

VII. Functional Requirements of the Elements:

Each of the ITS elements have requirements they are expected to perform in carrying out the ITS architecture. These are called functional requirements, and they come directly from the National ITS Architecture. The entity mapping described in the previous Section VI helped identify which functional requirements apply to the Northwest Indiana Regional ITS Architecture. However, the architecture development process described in Section II was necessary to further refine and tailor the exact functional requirements applied to the architecture. The functional requirements also have statuses. “Existing” means the ITS element already performs the functional requirement, “Planned” means the ITS element is planned to perform the functional requirement in the next 10 years, and “Potential” means the ITS element could potentially perform the functional requirement in the next 10 years. Table 6 lists the functional requirements by element in alphabetical order, and then by entity in alphabetical order. Since Table 6 is very long, the table of contents below explains the page of Table 6 the functional requirements for a given element start on. Note that not every element has functional requirements.

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Functional Requirements

Northwest Indiana Regional Intelligent Transportation System (Region)

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Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Archived Data Management System	
<i>Entity:</i> Archived Data Management	
<i>Functional Area:</i> ITS Data Repository	
Collect and maintain data and data catalogs from one or more data sources. May include quality checks, error notification, and archive coordination.	
<i>Requirement:</i>	Existing
1 The center shall collect data to be archived from one or more data sources.	
<i>Requirement:</i>	Existing
2 The center shall collect data catalogs from one or more data sources. A catalog describes the data contained in the collection of archived data and may include descriptions of the schema or structure of the data, a description of the contents of the data; e.g., time range of entries, number of entries; or a sample of the data (e.g. a thumbnail).	
<i>Requirement:</i>	Existing
3 The center shall store the archived data in a focused repository that is suited to a particular set of ITS data users.	
<i>Requirement:</i>	Existing
4 The center shall include capabilities for performing quality checks on the incoming archived data.	
<i>Requirement:</i>	Existing
5 The center shall include capabilities for error notification on the incoming archived data.	
<i>Requirement:</i>	Existing
6 The center shall include capabilities for archive to archive coordination.	
<i>Requirement:</i>	Existing
7 The center shall support a broad range of archived data management implementations, ranging from simple data marts that collect a focused set of data and serve a particular user community to large-scale data warehouses that collect, integrate, and summarize transportation data from multiple sources and serve a broad array of users within a region.	
<i>Requirement:</i>	Existing
8 The center shall perform quality checks on received data.	
<i>Requirement:</i>	Existing
9 The center shall provide the capability to execute methods on the incoming data such as cleansing, summarizations, aggregations, or transformations applied to the data before it is stored in the archive.	
<i>Requirement:</i>	Existing
10 The center shall respond to requests from the administrator interface function to maintain the archive data.	
<i>Requirement:</i>	Existing
11 When data or a catalog of data is received from the archive, the center shall generate the requested data product for the users systems.	
<i>Functional Area:</i> Traffic and Roadside Data Archival	
Collects and archives traffic and environmental information directly from the roadside for use in off-line planning, research, and analysis.	
<i>Requirement:</i>	Existing
1 The center shall manage the collection of archive data directly from collection equipment located at the roadside.	
<i>Requirement:</i>	Existing
2 The center shall collect traffic sensor information from roadside devices.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Archived Data Management System</i>	
<i>Entity: Archived Data Management</i>	
<i>Functional Area: Traffic and Roadside Data Archival</i>	
Collects and archives traffic and environmental information directly from the roadside for use in off-line planning, research, and analysis.	
<i>Requirement:</i>	
3 The center shall collect environmental sensor information that from roadside devices.	Existing
<i>Requirement:</i>	
4 The center shall respond to requests from the Archive Data Administer to input the parameters that control the collection process.	Existing
<i>Requirement:</i>	
5 The center shall send the request for data and control parameters to the field equipment where the information is collected and returned.	Existing
<i>Requirement:</i>	
6 The center shall record the status about the imported traffic and roadside data.	Existing
<i>Requirement:</i>	
7 The center shall use the status information to adjust the collection of traffic and roadside data.	Existing
<i>Functional Area: Government Reporting Systems Support</i>	
Selects and formats data residing in an ITS archive to facilitate local, state, and federal government data reporting requirements.	
<i>Requirement:</i>	
1 The center shall provide data from an ITS archive to federal, state, or local government reporting systems.	Existing
<i>Requirement:</i>	
2 The center shall provide the capability to select data from an ITS archive for use in government reports.	Existing
<i>Requirement:</i>	
3 The center shall provide the capability to format data from an ITS archive suitable for input into government reports.	Existing
<i>Requirement:</i>	
4 The center shall support requests for ITS archived data from Government Reporting Systems.	Existing
<i>Requirement:</i>	
5 The center shall provide the applicable meta-data for any ITS archived data to satisfy government reporting system requests. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.	Existing
<i>Functional Area: On-Line Analysis and Mining</i>	
Advanced data analysis and mining features to support discovery of information, patterns, and correlations in large ITS archives.	
<i>Requirement:</i>	
1 The center shall support the interface with Archive Data User Systems for requests for analysis of the archive data.	Existing
<i>Requirement:</i>	
2 The center shall provide the capability to perform activities such as data mining, data fusion, summarizations, aggregations, and recreation from archive data. This may include multidimensional analysis, selective summarization and expansion of data details, and many other advanced analysis services.	Planned
<i>Requirement:</i>	
3 The center shall receive the user's systems requests and develop the request to retrieve the data from the archive.	Existing
<i>Requirement:</i>	
4 The center shall respond to users systems requests for a catalog of the archived data analysis products available.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Archived Data Management System</i>	
<i>Entity: Archived Data Management</i>	
<i>Functional Area: Virtual Data Warehouse Services</i>	
Provides access to data from geographically dispersed archives and coordinates information exchange with a local data warehouse. Also provides the specialized publishing, directory services, and transaction management functions associated with coordinating remote archives.	
<i>Requirement:</i>	
1 The center shall provide capabilities to access "in-place" data from geographically dispersed archives. These capabilities may include analysis, data fusion, or data mining.	Planned
<i>Requirement:</i>	
2 The center shall coordinate information exchange with a local data warehouse.	Planned
<i>Requirement:</i>	
3 The center shall provide the specialized publishing, directory services, and transaction management functions associated with coordinating remote archives.	Planned
<i>Requirement:</i>	
4 The center shall support the collection of archived data from other archives on an as-needed basis. (This minimizes the need to duplicate the comprehensive set of data from the remote archives in the local data warehouse.)	Planned
<i>Requirement:</i>	
5 The center shall use data collected from different archives to build a set of global schema including the data archive definitions for the local archive plus any archives known to the local archive.	Planned
<i>Requirement:</i>	
6 The center shall provide the local archived data schema to other archive systems.	Planned
<i>Element: Borman Hoosier Helpers</i>	
<i>Entity: Emergency Vehicle</i>	
<i>Functional Area: On-board EV En Route Support</i>	
On-board systems for gathering of dispatch and routing information for emergency vehicle personnel, vehicle tracking, communications with care facilities, and signal preemption via short range communication directly with traffic control equipment at the roadside.	
<i>Requirement:</i>	
1 The emergency vehicle, including roadway service patrols, shall track its current location.	Existing
<i>Requirement:</i>	
2 The emergency vehicle, including roadway service patrols, shall send the vehicle's location and operational data to the center for emergency management and dispatch.	Existing
<i>Requirement:</i>	
3 The emergency vehicle, including roadway service patrols, shall receive incident details and a suggested route when dispatched to a scene.	Existing
<i>Requirement:</i>	
4 The emergency vehicle shall send the current en route status (including estimated time of arrival) and requests for emergency dispatch updates.	Existing
<i>Requirement:</i>	
6 The emergency vehicle shall provide the personnel on-board with dispatch information, including incident type and location, and forward an acknowledgment from personnel to the center that the vehicle is on its way to the incident scene.	Existing
<i>Requirement:</i>	
9 The emergency vehicle shall send the vehicle's location, speed and direction to other vehicles in the area.	Existing
<i>Functional Area: On-board EV Incident Management Communication</i>	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Borman Hoosier Helpers	
<i>Entity:</i> Emergency Vehicle	
<i>Functional Area:</i> On-board EV Incident Management Communication	
On-board systems provide communications support to first responders. Incident information is provided to dispatched emergency personnel. Emergency personnel transmit information about the incident and response status.	
<i>Requirement:</i>	Existing
1 The emergency vehicle shall receive dispatch instructions sufficient to enable emergency personnel in the field to implement an effective incident response. It includes local traffic, road, and weather conditions, hazardous material information, and the current status of resources that have been allocated to an incident.	
<i>Requirement:</i>	Existing
2 The emergency vehicle shall provide an interface to the center for emergency personnel to transmit information about the incident site such as the extent of injuries, identification of vehicles and people involved, hazardous material, etc.	
<i>Requirement:</i>	Existing
3 The emergency vehicle shall provide an interface to the center for emergency personnel to transmit information about the current incident response status such as the identification of the resources on site, site management strategies in effect, and current clearance status.	
<i>Requirement:</i>	Existing
4 The emergency vehicle shall provide traffic incident information to approaching vehicles using short range communications..	
<i>Element:</i> Borman TMC	
<i>Entity:</i> Emergency Management	
<i>Functional Area:</i> Incident Command	
Tactical decision support, resource coordination, and communications integration among emergency management agencies for Incident Commands that are established by first responders to support local management of an incident.	
<i>Requirement:</i>	Existing
1 The center shall 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.	
<i>Requirement:</i>	Existing
2 The center shall provide incident command communications with public safety, emergency management, transportation, and other allied response agency centers.	
<i>Requirement:</i>	Existing
3 The center shall track and maintain resource information and action plans pertaining to the incident command.	
<i>Requirement:</i>	Existing
4 The center shall 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.	
<i>Requirement:</i>	Planned
5 The center shall assess the status of responding emergency vehicles as part of an incident command.	
<i>Functional Area:</i> Service Patrol Management	
Dispatch and communication with roadway service patrol vehicles that monitor roads to aid motorists, offering rapid response to minor incidents.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Borman TMC	
<i>Entity:</i> Emergency Management	
<i>Functional Area:</i> Service Patrol Management	
Dispatch and communication with roadway service patrol vehicles that monitor roads to aid motorists, offering rapid response to minor incidents.	
<i>Requirement:</i>	
1 The center shall dispatch roadway service patrol vehicles to identified incident locations.	Existing
<i>Requirement:</i>	
2 The center shall store the current status of all service patrol vehicles available for dispatch and those that have been dispatched.	Existing
<i>Requirement:</i>	
3 The center shall share incident information collected by the service patrol with traffic, maintenance and construction, and traveler information centers for incident management, incident notification to travelers, and incident cleanup.	Existing
<i>Requirement:</i>	
4 The center shall track the location and status of service patrol vehicles.	Existing
<i>Functional Area:</i> Center Secure Area Surveillance	
Management of security surveillance devices and analysis of that data to detect potential threats. Areas under surveillance may include transit stops, transit stations, rest areas, park and ride lots, modal interchange facilities, on-board a transit vehicle, etc.	
<i>Requirement:</i>	
1 The center shall remotely monitor video images and audio surveillance data collected in secure areas including facilities (e.g. transit yards) and transportation infrastructure (e.g. bridges, tunnels, interchanges, roadway infrastructure, and transit railways or guideways). The data may be raw or pre-processed in the field.	Existing
<i>Requirement:</i>	
2 The center shall remotely monitor video images and audio surveillance data collected in traveler secure areas, which include transit stations, transit stops, rest areas, park and ride lots, and other fixed sites along travel routes (e.g., emergency pull-off areas and travel information centers). The data may be raw or pre-processed in the field.	Potential
<i>Requirement:</i>	
4 The center shall exchange surveillance data with other emergency centers.	Existing
<i>Requirement:</i>	
5 The center shall identify potential security threats based on collected security surveillance data.	Existing
<i>Requirement:</i>	
6 The center shall verify potential security threats by correlating security surveillance data from multiple sources.	Existing
<i>Requirement:</i>	
7 The center shall remotely control security surveillance devices in secure areas including facilities (e.g. transit yards) and transportation infrastructure (e.g. bridges, tunnels, interchanges, roadway infrastructure, and transit railways or guideways).	Existing
<i>Requirement:</i>	
8 The center shall remotely control security surveillance devices in traveler secure areas, which include transit stations, transit stops, rest areas, park and ride lots, and other fixed sites along travel routes (e.g., emergency pull-off areas and travel information centers).	Potential

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Borman TMC	
<i>Entity:</i> Emergency Management	
<i>Functional Area:</i> Center Secure Area Surveillance	
Management of security surveillance devices and analysis of that data to detect potential threats. Areas under surveillance may include transit stops, transit stations, rest areas, park and ride lots, modal interchange facilities, on-board a transit vehicle, etc.	
<i>Requirement:</i>	
10 The center shall match traveler video images against a database from the Alerting and Advisory Systems of known images that may represent criminals and terrorists.	Potential
<i>Requirement:</i>	
11 The center shall exchange traveler images with other emergency management centers to support traveler image matching.	Potential
<i>Requirement:</i>	
12 The center shall respond to control data from center personnel regarding security surveillance data collection, processing, threat detection, and image matching.	Planned
<i>Requirement:</i>	
13 The center shall monitor maintenance status of the security sensor field equipment.	Existing
<i>Functional Area:</i> Center Secure Area Sensor Management	
Management of security sensors, analysis of sensor data, correlation with surveillance data and alerts from other agencies to detect potential threats, and dissemination of threat information to other agencies. Sensors may be placed in areas such as transit stops, transit stations, rest areas, park and ride lots, modal interchange facilities, on-board a transit vehicle, etc.	
<i>Requirement:</i>	
1 The center shall remotely monitor and control security sensor data collected in secure areas including facilities (e.g. transit yards) and transportation infrastructure (e.g. bridges, tunnels, interchanges, roadway infrastructure, and transit railways or guideways). The types of security sensor data include environmental threat (e.g. chemical agent, toxic industrial chemical, biological, explosives, and radiological sensors), infrastructure condition and integrity, intrusion and motion, and object detection sensors. The data may be raw or pre-processed in the field.	Existing
<i>Requirement:</i>	
2 The center shall remotely monitor and control security sensor data collected in traveler secure areas, which include transit stations, transit stops, rest areas, park and ride lots, and other fixed sites along travel routes (e.g., emergency pull-off areas and travel information centers). The types of security sensor data include environmental threat (e.g. chemical agent, toxic industrial chemical, biological, explosives, and radiological sensors), intrusion and motion, and object detection sensors. The data may be raw or pre-processed in the field.	Potential
<i>Requirement:</i>	
4 The center shall exchange security sensor data with other emergency centers.	Existing
<i>Requirement:</i>	
5 The center shall identify potential security threats based on collected security sensor data.	Existing
<i>Requirement:</i>	
6 The center shall verify potential security threats by correlating security sensor data from multiple sources.	Existing
<i>Requirement:</i>	
7 The center shall perform threat analysis based on correlations of security sensor and surveillance data.	Potential

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Borman TMC	
<i>Entity:</i> Emergency Management	
<i>Functional Area:</i> Center Secure Area Sensor Management	
Management of security sensors, analysis of sensor data, correlation with surveillance data and alerts from other agencies to detect potential threats, and dissemination of threat information to other agencies. Sensors may be placed in areas such as transit stops, transit stations, rest areas, park and ride lots, modal interchange facilities, on-board a transit vehicle, etc.	
<i>Requirement:</i>	
8 The center shall exchange threat analysis data with Alerting and Advisory Systems and use that data in local threat analysis processing.	Existing
<i>Requirement:</i>	
9 The center shall disseminate threat information to other agencies, including traffic, transit, maintenance, rail operations, and other emergency management centers.	Existing
<i>Requirement:</i>	
10 The center shall respond to control data from center personnel regarding security sensor data collection, processing, threat detection, and threat analysis.	Planned
<i>Requirement:</i>	
11 The center shall request activation of barriers and safeguards on request from center personnel.	Planned
<i>Requirement:</i>	
12 The center shall monitor maintenance status of the security sensor field equipment.	Existing
<i>Functional Area:</i> Mayday Support	
Collection and response to Mayday messages received from vehicles and drivers.	
<i>Requirement:</i>	
1 The center shall collect mayday messages from vehicles and drivers.	Existing
<i>Requirement:</i>	
2 The center shall collect mayday messages from travelers via personal handheld devices.	Existing
<i>Requirement:</i>	
3 The center shall acknowledge the request for emergency assistance, whether originated by the driver, automatically by the vehicle's safety systems, or by a traveler via a personal handheld device.	Existing
<i>Requirement:</i>	
4 After the mayday becomes a verified incident, the center shall determine the appropriate response to the mayday message.	Existing
<i>Requirement:</i>	
5 The center shall determine whether the mayday message indicates an emergency that requires the attention of public safety agencies, and forward mayday emergency data to the appropriate agency as necessary.	Existing
<i>Functional Area:</i> Emergency Commercial Vehicle Response	
Responds to commercial vehicle and freight equipment related emergencies. Includes incidents involving hazardous materials as well as the detection of non-permitted transport of security sensitive hazmat.	
<i>Requirement:</i>	
1 The center shall receive emergency notification information from commercial vehicles, commercial vehicle check stations, or commercial fleet operators and present the possible incident information to the emergency system operator. This may include detection of non-permitted transport of security sensitive hazmat, hazardous cargo spills, etc.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Borman TMC	
<i>Entity:</i> Emergency Management	
<i>Functional Area:</i> Emergency Commercial Vehicle Response	
Responds to commercial vehicle and freight equipment related emergencies. Includes incidents involving hazardous materials as well as the detection of non-permitted transport of security sensitive hazmat.	
<i>Requirement:</i>	Planned
2 The center shall receive details of the cargo being carried by commercial vehicles from their commercial fleet manager for incidents involving potential hazardous materials.	
<i>Requirement:</i>	Existing
3 The center shall forward the verified emergency information to the responding agency based on the location and nature of the emergency.	
<i>Requirement:</i>	Potential
4 The center shall provide the capability to request Fleet and Freight Management to disable a specific vehicle in their fleet.	
<i>Functional Area:</i> Emergency Transportation Operations Data Collection	
Collects real-time information on the state of the regional transportation system for operational use by the center. It establishes communications with a regional repository, requests or subscribes to information relevant to the center, and distributes the received information for use.	
<i>Requirement:</i>	Existing
1 The center shall collect real-time information on the state of the regional transportation system including current traffic and road conditions, weather conditions, special event and incident information.	
<i>Requirement:</i>	Existing
2 The center shall support the capability for the system operator to monitor and control the information collection service.	
<i>Entity:</i> Emissions Management	
<i>Functional Area:</i> Emissions Data Management	
Assimilation and storage of air quality measures and roadside collected emissions data; distribution for general traveler information or for use in demand management programs.	
<i>Requirement:</i>	Planned
1 The center shall collect, analyze, and store vehicle emissions data collected from roadside sensors.	
<i>Requirement:</i>	Planned
2 The center shall collect, analyze, and store wide area pollution data collected from sensors that may the general (wide area) environment.	
<i>Requirement:</i>	Planned
3 The center shall configure and control emissions and air quality sensors located in the field.	
<i>Requirement:</i>	Planned
4 The center shall maintain a database of pollution reference data including acceptable and tolerable emissions and pollution levels for the area served by the center.	
<i>Requirement:</i>	Planned
5 The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for emissions.	
<i>Requirement:</i>	Potential
6 The center shall establish violation parameters, detect emissions violators, obtain the vehicle registration data from the appropriate State Department of Motor Vehicles (DMV) office, and then provide the capability to send violation information to a law enforcement agency.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Borman TMC	
<i>Entity:</i> Emissions Management	
<i>Functional Area:</i> Emissions Data Management	
Assimilation and storage of air quality measures and roadside collected emissions data; distribution for general traveler information or for use in demand management programs.	
<i>Requirement:</i>	Planned
7 The center shall distribute air quality information to the media, traveler information service providers, and traffic management centers. This information may be used for information to travelers or part of demand management programs.	
<i>Functional Area:</i> Emissions Data Collection	
Collection and storage of air quality and emissions management information. For use by operations personnel or data archives in the region.	
<i>Requirement:</i>	Planned
1 The center shall collect air quality and emissions management data from various sources, including emissions sensors distributed along the roadside and wide-area sensors detecting pollution over a larger geographical area.	
<i>Requirement:</i>	Planned
2 The center shall assign quality control metrics and meta-data to be stored along with the data. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.	
<i>Requirement:</i>	Planned
3 The center shall receive and respond to requests from ITS Archives for either a catalog of the emissions management data or for the data itself.	
<i>Requirement:</i>	Planned
4 The center shall be able to produce sample products of the data available.	
<i>Entity:</i> Traffic Management	
<i>Functional Area:</i> TMC Variable Speed Limits	
Remotely monitors and controls variable speed limits systems, including equipment that monitors current traffic and environmental conditions, determines the current speed limits by lane, and displays the speed limits and additional information to drivers.	
<i>Requirement:</i>	Existing
1 The center shall monitor data on traffic and environmental conditions collected from sensors along the roadway.	
<i>Functional Area:</i> TMC Dynamic Lane Management and Shoulder Use	
Remotely monitors and controls dynamically managed travel lanes, including temporary use of shoulders. It monitors conditions and determines and manages lane configuration changes. Includes intersection reconfiguration, special designated lanes, temporary shoulder use, and lane use restrictions.	
<i>Requirement:</i>	Potential
1 The center shall remotely monitor and control dynamically managed travel lanes.	
<i>Functional Area:</i> TMC Roadway Warning	
Remotely monitors and controls field elements used to warn drivers approaching hazards. Detects and warns approaching vehicles of adverse road weather conditions, traffic conditions including queues, and obstacles or animals in the road.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Borman TMC	
<i>Entity:</i> Traffic Management	
<i>Functional Area:</i> TMC Roadway Warning	
Remotely monitors and controls field elements used to warn drivers approaching hazards. Detects and warns approaching vehicles of adverse road weather conditions, traffic conditions including queues, and obstacles or animals in the road.	
<i>Requirement:</i>	Existing
1 The center shall monitor data on traffic, environmental conditions, and other hazards collected from sensors along the roadway.	
<i>Functional Area:</i> TMC Variable Speed Limits	
Remotely monitors and controls variable speed limits systems, including equipment that monitors current traffic and environmental conditions, determines the current speed limits by lane, and displays the speed limits and additional information to drivers.	
<i>Requirement:</i>	Potential
2 Based on the measured data, the center shall calculate and set suitable speed limits by lane.	
<i>Functional Area:</i> TMC Roadway Warning	
Remotely monitors and controls field elements used to warn drivers approaching hazards. Detects and warns approaching vehicles of adverse road weather conditions, traffic conditions including queues, and obstacles or animals in the road.	
<i>Requirement:</i>	Planned
2 The center shall identify hazardous road weather and surface conditions.	
<i>Functional Area:</i> TMC Dynamic Lane Management and Shoulder Use	
Remotely monitors and controls dynamically managed travel lanes, including temporary use of shoulders. It monitors conditions and determines and manages lane configuration changes. Includes intersection reconfiguration, special designated lanes, temporary shoulder use, and lane use restrictions.	
<i>Requirement:</i>	Potential
2 The center shall monitor traffic conditions and demand measured per lane.	
<i>Functional Area:</i> TMC Variable Speed Limits	
Remotely monitors and controls variable speed limits systems, including equipment that monitors current traffic and environmental conditions, determines the current speed limits by lane, and displays the speed limits and additional information to drivers.	
<i>Requirement:</i>	Potential
3 The center shall control field equipment that posts the current speed limits and displays additional information such as basic safety rules and current traffic information to drivers.	
<i>Functional Area:</i> TMC Roadway Warning	
Remotely monitors and controls field elements used to warn drivers approaching hazards. Detects and warns approaching vehicles of adverse road weather conditions, traffic conditions including queues, and obstacles or animals in the road.	
<i>Requirement:</i>	Planned
3 The center shall identify hazardous traffic conditions including queues.	
<i>Requirement:</i>	Planned
4 The center shall identify debris, animals, or other encroachment on the roadway dangerous to approaching motorists.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Borman TMC	
<i>Entity:</i> Traffic Management	
<i>Functional Area:</i> TMC Variable Speed Limits	
Remotely monitors and controls variable speed limits systems, including equipment that monitors current traffic and environmental conditions, determines the current speed limits by lane, and displays the speed limits and additional information to drivers.	
<i>Requirement:</i>	Potential
4 The center shall monitor the operational status of the variable speed limit equipment, including fault reports.	
<i>Functional Area:</i> TMC Roadway Warning	
Remotely monitors and controls field elements used to warn drivers approaching hazards. Detects and warns approaching vehicles of adverse road weather conditions, traffic conditions including queues, and obstacles or animals in the road.	
<i>Requirement:</i>	Planned
5 The center shall issue control commands to field equipment warning drivers approaching the identified hazardous conditions.	
<i>Functional Area:</i> TMC Variable Speed Limits	
Remotely monitors and controls variable speed limits systems, including equipment that monitors current traffic and environmental conditions, determines the current speed limits by lane, and displays the speed limits and additional information to drivers.	
<i>Requirement:</i>	Potential
5 The center shall provide center personnel current system status and respond to control data from center personnel regarding variable speed limits and	
<i>Functional Area:</i> TMC Roadway Warning	
Remotely monitors and controls field elements used to warn drivers approaching hazards. Detects and warns approaching vehicles of adverse road weather conditions, traffic conditions including queues, and obstacles or animals in the road.	
<i>Requirement:</i>	Planned
6 The center shall monitor the operational status of the dynamic warning equipment, including fault reports.	
<i>Functional Area:</i> TMC Dynamic Lane Management and Shoulder Use	
Remotely monitors and controls dynamically managed travel lanes, including temporary use of shoulders. It monitors conditions and determines and manages lane configuration changes. Includes intersection reconfiguration, special designated lanes, temporary shoulder use, and lane use restrictions.	
<i>Requirement:</i>	Potential
6 The center shall monitor and coordinate dynamic lane controls with adjacent jurisdictions.	
<i>Requirement:</i>	Potential
7 Based on the collected data and operator input, the center shall determine suggested and required lane control configuration changes.	
<i>Requirement:</i>	Planned
8 The center shall support temporary use of shoulders as travel lanes.	
<i>Requirement:</i>	Potential
9 The center shall designate lanes for use by special vehicles only, such as buses, high occupancy vehicles (HOVs), or vehicles attending a special event.	
<i>Requirement:</i>	Existing
10 The center shall identify lane use restrictions, prohibiting specific types of vehicles (e.g., commercial vehicles) from specific lanes.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Borman TMC	
<i>Entity:</i> Traffic Management	
<i>Functional Area:</i> TMC Dynamic Lane Management and Shoulder Use	
Remotely monitors and controls dynamically managed travel lanes, including temporary use of shoulders. It monitors conditions and determines and manages lane configuration changes. Includes intersection reconfiguration, special designated lanes, temporary shoulder use, and lane use restrictions.	
<i>Requirement:</i>	Potential
11 The center shall activate lane management field equipment that is used to dynamically manage specific lanes and shoulders.	
<i>Requirement:</i>	Potential
12 The center shall reconfigure intersections and interchanges for compatibility with the current lane configuration.	
<i>Requirement:</i>	Existing
13 The center shall notify the enforcement agency of violators of the lane controls.	
<i>Functional Area:</i> Collect Traffic Surveillance	
Management of traffic sensors and surveillance (CCTV) equipment, collection of current traffic conditions, and distribution of the collected information to other centers and operators.	
<i>Requirement:</i>	Existing
1 The center shall monitor, analyze, and store traffic sensor data (speed, volume, occupancy) collected from field elements under remote control of the center.	
<i>Requirement:</i>	Existing
2 The center shall monitor, analyze, and distribute traffic images from CCTV systems under remote control of the center.	
<i>Requirement:</i>	Existing
4 The center shall distribute road network conditions data (raw or processed) based on collected and analyzed traffic sensor and surveillance data to other centers.	
<i>Requirement:</i>	Existing
5 The center shall respond to control data from center personnel regarding sensor and surveillance data collection, analysis, storage, and distribution.	
<i>Requirement:</i>	Existing
6 The center shall maintain a database of surveillance equipment and sensors and associated data (including the roadway on which they are located, the type of data collected, and the ownership of each)	
<i>Requirement:</i>	Existing
7 The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for traffic data.	
<i>Functional Area:</i> TMC Probe Information Collection	
Collects, assimilates, and disseminates vehicle probe data collected from roadside beacons and centers controlling transit vehicles, emergency vehicles, toll collection points, and route-guided vehicles.	
<i>Requirement:</i>	Existing
1 The center shall collect traffic probe data from vehicles via roadside field equipment.	
<i>Requirement:</i>	Existing
3 The center shall collect traffic data from traveler information centers based on data from their subscriber vehicles; the data may be aggregated and initial link time calculations performed at the sending center.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Borman TMC	
<i>Entity:</i> Traffic Management	
<i>Functional Area:</i> TMC Probe Information Collection	
Collects, assimilates, and disseminates vehicle probe data collected from roadside beacons and centers controlling transit vehicles, emergency vehicles, toll collection points, and route-guided vehicles.	
<i>Requirement:</i>	Planned
4 The center shall collect traffic data from toll administrative centers containing travel times between toll collection points for those vehicles equipped for electronic toll collection; the data may be aggregated and processed at the sending center.	
<i>Requirement:</i>	Existing
5 The center shall assimilate current and forecast traffic conditions based on collected probe data and distribute to other centers for dissemination to travelers.	
<i>Requirement:</i>	Existing
6 The center shall collect operational status for the roadside probe data collection equipment.	
<i>Requirement:</i>	Existing
7 The center shall collect fault data for the roadside probe data collection equipment for repair.	
<i>Functional Area:</i> TMC Traffic Information Dissemination	
Controls dissemination of traffic-related data to other centers, the media, and travelers via the driver information systems (DMS, HAR) that it operates.	
<i>Requirement:</i>	Existing
1 The center shall remotely control dynamic messages signs for dissemination of traffic and other information to drivers.	
<i>Requirement:</i>	Existing
2 The center shall 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.	
<i>Requirement:</i>	Existing
3 The center shall collect operational status for the driver information systems equipment (DMS, HAR, etc.).	
<i>Requirement:</i>	Existing
4 The center shall collect fault data for the driver information systems equipment (DMS, HAR, etc.) for repair.	
<i>Requirement:</i>	Existing
5 The center shall 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), and the definition of the road network itself.	
<i>Requirement:</i>	Existing
6 The center shall distribute traffic data to maintenance and construction centers, transit centers, emergency management centers, and traveler information providers.	
<i>Requirement:</i>	Existing
7 The center shall distribute traffic data to the media; the capability to provide the information in both data stream and graphical display shall be supported.	
<i>Requirement:</i>	Existing
8 The center shall provide the capability for center personnel to control the nature of the data that is available to non-traffic operations centers and the media.	
<i>Functional Area:</i> TMC Regional Traffic Management	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Borman TMC	
<i>Entity:</i> Traffic Management	
<i>Functional Area:</i> TMC Regional Traffic Management	
Coordination between traffic management centers in order to share traffic information between centers as well as control of traffic management field equipment. This may be used during incidents and special events and during day-to-day operations.	
<i>Requirement:</i>	
1 The center shall exchange traffic information with other traffic management centers including incident information, congestion data, traffic data, signal timing plans, and real-time signal control information.	Planned
<i>Requirement:</i>	
2 The center shall exchange traffic control information with other traffic management centers to support remote monitoring and control of traffic management devices (e.g. signs, sensors, signals, cameras, etc.).	Planned
<i>Functional Area:</i> TMC Traffic Management Decision Support	
Recommends courses of action to the traffic operator based on current and forecast road and traffic conditions. Recommended actions may include predefined incident response plans, signal timing plan changes, DMS/HAR messages, lane control strategies, metering strategies, etc.	
<i>Requirement:</i>	
1 The center shall provide center personnel with an integrated regional view of current and forecast road and traffic conditions including traffic incidents, special events, maintenance activities and other events or conditions that impact capacity or demand.	Existing
<i>Requirement:</i>	
2 The center shall identify network imbalances and potential courses of action.	Planned
<i>Requirement:</i>	
3 The center shall compare the impact of potential courses of action and make recommendations to the operator.	Planned
<i>Requirement:</i>	
4 The recommended actions shall include predefined incident response plans, signal timing plan changes, DMS/HAR messages, lane control strategies and freeway control strategies including ramp metering, interchange metering, and mainline metering.	Planned
<i>Requirement:</i>	
5 The recommended actions shall include multimodal strategies that include suggested transit strategies and suggested route and mode choices for travelers.	Planned
<i>Requirement:</i>	
6 The center shall provide an interface to center personnel to input control parameters for the decision support process and receive recommended actions and supporting information presentation.	Planned
<i>Functional Area:</i> TMC Incident Detection	
Remotely monitors traffic sensor and surveillance systems to detect and verify incidents. Also monitors external advisory and incident reporting systems, intermodal freight depots, and border crossings for additional incident information. Identified incidents are reported to operations personnel and other centers.	
<i>Requirement:</i>	
1 The center shall 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.	Existing
<i>Requirement:</i>	
2 The center shall collect and store traffic flow and image data from the field equipment to detect and verify incidents.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Borman TMC	
<i>Entity:</i> Traffic Management	
<i>Functional Area:</i> TMC Incident Detection	
Remotely monitors traffic sensor and surveillance systems to detect and verify incidents. Also monitors external advisory and incident reporting systems, intermodal freight depots, and border crossings for additional incident information. Identified incidents are reported to operations personnel and other centers.	
<i>Requirement:</i>	Existing
3 The center shall receive inputs concerning upcoming events that would effect the traffic network from event promoters and traveler information service providers.	
<i>Requirement:</i>	Existing
4 The center shall exchange incident and threat information with emergency management centers as well as maintenance and construction centers; including notification of existence of incident and expected severity, location, time and nature of incident.	
<i>Requirement:</i>	Planned
5 The center shall support requests from emergency management centers and border inspection systems to remotely control sensor and surveillance equipment located in the field.	
<i>Requirement:</i>	Existing
6 The center shall provide road network conditions and traffic images to emergency management centers to support the detection, verification, and classification of incidents.	
<i>Requirement:</i>	Existing
7 The center shall provide video and traffic sensor control commands to the field equipment to detect and verify incidents.	
<i>Functional Area:</i> TMC Incident Dispatch Coordination/Communication	
Formulates an incident response that takes into account the incident potential, incident impacts, and/or resources required for incident management. Facilitates the dispatch of emergency response and service vehicles and coordinates the response with cooperating agencies.	
<i>Requirement:</i>	Existing
1 The center shall 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.	
<i>Requirement:</i>	Existing
2 The center shall coordinate planning for incidents with emergency management centers - including pre-planning activities for disaster response, evacuation, and recovery operations.	
<i>Requirement:</i>	Planned
3 The center shall support requests from emergency management centers to remotely control sensor and surveillance equipment located in the field, provide special routing for emergency vehicles, and to provide responding emergency vehicles with signal preemption.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Borman TMC</i>	
<i>Entity: Traffic Management</i>	
<i>Functional Area: TMC Incident Dispatch Coordination/Communication</i>	
Formulates an incident response that takes into account the incident potential, incident impacts, and/or resources required for incident management. Facilitates the dispatch of emergency response and service vehicles and coordinates the response with cooperating agencies.	
<i>Requirement:</i> 4 The center shall exchange incident information with emergency management centers, maintenance and construction centers, transit centers, information service providers, and the media including description, location, traffic impact, status, expected duration, and response information.	Existing
<i>Requirement:</i> 5 The center shall 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.	Existing
<i>Requirement:</i> 6 The center shall 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.	Existing
<i>Requirement:</i> 7 The center shall provide road network conditions and traffic images to emergency management centers, maintenance and construction centers, and traveler information service providers.	Existing
<i>Requirement:</i> 8 The center shall monitor incident response performance and calculate incident response and clearance times.	Planned
<i>Requirement:</i> 9 The center shall 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.	Planned
<i>Requirement:</i> 10 The center shall coordinate information and controls with other traffic management centers.	Potential
<i>Requirement:</i> 11 The center shall receive inputs from emergency management and transit management centers to develop an overall status of the transportation system including emergency transit schedules in effect and current status and condition of the transportation infrastructure.	Planned
<i>Requirement:</i> 12 The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for traffic incident management.	Existing
<i>Functional Area: TMC Evacuation Support</i>	
Development, coordination, and execution of special traffic management strategies during evacuation and subsequent reentry of a population in the vicinity of a disaster or major emergency. Interfaces with emergency management and other traffic management centers.	
<i>Requirement:</i> 1 The center shall coordinate planning for evacuation with emergency management centers - including pre-planning activities such as establishing routes, areas to be evacuated, timing, etc.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Borman TMC	
<i>Entity:</i> Traffic Management	
<i>Functional Area:</i> TMC Evacuation Support	
Development, coordination, and execution of special traffic management strategies during evacuation and subsequent reentry of a population in the vicinity of a disaster or major emergency. Interfaces with emergency management and other traffic management centers.	
<i>Requirement:</i>	
2 The center shall 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.	Potential
<i>Requirement:</i>	
3 The center shall coordinate information and controls with other traffic management centers.	Potential
<i>Requirement:</i>	
4 The center shall 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.	Planned
<i>Functional Area:</i> TMC Traffic Network Performance Evaluation	
Measures performance and predicts travel demand patterns to support traffic flow optimization, demand management, and incident management. Collects data from surveillance equipment as well as input from other management centers including emissions, event promoters, and other TMCs.	
<i>Requirement:</i>	
1 The center shall monitor, analyze, and store traffic sensor data (speed, volume, occupancy) collected from field elements under remote control of the center to support overall network performance evaluations.	Existing
<i>Requirement:</i>	
2 The center shall collect wide-area pollution data from emissions management centers to support overall network performance evaluations.	Planned
<i>Requirement:</i>	
3 The center shall collect and store plans from event promoters for major future events possibly impacting traffic to support overall network performance evaluations.	Existing
<i>Requirement:</i>	
4 The center shall collect and store anticipated route information from information service providers to support overall network performance evaluations and predictions.	Existing
<i>Requirement:</i>	
6 The center shall exchange traffic information with other traffic management centers, including incidents, congestion data, traffic data, signal timing plans, and real-time signal control information to support overall network performance evaluations.	Potential
<i>Requirement:</i>	
7 The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for network performance evaluations.	Existing
<i>Requirement:</i>	
8 The center shall provide an interface to the archive data repository to enable the operator to retrieve historical operating data for use in planning to predict future traffic patterns and conditions.	Planned
<i>Requirement:</i>	
9 This center shall use the collected information to measure overall current and forecast network performance and predict travel demand patterns.	Planned

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Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Borman TMC	
<i>Entity:</i> Traffic Management	
<i>Functional Area:</i> TMC Environmental Monitoring	
Management of environmental sensors and assimilation of collected data with other current and forecast road conditions and surface weather information from weather service providers and roadway maintenance operations.	
<i>Requirement:</i>	Existing
1 The center shall remotely control environmental sensors that measure road surface temperature, moisture, icing, salinity, and other measures.	
<i>Requirement:</i>	Existing
2 The center shall remotely control environmental sensors that measure weather conditions including temperature, wind, humidity, precipitation, and visibility.	
<i>Requirement:</i>	Planned
3 The center shall 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.	
<i>Requirement:</i>	Existing
4 The center shall provide weather and road condition information to weather service providers and center personnel.	
<i>Requirement:</i>	Planned
5 The center shall respond to control data from center personnel regarding environmental sensor control and weather data collection and processing.	
<i>Functional Area:</i> TMC Reversible Lane Management	
Remotely controls traffic sensors, surveillance, and automated reversible lane equipment and lane control signals to control traffic in reversible lanes.	
<i>Requirement:</i>	Potential
1 The center shall remotely control devices to detect traffic in reversible lanes, including wrong-way vehicles.	
<i>Requirement:</i>	Potential
2 The center shall monitor the use of reversible lanes and detect wrong-way vehicles in reversible lanes using sensor and surveillance information, and the current lane control status (which direction the lane is currently operating).	
<i>Requirement:</i>	Potential
4 The center shall remotely control automated reversible lane equipment and driver information systems (such as lane control signals) that control traffic in reversible lanes on freeways.	
<i>Requirement:</i>	Potential
5 The center shall collect operational status for the reversible lane field equipment.	
<i>Requirement:</i>	Potential
6 The center shall collect fault data for the reversible lane field equipment and send to the maintenance center for repair.	
<i>Requirement:</i>	Potential
7 The center shall provide the capability for center personnel to control access and management of reversible lane facilities, including the direction of traffic flow changes during the day, especially between the peak hours and dedication of more lanes to the congestion direction during special events.	
<i>Functional Area:</i> TMC Speed Monitoring and Warning	
Remotely monitors vehicle speeds, and informs an enforcement agency if excessive speeds are detected. Also configures and controls speed warning systems that provide safe speed advisories to the motorist.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Borman TMC	
<i>Entity:</i> Traffic Management	
<i>Functional Area:</i> TMC Speed Monitoring and Warning	
Remotely monitors vehicle speeds, and informs an enforcement agency if excessive speeds are detected. Also configures and controls speed warning systems that provide safe speed advisories to the motorist.	
<i>Requirement:</i>	Planned
1 The center shall remotely control vehicle speed sensors typically placed in work zones; control parameters may include environmental and traffic conditions.	
<i>Requirement:</i>	Planned
2 The center shall collect operational status for the vehicle speed sensors; the status shall include logged information including measured speeds, warning messages displayed, and violation records.	
<i>Requirement:</i>	Existing
3 The center shall provide the capability to notify an enforcement agency when vehicle speeds in the work zone are in excess of the posted speed limit or are creating an unsafe condition based upon the current environmental or traffic conditions.	
<i>Requirement:</i>	Planned
4 The center shall collect fault data for the vehicle speed sensors for repair.	
<i>Functional Area:</i> Barrier System Management	
Remotely controls barrier systems such as gates and other systems that manage entry to roadways, transportation facilities and infrastructure.	
<i>Requirement:</i>	Planned
1 The center shall remotely control barrier systems for transportation facilities and infrastructure. Barrier systems include automated or remotely controlled gates, barriers and other systems that manage entry to roadways.	
<i>Requirement:</i>	Planned
2 The center shall collect barrier system operational status.	
<i>Requirement:</i>	Planned
3 The center shall collect barrier system fault data and send to the maintenance center for repair.	
<i>Requirement:</i>	Planned
4 The center shall accept requests for barrier system activation from other centers and from center personnel to support emergency response and detours.	
<i>Functional Area:</i> Traffic Equipment Maintenance	
Monitoring and remote diagnostics of field equipment - detect failures, issue problem reports, and track the repair or replacement of the failed equipment.	
<i>Requirement:</i>	Existing
1 The center shall collect and store sensor (traffic, pedestrian, multimodal crossing) operational status.	
<i>Requirement:</i>	Existing
2 The center shall collect and store CCTV surveillance system (traffic, pedestrian) operational status.	
<i>Requirement:</i>	Existing
3 The center shall collect and store sensor (traffic, pedestrian, multimodal crossing) fault data and send to the maintenance center for repair.	
<i>Requirement:</i>	Existing
4 The center shall collect and store CCTV surveillance system (traffic, pedestrian) fault data send to the maintenance center for repair.	
<i>Requirement:</i>	Existing
5 The center shall collect environmental sensor operational status.	
<i>Requirement:</i>	Existing
6 The center shall collect environmental sensor equipment fault data and send to the maintenance center for repair.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Borman TMC	
<i>Entity:</i> Traffic Management	
<i>Functional Area:</i> Traffic Equipment Maintenance	
Monitoring and remote diagnostics of field equipment - detect failures, issue problem reports, and track the repair or replacement of the failed equipment.	
<i>Requirement:</i>	Existing
7 The center shall exchange data with maintenance centers concerning the reporting of faulty equipment and the schedule/status of their repair. Information exchanged includes details of new equipment faults, and clearances when the faults are cleared.	
<i>Requirement:</i>	Existing
8 The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for traffic maintenance data.	
<i>Functional Area:</i> TMC Work Zone Traffic Management	
Coordination with maintenance systems using work zone images and traveler information systems (such as DMS), and distribution of work plans so that work zones are established that have minimum traffic impact.	
<i>Requirement:</i>	Existing
1 The center shall receive work zone images from a maintenance center.	
<i>Requirement:</i>	Existing
2 The center shall analyze work zone images for indications of a possible incident.	
<i>Requirement:</i>	Existing
3 The center shall remotely control driver information systems (such as dynamic messages signs, highway advisory radios) to advise drivers of activity around a work zone.	
<i>Requirement:</i>	Existing
4 The center shall collect operational status for the driver information systems equipment in work zones.	
<i>Requirement:</i>	Existing
5 The center shall collect fault data for the driver information systems equipment in work zones for repair.	
<i>Requirement:</i>	Existing
6 The center shall receive proposed maintenance and construction work plans, analyze the activity as a possible incident, and provide work plan feedback to the sending center.	
<i>Functional Area:</i> TMC Demand Management Coordination	
Provides the capability to gather information on regional toll, parking, and transit usage and request changes to enable dynamic pricing for demand management.	
<i>Requirement:</i>	Planned
1 The center shall collect and store toll pricing data from toll administration centers, including the price for each road segment to which a toll applies, with the time and date for when it applies.	
<i>Requirement:</i>	Planned
5 The center shall send requests to toll administration centers to change pricing, modify restrictions, or modify operations of a toll road facility.	
<i>Functional Area:</i> Traffic Data Collection	
Collection and storage of traffic management data. For use by operations personnel or data archives in the region.	
<i>Requirement:</i>	Existing
1 The center shall collect traffic management data such as operational data, event logs, etc.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Borman TMC	
<i>Entity:</i> Traffic Management	
<i>Functional Area:</i> Traffic Data Collection	
Collection and storage of traffic management data. For use by operations personnel or data archives in the region.	
<i>Requirement:</i>	Existing
2 The center shall assign quality control metrics and meta-data to be stored along with the data. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.	
<i>Requirement:</i>	Existing
3 The center shall receive and respond to requests from ITS Archives for either a catalog of the traffic data or for the data itself.	
<i>Requirement:</i>	Planned
4 The center shall be able to produce sample products of the data available.	
<i>Functional Area:</i> TMC Transportation Operations Data Collection	
Collects real-time information on the state of the regional transportation system for operational use by the center. It establishes communications with a regional repository, requests or subscribes to information relevant to the center, and distributes the received information for use.	
<i>Requirement:</i>	Existing
1 The center shall collect real-time information on the state of the regional transportation system including current traffic and road conditions, weather conditions, special event and incident information.	
<i>Requirement:</i>	Existing
2 The center shall support the capability for the system operator to monitor and control the information collection service.	
<i>Element:</i> Borman TMC Roadside Equipment	
<i>Entity:</i> Roadway	
<i>Functional Area:</i> Roadway Basic Surveillance	
Field elements that monitor traffic conditions using loop detectors and CCTV cameras.	
<i>Requirement:</i>	Existing
1 The field element shall collect, process, digitize, and send traffic sensor data (speed, volume, and occupancy) to the center for further analysis and storage, under center control.	
<i>Requirement:</i>	Existing
2 The field element shall collect, process, and send traffic images to the center for further analysis and distribution.	
<i>Requirement:</i>	Existing
4 The field element shall return sensor and CCTV system operational status to the controlling center.	
<i>Requirement:</i>	Existing
5 The field element shall return sensor and CCTV system fault data to the controlling center for repair.	
<i>Functional Area:</i> Roadway Dynamic Lane Management and Shoulder Use	
Field elements including physical overhead lane signs and associated control electronics that are used to manage and control specific lanes, including temporary use of shoulders as travel lanes.	
<i>Requirement:</i>	Potential
1 The field element shall measure traffic conditions per lane, under center control.	
<i>Requirement:</i>	Potential
2 The field element shall determine how to change the lane controls to respond to current traffic and road conditions.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Borman TMC Roadside Equipment	
<i>Entity:</i> Roadway	
<i>Functional Area:</i> Roadway Dynamic Lane Management and Shoulder Use	
Field elements including physical overhead lane signs and associated control electronics that are used to manage and control specific lanes, including temporary use of shoulders as travel lanes.	
<i>Requirement:</i>	
3 The field element shall receive lane management control information from the controlling center.	Potential
<i>Requirement:</i>	
4 The field element shall provide guidance and information to drivers regarding current lane configuration and status.	Potential
<i>Requirement:</i>	
5 The field element shall monitor vehicle characteristics and classify individual vehicles.	Potential
<i>Requirement:</i>	
6 The field element shall collect vehicle profile information from individual vehicles using field-vehicle communications.	Potential
<i>Requirement:</i>	
7 The field element shall monitor current lane usage to determine if vehicles are complying with current lane use restrictions.	Existing
<i>Requirement:</i>	
8 The field element shall capture vehicle information, including vehicle image(s) of vehicles violating current lane usage restrictions and report violations to the controlling center.	Existing
<i>Requirement:</i>	
9 The field element shall monitor operational status of the dynamic lane control equipment and report operational status to the controlling center.	Potential
<i>Requirement:</i>	
10 The field element shall identify and report fault conditions to the controlling center.	Potential
<i>Functional Area:</i> Roadway Variable Speed Limits	
Field elements including physical overhead lane signs and associated monitoring, communications, and control electronics that are used to manage and control variable speed limits systems.	
<i>Requirement:</i>	
1 The field element shall monitor traffic and environmental conditions along the roadway.	Potential
<i>Requirement:</i>	
2 The field element shall autonomously calculate and set variable speed limits based on current conditions by lane.	Potential
<i>Requirement:</i>	
3 The field element shall receive commands from the controlling center that establish speed limits by lane.	Potential
<i>Requirement:</i>	
4 The field element shall display the current speed limits per lane to drivers.	Potential
<i>Requirement:</i>	
5 The field element shall display additional information such as basic safety rules and current traffic information to drivers.	Potential
<i>Requirement:</i>	
6 The field element shall collect operational status of the variable speed limit field equipment and report the operational status to the controlling center.	Potential
<i>Requirement:</i>	
7 The field element shall monitor and report faults to the controlling center.	Potential
<i>Functional Area:</i> Roadway Warning	
Field elements used to warn drivers approaching hazards including adverse road weather conditions, traffic conditions including queues, and obstacles or animals in the road.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Borman TMC Roadside Equipment	
<i>Entity:</i> Roadway	
<i>Functional Area:</i> Roadway Warning	
Field elements used to warn drivers approaching hazards including adverse road weather conditions, traffic conditions including queues, and obstacles or animals in the road.	
<i>Requirement:</i>	Existing
1 The field element shall monitor for hazardous traffic conditions, including queues.	
<i>Requirement:</i>	Existing
2 The field element shall monitor for hazardous road surface and local weather conditions.	
<i>Requirement:</i>	Existing
3 The field element shall monitor for debris, animals, or other objects in the travel lanes.	
<i>Requirement:</i>	Existing
4 The field element shall provide collected sensor data to the controlling center.	
<i>Requirement:</i>	Planned
5 The field element shall autonomously identify potentially hazardous conditions and activate warning signs to approaching motorists.	
<i>Requirement:</i>	Existing
6 The field element shall receive commands from the controlling center that activate warning signs to approaching motorists.	
<i>Requirement:</i>	Existing
7 The field element shall collect operational status of the warning system field equipment and report the operational status to the controlling center.	
<i>Requirement:</i>	Existing
8 The field element shall monitor and report faults to the controlling center.	
<i>Functional Area:</i> Roadway Traffic Information Dissemination	
Driver information systems, such as dynamic message signs and Highway Advisory Radio (HAR).	
<i>Requirement:</i>	Existing
1 The field element shall include dynamic messages signs for dissemination of traffic and other information to drivers, under center control; the DMS may be either those that display variable text messages, or those that have fixed format display(s) (e.g. vehicle restrictions, or lane open/close).	
<i>Requirement:</i>	Existing
2 The field element shall include 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, under center control.	
<i>Requirement:</i>	Existing
4 The field element shall provide operational status for the driver information systems equipment (DMS, HAR, etc.) to the center.	
<i>Requirement:</i>	Existing
5 The field element shall provide fault data for the driver information systems equipment (DMS, HAR, etc.) to the center for repair.	
<i>Functional Area:</i> Roadway Incident Detection	
Field elements that monitor traffic conditions to identify incidents. It includes traffic detectors that collect traffic flow information and identify unusual traffic conditions and advanced CCTV cameras with built-in incident detection algorithms.	
<i>Requirement:</i>	Existing
1 The field element shall collect, process, and send traffic images to the center for further analysis and distribution.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Borman TMC Roadside Equipment	
<i>Entity:</i> Roadway	
<i>Functional Area:</i> Roadway Incident Detection	
Field elements that monitor traffic conditions to identify incidents. It includes traffic detectors that collect traffic flow information and identify unusual traffic conditions and advanced CCTV cameras with built-in incident detection algorithms.	
<i>Requirement:</i>	Existing
2 The field element shall remotely process video data and provide an indication of potential incidents to the traffic management center.	
<i>Requirement:</i>	Existing
3 The field element's video devices shall be remotely controlled by a traffic management center.	
<i>Requirement:</i>	Existing
4 The field element shall provide operational status and fault data for the incident detection devices to the traffic management center.	
<i>Functional Area:</i> Roadway Equipment Coordination	
Field elements that control and send data to other field elements (such as environmental sensors that send data to a DMS or coordination between traffic controllers on adjacent intersections), without center control.	
<i>Requirement:</i>	Potential
1 The field element shall include sensors that provide data and status information to other field element devices, without center control.	
<i>Requirement:</i>	Potential
2 The field element shall include sensors that receive configuration data from other field element devices, without center control.	
<i>Requirement:</i>	Potential
3 The field element shall include devices that provide data and status information to other field element devices without center control.	
<i>Requirement:</i>	Potential
4 The field element shall include devices that receive configuration data from other field element devices, without center control.	
<i>Functional Area:</i> Roadway Field Device Monitoring	
Monitors field equipment operational status and detects and reports fault conditions. Device status, configuration, and fault information are provided to a remote center and a user interface provides information locally to field personnel.	
<i>Requirement:</i>	Existing
1 The field element shall monitor the operational status (state of the device, configuration, and fault data) of connected sensors (such as traffic, infrastructure, environmental, security, speed) and devices (such as highway advisory radio, dynamic message signs, automated roadway treatment systems, barrier and safeguard systems, cameras, traffic signals, ramp meters, short range communications equipment, security surveillance equipment).	
<i>Requirement:</i>	Existing
2 The field element shall send operational status of connected field equipment to the maintenance center.	
<i>Requirement:</i>	Existing
3 The field element shall send collected fault data to the maintenance center for repair.	
<i>Requirement:</i>	Existing
4 The field element shall include a local interface that provides operational status and fault data for connected field equipment to field personnel.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Borman TMC Roadside Equipment	
<i>Entity:</i> Roadway	
<i>Functional Area:</i> Roadway Field Device Monitoring	
Monitors field equipment operational status and detects and reports fault conditions. Device status, configuration, and fault information are provided to a remote center and a user interface provides information locally to field personnel.	
<i>Requirement:</i>	
5 The field element shall include a local interface that allows field personnel to command diagnostic tests on connected field equipment.	Existing
<i>Functional Area:</i> Roadway Emissions Monitoring	
Emissions and air quality sensors that collect vehicular emissions and area-wide air quality data.	
<i>Requirement:</i>	
1 The field element shall include emissions sensors that detect levels of emissions from individual vehicles, under center control.	Planned
<i>Requirement:</i>	
2 The field element shall include air quality sensors, often distributed geographically, that detect area-wide levels of pollution, under center control.	Planned
<i>Requirement:</i>	
3 The field element shall analyze collected vehicle emissions data against reference data to determine whether or not a vehicle is violating the acceptable levels of emissions, and shall return this analysis to a center for possible enforcement action.	Planned
<i>Requirement:</i>	
4 If the emissions level detected by the emissions sensor indicates a vehicle is violating the acceptable levels of emissions, the field element shall provide the capability to display summary emissions information or warnings to passing drivers via a driver information system (such as portable messages signs, field to vehicle communications to in-vehicle signing systems, etc.).	Planned
<i>Requirement:</i>	
5 The field element shall provide emissions sensor equipment operational status to the center.	Planned
<i>Requirement:</i>	
6 The field element shall provide emissions sensor equipment fault indication to the center for repair.	Planned
<i>Requirement:</i>	
7 The field element shall provide area-wide pollution sensor equipment operational status to the center.	Planned
<i>Requirement:</i>	
8 The field element shall provide area-wide pollution sensor equipment fault indication to the center for repair.	Planned
<i>Functional Area:</i> Roadway Environmental Monitoring	
Environmental sensors, surface and sub-surface, that collect weather and road surface information. Weather conditions measured include temperature, wind, humidity, precipitation, and visibility. Sensors measure road surface temperature, moisture, icing, salinity, etc.	
<i>Requirement:</i>	
1 The field element shall include surface and sub-surface environmental sensors that measure road surface temperature, moisture, icing, salinity, and other measures.	Existing
<i>Requirement:</i>	
2 The field element shall include environmental sensors that measure weather conditions including temperature, wind, humidity, precipitation, and visibility.	Existing
<i>Requirement:</i>	
3 The field element's environmental sensors shall be remotely controlled by a maintenance center.	Planned

