Allen County
Regional ITS Architecture

2022

Prepared By
Northeastern Indiana Regional Coordinating Council

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I. Introduction

Rapid advances in technology have created many new opportunities for transportation professionals to deliver safer and more efficient transportation services, and to respond proactively to increasing demand for transportation services in many areas and mounting customer expectations from coast to coast. However, many of these new opportunities are predicated upon effective coordination between organizations - at both an institutional and technical level. To encourage this coordination, the USDOT developed the National Intelligent Transportation Systems (ITS) Architecture to help identify and exploit these opportunities for cost-effective cooperation.

In 1997, Congress passed the Transportation Equity Act for the 21st Century (TEA-21) to address the need to begin to work toward regionally integrated transportation systems. In January 2001, FHWA published a rule (ITS Architecture and Standards) and the FTA published a companion policy to implement section 5206(e) of TEA-21. This Rule/Policy seeks to foster regional integration by requiring that all ITS projects funded from the Highway Trust Fund be in conformance with the National ITS Architecture and appropriate standards. "Conformance with the National ITS Architecture" is defined in the final Rule/Policy as using the National ITS Architecture to develop a "regional ITS architecture" that would be tailored to address the local situation and ITS investment needs, and the subsequent adherence of ITS projects to the regional ITS architecture. The deadline for a regional architecture to be in place is April 8, 2005. The Northeastern Indiana Regional Coordinating Council (NIRCC) met this deadline by submitting the Allen County Regional ITS Architecture to the FHWA on March 9, 2005.

The "initial" Allen County Regional ITS Architecture was developed to serve as a roadmap for transportation systems integration for Allen County over a 5 year period. The regional ITS architecture has since been expanded to cover the next 10 years. The architecture is a cooperative effort by the transportation agencies that serve within Allen County. The architecture represents how each agency's systems will work together in the future to provide a safer and more efficient transportation system for the traveling public in Allen County.

II. Development of Regional Architecture

The Northeastern Indiana Regional Coordinating Council (NIRCC), as the Metropolitan Planning Organization (MPO) that serves the metropolitan area within Allen County, took the role of champion for the development and continual updating of the architecture. NIRCC was responsible for the creation of the regional architecture database, which was done by using Turbo Architecture Software, and the regional architecture document (this document). The development of the regional architecture was done through the coordination and consensus of all stakeholders. The Transportation Technical Committee (TTC) served as the technical review committee during the development of the regional architecture. All of the stakeholders either participated on the TTC or were consulted during the development of the regional architecture.

In early 2005, the TTC approved the regional architecture and forwarded it onto the Urban Transportation Advisory Board (UTAB). UTAB also approved the regional architecture. In February of 2005, the regional architecture was taken to the 2030 Long Range Transportation Plan – Citizen Participation Meetings for public comment. The Allen County Regional ITS Architecture was submitted to the Federal Highway Administration in March of 2005.

In May 2008, the TTC approved the updated regional architecture and forwarded it onto the Urban Transportation Advisory Board (UTAB). In July 2008, UTAB also approved the updated regional architecture. The updated regional architecture was included in the 2030-II Long Range Transportation. The updated Allen County Regional ITS Architecture was submitted to the Federal Highway Administration in August of 2008.

In the spring of 2012, the architecture went through another update so that it could be approved and submitted to the Federal Highway Administration. This update was included in the 2035 Long Range Transportation Plan. In 2017architecture was updated to be included with the 2040 Long Range Transportation Plan. The latest 2022 update will be included with the 2045 Long Range Transportation plan.

III. Description of the Region and the Scope of the Architecture

Description of the Region

Allen County is the region that the Allen County Regional ITS Architecture serves. The region focuses on the Fort Wayne – New Haven – Allen County Metropolitan Area, but also includes the rural areas of Allen County. Allen County is the largest county geographically in Indiana, with approximately 657 square miles and the third largest in population with over 330,000 people. There are several major roadways that travel through Allen County. Interstate 69 spans the entire county. While Interstate 469 provides a loop around the City of Fort Wayne, connecting to Interstate 69 north and south of the City. U.S. Highways 24, 27, 30, and 33 also travel through Allen County, along with State Roads 1, 3, 14, 37, and 101.

Definition of the Scope

The Allen County Regional ITS Architecture provides a 10-year look at the ITS activities in Allen County. The architecture addresses the ITS systems that currently exist and those that are planned for development over the next 10 years. This architecture will provide a look at anticipated projects based on the information from the stakeholders. Frequent updates will be required to maintain an accurate representation of the region. The ITS services covered in this architecture include those associated with freeway management, maintenance and construction operations, arterial/ traffic management, emergency management, and public transportation.

IV. Identification of Stakeholders

Stakeholders are key to a regional architecture. The architecture represents how the ITS systems that the stakeholders operate (both existing and planned) are linked together to provide safe and efficient transportation. The regional architecture for Allen County consists of eight (8) stakeholders that represent the area transportation departments, public transportation, and the public safety agencies. Table 1 identifies and provides a description of the stakeholders that are included in the architecture.

Table 1: Stakeholders

Stakeholder Name	Stakeholder Description
ACHD	The Allen County Highway Department (ACHD) is the stakeholder responsible for bridges that span over 20 feet and all county roads in Allen County. This includes all divisions of the ACHD.
Citilink	Citilink is the stakeholder that serves as the public transportation provider in the region. Citilink provides a range of bus services in Fort Wayne and New Haven
Fort Wayne-Allen County Office of Homeland Security	The Fort Wayne-Allen County Office of Homeland Security is the stakeholder responsible for the protection of Allen County and the surrounding region from hazards, both internal and external, natural and man-made. This stakeholder is also responsible for emergency management activities in Allen County and the surrounding region.
Fort Wayne Transportation	Fort Wayne Transportation is the stakeholder that consists of all the City departments that provide transportation-related services for all City streets in Fort Wayne. This stakeholder also operates the Fort Wayne Traffic Control Center, which controls and maintains all of the signals owned by the City of Fort Wayne and maintains some of the signals throughout Allen County owned by INDOT, ACHD, and the City of New Haven.
INDOT	The Indiana Department of Transportation (INDOT) is the stakeholder responsible for all state roads, US Routes, and Interstate Routes within Allen County. This includes all divisions of INDOT that serve Allen County.
Media Service Provider	The Media element represents the information systems that provide traffic reports, travel conditions, and other transportation-related news services to the traveling public through radio, TV, and other media.
New Haven Transportation	New Haven Transportation is the stakeholder that consists of New Haven Engineering and New Haven Utilities Maintenance. Together they are responsible for all City streets in New Haven.
NIRCC	The Northeastern Indiana Regional Coordinating Council (NIRCC) is the Metropolitan Planning Organization (MPO) that serves the Fort Wayne – New Haven – Allen County Metropolitan Area. NIRCC also serves as the Rural Planning Organization (RPO) for rural Allen County. NIRCC is responsible for transportation planning in Allen County.

Public Safety Agencies	Public Safety Agencies includes the following stakeholders: Indiana State Police, Allen County Sheriff, New Haven Police, Fort Wayne Police, IPFW Police Department, Fort Wayne Fire Department, New Haven Fire Department, Aboite Fire District, Southwest Fire District, Township Fire Departments, EMS providers, INDOT Call Center, 311 Call Center and local 911 services.
Traveler	Users of the roadway system.
Weather Service Provider	This stakeholder provides weather, hydrologic, and climate information and warnings of hazardous weather including thunderstorms, flooding, hurricanes, tornadoes, winter weather, tsunamis, and climate events. It also provides atmospheric weather observations and forecasts that are collected and derived by the National Weather Service, private sector providers, and various research organizations.

V. Operational Concept

An Operational Concept identifies each stakeholder's current and future roles and responsibilities in the operation of the regional ITS system. The operational concept documents these roles and responsibilities across a range of transportation services. The services covered are:

- Surface Street Management: the development of signaling systems that react to changing traffic conditions and provide coordinated intersection timing over a corridor, an area, or multiple jurisdictions.
- Freeway Management: the development of systems to monitor freeway traffic flow and roadway conditions, and provide strategies to improve the flow of traffic on the freeway. Includes systems to provide information to travelers on the roadway.
- Incident Management: the development of systems to provide rapid and effective response to incidents. Includes systems to detect and verify incidents, along with coordinated agency response to the incidents.
- Transit Management: the development of systems to more efficiently manage fleets of transit vehicles. Includes systems to provide transit traveler information both pre-trip and during the trip.
- Emergency Management: the development of systems to provide emergency call taking, public safety dispatch, and emergency operations center operations.
- Maintenance and Construction Management: the development of systems to manage the maintenance of roadways in the region, including winter snow and ice clearance. Includes the managing of construction operations.
- Archive Data Management: the development of systems to collect transportation data for use in non-operational purposes (e.g. planning and research).

Table 2 illustrates the operational concept for the regional architecture.

Table 2: Operational Concept

Transportation Service	Stakeholder	Role/ Responsibilities
Surface Street Management	Fort Wayne Transportation	• Operate and/ or maintain traffic signal systems in Allen County that are owned by the City of Fort Wayne, INDOT, ACHD, and the City of New Haven
Freeway Control	ACHD	• Provide INDOT with traffic conditions on surface streets that may potentially effect Interstate 69 or 469
	Fort Wayne-Allen County Office of Homeland Security	• Coordinate with INDOT during emergencies and incidents occurring on Interstate 69 and 469
	Fort Wayne Transportation	• Provide INDOT with traffic conditions on surface streets that may potentially effect Interstate 69 or 469
	INDOT	• Monitor traffic conditions and incidents on Interstate 69 and 469 • Provide various systems and agencies with traffic conditions on Interstate 69 and 469, specifically those associated with maintenance and construction, surface street management, and emergency management • Operate traffic information devices on Interstate 69 and 469 such as Dynamic Message Signs (DMS) and Highway Advisory Radio (HAR)
	New Haven Transportation	• Provide INDOT with traffic conditions on surface streets that may potentially effect Interstate 69 or 469
	Public Safety Agencies	• Coordinate with INDOT during emergencies and incidents occurring on Interstate 69 and 469

Table 2:
Cont.

Transportation Service	Stakeholder	Role/ Responsibilities
Incident Management	ACHD	• Provide assistance to Public Safety Agencies responding to incidents on roads under ACHD's jurisdiction
	Fort Wayne Transportation	• Provide assistance to Public Safety Agencies responding to incidents on roads under Fort Wayne Transportation's jurisdiction
	INDOT	• Operate Freeway Service Vehicle on Interstate 69 • Provide incident information to travelers via traffic information devices on Interstate 69 such as DMS and HAR • Provide assistance to Public Safety Agencies responding to incidents on roads under INDOT's jurisdiction
	New Haven Transportation	• Provide assistance to Public Safety Agencies responding to incidents on roads under New Haven Transportation's jurisdiction
	Public Safety Agencies	• Receive emergency calls for incidents within Allen County, includes transit incidents • Dispatch appropriate Public Safety Agency to incident
Transit Services	Citilink	• Provide fixed route bus service throughout the City of Fort Wayne, the City of New Haven, and portions of Allen County • Provide point deviation bus service throughout the City of Fort Wayne. • Provide paratransit service throughout the City of Fort Wayne, the City of New Haven, and portions of Allen County

Table 2:
Cont.

Transportation Service	Stakeholder	Role/ Responsibilities
Emergency Management	ACHD	• Coordinate with various systems and agencies during emergencies
	Citilink	• Coordinate with various systems and agencies during emergencies
	Fort Wayne Transportation	• Coordinate with various systems and agencies during emergencies
	Fort Wayne-Allen County Office of Homeland Security	• Coordinate with various systems and agencies during emergencies • Develop and implement emergency plans • Dispatch appropriate agency or agencies to incidents
	INDOT	• Coordinate with various systems and agencies during emergencies
	New Haven Transportation	• Coordinate with various systems and agencies during emergencies
	Public Safety Agencies	• Provide emergency call taking (9-1-1) within Allen County • Dispatch appropriate agency or agencies to incidents • Coordinate with various systems and agencies during emergencies

Table 2:
Cont.

Transportation Service	Stakeholder	Role/ Responsibilities
Maintenance and Construction Management	ACHD	• Coordinate with other agencies that provide maintenance and construction within Allen County • Provide maintenance of county roads, including snow and ice control and pavement maintenance • Provide notification and status of maintenance and construction activities to public safety agencies
	Fort Wayne Transportation	• Coordinate with other agencies that provide maintenance and construction within Allen County • Provide maintenance of streets in Fort Wayne, including snow and ice control and pavement maintenance • Provide notification and status of maintenance and construction activities to public safety agencies
	INDOT	• Coordinate with other agencies that provide maintenance and construction within Allen County • Provide maintenance of state roads, US Routes, and Interstate Routes within Allen County, including snow and ice control and pavement maintenance • Provide notification and status of maintenance and construction activities to public safety agencies
	New Haven Transportation	• Coordinate with other agencies that provide maintenance and construction within Allen County • Provide maintenance of streets in New Haven, including snow and ice control and pavement maintenance • Provide notification and status of maintenance and construction activities to public safety agencies

Table 2:
Cont.

Transportation Service	Stakeholder	Role/ Responsibilities
Archived Data Management	NIRCC	• Collect and archive traffic count data for the County (includes data within municipal boundaries) • Collect and archive traffic count data for the State within Allen County (includes data within municipal boundaries) • Collect, archive, and summarize crash data within Allen County • Collect and archive transportation related data from various systems and transportation agencies within Allen County • Make data available for transportation planning activities

VI. Inventory

Each Stakeholder is responsible for ITS systems in the region. A regional ITS architecture inventory is a list of the elements that represent all the existing and planned ITS systems in the region as well as non – ITS systems that provide information to or get information from the ITS systems. The regional architecture contains twenty-nine (29) elements, consisting of systems and subsystems that are either related to the systems or stand alone. The elements are listed below:

Systems (10)
911 Call Center
ACHD Operations, Maintenance, and Construction
INDOT Traffic Management Center
Citilink Operations
Fort Wayne - Allen County Emergency Operations Center
Fort Wayne Operations, Maintenance, and Construction
Fort Wayne Traffic Control Center
INDOT Operations, Maintenance, and Construction
New Haven Operations, Maintenance, and Construction
Transportation Data

Subsystems (19)
ACHD Vehicles
INDOT Traffic Management Center Roadside Equipment
Citilink Operations Kiosks
Citilink Transit Vehicles
Emergency Vehicles
Fort Wayne Vehicles
Fort Wayne Traffic Control Center Roadside Equipment
INDOT Field Devices
INDOT Vehicles
Media
New Haven Vehicles
Surface Transportation Weather Service
User Personal Computing Devices
Weather Services

The inventory has been presented in two (2) different manners. Table 3 sorts the inventory by stakeholder. The table lists the stakeholders, their associated elements, an element description, and whether the element exists or is planned. Table 4 sorts the inventory by entity. Each element in the regional architecture is mapped to one or more entities from the National ITS Architecture. The table lists the entity, the element and stakeholder, and whether the element exists or is planned.

Table 3: Inventory Sorted by Stakeholder

Stakeholder	System/ Element	Description	Status
ACHD	ACHD Operations, Maintenance, and Construction	ACHD Operations, Maintenance, and Construction coordinates all construction and maintenance activities on roads under ACHD's jurisdiction.	Existing
	ACHD Vehicles	ACHD vehicles include ITS devices that provide the sensory, processing, storage, and communications functions necessary to support highway maintenance and construction.	Existing
Citilink	Citilink Operations	Citilink Operations coordinates public transit activities within Allen County.	Existing
	Citilink Operations Kiosks	Kiosks are public informational displays supporting various levels of interaction and information access and systems which provide security in public areas.	Planned
	Citilink Transit Vehicles	Citilink transit vehicles include ITS devices that support the safe and efficient movement of passengers. These systems collect, manage, and disseminate transit-related information to the driver, operations and maintenance personnel, and transit system patrons.	Existing

Table 3:
Cont.

Stakeholder	System/ Element	Description	Status
Fort Wayne - Allen County Office of Homeland Security	Fort Wayne - Allen County Emergency Operations Center	The Fort Wayne - Allen County Emergency Operations Center (EOC) is the physical location where area agencies come together during an emergency to coordinate response and recovery actions and resources. This is the operations center where coordination and management decisions are facilitated for emergencies occurring in Allen County and the surrounding areas.	Existing
Fort Wayne Transportation	Fort Wayne Operations, Maintenance, and Construction	Fort Wayne Operations, Maintenance, and Construction coordinates all construction and maintenance activities on all City streets in Fort Wayne.	Existing
	Fort Wayne Vehicles	Fort Wayne vehicles include ITS devices that provide the sensory, processing, storage, and communications functions necessary to support highway maintenance and construction.	Existing
	Fort Wayne Traffic Control Center	This center coordinates arterial / traffic management activities in Allen County for the City of Fort Wayne, INDOT, ACHD, and the City of New Haven.	Existing
	Fort Wayne Traffic Control Center Roadside Equipment	Roadside Equipment includes any and all equipment distributed on and along the roadway which monitors and controls traffic.	Existing

Table 3:
Cont.

Stakeholder	System/ Element	Description	Status
INDOT	INDOT Traffic Management Center	The INDOT Traffic Management Center coordinates ITS activities associated with freeways within Allen County in association with INDOT's Fort Wayne District Office.	Existing
	INDOT Traffic Management Center Personnel	Personnel represent the people who directly interface with an element of the ITS infrastructure. They provide operator data and command inputs to direct systems operations to varying degrees, depending on the type of system and the deployment scenario.	Existing
	INDOT Traffic Management Center Roadside Equipment	Roadside Equipment includes any and all equipment distributed on and along the roadway which monitors and controls traffic.	Existing
	INDOT Operations, Maintenance, and Construction	The Indiana Department of Transportation (INDOT) Operations, Maintenance, and Construction coordinates all maintenance and construction activities on roads under INDOT's jurisdiction in Allen County.	Existing
	INDOT Field Devices	INDOT Field Devices include sensors, displays, and cameras for operational purposes of maintenance and construction.	Existing
	INDOT Vehicles	INDOT vehicles include ITS devices that provides the sensory, processing, storage, and communications functions necessary to support highway	Existing
	Surface Transportation Weather Service	Providers of value-added sector specific meteorological services. These providers utilize National Weather Service data and predictions, road condition information and local environmental data to provide weather observations and forecasts.	Existing
New Haven Transportation	New Haven Operations, Maintenance, and Construction	New Haven Operations, Maintenance, and Construction coordinates all construction and maintenance activities on all City streets in New Haven.	Existing
	New Haven Vehicles	New Haven vehicles include ITS devices that provide the sensory, processing, storage, and communications functions necessary to support highway maintenance and construction.	Existing
NIRCC	Transportation Data	Transportation Data collects and stores transportation related data from various systems and transportation agencies within Allen County.	Existing

Table 3:
Cont.

Stakeholder	System/ Element	Description	Status
Public Safety Agencies	911 Call Center	The 911 Call Center receives and distributes emergency information in Allen County. This can be done through Allen County 911, Fort Wayne 911, and New Haven 911, which are connected by a single router or through the individual public safety agencies. Together they coordinate all emergency response activities within Allen County.	Existing
	Emergency Vehicles	Emergency vehicles include ITS equipment that provides the sensory, processing, storage, and communications functions necessary to support safe and efficient emergency response.	Existing
Media Service Provider	Media	The Media element represents the information systems that provide traffic reports, travel conditions, and other transportation-related news services to the traveling public through radio, TV, and other media.	Existing
Traveler	User Personal Computing Devices	User Personal Computing Devices refers to equipment an individual owns and can personalize with their choices for information about transportation networks. An Internet-connected PC is an example.	Existing
Weather Service Provider	Weather Services	Weather Services include the National Weather Service as well as private disseminators of weather data.	Existing

Table 4: Inventory Sorted by Entity

Entity	Systems/ Element	Stakeholder	Status
Archived Data Management Subsystem	Transportation Data	NIRCC	Existing
Emergency Management	911 Call Center	Public Safety Agencies	Existing
	Fort Wayne - Allen County EOC	Fort Wayne – Allen County Office of Homeland Security	Existing
Emergency Vehicle Subsystem	Emergency Vehicles	Public Safety Agencies	Existing
Maintenance and Construction Management	ACHD Operations, Maintenance, and Construction	ACHD	Existing
	Fort Wayne Operations, Maintenance, and Construction	Fort Wayne Transportation	Existing
	INDOT Operations, Maintenance, and Construction	INDOT	Existing
	New Haven Operations, Maintenance, and Construction	New Haven Transportation	Existing
Maintenance and Construction Vehicle	ACHD Vehicles	ACHD	Existing
	Fort Wayne Vehicles	Fort Wayne Transportation	Existing
	INDOT Vehicles	INDOT	Existing
	New Haven Vehicles	New Haven Transportation	Existing
Media	Media	None	Existing
Personal Information Access	User Personal Computing Devices	None	Existing
Remote Traveler Support	Citilink Operations Kiosks	Citilink	Planned
Roadway Subsystem	INDOT Traffic Management Center Roadside Equipment	INDOT	Existing
	Fort Wayne Traffic Control Center Roadside Equipment	Fort Wayne Transportation	Existing
	INDOT Field Devices	INDOT	Existing
Surface Transportation Weather Service	Surface Transportation Weather Service	None	Existing
Traffic Management	INDOT Traffic Management Center	INDOT	Existing
	Fort Wayne Traffic Control Center	Fort Wayne Transportation	Existing
Traffic Operations Personnel	INDOT Traffic Management Center Personnel	INDOT	Existing
	Fort Wayne Traffic Control Center Personnel	Fort Wayne Transportation	Existing
Transit Management	Citilink Operations	Citilink	Existing
Transit Vehicle Subsystem	Transit Vehicles	Citilink	Existing
Weather Service	Weather Services	None	Existing

VII. Needs and Services

The ITS systems in the region provide a variety of transportation services that address the transportation needs of the region. These services will continue to grow as more systems are developed and upgraded. The regional needs include; the need for safe and efficient transportation on freeways and arterials, the need for safe and efficient maintenance and construction activities, a need for safe and efficient public transit, a need for efficient and comprehensive emergency management, and the need for coordination between all of the needs listed above. The services that address these needs are described by the market packages that are associated with each element. Table 5 identifies the market packages for the region. The table identifies the market package, the associated element, and whether it is planned or existing.

Table 5: Service Packages

Service Package	Service Package Name	Element	Status
DM01	ITS Data Warehouse	ACHD Operations, Maintenance, and Construction	Existing
		INDOT Traffic Management Center	Planned
		Citilink Operations	Existing
		Fort Wayne Operations, Maintenance, and Construction	Existing
		Fort Wayne Traffic Control Center	Existing
		INDOT Operations, Maintenance, and Construction	Existing
		New Haven Operations, Maintenance, and Construction	Existing
		Transportation Data	Existing
TM01	Infrastructure-Based Traffic Surveillance	INDOT Traffic Management Center	Existing
		INDOT Traffic Management Center Roadside Equipment	Existing
		Fort Wayne Traffic Control Center	Existing
		Fort Wayne Traffic Control Center Roadside Equipment	Existing

Table 5:
Cont.

