

ITS Architecture

For the
Southern New Hampshire Planning Commission Region



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CHAPTER 1: EXECUTIVE SUMMARY

The Regional Intelligent Transportation Systems (ITS) Architecture for the Southern New Hampshire Planning Commission (SNHPC) Region is a roadmap for the integration of technology into the SNHPC transportation system during the next 10 years. The Architecture is a framework for the SNHPC region, rather than a system design or a plan for deployment, within which electronic information is organized. Based on the National ITS Architecture which provides a framework for ITS planning and integration, SNHPC has developed the Architecture to cover all modes in the region. The Architecture exhibits a shared vision of how the systems will work together in the future, sharing information and resources to provide a safer, more efficient transportation system for travelers in the region.

The Architecture is organized into the following sections:

1. Introduction to ITS and the Regional ITS Architecture.
2. Identification of the geographic boundary of the Architecture and stakeholders.
3. Description of ITS needs and associated services.
4. Documentation of the ITS system inventory.
5. Identification of the roles and responsibilities of participating agencies and stakeholders in the operation and implementation of the systems.
6. Description of functional requirement of the significant subsystems.
7. Interface requirements and information exchanges with planned systems and subsystems.
8. Identification of interagency agreements to implement the derived ITS architecture.
9. Identification of ITS standards supporting interoperability.
10. Prioritization of the projects for implementation of the ITS Architecture.
11. Using and maintaining the Architecture.

The geographic scope of the Architecture covers the SNHPC region, which includes the City of Manchester and 14 surrounding communities. Because the Architecture provides a ten-year view for ITS activities in the region, it addresses existing as well as planned ITS systems. Each transportation project is treated as an element of the overall transportation system, providing visibility into the relationship between individual transportation projects and ways to cost-effectively build an integrated transportation system over time. Projects are derived from a variety of transportation plans and information from stakeholders. The Architecture provides a broad range of ITS services, including traffic management, transit management, traveler information, emergency services, and maintenance and construction operations. In addition, the Architecture helps agencies to recognize and plan for functional requirements, operational roles and integration opportunities. As ITS technologies develop and the region's ITS needs change, the Architecture will be periodically updated.

CHAPTER 2: INTRODUCTION

The purpose of this document is to describe the development of the ITS Architecture for the SNHPC Region. This report describes ITS, ITS systems as well as the concept of the ITS Architecture and the methodology for the development of a regional Architecture. The document also outlines implementation of the ITS Architecture, its use and maintenance as well as what SNHPC hopes to accomplish through this project.

2.1 Intelligent Transportation Systems/ITS Architecture Defined

Broadband (high-speed internet) is broadly used in business as well as transportation system management and operations. A broadband connection, including a physical network that facilitates the transfer of information, has been introduced into ITS. Intelligent Transportation Systems have been defined as “the application of advanced sensor, computer, electronics, and communication technologies and management strategies – in an integrated manner – to improve the safety and efficiency of the surface transportation system”¹. The NHDOT Communication Diagram² shown in Figure 2.1 depicts ITS systems working in an integrated manner to improve the safety and efficiency of transportation systems. Increasing the safety and efficiency of transportation systems has been identified as a priority in the recently signed federal legislation, Fixing American’s Surface Transportation Act (FAST Act) as well as in the SNHPC Regional Transportation Plan.

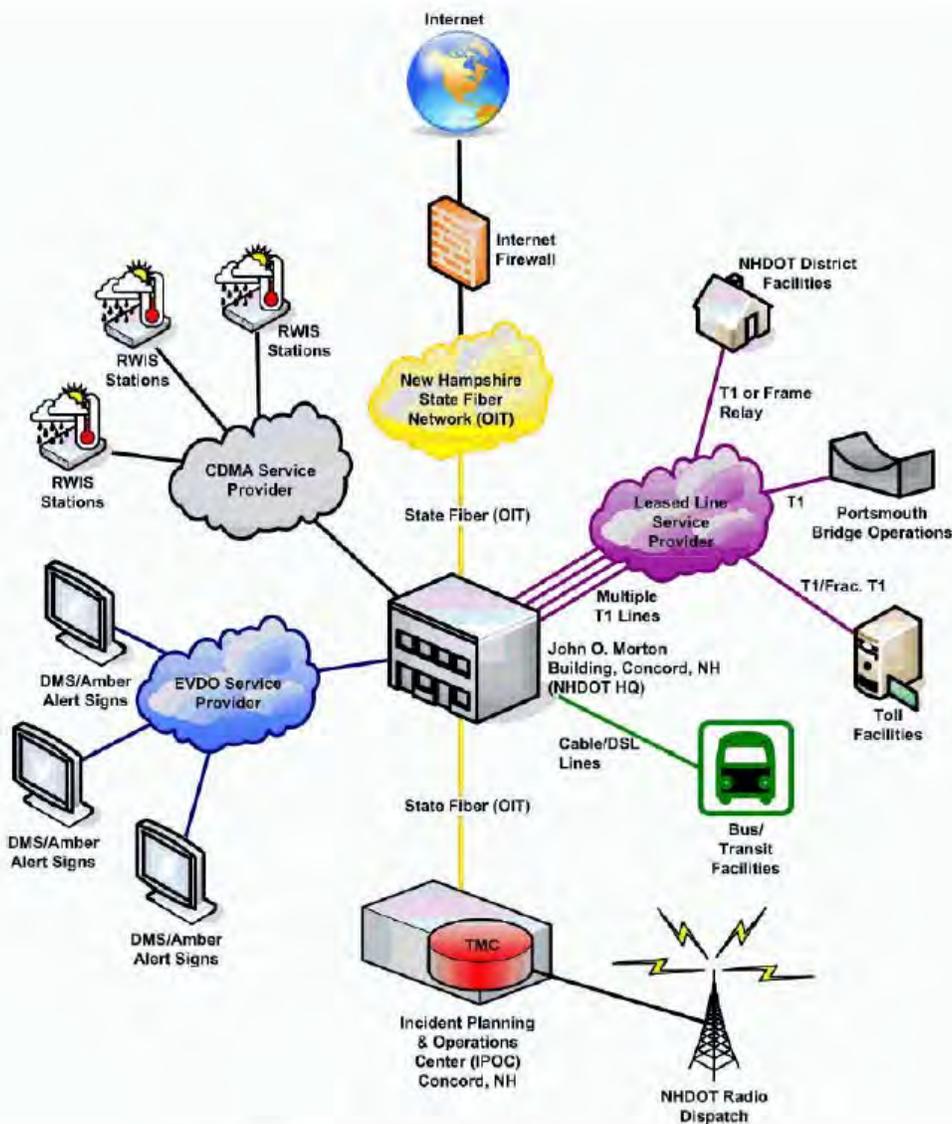
Examples of existing and planned ITS core technology systems in the SNHPC region include:

- Electronic Toll Collection – The Electronic Toll Collection (ETC) aims to eliminate the delay on toll roads by collecting tolls electronically. NH ETC (known as E-ZPass) has been in operation on the F.E. Everett Turnpike in Bedford and Hooksett since 2005. With this system, motorists carry electronic transponders in their vehicles that communicate with receivers at toll plazas. Tolls are deducted electronically from the accounts of motorists, eliminating the need to stop to pay tolls. The system also has the ability to detect and process violations. Open road tolling (ORT) or free-flow tolling is the collection of tolls on toll roads without the use of toll booths. ORT has operated on I-93 in Hooksett since 2013 and is planned for the F. E. Everett Turnpike in Bedford. This system reduces travel times and congestion at toll plazas.
- Transit Fare Collection – The transit fare collection system on Manchester Transit Authority (MTA) buses collects transit fares using electronic means.

¹ U.S. Department of Transportation, “Developing, Using, and Maintaining an ITS Architecture for Your Region”, October 12, 2001.

² New Hampshire Department of Transportation 5-year Strategic Plan, Transportation Systems, Management & Operations (TSM&O), July 2014.

Transit users use a traveler card or other electronic payment device to pay transit fares through the system. Data is processed, stored, and displayed on the transit vehicle.



NHDOT Communication Diagram (Statewide Communications Study)

Figure 2.1 NHDOT Communication Diagram

- Rest Area and Service Plaza Security – Surveillance and sensor devices are currently in operation at rest areas and service plazas throughout the state, including the I-93 Hooksett Visitor Centers, and at the Exit 4 and 5 bus terminals located on I-93 in Londonderry in the SNHPC region.
- I-93 Corridor Traffic Incident Management Plan (TIMP) – SNHPC has been involved in the planning process for the I-93 TIMP (2008), which is designed

to minimize the impacts of incidents on the I-93 corridor and surrounding communities and improve safety at incident scenes. The Technical Steering Committee (TSC) leads the efforts to promote and enhance the abilities of its State and Local partners to safely, effectively, and efficiently clear traffic incidents in the corridor while ensuring the safety of incident responders and the motoring public approaching and passing through the incident scene. Since 2001, the communities along the I-93 corridor (Salem, Windham, Derry, Londonderry, Manchester, as well as Methuen, MA), New Hampshire State Police (NHSP), New Hampshire Department of Transportation (NHDOT), and State Police and DOT officials from Massachusetts have been meeting to address a wide variety of traffic incident management issues.

Other examples of ITS technology include Dynamic Message Signage (DMS), public transit vehicle tracking, Closed Circuit Television (CCTV) Cameras, Road Weather Information System (RWIS), and traffic signal preemption and coordination. All ITS systems are designed around the concept that the ability to collect and distribute real-time data has positive impacts on the safety and efficiency of the transportation infrastructure. This is a benefit not only to those who use the transportation infrastructure but also for those who are responsible for the planning and maintenance of the infrastructure.

The maximum benefits of ITS technology will be realized through use in a systems framework where integration links the various ITS components. The format for the integration of ITS components into such a framework is referred to as ITS Architecture. The United States Department of Transportation (USDOT) has been maintaining the National ITS Architecture to current version 7.1 and the New Hampshire Department of Transportation (NHDOT) has completed Statewide ITS Architectures and a five-year strategic plan. SNHPC has been maintaining the ITS Architecture for the SNHPC region since it was initially developed in 2006.

The purpose of the ITS Architecture is to define, describe and provide the basis for interrelation of the various systems working together to provide transportation services. Additionally, the ITS Architecture provides definitions for the systems, the various types of information exchanged between them as well as the system interconnections used for the information exchange. The USDOT defines a Regional ITS Architecture as a "...specific regional framework for ensuring institutional agreement and technical integration for the implementation of ITS projects in a particular region". The Federal Highway Administration (FHWA) and the Federal Transit Administration (FTA) final rule and policy state that a regional ITS Architecture is required to define how the various systems and stakeholders will interact and operate.

The requirement stating that ITS projects which receive funding from the Highway Trust Fund must conform to the National ITS Architecture and appropriate standards was first established in the 1998 Transportation Equity Act for the 21st Century (TEA-21). Based on evidence from NHDOT and FHWA, a decision was made by the SNHPC that the interests of stakeholders in the region would be best served through the development of a regional ITS architecture. The following portions of this chapter describe the

development of the ITS Architecture for the SNHPC Region and the tasks that were required to complete the Architecture.

2.2 ITS Architecture for the SNHPC Region

The ITS Architecture for the SNHPC region was first developed in 2006. Since then the Architecture was updated biennially in conjunction with Transportation Improvement Program (TIP) and the Regional Transportation Plan for the Southern New Hampshire Planning Commission (Plan) updates. The SNHPC staff collected ITS inventory data for the 2006 Architecture through a survey from participating community Fire Departments, Police Departments, Highway Departments, Departments of Public Works, the Cooperative Alliance for Regional Transportation (CART), and the MTA. A similar survey was conducted during the 2015 update as well. Stakeholders that participated in the survey are listed in Appendix H. The survey covered public transit, traveler information, traffic management, emergency management, and maintenance and construction management. The survey data were used to establish an ITS database using Turbo Architecture software.

The ITS Architecture for the SNHPC Region provides a tool for planning and implementing various transportation projects for this region. Additionally, the architecture represents a framework for projects that regional stakeholders wish to complete. This framework ensures the projects are accomplished in an efficient fashion where proper coordination is obtained and institutional and funding issues are resolved in a timely fashion. Most importantly, the ITS Architecture for the SNHPC Region enables stakeholders to plan ITS projects that support regional goals and maximize the integration of projects. The document and the projects developed because of it become an integral part of the MPO planning processes and also serve as essential tools for updating documents such as the SNHPC TIP and Plan. The projects included in the ITS Architecture for the SNHPC region include those slated for immediate implementation as well as other more long-range projects. It is assumed that, in order to maintain consistency between this document and the Long-Range Plan, the architecture identifies those projects that could be implemented over the next ten years.

2.2.1 Geographic Area

SNHPC has been serving as the lead organization for the development and maintenance of the ITS Architecture. This is appropriate given the SNHPC's role as MPO for the greater Manchester area, as this ensures integration of the architecture into the ongoing planning processes that the agency is responsible for. As a result, the Regional ITS Architecture will include the SNHPC municipalities of Auburn, Bedford, Candia, Chester, Deerfield, Derry, Francestown, Goffstown, Hooksett, Londonderry, Manchester, New Boston, Raymond, Weare and Windham.

Due to a 2010 change in the Federal Urbanized Area boundaries, Allenstown, Bow, and Pembroke are now included in the Manchester UZA, despite not being a part of the SNHPC region. These three towns will be incorporated in the next Architecture update anticipated in 2018.

2.2.2 Goal of the ITS Architecture for the SNHPC Region

SNHPC, along with other states and regions throughout the country, is increasingly challenged with the task of planning, implementing and maintaining a safe and efficient transportation infrastructure in the face of increasing demands, rising costs and decreasing funding availability. This situation demonstrates the need for planning and implementation of projects in an efficient and coordinated manner, involving the participation of various agencies at the local, regional, State and Federal levels. The development of the regional ITS Architecture will promote planning and implementation of the transportation infrastructure in an organized and coordinated fashion. Additionally, the completion of the Architecture will allow for the sharing of information and coordination of activities among transportation systems to efficiently and effectively operate and illustrate the existing and proposed integration of the infrastructure, highlight additional needs for further integration and provide a framework for stakeholders to formulate goals and strategies designed to address transportation issues.

2.3 Conform to the National ITS Architecture

The Architecture has been updated to conform to the National ITS Architecture, Version 7.1.

2.4 The Statewide and Adjacent MPOs Regional ITS Architecture

Nashua Regional Planning Commission (NRPC) Regional ITS Architecture - The Nashua Regional ITS Architecture covers the 12 municipalities that make up NRPC: Amherst, Brookline, Hollis, Hudson, Litchfield, Lyndeborough, Merrimack, Milford, Mont Vernon, Nashua, Pelham and Wilton. Additional information on the Nashua Regional ITS Architecture is located on the website:

<http://www.nashuarpc.org/files/8413/9473/7156/ITSPlan.pdf>

Strafford-Rockingham Regional ITS Architecture - The geographic area for the Strafford-Rockingham Regional ITS Architecture consists of the geographic areas which make up Strafford Regional Planning Commission region and the Rockingham Planning Commission region. Additional information on the Strafford-Rockingham Regional ITS Architecture is located on the website:

http://www.strafford.org/cmsAdmin/uploads/TTR_Final_Report_Final_2012-06-18.pdf

New Hampshire Department of Transportation (NHDOT) 5-Year Strategic Plan – The NHDOT developed a five-year strategic plan for Transportation Systems, Management & Operations (TSM&O) in 2014. The plan provides guidance on the deployments and integrations of the ITS program over the next five years (2014-2019). Additional information on the plan is located at:

http://www.nashuarpc.org/files/1814/3351/2058/TSMO_Strategic_Plan_FINAL_2015w_App.pdf

CHAPTER 3: STAKEHOLDER IDENTIFICATION

Agencies that own or operate ITS systems and other agencies with an interest in regional transportation issues are stakeholders. Stakeholders play key roles in developing a complete and accurate ITS Architecture for the SNHPC Region.

3.1 Identified Stakeholders

Stakeholder participation in the development of a regional ITS architecture is essential. A diverse body of stakeholders ensures those agencies responsible for various ITS elements are included in the process. Additionally, participation of the stakeholders will also be essential to the development and implementation of the architecture as well as for long-range maintenance.

Stakeholder participation is key for several reasons. This group provides continuity to the development and maintenance efforts for the regional ITS architecture. The group also provides an important set of contacts for the architecture developers. In addition, the stakeholder group is usually made up of representatives of agencies that will be vitally affected by the ITS architecture when it is implemented.

For the SNHPC Region, a comprehensive list of stakeholders is presented in Appendix B.

3.2 Stakeholder Level of Involvement/Core Stakeholders

The identified stakeholders have varying levels of involvement in the implementation of the ITS Architecture for the SNHPC Region. Experience in other regions has shown the success of the regional ITS architecture depends on the participation by a diverse set of stakeholders in a core group. A decision was made to form a Steering Committee from this stakeholder list presented in Appendix B. The Steering Committee provided direct input for the development of the ITS Architecture for the SNHPC Region. The following is a listing of the members of the Steering Committee for the development of the ITS Architecture for the SNHPC Region:

Chief
Allentown Police Department
40 Allentown Road
Allentown, NH 03275
(603) 485-9500

Chief
Bedford Police Department
55 Constitution Drive
Bedford, NH 03110
(603) 472-5113

Chief
Bedford Safety Complex
55 Constitution Drive
Bedford, NH 03110
(603) 792-1370

Supervisor of Public Works
Town of Bedford
19 Chubbuck Road
Bedford, NH 03110
(603) 472-3070

Chief
Bow Police Department
12 Robinson Road
Bow, NH 03304
(603) 228-0511

Cooperative Alliance for Regional
Transportation (CART)
Executive Director
33 Geremonty Drive
Salem, NH 03079
603-458-6087

ITS/Safety Engineer
Federal Highway Administration
19 Chenell Drive, Suite 1
Concord, NH 03301
(603) 228-3057, ext. 108

Transportation Planner
Central NH Regional Planning Commission
28 Commercial Street
Concord, NH 03301
(603) 226-6020

Captain
Derry Police Department
One Municipal Drive
Derry, NH 03038
(603) 432-6111

Senior Transportation Planner
Rockingham Planning Commission
156 Water Street
Exeter, NH 03833
(603) 778-0885

Public Works Director
Town of Goffstown
404 Elm Street
Goffstown, NH 03045
(603) 497-3617

Chief
Emergency Management Center Director
15 Legends Drive
Hooksett, NH 03106
(603) 623-7272

Chief
Hooksett Fire Department
15 Legends Drive
Hooksett, NH 03106

President and Owner
Concord Trailways
Seven Langdon Street
Concord, NH 03301
(603) 228-3535

Easter Seals
555 Auburn Street
Manchester, NH 03103
(603) 623-8863

TMC/ITS Bureau Administrator
NH Department of Transportation
P.O. Box 483
Concord, NH 03302-0483
(603) 271-2291

Chief
Derry Central Fire Station
131 East Broadway
Derry, NH 03038
(603) 432-6121

Highway Coordinator
Derry Highway Department
14 Manning Street
Derry, NH 03038
(603) 432-6144

Executive Director
Strafford Regional Planning Commission
150 Wakefield Street # 12
Rochester, NH
03867 (603) 994-3500

Chief
Goffstown Police Department
326 Mast Road (Route 114)
Goffstown, NH 03045
(603) 497-4858

Chief
Goffstown Fire Department
18 Church Street
Goffstown, NH 03045
(603) 497-3619

Administrative Lieutenant
Hooksett Police Department
15 Legends Drive
Hooksett, NH 03106

(603) 623-7272

Assistant Director
Southwest Regional Planning Commission
37 Ashuelot Street
Keene, NH 03431
(603)357-0557

Londonderry Police Department
268-A Mammoth Road
Londonderry, NH 03053
(603) 432-1118

Chief
Londonderry Fire Department
280 Mammoth Road
Londonderry, NH 03053
(603) 432-1124

Director
Manchester Highway Department
475 Valley Street
Manchester, NH 03103
(603) 624-6444

Communications Manager
Manchester Police Department
405 Valley St,
Manchester, NH 03103
(603) 668-8711

Chief
Windham Police Department
4 Fellows Road
Windham, NH 03087
(603) 434-5577

Chief
Pembroke Police Department
247 Pembroke Street
Pembroke, NH 03275
(603) 485-9173

Highway Agent
Windham Highway Department
2 Ledge Road, Unit 2
Windham, NH 03087
(603) 216-5676

Executive Director
Manchester Transit Authority
110 Elm Street
Manchester, NH 03101

(603) 624-1560, ext. 136

Highway Manager
Town of Hooksett
210 West River Road
Hooksett, NH 03106
(603) 668-8019

Transportation Planner
Southwest Regional Planning Commission
37 Ashuelot St, Keene, NH 03431
(603)357-0557

Assistant Director
Londonderry Public Works & Engineering
268-B Mammoth Road
Londonderry, NH 03053
(603) 432-1100, x-193

Director
Manchester-Boston Regional Airport
One Airport Road, Suite 300
Manchester, NH 03103
(603) 624-6539

Deputy Fire Chief
Manchester Fire Department
100 Merrimack Street
Manchester, NH 03101-2208
(603) 669-2256, ext. 3404

Parking Division Manager
25 Vine Street
Manchester, NH 03101
(603) 624-6580

Chief
Windham Fire Department
3 Fellows Road
Windham, NH 03087
(603) 434-4907

Transportation GIS Planner
Nashua Regional Planning Commission
9 Executive Park Dr., Ste, 201
Merrimack, NH 03054
(603) 424-2240, ext. 20

President & CEO
Greater Manchester Chamber of Commerce
54 Hanover Street
Manchester, NH 03101

(603) 623-8801, ext. 612

Senior Transportation Planner
SNHPC
438 Dubuque Street
Manchester, NH 03038
(603) 669-4664

Executive Director
SNHPC
438 Dubuque Street
Manchester, NH 03038
(603) 669-4664

(603) 666-6600

Principal Transportation Planner
SNHPC
438 Dubuque Street
Manchester, NH 03038
(603) 669-4664

CHAPTER 4: ITS INVENTORY

An inventory of existing and planned ITS systems supports the development of interface requirements and information exchanges within these systems. To develop a comprehensive inventory of these existing and planned systems, a list of questions dealing with arterial management, maintenance and construction operations, public transportation, and emergency management was sent to the regional stakeholders. A list of agencies that responded to the survey is presented in Appendix H.

This chapter presents results of development of an inventory for the ITS Architecture for the SNHPC Region. The inventory consists of:

- A listing of regional ITS elements
- Information regarding the stakeholder who owns and/or operates the element
- Functional description of the elements
- Whether the system currently exists or is planned.

An element is a name used by stakeholders to describe an ITS system or portion of the system. The elements included in this section were identified through stakeholder input and a review of the New Hampshire Statewide ITS Architecture and Strategic Plan. The inventory includes ITS elements currently in place and future elements that have been identified. Subsystems correspond to the actual hardware and software that actually carry out the ITS functions. They are the principal structural elements of the physical architecture and provide a physical representation (although not a detailed design) of important ITS interfaces and major system components.

The elements, stakeholders, entity, description, and status that comprise the ITS inventory is detailed in Appendix C. Based on the National ITS Architecture, subsystem and terminator are defined as:

Subsystems: Subsystems are individual pieces of the Intelligent Transportation System defined by National ITS Architecture. Subsystems are grouped into four classes: Centers, Fields, Vehicles, and Travelers. For example, subsystems are the Traffic Management Subsystem, the Vehicle Subsystem, and the Roadway Subsystem. These correspond to the physical features such as traffic operations centers, automobiles, and roadside signal controllers. Due to the close connections between the physical world and the subsystems, subsystem interfaces are prime candidates for standardization.

Terminator: Terminators define the boundary of an architecture. The National ITS Architecture terminators represent the people, systems, and general environment that interface to ITS. Although the interfaces between terminators and the subsystems and processes within the National ITS Architecture are defined, no functional requirements are allocated to terminators. The logical architecture and physical architecture views of the National ITS Architecture have exactly the same set of terminators. The only

difference is that logical architecture processes communicate with terminators using data flows, while physical architecture subsystems use architecture flows.

CHAPTER 5: REGIONAL NEEDS AND ASSOCIATED SERVICES

The introduction to the ITS Architecture for the SNHPC Region defines ITS systems as “the application of advanced sensor, computer, electronics, and communication technologies and management strategies – in an integrated manner – to improve the safety and efficiency of the surface transportation system”. The planning and implementation of specific ITS technologies outlined in earlier sections of this document are designed to address the transportation needs of the region. The first step in this process is to ensure the transportation needs of the region are adequately identified and defined.

The purpose of this chapter is to identify the transportation needs of the SNHPC region and discuss how ITS technology is used to address them. Here the transportation needs of the region are presented through 1) statements of regional transportation need and 2) statement of the benefits of addressing these needs through the increased use of ITS technology. The transportation needs discussed in this chapter have been developed using feedback received from regional stakeholders and from an evaluation of the regional transportation goals and additional information included in the SNHPC Regional Transportation Plan (Plan). The regional transportation needs are presented and discussed in the first portion of this chapter and this information is followed by a discussion of the various ITS service packages designed to address these needs.

5.1 Transportation Needs

The following transportation needs identified in the SNHPC region are discussed below:

1) Improved Access to Information

ITS technologies provide numerous opportunities to provide information, both historic and in real time, to improve the operation, safety and security of the transportation infrastructure. Benefits of improved access to information through ITS technology are realized for those who use the transportation system as well as for those involved in its planning, implementation and maintenance. With access to information, the accessibility and efficiency of an existing highway system can be improved through mitigation of traffic congestion. Improved access to information, specifically pertaining to the alternative transportation options available in a region, is the first step toward increasing use of these modes. Additionally, increased use of ITS technology to provide this information will also improve coordination between the various modes and components of the transportation system to create opportunities for efficient, convenient and accessible transportation services.

Many existing and planned ITS improvements in the State are directed toward addressing the need for improved access to information for travelers, planners and others responsible for implementation and maintenance. ITS technology such as closed circuit television (CCTV) cameras, dynamic message signs (DMS), variable speed limit signs (VSL) and road weather information systems (RWIS) can be deployed to monitor the transportation

infrastructure, gather information and communicate this information to the traveling public. Travel information such as weather conditions, traffic delays and transit schedule information can be made available to travelers through social media such as e-mail, Twitter and Google. The NHDOT Traffic Management Center (TMC), which began operations in 2007, also provides real time traffic information throughout the State via a 511 website (511nh.com) and telephone number 511.

The benefits of addressing the need for improved access to information through the increased use of ITS technology in the region are:

Mitigation of Traffic Congestion – ITS technologies capable of mitigating traffic congestion and improving arterial and highway traffic flows are already in place in the SNHPC region. Deployment of ITS technology has been included in the widening of the I-93 corridor in the SNHPC region. CCTV capabilities are being included in various construction contracts as a means to mitigate traffic congestion and to implement ITS technology in a cost effective manner as part of the Salem to Manchester I-93 widening project. ITS improvements will enable the TMC to more effectively monitor traffic on the corridor. The TMC addresses Statewide traffic congestion as well as congestion on the I-93 corridor by monitoring weather conditions and providing this information to motorists, improving traffic flows to, from and around special events and managing regularly occurring traffic congestion. Improvements in incident management will result in a reduction in secondary incidents at accident scenes. Additionally, Corridor Patrols were implemented on the I-93 corridor in 2008 to reduce the impact of minor traffic incidents. Corridor Patrols reduce traffic congestion through timely accident/incidence response and by providing information directly to the TMC.

Historically, the I-93 corridor in Hooksett has experienced traffic congestion during peak weekday travel times as well as during summer weekends and holidays. The implementation of Open Road Tolling on I-93 in Hooksett is reducing traffic congestion and improving safety through the use of a combination of conventional toll plazas for cash customers and highway speed toll collection for E-Z Pass patrons. Traffic flow is improved through the separation of cash and E-Z Pass customers and through a reduction in unanticipated lane switching at cash toll lanes. These Open Road Tolling improvements have significantly increased the capacity of the tolling facilities from approximately 400 – 450 vehicles per hour for cash lanes to approximately 1,800 vehicles per hour for each open road tolling lane.

Increased Use of Alternative Modes of Transportation – Improvements in access to information on travel choices are instrumental in increasing the use of alternative modes of transportation such as public transit, Community Transportation as well as bicycle and pedestrian facilities. Increasingly, transit systems have the capability to disseminate real-time information on arrival times, schedules and trip planning. This information is then available to travelers via

smartphones, tablets and home computers. The Manchester Transit Authority provides trip planning capabilities for travelers via the MTA website (<http://nhdot-mta.hbssweb.com:3900/TripPlanner/tp.aspx>). The availability of this information increases the likelihood that travelers will choose the MTA for their trip. As a longer term improvement, MTA is also considering ITS technology to provide real time bus arrival information to improve traveler access to information. In addition to providing real-time traffic information updates on roadwork, accidents and lane closures, the NHDOT 511 (511nh.com) system also acts as a clearinghouse for information on alternative modes of transportation throughout the State including public transit, ridesharing, park and ride services and train schedules.

The use of alternative modes of transportation such as fixed route transit and Community Transportation demand response paratransit is also increased through vehicle monitoring and tracking using Automated Vehicle Location (AVL) systems. When real-time information on vehicle location and schedule adherence is available to the traveler, it increases the efficiency and quality of the service and also the probability that the mode will be chosen for the trip. MTA currently uses AVL technology to track its transit vehicles. Data on vehicle location can also be provided through Global Positioning Systems (GPS) in the vehicle or through a two-way wireless communication link with a transit facility. For fixed route systems, beacons along a route can also be employed to facilitate position determination and provide communications.

Improved Coordination of Community Transportation – Community Transportation refers to all transportation resources in a community that are available to help meet the mobility needs of a community including groups such as the elderly, those with physical disabilities and others for whom operating passenger vehicles is not feasible from a physical or economic standpoint. Community Transportation can include both public and private services, such as conventional public transit, public and private shuttles for seniors, vans owned/operated by churches or other community organizations as well other services operated by volunteers. Community Transportation services in New Hampshire generally lack the coordination that would improve efficiency and reduce duplication. ITS capabilities such as AVL systems and other enhanced vehicle tracking are designed to improve service coordination. Service coordination and efficiency could also be enhanced through the use of trip sharing software providing access to information on rides being requested. Improvements in service coordination combined with real-time information on schedule adherence will increase the probability that Community Transportation resources will be chosen for a trip. Travelers can access information collected by ITS elements via smartphones, tablets, and home computers through high-speed broadband.

Additionally, the full potential of ITS technology will be realized through partnering with public and private organizations and educating the public about the existence and benefits of ITS. The NHDOT ITS Strategic Plan includes establishing a Public Outreach Committee and ITS Awareness Campaign as part of their ITS program.

2) Increased Safety and Security of the Transportation System

ITS technology, particularly when used through an integrated approach formulated through the regional ITS architecture, is a powerful tool available to the public and private sector to address the safety and security needs of the transportation infrastructure. Federal Transportation Legislation planning factors, established in an effort to ensure that impacts associated with health, safety, welfare and the environment are properly weighed in the public interest, include:

- Increase the safety of the transportation system for motorized and non-motorized users;
- Increase the security of the transportation system for motorized and non-motorized users;

As mentioned in the previous section, many ITS technologies include monitoring and surveillance capabilities. These technologies address safety and security concerns for both the general public as well as transit and freight operators relating to unanticipated events impacting network efficiency. These capabilities enable the private and public sectors to address safety and security concerns relating to individual vehicles and facilities as well as other infrastructure (i.e. bridges, tunnels, work zones, transit stops) susceptible to planned and unplanned incidents and events. ITS technology in New Hampshire such as 511nh.com and enhancements on the I-93 Corridor provide real-time information to drivers and supervisory personnel facilitating rapid reaction and appropriate deployment of resources in response to accidents and other situations. These specialized ITS technologies also facilitate responses to safety and security concerns arising from incidents involving hazardous materials.

ITS technologies are essential in maintaining the safety and security of the transportation infrastructure during planned events such as public gatherings and roadway construction. These technologies can aid in facilitating roadway patrols, increasing safety in work zones and responding to requests for emergency routing assistance.

ITS technology is essential to the public transit industry for many safety and security facets of operations and management. In addition to system monitoring and surveillance at transit stops and transit centers, ITS technology can also increase system safety and security by monitoring individual vehicles and enabling tracking variables such as on-board vehicle diagnostics, vehicles speeds and performance. Transit safety and security are also enhanced through improved communication between drivers, dispatchers, transit centers and the general public.

The benefits of addressing the need for improved safety and security of the transportation system through the increased use of ITS technology in the region are:

- Improved Safety and Security of the Regional Roadway Network – Implementation of ITS technology is currently improving the safety and security of the roadway network in the region. Traveler safety on the I-93 corridor is benefitting from the increased use of ITS technology in the areas of incident response, congestion monitoring and capabilities for traffic diversions and alternative route planning. Enhanced ITS capabilities at the Hooksett Open Road Tolling facility have dramatically improved safety and security for travelers in the region. NHDOT's plan to convert semi-permanent DMS (Dynamic Message Signage) to permanent DMS systems with power and communications systems will improve traveler information and enhance capabilities to monitor congestion, traffic incidents as well as roadside maintenance and construction activities.
- Improved Emergency Operations Capabilities – Increased utilization of ITS technology in the region is improving the safety and security of the transportation system by facilitating the development and effectiveness of emergency operations planning. The City of Manchester Central Fire Station includes an Emergency Operations Center that serves as a communications hub with information and decisions flowing through an Emergency Management Director. This information is then disseminated to other departments and local stakeholders. Existing agreements developed to aid in the development of ITS in the SNHPC region and future agreements to implement ITS projects in the Architecture are included in Appendix F. Emergency operations capabilities in the SNHPC region are enhanced through interagency agreements covering mutual aid activities and support. Projects covered by these agreements would include activities such as resource planning, resource dispatch and recovery activities related to traffic incident management. These agreements set expectations and define relationships among agencies for planning the success of related tactical and support activities.
- Improved Safety and Security of Public Transit – The benefits of ITS capabilities such as vehicle monitoring and tracking using AVL systems not only increases the efficiency of alternative modes of transportation but also enhances the safety and security of these modes. Constant communication between transit vehicles and dispatch facilities is an important factor in ensuring the safety and security of the vehicles as well as the driver and passengers. MTA has begun installing on-board equipment providing detailed information on vehicle speed, vehicle direction and the status of mechanical systems. These technologies enable monitoring of vehicles even if a driver is unable to communicate. Transit operations in the I-93 corridor are benefitting

from the continuation of CCTV deployment being accomplished through a “mainstreaming” approach. The “mainstreaming” approach involves incorporating ITS features such as CCTV into roadway and bridge construction as opportunities arise. In this manner, ITS improvements can be implemented in a more cost-effective fashion. ITS technology also continues to play an important role in safety and security of other capital such as operations centers, maintenance facilities and transit stops.

3) Improved Efficiency/Management of the Transportation System

ITS technologies offer many opportunities to increase the efficiency and cost-effectiveness of various components of transportation infrastructure through improved system management. These benefits can be realized in both the public (i.e. government/public transit vehicle fleets and facilities) and private sector (i.e. freight vehicle fleets and facilities). Increased efficiency through ITS technology results in lower costs and increased benefits for the public, government agencies and those responsible for the planning, implementation and maintenance of transportation infrastructure.

The benefits of ITS technology hold significant promise for increasing the efficiency and cost-effectiveness of businesses and organizations managing public or private vehicle fleets. All vehicle fleets will benefit from improvements in maintenance and route coordination available through the increasing use of coordinated ITS technology. As mentioned earlier, fleet managers can also more efficiently modify routings and plan route deviations in response to changes in conditions or unanticipated incidents. ITS technology also enables the freight industry to more efficiently monitor shipments and streamline completion of required administration such as vehicle licensing, customs arrangements and vehicle and cargo insurance.

As mentioned earlier, the public transit industry also benefits from the use of ITS technology. ITS technology has the capability to facilitate the efficiency of operations through improvements in vehicle tracking, routing, scheduling and coordination with other modes. The efficiency of fare collection can also be improved through the use of ITS technology, and additional benefits in vehicle maintenance, administration, vehicle/facility security can also be derived. As a longer term improvement, MTA is considering development of fare kiosks to improve the efficiency of their services.

The benefits of addressing the need for improved efficiency and management of the transportation system through the increased use of ITS technology in the region are:

- Increased efficiency of public transit in the region – ITS technology is essential in the environment where funding for transportation projects is becoming increasingly difficult to obtain and competition for funding is making it difficult to improve and maintain existing infrastructure. Improvements in ITS technology implemented by MTA such as enhanced fare

collection systems, AVL and GPS enable MTA to more efficiently manage operations of existing systems. Future ITS enhancements such as the deployment of Road Weather Information Systems (RWIS) have the capacity to further improve the efficiency of transit operations by providing more localized weather monitoring and forecasting. Use of RWIS data will improve the efficiency of transit services by reducing reaction times for weather events. Additionally, other functions such as transit maintenance, management and finance are also enhanced through the implementation of ITS technology.

- Increased efficiency of freight movement in the region - The efficient movement of freight within the SNHPC region is essential to sustain the region's economic competitiveness and to maintain the quality of life for those who live and work in the area. The overwhelming majority of freight movement in the region is carried by trucks on the regional roadway network. These movements occur in areas of growth and development such as Manchester-Boston Regional Airport/South Willow Street (manufacturing, wholesale distributors, retail sales), downtown Manchester (offices, retail sales, entertainment, and services) and NH Route 28 in Derry (retail sales, manufacturing).

In addition to ITS enhancements addressing traffic congestion and incidents impacting traffic flows, other available technologies can also be used to improve the flow of freight in the region. The next generation of smart phone applications providing traveler information through hands-free and eyes-free technology will facilitate the efficient movement of freight by making this information available in a more accessible format. Additionally, the Advanced Traffic Management System/Advanced Traveler Information System being developed by New Hampshire, Maine and Vermont will also improve dissemination of traveler information.

Available ITS technology in the areas of fleet and freight administration, Commercial Vehicle Operations and vehicle administration have the potential to improve the efficiency of freight movements in the region. ITS technology has the capability to reduce the costs of freight administration and vehicle inspection for carriers and government agencies through the implementation of features such as automatic vehicle identification systems, computerized records and digital communications technologies.

5.2 Service Packages

The National ITS Architecture has designed 97 service packages in eight service areas which are segments of the Physical Architecture, addressing specific services like surface street control. The eight service areas include Archived Data Management; Public Transportation; Traveler Information; Traffic Management; Vehicle Safety; Commercial Vehicle Operations; Emergency Management; and Maintenance & Construction Management. Several different subsystems, equipment packages, terminators, and

architecture flows within a service package work together to provide the desired service. Specific service packages are identified in the Regional ITS Architecture to meet the regional needs. Detailed service packages with underlying graphics and definitions are provided on the <http://www.iteris.com/itsarch/html/mp/mpindex.htm> website. The physical and logical architecture components associated with each service package and the user service relationships are included in the link as well.

5.3 Desired Services

The previous section of this chapter identified three principal transportation needs within the SNHPC region. The remainder of this chapter will present the ITS service packages that have the potential to address these needs. These service packages represent the desired ITS services for this region. Many of the service packages in this section have been included to coordinate with the requirements of the NHDOT Statewide ITS Architecture and Strategic Plan.

1) Improved Access to Information

- Network Surveillance (ATMS01) - see NHDOT ITS Plan
- Traffic Probe Surveillance (ATMS02) - see NHDOT ITS Plan
- Traffic Signal Control (ATMS03)
- Traffic Information Dissemination (ATMS06) – see NHDOT ITS Plan
- Regional Traffic Management (ATMS07) – see NHDOT ITS Plan
- Traffic Incident Management System (ATMS08) – see NHDOT ITS Plan
- Broadcast Traveler information (ATIS01) – see NHDOT ITS Plan
- Interactive Traveler Information (ATIS02) – see NHDOT ITS Plan
- Transportation Operations Data Sharing (ATIS06) - see NHDOT ITS Plan
- Travel Services Information and Reservation (ATIS07) – see NHDOT ITS Plan
- Emergency Routing (EM02)
- Roadway Service Patrols (EM04)
- Wide-Area Alert (EM06) - see NHDOT ITS Plan
- Early Warning System (EM07)
- Disaster Response and Recovery (EM08)
- Evacuation and Reentry Management (EM09)
- Disaster Traveler Information (EM10)
- ITS Data Mart (AD1) – see NHDOT ITS Plan
- ITS Data Warehouse (AD2) – see NHDOT ITS Plan
- Multi-Model Coordination (APTS07)
- Transit Traveler Information (APTS08)
- Road Weather Data Collection (MC03)
- Weather Information Processing and Distribution (MC04)
- Maintenance and Construction Activity Coordination (MC10)

2) Increased Safety and Security of the Transportation System

- Network Surveillance (ATMS01) - see NHDOT ITS Plan
- Standard Railroad Grade Crossing (ATMS13)
- Parking Facility Management (ATMS16)
- Emergency Call-Taking and Dispatch (EM01)
- Emergency Routing (EM02)
- Mayday and Alarms Support (EM03)
- Roadway Service Patrols (EM04)
- Transportation Infrastructure Protection (EM05)
- Wide-Area Alert (EM06) - see NHDOT ITS Plan
- Early Warning System (EM07)
- Transit Vehicle Tracking (APTS01)
- Transit Security (APTS05)
- Transit Fleet Management (APTS06)
- Multi-Modal Coordination (APTS07)
- Work Zone Management (MC08)
- Work Zone Safety Monitoring (MC09)
- Maintenance and Construction Activity Coordination (MC10)

3) Improved Efficiency/Management of the Transportation System

- Traffic Information Dissemination (ATMS06) – see NHDOT ITS Plan
- Regional Traffic Management (ATMS07) - see NHDOT ITS Plan
- Traffic Incident Management System (ATMS08) - see NHDOT ITS Plan
- Electronic Toll Collection (ATMS10) – see NHDOT ITS Plan
- Parking Facility Management (ATMS16)
- Regional Parking Management (ATMS17)
- Interactive Traveler Information (ATIS02) – see NHDOT ITS Plan
- Travel Services Information and Reservation (ATIS07) – see NHDOT ITS Plan
- Emergency Call-Taking and Dispatch (EM01)
- Emergency Routing (EM02)
- Mayday and Alarms Support (EM03)
- Roadway Service Patrols (EM04)
- Transit Vehicle Tracking (APTS01)
- Transit Fixed-Route Operations (APTS02)
- Demand Response Transit Operations (APTS03) - MTA
- Demand Response Transit Operations (APTS03) - CART
- Transit Fare Collection Management (APTS04)
- Transit Security (APTS05)
- Transit Fleet Management (APTS06)
- Multi-Modal Coordination (APTS07)
- Transit Traveler Information (APTS08)
- Maintenance and Construction Vehicle and Equipment Tracking (MC01)

- Maintenance and Construction Vehicle Maintenance (MC02)
- Road Weather Data Collection (MC03)
- Weather Information Processing and Distribution (MC04) – see NHDOT ITS Plan
- Winter Maintenance (MC06)
- Roadway Maintenance and Construction (MC07)
- Work Zone Management (MC08)
- Maintenance and Construction Activity Coordination (MC10)
- Electronic Clearance (CVO03) – see NHDOT ITS Plan
- CV Administrative Processes (CVO04) – see NHDOT ITS Plan
- Weigh-In-Motion (CVO06) - see NHDOT ITS Plan
- Roadside CVO Safety (CVO07) – see NHDOT ITS Plan

CHAPTER 6: OPERATIONAL CONCEPT

Within the ITS Architecture for the SNHPC Region, operational concepts are defined as the roles and responsibilities of the regional stakeholders in the implementation and operation of the regional ITS systems. The purpose of the operational concept is to provide stakeholders with a basic understanding of these roles and responsibilities and their relation to the regional stakeholders. Operational roles and responsibilities as well as implementation roles and responsibilities are presented in this chapter.

6.1 Operational Roles and Responsibilities

High-level definitions presenting information flows between stakeholders for each ITS Service package are presented in this section. The operational roles and responsibilities are presented in Appendix D. When operational roles and responsibilities are included in the Statewide Architecture, SNHPC will be responsible for coordinating the two Architectures.

6.2 Implementation Roles and Responsibilities

Stakeholders in the SNHPC region will ultimately be responsible for the implementation of the ITS systems and technologies described in the Architecture. This is because there is no centralized agency in the region responsible for implementation. Despite the fact that regional needs and the availability of funding will guide the implementation of ITS technologies, stakeholders are advised to be active in the coordination for this implementation through the guidelines included in this document. Table 6.1 below identifies the different divisions of the major SNHPC Stakeholders that have a role in ITS.

Table 6.1 Implementation Roles and Responsibilities

Agency	Implementation Role and Responsibility
Southern New Hampshire Planning Commission	<ul style="list-style-type: none"> • SNHPC regional needs assessment. • Develop TIP and Regional Transportation Plan. • Assist Communities in applying for Federal funds through NHDOT. • Assist with prioritization of STP/NHS funding. • Work with NHDOT on prioritizing FTA funding. • Assist institutional relationships. • Coordinating role between Municipalities/State. • Implement MPO projects through NHDOT.
New Hampshire Department of Transportation	Refer to the Statewide ITS Architecture.
Manchester Transit Authority	<ul style="list-style-type: none"> • Implement ITS related to the transit system. • Coordinate with SNHPC on future needs and desired services.
Cooperative Alliance for Regional Transportation (CART)	<ul style="list-style-type: none"> • Implement ITS related to the transit system. • Coordinate with SNHPC on future needs and desired services.
SNHPC Communities – Departments of Public Works	<ul style="list-style-type: none"> • Implement ITS on local roads in collaboration with MPO/NHDOT. • Coordinate with SNHPC on future needs and desired services.
Municipal emergency operations centers (Fire, Police, and Ambulance)	<ul style="list-style-type: none"> • Procure equipment through Division of Administration. • Implement ITS within public safety sector. • Coordinate with SNHPC on future needs and desired services.
Manchester Traffic Department	<ul style="list-style-type: none"> • Coordinate signal systems within the City of Manchester. • Implement regional surface street control systems in the City of Manchester.
Manchester Parking Department	<ul style="list-style-type: none"> • Implement ITS related to parking system. • Provides electronic monitoring and management of parking facilities.

CHAPTER 7: FUNCTIONAL REQUIREMENTS

Functional requirements must be addressed within the structure of the regional ITS architecture. Functional requirements are defined as the tasks and activities that a subsystem contributes to an ITS application. They help to define the scope and requirements of individual projects to identify common functions and reduce duplication. The purpose of this chapter is to describe the required functionalities for the various subsystems in the SNHPC Regional ITS Inventory. A listing of subsystems and high-level functional requirements for regionally significant systems is included in Appendix E. The requirements included in Appendix E are linked to current and planned ITS systems defined in Chapter 4.

CHAPTER 8: INTERCONNECTS AND INFORMATION FLOWS

Federal rules and policies require that interface requirements and information exchanges with planned and existing systems must be addressed in a regional ITS architecture. Interface requirements define interconnections between ITS systems while information exchanges identify information to be exchanged between ITS systems. The purpose of identifying and documenting these various relationships is to illustrate common connections and flows, and identify opportunities for collaboration and cooperation between various stakeholders.

8.1 ITS Architecture Subsystem Diagram

Figure 8.1 is a Subsystem Diagram (Sausage Diagram) presenting the top-level architecture interconnect diagram depicting all subsystems in the Regional ITS Architecture and the basic communication channels between these subsystems. It provides information designed to assist in the understanding of the concepts of subsystem, interconnects, and information flows.

Figure 8.1 presents all 22 subsystems identified in the National ITS Architecture. Emissions Management (Center) and Archived Data Management (Center) are excluded from the ITS Architecture for the SNHPC Region. Interconnections (solid lines that connect subsystems) represent the data that is being exchanged between the subsystems.

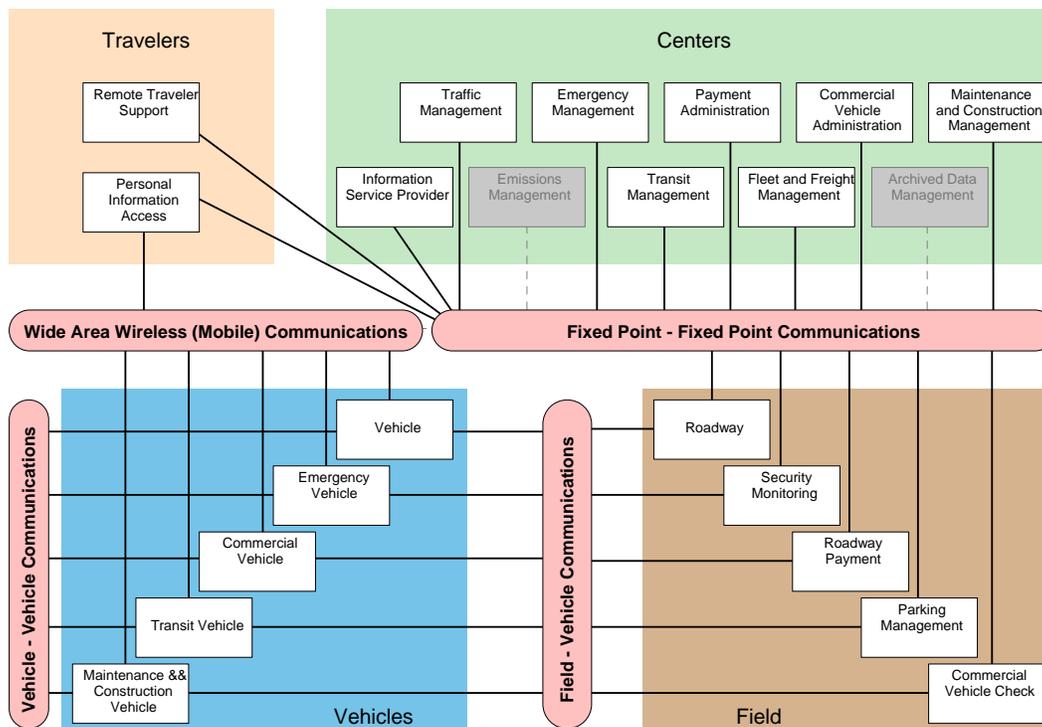


Figure 8.1 Subsystem Diagram

8.2 Architecture Information Flow and Interconnect Diagrams

The remainder of this chapter presents interconnect diagrams for the relevant service packages in the SNHPC region. The boxes, which depict regional ITS elements, include stakeholder identification information. Existing interconnects (solid lines) and planned interconnects (broken lines) are related to each element. The diagrams also include additional information identifying the specific information that travels between various ITS elements.

