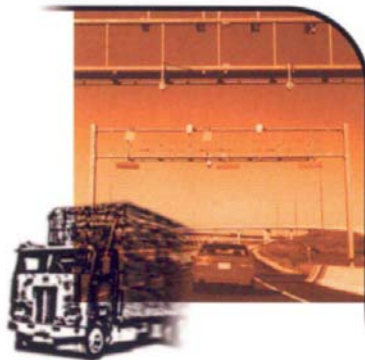


Michiana Area Council of Governments (MACOG)
REGIONAL ITS ARCHITECTURE 2010 - 2020

ITS STRATEGIC PLAN

MAY 2010



RESOLUTION 41-10
A RESOLUTION ENDORSING A REGIONAL INTELLIGENT TRANSPORTATION
SYSTEMS ARCHITECTURE

WHEREAS, SAFETEA-LU and Extension Acts requires the development of an architecture and implementation of Intelligent Transportation System (ITS) technologies.


WHEREAS, the Michiana Area Council of Governments (MACOG), the duly designated Metropolitan Planning Organization for the South Bend and Elkhart/Goshen Transportation Management Area, has cooperated with local government units and implementing agencies, and coordinated with multi-modal interests and intermodal activities to the best of its ability in developing the 2010 ITS Strategic Plan and Architecture.

WHEREAS, the MACOG has used local input, obtained positive and negative public input and comment from groups and individuals, and has coordinated the activities of all area modes available.

BE IT THEREFORE RESOLVED, that the MACOG hereby adopts a Regional ITS Architecture for the South Bend and Elkhart/Goshen Urbanized Areas, and that the MACOG Policy Board finds that the 2010 ITS Strategic Plan and Architecture meets the requirements set forth in SAFETEA-LU and is hereby endorsed.

RESOLVED THIS 9th DAY OF JUNE, 2010.

MICHIANA AREA COUNCIL OF GOVERNMENTS



Ernest Wiggins, Chairman

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1. INTRODUCTION

1.1 Architecture Process – *What is ITS?*

Intelligent Transportation Systems (ITS) Architecture provide a common framework for planning, defining, and integrating intelligent transportation systems. This product shows regional cooperation in the ITS community which includes transportation engineers, highway departments, emergency management services, technology specialists, etc. The architecture defines:

- Functional requirements for ITS (i.e. gather traffic information)
- Physical entities where these functions reside (i.e. the field)
- Information flows and data flows that connect functions and physical entities together into an integrated system

An ITS Architecture describes which technologies are to be established, and how those systems are to be implemented. Different uses for the same technology can be applied within the framework of the architecture, which makes the architecture a guide for technological development.

ITS Architecture includes a flow chart that depicts how different transportation providers, government entities, businesses, media, and others, provide information and services to each other and to the traveling public. ITS planning should result in improvements to the region's incident detection, response time to traffic conditions using state-of-the-art technologies, and improved communication technologies. ITS primary goals are to improve the efficiency, reliability, communication and safety of our transportation systems through the deployment of these various technologies.



1.2 Project Overview

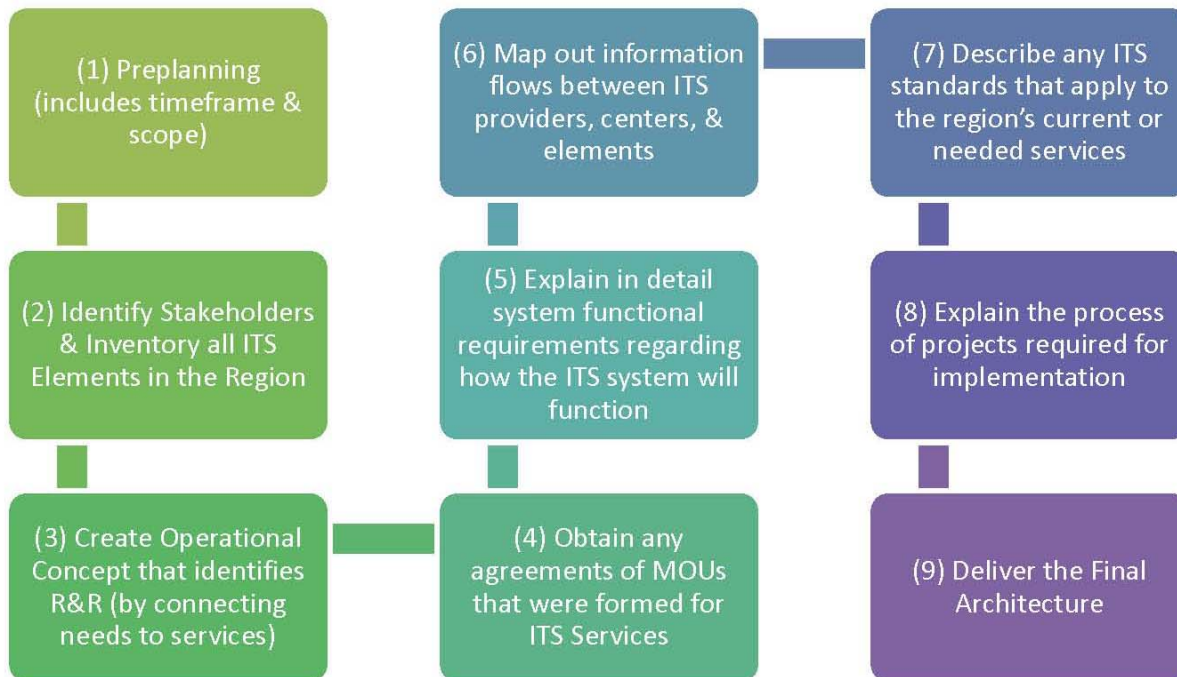
The MACOG ITS Architecture is a living document. It is flexible, changing when technologies upgrade or become obsolete. This architecture encompasses a ten year planning horizon. This allows for the deployment of the newest technologies and provides the flexibility to coordinate among stakeholders and agencies deploying these tools.

1.3 Federal Requirements

On January 8, 2001, the Federal Highway Administration (FHWA) and the Federal Transit Administration (FTA) issued final rules on the Intelligent Transportation System Architecture and Standards and National ITS Architecture Policy. The rules implement section 5206(e) of the Transportation Equity Act for the 21st Century. Compliance with the National Architecture is mandatory for urbanized areas. The joint rule required the

completion of an ITS Architecture by April 8, 2005, in order to be in compliance with the Final Rule.

The ITS rules required urbanized areas specify that all requirements henceforth shall be met:



Requirement (1) -Describe the region, timeframe, and service scope.

Requirement (2) -Identify all participating agencies and other stakeholders.

Requirement (3) -Include an operational concept that identifies the roles and responsibilities of participating agencies and stakeholder in the operation and implementation of the systems included in the regional ITS Architecture.

Requirement (4) -Any agreements required for operations, including at a minimum those affecting ITS project interoperability, utilization of ITS related standards, and the operation of the projects identified in the regional ITS Architecture.

Requirement (5) -System functional requirements. This section provides more detail regarding how the ITS system will function.

Requirement (6) -Interface requirements and information exchanges with planned and existing systems and subsystems.

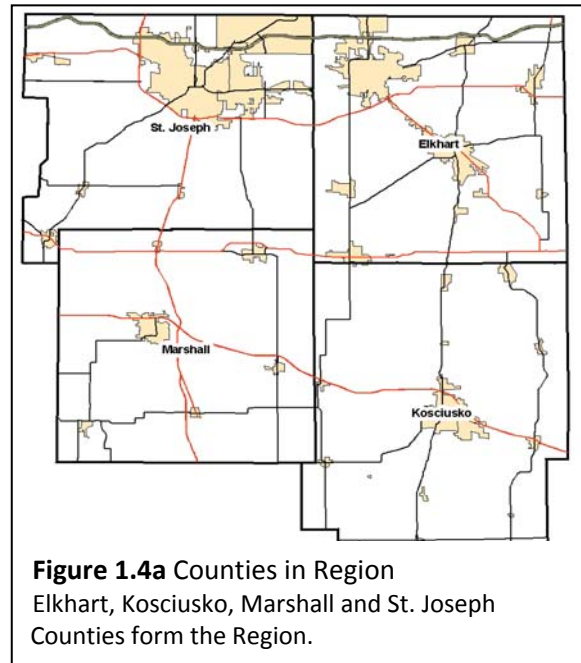
Requirement (7) -Identify ITS standards supporting regional national interoperability.

Requirement (8) -The process and sequence of projects required for implementation.

Requirement (9) -Deliver the Architecture.

1.4 Regional Background – The MACOG Region

The Michiana Area Council of Governments (MACOG) was organized under the 1964 Amendments to the Interlocal Cooperation Act of the Indiana General Assembly, Section 53-1101 to 53-1107 and the Urban Cooperation Act No. 7, Michigan Public Acts of 1967. Bylaws were adopted by the organization on December 2, 1970. The Michiana Area Council of Governments as a “council of governments” was organized to provide a forum for cooperation as well as to provide interaction between its member counties. Its original purpose was also to provide an entity that could apply for grants, administer programs and assist in the regional implementation of projects and planning activities.



Both the South Bend and the Elkhart-Goshen Urbanized Areas include portions of the state of Michigan. The South Western Michigan Plan Commission (SWMPC) is the designated Michigan MPO. MACOG and SWMPC cooperate in common area Bi-State Commission, which meets only to resolve bi-state issues, is in place by mutual agreement.

Figure 1.4b MACOG Populations Dist.

Elkhart County	
City of Elkhart	51,874
City of Goshen	29,383
City of Nappanee	6,710
Elkhart County Total	182,791
Kosciusko County	
City of Warsaw	12,415
Kosciusko County Total	74,057
Marshall County	
City of Plymouth	9,840
Marshall County Total	45,128
St. Joseph County	
City of South Bend	107,789
City of Mishawaka	46,557
St. Joseph County Total	265,559

The north central Indiana region as identified by MACOG and the Indiana Association of Regional Councils (IARC), includes, Elkhart, Kosciusko, Marshall and St. Joseph Counties. Elkhart, Kosciusko, Marshall and St. Joseph Counties are referred to as the Region. Figure 1.4a displays the Counties within the MACOG Region.

The MACOG Region is centrally located along the northern border of the State of Indiana. In total, the Region measures 1902.67 square miles. Figure 1.4b shows the population of the Cities and Towns and Counties in the Region, as according to the 2000 U.S. Census.

In 1973, MACOG became the Metropolitan Planning Organization (MPO) for the region's

urban counties. To date, MACOG provides regional transportation planning services in the Region. In addition to its responsibilities for transportation and infrastructure planning and implementation, MACOG operates two public transit services in Elkhart County. MACOG prioritizes Federal Transit Administration funding apportionments between the South Bend Public Transportation Corporation (TRANSPO), Niles Dial-A-Ride (Niles, Michigan) and the Northern Indiana Commuter Transportation District (NICTD). As part of its requirement as an MPO, MACOG conducts air quality conformity analysis on its transportation plans and programs and conducts a clean air public education program.

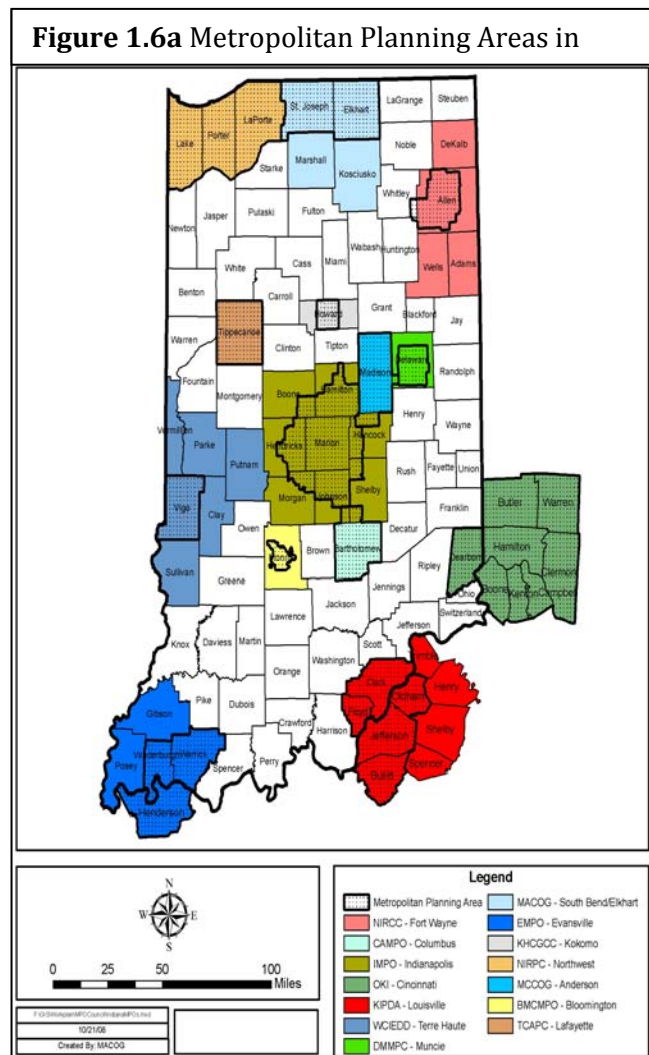
MACOG also staffs the St. Joseph River Basin Commission (SJRBC), which was formed through State enabling legislation in 1988. The SJRBC's core mission is to work to improve the water quality of the Basin as well as educate the public. The River Basin Commission is represented by its six Indiana member counties: Elkhart, Kosciusko, Lagrange, Noble, St. Joseph, and Steuben.

1.5 Public Outreach

Public outreach is a key activity of the success with the ITS Architecture. The Michiana Area Council of Governments (MACOG) organized an introductory workshop in September 2009 where stakeholders and champions were identified. Champions are leaders and drivers of ITS and Stakeholders are those willing and interested in participating. Needs and goals were identified from this meeting. Elements (inventory) were listed and agreed to by the stakeholders in our region. The MPO also met with the Indiana Department of Transportation (INDOT) and Federal Highway Administration (FHWA) to review past Architectures and set goals on what areas needed to be focused on in this update. The final Regional ITS Architecture is based on comments from the MPO, INDOT and FHWA.

1.6 ITS Development Process

The MACOG Regional ITS Architecture is developed by the MACOG Staff, working with all Stakeholders within the Region. The MACOG ITS Architecture is one of 14 Regional Architectures within the State of Indiana (as shown in Figure 1.6a).

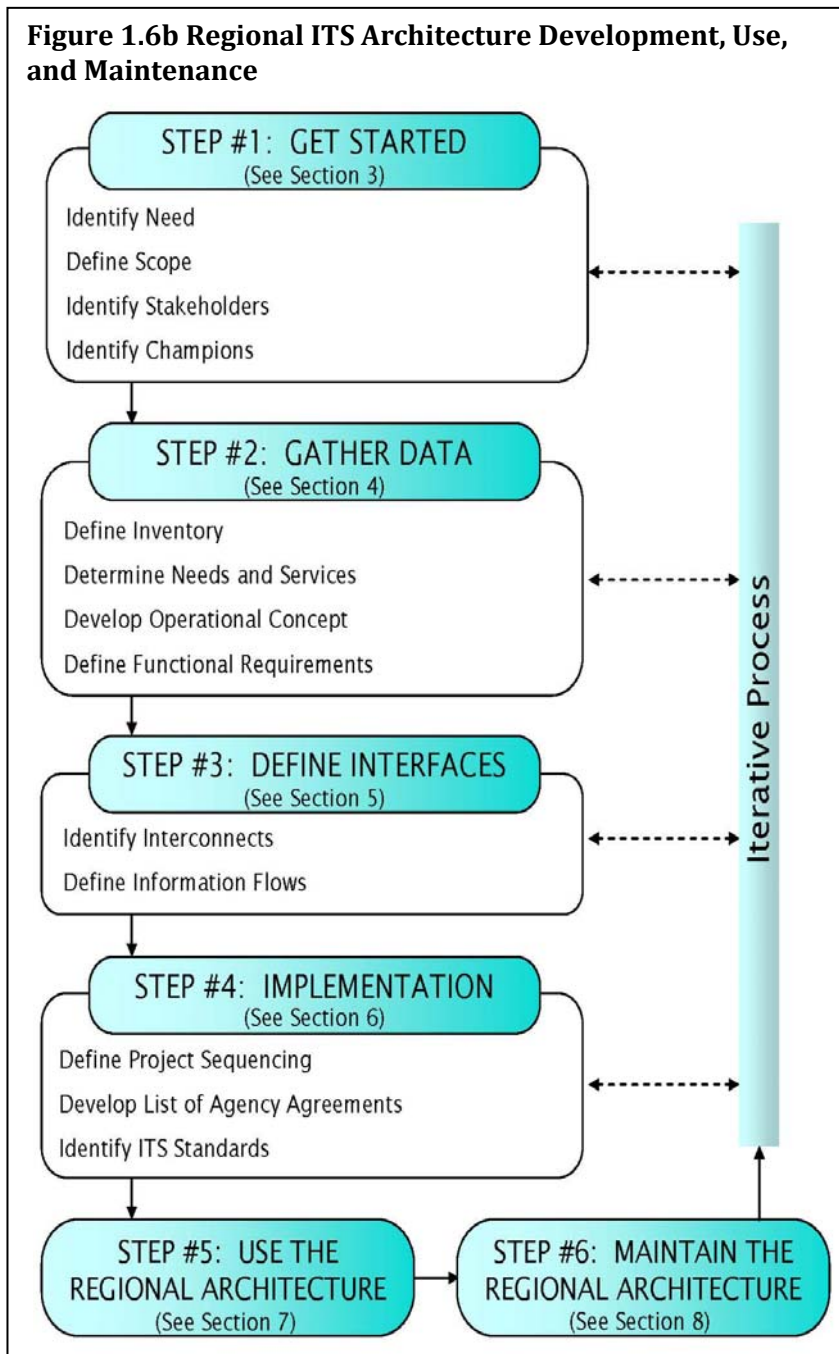


MACOG takes a structural approach to developing the Regional ITS Architecture. With the guidance of the Federal Highway Administration (FHWA), and input from Local Public Agencies (LPAs) within the MACOG area, the staff has assembled a group of Regional Stakeholders to take on the task of identifying needs and connections throughout the framework. The ITS Architecture and its narrative is a living document that will be flexible as new and changing technologies upgrade or become obsolete. The MACOG ITS Architecture covers a ten-year horizon. This allows for the deployment of the newest technologies and provides the flexibility to coordinate among

the stakeholders and agencies deploying these tools.

According to the U.S. Department of Transportation and the Federal Highway Administration, a regional architecture is developed with the following steps in mind. The MACOG Regional ITS Architecture starts with a workshop to get people involved. Stakeholder and Champions are identified at this workshop and the overall development effort is planned and explained to the champions. Once a plan is in place for constructing their input into an agreed upon document, the existing and planned ITS Systems within the region are inventoried, roles and responsibilities are developed, ITS Systems are defined and documented. Interfaces between the ITS Systems are defined and connections are made. At this point, ITS Standards and agreements between agencies are defined and entered into the software.

Figure 1.6b Regional ITS Architecture Development, Use, and Maintenance



The ITS Architecture will now be an effective tool for planning, programming, and project implementation. This tool will assist the MPO and other agencies in updating the Long Range Plan, the Transportation Improvement Program, and other existing plans. ITS Projects are programmed into the Architecture and provide guidance for project development. ITS Architecture improves consistency and strength in a project lifecycle. Figure 1.6b displays the Development Process is a six step process.

1.7 ITS Projects – Implementing ITS in the MACOG Region

The ITS Strategic Plan and Architecture will provide a regional blueprint for future ITS deployment in the MACOG Region. It is the intent of this document to aid governmental entities, project developers, decision-makers, and others in assuring that ITS elements are considered and coordinated so that the planned technological deployments meet the national ITS standards as they are procured.



The ITS Strategic Plan and Architecture also offers opportunities for improved and continuing regional linkages. As funding becomes available, the various ITS deployments will be rolled out and accomplished allowing the region to employ the newest technologies in improving traveler communication, managing congestion and providing safety and efficiency in the region transportation systems. See Appendix A for planned ITS Projects in the MACOG Region from 2010 – 2020.

2. CUSTOMIZING ARCHITECTURE

2.1 Scope

The scope of this document will include a wide-range of ITS projects and opportunities throughout the MACOG Region. The five objectives for the Region are addressed and developed through the Regional ITS Architecture. The five objectives are to: (1) define an architecture scope and inventory systems, (2) define needs and services, (3) generate the regional architecture, (4) conduct outreach to validate the architecture, and (5) finalize the Regional ITS Architecture. The ITS Architecture includes statewide projects that affect the region. These five objectives have been identified and developed by champions.

2.2 Regional Stakeholders

This section of the document identifies diverse stakeholders in terms of agencies and specific individuals in those agencies responsible for policy and operations. Agencies were selected by assessing their relation towards transportation systems. Specific departments within the stakeholders were classified as elements (which will be discussed in 3.1). Departments that did not have direct links within flows were included in the description of stakeholders within the Turbo software but not included as its own element (for example, planning departments); these departments are a part of the LPA management, but do not have an active function of transportation. Some stakeholders were grouped together because they have associated architecture inventory elements.

These stakeholders are represented with a group icon. A list of all regional stakeholders can be located in Appendix B.



Single Stakeholder Icon



Group Stakeholder Icon

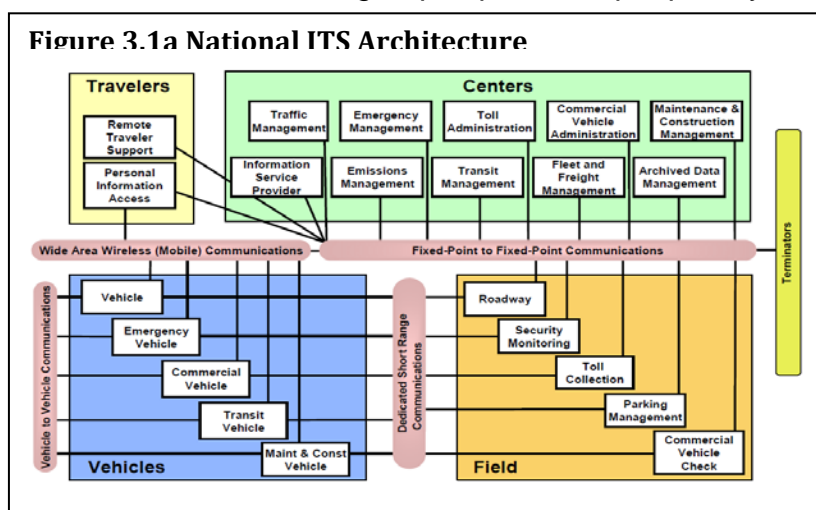
2.3 Regional Needs

Needs are defined as services that each element can provide to others. Needs from the Region were identified by Stakeholders at the Kick-Off Workshop held in June 2009. The needs identified provided guidance for determining which market packages should be included in the architecture. Stakeholders identified ITS needs for the MACOG Region in the following areas: traffic management, emergency management, maintenance and construction management, transit operations, traveler information, and archived data management. This information is used to program the Architecture.

3. REGIONAL ITS ARCHITECTURE

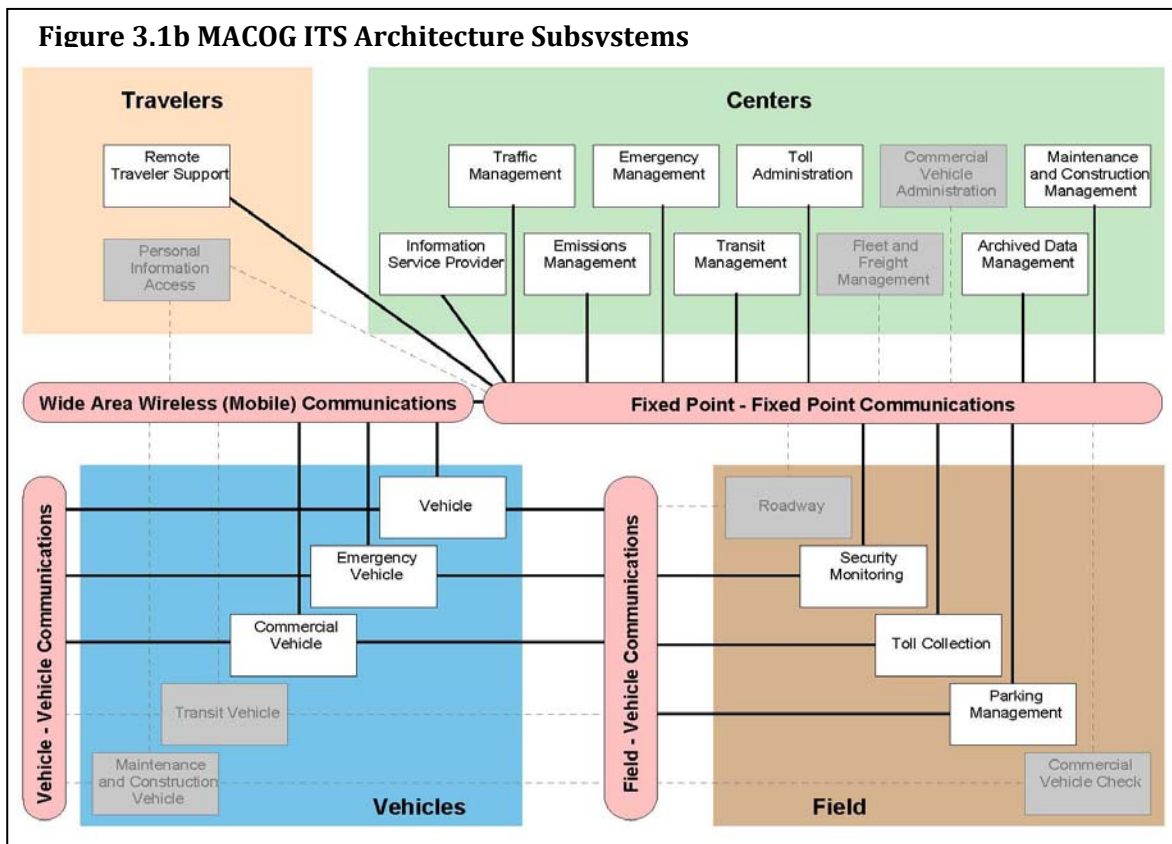
3.1 Inventory

Inventory is a listing of compiled elements within the MACOG Region. Elements in this ITS Architecture are defined as departments within an entity that possess the ability to utilize, own, or use ITS services and/or projects. Subsystems and terminators within the Architecture are used to customize the National Architecture and format the software to fit the needs of the MACOG Region. Subsystem and terminators are entities that represent systems within ITS. Subsystems are the foundation of the Architecture; this group includes centers, field, vehicles, and travelers. Terminators define the boundary of an Architecture; this group represents people, systems, other related facilities, and



environmental conditions that are outside of the Regional ITS but still interact with subsystems. Flow charts or 'sausage diagrams' represent how these four subsystems interact with each other, with terminators, and what inventory is included in each subsystem. Each subsystem and terminator is grouped under at least one stakeholder.

Figure 3.1a shows an example of the National ITS Architecture subsystems. The MACOG ITS Architecture subsystems are similar to the National example above. The MACOG subsystems are shown below in Figure 3.1b. Some of the MACOG subsystems have been grayed out. The MACOG Architecture was organized by Local Public Agencies (LPAs). The LPAs were categorized as stakeholders while each LPA included several different departments within the entity, which are categorized as elements. Equipment was omitted from the elements; however, they will be included in the ITS future projects appendix.



3.2 Services – Market Packages

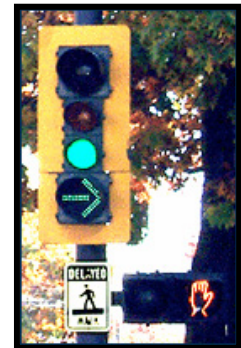
A market package collects together several different subsystems, equipment packages, terminators, and architecture flows that provide a specific service. Each market package includes physical and logical architecture components that fit the user service relationships, addresses transportation problems, and supports ITS Goals. Market packages are grouped together into eight (8) service areas which include: Archived Data Management, Public Transportation, Traveler Information, Traffic Management, Vehicle Safety, Commercial Vehicle Operations, Emergency Management, and Maintenance & Construction Management. Figure 3.2a shows an example of what included in a Market Package; APTS03 – Demand Response Transit Operations. Forty-eight (48) market packages of the ninety-one (91) that are supplied by the Federal Highway Administration (FHWA) were selected for implementation within the MACOG Region. In many cases there will be multiple stakeholders in the Region that provide the same service on different levels. The market packages are identified as existing or

planned for each stakeholder within the MACOG region. The MACOG Region has customized market packages that apply in a more logical order for this type of area. Customized market packages are available in Appendix C. This attachments shows that market packages that tailor to the MACOG Region and descriptions of each market package, in addition to what elements are associated with what market package.

All ninety-one (91) market packages are organized by service area and are provided on the National ITS Architecture website. The 91 market packages can also be seen in Appendix D, which shows service areas, market packages, a breakdown of what market packages the MACOG Region selected, ITS goals, and how each market package helps achieve the specific ITS goals that are displayed. The ITS goals that the national architecture and the MACOG architecture strive to achieve are: increase transportation system efficiency, enhance mobility, improve safety, reduce fuel consumption and environmental cost, increase economic productivity, and create an environment for the ITS Market. Appendix D displays how the market packages are involved in advancing the ITS goals identified by the US DOT. As the MACOG Regional architecture develops, these ITS goals will be at the forefront of decision making to make sure we are evaluating and selecting the most fitting intelligent transportation services, equipment, and systems for our unique region.

3.3 Operational Concepts & Requirements

The detailed description of the ITS system explains the roles and responsibilities of key stakeholders. Concepts are made up of major system elements and the relationship to each other. Within the MACOG ITS Architecture, these concepts have been categorized into eight (8) major areas. These eight categories are the service areas of Intelligent Transportation Systems as defined by the Research and Innovative Technology Administration (RITA). These categories are: archived data management, public transportation, traveler information, traffic management, vehicle safety, commercial vehicle operations, emergency management, and maintenance & construction management.



Roles and responsibilities are the definitions of what ITS should do from the user's perspective. A broad range of users (or stakeholders) must be considered while addressing roles and responsibilities (R&R). R&R of each stakeholder include their functions in developing, operating, and maintaining these ITS systems and how they will coordinate throughout the region. A full list of R&R for the MACOG Region can be found in Appendix E.

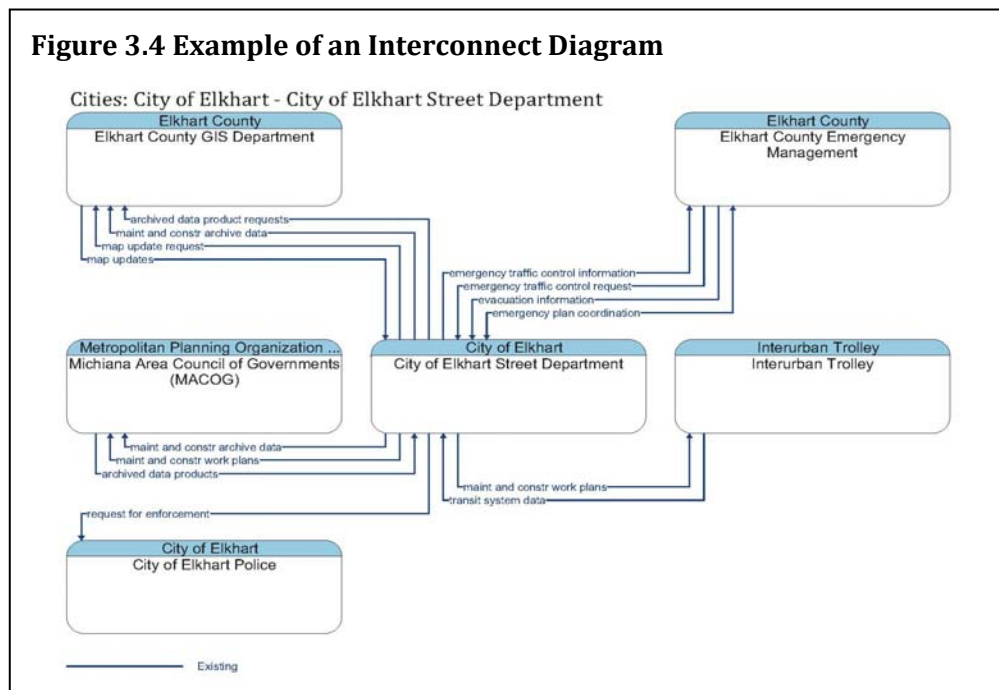
3.4 Interfaces

Interfaces are between elements (which include subsystems and terminators) and represent data exchange between these elements. Subsystems and terminators define the physical architecture and provide classification of the various systems within the architecture. Subsystems are associated with specific stakeholders and can include center systems, field components, vehicle equipment, and traveler devices. The term 'interfaces' is interchangeable with the term 'flow'. Interfaces of all element connections are identified in the Architecture as existing or planned. Interfaces between elements show how each element integrates and communicates with other elements. Interconnect diagrams representing the MACOG Architecture for the entire Region can be viewed in Appendix F. Each element is mapped and the Architecture shows where elements interface. Element connections can be illustrated in an interconnect diagram (see Figure 3.4). Each box with a blue header represents an element within the system, while the blue lines represent the interfaces, or flows, between the elements. Flow definitions can be viewed as Appendix G.

4. APPLICATION OF ARCHITECTURE

4.1 Standards

The Architecture promotes adherence to consistent and uniform standards across the Region. ITS Standards are the industry standards that define how pieces of your Architecture will operate within the framework given. As ITS projects are submitted to the Architecture, an INDOT SEA Check List Form will be completed. This check form will allow for reference documents (or standards) to be sighted, thus these standards will be inputted into the Architecture. To ensure different entities can work together, systems must be designed according to specific standards. An interoperable system provides increased communication between stakeholders, a faster response rate,



improved safety, and reductions in congestion.

To provide uniform ITS deployments throughout the region and the nation, ITS deployment standards have been developed. The USDOT's ITS Standards Program is working in conjunction with development organizations to establish a national collection of ITS standards. The standards have been defined for the MACOG Regional ITS Architecture and are included in this document as Appendix H. The following organizations oversee or participate in ITS Standard Development:

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

4.2 Agreements

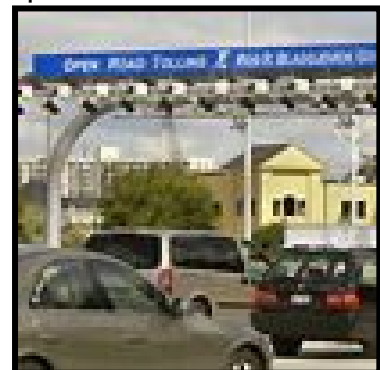
Agreements were determined based on flows within the region. The Architecture has identified interfaces, information exchange, and the interoperability required to provide functional ITS systems in the MACOG Region. Agreements should be general and not very detailed on the subject of technology. The agreements are to focus on responsibilities within the agencies. Agreements will vary from stakeholder to stakeholder. Agreement types can vary from a handshake, to a memorandum of understanding (MOU), to an Interagency Agreement. Agency agreements made throughout the MACOG Region can be found in Appendix J.

5. STRATEGIC PLAN MAINTENANCE

5.1 Maintenance

The Regional ITS Architecture is a living document that will be updated periodically. The FHWA/FTA has emphasized the importance of this step in its Final Rule/Final Policy, stating that "The 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." MACOG's Regional Architecture will be updated to reflect the new ITS priorities and strategies as they emerge.

The MACOG will be responsible for updating the Regional ITS Strategic Plan and Architecture in coordination with the MACOG 2035 Transportation Plan. Although MACOG is responsible for heading the maintenance effort, all stakeholders will participate in the process. Coordination and consensus of the



stakeholders is an important part of the success behind the Regional ITS Architecture and Strategic Plan. The goal of maintaining architecture is to keep an up-to-date snapshot of regional ITS architecture that is accessible for deploying ITS in the MACOG Region. A major update will occur every five (5) years. A major update will include reviewing and updating both the ITS Architecture and the ITS Strategic Plan. Minor updates will occur as needed.

Minor updates will occur on an “as needed” basis to maintain the architecture as a useful planning tool. When a change is required, an Architecture Maintenance Update Form is to be completed and submitted to the Architecture Maintenance Contact at MACOG whenever a change to the architecture is proposed. Minor updates would include changes such as: updating project status, add/removing project as needed, updating market packages, add/remove stakeholder, add/remove element, etc. When adding a project to the ITS Architecture, the INDOT SEA Check List Form is required to be in compliance with federal highway (located in Appendix K). Stakeholders are authorized to submit changes to the ITS Architecture. The MACOG will review and accept the proposed change and update the ITS Strategic Plan, ITS Architecture, and Long Range Plan (if applicable). When a major update is performed, all minor updates will be included. Minor updates, in addition to major updates, will be presented before both the Transportation Technical Advisory Committee (TTAC) and the MACOG Policy Board for approval into the Architect.

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APPENDIX A

ITS PROJECTS 2010 - 2020

Planned ITS Projects 2010 - 2020

Elkhart County	Implementation Year
Elkhart County Emergency Management	
•Fiber or Broadband Internet	On-going
Elkhart County/City Dispatch Centers	
•Common communication channels between centers	2010
Elkhart County/City/Town Police Departments	
•Mobile Computing Devices in Vehicles for access to online databases and reporting capabilities	On-going
•Automatic Vehicle Locators	On-going
Elkhart County/City/Town Fire Departments	
•Automatic Vehicle Locators	On-going
•Mobile Computing Devices in Vehicles for access to online databases	On-going
Elkhart County/City/Town Public Works Departments	
•Automatic Vehicle Locator Equipment for Maintenance Vehicle Tracking	2015
•Remote weather information systems installation for improved snow removal capabilities	2015
•Implementation of signal pre-emption devices	On-going
•Network municipal facilities with fiber optic cable	On-going
•Use of V/DMS for traffic control at large special events	On-going
•Fiber Optic Traffic Signal Interconnects	On-going
Indiana State Police	Implementation Year
•Implementation of statewide 800 Mhz radio system	On-going
•Mobile Computing Devices in Vehicles for access to online databases and reporting capabilities	On-going
Indiana Department of Transportation	Implementation Year
•Implementation of Electronic Toll Collection	2015
•Roadside sensors to collect real-time travel speeds to provide congestion information	2015
•Implement Indiana 511 Traveler Information System	2015
•Implementation of program to install sensors on maintenance vehicles to monitor road conditions	2015
•Video monitoring of work zones for intrusions, safety and speeds	2015
•Power, Communications, and Fiber Cables / Conduit, Signal Interconnection	On-going
Interurban Trolley	Implementation Year
•Implement automated system to provide passengers with real-time transit information via various sources	2012
•Implementation of a vehicle management system	2015



Planned ITS Projects 2010 - 2020



Kosciusko County	Implementation Year
Kosciusko County Emergency Management •Fiber or Broadband Internet	On-going
Kosciusko County/City/Town Dispatch Centers •Development of 800Mhz radio system Countywide	2015
•Implementation of Computer Aided Dispatch System	2010
Kosciusko County/City/Town Police Departments •Mobile Computing Devices in Vehicles for access to online databases and reporting capabilities	On-going
•Automatic Vehicle Locators	On-going
Kosciusko County/City/Town Fire Departments •Automatic Vehicle Locators	On-going
•Mobile Computing Devices in Vehicles for Access to online databases	On-going
Kosciusko County •Security Cameras in the parks and along the trails	2015
MACOG - Michiana Area Council of Governments	Implementation Year
•Network municipal facilities with fiber optic cable	On-going
Marshall County	Implementation Year
Marshall County Emergency Management •Fiber or Broadband Internet	On-going
Marshall County/City/Town Dispatch Centers •Common communication channels between centers	2015
•Development of 800Mhz radio system Countywide	2015
•Implementation of Computer Aided Dispatch System	2010
•Communication to Maintenance and Construction operations for response assistance	2015
•Completion of EPIX system (includes 9 wireless towers)	2010
Marshall County/City/Town Police Departments •Mobile Computing Devices in Vehicles for access to online databases and reporting capabilities	On-going
•Automatic Vehicle Locators	On-going
Marshall County/City/Town Fire Departments •Automatic Vehicle Locators	On-going
•Mobile Computing Devices in Vehicles for Access to online databases	On-going
Marshall County/City/Town Public Works Departments •Implementation of signal pre-emption devices	On-going
•Fiber Optic Traffic Signal Interconnects	On-going
•Network municipal facilities with fiber optic cable	On-going
•Use of V/DMS for traffic control at large special events	On-going
Media	Implementation Year
•Provide broadcast information from Borman TMC, Indiana 511 System, and other information providers to traveling public	On-going

Planned ITS Projects 2010 - 2020	
Northern Indiana Commuter Transportation District	Implementation Year
•Implementation of fiber optic based dispatching and tracking system	2015
•Installation of on-board vehicle video security systems	2015
•Implementation of a fare and passenger management system	2015
Regional Medical Facilities	Implementation Year
Development of systems capable of keeping electronic patient records	2015
Implementation of system for automated facility status and availability	2015
St. Joseph County	Implementation Year
St. Joseph County/City/Town Dispatch Centers	
•Common communication channels between centers	2015
•Communication to Maintenance and Construction operations for response assistance	2015
•Development of 800Mhz radio system Countywide	2015
St. Joseph County Emergency Management	
•Fiber or Broadband Internet	On-going
St. Joseph County/City/Town Police Departments	
•Implementation of Downtown South Bend CCTV safety monitoring system	2005 - On-going
•Mobile Computing Devices in Vehicles for access to online databases and reporting capabilities	On-going
•Use of V/DMS for traffic control and monitoring	On-going
•Automatic Vehicle Locators	On-going
St. Joseph County/City/Town Fire Departments	
•Automatic Vehicle Locators	On-going
•Mobile Computing Devices in Vehicles for Access to online databases	On-going
St. Joseph County/City/Town Public Works Departments	
•Automatic Vehicle Locator Equipment for Maintenance Vehicle Tracking	On-going
•Remote weather information systems installation for improved snow removal capabilities	On-going
•Implementation of signal pre-emption devices	On-going
•Use of V/DMS for traffic control at large special events	On-going
•Fiber Optic Traffic Signal Interconnects	On-going
•Network municipal facilities with fiber optic cable	On-going
TRANSP0	Implementation Year
•Implement system to provide passengers with real-time transit information via various sources	2015
Traveling Public	Implementation Year
•Use of Indiana 511 System to find less congested routes	On-going
•Use of personal communication devices to report incidents	On-going
Weather Services	Implementation Year
•Provide real-time weather information to Indiana 511 system	On-going

APPENDIX B

STAKEHOLDERS & ELEMENTS

Stakeholder Group 	Stakeholder 	Elements
Cities	City of Elkhart	Dispatch
		Police
		Street Department
	City of Goshen	Police
		Street Department
	City of Mishawaka	Dispatch
		Police
		Street Department
	City of Nappanee	Dispatch
		Police
		Street Department
	City of Plymouth	Dispatch
		Police
		Street Department
	City of South Bend	Dispatch
		Police
		Street Department
	City of Warsaw	Police
		Street Department
Counties	Elkhart County	Elkhart County 4-H Fair
		Dispatch
		Emergency Management
		GIS Department
		Highway Department
		Sherriff
	Kosciusko County	Communications Center
		Emergency Management
		GIS Department
		Highway Department
		Sherriff
	Marshall County	Blueberry Festival
		Emergency Management
		GIS Department
		Highway Department
		Sherriff
	St. Joseph County	Sherriff Dept 911 Center
		Emergency Management
		GIS Department
		Highway Department
		Dispatch
		Sherriff

Stakeholder Group 	Stakeholder 	Elements
Hospitals	Community Hospital of Bremen	Community Hospital of Bremen
	Elkhart General Hospital	Elkhart General Hospital
	Goshen General Hospital	Goshen General Hospital
	Kosciusko Community Hospital	Kosciusko Community Hospital
	Memorial Hospital of South Bend	Memorial Hospital of South Bend
	St. Joseph Regional Medical Center (Mishawaka)	St. Joseph Regional Medical Center (Mishawaka)
	St. Joseph Regional Medical Center (Plymouth)	St. Joseph Regional Medical Center (Plymouth)
	Indiana Dept of Environmental Management (IDEM)	Indiana Dept of Environmental Management (IDEM)
	Indiana Dept of Transportation (INDOT)	Borman Traffic Management Center
		Indianapolis Traffic Management Center
		INDOT - Ft Wayne District
		INDOT - LaPorte District
	Indiana State Police	ISP - Bremen District
		ISP - Toll Road District
	Indiana Toll Road Concession Company (ITRCC)	Indiana Toll Road Concession Company (ITRCC)
	Metropolitan Planning Organization (MPO)	Michiana Area Council of Governments (MACOG)
	Northern Indiana Commuter Transportation District (NICTD)	Northern Indiana Commuter Transportation District (NICTD)
	Regional Information Providers	Area News Stations
		Internet Sources
		Local Radio Stations
	South Bend Regional Airport	South Bend Regional Airport
		South Bend Regional Airport TSA
Towns	Town of Argos	Police
	Town of Bourbon	Police
	Town of Bremen	Police
		Dispatch
		Street Department
	Town of Bristol	Police
	Town of Claypool	Police
	Town of Culver	Police
	Town of La Paz	Police
	Town of Lakeville	Police
	Town of Mentone	Police