Service Package	Service Package Name	Element	Status
TM03	Traffic Signal Control	Fort Wayne Traffic Control Center	Existing
		Fort Wayne Traffic Control Center Roadside Equipment	Existing
TM06	Traffic Information Dissemination	INDOT Traffic Management Center	Existing
		INDOT Traffic Management Center Roadside Equipment	Existing
TM07	Regional Traffic Management	INDOT Traffic Management Center	Planned
		Fort Wayne Traffic Management Center	Planned
TM08	Traffic Incident Management System	911 Call Center	Existing
		ACHD Operations, Maintenance, and Construction	Existing
		INDOT Traffic Management Center	Existing
		INDOT Traffic Management Center Roadside Equipment	Existing
		Emergency Vehicles	Existing
		Fort Wayne – Allen County EOC	Existing
		Fort Wayne Operations, Maintenance, and Construction	Existing
		INDOT Operations, Maintenance, and Construction	Existing
		New Haven Operations, Maintenance, and Construction	Existing
TM19	Roadway Closure Management	INDOT Traffic Management Center	Existing
		INDOT Traffic Management Center Roadside Equipment	Existing
MC01	Maintenance and Construction Vehicle Tracking	Fort Wayne Operations, Maintenance, and Construction	Existing
		Fort Wayne Vehicles	Existing

Table 5:
Cont.

Service Package	Service Package Name	Element	Status
MC02	Maintenance and Construction Vehicle Maintenance	ACHD Operations, Maintenance, and Construction	Existing
		ACHD Vehicles	Existing
		Fort Wayne Maintenance and Construction	Existing
		Fort Wayne Vehicles	Existing
		INDOT Operations, Maintenance, and Construction	Existing
		INDOT Vehicles	Existing
		New Haven Operations, Maintenance, and Construction	Existing
		New Haven Vehicles	Existing
WX01	Weather Data Collection	INDOT Operations, Maintenance, and Construction	Existing
		INDOT Field Devices	Existing
WX02	Weather Information Processing and Distribution	INDOT Operations, Maintenance, and Construction	Existing
		Surface Transportation Weather Services	Existing
		Weather Services	Existing
MC04	Winter Maintenance	ACHD Operations, Maintenance, and Construction	Existing
		ACHD Vehicles	Existing
		Fort Wayne Operations, Maintenance, and Construction	Existing
		Fort Wayne Vehicles	Existing
		INDOT Operations, Maintenance, and Construction	Existing
		INDOT Vehicles	Existing
		New Haven Operations, Maintenance, and Construction	Existing
		New Haven Vehicles	Existing
		Surface Transportation Weather Services	Existing
		Weather Services	Existing

Table 5:
Cont.

Service Package	Service Package Name	Element	Status
MC05	Roadway Maintenance and Construction	ACHD Operations, Maintenance, and Construction	Existing
		ACHD Vehicles	Existing
		Fort Wayne Operations, Maintenance, and Construction	Existing
		Fort Wayne Vehicles	Existing
		INDOT Operations, Maintenance, and Construction	Existing
		INDOT Field Devices	Existing
		INDOT Vehicles	Existing
		New Haven Operations, Maintenance, and Construction	Existing
		New Haven Vehicles	Existing
MCO6	Work Zone Management Maintenance	ACHD Operations, Maintenance, and Construction	Existing
		Fort Wayne Operations, Maintenance, and Construction	Existing
		INDOT Traffic Management Center	Existing
		INDOT Traffic Management Center Roadside Equipment	Existing
		INDOT Operations, Maintenance, and Construction	Existing
		INDOT Field Devices	Existing
		Media	Existing
		New Haven Operations, Maintenance, and Construction	Existing
MC08	Construction Activity Coordination	ACHD Operations, Maintenance, and Construction	Existing
		Fort Wayne Operations, Maintenance, and Construction	Existing
		INDOT Operations, Maintenance, and Construction	Existing
		New Haven Operations, Maintenance, and Construction	Existing
PT01	Transit Vehicle Tracking	Citilink Operations	Existing
		Citilink Transit Vehicles	Existing

Table 5:
Cont.

Service Package	Service Package Name	Element	Status
PT02	Transit Fixed-Route Operations	Citilink Operations	Existing
		Citilink Transit Vehicles	Existing
PT03	Demand Response Transit Operations	Citilink Operations	Existing
		Citilink Transit Vehicles	Existing
PT04	Transit Fare Collection Management	Citilink Operations	Existing
		Citilink Operations Kiosks	Existing
		Citilink Transit Vehicles	Existing
PT05	Transit Security	Citilink Operations	Existing
		Citilink Operations Kiosks	Existing
		Citilink Transit Vehicles	Existing
PT06	Transit Fleet Management	Citilink Operations	Existing
		Citilink Transit Vehicles	Existing
PT08	Transit Traveler Information	Citilink Operations	Existing
		Citilink Operations Kiosks	Existing
		Media	Existing
		Transit Vehicles	Existing
		User Personal Computing Devices	Existing
PS01	Emergency Call-Taking and Dispatch	911 Call Center	Existing
		Emergency Vehicles	Existing
		Fort Wayne – Allen County EOC	Existing
PS02	Emergency Response	911 Call Center	Existing
		Emergency Vehicles	Existing
		Fort Wayne - Allen County Emergency Operations Center	Existing

Table 5:

Cont.

Service Package	Service Package Name	Element	Status
PS10	Wide-Area Alert	911 Call Center	Existing
		INDOT Traffic Management Center	Existing
		INDOT Traffic Management Center roadside Equipment	Existing
		Fort Wayne – Allen County EOC	Existing
PS11	Early Warning System	911 Call Center	Existing
		INDOT Traffic Management Center	Existing
		Fort Wayne – Allen County EOC	Existing
		Weather Services	Existing
PS12	Disaster Response and Recovery	911 Call Center	Existing
		ACHD Operations, Maintenance, and Construction	Existing
		INDOT Traffic Management Center	Existing
		Citilink Operations	Existing
		Fort Wayne – Allen County EOC	Existing
		Fort Wayne Operations, Maintenance, and Construction	Existing
		Fort Wayne Traffic Control Center	Existing
		INDOT Operations, Maintenance, and Construction	Existing
		New Haven Operations, Maintenance, and Construction	Existing

Table 5:
Cont.

Service Package	Service Package Name	Element	Status
PS13	Evacuation and Reentry Management	911 Call Center	Existing
		ACHD Operations, Maintenance, and Construction	Existing
		INDOT Traffic Management Center	Existing
		Citilink Operations	Existing
		Fort Wayne – Allen County EOC	Existing
		Fort Wayne Operations, Maintenance, and Construction	Existing
		Fort Wayne Traffic Control Center	Existing
		INDOT Operations, Maintenance, and Construction	Existing
		New Haven Operations, Maintenance, and Construction	Existing
PS14	Disaster Traveler Information	911 Call Center	Existing
		Fort Wayne – Allen County EOC	Existing
		INDOT Traffic Management Center	Existing
		Media	Existing

VIII. Interconnections and Information Flows

Regional Architecture Interconnections

The regional architecture has a total of sixty-five (65) interconnections between the twenty-four (24) elements that comprise it. Interconnect Diagram 1 illustrates the regional architecture interconnections. The interconnections for each of the ten (10) systems are broken down as follows:

911 Call Center
11 Total Interconnections

- 9 Interconnections with systems: Fort Wayne – Allen County EOC, Fort Wayne Operations, Maintenance, and Construction, Fort Wayne Traffic Control Center, New Haven Operations, Maintenance, and Construction, Allen County Operations, Maintenance, and Construction, INDOT Operations, Maintenance, and Construction, INDOT Traffic Management Center, Citilink Operations, and Transportation Data
- 2 Interconnections with sub-systems: Emergency Vehicles and Media

ACHD Operations, Maintenance, and Construction
10 Total Interconnections

- 7 Interconnections with systems: Fort Wayne – Allen County EOC, Fort Wayne Operations, Maintenance, and Construction, New Haven Operations, Maintenance, and Construction, INDOT Operations, Maintenance, and Construction, Fort Wayne Traffic Control Center, 911 Call Center, and Transportation Data
- 3 Interconnections with sub-systems: ACHD Vehicles, Media, and Weather Services

Citilink Operations
8 Total Interconnections

- 3 Interconnections with systems: 911 Call Center, Fort Wayne – Allen County EOC, and Transportation Data
- 5 Interconnections with sub-systems Citilink Operations Kiosks, Citilink Transit Vehicles, User Personal Computing Devices, Media, and Weather Services

Fort Wayne – Allen County Emergency Operations Center
11 Total Interconnections

- 9 Interconnections with systems: 911 Call Center, Fort Wayne Operations, Maintenance, and Construction, New Haven Operations, Maintenance, and Construction, Allen County Operations, Maintenance, and Construction, INDOT Operations, Maintenance, and Construction, INDOT Traffic Management Center, Fort Wayne Traffic Control Center, Citilink Operations, and Transportation Data
- 2 Interconnections with sub-systems: Media and Weather Services

Fort Wayne Operations, Maintenance, and Construction
10 Total Interconnections

- 7 Interconnections with systems: 911 Call Center, Fort Wayne – Allen County EOC, New Haven Operations, Maintenance, and Construction, Allen County Operations, Maintenance, and Construction, INDOT Operations, Maintenance, and Construction, Fort Wayne Traffic Control Center, and Transportation Data
- 3 Interconnections with sub-systems: Fort Wayne Vehicles, Media, and Weather Services

Fort Wayne Traffic Control Center
9 Total Interconnections

8 Interconnections with systems: 911 Call Center, Fort Wayne – Allen County EOC, Fort Wayne Operations, Maintenance, and Construction, New Haven Operations, Maintenance, and Construction, Allen County Operations, Maintenance, and Construction, INDOT Operations, Maintenance, and Construction, INDOT Traffic Management Center, and Transportation Data

- 1 Interconnection with sub-system: Fort Wayne Traffic Control Center Roadside Equipment

INDOT Traffic Management Center
8 Total Interconnections

- 5 Interconnections with systems: 911 Call Center, Fort Wayne – Allen County EOC, INDOT Operations, Maintenance, and Construction, Fort Wayne Traffic Control Center, and Transportation Data
- 3 Interconnections with sub-systems: INDOT Traffic Management Center Roadside Equipment, INDOT Field Devices, and Weather Services

INDOT Operations, Maintenance, and Construction
14 Total Interconnections

- 8 Interconnections with systems: 911 Call Center, INDOT Traffic Management Center, Fort Wayne Traffic Control Center, Fort Wayne Operations, Maintenance, and Construction, New Haven Operations, Maintenance, and Construction, Allen County Operations, Maintenance, and Construction, Fort Wayne – Allen County EOC, and Transportation Data
- 6 Interconnections with sub-systems: INDOT Traffic Management Center Roadside Equipment, INDOT Field Devices, INDOT Vehicles, Media, Surface Transportation Weather Service, and Weather Services

New Haven Operations, Maintenance, and Construction
10 Total Interconnections

- 7 Interconnections with systems: Fort Wayne Operations, Maintenance, and Construction, ACHD Operations, Maintenance, and Construction, INDOT Operations, Maintenance, and Construction, Fort Wayne Traffic Control Center, Fort Wayne – Allen County EOC, 911 Call Center, and Transportation Data
- 3 Interconnections with sub-systems: New Haven Vehicles, Media, and Weather Services

Transportation Data
9 Total Interconnections

- 9 Interconnections with systems: Fort Wayne Operations, Maintenance, and Construction, New Haven Operations, Maintenance, and Construction, ACHD Operations, Maintenance, and Construction, INDOT Operations, Maintenance, and Construction, Fort Wayne Traffic Control Center, Fort Wayne – Allen County EOC, 911 Call Center, Citilink Operations, and INDOT Traffic Management Center

Regional Architecture Information Flows

The regional architecture has a total of three hundred thirty-six (336) information flows between the twenty-four (24) elements that comprise it. The information flow diagram located in Appendix A illustrates the regional architecture information flows. The information flows entering and exiting each of the ten (10) systems have been illustrated for each individual system in Flow Diagrams 1 through 10. A summary of the information flows for each of the ten (10) systems is broken down as follows:

911 Call Center (Flow Diagram 1)
88 Total Information Flows Entering and Exiting

Sources

- Receives a total of 46 information flows from the following elements: Fort Wayne – Allen County EOC, Fort Wayne Operations, Maintenance, and Construction, New Haven Operations, Maintenance, and Construction, Allen County Operations, Maintenance, and Construction, INDOT Operations, Maintenance, and Construction, INDOT Traffic Management Center, Citilink Operations, Transportation Data, and Emergency Vehicles

Destinations

- Sends a total of 41 information flows to the following elements: Fort Wayne – Allen County EOC, Fort Wayne Operations, Maintenance, and Construction, New Haven Operations, Maintenance, and Construction, Allen County Operations, Maintenance, and Construction, INDOT Operations, Maintenance, and Construction, INDOT Traffic Management Center, Citilink Operations, Transportation Data, Emergency Vehicles, and Media

ACHD Operations, Maintenance, and Construction (Flow Diagram 2)
44 Total Information Flows Entering and Exiting

Sources

- Receives a total of 24 information flows from the following elements: Fort Wayne Operations, Maintenance, and Construction, New Haven Operations, Maintenance, and Construction, Allen County Operations, Maintenance, and Construction, INDOT Operations, Maintenance, and Construction, Fort Wayne Traffic Control Center, Fort Wayne – Allen County EOC, 911 Call Center, Transportation Data, ACHD Vehicles, and Weather Services

Destinations

- Sends a total of 20 information flows to the following elements: Fort Wayne Operations, Maintenance, and Construction, New Haven Operations, Maintenance, and Construction, Allen County Operations, Maintenance, and Construction, INDOT Operations, Maintenance, and Construction, Fort Wayne Traffic Control Center, Fort Wayne – Allen County EOC, 911 Call Center, Transportation Data, ACHD Vehicles, and Media

Citilink Operations (Flow Diagram 3)
39 Total Information Flows Entering and Exiting

Sources

- Receives a total of 23 information flows from the following elements: Fort Wayne – Allen County EOC, 911 Call Center, Fort Wayne Maintenance and Construction, Transportation Data, Citilink Operations Kiosks, Citilink Transit Vehicles, User Personal Computing Devices, and Weather Services

Destinations

- Sends a total of 22 information flows to the following elements: Fort Wayne – Allen County EOC, 911 Call Center, Fort Wayne Maintenance and Construction, Transportation Data, Citilink Operations Kiosks, Citilink Transit Vehicles, User Personal Computing Devices, and Media

Fort Wayne – Allen County Emergency Operations Center (Flow Diagram 4)
92 Total Information Flows Entering and Exiting

Sources

- Receives a total of 40 information flows from the following elements: 911 Call Center, Fort Wayne Operations, Maintenance, and Construction, New Haven Operations, Maintenance, and Construction, Allen County Operations, Maintenance, and Construction, INDOT Operations, Maintenance, and Construction, INDOT Traffic Management Center, Fort Wayne Traffic Control Center, Citilink Operations, Transportation Data, , and Weather Services

Destinations

- Sends a total of 53 information flows to the following elements: 911 Call Center, Fort Wayne Operations, Maintenance, and Construction, New Haven Operations, Maintenance, and Construction, Allen County Operations, Maintenance, and Construction, INDOT Operations, Maintenance, and Construction, INDOT Traffic Management Center, Fort Wayne Traffic Control Center, Citilink Operations, Transportation Data, Emergency Vehicles, and Media

Fort Wayne Operations, Maintenance, and Construction (Flow Diagram 5)
49 Total Information Flows Entering and Exiting

Sources

- Receives a total of 29 information flows from the following elements: New Haven Operations, Maintenance, and Construction, ACHD Operations, Maintenance, and Construction, INDOT Operations, Maintenance, and Construction, Fort Wayne Traffic Control Center, Fort Wayne – Allen County EOC, 911 Call Center, Fort Wayne Vehicles, Transportation Data, and Weather Services

Destinations

- Sends a total of 21 information flows to the following elements: New Haven Operations, Maintenance, and Construction, ACHD Operations, Maintenance, and Construction, INDOT Operations, Maintenance, and Construction, Fort Wayne Traffic Control Center, Fort Wayne – Allen County EOC, 911 Call Center, Fort Wayne Vehicles, Transportation Data, and Media

Fort Wayne Traffic Control Center (Flow Diagram 6)
75 Total Information Flows Entering and Exiting

Sources

- Receives a total of 32 information flows from the following elements: Fort Wayne Operations, Maintenance, and Construction, New Haven Operations, Maintenance, and Construction, ACHD Operations, Maintenance, and Construction, INDOT Operations, Maintenance, and Construction, INDOT Traffic Management Center, Fort Wayne – Allen County EOC, Transportation Data, Fort Wayne Traffic Control Center Personnel, and Fort Wayne Traffic Control Center Roadside Equipment

Destinations

- Sends a total of 43 information flows to the following elements: Fort Wayne Operations, Maintenance, and Construction, New Haven Operations, Maintenance, and Construction, ACHD Operations, Maintenance, and Construction, INDOT Operations, Maintenance, and Construction, INDOT Traffic Management Center, Fort Wayne – Allen County EOC, Transportation Data, Fort Wayne Traffic Control Center Personnel, and Fort Wayne Traffic Control Center Roadside Equipment

INDOT Operations and Construction (Flow Diagram 7)
70 Total Information Flows Entering and Exiting

Sources

- Receives a total of 42 information flows from the following elements: INDOT Traffic Management Center, Fort Wayne Traffic Control Center, Fort Wayne Operations, Maintenance, and Construction, New Haven Operations, Maintenance, and Construction, ACHD Operations, Maintenance, and Construction, Fort Wayne – Allen County EOC, 911 Call Center, Transportation Data, INDOT Traffic Management Center Roadside Equipment, INDOT Field Devices, INDOT Vehicles, Surface Transportation Weather Service, and Weather Services

Destinations

- Sends a total of 30 information flows to the following elements: INDOT Traffic Management Center, Fort Wayne Traffic Control Center, Fort Wayne Operations, Maintenance, and Construction, New Haven Operations, Maintenance, and Construction, ACHD Operations, Maintenance, and Construction, Fort Wayne – Allen County EOC, 911 Call Center, Transportation Data, INDOT Traffic Management Center Roadside Equipment, INDOT Field Devices, INDOT Vehicles, and Media

INDOT Traffic Management Center (Flow Diagram 8)
50 Total Information Flows Entering and Exiting

Sources

- Receives a total of 25 information flows from the following elements: INDOT Operations, Maintenance, and Construction, Fort Wayne – Allen County EOC, 911 Call Center, Fort Wayne Traffic Control Center, Transportation Data, INDOT Traffic Management Center Personnel, INDOT Traffic Management Center Roadside Equipment, Transportation Data, INDOT Field Devices, and Weather Services

Destinations

- Sends a total of 26 information flows to the following elements: INDOT Operations, Maintenance, and Construction, Fort Wayne – Allen County EOC, 911 Call Center, Fort Wayne Traffic Control Center, Transportation Data, INDOT Traffic Management Center Personnel, INDOT Traffic Management Center Roadside Equipment, and Transportation Data

New Haven Operations, Maintenance, and Construction (Flow Diagram 9)
44 Total Information Flows Entering and Exiting

Sources

- Receives a total of 25 information flows from the following elements: Fort Wayne Operations, Maintenance, and Construction, ACHD Operations, Maintenance, and Construction, INDOT Operations, Maintenance, and Construction, Fort Wayne Traffic Control Center, Fort Wayne – Allen County EOC, 911 Call Center, Transportation Data, New Haven Vehicles, and Weather Services

Destinations

- Sends a total of 20 information flows to the following elements: Fort Wayne Operations, Maintenance, and Construction, ACHD Operations, Maintenance, and Construction, INDOT Operations, Maintenance, and Construction, Fort Wayne Traffic Control Center, Fort Wayne – Allen County EOC, 911 Call Center, Transportation Data, New Haven Vehicles, and Media

Transportation Data (Flow Diagram 10)
12 Total Information Flows Entering and Exiting

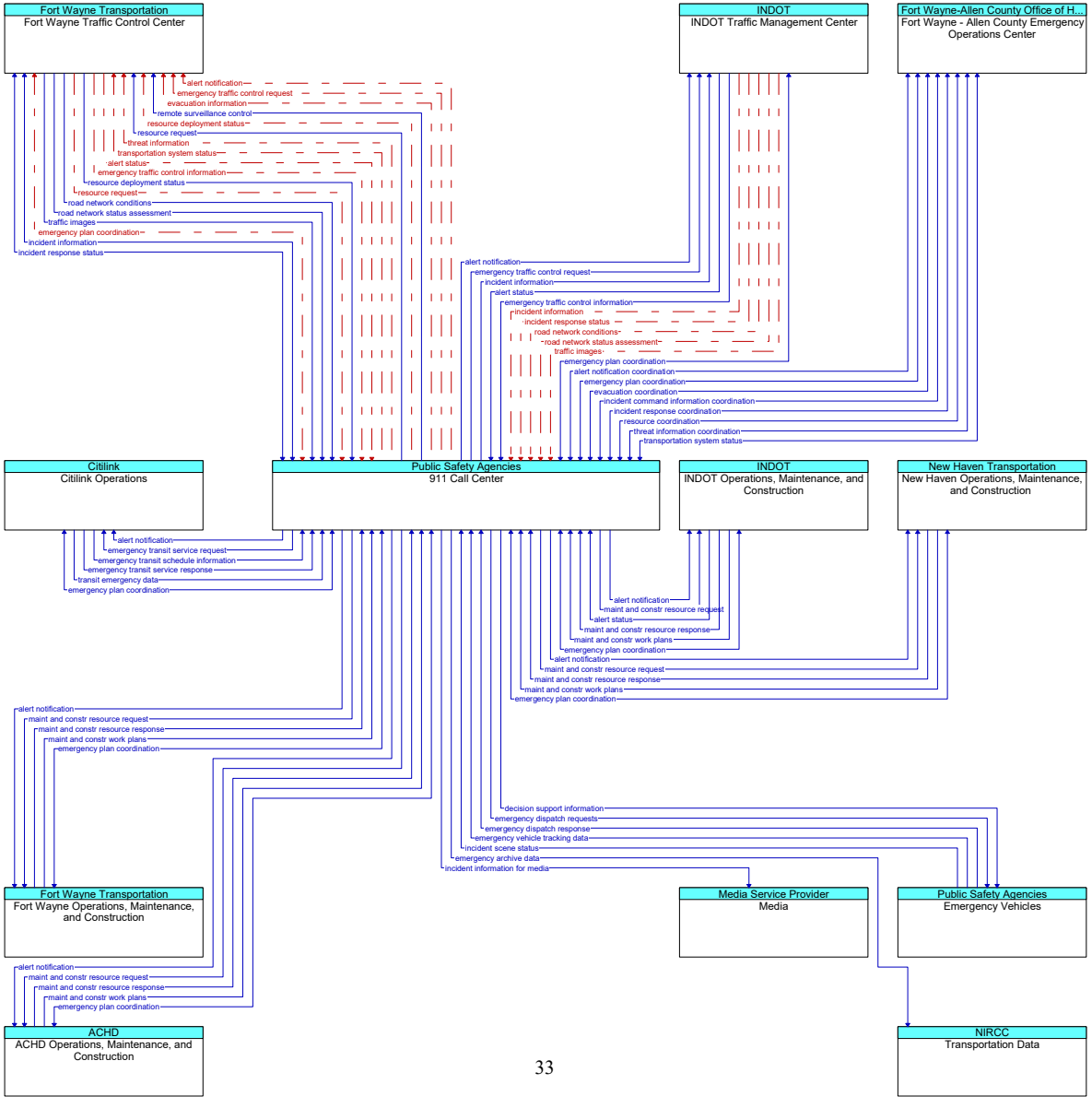
Sources

- Receives a total of 10 information flows from the following elements: Fort Wayne Operations, Maintenance, and Construction, New Haven Operations, Maintenance, and Construction, ACHD Operations, Maintenance, and Construction, INDOT Operations, Maintenance, and Construction, Fort Wayne Traffic Control Center, Fort Wayne – Allen County EOC, 911 Call Center, Citilink Operations, and INDOT Traffic Management Center