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Borman TMC Roadside Equipment	
<i>Entity:</i> Roadway	
<i>Functional Area:</i> Roadway Environmental Monitoring	
Environmental sensors, surface and sub-surface, that collect weather and road surface information. Weather conditions measured include temperature, wind, humidity, precipitation, and visibility. Sensors measure road surface temperature, moisture, icing, salinity, etc.	
<i>Requirement:</i>	
4 The field element's environmental sensors shall be remotely controlled by a traffic management center.	Existing
<i>Requirement:</i>	
5 The field element's environmental sensors shall be remotely controlled by weather service providers such as the National Weather Service or value-added sector specific meteorological services.	Potential
<i>Requirement:</i>	
6 The field element's environmental sensors shall be remotely controlled by a maintenance and construction vehicle.	Planned
<i>Requirement:</i>	
7 The field element shall provide environmental sensor equipment operational status to the controlling center or maintenance vehicle.	Existing
<i>Requirement:</i>	
8 The field element shall provide environmental sensor equipment fault indication to the controlling center or maintenance vehicle.	Existing
<i>Requirement:</i>	
9 The field element shall remotely aggregate environmental sensor data with environmental data collected from maintenance and construction vehicles.	Planned
<i>Requirement:</i>	
10 The field element shall provide weather and road surface condition data to centers.	Existing
<i>Requirement:</i>	
11 The field element shall provide weather and road surface condition data to maintenance and construction vehicles.	Existing
<i>Functional Area:</i> Field Barrier System Control	
Field elements that control barrier systems such as gates and other systems that manage entry to roadways, transportation facilities and infrastructure.	
<i>Requirement:</i>	
1 The field element shall activate barrier systems for transportation facilities and infrastructure under center control. Barrier systems include automated or remotely controlled gates, barriers and other systems that manage entry to roadways.	Planned
<i>Requirement:</i>	
2 The field element shall return barrier system operational status to the controlling center.	Planned
<i>Requirement:</i>	
3 The field element shall return barrier system fault data to the maintenance center for repair.	Planned
<i>Requirement:</i>	
4 The field element shall receive requests for access from approaching vehicles using field-vehicle communications and validate and authenticate the requests.	Planned
<i>Requirement:</i>	
5 The field element shall grant access only to qualified vehicles.	Planned
<i>Requirement:</i>	
6 The field element shall communicate access permission status and access instructions to approaching vehicles using field-vehicle communications.	Planned
<i>Functional Area:</i> Roadway Reversible Lanes	
Traffic sensors, surveillance, and automated reversible lane equipment and lane control signals to control traffic in reversible lanes.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Borman TMC Roadside Equipment	
<i>Entity:</i> Roadway	
<i>Functional Area:</i> Roadway Reversible Lanes	
Traffic sensors, surveillance, and automated reversible lane equipment and lane control signals to control traffic in reversible lanes.	
<i>Requirement:</i>	
1 The field element shall monitor traffic in reversible lanes, including wrong-way vehicles, using sensors and surveillance equipment under center control.	Potential
<i>Requirement:</i>	
2 The field element shall include automated reversible lane equipment and driver information systems (such as lane control signals) that control traffic in reversible lanes on surface streets, under center control.	Potential
<i>Requirement:</i>	
3 The field element shall include automated reversible lane equipment and driver information systems (such as lane control signals) that control traffic in reversible lanes on freeways, under center control.	Potential
<i>Requirement:</i>	
4 The field element shall provide operational status for the reversible lane field equipment to the center.	Potential
<i>Requirement:</i>	
5 The field element shall provide fault data for the reversible lane field equipment to the center.	Potential
<i>Functional Area:</i> Roadway Speed Monitoring and Warning	
Vehicle speed sensors that detect excessive vehicle speeds, optionally based on conditions and vehicle type, informing drivers, centers and/or enforcement agencies of speed violations.	
<i>Requirement:</i>	
1 The field element shall include sensors to detect vehicle speeds, under traffic or maintenance center control.	Existing
<i>Requirement:</i>	
2 The field element shall include sensors to detect vehicle speeds, under enforcement agency control.	Planned
<i>Requirement:</i>	
3 If the speed detected by vehicle speed sensors is determined to be excessive, the field element shall provide a safe speed advisory to passing drivers via a driver information system (such as portable messages signs, field to vehicle communications to in-vehicle signing systems, etc.).	Planned
<i>Requirement:</i>	
4 The field element shall base speed advisories to passing drivers on environmental conditions.	Planned
<i>Requirement:</i>	
5 The field element shall monitor notify an enforcement agency when a speed violation is detected.	Planned
<i>Requirement:</i>	
6 The field element shall return operational status for the vehicle speed sensors to the controlling traffic or maintenance center; including measured speeds, warning messages displayed, and violation records.	Existing
<i>Requirement:</i>	
7 The field element shall return operational status for the vehicle speed sensors to the enforcement agency.	Planned
<i>Requirement:</i>	
8 The field element shall return fault data for the vehicle speed sensors to the controlling center for repair.	Existing
<i>Functional Area:</i> Roadway Infrastructure Monitoring	
Sensors that monitor the condition of pavement, bridges, tunnels, associated hardware, and other transportation-related infrastructure (e.g., culverts), under maintenance center and maintenance vehicle control.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Borman TMC Roadside Equipment	
<i>Entity:</i> Roadway	
<i>Functional Area:</i> Roadway Infrastructure Monitoring	
Sensors that monitor the condition of pavement, bridges, tunnels, associated hardware, and other transportation-related infrastructure (e.g., culverts), under maintenance center and maintenance vehicle control.	
<i>Requirement:</i>	
1 The field element shall include infrastructure condition monitoring sensors that monitor the condition of pavement, bridges, tunnels, associated hardware, and other transportation-related infrastructure (e.g., culverts), under maintenance center control.	Planned
<i>Requirement:</i>	
2 The field element shall include infrastructure condition monitoring sensors that monitor the condition of pavement, bridges, tunnels, associated hardware, and other transportation-related infrastructure (e.g., culverts), under maintenance vehicle control.	Planned
<i>Requirement:</i>	
3 The field element shall provide operational status for the infrastructure condition monitoring sensors to the maintenance center.	Planned
<i>Requirement:</i>	
4 The field element shall provide operational status for the infrastructure condition monitoring sensors to the maintenance vehicle.	Planned
<i>Requirement:</i>	
5 The field element shall provide fault data for the infrastructure condition monitoring sensors to the maintenance center for repair.	Planned
<i>Functional Area:</i> Roadway Work Zone Traffic Control	
Field elements in maintenance and construction areas including CCTV cameras, driver information systems (such as DMS), and gates/barriers that monitor and control traffic and provide information directly to drivers in affected areas.	
<i>Requirement:</i>	
1 The field element shall collect, process, and send work zone images to the center for further analysis and distribution, under center control.	Existing
<i>Requirement:</i>	
2 Under traffic and maintenance center control, the field element shall include driver information systems (such as dynamic messages signs and highway advisory radios) that advise drivers of activity around the work zone through which they are currently passing.	Existing
<i>Requirement:</i>	
3 Under the control of field personnel within maintenance vehicles, the field element shall include driver information systems (such as dynamic messages signs and highway advisory radios) that advise drivers of activity around a work zone through which they are currently passing.	Existing
<i>Requirement:</i>	
4 The field element shall control access to the work zone using automated gate or barrier systems. This includes automated flagger assistance devices that include automated gate arms and other automated gate/barrier systems.	Planned
<i>Requirement:</i>	
5 The field element shall provide operational status for the surveillance (e.g. CCTV), driver information systems, and gates/barriers in work zones to the maintenance center.	Existing

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Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Borman TMC Roadside Equipment	
<i>Entity:</i> Roadway	
<i>Functional Area:</i> Roadway Work Zone Traffic Control	
Field elements in maintenance and construction areas including CCTV cameras, driver information systems (such as DMS), and gates/barriers that monitor and control traffic and provide information directly to drivers in affected areas.	
<i>Requirement:</i>	Existing
6 The field element shall provide fault data for the surveillance (e.g. CCTV), driver information systems, and gates/barriers in work zones to the maintenance center for repair.	
<i>Functional Area:</i> Roadway Work Zone Safety	
Work zone intrusion detection devices (to detect vehicle intrusion upon a work zone or crew worker movement across a work zone boundary) and intrusion alerting devices that provide alerts to crew and drivers.	
<i>Requirement:</i>	Planned
1 The field element shall include work zone intrusion detection devices that detect when a vehicle has intruded upon the boundary of a work zone, under center control.	
<i>Requirement:</i>	Planned
2 The field element shall include work zone intrusion detection devices that detect when crew workers have crossed the boundary between the work zone and vehicle traffic, under center control.	
<i>Requirement:</i>	Planned
3 The field element shall include work zone intrusion alerting devices that alert crew workers of a work zone emergency or safety issue such as the intrusion of a vehicle into the work zone area or movement of field crew into the travel lanes.	
<i>Requirement:</i>	Planned
4 The field element shall include work zone intrusion alerting devices that notify crew via maintenance vehicles of a work zone emergency or safety issue such as the intrusion of a vehicle into the work zone area or movement of field crew into the travel lanes.	
<i>Requirement:</i>	Planned
5 The field element shall include work zone intrusion alerting devices that alert drivers that they have intruded upon the perimeter of the work zone, or are about to do so; may provide alerts to drivers directly or via in-vehicle signing.	
<i>Requirement:</i>	Planned
6 The field element shall provide operational status for the work zone intrusion detection devices to the maintenance center.	
<i>Requirement:</i>	Planned
7 The field element shall provide fault data for the work zone intrusion detection devices to the maintenance center for repair.	
<i>Requirement:</i>	Planned
8 The field element shall provide operational status for the work zone intrusion alerting devices to the maintenance center.	
<i>Requirement:</i>	Planned
9 The field element shall provide fault data for the work zone intrusion alerting devices to the maintenance center for repair.	
<i>Functional Area:</i> Roadway Short Range Traveler Information Communications	
Field elements that distribute information to in-vehicle equipment. The information provided may be determined locally or under the control of a center.	
<i>Requirement:</i>	Existing
1 The field element shall distribute traveler information including traffic and road conditions to passing vehicles using short range communications, under center control.	

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Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Borman TMC Roadside Equipment	
<i>Entity:</i> Roadway	
<i>Functional Area:</i> Roadway Short Range Traveler Information Communications	
Field elements that distribute information to in-vehicle equipment. The information provided may be determined locally or under the control of a center.	
<i>Requirement:</i>	Existing
2 The field element shall distribute advisory information, such as evacuation information, wide-area alerts, incident information, work zone intrusion information, and other special information to passing vehicles using short range communications, under center control.	
<i>Requirement:</i>	Planned
3 The field element shall distribute indicator and fixed sign information, including static sign information (e.g., stop, curve warning, guide signs, service signs, and directional signs) and dynamic information (e.g., current signal states and local conditions warnings identified by local environmental sensors) to equipment on-board vehicles under center control.	
<i>Requirement:</i>	Existing
4 The field element shall return system operational status to the controlling center.	
<i>Requirement:</i>	Existing
5 The field element shall return system fault data to the maintenance center for repair.	
<i>Functional Area:</i> Roadway Safety Warning System	
Monitors for potential safety hazards including wrong way drivers, debris on the road, and adverse road conditions (e.g., standing water, icy conditions) and warns approaching vehicles of potential hazards.	
<i>Requirement:</i>	Planned
1 The field element shall collect safety data from passing vehicles including location, vehicle motion (speed, heading, acceleration), vehicle control (brakes, steering, throttle, exterior lights), and additional vehicle status (anti-lock brake activation, stability control activation).	
<i>Requirement:</i>	Planned
2 The field element shall collect data from sensors and surveillance equipment to monitor environmental conditions, stopped or wrong way vehicles, roadway debris, or other potentially hazardous conditions.	
<i>Requirement:</i>	Planned
3 The field element shall process the collected data to identify potential hazards.	
<i>Requirement:</i>	Planned
4 The field element shall provide warnings to passing vehicles using field-vehicle communications.	
<i>Requirement:</i>	Planned
5 The field element shall support remote monitoring and control by an authenticated center.	
<i>Functional Area:</i> Roadway Data Collection	
Field elements to collect traffic, road, and environmental conditions information for use in transportation planning, research, and other off-line applications. Includes the sensors, supporting roadside infrastructure, and communications equipment.	
<i>Requirement:</i>	Existing
1 The field element shall collect traffic, road, and environmental conditions information.	
<i>Requirement:</i>	Existing
2 The field element shall include the sensors and supporting roadside devices that sense, collect, and send traffic, road, and environmental conditions information to a center for archival.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Borman TMC Roadside Equipment	
<i>Entity:</i> Roadway	
<i>Functional Area:</i> Roadway Data Collection	
Field elements to collect traffic, road, and environmental conditions information for use in transportation planning, research, and other off-line applications. Includes the sensors, supporting roadside infrastructure, and communications equipment.	
<i>Requirement:</i>	
3 The field element shall collect sensor status and sensor faults from roadside equipment and send it along with the recorded data to a center for archival.	Existing
<hr/>	
<i>Element:</i> City of Gary 311 Center	
<i>Entity:</i> Emergency Management	
<i>Functional Area:</i> Service Patrol Management	
Dispatch and communication with roadway service patrol vehicles that monitor roads to aid motorists, offering rapid response to minor incidents.	
<i>Requirement:</i>	
1 The center shall dispatch roadway service patrol vehicles to identified incident locations.	Existing
<i>Requirement:</i>	
2 The center shall store the current status of all service patrol vehicles available for dispatch and those that have been dispatched.	Planned
<i>Requirement:</i>	
3 The center shall share incident information collected by the service patrol with traffic, maintenance and construction, and traveler information centers for incident management, incident notification to travelers, and incident cleanup.	Planned
<i>Requirement:</i>	
4 The center shall track the location and status of service patrol vehicles.	Planned
<hr/>	
<i>Functional Area:</i> Emergency Data Collection	
Collection and storage of information related to Emergency Management. For use by operations personnel or data archives in the region.	
<i>Requirement:</i>	
1 The center shall collect emergency service data, emergency vehicle management data, emergency vehicle data, sensor and surveillance data, threat data, and incident data.	Planned
<i>Requirement:</i>	
2 The center shall assign quality control metrics and meta-data to be stored along with the data. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.	Planned
<i>Requirement:</i>	
3 The center shall receive and respond to requests from ITS Archives for either a catalog of the emergency management data or for the data itself.	Planned
<i>Requirement:</i>	
4 The center shall be able to produce sample products of the data available.	Planned
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<i>Element:</i> City of Gary Traffic Division	
<i>Entity:</i> Parking Management	
<i>Functional Area:</i> Parking Management	
Monitor vehicles and current parking availability within parking facilities. Use driver information systems (e.g., DMS) to provide parking availability and other parking facility information to drivers. Support local traffic control coordination around the parking facility.	

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Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: City of Gary Traffic Division</i>	
<i>Entity: Parking Management</i>	
<i>Functional Area: Parking Management</i>	
Monitor vehicles and current parking availability within parking facilities. Use driver information systems (e.g., DMS) to provide parking availability and other parking facility information to drivers. Support local traffic control coordination around the parking facility.	
<i>Requirement:</i>	Existing
1 The parking element shall maintain parking lot information including static information such as hours of operation, rates, location, entrance locations, capacity, type, and constraints; as well as dynamic information such as current state of the lot, occupancy, arrival rates, and departure rates.	
<i>Requirement:</i>	Potential
2 The parking element shall share information with a traffic management center to identify queues at entrances, exits that should be used, and other information that supports coordinated local traffic control in and around the parking facility.	
<i>Requirement:</i>	Potential
3 The parking element shall manage local dynamic message signs that display messages to travelers such as the parking lot state, number of spaces available, location of entrances, and current charges.	
<i>Requirement:</i>	Planned
4 The parking element shall provide the capability to detect, count, and classify vehicles at entrances, exits, and designated locations within a parking facility.	
<i>Functional Area: Parking Electronic Payment</i>	
Parking payment collection using in-vehicle equipment (tags) or contact or proximity traveler cards used for electronic payment. Includes field elements and back-office functionality.	
<i>Requirement:</i>	Planned
1 The parking element shall detect and classify vehicles entering and exiting a parking facility (vehicle size, type, identifiable features, etc.).	
<i>Requirement:</i>	Existing
2 The parking element shall read data from the traveler card / payment instrument carried on-board the vehicle or by the traveler.	
<i>Requirement:</i>	Existing
3 The parking element shall provide an interface to the driver informing them of the success or failure of the financial transaction. This may involve a request for the driver to pull aside so the operator can resolve an issue.	
<i>Requirement:</i>	Planned
4 The parking element shall collect data on payment violations and send the data, including images of the violator and the vehicle registration data obtained from the Department of Motor Vehicles (DMV) office, to the appropriate enforcement agency.	
<i>Requirement:</i>	Existing
5 The parking element shall manage the parking lot charges, considering such factors as location, vehicle types, and times of day.	
<i>Requirement:</i>	Existing
6 The parking element shall process the financial requests and manage an interface to a Financial Institution.	
<i>Requirement:</i>	Existing
7 The parking element shall support the payment of parking lot transactions using data provided by the traveler cards / payment instruments.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: City of Gary Traffic Division</i>	
<i>Entity: Parking Management</i>	
<i>Functional Area: Parking Electronic Payment</i>	
Parking payment collection using in-vehicle equipment (tags) or contact or proximity traveler cards used for electronic payment. Includes field elements and back-office functionality.	
<i>Requirement:</i> 8 The parking element shall process requests for parking lot charges to be paid in advance.	Existing
<i>Requirement:</i> 10 The parking element shall maintain a list of invalid traveler credit identities.	Planned
<i>Functional Area: Parking Data Collection</i>	
Collection and storage of parking management information. For use by operations personnel or data archives in the region.	
<i>Requirement:</i> 1 The parking element shall collect parking management data including lot usage and charging information.	Planned
<i>Requirement:</i> 2 The parking element shall assign quality control metrics and meta-data to be stored along with the data. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.	Planned
<i>Requirement:</i> 3 The parking element shall receive and respond to requests from ITS Archives for either a catalog of the parking management data or for the data itself.	Planned
<i>Requirement:</i> 4 The parking element shall be able to produce sample products of the data available.	Planned
<i>Element: City of Hammond 311 Center</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Service Patrol Management</i>	
Dispatch and communication with roadway service patrol vehicles that monitor roads to aid motorists, offering rapid response to minor incidents.	
<i>Requirement:</i> 1 The center shall dispatch roadway service patrol vehicles to identified incident locations.	Existing
<i>Requirement:</i> 2 The center shall store the current status of all service patrol vehicles available for dispatch and those that have been dispatched.	Planned
<i>Requirement:</i> 3 The center shall share incident information collected by the service patrol with traffic, maintenance and construction, and traveler information centers for incident management, incident notification to travelers, and incident cleanup.	Planned
<i>Requirement:</i> 4 The center shall track the location and status of service patrol vehicles.	Planned
<i>Functional Area: Emergency Data Collection</i>	
Collection and storage of information related to Emergency Management. For use by operations personnel or data archives in the region.	
<i>Requirement:</i> 1 The center shall collect emergency service data, emergency vehicle management data, emergency vehicle data, sensor and surveillance data, threat data, and incident data.	Planned

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: City of Hammond 311 Center</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Emergency Data Collection</i>	
Collection and storage of information related to Emergency Management. For use by operations personnel or data archives in the region.	
<i>Requirement:</i>	
2 The center shall assign quality control metrics and meta-data to be stored along with the data. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.	Planned
<i>Requirement:</i>	
3 The center shall receive and respond to requests from ITS Archives for either a catalog of the emergency management data or for the data itself.	Planned
<i>Requirement:</i>	
4 The center shall be able to produce sample products of the data available.	Planned
<i>Element: Commercial Vehicle Weigh Stations</i>	
<i>Entity: Commercial Vehicle Check</i>	
<i>Functional Area: Roadside Electronic Screening</i>	
Roadside check facility equipment to communicate with commercial vehicles at mainline speeds - reading tag data, identification, weight and vehicle characteristics, and credential checking. Determines whether a pull-in message should be generated, allowing for inspectors to override.	
<i>Requirement:</i>	
1 The roadside check facility equipment shall detect the presence of commercial vehicles and freight equipment approaching a facility. Sensors can differentiate between different types of vehicles and determine the number of axles, gross vehicle weight, and the identification of the vehicle and its cargo.	Existing
<i>Requirement:</i>	
2 The roadside check facility equipment shall receive the credential and credentials status information (e.g. snapshots) from the commercial vehicle administration center to maintain an up to date list of which vehicles have been cleared (enrolled) to potentially pass through without stopping.	Existing
<i>Requirement:</i>	
3 The roadside check facility equipment shall receive commercial vehicle violation records and carriers, vehicles, and drivers of interest from appropriate law enforcement agencies.	Existing
<i>Requirement:</i>	
4 The roadside check facility equipment shall provide an interface to inspectors in the field to allow them to monitor and if necessary override the pull-in decisions made by the system.	Existing
<i>Requirement:</i>	
5 The roadside check facility equipment shall request and input electronic screening data from the commercial vehicle's electronic tag data.	Existing
<i>Requirement:</i>	
6 The roadside check facility equipment shall collect safety data from the commercial vehicle and its freight equipment.	Planned
<i>Requirement:</i>	
7 The roadside check facility equipment shall send a pass/pull-in notification to the commercial vehicle and its driver based on the information received from the vehicle, the administration center, enforcement agencies, and the inspector. The message may be sent to the on-board equipment in the commercial vehicle or transmitted to the driver using equipment such as dynamic message signs, red-green lights, flashing signs, etc.	Planned

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Commercial Vehicle Weigh Stations	
<i>Entity:</i> Commercial Vehicle Check	
<i>Functional Area:</i> Roadside Electronic Screening	
Roadside check facility equipment to communicate with commercial vehicles at mainline speeds - reading tag data, identification, weight and vehicle characteristics, and credential checking. Determines whether a pull-in message should be generated, allowing for inspectors to override.	
<i>Requirement:</i>	
8 The roadside check facility equipment shall verify that pull-in requests are heeded by drivers, notifying the facility operator if a vehicle fails to pull in as requested.	Planned
<i>Requirement:</i>	
9 The roadside check facility equipment shall monitor alerting and advisory systems for security alerts and advisories.	Existing
<i>Requirement:</i>	
10 The roadside check facility equipment shall send a record of daily activities at the facility including summaries of screening events and inspections to the commercial vehicle administration center.	Existing
<i>Functional Area:</i> Roadside WIM	
Roadside check facility equipment to detect and measure the weight commercial vehicles at high speed. Can include an interface to the credential checking or it can be a stand alone package with display.	
<i>Requirement:</i>	
1 The roadside check facility equipment shall detect the presence of commercial vehicles and freight equipment approaching a facility. Sensors can differentiate between different types of vehicles and determine the number of axles, gross vehicle weight, weight per axle, and the identification of the vehicle and its cargo.	Planned
<i>Requirement:</i>	
2 The roadside check facility equipment shall request and input electronic screening data from the commercial vehicle's electronic tag data.	Planned
<i>Requirement:</i>	
3 The roadside check facility equipment shall send a pass/pull-in notification to the commercial vehicle and its driver based on the information received from the vehicle and the measurements taken. The message may be sent to the on-board equipment in the commercial vehicle or transmitted to the driver using equipment such as dynamic message signs, red-green lights, flashing signs, etc.	Planned
<i>Functional Area:</i> Roadside Safety and Security Inspection	
Roadside check facility equipment to provide the capabilities to automate the roadside safety inspection process including wireless roadside inspections and use of hand held devices to rapidly inspect the vehicle and driver.	
<i>Requirement:</i>	
1 The roadside check facility equipment shall receive information concerning commercial vehicles and freight equipment approaching a facility that are being pulled in for safety and security inspections.	Existing
<i>Requirement:</i>	
2 The roadside check facility equipment shall receive the safety and security inspection and status information from the commercial vehicle administration center to include information such as safety ratings, inspection summaries, and violation summaries. Corresponds to the safety portion of CVISN "snapshots."	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Commercial Vehicle Weigh Stations	
<i>Entity:</i> Commercial Vehicle Check	
<i>Functional Area:</i> Roadside Safety and Security Inspection	
Roadside check facility equipment to provide the capabilities to automate the roadside safety inspection process including wireless roadside inspections and use of hand held devices to rapidly inspect the vehicle and driver.	
<i>Requirement:</i>	
3 The roadside check facility equipment shall provide an interface to inspectors in the field to allow them to safety inspection data including overrides to the pull-in decisions made by the system.	Planned
<i>Requirement:</i>	
4 The roadside check facility equipment shall request and input electronic safety data from the commercial vehicle's electronic tag data. This includes driver logs, on-board safety data, safety inspection records, commercial vehicle breach information, as well as freight equipment information.	Planned
<i>Requirement:</i>	
5 The roadside check facility equipment shall send a pass/pull-in notification to the commercial vehicle and its driver based on the information received from the vehicle, the administration center, and the inspector. The message may be sent to the on-board equipment in the commercial vehicle or transmitted to the driver using equipment such as dynamic message signs, red-green lights, flashing signs, etc.	Planned
<i>Requirement:</i>	
6 The roadside check facility equipment shall receive information about a breach or tamper event on a commercial vehicle or its attached freight equipment which includes identity, type of breach, location, and time.	Planned
<i>Requirement:</i>	
7 The roadside check facility equipment shall receive driver records, accident reports, and citation records from the commercial vehicle administration center to support driver identification and access to driver credentials and history information.	Existing
<i>Requirement:</i>	
8 The roadside check facility equipment shall read expected driver identity characteristics (e.g., PIN codes and biometric data) from the commercial vehicle equipment to support safety and security checking.	Planned
<i>Requirement:</i>	
9 The roadside check facility equipment shall read the driver identification card provided by the commercial vehicle driver and support cross-check of the identification data with driver records.	Existing
<i>Requirement:</i>	
10 The roadside check facility equipment shall forward results of the roadside safety inspections to the commercial vehicle administration center.	Existing
<i>Requirement:</i>	
11 The roadside check facility equipment shall support wireless roadside inspections that are conducted remotely, forwarding data provided by the commercial vehicle via Field-Vehicle communications to the center that performs the safety assessment.	Planned
<i>Functional Area:</i> Citation and Accident Electronic Recording	
Roadside check facility equipment records results of roadside inspections and forwards information to the commercial vehicle administration center. Includes accident reports, violations, citations, and the daily site activity data.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Commercial Vehicle Weigh Stations	
<i>Entity:</i> Commercial Vehicle Check	
<i>Functional Area:</i> Citation and Accident Electronic Recording	
Roadside check facility equipment records results of roadside inspections and forwards information to the commercial vehicle administration center. Includes accident reports, violations, citations, and the daily site activity data.	
<i>Requirement:</i>	Existing
1 The roadside check facility equipment shall record the results of roadside inspections carried using an inspector's hand held terminal interface.	
<i>Requirement:</i>	Existing
2 The roadside check facility equipment shall provide an interface for an inspector to add comments to the inspection results.	
<i>Requirement:</i>	Existing
3 The roadside check facility equipment shall forward results of the roadside inspections to the commercial vehicle administration center either as needed or on a periodic basis. These reports include accident reports, violation notifications, citations, and daily site activity logs.	
<i>Requirement:</i>	Existing
4 The roadside check facility equipment shall receive driver records from the commercial vehicle administration center to support driver identification and collection of driver credentials and history information.	
<i>Requirement:</i>	Planned
5 The roadside check facility equipment shall collect safety data from the commercial vehicle and its freight equipment to help characterize the circumstances surrounding an accident.	
<i>Requirement:</i>	Existing
6 The roadside check facility equipment shall read the driver identification card provided by the commercial vehicle driver and support cross-check of the identification data with driver records.	
<i>Functional Area:</i> Roadside HAZMAT Detection	
Roadside check facility equipment to detect and identify commercial vehicles carrying hazardous materials. Compare data with registered credentials and determines whether a pull-in message should be generated - notify emergency management if a problem occurs.	
<i>Requirement:</i>	Existing
1 The roadside check facility equipment shall detect the presence of commercial vehicles and freight equipment approaching a facility. Sensors can differentiate between different types of vehicles and determine the number of axles, gross vehicle weight, presence of security sensitive hazardous materials, and the identification of the vehicle and its cargo.	
<i>Requirement:</i>	Existing
2 The roadside check facility equipment shall detect the presence of security sensitive substance, e.g. detection of radiation or ammonia compounds, carried on-board commercial vehicles and freight equipment approaching a facility. This data is acquired by roadside sensors from the freight equipment electronically, optically, or manually.	
<i>Requirement:</i>	Existing
3 The roadside check facility equipment shall receive the credential information (e.g. snapshots) from the commercial vehicle administration center to maintain an up to date list of which vehicles with hazardous materials shipments have been cleared (enrolled).	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Commercial Vehicle Weigh Stations</i>	
<i>Entity: Commercial Vehicle Check</i>	
<i>Functional Area: Roadside HAZMAT Detection</i>	
Roadside check facility equipment to detect and identify commercial vehicles carrying hazardous materials. Compare data with registered credentials and determines whether a pull-in message should be generated - notify emergency management if a problem occurs.	
<i>Requirement:</i>	
4 The roadside check facility equipment shall send a pass/pull-in notification to the commercial vehicle and its driver based on the hazmat information received from the vehicle, the freight equipment, or the administration center. The message may be sent to the on-board equipment in the commercial vehicle or transmitted to the driver using equipment such as dynamic message signs, red-green lights, flashing signs, etc.	Planned
<i>Requirement:</i>	
5 The roadside check facility equipment shall raise and forward an alarm to the appropriate emergency management center if the hazmat-carrying commercial vehicle does not stop, or in the case of a positive identification of an unpermitted security sensitive hazmat cargo, to coordinate a traffic stop or some other action with respect to the offending commercial vehicle. The alarm will include information concerning the security sensitive hazmat detected at the roadside including the location, appropriate identifiers, route deviation, or assignment mismatches between the driver, commercial vehicle, or the freight equipment.	Existing
<i>Element: Commercial Vehicles</i>	
<i>Entity: Commercial Vehicle</i>	
<i>Functional Area: On-board Trip Monitoring</i>	
On-board systems to provide automatic vehicle location and automated mileage and fuel reporting and auditing. In addition, monitors the planned route and notifies the fleet and freight management center of any deviations.	
<i>Requirement:</i>	
1 The commercial vehicle shall compute the location of the commercial vehicle and its freight equipment based on inputs from commercial vehicle measures (e.g. identity, distance traveled, etc.) and a positioning system.	Existing
<i>Requirement:</i>	
2 The commercial vehicle shall provide details of the route input from the commercial vehicle fleet management center.	Existing
<i>Requirement:</i>	
3 The commercial vehicle shall provide warnings to the driver and the commercial vehicle fleet management center when the vehicle's location has deviated from its planned route.	Existing
<i>Requirement:</i>	
4 The commercial vehicle shall maintain the driver's daily log, vehicle location, mileage, and trip activity (includes screening, inspection and border clearance event data as well as fare payments) and distribute it to the driver and to the commercial vehicle fleet management center upon request.	Existing
<i>Requirement:</i>	
5 The commercial vehicle shall provide on-board vehicle data to the commercial vehicle fleet management center upon request - includes location, credentials, driver license citations, fuel purchase data, identity details, inspection data, log data, service records, safety systems diagnostics, and freight equipment data.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Commercial Vehicles</i>	
<i>Entity: Commercial Vehicle</i>	
<i>Functional Area: On-board Trip Monitoring</i>	
On-board systems to provide automatic vehicle location and automated mileage and fuel reporting and auditing. In addition, monitors the planned route and notifies the fleet and freight management center of any deviations.	
<i>Requirement:</i>	Existing
6 The commercial vehicle shall maintain the interface between the vehicle, its driver, and the commercial vehicle fleet management center for dispatch, routing, and special instructions as well as payment, and enrollment information.	
<i>Functional Area: On-board Cargo Monitoring</i>	
On-board systems monitoring the location and status of the commercial vehicle and its cargo. Sends the data on to appropriate centers and roadside facilities, including emergency management in the case of HAZMAT incidents.	
<i>Requirement:</i>	Existing
1 The commercial vehicle shall compute the location of the commercial vehicle and its freight equipment.	
<i>Requirement:</i>	Existing
2 The commercial vehicle shall monitor on-board systems and record measures such as weight, vehicle security status, vehicle safety status, vehicle identity, driver status, driver safety status, distance traveled, and brake condition.	
<i>Requirement:</i>	Existing
3 The commercial vehicle shall monitor information concerning the freight equipment including cargo type, HAZMAT designation (if any) for the cargo, cargo weight, the type of container in which the cargo is held, safety condition of the cargo, etc.	
<i>Requirement:</i>	Existing
4 The commercial vehicle shall forward information concerning the freight equipment on to its fleet and freight management center as well as the roadside check facility.	
<i>Requirement:</i>	Existing
5 The commercial vehicle shall send notification of a hazmat spill to appropriate emergency management center in case of an incident including the information from cargo sensors, vehicle location, and the carrier identification.	
<i>Functional Area: On-board CV Electronic Data</i>	
On-board systems exchanging information between the vehicle and the roadside facility with the information such as status of driver, vehicle, carrier IDs and cargo information identified via an electronic tag.	
<i>Requirement:</i>	Planned
1 The commercial vehicle shall receive pass/pull-in messages from the roadside check facilities and present them to the driver in either audible or visual forms.	
<i>Requirement:</i>	Existing
2 The commercial vehicle shall respond to requests to provide data accumulated on-board the vehicle to roadside check facilities for inspection including driver logs, electronic identifiers, credentials, border clearance data, and other screening data such as cargo status, hazmat identifiers, out of service status, vehicle axle weight, vehicle weight, and time.	
<i>Requirement:</i>	Existing
3 The commercial vehicle shall respond to requests to provide the identity, status and other information from the electronic cargo lock tag, if so equipped, to roadside check facilities, including border crossings.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Commercial Vehicles</i>	
<i>Entity: Commercial Vehicle</i>	
<i>Functional Area: On-board CV Electronic Data</i>	
On-board systems exchanging information between the vehicle and the roadside facility with the information such as status of driver, vehicle, carrier IDs and cargo information identified via an electronic tag.	
<i>Requirement:</i>	Existing
4 The commercial vehicle shall support an interface to a commercial vehicle driver that is also acting in the role of a commercial vehicle fleet manager to set up routes, pay necessary taxes, obtain proper credentials, and write the identifiers to the electronic tag for the driver, vehicle, and carrier.	
<i>Functional Area: On-board CV Safety and Security</i>	
On-board systems collect and process on-board vehicle and driver safety and security information; exchanging information with roadside and remote facilities at mainline speeds and while stopped for inspections.	
<i>Requirement:</i>	Planned
1 The commercial vehicle shall receive pass/pull-in messages from the roadside check facilities and present them to the driver in either audible or visual forms.	
<i>Requirement:</i>	Existing
2 The commercial vehicle shall respond to requests to provide on-board safety inspection data to roadside check facilities including vehicle identification, driver logs, and characteristics data for initiating safety and security checking. Results of the inspection are read back into the on-board equipment.	
<i>Requirement:</i>	Planned
3 The commercial vehicle shall monitor on-board systems pertaining to the safety and security of the vehicle, its driver, and its cargo/freight equipment; and provide the information to the driver, roadside check facilities, and commercial fleet management centers.	
<i>Requirement:</i>	Planned
4 The commercial vehicle shall provide interface with the driver to be presented with and respond to alerts, either visual or audible, concerning the safety and security of the vehicle and its cargo. Alerts and messages specific to commercial vehicles include trucks not advised on a route, trucks over 10 tons not allowed on bridge, route details, detected route deviations and warning indications detected by on-board sensors (e.g., safety) and freight equipment sensors (e.g., breach, cargo).	
<i>Requirement:</i>	Planned
5 The commercial vehicle shall provide information concerning a breach or tamper event on a commercial vehicle or its attached freight equipment to roadside check facilities and to the commercial fleet management center, the information includes identity, type of breach, location, and time.	
<i>Requirement:</i>	Planned
6 The commercial vehicle shall provide expected driver identity characteristics (e.g., PIN codes and biometric data) to roadside check facilities to support safety and security checking.	
<i>Requirement:</i>	Planned
7 The commercial vehicle shall provide information about previous attempts to disable the commercial vehicle to roadside check facilities.	
<i>Requirement:</i>	Planned
8 The commercial vehicle shall provide safety information at predetermined trigger areas using wireless communications.	
<i>Functional Area: On-board Driver Authentication</i>	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Commercial Vehicles</i>	
<i>Entity: Commercial Vehicle</i>	
<i>Functional Area: On-board Driver Authentication</i>	
On-board systems to identify and authenticate commercial vehicle drivers based on inputs from the controlling center. Supports ability to safely disable the vehicle if an unauthorized access is detected.	
<i>Requirement:</i>	1 The commercial vehicle shall receive and store driver assignments and associated driver identity characteristic keys from the commercial vehicle fleet management center. Existing
<i>Requirement:</i>	2 The commercial vehicle shall detect when an unauthorized commercial vehicle driver attempts to drive their vehicle based on stored driver identity information; passing the information on to the commercial vehicle fleet management center. Existing
<i>Requirement:</i>	3 The commercial vehicle shall activate commands to safely disable the commercial vehicle when an unauthorized driver is detected; either in a stand-alone fashion or in response to inputs from the commercial vehicle fleet management center. Planned
<i>Element: ECT Agency Management</i>	
<i>Entity: Transit Management</i>	
<i>Functional Area: Transit Center Connection Protection</i>	
Manages the coordination of transit transfers between routes, including routes on different modes. Also supports the capability for travelers to obtain connection protection throughout a trip.	
<i>Requirement:</i>	1 The center shall manage service requests for routing of an individual through the transit system. Existing
<i>Requirement:</i>	2 The center shall provide transit plans for both fixed and demand responsive transit to transit passengers. Existing
<i>Requirement:</i>	3 The center shall be able to coordinate with Other Transit Management systems or Multimodal Transportation Service Providers in order to provide a complete multimodal trip plan. Planned
<i>Requirement:</i>	4 The center shall track the passenger through the transit network, and coordinate with Other TRM and Multimodal Transportation Service Providers so that the passenger makes efficient connections between the transit system and other transit systems or other modes of transportation. Planned
<i>Functional Area: Transit Center Vehicle Tracking</i>	
Monitoring transit vehicle locations via interactions with on-board systems. Furnish users with real-time transit schedule information and maintain interface with digital map providers.	
<i>Requirement:</i>	1 The center shall monitor the locations of all transit vehicles within its network. Existing
<i>Requirement:</i>	2 The center shall determine adherence of transit vehicles to their assigned schedule. Existing
<i>Requirement:</i>	3 The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for transit tracking and dispatch. Existing
<i>Requirement:</i>	4 The center shall provide transit operational data to traveler information service providers. Planned

