



REGIONAL ITS STRATEGIC PLAN

FOR THE MADISON METROPOLITAN AREA

An Intelligent Transportation System (ITS) represents the collection of technologies or systems (e.g., advanced sensors, computers, communications systems) that enable multiple agencies to work together to deliver various transportation services (e.g., regional traffic control) in an efficient and cost-effective manner.

Appendices

A REGIONAL ITS STRATEGIC PLAN MAINTENANCE PLAN

A.1. Introduction

In 2015, the Madison Area Transportation Planning Board (MATPB) and the City of Madison Traffic Engineering Division in cooperation with their regional and statewide partners developed the Regional ITS Strategic Plan for the Madison Metropolitan Area. The Strategic Plan includes the Madison Regional ITS Architecture (hereafter referred to as the Regional Architecture) which provides a framework that can be used to coordinate and integrate ITS technologies (e.g., electronics, communications, and information processing software and systems) on a regional level. Through coordination and integration, ITS technologies will work together as a seamless, compatible system to improve transportation operations and traveler safety throughout the region. Besides the Regional Architecture, the Regional ITS Strategic Plan is comprised of several other chapters and an electronic Turbo Architecture database file. The hardcopy document is comprised of the following an Executive Summary (Chapter 1), Introduction (Chapter 2) and the following six key chapters, listed in order they were initially developed.

- ITE Element Inventory (Chapter 3)
- ITS User Needs (Chapter 4)
- ITS Vision, Goals, Objectives and Performance Measures (Chapter 5)
- ITS Operational Concept (Chapter 6)
- ITS Architecture (Chapter 7)
- ITS Implementation Plan (Chapter 8)

Each chapter listed above represents an important piece of the ITS Strategic Plan, and in themselves each constitute a step that works toward the goal of developing an effective approach for developing and integrating ITS in the Madison Metropolitan Area. To remain effective, each of these documents should be updated periodically as transportation user needs change, new technologies emerge and updates to the National ITS Architecture occur. Despite its 10 year timeframe, updating the Strategic Plan when changes occur ensures that it remains a living, useful document. This in turn ensures that region's investment in the ITS Strategic Plan remains viable through its planned life cycle.

This document provides an approach for maintaining the Regional ITS Strategic Plan for the Madison Metropolitan Area. Following this approach will allow the Strategic Plan to be effectively maintained over time, allowing greater return on the initial investment spent to develop it. Maintaining the architecture will ensure that the architecture remains a viable, useful reference which individuals can benefit from when developing ITS projects and integrating them with other ITS elements. The development of this maintenance plan also ensures compliance with requirements set forth by FHWA's Final Rule and FTA's Policy governing development of ITS Strategic Plans and Architectures, ensuring that ITS projects considered for implementation in the region remain eligible to receive Federal funding.

A.1.1 Purpose

The purpose of this Maintenance Plan is to promote continued integration and interoperability of systems in the Madison Metropolitan Area through the frequent, effective maintenance of the Regional ITS Strategic Plan in accordance with National policies and local guidance. In early 2001, the United States Department of Transportation (USDOT) announced the release of FHWA's Final rule and FTA's policy for applying the National ITS Architecture at the regional level. The FHWA rule and FTA policy sets forth a number of requirements for funding ITS projects through the National Highway Trust Fund. One such requirement is that "agencies and other stakeholders participating in the development of the regional ITS architecture shall develop and implement procedures and responsibilities for maintaining it, as needs evolve within the region." This document helps to fulfill this requirement and ensures that the Regional ITS Strategic Plan and Architecture remain useful and effective beyond their designed 10-year life span.

This document sets forth and describes a process to periodically update the Regional ITS Strategic Plan and Architecture. Without a formal maintenance plan, the Regional ITS Strategic Plan and the chapters that comprise it will over time become out of date, requiring significant time and resources be allocated to re-developing it. This in turn will result in the inefficient and unnecessary use of funds and staff resources.

A.1.2 Background

The Regional ITS Architecture was developed using Version 7.0 of the National ITS Architecture, and customized based on the existing regional ITS framework and identified transportation issues and needs. The team considered proposed updates to the National ITS Architecture that were available before the Architecture was finalized. In the future, it is expected that updates to the National ITS Architecture will be released. Therefore, it is possible that needs expressed by stakeholders that could not be addressed by the National ITS Architecture, may be addressable as future updates are released.

A.1.3 Intended Audience

This document is intended for agencies and transportation professionals responsible for the implementation of ITS technologies in the Madison Metropolitan Area, and those responsible for maintaining both the Madison Regional and Wisconsin Statewide Architecture. It is expected that individuals will use this document as a guide to periodically update the Regional Architecture but more specifically to:

- Decide when to update the Regional Architecture,
- Define agency responsibilities for updating the Regional Architecture,
- Decide which ITS products must be updated, and
- Define a process for managing changes.

Additionally, individuals responsible for maintaining the Wisconsin Statewide ITS Architecture also benefit from this document. The Statewide ITS Architecture was developed in a similar fashion as the Regional Architecture, and therefore much of this plan can be used by the State to update their documentation.

A.2. Maintaining the Architecture

Maintenance is a critical step in the designed life cycle of state and regional ITS architectures, including the Madison Regional ITS Architecture. The importance of architecture maintenance is underscored in the USDOT rule 940 on regional ITS architectures, Section 940.9(F) which states that "agencies and other stakeholders participating in the development of the regional ITS architecture shall develop and implement procedures and responsibilities for maintaining it (the architecture) as needs evolve within the region". Although the USDOT rule requires regions that have developed an ITS architecture to develop a maintenance procedure, there are several other beneficial reasons why Madison stakeholders should update their architecture. In addition, there are several other situations that may develop over time, in addition to a change in user needs that may warrant the Regional Architecture be updated. These beneficial reasons and situations are described in greater detail in Sections B.2.1 and B.2.2 respectively.

A.2.1 Benefits of Architecture Maintenance

Updating the Regional Architecture ensures that it remains a living document that is both useful and effective as a decision support and planning tool for those responsible for operating the regional transportation network and the ITS-related systems that are part of it.

Updates to the Regional Architecture also ensures that it is kept up-to-date, and in line with other state and regional transportation plans, preserving the usefulness of the Architecture in transportation planning activities throughout its 10 year life cycle. For instance, information on project sequencing from the Regional Architecture may be used to determine when projects should be considered to be included in the transportation improvement program so that project funding is available when implementation is planned to occur. If the Regional Architecture is not kept up-to-date projects may not obtain the funds needed for implementation, especially, if the architecture has not been updated to include new projects that are not included in the original version of the architecture.

Updating the Regional Architecture also offers potential to promote the development of institutional relationships. Workshops can be formed that allow stakeholders to assemble to provide input on ITS activities and to express their needs. Resulting discussions can provide the opportunity for stakeholders to leverage areas where resources and funds can be pulled to support ITS activities in the region.

A.2.2 When to Update the Regional Architecture

The Regional Architecture provides the framework to coordinate and integrate ITS technologies in the Madison Metropolitan Area. A set of inputs acted as the foundation from which the Architecture was developed. These inputs include; stakeholder input gathered during the course of the project, existing state and regional plans, the National ITS Architecture and ITS-related systems existing or planned for implementation in Metropolitan Area. Over time inputs like these will change, and as a result, the foundation on which the architecture was originally developed will be altered. Therefore, to align the Regional Architecture with the altered foundation, or the modified set of inputs, the architecture must be updated. It is recommended that the architecture be modified every time a significant change in user needs or system function occurs. Updating the architecture in this fashion will ensure that all changes are included in the architecture and the architecture always remains up to date.

If the Regional Architecture cannot be updated every time there is a significant change, either due to staff workload or skill sets, fiscal constraints or other reason, then effort should be made to update the architecture regularly in defined intervals suitable to ITS activity occurring within the region. In these cases, completing an update at least every three years is recommended; however, if there isn't significant ITS activity in the region, every five years may be suitable. Updating the architecture on a periodic basis (e.g., every 3-5 years) requires that a temporary list of on-going changes be recorded so that they are not forgotten. The time and level of effort needed to create and maintain such a list might be on the same level as updating the architecture itself, so consideration should be given to the amount of time and resources needed to record changes, and compare that to the time and resources needed to make updates in the document.

Consideration should also be given to the resources required to perform updates, and to plan for related actions in advance of when updates should occur. This includes allocating funds in advance to ensure that updates can be made in a timely manner.

A.2.3 Reasons Why the Regional Strategic Plan May Need to be maintained

The Regional ITS Strategic Plan and/or Architecture may need to be revised or updated for one or more reasons. Depending on the circumstances leading to the update, one or more of the chapters that comprise the Regional ITS Architecture may need to be modified. The specific chapters to be modified; however, will depend on the reasons for the modification. Updating the Regional ITS Strategic Plan will be easier if these reasons are understood. Potential reasons for updating the Architecture are described below.

Changes in Regional Needs - Over time, as new transportation problems surface and existing problems are resolved, regional transportation needs will change. Additionally, as knowledge and acceptance of the Regional Architecture grows, there will likely be new stakeholders with new needs identified. Since

transportation needs form the foundation from which the Regional Architecture is based, a change in user needs will likely require significant changes be made to the Architecture.

Changes in Institutional Framework - Within the ITS Architecture's 10 year time frame it is likely that institutional frameworks will evolve to include additional stakeholders, with different perspectives and needs. These new stakeholders may own ITS elements that can be integrated into the existing ITS framework. As a result these new stakeholders should be added to the Regional Architecture. It is also possible that the institutional framework will evolve to exclude stakeholders when projects are discontinued or when agencies split or merge. In these cases, stakeholder names may need to be modified, added and/or removed.

Changes in Project Definition - Projects proposed for future implementation may be modified to include, eliminate, or modify elements, connections, or information flows. When changes to project definition occur, the Regional Architecture should be analyzed to determine if the modifications are covered by the existing architecture. If the architecture doesn't adequately include the modified project definition, it should be updated so that these modifications are accurately reflected. Additionally, ITS projects will not always be implemented exactly as they were planned requiring that information be fed back into the architecture after the project is implemented.

Changes in Project Acceptance and Status - In some cases, projects may be added, modified or eliminated altogether. When projects are added or modified, the Regional Architecture should be analyzed to determine if an update is warranted to reflect additional information flows, connections, and other impacts associated with these projects. Also, projects that were planned may have been implemented since this last update, requiring that their status be updated. When projects are deleted, all corresponding elements and information flows associated with these projects must be removed, unless similar projects covering the same functions and flows remain.

Changes in Project Priority - From time to time, project implementation may be delayed due to funding constraints and/or institutional challenges, or advanced due to increased need or opportunity. In these situations, project implementation may occur in a year or timeframe other than the one originally proposed. Using the Regional Architecture as an example, a project originally slated for implementation in the short-term may be delayed and pushed back to the mid- or long-term. This will affect other projects if implementation of these projects is dependent on the delayed project. As a result the implementation plan and other elements of the Regional Strategic Plan may need to be updated.

Changes to National ITS Architecture Framework - Since the initial development of the National ITS Architecture, there have been several modifications that affect how ITS architectures are developed. These modifications include the addition of new user services, subsystems, and architecture flows to name a few. It is expected that modifications like these will continue as will changes made to policies that dictate how ITS projects are planned and funded. Furthermore, the USDOT recently released its Connected Vehicle Reference Implementation Architecture. It is expected that this architecture will evolve rather rapidly as connected vehicle technologies hit the marketplace. Significant changes to either the National ITS Architecture or Connected Vehicle Architecture that affect significant aspects of the Madison Regional ITS program may lead the MATPB to update the Regional Architecture.

A.3. First Steps

Before updating the Regional Architecture, MATPB and other regional ITS stakeholders should collectively answer a number of important questions aimed to ease the update process and ensure that the update incorporates the input of all relevant stakeholders. First, stakeholders should decide which agency or agencies will be responsible for updating the architecture and overseeing the update process. Second, the selected agencies and the individuals responsible for implementing updates to the architecture should define the products that need to be modified. Third, the available electronic resources used to create previous versions of the Architecture should be collected to ease the architecture update process. Last, procedures to manage Architecture updates should be defined so that changes can be documented at the same time the change is made, eliminating the need to

remember what changes have been made, when, and by whom. Each of these tasks are described in greater detail in sections 1.3.1 - 1.3.4 respectively.

A.3.1 Define Agency Responsibilities for Maintaining the Architecture

As the owner of the Architecture, MATPB will be the formal entity responsible for updating the Regional Architecture. However, MATPB may develop mechanisms to facilitate this process which relies on the participation of ITS stakeholders to complete this process on a project-by-project basis. Because changes will be proposed from a number of different sources, changes might be outside the range of expertise of one individual. Therefore, MATPB may also elect to develop a panel of individuals representing various regional agencies (for example, law enforcement, emergency response, transit, or traffic management) to oversee the update process, or may elect to have a consultant maintain the architecture.

Responsibilities of the maintainer are listed below. The list below is not meant to be exhaustive, but rather a minimum set of responsibilities for maintaining the architecture. Depending on the delegation of responsibilities, these responsibilities may rely solely with MATPB, a consultant or some combination of both parties and or group of individuals.

- Informing agencies and departments of meetings and workshops so as to gauge ITS activity occurring within the region and determining the appropriate actions for updating the Regional Architecture.
- Archiving the electronic files and hardcopy documents of the architecture, and disseminating these products to agencies that have a need for them.
- Performing on-going updates to the architecture when a change is approved, or maintaining a list of changes that need to be made when the architecture is periodically updated.
- Archiving and incorporating comments received regarding the Regional Architecture, and responding to stakeholders on how these changes were made.
- Establishing a configuration management process and maintaining a change log.

A.3.2 Define Architecture Products to be Maintained

Updating the Madison Metropolitan Area Strategic ITS Plan requires clear definition of the products to be updated. Clear definition of these products will ensure that every element of the Plan is updated. Additionally, the list of products will act as a method, or check list, that can be used to verify if needed changes were made.

With each update to the Madison ITS Strategic Plan, the individuals responsible for updating it should review the following elements to determine if changes are needed. Changes will be needed if the information in any of them is no longer relevant. These elements are identified within FHWA's rule and FTA's policy on ITS Architecture development and are therefore considered important aspects to future updates.

- Description of the region
- List of stakeholders, including key contact information
- Inventory of existing and planned ITS systems
- Documented needs and ITS services associated with supporting systems in the region
- Operational concepts
- System functional requirements
- Documentation of existing and planned interconnects and information flows
- Documentation of project sequencing
- List of agency agreements
- Documentation of applicable, in use, or planned ITS standards

A.3.3 Obtain Available Electronic Resources

Before beginning the Strategic Plan update process, the update team should gather available electronic resources developed or used in previous architecture development or update efforts. The resources include all electronic files (i.e., graphics, databases, and document files) that were produced in the

original Strategic Plan (and/or subsequent updates). Without these files, updating the Strategic Plan will be more difficult as files will need to be recreated if affected by the update.

Data/electronic files that need to be collected include:

- Electronic copies of the Regional ITS Strategic Plan
- Electronic copies of tables/graphics not embedded in the Plan documentation
- Recent version of the National ITS Architecture (available on the internet)
- Inventory of stakeholders' systems (e.g., Turbo Architecture File)
- Recently released Regional Transportation Plans
- Stakeholder input/workshop transcripts
- All files created/used by the consultant or other agency responsible for the development or last update to the Regional Architecture

A.3.4 Manage Changes

Before updates are made to the Regional ITS Strategic Plan, the update team should establish a process for recommending, implementing, tracking, and documenting changes. Following a process to manage change will ensure that a common approach is used each time the Strategic Plan is updated.

When a new project is identified, or when another change must be made to the Strategic Plan, a Regional ITS Architecture update form should be completed by the agency or individual seeking to make the change. Approved changes to the Strategic Plan will be made during the next scheduled update. A sample change form is provided in Table 122. This form should be used to inform MATPB of the change, and sent to Bill Schaefer the Regional ITS Strategic Plan Coordinator at the following address:

Bill Schaefer
 Madison Area Transportation Planning Board
 121 S. Pinckney St., #400
 Madison, WI 53703
 Tel: (608) 266-9115
 Fax: (608) 261-9967
 e-mail: wschaefer@cityofmadison.com

A defined change management process will reduce the time and effort needed to determine changes made in previous updates to the Regional Architecture. It will also reduce confusion regarding which draft of the architecture is most current, ensuring that updates are applied to the correct version of the document (version control).

A.4. Turbo Architecture Database Modification

Turbo Architecture is a free software application offered through the USDOT that supports development and maintenance of ITS Architectures. The Turbo software uses the underlying framework of the National Architecture to allow architecture developers to develop their ITS Architectures using a consistent, common platform. By downloading, and using the most recent version of the software platform the MATPB can effectively update the Regional Architecture, ensuring that any updates made are consistent with the National ITS Architecture. The Regional ITS Architecture was developed in 2015, using the latest version of the USDOT's Turbo Architecture (Version 7.x) software. The Turbo file is a valuable tool in that it preserves the knowledge and effort expended to develop the Regional Architecture. In turn this knowledge can be brought forward when new projects are identified and need to be included in the Regional Architecture, or when the Wisconsin Statewide Architecture undergoes an update.

The Madison ITS Architecture Turbo database file contains attributes of the Regional Architecture, including stakeholders, existing and planned ITS elements, high-level functions, system-to-system interconnects and information flows, and applicable standards. These attributes loosely correlate to the reasons why the architecture needs to be maintained, as previously discussed in Section 1.2.3. For instance the Turbo Architecture software contains a tab called 'Stakeholders'. Every time there is a

change to the Regional ITS Architecture that pertains to a stakeholder, information in the “Stakeholder” tab should be updated.

When updating the Turbo Architecture file, a new “project architecture” should be created to capture the changes proposed and ultimately made to the Regional Architecture. A new project architecture can be created in the “Start” menu, by clicking the button “New” under the Project window. The new project will contain just the attributes of the “project” being initiated until all the changes are recorded. At this time, the results of the project can be uploaded and seamlessly integrated into the Regional ITS Architecture by clicking on the “Project-to-Region” button in the ‘Start Menu’. When uploaded the Regional Architecture is automatically updated to include changes that occurred as a result of adding the project.

Table 122: Madison Regional ITS Architecture Change Request Form

Change Information			
Project Name:		Request Date:	
Description of Requested Change:			
Type of Change:	<input type="checkbox"/> New Project (if new project select one of the following) <input type="checkbox"/> Proposed (funding not secured) <input type="checkbox"/> Planned (funding secured) <input type="checkbox"/> Under Construction (project currently being deployed) <input type="checkbox"/> Existing <input type="checkbox"/> Deleted Project <input type="checkbox"/> Modified Project <input type="checkbox"/> Change to a User Need <input type="checkbox"/> Change to Project Status <input type="checkbox"/> Change to Project Priority <input type="checkbox"/> Change to National ITS Architecture <input type="checkbox"/> Other		
Change Rationale:			
Agencies Involved, Including Roles:			
Additional Notes:			
Submitter Information			
Name and Title:			
Agency:			
Address:			
Phone Number:			
E-mail:			

A.5. Document Modification

After the Turbo Architecture file is updated, individuals responsible for updating the Regional Architecture can use the updated Turbo file to more easily update the existing hardcopy documentation. Significant changes in user needs or ITS program direction, or the addition of, or change to, significant functions that are not reflected in the Strategic ITS Plan will require that the six primary chapters that comprise the Plan be updated. To summarize, these chapters in the order they were developed are listed below.

- Chapter 3: ITS Inventory
- Chapter 4: ITS User Needs
- Chapter 5: ITS Vision, Goals, Objectives and Performance Measures
- Chapter 6: ITS Operational Concept
- Chapter 7: ITS Architecture
- Chapter 8: Implementation Plan

The order in which each chapter was developed and last updated was based on the USDOT recommended process for developing an ITS architecture. In general, this process moves from high-level concepts to specific details, and as a result, each chapter in the Strategic ITS Plan acts as the foundation for the next. For example, Chapters 3 & 4 (ITS Inventory and ITS User Needs, respectively) define the concepts needed to develop Chapter 5 (ITS Vision, Goals, Objectives and Performance Measures), Chapters 3, 4, and 5 define the concepts needed to develop Chapter 6, and so on. This process is illustrated in Figure 39. Therefore, when a decision is made to modify the architecture, it is important that the individual or group of individuals responsible for maintaining it follow this process as it will be the most efficient, comprehensive and familiar method of updating the Regional Architecture.

Since the process illustrated in the diagram is intended for use in developing ITS Strategic Plans, individuals responsible for maintaining the Plan do not have to recreate each document, but rather adopt the process to review documents for the modifications that need to be made. Therefore, the individual or group of individuals should begin with the first chapter in the process (Chapter 3: ITS Inventory) and determine if there are any changes that need to be reflected, implement the changes, and when finished proceed to the ITS User Needs chapter, repeating these steps for each chapter.

A.5.1 ITS Inventory

Whenever a new project is proposed for implementation within the Madison Metropolitan Area, project descriptions should be reviewed and applicable ITS elements to be implemented by the project should be included within the Regional Strategic Plan, if not already included. Project champions should be responsible for providing project details so they can be included in the Regional ITS inventory and so that they can be identified in the Transportation Improvement Program and/or Congestion Management Plan.

Maintaining the Regional ITS inventory will improve the quality of the inventory over time, and will increase stakeholder awareness of the existing and planned transportation systems within the region.

A.5.2 User Needs

Definition of the ITS inventory and ITS user needs were the first major steps taken to develop the Regional ITS Strategic Plan. User needs act as the foundation from which the remaining pieces of the Plan were developed. As stated previously, the ITS Strategic Plan update process should begin with a review of the User Needs Chapter to determine if any new user needs should be added to this document and incorporated into the text of other chapters.

If stakeholders identified one or more new user needs, the update team should modify the text in the User Needs Chapter to reflect the new user need(s). Since the user needs chapter acts as the foundation for development of the other chapters, a change in user needs will require that one or more of the remaining five chapters be modified.

If a new user need is identified, modifications to the User Needs Chapter will be rather straight forward and easy to implement compared to subsequent changes to the other chapters. In general, the complexity of changes made to the Strategic Plan will become greater as one works toward the last

chapter (Implementation Plan). The only significant change that will need to be made to the User Needs Chapter will be to update the user need descriptions. This may involve modifying the existing text to alter the meaning of an existing user need, adding an entirely new user need, or removing a need that is no longer relevant.

After the update team updates the user need descriptions, or modifies existing text to better describe the need, the team should carry the changes made over to the following chapters where applicable. If new user needs were added to Chapter 4, the new needs will need to be mapped to National ITS Architecture Service Packages in the ITS Operational Concept Chapter (Chapter 6).

A.5.3 ITS Vision, Goals, Objectives & Performance Measures

The Madison Metropolitan Area's ITS Long-Range Vision was developed based on the transportation desires and needs expressed by regional ITS Stakeholders. Although it is not expected that these desires and needs will change significantly in the next ten years, institutional changes, and shifts in policy may require that the Madison Metropolitan Area ITS Vision be updated. Any changes to the ITS Vision or corresponding Goals and Objectives should be reflected in the applicable sections of the ITS Vision, Goals, Objectives and Performance Measures Chapter and carried over into the remaining documents (i.e., ITS Operational Concept, Physical ITS Architecture, and Implementation Plan).

A.5.4 Operational Concept

The Operational Concept identifies and defines the agency operational roles and responsibilities for implementing, operating, and maintaining various transportation services. When a new ITS concept or function is planned for implementation in the region, the Operational Concept will need to be updated.

If a previously unidentified stakeholder implements a new project or associated system, a description of the stakeholder should be added to the existing text. The new description should reflect the agency's ITS functions, the other organizations or agencies with which it shares data, and other relevant data that help describe the agency's role in terms of ITS operations. The modified text should describe all of the agency's ITS related systems, in National ITS Architecture terms.

If an existing stakeholder implements a new project or system, a description of the stakeholder does not need to be added as it already exists. However, the description of the stakeholder should be reviewed and updated if its operational responsibilities have changed. Additionally, the update team should add a description of the new system being implemented to all relevant sections of the chapter.

When stakeholder and/or system descriptions are added or updated, stakeholders should take the opportunity to update descriptions of legacy systems, including any changes in current deployment status.

If new systems have been deployed in the Madison Metropolitan Area since the last time the Regional ITS Architecture was updated, the person or group of people responsible for updating the architecture should map these systems to the National ITS Architecture by identifying the applicable Service Packages, Sub-Systems, and Equipment Packages which new systems apply.

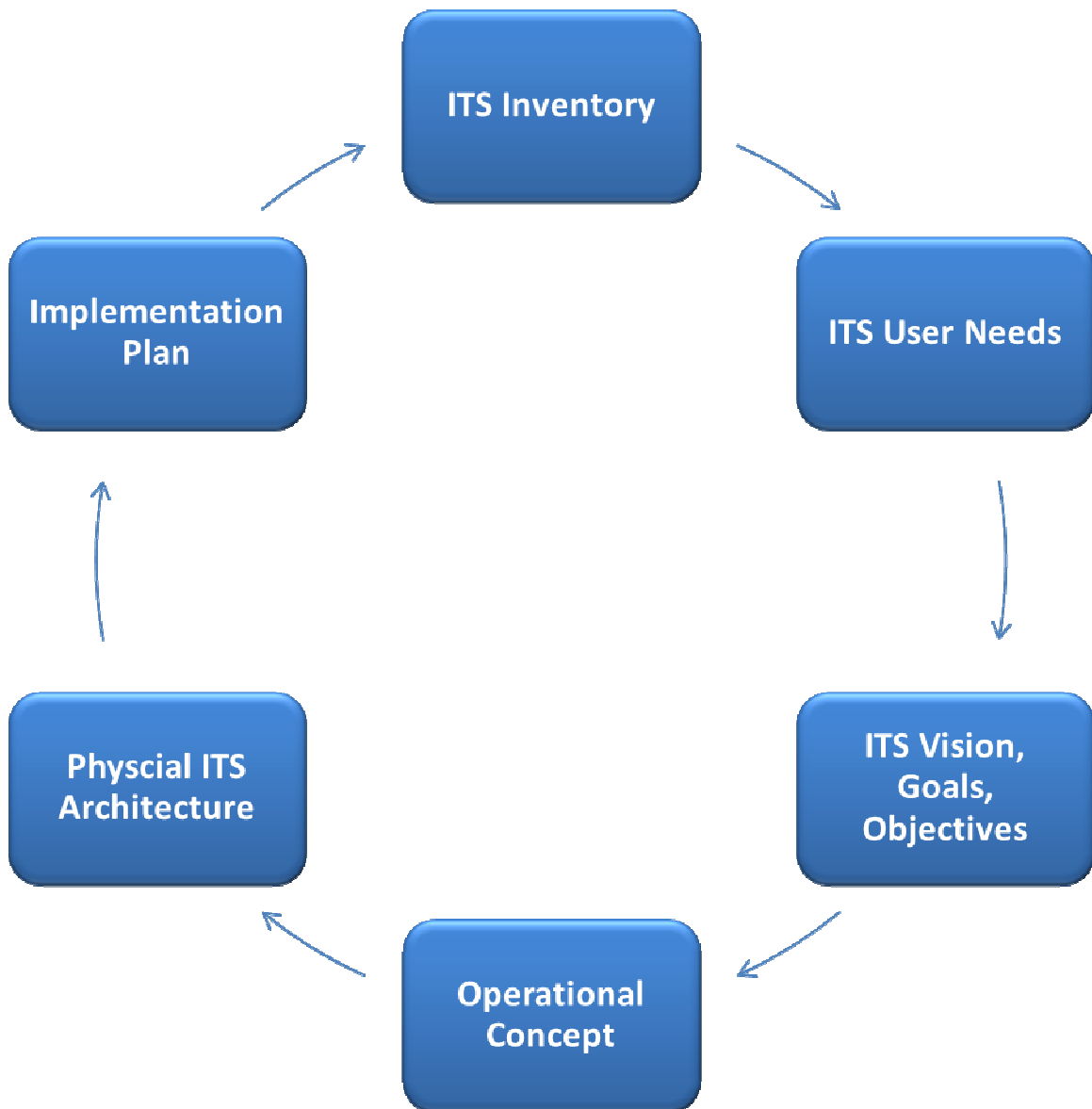


Figure 39: Madison Regional ITS Strategic Plan Update Process

A.5.5 Physical Architecture

The Physical ITS Architecture should be updated whenever there is a change to the Madison Metropolitan ITS Inventory (e.g., new system is implemented or planned). Through the update process, connections with the new system and existing systems will be defined making it possible to identify the other systems it will communicate with and the data that will be communicated. Although, not required, it may also be beneficial to update the Physical ITS Architecture when the National ITS Architecture is updated. This will ensure that terminology used in the Physical Architecture document remains consistent with that of the National ITS Architecture.

When a new project is identified, it must be mapped to National ITS Architecture Service Packages. The project may or may not require that a new service package be added. If a new service package is

identified and included in the Regional Architecture, the new market package(s) should be cross referenced to applicable User Needs.

The ITS Architecture interconnect diagrams and architecture flows found in Chapter 7, must be updated whenever a new system is implemented or system scope is modified. New systems should be added, as well as the information flows that connect them to other systems.

Changes that occur as a result of updates to previous chapters must also be incorporated in this chapter. These changes include modifications made to stakeholder and element names, as well as element status (e.g., planned or not planned).

A.5.6 Implementation Plan

Over time, the status of projects slated for implementation in the Madison Metropolitan Area will change. For instance, if the Strategic Plan has not been updated in several years, a project classified as a potential future project may have been implemented since the last time the Plan was updated. This will require that current text be modified to reflect this change in status. (Although, this natural change in status of projects should not, in and of themselves, necessitate an update to the Plan). Likewise, new projects that have yet to be implemented may be identified. A description of these projects should be added to the description of future potential projects.

Similar to project status, project phasing or conceptual integration, will also change. For instance, a project slated for implementation in the short-term may have been implemented since the last time the Strategic Plan was updated. This project along with others that have been implemented should be removed from the list of short-term projects and replaced with projects originally slated for implementation in the long-term. Likewise, long-term projects should be replaced with newly identified projects that will be implemented 5-10 years in the future.

A.6. Final Steps

Upon updating the Architecture/Strategic ITS Plan, there are a couple final steps that need to be made. These steps are summarized below.

A.6.1 Notify Stakeholders

After the each update to the ITS Plan, the update team should notify stakeholders of the changes that have taken place. Stakeholder notification will allow individuals responsible for other transportation activities within the state the opportunity to adjust their plans based on the updates that were made. Stakeholder notification will also help maintain stakeholder familiarity with regional ITS activities. Before stakeholders are notified, however, decisions pertaining to who will be notified and how this notification should occur need to be made.

A.6.2 Archive Files

The individual or group of individuals that update the Strategic ITS Plan should archive all files that were created and or used during the update process, according to the change management process described in section B.3.4. The archive can be a simple folder located on an agency's network. To increase the security of the files, a copy of all the files should be stored on a backup drive in case the integrity of the network is jeopardized or the file is accidentally deleted. The contents and location of the folder or archive should be documented and stored with the updated version of the Plan (hardcopy) so that files can be easily located next time it is updated.

B SYSTEMS ENGINEERING ANALYSIS AND COMPLIANCE CHECKLIST

B.1 Background

On January 8, 2001 the Final Rule on Intelligent Transportation Systems (ITS) Architecture and Standards Conformity (Final Rule) and the Final Policy on Architecture and Standards Conformity (Final Policy) were enacted by the FHWA and FTA respectively. The Final Rule/Final Policy requires that ITS projects or ITS elements within a project that are implemented using funds from the Highway Trust Fund including the Mass Transit Account conform to the National ITS Architecture and applicable ITS standards.

The Final Rule requires that all ITS projects or ITS elements within a project be developed using a systems engineering analysis (SEA). Section 23 CFR 940.11 specifies seven activities that are to be performed to accomplish a SEA. These seven activities are identified on the SEA checklist under the column labeled “Systems Engineering Element” (see Table 123).

Project managers are required to complete a SEA and corresponding SEA Checklist for “...any project in whole or in part that funds the acquisition of technologies or systems that provide or significantly contribute to the provision of one or more ITS user services, as defined in the National ITS Architecture. In other words, an ITS project is any project that may provide an opportunity for integration at any point during its life.” This applies to all projects or portions of projects. Systems that stand alone, that are not and will not integrate with another system is not subject to a SEA.

B.2 Instructions for Completing the Systems Engineering Analysis Checklist

Project sponsors/champions are required to use the SEA checklist to demonstrate that their ITS project(s) or ITS element within a project were developed using a systems engineering approach. The SEA checklist can be found on the Madison Area Transportation Planning Board (MATPB) website located at:

<http://www.madisonareampo.org/>

Table 123: Madison Metropolitan Area Systems Engineering Checklist

Regional ITS Architecture for the Madison Metropolitan Area Systems Engineering Analysis Checklist		Date: _____
		Project Name: _____
		Project No.: _____
		Agency: _____
		Project Manager: _____
Systems Engineering Element	How Element is Met/Fulfilled	Date Verified
1) Portions of the Madison Regional ITS or Statewide ITS Architecture being implemented. Must identify the ITS Concept and a brief description of the functional needs to meet that Concept.		
2) Participating agencies roles and responsibilities.		
3) Requirements definitions.		
4) Analysis of alternative system configurations and technology options to meet requirements.		
5) Procurement option(s).		
6) Applicable ITS standards that are being implemented and testing procedures that will be used upon project implementation.		
7) Procedures and resources necessary for operations and management of the system.		

For larger, more complex projects, there may be separate documents that cover one or more of the systems engineering requirements. In those cases, a summary of the relevant information should be included in the SEA checklist and the document should be referenced. References should include: the full name of the plan or document; date and year the document was prepared; and the heading/heading number of the section within the document where the information is provided. Upon entering the reference, enter the date the information was verified in the far right column.

If documents or plans do not exist for the necessary information, all the relevant information must be entered in the SEA checklist. For minor or straightforward projects, the required information may only be one or two paragraphs for each of the seven required systems engineering elements. For complex projects, documentation for some of the elements will likely be much longer and a separate document can be attached to the checklist.

More detailed instructions for documenting each of the required systems engineering elements is provided on the pages following the checklist.

Questions or comments on properly completing the SEA checklist or general System Engineering requirements should be directed to: William C. Schaefer (Transportation Planning Manager at the Madison Area Transportation Planning Board) at PH: (608) 266-9115 or wschaefer@cityofmadison.com.

B.2.1 Identify portions of the Madison Regional ITS or Statewide ITS Architecture being Implemented

Summarize and reference the document(s) that describe the new ITS project or elements and how they meet the functional needs of one or more of the ITS Concepts identified in the Regional ITS Strategic Plan for the Madison Metropolitan Area. Chapter 6 (ITS Operational Concept) and Chapter 7 (ITS Architecture) of the Regional ITS Strategic Plan may provide an initial starting point for meeting this requirement. Also, check to see if there is a project level or system concept of operations that might include a discussion of the portions of the architecture being implemented.

If there are no existing documents that describe new ITS project or elements and how they meet the functional needs of one or more of the ITS Service Areas identified in the Regional ITS Strategic Plan, then this section of the SEA checklist should provide this description.

B.2.2 Identify Participating Agencies Roles and Responsibilities

Summarize and reference the document(s) that define agency roles and responsibilities as they pertain to ITS system design, purchase, installation, operation, maintenance, and modification. Chapters 5-7 (Operational Concept, Physical ITS Architecture, and ITS Implementation Plan respectively) of the Regional ITS Strategic Plan may provide an initial starting point for satisfying this requirement. Also, check to see if there is a project level or system concept of operations that might discussion of participating roles and responsibilities.

If there are no existing documents that define agency roles and responsibilities as they pertain to ITS system design, purchase, installation, operation, maintenance, and modification, then this section of the SEA checklist should provide this description.

B.2.3 Identify Requirements Definitions

Summarize and reference the documents(s) that define “what” the subject ITS project or element is required to do. This includes all items necessary to complete a fully operational system including hardware, software, installation, training, etc. For many projects, there may be a formal requirements document that is developed. For example, you might have a requirements list included with a RFP. If there is no existing requirements document, this section should identify high-level requirements for the project. Please note that requirements are “what” statements. They are later further developed into “how” statements (or specifications) during the design process. Refer to the U.S. Department of Transportation report titled “Developing Functional Requirements for ITS Projects” for specific guidance on developing functional requirements.

B.2.4 Conduct Analysis of Alternative System Configurations and Technology Options to Meet Requirements

Summarize and reference the document(s) that list the alternatives that were considered during the development of the ITS project or element. Such a document should list strengths and weaknesses, technical feasibility, institutional compatibility, and life cycle costs of each alternative, and the preferred alternative. If there is a project level or system concept of operations that covers this project, it should include an alternatives analysis that could be referenced here.

If there are no existing documents that list the alternatives that were considered, then this section of the SEA checklist should provide this listing.

B.2.5 Identify Procurement Options

Summarize and reference the document(s) that identify procurement options for the ITS project or element, or list the procurement method used on the attached SEA checklist.

If there are no existing documents that identify procurement options, then this section of the SEA checklist should describe the procurement options.

B.2.6 Identify Applicable ITS Standards that are being implemented and Testing Procedures that will be used upon Project implementation

Summarize and reference the document(s) that identify the ITS standards that apply to new ITS projects or elements. A list of standards applicable to projects identified in the Regional ITS Strategic Plan can be found in Chapter 7 (ITS Architecture). Depending on the elements of the new ITS project, additional ITS standards may have been approved since the initial development of the Strategic Plan. Also, check to see if there is a project level or system concept of operations that might include a discussion of standards.

If there are no existing documents that identify the ITS standards that apply, then this section of the SEA checklist should identify the applicable standards.

B.2.7 Identify Procedures and Resources Necessary for Operations and Management of the System

Summarize and reference the document(s) that identify the internal policies or procedures necessary to recognize and incorporate the new system into current operations and decision processes. Resources that support continued operations, including staffing, training and spare parts should also be referenced.

If there are no existing documents that identify the procedures and resources necessary to operate and manage the ITS elements of the project, then this section of the SEA checklist should identify the needed operations and maintenance procedures and resources.

C HIGH-LEVEL FUNCTIONAL REQUIREMENTS

Table 124: Mapping of Madison Metropolitan Area ITS Elements to National ITS Architecture High-Level Functional Requirements

Element Name	Functional Area	ID	Requirement	Status
3rd Party Information Sources				
City_Madison_Parking Utility_Parking Garage Cameras	Field Secure Area Surveillance	1	The field element shall include video and/or audio surveillance of secure areas including facilities (e.g. transit yards) and transportation infrastructure (e.g. bridges, tunnels, interchanges, roadway infrastructure, and transit railways or guideways).	Existing
		2	The field element shall be remotely controlled by a center.	Existing
		3	The field element shall provide equipment status and fault indication of surveillance equipment to a center.	Existing
		4	The field element shall provide raw video or audio data.	Existing
City_Madison_Parking Utility_Parking Management System	Parking Management	1	The parking element shall maintain parking lot information including static information such as hours of operation, rates, location, entrance	Existing

Element Name	Functional Area	ID	Requirement	Status
	Parking Electronic Payment		locations, capacity, type, and constraints; as well as dynamic information such as current state of the lot, occupancy, arrival rates, and departure rates.	
		2	The parking element shall share information with a traffic management center to identify queues at entrances, exits that should be used, and other information that supports coordinated local traffic control in and around the parking facility.	Planned
		3	The parking element shall manage local dynamic message signs that display messages to travelers such as the parking lot state, number of spaces available, location of entrances, and current charges.	Existing
		4	The parking element shall provide the capability to detect, count, and classify vehicles at entrances, exits, and designated locations within a parking facility.	Existing
		1	The parking element shall detect and classify vehicles entering and exiting a parking facility (vehicle size, type, identifiable features, etc.).	Existing
		2	The parking element shall read data from the traveler card / payment instrument carried on-board the vehicle or by the traveler.	Planned
		3	The parking element shall provide an interface to the driver informing them of the success or failure of the financial transaction. This may involve a request for the driver to pull aside so the operator can resolve an issue.	Existing
		5	The parking element shall manage the parking lot charges, considering such factors as location, vehicle types, and times of day.	Planned
		6	The parking element shall process the financial requests and manage an interface to a Financial	Existing

Element Name	Functional Area	ID	Requirement	Status
	Parking Coordination		Institution.	
		7	The parking element shall support the payment of parking lot transactions using data provided by the traveler cards / payment instruments.	Planned
		8	The parking element shall process requests for parking lot charges to be paid in advance.	Planned
		10	The parking element shall maintain a list of invalid traveler credit identities.	Planned
		2	The parking element shall provide parking management data to traffic management centers upon request as part of the implementation of demand management programs in the region. This could include changes to hours of operation or pricing.	Planned
		3	The parking element shall distribute parking lot information to traffic management centers upon request to support integrated regional traffic control and parking management. This could include information on facility hours of operation and current parking availability.	Planned
	Parking Short Range Traveler Information Communications	5	The parking element shall distribute parking lot information upon request to traveler information providers to support travel planning.	Existing
		6	The parking element shall support requests for parking reservations.	Planned
		1	The parking element shall distribute static parking information (e.g., guide signs, directional signs, rates, and restrictions) to equipment on-board vehicles.	Planned
		2	The parking element shall distribute dynamic parking information (e.g., parking availability and locations) to equipment on-board vehicles.	Planned

Element Name	Functional Area	ID	Requirement	Status
City_Madison_Streets and Recycling_In Pavement Sensors/Treatment Systems	Parking Data Collection	1	The parking element shall collect parking management data including lot usage and charging information.	Existing
		2	The parking element shall assign quality control metrics and meta-data to be stored along with the data. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.	Existing
		3	The parking element shall receive and respond to requests from ITS Archives for either a catalog of the parking management data or for the data itself.	Planned
		4	The parking element shall be able to produce sample products of the data available.	Existing
	Roadway Field Device Monitoring	1	The field element shall monitor the operational status (state of the device, configuration, and fault data) of connected sensors (such as traffic, infrastructure, environmental, security, speed) and devices (such as highway advisory radio, dynamic message signs, automated roadway treatment systems, barrier and safeguard systems, cameras, traffic signals, ramp meters, short range communications equipment, security surveillance equipment).	Planned
		2	The field element shall send operational status of connected field equipment to the maintenance center.	Planned
		3	The field element shall send collected fault data to the maintenance center for repair.	Planned
		1	The field element shall include surface and sub-surface environmental sensors that measure road surface temperature, moisture, icing, salinity, and other measures.	Planned

Element Name	Functional Area	ID	Requirement	Status
		3	The field element's environmental sensors shall be remotely controlled by a maintenance center.	Planned
		4	The field element's environmental sensors shall be remotely controlled by a traffic management center.	Planned
		7	The field element shall provide environmental sensor equipment operational status to the controlling center or maintenance vehicle.	Planned
		8	The field element shall provide environmental sensor equipment fault indication to the controlling center or maintenance vehicle.	Planned
		10	The field element shall provide weather and road surface condition data to centers.	Planned
		11	The field element shall provide weather and road surface condition data to maintenance and construction vehicles.	Planned
	Roadway Automated Treatment	1	The field element shall activate automated roadway treatment systems based on environmental or atmospheric conditions. Treatments can be in the form of fog dispersion, anti-icing chemicals, etc.	Planned
		2	The field element shall activate automated roadway treatment systems under center control. Treatments can be in the form of fog dispersion, anti-icing chemicals, etc.	Planned
		3	The field element shall return automated roadway treatment system and associated environmental sensor operational status to the maintenance center.	Planned
		4	The field element shall return automated roadway treatment system and associated environmental sensor fault data to the maintenance center for repair.	Planned
City_Madison_Streets and	MCM Vehicle Tracking	1	The center shall monitor the locations of all	Planned

Element Name	Functional Area	ID	Requirement	Status
Recycling_Maintenance Decision Support System (MDSS)			maintenance and construction vehicles and other equipment under its jurisdiction.	
		2	The center shall present location data to center personnel for the fleet of maintenance and construction vehicles and other equipment.	Planned
		3	The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for maintenance and construction vehicle tracking.	Planned
	MCM Vehicle and Equipment Maintenance Management	1	The center shall collect and analyze vehicle diagnostics information from maintenance and construction vehicles. The information includes engine temperature, mileage, tire wear, brake wear, belt wear, and any warnings or alarms concerning the operational condition of the vehicle and ancillary equipment.	
	MCM Environmental Information Collection	2	The center shall exchange information with equipment repair facilities including status and history of repairs concerning maintenance and construction vehicles. This information includes vehicle status and diagnostic information, vehicle utilization, and coordination of when vehicles will be available for preventative and corrective maintenance.	
		1	The center shall remotely control environmental sensors that measure road surface temperature, moisture, icing, salinity, and other measures.	Planned
		2	The center shall remotely control environmental sensors that measure weather conditions including temperature, wind, humidity, precipitation, and visibility.	Planned
		8	The center shall collect operational status for the roadside and vehicle-based environmental	Planned

Element Name	Functional Area	ID	Requirement	Status
	MCM Automated Treatment System Control		sensor equipment.	
		9	The center shall collect fault data for the roadside and vehicle-based environmental sensor equipment for repair.	Planned
		1	The center shall remotely control automated roadway treatment systems. Treatments can be in the form of fog dispersion, anti-icing chemicals, etc.	Planned
		2	The center shall remotely control the environmental sensors that upon detecting changes in environmental or atmospheric conditions, automatically activate roadway treatment systems.	Planned
		3	The center shall collect automated roadway treatment system and associated environmental sensor operational status.	Planned
		4	The center shall collect automated roadway treatment system and associated environmental sensor fault data and request repair.	Planned
		5	The center shall accept requests for automated roadway treatment system activation from center personnel.	Planned
	MCM Maintenance Decision Support	1	The center shall provide the center personnel with tailored external information, including weather or road condition observations, forecasted weather information or road conditions, current usage of treatments and materials, available resources, equipment and vehicle availability, road network information, and source reliability information.	Planned
		3	The center shall provide an interface to the center personnel to input control parameters for the decision support process and receive decisions or information presentation.	Planned

Element Name	Functional Area	ID	Requirement	Status
		4	The center shall provide dispatch information to maintenance and construction vehicles based on the outputs of the decision support system, including recommended roadway treatment actions.	Existing
	MCM Winter Maintenance Management			
	MCM Infrastructure Monitoring			
	MCM Data Collection	1	The center shall collect maintenance and construction data (such as field equipment status, infrastructure status, maintenance and construction activity data) gathered from roadway, traffic, and other maintenance and construction sources.	Planned
		2	The center shall assign quality control metrics and meta-data to be stored along with the data. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.	Planned
		3	The center shall receive and respond to requests from ITS Archives for either a catalog of the maintenance and construction data or for the data itself.	Planned
		4	The center shall be able to produce sample products of the data available.	Planned
		5	The center shall provide data to Asset Management to be used in updating the status of assets in the inventory.	Planned
	MCM Transportation Operations Data Collection			
City_Madison_Streets and Recycling_Maintenance Vehicles	MCV Vehicle Location Tracking	1	The maintenance and construction vehicle shall track its current location.	Existing

Element Name	Functional Area	ID	Requirement	Status
	MCV Environmental Monitoring	2	The maintenance and construction vehicle shall send the time stamped vehicle location to the controlling center.	Existing
		1	The maintenance and construction vehicle shall collect environmental data from on-board sensors, including air temperature, wind speed, surface temperature, traction conditions, etc.	Planned
		2	The maintenance and construction vehicle shall transmit environmental sensor data to the center. The sensor data includes location and timestamp information.	Planned
	MCV Winter Maintenance	3	The maintenance and construction vehicle shall provide environmental sensor equipment operational status to the center.	Planned
		4	The maintenance and construction vehicle shall provide environmental sensor equipment fault indication to the center for repair.	Planned
		3	The maintenance and construction vehicle shall monitor materials information including remaining quantity and current application rate of materials on the vehicle.	Existing
		4	The maintenance and construction vehicle shall respond to dispatch information from the center, presented to the vehicle operator for acknowledgement and returning status.	Planned
		5	The maintenance and construction vehicle shall send operational data to the center including the operational state of the maintenance equipment (e.g., blade up/down, spreader pattern), types and quantities of materials used for construction and maintenance activities, and a record of the actual work performed.	Planned
City_Madison_Streets and Recycling_Maintenance Vehicles	MCV Work Zone Support	1	The maintenance and construction vehicle shall monitor, operate, and control work zone devices located at or alongside the roadway. The devices	Planned

Element Name	Functional Area	ID	Requirement	Status
City_Madison_Traffic Engineering Division_CCTV Cameras	Roadway Basic Surveillance		operated on board the vehicle include driver information devices (e.g. dynamic message signs) and work zone intrusion detection and alert devices.	
		2	The maintenance and construction vehicle shall provide an interface for field personnel to input status of their work zone activities.	Planned
		2	The field element shall collect, process, and send traffic images to the center for further analysis and distribution.	Existing
		4	The field element shall return sensor and CCTV system operational status to the controlling center.	Existing
	Roadway Incident Detection	5	The field element shall return sensor and CCTV system fault data to the controlling center for repair.	Existing
		1	The field element shall collect, process, and send traffic images to the center for further analysis and distribution.	Existing
		3	The field element's video devices shall be remotely controlled by a traffic management center.	Existing
		4	The field element shall provide operational status and fault data for the incident detection devices to the traffic management center.	Existing
	Roadway Field Device Monitoring	1	The field element shall monitor the operational status (state of the device, configuration, and fault data) of connected sensors (such as traffic, infrastructure, environmental, security, speed) and devices (such as highway advisory radio, dynamic message signs, automated roadway treatment systems, barrier and safeguard systems, cameras, traffic signals, ramp meters, short range communications equipment, security surveillance equipment).	Existing

Element Name	Functional Area	ID	Requirement	Status
City_Madison_Traffic Engineering Division_Floating Bike Lane Signs	Roadway Dynamic Lane Management and Shoulder Use	4	The field element shall include a local interface that provides operational status and fault data for connected field equipment to field personnel.	Existing
		5	The field element shall include a local interface that allows field personnel to command diagnostic tests on connected field equipment.	Existing
		3	The field element shall receive lane management control information from the controlling center.	Existing
		4	The field element shall provide guidance and information to drivers regarding current lane configuration and status.	Existing
		9	The field element shall monitor operational status of the dynamic lane control equipment and report operational status to the controlling center.	Existing
		10	The field element shall identify and report fault conditions to the controlling center.	Existing
	Roadway Traffic Information Dissemination	1	The field element shall include dynamic messages signs for dissemination of traffic and other information to drivers, under center control; the DMS may be either those that display variable text messages, or those that have fixed format display(s) (e.g. vehicle restrictions, or lane open/close).	Existing
		4	The field element shall provide operational status for the driver information systems equipment (DMS, HAR, etc.) to the center.	Existing
		5	The field element shall provide fault data for the driver information systems equipment (DMS, HAR, etc.) to the center for repair.	Existing
	Roadway Field Device Monitoring	1	The field element shall monitor the operational status (state of the device, configuration, and fault data) of connected sensors (such as traffic,	Existing

Element Name	Functional Area	ID	Requirement	Status
			infrastructure, environmental, security, speed) and devices (such as highway advisory radio, dynamic message signs, automated roadway treatment systems, barrier and safeguard systems, cameras, traffic signals, ramp meters, short range communications equipment, security surveillance equipment).	
		2	The field element shall send operational status of connected field equipment to the maintenance center.	Existing
		3	The field element shall send collected fault data to the maintenance center for repair.	Existing
		4	The field element shall include a local interface that provides operational status and fault data for connected field equipment to field personnel.	Existing
		5	The field element shall include a local interface that allows field personnel to command diagnostic tests on connected field equipment.	Existing
City_Madison_Traffic Engineering Division_Pedestrian and Bicyclist Hybrid Beacons	Roadway Mixed Use Sensing			
	Roadway Field Device Monitoring	1	The field element shall monitor the operational status (state of the device, configuration, and fault data) of connected sensors (such as traffic, infrastructure, environmental, security, speed) and devices (such as highway advisory radio, dynamic message signs, automated roadway treatment systems, barrier and safeguard systems, cameras, traffic signals, ramp meters, short range communications equipment, security surveillance equipment).	Planned
	Roadway Field Device Monitoring	4	The field element shall include a local interface that provides operational status and fault data for connected field equipment to field personnel.	Planned
	Roadway Field Device Monitoring	5	The field element shall include a local interface that allows field personnel to command	Planned

Element Name	Functional Area	ID	Requirement	Status
			diagnostic tests on connected field equipment.	
City_Madison_Traffic Engineering Division_Signal Preemption/Priority Equipment	Roadway Signal Priority	1	The field element shall respond to signal priority requests from transit vehicles.	Existing
	Roadway Signal Preemption	1	The field element shall respond to signal preemption requests from emergency vehicles.	Existing
City_Madison_Traffic Engineering Division_Traffic Operations Center Software	ISP Traveler Data Collection	1	The center shall collect, process, and store traffic and highway condition information, including incident information, detours and road closures, event information, recommended routes, and current speeds on specific routes.	Planned
	Basic Information Broadcast	1	The center shall disseminate traffic and highway condition information to travelers, including incident information, detours and road closures, event information, recommended routes, and current speeds on specific routes.	Existing
		10	The center shall provide the capability for a system operator to control the type and update frequency of broadcast traveler information.	Existing
	ISP Emergency Traveler Information	1	The center shall disseminate emergency evacuation information to the traveler interface systems, including evacuation zones, shelter information, available transportation modes, road closures and detours, changes to transit services, and traffic and road conditions at the origin, destination, and along the evacuation routes.	Existing
	ISP Data Collection	1	The center shall collect traveler information data, such as parking lot data, rideshare data, road network use data, vehicle probe data, and other data from traveler information system operations.	Existing
		3	The center shall assign quality control metrics and meta-data to be stored along with the data. Meta-data may include attributes that describe	Existing

Element Name	Functional Area	ID	Requirement	Status
	MCM Roadway Maintenance and Construction		the source and quality of the data and the conditions surrounding the collection of the data.	
		4	The center shall receive and respond to requests from ITS Archives for either a catalog of the traveler information data or for the data itself.	Existing
		1	The center shall maintain an interface with asset management systems to track the inventory, restrictions, repair needs and status updates of transportation assets (pavement, bridges, signs, etc.) including location, installation and materials information, vendor/contractor, current maintenance status, standard height, width, and weight restrictions.	Planned
		4	The center shall provide emergency management and traffic management centers with information about scheduled maintenance and construction work activities including anticipated closures and impact to the roadway, alternate routes, anticipated delays, closure times, and durations.	Planned
		5	The center shall collect the status and fault data from roadside equipment, such as traffic, infrastructure, and environmental sensors, highway advisory radio and dynamic message signs, automated roadway treatment systems, barrier and safeguard systems, cameras, traffic signals and override equipment, ramp meters, short range communications equipment, security sensors and surveillance equipment, etc., and provide a cohesive view of equipment repair needs.	Planned
		6	The center shall collect the status and fault data from the centers that operate the equipment, including data for traffic, infrastructure, and environmental sensors, highway advisory radio	Planned

Element Name	Functional Area	ID	Requirement	Status
	Collect Traffic Surveillance		and dynamic message signs, automated roadway treatment systems, barrier and safeguard systems, cameras, traffic signals and override equipment, ramp meters, short range communications equipment, security sensors and surveillance equipment, etc., and provide a cohesive view of equipment repair needs.	
		1	The center shall monitor, analyze, and store traffic sensor data (speed, volume, occupancy) collected from field elements under remote control of the center.	Existing
		2	The center shall monitor, analyze, and distribute traffic images from CCTV systems under remote control of the center.	Planned
		4	The center shall distribute road network conditions data (raw or processed) based on collected and analyzed traffic sensor and surveillance data to other centers.	Planned
	TMC Signal Control	6	The center shall maintain a database of surveillance equipment and sensors and associated data (including the roadway on which they are located, the type of data collected, and the ownership of each)	Existing
		1	The center shall remotely control traffic signal controllers.	Planned
		2	The center shall accept notifications of pedestrian calls.	Planned
		3	The center shall collect traffic signal controller operational status and compare against the control information sent by the center.	Planned
		4	The center shall collect traffic signal controller fault data from the field.	Planned
		5	The center shall manage (define, store and modify) control plans to coordinate signalized	Planned

Element Name	Functional Area	ID	Requirement	Status
	TMC Traffic Information Dissemination		intersections, to be engaged at the direction of center personnel or according to a daily schedule.	
		6	The center shall implement control plans to coordinate signalized intersections based on data from sensors.	Planned
		7	The center shall manage boundaries of the control sections used within the signal system.	Planned
		8	The center shall maintain traffic signal coordination including synchronizing clocks throughout the system.	Planned
		8	The center shall provide the capability for center personnel to control the nature of the data that is available to non-traffic operations centers and the media.	Existing
		1	The center shall exchange traffic information with other traffic management centers including incident information, congestion data, traffic data, signal timing plans, and real-time signal control information.	Planned
		2	The center shall exchange traffic control information with other traffic management centers to support remote monitoring and control of traffic management devices (e.g. signs, sensors, signals, cameras, etc.).	Planned
	TMC Incident Detection	3	The center shall receive inputs concerning upcoming events that would affect the traffic network from event promoters and traveler information service providers.	Existing
		4	The center shall exchange incident and threat information with emergency management centers as well as maintenance and construction centers; including notification of existence of incident and expected severity, location, time and nature of incident.	Existing

Element Name	Functional Area	ID	Requirement	Status
		5	The center shall support requests from emergency management centers and border inspection systems to remotely control sensor and surveillance equipment located in the field.	Planned
		6	The center shall provide road network conditions and traffic images to emergency management centers to support the detection, verification, and classification of incidents.	Planned
		7	The center shall provide video and traffic sensor control commands to the field equipment to detect and verify incidents.	Existing
	TMC Incident Dispatch Coordination/Communication			
	TMC Traffic Network Performance Evaluation	1	The center shall monitor, analyze, and store traffic sensor data (speed, volume, occupancy) collected from field elements under remote control of the center to support overall network performance evaluations.	Existing
		6	The center shall exchange traffic information with other traffic management centers, including incidents, congestion data, traffic data, signal timing plans, and real-time signal control information to support overall network performance evaluations.	Existing
		7	The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for network performance evaluations.	Existing
		8	The center shall provide an interface to the archive data repository to enable the operator to retrieve historical operating data for use in planning to predict future traffic patterns and conditions.	Existing

Element Name	Functional Area	ID	Requirement	Status
	Traffic Equipment Maintenance	9	This center shall use the collected information to measure overall current and forecast network performance and predict travel demand patterns.	Existing
		1	The center shall collect and store sensor (traffic, pedestrian, multimodal crossing) operational status.	Existing
		2	The center shall collect and store CCTV surveillance system (traffic, pedestrian) operational status.	Existing
		3	The center shall collect and store sensor (traffic, pedestrian, multimodal crossing) fault data and send to the maintenance center for repair.	Existing
		4	The center shall collect and store CCTV surveillance system (traffic, pedestrian) fault data send to the maintenance center for repair.	Existing
		7	The center shall exchange data with maintenance centers concerning the reporting of faulty equipment and the schedule/status of their repair. Information exchanged includes details of new equipment faults, and clearances when the faults are cleared.	Existing
		8	The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for traffic maintenance data.	Existing
	TMC Demand Management Coordination			
	Traffic Data Collection	1	The center shall collect traffic management data such as operational data, event logs, etc.	Existing
		2	The center shall assign quality control metrics and meta-data to be stored along with the data. Meta-data may include attributes that describe	Existing

Element Name	Functional Area	ID	Requirement	Status
	TMC Transportation Operations Data Collection		the source and quality of the data and the conditions surrounding the collection of the data.	
		3	The center shall receive and respond to requests from ITS Archives for either a catalog of the traffic data or for the data itself.	Existing
		1	The center shall collect real-time information on the state of the regional transportation system including current traffic and road conditions, weather conditions, special event and incident information.	Existing
		2	The center shall support the capability for the system operator to monitor and control the information collection service.	Existing
City_Madison_Traffic Engineering Division_Traffic Signal Systems	Roadway Signal Controls	1	The field element shall control traffic signals under center control.	Existing
		2	The field element shall respond to pedestrian crossing requests by accommodating the pedestrian crossing.	Existing
		3	The field element shall provide the capability to notify the traffic management center of pedestrian calls and pedestrian accommodations.	Existing
		4	The field element shall report the current signal control information to the center.	Existing
		5	The field element shall report current preemption status to the center.	Existing
		6	The field element shall return traffic signal controller operational status to the center.	Existing
		7	The field element shall return traffic signal controller fault data to the center.	Existing
		8	The field element shall report current transit priority status to the center.	Existing

Element Name	Functional Area	ID	Requirement	Status
	Roadway Signal Priority	1	The field element shall respond to signal priority requests from transit vehicles.	Existing
	Roadway Signal Preemption	1	The field element shall respond to signal preemption requests from emergency vehicles.	Existing
	Roadway Equipment Coordination	1	The field element shall include sensors that provide data and status information to other field element devices, without center control.	Existing
	Roadway Field Device Monitoring	1	The field element shall monitor the operational status (state of the device, configuration, and fault data) of connected sensors (such as traffic, infrastructure, environmental, security, speed) and devices (such as highway advisory radio, dynamic message signs, automated roadway treatment systems, barrier and safeguard systems, cameras, traffic signals, ramp meters, short range communications equipment, security surveillance equipment).	Existing
		2	The field element shall send operational status of connected field equipment to the maintenance center.	Existing
		3	The field element shall send collected fault data to the maintenance center for repair.	Existing
		4	The field element shall include a local interface that provides operational status and fault data for connected field equipment to field personnel.	Existing
		5	The field element shall include a local interface that allows field personnel to command diagnostic tests on connected field equipment.	Existing
City_Non Specified_Communications Center (Dispatch)	Emergency Routing	1	The center shall collect current traffic and road condition information for emergency vehicle route calculation.	Existing
		3	The center shall receive status information from care facilities to determine the appropriate facility and its location.	Existing

Element Name	Functional Area	ID	Requirement	Status
	Emergency Data Collection	4	The center shall receive asset restriction information to support the dispatching of appropriate emergency resources.	Planned
		6	The center shall track current emergency vehicle location and status.	Existing
		9	The center shall provide the capability to request special traffic control measures, such as signal preemption, from the traffic management center to facilitate emergency vehicle progress along the suggested route.	Existing
		11	The center shall provide the capability for digitized map data to act as the background to the information presented to the emergency system operator.	Existing
		1	The center shall collect emergency service data, emergency vehicle management data, emergency vehicle data, sensor and surveillance data, threat data, and incident data.	Existing
		2	The center shall assign quality control metrics and meta-data to be stored along with the data. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.	Existing
	Emergency Call-Taking	3	The center shall receive and respond to requests from ITS Archives for either a catalog of the emergency management data or for the data itself.	Planned
		1	The center shall support the interface to the Emergency Telecommunications System (e.g. 911 or 7-digit call routing) to receive emergency notification information and provide it to the emergency system operator.	Existing
		2	The center shall receive emergency call information from 911 services and present the	Existing

Element Name	Functional Area	ID	Requirement	Status
			possible incident information to the emergency system operator.	
		3	The center shall receive emergency call information from motorist call-boxes and present the possible incident information to the emergency system operator.	Existing
		4	The center shall receive emergency call information from mayday service providers and present the possible incident information to the emergency system operator.	Existing
		5	The center shall receive emergency notification information from other public safety agencies and present the possible incident information to the emergency system operator.	Existing
		6	The center shall receive emergency notification information from public transit systems and present the possible incident information to the emergency system operator.	Existing
		8	The center shall send a request for remote control of CCTV systems from a traffic management center in order to verify the reported incident.	Planned
		9	The center shall forward the verified emergency information to the responding agency based on the location and nature of the emergency.	Existing
		10	The center shall update the incident information log once the emergency system operator has verified the incident.	Existing
		11	The center shall provide the capability for digitized map data to act as the background to the emergency information presented to the emergency system operator.	Existing
	Emergency Dispatch	1	The center shall dispatch emergency vehicles to respond to verified emergencies under center	Existing

Element Name	Functional Area	ID	Requirement	Status	
			personnel control.		
		7	The center shall receive traffic images to support dispatch of emergency vehicles.	Planned	
		8	The center shall provide the capability to request remote control of traffic surveillance devices	Planned	
		9	The center shall coordinate response to incidents with other Emergency Management centers to ensure appropriate resources are dispatched and utilized.	Existing	
	Mayday Support	1	The center shall collect mayday messages from vehicles and drivers.	Existing	
		2	The center shall collect mayday messages from travelers via personal handheld devices.	Existing	
		3	The center shall acknowledge the request for emergency assistance, whether originated by the driver, automatically by the vehicle's safety systems, or by a traveler via a personal handheld device.	Existing	
		4	After the mayday becomes a verified incident, the center shall determine the appropriate response to the mayday message.	Existing	
		5	The center shall determine whether the mayday message indicates an emergency that requires the attention of public safety agencies, and forward mayday emergency data to the appropriate agency as necessary.	Existing	
	City_Non Specified_Signal Preemption/Priority Equipment	Roadway Signal Priority	1	The field element shall respond to signal priority requests from transit vehicles.	Existing
		Roadway Signal Preemption	1	The field element shall respond to signal preemption requests from emergency vehicles.	Existing
City_Non Specified_Traffic Signal Systems	Roadway Signal Controls	1	The field element shall control traffic signals under center control.	Existing	

Element Name	Functional Area	ID	Requirement	Status
City_Non Specified_Traffic Signal Systems		2	The field element shall respond to pedestrian crossing requests by accommodating the pedestrian crossing.	Existing
		3	The field element shall provide the capability to notify the traffic management center of pedestrian calls and pedestrian accommodations.	Existing
		4	The field element shall report the current signal control information to the center.	Existing
		5	The field element shall report current preemption status to the center.	Existing
		6	The field element shall return traffic signal controller operational status to the center.	Existing
		7	The field element shall return traffic signal controller fault data to the center.	Existing
		8	The field element shall report current transit priority status to the center.	Existing
	Roadway Signal Priority	1	The field element shall respond to signal priority requests from transit vehicles.	Existing
	Roadway Signal Preemption	1	The field element shall respond to signal preemption requests from emergency vehicles.	Existing
	Roadway Equipment Coordination	1	The field element shall include sensors that provide data and status information to other field element devices, without center control.	Existing
	Roadway Field Device Monitoring	1	The field element shall monitor the operational status (state of the device, configuration, and fault data) of connected sensors (such as traffic, infrastructure, environmental, security, speed) and devices (such as highway advisory radio, dynamic message signs, automated roadway treatment systems, barrier and safeguard systems, cameras, traffic signals, ramp meters, short range communications equipment, security surveillance equipment).	Existing

Element Name	Functional Area	ID	Requirement	Status
		2	The field element shall send operational status of connected field equipment to the maintenance center.	Existing
		3	The field element shall send collected fault data to the maintenance center for repair.	Existing
		4	The field element shall include a local interface that provides operational status and fault data for connected field equipment to field personnel.	Existing
		5	The field element shall include a local interface that allows field personnel to command diagnostic tests on connected field equipment.	Existing
County_Dane_Airport_easyPark	Parking Electronic Payment	2	The parking element shall read data from the traveler card / payment instrument carried on-board the vehicle or by the traveler.	Existing
		3	The parking element shall provide an interface to the driver informing them of the success or failure of the financial transaction. This may involve a request for the driver to pull aside so the operator can resolve an issue.	Existing
		5	The parking element shall manage the parking lot charges, considering such factors as location, vehicle types, and times of day.	Existing
		6	The parking element shall process the financial requests and manage an interface to a Financial Institution.	Existing
		7	The parking element shall support the payment of parking lot transactions using data provided by the traveler cards / payment instruments.	Existing
		8	The parking element shall process requests for parking lot charges to be paid in advance.	Planned
		10	The parking element shall maintain a list of invalid traveler credit identities.	Existing
County_Dane_Emergency Warning System	Emergency Early Warning	3	The center shall broadcast wide-area alerts and	Existing

Element Name	Functional Area	ID	Requirement	Status
	System		advisories to traffic management centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	
		4	The center shall broadcast wide-area alerts and advisories to transit management centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	Existing
		6	The center shall broadcast wide-area alerts and advisories to traveler information service providers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	Existing
		7	The center shall broadcast wide-area alerts and advisories to maintenance centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	Existing
		8	The center shall broadcast wide-area alerts and advisories to other emergency management centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	Existing
		11	The center shall coordinate the broadcast of wide-area alerts and advisories with other	Existing

Element Name	Functional Area	ID	Requirement	Status
County_Dane_Parking Management System	Parking Management		emergency management centers.	
		12	The center shall receive incident information from other transportation management centers to support the early warning system.	Existing
		1	The parking element shall maintain parking lot information including static information such as hours of operation, rates, location, entrance locations, capacity, type, and constraints; as well as dynamic information such as current state of the lot, occupancy, arrival rates, and departure rates.	Existing
		2	The parking element shall share information with a traffic management center to identify queues at entrances, exits that should be used, and other information that supports coordinated local traffic control in and around the parking facility.	Planned
		3	The parking element shall manage local dynamic message signs that display messages to travelers such as the parking lot state, number of spaces available, location of entrances, and current charges.	Existing
		4	The parking element shall provide the capability to detect, count, and classify vehicles at entrances, exits, and designated locations within a parking facility.	Existing
	Parking Electronic Payment	1	The parking element shall detect and classify vehicles entering and exiting a parking facility (vehicle size, type, identifiable features, etc.).	Planned
		2	The parking element shall read data from the traveler card / payment instrument carried on-board the vehicle or by the traveler.	Planned
		3	The parking element shall provide an interface to the driver informing them of the success or	Existing

Element Name	Functional Area	ID	Requirement	Status
County_Dane_Parking Management System	Parking Coordination		failure of the financial transaction. This may involve a request for the driver to pull aside so the operator can resolve an issue.	
		4	The parking element shall collect data on payment violations and send the data, including images of the violator and the vehicle registration data obtained from the Department of Motor Vehicles (DMV) office, to the appropriate enforcement agency.	Planned
		5	The parking element shall manage the parking lot charges, considering such factors as location, vehicle types, and times of day.	Planned
		6	The parking element shall process the financial requests and manage an interface to a Financial Institution.	Existing
		7	The parking element shall support the payment of parking lot transactions using data provided by the traveler cards / payment instruments.	Planned
		8	The parking element shall process requests for parking lot charges to be paid in advance.	Planned
		10	The parking element shall maintain a list of invalid traveler credit identities.	Planned
		2	The parking element shall provide parking management data to traffic management centers upon request as part of the implementation of demand management programs in the region. This could include changes to hours of operation or pricing.	Planned
		3	The parking element shall distribute parking lot information to traffic management centers upon request to support integrated regional traffic control and parking management. This could include information on facility hours of operation and current parking availability.	Planned

Element Name	Functional Area	ID	Requirement	Status
	Parking Short Range Traveler Information Communications	5	The parking element shall distribute parking lot information upon request to traveler information providers to support travel planning.	Existing
		6	The parking element shall support requests for parking reservations.	Planned
		1	The parking element shall distribute static parking information (e.g., guide signs, directional signs, rates, and restrictions) to equipment on-board vehicles.	Planned
		2	The parking element shall distribute dynamic parking information (e.g., parking availability and locations) to equipment on-board vehicles.	Planned
	Parking Data Collection	1	The parking element shall collect parking management data including lot usage and charging information.	Existing
		2	The parking element shall assign quality control metrics and meta-data to be stored along with the data. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.	Existing
		3	The parking element shall receive and respond to requests from ITS Archives for either a catalog of the parking management data or for the data itself.	Planned
County_Dane_Public Safety Comm Center	Emergency Call-Taking	1	The center shall support the interface to the Emergency Telecommunications System (e.g. 911 or 7-digit call routing) to receive emergency notification information and provide it to the emergency system operator.	Existing
		2	The center shall receive emergency call information from 911 services and present the possible incident information to the emergency system operator.	Existing

Element Name	Functional Area	ID	Requirement	Status
	Emergency Dispatch	3	The center shall receive emergency call information from motorist call-boxes and present the possible incident information to the emergency system operator.	Existing
		4	The center shall receive emergency call information from mayday service providers and present the possible incident information to the emergency system operator.	Existing
		5	The center shall receive emergency notification information from other public safety agencies and present the possible incident information to the emergency system operator.	Existing
		6	The center shall receive emergency notification information from public transit systems and present the possible incident information to the emergency system operator.	Existing
		8	The center shall send a request for remote control of CCTV systems from a traffic management center in order to verify the reported incident.	Planned
		9	The center shall forward the verified emergency information to the responding agency based on the location and nature of the emergency.	Existing
		10	The center shall update the incident information log once the emergency system operator has verified the incident.	Existing
		11	The center shall provide the capability for digitized map data to act as the background to the emergency information presented to the emergency system operator.	Existing
		1	The center shall dispatch emergency vehicles to respond to verified emergencies under center personnel control.	Existing
		7	The center shall receive traffic images to	Planned

Element Name	Functional Area	ID	Requirement	Status
	Mayday Support		support dispatch of emergency vehicles.	
		8	The center shall provide the capability to request remote control of traffic surveillance devices	Planned
		9	The center shall coordinate response to incidents with other Emergency Management centers to ensure appropriate resources are dispatched and utilized.	Existing
		1	The center shall collect mayday messages from vehicles and drivers.	Existing
		2	The center shall collect mayday messages from travelers via personal handheld devices.	Existing
		3	The center shall acknowledge the request for emergency assistance, whether originated by the driver, automatically by the vehicle's safety systems, or by a traveler via a personal handheld device.	Existing
		4	After the mayday becomes a verified incident, the center shall determine the appropriate response to the mayday message.	Existing
		5	The center shall determine whether the mayday message indicates an emergency that requires the attention of public safety agencies, and forward mayday emergency data to the appropriate agency as necessary.	Existing
	Emergency Transportation Operations Data Collection			
Data Archive (Regional)	ITS Data Repository	1	The center shall collect data to be archived from one or more data sources.	Planned
		2	The center shall collect data catalogs from one or more data sources. A catalog describes the data contained in the collection of archived data and may include descriptions of the schema or structure of the data, a description of the	Planned

Element Name	Functional Area	ID	Requirement	Status
			contents of the data; e.g., time range of entries, number of entries; or a sample of the data (e. g. a thumbnail).	
		3	The center shall store the archived data in a focused repository that is suited to a particular set of ITS data users.	Planned
		4	The center shall include capabilities for performing quality checks on the incoming archived data.	Planned
		5	The center shall include capabilities for error notification on the incoming archived data.	Planned
		7	The center shall support a broad range of archived data management implementations, ranging from simple data marts that collect a focused set of data and serve a particular user community to large-scale data warehouses that collect, integrate, and summarize transportation data from multiple sources and serve a broad array of users within a region.	Planned
		8	The center shall perform quality checks on received data.	Planned
		9	The center shall provide the capability to execute methods on the incoming data such as cleansing, summarizations, aggregations, or transformations applied to the data before it is stored in the archive.	Planned
		10	The center shall respond to requests from the administrator interface function to maintain the archive data.	Planned
		11	When data or a catalog of data is received from the archive, the center shall generate the requested data product for the users systems.	Planned
	Traffic and Roadside Data	1	The center shall manage the collection of archive data directly from collection equipment	Planned

Element Name	Functional Area	ID	Requirement	Status
	Archival		located at the roadside.	
		2	The center shall collect traffic sensor information from roadside devices.	Planned
		3	The center shall collect environmental sensor information that from roadside devices.	Planned
		4	The center shall respond to requests from the Archive Data Administer to input the parameters that control the collection process.	Planned
		5	The center shall send the request for data and control parameters to the field equipment where the information is collected and returned.	Planned
		6	The center shall record the status about the imported traffic and roadside data.	Planned
	Government Reporting Systems Support	1	The center shall provide data from an ITS archive to federal, state, or local government reporting systems.	Planned
		2	The center shall provide the capability to select data from an ITS archive for use in government reports.	Planned
		3	The center shall provide the capability to format data from an ITS archive suitable for input into government reports.	Planned
		4	The center shall support requests for ITS archived data from Government Reporting Systems.	Planned
		5	The center shall provide the applicable meta-data for any ITS archived data to satisfy government reporting system requests. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.	Planned
	On-Line Analysis and Mining	1	The center shall support the interface with	Planned

Element Name	Functional Area	ID	Requirement	Status
	Virtual Data Warehouse Services		Archive Data User Systems for requests for analysis of the archive data.	
		2	The center shall provide the capability to perform activities such as data mining, data fusion, summarizations, aggregations, and recreation from archive data. This may include multidimensional analysis, selective summarization and expansion of data details, and many other advanced analysis services.	Planned
		3	The center shall receive the user's systems requests and develop the request to retrieve the data from the archive.	Planned
		4	The center shall respond to user's systems requests for a catalog of the archived data analysis products available.	Planned
		1	The center shall provide capabilities to access in-place" data from geographically dispersed archives. These capabilities may include analysis	data fusion
		2	The center shall coordinate information exchange with a local data warehouse.	Planned
		3	The center shall provide the specialized publishing, directory services, and transaction management functions associated with coordinating remote archives.	Planned
		4	The center shall support the collection of archived data from other archives on an as-needed basis. (This minimizes the need to duplicate the comprehensive set of data from the remote archives in the local data warehouse.)	Planned
Data Archives (Individual Agency)	ITS Data Repository	1	The center shall collect data to be archived from one or more data sources.	Existing
		3	The center shall store the archived data in a	Existing

Element Name	Functional Area	ID	Requirement	Status
			focused repository that is suited to a particular set of ITS data users.	
		4	The center shall include capabilities for performing quality checks on the incoming archived data.	Existing
		5	The center shall include capabilities for error notification on the incoming archived data.	Existing
		7	The center shall support a broad range of archived data management implementations, ranging from simple data marts that collect a focused set of data and serve a particular user community to large-scale data warehouses that collect, integrate, and summarize transportation data from multiple sources and serve a broad array of users within a region.	Existing
		8	The center shall perform quality checks on received data.	Existing
		9	The center shall provide the capability to execute methods on the incoming data such as cleansing, summarizations, aggregations, or transformations applied to the data before it is stored in the archive.	Existing
		10	The center shall respond to requests from the administrator interface function to maintain the archive data.	Existing
		11	When data or a catalog of data is received from the archive, the center shall generate the requested data product for the users systems.	Existing
		12	For archive data requiring financial payment, the center shall process the financial requests and manage an interface to a Financial Institution.	Planned
	Traffic and Roadside Data Archival	1	The center shall manage the collection of archive data directly from collection equipment located at the roadside.	Existing

Element Name	Functional Area	ID	Requirement	Status
	Government Reporting Systems Support	2	The center shall collect traffic sensor information from roadside devices.	Existing
		3	The center shall collect environmental sensor information that from roadside devices.	Existing
		4	The center shall respond to requests from the Archive Data Administer to input the parameters that control the collection process.	Existing
		5	The center shall send the request for data and control parameters to the field equipment where the information is collected and returned.	Existing
		6	The center shall record the status about the imported traffic and roadside data.	Existing
		7	The center shall use the status information to adjust the collection of traffic and roadside data.	Existing
		1	The center shall provide data from an ITS archive to federal, state, or local government reporting systems.	Planned
		2	The center shall provide the capability to select data from an ITS archive for use in government reports.	Planned
		3	The center shall provide the capability to format data from an ITS archive suitable for input into government reports.	Planned
		4	The center shall support requests for ITS archived data from Government Reporting Systems.	Planned
		5	The center shall provide the applicable meta-data for any ITS archived data to satisfy government reporting system requests. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.	Planned

Element Name	Functional Area	ID	Requirement	Status
	On-Line Analysis and Mining	1	The center shall support the interface with Archive Data User Systems for requests for analysis of the archive data.	Existing
		2	The center shall provide the capability to perform activities such as data mining, data fusion, summarizations, aggregations, and recreation from archive data. This may include multidimensional analysis, selective summarization and expansion of data details, and many other advanced analysis services.	Existing
		3	The center shall receive the user's systems requests and develop the request to retrieve the data from the archive.	Existing
		4	The center shall respond to user's systems requests for a catalog of the archived data analysis products available.	Existing
		5	For archive analysis and data mining products requiring financial payment the center shall process the financial requests and manage an interface to a Financial Institution.	Existing
	Virtual Data Warehouse Services	1	The center shall provide capabilities to access in-place" data from geographically dispersed archives. These capabilities may include analysis	data fusion
		2	The center shall coordinate information exchange with a local data warehouse.	Planned
		3	The center shall provide the specialized publishing, directory services, and transaction management functions associated with coordinating remote archives.	Planned
		4	The center shall support the collection of archived data from other archives on an as-needed basis. (This minimizes the need to duplicate the comprehensive set of data from the remote archives in the local data	Planned

Element Name	Functional Area	ID	Requirement	Status
Emergency Vehicle On-Board Equipment	On-board EV EnRoute Support		warehouse.)	
		5	The center shall use data collected from different archives to build a set of global schema including the data archive definitions for the local archive plus any archives known to the local archive.	Planned
		6	The center shall provide the local archived data schema to other archive systems.	Planned
		1	The emergency vehicle, including roadway service patrols, shall track its current location.	Existing
		2	The emergency vehicle, including roadway service patrols, shall send the vehicle's location and operational data to the center for emergency management and dispatch.	Existing
		3	The emergency vehicle, including roadway service patrols, shall receive incident details and a suggested route when dispatched to a scene.	Existing
		4	The emergency vehicle shall send the current en route status (including estimated time of arrival) and requests for emergency dispatch updates.	Existing
		5	The emergency vehicle shall send requests to traffic signal control equipment at the roadside to preempt the signal.	Existing
		6	The emergency vehicle shall provide the personnel on-board with dispatch information, including incident type and location, and forward an acknowledgment from personnel to the center that the vehicle is on its way to the incident scene.	Existing
		7	The emergency vehicle shall send patient status information to the care facility along with a request for further information.	Existing
		8	The emergency vehicle shall forward care facility status information to emergency vehicle	Existing

Element Name	Functional Area	ID	Requirement	Status
Emergency Vehicle Signal Pre-Emption On-Board Equipment	On-board EV Incident Management Communication		personnel, including the location, specialized services, quality of care, waiting time, number of rooms available, and emergency room status of hospitals or emergency care providers.	
		9	The emergency vehicle shall send the vehicle's location, speed and direction to other vehicles in the area.	Planned
		1	The emergency vehicle shall receive dispatch instructions sufficient to enable emergency personnel in the field to implement an effective incident response. It includes local traffic, road, and weather conditions, hazardous material information, and the current status of resources that have been allocated to an incident.	Existing
		2	The emergency vehicle shall provide an interface to the center for emergency personnel to transmit information about the incident site such as the extent of injuries, identification of vehicles and people involved, hazardous material, etc.	Existing
		3	The emergency vehicle shall provide an interface to the center for emergency personnel to transmit information about the current incident response status such as the identification of the resources on site, site management strategies in effect, and current clearance status.	Existing
	On-board EV En Route Support	4	The emergency vehicle shall provide traffic incident information to approaching vehicles using short range communications.	Planned
		1	The emergency vehicle, including roadway service patrols, shall track its current location.	Existing
		2	The emergency vehicle, including roadway service patrols, shall send the vehicle's location and operational data to the center for	Existing

Element Name	Functional Area	ID	Requirement	Status
			emergency management and dispatch.	
		3	The emergency vehicle, including roadway service patrols, shall receive incident details and a suggested route when dispatched to a scene.	Planned
		5	The emergency vehicle shall send requests to traffic signal control equipment at the roadside to preempt the signal.	Existing
		6	The emergency vehicle shall provide the personnel on-board with dispatch information, including incident type and location, and forward an acknowledgment from personnel to the center that the vehicle is on its way to the incident scene.	Existing
		8	The emergency vehicle shall forward care facility status information to emergency vehicle personnel, including the location, specialized services, quality of care, waiting time, number of rooms available, and emergency room status of hospitals or emergency care providers.	Planned
		9	The emergency vehicle shall send the vehicles location, speed and direction to other vehicles in the area.	Planned
	On-board EV Incident Management Communication	1	The emergency vehicle shall receive dispatch instructions sufficient to enable emergency personnel in the field to implement an effective incident response. It includes local traffic, road, and weather conditions, hazardous material information, and the current status of resources that have been allocated to an incident.	Existing
		2	The emergency vehicle shall provide an interface to the center for emergency personnel to transmit information about the incident site such as the extent of injuries, identification of vehicles and people involved, hazardous material, etc.	Existing

Element Name	Functional Area	ID	Requirement	Status
Madison Metro Transit_Automatic Passenger Counters (APC)	On-board Passenger Counting	3	The emergency vehicle shall provide an interface to the center for emergency personnel to transmit information about the current incident response status such as the identification of the resources on site, site management strategies in effect, and current clearance status.	Existing
		1	The transit vehicle shall count passengers boarding and alighting.	Existing
		2	The passenger counts shall be related to location to support association of passenger counts with routes, route segments, or bus stops.	Existing
Madison Metro Transit_Automatic Vehicle Location (AVL)	On-board Transit Trip Monitoring	3	The passenger counts shall be time stamped so that ridership can be measured by time of day and day of week.	Existing
		4	The transit vehicle shall send the collected passenger count information to the transit center.	Existing
		1	The transit vehicle shall track the current location of the transit vehicle.	Existing
		2	The transit vehicle shall support the computation of the location of a transit vehicle using on-board sensors to augment the location determination function. This may include proximity to the transit stops or other known reference points as well as recording trip length.	Existing
		3	The transit vehicle shall record transit trip monitoring data including vehicle mileage and fuel usage.	Existing
		4	The transit vehicle shall record transit trip monitoring data including operational status information such as doors open/closed, running times, etc.	Existing

Element Name	Functional Area	ID	Requirement	Status
Madison Metro Transit_Building and Transfer Point Camera System Software	Center Secure Area Surveillance	5	The transit vehicle shall send the transit vehicle trip monitoring data to center-based trip monitoring functions.	Existing
		1	The center shall remotely monitor video images and audio surveillance data collected in secure areas including facilities (e.g. transit yards) and transportation infrastructure (e.g. bridges, tunnels, interchanges, roadway infrastructure, and transit railways or guideways). The data may be raw or pre-processed in the field.	Existing
		2	The center shall remotely monitor video images and audio surveillance data collected in traveler secure areas, which include transit stations, transit stops, rest areas, park and ride lots, and other fixed sites along travel routes (e.g., emergency pull-off areas and travel information centers). The data may be raw or pre-processed in the field.	Existing
		3	The center shall remotely monitor video images and audio surveillance data collected on-board transit vehicles. The data may be raw or pre-processed in the field.	Planned
		4	The center shall exchange surveillance data with other emergency centers.	Planned
		5	The center shall identify potential security threats based on collected security surveillance data.	Existing
		7	The center shall remotely control security surveillance devices in secure areas including facilities (e.g. transit yards) and transportation infrastructure (e.g. bridges, tunnels, interchanges, roadway infrastructure, and transit railways or guideways).	Planned
		8	The center shall remotely control security surveillance devices in traveler secure areas,	Planned