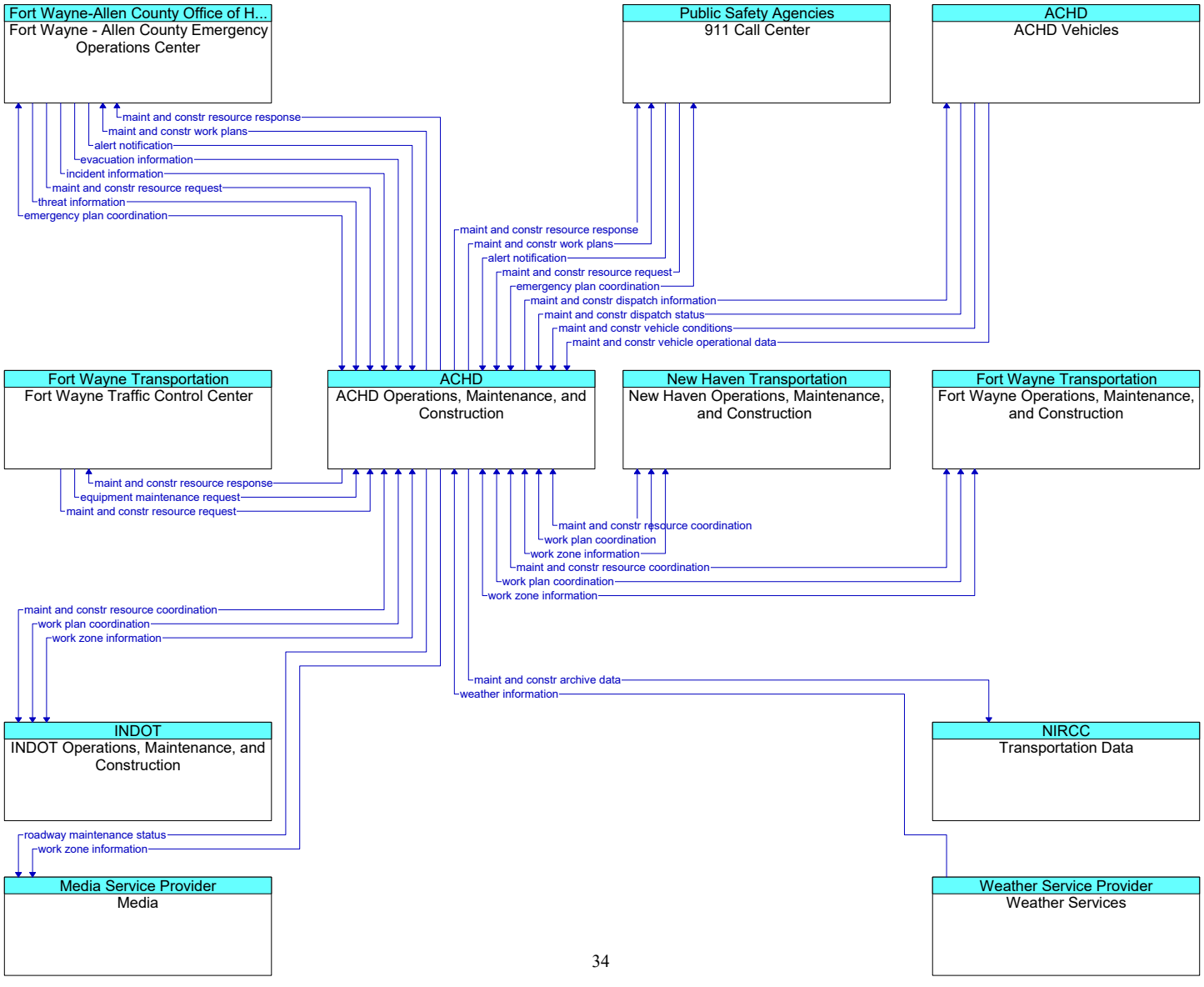
Destinations

- Sends a total of 10 information flows to the following elements: Fort Wayne Operations, Maintenance, and Construction, New Haven Operations, Maintenance, and Construction, ACHD Operations, Maintenance, and Construction, INDOT Operations, Maintenance, and Construction, Fort Wayne Traffic Control Center, Fort Wayne – Allen County EOC, 911 Call Center, Citilink Operations, and INDOT Traffic Management Center

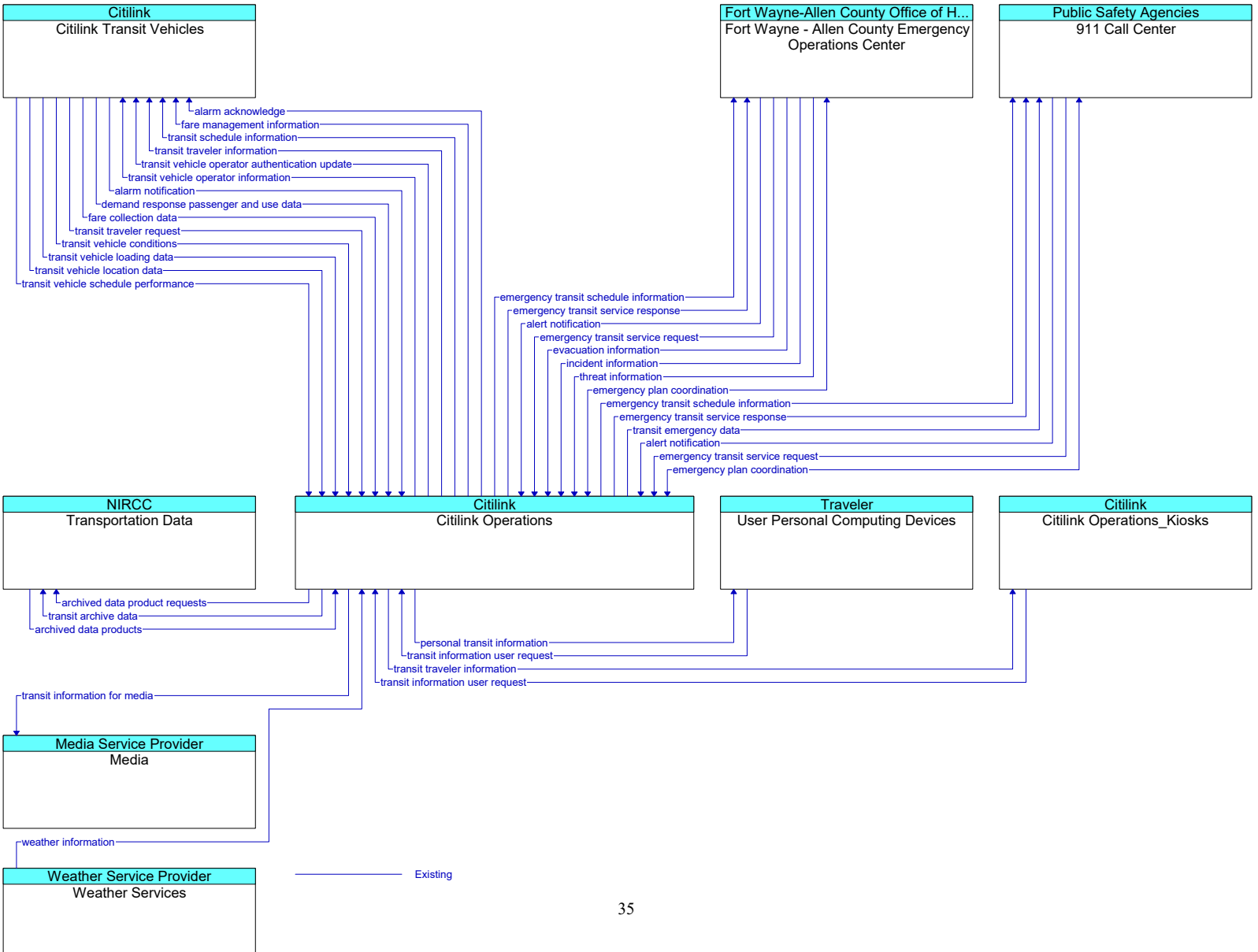
911 Call Center (Flow Diagram 1)
88 Total Information Flowes Entering and Exiting



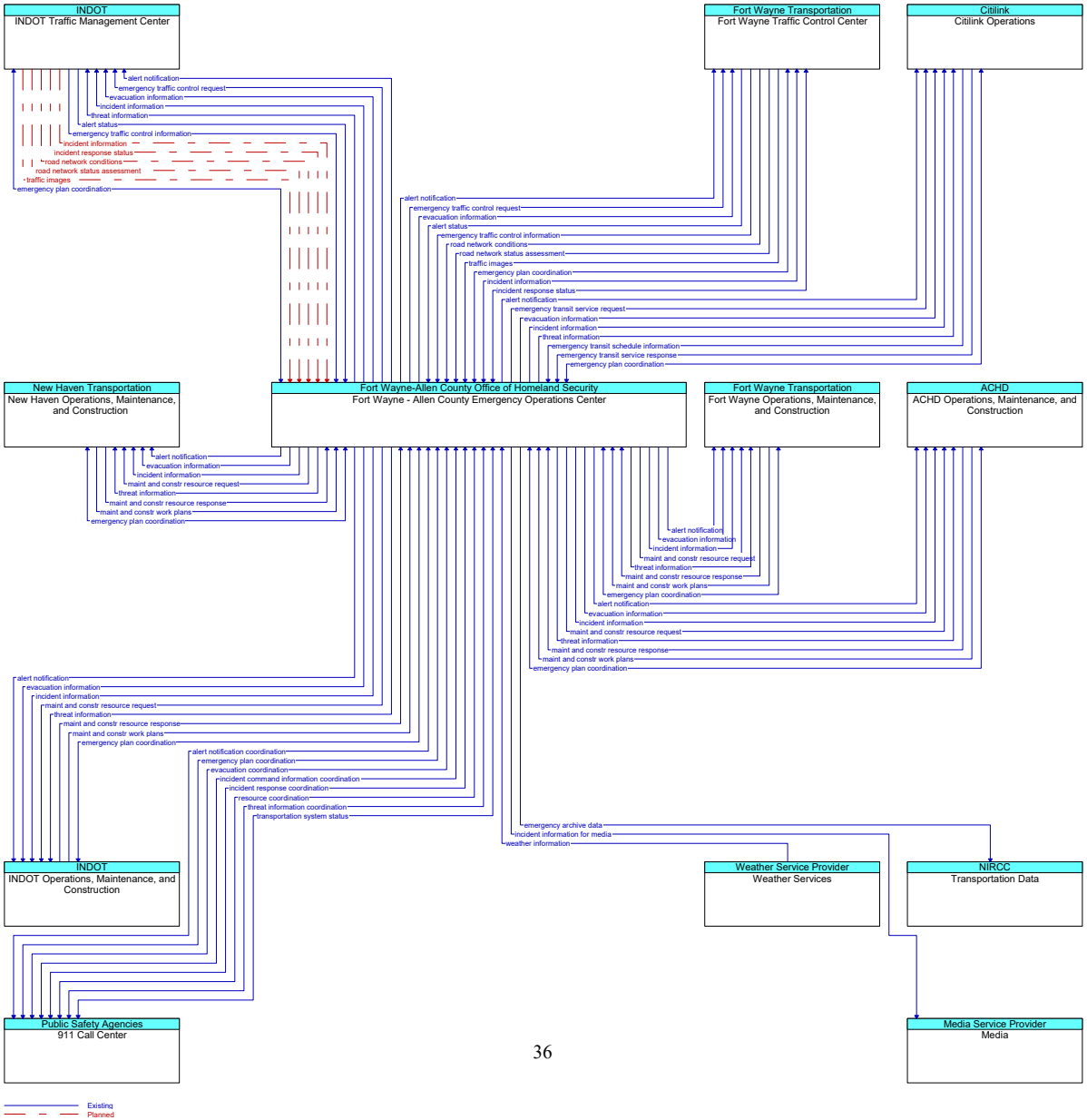
ACHD Operations, Maintenance, and Construction (Flow Diagram 2)
44 Total Information Flows Entering and Exiting



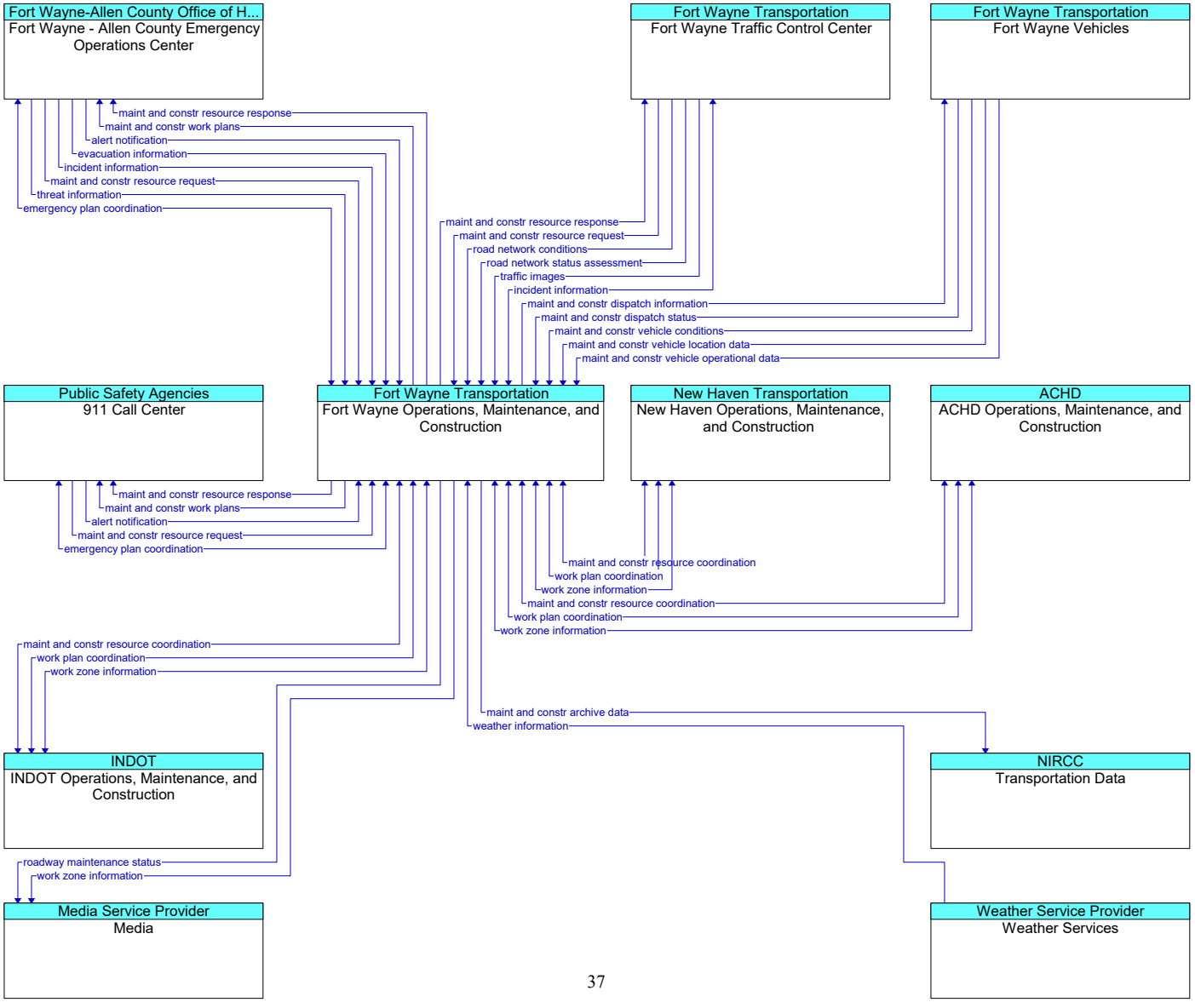
Citilink Operations (Flow Diagram 3)
39 Total Information Flows Entering and Exiting



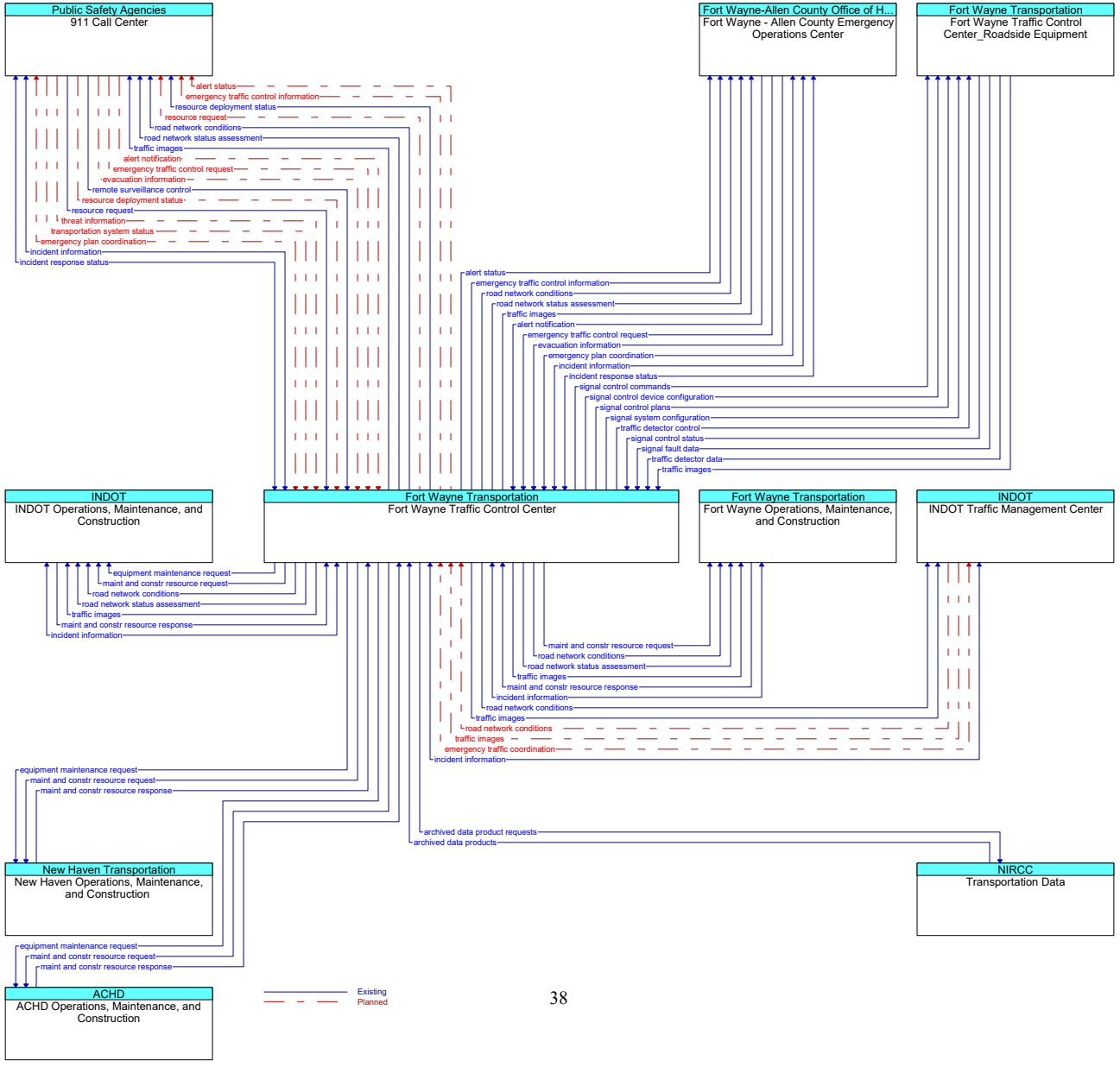
Fort Wayne – Allen County Emergency Operations Center (Flow Diagram 4)
92 Total Information Flows Entering and Exiting



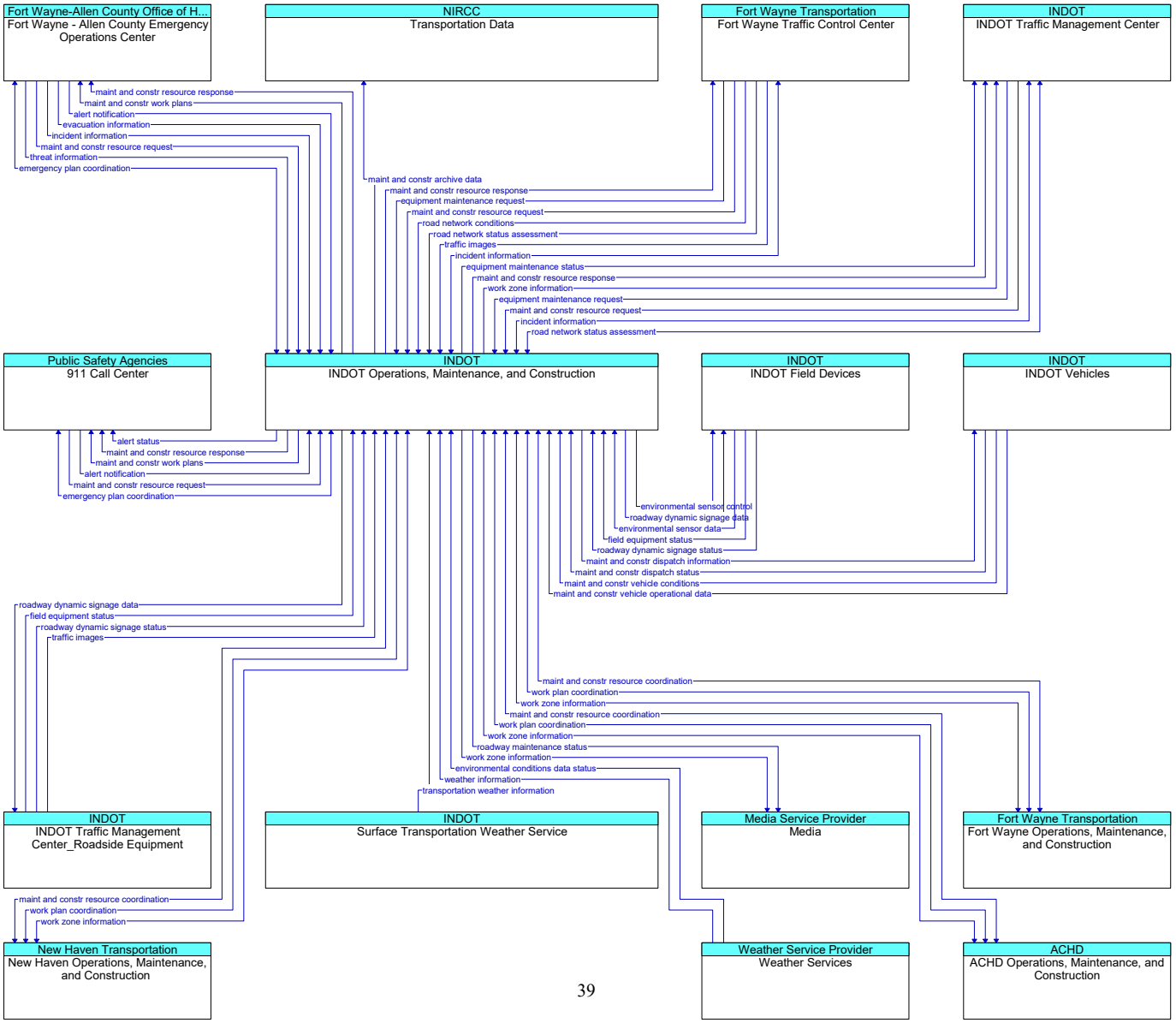
Fort Wayne Operations, Maintenance, and Construction (Flow Diagram 5)
49 Total Information Flows Entering and Exiting