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: ECT Agency Management</i>	
<i>Entity: Transit Management</i>	
<i>Functional Area: Transit Center Vehicle Tracking</i>	
Monitoring transit vehicle locations via interactions with on-board systems. Furnish users with real-time transit schedule information and maintain interface with digital map providers.	
<i>Requirement:</i> 5 The center shall provide collected transit probe data to traffic management centers and traveler information service providers for use in measuring current traffic conditions.	Existing
<i>Functional Area: Transit Center Fixed-Route Operations</i>	
Management of fixed route transit operations. Planning, scheduling, and dispatch associated with fixed and flexible route transit services. Updates customer service operator systems, and provides current vehicle schedule adherence and optimum scenarios for schedule adjustment.	
<i>Requirement:</i> 1 The center shall generate transit routes and schedules based on such factors as parameters input by the system operator, road network conditions, incident information, operational data on current routes and schedules, and digitized map data.	Existing
<i>Requirement:</i> 2 The center shall provide the interface to the system operator to control the generation of new routes and schedules (transit services) including the ability to review and update the parameters used by the routes and schedules generation processes and to initiate these processes	Existing
<i>Requirement:</i> 3 The center shall be able to generate special routes and schedules to support an incident, disaster, evacuation, or other emergency.	Existing
<i>Requirement:</i> 4 The center shall dispatch fixed route or flexible route transit vehicles	Existing
<i>Requirement:</i> 5 The center shall collect transit operational data for use in the generation of routes and schedules.	Existing
<i>Requirement:</i> 6 The center shall provide instructions or corrective actions to the transit vehicle operators based upon operational needs.	Existing
<i>Requirement:</i> 7 The center shall manage large deviations of individual transit vehicles, deviations in rural areas, and deviations of large numbers of vehicles.	Existing
<i>Requirement:</i> 8 The center shall 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.	Existing
<i>Requirement:</i> 9 The center shall exchange information with Maintenance and Construction Operations concerning work zones, roadway conditions, asset restrictions, work plans, etc.	Existing
<i>Requirement:</i> 10 The center shall disseminate up-to-date schedules and route information to other centers for fixed and flexible route services.	Existing
<i>Requirement:</i> 11 The center shall provide an interface to the archive data repository to enable the operator to retrieve historical operating data for use in planning transit routes and schedules.	Existing
<i>Functional Area: Transit Center Paratransit Operations</i>	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> ECT Agency Management	
<i>Entity:</i> Transit Management	
<i>Functional Area:</i> Transit Center Paratransit Operations	
Management of demand response transit services, including paratransit. Planning and scheduling of these services. Supports automated vehicle dispatch and automatically updates customer service operator systems.	
<i>Requirement:</i>	Existing
1 The center shall process trip requests for demand responsive transit services, i.e. paratransit. Sources of the requests may include traveler information service providers.	
<i>Requirement:</i>	Existing
2 The center shall monitor the operational status of the demand response vehicles including status of passenger pick-up and drop-off.	
<i>Requirement:</i>	Existing
3 The center shall generate demand response transit (including paratransit) routes and schedules based on such factors as parameters input by the system operator, what other demand responsive transit schedules have been planned, the availability and location of vehicles, the relevance of any fixed transit routes and schedules, road network information, and incident information.	
<i>Requirement:</i>	Existing
4 The center shall dispatch demand response (paratransit) transit vehicles.	
<i>Requirement:</i>	Existing
5 The center shall exchange information with Maintenance and Construction Operations concerning work zones, roadway conditions, asset restrictions, work plans, etc.	
<i>Requirement:</i>	Existing
6 The center shall disseminate up-to-date schedules and route information to other centers for demand responsive transit services (paratransit).	
<i>Requirement:</i>	Existing
7 The center shall collect the log of passenger boardings and alightings from the paratransit vehicles.	
<i>Functional Area:</i> Transit Center Passenger Counting	
Receives and processes transit vehicle loading data using two-way communications from equipped transit vehicles.	
<i>Requirement:</i>	Potential
1 The center shall collect passenger count information from each transit vehicle.	
<i>Requirement:</i>	Potential
2 The center shall calculate transit ridership data by route, route segment, transit stop, time of day, and day of week based on the collected passenger count information.	
<i>Requirement:</i>	Potential
3 The center shall make the compiled ridership data available to the system operator and other applications.	
<i>Functional Area:</i> Transit Center Security	
Monitor transit vehicle operator or traveler activated alarms; authenticate transit vehicle operators; remotely disable a transit vehicle; alert operators, travelers, and police to potential incidents identified by these security features.	
<i>Requirement:</i>	Existing
1 The center shall monitor transit vehicle operational data to determine if the transit vehicle is off-route and assess whether a security incident is occurring.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: ECT Agency Management</i>	
<i>Entity: Transit Management</i>	
<i>Functional Area: Transit Center Security</i>	
Monitor transit vehicle operator or traveler activated alarms; authenticate transit vehicle operators; remotely disable a transit vehicle; alert operators, travelers, and police to potential incidents identified by these security features.	
<i>Requirement:</i> 2 The center shall receive reports of emergencies on-board transit vehicles entered directly by the transit vehicle operator or from a traveler through interfaces such as panic buttons or alarm switches.	Existing
<i>Requirement:</i> 3 The center shall support the back-office portion of functionality to authenticate transit vehicle operators.	Potential
<i>Requirement:</i> 4 The center shall exchange transit incident information along with other service data with other transit agencies.	Existing
<i>Requirement:</i> 5 The center shall receive information pertaining to a wide-area alert such as weather alerts, disaster situations, or child abductions. This information may come from Emergency Management or from other Alerting and Advisory Systems.	Existing
<i>Requirement:</i> 6 The center shall send wide-area alert information to travelers (on-board transit vehicles or at stations/stops) and transit vehicle operators.	Planned
<i>Requirement:</i> 7 The center shall coordinate the response to security incidents involving transit with other agencies including Emergency Management, other transit agencies, media, traffic management, and traveler information service providers.	Existing
<i>Requirement:</i> 8 The center shall receive threat information and status on the integrity of the transit infrastructure.	Existing
<i>Requirement:</i> 9 The center shall provide support to remotely disable (or reset the disabling of) a transit vehicle in service.	Potential
<i>Functional Area: Transit Vehicle Operator Assignment</i>	
Assignment of transit operators to runs in a fair manner while minimizing labor and overtime services, considering operator preferences, qualifications, accumulated work hours, and other information about each operator.	
<i>Requirement:</i> 1 The center shall 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.	Existing
<i>Requirement:</i> 2 The center shall assess the transit vehicle operator's availability based on previous work assignments, accumulated hours, plus health and vacation commitments.	Existing
<i>Requirement:</i> 3 The center shall assign transit vehicle operators to transit schedules based on their eligibility, route preferences, seniority, and transit vehicle availability.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: ECT Agency Management</i>	
<i>Entity: Transit Management</i>	
<i>Functional Area: Transit Vehicle Operator Assignment</i>	
Assignment of transit operators to runs in a fair manner while minimizing labor and overtime services, considering operator preferences, qualifications, accumulated work hours, and other information about each operator.	
<i>Requirement:</i>	Existing
4 The center shall provide an interface through which the transit vehicle operator information can be maintained - either from the transit vehicle operator, center personnel, or other functions.	
<i>Requirement:</i>	Existing
5 The center shall generate supplemental vehicle operator assignments as required due to change events that occur during the operating day.	
<i>Functional Area: Transit Garage Maintenance</i>	
Collect operational and maintenance data from transit vehicles, manage vehicle service histories, automatically generate preventative maintenance schedules, and provide information to service personnel.	
<i>Requirement:</i>	Existing
2 The center shall monitor the condition of a transit vehicle to analyze brake, drive train, sensors, fuel, steering, tire, processor, communications equipment, and transit vehicle mileage to identify mileage based maintenance, out-of-specification or imminent failure conditions.	
<i>Requirement:</i>	Planned
3 The center shall generate transit vehicle maintenance schedules that identify the maintenance or repair to be performed and when the work is to be done.	
<i>Requirement:</i>	Planned
4 The center shall generate transit vehicle availability listings, current and forecast, to support transit vehicle assignment planning based, in part, on the transit vehicle maintenance schedule.	
<i>Requirement:</i>	Existing
5 The center shall assign technicians to a transit vehicle maintenance schedule, based upon such factors as personnel eligibility, work assignments, preferences and seniority.	
<i>Requirement:</i>	Planned
6 The center shall verify that the transit vehicle maintenance activities were performed correctly, using the transit vehicle's status, the maintenance personnel's work assignment, and the transit maintenance schedules.	
<i>Requirement:</i>	Planned
7 The center shall generate a time-stamped maintenance log of all maintenance activities performed on a transit vehicle.	
<i>Functional Area: Transit Vehicle Assignment</i>	
Assigns individual transit vehicles to vehicle blocks and downloads this information to the transit vehicle, updating assignments as necessitated by changes. It also provides an inventory management function that stores attributes about each of the transit vehicles.	
<i>Requirement:</i>	Existing
1 The center shall assign individual transit vehicles to transit blocks.	
<i>Requirement:</i>	Existing
3 The center shall provide an exception handling process for the vehicle assignment function. This process shall generate new supplemental vehicle assignments as required due to change events which occur during the operating day.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: ECT Agency Management</i>	
<i>Entity: Transit Management</i>	
<i>Functional Area: Transit Vehicle Assignment</i>	
Assigns individual transit vehicles to vehicle blocks and downloads this information to the transit vehicle, updating assignments as necessitated by changes. It also provides an inventory management function that stores attributes about each of the transit vehicles.	
<i>Requirement:</i> 5 The center shall generate transit vehicle availability listings, current and forecast, to support transit vehicle assignment planning.	Planned
<i>Requirement:</i> 6 The center shall provide transit operations personnel with the capability to update transit vehicle assignments and receive reports on transit vehicle inventory status.	Planned
<i>Functional Area: Transit Center Information Services</i>	
Provide interactive traveler information to travelers (on-board transit vehicles, at stops/stations, using personal devices), traveler information service providers, media, and other transit organizations. Includes routes, schedules, transfer options, fares, real-time schedule adherence, current incidents, weather conditions, yellow pages, and special events.	
<i>Requirement:</i> 1 The center shall provide travelers using public transportation with traffic and advisory information upon request. Such information may include transit routes, schedules, transfer options, fares, real-time schedule adherence, current incidents, weather conditions, and special events.	Existing
<i>Requirement:</i> 2 The center shall provide transit information to the media including details of deviations from schedule of regular transit services.	Existing
<i>Requirement:</i> 3 The center shall exchange transit schedules, real-time arrival information, fare schedules, and general transit service information with other transit organizations to support transit traveler information systems.	Planned
<i>Requirement:</i> 4 The center shall provide transit service information to traveler information service providers including routes, schedules, schedule adherence, and fare information as well as transit service information during evacuation.	Planned
<i>Requirement:</i> 6 The center shall broadcast transit advisory data, including alerts and advisories pertaining to major emergencies, or man made disasters.	Existing
<i>Functional Area: Transit Environmental Monitoring</i>	
Current and forecast road and weather information assimilated from weather service providers and vehicle probes. The information is monitored and forwarded to other agencies to more effectively manage transit operations.	
<i>Requirement:</i> 1 The center shall assimilate current and forecast road conditions and surface weather information to more effectively manage transit operations.	Existing
<i>Requirement:</i> 2 The center shall collect current and forecast road and weather information from weather service providers and roadway maintenance centers.	Existing
<i>Functional Area: Transit Center Multi-Modal Coordination</i>	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> ECT Agency Management	
<i>Entity:</i> Transit Management	
<i>Functional Area:</i> Transit Center Multi-Modal Coordination	
Coordinate schedules with other agencies and modes, including transit transfer cluster and transfer point information.	
<i>Requirement:</i>	
1 The center shall coordinate schedules and services between transit agencies, traffic management, maintenance and construction operations, parking management, and other surface or air transportation modes.	Planned
<i>Requirement:</i>	
2 The center shall share transfer cluster and transfer point information with multimodal transportation service providers, other transit agencies, and traveler information service providers. A transfer cluster is a collection of stop points, stations, or terminals where transfers can be made conveniently.	Planned
<i>Requirement:</i>	
3 The center shall accept requests from traffic management to change routes and schedules as part of the implementation of demand management strategies.	Planned
<i>Requirement:</i>	
4 The center shall coordinate transit services for special events, planning services for the event and managing transit services on the day of the event.	Existing
<i>Requirement:</i>	
5 The center shall provide transit operations personnel with the capability to control and monitor transit service coordination activities.	Planned
<i>Functional Area:</i> Transit Evacuation Support	
Support evacuation and subsequent reentry of a population in the vicinity of a disaster or other emergency. Coordinate regional evacuation plans and resources including transit and school bus fleets.	
<i>Requirement:</i>	
1 The center shall manage the use of transit resources to support evacuation and subsequent reentry of a population in the vicinity of a disaster or other emergency.	Potential
<i>Requirement:</i>	
2 The center shall coordinate regional evacuation plans with Emergency Management - identifying the transit role in an evacuation and the transit resources that would be used.	Existing
<i>Requirement:</i>	
3 The center shall coordinate the use of transit and school bus fleets during an evacuation, supporting evacuation of those with special needs and the general population.	Potential
<i>Requirement:</i>	
4 The center shall adjust and update transit service and fare schedules and provide that information to other agencies as they coordinate evacuations.	Potential
<i>Functional Area:</i> Transit Data Collection	
Collection and storage of transit management data. For use by operations personnel or data archives in the region.	
<i>Requirement:</i>	
1 The center shall collect transit management data such as transit fares and passenger use, transit services, paratransit operations, transit vehicle maintenance data, etc.	Existing
<i>Requirement:</i>	
2 The center shall assign quality control metrics and meta-data to be stored along with the data. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: ECT Agency Management</i>	
<i>Entity: Transit Management</i>	
<i>Functional Area: Transit Data Collection</i>	
Collection and storage of transit management data. For use by operations personnel or data archives in the region.	
<i>Requirement:</i>	
3 The center shall receive and respond to requests from ITS Archives for either a catalog of the transit data or for the data itself.	Planned
<i>Requirement:</i>	
4 The center shall be able to produce sample products of the data available.	Planned
<i>Functional Area: Transit Transportation Operations Data Collection</i>	
Collects real-time information on the state of the regional transportation system for operational use by the center. It establishes communications with a regional repository, requests or subscribes to information relevant to the center, and distributes the received information for use.	
<i>Requirement:</i>	
1 The center shall collect real-time information on the state of the regional transportation system including current traffic and road conditions, weather conditions, special event and incident information.	Existing
<i>Requirement:</i>	
2 The center shall support the capability for the system operator to monitor and control the information collection service.	Existing
<i>Element: ECT Transit Vehicles</i>	
<i>Entity: Transit Vehicle</i>	
<i>Functional Area: On-board Connection Protection</i>	
Monitors vehicle schedule performance and provides it to the transit center for connection protection processing. Also recognizes travelers who have arranged for connection protection and provides information regarding them to the transit center.	
<i>Requirement:</i>	
1 The transit vehicle shall monitor vehicle schedule performance and provides it to the transit center for connection protection processing.	Existing
<i>Requirement:</i>	
2 The transit vehicle shall receive operator instructions from the transit center relating to managing connection protection.	Existing
<i>Requirement:</i>	
3 The transit vehicle shall recognizes individual travelers who have arranged for connection protection and provides information regarding them to the transit center.	Planned
<i>Functional Area: On-board Transit Trip Monitoring</i>	
Support fleet management with automatic vehicle location (AVL) and automated mileage and fuel reporting and auditing.	
<i>Requirement:</i>	
1 The transit vehicle shall track the current location of the transit vehicle.	Existing
<i>Requirement:</i>	
2 The transit vehicle shall support the computation of the location of a transit vehicle using on-board sensors to augment the location determination function. This may include proximity to the transit stops or other known reference points as well as recording trip length.	Potential
<i>Requirement:</i>	
3 The transit vehicle shall record transit trip monitoring data including vehicle mileage and fuel usage.	Potential

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> ECT Transit Vehicles	
<i>Entity:</i> Transit Vehicle	
<i>Functional Area:</i> On-board Transit Trip Monitoring Support fleet management with automatic vehicle location (AVL) and automated mileage and fuel reporting and auditing.	
<i>Requirement:</i>	Potential
4 The transit vehicle shall record transit trip monitoring data including operational status information such as doors open/closed, running times, etc.	
<i>Requirement:</i>	Potential
5 The transit vehicle shall send the transit vehicle trip monitoring data to center-based trip monitoring functions.	
<i>Functional Area:</i> On-board Schedule Management Collecting of data for schedule generation and adjustment on-board a transit vehicle. Supports communication between the vehicle, operator, and center.	
<i>Requirement:</i>	Existing
1 The transit vehicle shall receive a vehicle assignment including transit route information, transit service instructions, traffic information, road conditions, and other information for the operator.	
<i>Requirement:</i>	Existing
2 The transit vehicle shall use the route information and its current location to determine the deviation from the predetermined schedule.	
<i>Requirement:</i>	Existing
3 The transit vehicle shall calculate the estimated times of arrival (ETA) at transit stops.	
<i>Requirement:</i>	Existing
4 The transit vehicle shall determine scenarios to correct the schedule deviation.	
<i>Requirement:</i>	Existing
5 The transit vehicle shall provide the schedule deviations and instructions for schedule corrections to the transit vehicle operator if the deviation is small, or the transit vehicle is operating in an urban area.	
<i>Requirement:</i>	Existing
6 The transit vehicle shall send the schedule deviation and estimated arrival time information to the center.	
<i>Requirement:</i>	Existing
7 The transit vehicle shall support the operations of a flexible route service. This may include requests for route deviations that would then lead to schedule corrective actions.	
<i>Requirement:</i>	Existing
8 The transit vehicle shall notify the transit center of vehicle location and operational status as the vehicle exits and returns to the transit facility to support future vehicle assignments.	
<i>Functional Area:</i> On-board Paratransit Operations On-board systems to manage paratransit and flexible-route dispatch requests, including multi-stop runs. Passenger data is collected and provided to the center.	
<i>Requirement:</i>	Existing
2 The transit vehicle shall receive the status of demand responsive or flexible-route transit schedules and passenger loading from the transit vehicle operator.	
<i>Requirement:</i>	Existing
3 The transit vehicle shall provide the transit vehicle operator instructions about the demand responsive or flexible-route transit schedule that has been confirmed from the center.	
<i>Requirement:</i>	Existing
4 The transit vehicle shall provide the capability to log passenger boardings and alightings and make passenger use data available to the transit center.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: ECT Transit Vehicles</i>	
<i>Entity: Transit Vehicle</i>	
Functional Area: On-board Passenger Counting	
On-board systems collect transit vehicle loading data and make it available to the center.	
<i>Requirement:</i>	Potential
1 The transit vehicle shall count passengers boarding and alighting.	
<i>Requirement:</i>	Potential
2 The passenger counts shall be related to location to support association of passenger counts with routes, route segments, or bus stops.	
<i>Requirement:</i>	Potential
3 The passenger counts shall be timestamped so that ridership can be measured by time of day and day of week.	
<i>Requirement:</i>	Potential
4 The transit vehicle shall send the collected passenger count information to the transit center.	
Functional Area: On-board Transit Security	
On-board video/audio surveillance systems, threat sensors, and object detection sensors to enhance security and safety on-board a transit vehicles. Also includes silent alarms activated by transit user or vehicle operator, operator authentication, and remote vehicle disabling.	
<i>Requirement:</i>	Existing
1 The transit vehicle shall perform video and audio surveillance inside of transit vehicles and output raw video or audio data for either local monitoring (for processing or direct output to the transit vehicle operator), remote monitoring or for local storage (e.g., in an event recorder).	
<i>Requirement:</i>	Existing
2 The transit vehicle shall perform local monitoring of video or audio surveillance data collected inside of transit vehicles, and identify potential incidents or threats based on received processing parameters.	
<i>Requirement:</i>	Existing
3 The transit vehicle shall output an indication of potential incidents or threats and the processed video or audio information to the center along with the vehicle's current location.	
<i>Requirement:</i>	Potential
4 The transit vehicle shall detect potential threats via sensors for chemical agents, toxic industrial chemicals, biological agents, explosives, and radiation.	
<i>Requirement:</i>	Potential
5 The transit vehicle shall detect potential threats via object detection sensors (e.g. metal detectors).	
<i>Requirement:</i>	Potential
6 The transit vehicle shall output an indication of potential incidents or threats and the processed sensor information to the center along with the vehicle's current location.	
<i>Requirement:</i>	Potential
7 The transit vehicle shall accept sensor control data to allow remote control of the sensors.	
<i>Requirement:</i>	Planned
8 The transit vehicle shall monitor and output surveillance and sensor equipment status and fault indications.	
<i>Requirement:</i>	Potential
9 The transit vehicle shall accept emergency inputs from either the transit vehicle operator or a traveler through such interfaces as panic buttons, silent or audible alarms, etc.	
<i>Requirement:</i>	Existing
10 The transit vehicle shall output reported emergencies to the center.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> ECT Transit Vehicles	
<i>Entity:</i> Transit Vehicle	
<i>Functional Area:</i> On-board Transit Security	
On-board video/audio surveillance systems, threat sensors, and object detection sensors to enhance security and safety on-board a transit vehicles. Also includes silent alarms activated by transit user or vehicle operator, operator authentication, and remote vehicle disabling.	
<i>Requirement:</i> 11	The transit vehicle shall receive acknowledgments of the emergency request from the center and output this acknowledgment to the transit vehicle operator or to the travelers. Existing
<i>Requirement:</i> 12	The transit vehicle shall be capable of receiving an emergency message for broadcast to the travelers or to the transit vehicle operator. Existing
<i>Requirement:</i> 13	The transit vehicle shall be capable of disabling or enabling the transit vehicle based on commands from the center or authentic inputs from the transit vehicle operator. Planned
<i>Requirement:</i> 14	The transit vehicle shall perform authentication of the transit vehicle operator. Potential
<i>Functional Area:</i> On-board Maintenance	
On-board systems to collect and process transit vehicle maintenance data including mileage and vehicle operating conditions for use in scheduling future vehicle maintenance.	
<i>Requirement:</i> 1	The transit vehicle shall collect and process vehicle mileage data available to sensors on-board. Potential
<i>Requirement:</i> 2	The transit vehicle shall collect and process the transit vehicle's operating conditions such as engine temperature, oil pressure, brake wear, internal lighting, environmental controls, etc. Potential
<i>Requirement:</i> 3	The transit vehicle shall transmit vehicle maintenance data to the center to be used for scheduling future vehicle maintenance. Potential
<i>Functional Area:</i> On-board Transit Information Services	
On-board systems to furnish next-stop annunciation as well as interactive travel-related information, including routes, schedules, transfer options, fares, real-time schedule adherence, current incidents, weather conditions, non-motorized transportation services, and special events.	
<i>Requirement:</i> 1	The transit vehicle shall enable traffic and travel advisory information to be requested and output to the traveler. Such information may include transit routes, schedules, transfer options, fares, real-time schedule adherence, current incidents, weather conditions, and special events. Planned
<i>Requirement:</i> 3	The transit vehicle shall broadcast advisories about the imminent arrival of the transit vehicle at the next stop via an on-board automated annunciation system. Planned
<i>Requirement:</i> 4	The transit vehicle shall support input and output forms that are suitable for travelers with physical disabilities. Planned
<i>Requirement:</i> 5	The transit vehicle shall gather transit advisory data, including alerts and advisories pertaining to major emergencies, or man made disasters. Existing
<i>Requirement:</i> 6	The transit vehicle shall tailor the output of the request traveler information based on the current location of the transit vehicle. Planned

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: ECT Transit Vehicles</i>	
<i>Entity: Transit Vehicle</i>	
<i>Element: Emergency Management Agencies</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Emergency Call-Taking</i>	
Provides interface to the emergency call-taking systems such as the Emergency Telecommunications System (e.g., 911) that correlate call information with emergencies reported by transit agencies, commercial vehicle operators, or other public safety agencies. Allows the operator to verify the incident and forward the information to the responding agencies.	
<i>Requirement:</i>	
1 The center shall support the interface to the Emergency Telecommunications System (e.g. 911 or 7-digit call routing) to receive emergency notification information and provide it to the emergency system operator.	Existing
<i>Requirement:</i>	
2 The center shall receive emergency call information from 911 services and present the possible incident information to the emergency system operator.	Existing
<i>Requirement:</i>	
4 The center shall receive emergency call information from mayday service providers and present the possible incident information to the emergency system operator.	Existing
<i>Requirement:</i>	
5 The center shall receive emergency notification information from other public safety agencies and present the possible incident information to the emergency system operator.	Existing
<i>Requirement:</i>	
6 The center shall receive emergency notification information from public transit systems and present the possible incident information to the emergency system operator.	Existing
<i>Requirement:</i>	
7 The center shall coordinate, correlate, and verify all emergency inputs, including those identified based on external calls and internal analysis of security sensor and surveillance data, and assign each a level of confidence.	Existing
<i>Requirement:</i>	
8 The center shall send a request for remote control of CCTV systems from a traffic management center in order to verify the reported incident.	Potential
<i>Requirement:</i>	
9 The center shall forward the verified emergency information to the responding agency based on the location and nature of the emergency.	Existing
<i>Requirement:</i>	
10 The center shall update the incident information log once the emergency system operator has verified the incident.	Existing
<i>Requirement:</i>	
11 The center shall provide the capability for digitized map data to act as the background to the emergency information presented to the emergency system operator.	Planned
<i>Functional Area: Emergency Dispatch</i>	
Dispatch emergency vehicles to incidents, tracking their location and status. Pertinent incident information is gathered and relayed to the responding units.	
<i>Requirement:</i>	
1 The center shall dispatch emergency vehicles to respond to verified emergencies under center personnel control.	Existing
<i>Requirement:</i>	
2 The center shall store the current status of all emergency vehicles available for dispatch and those that have been dispatched.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Emergency Management Agencies</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Emergency Dispatch</i>	
Dispatch emergency vehicles to incidents, tracking their location and status. Pertinent incident information is gathered and relayed to the responding units.	
<i>Requirement:</i> 3 The center shall relay location and incident details to the responding vehicles.	Existing
<i>Requirement:</i> 4 The center shall track the location and status of emergency vehicles responding to an emergency based on information from the emergency vehicle.	Existing
<i>Requirement:</i> 5 The center shall store and maintain the emergency service responses in an action log.	Existing
<i>Requirement:</i> 6 The center shall provide the capability for digitized map data to act as the background to the information presented to the emergency system operator.	Planned
<i>Requirement:</i> 7 The center shall receive traffic images to support dispatch of emergency vehicles.	Planned
<i>Requirement:</i> 8 The center shall provide the capability to request remote control of traffic surveillance devices	Planned
<i>Requirement:</i> 9 The center shall coordinate response to incidents with other Emergency Management centers to ensure appropriate resources are dispatched and utilized.	Existing
<i>Functional Area: Emergency Routing</i>	
Routing of emergency vehicles to facilitate the quickest/safest arrival. Routes may be determined based on real-time traffic information and road conditions or routes may be provided by Traffic Management on request.	
<i>Requirement:</i> 1 The center shall collect current traffic and road condition information for emergency vehicle route calculation.	Existing
<i>Requirement:</i> 2 The center shall receive information on the location and status of traffic control equipment and work zones along potential emergency routes.	Existing
<i>Requirement:</i> 4 The center shall receive asset restriction information to support the dispatching of appropriate emergency resources.	Existing
<i>Requirement:</i> 5 The center shall receive current railroad schedule information for emergency vehicle route calculation.	Planned
<i>Requirement:</i> 6 The center shall track current emergency vehicle location and status.	Existing
<i>Requirement:</i> 7 The center shall calculate emergency vehicle routes, under center personnel control, based on the collected traffic and road conditions information.	Existing
<i>Requirement:</i> 8 The center shall request and receive ingress and egress routes or other specialized emergency access routes from the traffic management center.	Planned
<i>Requirement:</i> 9 The center shall provide the capability to request special traffic control measures, such as signal preemption, from the traffic management center to facilitate emergency vehicle progress along the suggested route.	Potential

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Emergency Management Agencies</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Emergency Routing</i>	
Routing of emergency vehicles to facilitate the quickest/safest arrival. Routes may be determined based on real-time traffic information and road conditions or routes may be provided by Traffic Management on request.	
<i>Requirement:</i>	
10 Once the route is calculated the route shall be provided to the dispatch function.	Existing
<i>Requirement:</i>	
11 The center shall provide the capability for digitized map data to act as the background to the information presented to the emergency system operator.	Planned
<i>Functional Area: Incident Command</i>	
Tactical decision support, resource coordination, and communications integration among emergency management agencies for Incident Commands that are established by first responders to support local management of an incident.	
<i>Requirement:</i>	
1 The center shall 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.	Existing
<i>Requirement:</i>	
2 The center shall provide incident command communications with public safety, emergency management, transportation, and other allied response agency centers.	Existing
<i>Requirement:</i>	
3 The center shall track and maintain resource information and action plans pertaining to the incident command.	Existing
<i>Requirement:</i>	
4 The center shall 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.	Existing
<i>Requirement:</i>	
5 The center shall assess the status of responding emergency vehicles as part of an incident command.	Planned
<i>Functional Area: Emergency Early Warning System</i>	
Monitors alerting and advisory systems, information collected by ITS surveillance and sensors, and reports from other agencies in order to identify potential, imminent, or in-progress major incidents or disasters. Notification is provided to other ITS centers to notify the traveling public.	
<i>Requirement:</i>	
1 The center shall 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).	Existing
<i>Requirement:</i>	
2 The center shall provide the capability to correlate alerts and advisories, incident information, and security sensor and surveillance data.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Emergency Management Agencies</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Emergency Early Warning System</i>	
Monitors alerting and advisory systems, information collected by ITS surveillance and sensors, and reports from other agencies in order to identify potential, imminent, or in-progress major incidents or disasters. Notification is provided to other ITS centers to notify the traveling public.	
<i>Requirement:</i> 3 The center shall 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.	Existing
<i>Requirement:</i> 4 The center shall broadcast wide-area alerts and advisories to transit management centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	Existing
<i>Requirement:</i> 5 The center shall broadcast wide-area alerts and advisories to toll administration centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	Existing
<i>Requirement:</i> 6 The center shall broadcast wide-area alerts and advisories to traveler information service providers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	Existing
<i>Requirement:</i> 7 The center shall broadcast wide-area alerts and advisories to maintenance centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	Existing
<i>Requirement:</i> 8 The center shall broadcast wide-area alerts and advisories to other emergency management centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	Existing
<i>Requirement:</i> 9 The center shall broadcast wide-area alerts and advisories to commercial vehicle administration centers and roadside check facilities for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	Existing
<i>Requirement:</i> 10 The center shall process status information from each of the centers that have been sent the wide-area alert.	Existing
<i>Requirement:</i> 11 The center shall coordinate the broadcast of wide-area alerts and advisories with other emergency management centers.	Existing
<i>Requirement:</i> 12 The center shall receive incident information from other transportation management centers to support the early warning system.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Emergency Management Agencies</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Emergency Early Warning System</i>	
Monitors alerting and advisory systems, information collected by ITS surveillance and sensors, and reports from other agencies in order to identify potential, imminent, or in-progress major incidents or disasters. Notification is provided to other ITS centers to notify the traveling public.	
<i>Requirement:</i> 13 The center shall present the alert and advisory information and the status of the actions taken in response to the alert by the other centers to the emergency system operator as received from other system inputs.	Existing
<i>Requirement:</i> 14 The center shall support the entry of alert and advisory information directly from the emergency system operator.	Existing
<i>Functional Area: Emergency Response Management</i>	
Strategic emergency planning and response capabilities and broad inter-agency interfaces to support large-scale incidents and disasters, commonly associated with Emergency Operations Centers.	
<i>Requirement:</i> 1 The center shall provide strategic emergency response capabilities provided by an Emergency Operations Center for large-scale incidents and disasters.	Existing
<i>Requirement:</i> 2 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.	Existing
<i>Requirement:</i> 3 The center shall provide the capability to implement response plans and track progress through the incident by exchanging incident information and response status with allied agencies.	Existing
<i>Requirement:</i> 4 The center shall develop, coordinate with other agencies, and store emergency response plans.	Existing
<i>Requirement:</i> 5 The center shall track the availability of resources and coordinate resource sharing with allied agency centers including traffic, maintenance, or other emergency centers.	Existing
<i>Requirement:</i> 6 The center shall 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.	Existing
<i>Requirement:</i> 7 The center shall receive event scheduling information from Event Promoters.	Planned
<i>Requirement:</i> 8 The center shall support remote control of field equipment normally under control of the traffic management center including traffic signals, dynamic message signs, gates, and barriers.	Potential
<i>Requirement:</i> 9 The center shall provide the capability to remotely control and monitor CCTV systems normally operated by a traffic management center.	Planned
<i>Requirement:</i> 10 The center shall provide the capability to request transit resource availability from transit centers for use during disaster and evacuation operations.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Emergency Management Agencies</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Emergency Response Management</i>	
Strategic emergency planning and response capabilities and broad inter-agency interfaces to support large-scale incidents and disasters, commonly associated with Emergency Operations Centers.	
<i>Requirement:</i> 11	The center shall 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. Planned
<i>Requirement:</i> 12	The center shall provide information to the media concerning the status of an emergency response. Existing
<i>Requirement:</i> 13	The center shall provide the capability for digitized map data to act as the background to the information presented to the emergency system operator. Planned
<i>Requirement:</i> 14	The center shall provide the capability for center personnel to provide inputs to the management of incidents, disasters and evacuations. Existing
<i>Requirement:</i> 15	The center shall collect information about the status of the recovery efforts for the infrastructure during disasters. Potential
<i>Requirement:</i> 16	The center shall provide the overall status of infrastructure recovery efforts to traveler information providers and media. Potential
<i>Requirement:</i> 17	The center shall provide the capability to communicate information about emergency situations to local population through the Emergency Telecommunications System. Planned
<i>Requirement:</i> 18	The center shall 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. Planned
<i>Requirement:</i> 19	The center shall retrieve information from public health systems to increase preparedness for, and implement a response to biological, chemical, radiation, and other public health emergencies. Existing
<i>Functional Area: Emergency Evacuation Support</i>	
Evacuation planning and coordination to manage evacuation and reentry of a population in the vicinity of a disaster or other emergency that poses a risk to public safety.	
<i>Requirement:</i> 1	The center shall manage inter-agency coordination of evacuation operations, from initial planning through the evacuation process and reentry. Existing
<i>Requirement:</i> 2	The center shall develop and exchange evacuation plans with allied agencies prior to the occurrence of a disaster. Existing
<i>Requirement:</i> 3	The center shall provide an interface to the emergency system operator to enter evacuation plans and procedures and present the operator with other agencies' plans. Existing
<i>Requirement:</i> 4	The center shall coordinate evacuation destinations and shelter needs with shelter providers (e.g., the American Red Cross) in the region. Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Emergency Management Agencies</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Emergency Evacuation Support</i>	
Evacuation planning and coordination to manage evacuation and reentry of a population in the vicinity of a disaster or other emergency that poses a risk to public safety.	
<i>Requirement:</i>	
5 The center shall provide evacuation information to traffic, transit, maintenance and construction, rail operations, and other emergency management centers as needed.	Existing
<i>Requirement:</i>	
6 The center shall request resources from transit agencies as needed to support the evacuation.	Existing
<i>Requirement:</i>	
7 The center shall 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.	Planned
<i>Requirement:</i>	
8 The center shall 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.	Planned
<i>Requirement:</i>	
9 The center shall monitor the progress or status of the evacuation once it begins and exchange tactical plans, prepared during the incident, with allied agencies.	Potential
<i>Requirement:</i>	
10 The center shall monitor the progress of the reentry process.	Potential
<i>Requirement:</i>	
11 The center shall submit evacuation information to toll administration centers along with requests for changes in the toll services or fee collection during an evacuation.	Planned
<i>Requirement:</i>	
12 The center shall 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.	Existing
<i>Functional Area: Emergency Environmental Monitoring</i>	
Collects current and forecast road and weather information that is used by the operator to more effectively manage incidents.	
<i>Requirement:</i>	
1 The center shall 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).	Existing
<i>Requirement:</i>	
2 The center shall collect current road and weather information from roadway maintenance operations.	Planned
<i>Requirement:</i>	
3 The center shall assimilate current and forecast road conditions and surface weather information to support incident management.	Planned
<i>Requirement:</i>	
4 The center shall present the current and forecast road and weather information to the emergency system operator.	Planned
<i>Functional Area: Mayday Support</i>	
Collection and response to Mayday messages received from vehicles and drivers.	
<i>Requirement:</i>	
1 The center shall collect mayday messages from vehicles and drivers.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Emergency Management Agencies</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Mayday Support</i>	
Collection and response to Mayday messages received from vehicles and drivers.	
<i>Requirement:</i>	Existing
2 The center shall collect mayday messages from travelers via personal handheld devices.	
<i>Requirement:</i>	Existing
3 The center shall acknowledge the request for emergency assistance, whether originated by the driver, automatically by the vehicle's safety systems, or by a traveler via a personal handheld device.	
<i>Requirement:</i>	Existing
4 After the mayday becomes a verified incident, the center shall determine the appropriate response to the mayday message.	
<i>Requirement:</i>	Existing
5 The center shall determine whether the mayday message indicates an emergency that requires the attention of public safety agencies, and forward mayday emergency data to the appropriate agency as necessary.	
<i>Requirement:</i>	Existing
7 The center shall request additional emergency details from or issue commands to the vehicle's security systems or vehicle driver if needed.	
<i>Requirement:</i>	Existing
8 The center shall maintain a log of all mayday signals received from vehicles.	
<i>Requirement:</i>	Existing
9 The center shall provide all mayday data to center personnel and respond to the vehicle, driver, or traveler using the portable handheld device as directed by the personnel.	
<i>Functional Area: Emergency Commercial Vehicle Response</i>	
Responds to commercial vehicle and freight equipment related emergencies. Includes incidents involving hazardous materials as well as the detection of non-permitted transport of security sensitive hazmat.	
<i>Requirement:</i>	Existing
1 The center shall receive emergency notification information from commercial vehicles, commercial vehicle check stations, or commercial fleet operators and present the possible incident information to the emergency system operator. This may include detection of non-permitted transport of security sensitive hazmat, hazardous cargo spills, etc.	
<i>Requirement:</i>	Existing
2 The center shall receive details of the cargo being carried by commercial vehicles from their commercial fleet manager for incidents involving potential hazardous materials.	
<i>Requirement:</i>	Existing
3 The center shall forward the verified emergency information to the responding agency based on the location and nature of the emergency.	
<i>Requirement:</i>	Planned
4 The center shall provide the capability to request Fleet and Freight Management to disable a specific vehicle in their fleet.	
<i>Functional Area: Emergency Data Collection</i>	
Collection and storage of information related to Emergency Management. For use by operations personnel or data archives in the region.	
<i>Requirement:</i>	Existing
1 The center shall collect emergency service data, emergency vehicle management data, emergency vehicle data, sensor and surveillance data, threat data, and incident data.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Emergency Management Agencies</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Emergency Data Collection</i>	
Collection and storage of information related to Emergency Management. For use by operations personnel or data archives in the region.	
<i>Requirement:</i>	
2 The center shall assign quality control metrics and meta-data to be stored along with the data. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.	Existing
<i>Requirement:</i>	
3 The center shall receive and respond to requests from ITS Archives for either a catalog of the emergency management data or for the data itself.	Planned
<i>Requirement:</i>	
4 The center shall be able to produce sample products of the data available.	Planned
<i>Functional Area: Emergency Transportation Operations Data Collection</i>	
Collects real-time information on the state of the regional transportation system for operational use by the center. It establishes communications with a regional repository, requests or subscribes to information relevant to the center, and distributes the received information for use.	
<i>Requirement:</i>	
1 The center shall collect real-time information on the state of the regional transportation system including current traffic and road conditions, weather conditions, special event and incident information.	Existing
<i>Requirement:</i>	
2 The center shall support the capability for the system operator to monitor and control the information collection service.	Existing
<i>Element: Emergency Medical Services</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Emergency Call-Taking</i>	
Provides interface to the emergency call-taking systems such as the Emergency Telecommunications System (e.g., 911) that correlate call information with emergencies reported by transit agencies, commercial vehicle operators, or other public safety agencies. Allows the operator to verify the incident and forward the information to the responding agencies.	
<i>Requirement:</i>	
1 The center shall support the interface to the Emergency Telecommunications System (e.g. 911 or 7-digit call routing) to receive emergency notification information and provide it to the emergency system operator.	Existing
<i>Requirement:</i>	
2 The center shall receive emergency call information from 911 services and present the possible incident information to the emergency system operator.	Existing
<i>Requirement:</i>	
4 The center shall receive emergency call information from mayday service providers and present the possible incident information to the emergency system operator.	Existing
<i>Requirement:</i>	
5 The center shall receive emergency notification information from other public safety agencies and present the possible incident information to the emergency system operator.	Existing
<i>Requirement:</i>	
6 The center shall receive emergency notification information from public transit systems and present the possible incident information to the emergency system operator.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Emergency Medical Services</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Emergency Call-Taking</i>	
Provides interface to the emergency call-taking systems such as the Emergency Telecommunications System (e.g., 911) that correlate call information with emergencies reported by transit agencies, commercial vehicle operators, or other public safety agencies. Allows the operator to verify the incident and forward the information to the responding agencies.	
<i>Requirement:</i>	
7 The center shall coordinate, correlate, and verify all emergency inputs, including those identified based on external calls and internal analysis of security sensor and surveillance data, and assign each a level of confidence.	Existing
<i>Requirement:</i>	
8 The center shall send a request for remote control of CCTV systems from a traffic management center in order to verify the reported incident.	Potential
<i>Requirement:</i>	
9 The center shall forward the verified emergency information to the responding agency based on the location and nature of the emergency.	Existing
<i>Requirement:</i>	
10 The center shall update the incident information log once the emergency system operator has verified the incident.	Existing
<i>Requirement:</i>	
11 The center shall provide the capability for digitized map data to act as the background to the emergency information presented to the emergency system operator.	Planned
<i>Functional Area: Emergency Dispatch</i>	
Dispatch emergency vehicles to incidents, tracking their location and status. Pertinent incident information is gathered and relayed to the responding units.	
<i>Requirement:</i>	
1 The center shall dispatch emergency vehicles to respond to verified emergencies under center personnel control.	Existing
<i>Requirement:</i>	
2 The center shall store the current status of all emergency vehicles available for dispatch and those that have been dispatched.	Existing
<i>Requirement:</i>	
3 The center shall relay location and incident details to the responding vehicles.	Existing
<i>Requirement:</i>	
4 The center shall track the location and status of emergency vehicles responding to an emergency based on information from the emergency vehicle.	Existing
<i>Requirement:</i>	
5 The center shall store and maintain the emergency service responses in an action log.	Existing
<i>Requirement:</i>	
6 The center shall provide the capability for digitized map data to act as the background to the information presented to the emergency system operator.	Planned
<i>Requirement:</i>	
7 The center shall receive traffic images to support dispatch of emergency vehicles.	Planned
<i>Requirement:</i>	
8 The center shall provide the capability to request remote control of traffic surveillance devices	Planned
<i>Requirement:</i>	
9 The center shall coordinate response to incidents with other Emergency Management centers to ensure appropriate resources are dispatched and utilized.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Emergency Medical Services</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Emergency Routing</i>	
Routing of emergency vehicles to facilitate the quickest/safest arrival. Routes may be determined based on real-time traffic information and road conditions or routes may be provided by Traffic Management on request.	
<i>Requirement:</i>	
1 The center shall collect current traffic and road condition information for emergency vehicle route calculation.	Existing
<i>Requirement:</i>	
2 The center shall receive information on the location and status of traffic control equipment and work zones along potential emergency routes.	Existing
<i>Requirement:</i>	
3 The center shall receive status information from care facilities to determine the appropriate facility and its location.	Existing
<i>Requirement:</i>	
4 The center shall receive asset restriction information to support the dispatching of appropriate emergency resources.	Existing
<i>Requirement:</i>	
5 The center shall receive current railroad schedule information for emergency vehicle route calculation.	Planned
<i>Requirement:</i>	
6 The center shall track current emergency vehicle location and status.	Existing
<i>Requirement:</i>	
7 The center shall calculate emergency vehicle routes, under center personnel control, based on the collected traffic and road conditions information.	Existing
<i>Requirement:</i>	
8 The center shall request and receive ingress and egress routes or other specialized emergency access routes from the traffic management center.	Planned
<i>Requirement:</i>	
9 The center shall provide the capability to request special traffic control measures, such as signal preemption, from the traffic management center to facilitate emergency vehicle progress along the suggested route.	Potential
<i>Requirement:</i>	
10 Once the route is calculated the route shall be provided to the dispatch function.	Existing
<i>Requirement:</i>	
11 The center shall provide the capability for digitized map data to act as the background to the information presented to the emergency system operator.	Planned
<i>Functional Area: Incident Command</i>	
Tactical decision support, resource coordination, and communications integration among emergency management agencies for Incident Commands that are established by first responders to support local management of an incident.	
<i>Requirement:</i>	
1 The center shall 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.	Existing
<i>Requirement:</i>	
2 The center shall provide incident command communications with public safety, emergency management, transportation, and other allied response agency centers.	Existing
<i>Requirement:</i>	
3 The center shall track and maintain resource information and action plans pertaining to the incident command.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Emergency Medical Services</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Incident Command</i>	
Tactical decision support, resource coordination, and communications integration among emergency management agencies for Incident Commands that are established by first responders to support local management of an incident.	
<i>Requirement:</i> 4 The center shall 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.	Existing
<i>Requirement:</i> 5 The center shall assess the status of responding emergency vehicles as part of an incident command.	Planned
<i>Functional Area: Emergency Early Warning System</i>	
Monitors alerting and advisory systems, information collected by ITS surveillance and sensors, and reports from other agencies in order to identify potential, imminent, or in-progress major incidents or disasters. Notification is provided to other ITS centers to notify the traveling public.	
<i>Requirement:</i> 1 The center shall 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).	Existing
<i>Requirement:</i> 2 The center shall provide the capability to correlate alerts and advisories, incident information, and security sensor and surveillance data.	Existing
<i>Requirement:</i> 12 The center shall receive incident information from other transportation management centers to support the early warning system.	Existing
<i>Requirement:</i> 13 The center shall present the alert and advisory information and the status of the actions taken in response to the alert by the other centers to the emergency system operator as received from other system inputs.	Existing
<i>Requirement:</i> 14 The center shall support the entry of alert and advisory information directly from the emergency system operator.	Existing
<i>Functional Area: Emergency Response Management</i>	
Strategic emergency planning and response capabilities and broad inter-agency interfaces to support large-scale incidents and disasters, commonly associated with Emergency Operations Centers.	
<i>Requirement:</i> 1 The center shall provide strategic emergency response capabilities provided by an Emergency Operations Center for large-scale incidents and disasters.	Existing
<i>Requirement:</i> 2 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.	Existing

Table 6

Architecture		Status
Northwest Indiana Regional Intelligent Transportation System (Region)		(Region)
<i>Element: Emergency Medical Services</i>		
<i>Entity: Emergency Management</i>		
<i>Functional Area: Emergency Response Management</i>		
	Strategic emergency planning and response capabilities and broad inter-agency interfaces to support large-scale incidents and disasters, commonly associated with Emergency Operations Centers.	
<i>Requirement:</i>	3 The center shall provide the capability to implement response plans and track progress through the incident by exchanging incident information and response status with allied agencies.	Existing
<i>Requirement:</i>	4 The center shall develop, coordinate with other agencies, and store emergency response plans.	Existing
<i>Requirement:</i>	5 The center shall track the availability of resources and coordinate resource sharing with allied agency centers including traffic, maintenance, or other emergency centers.	Existing
<i>Requirement:</i>	6 The center shall 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.	Existing
<i>Requirement:</i>	7 The center shall receive event scheduling information from Event Promoters.	Planned
<i>Requirement:</i>	8 The center shall support remote control of field equipment normally under control of the traffic management center including traffic signals, dynamic message signs, gates, and barriers.	Potential
<i>Requirement:</i>	9 The center shall provide the capability to remotely control and monitor CCTV systems normally operated by a traffic management center.	Potential
<i>Requirement:</i>	12 The center shall provide information to the media concerning the status of an emergency response.	Existing
<i>Requirement:</i>	13 The center shall provide the capability for digitized map data to act as the background to the information presented to the emergency system operator.	Planned
<i>Requirement:</i>	14 The center shall provide the capability for center personnel to provide inputs to the management of incidents, disasters and evacuations.	Existing
<i>Requirement:</i>	15 The center shall collect information about the status of the recovery efforts for the infrastructure during disasters.	Potential
<i>Requirement:</i>	17 The center shall provide the capability to communicate information about emergency situations to local population through the Emergency Telecommunications System.	Planned
<i>Requirement:</i>	19 The center shall retrieve information from public health systems to increase preparedness for, and implement a response to biological, chemical, radiation, and other public health emergencies.	Existing
<i>Functional Area: Emergency Evacuation Support</i>		
	Evacuation planning and coordination to manage evacuation and reentry of a population in the vicinity of a disaster or other emergency that poses a risk to public safety.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Emergency Medical Services</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Emergency Evacuation Support</i>	
Evacuation planning and coordination to manage evacuation and reentry of a population in the vicinity of a disaster or other emergency that poses a risk to public safety.	
<i>Requirement:</i>	
1 The center shall manage inter-agency coordination of evacuation operations, from initial planning through the evacuation process and reentry.	Existing
<i>Requirement:</i>	
2 The center shall develop and exchange evacuation plans with allied agencies prior to the occurrence of a disaster.	Existing
<i>Requirement:</i>	
3 The center shall provide an interface to the emergency system operator to enter evacuation plans and procedures and present the operator with other agencies' plans.	Existing
<i>Requirement:</i>	
4 The center shall coordinate evacuation destinations and shelter needs with shelter providers (e.g., the American Red Cross) in the region.	Existing
<i>Requirement:</i>	
5 The center shall provide evacuation information to traffic, transit, maintenance and construction, rail operations, and other emergency management centers as needed.	Existing
<i>Requirement:</i>	
6 The center shall request resources from transit agencies as needed to support the evacuation.	Existing
<i>Requirement:</i>	
7 The center shall 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.	Planned
<i>Requirement:</i>	
8 The center shall 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.	Planned
<i>Requirement:</i>	
9 The center shall monitor the progress or status of the evacuation once it begins and exchange tactical plans, prepared during the incident, with allied agencies.	Potential
<i>Requirement:</i>	
10 The center shall monitor the progress of the reentry process.	Potential
<i>Requirement:</i>	
11 The center shall submit evacuation information to toll administration centers along with requests for changes in the toll services or fee collection during an evacuation.	Planned
<i>Requirement:</i>	
12 The center shall 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.	Existing
<i>Functional Area: Emergency Environmental Monitoring</i>	
Collects current and forecast road and weather information that is used by the operator to more effectively manage incidents.	
<i>Requirement:</i>	
1 The center shall 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).	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Emergency Medical Services</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Emergency Environmental Monitoring</i>	
Collects current and forecast road and weather information that is used by the operator to more effectively manage incidents.	
<i>Requirement:</i>	
2 The center shall collect current road and weather information from roadway maintenance operations.	Planned
<i>Requirement:</i>	
3 The center shall assimilate current and forecast road conditions and surface weather information to support incident management.	Planned
<i>Requirement:</i>	
4 The center shall present the current and forecast road and weather information to the emergency system operator.	Planned
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<i>Functional Area: Mayday Support</i>	
Collection and response to Mayday messages received from vehicles and drivers.	
<i>Requirement:</i>	
1 The center shall collect mayday messages from vehicles and drivers.	Existing
<i>Requirement:</i>	
2 The center shall collect mayday messages from travelers via personal handheld devices.	Existing
<i>Requirement:</i>	
3 The center shall acknowledge the request for emergency assistance, whether originated by the driver, automatically by the vehicle's safety systems, or by a traveler via a personal handheld device.	Existing
<i>Requirement:</i>	
4 After the mayday becomes a verified incident, the center shall determine the appropriate response to the mayday message.	Existing
<i>Requirement:</i>	
5 The center shall determine whether the mayday message indicates an emergency that requires the attention of public safety agencies, and forward mayday emergency data to the appropriate agency as necessary.	Existing
<i>Requirement:</i>	
7 The center shall request additional emergency details from or issue commands to the vehicle's security systems or vehicle driver if needed.	Existing
<i>Requirement:</i>	
8 The center shall maintain a log of all mayday signals received from vehicles.	Existing
<i>Requirement:</i>	
9 The center shall provide all mayday data to center personnel and respond to the vehicle, driver, or traveler using the portable handheld device as directed by the personnel.	Existing
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<i>Functional Area: Emergency Data Collection</i>	
Collection and storage of information related to Emergency Management. For use by operations personnel or data archives in the region.	
<i>Requirement:</i>	
1 The center shall collect emergency service data, emergency vehicle management data, emergency vehicle data, sensor and surveillance data, threat data, and incident data.	Existing
<i>Requirement:</i>	
2 The center shall assign quality control metrics and meta-data to be stored along with the data. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.	Existing
<i>Requirement:</i>	
3 The center shall receive and respond to requests from ITS Archives for either a catalog of the emergency management data or for the data itself.	Planned