Element Name	Functional Area	ID	Requirement	Status
			which include transit stations, transit stops, rest areas, park and ride lots, and other fixed sites along travel routes (e.g., emergency pull-off areas and travel information centers).	
		9	The center shall remotely control security surveillance devices on-board transit vehicles.	Planned
		12	The center shall respond to control data from center personnel regarding security surveillance data collection, processing, threat detection, and image matching.	Existing
		13	The center shall monitor maintenance status of the security sensor field equipment.	Existing
Madison Metro Transit_Building and Transfer Point Cameras	Traveler Secure Area Surveillance	1	The field element shall include video and/or audio surveillance of traveler secure areas including transit stations, transit stops, rest areas, park and ride lots, and other fixed sites along travel routes (e.g., emergency pull-off areas and traveler information centers).	Existing
		2	The field element shall be remotely controlled by a center.	Existing
		3	The field element shall provide equipment status and fault indication of surveillance equipment to a center.	Existing
		4	The field element shall provide raw video or audio data.	Existing
Madison Metro Transit_Bus Shelter Signage	Remote Basic Information Reception	2	The public interface for travelers shall receive transit information from a center and present it to the traveler.	Existing
	Remote Transit Information Services	5	The public interface for travelers shall receive wide-area alerts and present it to the traveler.	Existing
		2	The public interface for travelers shall collect and present to the transit traveler information on transit routes, schedules, and real-time schedule adherence.	Existing

Element Name	Functional Area	ID	Requirement	Status
		3	The public interface for travelers shall provide support for general annunciation and/or display of imminent arrival information and other information of general interest to transit users.	Existing
		4	The public interface for travelers shall present information to the traveler in a form suitable for travelers with physical disabilities.	Planned
Madison Metro Transit_External Announcement	On-board Transit Information Services	3	The transit vehicle shall broadcast advisories about the imminent arrival of the transit vehicle at the next stop via an on-board automated annunciation system.	Planned
Madison Metro Transit_FuelMaster	Transit Garage Maintenance	1	The center shall collect operational and maintenance data from transit vehicles.	Existing
		2	The center shall monitor the condition of a transit vehicle to analyze brake, drive train, sensors, fuel, steering, tire, processor, communications equipment, and transit vehicle mileage to identify mileage based maintenance, out-of-specification or imminent failure conditions.	Existing
Madison Metro Transit_Internal Message Board	Remote Basic Information Reception	1	The public interface for travelers shall receive traffic information from a center and present it to the traveler.	Planned
		2	The public interface for travelers shall receive transit information from a center and present it to the traveler.	Planned
		5	The public interface for travelers shall receive wide-area alerts and present it to the traveler.	Planned
		8	The public interface for travelers shall present information to the traveler in audible or visual forms consistent with a kiosk, including those that are suitable for travelers with hearing or vision physical disabilities.	Existing
	Remote Transit Information	3	The public interface for travelers shall provide	Existing

Element Name	Functional Area	ID	Requirement	Status
Madison Metro Transit_Kiosks	Services		support for general annunciation and/or display of imminent arrival information and other information of general interest to transit users.	
	Remote Basic Information Reception	4	The public interface for travelers shall present information to the traveler in a form suitable for travelers with physical disabilities.	Existing
		2	The public interface for travelers shall receive transit information from a center and present it to the traveler.	Existing
		6	The public interface for travelers shall provide the capability for digitized map data to act as the background to the information presented to the traveler.	Existing
		7	The public interface for travelers shall support traveler input in audio or manual form.	Existing
		8	The public interface for travelers shall present information to the traveler in audible or visual forms consistent with a kiosk, including those that are suitable for travelers with hearing or vision physical disabilities.	Existing
	Remote Interactive Information Reception	2	The public interface for travelers shall receive transit information from a center and present it to the traveler upon request.	Existing
		3	The public interface for travelers shall receive yellow pages information (such as lodging, restaurants, theaters, bicycle facilities, and other tourist activities) from a center and present it to the traveler upon request.	Planned
		6	The public interface for travelers shall receive wide-area alerts and present it to the traveler.	Planned
		11	The public interface for travelers shall provide digitized map data to act as the background to the information presented to the traveler.	Existing
		12	The public interface for travelers shall support	Existing

Element Name	Functional Area	ID	Requirement	Status
	Remote Traveler Security		traveler input in audio or manual form.	
		13	The public interface for travelers shall present information to the traveler in audible or visual forms consistent with a kiosk, including those that are suitable for travelers with hearing or vision physical disabilities.	Existing
		1	The public interface for travelers shall provide the capability for a traveler to report an emergency and summon assistance from secure areas such as transit stops, transit stations, modal transfer facilities, rest stops, park-and-ride areas, travel information areas, and emergency pull off areas.	Existing
		2	When initiated by a traveler, the public interface for travelers shall forward a request for assistance to an emergency management function and acknowledge the request.	Existing
		3	The public interface for travelers shall provide the capability to broadcast a message to advise or warn a traveler.	Existing
	Remote Transit Information Services	4	The public interface for travelers shall accept input and provide information to the traveler in a form suitable for travelers with physical disabilities.	Existing
		1	The public interface for travelers shall collect and provide real-time travel-related information at transit stops, multi-modal transfer points, and other public transportation areas.	Existing
		2	The public interface for travelers shall collect and present to the transit traveler information on transit routes, schedules, and real-time schedule adherence.	Existing
		3	The public interface for travelers shall provide support for general annunciation and/or display	Existing

Element Name	Functional Area	ID	Requirement	Status
	Remote Transit Fare Management	4	of imminent arrival information and other information of general interest to transit users. The public interface for travelers shall present information to the traveler in a form suitable for travelers with physical disabilities.	Existing
		2	The public interface for travelers shall calculate a fare based on the origin and destination provided by the traveler, in conjunction with transit routing, transit fare category, and transit user history.	Existing
		3	The public interface for travelers shall provide an interface to a transit user traveler card in support of payment for transit fares, tolls, and/or parking lot charges. The stored credit value data from the card shall be collected and updated based on the fare or other charges, or the credit identity shall be collected.	Planned
		4	The public interface for travelers shall provide information to the center for financial authorization and transaction processing.	Planned
		8	The public interface for travelers shall present information to the traveler in a form suitable for travelers with physical disabilities.	Existing
Madison Metro Transit_Mobile Data Terminal (MDT)	On-board Schedule Management	1	The transit vehicle shall receive a vehicle assignment including transit route information, transit service instructions, traffic information, road conditions, and other information for the operator.	Existing
		2	The transit vehicle shall use the route information and its current location to determine the deviation from the predetermined schedule.	Existing
		3	The transit vehicle shall calculate the estimated times of arrival (ETA) at transit stops.	Existing

Element Name	Functional Area	ID	Requirement	Status
	On-board Transit Security	9	The transit vehicle shall accept emergency inputs from either the transit vehicle operator or a traveler through such interfaces as panic buttons, silent or audible alarms, etc.	Existing
		10	The transit vehicle shall output reported emergencies to the center.	Existing
		11	The transit vehicle shall receive acknowledgments of the emergency request from the center and output this acknowledgment to the transit vehicle operator or to the travelers.	Existing
Madison Metro Transit_On-Board Fareboxes	On-board Transit Fare Management	1	The transit vehicle shall read data from the traveler card / payment instrument presented by boarding passengers.	Existing
		3	The transit vehicle shall determine the traveler's travel routing based on the transit vehicle's current location and the traveler's destination.	Planned
		6	The transit vehicle shall provide a transit fare payment interface that is suitable for travelers with physical disabilities.	Existing
		9	The transit vehicle shall support the support advanced payments for tolls, and/or parking lot charges, and/or transit fares via the traveler card / payment instrument.	Existing
		10	The transit vehicle shall provide fare statistics data to the center.	Existing
Madison Metro Transit_On-Board Fuel Usage Sensors				
Madison Metro Transit_On-Board Video Cameras				
Madison Metro Transit_Transit Signal Priority On-Board Equipment	On-board Transit Signal Priority	1	The transit vehicle shall determine the schedule deviation and estimated times of arrival (ETA) at transit stops.	Existing

Element Name	Functional Area	ID	Requirement	Status
Madison Metro Transit_TransitFleet Software Madison Metro Transit_TransitMaster CAD		2	The transit vehicle shall send priority requests to traffic signal controllers at intersections, pedestrian crossings, and multimodal crossings on the roads (surface streets) and freeway (ramp controls) network that enable a transit vehicle schedule deviation to be corrected.	Existing
		3	The transit vehicle shall send the schedule deviation data and status of priority requests to the transit vehicle operator and provide the capability for the transit vehicle operator to control the priority system.	Existing
		4	The transit vehicle shall prevent a priority request from being sent when the transit vehicle cannot use the priority (e.g., when the transit vehicle makes a passenger stop on the approach to an intersection).	Existing
	Transit Center Connection Protection	1	The center shall manage service requests for routing of an individual through the transit system.	Planned
		2	The center shall provide transit plans for both fixed and demand responsive transit to transit passengers.	Planned
	Transit Center Vehicle Tracking	1	The center shall monitor the locations of all transit vehicles within its network.	Existing
		2	The center shall determine adherence of transit vehicles to their assigned schedule.	Existing
		3	The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for transit tracking and dispatch.	Existing
		4	The center shall provide transit operational data	Existing

Element Name	Functional Area	ID	Requirement	Status
			to traveler information service providers.	
		5	The center shall provide collected transit probe data to traffic management centers and traveler information service providers for use in measuring current traffic conditions.	Planned
	Transit Center Fixed-Route Operations	1	The center shall generate transit routes and schedules based on such factors as parameters input by the system operator, road network conditions, incident information, operational data on current routes and schedules, and digitized map data.	Existing
		2	The center shall provide the interface to the system operator to control the generation of new routes and schedules (transit services) including the ability to review and update the parameters used by the routes and schedules generation processes and to initiate these processes	Existing
		3	The center shall be able to generate special routes and schedules to support an incident, disaster, evacuation, or other emergency.	Existing
		4	The center shall dispatch fixed route or flexible route transit vehicles	Existing
		5	The center shall collect transit operational data for use in the generation of routes and schedules.	Existing
		6	The center shall provide instructions or corrective actions to the transit vehicle operators based upon operational needs.	Existing
		7	The center shall manage large deviations of individual transit vehicles, deviations in rural areas, and deviations of large numbers of vehicles.	Existing
		8	The center shall generate the necessary	Existing

Element Name	Functional Area	ID	Requirement	Status
Madison Metro Transit_TransitMaster CAD	Transit Center Paratransit Operations	10	corrective actions which may involve more than the vehicles concerned and more far reaching action, such as, the introduction of extra vehicles, wide area signal priority by traffic management, the premature termination of some services, etc.	Existing
			The center shall disseminate up-to-date schedules and route information to other centers for fixed and flexible route services.	
		11	The center shall provide an interface to the archive data repository to enable the operator to retrieve historical operating data for use in planning transit routes and schedules.	Existing
	Transit Center Paratransit Operations	1	The center shall process trip requests for demand responsive transit services, i.e. paratransit. Sources of the requests may include traveler information service providers.	Existing
	Transit Center Paratransit Operations	2	The center shall monitor the operational status of the demand response vehicles including status of passenger pick-up and drop-off.	Existing
		3	The center shall generate demand response transit (including paratransit) routes and schedules based on such factors as parameters input by the system operator, what other demand responsive transit schedules have been planned, the availability and location of vehicles, the relevance of any fixed transit routes and schedules, road network information, and incident information.	Existing
		4	The center shall dispatch demand response (paratransit) transit vehicles.	Existing
		6	The center shall disseminate up-to-date schedules and route information to other centers for demand responsive transit services (paratransit).	Existing

Element Name	Functional Area	ID	Requirement	Status
	Transit Center Fare Management	7	The center shall collect the log of passenger boardings and alightings from the paratransit vehicles.	Existing
		1	The center shall manage the actual value of transit fares for each segment of each regular transit route, including the transmission of the information to transit vehicles and transit stops or stations.	Existing
		2	The center shall provide the capability for a system operator to manage the transit fares and control the exchange of transit fare information.	Existing
		3	The center shall process the financial requests from the transit vehicles or roadside and manage an interface to a Financial Institution.	Existing
		4	The center shall support the payment of transit fare transactions using data provided by the traveler cards / payment instruments.	Existing
		5	The center shall collect data on fare payment violations and send the data, including images of the violator, to the appropriate enforcement agency.	Existing
		6	The center shall process requests for transit fares to be paid in advance.	Existing
		9	The center shall maintain a list of invalid traveler credit identities or bad tag lists that can be forwarded to transit vehicles and transit stops or stations.	Existing
	Transit Center Passenger Counting	12	The center shall provide transit fare information to other centers, including traveler information providers upon request.	Existing
		1	The center shall collect passenger count information from each transit vehicle.	Existing
		2	The center shall calculate transit ridership data by route, route segment, transit stop, time of	Existing

Element Name	Functional Area	ID	Requirement	Status
		3	day, and day of week based on the collected passenger count information. The center shall make the compiled ridership data available to the system operator and other applications.	Existing
		1	The center shall analyze transit vehicle schedule performance to determine the need for priority along certain routes or at certain intersections.	Planned
	Transit Center Signal Priority	2	The center shall send requests for priority along routes or at intersections to traffic management.	Planned
		3	The center shall define business rules that govern use of transit vehicle signal priority, communicate these rules to the transit vehicle, and monitor transit vehicle requests for priority at signalized intersections.	Planned
		4	The center shall provide transit operations personnel with the capability to control and monitor transit signal priority operations.	Planned
		1	The center shall monitor transit vehicle operational data to determine if the transit vehicle is off-route and assess whether a security incident is occurring.	Existing
		2	The center shall receive reports of emergencies on-board transit vehicles entered directly by the transit vehicle operator or from a traveler through interfaces such as panic buttons or alarm switches.	Existing
		3	The center shall support the back-office portion of functionality to authenticate transit vehicle operators.	Existing
		4	The center shall exchange transit incident information along with other service data with other transit agencies.	Existing

Element Name	Functional Area	ID	Requirement	Status
	Transit Vehicle Operator Assignment	5	The center shall receive information pertaining to a wide-area alert such as weather alerts, disaster situations, or child abductions. This information may come from Emergency Management or from other Alerting and Advisory Systems.	Planned
		6	The center shall send wide-area alert information to travelers (on-board transit vehicles or at stations/stops) and transit vehicle operators.	Planned
		7	The center shall coordinate the response to security incidents involving transit with other agencies including Emergency Management, other transit agencies, media, traffic management, and traveler information service providers.	Existing
		9	The center shall provide support to remotely disable (or reset the disabling of) a transit vehicle in service.	Planned
		2	The center shall assess the transit vehicle operator's availability based on previous work assignments, accumulated hours, plus health and vacation commitments.	Existing
		3	The center shall assign transit vehicle operators to transit schedules based on their eligibility, route preferences, seniority, and transit vehicle availability.	Existing
		4	The center shall provide an interface through which the transit vehicle operator information can be maintained - either from the transit vehicle operator, center personnel, or other functions.	Existing
		5	The center shall generate supplemental vehicle operator assignments as required due to change events that occur during the operating day.	Existing

Element Name	Functional Area	ID	Requirement	Status
	Transit Garage Maintenance	1	The center shall collect operational and maintenance data from transit vehicles.	Existing
		2	The center shall monitor the condition of a transit vehicle to analyze brake, drive train, sensors, fuel, steering, tire, processor, communications equipment, and transit vehicle mileage to identify mileage based maintenance, out-of-specification or imminent failure conditions.	Existing
		3	The center shall generate transit vehicle maintenance schedules that identify the maintenance or repair to be performed and when the work is to be done.	Existing
		4	The center shall generate transit vehicle availability listings, current and forecast, to support transit vehicle assignment planning based, in part, on the transit vehicle maintenance schedule.	Existing
		5	The center shall assign technicians to a transit vehicle maintenance schedule, based upon such factors as personnel eligibility, work assignments, preferences and seniority.	Existing
		6	The center shall verify that the transit vehicle maintenance activities were performed correctly, using the transit vehicle's status, the maintenance personnel's work assignment, and the transit maintenance schedules.	Existing
		7	The center shall generate a time-stamped maintenance log of all maintenance activities performed on a transit vehicle.	Existing
		8	The center shall provide transit operations personnel with the capability to update transit vehicle maintenance information and receive reports on all transit vehicle operations data.	Existing

Element Name	Functional Area	ID	Requirement	Status
	Transit Vehicle Assignment	1	The center shall assign individual transit vehicles to transit blocks.	Existing
		2	The center shall download vehicle assignments to the transit vehicle prior to the start of the day's operations.	Existing
		3	The center shall provide an exception handling process for the vehicle assignment function. This process shall generate new supplemental vehicle assignments as required due to change events which occur during the operating day.	Existing
		4	The center shall provide an inventory management function for the transit facility that stores functional attributes about each vehicle owned by the transit operator. The functional attributes permit the planning and assignment functions to match vehicles with routes based on suitability for the types of service required by the particular routes.	Existing
		5	The center shall generate transit vehicle availability listings, current and forecast, to support transit vehicle assignment planning.	Existing
		6	The center shall provide transit operations personnel with the capability to update transit vehicle assignments and receive reports on transit vehicle inventory status.	Existing
	Transit Center Information Services	1	The center shall provide travelers using public transportation with traffic and advisory information upon request. Such information may include transit routes, schedules, transfer options, fares, real-time schedule adherence, current incidents, weather conditions, and special events.	Existing
		2	The center shall provide transit information to the media including details of deviations from schedule of regular transit services.	Existing

Element Name	Functional Area	ID	Requirement	Status
		3	The center shall exchange transit schedules, real-time arrival information, fare schedules, and general transit service information with other transit organizations to support transit traveler information systems.	Existing
		4	The center shall provide transit service information to traveler information service providers including routes, schedules, schedule adherence, and fare information as well as transit service information during evacuation.	Existing
		6	The center shall broadcast transit advisory data, including alerts and advisories pertaining to major emergencies, or man-made disasters.	Existing
	Transit Data Collection	1	The center shall collect transit management data such as transit fares and passenger use, transit services, paratransit operations, transit vehicle maintenance data, etc.	Existing
		2	The center shall assign quality control metrics and meta-data to be stored along with the data. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.	Existing
		3	The center shall receive and respond to requests from ITS Archives for either a catalog of the transit data or for the data itself.	Planned
	Transit Transportation Operations Data Collection	1	The center shall collect real-time information on the state of the regional transportation system including current traffic and road conditions, weather conditions, special event and incident information.	Existing
		2	The center shall support the capability for the system operator to monitor and control the information collection service.	Planned

Element Name	Functional Area	ID	Requirement	Status
Madison Metro Transit_TransitMaster Integrated Vehicle Logic Unit (IVLU)	On-board Transit In Vehicle Signing Communications			
	On-board Transit Trip Monitoring			
	On-board Schedule Management			
	On-board Transit Fare Management			
	On-board Passenger Counting			
	On-board Transit Signal Priority			
	On-board Transit Information Services			
Madison Metro Transit_Website	ISP Traveler Data Collection	3	The center shall collect, process, and store transit routes and schedules, transit transfer options, transit fares, and real-time schedule adherence information.	Existing
	Basic Information Broadcast	3	The center shall disseminate transit routes and schedules, transit transfer options, transit fares, and real-time schedule adherence information to travelers.	Existing
	Interactive Infrastructure Information	3	The center shall disseminate customized transit routes and schedules, transit transfer options, transit fares, and real-time schedule adherence information to travelers upon request.	Existing
		15	The center shall manage updates of digitized map data and provide updates to traveler interface systems upon request.	Existing
Social Media and Subscription Based Services	ISP Traveler Data Collection	1	The center shall collect, process, and store traffic and highway condition information, including incident information, detours and road closures, event information, recommended	Existing

Element Name	Functional Area	ID	Requirement	Status
			routes, and current speeds on specific routes.	
		2	The center shall collect, process, and store maintenance and construction information, including scheduled maintenance and construction work activities and work zone activities.	Existing
		3	The center shall collect, process, and store transit routes and schedules, transit transfer options, transit fares, and real-time schedule adherence information.	Existing
		4	The center shall collect, process, and store parking information, including location, availability, and fees.	Existing
		6	The center shall collect, process, and store current and forecast road conditions and surface weather conditions.	Planned
		7	The center shall collect, process, and store event information.	Planned
	ISP Probe Information Collection			
	Basic Information Broadcast	1	The center shall disseminate traffic and highway condition information to travelers, including incident information, detours and road closures, event information, recommended routes, and current speeds on specific routes.	Existing
		2	The center shall disseminate maintenance and construction information to travelers, including scheduled maintenance and construction work activities and work zone activities.	Existing
		3	The center shall disseminate transit routes and schedules, transit transfer options, transit fares, and real-time schedule adherence information to travelers.	Existing

Element Name	Functional Area	ID	Requirement	Status
		6	The center shall disseminate weather information to travelers.	Existing
		7	The center shall disseminate event information to travelers.	Existing
		10	The center shall provide the capability for a system operator to control the type and update frequency of broadcast traveler information.	Existing
	ISP Traveler Information Alerts	1	The center shall accept traveler profiles that establish recurring trip characteristics including route, mode, and timeframe information.	Existing
		2	The center shall accept traveler profiles that define alert thresholds that establish the severity and types of alerts that are provided to each traveler.	Existing
		3	The center shall disseminate personalized traffic alerts reporting congestion, incidents, delays, detours and road closures that may impact a current or planned trip.	Existing
		4	The center shall disseminate personalized transit alerts reporting transit delays and service interruptions.	Existing
		5	The center shall disseminate personalized parking alerts reporting parking availability and closures.	Existing
		6	The center shall disseminate personalized road weather alerts reporting adverse road and weather conditions.	Existing
		8	The center shall disseminate personalized event alerts reporting special event impacts on the transportation system.	Existing
		9	The center shall provide an operator interface that supports monitoring and management of subscribers and the content and format of alert messages.	Existing

Element Name	Functional Area	ID	Requirement	Status
	Interactive Infrastructure Information			
	Infrastructure Provided Trip Planning	1	The center shall provide the capability to provide specific pre-trip and enrooted directions to travelers (and drivers), including costs, arrival times, and transfer points.	Planned
		2	The center shall include bicycle routes, walkways, skyways, and multi-use trails in the pre-trip and enrooted directions it provides to travelers.	Planned
		3	The center shall support on-line route guidance for travelers using personal devices (such as PDAs).	Planned
		4	The center shall support on-line route guidance for drivers in vehicles.	Planned
		6	The center shall generate route plans based on current and/or predicted conditions of the road network, scheduled maintenance and construction work activities, and work zone activities.	Planned
		7	The center shall generate route plans based on transit services, including fares, schedules, and requirements for travelers with special needs.	Planned
		9	The center shall generate route plans based on current or forecasted weather.	Planned
	ISP Operational Data Repository			
	ISP Travel Services Information and Reservation	1	The center shall disseminate yellow pages information (such as lodging, restaurants, theaters, bicycle facilities, and other tourist activities) to travelers upon request.	Planned
		2	The center shall support yellow pages service information and reservation requests from a vehicle.	Planned

Element Name	Functional Area	ID	Requirement	Status
	ISP Emergency Traveler Information	3	The center shall support yellow pages service information and reservation requests from a traveler on-board a transit vehicle.	Planned
		4	The center shall provide all yellow pages information based on the traveler's current location and filter the provided information accordingly.	Planned
		5	The center shall manage registration of yellow pages service providers, store provider details, and transact payments for the provider's registration.	Planned
		6	The center shall manage updates of digitized map data and provide periodic updates to traveler interface systems.	Existing
Transit Agency_Non Specified_CAD	ISP Data Collection			
Transit Agency_Non Specified_Transit Signal Priority On-Board Equipment	Roadway Signal Priority			
	Roadway Signal Preemption			
Transit Agency_Non Specified_Website	ISP Traveler Data Collection	3	The center shall collect, process, and store transit routes and schedules, transit transfer options, transit fares, and real-time schedule adherence information.	Existing
User Personal Computing Devices	Personal Basic Information Reception	1	The personal traveler interface shall receive traffic information from a center and present it to the traveler.	Existing
		2	The personal traveler interface shall receive transit information from a center and present it to the traveler.	Existing
		3	The personal traveler interface shall receive	Existing

Element Name	Functional Area	ID	Requirement	Status
UW-Madison_Parking Management System			event information from a center and present it to the traveler.	
	Personal Interactive Information Reception			
	Personal Autonomous Route Guidance	1	The personal traveler interface shall provide the capability for a traveler to obtain route guidance from a specified source to a destination.	Existing
		2	The personal traveler interface shall calculate the requested route using data obtained from a navigable map database stored in the device.	Existing
		3	The personal traveler interface shall provide multi-modal guidance for the shortest route, within the preferences and constraints specified by the traveler.	Existing
	Personal Trip Planning and Route Guidance	4	The personal traveler interface shall present information to the traveler in audible or visual forms consistent with a personal device and suitable for travelers with hearing and vision physical disabilities.	Existing
		5	The personal traveler interface shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used for route guidance.	Existing
	Personal Mayday I/F			
	Parking Management	1	The parking element shall maintain parking lot information including static information such as hours of operation, rates, location, entrance locations, capacity, type, and constraints; as well as dynamic information such as current state of the lot, occupancy, arrival rates, and departure rates.	Existing

Element Name	Functional Area	ID	Requirement	Status
		2	The parking element shall share information with a traffic management center to identify queues at entrances, exits that should be used, and other information that supports coordinated local traffic control in and around the parking facility.	Planned
		3	The parking element shall manage local dynamic message signs that display messages to travelers such as the parking lot state, number of spaces available, location of entrances, and current charges.	Existing
		4	The parking element shall provide the capability to detect, count, and classify vehicles at entrances, exits, and designated locations within a parking facility.	Existing
	Parking Electronic Payment	2	The parking element shall read data from the traveler card / payment instrument carried on-board the vehicle or by the traveler.	Existing
		3	The parking element shall provide an interface to the driver informing them of the success or failure of the financial transaction. This may involve a request for the driver to pull aside so the operator can resolve an issue.	Existing
		4	The parking element shall collect data on payment violations and send the data, including images of the violator and the vehicle registration data obtained from the Department of Motor Vehicles (DMV) office, to the appropriate enforcement agency.	Existing
		5	The parking element shall manage the parking lot charges, considering such factors as location, vehicle types, and times of day.	Planned
		6	The parking element shall process the financial requests and manage an interface to a Financial Institution.	Existing

Element Name	Functional Area	ID	Requirement	Status
UW-Madison_Police Dept_Cameras		7	The parking element shall support the payment of parking lot transactions using data provided by the traveler cards / payment instruments.	Existing
		8	The parking element shall process requests for parking lot charges to be paid in advance.	Planned
		10	The parking element shall maintain a list of invalid traveler credit identities.	Existing
	Parking Short Range Traveler Information Communications	1	The parking element shall distribute static parking information (e.g., guide signs, directional signs, rates, and restrictions) to equipment on-board vehicles.	Planned
	Parking Data Collection	2	The parking element shall distribute dynamic parking information (e.g., parking availability and locations) to equipment on-board vehicles.	Planned
		1	The parking element shall collect parking management data including lot usage and charging information.	Existing
		2	The parking element shall assign quality control metrics and meta-data to be stored along with the data. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.	Existing
	Field Secure Area Surveillance	1	The field element shall include video and/or audio surveillance of secure areas including facilities (e.g. transit yards) and transportation infrastructure (e.g. bridges, tunnels, interchanges, roadway infrastructure, and transit railways or guideways).	Existing
		2	The field element shall be remotely controlled by a center.	Existing
		3	The field element shall provide equipment status and fault indication of surveillance equipment to a center.	Existing

Element Name	Functional Area	ID	Requirement	Status
UW-Madison_Police Dept_Communications Center (Dispatch)	Emergency Call-Taking	4	The field element shall provide raw video or audio data.	Existing
		1	The center shall support the interface to the Emergency Telecommunications System (e.g. 911 or 7-digit call routing) to receive emergency notification information and provide it to the emergency system operator.	Existing
		2	The center shall receive emergency call information from 911 services and present the possible incident information to the emergency system operator.	Existing
		5	The center shall receive emergency notification information from other public safety agencies and present the possible incident information to the emergency system operator.	Existing
		6	The center shall receive emergency notification information from public transit systems and present the possible incident information to the emergency system operator.	Planned
		8	The center shall send a request for remote control of CCTV systems from a traffic management center in order to verify the reported incident.	Planned
		9	The center shall forward the verified emergency information to the responding agency based on the location and nature of the emergency.	Existing
		10	The center shall update the incident information log once the emergency system operator has verified the incident.	Existing
	Emergency Dispatch	11	The center shall provide the capability for digitized map data to act as the background to the emergency information presented to the emergency system operator.	Existing
		1	The center shall dispatch emergency vehicles to	Existing

Element Name	Functional Area	ID	Requirement	Status
			respond to verified emergencies under center personnel control.	
		2	The center shall store the current status of all emergency vehicles available for dispatch and those that have been dispatched.	Existing
		3	The center shall relay location and incident details to the responding vehicles.	Existing
		4	The center shall track the location and status of emergency vehicles responding to an emergency based on information from the emergency vehicle.	Existing
		5	The center shall store and maintain the emergency service responses in an action log.	Existing
		6	The center shall provide the capability for digitized map data to act as the background to the information presented to the emergency system operator.	Existing
		7	The center shall receive traffic images to support dispatch of emergency vehicles.	Existing
		8	The center shall provide the capability to request remote control of traffic surveillance devices	Planned
		9	The center shall coordinate response to incidents with other Emergency Management centers to ensure appropriate resources are dispatched and utilized.	Existing
	Emergency Routing	1	The center shall collect current traffic and road condition information for emergency vehicle route calculation.	Planned
		2	The center shall receive information on the location and status of traffic control equipment and work zones along potential emergency routes.	Planned

Element Name	Functional Area	ID	Requirement	Status
	Emergency Data Collection	4	The center shall receive asset restriction information to support the dispatching of appropriate emergency resources.	Planned
		6	The center shall track current emergency vehicle location and status.	Existing
		7	The center shall calculate emergency vehicle routes, under center personnel control, based on the collected traffic and road conditions information.	Existing
		9	The center shall provide the capability to request special traffic control measures, such as signal preemption, from the traffic management center to facilitate emergency vehicle progress along the suggested route.	Planned
		11	The center shall provide the capability for digitized map data to act as the background to the information presented to the emergency system operator.	Existing
		1	The center shall collect emergency service data, emergency vehicle management data, emergency vehicle data, sensor and surveillance data, threat data, and incident data.	Existing
		2	The center shall assign quality control metrics and meta-data to be stored along with the data. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.	Existing
UW-Madison_Police Dept_Emergency Notification System (WiscAlerts)	ISP Emergency Traveler Information	1	The center shall disseminate emergency evacuation information to the traveler interface systems, including evacuation zones, shelter information, available transportation modes, road closures and detours, changes to transit services, and traffic and road conditions at the origin, destination, and along the evacuation	Existing

Element Name	Functional Area	ID	Requirement	Status
Vehicles	Basic Vehicle Reception		routes.	
		3	The center shall disseminate wide-area alert information to the traveler interface systems, including major emergencies such as a natural or man-made disaster, civil emergency, child abductions, severe weather watches and warnings, military activities, and law enforcement warnings.	Existing
		4	The center shall provide the capability for a system operator to control the type and update frequency of emergency and wide-area alert information distributed to travelers.	Existing
		1	The vehicle shall receive formatted traffic information from a center and present it to the driver.	Existing
		9	The vehicle shall present information to the driver in audible or visual forms without impairing the driver's ability to control the vehicle in a safe manner.	Existing
	Interactive Vehicle Reception			
	Vehicle Autonomous Route Guidance			
	Vehicle Location Determination			
	Vehicle Environmental Probe Support			
	Vehicle Short Range Traveler Information Reception			
	Vehicle Mayday I/F			
	Vehicle Intersection Safety Warning			
	Vehicle Intersection Control			

Element Name	Functional Area	ID	Requirement	Status
WisDOT_DTSD_BTO_STOC_511 System	Vehicle Automated Operations	1	The vehicle shall provide the capability for a driver to request access to automated vehicle lanes.	Planned
	Vehicle Warning System			
	Interactive Infrastructure Information	1	The center shall disseminate customized traffic and highway condition information to travelers, including incident information, detours and road closures, recommended routes, and current speeds on specific routes upon request.	Existing
		2	The center shall disseminate customized maintenance and construction information to travelers, including scheduled maintenance and construction work activities and work zone activities upon request.	Existing
		3	The center shall disseminate customized transit routes and schedules, transit transfer options, transit fares, and real-time schedule adherence information to travelers upon request.	Existing
		4	The center shall disseminate customized parking information to travelers, including location, availability, and fees upon request.	Planned
		6	The center shall disseminate customized weather information to travelers upon request.	Existing
		7	The center shall disseminate customized multimodal transportation service information (for example, from ferry and airline operators), including transfer points and other information, to travelers upon request.	Planned
		10	The center shall provide all traveler information based on the traveler's current location or a specific location identified by the traveler, and filter or customize the provided information accordingly.	Planned
		11	The center shall accept traveler profiles for	Planned

Element Name	Functional Area	ID	Requirement	Status
			determining the type of personalized data to send to the traveler.	
		12	The center shall manage payment for services, such as tolls, transit fares, parking lot charges, map updates, and advanced payment for tolls, and provide transaction success or failure details.	Planned
		14	The center shall provide the capability to exchange information with another traveler information service provider current or predicted data for road links that are outside the area served by the local supplier.	Existing
		15	The center shall manage updates of digitized map data and provide updates to traveler interface systems upon request.	Existing
		16	The center shall provide the capability to support requests from the media for traffic and incident data.	Existing
		17	The center shall provide the capability for a system operator to control the type and update frequency of traveler information.	Existing
WisDOT_DTSD_BTO_STOC_511 Twitter Accounts				
WisDOT_DTSD_BTO_STOC_511 Website	Basic Information Broadcast	1	The center shall disseminate traffic and highway condition information to travelers, including incident information, detours and road closures, event information, recommended routes, and current speeds on specific routes.	Existing
		2	The center shall disseminate maintenance and construction information to travelers, including scheduled maintenance and construction work activities and work zone activities.	Existing
		3	The center shall disseminate transit routes and schedules, transit transfer options, transit fares,	Existing

Element Name	Functional Area	ID	Requirement	Status
	ISP Traveler Information Alerts		and real-time schedule adherence information to travelers.	
		4	The center shall disseminate parking information to travelers, including location, availability, and fees.	Planned
		6	The center shall disseminate weather information to travelers.	Existing
		9	The center shall provide the capability to support requests from the media for traffic and incident data.	Existing
		10	The center shall provide the capability for a system operator to control the type and update frequency of broadcast traveler information.	Existing
		1	The center shall accept traveler profiles that establish recurring trip characteristics including route, mode, and timeframe information.	Planned
		2	The center shall accept traveler profiles that define alert thresholds that establish the severity and types of alerts that are provided to each traveler.	Planned
		3	The center shall disseminate personalized traffic alerts reporting congestion, incidents, delays, detours and road closures that may impact a current or planned trip.	Planned
		4	The center shall disseminate personalized transit alerts reporting transit delays and service interruptions.	Planned
		5	The center shall disseminate personalized parking alerts reporting parking availability and closures.	Planned
		6	The center shall disseminate personalized road weather alerts reporting adverse road and weather conditions.	Planned

Element Name	Functional Area	ID	Requirement	Status
	Interactive Infrastructure Information	1	The center shall disseminate customized traffic and highway condition information to travelers, including incident information, detours and road closures, recommended routes, and current speeds on specific routes upon request.	Planned
		2	The center shall disseminate customized maintenance and construction information to travelers, including scheduled maintenance and construction work activities and work zone activities upon request.	Planned
		3	The center shall disseminate customized transit routes and schedules, transit transfer options, transit fares, and real-time schedule adherence information to travelers upon request.	Planned
		4	The center shall disseminate customized parking information to travelers, including location, availability, and fees upon request.	Planned
		6	The center shall disseminate customized weather information to travelers upon request.	Planned
		7	The center shall disseminate customized multimodal transportation service information (for example, from ferry and airline operators), including transfer points and other information, to travelers upon request.	Planned
		10	The center shall provide all traveler information based on the traveler's current location or a specific location identified by the traveler, and filter or customize the provided information accordingly.	Planned
		11	The center shall accept traveler profiles for determining the type of personalized data to send to the traveler.	Planned
		12	The center shall manage payment for services, such as tolls, transit fares, parking lot charges, map updates, and advanced payment for tolls,	Planned

Element Name	Functional Area	ID	Requirement	Status
			and provide transaction success or failure details.	
		14	The center shall provide the capability to exchange information with another traveler information service provider current or predicted data for road links that are outside the area served by the local supplier.	Existing
		15	The center shall manage updates of digitized map data and provide updates to traveler interface systems upon request.	Existing
		16	The center shall provide the capability to support requests from the media for traffic and incident data.	Existing
		17	The center shall provide the capability for a system operator to control the type and update frequency of traveler information.	Existing
	ISP Travel Services Information and Reservation	1	The center shall disseminate yellow pages information (such as lodging, restaurants, theaters, bicycle facilities, and other tourist activities) to travelers upon request.	Planned
		2	The center shall support yellow pages service information and reservation requests from a vehicle.	Planned
WisDOT_DTSD_BTO_STOC_CCTV Cameras	Roadway Basic Surveillance	2	The field element shall collect, process, and send traffic images to the center for further analysis and distribution.	Existing
		4	The field element shall return sensor and CCTV system operational status to the controlling center.	Existing
		5	The field element shall return sensor and CCTV system fault data to the controlling center for repair.	Existing
	Roadway Incident Detection	1	The field element shall collect, process, and send traffic images to the center for further analysis	Existing

Element Name	Functional Area	ID	Requirement	Status
			and distribution.	
		2	The field element shall remotely process video data and provide an indication of potential incidents to the traffic management center.	Existing
		3	The field element's video devices shall be remotely controlled by a traffic management center.	Existing
		4	The field element shall provide operational status and fault data for the incident detection devices to the traffic management center.	Existing
	Roadway Field Device Monitoring	1	The field element shall monitor the operational status (state of the device, configuration, and fault data) of connected sensors (such as traffic, infrastructure, environmental, security, speed) and devices (such as highway advisory radio, dynamic message signs, automated roadway treatment systems, barrier and safeguard systems, cameras, traffic signals, ramp meters, short range communications equipment, security surveillance equipment).	Existing
		2	The field element shall send operational status of connected field equipment to the maintenance center.	Existing
		3	The field element shall send collected fault data to the maintenance center for repair.	Existing
		4	The field element shall include a local interface that provides operational status and fault data for connected field equipment to field personnel.	Existing
		5	The field element shall include a local interface that allows field personnel to command diagnostic tests on connected field equipment.	Existing
	Roadway Traffic Information Dissemination	1	The field element shall include dynamic messages signs for dissemination of traffic and other information to drivers, under center	Existing
WisDOT_DTSD_BTO_STOC_DMS (Fixed and Portable)	Roadway Traffic Information Dissemination	1	The field element shall include dynamic messages signs for dissemination of traffic and other information to drivers, under center	Existing

Element Name	Functional Area	ID	Requirement	Status
	Roadway Field Device Monitoring		control; the DMS may be either those that display variable text messages, or those that have fixed format display(s) (e.g. vehicle restrictions, or lane open/close).	
		4	The field element shall provide operational status for the driver information systems equipment (DMS, HAR, etc.) to the center.	Existing
		5	The field element shall provide fault data for the driver information systems equipment (DMS, HAR, etc.) to the center for repair.	Existing
		1	The field element shall monitor the operational status (state of the device, configuration, and fault data) of connected sensors (such as traffic, infrastructure, environmental, security, speed) and devices (such as highway advisory radio, dynamic message signs, automated roadway treatment systems, barrier and safeguard systems, cameras, traffic signals, ramp meters, short range communications equipment, security surveillance equipment).	Existing
		2	The field element shall send operational status of connected field equipment to the maintenance center.	Existing
		4	The field element shall include a local interface that provides operational status and fault data for connected field equipment to field personnel.	Existing
		5	The field element shall include a local interface that allows field personnel to command diagnostic tests on connected field equipment.	Existing
	Roadway Work Zone Traffic Control	2	Under traffic and maintenance center control, the field element shall include driver information systems (such as dynamic messages signs and highway advisory radios) that advise drivers of activity around the work zone through which they are currently passing.	Existing

Element Name	Functional Area	ID	Requirement	Status
		3	Under the control of field personnel within maintenance vehicles, the field element shall include driver information systems (such as dynamic messages signs and highway advisory radios) that advise drivers of activity around a work zone through which they are currently passing.	Existing
		5	The field element shall provide operational status for the surveillance (e.g. CCTV), driver information systems, and gates/barriers in work zones to the maintenance center.	Existing
		6	The field element shall provide fault data for the surveillance (e.g. CCTV), driver information systems, and gates/barriers in work zones to the maintenance center for repair.	Existing
WISDOT_DTSD_BTO_STOC_Environmental Sensor Stations	Roadway Field Device Monitoring	1	The field element shall monitor the operational status (state of the device, configuration, and fault data) of connected sensors (such as traffic, infrastructure, environmental, security, speed) and devices (such as highway advisory radio, dynamic message signs, automated roadway treatment systems, barrier and safeguard systems, cameras, traffic signals, ramp meters, short range communications equipment, security surveillance equipment).	Existing
		2	The field element shall send operational status of connected field equipment to the maintenance center.	Existing
		4	The field element shall include a local interface that provides operational status and fault data for connected field equipment to field personnel.	Existing
		5	The field element shall include a local interface that allows field personnel to command diagnostic tests on connected field equipment.	Existing
	Roadway Environmental	1	The field element shall include surface and sub-	Existing

Element Name	Functional Area	ID	Requirement	Status
	Monitoring		surface environmental sensors that measure road surface temperature, moisture, icing, salinity, and other measures.	
		2	The field element shall include environmental sensors that measure weather conditions including temperature, wind, humidity, precipitation, and visibility.	Existing
		3	The field element's environmental sensors shall be remotely controlled by a maintenance center.	Existing
		4	The field element's environmental sensors shall be remotely controlled by a traffic management center.	Existing
		5	The field element's environmental sensors shall be remotely controlled by weather service providers such as the National Weather Service or value-added sector specific meteorological services.	Existing
		7	The field element shall provide environmental sensor equipment operational status to the controlling center or maintenance vehicle.	Existing
		8	The field element shall provide environmental sensor equipment fault indication to the controlling center or maintenance vehicle.	Existing
		10	The field element shall provide weather and road surface condition data to centers.	Planned
WisDOT_DTSD_BTO_STOC_Freeway Service Team Vehicles	On-board EV En Route Support	1	The emergency vehicle, including roadway service patrols, shall track its current location.	Existing
		2	The emergency vehicle, including roadway service patrols, shall send the vehicle's location and operational data to the center for emergency management and dispatch.	Existing
		3	The emergency vehicle, including roadway service patrols, shall receive incident details and a suggested route when dispatched to a scene.	Proposed

Element Name	Functional Area	ID	Requirement	Status
WisDOT_DTSD_BTO_STOC_Ramp Meters	On-board EV Incident Management Communication Roadway Traffic Metering	1	The field element shall regulate the flow of traffic on ramps, interchanges, and the mainline, under center control.	Existing
		2	The field element shall monitor operation of ramp, interchange, and mainline meters and report to the center any conflicts between received control plans and current system operation.	Existing
		3	The field element shall return ramp, interchange, and mainline meter operational status to the controlling center.	Existing
		4	The field element shall provide indications to the driver that the metering system is active and provide safe transitions between active and inactive status.	Existing
		5	The field element shall return ramp, interchange, and mainline meter fault data to the maintenance center for repair.	Existing
	Roadway Field Device Monitoring	1	The field element shall monitor the operational status (state of the device, configuration, and fault data) of connected sensors (such as traffic, infrastructure, environmental, security, speed) and devices (such as highway advisory radio, dynamic message signs, automated roadway treatment systems, barrier and safeguard systems, cameras, traffic signals, ramp meters, short range communications equipment, security surveillance equipment).	Existing
		2	The field element shall send operational status of connected field equipment to the maintenance center.	Existing
		3	The field element shall send collected fault data to the maintenance center for repair.	Existing

Element Name	Functional Area	ID	Requirement	Status
WisDOT_DTSD_BTO_STOC_System Detector Stations	Roadway Basic Surveillance	4	The field element shall include a local interface that provides operational status and fault data for connected field equipment to field personnel.	Existing
		5	The field element shall include a local interface that allows field personnel to command diagnostic tests on connected field equipment.	Existing
		1	The field element shall collect, process, digitize, and send traffic sensor data (speed, volume, and occupancy) to the center for further analysis and storage, under center control.	Existing
		4	The field element shall return sensor and CCTV system operational status to the controlling center.	Existing
		5	The field element shall return sensor and CCTV system fault data to the controlling center for repair.	Existing
	Roadway Incident Detection			
	Roadway Equipment Coordination	1	The field element shall include sensors that provide data and status information to other field element devices, without center control.	Existing
	Roadway Field Device Monitoring	1	The field element shall monitor the operational status (state of the device, configuration, and fault data) of connected sensors (such as traffic, infrastructure, environmental, security, speed) and devices (such as highway advisory radio, dynamic message signs, automated roadway treatment systems, barrier and safeguard systems, cameras, traffic signals, ramp meters, short range communications equipment, security surveillance equipment).	Existing
		2	The field element shall send operational status of connected field equipment to the maintenance center.	Existing
		3	The field element shall send collected fault data	Existing

Element Name	Functional Area	ID	Requirement	Status
			to the maintenance center for repair.	
	Roadway Data Collection	1	The field element shall collect traffic, road, and environmental conditions information.	Existing
		2	The field element shall include the sensors and supporting roadside devices that sense, collect, and send traffic, road, and environmental conditions information to a center for archival.	Existing
		3	The field element shall collect sensor status and sensor faults from roadside equipment and send it along with the recorded data to a center for archival.	Existing
	Collect Traffic Surveillance	1	The center shall monitor, analyze, and store traffic sensor data (speed, volume, occupancy) collected from field elements under remote control of the center.	Existing
	TMC Signal Control	1	The center shall remotely control traffic signal controllers.	Existing
		2	The center shall accept notifications of pedestrian calls.	Existing
		3	The center shall collect traffic signal controller operational status and compare against the control information sent by the center.	Existing
		4	The center shall collect traffic signal controller fault data from the field.	Existing
		5	The center shall manage (define, store and modify) control plans to coordinate signalized intersections, to be engaged at the direction of center personnel or according to a daily schedule.	Existing
		6	The center shall implement control plans to coordinate signalized intersections based on data from sensors.	Existing
		7	The center shall manage boundaries of the	Existing

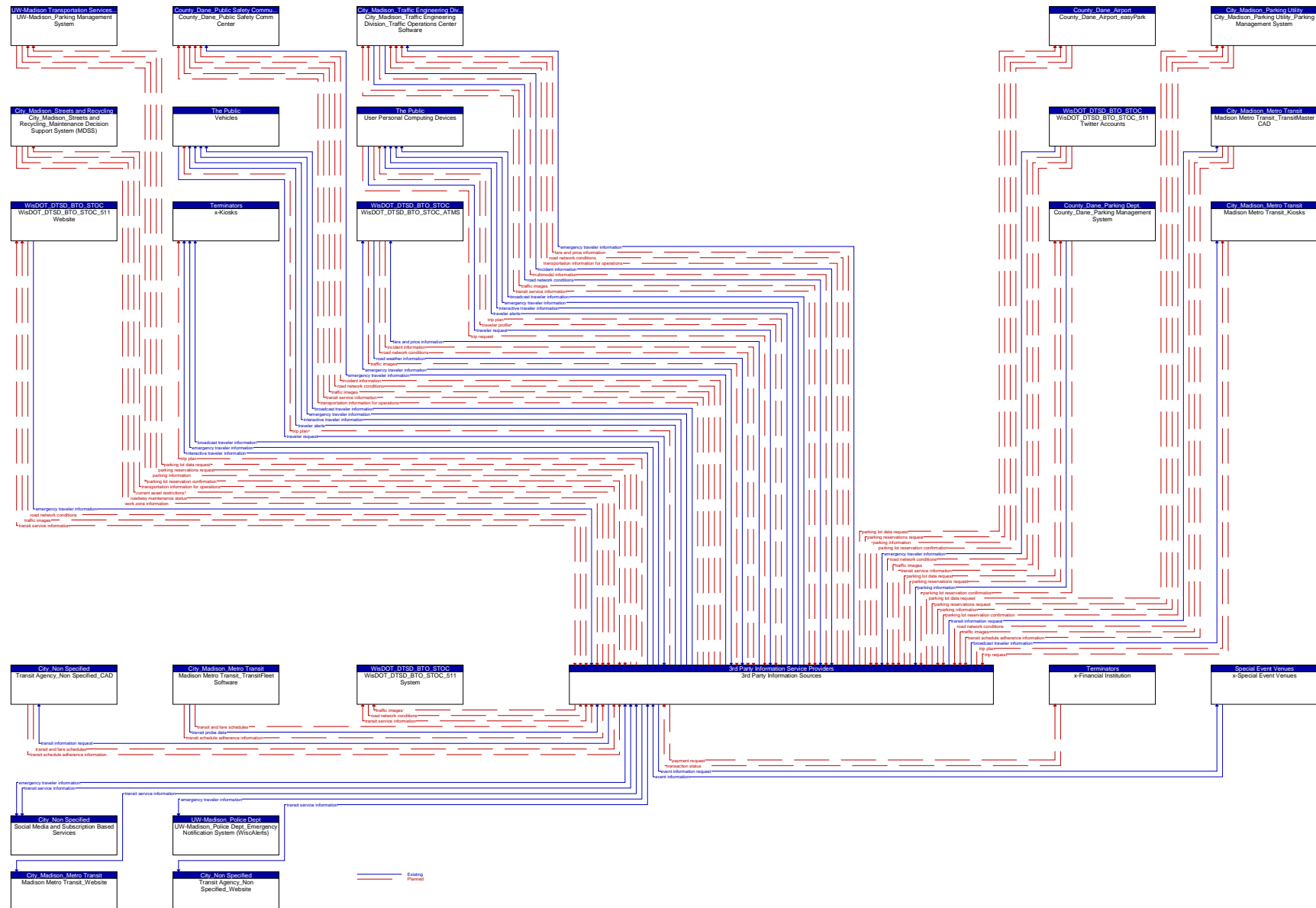
Element Name	Functional Area	ID	Requirement	Status
WisDOT_DTSD_SW Region_Madison_Signal Preemption/Priority Equipment	TMC Regional Traffic Management		control sections used within the signal system.	
		8	The center shall maintain traffic signal coordination including synchronizing clocks throughout the system.	Existing
		1	The center shall exchange traffic information with other traffic management centers including incident information, congestion data, traffic data, signal timing plans, and real-time signal control information.	Existing
		2	The center shall exchange traffic control information with other traffic management centers to support remote monitoring and control of traffic management devices (e.g. signs, sensors, signals, cameras, etc.).	Existing
	Traffic Equipment Maintenance	1	The center shall collect and store sensor (traffic, pedestrian, multimodal crossing) operational status.	Existing
		2	The center shall collect and store CCTV surveillance system (traffic, pedestrian) operational status.	Existing
		3	The center shall collect and store sensor (traffic, pedestrian, multimodal crossing) fault data and send to the maintenance center for repair.	Existing
		4	The center shall collect and store CCTV surveillance system (traffic, pedestrian) fault data send to the maintenance center for repair.	Existing
		7	The center shall exchange data with maintenance centers concerning the reporting of faulty equipment and the schedule/status of their repair. Information exchanged includes details of new equipment faults, and clearances when the faults are cleared.	Existing
	Roadway Signal Priority	1	The field element shall respond to signal priority requests from transit vehicles.	Planned

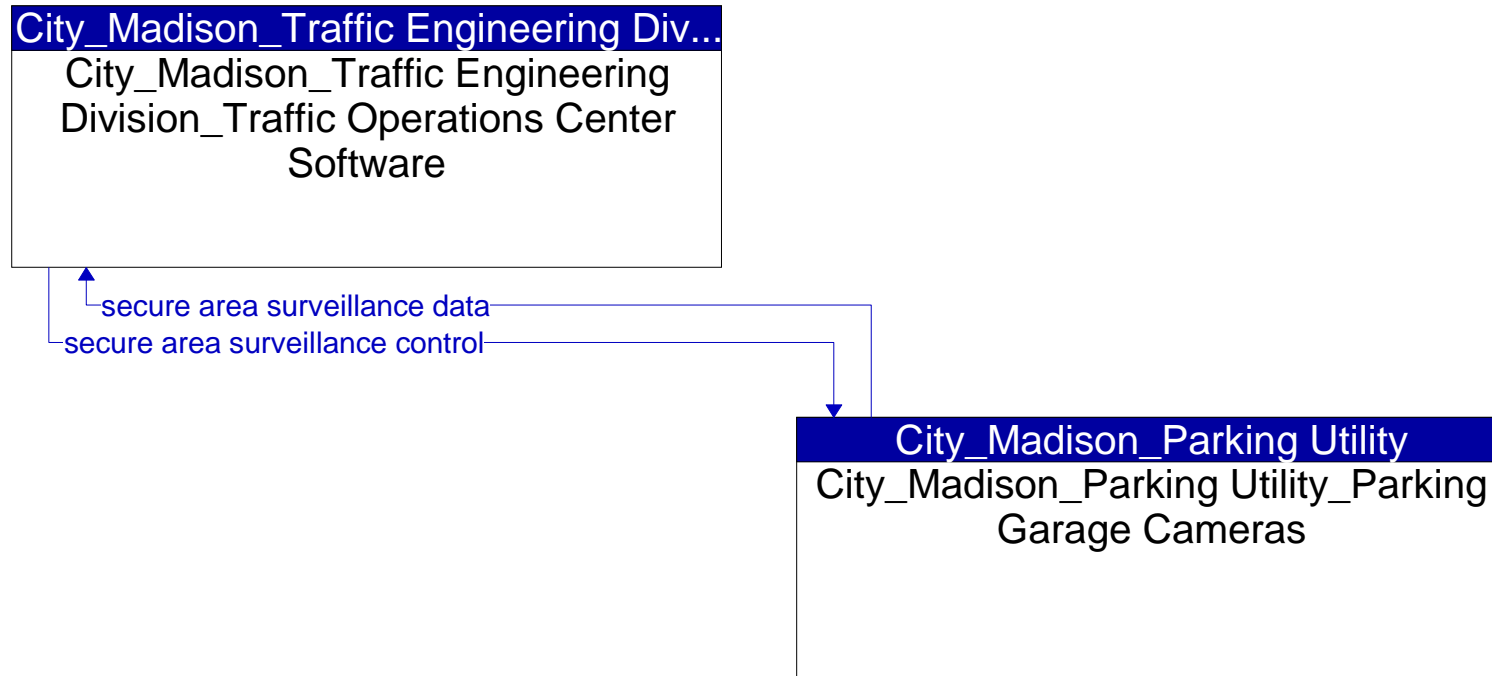
Element Name	Functional Area	ID	Requirement	Status
WisDOT_DTSD_SW Region_Madison_Traffic Signal Systems	Roadway Signal Preemption	1	The field element shall respond to signal preemption requests from emergency vehicles.	Planned

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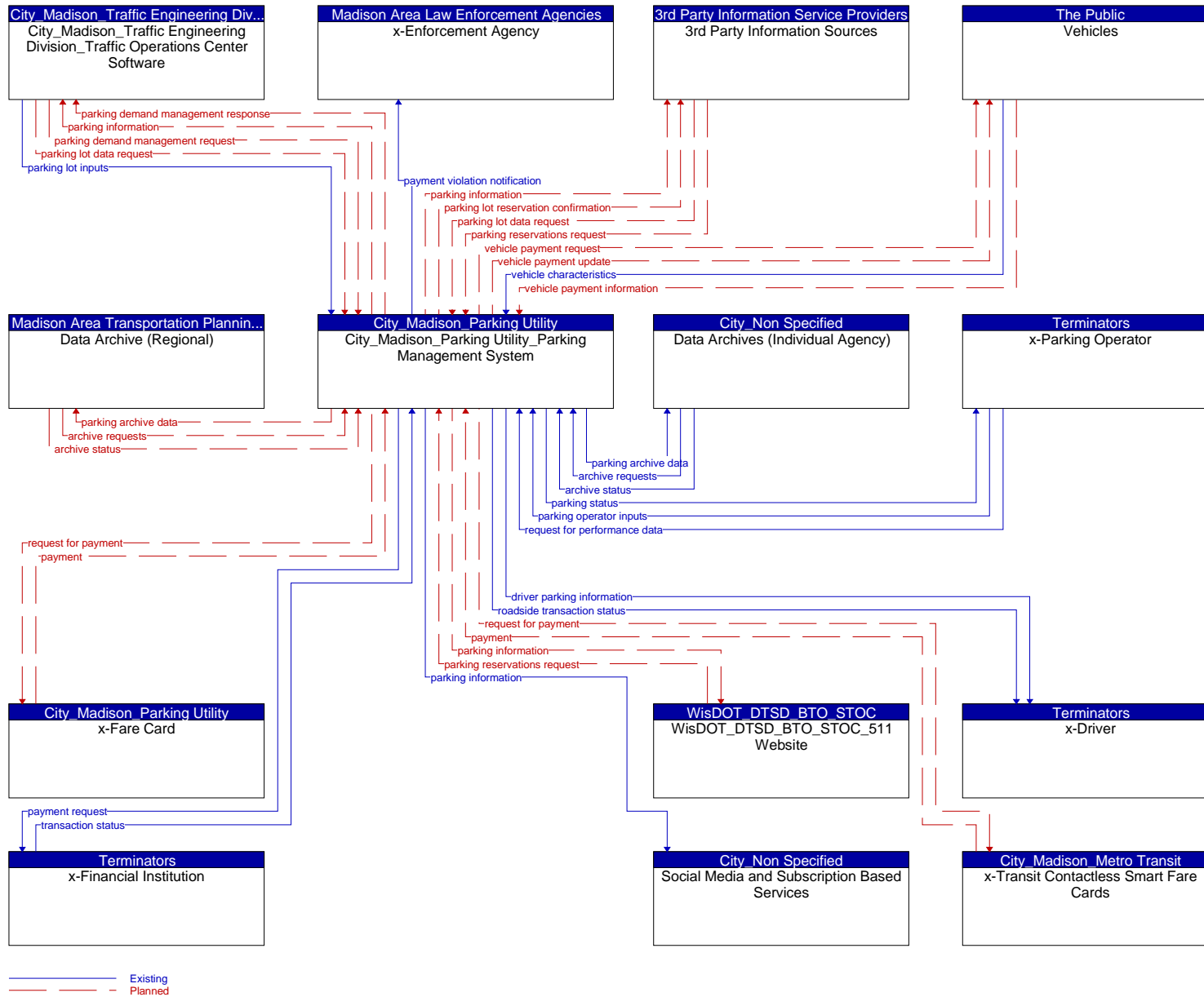
ARCHITECTURE FLOW DIAGRAMS – INDIVIDUAL ITS ELEMENT VIEW

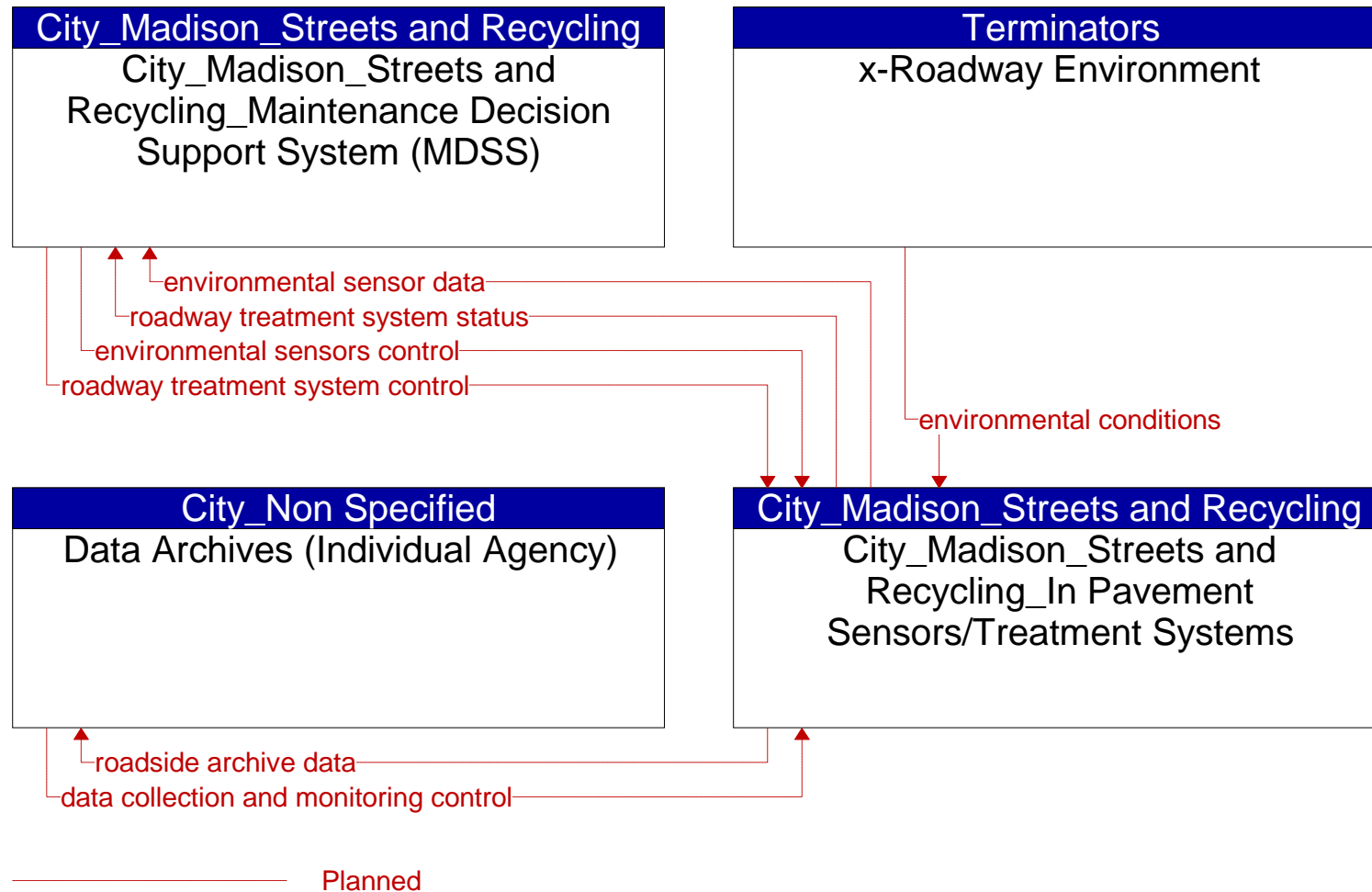
Architecture flow diagrams for individual ITS elements in the Madison Regional ITS Architecture are provided below. Architecture flow diagrams have been provided as a means to visually understand and verify the flow of information and data between ITS elements. Due to the number of flows between individual elements, and the resulting complexity that results from graphically displaying flows, some diagrams including the flows identified within them have become illegible. [Appendix F](#) provides flows in a tabular format. Illegible diagrams remain in the section for viewing at a zoomed in level electronically.



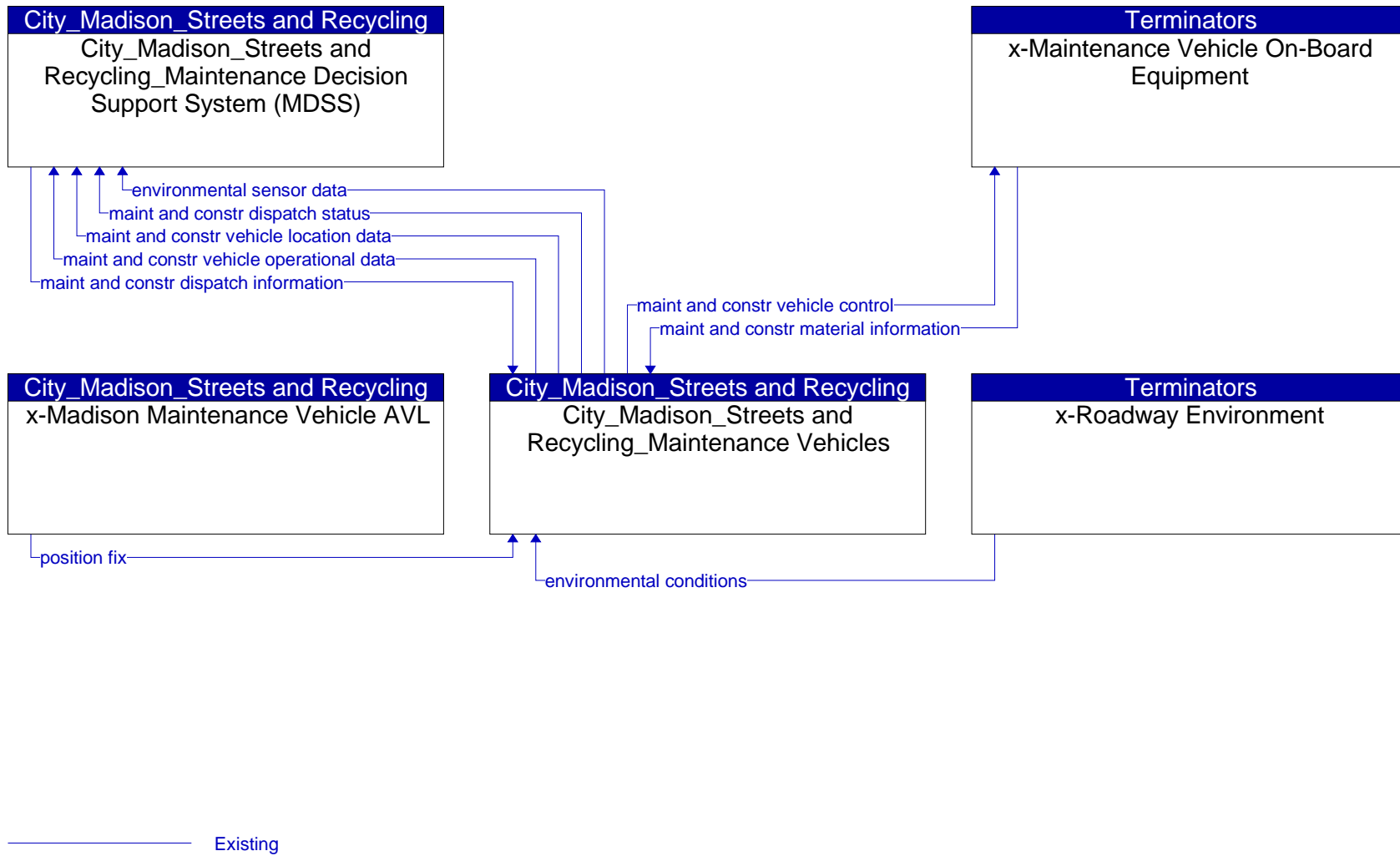


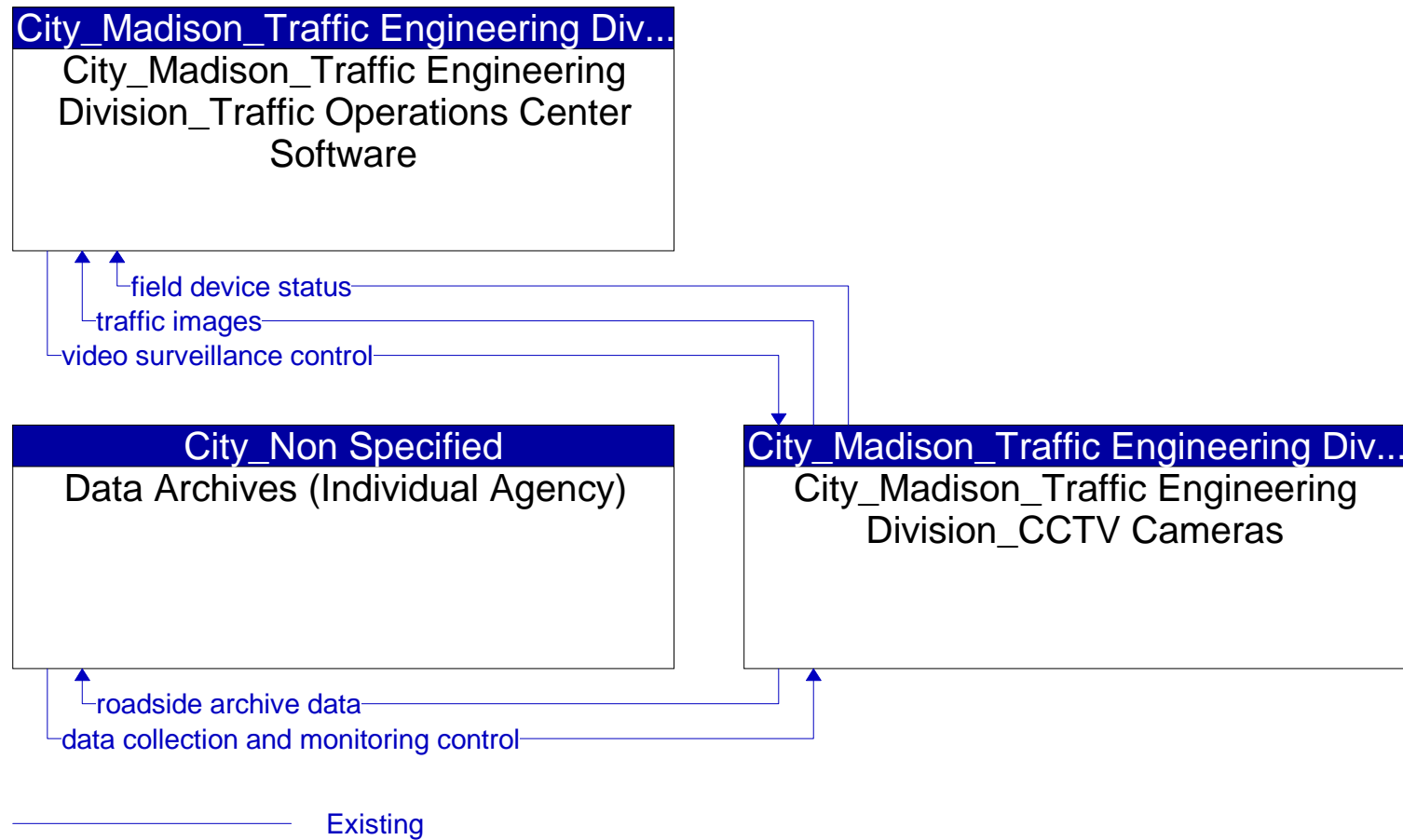
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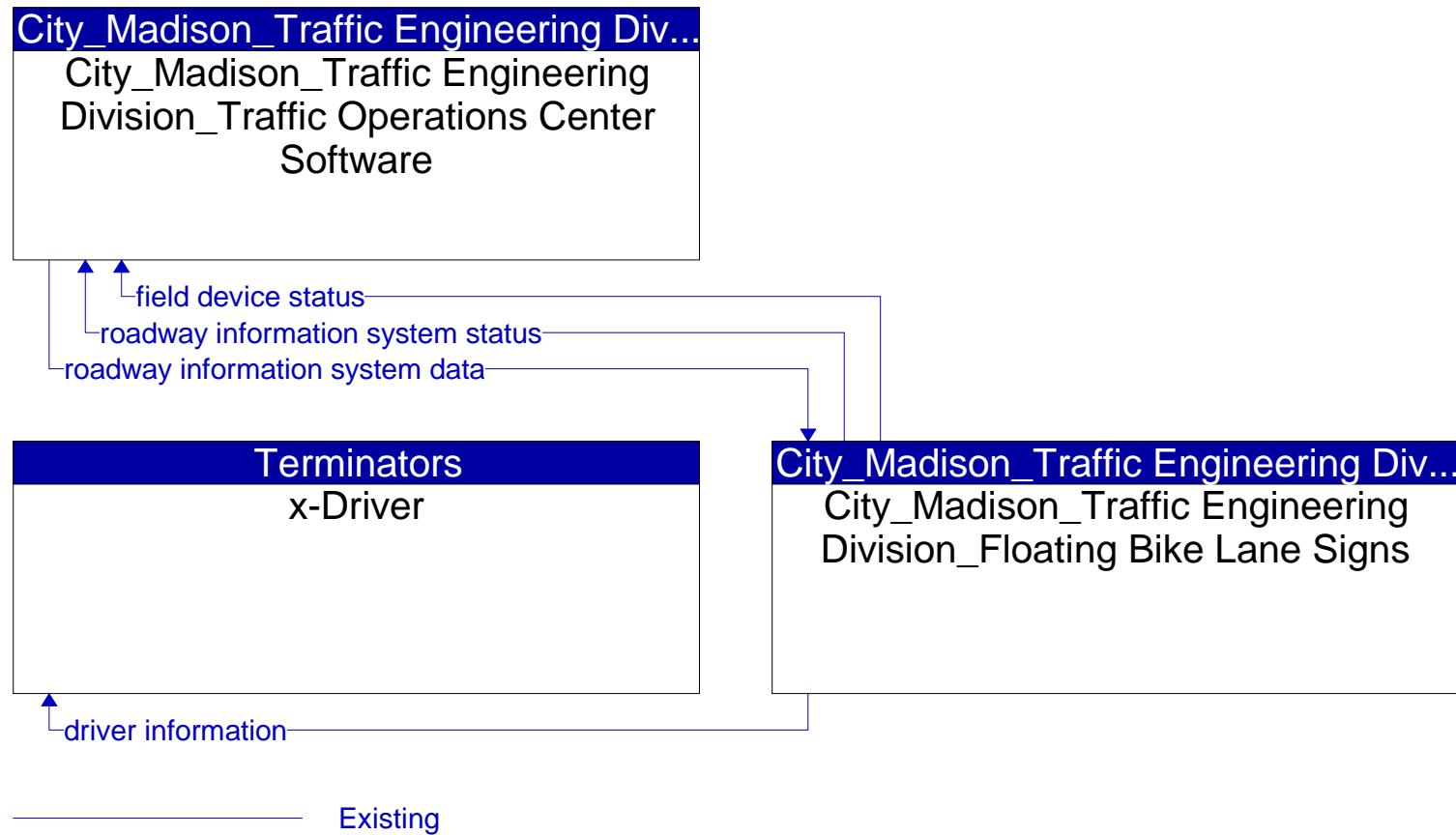