Archived Data (AD)

ITS Data Mart (AD1)

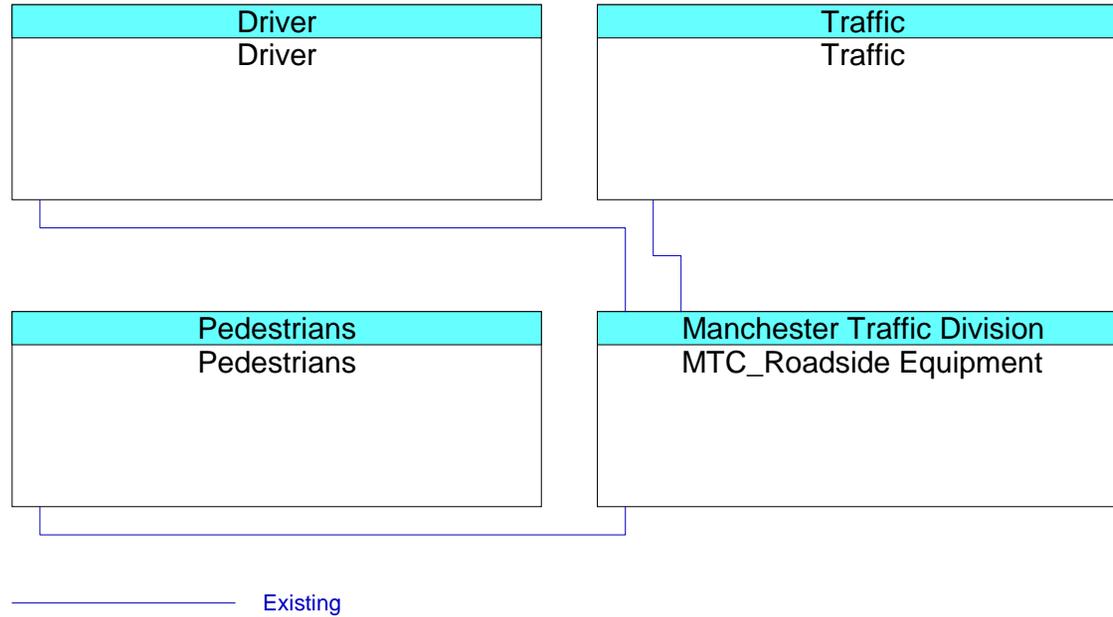
Refer to the Statewide ITS Architecture

ITS Data Warehouse (AD2)

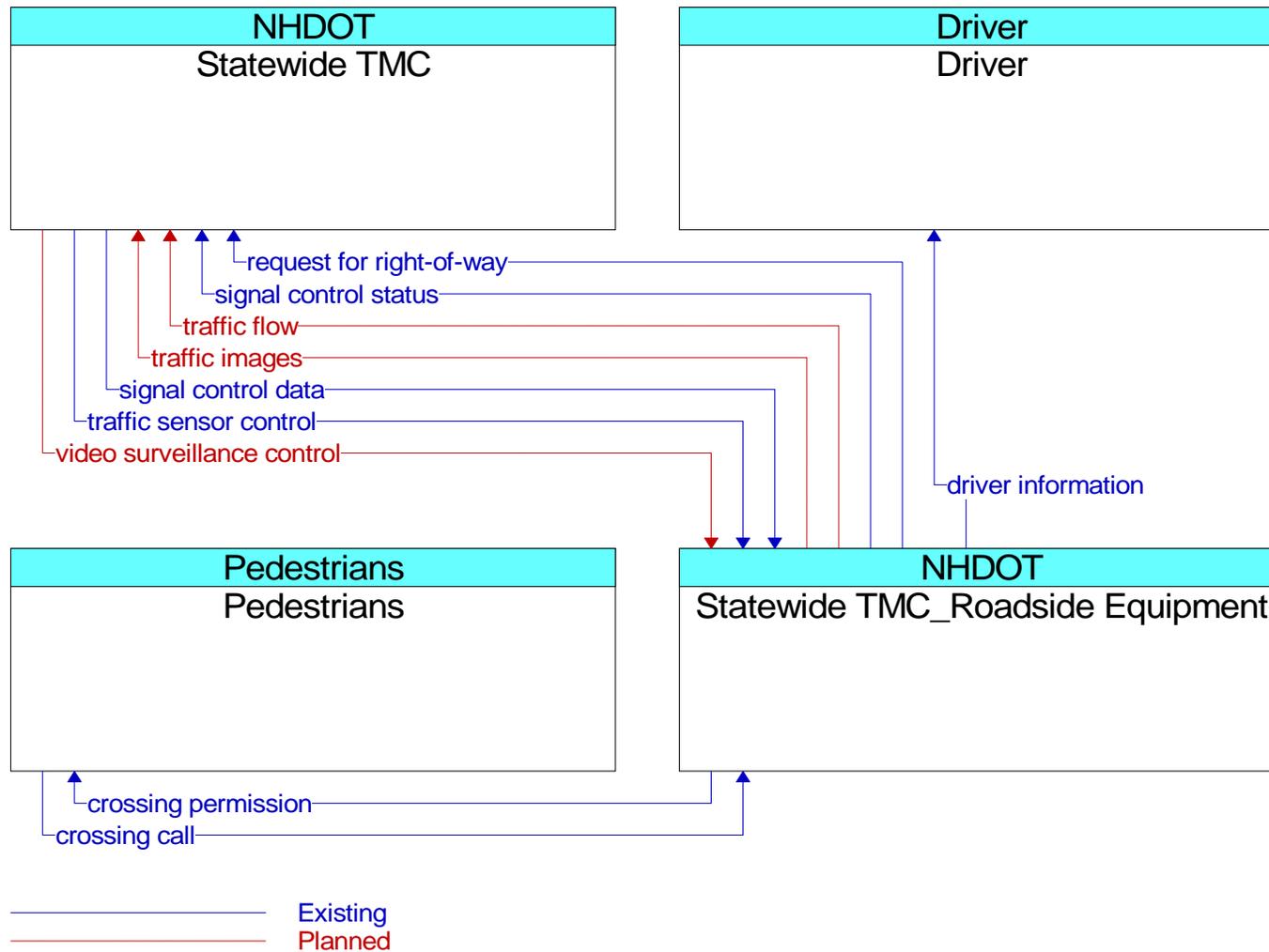
Refer to the Statewide ITS Architecture

Advanced Traffic Management System (ATMS)

Traffic Signal Control (ATMS03) – Manchester



Traffic Signal Control (ATMS03) – SNHPC Communities Except Manchester



Traffic Information Dissemination (ATMS06)

Refer to the Statewide ITS Architecture

Regional Traffic Management (ATMS07)

Refer to the Statewide ITS Architecture

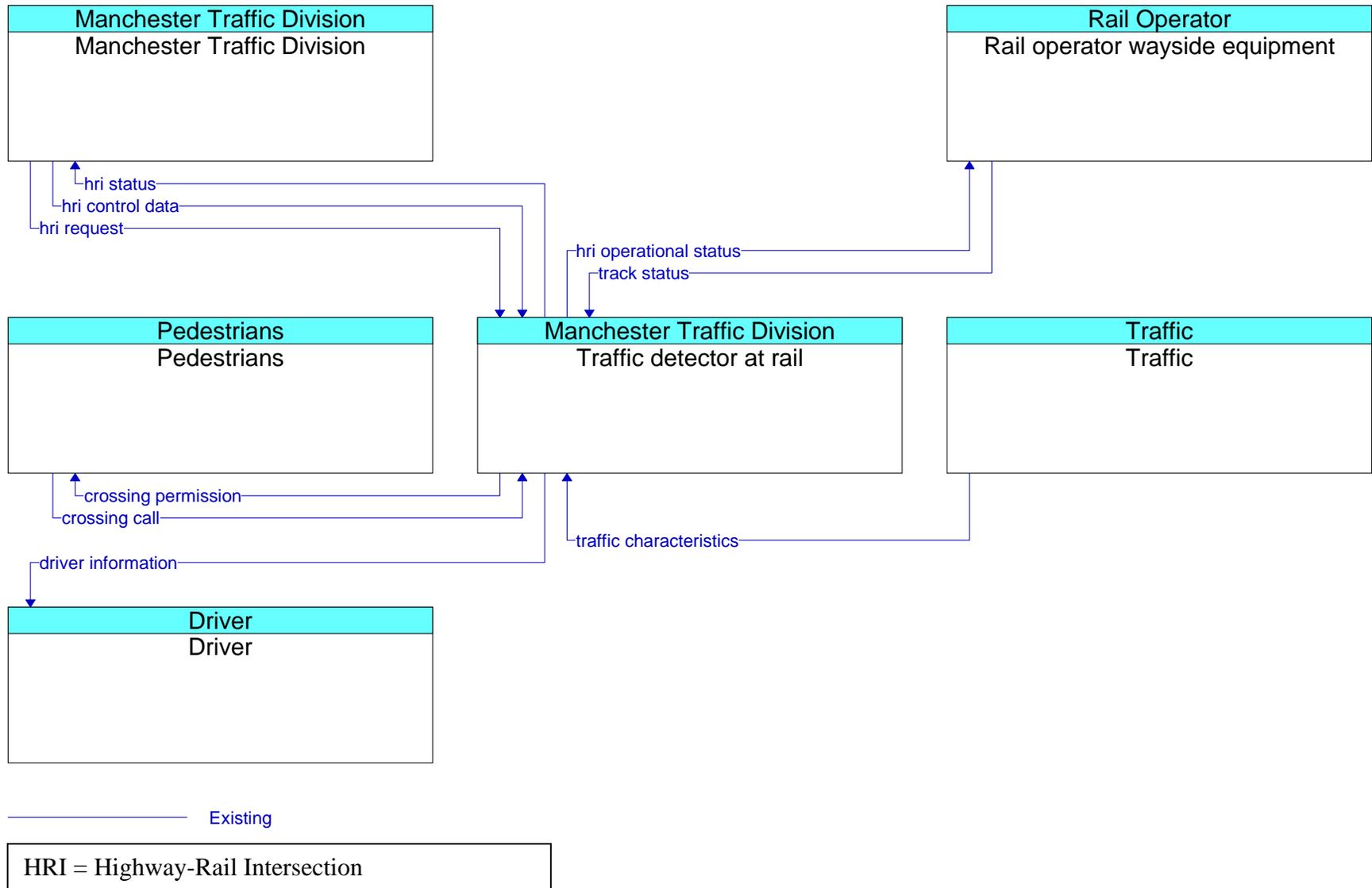
Traffic Incident Management System (ATMS08)

Refer to the Statewide ITS Architecture

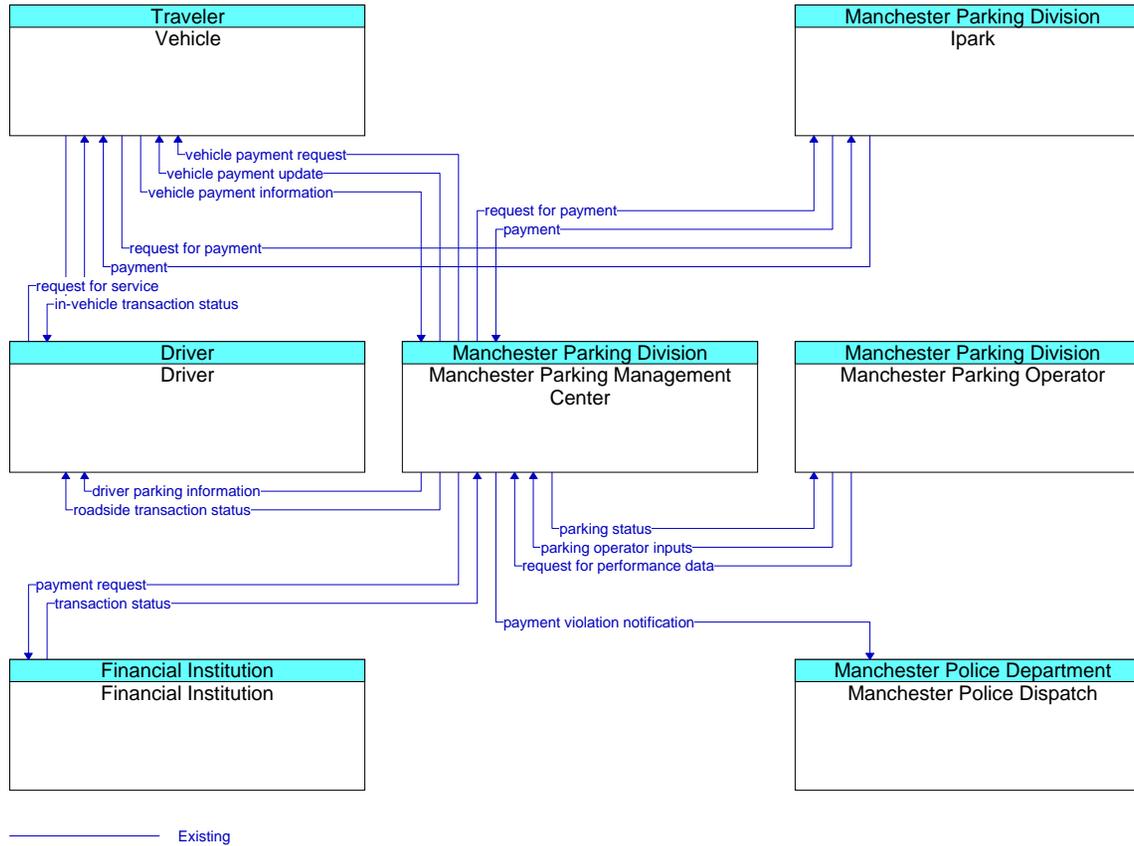
Electronic Toll Collection (ATMS10)

Refer to the Statewide ITS Architecture

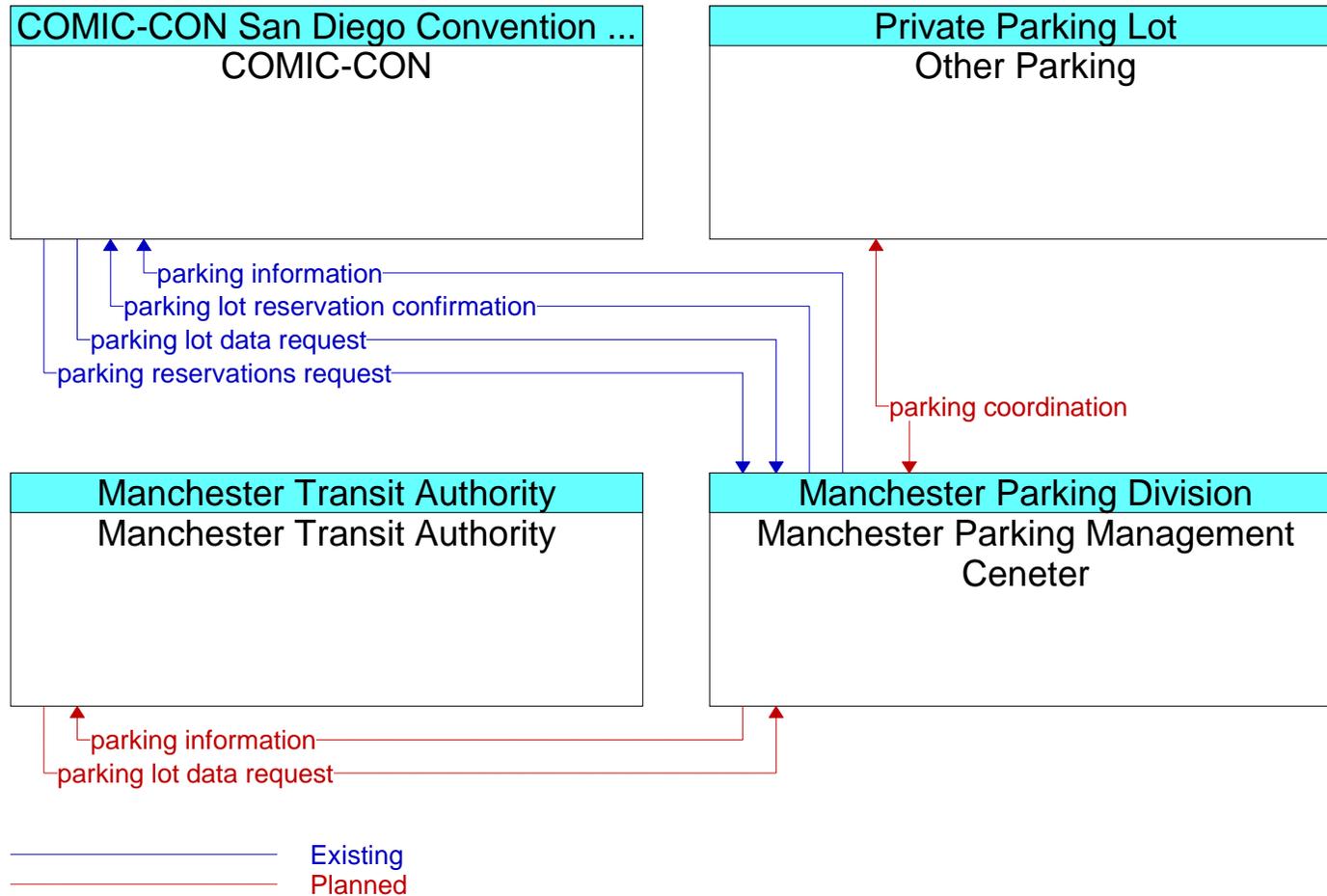
Standard Railroad Grade Crossing (ATMS13) - Manchester



Parking Facility Management (ATMS16) - Manchester

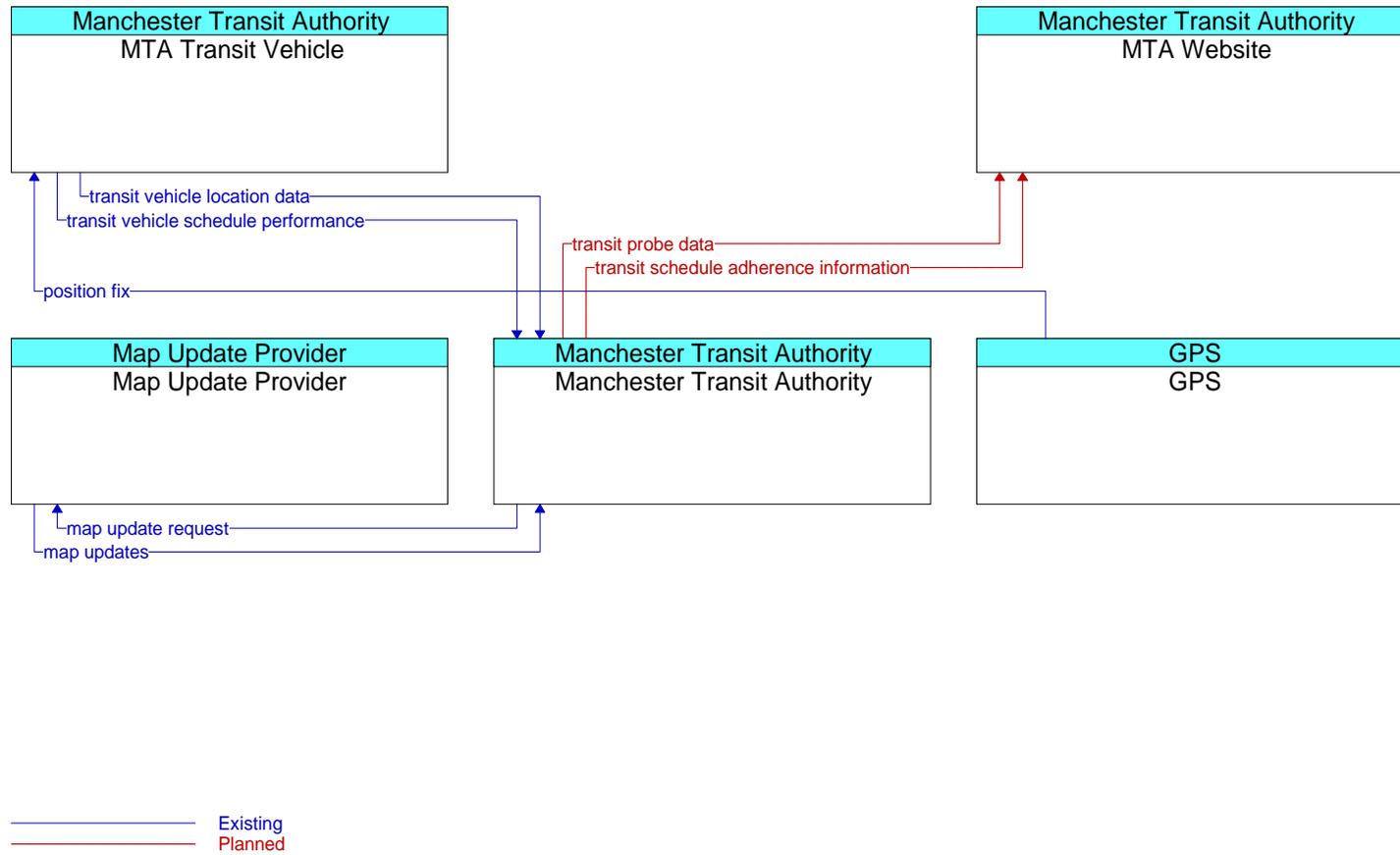


Regional Parking Management (ATMS17) -Manchester

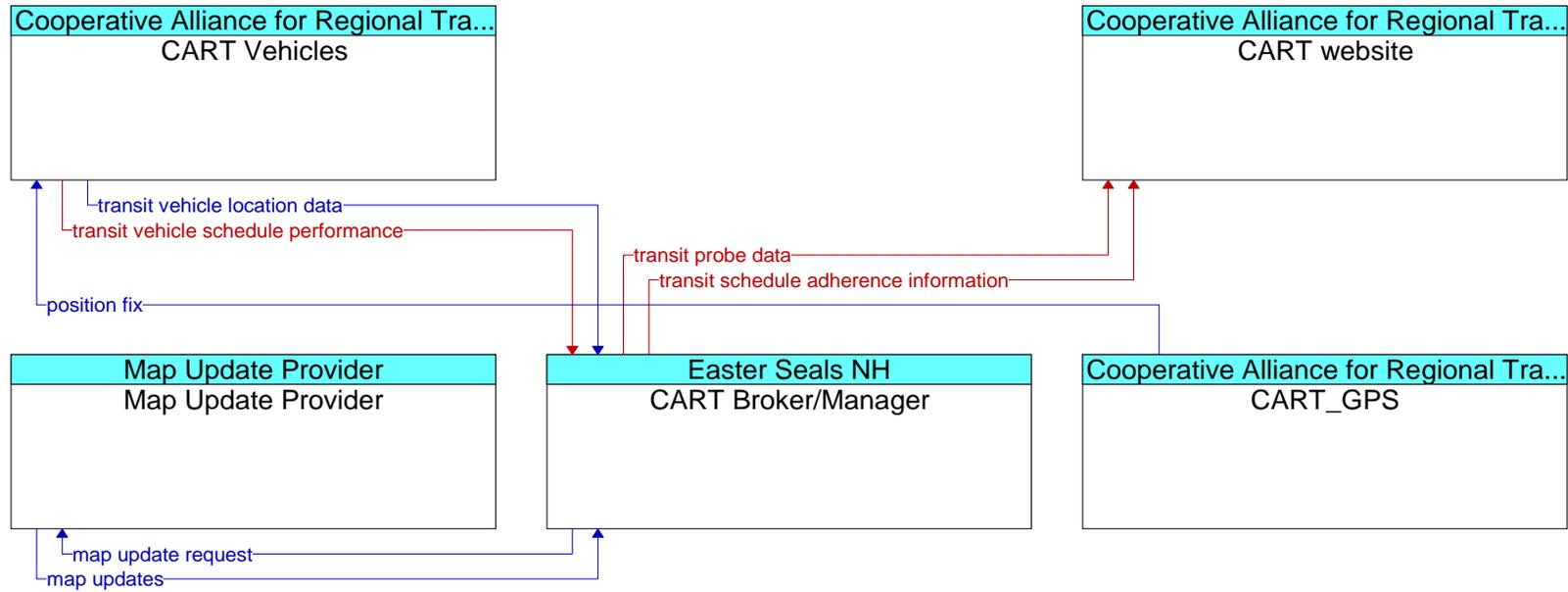


Advanced Public Transportation Systems (APTS)

Transit Vehicle Tracking (APTS01) -MTA



Transit Vehicle Tracking (APTS01) -CART



Existing
Planned

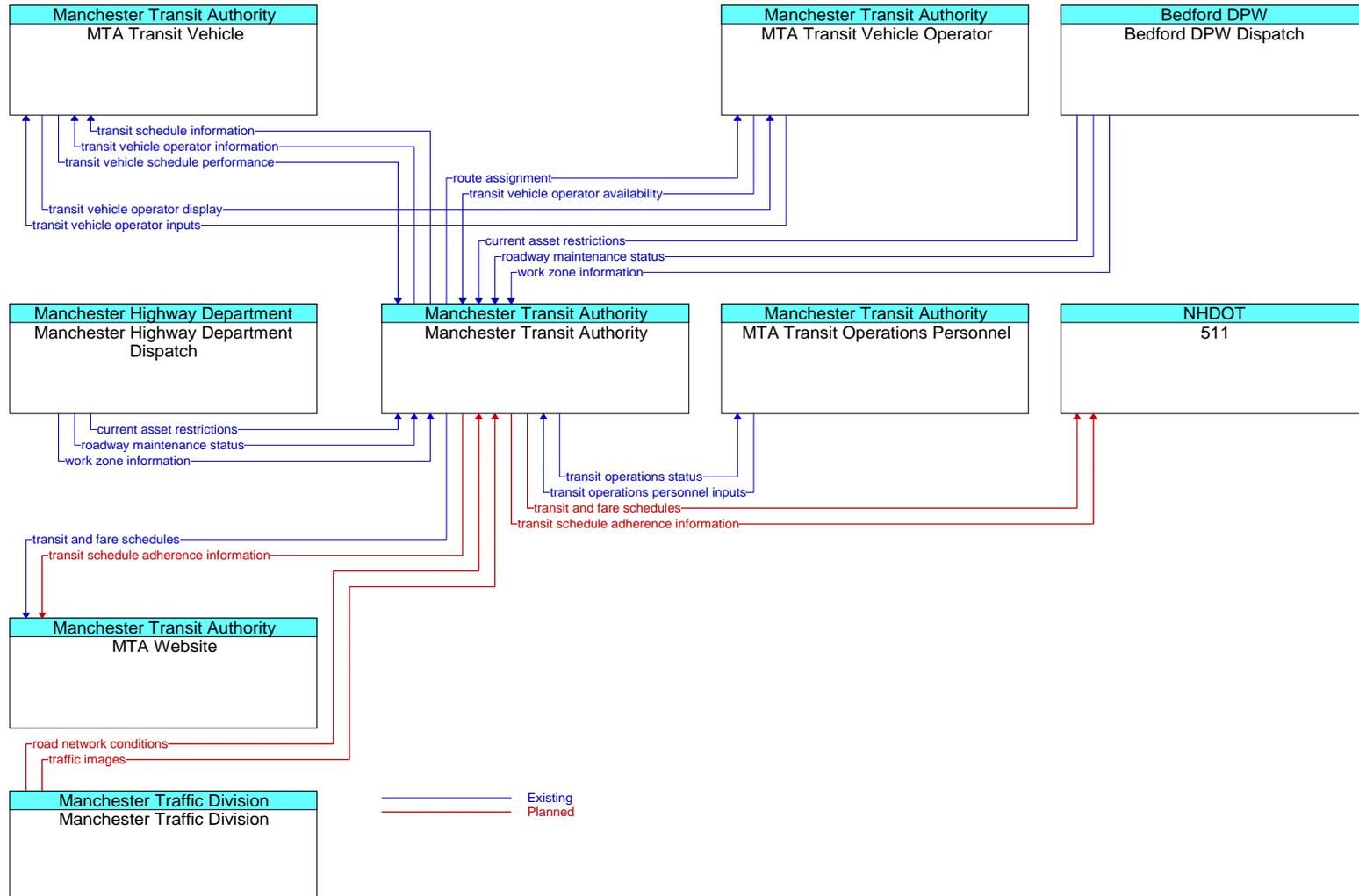
Transit Vehicle Tracking (APTS01) –Boston Express

Refer to the Statewide ITS Architecture

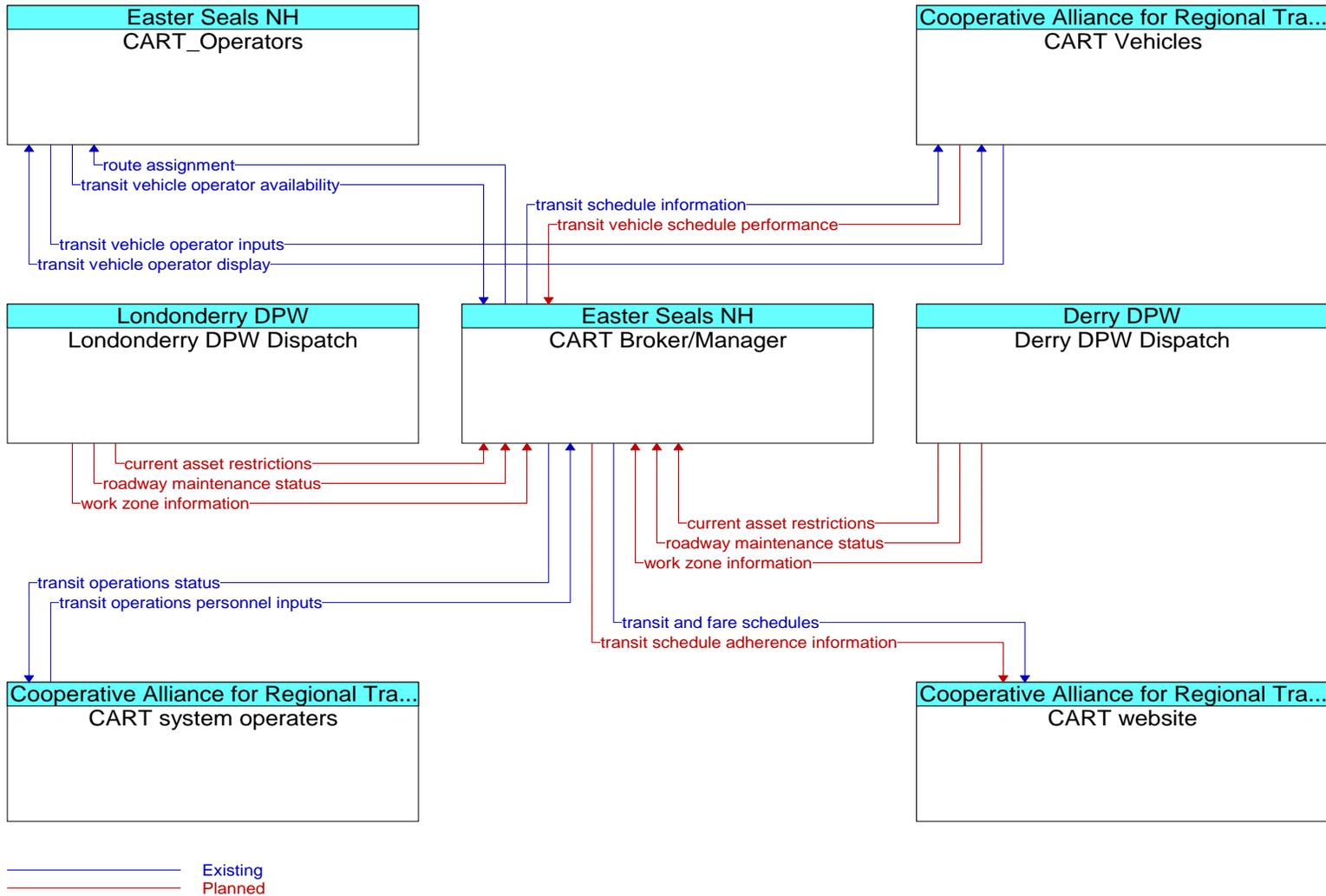
Transit Vehicle Tracking (APTS01) – Concord Coach

Refer to the Statewide ITS Architecture

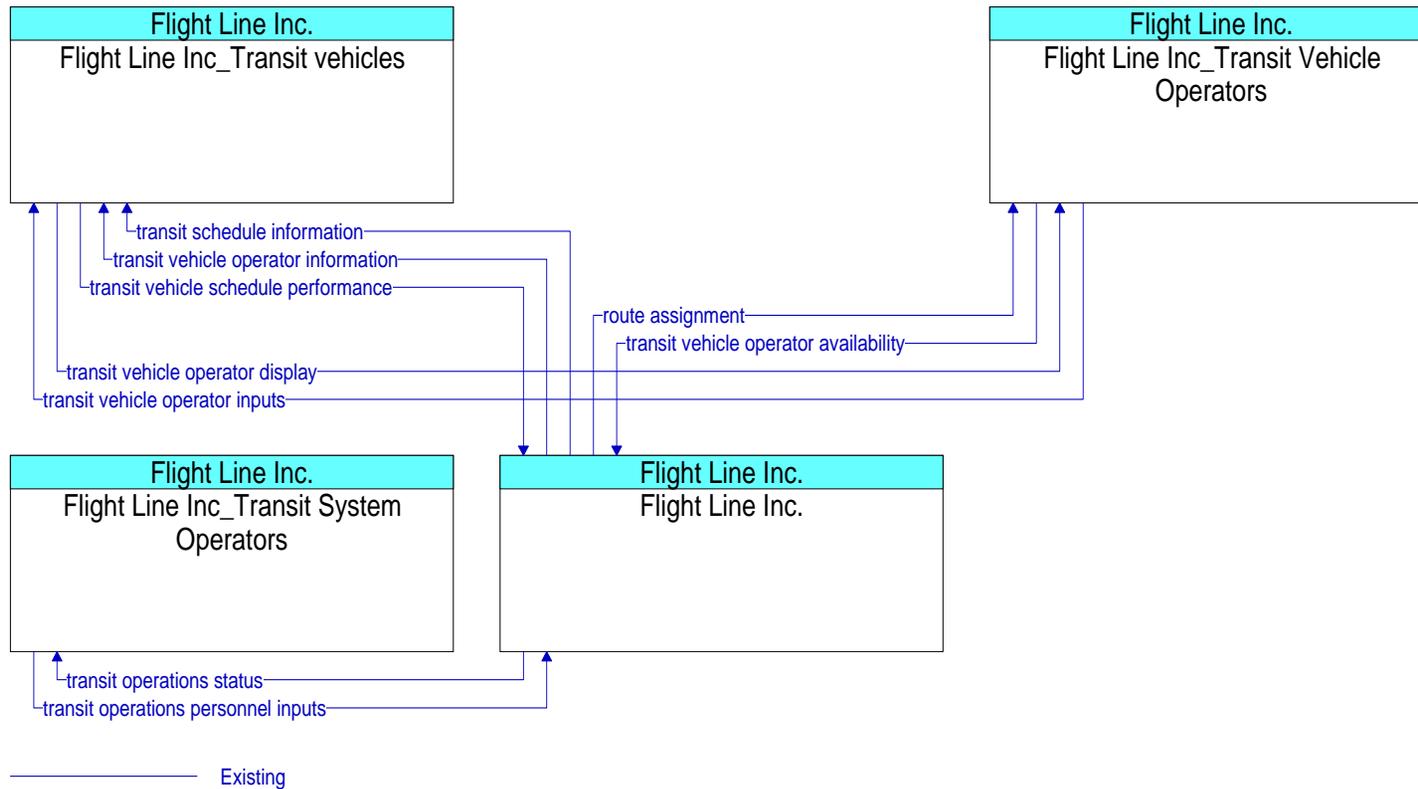
Transit Fixed-Route Operations (APTS02) - MTA



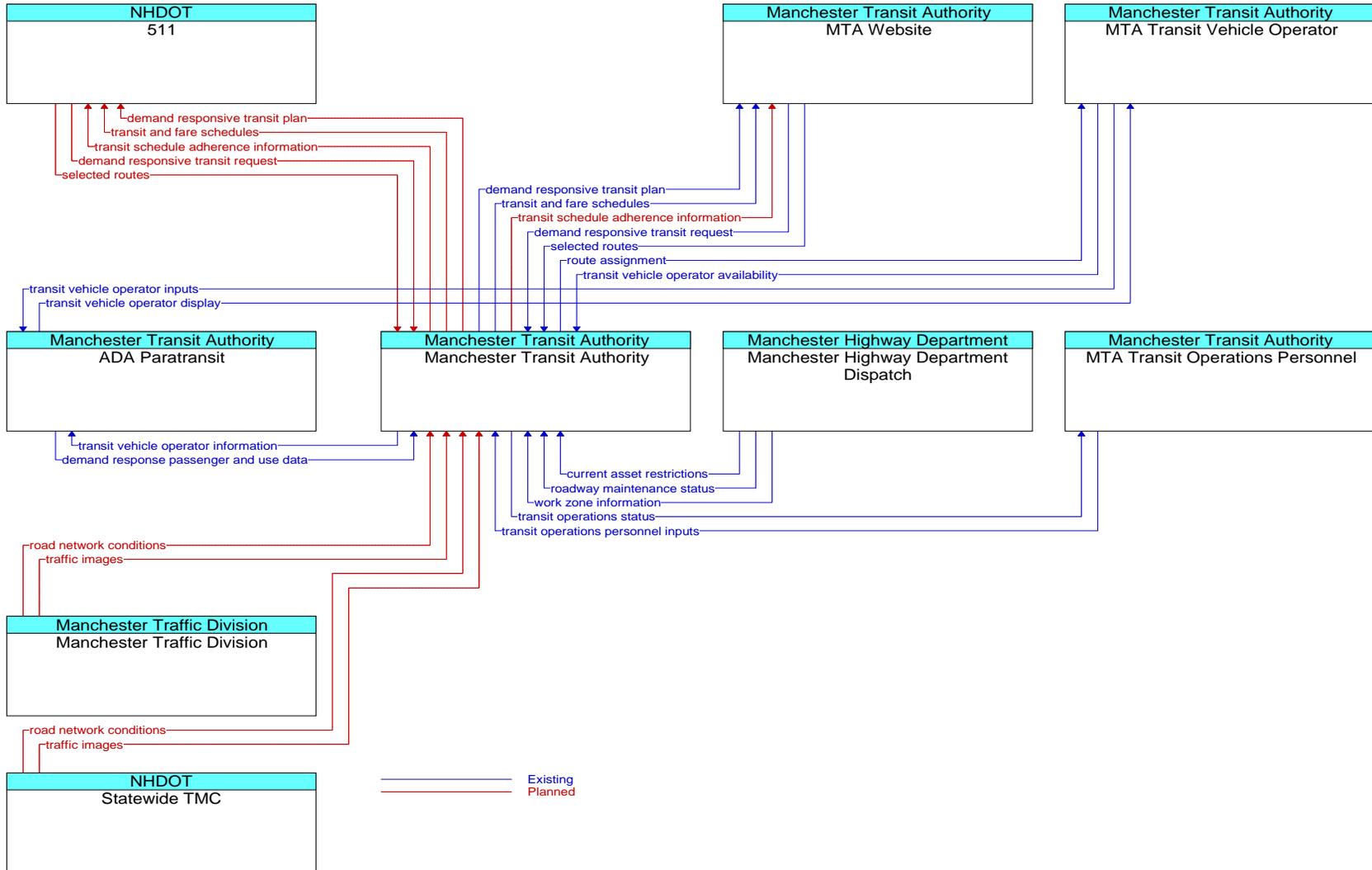
Transit Fixed-Route Operations (APTS02) - CART



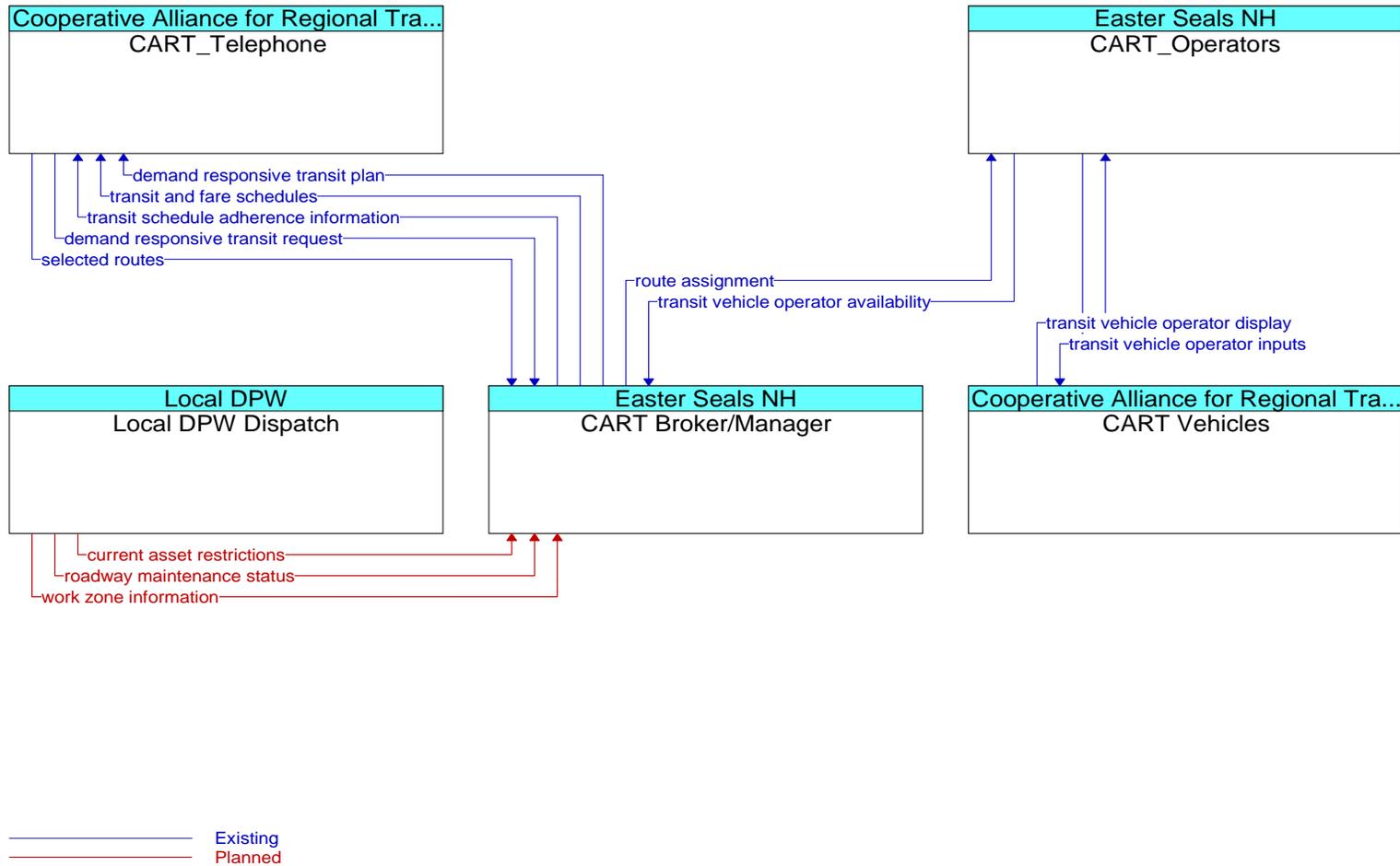
Transit Fixed-Route Operations (APTS02) – Manchester –Portsmouth



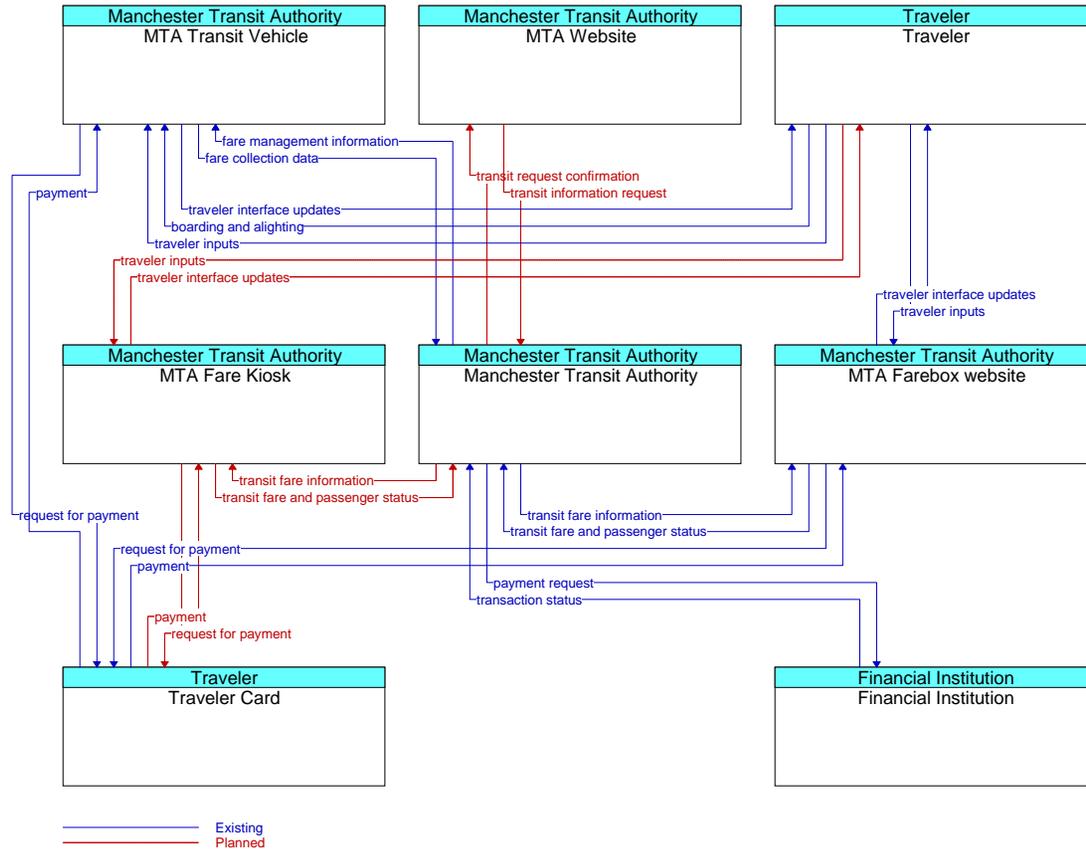
Demand Response Transit Operations (APTS03) – MTA



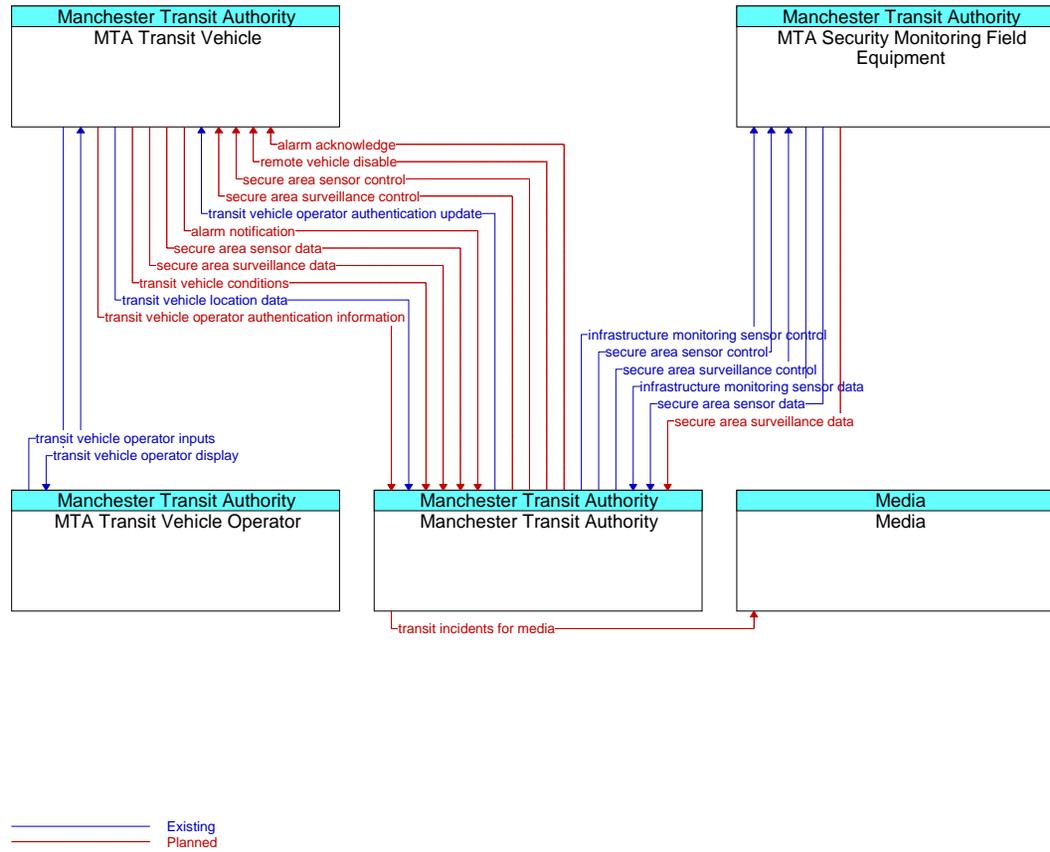
Demand Response Transit Operations (APTS03) - CART



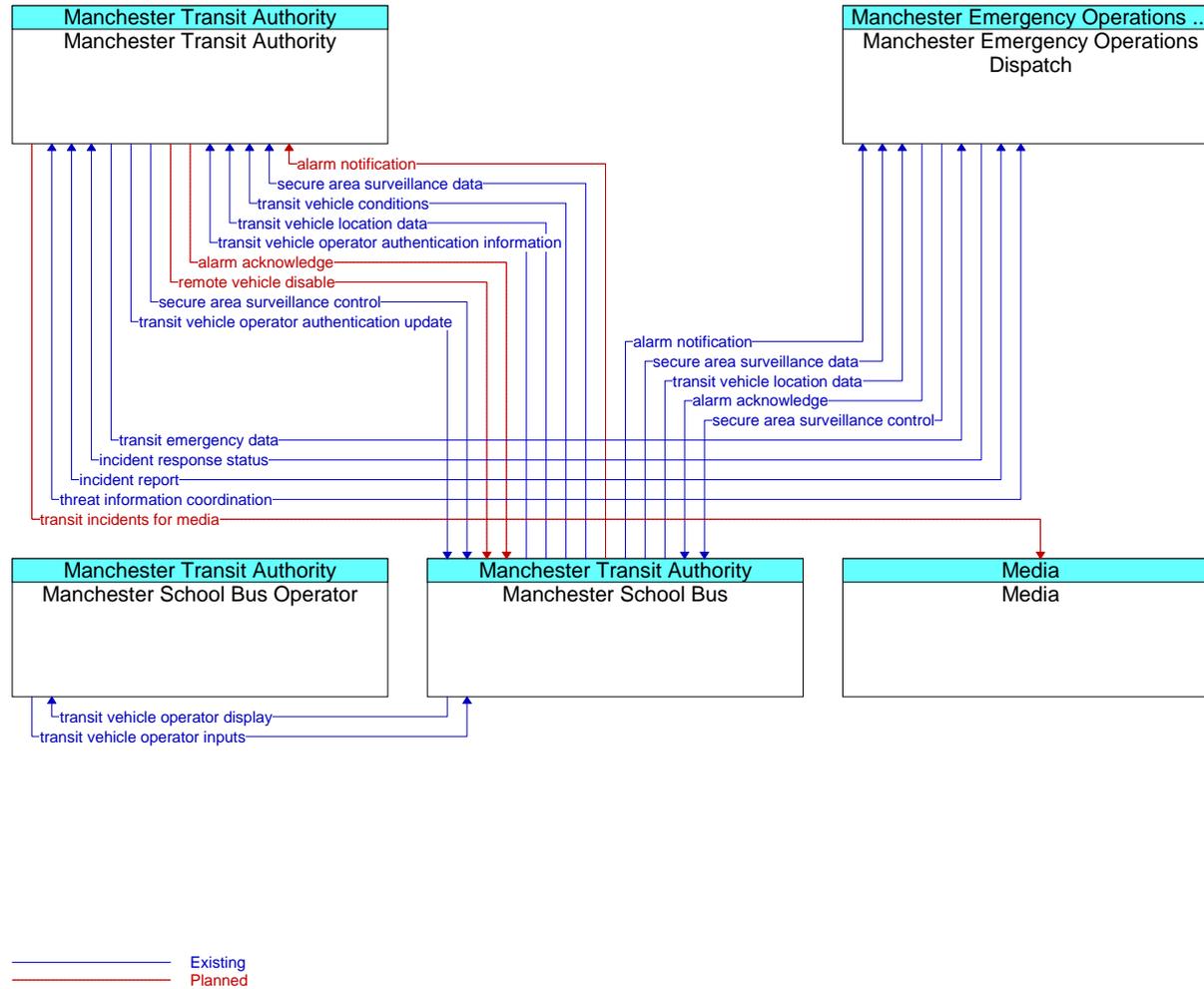
Transit Fare Collection Management (APTS04) - MTA