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Emergency Medical Services</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Emergency Data Collection</i>	
Collection and storage of information related to Emergency Management. For use by operations personnel or data archives in the region.	
<i>Requirement:</i>	
4 The center shall be able to produce sample products of the data available.	Planned
<i>Functional Area: Emergency Transportation Operations Data Collection</i>	
Collects real-time information on the state of the regional transportation system for operational use by the center. It establishes communications with a regional repository, requests or subscribes to information relevant to the center, and distributes the received information for use.	
<i>Requirement:</i>	
1 The center shall collect real-time information on the state of the regional transportation system including current traffic and road conditions, weather conditions, special event and incident information.	Existing
<i>Requirement:</i>	
2 The center shall support the capability for the system operator to monitor and control the information collection service.	Existing
<i>Element: Fleet and Freight Management System</i>	
<i>Entity: Fleet and Freight Management</i>	
<i>Functional Area: Fleet Administration</i>	
Commercial vehicle fleet tracking, dispatch, and reporting - includes interfaces to state/federal commercial vehicle administration, toll administration, emergency management, and traveler information service providers. Supports pre-hiring checks and performance monitoring for drivers.	
<i>Requirement:</i>	
1 The center shall send data concerning enrollment of commercial vehicles for electronic clearance and tax filing to the appropriate commercial vehicle administration center. The data may include driver and vehicle identification, safety inspections/status, carrier credentials, related citations, and accident information.	Existing
<i>Requirement:</i>	
2 The center shall obtain and manage commercial vehicle routes for its fleet of vehicles, taking into account route restrictions, advance payment of tolls, HAZMAT restrictions, current traffic and road conditions, and incident information provided by traveler information systems.	Existing
<i>Requirement:</i>	
3 The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as the background for commercial vehicle fleet administration - includes commercial vehicle specific data such as route or HAZMAT restrictions.	Existing
<i>Requirement:</i>	
4 The center shall monitor the locations and progress of commercial vehicles against their planned routes and raise appropriate warnings based on route monitoring parameters.	Existing
<i>Requirement:</i>	
5 The center shall coordinate the response to security incidents and the sharing of security threat information involving commercial vehicles with other agencies including emergency management centers and alerting/advisory systems.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Fleet and Freight Management System	
<i>Entity:</i> Fleet and Freight Management	
<i>Functional Area:</i> Fleet Administration	
Commercial vehicle fleet tracking, dispatch, and reporting - includes interfaces to state/federal commercial vehicle administration, toll administration, emergency management, and traveler information service providers. Supports pre-hiring checks and performance monitoring for drivers.	
<i>Requirement:</i>	Existing
6 The center shall access driver records from the appropriate commercial vehicle administration center and use the records to support pre-hiring checks for potential drivers and monitor the performance of each driver who is hired.	
<i>Requirement:</i>	Planned
7 The center shall monitor geographic trigger areas for wireless roadside inspection programs and distribute the trigger areas to their commercial vehicles.	
<i>Functional Area:</i> Freight Administration and Management	
Management of the movement of cargo from source to destination via links to intermodal freight shippers, government agencies, and depots as well as links out to the freight equipment.	
<i>Requirement:</i>	Existing
1 The center shall collect data from the commercial vehicles carrying freight or from the freight equipment itself. Includes container, trailer, or chassis information regarding identity, type, location, brake wear data, mileage, seal number/type, door open/close status, chassis bare/covered status, tethered / untethered status, bill of lading, and sensor status.	
<i>Requirement:</i>	Existing
2 The center shall provide the interface with intermodal freight shippers to setup transportation for freight equipment. Inputs to this include information about the shipper, consignee, commodities, pick-up and drop-off locations for freight equipment. Outputs include information about the driver and commercial vehicle that will be transporting the freight.	
<i>Requirement:</i>	Existing
3 The center shall coordinate the shipment of cargo using freight equipment with intermodal freight depots. Information to be coordinated includes information regarding a freight transportation booking and the assigned driver and vehicle scheduled to transport the freight along with cargo movement logs, routing information, and cargo ID's.	
<i>Requirement:</i>	Planned
4 The center shall track the progress of freight equipment as it moves from source to destination based on inputs from the commercial vehicles, the freight equipment, intermodal freight depots, shippers, and commercial vehicle administration centers that provide border clearance status information.	
<i>Requirement:</i>	Planned
5 The center shall collect diagnostic information fro freight equipment to schedule preventative and corrective maintenance.	
<i>Requirement:</i>	Existing
6 The center shall notify other security functions within the center of deviations in the movement of freight equipment from its planned route.	
<i>Requirement:</i>	Existing
7 The center shall support the submission of cargo manifest data to the appropriate government border inspection administration system.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Fleet and Freight Management System	
<i>Entity:</i> Fleet and Freight Management	
<i>Functional Area:</i> Freight Administration and Management	
Management of the movement of cargo from source to destination via links to intermodal freight shippers, government agencies, and depots as well as links out to the freight equipment.	
<i>Requirement:</i>	Existing
8 The center shall support the registration of its vehicles, drivers, and cargo for expedited border crossings with the appropriate government border inspection administration system.	
<i>Requirement:</i>	Existing
9 The center shall coordinate the response to security incidents and the sharing of security threat information involving freight equipment with other agencies including emergency management centers, intermodal freight shippers, and alerting/advisory systems.	
<i>Functional Area:</i> Fleet Credentials and Taxes Management and Reporting	
Commercial vehicle fleet support systems for the purchase and filing of electronic credentials, status reporting, tax audit data, and compliance reviews. Electronic interfaces with the appropriate state or federal commercial vehicle administration centers.	
<i>Requirement:</i>	Existing
1 The center shall send data concerning enrollment and purchase of commercial vehicles credentials and tax filing to the appropriate commercial vehicle administration center.	
<i>Requirement:</i>	Existing
2 The center shall receive compliance review reports from the appropriate commercial vehicle administration centers concerning the operations of the commercial vehicle fleet, including concomitant out-of-service notifications, and carrier warnings/notifications.	
<i>Requirement:</i>	Existing
3 The center shall provide audit data to the appropriate commercial vehicle administration center to support tax audits.	
<i>Requirement:</i>	Existing
4 The center shall support an interface with a commercial vehicle driver that is acting in the role of a commercial vehicle fleet manager for the purposes of obtaining credentials, obtaining permits, filing taxes and audit data, and receiving compliance reports and status information.	
<i>Functional Area:</i> Fleet Maintenance Management	
Commercial vehicle fleet tracking and monitoring of on-board data sent to the center to support scheduling of maintenance and repair activities.	
<i>Requirement:</i>	Existing
1 The center shall collect and process operational and safety data from its fleet of commercial vehicles - data includes mileage data, repairs, diagnostic data, driver logs, and on-board safety system data.	
<i>Requirement:</i>	Existing
2 The center shall use data from its fleet of commercial vehicles to schedule maintenance and repair activities.	
<i>Requirement:</i>	Existing
3 The center shall report required commercial vehicle repairs and other corrections of identified deficiencies to the appropriate commercial vehicle administration center.	
<i>Functional Area:</i> Commercial Vehicle and Freight Security	
Coordinated response for commercial vehicle and freight security incidents. Remote monitoring of commercial vehicle driver and freight equipment to vehicle assignments as well as detection of breaches or tampering.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Fleet and Freight Management System</i>	
<i>Entity: Fleet and Freight Management</i>	
<i>Functional Area: Commercial Vehicle and Freight Security</i>	
Coordinated response for commercial vehicle and freight security incidents. Remote monitoring of commercial vehicle driver and freight equipment to vehicle assignments as well as detection of breaches or tampering.	
<i>Requirement:</i>	Planned
1 The center shall monitor the identity of a commercial vehicle driver and compare it with the planned driver, generating warnings if the tracked identities do not match the planned assignments.	
<i>Requirement:</i>	Planned
2 The center shall monitor the freight equipment identity with the planned vehicle assignment, generating a warning if the tracked identities do not match the planned assignments.	
<i>Requirement:</i>	Planned
3 The center shall receive data from commercial vehicles and freight equipment concerning potential critical security problem(s), including a breach or tamper event with information such as time, date, location, identities, and nature of the problem.	
<i>Requirement:</i>	Existing
4 The center shall coordinate the response to security incidents and the sharing of security threat information involving commercial vehicles and freight equipment with other agencies including emergency management centers, intermodal freight shippers, and alerting/advisory systems.	
<i>Functional Area: Fleet HAZMAT Management</i>	
Notification of hazardous materials (HAZMAT) shipments to emergency management centers for commercial vehicles managed by the center - includes information on the nature of the cargo, the vehicle, and its expected route.	
<i>Requirement:</i>	Existing
1 The center shall track the routing and cargo information, including the manifest data plus the chemical characteristics of a hazardous materials (HAZMAT) load being carried by its fleet of commercial vehicles.	
<i>Requirement:</i>	Existing
2 The center shall provide information concerning commercial vehicles carrying hazardous materials (HAZMAT) upon request from an emergency management center. The information includes the nature of the cargo being carried, identity of the vehicle and unloading instructions.	
<i>Functional Area: Manage CV Driver Identification</i>	
Commercial vehicle fleet support systems to collect and store driver identification records, including PINs and biometrics. Remote authentication of the drivers and supports remote disabling of the vehicle if an unauthorized access is detected.	
<i>Requirement:</i>	Potential
1 The center shall send driver assignment data to the fleet of commercial vehicles including unique identification information that is used to authenticate a driver. This may include biometric parameters for a driver or an encoded Personal Identification Number (PIN) used to identify a driver.	
<i>Requirement:</i>	Potential
2 The center shall receive the identities of the commercial vehicle drivers as they attempt to access a commercial vehicle.	
<i>Requirement:</i>	Potential
3 The center shall send an alarm to the appropriate emergency management center when an unauthorized access has been attempted on a commercial vehicle.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Fleet and Freight Management System	
<i>Entity:</i> Fleet and Freight Management	
<i>Functional Area:</i> Manage CV Driver Identification	
Commercial vehicle fleet support systems to collect and store driver identification records, including PINs and biometrics. Remote authentication of the drivers and supports remote disabling of the vehicle if an unauthorized access is detected.	
<i>Requirement:</i>	Potential
4 The center shall send a command to the commercial vehicle to disable the vehicle when an unauthorized access has been attempted - this may be initiated within the center or based on inputs from the emergency management center.	
<i>Element:</i> GPTC Agency Management	
<i>Entity:</i> Transit Management	
<i>Functional Area:</i> Transit Center Connection Protection	
Manages the coordination of transit transfers between routes, including routes on different modes. Also supports the capability for travelers to obtain connection protection throughout a trip.	
<i>Requirement:</i>	Existing
1 The center shall manage service requests for routing of an individual through the transit system.	
<i>Requirement:</i>	Existing
2 The center shall provide transit plans for both fixed and demand responsive transit to transit passengers.	
<i>Requirement:</i>	Planned
3 The center shall be able to coordinate with Other Transit Management systems or Multimodal Transportation Service Providers in order to provide a complete multimodal trip plan.	
<i>Requirement:</i>	Planned
4 The center shall track the passenger through the transit network, and coordinate with Other TRM and Multimodal Transportation Service Providers so that the passenger makes efficient connections between the transit system and other transit systems or other modes of transportation.	
<i>Functional Area:</i> Transit Center Vehicle Tracking	
Monitoring transit vehicle locations via interactions with on-board systems. Furnish users with real-time transit schedule information and maintain interface with digital map providers.	
<i>Requirement:</i>	Existing
1 The center shall monitor the locations of all transit vehicles within its network.	
<i>Requirement:</i>	Existing
2 The center shall determine adherence of transit vehicles to their assigned schedule.	
<i>Requirement:</i>	Planned
3 The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for transit tracking and dispatch.	
<i>Requirement:</i>	Planned
4 The center shall provide transit operational data to traveler information service providers.	
<i>Requirement:</i>	Existing
5 The center shall provide collected transit probe data to traffic management centers and traveler information service providers for use in measuring current traffic conditions.	
<i>Functional Area:</i> Transit Center Fixed-Route Operations	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> GPTC Agency Management	
<i>Entity:</i> Transit Management	
<i>Functional Area:</i> Transit Center Fixed-Route Operations	
Management of fixed route transit operations. Planning, scheduling, and dispatch associated with fixed and flexible route transit services. Updates customer service operator systems, and provides current vehicle schedule adherence and optimum scenarios for schedule adjustment.	
<i>Requirement:</i>	Existing
1 The center shall generate transit routes and schedules based on such factors as parameters input by the system operator, road network conditions, incident information, operational data on current routes and schedules, and digitized map data.	
<i>Requirement:</i>	Existing
2 The center shall provide the interface to the system operator to control the generation of new routes and schedules (transit services) including the ability to review and update the parameters used by the routes and schedules generation processes and to initiate these processes	
<i>Requirement:</i>	Existing
3 The center shall be able to generate special routes and schedules to support an incident, disaster, evacuation, or other emergency.	
<i>Requirement:</i>	Existing
4 The center shall dispatch fixed route or flexible route transit vehicles	
<i>Requirement:</i>	Existing
5 The center shall collect transit operational data for use in the generation of routes and schedules.	
<i>Requirement:</i>	Existing
6 The center shall provide instructions or corrective actions to the transit vehicle operators based upon operational needs.	
<i>Requirement:</i>	Existing
7 The center shall manage large deviations of individual transit vehicles, deviations in rural areas, and deviations of large numbers of vehicles.	
<i>Requirement:</i>	Existing
8 The center shall 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.	
<i>Requirement:</i>	Existing
9 The center shall exchange information with Maintenance and Construction Operations concerning work zones, roadway conditions, asset restrictions, work plans, etc.	
<i>Requirement:</i>	Existing
10 The center shall disseminate up-to-date schedules and route information to other centers for fixed and flexible route services.	
<i>Requirement:</i>	Existing
11 The center shall provide an interface to the archive data repository to enable the operator to retrieve historical operating data for use in planning transit routes and schedules.	
<i>Functional Area:</i> Transit Center Paratransit Operations	
Management of demand response transit services, including paratransit. Planning and scheduling of these services. Supports automated vehicle dispatch and automatically updates customer service operator systems.	
<i>Requirement:</i>	Existing
1 The center shall process trip requests for demand responsive transit services, i.e. paratransit. Sources of the requests may include traveler information service providers.	
<i>Requirement:</i>	Existing
2 The center shall monitor the operational status of the demand response vehicles including status of passenger pick-up and drop-off.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: GPTC Agency Management</i>	
<i>Entity: Transit Management</i>	
<i>Functional Area: Transit Center Paratransit Operations</i>	
Management of demand response transit services, including paratransit. Planning and scheduling of these services. Supports automated vehicle dispatch and automatically updates customer service operator systems.	
<i>Requirement:</i> 3 The center shall generate demand response transit (including paratransit) routes and schedules based on such factors as parameters input by the system operator, what other demand responsive transit schedules have been planned, the availability and location of vehicles, the relevance of any fixed transit routes and schedules, road network information, and incident information.	Existing
<i>Requirement:</i> 4 The center shall dispatch demand response (paratransit) transit vehicles.	Existing
<i>Requirement:</i> 5 The center shall exchange information with Maintenance and Construction Operations concerning work zones, roadway conditions, asset restrictions, work plans, etc.	Existing
<i>Requirement:</i> 6 The center shall disseminate up-to-date schedules and route information to other centers for demand responsive transit services (paratransit).	Existing
<i>Requirement:</i> 7 The center shall collect the log of passenger boardings and alightings from the paratransit vehicles.	Existing
<i>Functional Area: Transit Center Fare Management</i>	
Management of fare collection at the center - includes setting and distributing fare information, central processing of fares for transit as well as other ITS services, links to financial institutions and enforcement agencies.	
<i>Requirement:</i> 1 The center shall manage the actual value of transit fares for each segment of each regular transit route, including the transmission of the information to transit vehicles and transit stops or stations.	Existing
<i>Requirement:</i> 3 The center shall process the financial requests from the transit vehicles or roadside and manage an interface to a Financial Institution.	Existing
<i>Requirement:</i> 4 The center shall support the payment of transit fare transactions using data provided by the traveler cards / payment instruments.	Existing
<i>Requirement:</i> 6 The center shall process requests for transit fares to be paid in advance.	Existing
<i>Requirement:</i> 8 The center shall be capable of establishing emergency fare structures to override all other fares during disasters, states of emergency, or evacuations.	Existing
<i>Requirement:</i> 10 The center shall collect fare statistics data to implement variable and flexible fare structures.	Potential
<i>Requirement:</i> 11 The center shall exchange fare and load information with other transit management centers, including potential Centralized Payments facilities.	Potential
<i>Requirement:</i> 12 The center shall provide transit fare information to other centers, including traveler information providers upon request.	Existing
<i>Functional Area: Transit Center Passenger Counting</i>	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: GPTC Agency Management</i>	
<i>Entity: Transit Management</i>	
<i>Functional Area: Transit Center Passenger Counting</i>	
Receives and processes transit vehicle loading data using two-way communications from equipped transit vehicles.	
<i>Requirement:</i>	Existing
1 The center shall collect passenger count information from each transit vehicle.	
<i>Requirement:</i>	Existing
2 The center shall calculate transit ridership data by route, route segment, transit stop, time of day, and day of week based on the collected passenger count information.	
<i>Requirement:</i>	Existing
3 The center shall make the compiled ridership data available to the system operator and other applications.	
<i>Functional Area: Transit Center Security</i>	
Monitor transit vehicle operator or traveler activated alarms; authenticate transit vehicle operators; remotely disable a transit vehicle; alert operators, travelers, and police to potential incidents identified by these security features.	
<i>Requirement:</i>	Existing
1 The center shall monitor transit vehicle operational data to determine if the transit vehicle is off-route and assess whether a security incident is occurring.	
<i>Requirement:</i>	Existing
2 The center shall receive reports of emergencies on-board transit vehicles entered directly by the transit vehicle operator or from a traveler through interfaces such as panic buttons or alarm switches.	
<i>Requirement:</i>	Potential
3 The center shall support the back-office portion of functionality to authenticate transit vehicle operators.	
<i>Requirement:</i>	Existing
4 The center shall exchange transit incident information along with other service data with other transit agencies.	
<i>Requirement:</i>	Existing
5 The center shall receive information pertaining to a wide-area alert such as weather alerts, disaster situations, or child abductions. This information may come from Emergency Management or from other Alerting and Advisory Systems.	
<i>Requirement:</i>	Existing
6 The center shall send wide-area alert information to travelers (on-board transit vehicles or at stations/stops) and transit vehicle operators.	
<i>Requirement:</i>	Existing
7 The center shall coordinate the response to security incidents involving transit with other agencies including Emergency Management, other transit agencies, media, traffic management, and traveler information service providers.	
<i>Requirement:</i>	Existing
8 The center shall receive threat information and status on the integrity of the transit infrastructure.	
<i>Requirement:</i>	Potential
9 The center shall provide support to remotely disable (or reset the disabling of) a transit vehicle in service.	
<i>Functional Area: Transit Vehicle Operator Assignment</i>	
Assignment of transit operators to runs in a fair manner while minimizing labor and overtime services, considering operator preferences, qualifications, accumulated work hours, and other information about each operator.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: GPTC Agency Management</i>	
<i>Entity: Transit Management</i>	
<i>Functional Area: Transit Vehicle Operator Assignment</i>	
Assignment of transit operators to runs in a fair manner while minimizing labor and overtime services, considering operator preferences, qualifications, accumulated work hours, and other information about each operator.	
<i>Requirement:</i>	Existing
1 The center shall 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.	
<i>Requirement:</i>	Existing
2 The center shall assess the transit vehicle operator's availability based on previous work assignments, accumulated hours, plus health and vacation commitments.	
<i>Requirement:</i>	Existing
3 The center shall assign transit vehicle operators to transit schedules based on their eligibility, route preferences, seniority, and transit vehicle availability.	
<i>Requirement:</i>	Existing
4 The center shall provide an interface through which the transit vehicle operator information can be maintained - either from the transit vehicle operator, center personnel, or other functions.	
<i>Requirement:</i>	Existing
5 The center shall generate supplemental vehicle operator assignments as required due to change events that occur during the operating day.	
<i>Functional Area: Transit Garage Maintenance</i>	
Collect operational and maintenance data from transit vehicles, manage vehicle service histories, automatically generate preventative maintenance schedules, and provide information to service personnel.	
<i>Requirement:</i>	Existing
2 The center shall monitor the condition of a transit vehicle to analyze brake, drive train, sensors, fuel, steering, tire, processor, communications equipment, and transit vehicle mileage to identify mileage based maintenance, out-of-specification or imminent failure conditions.	
<i>Requirement:</i>	Planned
3 The center shall generate transit vehicle maintenance schedules that identify the maintenance or repair to be performed and when the work is to be done.	
<i>Requirement:</i>	Planned
4 The center shall generate transit vehicle availability listings, current and forecast, to support transit vehicle assignment planning based, in part, on the transit vehicle maintenance schedule.	
<i>Requirement:</i>	Existing
5 The center shall assign technicians to a transit vehicle maintenance schedule, based upon such factors as personnel eligibility, work assignments, preferences and seniority.	
<i>Requirement:</i>	Planned
6 The center shall verify that the transit vehicle maintenance activities were performed correctly, using the transit vehicle's status, the maintenance personnel's work assignment, and the transit maintenance schedules.	
<i>Requirement:</i>	Planned
7 The center shall generate a time-stamped maintenance log of all maintenance activities performed on a transit vehicle.	

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Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> GPTC Agency Management	
<i>Entity:</i> Transit Management	
<i>Functional Area:</i> Transit Vehicle Assignment	
Assigns individual transit vehicles to vehicle blocks and downloads this information to the transit vehicle, updating assignments as necessitated by changes. It also provides an inventory management function that stores attributes about each of the transit vehicles.	
<i>Requirement:</i>	Existing
1 The center shall assign individual transit vehicles to transit blocks.	
<i>Requirement:</i>	Existing
3 The center shall provide an exception handling process for the vehicle assignment function. This process shall generate new supplemental vehicle assignments as required due to change events which occur during the operating day.	
<i>Requirement:</i>	Planned
5 The center shall generate transit vehicle availability listings, current and forecast, to support transit vehicle assignment planning.	
<i>Requirement:</i>	Planned
6 The center shall provide transit operations personnel with the capability to update transit vehicle assignments and receive reports on transit vehicle inventory status.	
<i>Functional Area:</i> Transit Center Information Services	
Provide interactive traveler information to travelers (on-board transit vehicles, at stops/stations, using personal devices), traveler information service providers, media, and other transit organizations. Includes routes, schedules, transfer options, fares, real-time schedule adherence, current incidents, weather conditions, yellow pages, and special events.	
<i>Requirement:</i>	Existing
1 The center shall provide travelers using public transportation with traffic and advisory information upon request. Such information may include transit routes, schedules, transfer options, fares, real-time schedule adherence, current incidents, weather conditions, and special events.	
<i>Requirement:</i>	Existing
2 The center shall provide transit information to the media including details of deviations from schedule of regular transit services.	
<i>Requirement:</i>	Planned
3 The center shall exchange transit schedules, real-time arrival information, fare schedules, and general transit service information with other transit organizations to support transit traveler information systems.	
<i>Requirement:</i>	Planned
4 The center shall provide transit service information to traveler information service providers including routes, schedules, schedule adherence, and fare information as well as transit service information during evacuation.	
<i>Requirement:</i>	Existing
6 The center shall broadcast transit advisory data, including alerts and advisories pertaining to major emergencies, or man made disasters.	
<i>Functional Area:</i> Transit Environmental Monitoring	
Current and forecast road and weather information assimilated from weather service providers and vehicle probes. The information is monitored and forwarded to other agencies to more effectively manage transit operations.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: GPTC Agency Management</i>	
<i>Entity: Transit Management</i>	
<i>Functional Area: Transit Environmental Monitoring</i>	
Current and forecast road and weather information assimilated from weather service providers and vehicle probes. The information is monitored and forwarded to other agencies to more effectively manage transit operations.	
<i>Requirement:</i>	Existing
1 The center shall assimilate current and forecast road conditions and surface weather information to more effectively manage transit operations.	
<i>Requirement:</i>	Existing
2 The center shall collect current and forecast road and weather information from weather service providers and roadway maintenance centers.	
<i>Functional Area: Transit Center Multi-Modal Coordination</i>	
Coordinate schedules with other agencies and modes, including transit transfer cluster and transfer point information.	
<i>Requirement:</i>	Planned
1 The center shall coordinate schedules and services between transit agencies, traffic management, maintenance and construction operations, parking management, and other surface or air transportation modes.	
<i>Requirement:</i>	Planned
2 The center shall share transfer cluster and transfer point information with multimodal transportation service providers, other transit agencies, and traveler information service providers. A transfer cluster is a collection of stop points, stations, or terminals where transfers can be made conveniently.	
<i>Requirement:</i>	Planned
3 The center shall accept requests from traffic management to change routes and schedules as part of the implementation of demand management strategies.	
<i>Requirement:</i>	Existing
4 The center shall coordinate transit services for special events, planning services for the event and managing transit services on the day of the event.	
<i>Requirement:</i>	Planned
5 The center shall provide transit operations personnel with the capability to control and monitor transit service coordination activities.	
<i>Functional Area: Transit Evacuation Support</i>	
Support evacuation and subsequent reentry of a population in the vicinity of a disaster or other emergency. Coordinate regional evacuation plans and resources including transit and school bus fleets.	
<i>Requirement:</i>	Potential
1 The center shall manage the use of transit resources to support evacuation and subsequent reentry of a population in the vicinity of a disaster or other emergency.	
<i>Requirement:</i>	Existing
2 The center shall coordinate regional evacuation plans with Emergency Management - identifying the transit role in an evacuation and the transit resources that would be used.	
<i>Requirement:</i>	Potential
3 The center shall coordinate the use of transit and school bus fleets during an evacuation, supporting evacuation of those with special needs and the general population.	
<i>Requirement:</i>	Potential
4 The center shall adjust and update transit service and fare schedules and provide that information to other agencies as they coordinate evacuations.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> GPTC Agency Management	
<i>Entity:</i> Transit Management	
<i>Functional Area:</i> Transit Data Collection	
Collection and storage of transit management data. For use by operations personnel or data archives in the region.	
<i>Requirement:</i>	Existing
1 The center shall collect transit management data such as transit fares and passenger use, transit services, paratransit operations, transit vehicle maintenance data, etc.	
<i>Requirement:</i>	Existing
2 The center shall assign quality control metrics and meta-data to be stored along with the data. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.	
<i>Requirement:</i>	Planned
3 The center shall receive and respond to requests from ITS Archives for either a catalog of the transit data or for the data itself.	
<i>Requirement:</i>	Planned
4 The center shall be able to produce sample products of the data available.	
<i>Functional Area:</i> Transit Transportation Operations Data Collection	
Collects real-time information on the state of the regional transportation system for operational use by the center. It establishes communications with a regional repository, requests or subscribes to information relevant to the center, and distributes the received information for use.	
<i>Requirement:</i>	Existing
1 The center shall collect real-time information on the state of the regional transportation system including current traffic and road conditions, weather conditions, special event and incident information.	
<i>Requirement:</i>	Existing
2 The center shall support the capability for the system operator to monitor and control the information collection service.	
<i>Element:</i> GPTC Kiosks	
<i>Entity:</i> Remote Traveler Support	
<i>Functional Area:</i> Remote Basic Information Reception	
Public traveler interface, such as a kiosk, that provides formatted traffic advisories, transit, event, and other traveler information, as well as broadcast alerts.	
<i>Requirement:</i>	Existing
1 The public interface for travelers shall receive traffic information from a center and present it to the traveler.	
<i>Requirement:</i>	Existing
2 The public interface for travelers shall receive transit information from a center and present it to the traveler.	
<i>Requirement:</i>	Planned
3 The public interface for travelers shall receive event information from a center and present it to the traveler.	
<i>Requirement:</i>	Potential
4 This public interface for travelers shall receive evacuation information from a center and present it to the traveler.	
<i>Requirement:</i>	Planned
5 The public interface for travelers shall receive wide-area alerts and present it to the traveler.	
<i>Requirement:</i>	Planned
6 The public interface for travelers shall provide the capability for digitized map data to act as the background to the information presented to the traveler.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> GPTC Kiosks	
<i>Entity:</i> Remote Traveler Support	
<i>Functional Area:</i> Remote Basic Information Reception	
Public traveler interface, such as a kiosk, that provides formatted traffic advisories, transit, event, and other traveler information, as well as broadcast alerts.	
<i>Requirement:</i>	
7 The public interface for travelers shall support traveler input in audio or manual form.	Existing
<i>Requirement:</i>	
8 The public interface for travelers shall present information to the traveler in audible or visual forms consistent with a kiosk, including those that are suitable for travelers with hearing or vision physical disabilities.	Existing
<i>Requirement:</i>	
9 The public interface for travelers shall be able to store frequently requested data.	Planned
<i>Functional Area:</i> Remote Interactive Information Reception	
Public traveler interface, such as a kiosk, that provides traffic, transit, yellow pages, special event, and other personalized traveler information services upon request.	
<i>Requirement:</i>	
1 The public interface for travelers shall receive traffic information from a center and present it to the traveler upon request.	Existing
<i>Requirement:</i>	
2 The public interface for travelers shall receive transit information from a center and present it to the traveler upon request.	Existing
<i>Requirement:</i>	
3 The public interface for travelers shall receive yellow pages information (such as lodging, restaurants, theaters, bicycle facilities, and other tourist activities) from a center and present it to the traveler upon request.	Planned
<i>Requirement:</i>	
4 The public interface for travelers shall receive event information from a center and present it to the traveler upon request.	Planned
<i>Requirement:</i>	
5 The public interface for travelers shall receive evacuation information from a center and present it to the traveler.	Potential
<i>Requirement:</i>	
6 The public interface for travelers shall receive wide-area alerts and present it to the traveler.	Planned
<i>Requirement:</i>	
7 The public interface for travelers shall accept reservations for confirmed trip plans.	Existing
<i>Requirement:</i>	
8 The public interface for travelers shall support payment for services, such as confirmed trip plans, confirmed traveler services, tolls, transit fares, parking lot charges, and advanced payment for tolls.	Existing
<i>Requirement:</i>	
9 The public interface for travelers shall provide an interface through which credit identities and stored credit values may be collected from tags, traveler cards, or payment instruments used by travelers.	Existing
<i>Requirement:</i>	
10 The public interface for travelers shall base requests from the traveler on the traveler's current location or a specific location identified by the traveler, and filter the provided information accordingly.	Existing
<i>Requirement:</i>	
11 The public interface for travelers shall provide digitized map data to act as the background to the information presented to the traveler.	Planned

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> GPTC Kiosks	
<i>Entity:</i> Remote Traveler Support	
<i>Functional Area:</i> Remote Interactive Information Reception	
Public traveler interface, such as a kiosk, that provides traffic, transit, yellow pages, special event, and other personalized traveler information services upon request.	
<i>Requirement:</i>	
12 The public interface for travelers shall support traveler input in audio or manual form.	Planned
<i>Requirement:</i>	
13 The public interface for travelers shall present information to the traveler in audible or visual forms consistent with a kiosk, including those that are suitable for travelers with hearing or vision physical disabilities.	Existing
<i>Requirement:</i>	
14 The public interface for travelers shall be able to store frequently requested data.	Planned
<i>Functional Area:</i> Traveler Secure Area Surveillance	
Security surveillance devices that monitor traveler-frequented areas such as transit stops and rest stops.	
<i>Requirement:</i>	
1 The field element shall include video and/or audio surveillance of traveler secure areas including transit stations, transit stops, rest areas, park and ride lots, and other fixed sites along travel routes (e.g., emergency pull-off areas and traveler information centers).	Existing
<i>Requirement:</i>	
2 The field element shall be remotely controlled by a center.	Existing
<i>Requirement:</i>	
3 The field element shall provide equipment status and fault indication of surveillance equipment to a center.	Existing
<i>Requirement:</i>	
4 The field element shall provide raw video or audio data.	Existing
<i>Requirement:</i>	
5 The field element shall remotely process video and audio data and provide an indication of potential incidents or threats to a center.	Existing
<i>Functional Area:</i> Traveler Secure Area Sensor Monitoring	
Security sensors monitoring traveler-frequented areas such as transit stops, park-and-ride lots, and rest areas for environmental threats, intrusion and motion, and object detection.	
<i>Requirement:</i>	
1 The field element shall include security sensors that monitor conditions in traveler secure areas, which include transit stations, transit stops, rest areas, park and ride lots, and other fixed sites along travel routes (e.g., emergency pull-off areas and travel information centers).	Potential
<i>Requirement:</i>	
2 The field element shall be remotely controlled by a center.	Potential
<i>Requirement:</i>	
3 The field element shall provide equipment status and fault indication of security sensor equipment to a center.	Potential
<i>Requirement:</i>	
4 The field element shall include environmental threat sensors (e.g. chemical agent, toxic industrial chemical, biological, explosives, and radiological).	Potential
<i>Requirement:</i>	
5 The field element shall include motion and intrusion detection sensors.	Potential
<i>Requirement:</i>	
6 The field element shall include object detection sensors (such as metal detectors).	Potential
<i>Requirement:</i>	
7 The field element shall provide raw security sensor data.	Potential

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: GPTC Kiosks</i>	
<i>Entity: Remote Traveler Support</i>	
<i>Functional Area: Traveler Secure Area Sensor Monitoring</i>	
Security sensors monitoring traveler-frequented areas such as transit stops, park-and-ride lots, and rest areas for environmental threats, intrusion and motion, and object detection.	
<i>Requirement:</i>	
8 The field element shall remotely process security sensor data and provide an indication of potential incidents or threats to a center.	Potential
<i>Functional Area: Remote Traveler Security</i>	
Public traveler interface that provides the capability for travelers to report an emergency or activate a panic button to summon assistance in areas such as transit stops, park-and-ride areas, etc.	
<i>Requirement:</i>	
1 The public interface for travelers shall provide the capability for a traveler to report an emergency and summon assistance from secure areas such as transit stops, transit stations, modal transfer facilities, rest stops, park-and-ride areas, travel information areas, and emergency pull off areas.	Existing
<i>Requirement:</i>	
2 When initiated by a traveler, the public interface for travelers shall forward a request for assistance to an emergency management function and acknowledge the request.	Existing
<i>Requirement:</i>	
3 The public interface for travelers shall provide the capability to broadcast a message to advise or warn a traveler.	Planned
<i>Requirement:</i>	
4 The public interface for travelers shall accept input and provide information to the traveler in a form suitable for travelers with physical disabilities.	Planned
<i>Functional Area: Remote Transit Information Services</i>	
Public traveler interface that provides real-time travel-related information at transit stops and multi-modal transfer points, including general annunciation, display of imminent arrival information, the latest available information on transit routes, schedules, transfer options, available services, fares, and real-time schedule adherence.	
<i>Requirement:</i>	
1 The public interface for travelers shall collect and provide real-time travel-related information at transit stops, multi-modal transfer points, and other public transportation areas.	Planned
<i>Requirement:</i>	
2 The public interface for travelers shall collect and present to the transit traveler information on transit routes, schedules, and real-time schedule adherence.	Planned
<i>Requirement:</i>	
3 The public interface for travelers shall provide support for general annunciation and/or display of imminent arrival information and other information of general interest to transit users.	Planned
<i>Requirement:</i>	
4 The public interface for travelers shall present information to the traveler in a form suitable for travelers with physical disabilities.	Planned
<i>Functional Area: Remote Transit Fare Management</i>	
Public traveler interface, such as a kiosk, that provides the capability for the traveler to use a common fare medium for transit fares, tolls, and/or parking lot charges, to calculate the amount due and identify payment problems.	
<i>Requirement:</i>	
1 The public interface for travelers shall accept and process current transit passenger fare collection information.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: GPTC Kiosks</i>	
<i>Entity: Remote Traveler Support</i>	
<i>Functional Area: Remote Transit Fare Management</i>	
Public traveler interface, such as a kiosk, that provides the capability for the traveler to use a common fare medium for transit fares, tolls, and/or parking lot charges, to calculate the amount due and identify payment problems.	
<i>Requirement:</i> 2 The public interface for travelers shall calculate a fare based on the origin and destination provided by the traveler, in conjunction with transit routing, transit fare category, and transit user history.	Existing
<i>Requirement:</i> 3 The public interface for travelers shall provide an interface to a transit user traveler card in support of payment for transit fares, tolls, and/or parking lot charges. The stored credit value data from the card shall be collected and updated based on the fare or other charges, or the credit identity shall be collected.	Existing
<i>Requirement:</i> 4 The public interface for travelers shall provide information to the center for financial authorization and transaction processing.	Existing
<i>Requirement:</i> 5 The public interface for travelers shall provide an image of all travelers purchasing rides or services to be used for violation processing.	Potential
<i>Requirement:</i> 6 The public interface for travelers shall determine the routing based on the traveler's destination and the location of the closest transit stop from which a route request is being made.	Existing
<i>Requirement:</i> 7 The public interface for travelers shall create fare statistics data based upon data collected at a transit stop.	Existing
<i>Requirement:</i> 8 The public interface for travelers shall present information to the traveler in a form suitable for travelers with physical disabilities.	Planned
<i>Element: GPTC Transit Vehicles</i>	
<i>Entity: Transit Vehicle</i>	
<i>Functional Area: On-board Connection Protection</i>	
Monitors vehicle schedule performance and provides it to the transit center for connection protection processing. Also recognizes travelers who have arranged for connection protection and provides information regarding them to the transit center.	
<i>Requirement:</i> 1 The transit vehicle shall monitor vehicle schedule performance and provides it to the transit center for connection protection processing.	Existing
<i>Requirement:</i> 2 The transit vehicle shall receive operator instructions from the transit center relating to managing connection protection.	Existing
<i>Requirement:</i> 3 The transit vehicle shall recognizes individual travelers who have arranged for connection protection and provides information regarding them to the transit center.	Planned
<i>Functional Area: On-board Transit Trip Monitoring</i>	
Support fleet management with automatic vehicle location (AVL) and automated mileage and fuel reporting and auditing.	
<i>Requirement:</i> 1 The transit vehicle shall track the current location of the transit vehicle.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> GPTC Transit Vehicles	
<i>Entity:</i> Transit Vehicle	
<i>Functional Area:</i> On-board Transit Trip Monitoring	
Support fleet management with automatic vehicle location (AVL) and automated mileage and fuel reporting and auditing.	
<i>Requirement:</i>	Potential
2 The transit vehicle shall support the computation of the location of a transit vehicle using on-board sensors to augment the location determination function. This may include proximity to the transit stops or other known reference points as well as recording trip length.	
<i>Requirement:</i>	Potential
3 The transit vehicle shall record transit trip monitoring data including vehicle mileage and fuel usage.	
<i>Requirement:</i>	Potential
4 The transit vehicle shall record transit trip monitoring data including operational status information such as doors open/closed, running times, etc.	
<i>Requirement:</i>	Existing
5 The transit vehicle shall send the transit vehicle trip monitoring data to center-based trip monitoring functions.	
<i>Functional Area:</i> On-board Schedule Management	
Collecting of data for schedule generation and adjustment on-board a transit vehicle. Supports communication between the vehicle, operator, and center.	
<i>Requirement:</i>	Potential
1 The transit vehicle shall receive a vehicle assignment including transit route information, transit service instructions, traffic information, road conditions, and other information for the operator.	
<i>Requirement:</i>	Potential
2 The transit vehicle shall use the route information and its current location to determine the deviation from the predetermined schedule.	
<i>Requirement:</i>	Potential
3 The transit vehicle shall calculate the estimated times of arrival (ETA) at transit stops.	
<i>Requirement:</i>	Potential
4 The transit vehicle shall determine scenarios to correct the schedule deviation.	
<i>Requirement:</i>	Potential
5 The transit vehicle shall provide the schedule deviations and instructions for schedule corrections to the transit vehicle operator if the deviation is small, or the transit vehicle is operating in an urban area.	
<i>Requirement:</i>	Potential
6 The transit vehicle shall send the schedule deviation and estimated arrival time information to the center.	
<i>Requirement:</i>	Potential
7 The transit vehicle shall support the operations of a flexible route service. This may include requests for route deviations that would then lead to schedule corrective actions.	
<i>Requirement:</i>	Potential
8 The transit vehicle shall notify the transit center of vehicle location and operational status as the vehicle exits and returns to the transit facility to support future vehicle assignments.	
<i>Functional Area:</i> On-board Paratransit Operations	
On-board systems to manage paratransit and flexible-route dispatch requests, including multi-stop runs. Passenger data is collected and provided to the center.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> GPTC Transit Vehicles	
<i>Entity:</i> Transit Vehicle	
<i>Functional Area:</i> On-board Paratransit Operations	
On-board systems to manage paratransit and flexible-route dispatch requests, including multi-stop runs. Passenger data is collected and provided to the center.	
<i>Requirement:</i> 2 The transit vehicle shall receive the status of demand responsive or flexible-route transit schedules and passenger loading from the transit vehicle operator.	Existing
<i>Requirement:</i> 3 The transit vehicle shall provide the transit vehicle operator instructions about the demand responsive or flexible-route transit schedule that has been confirmed from the center.	Existing
<i>Requirement:</i> 4 The transit vehicle shall provide the capability to log passenger boardings and alightings and make passenger use data available to the transit center.	Existing
<i>Functional Area:</i> On-board Transit Fare Management	
On-board systems provide fare collection using a travelers non-monetary fare medium. Collected fare data are made available to the center.	
<i>Requirement:</i> 1 The transit vehicle shall read data from the traveler card / payment instrument presented by boarding passengers.	Existing
<i>Requirement:</i> 2 The transit vehicle shall provide an image of all travelers which shall be used for violation processing of those who do not have a traveler card / payment instrument or whose transit fare transaction fails.	Potential
<i>Requirement:</i> 3 The transit vehicle shall determine the traveler's travel routing based on the transit vehicle's current location and the traveler's destination.	Existing
<i>Requirement:</i> 4 The transit vehicle shall calculate the traveler's fare based on the origin and destination provided by the traveler as well as factors such as the transit routing, transit fare category, traveler history, and route-specific information.	Existing
<i>Requirement:</i> 5 The transit vehicle shall have access to the complete range of transit services (routes and schedules) that are available to the traveler.	Existing
<i>Requirement:</i> 6 The transit vehicle shall provide a transit fare payment interface that is suitable for travelers with physical disabilities.	Existing
<i>Requirement:</i> 7 The transit vehicle shall include a database on-board the transit vehicle for use in fare processing from which the fares for all possible trips within the transit operational network can be determined.	Existing
<i>Requirement:</i> 8 The transit vehicle shall support an emergency fare structure overriding all other fares that can be activated during disasters, states of emergency or evacuations.	Existing
<i>Requirement:</i> 10 The transit vehicle shall provide fare statistics data to the center.	Existing
<i>Functional Area:</i> On-board Passenger Counting	
On-board systems collect transit vehicle loading data and make it available to the center.	
<i>Requirement:</i> 1 The transit vehicle shall count passengers boarding and alighting.	Planned

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: GPTC Transit Vehicles</i>	
<i>Entity: Transit Vehicle</i>	
<i>Functional Area: On-board Passenger Counting</i>	
On-board systems collect transit vehicle loading data and make it available to the center.	
<i>Requirement:</i>	
2 The passenger counts shall be related to location to support association of passenger counts with routes, route segments, or bus stops.	Planned
<i>Requirement:</i>	
3 The passenger counts shall be timestamped so that ridership can be measured by time of day and day of week.	Planned
<i>Requirement:</i>	
4 The transit vehicle shall send the collected passenger count information to the transit center.	Planned
<i>Functional Area: On-board Transit Security</i>	
On-board video/audio surveillance systems, threat sensors, and object detection sensors to enhance security and safety on-board a transit vehicles. Also includes silent alarms activated by transit user or vehicle operator, operator authentication, and remote vehicle disabling.	
<i>Requirement:</i>	
1 The transit vehicle shall perform video and audio surveillance inside of transit vehicles and output raw video or audio data for either local monitoring (for processing or direct output to the transit vehicle operator), remote monitoring or for local storage (e.g., in an event recorder).	Existing
<i>Requirement:</i>	
2 The transit vehicle shall perform local monitoring of video or audio surveillance data collected inside of transit vehicles, and identify potential incidents or threats based on received processing parameters.	Existing
<i>Requirement:</i>	
3 The transit vehicle shall output an indication of potential incidents or threats and the processed video or audio information to the center along with the vehicle's current location.	Existing
<i>Requirement:</i>	
4 The transit vehicle shall detect potential threats via sensors for chemical agents, toxic industrial chemicals, biological agents, explosives, and radiation.	Potential
<i>Requirement:</i>	
5 The transit vehicle shall detect potential threats via object detection sensors (e.g. metal detectors).	Potential
<i>Requirement:</i>	
6 The transit vehicle shall output an indication of potential incidents or threats and the processed sensor information to the center along with the vehicle's current location.	Potential
<i>Requirement:</i>	
7 The transit vehicle shall accept sensor control data to allow remote control of the sensors.	Potential
<i>Requirement:</i>	
8 The transit vehicle shall monitor and output surveillance and sensor equipment status and fault indications.	Planned
<i>Requirement:</i>	
9 The transit vehicle shall accept emergency inputs from either the transit vehicle operator or a traveler through such interfaces as panic buttons, silent or audible alarms, etc.	Potential
<i>Requirement:</i>	
10 The transit vehicle shall output reported emergencies to the center.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> GPTC Transit Vehicles	
<i>Entity:</i> Transit Vehicle	
<i>Functional Area:</i> On-board Transit Security	
On-board video/audio surveillance systems, threat sensors, and object detection sensors to enhance security and safety on-board a transit vehicles. Also includes silent alarms activated by transit user or vehicle operator, operator authentication, and remote vehicle disabling.	
<i>Requirement:</i>	Existing
11 The transit vehicle shall receive acknowledgments of the emergency request from the center and output this acknowledgment to the transit vehicle operator or to the travelers.	
<i>Requirement:</i>	Existing
12 The transit vehicle shall be capable of receiving an emergency message for broadcast to the travelers or to the transit vehicle operator.	
<i>Requirement:</i>	Planned
13 The transit vehicle shall be capable of disabling or enabling the transit vehicle based on commands from the center or authentic inputs from the transit vehicle operator.	
<i>Requirement:</i>	Potential
14 The transit vehicle shall perform authentication of the transit vehicle operator.	
<i>Functional Area:</i> On-board Maintenance	
On-board systems to collect and process transit vehicle maintenance data including mileage and vehicle operating conditions for use in scheduling future vehicle maintenance.	
<i>Requirement:</i>	Planned
1 The transit vehicle shall collect and process vehicle mileage data available to sensors on-board.	
<i>Requirement:</i>	Planned
2 The transit vehicle shall collect and process the transit vehicle's operating conditions such as engine temperature, oil pressure, brake wear, internal lighting, environmental controls, etc.	
<i>Requirement:</i>	Planned
3 The transit vehicle shall transmit vehicle maintenance data to the center to be used for scheduling future vehicle maintenance.	
<i>Functional Area:</i> On-board Transit Information Services	
On-board systems to furnish next-stop annunciation as well as interactive travel-related information, including routes, schedules, transfer options, fares, real-time schedule adherence, current incidents, weather conditions, non-motorized transportation services, and special events.	
<i>Requirement:</i>	Planned
1 The transit vehicle shall enable traffic and travel advisory information to be requested and output to the traveler. Such information may include transit routes, schedules, transfer options, fares, real-time schedule adherence, current incidents, weather conditions, and special events.	
<i>Requirement:</i>	Planned
3 The transit vehicle shall broadcast advisories about the imminent arrival of the transit vehicle at the next stop via an on-board automated annunciation system.	
<i>Requirement:</i>	Planned
4 The transit vehicle shall support input and output forms that are suitable for travelers with physical disabilities.	
<i>Requirement:</i>	Existing
5 The transit vehicle shall gather transit advisory data, including alerts and advisories pertaining to major emergencies, or man made disasters.	
<i>Requirement:</i>	Planned
6 The transit vehicle shall tailor the output of the request traveler information based on the current location of the transit vehicle.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: GPTC Transit Vehicles</i>	
<i>Entity: Transit Vehicle</i>	
<i>Element: Hazmat Management and Cleanup</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Emergency Call-Taking</i>	
Provides interface to the emergency call-taking systems such as the Emergency Telecommunications System (e.g., 911) that correlate call information with emergencies reported by transit agencies, commercial vehicle operators, or other public safety agencies. Allows the operator to verify the incident and forward the information to the responding agencies.	
<i>Requirement:</i>	
1 The center shall support the interface to the Emergency Telecommunications System (e.g. 911 or 7-digit call routing) to receive emergency notification information and provide it to the emergency system operator.	Existing
<i>Requirement:</i>	
2 The center shall receive emergency call information from 911 services and present the possible incident information to the emergency system operator.	Existing
<i>Requirement:</i>	
4 The center shall receive emergency call information from mayday service providers and present the possible incident information to the emergency system operator.	Existing
<i>Requirement:</i>	
5 The center shall receive emergency notification information from other public safety agencies and present the possible incident information to the emergency system operator.	Existing
<i>Requirement:</i>	
7 The center shall coordinate, correlate, and verify all emergency inputs, including those identified based on external calls and internal analysis of security sensor and surveillance data, and assign each a level of confidence.	Planned
<i>Requirement:</i>	
8 The center shall send a request for remote control of CCTV systems from a traffic management center in order to verify the reported incident.	Planned
<i>Requirement:</i>	
9 The center shall forward the verified emergency information to the responding agency based on the location and nature of the emergency.	Existing
<i>Requirement:</i>	
10 The center shall update the incident information log once the emergency system operator has verified the incident.	Existing
<i>Requirement:</i>	
11 The center shall provide the capability for digitized map data to act as the background to the emergency information presented to the emergency system operator.	Planned
<i>Functional Area: Emergency Dispatch</i>	
Dispatch emergency vehicles to incidents, tracking their location and status. Pertinent incident information is gathered and relayed to the responding units.	
<i>Requirement:</i>	
1 The center shall dispatch emergency vehicles to respond to verified emergencies under center personnel control.	Existing
<i>Requirement:</i>	
2 The center shall store the current status of all emergency vehicles available for dispatch and those that have been dispatched.	Planned
<i>Requirement:</i>	
3 The center shall relay location and incident details to the responding vehicles.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Hazmat Management and Cleanup	
<i>Entity:</i> Emergency Management	
<i>Functional Area:</i> Emergency Dispatch	
Dispatch emergency vehicles to incidents, tracking their location and status. Pertinent incident information is gathered and relayed to the responding units.	
<i>Requirement:</i>	
4 The center shall track the location and status of emergency vehicles responding to an emergency based on information from the emergency vehicle.	Planned
<i>Requirement:</i>	
5 The center shall store and maintain the emergency service responses in an action log.	Existing
<i>Requirement:</i>	
6 The center shall provide the capability for digitized map data to act as the background to the information presented to the emergency system operator.	Planned
<i>Requirement:</i>	
7 The center shall receive traffic images to support dispatch of emergency vehicles.	Existing
<i>Requirement:</i>	
8 The center shall provide the capability to request remote control of traffic surveillance devices	Planned
<i>Requirement:</i>	
9 The center shall coordinate response to incidents with other Emergency Management centers to ensure appropriate resources are dispatched and utilized.	Existing
<i>Functional Area:</i> Emergency Routing	
Routing of emergency vehicles to facilitate the quickest/safest arrival. Routes may be determined based on real-time traffic information and road conditions or routes may be provided by Traffic Management on request.	
<i>Requirement:</i>	
1 The center shall collect current traffic and road condition information for emergency vehicle route calculation.	Existing
<i>Requirement:</i>	
2 The center shall receive information on the location and status of traffic control equipment and work zones along potential emergency routes.	Existing
<i>Requirement:</i>	
3 The center shall receive status information from care facilities to determine the appropriate facility and its location.	Existing
<i>Requirement:</i>	
4 The center shall receive asset restriction information to support the dispatching of appropriate emergency resources.	Existing
<i>Requirement:</i>	
5 The center shall receive current railroad schedule information for emergency vehicle route calculation.	Planned
<i>Requirement:</i>	
6 The center shall track current emergency vehicle location and status.	Planned
<i>Requirement:</i>	
7 The center shall calculate emergency vehicle routes, under center personnel control, based on the collected traffic and road conditions information.	Existing
<i>Requirement:</i>	
8 The center shall request and receive ingress and egress routes or other specialized emergency access routes from the traffic management center.	Planned
<i>Requirement:</i>	
9 The center shall provide the capability to request special traffic control measures, such as signal preemption, from the traffic management center to facilitate emergency vehicle progress along the suggested route.	Potential