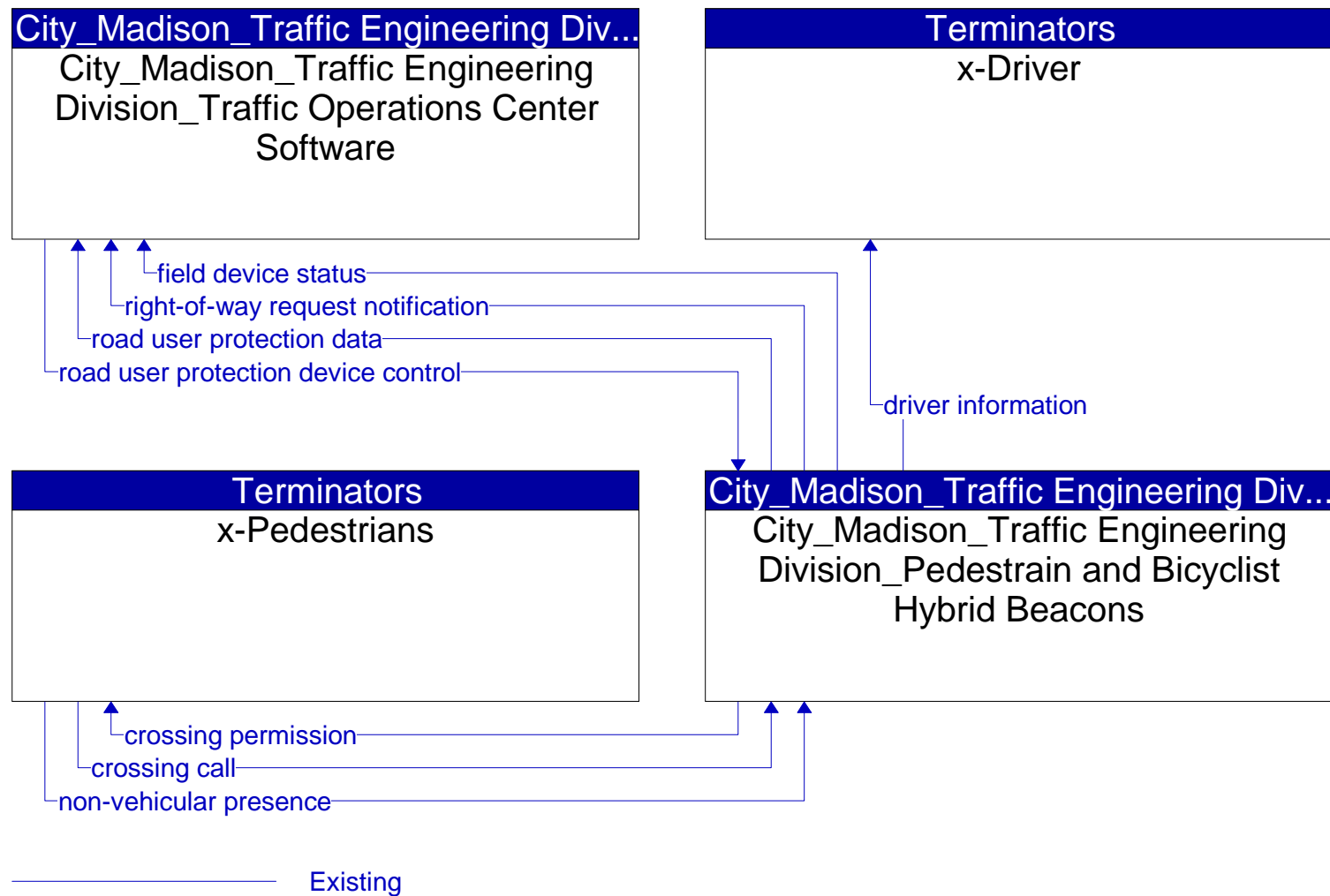


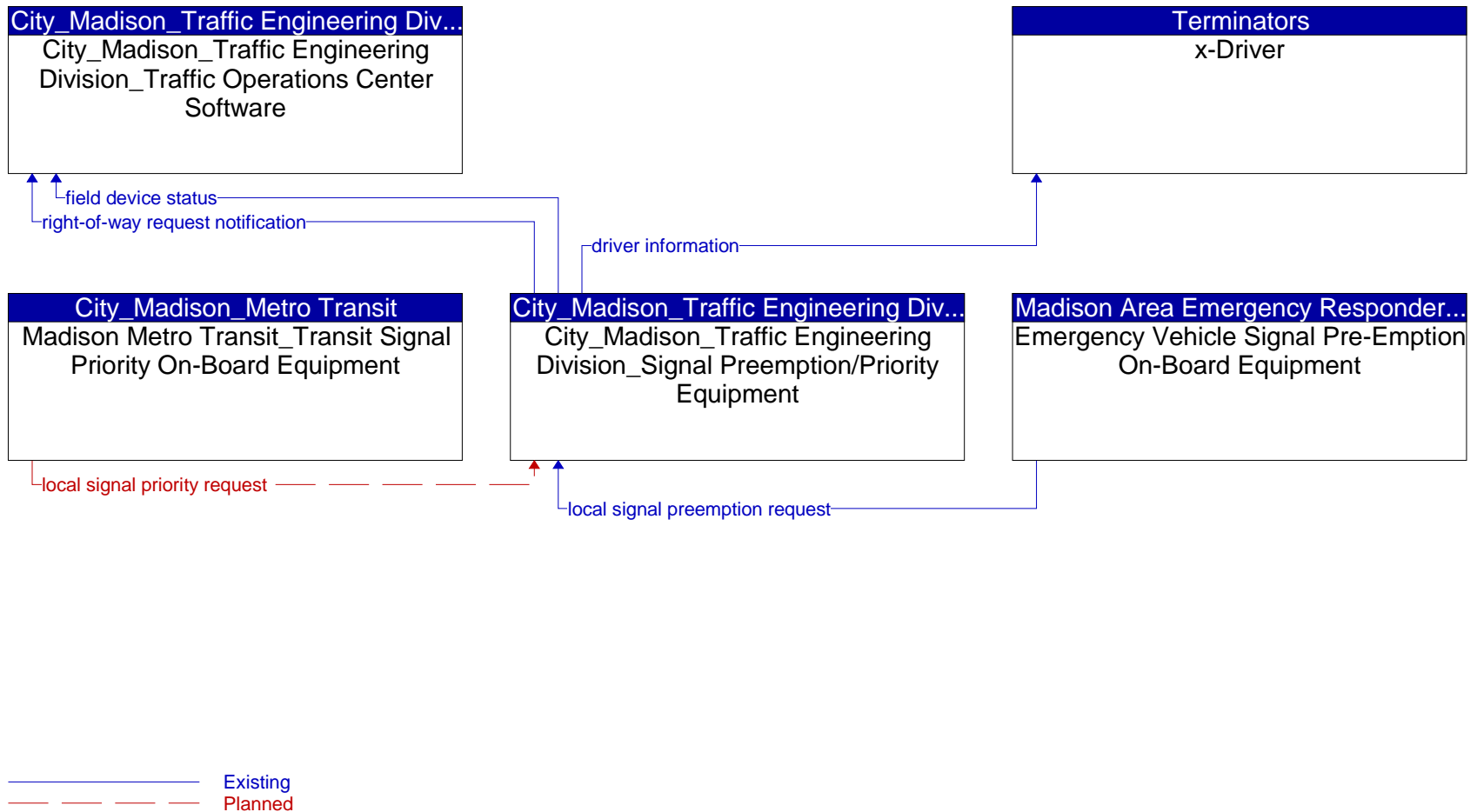


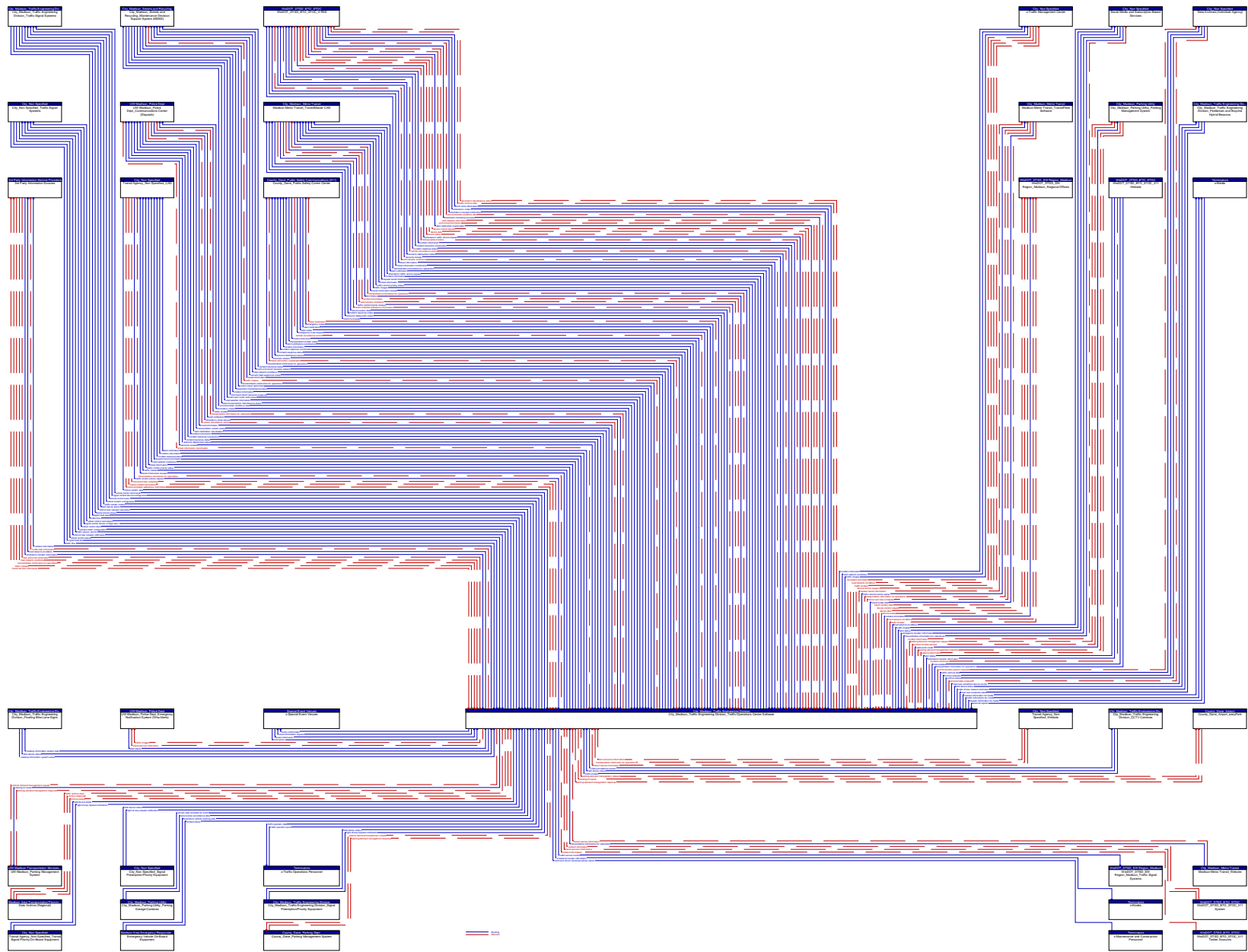


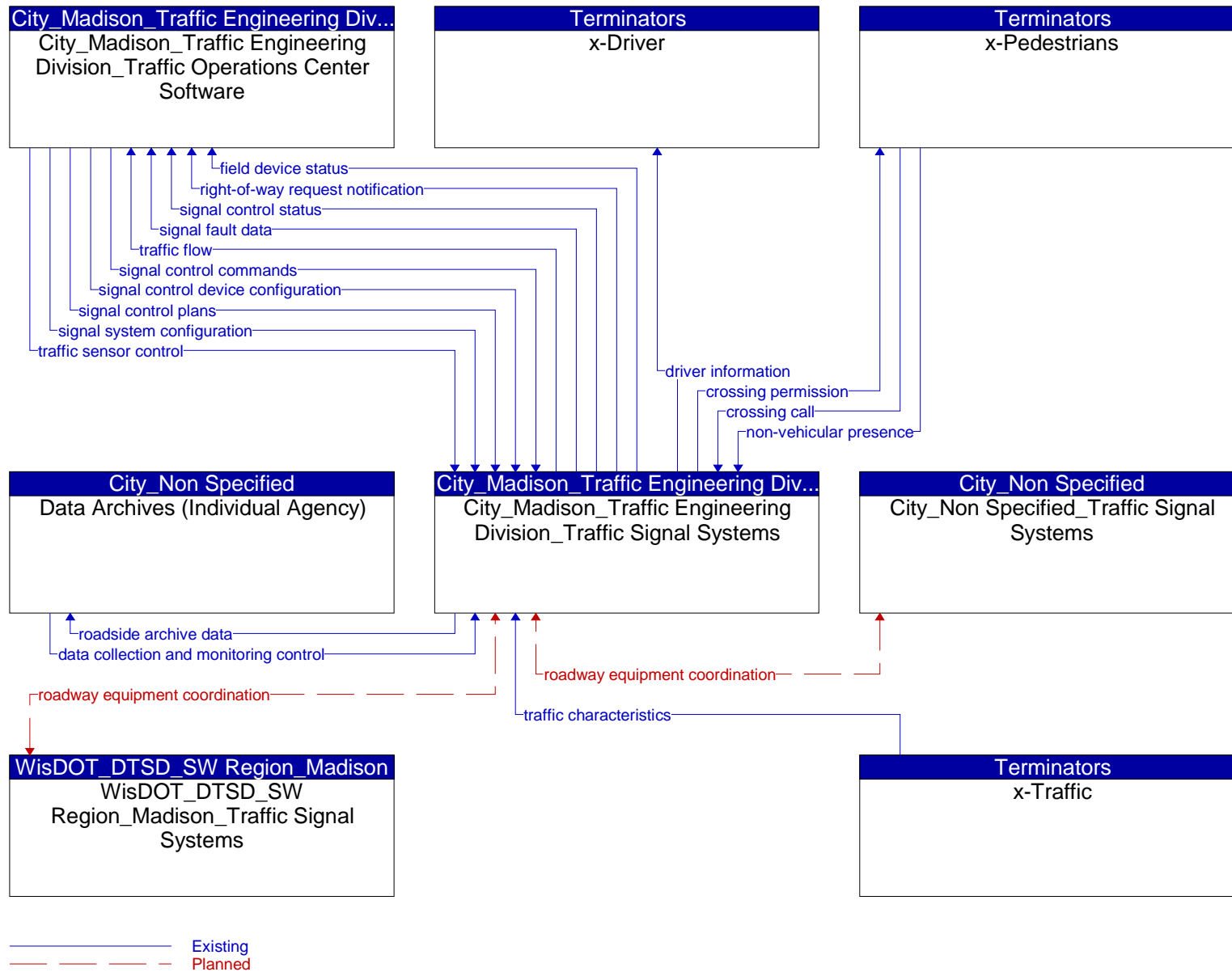


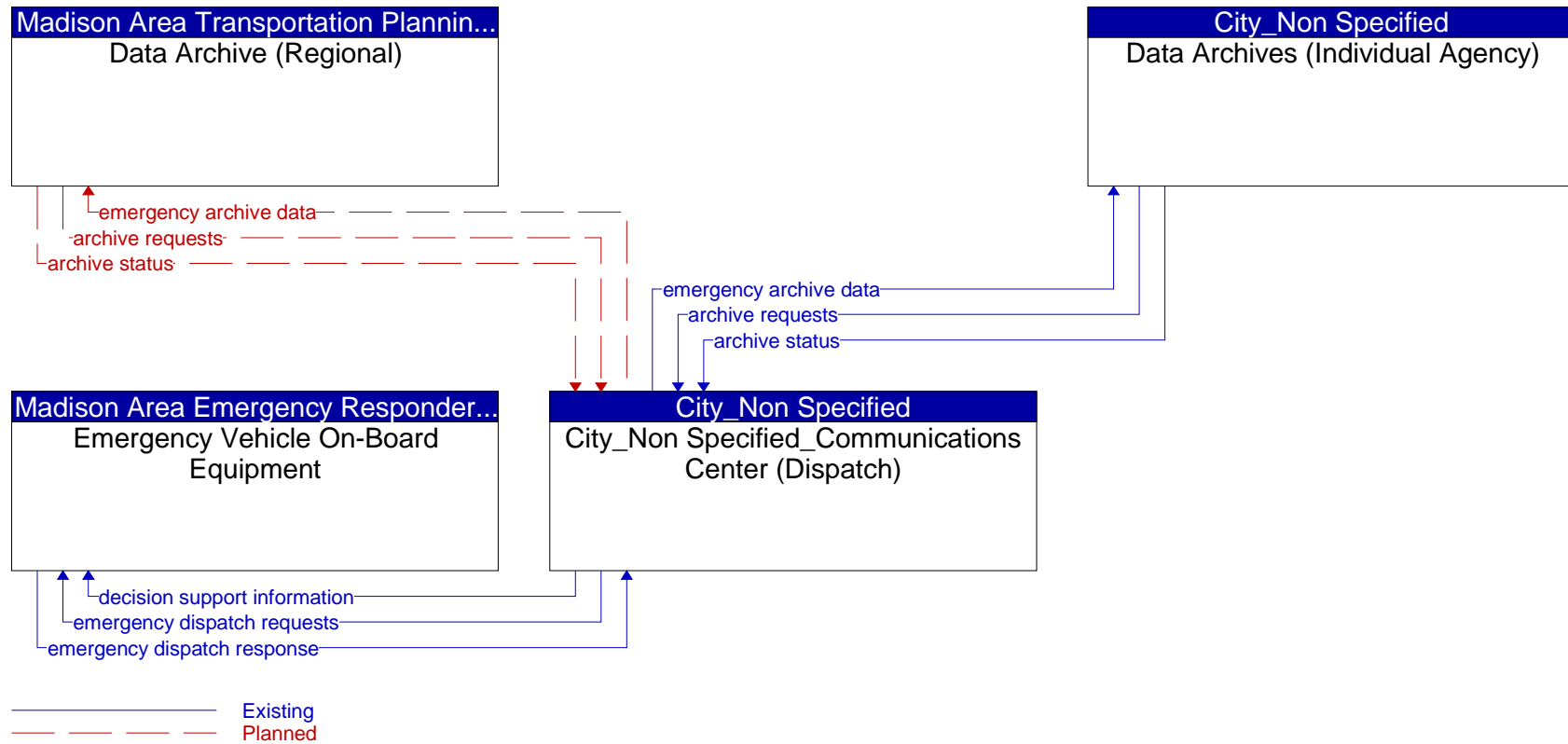


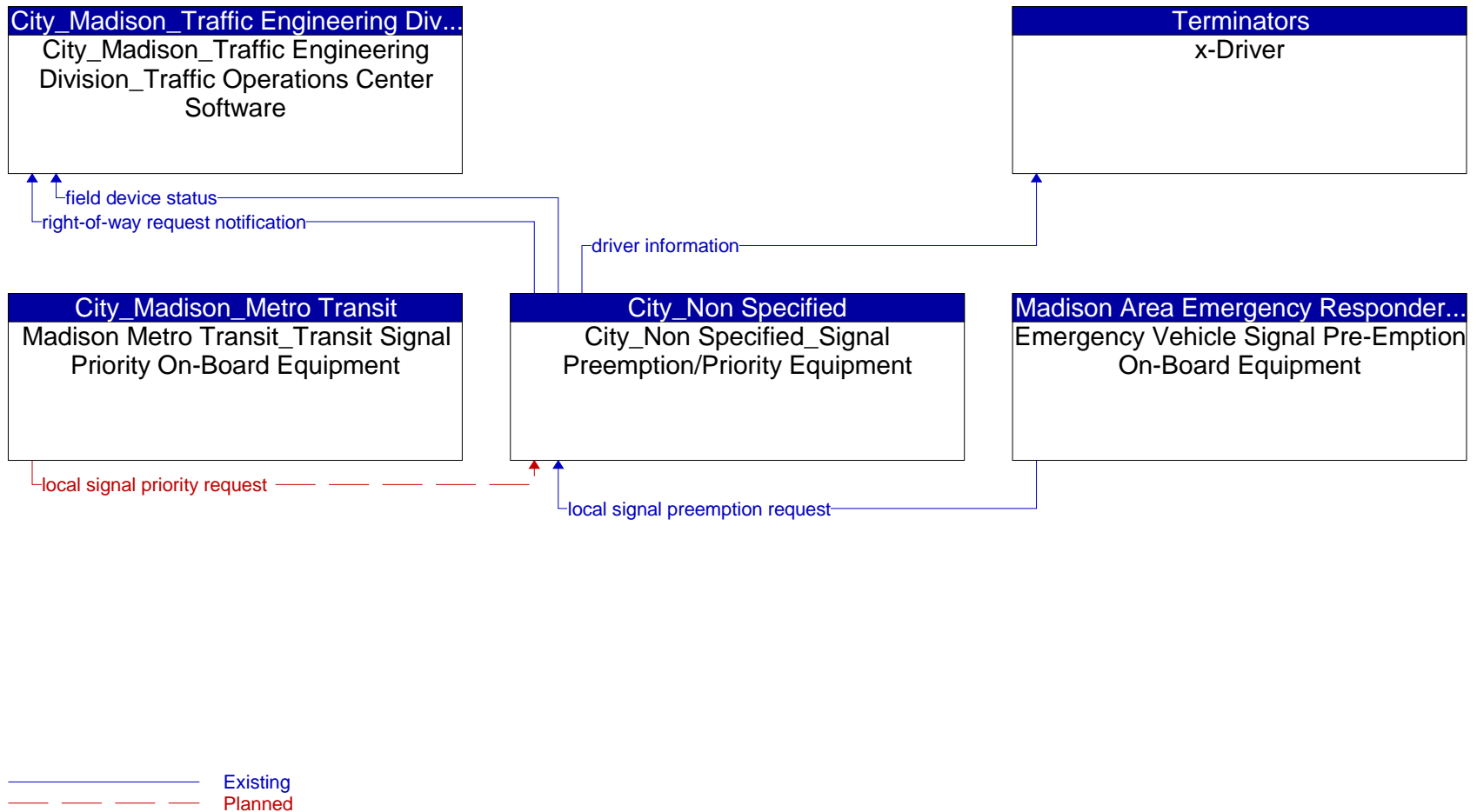


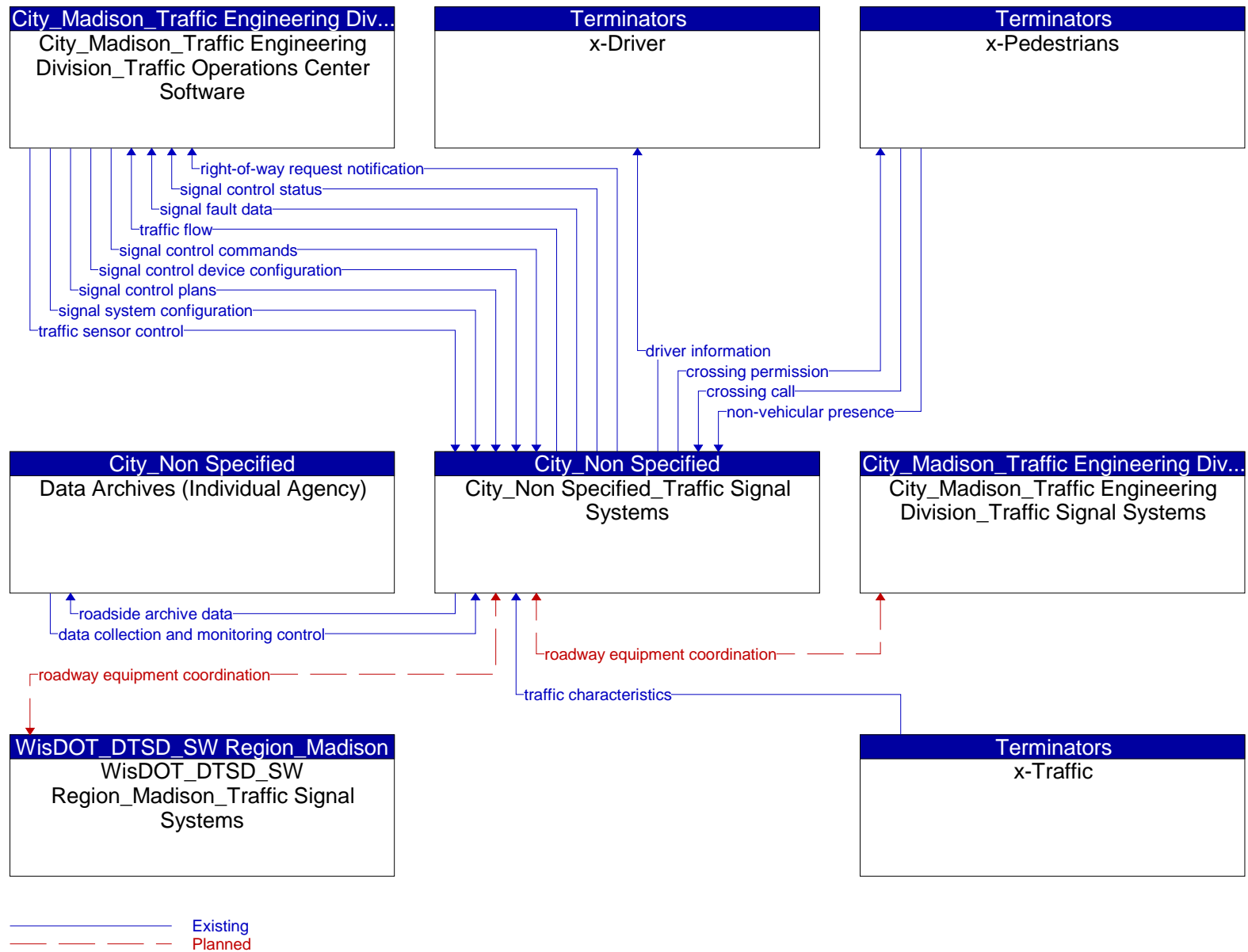


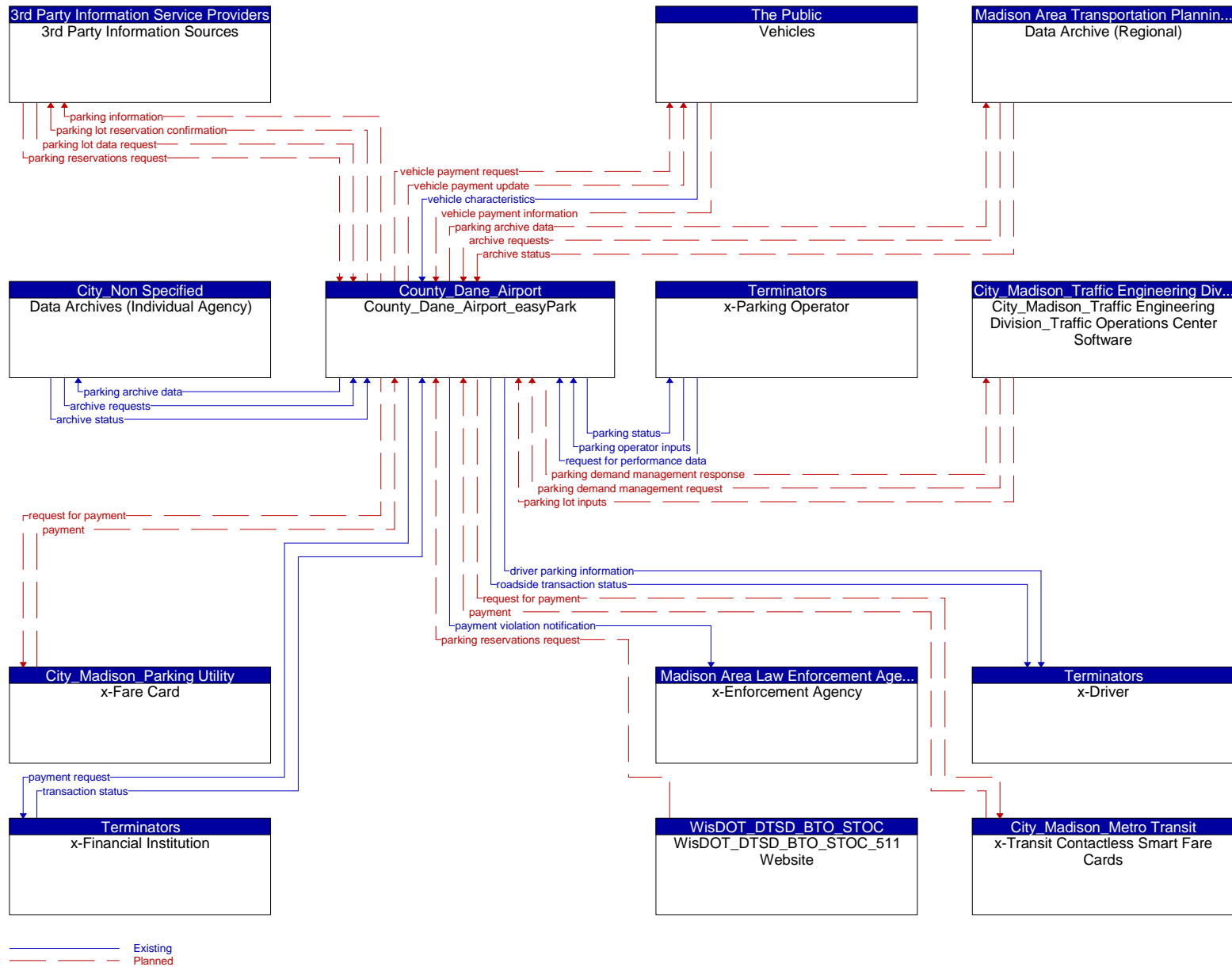


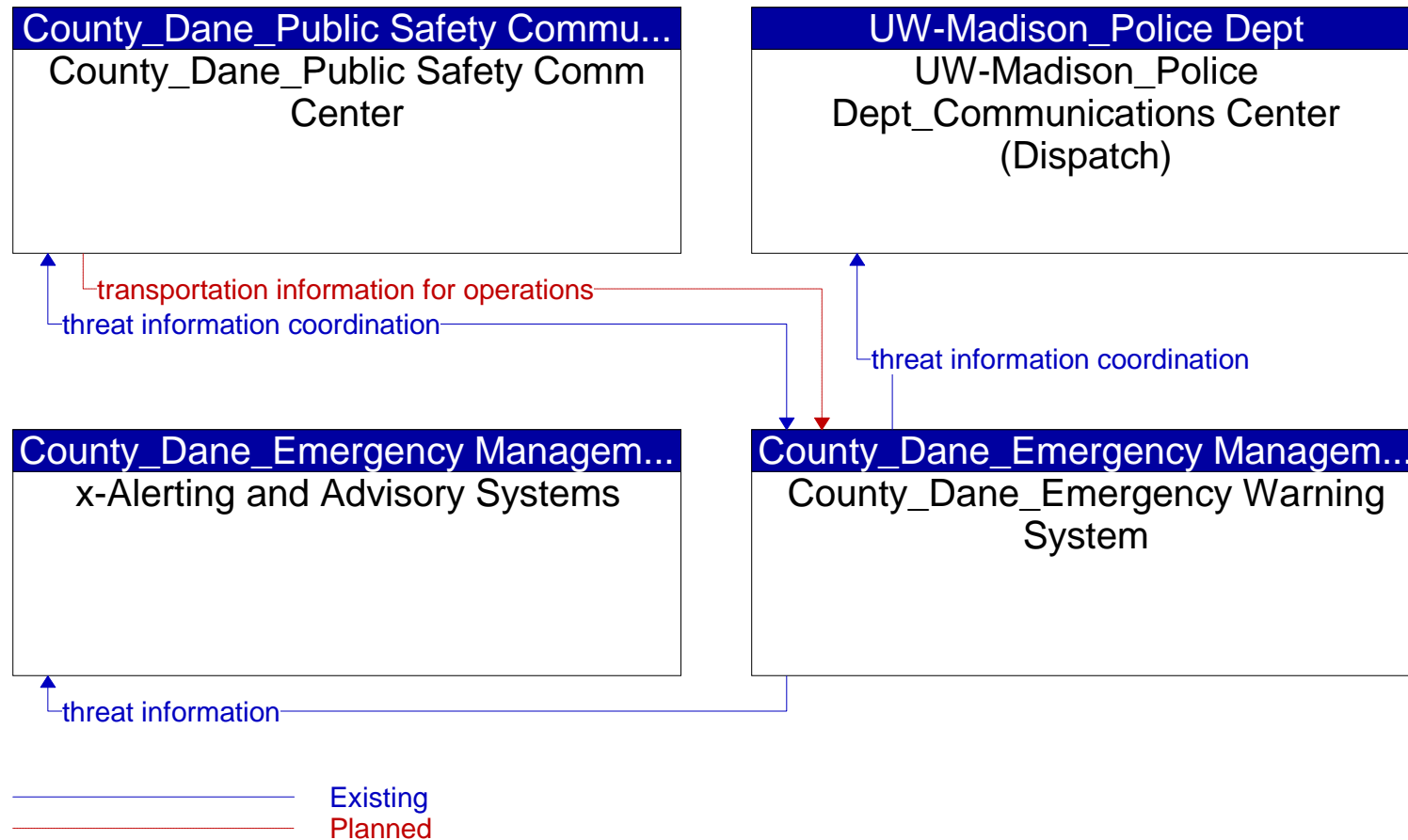


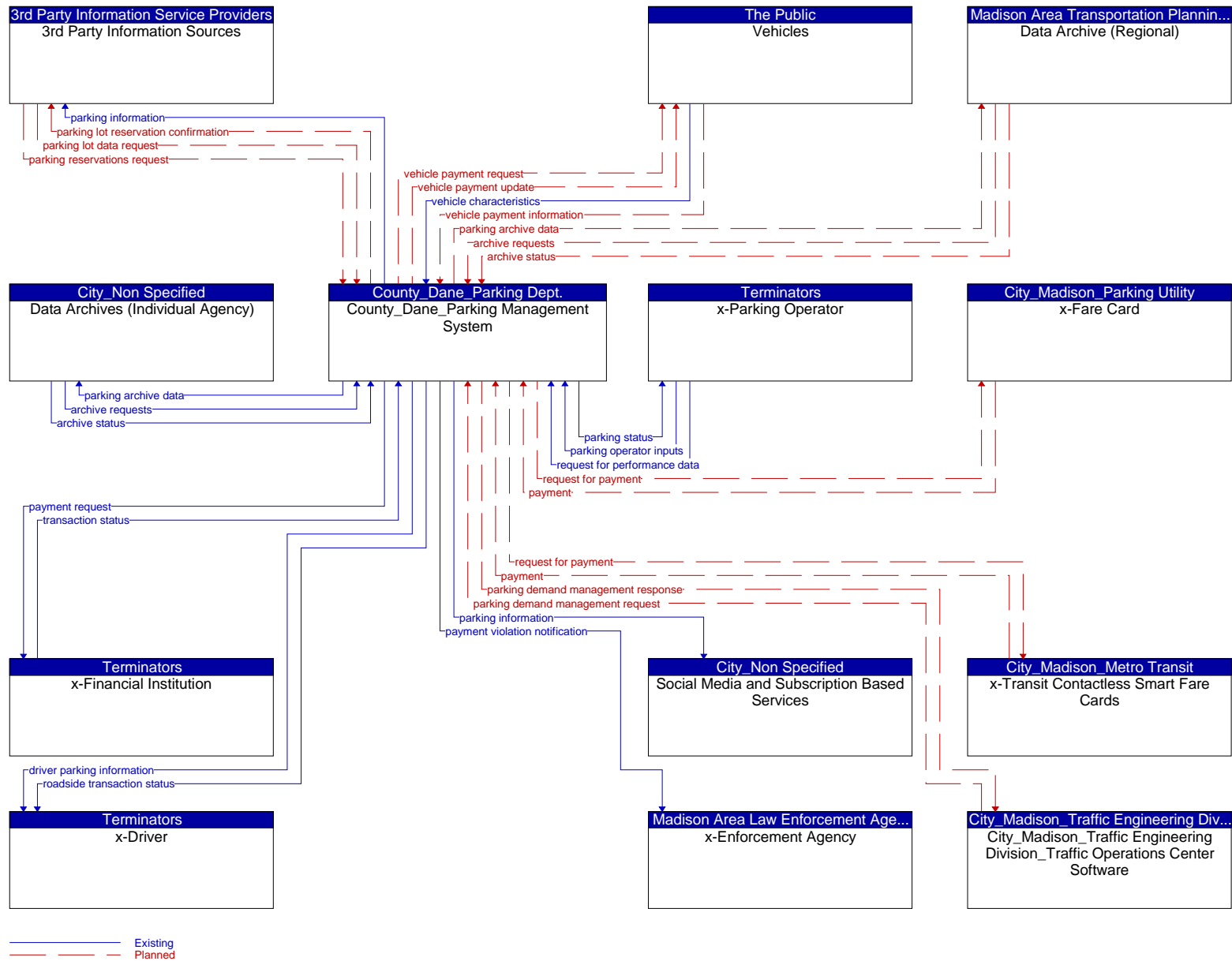


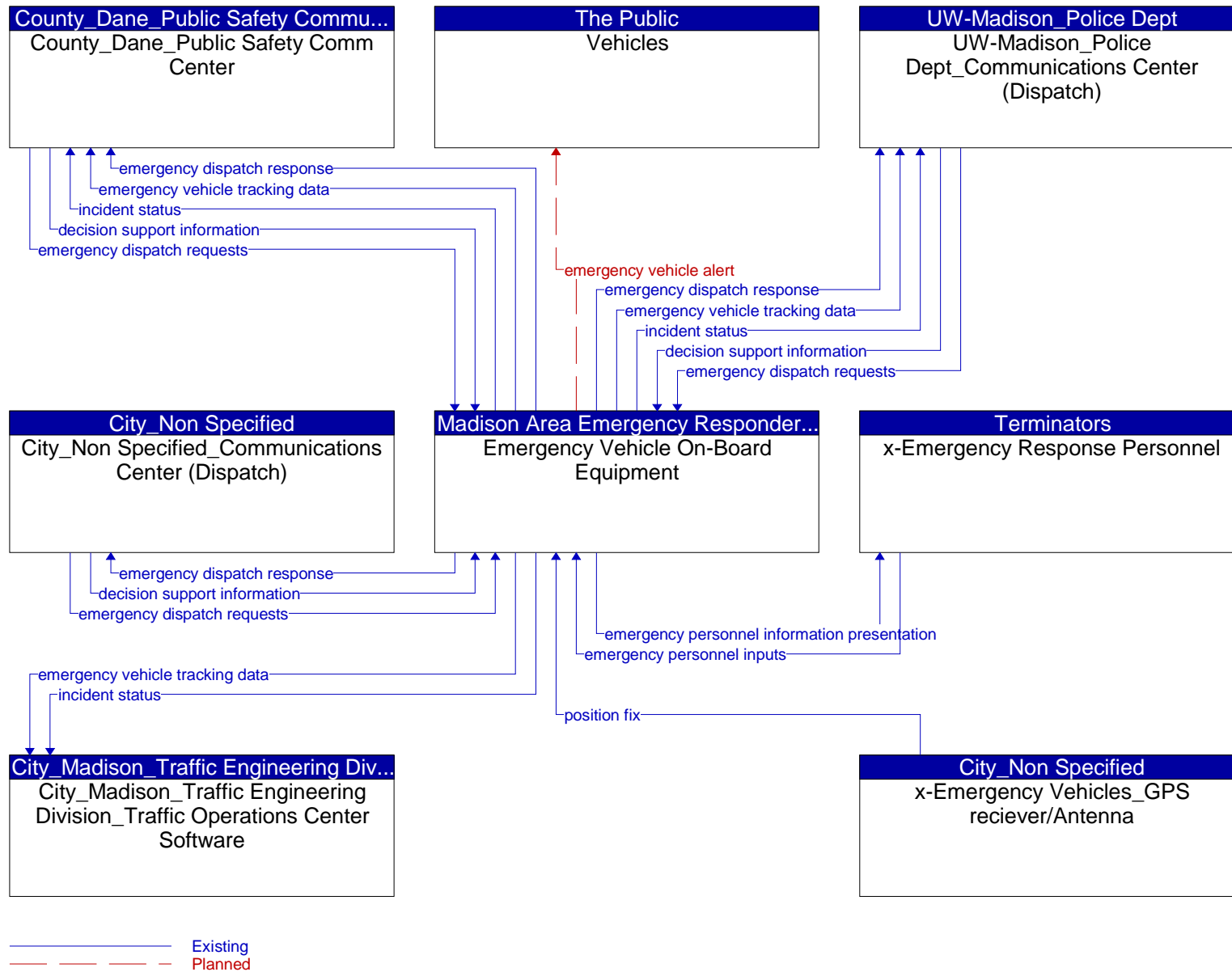


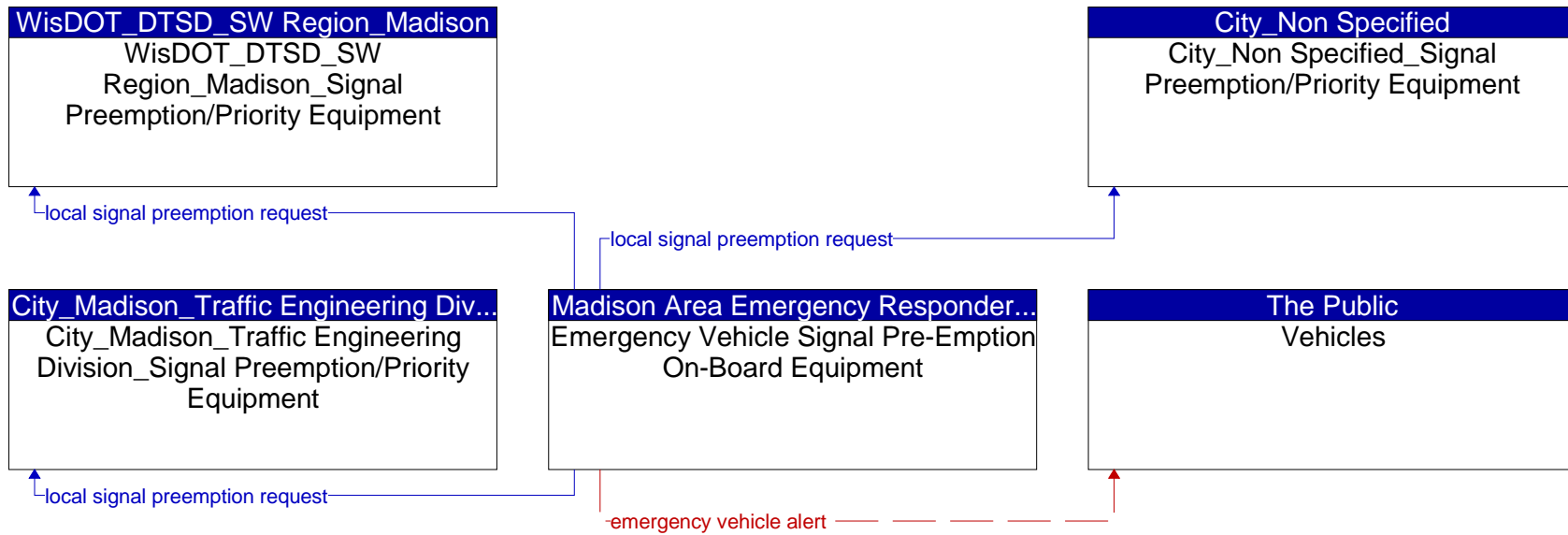




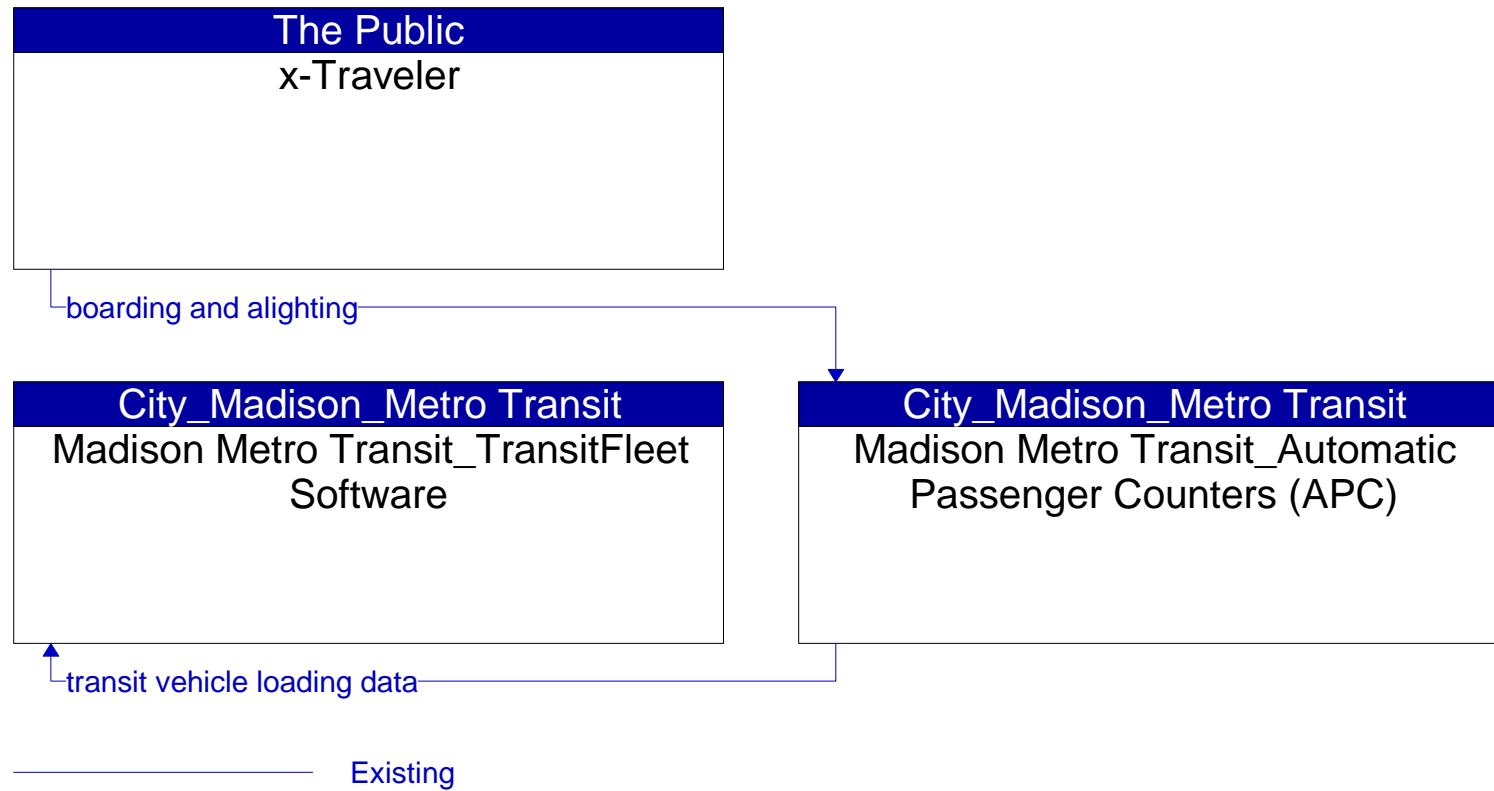


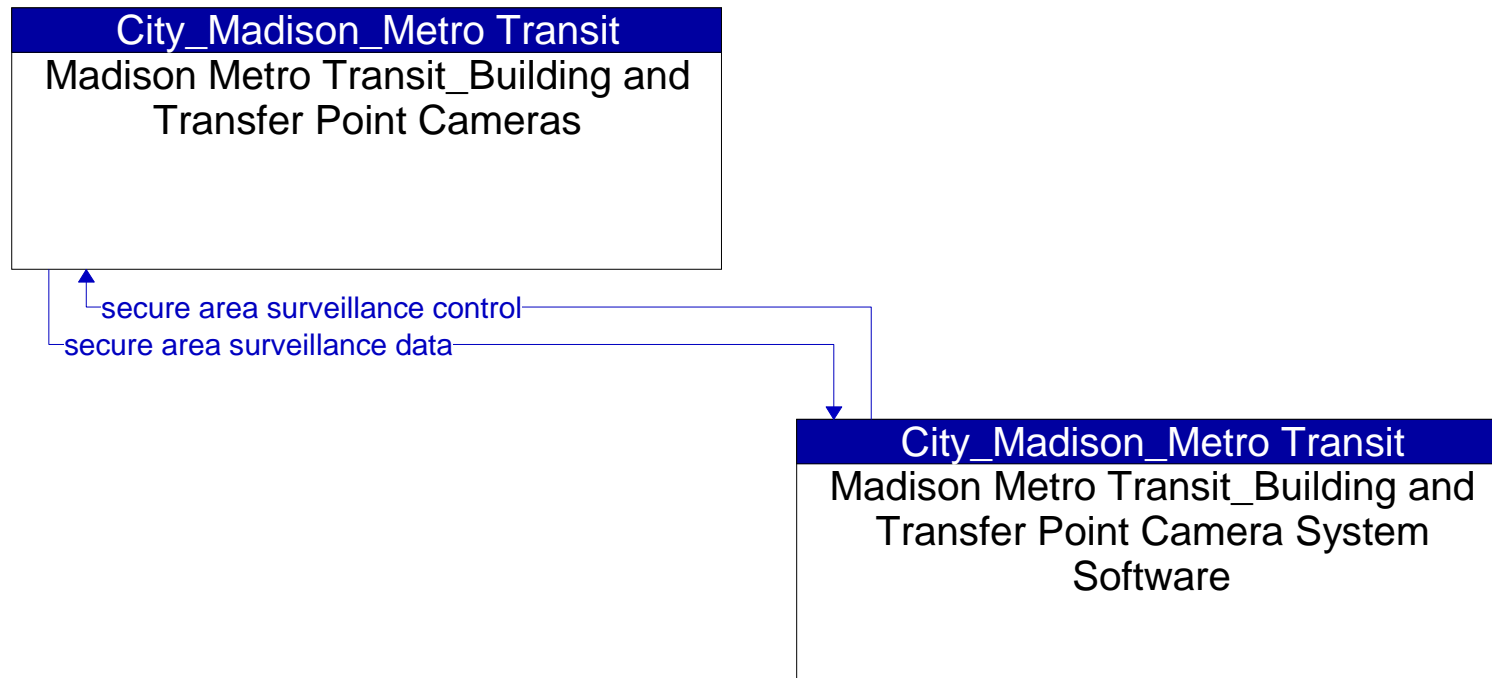




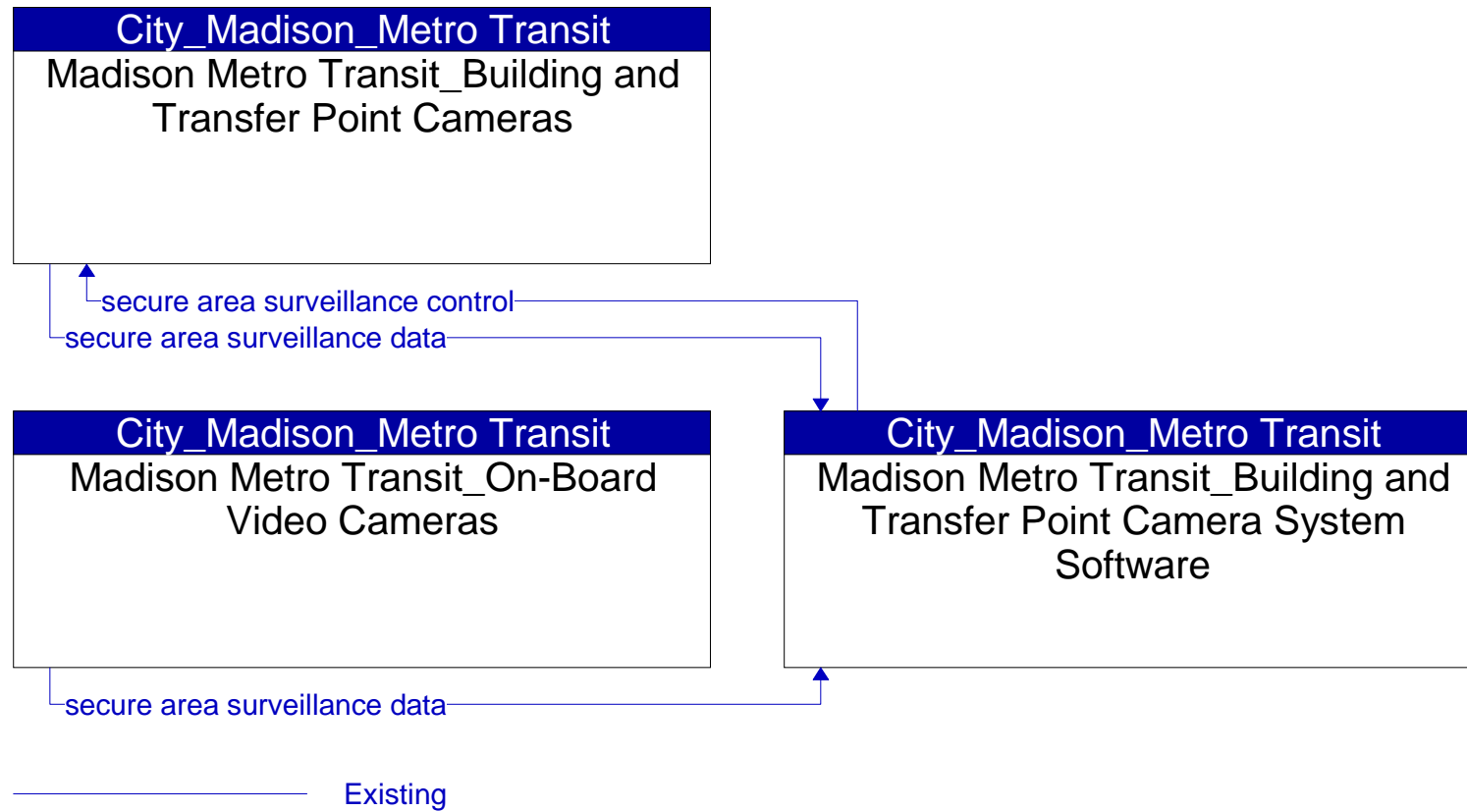


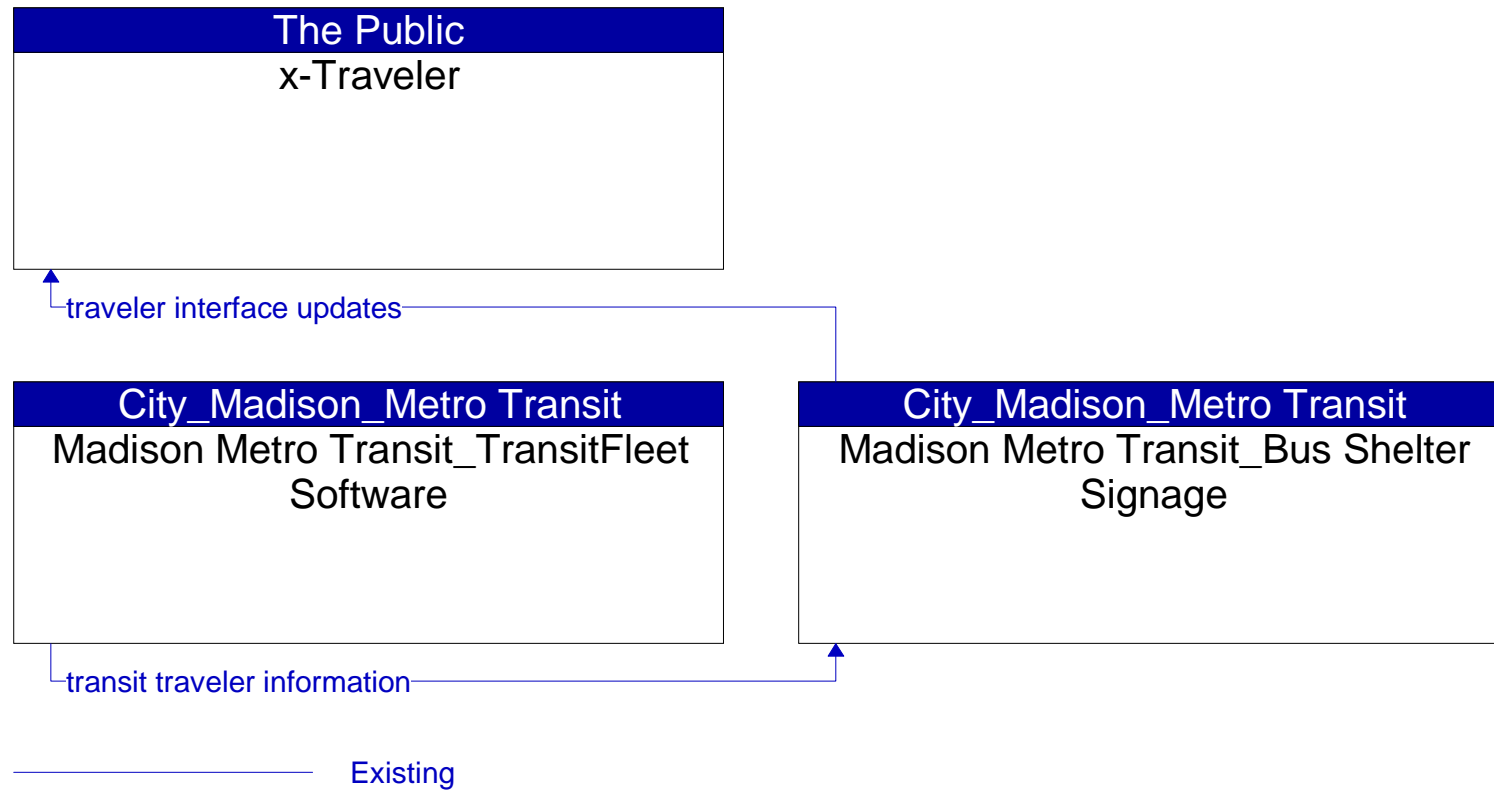
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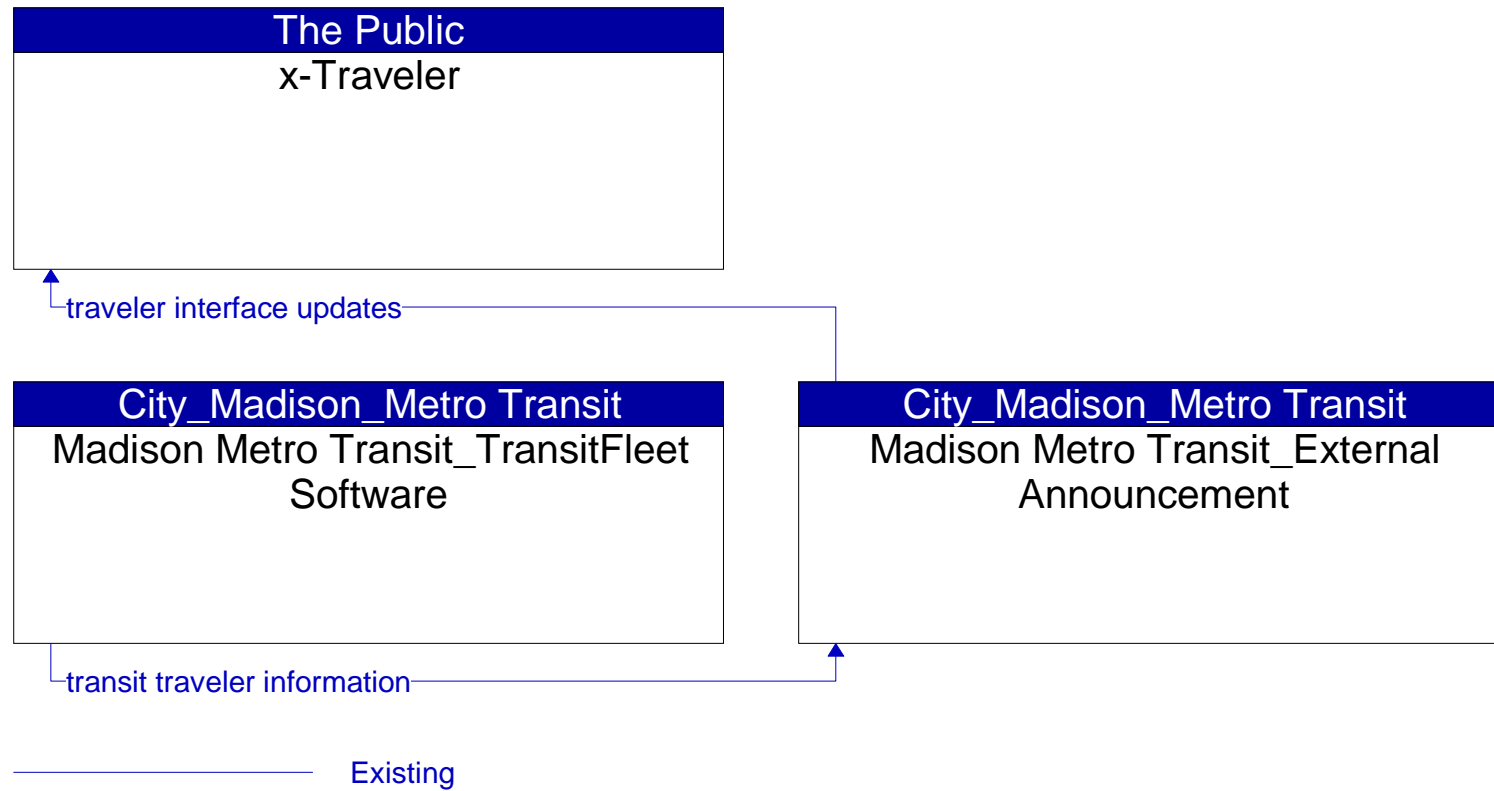


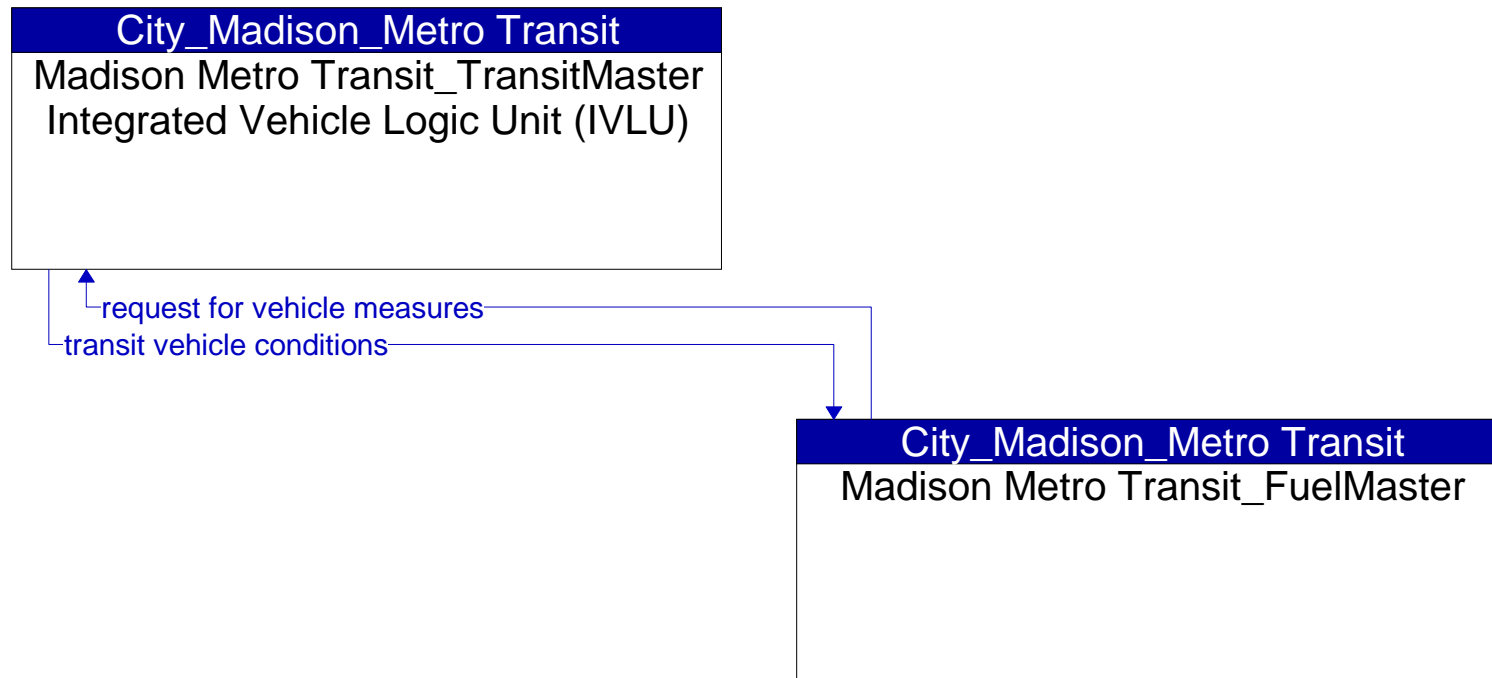


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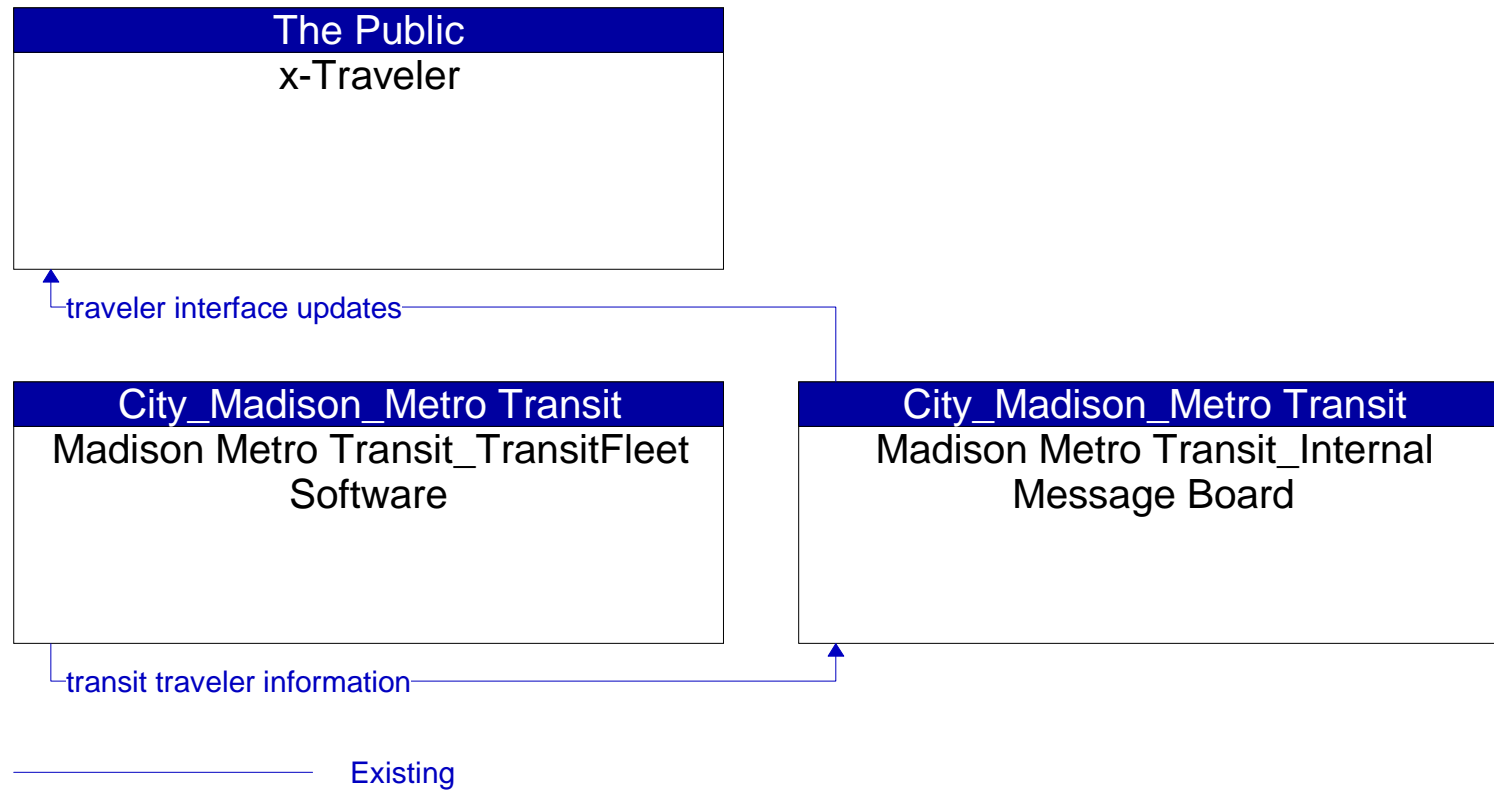


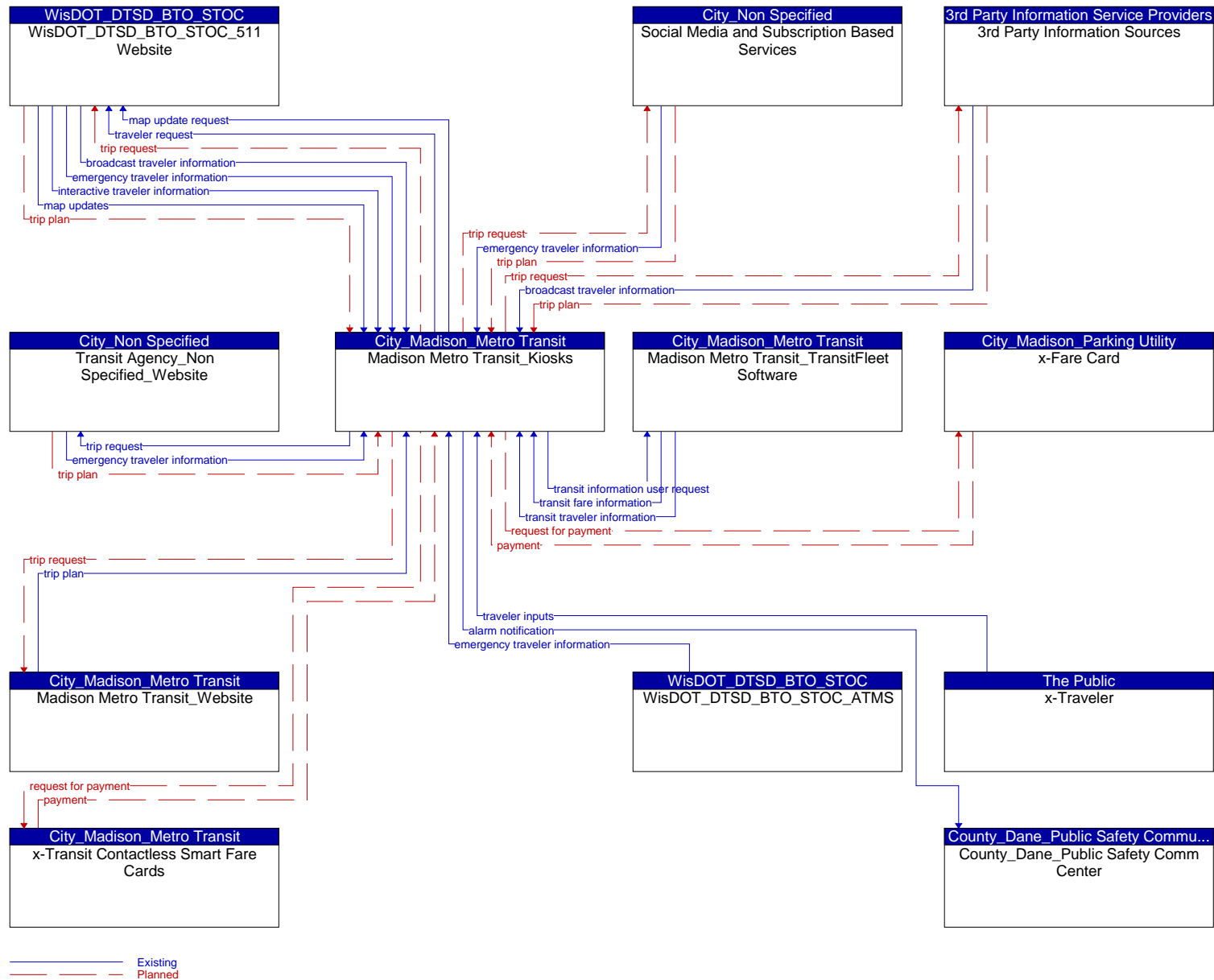


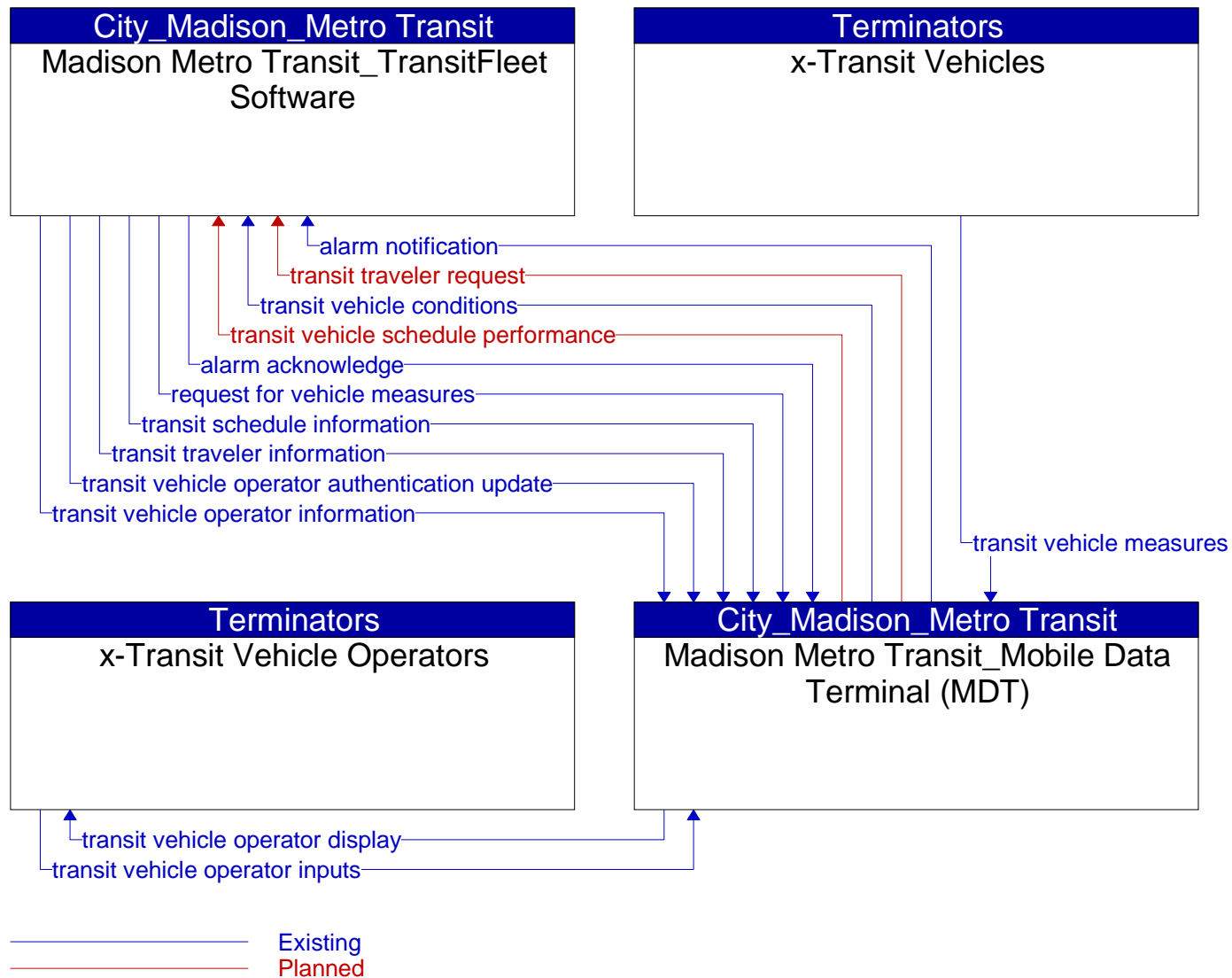


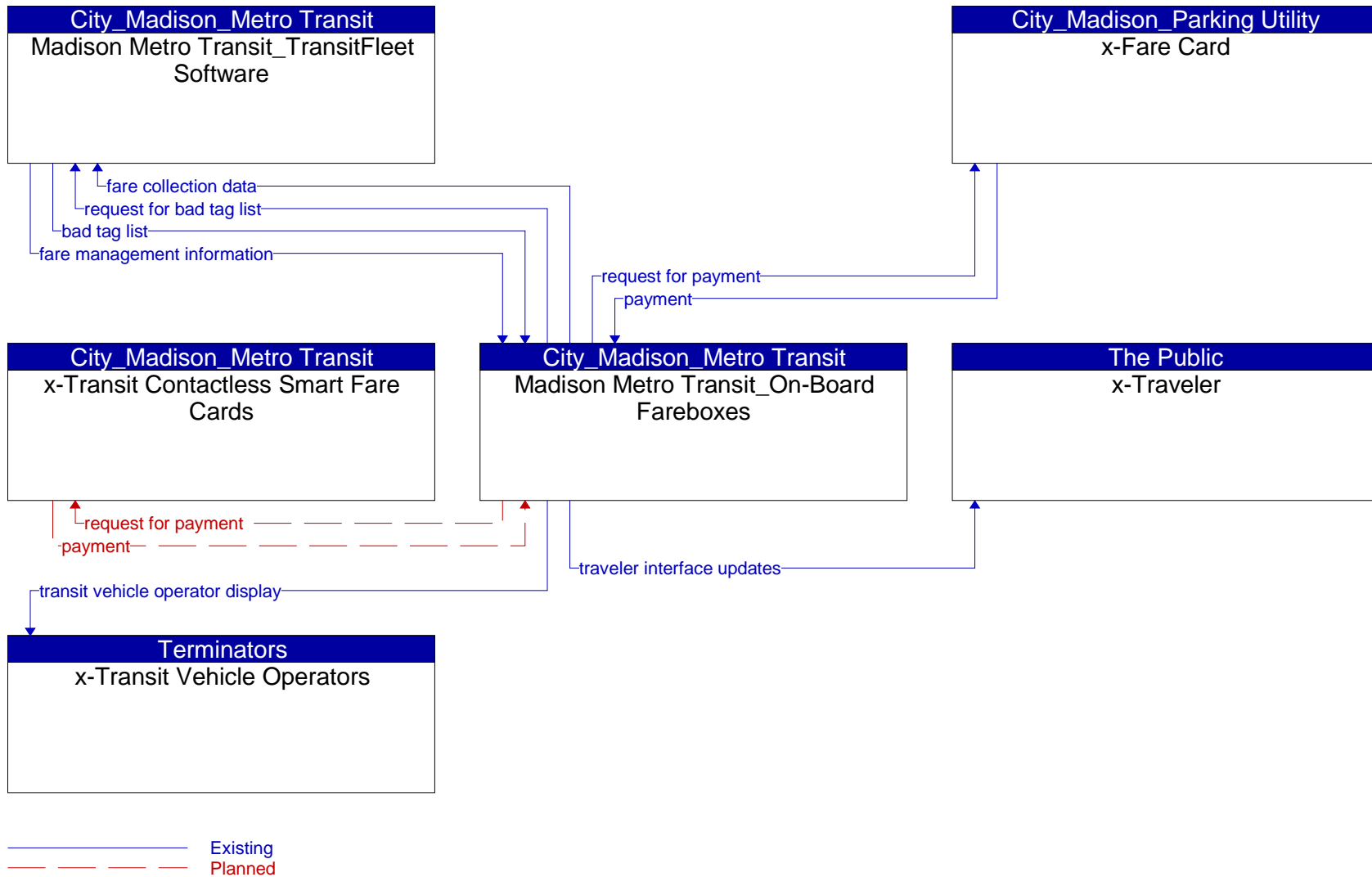


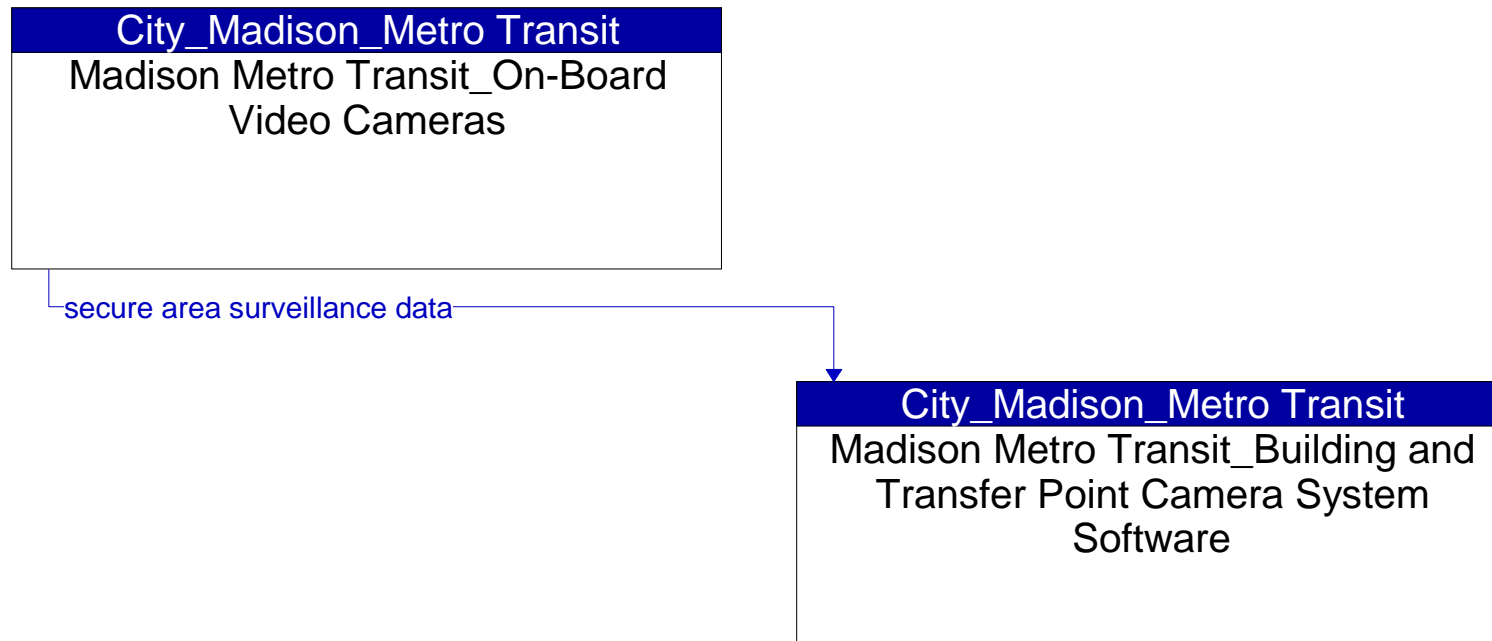
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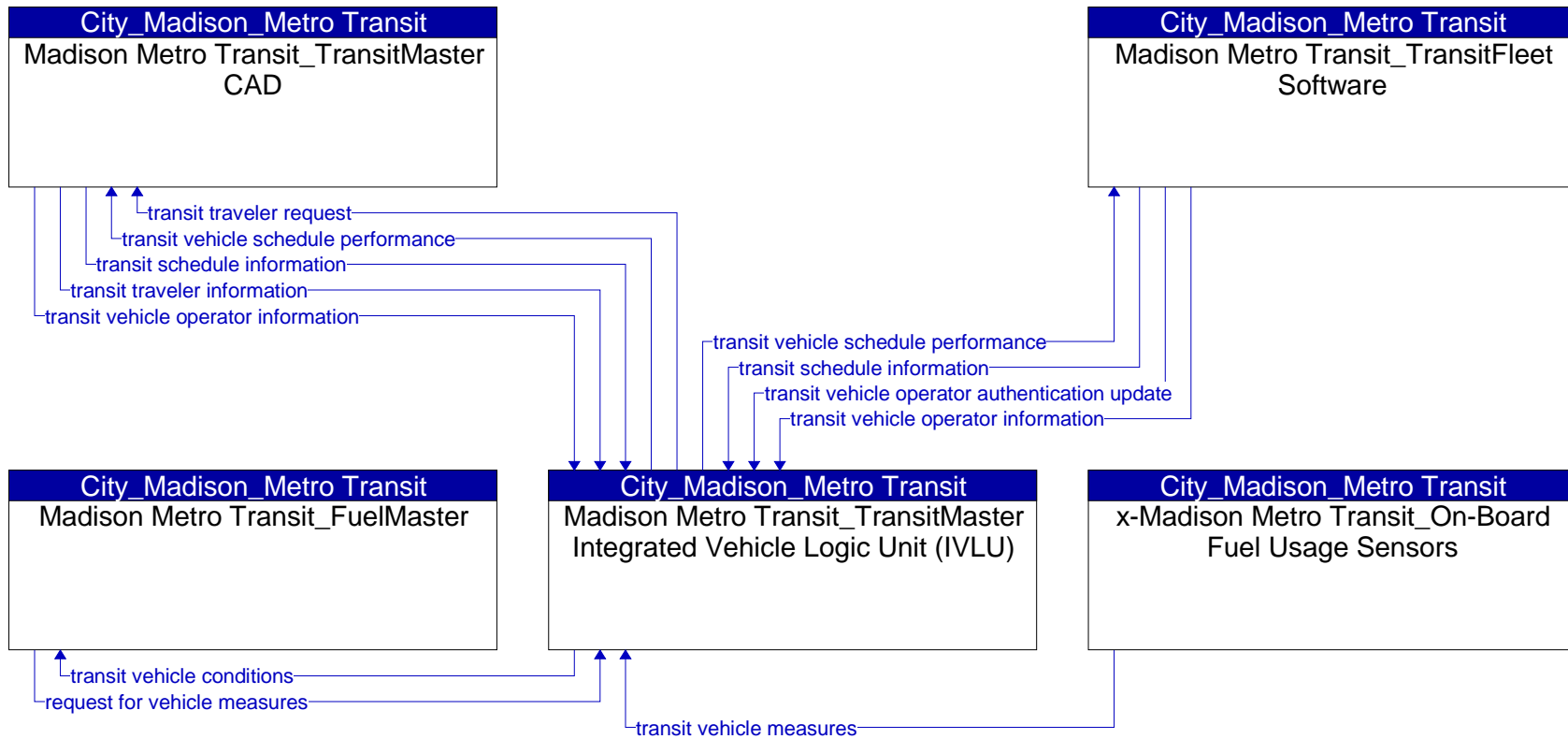


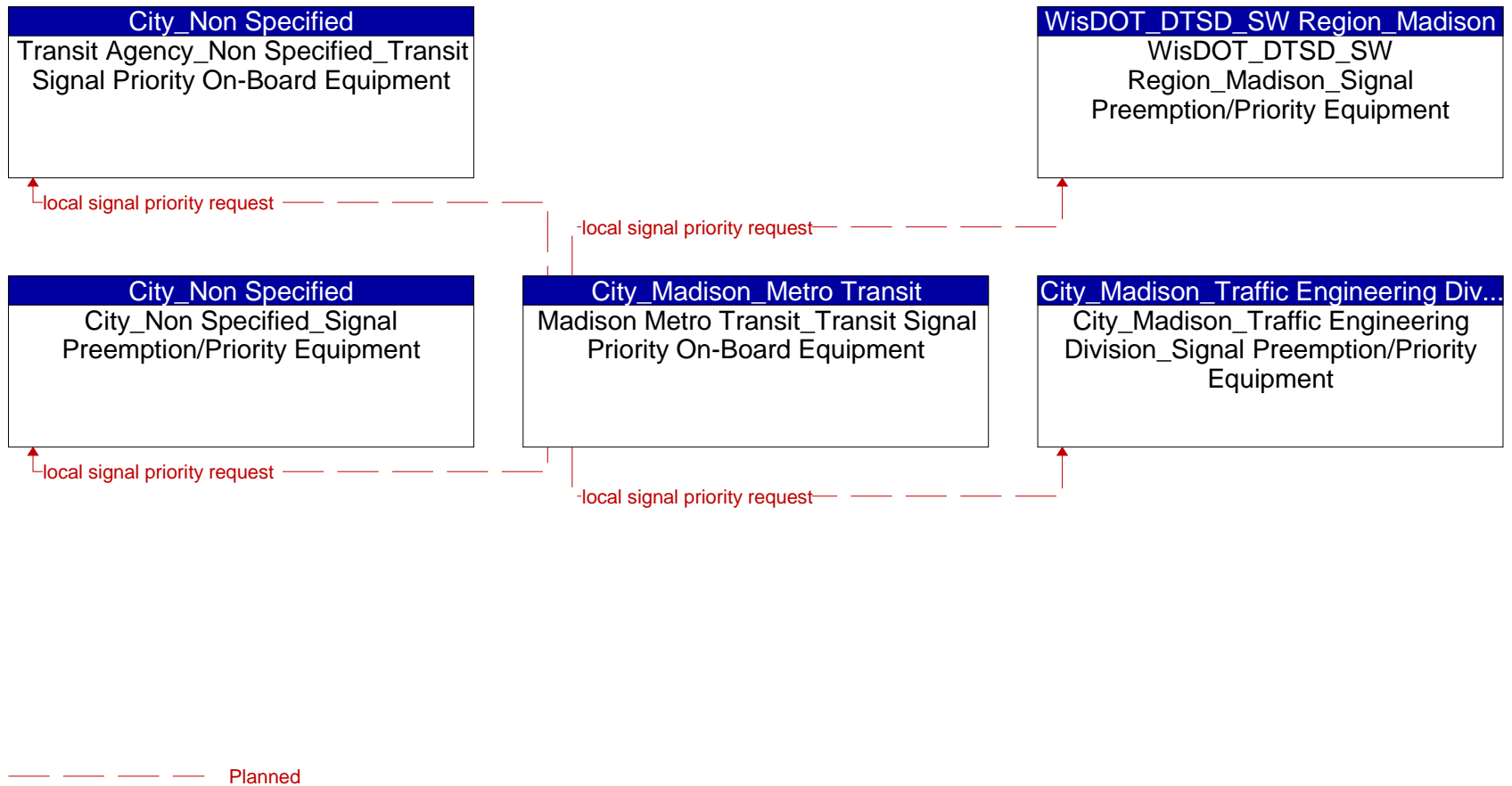


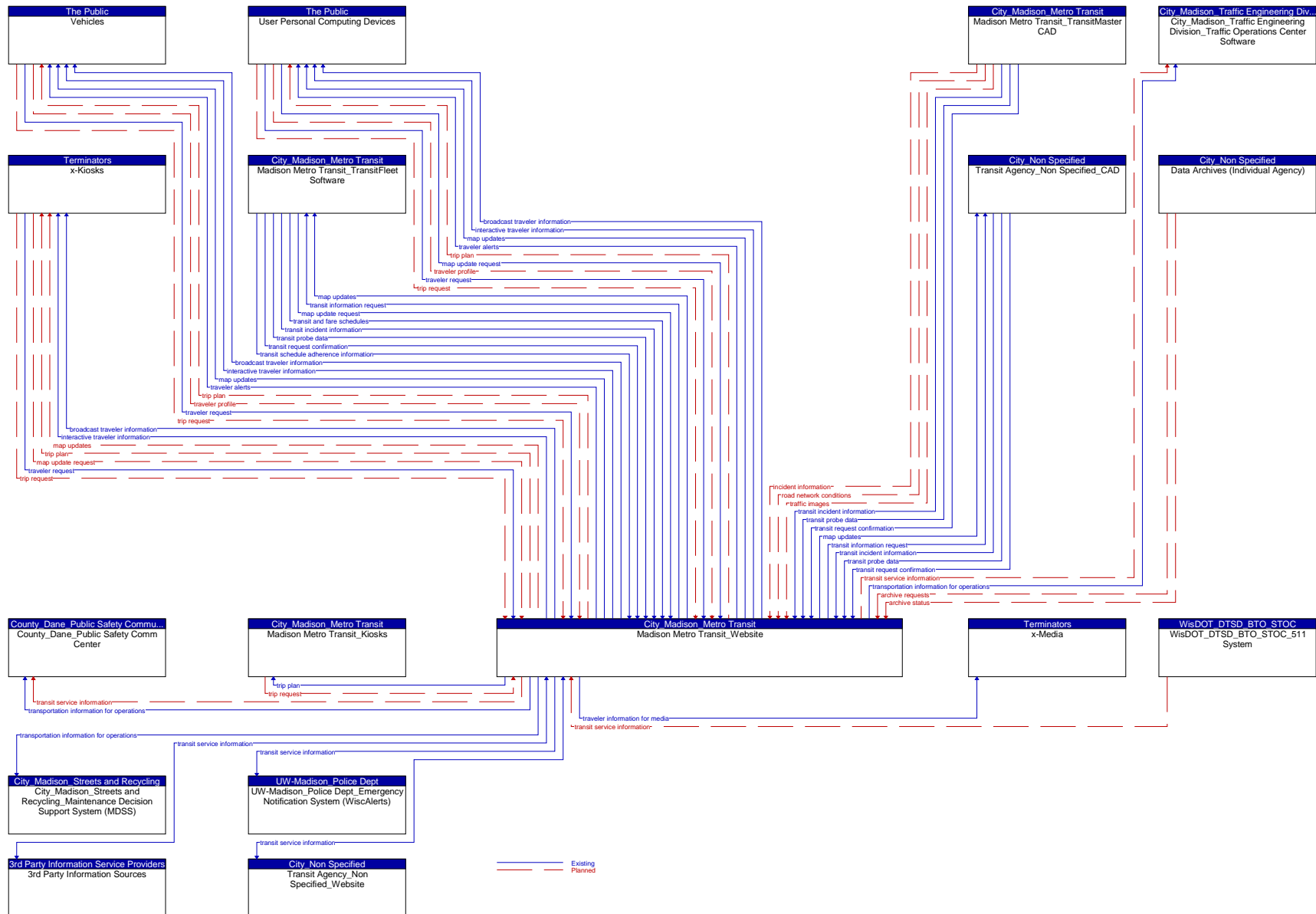


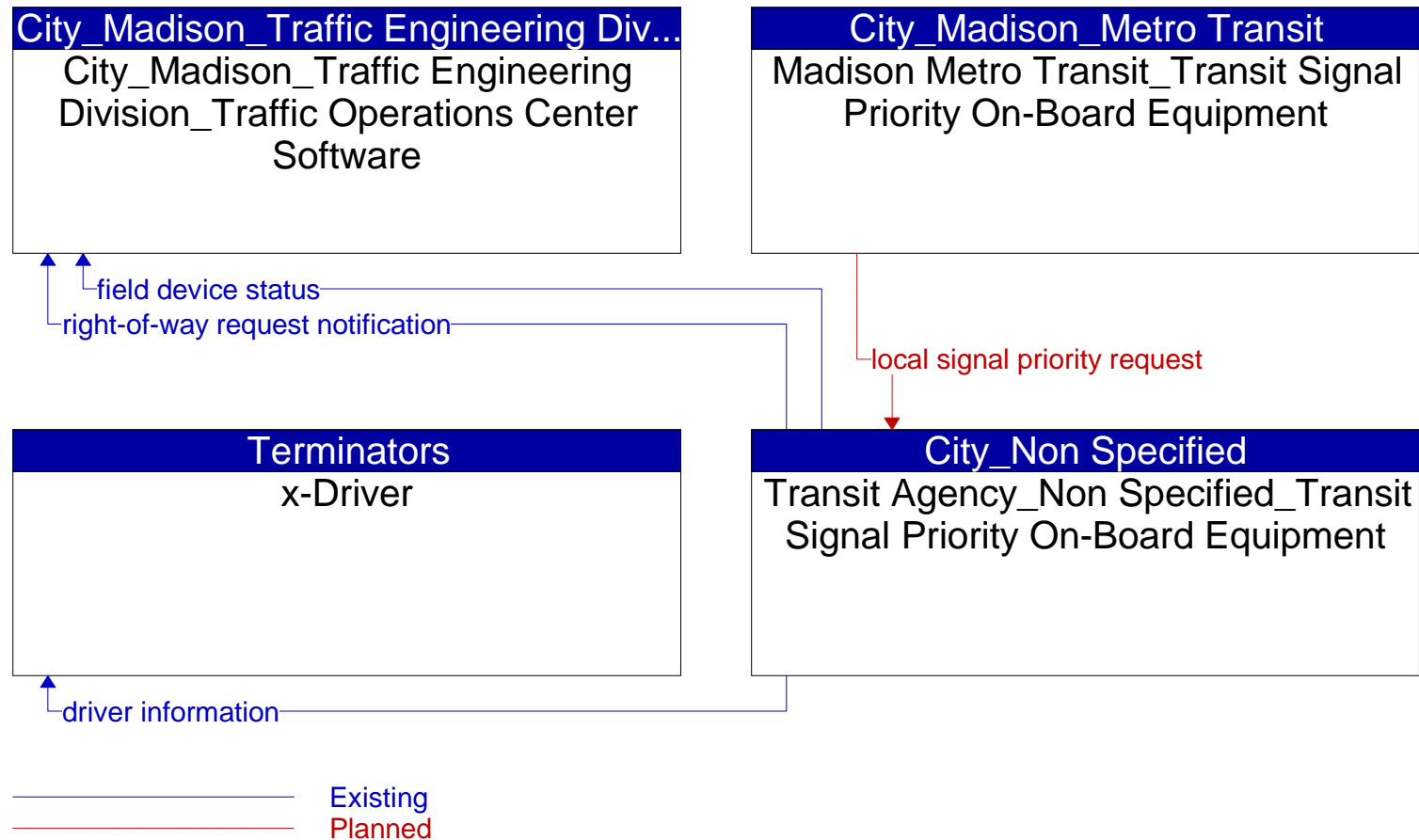


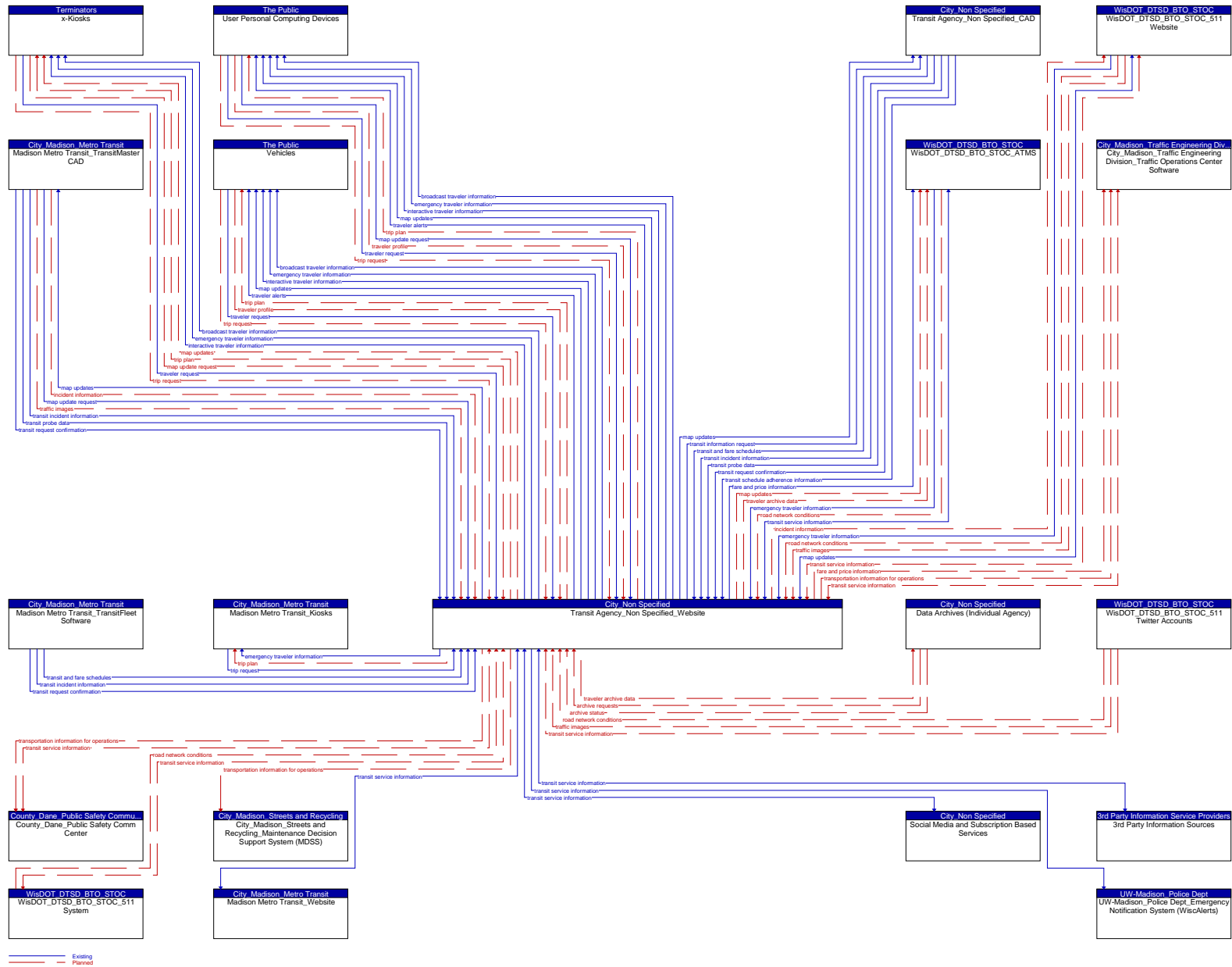
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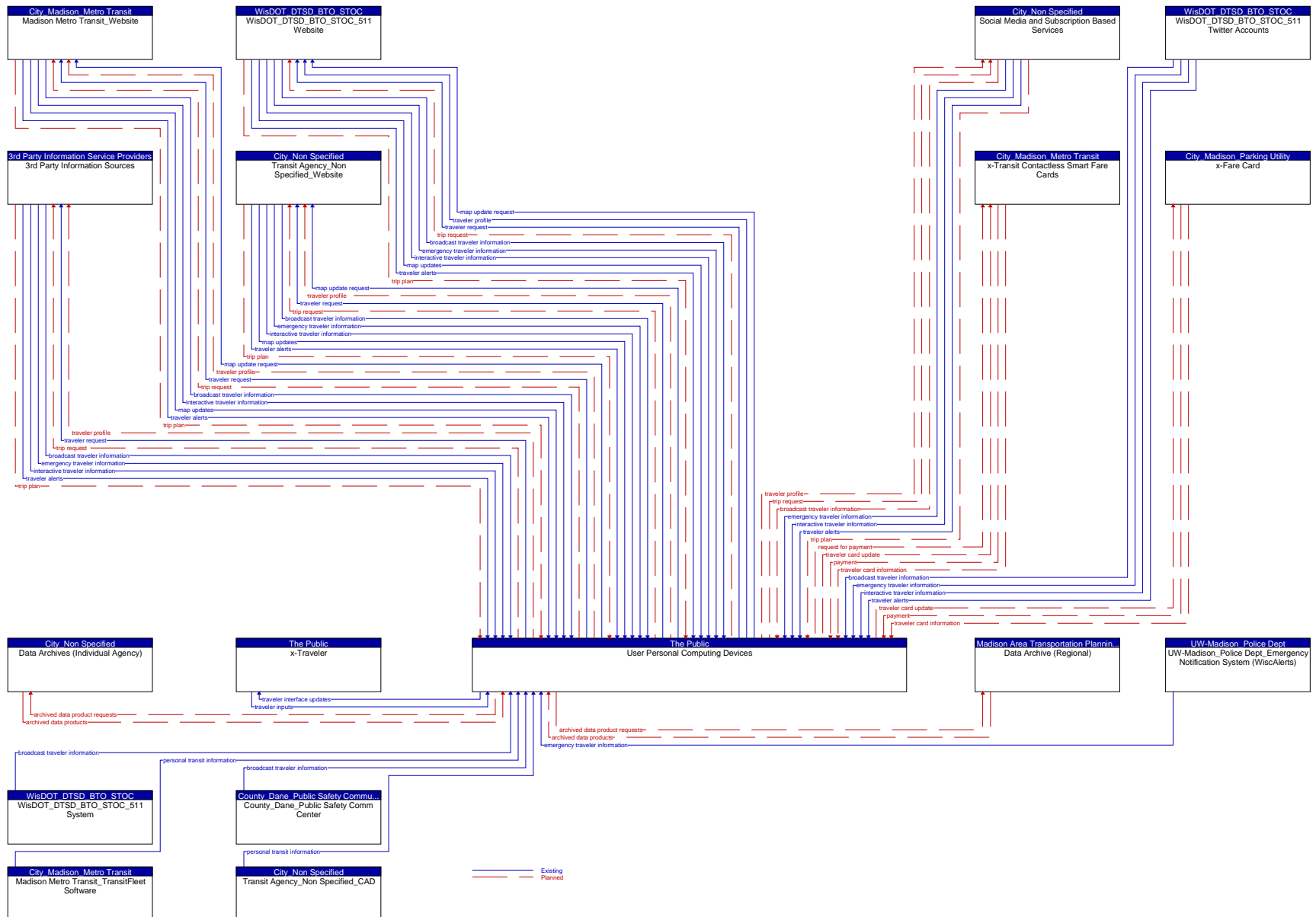