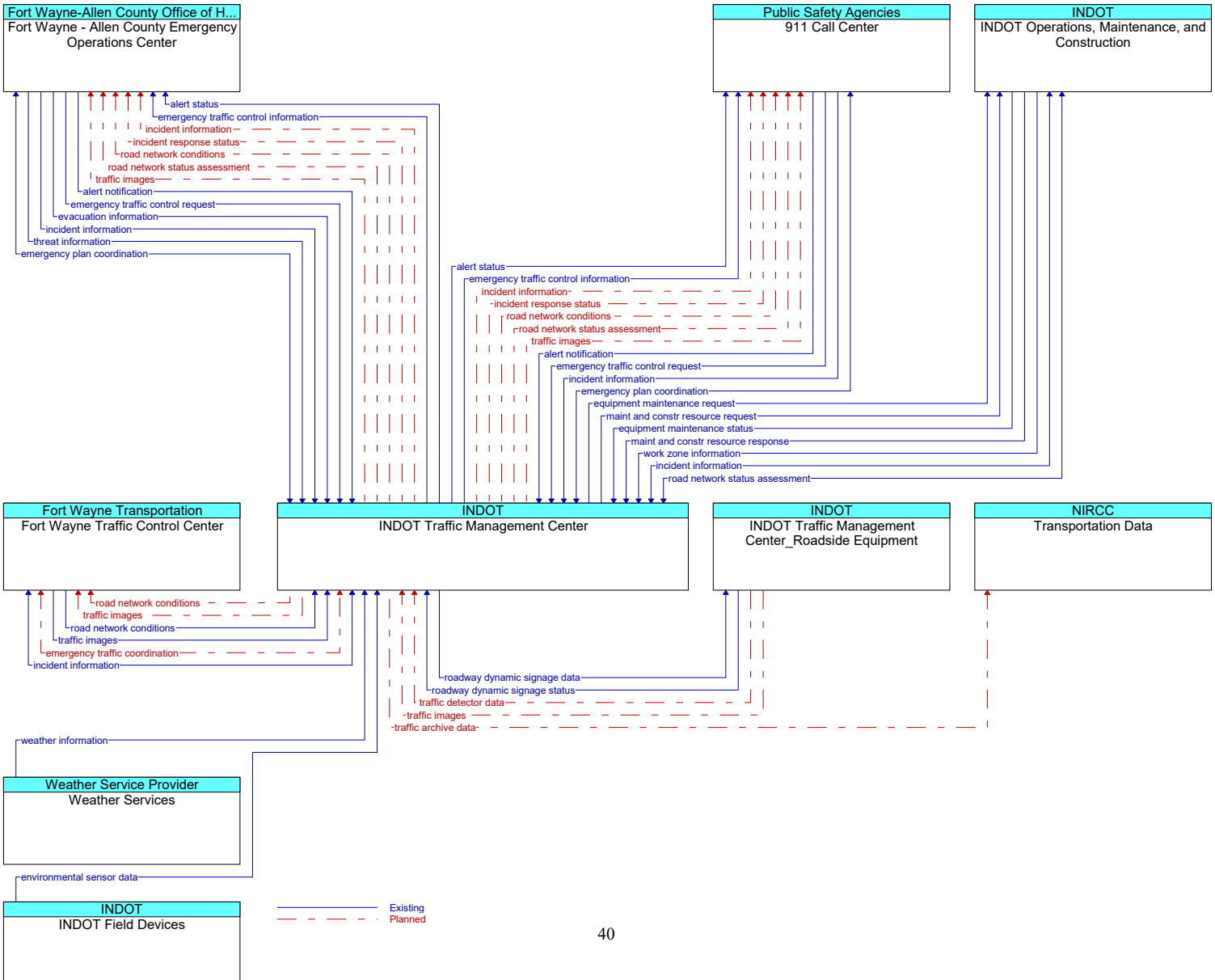
Fort Wayne Traffic Control Center (Flow Diagram 6)
75 Total Information Flows Entering and Exiting



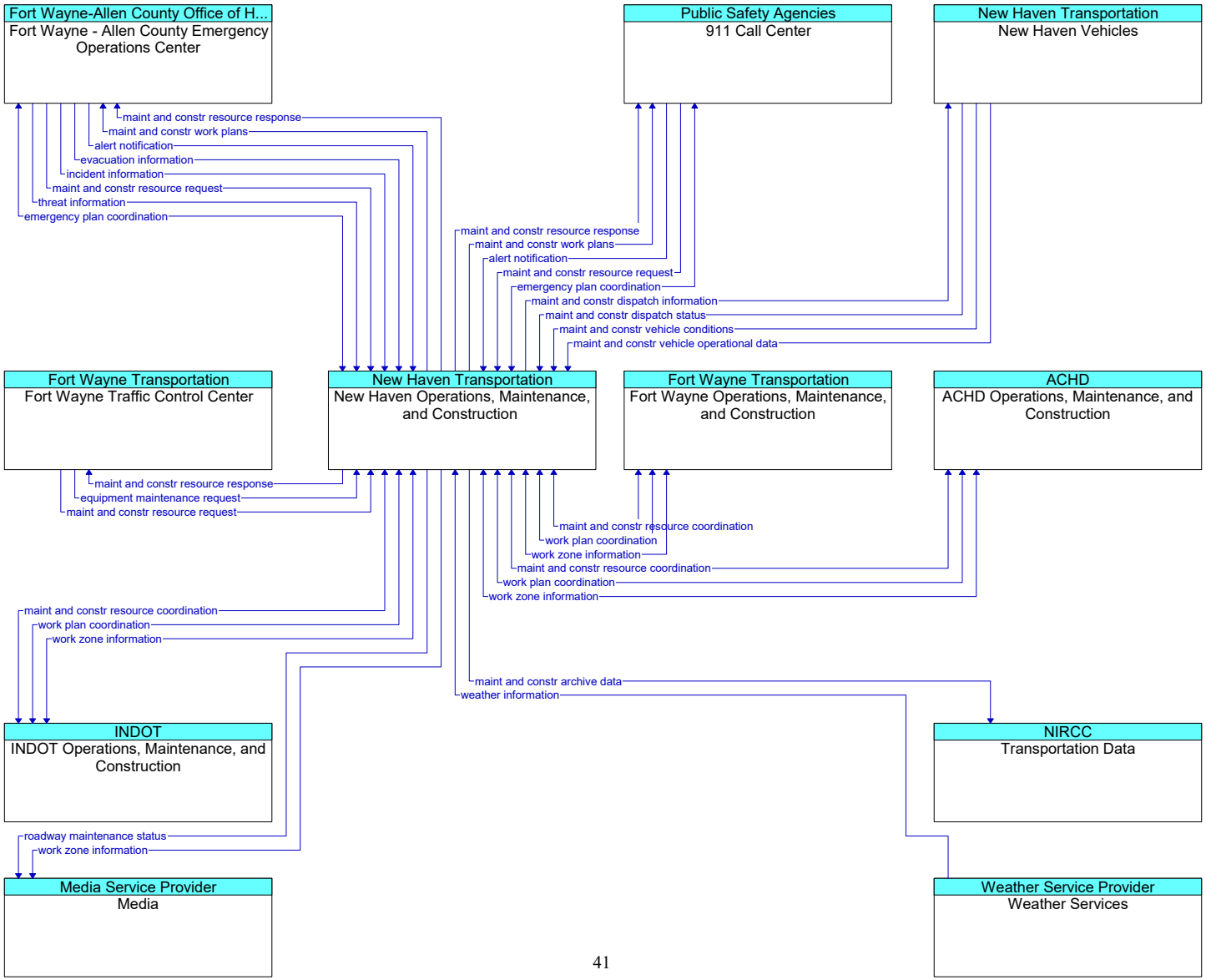
INDOT Operations and Construction (Flow Diagram 7)
70 Total Information Flows Entering and Exiting



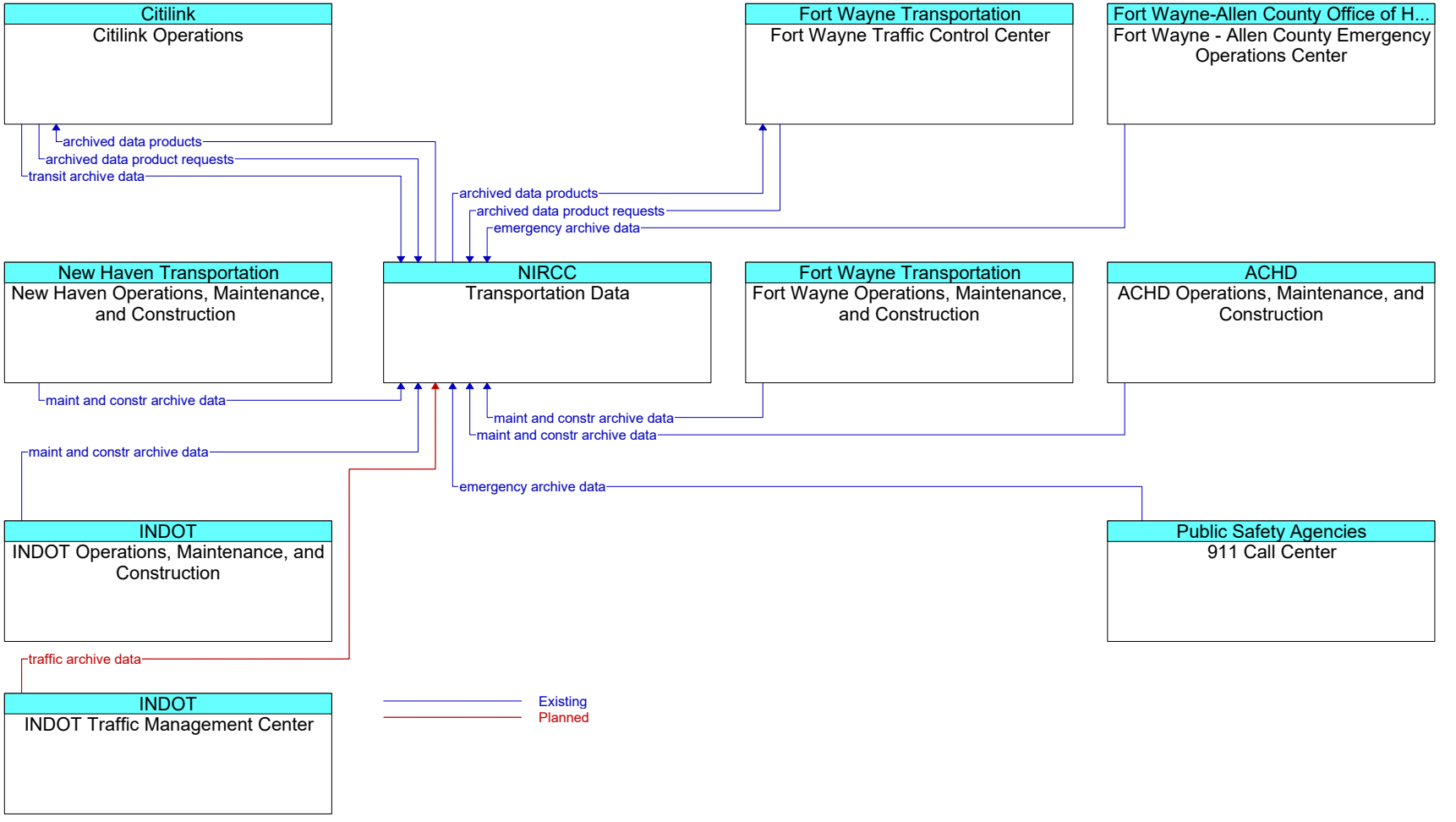
INDOT Traffic Management Center (Flow Diagram 8)
50 Total Information Flows Entering and Exiting



New Haven Operations, Maintenance, and Construction (Flow Diagram 9)
44 Total Information Flows Entering and Exiting



Transportation Data (Flow Diagram 10)
12 Total Information Flows Entering and Exiting



IX. Functional Requirements

The functional requirements describe the tasks or activities that are performed by each system in the region. This documents the share of work that each system in the region will do to provide the ITS services. The section below provides the functional requirements for each of the ten (10) systems in the region. *Italicized text* identifies the requirements that are planned.

Functional Requirements for the 911 Call Center

This system shall for the following functional areas:

Emergency Call-Taking

- Support the interface to the Emergency Telecommunications System (e.g. 911 or 7-digit call routing) to receive emergency notification information and provide it to the emergency system operator.
- Receive emergency call information from 911 services and present the possible incident information to the emergency system operator.
- Receive emergency notification information from other public safety agencies and present the possible incident information to the emergency system operator.
- Forward the verified emergency information to the responding agency based on the location and nature of the emergency.
- Update the incident information log once the emergency system operator has verified the incident.
- Provide the capability for digitized map data to act as the background to the emergency information presented to the emergency system operator.
- Receive emergency notification information from the public transit system (Citilink) and present the possible incident information to the emergency system operator.
- Receive emergency notification information from the INDOT Traffic Management Center of identified incidents occurring on I69 or I469 and present the possible incident information to the emergency system operator.

Emergency Data Collection

- Collect emergency service data, emergency vehicle management data, emergency vehicle data, threat data, and incident data.
- Provide emergency data to operations personnel and other data users and archives in the region.

Emergency Dispatch

- Dispatch emergency vehicles to respond to verified emergencies under center personnel control.
- Store the current status of all emergency vehicles available for dispatch and those that have been dispatched.
- Relay location and incident details to the responding vehicles.
- Track the location and status of emergency vehicles responding to an emergency based on information from the emergency vehicle.
- Store and maintain the emergency service responses in an action log.
- Provide the capability for digitized map data to act as the background to the information presented to the emergency system operator.
- Coordinate response to incidents with other Emergency Management centers to ensure appropriate resources are dispatched and utilized.
- Notify the INDOT Traffic Management Center of incidents, Amber Alerts, and other emergency information that may be displayed via DMS

Emergency Environmental Monitoring

- Collect current and forecast road and weather information from weather service providers (such as the National Weather Service and value-added sector specific meteorological services).
- Assimilate current and forecast road conditions and surface weather information to support incident management.
- Present the current and forecast road and weather information to the emergency system operator.

Emergency Routing

- Collect current traffic and road condition information for emergency vehicle route calculation.
- Provide the capability for digitized map data to act as the background to the information presented to the emergency system operator.

Incident Command

- Provide tactical decision support, resource coordination, and communications integration for Incident Commands that are established by first responders to support local management of an incident.
- Provide incident command communications with public safety, emergency management, transportation, and other allied response agency centers.
- Track and maintain resource information and action plans pertaining to the incident command.
- Share incident command information with other public safety agencies including resource deployment status, hazardous material information, rail incident information, evacuation advice as well as traffic, road, and weather conditions.
- Assess the status of responding emergency vehicles as part of an incident command.
- Request resources from area Maintenance and Construction centers to be used for traffic diversions, clearing of hazards, road repair, or any other response that may be required due to an incident.

Emergency Transportation Operations Data Collection

- Collect real-time information on the state of the regional transportation system including current traffic and road condition, weather conditions, special event and incident information

Functional Requirements for the ACHD Operations, Maintenance, and Construction

This system shall for the following functional areas:

Data Collection

- Collect maintenance and construction data (such as field equipment status, infrastructure status, maintenance and construction activity data) gathered from roadway, traffic, and other maintenance and construction sources.
- Provide maintenance and construction data to operations personnel and other data users and archives in the region.

Incident Management

- Exchange alert information and status with emergency management centers. The information includes notification of a major emergency such as a natural or man-made disaster, civil emergency, or child abduction. The information may include the alert originator, the nature of the emergency, the geographic area affected by the emergency, the effective time period, etc.
- Exchange incident and threat information with emergency management centers as well as traffic management centers; including notification of existence of incident and expected severity, location, time and nature of incident.
- Coordinate planning for incidents with emergency management centers - including pre-planning activities for disaster response, evacuation, and recovery operations.
- Respond to requests from emergency management to provide maintenance and construction resources to implement response plans, assist in clean up, verify an incident, etc. This may also involve coordination with traffic management centers and other maintenance centers.
- Provide work zone activities affecting the road network including the nature of the maintenance or construction activity, location, impact to the roadway, expected time(s) and duration of impact, anticipated delays, alternate routes, and suggested speed limits. This information may be augmented with images that provide a visual indication of current work zone status and traffic impacts.

- Receive information indicating the damage sustained by transportation assets, derived from aerial surveillance, field reports, inspections, tests, and analyses to support incident management.

Maintenance Decision Support

- Provide the center personnel with tailored external information, including weather or road condition observations, forecasted weather information or road conditions, current usage of treatments and materials, available resources, equipment and vehicle availability, road network information, and source reliability information.
- Provide dispatch information to maintenance and construction vehicles based on the outputs of the decision support system, including recommended roadway treatment actions.

Roadway Maintenance and Construction

- Respond to requests from emergency management and traffic management centers for hazard removal, field equipment repair, and other roadway maintenance.
- Provide emergency management and traffic management centers with information about scheduled maintenance and construction work activities including anticipated closures and impact to the roadway, alternate routes, anticipated delays, closure times, and durations.
- Support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for the scheduling of roadway maintenance and construction activities.
- Dispatch and route maintenance and construction vehicle drivers and support them with route-specific environmental, incident, advisory, threat, alert, and traffic congestion information.
- Track the status of roadway maintenance and construction activities by monitoring collected data from the dispatched vehicles and equipment.

Vehicle and Equipment Maintenance Management

- Collect and analyze vehicle diagnostics information from maintenance and construction vehicles. The information includes engine temperature, mileage, tire wear, brake wear, belt wear, and any warnings or alarms concerning the operational condition of the vehicle and ancillary equipment.
- Schedule preventive and corrective vehicle maintenance with the equipment repair facility based on fleet health reports, maintenance records, vehicle utilization and vehicle availability schedules.

Winter Maintenance Management

- Respond to requests from emergency management and traffic management centers for hazard removal, field equipment repair, and other winter roadway maintenance.
- Provide status information about scheduled winter maintenance activities including anticipated closures and impact to the roadway, alternate routes, anticipated delays, closure times, and durations. The information is provided to other management centers such as traffic, emergency, transit, traveler information providers, other maintenance centers, and the media.
- Dispatch and route winter maintenance vehicle drivers and support them with route- specific environmental, incident, advisory, threat, alert, and traffic congestion information.
- Determine the need for roadway treatment based on current and forecasted weather information, current usage of treatments and materials, available resources, requests for action from other agencies, and recommendations from the Maintenance Decision Support system, specifically under winter conditions. This supports winter maintenance such as plowing, treating, anti-icing, etc.
- Provide dispatch instructions for vehicle operators based on input parameters from center personnel, specifically for winter conditions. This could include a treatment route, treatment application rates, start and end times, and other treatment instructions.

Work Activity Coordination

- Provide work zone activities affecting the road network including the nature of the maintenance or construction activity, location, impact to the roadway, expected time(s) and duration of impact, anticipated delays, alternate routes, and suggested speed limits. This information may be augmented with images that provide a visual indication of current work zone status and traffic impacts.
- Provide status information about scheduled maintenance and construction activities including anticipated closures and impact to the roadway, alternate routes, anticipated delays, closure times, and durations. The information is provided to other management centers such as traffic, emergency, transit, traveler information providers, other maintenance centers, multimodal transportation providers, rail operations, and the media.

Work Zone Management

- Generate new work zone activity schedules for use by maintenance and construction vehicles, maintenance and construction operators, and for information coordination purposes.
- Disseminate work zone information to other agencies and centers including traffic, transit, emergency management centers, other maintenance centers, traveler information providers, and the media.

Functional Requirements for Citilink Operations

This system shall for the following functional areas:

Transit Center Fare Management

- Manage the actual value of transit fares for each segment of each regular transit route, including the transmission of the information to transit vehicles and transit stops or stations.
- Provide the capability for a system operator to manage the transit fares and control the exchange of transit fare information.
- Support the payment of transit fare transactions using data provided by the traveler cards / payment instruments.

- Be capable of establishing emergency fare structures to override all other fares during disasters, states of emergency, or evacuations.
- Collect fare statistics data to implement variable and flexible fare structures.

Transit Center Fixed-Route Operations

- Generate transit routes and schedules based on such factors as parameters input by the system operator, road network conditions, operational data on current routes and schedules, and digitized map data.
- Provide the interface to the system operator to control the generation of new routes and schedules (transit services) including the ability to review and update the parameters used by the routes and schedules generation processes and to initiate these processes
- Be able to generate special routes and schedules to support an incident, disaster, evacuation, or other emergency.
- Dispatch fixed route or flexible route transit vehicles
- Collect transit operational data for use in the generation of routes and schedules.
- Provide instructions or corrective actions to the transit vehicle operators based upon operational needs.
- Manage large deviations of individual transit vehicles, deviations in rural areas, and deviations of large numbers of vehicles.
- Generate the necessary corrective actions which may involve more than the vehicles concerned and more far reaching action, such as, the introduction of extra vehicles, wide area signal priority by traffic management, the premature termination of some services, etc.
- Provide an interface to the archive data repository to enable the operator to retrieve historical operating data for use in planning transit routes and schedules.

Transit Center Information Services

- Provide travelers using public transportation with traffic and advisory information upon request. Such information may include transit routes, schedules, transfer options, fares, real-time schedule adherence, current incidents, weather conditions, and special events.