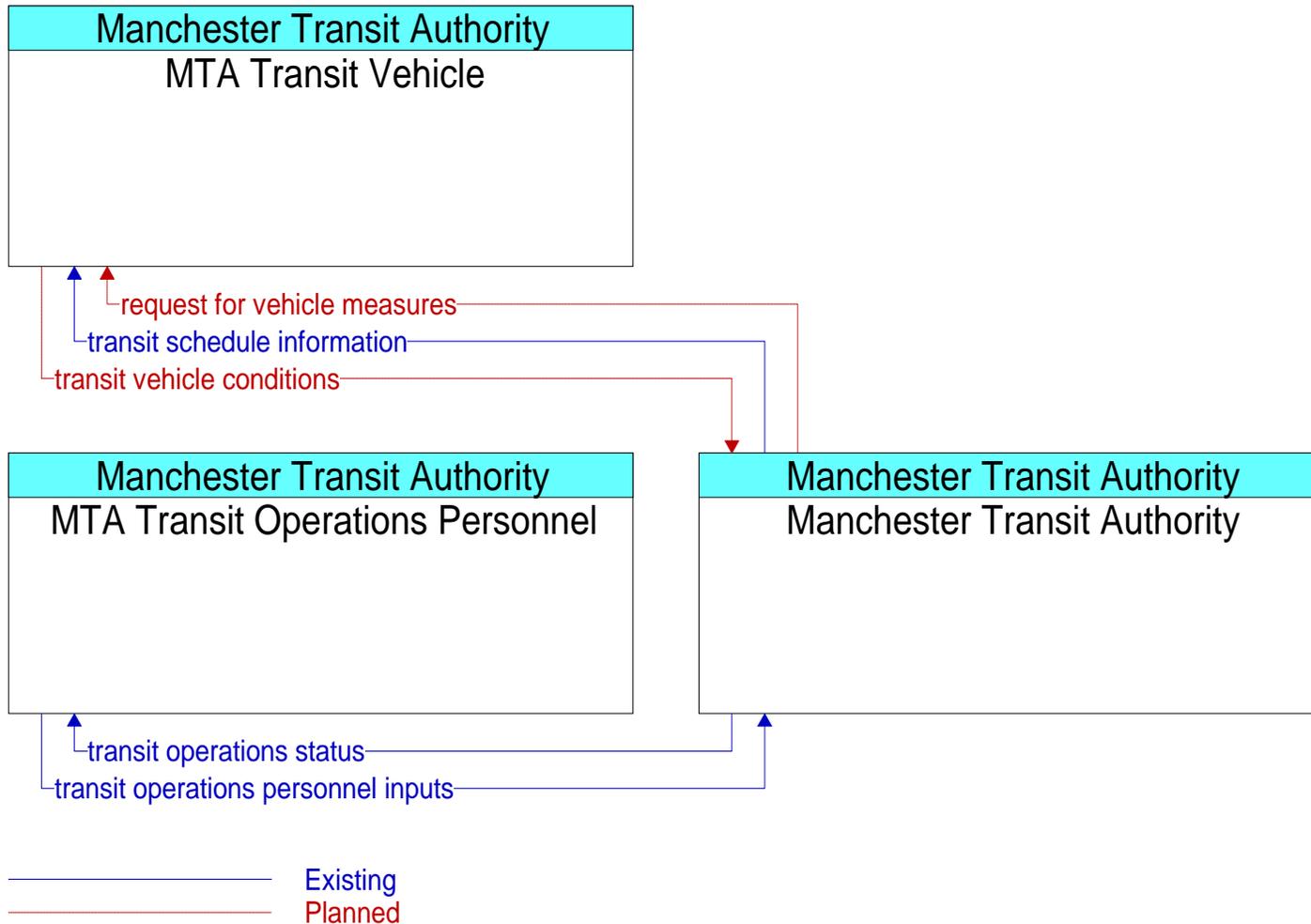
Transit Security (APTS05) – MTA Transit Vehicle



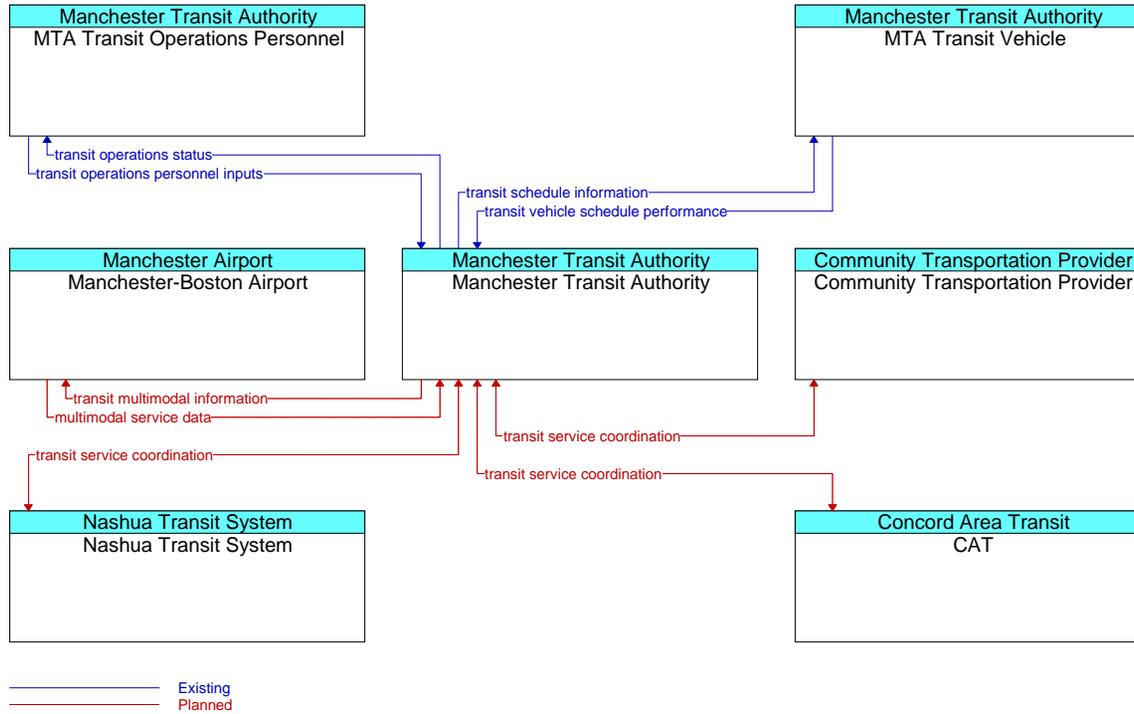
Transit Security (APTS05) – Manchester School Bus



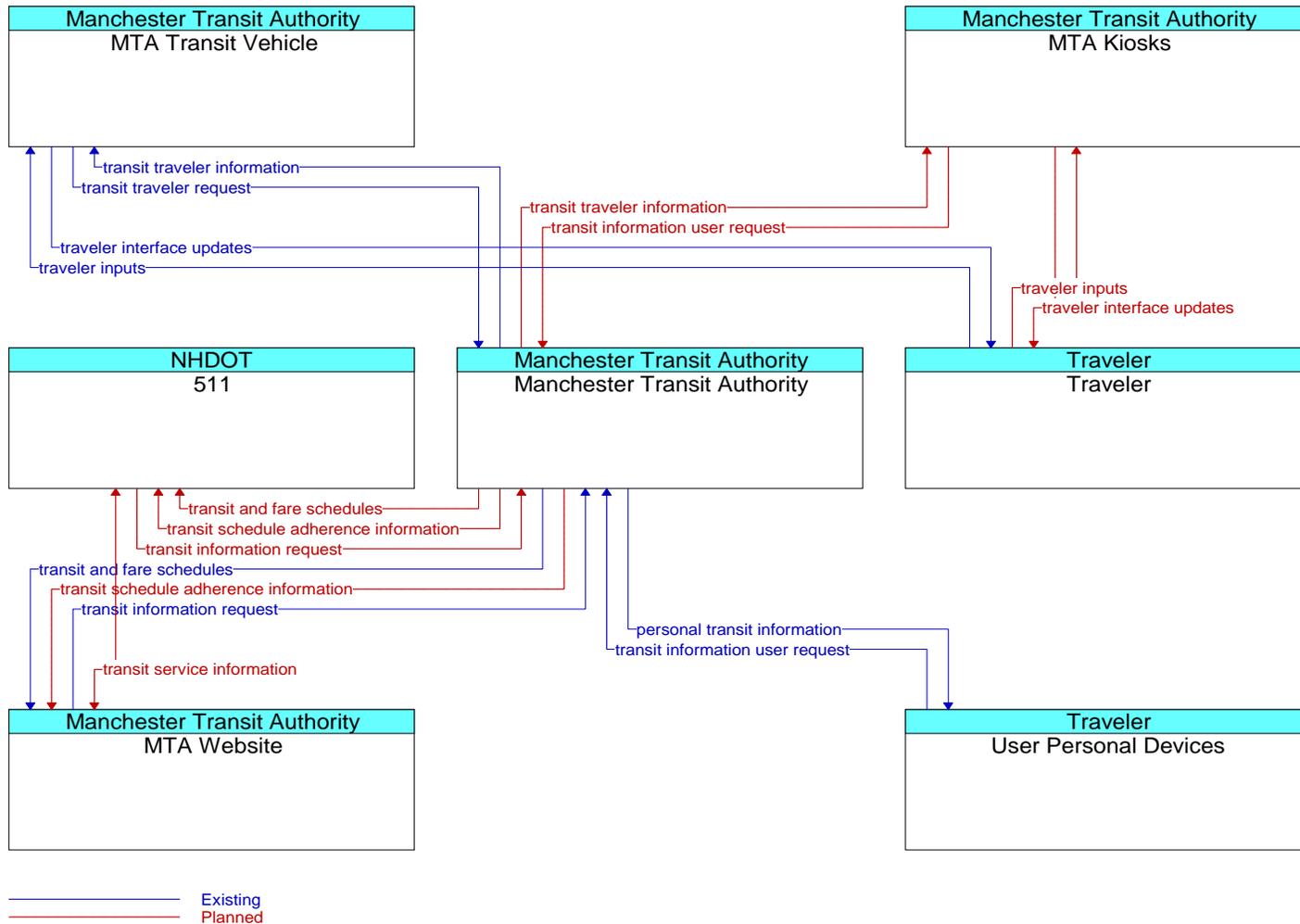
Transit Fleet Maintenance (APTS06) - MTA



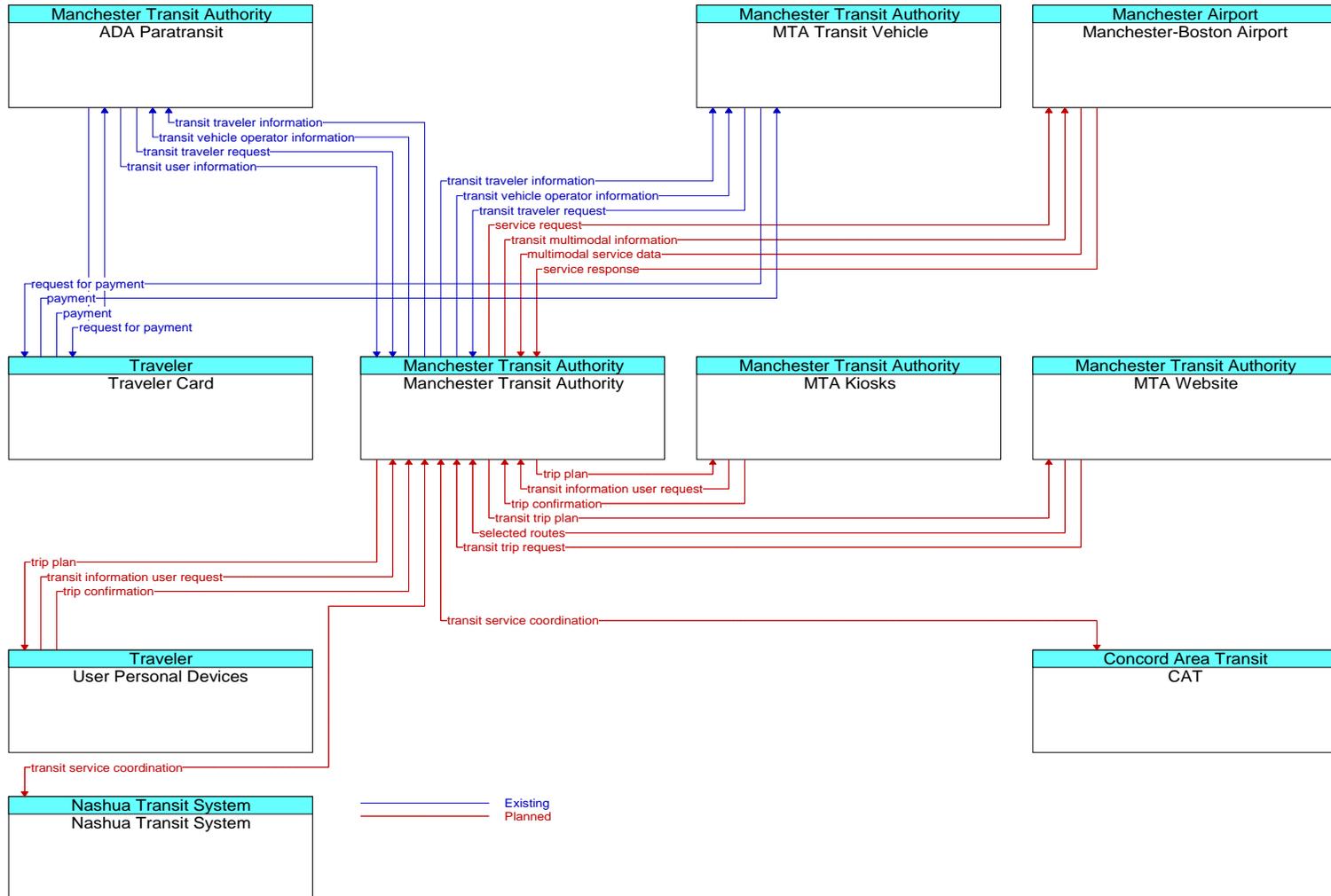
Multi-Modal Coordination (APTS07) - MTA



Transit Traveler Information (APTS08) - MTA



Multimodal Connection Protection (APTS11) - MTA



Commercial Vehicle Operations (CVO)

Electronic Clearance (CVO03)

Refer to the Statewide ITS Architecture

CV Administration Processes (CVO04)

Refer to the Statewide ITS Architecture

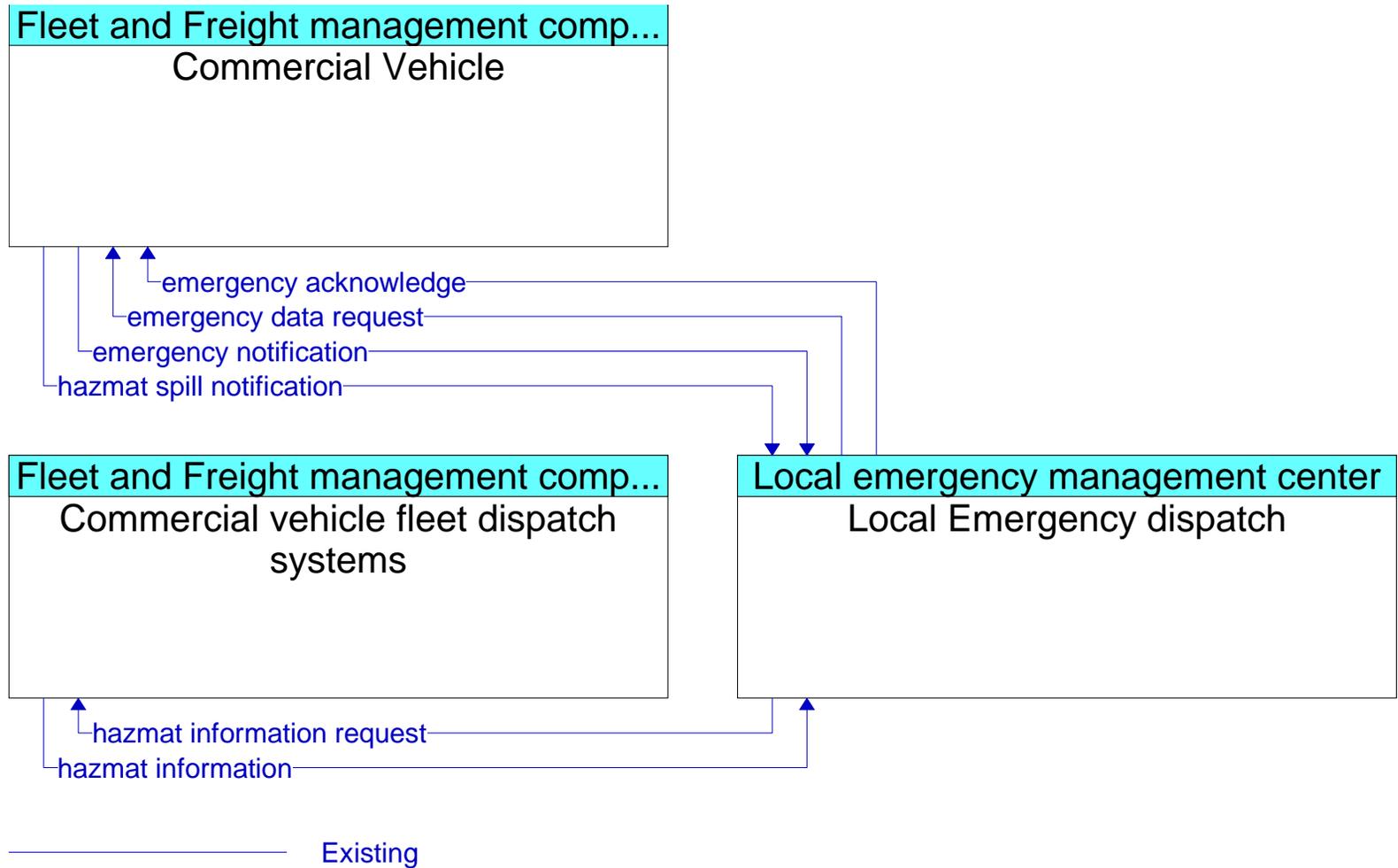
Weigh-In-Motion (CVO06)

Refer to the Statewide ITS Architecture

Roadside CVO Safety (CVO07)

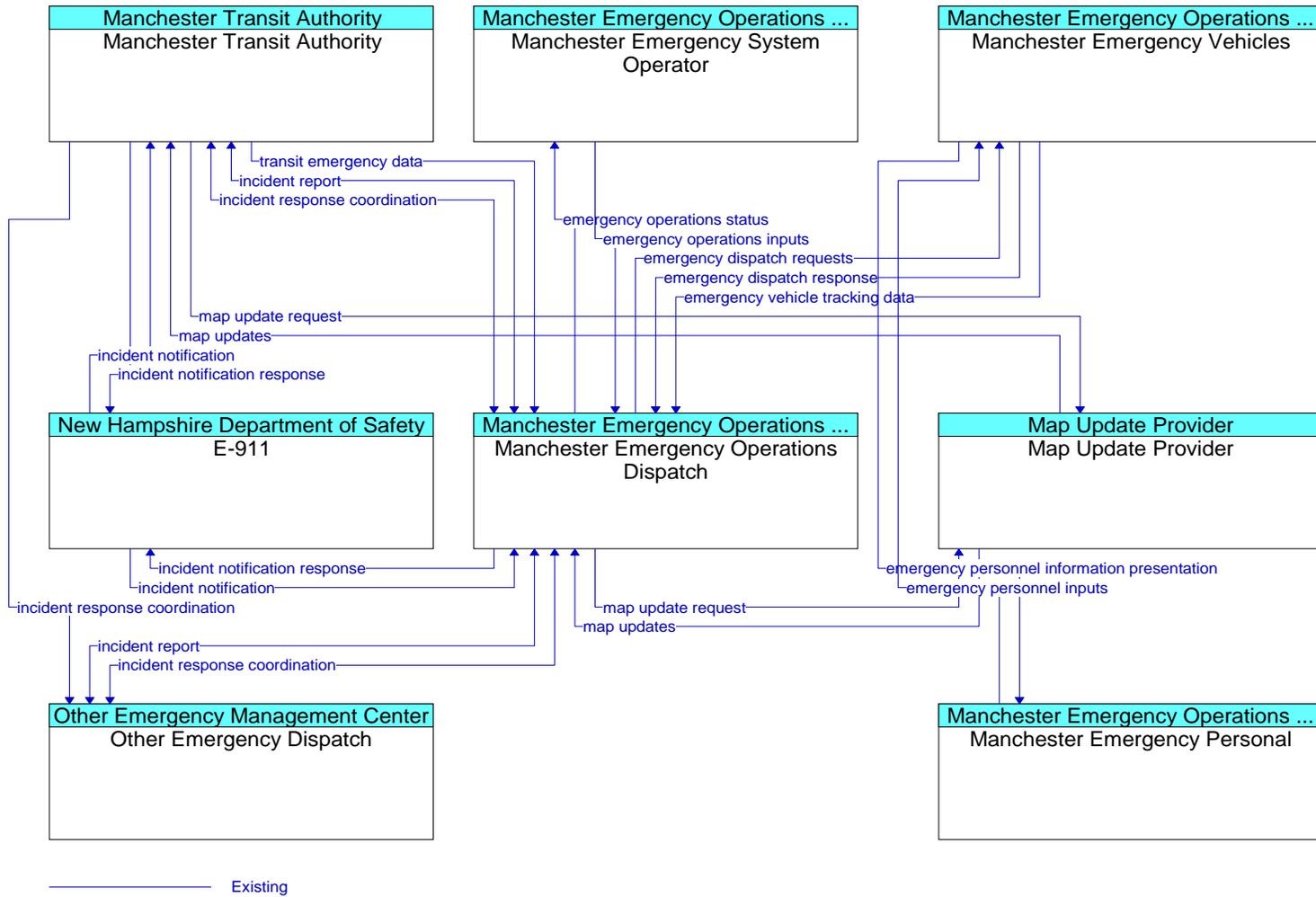
Refer to the Statewide ITS Architecture

HAZMAT Management (CVO10)

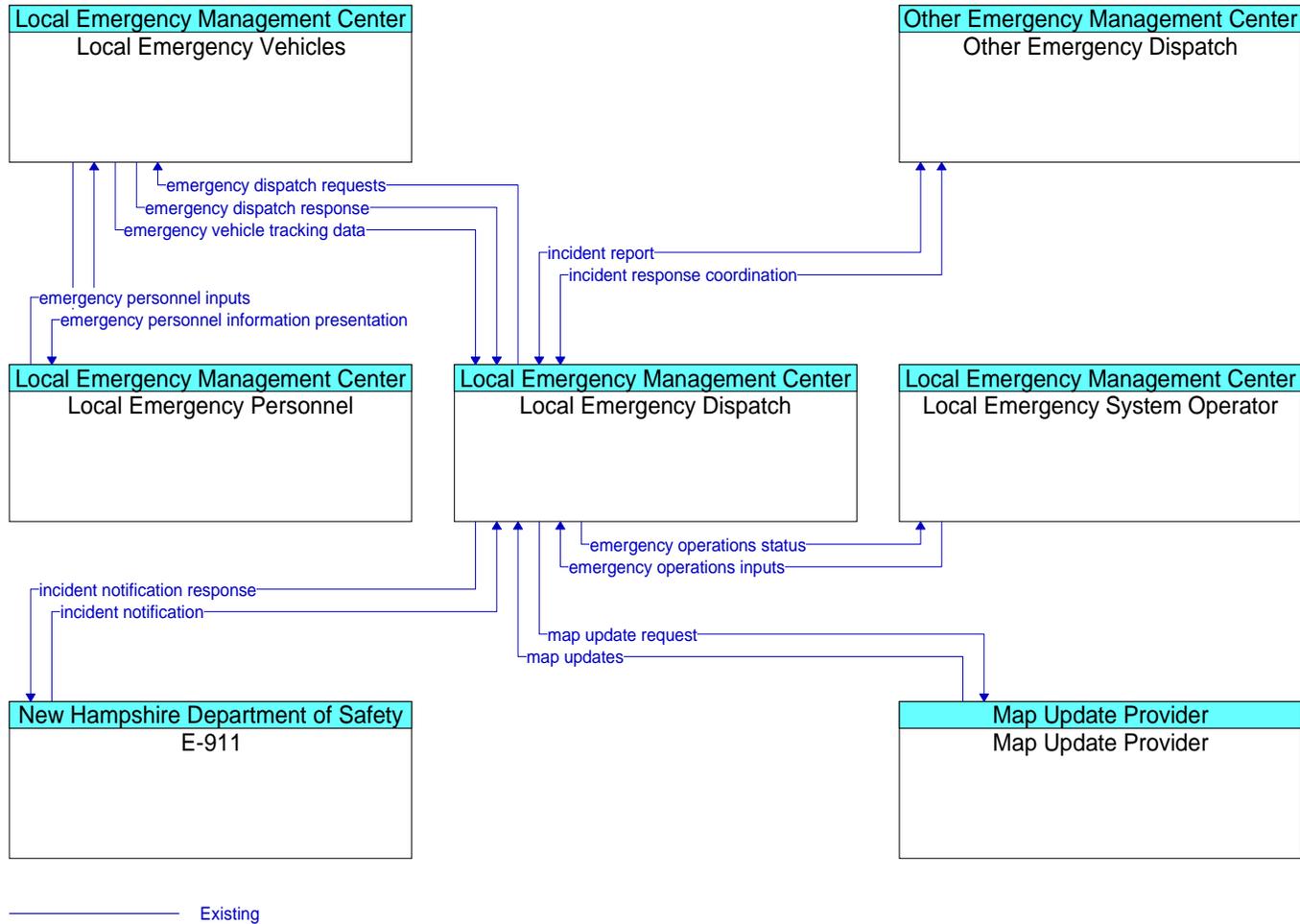


Emergency Management (EM)

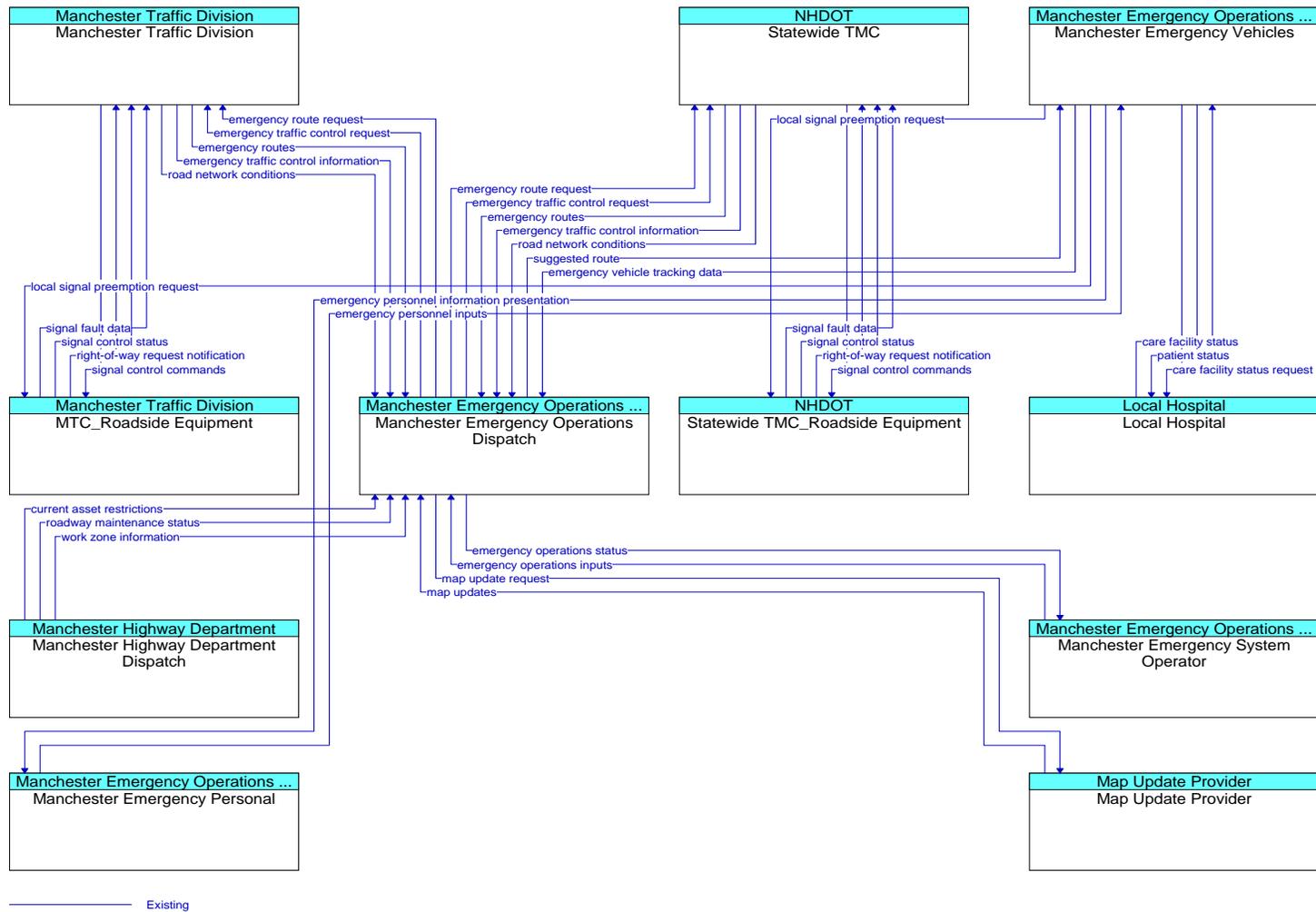
Emergency Call-Taking and Dispatch (EM01) Manchester



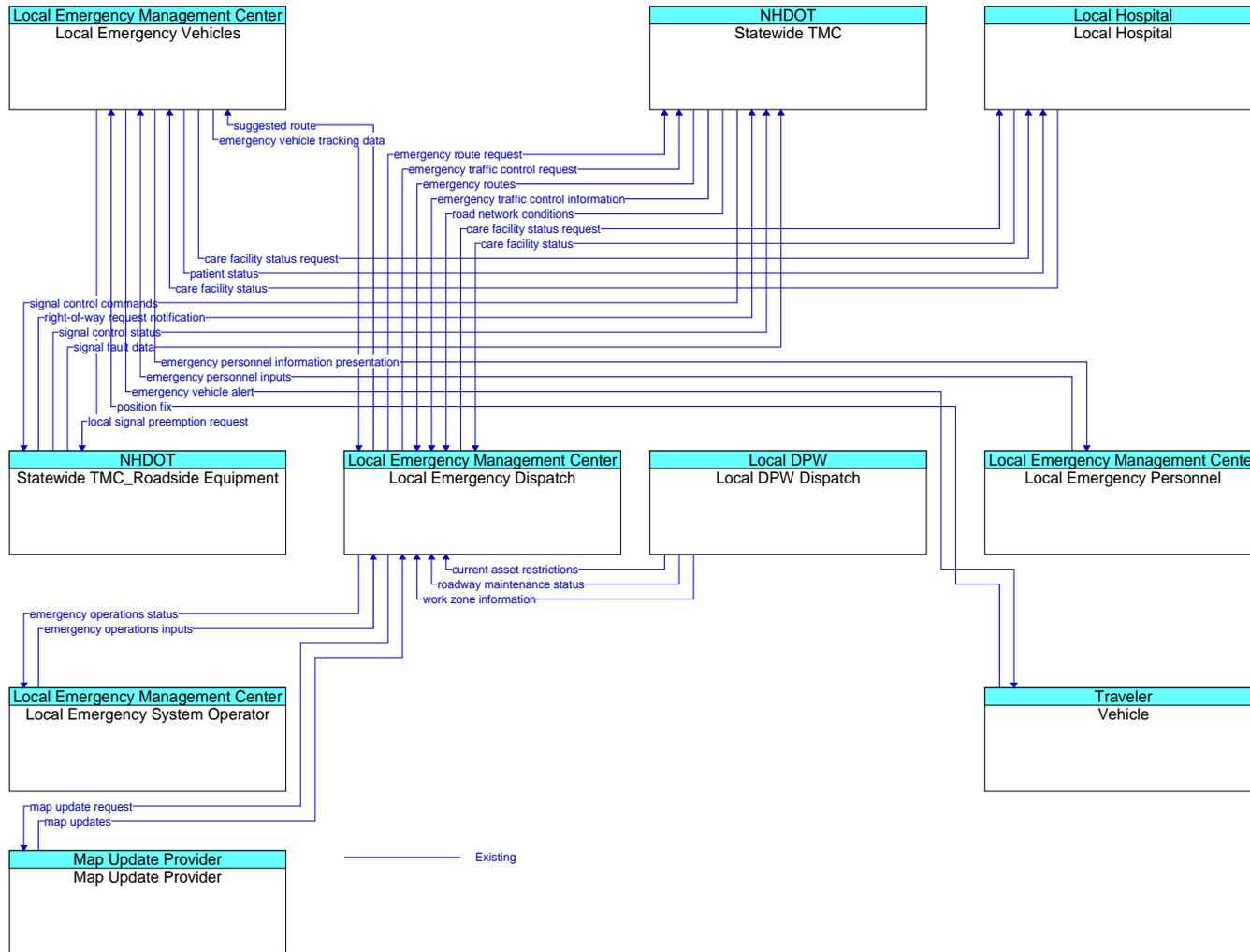
Emergency Call-Taking and Dispatch (EM01) SNHPC Communities Except Manchester



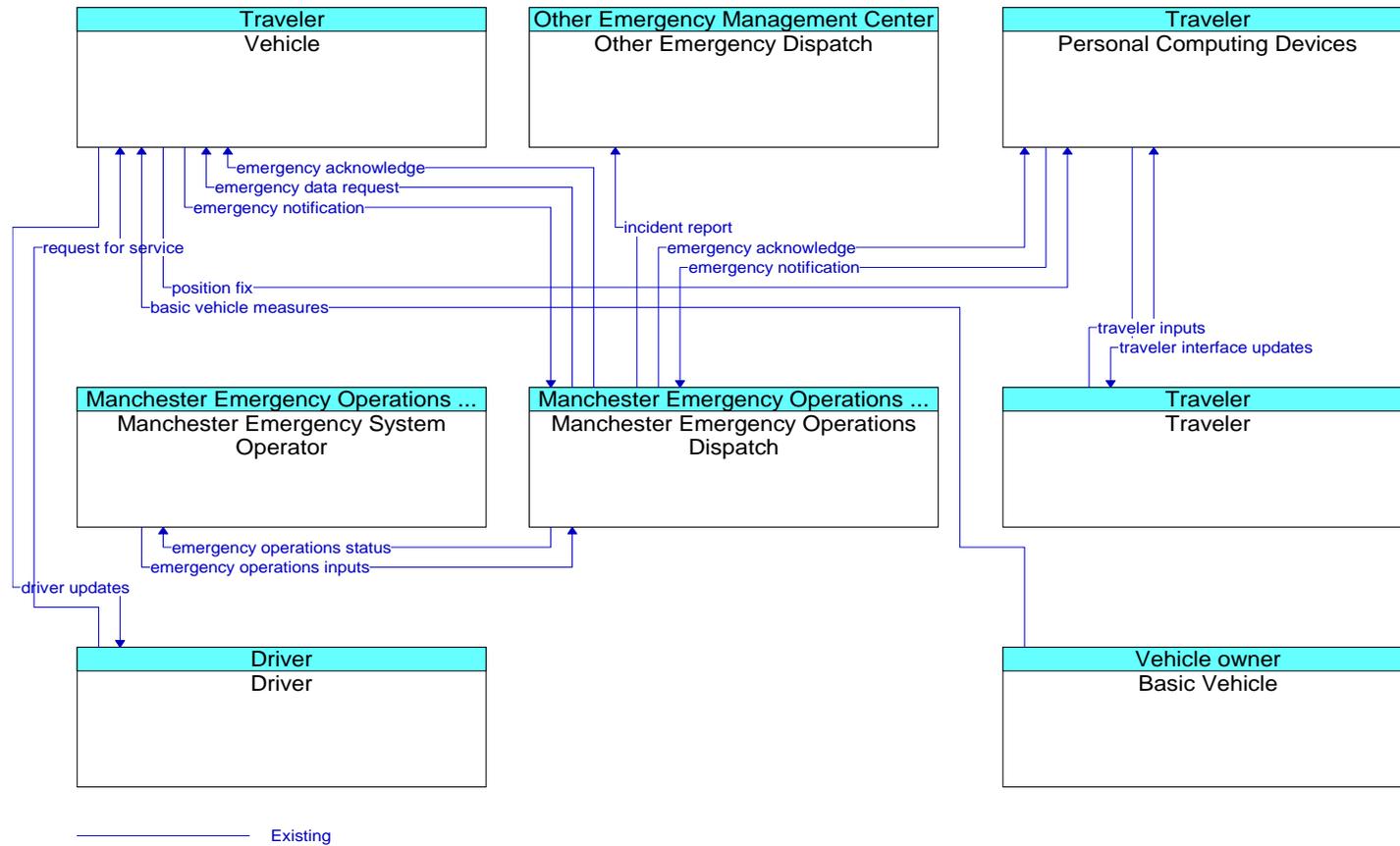
Emergency Routing (EM02) – Manchester



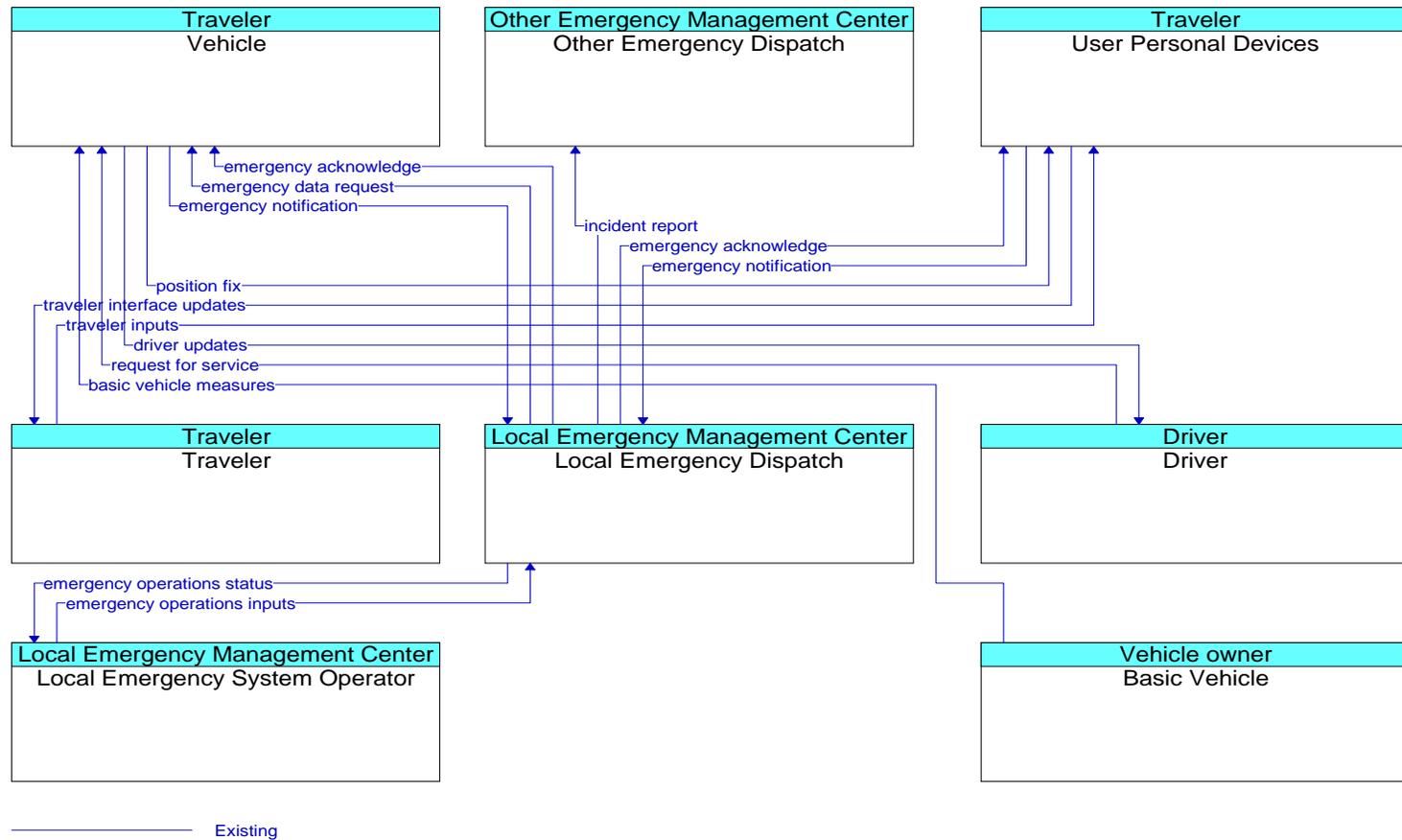
Emergency Routing (EM02) –SNHPC Communities Except Manchester



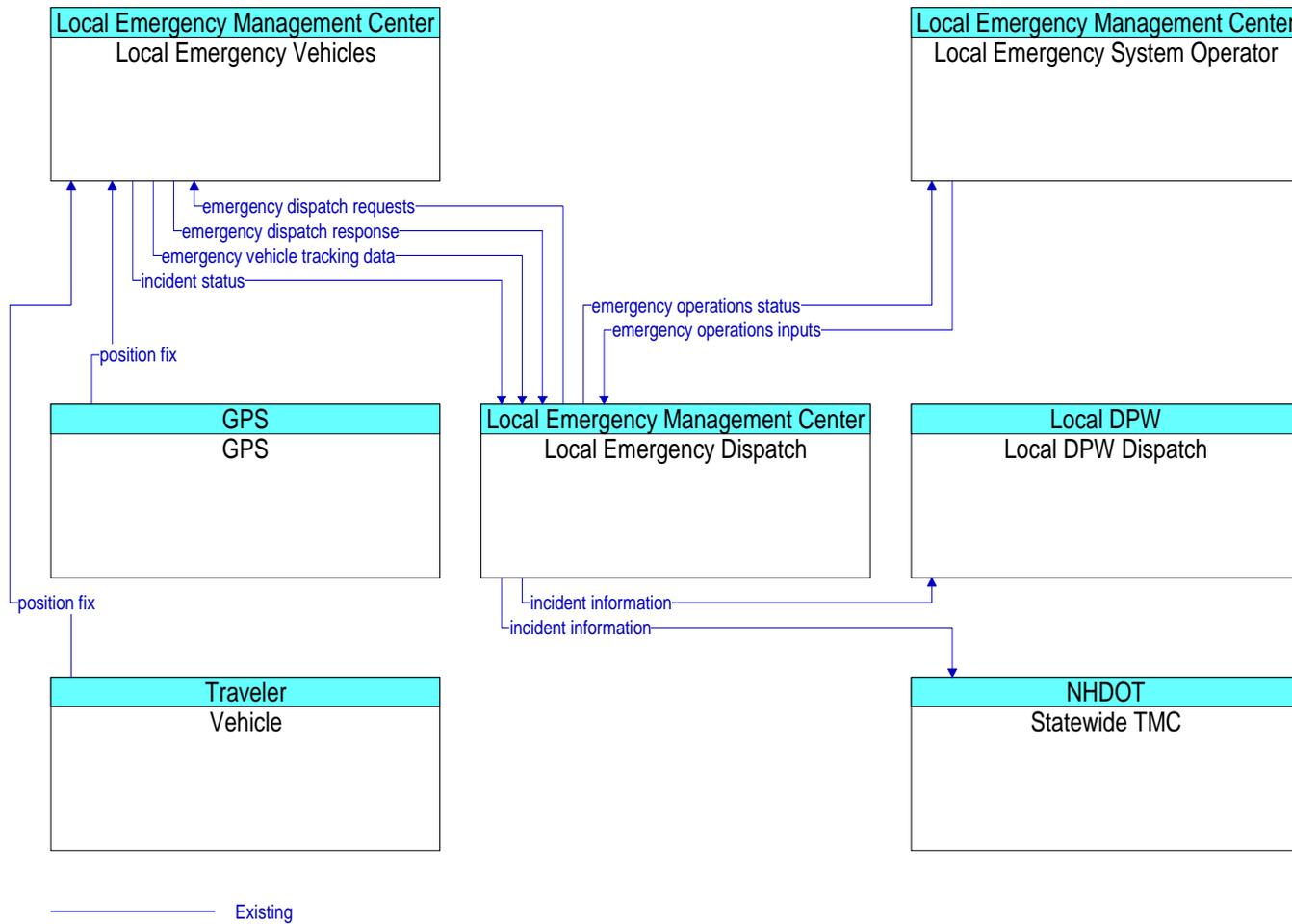
Mayday and Alarms Support (EM03) - Manchester



Mayday and Alarms Support (EM03) - SNHPC Communities Except Manchester



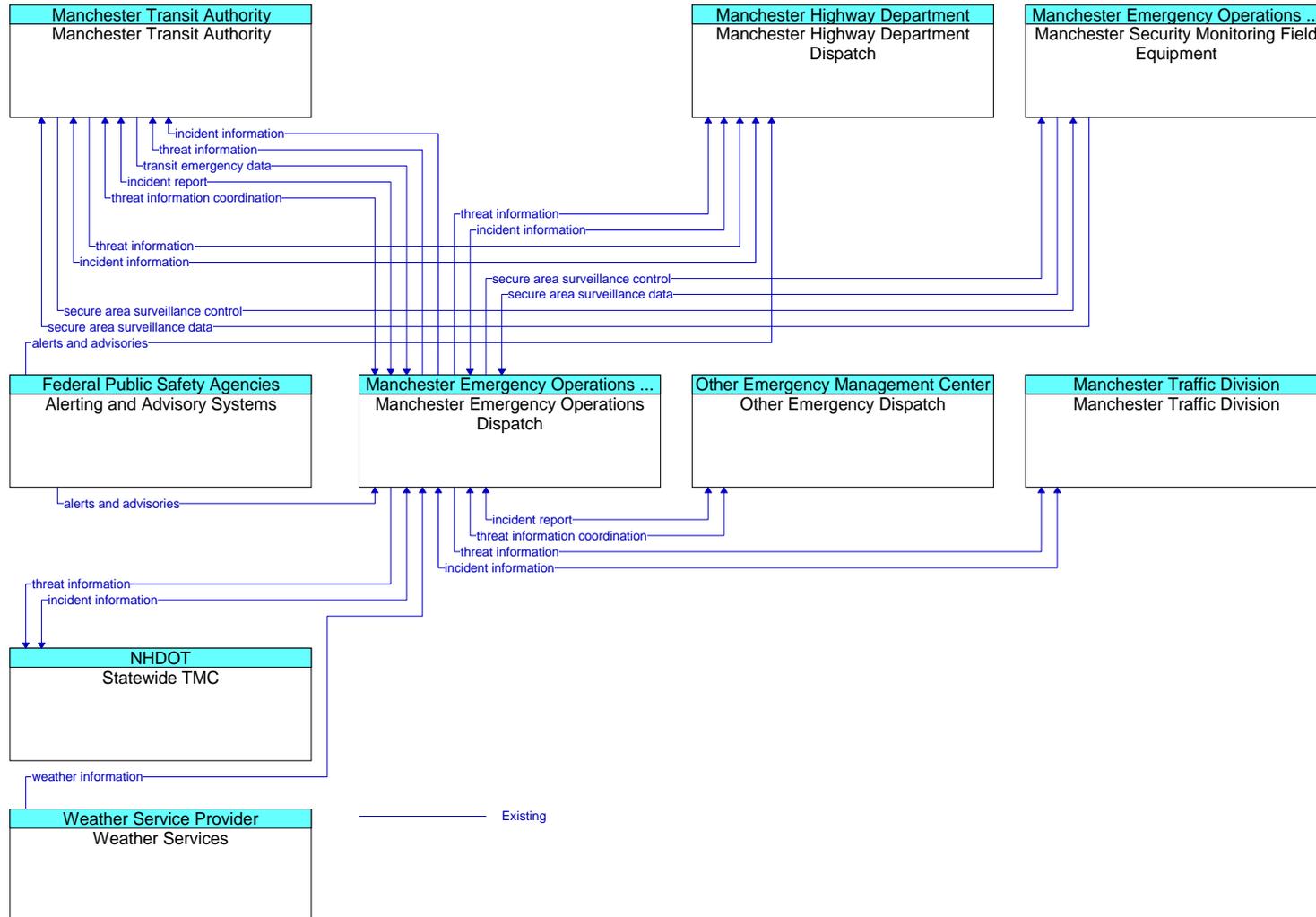
Roadway Service Patrols (EM04) – SNHPC Communities – Bedford, Frankestown and Chester



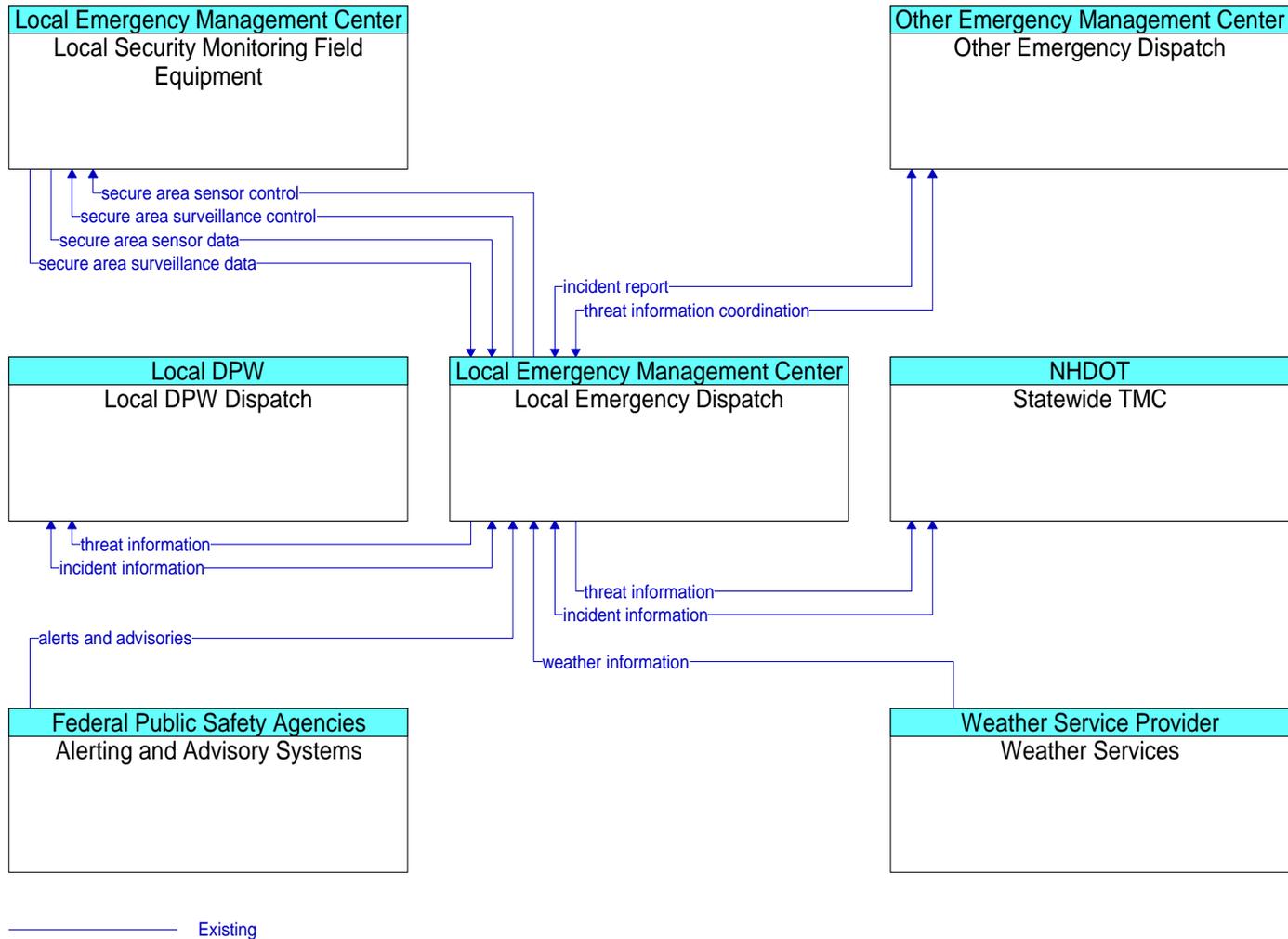
Wide–Area Alert (EM06)