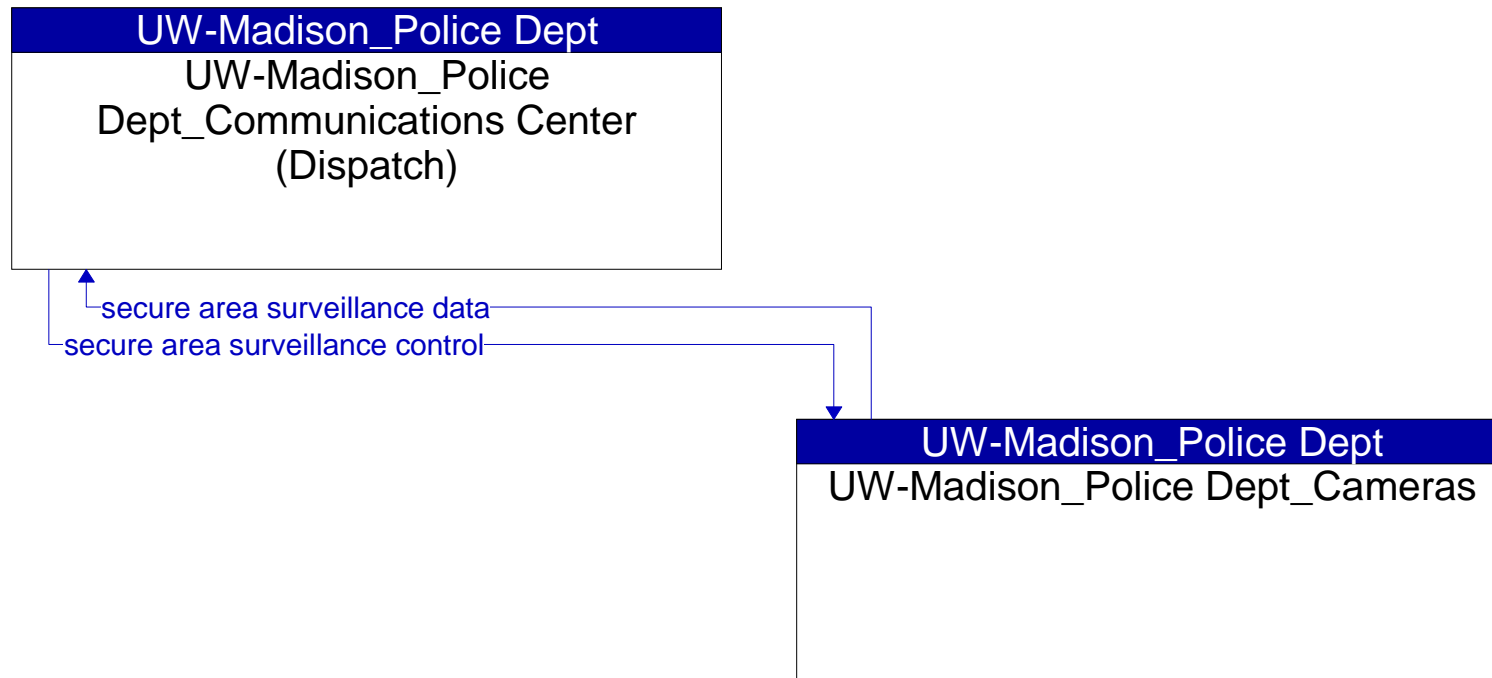




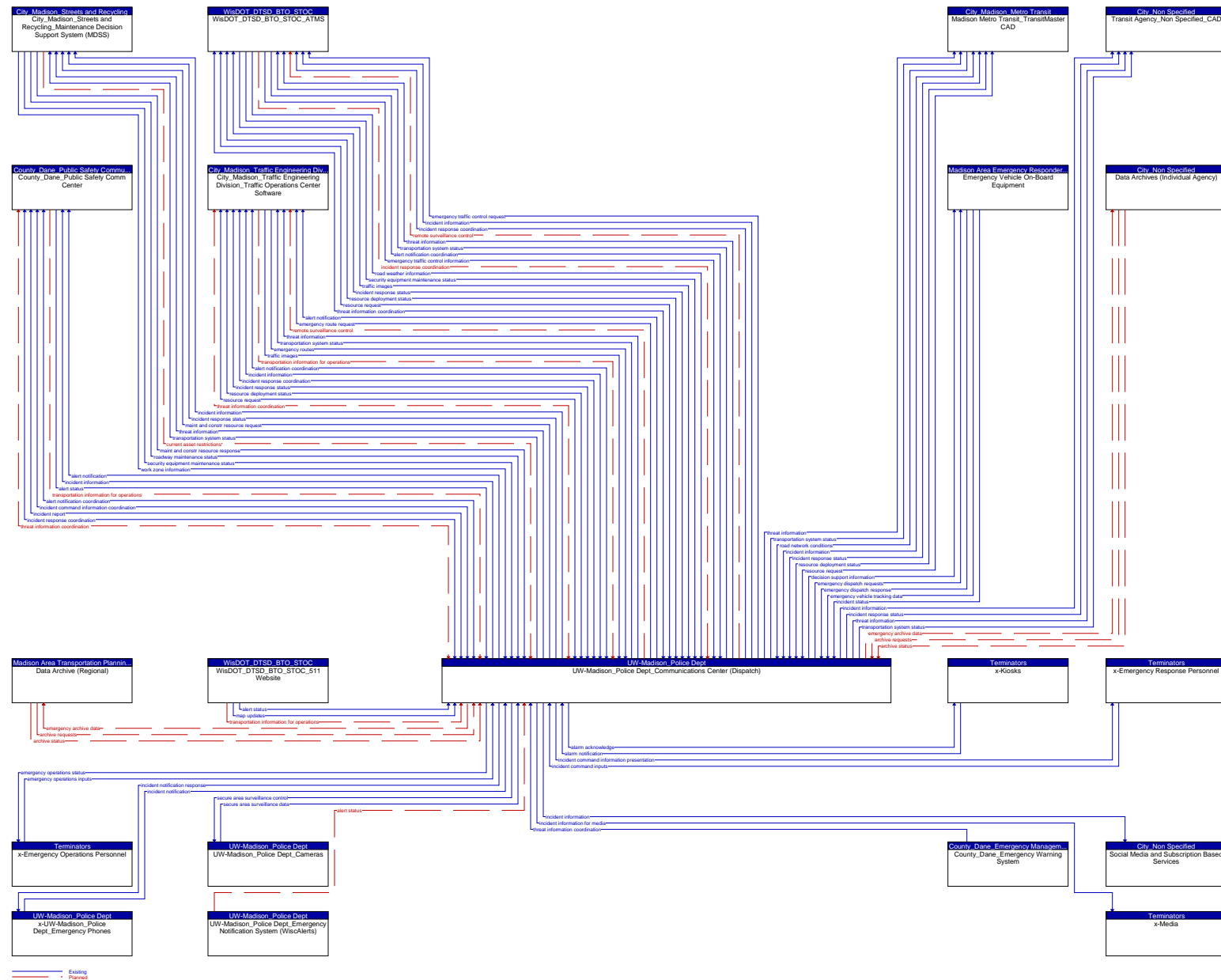


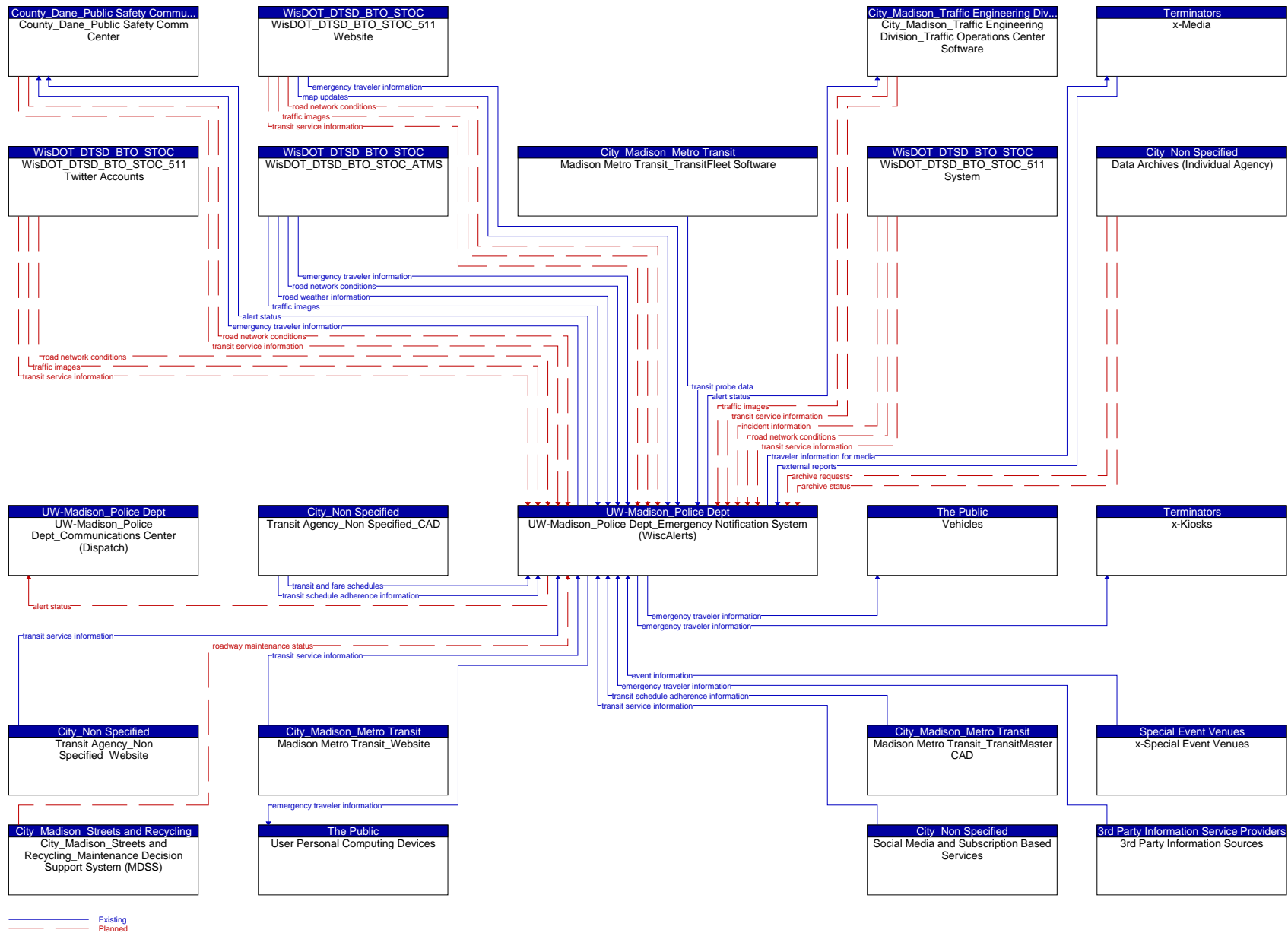


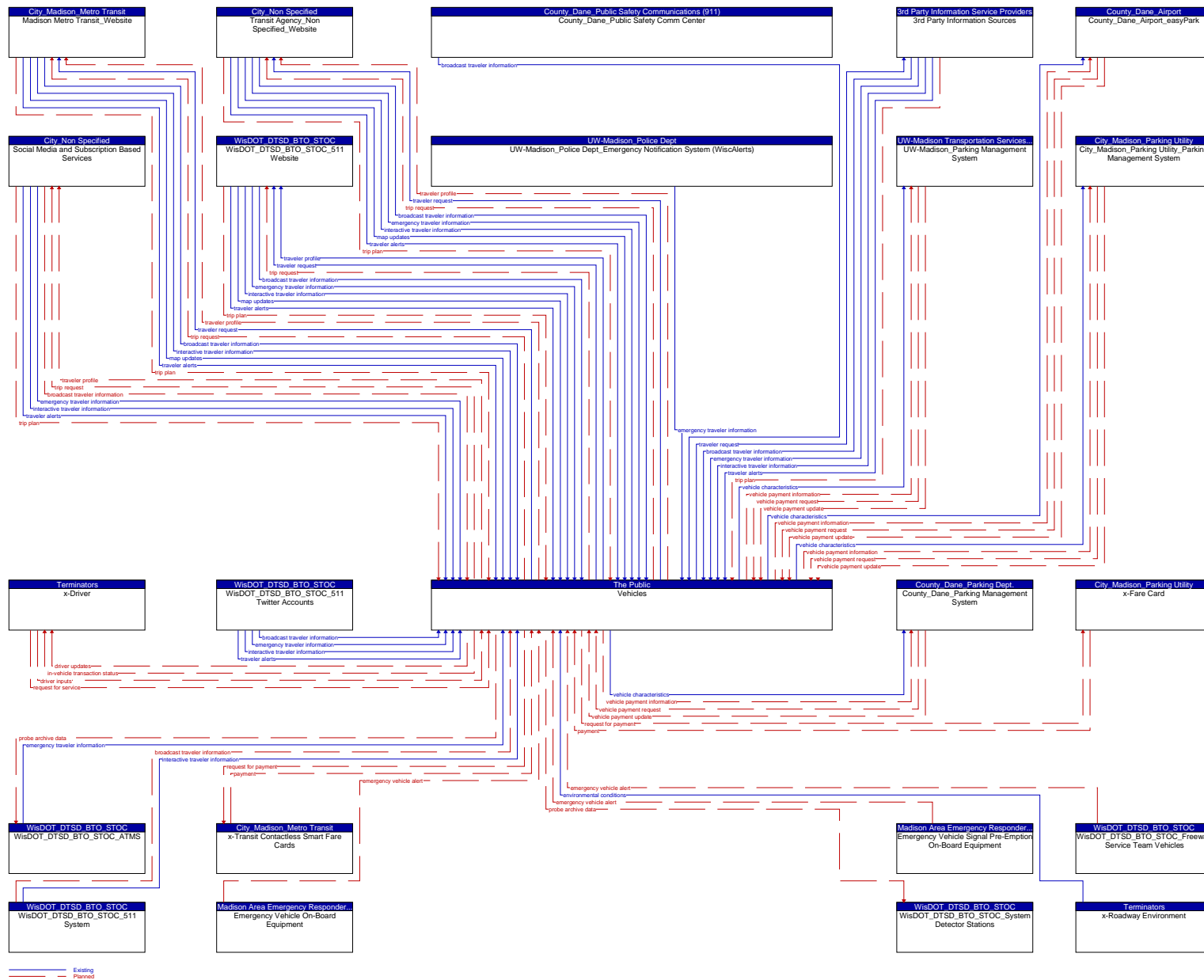


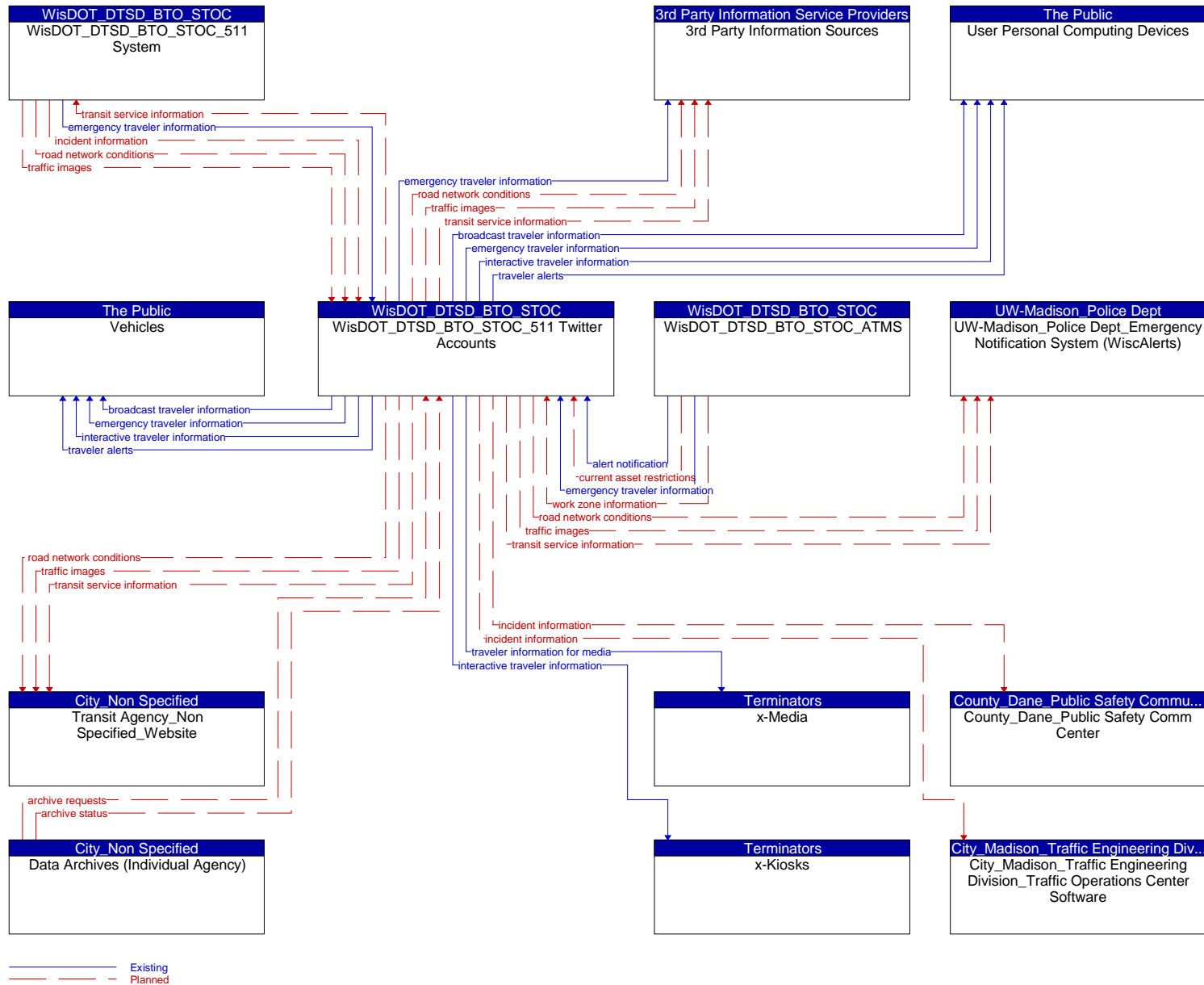


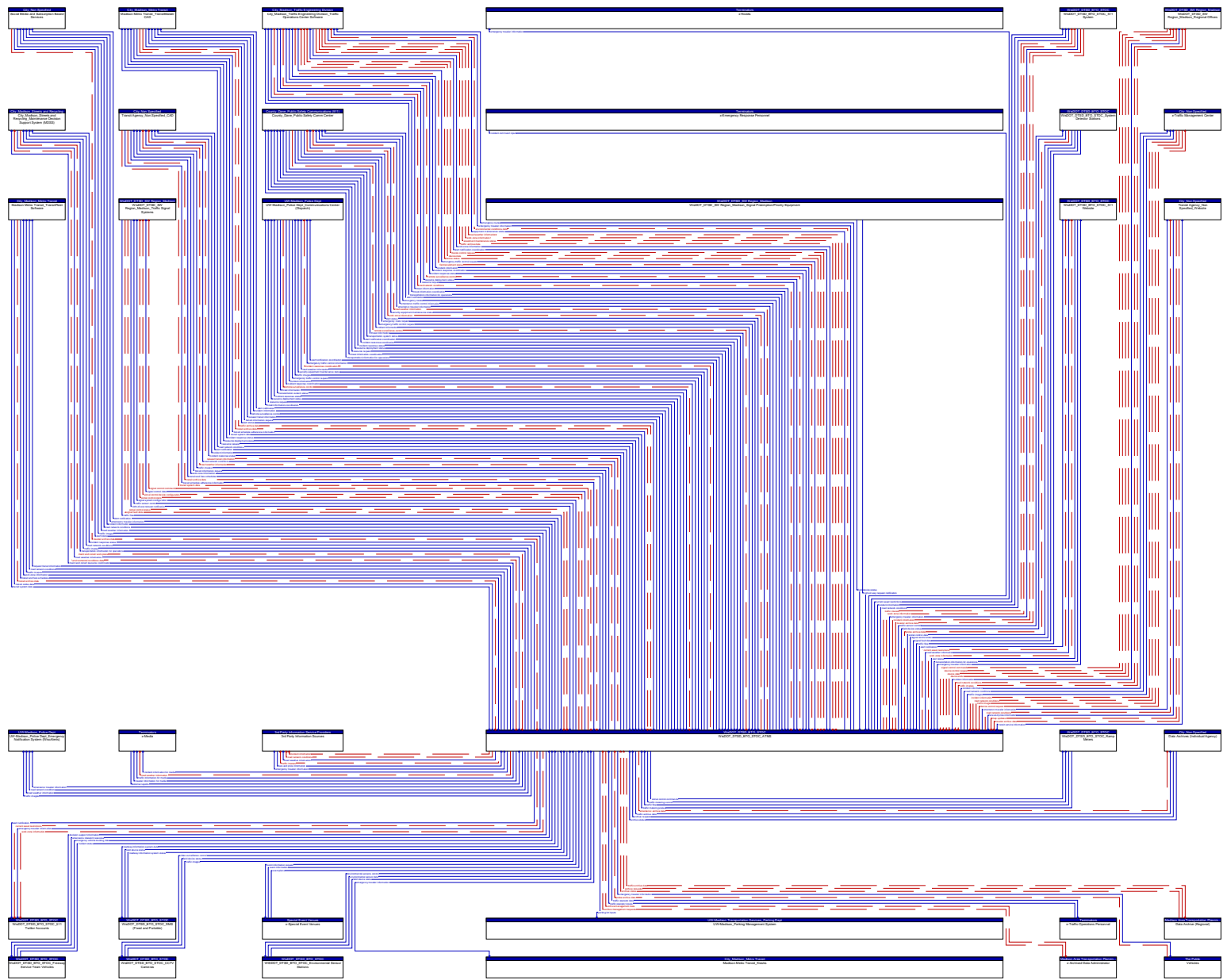
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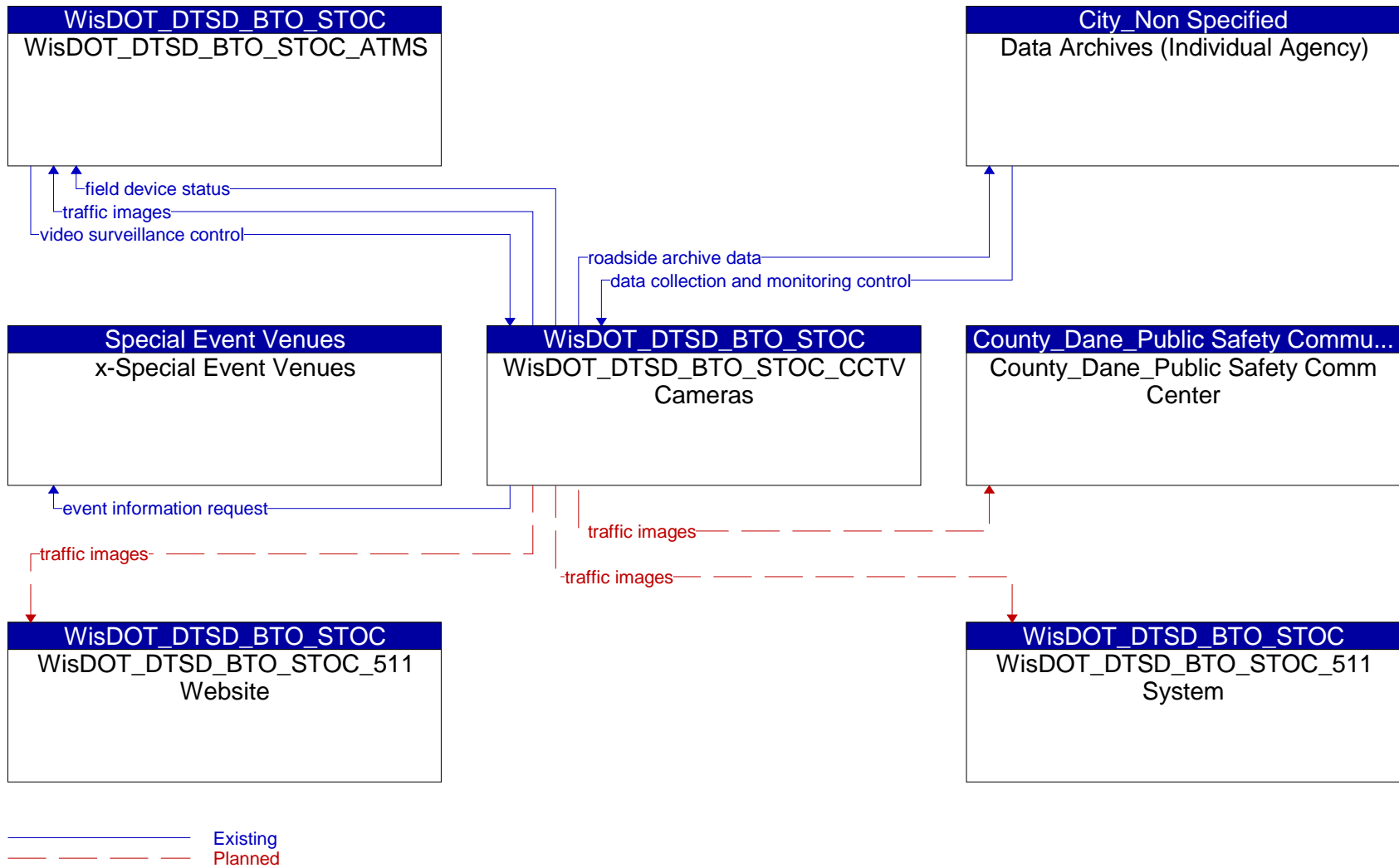


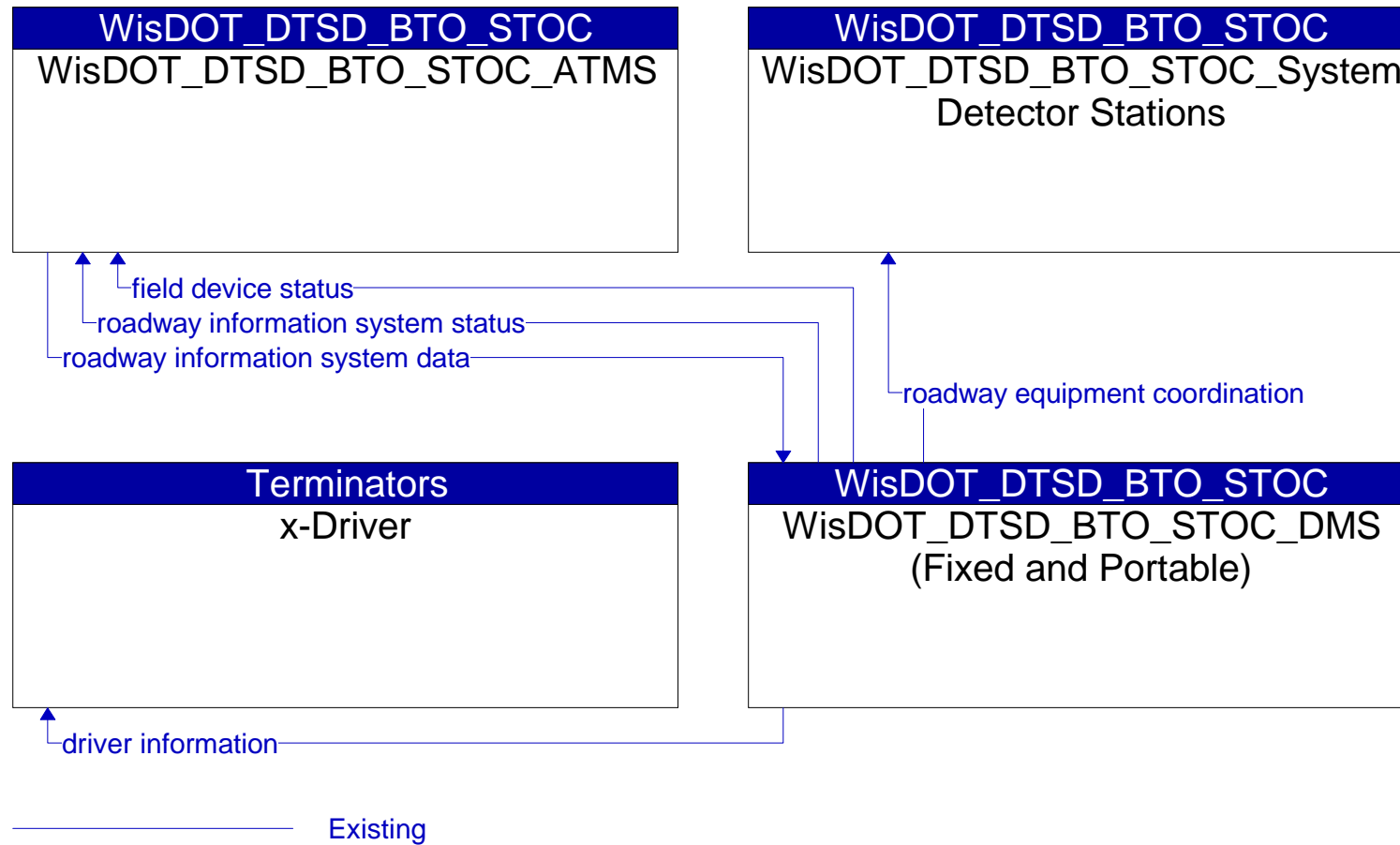


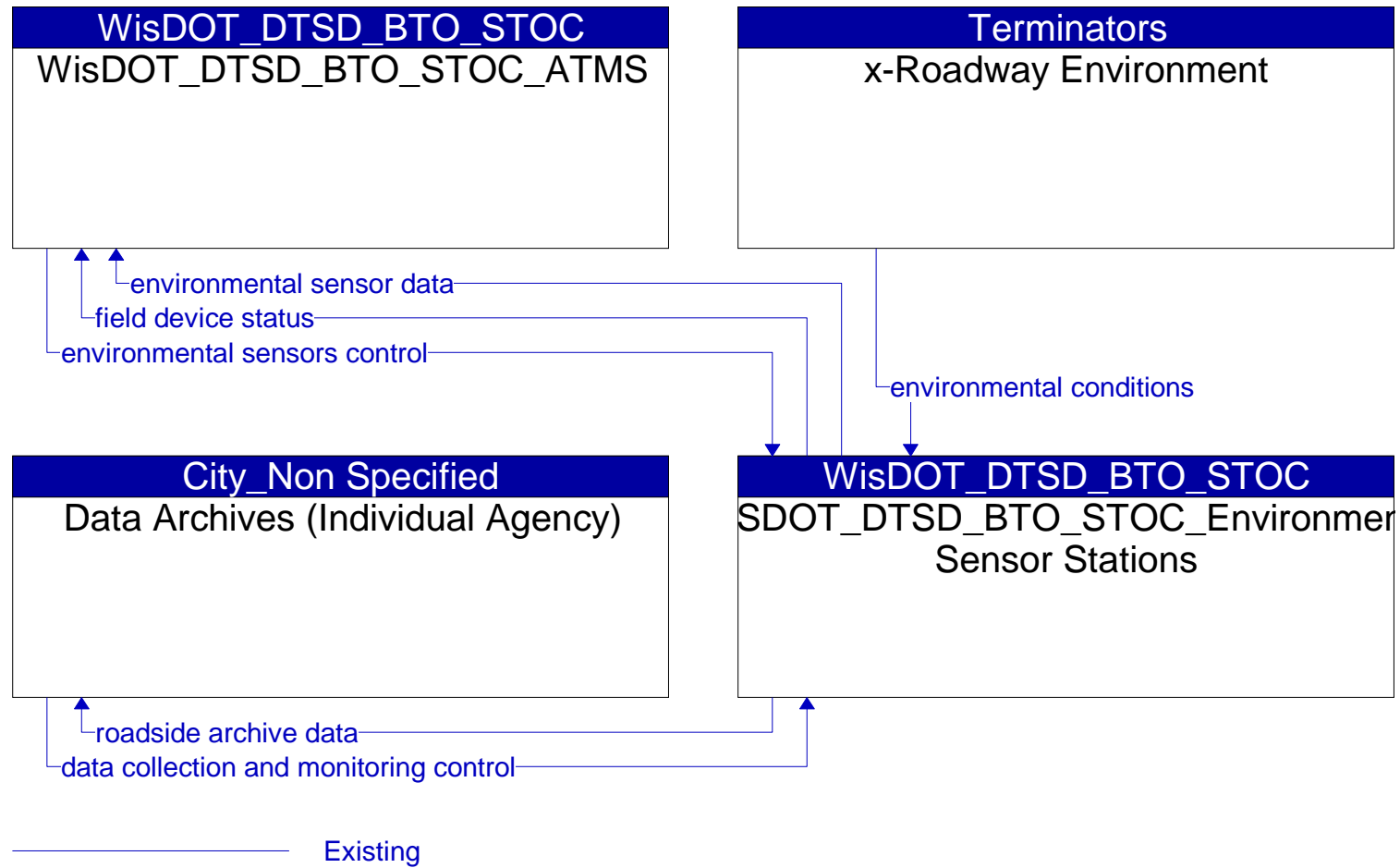


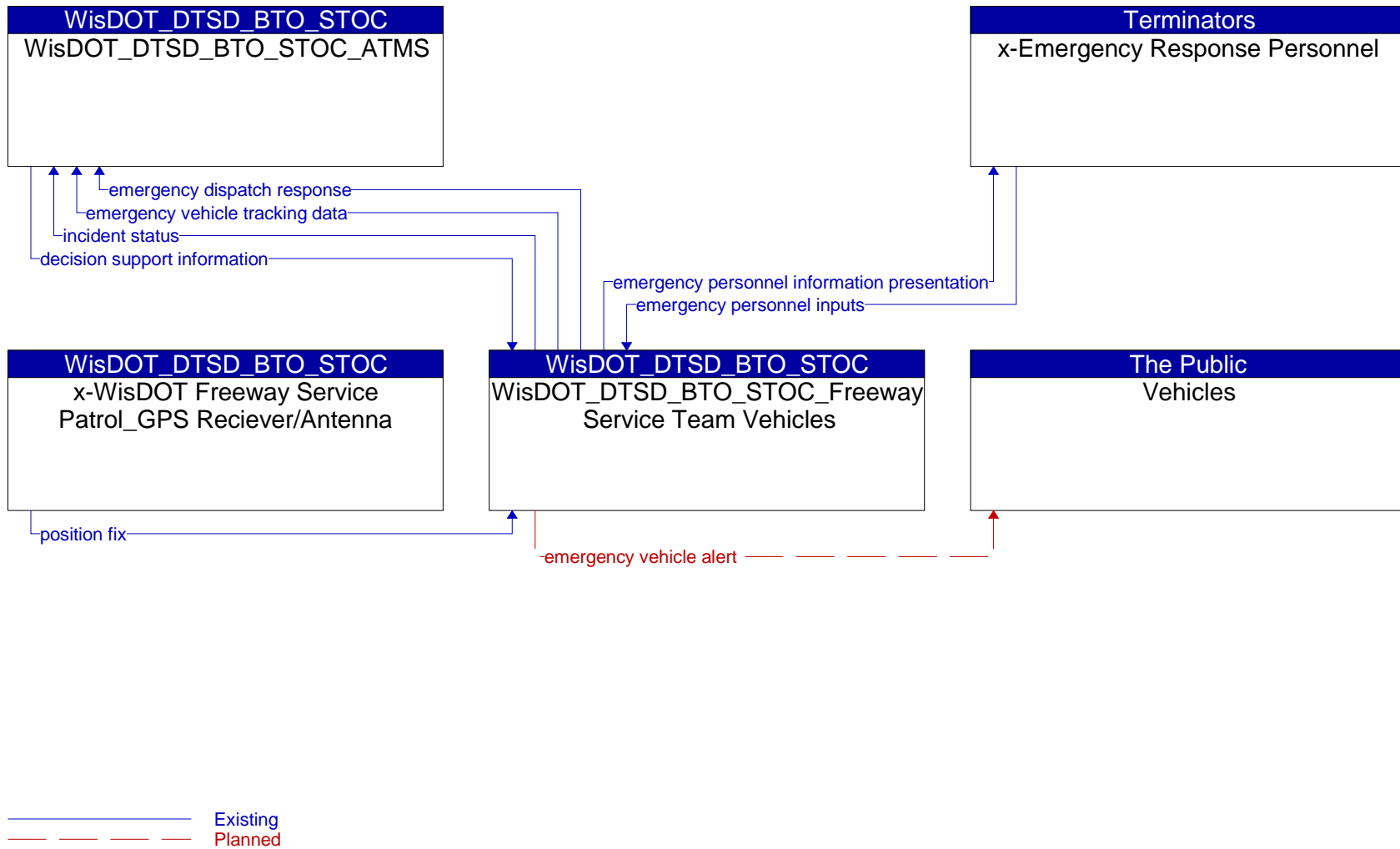


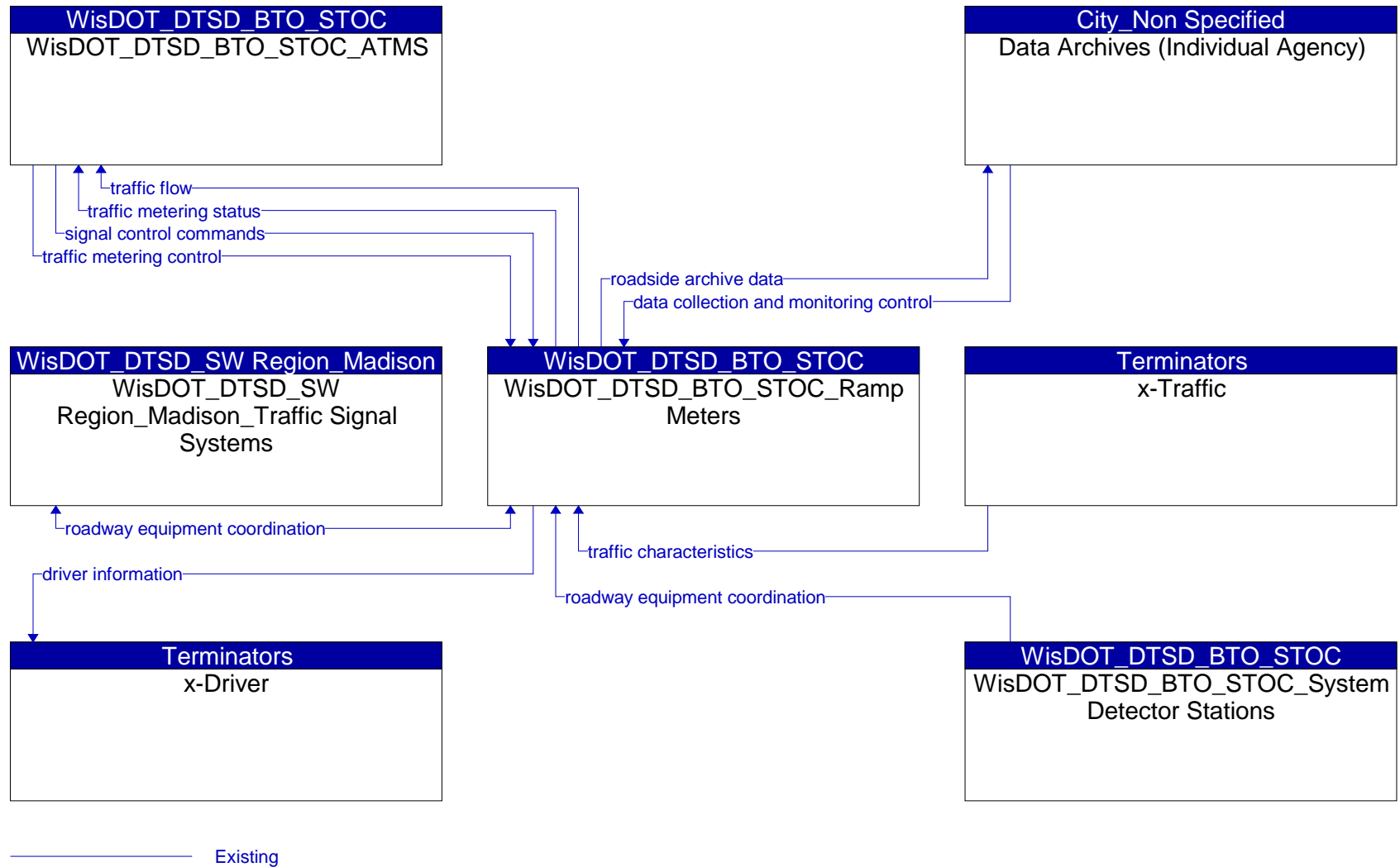


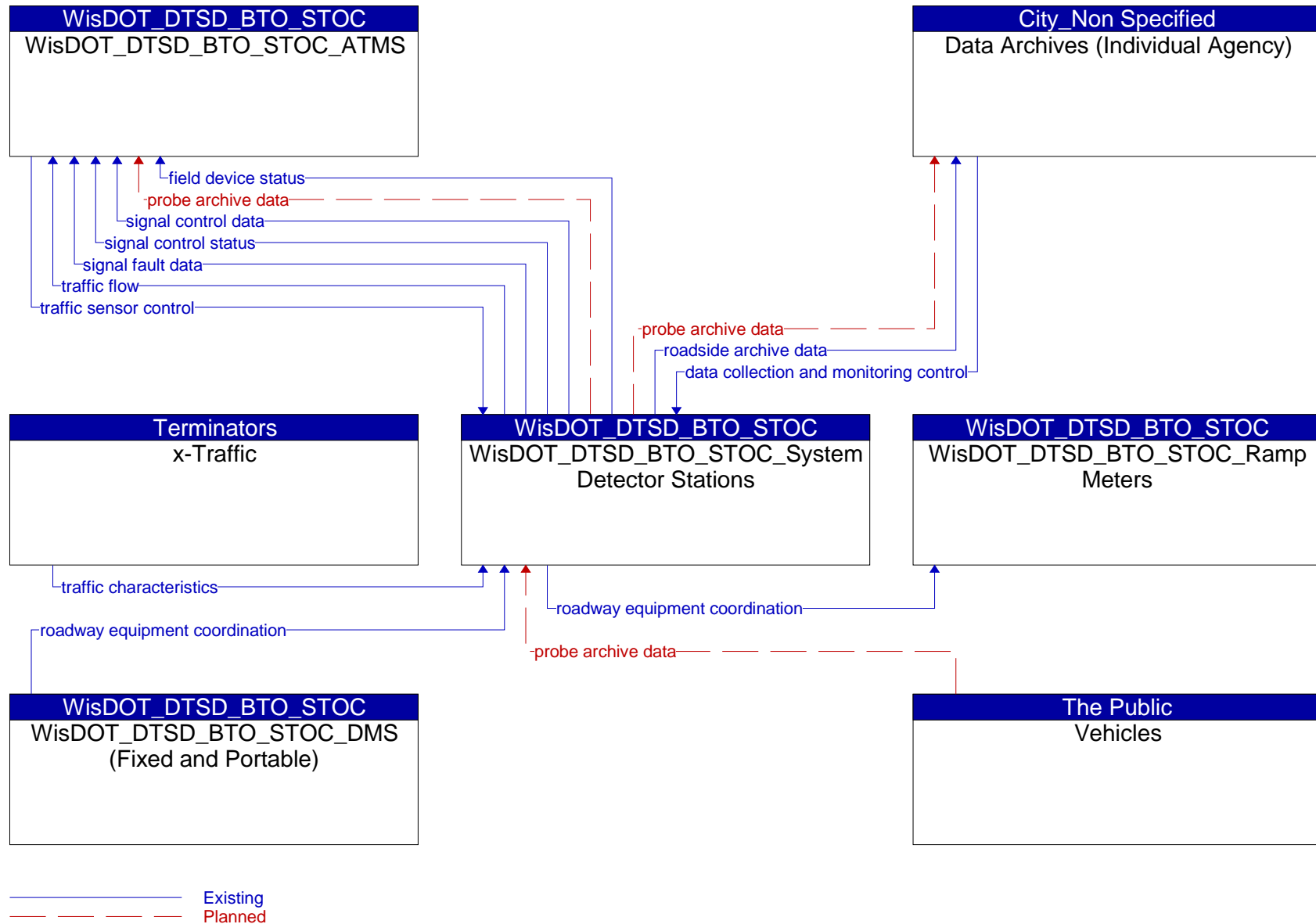


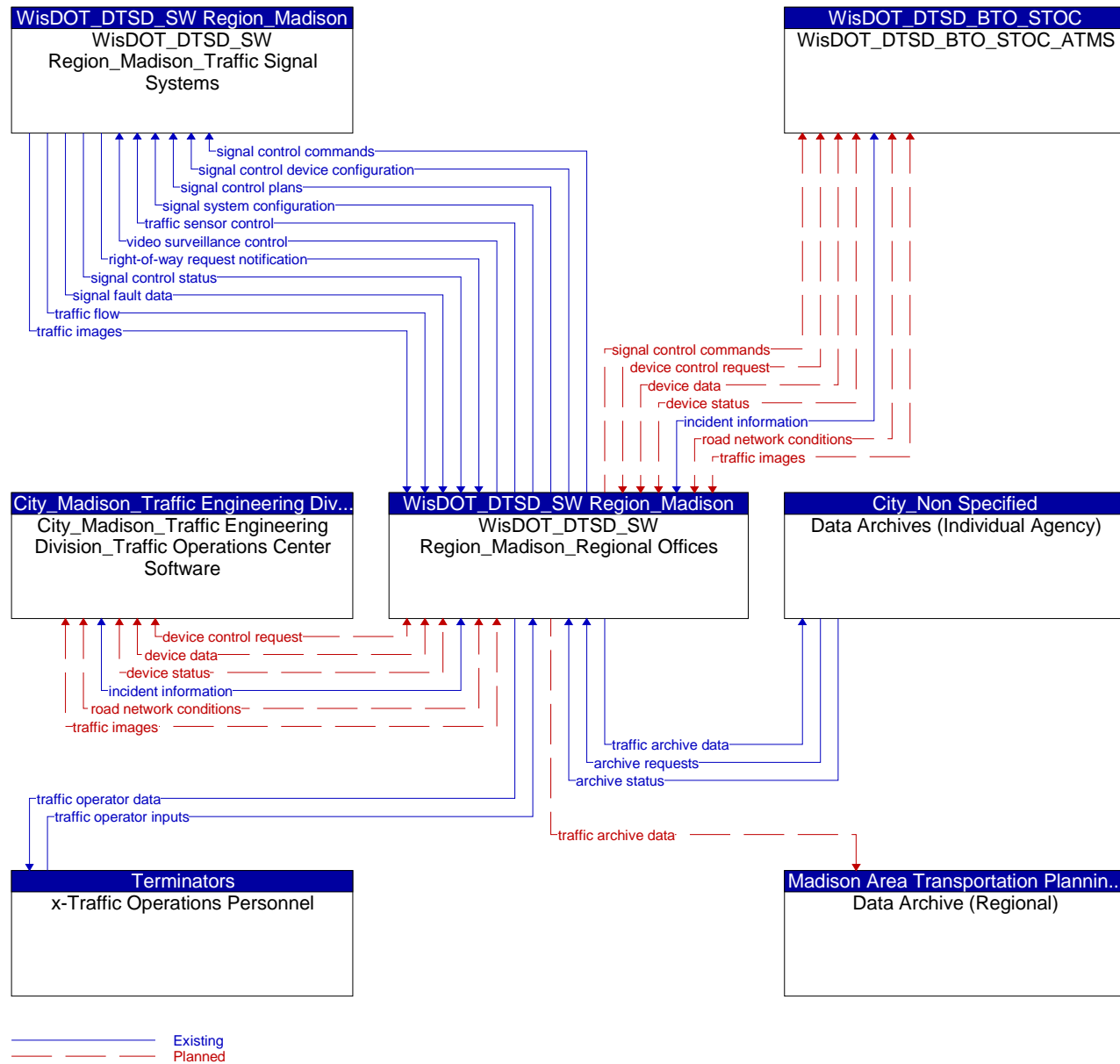


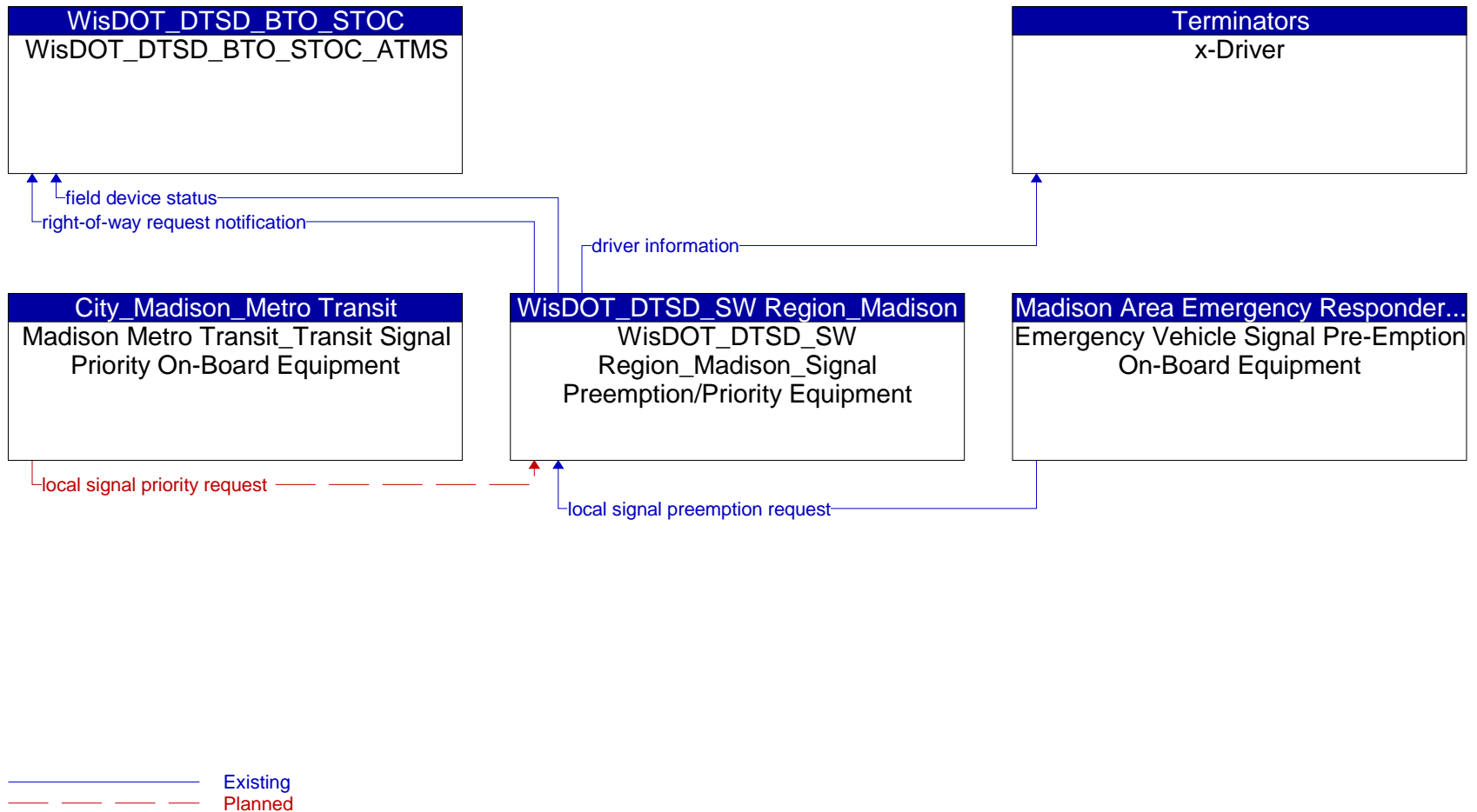


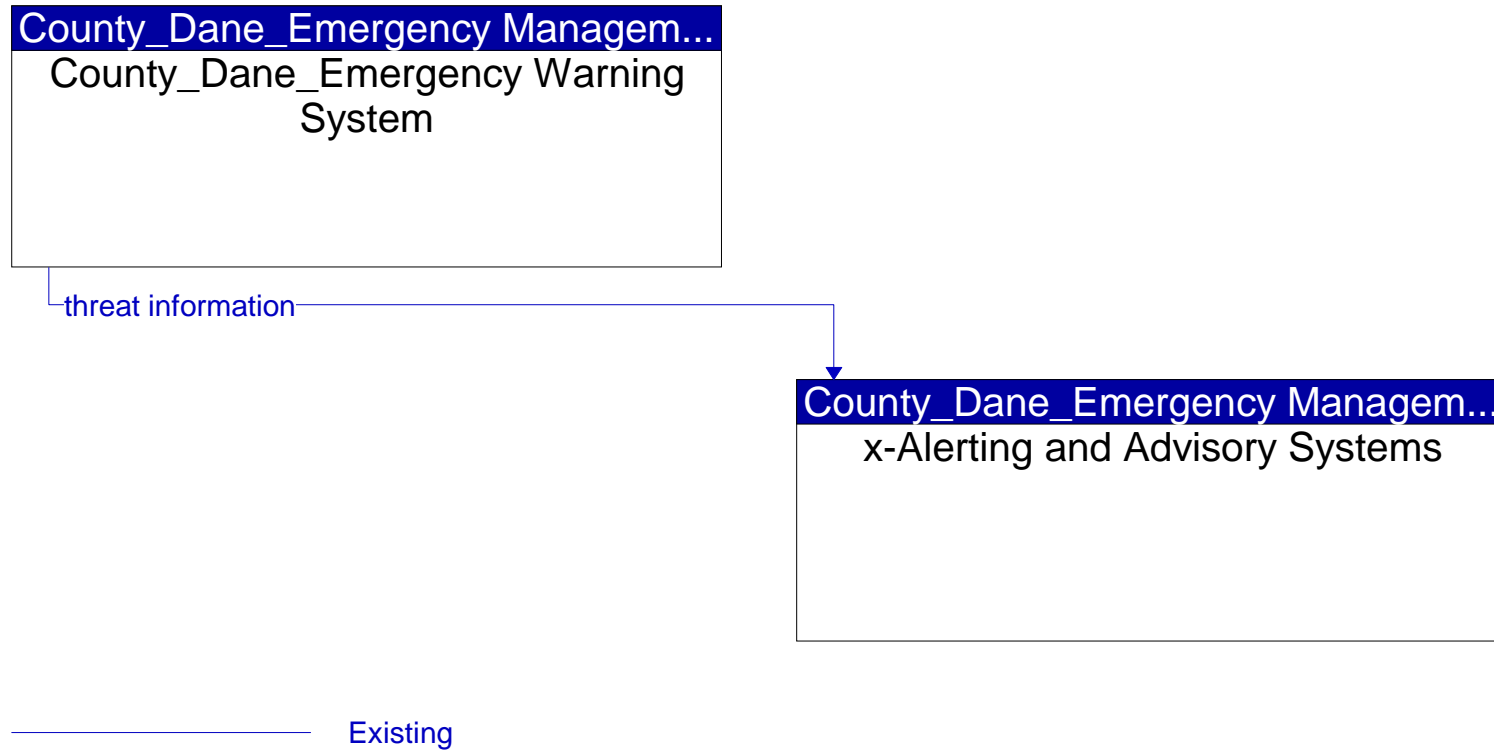


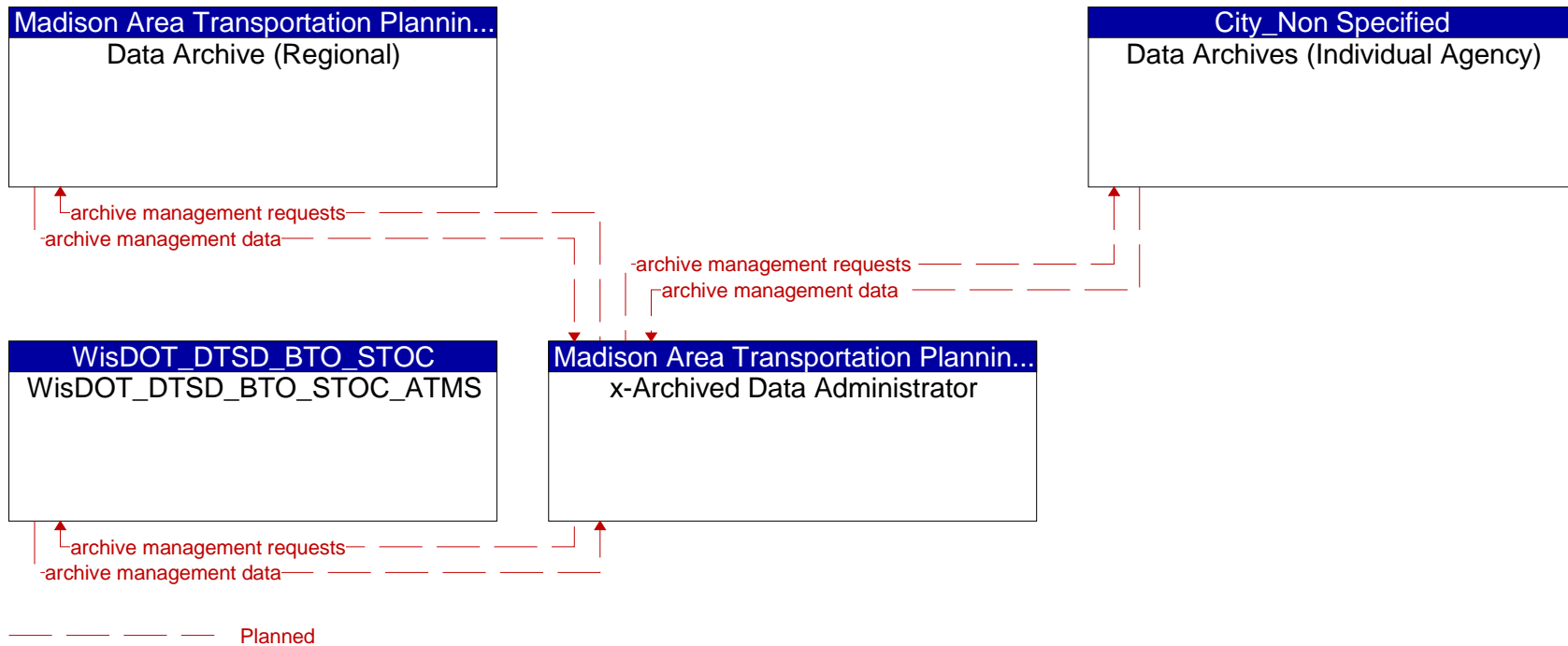


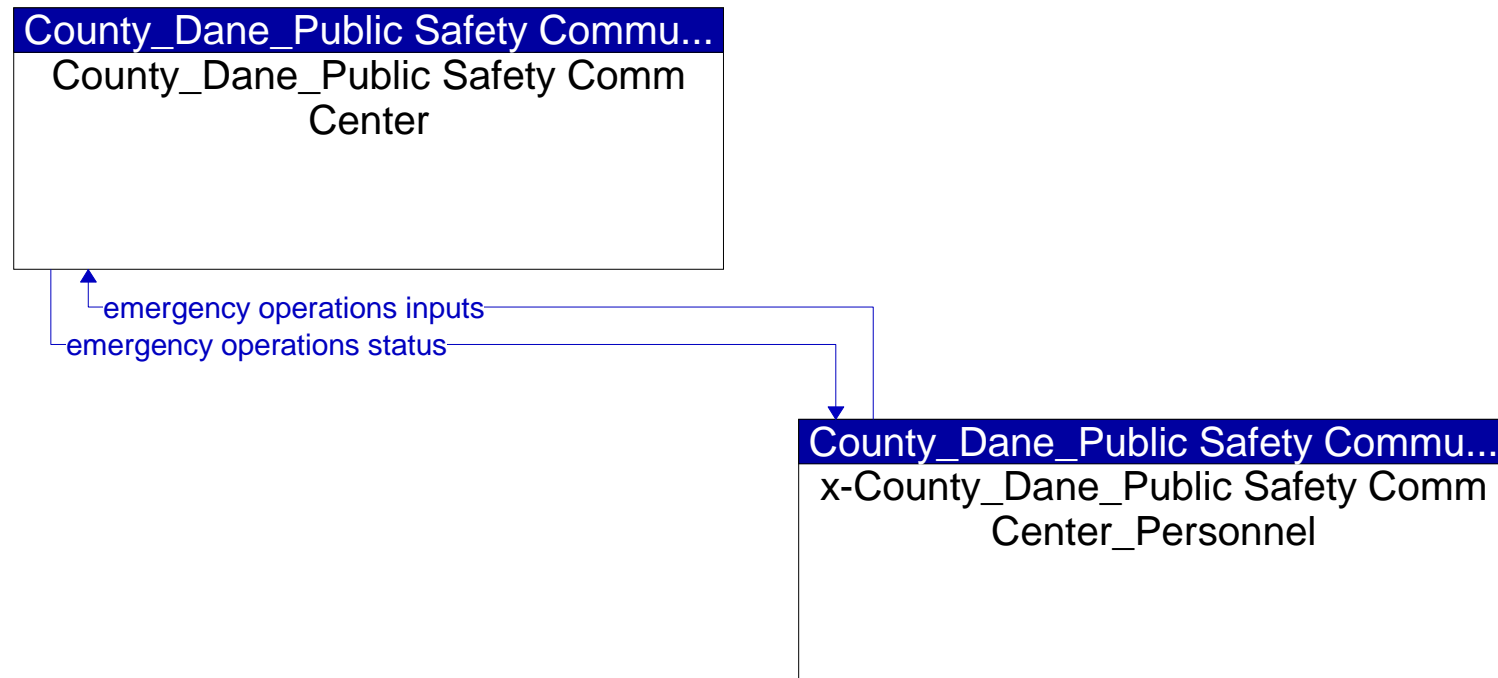




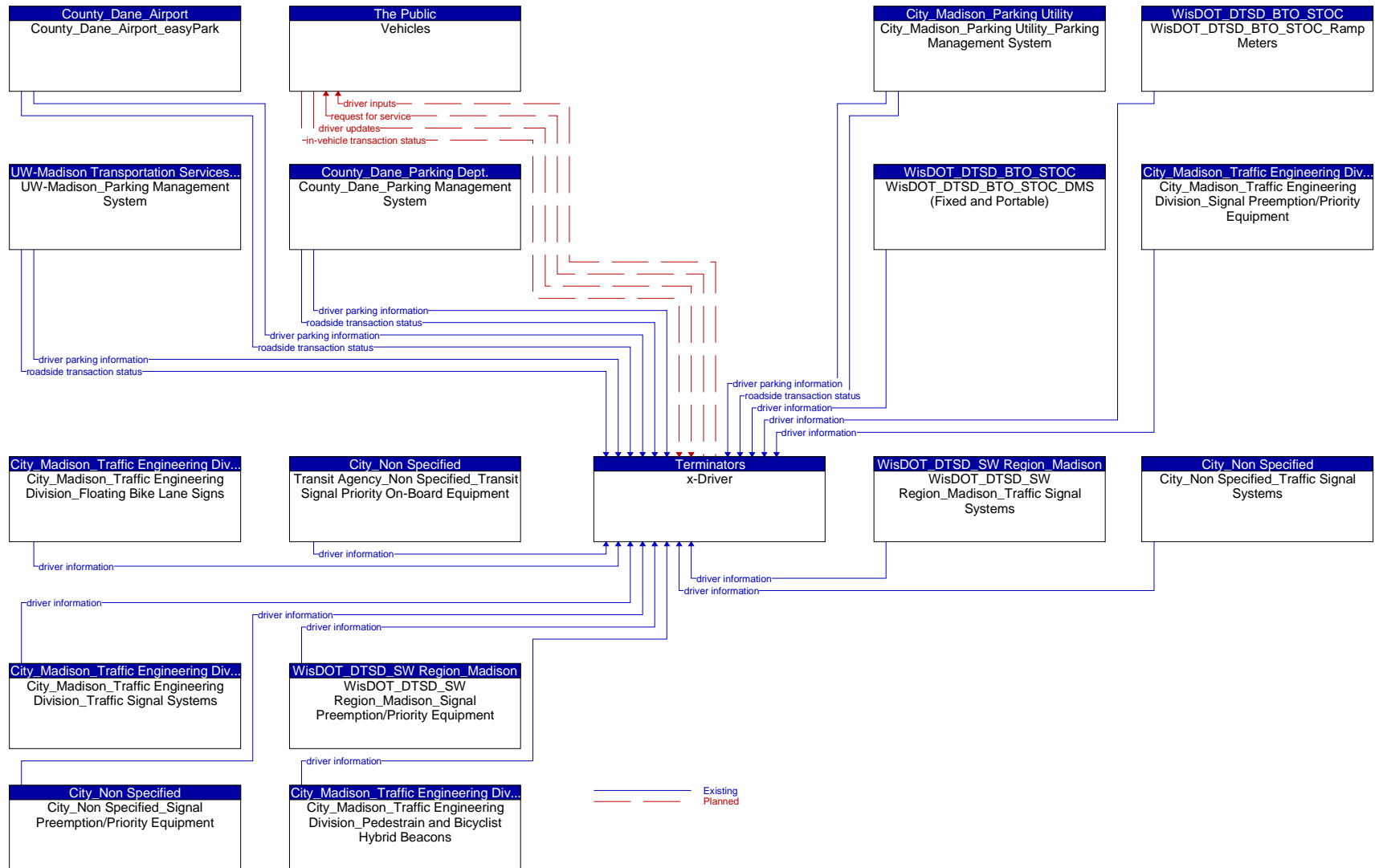


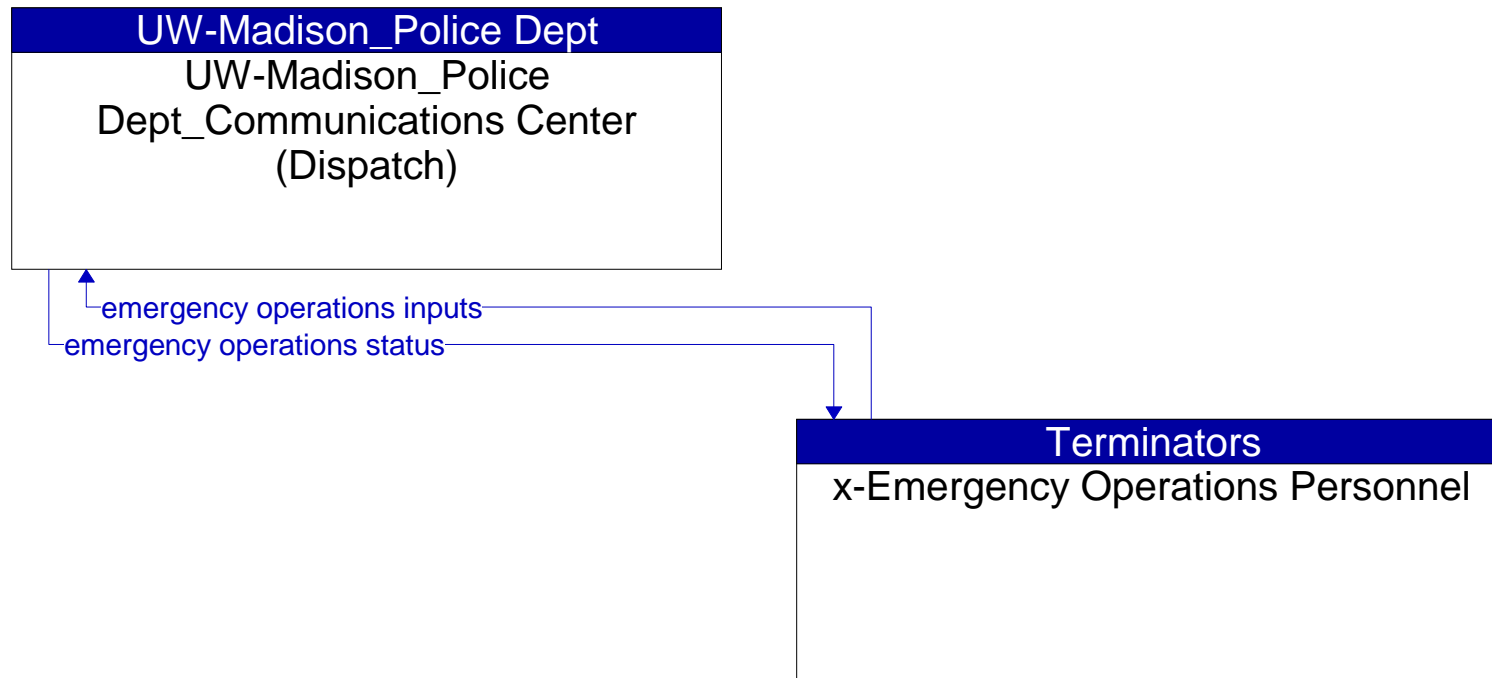




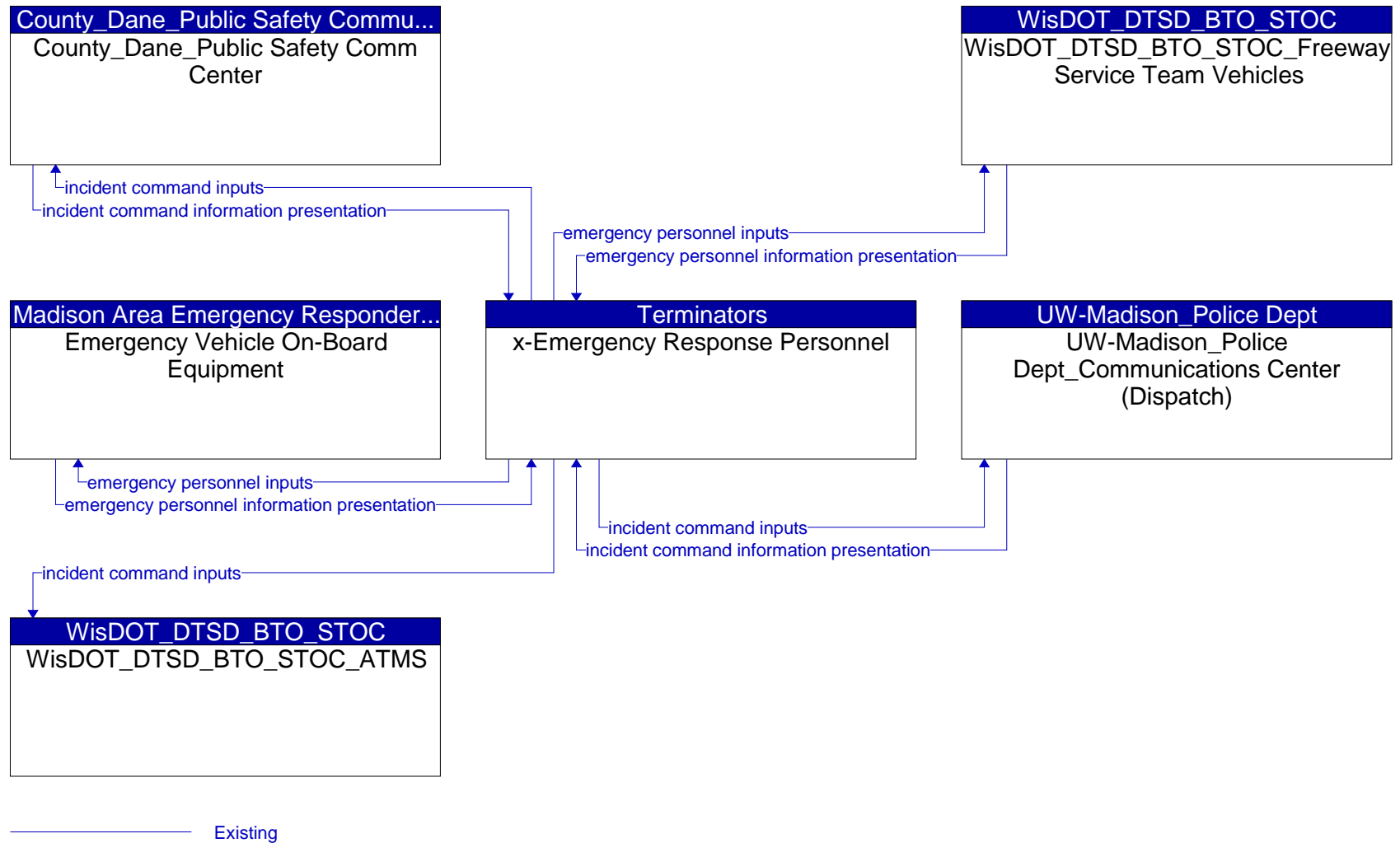


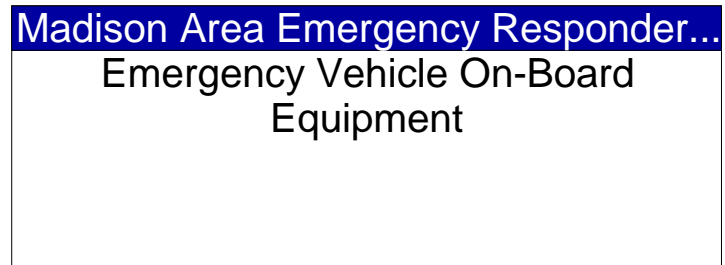
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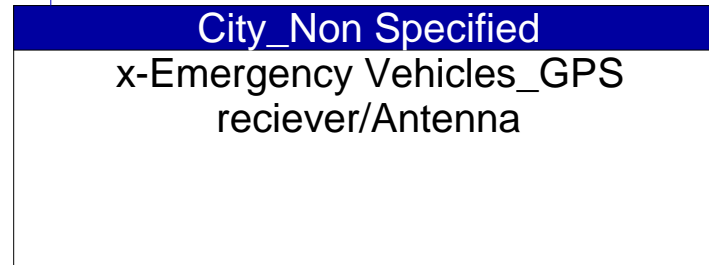


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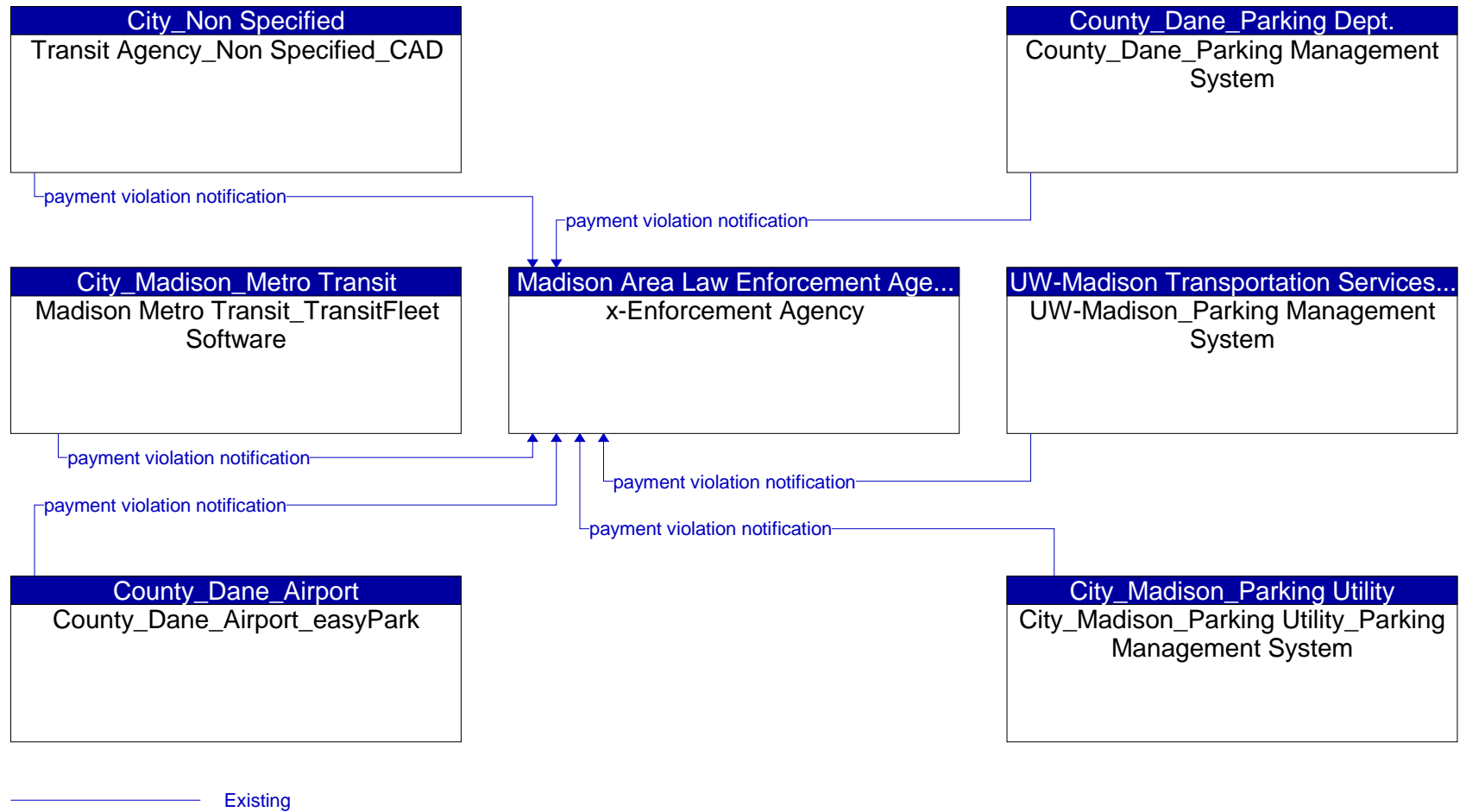