Stakeholder Group 	Stakeholder 	Elements
Towns	Town of Middlebury	Police
	Town of Milford	Police
	Town of Millersburg	Police
	Town of New Carlisle	Police
	Town of North Liberty	Police
	Town of North Webster	Police
	Town of Osceola	Police
	Town of Pierceton	Police
	Town of Roseland	Police
	Town of Silver Lake	Town Marshall
	Town of Syracuse	Police
	Town of Wakarusa	Police
	Town of Walkerton	Police
		Dispatch
	Town of Winona Lake	Police
		Street Department
Transit Systems	Heart City Rider/Goshen Transit Service	Goshen Transit
		Heart City Rider
	Interurban Trolley	Interurban Trolley
	Kosciusko Area Bus Service (KABS) City Bus	Kosciusko Area Bus Service (KABS) City Bus
	Marshall County Council on Aging (COA)	Rock City Rider
	South Bend Public Transportation Corporation (SBPTC)	TRANSPO
	Traveling Public	Private Vehicles
	University of Notre Dame	Dispatch
		Police
		Special Events

APPENDIX C

CUSTOMIZED MARKET PACKAGES

Market Package	Market Package Name	Description / Purpose of Market Package	Elements Included in Market Packages
ARCHIVED DATA MANAGEMENT			
AD1	ITS Data Mart	Provides a focused archive that houses data collected and owned by a single agency, district, private sector provider, research institution, or other organization.	Elkhart County GIS Department, Kosciusko County GIS Department, Marshall County GIS Department, St. Joseph County GIS Department, Indiana Department of Environmental Management (IDEM), INDOT - Ft. Wayne District, INDOT - LaPorte District, Michiana Area Council of Governments (MACOG)
AD2	ITS Data Warehouse	Includes all the data collection and management capabilities provided by the ITS Data Mart, and adds the functionality and interface definitions that allow collection of data from multiple agencies and data sources spanning across modal and jurisdictional boundaries.	Michiana Area Council of Governments (MACOG)
PUBLIC TRANSPORTATION			
APTS01	Transit Vehicle Tracking	Monitors current transit vehicle location using an Automated Vehicle Location System.	Goshen Transit, Heart City Rider, Interurban Trolley, TRANSPO
APTS02	Transit Fixed-Route Operations	Performs automated dispatch and system monitoring for fixed-route and flexible-route transit services.	Interurban Trolley, TRANSPO
APTS03	Demand Response Transit Operations	Performs automated dispatch and system monitoring for demand responsive transit services.	Goshen Transit, Heart City Rider, Kosciusko Area Bus Service (KABS) City Bus, Rock City Rider, TRANSPO
APTS04	Transit Fare Collection Management	Manages transit fare collection on-board transit vehicles and at transit stops using electronic means.	TRANSPO
APTS05	Transit Security	Provides for the physical security of transit passengers and transit vehicle operators through the use of surveillance equipment.	Interurban Trolley, Northern Indiana Commuter Transportation District (NICTD), TRANSPO, South Bend Regional Airport TSA
APTS07	Multi-modal Coordination	Establishes two way communications between multiple transit and traffic agencies to improve service coordination.	Interurban Trolley, TRANSPO, South Bend Regional Airport

Market Package	Market Package Name	Description / Purpose of Market Package	Elements Included in Market Packages
PUBLIC TRANSPORTATION			
APTS08	Transit Traveler Information	Provides transit users at transit stops and on-board transit vehicles with ready access to transit information.	Interurban Trolley, TRANSPO, Northern Indiana Commuter Transportation District (NICTD)
TRAVELER INFORMATION			
ATIS01	Broadcast Traveler Information	Collects traffic conditions, advisories, general public transportation, toll and parking information, incident information, roadway maintenance and construction information, air quality and weather information, and broadcasts the information to travelers using technologies such as FM subcarrier, satellite radio, cellular data broadcasts, and Internet web casts.	Area News Stations, Internet Sources, Local Radio Stations, South Bend Regional Airport
ATIS02	Interactive Traveler Information	Provides tailored information in response to a traveler request.	Area News Stations, Internet Sources
ATIS03	Autonomous Route Guidance	Relies on in-vehicle sensory, location determination, computational, map database, and interactive driver interface equipment to enable route planning and detailed route guidance based on static, stored information.	Private Vehicles
ATIS05	ISP Based Trip Planning and Route Guidance	Offers the user trip planning and en-route guidance services.	Goshen Transit, Heart City Rider, Private Vehicles
TRAFFIC INFORMATION			
ATMS01	Network Surveillance	Includes traffic detectors, other surveillance equipment, the supporting field equipment, and fixed-point to fixed-point communications to transmit the collected data back to the Traffic Management Subsystem.	Elkhart County Highway Department, Kosciusko County Highway Department, Marshall County Highway Department, St. Joseph County Highway Department

Market Package	Market Package Name	Description / Purpose of Market Package	Elements Included in Market Packages
TRAFFIC INFORMATION			
ATMS03	Surface Street Control	Provides the central control and monitoring equipment, communication links, and the signal control equipment that support local surface street control and/or arterial traffic management.	City of Elkhart Street Department, City of Goshen Street Department, City of Mishawaka Street Department, City of Plymouth Street Department, City of South Bend Street Department, City of Warsaw Street Department, Elkhart County Highway Department, Kosciusko County Highway Department, Marshall County Highway Department, St. Joseph County Highway Department
ATMS04	Freeway Control	Provides central monitoring and control, communications, and field equipment that support freeway management.	Borman Traffic Management Center, Indiana Toll Road Concession Company (ITRCC), Indianapolis Traffic Management Center
ATMS06	Traffic Information Dissemination	Provides driver information using roadway equipment such as dynamic message signs or highway advisory radio.	City of Elkhart Street Department, City of Goshen Street Department, City of Mishawaka Street Department, City of Plymouth Street Department, City of South Bend Street Department, City of Warsaw Street Department, Elkhart County Highway Department, Kosciusko County Highway Department, Marshall County Highway Department, St. Joseph County Highway Department, INDOT - Ft Wayne District, INDOT - LaPorte District, Indiana Toll Road Concession Company (ITRCC)
ATMS07	Regional Traffic Management	Provides for the sharing of traffic information and control among traffic management centers to support regional traffic management strategies including coordinated signal control in a metropolitan area and coordination between freeway operations and arterial signal control within a corridor.	Borman Traffic Management Center, Indianapolis Traffic Management Center
ATMS08	Traffic Incident Management System	Manages both unexpected incidents and planned events so that the impact to the transportation network and traveler safety is minimized.	Elkhart County 4-H Fair, Marshall County Blueberry Festival, University of Notre Dame Special Events
ATMS09	Traffic Decision Support and Demand Management	Recommends courses of action to traffic operations personnel based on an assessment of current and forecast road network performance.	Borman Traffic Management Center, Indianapolis Traffic Management Center, Indiana Department of Environmental Management (IDEM), Michiana Area Council of Governments (MACOG)
ATMS10	Electronic Toll Collection	Provides toll operators with the ability to collect tolls electronically and detect and process violations.	Indiana Toll Road Concession Company (ITRCC)

Market Package	Market Package Name	Description / Purpose of Market Package	Elements Included in Market Packages
TRAFFIC INFORMATION			
ATMS11	Emissions Monitoring and Management	Monitors individual vehicle emissions and provides general air quality monitoring using distributed sensors to collect the data.	Indiana Department of Environmental Management (IDEM), Michiana Area Council of Governments (MACOG)
ATMS16	Parking Facility Management	Provides enhanced monitoring and management of parking facilities.	South Bend Regional Airport, University of Notre Dame Special Events
ATMS19	Speed Monitoring	Monitors and responds to the speeds of vehicles traveling through a roadway system via roadside equipment.	Town of Argos Police, Town of Bourbon Police, Town of Bremen Police, Town of Bristol Police, Town of Claypool Police, Town of Culver Police, Town of La Paz Police, Town of Lakeville Police, Town of Mentone Police, Town of Middlebury Police, Town of Milford Police, Town of Millersburg Police, Town of New Carlisle Police, Town of North Liberty Police, Town of North Webster Police, Town of Osceola Police, Town of Pierceton Police, Town of Roseland Police, Town of Silver Lake Town Marshall, Town of Syracuse Police, Town of Wakarusa Police, Town of Walkerton Police, Town of Winona Lake Police, City of Elkhart Police, City of Goshen Police, City of Mishawaka Police, City of Nappanee Police, City of Plymouth Police, City of South Bend Police City of Warsaw Police, University of Notre Dame Police, Elkhart County Sheriff, Kosciusko County Sheriff, Marshall County Sheriff, St. Joseph County Sheriff, Indiana State Police - Bremen District, Indiana State Police - Toll Road District, Indiana Toll Road Concession Company (ITRCC), South Bend Regional Airport
ATMS21	Roadway Closure Management	Closes roadways to vehicular traffic when driving conditions are unsafe, maintenance must be performed, and other scenarios where access to the roadway must be prohibited.	City of Elkhart Street Department, City of Goshen Street Department, City of Mishawaka Street Department, City of Nappanee Street Department, City of Plymouth Street Department, City of South Bend Street Department, City of Warsaw Street Department, Elkhart County Highway Department, Kosciusko County Highway Department, Marshall County Highway Department, St. Joseph County Highway Department, Indiana Dept of Transportation (INDOT) - Ft Wayne District, Indiana Dept of Transportation (INDOT) - LaPorte District, Indiana Toll Road Concession Company (ITRCC)

Market Package	Market Package Name	Description / Purpose of Market Package	Elements Included in Market Packages
VEHICLE SAFETY			
AVSS01	Vehicle Safety Monitoring	Diagnoses critical components of the vehicle and warn the driver of potential dangers.	Private Vehicles
AVSS03	Longitudinal Safety Warning	Allows for longitudinal warning by utilizing safety sensors and collision sensors.	Private Vehicles
AVSS04	Lateral Safety Warning	Allows for lateral warning by utilizing safety sensors and collision sensors.	Private Vehicles
AVSS06	Pre-Crash Restraint Deployment	Provides in-vehicle sensors and on-board communications to monitor the vehicle's local environment, determine collision probability and deploy a pre-crash safety system.	Private Vehicles
AVSS07	Driver Visibility Improvement	Enhances driver visibility using an enhanced vision system via on-board display hardware.	Private Vehicles
COMMERCIAL VEHICLE OPERATORS			
CVO10	HAZMAT Management	Integrates incident management capabilities with commercial vehicle tracking to assure effective treatment of HAZMAT material and incidents.	Private Vehicles
CVO12	CV Driver Security Authentication	Provides the ability for Fleet and Freight Management to detect when an unauthorized commercial vehicle driver attempts to drive their vehicle based on stored driver identity information.	Indiana State Police - Bremen District, Indiana State Police - Toll Road District
EMERGENCY MANAGEMENT			
EM01	Emergency Call-Taking and Dispatch	Provides basic public safety call-taking and dispatch services.	City of Elkhart Dispatch, City of Mishawaka Dispatch, City of Nappanee Dispatch, City of Plymouth Dispatch, City of South Bend Dispatch, Elkhart County Dispatch, Kosciusko County Communications Center, Marshall County Sheriff Dept 911 Center, St. Joseph County Dispatch, University of Notre Dame Dispatch, Town of Bremen Dispatch, Town of Walkerton Dispatch
EM02	Emergency Routing	Supports automated vehicle location and dynamic routing of emergency vehicles.	Community Hospital of Bremen, Elkhart General Hospital, Goshen General Hospital, Kosciusko Community Hospital, Memorial Hospital of South Bend, St. Joseph Regional Medical Center (Mishawaka), St. Joseph Regional Medical Center (Plymouth)

Market Package	Market Package Name	Description / Purpose of Market Package	Elements Included in Market Packages
EMERGENCY MANAGEMENT			
EM03	Mayday and Alarms Support	Allows the user (driver or non-driver) to initiate a request for emergency assistance and enables the Emergency Management Subsystem to locate the user, gather information about the incident, and determine the appropriate response.	Private Vehicles
EM04	Roadway Service Patrols	Supports roadway service patrol vehicles that monitor roads that aid motorists, offering rapid response to minor incidents (flat tire, accidents, out of gas) to minimize disruption to the traffic stream.	Town of Argos Police, Town of Bourbon Police, Town of Bremen Police, Town of Bristol Police, Town of Claypool Police, Town of Culver Police, Town of La Paz Police, Town of Lakeville Police, Town of Mentone Police, Town of Middlebury Police, Town of Milford Police, Town of Millersburg Police, Town of New Carlisle Police, Town of North Liberty Police, Town of North Webster Police Town of Osceola Police, Town of Pierceton Police, Town of Roseland Police, Town of Silver Lake Town Marshall, Town of Syracuse Police, Town of Wakarusa Police, Town of Walkerton Police, Town of Winona Lake Police, City of Elkhart Police, City of Goshen Police, City of Mishawaka Police, City of Nappanee Police, City of Plymouth Police, City of South Bend Police, City of Warsaw Police, University of Notre Dame Police, Elkhart County Sheriff, Kosciusko County Sheriff, Marshall County Sheriff, St. Joseph County Sheriff, Indiana State Police - Bremen District, Indiana State Police - Toll Road District
EM05	Transportation Infrastructure Protection	Includes the monitoring of transportation infrastructure (e.g., bridges, tunnels and management centers) for potential threats using sensors and surveillance equipment and barrier and safeguard systems to control access, preclude an incident, and mitigate the impact of an incident if it occurs.	Indiana Dept of Transportation (INDOT) - Ft Wayne District, Indiana Dept of Transportation (INDOT) - LaPorte District, Indiana State Police - Bremen District, Indiana State Police - Toll Road District, South Bend Regional Airport

Market Package	Market Package Name	Description / Purpose of Market Package	Elements Included in Market Packages
EMERGENCY MANAGEMENT			
EM06	Wide-Area Alert	Uses ITS driver and traveler information systems to alert the public in emergency situations such as child abductions, severe weather events, civil emergencies, and other situations that pose a threat to life and property. The alert includes information and instructions for transportation system operators and the traveling public, improving public safety and enlisting the public's help in some scenarios. The ITS technologies will supplement and support other emergency and homeland security alert systems such as the Emergency Alert System (EAS).	Borman Traffic Management Center, Indianapolis Traffic Management Center
EM07	Early Warning System	Monitors and detects potential, looming, and actual disasters including natural disasters and technological and man-made disasters (hazardous materials incidents, nuclear power plant accidents, and acts of terrorism including nuclear, chemical, biological, and radiological weapons attacks).	Area News Stations, Internet Sources, Local Radio Stations, South Bend Regional Airport TSA
EM08	Disaster Response and Recovery	Enhances the ability of the surface transportation system to respond to and recover from disasters.	Elkhart County Emergency Management, Kosciusko County Emergency Management, Marshall County Emergency Management, St. Joseph County Emergency Management, Community Hospital of Bremen, Elkhart General Hospital, Goshen General Hospital, Kosciusko Community Hospital, Memorial Hospital of South Bend, St. Joseph Regional Medical Center (Mishawaka), St. Joseph Regional Medical Center (Plymouth)
EM09	Evacuation and Reentry Management	Supports evacuation of the general public from a disaster area and manages subsequent reentry to the disaster area.	Elkhart County Emergency Management, Kosciusko County Emergency Management, Marshall County Emergency Management, St. Joseph County Emergency Management
EM10	Disaster Traveler Information	Uses ITS to provide disaster-related traveler information to the general public, including evacuation and reentry information and other information concerning the operation of the transportation system during a disaster.	City of Elkhart Dispatch, City of Mishawaka Dispatch, City of Nappanee Dispatch, City of Plymouth Dispatch, City of South Bend Dispatch, Elkhart County Emergency Management, Kosciusko County Emergency Management, Marshall County Emergency Management, St. Joseph County Emergency Management, Indiana Toll Road Concession Company (ITRCC), University of Notre Dame Dispatch

Market Package	Market Package Name	Description / Purpose of Market Package	Elements Included in Market Packages
MAINTENANCE AND CONSTRUCTION MANAGEMENT			
MC01	Maintenance and Construction Vehicle and Equipment Tracking	Tracks the location of maintenance and construction vehicles and other equipment to ascertain the progress of their activities.	City of Elkhart Street Department, City of Goshen Street Department, City of Mishawaka Street Department, City of Nappanee Street Department, City of Plymouth Street Department, City of South Bend Street Department, City of Warsaw Street Department, Elkhart County Highway Department, Kosciusko County Highway Department, Marshall County Highway Department, St. Joseph County Highway Department, Indiana Dept of Transportation (INDOT) - Ft Wayne District, Indiana Dept of Transportation (INDOT) - LaPorte District
MC04	Weather Information Processing and Distribution	Processes and distributes the environmental information collected from the Road Weather Data Collection market package.	Elkhart County Highway Department, Kosciusko County Highway Department, Marshall County Highway Department, St. Joseph County Highway Department, Borman Traffic Management Center, Indianapolis Traffic Management Center, Indiana Dept of Transportation (INDOT) - Ft Wayne District, Indiana Dept of Transportation (INDOT) - LaPorte District, Area News Stations, Internet Sources, Local Radio Stations
MC07	Roadway Maintenance and Construction	Supports numerous services for scheduled and unscheduled maintenance and construction on a roadway system or right-of-way.	City of Elkhart Street Department, City of Goshen Street Department, City of Mishawaka Street Department, City of Plymouth Street Department, City of South Bend Street Department, City of Warsaw Street Department, Elkhart County Highway Department, Kosciusko County Highway Department, Marshall County Highway Department, St. Joseph County Highway Department, Indiana Dept of Transportation (INDOT) - Ft Wayne District, Indiana Dept of Transportation (INDOT) - LaPorte District, Indiana Toll Road Concession Company (ITRCC)
MC08	Work Zone Management	Manages work zones, controlling traffic in areas of the roadway where maintenance, construction, and utility work activities are underway.	City of Elkhart Street Department, City of Goshen Street Department, City of Mishawaka Street Department, City of Plymouth Street Department, City of South Bend Street Department, City of Warsaw Street Department, Elkhart County Highway Department, Kosciusko County Highway Department, Marshall County Highway Department, St. Joseph County Highway Department, Indiana Toll Road Concession Company (ITRCC)

Market Package	Market Package Name	Description / Purpose of Market Package	Elements Included in Market Packages
MAINTENANCE AND CONSTRUCTION MANAGEMENT			
MC10	Maintenance and Construction Activity Coordination	Supports the dissemination of maintenance and construction activity to centers that can utilize it as part of their operations, or to the Information Service Providers who can provide the information to travelers.	City of Elkhart Street Department, City of Goshen Street Department, City of Mishawaka Street Department, City of Nappanee Street Department, City of Plymouth Street Department, City of South Bend Street Department, City of Warsaw Street Department, Elkhart County Highway Department, Kosciusko County Highway Department, Marshall County Highway Department, St. Joseph County Highway Department, Indiana Dept of Transportation (INDOT) - Ft Wayne District, Indiana Dept of Transportation (INDOT) - LaPorte District, Indiana Toll Road Concession Company (ITRCC), Northern Indiana Commuter Transportation District (NICTD), TRANSPO, Interurban Trolley

APPENDIX D

ITS MARKET PACKAGE GOALS

Market Package	Market Package Name	Increase Transportation System Efficiency	Enhance Mobility	Improve Safety	Reduce Fuel Consumption and Environmental Cost	Increase Economic Productivity	Create an Environment for an ITS Market
ARCHIVED DATA MANAGEMENT							
AD1	ITS Data Mart	**	**	**	**	**	***
AD2	ITS Data Warehouse	**	**	**	**	**	***
AD3	ITS Virtual Data Warehouse	**	**	**	**	**	***
PUBLIC TRANSPORTATION							
APTS01	Transit Vehicle Tracking	*	**		*	*	*
APTS02	Transit Fixed-Route Operations	*	**		*	*	*
APTS03	Demand Response Transit Operations	*	**		*	*	*
APTS04	Transit Fare Collection Management					**	*
APTS05	Transit Security			**			*
APTS06	Transit Fleet Management					*	*
APTS07	Multi-modal Coordination	*	*			*	
APTS08	Transit Traveler Information	*	**	*		*	*
APTS09	Transit Signal Priority	*	*				
APTS10	Transit Passenger Counting	*	*		*		
TRAVELER INFORMATION							
ATIS01	Broadcast Traveler Information	*	**		*		***
ATIS02	Interactive Traveler Information	**	***		*		***
ATIS03	Autonomous Route Guidance	**	***				***
ATIS04	Dynamic Route Guidance	**	***	*	*		***
ATIS05	ISP Based Trip Planning and Route Guidance	**	***	*	*		***
ATIS06	Transportation Operations Data Sharing	**	*	*		*	
ATIS07	Yellow Pages and Reservation	*					**
ATIS08	Dynamic Ridesharing	**	*		*		*
ATIS09	In Vehicle Signing		*	*			***
ATIS10	VII Traveler Information	*	**		*		***

Market Packages that are grayed out do not apply in the MACOG Region currently.

* Features that marginally satisfy the goal
 ** Features that almost satisfy every aspect of the goal
 *** Features completely satisfy every aspect of the goal

Market Package	Market Package Name	Increase Transportation System Efficiency	Enhance Mobility	Improve Safety	Reduce Fuel Consumption and Environmental Cost	Increase Economic Productivity	Create an Environment for an ITS Market
TRAFFIC MANAGEMENT							
ATMS01	Network Surveillance	*	*		*		*
ATMS02	Traffic Probe Surveillance	*	*		*		**
ATMS03	Surface Street Control	**	***	**	**		*
ATMS04	Freeway Control	**	***	*	**		*
ATMS05	HOV Lane Management	*	**		*		*
ATMS06	Traffic Information Dissemination	**	*		*		*
ATMS07	Regional Traffic Management	***	***	**	***		*
ATMS08	Traffic Incident Management System	**	**	**	***		*
ATMS09	Traffic Decision Support and Demand Management	**	**				*
ATMS10	Electronic Toll Collection					**	*
ATMS11	Emissions Monitoring and Management				***		**
ATMS12	Roadside Lighting System Control			**	**		
ATMS13	Standard Railroad Grade Crossing			***			*
ATMS14	Advanced Railroad Grade Crossing			***			*
ATMS15	Railroad Operations Coordination	*	*		*		*
ATMS16	Parking Facility Management	**			*	*	
ATMS17	Regional Parking Management	**	*		*		
ATMS18	Reversible Lane Management	**	*		*		
ATMS19	Speed Monitoring	**	*	***			*
ATMS20	Drawbridge Management	**	**	*		*	
ATMS21	Roadway Closure Management	*	**		*		*
VEHICLE SAFETY							
AVSS01	Vehicle Safety Monitoring			***			***
AVSS02	Driver Safety Monitoring			***			***
AVSS03	Longitudinal Safety Warning			***			***

Market Packages that are grayed out do not apply in the MACOG Region currently.

- * Features that marginally satisfy the goal
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- *** Features completely satisfy every aspect of the goal

Market Package	Market Package Name	Increase Transportation System Efficiency	Enhance Mobility	Improve Safety	Reduce Fuel Consumption and Environmental Cost	Increase Economic Productivity	Create an Environment for an ITS Market
VEHICLE SAFETY							
AVSS04	Lateral Safety Warning			***			***
AVSS05	Intersection Safety Warning			***			***
AVSS06	Pre-Crash Restraint Deployment			***			***
AVSS07	Driver Visibility Improvement			***			***
AVSS08	Advanced Vehicle Longitudinal Control	**	*	***			***
AVSS09	Advanced Vehicle Lateral Control	**	*	***			***
AVSS10	Intersection Collision Avoidance			***			***
AVSS11	Automated Vehicle Operations	***	***	***			***
AVSS12	Cooperative Vehicle Safety Systems			***			***
COMMERCIAL VEHICLE OPERATIONS							
CVO01	Fleet Administration		***	*		***	**
CVO02	Freight Administration		***			***	**
CVO03	Electronic Clearance	**	***			***	**
CVO04	CV Administrative Processes					**	*
CVO05	International Border Electronic Clearance	**	***			***	**
CVO06	Weigh-In-Motion	**	***			***	**
CVO07	Roadside CVO Safety	*	**	**		**	**
CVO08	On-board CVO and Freight Safety and Security			***		**	**
CVO09	CVO Fleet Maintenance	*		**		**	*
CVO10	HAZMAT Management	*		**		**	*
CVO11	Roadside HAZMAT Security Detection and Mitigation			*			*
CVO12	CV Driver Security Authentication			*			*
CVO13	Freight Assignment Tracking			*			*
EMERGENCY MANAGEMENT							
EM01	Emergency Call-Taking and Dispatch	*		***	*	**	*

Market Packages that are grayed out do not apply in the MACOG Region currently.

* Features that marginally satisfy the goal
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Market Package	Market Package Name	Increase Transportation System Efficiency	Enhance Mobility	Improve Safety	Reduce Fuel Consumption and Environmental Cost	Increase Economic Productivity	Create an Environment for an ITS Market
EMERGENCY MANAGEMENT							
EM02	Emergency Routing	*		***	*	**	*
EM03	Mayday and Alarms Support			***		*	**
EM04	Roadway Service Patrols	*		***	*	**	*
EM05	Transportation Infrastructure Protection			*			*
EM06	Wide-Area Alert			*			*
EM07	Early Warning System			*			*
EM08	Disaster Response and Recovery	*		*	*		
EM09	Evacuation and Reentry Management	*	*				
EM10	Disaster Traveler Information	*	*				
MAINTENANCE AND CONSTRUCTION MANAGEMENT							
MC01	Maintenance and Construction Vehicle and Equipment Tracking		*	**		**	*
MC02	Maintenance and Construction Vehicle Maintenance			**	*	**	
MC03	Road Weather Data Collection	**	*	***		**	*
MC04	Weather Information Processing and Distribution	**	*	***		**	**
MC05	Roadway Automated Treatment	*	*	***			*
MC06	Winter Maintenance	**	***	***	*	**	
MC07	Roadway Maintenance and Construction	*	*	*	*		
MC08	Work Zone Management	*			*	*	
MC09	Work Zone Safety Monitoring	*		***	*	*	**
MC10	Maintenance and Construction Activity Coordination	*	*		*	*	
MC11	Environmental Probe Surveillance	*		**		*	
MC12	Infrastructure Monitoring	*		***		*	

Market Packages that are grayed out do not apply in the MACOG Region currently.

- * Features that marginally satisfy the goal
- ** Features that almost satisfy every aspect of the goal
- *** Features completely satisfy every aspect of the goal

APPENDIX E

ROLES AND RESPONSIBILITIES

Market Package	Stakeholder	Roles & Responsibilities
<u>Archived Data Systems</u>	Counties	Collect and store traffic data.
	Indiana Department of Environmental Management (IDEM)	Collect and store environmental data.
	Indiana Department of Transportation (INDOT)	Collect and store traffic data.
	Metropolitan Planning Organization (MPO)	Collect and store traffic data.
<u>Commercial Vehicle Operations</u>	Indiana State Police	Monitor commercial vehicles and enforce commercial vehicle laws in Region.
<u>Electronic Toll Collection</u>	Indiana Toll Road Concession Company (ITRCC)	Automated and manual toll collection for I-80/90 via currency and I-Zoom.
<u>Emergency Management</u>	Cities	Dispatch services receive and process emergency phone calls.
		Law enforcement provides traffic control during emergency situations.
		Law enforcement responds to emergencies and provides emergency care.
	Counties	Emergency management and dispatch provide coordination of emergency responders to incidents within the county.
		Law enforcement provides traffic control during emergency situations.
		Law enforcement responds to emergencies and provides emergency care.
	Hospitals	Provide emergency medical care throughout the MACOG Region.
	Indiana Department of Transportation (INDOT)	Coordinates emergency response between LPAs.
	Indiana State Police	Emergency response and traffic control.
		Receives and processes emergency calls.
	Indiana Toll Road Concession Company (ITRCC)	Emergency service coordination on I-80/90.
		Freeway management assistance and traffic control during emergency situations.

Market Package	Stakeholder	Roles & Responsibilities
<u>Emergency Management</u>	Regional Information Providers	Natural and man-made emergency notification and warnings to traveling public.
	South Bend Regional Airport	Transportation Security Administration (TSA) and airport security coordinates emergency response with federal agencies.
	South Bend Regional Airport	Transportation Security Administration (TSA) and airport security coordinates emergency response with local police department.
	Towns	Dispatch services receive and process emergency phone calls.
		Law enforcement provides traffic control during emergency situations.
		Law enforcement responds to emergencies and provides emergency care.
	Traveling Public	Initiates emergency requests.
	University of Notre Dame	Coordinates emergency response with local law enforcement.
<u>Freeway Management</u>	Indiana Department of Environmental Management (IDEM)	Disseminates environmental data to local and state agencies and traveling public.
	Indiana Department of Transportation (INDOT)	Manages state highways.
	Indiana Toll Road Concession Company (ITRCC)	Manages freeway along toll road.
<u>Incident Management</u>	Counties	Maintenance of emergency management plans for counties within the region.
	University of Notre Dame	Coordinates emergency response with local law enforcement.
		Maintains and monitor parking facility.
<u>Maintenance and Construction</u>	Cities	Coordination of construction activities with INDOT, MPO, and other agencies.
	Counties	Coordination of construction activities with INDOT, MPO, and other agencies.
		Maintain local roads during weather related events (snow, ice, etc.) and ITS devices.

Market Package	Stakeholder	Roles & Responsibilities
<u>Maintenance and Construction</u>	Indiana Department of Transportation (INDOT)	Coordination of maintenance and construction projects.
		Provides road maintenance, including congestion relief during weather related events and ITS devices.
		Provides roadway construction information and updates on an ongoing basis.
	Indiana Toll Road Concession Company (ITRCC)	Coordinates road projects with INDOT.
		Maintains Toll Road, including during weather related events and ITS devices.
	Northern Indiana Commuter Transportation District (NICTD)	Coordinates maintenance and construction activities with LPAs and MPO.
	Regional Information Providers	Provides maintenance and weather related updates to travelers (via radio, television, and internet services).
	South Bend Regional Airport	Coordinates construction projects with the LPA, MPO, and INDOT.
		Maintains on-site maintenance including weather related activiteis and ITS devices.
<u>Parking Management</u>	Towns	Maintain roads, including during weather related events.
	Transit Systems	Coordinates maintenance and construction activities with LPAs and MPO.
<u>Surface Street Management</u>	South Bend Regional Airport	Maintains and monitors airport parking facility.
	University of Notre Dame	Maintains and monitors parking facility.
	Cities	Install and operate traffic control devices.
		Monitor speeds of vehicles traveling through the roadway system.
	Counties	Install and operate traffic control devices.
		Monitor speeds of vehicles traveling through the roadway system.

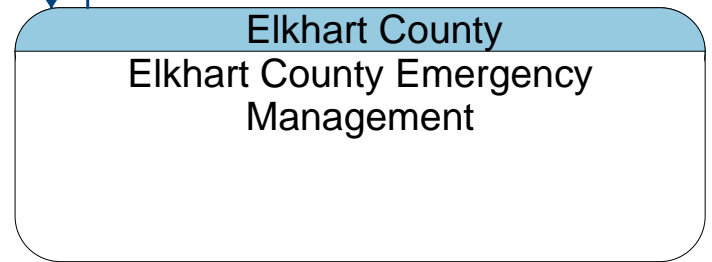
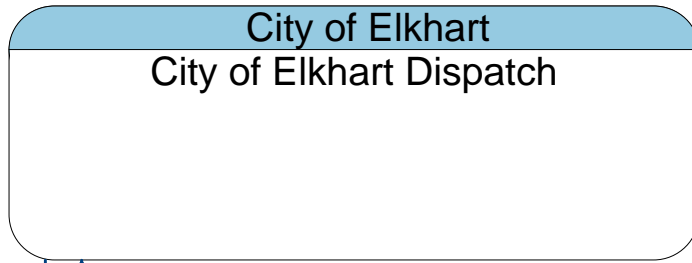
Market Package	Stakeholder	Roles & Responsibilities
<u>Surface Street Management</u>	Counties	Provide driver with information using roadway equipment.
	Indiana Department of Environmental Management (IDEM)	Assesses current and forecast road network performance.
	Indiana Department of Transportation (INDOT)	Controls roadway for traffic during maintenance or other unsafe scenarios.
	Indiana Toll Road Concession Company (ITRCC)	Collects tolls electronically and detects and process violations.
		Controls roadway maintenance when driving conditions are unsafe.
		Monitors speed of vehicleless driving on the toll road.
	Metropolitan Planning Organization (MPO)	Assesses current and forecast road network performance.
	Towns	Monitor speeds of vehicles traveling through the roadway system.
<u>Transit Services</u>	Northern Indiana Commuter Transportation District (NICTD)	Establishes two way communications between South Shore and transit information center.
		Performs automated dispatch and system monitoring.
		Provides physical security of passengers.
		Provides transit users ready access transit information at transit stops and on train.
	South Bend Regional Airport	Establishes two way communications between air traffic and information center.
		Provides physical security of passengers.
	Transit Systems	Establishes two way communications between cab/trolley and transit information center.

Market Package	Stakeholder	Roles & Responsibilities
<u>Transit Services</u>	Transit Systems	Manages transit fare collection on-board transit vehicles and at transit stops.
		Performs automated dispatch and system monitoring (including AVL system) for fixed rout and demand response transit services.
		Provides physical security of passengers.
<u>Traveler Information</u>	Regional Information Providers	Broadcasts traffic conditions, advisories, and traveling information to the traveling public.
	South Bend Regional Airport	Provides schedule and fare information to passengers.
	Transit Systems	Provides transit users ready access transit information at transit stops.
	Traveling Public	Owns user trip planning software tools.
<u>Vehicle Safety</u>	Traveling Public	Initiates emergency requests.