Refer to the Statewide ITS Architecture

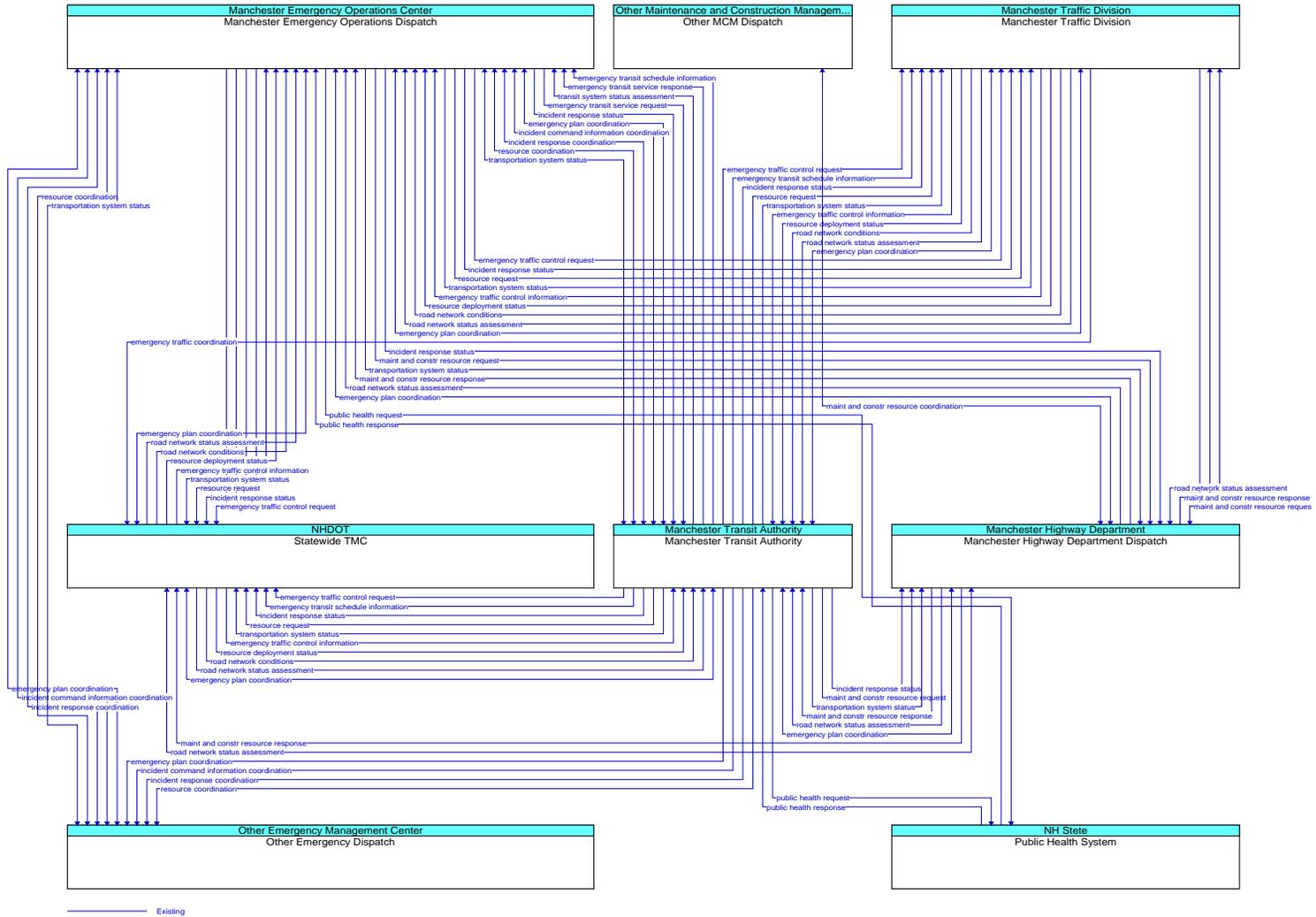
Early Warning System (EM07) –Manchester



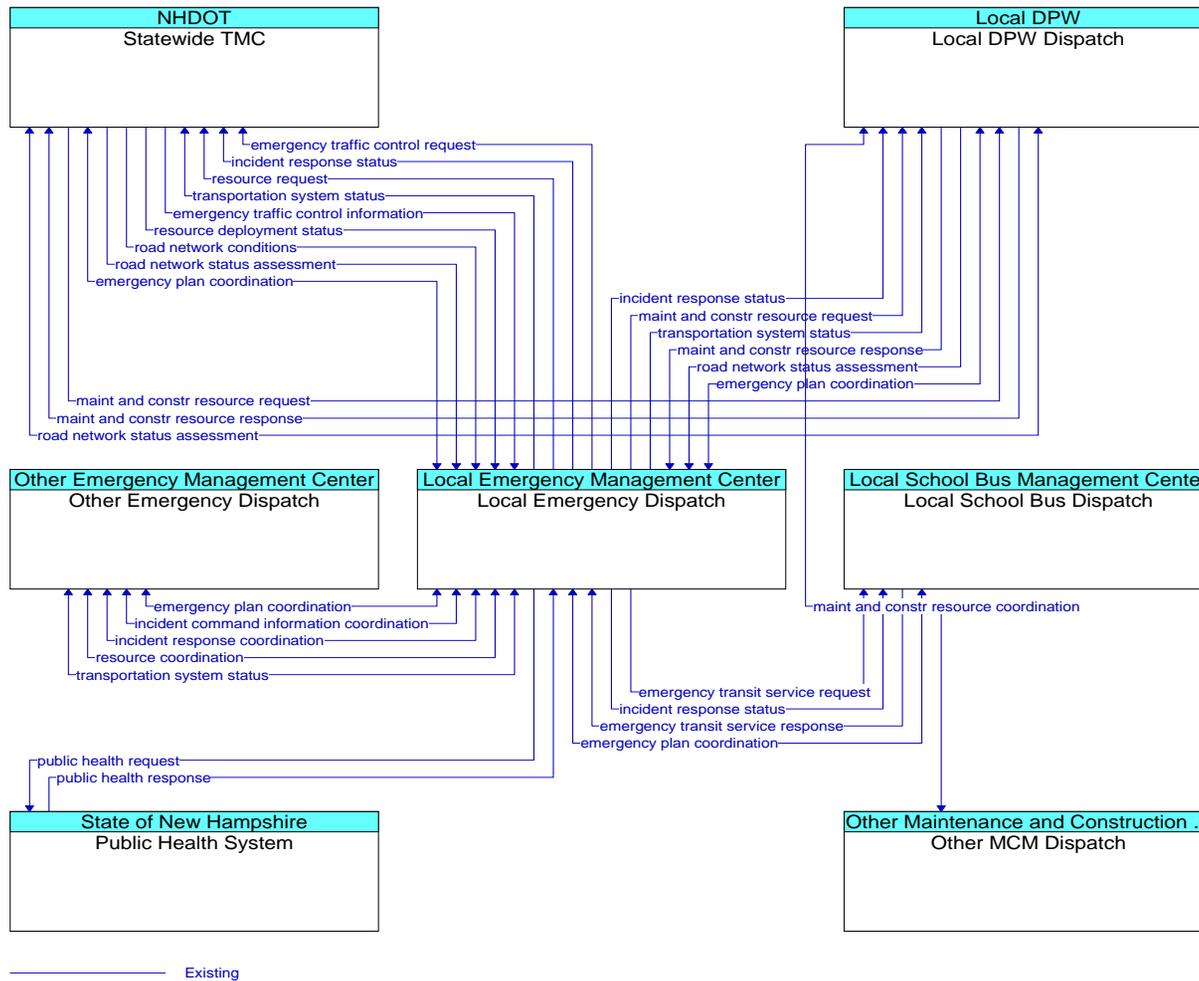
Early Warning System (EM07) – SNHPC Communities Except Manchester



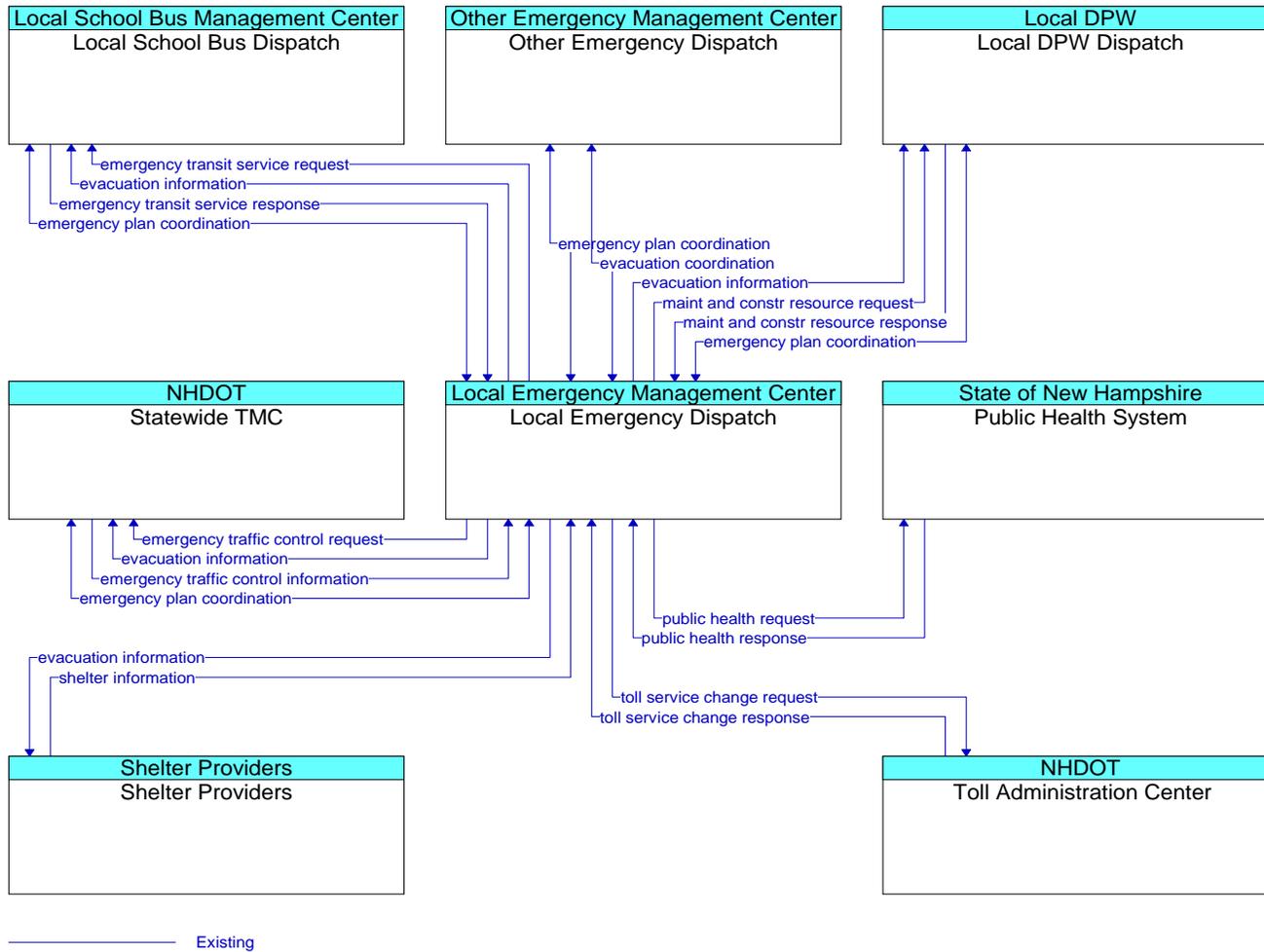
Disaster Response and Recovery (EM08) – Manchester



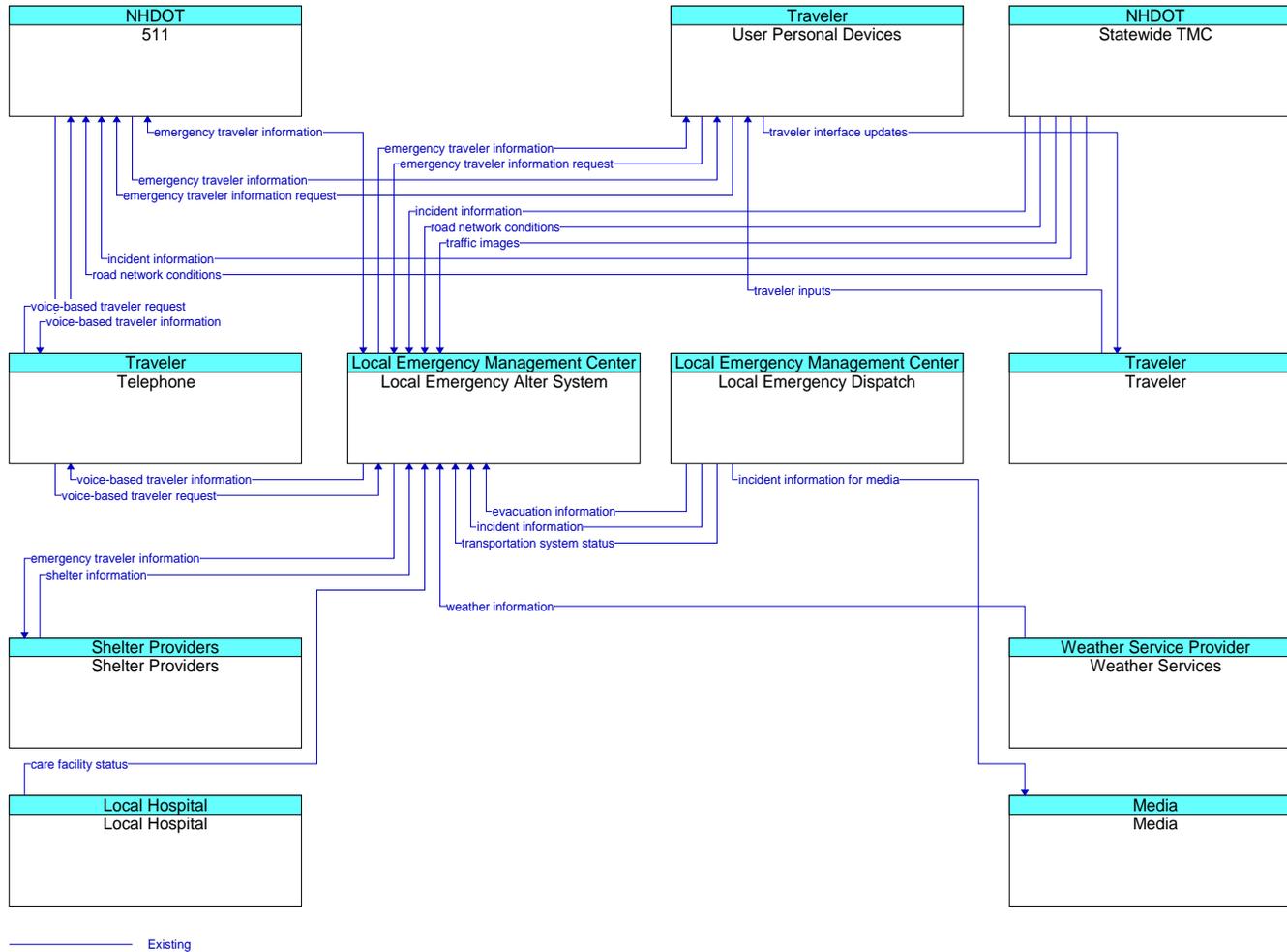
Disaster Response and Recovery (EM08) – SNHPC Communities Except Manchester



Evacuation and Reentry Management (EM09) – SNHPC Communities Except Manchester

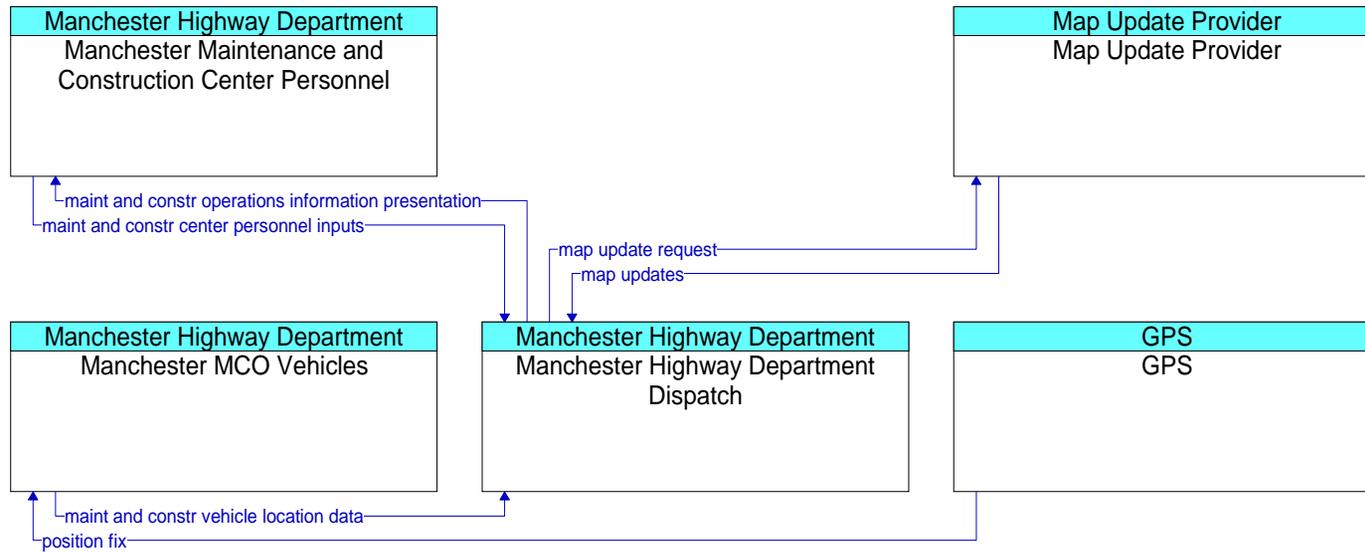


Disaster Traveler Information (EM10) –SNHPC Communities Except Manchester



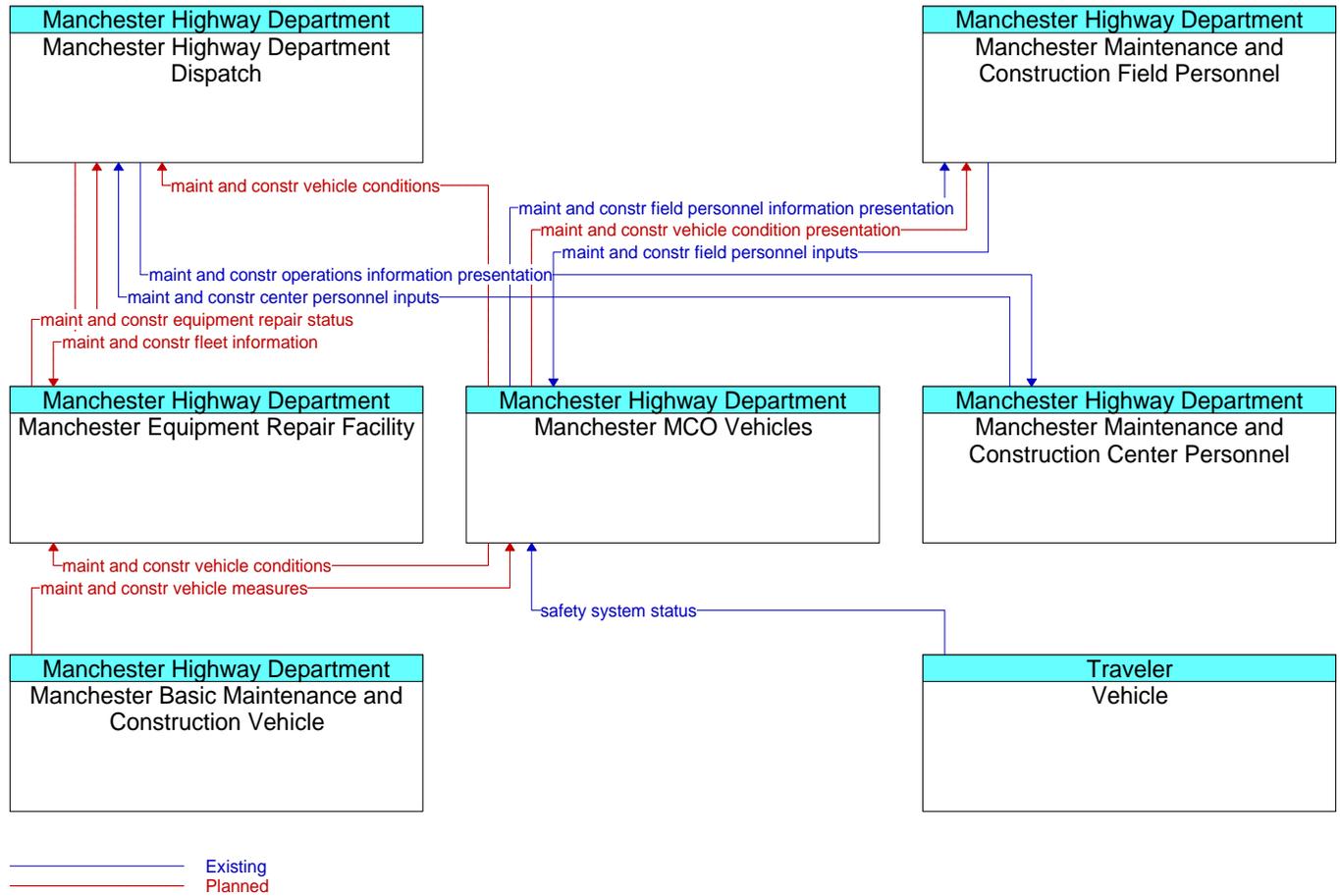
Maintenance and Construction Operations (MCO)

Maintenance and Construction Vehicle and Equipment Tracking (MC01) – Manchester

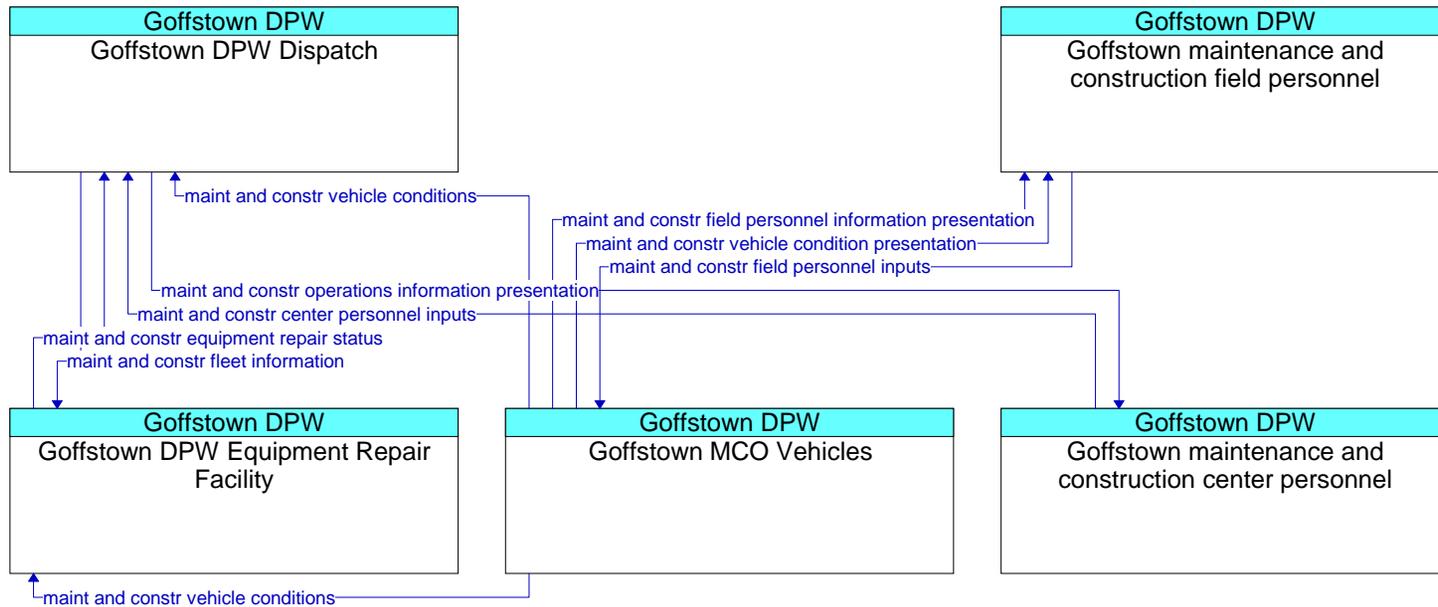


Existing

Maintenance and Construction Vehicle Maintenance (MC02) - Manchester

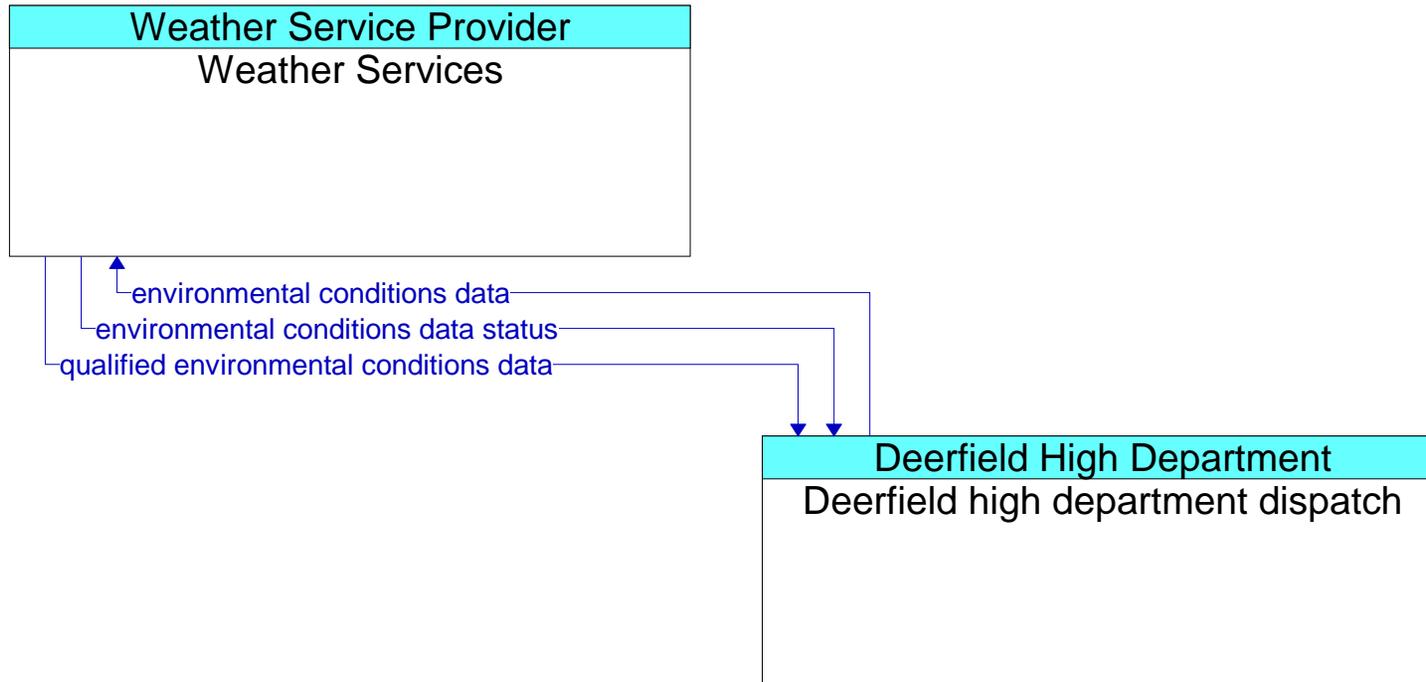


Maintenance and Construction Vehicle Maintenance (MC02) – Goffstown



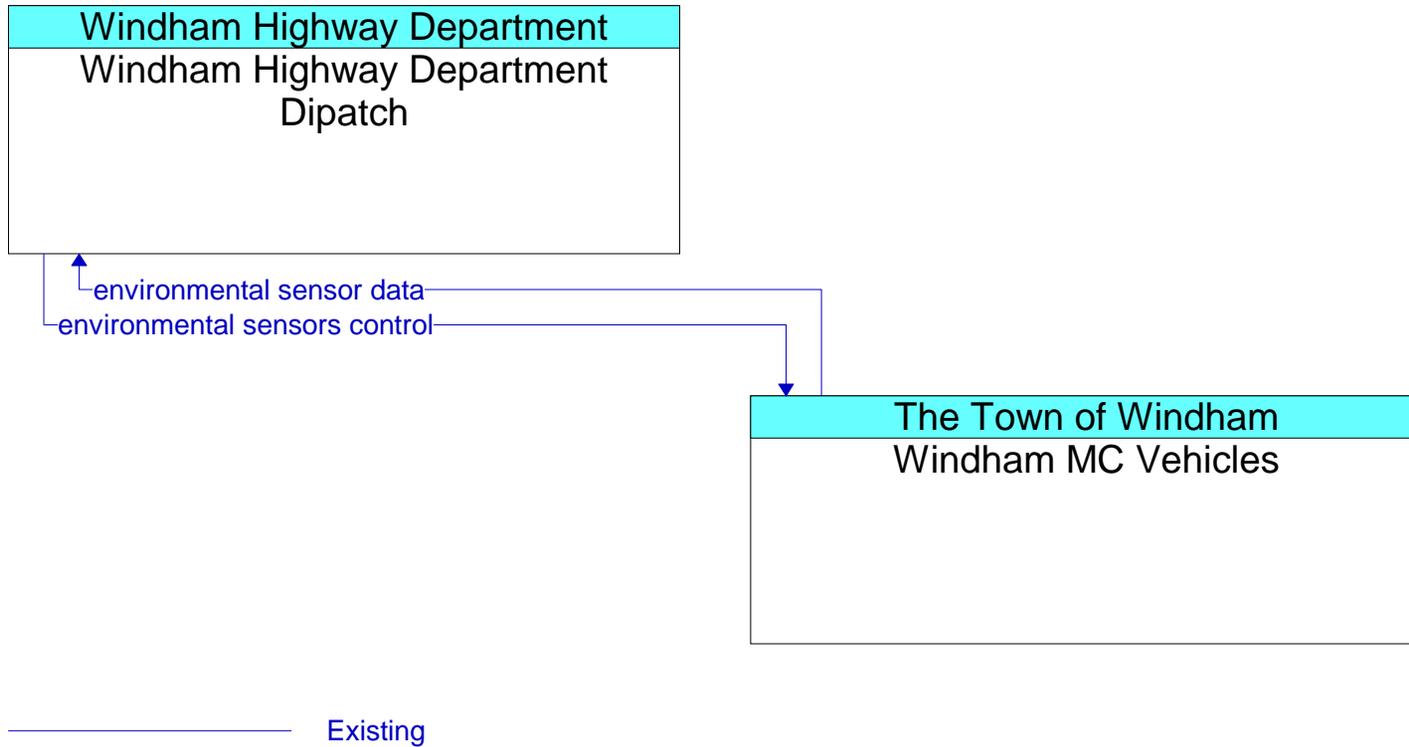
Existing

Road Weather Data Collection (MC03) - Deerfield

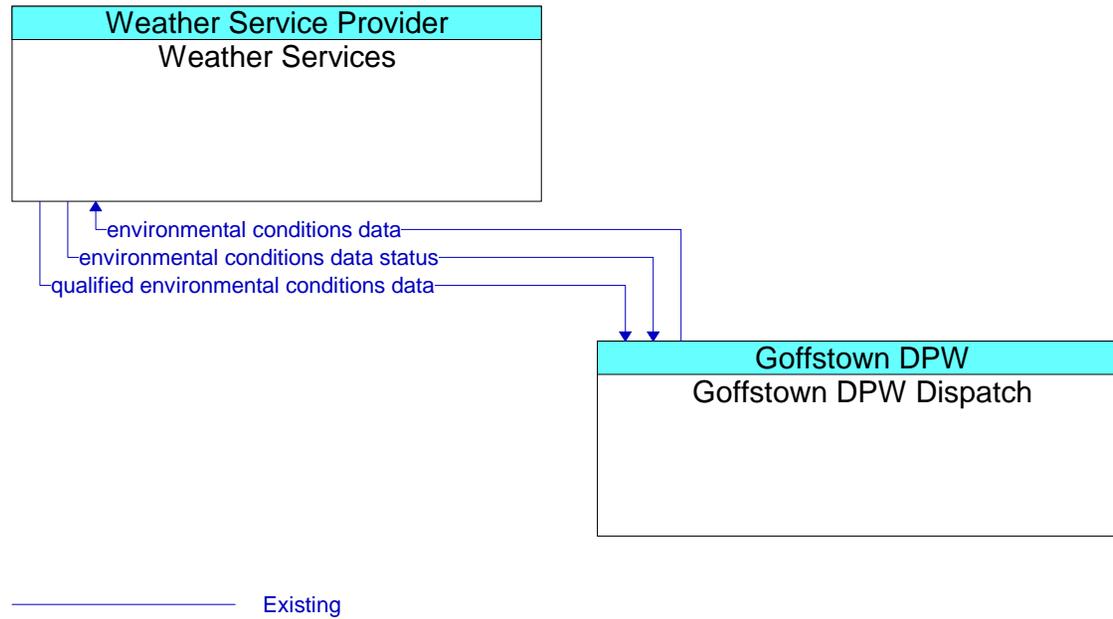


Existing

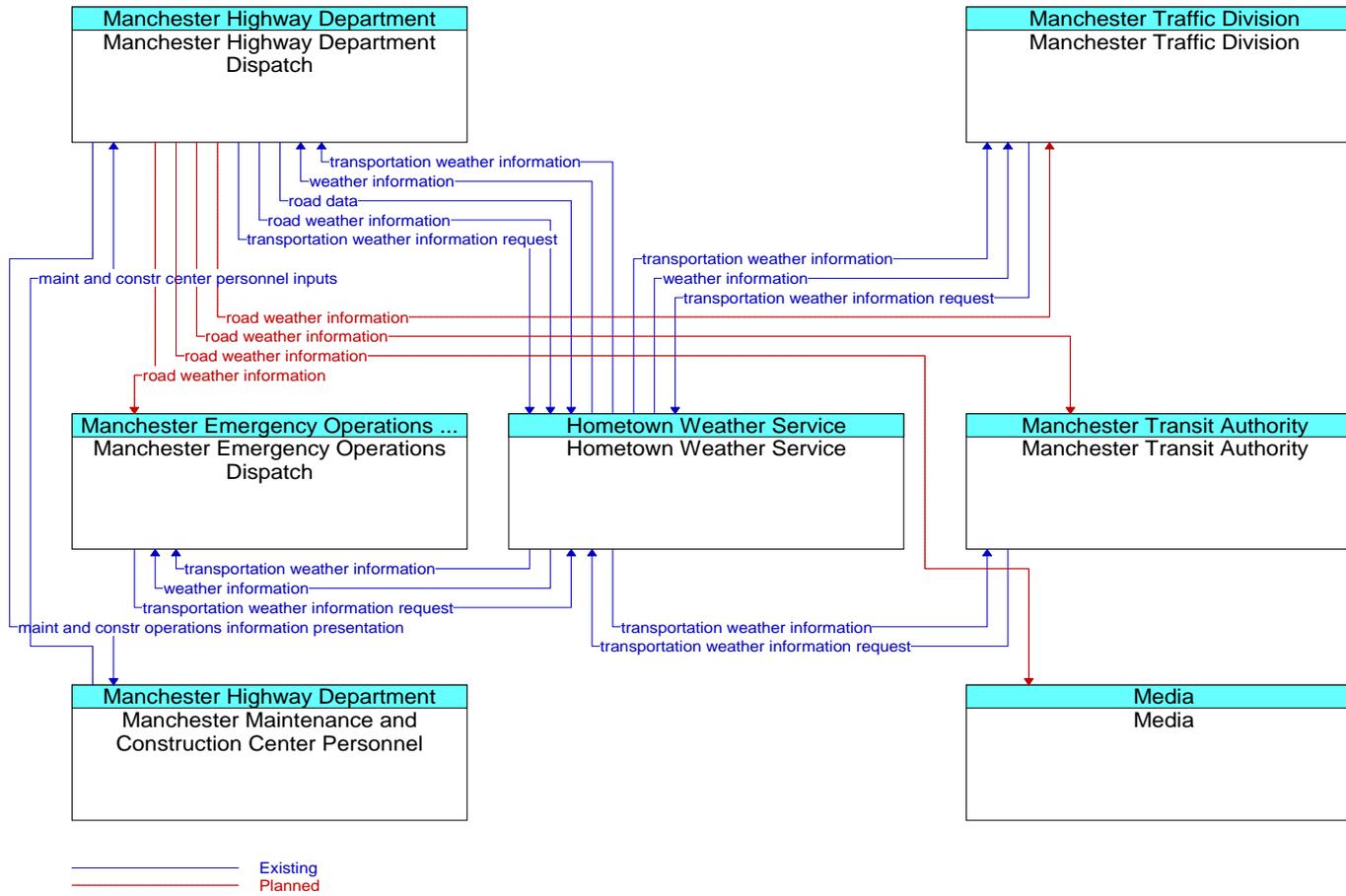
Road Weather Data Collection (MC03) – Windham



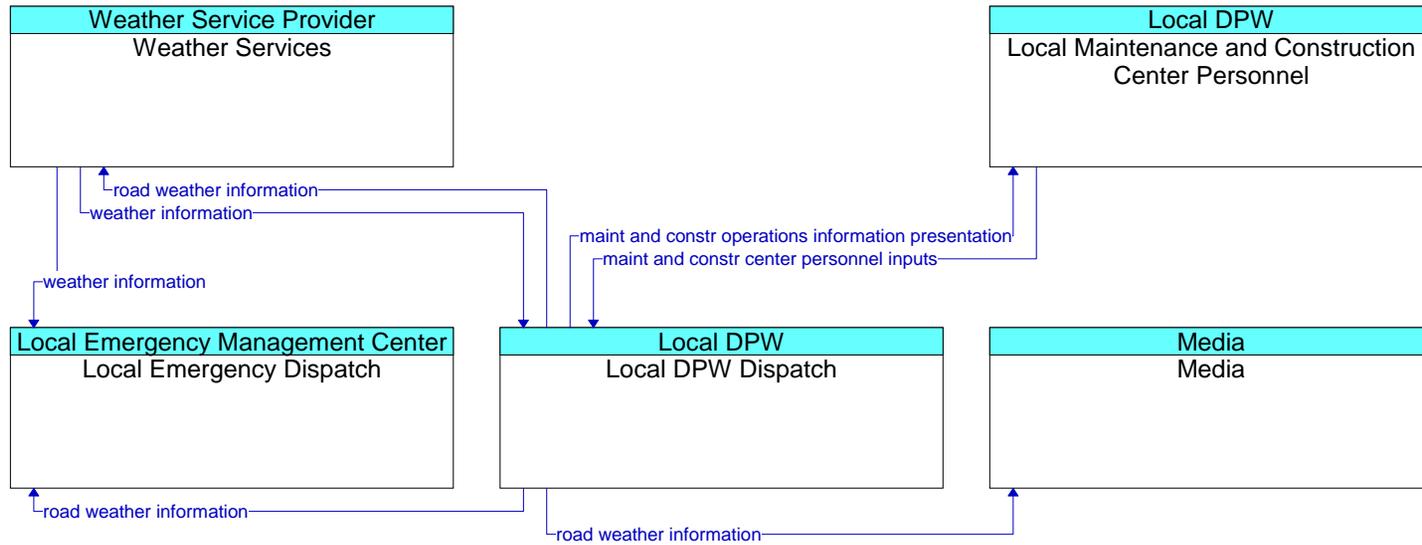
Road Weather Data Collection (MC03) – Goffstown



Weather Information Processing and Distribution (MC04) – Manchester

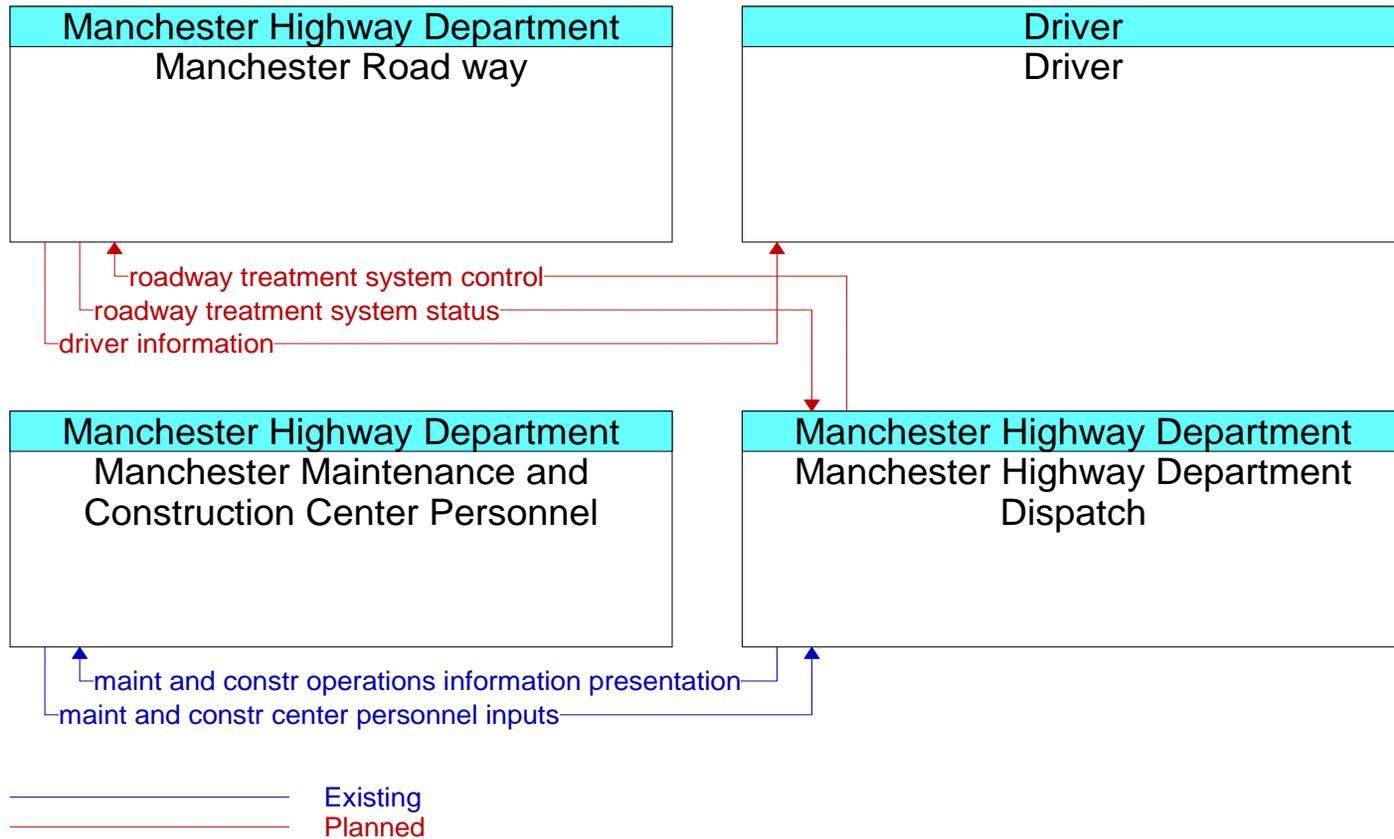


Weather Information Processing and Distribution (MC04) - –SNHPC Communities Except Manchester

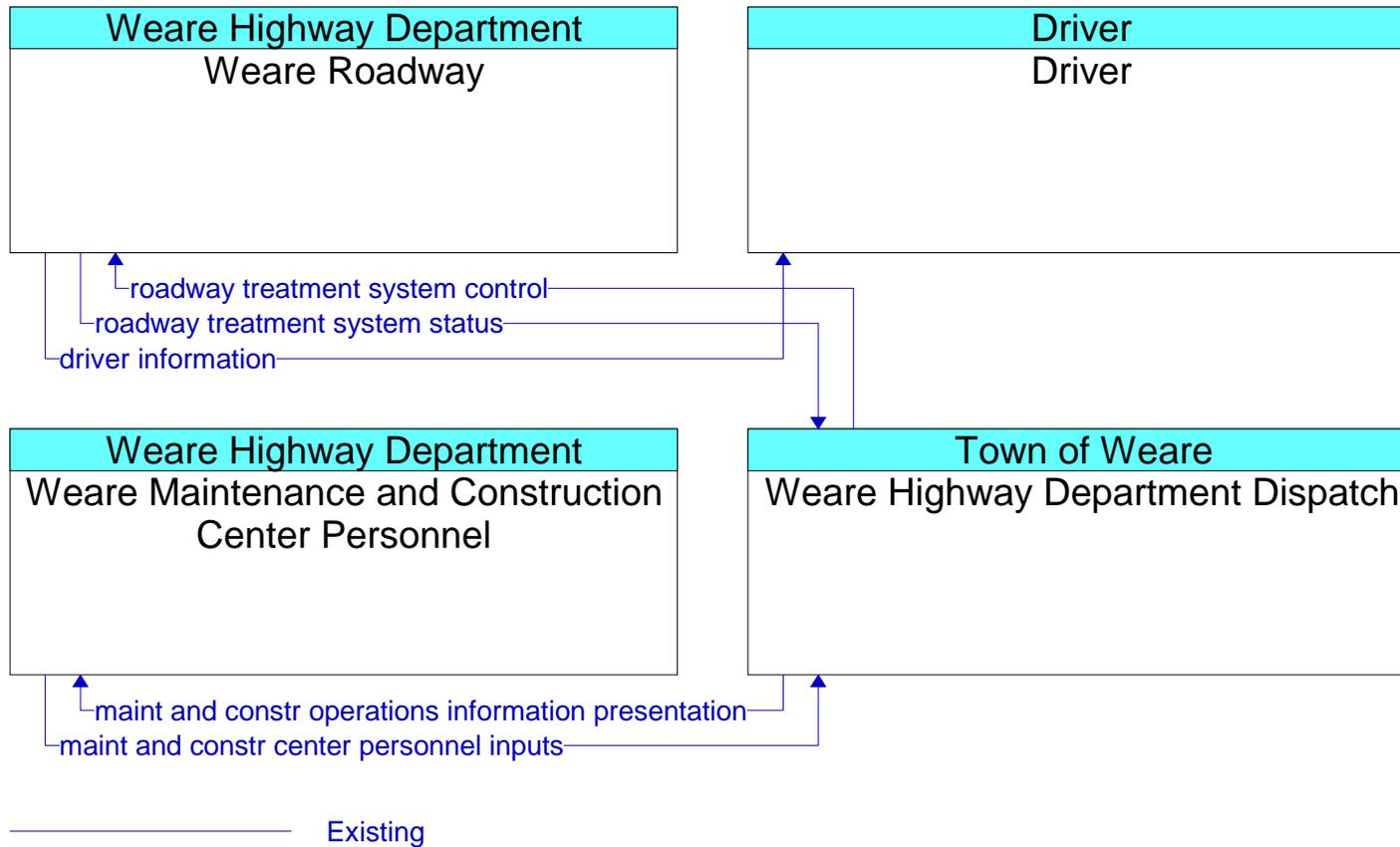


Existing

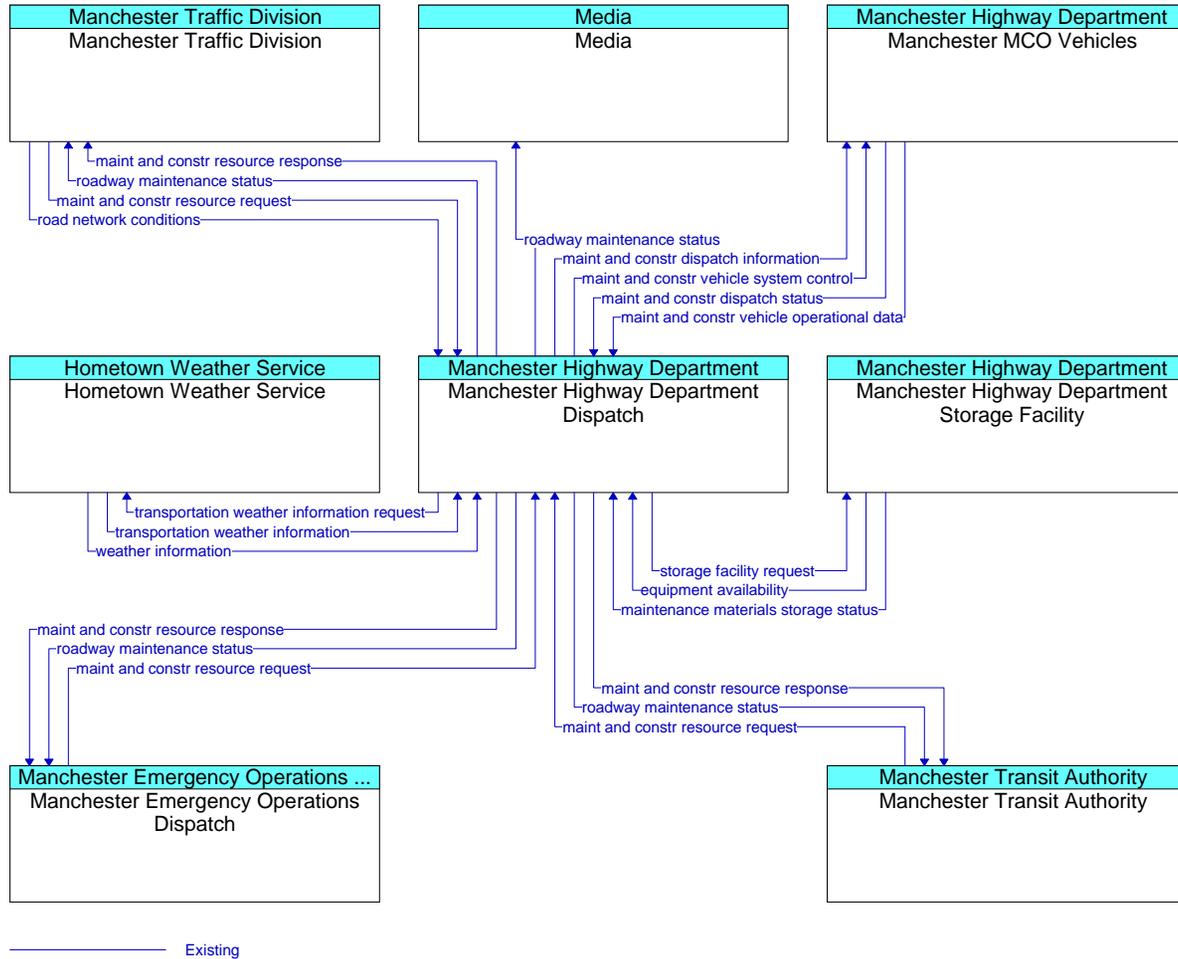
Roadway Automated Treatment (MC05) - Manchester