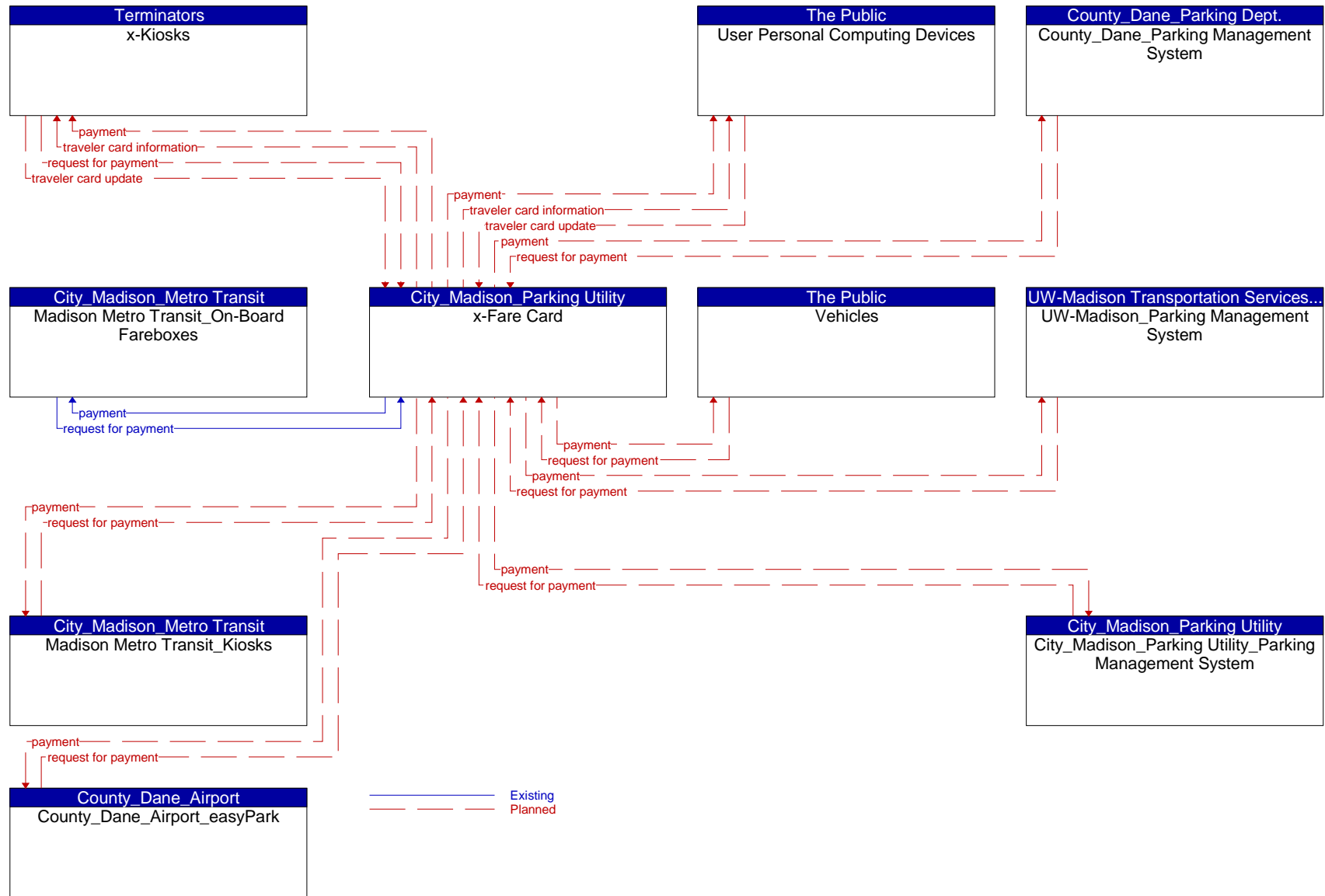


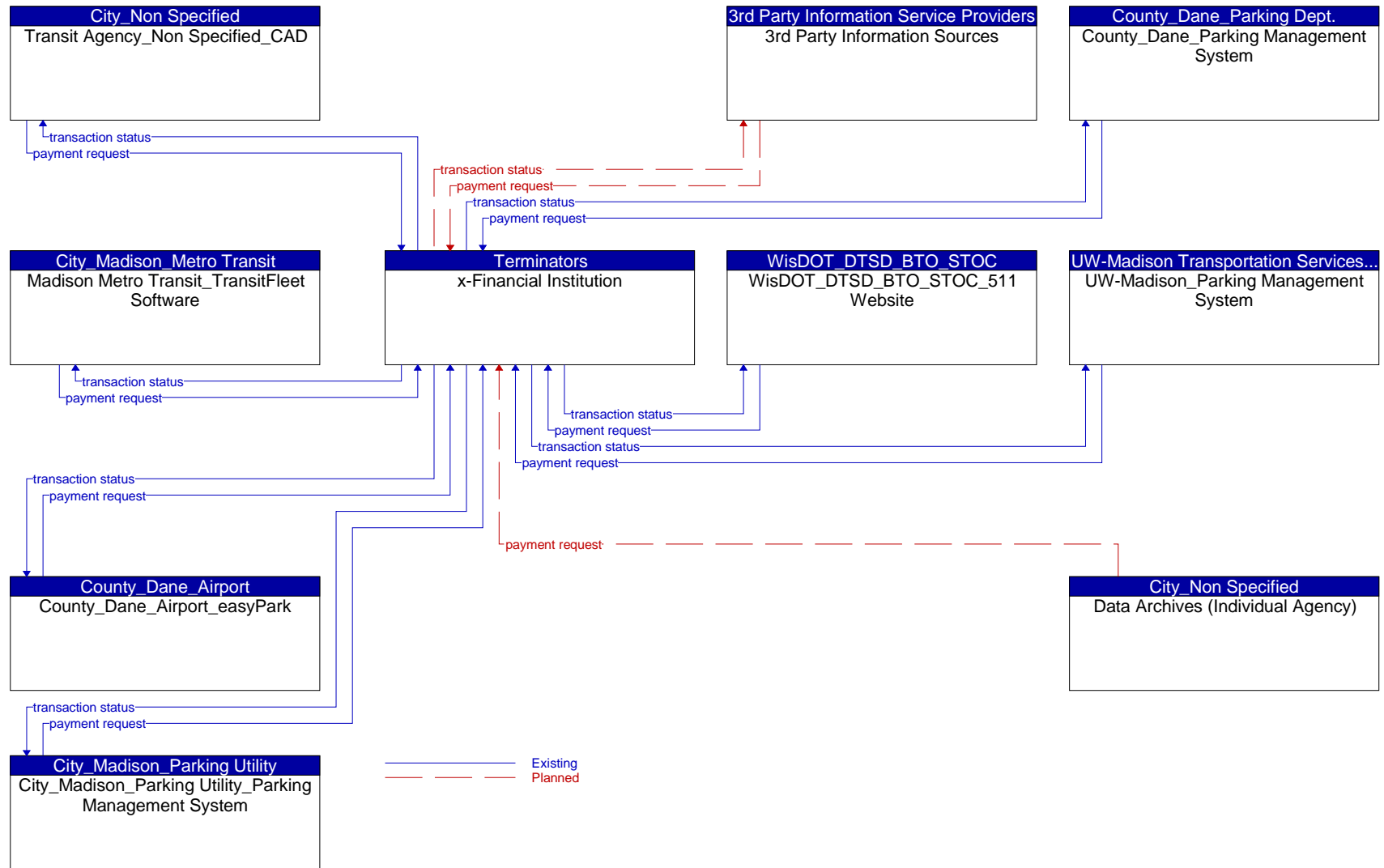
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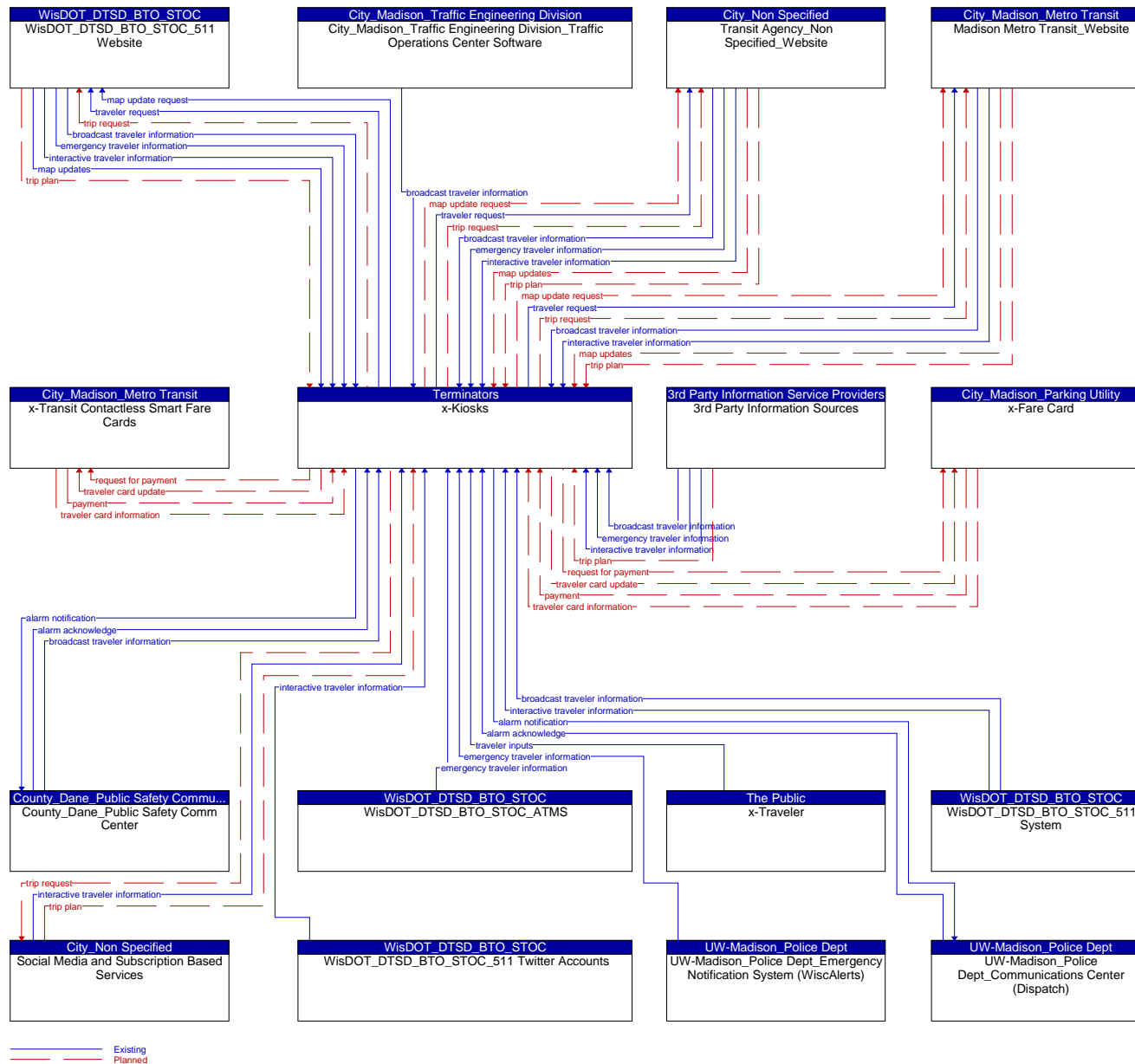


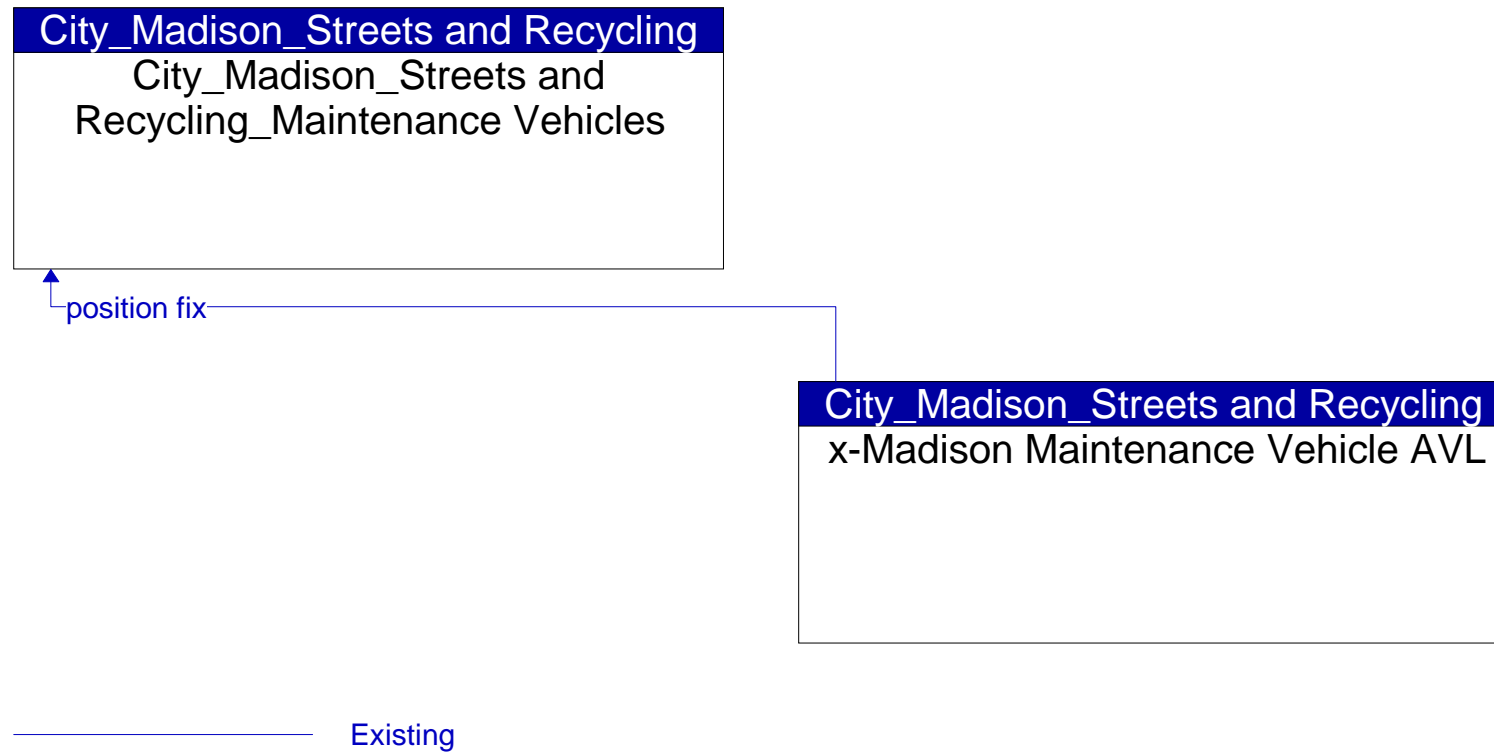
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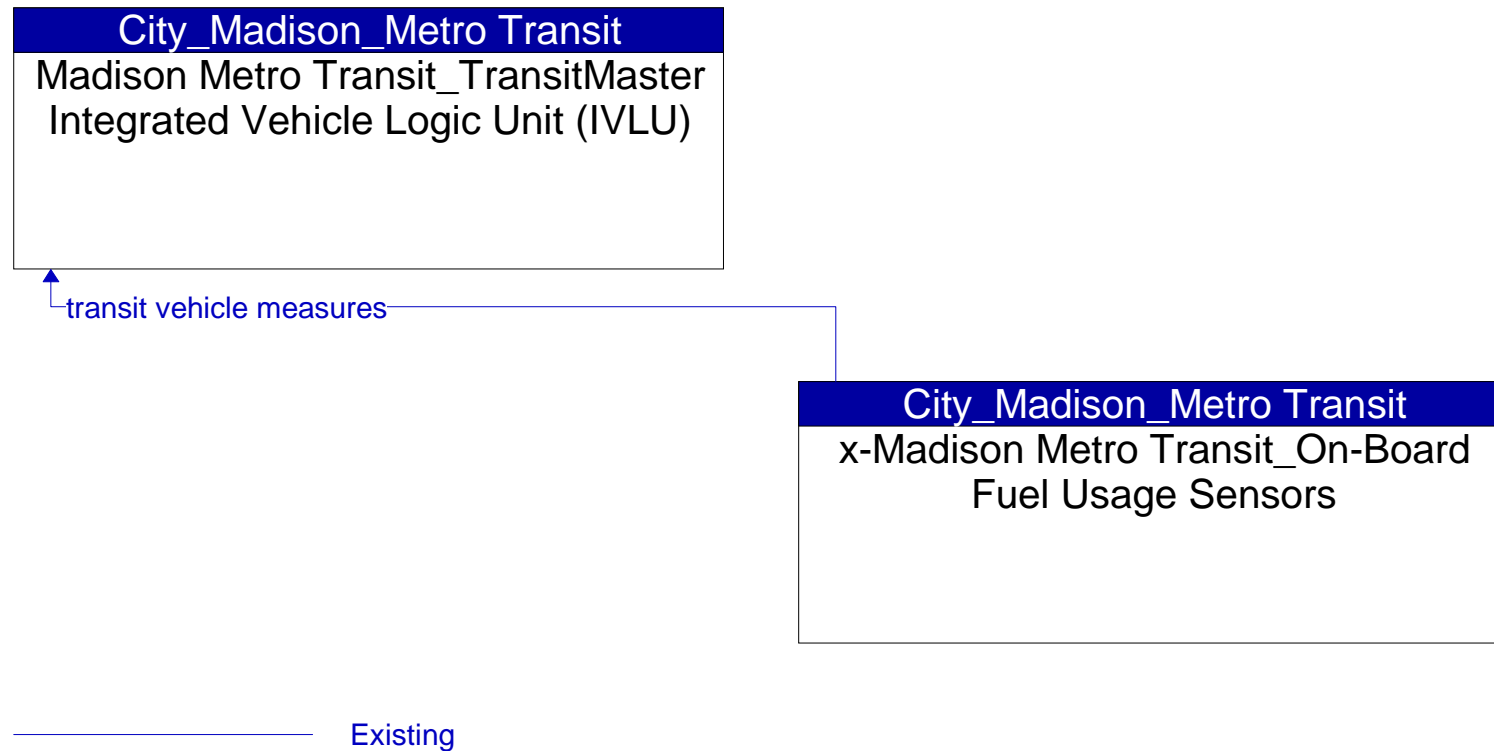


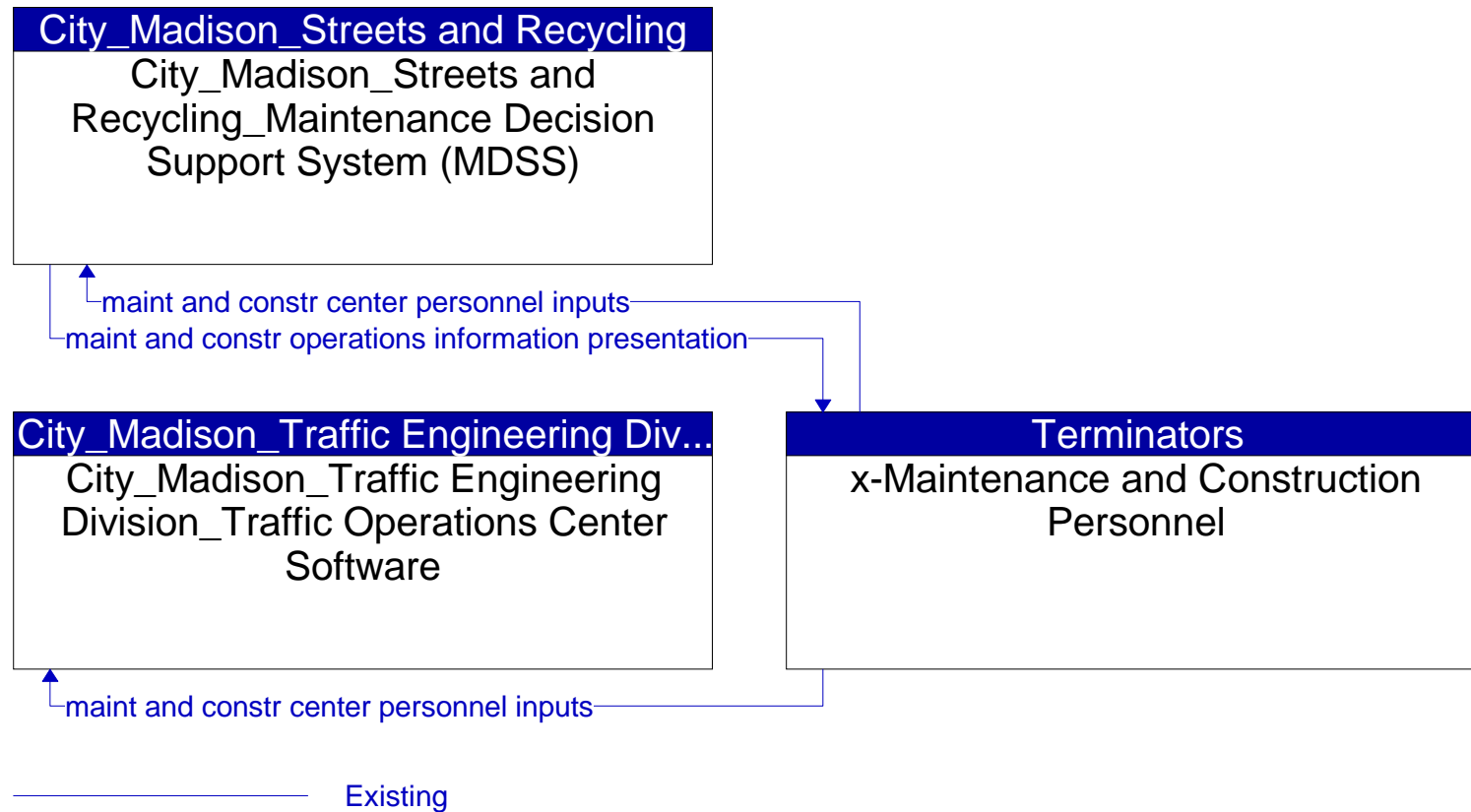


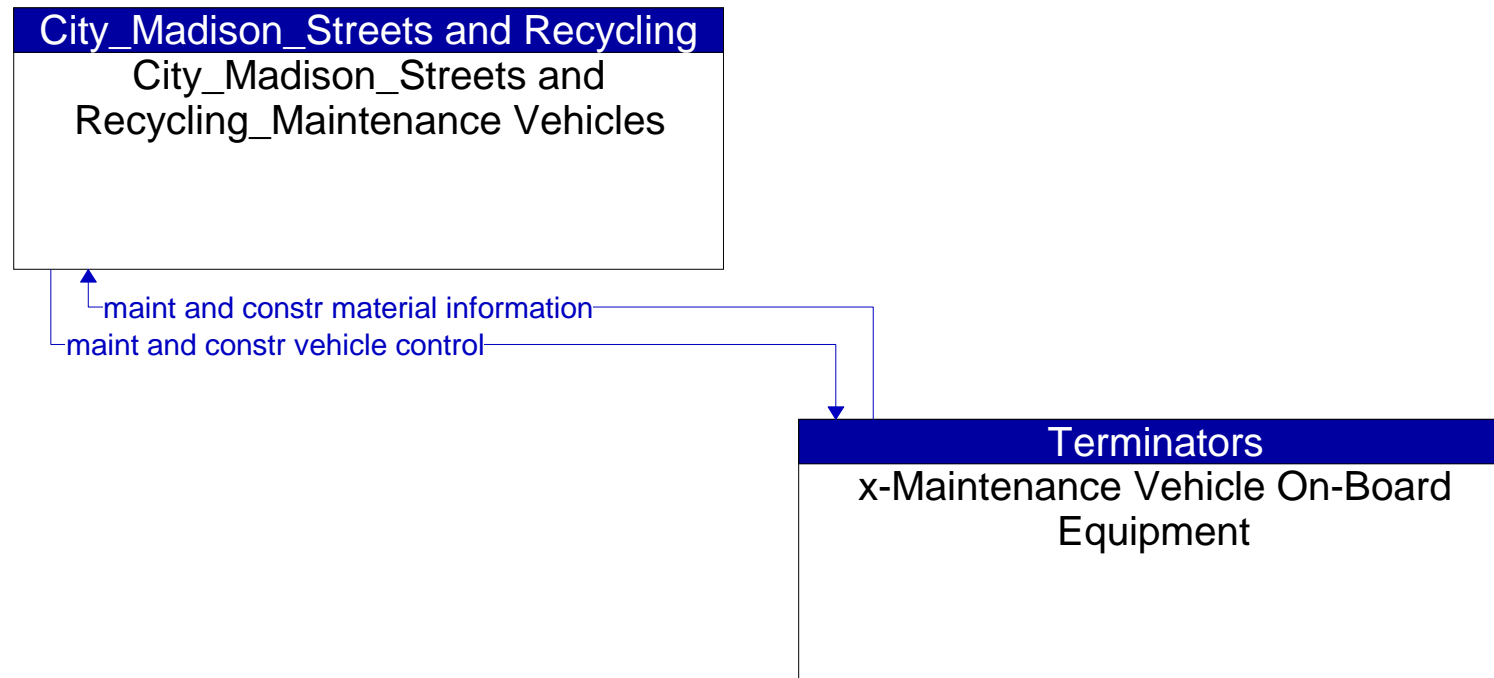




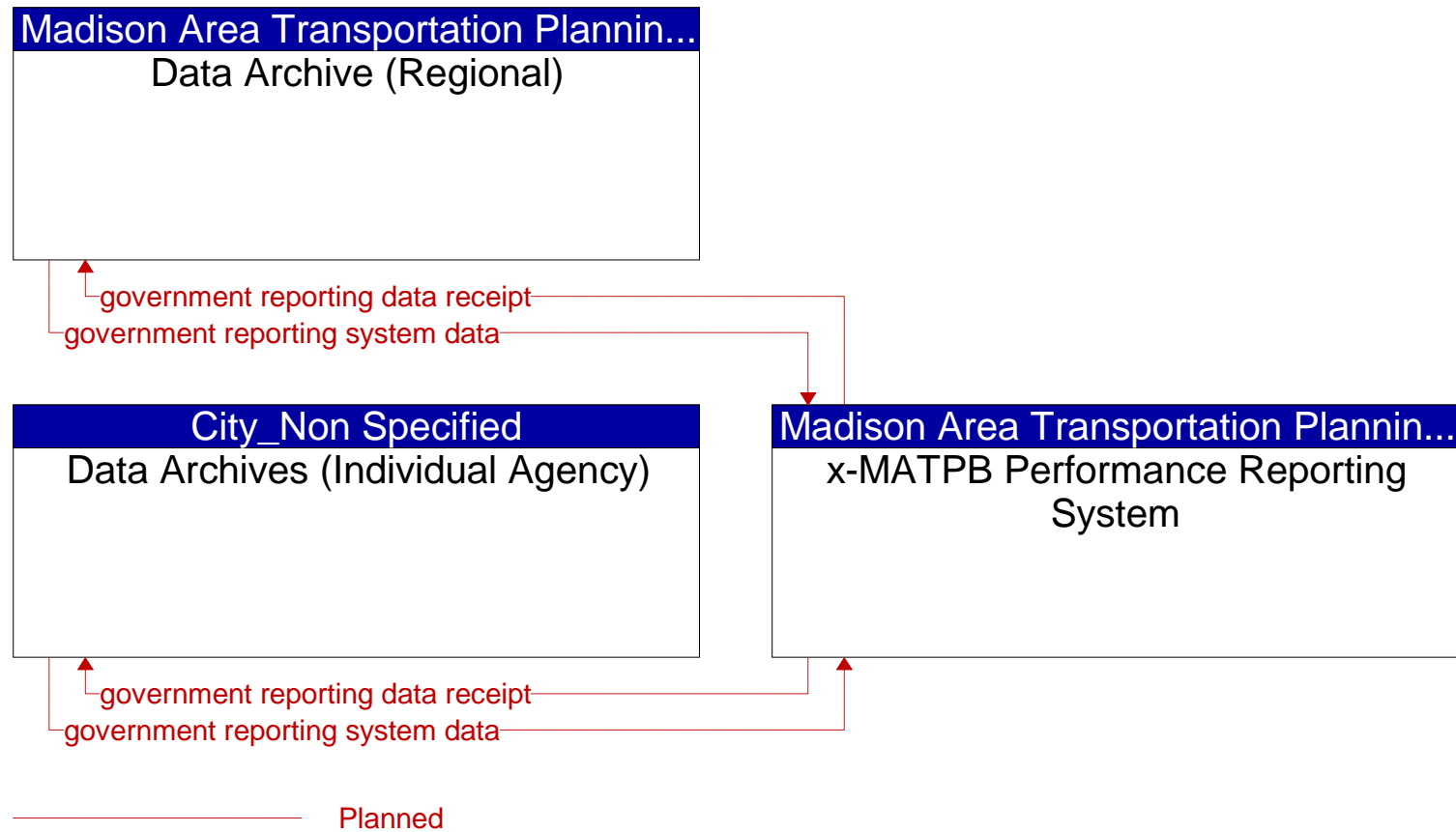


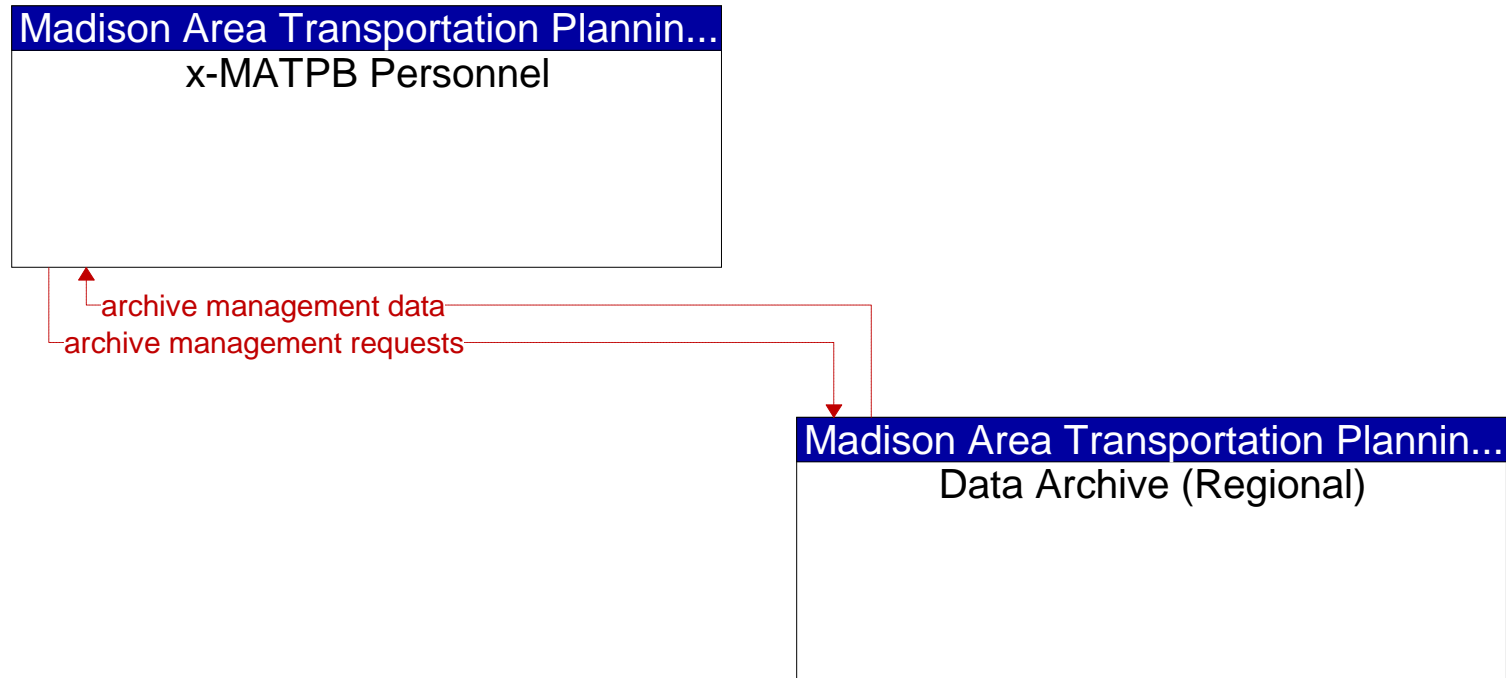




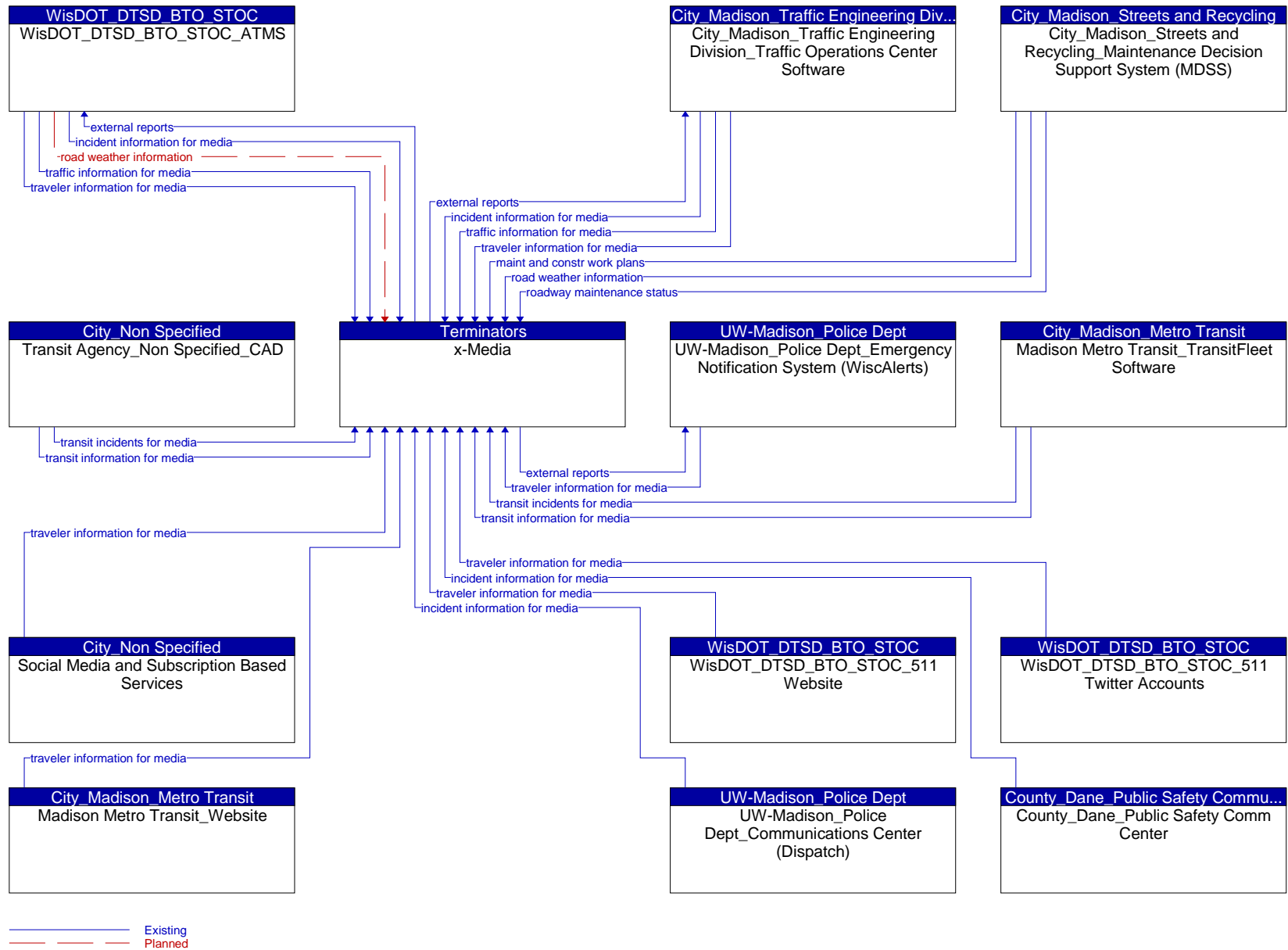


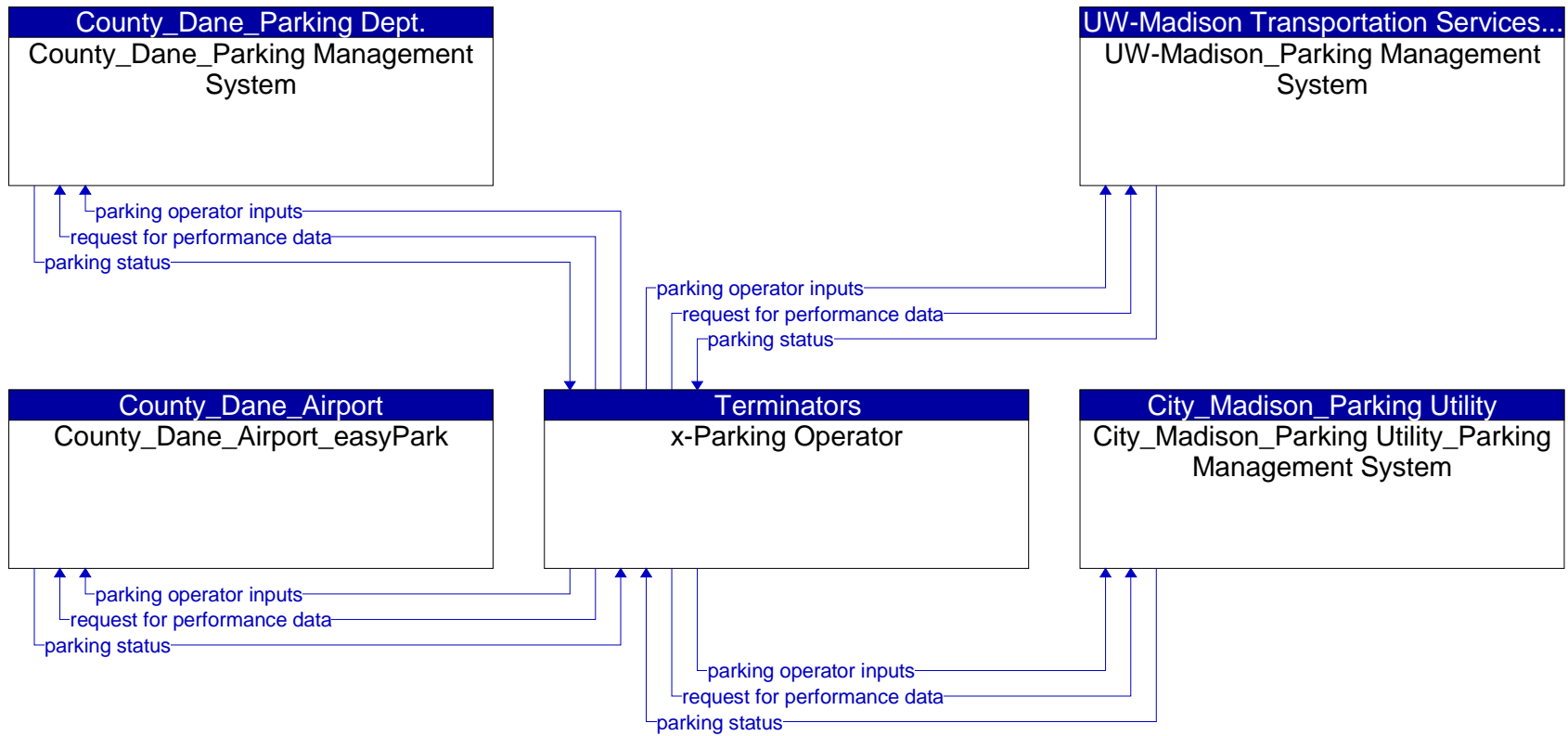
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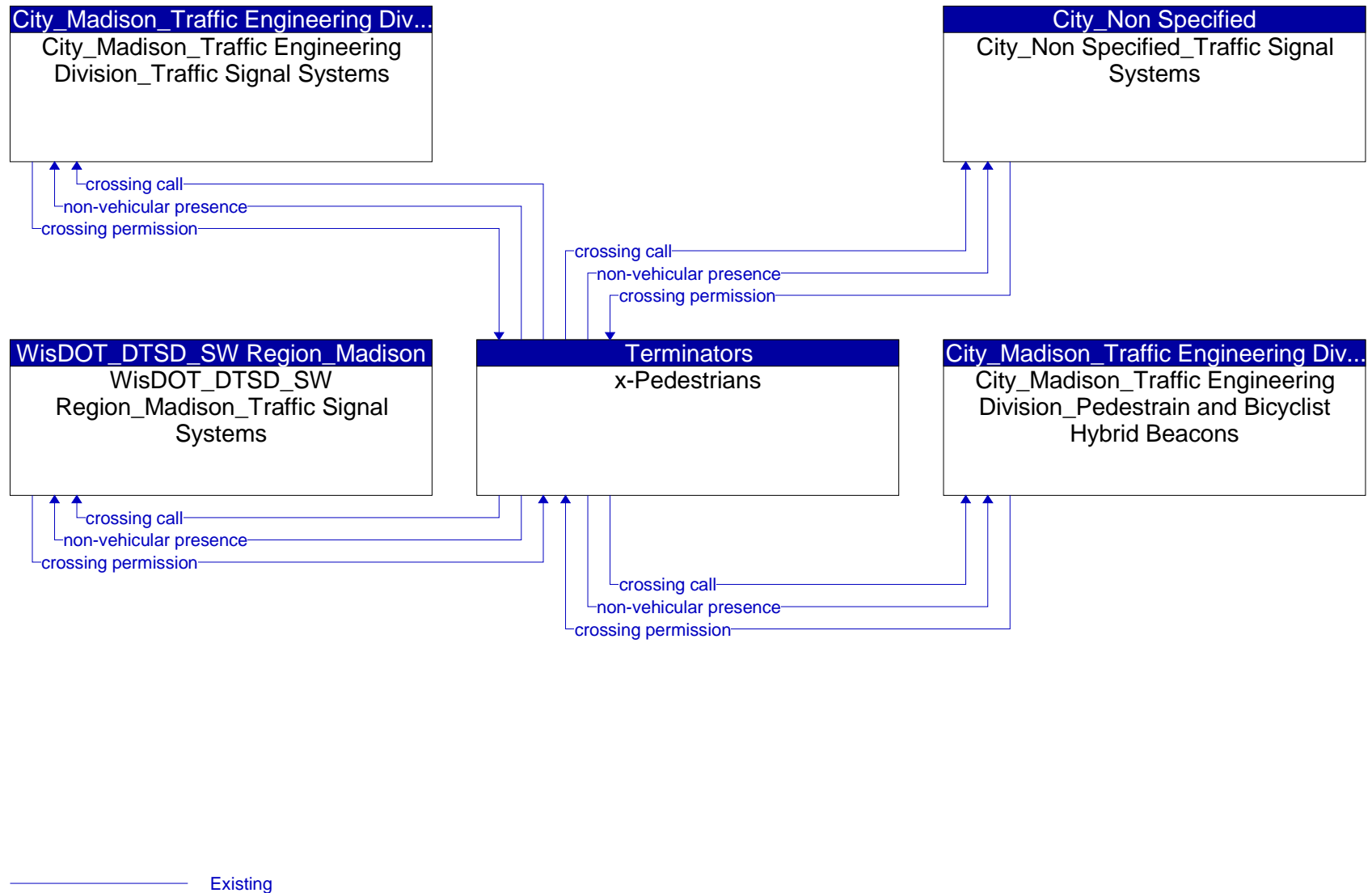


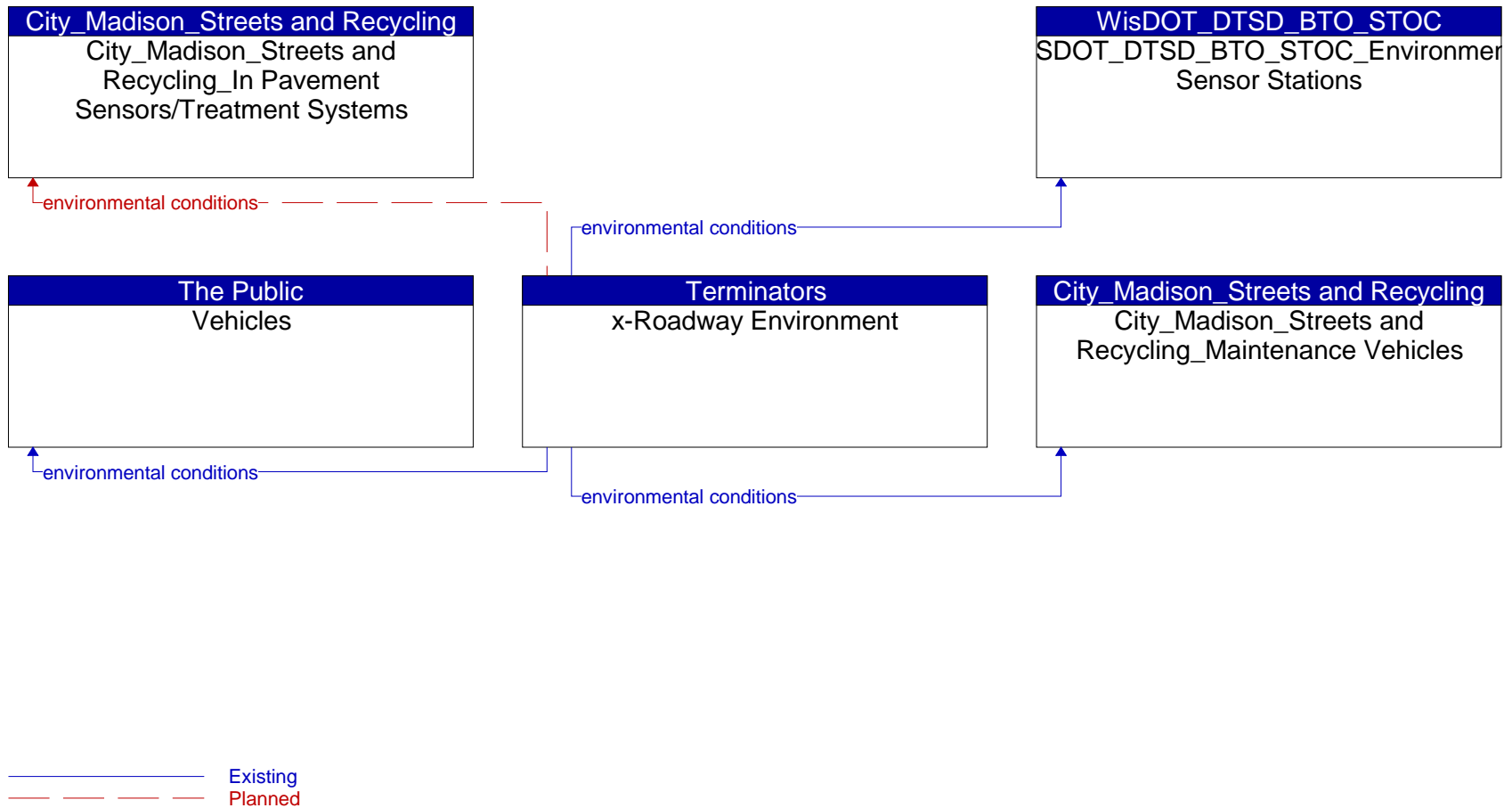
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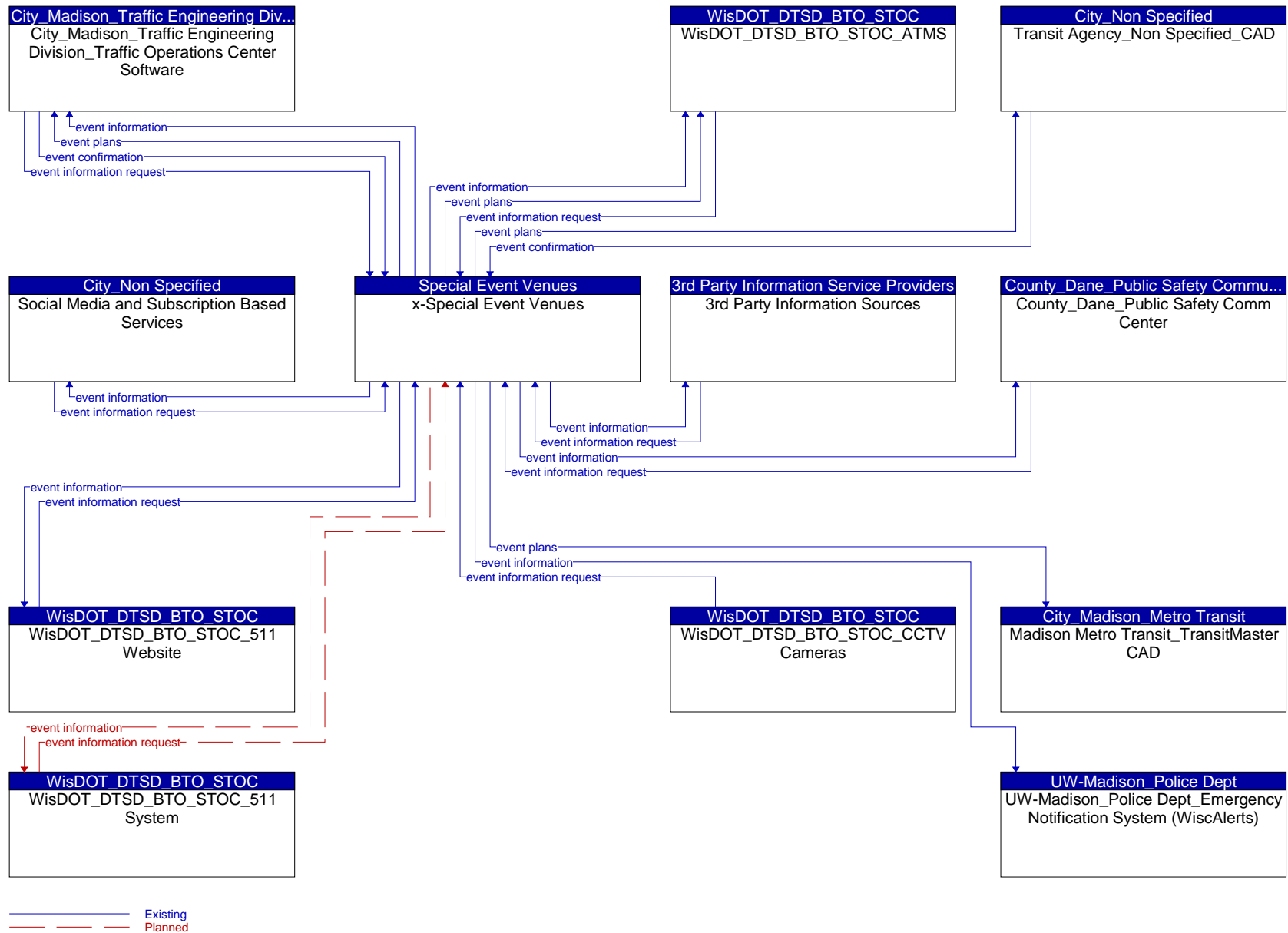


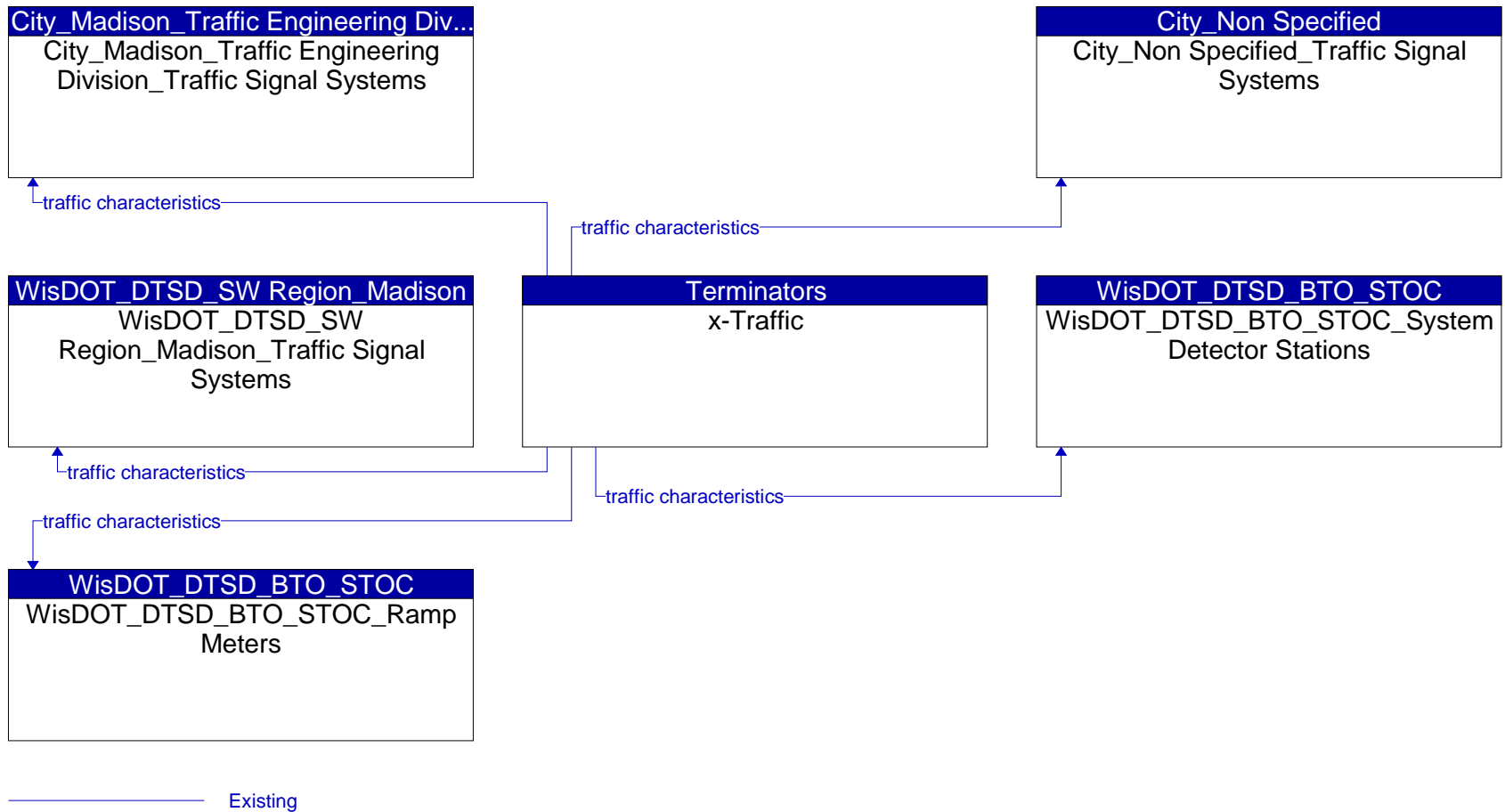


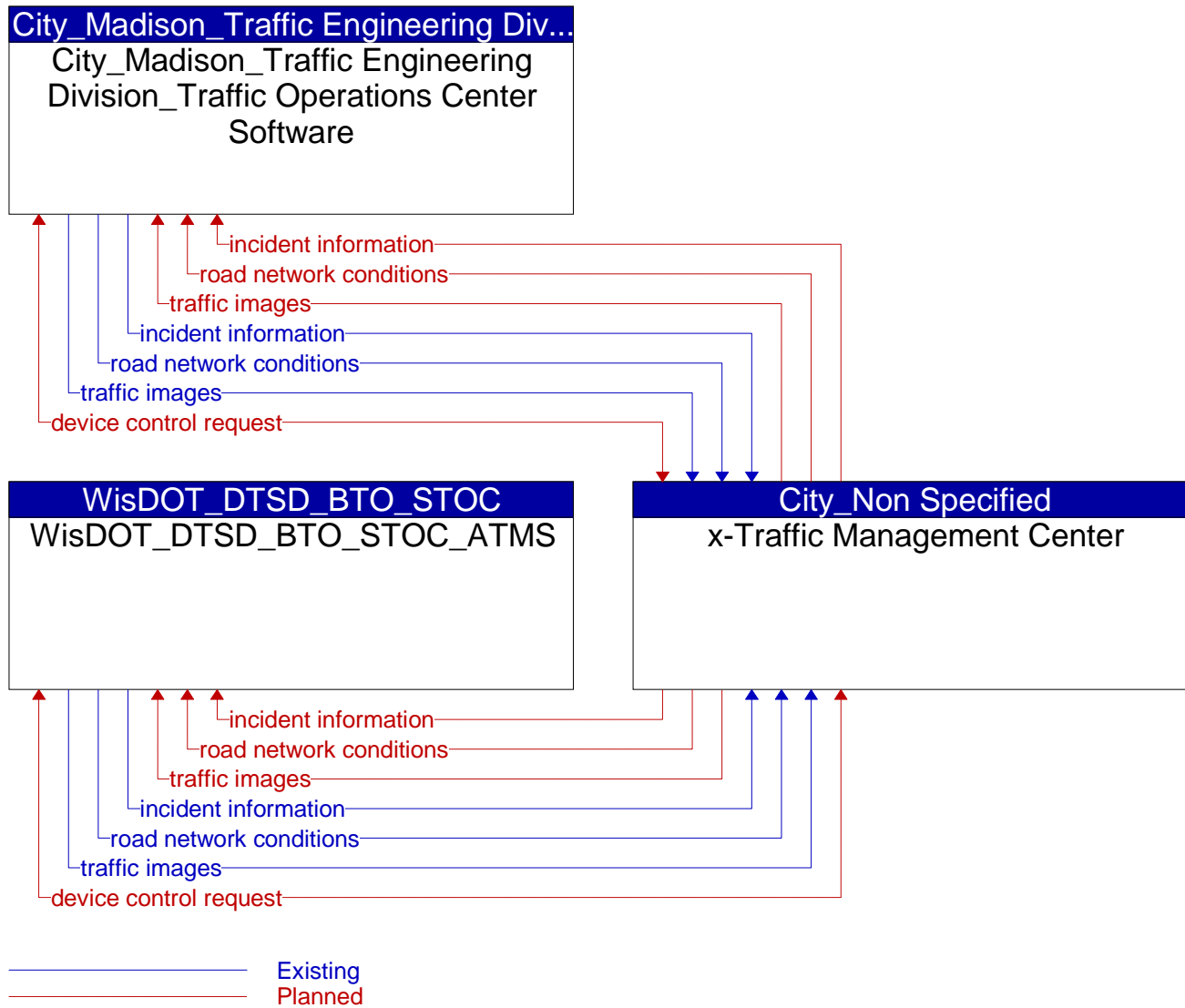
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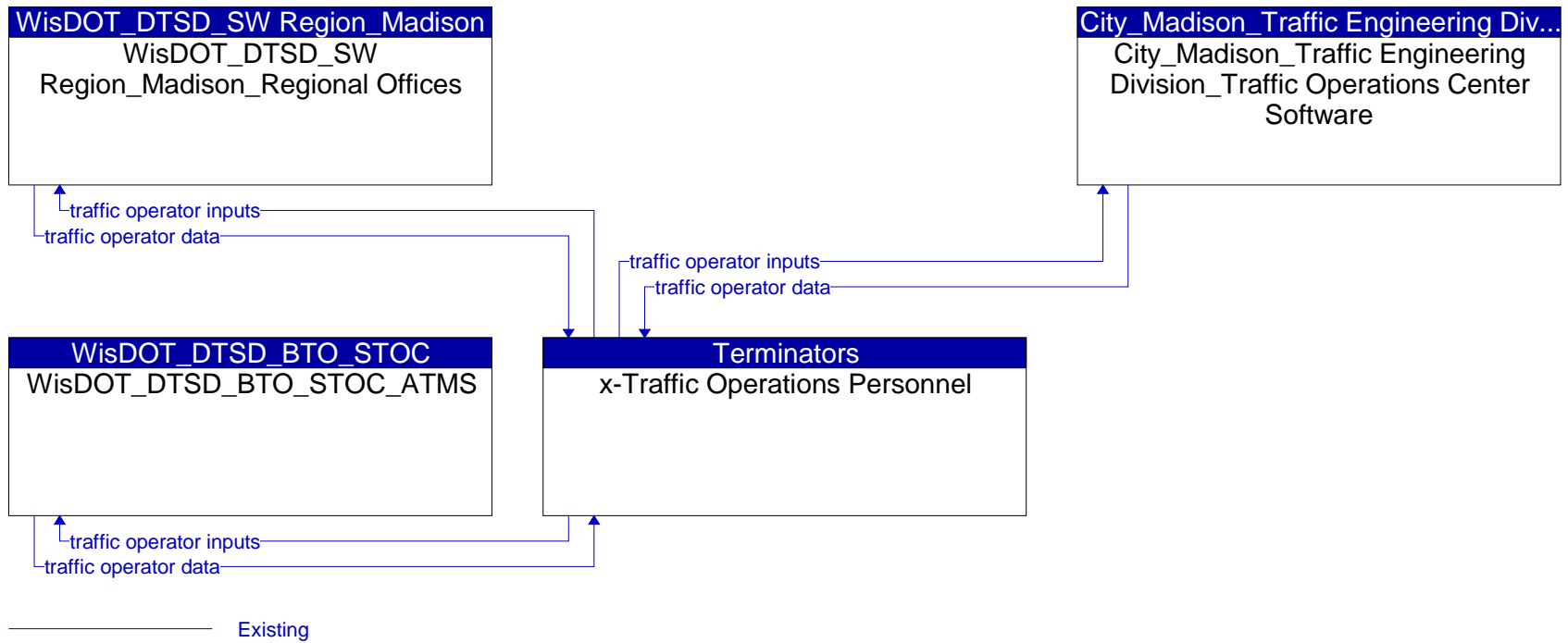


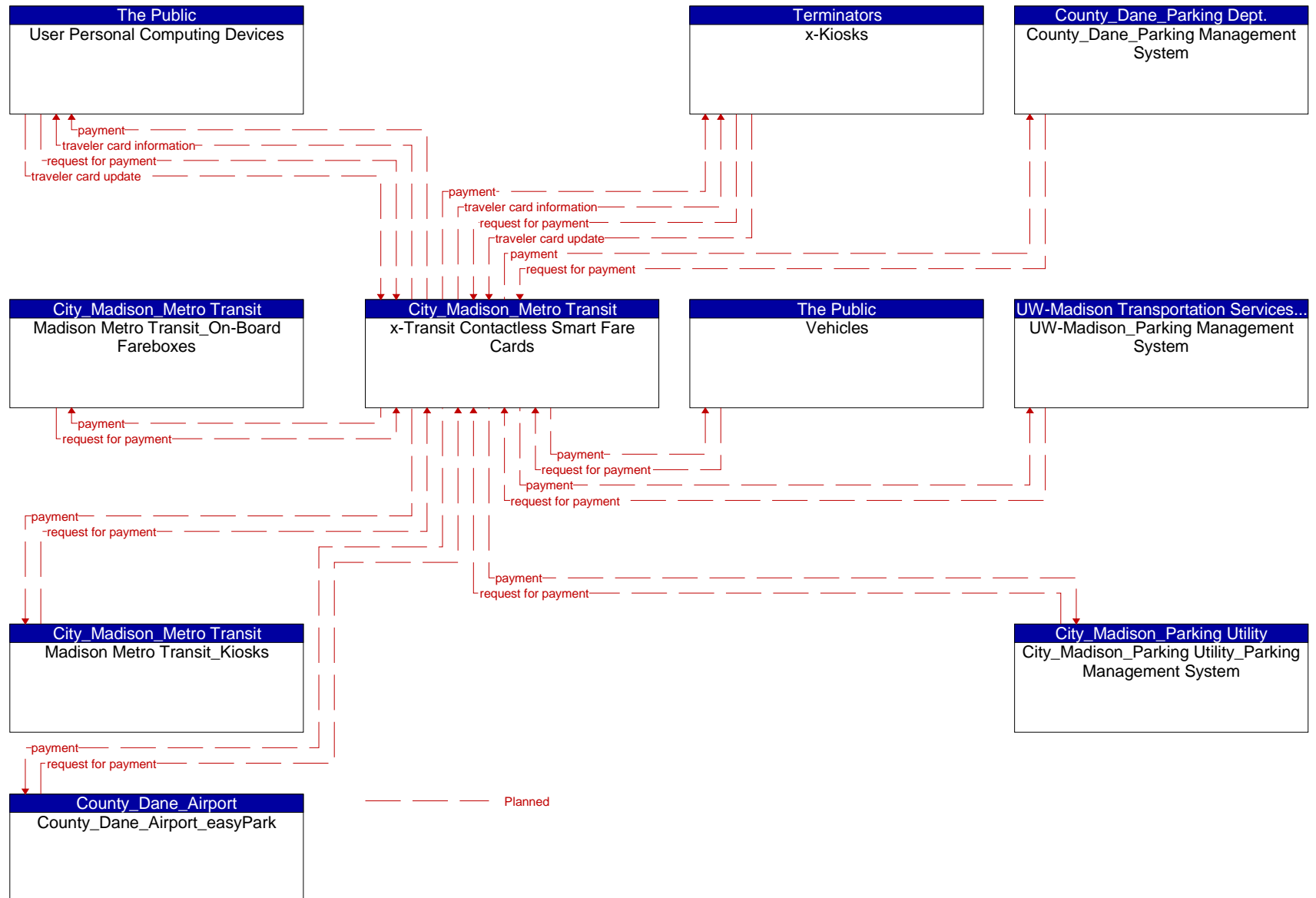


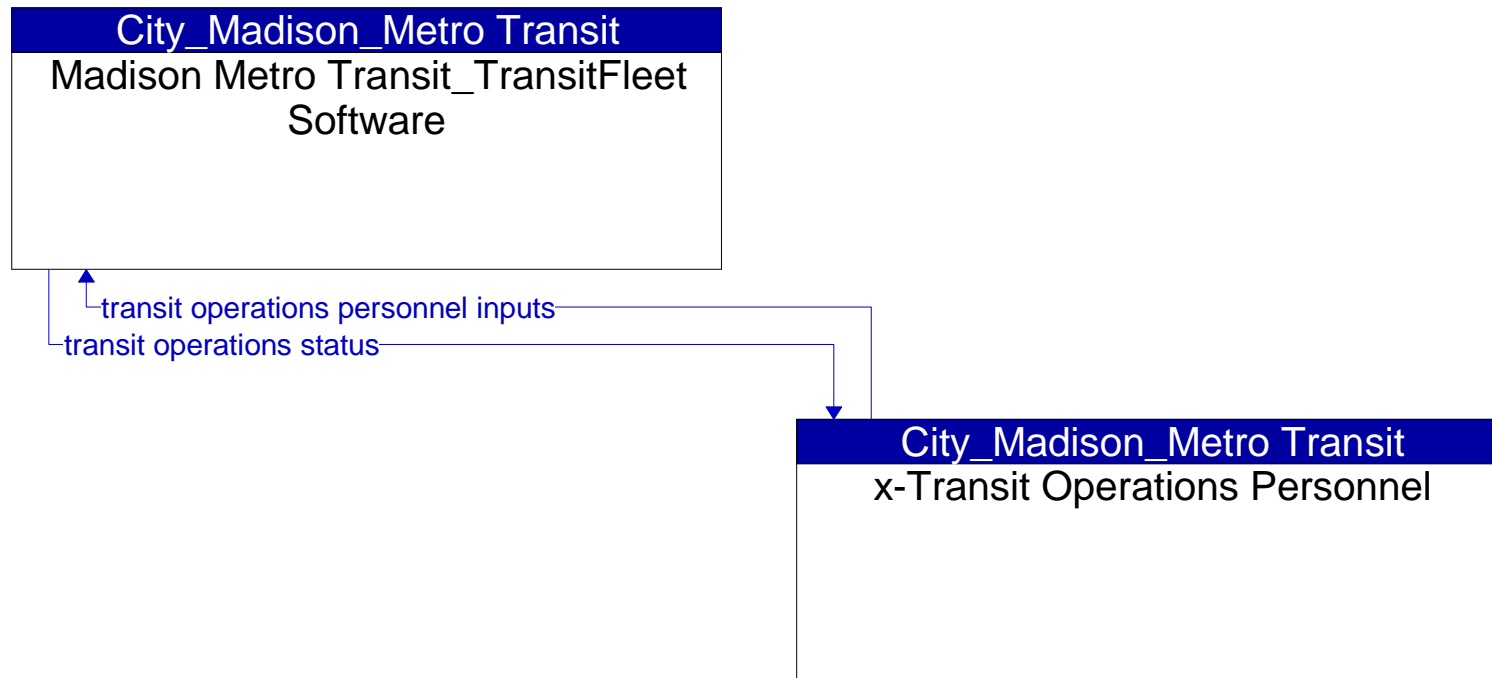




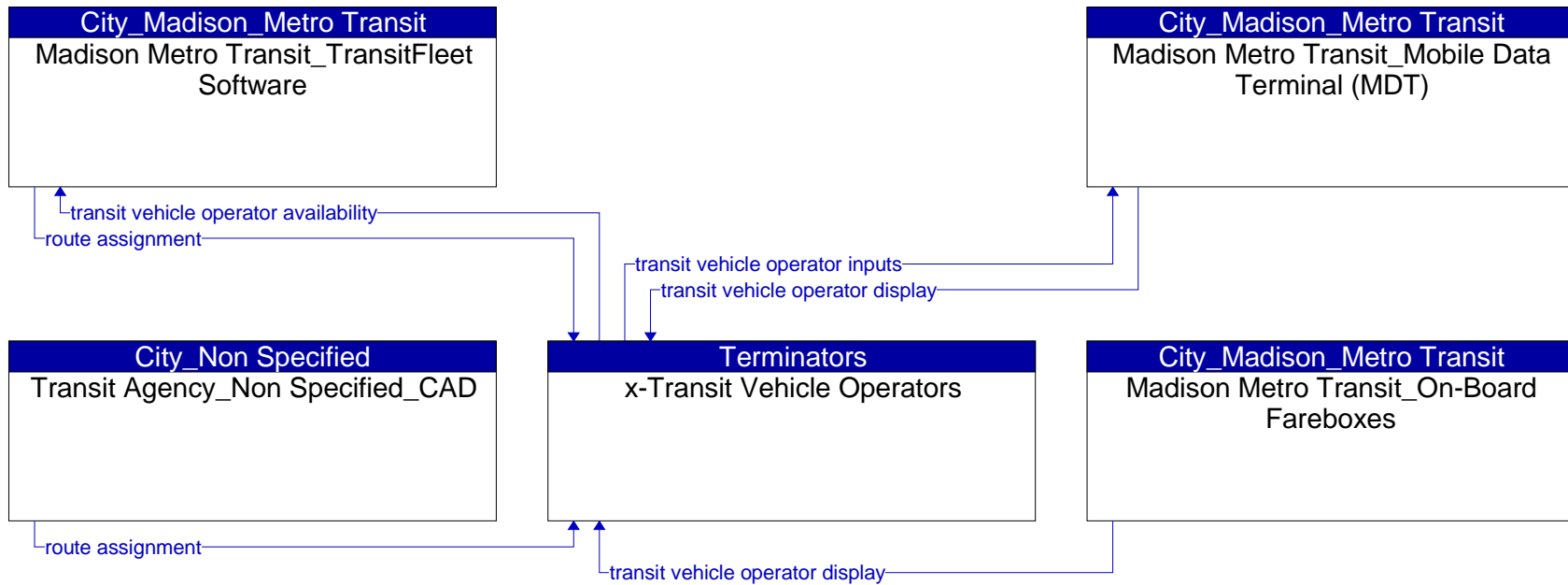




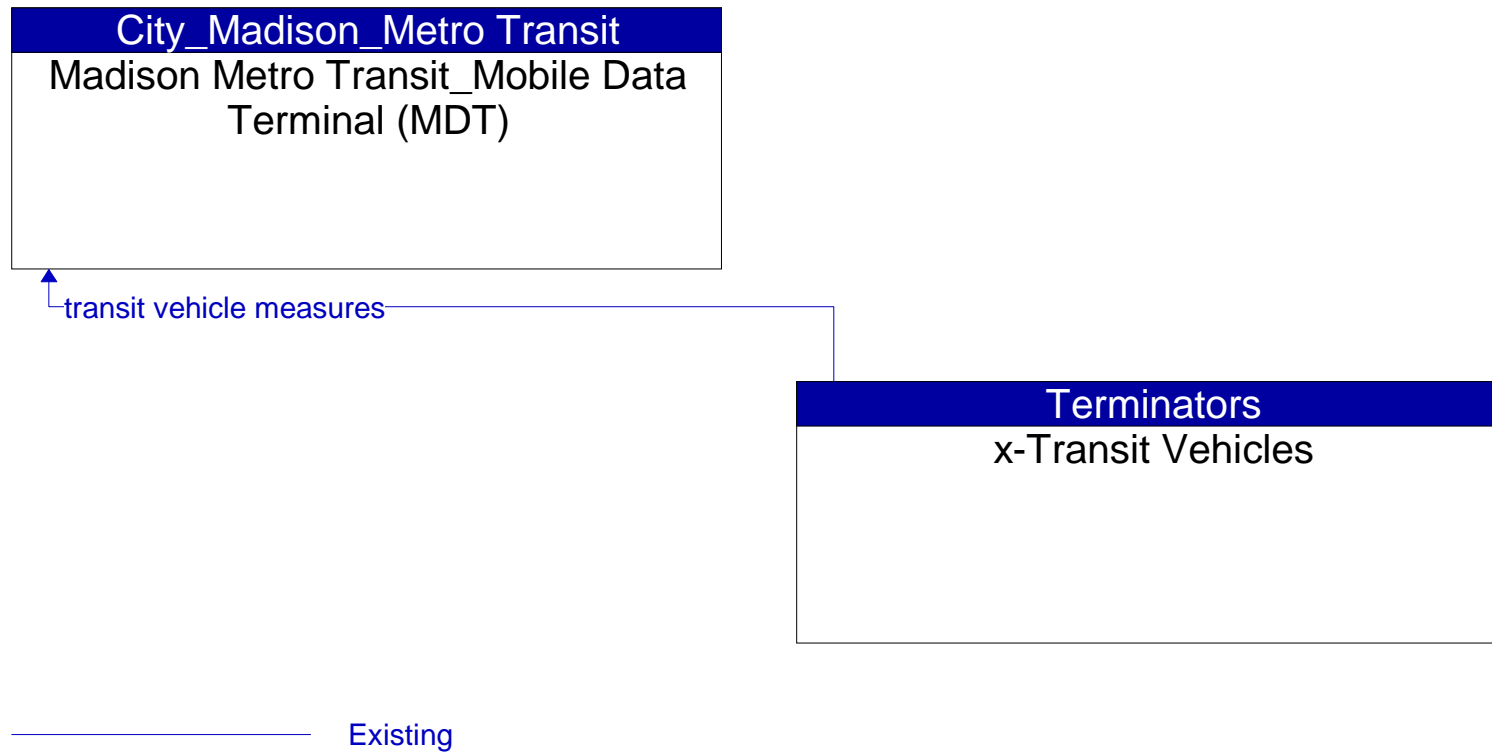


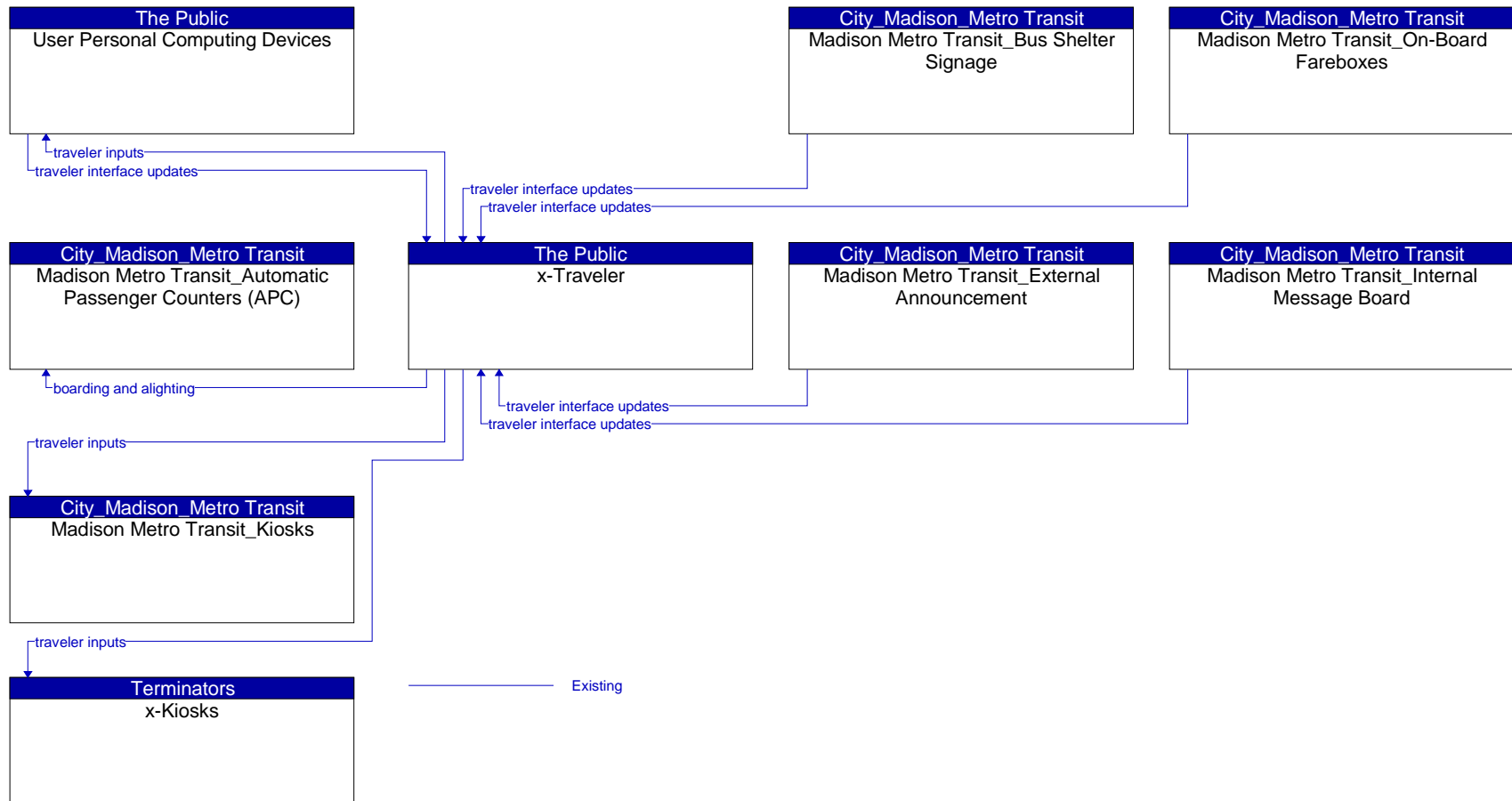


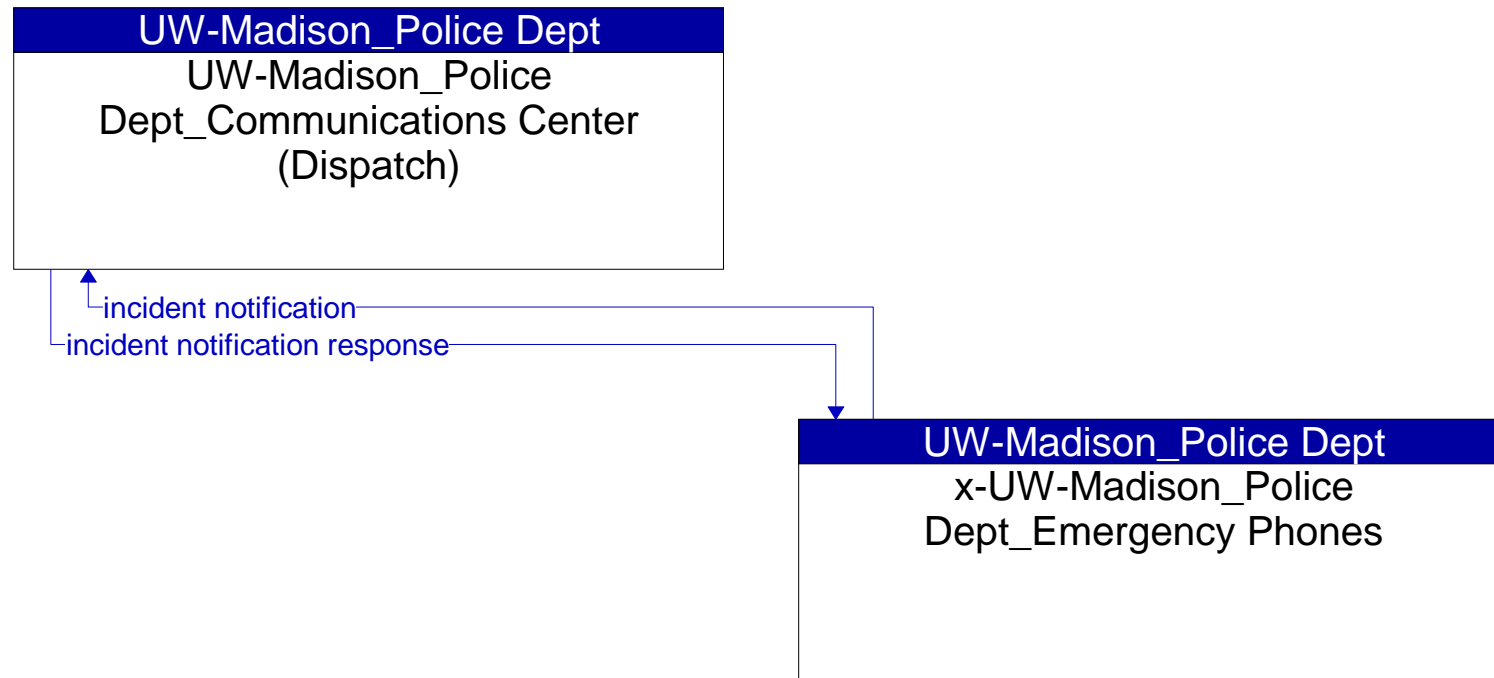
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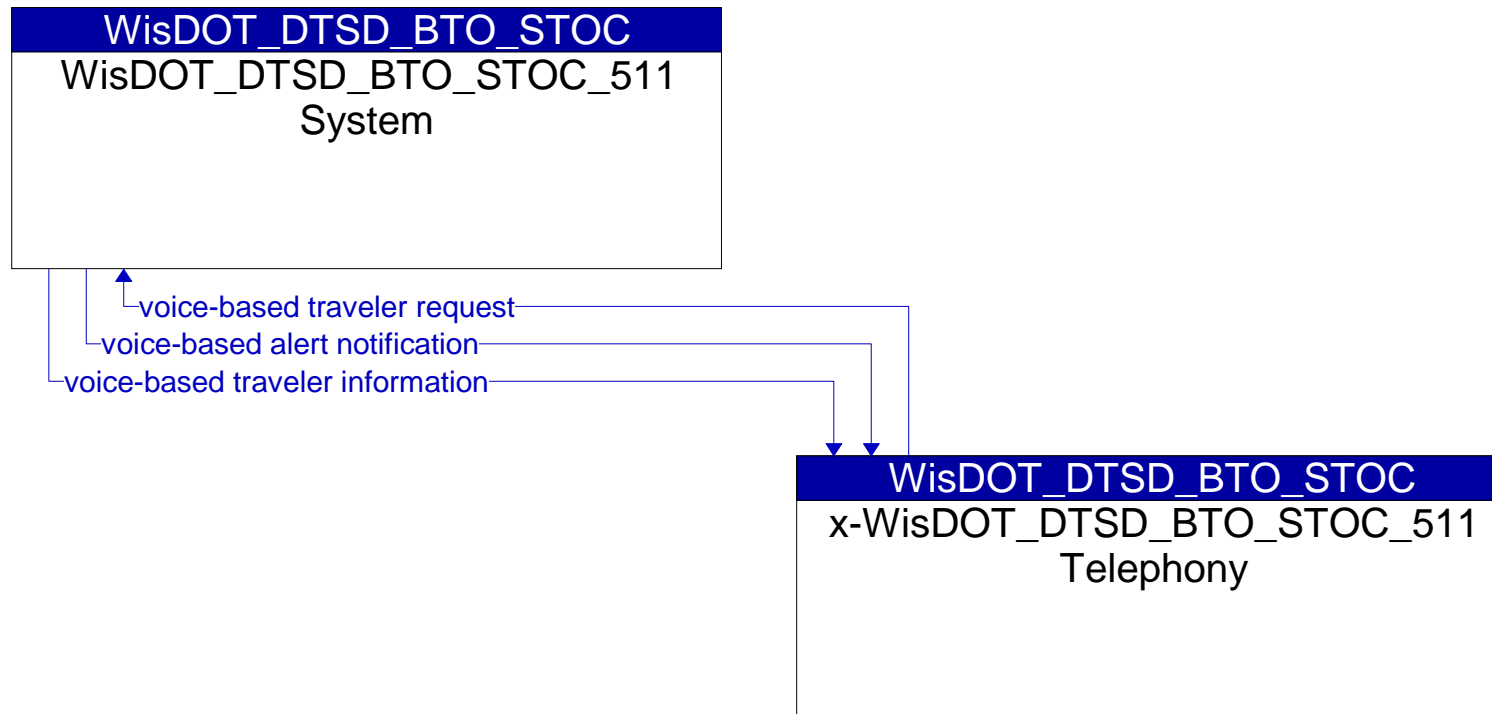
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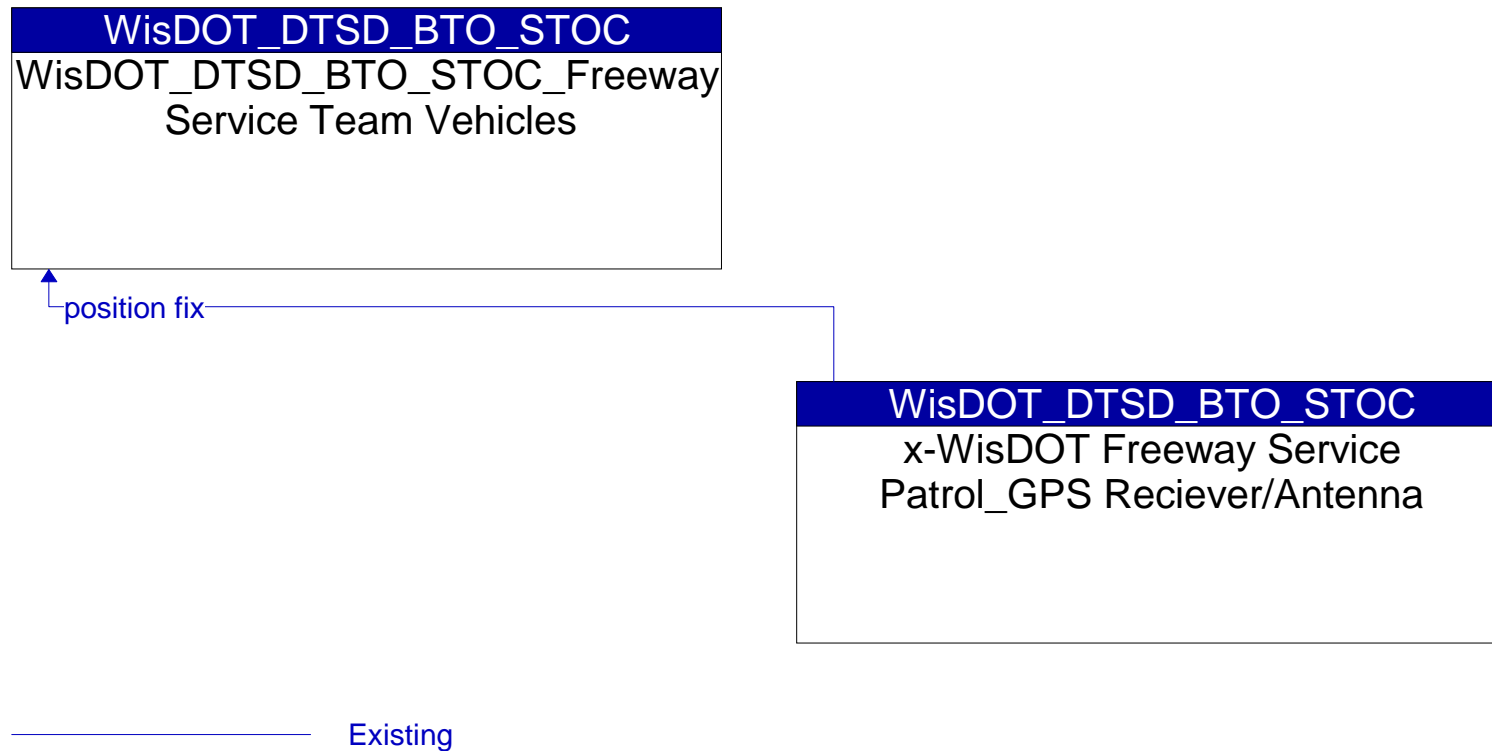




Existing



Existing



E

ARCHITECTURE FLOW DIAGRAMS – SERVICE PACKAGE VIEW

Architecture flow diagrams corresponding to applicable National ITS Architecture Service Packages are provided below. Architecture flow diagrams have been provided as a means to visually understand and verify the flow of information and data that need to occur between ITS elements to fulfill desired transportation services. Due to the number of flows between individual elements, and the resulting complexity that results from graphically displaying flows, some diagrams including the flows identified within them have become illegible. Appendix F provides flows in a tabular format. Illegible diagrams remain in this section for viewing at a zoomed in level electronically.