APPENDIX F

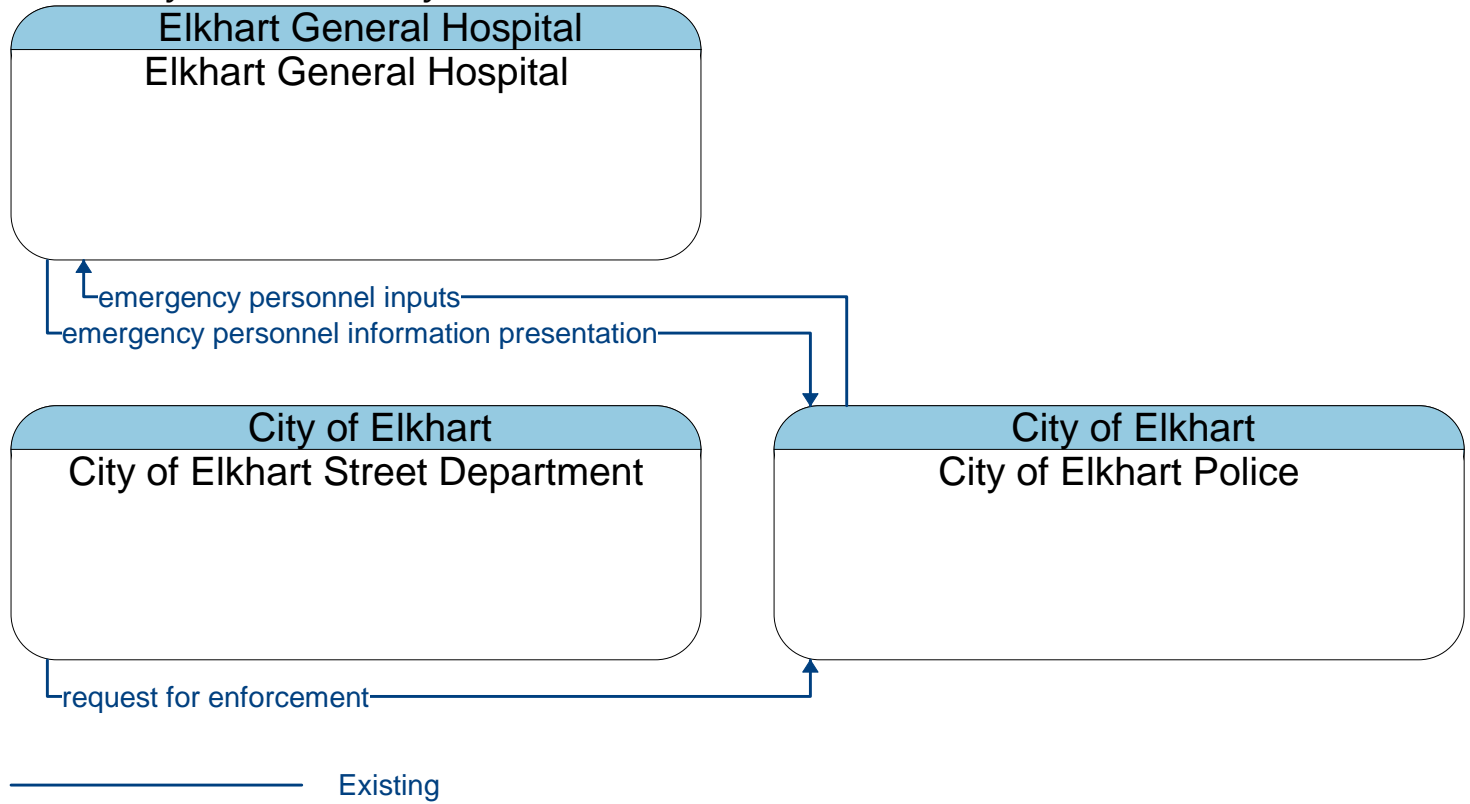
INTERCONNECT DIAGRAMS

Cities: City of Elkhart - City of Elkhart

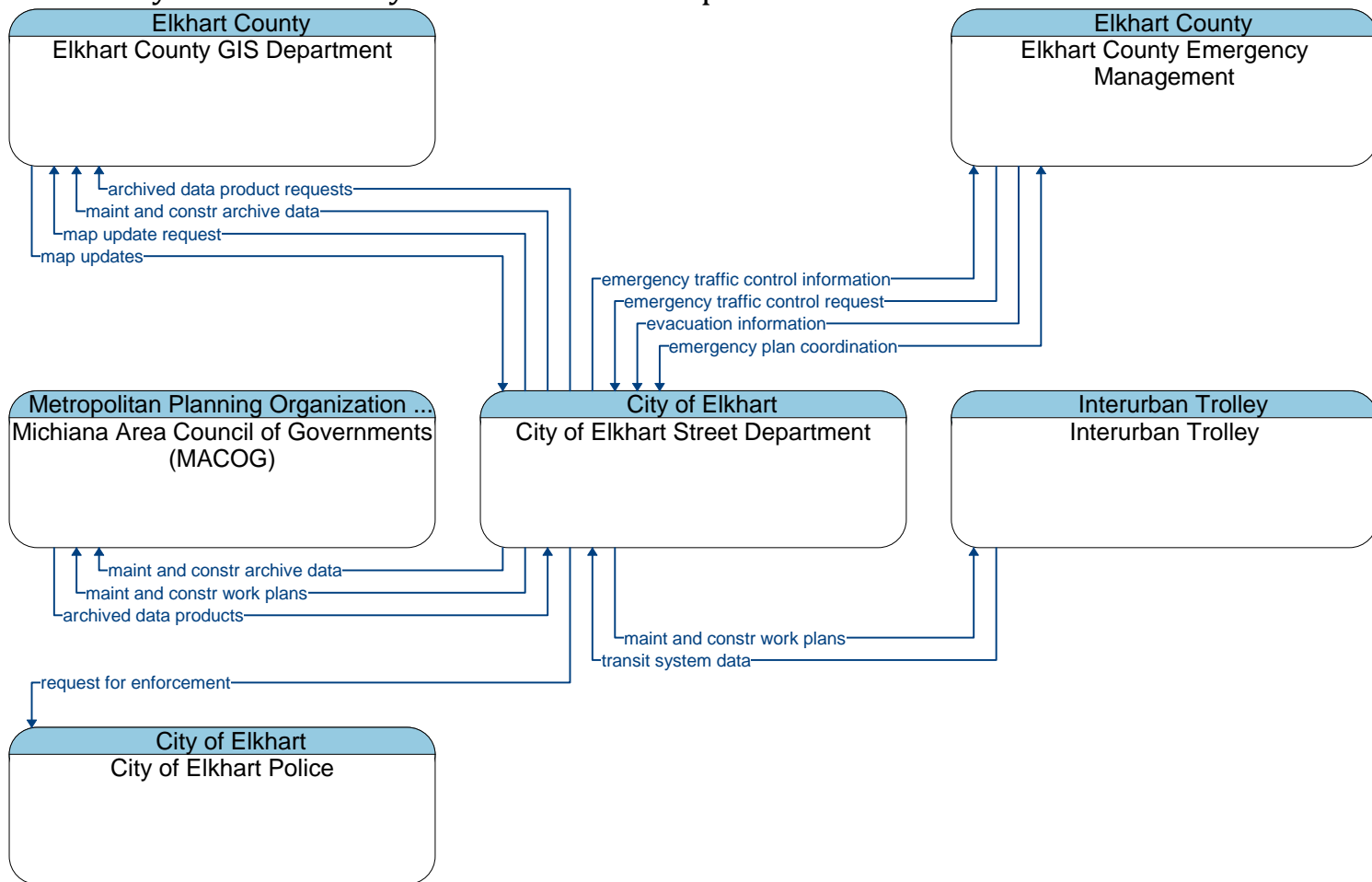


Existing

Cities: City of Elkhart - City of Elkhart Police

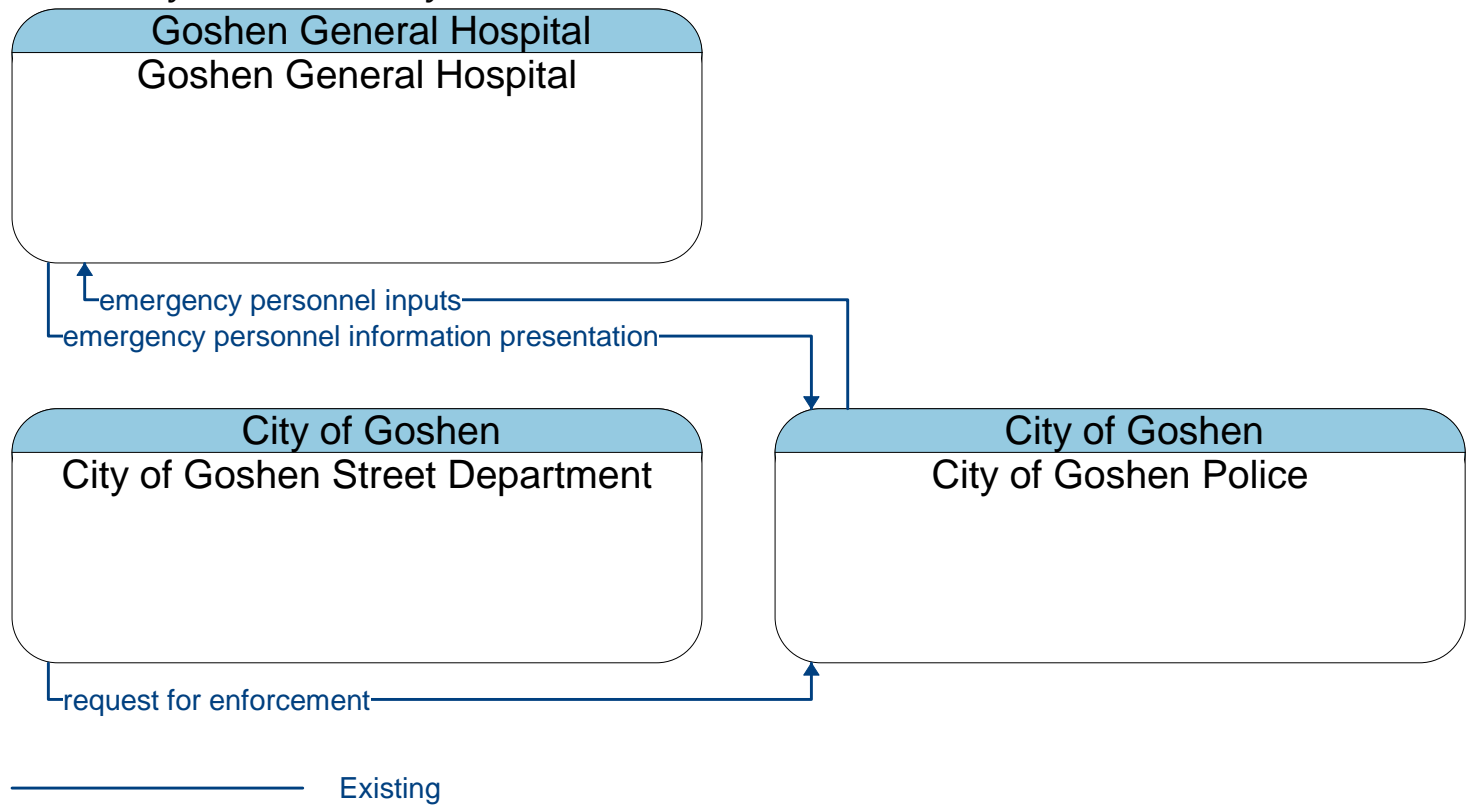


Cities: City of Elkhart - City of Elkhart Street Department

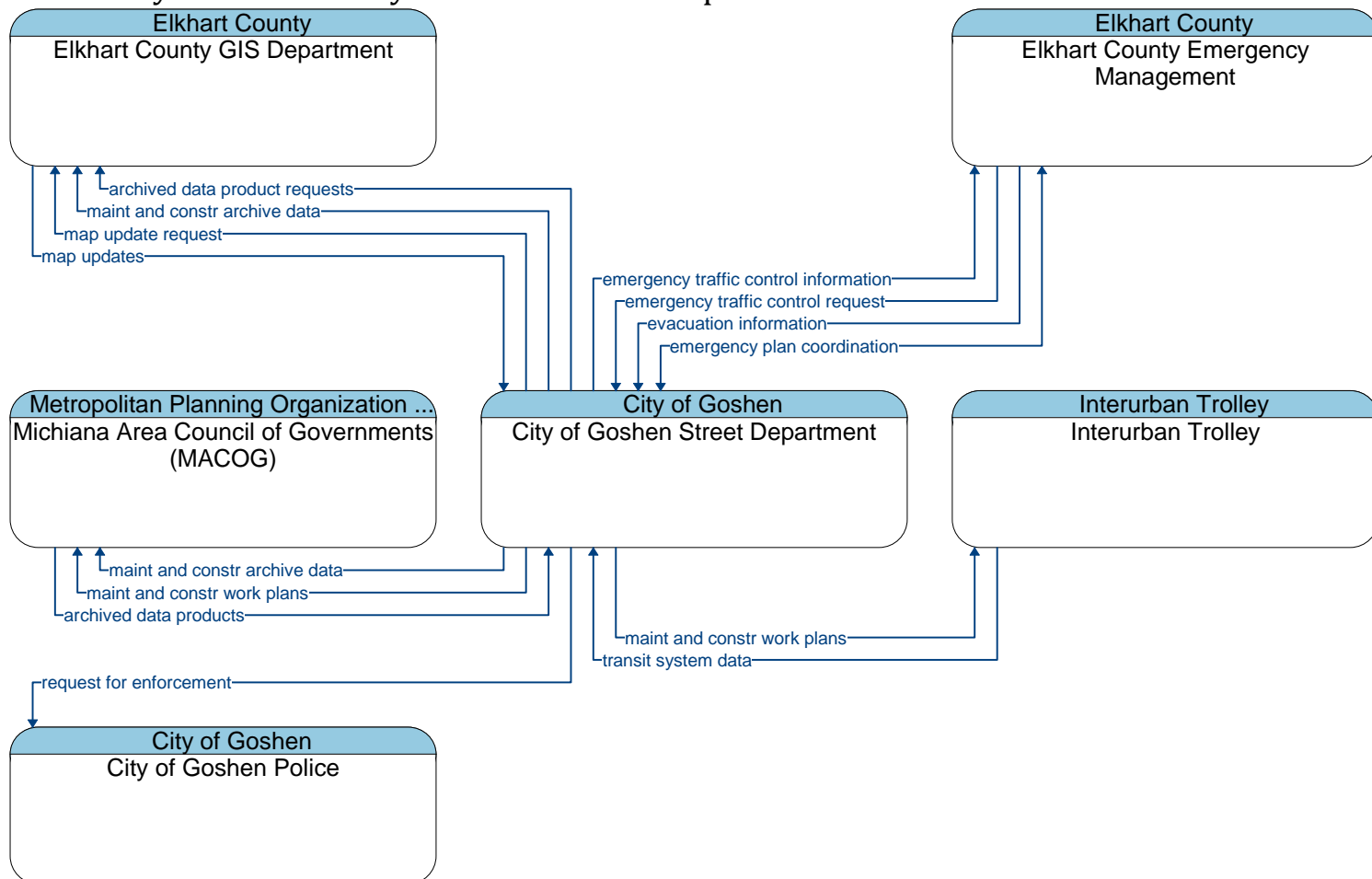


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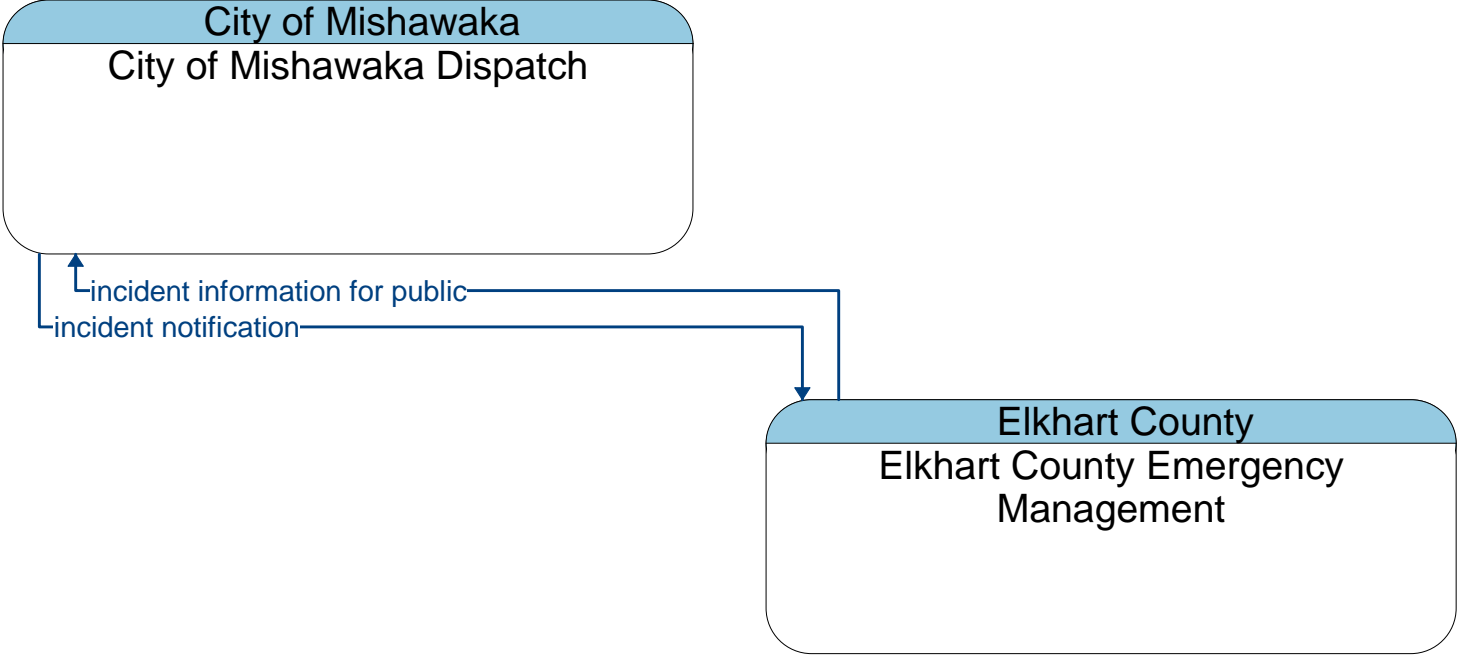
Cities: City of Goshen - City of Goshen Police



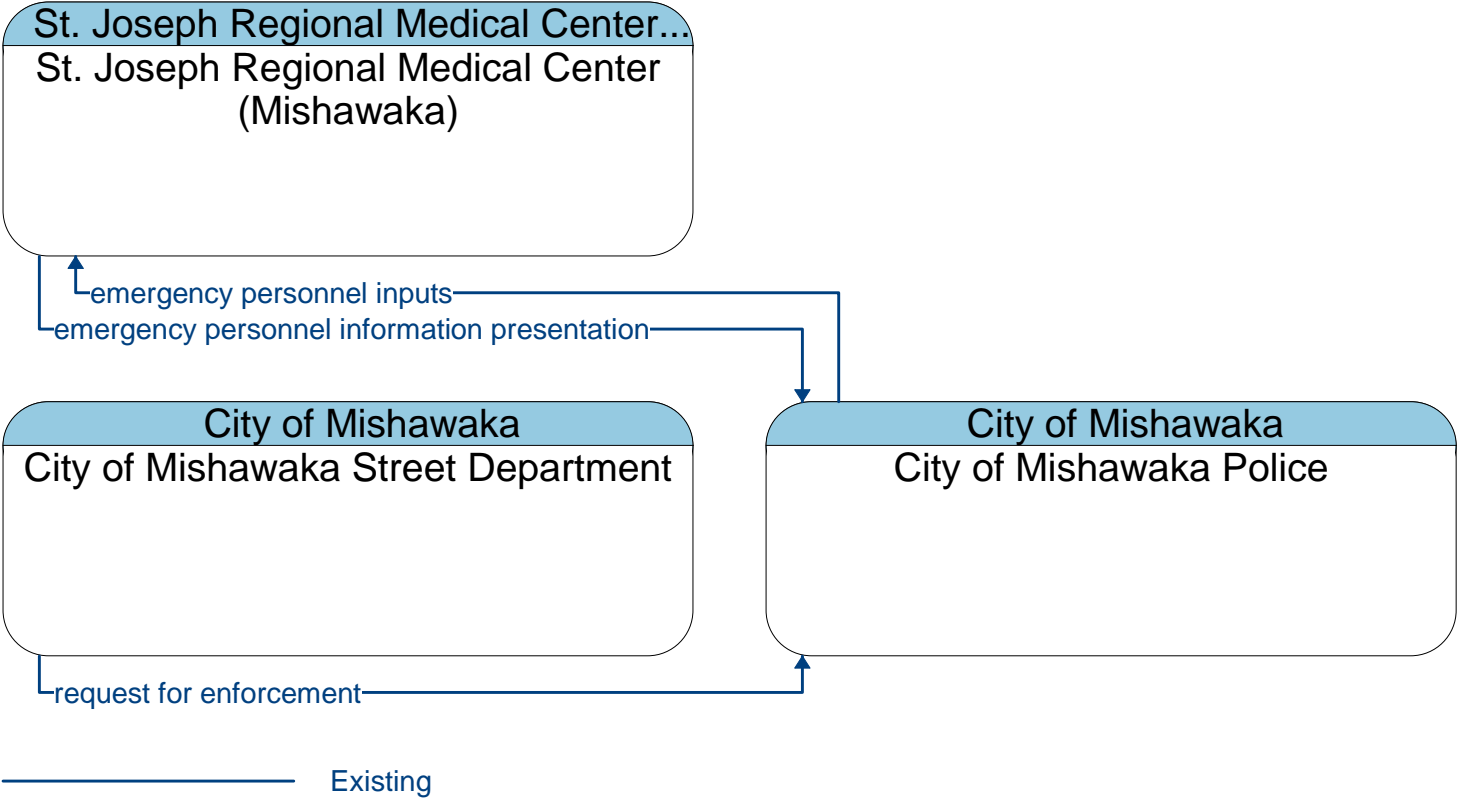
Cities: City of Goshen - City of Goshen Street Department



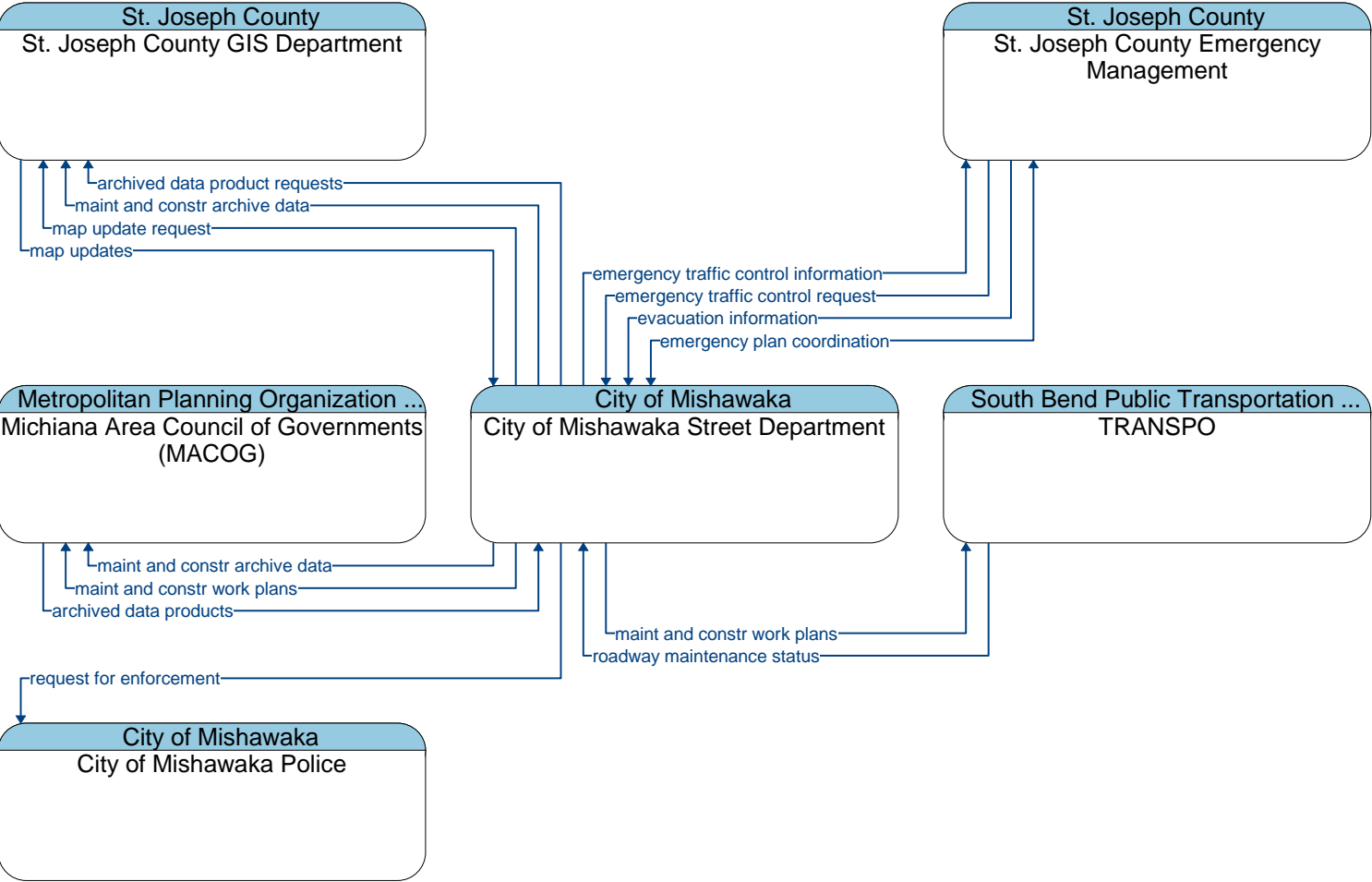
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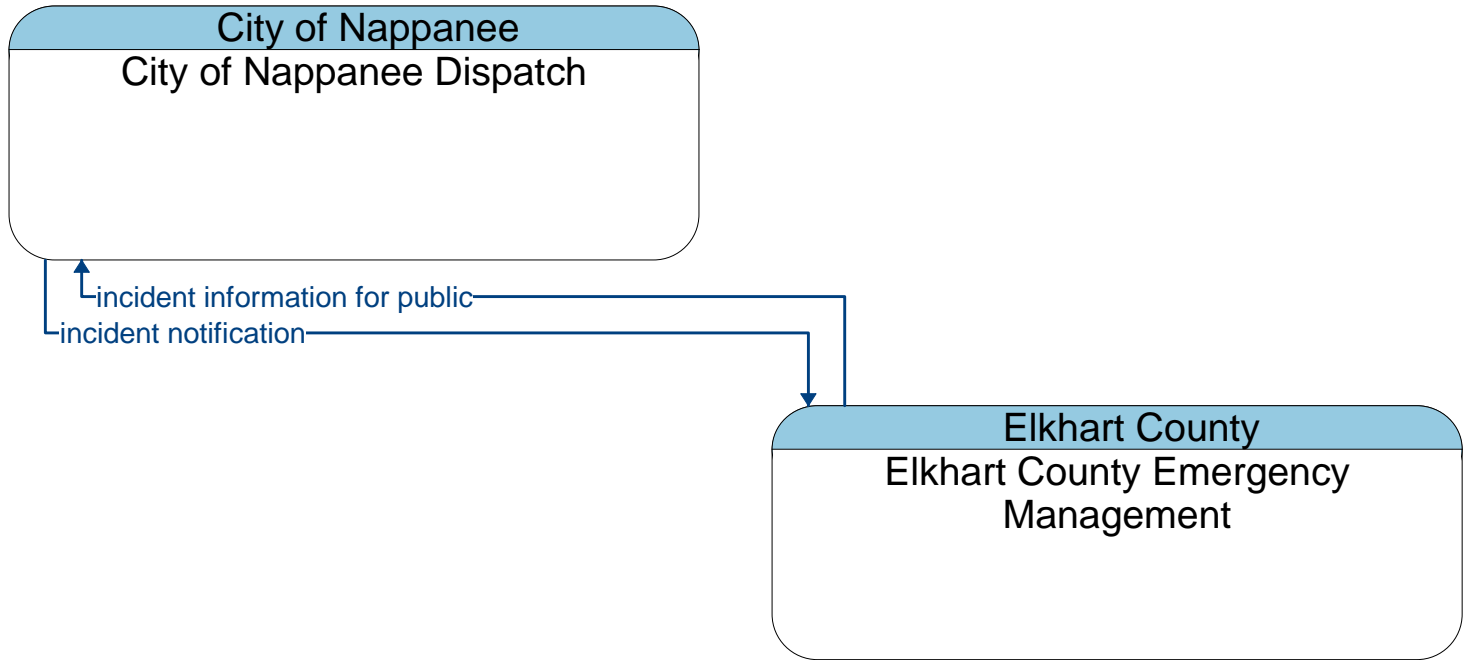


Cities: City of Mishawaka - City of Mishawaka Street Department



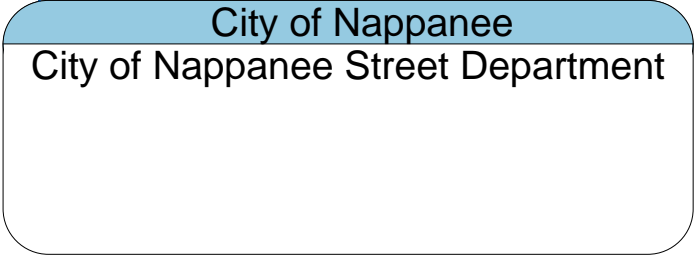
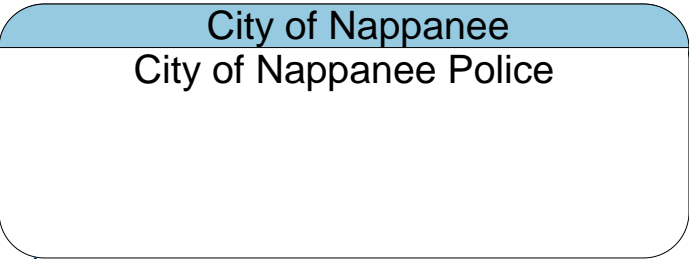
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Cities: City of Nappanee - City of Nappanee Dispatch



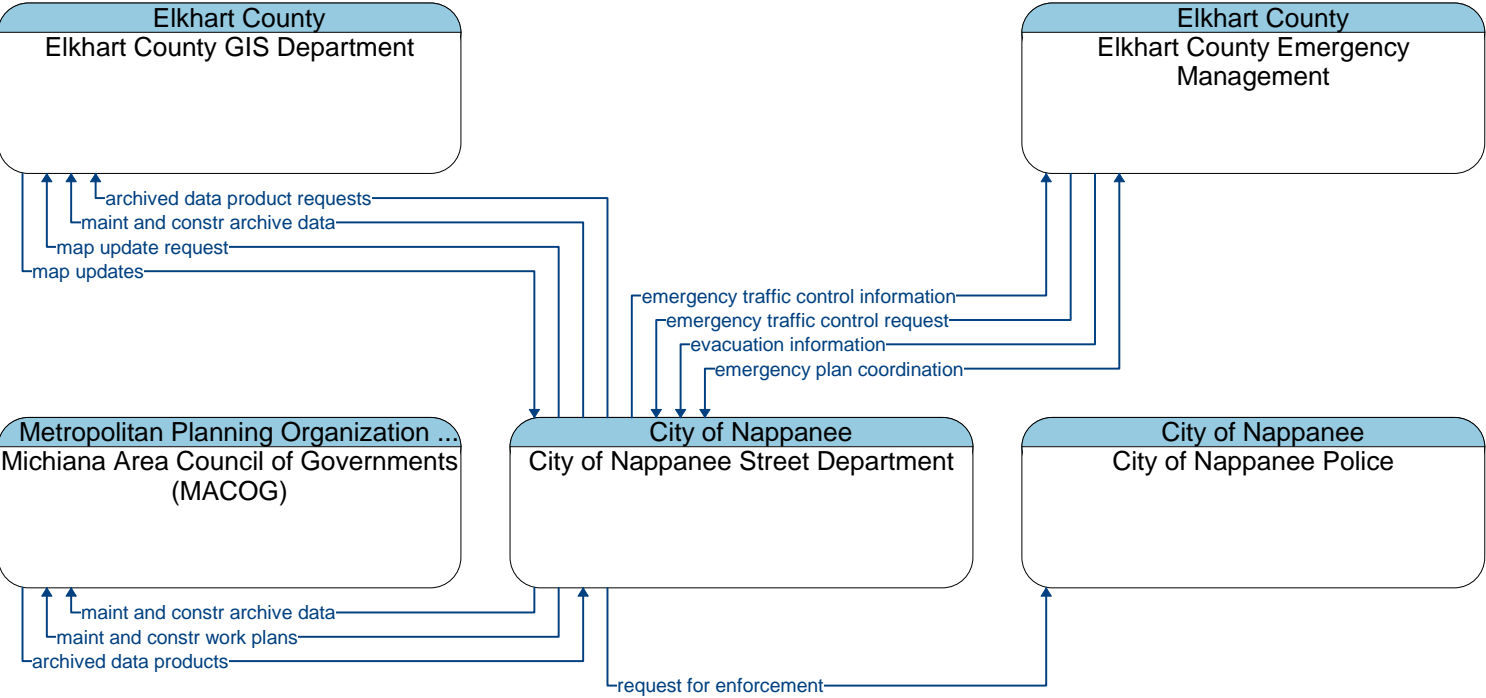
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Cities: City of Nappanee - City of Nappanee Police



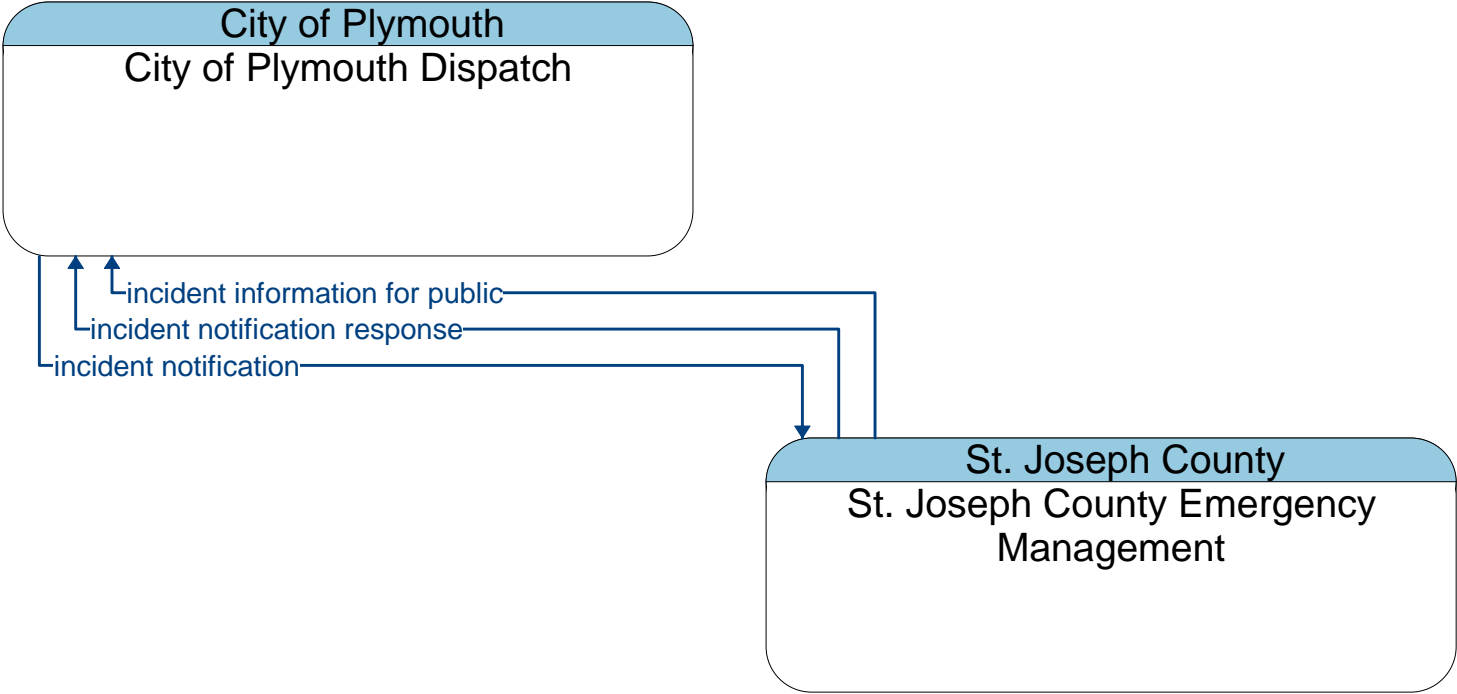
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Cities: City of Nappanee - City of Nappanee Street Department



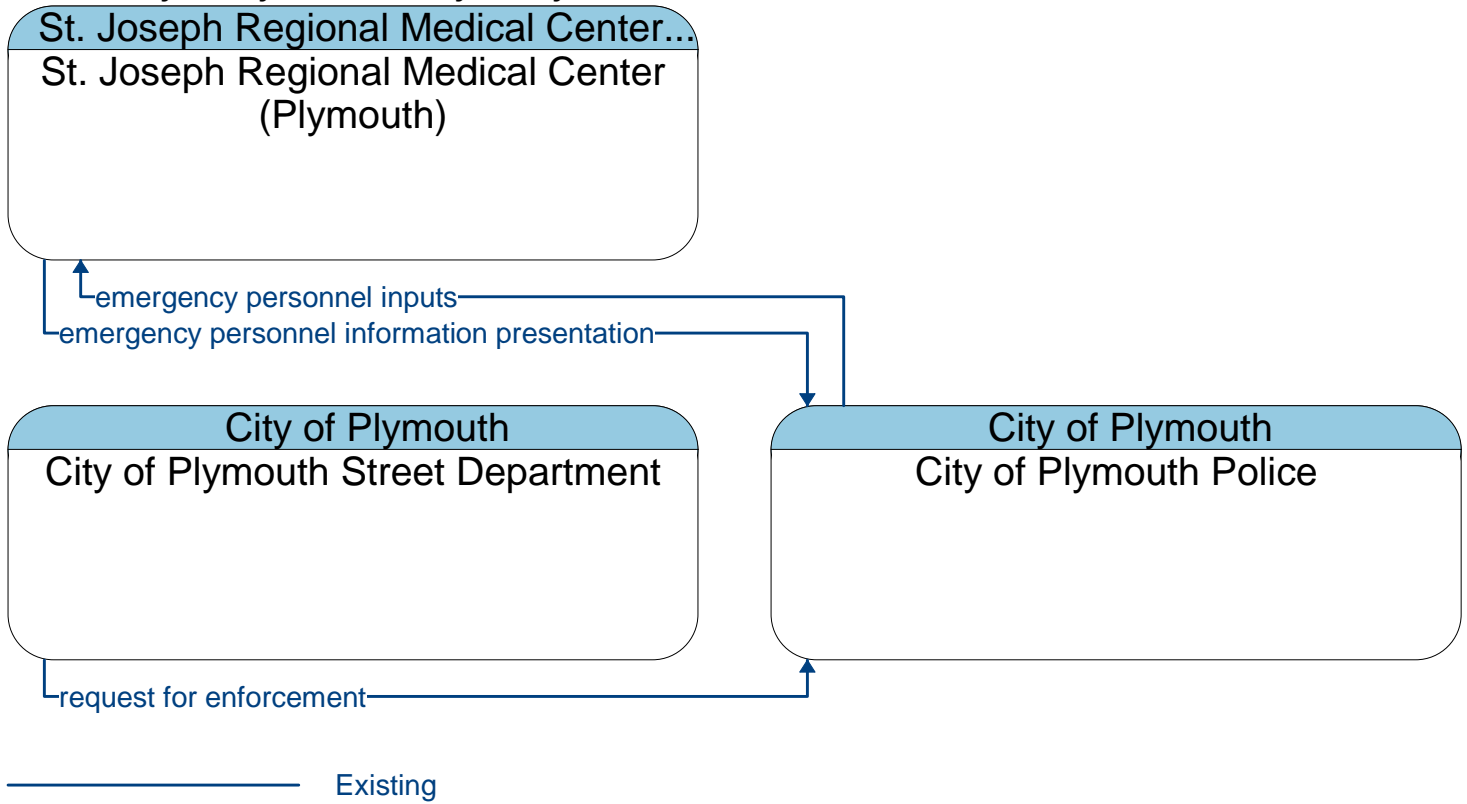
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Cities: City of Plymouth - City of Plymouth Dispatch

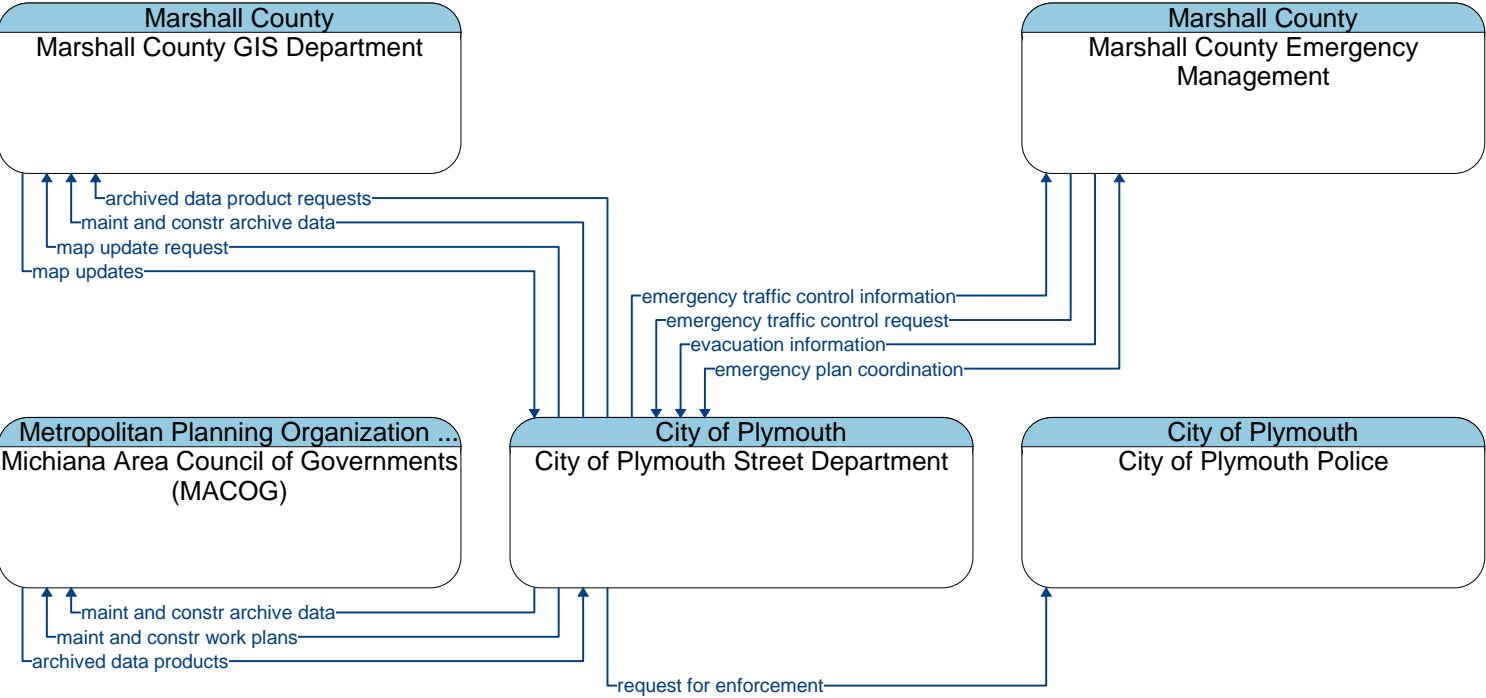


Existing

Cities: City of Plymouth - City of Plymouth Police

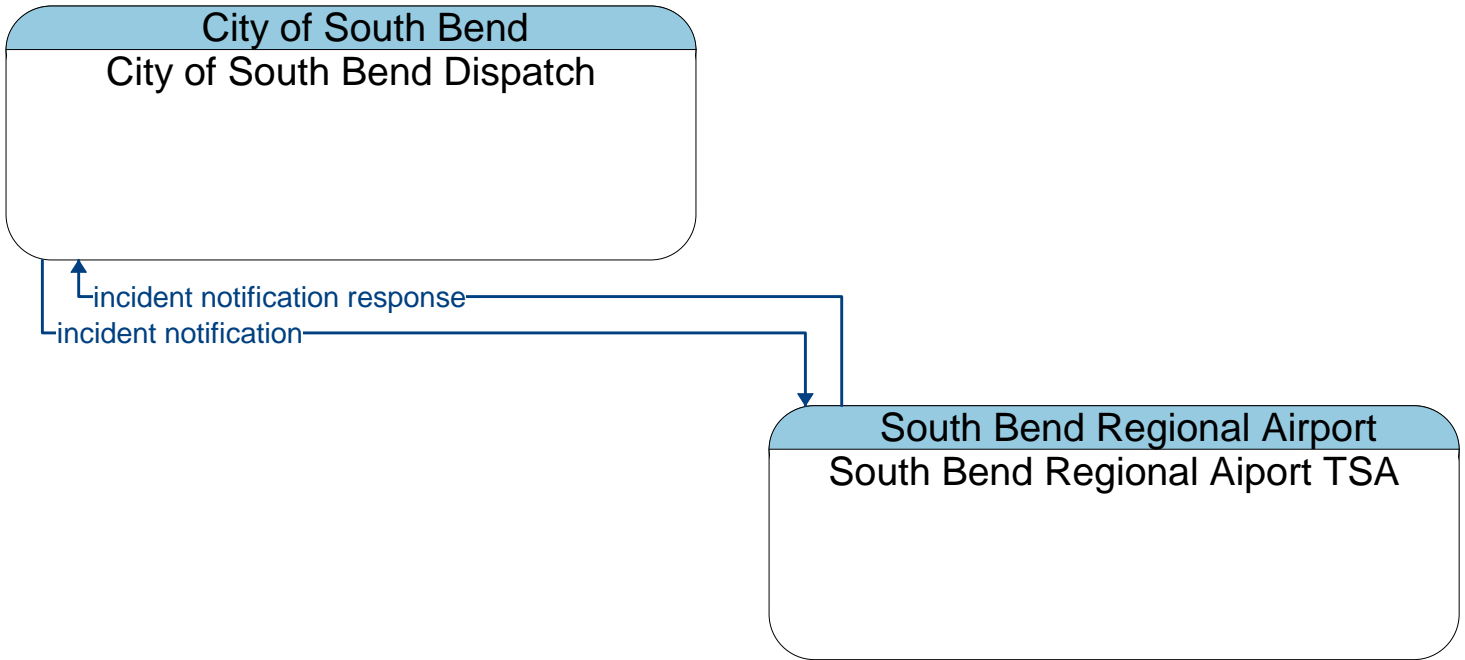


Cities: City of Plymouth - City of Plymouth Street Department



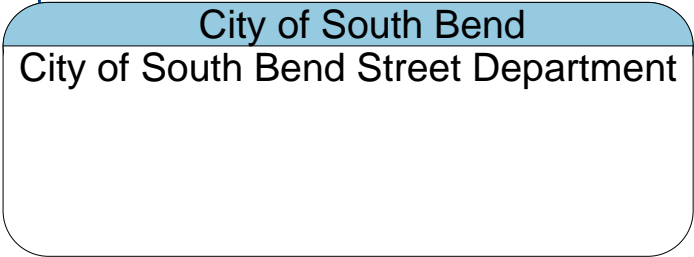
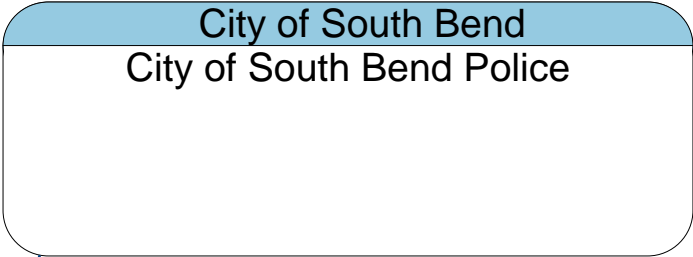
Existing

Cities: City of South Bend - City of South Bend Dispatch



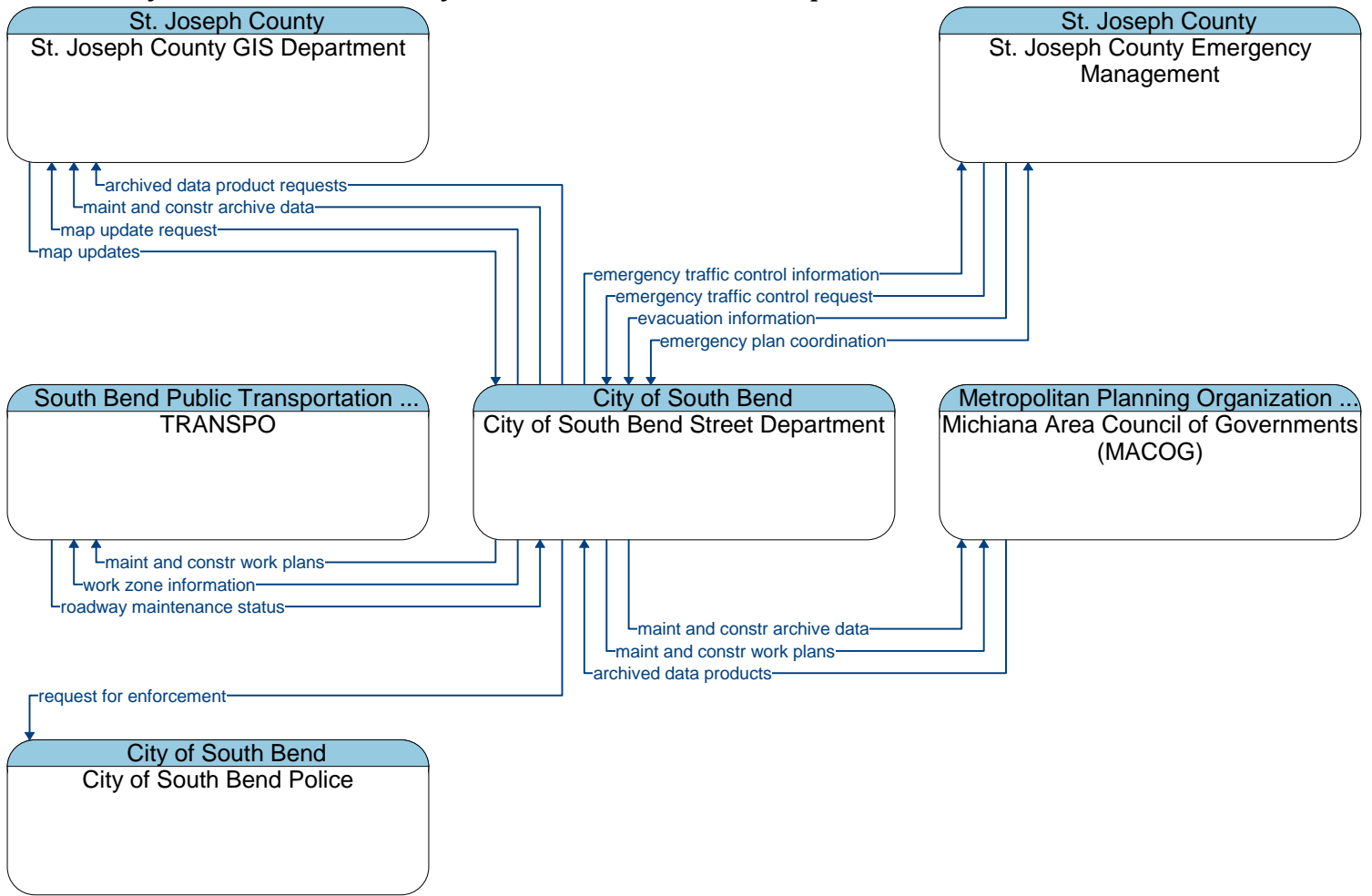
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Cities: City of South Bend - City of South Bend Police



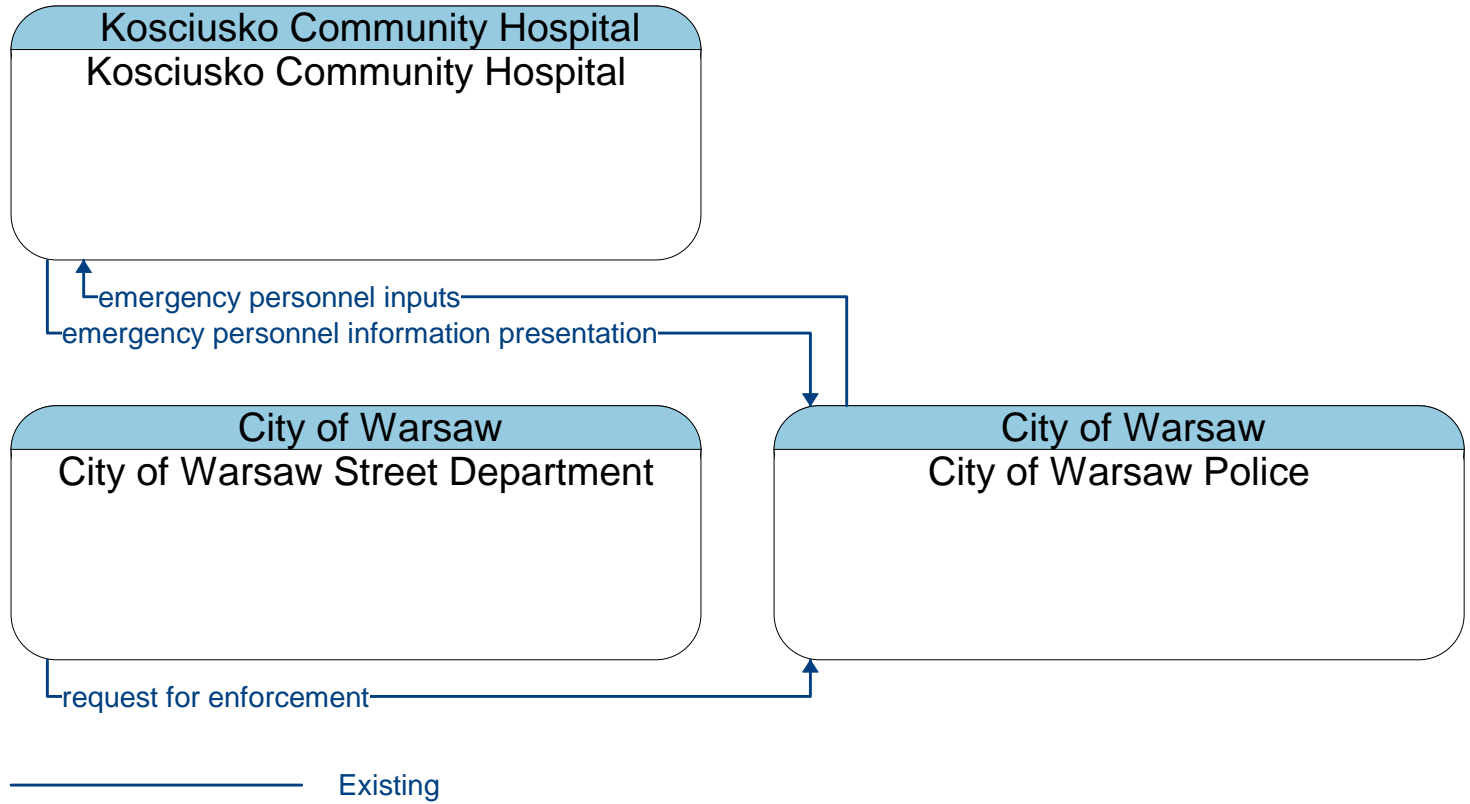
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Cities: City of South Bend - City of South Bend Street Department