- Provide transit information to the media including details of deviations from schedule of regular transit services.
- *Provide transit service information to traveler information service providers including routes, schedules, schedule adherence, and fare information as well as transit service information during evacuation.*

Transit Paratransit Operations

- Process trip requests for demand responsive transit services, i.e. paratransit. Sources of the requests may include traveler information service providers.
- Monitor the operational status of the demand response vehicles including status of passenger pick-up and drop-off.
- Generate demand response transit (including paratransit) routes and schedules based on such factors as parameters input by the system operator, what other demand responsive transit schedules have been planned, the availability and location of vehicles, the relevance of any fixed transit routes and schedules, and road network information.
- Dispatch demand response (paratransit) transit vehicles.
- Collect the log of passenger boardings and alightings from the paratransit vehicles.

Transit Center Passenger Counting

- Collect passenger count information from each transit vehicle.
- Calculate transit ridership data by route, route segment, transit stop, time of day, and day of week based on the collected passenger count information.
- Make the compiled ridership data available to the system operator and other applications.

Transit Center Security

- Monitor transit vehicle operational data to determine if the transit vehicle is off-route and assess whether a security incident is occurring.

- Receive reports of emergencies on-board transit vehicles entered directly be the transit vehicle operator or from a traveler through interfaces such as panic buttons or alarm switches.
- Receive information pertaining to a wide-area alert such as weather alerts, disaster situations, or child abductions. This information may come from Emergency Management or from other Alerting and Advisory Systems.
- Receive information pertaining to a wide-area alert such as weather alerts, disaster situations, or child abductions. This information may come from Emergency Management or from other Alerting and Advisory Systems.
- Receive threat information and status on the integrity of the transit infrastructure.

Transit Center Vehicle Tracking

- Monitor the locations of all transit vehicles within its network.
- Determine adherence of transit vehicles to their assigned schedule.
- *Provide transit operational data to traveler information service providers.*

Transit Data Collection

- Collect transit management data such as transit fares and passenger use, transit services, paratransit operations, transit vehicle maintenance data, etc.
- Assign quality control metrics and meta-data to be stored along with the data. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.
- Provide transit data to operations personnel and other data users and archives in the region.

Transit Evacuation Support

- Manage the use of transit resources to support evacuation and subsequent reentry of a population in the vicinity of a disaster or other emergency.
- Coordinate regional evacuation plans with Emergency Management - identifying the transit role in an evacuation and the transit resources that would be used.

- Coordinate the use of transit and school bus fleets during an evacuation, supporting evacuation of those with special needs and the general population.
- Adjust and update transit service and fare schedules and provide that information to other agencies as they coordinate evacuations.

Transit Garage Maintenance

- Collect operational and maintenance data from transit vehicles.
- Monitor the condition of a transit vehicle to analyze brake, drive train, sensors, fuel, steering, tire, processor, communications equipment, and transit vehicle mileage to identify mileage based maintenance, out-of-specification or imminent failure conditions.
- Generate transit vehicle maintenance schedules that identify the maintenance or repair to be performed and when the work is to be done.
- Generate transit vehicle availability listings, current and forecast, to support transit vehicle assignment planning based, in part, on the transit vehicle maintenance schedule.
- Assign technicians to a transit vehicle maintenance schedule, based upon such factors as personnel eligibility, work assignments, preferences and seniority.
- Verify that the transit vehicle maintenance activities were performed correctly, using the transit vehicle's status, the maintenance personnel's work assignment, and the transit maintenance schedules.

Transit Vehicle Operator Assignment

- Maintain records of a transit vehicle operator's performance. This may be done utilizing standardized performance evaluation criteria set forth by governmental regulations and transit operating company policies, assessing the transit vehicle operator's driving history, and assessing comments from the transit vehicle operator's supervisor(s) as well as noting any moving violations or accidents, supervisor comments, government regulations, and company policies.

Functional Requirements for the Fort Wayne – Allen County Emergency Operations Center

This system shall for the following functional areas:

Emergency Call-Taking

- Support the interface to the Emergency Telecommunications System (e.g. 911 or 7-digit call routing) to receive emergency notification information and provide it to the emergency system operator.
- Receive emergency call information from 911 services and present the possible incident information to the emergency system operator.
- Receive emergency notification information from other public safety agencies and present the possible incident information to the emergency system operator.
- Update the incident information log once the emergency system operator has verified the incident.
- Provide the capability for digitized map data to act as the background to the emergency information presented to the emergency system operator.
- *Receive emergency notification information from the INDOT Traffic Management Center of identified incidents occuring on I69 or I469 and present the possible incident information to the emergency system operator.*

Emergency Data Collection

- Collect emergency service data, emergency vehicle management data, emergency vehicle data, threat data, and incident data.
- Provide emergency data to operations personnel and other data users and archives in the region.

Emergency Dispatch

- Dispatch emergency vehicles to respond to verified emergencies under center personnel control.
- Store the current status of all emergency vehicles available for dispatch and those that have been dispatched.
- Relay location and incident details to the responding vehicles.

- Track the location and status of emergency vehicles responding to an emergency based on information from the emergency vehicle.
- Store and maintain the emergency service responses in an action log.
- Provide the capability for digitized map data to act as the background to the information presented to the emergency system operator.
- Coordinate response to incidents with other Emergency Management centers to ensure appropriate resources are dispatched and utilized.
- Notify the INDOT Traffic Management Center of incidents, Amber Alerts, and other emergency information that may be displayed via DMS

Emergency Early Warning System

- Monitor information from Alerting and Advisory Systems such as the Information Sharing and Analysis Centers (ISACs), the National Infrastructure Protection Center (NIPC), the Homeland Security Advisory System (HSAS), etc. The information may include assessments (general incident and vulnerability awareness information), advisories (identification of threats or recommendations to increase preparedness levels), or alerts (information on imminent or in-progress emergencies).
- Provide the capability to correlate alerts and advisories, incident information, and security sensor and surveillance data.
- Broadcast wide-area alerts and advisories to traffic management centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.
- Broadcast wide-area alerts and advisories to transit management centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.
- Broadcast wide-area alerts and advisories to traveler information service providers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.

- Broadcast wide-area alerts and advisories to maintenance centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.
- Broadcast wide-area alerts and advisories to other emergency management centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.
- Process status information from each of the centers that have been sent the wide-area alert.

Emergency Environmental Monitoring

- Collect current and forecast road and weather information from weather service providers (such as the National Weather Service and value-added sector specific meteorological services).
- Assimilate current and forecast road conditions and surface weather information to support incident management.
- Present the current and forecast road and weather information to the emergency system operator.

Emergency Evacuation Support

- Manage inter-agency coordination of evacuation operations, from initial planning through the evacuation process and reentry.
- Develop and exchange evacuation plans with allied agencies prior to the occurrence of a disaster.
- Provide an interface to the emergency system operator to enter evacuation plans and procedures and present the operator with other agencies' plans.
- Coordinate evacuation destinations and shelter needs with shelter providers (e.g., the American Red Cross) in the region.
- Provide evacuation information to traffic, transit, maintenance and construction, rail operations, and other emergency management centers as needed.
- Request resources from transit agencies as needed to support the evacuation.

- Request traffic management agencies to implement special traffic control strategies and to control evacuation traffic, including traffic on local streets and arterials as well as the major evacuation routes.
- Provide traveler information systems with evacuation guidance including basic information to assist potential evacuees in determining whether evacuation is necessary and when it is safe to return.
- Monitor the progress or status of the evacuation once it begins and exchange tactical plans, prepared during the incident, with allied agencies.
- Monitor the progress of the reentry process.
- Retrieve information from public health systems to plan for and implement evacuations or in-place sheltering for biological, chemical, radiation, and other public health emergencies.

Emergency Response Management

- Provide strategic emergency response capabilities provided by an Emergency Operations Center for large-scale incidents and disasters.
- The center shall manage coordinated inter-agency responses to and recovery from large-scale emergencies. Such agencies include traffic management, transit, maintenance and construction management, rail operations, and other emergency management agencies.
- Provide the capability to implement response plans and track progress through the incident by exchanging incident information and response status with allied agencies.
- Develop, coordinate with other agencies, and store emergency response plans.
- Track the availability of resources and coordinate resource sharing with allied agency centers including traffic, maintenance, or other emergency centers.
- Allocate the appropriate emergency services, resources, and vehicle (s) to respond to incidents, and shall provide the capability to override the current allocation to suit the special needs of a current incident.
- Receive event scheduling information from Event Promoters.

- The center shall provide the capability to remotely control and monitor CCTV systems normally operated by a traffic management center.
- Provide the capability to request transit resource availability from transit centers for use during disaster and evacuation operations.
- Assimilate the damage assessment of the transit, traffic, rail, maintenance, and other emergency center services and systems to create an overall transportation system status, and disseminate to each of these centers and the traveling public via traveler information providers.
- Provide information to the media concerning the status of an emergency response.
- Provide the capability for digitized map data to act as the background to the information presented to the emergency system operator.
- Provide the capability for center personnel to provide inputs to the management of incidents, disasters and evacuations.
- Collect information about the status of the recovery efforts for the infrastructure during disasters.
- Provide the overall status of infrastructure recovery efforts to traveler information providers and media.
- Provide the capability to identify neighborhoods and businesses that should be informed of an emergency situation based on information collected about incidents including their severity, impacted locations, and recovery schedule.
- Retrieve information from public health systems to increase preparedness for, and implement a response to biological, chemical, radiation, and other public health emergencies.
- Collect real-time information on the state of the regional transportation system including current traffic and road conditions, weather conditions, special event and incident information from transportation system operators.
- Request resources from area Maintenance and Construction centers to be used for traffic diversions, clearing of hazards, road repair, or any other response that may be required due to an incident.

Emergency Routing

- Collect current traffic and road condition information for emergency vehicle route calculation.
- Provide the capability for digitized map data to act as the background to the information presented to the emergency system operator.

Incident Command

- Provide tactical decision support, resource coordination, and communications integration for Incident Commands that are established by first responders to support local management of an incident.
- Provide incident command communications with public safety, emergency management, transportation, and other allied response agency centers.
- Track and maintain resource information and action plans pertaining to the incident command.
- Share incident command information with other public safety agencies including resource deployment status, hazardous material information, rail incident information, evacuation advice as well as traffic, road, and weather conditions.
- Assess the status of responding emergency vehicles as part of an incident command.
- Request resources from area Maintenance and Construction centers to be used for traffic diversions, clearing of hazards, road repair, or any other response that may be required due to an incident.

Functional Requirements for Fort Wayne Operations, Maintenance, and Construction

This system shall for the following functional areas:

Data Collection

- Collect maintenance and construction data (such as field equipment status, infrastructure status, maintenance and construction activity data) gathered from roadway, traffic, and other maintenance and construction sources.
- Provide maintenance and construction data to operations personnel and other data users and archives in the region.

Incident Management

- Exchange alert information and status with emergency management centers. The information includes notification of a major emergency such as a natural or man-made disaster, civil emergency, or child abduction. The information may include the alert originator, the nature of the emergency, the geographic area affected by the emergency, the effective time period, etc.
- Exchange incident and threat information with emergency management centers as well as traffic management centers; including notification of existence of incident and expected severity, location, time and nature of incident.
- Coordinate planning for incidents with emergency management centers - including pre-planning activities for disaster response, evacuation, and recovery operations.
- Respond to requests from emergency management to provide maintenance and construction resources to implement response plans, assist in clean up, verify an incident, etc. This may also involve coordination with traffic management centers and other maintenance centers.
- Provide work zone activities affecting the road network including the nature of the maintenance or construction activity, location, impact to the roadway, expected time(s) and duration of impact, anticipated delays, alternate routes, and suggested speed limits. This information may be augmented with images that provide a visual indication of current work zone status and traffic impacts.
- Receive information indicating the damage sustained by transportation assets, derived from aerial surveillance, field reports, inspections, tests, and analyses to support incident management.

Maintenance Decision Support

- Provide the center personnel with tailored external information, including weather or road condition observations, forecasted weather information or road conditions, current usage of treatments and materials, available resources, equipment and vehicle availability, road network information, and source reliability information.

- Provide dispatch information to maintenance and construction vehicles based on the outputs of the decision support system, including recommended roadway treatment actions.

Roadway Maintenance and Construction

- Respond to requests from emergency management and traffic management centers for hazard removal, field equipment repair, and other roadway maintenance.
- Provide emergency management and traffic management centers with information about scheduled maintenance and construction work activities including anticipated closures and impact to the roadway, alternate routes, anticipated delays, closure times, and durations.
- Support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for the scheduling of roadway maintenance and construction activities.
- Dispatch and route maintenance and construction vehicle drivers and support them with route-specific environmental, incident, advisory, threat, alert, and traffic congestion information.
- Track the status of roadway maintenance and construction activities by monitoring collected data from the dispatched vehicles and equipment.

Vehicle and Equipment Maintenance Management

- Collect and analyze vehicle diagnostics information from maintenance and construction vehicles. The information includes engine temperature, mileage, tire wear, brake wear, belt wear, and any warnings or alarms concerning the operational condition of the vehicle and ancillary equipment.
- Schedule preventive and corrective vehicle maintenance with the equipment repair facility based on fleet health reports, maintenance records, vehicle utilization and vehicle availability schedules.

Winter Maintenance Management

- Respond to requests from emergency management and traffic management centers for hazard removal, field equipment repair, and other winter roadway maintenance.
- Provide status information about scheduled winter maintenance activities including anticipated closures and impact to the roadway, alternate routes, anticipated delays, closure times, and durations. The information is provided to other management centers such as traffic, emergency, transit, traveler information providers, other maintenance centers, and the media.
- Dispatch and route winter maintenance vehicle drivers and support them with route- specific environmental, incident, advisory, threat, alert, and traffic congestion information.
- Determine the need for roadway treatment based on current and forecasted weather information, current usage of treatments and materials, available resources, requests for action from other agencies, and recommendations from the Maintenance Decision Support system, specifically under winter conditions. This supports winter maintenance such as plowing, treating, anti-icing, etc.
- Provide dispatch instructions for vehicle operators based on input parameters from center personnel, specifically for winter conditions. This could include a treatment route, treatment application rates, start and end times, and other treatment instructions.

Work Activity Coordination

- Provide work zone activities affecting the road network including the nature of the maintenance or construction activity, location, impact to the roadway, expected time(s) and duration of impact, anticipated delays, alternate routes, and suggested speed limits. This information may be augmented with images that provide a visual indication of current work zone status and traffic impacts.
- Provide status information about scheduled maintenance and construction activities including anticipated closures and impact to the roadway, alternate routes, anticipated delays, closure times, and durations. The information is provided to other management centers such as traffic, emergency, transit, traveler

information providers, other maintenance centers, multimodal transportation providers, rail operations, and the media.

Work Zone Management

- Generate new work zone activity schedules for use by maintenance and construction vehicles, maintenance and construction operators, and for information coordination purposes.
- Disseminate work zone information to other agencies and centers including traffic, transit, emergency management centers, other maintenance centers, traveler information providers, and the media.

Functional Requirements for the Fort Wayne Traffic Control Center

This system shall for the following functional areas:

Regional Traffic Management

- *The center shall exchange traffic information with other traffic management centers including incident information, congestion data, traffic data, signal timing plans, and real-time signal control information.*

Signal Control

- Remotely control traffic signal controllers.
- Implement control plans to coordinate signalized intersections, under control of center personnel, based on data from sensors and surveillance monitoring traffic conditions, incidents, emergency vehicle preemptions, the passage of commercial vehicles with unusual loads, equipment faults, pedestrian crossings, etc.

Traffic Surveillance

- Monitor, analyze, and store traffic sensor data (speed, volume, occupancy) collected from field elements under remote control of the center.
- Monitor, analyze, and distribute traffic images from CCTV systems under remote control of the center.
- Distribute road network conditions data (raw or processed) based on collected and analyzed traffic sensor and surveillance data to other centers.

- The center shall maintain a database of surveillance equipment and sensors and associated data (including the roadway on which they are located, the type of data collected, and the ownership of each)

Traffic Data Collection

- Collect traffic management data such as operational data, event logs, etc.
- Receive and respond to requests from ITS Archives for either a catalog of the traffic data or for the data itself.

Traffic Maintenance

- Collect and store sensor (traffic, pedestrian, multimodal crossing) operational status.
- Collect and store sensor (traffic, pedestrian, multimodal crossing) fault data and send to the maintenance center for repair.
- Exchange data with maintenance centers concerning the reporting of faulty equipment and the schedule/status of their repair. Information exchanged includes details of new equipment faults, and clearances when the faults are cleared.
- Support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for traffic maintenance data.

Functional Requirements for New Haven Operations, Maintenance, and Construction

This system shall for the following functional areas:

Data Collection

- Collect maintenance and construction data (such as field equipment status, infrastructure status, maintenance and construction activity data) gathered from roadway, traffic, and other maintenance and construction sources.
- Provide maintenance and construction data to operations personnel and other data users and archives in the region.

Incident Management

- Exchange alert information and status with emergency management centers. The information includes notification of a major emergency such as a natural or man-made disaster, civil emergency, or child abduction. The information may include the alert originator, the nature of the emergency, the geographic area affected by the emergency, the effective time period, etc.
- Exchange incident and threat information with emergency management centers as well as traffic management centers; including notification of existence of incident and expected severity, location, time and nature of incident.
- Coordinate planning for incidents with emergency management centers - including pre-planning activities for disaster response, evacuation, and recovery operations.
- Respond to requests from emergency management to provide maintenance and construction resources to implement response plans, assist in clean up, verify an incident, etc. This may also involve coordination with traffic management centers and other maintenance centers.
- Provide work zone activities affecting the road network including the nature of the maintenance or construction activity, location, impact to the roadway, expected time(s) and duration of impact, anticipated delays, alternate routes, and suggested speed limits. This information may be augmented with images that provide a visual indication of current work zone status and traffic impacts.
- Receive information indicating the damage sustained by transportation assets, derived from aerial surveillance, field reports, inspections, tests, and analyses to support incident management.

Maintenance Decision Support

- Provide the center personnel with tailored external information, including weather or road condition observations, forecasted weather information or road conditions, current usage of treatments and materials, available resources, equipment and vehicle availability, road network information, and source reliability information.
- Provide dispatch information to maintenance and construction vehicles based on the outputs of the decision support system, including recommended roadway treatment actions.

Roadway Maintenance and Construction

- Respond to requests from emergency management and traffic management centers for hazard removal, field equipment repair, and other roadway maintenance.
- Provide emergency management and traffic management centers with information about scheduled maintenance and construction work activities including anticipated closures and impact to the roadway, alternate routes, anticipated delays, closure times, and durations.
- Support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for the scheduling of roadway maintenance and construction activities.
- Dispatch and route maintenance and construction vehicle drivers and support them with route-specific environmental, incident, advisory, threat, alert, and traffic congestion information.
- Track the status of roadway maintenance and construction activities by monitoring collected data from the dispatched vehicles and equipment.

Vehicle and Equipment Maintenance Management

- Collect and analyze vehicle diagnostics information from maintenance and construction vehicles. The information includes engine temperature, mileage, tire wear, brake wear, belt wear, and any warnings or alarms concerning the operational condition of the vehicle and ancillary equipment.
- Schedule preventive and corrective vehicle maintenance with the equipment repair facility based on fleet health reports, maintenance records, vehicle utilization and vehicle availability schedules.

Winter Maintenance Management

- Respond to requests from emergency management and traffic management centers for hazard removal, field equipment repair, and other winter roadway maintenance.

- Provide status information about scheduled winter maintenance activities including anticipated closures and impact to the roadway, alternate routes, anticipated delays, closure times, and durations. The information is provided to other management centers such as traffic, emergency, transit, traveler information providers, other maintenance centers, and the media.
- Dispatch and route winter maintenance vehicle drivers and support them with route- specific environmental, incident, advisory, threat, alert, and traffic congestion information.
- Determine the need for roadway treatment based on current and forecasted weather information, current usage of treatments and materials, available resources, requests for action from other agencies, and recommendations from the Maintenance Decision Support system, specifically under winter conditions. This supports winter maintenance such as plowing, treating, anti-icing, etc.
- Provide dispatch instructions for vehicle operators based on input parameters from center personnel, specifically for winter conditions. This could include a treatment route, treatment application rates, start and end times, and other treatment instructions.

Work Activity Coordination

- Provide work zone activities affecting the road network including the nature of the maintenance or construction activity, location, impact to the roadway, expected time(s) and duration of impact, anticipated delays, alternate routes, and suggested speed limits. This information may be augmented with images that provide a visual indication of current work zone status and traffic impacts.
- Provide status information about scheduled maintenance and construction activities including anticipated closures and impact to the roadway, alternate routes, anticipated delays, closure times, and durations. The information is provided to other management centers such as traffic, emergency, transit, traveler information providers, other maintenance centers, multimodal transportation providers, rail operations, and the media.

Work Zone Management

- Generate new work zone activity schedules for use by maintenance and construction vehicles, maintenance and construction operators, and for information coordination purposes.
- Disseminate work zone information to other agencies and centers including traffic, transit, emergency management centers, other maintenance centers, traveler information providers, and the media.

Functional Requirements for INDOT Operations, Maintenance, and Construction

This system shall for the following functional areas:

Data Collection

- Collect maintenance and construction data (such as field equipment status, infrastructure status, maintenance and construction activity data) gathered from roadway, traffic, and other maintenance and construction sources.
- Provide maintenance and construction data to operations personnel and other data users and archives in the region.

Environmental Information Collection

- Assimilate current and forecast road conditions and surface weather information using a combination of weather service provider information (such as the National Weather Service and value-added sector specific meteorological services), data from traffic and traveler information providers, and environmental data collected from sensors deployed on and about the roadway as well as the fleet of maintenance and construction vehicles and the broader population of vehicle probes.
- Provide weather and road condition information to weather service providers and center personnel.

Incident Management

- Receive inputs from the Alerting and Advisory System concerning the possibility or occurrence of severe weather, terrorist activity, or other major emergency, including information provided by the Emergency Alert System.

- Exchange alert information and status with emergency management centers. The information includes notification of a major emergency such as a natural or man-made disaster, civil emergency, or child abduction. The information may include the alert originator, the nature of the emergency, the geographic area affected by the emergency, the effective time period, etc.
- Exchange incident and threat information with emergency management centers as well as traffic management centers; including notification of existence of incident and expected severity, location, time and nature of incident.
- Coordinate planning for incidents with emergency management centers - including pre-planning activities for disaster response, evacuation, and recovery operations.
- Respond to requests from emergency management to provide maintenance and construction resources to implement response plans, assist in clean up, verify an incident, etc. This may also involve coordination with traffic management centers and other maintenance centers.
- Provide work zone activities affecting the road network including the nature of the maintenance or construction activity, location, impact to the roadway, expected time(s) and duration of impact, anticipated delays, alternate routes, and suggested speed limits. This information may be augmented with images that provide a visual indication of current work zone status and traffic impacts.
- Receive information indicating the damage sustained by transportation assets, derived from aerial surveillance, field reports, inspections, tests, and analyses to support incident management.