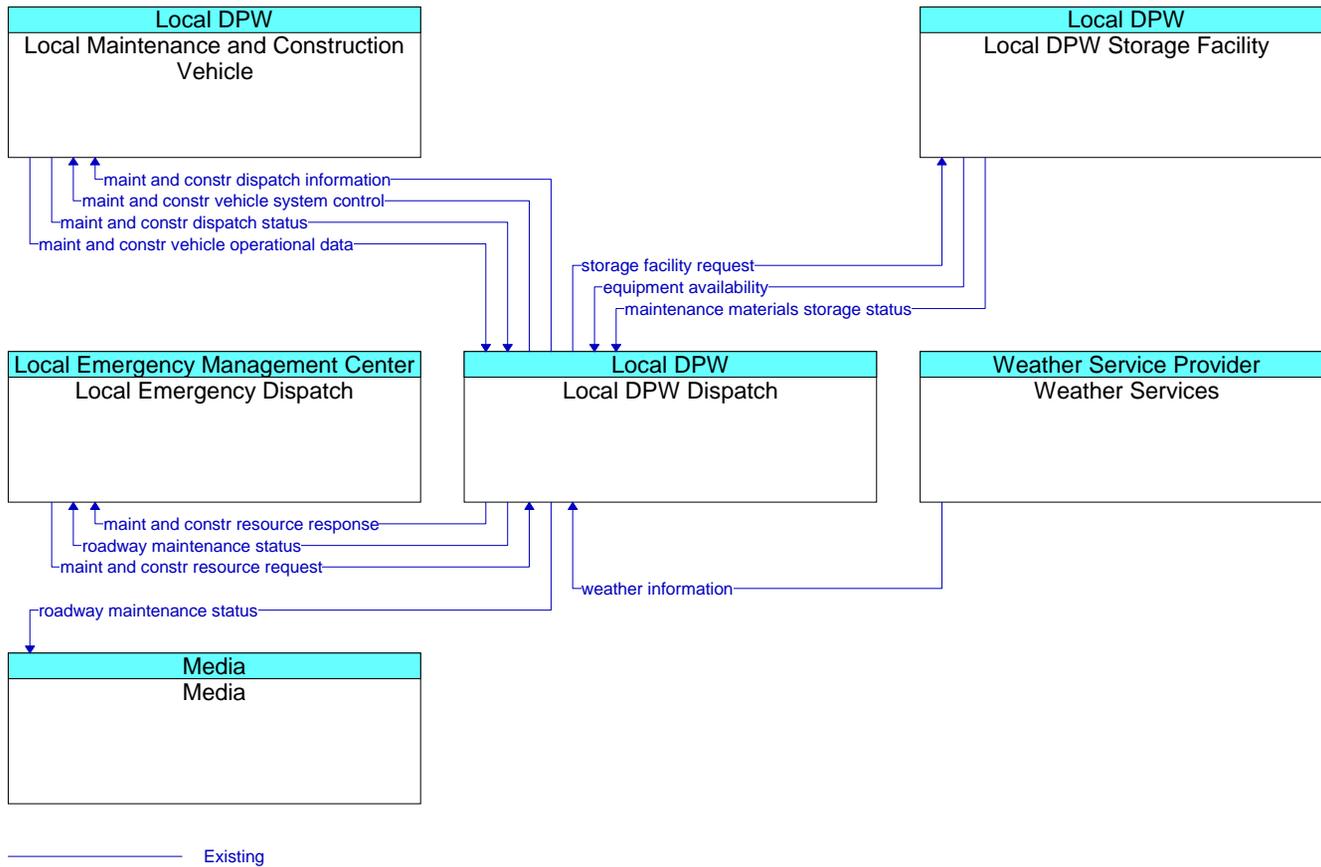
Roadway Automated Treatment (MC05) - Weare



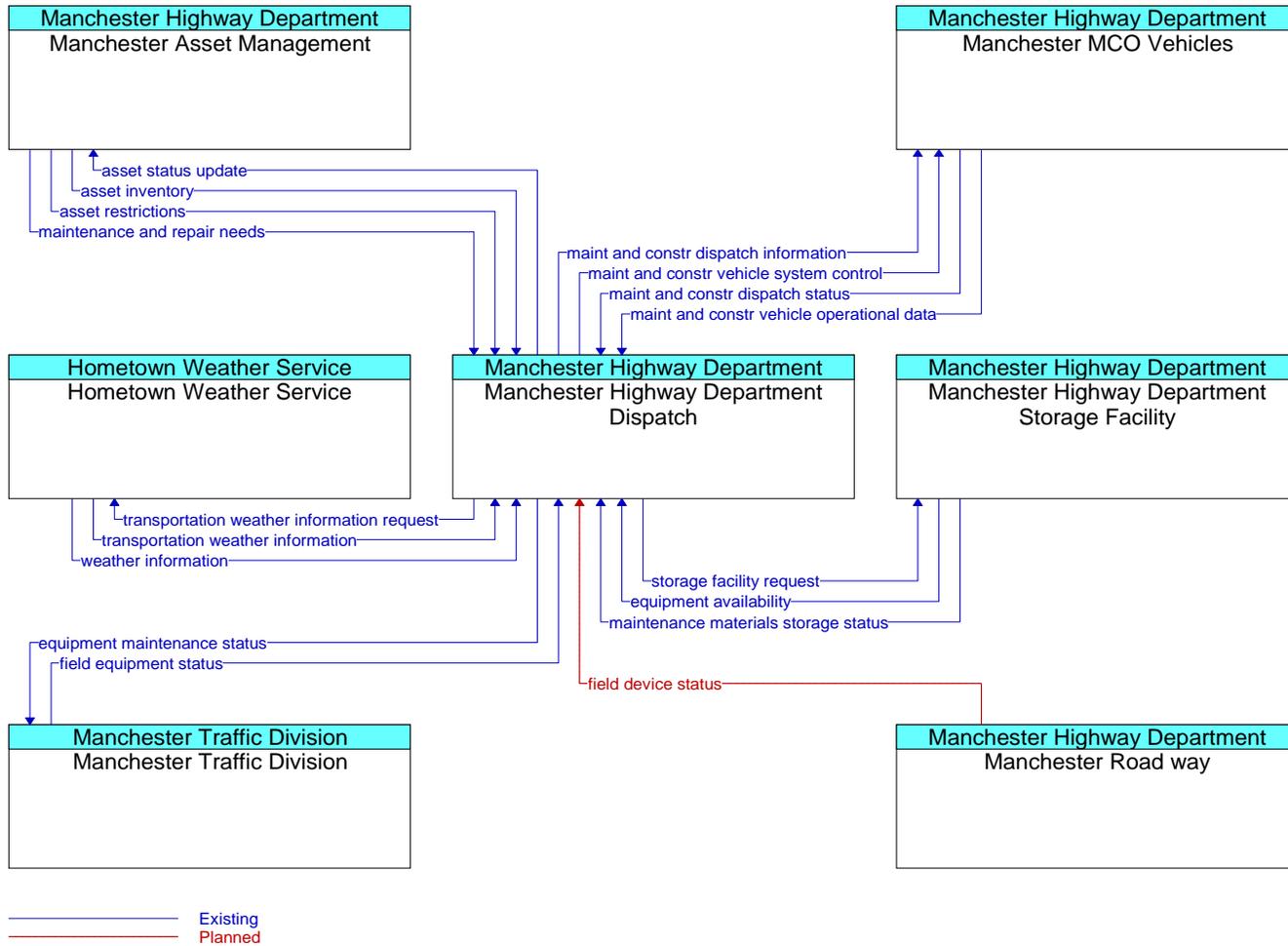
Winter Maintenance (MC06) - Manchester



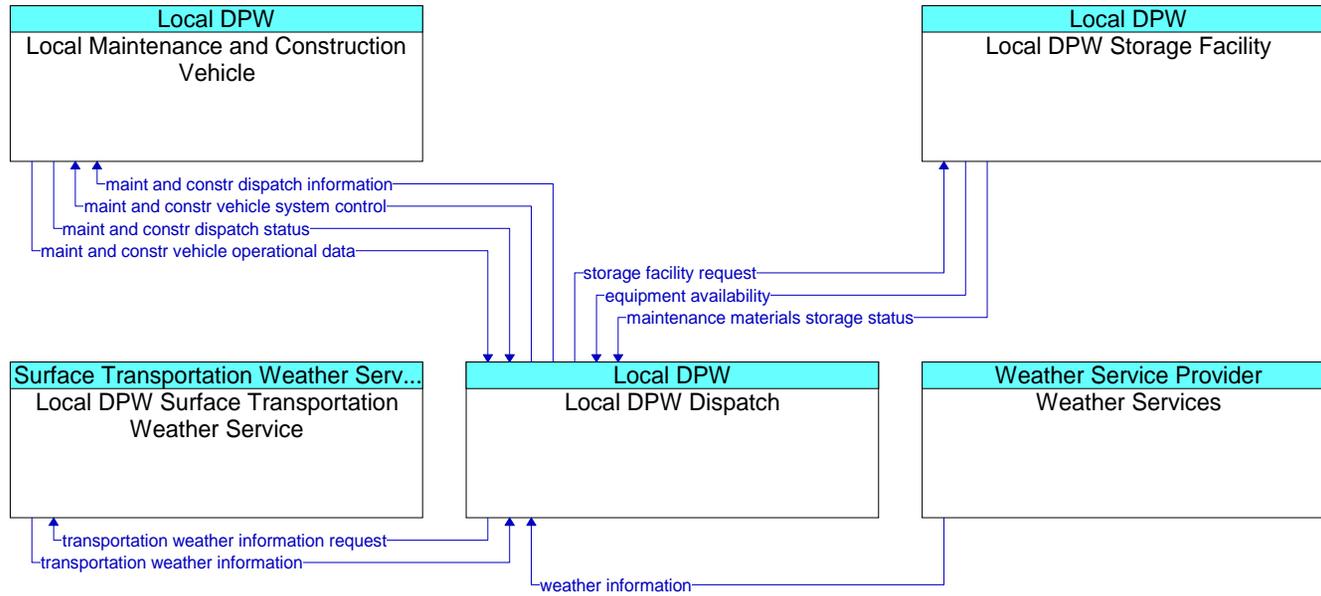
Winter Maintenance (MC06) – SNHPC Communities Except Manchester



Roadway Maintenance and Construction (MC 07) – Manchester

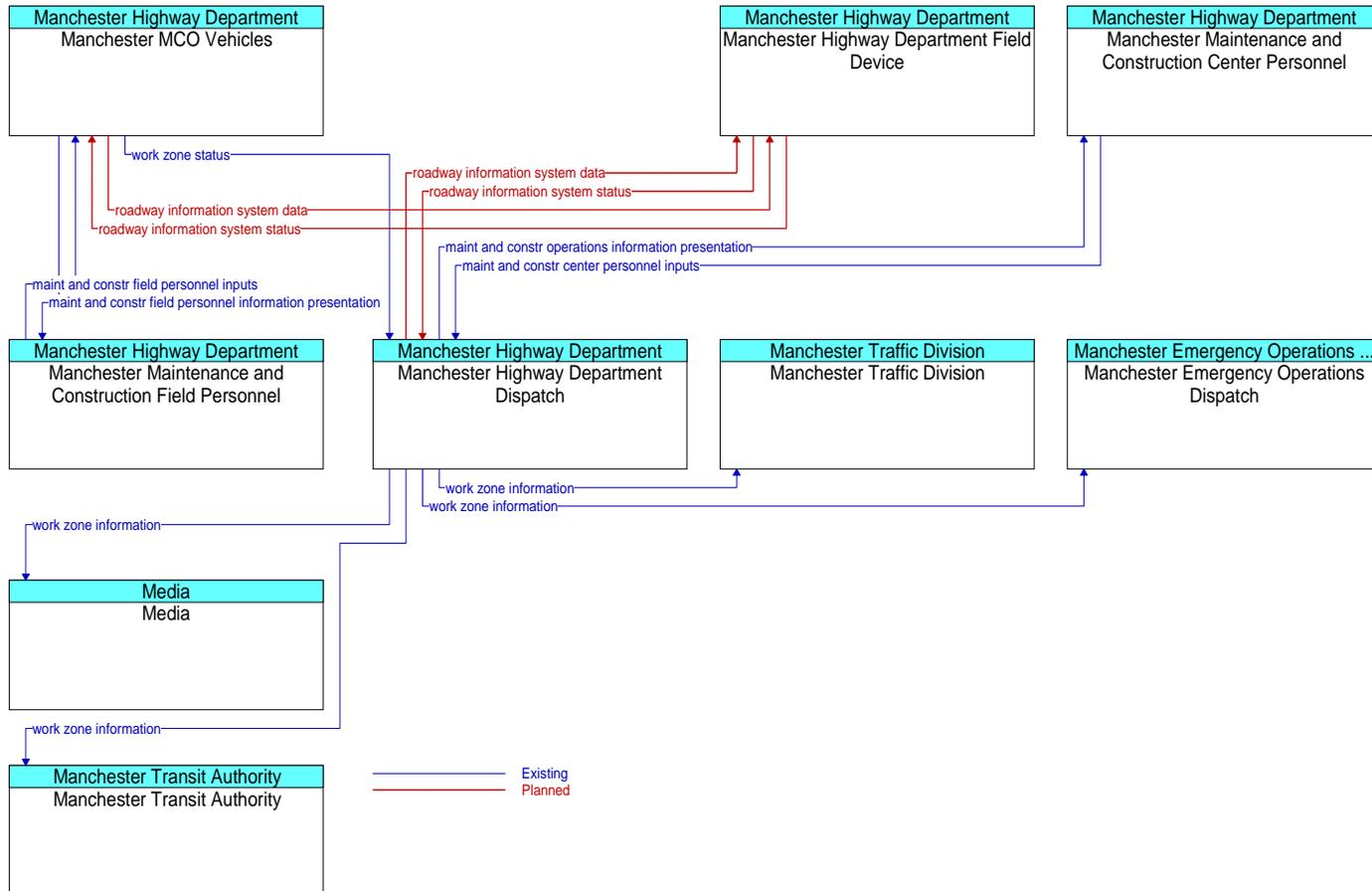


Roadway Maintenance and Construction (MC07) – SNHPC Communities Except Manchester

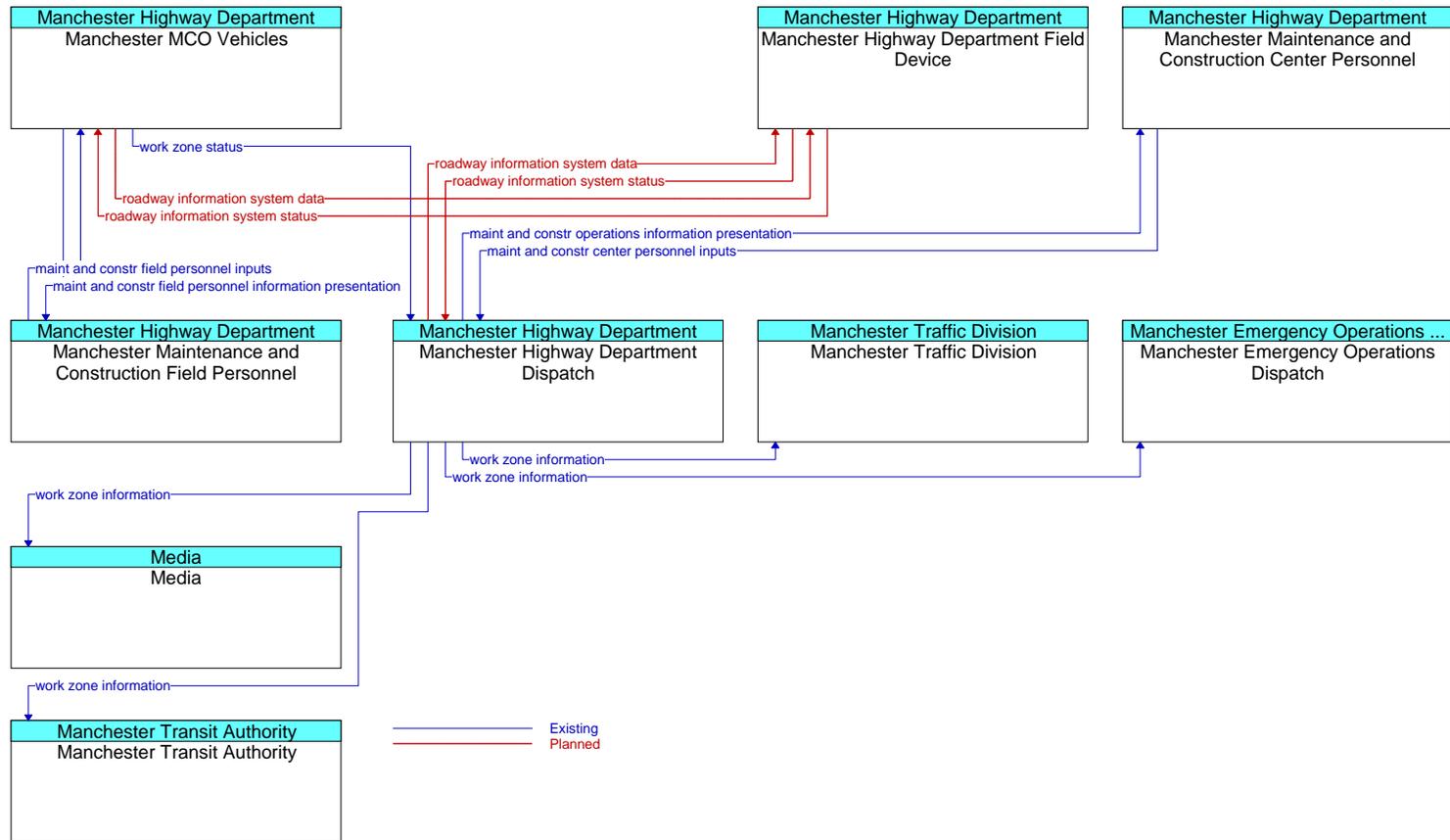


Existing

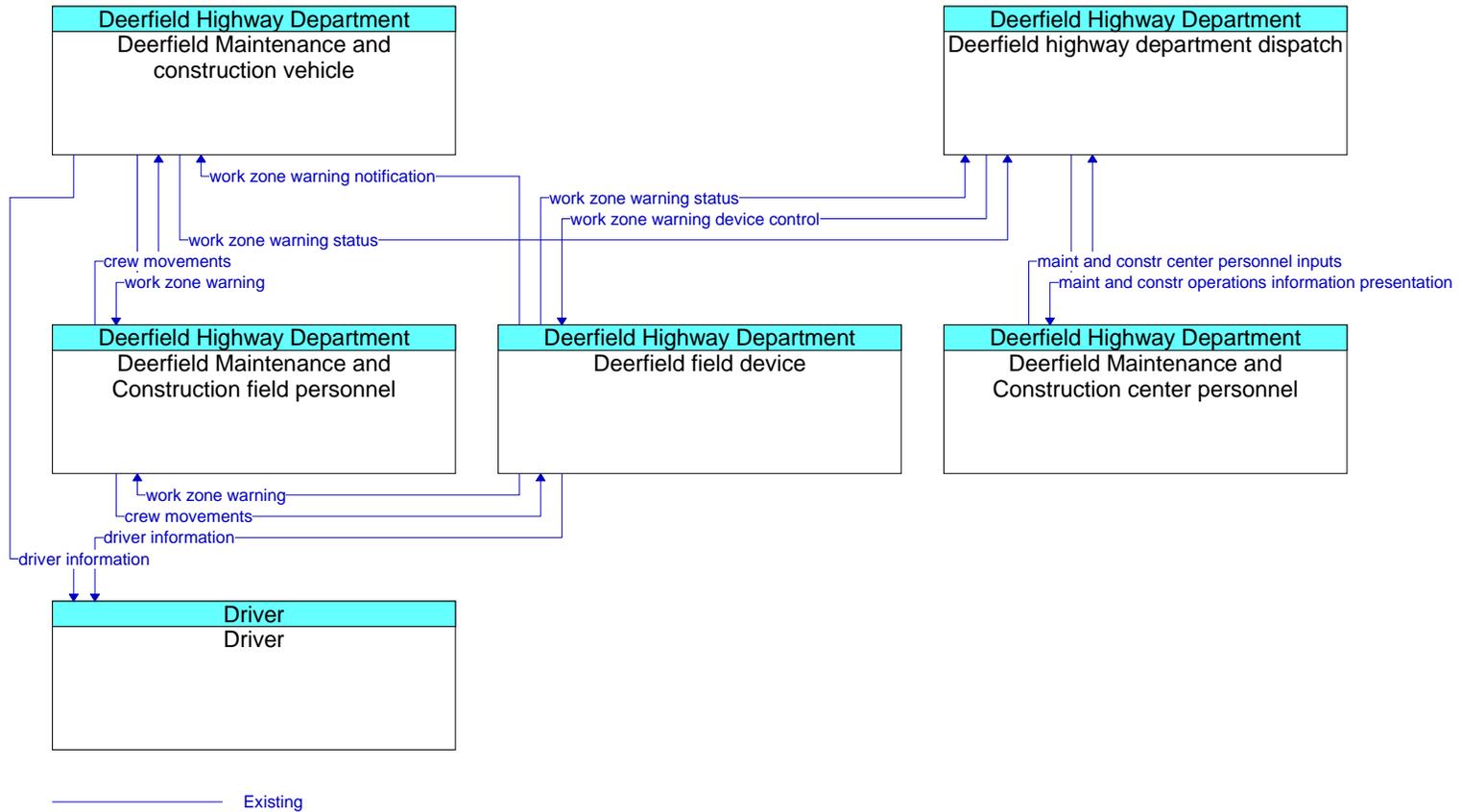
Work Zone Management (MC08) - Manchester



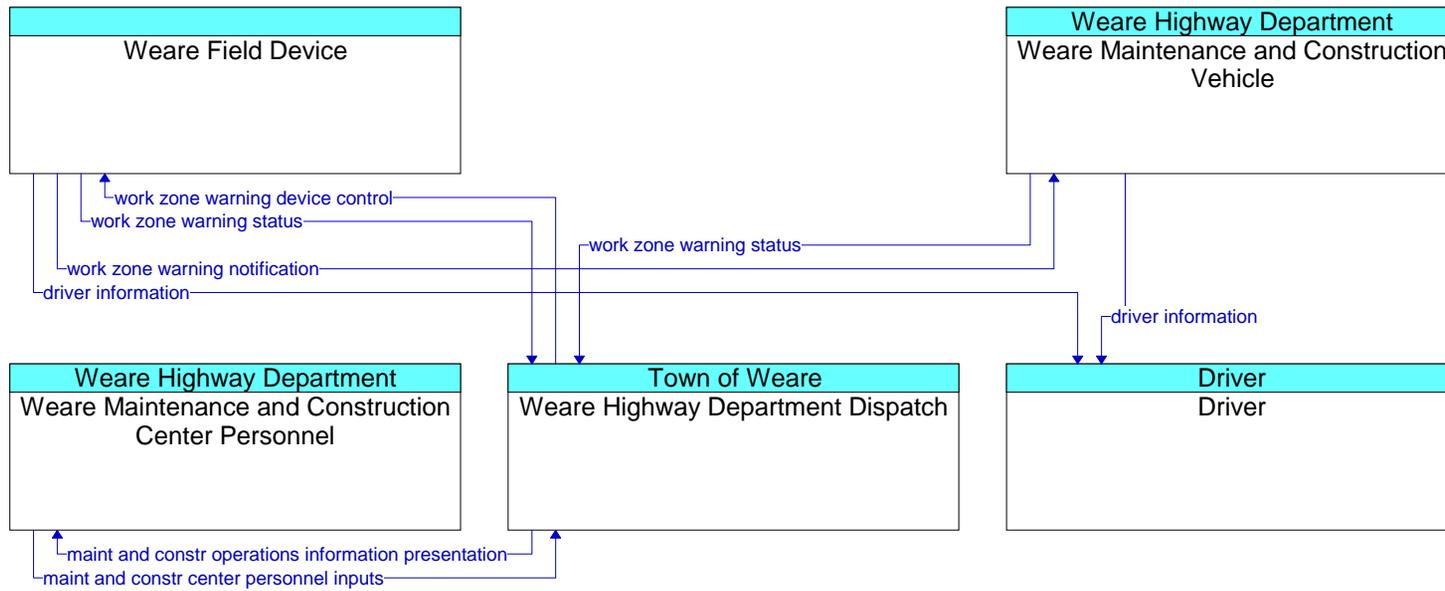
Work Zone Management (MC08) – SNHPC Communities Except Manchester



Work Zone Safety Monitoring (MC09) –Deerfield

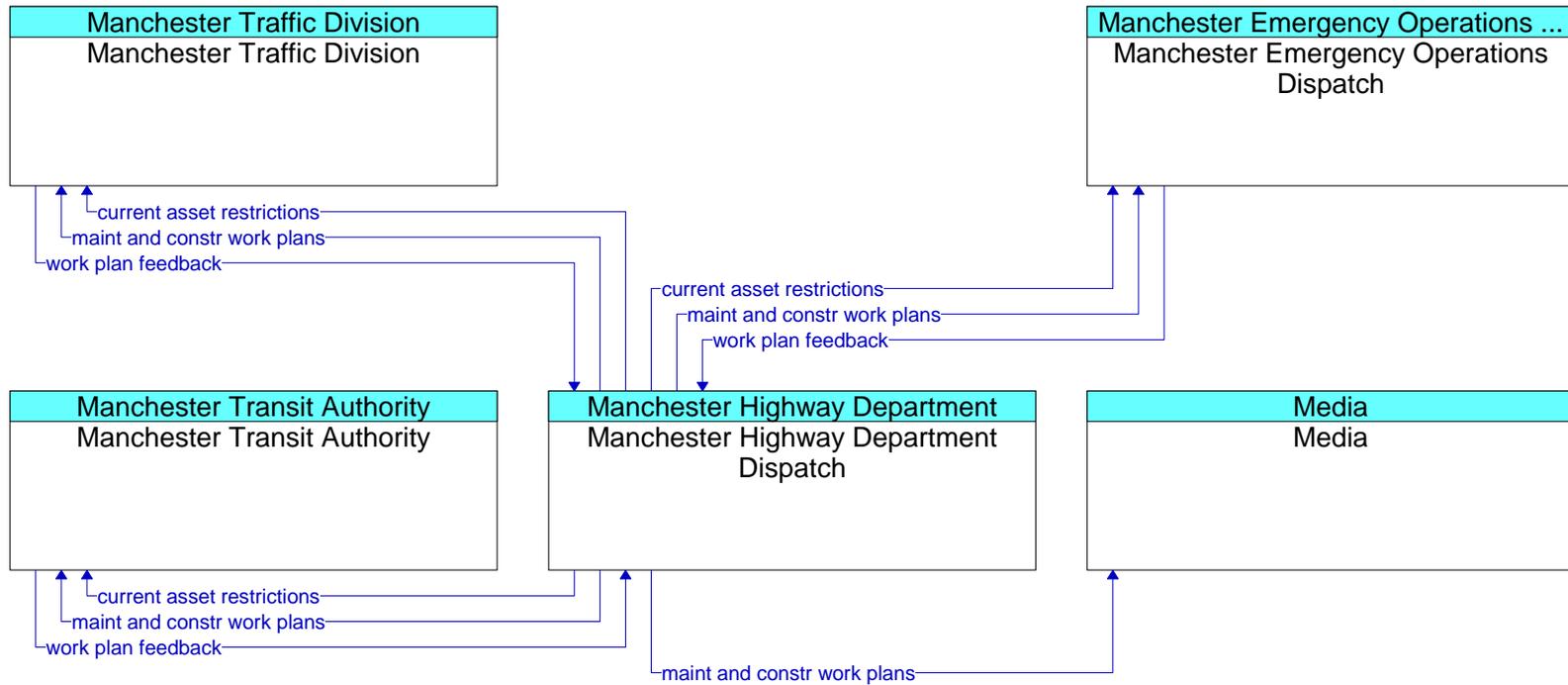


Work Zone Safety Monitoring (MC09) –Weare



Existing

Maintenance and Construction Activity Coordination (MC10) – Manchester



Existing

CHAPTER 9: ITS STANDARDS IDENTIFICATION

ITS standards define the interfaces between ITS subsystems. Establishing ITS standards for exchanging information among ITS systems facilitates deployment of interoperable systems at local, regional, and national levels without compromising innovation. It also reduces risk and cost since a region can select among multiple vendors for deployment products. As a required component of the ITS Architecture for the SNHPC Region, the identified ITS standards in this chapter that currently apply to existing and planned projects are to be used to guide deployment of ITS projects. Appendix G defines ITS standards that are potentially applicable to the SNHPC region.

CHAPTER 10: PROJECT SEQUENCING

Project sequence identifies the order in which ITS projects should be implemented. The primary sources for sequencing information are applicable transportation planning documents like the TIP and Regional Transportation Plan, where ITS projects are already prioritized. The second primary source of project sequencing information is stakeholder input.

Much of the project sequencing information contained in this chapter was accomplished through a review of existing transportation planning documents, and the survey conducted for developing the ITS inventory is contained in Chapter 4.

The projects in the ITS Architecture for the SNHPC Region will be implemented over years, or even a decade. Implementation of ITS projects in the SNHPC Regional Architecture is broken down to three timeframes:

- Short-term (1-4 years)
- Medium-term (5-6 years)
- Long-term (7-10 years)

The project sequencing analysis is presented in Table 10.1.

Table 10.1 Project Sequencing

Project name and location	Description	Lead Agency And Involved Agencies	Time Frame	Service package	Source
Advanced Traffic Management systems (ATMS) and Advanced Traveler Information Systems (ATIS)					
Intersection improvements for safety and traffic flow NH28/NH128- Londonderry		NHDOT	L	• Surface Street Control - ATMS03	RTP
Statewide TSM&O	Statewide Transportation systems management & operations – ITS technologies, cars-511 traveler information - Statewide	NHDOT/ Local Police Department	S	• Refer to the statewide ITS Architecture	TIP
Statewide – Various	Evaluate & Optimize timing at 65 signalized intersections to improve traffic flow and reduce delays	NHDOT	S	• Refer to the statewide ITS Architecture	TIP
Statewide BET-HIRI	Hazardous intersection and roadway improvement	NHDOT	S/M/L	• Surface Street Control - ATMS03	TIP & RTP
Statewide monitoring of environmental mitigation measures – Statewide		NHDOT	S/M/L	• Refer to the Statewide ITS Architecture	TIP & RTP
Transportation systems management - statewide	Engineering for ITS and CARS-511 project	NHDOT	S/M/L	• Refer to the Statewide ITS Architecture	TIP & RTP
Mainstreaming of I-93 CCTV		NHDOT	S/M	• Refer to the statewide ITS Architecture	5-year Strategic Plan
Everett Turnpike (Exit 1 to 15) / I-293 Corridor Deployment		NHDOT	S/M	• Refer to the statewide ITS Architecture	5-year Strategic Plan
RWIS – Strategic Locations statewide	To install road and weather systems around state	NHDOT	S/M	• Refer to the statewide ITS Architecture	5-year Strategic Plan/TIP
High Level Bridge CCTV		NHDOT	S/M	• Refer to the statewide ITS Architecture	5-year Strategic Plan
Turnpike Sensor (Speed, volume, occupancy) Deployment		NHDOT	S/M	• Refer to the statewide ITS Architecture	5-year Strategic Plan

Project name and location	Description	Lead Agency And Involved Agencies	Time Frame	Service package	Source
NH 101 Corridor Deployment		NHDOT	S/M	<ul style="list-style-type: none"> Refer to the statewide ITS Architecture 	5-year Strategic Plan
Transit Master Plan Mainstreaming Development		NHDOT	S/M	<ul style="list-style-type: none"> Refer to the statewide ITS Architecture 	5-year Strategic Plan
Maintenance Decision Support System (MDSS) Request for Proposal Release		NHDOT	S	<ul style="list-style-type: none"> Refer to the statewide ITS Architecture 	5-year Strategic Plan
WorkZone ITS Deployments		NHDOT	S/M	<ul style="list-style-type: none"> Refer to the statewide ITS Architecture 	5-year Strategic Plan
TMC – MAINT - Various	Statewide maintenance for various ITS devices such as message boards and cameras.	NHDOT	S	<ul style="list-style-type: none"> Refer to the statewide ITS Architecture 	TIP
Statewide – RRRCS - Rail	Reconstruction of crossing, signals, and related work	NHDOT	S/M/L	<ul style="list-style-type: none"> Surface street control ATMS03 	TIP
NH 101 Corridor safety improvements @ Various Locations from Wilton to Wallace Rd. - Bedford	Safety improvements @ various locations from Wilton to Wallace RD NH 101 Corridor Study - Statewide	NHDOT	S/M/L	<ul style="list-style-type: none"> Surface Street Control - ATMS03 	TIP & RTP
Bedford-Merrimack - F. E. Everett TPK	Improvement to Bedford Mainline Toll Plaza to Institute Open Road Tolling	NHDOT	S	<ul style="list-style-type: none"> Electronic Toll Collection (ATMS10) 	TIP
Advanced Public Transportation Systems (APTS)					
I -93 commuter bus services - Londonderry -Salem	Capital, and Commuter bus preventative maintenance	NHDOT	S/M/L	<ul style="list-style-type: none"> Refer to the Statewide ITS Architecture 	TIP
Operating assistance for fixed route service – Manchester		MTA/ Manchester Highway Department	S/M/L	<ul style="list-style-type: none"> Transit Fixed Operations - APTS2 	TIP & RTP
Replace buses - Manchester		MTA	S/M/L	<ul style="list-style-type: none"> Transit Vehicle Tracking - APTS1 Transit Fixed Route 	TIP & RTP

Project name and location	Description	Lead Agency And Involved Agencies	Time Frame	Service package	Source
				<ul style="list-style-type: none"> Operations - APTS2 • Demand response Transit Operations - APTS3 • Transit Fare Collection Management – APTS4 • Transit Security - APTS5 • Transit Fleet Maintenance -APTS6 • Multi-modal Coordination - APTS7 • Transit Traveler Information - APTS8 	
Operating assistance for capital maintenance of MTA fleet - Manchester		MTA	S/M/L	<ul style="list-style-type: none"> • Transit Fleet Maintenance -APTS6 	TIP & RTP
Operating Assistance for ADA Paratransit Service - Manchester		MTA	S/M/L	<ul style="list-style-type: none"> • Demand Response Transit Operations - APTS3 	TIP & RTP
Replacement of ADA Paratransit Vans - Manchester		MTA	S/M/L	<ul style="list-style-type: none"> • Transit Vehicle Tracking - APTS1 • Demand Response Transit Operations - APTS3 • Transit Security - APTS5 • Transit Fleet Maintenance -APTS6 • Multi-modal Coordination - APTS7 • Transit Traveler Information - APTS8 	TIP
Replacement of transit service vehicles - Manchester		MTA	S	<ul style="list-style-type: none"> • Transit Vehicle Tracking - APTS1 • Transit Fixed Route Operations - APTS2 • Demand Response Transit Operations - APTS3 • Transit Fare Collection 	TIP

Project name and location	Description	Lead Agency And Involved Agencies	Time Frame	Service package	Source
				Management – APTS4 • Transit Security - APTS5 • Transit Fleet Maintenance - APTS6 • Multi-modal Coordination - APTS7 • Transit Traveler Information - APTS8	
Miscellaneous Capital - Manchester		MTA	S/M/L	• Transit Vehicle Tracking - APTS1 • Transit Fixed Route Operations - APTS2 • Demand response Transit Operations - APTS3 • Transit Security - APTS5 • Transit Fleet Maintenance - APTS6 • Multi-modal Coordination - APTS7 • Transit Traveler Information - APTS8	TIP & RTP
CART – Preventative Maintenance	The Cooperative Alliance for Regional Transportation (CART) provides fixed route and curb-to-curb transportation serving the town of Chester, Derry, Hampstead, Londonderry, Plaistow, and Salem. Limited service to Plaistow and Windham.	CART	S/M/L	• Demand Response Transit Operations - APTS3 • Transit Fixed-Route Operations – APTS2	TIP
CART Operating Assistance	The Cooperative Alliance for Regional Transportation (CART) provides fixed route and curb-to-curb transportation serving the town of Chester, Derry, Hampstead, Londonderry,	CART	S/M/L	• Demand Response Transit Operations - APTS3 • Transit Fixed-Route Operations – APTS2	TIP

Project name and location	Description	Lead Agency And Involved Agencies	Time Frame	Service package	Source
	Plaistow, and Salem. Limited service to Plaistow and Windham.				
Portsmouth – Manchester Bus service between Portsmouth & Manchester	The service connects Portsmouth, Downtown Manchester & Manchester-BR Airport.	NHDOT	S	<ul style="list-style-type: none"> Transit Fixed-Route Operations – APTS2 	TIP
Maintenance and Construction Operations (MCO)					
Salem to Manchester	Corridor Smart Work Zone	NHDOT	S	<ul style="list-style-type: none"> Refer to the Statewide ITS Architecture 	TIP
Local DPW Maintenance Vehicle Upgrades	Intended to be a deployment of AVL, vehicle sensors and other ITS devices on-board local DPW maintenance vehicles to alert the dispatch function of vehicle location and road conditions, to alert equipment repair facilities of maintenance status, and to request motorist aid.	Local DPW/Map Update Provider, Meteorlogix DTN, Hometown Weather Service, NHDOT, Media	L	<ul style="list-style-type: none"> Maintenance and construction vehicle maintenance - MC02 – (Manchester) Road weather data collection - MC03 (Manchester) 	ITS Survey
Manchester Roadway Automated treatment	Intended to deploy automated treatment for the local road.	Manchester DPW/Driver	L	<ul style="list-style-type: none"> Roadway Automated Treatment - MC05 (Manchester) 	ITS Survey
Road weather information collection system	Intended for the deployment of cameras, sensors, signs, and weather related warnings.	Manchester Highway Dept./ Meteorlogix DTN/Media	L	<ul style="list-style-type: none"> Road Weather Data Collection - MC03 (Manchester) Weather Information Processing and Distribution - MC04 (Manchester) 	ITS Survey
Emergency Management (EM)					
Corridor Service Patrol (SA-MA) I-93	Service to help manage incidents and reduce delay.	NH State Police/NHDOT TMC	S/M	<ul style="list-style-type: none"> Roadway Service Patrol (EM04) 	TIP
Emergency Evacuation Support	This equipment package Coordinates evacuation plans among allied agencies and manages evacuation and reentry of	Candia Emergency Management Center/NHDOT, Public Health	S	<ul style="list-style-type: none"> Evacuation and Reentry Management Disaster Traveler Information 	ITS Survey

Project name and location	Description	Lead Agency And Involved Agencies	Time Frame	Service package	Source
	a population in the vicinity of a disaster or other emergency that poses a risk to public safety.	System, Shelter, DPW			

Note: Lead agency in bold.

CHAPTER 11: INTERAGENCY AGREEMENT REQUIREMENTS

Any agreements (existing or new) required for operations, including at a minimum those affecting ITS project interoperability, utilization of ITS related standards, and the operation of the projects identified in the Regional ITS Architecture are required in FHWA Rule 940.9 (d)4 and FTA National ITS Architecture Policy Section 5.d.4.

Connections between systems in the ITS Architecture for the SNHPC Region represent cooperation between stakeholders and potential requirements for agreements. Agreements among the stakeholder agencies and organizations document information sharing, purposes and terms of the agreements, security issues, budget, scope, and boundaries. The ITS deployments detailed in the ITS Architecture for the SNHPC Region are to be implemented by a number of stakeholders. To assist the implementation of these deployments, existing and identified agreements are compiled in this chapter.

11.1 Agreements

Existing agreements developed to aid in the development of ITS and identified agreements that will support implementation of ITS projects detailed in the Architecture are developed in Appendix F. Actual agreements will be developed depending on project deployments, organizational and operational considerations, and funding availability.

CHAPTER 12: USING THE ARCHITECTURE/MAINTENANCE PLAN

This chapter describes how the ITS Architecture for the SNHPC Region is used to assist in the implementation of ITS technology in the region and how it supports regional transportation planning activities. This chapter also describes maintenance of the Architecture.

Use of the Architecture

The objectives for the ITS Architecture for the SNHPC Region are 1) to incorporate planned/proposed projects involving ITS technologies into the regional transportation planning process; 2) fully integrate ITS technology into the existing and planned transportation infrastructure and 3) facilitate the best possible decisions concerning the investment of public funds for regional transportation systems and services. The ITS Architecture for the SNHPC Region is designed to support these goals. Use of the Architecture for transportation planning in the region will involve a two-way information flow where proposed transportation plans and projects serve as inputs to the Architecture and information derived from the Architecture is used to guide subsequent transportation planning activities.

SNHPC, as the MPO for the Manchester UZA, is responsible for producing and maintaining the regional Transportation Improvement Program (TIP) and the Regional Transportation Plan for the Southern New Hampshire Planning Commission (Plan). The TIP represents a vital link between plan development and project implementation where plans are converted into specific improvement projects programmed for implementation on the basis of priority and fiscal constraint. The TIP serves as the short-range component of the long-range Plan. The Plan addresses all forms of transportation used in the 15 municipalities of the region. For each transportation mode, the Plan is intended to serve as a guide for funding of projects. The intermodal Plan is required by Federal law to establish funding priorities for regional transportation projects and to maintain eligibility for transportation funds.

In New Hampshire, the TIP is updated every two years in accordance with the Ten-Year Plan process and federal metropolitan planning regulations issued by FHWA and FTA. SNHPC historically updates the TIP and Plan concurrently during this two-year cycle.

Consideration of ITS projects for inclusion in the TIP and Plan could originate from recommendations from specific studies or from additional input received from other stakeholders such as municipalities or transit operators. Input from the Architecture is used to identify new ITS elements related to the development and selection of TIP projects and descriptions of projects in the TIP and Plan benefit from information available from the Architecture. The Architecture facilitates and augments project selection process by providing additional details concerning the nature of ITS applications.

Consideration of ITS projects for inclusion in the TIP and Plan, including the processes described in the previous chapter occurs during public comment for the TIP and Plan and includes consideration by the SNHPC Technical Advisory Committee (TAC) and MPO Policy Board (MPO). The TAC is responsible for making recommendations to the MPO, which is in turn responsible for selecting projects for inclusion in the TIP and Plan. Following selection of projects for inclusion in the TIP and Plan, the MPO Policy Board is then responsible for providing input into the implementation process with NHDOT, FHWA and other implementing agencies. Information on project prioritization and implementation from the Architecture would be inputs to this process.

Projects included in the ITS Architecture for the SNHPC Region will be implemented over years, or even decades. In order to coordinate selection and implementation of projects with the Statewide Architecture and Strategic Plan, implementation of ITS projects in NHDOT the ITS Architecture for the SNHPC Region will be broken down into three timeframes as defined in Chapter 10.

The ITS Architecture for the SNHPC Region will support development of the TIP and Plan and related planning requirements. The Architecture will support the development of projects designed to preserve and make the most efficient use of the existing transportation infrastructure, and will also facilitate the planning and development of projects designed to relieve congestion and maximize the mobility of goods and people throughout the region. The basis for this work is the Congestion Management Process for the SNHPC Region (CMP), which is being designed to identify congested locations, determine the causes of congestion, develop alternative strategies to mitigate congestion, evaluate the potential of different strategies and track and evaluate the impact of previously implemented congestion management strategies. The implementation of ITS technologies in the region will be instrumental in the full design of the CMP.

Architecture Maintenance

The ITS Architecture for the SNHPC Region requires regular updating. Updates are required to incorporate changes in ITS project status, including the completion and implementation of projects, project modifications and other revisions designed to reflect advances in ITS technology and opportunities for integration. FHWA recommends the development of a documented process for maintaining regional ITS Architectures. Additionally, the process should be designed to facilitate cooperation and integration with similar ITS maintenance plans developed by the NHDOT and other MPOs in the State. The remainder of this section will outline the features of the maintenance plan for the ITS Architecture for the SNHPC Region.

Based on the importance of coordinating the ITS Architecture for the SNHPC Region maintenance with similar State efforts, the SNHPC has assumed responsibility for maintenance of the Architecture. SNHPC has assumed this responsibility based on the organization's role in the MPO transportation planning process and based on experience gained through the development of the regional Architecture.

SNHPC has adopted a two-year cycle for regular updates and maintenance of the Architecture to coincide with the Ten-Year Plan process. In addition to the regular updates, maintenance includes modifications between regularly scheduled updates to allow for incorporation of significant additions, deletions or modifications to planned or proposed regional ITS projects. The TAC and Policy Committee play key roles in the review and approval of Architecture updates, including consideration of how changes address regional needs as defined in the Architecture and if these change reflect desired ITS services. Information pertaining to projects chosen for inclusion in the Architecture will be forwarded to the NHDOT. Once these ITS projects have been approved by NHDOT for inclusion in the Ten-Year Plan, the projects and project elements will be fully incorporated into the Architecture.

The TAC can play a key role in the maintenance of the Architecture, as it well-suited for this role because it is composed of municipal technical personnel. TAC members will also be familiar with earlier phases of regional Architecture project development in their communities.

Since the development of the initial Architecture in 2006, the Architecture update process has focused primarily on information gathered through regular outreach to SNHPC member communities and stakeholders. The outreach has been achieved through the completion of surveys providing information on local ITS elements such as parking facility management, emergency management operations, maintenance and construction operations and public transit applications. This information originates from SNHPC member communities and other stakeholder agencies within the region. The information obtained from this process is used to update ITS inventory and documentation of their operational concepts, definition of project functional requirements, project interconnects, information flows and project standards. Any information received regarding project sequencing and interagency agreements will also be used to update the Architecture. As a result of this process, rural SNHPC towns have also benefited from exposure to information on ITS technology and how it relates to their community.

The Architecture maintenance plan will also be reviewed periodically. The review will ensure the maintenance plan continues to effectively incorporate changes resulting from completion and implementation of projects, project modifications and other changes in project status. The role of SNHPC staff in this review will be to monitor the ITS maintenance plan and make recommendations to the TAC when changes may be required.

APPENDICES

APPENDIX A: LIST OF ACRONYMS

AASHTO – American Association of State Highway and Transportation Officials
ANSI – American National Standards Institute
ASTM – American Society for Testing and Material
ATMS – Advanced Traffic Management System
AVL – Automatic Vehicle Location
CARS – Condition Acquisition Reporting System
CCTV – Closed Circuit Television
CVO – Commercial Vehicle Operations
DMS – Dynamic Message Sign
DPW – Department of Public Works
EOC – Emergency Operations Center
ETC – Electronic Toll Collection
FHWA – Federal Highway Administration
IEEE – Institute of Electrical and Electronics Engineers
ITE – Institute of Transportation Engineers
ITS – Intelligent Transportation Systems
MCM – Maintenance and Construction Management
MCV – Maintenance and Construction Vehicle
MTA – Manchester Transit Authority
NEMA – National Electrical Manufacturers Association
NHDAS – New Hampshire Department of Administrative Services
NHDOS – New Hampshire Department of Safety
NHDOT – New Hampshire Department of Transportation
NHOIT – New Hampshire Office of Information Technology
NTCIP – National Transportation Communications for ITS Protocols
PRISM – Performance and Registration Information System Management
RTMS – Remote Traffic Microwave Sensor
RTP – Regional Transportation Plan
RWIS – Roadway Weather information System
SAE – Society of Automotive Engineers
SDO – Standards Development Organization
TIMS – Traffic and Incident Management System
TMC – Transportation Management Center
TMS – Transportation management System
TOC – Transportation Operations Center
TIP – Transportation Improvement Program
WIM – Weigh in Motion

APPENDIX B: LIST OF STAKEHOLDERS



Stakeholder

Auburn Emergency Management Center

Description: Auburn Emergency Management Center supports incident management, disaster response and evacuation, security monitoring, and other security and public safety-oriented ITS applications.

Associated Element: Auburn Emergency Vehicle

BCTV

Description: Bedford TV provides traffic reports, travel conditions, and other transportation-related news services to the traveling public.

Bedford Bulletin

Description: Bedford Bulletin provides traffic reports, travel conditions, and other transportation-related news services to the traveling public.

Bedford DPW

Description: Bedford Department of Public Works is responsible for maintaining a large segment of the town's physical infrastructure.

Associated Element: Bedford DPW Dispatch

Associated Element: Bedford MCO Vehicles

Associated Element: Bedford MCO Field Devices

Associated Element: Bedford DPW Webpage

Candia Emergency Management Center

Description: Candia Emergency Management Center supports incident management, disaster response and evacuation, security monitoring, and other security and public safety-oriented ITS applications.

Chester Emergency Management Center

Description: Chester Emergency Management Center supports incident management, disaster response and evacuation, security monitoring, and other security and public safety-oriented ITS applications.

Associated Element: Chester emergency Vehicle

COMIC-CON San Diego Convention Center

Description: A website provides space to manage event parkings.

Associated Element: COMIC-CON

Community Transportation Provider

Description:

Associated Element: Community Transportation Provider

Concord Area Transit

Description: CAT provides fixed route transportation in the City of Concord, NH. CAT also provides demand response transportation to senior and people with disabilities.

Associated Element: CAT

Cooperative Alliance for Regional Transportation

Description: CART is a curb-to-curb transportation system serving the towns of Chester, Derry, Hampstead, Londonderry and Salem. Limited service to Plaistow and Windham.

Associated Element: CART Vehicles

Associated Element: CART_Telephone

Associated Element: CART website

Associated Element: CART system operators

Associated Element: CART_GPS

Deerfield Highway Department

Description: Deerfield Highway Department is responsible for maintaining a large segment of the town's physical infrastructure.

Stakeholder

- Associated Element:* Deerfield highway department dispatch
- Associated Element:* Deerfield Maintenance and Construction center personnel
- Associated Element:* Deerfield Maintenance and Construction field personnel
- Associated Element:* Deerfield Maintenance and construction vehicle
- Associated Element:* Deerfield field device

Derry DPW

- Description:* Derry Department of Public Works is responsible for maintaining a large segment of the town's physical infrastructure.
- Associated Element:* Derry DPW Dispatch
- Associated Element:* Derry MCO Vehicles
- Associated Element:* Derry MCO Field Devices

Derry Emergency Operation Center

- Description:* Derry Emergency Management Center supports incident management, disaster response and evacuation, security monitoring, and other security and public safety-oriented ITS applications.
- Associated Element:* Derry Emergency Operation Dispatch
- Associated Element:* Derry Fire Vehicles

Driver

- Description:* All kinds of vehicle operators.
- Associated Element:* Driver

Easter Seals NH

- Description:* Easter Seals NH is one contractor of CART operating transit vehicles and also provides Special Transit Service (STS) for the frail and isolated elderly, as well as individuals with special needs and disabilities.
- Associated Element:* CART_Operators
- Associated Element:* CART Broker/Manager

Federal Public Safety Agencies

- Description:* Federal public safety agencies represent the federal, state, and local alerting and advisory systems that provide alerts, advisories, and other potential threat information that is relevant to surface transportation systems.
- Associated Element:* Alerting and Advisory Systems

Financial Institution

- Description:* Financial Institutions handle all electronic fund transfer requests to enable the transfer of funds from the user of the service to the provider of the service.
- Associated Element:* Financial Institution

Fleet and Freight Management Company

- Description:* Monitors and coordinates vehicle fleets including coordination with intermodal freight depots or shippers.
- Associated Element:* Commercial Vehicle Fleet Dispatch Systems
- Associated Element:* Commercial Vehicles

Flight Line Inc.