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Hazmat Management and Cleanup	
<i>Entity:</i> Emergency Management	
<i>Functional Area:</i> Emergency Routing	
Routing of emergency vehicles to facilitate the quickest/safest arrival. Routes may be determined based on real-time traffic information and road conditions or routes may be provided by Traffic Management on request.	
<i>Requirement:</i>	Existing
10 Once the route is calculated the route shall be provided to the dispatch function.	
<i>Requirement:</i>	Existing
11 The center shall provide the capability for digitized map data to act as the background to the information presented to the emergency system operator.	
<i>Functional Area:</i> Incident Command	
Tactical decision support, resource coordination, and communications integration among emergency management agencies for Incident Commands that are established by first responders to support local management of an incident.	
<i>Requirement:</i>	Existing
1 The center shall 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.	
<i>Requirement:</i>	Existing
2 The center shall provide incident command communications with public safety, emergency management, transportation, and other allied response agency centers.	
<i>Requirement:</i>	Existing
3 The center shall track and maintain resource information and action plans pertaining to the incident command.	
<i>Requirement:</i>	Existing
4 The center shall 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.	
<i>Requirement:</i>	Planned
5 The center shall assess the status of responding emergency vehicles as part of an incident command.	
<i>Functional Area:</i> Emergency Early Warning System	
Monitors alerting and advisory systems, information collected by ITS surveillance and sensors, and reports from other agencies in order to identify potential, imminent, or in-progress major incidents or disasters. Notification is provided to other ITS centers to notify the traveling public.	
<i>Requirement:</i>	Existing
1 The center shall 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).	
<i>Requirement:</i>	Planned
2 The center shall provide the capability to correlate alerts and advisories, incident information, and security sensor and surveillance data.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Hazmat Management and Cleanup</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Emergency Early Warning System</i>	
Monitors alerting and advisory systems, information collected by ITS surveillance and sensors, and reports from other agencies in order to identify potential, imminent, or in-progress major incidents or disasters. Notification is provided to other ITS centers to notify the traveling public.	
<i>Requirement:</i> 3 The center shall 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.	Existing
<i>Requirement:</i> 5 The center shall broadcast wide-area alerts and advisories to toll administration centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	Existing
<i>Requirement:</i> 6 The center shall broadcast wide-area alerts and advisories to traveler information service providers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	Planned
<i>Requirement:</i> 7 The center shall broadcast wide-area alerts and advisories to maintenance centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	Existing
<i>Requirement:</i> 8 The center shall broadcast wide-area alerts and advisories to other emergency management centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	Existing
<i>Requirement:</i> 9 The center shall broadcast wide-area alerts and advisories to commercial vehicle administration centers and roadside check facilities for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	Existing
<i>Requirement:</i> 10 The center shall process status information from each of the centers that have been sent the wide-area alert.	Planned
<i>Requirement:</i> 11 The center shall coordinate the broadcast of wide-area alerts and advisories with other emergency management centers.	Planned
<i>Requirement:</i> 12 The center shall receive incident information from other transportation management centers to support the early warning system.	Existing
<i>Requirement:</i> 13 The center shall present the alert and advisory information and the status of the actions taken in response to the alert by the other centers to the emergency system operator as received from other system inputs.	Planned
<i>Requirement:</i> 14 The center shall support the entry of alert and advisory information directly from the emergency system operator.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Hazmat Management and Cleanup</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Emergency Response Management</i>	
Strategic emergency planning and response capabilities and broad inter-agency interfaces to support large-scale incidents and disasters, commonly associated with Emergency Operations Centers.	
<i>Requirement:</i>	
1 The center shall provide strategic emergency response capabilities provided by an Emergency Operations Center for large-scale incidents and disasters.	Existing
<i>Requirement:</i>	
2 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.	Existing
<i>Requirement:</i>	
3 The center shall provide the capability to implement response plans and track progress through the incident by exchanging incident information and response status with allied agencies.	Existing
<i>Requirement:</i>	
4 The center shall develop, coordinate with other agencies, and store emergency response plans.	Planned
<i>Requirement:</i>	
5 The center shall track the availability of resources and coordinate resource sharing with allied agency centers including traffic, maintenance, or other emergency centers.	Existing
<i>Requirement:</i>	
6 The center shall 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.	Existing
<i>Requirement:</i>	
8 The center shall support remote control of field equipment normally under control of the traffic management center including traffic signals, dynamic message signs, gates, and barriers.	Planned
<i>Requirement:</i>	
9 The center shall provide the capability to remotely control and monitor CCTV systems normally operated by a traffic management center.	Planned
<i>Requirement:</i>	
11 The center shall 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.	Planned
<i>Requirement:</i>	
12 The center shall provide information to the media concerning the status of an emergency response.	Existing
<i>Requirement:</i>	
13 The center shall provide the capability for digitized map data to act as the background to the information presented to the emergency system operator.	Planned
<i>Requirement:</i>	
14 The center shall provide the capability for center personnel to provide inputs to the management of incidents, disasters and evacuations.	Existing
<i>Requirement:</i>	
15 The center shall collect information about the status of the recovery efforts for the infrastructure during disasters.	Existing
<i>Requirement:</i>	
16 The center shall provide the overall status of infrastructure recovery efforts to traveler information providers and media.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Hazmat Management and Cleanup	
<i>Entity:</i> Emergency Management	
<i>Functional Area:</i> Emergency Response Management	
Strategic emergency planning and response capabilities and broad inter-agency interfaces to support large-scale incidents and disasters, commonly associated with Emergency Operations Centers.	
<i>Requirement:</i>	
17 The center shall provide the capability to communicate information about emergency situations to local population through the Emergency Telecommunications System.	Potential
<i>Requirement:</i>	
18 The center shall 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.	Planned
<i>Requirement:</i>	
19 The center shall retrieve information from public health systems to increase preparedness for, and implement a response to biological, chemical, radiation, and other public health emergencies.	Existing
<i>Functional Area:</i> Emergency Environmental Monitoring	
Collects current and forecast road and weather information that is used by the operator to more effectively manage incidents.	
<i>Requirement:</i>	
1 The center shall 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).	Existing
<i>Requirement:</i>	
2 The center shall collect current road and weather information from roadway maintenance operations.	Existing
<i>Requirement:</i>	
3 The center shall assimilate current and forecast road conditions and surface weather information to support incident management.	Existing
<i>Requirement:</i>	
4 The center shall present the current and forecast road and weather information to the emergency system operator.	Existing
<i>Functional Area:</i> Mayday Support	
Collection and response to Mayday messages received from vehicles and drivers.	
<i>Requirement:</i>	
1 The center shall collect mayday messages from vehicles and drivers.	Existing
<i>Requirement:</i>	
2 The center shall collect mayday messages from travelers via personal handheld devices.	Existing
<i>Requirement:</i>	
3 The center shall acknowledge the request for emergency assistance, whether originated by the driver, automatically by the vehicle's safety systems, or by a traveler via a personal handheld device.	Existing
<i>Requirement:</i>	
4 After the mayday becomes a verified incident, the center shall determine the appropriate response to the mayday message.	Existing
<i>Requirement:</i>	
5 The center shall determine whether the mayday message indicates an emergency that requires the attention of public safety agencies, and forward mayday emergency data to the appropriate agency as necessary.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Hazmat Management and Cleanup</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Mayday Support</i>	
Collection and response to Mayday messages received from vehicles and drivers.	
<i>Requirement:</i> 6 The center shall support the activation of remote controlled functions requested by a vehicle, such as requests to unlock doors.	Potential
<i>Requirement:</i> 7 The center shall request additional emergency details from or issue commands to the vehicle's security systems or vehicle driver if needed.	Existing
<i>Requirement:</i> 8 The center shall maintain a log of all mayday signals received from vehicles.	Existing
<i>Requirement:</i> 9 The center shall provide all mayday data to center personnel and respond to the vehicle, driver, or traveler using the portable handheld device as directed by the personnel.	Existing
<i>Functional Area: Emergency Commercial Vehicle Response</i>	
Responds to commercial vehicle and freight equipment related emergencies. Includes incidents involving hazardous materials as well as the detection of non-permitted transport of security sensitive hazmat.	
<i>Requirement:</i> 1 The center shall receive emergency notification information from commercial vehicles, commercial vehicle check stations, or commercial fleet operators and present the possible incident information to the emergency system operator. This may include detection of non-permitted transport of security sensitive hazmat, hazardous cargo spills, etc.	Existing
<i>Requirement:</i> 2 The center shall receive details of the cargo being carried by commercial vehicles from their commercial fleet manager for incidents involving potential hazardous materials.	Existing
<i>Requirement:</i> 3 The center shall forward the verified emergency information to the responding agency based on the location and nature of the emergency.	Existing
<i>Requirement:</i> 4 The center shall provide the capability to request Fleet and Freight Management to disable a specific vehicle in their fleet.	Planned
<i>Entity: Fleet and Freight Management</i>	
<i>Functional Area: Fleet Administration</i>	
Commercial vehicle fleet tracking, dispatch, and reporting - includes interfaces to state/federal commercial vehicle administration, toll administration, emergency management, and traveler information service providers. Supports pre-hiring checks and performance monitoring for drivers.	
<i>Requirement:</i> 3 The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as the background for commercial vehicle fleet administration - includes commercial vehicle specific data such as route or HAZMAT restrictions.	Planned
<i>Requirement:</i> 4 The center shall monitor the locations and progress of commercial vehicles against their planned routes and raise appropriate warnings based on route monitoring parameters.	Planned

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Hazmat Management and Cleanup	
<i>Entity:</i> Fleet and Freight Management	
<i>Functional Area:</i> Fleet Administration	
Commercial vehicle fleet tracking, dispatch, and reporting - includes interfaces to state/federal commercial vehicle administration, toll administration, emergency management, and traveler information service providers. Supports pre-hiring checks and performance monitoring for drivers.	
<i>Requirement:</i> 5	The center shall coordinate the response to security incidents and the sharing of security threat information involving commercial vehicles with other agencies including emergency management centers and alerting/advisory systems. Existing
<i>Functional Area:</i> Freight Administration and Management	
Management of the movement of cargo from source to destination via links to intermodal freight shippers, government agencies, and depots as well as links out to the freight equipment.	
<i>Requirement:</i> 4	The center shall track the progress of freight equipment as it moves from source to destination based on inputs from the commercial vehicles, the freight equipment, intermodal freight depots, shippers, and commercial vehicle administration centers that provide border clearance status information. Planned
<i>Requirement:</i> 6	The center shall notify other security functions within the center of deviations in the movement of freight equipment from its planned route. Existing
<i>Requirement:</i> 9	The center shall coordinate the response to security incidents and the sharing of security threat information involving freight equipment with other agencies including emergency management centers, intermodal freight shippers, and alerting/advisory systems. Existing
<i>Functional Area:</i> Fleet Credentials and Taxes Management and Reporting	
Commercial vehicle fleet support systems for the purchase and filing of electronic credentials, status reporting, tax audit data, and compliance reviews. Electronic interfaces with the appropriate state or federal commercial vehicle administration centers.	
<i>Requirement:</i> 2	The center shall receive compliance review reports from the appropriate commercial vehicle administration centers concerning the operations of the commercial vehicle fleet, including concomitant out-of-service notifications, and carrier warnings/notifications. Existing
<i>Functional Area:</i> Commercial Vehicle and Freight Security	
Coordinated response for commercial vehicle and freight security incidents. Remote monitoring of commercial vehicle driver and freight equipment to vehicle assignments as well as detection of breaches or tampering.	
<i>Requirement:</i> 1	The center shall monitor the identity of a commercial vehicle driver and compare it with the planned driver, generating warnings if the tracked identities do not match the planned assignments. Planned
<i>Requirement:</i> 2	The center shall monitor the freight equipment identity with the planned vehicle assignment, generating a warning if the tracked identities do not match the planned assignments. Planned

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Hazmat Management and Cleanup	
<i>Entity:</i> Fleet and Freight Management	
<i>Functional Area:</i> Commercial Vehicle and Freight Security	
Coordinated response for commercial vehicle and freight security incidents. Remote monitoring of commercial vehicle driver and freight equipment to vehicle assignments as well as detection of breaches or tampering.	
<i>Requirement:</i>	
3 The center shall receive data from commercial vehicles and freight equipment concerning potential critical security problem(s), including a breach or tamper event with information such as time, date, location, identities, and nature of the problem.	Planned
<i>Requirement:</i>	
4 The center shall coordinate the response to security incidents and the sharing of security threat information involving commercial vehicles and freight equipment with other agencies including emergency management centers, intermodal freight shippers, and alerting/advisory systems.	Existing
<i>Functional Area:</i> Fleet HAZMAT Management	
Notification of hazardous materials (HAZMAT) shipments to emergency management centers for commercial vehicles managed by the center - includes information on the nature of the cargo, the vehicle, and its expected route.	
<i>Requirement:</i>	
1 The center shall track the routing and cargo information, including the manifest data plus the chemical characteristics of a hazardous materials (HAZMAT) load being carried by its fleet of commercial vehicles.	Existing
<i>Requirement:</i>	
2 The center shall provide information concerning commercial vehicles carrying hazardous materials (HAZMAT) upon request from an emergency management center. The information includes the nature of the cargo being carried, identity of the vehicle and unloading instructions.	Existing
<i>Element:</i> Hazmat Response Vehicles	
<i>Entity:</i> Emergency Vehicle	
<i>Functional Area:</i> On-board EV En Route Support	
On-board systems for gathering of dispatch and routing information for emergency vehicle personnel, vehicle tracking, communications with care facilities, and signal preemption via short range communication directly with traffic control equipment at the roadside.	
<i>Requirement:</i>	
1 The emergency vehicle, including roadway service patrols, shall track its current location.	Existing
<i>Requirement:</i>	
2 The emergency vehicle, including roadway service patrols, shall send the vehicle's location and operational data to the center for emergency management and dispatch.	Existing
<i>Requirement:</i>	
3 The emergency vehicle, including roadway service patrols, shall receive incident details and a suggested route when dispatched to a scene.	Existing
<i>Requirement:</i>	
4 The emergency vehicle shall send the current en route status (including estimated time of arrival) and requests for emergency dispatch updates.	Existing
<i>Requirement:</i>	
5 The emergency vehicle shall send requests to traffic signal control equipment at the roadside to preempt the signal.	Potential

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Hazmat Response Vehicles</i>	
<i>Entity: Emergency Vehicle</i>	
<i>Functional Area: On-board EV En Route Support</i>	
On-board systems for gathering of dispatch and routing information for emergency vehicle personnel, vehicle tracking, communications with care facilities, and signal preemption via short range communication directly with traffic control equipment at the roadside.	
<i>Requirement:</i>	Existing
6 The emergency vehicle shall provide the personnel on-board with dispatch information, including incident type and location, and forward an acknowledgment from personnel to the center that the vehicle is on its way to the incident scene.	
<i>Requirement:</i>	Existing
7 The emergency vehicle shall send patient status information to the care facility along with a request for further information.	
<i>Requirement:</i>	Existing
8 The emergency vehicle shall forward care facility status information to emergency vehicle personnel, including the location, specialized services, quality of care, waiting time, number of rooms available, and emergency room status of hospitals or emergency care providers.	
<i>Requirement:</i>	Existing
9 The emergency vehicle shall send the vehicle's location, speed and direction to other vehicles in the area.	
<i>Functional Area: On-board EV Incident Management Communication</i>	
On-board systems provide communications support to first responders. Incident information is provided to dispatched emergency personnel. Emergency personnel transmit information about the incident and response status.	
<i>Requirement:</i>	Existing
1 The emergency vehicle shall receive dispatch instructions sufficient to enable emergency personnel in the field to implement an effective incident response. It includes local traffic, road, and weather conditions, hazardous material information, and the current status of resources that have been allocated to an incident.	
<i>Requirement:</i>	Existing
2 The emergency vehicle shall provide an interface to the center for emergency personnel to transmit information about the incident site such as the extent of injuries, identification of vehicles and people involved, hazardous material, etc.	
<i>Requirement:</i>	Existing
3 The emergency vehicle shall provide an interface to the center for emergency personnel to transmit information about the current incident response status such as the identification of the resources on site, site management strategies in effect, and current clearance status.	
<i>Requirement:</i>	Existing
4 The emergency vehicle shall provide traffic incident information to approaching vehicles using short range communications..	
<i>Functional Area: On-Board EV Barrier System Control</i>	
Control automatic or remotely controlled gates and other barrier systems from an emergency vehicle.	
<i>Requirement:</i>	Planned
1 The vehicle shall remotely control barrier systems. Barrier systems include automated or remotely controlled gates, barriers and other systems that manage entry to roadways.	
<i>Element: Illiana Corridor Maintenance and Construction Management System</i>	
<i>Entity: Maintenance and Construction Management</i>	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Illiana Corridor Maintenance and Construction Management System	
<i>Entity:</i> Maintenance and Construction Management	
<i>Functional Area:</i> MCM Vehicle Tracking	
Remotely tracks the location of maintenance and construction vehicles and other equipment; presented to the center personnel.	
<i>Requirement:</i>	Planned
1 The center shall monitor the locations of all maintenance and construction vehicles and other equipment under its jurisdiction.	
<i>Requirement:</i>	Planned
2 The center shall present location data to center personnel for the fleet of maintenance and construction vehicles and other equipment.	
<i>Requirement:</i>	Planned
3 The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for maintenance and construction vehicle tracking.	
<i>Functional Area:</i> MCM Vehicle and Equipment Maintenance Management	
Monitors vehicle and equipment condition, tracks maintenance history, and schedules routine and corrective maintenance.	
<i>Requirement:</i>	Planned
1 The center shall collect and analyze vehicle diagnostics information from maintenance and construction vehicles. The information includes engine temperature, mileage, tire wear, brake wear, belt wear, and any warnings or alarms concerning the operational condition of the vehicle and ancillary equipment.	
<i>Requirement:</i>	Planned
2 The center shall exchange information with equipment repair facilities including status and history of repairs concerning maintenance and construction vehicles. This information includes vehicle status and diagnostic information, vehicle utilization, and coordination of when vehicles will be available for preventative and corrective maintenance.	
<i>Requirement:</i>	Planned
3 The center shall schedule preventive and corrective vehicle maintenance with the equipment repair facility based on fleet health reports, maintenance records, vehicle utilization and vehicle availability schedules.	
<i>Functional Area:</i> MCM Incident Management	
Supports coordinated response to incidents - share incident notifications, manage incident response resources, and coordinate overall incident situation and response among allied response organizations.	
<i>Requirement:</i>	Planned
1 The center shall 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.	
<i>Requirement:</i>	Planned
2 The center shall 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.	
<i>Requirement:</i>	Planned
3 The center shall 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.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Illiana Corridor Maintenance and Construction Management System</i>	
<i>Entity: Maintenance and Construction Management</i>	
<i>Functional Area: MCM Incident Management</i>	
Supports coordinated response to incidents - share incident notifications, manage incident response resources, and coordinate overall incident situation and response among allied response organizations.	
<i>Requirement:</i>	Planned
4 The center shall coordinate planning for incidents with emergency management centers - including pre-planning activities for disaster response, evacuation, and recovery operations.	
<i>Requirement:</i>	Planned
5 The center shall 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.	
<i>Requirement:</i>	Planned
6 The center shall exchange road network status assessment information with emergency management and traffic management 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.	
<i>Requirement:</i>	Planned
7 The center shall 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.	
<i>Requirement:</i>	Planned
8 The center shall receive information indicating the damage sustained by transportation assets, derived from aerial surveillance, field reports, inspections, tests, and analyses to support incident management.	
<i>Functional Area: MCM Maintenance Decision Support</i>	
Maintenance Decision Support Systems recommend courses of action based on current and forecast environmental and road conditions (filtered and fused for specific time horizons) and additional application specific information. Recommendations and dispatch instructions are generated based on this integrated information.	
<i>Requirement:</i>	Planned
1 The center shall provide the center personnel with tailored external information, including weather or road condition observations, forecasted weather information or road conditions, current usage of treatments and materials, available resources, equipment and vehicle availability, road network information, and source reliability information.	
<i>Requirement:</i>	Planned
2 The center shall tailor the decision support information to include filtering (selection from a large amount of external information), error reduction ('smoothing' the information), fusion (combination of disparate information to match the decision needs), and analysis (creating the decision).	
<i>Requirement:</i>	Planned
3 The center shall provide an interface to the center personnel to input control parameters for the decision support process and receive decisions or information presentation.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Illiana Corridor Maintenance and Construction Management System</i>	
<i>Entity: Maintenance and Construction Management</i>	
<i>Functional Area: MCM Maintenance Decision Support</i>	
Maintenance Decision Support Systems recommend courses of action based on current and forecast environmental and road conditions (filtered and fused for specific time horizons) and additional application specific information. Recommendations and dispatch instructions are generated based on this integrated information.	
<i>Requirement:</i>	
4 The center shall provide dispatch information to maintenance and construction vehicles based on the outputs of the decision support system, including recommended roadway treatment actions.	Planned
<i>Functional Area: MCM Winter Maintenance Management</i>	
Manages winter road maintenance, tracking and controlling snow plow operations, roadway treatment (e.g., salt spraying and other material applications) based on weather information.	
<i>Requirement:</i>	
1 The center shall respond to requests from emergency management and traffic management centers for hazard removal, field equipment repair, and other winter roadway maintenance.	Planned
<i>Requirement:</i>	
2 The center shall exchange information with administrative systems to support the planning and scheduling of winter maintenance activities. This information includes: equipment and consumables resupply purchase request status, personnel qualifications including training and special certifications, environmental regulations and rules that may impact maintenance activities, and requests and project requirements from contract administration.	Planned
<i>Requirement:</i>	
3 The center shall 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.	Planned
<i>Requirement:</i>	
4 The center shall receive equipment availability and materials storage status information from storage facilities to support the scheduling of winter maintenance activities.	Planned
<i>Requirement:</i>	
5 The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for the scheduling of winter maintenance activities.	Planned
<i>Requirement:</i>	
6 The center shall collect real-time information on the state of the regional transportation system from other centers including current traffic and road conditions, weather conditions, special event and incident information and use the collected information to support winter maintenance operations.	Planned
<i>Requirement:</i>	
7 The center shall dispatch and route winter maintenance vehicle drivers and support them with route- specific environmental, incident, advisory, threat, alert, and traffic congestion information.	Planned

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Illiana Corridor Maintenance and Construction Management System</i>	
<i>Entity: Maintenance and Construction Management</i>	
<i>Functional Area: MCM Winter Maintenance Management</i>	
Manages winter road maintenance, tracking and controlling snow plow operations, roadway treatment (e.g., salt spraying and other material applications) based on weather information.	
<i>Requirement:</i>	Planned
8 The center shall 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.	
<i>Requirement:</i>	Planned
9 The center shall 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.	
<i>Requirement:</i>	Planned
10 The center shall support remote control of on-board maintenance and construction vehicle systems and field equipment that is remotely controlled by the vehicle such as adjusting material application rates and spread patterns.	
<i>Requirement:</i>	Planned
11 The center shall assess the current status of all winter maintenance activities, including actual work activities performed, current locations and operational conditions of vehicles, materials and equipment inventories, field equipment status, environmental information, etc.	
<i>Functional Area: MCM Roadway Maintenance and Construction</i>	
Overall management and support for routine maintenance on the roadway or right-of-way. Includes landscape maintenance, hazard removal (roadway debris, dead animals), routine maintenance activities (roadway cleaning, grass cutting), and repair and maintenance of both ITS and non-ITS equipment.	
<i>Requirement:</i>	Planned
1 The center shall maintain an interface with asset management systems to track the inventory, restrictions, repair needs and status updates of transportation assets (pavement, bridges, signs, etc.) including location, installation and materials information, vendor/contractor, current maintenance status, standard height, width, and weight restrictions.	
<i>Requirement:</i>	Planned
2 The center shall respond to requests from emergency management and traffic management centers for hazard removal, field equipment repair, and other roadway maintenance.	
<i>Requirement:</i>	Planned
3 The center shall exchange information with administrative systems to support the planning and scheduling of maintenance activities. This information includes: equipment and consumables resupply purchase request status, personnel qualifications including training and special certifications, environmental regulations and rules that may impact maintenance activities, and requests and project requirements from contract administration.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Illiana Corridor Maintenance and Construction Management System</i>	
<i>Entity: Maintenance and Construction Management</i>	
<i>Functional Area: MCM Roadway Maintenance and Construction</i>	
Overall management and support for routine maintenance on the roadway or right-of-way. Includes landscape maintenance, hazard removal (roadway debris, dead animals), routine maintenance activities (roadway cleaning, grass cutting), and repair and maintenance of both ITS and non-ITS equipment.	
<i>Requirement:</i>	
4 The center shall provide emergency management and traffic management centers with information about scheduled maintenance and construction work activities including anticipated closures and impact to the roadway, alternate routes, anticipated delays, closure times, and durations.	Planned
<i>Requirement:</i>	
5 The center shall collect the status and fault data from roadside equipment, such as traffic, infrastructure, and environmental sensors, highway advisory radio and dynamic message signs, automated roadway treatment systems, barrier and safeguard systems, cameras, traffic signals and override equipment, ramp meters, short range communications equipment, security sensors and surveillance equipment, etc., and provide a cohesive view of equipment repair needs.	Planned
<i>Requirement:</i>	
6 The center shall collect the status and fault data from the centers that operate the equipment, including data for traffic, infrastructure, and environmental sensors, highway advisory radio and dynamic message signs, automated roadway treatment systems, barrier and safeguard systems, cameras, traffic signals and override equipment, ramp meters, short range communications equipment, security sensors and surveillance equipment, etc., and provide a cohesive view of equipment repair needs.	Planned
<i>Requirement:</i>	
7 The center shall receive equipment availability and materials storage status information from storage facilities to support the scheduling of roadway maintenance and construction activities.	Planned
<i>Requirement:</i>	
8 The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for the scheduling of roadway maintenance and construction activities.	Planned
<i>Requirement:</i>	
9 The center shall collect current and forecast traffic and weather information from traffic management centers and weather service providers (such as the National Weather Service and value-added sector specific meteorological services).	Planned
<i>Requirement:</i>	
10 The center shall dispatch and route maintenance and construction vehicle drivers and support them with route-specific environmental, incident, advisory, threat, alert, and traffic congestion information.	Planned
<i>Requirement:</i>	
11 The center shall manage an interface with center personnel to accept vehicle systems control information and remotely control maintenance and construction vehicle on-board equipment.	Planned
<i>Requirement:</i>	
12 The center shall track the status of roadway maintenance and construction activities by monitoring collected data from the dispatched vehicles and equipment.	Planned

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Illiana Corridor Maintenance and Construction Management System</i>	
<i>Entity: Maintenance and Construction Management</i>	
<i>Functional Area: MCM Roadway Maintenance and Construction</i>	
Overall management and support for routine maintenance on the roadway or right-of-way. Includes landscape maintenance, hazard removal (roadway debris, dead animals), routine maintenance activities (roadway cleaning, grass cutting), and repair and maintenance of both ITS and non-ITS equipment.	
<i>Requirement:</i> 13 The center shall report the status of field equipment maintenance activities to the centers that operate the equipment.	Planned
<i>Functional Area: MCM Work Zone Management</i>	
Remotely monitors and supports work zone activities, controlling traffic through dynamic message signs (DMS), highway advisory radio, gates and barriers, and informing other groups of activity (e.g., traveler information systems, traffic management centers, other maintenance and construction centers).	
<i>Requirement:</i> 1 The center shall generate new work zone activity schedules for use by maintenance and construction vehicles, maintenance and construction operators, and for information coordination purposes.	Planned
<i>Requirement:</i> 2 The center shall control the collection of work zone status information including video images from cameras located in or near the work zone.	Planned
<i>Requirement:</i> 3 The center shall disseminate work zone information to other agencies and centers including traffic, transit, emergency management centers, other maintenance centers, traveler information providers, and the media.	Planned
<i>Requirement:</i> 4 The center shall control traffic in work zones by providing remote control of dynamic message signs, highway advisory radio systems, gates, and barriers located in or near the work zone.	Planned
<i>Requirement:</i> 5 The center shall exchange information with administrative systems to support the planning and scheduling of work zone activities. This information includes: equipment and consumables resupply purchase request status, personnel qualifications including training and special certifications, environmental regulations and rules that may impact maintenance activities, and requests and project requirements from contract administration.	Planned
<i>Requirement:</i> 6 The center shall collect real-time information on the state of the road network including current traffic and road conditions to support work zone scheduling and management.	Planned
<i>Functional Area: MCM Speed Monitoring and Warning</i>	
Remotely monitors vehicle speeds, and informs an enforcement agency if excessive speeds are detected; primarily used in work zones.	
<i>Requirement:</i> 1 The center shall remotely control vehicle speed sensors typically placed in work zones; control parameters may include environmental and traffic conditions.	Potential

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Illiana Corridor Maintenance and Construction Management System</i>	
<i>Entity: Maintenance and Construction Management</i>	
<i>Functional Area: MCM Speed Monitoring and Warning</i>	
Remotely monitors vehicle speeds, and informs an enforcement agency if excessive speeds are detected; primarily used in work zones.	
<i>Requirement:</i> 2 The center shall collect operational status for the vehicle speed sensors; the status shall include logged information including measured speeds, warning messages displayed, and violation records.	Potential
<i>Requirement:</i> 3 The center shall provide the capability to notify an enforcement agency when vehicle speeds in the work zone are in excess of the posted speed limit or are creating an unsafe condition based upon the current environmental or traffic conditions.	Potential
<i>Requirement:</i> 4 The center shall collect fault data for the vehicle speed sensors for repair.	Potential
<i>Functional Area: MCM Work Zone Safety Management</i>	
Remotely monitors work zone safety systems that detect vehicle intrusions in work zones and warns crew workers and drivers of imminent encroachment. Crew movements are also monitored so that the crew can be warned of movement beyond the designated safe zone.	
<i>Requirement:</i> 1 The center shall provide remote monitoring and control of work zone safety devices - including intrusion detection devices that have been installed in work zones or maintenance areas.	Potential
<i>Requirement:</i> 2 The center shall provide remote monitoring and control of intrusion alert devices that have been installed in work zones or maintenance areas.	Potential
<i>Requirement:</i> 3 The center shall collect status information of work zone safety device status from field equipment or the maintenance and construction vehicles.	Potential
<i>Requirement:</i> 4 The center shall collect and store work zone data collected from work zone monitoring devices (such as intrusion detection or alert devices and speed monitoring devices) on-board the vehicle and at the roadside.	Potential
<i>Functional Area: MCM Work Activity Coordination</i>	
Disseminates work activity schedules and current asset restrictions to other agencies. Work schedules are coordinated, factoring in the needs and activities of other agencies and adjacent jurisdictions.	
<i>Requirement:</i> 1 The center shall 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.	Planned

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Illiana Corridor Maintenance and Construction Management System	
<i>Entity:</i> Maintenance and Construction Management	
<i>Functional Area:</i> MCM Work Activity Coordination	
Disseminates work activity schedules and current asset restrictions to other agencies. Work schedules are coordinated, factoring in the needs and activities of other agencies and adjacent jurisdictions.	
<i>Requirement:</i> 2 The center shall 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.	Planned
<i>Requirement:</i> 3 The center shall collect and respond to feedback concerning scheduled maintenance and construction activities with other management centers such as traffic, emergency, transit, and rail operations.	Planned
<i>Requirement:</i> 4 The center shall collect and disseminate asset restriction information levied on transportation asset usage based on infrastructure design, surveys, tests, or analyses. This includes standard facility design height, width, and weight restrictions, special restrictions such as spring weight restrictions, and temporary facility restrictions that are imposed during maintenance and construction.	Planned
<i>Requirement:</i> 5 The center shall exchange information with administrative systems to support the planning and scheduling of maintenance and construction activities. This information includes: equipment and consumables resupply purchase request status, personnel qualifications including training and special certifications, environmental regulations and rules that may impact maintenance activities, and requests and project requirements from contract administration.	Planned
<i>Functional Area:</i> MCM Infrastructure Monitoring	
Remotely monitors the condition of pavement, bridges, tunnels, associated hardware, and other transportation-related infrastructure (e.g., culverts) using vehicle-based and roadway-based infrastructure monitoring sensors.	
<i>Requirement:</i> 1 The center shall remotely control and collect data from fixed infrastructure monitoring sensors that monitor vibration, stress, temperature, surface continuity, and other condition measures.	Planned
<i>Requirement:</i> 2 The center shall monitor maintenance vehicle-based mobile sensors and data logging devices that collect information on current infrastructure condition.	Planned
<i>Requirement:</i> 3 The center shall remotely collect data from vehicle probes using short range communications equipment and process this data to identify potential pavement degradation, potholes, and other rough or adverse road surface conditions.	Planned
<i>Requirement:</i> 4 The center shall process the collected information and use it to monitor the condition of pavement, bridges, tunnels, associated hardware, and other transportation-related infrastructure.	Planned

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Illiana Corridor Maintenance and Construction Management System</i>	
<i>Entity: Maintenance and Construction Management</i>	
<i>Functional Area: MCM Infrastructure Monitoring</i>	
Remotely monitors the condition of pavement, bridges, tunnels, associated hardware, and other transportation-related infrastructure (e.g., culverts) using vehicle-based and roadway-based infrastructure monitoring sensors.	
<i>Requirement:</i>	Planned
5 The center shall collect current maintenance and repair needs from the asset management system and correlate this data with data collected through infrastructure monitoring systems.	
<i>Requirement:</i>	Planned
6 The center shall provide current infrastructure conditions information to the asset management system.	
<i>Requirement:</i>	Planned
7 The center shall report infrastructure repair needs to the maintenance management system.	
<i>Functional Area: MCM Data Collection</i>	
Collection and storage of maintenance and construction information. For use by operations personnel or data archives in the region.	
<i>Requirement:</i>	Planned
1 The center shall collect maintenance and construction data (such as field equipment status, infrastructure status, maintenance and construction activity data) gathered from roadway, traffic, and other maintenance and construction sources.	
<i>Requirement:</i>	Planned
2 The center shall assign quality control metrics and meta-data to be stored along with the data. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.	
<i>Requirement:</i>	Planned
3 The center shall receive and respond to requests from ITS Archives for either a catalog of the maintenance and construction data or for the data itself.	
<i>Requirement:</i>	Planned
4 The center shall be able to produce sample products of the data available.	
<i>Requirement:</i>	Planned
5 The center shall provide data to Asset Management to be used in updating the status of assets in the inventory.	
<i>Functional Area: MCM Transportation Operations Data Collection</i>	
Collects real-time information on the state of the regional transportation system for operational use by the center. It establishes communications with a regional repository, requests or subscribes to information relevant to the center, and distributes the received information for use.	
<i>Requirement:</i>	Planned
1 The center shall collect real-time information on the state of the regional transportation system including current traffic and road conditions, weather conditions, special event and incident information.	
<i>Requirement:</i>	Planned
2 The center shall support the capability for the system operator to monitor and control the information collection service.	
<i>Element: Illiana Corridor Maintenance and Construction Vehicles</i>	
<i>Entity: Maintenance and Construction Vehicle</i>	
<i>Functional Area: MCV Vehicle Location Tracking</i>	
On-board systems to track vehicle location and reports the position and timestamp information to the dispatch center.	
<i>Requirement:</i>	Planned
1 The maintenance and construction vehicle shall track its current location.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Illiana Corridor Maintenance and Construction Vehicles	
<i>Entity:</i> Maintenance and Construction Vehicle	
<i>Functional Area:</i> MCV Vehicle Location Tracking	
On-board systems to track vehicle location and reports the position and timestamp information to the dispatch center.	
<i>Requirement:</i>	Planned
2 The maintenance and construction vehicle shall send the time stamped vehicle location to the controlling center.	
<i>Functional Area:</i> MCV Vehicle System Monitoring and Diagnostics	
On-board sensors capable of monitoring the condition of each of the vehicle systems and diagnostics that can be used to support vehicle maintenance.	
<i>Requirement:</i>	Planned
1 The maintenance and construction vehicle shall collect vehicle diagnostics and operating status data from the maintenance vehicle platform including engine temperature, mileage, tire wear, brake wear, belt wear, and other operational status measures as well as the status of maintenance and construction-specific systems on the vehicle.	
<i>Requirement:</i>	Planned
2 The maintenance and construction vehicle shall use the diagnostic and status information to support scheduling vehicle maintenance, monitoring safety status, and informing the vehicle operator of the conditions.	
<i>Requirement:</i>	Planned
3 The maintenance and construction vehicle shall the vehicle diagnostic and safety information to an equipment repair facility.	
<i>Requirement:</i>	Planned
4 The maintenance and construction vehicle shall send the vehicle diagnostic and safety information to the controlling maintenance center.	
<i>Functional Area:</i> MCV Barrier System Control	
Control automatic or remotely controlled gates and other barrier systems from a maintenance and construction vehicle.	
<i>Requirement:</i>	Planned
1 The vehicle shall remotely control barrier systems. Barrier systems include automated or remotely controlled gates, barriers and other systems that manage entry to roadways.	
<i>Requirement:</i>	Planned
2 The vehicle shall collect barrier system operational status.	
<i>Requirement:</i>	Planned
3 The vehicle shall collect barrier system fault data.	
<i>Functional Area:</i> MCV Winter Maintenance	
On-board systems that support snow plow operations and other roadway treatments (e.g., salt spraying and other material applications). Supports information sharing between snow plows.	
<i>Requirement:</i>	Planned
1 The maintenance and construction vehicle shall track the location and status of safety systems on-board the vehicle.	
<i>Requirement:</i>	Planned
2 The maintenance and construction vehicle shall respond to control information from the center to allow remote operation of the on-board vehicle systems. These systems include winter maintenance equipment for plowing, treating, and anti-icing.	
<i>Requirement:</i>	Planned
3 The maintenance and construction vehicle shall monitor materials information including remaining quantity and current application rate of materials on the vehicle.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Illiana Corridor Maintenance and Construction Vehicles	
<i>Entity:</i> Maintenance and Construction Vehicle	
<i>Functional Area:</i> MCV Winter Maintenance	
On-board systems that support snow plow operations and other roadway treatments (e.g., salt spraying and other material applications). Supports information sharing between snow plows.	
<i>Requirement:</i>	Planned
4 The maintenance and construction vehicle shall respond to dispatch information from the center, presented to the vehicle operator for acknowledgement and returning status.	
<i>Requirement:</i>	Planned
5 The maintenance and construction vehicle shall send operational data to the center including the operational state of the maintenance equipment (e.g., blade up/down, spreader pattern), types and quantities of materials used for construction and maintenance activities, and a record of the actual work performed.	
<i>Requirement:</i>	Planned
6 The maintenance and construction vehicle shall exchange operational and environmental data with other maintenance and construction vehicles. Operational data includes operational state of the maintenance equipment (e.g., blade up/down, spreader pattern, equipment configuration) and a record of the actual work performed while the environmental data includes environmental sensor data collected on-board a maintenance and construction vehicle, either raw or processed data.	
<i>Functional Area:</i> MCV Roadway Maintenance and Construction	
On-board systems that support routine non-winter maintenance on the roadway or right-of-way. Includes landscape maintenance, hazard removal (roadway debris, dead animals), routine maintenance activities (roadway cleaning, grass cutting), and repair and maintenance of equipment on the roadway.	
<i>Requirement:</i>	Planned
1 The maintenance and construction vehicle shall track the location and status of safety systems on-board the vehicle.	
<i>Requirement:</i>	Planned
2 The maintenance and construction vehicle shall respond to control information from the center to allow remote operation of the on-board vehicle systems. These systems include routine maintenance equipment for cutting, repairs, hazard removal, etc.	
<i>Requirement:</i>	Planned
3 The maintenance and construction vehicle shall monitor materials information including remaining quantity and current application rate of materials on the vehicle.	
<i>Requirement:</i>	Planned
4 The maintenance and construction vehicle shall respond to dispatch information from the center, presented to the vehicle operator for acknowledgement and returning status.	
<i>Requirement:</i>	Planned
5 The maintenance and construction vehicle shall send operational data to the center including the operational state of the maintenance equipment (e.g., blade up/down, spreader pattern), types and quantities of materials used for construction and maintenance activities, and a record of the actual work performed.	
<i>Functional Area:</i> MCV Infrastructure Monitoring	
On-board systems to monitor the condition of pavement, bridges, tunnels, associated hardware, and other transportation-related infrastructure (e.g., culverts). Includes vehicle-based sensors and communications with roadway-based infrastructure monitoring sensors.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Illiana Corridor Maintenance and Construction Vehicles</i>	
<i>Entity: Maintenance and Construction Vehicle</i>	
<i>Functional Area: MCV Infrastructure Monitoring</i>	
On-board systems to monitor the condition of pavement, bridges, tunnels, associated hardware, and other transportation-related infrastructure (e.g., culverts). Includes vehicle-based sensors and communications with roadway-based infrastructure monitoring sensors.	
<i>Requirement:</i>	Planned
1 The maintenance and construction vehicle shall collect infrastructure data from on-board sensors relating to the physical characteristics of the roadway infrastructure, including pavement, bridges, culverts, signs, etc.	
<i>Requirement:</i>	Planned
2 The maintenance and construction vehicle shall collect infrastructure data from sensors located along the roadway relating to the physical characteristics of the roadway infrastructure, including pavement, bridges, culverts, signs, etc.	
<i>Requirement:</i>	Planned
3 The maintenance and construction vehicle shall provide control signals to infrastructure monitoring sensors located at the roadway.	
<i>Requirement:</i>	Planned
4 The maintenance and construction vehicle shall send current condition of pavement, bridges, culverts, signs, and other roadway infrastructure as measured by on-board sensors or read from infrastructure-based sensors to the center. The data may include raw data or images (e.g., photo logs) that indicate the current status of the infrastructure.	
<i>Requirement:</i>	Planned
5 The maintenance and construction vehicle shall respond to control information from the center to allow remote operation of the on-board vehicle systems.	
<i>Requirement:</i>	Planned
6 The maintenance and construction vehicle shall provide infrastructure sensor equipment operational status to the center.	
<i>Functional Area: MCV Work Zone Support</i>	
On-board systems that provide communications and support for local management of a work zone.	
<i>Requirement:</i>	Planned
1 The maintenance and construction vehicle shall monitor, operate, and control work zone devices located at or alongside the roadway. The devices operated on board the vehicle include driver information devices (e.g. dynamic message signs) and work zone intrusion detection and alert devices.	
<i>Requirement:</i>	Planned
2 The maintenance and construction vehicle shall provide an interface for field personnel to input status of their work zone activities.	
<i>Requirement:</i>	Planned
3 The maintenance and construction vehicle shall collect inputs from field personnel and from work zone devices on-board the maintenance and construction vehicle and send them to the controlling center.	
<i>Functional Area: MCV Vehicle Safety Monitoring</i>	
On-board systems to detect vehicle intrusions and warn crew workers and drivers of imminent encroachment. Crew movements are monitored so that the crew can be warned of movement beyond the designated safe zone. Used for stationary work zones or in mobile applications where a safe zone is maintained around the moving vehicle.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Illiana Corridor Maintenance and Construction Vehicles</i>	
<i>Entity: Maintenance and Construction Vehicle</i>	
<i>Functional Area: MCV Vehicle Safety Monitoring</i>	
On-board systems to detect vehicle intrusions and warn crew workers and drivers of imminent encroachment. Crew movements are monitored so that the crew can be warned of movement beyond the designated safe zone. Used for stationary work zones or in mobile applications where a safe zone is maintained around the moving vehicle.	
<i>Requirement:</i>	Potential
1 The maintenance and construction vehicle shall detect that a vehicle has intruded upon the boundary of a work zone. The boundary of the work zone represents an area around the maintenance and construction vehicle, which may be stationary or moving.	
<i>Requirement:</i>	Potential
2 The maintenance and construction vehicle shall receive work zone warnings from the field equipment at the roadside, other maintenance and construction vehicles.	
<i>Requirement:</i>	Potential
3 The maintenance and construction vehicle shall present work zone warnings to the field personnel using direct warning signals or in-vehicle signage functions.	
<i>Requirement:</i>	Potential
4 The maintenance and construction vehicle shall monitor the crew movements to identify when a crew member is crossing the boundary between a work zone and vehicle traffic and issue an alert to the crew member.	
<i>Requirement:</i>	Potential
5 The maintenance and construction vehicle shall provide status of the work zone warning systems to the center.	
<i>Element: Illiana Corridor Operations Center</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Incident Command</i>	
Tactical decision support, resource coordination, and communications integration among emergency management agencies for Incident Commands that are established by first responders to support local management of an incident.	
<i>Requirement:</i>	Planned
1 The center shall 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.	
<i>Requirement:</i>	Planned
2 The center shall provide incident command communications with public safety, emergency management, transportation, and other allied response agency centers.	
<i>Requirement:</i>	Planned
3 The center shall track and maintain resource information and action plans pertaining to the incident command.	
<i>Requirement:</i>	Planned
4 The center shall 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.	
<i>Requirement:</i>	Planned
5 The center shall assess the status of responding emergency vehicles as part of an incident command.	
<i>Functional Area: Service Patrol Management</i>	
Dispatch and communication with roadway service patrol vehicles that monitor roads to aid motorists, offering rapid response to minor incidents.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Illiana Corridor Operations Center</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Service Patrol Management</i>	
Dispatch and communication with roadway service patrol vehicles that monitor roads to aid motorists, offering rapid response to minor incidents.	
<i>Requirement:</i>	Potential
1 The center shall dispatch roadway service patrol vehicles to identified incident locations.	
<i>Requirement:</i>	Potential
2 The center shall store the current status of all service patrol vehicles available for dispatch and those that have been dispatched.	
<i>Requirement:</i>	Potential
3 The center shall share incident information collected by the service patrol with traffic, maintenance and construction, and traveler information centers for incident management, incident notification to travelers, and incident cleanup.	
<i>Requirement:</i>	Potential
4 The center shall track the location and status of service patrol vehicles.	
<i>Functional Area: Center Secure Area Surveillance</i>	
Management of security surveillance devices and analysis of that data to detect potential threats. Areas under surveillance may include transit stops, transit stations, rest areas, park and ride lots, modal interchange facilities, on-board a transit vehicle, etc.	
<i>Requirement:</i>	Planned
1 The center shall remotely monitor video images and audio surveillance data collected in secure areas including facilities (e.g. transit yards) and transportation infrastructure (e.g. bridges, tunnels, interchanges, roadway infrastructure, and transit railways or guideways). The data may be raw or pre-processed in the field.	
<i>Requirement:</i>	Potential
2 The center shall remotely monitor video images and audio surveillance data collected in traveler secure areas, which include transit stations, transit stops, rest areas, park and ride lots, and other fixed sites along travel routes (e.g., emergency pull-off areas and travel information centers). The data may be raw or pre-processed in the field.	
<i>Requirement:</i>	Planned
4 The center shall exchange surveillance data with other emergency centers.	
<i>Requirement:</i>	Planned
5 The center shall identify potential security threats based on collected security surveillance data.	
<i>Requirement:</i>	Planned
6 The center shall verify potential security threats by correlating security surveillance data from multiple sources.	
<i>Requirement:</i>	Planned
7 The center shall remotely control security surveillance devices in secure areas including facilities (e.g. transit yards) and transportation infrastructure (e.g. bridges, tunnels, interchanges, roadway infrastructure, and transit railways or guideways).	
<i>Requirement:</i>	Potential
8 The center shall remotely control security surveillance devices in traveler secure areas, which include transit stations, transit stops, rest areas, park and ride lots, and other fixed sites along travel routes (e.g., emergency pull-off areas and travel information centers).	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Illiana Corridor Operations Center</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Center Secure Area Surveillance</i>	
Management of security surveillance devices and analysis of that data to detect potential threats. Areas under surveillance may include transit stops, transit stations, rest areas, park and ride lots, modal interchange facilities, on-board a transit vehicle, etc.	
<i>Requirement:</i>	
10 The center shall match traveler video images against a database from the Alerting and Advisory Systems of known images that may represent criminals and terrorists.	Potential
<i>Requirement:</i>	
11 The center shall exchange traveler images with other emergency management centers to support traveler image matching.	Potential
<i>Requirement:</i>	
12 The center shall respond to control data from center personnel regarding security surveillance data collection, processing, threat detection, and image matching.	Planned
<i>Requirement:</i>	
13 The center shall monitor maintenance status of the security sensor field equipment.	Planned
<i>Functional Area: Center Secure Area Sensor Management</i>	
Management of security sensors, analysis of sensor data, correlation with surveillance data and alerts from other agencies to detect potential threats, and dissemination of threat information to other agencies. Sensors may be placed in areas such as transit stops, transit stations, rest areas, park and ride lots, modal interchange facilities, on-board a transit vehicle, etc.	
<i>Requirement:</i>	
1 The center shall remotely monitor and control security sensor data collected in secure areas including facilities (e.g. transit yards) and transportation infrastructure (e.g. bridges, tunnels, interchanges, roadway infrastructure, and transit railways or guideways). The types of security sensor data include environmental threat (e.g. chemical agent, toxic industrial chemical, biological, explosives, and radiological sensors), infrastructure condition and integrity, intrusion and motion, and object detection sensors. The data may be raw or pre-processed in the field.	Planned
<i>Requirement:</i>	
2 The center shall remotely monitor and control security sensor data collected in traveler secure areas, which include transit stations, transit stops, rest areas, park and ride lots, and other fixed sites along travel routes (e.g., emergency pull-off areas and travel information centers). The types of security sensor data include environmental threat (e.g. chemical agent, toxic industrial chemical, biological, explosives, and radiological sensors), intrusion and motion, and object detection sensors. The data may be raw or pre-processed in the field.	Potential
<i>Requirement:</i>	
4 The center shall exchange security sensor data with other emergency centers.	Planned
<i>Requirement:</i>	
5 The center shall identify potential security threats based on collected security sensor data.	Planned
<i>Requirement:</i>	
6 The center shall verify potential security threats by correlating security sensor data from multiple sources.	Planned
<i>Requirement:</i>	
7 The center shall perform threat analysis based on correlations of security sensor and surveillance data.	Potential

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Illiana Corridor Operations Center</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Center Secure Area Sensor Management</i>	
Management of security sensors, analysis of sensor data, correlation with surveillance data and alerts from other agencies to detect potential threats, and dissemination of threat information to other agencies. Sensors may be placed in areas such as transit stops, transit stations, rest areas, park and ride lots, modal interchange facilities, on-board a transit vehicle, etc.	
<i>Requirement:</i>	
8 The center shall exchange threat analysis data with Alerting and Advisory Systems and use that data in local threat analysis processing.	Planned
<i>Requirement:</i>	
9 The center shall disseminate threat information to other agencies, including traffic, transit, maintenance, rail operations, and other emergency management centers.	Planned
<i>Requirement:</i>	
10 The center shall respond to control data from center personnel regarding security sensor data collection, processing, threat detection, and threat analysis.	Planned
<i>Requirement:</i>	
11 The center shall request activation of barriers and safeguards on request from center personnel.	Planned
<i>Requirement:</i>	
12 The center shall monitor maintenance status of the security sensor field equipment.	Planned
<i>Functional Area: Mayday Support</i>	
Collection and response to Mayday messages received from vehicles and drivers.	
<i>Requirement:</i>	
1 The center shall collect mayday messages from vehicles and drivers.	Planned
<i>Requirement:</i>	
2 The center shall collect mayday messages from travelers via personal handheld devices.	Planned
<i>Requirement:</i>	
3 The center shall acknowledge the request for emergency assistance, whether originated by the driver, automatically by the vehicle's safety systems, or by a traveler via a personal handheld device.	Planned
<i>Requirement:</i>	
4 After the mayday becomes a verified incident, the center shall determine the appropriate response to the mayday message.	Planned
<i>Requirement:</i>	
5 The center shall determine whether the mayday message indicates an emergency that requires the attention of public safety agencies, and forward mayday emergency data to the appropriate agency as necessary.	Planned
<i>Functional Area: Emergency Commercial Vehicle Response</i>	
Responds to commercial vehicle and freight equipment related emergencies. Includes incidents involving hazardous materials as well as the detection of non-permitted transport of security sensitive hazmat.	
<i>Requirement:</i>	
1 The center shall receive emergency notification information from commercial vehicles, commercial vehicle check stations, or commercial fleet operators and present the possible incident information to the emergency system operator. This may include detection of non-permitted transport of security sensitive hazmat, hazardous cargo spills, etc.	Planned

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Illiana Corridor Operations Center</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Emergency Commercial Vehicle Response</i>	
Responds to commercial vehicle and freight equipment related emergencies. Includes incidents involving hazardous materials as well as the detection of non-permitted transport of security sensitive hazmat.	
<i>Requirement:</i>	Planned
2 The center shall receive details of the cargo being carried by commercial vehicles from their commercial fleet manager for incidents involving potential hazardous materials.	
<i>Requirement:</i>	Planned
3 The center shall forward the verified emergency information to the responding agency based on the location and nature of the emergency.	
<i>Requirement:</i>	Potential
4 The center shall provide the capability to request Fleet and Freight Management to disable a specific vehicle in their fleet.	
<i>Functional Area: Emergency Transportation Operations Data Collection</i>	
Collects real-time information on the state of the regional transportation system for operational use by the center. It establishes communications with a regional repository, requests or subscribes to information relevant to the center, and distributes the received information for use.	
<i>Requirement:</i>	Planned
1 The center shall collect real-time information on the state of the regional transportation system including current traffic and road conditions, weather conditions, special event and incident information.	
<i>Requirement:</i>	Planned
2 The center shall support the capability for the system operator to monitor and control the information collection service.	
<i>Entity: Emissions Management</i>	
<i>Functional Area: Emissions Data Management</i>	
Assimilation and storage of air quality measures and roadside collected emissions data; distribution for general traveler information or for use in demand management programs.	
<i>Requirement:</i>	Planned
1 The center shall collect, analyze, and store vehicle emissions data collected from roadside sensors.	
<i>Requirement:</i>	Planned
2 The center shall collect, analyze, and store wide area pollution data collected from sensors that may the general (wide area) environment.	
<i>Requirement:</i>	Planned
3 The center shall configure and control emissions and air quality sensors located in the field.	
<i>Requirement:</i>	Planned
4 The center shall maintain a database of pollution reference data including acceptable and tolerable emissions and pollution levels for the area served by the center.	
<i>Requirement:</i>	Planned
5 The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for emissions.	
<i>Requirement:</i>	Potential
6 The center shall establish violation parameters, detect emissions violators, obtain the vehicle registration data from the appropriate State Department of Motor Vehicles (DMV) office, and then provide the capability to send violation information to a law enforcement agency.	