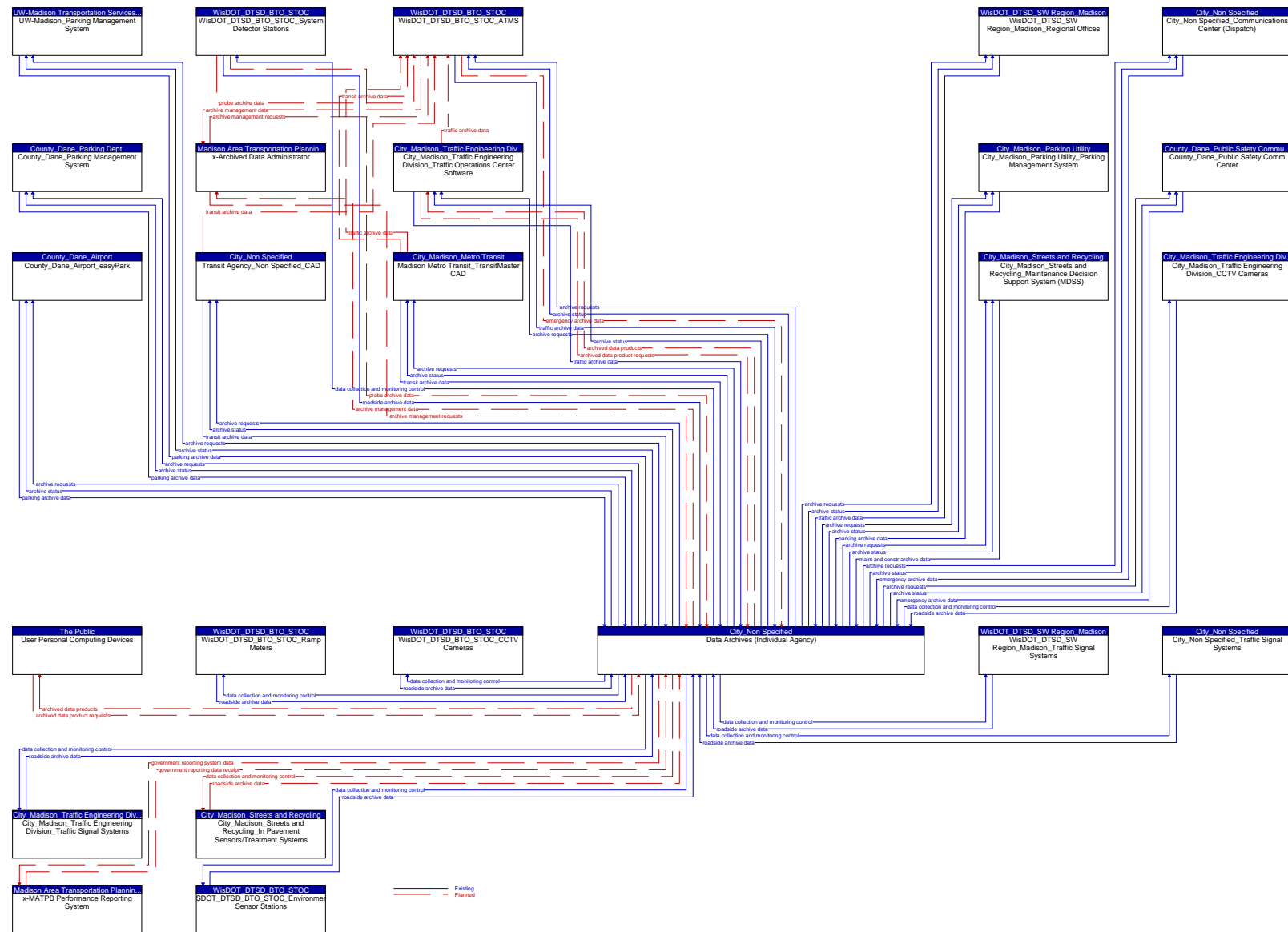


Figure 40: Architecture Flow Diagram for ITS Data Mart

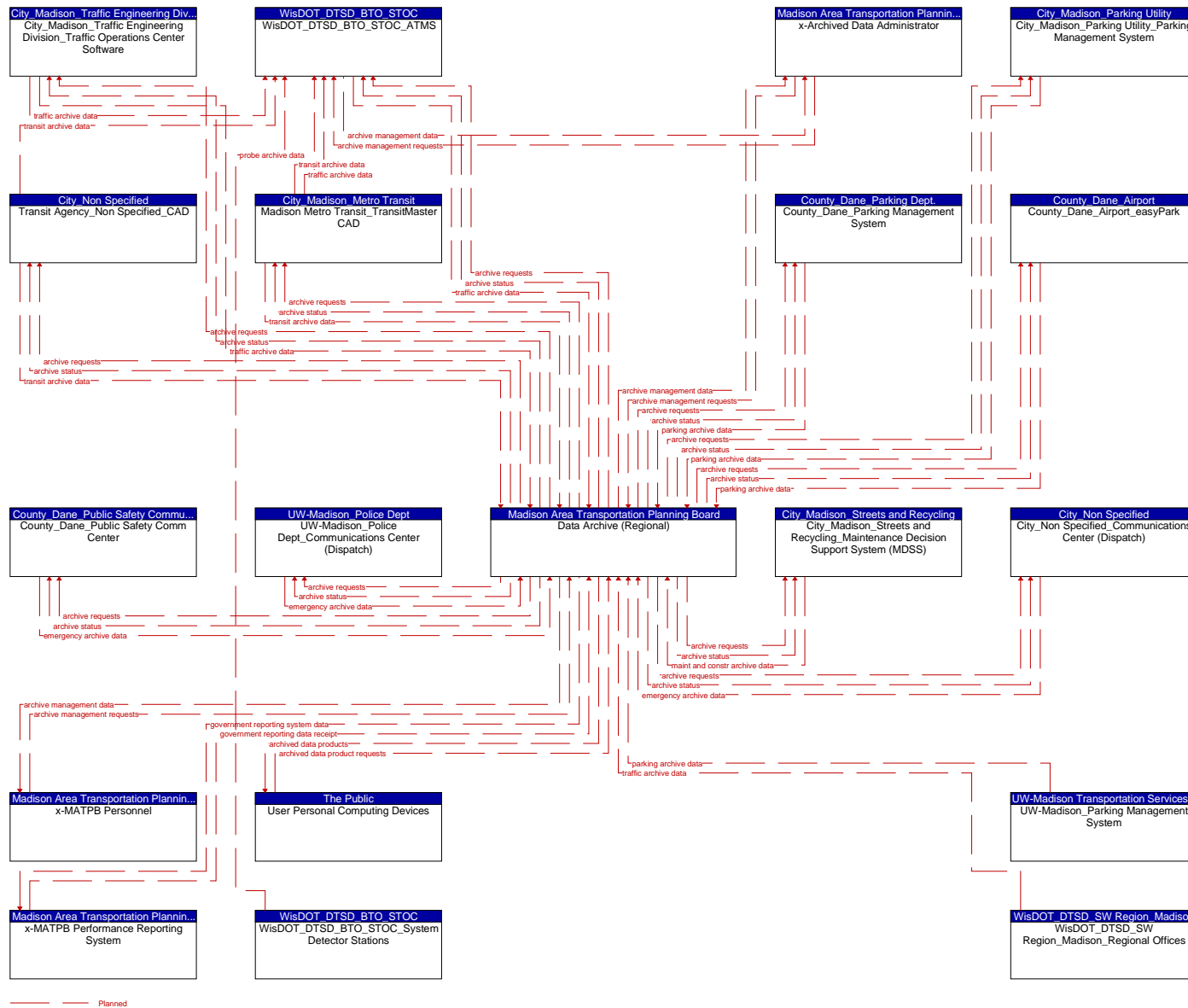


Figure 41: Architecture Flow Diagram for ITS DataWarehouse

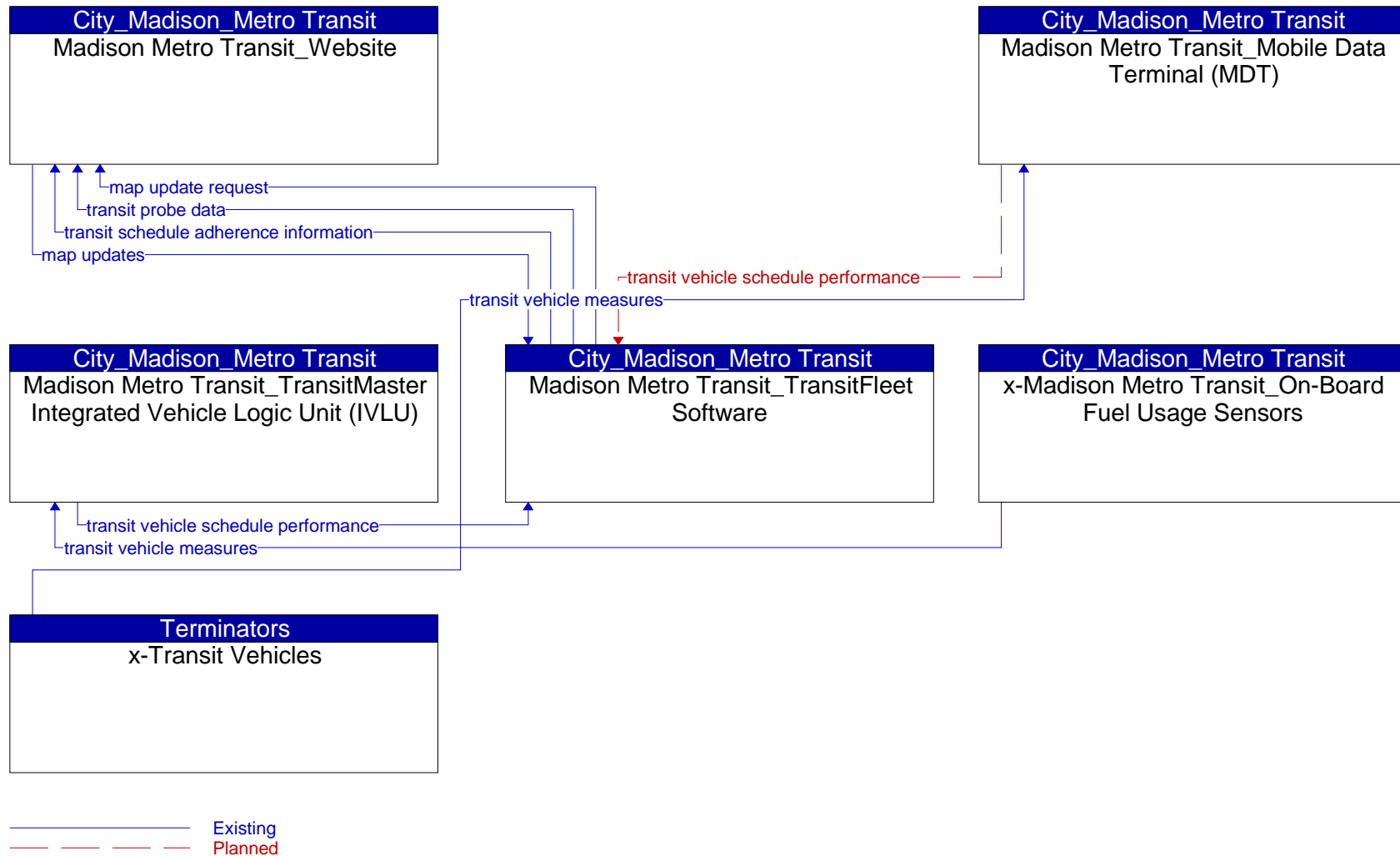
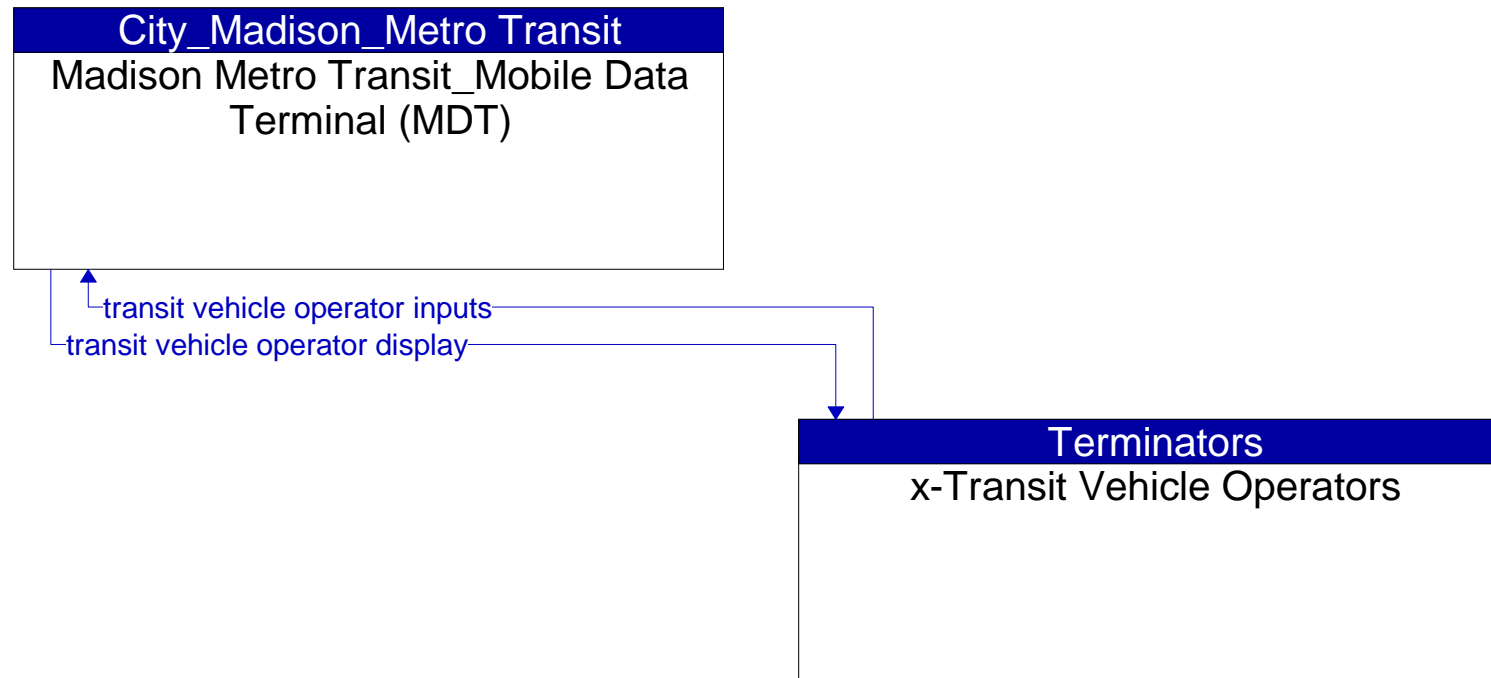
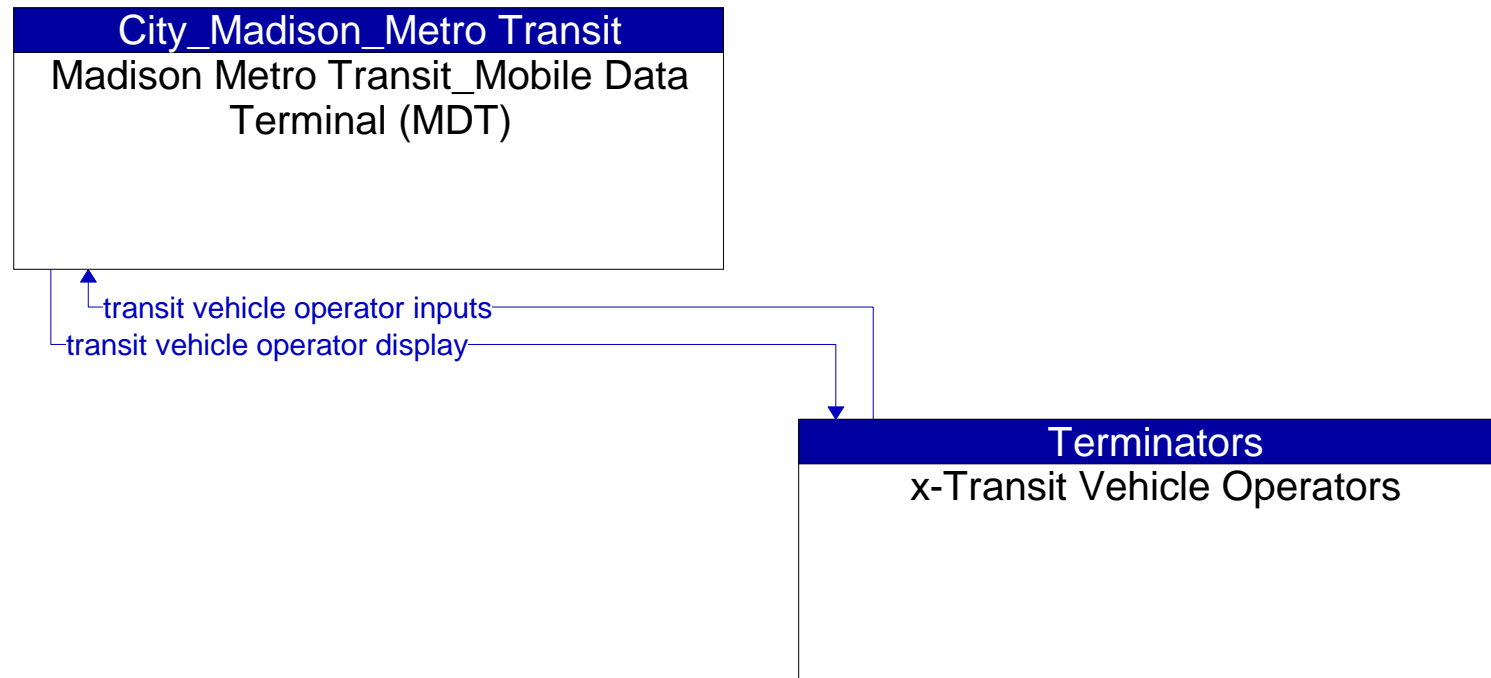


Figure 42: Architecture Flow Diagram for Transit fixed-Route Operations



Existing

Figure 43: Architecture Flow Diagram for Transit Fixed-Route Operations



Existing

Figure 44: Architecture Flow Diagram for Demand Response Transit Operations

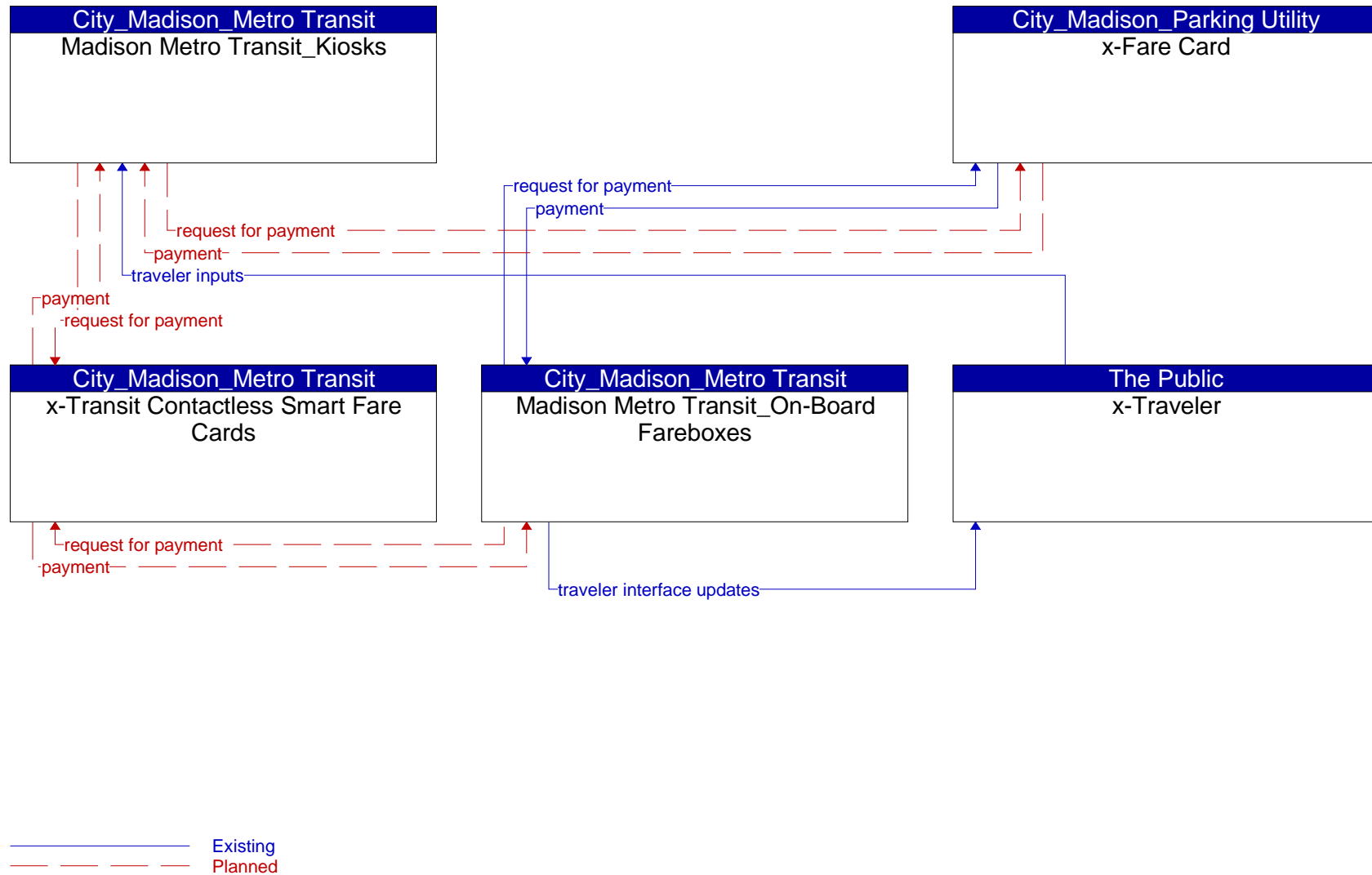


Figure 45: Architecture Flow Diagram for Transit Fare Collection

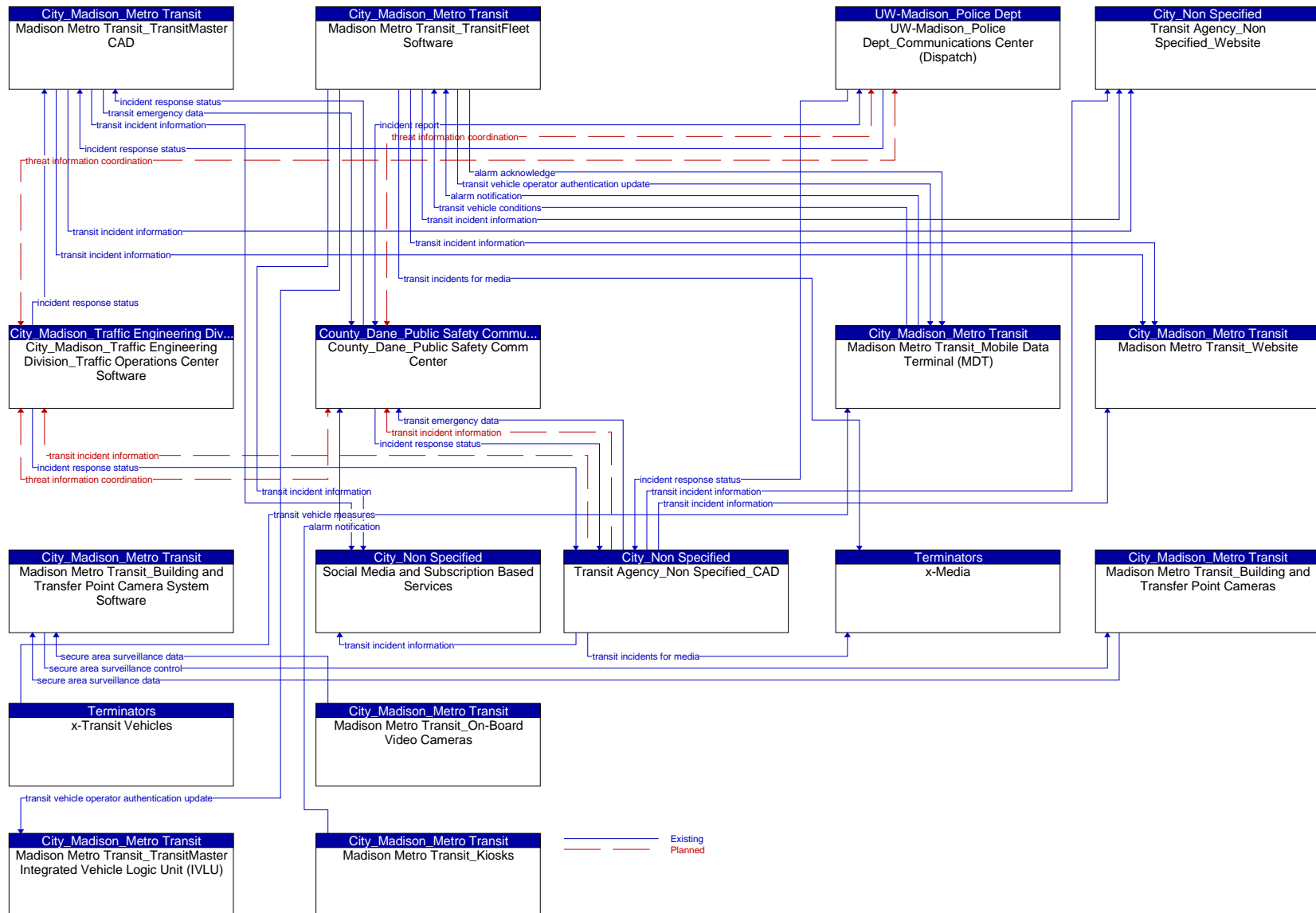


Figure 46: Architecture Flow Diagram for Transit Security

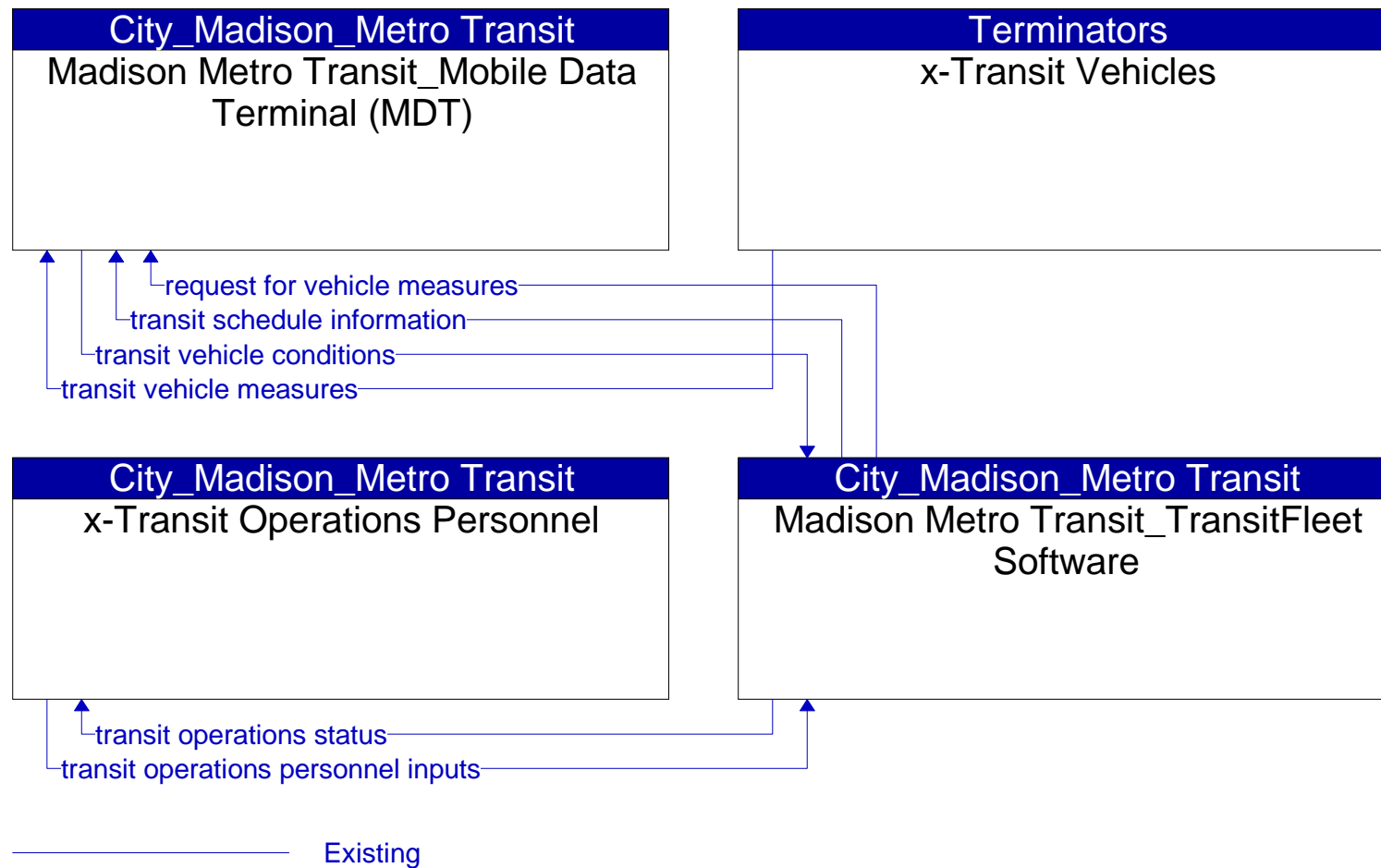


Figure 47: Architecture Flow Diagram for Transit Fleet Management

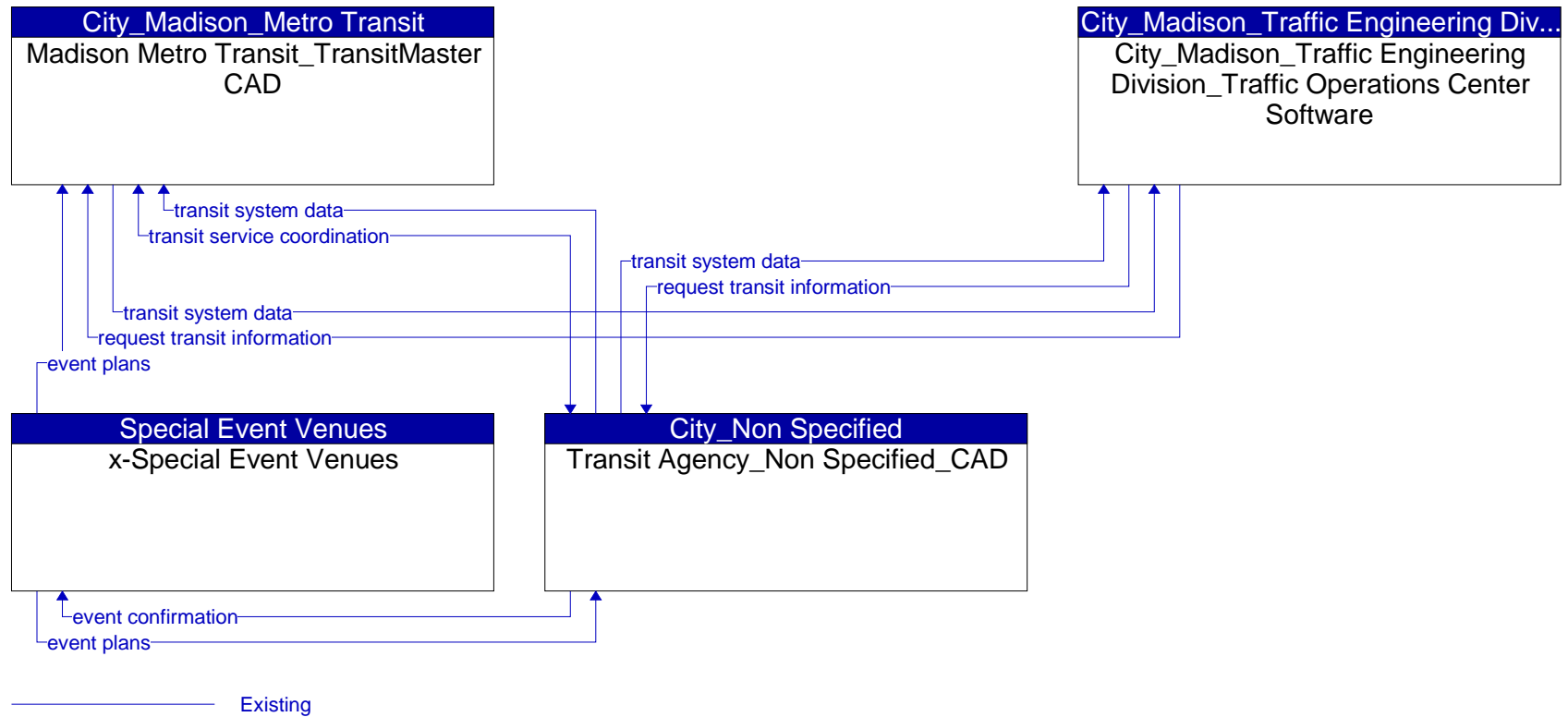


Figure 48: Architecture Flow Diagram for Multi-modal Coordination

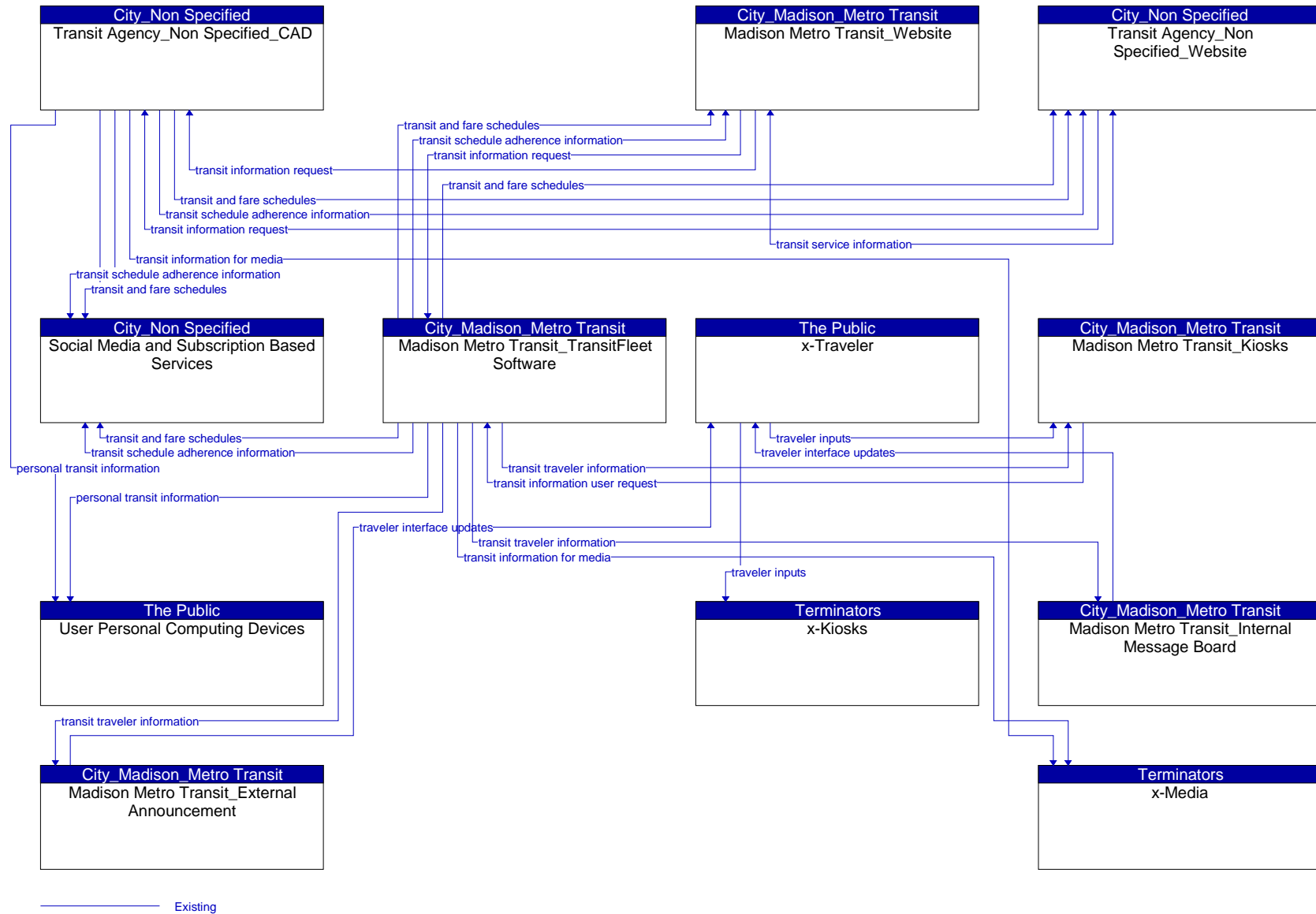


Figure 49: Architecture Flow Diagram for Transit Traveler Information

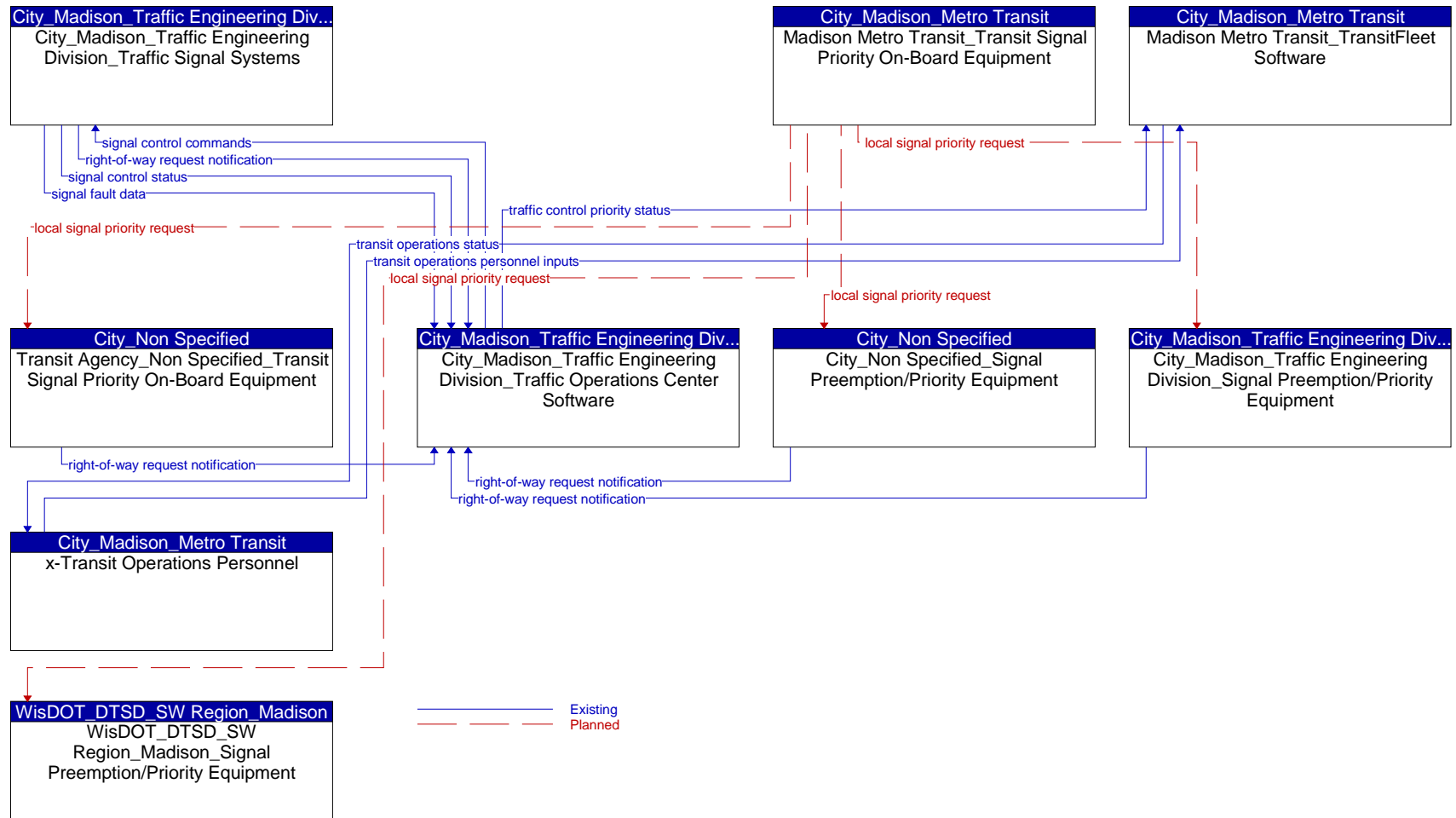


Figure 50: Architecture Flow Diagram for Transit Signal Priority

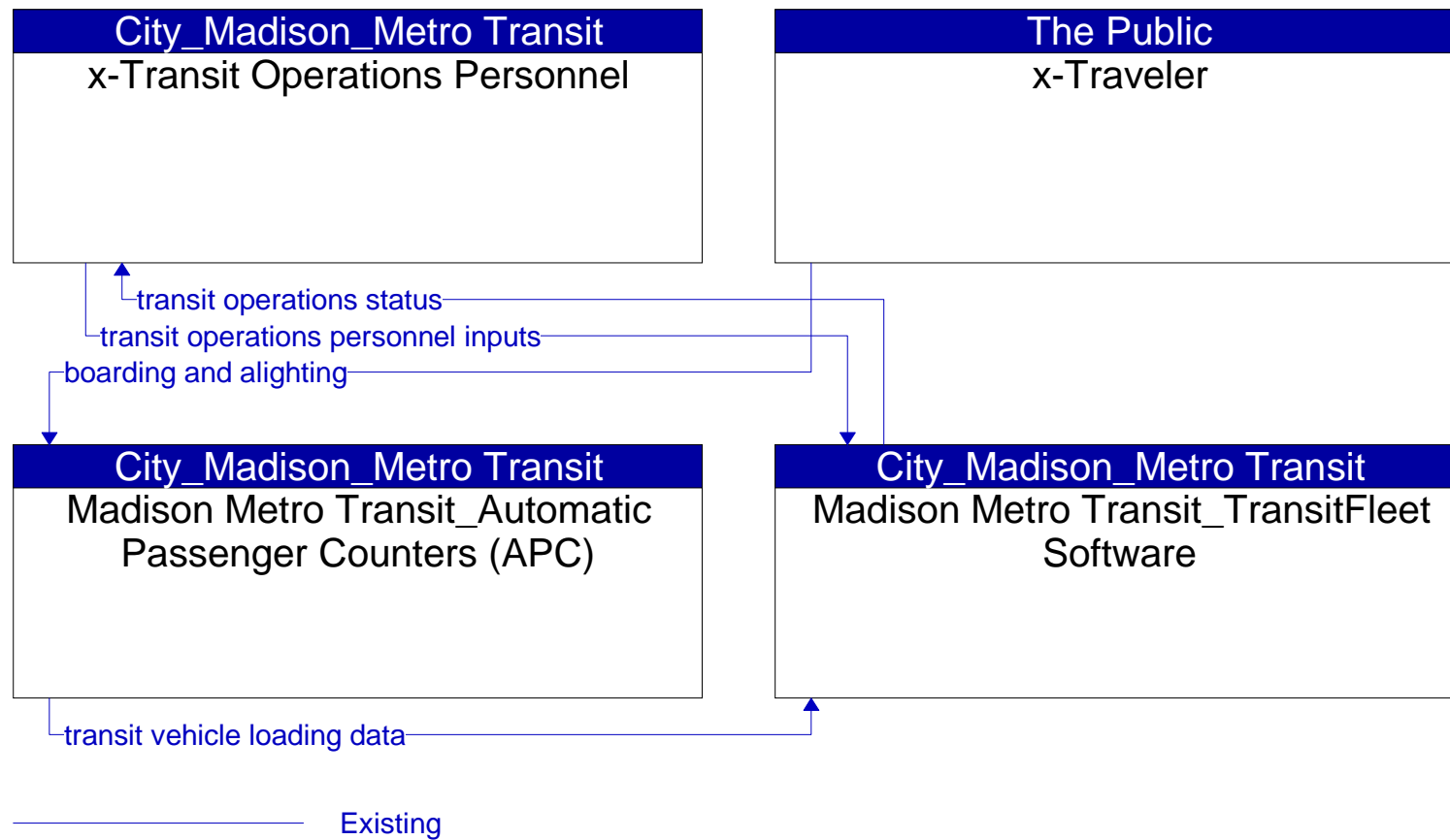


Figure 51: Architecture Flow Diagram for Transit Passenger Counting

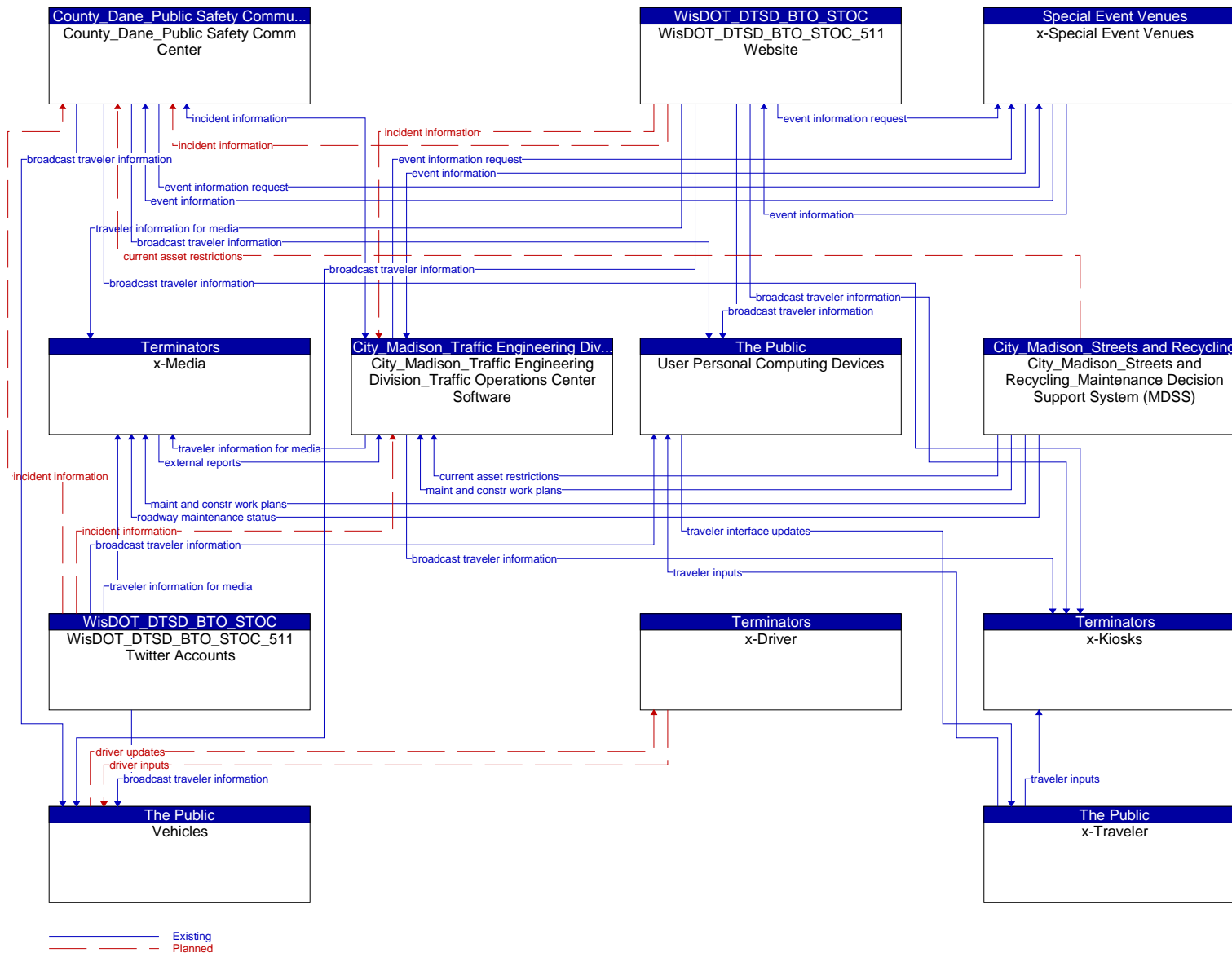


Figure 52: Architecture Flow Diagram for Broadcast Traveler Information

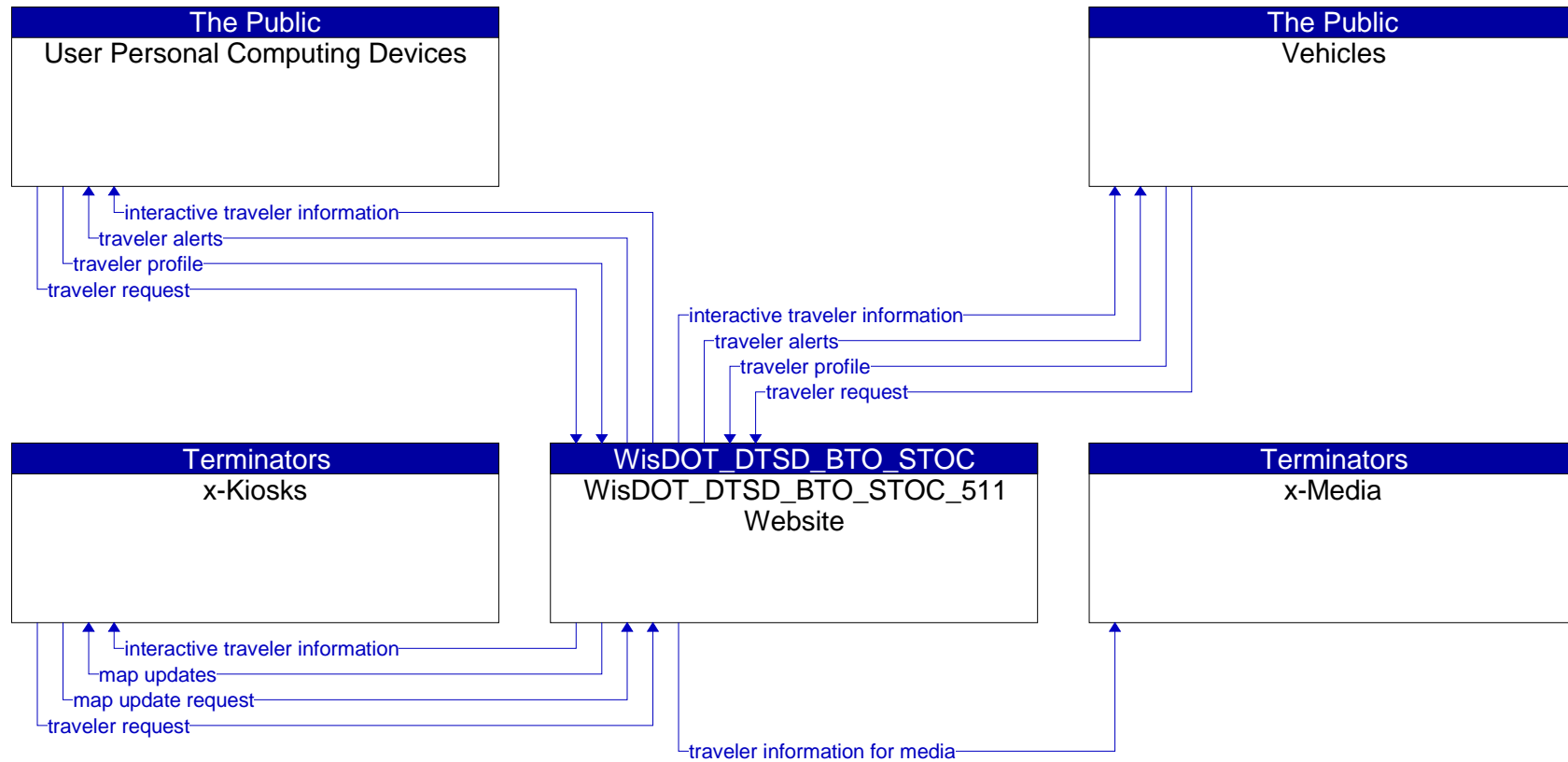


Figure 53: Architecture Flow Diagram for Interactive Traveler Information

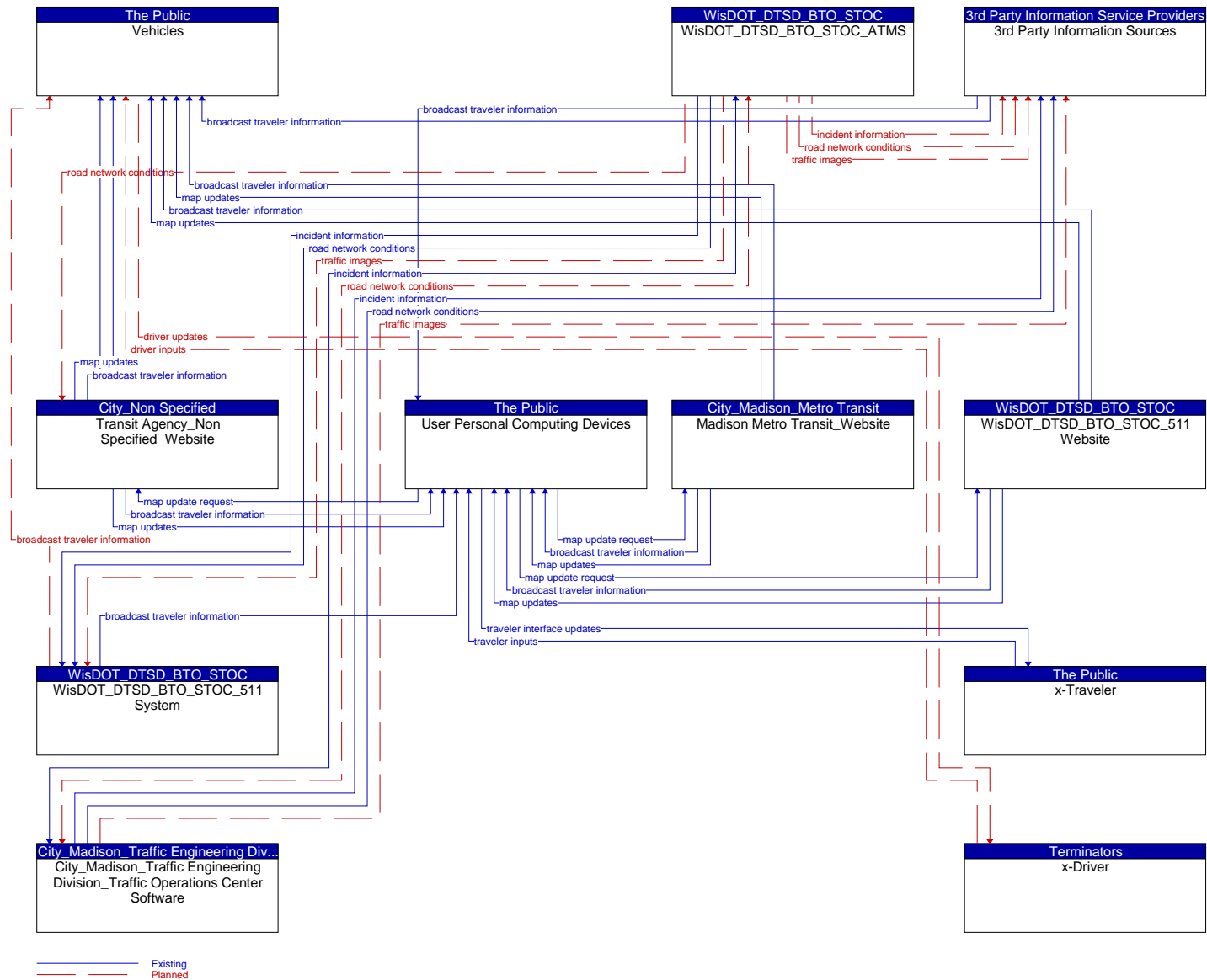


Figure 54: Architecture Flow Diagram for Dynamic Route Guidance

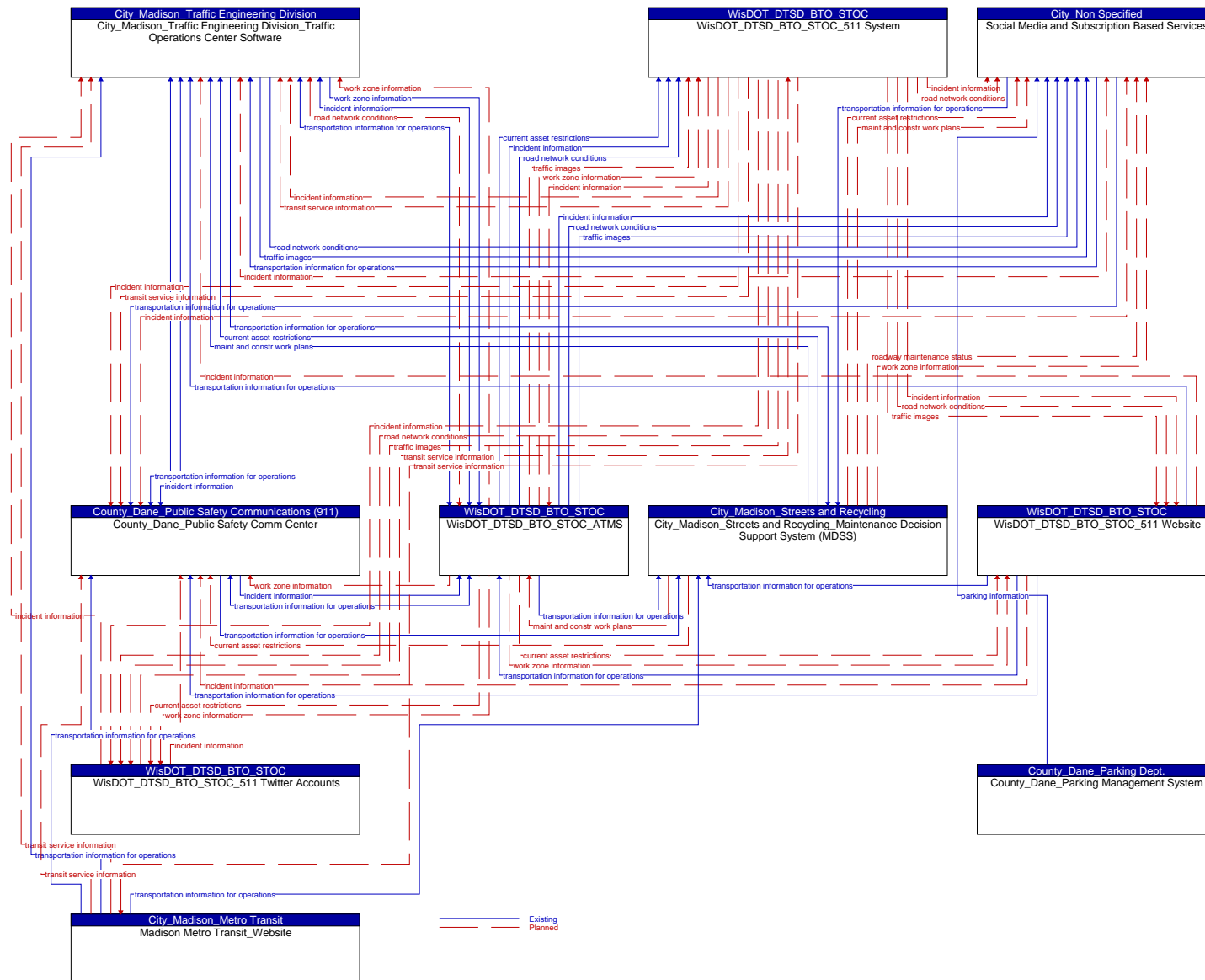


Figure 55: Architecture Flow Diagram for Transportation Operations Data Sharing

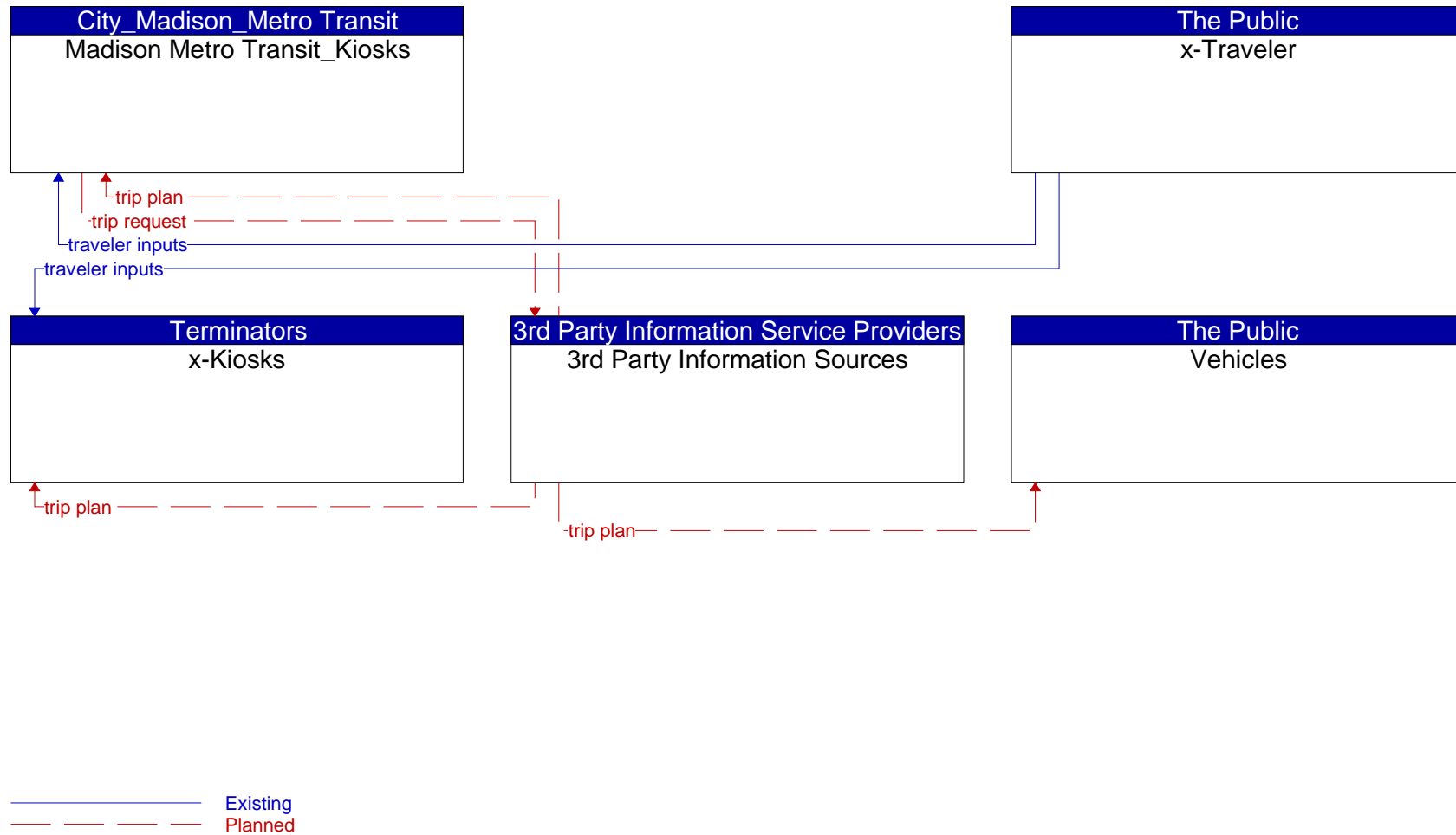


Figure 56: Architecture Flow Diagram for Dynamic Ridesharing

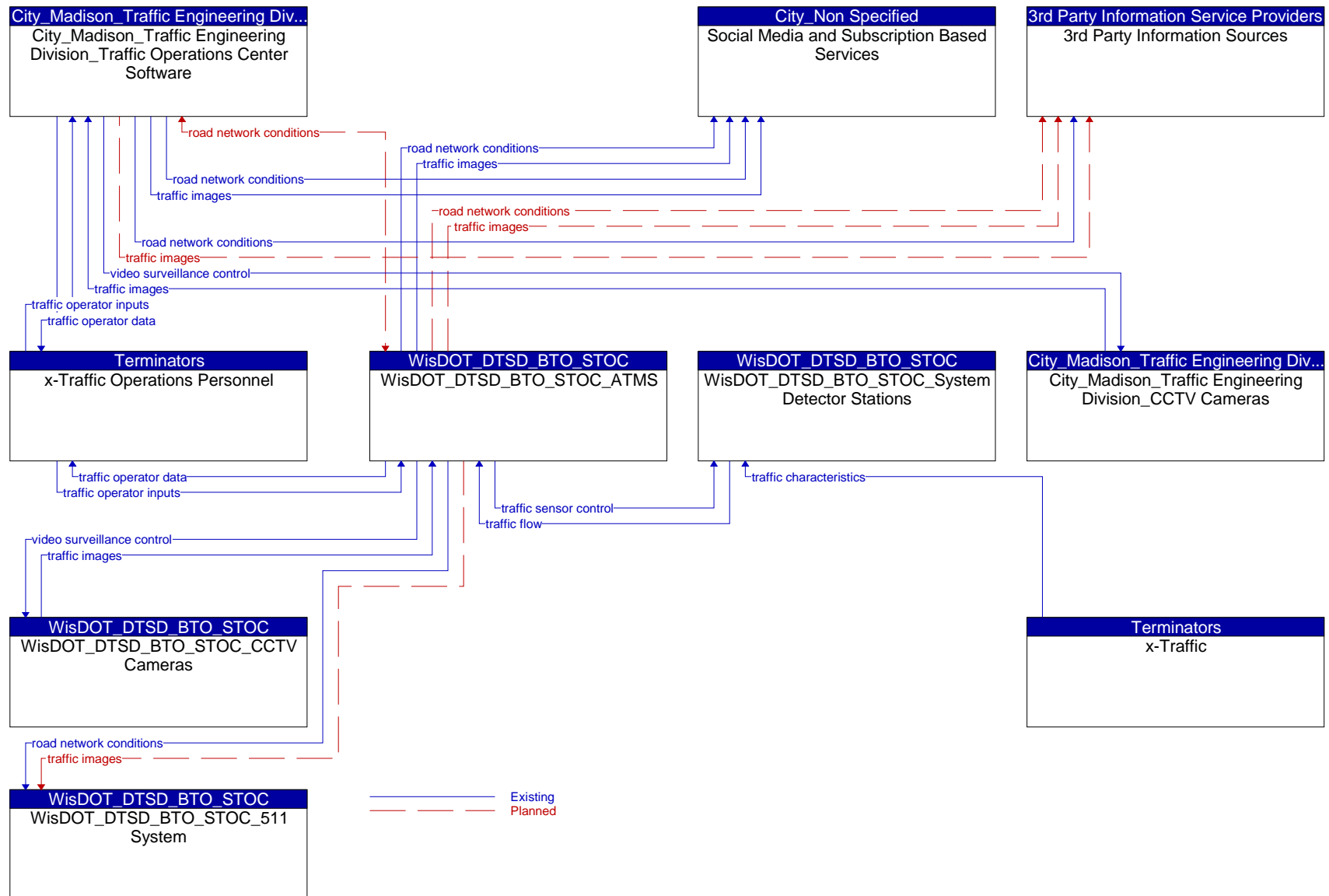


Figure 57: Architecture Flow Diagram for Network Surveillance

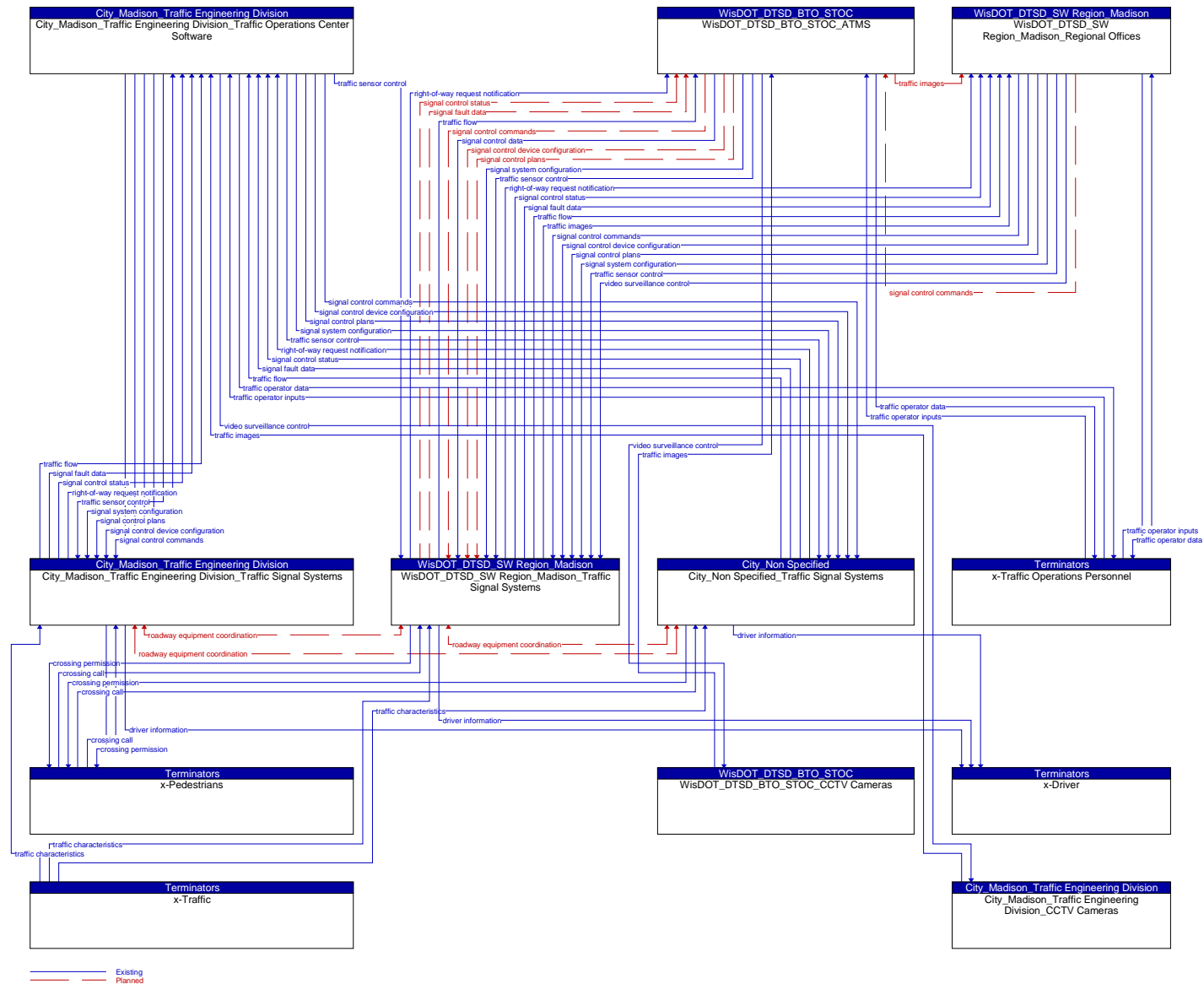


Figure 58: Architecture Flow Diagram for Traffic Signal Control

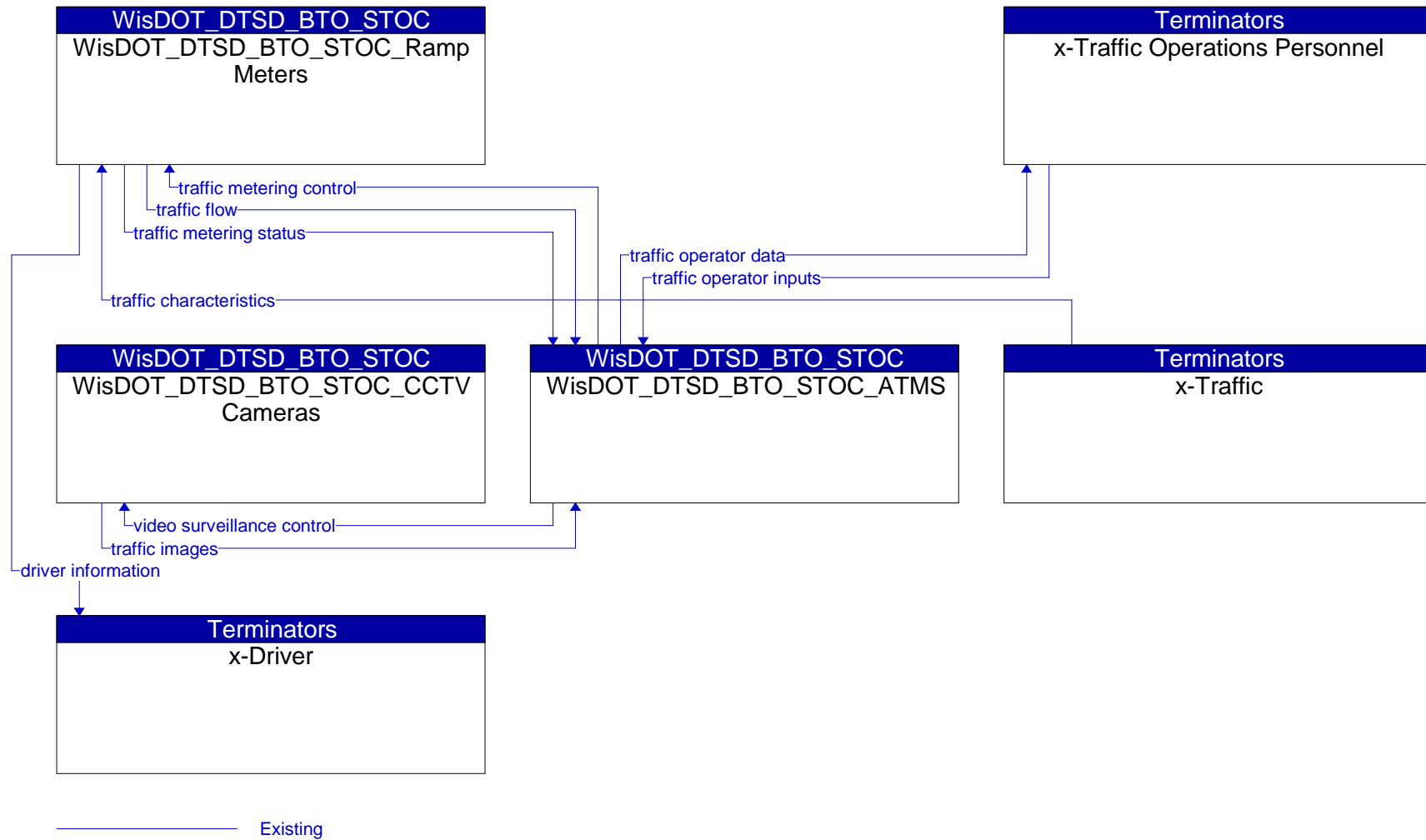


Figure 59: Architecture Flow Diagram for Traffic Metering

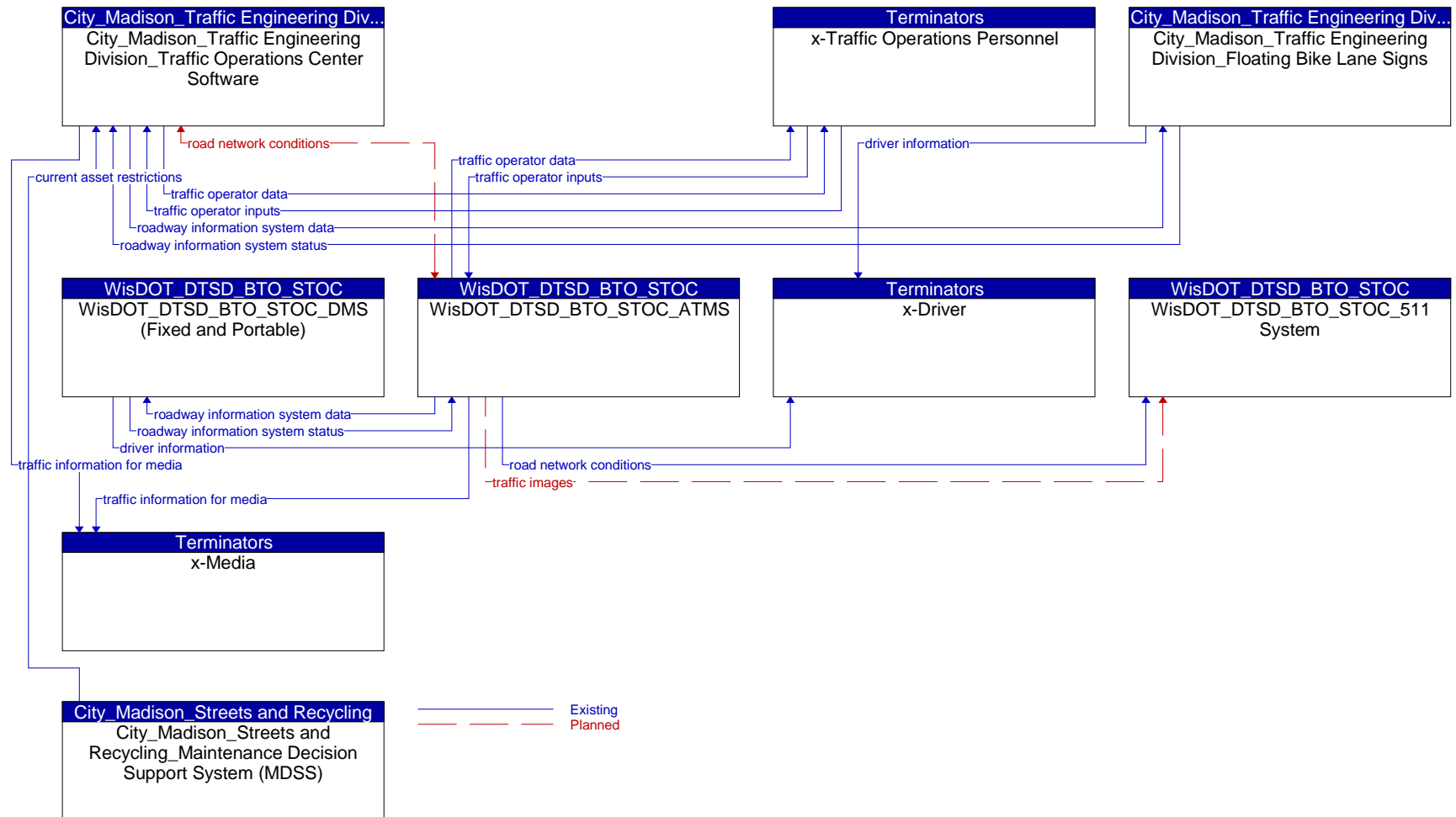


Figure 60: Architecture Flow Diagram for Traffic Information Dissemination

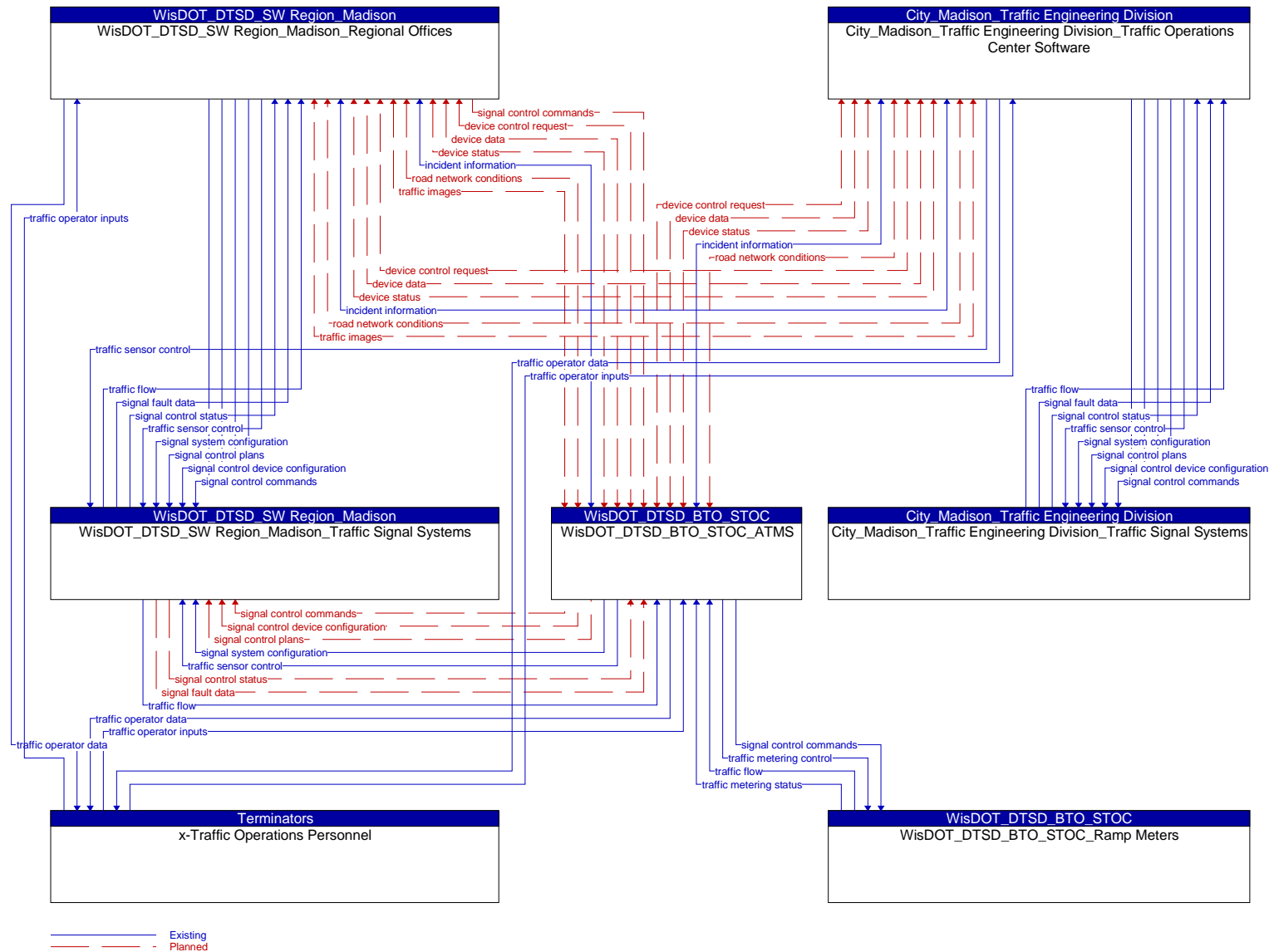


Figure 61: Architecture Flow Diagram for Regional Traffic Management

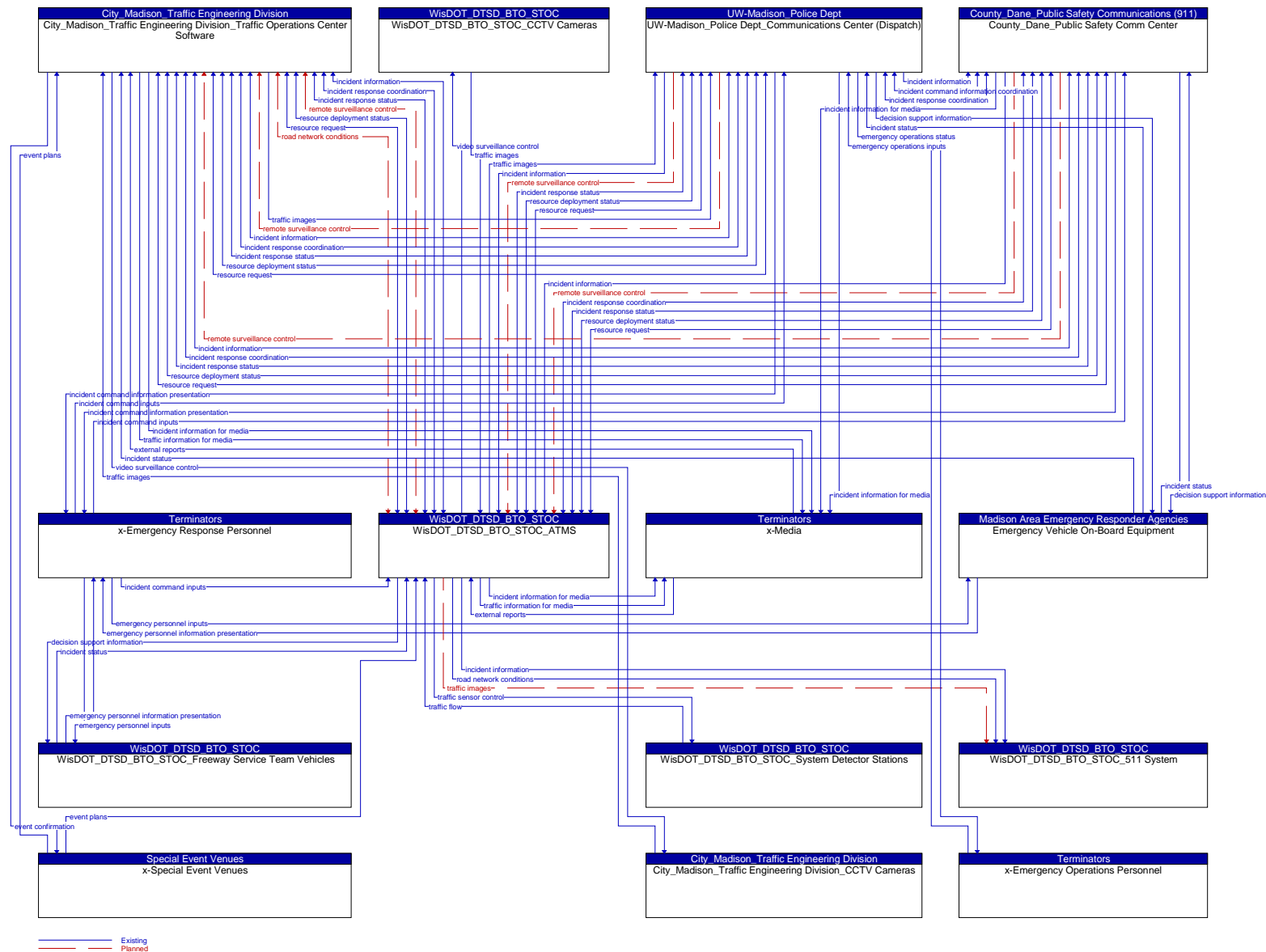


Figure 62: Architecture Flow Diagram for Traffic Incident Management System

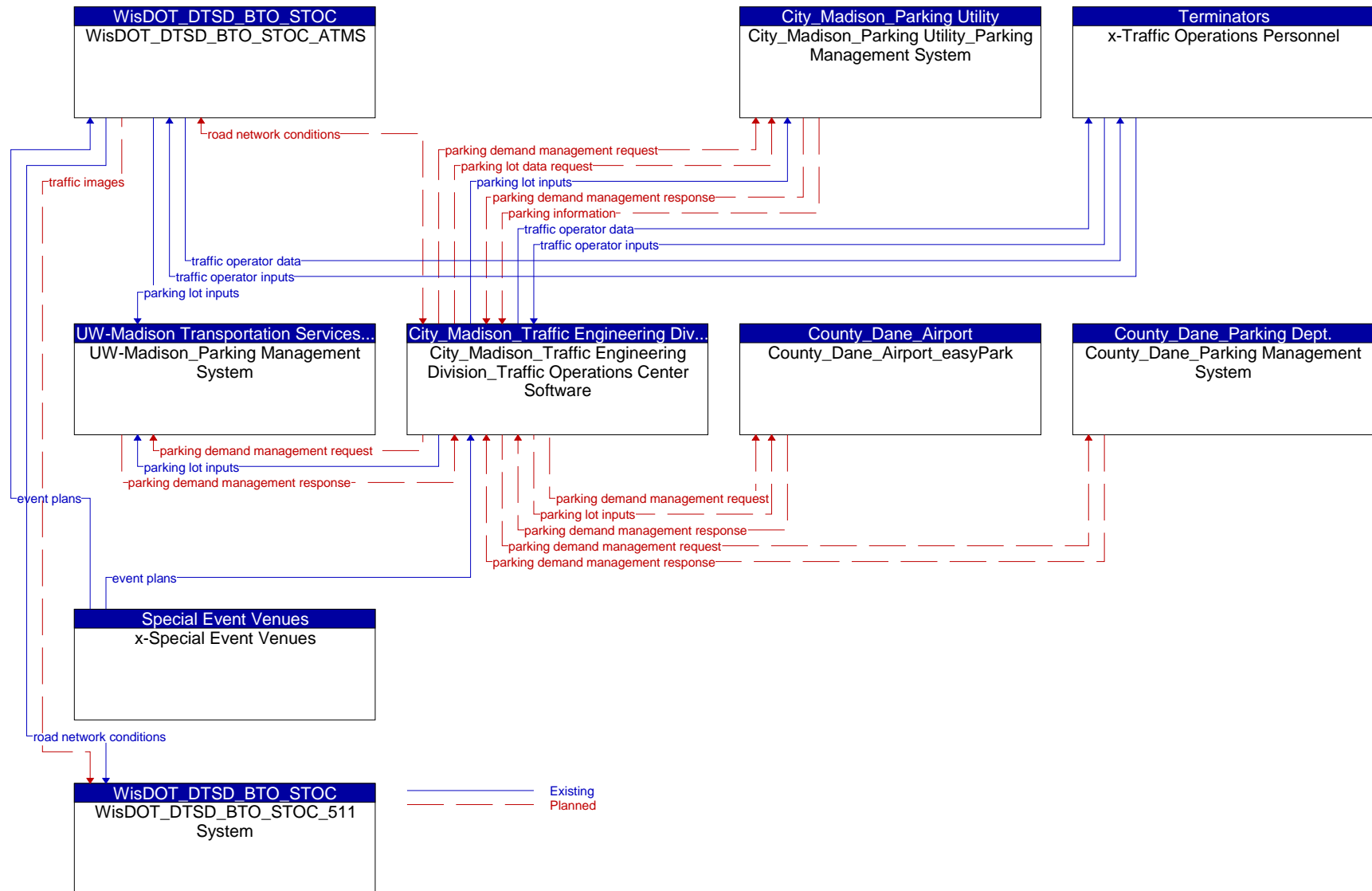


Figure 63: Architecture Flow Diagram Transportation Decision Support and Demand Management