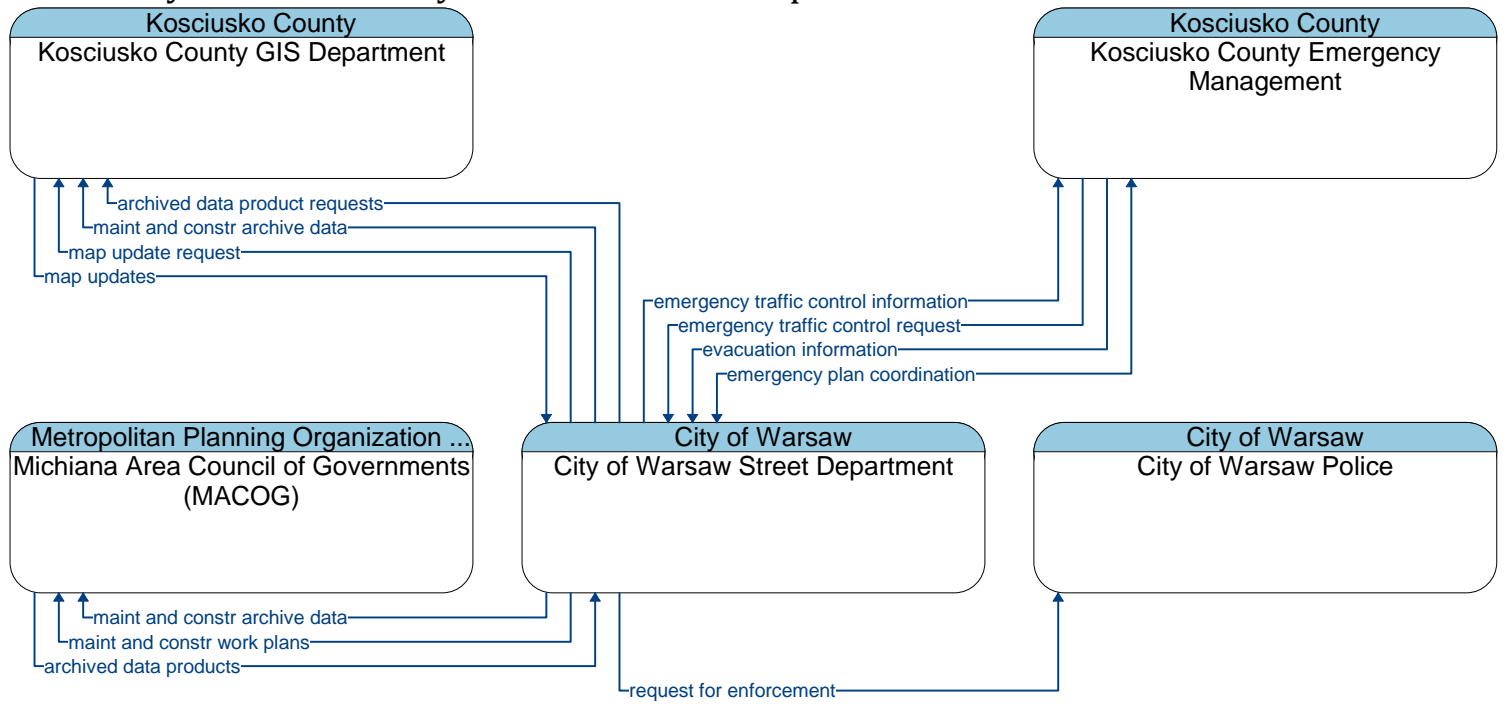


Existing

Cities: City of Warsaw - City of Warsaw Police

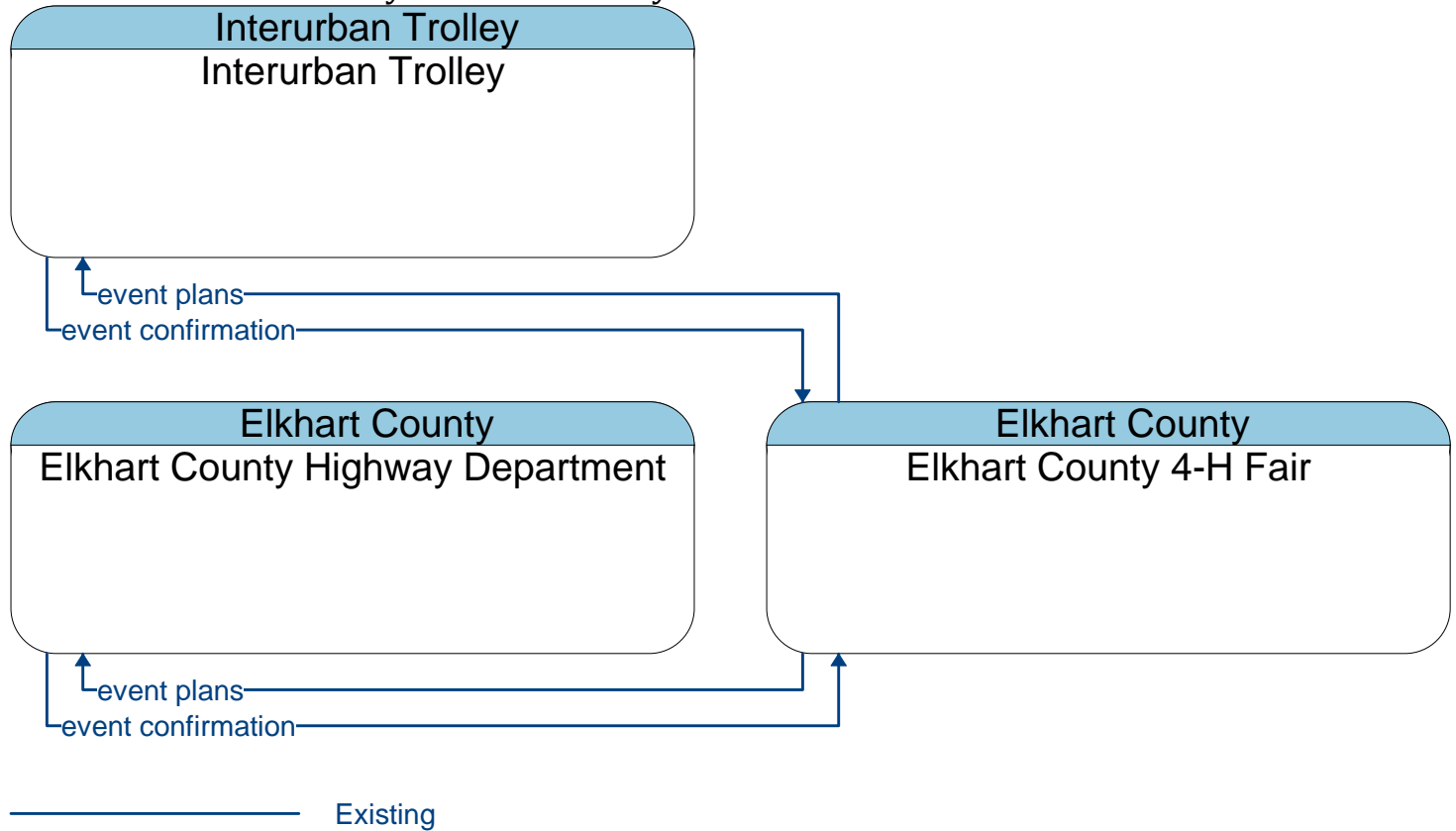


Cities: City of Warsaw - City of Warsaw Street Department

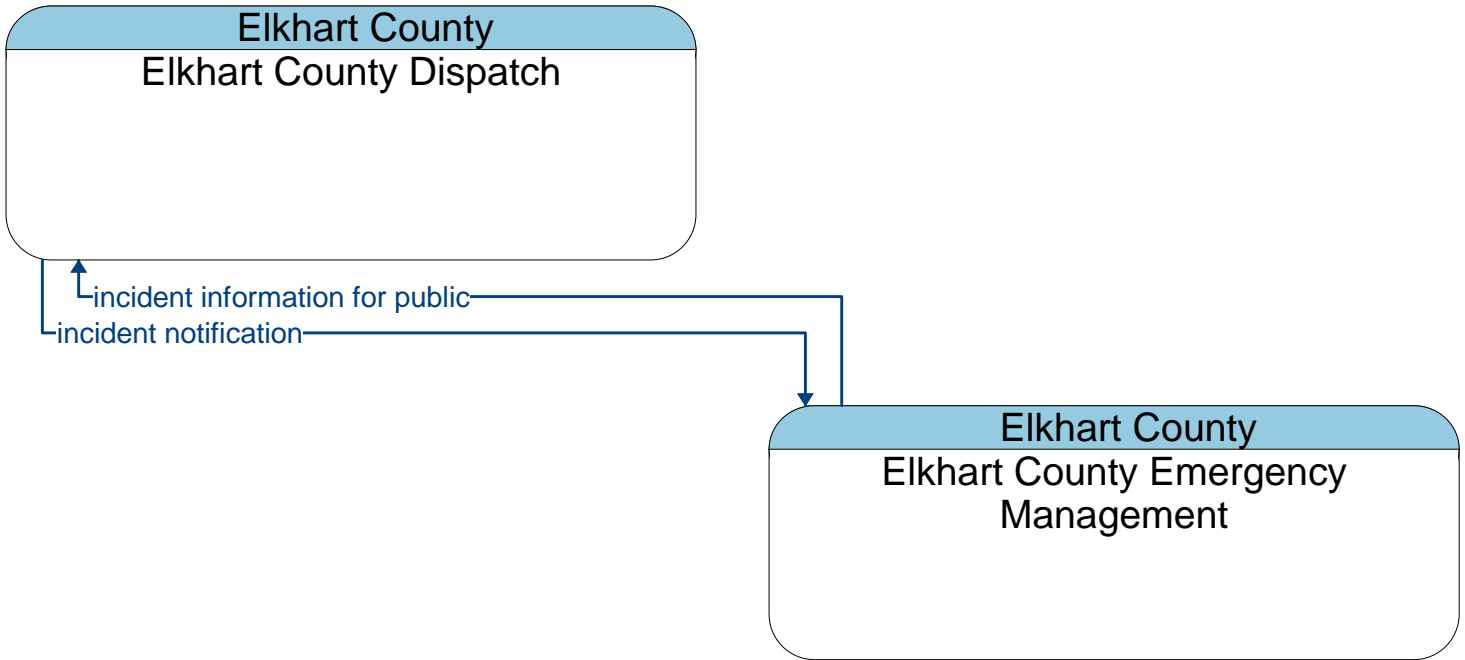


Existing

Counties: Elkhart County - Elkhart County 4-H Fair

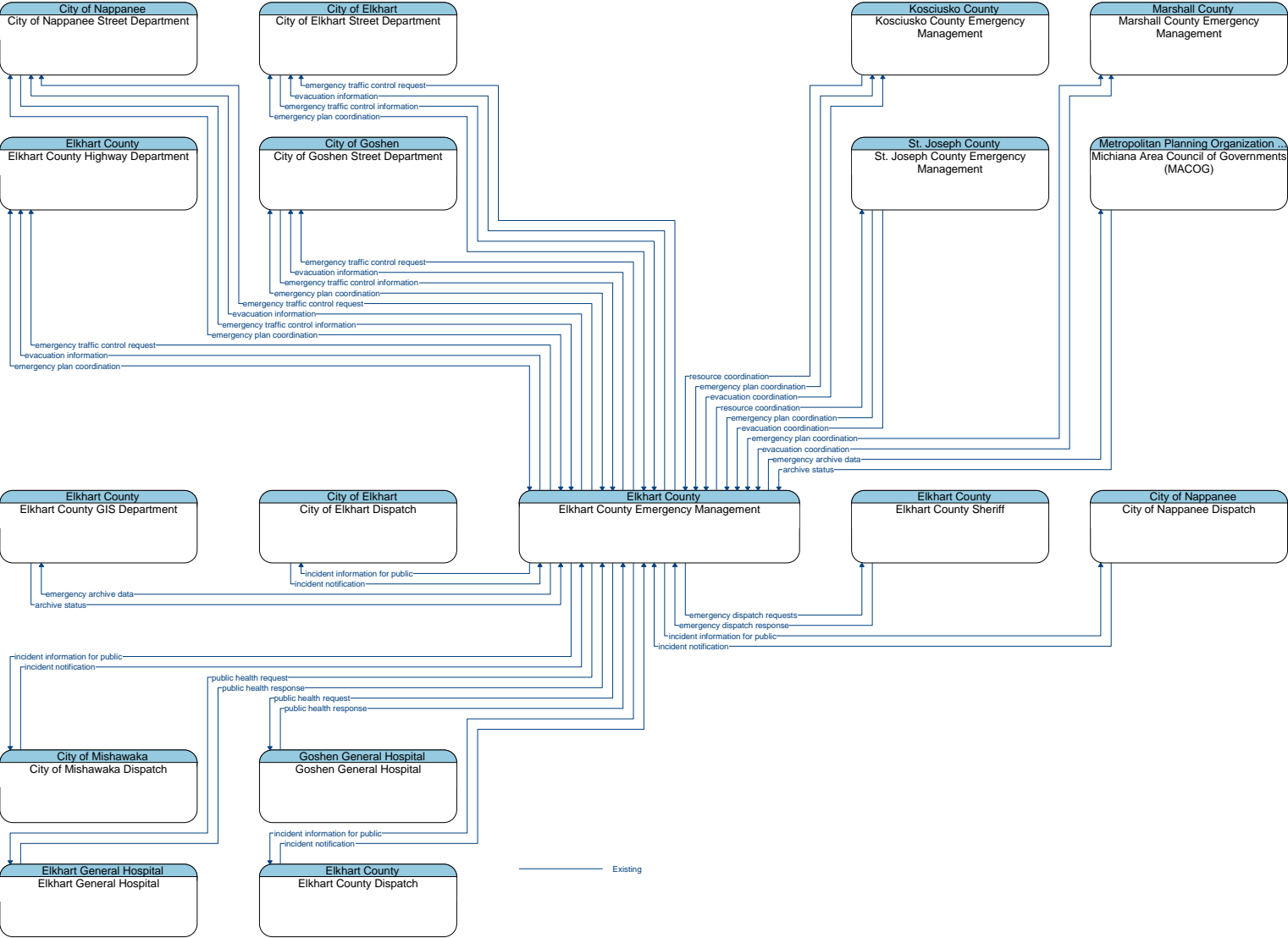


Counties: Elkhart County - Elkhart County Dispatch

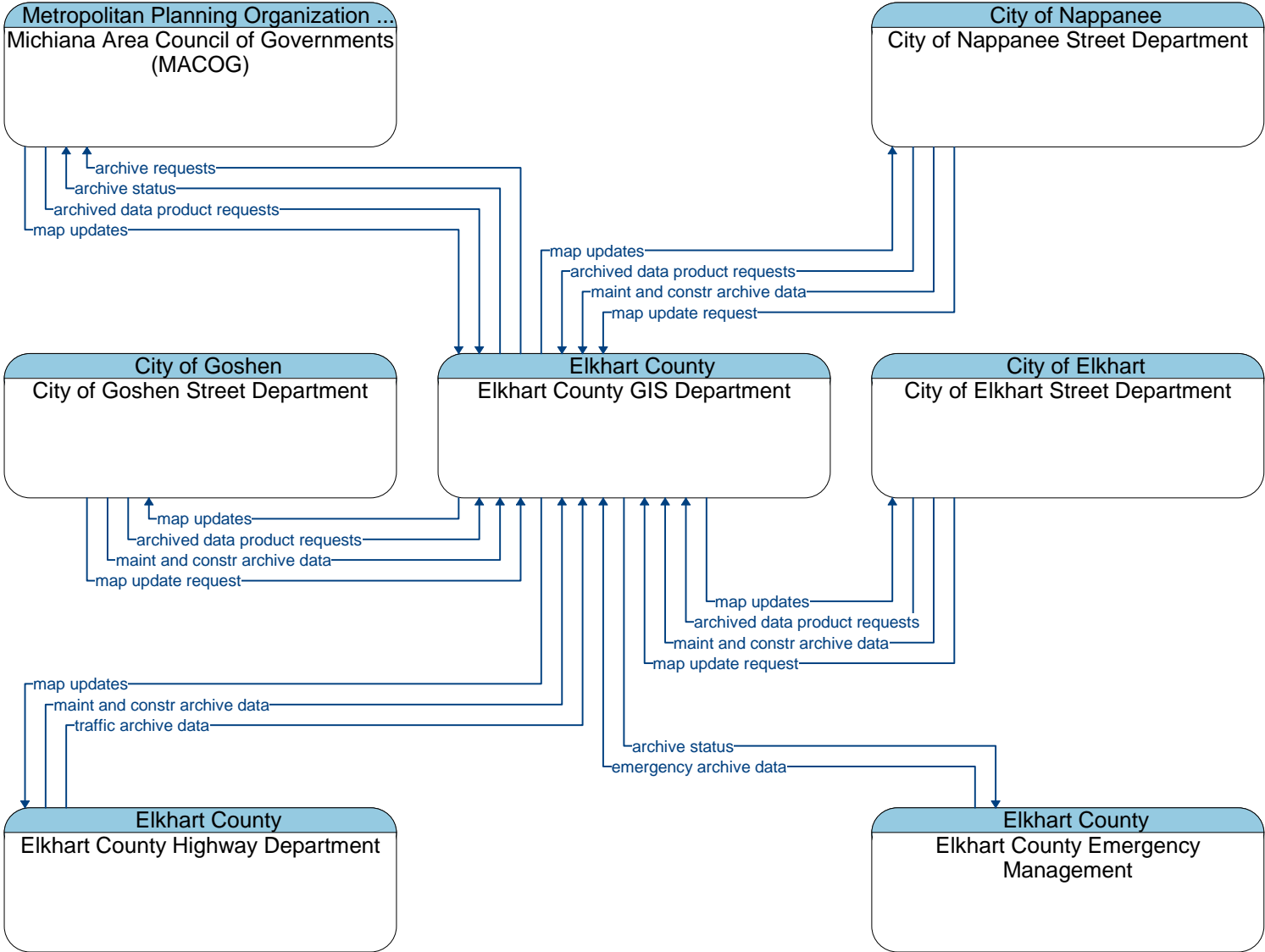


Existing

Counties: Elkhart County - Elkhart County Emergency Management

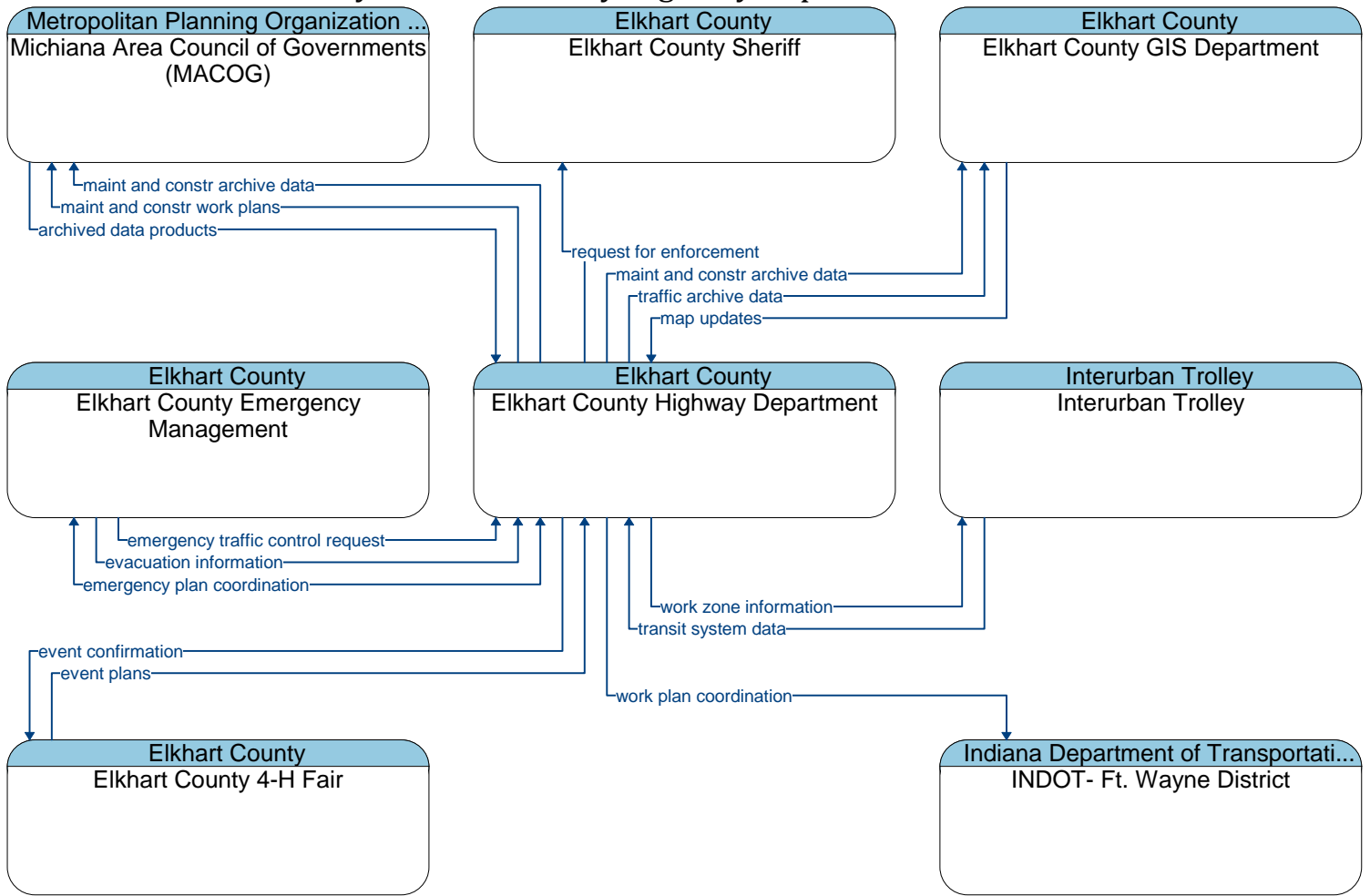


Counties: Elkhart County - Elkhart County GIS Department



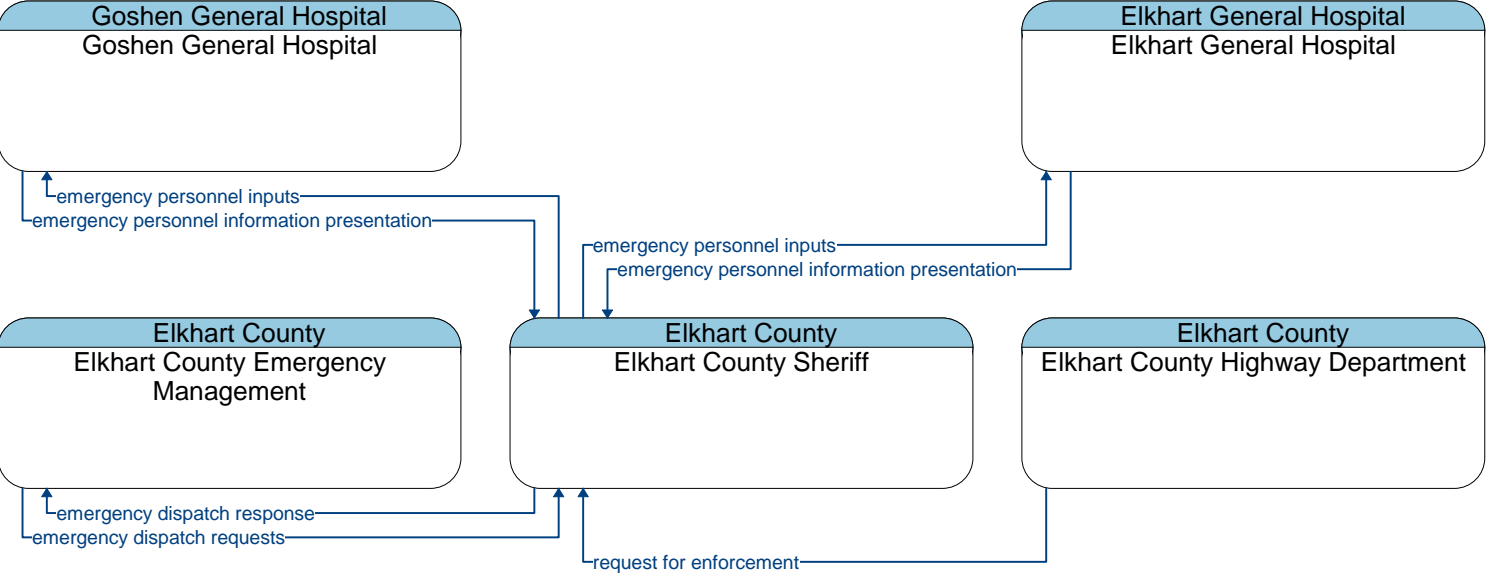
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Counties: Elkhart County - Elkhart County Highway Department



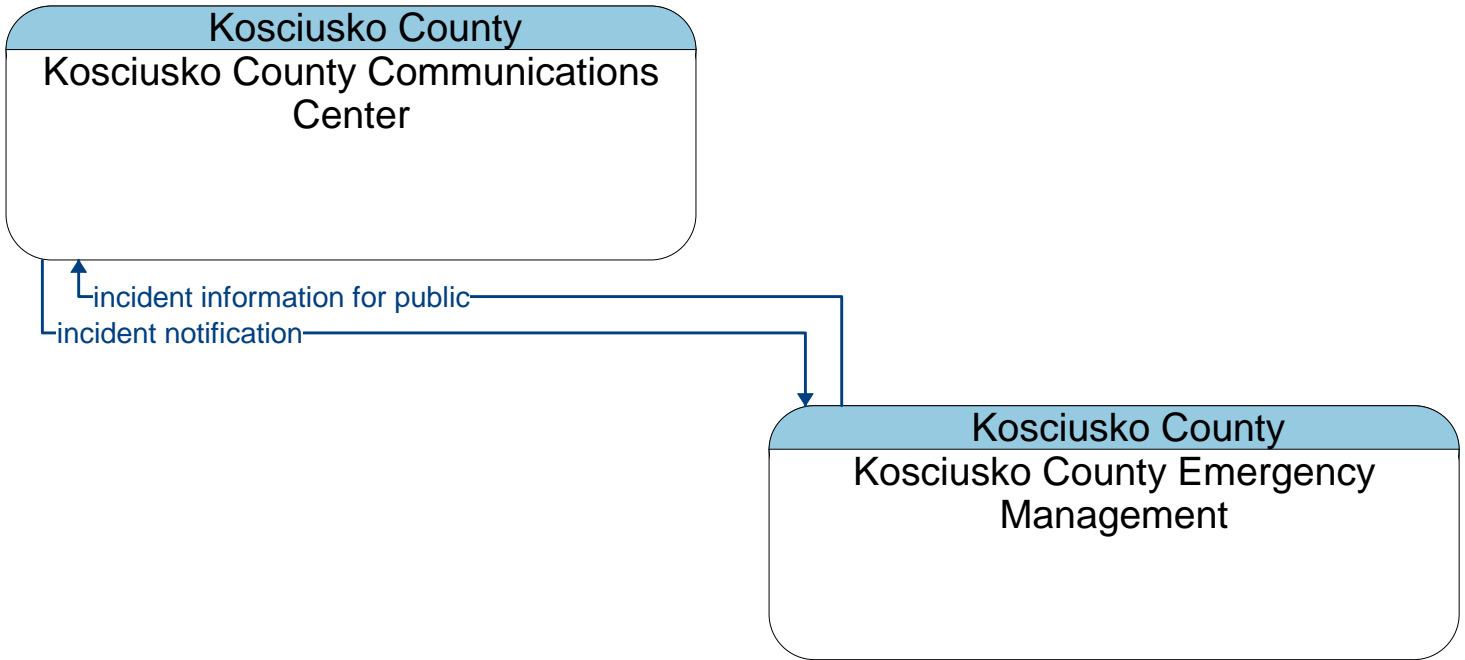
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Counties: Elkhart County - Elkhart County Sheriff



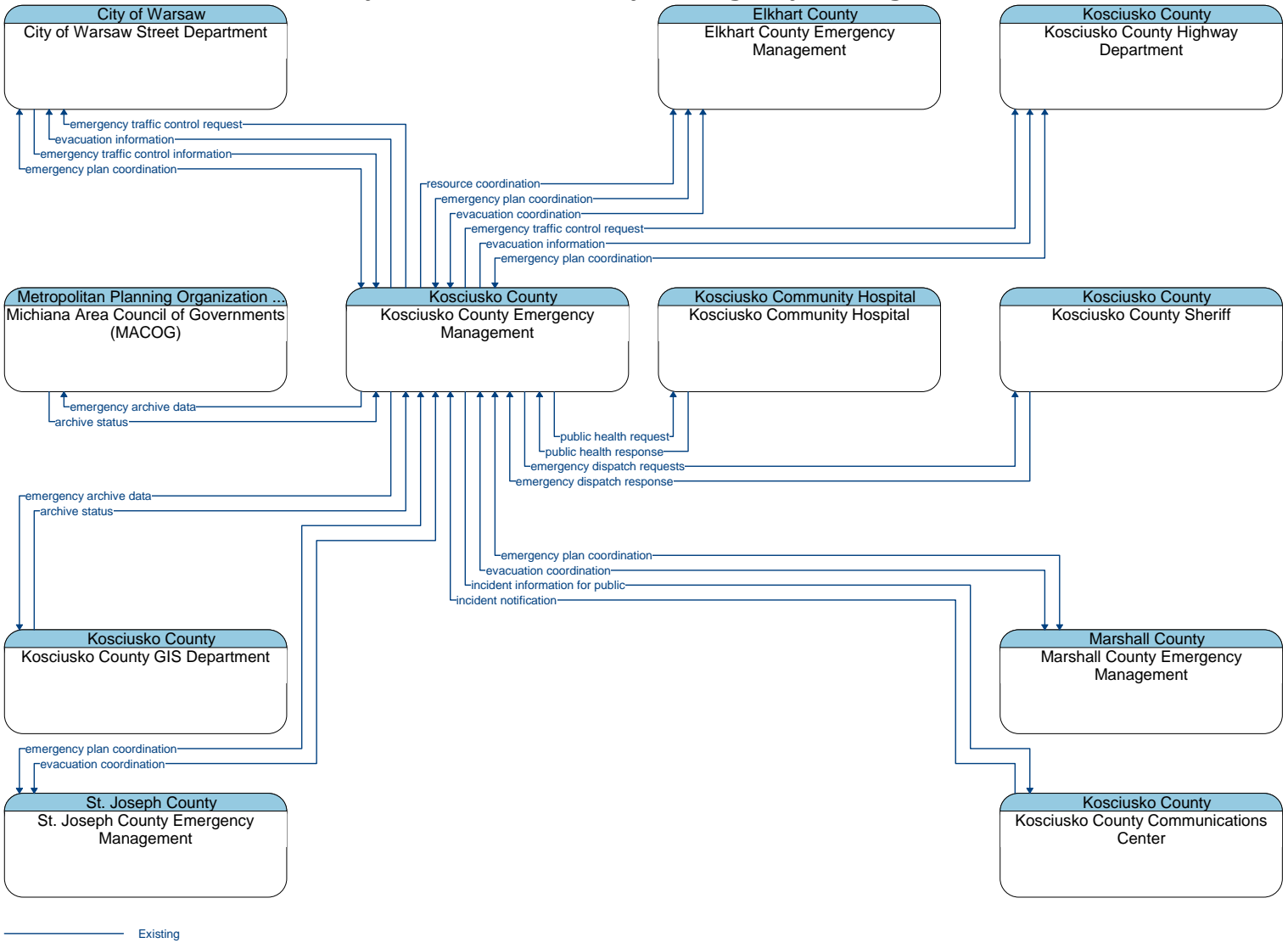
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Counties: Kosciusko County - Kosciusko County Communications Center

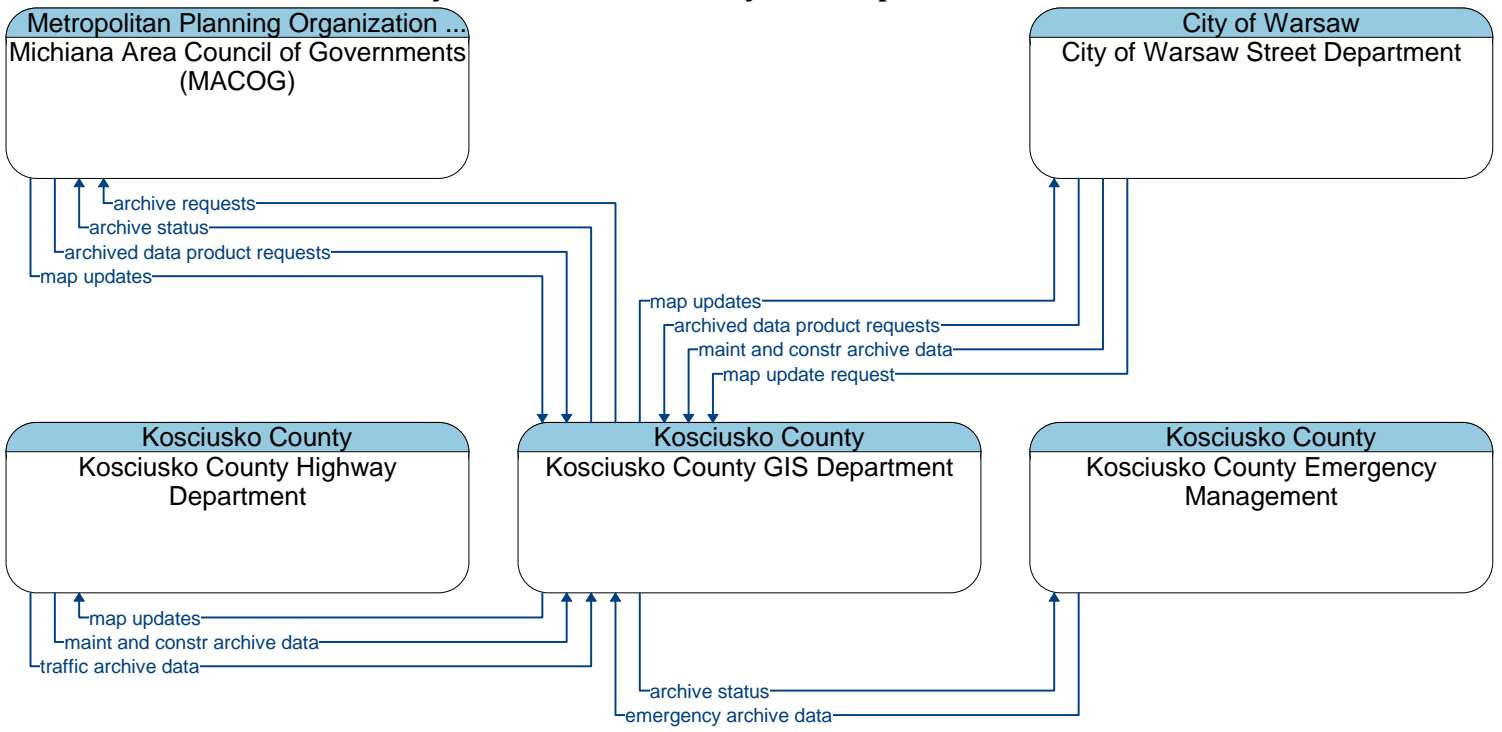


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Counties: Kosciusko County - Kosciusko County Emergency Management

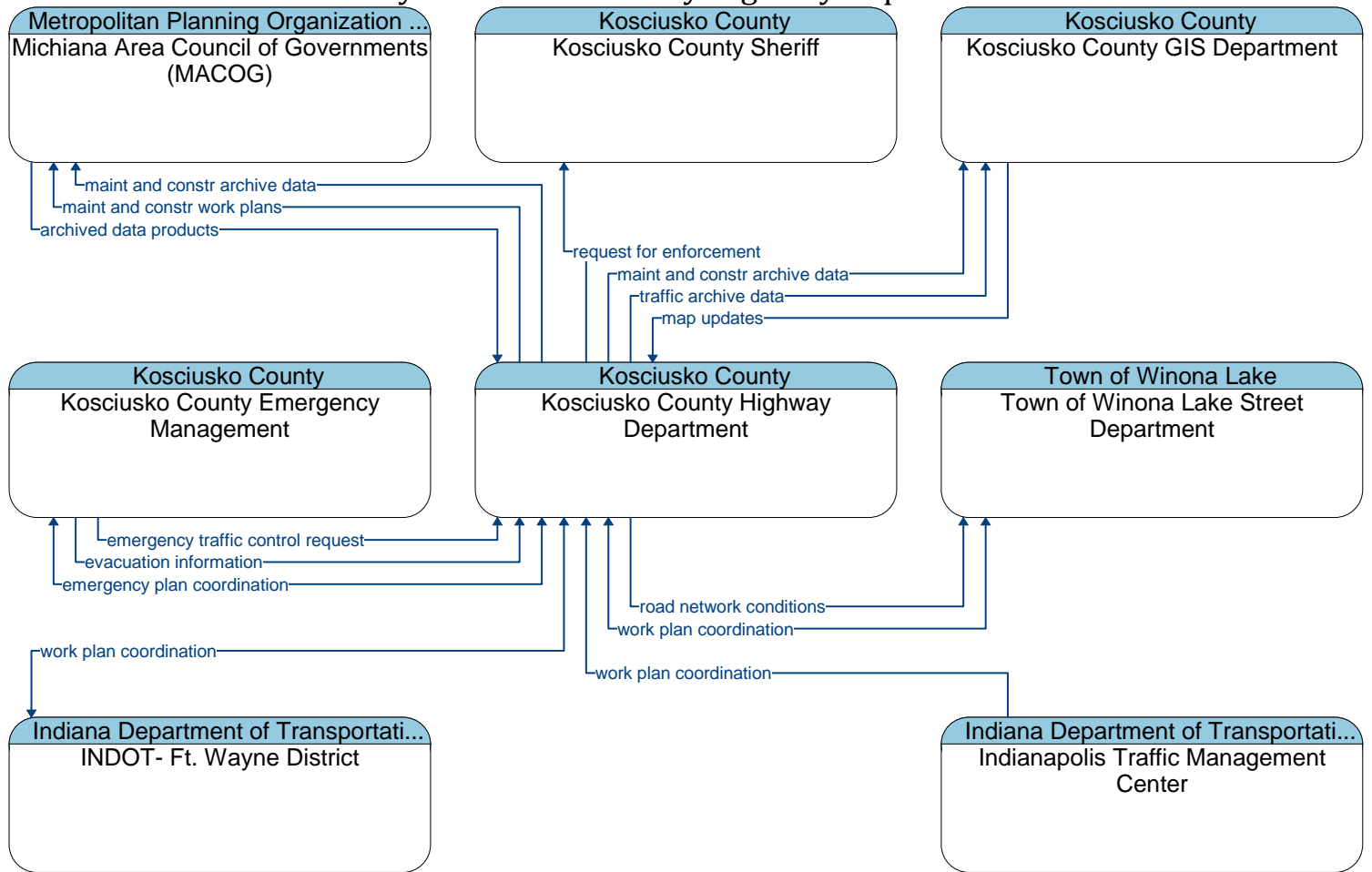


Counties: Kosciusko County - Kosciusko County GIS Department



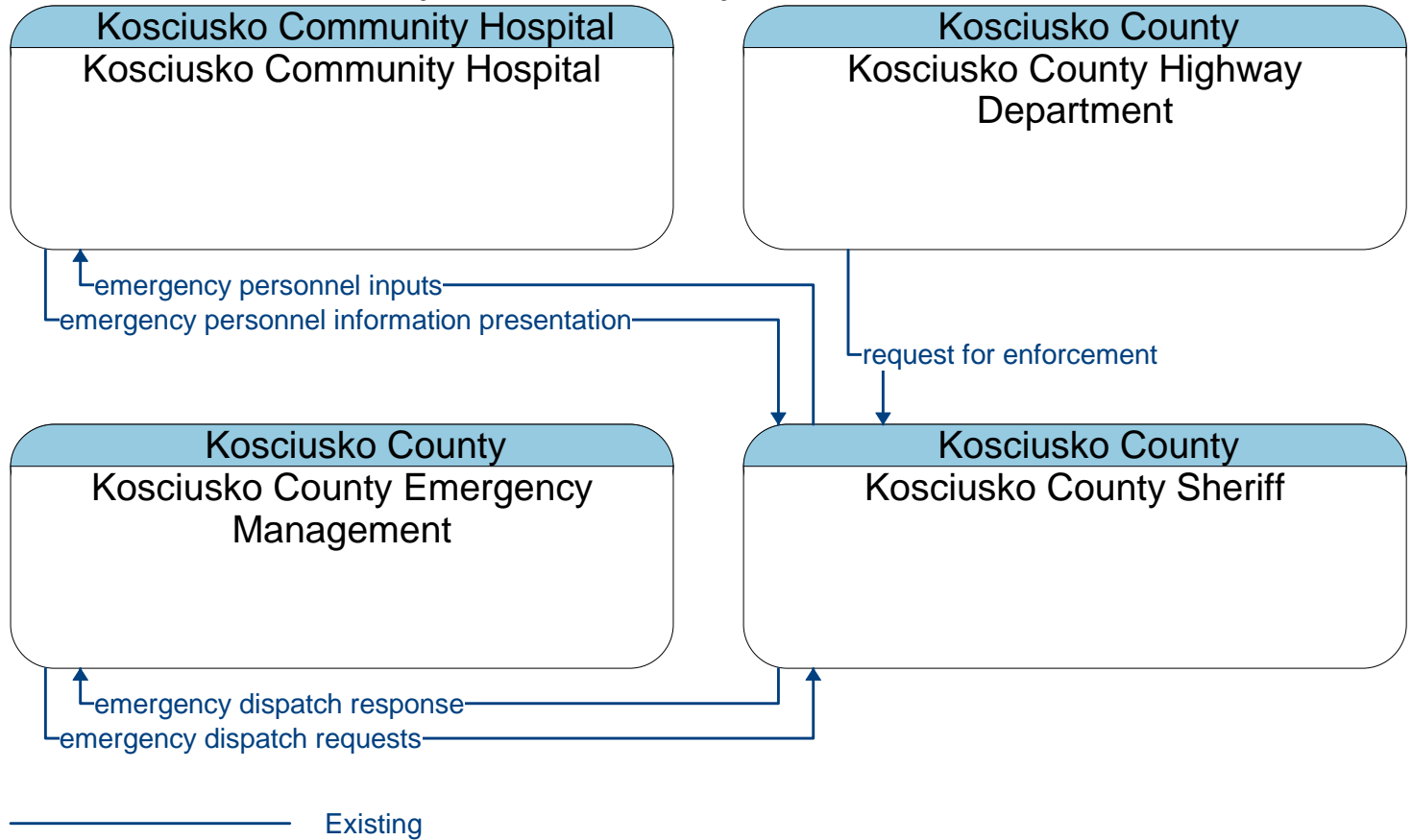
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Counties: Kosciusko County - Kosciusko County Highway Department