- Description:* Flight Line Inc. provides bus service between Manchester, NH and Portsmouth, NH.
- Associated Element:* Flight Line Inc.
- Associated Element:* Flight Line Inc_Transit vehicles
- Associated Element:* Flight Line Inc_Transit Vehicle Operators
- Associated Element:* Flight Line Inc_Transit System Operators

Francestown Emergency Management Center

- Description:* Francestown Emergency Management Center supports incident management, disaster response and evacuation, security monitoring, and other security and public safety-oriented ITS applications.
- Associated Element:* Francestown Emergency Dispatch
- Associated Element:* Francestown Emergency Vehicle

Francestown Highway Department

- Description:* Francestown Highway Department is responsible for maintaining a large segment of the town's physical infrastructure.

Stakeholder

Associated Element: Francestown Maintenance and Construction Management Dispatch

Goffstown DPW

Description: Goffstown Department of Public Works is responsible for maintaining a large segment of the town's physical infrastructure.

Associated Element: Goffstown DPW Dispatch

Associated Element: Goffstown MCO Vehicles

Associated Element: Goffstown MCO Field Devices

Associated Element: Goffstown DPW Equipment Repair Facility

Associated Element: Goffstown maintenance and construction center personnel

Associated Element: Goffstown maintenance and construction field personnel

Goffstown Emergency Management Center

Description: The Emergency Management center represents public safety, emergency management, and other allied agency systems that support incident management, disaster response and evacuation, security monitoring, and other security and public safety-oriented ITS applications.

Associated Element: Goffstown Fire Vehicles

Associated Element: Goffstown Emergency Dispatch

Associated Element: Goffstown Emergency System Operator

Associated Element: Goffstown Remote Traveler Support

Associated Element: Goffstown Secure Area Environment

Goffstown Truck Center

Description: This center operates school buses.

Associated Element: Goffstown School Bus Dispatch

Associated Element: Hooksett School Bus

Associated Element: GTC School Bus Operator

GPS

Description: Global Positioning System

Associated Element: GPS

Hometown Weather Service

Description: The Hometown Weather Service provide real-time information services.

Associated Element: Hometown Weather Service

Hooksett Emergency Operation Center

Description: Hooksett Emergency operation center supports incident management, disaster response and evacuation, security monitoring, and other security and public safety-oriented ITS applications.

Associated Element: Hooksett Emergency Operation Center Dispatch

Associated Element: Hooksett Fire Vehicles

Hooksett Highway Department

Description: Hooksett Highway Department is responsible for maintaining a large segment of the town's physical infrastructure.

Associated Element: Hooksett Highway Department Dispatch

Associated Element: Hooksett MCO Vehicles

Associated Element: Hooksett MCO Field Devices

Associated Element: Hooksett Maintenance and Construction Center Personnel

Information Service Provider

Description: The Information Service Provider collects, processes, stores, and disseminates transportation information to system operators and the traveling public.

Associated Element: information Service Provider

Local DPW

Description: Local department of public works are responsible for maintaining a large portion of the town's physical infrastructure.

Associated Element: Local DPW Dispatch

Associated Element: Local Maintenance and Construction Center Personnel

Associated Element: Local Maintenance and Construction Vehicle

Stakeholder

Associated Element: Local Maintenance and Construction Field Personnel

Associated Element: Local DPW Storage Facility

Associated Element: Local Asset Management

Associated Element: Local DPW Field Device

Associated Element: Local Roadway

Local Emergency Management Center

Description: Local emergency management centers coordinate responses to incidents, including those involving hazardous material.

Associated Element: Local Emergency Dispatch

Associated Element: Local Emergency System Operator

Associated Element: Local Emergency Personnel

Associated Element: Local Emergency Vehicles

Associated Element: Local Security Monitoring Field Equipment

Associated Element: Local Emergency Alter System

Local Hospital

Description: Local hospital represents a hospital or another emergency care facility. It may also represent a third party quality of care information provider.

Associated Element: Local Hospital

Local Police Department

Description: Local police departments receive reports of violations detected by various ITS facilities including individual vehicle emissions, toll violations, CVO violations, excessive speed in work zones, etc.

Associated Element: Local Police Department Dispatch

Local School Bus Management Center

Description: Local School Bus Management Center operates school buses.

Associated Element: Local School Bus Dispatch

Londonderry DPW

Description: Londonderry Department of Public Works is responsible for maintaining a large segment of the town's physical infrastructure.

Associated Element: Londonderry DPW Dispatch

Associated Element: Londonderry DPW DMS

Associated Element: Londonderry DPW Webpage

Londonderry Emergency Management Center

Description: The center represents public safety, emergency management, and other allied agency systems that support incident management, disaster response and evacuation, security monitoring, and other security and public safety-oriented ITS applications.

Associated Element: Londonderry Emergency Operation Dispatch

Associated Element: Londonderry Emergency Vehicles

Associated Element: Londonderry Security Monitoring Field Equipment

Manchester Airport

Description: Manchester-Boston Regional Airport serves the greater Boston area.

Associated Element: Manchester-Boston Airport Airport Parking management equipment

Associated Element: Manchester-Boston Airport Webpage

Associated Element: Manchester-Boston Airport

Manchester Emergency Operations Center

Description: Manchester Emergency Operations Center supports incident management, disaster response and evacuation, security monitoring, and other security and public safety-oriented ITS applications.

Associated Element: Manchester Emergency Operations Dispatch

Associated Element: Manchester Emergency Vehicles

Associated Element: Manchester Security Monitoring Field Equipment

Associated Element: Manchester Emergency System Operator

Associated Element: Manchester Emergency Personal

Associated Element: Manchester Emergency Alert System

Stakeholder**Manchester Highway Department**

Description: Responsible for the operation and maintenance of the city's streets, solid waste program, sanitary sewer system and the stormwater drainage system.

Associated Element: Surface Transportation Weather Service

Associated Element: Manchester Highway Department Dispatch

Associated Element: Manchester MCO Vehicles

Associated Element: Manchester MCO Field Devices

Associated Element: Manchester Equipment Repair Facility

Associated Element: Manchester Highway Department Storage Facility

Associated Element: Manchester Maintenance and Construction Field Personnel

Associated Element: Manchester Maintenance and Construction Center Personnel

Associated Element: Manchester Highway Department Field Device

Associated Element: Manchester Asset Management

Associated Element: Manchester Basic Maintenance and Construction Vehicle

Associated Element: Manchester Road way

Manchester Parking Division

Description: Manchester Parking Division manages and maintains all municipal parking facilities and parking lots, on-street meters and parking lot meters and associated parking permits.

Associated Element: Manchester Parking Management Center

Associated Element: Manchester Parking Operator

Associated Element: Manchester Parking Management Webpage

Associated Element: Ipark

Manchester Police Department

Description: Manchester police department receives reports of violations detected by various ITS facilities including individual vehicle emissions, toll violations, CVO violations, excessive speed in work zones, etc.

Associated Element: Manchester Police Dispatch

Manchester School District

Description: Manchester School District maintains a website to provide parents and students with school bus schedules and onboard students.

Associated Element: Manchester School District Website

Manchester Traffic Division

Description: Manchester Traffic Division operates traffic facilities in the City of Manchester.

Associated Element: Manchester Traffic Division

Associated Element: MTC_Roadside Equipment

Associated Element: Manchester Traffic Division_Roadside Equipment

Associated Element: Traffic Detector at Rail

Manchester Transit Authority

Description: Provides mass transit service for the City of Manchester, and certain locations in the Towns/Cities of Bedford, Goffstown, Hooksett, Concord, Londonderry and Nashua. In addition to providing public transportation, the MTA also provides pupil transportation for the Manchester School District.

Associated Element: Manchester Transit Authority

Associated Element: Transit Vehicles

Associated Element: Transit System Operators

Associated Element: Transit Vehicle Operator

Associated Element: MTA Website

Associated Element: Manchester School Bus

Associated Element: Manchester School Bus Operator

Associated Element: ADA Paratransit

Associated Element: MTA Kiosks

Associated Element: MTA Transit Vehicle

Associated Element: MTA Transit Vehicle Operator

Associated Element: MTA Transit Operations Personnel

Associated Element: MTA Security Monitoring Field Equipment

Associated Element: MTA Farebox website

Associated Element: MTA Fare Kiosk

Stakeholder

Manchester Union Leader

Description: NewsPaper - Biggest newspaper in the state. The Manchester Union Leader provides traffic reports, travel conditions, and other transportation-related news services to the traveling public

Map Update Provider

Description: Map update provider develops and provides of digitized map databases used to support ITS services.
Associated Element: Map Update Provider

Media

Description: Provide traffic reports, travel conditions and other transportation-related news services to traveling public through radio, TV, and other media. Traffic and travel advisory information that are collected by ITS are provided to this terminator. It is also a source for traffic flow information, incident and special event information, and other events which may have implications for the transportation system.

Associated Element: Media

Meteorlogix DTN

Description: DTN/Meteorlogix® is the commercial weather services business unit of DTN, the leading provider of real-time information services in the agriculture, energy, and commodity trading markets.

Associated Element: Meteorlogix

Nashua Transit System

Description: Provides mass transit service for the City of Nashua.

Associated Element: Nashua Transit System

New Hampshire Department of Safety

Description: The multi-faceted mission of the Department of Safety encompasses protection of the lives and safety and preservation of the quality of life of New Hampshire citizens and visitors to our state on the highways, on the waterways, and in their homes and businesses. Enforce motor vehicle and highway safety laws, criminal laws, commercial vehicle regulations, fire safety, building and equipment safety laws and regulations, and boating safety laws and rules. Provide enhanced 911 emergency communications statewide, and is responsible for homeland safety and emergency management activities.

Associated Element: E-911

Associated Element: Concord Fire Dispatch

NH Commercial Vehicle Administration

Description: Sells credential and administers taxes, keeps records of safety and credential check data and participates in information exchange with other commercial vehicle administration.

Associated Element: Commercial Vehicle Administration

NHDOT

Description: New Hampshire Department of Transportation

Associated Element: Statewide TMC

Associated Element: Statewide TMC_Roadside Equipment

Associated Element: Statewide TMC_Kiosks

Associated Element: DOT MCO Vehicles

Associated Element: DOT MCO Field Devices

Associated Element: Toll Administration Center

Associated Element: Toll Plaza

Associated Element: 511

Associated Element: 511.net

Associated Element: NHDOT Maintenance District 5

Associated Element: NHDOT Surface Transportation Weather Service

Associated Element: Electronic Toll Collect Equipment

Associated Element: Call Boxes

Associated Element: Commercial Vehicle Check System

Associated Element: NHDOT Closed Circuit Television (CCTV) cameras

Associated Element: NHDOT Dynamic Message Signs (DMS)

Associated Element: NHDOT Variable Speed Limit (VSL) signs

Other Emergency Management Center

Stakeholder

Description: Other emergency management center provides a source and destination for ITS data flows between various communications centers operated by public safety agencies, emergency management agencies, other allied agencies, and private companies that participate in coordinated management of highway-related incidents, including disasters.

Associated Element: Other Emergency Dispatch

Other Information Service Provider

Description: The Information Service Provider collects, processes, stores, and disseminates transportation information to system operators and the traveling public.

Associated Element: Other ISP

Other Maintenance and Construction Management center

Description: Other Maintenance and Construction Management center is intended to provide a source and destination for ITS information flows between maintenance and construction management functions.

Associated Element: Other MCM Dispatch

Pedestrians

Description: Pedestrians provide input (e.g. a request for right of way at an intersection) using a specialized form for the traveler who is not using any type of vehicle (including bicycles) as a form of transport. Pedestrians may comprise those on foot and those in wheelchairs.

Associated Element: Pedestrians

Precision Weather

Description: The Precision Weather Service provide unique weather information services for local communities.

Associated Element: Precision Weather

Private Commercial Vehicle and Fleet Operators

Description: Operate private commercial vehicle and fleet.

Private Parking Lot

Description: Operates parking lot.

Associated Element: Other Parking

Rail Operator

Description: Rail Operator represents the (usually) centralized control point for a substantial segment of a freight railroad's operations and maintenance activities.

Associated Element: Rail Operator Wayside Equipment

Associated Element: Rail Operations

Shelter Providers

Description: Provides information about the shelters that open with the threat of a disaster and are operated and maintained until the threat has passed.

Associated Element: Shelter Providers

State of New Hampshire

Description:

Associated Element: State EOC

Associated Element: Public Health System

State of NH

Description:

Associated Element: NH Homeland Security and Emergency Management

Surface Transportation Weather Service Provider

Description: Surface transportation weather service provider represents the providers of value-added sector specific meteorological services.

Associated Element: Local DPW Surface Transportation Weather Service

Traffic

Description: Traffic represents the collective body of vehicles that travel on surface streets, arterials, highways, expressways, tollways, freeways, or any other vehicle travel surface.

Stakeholder

Associated Element: Traffic

Traveler

Description: Traveler represents any individual who uses transportation services.

Associated Element: User Personal Devices

Associated Element: Traveler Card

Associated Element: Vehicle

Associated Element: Telephone

Associated Element: Traveler

Associated Element: Personal Computing Devices

Associated Element: Manchester Traveler card

Vehicle owner

Description:

Associated Element: Basic Vehicle

Weare Highway Department

Description:

Associated Element: Weare Highway Department Dispatch

Associated Element: Weare Roadway

Associated Element: Weare Maintenance and Construction Center Personnel

Associated Element: Weare Maintenance and Construction Field Personnel

Associated Element: Weare Maintenance and Construction Vehicle

Weather Service Provider

Description: Weather Service Provider provides weather, hydrologic, and climate information and warnings of hazardous weather including thunderstorms, flooding, hurricanes, tornadoes, winter weather, tsunamis, and climate events.

Associated Element: Weather Services

Windham Fire Department

Description: Represents public safety, emergency management, and other allied agency systems that support incident management, disaster response and evacuation, security monitoring, and other security and public safety-oriented ITS applications.

Windham Highway Department

Description: Windham Highway Department is responsible for maintaining a large segment of the town's physical infrastructure.

Associated Element: Windham Highway Department Dipatch

Associated Element: Windham MC Vehicles

WMUR

Description: TV Channel - Provides real time traffic conditions and incidents in southern portion of the state.

WNDS 686 TV

Description: TV Channel - Provides incidents information in Derry.

WQLL

Description: Radio station - Broadcasts incidents around Manchester

WZID

Description: Radio - Broadcasts incidents around Manchester.

APPENDIX C: ITS INVENTORY

Inventory Report

4/4/2016 2:37:08PM



Element Inventory for Region ITS Architecture for the Southern New Hampshire Planning Commission Region

511

Status: Existing

Description: Refer to the statewide ITS Architecture

Associated Stakeholder: NHDOT

511.net

Status: Existing

Description: Refer to the Statewide ITS Architecture

Associated Stakeholder: NHDOT

ADA Paratransit

Status: Existing

Description: Provides curb-to-curb transportation service that provides assistance to individuals who are prevented from using the regular fixed route bus service.

Associated Stakeholder: Manchester Transit Authority

Alerting and Advisory Systems

Status: Existing

Description: Provides alerts, advisories, and other potential threat information that is relevant to surface transportation systems.

Associated Stakeholder: Federal Public Safety Agencies

Auburn Emergency Vehicle

Status: Existing

Description: The Emergency Vehicle Subsystem (EVS) resides in an emergency vehicle and provides the sensory, processing, storage, and communications functions necessary to support safe and efficient incident response.

Associated Stakeholder: Auburn Emergency Management Center

Basic Vehicle

Status: Existing

Description:

Associated Stakeholder: Vehicle owner

Bedford DPW Dispatch

Status: Existing

Description: Monitors and manages roadway infrastructure construction and maintenance activities.

Associated Stakeholder: Bedford DPW

Bedford DPW Webpage

Status: Existing

Description: Provides public with construction and maintenance information

Associated Stakeholder: Bedford DPW

Bedford Emergency Dispatch

Status: Existing

Description: Monitors, alerts, advises, and prepares for, and responds to identified emergencies. It supports evacuation of the general public from a disaster area and manages subsequent reentry to the disaster area using transportation resources. It provides disaster-related traveler information to the general public.

Associated Stakeholder: Bedford Safety Complex

Bedford Fire Vehicles

Status: Existing

Description: Emergency vehicles include ITS equipment that provides the sensory, processing, storage, and communications functions necessary to support safe and efficient emergency response.

Associated Stakeholder: Bedford Safety Complex

Bedford MCO Field Devices

Status: Existing

Description: MCO Field Devices include sensors, displays, and cameras for operational purposes of maintenance and construction.

Associated Stakeholder: Bedford DPW

Element Inventory for Region ITS Architecture for the Southern New Hampshire Planning Commission Region

Bedford MCO Vehicles	<i>Status:</i> Existing
<i>Description:</i> MCO vehicles include ITS devices that provide the sensory, processing, storage, and communications functions necessary to support highway maintenance and construction.	
<i>Associated Stakeholder:</i> Bedford DPW	
Bedford Security Monitoring Field Equipment	<i>Status:</i> Planned
<i>Description:</i> Security monitoring field equipment includes sensors and surveillance devices that monitor transportation infrastructure and public areas.	
<i>Associated Stakeholder:</i> Bedford Safety Complex	
Call Boxes	<i>Status:</i> Existing
<i>Description:</i> This terminator provides the caller interface and voice processing (voice recognition/synthesis) that supports voice-enabled traveler telephone information systems.	
<i>Associated Stakeholder:</i> NHDOT	
CART Broker/Manager	<i>Status:</i> Existing
<i>Description:</i> Dispatches CART.	
<i>Associated Stakeholder:</i> Easter Seals NH	
CART system operators	<i>Status:</i> Existing
<i>Description:</i> This terminator represents the human entities that are responsible for all aspects of the CART system operation including fleet management, maintenance operations, and scheduling.	
<i>Associated Stakeholder:</i> Cooperative Alliance for Regional Transportation	
CART Vehicles	<i>Status:</i> Existing
<i>Description:</i> This subsystem resides in a transit vehicle and provides the sensory processing, storage, and communications functions necessary to support safe and efficient movement of passengers.	
<i>Associated Stakeholder:</i> Cooperative Alliance for Regional Transportation	
CART website	<i>Status:</i> Existing
<i>Description:</i> This subsystem collects, processes, stores, and disseminates CART information such as CART schedule, performance, and fare to CART system operators and the traveling public.	
<i>Associated Stakeholder:</i> Cooperative Alliance for Regional Transportation	
CART_GPS	<i>Status:</i> Planned
<i>Description:</i> This terminator provides accurate position information.	
<i>Associated Stakeholder:</i> Cooperative Alliance for Regional Transportation	
CART_Operators	<i>Status:</i> Existing
<i>Description:</i> Operate CART vehicles.	
<i>Associated Stakeholder:</i> Easter Seals NH	
CART_Telephone	<i>Status:</i> Existing
<i>Description:</i> Provides an interface for a traveler request for personalized transit service.	
<i>Associated Stakeholder:</i> Cooperative Alliance for Regional Transportation	
CAT	<i>Status:</i> Existing
<i>Description:</i> This terminator is intended to provide a source and destination for ITS data flows between peer (e.g. inter-regional) transit management functions. It enables transit management activities to be coordinated across geographic boundaries or different jurisdictional areas.	
<i>Associated Stakeholder:</i> Concord Area Transit	

Element Inventory for Region ITS Architecture for the Southern New Hampshire Planning Commission Region

Chester emergency Vehicle	<i>Status:</i> Existing
<i>Description:</i> The Emergency Vehicle Subsystem (EVS) resides in an emergency vehicle and provides the sensory, processing, storage, and communications functions necessary to support safe and efficient incident response.	
<i>Associated Stakeholder:</i> Chester Emergency Management Center	
COMIC-CON	<i>Status:</i> Existing
<i>Description:</i> This subsystem collects, processes, stores, and disseminates parking information. The ISP is implemented as an Internet web site.	
<i>Associated Stakeholder:</i> COMIC-CON San Diego Convention Center	
Commercial Vehicle Administration	<i>Status:</i> Existing
<i>Description:</i> Refer to Statewide ITS Architecture	
<i>Associated Stakeholder:</i> NH Commercial Vehicle Administration	
Commercial Vehicle Check System	<i>Status:</i> Existing
<i>Description:</i>	
<i>Associated Stakeholder:</i> NHDOT	
Commercial Vehicle Fleet Dispatch Systems	<i>Status:</i> Existing
<i>Description:</i> Provides the capability for commercial drivers and fleet or freight managers to receive real-time routing information and access databases containing vehicle and/or freight equipment locations as well as carrier, vehicle, freight equipment and driver information.	
<i>Associated Stakeholder:</i> Fleet and Freight Management Company	
Commercial Vehicles	<i>Status:</i> Existing
<i>Description:</i> Refer to Statewide ITS Architecture	
<i>Associated Stakeholder:</i> Fleet and Freight Management Company	
Community Transportation Provider	<i>Status:</i> Existing
<i>Description:</i>	
<i>Associated Stakeholder:</i> Community Transportation Provider	
Concord Fire Dispatch	<i>Status:</i> Existing
<i>Description:</i> Monitors alerts, advises, and prepares for, and responds to identified emergencies, such as fire, rescue, emergency medical and hazardous materials.	
<i>Associated Stakeholder:</i> New Hampshire Department of Safety	
Deerfield field device	<i>Status:</i> Existing
<i>Description:</i>	
<i>Associated Stakeholder:</i> Deerfield Highway Department	
Deerfield highway department dispatch	<i>Status:</i> Existing
<i>Description:</i> Monitors and manages roadway infrastructure construction and maintenance activities.	
<i>Associated Stakeholder:</i> Deerfield Highway Department	
Deerfield Maintenance and Construction center personnel	<i>Status:</i> Existing
<i>Description:</i> This terminator represents the people that directly interface with the systems in the Maintenance and Construction Management subsystem.	
<i>Associated Stakeholder:</i> Deerfield Highway Department	
Deerfield Maintenance and Construction field personnel	<i>Status:</i> Existing

Element Inventory for Region ITS Architecture for the Southern New Hampshire Planning Commission Region**Deerfield Maintenance and Construction field personnel***Status:* Existing

Description: This terminator represents the people that perform maintenance and construction field activities including vehicle and equipment operators, field supervisory personnel, field crews, and work zone safety personnel.

Associated Stakeholder: Deerfield Highway Department

Deerfield Maintenance and construction vehicle*Status:* Existing

Description: MCO vehicles include ITS devices that provides the sensory, processing, storage, and communications functions necessary to support highway maintenance and construction.

Associated Stakeholder: Deerfield Highway Department

Derry DPW Dispatch*Status:* Existing

Description: Monitors and manages roadway infrastructure construction and maintenance activities.

Associated Stakeholder: Derry DPW

Derry Emergency Operation Dispatch*Status:* Existing

Description: Monitors, alerts, advises, and prepares for, and responds to identified emergencies. It supports evacuation of the general public from a disaster area and manages subsequent reentry to the disaster area using transportation resources. It provides disaster-related traveler information to the general public.

Associated Stakeholder: Derry Emergency Operation Center

Derry Fire Vehicles*Status:* Existing

Description: Emergency vehicles include ITS equipment that provides the sensory, processing, storage, and communications functions necessary to support safe and efficient emergency response.

Associated Stakeholder: Derry Emergency Operation Center

Derry MCO Field Devices*Status:* Existing

Description: MCO Field Devices include sensors, displays, and cameras for operational purposes of maintenance and construction.

Associated Stakeholder: Derry DPW

Derry MCO Vehicles*Status:* Existing

Description: MCO vehicles include ITS devices that provides the sensory, processing, storage, and communications functions necessary to support highway maintenance and construction.

Associated Stakeholder: Derry DPW

DOT MCO Field Devices*Status:* Existing

Description: MCO Field Devices include sensors, displays, and cameras for operational purposes of maintenance and construction.

Associated Stakeholder: NHDOT

DOT MCO Vehicles*Status:* Existing

Description: MCO vehicles include ITS devices that provides the sensory, processing, storage, and communications functions necessary to support highway maintenance and construction.

Associated Stakeholder: NHDOT

Driver*Status:* Existing

Description: Represents the human entity that operates a licensed vehicle on the roadway.

Associated Stakeholder: Driver

E-911*Status:* Existing

Description: Represents the telecommunications systems that connect a caller with a Public Safety Answering Point (PSAP). These systems transparently support priority wire line and wireless caller access to the PSAP through 9-1-1 and other access mechanisms like 7 digit local access numbers, and motorist aid call boxes. The calls are routed to the appropriate PSAP, based on caller location when this information is available. When available, the caller's location and call-back number are also provided to the PSAP by this interface.

Element Inventory for Region ITS Architecture for the Southern New Hampshire Planning Commission Region

E-911	<i>Status:</i> Existing
<i>Description:</i> Represents the telecommunications systems that connect a caller with a Public Safety Answering Point (PSAP). These systems transparently support priority wire line and wireless caller access to the PSAP through 9-1-1 and other access mechanisms like 7 digit local access numbers, and motorist aid call boxes. The calls are routed to the appropriate PSAP, based on caller location when this information is available. When available, the caller's location and call-back number are also provided to the PSAP by this interface.	
<i>Associated Stakeholder:</i> New Hampshire Department of Safety	
Electronic Toll Collect Equipment	<i>Status:</i> Existing
<i>Description:</i> Refer to the statewide ITS Architecture	
<i>Associated Stakeholder:</i> NHDOT	
Event Promoter	<i>Status:</i> Planned
<i>Description:</i> This terminator represents Special Event sponsors that have knowledge of event that may impact travel on roadways or other modal means.	
<i>Associated Stakeholder:</i> Event Promoter	
Financial Institution	<i>Status:</i> Existing
<i>Description:</i> This Terminator represents the organization that handles all electronic fund transfer requests to enable the transfer of funds from the user of the service to the provider of the service.	
<i>Associated Stakeholder:</i> Financial Institution	
Flight Line Inc.	<i>Status:</i> Existing
<i>Description:</i> Flight Line Inc. is the contractor of Manchester-Portsmouth bus service.	
<i>Associated Stakeholder:</i> Flight Line Inc.	
Flight Line Inc_Transit System Operators	<i>Status:</i> Existing
<i>Description:</i> This terminator represents the human entities that are responsible for fleet management, maintenance operations, and scheduling activities of the transit system.	
<i>Associated Stakeholder:</i> Flight Line Inc.	
Flight Line Inc_Transit Vehicle Operators	<i>Status:</i> Existing
<i>Description:</i> This terminator represents the human entity that receives and provides additional information that is specific to operating the ITS functions in all types of transit vehicles.	
<i>Associated Stakeholder:</i> Flight Line Inc.	
Flight Line Inc_Transit vehicles	<i>Status:</i> Existing
<i>Description:</i> The Transit Vehicle Subsystem (TRVS) resides in a transit vehicle and provides the sensory, processing, storage, and communications functions necessary to support safe and efficient movement of passengers.	
<i>Associated Stakeholder:</i> Flight Line Inc.	
Francestown Emergency Dispatch	<i>Status:</i> Existing
<i>Description:</i>	
<i>Associated Stakeholder:</i> Francestown Emergency Management Center	
Francestown Emergency Vehicle	<i>Status:</i> Existing
<i>Description:</i>	
<i>Associated Stakeholder:</i> Francestown Emergency Management Center	
Francestown Maintenance and Construction Management Dispatch	<i>Status:</i> Existing
<i>Description:</i>	
<i>Associated Stakeholder:</i> Francestown Highway Department	

Element Inventory for Region ITS Architecture for the Southern New Hampshire Planning Commission Region

Goffstown DPW Dispatch	<i>Status:</i> Existing
<i>Description:</i> Monitors and manages roadway infrastructure construction and maintenance activities.	
<i>Associated Stakeholder:</i> Goffstown DPW	
Goffstown DPW Equipment Repair Facility	<i>Status:</i> Existing
<i>Description:</i> This terminator represents the facilities that configure, service, and repair vehicles and other support equipment used in roadway infrastructure construction and maintenance.	
<i>Associated Stakeholder:</i> Goffstown DPW	
Goffstown Emergency Dispatch	<i>Status:</i> Existing
<i>Description:</i> Monitors, alerts, advises, prepares for, and responds to identified emergencies. It supports evacuation of the general public from a disaster area and manages subsequent reentry to the disaster area using transportation resources. It provides disaster-related traveler information to the general public.	
<i>Associated Stakeholder:</i> Goffstown Emergency Management Center	
Goffstown Emergency System Operator	<i>Status:</i> Existing
<i>Description:</i>	
<i>Associated Stakeholder:</i> Goffstown Emergency Management Center	
Goffstown Fire Vehicles	<i>Status:</i> Existing
<i>Description:</i> Emergency vehicles include ITS equipment that provides the sensory, processing, storage, and communications functions necessary to support safe and efficient emergency response.	
<i>Associated Stakeholder:</i> Goffstown Emergency Management Center	
Goffstown maintenance and construction center personnel	<i>Status:</i> Existing
<i>Description:</i> This terminator represents the people that directly interface with the systems in the Maintenance and Construction Management subsystem.	
<i>Associated Stakeholder:</i> Goffstown DPW	
Goffstown maintenance and construction field personnel	<i>Status:</i> Existing
<i>Description:</i> This terminator represents the people that perform maintenance and construction field activities including vehicle and equipment operators, field supervisory personnel, field crews, and work zone safety personnel.	
<i>Associated Stakeholder:</i> Goffstown DPW	
Goffstown MCO Vehicles	<i>Status:</i> Existing
<i>Description:</i> MCO vehicles include ITS devices that provides the sensory, processing, storage, and communications functions necessary to support highway maintenance and construction.	
<i>Associated Stakeholder:</i> Goffstown DPW	
Goffstown Remote Traveler Support	<i>Status:</i> Existing
<i>Description:</i>	
<i>Associated Stakeholder:</i> Goffstown Emergency Management Center	
Goffstown School Bus Dispatch	<i>Status:</i> Existing
<i>Description:</i> Manages school buses and provides Hooksett and Bedford emergency management center with buses in emergency.	
<i>Associated Stakeholder:</i> Goffstown Truck Center	
Goffstown Secure Area Environment	<i>Status:</i> Existing
<i>Description:</i>	
<i>Associated Stakeholder:</i> Goffstown Emergency Management Center	
Goffstown MCO Field Devices	<i>Status:</i> Existing

Element Inventory for Region ITS Architecture for the Southern New Hampshire Planning Commission Region**Goffstown MCO Field Devices***Status:* Existing*Description:* MCO Field Devices include sensors, displays, and cameras for operational purposes of maintenance and construction.*Associated Stakeholder:* Goffstown DPW**GPS***Status:* Existing*Description:* Global Positioning System*Associated Stakeholder:* GPS**GTC School Bus Operator***Status:* Existing*Description:* This terminator represent the human entity that receives and provides additional information that is specific to operating the ITS functions.*Associated Stakeholder:* Goffstown Truck Center**Hometown Weather Service***Status:* Existing*Description:* Providers of value-added sector specific meteorological services. These providers utilize National Weather Service data and predictions, road condition information and local environmental data to provide weather observations and forecasts.*Associated Stakeholder:* Hometown Weather Service**Hooksett Emergency Operation Center Dispatch***Status:* Existing*Description:* Monitors, alerts, advises, prepares for, and responds to identified emergencies. It supports evacuation of the general public from a disaster area and manages subsequent reentry to the disaster area using transportation resources. It provides disaster-related traveler information to the general public.*Associated Stakeholder:* Hooksett Emergency Operation Center**Hooksett Fire Vehicles***Status:* Existing*Description:* Hookset Fire Vehicles include ITS equipment that provides the sensory, processing, storage, and communications functions necessary to support safe and efficient emergency response.*Associated Stakeholder:* Hooksett Emergency Operation Center**Hooksett Highway Department Dispatch***Status:* Existing*Description:* Monitors and manages roadway infrastructure construction and maintenance activities.*Associated Stakeholder:* Hooksett Highway Department**Hooksett Maintenance and Construction Center Personnel***Status:* Existing*Description:* Represents the people that directly interface with the systems in the Maintenance and Construction Management subsystem.*Associated Stakeholder:* Hooksett Highway Department**Hooksett MCO Field Devices***Status:* Planned*Description:* MCO Field Devices include sensors, displays, and cameras for operational purposes of maintenance and construction.*Associated Stakeholder:* Hooksett Highway Department**Hooksett MCO Vehicles***Status:* Existing*Description:* MCO vehicles include ITS devices that provides the sensory, processing, storage, and communications functions necessary to support highway maintenance and construction.*Associated Stakeholder:* Hooksett Highway Department**Hooksett School Bus***Status:* Existing*Description:* Resides in a school bus and provides the sensory, processing, storage, and communications functions necessary to support safe and efficient movement of passengers.*Associated Stakeholder:* Goffstown Truck Center**information Service Provider***Status:* Existing

Element Inventory for Region ITS Architecture for the Southern New Hampshire Planning Commission Region**information Service Provider***Status:* Existing*Description:**Associated Stakeholder:* Information Service Provider**Ipark***Status:* Existing*Description:* This terminator represents the entity that enables the actual transfer of electronic information from the user of a service (I.e. a traveler) to the provider of the service. This may include the transfer of funds through means of an electronic payment instrument. The device, like a smart card, may also hold and update the traveler's information such as personal profiles or trip histories.*Associated Stakeholder:* Manchester Parking Division**Local Asset Management***Status:* Existing*Description:* This terminator represents the systems that support decision-making for maintenance, upgrade, and operation of physical transportation assets.*Associated Stakeholder:* Local DPW**Local DPW Dispatch***Status:* Existing*Description:* This element monitors and manages roadway infrastructure construction and maintenance activities.*Associated Stakeholder:* Local DPW**Local DPW Equipment Repair Facility***Status:* Existing*Description:* This terminator represents the facilities that configure, service, and repair vehicles and other support equipment used in roadway infrastructure construction and maintenance.*Associated Stakeholder:***Local DPW Field Device***Status:* Existing*Description:* This subsystem includes the equipment distributed on and along the roadway that monitors and controls traffic and monitors and manages the roadway itself. This element includes DMS, signs, cones and barricades.*Associated Stakeholder:* Local DPW**Local DPW Storage Facility***Status:* Existing*Description:* This terminator represents the facilities that provide storage and forward staging for equipment and materials used in maintenance and construction operations. It provides status information on the types and quantities of materials and equipment that are available at the facility.*Associated Stakeholder:* Local DPW**Local DPW Surface Transportation Weather Service***Status:* Planned*Description:* Providers of value-added sector specific meteorological services. These providers utilize National Weather Service data and predictions, road condition information and local environmental data to provide weather observations and forecasts.*Associated Stakeholder:* Surface Transportation Weather Service Provider**Local Emergency Alter System***Status:* Existing*Description:* Collects, processes, stores, and disseminates transportation information to system operators and the traveling public.*Associated Stakeholder:* Local Emergency Management Center**Local Emergency Dispatch***Status:* Existing*Description:* Monitors, alerts, advises, and prepares for, and responds to identified emergencies. It supports evacuation of the general public from a disaster area and manages subsequent reentry to the disaster area using transportation resources. It provides disaster-related traveler information to the general public.*Associated Stakeholder:* Local Emergency Management Center**Local Emergency Personnel***Status:* Existing

Element Inventory for Region ITS Architecture for the Southern New Hampshire Planning Commission Region**Local Emergency Personnel***Status:* Existing

Description: This terminator represents personnel that are responsible for police, fire, emergency medical services, towing, service patrols, and other special response team activities at an incident site.

Associated Stakeholder: Local Emergency Management Center

Local Emergency System Operator*Status:* Existing

Description: This terminator represents the human entity that monitors all ITS emergency requests, (including those from the E911 Operator) and sets up pre-defined responses to be executed by an emergency management system. The operator may also override predefined responses where it is observed that they are not achieving the desired result. This terminator includes dispatchers who manage an emergency fleet (police, fire, ambulance, HAZMAT, etc.) or higher order emergency managers who provide response coordination during emergencies.

Associated Stakeholder: Local Emergency Management Center

Local Emergency Vehicles*Status:* Existing

Description: Emergency vehicles include ITS equipment that provides the sensory, processing, storage, and communications functions necessary to support safe and efficient emergency response. The subsystem represents a range of vehicles including those operated by police, fire, and emergency medical services. In addition, this subsystem represents other incident response vehicles including towing and recovery vehicles and freeway service patrols.

Associated Stakeholder: Local Emergency Management Center

Local Hospital*Status:* Existing

Description: This terminator represents a hospital or another emergency care facility. It may also represent a third party quality of care information provider.

Associated Stakeholder: Local Hospital

Local Maintenance and Construction Center Personnel*Status:* Existing

Description: This terminator represents the people that directly interface with the systems in the Maintenance and Construction Management subsystem.

Associated Stakeholder: Local DPW

Local Maintenance and Construction Field Personnel*Status:* Existing

Description: This terminator represents the people that perform maintenance and construction field activities including vehicle and equipment operators, field supervisory personnel, field crews, and work zone safety personnel.

Associated Stakeholder: Local DPW

Local Maintenance and Construction Vehicle*Status:* Existing

Description: This element provides the sensory, processing, storage, and communications functions necessary to support highway maintenance and construction. All types of maintenance and construction vehicles are covered, including heavy equipment and supervisory vehicles.

Associated Stakeholder: Local DPW

Local Police Department Dispatch*Status:* Existing

Description: This terminator represents the systems that receive reports of violations detected by various ITS facilities including individual vehicle emissions, toll violations, CVO violations, excessive speed in work zones, etc.

Associated Stakeholder: Local Police Department

Local Roadway*Status:* Existing

Description:

Associated Stakeholder: Local DPW

Local School Bus Dispatch*Status:* Existing

Description: The subsystem manages school buses and provides emergency management centers with buses in emergency.

Associated Stakeholder: Local School Bus Management Center

Element Inventory for Region ITS Architecture for the Southern New Hampshire Planning Commission Region**Local Security Monitoring Field Equipment***Status:* Planned*Description:* Includes surveillance and sensor equipment used to provide enhanced security and safety for transportation facilities or infrastructure.*Associated Stakeholder:* Local Emergency Management Center**Londonderry DPW Dispatch***Status:* Existing*Description:* This element monitors and manages roadway infrastructure construction and maintenance activities.*Associated Stakeholder:* Londonderry DPW**Londonderry DPW DMS***Status:* Existing*Description:* This subsystem includes the equipment distributed on and along the roadway that controls traffic.*Associated Stakeholder:* Londonderry DPW**Londonderry DPW Webpage***Status:* Existing*Description:* Provides public with construction and maintenance information.*Associated Stakeholder:* Londonderry DPW**Londonderry Emergency Operation Dispatch***Status:* Existing*Description:* Monitors, alerts, advises, prepares for, and responds to identified emergencies. It supports evacuation of the general public from a disaster area and manages subsequent reentry to the disaster area using transportation resources. It provides disaster-related traveler information to the general public.*Associated Stakeholder:* Londonderry Emergency Management Center**Londonderry Emergency Vehicles***Status:* Existing*Description:* Emergency vehicles include ITS equipment that provides the sensory, processing, storage, and communications functions necessary to support safe and efficient emergency response.*Associated Stakeholder:* Londonderry Emergency Management Center**Londonderry Security Monitoring Field Equipment***Status:* Existing*Description:* Security monitoring field equipment includes sensors and surveillance devices that monitor transportation infrastructure and public areas.*Associated Stakeholder:* Londonderry Emergency Management Center**Manchester Asset Management***Status:* Planned*Description:* This terminator represents the systems that support decision-making for maintenance, upgrade, and operation of physical transportation assets.*Associated Stakeholder:* Manchester Highway Department**Manchester Basic Maintenance and Construction Vehicle***Status:* Existing*Description:**Associated Stakeholder:* Manchester Highway Department**Manchester Emergency Alert System***Status:* Existing*Description:* This center collects, processes, stores, and disseminates transportation information to system operators and the traveling public.*Associated Stakeholder:* Manchester Emergency Operations Center**Manchester Emergency Operations Dispatch***Status:* Existing*Description:* Monitors, alerts, advises, prepares for, and responds to identified emergencies. It supports evacuation of the general public from a disaster area and manages subsequent reentry to the disaster area using transportation resources. It provides disaster-related traveler information to the general public.*Associated Stakeholder:* Manchester Emergency Operations Center

Element Inventory for Region ITS Architecture for the Southern New Hampshire Planning Commission Region

Manchester Emergency Personal	<i>Status:</i> Existing
<i>Description:</i> This terminator represents personnel that are responsible for police, fire, emergency medical services, towing, service patrols, and other special response team (e.g., hazardous material clean-up) activities at an incident site.	
<i>Associated Stakeholder:</i> Manchester Emergency Operations Center	
Manchester Emergency System Operator	<i>Status:</i> Existing
<i>Description:</i> This terminator represents the human entity that monitors all ITS emergency requests, (including those from the E911 Operator) and sets up pre-defined responses to be executed by an emergency management system.	
<i>Associated Stakeholder:</i> Manchester Emergency Operations Center	
Manchester Emergency Vehicles	<i>Status:</i> Existing
<i>Description:</i> Emergency vehicles include ITS equipment that provide the sensory, processing, storage, and communications functions necessary to support safe and efficient emergency response.	
<i>Associated Stakeholder:</i> Manchester Emergency Operations Center	
Manchester Equipment Repair Facility	<i>Status:</i> Existing
<i>Description:</i> This terminator represents the facilities that configure, service, and repair vehicles and other support equipment used in roadway infrastructure construction and maintenance.	
<i>Associated Stakeholder:</i> Manchester Highway Department	
Manchester Highway Department Dispatch	<i>Status:</i> Existing
<i>Description:</i> This element monitors and manages roadway infrastructure construction and maintenance activities.	
<i>Associated Stakeholder:</i> Manchester Highway Department	
Manchester Highway Department Field Device	<i>Status:</i> Existing
<i>Description:</i> This subsystem includes the equipment distributed on and along the roadway that monitors and controls traffic and monitors and manages the roadway itself. Equipment includes traffic detectors, environmental sensors, traffic signals, highway advisory radios, dynamic message signs, CCTV cameras and video image processing systems, grade crossing warning systems, and freeway ramp metering systems.	
<i>Associated Stakeholder:</i> Manchester Highway Department	
Manchester Highway Department Storage Facility	<i>Status:</i> Existing
<i>Description:</i> This terminator represents the facilities that provide storage and forward staging for equipment and materials used in maintenance and construction operations. It provides status information on the types and quantities of materials and equipment that are available at the facility.	
<i>Associated Stakeholder:</i> Manchester Highway Department	
Manchester Maintenance and Construction Center Personnel	<i>Status:</i> Existing
<i>Description:</i> This terminator represents the people that directly interface with the systems in the Maintenance and Construction Management subsystem. These personnel interact with fleet dispatch and management systems, road maintenance systems, incident management systems, work plan scheduling systems, and work zone management systems.	
<i>Associated Stakeholder:</i> Manchester Highway Department	
Manchester Maintenance and Construction Field Personnel	<i>Status:</i> Existing
<i>Description:</i> This terminator represents the people that perform maintenance and construction field activities including vehicle and equipment operators, field supervisory personnel, field crews, and work zone safety personnel. Information flowing from the Maintenance and Construction Field Personnel terminator will include those system inputs specific to maintenance and construction operations, such as information regarding work zone status, or the status of maintenance actions	
<i>Associated Stakeholder:</i> Manchester Highway Department	
Manchester MCO Field Devices	<i>Status:</i> Existing
<i>Description:</i> MCO Field Devices include sensors, displays, and cameras for operational purposes of maintenance and construction.	

Element Inventory for Region ITS Architecture for the Southern New Hampshire Planning Commission Region

Manchester MCO Field Devices	<i>Status:</i> Existing
<i>Description:</i> MCO Field Devices include sensors, displays, and cameras for operational purposes of maintenance and construction.	
<i>Associated Stakeholder:</i> Manchester Highway Department	
Manchester MCO Vehicles	<i>Status:</i> Existing
<i>Description:</i> MCO vehicles include ITS devices that provides the sensory, processing, storage, and communications functions necessary to support highway maintenance and construction.	
<i>Associated Stakeholder:</i> Manchester Highway Department	
Manchester Parking Management Center	<i>Status:</i> Existing
<i>Description:</i> It supports a dedicated short-range communications (DSRC) link to the Vehicle Subsystem that allows electronic collection of parking fees. It also includes the instrumentation, signs, and other infrastructure that monitors parking lot usage and provides local information about parking availability and other general parking information.	
<i>Associated Stakeholder:</i> Manchester Parking Division	
Manchester Parking Management Webpage	<i>Status:</i> Existing
<i>Description:</i> This subsystem collects, processes, stores, and disseminates transportation information to system operators and the traveling public. The subsystem can play several different roles in an integrated ITS. In one role, the ISP provides a data collection, fusing, and repackaging function, collecting information from transportation system operators and redistributing this information to other system operators in the region and other ISPs.	
<i>Associated Stakeholder:</i> Manchester Parking Division	
Manchester Parking Operator	<i>Status:</i> Existing
<i>Description:</i> This terminator is the human entity that may be physically present at the parking lot facility to monitor the operational status of the facility.	
<i>Associated Stakeholder:</i> Manchester Parking Division	
Manchester Police Dispatch	<i>Status:</i> Existing
<i>Description:</i> This terminator represents the systems that receive reports of violations detected by various ITS facilities including individual vehicle emissions, toll violations, CVO violations, excessive speed in work zones, etc.	
<i>Associated Stakeholder:</i> Manchester Police Department	
Manchester Road way	<i>Status:</i> Planned
<i>Description:</i>	
<i>Associated Stakeholder:</i> Manchester Highway Department	
Manchester School Bus	<i>Status:</i> Existing
<i>Description:</i> This subsystem resides in a school bus and provides the sensory, processing, storage, and communications functions necessary to support safe and efficient movement of passengers.	
<i>Associated Stakeholder:</i> Manchester Transit Authority	
Manchester School Bus Operator	<i>Status:</i> Existing
<i>Description:</i> This terminator represents the human entity that receives and provides additional information that is specific to operating the ITS functions in school buses.	
<i>Associated Stakeholder:</i> Manchester Transit Authority	
Manchester School District Website	<i>Status:</i> Existing
<i>Description:</i> This element provides students and parents with school bus schedule.	
<i>Associated Stakeholder:</i> Manchester School District	
Manchester Security Monitoring Field Equipment	<i>Status:</i> Planned
<i>Description:</i> Security Monitoring Field Equipment includes sensors and surveillance devices that monitor transportation infrastructure and public areas.	

Manchester Security Monitoring Field Equipment*Status:* Planned

Description: Security Monitoring Field Equipment includes sensors and surveillance devices that monitor transportation infrastructure and public areas.

Associated Stakeholder: Manchester Emergency Operations Center

Manchester Traffic Division*Status:* Existing

Description: The Traffic Management Subsystem monitors and controls traffic and the road network. This subsystem communicates with the Roadway Subsystem to monitor and manage traffic flow and monitor the condition of the roadway, surrounding environmental conditions, and field equipment status. This subsystem coordinates with the Maintenance and Construction Management Subsystem to maintain the road network and coordinate and adapt to maintenance activities, closures, and detours.

Associated Stakeholder: Manchester Traffic Division

Manchester Traffic Division_Roadside Equipment*Status:* Planned

Description: This subsystem includes the equipment distributed on and along the roadway that monitors and controls traffic and monitors and manages the roadway itself. Equipment includes traffic detectors, environmental sensors, traffic signals, highway advisory radios, dynamic message signs, CCTV cameras and video image processing systems, grade crossing warning systems, and freeway ramp metering systems

Associated Stakeholder: Manchester Traffic Division

Manchester Transit Authority*Status:* Existing

Description: This subsystem collects, processes, stores, and disseminates transit information such as transit schedule, performance, and fare to transit system operators and the traveling public.

Associated Stakeholder: Manchester Transit Authority

Manchester Traveler card*Status:* Existing

Description: This terminator represents the entity that enables the actual transfer of electronic information from the user of a service (I.e. a traveler) to the provider of the service. This may include the transfer of funds through means of an electronic payment instrument. The device, like a smart card, may also hold and update the travelers's information such as personal profiles or trip histories.

Associated Stakeholder: Traveler

Manchester-Boston Airport*Status:* Existing

Description:

Associated Stakeholder: Manchester Airport

Manchester-Boston Airport Airport Parking management equipment*Status:* Existing

Description: It supports a dedicated short-range communications (DSRC) link to the Vehicle Subsystem that allows electronic collection of parking fees. It also includes the instrumentation, signs, and other infrastructure that monitors parking lot usage and provides local information about parking availability and other general parking information.

Associated Stakeholder: Manchester Airport

Manchester-Boston Airport Webpage*Status:* Existing

Description: This subsystem provides flight, transit, taxis, rental cars, wheelchair accessible shared shuttle van/private van and parking information to the traveling public.

Associated Stakeholder: Manchester Airport

Map Update Provider*Status:* Existing

Description: This terminator represents a third-party developer and provider of digitized map databases used to support ITS services.