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Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Illiana Corridor Operations Center</i>	
<i>Entity: Emissions Management</i>	
<i>Functional Area: Emissions Data Management</i>	
Assimilation and storage of air quality measures and roadside collected emissions data; distribution for general traveler information or for use in demand management programs.	
<i>Requirement:</i>	
7 The center shall distribute air quality information to the media, traveler information service providers, and traffic management centers. This information may be used for information to travelers or part of demand management programs.	Planned
<i>Functional Area: Emissions Data Collection</i>	
Collection and storage of air quality and emissions management information. For use by operations personnel or data archives in the region.	
<i>Requirement:</i>	
1 The center shall collect air quality and emissions management data from various sources, including emissions sensors distributed along the roadside and wide-area sensors detecting pollution over a larger geographical area.	Planned
<i>Requirement:</i>	
2 The center shall assign quality control metrics and meta-data to be stored along with the data. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.	Planned
<i>Requirement:</i>	
3 The center shall receive and respond to requests from ITS Archives for either a catalog of the emissions management data or for the data itself.	Planned
<i>Requirement:</i>	
4 The center shall be able to produce sample products of the data available.	Planned
<i>Entity: Payment Administration</i>	
<i>Functional Area: Toll Administration</i>	
Management of toll collection for private and commercial vehicles, dynamic pricing, payment reconciliation with financial institutions, and violation notification to enforcement agencies.	
<i>Requirement:</i>	
1 The center shall manage toll transactions, including maintaining a log of all transactions and toll pricing structure information.	Planned
<i>Requirement:</i>	
2 The center shall dynamically price tolls based on current traffic condition information.	Potential
<i>Requirement:</i>	
3 For electronic toll payments requiring financial payment, the center shall process the financial information from toll plazas and manage an interface to a Financial Institution.	Planned
<i>Requirement:</i>	
4 The center shall manage a local billing database for toll customers.	Planned
<i>Requirement:</i>	
5 The center shall manage the details of toll payment violations based on vehicle information from the toll plaza, registration information from the Department of Motor Vehicles, invalid payment information from a Financial Institution, and previous violation information stored locally, and report such violations to appropriate law enforcement agencies.	Planned
<i>Requirement:</i>	
6 The center shall calculate traffic flow based on timestamped toll transactions for vehicle travel between successive toll plazas and send to other agencies.	Planned

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Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Illiana Corridor Operations Center</i>	
<i>Entity: Payment Administration</i>	
<i>Functional Area: Toll Administration</i>	
Management of toll collection for private and commercial vehicles, dynamic pricing, payment reconciliation with financial institutions, and violation notification to enforcement agencies.	
<i>Requirement:</i>	
7 The center shall respond to changes in toll prices from the Toll Administrator.	Planned
<i>Requirement:</i>	
8 The center shall exchange data with other toll agencies to coordinate toll transactions and pricing.	Potential
<i>Requirement:</i>	
9 The center shall support requests for advanced toll payment and provide this information to its toll plazas.	Potential
<i>Requirement:</i>	
10 The center shall support wide-area alerts from emergency centers by passing on the information to its toll plazas and the Toll Administrator.	Planned
<i>Requirement:</i>	
11 The center shall support toll transactions by commercial fleet operators.	Planned
<i>Functional Area: Toll Operator Alert</i>	
Receipt/acknowledgement of alert notifications (safety/security broadcasts, child abductions, etc.) from the emergency management centers; the toll administrator controls distribution of the alert to the operators at the toll plazas.	
<i>Requirement:</i>	
1 The center shall receive wide-area alerts and advisories from 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.	Planned
<i>Requirement:</i>	
2 The center shall provide an interface with the toll administration center personnel to present wide-area alert notifications and to allow the center personnel to acknowledge the input and control the dissemination of the information.	Planned
<i>Requirement:</i>	
3 The center shall distribute wide-area alert notifications to toll plazas to keep toll operators informed of identified threats that may impact toll operations or public safety on a toll facility.	Planned
<i>Requirement:</i>	
4 The center shall return status back to the emergency management center that initiated the wide-area alert with information indicating the status of the alert from the toll operators including the information systems that are being used to provide the alert notification.	Planned
<i>Functional Area: Toll Data Collection</i>	
Collection and storage of toll operations and pricing data. For use by operations personnel or data archives in the region.	
<i>Requirement:</i>	
1 The center shall collect toll operational data and pricing data.	Planned
<i>Requirement:</i>	
2 The center shall assign quality control metrics and meta-data to be stored along with the data. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.	Planned
<i>Requirement:</i>	
3 The center shall receive and respond to requests from ITS Archives for either a catalog of the toll data or for the data itself.	Planned

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Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Illiana Corridor Operations Center</i>	
<i>Entity: Payment Administration</i>	
<i>Functional Area: Toll Data Collection</i>	
Collection and storage of toll operations and pricing data. For use by operations personnel or data archives in the region.	
<i>Requirement:</i> 4 The center shall be able to produce sample products of the data available.	Planned
<i>Entity: Traffic Management</i>	
<i>Functional Area: TMC Roadway Warning</i>	
Remotely monitors and controls field elements used to warn drivers approaching hazards. Detects and warns approaching vehicles of adverse road weather conditions, traffic conditions including queues, and obstacles or animals in the road.	
<i>Requirement:</i> 1 The center shall monitor data on traffic, environmental conditions, and other hazards collected from sensors along the roadway.	Planned
<i>Functional Area: TMC Variable Speed Limits</i>	
Remotely monitors and controls variable speed limits systems, including equipment that monitors current traffic and environmental conditions, determines the current speed limits by lane, and displays the speed limits and additional information to drivers.	
<i>Requirement:</i> 1 The center shall monitor data on traffic and environmental conditions collected from sensors along the roadway.	Planned
<i>Functional Area: TMC Roadway Warning</i>	
Remotely monitors and controls field elements used to warn drivers approaching hazards. Detects and warns approaching vehicles of adverse road weather conditions, traffic conditions including queues, and obstacles or animals in the road.	
<i>Requirement:</i> 2 The center shall identify hazardous road weather and surface conditions.	Planned
<i>Functional Area: TMC Variable Speed Limits</i>	
Remotely monitors and controls variable speed limits systems, including equipment that monitors current traffic and environmental conditions, determines the current speed limits by lane, and displays the speed limits and additional information to drivers.	
<i>Requirement:</i> 2 Based on the measured data, the center shall calculate and set suitable speed limits by lane.	Potential
<i>Functional Area: TMC Roadway Warning</i>	
Remotely monitors and controls field elements used to warn drivers approaching hazards. Detects and warns approaching vehicles of adverse road weather conditions, traffic conditions including queues, and obstacles or animals in the road.	
<i>Requirement:</i> 3 The center shall identify hazardous traffic conditions including queues.	Planned
<i>Functional Area: TMC Variable Speed Limits</i>	
Remotely monitors and controls variable speed limits systems, including equipment that monitors current traffic and environmental conditions, determines the current speed limits by lane, and displays the speed limits and additional information to drivers.	

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Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Illiana Corridor Operations Center</i>	
<i>Entity: Traffic Management</i>	
Functional Area: TMC Variable Speed Limits	
Remotely monitors and controls variable speed limits systems, including equipment that monitors current traffic and environmental conditions, determines the current speed limits by lane, and displays the speed limits and additional information to drivers.	
<i>Requirement:</i> 3 The center shall control field equipment that posts the current speed limits and displays additional information such as basic safety rules and current traffic information to drivers.	Potential
<i>Requirement:</i> 4 The center shall monitor the operational status of the variable speed limit equipment, including fault reports.	Potential
Functional Area: TMC Roadway Warning	
Remotely monitors and controls field elements used to warn drivers approaching hazards. Detects and warns approaching vehicles of adverse road weather conditions, traffic conditions including queues, and obstacles or animals in the road.	
<i>Requirement:</i> 4 The center shall identify debris, animals, or other encroachment on the roadway dangerous to approaching motorists.	Planned
<i>Requirement:</i> 5 The center shall issue control commands to field equipment warning drivers approaching the identified hazardous conditions.	Planned
Functional Area: TMC Variable Speed Limits	
Remotely monitors and controls variable speed limits systems, including equipment that monitors current traffic and environmental conditions, determines the current speed limits by lane, and displays the speed limits and additional information to drivers.	
<i>Requirement:</i> 5 The center shall provide center personnel current system status and respond to control data from center personnel regarding variable speed limits and	Potential
Functional Area: TMC Roadway Warning	
Remotely monitors and controls field elements used to warn drivers approaching hazards. Detects and warns approaching vehicles of adverse road weather conditions, traffic conditions including queues, and obstacles or animals in the road.	
<i>Requirement:</i> 6 The center shall monitor the operational status of the dynamic warning equipment, including fault reports.	Planned
Functional Area: Collect Traffic Surveillance	
Management of traffic sensors and surveillance (CCTV) equipment, collection of current traffic conditions, and distribution of the collected information to other centers and operators.	
<i>Requirement:</i> 1 The center shall monitor, analyze, and store traffic sensor data (speed, volume, occupancy) collected from field elements under remote control of the center.	Potential
<i>Requirement:</i> 2 The center shall monitor, analyze, and distribute traffic images from CCTV systems under remote control of the center.	Potential
<i>Requirement:</i> 4 The center shall distribute road network conditions data (raw or processed) based on collected and analyzed traffic sensor and surveillance data to other centers.	Potential

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Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Illiana Corridor Operations Center</i>	
<i>Entity: Traffic Management</i>	
<i>Functional Area: Collect Traffic Surveillance</i>	
Management of traffic sensors and surveillance (CCTV) equipment, collection of current traffic conditions, and distribution of the collected information to other centers and operators.	
<i>Requirement:</i>	Potential
5 The center shall respond to control data from center personnel regarding sensor and surveillance data collection, analysis, storage, and distribution.	
<i>Requirement:</i>	Potential
6 The center shall maintain a database of surveillance equipment and sensors and associated data (including the roadway on which they are located, the type of data collected, and the ownership of each)	
<i>Requirement:</i>	Potential
7 The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for traffic data.	
<i>Functional Area: TMC Probe Information Collection</i>	
Collects, assimilates, and disseminates vehicle probe data collected from roadside beacons and centers controlling transit vehicles, emergency vehicles, toll collection points, and route-guided vehicles.	
<i>Requirement:</i>	Potential
1 The center shall collect traffic probe data from vehicles via roadside field equipment.	
<i>Requirement:</i>	Potential
3 The center shall collect traffic data from traveler information centers based on data from their subscriber vehicles; the data may be aggregated and initial link time calculations performed at the sending center.	
<i>Requirement:</i>	Potential
4 The center shall collect traffic data from toll administrative centers containing travel times between toll collection points for those vehicles equipped for electronic toll collection; the data may be aggregated and processed at the sending center.	
<i>Requirement:</i>	Potential
5 The center shall assimilate current and forecast traffic conditions based on collected probe data and distribute to other centers for dissemination to travelers.	
<i>Requirement:</i>	Potential
6 The center shall collect operational status for the roadside probe data collection equipment.	
<i>Requirement:</i>	Potential
7 The center shall collect fault data for the roadside probe data collection equipment for repair.	
<i>Functional Area: TMC Traffic Information Dissemination</i>	
Controls dissemination of traffic-related data to other centers, the media, and travelers via the driver information systems (DMS, HAR) that it operates.	
<i>Requirement:</i>	Potential
1 The center shall remotely control dynamic messages signs for dissemination of traffic and other information to drivers.	
<i>Requirement:</i>	Potential
2 The center shall 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.	
<i>Requirement:</i>	Potential
3 The center shall collect operational status for the driver information systems equipment (DMS, HAR, etc.).	

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Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Illiana Corridor Operations Center</i>	
<i>Entity: Traffic Management</i>	
<i>Functional Area: TMC Traffic Information Dissemination</i>	
Controls dissemination of traffic-related data to other centers, the media, and travelers via the driver information systems (DMS, HAR) that it operates.	
<i>Requirement:</i>	
4 The center shall collect fault data for the driver information systems equipment (DMS, HAR, etc.) for repair.	Potential
<i>Requirement:</i>	
5 The center shall 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), and the definition of the road network itself.	Potential
<i>Requirement:</i>	
6 The center shall distribute traffic data to maintenance and construction centers, transit centers, emergency management centers, and traveler information providers.	Potential
<i>Requirement:</i>	
7 The center shall distribute traffic data to the media; the capability to provide the information in both data stream and graphical display shall be supported.	Potential
<i>Requirement:</i>	
8 The center shall provide the capability for center personnel to control the nature of the data that is available to non-traffic operations centers and the media.	Potential
<i>Functional Area: TMC Regional Traffic Management</i>	
Coordination between traffic management centers in order to share traffic information between centers as well as control of traffic management field equipment. This may be used during incidents and special events and during day-to-day operations.	
<i>Requirement:</i>	
1 The center shall exchange traffic information with other traffic management centers including incident information, congestion data, traffic data, signal timing plans, and real-time signal control information.	Planned
<i>Requirement:</i>	
2 The center shall exchange traffic control information with other traffic management centers to support remote monitoring and control of traffic management devices (e.g. signs, sensors, signals, cameras, etc.).	Planned
<i>Functional Area: TMC Traffic Management Decision Support</i>	
Recommends courses of action to the traffic operator based on current and forecast road and traffic conditions. Recommended actions may include predefined incident response plans, signal timing plan changes, DMS/HAR messages, lane control strategies, metering strategies, etc.	
<i>Requirement:</i>	
1 The center shall provide center personnel with an integrated regional view of current and forecast road and traffic conditions including traffic incidents, special events, maintenance activities and other events or conditions that impact capacity or demand.	Planned
<i>Requirement:</i>	
2 The center shall identify network imbalances and potential courses of action.	Planned
<i>Requirement:</i>	
3 The center shall compare the impact of potential courses of action and make recommendations to the operator.	Planned

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Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Illiana Corridor Operations Center</i>	
<i>Entity: Traffic Management</i>	
Functional Area: TMC Traffic Management Decision Support	
<p>Recommends courses of action to the traffic operator based on current and forecast road and traffic conditions. Recommended actions may include predefined incident response plans, signal timing plan changes, DMS/HAR messages, lane control strategies, metering strategies, etc.</p>	
<i>Requirement:</i>	<p>4 The recommended actions shall include predefined incident response plans, signal timing plan changes, DMS/HAR messages, lane control strategies and freeway control strategies including ramp metering, interchange metering, and mainline metering.</p> <p style="text-align: right;">Planned</p>
<i>Requirement:</i>	<p>5 The recommended actions shall include multimodal strategies that include suggested transit strategies and suggested route and mode choices for travelers.</p> <p style="text-align: right;">Planned</p>
<i>Requirement:</i>	<p>6 The center shall provide an interface to center personnel to input control parameters for the decision support process and receive recommended actions and supporting information presentation.</p> <p style="text-align: right;">Planned</p>
Functional Area: TMC Incident Detection	
<p>Remotely monitors traffic sensor and surveillance systems to detect and verify incidents. Also monitors external advisory and incident reporting systems, intermodal freight depots, and border crossings for additional incident information. Identified incidents are reported to operations personnel and other centers.</p>	
<i>Requirement:</i>	<p>1 The center shall 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.</p> <p style="text-align: right;">Planned</p>
<i>Requirement:</i>	<p>2 The center shall collect and store traffic flow and image data from the field equipment to detect and verify incidents.</p> <p style="text-align: right;">Potential</p>
<i>Requirement:</i>	<p>3 The center shall receive inputs concerning upcoming events that would effect the traffic network from event promoters and traveler information service providers.</p> <p style="text-align: right;">Planned</p>
<i>Requirement:</i>	<p>4 The center shall exchange incident and threat information with emergency management centers as well as maintenance and construction centers; including notification of existence of incident and expected severity, location, time and nature of incident.</p> <p style="text-align: right;">Planned</p>
<i>Requirement:</i>	<p>5 The center shall support requests from emergency management centers and border inspection systems to remotely control sensor and surveillance equipment located in the field.</p> <p style="text-align: right;">Potential</p>
<i>Requirement:</i>	<p>6 The center shall provide road network conditions and traffic images to emergency management centers to support the detection, verification, and classification of incidents.</p> <p style="text-align: right;">Potential</p>
<i>Requirement:</i>	<p>7 The center shall provide video and traffic sensor control commands to the field equipment to detect and verify incidents.</p> <p style="text-align: right;">Potential</p>
Functional Area: TMC Incident Dispatch Coordination/Communication	
<p>Formulates an incident response that takes into account the incident potential, incident impacts, and/or resources required for incident management. Facilitates the dispatch of emergency response and service vehicles and coordinates the response with cooperating agencies.</p>	

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Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:Illiana Corridor Operations Center</i>	
<i>Entity: Traffic Management</i>	
<i>Functional Area: TMC Incident Dispatch Coordination/Communication</i>	
Formulates an incident response that takes into account the incident potential, incident impacts, and/or resources required for incident management. Facilitates the dispatch of emergency response and service vehicles and coordinates the response with cooperating agencies.	
<i>Requirement:</i>	1 The center shall 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.
<i>Requirement:</i>	2 The center shall coordinate planning for incidents with emergency management centers - including pre-planning activities for disaster response, evacuation, and recovery operations.
<i>Requirement:</i>	3 The center shall support requests from emergency management centers to remotely control sensor and surveillance equipment located in the field, provide special routing for emergency vehicles, and to provide responding emergency vehicles with signal preemption.
<i>Requirement:</i>	4 The center shall exchange incident information with emergency management centers, maintenance and construction centers, transit centers, information service providers, and the media including description, location, traffic impact, status, expected duration, and response information.
<i>Requirement:</i>	5 The center shall 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.
<i>Requirement:</i>	6 The center shall 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.
<i>Requirement:</i>	7 The center shall provide road network conditions and traffic images to emergency management centers, maintenance and construction centers, and traveler information service providers.
<i>Requirement:</i>	8 The center shall monitor incident response performance and calculate incident response and clearance times.
<i>Requirement:</i>	9 The center shall 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.
<i>Requirement:</i>	10 The center shall coordinate information and controls with other traffic management centers.

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Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Illiana Corridor Operations Center</i>	
<i>Entity: Traffic Management</i>	
<i>Functional Area: TMC Incident Dispatch Coordination/Communication</i>	
Formulates an incident response that takes into account the incident potential, incident impacts, and/or resources required for incident management. Facilitates the dispatch of emergency response and service vehicles and coordinates the response with cooperating agencies.	
<i>Requirement:</i>	
11 The center shall receive inputs from emergency management and transit management centers to develop an overall status of the transportation system including emergency transit schedules in effect and current status and condition of the transportation infrastructure.	Planned
<i>Requirement:</i>	
12 The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for traffic incident management.	Planned
<i>Functional Area: TMC Evacuation Support</i>	
Development, coordination, and execution of special traffic management strategies during evacuation and subsequent reentry of a population in the vicinity of a disaster or major emergency. Interfaces with emergency management and other traffic management centers.	
<i>Requirement:</i>	
1 The center shall coordinate planning for evacuation with emergency management centers - including pre-planning activities such as establishing routes, areas to be evacuated, timing, etc.	Planned
<i>Requirement:</i>	
2 The center shall 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.	Potential
<i>Requirement:</i>	
3 The center shall coordinate information and controls with other traffic management centers.	Potential
<i>Requirement:</i>	
4 The center shall 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.	Planned
<i>Functional Area: TMC Traffic Network Performance Evaluation</i>	
Measures performance and predicts travel demand patterns to support traffic flow optimization, demand management, and incident management. Collects data from surveillance equipment as well as input from other management centers including emissions, event promoters, and other TMCs.	
<i>Requirement:</i>	
1 The center shall monitor, analyze, and store traffic sensor data (speed, volume, occupancy) collected from field elements under remote control of the center to support overall network performance evaluations.	Potential
<i>Requirement:</i>	
2 The center shall collect wide-area pollution data from emissions management centers to support overall network performance evaluations.	Planned
<i>Requirement:</i>	
3 The center shall collect and store plans from event promoters for major future events possibly impacting traffic to support overall network performance evaluations.	Planned

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Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Illiana Corridor Operations Center</i>	
<i>Entity: Traffic Management</i>	
<i>Functional Area: TMC Traffic Network Performance Evaluation</i>	
Measures performance and predicts travel demand patterns to support traffic flow optimization, demand management, and incident management. Collects data from surveillance equipment as well as input from other management centers including emissions, event promoters, and other TMCs.	
<i>Requirement:</i>	
4 The center shall collect and store anticipated route information from information service providers to support overall network performance evaluations and predictions.	Planned
<i>Requirement:</i>	
6 The center shall exchange traffic information with other traffic management centers, including incidents, congestion data, traffic data, signal timing plans, and real-time signal control information to support overall network performance evaluations.	Potential
<i>Requirement:</i>	
7 The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for network performance evaluations.	Planned
<i>Requirement:</i>	
8 The center shall provide an interface to the archive data repository to enable the operator to retrieve historical operating data for use in planning to predict future traffic patterns and conditions.	Planned
<i>Requirement:</i>	
9 This center shall use the collected information to measure overall current and forecast network performance and predict travel demand patterns.	Planned
<i>Functional Area: TMC Environmental Monitoring</i>	
Management of environmental sensors and assimilation of collected data with other current and forecast road conditions and surface weather information from weather service providers and roadway maintenance operations.	
<i>Requirement:</i>	
1 The center shall remotely control environmental sensors that measure road surface temperature, moisture, icing, salinity, and other measures.	Planned
<i>Requirement:</i>	
2 The center shall remotely control environmental sensors that measure weather conditions including temperature, wind, humidity, precipitation, and visibility.	Planned
<i>Requirement:</i>	
3 The center shall 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.	Planned
<i>Requirement:</i>	
4 The center shall provide weather and road condition information to weather service providers and center personnel.	Planned
<i>Requirement:</i>	
5 The center shall respond to control data from center personnel regarding environmental sensor control and weather data collection and processing.	Planned
<i>Functional Area: TMC Speed Monitoring and Warning</i>	

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Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Illiana Corridor Operations Center</i>	
<i>Entity: Traffic Management</i>	
<i>Functional Area: TMC Speed Monitoring and Warning</i>	
Remotely monitors vehicle speeds, and informs an enforcement agency if excessive speeds are detected. Also configures and controls speed warning systems that provide safe speed advisories to the motorist.	
<i>Requirement:</i>	1 The center shall remotely control vehicle speed sensors typically placed in work zones; control parameters may include environmental and traffic conditions. Planned
<i>Requirement:</i>	2 The center shall collect operational status for the vehicle speed sensors; the status shall include logged information including measured speeds, warning messages displayed, and violation records. Planned
<i>Requirement:</i>	3 The center shall provide the capability to notify an enforcement agency when vehicle speeds in the work zone are in excess of the posted speed limit or are creating an unsafe condition based upon the current environmental or traffic conditions. Planned
<i>Requirement:</i>	4 The center shall collect fault data for the vehicle speed sensors for repair. Planned
<i>Functional Area: Barrier System Management</i>	
Remotely controls barrier systems such as gates and other systems that manage entry to roadways, transportation facilities and infrastructure.	
<i>Requirement:</i>	1 The center shall remotely control barrier systems for transportation facilities and infrastructure. Barrier systems include automated or remotely controlled gates, barriers and other systems that manage entry to roadways. Planned
<i>Requirement:</i>	2 The center shall collect barrier system operational status. Planned
<i>Requirement:</i>	3 The center shall collect barrier system fault data and send to the maintenance center for repair. Planned
<i>Requirement:</i>	4 The center shall accept requests for barrier system activation from other centers and from center personnel to support emergency response and detours. Planned
<i>Functional Area: Traffic Equipment Maintenance</i>	
Monitoring and remote diagnostics of field equipment - detect failures, issue problem reports, and track the repair or replacement of the failed equipment.	
<i>Requirement:</i>	1 The center shall collect and store sensor (traffic, pedestrian, multimodal crossing) operational status. Potential
<i>Requirement:</i>	2 The center shall collect and store CCTV surveillance system (traffic, pedestrian) operational status. Potential
<i>Requirement:</i>	3 The center shall collect and store sensor (traffic, pedestrian, multimodal crossing) fault data and send to the maintenance center for repair. Potential
<i>Requirement:</i>	4 The center shall collect and store CCTV surveillance system (traffic, pedestrian) fault data send to the maintenance center for repair. Potential
<i>Requirement:</i>	5 The center shall collect environmental sensor operational status. Planned
<i>Requirement:</i>	6 The center shall collect environmental sensor equipment fault data and send to the maintenance center for repair. Planned

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Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Illiana Corridor Operations Center	
<i>Entity:</i> Traffic Management	
<i>Functional Area:</i> Traffic Equipment Maintenance	
Monitoring and remote diagnostics of field equipment - detect failures, issue problem reports, and track the repair or replacement of the failed equipment.	
<i>Requirement:</i>	Planned
7 The center shall exchange data with maintenance centers concerning the reporting of faulty equipment and the schedule/status of their repair. Information exchanged includes details of new equipment faults, and clearances when the faults are cleared.	
<i>Requirement:</i>	Planned
8 The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for traffic maintenance data.	
<i>Functional Area:</i> TMC Work Zone Traffic Management	
Coordination with maintenance systems using work zone images and traveler information systems (such as DMS), and distribution of work plans so that work zones are established that have minimum traffic impact.	
<i>Requirement:</i>	Planned
1 The center shall receive work zone images from a maintenance center.	
<i>Requirement:</i>	Planned
2 The center shall analyze work zone images for indications of a possible incident.	
<i>Requirement:</i>	Planned
3 The center shall remotely control driver information systems (such as dynamic messages signs, highway advisory radios) to advise drivers of activity around a work zone.	
<i>Requirement:</i>	Planned
4 The center shall collect operational status for the driver information systems equipment in work zones.	
<i>Requirement:</i>	Planned
5 The center shall collect fault data for the driver information systems equipment in work zones for repair.	
<i>Requirement:</i>	Planned
6 The center shall receive proposed maintenance and construction work plans, analyze the activity as a possible incident, and provide work plan feedback to the sending center.	
<i>Functional Area:</i> TMC Demand Management Coordination	
Provides the capability to gather information on regional toll, parking, and transit usage and request changes to enable dynamic pricing for demand management.	
<i>Requirement:</i>	Planned
1 The center shall collect and store toll pricing data from toll administration centers, including the price for each road segment to which a toll applies, with the time and date for when it applies.	
<i>Requirement:</i>	Planned
5 The center shall send requests to toll administration centers to change pricing, modify restrictions, or modify operations of a toll road facility.	
<i>Functional Area:</i> Traffic Data Collection	
Collection and storage of traffic management data. For use by operations personnel or data archives in the region.	
<i>Requirement:</i>	Planned
1 The center shall collect traffic management data such as operational data, event logs, etc.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Illiana Corridor Operations Center</i>	
<i>Entity: Traffic Management</i>	
<i>Functional Area: Traffic Data Collection</i>	
Collection and storage of traffic management data. For use by operations personnel or data archives in the region.	
<i>Requirement:</i>	Planned
2 The center shall assign quality control metrics and meta-data to be stored along with the data. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.	
<i>Requirement:</i>	Planned
3 The center shall receive and respond to requests from ITS Archives for either a catalog of the traffic data or for the data itself.	
<i>Requirement:</i>	Planned
4 The center shall be able to produce sample products of the data available.	
<i>Functional Area: TMC Transportation Operations Data Collection</i>	
Collects real-time information on the state of the regional transportation system for operational use by the center. It establishes communications with a regional repository, requests or subscribes to information relevant to the center, and distributes the received information for use.	
<i>Requirement:</i>	Planned
1 The center shall collect real-time information on the state of the regional transportation system including current traffic and road conditions, weather conditions, special event and incident information.	
<i>Requirement:</i>	Planned
2 The center shall support the capability for the system operator to monitor and control the information collection service.	
<i>Element: Illiana Corridor Roadside Equipment/Toll Plazas/Gantries</i>	
<i>Entity: Roadway</i>	
<i>Functional Area: Roadway Basic Surveillance</i>	
Field elements that monitor traffic conditions using loop detectors and CCTV cameras.	
<i>Requirement:</i>	Potential
1 The field element shall collect, process, digitize, and send traffic sensor data (speed, volume, and occupancy) to the center for further analysis and storage, under center control.	
<i>Requirement:</i>	Potential
2 The field element shall collect, process, and send traffic images to the center for further analysis and distribution.	
<i>Requirement:</i>	Potential
4 The field element shall return sensor and CCTV system operational status to the controlling center.	
<i>Requirement:</i>	Potential
5 The field element shall return sensor and CCTV system fault data to the controlling center for repair.	
<i>Functional Area: Roadway Probe Data Communications</i>	
Field elements that collect probe data from vehicles using short range communications.	
<i>Requirement:</i>	Potential
1 The field element shall communicate with passing vehicles for traffic data link time calculations and send collected data to the controlling center; identification will be removed to ensure anonymity.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Illiana Corridor Roadside Equipment/Toll Plazas/Gantries</i>	
<i>Entity: Roadway</i>	
<i>Functional Area: Roadway Probe Data Communications</i>	
Field elements that collect probe data from vehicles using short range communications.	
<i>Requirement:</i> 2 The field element shall communicate with on-board equipment on passing vehicles to collect current vehicle position, speed, and heading and a record of previous events (e.g., starts and stops, link travel times) that can be used to determine current traffic conditions.	Potential
<i>Requirement:</i> 3 The field element shall communicate with on-board equipment on passing vehicles to collect current status information and a record of previous events (e.g., temperature, wiper status, headlight status, traction control system status) that can be used to determine road and surface weather conditions.	Potential
<i>Requirement:</i> 4 The field element shall communicate with on-board equipment on passing vehicles to collect vehicle trip information (e.g., origin and destination information, travel times) that can be used to support transportation planning.	Potential
<i>Requirement:</i> 5 The field element shall communicate with on-board equipment on passing vehicles to collect a history of precise positioning information that can be used to derive or verify accurate roadway geometry and lane features for use by map update providers.	Potential
<i>Requirement:</i> 6 The field element shall aggregate and forward collected probe information to the center.	Potential
<i>Requirement:</i> 7 The field element shall provide roadside equipment operational status to the center.	Potential
<i>Requirement:</i> 8 The field element shall provide roadside equipment fault indication to the center for repair.	Potential
<i>Functional Area: Roadway Variable Speed Limits</i>	
Field elements including physical overhead lane signs and associated monitoring, communications, and control electronics that are used to manage and control variable speed limits systems.	
<i>Requirement:</i> 1 The field element shall monitor traffic and environmental conditions along the roadway.	Planned
<i>Requirement:</i> 2 The field element shall autonomously calculate and set variable speed limits based on current conditions by lane.	Potential
<i>Requirement:</i> 3 The field element shall receive commands from the controlling center that establish speed limits by lane.	Potential
<i>Requirement:</i> 4 The field element shall display the current speed limits per lane to drivers.	Potential
<i>Requirement:</i> 5 The field element shall display additional information such as basic safety rules and current traffic information to drivers.	Potential
<i>Requirement:</i> 6 The field element shall collect operational status of the variable speed limit field equipment and report the operational status to the controlling center.	Potential
<i>Requirement:</i> 7 The field element shall monitor and report faults to the controlling center.	Potential
<i>Functional Area: Roadway Warning</i>	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Illiana Corridor Roadside Equipment/Toll Plazas/Gantries</i>	
<i>Entity: Roadway</i>	
<i>Functional Area: Roadway Warning</i>	
Field elements used to warn drivers approaching hazards including adverse road weather conditions, traffic conditions including queues, and obstacles or animals in the road.	
<i>Requirement:</i>	
1 The field element shall monitor for hazardous traffic conditions, including queues.	Planned
<i>Requirement:</i>	
2 The field element shall monitor for hazardous road surface and local weather conditions.	Planned
<i>Requirement:</i>	
3 The field element shall monitor for debris, animals, or other objects in the travel lanes.	Planned
<i>Requirement:</i>	
4 The field element shall provide collected sensor data to the controlling center.	Planned
<i>Requirement:</i>	
5 The field element shall autonomously identify potentially hazardous conditions and activate warning signs to approaching motorists.	Planned
<i>Requirement:</i>	
6 The field element shall receive commands from the controlling center that activate warning signs to approaching motorists.	Planned
<i>Requirement:</i>	
7 The field element shall collect operational status of the warning system field equipment and report the operational status to the controlling center.	Planned
<i>Requirement:</i>	
8 The field element shall monitor and report faults to the controlling center.	Planned
<i>Functional Area: Roadway Traffic Information Dissemination</i>	
Driver information systems, such as dynamic message signs and Highway Advisory Radio (HAR).	
<i>Requirement:</i>	
1 The field element shall include dynamic messages signs for dissemination of traffic and other information to drivers, under center control; the DMS may be either those that display variable text messages, or those that have fixed format display(s) (e.g. vehicle restrictions, or lane open/close).	Potential
<i>Requirement:</i>	
2 The field element shall include 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, under center control.	Potential
<i>Requirement:</i>	
4 The field element shall provide operational status for the driver information systems equipment (DMS, HAR, etc.) to the center.	Potential
<i>Requirement:</i>	
5 The field element shall provide fault data for the driver information systems equipment (DMS, HAR, etc.) to the center for repair.	Potential
<i>Functional Area: Roadway Incident Detection</i>	
Field elements that monitor traffic conditions to identify incidents. It includes traffic detectors that collect traffic flow information and identify unusual traffic conditions and advanced CCTV cameras with built-in incident detection algorithms.	
<i>Requirement:</i>	
1 The field element shall collect, process, and send traffic images to the center for further analysis and distribution.	Potential

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Illiana Corridor Roadside Equipment/Toll Plazas/Gantries</i>	
<i>Entity: Roadway</i>	
Functional Area: Roadway Incident Detection	
Field elements that monitor traffic conditions to identify incidents. It includes traffic detectors that collect traffic flow information and identify unusual traffic conditions and advanced CCTV cameras with built-in incident detection algorithms.	
<i>Requirement:</i>	Potential
2 The field element shall remotely process video data and provide an indication of potential incidents to the traffic management center.	
<i>Requirement:</i>	Potential
3 The field element's video devices shall be remotely controlled by a traffic management center.	
<i>Requirement:</i>	Potential
4 The field element shall provide operational status and fault data for the incident detection devices to the traffic management center.	
Functional Area: Roadway Equipment Coordination	
Field elements that control and send data to other field elements (such as environmental sensors that send data to a DMS or coordination between traffic controllers on adjacent intersections), without center control.	
<i>Requirement:</i>	Potential
1 The field element shall include sensors that provide data and status information to other field element devices, without center control.	
<i>Requirement:</i>	Potential
2 The field element shall include sensors that receive configuration data from other field element devices, without center control.	
<i>Requirement:</i>	Potential
3 The field element shall include devices that provide data and status information to other field element devices without center control.	
<i>Requirement:</i>	Potential
4 The field element shall include devices that receive configuration data from other field element devices, without center control.	
Functional Area: Roadway Field Device Monitoring	
Monitors field equipment operational status and detects and reports fault conditions. Device status, configuration, and fault information are provided to a remote center and a user interface provides information locally to field personnel.	
<i>Requirement:</i>	Potential
1 The field element shall monitor the operational status (state of the device, configuration, and fault data) of connected sensors (such as traffic, infrastructure, environmental, security, speed) and devices (such as highway advisory radio, dynamic message signs, automated roadway treatment systems, barrier and safeguard systems, cameras, traffic signals, ramp meters, short range communications equipment, security surveillance equipment).	
<i>Requirement:</i>	Potential
2 The field element shall send operational status of connected field equipment to the maintenance center.	
<i>Requirement:</i>	Potential
3 The field element shall send collected fault data to the maintenance center for repair.	
<i>Requirement:</i>	Potential
4 The field element shall include a local interface that provides operational status and fault data for connected field equipment to field personnel.	

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Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Illiana Corridor Roadside Equipment/Toll Plazas/Gantries</i>	
<i>Entity: Roadway</i>	
Functional Area: Roadway Field Device Monitoring	
Monitors field equipment operational status and detects and reports fault conditions. Device status, configuration, and fault information are provided to a remote center and a user interface provides information locally to field personnel.	
<i>Requirement:</i> 5	The field element shall include a local interface that allows field personnel to command diagnostic tests on connected field equipment. Potential
Functional Area: Roadway Emissions Monitoring	
Emissions and air quality sensors that collect vehicular emissions and area-wide air quality data.	
<i>Requirement:</i> 1	The field element shall include emissions sensors that detect levels of emissions from individual vehicles, under center control. Planned
<i>Requirement:</i> 2	The field element shall include air quality sensors, often distributed geographically, that detect area-wide levels of pollution, under center control. Planned
<i>Requirement:</i> 3	The field element shall analyze collected vehicle emissions data against reference data to determine whether or not a vehicle is violating the acceptable levels of emissions, and shall return this analysis to a center for possible enforcement action. Planned
<i>Requirement:</i> 4	If the emissions level detected by the emissions sensor indicates a vehicle is violating the acceptable levels of emissions, the field element shall provide the capability to display summary emissions information or warnings to passing drivers via a driver information system (such as portable messages signs, field to vehicle communications to in-vehicle signing systems, etc.). Planned
<i>Requirement:</i> 5	The field element shall provide emissions sensor equipment operational status to the center. Planned
<i>Requirement:</i> 6	The field element shall provide emissions sensor equipment fault indication to the center for repair. Planned
<i>Requirement:</i> 7	The field element shall provide area-wide pollution sensor equipment operational status to the center. Planned
<i>Requirement:</i> 8	The field element shall provide area-wide pollution sensor equipment fault indication to the center for repair. Planned
Functional Area: Roadway Environmental Monitoring	
Environmental sensors, surface and sub-surface, that collect weather and road surface information. Weather conditions measured include temperature, wind, humidity, precipitation, and visibility. Sensors measure road surface temperature, moisture, icing, salinity, etc.	
<i>Requirement:</i> 1	The field element shall include surface and sub-surface environmental sensors that measure road surface temperature, moisture, icing, salinity, and other measures. Planned
<i>Requirement:</i> 2	The field element shall include environmental sensors that measure weather conditions including temperature, wind, humidity, precipitation, and visibility. Planned
<i>Requirement:</i> 3	The field element's environmental sensors shall be remotely controlled by a maintenance center. Planned

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Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Illiana Corridor Roadside Equipment/Toll Plazas/Gantries</i>	
<i>Entity: Roadway</i>	
<i>Functional Area: Roadway Environmental Monitoring</i>	
Environmental sensors, surface and sub-surface, that collect weather and road surface information. Weather conditions measured include temperature, wind, humidity, precipitation, and visibility. Sensors measure road surface temperature, moisture, icing, salinity, etc.	
<i>Requirement:</i>	Planned
4 The field element's environmental sensors shall be remotely controlled by a traffic management center.	
<i>Requirement:</i>	Planned
5 The field element's environmental sensors shall be remotely controlled by weather service providers such as the National Weather Service or value-added sector specific meteorological services.	
<i>Requirement:</i>	Planned
6 The field element's environmental sensors shall be remotely controlled by a maintenance and construction vehicle.	
<i>Requirement:</i>	Planned
7 The field element shall provide environmental sensor equipment operational status to the controlling center or maintenance vehicle.	
<i>Requirement:</i>	Planned
8 The field element shall provide environmental sensor equipment fault indication to the controlling center or maintenance vehicle.	
<i>Requirement:</i>	Planned
9 The field element shall remotely aggregate environmental sensor data with environmental data collected from maintenance and construction vehicles.	
<i>Requirement:</i>	Planned
10 The field element shall provide weather and road surface condition data to centers.	
<i>Requirement:</i>	Planned
11 The field element shall provide weather and road surface condition data to maintenance and construction vehicles.	
<i>Functional Area: Field Barrier System Control</i>	
Field elements that control barrier systems such as gates and other systems that manage entry to roadways, transportation facilities and infrastructure.	
<i>Requirement:</i>	Planned
1 The field element shall activate barrier systems for transportation facilities and infrastructure under center control. Barrier systems include automated or remotely controlled gates, barriers and other systems that manage entry to roadways.	
<i>Requirement:</i>	Planned
2 The field element shall return barrier system operational status to the controlling center.	
<i>Requirement:</i>	Planned
3 The field element shall return barrier system fault data to the maintenance center for repair.	
<i>Requirement:</i>	Planned
4 The field element shall receive requests for access from approaching vehicles using field-vehicle communications and validate and authenticate the requests.	
<i>Requirement:</i>	Planned
5 The field element shall grant access only to qualified vehicles.	
<i>Requirement:</i>	Planned
6 The field element shall communicate access permission status and access instructions to approaching vehicles using field-vehicle communications.	
<i>Functional Area: Roadway Speed Monitoring and Warning</i>	

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Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Illiana Corridor Roadside Equipment/Toll Plazas/Gantries</i>	
<i>Entity: Roadway</i>	
<i>Functional Area: Roadway Speed Monitoring and Warning</i>	
Vehicle speed sensors that detect excessive vehicle speeds, optionally based on conditions and vehicle type, informing drivers, centers and/or enforcement agencies of speed violations.	
<i>Requirement:</i>	Planned
1 The field element shall include sensors to detect vehicle speeds, under traffic or maintenance center control.	
<i>Requirement:</i>	Planned
2 The field element shall include sensors to detect vehicle speeds, under enforcement agency control.	
<i>Requirement:</i>	Planned
3 If the speed detected by vehicle speed sensors is determined to be excessive, the field element shall provide a safe speed advisory to passing drivers via a driver information system (such as portable messages signs, field to vehicle communications to in-vehicle signing systems, etc.).	
<i>Requirement:</i>	Planned
4 The field element shall base speed advisories to passing drivers on environmental conditions.	
<i>Requirement:</i>	Planned
5 The field element shall monitor notify an enforcement agency when a speed violation is detected.	
<i>Requirement:</i>	Planned
6 The field element shall return operational status for the vehicle speed sensors to the controlling traffic or maintenance center; including measured speeds, warning messages displayed, and violation records.	
<i>Requirement:</i>	Planned
7 The field element shall return operational status for the vehicle speed sensors to the enforcement agency.	
<i>Requirement:</i>	Planned
8 The field element shall return fault data for the vehicle speed sensors to the controlling center for repair.	
<i>Functional Area: Roadway Infrastructure Monitoring</i>	
Sensors that monitor the condition of pavement, bridges, tunnels, associated hardware, and other transportation-related infrastructure (e.g., culverts), under maintenance center and maintenance vehicle control.	
<i>Requirement:</i>	Planned
1 The field element shall include infrastructure condition monitoring sensors that monitor the condition of pavement, bridges, tunnels, associated hardware, and other transportation-related infrastructure (e.g., culverts), under maintenance center control.	
<i>Requirement:</i>	Planned
2 The field element shall include infrastructure condition monitoring sensors that monitor the condition of pavement, bridges, tunnels, associated hardware, and other transportation-related infrastructure (e.g., culverts), under maintenance vehicle control.	
<i>Requirement:</i>	Planned
3 The field element shall provide operational status for the infrastructure condition monitoring sensors to the maintenance center.	
<i>Requirement:</i>	Planned
4 The field element shall provide operational status for the infrastructure condition monitoring sensors to the maintenance vehicle.	
<i>Requirement:</i>	Planned
5 The field element shall provide fault data for the infrastructure condition monitoring sensors to the maintenance center for repair.	