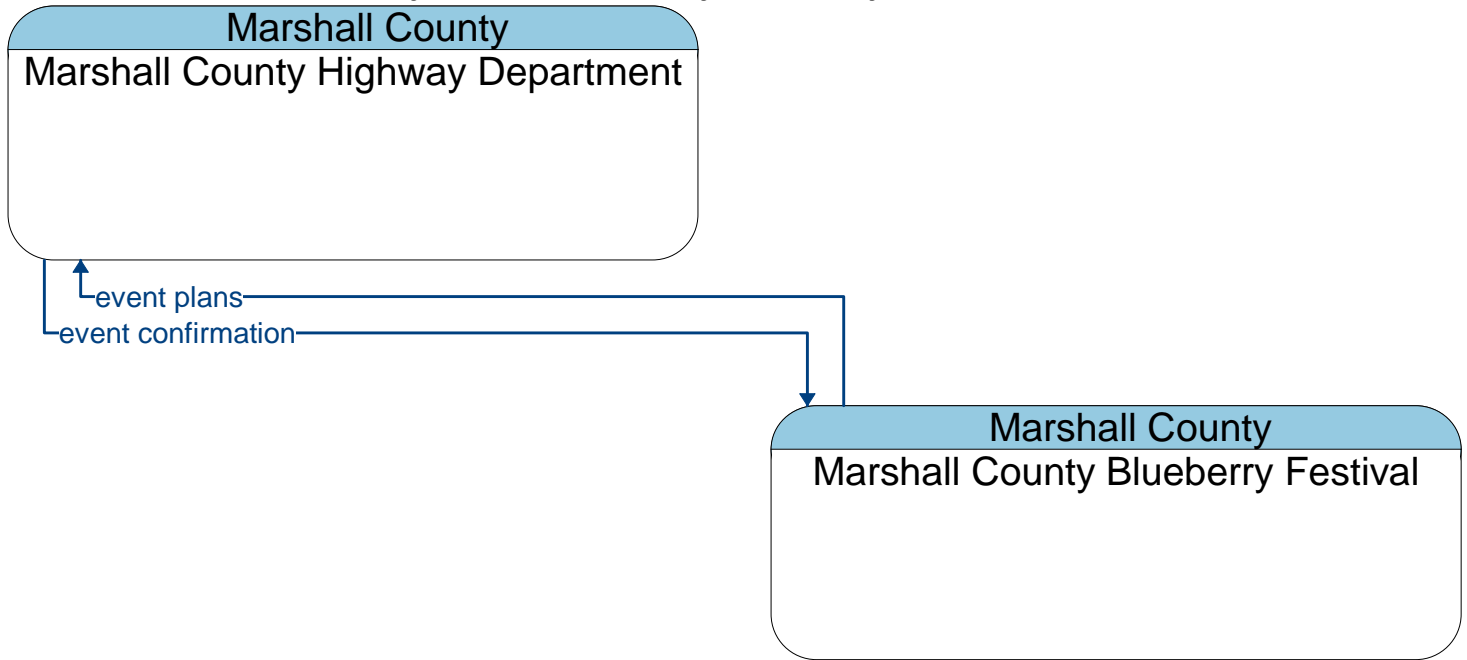


Existing

Counties: Kosciusko County - Kosciusko County Sheriff

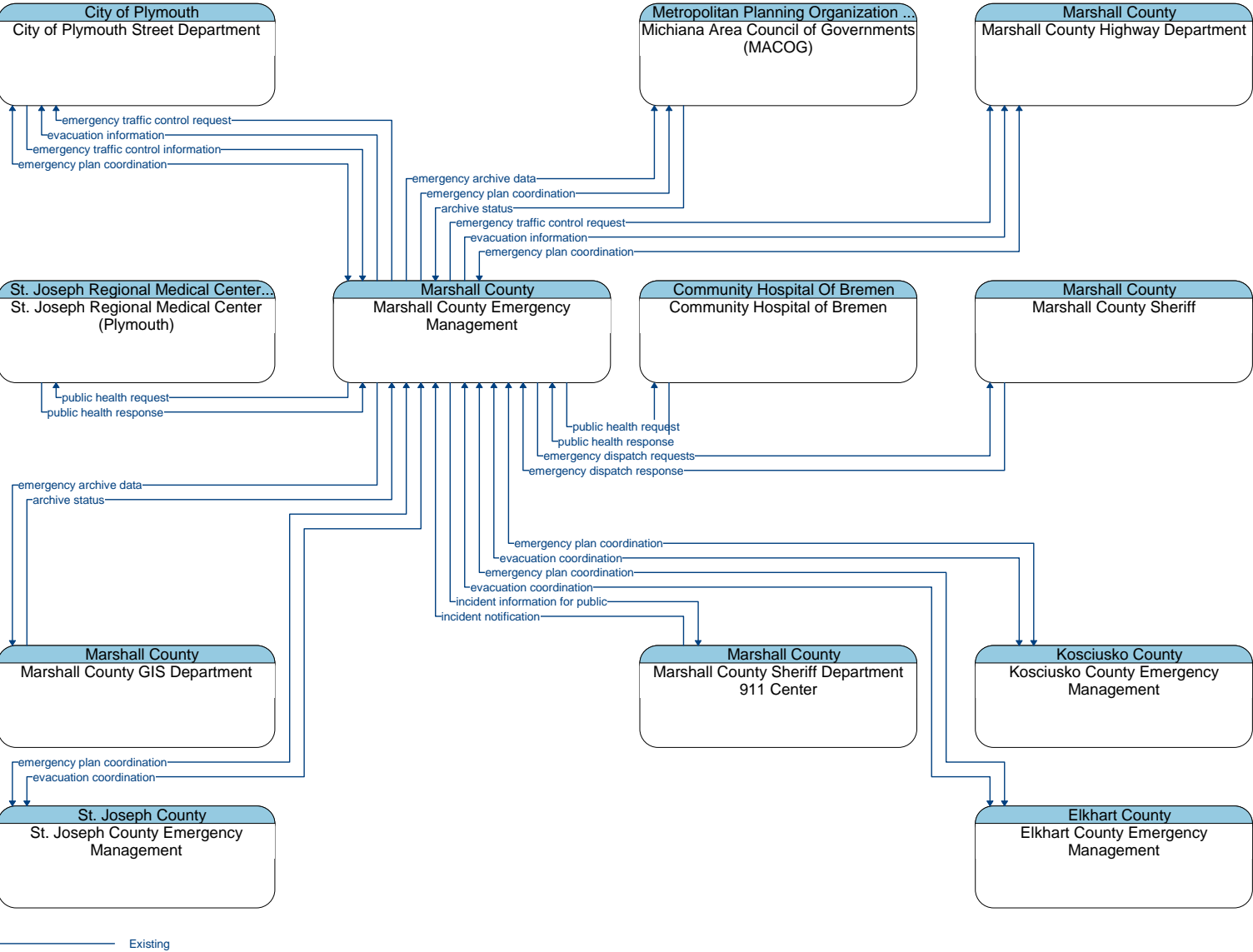


Counties: Marshall County - Marshall County Blueberry Festival

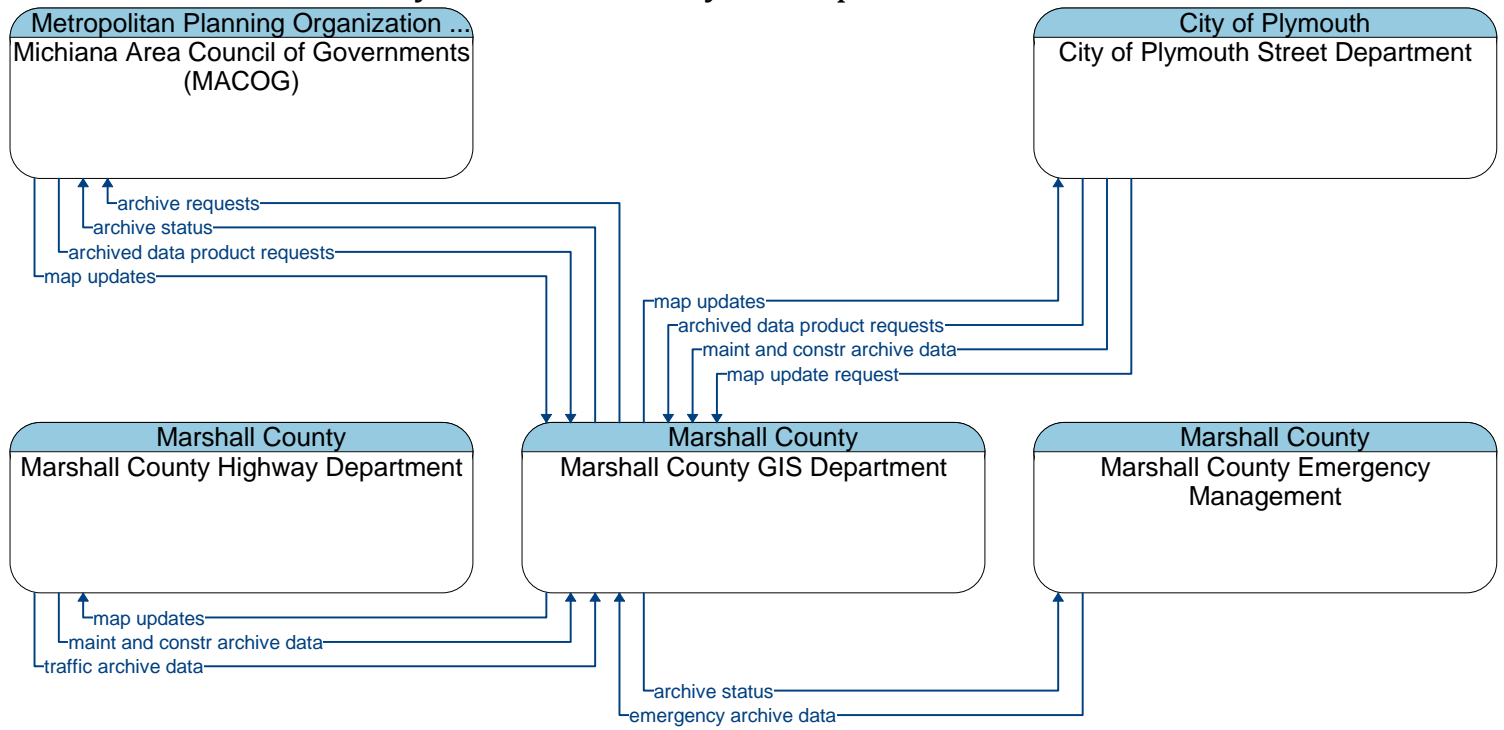


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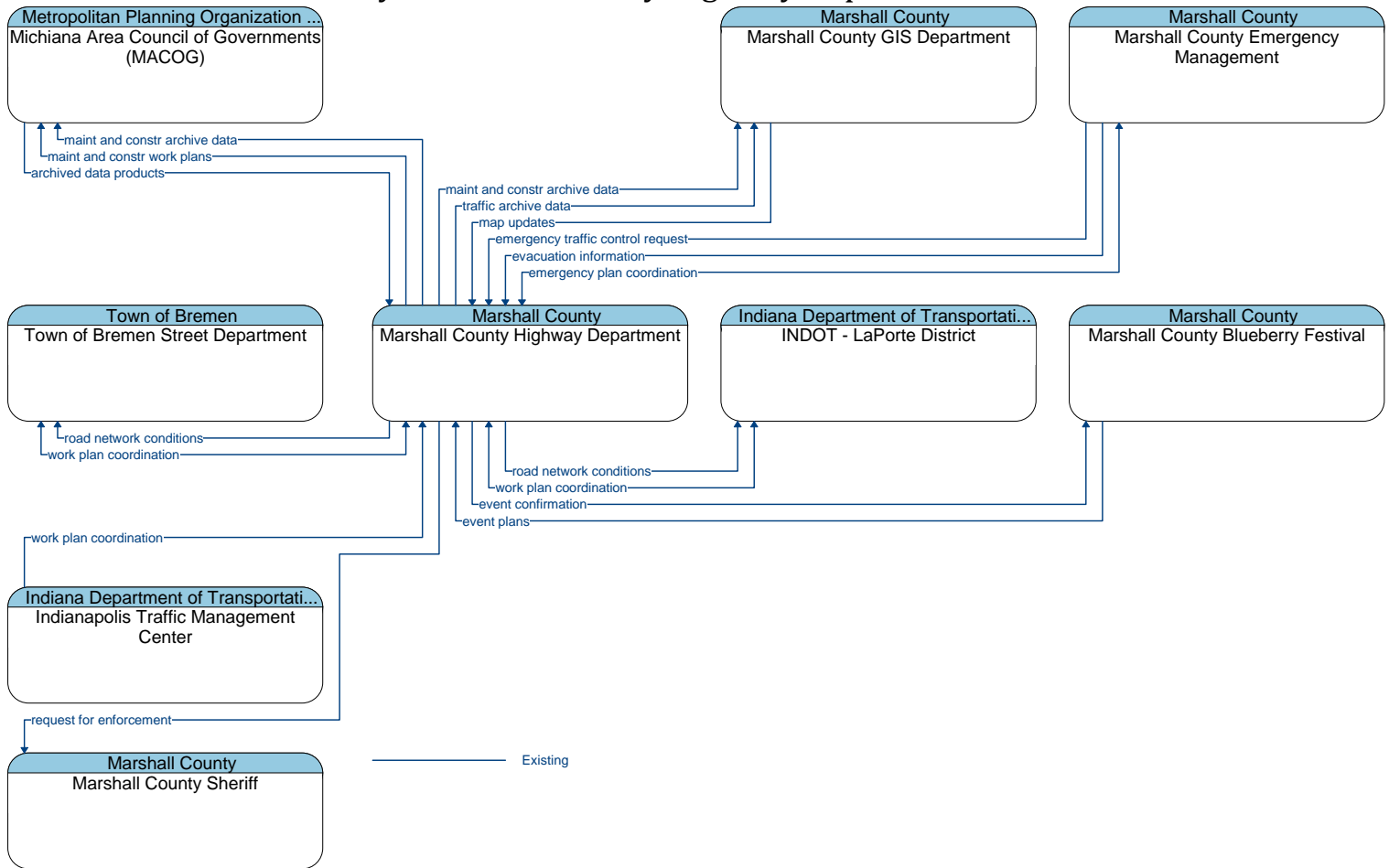


Counties: Marshall County - Marshall County GIS Department

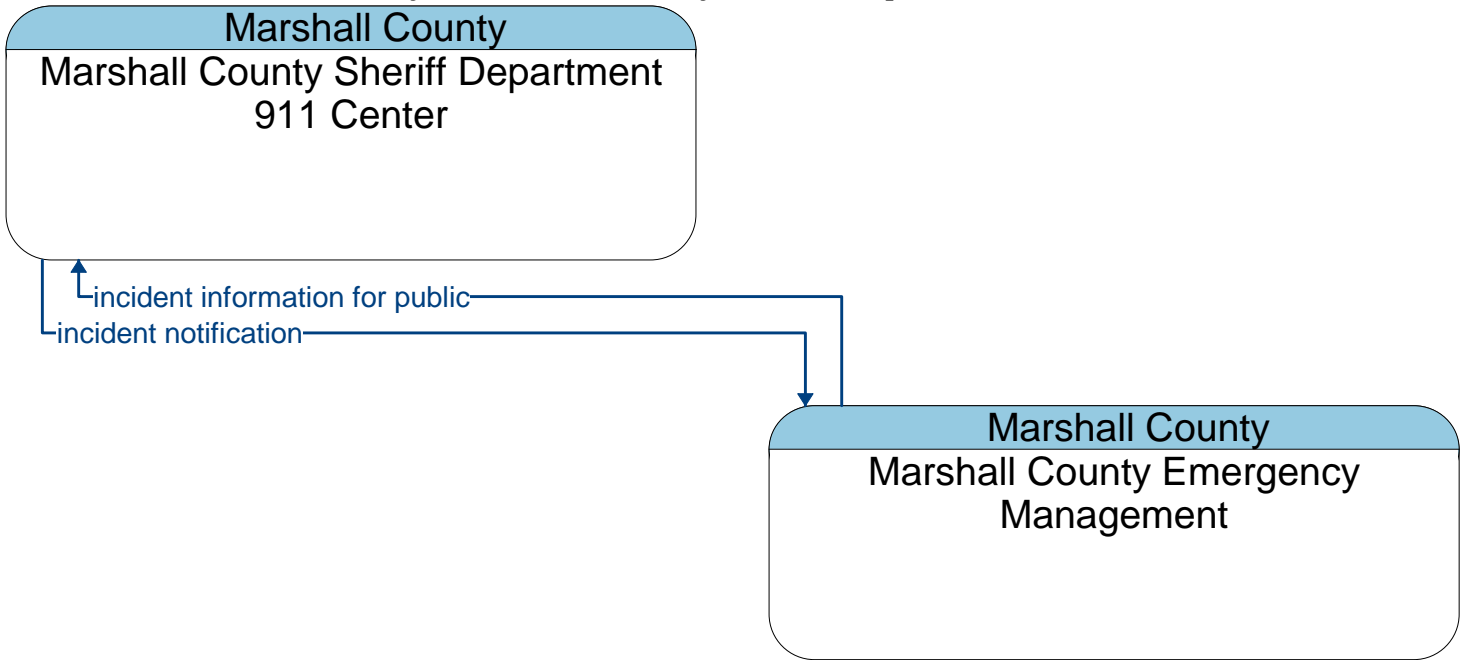


Existing

Counties: Marshall County - Marshall County Highway Department

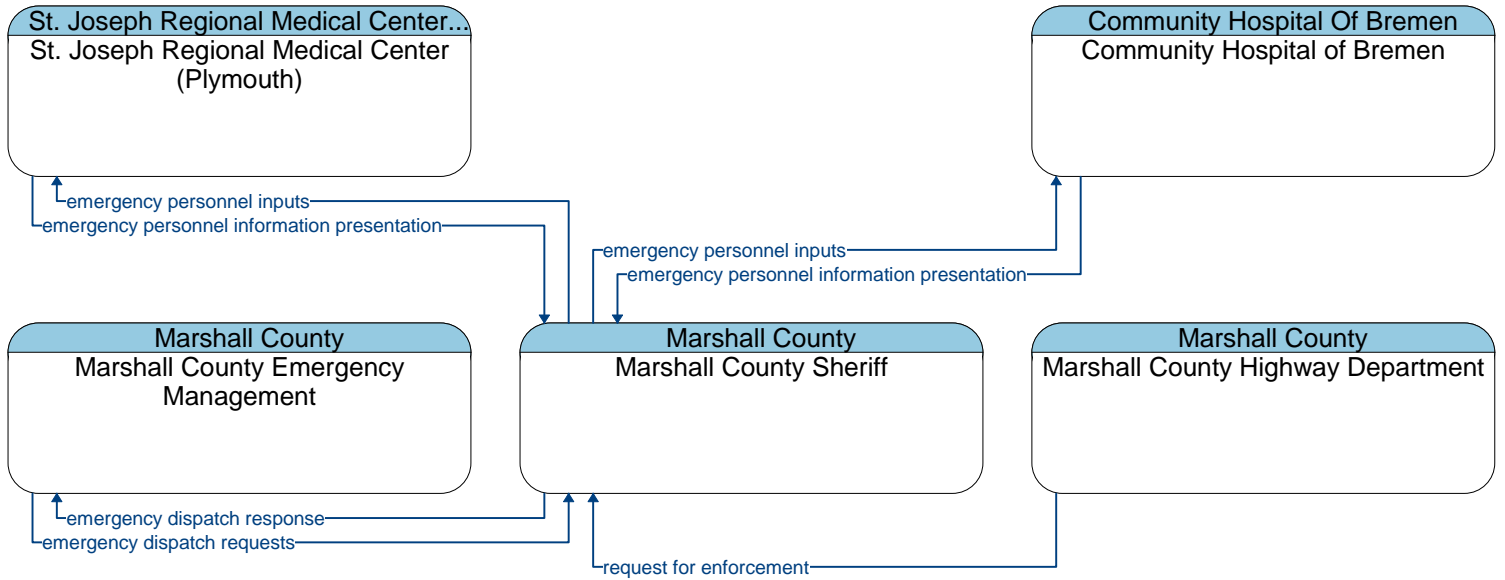


Counties: Marshall County - Marshall County Sheriff Department 911 Center



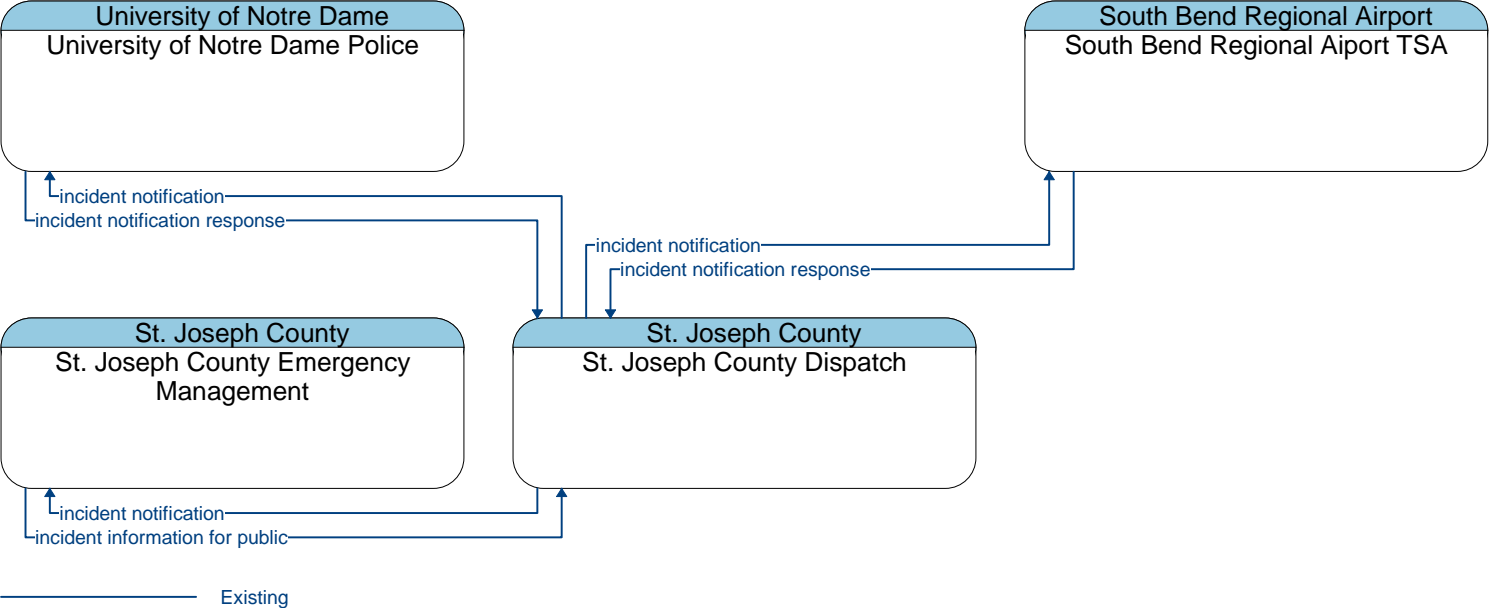
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Counties: Marshall County - Marshall County Sheriff

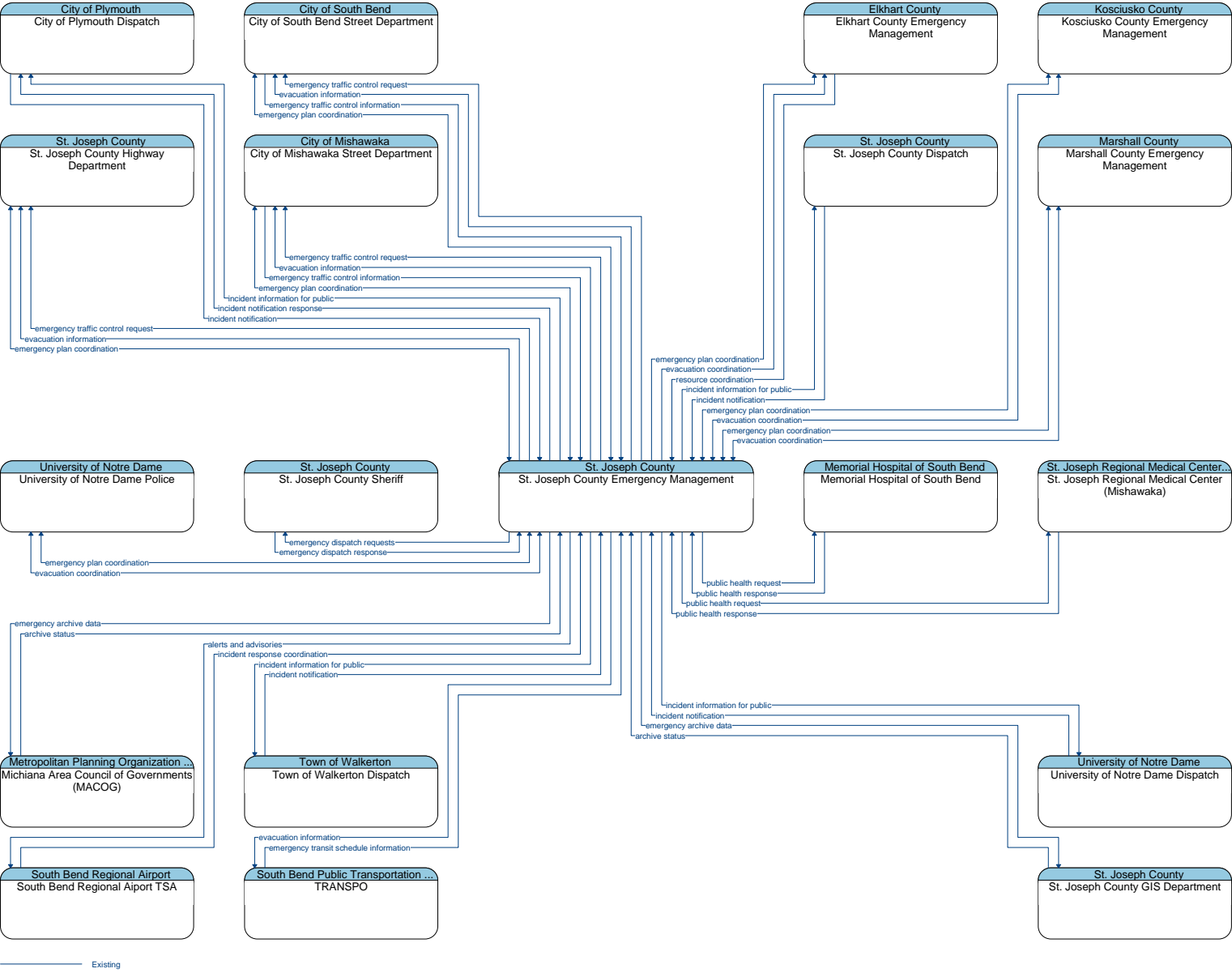


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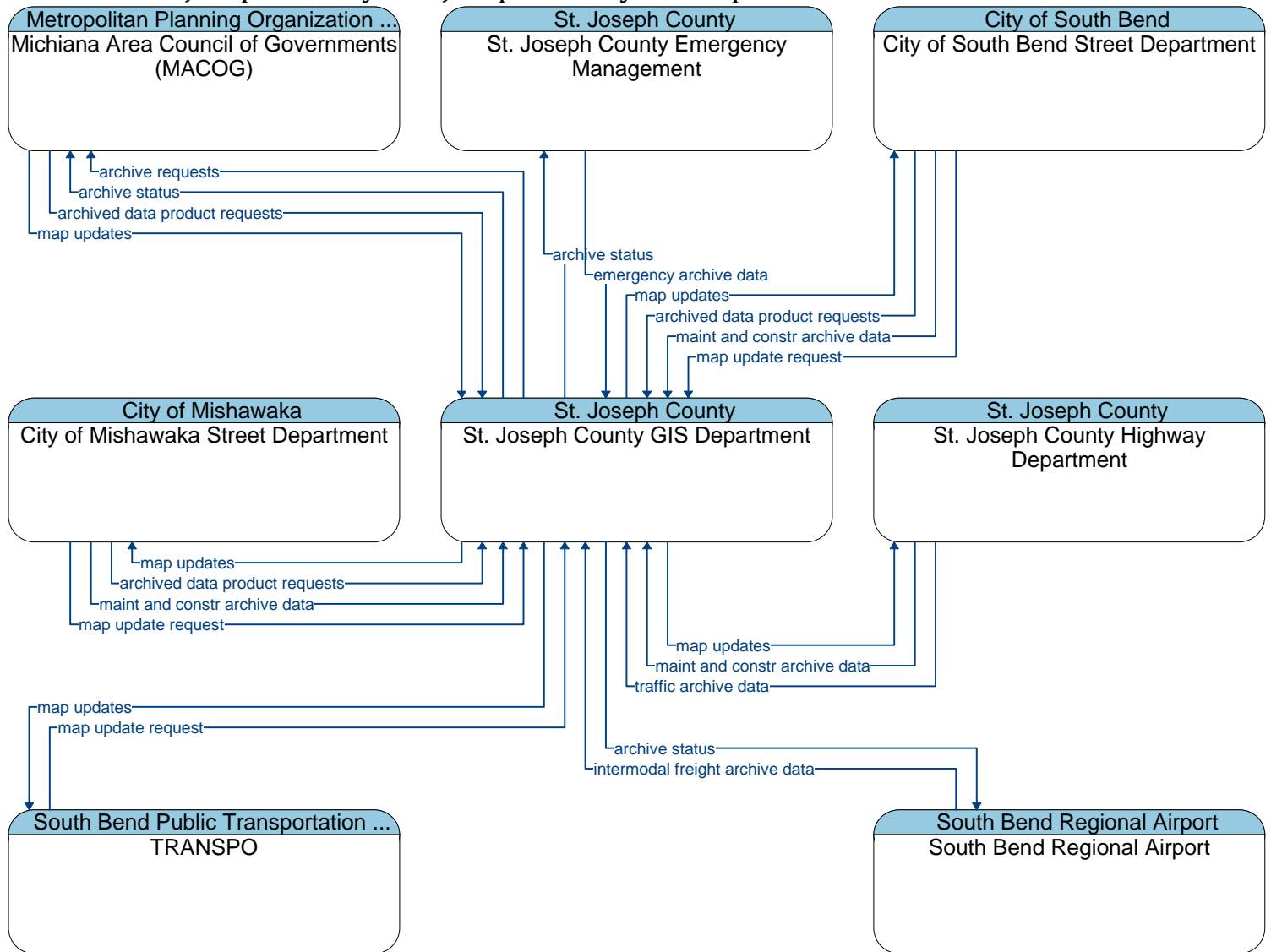
Counties: St. Joseph County - St. Joseph County Dispatch



Counties: St. Joseph County - St. Joseph County Emergency Management

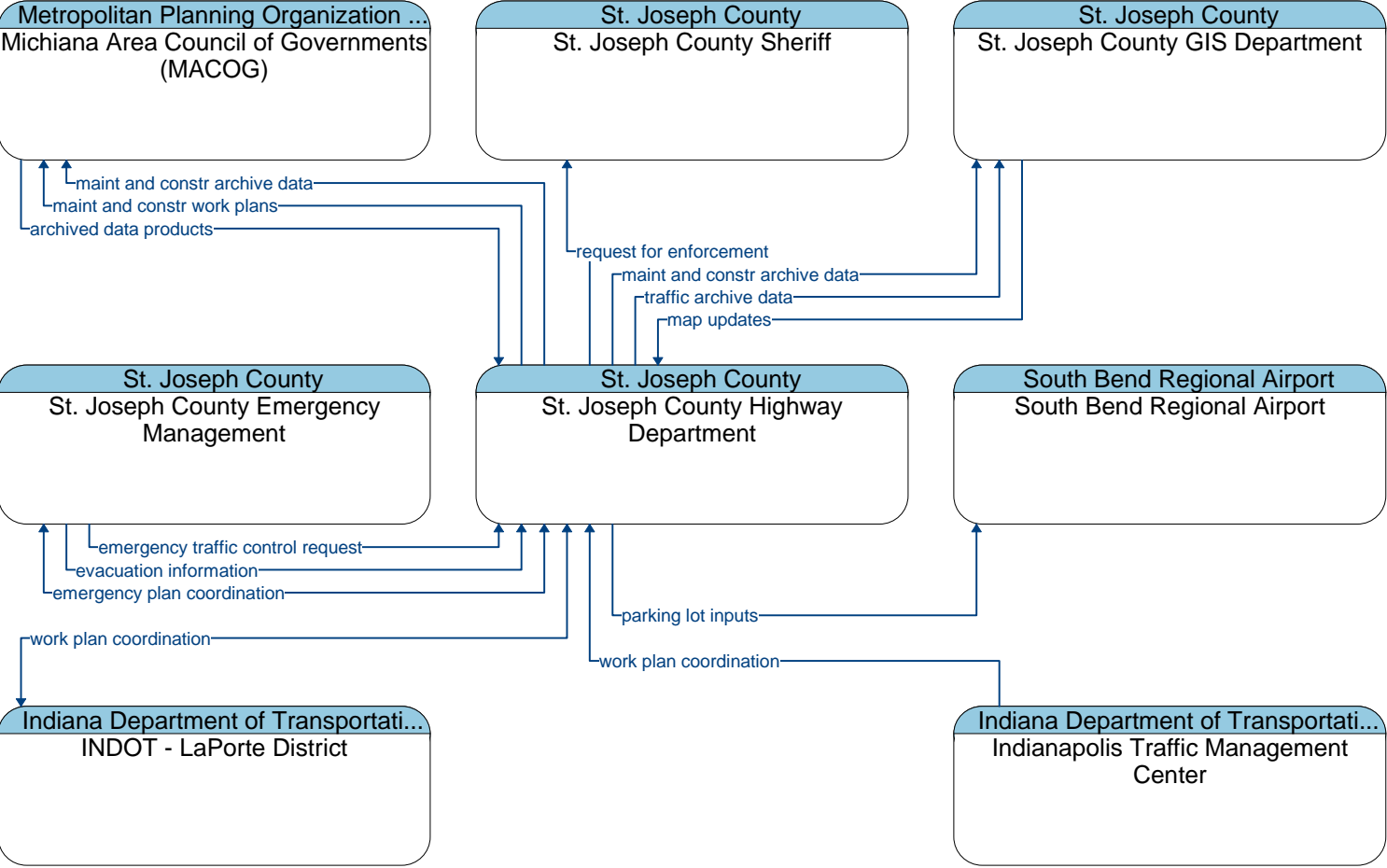


Counties: St. Joseph County - St. Joseph County GIS Department



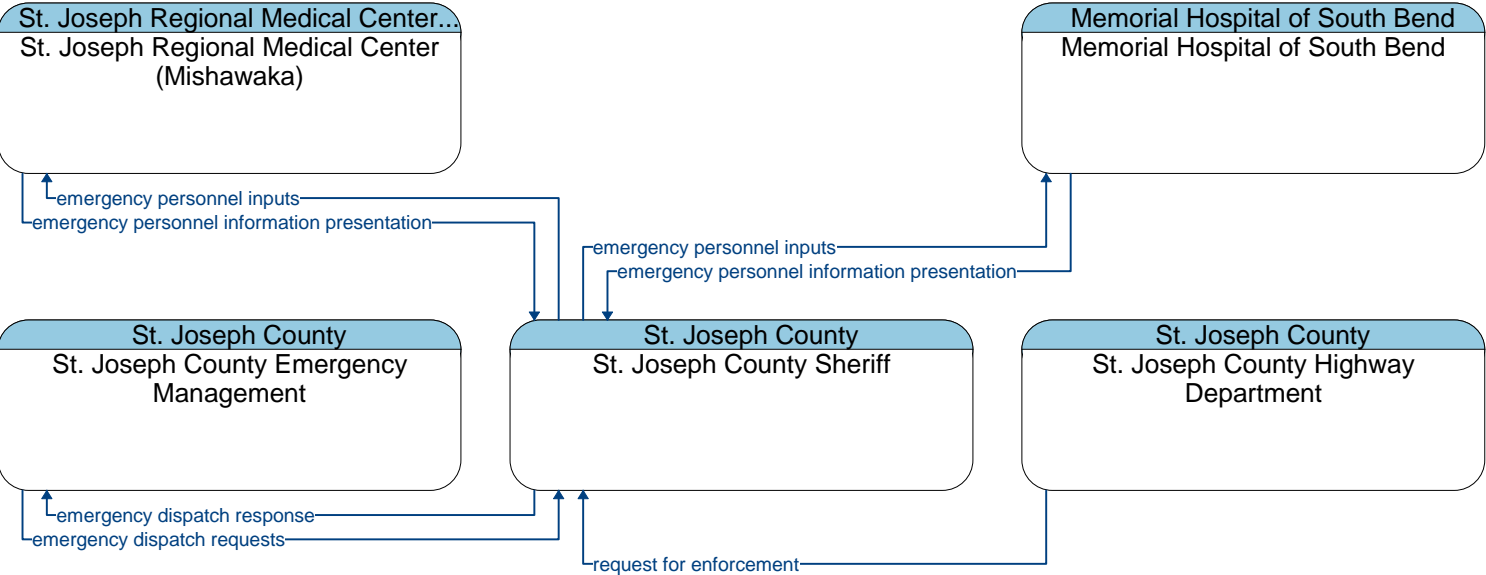
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Counties: St. Joseph County - St. Joseph County Highway Department



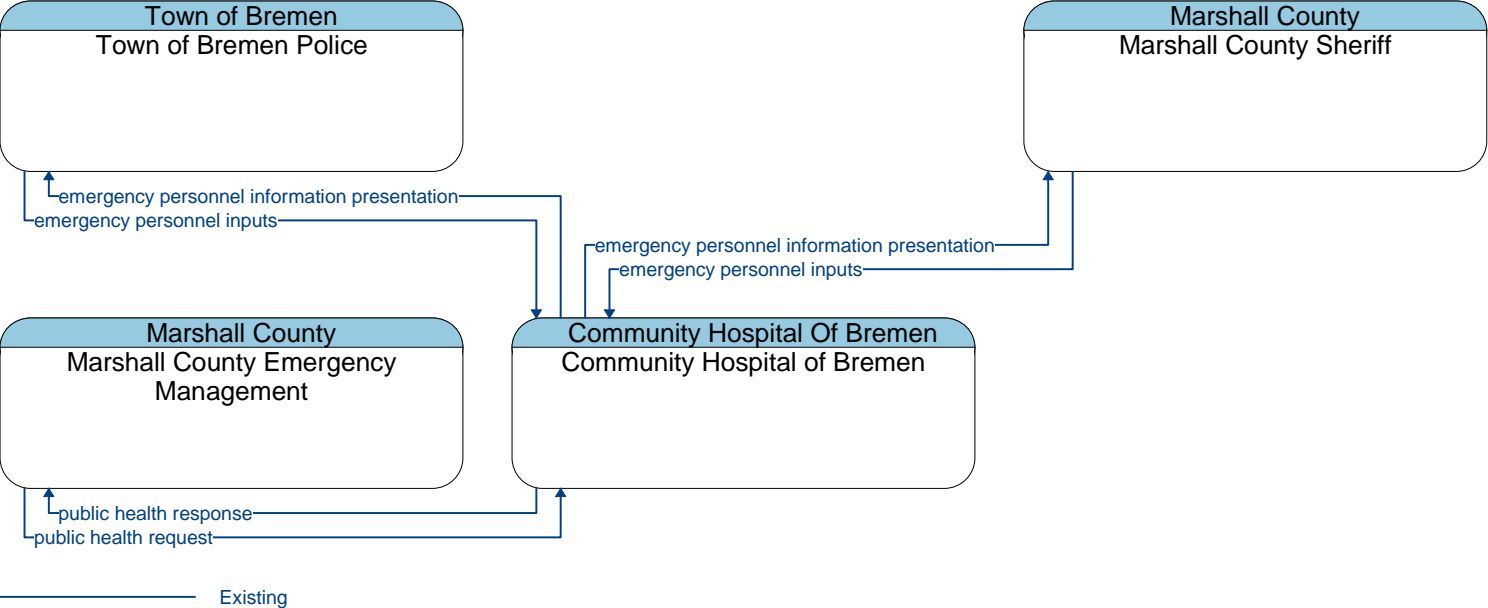
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Counties: St. Joseph County - St. Joseph County Sheriff

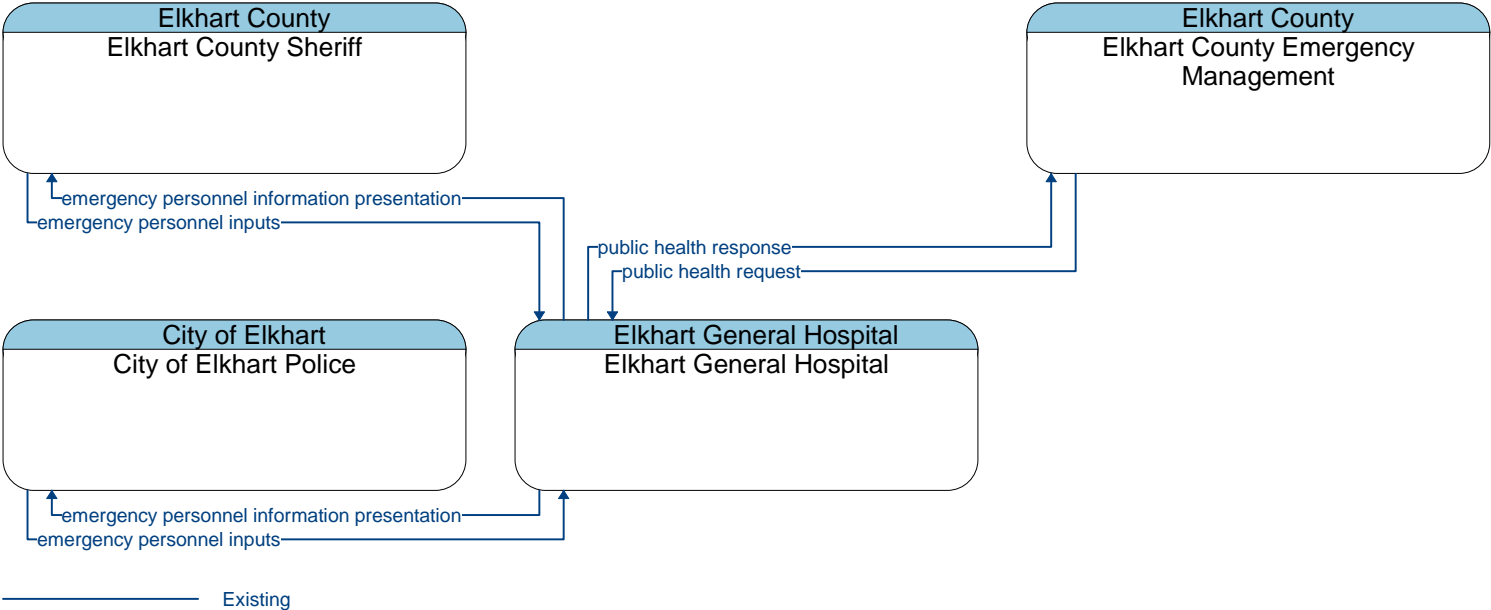


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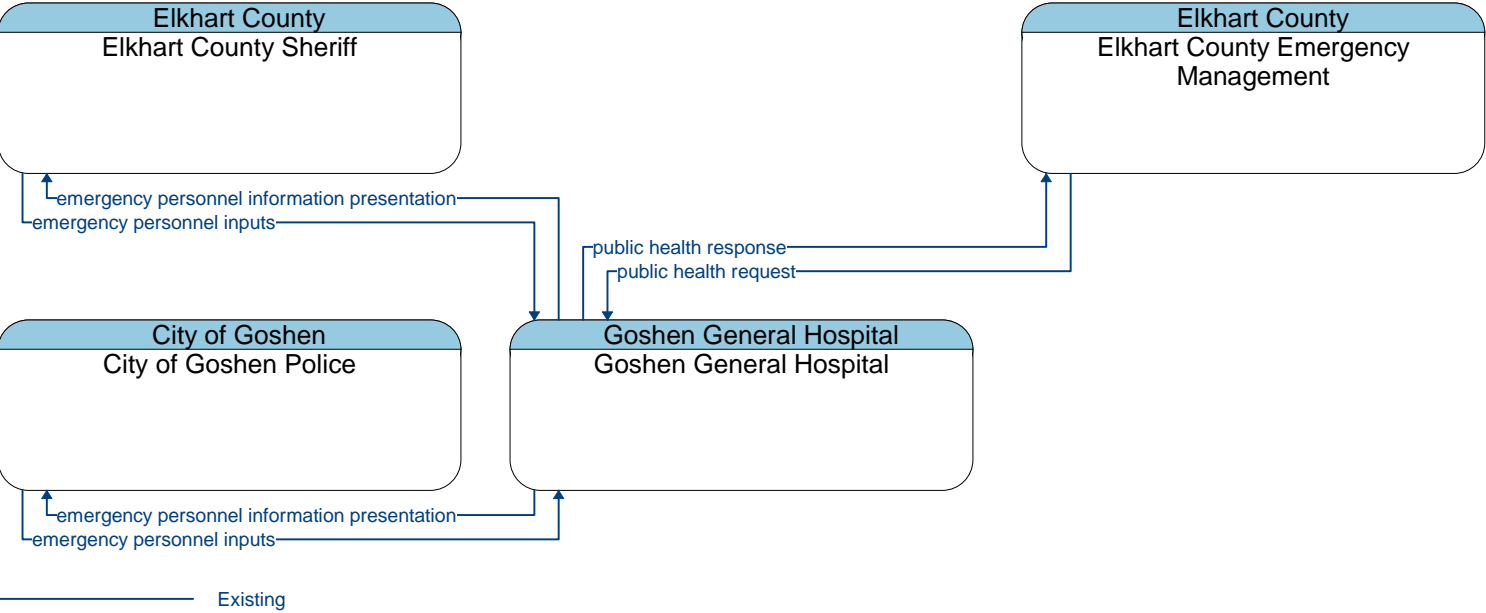
Hospitals: Community Hospital of Bremen