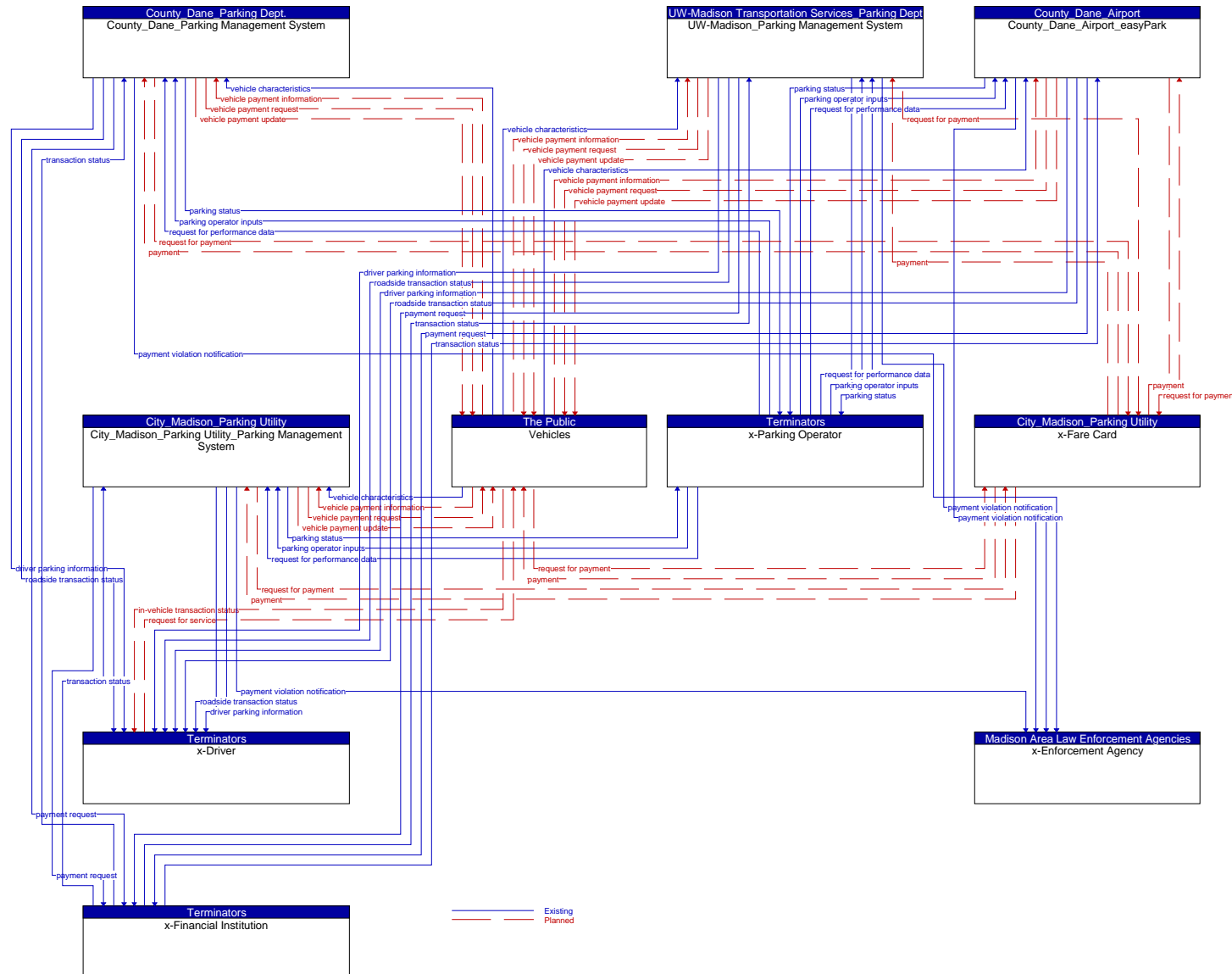


Figure 64: Architecture Flow Diagram for Parking Facility Management

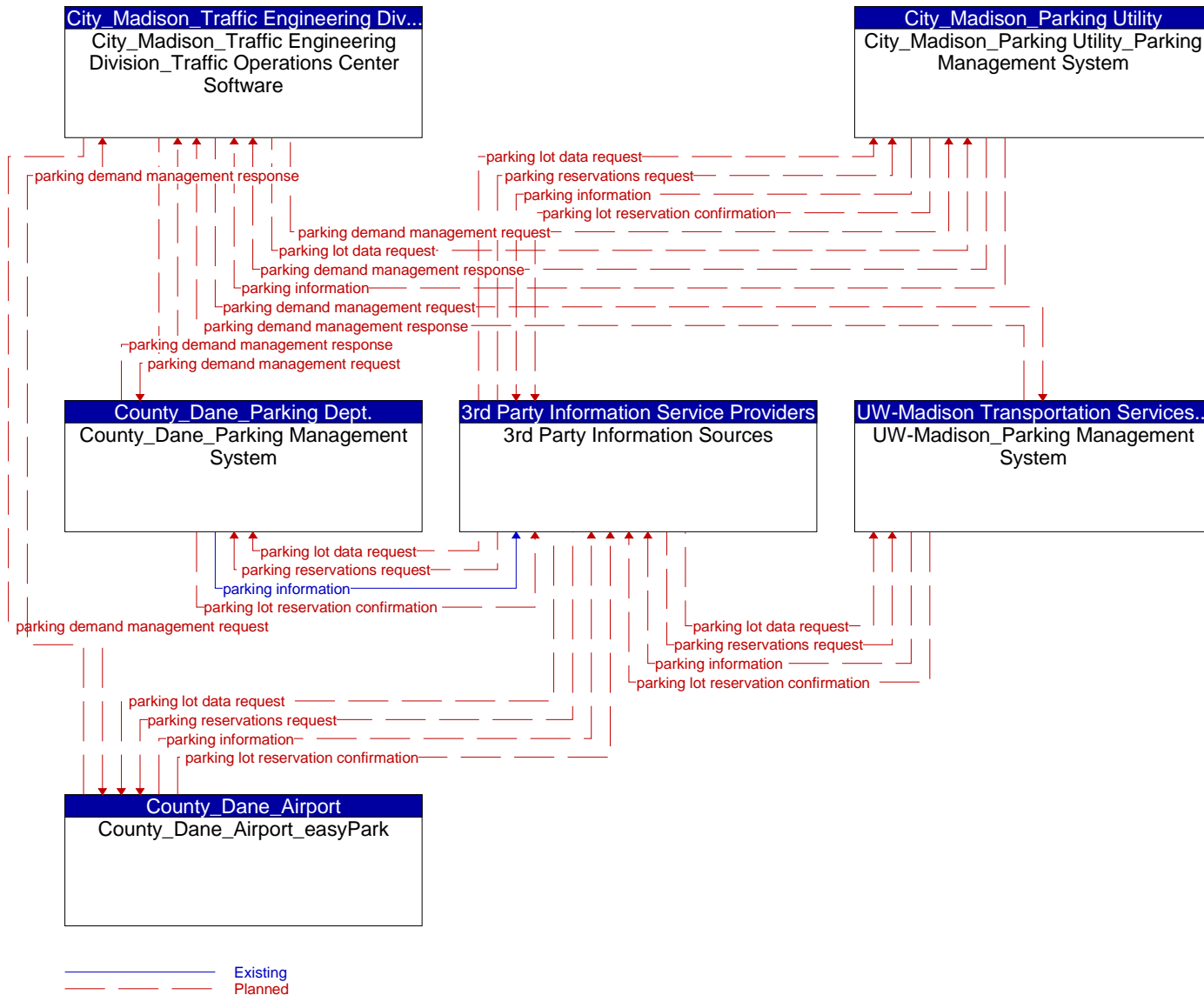


Figure 65: Architecture Flow Diagram for Regional Parking Management

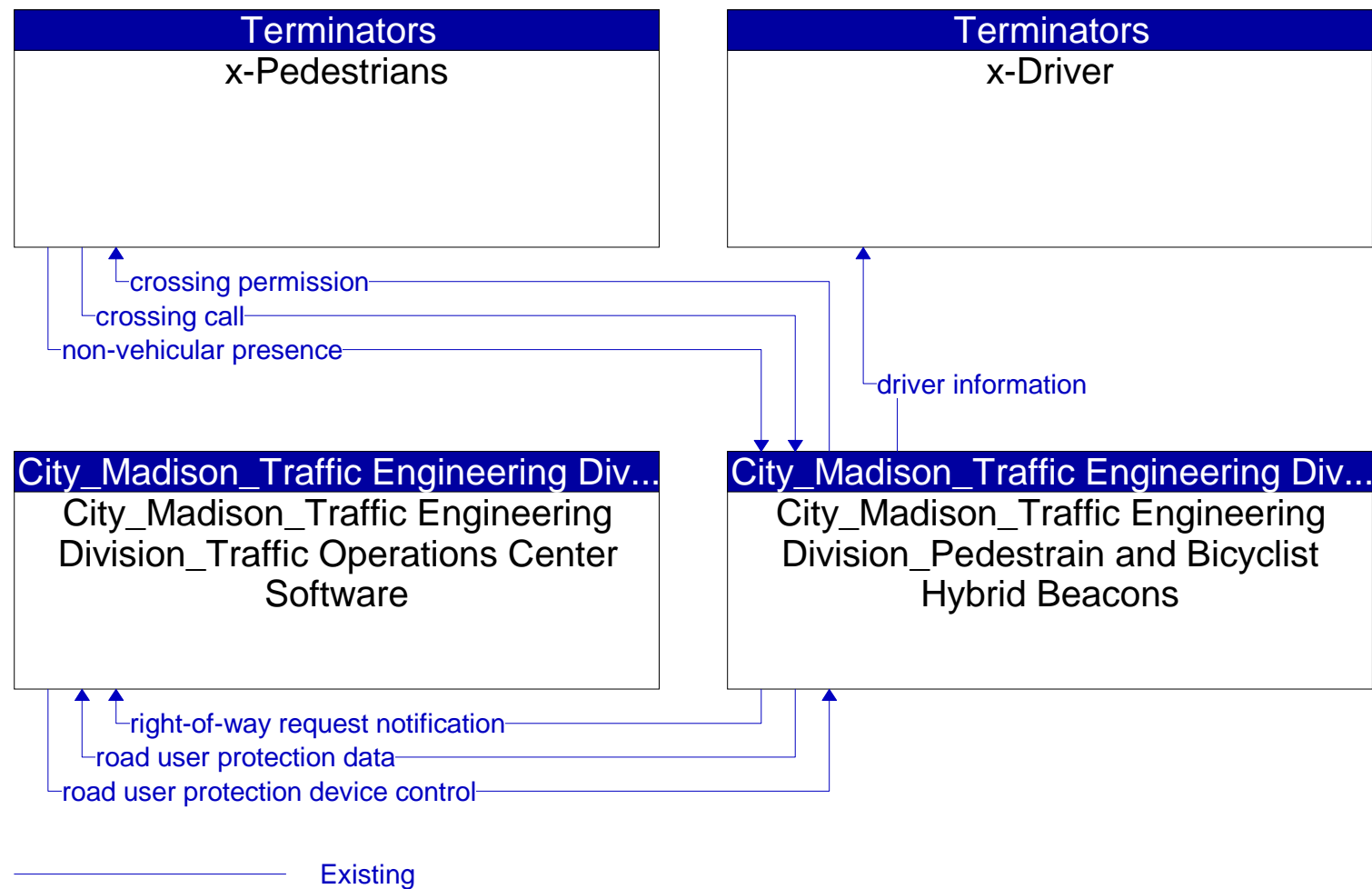


Figure 66: Architecture Flow Diagram for Mixed Use Warning Systems

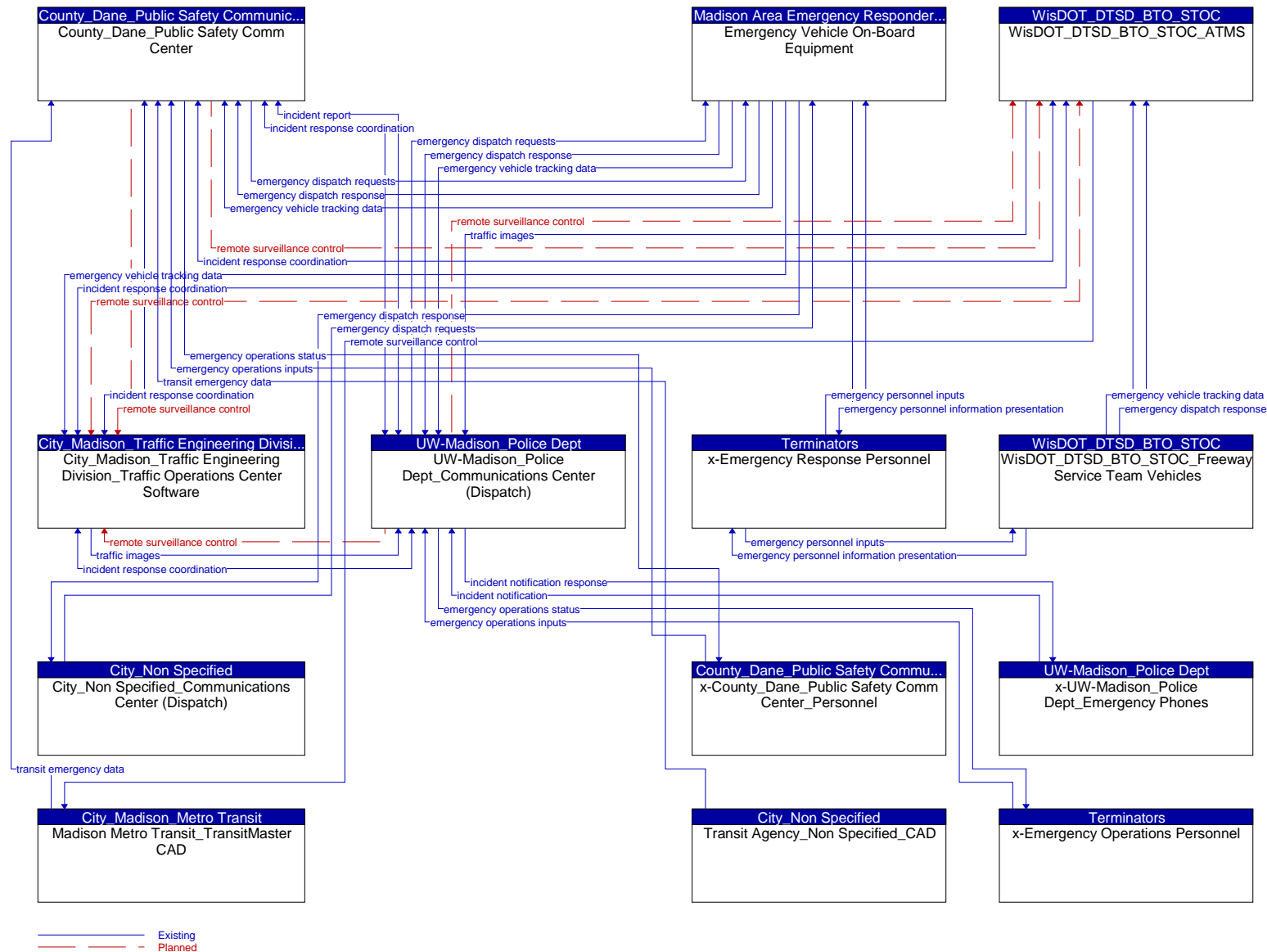


Figure 67: Architecture Flow Diagram for Emergency Call-Taking and Dispatch

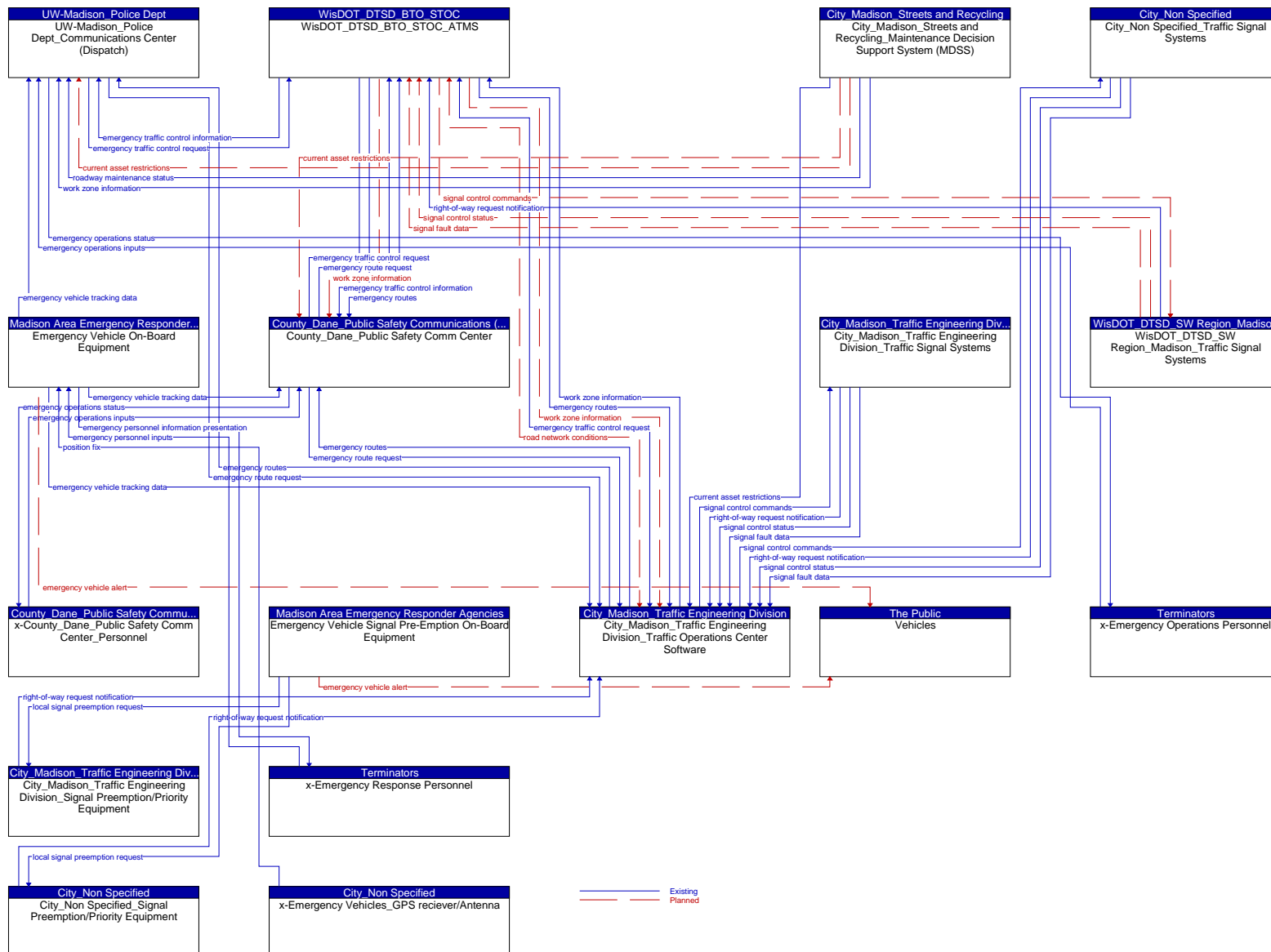


Figure 68: Architecture Flow Diagram for Emergency Routing

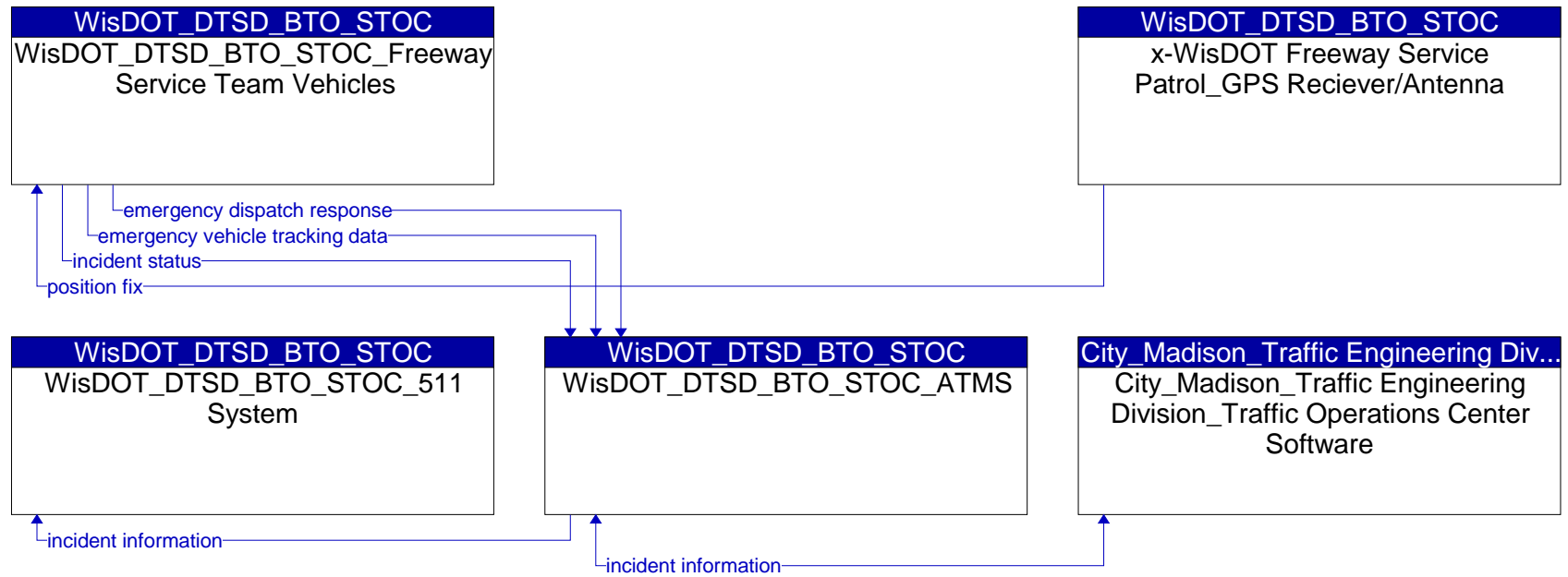


Figure 69: Architecture Flow Diagram for roadway Service Patrols

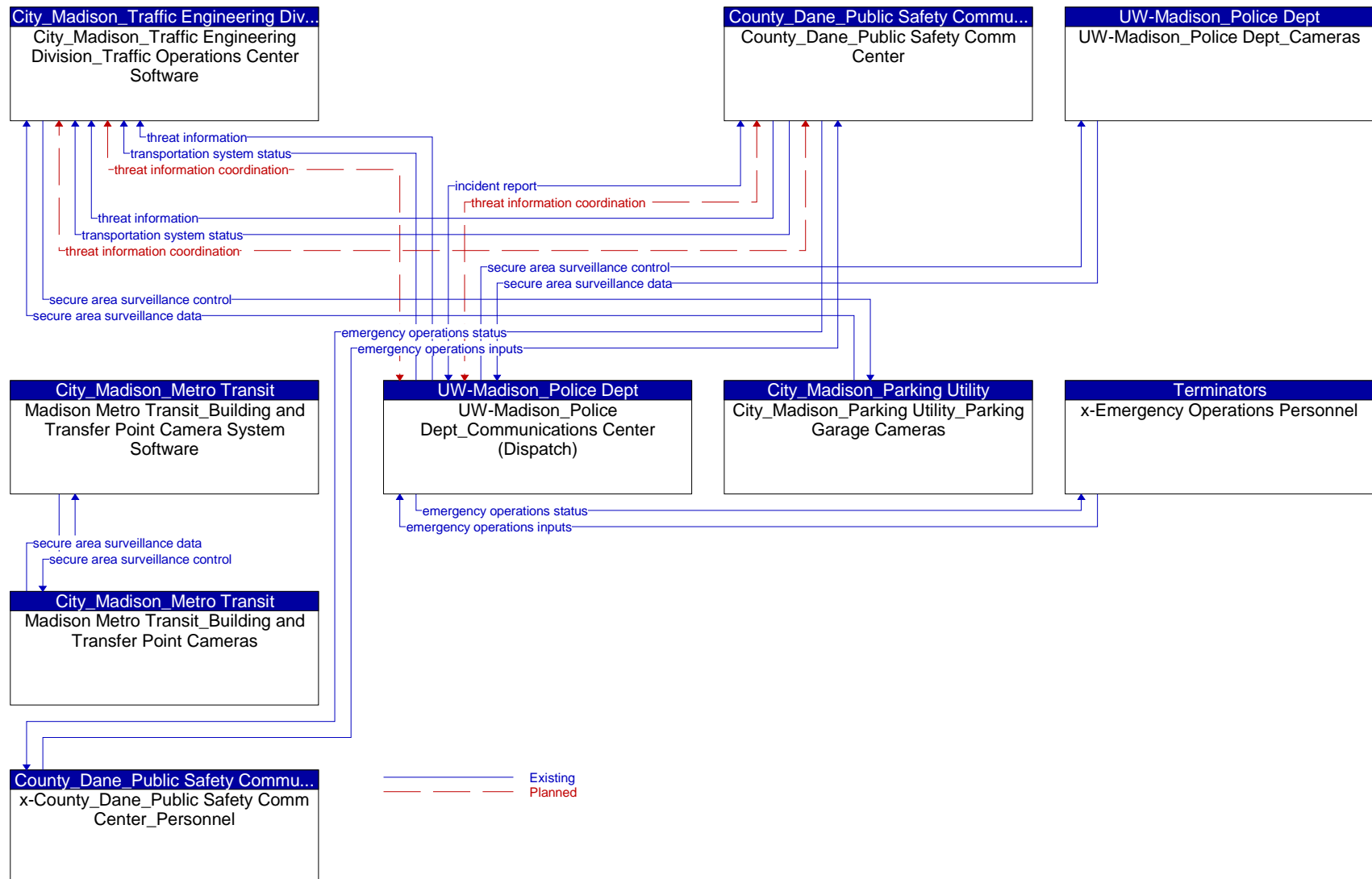


Figure 70: Architecture Flow Diagram for Transportation Infrastructure Protection

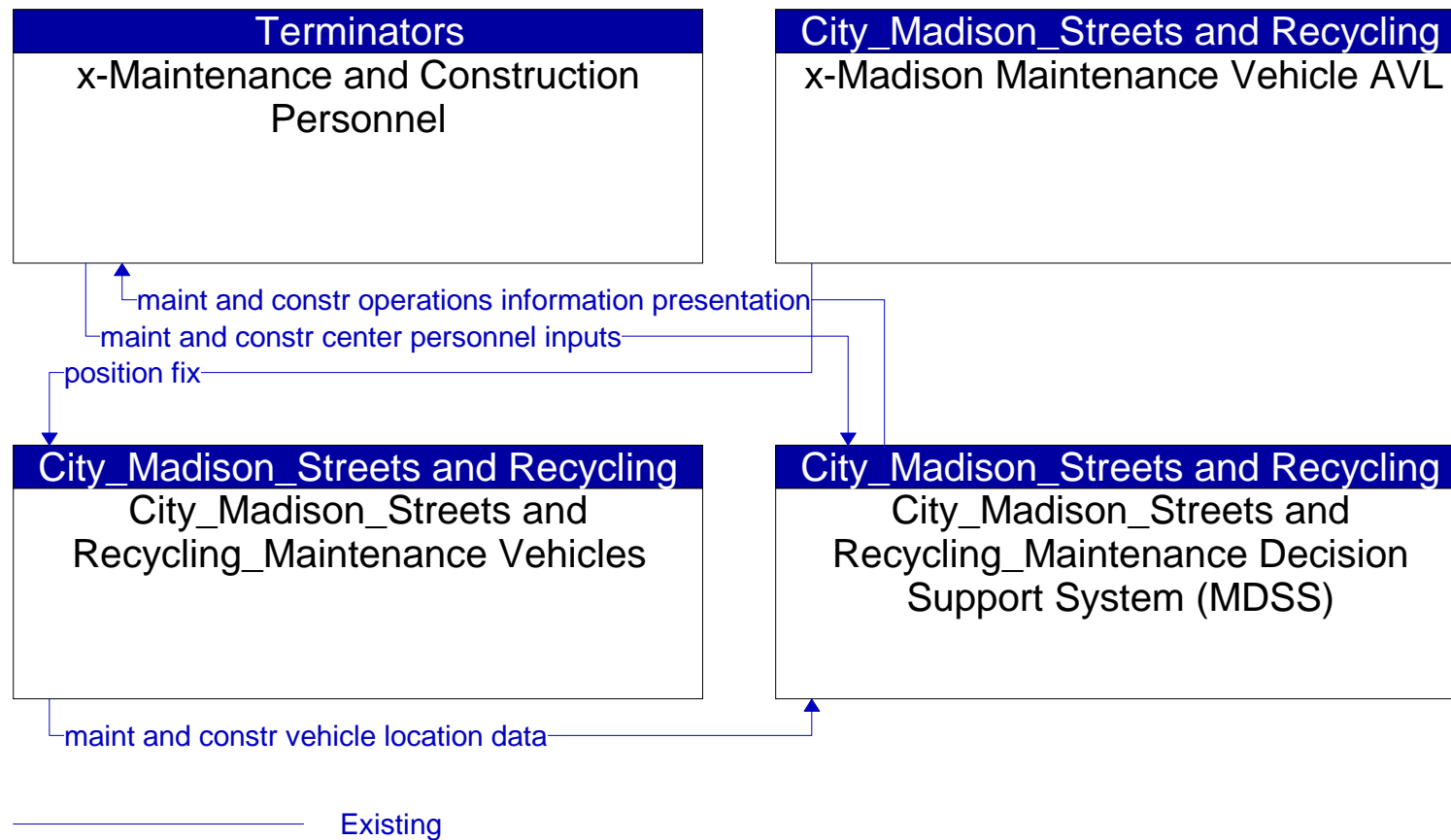


Figure 72: Architecture Flow Diagram for Maintenance and Construction Vehicle and Equipment Tracking

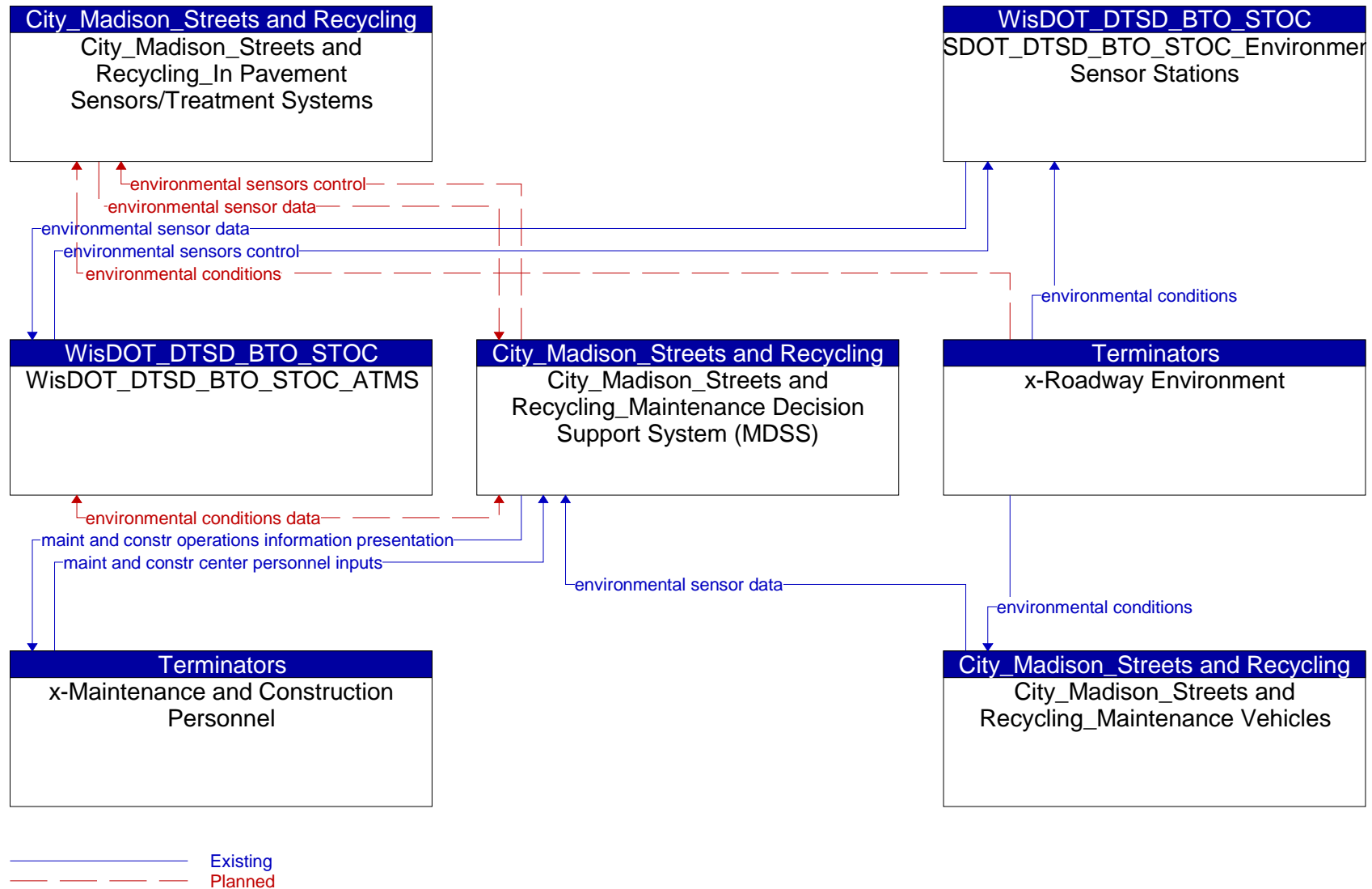


Figure 73: Architecture Flow Diagram for Road Weather Data Collection

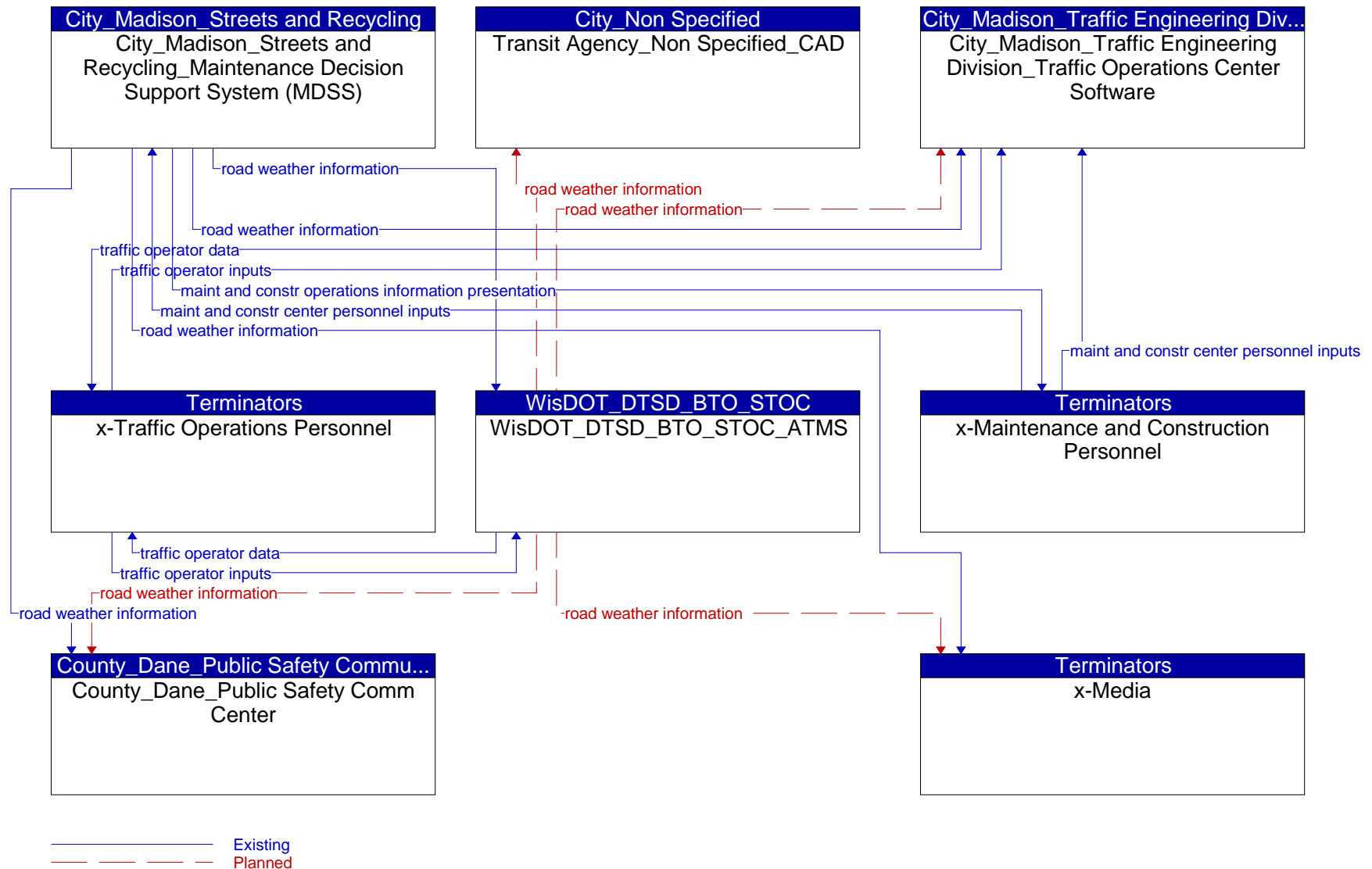


Figure 74: Architecture Flow Diagram for Weather Information Processing and Distribution

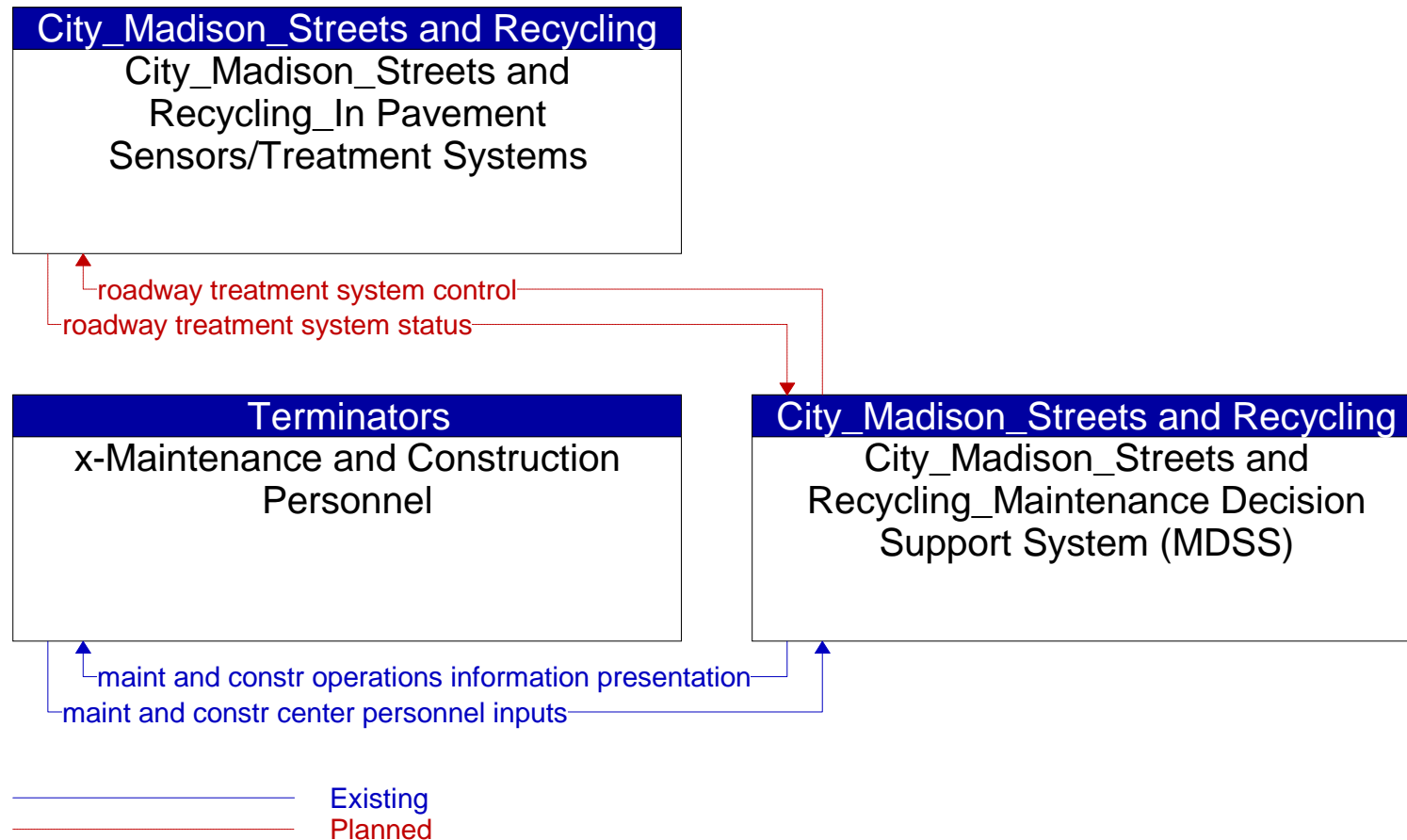


Figure 75: Architecture Flow Diagram for Roadway Automated Treatment

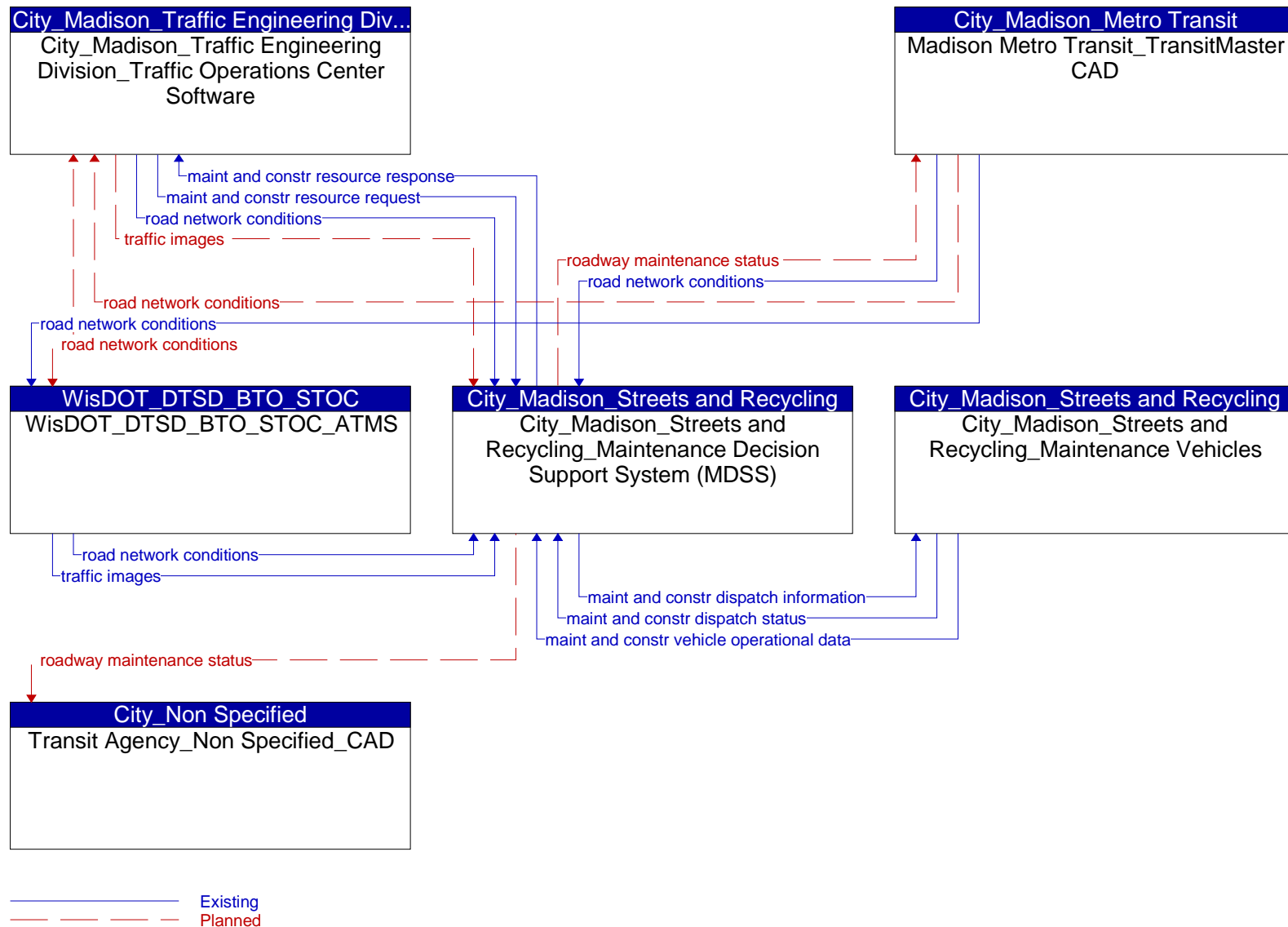


Figure 76: Architecture Flow Diagram for Winter Maintenance

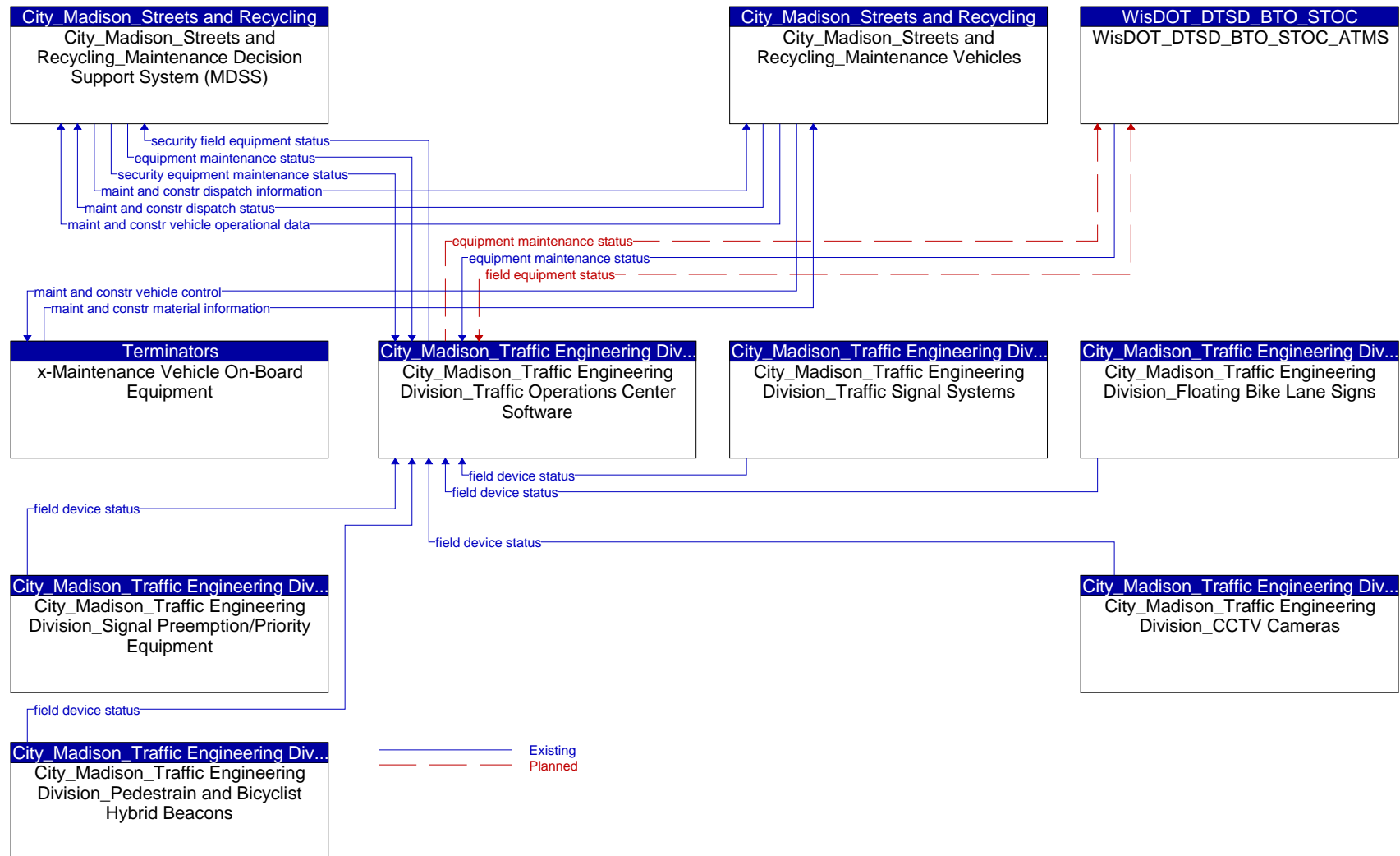


Figure 77: Architecture Flow Diagram for Roadway Maintenance and Construction

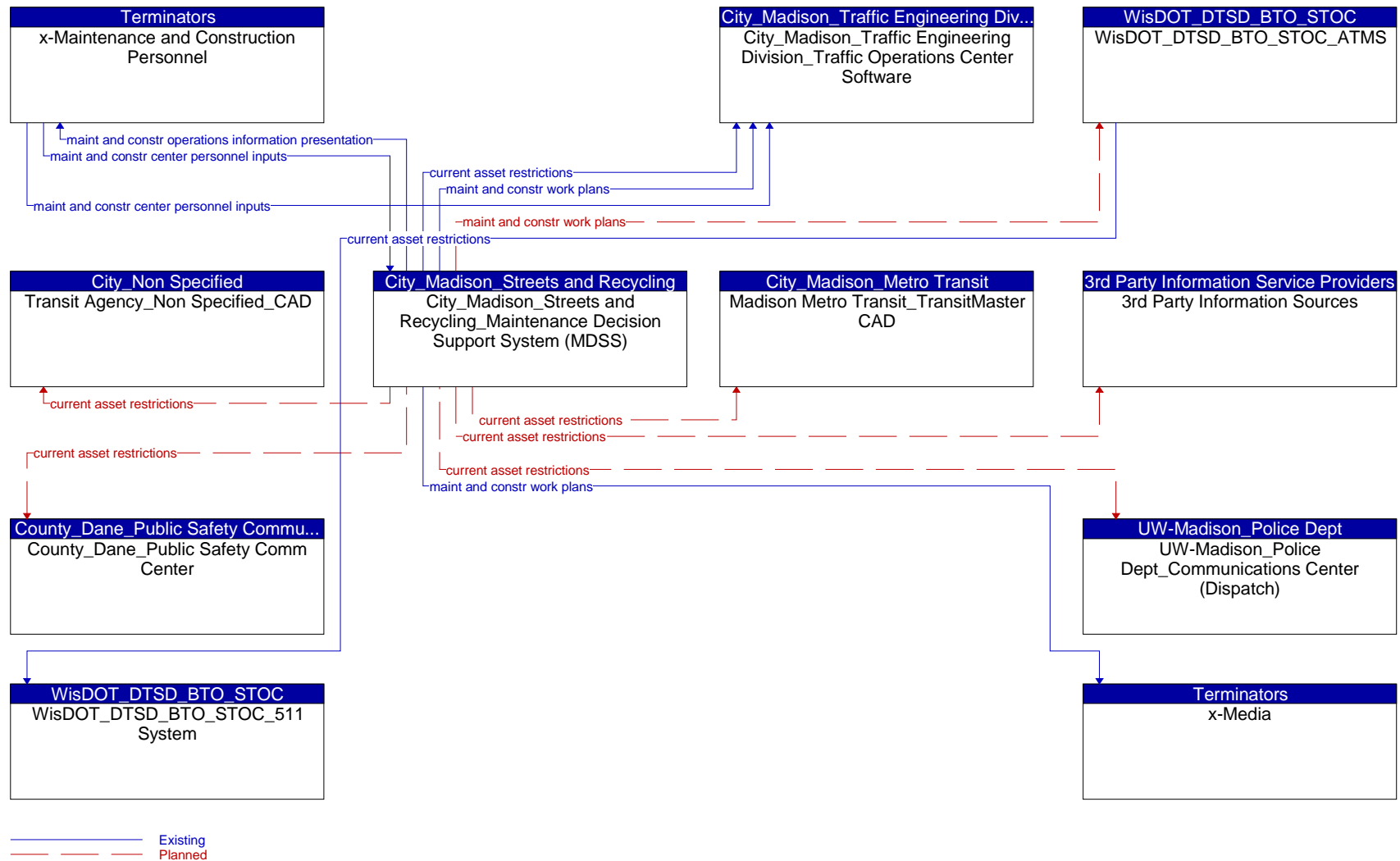


Figure 78: Architecture Flow Diagram for Maintenance and Construction Activity Coordination

F ARCHITECTURE FLOWS

Source Element	Destination Element	Flow Name	Status
3rd Party Information Sources	City_Madison_Parking Utility_Parking Management System	parking lot data request	Planned
		parking reservations request	Planned
	City_Madison_Streets and Recycling_Maintenance Decision Support System (MDSS)	transportation information for operations	Planned
		emergency traveler information	Existing
	City_Madison_Traffic Engineering Division_Traffic Operations Center Software	fare and price information	Planned
		road network conditions	Planned
		traffic images	Planned
		transit service information	Planned
		transportation information for operations	Planned
	County_Dane_Airport_easyPark	parking lot data request	Planned
		parking reservations request	Planned

Source Element	Destination Element	Flow Name	Status
	County_Dane_Parking Management System	parking lot data request	Planned
		parking reservations request	Planned
	County_Dane_Public Safety Comm Center	emergency traveler information	Existing
		incident information	Planned
		road network conditions	Planned
		traffic images	Planned
		transit service information	Planned
		transportation information for operations	Planned
	Madison Metro Transit_Kiosks	broadcast traveler information	Existing
		trip plan	Planned
	Madison Metro Transit_TransitMaster CAD	transit information request	Existing
	Madison Metro Transit_Website	transit service information	Existing
	Social Media and Subscription Based Services	emergency traveler information	Existing
		transit service information	Existing
	Transit Agency_Non Specified_CAD	transit information request	Existing
	Transit Agency_Non Specified_Website User Personal Computing Devices	transit service information	Existing
		broadcast traveler information	Existing
		emergency traveler information	Existing
		interactive traveler information	Existing
		traveler alerts	Existing
		trip plan	Planned
	UW-Madison_Parking Management System	parking lot data request	Planned
		parking reservations request	Planned

Source Element	Destination Element	Flow Name	Status
City_Madison_Parking Utility_Parking Garage Cameras	UW-Madison_Police Dept_Emergency Notification System (WiscAlerts) Vehicles	emergency traveler information	Existing
		broadcast traveler information	Existing
		emergency traveler information	Existing
		interactive traveler information	Existing
		traveler alerts	Existing
		trip plan	Planned
	WisDOT_DTSD_BTO_STOC_511 System	traffic images	Planned
	WisDOT_DTSD_BTO_STOC_511 Website	transit service information	Planned
		traffic images	Planned
	WisDOT_DTSD_BTO_STOC_ATMS	transit service information	Planned
		emergency traveler information	Existing
		fare and price information	Existing
	x-Financial Institution	payment request	Planned
	x-Kiosks	broadcast traveler information	Existing
		emergency traveler information	Existing
		interactive traveler information	Existing
		trip plan	Planned
	x-Special Event Venues	event information request	Existing
	City_Madison_Traffic Engineering Division_Traffic Operations Center Software	secure area surveillance data	Existing
	3rd Party Information Sources	parking information	Planned
		parking lot reservation confirmation	Planned
	City_Madison_Traffic Engineering	parking demand management response	Planned

Source Element	Destination Element	Flow Name	Status
City_Madison_Streets and Recycling_In Pavement Sensors/Treatment Systems	Division_Traffic Operations Center Software	parking information	Planned
	Data Archive (Regional)	parking archive data	Planned
	Data Archives (Individual Agency)	parking archive data	Existing
	Social Media and Subscription Based Services	parking information	Existing
	Vehicles	vehicle payment request	Planned
		vehicle payment update	Planned
	WisDOT_DTSD_BTO_STOC_511 Website x-Driver	parking information	Planned
		driver parking information	Existing
		roadside transaction status	Existing
	x-Enforcement Agency	payment violation notification	Existing
	x-Fare Card	request for payment	Planned
	x-Financial Institution	payment request	Existing
	x-Parking Operator	parking status	Existing
	x-Transit Contactless Smart Fare Cards	request for payment	Planned
City_Madison_Streets and Recycling_Maintenance Decision Support System (MDSS)	City_Madison_Streets and Recycling_Maintenance Decision Support System (MDSS)	environmental sensor data	Planned
		roadway treatment system status	Planned
City_Madison_Streets and Recycling_Maintenance Decision Support System (MDSS)	Data Archives (Individual Agency)	roadside archive data	Planned
	3rd Party Information Sources	current asset restrictions	Planned
		roadway maintenance status	Planned
		work zone information	Planned
City_Madison_Streets and Recycling_In Pavement Sensors/Treatment Systems	City_Madison_Streets and Recycling_In Pavement Sensors/Treatment Systems	environmental sensors control	Planned
		roadway treatment system control	Planned

Source Element	Destination Element	Flow Name	Status
	City_Madison_Streets and Recycling_Maintenance Vehicles City_Madison_Traffic Engineering Division_Traffic Operations Center Software	maint and constr dispatch information	Existing
		current asset restrictions	Existing
		environmental conditions data	Existing
		equipment maintenance status	Existing
		incident information	Existing
		maint and constr resource response	Existing
		maint and constr work plans	Existing
		road weather information	Existing
		security equipment maintenance status	Existing
	County_Dane_Public Safety Comm Center	current asset restrictions	Planned
		road weather information	Existing
		security equipment maintenance status	Existing
	Data Archive (Regional)	maint and constr archive data	Planned
	Data Archives (Individual Agency) Madison Metro Transit_TransitMaster CAD	maint and constr archive data	Existing
		current asset restrictions	Planned
		roadway maintenance status	Planned
		work zone information	Existing
	Social Media and Subscription Based Services	current asset restrictions	Planned
		maint and constr work plans	Planned
		roadway maintenance status	Planned
		work zone information	Planned
	Transit Agency_Non Specified_CAD	current asset restrictions	Planned
		roadway maintenance status	Planned

Source Element	Destination Element	Flow Name	Status
City_Madison_Streets and Recycling_Maintenance Vehicles	UW-Madison_Police Dept_Communications Center (Dispatch)	work zone information	Existing
		current asset restrictions	Planned
		maint and constr resource response	Existing
		roadway maintenance status	Existing
	UW-Madison_Police Dept_Emergency Notification System (WiscAlerts)	security equipment maintenance status	Existing
		work zone information	Existing
		roadway maintenance status	Planned
		roadway maintenance status	Planned
	WisDOT_DTSD_BTO_STOC_ATMS	environmental conditions data	Planned
		maint and constr resource coordination	Existing
	x-Maintenance and Construction Personnel	maint and constr work plans	Planned
		road weather information	Existing
		maint and constr operations information presentation	Existing
		presentation	Existing
	x-Media	maint and constr work plans	Existing
		road weather information	Existing
	City_Madison_Streets and Recycling_Maintenance Decision Support System (MDSS)	roadway maintenance status	Existing
		environmental sensor data	Existing
		maint and constr dispatch status	Existing
		maint and constr vehicle location data	Existing
		maint and constr vehicle operational data	Existing
	x-Maintenance Vehicle On-Board Equipment	maint and constr vehicle control	Existing
		control	Existing
	City_Madison_Traffic Engineering Division_CCTV Cameras	field device status	Existing
		traffic images	Existing

Source Element	Destination Element	Flow Name	Status
	Data Archives (Individual Agency)	roadside archive data	Existing
City_Madison_Traffic Engineering Division_Floating Bike Lane Signs	City_Madison_Traffic Engineering Division_Traffic Operations Center Software x-Driver	field device status	Existing
		roadway information system status	Existing
		driver information	Existing
City_Madison_Traffic Engineering Division_Pedestrian and Bicyclist Hybrid Beacons	City_Madison_Traffic Engineering Division_Traffic Operations Center Software x-Driver	field device status	Existing
		right-of-way request notification	Existing
		road user protection data	Existing
City_Madison_Traffic Engineering Division_Signal Preemption/Priority Equipment	x-Pedestrians City_Madison_Traffic Engineering Division_Traffic Operations Center Software x-Driver	driver information	Existing
		crossing permission	Existing
		field device status	Existing
City_Madison_Traffic Engineering Division_Traffic Operations Center Software	3rd Party Information Sources	right-of-way request notification	Existing
		driver information	Existing
		incident information	Existing
		multimodal information	Planned
	City_Madison_Parking Utility_Parking Garage Cameras	road network conditions	Existing
		traffic images	Planned
		transit service information	Planned
		secure area surveillance control	Existing
	City_Madison_Parking Utility_Parking Management System	parking demand management request	Planned
		parking lot data request	Planned
		parking lot inputs	Existing
	City_Madison_Streets and Recycling_Maintenance Decision Support	environmental conditions data	Existing
		incident response status	Existing

Source Element	Destination Element	Flow Name	Status
	System (MDSS)	maint and constr resource request	Existing
		road network conditions	Existing
		security field equipment status	Existing
		threat information	Existing
		traffic images	Planned
		transportation information for operations	Existing
	City_Madison_Traffic Engineering Division_CCTV Cameras	video surveillance control	Existing
	City_Madison_Traffic Engineering Division_Floating Bike Lane Signs	roadway information system data	Existing
	City_Madison_Traffic Engineering Division_Pedestrian and Bicyclist Hybrid Beacons	road user protection device control	Existing
	City_Madison_Traffic Engineering Division_Traffic Signal Systems	signal control commands	Existing
		signal control device configuration	Existing
		signal control plans	Existing
		signal system configuration	Existing
		traffic sensor control	Existing
	City_Non Specified_Traffic Signal Systems	signal control commands	Existing
		signal control device configuration	Existing
		signal control plans	Existing
		signal system configuration	Existing
		traffic sensor control	Existing
	County_Dane_Airport_easyPark	parking demand management request	Planned
		parking lot inputs	Planned

Source Element	Destination Element	Flow Name	Status
	County_Dane_Parking Management System	parking demand management request	Planned
	County_Dane_Public Safety Comm Center	alert notification	Planned
		alert notification coordination	Existing
		emergency routes	Existing
		incident information	Existing
		incident response coordination	Existing
		incident response status	Existing
		resource deployment status	Existing
		resource request	Existing
		threat information coordination	Planned
		transportation information for operations	Existing
	Data Archive (Regional)	traffic archive data	Planned
	Data Archives (Individual Agency)	archived data product requests	Planned
		traffic archive data	Existing
	Madison Metro Transit_TransitFleet Software	request transit information	Planned
		traffic control priority status	Existing
		transportation information for operations	Planned
	Madison Metro Transit_TransitMaster CAD	alert notification	Existing
		emergency traffic control request	Existing
		incident information	Existing
		incident response status	Existing
		request transit information	Existing
		resource deployment status	Existing

Source Element	Destination Element	Flow Name	Status
	Social Media and Subscription Based Services	resource request	Existing
		threat information	Existing
		traffic control priority status	Existing
		traffic images	Existing
		transit information request	Existing
		transportation information for operations	Planned
		incident information	Planned
		road network conditions	Existing
	Transit Agency_Non Specified_CAD	traffic images	Existing
		alert notification	Existing
		incident information	Existing
		incident response status	Existing
		request transit information	Existing
		road network conditions	Existing
		threat information	Existing
		traffic control priority status	Existing
		traffic images	Existing
		transit information request	Existing
		transportation information for operations	Planned
	Transit Agency_Non Specified_Website	transit service information	Planned
	UW-Madison_Parking Management System	parking demand management request	Planned
		parking lot inputs	Existing
	UW-Madison_Police Dept_Communications Center (Dispatch)	alert notification coordination	Existing
		emergency routes	Existing

Source Element	Destination Element	Flow Name	Status
		incident information	Existing
		incident response coordination	Existing
		incident response status	Existing
		resource deployment status	Existing
		resource request	Existing
		threat information coordination	Planned
		traffic images	Existing
		transportation information for operations	Planned
	UW-Madison_Police Dept_Emergency Notification System (WiscAlerts)	traffic images	Planned
	WisDOT_DTSD_BTO_STOC_ATMS	transit service information	Planned
		alert notification coordination	Existing
		device control request	Planned
		device data	Planned
		device status	Planned
		emergency traffic control request	Existing
		equipment maintenance status	Planned
		field equipment status	Planned
		incident information	Existing
		incident response coordination	Existing
		incident response status	Existing
		remote surveillance control	Planned
		resource deployment status	Existing
		resource request	Existing
		road network conditions	Planned

Source Element	Destination Element	Flow Name	Status
	WisDOT_DTSD_SW Region_Madison_Regional Offices	threat information	Existing
		threat information coordination	Existing
		traffic archive data	Planned
		transportation information for operations	Existing
		work zone information	Existing
		device control request	Planned
		device data	Planned
		device status	Planned
		incident information	Existing
		road network conditions	Planned
		traffic images	Planned
	WisDOT_DTSD_SW Region_Madison_Traffic Signal Systems x-Kiosks	traffic sensor control	Existing
		broadcast traveler information	Existing
	x-Media	incident information for media	Existing
		traffic information for media	Existing
		traveler information for media	Existing
	x-Special Event Venues	event confirmation	Existing
		event information request	Existing
	x-Traffic Management Center	device control request	Planned
		incident information	Existing
		road network conditions	Existing
		traffic images	Existing
	x-Traffic Operations Personnel	traffic operator data	Existing

Source Element	Destination Element	Flow Name	Status
City_Madison_Traffic Engineering Division_Traffic Signal Systems	City_Madison_Traffic Engineering Division_Traffic Operations Center Software	field device status	Existing
		right-of-way request notification	Existing
		signal control status	Existing
		signal fault data	Existing
		traffic flow	Existing
	City_Non Specified_Traffic Signal Systems Data Archives (Individual Agency) WisDOT_DTSD_SW Region_Madison_Traffic Signal Systems x-Driver	roadway equipment coordination	Planned
		roadside archive data	Existing
		roadway equipment coordination	Planned
		driver information	Existing
	x-Pedestrians	crossing permission	Existing
City_Non Specified_Communications Center (Dispatch)	Data Archive (Regional)	emergency archive data	Planned
	Data Archives (Individual Agency)	emergency archive data	Existing
	Emergency Vehicle On-Board Equipment	decision support information	Existing
		emergency dispatch requests	Existing
City_Non Specified_Signal Preemption/Priority Equipment	City_Madison_Traffic Engineering Division_Traffic Operations Center Software x-Driver	field device status	Existing
		right-of-way request notification	Existing
		driver information	Existing
City_Non Specified_Traffic Signal Systems	City_Madison_Traffic Engineering Division_Traffic Operations Center Software	right-of-way request notification	Existing
		signal control status	Existing
		signal fault data	Existing
		traffic flow	Existing
	City_Madison_Traffic Engineering Division_Traffic Signal Systems	roadway equipment coordination	Planned

Source Element	Destination Element	Flow Name	Status
County_Dane_Airport_easyPark	Data Archives (Individual Agency)	roadside archive data	Existing
	WisDOT_DTSD_SW Region_Madison_Traffic Signal Systems	roadway equipment coordination	Planned
	x-Driver	driver information	Existing
	x-Pedestrians	crossing permission	Existing
	3rd Party Information Sources	parking information	Planned
		parking lot reservation confirmation	Planned
	City_Madison_Traffic Engineering Division_Traffic Operations Center Software	parking demand management response	Planned
	Data Archive (Regional)	parking archive data	Planned
	Data Archives (Individual Agency)	parking archive data	Existing
	Vehicles	vehicle payment request	Planned
		vehicle payment update	Planned
	x-Driver	driver parking information	Existing
		roadside transaction status	Existing
	x-Enforcement Agency	payment violation notification	Existing
County_Dane_Emergency Warning System	x-Fare Card	request for payment	Planned
	x-Financial Institution	payment request	Existing
	x-Parking Operator	parking status	Existing
	x-Transit Contactless Smart Fare Cards	request for payment	Planned
	County_Dane_Public Safety Comm Center	threat information coordination	Existing
	UW-Madison_Police Dept_Communications Center (Dispatch)	threat information coordination	Existing
	x-Alerting and Advisory Systems	threat information	Existing

Source Element	Destination Element	Flow Name	Status
County_Dane_Parking Management System	3rd Party Information Sources	parking information	Existing
		parking lot reservation confirmation	Planned
	City_Madison_Traffic Engineering Division_Traffic Operations Center Software	parking demand management response	Planned
	Data Archive (Regional)	parking archive data	Planned
	Data Archives (Individual Agency)	parking archive data	Existing
	Social Media and Subscription Based Services	parking information	Existing
	Vehicles	vehicle payment request	Planned
		vehicle payment update	Planned
	x-Driver	driver parking information	Existing
	x-Driver	roadside transaction status	Existing
	x-Enforcement Agency	payment violation notification	Existing
	x-Fare Card	request for payment	Planned
County_Dane_Public Safety Comm Center	x-Financial Institution	payment request	Existing
	x-Parking Operator	parking status	Existing
	x-Transit Contactless Smart Fare Cards	request for payment	Planned
	City_Madison_Streets and Recycling_Maintenance Decision Support System (MDSS)	incident information	Existing
		incident response status	Existing
		threat information	Existing
		transportation information for operations	Existing
		transportation system status	Existing
	City_Madison_Traffic Engineering Division_Traffic Operations Center	alert notification	Existing
		alert notification coordination	Existing

Source Element	Destination Element	Flow Name	Status
	Software	alert status	Existing
		emergency route request	Existing
		incident information	Existing
		incident response coordination	Existing
		incident response status	Existing
		remote surveillance control	Planned
		resource deployment status	Existing
		resource request	Existing
		threat information	Existing
		threat information coordination	Planned
		transportation information for operations	Existing
		transportation system status	Existing
	County_Dane_Emergency Warning System	threat information coordination	Existing
		transportation information for operations	Planned
	Data Archive (Regional)	emergency archive data	Planned
	Data Archives (Individual Agency)	emergency archive data	Existing
	Emergency Vehicle On-Board Equipment	decision support information	Existing
		emergency dispatch requests	Existing
	Madison Metro Transit_TransitFleet Software	transportation information for operations	Planned
	Madison Metro Transit_TransitMaster CAD	alert notification	Existing
		incident information	Existing
		incident response status	Existing
		resource deployment status	Existing

Source Element	Destination Element	Flow Name	Status
		resource request	Existing
		threat information	Existing
		transit information request	Existing
		transportation information for operations	Planned
	Social Media and Subscription Based Services	transportation system status	Existing
		alert notification	Existing
		incident information	Planned
		incident response status	Existing
	Transit Agency_Non Specified_CAD	threat information	Existing
		transit information request	Existing
		transportation information for operations	Planned
		transportation system status	Existing
	Transit Agency_Non Specified_Website	transit service information	Planned
		broadcast traveler information	Existing
		alert notification coordination	Existing
		alert status	Existing
	User Personal Computing Devices	incident command information coordination	Existing
		incident report	Existing
		incident response coordination	Existing
		threat information coordination	Planned
	UW-Madison_Police Dept_Communications Center (Dispatch)	transportation information for operations	Planned

Source Element	Destination Element	Flow Name	Status
	UW-Madison_Police Dept_Emergency Notification System (WiscAlerts)	road network conditions	Planned
		transit service information	Planned
	Vehicles	broadcast traveler information	Existing
		alert notification coordination	Existing
	WisDOT_DTSD_BTO_STOC_ATMS	alert status	Existing
		emergency route request	Existing
		emergency traffic control request	Existing
		incident information	Existing
		incident response coordination	Existing
		incident response status	Existing
		remote surveillance control	Planned
		resource deployment status	Existing
		resource request	Existing
		threat information	Existing
		threat information coordination	Existing
		transportation information for operations	Existing
		transportation system status	Existing
	x-County_Dane_Public Safety Comm Center_Personnel	emergency operations status	Existing
	x-Emergency Response Personnel	incident command information presentation	Existing
		alarm acknowledge	Existing
	x-Kiosks	broadcast traveler information	Existing
		incident information for media	Existing
	x-Media	event information request	Existing
	x-Special Event Venues		

Source Element	Destination Element	Flow Name	Status
Data Archive (Regional)	City_Madison_Parking Utility_Parking Management System	archive requests	Planned
		archive status	Planned
	City_Madison_Streets and Recycling_Maintenance Decision Support System (MDSS)	archive requests	Planned
		archive status	Planned
	City_Madison_Traffic Engineering Division_Traffic Operations Center Software	archive requests	Planned
		archive status	Planned
	City_Non Specified_Communications Center (Dispatch)	archive requests	Planned
		archive status	Planned
	County_Dane_Airport_easyPark	archive requests	Planned
		archive status	Planned
	County_Dane_Parking Management System	archive requests	Planned
		archive status	Planned
	County_Dane_Public Safety Comm Center	archive requests	Planned
		archive status	Planned
	Madison Metro Transit_TransitMaster CAD	archive requests	Planned
		archive status	Planned
	Transit Agency_Non Specified_CAD	archive requests	Planned
		archive status	Planned
	User Personal Computing Devices	archived data products	Planned
	UW-Madison_Police Dept_Communications Center (Dispatch)	archive requests	Planned
		archive status	Planned
	WisDOT_DTSD_BTO_STOC_ATMS	archive requests	Planned
		archive status	Planned

Source Element	Destination Element	Flow Name	Status
Data Archives (Individual Agency)	x-Archived Data Administrator	archive management data	Planned
	x-MATPB Performance Reporting System	government reporting system data	Planned
	x-MATPB Personnel	archive management data	Planned
	City_Madison_Parking Utility_Parking Management System	archive requests	Existing
		archive status	Existing
	City_Madison_Streets and Recycling_In Pavement Sensors/Treatment Systems	data collection and monitoring control	Planned
	City_Madison_Streets and Recycling_Maintenance Decision Support System (MDSS)	archive requests	Existing
		archive status	Existing
	City_Madison_Traffic Engineering Division_CCTV Cameras	data collection and monitoring control	Existing
	City_Madison_Traffic Engineering Division_Traffic Operations Center Software	archive requests	Existing
		archive status	Existing
		archived data products	Planned
		data collection and monitoring control	Existing
	City_Non Specified_Communications Center (Dispatch)	archive requests	Existing
		archive status	Existing
	City_Non Specified_Traffic Signal Systems	data collection and monitoring control	Existing
	County_Dane_Airport_easyPark	archive requests	Existing
		archive status	Existing
	County_Dane_Parking Management System	archive requests	Existing
		archive status	Existing
	County_Dane_Public Safety Comm Center	archive requests	Existing
		archive status	Existing

Source Element	Destination Element	Flow Name	Status
	Madison Metro Transit_TransitFleet Software	archive requests	Planned
		archive status	Planned
		archived data products	Planned
	Madison Metro Transit_TransitMaster CAD	archive requests	Existing
		archive status	Existing
	Madison Metro Transit_Website	archive requests	Planned
		archive status	Planned
	Social Media and Subscription Based Services	archive requests	Planned
		archive status	Planned
	Transit Agency_Non Specified_CAD	archive requests	Existing
		archive status	Existing
	Transit Agency_Non Specified_Website	archive requests	Planned
		archive status	Planned
	User Personal Computing Devices	archived data products	Planned
	UW-Madison_Parking Management System	archive requests	Existing
		archive status	Existing
	UW-Madison_Police Dept_Communications Center (Dispatch)	archive requests	Planned
		archive status	Planned
	UW-Madison_Police Dept_Emergency Notification System (WiscAlerts)	archive requests	Planned
		archive status	Planned
	WisDOT_DTSD_BTO_STOC_511 System	archive requests	Planned
		archive status	Planned
	WisDOT_DTSD_BTO_STOC_511 Twitter Accounts	archive requests	Planned
		archive status	Planned

Source Element	Destination Element	Flow Name	Status
Emergency Vehicle On-Board Equipment	WisDOT_DTSD_BTO_STOC_511 Website	archive requests	Planned
		archive status	Planned
	WisDOT_DTSD_BTO_STOC_ATMS	archive requests	Existing
		archive status	Existing
	WisDOT_DTSD_BTO_STOC_CCTV Cameras	data collection and monitoring control	Existing
	WISDOT_DTSD_BTO_STOC_Environmental Sensor Stations	data collection and monitoring control	Existing
	WisDOT_DTSD_BTO_STOC_Ramp Meters	data collection and monitoring control	Existing
	WisDOT_DTSD_BTO_STOC_System Detector Stations	data collection and monitoring control	Existing
	WisDOT_DTSD_SW Region_Madison_Regional Offices	archive requests	Existing
		archive status	Existing
	WisDOT_DTSD_SW Region_Madison_Traffic Signal Systems	data collection and monitoring control	Existing
		archive management data	Planned
	x-Archived Data Administrator	archive management data	Planned
	x-Financial Institution	payment request	Planned
	x-MATPB Performance Reporting System	government reporting system data	Planned
	City_Madison_Traffic Engineering Division_Traffic Operations Center Software	emergency vehicle tracking data	Existing
		incident status	Existing
	City_Non Specified_Communications Center (Dispatch)	emergency dispatch response	Existing
	County_Dane_Public Safety Comm Center	emergency dispatch response	Existing
		emergency vehicle tracking data	Existing
		incident status	Existing
	UW-Madison_Police Dept_Communications	emergency dispatch response	Existing

Source Element	Destination Element	Flow Name	Status
Emergency Vehicle Signal Pre-Emption On-Board Equipment	Center (Dispatch)	emergency vehicle tracking data	Existing
		incident status	Existing
	Vehicles	emergency vehicle alert	Planned
	x-Emergency Response Personnel	emergency personnel information presentation	Existing
	City_Madison_Traffic Engineering Division_Signal Preemption/Priority Equipment	local signal preemption request	Existing
	City_Non Specified_Signal Preemption/Priority Equipment	local signal preemption request	Existing
	Vehicles	emergency vehicle alert	Planned
	WisDOT_DTSD_SW Region_Madison_Signal Preemption/Priority Equipment	local signal preemption request	Existing
Madison Metro Transit_Automatic Passenger Counters (APC)	Madison Metro Transit_TransitFleet Software	transit vehicle loading data	Existing
Madison Metro Transit_Building and Transfer Point Camera System Software	Madison Metro Transit_Building and Transfer Point Cameras	secure area surveillance control	Existing
Madison Metro Transit_Building and Transfer Point Cameras	Madison Metro Transit_Building and Transfer Point Camera System Software	secure area surveillance data	Existing
Madison Metro Transit_Bus Shelter Signage	x-Traveler	traveler interface updates	Existing
Madison Metro Transit_External Announcement	x-Traveler	traveler interface updates	Existing
Madison Metro Transit_FuelMaster	Madison Metro Transit_TransitMaster Integrated Vehicle Logic Unit (IVLU)	request for vehicle measures	Existing
Madison Metro Transit_Internal Message Board	x-Traveler	traveler interface updates	Existing
Madison Metro Transit_Kiosks	3rd Party Information Sources	trip request	Planned
	County_Dane_Public Safety Comm Center	alarm notification	Existing

Source Element	Destination Element	Flow Name	Status
	Madison Metro Transit_TransitFleet Software	transit information user request	Existing
	Madison Metro Transit_Website	trip request	Planned
	Social Media and Subscription Based Services	trip request	Planned
Madison Metro Transit_Mobile Data Terminal (MDT)	Transit Agency_Non Specified_Website	trip request	Existing
	WisDOT_DTSD_BTO_STOC_511 Website	map update request	Existing
		traveler request	Existing
		trip request	Planned
	x-Fare Card	request for payment	Planned
	x-Transit Contactless Smart Fare Cards	request for payment	Planned
	Madison Metro Transit_TransitFleet Software	alarm notification	Existing
		transit traveler request	Planned
		transit vehicle conditions	Existing
	x-Transit Vehicle Operators	transit vehicle schedule performance	Planned
		transit vehicle operator display	Existing
Madison Metro Transit_On-Board Fareboxes	Madison Metro Transit_TransitFleet Software	fare collection data	Existing
		request for bad tag list	Existing
	x-Fare Card	request for payment	Existing
	x-Transit Contactless Smart Fare Cards	request for payment	Planned
	x-Transit Vehicle Operators	transit vehicle operator display	Existing
Madison Metro Transit_On-Board Video Cameras	x-Traveler	traveler interface updates	Existing
		secure area surveillance data	Existing
	Madison Metro Transit_Building and Transfer Point Camera System Software		