Maintenance Decision Support

- Provide the center personnel with tailored external information, including weather or road condition observations, forecasted weather information or road conditions, current usage of treatments and materials, available resources, equipment and vehicle availability, road network information, and source reliability information.
- Provide dispatch information to maintenance and construction vehicles based on the outputs of the decision support system, including recommended roadway treatment actions.

Roadway Maintenance and Construction

- Respond to requests from emergency management and traffic management centers for hazard removal, field equipment repair, and other roadway maintenance.
- Provide emergency management and traffic management centers with information about scheduled maintenance and construction work activities including anticipated closures and impact to the roadway, alternate routes, anticipated delays, closure times, and durations.
- Support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for the scheduling of roadway maintenance and construction activities.
- Dispatch and route maintenance and construction vehicle drivers and support them with route-specific environmental, incident, advisory, threat, alert, and traffic congestion information.
- Track the status of roadway maintenance and construction activities by monitoring collected data from the dispatched vehicles and equipment.

Vehicle and Equipment Maintenance Management

- Collect and analyze vehicle diagnostics information from maintenance and construction vehicles. The information includes engine temperature, mileage, tire wear, brake wear, belt wear, and any warnings or alarms concerning the operational condition of the vehicle and ancillary equipment.
- Schedule preventive and corrective vehicle maintenance with the equipment repair facility based on fleet health reports, maintenance records, vehicle utilization and vehicle availability schedules.

Winter Maintenance Management

- Respond to requests from emergency management and traffic management centers for hazard removal, field equipment repair, and other winter roadway maintenance.

- Provide status information about scheduled winter maintenance activities including anticipated closures and impact to the roadway, alternate routes, anticipated delays, closure times, and durations. The information is provided to other management centers such as traffic, emergency, transit, traveler information providers, other maintenance centers, and the media.
- Dispatch and route winter maintenance vehicle drivers and support them with route- specific environmental, incident, advisory, threat, alert, and traffic congestion information.
- Determine the need for roadway treatment based on current and forecasted weather information, current usage of treatments and materials, available resources, requests for action from other agencies, and recommendations from the Maintenance Decision Support system, specifically under winter conditions. This supports winter maintenance such as plowing, treating, anti-icing, etc.

- Provide dispatch instructions for vehicle operators based on input parameters from center personnel, specifically for winter conditions. This could include a treatment route, treatment application rates, start and end times, and other treatment instructions.

Work Activity Coordination

- Provide work zone activities affecting the road network including the nature of the maintenance or construction activity, location, impact to the roadway, expected time(s) and duration of impact, anticipated delays, alternate routes, and suggested speed limits. This information may be augmented with images that provide a visual indication of current work zone status and traffic impacts.
- Provide status information about scheduled maintenance and construction activities including anticipated closures and impact to the roadway, alternate routes, anticipated delays, closure times, and durations. The information is provided to other management centers such as traffic, emergency, transit, traveler information providers, other maintenance centers, multimodal transportation providers, rail operations, and the media.

Work Zone Management

- Generate new work zone activity schedules for use by maintenance and construction vehicles, maintenance and construction operators, and for information coordination purposes.
- Disseminate work zone information to other agencies and centers including traffic, transit, emergency management centers, other maintenance centers, traveler information providers, and the media.

Functional Requirements for the INDOT Traffic Management Center

This system shall for the following functional areas:

Traffic Surveillance

- *Monitor, analyze, and store traffic sensor data (speed, volume, occupancy) collected from field elements under remote control of the center.*
- *Monitor, analyze, and distribute traffic images from CCTV systems under remote control of the center.*
- *Distribute road network conditions data (raw or processed) based on collected and analyzed traffic sensor and surveillance data to other centers.*
- *Maintain a database of surveillance and sensors and the freeways, surface street and rural roadways, e.g. where they are located, to which part(s) of the network their data applies, the type of data, and the ownership of each link (that is, the agency or entity responsible for collecting and storing surveillance of the link) in the network.*
- *Support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for traffic data.*
- *Collect current traffic and road conditions data that is collected and shared by other centers.*

Environmental Monitoring

- Remotely control environmental sensors that measure road surface temperature, moisture, icing, salinity, and other measures.

- Remotely control environmental sensors that measure weather conditions including temperature, wind, humidity, precipitation, and visibility.
- Assimilate current and forecast road conditions and surface weather information using a combination of weather service provider information (such as the National Weather Service and value-added sector specific meteorological services), data from roadway maintenance operations, and environmental data collected from sensors deployed on and about the roadway.
- Provide weather and road condition information to weather service providers and center personnel.

Evacuation Support

- *Coordinate planning for evacuation with emergency management centers - including pre-planning activities such as establishing routes, areas to be evacuated, timing, etc.*
- Support requests from emergency management centers to preempt the current traffic control strategy, activate traffic control and closure systems such as gates and barriers, activate safeguard systems, or use driver information systems to support evacuation traffic control plans.
- *Coordinate execution of evacuation strategies with emergency management centers - including activities such as setting closures and detours, establishing routes, updating areas to be evacuated, timing the process, etc.*

Incident Detection

- *Receive inputs from the Alerting and Advisory System concerning the possibility or occurrence of severe weather, terrorist activity, or other major emergency, including information provided by the Emergency Alert System.*
- *Collect and store traffic flow and image data from the field equipment to detect and verify incidents.*
- *Receive inputs concerning upcoming events that would effect the traffic network from event promoters, traveler information service providers, border crossings, and intermodal freight depots.*

- *Exchange incident and threat information with emergency management centers as well as maintenance and construction centers; including notification of existence of incident and expected severity, location, time and nature of incident.*
- *Provide road network conditions and traffic images to emergency management centers to support the detection, verification, and classification of incidents.*

Incident Dispatch Coordination / Communication

- Exchange alert information and status with emergency management centers. The information includes notification of a major emergency such as a natural or man-made disaster, civil emergency, or child abduction for distribution to the public. The information may include the alert originator, the nature of the emergency, the geographic area affected by the emergency, the effective time period, and information and instructions necessary for the public to respond to the alert. This may also identify specific information that should not be released to the public.
- Coordinate planning for incidents with emergency management centers - including pre-planning activities for disaster response, evacuation, and recovery operations.
- Exchange incident and threat information with emergency management centers as well as maintenance and construction centers; including notification of existence of incident and expected severity, location, time and nature of incident.
- *Share resources with allied agency centers to implement special traffic control measures, assist in clean up, verify an incident, etc. This may also involve coordination with maintenance centers.*
- Receive inputs concerning upcoming events that would effect the traffic network from event promoters, traveler information service providers, media, border crossings, and rail operations centers.
- *Provide road network conditions and traffic images to emergency management centers, maintenance and construction centers, and traveler information service providers via internet or direct connections.*
- *Exchange road network status assessment information with emergency management and maintenance centers including an assessment of damage sustained by the road network including location and extent of the damage,*

estimate of remaining capacity, required closures, alternate routes, necessary restrictions, and time frame for repair and recovery.

- Support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for traffic incident management.

Regional Traffic Management

- Exchange traffic information with other traffic management centers including incident information, congestion data, traffic data, signal timing plans, and real-time signal control information.

Traffic Information Dissemination

- Remotely control dynamic messages signs for dissemination of traffic and other information to drivers.
- Remotely control driver information systems that communicate directly from a center to the vehicle radio (such as Highway Advisory Radios) for dissemination of traffic and other information to drivers.
- Collect operational status for the driver information systems equipment (DMS, HAR, etc.).
- Collect fault data for the driver information systems equipment (DMS, HAR, etc.) for repair.
- Retrieve locally stored traffic information, including current and forecasted traffic information, road and weather conditions, traffic incident information, information on diversions and alternate routes, closures, and special traffic restrictions (lane/shoulder use, weight restrictions, width restrictions, HOV requirements), etc.
- Distribute traffic data to maintenance and construction centers, transit centers, emergency management centers, and traveler information providers.
- Distribute traffic data to the media; the capability to provide the information in both data stream and graphical display shall be supported.
- Provide the capability for center personnel to control the nature of the data that is available to non-traffic operations centers and the media.

Traffic Data Collection

- Collect traffic management data such as operational data, event logs, etc.
- Receive and respond to requests from ITS Archives for either a catalog of the traffic data or for the data itself.
- Be able to produce sample products of the data available.

Traffic Maintenance

- *Collect and store sensor (traffic, pedestrian, multimodal crossing) operational status.*
- *Collect and store CCTV surveillance system (traffic, pedestrian) operational status.*
- *Collect and store sensor (traffic, pedestrian, multimodal crossing) fault data and send to the maintenance center for repair.*
- *Collect and store CCTV surveillance system (traffic, pedestrian) fault data send to the maintenance center for repair.*
- *Collect environmental sensor operational status.*
- *Collect environmental sensor equipment fault data and send to the maintenance center for repair.*
- Exchange data with maintenance centers concerning the reporting of faulty equipment and the schedule/status of their repair. Information exchanged includes details of new equipment faults, and clearances when the faults are cleared.

Functional Requirements for Transportation Data

This system shall for the following functional areas:

Government Reporting Systems Support

- The center shall provide data from an ITS archive to federal, state, or local government reporting systems.
- The center shall provide the capability to select data from an ITS archive for use in government reports.

- The center shall provide the capability to format data from an ITS archive suitable for input into government reports.
- The center shall support requests for ITS archived data from Government Reporting Systems.
- The center shall provide the applicable meta-data for any ITS archived data to satisfy government reporting system requests. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.

Traffic and Roadside Data Archival

- The center shall manage the collection of archive data directly from collection equipment located at the roadside.
- The center shall collect crash data.
- The center shall collect traffic sensor information from roadside devices (traffic counters).
- The center shall collect intersection operational data.
- The center shall make available the collected data to agencies and the public.

X. Standards

Standards are documented technical specifications sponsored by a Standards Development Organization (SDO) to be used consistently as rules, guidelines, or definitions of characteristics for the interchanged data. The standards specifically define the interfaces identified in the National ITS Architecture. The standards used in the Allen County Regional ITS Architecture are listed in the Relative Standards Activities Report included in Appendix B. The report identifies the standard name, the SDO, and the associated source element, destination element, and information flows. The SDO's that are referenced in the table include:

- American Association of State Highway and Transportation Officials (AASHTO)
- American National Standards Institute (ANSI)
- American Public Transportation Association (APTA)
- American Society for Testing and Materials (ASTM)
- Electronic Industries Alliance/Consumer Electronic Association (EIA/CEA)
- Institute of Electrical and Electronics Engineers (IEEE)
- Institute of Transportation Engineers (ITE)
- National Electrical Manufactures Association (NEMA)
- Society of Automotive Engineers (SAE)

XI. Regional Projects

It is important to identify the ITS projects in the region that are planned within the next 10-years. Currently, Citilink and INDOT have ITS projects that are planned within this time frame. In addition, the ACHD, the City of Fort Wayne, INDOT, and the City of New Haven have road construction improvement projects with ITS components within the project. The project architecture has been created for each of the projects and are listed below. The project architectures have been integrated into the regional architecture. A Project architecture flow diagram follows each project architecture description.

Automatic Passenger Counter (APC) Technology

Description: This project is to purchase and install APC technology on Citilink transit vehicles. This includes any new vehicles that are added to the fleet that will require APC technology and existing vehicles that require upgrades of AVL technology. This will be an ongoing project. Citilink plans to expand the use of APC technology to provide pasenger ridership data to assit with planning activies

Time Frame: 2022-2032

Status: Planned

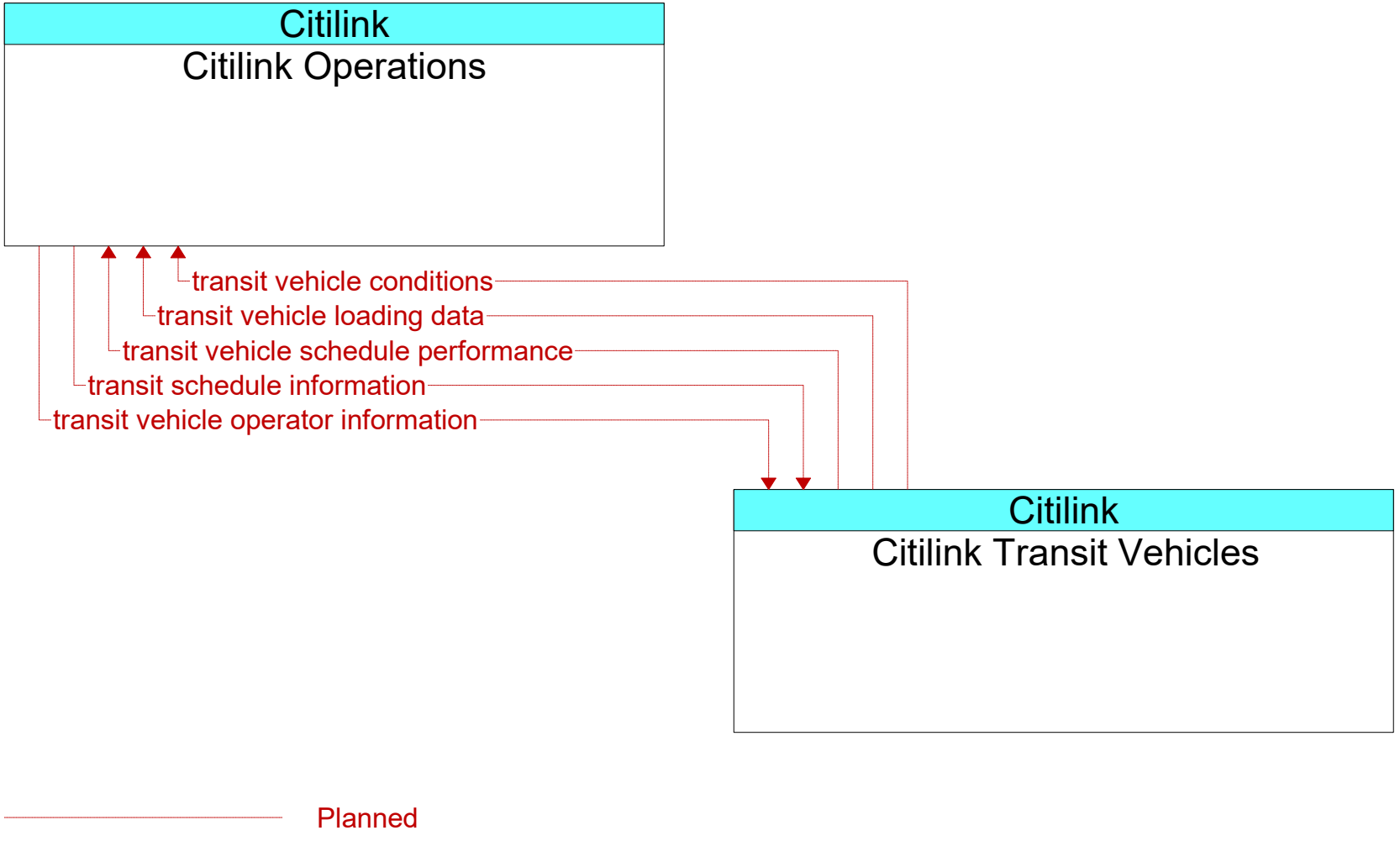
Stakeholder: Citilink

Operational Concepts: Same as Regional Architecture

Element(s): Citlink Operations
Citilink Transit Vehicles

Functional Requirements: Same as Regional Architecture

Market Package(s): PT01: Transit Vehicle Tracking, PT02: Transit Fixed-Route Operations, APTS06: Transit Fleet Management, PT07: Transit Passenger Counting


Citilink
Citilink Operations
transit vehicle conditions
transit vehicle loading data
transit vehicle schedule performance
transit schedule information
transit vehicle operator information
Citilink
Citilink Transit Vehicles
Planned

Project: **Automatic Vehicle Locator (AVL) Technology**

Description: This project is to purchase and install AVL technology on Citilink transit vehicles. This includes any new vehicles that are added to the fleet that will require AVL technology and existing vehicles that require upgrades of AVL technology. This will be an ongoing project. Citilink plans to expand the use of AVL technology to provide real – time information to transit users via the internet, pagers, and kiosks at bus stops.

Time Frame: 2022-2032

Status: Planned

Stakeholder: Citilink

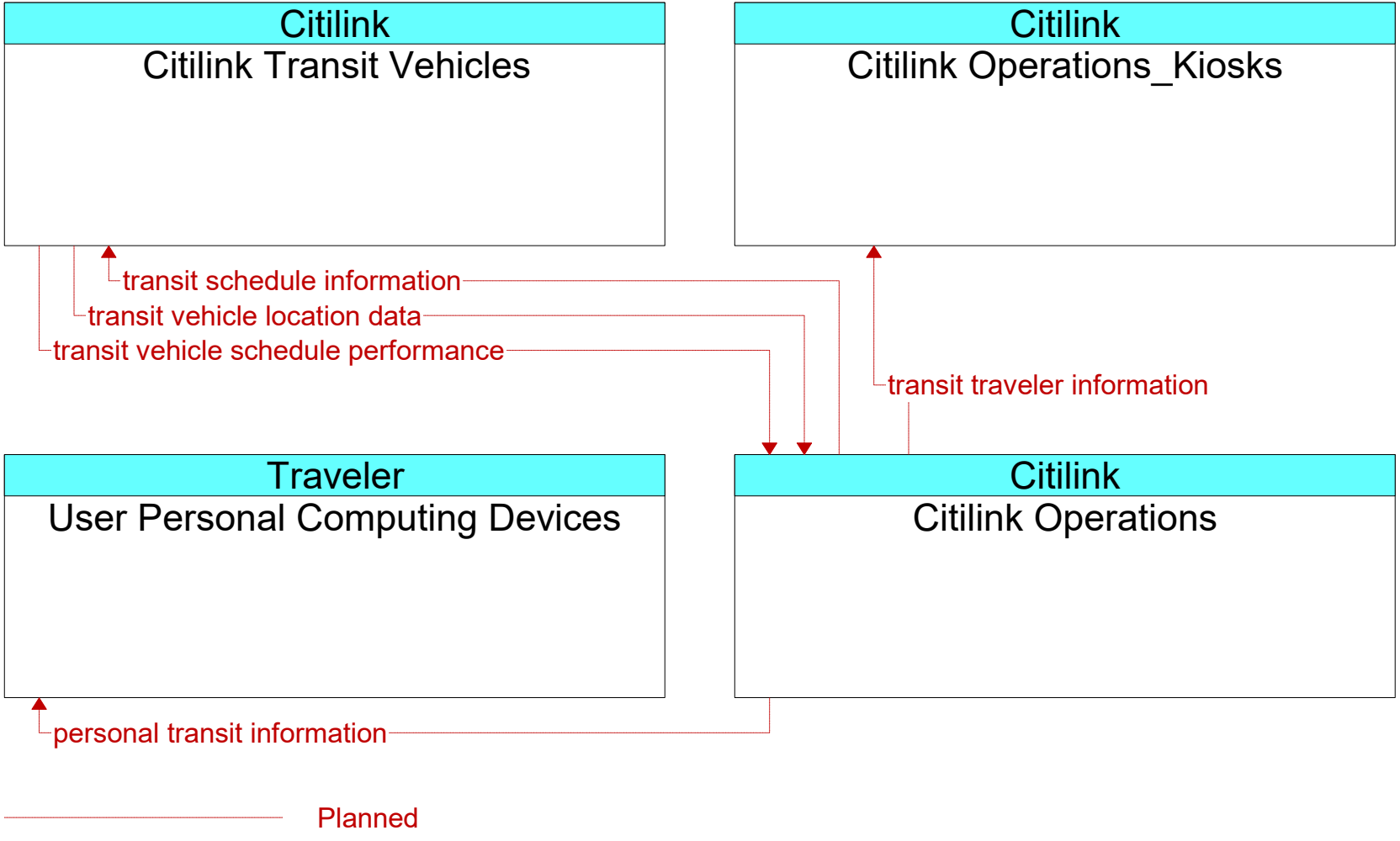
Operational Concepts: Same as Regional Architecture

Element(s): Citlink Operations
Citilink Transit Vehicles
Citlink Operations Kiosks
User Personal Computing Devices

Functional Requirements: Same as Regional Architecture

Market Package(s): PT01: Transit Vehicle Tracking, PT02: Transit Fixed-Route Operations, PT03: Demand Response Transit Operations, PT06: Transit Fleet Management

Project Architecture Flow Diagram: Automatic Vehicle Locator (AVL)



Project: **Dynamic Message Signs (DMS) - Upgrades**

Description: INDOT will upgrade the existing two DMS signs located in Interstate 69, located on Northbound at mile 94.2 and Southbound at mile 117.1.