Associated Stakeholder: Map Update Provider

Media*Status:* Existing

Element Inventory for Region ITS Architecture for the Southern New Hampshire Planning Commission Region

Media	<i>Status:</i> Existing
<i>Description:</i> The Media element represents the information systems that provide traffic reports, travel conditions, and other transportation-related news services to the traveling public through radio, TV, and other media.	
<i>Associated Stakeholder:</i> Media	
Meteorlogix	<i>Status:</i> Existing
<i>Description:</i> Providers of value-added sector specific meteorological services. These providers utilize National Weather Service data and predictions, road condition information and local environmental data to provide weather observations and forecasts.	
<i>Associated Stakeholder:</i> Meteorlogix DTN	
Motor Carriers	<i>Status:</i> Planned
<i>Description:</i> Refer to the statewide ITS Architecture	
<i>Associated Stakeholder:</i> Motor Carriers	
MTA Fare Kiosk	<i>Status:</i> Planned
<i>Description:</i>	
<i>Associated Stakeholder:</i> Manchester Transit Authority	
MTA Farebox website	<i>Status:</i> Existing
<i>Description:</i>	
<i>Associated Stakeholder:</i> Manchester Transit Authority	
MTA Kiosks	<i>Status:</i> Planned
<i>Description:</i> MTA Kiosks provide access to traveler information at transit stations, transit stops, other fixed sites along travel routes (e.g., rest stops, merchant locations), and major trip generation locations such as special event centers, hotels, office complexes, amusement parks, and theaters. Traveler information access points include kiosks and informational displays supporting varied levels of interaction and information access. At transit stops, simple displays providing schedule information and imminent arrival signals can be provided. This basic information may be extended to include multi-modal information including traffic conditions and transit schedules along with yellow pages information to support mode and route selection at major trip generation sites. Personalized route planning and route guidance information can also be provided based on criteria supplied by the traveler. The subsystem also supports electronic payment of transit fares.	
<i>Associated Stakeholder:</i> Manchester Transit Authority	
MTA Security Monitoring Field Equipment	<i>Status:</i> Existing
<i>Description:</i>	
<i>Associated Stakeholder:</i> Manchester Transit Authority	
MTA Transit Operations Personnel	<i>Status:</i> Existing
<i>Description:</i>	
<i>Associated Stakeholder:</i> Manchester Transit Authority	
MTA Transit Vehicle	<i>Status:</i> Existing
<i>Description:</i>	
<i>Associated Stakeholder:</i> Manchester Transit Authority	
MTA Transit Vehicle Operator	<i>Status:</i> Existing
<i>Description:</i>	
<i>Associated Stakeholder:</i> Manchester Transit Authority	
MTA Website	<i>Status:</i> Existing
<i>Description:</i> This subsystem collects, processes, stores, and disseminates transit information such as transit schedule, performance, and fare to Transit system operators and the traveling public.	
<i>Associated Stakeholder:</i> Manchester Transit Authority	

Element Inventory for Region ITS Architecture for the Southern New Hampshire Planning Commission Region

MTC_Roadside Equipment	<i>Status:</i> Existing
<i>Description:</i> Roadside Equipment includes any and all equipment distributed on and along the roadway which monitors and controls traffic. This can include equipment for tolling.	
<i>Associated Stakeholder:</i> Manchester Traffic Division	
Nashua Transit System	<i>Status:</i> Existing
<i>Description:</i> This terminator is intended to provide a source and destination for ITS data flows between peer (e.g. inter-regional) transit management functions. It enables transit management activities to be coordinated across geographic boundaries or different jurisdictional areas.	
<i>Associated Stakeholder:</i> Nashua Transit System	
NH Homeland Security and Emergency Management	<i>Status:</i> Existing
<i>Description:</i>	
<i>Associated Stakeholder:</i> State of NH	
NHDOT Closed Circuit Television (CCTV) cameras	<i>Status:</i> Existing
<i>Description:</i> The Roadway Subsystem (RS) includes the equipment distributed on and along the roadway that monitors and controls traffic and monitors and manages the roadway itself. Equipment includes traffic detectors, environmental sensors, traffic signals, highway advisory radios, dynamic message signs, CCTV cameras and video image processing systems, grade crossing warning systems, and freeway ramp metering systems.	
<i>Associated Stakeholder:</i> NHDOT	
NHDOT Communications Infrastructure including fiber optic cable and wireless Microwave	<i>Status:</i> Planned
<i>Description:</i>	
<i>Associated Stakeholder:</i>	
NHDOT Dynamic Message Signs (DMS)	<i>Status:</i> Existing
<i>Description:</i> The Roadway Subsystem (RS) includes the equipment distributed on and along the roadway that monitors and controls traffic and monitors and manages the roadway itself. Equipment includes traffic detectors, environmental sensors, traffic signals, highway advisory radios, dynamic message signs, CCTV cameras and video image processing systems, grade crossing warning systems, and freeway ramp metering systems.	
<i>Associated Stakeholder:</i> NHDOT	
NHDOT Maintenance District 5	<i>Status:</i> Existing
<i>Description:</i> Refer to the NH statewide ITS Architecture	
<i>Associated Stakeholder:</i> NHDOT	
NHDOT Surface Transportation Weather Service	<i>Status:</i> Existing
<i>Description:</i> Refer to the statewide ITS Architecture	
<i>Associated Stakeholder:</i> NHDOT	
NHDOT Variable Speed Limit (VSL) signs	<i>Status:</i> Existing
<i>Description:</i> The Roadway Subsystem (RS) includes the equipment distributed on and along the roadway that monitors and controls traffic and monitors and manages the roadway itself. Equipment includes traffic detectors, environmental sensors, traffic signals, highway advisory radios, dynamic message signs, CCTV cameras and video image processing systems, grade crossing warning systems, and freeway ramp metering systems.	
<i>Associated Stakeholder:</i> NHDOT	
NHS Police Dispatch	<i>Status:</i> Existing
<i>Description:</i> Refer to the statewide ITS Architecture	
<i>Associated Stakeholder:</i> NH State Police	

Element Inventory for Region ITS Architecture for the Southern New Hampshire Planning Commission Region**Other Emergency Dispatch***Status:* Existing

Description: Representing other emergency management center systems or subsystems, this terminator provides a source and destination for ITS data flow between various communications centers operated by public safety agencies, emergency management agencies, other allied agencies, and private companies that participate in coordinated management of highway-related incidents, including disasters.

Associated Stakeholder: Other Emergency Management Center

Other ISP*Status:* Planned

Description:

Associated Stakeholder: Other Information Service Provider

Other MCM Dispatch*Status:* Existing

Description: Representing another maintenance and construction management centers or subsystems, this terminator is intended to provide a source and destination for ITS information flows between maintenance and construction across jurisdictions or between public and private sectors.

Associated Stakeholder: Other Maintenance and Construction Management center

Other Parking*Status:* Existing

Description: This terminator provides a source and destination for information that may be exchanged between peer parking systems.

Associated Stakeholder: Private Parking Lot

Pedestrians*Status:* Existing

Description: This terminator provides input (e.g. a request for right of way at an intersection) from a specialized form of the Traveler who is not using any type of vehicle (including bicycles) as a form of transport. Pedestrians may comprise those on foot and those in wheelchairs.

Associated Stakeholder: Pedestrians

Personal Computing Devices*Status:* Existing

Description: This subsystem provides the capability for travelers to receive formatted traffic advisories from their homes, place of work, major trip generation sites, personal portable devices, over multiple types of electronic media.

Associated Stakeholder: Traveler

Precision Weather*Status:* Existing

Description: Providers of value-added sector specific meteorological services. These providers utilize National Weather Service data and predictions, road condition information and local environmental data to provide weather observations and forecasts.

Associated Stakeholder: Precision Weather

Public Health System*Status:* Existing

Description:

Associated Stakeholder: State of New Hampshire

Rail Operations*Status:* Existing

Description:

Associated Stakeholder: Rail Operator

Rail Operator Wayside Equipment*Status:* Existing

Description: This terminator represents train interface equipment (usually) maintained and operated by the railroad and (usually) physically located at or near a grade crossing. This terminator is the source and destination for HRI information for, or about, approaching trains and their crews (e.g. the time at which the train will arrive and the time it will take to clear a crossing, crossing status or warnings, etc.). Generally one wayside equipment interface would be associated with one highway rail intersection. However, multiple crossings may be controlled using information based on data from one wayside equipment interface.

Associated Stakeholder: Rail Operator

Element Inventory for Region ITS Architecture for the Southern New Hampshire Planning Commission Region**Shelter Providers***Status:* Existing

Description: This terminator provides information about the shelters that open with the threat of a disaster and are operated and maintained until the threat has passed.

Associated Stakeholder: Shelter Providers

State EOC*Status:* Existing

Description:

Associated Stakeholder: State of New Hampshire

Statewide TMC*Status:* Existing

Description: Refer to Statewide Architecture.

Associated Stakeholder: NHDOT

Statewide TMC_Kiosks*Status:* Existing

Description: Kiosks are public informational displays supporting various levels of interaction and information access.

Associated Stakeholder: NHDOT

Statewide TMC_Roadside Equipment*Status:* Existing

Description: Roadside Equipment includes any and all equipment distributed on and along the roadway which monitors and controls traffic. This can include equipment for tolling.

Associated Stakeholder: NHDOT

Surface Transportation Weather Service*Status:* Existing

Description: Providers of value-added sector specific meteorological services. These providers utilize National Weather Service data and predictions, road condition information and local environmental data to provide weather observations and forecasts.

Associated Stakeholder: Manchester Highway Department

Telephone*Status:* Existing

Description: This terminator provides the caller interface and voice processing (voice recognition/synthesis) that supports voice-enabled traveler telephone information systems.

Associated Stakeholder: Traveler

Toll Administration Center*Status:* Existing

Description: Refer to State ITSwide architecture.

Associated Stakeholder: NHDOT

Toll Plaza*Status:* Existing

Description: Refer to State Architecture.

Associated Stakeholder: NHDOT

Traffic*Status:* Existing

Description: The Traffic terminator represents the collective body of vehicles that travel on surface streets, arterials, highways, expressways, tollways, freeways, or any other vehicle travel surface.

Associated Stakeholder: Traffic

Traffic Detector at Rail*Status:* Existing

Description: The Roadway Subsystem (RS) includes the equipment distributed on and along the roadway that monitors and controls traffic and monitors and manages the roadway itself. Equipment includes traffic detectors, environmental sensors, traffic signals, highway advisory radios, dynamic message signs, CCTV cameras and video image processing systems, grade crossing warning systems, and freeway ramp metering systems.

Associated Stakeholder: Manchester Traffic Division

Element Inventory for Region ITS Architecture for the Southern New Hampshire Planning Commission Region**Transit System Operators***Status:* Existing

Description: This terminator represents the human entities that are responsible for all aspects of the transit system operation including fleet management, maintenance operations, and scheduling.

Associated Stakeholder: Manchester Transit Authority

Transit Vehicle Operator*Status:* Existing

Description: This terminator represents the human entity that receives and provides additional information that is specific to operating the ITS functions in all types of transit vehicles.

Associated Stakeholder: Manchester Transit Authority

Transit Vehicles*Status:* Existing

Description: Transit vehicles include ITS devices that support the safe and efficient movement of passengers. These systems collect, manage, and disseminate transit-related information to the driver, operations and maintenance personnel, and transit system patrons.

Associated Stakeholder: Manchester Transit Authority

Traveler*Status:* Existing

Description: This terminator represents any individual who uses transportation services.

Associated Stakeholder: Traveler

Traveler Card*Status:* Existing

Description: Traveler Cards enable the actual transfer of electronic information from the user of a service (I.e. a traveler) to the provider of the service.

Associated Stakeholder: Traveler

User Personal Devices*Status:* Existing

Description: User Personal Computing Devices refers to equipment an individual owns and can personalize with their choices for information about transportation networks. An Internet-connected PC is an example.

Associated Stakeholder: Traveler

Vehicle*Status:* Existing

Description: A general element that represents personal automobiles and fleet vehicles that include ITS safety, navigation and traveler information systems that may be applicable to any highway vehicle.

Associated Stakeholder: Traveler

Weare Field Device*Status:* Planned

Description: This subsystem includes the equipment distributed on and along the roadway that monitors and controls traffic and monitors and manages the roadway itself. This element includes DMS, signs, cones and barricades.

Associated Stakeholder:

Weare Highway Department Dispatch*Status:* Planned

Description:

Associated Stakeholder: Weare Highway Department

Weare Maintenance and Construction Center Personnel*Status:* Existing

Description:

Associated Stakeholder: Weare Highway Department

Weare Maintenance and Construction Field Personnel*Status:* Existing

Description: This terminator represents the people that perform maintenance and construction field activities including vehicle and equipment operators, field supervisory personnel, field crews, and work zone safety personnel.

Associated Stakeholder: Weare Highway Department

Element Inventory for Region ITS Architecture for the Southern New Hampshire Planning Commission Region

Weare Maintenance and Construction Vehicle*Status:* Existing

Description: MCO vehicles include ITS devices that provides the sensory, processing, storage, and communications functions necessary to support highway maintenance and construction.*Associated Stakeholder:* Weare Highway Department

Weare Roadway*Status:* Existing

Description: The Weare Roadway Subsystem (RS) includes the equipment distributed on and along the roadway that monitors and controls traffic and monitors and manages the roadway itself.*Associated Stakeholder:* Weare Highway Department

Weather Services*Status:* Existing

Description: Weather Services include the National Weather Service as well as private disseminators of weather data.*Associated Stakeholder:* Weather Service Provider

Windham Highway Department Dipatch*Status:* Existing

Description: Monitors and manages roadway infrastructure construction and maintenance activities.*Associated Stakeholder:* Windham Highway Department

Windham MC Vehicles*Status:* Existing

Description: MCO vehicles include ITS devices that provides the sensory, processing, storage, and communications functions necessary to support highway maintenance and construction.*Associated Stakeholder:* Windham Highway Department

APPENDIX D: OPERATIONAL ROLES AND RESPONSIBILITIES



Cooperative Alliance for Regional Transportation

RR Area: Transit Services for ITS Architecture for the Southern New Hampshire Planning Commission Region

<i>Roles and Responsibilities</i>	<i>Status</i>
Collects CART passenger data, use the data and sends demand responsive transit request to Easter Seals NH.	Existing

Deerfield Highway Department

RR Area: Maintenance and Construction for ITS Architecture for the Southern New Hampshire Planning Commission Region

<i>Roles and Responsibilities</i>	<i>Status</i>
Dispatches MCV in response to maintenance and construction request. Collects MCV operational data and infrastructure conditions data. Gathers transportation weather information using Surface Transportation weather service. Responds to the request for roadway maintenance status from following agencies: Fire department and police department.	Existing
Gathers weather information using weather service. Dispatches and operates vehicles in response to winter maintenance. Controls maintenance and construction material information. Coordinates maintenance and construction vehicles status, processes maintenance materials storage status and equipment availability. Gathers maintenance and construction dispatch status and vehicle operational data, processes maintenance and construction dispatches information and vehicle system control. Gathers roadway maintenance status and work performance. Responds to request for roadway maintenance status from following agencies: Fire department, police department. Sends maintenance and construction work performance to maintenance and construction administrative system.	Existing

Derry DPW

RR Area: Maintenance and Construction for ITS Architecture for the Southern New Hampshire Planning Commission Region

<i>Roles and Responsibilities</i>	<i>Status</i>
Dispatches MCV in response to maintenance and construction request. Collects MCV operational data and infrastructure conditions data. Gathers transportation weather information using Surface Transportation weather service. Responds to the request for roadway maintenance status from following agencies: Fire department and police department.	Existing

RR Area: Maintenance and Construction for ITS Architecture for the Southern New Hampshire Planning Commission Region

Roles and Responsibilities

Status

Gathers weather information using weather service. Dispatches and operates vehicles in response to winter maintenance. Controls maintenance and construction material information. Coordinates maintenance and construction vehicles status, processes maintenance materials storage status and equipment availability. Gathers maintenance and construction dispatch status and vehicle operational data, processes maintenance and construction dispatches information and vehicle system control. Gathers roadway maintenance status and work performance. Responds to request for roadway maintenance status from following agencies: Fire department, police department. Sends maintenance and construction work performance to maintenance and construction administrative system.

Existing

Easter Seals NH

RR Area: Transit Services for ITS Architecture for the Southern New Hampshire Planning Commission Region

Roles and Responsibilities

Status

Assigns CART operator automatically. Sends route assignment to CART vehicle operator and CART operator instructions to transit vehicle.

Existing

Financial Institution

RR Area: Parking Management for ITS Architecture for the Southern New Hampshire Planning Commission Region

Roles and Responsibilities

Status

Send transaction status to Manchester parking division.

Existing

Goffstown DPW

RR Area: Maintenance and Construction for ITS Architecture for the Southern New Hampshire Planning Commission Region

Roles and Responsibilities

Status

Dispatches MCV in response to maintenance and construction request. Collects MCV operational data and infrastructure conditions data. Gathers transportation weather information using Surface Transportation weather service. Responds to the request for roadway maintenance status from following agencies: Fire department and police department.

Existing

Gathers weather information using weather service. Dispatches and operates vehicles in response to winter maintenance. Controls maintenance and construction material information. Coordinates maintenance and construction vehicles status, processes maintenance materials storage status and equipment availability. Gathers maintenance and construction dispatch status and vehicle operational data, processes maintenance and construction dispatches information and vehicle system control. Gathers roadway maintenance status and work performance. Responds to request for roadway maintenance status from following agencies: Fire department, police department. Sends maintenance and construction work performance to maintenance and construction administrative system.

Existing

Local DPW

**RR Area: Emergency Management for ITS Architecture for the Southern New Hampshire
Planning Commission Region**

<i>Roles and Responsibilities</i>	<i>Status</i>
Provides current asset restrictions, roadway maintenance status and work zone information to emergency center.	Existing
Provides damage assessment of road network facilities and management service restoration Cooperates with local emergency management center in performing emergency plan.	Existing

**RR Area: Maintenance and Construction for ITS Architecture for the Southern New
Hampshire Planning Commission Region**

<i>Roles and Responsibilities</i>	<i>Status</i>
Controls maintenance and construction system.	Existing
Coordinates maintenance and construction vehicle status.	Existing
Dispatches and operates vehicles in response to winter maintenance.	Existing
Gathers Maintenance and construction vehicle conditions data.	Existing
Gathers maintenance and construction dispatch information and vehicles system control.	Existing
Gathers weather information using weather service.	Existing
Presents maintenance and construction operations information to MCO center personnel.	Existing
Processes maintenance and construction dispatch information and vehicle system control.	Existing
Processes maintenance and construction material information.	Existing
Processes maintenance materials storage status and equipment availability.	Existing
Processes vehicle repair status.	Existing
Repsponds to the request for roadway maintenance status from following agencies. Statewide TMC and/or Manchester traffic division, fire department, police department, transit authority and 511.	Existing
Sends maintenance and construction work performance to maintenance and construction administrative system.	Existing

**RR Area: Transit Services for ITS Architecture for the Southern New Hampshire Planning
Commission Region**

<i>Roles and Responsibilities</i>	<i>Status</i>
Provides MTA with current asset restrictions, roadway maintenance status and work zone information.	Planned

Local Emergency Management Center

**RR Area: Commercial Vehicle Operations for ITS Architecture for the Southern New
Hampshire Planning Commission Region**

<i>Roles and Responsibilities</i>	<i>Status</i>
Coordinates the HAZMAT incident response.	Existing

**RR Area: Emergency Management for ITS Architecture for the Southern New Hampshire
Planning Commission Region**

<i>Roles and Responsibilities</i>	<i>Status</i>
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RR Area: Emergency Management for ITS Architecture for the Southern New Hampshire Planning Commission Region

<i>Roles and Responsibilities</i>	<i>Status</i>
Implements evacuation plans and coordinates with associated agencies. provides evacuation information to local DPW, NHDOT, Manchester traffic Division and MTA. Requests toll service change to toll administration. Transmits evacuation information to shelter provider.	Existing
Monitors alerting system, ITS sensors and surveillance systems, field reports, and emergency call-taking systems to identify emergencies.	Existing
Operates equipment used to receive and route emergency calls and wireless communications that enable safe and rapid deployment of appropriate resources to an emergency.	Existing
Provides media with incident information.	Existing
Responds to disaster. Cooperates with transportation and other allied response agencies in performing emergency plan.	Existing

Local School Bus Management Center

RR Area: Emergency Management for ITS Architecture for the Southern New Hampshire Planning Commission Region

<i>Roles and Responsibilities</i>	<i>Status</i>
Cooperates with local emergency management center in performing emergency.	Existing
Provides an assessment for road network facilities and management service restoration.	Existing
Provides school bus for removing people from an evacuated area.	Existing

Manchester Emergency Operations Center

RR Area: Emergency Management for ITS Architecture for the Southern New Hampshire Planning Commission Region

<i>Roles and Responsibilities</i>	<i>Status</i>
Responds to transit emergency.	Existing

RR Area: Transit Services for ITS Architecture for the Southern New Hampshire Planning Commission Region

<i>Roles and Responsibilities</i>	<i>Status</i>
Responds to transit emergency.	Existing

Manchester Highway Department

RR Area: Maintenance and Construction for ITS Architecture for the Southern New Hampshire Planning Commission Region

<i>Roles and Responsibilities</i>	<i>Status</i>
Dispatches MCV in response to maintenance and construction request. Collects MCV operational data and infrastructure conditions data. Controls infrastructure monitoring sensor on the road. Collects field device status and infrastructure monitoring sensor data. Collects weather weather service data. Gathers transportation weather information using Surface Transportation weather service.	Existing

RR Area: Maintenance and Construction for ITS Architecture for the Southern New Hampshire Planning Commission Region

<i>Roles and Responsibilities</i>	<i>Status</i>
Disseminates maintenance and construction activity to Manchester Transit Authority, Emergency operation center, Traffic Division and 511 and Media. Gathers maintenance and control administration information from maintenance and construction administration systems. Gathers asset restrictions from asset management.	Existing
Gathers weather information using weather service. Gather transportation weather information using Surface Transportation Weather Service. Dispatches and operates vehicles in response to winter maintenance. Controls maintenance and construction system. Process maintenance and construction material information. Coordinates maintenance and construction vehicle status. Processes maintenance materials storage status and equipment availability. Gathers maintenances and construction dispatch information and vehicle system control. Gathers roadway maintenance status and work performance. Responds to the request for roadway maintenance status from following agencies: Fire department, Police department and transit authority.	Existing
Identifies maintenance and construction vehicle location.	Existing
Transmits weather and pavement conditions and forecasts relevant agencies : Manchester Traffic Division; Fire Department; Police Department; Transit authority; and media. Monitors weather forecasts using Meteorologic DTN. Gathers transportation weather information from surface transportation weather service.	Existing
Gathers maintenance and construction vehicle conditions data. Presents MCO center personnel maintenance and construction operations information. Processes vehicle repair status.	Planned
Operates and maintains fog detection, automated deicing systems and automated surface treatment systems. Monitors and records operation of systems, merges information with safety/accident records for assessment of system performance. Posts traveler advisories/warnings when systems are operational/activated.	Planned
Operates and monitors environmental sensors. Monitor weather and pavement conditions during inclement weather. Monitor weather forecasts using Meteorlogix DTN. Gathers environmental probe data from environmental sensors. Sends environmental condition data to Manchester Traffic Division.	Planned
Operates MCV. Transmits work zone information to the following agencies: Manchester Transit Authority (if the activities influence transit); Local fire department; Media; Manchester Traffic Division.	Planned

Manchester Parking Division

RR Area: Parking Management for ITS Architecture for the Southern New Hampshire Planning Commission Region

<i>Roles and Responsibilities</i>	<i>Status</i>
Gather parking status information. Send payment request to financial institute.	Existing

Manchester Traffic Division

RR Area: Emergency Management for ITS Architecture for the Southern New Hampshire Planning Commission Region

<i>Roles and Responsibilities</i>	<i>Status</i>
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RR Area: Emergency Management for ITS Architecture for the Southern New Hampshire Planning Commission Region

<i>Roles and Responsibilities</i>	<i>Status</i>
Implements special traffic control strategies and detours and restrictions to effectively manage traffic and around the disaster. Cooperates with local emergency management center in performing emergency plan.	Existing
Provides Manchester emergency operations dispatch with road network conditions.	Existing
Provides emergency traffic control information to MTA and emergency operations center.	Planned
Provides road network conditions to 511.	Planned

RR Area: Maintenance and Construction for ITS Architecture for the Southern New Hampshire Planning Commission Region

<i>Roles and Responsibilities</i>	<i>Status</i>
Controls roadway work zone traffic using roadway work zone traffic control equipment.	Planned
Gathers environmental conditional data from environmental sensors. Send environmental condition data to Manchester Highway Department. Gather road network prob information from 511.	Planned
Sends road network conditions and field equipment status (such as traffic controller, traffic detector, ect) to Manchester DPW.	Planned

RR Area: Transit Services for ITS Architecture for the Southern New Hampshire Planning Commission Region

<i>Roles and Responsibilities</i>	<i>Status</i>
Provides MTA with road network conditions.	Existing

Manchester Transit Authority

RR Area: Emergency Management for ITS Architecture for the Southern New Hampshire Planning Commission Region

<i>Roles and Responsibilities</i>	<i>Status</i>
Provides emergency management center with transit emergency data. Coordinates incidence response with Manchester Emergency Management Center.	Existing
Removes people from an evacuated area. Cooperates with local emergency management center in performing evacuation plans.	Existing
Provides an assessment of status for transit facilities and modifies service transit operations to meet the special demands of the disaster.	Planned

RR Area: Transit Services for ITS Architecture for the Southern New Hampshire Planning Commission Region

<i>Roles and Responsibilities</i>	<i>Status</i>
Determines real time schedule performance using AVL data. Assigns transit operator automatically. Provides information service providers with static and real time transit and fare schedules. Presents transit operations status to transit system operators.	Existing
Operates and maintains on board transit security and surveillance systems. Notifies local police department on in-vehicle alarm detection. Provides transit incident information to information provider. Sends transit incident information to media. Operates and monitor transit vehicles. Sends transit emergency data to emergency management center.	Existing
Provides information services include transit stop annuciation,	Existing

RR Area: Transit Services for ITS Architecture for the Southern New Hampshire Planning**Commision Region**

<i>Roles and Responsibilities</i>	<i>Status</i>
Requests map update from map update provides. Monitors current vehicle location using an Automated vehicle Location System. Determines real time schedule adherence, updates transit schedule using location data and makes real-time schedule available to the MTA webpage.	Existing
Collects transit vehicle passenger data and use the data. Assign transit operator automatically. Sends route assignment to transit vehicle operator and transit operator instructiions to transit vehicle.	Planned
Gathers transit vehicle schedule performance from transit vehicles and parking information agency.	Planned
Process system status and trnsnit critical status data from on-board condition sensors to schedule preventative and corrective maintenance.	Planned
Provides imminent arrival signs, and real-time transit schedule displays on-board transit vehicles. Transmits information to 511. Provide remote transit information service.	Planned

Media**RR Area: Incident Management for ITS Architecture for the Southern New Hampshire Planning Commision Region**

<i>Roles and Responsibilities</i>	<i>Status</i>
Refer to the Statewide ITS Architecture.	Existing

New Hampshire Department of Safety**RR Area: Incident Management for ITS Architecture for the Southern New Hampshire Planning Commision Region**

<i>Roles and Responsibilities</i>	<i>Status</i>
Refer to the Statewide ITS Architecture.	Existing

NH Commercial Vehicle Administration**RR Area: Commercial Vehicle Operations for ITS Architecture for the Southern New Hampshire Planning Commision Region**

<i>Roles and Responsibilities</i>	<i>Status</i>
Refer to the Statewide ITS Architecture.	Existing
Refer to the Statewide ITAS Architecture.	Existing

NHDOT**RR Area: Incident Management for ITS Architecture for the Southern New Hampshire Planning Commision Region**

<i>Roles and Responsibilities</i>	<i>Status</i>
Refer to the Statewide ITS Architecture.	Existing

RR Area: Maintenance and Construction for ITS Architecture for the Southern New Hampshire Planning Commission Region

<i>Roles and Responsibilities</i>	<i>Status</i>
Send road network conditions and field equipment status (Such as traffic controller, traffic detector, etc.) to local DPW.	Planned

RR Area: Traveler Information for ITS Architecture for the Southern New Hampshire Planning Commission Region

<i>Roles and Responsibilities</i>	<i>Status</i>
Refer to Statewide ITS Architecture.	Planned

Shelter Providers

RR Area: Emergency Management for ITS Architecture for the Southern New Hampshire Planning Commission Region

<i>Roles and Responsibilities</i>	<i>Status</i>
Provides shelter information to emergency operation center.	Existing
Shelters evacuated people.	Existing

Weare Highway Department

RR Area: Maintenance and Construction for ITS Architecture for the Southern New Hampshire Planning Commission Region

<i>Roles and Responsibilities</i>	<i>Status</i>
Gathers weather information using weather service. Dispatches and operates vehicles in response to winter maintenance. Control maintenance and construction material information. Coordinates maintenance and construction vehicle status. Processes maintenance materials status and equipment availability. Gathers maintenance and construction dispatch status and vehicle operational data. Processes maintenance and construction dispatch information and vehicle system control. Gathers roadway maintenance status and work performance. Responds to the request for roadway maintenance status from following agencies: Fire department, police department. Sends maintenance and construction work performance to maintenance and construction administrative system.	Existing
Monitors crew movements so that the crew can be warned of movement beyond the designated safe zone.	Existing
Monitors weather forecasts. Gathers transportation weather information weather information from surface transportation weather service.	Existing
Operates and maintain fog detection, UTOMted deicing systems and automated surface treatment systems.	Existing
Provides the motorist with work zone speeds and deploys prior to the work zones.	Existing

Windham Highway Department

RR Area: Maintenance and Construction for ITS Architecture for the Southern New Hampshire Planning Commission Region

<i>Roles and Responsibilities</i>	<i>Status</i>
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RR Area: Maintenance and Construction for ITS Architecture for the Southern New Hampshire Planning Commission Region

<i>Roles and Responsibilities</i>	<i>Status</i>
Gathers weather information using weather service. Dispatches and operates vehicles in response to winter maintenance. Control maintenance and construction material information. Coordinates maintenance and construction vehicle status. Processes maintenance materials status and equipment availability. Gathers maintenance and construction dispatch status and vehicle operational data. Processes maintenance and construction dispatch information and vehicle system control. Gathers roadway maintenance status and work performance. Responds to the request for roadway maintenance status from following agencies: Fire department, police department. Sends maintenance and construction work performance to maintenance and construction administrative system.	Existing
Operates and monitors environmental sensors. Monitors weather and pavement conditions during inclement weather. Monitor weather forecasts. Gather environmental probe data from environmental sensors.	Existing

Status Value Legend

Name	Description
Existing	
Planned	
Not Planned	

APPENDIX E: FUNCTIONAL REQUIREMENTS

Functional Requirements



ITS Architecture for the Southern New Hampshire Planning Commission Region (Region)

11/20/2015 11:46:39AM

Architecture

Status

ITS Architecture for the Southern New Hampshire Planning Commission Region (Region)

(Region)

Element:511

Entity: **Information Service Provider**

Functional Area: **Basic Information Broadcast**

Broadcast dissemination of traffic, transit, maintenance and construction, event, and weather information to traveler interface systems and vehicles.

Functional Area: **Traveler Telephone Information**

Distribution of traveler information and wide-area alerts to traveler telephone information systems such as 511, based on voice-based traveler requests.

Functional Area: **ISP Operational Data Repository**

Processes, stores, and distributes real-time information on the state of the regional transportation system to transportation system operators.

Functional Area: **ISP Emergency Traveler Information**

Distribution of emergency information to the traveling public, including evacuation information and wide-area alerts.

Element:511.net

Entity: **Information Service Provider**

Functional Area: **ISP Traveler Data Collection**

Collects traveler information from other centers, consolidates and refines the collected data, and makes this data available to traveler information applications.

Functional Area: **Basic Information Broadcast**

Broadcast dissemination of traffic, transit, maintenance and construction, event, and weather information to traveler interface systems and vehicles.

Functional Area: **ISP Operational Data Repository**

Processes, stores, and distributes real-time information on the state of the regional transportation system to transportation system operators.

Element:ADA Paratransit

Entity: **Transit Vehicle**

Functional Area: **On-board Schedule Management**

Collecting of data for schedule generation and adjustment on-board a transit vehicle. Supports communication between the vehicle, operator, and center.

Functional Area: **On-board Paratransit Operations**

On-board systems to manage paratransit and flexible-route dispatch requests, including multi-stop runs. Passenger data is collected and provided to the center.

Functional Area: **On-board Transit Fare Management**

On-board systems provide fare collection using a travelers non-monetary fare medium. Collected fare data are made available to the center.

Functional Area: **On-board Transit Security**

On-board video/audio surveillance systems, threat sensors, and object detection sensors to enhance security and safety on-board a transit vehicles. Also includes silent alarms activated by transit user or vehicle operator, operator authentication, and remote vehicle disabling.

Functional Area: **On-board Maintenance**

On-board systems to collect and process transit vehicle maintenance data including mileage and vehicle operating conditions for use in scheduling future vehicle maintenance.

Architecture	Status
ITS Architecture for the Southern New Hampshire Planning Commission Region (Region)	(Region)
<i>Element:ADA Paratransit</i>	
<i>Entity: Vehicle</i>	
<i>Functional Area: Vehicle Location Determination</i> Receives current location of the vehicle from GPS or other positioning technology and provides this information to other in-vehicle functions.	
<i>Element:CART Broker/Manager</i>	
<i>Entity: Transit Management</i>	
<i>Functional Area: Transit Center Vehicle Tracking</i> Monitoring transit vehicle locations via interactions with on-board systems. Furnish users with real-time transit schedule information and maintain interface with digital map providers.	
<i>Functional Area: Transit Center Fixed-Route Operations</i> Management of fixed route transit operations. Planning, scheduling, and dispatch associated with fixed and flexible route transit services. Updates customer service operator systems, and provides current vehicle schedule adherence and optimum scenarios for schedule adjustment.	
<i>Functional Area: Transit Center Paratransit Operations</i> Management of demand response transit services, including paratransit. Planning and scheduling of these services. Supports automated vehicle dispatch and automatically updates customer service operator systems.	
<i>Functional Area: Transit Vehicle Operator Assignment</i> Assignment of transit operators to runs in a fair manner while minimizing labor and overtime services, considering operator preferences, qualifications, accumulated work hours, and other information about each operator.	
<i>Functional Area: Transit Garage Maintenance</i> Collect operational and maintenance data from transit vehicles, manage vehicle service histories, automatically generate preventative maintenance schedules, and provide information to service personnel.	
<i>Functional Area: Transit Vehicle Assignment</i> Assigns individual transit vehicles to vehicle blocks and downloads this information to the transit vehicle, updating assignments as necessitated by changes. It also provides an inventory management function that stores attributes about each of the transit vehicles.	
<i>Element:CART Vehicles</i>	
<i>Entity: Transit Vehicle</i>	
<i>Functional Area: On-board Schedule Management</i> Collecting of data for schedule generation and adjustment on-board a transit vehicle. Supports communication between the vehicle, operator, and center.	
<i>Functional Area: On-board Paratransit Operations</i> On-board systems to manage paratransit and flexible-route dispatch requests, including multi-stop runs. Passenger data is collected and provided to the center.	
<i>Element:Commercial Vehicle Fleet Dispatch Systems</i>	
<i>Entity: Fleet and Freight Management</i>	
<i>Functional Area: Commercial Vehicle and Freight Security</i> Coordinated response for commercial vehicle and freight security incidents. Remote monitoring of commercial vehicle driver and freight equipment to vehicle assignments as well as detection of breaches or tampering.	
<i>Functional Area: Fleet HAZMAT Management</i>	

Architecture	Status
ITS Architecture for the Southern New Hampshire Planning Commission Region (Region)	(Region)
<i>Element:</i> Commercial Vehicle Fleet Dispatch Systems	
<i>Entity:</i> Fleet and Freight Management	
<i>Functional Area:</i> Fleet HAZMAT Management Notification of hazardous materials (HAZMAT) shipments to emergency management centers for commercial vehicles managed by the center - includes information on the nature of the cargo, the vehicle, and its expected route.	
<i>Element:</i> Commercial Vehicles	
<i>Entity:</i> Commercial Vehicle	
<i>Functional Area:</i> On-board Cargo Monitoring On-board systems monitoring the location and status of the commercial vehicle and its cargo. Sends the data on to appropriate centers and roadside facilities, including emergency management in the case of HAZMAT incidents.	
<i>Entity:</i> Vehicle	
<i>Functional Area:</i> Vehicle Mayday I/F In-vehicle capability for drivers or collision detection sensors onboard a vehicle to report an emergency and summon assistance.	
<i>Element:</i> Derry Emergency Operation Dispatch	
<i>Entity:</i> Emergency Management	
<i>Functional Area:</i> Emergency Call-Taking Provides interface to the emergency call-taking systems such as the Emergency Telecommunications System (e.g., 911) that correlate call information with emergencies reported by transit agencies, commercial vehicle operators, or other public safety agencies. Allows the operator to verify the incident and forward the information to the responding agencies.	
<i>Functional Area:</i> Emergency Dispatch Dispatch emergency vehicles to incidents, tracking their location and status. Pertinent incident information is gathered and relayed to the responding units.	
<i>Functional Area:</i> Emergency Routing Routing of emergency vehicles to facilitate the quickest/safest arrival. Routes may be determined based on real-time traffic information and road conditions or routes may be provided by Traffic Management on request.	
<i>Functional Area:</i> Incident Command Tactical decision support, resource coordination, and communications integration among emergency management agencies for Incident Commands that are established by first responders to support local management of an incident.	
<i>Functional Area:</i> Service Patrol Management Dispatch and communication with roadway service patrol vehicles that monitor roads to aid motorists, offering rapid response to minor incidents.	
<i>Functional Area:</i> Emergency Early Warning System Monitors alerting and advisory systems, information collected by ITS surveillance and sensors, and reports from other agencies in order to identify potential, imminent, or in-progress major incidents or disasters. Notification is provided to other ITS centers to notify the traveling public.	
<i>Functional Area:</i> Emergency Response Management Strategic emergency planning and response capabilities and broad inter-agency interfaces to support large-scale incidents and disasters, commonly associated with Emergency Operations Centers.	
<i>Functional Area:</i> Emergency Evacuation Support	

Architecture	Status
ITS Architecture for the Southern New Hampshire Planning Commission Region (Region)	(Region)
<i>Element:</i> Derry Emergency Operation Dispatch	
<i>Entity:</i> Emergency Management	
<i>Functional Area:</i> Emergency Evacuation Support Evacuation planning and coordination to manage evacuation and reentry of a population in the vicinity of a disaster or other emergency that poses a risk to public safety.	
<i>Functional Area:</i> Mayday Support Collection and response to Mayday messages received from vehicles and drivers.	
<i>Element:</i> DOT MCO Field Devices	
<i>Entity:</i> Roadway	
<i>Functional Area:</i> Roadway Equipment Coordination Field elements that control and send data to other field elements (such as environmental sensors that send data to a DMS or coordination between traffic controllers on adjacent intersections), without center control.	
<i>Functional Area:</i> Roadway Speed Monitoring and Warning Vehicle speed sensors that detect excessive vehicle speeds, optionally based on conditions and vehicle type, informing drivers, centers and/or enforcement agencies of speed violations.	
<i>Element:</i> Flight Line Inc.	
<i>Entity:</i> Transit Management	
<i>Functional Area:</i> Transit Center Fixed-Route Operations Management of fixed route transit operations. Planning, scheduling, and dispatch associated with fixed and flexible route transit services. Updates customer service operator systems, and provides current vehicle schedule adherence and optimum scenarios for schedule adjustment.	
<i>Functional Area:</i> Transit Vehicle Operator Assignment Assignment of transit operators to runs in a fair manner while minimizing labor and overtime services, considering operator preferences, qualifications, accumulated work hours, and other information about each operator.	
<i>Element:</i> Flight Line Inc_Transit vehicles	
<i>Entity:</i> Transit Vehicle	
<i>Functional Area:</i> On-board Schedule Management Collecting of data for schedule generation and adjustment on-board a transit vehicle. Supports communication between the vehicle, operator, and center.	
<i>Element:</i> Hooksett Highway Department Dispatch	
<i>Entity:</i> Maintenance and Construction Management	
<i>Functional Area:</i> MCM Winter Maintenance Management Manages winter road maintenance, tracking and controlling snow plow operations, roadway treatment (e.g., salt spraying and other material applications) based on weather information.	
<i>Functional Area:</i> MCM Work Zone Management Remotely monitors and supports work zone activities, controlling traffic through dynamic message signs (DMS), highway advisory radio, gates and barriers, and informing other groups of activity (e.g., traveler information systems, traffic management centers, other maintenance and construction centers).	
<i>Functional Area:</i> MCM Work Activity Coordination Disseminates work activity schedules and current asset restrictions to other agencies. Work schedules are coordinated, factoring in the needs and activities of other agencies and adjacent jurisdictions.	
<i>Element:</i> Hooksett MCO Field Devices	

Architecture	Status
ITS Architecture for the Southern New Hampshire Planning Commission Region (Region)	(Region)
<i>Element:</i> Hooksett MCO Field Devices	
<i>Entity:</i> Roadway	
<i>Functional Area:</i> Roadway Equipment Coordination Field elements that control and send data to other field elements (such as environmental sensors that send data to a DMS or coordination between traffic controllers on adjacent intersections), without center control.	
<i>Element:</i> Local DPW Dispatch	
<i>Entity:</i> Maintenance and Construction Management	
<i>Functional Area:</i> MCM Vehicle and Equipment Maintenance Management Monitors vehicle and equipment condition, tracks maintenance history, and schedules routine and corrective maintenance.	
<i>Functional Area:</i> MCM Incident Management Supports coordinated response to incidents - share incident notifications, manage incident response resources, and coordinate overall incident situation and response among allied response organizations.	
<i>Functional Area:</i> MCM Maintenance Decision Support Maintenance Decision Support Systems recommend courses of action based on current and forecast environmental and road conditions (filtered and fused for specific time horizons) and additional application specific information. Recommendations and dispatch instructions are generated based on this integrated information.	
<i>Functional Area:</i> MCM Winter Maintenance Management Manages winter road maintenance, tracking and controlling snow plow operations, roadway treatment (e.g., salt spraying and other material applications) based on weather information.	
<i>Functional Area:</i> MCM Roadway Maintenance and Construction Overall management and support for routine maintenance on the roadway or right-of-way. Includes landscape maintenance, hazard removal (roadway debris, dead animals), routine maintenance activities (roadway cleaning, grass cutting), and repair and maintenance of both ITS and non-ITS equipment.	
<i>Functional Area:</i> MCM Work Zone Management Remotely monitors and supports work zone activities, controlling traffic through dynamic message signs (DMS), highway advisory radio, gates and barriers, and informing other groups of activity (e.g., traveler information systems, traffic management centers, other maintenance and construction centers).	
<i>Functional Area:</i> MCM Work Activity Coordination Disseminates work activity schedules and current asset restrictions to other agencies. Work schedules are coordinated, factoring in the needs and activities of other agencies and adjacent jurisdictions.	
<i>Element:</i> Local DPW Field Device	
<i>Entity:</i> Roadway	
<i>Functional Area:</i> Roadway Equipment Coordination Field elements that control and send data to other field elements (such as environmental sensors that send data to a DMS or coordination between traffic controllers on adjacent intersections), without center control.	
<i>Functional Area:</i> Roadway Work Zone Traffic Control Field elements in maintenance and construction areas including CCTV cameras, driver information systems (such as DMS), and gates/barriers that monitor and control traffic and provide information directly to drivers in affected areas.	
<i>Functional Area:</i> Roadway Work Zone Safety	

Architecture	Status
ITS Architecture for the Southern New Hampshire Planning Commission Region (Region)	(Region)
<i>Element:</i> Local DPW Field Device	
<i>Entity:</i> Roadway	
<i>Functional Area:</i> Roadway Work Zone Safety Work zone intrusion detection devices (to detect vehicle intrusion upon a work zone or crew worker movement across a work zone boundary) and intrusion alerting devices that provide alerts to crew and drivers.	
<i>Element:</i> Local Emergency Alter System	
<i>Entity:</i> Information Service Provider	
<i>Functional Area:</i> ISP Traveler Data Collection Collects traveler information from other centers, consolidates and refines the collected data, and makes this data available to traveler information applications.	
<i>Functional Area:</i> Basic Information Broadcast Broadcast dissemination of traffic, transit, maintenance and construction, event, and weather information to traveler interface systems and vehicles.	
<i>Functional Area:</i> Traveler Telephone Information Distribution of traveler information and wide-area alerts to traveler telephone information systems such as 511, based on voice-based traveler requests.	
<i>Functional Area:</i> ISP Emergency Traveler Information Distribution of emergency information to the traveling public, including evacuation information and wide-area alerts.	
<i>Element:</i> Local Emergency Dispatch	
<i>Entity:</i> Emergency Management	
<i>Functional Area:</i> Emergency Call-Taking Provides interface to the emergency call-taking systems such as the Emergency Telecommunications System (e.g., 911) that correlate call information with emergencies reported by transit agencies, commercial vehicle operators, or other public safety agencies. Allows the operator to verify the incident and forward the information to the responding agencies.	
<i>Functional Area:</i> Emergency Dispatch Dispatch emergency vehicles to incidents, tracking their location and status. Pertinent incident information is gathered and relayed to the responding units.	
<i>Functional Area:</i> Emergency Routing Routing of emergency vehicles to facilitate the quickest/safest arrival. Routes may be determined based on real-time traffic information and road conditions or routes may be provided by Traffic Management on request.	
<i>Functional Area:</i> Incident Command Tactical decision support, resource coordination, and communications integration among emergency management agencies for Incident Commands that are established by first responders to support local management of an incident.	
<i>Functional Area:</i> Service Patrol Management Dispatch and communication with roadway service patrol vehicles that monitor roads to aid motorists, offering rapid response to minor incidents.	
<i>Functional Area:</i> Emergency Early Warning System Monitors alerting and advisory systems, information collected by ITS surveillance and sensors, and reports from other agencies in order to identify potential, imminent, or in-progress major incidents or disasters. Notification is provided to other ITS centers to notify the traveling public.	
<i>Functional Area:</i> Emergency Response Management	

Architecture	Status
ITS Architecture for the Southern New Hampshire Planning Commission Region (Region) (Region)	
<i>Element:</i> Local Emergency Dispatch	
<i>Entity:</i> Emergency Management	
<i>Functional Area:</i> Emergency Response Management Strategic emergency planning and response capabilities and broad inter-agency interfaces to support large-scale incidents and disasters, commonly associated with Emergency Operations Centers.	
<i>Functional Area:</i> Emergency Evacuation Support Evacuation planning and coordination to manage evacuation and reentry of a population in the vicinity of a disaster or other emergency that poses a risk to public safety.	
<i>Functional Area:</i> Emergency Environmental Monitoring Collects current and forecast road and weather information that is used by the operator to more effectively manage incidents.	
<i>Functional Area:</i> Center Secure Area Surveillance Management of security surveillance devices and analysis of that data to detect potential threats. Areas under surveillance may include transit stops, transit stations, rest areas, park and ride lots, modal interchange facilities, on-board a transit vehicle, etc.	
<i>Functional Area:</i> Center Secure Area Sensor Management Management of security sensors, analysis of sensor data, correlation with surveillance data and alerts from other agencies to detect potential threats, and dissemination of threat information to other agencies. Sensors may be placed in areas such as transit stops, transit stations, rest areas, park and ride lots, modal interchange facilities, on-board a transit vehicle, etc.	
<i>Functional Area:</i> Center Secure Area Alarm Support Collection and response to silent and audible alarms received from travelers in secure areas (such as transit stops, rest areas, park-and-ride lots) and from on-board transit vehicles.	
<i>Functional Area:</i> Mayday Support Collection and response to Mayday messages received from vehicles and drivers.	
<i>Functional Area:</i> Emergency Commercial Vehicle Response Responds to commercial vehicle and freight equipment related emergencies. Includes incidents involving hazardous materials as well as the detection of non-permitted transport of security sensitive hazmat.	
<i>Element:</i> Local Emergency Vehicles	
<i>Entity:</i> Emergency Vehicle	
<i>Functional Area:</i> On-board EV En Route Support On-board systems for gathering of dispatch and routing information for emergency vehicle personnel, vehicle tracking, communications with care facilities, and signal preemption via short range communication directly with traffic control equipment at the roadside.	
<i>Functional Area:</i> On-board EV Incident Management Communication On-board systems provide communications support to first responders. Incident information is provided to dispatched emergency personnel. Emergency personnel transmit information about the incident and response status.	
<i>Element:</i> Local Maintenance and Construction Vehicle	
<i>Entity:</i> Maintenance and Construction Vehicle	
<i>Functional Area:</i> MCV Winter Maintenance On-board systems that support snow plow operations and other roadway treatments (e.g., salt spraying and other material applications). Supports information sharing between snow plows.	