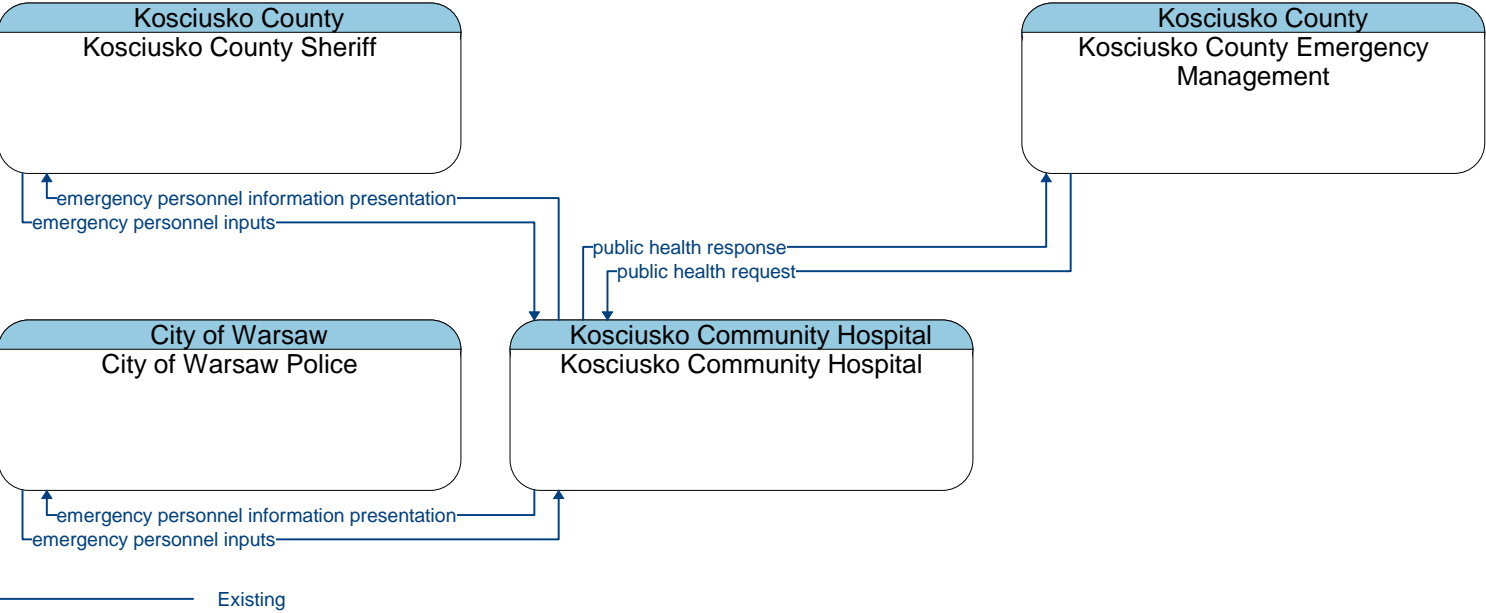
Hospitals: Elkhart General Hospital



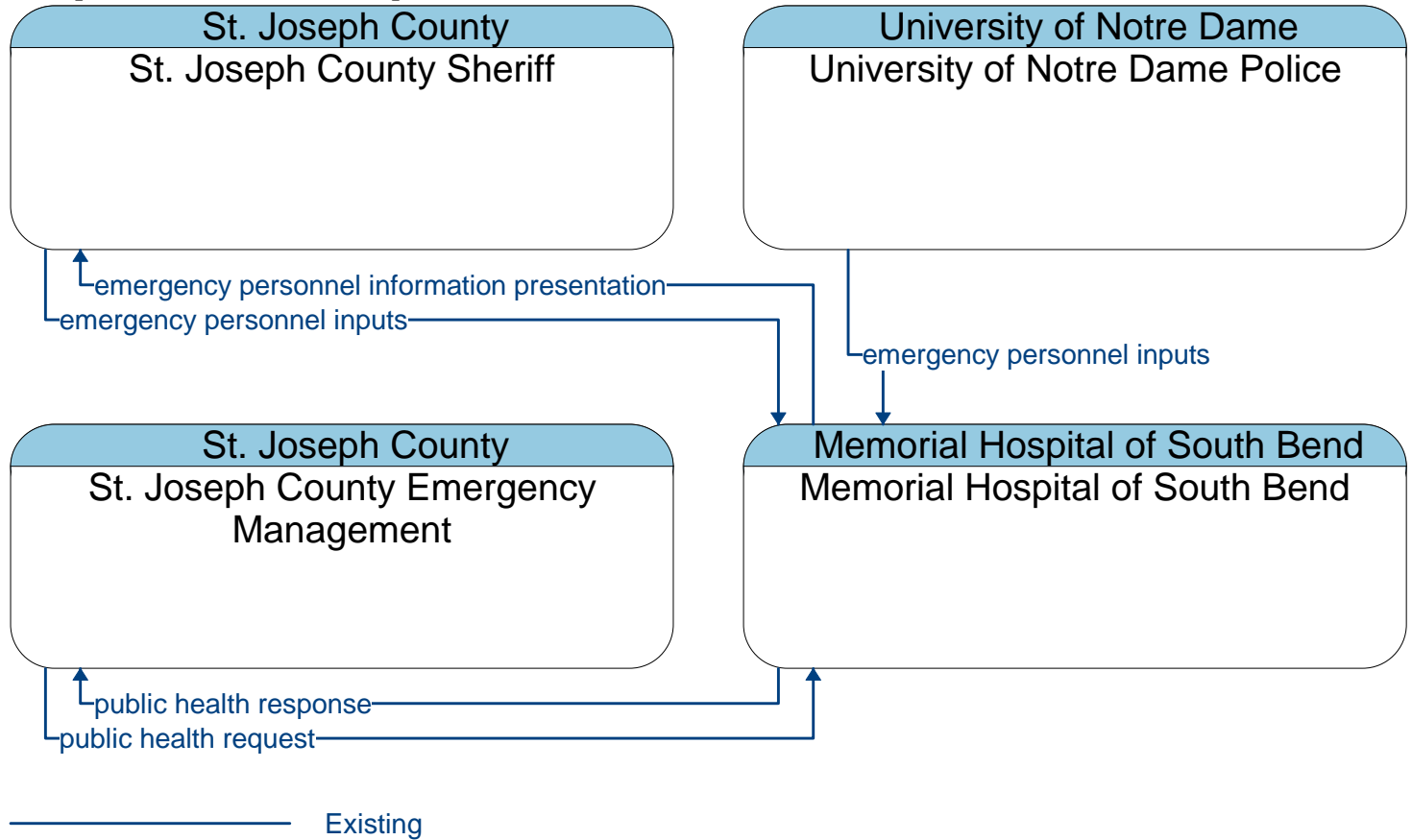
Hospitals: Goshen General Hospital



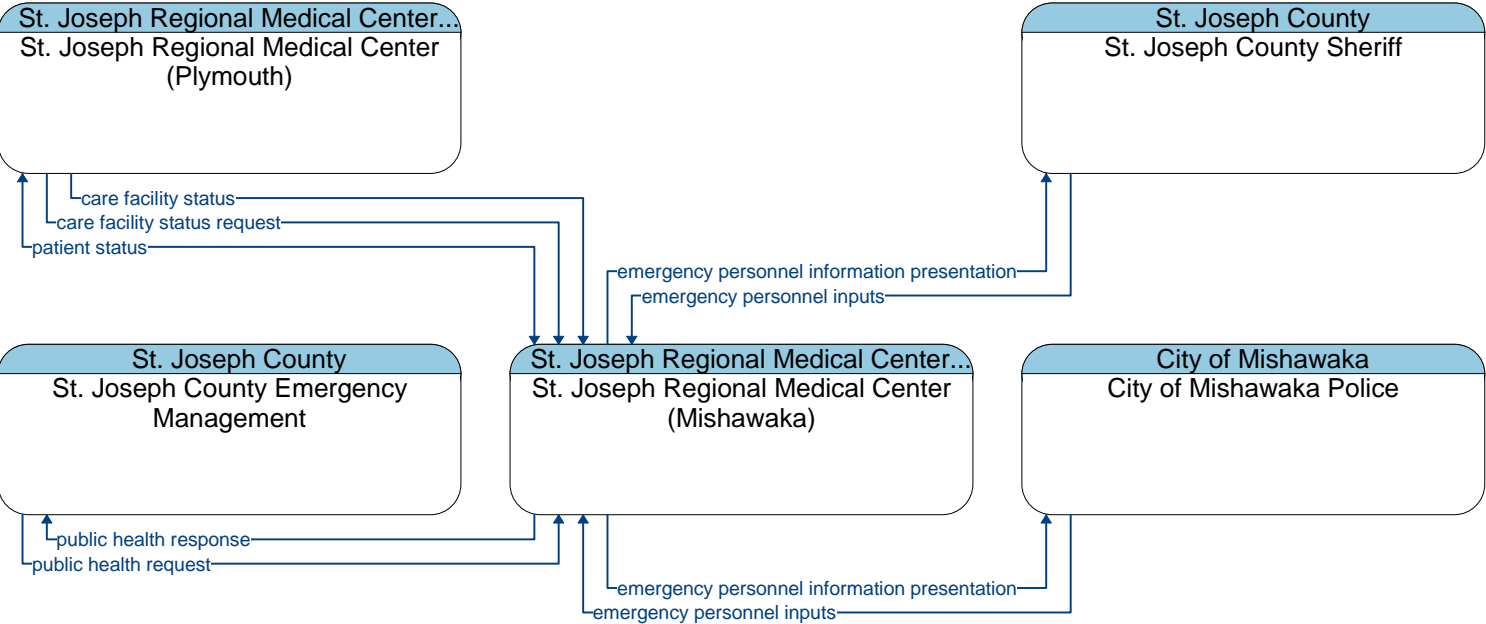
Hospitals: Kosciusko Community Hospital



Hospitals: Memorial Hospital of South Bend

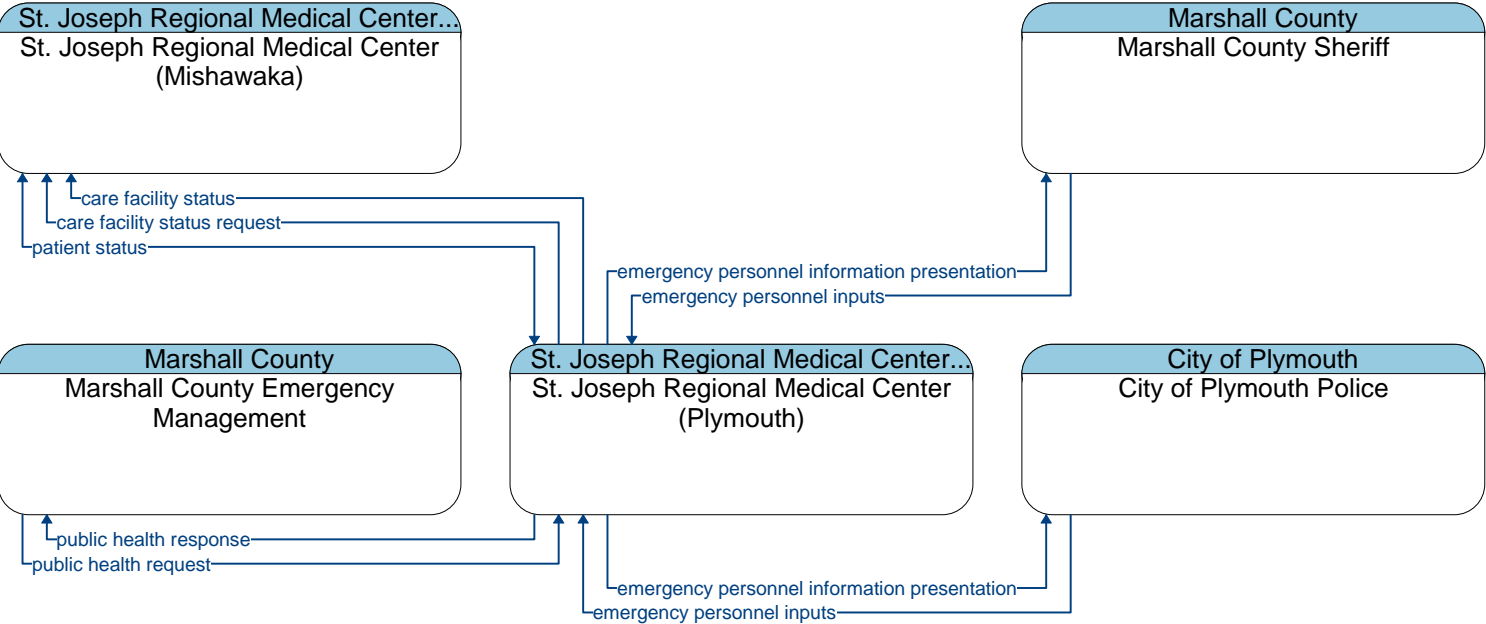


Hospitals: St. Joseph Regional Medical Center (Mishawaka)



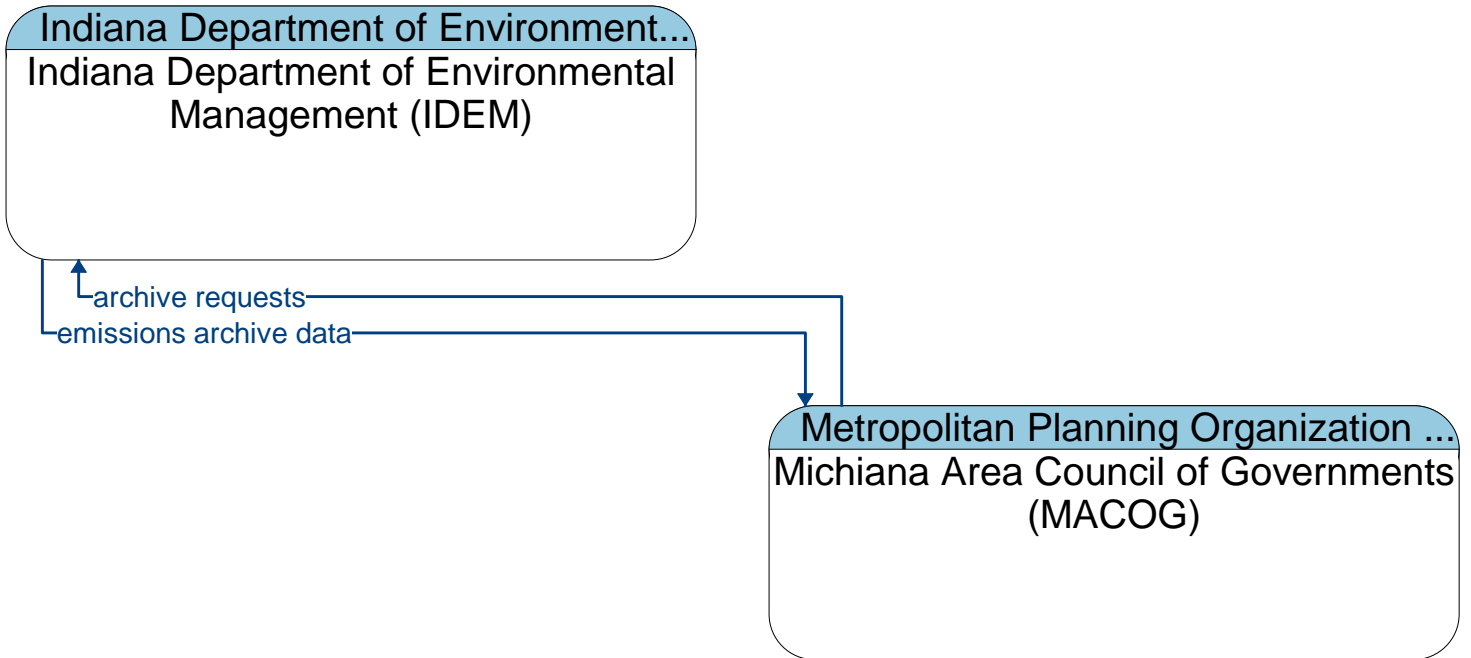
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Hospitals: St. Joseph Regional Medical Center (Plymouth)



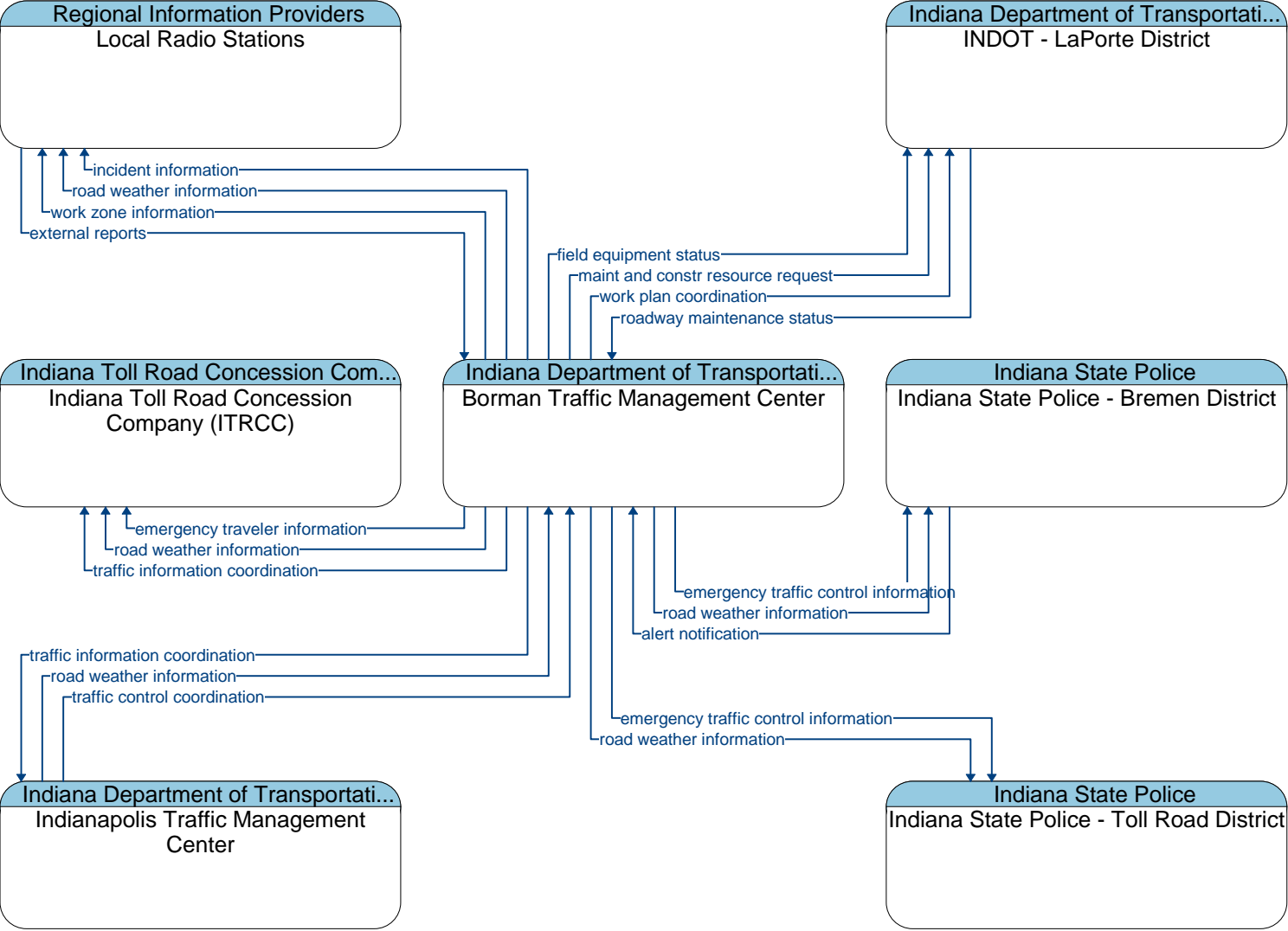
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Indiana Department of Environmental Management (IDEM)



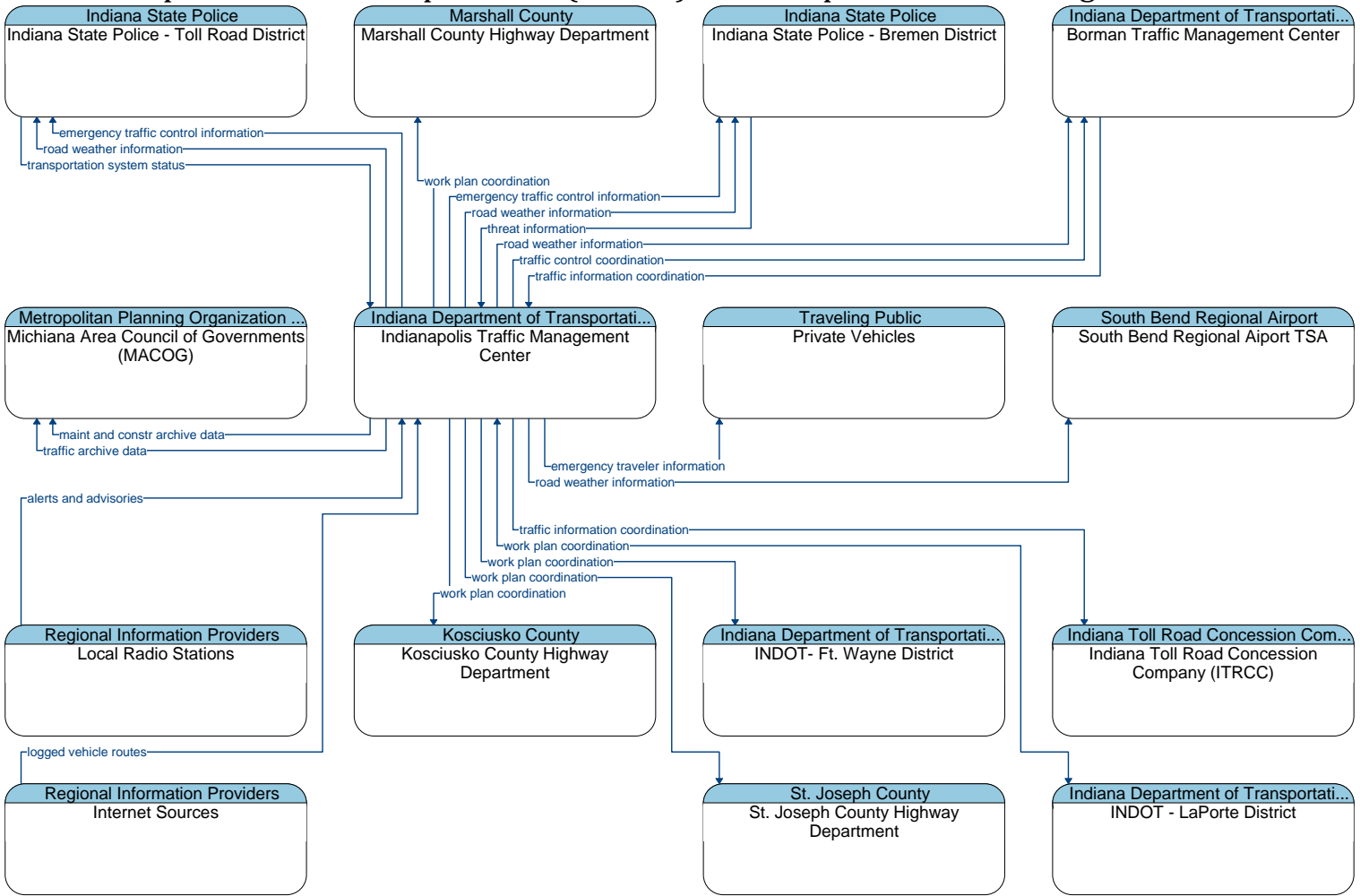
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Indiana Department of Transportation (INDOT) - Borman Traffic Management Center



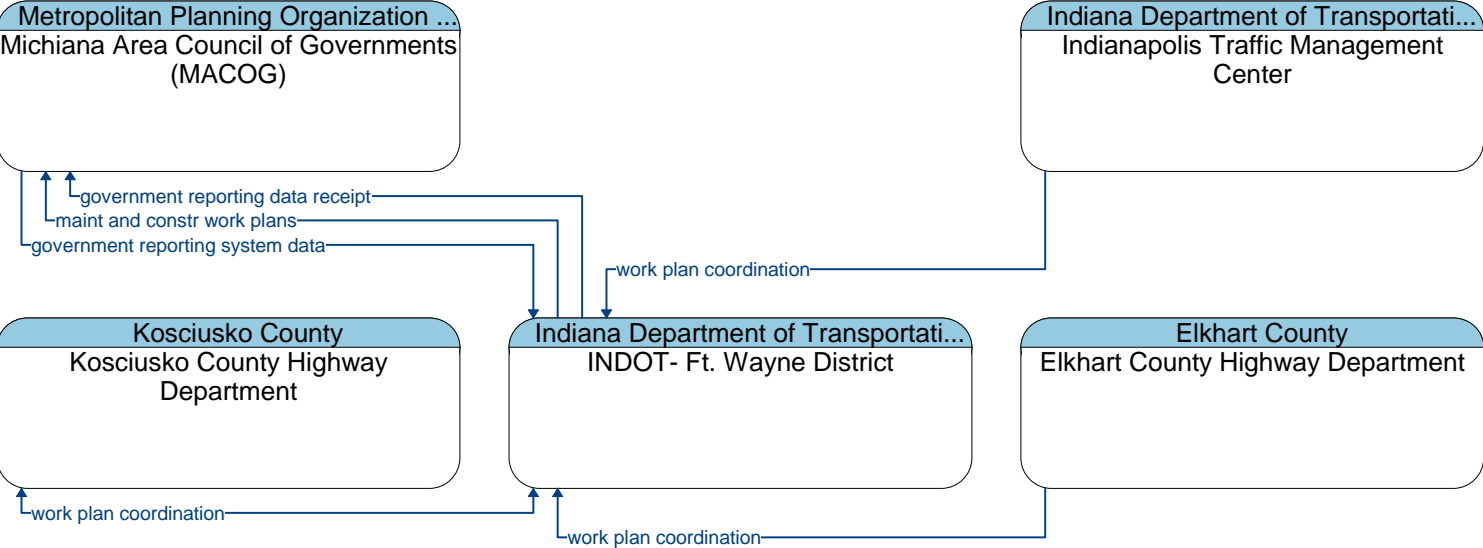
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Indiana Department of Transportation (INDOT) - Indianapolis Traffic Management Center



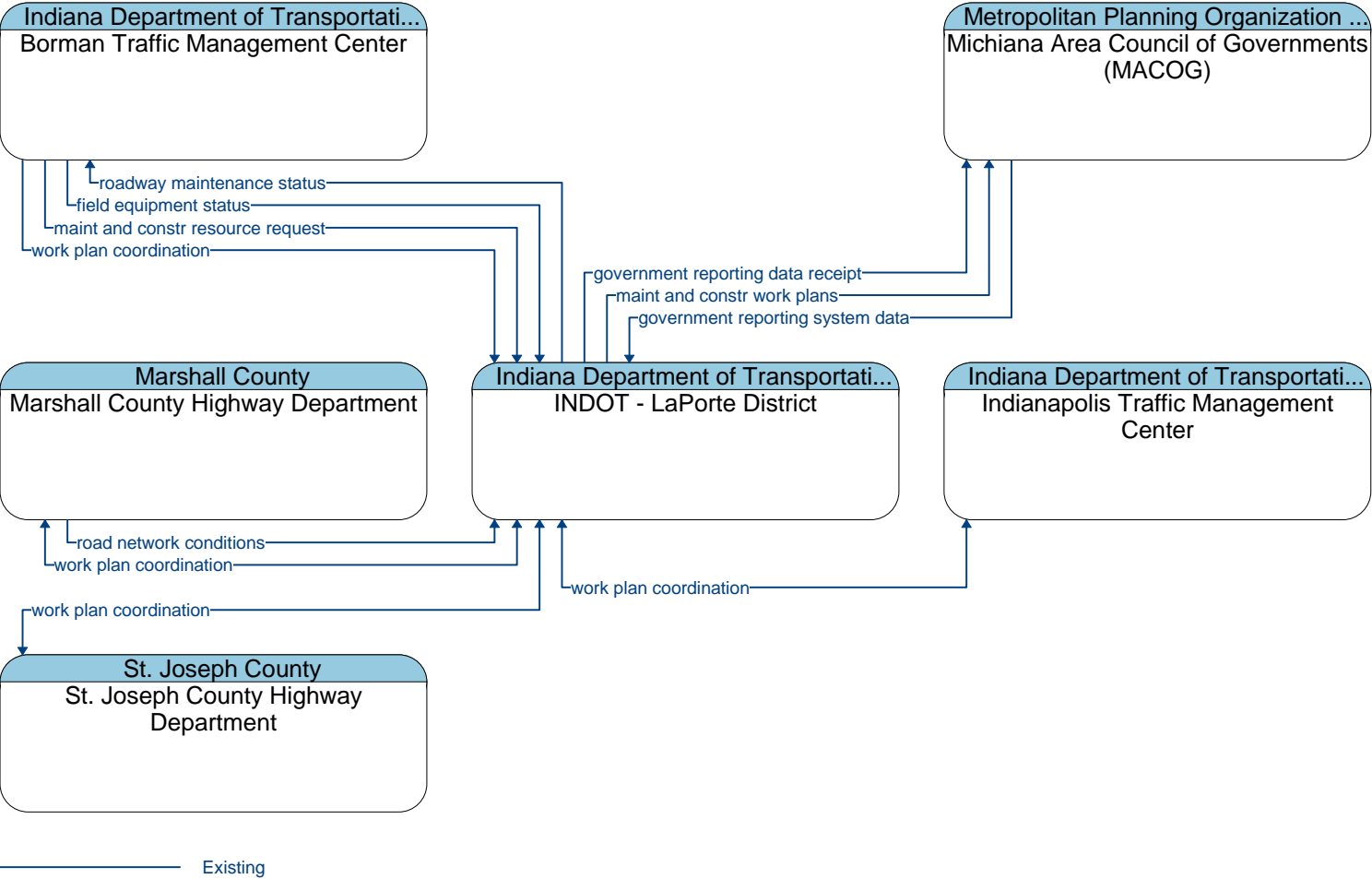
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Indiana Department of Transportation (INDOT) - Ft. Wayne District

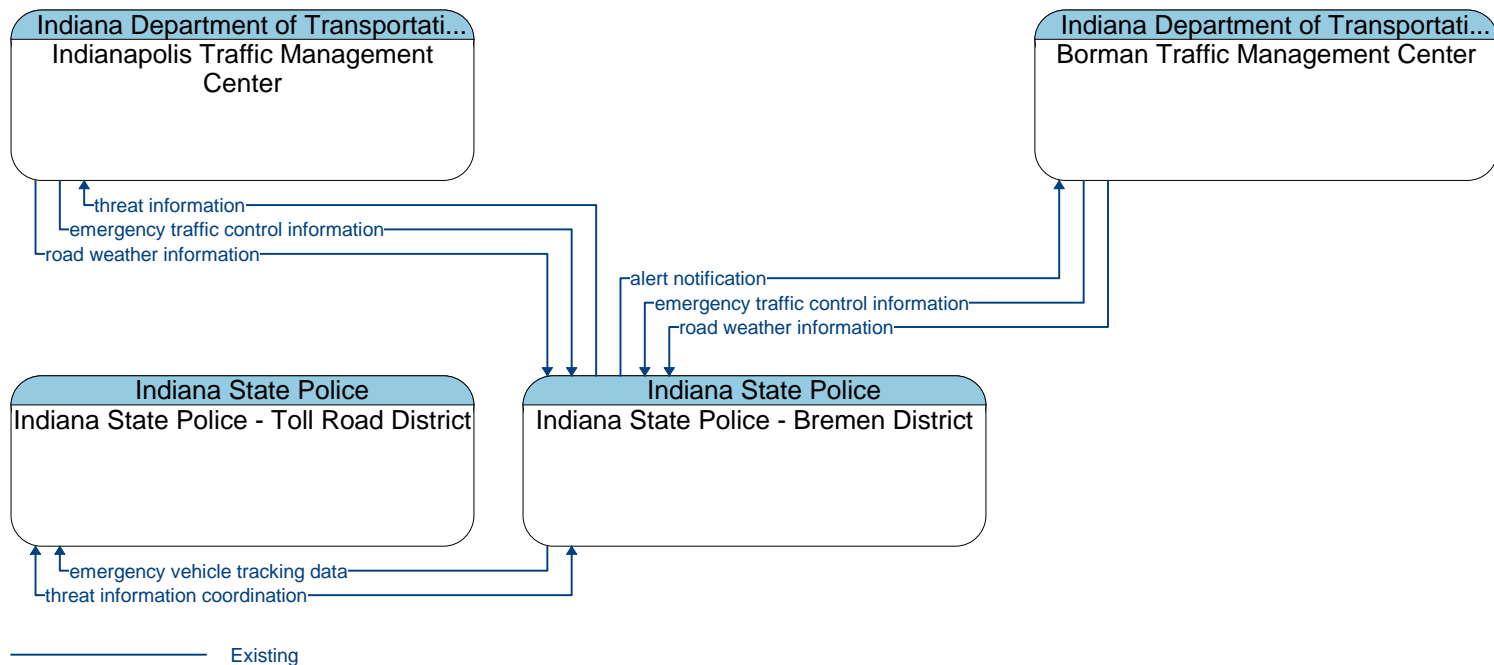


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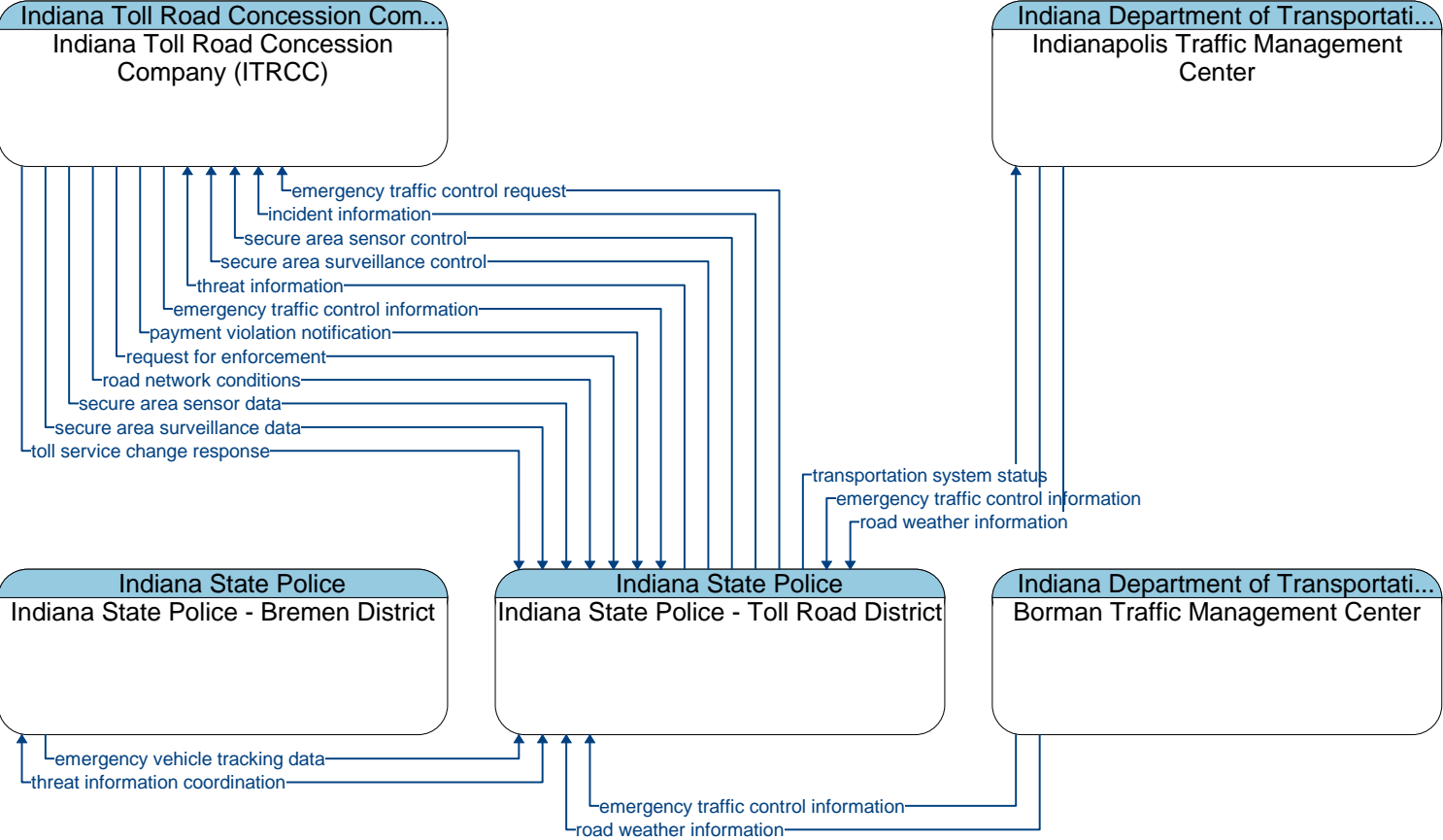
Indiana Department of Transportation (INDOT) - LaPorte District



Indiana State Police - Bremen District

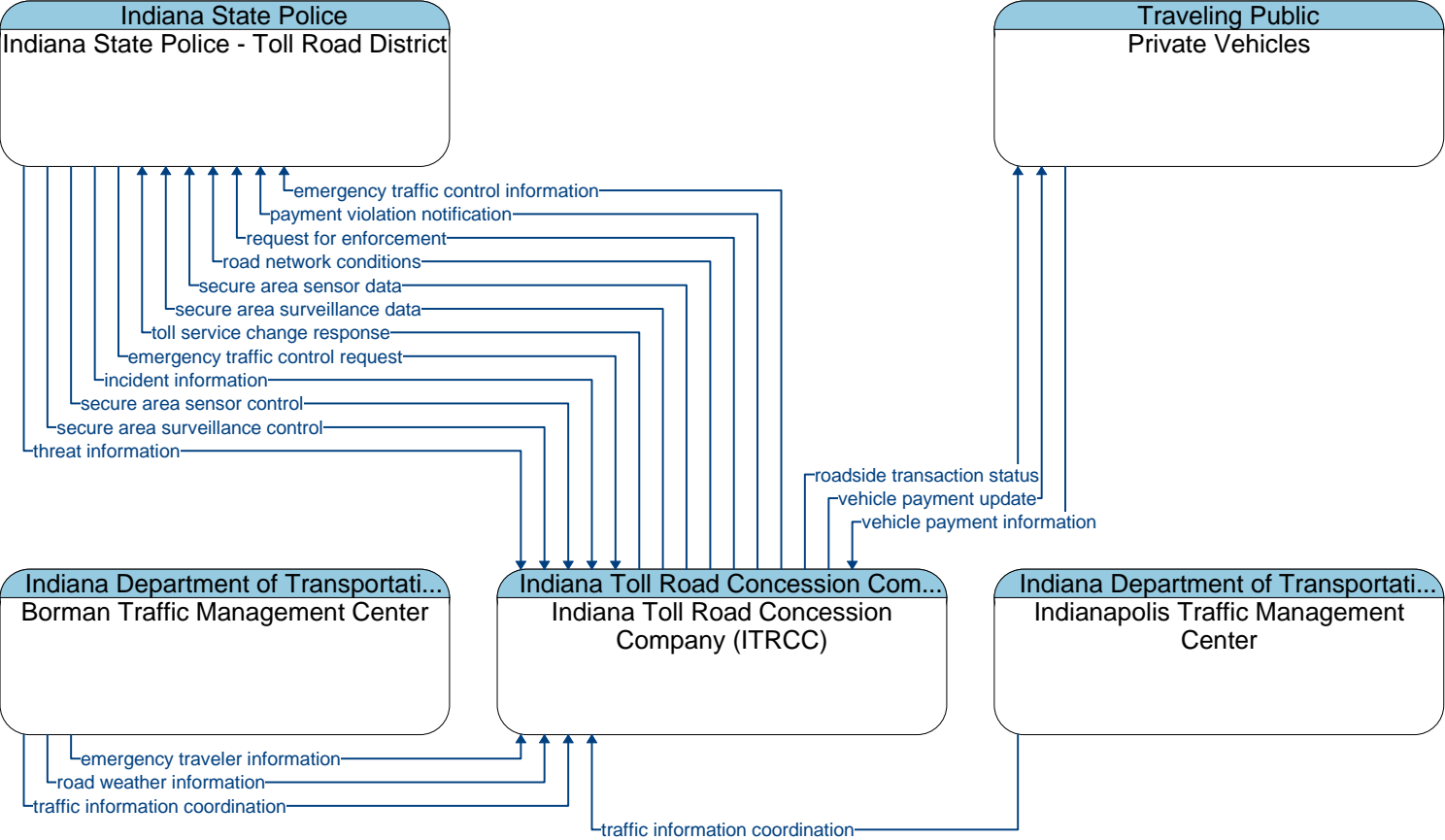


Indiana State Police - Toll Road District



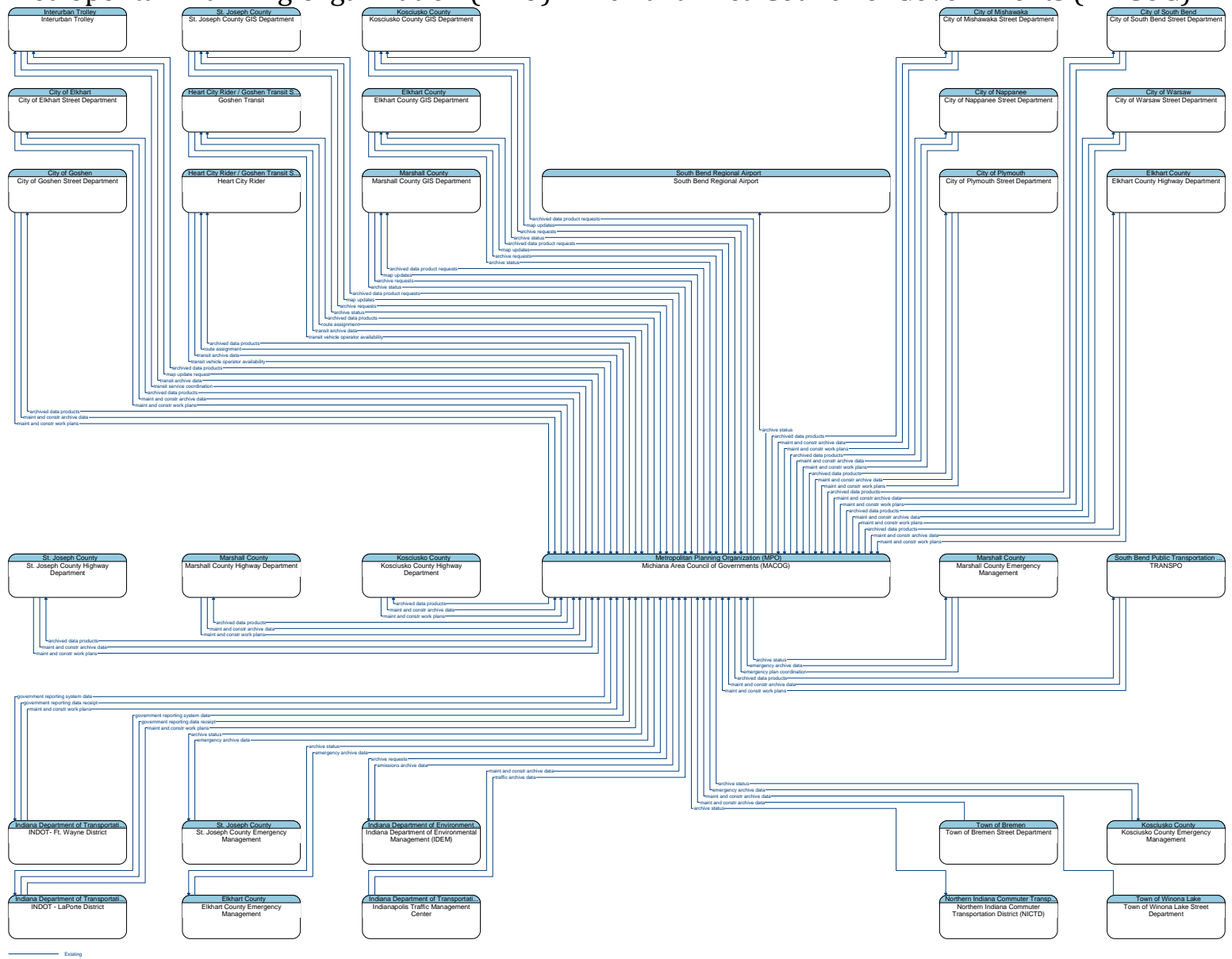
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Indiana Toll Road Concession Company (ITRCC)