Source Element	Destination Element	Flow Name	Status
Madison Metro Transit_Transit Signal Priority On-Board Equipment	City_Madison_Traffic Engineering Division_Signal Preemption/Priority Equipment	local signal priority request	Planned
	City_Non Specified_Signal Preemption/Priority Equipment	local signal priority request	Planned
	Transit Agency_Non Specified_Transit Signal Priority On-Board Equipment	local signal priority request	Planned
	WisDOT_DTSD_SW Region_Madison_Signal Preemption/Priority Equipment	local signal priority request	Planned
Madison Metro Transit_TransitFleet Software	3rd Party Information Sources	transit and fare schedules	Planned
		transit probe data	Existing
		transit schedule adherence information	Planned
	City_Madison_Traffic Engineering Division_Traffic Operations Center Software	transit and fare schedules	Planned
		transit probe data	Existing
		transit system data	Planned
	County_Dane_Public Safety Comm Center	transit and fare schedules	Planned
		transit probe data	Existing
		transit schedule adherence information	Planned
	Data Archives (Individual Agency)	archived data product requests	Planned
		transit archive data	Planned
	Madison Metro Transit_Bus Shelter Signage	transit traveler information	Existing
	Madison Metro Transit_External Announcement	transit traveler information	Existing
	Madison Metro Transit_Internal Message Board	transit traveler information	Existing
	Madison Metro Transit_Kiosks	transit fare information	Existing

Source Element	Destination Element	Flow Name	Status
	Madison Metro Transit_Mobile Data Terminal (MDT)	transit traveler information	Existing
		alarm acknowledge	Existing
		request for vehicle measures	Existing
		transit schedule information	Existing
		transit traveler information	Existing
		transit vehicle operator authentication update	Existing
	Madison Metro Transit_On-Board Fareboxes	transit vehicle operator information	Existing
		bad tag list	Existing
		fare management information	Existing
	Madison Metro Transit_TransitMaster CAD	transit probe data	Existing
		transit schedule information	Existing
	Madison Metro Transit_TransitMaster Integrated Vehicle Logic Unit (IVLU)	transit vehicle operator authentication update	Existing
		transit vehicle operator information	Existing
	Madison Metro Transit_Website	map update request	Existing
		transit and fare schedules	Existing
		transit incident information	Existing
		transit probe data	Existing
		transit request confirmation	Existing
	Social Media and Subscription Based Services	transit schedule adherence information	Existing
		transit and fare schedules	Existing
		transit incident information	Existing
		transit probe data	Existing
		transit request confirmation	Existing

Source Element	Destination Element	Flow Name	Status
	Transit Agency_Non Specified_CAD Transit Agency_Non Specified_Website	transit schedule adherence information	Existing
		transit trip plan	Planned
		transit service coordination	Planned
		transit and fare schedules	Existing
	User Personal Computing Devices UW-Madison_Police Dept_Emergency Notification System (WiscAlerts) WisDOT_DTSD_BTO_STOC_511 System	transit incident information	Existing
		transit request confirmation	Existing
		personal transit information	Existing
		transit probe data	Existing
	WisDOT_DTSD_BTO_STOC_511 System	transit and fare schedules	Planned
		transit incident information	Planned
		transit probe data	Existing
		transit schedule adherence information	Planned
	WisDOT_DTSD_BTO_STOC_ATMS	transit and fare schedules	Planned
		transit probe data	Existing
		transit and fare schedules	Existing
		transit archive data	Planned
	x-Enforcement Agency x-Financial Institution	transit probe data	Existing
		transit system data	Existing
		payment violation notification	Existing
		payment request	Existing
	x-Media	transit incidents for media	Existing
		transit information for media	Existing
	x-Transit Operations Personnel	transit operations status	Existing

Source Element	Destination Element	Flow Name	Status
Madison Metro Transit_TransitMaster CAD	x-Transit Vehicle Operators	route assignment	Existing
	3rd Party Information Sources	road network conditions	Planned
		traffic images	Planned
		transit schedule adherence information	Planned
	City_Madison_Streets and Recycling_Maintenance Decision Support System (MDSS)	road network conditions	Existing
		alert status	Existing
		incident information	Planned
		incident response status	Existing
		resource deployment status	Existing
		resource request	Existing
		road network conditions	Planned
		traffic control priority request	Existing
		transit schedule adherence information	Planned
		transit system data	Existing
	County_Dane_Public Safety Comm Center	alert status	Existing
		incident information	Planned
		incident response status	Existing
		resource deployment status	Existing
		resource request	Existing
		road network conditions	Planned
		transit emergency data	Existing
	Data Archive (Regional)	transit schedule adherence information	Planned
		transit archive data	Planned

Source Element	Destination Element	Flow Name	Status
	Data Archives (Individual Agency)	transit archive data	Existing
	Madison Metro Transit_TransitMaster Integrated Vehicle Logic Unit (IVLU)	transit schedule information	Existing
		transit traveler information	Existing
		transit vehicle operator information	Existing
	Madison Metro Transit_Website	incident information	Planned
		road network conditions	Planned
		traffic images	Planned
		transit incident information	Existing
		transit probe data	Existing
		transit request confirmation	Existing
	Social Media and Subscription Based Services	transit incident information	Existing
		transit request confirmation	Existing
		transit trip plan	Planned
	Transit Agency_Non Specified_CAD Transit Agency_Non Specified_Website	transit service coordination	Existing
		incident information	Planned
		map update request	Existing
		traffic images	Planned
		transit incident information	Existing
		transit probe data	Existing
		transit request confirmation	Existing
	UW-Madison_Parking Management System	parking lot inputs	Existing
	UW-Madison_Police Dept_Communications Center (Dispatch)	incident information	Existing
		incident response status	Existing
		resource deployment status	Existing

Source Element	Destination Element	Flow Name	Status
Madison Metro Transit_TransitMaster Integrated Vehicle Logic Unit (IVLU)	UW-Madison_Police Dept_Emergency Notification System (WiscAlerts) WisDOT_DTSD_BTO_STOC_511 System	resource request	Existing
		road network conditions	Existing
		transit schedule adherence information	Existing
		traffic images	Planned
		transit incident information	Planned
		transit schedule adherence information	Planned
	WisDOT_DTSD_BTO_STOC_ATMS	alert status	Existing
		incident response status	Existing
		resource deployment status	Existing
		resource request	Existing
		road network conditions	Existing
		traffic archive data	Planned
		transit archive data	Planned
	Madison Metro Transit_FuelMaster	transit schedule adherence information	Existing
		transit system data	Existing
	Madison Metro Transit_TransitFleet Software	transit vehicle conditions	Existing
		transit vehicle schedule performance	Existing
	Madison Metro Transit_TransitMaster CAD	transit traveler request	Existing
		transit vehicle schedule performance	Existing
Madison Metro Transit_Website	3rd Party Information Sources City_Madison_Streets and Recycling_Maintenance Decision Support System (MDSS)	transit service information	Existing
		transportation information for operations	Existing

Source Element	Destination Element	Flow Name	Status
	City_Madison_Traffic Engineering Division_Traffic Operations Center Software	transit service information	Planned
		transportation information for operations	Existing
	County_Dane_Public Safety Comm Center	transit service information	Planned
		transportation information for operations	Existing
	Madison Metro Transit_Kiosks	trip plan	Existing
	Madison Metro Transit_TransitFleet Software	map updates	Existing
		transit information request	Existing
	Transit Agency_Non Specified_CAD	map updates	Existing
		transit information request	Existing
	Transit Agency_Non Specified_Website	transit service information	Existing
		broadcast traveler information	Existing
		interactive traveler information	Existing
	User Personal Computing Devices	map updates	Existing
		traveler alerts	Existing
		trip plan	Planned
	UW-Madison_Police Dept_Emergency Notification System (WiscAlerts) Vehicles	transit service information	Existing
		broadcast traveler information	Existing
		interactive traveler information	Existing
		map updates	Existing
		traveler alerts	Existing
		trip plan	Planned
	x-Kiosks	broadcast traveler information	Existing
		interactive traveler information	Existing

Source Element	Destination Element	Flow Name	Status
Social Media and Subscription Based Services	x-Media 3rd Party Information Sources	map updates	Planned
		trip plan	Planned
		traveler information for media	Existing
		emergency traveler information	Existing
	3rd Party Information Sources	transit service information	Existing
	City_Madison_Streets and Recycling_Maintenance Decision Support System (MDSS)	transportation information for operations	Existing
	City_Madison_Traffic Engineering Division_Traffic Operations Center Software	alert status	Existing
		emergency traveler information	Existing
		incident information	Planned
		transportation information for operations	Existing
Social Media and Subscription Based Services	County_Dane_Public Safety Comm Center	alert status	Existing
	County_Dane_Public Safety Comm Center	emergency traveler information	Existing
		incident information	Planned
		transportation information for operations	Existing
		Data Archives (Individual Agency)	traveler archive data
	Madison Metro Transit_Kiosks	emergency traveler information	Existing
		trip plan	Planned
	Madison Metro Transit_TransitFleet Software	transit trip request	Planned
	Madison Metro Transit_TransitMaster CAD	transit trip request	Planned
	Transit Agency_Non Specified_CAD	transit trip request	Planned
Transit Agency_Non Specified_Website	transit service information	Existing	
User Personal Computing Devices	broadcast traveler information	Planned	

Source Element	Destination Element	Flow Name	Status
		emergency traveler information	Existing
		interactive traveler information	Existing
		traveler alerts	Existing
		trip plan	Planned
	UW-Madison_Police Dept_Emergency Notification System (WiscAlerts) Vehicles	transit service information	Existing
		broadcast traveler information	Planned
Social Media and Subscription Based Services	Vehicles	emergency traveler information	Existing
		interactive traveler information	Existing
		traveler alerts	Existing
	WisDOT_DTSD_BTO_STOC_ATMS	trip plan	Planned
		alert status	Existing
		traveler archive data	Planned
	x-Kiosks	interactive traveler information	Existing
		trip plan	Planned
	x-Media	traveler information for media	Existing
Transit Agency_Non Specified_CAD	3rd Party Information Sources	event information request	Existing
		transit and fare schedules	Planned
	City_Madison_Traffic Engineering Division_Traffic Operations Center Software	transit schedule adherence information	Planned
		traffic control priority request	Existing
		transit and fare schedules	Planned
		transit incident information	Planned
		transit schedule adherence information	Planned
		transit system data	Existing

Source Element	Destination Element	Flow Name	Status
	County_Dane_Public Safety Comm Center	transit and fare schedules	Planned
		transit emergency data	Existing
		transit incident information	Planned
		transit schedule adherence information	Planned
	Data Archive (Regional)	transit archive data	Planned
	Data Archives (Individual Agency)	transit archive data	Existing
	Madison Metro Transit_TransitFleet Software	transit service coordination	Planned
	Madison Metro Transit_TransitMaster CAD	transit service coordination	Existing
		transit system data	Existing
	Madison Metro Transit_Website	transit incident information	Existing
		transit probe data	Existing
		transit request confirmation	Existing
		transit and fare schedules	Existing
	Social Media and Subscription Based Services	transit incident information	Existing
		transit request confirmation	Existing
		transit schedule adherence information	Existing
		transit trip plan	Planned
	Transit Agency_Non Specified_Website	transit and fare schedules	Existing
		transit incident information	Existing
		transit probe data	Existing
		transit request confirmation	Existing
	User Personal Computing Devices	transit schedule adherence information	Existing
		personal transit information	Existing

Source Element	Destination Element	Flow Name	Status
Transit Agency_Non Specified_Transit Signal Priority On-Board Equipment	UW-Madison_Police Dept_Emergency Notification System (WiscAlerts)	transit and fare schedules	Existing
		transit schedule adherence information	Existing
	WisDOT_DTSD_BTO_STOC_511 System	transit and fare schedules	Planned
		transit incident information	Planned
	WisDOT_DTSD_BTO_STOC_511 Website	transit schedule adherence information	Planned
		transit and fare schedules	Planned
		transit incident information	Planned
		transit schedule adherence information	Planned
	WisDOT_DTSD_BTO_STOC_ATMS	transit and fare schedules	Existing
		transit archive data	Planned
		transit schedule adherence information	Existing
		transit system data	Planned
	x-Enforcement Agency	payment violation notification	Existing
	x-Financial Institution	payment request	Existing
	x-Media	transit incidents for media	Existing
		transit information for media	Existing
Transit Agency_Non Specified_Website	x-Special Event Venues	event confirmation	Existing
	x-Transit Vehicle Operators	route assignment	Existing
	City_Madison_Traffic Engineering Division_Traffic Operations Center Software	field device status	Existing
		right-of-way request notification	Existing
	x-Driver	driver information	Existing
Transit Agency_Non Specified_Website	3rd Party Information Sources	transit service information	Existing

Source Element	Destination Element	Flow Name	Status
	City_Madison_Streets and Recycling_Maintenance Decision Support System (MDSS)	transportation information for operations	Planned
	City_Madison_Traffic Engineering Division_Traffic Operations Center Software	fare and price information	Planned
		transit service information	Planned
		transportation information for operations	Planned
	County_Dane_Public Safety Comm Center	transit service information	Planned
		transportation information for operations	Planned
	Data Archives (Individual Agency)	traveler archive data	Planned
	Madison Metro Transit_Kiosks	emergency traveler information	Existing
		trip plan	Planned
	Madison Metro Transit_TransitMaster CAD	map updates	Existing
	Madison Metro Transit_Website	transit service information	Existing
	Social Media and Subscription Based Services	transit service information	Existing
	Transit Agency_Non Specified_CAD	map updates	Existing
		transit information request	Existing
	User Personal Computing Devices	broadcast traveler information	Existing
		emergency traveler information	Existing
		interactive traveler information	Existing
		map updates	Existing
		traveler alerts	Existing
		trip plan	Planned
	UW-Madison_Police Dept_Emergency Notification System (WiscAlerts)	transit service information	Existing

Source Element	Destination Element	Flow Name	Status
	Vehicles	broadcast traveler information	Existing
		emergency traveler information	Existing
		interactive traveler information	Existing
		map updates	Existing
		traveler alerts	Existing
		trip plan	Planned
	WisDOT_DTSD_BTO_STOC_511 System	transit service information	Planned
	WisDOT_DTSD_BTO_STOC_511 Website	incident information	Planned
	WisDOT_DTSD_BTO_STOC_ATMS	map updates	Existing
		transit service information	Planned
		fare and price information	Existing
		map updates	Planned
		transit service information	Existing
		traveler archive data	Planned
	x-Kiosks	broadcast traveler information	Existing
		emergency traveler information	Existing
		interactive traveler information	Existing
		map updates	Planned
		trip plan	Planned
User Personal Computing Devices	3rd Party Information Sources	traveler profile	Planned
		traveler request	Existing
		trip request	Planned
	Data Archive (Regional)	archived data product requests	Planned
	Data Archives (Individual Agency)	archived data product requests	Planned

Source Element	Destination Element	Flow Name	Status
UW-Madison_Parking Management System	Madison Metro Transit_Website	map update request	Existing
		traveler profile	Planned
		traveler request	Existing
		trip request	Planned
	Social Media and Subscription Based Services	traveler profile	Planned
		trip request	Planned
	Transit Agency_Non Specified_Website	map update request	Existing
		traveler profile	Planned
		traveler request	Existing
		trip request	Planned
	WisDOT_DTSD_BTO_STOC_511 Website	map update request	Existing
		traveler profile	Existing
		traveler request	Existing
		trip request	Planned
	x-Fare Card	traveler card update	Planned
	x-Transit Contactless Smart Fare Cards	request for payment	Planned
		traveler card update	Planned
	x-Traveler	traveler interface updates	Existing
	3rd Party Information Sources	parking information	Planned
		parking lot reservation confirmation	Planned
	City_Madison_Traffic Engineering Division_Traffic Operations Center Software	parking demand management response	Planned
	Data Archive (Regional)	parking archive data	Planned
	Data Archives (Individual Agency)	parking archive data	Existing

Source Element	Destination Element	Flow Name	Status
UW-Madison_Police Dept_Cameras UW-Madison_Police Dept_Communications Center (Dispatch)	Vehicles	vehicle payment request	Planned
		vehicle payment update	Planned
	x-Driver	driver parking information	Existing
		roadside transaction status	Existing
	x-Enforcement Agency	payment violation notification	Existing
	x-Fare Card	request for payment	Planned
	x-Financial Institution	payment request	Existing
	x-Parking Operator	parking status	Existing
	x-Transit Contactless Smart Fare Cards	request for payment	Planned
	UW-Madison_Police Dept_Communications Center (Dispatch)	secure area surveillance data	Existing
	City_Madison_Streets and Recycling_Maintenance Decision Support System (MDSS)	incident information	Existing
		incident response status	Existing
		maint and constr resource request	Existing
		threat information	Existing
	City_Madison_Traffic Engineering Division_Traffic Operations Center Software	transportation system status	Existing
		alert notification	Existing
		alert notification coordination	Existing
		emergency route request	Existing
		incident information	Existing
		incident response coordination	Existing
		incident response status	Existing
		remote surveillance control	Planned
		resource deployment status	Existing

Source Element	Destination Element	Flow Name	Status
		resource request	Existing
		threat information	Existing
		threat information coordination	Planned
		transportation system status	Existing
	County_Dane_Public Safety Comm Center	alert notification	Existing
		alert notification coordination	Existing
		incident command information coordination	Existing
		incident information	Existing
		incident report	Existing
		incident response coordination	Existing
		threat information coordination	Planned
		emergency archive data	Planned
	Data Archive (Regional)	emergency archive data	Planned
	Data Archives (Individual Agency)	emergency archive data	Planned
	Emergency Vehicle On-Board Equipment	decision support information	Existing
		emergency dispatch requests	Existing
	Madison Metro Transit_TransitMaster CAD	incident information	Existing
		incident response status	Existing
		resource deployment status	Existing
		resource request	Existing
		threat information	Existing
		transportation system status	Existing
	Social Media and Subscription Based Services	incident information	Existing
	Transit Agency_Non Specified_CAD	incident information	Existing

Source Element	Destination Element	Flow Name	Status
UW-Madison_Police Dept_Emergency Notification System (WiscAlerts)	UW-Madison_Police Dept_Cameras	incident response status	Existing
		threat information	Existing
		transportation system status	Existing
		secure area surveillance control	Existing
	WisDOT_DTSD_BTO_STOC_ATMS	emergency traffic control request	Existing
		incident information	Existing
		incident response coordination	Existing
		incident response status	Existing
		remote surveillance control	Planned
		resource deployment status	Existing
		resource request	Existing
		threat information	Existing
	x-Emergency Operations Personnel	threat information coordination	Existing
		transportation system status	Existing
		emergency operations status	Existing
	x-Emergency Response Personnel	incident command information presentation	Existing
	x-Kiosks	alarm acknowledge	Existing
	x-Media	incident information for media	Existing
	x-UW-Madison_Police Dept_Emergency Phones	incident notification response	Existing
	City_Madison_Traffic Engineering Division_Traffic Operations Center Software	alert status	Existing
	County_Dane_Public Safety Comm Center	alert status	Existing

Source Element	Destination Element	Flow Name	Status
		emergency traveler information	Existing
	User Personal Computing Devices	emergency traveler information	Existing
	UW-Madison_Police Dept_Communications Center (Dispatch)	alert status	Planned
	Vehicles	emergency traveler information	Existing
	x-Kiosks	emergency traveler information	Existing
	x-Media	traveler information for media	Existing
Vehicles	3rd Party Information Sources	traveler request	Existing
	City_Madison_Parking Utility_Parking Management System	vehicle characteristics	Existing
		vehicle payment information	Planned
	County_Dane_Airport_easyPark	vehicle characteristics	Existing
		vehicle payment information	Planned
	County_Dane_Parking Management System	vehicle characteristics	Existing
		vehicle payment information	Planned
	Madison Metro Transit_Website	traveler profile	Planned
		traveler request	Existing
		trip request	Planned
	Social Media and Subscription Based Services	traveler profile	Planned
		trip request	Planned
	Transit Agency_Non Specified_Website	traveler profile	Planned
		traveler request	Existing
		trip request	Planned
	UW-Madison_Parking Management System	vehicle characteristics	Existing
		vehicle payment information	Planned

Source Element	Destination Element	Flow Name	Status
	WisDOT_DTSD_BTO_STOC_511 Website	traveler profile	Existing
		traveler request	Existing
		trip request	Planned
	WisDOT_DTSD_BTO_STOC_ATMS	probe archive data	Planned
	WisDOT_DTSD_BTO_STOC_System Detector Stations	probe archive data	Planned
		driver updates	Planned
		in-vehicle transaction status	Planned
	x-Fare Card	request for payment	Planned
	x-Transit Contactless Smart Fare Cards	request for payment	Planned
WisDOT_DTSD_BTO_STOC_511 System	3rd Party Information Sources	road network conditions	Planned
		transit service information	Planned
	City_Madison_Traffic Engineering Division_Traffic Operations Center Software	incident information	Planned
		transit service information	Planned
	County_Dane_Public Safety Comm Center	incident information	Planned
		transit service information	Planned
	Data Archives (Individual Agency)	traveler archive data	Planned
	Madison Metro Transit_TransitFleet Software	transportation information for operations	Planned
	Madison Metro Transit_TransitMaster CAD	fare and price information	Planned
		transit information request	Existing
		transportation information for operations	Planned
	Madison Metro Transit_Website	transit service information	Planned
	Social Media and Subscription Based	emergency traveler information	Existing

Source Element	Destination Element	Flow Name	Status
	Services	incident information	Planned
		road network conditions	Planned
	Transit Agency_Non Specified_CAD	transit information request	Existing
		transportation information for operations	Planned
	Transit Agency_Non Specified_Website	road network conditions	Planned
		transit service information	Planned
	User Personal Computing Devices	broadcast traveler information	Existing
	UW-Madison_Police Dept_Emergency Notification System (WiscAlerts)	incident information	Planned
		road network conditions	Planned
		transit service information	Planned
	Vehicles	broadcast traveler information	Planned
		interactive traveler information	Existing
	WisDOT_DTSD_BTO_STOC_511 Twitter Accounts	emergency traveler information	Existing
		incident information	Planned
		road network conditions	Planned
	WisDOT_DTSD_BTO_STOC_511 Website	traffic images	Planned
		emergency traveler information	Existing
		incident information	Planned
		map update request	Existing
		road network conditions	Planned
	WisDOT_DTSD_BTO_STOC_ATMS	traffic images	Planned
		emergency traveler information	Existing
		incident information	Planned
		traveler archive data	Planned

Source Element	Destination Element	Flow Name	Status
WisDOT_DTSD_BTO_STOC_511 Twitter Accounts	x-Kiosks	broadcast traveler information	Existing
		interactive traveler information	Existing
	x-Special Event Venues	event information request	Planned
	x-WisDOT_DTSD_BTO_STOC_511 Telephony	voice-based alert notification	Existing
		voice-based traveler information	Existing
	3rd Party Information Sources	emergency traveler information	Existing
		road network conditions	Planned
		traffic images	Planned
		transit service information	Planned
	City_Madison_Traffic Engineering Division_Traffic Operations Center Software	incident information	Planned
		incident information	Planned
	County_Dane_Public Safety Comm Center	incident information	Planned
	Transit Agency_Non Specified_Website	road network conditions	Planned
		traffic images	Planned
		transit service information	Planned
	User Personal Computing Devices	broadcast traveler information	Existing
		emergency traveler information	Existing
		interactive traveler information	Existing
		traveler alerts	Existing
	UW-Madison_Police Dept_Emergency Notification System (WiscAlerts)	road network conditions	Planned
		traffic images	Planned
		transit service information	Planned
	Vehicles	broadcast traveler information	Existing
		emergency traveler information	Existing

Source Element	Destination Element	Flow Name	Status
WisDOT_DTSD_BTO_STOC_511 Website	WisDOT_DTSD_BTO_STOC_511 System x-Kiosks	interactive traveler information	Existing
		traveler alerts	Existing
		transit service information	Planned
		interactive traveler information	Existing
	x-Media	traveler information for media	Existing
		emergency traveler information	Existing
		road network conditions	Planned
		traffic images	Planned
	3rd Party Information Sources	transit service information	Planned
		parking reservations request	Planned
		map updates	Existing
		transportation information for operations	Existing
	City_Madison_Parking Utility_Parking Management System	alert status	Existing
		emergency traveler information	Existing
		incident information	Planned
		map updates	Existing
	City_Madison_Streets and Recycling_Maintenance Decision Support System (MDSS)	transportation information for operations	Existing
		alert status	Existing
		emergency traveler information	Existing
		incident information	Planned
	City_Madison_Traffic Engineering Division_Traffic Operations Center Software	map updates	Existing
		transportation information for operations	Existing
	County_Dane_Airport_easyPark	parking reservations request	Planned
		alert status	Existing
		emergency traveler information	Existing
		incident information	Planned
	County_Dane_Public Safety Comm Center	map updates	Existing
		transportation information for operations	Existing

Source Element	Destination Element	Flow Name	Status
	Madison Metro Transit_Kiosks	broadcast traveler information	Existing
		emergency traveler information	Existing
		interactive traveler information	Existing
		map updates	Existing
		trip plan	Planned
	Madison Metro Transit_TransitFleet Software	map updates	Existing
	Madison Metro Transit_TransitFleet Software	transportation information for operations	Planned
	Madison Metro Transit_TransitMaster CAD	transit information request	Existing
		transportation information for operations	Planned
	Social Media and Subscription Based Services	emergency traveler information	Existing
		map updates	Existing
	Transit Agency_Non Specified_CAD	transit information request	Existing
		transportation information for operations	Planned
	Transit Agency_Non Specified_Website	emergency traveler information	Existing
		map updates	Existing
		road network conditions	Planned
		traffic images	Planned
		transit service information	Planned
	User Personal Computing Devices	broadcast traveler information	Existing
		emergency traveler information	Existing
		interactive traveler information	Existing
		map updates	Existing
		traveler alerts	Existing

Source Element	Destination Element	Flow Name	Status
		trip plan	Planned
	UW-Madison_Parking Management System	parking reservations request	Planned
	UW-Madison_Police Dept_Communications Center (Dispatch)	alert status	Existing
		map updates	Existing
	UW-Madison_Police Dept_Emergency Notification System (WiscAlerts)	transportation information for operations	Planned
		emergency traveler information	Existing
		map updates	Existing
		road network conditions	Planned
	Vehicles	traffic images	Planned
		transit service information	Planned
		broadcast traveler information	Existing
		emergency traveler information	Existing
		interactive traveler information	Existing
		map updates	Existing
		traveler alerts	Existing
	WisDOT_DTSD_BTO_STOC_511 System WisDOT_DTSD_BTO_STOC_ATMS	trip plan	Planned
		emergency traveler information	Existing
		alert status	Existing
		emergency traveler information	Existing
		transportation information for operations	Existing
	x-Financial Institution x-Kiosks	payment request	Existing
		broadcast traveler information	Existing
		emergency traveler information	Existing
		interactive traveler information	Existing

Source Element	Destination Element	Flow Name	Status
	x-Media x-Special Event Venues	map updates	Existing
		trip plan	Planned
		traveler information for media	Existing
		event information request	Existing
WisDOT_DTSD_BTO_STOC_ATMS	3rd Party Information Sources	emergency traveler information	Existing
		incident information	Planned
		road network conditions	Planned
		road weather information	Existing
	City_Madison_Streets and Recycling_Maintenance Decision Support System (MDSS)	traffic images	Planned
		environmental conditions data	Planned
		incident response status	Existing
		maint and constr resource coordination	Existing
		road network conditions	Existing
		traffic images	Existing
		transportation information for operations	Existing
	City_Madison_Traffic Engineering Division_Traffic Operations Center Software	alert notification coordination	Existing
		device control request	Planned
		device data	Planned
		device status	Planned
		emergency routes	Existing
		emergency traffic control request	Existing
		emergency traveler information	Existing
		environmental conditions data	Planned
		equipment maintenance status	Existing

Source Element	Destination Element	Flow Name	Status
	County_Dane_Public Safety Comm Center	field equipment status	Planned
		incident information	Existing
		incident response coordination	Existing
		incident response status	Existing
		remote surveillance control	Planned
		resource deployment status	Existing
		resource request	Existing
		road network conditions	Planned
		road weather information	Planned
		threat information	Existing
		threat information coordination	Existing
		transportation information for operations	Existing
		work zone information	Planned
		alert notification	Existing
		alert notification coordination	Existing
		emergency routes	Existing
		emergency traffic control information	Existing
		emergency traveler information	Existing
		incident response coordination	Existing
		incident response status	Existing
		resource deployment status	Existing
		resource request	Existing
		road weather information	Planned
		security equipment maintenance status	Existing

Source Element	Destination Element	Flow Name	Status
	Data Archive (Regional)	threat information coordination	Existing
		transportation information for operations	Existing
		work zone information	Planned
		traffic archive data	Planned
	Data Archives (Individual Agency)	emergency archive data	Planned
		traffic archive data	Existing
	Madison Metro Transit_Kiosks	emergency traveler information	Existing
	Madison Metro Transit_TransitFleet Software	request transit information	Existing
		road network conditions	Existing
		traffic images	Existing
		work zone information	Existing
	Madison Metro Transit_TransitMaster CAD	alert notification	Existing
		incident information	Existing
		incident response status	Existing
		remote surveillance control	Existing
		request transit information	Existing
		resource deployment status	Existing
		resource request	Existing
		road network conditions	Existing
		transit information request	Existing
	Social Media and Subscription Based Services	alert notification	Existing
		emergency traveler information	Existing
		incident information	Existing
		road network conditions	Existing

Source Element	Destination Element	Flow Name	Status
	Transit Agency_Non Specified_CAD	road weather information	Existing
		traffic images	Existing
		alert notification	Existing
		incident information	Existing
		incident response status	Existing
		request transit information	Planned
		road network conditions	Existing
		road weather information	Planned
		traffic images	Existing
		transit information request	Existing
		work zone information	Existing
	Transit Agency_Non Specified_Website	emergency traveler information	Existing
		road network conditions	Planned
		transit service information	Existing
	UW-Madison_Parking Management System	parking lot inputs	Existing
	UW-Madison_Police Dept_Communications Center (Dispatch)	alert notification coordination	Existing
		emergency traffic control information	Existing
		incident response coordination	Planned
		incident response status	Existing
		resource deployment status	Existing
		resource request	Existing
		road weather information	Existing
		security equipment maintenance status	Existing
		threat information coordination	Existing

Source Element	Destination Element	Flow Name	Status
		traffic images	Existing
	UW-Madison_Police Dept_Emergency Notification System (WiscAlerts)	emergency traveler information	Existing
		road network conditions	Existing
		road weather information	Existing
	Vehicles WisDOT_DTSD_BTO_STOC_511 System	traffic images	Existing
		emergency traveler information	Existing
		current asset restrictions	Existing
		incident information	Existing
		road network conditions	Existing
		traffic images	Planned
		work zone information	Planned
	WisDOT_DTSD_BTO_STOC_511 Twitter Accounts	alert notification	Existing
		current asset restrictions	Planned
		emergency traveler information	Existing
		work zone information	Planned
	WisDOT_DTSD_BTO_STOC_511 Website	alert notification	Existing
		current asset restrictions	Planned
		emergency traveler information	Existing
		road weather information	Existing
		work zone information	Planned
	WisDOT_DTSD_BTO_STOC_CCTV Cameras	video surveillance control	Existing
	WisDOT_DTSD_BTO_STOC_DMS (Fixed and Portable)	roadway information system data	Existing
	WISDOT_DTSD_BTO_STOC_Environmental Sensor Stations	environmental sensors control	Existing

Source Element	Destination Element	Flow Name	Status
	WisDOT_DTSD_BTO_STOC_Freeway Service Team Vehicles	decision support information	Existing
	WisDOT_DTSD_BTO_STOC_Ramp Meters	signal control commands	Existing
		traffic metering control	Existing
	WisDOT_DTSD_BTO_STOC_System Detector Stations	traffic sensor control	Existing
	WisDOT_DTSD_SW Region_Madison_Regional Offices	device control request	Planned
		device data	Planned
		device status	Planned
		incident information	Existing
		road network conditions	Planned
		traffic images	Planned
	WisDOT_DTSD_SW Region_Madison_Traffic Signal Systems	signal control commands	Planned
		signal control data	Existing
		signal control device configuration	Planned
		signal control plans	Planned
		signal system configuration	Existing
		traffic sensor control	Existing
	x-Archived Data Administrator	archive management data	Planned
	x-Kiosks	emergency traveler information	Existing
	x-Media	incident information for media	Existing
		road weather information	Planned
		traffic information for media	Existing
		traveler information for media	Existing
	x-Special Event Venues	event information request	Existing

Source Element	Destination Element	Flow Name	Status
WisDOT_DTSD_BTO_STOC_CCTV Cameras	x-Traffic Management Center	device control request	Planned
		incident information	Existing
		road network conditions	Existing
		traffic images	Existing
	x-Traffic Operations Personnel	traffic operator data	Existing
	County_Dane_Public Safety Comm Center	traffic images	Planned
	Data Archives (Individual Agency)	roadside archive data	Existing
	WisDOT_DTSD_BTO_STOC_511 System	traffic images	Planned
	WisDOT_DTSD_BTO_STOC_511 Website	traffic images	Planned
	WisDOT_DTSD_BTO_STOC_ATMS	field device status	Existing
		traffic images	Existing
x-Special Event Venues	event information request	Existing	
WisDOT_DTSD_BTO_STOC_DMS (Fixed and Portable)	WisDOT_DTSD_BTO_STOC_ATMS	field device status	Existing
		roadway information system status	Existing
	WisDOT_DTSD_BTO_STOC_System Detector Stations	roadway equipment coordination	Existing
	x-Driver	driver information	Existing
WISDOT_DTSD_BTO_STOC_Environmental Sensor Stations	Data Archives (Individual Agency)	roadside archive data	Existing
	WisDOT_DTSD_BTO_STOC_ATMS	environmental sensor data	Existing
WisDOT_DTSD_BTO_STOC_Freeway Service Team Vehicles		Vehicles	field device status
	emergency vehicle alert		Planned
	WisDOT_DTSD_BTO_STOC_ATMS	emergency dispatch response	Existing
		emergency vehicle tracking data	Existing
	incident status	Existing	

Source Element	Destination Element	Flow Name	Status
WisDOT_DTSD_BTO_STOC_Ramp Meters	x-Emergency Response Personnel	emergency personnel information presentation	Existing
	Data Archives (Individual Agency)	roadside archive data	Existing
	WisDOT_DTSD_BTO_STOC_ATMS	traffic flow	Existing
		traffic metering status	Existing
WisDOT_DTSD_BTO_STOC_System Detector Stations	WisDOT_DTSD_SW Region_Madison_Traffic Signal Systems	roadway equipment coordination	Existing
	x-Driver	driver information	Existing
	Data Archives (Individual Agency)	probe archive data	Planned
	WisDOT_DTSD_BTO_STOC_ATMS	roadside archive data	Existing
		field device status	Existing
		probe archive data	Planned
		signal control data	Existing
		signal control status	Existing
		signal fault data	Existing
		traffic flow	Existing
WisDOT_DTSD_SW Region_Madison_Regional Offices	WisDOT_DTSD_BTO_STOC_Ramp Meters	roadway equipment coordination	Existing
	City_Madison_Traffic Engineering Division_Traffic Operations Center Software	device control request	Planned
		device data	Planned
		device status	Planned
		incident information	Existing
	road network conditions	Planned	
	traffic images	Planned	
	Data Archive (Regional)	traffic archive data	Planned
	Data Archives (Individual Agency)	traffic archive data	Existing

Source Element	Destination Element	Flow Name	Status
WisDOT_DTSD_SW Region_Madison_Signal Preemption/Priority Equipment	WisDOT_DTSD_BTO_STOC_ATMS	device control request	Planned
		device data	Planned
		device status	Planned
		incident information	Existing
	WisDOT_DTSD_SW Region_Madison_Traffic Signal Systems	road network conditions	Planned
		signal control commands	Planned
		traffic images	Planned
		signal control commands	Existing
		signal control device configuration	Existing
		signal control plans	Existing
		signal system configuration	Existing
		traffic sensor control	Existing
	x-Traffic Operations Personnel	video surveillance control	Existing
		traffic operator data	Existing
	WisDOT_DTSD_BTO_STOC_ATMS	field device status	Existing
		right-of-way request notification	Existing
WisDOT_DTSD_SW Region_Madison_Traffic Signal Systems	x-Driver	driver information	Existing
	City_Madison_Traffic Engineering Division_Traffic Signal Systems	roadway equipment coordination	Planned
	City_Non Specified_Traffic Signal Systems	roadway equipment coordination	Planned
	Data Archives (Individual Agency)	roadside archive data	Existing
	WisDOT_DTSD_BTO_STOC_ATMS	right-of-way request notification	Existing
		signal control status	Planned
		signal fault data	Planned

Source Element	Destination Element	Flow Name	Status
x-Archived Data Administrator		traffic flow	Existing
	WisDOT_DTSD_BTO_STOC_Ramp Meters	roadway equipment coordination	Existing
	WisDOT_DTSD_SW	right-of-way request notification	Existing
	Region_Madison_Regional Offices	signal control status	Existing
		signal fault data	Existing
		traffic flow	Existing
		traffic images	Existing
	x-Driver	driver information	Existing
	x-Pedestrians	crossing permission	Existing
	Data Archive (Regional)	archive management requests	Planned
x-County_Dane_Public Safety Comm Center_Personnel	Data Archives (Individual Agency)	archive management requests	Planned
	WisDOT_DTSD_BTO_STOC_ATMS	archive management requests	Planned
x-County_Dane_Public Safety Comm Center_Personnel	County_Dane_Public Safety Comm Center	emergency operations inputs	Existing
x-Driver	Vehicles	driver inputs	Planned
x-Emergency Operations Personnel		request for service	Planned
	UW-Madison_Police Dept_Communications Center (Dispatch)	emergency operations inputs	Existing
x-Emergency Response Personnel	County_Dane_Public Safety Comm Center	incident command inputs	Existing
	Emergency Vehicle On-Board Equipment	emergency personnel inputs	Existing
	UW-Madison_Police Dept_Communications Center (Dispatch)	incident command inputs	Existing
	WisDOT_DTSD_BTO_STOC_ATMS	incident command inputs	Existing
	WisDOT_DTSD_BTO_STOC_Freeway Service Team Vehicles	emergency personnel inputs	Existing

Source Element	Destination Element	Flow Name	Status
x-Emergency Vehicles_GPS receiver/Antenna	Emergency Vehicle On-Board Equipment	position fix	Existing
	City_Madison_Parking Utility_Parking Management System	payment	Planned
x-Fare Card	County_Dane_Airport_easyPark	payment	Planned
	County_Dane_Parking Management System	payment	Planned
	Madison Metro Transit_Kiosks	payment	Planned
	Madison Metro Transit_On-Board Fareboxes	payment	Existing
	User Personal Computing Devices	payment traveler card information	Planned Planned
x-Financial Institution	UW-Madison_Parking Management System Vehicles	payment payment	Planned Planned
	x-Kiosks	payment traveler card information	Planned Planned
	3rd Party Information Sources	transaction status	Planned
	City_Madison_Parking Utility_Parking Management System	transaction status	Existing
	County_Dane_Airport_easyPark	transaction status	Existing
	County_Dane_Parking Management System	transaction status	Existing
	Madison Metro Transit_TransitFleet Software	transaction status	Existing
	Transit Agency_Non Specified_CAD	transaction status	Existing
	UW-Madison_Parking Management System	transaction status	Existing
	WisDOT_DTSD_BTO_STOC_511 Website	transaction status	Existing

Source Element	Destination Element	Flow Name	Status
x-Kiosks	County_Dane_Public Safety Comm Center	alarm notification	Existing
	Madison Metro Transit_Website	map update request	Planned
		traveler request	Existing
		trip request	Planned
	Social Media and Subscription Based Services	trip request	Planned
	Transit Agency_Non Specified_Website	map update request	Planned
		traveler request	Existing
		trip request	Planned
	UW-Madison_Police Dept_Communications Center (Dispatch)	alarm notification	Existing
	WisDOT_DTSD_BTO_STOC_511 Website	map update request	Existing
		traveler request	Existing
		trip request	Planned
	x-Fare Card	request for payment	Planned
		traveler card update	Planned
x-Madison Maintenance Vehicle AVL	x-Transit Contactless Smart Fare Cards	request for payment	Planned
		traveler card update	Planned
x-Madison Metro Transit_On-Board Fuel Usage Sensors	City_Madison_Streets and Recycling_Maintenance Vehicles	position fix	Existing
x-Maintenance and Construction Personnel	Madison Metro Transit_TransitMaster Integrated Vehicle Logic Unit (IVLU)	transit vehicle measures	Existing
	City_Madison_Streets and Recycling_Maintenance Decision Support System (MDSS)	maint and constr center personnel inputs	Existing

Source Element	Destination Element	Flow Name	Status
x-Maintenance and Construction Personnel	City_Madison_Traffic Engineering Division_Traffic Operations Center Software	maint and constr center personnel inputs	Existing
x-Maintenance Vehicle On-Board Equipment	City_Madison_Streets and Recycling_Maintenance Vehicles	maint and constr material information	Existing
x-MATPB Performance Reporting System	Data Archive (Regional)	government reporting data receipt	Planned
	Data Archives (Individual Agency)	government reporting data receipt	Planned
x-MATPB Personnel	Data Archive (Regional)	archive management requests	Planned
x-Media	City_Madison_Traffic Engineering Division_Traffic Operations Center Software	external reports	Existing
x-Parking Operator	UW-Madison_Police Dept_Emergency Notification System (WiscAlerts)	external reports	Existing
	WisDOT_DTSD_BTO_STOC_ATMS	external reports	Existing
	City_Madison_Parking Utility_Parking Management System	parking operator inputs	Existing
		request for performance data	Existing
	County_Dane_Airport_easyPark	parking operator inputs	Existing
		request for performance data	Existing
	County_Dane_Parking Management System	parking operator inputs	Existing
		request for performance data	Existing
x-Pedestrians	City_Madison_Traffic Engineering Division_Pedestrian and Bicyclist Hybrid Beacons	parking operator inputs	Existing
		request for performance data	Existing
	City_Madison_Traffic Engineering Division_Traffic Signal Systems	crossing call	Existing
		non-vehicular presence	Existing

Source Element	Destination Element	Flow Name	Status
	City_Non Specified_Traffic Signal Systems	crossing call	Existing
		non-vehicular presence	Existing
	WisDOT_DTSD_SW Region_Madison_Traffic Signal Systems	crossing call	Existing
		non-vehicular presence	Existing
x-Public Devices and Vehicles_GPS Receiver/Antenna	User Personal Computing Devices	position fix	Existing
	Vehicles	position fix	Existing
x-Roadway Environment	City_Madison_Streets and Recycling_In Pavement Sensors/Treatment Systems	environmental conditions	Planned
	City_Madison_Streets and Recycling_Maintenance Vehicles	environmental conditions	Existing
	Vehicles	environmental conditions	Existing
	WISDOT_DTSD_BTO_STOC_Environmental Sensor Stations	environmental conditions	Existing
x-Special Event Venues	3rd Party Information Sources	event information	Existing
	City_Madison_Traffic Engineering Division_Traffic Operations Center Software	event information	Existing
		event plans	Existing
	County_Dane_Public Safety Comm Center	event information	Existing
	Madison Metro Transit_TransitMaster CAD	event plans	Existing
	Social Media and Subscription Based Services	event information	Existing
	Transit Agency_Non Specified_CAD	event plans	Existing
	UW-Madison_Police Dept_Emergency Notification System (WiscAlerts)	event information	Existing
	WisDOT_DTSD_BTO_STOC_511 System	event information	Planned
	WisDOT_DTSD_BTO_STOC_511 Website	event information	Existing
	WisDOT_DTSD_BTO_STOC_ATMS	event information	Existing

Source Element	Destination Element	Flow Name	Status
		event plans	Existing
x-Traffic	City_Madison_Traffic Engineering Division_Traffic Signal Systems	traffic characteristics	Existing
	City_Non Specified_Traffic Signal Systems	traffic characteristics	Existing
	WisDOT_DTSD_BTO_STOC_Ramp Meters	traffic characteristics	Existing
	WisDOT_DTSD_BTO_STOC_System Detector Stations	traffic characteristics	Existing
	WisDOT_DTSD_SW Region_Madison_Traffic Signal Systems	traffic characteristics	Existing
x-Traffic Management Center	City_Madison_Traffic Engineering Division_Traffic Operations Center Software	device control request	Planned
		incident information	Planned
		road network conditions	Planned
		traffic images	Planned
	WisDOT_DTSD_BTO_STOC_ATMS	device control request	Planned
		incident information	Planned
		road network conditions	Planned
		traffic images	Planned
x-Traffic Operations Personnel	City_Madison_Traffic Engineering Division_Traffic Operations Center Software	traffic operator inputs	Existing
	WisDOT_DTSD_BTO_STOC_ATMS	traffic operator inputs	Existing
	WisDOT_DTSD_SW Region_Madison_Regional Offices	traffic operator inputs	Existing
x-Transit Contactless Smart Fare Cards	City_Madison_Parking Utility_Parking Management System	payment	Planned
	County_Dane_Airport_easyPark	payment	Planned

Source Element	Destination Element	Flow Name	Status
	County_Dane_Parking Management System	payment	Planned
	Madison Metro Transit_Kiosks	payment	Planned
	Madison Metro Transit_On-Board Fareboxes	payment	Planned
x-Transit Operations Personnel x-Transit Vehicle Operators x-Transit Vehicles	User Personal Computing Devices	payment	Planned
		traveler card information	Planned
	UW-Madison_Parking Management System	payment	Planned
	Vehicles	payment	Planned
	x-Kiosks	payment	Planned
		traveler card information	Planned
	Madison Metro Transit_TransitFleet Software	transit operations personnel inputs	Existing
	Madison Metro Transit_Mobile Data Terminal (MDT)	transit vehicle operator inputs	Existing
	Madison Metro Transit_TransitFleet Software	transit vehicle operator availability	Existing
	Madison Metro Transit_Mobile Data Terminal (MDT)	transit vehicle measures	Existing
x-Traveler x-UW-Madison_Police Dept_Emergency Phones x-WisDOT Freeway Service Patrol_GPS Receiver/Antenna	Madison Metro Transit_Automatic Passenger Counters (APC)	boarding and alighting	Existing
	Madison Metro Transit_Kiosks	traveler inputs	Existing
	User Personal Computing Devices	traveler inputs	Existing
	x-Kiosks	traveler inputs	Existing
	UW-Madison_Police Dept_Communications Center (Dispatch)	incident notification	Existing
	WisDOT_DTSD_BTO_STOC_Freeway Service Team Vehicles	position fix	Existing

Source Element	Destination Element	Flow Name	Status
x-WisDOT_DTSD_BTO_STOC_511 Telephony	WisDOT_DTSD_BTO_STOC_511 System	voice-based traveler request	Existing



ARCHITECTURE FLOW DEFINITIONS

The National ITS Architecture provides a comprehensive listing of high-level information flows that are commonly exchanged between various types of ITS elements. This listing is not intended to represent all the possible types of information that can be exchanged, but rather it is intended to provide a high-level representation of the types of data in which specific information may fall. Therefore, information flows from the National ITS Architecture help further define the framework, in which system development and integration will occur. In this regard it helps identify specific standards that may be used to ensure that systems can be easily integrated and remain interoperable well into the future. Architecture flows from the National ITS Architecture that are relevant to the Madison Regional ITS Architecture are listed and defined in the following table.

Architecture Flow Name	Architecture Flow Definition
alarm acknowledge	Confirmation that alarm was received, instructions and additional information for the alarm initiator, and requests for additional information.
alarm notification	Notification of activation of an audible or silent alarm by a traveler in a public area or by a transit vehicle operator using an on-board device.
alert notification	Notification of a major emergency such as a natural or man-made disaster, civil emergency, or child abduction for distribution to the public. The flow identifies the alert originator, the nature of the emergency, the geographic area affected by the emergency, the effective time period, and information and instructions necessary for the public to respond to the alert. This flow may also identify specific information that should not be released to the public.
alert notification coordination	Coordination of emergency alerts to be distributed to the public. This includes notification of a major emergency such as a natural or man-made disaster, civil

Architecture Flow Name	Architecture Flow Definition
alert status	emergency, or child abduction for distribution to the public and status of the public notification. Information indicating the current status of the emergency alert including identification of the traveler and driver information systems that are being used to provide the alert.
archive management data	Presentation of information to the administrator to support the management of an ITS archive including database reports on the condition and quality of the archived data, status of the import and collection process, reports that monitor archive usage, and any special requests that require direct action by the administrator (e.g., requests for access to new data sources).
archive status	Notification that data provided to an archive contains erroneous, missing, or suspicious data or verification that the data provided appears valid. If an error has been detected, the offending data and the nature of the potential problem are identified.
archived data products	Raw or processed data, meta data, data catalogs and other data products provided to a user system upon request. The response may also include any associated transaction information.
bad tag list	List of invalid transit user tags which may have previously failed a fare payment transaction.
boarding and alighting	Detection of transit passenger boarding and alighting. This flow represents the travelers' physical presence as they board a transit vehicle that can be detected or monitored by on-board sensors.
broadcast traveler information	General traveler information that contains traffic and road conditions, link travel times, incidents, advisories, restrictions, transit service information, weather information, parking information, and other related traveler information.
crossing call	Pedestrian request to cross the roadway. This may be an overt (e.g., push button) request from a pedestrian or the physical presence of a pedestrian that can be detected by sensors or surveillance systems.
crossing permission	Signal to pedestrians indicating permission to cross roadway.
current asset restrictions	Restrictions levied on transportation asset usage based on infrastructure design, surveys, tests, or analyses. This includes standard facility design height, width, and weight restrictions, special restrictions such as spring weight restrictions, and temporary facility restrictions that are imposed during maintenance and construction.

Architecture Flow Name	Architecture Flow Definition
data collection and monitoring control	Information used to configure and control data collection and monitoring systems.
decision support information	Information provided to support effective and safe incident response, including local traffic, road, and weather conditions, hazardous material information, and the current status of resources that have been allocated to an incident.
device control request	Request for device control action
device data	Data from detectors, environmental sensor stations, and traffic control devices including device inventory information.
device status	Status information from devices
driver information	Regulatory, warning, and guidance information provided to the driver while en route to support safe and efficient vehicle operation.
driver inputs	Driver input to the vehicle including configuration data, settings and preferences, interactive requests, and control commands.
driver parking information	Presentation of general parking information to drivers including lot status, parking availability, and directions to available spaces, entrances, and exits.
driver updates	Information displayed or otherwise conveyed by the vehicle to the driver.
emergency archive data	Logged emergency information including information that characterizes identified incidents (routine highway incidents through disasters), corresponding incident response information, evacuation information, surveillance data, threat data, and resource information. Content may include a catalog of available information, the actual information to be archived and associated meta data that describes the archived information.
emergency dispatch requests	Emergency vehicle dispatch instructions including incident location and available information concerning the incident.
emergency dispatch response	Request for additional emergency dispatch information and provision of en route status.
emergency operations inputs	Emergency operator inputs supporting call taking, dispatch, emergency operations, security monitoring, and other operations and communications center operator functions.
emergency operations status	Presentation of information to the operator including emergency operations data, supporting a range of emergency operating positions including call taker, dispatch, emergency operations, security monitoring, and various other operations and communications center operator positions.

Architecture Flow Name	Architecture Flow Definition
emergency personnel information presentation	Presentation of information to emergency personnel in the field including dispatch information, incident information, current road network conditions, device status, and other supporting information.
emergency personnel inputs	User input from emergency personnel in the field including dispatch coordination, incident status information, and remote device control requests.
emergency route request	Request for access routes for emergency response vehicles and equipment. This may be a request for ingress or egress routes or other emergency routes.
emergency routes	Suggested ingress and egress routes for access to and between the scene and staging areas or other specialized emergency access routes.
emergency traffic control information	Status of a special traffic control strategy or system activation implemented in response to an emergency traffic control request, a request for emergency access routes, a request for evacuation, a request to activate closure systems, a request to employ driver information systems to support public safety objectives, or other special requests. Identifies the selected traffic control strategy and system control status.
emergency traffic control request	Special request to preempt the current traffic control strategy in effect at one or more signalized intersections or highway segments, activate traffic control and closure systems such as gates and barriers, activate safeguard systems, or use driver information systems. For example, this flow can request all signals to red-flash, request a progression of traffic control preemptions along an emergency vehicle route, request a specific evacuation traffic control plan, request activation of a road closure barrier system, or place a public safety or emergency-related message on a dynamic message sign.
emergency traveler information	Public notification of an emergency such as a natural or man-made disaster, civil emergency, or child abduction. This flow also includes evacuation information including evacuation instructions, evacuation zones, recommended evacuation times, tailored evacuation routes and destinations, traffic and road conditions along the evacuation routes, traveler services and shelter information, and reentry times and instructions.
emergency vehicle alert	Notification to vehicles in the area that an emergency vehicle is in the vicinity. The number of responding vehicles, their status, location, speed, and direction are provided.
emergency vehicle tracking data	The current location and operating status of the emergency vehicle.
environmental conditions	Current road conditions (e.g., surface temperature, subsurface temperature,

Architecture Flow Name	Architecture Flow Definition
	moisture, icing, treatment status) and surface weather conditions (e.g., air temperature, wind speed, precipitation, visibility) that are measured by environmental sensors.
environmental conditions data	Current road conditions (e.g., surface temperature, subsurface temperature, moisture, icing, treatment status) and surface weather conditions (e.g., air temperature, wind speed, precipitation, visibility) as measured and reported by fixed and/or mobile environmental sensors and aggregated by the data collector. Attributes relating to the data collection (and aggregation) are also included.
environmental sensor data	Current road conditions (e.g., surface temperature, subsurface temperature, moisture, icing, treatment status) and surface weather conditions (e.g., air temperature, wind speed, precipitation, visibility) as measured and reported by fixed and/or mobile environmental sensors. Operational status of the sensors is also included.
environmental sensors control	Data used to configure and control environmental sensors.
equipment maintenance status	Current status of field equipment maintenance actions.
event confirmation	Confirmation that special event details have been received and processed.
event information	Special event information for travelers. This would include a broader array of information than the similar "event plans" that conveys only information necessary to support traffic management for the event.
event information request	Request for special event information.
event plans	Plans for major events possibly impacting traffic.
external reports	Traffic and incident information that is collected by the media through a variety of mechanisms (e.g., radio station call-in programs, air surveillance).
fare and price information	Current transit, parking, and toll fee schedule information.
fare collection data	Fare collection information including the summary of on-board fare system data and financial payment transaction data.
fare management information	Transit fare information and transaction data used to manage transit fare processing on the transit vehicle.
field device status	Reports from field equipment (sensors, signals, signs, controllers, etc.) which indicate current operational status.
field equipment status	Identification of field equipment requiring repair and known information about the

Architecture Flow Name	Architecture Flow Definition
	associated faults.
government reporting data receipt	The acknowledgement of satisfactory receipt of information used as input to government data systems or a report identifying problems or issues with the data submittal.
government reporting system data	Information provided by an ITS archive, formatted as appropriate, that can be used as input to government data reporting systems.
incident command information coordination	Information that supports local management of an incident. It includes resource deployment status, hazardous material information, traffic, road, and weather conditions, evacuation advice, and other information that enables emergency or maintenance personnel in the field to implement an effective, safe incident response.
incident command information presentation	Presentation of information to emergency personnel in the field that supports local tactical decision-making within an incident command system structure
incident command inputs	User input from emergency personnel including incident command status, incident information and resource coordination.
incident information	Notification of existence of incident and expected severity, location, time and nature of incident. As additional information is gathered and the incident evolves, updated incident information is provided. Incidents include any event that impacts transportation system operation ranging from routine incidents (e.g., disabled vehicle at the side of the road) through large-scale natural or human-caused disasters that involve loss of life, injuries, extensive property damage, and multi-jurisdictional response. This also includes special events, closures, and other planned events that may impact the transportation system.
incident information for media	Report of current desensitized incident information prepared for public dissemination through the media.
incident notification	The notification of an incident including its nature, severity, and location.
incident notification response	Interactive acknowledgement and verification of the incident information received, requests for additional information, and general information on incident response status.
incident report	Report of an identified incident including incident location, type, severity and other information necessary to initiate an appropriate incident response.
incident response coordination	Incident response procedures and current incident response status that are shared between allied response agencies to support a coordinated response to incidents. This flow provides current situation information, including a summary of incident

Architecture Flow Name	Architecture Flow Definition
	status and its impact on the transportation system and other infrastructure, and current and planned response activities. This flow also coordinates a positive hand off of responsibility for all or part of an incident response between agencies.
incident response status	Status of the current incident response including a summary of incident status and its impact on the transportation system, traffic management strategies implemented at the site (e.g., closures, diversions, traffic signal control overrides), and current and planned response activities.
incident status	Information gathered at the incident site that more completely characterizes the incident and provides current incident response status.
interactive traveler information	Traveler information provided in response to a traveler request. The provided information includes traffic and road conditions, advisories, incidents, payment information, transit services, parking information, weather information, and other travel-related data updates and confirmations.
in-vehicle transaction status	The status of an electronic payment transaction presented to the driver by in-vehicle equipment.
local signal preemption request	Direct control signal or message to a signalized intersection that results in preemption of the current control plan and grants right-of-way to the requesting vehicle.
local signal priority request	Request from a vehicle to a signalized intersection for priority at that intersection.
maint and constr archive data	Information describing road construction and maintenance activities identifying the type of activity, the work performed, and work zone information including work zone configuration and safety (e.g., a record of intrusions and vehicle speeds) information. For construction activities, this information also includes a description of the completed infrastructure, including as-built plans as applicable. Content may include a catalog of available information, the actual information to be archived and associated meta data that describes the archived information.
maint and constr center personnel inputs	User input from maintenance and construction center personnel including routing information, scheduling data, dispatch instructions, device configuration and control, resource allocations, alerts, incident and emergency response plan coordination.
maint and constr dispatch information	Information used to dispatch maintenance and construction vehicles, equipment, and crews and information used to keep work zone crews informed. This information includes routing information, traffic information, road restrictions, incident information, environmental information, decision support information, maintenance schedule data, dispatch instructions, personnel assignments, alert notifications, and

Architecture Flow Name	Architecture Flow Definition
	corrective actions.
maint and constr dispatch status	Current maintenance and construction status including work data, operator status, crew status, and equipment status.
maint and constr material information	Information on materials stored on the vehicle including quantity and current application rate.
maint and constr operations information presentation	Presentation of maintenance and construction operations information to center personnel. This information includes maintenance resource status (vehicles, equipment, and personnel), work schedule information, work status, road and weather conditions, traffic information, incident information and associated resource requests, security alerts, emergency response plans and a range of other information that supports efficient maintenance and construction operations and planning.
maint and constr resource coordination	Request for road maintenance and construction resources that can be used in the diversion of traffic (cones, portable signs), clearance of a road hazard, repair of ancillary damage, or any other incident response.
maint and constr resource request	Request for road maintenance and construction resources that can be used in the diversion of traffic (cones, portable signs), clearance of a road hazard, repair of ancillary damage, or any other incident response. The request may poll for resource availability or request pre-staging, staging, or immediate dispatch of resources.
maint and constr resource response	Current status of maintenance and construction resources including availability and deployment status. General resource inventory information covering vehicles, equipment, materials, and people and specific resource deployment status may be included.
maint and constr vehicle control	Control data sent from on-board ITS systems to control maintenance and construction vehicle equipment, including control of materials dispersion rate and other control functions that will vary with vehicle type and application.
maint and constr vehicle location data	The current location and related status (e.g., direction and speed) of the maintenance/construction vehicle.
maint and constr vehicle operational data	Data that describes the maintenance and construction activity performed by the vehicle. Operational data includes materials usage (amount stored and current application rate), operational state of the maintenance equipment (e.g., blade up/down, spreader pattern), vehicle safety status, and other measures associated with the operation of maintenance, construction, or other special purpose vehicle. Operational data may include basic operational status of the vehicle equipment or a more precise record of the work performed (e.g., application of crack sealant with

Architecture Flow Name	Architecture Flow Definition
	precise locations and application characteristics).
maint and constr work plans	Future construction and maintenance work schedules and activities including anticipated closures with anticipated impact to the roadway, alternate routes, anticipated delays, closure times, and durations.
map update request	Request for a map update which could include a new underlying map or map layer updates.
map updates	Map update which could include a new underlying static or real-time map or map layer(s) update.
multimodal information	Schedule information for alternate mode transportation providers such as train, ferry, air and bus.
non-vehicular presence	Sensed presence of pedestrians and other non-motor vehicle travelers at roadway crossing or control points.
parking archive data	Data used to analyze and monitor trends in parking demand, pricing, and operational actions. Content may include a catalog of available information, the actual information to be archived and associated meta data that describes the archived information.
parking demand management request	Request to change the demand for parking facility use through pricing or other mechanisms.
parking demand management response	Response to parking demand management change requests indicating level of compliance with request.
parking information	General parking information and status, including current parking availability.
parking lot data request	Request for parking lot occupancy, fares, and availability. The request can be a subscription that initiates as-needed information updates as well as a one-time request for information.
parking lot inputs	Instructions for operation of local parking facilities to support regional traffic management objectives (e.g. which parking lot exits to use). Also, includes inputs from traffic sensors to support calculation of parking lot occupancy and support more effective management of parking entrances and exits.
parking lot reservation confirmation	Confirmation for parking lot reservation.
parking operator inputs	User input from the parking operator to query current status and control the operation of the parking management system.

Architecture Flow Name	Architecture Flow Definition
parking reservations request	Reservation request for parking lot.
parking status	Presentation of information to the parking operator including operational status and transaction reports.
payment	Payment of some kind (e.g., toll, parking, fare) by traveler which, in most cases, can be related to a credit account.
payment request	Request for payment from financial institution.
payment violation notification	Notification to enforcement agency of a toll, parking, or transit fare payment violation.
personal transit information	General and personalized transit information for a particular fixed route, flexible route, or paratransit system.
position fix	Information which provides a traveler's or vehicle's geographical position.
probe archive data	Probe data that allows calculation of travel times, volumes, and other measures that support transportation planning. Optionally, this flow also includes origin and destination information for vehicles that opt to provide this information.
remote surveillance control	The control commands used to remotely operate another center's sensors or surveillance equipment so that roadside surveillance assets can be shared by more than one agency.
request for bad tag list	Request for list of bad vehicle tag IDs.
request for payment	Request to deduct cost of service from user's payment account.
request for performance data	User input from the parking operator to request current parking service performance data.
request for service	Driver inputs that summon an emergency response, request a financial transaction, or initiate other services.
request for vehicle measures	Request for vehicle performance and maintenance data collected by onboard sensors.
request transit information	Request for transit service information and current transit status.
resource deployment status	Status of resource deployment identifying the resources (vehicles, equipment, materials, and personnel) available and their current status. General resource inventory information and specific status of deployed resources may be included.
resource request	A request for resources to implement special traffic control measures, assist in clean

Architecture Flow Name	Architecture Flow Definition
right-of-way request notification	up, verify an incident, etc. The request may poll for resource availability or request pre-staging, staging, or immediate deployment of resources. Resources may be explicitly requested or a service may be requested and the specific resource deployment may be determined by the responding agency.
road network conditions	Notice that a request has occurred for signal prioritization, signal preemption, pedestrian call, multi-modal crossing activation, or other source for right-of-way. Current and forecasted traffic information, road and weather conditions, and other road network status. Either raw data, processed data, or some combination of both may be provided by this architecture flow. Information on diversions and alternate routes, closures, and special traffic restrictions (lane/shoulder use, weight restrictions, width restrictions, HOV requirements) in effect is included along with a definition of the links, nodes, and routes that make up the road network.
road user protection data	Current data as well as operational status from mixed roadway and right-of-way systems.
road user protection device control	Control requests and operating parameters for mixed roadway and right-of-way systems.
road weather information	Road conditions and weather information that are made available by road maintenance operations to other transportation system operators.
roadside archive data	A broad set of data derived from roadside sensors that include current traffic conditions, environmental conditions, and any other data that can be directly collected by roadside sensors. This data also indicates the status of the sensors and reports of any identified sensor faults.
roadside transaction status	The status of an electronic payment transaction provided directly to the driver via sign or other roadside infrastructure.
roadway equipment coordination	The direct flow of information between field equipment. This includes transfer of information between sensors and driver information systems (e.g., DMS, HAR, variable speed limit signs, dynamic lane signs) or control devices (e.g., traffic signals, ramp meters), direct coordination between adjacent control devices, interfaces between detection and warning or alarm systems, and any other direct communications between field equipment.
roadway information system data	Information used to initialize, configure, and control roadside systems that provide driver information (e.g., dynamic message signs, highway advisory radio, beacon systems). This flow can provide message content and delivery attributes, local message store maintenance requests, control mode commands, status queries, and

Architecture Flow Name	Architecture Flow Definition
roadway information system status	all other commands and associated parameters that support remote management of these systems. Current operating status of dynamic message signs, highway advisory radios, beacon systems, or other configurable field equipment that provides dynamic information to the driver.
roadway maintenance status	Summary of maintenance fleet operations affecting the road network. This includes the status of winter maintenance (snow plow schedule and current status).
roadway treatment system control	Control data for remotely located, automated devices that affect the roadway surface (e.g. de-icing applications).
roadway treatment system status	Current operational status of automated roadway treatment devices (e.g., anti-icing systems).
route assignment	Route assignment information for transit vehicle operator.
secure area surveillance control	Information used to configure and control audio and video surveillance systems used for transportation infrastructure security in secure areas. The provided information controls surveillance data collection, aggregation, filtering, and other local processing.
secure area surveillance data	Data collected from surveillance systems used to monitor secure areas. Includes video, audio, processed surveillance data, equipment operational status, and alarm indicators when a threat has been detected.
security equipment maintenance status	Current status of security surveillance and sensor field equipment maintenance actions.
security field equipment status	Identification of security sensors and surveillance equipment requiring repair and known information about the associated faults.
signal control commands	Control of traffic signal controllers or field masters including clock synchronization.
signal control data	Information used to configure local traffic signal controllers.
signal control device configuration	Data used to configure traffic signal control equipment including local controllers and system masters.
signal control plans	Traffic signal timing parameters including minimum green time and interval durations for basic operation and cycle length, splits, offset, phase sequence, etc. for coordinated systems.
signal control status	Operational and status data of traffic signal control equipment including operating

Architecture Flow Name	Architecture Flow Definition
	condition and current indications.
signal fault data	Faults from traffic signal control equipment.
signal system configuration	Data used to configure traffic signal systems including configuring control sections and mode of operation (time based or traffic responsive).
threat information	Threats regarding transportation infrastructure, facilities, or systems detected by a variety of methods (sensors, surveillance, threat analysis of advisories from outside agencies, etc).
threat information coordination	Sensor, surveillance, and threat data including raw and processed data that is collected by sensor and surveillance equipment located in secure areas.
traffic archive data	Data indicating toll facility usage and pricing schedules. Content may include a catalog of available information, the actual information to be archived and associated meta data that describes the archived information.
traffic characteristics	Physical traffic characteristics which are monitored and translated into macroscopic measures like occupancy, volume, density, and average speed. Point measures support presence detection and individual vehicle measures like speed.
traffic control priority request	Request for signal priority at one or more intersections along a particular route.
traffic control priority status	Status of signal priority request functions at the roadside (e.g. enabled or disabled).
traffic flow	Raw and/or processed traffic detector data which allows derivation of traffic flow variables (e.g., speed, volume, and density measures) and associated information (e.g., congestion, potential incidents). This flow includes the traffic data and the operational status of the traffic detectors.
traffic images	High fidelity, real-time traffic images suitable for surveillance monitoring by the operator or for use in machine vision applications.
traffic information for media	Report of traffic conditions including traffic incident reports and traffic images for public dissemination through the media. The reports may also include information on diversions and alternate routes, closures, and special traffic restrictions in effect.
traffic metering control	Control commands and operating parameters for ramp meters, interchange meters, mainline meters, and other systems equipment associated with roadway metering operations.
traffic metering status	Current operational status and operating parameters for ramp meters, interchange meters, mainline meters and other control equipment associated with roadway metering operations.

Architecture Flow Name	Architecture Flow Definition
traffic operator data	Presentation of traffic operations data to the operator including traffic conditions, current operating status of field equipment, maintenance activity status, incident status, video images, security alerts, emergency response plan updates and other information. This data keeps the operator apprised of current road network status, provides feedback to the operator as traffic control actions are implemented, provides transportation security inputs, and supports review of historical data and preparation for future traffic operations activities.
traffic operator inputs	
traffic sensor control	Information used to configure and control traffic sensor systems.
transaction status	Response to transaction request. Normally dealing with a request for payment.
transit and fare schedules	Transit service information including routes, schedules, and fare information.
transit archive data	Information describing the use and vehicle composition on transportation facilities and the traffic control strategies employed. Content may include a catalog of available information, the actual information to be archived and associated meta data that describes the archived information.
transit emergency data	Initial notification of transit emergency at a transit stop or on transit vehicles and further coordination as additional details become available and the response is coordinated.
transit fare information	Information provided by transit management that supports fare payment transactions and passenger data collection.
transit incident information	Information on transit incidents that impact transit services for public dissemination.
transit incidents for media	Report of an incident impacting transit operations for public dissemination through the media.
transit information for media	Report of transit schedule deviations for public dissemination through the media.
transit information request	Request for transit operations information including schedule and fare information. The request can be a subscription that initiates as-needed information updates as well as a one-time request for information.
transit information user request	Request for special transit routing, real-time schedule information, and availability information.

Architecture Flow Name	Architecture Flow Definition
transit operations personnel inputs	User input from transit operations personnel including instructions governing service availability, schedules, emergency response plans, transit personnel assignments, transit maintenance requirements, and other inputs that establish general system operating requirements and procedures.
transit operations status	Presentation of information to transit operations personnel including accumulated schedule and fare information, ridership and on-time performance information, emergency response plans, transit personnel information, maintenance records, and other information intended to support overall planning and management of a transit property.
transit probe data	Aggregate probe data derived from tracking transit vehicles. Data collected could include transit vehicle speeds and travel times for a given link or collection of links.
transit request confirmation	Confirmation of a request for transit information or service.
transit schedule adherence information	Dynamic transit schedule adherence and transit vehicle location information.
transit schedule information	Current and projected transit schedule information used to initialize the transit vehicle with a vehicle assignment, monitor schedule performance, and develop corrective actions on-board.
transit service coordination	Schedule coordination information shared between local/regional transit organizations.
transit system data	Current transit system operations information indicating current transit routes, the level of service on each route, and the progress of individual vehicles along their routes for use in forecasting demand and estimating current transportation network performance.
transit traveler information	Transit information prepared to support transit users and other travelers. It contains transit schedules, real-time arrival information, fare schedules, alerts and advisories, and general transit service information.
transit traveler request	Request by a Transit traveler to summon assistance, request transit information, or request any other transit services.
transit trip plan	An origin-destination transit trip that may involve multiple modes and connections. (could use current trip plan that is PIAS to ISP, but since this is center to center a separate AF might be called for).
transit trip request	Request for a transit trip plan that is responsive to traveler requirements such as schedule, cost, or duration.

Architecture Flow Name	Architecture Flow Definition
transit vehicle conditions	Operating conditions of transit vehicle (e.g., engine running, oil pressure, fuel level and usage).
transit vehicle loading data	Data collected on board the transit vehicle relating to passenger boarding and alighting.
transit vehicle measures	Transit vehicle status measured by on-board ITS equipment.
transit vehicle operator authentication update	Information regarding on-board transit operator authentication.
transit vehicle operator availability	Transit vehicle operator availability data that can be used to develop vehicle operator assignments and detailed operations schedules.
transit vehicle operator display	Visual and audible outputs to the transit vehicle operator including vehicle surveillance information, alarm information, vehicle system status, information from the operations center, and information indicating the status of all other on-board ITS services.
transit vehicle operator information	Transit service instructions, wide area alerts, traffic information, road conditions, and other information for both transit and paratransit operators.
transit vehicle operator inputs	Transit vehicle operator inputs to on-board ITS equipment, including tactile and verbal inputs. Includes authentication information, on-board system control, emergency requests, and fare transaction data.
transit vehicle schedule performance	Estimated times of arrival and anticipated schedule deviations reported by a transit vehicle.
transportation information for operations	Information on the state of transportation system operations including traffic and road conditions, advisories, incidents, transit service information, weather information, parking information, and other related data.
transportation system status	Current status and condition of transportation infrastructure (e.g., tunnels, bridges, interchanges, TMC offices, maintenance facilities). In case of disaster or major incident, this flow provides an assessment of damage sustained by the surface transportation system including location and extent of the damage, estimate of remaining capacity and necessary restrictions, and time frame for repair and recovery.
traveler alerts	Traveler information alerts reporting congestion, incidents, adverse road or weather conditions, parking availability, transit service delays or interruptions, and other information that may impact the traveler. Relevant alerts are provided based on traveler-supplied profile information including trip characteristics and preferences.

Architecture Flow Name	Architecture Flow Definition
traveler archive data	Data associated with traveler information services including service requests, facility usage, rideshare, routing, and traveler payment transaction data. Content may include a catalog of available information, the actual information to be archived and associated meta data that describes the archived information.
traveler card information	The traveler personal information such as name, address, license number, and trip records and profile data.
traveler card update	Information updated concerning traveler's personal data including items such as address, trip records, and profile data.
traveler information for media	General traveler information regarding incidents, unusual traffic conditions, transit issues, or other advisory information that has been desensitized and provided to the media.
traveler inputs	User input from a traveler to summon assistance, request travel information, make a reservation, or request any other traveler service.
traveler interface updates	Visual or audio information (e.g., routes, messages, guidance, emergency information) that is provided to the traveler.
traveler profile	Information about a traveler including equipment capabilities, personal preferences, and traveler alert subscriptions.
traveler request	A request for traveler information including traffic, transit, toll, parking, road weather conditions, event, and passenger rail information. The request identifies the type of information, the area of interest, parameters that are used to prioritize or filter the returned information, and sorting preferences.
trip plan	A travel itinerary identifying a route and associated traveler information and instructions identifying recommended modes and transfer information, ride sharing options, and transit and parking reservation information.
trip request	Request for trip planning services that identifies the trip origin, destination(s), timing, preferences, and constraints. The request may also include a request for transit and parking reservations and ridesharing options associated with the trip.
vehicle characteristics	The physical or visible characteristics of an individual vehicle that can be measured to classify a vehicle and imaged to uniquely identify a vehicle.
vehicle payment information	Information provided for payment of tolls and parking fees including identification that can be used to identify the payment account or source and related vehicle and service information that are used to determine the type and price of service requested.

Architecture Flow Name	Architecture Flow Definition
vehicle payment request	Request for information supporting toll and parking payments.
vehicle payment update	Data written to vehicle equipment to support electronic toll collection or parking payment.
video surveillance control	Information used to configure and control video surveillance systems.
voice-based alert notification	Information to be distributed to the traveling public via voice regarding a major emergency such as a natural or man-made disaster, civil emergency, severe weather or child abduction. The flow may identify the alert originator, the nature of the emergency, the geographic area affected by the emergency, the effective time period, and information and instructions necessary for the public to respond to the alert. The content of this architecture flow may be specially formatted for voice-based traveler information.
voice-based traveler information	Traveler information sent to the telecommunications systems for traveler information terminator. This flow may represent the bulk transfer of traveler information, including traffic conditions, incident information, transit information and weather and road condition information. It may be specially formatted for voice-based traveler information.
voice-based traveler request	The electronic traveler information request from the telecommunications systems for traveler information terminator. It may be specifically formatted for voice-based traveler requests. The request can be a general subscription intended to initiate a continuous or regular data stream or a specific request intended to initiate a one-time response from the recipient.
work zone information	Summary of maintenance and construction work zone activities affecting the road network including the nature of the maintenance or construction activity, location, impact to the roadway, expected time(s) and duration of impact, anticipated delays, alternate routes, and suggested speed limits. This information may be augmented with images that provide a visual indication of current work zone status and traffic impacts.



STP ITS URBAN PROJECT EVALUATION CRITERIA & SCORING GUIDELINES (MATPB)

1. Importance to Regional Transportation System - 20 Points Total		
Criteria	Points	Scoring Guidelines
Roadway Functional Class: Functional class of roadway(s) project is located on or will benefit. The Madison Area TPB Functional Classification System map assigns the following functional classifications to roadways within the urban area: Principal Arterial, Minor Arterial, and Collector. The functional classification defines the role the roadway plays (mobility, connectivity, accessibility) in serving travel needs through the regional network. See link to map below. [http://www.madisonareampb.org/maps/documents/FunctionalClassesDaneCountyCurrentRds.pdf]	2 - 7	Principal Arterial: 7 Points; Minor Arterial: 5 Points; Collector: 2 Points
Traffic Volume: The Annual Average Weekday Traffic volume (AAWT) of the roadways served by the project. [Note: If only Annual Average Daily Traffic (AADT) volume available, an adjustment will be made to convert to AAWT.]	0 - 5	>35,000 AAWT: 5 Points 25,000 - 35,000 AAWT: 4 points 12,000 - 25,000 AAWT: 2 Points; < 12,000 AAWT: 0 Points
Freight Route: The project is located on or would benefit a designated freight route, or would otherwise improve the reliability of truck or rail movements. [Note: "Key" routes include those serving industrial parks or other locations with higher truck volumes. For routes, see Freight Facilities and Service map in the 2035 Regional	0 - 3	Project located on or benefits key freight route location(s): 3 Points Project provides minor improvements to freight system/ freight movements: 1-2 Points. Non-freight route or no freight-

Transportation Plan Update at link below: http://www.madisonareampoc.org/maps/documents/TruckingCompanies_2011_Page.pdf		related improvements: 0 Points
Transit Route: The project is located on or will benefit roadway corridors with bus route(s).	0 - 5	6+ buses peak, 3+ off-peak, and 2+ weekends: 5 Points 4+ peak, 2+ off-peak, 1+ weekends: 4 Points 2+ peak, 1+ off-peak/weekend: 2 Points Weekday peak period service only: 1 Point Not on bus route: 0 Points

2. System Preservation -5 Points Total

Criterion	Points	Scoring Guidelines
The project will help preserve the viability of existing transportation infrastructure.	0 - 5	
The project improves ability to maintain the roadway or transit system/vehicles.		

3. Congestion Mitigation & Transportation System Management - 15 Points Total

Criteria	Points	Scoring Guidelines
<u>Congestion Mitigation/TSM</u> Overall level of existing recurring and non-recurring traffic congestion and extent to which the project mitigates it, improving travel times or traffic flow conditions. [Note: The level of traffic congestion will be measured based on the best data available, including volume-to-capacity ratio (using AAWT and planning level capacities in the regional travel model - see tables in Roadway Projects criteria), intersection Level of Service during the peak periods, and congested travel speeds.] The project will reduce intersection delay through improved traffic signal operations (better coordination and/or signal equipment upgrades, including responsive signal controls).	0 - 15	Maximum points for projects that significantly mitigate recurring and non-recurring congestion in one or more of the most congested local arterial corridors.

<p>The project will reduce congestion caused by incidents and special events through improved traffic control operations, real-time information systems (travel time, transit service, parking availability, etc.), improved incident response/management, or other strategies.</p> <p>The project will increase the attractiveness of transit, ridesharing, bicycling, and/or walking in congested areas or corridors through enhanced signal operations (e.g., transit signal priority, adding detection for bicyclists, etc.), real-time information systems, or other strategies.</p> <p>The project will provide data that will assist in identifying and addressing problem congestion areas or intersections for all transportation modes.</p>		
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4. Safety Enhancement - 18 Points Total		
Criteria	Points	Scoring Guidelines
<p><u>Crash Rate</u> The crash rate on the affected roadway corridors relative to the recent 5-year average Dane County crash rate for an urban street.</p>	0 - 5	<p>Crash rate significantly higher than the Dane County average: 4 - 5 Points</p> <p>Crash rate around the Dane County average: 1 - 3 Points</p> <p>Crash significantly lower than the Dane County average, or no crash history: 0 Points</p>
<p><u>Potential Crash Reduction Impact of the Proposed Project(s)</u> Extent to which the project addresses documented safety issues and the estimated impact the project will have in reducing motorist, bicyclist, and/or pedestrian crashes based on previous studies. [Note: See U.S. DOT ITS benefits database with results of studies measuring impacts of implemented ITS projects at the following link: http://www.itsbenefits.its.dot.gov/.] Examples of potential safety benefits of ITS projects related to incidents: Improves traffic incident management, reducing</p>	0 - 13	<p>High crash reduction impact: 10-13 Points;</p> <p>Medium impact: 5-9 Points</p> <p>Low impact: 1-4 Points</p> <p>No significant safety benefits: 0 Points</p>

<p>the threat of secondary crashes.</p> <p>Helps identify and manage hazardous roadway conditions from weather events or other causes through real-time information systems or other strategies.</p> <p>Improves emergency management communications by coordinating interagency communication system and real-time traveler information systems for incidents, special events, evacuations, major route closings, re-routings, or other restrictions.</p>		
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5. Enhancement of Multi-Modal Options - 10 Points Total		
Criteria	Points	Scoring Guidelines
<p><u>Pedestrian and Bicycle Facilities</u> The project includes ITS infrastructure that will increase the convenience and attractiveness of bicycling and walking (e.g., pedestrian signals or warning lights, pedestrian and bicyclist detection devices, etc.).</p>	0 - 4	<p>Project accommodates and provides significant benefits to pedestrians and bicyclists: 3-4 Points</p> <p>Project accommodates and provides limited benefits to pedestrian and bicyclists: 2 Points</p> <p>Project accommodates, provides limited benefits to pedestrians only: 1 Points</p> <p>No additional or improved accommodations for pedestrians or bicyclists: 0 Points</p>
<p><u>Transit Facilities</u> The project includes ITS infrastructure (e.g., transit signal priority, real time information systems, fare collection systems, etc.) that will improve transit travel time, reliability, and/or attractiveness.</p>	0 - 3	<p>Project accommodates and provides significant benefits to transit (e.g., transit signal priority): 3 Points</p> <p>Project provides some benefits (e.g., fare collection systems): 2 Points</p> <p>Project is located on a bus route and thus benefits transit to limited degree (e.g., improving traffic flow): 1 Point</p> <p>Project is not located on a bus route: 0 Points</p>

<u>Data Collection</u> The project includes ITS infrastructure that will improve data collection for alternative transportation modes needed for planning and project design purposes.	0 - 3	Project provides significant benefits in terms of archived data: 3 Points Project provides some benefits (e.g., fare collection systems): 2 Points Project is located on a bus route and thus benefits transit to limited degree (e.g., improving traffic flow): 1 Point Project is not located on a bus route: 0 Points
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6. Supports Transportation Efficient Land Use, Livability, and Economic Prosperity - 7 Points Total

Criteria	Points	Scoring Guidelines
<u>Supports Regional Center and/or Redevelopment Area</u> The project is located within or benefits an existing or planned mixed-use or regional employment/activity center. [Note: See map of existing and planned centers based primarily on employment, page 23 of the Regional Transportation Plan 2035 Update. Map of mixed-use centers to be prepared.] The project is located within or benefits a targeted infill/redevelopment area, such as a Tax Incremental District (TID). [Targeted infill/redevelopment areas will be based on local plans.]	0 - 7	Project serves an existing regional mixed-use center and redevelopment area: 7 Points; Project serves an existing regional center but not a redevelopment area: 6 Points; Project serves an existing mixed-use center/redevelopment area, but not a regional center: 5 Points; Project serves a planned regional center: 4 Points; Project serves a planned mixed use center: 3 Point; Project does not serve a regional center or redevelopment area: 0 Points

7. Environment- 8 Points Total

Criteria	Points	Scoring Guidelines
<u>Impact on Use of Alternative Modes</u> Extent to which project is likely to result in increased transit ridership and bicycling and		Significant impact on transit, bicycling, and walking levels: 2-3 Points

walking levels and therefore reduced vehicle trips/VMT.	0 - 3	Modest impact: 1 Point No impact: 0 Points
<u>Impact on Fuel Use/Emissions and Goundwater Quality</u> Extent to which the project will reduce fuel consumption and vehicle emissions through improved traffic flow (e.g., less stop/start conditions) and/or reduced non-recurring congestion caused by incidents and special events. Extent to which project will reduce salt and other chemical usage for winter maintenance, improving ground water quality and roadside vegetation.	0 - 5	Significant estimated impact on fuel use/vehicle emissions and/or salt/chemical usage based on studies: 4-5 Points Modest impact: 1-3 Points No impact: 0 Points

8. Environmental Justice and Public Health - 7 Points Total		
Criterion	Points	Scoring Guidelines
<u>Environmental Justice</u> The project is located within or directly benefits a MPO-defined environmental justice area, providing improved multi-modal access/mobility and/or otherwise improving or maintaining the area's livability. [Note: See maps in Attachment D - Environmental Justice Analysis of the Transportation Improvement Program (TIP).]	-5 - 5	Maximum points will be awarded for projects located in and directly benefiting an EJ area. [Note: Up to five points may be subtracted if a project creates significant adverse human health, environmental, social, or economic impacts on environmental justice population groups and fails to avoid or mitigate unavoidable impacts.]
<u>Public Health/Health Equity</u> The project provides public health benefits (e.g., improves safety, enhances active transportation modes, etc.).	0 - 2	

9. Cost Benefit - 10 Points Total		
Criteria	Points	Scoring Guidelines
<u>Cost/benefit ratio</u> This criterion takes into account the overall benefits of the project based on the other criteria	0 - 7	Maximum points for high/moderate scoring projects with moderate/low relative cost per mile.

as compared to the cost of the project.		
<p><u>Cost Efficiency/Leverage of Additional Funding</u> Extent to which the project maximizes use of limited financial resources to ensure the continued productivity of the existing transportation system.</p> <p>The project demonstrates public, private partner, and/or municipal commitment (beyond the required local match), which adds value, reduces costs, and/or leverages additional funding from past or for future project phases and/or complementary transportation system improvements.</p> <p>The project is coordinated with a separate funded project resulting in cost savings or efficiencies.</p>	0 - 3	Maximum points for projects that achieve cost efficiencies and/or leverage additional funding or improvements.