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Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Illiana Corridor Roadside Equipment/Toll Plazas/Gantries</i>	
<i>Entity: Roadway</i>	
Functional Area: Roadway Work Zone Traffic Control	
Field elements in maintenance and construction areas including CCTV cameras, driver information systems (such as DMS), and gates/barriers that monitor and control traffic and provide information directly to drivers in affected areas.	
<i>Requirement:</i>	
1 The field element shall collect, process, and send work zone images to the center for further analysis and distribution, under center control.	Planned
<i>Requirement:</i>	
2 Under traffic and maintenance center control, the field element shall include driver information systems (such as dynamic messages signs and highway advisory radios) that advise drivers of activity around the work zone through which they are currently passing.	Planned
<i>Requirement:</i>	
3 Under the control of field personnel within maintenance vehicles, the field element shall include driver information systems (such as dynamic messages signs and highway advisory radios) that advise drivers of activity around a work zone through which they are currently passing.	Planned
<i>Requirement:</i>	
4 The field element shall control access to the work zone using automated gate or barrier systems. This includes automated flagger assistance devices that include automated gate arms and other automated gate/barrier systems.	Potential
<i>Requirement:</i>	
5 The field element shall provide operational status for the surveillance (e.g. CCTV), driver information systems, and gates/barriers in work zones to the maintenance center.	Planned
<i>Requirement:</i>	
6 The field element shall provide fault data for the surveillance (e.g. CCTV), driver information systems, and gates/barriers in work zones to the maintenance center for repair.	Planned
Functional Area: Roadway Work Zone Safety	
Work zone intrusion detection devices (to detect vehicle intrusion upon a work zone or crew worker movement across a work zone boundary) and intrusion alerting devices that provide alerts to crew and drivers.	
<i>Requirement:</i>	
1 The field element shall include work zone intrusion detection devices that detect when a vehicle has intruded upon the boundary of a work zone, under center control.	Potential
<i>Requirement:</i>	
2 The field element shall include work zone intrusion detection devices that detect when crew workers have crossed the boundary between the work zone and vehicle traffic, under center control.	Potential
<i>Requirement:</i>	
3 The field element shall include work zone intrusion alerting devices that alert crew workers of a work zone emergency or safety issue such as the intrusion of a vehicle into the work zone area or movement of field crew into the travel lanes.	Potential
<i>Requirement:</i>	
4 The field element shall include work zone intrusion alerting devices that notify crew via maintenance vehicles of a work zone emergency or safety issue such as the intrusion of a vehicle into the work zone area or movement of field crew into the travel lanes.	Potential

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Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Illiana Corridor Roadside Equipment/Toll Plazas/Gantries</i>	
<i>Entity: Roadway</i>	
<i>Functional Area: Roadway Work Zone Safety</i>	
Work zone intrusion detection devices (to detect vehicle intrusion upon a work zone or crew worker movement across a work zone boundary) and intrusion alerting devices that provide alerts to crew and drivers.	
<i>Requirement:</i> 5 The field element shall include work zone intrusion alerting devices that alert drivers that they have intruded upon the perimeter of the work zone, or are about to do so; may provide alerts to drivers directly or via in-vehicle signing.	Potential
<i>Requirement:</i> 6 The field element shall provide operational status for the work zone intrusion detection devices to the maintenance center.	Potential
<i>Requirement:</i> 7 The field element shall provide fault data for the work zone intrusion detection devices to the maintenance center for repair.	Potential
<i>Requirement:</i> 8 The field element shall provide operational status for the work zone intrusion alerting devices to the maintenance center.	Potential
<i>Requirement:</i> 9 The field element shall provide fault data for the work zone intrusion alerting devices to the maintenance center for repair.	Potential
<i>Functional Area: Roadway Short Range Traveler Information Communications</i>	
Field elements that distribute information to in-vehicle equipment. The information provided may be determined locally or under the control of a center.	
<i>Requirement:</i> 1 The field element shall distribute traveler information including traffic and road conditions to passing vehicles using short range communications, under center control.	Potential
<i>Requirement:</i> 2 The field element shall distribute advisory information, such as evacuation information, wide-area alerts, incident information, work zone intrusion information, and other special information to passing vehicles using short range communications, under center control.	Potential
<i>Requirement:</i> 3 The field element shall distribute indicator and fixed sign information, including static sign information (e.g., stop, curve warning, guide signs, service signs, and directional signs) and dynamic information (e.g., current signal states and local conditions warnings identified by local environmental sensors) to equipment on-board vehicles under center control.	Potential
<i>Requirement:</i> 4 The field element shall return system operational status to the controlling center.	Potential
<i>Requirement:</i> 5 The field element shall return system fault data to the maintenance center for repair.	Potential
<i>Functional Area: Roadway Data Collection</i>	
Field elements to collect traffic, road, and environmental conditions information for use in transportation planning, research, and other off-line applications. Includes the sensors, supporting roadside infrastructure, and communications equipment.	
<i>Requirement:</i> 1 The field element shall collect traffic, road, and environmental conditions information.	Planned
<i>Requirement:</i> 2 The field element shall include the sensors and supporting roadside devices that sense, collect, and send traffic, road, and environmental conditions information to a center for archival.	Planned

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Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:Illiana Corridor Roadside Equipment/Toll Plazas/Gantries</i>	
<i>Entity: Roadway</i>	
<i>Functional Area: Roadway Data Collection</i>	
Field elements to collect traffic, road, and environmental conditions information for use in transportation planning, research, and other off-line applications. Includes the sensors, supporting roadside infrastructure, and communications equipment.	
<i>Requirement:</i>	
3 The field element shall collect sensor status and sensor faults from roadside equipment and send it along with the recorded data to a center for archival.	Planned
<i>Entity: Roadway Payment</i>	
<i>Functional Area: Toll Plaza Toll Collection</i>	
Roadside collection of tolls from vehicle toll tags and violation identification.	
<i>Requirement:</i>	
1 The field element shall read data from passing vehicles to support toll payment transactions.	Planned
<i>Requirement:</i>	
2 The field element shall calculate the toll due based on the vehicle characteristics (vehicle size, weight, axle count, etc.) and stored toll prices.	Planned
<i>Requirement:</i>	
3 The field element shall update the stored value after debiting the toll amount and send a record of the transaction to a center.	Planned
<i>Requirement:</i>	
4 The field element shall read the credit identity from the passing vehicle and send that identity and the amount to be debited to a center.	Planned
<i>Requirement:</i>	
5 The field element shall support advanced toll payment by checking the vehicle's toll information against a stored list of advanced payments, and debiting the toll from the list in the case of a match.	Potential
<i>Requirement:</i>	
6 In the case of closed toll systems, the field element shall update the vehicle on-board data with the system entry point, and upon toll system exit, use the stored data in the calculation of the toll.	Planned
<i>Requirement:</i>	
7 The field element shall control roadside displays indicating success or failure of the toll transaction to the driver.	Planned
<i>Requirement:</i>	
8 The field element shall control cameras, obtain images, and forward images of toll violators to a center.	Planned
<i>Requirement:</i>	
9 The field element shall respond to changes in tolls from the Toll Operator.	Planned
<i>Requirement:</i>	
10 The field element shall forward wide-area alert information to the Toll Operator.	Planned
<i>Element:Illinois Department of Transportation Emergency Traffic Patrol (ETP)</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Emergency Call-Taking</i>	
Provides interface to the emergency call-taking systems such as the Emergency Telecommunications System (e.g., 911) that correlate call information with emergencies reported by transit agencies, commercial vehicle operators, or other public safety agencies. Allows the operator to verify the incident and forward the information to the responding agencies.	

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Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Illinois Department of Transportation Emergency Traffic Patrol (ETP)</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Emergency Call-Taking</i>	
Provides interface to the emergency call-taking systems such as the Emergency Telecommunications System (e.g., 911) that correlate call information with emergencies reported by transit agencies, commercial vehicle operators, or other public safety agencies. Allows the operator to verify the incident and forward the information to the responding agencies.	
<i>Requirement:</i>	
1 The center shall support the interface to the Emergency Telecommunications System (e.g. 911 or 7-digit call routing) to receive emergency notification information and provide it to the emergency system operator.	Existing
<i>Requirement:</i>	
2 The center shall receive emergency call information from 911 services and present the possible incident information to the emergency system operator.	Existing
<i>Requirement:</i>	
4 The center shall receive emergency call information from mayday service providers and present the possible incident information to the emergency system operator.	Existing
<i>Requirement:</i>	
5 The center shall receive emergency notification information from other public safety agencies and present the possible incident information to the emergency system operator.	Existing
<i>Requirement:</i>	
7 The center shall coordinate, correlate, and verify all emergency inputs, including those identified based on external calls and internal analysis of security sensor and surveillance data, and assign each a level of confidence.	Existing
<i>Requirement:</i>	
8 The center shall send a request for remote control of CCTV systems from a traffic management center in order to verify the reported incident.	Planned
<i>Requirement:</i>	
9 The center shall forward the verified emergency information to the responding agency based on the location and nature of the emergency.	Existing
<i>Requirement:</i>	
10 The center shall update the incident information log once the emergency system operator has verified the incident.	Existing
<i>Requirement:</i>	
11 The center shall provide the capability for digitized map data to act as the background to the emergency information presented to the emergency system operator.	Planned
<i>Functional Area: Emergency Dispatch</i>	
Dispatch emergency vehicles to incidents, tracking their location and status. Pertinent incident information is gathered and relayed to the responding units.	
<i>Requirement:</i>	
1 The center shall dispatch emergency vehicles to respond to verified emergencies under center personnel control.	Existing
<i>Requirement:</i>	
2 The center shall store the current status of all emergency vehicles available for dispatch and those that have been dispatched.	Existing
<i>Requirement:</i>	
3 The center shall relay location and incident details to the responding vehicles.	Existing
<i>Requirement:</i>	
4 The center shall track the location and status of emergency vehicles responding to an emergency based on information from the emergency vehicle.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Illinois Department of Transportation Emergency Traffic Patrol (ETP)	
<i>Entity:</i> Emergency Management	
<i>Functional Area:</i> Emergency Dispatch	
Dispatch emergency vehicles to incidents, tracking their location and status. Pertinent incident information is gathered and relayed to the responding units.	
<i>Requirement:</i>	
5 The center shall store and maintain the emergency service responses in an action log.	Existing
<i>Requirement:</i>	
6 The center shall provide the capability for digitized map data to act as the background to the information presented to the emergency system operator.	Existing
<i>Requirement:</i>	
7 The center shall receive traffic images to support dispatch of emergency vehicles.	Existing
<i>Requirement:</i>	
8 The center shall provide the capability to request remote control of traffic surveillance devices	Planned
<i>Requirement:</i>	
9 The center shall coordinate response to incidents with other Emergency Management centers to ensure appropriate resources are dispatched and utilized.	Existing
<i>Functional Area:</i> Emergency Routing	
Routing of emergency vehicles to facilitate the quickest/safest arrival. Routes may be determined based on real-time traffic information and road conditions or routes may be provided by Traffic Management on request.	
<i>Requirement:</i>	
1 The center shall collect current traffic and road condition information for emergency vehicle route calculation.	Existing
<i>Requirement:</i>	
2 The center shall receive information on the location and status of traffic control equipment and work zones along potential emergency routes.	Existing
<i>Requirement:</i>	
3 The center shall receive status information from care facilities to determine the appropriate facility and its location.	Existing
<i>Requirement:</i>	
4 The center shall receive asset restriction information to support the dispatching of appropriate emergency resources.	Existing
<i>Requirement:</i>	
5 The center shall receive current railroad schedule information for emergency vehicle route calculation.	Existing
<i>Requirement:</i>	
6 The center shall track current emergency vehicle location and status.	Existing
<i>Requirement:</i>	
7 The center shall calculate emergency vehicle routes, under center personnel control, based on the collected traffic and road conditions information.	Existing
<i>Requirement:</i>	
8 The center shall request and receive ingress and egress routes or other specialized emergency access routes from the traffic management center.	Planned
<i>Requirement:</i>	
9 The center shall provide the capability to request special traffic control measures, such as signal preemption, from the traffic management center to facilitate emergency vehicle progress along the suggested route.	Potential
<i>Requirement:</i>	
10 Once the route is calculated the route shall be provided to the dispatch function.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Illinois Department of Transportation Emergency Traffic Patrol (ETP)</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Emergency Routing</i>	
Routing of emergency vehicles to facilitate the quickest/safest arrival. Routes may be determined based on real-time traffic information and road conditions or routes may be provided by Traffic Management on request.	
<i>Requirement:</i>	Existing
11 The center shall provide the capability for digitized map data to act as the background to the information presented to the emergency system operator.	
<i>Functional Area: Incident Command</i>	
Tactical decision support, resource coordination, and communications integration among emergency management agencies for Incident Commands that are established by first responders to support local management of an incident.	
<i>Requirement:</i>	Existing
1 The center shall 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.	
<i>Requirement:</i>	Existing
2 The center shall provide incident command communications with public safety, emergency management, transportation, and other allied response agency centers.	
<i>Requirement:</i>	Existing
3 The center shall track and maintain resource information and action plans pertaining to the incident command.	
<i>Requirement:</i>	Existing
4 The center shall 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.	
<i>Requirement:</i>	Existing
5 The center shall assess the status of responding emergency vehicles as part of an incident command.	
<i>Functional Area: Emergency Early Warning System</i>	
Monitors alerting and advisory systems, information collected by ITS surveillance and sensors, and reports from other agencies in order to identify potential, imminent, or in-progress major incidents or disasters. Notification is provided to other ITS centers to notify the traveling public.	
<i>Requirement:</i>	Existing
1 The center shall 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).	
<i>Requirement:</i>	Existing
2 The center shall provide the capability to correlate alerts and advisories, incident information, and security sensor and surveillance data.	
<i>Requirement:</i>	Existing
3 The center shall 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.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Illinois Department of Transportation Emergency Traffic Patrol (ETP)</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Emergency Early Warning System</i>	
Monitors alerting and advisory systems, information collected by ITS surveillance and sensors, and reports from other agencies in order to identify potential, imminent, or in-progress major incidents or disasters. Notification is provided to other ITS centers to notify the traveling public.	
<i>Requirement:</i> 5 The center shall broadcast wide-area alerts and advisories to toll administration centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	Existing
<i>Requirement:</i> 6 The center shall broadcast wide-area alerts and advisories to traveler information service providers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	Existing
<i>Requirement:</i> 7 The center shall broadcast wide-area alerts and advisories to maintenance centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	Existing
<i>Requirement:</i> 8 The center shall broadcast wide-area alerts and advisories to other emergency management centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	Existing
<i>Requirement:</i> 9 The center shall broadcast wide-area alerts and advisories to commercial vehicle administration centers and roadside check facilities for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	Existing
<i>Requirement:</i> 10 The center shall process status information from each of the centers that have been sent the wide-area alert.	Existing
<i>Requirement:</i> 11 The center shall coordinate the broadcast of wide-area alerts and advisories with other emergency management centers.	Existing
<i>Requirement:</i> 12 The center shall receive incident information from other transportation management centers to support the early warning system.	Existing
<i>Requirement:</i> 13 The center shall present the alert and advisory information and the status of the actions taken in response to the alert by the other centers to the emergency system operator as received from other system inputs.	Existing
<i>Requirement:</i> 14 The center shall support the entry of alert and advisory information directly from the emergency system operator.	Existing
<i>Functional Area: Emergency Response Management</i>	
Strategic emergency planning and response capabilities and broad inter-agency interfaces to support large-scale incidents and disasters, commonly associated with Emergency Operations Centers.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Illinois Department of Transportation Emergency Traffic Patrol (ETP)</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Emergency Response Management</i>	
Strategic emergency planning and response capabilities and broad inter-agency interfaces to support large-scale incidents and disasters, commonly associated with Emergency Operations Centers.	
<i>Requirement:</i> 1 The center shall provide strategic emergency response capabilities provided by an Emergency Operations Center for large-scale incidents and disasters.	Existing
<i>Requirement:</i> 2 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.	Existing
<i>Requirement:</i> 3 The center shall provide the capability to implement response plans and track progress through the incident by exchanging incident information and response status with allied agencies.	Existing
<i>Requirement:</i> 4 The center shall develop, coordinate with other agencies, and store emergency response plans.	Existing
<i>Requirement:</i> 5 The center shall track the availability of resources and coordinate resource sharing with allied agency centers including traffic, maintenance, or other emergency centers.	Existing
<i>Requirement:</i> 6 The center shall 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.	Existing
<i>Requirement:</i> 8 The center shall support remote control of field equipment normally under control of the traffic management center including traffic signals, dynamic message signs, gates, and barriers.	Potential
<i>Requirement:</i> 9 The center shall provide the capability to remotely control and monitor CCTV systems normally operated by a traffic management center.	Planned
<i>Requirement:</i> 11 The center shall 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.	Planned
<i>Requirement:</i> 12 The center shall provide information to the media concerning the status of an emergency response.	Existing
<i>Requirement:</i> 13 The center shall provide the capability for digitized map data to act as the background to the information presented to the emergency system operator.	Existing
<i>Requirement:</i> 14 The center shall provide the capability for center personnel to provide inputs to the management of incidents, disasters and evacuations.	Existing
<i>Requirement:</i> 15 The center shall collect information about the status of the recovery efforts for the infrastructure during disasters.	Potential
<i>Requirement:</i> 16 The center shall provide the overall status of infrastructure recovery efforts to traveler information providers and media.	Potential

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Illinois Department of Transportation Emergency Traffic Patrol (ETP)	
<i>Entity:</i> Emergency Management	
<i>Functional Area:</i> Emergency Response Management	
Strategic emergency planning and response capabilities and broad inter-agency interfaces to support large-scale incidents and disasters, commonly associated with Emergency Operations Centers.	
<i>Requirement:</i>	
17 The center shall provide the capability to communicate information about emergency situations to local population through the Emergency Telecommunications System.	Existing
<i>Requirement:</i>	
19 The center shall retrieve information from public health systems to increase preparedness for, and implement a response to biological, chemical, radiation, and other public health emergencies.	Existing
<i>Functional Area:</i> Emergency Evacuation Support	
Evacuation planning and coordination to manage evacuation and reentry of a population in the vicinity of a disaster or other emergency that poses a risk to public safety.	
<i>Requirement:</i>	
1 The center shall manage inter-agency coordination of evacuation operations, from initial planning through the evacuation process and reentry.	Existing
<i>Requirement:</i>	
2 The center shall develop and exchange evacuation plans with allied agencies prior to the occurrence of a disaster.	Existing
<i>Requirement:</i>	
3 The center shall provide an interface to the emergency system operator to enter evacuation plans and procedures and present the operator with other agencies' plans.	Existing
<i>Requirement:</i>	
4 The center shall coordinate evacuation destinations and shelter needs with shelter providers (e.g., the American Red Cross) in the region.	Existing
<i>Requirement:</i>	
5 The center shall provide evacuation information to traffic, transit, maintenance and construction, rail operations, and other emergency management centers as needed.	Existing
<i>Requirement:</i>	
7 The center shall 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.	Potential
<i>Requirement:</i>	
8 The center shall 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.	Existing
<i>Requirement:</i>	
9 The center shall monitor the progress or status of the evacuation once it begins and exchange tactical plans, prepared during the incident, with allied agencies.	Potential
<i>Requirement:</i>	
10 The center shall monitor the progress of the reentry process.	Potential
<i>Requirement:</i>	
11 The center shall submit evacuation information to toll administration centers along with requests for changes in the toll services or fee collection during an evacuation.	Potential
<i>Requirement:</i>	
12 The center shall 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.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Illinois Department of Transportation Emergency Traffic Patrol (ETP)</i>	
<i>Entity: Emergency Management</i>	
Functional Area: Emergency Environmental Monitoring	
Collects current and forecast road and weather information that is used by the operator to more effectively manage incidents.	
<i>Requirement:</i>	Existing
1 The center shall 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).	
<i>Requirement:</i>	Existing
2 The center shall collect current road and weather information from roadway maintenance operations.	
<i>Requirement:</i>	Existing
3 The center shall assimilate current and forecast road conditions and surface weather information to support incident management.	
<i>Requirement:</i>	Existing
4 The center shall present the current and forecast road and weather information to the emergency system operator.	
Functional Area: Center Secure Area Surveillance	
Management of security surveillance devices and analysis of that data to detect potential threats. Areas under surveillance may include transit stops, transit stations, rest areas, park and ride lots, modal interchange facilities, on-board a transit vehicle, etc.	
<i>Requirement:</i>	Existing
1 The center shall remotely monitor video images and audio surveillance data collected in secure areas including facilities (e.g. transit yards) and transportation infrastructure (e.g. bridges, tunnels, interchanges, roadway infrastructure, and transit railways or guideways). The data may be raw or pre-processed in the field.	
<i>Requirement:</i>	Planned
2 The center shall remotely monitor video images and audio surveillance data collected in traveler secure areas, which include transit stations, transit stops, rest areas, park and ride lots, and other fixed sites along travel routes (e.g., emergency pull-off areas and travel information centers). The data may be raw or pre-processed in the field.	
<i>Requirement:</i>	Existing
4 The center shall exchange surveillance data with other emergency centers.	
<i>Requirement:</i>	Existing
5 The center shall identify potential security threats based on collected security surveillance data.	
<i>Requirement:</i>	Existing
6 The center shall verify potential security threats by correlating security surveillance data from multiple sources.	
<i>Requirement:</i>	Existing
7 The center shall remotely control security surveillance devices in secure areas including facilities (e.g. transit yards) and transportation infrastructure (e.g. bridges, tunnels, interchanges, roadway infrastructure, and transit railways or guideways).	
<i>Requirement:</i>	Planned
8 The center shall remotely control security surveillance devices in traveler secure areas, which include transit stations, transit stops, rest areas, park and ride lots, and other fixed sites along travel routes (e.g., emergency pull-off areas and travel information centers).	
<i>Requirement:</i>	Existing
10 The center shall match traveler video images against a database from the Alerting and Advisory Systems of known images that may represent criminals and terrorists.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Illinois Department of Transportation Emergency Traffic Patrol (ETP)</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Center Secure Area Surveillance</i>	
Management of security surveillance devices and analysis of that data to detect potential threats. Areas under surveillance may include transit stops, transit stations, rest areas, park and ride lots, modal interchange facilities, on-board a transit vehicle, etc.	
<i>Requirement:</i>	
11 The center shall exchange traveler images with other emergency management centers to support traveler image matching.	Existing
<i>Requirement:</i>	
12 The center shall respond to control data from center personnel regarding security surveillance data collection, processing, threat detection, and image matching.	Existing
<i>Requirement:</i>	
13 The center shall monitor maintenance status of the security sensor field equipment.	Existing
<i>Functional Area: Center Secure Area Alarm Support</i>	
Collection and response to silent and audible alarms received from travelers in secure areas (such as transit stops, rest areas, park-and-ride lots) and from on-board transit vehicles.	
<i>Requirement:</i>	
1 The center shall collect silent and audible alarms received from travelers in secure areas (such as transit stops, rest areas, park and ride lots, modal interchange facilities).	Existing
<i>Requirement:</i>	
3 After the alarm message has been received, the center shall generate an alarm acknowledgment to the sender.	Existing
<i>Requirement:</i>	
4 After the alarm message becomes a verified incident, the center shall determine the appropriate response.	Existing
<i>Requirement:</i>	
5 The center shall determine whether the alarm message indicates an emergency that requires the attention of public safety agencies, and forward alarm message data to the appropriate agency as necessary.	Existing
<i>Requirement:</i>	
6 The center shall forward the alarm message to center personnel and respond to the traveler or transit vehicle operator as directed by the personnel.	Existing
<i>Functional Area: Mayday Support</i>	
Collection and response to Mayday messages received from vehicles and drivers.	
<i>Requirement:</i>	
1 The center shall collect mayday messages from vehicles and drivers.	Existing
<i>Requirement:</i>	
2 The center shall collect mayday messages from travelers via personal handheld devices.	Existing
<i>Requirement:</i>	
3 The center shall acknowledge the request for emergency assistance, whether originated by the driver, automatically by the vehicle's safety systems, or by a traveler via a personal handheld device.	Existing
<i>Requirement:</i>	
4 After the mayday becomes a verified incident, the center shall determine the appropriate response to the mayday message.	Existing
<i>Requirement:</i>	
5 The center shall determine whether the mayday message indicates an emergency that requires the attention of public safety agencies, and forward mayday emergency data to the appropriate agency as necessary.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Illinois Department of Transportation Emergency Traffic Patrol (ETP)	
<i>Entity:</i> Emergency Management	
<i>Functional Area:</i> Mayday Support	
Collection and response to Mayday messages received from vehicles and drivers.	
<i>Requirement:</i>	
6 The center shall support the activation of remote controlled functions requested by a vehicle, such as requests to unlock doors.	Planned
<i>Requirement:</i>	
7 The center shall request additional emergency details from or issue commands to the vehicle's security systems or vehicle driver if needed.	Existing
<i>Requirement:</i>	
8 The center shall maintain a log of all mayday signals received from vehicles.	Existing
<i>Requirement:</i>	
9 The center shall provide all mayday data to center personnel and respond to the vehicle, driver, or traveler using the portable handheld device as directed by the personnel.	Existing
<i>Functional Area:</i> Emergency Commercial Vehicle Response	
Responds to commercial vehicle and freight equipment related emergencies. Includes incidents involving hazardous materials as well as the detection of non-permitted transport of security sensitive hazmat.	
<i>Requirement:</i>	
1 The center shall receive emergency notification information from commercial vehicles, commercial vehicle check stations, or commercial fleet operators and present the possible incident information to the emergency system operator. This may include detection of non-permitted transport of security sensitive hazmat, hazardous cargo spills, etc.	Existing
<i>Requirement:</i>	
2 The center shall receive details of the cargo being carried by commercial vehicles from their commercial fleet manager for incidents involving potential hazardous materials.	Existing
<i>Requirement:</i>	
3 The center shall forward the verified emergency information to the responding agency based on the location and nature of the emergency.	Existing
<i>Requirement:</i>	
4 The center shall provide the capability to request Fleet and Freight Management to disable a specific vehicle in their fleet.	Existing
<i>Functional Area:</i> Emergency Data Collection	
Collection and storage of information related to Emergency Management. For use by operations personnel or data archives in the region.	
<i>Requirement:</i>	
1 The center shall collect emergency service data, emergency vehicle management data, emergency vehicle data, sensor and surveillance data, threat data, and incident data.	Existing
<i>Requirement:</i>	
2 The center shall assign quality control metrics and meta-data to be stored along with the data. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.	Planned
<i>Requirement:</i>	
3 The center shall receive and respond to requests from ITS Archives for either a catalog of the emergency management data or for the data itself.	Planned
<i>Requirement:</i>	
4 The center shall be able to produce sample products of the data available.	Planned

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Illinois Department of Transportation Emergency Traffic Patrol (ETP)</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Emergency Transportation Operations Data Collection</i>	
Collects real-time information on the state of the regional transportation system for operational use by the center. It establishes communications with a regional repository, requests or subscribes to information relevant to the center, and distributes the received information for use.	
<i>Requirement:</i>	
1 The center shall collect real-time information on the state of the regional transportation system including current traffic and road conditions, weather conditions, special event and incident information.	Planned
<i>Requirement:</i>	
2 The center shall support the capability for the system operator to monitor and control the information collection service.	Planned
<i>Element: Indiana Department of Homeland Security State Emergency Operations Center</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Emergency Call-Taking</i>	
Provides interface to the emergency call-taking systems such as the Emergency Telecommunications System (e.g., 911) that correlate call information with emergencies reported by transit agencies, commercial vehicle operators, or other public safety agencies. Allows the operator to verify the incident and forward the information to the responding agencies.	
<i>Requirement:</i>	
1 The center shall support the interface to the Emergency Telecommunications System (e.g. 911 or 7-digit call routing) to receive emergency notification information and provide it to the emergency system operator.	Existing
<i>Requirement:</i>	
2 The center shall receive emergency call information from 911 services and present the possible incident information to the emergency system operator.	Existing
<i>Requirement:</i>	
3 The center shall receive emergency call information from motorist call-boxes and present the possible incident information to the emergency system operator.	Existing
<i>Requirement:</i>	
4 The center shall receive emergency call information from mayday service providers and present the possible incident information to the emergency system operator.	Existing
<i>Requirement:</i>	
5 The center shall receive emergency notification information from other public safety agencies and present the possible incident information to the emergency system operator.	Existing
<i>Requirement:</i>	
6 The center shall receive emergency notification information from public transit systems and present the possible incident information to the emergency system operator.	Existing
<i>Requirement:</i>	
7 The center shall coordinate, correlate, and verify all emergency inputs, including those identified based on external calls and internal analysis of security sensor and surveillance data, and assign each a level of confidence.	Existing
<i>Requirement:</i>	
8 The center shall send a request for remote control of CCTV systems from a traffic management center in order to verify the reported incident.	Planned
<i>Requirement:</i>	
9 The center shall forward the verified emergency information to the responding agency based on the location and nature of the emergency.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Indiana Department of Homeland Security State Emergency Operations Center	
<i>Entity:</i> Emergency Management	
<i>Functional Area:</i> Emergency Call-Taking	
Provides interface to the emergency call-taking systems such as the Emergency Telecommunications System (e.g., 911) that correlate call information with emergencies reported by transit agencies, commercial vehicle operators, or other public safety agencies. Allows the operator to verify the incident and forward the information to the responding agencies.	
<i>Requirement:</i>	
10 The center shall update the incident information log once the emergency system operator has verified the incident.	Existing
<i>Requirement:</i>	
11 The center shall provide the capability for digitized map data to act as the background to the emergency information presented to the emergency system operator.	Planned
<i>Functional Area:</i> Emergency Dispatch	
Dispatch emergency vehicles to incidents, tracking their location and status. Pertinent incident information is gathered and relayed to the responding units.	
<i>Requirement:</i>	
1 The center shall dispatch emergency vehicles to respond to verified emergencies under center personnel control.	Existing
<i>Requirement:</i>	
2 The center shall store the current status of all emergency vehicles available for dispatch and those that have been dispatched.	Existing
<i>Requirement:</i>	
3 The center shall relay location and incident details to the responding vehicles.	Existing
<i>Requirement:</i>	
4 The center shall track the location and status of emergency vehicles responding to an emergency based on information from the emergency vehicle.	Existing
<i>Requirement:</i>	
5 The center shall store and maintain the emergency service responses in an action log.	Existing
<i>Requirement:</i>	
6 The center shall provide the capability for digitized map data to act as the background to the information presented to the emergency system operator.	Planned
<i>Requirement:</i>	
7 The center shall receive traffic images to support dispatch of emergency vehicles.	Planned
<i>Requirement:</i>	
8 The center shall provide the capability to request remote control of traffic surveillance devices	Planned
<i>Requirement:</i>	
9 The center shall coordinate response to incidents with other Emergency Management centers to ensure appropriate resources are dispatched and utilized.	Existing
<i>Functional Area:</i> Emergency Routing	
Routing of emergency vehicles to facilitate the quickest/safest arrival. Routes may be determined based on real-time traffic information and road conditions or routes may be provided by Traffic Management on request.	
<i>Requirement:</i>	
1 The center shall collect current traffic and road condition information for emergency vehicle route calculation.	Existing
<i>Requirement:</i>	
2 The center shall receive information on the location and status of traffic control equipment and work zones along potential emergency routes.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Indiana Department of Homeland Security State Emergency Operations Center	
<i>Entity:</i> Emergency Management	
<i>Functional Area:</i> Emergency Routing	
Routing of emergency vehicles to facilitate the quickest/safest arrival. Routes may be determined based on real-time traffic information and road conditions or routes may be provided by Traffic Management on request.	
<i>Requirement:</i>	Existing
3 The center shall receive status information from care facilities to determine the appropriate facility and its location.	
<i>Requirement:</i>	Existing
4 The center shall receive asset restriction information to support the dispatching of appropriate emergency resources.	
<i>Requirement:</i>	Planned
5 The center shall receive current railroad schedule information for emergency vehicle route calculation.	
<i>Requirement:</i>	Existing
6 The center shall track current emergency vehicle location and status.	
<i>Requirement:</i>	Existing
7 The center shall calculate emergency vehicle routes, under center personnel control, based on the collected traffic and road conditions information.	
<i>Requirement:</i>	Planned
8 The center shall request and receive ingress and egress routes or other specialized emergency access routes from the traffic management center.	
<i>Requirement:</i>	Potential
9 The center shall provide the capability to request special traffic control measures, such as signal preemption, from the traffic management center to facilitate emergency vehicle progress along the suggested route.	
<i>Requirement:</i>	Existing
10 Once the route is calculated the route shall be provided to the dispatch function.	
<i>Requirement:</i>	Planned
11 The center shall provide the capability for digitized map data to act as the background to the information presented to the emergency system operator.	
<i>Functional Area:</i> Incident Command	
Tactical decision support, resource coordination, and communications integration among emergency management agencies for Incident Commands that are established by first responders to support local management of an incident.	
<i>Requirement:</i>	Existing
1 The center shall 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.	
<i>Requirement:</i>	Existing
2 The center shall provide incident command communications with public safety, emergency management, transportation, and other allied response agency centers.	
<i>Requirement:</i>	Existing
3 The center shall track and maintain resource information and action plans pertaining to the incident command.	
<i>Requirement:</i>	Existing
4 The center shall 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.	
<i>Requirement:</i>	Existing
5 The center shall assess the status of responding emergency vehicles as part of an incident command.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Indiana Department of Homeland Security State Emergency Operations Center	
<i>Entity:</i> Emergency Management	
<i>Functional Area:</i> Emergency Early Warning System	
Monitors alerting and advisory systems, information collected by ITS surveillance and sensors, and reports from other agencies in order to identify potential, imminent, or in-progress major incidents or disasters. Notification is provided to other ITS centers to notify the traveling public.	
<i>Requirement:</i>	1 The center shall 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). Existing
<i>Requirement:</i>	2 The center shall provide the capability to correlate alerts and advisories, incident information, and security sensor and surveillance data. Existing
<i>Requirement:</i>	3 The center shall 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. Existing
<i>Requirement:</i>	4 The center shall broadcast wide-area alerts and advisories to transit management centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property. Existing
<i>Requirement:</i>	5 The center shall broadcast wide-area alerts and advisories to toll administration centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property. Existing
<i>Requirement:</i>	6 The center shall broadcast wide-area alerts and advisories to traveler information service providers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property. Existing
<i>Requirement:</i>	7 The center shall broadcast wide-area alerts and advisories to maintenance centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property. Existing
<i>Requirement:</i>	8 The center shall broadcast wide-area alerts and advisories to other emergency management centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property. Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Indiana Department of Homeland Security State Emergency Operations Center	
<i>Entity:</i> Emergency Management	
<i>Functional Area:</i> Emergency Early Warning System	
Monitors alerting and advisory systems, information collected by ITS surveillance and sensors, and reports from other agencies in order to identify potential, imminent, or in-progress major incidents or disasters. Notification is provided to other ITS centers to notify the traveling public.	
<i>Requirement:</i> 9 The center shall broadcast wide-area alerts and advisories to commercial vehicle administration centers and roadside check facilities for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	Existing
<i>Requirement:</i> 10 The center shall process status information from each of the centers that have been sent the wide-area alert.	Existing
<i>Requirement:</i> 11 The center shall coordinate the broadcast of wide-area alerts and advisories with other emergency management centers.	Existing
<i>Requirement:</i> 12 The center shall receive incident information from other transportation management centers to support the early warning system.	Existing
<i>Requirement:</i> 13 The center shall present the alert and advisory information and the status of the actions taken in response to the alert by the other centers to the emergency system operator as received from other system inputs.	Existing
<i>Requirement:</i> 14 The center shall support the entry of alert and advisory information directly from the emergency system operator.	Existing
<i>Functional Area:</i> Emergency Response Management	
Strategic emergency planning and response capabilities and broad inter-agency interfaces to support large-scale incidents and disasters, commonly associated with Emergency Operations Centers.	
<i>Requirement:</i> 1 The center shall provide strategic emergency response capabilities provided by an Emergency Operations Center for large-scale incidents and disasters.	Existing
<i>Requirement:</i> 2 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.	Existing
<i>Requirement:</i> 3 The center shall provide the capability to implement response plans and track progress through the incident by exchanging incident information and response status with allied agencies.	Existing
<i>Requirement:</i> 4 The center shall develop, coordinate with other agencies, and store emergency response plans.	Existing
<i>Requirement:</i> 5 The center shall track the availability of resources and coordinate resource sharing with allied agency centers including traffic, maintenance, or other emergency centers.	Existing
<i>Requirement:</i> 6 The center shall 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.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Indiana Department of Homeland Security State Emergency Operations Center	
<i>Entity:</i> Emergency Management	
<i>Functional Area:</i> Emergency Response Management	
Strategic emergency planning and response capabilities and broad inter-agency interfaces to support large-scale incidents and disasters, commonly associated with Emergency Operations Centers.	
<i>Requirement:</i> 8 The center shall support remote control of field equipment normally under control of the traffic management center including traffic signals, dynamic message signs, gates, and barriers.	Potential
<i>Requirement:</i> 9 The center shall provide the capability to remotely control and monitor CCTV systems normally operated by a traffic management center.	Planned
<i>Requirement:</i> 10 The center shall provide the capability to request transit resource availability from transit centers for use during disaster and evacuation operations.	Existing
<i>Requirement:</i> 11 The center shall 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.	Planned
<i>Requirement:</i> 12 The center shall provide information to the media concerning the status of an emergency response.	Existing
<i>Requirement:</i> 13 The center shall provide the capability for digitized map data to act as the background to the information presented to the emergency system operator.	Planned
<i>Requirement:</i> 14 The center shall provide the capability for center personnel to provide inputs to the management of incidents, disasters and evacuations.	Existing
<i>Requirement:</i> 15 The center shall collect information about the status of the recovery efforts for the infrastructure during disasters.	Existing
<i>Requirement:</i> 16 The center shall provide the overall status of infrastructure recovery efforts to traveler information providers and media.	Existing
<i>Requirement:</i> 17 The center shall provide the capability to communicate information about emergency situations to local population through the Emergency Telecommunications System.	Existing
<i>Requirement:</i> 18 The center shall 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.	Planned
<i>Requirement:</i> 19 The center shall retrieve information from public health systems to increase preparedness for, and implement a response to biological, chemical, radiation, and other public health emergencies.	Existing
<i>Functional Area:</i> Emergency Evacuation Support	
Evacuation planning and coordination to manage evacuation and reentry of a population in the vicinity of a disaster or other emergency that poses a risk to public safety.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Indiana Department of Homeland Security State Emergency Operations Center	
<i>Entity:</i> Emergency Management	
<i>Functional Area:</i> Emergency Evacuation Support	
Evacuation planning and coordination to manage evacuation and reentry of a population in the vicinity of a disaster or other emergency that poses a risk to public safety.	
<i>Requirement:</i>	Existing
1 The center shall manage inter-agency coordination of evacuation operations, from initial planning through the evacuation process and reentry.	
<i>Requirement:</i>	Existing
2 The center shall develop and exchange evacuation plans with allied agencies prior to the occurrence of a disaster.	
<i>Requirement:</i>	Existing
3 The center shall provide an interface to the emergency system operator to enter evacuation plans and procedures and present the operator with other agencies' plans.	
<i>Requirement:</i>	Existing
4 The center shall coordinate evacuation destinations and shelter needs with shelter providers (e.g., the American Red Cross) in the region.	
<i>Requirement:</i>	Existing
5 The center shall provide evacuation information to traffic, transit, maintenance and construction, rail operations, and other emergency management centers as needed.	
<i>Requirement:</i>	Existing
6 The center shall request resources from transit agencies as needed to support the evacuation.	
<i>Requirement:</i>	Potential
7 The center shall 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.	
<i>Requirement:</i>	Existing
8 The center shall 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.	
<i>Requirement:</i>	Existing
9 The center shall monitor the progress or status of the evacuation once it begins and exchange tactical plans, prepared during the incident, with allied agencies.	
<i>Requirement:</i>	Existing
10 The center shall monitor the progress of the reentry process.	
<i>Requirement:</i>	Potential
11 The center shall submit evacuation information to toll administration centers along with requests for changes in the toll services or fee collection during an evacuation.	
<i>Requirement:</i>	Existing
12 The center shall 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.	
<i>Functional Area:</i> Emergency Environmental Monitoring	
Collects current and forecast road and weather information that is used by the operator to more effectively manage incidents.	
<i>Requirement:</i>	Existing
1 The center shall 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).	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Indiana Department of Homeland Security State Emergency Operations Center	
<i>Entity:</i> Emergency Management	
<i>Functional Area:</i> Emergency Environmental Monitoring	
Collects current and forecast road and weather information that is used by the operator to more effectively manage incidents.	
<i>Requirement:</i> 2 The center shall collect current road and weather information from roadway maintenance operations.	Existing
<i>Requirement:</i> 3 The center shall assimilate current and forecast road conditions and surface weather information to support incident management.	Existing
<i>Requirement:</i> 4 The center shall present the current and forecast road and weather information to the emergency system operator.	Existing
<i>Functional Area:</i> Center Secure Area Surveillance	
Management of security surveillance devices and analysis of that data to detect potential threats. Areas under surveillance may include transit stops, transit stations, rest areas, park and ride lots, modal interchange facilities, on-board a transit vehicle, etc.	
<i>Requirement:</i> 1 The center shall remotely monitor video images and audio surveillance data collected in secure areas including facilities (e.g. transit yards) and transportation infrastructure (e.g. bridges, tunnels, interchanges, roadway infrastructure, and transit railways or guideways). The data may be raw or pre-processed in the field.	Planned
<i>Requirement:</i> 2 The center shall remotely monitor video images and audio surveillance data collected in traveler secure areas, which include transit stations, transit stops, rest areas, park and ride lots, and other fixed sites along travel routes (e.g., emergency pull-off areas and travel information centers). The data may be raw or pre-processed in the field.	Planned
<i>Requirement:</i> 3 The center shall remotely monitor video images and audio surveillance data collected on-board transit vehicles. The data may be raw or pre-processed in the field.	Planned
<i>Requirement:</i> 4 The center shall exchange surveillance data with other emergency centers.	Planned
<i>Requirement:</i> 5 The center shall identify potential security threats based on collected security surveillance data.	Planned
<i>Requirement:</i> 6 The center shall verify potential security threats by correlating security surveillance data from multiple sources.	Planned
<i>Requirement:</i> 7 The center shall remotely control security surveillance devices in secure areas including facilities (e.g. transit yards) and transportation infrastructure (e.g. bridges, tunnels, interchanges, roadway infrastructure, and transit railways or guideways).	Planned
<i>Requirement:</i> 8 The center shall remotely control security surveillance devices in traveler secure areas, which include transit stations, transit stops, rest areas, park and ride lots, and other fixed sites along travel routes (e.g., emergency pull-off areas and travel information centers).	Planned
<i>Requirement:</i> 9 The center shall remotely control security surveillance devices on-board transit vehicles.	Planned