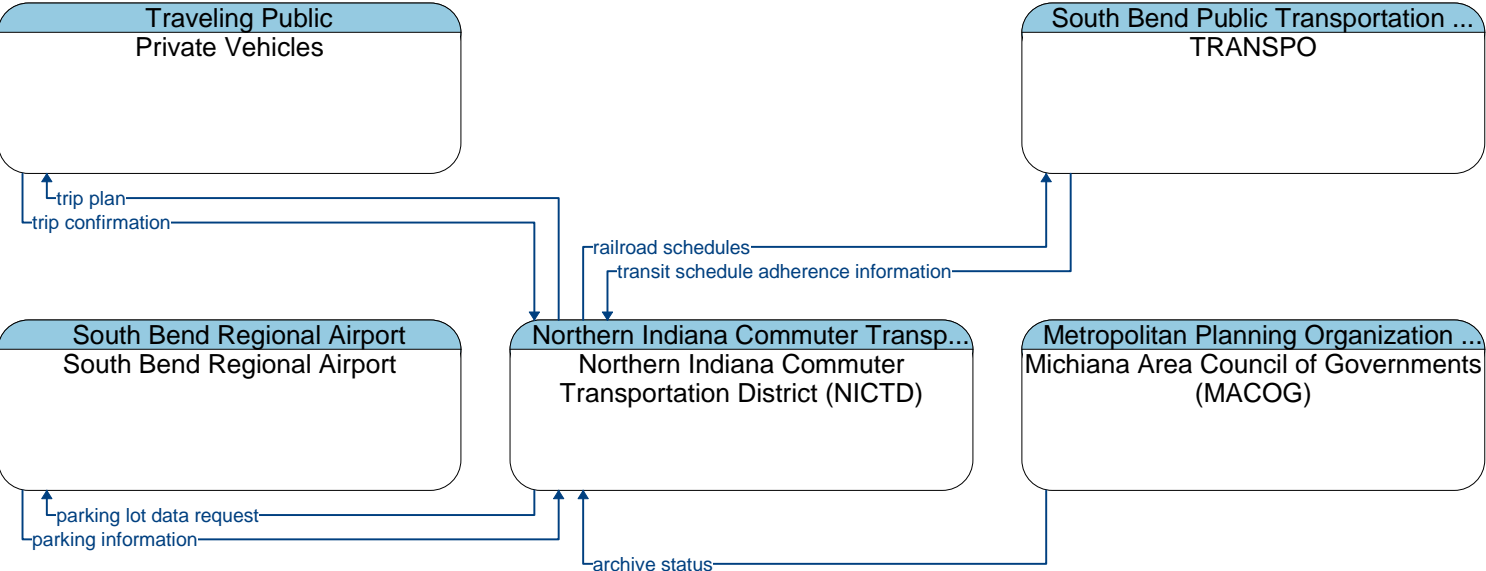


Existing

Metropolitan Planning Organization (MPO) - Michiana Area Council of Governments (MACOG)

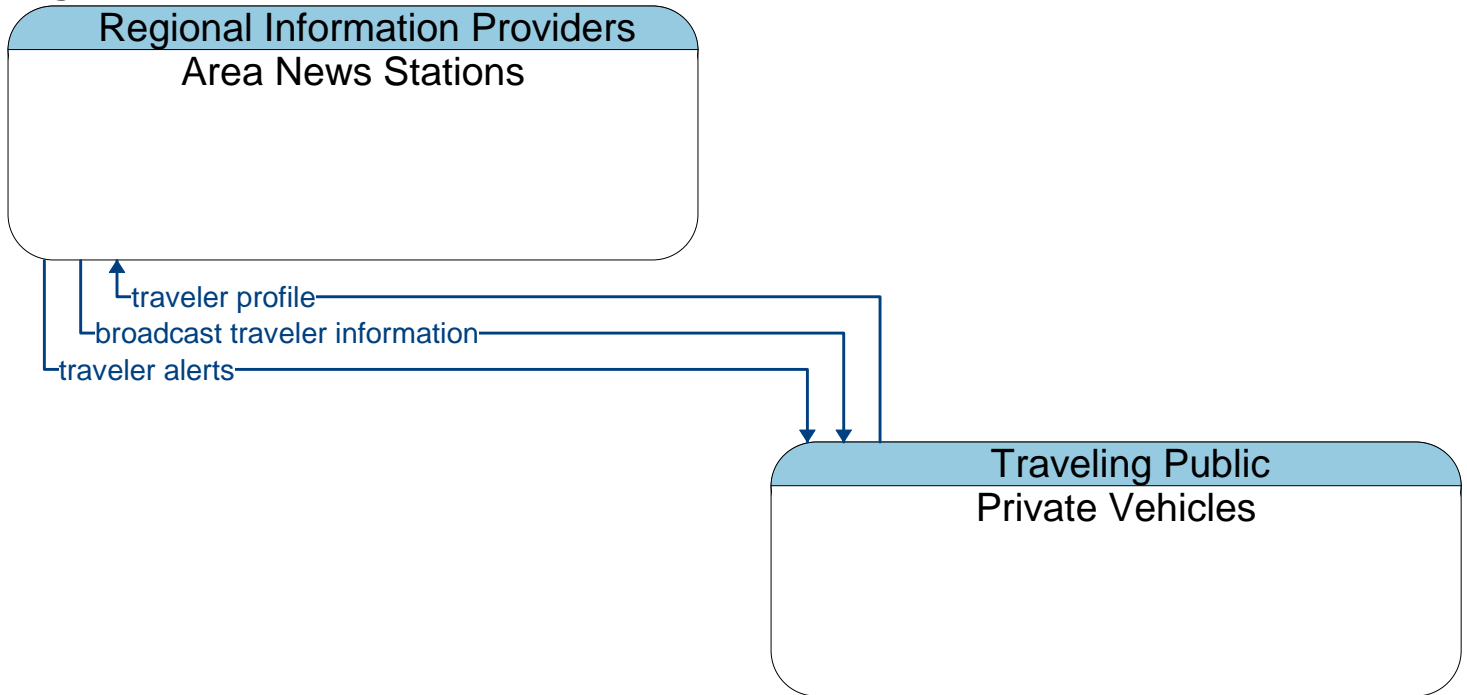


Northern Indiana Commuter Transportation District (NICTD)



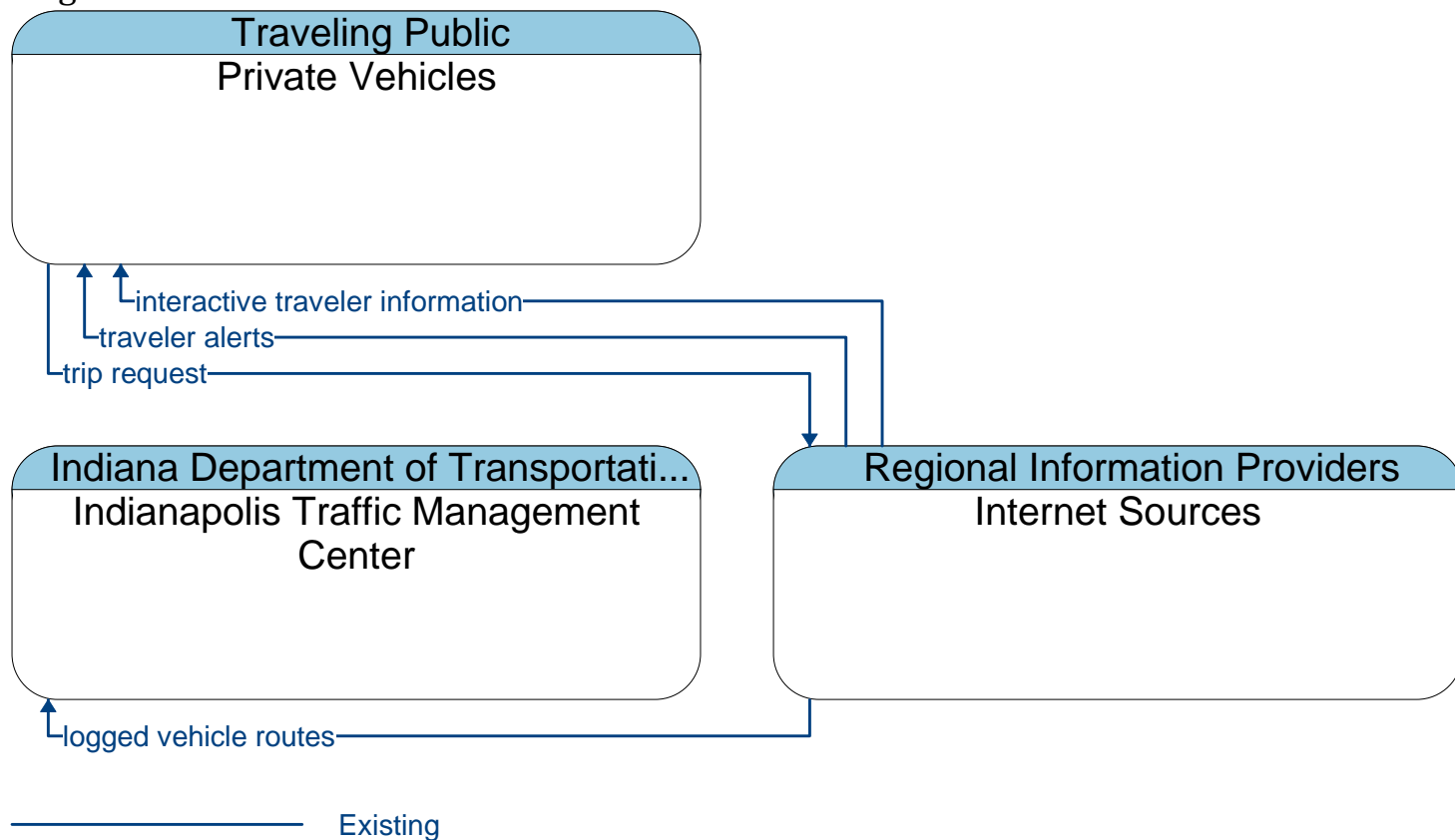
Existing

Regional Information Providers - Area News Stations

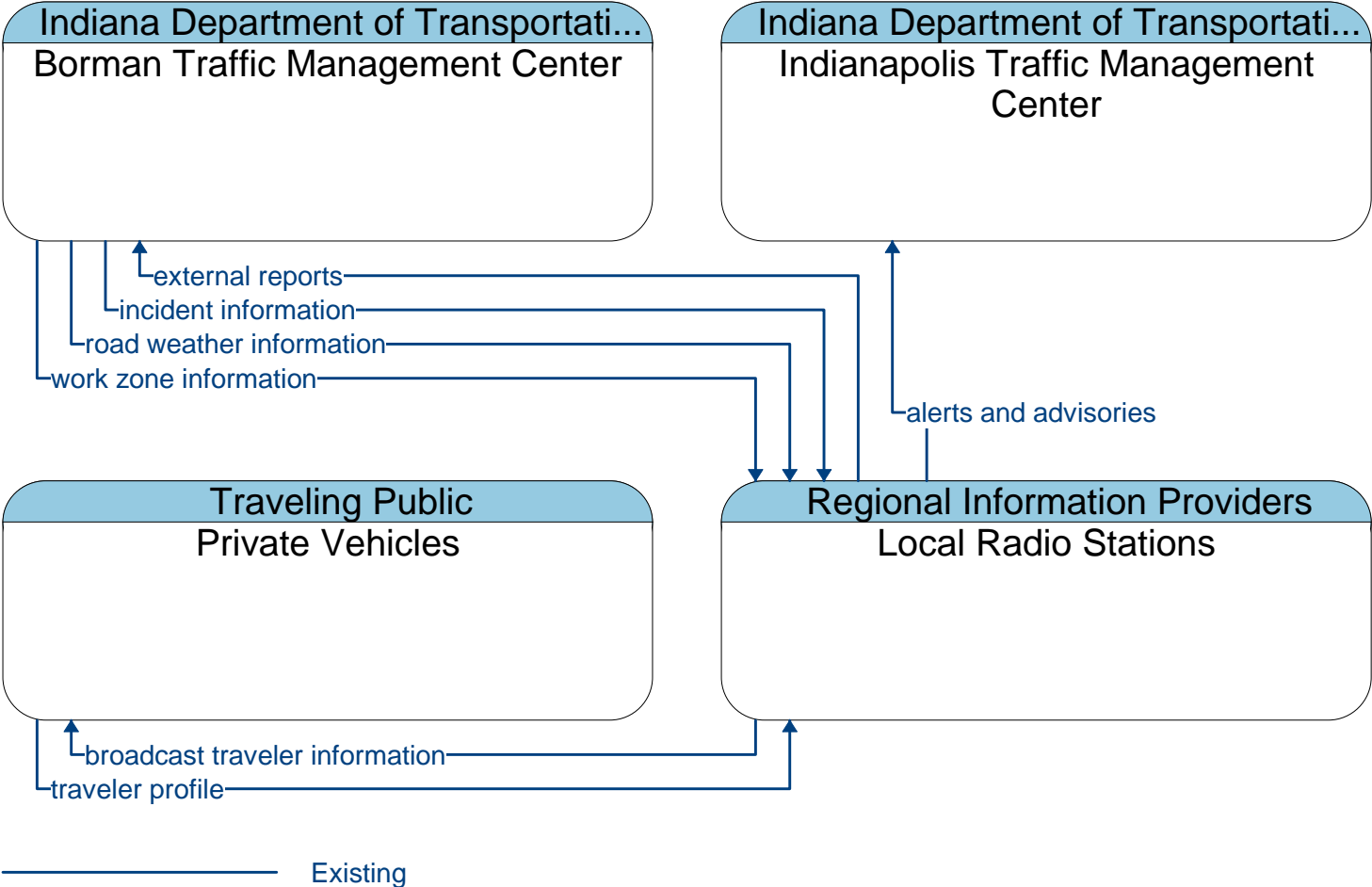


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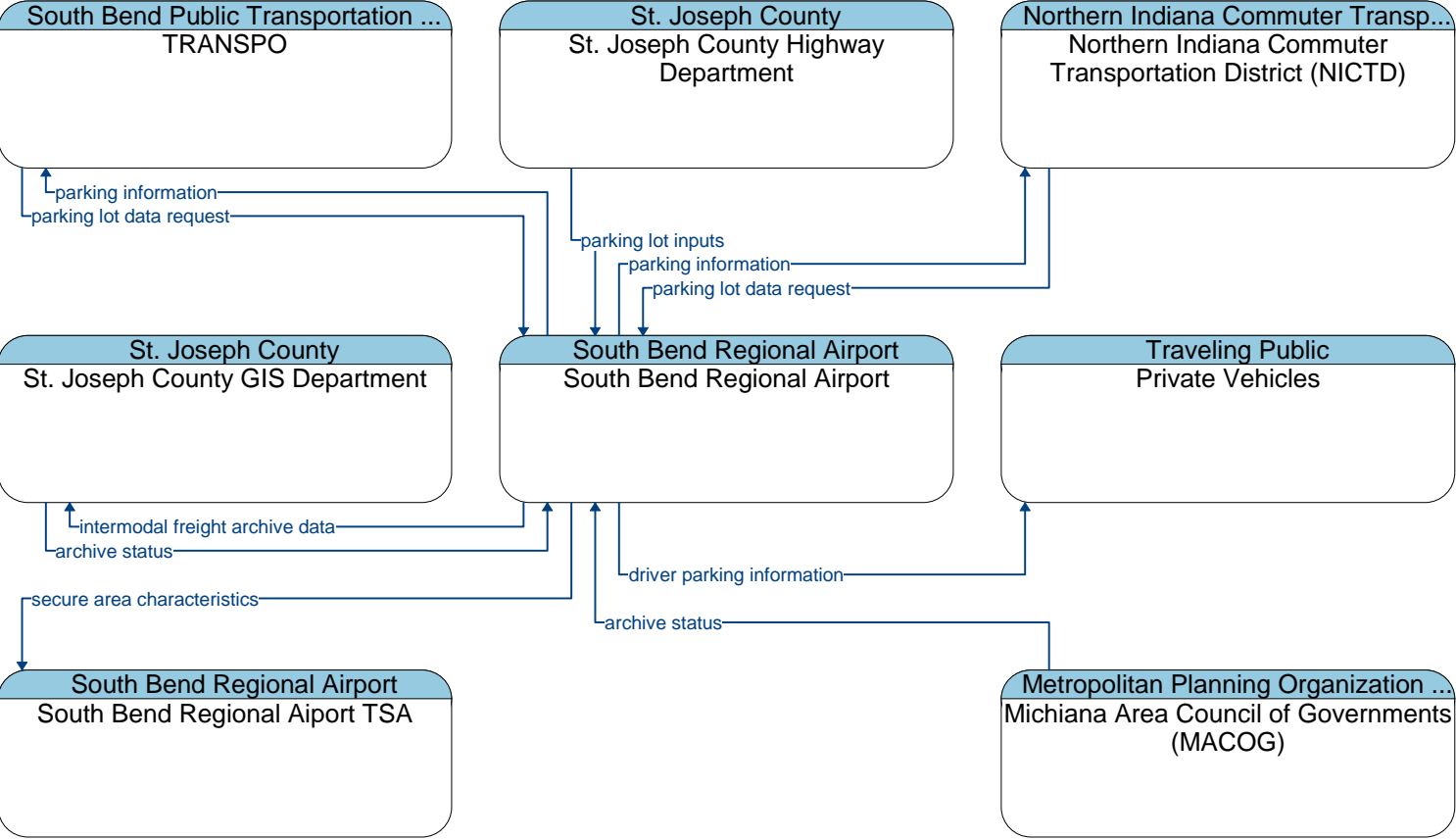
Regional Information Providers - Internet Sources