Architecture	Status
ITS Architecture for the Southern New Hampshire Planning Commission Region (Region)	(Region)
<i>Element:</i> Local Maintenance and Construction Vehicle	
<i>Entity:</i> Maintenance and Construction Vehicle	
<i>Functional Area:</i> MCV Roadway Maintenance and Construction On-board systems that support routine non-winter maintenance on the roadway or right-of-way. Includes landscape maintenance, hazard removal (roadway debris, dead animals), routine maintenance activities (roadway cleaning, grass cutting), and repair and maintenance of equipment on the roadway.	
<i>Functional Area:</i> MCV Work Zone Support On-board systems that provide communications and support for local management of a work zone.	
<i>Functional Area:</i> MCV Vehicle Safety Monitoring On-board systems to detect vehicle intrusions and warn crew workers and drivers of imminent encroachment. Crew movements are monitored so that the crew can be warned of movement beyond the designated safe zone. Used for stationary work zones or in mobile applications where a safe zone is maintained around the moving vehicle.	
<i>Entity:</i> Vehicle	
<i>Functional Area:</i> Vehicle Safety Monitoring System On-board systems to diagnose critical components of the vehicle and warn the driver of potential dangers, including steering, braking, acceleration, emissions, fuel economy, engine performance, etc.	
<i>Element:</i> Local School Bus Dispatch	
<i>Entity:</i> Transit Management	
<i>Functional Area:</i> Transit Center Security Monitor transit vehicle operator or traveler activated alarms; authenticate transit vehicle operators; remotely disable a transit vehicle; alert operators, travelers, and police to potential incidents identified by these security features.	
<i>Functional Area:</i> Transit Evacuation Support Support evacuation and subsequent reentry of a population in the vicinity of a disaster or other emergency. Coordinate regional evacuation plans and resources including transit and school bus fleets.	
<i>Element:</i> Local Security Monitoring Field Equipment	
<i>Entity:</i> Security Monitoring	
<i>Functional Area:</i> Field Secure Area Sensor Monitoring Security sensors monitoring facilities (e.g. transit yards) and transportation infrastructure (e.g. bridges, tunnels, interchanges, and transit railways or guideways) for environmental threats, intrusion and motion, object detection, and infrastructure integrity.	
<i>Functional Area:</i> Field Secure Area Surveillance Security surveillance devices (audio/video) that monitor facilities (e.g. transit yards) and transportation infrastructure (e.g. bridges, tunnels, interchanges, and transit railways or guideways).	
<i>Element:</i> Manchester Emergency Alert System	
<i>Entity:</i> Information Service Provider	
<i>Functional Area:</i> ISP Traveler Data Collection Collects traveler information from other centers, consolidates and refines the collected data, and makes this data available to traveler information applications.	
<i>Functional Area:</i> Basic Information Broadcast	

Architecture	Status
ITS Architecture for the Southern New Hampshire Planning Commission Region (Region) (Region)	
<i>Element:</i> Manchester Emergency Alert System	
<i>Entity:</i> Information Service Provider	
<i>Functional Area:</i>	Basic Information Broadcast
Broadcast dissemination of traffic, transit, maintenance and construction, event, and weather information to traveler interface systems and vehicles.	
<i>Functional Area:</i>	Traveler Telephone Information
Distribution of traveler information and wide-area alerts to traveler telephone information systems such as 511, based on voice-based traveler requests.	
<i>Functional Area:</i>	ISP Emergency Traveler Information
Distribution of emergency information to the traveling public, including evacuation information and wide-area alerts.	
<i>Element:</i> Manchester Emergency Operations Dispatch	
<i>Entity:</i> Emergency Management	
<i>Functional Area:</i>	Emergency Call-Taking
Provides interface to the emergency call-taking systems such as the Emergency Telecommunications System (e.g., 911) that correlate call information with emergencies reported by transit agencies, commercial vehicle operators, or other public safety agencies. Allows the operator to verify the incident and forward the information to the responding agencies.	
<i>Functional Area:</i>	Emergency Dispatch
Dispatch emergency vehicles to incidents, tracking their location and status. Pertinent incident information is gathered and relayed to the responding units.	
<i>Functional Area:</i>	Emergency Routing
Routing of emergency vehicles to facilitate the quickest/safest arrival. Routes may be determined based on real-time traffic information and road conditions or routes may be provided by Traffic Management on request.	
<i>Functional Area:</i>	Incident Command
Tactical decision support, resource coordination, and communications integration among emergency management agencies for Incident Commands that are established by first responders to support local management of an incident.	
<i>Functional Area:</i>	Service Patrol Management
Dispatch and communication with roadway service patrol vehicles that monitor roads to aid motorists, offering rapid response to minor incidents.	
<i>Functional Area:</i>	Emergency Early Warning System
Monitors alerting and advisory systems, information collected by ITS surveillance and sensors, and reports from other agencies in order to identify potential, imminent, or in-progress major incidents or disasters. Notification is provided to other ITS centers to notify the traveling public.	
<i>Functional Area:</i>	Emergency Response Management
Strategic emergency planning and response capabilities and broad inter-agency interfaces to support large-scale incidents and disasters, commonly associated with Emergency Operations Centers.	
<i>Functional Area:</i>	Emergency Evacuation Support
Evacuation planning and coordination to manage evacuation and reentry of a population in the vicinity of a disaster or other emergency that poses a risk to public safety.	
<i>Functional Area:</i>	Emergency Environmental Monitoring
Collects current and forecast road and weather information that is used by the operator to more effectively manage incidents.	
<i>Functional Area:</i>	Center Secure Area Surveillance

Architecture	Status
ITS Architecture for the Southern New Hampshire Planning Commission Region (Region)	(Region)
<i>Element:</i> Manchester Emergency Operations Dispatch	
<i>Entity:</i> Emergency Management	
<i>Functional Area:</i> Center Secure Area Surveillance Management of security surveillance devices and analysis of that data to detect potential threats. Areas under surveillance may include transit stops, transit stations, rest areas, park and ride lots, modal interchange facilities, on-board a transit vehicle, etc.	
<i>Functional Area:</i> Center Secure Area Sensor Management Management of security sensors, analysis of sensor data, correlation with surveillance data and alerts from other agencies to detect potential threats, and dissemination of threat information to other agencies. Sensors may be placed in areas such as transit stops, transit stations, rest areas, park and ride lots, modal interchange facilities, on-board a transit vehicle, etc.	
<i>Functional Area:</i> Center Secure Area Alarm Support Collection and response to silent and audible alarms received from travelers in secure areas (such as transit stops, rest areas, park-and-ride lots) and from on-board transit vehicles.	
<i>Functional Area:</i> Mayday Support Collection and response to Mayday messages received from vehicles and drivers.	
<i>Element:</i> Manchester Emergency Vehicles	
<i>Entity:</i> Emergency Vehicle	
<i>Functional Area:</i> On-board EV En Route Support On-board systems for gathering of dispatch and routing information for emergency vehicle personnel, vehicle tracking, communications with care facilities, and signal preemption via short range communication directly with traffic control equipment at the roadside.	
<i>Functional Area:</i> On-board EV Incident Management Communication On-board systems provide communications support to first responders. Incident information is provided to dispatched emergency personnel. Emergency personnel transmit information about the incident and response status.	
<i>Element:</i> Manchester Highway Department Dispatch	
<i>Entity:</i> Maintenance and Construction Management	
<i>Functional Area:</i> MCM Vehicle Tracking Remotely tracks the location of maintenance and construction vehicles and other equipment; presented to the center personnel.	
<i>Functional Area:</i> MCM Vehicle and Equipment Maintenance Management Monitors vehicle and equipment condition, tracks maintenance history, and schedules routine and corrective maintenance.	
<i>Functional Area:</i> MCM Environmental Information Collection Remotely controls environmental sensors and assimilates collected data with environmental probe data and other current and forecast road conditions and surface weather information from weather service providers and transportation operations.	
<i>Functional Area:</i> MCM Environmental Information Processing Processes current and forecast weather data, road condition information, local environmental data, and uses internal models to develop specialized detailed forecasts of local weather and surface conditions. Disseminates road weather information to other agencies and centers.	
<i>Functional Area:</i> MCM Automated Treatment System Control	

Architecture	Status
ITS Architecture for the Southern New Hampshire Planning Commission Region (Region)	(Region)
<i>Element:</i> Manchester Highway Department Dispatch	
<i>Entity:</i> Maintenance and Construction Management	
<i>Functional Area:</i> MCM Automated Treatment System Control Remotely controls automated roadway treatment systems (to disperse anti-icing chemicals, etc.) directly, or via control of the environmental sensors that activate the treatment systems automatically in the field.	
<i>Functional Area:</i> MCM Incident Management Supports coordinated response to incidents - share incident notifications, manage incident response resources, and coordinate overall incident situation and response among allied response organizations.	
<i>Functional Area:</i> MCM Maintenance Decision Support Maintenance Decision Support Systems recommend courses of action based on current and forecast environmental and road conditions (filtered and fused for specific time horizons) and additional application specific information. Recommendations and dispatch instructions are generated based on this integrated information.	
<i>Functional Area:</i> MCM Winter Maintenance Management Manages winter road maintenance, tracking and controlling snow plow operations, roadway treatment (e.g., salt spraying and other material applications) based on weather information.	
<i>Functional Area:</i> MCM Roadway Maintenance and Construction Overall management and support for routine maintenance on the roadway or right-of-way. Includes landscape maintenance, hazard removal (roadway debris, dead animals), routine maintenance activities (roadway cleaning, grass cutting), and repair and maintenance of both ITS and non-ITS equipment.	
<i>Functional Area:</i> MCM Work Zone Management Remotely monitors and supports work zone activities, controlling traffic through dynamic message signs (DMS), highway advisory radio, gates and barriers, and informing other groups of activity (e.g., traveler information systems, traffic management centers, other maintenance and construction centers).	
<i>Functional Area:</i> MCM Work Zone Safety Management Remotely monitors work zone safety systems that detect vehicle intrusions in work zones and warns crew workers and drivers of imminent encroachment. Crew movements are also monitored so that the crew can be warned of movement beyond the designated safe zone.	
<i>Functional Area:</i> MCM Work Activity Coordination Disseminates work activity schedules and current asset restrictions to other agencies. Work schedules are coordinated, factoring in the needs and activities of other agencies and adjacent jurisdictions.	
<i>Element:</i> Manchester Highway Department Field Device	
<i>Entity:</i> Roadway	
<i>Functional Area:</i> Roadway Equipment Coordination Field elements that control and send data to other field elements (such as environmental sensors that send data to a DMS or coordination between traffic controllers on adjacent intersections), without center control.	
<i>Functional Area:</i> Roadway Work Zone Traffic Control Field elements in maintenance and construction areas including CCTV cameras, driver information systems (such as DMS), and gates/barriers that monitor and control traffic and provide information directly to drivers in affected areas.	
<i>Functional Area:</i> Roadway Work Zone Safety	

Architecture	Status
ITS Architecture for the Southern New Hampshire Planning Commission Region (Region)	(Region)
<i>Element:</i> Manchester Highway Department Field Device	
<i>Entity:</i> Roadway	
<i>Functional Area:</i> Roadway Work Zone Safety Work zone intrusion detection devices (to detect vehicle intrusion upon a work zone or crew worker movement across a work zone boundary) and intrusion alerting devices that provide alerts to crew and drivers.	
<i>Element:</i> Manchester MCO Field Devices	
<i>Entity:</i> Roadway	
<i>Functional Area:</i> Roadway Traffic Information Dissemination Driver information systems, such as dynamic message signs and Highway Advisory Radio (HAR).	
<i>Functional Area:</i> Roadway Equipment Coordination Field elements that control and send data to other field elements (such as environmental sensors that send data to a DMS or coordination between traffic controllers on adjacent intersections), without center control.	
<i>Functional Area:</i> Roadway Environmental Monitoring Environmental sensors, surface and sub-surface, that collect weather and road surface information. Weather conditions measured include temperature, wind, humidity, precipitation, and visibility. Sensors measure road surface temperature, moisture, icing, salinity, etc.	
<i>Functional Area:</i> Roadway Automated Treatment Field elements that activate automated roadway treatment systems (to disperse anti-icing chemicals, etc.) based on environmental or atmospheric conditions, or under center control.	
<i>Functional Area:</i> Roadway Work Zone Safety Work zone intrusion detection devices (to detect vehicle intrusion upon a work zone or crew worker movement across a work zone boundary) and intrusion alerting devices that provide alerts to crew and drivers.	
<i>Element:</i> Manchester MCO Vehicles	
<i>Entity:</i> Maintenance and Construction Vehicle	
<i>Functional Area:</i> MCV Vehicle Location Tracking On-board systems to track vehicle location and reports the position and timestamp information to the dispatch center.	
<i>Functional Area:</i> MCV Vehicle System Monitoring and Diagnostics On-board sensors capable of monitoring the condition of each of the vehicle systems and diagnostics that can be used to support vehicle maintenance.	
<i>Functional Area:</i> MCV Environmental Monitoring On-board systems that collect environmental and road condition data (including road surface or air temperature, wind speed, and road traction information - spatially located and time stamped) from sensors on-board the maintenance vehicle or located at the roadway.	
<i>Functional Area:</i> MCV Barrier System Control Control automatic or remotely controlled gates and other barrier systems from a maintenance and construction vehicle.	
<i>Functional Area:</i> MCV Winter Maintenance On-board systems that support snow plow operations and other roadway treatments (e.g., salt spraying and other material applications). Supports information sharing between snow plows.	
<i>Functional Area:</i> MCV Roadway Maintenance and Construction	

Architecture	Status
ITS Architecture for the Southern New Hampshire Planning Commission Region (Region)	(Region)
<i>Element:</i> Manchester MCO Vehicles	
<i>Entity:</i> Maintenance and Construction Vehicle	
<i>Functional Area:</i> MCV Roadway Maintenance and Construction On-board systems that support routine non-winter maintenance on the roadway or right-of-way. Includes landscape maintenance, hazard removal (roadway debris, dead animals), routine maintenance activities (roadway cleaning, grass cutting), and repair and maintenance of equipment on the roadway.	
<i>Functional Area:</i> MCV Work Zone Support On-board systems that provide communications and support for local management of a work zone.	
<i>Functional Area:</i> MCV Vehicle Safety Monitoring On-board systems to detect vehicle intrusions and warn crew workers and drivers of imminent encroachment. Crew movements are monitored so that the crew can be warned of movement beyond the designated safe zone. Used for stationary work zones or in mobile applications where a safe zone is maintained around the moving vehicle.	
<i>Entity:</i> Vehicle	
<i>Functional Area:</i> Vehicle Safety Monitoring System On-board systems to diagnose critical components of the vehicle and warn the driver of potential dangers, including steering, braking, acceleration, emissions, fuel economy, engine performance, etc.	
<i>Element:</i> Manchester Parking Management Center	
<i>Entity:</i> Parking Management	
<i>Functional Area:</i> Parking Management Monitor vehicles and current parking availability within parking facilities. Use driver information systems (e.g., DMS) to provide parking availability and other parking facility information to drivers. Support local traffic control coordination around the parking facility.	
<i>Functional Area:</i> Parking Electronic Payment Parking payment collection using in-vehicle equipment (tags) or contact or proximity traveler cards used for electronic payment. Includes field elements and back-office functionality.	
<i>Functional Area:</i> Parking Coordination Coordination between parking facilities and between parking facilities and traffic, transit, and traveler information systems. Includes sharing of hours of operation, charging strategies, lot sizes, current parking availability, and parking reservations.	
<i>Element:</i> Manchester School Bus	
<i>Entity:</i> Transit Vehicle	
<i>Functional Area:</i> On-board Transit Security On-board video/audio surveillance systems, threat sensors, and object detection sensors to enhance security and safety on-board a transit vehicles. Also includes silent alarms activated by transit user or vehicle operator, operator authentication, and remote vehicle disabling.	
<i>Functional Area:</i> On-board Transit Information Services On-board systems to furnish next-stop annunciation as well as interactive travel-related information, including routes, schedules, transfer options, fares, real-time schedule adherence, current incidents, weather conditions, non-motorized transportation services, and special events.	
<i>Element:</i> Manchester School District Website	
<i>Entity:</i> Information Service Provider	

Architecture	Status
ITS Architecture for the Southern New Hampshire Planning Commission Region (Region)	(Region)
<i>Element:</i> Manchester School District Website	
<i>Entity:</i> Information Service Provider	
<i>Functional Area:</i> ISP Traveler Data Collection Collects traveler information from other centers, consolidates and refines the collected data, and makes this data available to traveler information applications.	
<i>Functional Area:</i> Basic Information Broadcast Broadcast dissemination of traffic, transit, maintenance and construction, event, and weather information to traveler interface systems and vehicles.	
<i>Element:</i> Manchester Security Monitoring Field Equipment	
<i>Entity:</i> Security Monitoring	
<i>Functional Area:</i> Field Secure Area Sensor Monitoring Security sensors monitoring facilities (e.g. transit yards) and transportation infrastructure (e.g. bridges, tunnels, interchanges, and transit railways or guideways) for environmental threats, intrusion and motion, object detection, and infrastructure integrity.	
<i>Functional Area:</i> Field Secure Area Surveillance Security surveillance devices (audio/video) that monitor facilities (e.g. transit yards) and transportation infrastructure (e.g. bridges, tunnels, interchanges, and transit railways or guideways).	
<i>Element:</i> Manchester Traffic Division	
<i>Entity:</i> Traffic Management	
<i>Functional Area:</i> Collect Traffic Surveillance Management of traffic sensors and surveillance (CCTV) equipment, collection of current traffic conditions, and distribution of the collected information to other centers and operators.	
<i>Functional Area:</i> TMC Signal Control Remotely controls traffic signal controllers to implement traffic management strategies at signalized intersections based on traffic conditions, incidents, emergency vehicle preemptions, pedestrian crossings, etc.	
<i>Functional Area:</i> TMC Incident Detection Remotely monitors traffic sensor and surveillance systems to detect and verify incidents. Also monitors external advisory and incident reporting systems, intermodal freight depots, and border crossings for additional incident information. Identified incidents are reported to operations personnel and other centers.	
<i>Functional Area:</i> TMC Incident Dispatch Coordination/Communication Formulates an incident response that takes into account the incident potential, incident impacts, and/or resources required for incident management. Facilitates the dispatch of emergency response and service vehicles and coordinates the response with cooperating agencies.	
<i>Functional Area:</i> TMC Evacuation Support Development, coordination, and execution of special traffic management strategies during evacuation and subsequent reentry of a population in the vicinity of a disaster or major emergency. Interfaces with emergency management and other traffic management centers.	
<i>Functional Area:</i> HRI Traffic Management Remotely monitor and control highway-rail intersection (HRI) equipment, includes standard speed active warning systems and high speed systems which provide additional information on approaching trains and detect and report on obstructions in the HRI.	
<i>Functional Area:</i> Rail Operations Coordination	

Architecture	Status
ITS Architecture for the Southern New Hampshire Planning Commission Region (Region)	(Region)
<i>Element:</i> Manchester Traffic Division	
<i>Entity:</i> Traffic Management	
<i>Functional Area:</i> Rail Operations Coordination Coordination between rail operations and traffic management centers - exchanging train schedules, maintenance schedules, as well as incidents and priority messages that impact highway-rail intersections (HRIs). Supports advanced traffic control strategies and enhanced traveler information.	
<i>Functional Area:</i> Barrier System Management Remotely controls barrier systems such as gates and other systems that manage entry to roadways, transportation facilities and infrastructure.	
<i>Functional Area:</i> Safeguard System Management Remotely controls safeguard systems such as blast shields and tunnel exhaust systems that are used to mitigate the impact of incidents on transportation infrastructure.	
<i>Functional Area:</i> Traffic Equipment Maintenance Monitoring and remote diagnostics of field equipment - detect failures, issue problem reports, and track the repair or replacement of the failed equipment.	
<i>Functional Area:</i> TMC Work Zone Traffic Management Coordination with maintenance systems using work zone images and traveler information systems (such as DMS), and distribution of work plans so that work zones are established that have minimum traffic impact.	
<i>Functional Area:</i> TMC Multimodal Coordination Provides traffic signal priority for transit vehicles based on center-to-center communications with the transit management center; also exchange traffic and transit information.	
<i>Element:</i> Manchester Traffic Division Roadside Equipment	
<i>Entity:</i> Roadway	
<i>Functional Area:</i> Roadway Basic Surveillance Field elements that monitor traffic conditions using loop detectors and CCTV cameras.	
<i>Functional Area:</i> Standard Rail Crossing Field elements at highway-rail intersections (HRIs) where operational requirements do not dictate advanced features (e.g., where rail operational speeds are less than 80 miles per hour). Includes traditional HRI warning systems augmented with other standard traffic management devices.	
<i>Functional Area:</i> Roadway Equipment Coordination Field elements that control and send data to other field elements (such as environmental sensors that send data to a DMS or coordination between traffic controllers on adjacent intersections), without center control.	
<i>Element:</i> Manchester Transit Authority	
<i>Entity:</i> Emergency Management	
<i>Functional Area:</i> Emergency Call-Taking Provides interface to the emergency call-taking systems such as the Emergency Telecommunications System (e.g., 911) that correlate call information with emergencies reported by transit agencies, commercial vehicle operators, or other public safety agencies. Allows the operator to verify the incident and forward the information to the responding agencies.	
<i>Functional Area:</i> Emergency Dispatch Dispatch emergency vehicles to incidents, tracking their location and status. Pertinent incident information is gathered and relayed to the responding units.	
<i>Functional Area:</i> Emergency Routing	

Architecture	Status
ITS Architecture for the Southern New Hampshire Planning Commission Region (Region)	(Region)
<i>Element:</i> Manchester Transit Authority	
<i>Entity:</i> Emergency Management	
<i>Functional Area:</i> Emergency Routing Routing of emergency vehicles to facilitate the quickest/safest arrival. Routes may be determined based on real-time traffic information and road conditions or routes may be provided by Traffic Management on request.	
<i>Functional Area:</i> Incident Command Tactical decision support, resource coordination, and communications integration among emergency management agencies for Incident Commands that are established by first responders to support local management of an incident.	
<i>Functional Area:</i> Emergency Early Warning System Monitors alerting and advisory systems, information collected by ITS surveillance and sensors, and reports from other agencies in order to identify potential, imminent, or in-progress major incidents or disasters. Notification is provided to other ITS centers to notify the traveling public.	
<i>Functional Area:</i> Emergency Response Management Strategic emergency planning and response capabilities and broad inter-agency interfaces to support large-scale incidents and disasters, commonly associated with Emergency Operations Centers.	
<i>Functional Area:</i> Emergency Evacuation Support Evacuation planning and coordination to manage evacuation and reentry of a population in the vicinity of a disaster or other emergency that poses a risk to public safety.	
<i>Functional Area:</i> Emergency Environmental Monitoring Collects current and forecast road and weather information that is used by the operator to more effectively manage incidents.	
<i>Functional Area:</i> Center Secure Area Surveillance Management of security surveillance devices and analysis of that data to detect potential threats. Areas under surveillance may include transit stops, transit stations, rest areas, park and ride lots, modal interchange facilities, on-board a transit vehicle, etc.	
<i>Functional Area:</i> Center Secure Area Sensor Management Management of security sensors, analysis of sensor data, correlation with surveillance data and alerts from other agencies to detect potential threats, and dissemination of threat information to other agencies. Sensors may be placed in areas such as transit stops, transit stations, rest areas, park and ride lots, modal interchange facilities, on-board a transit vehicle, etc.	
<i>Functional Area:</i> Center Secure Area Alarm Support Collection and response to silent and audible alarms received from travelers in secure areas (such as transit stops, rest areas, park-and-ride lots) and from on-board transit vehicles.	
<i>Functional Area:</i> Mayday Support Collection and response to Mayday messages received from vehicles and drivers.	
<i>Entity:</i> Transit Management	
<i>Functional Area:</i> Transit Center Connection Protection Manages the coordination of transit transfers between routes, including routes on different modes. Also supports the capability for travelers to obtain connection protection throughout a trip.	
<i>Functional Area:</i> Transit Center Vehicle Tracking Monitoring transit vehicle locations via interactions with on-board systems. Furnish users with real-time transit schedule information and maintain interface with digital map providers.	

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<i>Element:</i> Manchester Transit Authority	
<i>Entity:</i> Transit Management	
<i>Functional Area:</i>	Transit Center Fixed-Route Operations
Management of fixed route transit operations. Planning, scheduling, and dispatch associated with fixed and flexible route transit services. Updates customer service operator systems, and provides current vehicle schedule adherence and optimum scenarios for schedule adjustment.	
<i>Functional Area:</i>	Transit Center Paratransit Operations
Management of demand response transit services, including paratransit. Planning and scheduling of these services. Supports automated vehicle dispatch and automatically updates customer service operator systems.	
<i>Functional Area:</i>	Transit Center Fare Management
Management of fare collection at the center - includes setting and distributing fare information, central processing of fares for transit as well as other ITS services, links to financial institutions and enforcement agencies.	
<i>Functional Area:</i>	Transit Center Security
Monitor transit vehicle operator or traveler activated alarms; authenticate transit vehicle operators; remotely disable a transit vehicle; alert operators, travelers, and police to potential incidents identified by these security features.	
<i>Functional Area:</i>	Transit Vehicle Operator Assignment
Assignment of transit operators to runs in a fair manner while minimizing labor and overtime services, considering operator preferences, qualifications, accumulated work hours, and other information about each operator.	
<i>Functional Area:</i>	Transit Garage Maintenance
Collect operational and maintenance data from transit vehicles, manage vehicle service histories, automatically generate preventative maintenance schedules, and provide information to service personnel.	
<i>Functional Area:</i>	Transit Vehicle Assignment
Assigns individual transit vehicles to vehicle blocks and downloads this information to the transit vehicle, updating assignments as necessitated by changes. It also provides an inventory management function that stores attributes about each of the transit vehicles.	
<i>Functional Area:</i>	Transit Center Information Services
Provide interactive traveler information to travelers (on-board transit vehicles, at stops/stations, using personal devices), traveler information service providers, media, and other transit organizations. Includes routes, schedules, transfer options, fares, real-time schedule adherence, current incidents, weather conditions, yellow pages, and special events.	
<i>Functional Area:</i>	Transit Environmental Monitoring
Current and forecast road and weather information assimilated from weather service providers and vehicle probes. The information is monitored and forwarded to other agencies to more effectively manage transit operations.	
<i>Functional Area:</i>	Transit Center Multi-Modal Coordination
Coordinate schedules with other agencies and modes, including transit transfer cluster and transfer point information.	
<i>Functional Area:</i>	Transit Evacuation Support
Support evacuation and subsequent reentry of a population in the vicinity of a disaster or other emergency. Coordinate regional evacuation plans and resources including transit and school bus fleets.	
<i>Element:</i> MTA Kiosks	
<i>Entity:</i> Remote Traveler Support	
<i>Functional Area:</i>	Remote Transit Information Services

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*Element: MTA Kiosks**Entity: Remote Traveler Support**Functional Area: Remote Transit Information Services*

Public traveler interface that provides real-time travel-related information at transit stops and multi-modal transfer points, including general annunciation, display of imminent arrival information, the latest available information on transit routes, schedules, transfer options, available services, fares, and real-time schedule adherence.

*Element: MTA Website**Entity: Information Service Provider**Functional Area: ISP Traveler Data Collection*

Collects traveler information from other centers, consolidates and refines the collected data, and makes this data available to traveler information applications.

Functional Area: Basic Information Broadcast

Broadcast dissemination of traffic, transit, maintenance and construction, event, and weather information to traveler interface systems and vehicles.

Functional Area: Traveler Telephone Information

Distribution of traveler information and wide-area alerts to traveler telephone information systems such as 511, based on voice-based traveler requests.

Functional Area: Infrastructure Provided Trip Planning

Generation of pre-trip and enroute trip plans for travelers (and vehicles) based on current traffic conditions, work zones, weather, and travelers constraints and preferences. Includes end-to-end trips using multiple modes, such as bicycle, transit, etc.

*Element: MTC Roadside Equipment**Entity: Roadway**Functional Area: Roadway Basic Surveillance*

Field elements that monitor traffic conditions using loop detectors and CCTV cameras.

Functional Area: Roadway Signal Controls

Field elements including traffic signal controllers for use at signalized intersections; also supports pedestrian crossings.

Functional Area: Field Management Stations Operation

Supports direct communications between field management stations and the local field equipment under their control.

Functional Area: Roadway Signal Preemption

Field elements that receive signal preemption requests from approaching emergency vehicles and overrides the current operation of the traffic signals

Functional Area: Standard Rail Crossing

Field elements at highway-rail intersections (HRIs) where operational requirements do not dictate advanced features (e.g., where rail operational speeds are less than 80 miles per hour). Includes traditional HRI warning systems augmented with other standard traffic management devices.

Functional Area: Roadway Equipment Coordination

Field elements that control and send data to other field elements (such as environmental sensors that send data to a DMS or coordination between traffic controllers on adjacent intersections), without center control.

*Element: Statewide TMC**Entity: Traffic Management**Functional Area: Collect Traffic Surveillance*

Architecture	Status
ITS Architecture for the Southern New Hampshire Planning Commission Region (Region)	(Region)
<i>Element:</i> Statewide TMC	
<i>Entity:</i> Traffic Management	
<i>Functional Area:</i> Collect Traffic Surveillance Management of traffic sensors and surveillance (CCTV) equipment, collection of current traffic conditions, and distribution of the collected information to other centers and operators.	
<i>Functional Area:</i> TMC Signal Control Remotely controls traffic signal controllers to implement traffic management strategies at signalized intersections based on traffic conditions, incidents, emergency vehicle preemptions, pedestrian crossings, etc.	
<i>Functional Area:</i> TMC Traffic Metering Remotely controls ramp meters, interchange connector meters, and mainline meters, covering all types of metering as well as management of bypass lanes.	
<i>Functional Area:</i> TMC Traffic Information Dissemination Controls dissemination of traffic-related data to other centers, the media, and travelers via the driver information systems (DMS, HAR) that it operates.	
<i>Functional Area:</i> TMC Regional Traffic Management Coordination between traffic management centers in order to share traffic information between centers as well as control of traffic management field equipment. This may be used during incidents and special events and during day-to-day operations.	
<i>Functional Area:</i> TMC Incident Detection Remotely monitors traffic sensor and surveillance systems to detect and verify incidents. Also monitors external advisory and incident reporting systems, intermodal freight depots, and border crossings for additional incident information. Identified incidents are reported to operations personnel and other centers.	
<i>Functional Area:</i> TMC Incident Dispatch Coordination/Communication Formulates an incident response that takes into account the incident potential, incident impacts, and/or resources required for incident management. Facilitates the dispatch of emergency response and service vehicles and coordinates the response with cooperating agencies.	
<i>Functional Area:</i> TMC Evacuation Support Development, coordination, and execution of special traffic management strategies during evacuation and subsequent reentry of a population in the vicinity of a disaster or major emergency. Interfaces with emergency management and other traffic management centers.	
<i>Functional Area:</i> TMC Environmental Monitoring Management of environmental sensors and assimilation of collected data with other current and forecast road conditions and surface weather information from weather service providers and roadway maintenance operations.	
<i>Functional Area:</i> TMC Speed Monitoring and Warning Remotely monitors vehicle speeds, and informs an enforcement agency if excessive speeds are detected. Also configures and controls speed warning systems that provide safe speed advisories to the motorist.	
<i>Functional Area:</i> Barrier System Management Remotely controls barrier systems such as gates and other systems that manage entry to roadways, transportation facilities and infrastructure.	
<i>Functional Area:</i> Traffic Equipment Maintenance Monitoring and remote diagnostics of field equipment - detect failures, issue problem reports, and track the repair or replacement of the failed equipment.	
<i>Functional Area:</i> TMC Work Zone Traffic Management	

Architecture	Status
ITS Architecture for the Southern New Hampshire Planning Commission Region (Region)	(Region)
<i>Element: Statewide TMC</i>	
<i>Entity: Traffic Management</i>	
<i>Functional Area: TMC Work Zone Traffic Management</i>	Coordination with maintenance systems using work zone images and traveler information systems (such as DMS), and distribution of work plans so that work zones are established that have minimum traffic impact.
<i>Functional Area: TMC Multimodal Coordination</i>	Provides traffic signal priority for transit vehicles based on center-to-center communications with the transit management center; also exchange traffic and transit information.
<i>Element: Statewide TMC_Roadside Equipment</i>	
<i>Entity: Roadway</i>	
<i>Functional Area: Roadway Basic Surveillance</i>	Field elements that monitor traffic conditions using loop detectors and CCTV cameras.
<i>Functional Area: Roadway Signal Controls</i>	Field elements including traffic signal controllers for use at signalized intersections; also supports pedestrian crossings.
<i>Functional Area: Field Management Stations Operation</i>	Supports direct communications between field management stations and the local field equipment under their control.
<i>Functional Area: Roadway Signal Preemption</i>	Field elements that receive signal preemption requests from approaching emergency vehicles and overrides the current operation of the traffic signals
<i>Functional Area: Roadway Traffic Information Dissemination</i>	Driver information systems, such as dynamic message signs and Highway Advisory Radio (HAR).
<i>Functional Area: Roadway Equipment Coordination</i>	Field elements that control and send data to other field elements (such as environmental sensors that send data to a DMS or coordination between traffic controllers on adjacent intersections), without center control.
<i>Functional Area: Field Barrier System Control</i>	Field elements that control barrier systems such as gates and other systems that manage entry to roadways, transportation facilities and infrastructure.
<i>Functional Area: Roadway Work Zone Traffic Control</i>	Field elements in maintenance and construction areas including CCTV cameras, driver information systems (such as DMS), and gates/barriers that monitor and control traffic and provide information directly to drivers in affected areas.
<i>Element: Toll Administration Center</i>	
<i>Entity: Payment Administration</i>	
<i>Functional Area: Toll Administration</i>	Management of toll collection for private and commercial vehicles, dynamic pricing, payment reconciliation with financial institutions, and violation notification to enforcement agencies.
<i>Functional Area: Toll Operator Alert</i>	Receipt/acknowledgement of alert notifications (safety/security broadcasts, child abductions, etc.) from the emergency management centers; the toll administrator controls distribution of the alert to the operators at the toll plazas.
<i>Functional Area: Toll Data Collection</i>	

Architecture	Status
ITS Architecture for the Southern New Hampshire Planning Commission Region (Region) (Region)	
<i>Element:</i> Toll Administration Center	
<i>Entity:</i> Payment Administration	
<i>Functional Area:</i> Toll Data Collection Collection and storage of toll operations and pricing data. For use by operations personnel or data archives in the region.	
<i>Element:</i> Traffic Detector at Rail	
<i>Entity:</i> Roadway	
<i>Functional Area:</i> Standard Rail Crossing Field elements at highway-rail intersections (HRIs) where operational requirements do not dictate advanced features (e.g., where rail operational speeds are less than 80 miles per hour). Includes traditional HRI warning systems augmented with other standard traffic management devices.	
<i>Element:</i> Transit Vehicles	
<i>Entity:</i> Transit Vehicle	
<i>Functional Area:</i> On-board Connection Protection Monitors vehicle schedule performance and provides it to the transit center for connection protection processing. Also recognizes travelers who have arranged for connection protection and provides information regarding them to the transit center.	
<i>Functional Area:</i> On-board Transit Trip Monitoring Support fleet management with automatic vehicle location (AVL) and automated mileage and fuel reporting and auditing.	
<i>Functional Area:</i> On-board Schedule Management Collecting of data for schedule generation and adjustment on-board a transit vehicle. Supports communication between the vehicle, operator, and center.	
<i>Functional Area:</i> On-board Transit Fare Management On-board systems provide fare collection using a travelers non-monetary fare medium. Collected fare data are made available to the center.	
<i>Functional Area:</i> On-board Transit Security On-board video/audio surveillance systems, threat sensors, and object detection sensors to enhance security and safety on-board a transit vehicles. Also includes silent alarms activated by transit user or vehicle operator, operator authentication, and remote vehicle disabling.	
<i>Functional Area:</i> On-board Maintenance On-board systems to collect and process transit vehicle maintenance data including mileage and vehicle operating conditions for use in scheduling future vehicle maintenance.	
<i>Functional Area:</i> On-board Transit Information Services On-board systems to furnish next-stop annunciation as well as interactive travel-related information, including routes, schedules, transfer options, fares, real-time schedule adherence, current incidents, weather conditions, non-motorized transportation services, and special events.	
<i>Element:</i> User Personal Devices	
<i>Entity:</i> Personal Information Access	
<i>Functional Area:</i> Personal Basic Information Reception Personal traveler interface that provides formatted traffic advisories, transit, event, and other traveler information, as well as broadcast alerts. Devices include personal computers and personal portable devices such as PDAs and pagers.	
<i>Functional Area:</i> Personal Interactive Information Reception	

Architecture	Status
ITS Architecture for the Southern New Hampshire Planning Commission Region (Region)	(Region)
<i>Element: User Personal Devices</i>	
<i>Entity: Personal Information Access</i>	
<i>Functional Area: Personal Interactive Information Reception</i> Personal traveler interface that provides traffic, transit, yellow pages, event, and trip planning information, and other personalized traveler information services upon request. Devices include personal computers and personal portable devices such as PDAs.	
<i>Element: Vehicle</i>	
<i>Entity: Vehicle</i>	
<i>Functional Area: Vehicle Toll/Parking Interface</i> On-board systems to support paying toll without stopping and pay for parking without the use of cash through the use of an active tag interface and debit/credit card interface.	
<i>Element: Windham Highway Department Dispatch</i>	
<i>Entity: Maintenance and Construction Management</i>	
<i>Functional Area: MCM Environmental Information Collection</i> Remotely controls environmental sensors and assimilates collected data with environmental probe data and other current and forecast road conditions and surface weather information from weather service providers and transportation operations.	
<i>Functional Area: MCM Winter Maintenance Management</i> Manages winter road maintenance, tracking and controlling snow plow operations, roadway treatment (e.g., salt spraying and other material applications) based on weather information.	
<i>Functional Area: MCM Work Zone Management</i> Remotely monitors and supports work zone activities, controlling traffic through dynamic message signs (DMS), highway advisory radio, gates and barriers, and informing other groups of activity (e.g., traveler information systems, traffic management centers, other maintenance and construction centers).	
<i>Functional Area: MCM Work Activity Coordination</i> Disseminates work activity schedules and current asset restrictions to other agencies. Work schedules are coordinated, factoring in the needs and activities of other agencies and adjacent jurisdictions.	
<i>Element: Windham MC Vehicles</i>	
<i>Entity: Maintenance and Construction Vehicle</i>	
<i>Functional Area: MCV Environmental Monitoring</i> On-board systems that collect environmental and road condition data (including road surface or air temperature, wind speed, and road traction information - spatially located and time stamped) from sensors on-board the maintenance vehicle or located at the roadway.	

APPENDIX F: AGREEMENTS

List of Agreements

11/20/2015 1:31:18PM



Agreements for Region ITS Architecture for the Southern New Hampshire Planning Commission Region

Agreement	Status
<p><i>Number:</i></p> <p><i>Title:</i> Manchester maintenance and construction activity coordination</p> <p><i>Type:</i> Handshake</p> <p><i>Description:</i> Agreement regarding Manchester highway department disseminating current asset restrictions, and maintenance and construction work plans to Manchester Transit Authority, and Manchester Emergency Operations Center.</p> <p><i>Lead Stakeholder:</i> Manchester Highway Department</p> <p><i>Associated Stakeholders:</i> Manchester Highway Department Manchester Traffic Division Manchester Transit Authority</p>	Existing
<p><i>Number:</i></p> <p><i>Title:</i> Traffic signal agreement between Manchester and NHDOT</p> <p><i>Type:</i> Memorandum of Understanding</p> <p><i>Description:</i> Agreement between the City of Manchester and State concerning facilitating maintenance of a traffic control device, located in the City of Manchester at South Willow Street/ I-293 on and off ramps.</p> <p><i>Lead Stakeholder:</i> NHDOT</p> <p><i>Associated Stakeholders:</i> Manchester Traffic Division NHDOT</p>	Existing
<p><i>Number:</i></p> <p><i>Title:</i> Traffic signal agreement between Bedford and NHDOT</p> <p><i>Type:</i> Memorandum of Understanding</p> <p><i>Description:</i> Agreement between Bedford and State on facilitating maintenance and operation of coordinated traffic signal system located in the vicinity of Kilton Road, US Route 3 and Meetinghouse Road</p> <p><i>Lead Stakeholder:</i> NHDOT</p> <p><i>Associated Stakeholders:</i> Bedford DPW NHDOT</p>	Existing
<p><i>Number:</i></p> <p><i>Title:</i> Emergency management agreement among 15 SNHPC Communities</p> <p><i>Type:</i> Memorandum of Understanding</p> <p><i>Description:</i> All 14 SNHPC communities are part of mutual aid organization</p> <p><i>Lead Stakeholder:</i> Local Emergency Management Center</p> <p><i>Associated Stakeholders:</i> Local Emergency Management Center</p>	Existing
<p><i>Number:</i></p> <p><i>Title:</i> Manchester Granite Street traffic signal agreement</p> <p><i>Type:</i> Memorandum of Understanding</p> <p><i>Description:</i> Agreement between the City of Manchester and State concerning facilitating maintenance of a traffic control device, located in the City of Manchester at Granite Street.</p> <p><i>Lead Stakeholder:</i> Manchester Traffic Division</p>	Existing

Associated Stakeholders:

Manchester Traffic Division
NHDOT

Agreement**Status***Number:*

Existing

Title: Parking facility management*Type:* Handshake*Description:* An agreement between Manchester parking division and financial institution regarding parking fee collection.*Lead Stakeholder:* Manchester Parking Division*Associated Stakeholders:*

Financial Institution
Manchester Parking Division

Agreement**Status***Number:*

Planned

Title: Advanced traveler information systems*Type:* Handshake*Description:* Refer to the Statewide ITS architecture*Lead Stakeholder:* NHDOT*Associated Stakeholders:*

NHDOT

Agreement**Status***Number:*

Planned

Title: Road Weather Information System*Type:* Handshake*Description:* Roadway exchange of road weather data collection information with traffic information dissemination, broadcast information services for improved information to travelers.*Lead Stakeholder:* Manchester Highway Department*Associated Stakeholders:*

Manchester Highway Department
Manchester Traffic Division
Media
NHDOT

Agreement**Status***Number:*

Planned

Title: Weather information processing*Type:* Handshake*Description:* Exchange of road weather data and weather information among Manchester Traffic Division, Manchester Highway Department, Manchester Emergency Management Center and Manchester Transit Authority.*Lead Stakeholder:* Manchester Highway Department*Associated Stakeholders:*

Manchester Emergency Operations Center
Manchester Highway Department
Manchester Traffic Division
Manchester Transit Authority

Agreement**Status***Number:*

Planned

Title: Work-Zone Safety*Type:* Handshake*Description:* Coordination of work zone management and safety systems with local police department.*Lead Stakeholder:* Local DPW

Associated Stakeholders:

Local DPW
Local Police Department

Agreement**Status**

Number: Planned

Title: Road weather data collection

Type: Handshake

Description: Manchester highway Department collect environmental conditions data through Meteorologic DTN.

Lead Stakeholder: Manchester Highway Department

Associated Stakeholders:

Manchester Highway Department
Manchester Traffic Division
NHDOT
Weather Service Provider

Agreement**Status**

Number: Existing

Title: Traffic signal agreement between Manchester and Bedford

Type: Memorandum of Understanding

Description: Regarding improvement, timing, and maintenance of South River Traffic Signals at Second Street and South Main Street in Manchester, New Hampshire and at Colby Court and Bedford Square in Bedford, New Hampshire.

Lead Stakeholder: Manchester Traffic Division

Associated Stakeholders:

Bedford DPW
Manchester Traffic Division

Agreement**Status**

Number: Planned

Title: Maintenance and construction activity coordination

Type: Handshake

Description: Agreement between Local DPW and media regarding broadcasting maintenance and construction work plans.

Lead Stakeholder: Local DPW

Associated Stakeholders:

Local DPW
Local Emergency Management Center
Manchester Emergency Operations Center
Manchester Highway Department
Manchester Traffic Division
Manchester Transit Authority
Media

Agreement**Status**

Number: Planned

Title: Incident information sharing plan

Type: Handshake

Description: Coordination agreement between local police and fire departments and the statewide EMC concerning the sharing of the incident information.

Lead Stakeholder: New Hampshire Department of Safety

Associated Stakeholders:

Local Police Department
New Hampshire Department of Safety
NHDOT

Agreement**Status**

Number: Planned

Title: Signal prioritization agreement
Type: Memorandum of understanding
Description: Signal prioritization agreement between Manchester Transit Authority and Manchester Traffic Division.
Lead Stakeholder: Manchester Traffic Division

Associated Stakeholders:
 Manchester Traffic Division
 Manchester Transit Authority

Agreement	Status
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Number: Planned
Title: Information exchange
Type: Handshake
Description: Information exchange agreement between MTA and Manchester highway department and Bedford DPW concerning road condition and work zone update.
Lead Stakeholder: Manchester Highway Department

Associated Stakeholders:
 Bedford DPW
 Manchester Highway Department
 Manchester Transit Authority

Agreement	Status
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Number: Planned
Title: MTA transit schedule and fare
Type: Handshake
Description: MTA transit schedule and fare information exchange between MTA and 511.
Lead Stakeholder: Manchester Transit Authority

Associated Stakeholders:
 Manchester Transit Authority
 NHDOT

Agreement	Status
------------------	---------------

Number: Existing
Title: MTA Safety Agreement
Type: Handshake
Description: Safety agreement between MTA and Manchester Police Department/Bedford Police Department regarding alarm response duties.
Lead Stakeholder: Manchester Transit Authority

Associated Stakeholders:
 Manchester Emergency Operations Center
 Manchester Transit Authority

Agreement	Status
------------------	---------------

Number: Planned
Title: MTA coordination agreement
Type:
Description: Coordination agreement between MTA and Manchester Emergency Management Center relating to emergency plan.
Lead Stakeholder: Manchester Transit Authority

Associated Stakeholders:
 Manchester Emergency Operations Center
 Manchester Transit Authority

Agreement	Status
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Number: Existing
Title: Manchester school bus schedule
Type: Handshake

Description: Manchester school bus schedule operational information exchange agreement between MTA and Manchester Board of Education.

Lead Stakeholder: Manchester Transit Authority

Associated Stakeholders:

Manchester School District
Manchester Transit Authority

Agreement	Status
------------------	---------------

Number:

Existing

Title: Local school bus coordination agreement

Type: Handshake

Description: Coordination agreement between local school bus management center and local emergency management center regarding emergency plan.

Lead Stakeholder: Local School Bus Management Center

Associated Stakeholders:

Local School Bus Management Center

Agreement	Status
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Number:

Existing

Title: CART agreement

Type: Memorandum of Understanding

Description: Operational agreement between CART and Easter Seals NH.

Lead Stakeholder: Easter Seals NH

Associated Stakeholders:

Cooperative Alliance for Regional Transportation
Easter Seals NH

Agreement	Status
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Number:

Existing

Title: Communications agreement

Type: Handshake

Description: Communications agreement between the DPW/DOT and their respective fire and rescue departments for the use and coordination of emergency vehicle signal preemption system.

Lead Stakeholder: NHDOT

Associated Stakeholders:

Local DPW
Local Emergency Management Center
NHDOT

Agreement	Status
------------------	---------------

Number:

Planned

Title: Coordination of emergency plan

Type: Handshake

Description: Local emergency management center coordination of emergency plan with local DPW.

Lead Stakeholder: Local Emergency Management Center

Associated Stakeholders:

Local DPW
Local Emergency Management Center

Agreement	Status
------------------	---------------

Number:

Planned

Title: Evacuation and incident information broadcast agreement

Type: Handshake

Description: Evacuation and incident information broadcast agreement between local emergency management center and media /511

Lead Stakeholder: Local Emergency Management Center

Associated Stakeholders:

Local Emergency Management Center
 Media
 NHDOT

Agreement**Status***Number:*

Existing

Title: Winter Maintenance*Type:* Handshake*Description:* A agreement between Local DPW and weather service provider. Weather service provider provide local DPW with weather information.*Lead Stakeholder:* Local DPW*Associated Stakeholders:*

Local DPW
 Media
 Weather Service Provider

Status Value Legend

Name	Description
Existing	
Planned	
Not Planned	

APPENDIX G: ITS STANDARDS

Relevant Standards Activities

4/5/2016 1:44:55PM



Standards for ITS Architecture for the Southern New Hampshire Planning Commission Region

 **NOTE: The ITS standards list has been customized or a standards group has been modified. The ITS standards presented in this report may represent a superset of options, and in some cases, provide redundant capabilities. In addition, these ITS standards are at different maturity levels. Care should be taken to select the standards that best meet the needs of the region or project.**

Lead SDO	Standard Name	Version	Document ID
AASHTO/ITE	Traffic Management Data Dictionary (TMDD) and Message Sets for External Traffic Management Center Communications (MS/ETMCC)		ITE TMDD
AASHTO/ITE/NEMA	NTCIP Center-to-Center Standards Group		(See Footnote)
AASHTO/ITE/NEMA	NTCIP Center-to-Field Standards Group		(See Footnote)
AASHTO/ITE/NEMA	Global Object Definitions		NTCIP 1201
AASHTO/ITE/NEMA	Object Definitions for Actuated Traffic Signal Controller (ASC) Units		NTCIP 1202
AASHTO/ITE/NEMA	Object Definitions for Dynamic Message Signs (DMS)		NTCIP 1203
AASHTO/ITE/NEMA	Object Definitions for Environmental Sensor Stations (ESS)		NTCIP 1204
AASHTO/ITE/NEMA	Object Definitions for Closed Circuit Television (CCTV) Camera Control		NTCIP 1205
AASHTO/ITE/NEMA	Object Definitions for Data Collection and Monitoring (DCM) Devices		NTCIP 1206
AASHTO/ITE/NEMA	Object Definitions for Ramp Meter Control (RMC) Units		NTCIP 1207
AASHTO/ITE/NEMA	Object Definitions for Closed Circuit Television (CCTV) Switching		NTCIP 1208
AASHTO/ITE/NEMA	Data Element Definitions for Transportation Sensor Systems (TSS)		NTCIP 1209
AASHTO/ITE/NEMA	Field Management Stations (FMS) - Part 1: Object Definitions for Signal System Masters		NTCIP 1210
AASHTO/ITE/NEMA	Object Definitions for Signal Control and Prioritization (SCP)		NTCIP 1211
AASHTO/ITE/NEMA	Object Definitions for Conflict Monitor Units (CMU)		NTCIP 1214

Standards for ITS Architecture for the Southern New Hampshire Planning Commission Region

Lead SDO	Standard Name	Version	Document ID
APTA	Standard for Transit Communications Interface Profiles		APTA TCIP-S-001 3.0.4
ASTM	Dedicated Short Range Communication at 915 MHz Standards Group		(See Footnote)
ASTM/IEEE/SAE	Dedicated Short Range Communication at 5.9 GHz Standards Group		(See Footnote)
IEEE	Incident Management Standards Group		(See Footnote)
IEEE	Standard for the Interface Between the Rail Subsystem and the Highway Subsystem at a Highway Rail Intersection		IEEE 1570-2002
SAE	USER DEFINED: Advanced Traveler Information Systems (ATIS) Bandwidth Limited Standards Group		(See Footnote)
SAE	USER DEFINED: Advanced Traveler Information Systems (ATIS) General Use Standards Group		(See Footnote)
SAE	USER DEFINED: On-board Vehicle Mayday Standards Group		(See Footnote)

Standards for ITS Architecture for the Southern New Hampshire Planning Commission Region

Lead SDO	Standard Name	Version	Document ID
NTCIP Center-to-Center Standards Group			
SDO	Standard Name		Document ID
AASHTO/ITE/NEMA	Octet Encoding Rules (OER) Base Protocol		NTCIP 1102
AASHTO/ITE/NEMA	Center-to-Center Naming Convention Specification		NTCIP 1104
AASHTO/ITE/NEMA	Ethernet Subnetwork Profile		NTCIP 2104
AASHTO/ITE/NEMA	Internet (TCP/IP and UDP/IP) Transport Profile		NTCIP 2202
AASHTO/ITE/NEMA	File Transfer Protocol (FTP) Application Profile		NTCIP 2303
AASHTO/ITE/NEMA	Application Profile for DATEX-ASN (AP-DATEX)		NTCIP 2304
AASHTO/ITE/NEMA	Application Profile for XML Message Encoding and Transport in ITS Center-to-Center Communications (C2C XML)		NTCIP 2306
NTCIP Center-to-Field Standards Group			
SDO	Standard Name		Document ID
AASHTO/ITE/NEMA	Octet Encoding Rules (OER) Base Protocol		NTCIP 1102
AASHTO/ITE/NEMA	Transportation Management Protocols (TMP)		NTCIP 1103
AASHTO/ITE/NEMA	Point to Multi-Point Protocol Using RS-232 Subnetwork Profile		NTCIP 2101
AASHTO/ITE/NEMA	Point to Multi-Point Protocol Using FSK Modem Subnetwork Profile		NTCIP 2102
AASHTO/ITE/NEMA	Point-to-Point Protocol Over RS-232 Subnetwork Profile		NTCIP 2103
AASHTO/ITE/NEMA	Ethernet Subnetwork Profile		NTCIP 2104
AASHTO/ITE/NEMA	Transportation Transport Profile		NTCIP 2201
AASHTO/ITE/NEMA	Internet (TCP/IP and UDP/IP) Transport Profile		NTCIP 2202
AASHTO/ITE/NEMA	Simple Transportation Management Framework (STMF) Application Profile		NTCIP 2301
AASHTO/ITE/NEMA	Trivial File Transfer Protocol (TFTP) Application Profile		NTCIP 2302
AASHTO/ITE/NEMA	File Transfer Protocol (FTP) Application Profile		NTCIP 2303
USER DEFINED: Advanced Traveler Information Systems (ATIS) Bandwidth Limited Standards Group			
SDO	Standard Name		Document ID
SAE	Location Referencing Message Specification (LRMS)		SAE J2266
SAE	Message Set for Advanced Traveler Information System (ATIS)		SAE J2354
SAE	Standard for ATIS Message Sets Delivered Over Reduced Bandwidth Media		SAE J2369
SAE	Messages for Handling Strings and Look-Up Tables in ATIS Standards		SAE J2540
SAE	RDS (Radio Data System) Phrase Lists		SAE J2540/1
SAE	ITIS (International Traveler Information Systems) Phrase Lists		SAE J2540/2
SAE	National Names Phrase List		SAE J2540/3
SEA	Rules for Standardizing Street Names and Route IDs		ATIS Low Bandwidth/SAE J2529
USER DEFINED: Advanced Traveler Information Systems (ATIS) General Use Standards Group			
SDO	Standard Name		Document ID
SAE	Location Referencing Message Specification (LRMS)		SAE J2266
SAE	Message Set for Advanced Traveler Information System (ATIS)		SAE J2354
SAE	Messages for Handling Strings and Look-Up Tables in ATIS Standards		SAE J2540

Standards for ITS Architecture for the Southern New Hampshire Planning Commission Region

Lead SDO	Standard Name	Version	Document ID
USER DEFINED: Advanced Traveler Information Systems (ATIS) General Use Standards Group			
SDO	Standard Name		Document ID
SAE	RDS (Radio Data System) Phrase Lists		SAE J2540/1
SAE	ITIS (International Traveler Information Systems) Phrase Lists		SAE J2540/2
SAE	National Names Phrase List		SAE J2540/3
SEA	Rules for Standardizing Street Names and Route IDs		ATIS Low Bandwidth/SAE J2529
USER DEFINED: On-board Vehicle Mayday Standards Group			
SDO	Standard Name		Document ID
SAE	Location Referencing Message Specification (LRMS)		SAE J2266
SAE	On-Board Land Vehicle Mayday Reporting Interface		SAE J2313
SAE	Message Set for Advanced Traveler Information System (ATIS)		SAE J2354
SAE	Messages for Handling Strings and Look-Up Tables in ATIS Standards		SAE J2540
SAE	RDS (Radio Data System) Phrase Lists		SAE J2540/1
SAE	ITIS (International Traveler Information Systems) Phrase Lists		SAE J2540/2
SAE	National Names Phrase List		SAE J2540/3
SEA	Rules for Standardizing Street Names and Route IDs		ATIS Low Bandwidth/SAE J2529

APPENDIX H: STAKEHOLDER PARTICIPATION

APPENDIX H STAKEHOLDER PARTICIPATION

The following agencies returned the ITS survey questionnaire back to SNHPC.

- Auburn Emergency Management Center
- Bedford Emergency Management Center
- Candia Emergency Management Center
- Chester Emergency Management Center
- Deerfield Emergency Management Center
- Derry Public Works Department
- Derry Emergency Management Center
- Francestown Emergency Management Center
- Goffstown Emergency Management Center
- Goffstown Public Works Department
- Hooksett Police Department
- Manchester Department of Public Works
- Manchester Traffic Department
- Manchester Transit Authority
- Manchester Emergency Management Center
- New Boston Emergency Management Center
- Weare Department of Public Works
- Windham Emergency Management Center
- Easter Seals New Hampshire