Time Frame: 2022-2032

Status: Planned

Stakeholder: INDOT

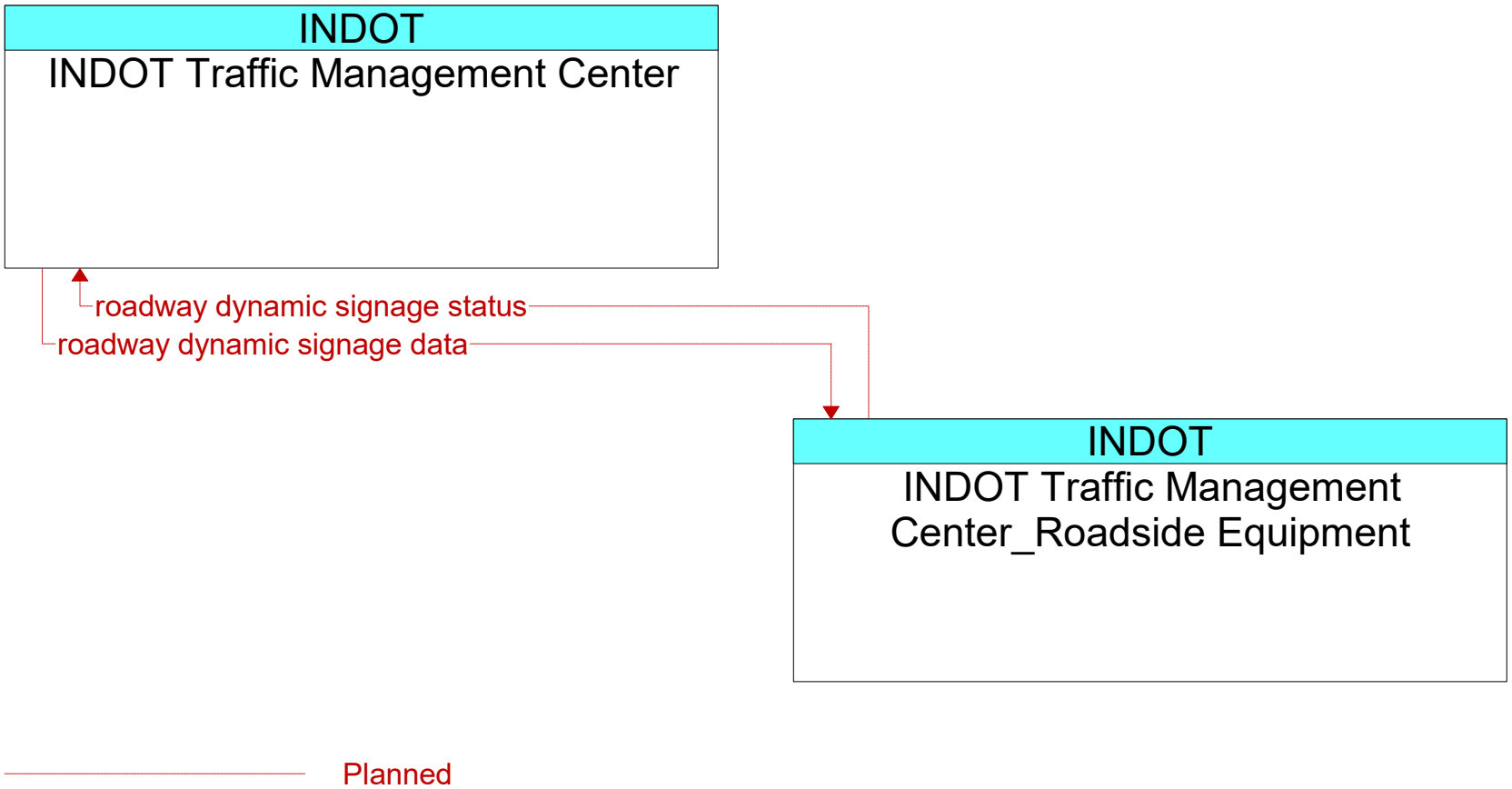
Operational Concepts: Same as Regional Architecture

Element(s): INDOT Traffic Management Center

INDOT Traffic Management Center Roadside Equipment

Functional Requirements: Same as Regional Architecture

Market Package(s): TM06: Traffic Information Dissemination


INDOT
INDOT Traffic Management Center
roadway dynamic signage status
roadway dynamic signage data
INDOT
INDOT Traffic Management Center_Roadside Equipment
Planned

Project: **Dynamic Message Signs (DMS) – Additional Signs**

Description: INDOT will purchase, install, and operate additional DMS signs along Interstate 69 and Interstate 469, located at SB I-69 - near Mile 100.3, NB I-69 - near Mile 113.4, NB I-69 - near Mile 132.4, SB I-69 - near Mile 136.6, SB I-69 - near Mile 157.6, WB I-469 - near Mile 3.7 and WB I-469 - near Mile 27.0

Time Frame: 2022-2032

Status: Planned

Stakeholder: INDOT

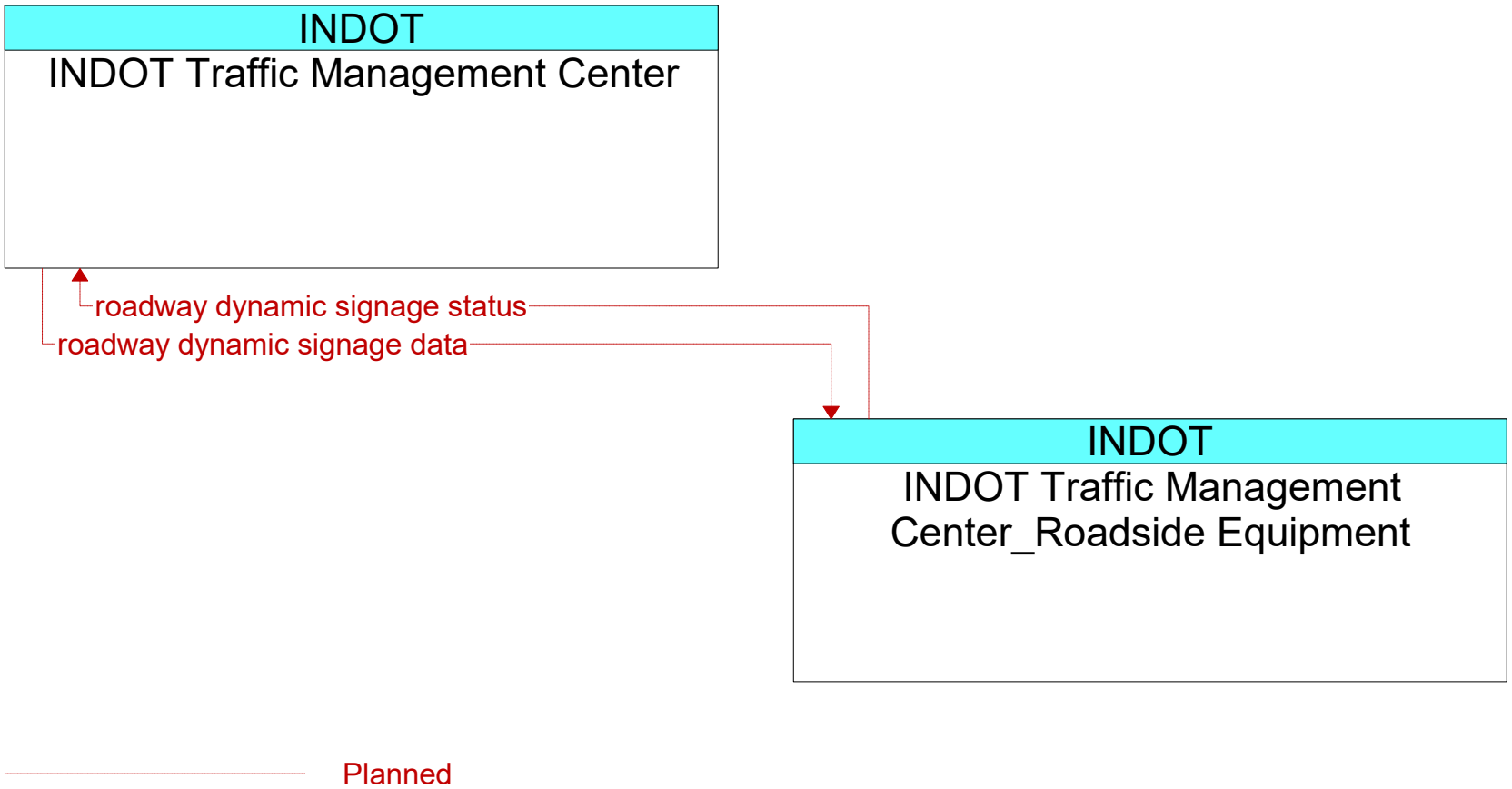
Operational Concepts: Same as Regional Architecture

Element(s): INDOT Traffic Management Center

INDOT Traffic Management Center Roadside Equipment

Functional Requirements: Same as Regional Architecture

Market Package(s): TMS06: Traffic Information Dissemination


INDOT
INDOT Traffic Management Center
roadway dynamic signage status
roadway dynamic signage data
INDOT
INDOT Traffic Management Center_Roadside Equipment
Planned

Project: **CCTV Cameras**

Description: The City of Fort Wayne will purchase, install, and operate additional CCTV Cameras around the city.

Time Frame: 2022-2032

Status: Planned

Stakeholder: Fort Wayne Transportation

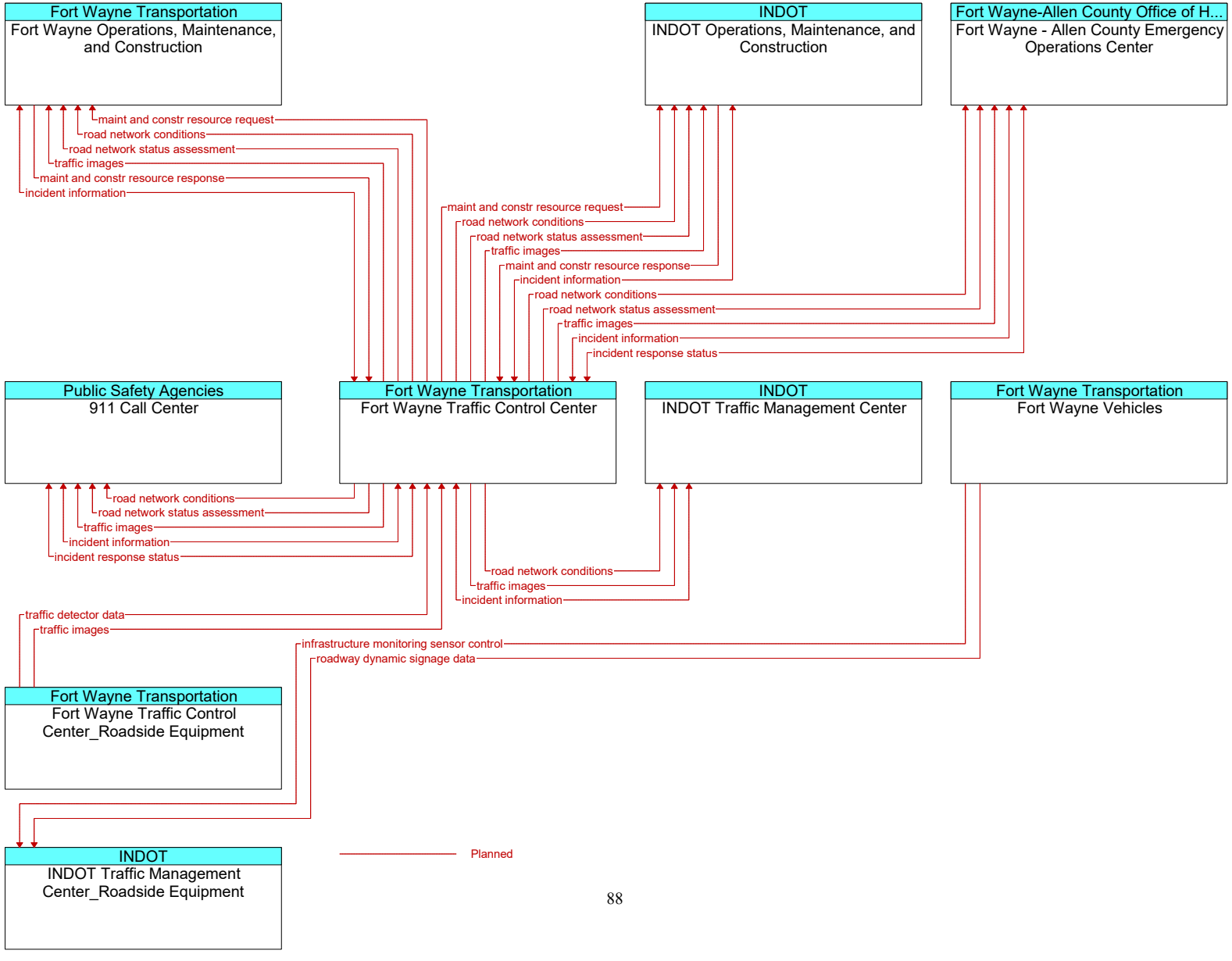
Operational Concepts: Same as Regional Architecture

Element(s): Fort Wayne Operations, Maintenance, and Construction
Fort Wayne Traffic Management Center
Fort Wayne Traffic Management Center Roadside Equipment
Fort Wayne – Allen County Emergency Operations Center
INDOT Traffic Management Center
INDOT Operations, Maintenance, and Constructions

Functional Requirements: Same as Regional Architecture

Market Package(s): TM01: Network Surveillance

Project Architecture Flow Diagram: CCTV Cameras



Project: **CCTV Cameras and Vehicle Detection**

Description: INDOT will purchase, install, and operate CCTV Cameras and Vehicle Detection Devices along Interstate 69 and Interstate 469, located along Interstate 69 from 1/4 mile south of Yoder Road to 1/4 mile south of SR 1 (2012), Interstate 69 from 1/4 mile north of Union Chapel road to Allen/ DeKalb County Line Road (2014), and Interstate 469 from Feighner Road to 3/4 mile east of Leo Road.

The CCTV Cameras and Vehicle Detection will be monitored at the INDOT Traffic Management Center. Traffic images will be available to other centers, agencies, and the public via INDOT's Traffic Wise website. The Fort Wayne – Allen County Emergency Operations Center (EOC) has requested a direct feed to the traffic images. In addition, the EOC has requested that INDOT and the EOC partner to purchase camera and detection devices with the additional capability of radiation detection.

Time Frame: 2022-2032

Status: Planned

Stakeholder: INDOT, Fort Wayne – Allen County Office of Homeland Security

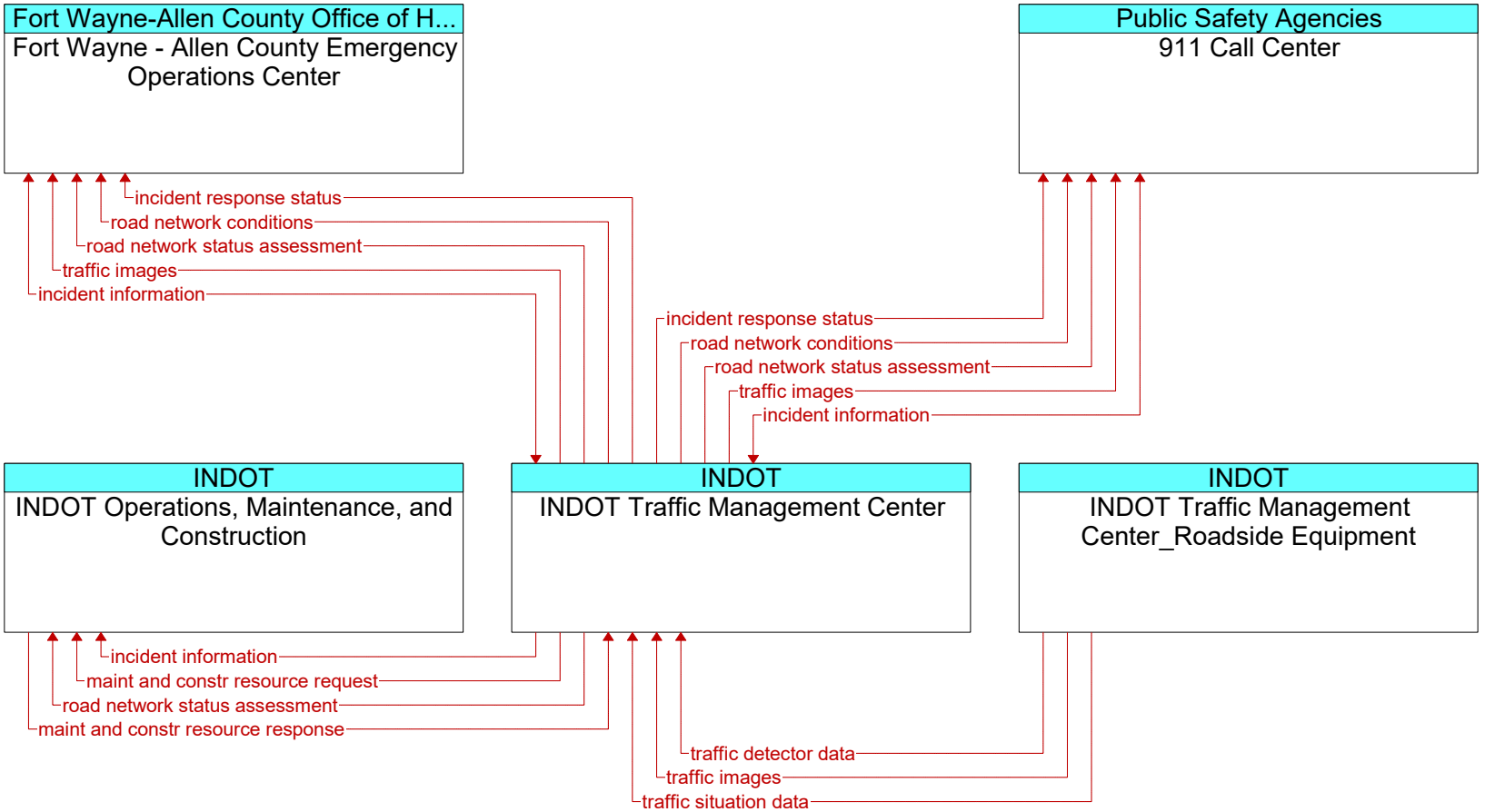
Operational Concepts: Same as Regional Architecture

Element(s): INDOT Traffic Management Center
INDOT Traffic Management Center Roadside Equipment
Fort Wayne – Allen County Emergency Operations Center
INDOT Operations, Maintenance, and Constructions

Functional Requirements: Same as Regional Architecture

Market Package(s): PS02: Emergency Response
TM01: Network Surveillance
TM08: Traffic Incident Management System

Project Architecture Flow Diagram: CCTV Cameras and Vehicle Detection



Planned

Project: **Signal Interconnection Projects**

Description: The City of Fort Wayne will complete signal interconnection projects around the region.

Time Frame: 2022-2032

Status: Planned

Stakeholder: Fort Wayne Transportation

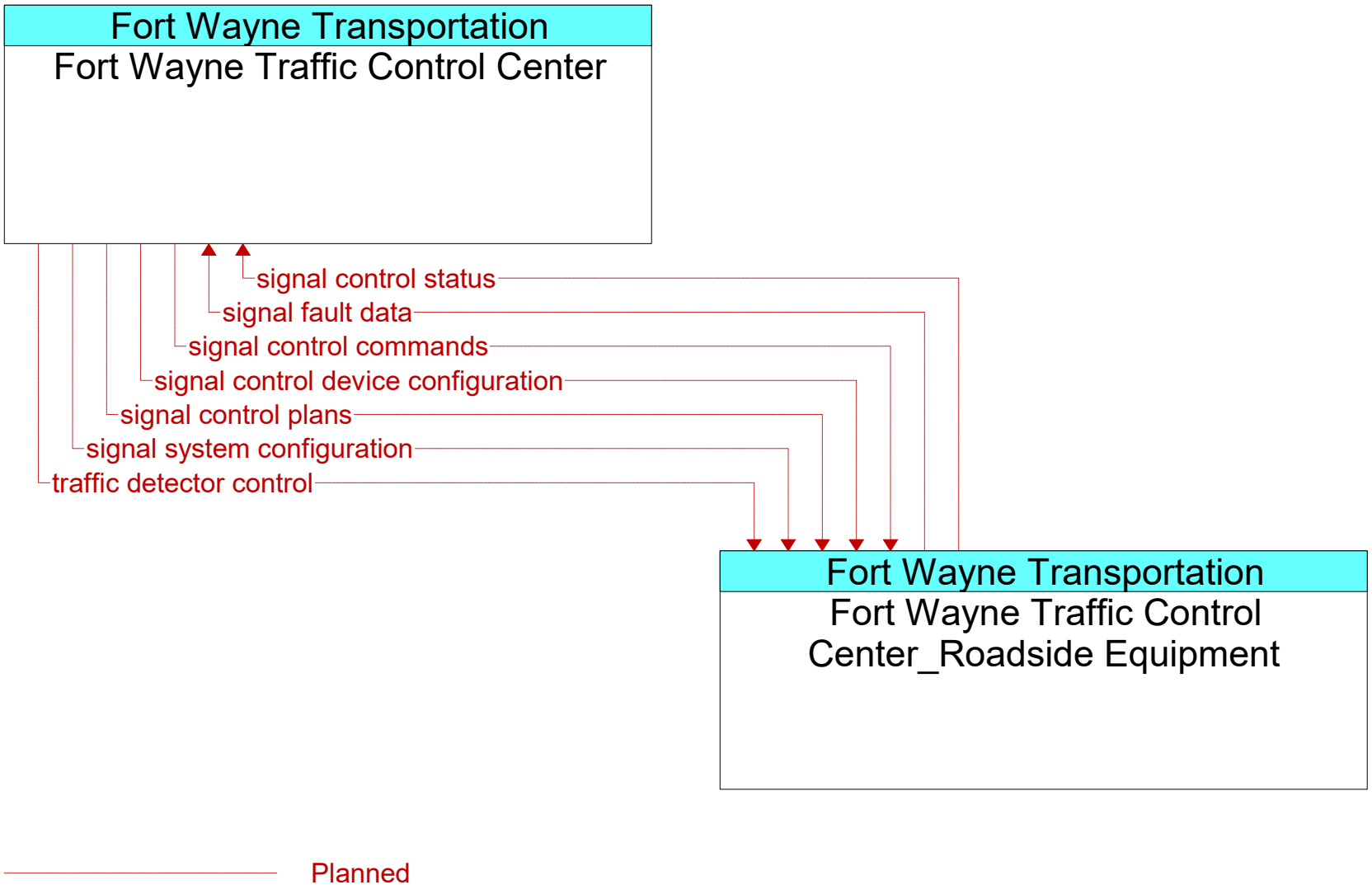
Operational Concepts: Same as Regional Architecture

Element(s): Fort Wayne Traffic Control Center

Fort Wayne Traffic Control Center Roadside Equipment

Functional Requirements: Same as Regional Architecture

Market Package(s): TM03: Surface Street Control


Fort Wayne Transportation
Fort Wayne Traffic Control Center
signal control status
signal fault data
signal control commands
signal control device configuration
signal control plans
signal system configuration
traffic detector control
Fort Wayne Transportation
Fort Wayne Traffic Control Center_Roadside Equipment
Planned

Project: **Road Projects with ITS Components**

Description: This includes any road construction projects involving new construction, added travel lane, or intersection improvement with ITS components such as signal interconnection and / or placement of fiber-optic cable.