Regional Information Providers - Local Radio Stations

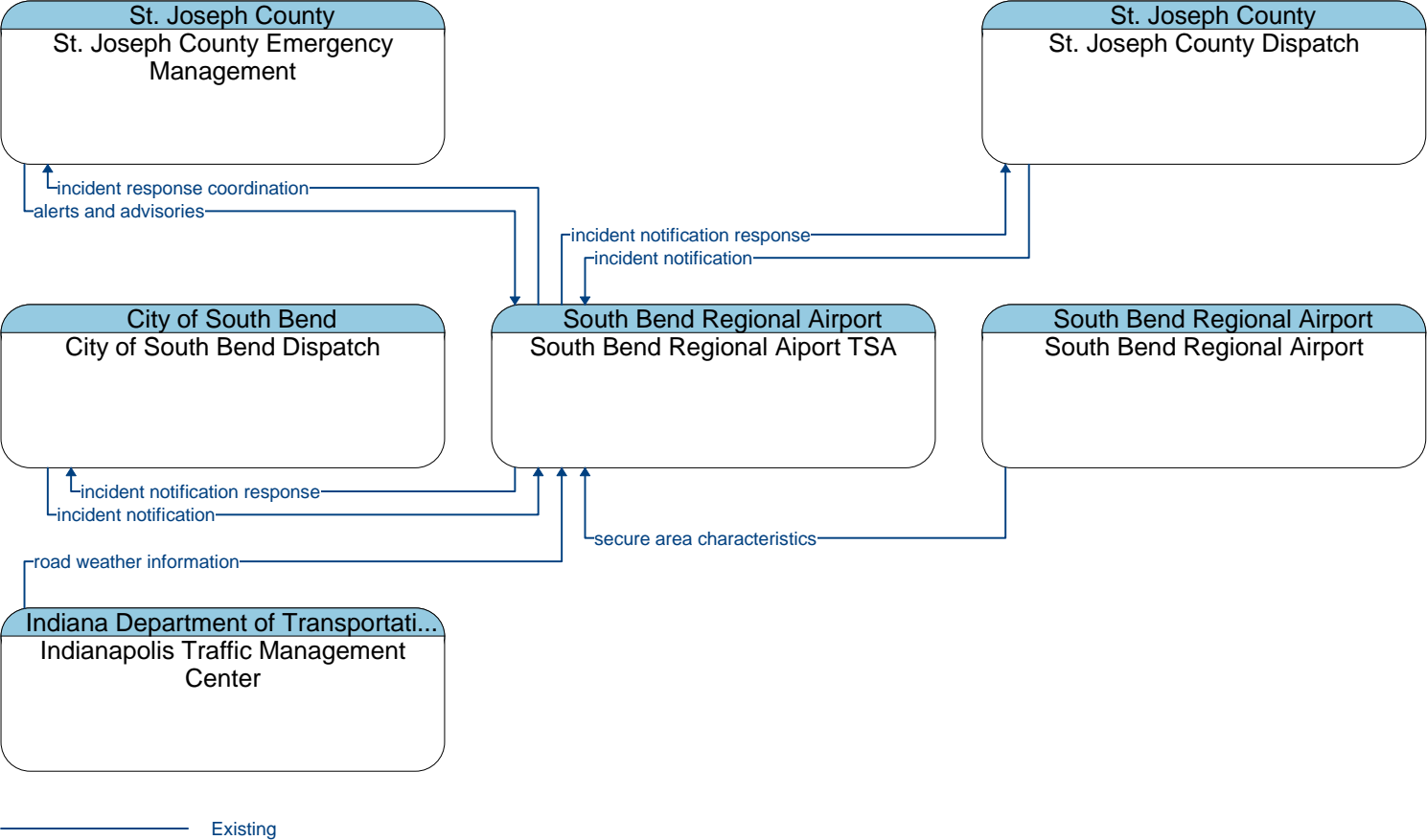


South Bend Regional Airport

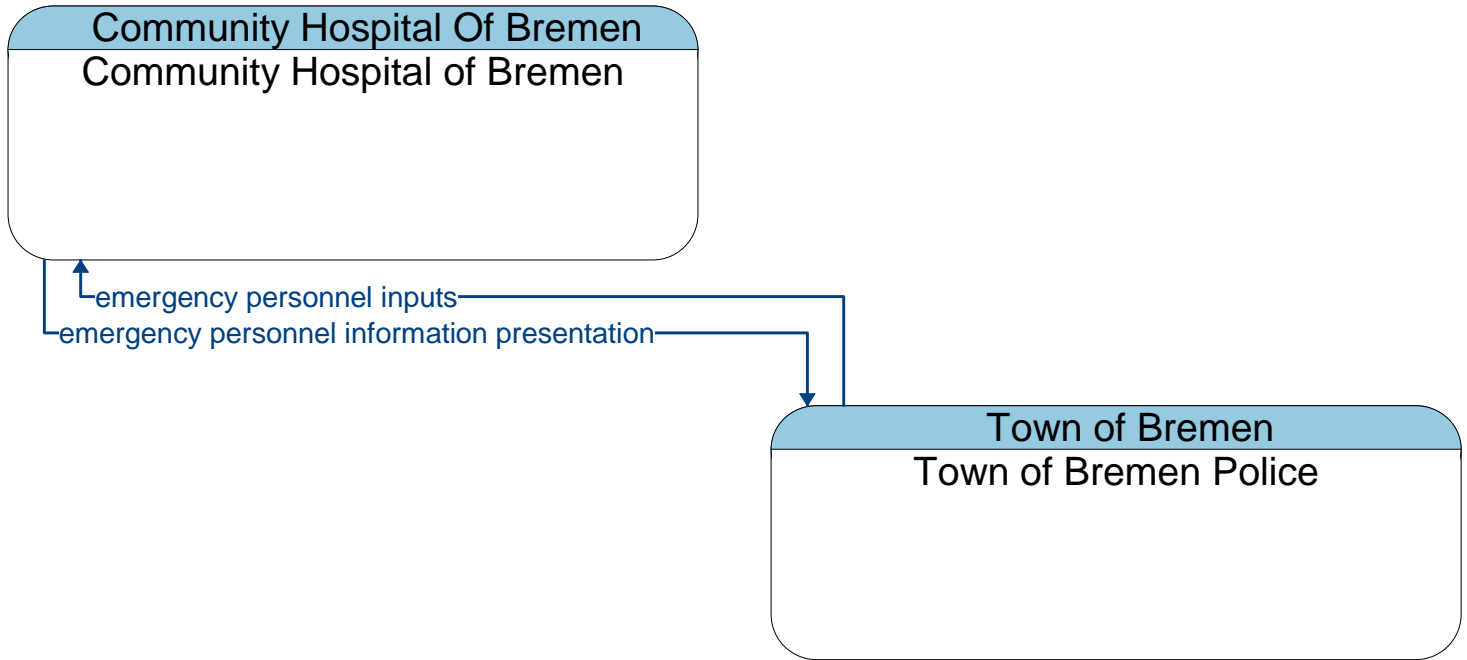


Existing

South Bend Regional Airport - South Bend Regional Airport TSA

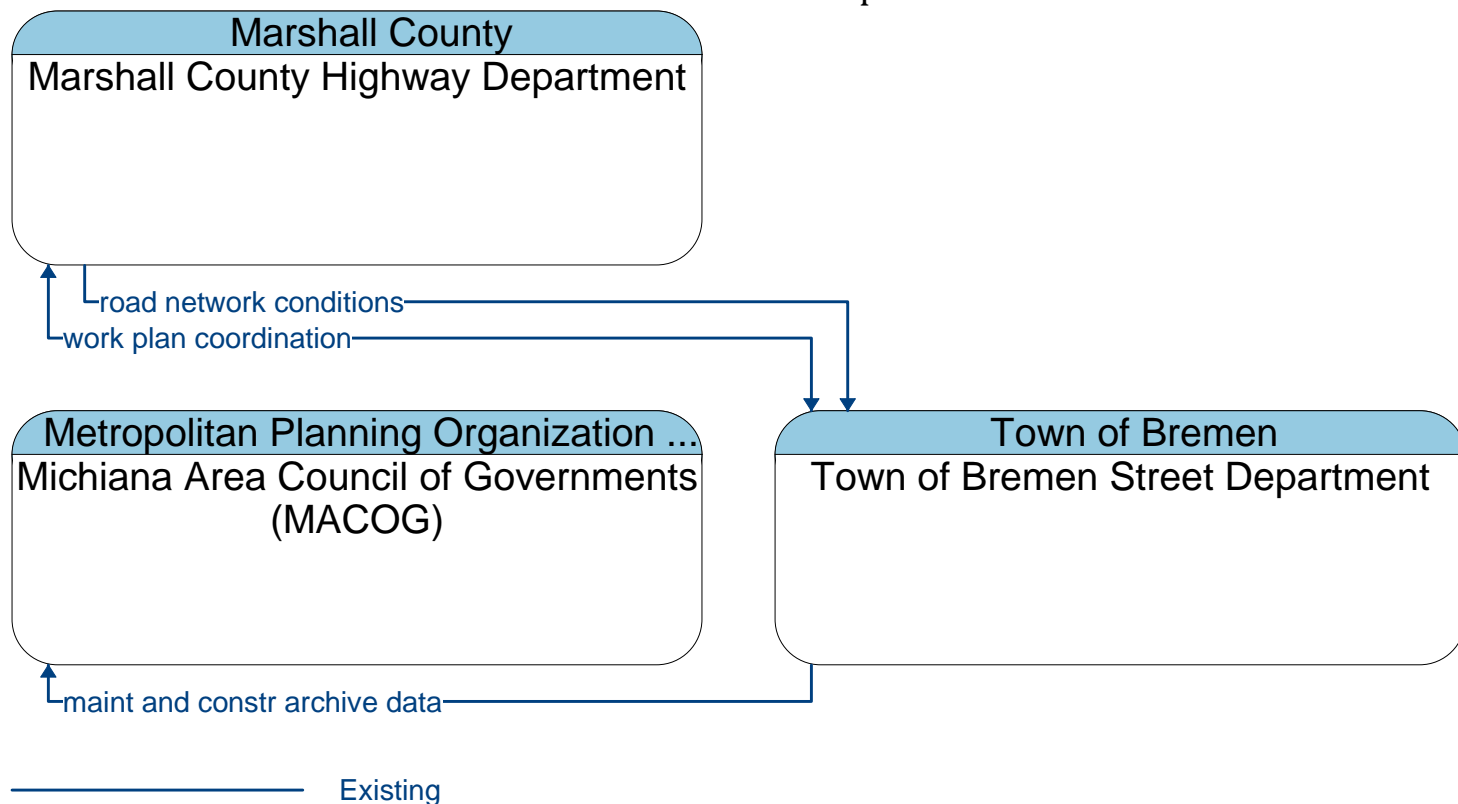


Towns: Town of Bremen - Town of Bremen Police

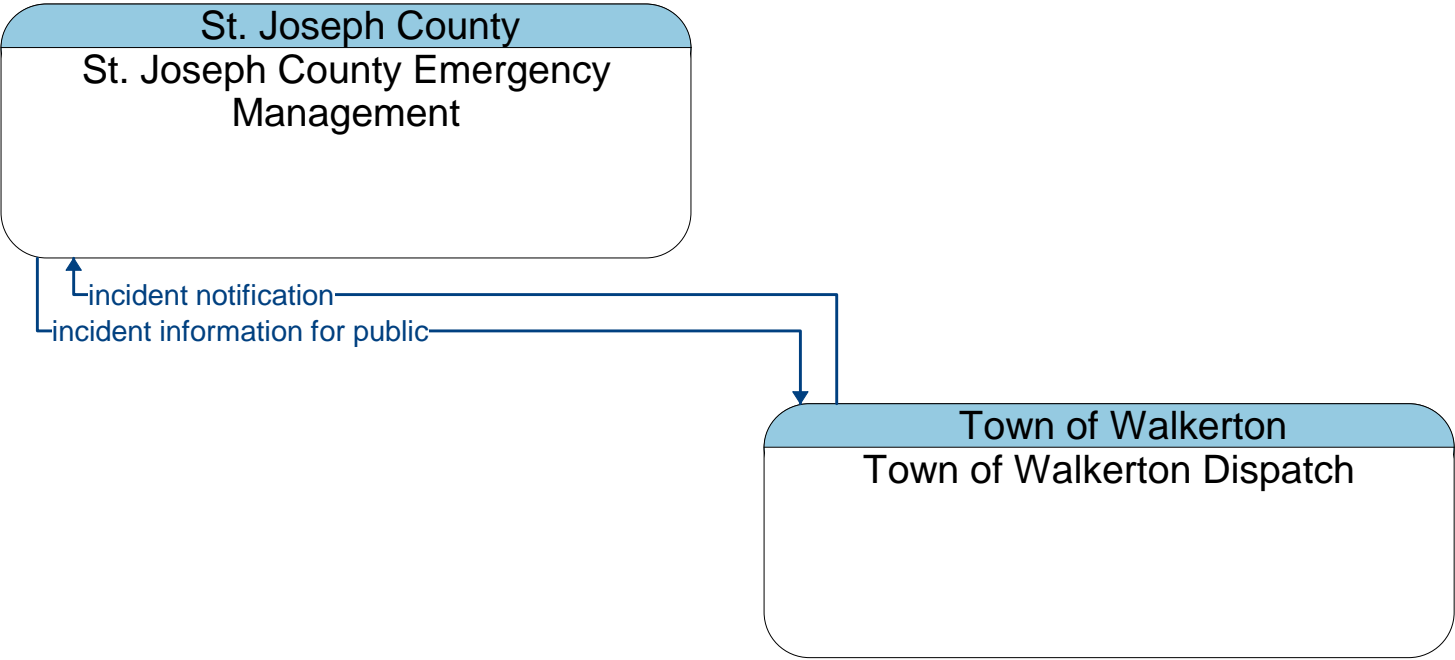


Existing

Towns: Town of Bremen - Town of Bremen Street Department

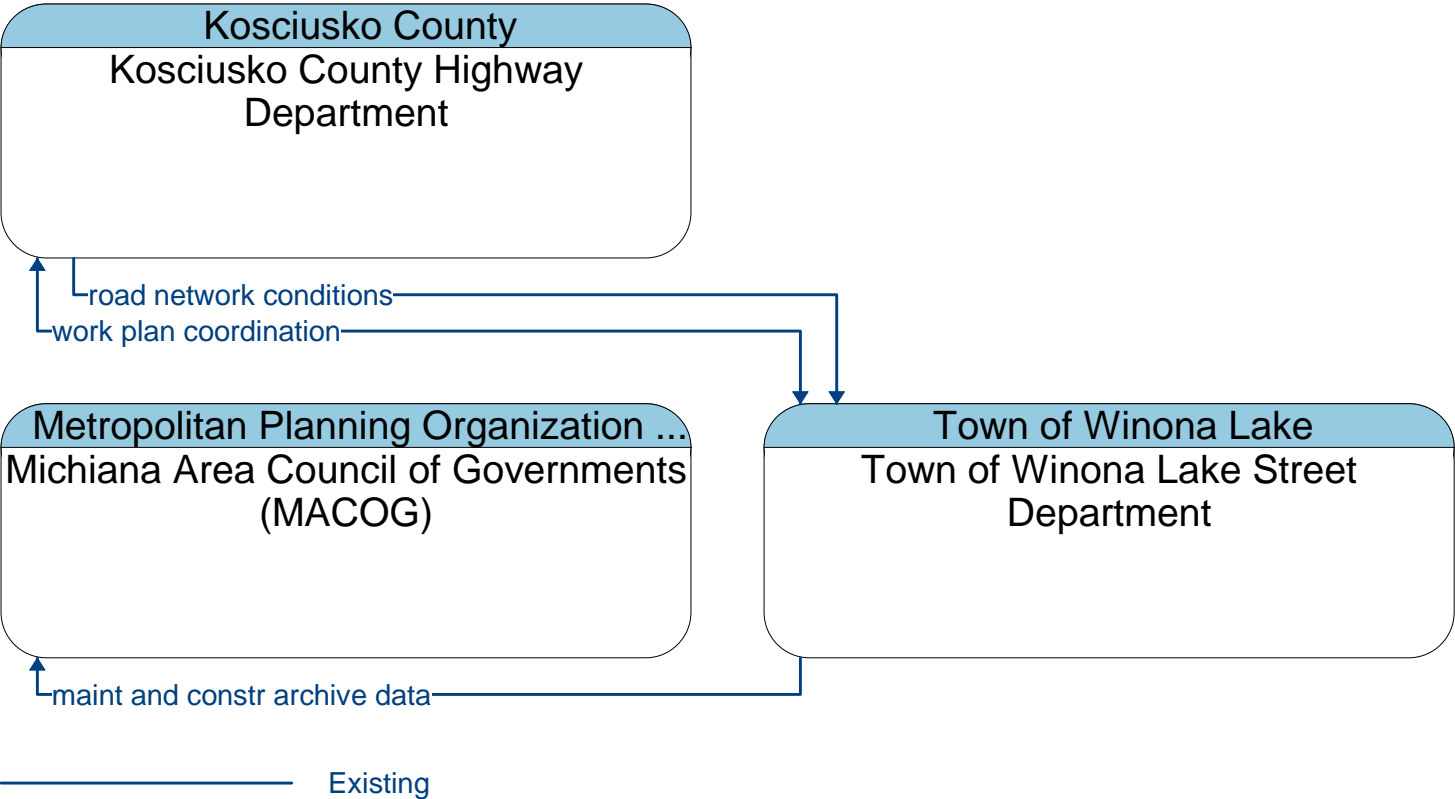


Towns: Town of Walkerton - Town of Walkerton Dispatch

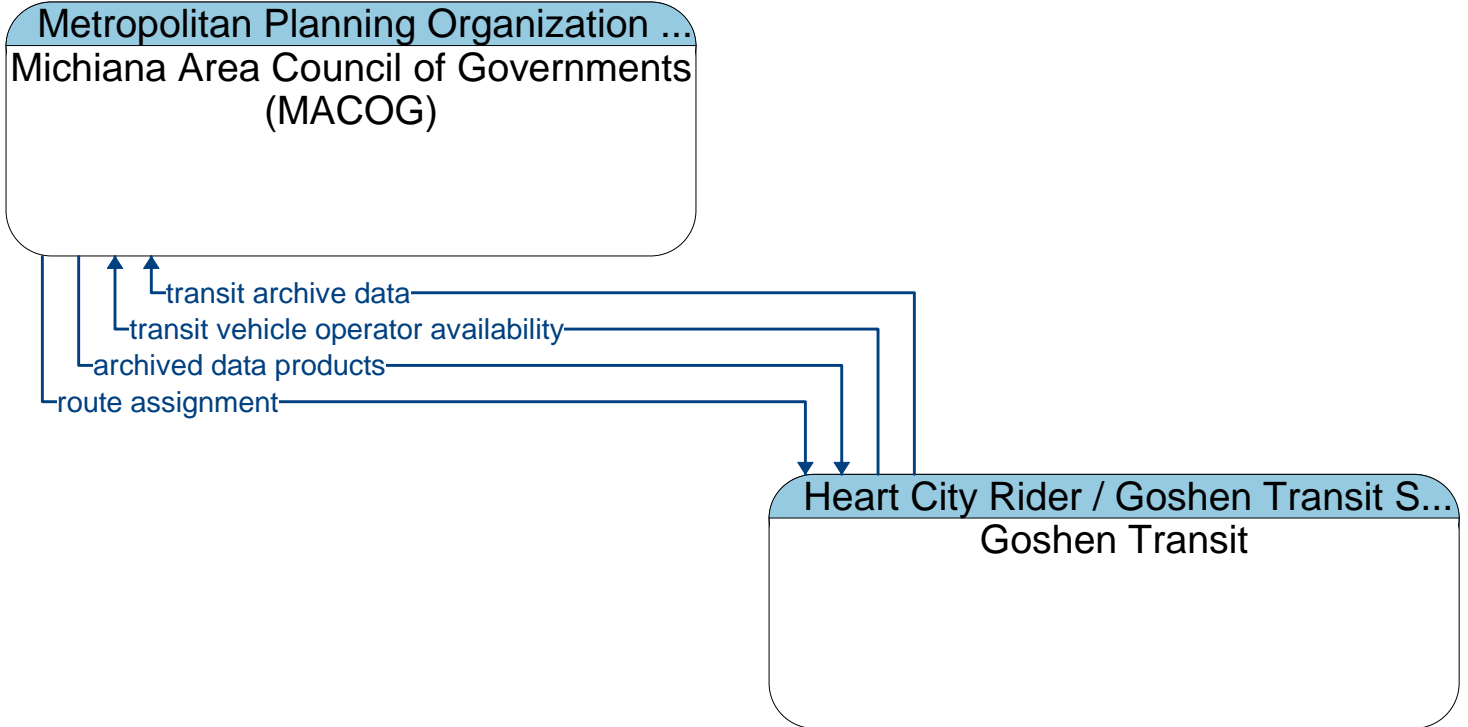


Existing

Towns: Town of Winona Lake - Town of Winona Lake Street Department

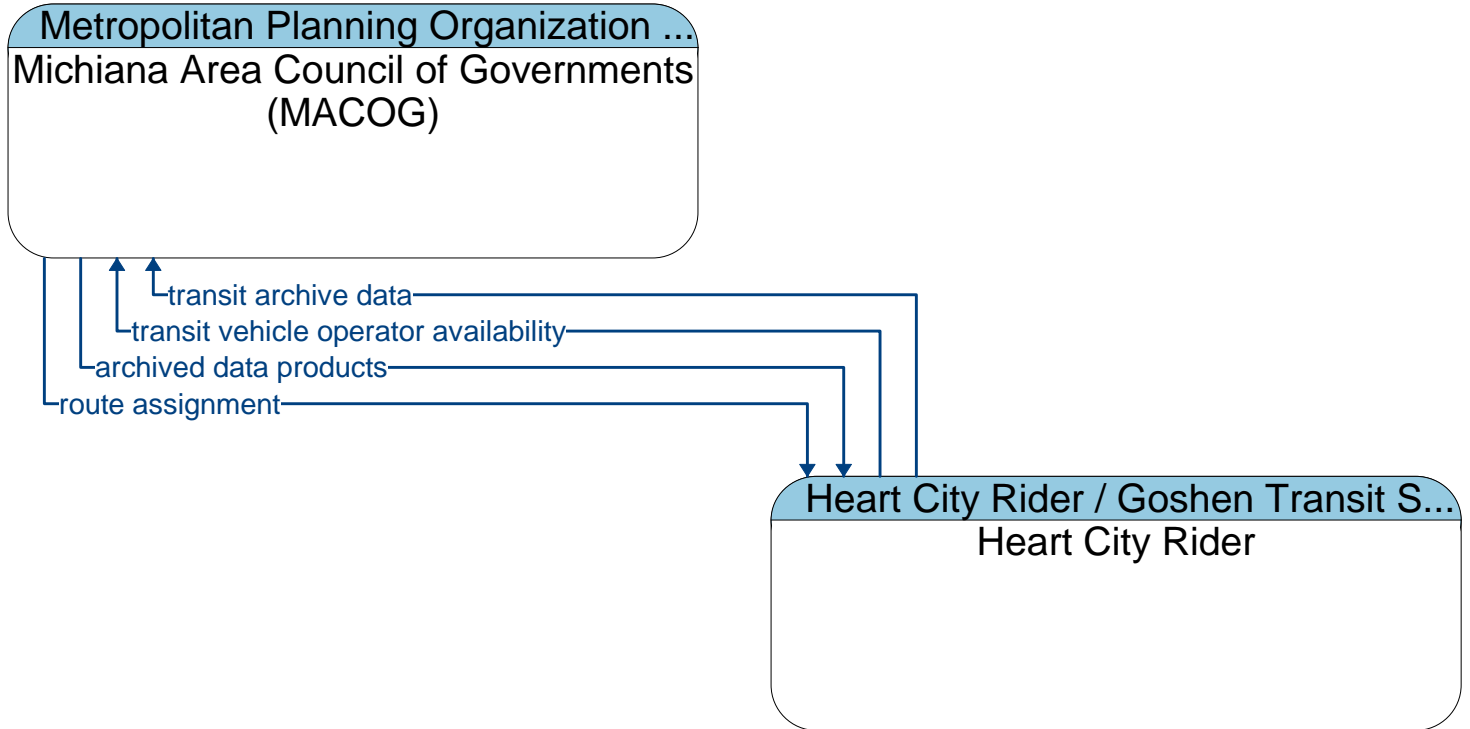


Transit Systems: Heart City Rider / Goshen Transit Service - Goshen Transit



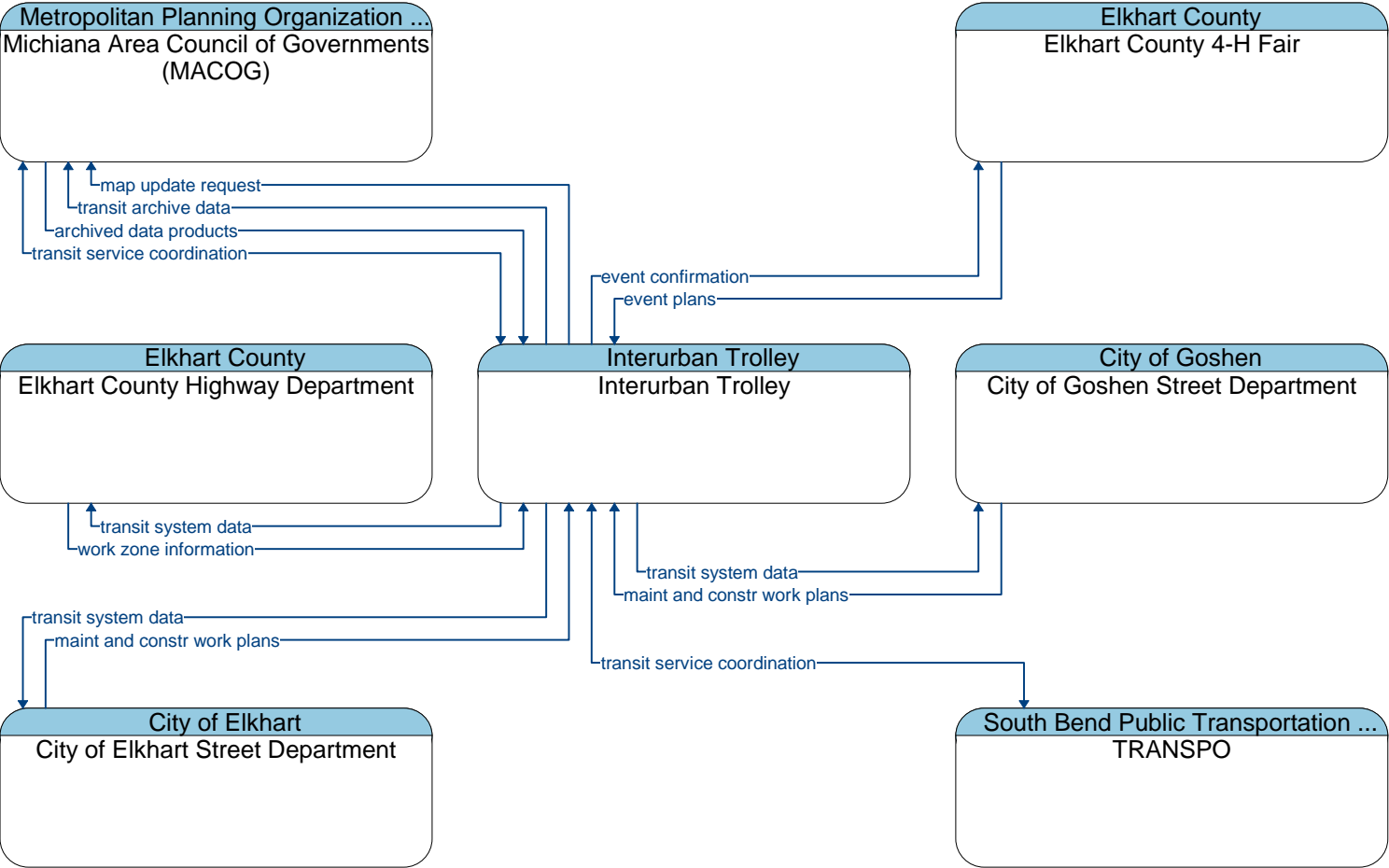
Existing

Transit Systems: Heart City Rider / Goshen Transit Service - Heart City Rider



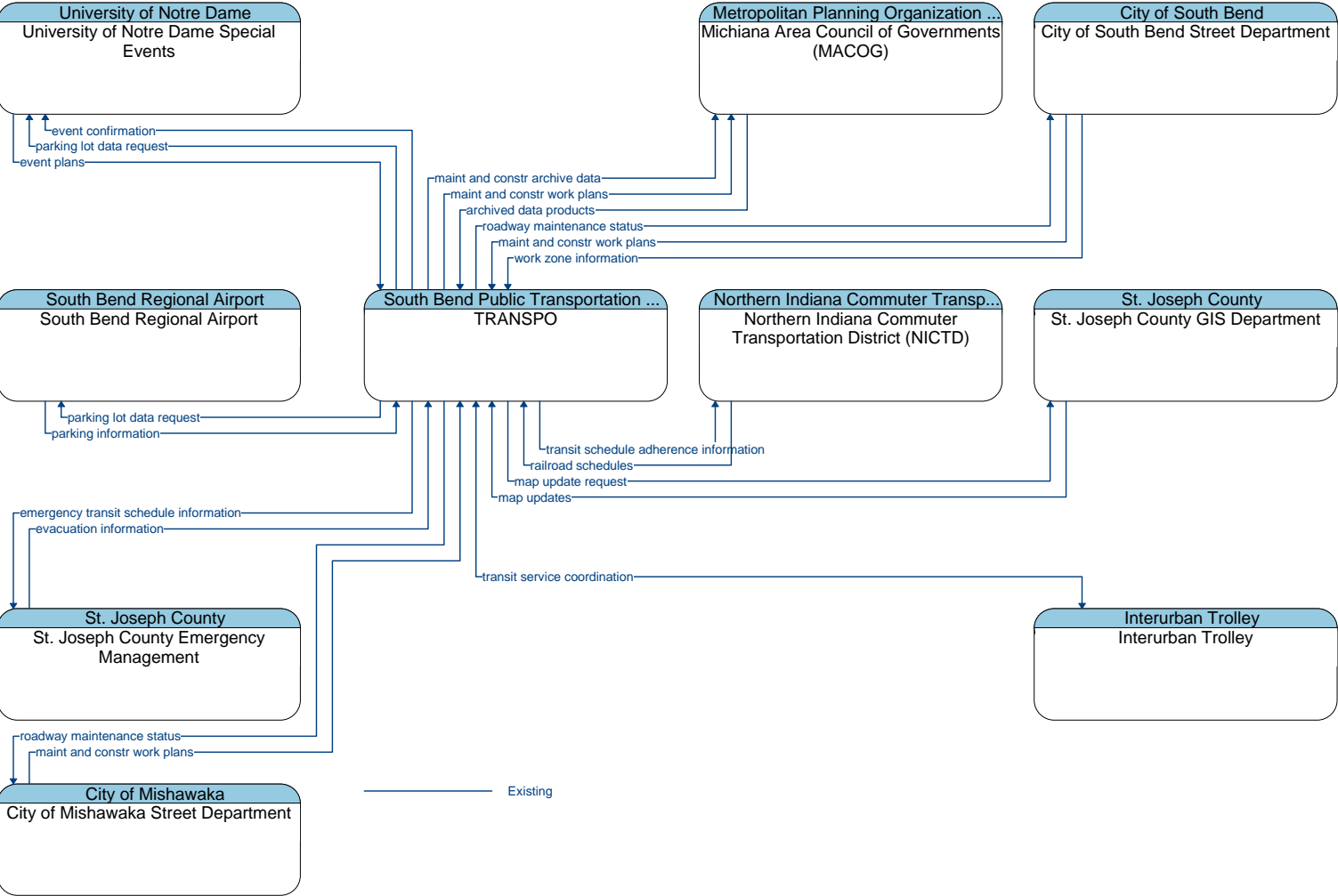
Existing

Transit Systems: Interurban Trolley

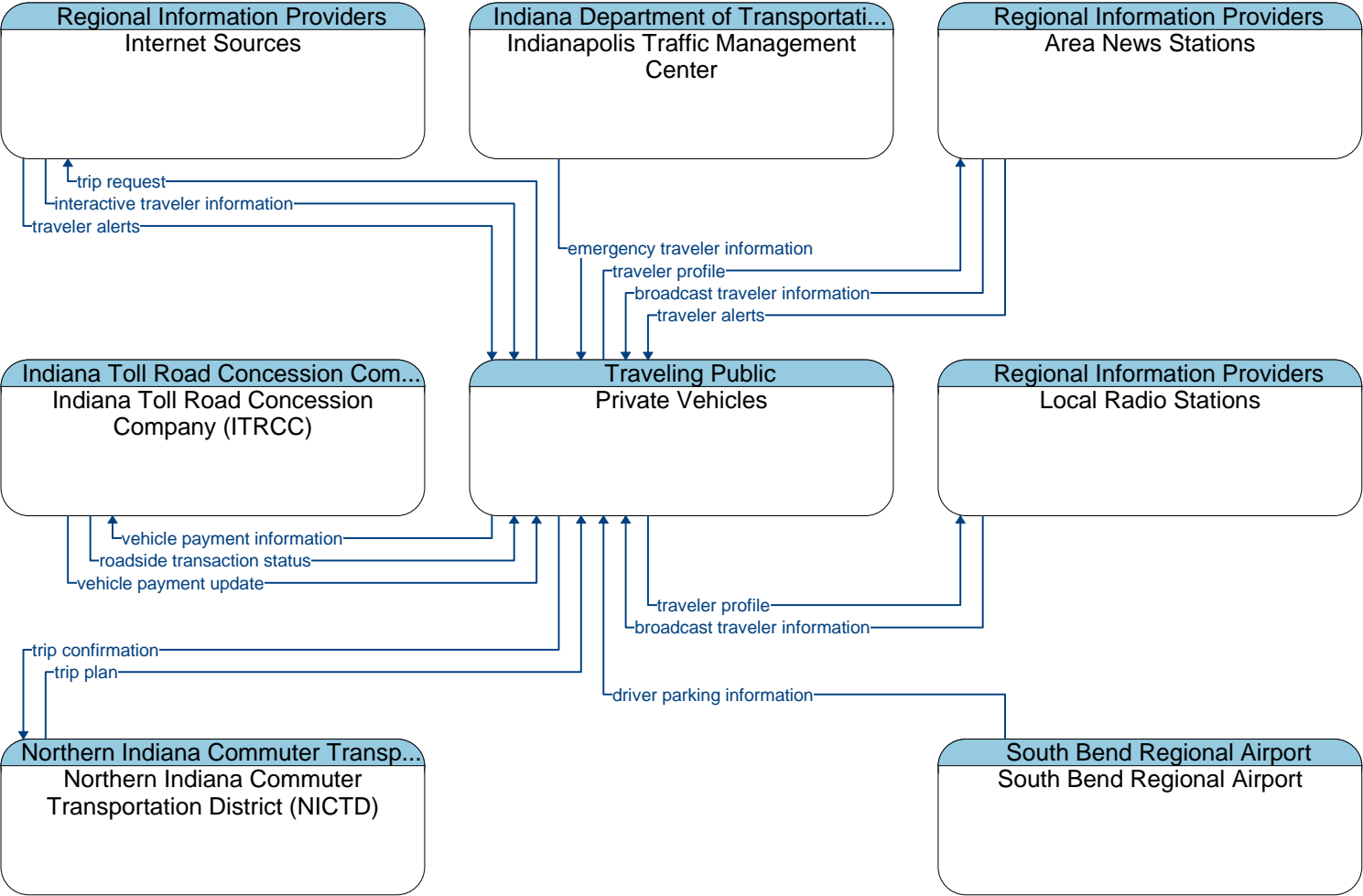


Existing

Transit Systems: South Bend Public Transportation Corporation (SBPTC) - TRANSPO

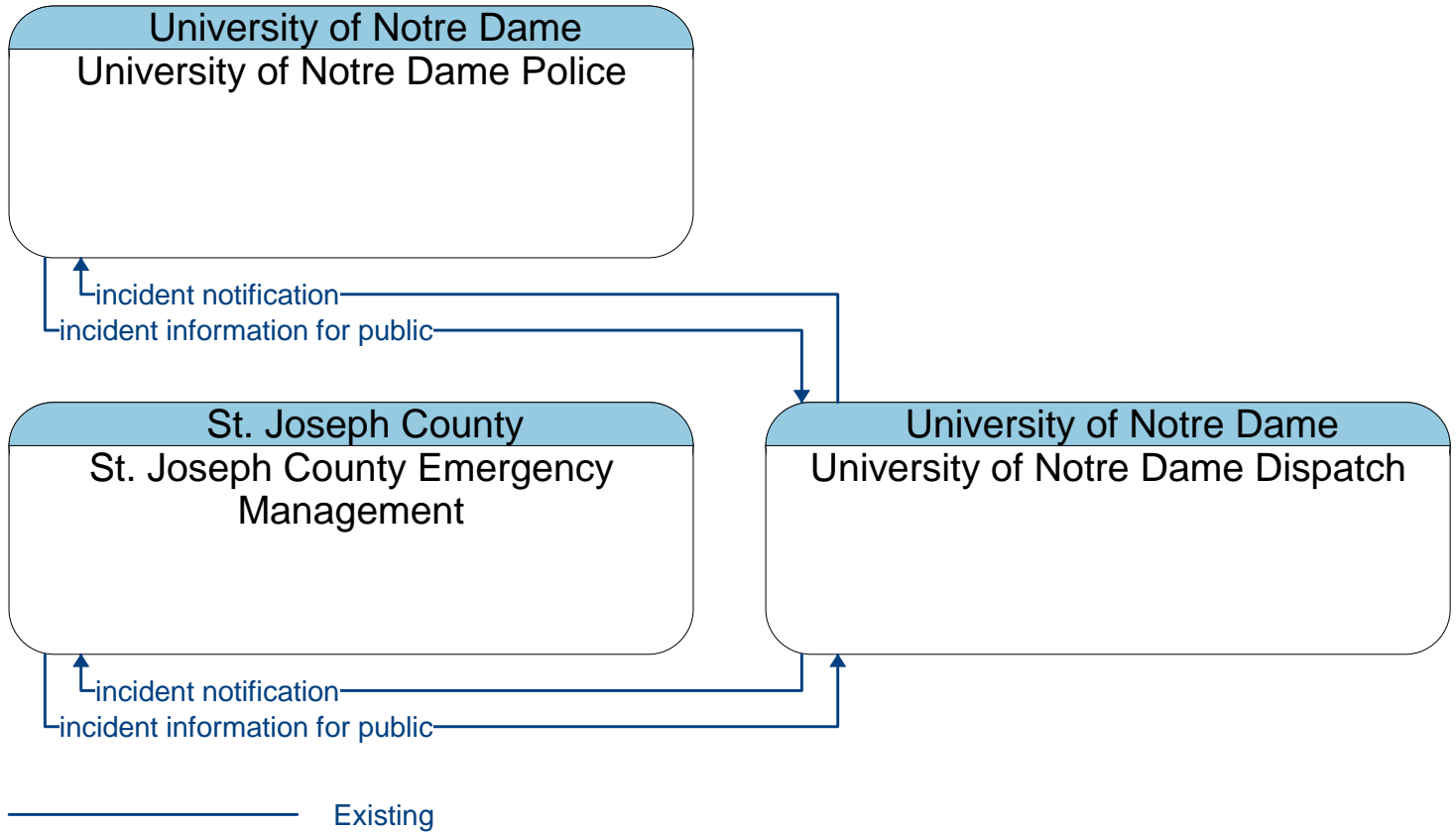


Traveling Public - Private Vehicles

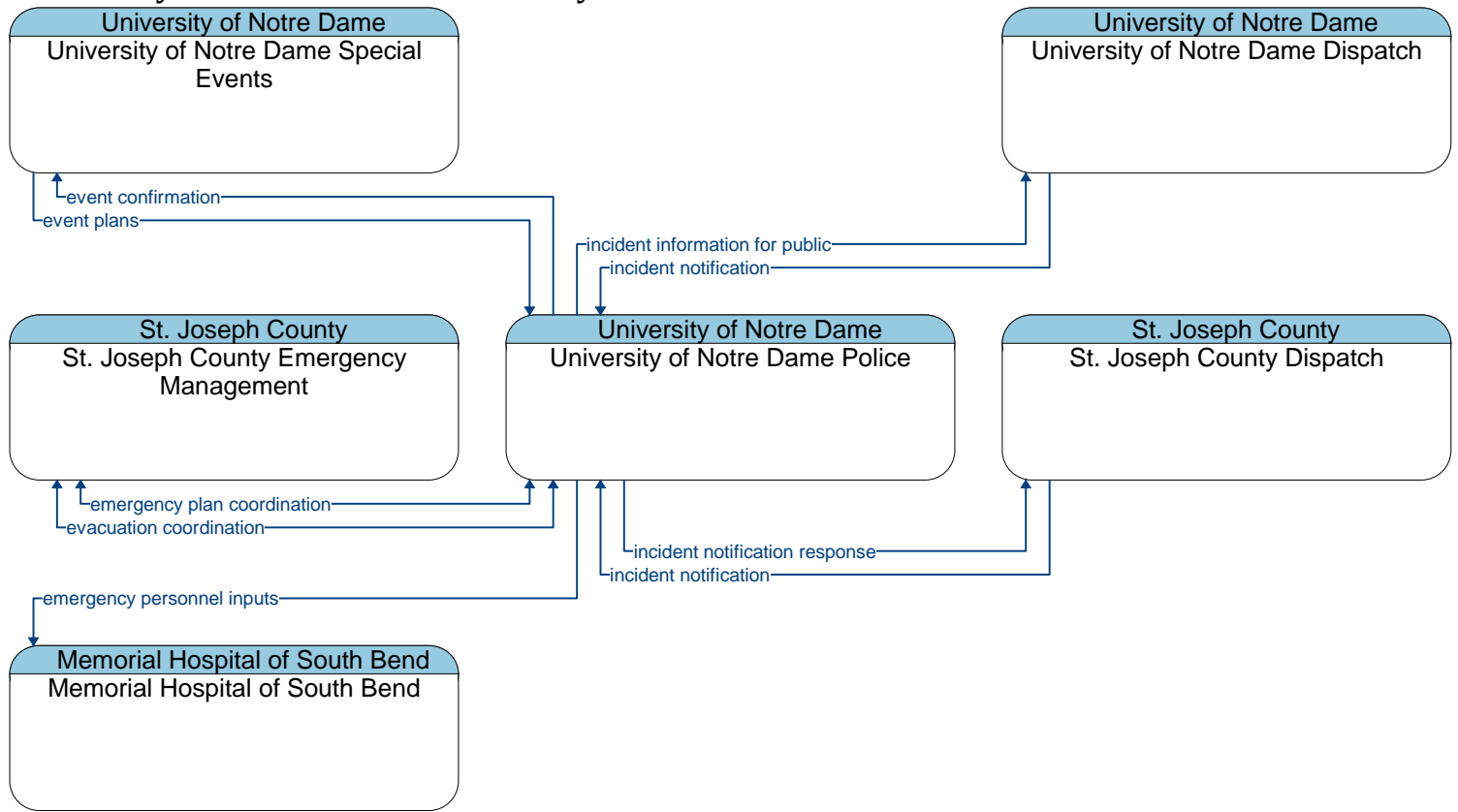


Existing

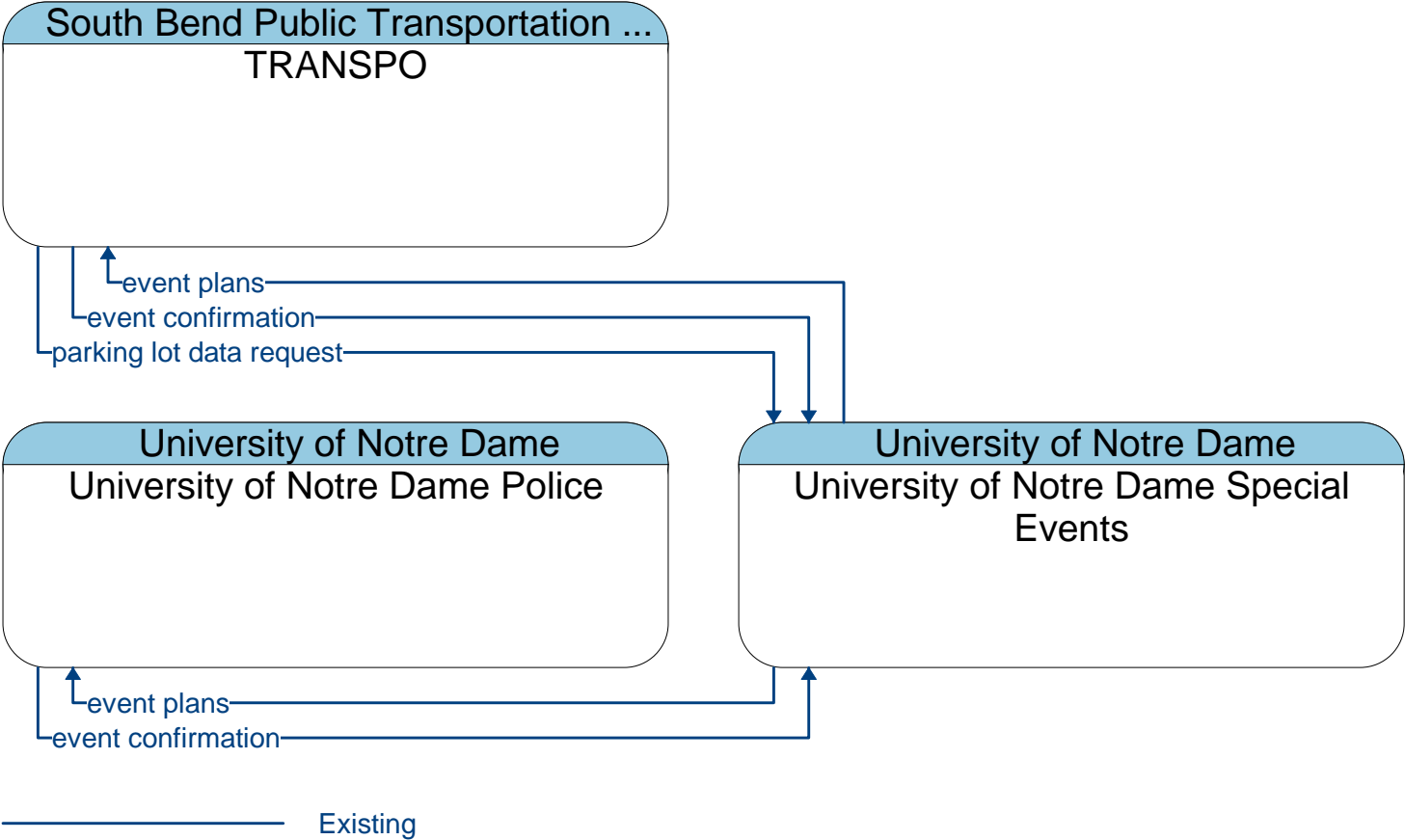
University of Notre Dame - University of Notre Dame Dispatch



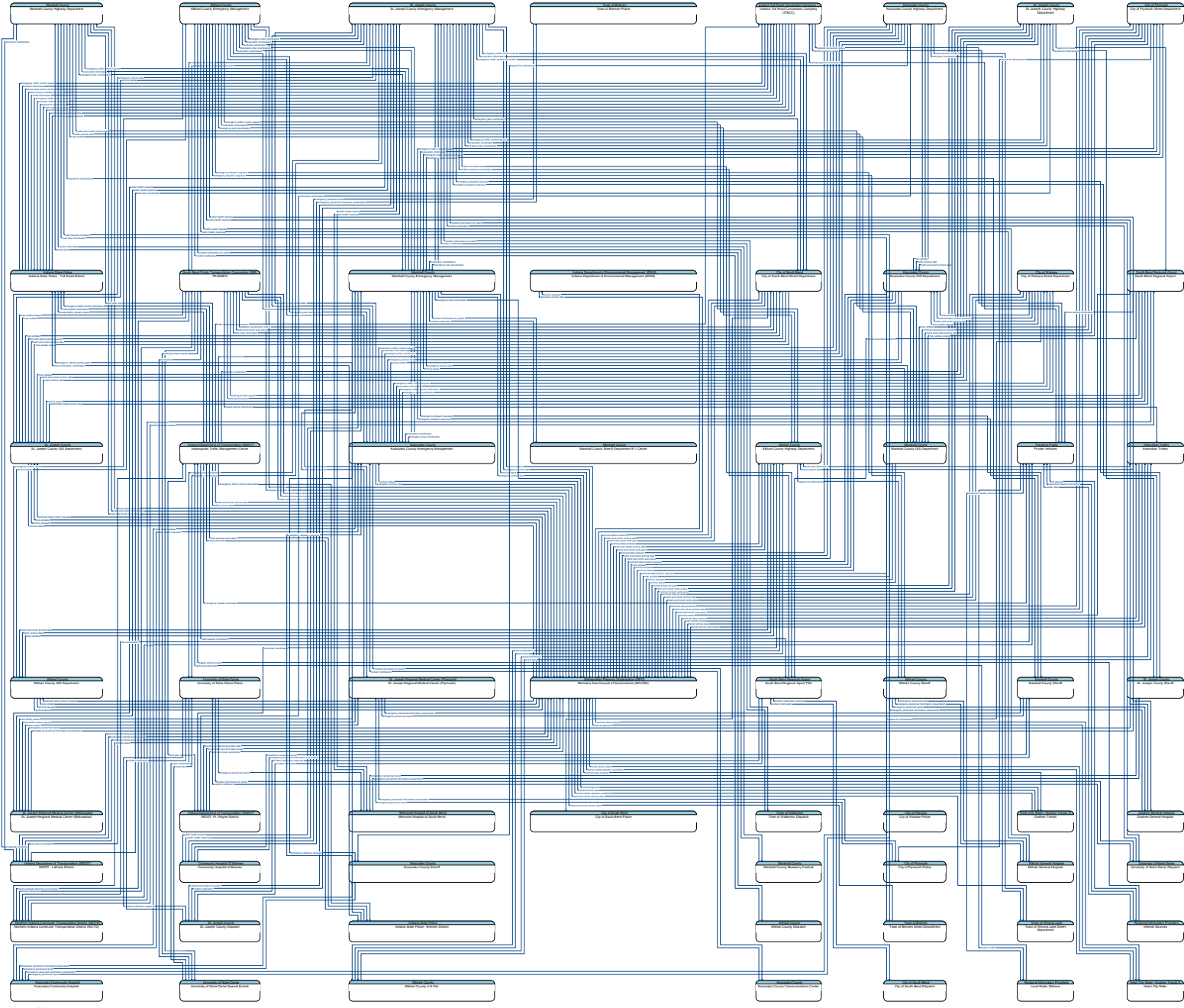
University of Notre Dame - University of Notre Dame Police



Existing



Regional Flow Diagram



APPENDIX G

FLOW DEFINITIONS

Flow Name	Flow Definition
air quality information	Aggregated region-wide measured air quality data and possible pollution incident information.
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 status	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.
alerts and advisories	Assessments (general incident and vulnerability awareness information), advisories (identification of threats or recommendations to increase preparedness levels), and alerts (information on imminent or in-progress emergencies). This flow also provides supporting descriptive detail on incidents, threats, and vulnerabilities to increase preparedness and support effective response to threats against the surface transportation system.
archive requests	A request to a data source for information on available data (i.e. "catalog") or a request that defines the data to be archived. The request can be a general subscription intended to initiate a continuous or regular data stream or a specific request intended to initiate a one-time response from the recipient.
archive status	Notification that data provided to an archive contains erroneous, missing, or suspicious data or verification that the data provided appears valid. If an error has been detected, the offending data and the nature of the potential problem are identified.
archived data product requests	A user-specified request for archived data products (i.e. data, meta data, or data catalogs). The request also includes information that is used to identify and authenticate the user and support electronic payment requirements, if any.
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.
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.

Flow Name	Flow Definition
care facility status	Information regarding facility type and capabilities, facility status, and its ability to admit new patients.
care facility status request	Request for information regarding care facility availability and status.
commercial vehicle data	Information about the commercial vehicles cargo, credentials, and payments.
commercial vehicle data request	Requests from the vehicle for information about the commercial vehicle's cargo, credentials, and payments.
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.
demand responsive transit plan	Plan regarding overall demand responsive transit schedules and deployment.
demand responsive transit request	Request for paratransit support.
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 acknowledge	Acknowledge request for emergency assistance and provide additional details regarding actions and verification requirements.
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 data request	A request for additional information or a control command issued by the emergency response agency in response to an emergency request for assistance from a traveler.
emergency dispatch requests	Emergency vehicle dispatch instructions including incident location and available information concerning the incident.
emergency dispatch response	Request for additional emergency dispatch information and provision of en route status.
emergency notification	An emergency request for assistance automatically initiated by a vehicle or originated by a traveler using an in-vehicle or personal device.
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.

Flow Name	Flow Definition
emergency personnel inputs	User input from emergency personnel in the field including dispatch coordination, incident status information, and remote device control requests.
emergency plan coordination	Information that supports coordination of emergency management plans, continuity of operations plans, emergency response and recovery plans, evacuation plans, and other emergency plans between agencies. This includes general plans that are coordinated prior to an incident and shorter duration tactical plans that are prepared during an incident.
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 transit schedule information	Information on transit schedule and service changes that adapt the service to better meet needs of responders and the general public in an emergency situation, including special service schedules supporting evacuation.
emergency transit service request	Request to modify transit service and fare schedules to address emergencies, including requests for transit services to evacuate people from and/or deploy response agency personnel to an emergency scene. The request may poll for resource availability or request pre-staging, staging, or immediate dispatch of transit resources.
emergency transit service response	Response indicating changes to transit service, fares, and/or restrictions that will be made and status of transit resources to be deployed to support emergency response and/or evacuation.
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.

Flow Name	Flow Definition
emergency traveler information request	Request for alerts, evacuation information, and other emergency information provided to the traveling public.
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.
emissions archive data	Air quality and vehicle emissions information that is collected by sensors or derived from models. Content may include a catalog of available information, the actual information to be archived, and associated meta data that describes the archived information.
emissions violation notification	Notification to enforcement agency of a detected vehicle emissions violation.
equipment maintenance status	Current status of field equipment maintenance actions.
evacuation coordination	Coordination of information regarding a pending or in-process evacuation. Includes evacuation zones, evacuation times, evacuation routes, forecast network conditions, and reentry times.
evacuation information	Evacuation instructions and information including evacuation zones, evacuation times, and reentry times.
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.
field equipment status	Identification of field equipment requiring repair and known information about the 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.
hazmat spill notification	Information provided to emergency response organizations when cargo sensors detect a release of hazardous material. This information will include sensor information, vehicle location and identification, and carrier identification.

Flow Name	Flow Definition
hri advisories	Notification of Highway-Rail Intersection equipment failure, intersection blockage, or other condition requiring attention, and maintenance activities at or near highway rail intersections.
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 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 information for public	Report of current desensitized incident information prepared for public dissemination through the telecommunications system.
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 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.

Flow Name	Flow Definition
infrastructure monitoring sensor control	Data used to configure and control infrastructure monitoring sensors.
infrastructure monitoring sensor data	Data read from infrastructure-based sensors that monitor the condition or integrity of transportation infrastructure including bridges, tunnels, interchanges, pavement, culverts, signs, transit rail or guideway, and other roadway infrastructure. Includes sensor data and the operational status of the sensors.
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.
intermodal freight archive data	Information describing demand at intermodal freight terminals including loading/unloading activities of trailers and containers. Content may include a catalog of available information, the actual information to be archived, and associated meta data that describes the archived information.
ISP coordination	Coordination and exchange of transportation information between centers. This flow allows a broad range of transportation information collected by one ISP to be redistributed to many other ISPs and their clients.
logged vehicle routes	Anticipated route information for guided vehicles, special vehicles (e.g., oversized vehicles) or groups of vehicles (e.g., governor's motorcade) that may require changes in traffic control strategy.
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 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 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.

Flow Name	Flow Definition
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.
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.
patient status	Information that supports assessment of the patient's condition. Information could include general categorization of patient status, patient vital signs, pertinent medical history, and emergency care information.
payment violation notification	Notification to enforcement agency of a toll, parking, or transit fare payment violation.
pollution state data request	Aggregated emissions data information request.
public health request	Request for specific information or recommended response concerning an emergency involving biological or other medically related emergency.
public health response	Specific information or recommendation on how to treat or respond to an emergency involving biological or other medically related emergency.
rail system status assessment	Assessment of damage sustained by rail lines and associated railroad infrastructure including location and extent of the damage, impact on current operations and necessary restrictions, and time frame for repair and recovery.
railroad advisories	Real-time notification of railway-related incident or advisory.
railroad schedules	Train schedules, maintenance schedules, and other information from the railroad that supports forecast of HRI closures.
request for enforcement	Request for traffic enforcement to address safety issues in a work zone or other special situations.

Flow Name	Flow Definition
request for service	Driver inputs that summon an emergency response, request a financial transaction, or initiate other services.
request transit information	Request for transit service information and current transit status.
resource coordination	Coordination of resource inventory information, specific resource status information, resource prioritization and reallocation between jurisdictions, and specific requests for resources and responses that service those requests.
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 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	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 network status assessment	Assessment of damage sustained by the road network including location and extent of the damage, estimate of remaining capacity, required closures, alternate routes, necessary restrictions, and time frame for repair and recovery.
road weather information	Road conditions and weather information that are made available by road maintenance operations to other transportation system operators.
roadside transaction status	The status of an electronic payment transaction provided directly to the driver via sign or other roadside infrastructure.
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).
route assignment	Route assignment information for transit vehicle operator.
secure area characteristics	The range of physical and environmental characteristics (visual, audible, presence, motion, chemical, biological, radiological, other) that are monitored by surveillance and sensor systems.
secure area sensor control	Information used to configure and control threat sensors (e.g., thermal, acoustic, radiological, chemical), object, motion and intrusion detection sensors. The provided information controls sensor data collection, aggregation, filtering, and other local processing.

Flow Name	Flow Definition
secure area sensor data	Data provided by threat sensors (e.g., thermal, acoustic, radiological, chemical), and intrusion, motion, and object detection sensors in secure areas indicating the sensor's operational status, raw and processed sensor data, and alarm indicators when a threat has been detected.
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.
selected routes	Routes selected based on route request criteria.
suggested route	Suggested route for a dispatched emergency or maintenance vehicle that may reflect current network conditions and the additional routing options available to en route emergency or maintenance vehicles that are not available to the general public.
threat data for analysis	Data from surveillance or sensor equipment in secure areas provided for further analysis.
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.
threat support data	Information provided to help receiving agency identify possible threats, including biometric image processing support data.
toll 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.
toll data	Current toll schedules for different types of vehicles as well as advanced toll payment information.
toll data request	Request made to obtain toll schedule information or pay a toll in advance. The request can be a subscription that initiates as-needed information updates as well as a one-time request for information.
toll probe data	Aggregate probe data derived from electronic toll collection operations. Data collected could include vehicle speeds and travel times for a given link or collection of links.
toll service change request	Request to change pricing, modify restrictions, or modify operations of a toll road facility

Flow Name	Flow Definition
toll service change response	Response to toll service change requests indicating level of compliance with request.
traffic archive data	Information describing the use and vehicle composition on transportation facilities and the traffic control strategies employed. Content may include a catalog of available information, the actual information to be archived, and associated meta data that describes the archived information.
traffic control coordination	Information transfers that enable remote monitoring and control of traffic management devices. This flow is intended to allow cooperative access to, and control of, field equipment during incidents and special events and during day-to-day operations. This flow also allows 24-hour centers to monitor and control assets of other centers during off-hours, allows system redundancies and fail-over capabilities to be established, and otherwise enables integrated traffic control strategies in a region.
traffic information coordination	Traffic information exchanged between TMC's. Normally would include incidents, congestion data, traffic data, signal timing plans, and real-time signal control information.
transit and fare schedules	Transit service information including routes, schedules, and fare information.
transit archive data	Data used to describe and monitor transit demand, fares, operations, and system performance. Content may include a catalog of available information, the actual information to be archived, and associated meta data that describes the archived information.
transit demand management request	Request to change the demand for transit facility use through pricing or other mechanisms.
transit demand management response	Response to transit demand management change requests indicating level of compliance with request.
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 and passenger status	Information provided from the traveler location that supports fare payments, passenger data, and associated record-keeping.
transit fare coordination	Fare and pricing information shared between local/regional transit organizations.
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.

Flow Name	Flow Definition
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.
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 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 system status assessment	Assessment of damage sustained by the public transportation system including location and extent of the damage, current operational status including an estimate of remaining capacity and necessary restrictions, and time frame for repair and recovery.
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 information coordination	Transit schedules, real-time arrival information, fare schedules, and general transit service information shared between transit organizations to support transit traveler information systems.
transit vehicle operator availability	Transit vehicle operator availability data that can be used to develop vehicle operator assignments and detailed operations schedules.
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.

Flow Name	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 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 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 confirmation	Acknowledgement by the driver/traveler of acceptance of a trip plan with associated personal and payment information required to confirm reservations.
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 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.
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.
widearea statistical pollution information	Aggregated region-wide measured emissions data and possible pollution incident information.
work plan coordination	Coordination of work plan schedules and activities between maintenance and construction organizations or systems. This information includes the work plan schedules and comments and suggested changes that are exchanged as work plans are coordinated and finalized.
work plan feedback	Comments and suggested changes to proposed construction and maintenance work schedules and activities. This information influences work plan schedules so that they minimize impact to other system operations and the overall transportation system.

Flow Name	Flow Definition
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.

APPENDIX H

ITS STANDARDS

LEAD SDO	STANDARD NAME	DOCUMENT ID
AASHTO/ITE	Traffic management Data Dictionary (TMDD) and Message Sets for Extranal Traffic Management Center Communications (MS/ETMCC)	ITE TMDD
AASHTO/ITE/NEMA	NTCIP Center-to-Center Standards Group	NTCIP C2C
AASHTO/ITE/NEMA	Global Object Definitions	NTCIP 1201
AASHTO/ITE/NEMA	Object Definitions for Closed Circuit Television (CCTV) Camera Control	NTCIP 1205
AASHTO/ITE/NEMA	Object Definitions for Closed Circuit Television (CCTV) Switching	NTCIP 1208
AASHTO/ITE/NEMA	Object Definitions for Signal Control and Prioritization (SCP)	NTCIP 1211
APTA	Standard for Transit Communications Interface Profiles	APTA T CIP-S-001 3.0.0
ASTM	Dedicated Short Range Communication at 915 MHz Standards Group	DSRC 915MHz
ASTM	Standard Practice for Metadata to Support Archived Data Management Systems	ASTM E2468-05
ASTM	Standard Specifications for Archiving ITS-Generated Traffic Monitoring Data	ASTM WK7604
ASTM/IEEE/SAE	Dedicated Short Range Communication at 5.9 GHz Standards Group	DSRC 5GHz
IEEE	Incident Management Standards Group	IEEE IM
IEEE	Standard for Message Sets for Vehicle/Roadside Communications	IEEE 1455-1999
SAE	Advanced Traveler Information Systems (ATIS) Bandwidth Limited Standards Group	ATIS Low Bandwidth
SAE	Advanced Traveler Information Systems (ATIS) General Use Standards Group	ATIS General Use

APPENDIX J

AGENCY AGREEMENTS

Agreement	Type	Agencies Involved	Agreement Description	Status
GIS Data Sharing	Data Sharing	Elkhart County, City of Elkhart, City of Goshen	Allows GIS Departments within these public agencies to share and use GIS data.	Existing
GIS Data Sharing	Data Sharing	MACOG, St Joseph County, Elkhart County, Kosciusko County, and Marshall County	Allows GIS Departments within these public agencies to share and use GIS data.	Existing
GIS Data Sharing	Data Sharing	St Joseph County, City of South Bend, City of Mishawaka	Allows GIS Departments within these public agencies to share and use GIS data.	Existing
Maintenance	Maintenance	City of South Bend, INDOT	City of South Bend is responsible for sweeping state roads within the city limits.	Existing
Maintenance	Maintenance	Kosciusko County, City of Warsaw, Town of Winona Lake, Town of Syracuse	Allows these public agencies to share and use snowplowing equipment.	Existing
Signal Maintenance	Maintenance	St Joseph County, City of South Bend, INDOT	City of South Bend is first on call for traffic signal responsibilities for the City, County, and INDOT roads within the city limits.	Existing
Lighting Maintenance	Maintenance	City of Goshen, INDOT	City of Goshen is responsible for lighting at traffic signals on state roads within the city limits. INDOT is responsible for school zone flashers on state roads.	Existing
Environmental Notification	Enviromental	MACOG, INDOT, IDEM	MACOG posts Ozone Action Day messages during ozone season for INDOT.	Existing

APPENDIX K

ARCHITECTURE MAINTENANCE FORMS



ITS ARCHITECTURE MAINTENANCE UPDATE FORM

Stakeholder:		Agency:	
Phone:	Email:		

☐ New Stakeholder ☐ New Element ☐ New Project ☐ Other Changes

New Stakeholder Name: _____

Stakeholder – An agency and specific individuals in those agencies responsible for policy and operations. A Stakeholder should have a relationship with or to ITS.

New Element Name: _____

Element Description: _____

Status: ☐ Existing ☐ Planned

Element – Equipment/Group that operates within a Stakeholder. Elements should be described in terms of their mission and relationship to ITS.

New Project Name: _____

Description: _____

Implementation year: _____

*Project - A project within the MACOG Region that has a relationship with or to ITS.
Complete this form with INDOT SEA Form.*

Other Changes: _____

Guide to INDOT SEA Check List Form Edition 1.0 (September 2008)

General Identification Information	
Basic Identification information	
Name of Project	
DES Number	
Project Number	
Project Description	
ITS Components	
Project contact Information	
Est. Project Budget	

Risk Identification	
<p>Identification of the risk category identifies the type of SEA that is needed for the project. If you have questions consult with Karen Stippich, FHWA, 317-226-7122.</p>	
<p><u>Major ITS Project (Category 1)</u> <u>– High Risk Projects</u></p> <p><i>Major ITS projects</i> are defined in terms of significant risks or costs. If <u>one or more</u> of the following risk factors is present, then the project is high risk and considered a <i>Major ITS project</i>.</p> <ul style="list-style-type: none"> • Multi-jurisdictional and/or multimodal • New software creation • New hardware integration • New technology applications • New interfaces – if to external systems • System requirements not well understood • Likely technology changes <p>Examples (Indiana version)</p> <ul style="list-style-type: none"> • Development of a Traffic Management center • 511 Deployment 	<p><u>Minor ITS Project (Category 2)</u> <u>– Medium to Low Risk Projects</u></p> <p><i>Minor ITS projects</i> are often referred to as <i>ITS infrastructure expansion</i>. For example, Standard Plans, Standard Specification, and Standard Special Provisions are well documented.</p> <p><i>Minor ITS projects</i> meet <u>all</u> of these characteristics of low risk are met:</p> <ul style="list-style-type: none"> • Single Jurisdiction and or stand alone system • No software creation (COTS Commercial Off the shelf) - COTS or proven software used • No new interfaces • System requirements well defined and documented • Operating procedures well documented • Agency has previous experience <p>Examples (Indiana version)</p> <ul style="list-style-type: none"> • Installation of sensor to expand the ITS network of detection <p>Minor - Very Low Risk Project</p> <p>The list of these projects are:</p> <ul style="list-style-type: none"> • Traffic Signal upgrades from a timed based coordination to interconnected coordination • Traffic Signal retiming
Final Risk Category Chosen	Major <input type="checkbox"/> Minor <input type="checkbox"/>
By:	
Date:	

1. Architecture Mapping

Document the portions of the ITS Architecture you are implementing. This would typically consist of a Turbo output of the corresponding market packages, which describe the information flows of the system.

If some or all of the proposed project functions, and/or information flows, do not exist in the Regional ITS Architecture, new functions and/or information flows identified shall be incorporated into the current Regional Architecture. Changes to the Regional Architecture must be coordinated with and documented by the agency maintaining that architecture.

Identify what portion of the ITS Architecture is being implemented: Functions and information flows, market package. (A Turbo output of the corresponding market packages, which describe the information flows of the system, may be attached.)

Architecture Identification	Statewide <input type="checkbox"/>
	Regional <input checked="" type="checkbox"/> (List)
Identification of what portion of the ITS Architecture is being Implemented	

2. Participating Agencies

A list of participating agencies that needs to be involved in developing the system requirements.

Reference Document:

3. System Requirements

High Level Statement of requirements that meet the stakeholders needs.

Many of these are identified in the INDOT Traffic Management Strategic Deployment Plan and often restated in the RFP.

Reference Document:

4. Alternatives Analysis

The ITS Architecture is technology independent, meaning it describes the flow of information between systems, but not the technology used to transfer the information. This document should describe the various technologies which were looked at for the project. (i.e. wireless communication vs. fiber / LED vs. Fiber Optic Signs / Digital Highway Advisory Radio vs. Analog / permanent HAR vs. portable / etc...)

Reference Document:

5. Procurement Options

Depending on how well your ITS project is defined, there are a variety of procurement options. For some ITS projects that are well defined, low bid may work well. However for other more complex projects, particularly ones with software development, a systems manager may be more appropriate.

Reference Document:

FHWA Approval/Concurrence needed before proceeding to preliminary design

Review and signature needed by FHWA Division Office. E-mail the check list and supporting documentation to Karen Stippich at Karen.Stippich@fhwa.dot.gov

By:

Date:

6. Concept of Operations

In this process, the project stakeholders reach a shared understanding of the system to be developed and how it will be operated and maintained. The Concept of Operations (Con Ops) is documented to provide a foundation for more detailed analyses that will follow. It will be the basis for the system requirements that are developed in the next step.

Reference Document:

7. Requirements Definition

The Concept of Operations are reviewed, analyzed, and transformed into verifiable requirements that define *what* the system will do but not *how* the system will do it. Working closely with stakeholders, the requirements are developed and verified.

Reference Document:

8. Identification of applicable Standards and testing procedures

Identification of Standards and a description of how installed equipment is will be tested to verify that the system will do what is required.

This Standards are should be listed in the special provisions of the PS&E package.

Reference Document:

9. High and Low Level Design

A system design is created based on the "System Requirements" which is the high-level design that defines the overall framework for the system. Subsystems of the system are identified and decomposed further into components. Requirements are allocated to the system components, and interfaces are specified in detail. Detailed specifications are created for the hardware and software components to be developed, and final product selections are made for off-the-shelf components.

Reference Document:

FHWA Approval/Concurrence needed at PS&E

Review and signature needed by FHWA Division Office. E-mail the check list and supporting documentation to Karen Stippich at Karen.Stippich@fhwa.dot.gov

By:

Date:

10. System Validations

System validations must occur to ensure the systems is working as required. Briefly describe that how the validations were accomplished and attach a validation/acceptance testing documentation.

Accepted By:

Date:

11. Operations and Maintenance/System Replacement

Briefly describe how the system will be maintained. The Nagios System is a live data base that shows the operability of all ITS devices on line. INDOT has a Performance Measure to have all ITS devices operating at 90%.

Brief Summary:

Entered into System Monitoring Program: Nagios ☐ Other ☐ (list)

By:

Date:

FHWA Final Acceptance

Review and signature needed by FHWA Division Office. E-mail the check list and supporting documentation to Karen Stippich at Karen.Stippich@fhwa.dot.gov

By:

Date:

APPENDIX L
ITS PROJECTS 2005 - 2010

ITS Projects 2005 - 2010	
City of Goshen	Implementation Year
•3 Way Signal College Ave @ SR 15	2007
City of Mishawaka	Implementation Year
•Large Overhead ID Signage	2010
•McKinley Ave Corridor Traffic Signal Improvement	2010
City of South Bend	Implementation Year
•Eddy at LaSalle/Colfax	2008
•Western Ave at S Olive Street	2009
•Angela Ave and Portage Ave Intersection	2010
•Fiber Optic Signal Interconnect along Mishawaka Avenue	2010
•Fiber Optic Signal Interconnect along Western Avenue	2010
•W Western Ave at S Walnut Street	2010
Elkhart County	Implementation Year
•Install Loop Detector at CR 40	2006
•CR 17 Phase 2B from Leedy Ditch to CR 30	2009
•CR 15 at CR 45	2010
•CR 17 Fiber Optic Interconnect - Phase I	2010
Interurban Trolley	Implementation Year
•Dispatching System	2004
•Passenger Counters	2008
•Traveler Information Software & Kiosks	2008
•Electronic Fareboxes	2009
St Joseph County	Implementation Year
•Cleveland Road at Hickory Road	2009
•McKinley from Bittersweet to Birch	2009
•Locust @ Ireland Rd	2010
TRANSPO	Implementation Year
•Automatic Fare Dispensing Machines & Counting System	2005
•Route Signage	2006