Time Frame: 2022-2032

Status: Planned

Stakeholder: Fort Wayne Transportation and the owner of the project, ACHD, INDOT, or New Haven Transportation

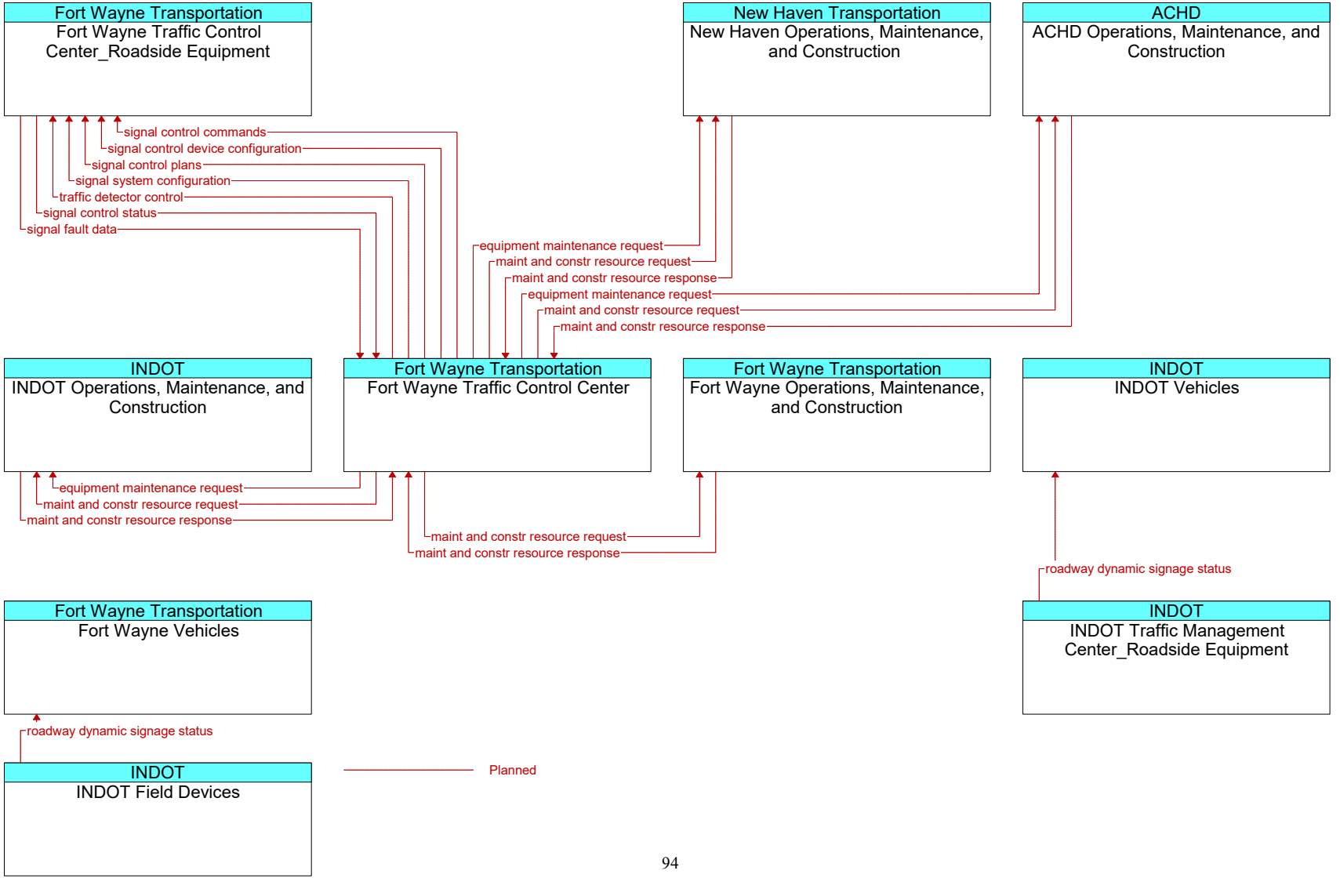
Operational Concepts: Same as Regional Architecture

Element(s): Fort Wayne Traffic Control Center
Fort Wayne Traffic Control Center Roadside Equipment
ACHD Operations, Maintenance, and Construction
Fort Wayne Operations, Maintenance, and Construction
INDOT Operations, Maintenance, and Construction
New Haven Operations, Maintenance, and Construction

Functional Requirements: Same as Regional Architecture

Market Package(s): TM03: Surface Street Control

Project Architecture Flow Diagram: Road Projects with ITS Components



XII. Agreements

Allen County has a strong history of coordination and cooperation between the stakeholder agencies of the regional architecture. A majority of this is not based upon formal agreements, but on mutual understandings that coordination and cooperation are required to provide safe and efficient transportation within Allen County. It can be seen from the regional architecture that a majority of the activities outlined already exist. This is because most of these activities have been taking place for many years, but until recently were not being designated as "ITS" activities.

As a result of this, there are only two (2) agreements to be listed:

1. The City of Fort Wayne has an agreement to operate and/ or maintain traffic signals owned by the Indiana Department of Transportation (INDOT), the Allen County Highway Department (ACHD), and the City of New Haven.

2. INDOT has developed a protocol/ process that is required to be followed by agencies that wish to display information via Dynamic Message Signs (DMS).

Due to the strong history of coordination and cooperation, only one (1) possible future agreement has been identified at this time and is listed below:

1. An agreement between INDOT and the Fort Wayne – Allen County Office of Homeland Security that would enable the Fort Wayne – Allen County Office of Homeland Security's Emergency Operations Center to have a direct feed to images and information gathered from INDOT's CCTV cameras and detection devices located on Interstates 69 and 469.

In addition, any agreements required to implement ITS projects will be developed and signed as they are identified.

XIII. Implementation of the Regional Architecture

The Allen County Regional ITS Architecture is a significant transportation planning resource. It will be used as a key reference in the transportation planning process. As a result, the original architecture became a part of the 2030 Transportation Plan that become effective in early 2005. The architecture was updated in 2012 so that it could be integrated into the 2035 Transportation Plan. The current update will be included in the 2045 plan.

The architecture will be used to ensure all proposed ITS projects are consistent with the regional ITS architecture and additional integration opportunities are considered, leading to more efficient implementations. All projects listed in the 2040 Transportation Plan and Transportation Improvement Program (TIP) will be reviewed prior to their inclusion to make sure that all ITS elements have been identified and are included in the architecture.

In the future updates of the architecture the implementation of connected vehicles will be tracked to ensure that any introduction of this technology to the local roadways is compliant with the ITS Architecture.

XIV. Maintenance of the Regional Architecture

As in the development of the regional architecture, NIRCC, as the MPO, is the agency that will be responsible for maintaining and updating the regional architecture. Any maintenance and updates that are required to be done to the architecture will be done through coordination and consensus with all stakeholders. The TTC will continue to serve as the technical review committee for the regional architecture. All stakeholders will either participate on the TTC or will be consulted as part of the reviews and updates of the regional architecture.

It is anticipated that a complete review and update of the regional architecture will be conducted at five (5) year intervals. However, updates will be made to the architecture whenever necessary. The various reasons for updates within the five year intervals include but are not limited to: new projects, project implementation, additional stakeholders, new technology, additional needs in the region, changes to the National ITS architecture, and changes in the planning process. Any review and update will be conducted through the TTC. The TTC recommendations will then be forwarded to the UTAB for review and approval. After UTAB approval, the updates to the architecture will need final approval from the NIRCC board.

The following two (2) products of the regional architecture will be maintained:

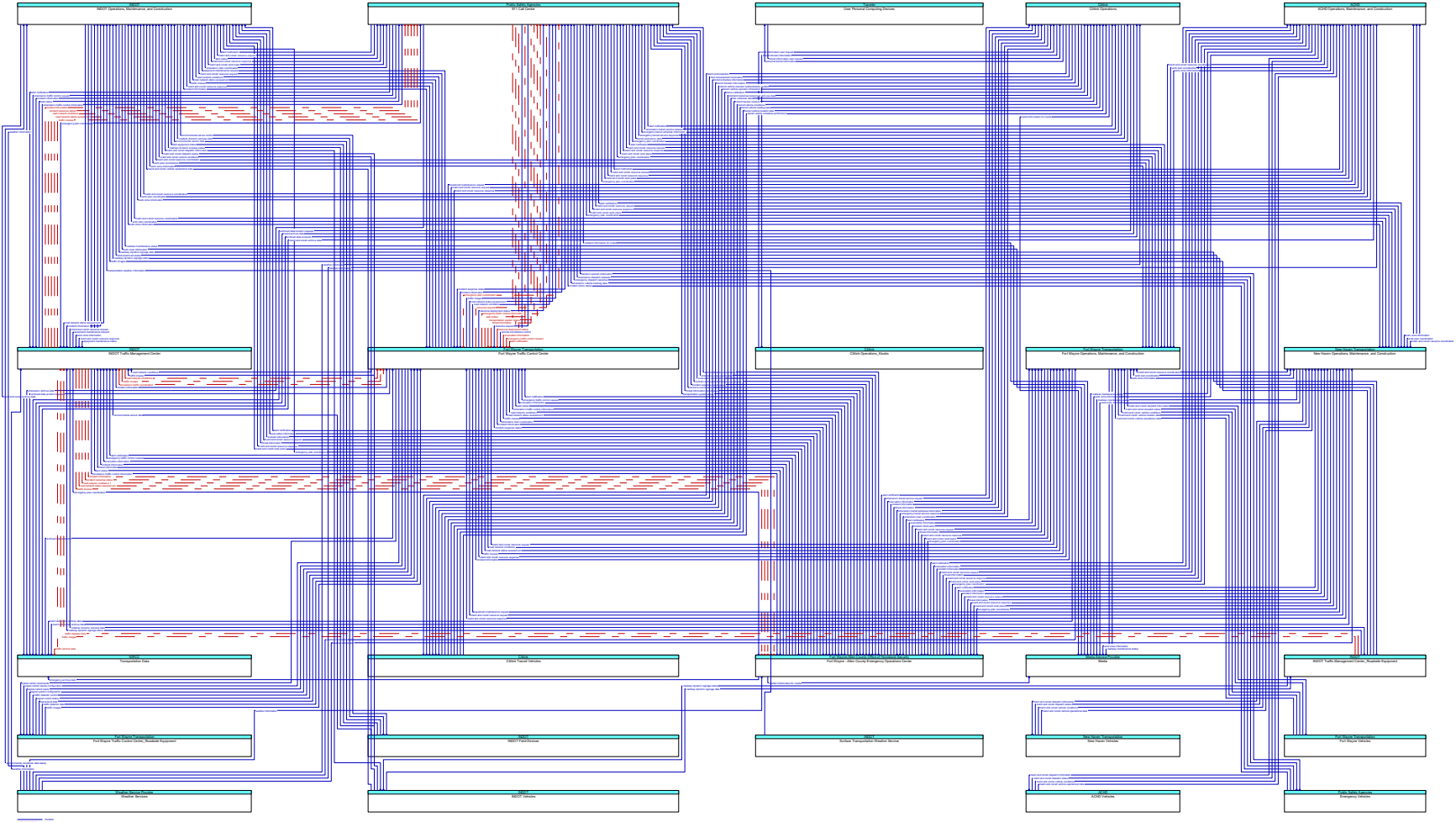
1. Architecture Document (this document). All of the components contained within the architecture document will be updated to reflect the changes that are made to the architecture, including:
    - Scope
    - Stakeholders
    - Operational Concepts
    - Inventory
    - Needs and Services
    - Interconnections and Information Flows
        - Diagrams

    - Definitions
- Functional Requirements
- Standards
- Regional Projects
- Agreements
- Maintenance of Architecture.

2. RAD-IT Architecture Database. The database components will be updated to reflect changes that are made to the architecture, including:
    - Regional and Project Architectures
    - Stakeholders
    - Inventory
    - Services
    - Operational Concepts
    - Requirements
    - Interfaces
    - Standards
    - Agreements

Appendix A: Regional Architecture Flow Diagram

Allen County Regional ITS Architecure



Appendix B: Physical Standards Report

Physical Standards

SDO	Standard Number	Standard Title	Element Name
Advanced Traffic Controller Joint Committee	ITE ATC 5201	Advanced Transportation Controller	Fort Wayne Traffic Control Center_Roadside Equipment, INDOT Field Devices, INDOT Traffic Management Center_Roadside Equipment
Advanced Traffic Controller Joint Committee	ITE ATC 5202	Model 2070 Controller Standard	Fort Wayne Traffic Control Center_Roadside Equipment, INDOT Field Devices, INDOT Traffic Management Center_Roadside Equipment
Advanced Traffic Controller Joint Committee	ITE ATC 5301	Intelligent Transportation System Standard Specification for Roadside Cabinets	Fort Wayne Traffic Control Center_Roadside Equipment, INDOT Field Devices, INDOT Traffic Management Center_Roadside Equipment
Advanced Traffic Controller Joint Committee	ITE ATC 5401	Application Programming Interface Standard for the Advanced Transportation Controller	Fort Wayne Traffic Control Center_Roadside Equipment, INDOT Field Devices, INDOT Traffic Management Center_Roadside Equipment
International Organization for Standardization	ISO 21217	Intelligent transport systems -- Communications access for land mobiles (CALM) -- Architecture	911 Call Center, ACHD Operations, Maintenance, and Construction, ACHD Vehicles, Citilink Operations, Citilink Operations_Kiosks, Citilink Transit Vehicles, Emergency Vehicles, Fort Wayne - Allen County Emergency Operations Center, Fort Wayne Operations, Maintenance, and Construction, Fort Wayne Traffic Control Center, Fort Wayne Traffic Control Center_Roadside Equipment, Fort Wayne Vehicles, INDOT Field Devices, INDOT Operations, Maintenance, and Construction, INDOT Traffic Management Center, INDOT Traffic Management Center_Roadside Equipment, INDOT Vehicles, Media, New Haven Operations, Maintenance, and Construction , New Haven Vehicles, Surface Transportation Weather Service, Transportation Data, User Personal Computing Devices, Weather Services
National Electrical Manufacturers Association	NEMA TS 5	Portable Traffic Signal Systems (PTSS) Standard	Fort Wayne Traffic Control Center_Roadside Equipment, INDOT Field Devices, INDOT Traffic Management Center_Roadside Equipment
National Electrical Manufacturers Association	NEMA TS 8	Cyber and Physical Security for Intelligent Transportation Systems	911 Call Center, ACHD Operations, Maintenance, and Construction, Citilink Operations, Fort Wayne - Allen County Emergency Operations Center, Fort Wayne Operations, Maintenance, and Construction, Fort Wayne Traffic Control Center, Fort Wayne Traffic Control Center_Roadside Equipment, INDOT Field Devices, INDOT Operations, Maintenance, and Construction, INDOT Traffic Management Center, INDOT Traffic Management Center_Roadside Equipment, New Haven Operations, Maintenance, and Construction , Transportation Data
National Electrical Manufacturers Association	NEMA TS2	Traffic Controller Assemblies with NTCIP Requirements	Fort Wayne Traffic Control Center_Roadside Equipment, INDOT Field Devices, INDOT Traffic Management Center_Roadside Equipment

SDO	Standard Number	Standard Title	Element Name
National Electrical Manufacturers Association	NEMA TS4	Hardware Standards for Dynamic Message Signs (DMS) With NTCIP Requirements	Fort Wayne Traffic Control Center_Roadside Equipment, INDOT Field Devices, INDOT Traffic Management Center_Roadside Equipment
National Institute for Standards and Technology	NIST FIPS PUB 140-2	Security Requirements for Cryptographic Modules	911 Call Center, ACHD Operations, Maintenance, and Construction, ACHD Vehicles, Citilink Operations, Citilink Operations_Kiosks, Citilink Transit Vehicles, Emergency Vehicles, Fort Wayne - Allen County Emergency Operations Center, Fort Wayne Operations, Maintenance, and Construction, Fort Wayne Traffic Control Center, Fort Wayne Traffic Control Center_Roadside Equipment, Fort Wayne Vehicles, INDOT Field Devices, INDOT Operations, Maintenance, and Construction, INDOT Traffic Management Center, INDOT Traffic Management Center_Roadside Equipment, INDOT Vehicles, Media, New Haven Operations, Maintenance, and Construction , New Haven Vehicles, Surface Transportation Weather Service, Transportation Data, User Personal Computing Devices, Weather Services
Not Applicable	CTI 4001	Dedicated Short-Range Communications Roadside Unit Specifications (FHWA-JPO-17-589)	Fort Wayne Traffic Control Center_Roadside Equipment, INDOT Field Devices, INDOT Traffic Management Center_Roadside Equipment

Appendix C: Flow Definitions

Flow Definitions

Flow Name	Flow Description
alarm acknowledge	Confirmation that alarm was received, instructions and additional information for the alarm initiator, and requests for additional information.
alarm notification	Notification of activation of an audible or silent alarm by a traveler in a public area or by a transit vehicle operator using an on-board device.
alert notification	Notification of a major emergency such as a natural or man-made disaster, civil emergency, or child abduction for distribution to the public. The flow identifies the alert originator, the nature of the emergency, the geographic area affected by the emergency, the effective time period, and information and instructions necessary for the public to respond to the alert. This flow may also identify specific information that should not be released to the public.
alert notification coordination	Coordination of emergency alerts to be distributed to the public. This includes notification of a major emergency such as a natural or man-made disaster, civil emergency, or child abduction for distribution to the public and status of the public notification.
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.
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.
decision support information	Information provided to support effective and safe incident response, including local traffic, road, and weather conditions, hazardous material information, and the current status of resources (including vehicles, other equipment, supplies) that have been allocated to an incident.
demand response passenger and use data	Data collected on board a demand response vehicle relating to the picking up and discharging of passengers.
emergency archive data	Logged emergency information including information that characterizes identified incidents (routine highway incidents through disasters), corresponding incident response information, evacuation information, surveillance data, threat data, and resource information. Content may include a catalog of available information, the actual information to be archived, and associated meta data that describes the archived information.
emergency dispatch requests	Emergency vehicle dispatch instructions including incident location and available information concerning the incident.
emergency dispatch response	Request for additional emergency dispatch information and provision of en route status.
emergency 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.

Flow Name	Flow Description
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 traffic coordination	Coordination supporting disaster response including evacuation and reentry. Includes coordination of special traffic control strategies that support efficient evacuation and reentry while protecting and optimizing movement of response vehicles and other resources responding to the emergency.
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 vehicle tracking data	The current location and operating status of the emergency vehicle.
environmental conditions data status	Status of the data quality of environmental conditions data provided by a data contributor. Includes not only status by sensor, but statistical data regarding the quality checking of data provided.
environmental sensor control	Data used to configure and control environmental sensors.
environmental sensor data	Current road conditions (e.g., surface temperature, subsurface temperature, moisture, icing, treatment status) and surface weather conditions (e.g., air temperature, wind speed, precipitation, visibility) as measured and reported by fixed and/or mobile environmental sensors. Operational status of the sensors is also included.
equipment maintenance request	Identification of field equipment requiring repair and known information about the associated faults.
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.

Flow Name	Flow Description
evacuation information	Evacuation instructions and information including evacuation zones, evacuation times, and reentry times.
fare collection data	Fare collection information including the summary of fare system data and financial payment transaction data.
fare management information	Transit fare information and transaction data used to manage transit fare processing.
field equipment status	Reports from field equipment (sensors, signals, signs, controllers, etc.) which indicate current operational status.
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 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 scene status	Information gathered at the incident site that more completely characterizes the incident and provides current incident response status.
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 dispatch information	Information used to dispatch maintenance and construction vehicles, equipment, and crews and information used to keep work zone crews informed. This information includes routing information, traffic information, road restrictions, incident information, environmental information, decision support information, maintenance schedule data, dispatch instructions, personnel assignments, alert notifications, and corrective actions.
maint and constr dispatch status	Current maintenance and construction status including work data, operator status, crew status, and equipment status.

Flow Name	Flow Description
maint and constr resource coordination	Request for road maintenance and construction resources that can be used in the diversion of traffic (cones, portable signs), clearance of a road hazard, repair of ancillary damage, or any other incident response.
maint and constr resource request	Request for road maintenance and construction resources that can be used in the diversion of traffic (cones, portable signs), clearance of a road hazard, repair of ancillary damage, or any other incident response. The request may poll for resource availability or request pre-staging, staging, or immediate dispatch of resources.
maint and constr resource response	Current status of maintenance and construction resources including availability and deployment status. General resource inventory information covering vehicles, equipment, materials, and people and specific resource deployment status may be included.
maint and constr vehicle conditions	Vehicle diagnostics information that is collected, filtered, and selectively reported by a maintenance and construction vehicle. The information includes engine temperature, mileage, tire wear, brake wear, belt wear, and any warnings or alarms concerning the operational condition of the vehicle and ancillary equipment.
maint and constr vehicle location data	The current location and related status (e.g., direction and speed) of the maintenance/construction vehicle.
maint and constr vehicle operational data	Data that describes the maintenance and construction activity performed by the vehicle. Operational data includes materials usage (amount stored and current application rate), operational state of the maintenance equipment (e.g., blade up/down, spreader pattern), vehicle safety status, and other measures associated with the operation of a maintenance, construction, or other special purpose vehicle. Operational data may include basic operational status of the vehicle equipment or a more precise record of the work performed (e.g., application of crack sealant with precise locations and application characteristics).
maint and constr work plans	Future construction and maintenance work schedules and activities including anticipated closures with anticipated impact to the roadway, alternate routes, anticipated delays, closure times, and durations.
personal transit information	General and personalized transit information for a particular fixed route, flexible route, or paratransit system.
remote surveillance control	The control commands used to remotely operate another center's sensors or surveillance equipment so that roadside surveillance assets can be shared by more than one agency.
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 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.

Flow Name	Flow Description
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.
roadway dynamic signage data	Information used to initialize, configure, and control dynamic message signs. This flow can provide message content and delivery attributes, local message store maintenance requests, control mode commands, status queries, and all other commands and associated parameters that support remote management of these devices.
roadway dynamic signage status	Current operating status of dynamic message signs.
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).
signal control commands	Control of traffic signal controllers or field masters including clock synchronization.
signal control device configuration	Data used to configure traffic signal control equipment including local controllers and system masters.
signal control plans	Traffic signal timing parameters including minimum green time and interval durations for basic operation and cycle length, splits, offset, phase sequence, etc. for coordinated systems.
signal control status	Operational and status data of traffic signal control equipment including operating condition and current indications.
signal fault data	Faults reported by traffic signal control equipment.
signal system configuration	Data used to configure traffic signal systems including configuring control sections and mode of operation (time based or traffic responsive).
threat information	Threats regarding transportation infrastructure, facilities, or systems detected by a variety of methods (sensors, surveillance, threat analysis of advisories from outside agencies, etc.
threat information coordination	Sensor, surveillance, and threat data including raw and processed data that is collected by sensor and surveillance equipment located in secure areas.
traffic archive data	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 detector control	Information used to configure and control traffic detector systems such as inductive loop detectors and machine vision sensors.
traffic detector data	Raw and/or processed traffic detector data which allows derivation of traffic flow variables (e.g., speed, volume, and density measures) and associated information (e.g., congestion, potential incidents). This flow includes the traffic data and the operational status of the traffic detectors
traffic images	High fidelity, real-time traffic images suitable for surveillance monitoring by the operator or for use in machine vision applications. This flow includes the images. Meta data that describes the images is contained in another flow.

Flow Name	Flow Description
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 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 information for media	Report of transit schedule deviations for public dissemination through the media.
transit information user request	Request for special transit routing, real-time schedule information, and availability information.
transit schedule information	Current and projected transit schedule information used to initialize the transit vehicle with a vehicle assignment, monitor schedule performance, and develop corrective actions on-board.
transit traveler information	Transit information prepared to support transit users and other travelers. It contains transit schedules, real-time arrival information, fare schedules, alerts and advisories, and general transit service information.
transit traveler request	Request by a Transit traveler to summon assistance, request transit information, or request any other transit services.
transit vehicle conditions	Operating conditions of transit vehicle (e.g., engine running, oil pressure, fuel level and usage). It includes status of other on-board systems including user displays, passenger counters, and security systems. This overall status information is also collected from unused (out of service) vehicles.
transit vehicle loading data	Data collected on board the transit vehicle relating to passenger boarding and alighting.
transit vehicle location data	Current transit vehicle location and related operational conditions data provided by a transit vehicle.
transit vehicle operator authentication update	Results of authentication process or update of on-board authentication database.
transit vehicle operator information	Transit service instructions, wide area alerts, traffic information, road conditions, and other information for both transit and paratransit operators.
transit vehicle schedule performance	Estimated times of arrival and anticipated schedule deviations reported by a transit vehicle.
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.
transportation weather information	Current and forecast road conditions and weather information (e.g., surface condition, flooding, wind advisories, visibility, etc.) associated with the transportation network. This information is of a resolution, timeliness, and accuracy to be useful in transportation decision making.

Flow Name	Flow Description
weather information	Accumulated forecasted and current weather data (e.g., temperature, pressure, wind speed, wind direction, humidity, precipitation, visibility, light conditions, etc.).
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 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.