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Indiana Department of Homeland Security State Emergency Operations Center	
<i>Entity:</i> Emergency Management	
<i>Functional Area:</i> Center Secure Area Surveillance	
Management of security surveillance devices and analysis of that data to detect potential threats. Areas under surveillance may include transit stops, transit stations, rest areas, park and ride lots, modal interchange facilities, on-board a transit vehicle, etc.	
<i>Requirement:</i> 10 The center shall match traveler video images against a database from the Alerting and Advisory Systems of known images that may represent criminals and terrorists.	Planned
<i>Requirement:</i> 11 The center shall exchange traveler images with other emergency management centers to support traveler image matching.	Planned
<i>Requirement:</i> 12 The center shall respond to control data from center personnel regarding security surveillance data collection, processing, threat detection, and image matching.	Planned
<i>Requirement:</i> 13 The center shall monitor maintenance status of the security sensor field equipment.	Planned
<i>Functional Area:</i> Center Secure Area Alarm Support	
Collection and response to silent and audible alarms received from travelers in secure areas (such as transit stops, rest areas, park-and-ride lots) and from on-board transit vehicles.	
<i>Requirement:</i> 1 The center shall collect silent and audible alarms received from travelers in secure areas (such as transit stops, rest areas, park and ride lots, modal interchange facilities).	Existing
<i>Requirement:</i> 2 The center shall collect silent and audible alarms received from transit vehicles, originated by the traveler or the transit vehicle operator.	Existing
<i>Requirement:</i> 3 After the alarm message has been received, the center shall generate an alarm acknowledgment to the sender.	Existing
<i>Requirement:</i> 4 After the alarm message becomes a verified incident, the center shall determine the appropriate response.	Existing
<i>Requirement:</i> 5 The center shall determine whether the alarm message indicates an emergency that requires the attention of public safety agencies, and forward alarm message data to the appropriate agency as necessary.	Existing
<i>Requirement:</i> 6 The center shall forward the alarm message to center personnel and respond to the traveler or transit vehicle operator as directed by the personnel.	Existing
<i>Functional Area:</i> Mayday Support	
Collection and response to Mayday messages received from vehicles and drivers.	
<i>Requirement:</i> 1 The center shall collect mayday messages from vehicles and drivers.	Existing
<i>Requirement:</i> 2 The center shall collect mayday messages from travelers via personal handheld devices.	Existing
<i>Requirement:</i> 3 The center shall acknowledge the request for emergency assistance, whether originated by the driver, automatically by the vehicle's safety systems, or by a traveler via a personal handheld device.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Indiana Department of Homeland Security State Emergency Operations Center	
<i>Entity:</i> Emergency Management	
<i>Functional Area:</i> Mayday Support	
Collection and response to Mayday messages received from vehicles and drivers.	
<i>Requirement:</i>	Existing
4 After the mayday becomes a verified incident, the center shall determine the appropriate response to the mayday message.	
<i>Requirement:</i>	Existing
5 The center shall determine whether the mayday message indicates an emergency that requires the attention of public safety agencies, and forward mayday emergency data to the appropriate agency as necessary.	
<i>Requirement:</i>	Planned
6 The center shall support the activation of remote controlled functions requested by a vehicle, such as requests to unlock doors.	
<i>Requirement:</i>	Existing
7 The center shall request additional emergency details from or issue commands to the vehicle's security systems or vehicle driver if needed.	
<i>Requirement:</i>	Existing
8 The center shall maintain a log of all mayday signals received from vehicles.	
<i>Requirement:</i>	Existing
9 The center shall provide all mayday data to center personnel and respond to the vehicle, driver, or traveler using the portable handheld device as directed by the personnel.	
<i>Functional Area:</i> Emergency Commercial Vehicle Response	
Responds to commercial vehicle and freight equipment related emergencies. Includes incidents involving hazardous materials as well as the detection of non-permitted transport of security sensitive hazmat.	
<i>Requirement:</i>	Existing
1 The center shall receive emergency notification information from commercial vehicles, commercial vehicle check stations, or commercial fleet operators and present the possible incident information to the emergency system operator. This may include detection of non-permitted transport of security sensitive hazmat, hazardous cargo spills, etc.	
<i>Requirement:</i>	Existing
2 The center shall receive details of the cargo being carried by commercial vehicles from their commercial fleet manager for incidents involving potential hazardous materials.	
<i>Requirement:</i>	Existing
3 The center shall forward the verified emergency information to the responding agency based on the location and nature of the emergency.	
<i>Requirement:</i>	Planned
4 The center shall provide the capability to request Fleet and Freight Management to disable a specific vehicle in their fleet.	
<i>Functional Area:</i> Emergency Data Collection	
Collection and storage of information related to Emergency Management. For use by operations personnel or data archives in the region.	
<i>Requirement:</i>	Existing
1 The center shall collect emergency service data, emergency vehicle management data, emergency vehicle data, sensor and surveillance data, threat data, and incident data.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Indiana Department of Homeland Security State Emergency Operations Center	
<i>Entity:</i> Emergency Management	
<i>Functional Area:</i> Emergency Data Collection	
Collection and storage of information related to Emergency Management. For use by operations personnel or data archives in the region.	
<i>Requirement:</i>	Existing
2 The center shall assign quality control metrics and meta-data to be stored along with the data. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.	
<i>Requirement:</i>	Planned
3 The center shall receive and respond to requests from ITS Archives for either a catalog of the emergency management data or for the data itself.	
<i>Requirement:</i>	Planned
4 The center shall be able to produce sample products of the data available.	
<i>Functional Area:</i> Emergency Transportation Operations Data Collection	
Collects real-time information on the state of the regional transportation system for operational use by the center. It establishes communications with a regional repository, requests or subscribes to information relevant to the center, and distributes the received information for use.	
<i>Requirement:</i>	Planned
1 The center shall collect real-time information on the state of the regional transportation system including current traffic and road conditions, weather conditions, special event and incident information.	
<i>Requirement:</i>	Planned
2 The center shall support the capability for the system operator to monitor and control the information collection service.	
<i>Element:</i> Indiana Department of Revenue International Fuel Tax Agreement (IFTA) On-Line filing	
<i>Entity:</i> Commercial Vehicle Administration	
<i>Functional Area:</i> Credentials and Taxes Administration	
Manage electronic filing of credentials, tax filing, and driver licensing for commercial vehicle operators. Provides commercial vehicle (including HAZMAT) route restrictions.	
<i>Requirement:</i>	Existing
1 The center shall manage electronic credentials filing and processing for commercial vehicles.	
<i>Requirement:</i>	Existing
2 The center shall manage the filing of appropriate taxes for the operation of commercial vehicles.	
<i>Requirement:</i>	Existing
3 The center shall process requests for payments of electronic credentials and tax filing and maintain an interface to a Financial Institution.	
<i>Requirement:</i>	Existing
4 The center shall exchange credentials and tax information with other commercial vehicle administration centers - either in other states or the federal government.	
<i>Requirement:</i>	Existing
5 The center shall provide route restrictions information, including hazmat restrictions, to other centers and agencies for distribution to commercial vehicle operators. These centers and agencies may include commercial fleet and freight management operators, traveler information centers, digital map update providers, and other commercial vehicle administration centers.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Indiana Department of Revenue International Fuel Tax Agreement (IFTA) On-Line filing	
<i>Entity:</i> Commercial Vehicle Administration	
<i>Functional Area:</i> Credentials and Taxes Administration	
Manage electronic filing of credentials, tax filing, and driver licensing for commercial vehicle operators. Provides commercial vehicle (including HAZMAT) route restrictions.	
<i>Requirement:</i>	Existing
6 The center shall use information on asset restrictions received from maintenance centers to develop the commercial vehicle route restrictions and process credentials applications.	
<i>Requirement:</i>	Existing
7 The center shall provide an interface with commercial vehicle fleet and freight management centers to exchange audit and compliance review reports.	
<i>Requirement:</i>	Existing
8 The center shall provide credentials information about commercial vehicle operators and carriers to authorized requestors such as insurance agencies.	
<i>Requirement:</i>	Existing
9 The center shall receive and store information on commercial vehicle violations from enforcement agencies as part of the processing of credentials applications.	
<i>Requirement:</i>	Existing
10 The center shall manage driver licensing for commercial vehicle drivers.	
<i>Requirement:</i>	Existing
11 The center shall enroll carriers in CVO programs and support user account management.	
<i>Requirement:</i>	Existing
12 The center shall process requests for review of carrier and driver status.	
<i>Requirement:</i>	Existing
13 The center shall issue special Oversize/Overweight and HAZMAT permits in coordination with other cognizant authorities.	
<i>Functional Area:</i> CV Safety and Security Administration	
Provides commercial vehicle safety and security criteria to roadside check facilities, collects and reviews safety and security data from the field, conducts wireless roadside inspections, and distributes safety and security information to other centers, carriers, and enforcement agencies.	
<i>Requirement:</i>	Existing
1 The center shall provide commercial vehicle safety and security data to roadside check facilities.	
<i>Requirement:</i>	Existing
2 The center shall collect and review safety inspection reports and violations from the roadside check facilities and pass on appropriate portions to other commercial vehicle administrative centers and commercial vehicle fleet operators.	
<i>Requirement:</i>	Existing
3 The center shall notify enforcement agencies of commercial vehicle safety violations by individual commercial vehicles, drivers, or carriers.	
<i>Requirement:</i>	Existing
4 The center shall monitor alerting and advisory systems for security alerts and advisories.	
<i>Requirement:</i>	Existing
5 The center shall provide commercial vehicle accident reports to enforcement agencies.	
<i>Requirement:</i>	Existing
6 The center shall receive citation records from roadside check facilities.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Indiana Department of Revenue International Fuel Tax Agreement (IFTA) On-Line filing	
<i>Entity:</i> Commercial Vehicle Administration	
<i>Functional Area:</i> CV Safety and Security Administration	
Provides commercial vehicle safety and security criteria to roadside check facilities, collects and reviews safety and security data from the field, conducts wireless roadside inspections, and distributes safety and security information to other centers, carriers, and enforcement agencies.	
<i>Requirement:</i>	Existing
7 The center shall manage the citation records and provide the citations to enforcement agencies and the commercial fleet management center.	
<i>Requirement:</i>	Existing
8 The center shall provide the capability for the commercial fleet management center to report required commercial vehicle repairs and other corrections of identified deficiencies.	
<i>Requirement:</i>	Existing
9 The center shall support carrier enrollment in wireless roadside inspection programs.	
<i>Requirement:</i>	Existing
10 The center shall manage and distribute information about trigger areas where wireless inspections will occur.	
<i>Requirement:</i>	Planned
11 The center shall monitor the condition of the commercial vehicle and driver using wireless communications at identified trigger areas.	
<i>Functional Area:</i> CV Information Exchange	
Exchange information concerning safety, credentialing, and operations of commercial vehicles between the center and the roadside check stations, across jurisdictions, with fleet operators and other information requestors.	
<i>Requirement:</i>	Existing
1 The center shall exchange information with roadside check facilities, including credentials and credentials status information, safety status information, daily site activity data, driver records, and citations.	
<i>Requirement:</i>	Existing
2 The center shall exchange safety and credentials data among other commercial vehicle administration centers; includes border clearance status, credentials information, credentials status information, driver records, accident reports, permit information, and safety status information.	
<i>Requirement:</i>	Existing
3 The center shall package data concerning commercial vehicle safety and credentials into snapshots (top-level summary and critical status information).	
<i>Requirement:</i>	Existing
4 The center shall package data concerning commercial vehicle safety and credentials into profiles (detailed and historical data).	
<i>Requirement:</i>	Existing
5 The center shall provide commercial vehicle credentials and safety status information to authorized requestors such as insurance agencies.	
<i>Requirement:</i>	Existing
6 The center shall provide reports to the commercial vehicle fleet manager regarding fleet activity through roadside facilities including accident reports, citations, credentials status information, driver records, and safety status information.	
<i>Requirement:</i>	Existing
7 The center shall provide individual drivers access to their own driver records on request.	
<i>Functional Area:</i> CV Data Collection	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Indiana Department of Revenue International Fuel Tax Agreement (IFTA) On-Line filing</i>	
<i>Entity: Commercial Vehicle Administration</i>	
<i>Functional Area: CV Data Collection</i>	
Collects and stores information related to Commercial Vehicle Operations. For use by operations personnel or data archives in the region.	
<i>Requirement:</i>	
1 The center shall receive operational data from the roadside check systems as well as administration and credentials data.	Planned
<i>Requirement:</i>	
2 The center shall assign quality control metrics and meta-data to be stored along with the data. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.	Planned
<i>Requirement:</i>	
3 The center shall receive and respond to requests from ITS Archives for either a catalog of the commercial vehicle operations data or for the data itself.	Planned
<i>Requirement:</i>	
4 The center shall be able to produce sample products of the data available.	Planned
<i>Element: Indiana Department of Revenue Unified Carrier Registration (UCR)</i>	
<i>Entity: Commercial Vehicle Administration</i>	
<i>Functional Area: Credentials and Taxes Administration</i>	
Manage electronic filing of credentials, tax filing, and driver licensing for commercial vehicle operators. Provides commercial vehicle (including HAZMAT) route restrictions.	
<i>Requirement:</i>	
1 The center shall manage electronic credentials filing and processing for commercial vehicles.	Existing
<i>Requirement:</i>	
2 The center shall manage the filing of appropriate taxes for the operation of commercial vehicles.	Existing
<i>Requirement:</i>	
3 The center shall process requests for payments of electronic credentials and tax filing and maintain an interface to a Financial Institution.	Existing
<i>Requirement:</i>	
4 The center shall exchange credentials and tax information with other commercial vehicle administration centers - either in other states or the federal government.	Existing
<i>Requirement:</i>	
5 The center shall provide route restrictions information, including hazmat restrictions, to other centers and agencies for distribution to commercial vehicle operators. These centers and agencies may include commercial fleet and freight management operators, traveler information centers, digital map update providers, and other commercial vehicle administration centers.	Existing
<i>Requirement:</i>	
6 The center shall use information on asset restrictions received from maintenance centers to develop the commercial vehicle route restrictions and process credentials applications.	Existing
<i>Requirement:</i>	
7 The center shall provide an interface with commercial vehicle fleet and freight management centers to exchange audit and compliance review reports.	Existing
<i>Requirement:</i>	
8 The center shall provide credentials information about commercial vehicle operators and carriers to authorized requestors such as insurance agencies.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Indiana Department of Revenue Unified Carrier Registration (UCR)	
<i>Entity:</i> Commercial Vehicle Administration	
<i>Functional Area:</i> Credentials and Taxes Administration	
Manage electronic filing of credentials, tax filing, and driver licensing for commercial vehicle operators. Provides commercial vehicle (including HAZMAT) route restrictions.	
<i>Requirement:</i>	Existing
9 The center shall receive and store information on commercial vehicle violations from enforcement agencies as part of the processing of credentials applications.	
<i>Requirement:</i>	Existing
10 The center shall manage driver licensing for commercial vehicle drivers.	
<i>Requirement:</i>	Existing
11 The center shall enroll carriers in CVO programs and support user account management.	
<i>Requirement:</i>	Existing
12 The center shall process requests for review of carrier and driver status.	
<i>Requirement:</i>	Existing
13 The center shall issue special Oversize/Overweight and HAZMAT permits in coordination with other cognizant authorities.	
<i>Functional Area:</i> CV Safety and Security Administration	
Provides commercial vehicle safety and security criteria to roadside check facilities, collects and reviews safety and security data from the field, conducts wireless roadside inspections, and distributes safety and security information to other centers, carriers, and enforcement agencies.	
<i>Requirement:</i>	Existing
1 The center shall provide commercial vehicle safety and security data to roadside check facilities.	
<i>Requirement:</i>	Existing
2 The center shall collect and review safety inspection reports and violations from the roadside check facilities and pass on appropriate portions to other commercial vehicle administrative centers and commercial vehicle fleet operators.	
<i>Requirement:</i>	Existing
3 The center shall notify enforcement agencies of commercial vehicle safety violations by individual commercial vehicles, drivers, or carriers.	
<i>Requirement:</i>	Existing
4 The center shall monitor alerting and advisory systems for security alerts and advisories.	
<i>Requirement:</i>	Existing
5 The center shall provide commercial vehicle accident reports to enforcement agencies.	
<i>Requirement:</i>	Existing
6 The center shall receive citation records from roadside check facilities.	
<i>Requirement:</i>	Existing
7 The center shall manage the citation records and provide the citations to enforcement agencies and the commercial fleet management center.	
<i>Requirement:</i>	Existing
8 The center shall provide the capability for the commercial fleet management center to report required commercial vehicle repairs and other corrections of identified deficiencies.	
<i>Requirement:</i>	Existing
9 The center shall support carrier enrollment in wireless roadside inspection programs.	
<i>Requirement:</i>	Existing
10 The center shall manage and distribute information about trigger areas where wireless inspections will occur.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Indiana Department of Revenue Unified Carrier Registration (UCR)	
<i>Entity:</i> Commercial Vehicle Administration	
<i>Functional Area:</i> CV Safety and Security Administration	
Provides commercial vehicle safety and security criteria to roadside check facilities, collects and reviews safety and security data from the field, conducts wireless roadside inspections, and distributes safety and security information to other centers, carriers, and enforcement agencies.	
<i>Requirement:</i>	
11 The center shall monitor the condition of the commercial vehicle and driver using wireless communications at identified trigger areas.	Planned
<i>Functional Area:</i> CV Information Exchange	
Exchange information concerning safety, credentialing, and operations of commercial vehicles between the center and the roadside check stations, across jurisdictions, with fleet operators and other information requestors.	
<i>Requirement:</i>	
1 The center shall exchange information with roadside check facilities, including credentials and credentials status information, safety status information, daily site activity data, driver records, and citations.	Existing
<i>Requirement:</i>	
2 The center shall exchange safety and credentials data among other commercial vehicle administration centers; includes border clearance status, credentials information, credentials status information, driver records, accident reports, permit information, and safety status information.	Existing
<i>Requirement:</i>	
3 The center shall package data concerning commercial vehicle safety and credentials into snapshots (top-level summary and critical status information).	Existing
<i>Requirement:</i>	
4 The center shall package data concerning commercial vehicle safety and credentials into profiles (detailed and historical data).	Existing
<i>Requirement:</i>	
5 The center shall provide commercial vehicle credentials and safety status information to authorized requestors such as insurance agencies.	Existing
<i>Requirement:</i>	
6 The center shall provide reports to the commercial vehicle fleet manager regarding fleet activity through roadside facilities including accident reports, citations, credentials status information, driver records, and safety status information.	Existing
<i>Requirement:</i>	
7 The center shall provide individual drivers access to their own driver records on request.	Existing
<i>Functional Area:</i> CV Data Collection	
Collects and stores information related to Commercial Vehicle Operations. For use by operations personnel or data archives in the region.	
<i>Requirement:</i>	
1 The center shall receive operational data from the roadside check systems as well as administration and credentials data.	Planned
<i>Requirement:</i>	
2 The center shall assign quality control metrics and meta-data to be stored along with the data. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.	Planned
<i>Requirement:</i>	
3 The center shall receive and respond to requests from ITS Archives for either a catalog of the commercial vehicle operations data or for the data itself.	Planned

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Indiana Department of Revenue Unified Carrier Registration (UCR)</i>	
<i>Entity: Commercial Vehicle Administration</i>	
<i>Functional Area: CV Data Collection</i>	
Collects and stores information related to Commercial Vehicle Operations. For use by operations personnel or data archives in the region.	
<i>Requirement:</i>	Planned
4 The center shall be able to produce sample products of the data available.	
<i>Element: Indiana Dunes National Lakeshore Shuttle Agency Management</i>	
<i>Entity: Transit Management</i>	
<i>Functional Area: Transit Center Connection Protection</i>	
Manages the coordination of transit transfers between routes, including routes on different modes. Also supports the capability for travelers to obtain connection protection throughout a trip.	
<i>Requirement:</i>	Planned
1 The center shall manage service requests for routing of an individual through the transit system.	
<i>Requirement:</i>	Planned
2 The center shall provide transit plans for both fixed and demand responsive transit to transit passengers.	
<i>Requirement:</i>	Planned
3 The center shall be able to coordinate with Other Transit Management systems or Multimodal Transportation Service Providers in order to provide a complete multimodal trip plan.	
<i>Requirement:</i>	Planned
4 The center shall track the passenger through the transit network, and coordinate with Other TRM and Multimodal Transportation Service Providers so that the passenger makes efficient connections between the transit system and other transit systems or other modes of transportation.	
<i>Functional Area: Transit Center Vehicle Tracking</i>	
Monitoring transit vehicle locations via interactions with on-board systems. Furnish users with real-time transit schedule information and maintain interface with digital map providers.	
<i>Requirement:</i>	Planned
1 The center shall monitor the locations of all transit vehicles within its network.	
<i>Requirement:</i>	Planned
2 The center shall determine adherence of transit vehicles to their assigned schedule.	
<i>Requirement:</i>	Planned
3 The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for transit tracking and dispatch.	
<i>Requirement:</i>	Planned
4 The center shall provide transit operational data to traveler information service providers.	
<i>Requirement:</i>	Planned
5 The center shall provide collected transit probe data to traffic management centers and traveler information service providers for use in measuring current traffic conditions.	
<i>Functional Area: Transit Center Fixed-Route Operations</i>	
Management of fixed route transit operations. Planning, scheduling, and dispatch associated with fixed and flexible route transit services. Updates customer service operator systems, and provides current vehicle schedule adherence and optimum scenarios for schedule adjustment.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Indiana Dunes National Lakeshore Shuttle Agency Management	
<i>Entity:</i> Transit Management	
<i>Functional Area:</i> Transit Center Fixed-Route Operations	
Management of fixed route transit operations. Planning, scheduling, and dispatch associated with fixed and flexible route transit services. Updates customer service operator systems, and provides current vehicle schedule adherence and optimum scenarios for schedule adjustment.	
<i>Requirement:</i>	
1 The center shall generate transit routes and schedules based on such factors as parameters input by the system operator, road network conditions, incident information, operational data on current routes and schedules, and digitized map data.	Planned
<i>Requirement:</i>	
2 The center shall provide the interface to the system operator to control the generation of new routes and schedules (transit services) including the ability to review and update the parameters used by the routes and schedules generation processes and to initiate these processes	Planned
<i>Requirement:</i>	
3 The center shall be able to generate special routes and schedules to support an incident, disaster, evacuation, or other emergency.	Planned
<i>Requirement:</i>	
4 The center shall dispatch fixed route or flexible route transit vehicles	Planned
<i>Requirement:</i>	
5 The center shall collect transit operational data for use in the generation of routes and schedules.	Planned
<i>Requirement:</i>	
6 The center shall provide instructions or corrective actions to the transit vehicle operators based upon operational needs.	Planned
<i>Requirement:</i>	
7 The center shall manage large deviations of individual transit vehicles, deviations in rural areas, and deviations of large numbers of vehicles.	Planned
<i>Requirement:</i>	
8 The center shall 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.	Planned
<i>Requirement:</i>	
9 The center shall exchange information with Maintenance and Construction Operations concerning work zones, roadway conditions, asset restrictions, work plans, etc.	Planned
<i>Requirement:</i>	
10 The center shall disseminate up-to-date schedules and route information to other centers for fixed and flexible route services.	Planned
<i>Requirement:</i>	
11 The center shall provide an interface to the archive data repository to enable the operator to retrieve historical operating data for use in planning transit routes and schedules.	Planned
<i>Functional Area:</i> Transit Center Paratransit Operations	
Management of demand response transit services, including paratransit. Planning and scheduling of these services. Supports automated vehicle dispatch and automatically updates customer service operator systems.	
<i>Requirement:</i>	
1 The center shall process trip requests for demand responsive transit services, i.e. paratransit. Sources of the requests may include traveler information service providers.	Potential
<i>Requirement:</i>	
2 The center shall monitor the operational status of the demand response vehicles including status of passenger pick-up and drop-off.	Potential

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Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Indiana Dunes National Lakeshore Shuttle Agency Management	
<i>Entity:</i> Transit Management	
<i>Functional Area:</i> Transit Center Paratransit Operations	
Management of demand response transit services, including paratransit. Planning and scheduling of these services. Supports automated vehicle dispatch and automatically updates customer service operator systems.	
<i>Requirement:</i>	
3 The center shall generate demand response transit (including paratransit) routes and schedules based on such factors as parameters input by the system operator, what other demand responsive transit schedules have been planned, the availability and location of vehicles, the relevance of any fixed transit routes and schedules, road network information, and incident information.	Potential
<i>Requirement:</i>	
4 The center shall dispatch demand response (paratransit) transit vehicles.	Potential
<i>Requirement:</i>	
5 The center shall exchange information with Maintenance and Construction Operations concerning work zones, roadway conditions, asset restrictions, work plans, etc.	Planned
<i>Requirement:</i>	
6 The center shall disseminate up-to-date schedules and route information to other centers for demand responsive transit services (paratransit).	Potential
<i>Requirement:</i>	
7 The center shall collect the log of passenger boardings and alightings from the paratransit vehicles.	Potential
<i>Functional Area:</i> Transit Center Fare Management	
Management of fare collection at the center - includes setting and distributing fare information, central processing of fares for transit as well as other ITS services, links to financial institutions and enforcement agencies.	
<i>Requirement:</i>	
1 The center shall manage the actual value of transit fares for each segment of each regular transit route, including the transmission of the information to transit vehicles and transit stops or stations.	Planned
<i>Requirement:</i>	
3 The center shall process the financial requests from the transit vehicles or roadside and manage an interface to a Financial Institution.	Planned
<i>Requirement:</i>	
4 The center shall support the payment of transit fare transactions using data provided by the traveler cards / payment instruments.	Planned
<i>Requirement:</i>	
6 The center shall process requests for transit fares to be paid in advance.	Planned
<i>Requirement:</i>	
8 The center shall be capable of establishing emergency fare structures to override all other fares during disasters, states of emergency, or evacuations.	Planned
<i>Requirement:</i>	
10 The center shall collect fare statistics data to implement variable and flexible fare structures.	Potential
<i>Requirement:</i>	
11 The center shall exchange fare and load information with other transit management centers, including potential Centralized Payments facilities.	Potential
<i>Requirement:</i>	
12 The center shall provide transit fare information to other centers, including traveler information providers upon request.	Planned
<i>Functional Area:</i> Transit Center Passenger Counting	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Indiana Dunes National Lakeshore Shuttle Agency Management	
<i>Entity:</i> Transit Management	
<i>Functional Area:</i> Transit Center Passenger Counting	
Receives and processes transit vehicle loading data using two-way communications from equipped transit vehicles.	
<i>Requirement:</i>	Potential
1 The center shall collect passenger count information from each transit vehicle.	
<i>Requirement:</i>	Potential
2 The center shall calculate transit ridership data by route, route segment, transit stop, time of day, and day of week based on the collected passenger count information.	
<i>Requirement:</i>	Potential
3 The center shall make the compiled ridership data available to the system operator and other applications.	
<i>Functional Area:</i> Transit Center Security	
Monitor transit vehicle operator or traveler activated alarms; authenticate transit vehicle operators; remotely disable a transit vehicle; alert operators, travelers, and police to potential incidents identified by these security features.	
<i>Requirement:</i>	Planned
1 The center shall monitor transit vehicle operational data to determine if the transit vehicle is off-route and assess whether a security incident is occurring.	
<i>Requirement:</i>	Planned
2 The center shall receive reports of emergencies on-board transit vehicles entered directly by the transit vehicle operator or from a traveler through interfaces such as panic buttons or alarm switches.	
<i>Requirement:</i>	Planned
3 The center shall support the back-office portion of functionality to authenticate transit vehicle operators.	
<i>Requirement:</i>	Planned
4 The center shall exchange transit incident information along with other service data with other transit agencies.	
<i>Requirement:</i>	Planned
5 The center shall receive information pertaining to a wide-area alert such as weather alerts, disaster situations, or child abductions. This information may come from Emergency Management or from other Alerting and Advisory Systems.	
<i>Requirement:</i>	Planned
6 The center shall send wide-area alert information to travelers (on-board transit vehicles or at stations/stops) and transit vehicle operators.	
<i>Requirement:</i>	Planned
7 The center shall coordinate the response to security incidents involving transit with other agencies including Emergency Management, other transit agencies, media, traffic management, and traveler information service providers.	
<i>Requirement:</i>	Planned
8 The center shall receive threat information and status on the integrity of the transit infrastructure.	
<i>Requirement:</i>	Potential
9 The center shall provide support to remotely disable (or reset the disabling of) a transit vehicle in service.	
<i>Functional Area:</i> Transit Vehicle Operator Assignment	
Assignment of transit operators to runs in a fair manner while minimizing labor and overtime services, considering operator preferences, qualifications, accumulated work hours, and other information about each operator.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Indiana Dunes National Lakeshore Shuttle Agency Management	
<i>Entity:</i> Transit Management	
<i>Functional Area:</i> Transit Vehicle Operator Assignment	
Assignment of transit operators to runs in a fair manner while minimizing labor and overtime services, considering operator preferences, qualifications, accumulated work hours, and other information about each operator.	
<i>Requirement:</i>	Planned
1 The center shall 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.	
<i>Requirement:</i>	Planned
2 The center shall assess the transit vehicle operator's availability based on previous work assignments, accumulated hours, plus health and vacation commitments.	
<i>Requirement:</i>	Planned
3 The center shall assign transit vehicle operators to transit schedules based on their eligibility, route preferences, seniority, and transit vehicle availability.	
<i>Requirement:</i>	Planned
4 The center shall provide an interface through which the transit vehicle operator information can be maintained - either from the transit vehicle operator, center personnel, or other functions.	
<i>Requirement:</i>	Planned
5 The center shall generate supplemental vehicle operator assignments as required due to change events that occur during the operating day.	
<i>Functional Area:</i> Transit Garage Maintenance	
Collect operational and maintenance data from transit vehicles, manage vehicle service histories, automatically generate preventative maintenance schedules, and provide information to service personnel.	
<i>Requirement:</i>	Planned
2 The center shall monitor the condition of a transit vehicle to analyze brake, drive train, sensors, fuel, steering, tire, processor, communications equipment, and transit vehicle mileage to identify mileage based maintenance, out-of-specification or imminent failure conditions.	
<i>Requirement:</i>	Planned
3 The center shall generate transit vehicle maintenance schedules that identify the maintenance or repair to be performed and when the work is to be done.	
<i>Requirement:</i>	Planned
4 The center shall generate transit vehicle availability listings, current and forecast, to support transit vehicle assignment planning based, in part, on the transit vehicle maintenance schedule.	
<i>Requirement:</i>	Planned
5 The center shall assign technicians to a transit vehicle maintenance schedule, based upon such factors as personnel eligibility, work assignments, preferences and seniority.	
<i>Requirement:</i>	Planned
6 The center shall verify that the transit vehicle maintenance activities were performed correctly, using the transit vehicle's status, the maintenance personnel's work assignment, and the transit maintenance schedules.	
<i>Requirement:</i>	Planned
7 The center shall generate a time-stamped maintenance log of all maintenance activities performed on a transit vehicle.	

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Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Indiana Dunes National Lakeshore Shuttle Agency Management	
<i>Entity:</i> Transit Management	
<i>Functional Area:</i> Transit Vehicle Assignment	
Assigns individual transit vehicles to vehicle blocks and downloads this information to the transit vehicle, updating assignments as necessitated by changes. It also provides an inventory management function that stores attributes about each of the transit vehicles.	
<i>Requirement:</i>	Planned
1 The center shall assign individual transit vehicles to transit blocks.	
<i>Requirement:</i>	Planned
3 The center shall provide an exception handling process for the vehicle assignment function. This process shall generate new supplemental vehicle assignments as required due to change events which occur during the operating day.	
<i>Requirement:</i>	Planned
5 The center shall generate transit vehicle availability listings, current and forecast, to support transit vehicle assignment planning.	
<i>Requirement:</i>	Planned
6 The center shall provide transit operations personnel with the capability to update transit vehicle assignments and receive reports on transit vehicle inventory status.	
<i>Functional Area:</i> Transit Center Information Services	
Provide interactive traveler information to travelers (on-board transit vehicles, at stops/stations, using personal devices), traveler information service providers, media, and other transit organizations. Includes routes, schedules, transfer options, fares, real-time schedule adherence, current incidents, weather conditions, yellow pages, and special events.	
<i>Requirement:</i>	Planned
1 The center shall provide travelers using public transportation with traffic and advisory information upon request. Such information may include transit routes, schedules, transfer options, fares, real-time schedule adherence, current incidents, weather conditions, and special events.	
<i>Requirement:</i>	Planned
2 The center shall provide transit information to the media including details of deviations from schedule of regular transit services.	
<i>Requirement:</i>	Planned
3 The center shall exchange transit schedules, real-time arrival information, fare schedules, and general transit service information with other transit organizations to support transit traveler information systems.	
<i>Requirement:</i>	Planned
4 The center shall provide transit service information to traveler information service providers including routes, schedules, schedule adherence, and fare information as well as transit service information during evacuation.	
<i>Requirement:</i>	Planned
6 The center shall broadcast transit advisory data, including alerts and advisories pertaining to major emergencies, or man made disasters.	
<i>Functional Area:</i> Transit Environmental Monitoring	
Current and forecast road and weather information assimilated from weather service providers and vehicle probes. The information is monitored and forwarded to other agencies to more effectively manage transit operations.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Indiana Dunes National Lakeshore Shuttle Agency Management</i>	
<i>Entity: Transit Management</i>	
<i>Functional Area: Transit Environmental Monitoring</i>	
Current and forecast road and weather information assimilated from weather service providers and vehicle probes. The information is monitored and forwarded to other agencies to more effectively manage transit operations.	
<i>Requirement:</i>	Planned
1 The center shall assimilate current and forecast road conditions and surface weather information to more effectively manage transit operations.	
<i>Requirement:</i>	Planned
2 The center shall collect current and forecast road and weather information from weather service providers and roadway maintenance centers.	
<i>Functional Area: Transit Center Multi-Modal Coordination</i>	
Coordinate schedules with other agencies and modes, including transit transfer cluster and transfer point information.	
<i>Requirement:</i>	Planned
1 The center shall coordinate schedules and services between transit agencies, traffic management, maintenance and construction operations, parking management, and other surface or air transportation modes.	
<i>Requirement:</i>	Planned
2 The center shall share transfer cluster and transfer point information with multimodal transportation service providers, other transit agencies, and traveler information service providers. A transfer cluster is a collection of stop points, stations, or terminals where transfers can be made conveniently.	
<i>Requirement:</i>	Planned
3 The center shall accept requests from traffic management to change routes and schedules as part of the implementation of demand management strategies.	
<i>Requirement:</i>	Planned
4 The center shall coordinate transit services for special events, planning services for the event and managing transit services on the day of the event.	
<i>Requirement:</i>	Planned
5 The center shall provide transit operations personnel with the capability to control and monitor transit service coordination activities.	
<i>Functional Area: Transit Evacuation Support</i>	
Support evacuation and subsequent reentry of a population in the vicinity of a disaster or other emergency. Coordinate regional evacuation plans and resources including transit and school bus fleets.	
<i>Requirement:</i>	Potential
1 The center shall manage the use of transit resources to support evacuation and subsequent reentry of a population in the vicinity of a disaster or other emergency.	
<i>Requirement:</i>	Planned
2 The center shall coordinate regional evacuation plans with Emergency Management - identifying the transit role in an evacuation and the transit resources that would be used.	
<i>Requirement:</i>	Potential
3 The center shall coordinate the use of transit and school bus fleets during an evacuation, supporting evacuation of those with special needs and the general population.	
<i>Requirement:</i>	Potential
4 The center shall adjust and update transit service and fare schedules and provide that information to other agencies as they coordinate evacuations.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Indiana Dunes National Lakeshore Shuttle Agency Management	
<i>Entity:</i> Transit Management	
<i>Functional Area:</i> Transit Data Collection	
Collection and storage of transit management data. For use by operations personnel or data archives in the region.	
<i>Requirement:</i>	Planned
1 The center shall collect transit management data such as transit fares and passenger use, transit services, paratransit operations, transit vehicle maintenance data, etc.	
<i>Requirement:</i>	Planned
2 The center shall assign quality control metrics and meta-data to be stored along with the data. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.	
<i>Requirement:</i>	Planned
3 The center shall receive and respond to requests from ITS Archives for either a catalog of the transit data or for the data itself.	
<i>Requirement:</i>	Planned
4 The center shall be able to produce sample products of the data available.	
<i>Functional Area:</i> Transit Transportation Operations Data Collection	
Collects real-time information on the state of the regional transportation system for operational use by the center. It establishes communications with a regional repository, requests or subscribes to information relevant to the center, and distributes the received information for use.	
<i>Requirement:</i>	Planned
1 The center shall collect real-time information on the state of the regional transportation system including current traffic and road conditions, weather conditions, special event and incident information.	
<i>Requirement:</i>	Planned
2 The center shall support the capability for the system operator to monitor and control the information collection service.	
<i>Element:</i> Indiana Dunes National Lakeshore Shuttle Kiosks	
<i>Entity:</i> Remote Traveler Support	
<i>Functional Area:</i> Remote Basic Information Reception	
Public traveler interface, such as a kiosk, that provides formatted traffic advisories, transit, event, and other traveler information, as well as broadcast alerts.	
<i>Requirement:</i>	Planned
1 The public interface for travelers shall receive traffic information from a center and present it to the traveler.	
<i>Requirement:</i>	Planned
2 The public interface for travelers shall receive transit information from a center and present it to the traveler.	
<i>Requirement:</i>	Planned
3 The public interface for travelers shall receive event information from a center and present it to the traveler.	
<i>Requirement:</i>	Potential
4 This public interface for travelers shall receive evacuation information from a center and present it to the traveler.	
<i>Requirement:</i>	Planned
5 The public interface for travelers shall receive wide-area alerts and present it to the traveler.	
<i>Requirement:</i>	Planned
6 The public interface for travelers shall provide the capability for digitized map data to act as the background to the information presented to the traveler.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Indiana Dunes National Lakeshore Shuttle Kiosks	
<i>Entity:</i> Remote Traveler Support	
<i>Functional Area:</i> Remote Basic Information Reception	
Public traveler interface, such as a kiosk, that provides formatted traffic advisories, transit, event, and other traveler information, as well as broadcast alerts.	
<i>Requirement:</i>	
7 The public interface for travelers shall support traveler input in audio or manual form.	Planned
<i>Requirement:</i>	
8 The public interface for travelers shall present information to the traveler in audible or visual forms consistent with a kiosk, including those that are suitable for travelers with hearing or vision physical disabilities.	Planned
<i>Requirement:</i>	
9 The public interface for travelers shall be able to store frequently requested data.	Planned
<i>Functional Area:</i> Remote Interactive Information Reception	
Public traveler interface, such as a kiosk, that provides traffic, transit, yellow pages, special event, and other personalized traveler information services upon request.	
<i>Requirement:</i>	
1 The public interface for travelers shall receive traffic information from a center and present it to the traveler upon request.	Planned
<i>Requirement:</i>	
2 The public interface for travelers shall receive transit information from a center and present it to the traveler upon request.	Planned
<i>Requirement:</i>	
3 The public interface for travelers shall receive yellow pages information (such as lodging, restaurants, theaters, bicycle facilities, and other tourist activities) from a center and present it to the traveler upon request.	Planned
<i>Requirement:</i>	
4 The public interface for travelers shall receive event information from a center and present it to the traveler upon request.	Planned
<i>Requirement:</i>	
5 The public interface for travelers shall receive evacuation information from a center and present it to the traveler.	Potential
<i>Requirement:</i>	
6 The public interface for travelers shall receive wide-area alerts and present it to the traveler.	Planned
<i>Requirement:</i>	
7 The public interface for travelers shall accept reservations for confirmed trip plans.	Planned
<i>Requirement:</i>	
8 The public interface for travelers shall support payment for services, such as confirmed trip plans, confirmed traveler services, tolls, transit fares, parking lot charges, and advanced payment for tolls.	Planned
<i>Requirement:</i>	
9 The public interface for travelers shall provide an interface through which credit identities and stored credit values may be collected from tags, traveler cards, or payment instruments used by travelers.	Planned
<i>Requirement:</i>	
10 The public interface for travelers shall base requests from the traveler on the traveler's current location or a specific location identified by the traveler, and filter the provided information accordingly.	Planned
<i>Requirement:</i>	
11 The public interface for travelers shall provide digitized map data to act as the background to the information presented to the traveler.	Planned

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Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Indiana Dunes National Lakeshore Shuttle Kiosks	
<i>Entity:</i> Remote Traveler Support	
<i>Functional Area:</i> Remote Interactive Information Reception	
Public traveler interface, such as a kiosk, that provides traffic, transit, yellow pages, special event, and other personalized traveler information services upon request.	
<i>Requirement:</i>	
12 The public interface for travelers shall support traveler input in audio or manual form.	Planned
<i>Requirement:</i>	
13 The public interface for travelers shall present information to the traveler in audible or visual forms consistent with a kiosk, including those that are suitable for travelers with hearing or vision physical disabilities.	Planned
<i>Requirement:</i>	
14 The public interface for travelers shall be able to store frequently requested data.	Planned
<i>Functional Area:</i> Traveler Secure Area Surveillance	
Security surveillance devices that monitor traveler-frequented areas such as transit stops and rest stops.	
<i>Requirement:</i>	
1 The field element shall include video and/or audio surveillance of traveler secure areas including transit stations, transit stops, rest areas, park and ride lots, and other fixed sites along travel routes (e.g., emergency pull-off areas and traveler information centers).	Planned
<i>Requirement:</i>	
2 The field element shall be remotely controlled by a center.	Planned
<i>Requirement:</i>	
3 The field element shall provide equipment status and fault indication of surveillance equipment to a center.	Planned
<i>Requirement:</i>	
4 The field element shall provide raw video or audio data.	Planned
<i>Requirement:</i>	
5 The field element shall remotely process video and audio data and provide an indication of potential incidents or threats to a center.	Planned
<i>Functional Area:</i> Traveler Secure Area Sensor Monitoring	
Security sensors monitoring traveler-frequented areas such as transit stops, park-and-ride lots, and rest areas for environmental threats, intrusion and motion, and object detection.	
<i>Requirement:</i>	
1 The field element shall include security sensors that monitor conditions in traveler secure areas, which include transit stations, transit stops, rest areas, park and ride lots, and other fixed sites along travel routes (e.g., emergency pull-off areas and travel information centers).	Potential
<i>Requirement:</i>	
2 The field element shall be remotely controlled by a center.	Potential
<i>Requirement:</i>	
3 The field element shall provide equipment status and fault indication of security sensor equipment to a center.	Potential
<i>Requirement:</i>	
4 The field element shall include environmental threat sensors (e.g. chemical agent, toxic industrial chemical, biological, explosives, and radiological).	Potential
<i>Requirement:</i>	
5 The field element shall include motion and intrusion detection sensors.	Potential
<i>Requirement:</i>	
6 The field element shall include object detection sensors (such as metal detectors).	Potential
<i>Requirement:</i>	
7 The field element shall provide raw security sensor data.	Potential

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Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Indiana Dunes National Lakeshore Shuttle Kiosks	
<i>Entity:</i> Remote Traveler Support	
<i>Functional Area:</i> Traveler Secure Area Sensor Monitoring	
Security sensors monitoring traveler-frequented areas such as transit stops, park-and-ride lots, and rest areas for environmental threats, intrusion and motion, and object detection.	
<i>Requirement:</i>	
8 The field element shall remotely process security sensor data and provide an indication of potential incidents or threats to a center.	Potential
<i>Functional Area:</i> Remote Traveler Security	
Public traveler interface that provides the capability for travelers to report an emergency or activate a panic button to summon assistance in areas such as transit stops, park-and-ride areas, etc.	
<i>Requirement:</i>	
1 The public interface for travelers shall provide the capability for a traveler to report an emergency and summon assistance from secure areas such as transit stops, transit stations, modal transfer facilities, rest stops, park-and-ride areas, travel information areas, and emergency pull off areas.	Planned
<i>Requirement:</i>	
2 When initiated by a traveler, the public interface for travelers shall forward a request for assistance to an emergency management function and acknowledge the request.	Planned
<i>Requirement:</i>	
3 The public interface for travelers shall provide the capability to broadcast a message to advise or warn a traveler.	Planned
<i>Requirement:</i>	
4 The public interface for travelers shall accept input and provide information to the traveler in a form suitable for travelers with physical disabilities.	Planned
<i>Functional Area:</i> Remote Transit Information Services	
Public traveler interface that provides real-time travel-related information at transit stops and multi-modal transfer points, including general annunciation, display of imminent arrival information, the latest available information on transit routes, schedules, transfer options, available services, fares, and real-time schedule adherence.	
<i>Requirement:</i>	
1 The public interface for travelers shall collect and provide real-time travel-related information at transit stops, multi-modal transfer points, and other public transportation areas.	Planned
<i>Requirement:</i>	
2 The public interface for travelers shall collect and present to the transit traveler information on transit routes, schedules, and real-time schedule adherence.	Planned
<i>Requirement:</i>	
3 The public interface for travelers shall provide support for general annunciation and/or display of imminent arrival information and other information of general interest to transit users.	Planned
<i>Requirement:</i>	
4 The public interface for travelers shall present information to the traveler in a form suitable for travelers with physical disabilities.	Planned
<i>Functional Area:</i> Remote Transit Fare Management	
Public traveler interface, such as a kiosk, that provides the capability for the traveler to use a common fare medium for transit fares, tolls, and/or parking lot charges, to calculate the amount due and identify payment problems.	
<i>Requirement:</i>	
1 The public interface for travelers shall accept and process current transit passenger fare collection information.	Planned

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Indiana Dunes National Lakeshore Shuttle Kiosks</i>	
<i>Entity: Remote Traveler Support</i>	
<i>Functional Area: Remote Transit Fare Management</i>	
Public traveler interface, such as a kiosk, that provides the capability for the traveler to use a common fare medium for transit fares, tolls, and/or parking lot charges, to calculate the amount due and identify payment problems.	
<i>Requirement:</i>	
2 The public interface for travelers shall calculate a fare based on the origin and destination provided by the traveler, in conjunction with transit routing, transit fare category, and transit user history.	Planned
<i>Requirement:</i>	
3 The public interface for travelers shall provide an interface to a transit user traveler card in support of payment for transit fares, tolls, and/or parking lot charges. The stored credit value data from the card shall be collected and updated based on the fare or other charges, or the credit identity shall be collected.	Planned
<i>Requirement:</i>	
4 The public interface for travelers shall provide information to the center for financial authorization and transaction processing.	Planned
<i>Requirement:</i>	
5 The public interface for travelers shall provide an image of all travelers purchasing rides or services to be used for violation processing.	Potential
<i>Requirement:</i>	
6 The public interface for travelers shall determine the routing based on the traveler's destination and the location of the closest transit stop from which a route request is being made.	Planned
<i>Requirement:</i>	
7 The public interface for travelers shall create fare statistics data based upon data collected at a transit stop.	Planned
<i>Requirement:</i>	
8 The public interface for travelers shall present information to the traveler in a form suitable for travelers with physical disabilities.	Planned
<i>Element: Indiana Dunes National Lakeshore Shuttle Transit Vehicles</i>	
<i>Entity: Transit Vehicle</i>	
<i>Functional Area: On-board Connection Protection</i>	
Monitors vehicle schedule performance and provides it to the transit center for connection protection processing. Also recognizes travelers who have arranged for connection protection and provides information regarding them to the transit center.	
<i>Requirement:</i>	
1 The transit vehicle shall monitor vehicle schedule performance and provides it to the transit center for connection protection processing.	Planned
<i>Requirement:</i>	
2 The transit vehicle shall receive operator instructions from the transit center relating to managing connection protection.	Planned
<i>Requirement:</i>	
3 The transit vehicle shall recognizes individual travelers who have arranged for connection protection and provides information regarding them to the transit center.	Planned
<i>Functional Area: On-board Transit Trip Monitoring</i>	
Support fleet management with automatic vehicle location (AVL) and automated mileage and fuel reporting and auditing.	
<i>Requirement:</i>	
1 The transit vehicle shall track the current location of the transit vehicle.	Potential

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Indiana Dunes National Lakeshore Shuttle Transit Vehicles	
<i>Entity:</i> Transit Vehicle	
<i>Functional Area:</i> On-board Transit Trip Monitoring	
Support fleet management with automatic vehicle location (AVL) and automated mileage and fuel reporting and auditing.	
<i>Requirement:</i>	Potential
2 The transit vehicle shall support the computation of the location of a transit vehicle using on-board sensors to augment the location determination function. This may include proximity to the transit stops or other known reference points as well as recording trip length.	
<i>Requirement:</i>	Potential
3 The transit vehicle shall record transit trip monitoring data including vehicle mileage and fuel usage.	
<i>Requirement:</i>	Potential
4 The transit vehicle shall record transit trip monitoring data including operational status information such as doors open/closed, running times, etc.	
<i>Requirement:</i>	Potential
5 The transit vehicle shall send the transit vehicle trip monitoring data to center-based trip monitoring functions.	
<i>Functional Area:</i> On-board Schedule Management	
Collecting of data for schedule generation and adjustment on-board a transit vehicle. Supports communication between the vehicle, operator, and center.	
<i>Requirement:</i>	Potential
1 The transit vehicle shall receive a vehicle assignment including transit route information, transit service instructions, traffic information, road conditions, and other information for the operator.	
<i>Requirement:</i>	Potential
2 The transit vehicle shall use the route information and its current location to determine the deviation from the predetermined schedule.	
<i>Requirement:</i>	Potential
3 The transit vehicle shall calculate the estimated times of arrival (ETA) at transit stops.	
<i>Requirement:</i>	Potential
4 The transit vehicle shall determine scenarios to correct the schedule deviation.	
<i>Requirement:</i>	Potential
5 The transit vehicle shall provide the schedule deviations and instructions for schedule corrections to the transit vehicle operator if the deviation is small, or the transit vehicle is operating in an urban area.	
<i>Requirement:</i>	Potential
6 The transit vehicle shall send the schedule deviation and estimated arrival time information to the center.	
<i>Requirement:</i>	Potential
7 The transit vehicle shall support the operations of a flexible route service. This may include requests for route deviations that would then lead to schedule corrective actions.	
<i>Requirement:</i>	Potential
8 The transit vehicle shall notify the transit center of vehicle location and operational status as the vehicle exits and returns to the transit facility to support future vehicle assignments.	
<i>Functional Area:</i> On-board Paratransit Operations	
On-board systems to manage paratransit and flexible-route dispatch requests, including multi-stop runs. Passenger data is collected and provided to the center.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Indiana Dunes National Lakeshore Shuttle Transit Vehicles	
<i>Entity:</i> Transit Vehicle	
<i>Functional Area:</i> On-board Paratransit Operations	
On-board systems to manage paratransit and flexible-route dispatch requests, including multi-stop runs. Passenger data is collected and provided to the center.	
<i>Requirement:</i> 2 The transit vehicle shall receive the status of demand responsive or flexible-route transit schedules and passenger loading from the transit vehicle operator.	Potential
<i>Requirement:</i> 3 The transit vehicle shall provide the transit vehicle operator instructions about the demand responsive or flexible-route transit schedule that has been confirmed from the center.	Potential
<i>Requirement:</i> 4 The transit vehicle shall provide the capability to log passenger boardings and alightings and make passenger use data available to the transit center.	Potential
<i>Functional Area:</i> On-board Transit Fare Management	
On-board systems provide fare collection using a travelers non-monetary fare medium. Collected fare data are made available to the center.	
<i>Requirement:</i> 1 The transit vehicle shall read data from the traveler card / payment instrument presented by boarding passengers.	Potential
<i>Requirement:</i> 2 The transit vehicle shall provide an image of all travelers which shall be used for violation processing of those who do not have a traveler card / payment instrument or whose transit fare transaction fails.	Potential
<i>Requirement:</i> 3 The transit vehicle shall determine the traveler's travel routing based on the transit vehicle's current location and the traveler's destination.	Potential
<i>Requirement:</i> 4 The transit vehicle shall calculate the traveler's fare based on the origin and destination provided by the traveler as well as factors such as the transit routing, transit fare category, traveler history, and route-specific information.	Potential
<i>Requirement:</i> 5 The transit vehicle shall have access to the complete range of transit services (routes and schedules) that are available to the traveler.	Planned
<i>Requirement:</i> 6 The transit vehicle shall provide a transit fare payment interface that is suitable for travelers with physical disabilities.	Planned
<i>Requirement:</i> 7 The transit vehicle shall include a database on-board the transit vehicle for use in fare processing from which the fares for all possible trips within the transit operational network can be determined.	Potential
<i>Requirement:</i> 8 The transit vehicle shall support an emergency fare structure overriding all other fares that can be activated during disasters, states of emergency or evacuations.	Potential
<i>Requirement:</i> 10 The transit vehicle shall provide fare statistics data to the center.	Potential
<i>Functional Area:</i> On-board Passenger Counting	
On-board systems collect transit vehicle loading data and make it available to the center.	
<i>Requirement:</i> 1 The transit vehicle shall count passengers boarding and alighting.	Potential

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Indiana Dunes National Lakeshore Shuttle Transit Vehicles</i>	
<i>Entity: Transit Vehicle</i>	
<i>Functional Area: On-board Passenger Counting</i>	
On-board systems collect transit vehicle loading data and make it available to the center.	
<i>Requirement:</i>	
2 The passenger counts shall be related to location to support association of passenger counts with routes, route segments, or bus stops.	Potential
<i>Requirement:</i>	
3 The passenger counts shall be timestamped so that ridership can be measured by time of day and day of week.	Potential
<i>Requirement:</i>	
4 The transit vehicle shall send the collected passenger count information to the transit center.	Potential
<i>Functional Area: On-board Transit Security</i>	
On-board video/audio surveillance systems, threat sensors, and object detection sensors to enhance security and safety on-board a transit vehicles. Also includes silent alarms activated by transit user or vehicle operator, operator authentication, and remote vehicle disabling.	
<i>Requirement:</i>	
1 The transit vehicle shall perform video and audio surveillance inside of transit vehicles and output raw video or audio data for either local monitoring (for processing or direct output to the transit vehicle operator), remote monitoring or for local storage (e.g., in an event recorder).	Planned
<i>Requirement:</i>	
2 The transit vehicle shall perform local monitoring of video or audio surveillance data collected inside of transit vehicles, and identify potential incidents or threats based on received processing parameters.	Planned
<i>Requirement:</i>	
3 The transit vehicle shall output an indication of potential incidents or threats and the processed video or audio information to the center along with the vehicle's current location.	Planned
<i>Requirement:</i>	
4 The transit vehicle shall detect potential threats via sensors for chemical agents, toxic industrial chemicals, biological agents, explosives, and radiation.	Potential
<i>Requirement:</i>	
5 The transit vehicle shall detect potential threats via object detection sensors (e.g. metal detectors).	Potential
<i>Requirement:</i>	
6 The transit vehicle shall output an indication of potential incidents or threats and the processed sensor information to the center along with the vehicle's current location.	Potential
<i>Requirement:</i>	
7 The transit vehicle shall accept sensor control data to allow remote control of the sensors.	Potential
<i>Requirement:</i>	
8 The transit vehicle shall monitor and output surveillance and sensor equipment status and fault indications.	Planned
<i>Requirement:</i>	
9 The transit vehicle shall accept emergency inputs from either the transit vehicle operator or a traveler through such interfaces as panic buttons, silent or audible alarms, etc.	Potential
<i>Requirement:</i>	
10 The transit vehicle shall output reported emergencies to the center.	Planned

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Indiana Dunes National Lakeshore Shuttle Transit Vehicles	
<i>Entity:</i> Transit Vehicle	
<i>Functional Area:</i> On-board Transit Security	
On-board video/audio surveillance systems, threat sensors, and object detection sensors to enhance security and safety on-board a transit vehicles. Also includes silent alarms activated by transit user or vehicle operator, operator authentication, and remote vehicle disabling.	
<i>Requirement:</i>	Planned
11 The transit vehicle shall receive acknowledgments of the emergency request from the center and output this acknowledgment to the transit vehicle operator or to the travelers.	
<i>Requirement:</i>	Planned
12 The transit vehicle shall be capable of receiving an emergency message for broadcast to the travelers or to the transit vehicle operator.	
<i>Requirement:</i>	Planned
13 The transit vehicle shall be capable of disabling or enabling the transit vehicle based on commands from the center or authentic inputs from the transit vehicle operator.	
<i>Requirement:</i>	Potential
14 The transit vehicle shall perform authentication of the transit vehicle operator.	
<i>Functional Area:</i> On-board Maintenance	
On-board systems to collect and process transit vehicle maintenance data including mileage and vehicle operating conditions for use in scheduling future vehicle maintenance.	
<i>Requirement:</i>	Planned
1 The transit vehicle shall collect and process vehicle mileage data available to sensors on-board.	
<i>Requirement:</i>	Planned
2 The transit vehicle shall collect and process the transit vehicle's operating conditions such as engine temperature, oil pressure, brake wear, internal lighting, environmental controls, etc.	
<i>Requirement:</i>	Planned
3 The transit vehicle shall transmit vehicle maintenance data to the center to be used for scheduling future vehicle maintenance.	
<i>Functional Area:</i> On-board Transit Information Services	
On-board systems to furnish next-stop annunciation as well as interactive travel-related information, including routes, schedules, transfer options, fares, real-time schedule adherence, current incidents, weather conditions, non-motorized transportation services, and special events.	
<i>Requirement:</i>	Planned
1 The transit vehicle shall enable traffic and travel advisory information to be requested and output to the traveler. Such information may include transit routes, schedules, transfer options, fares, real-time schedule adherence, current incidents, weather conditions, and special events.	
<i>Requirement:</i>	Planned
3 The transit vehicle shall broadcast advisories about the imminent arrival of the transit vehicle at the next stop via an on-board automated annunciation system.	
<i>Requirement:</i>	Planned
4 The transit vehicle shall support input and output forms that are suitable for travelers with physical disabilities.	
<i>Requirement:</i>	Planned
5 The transit vehicle shall gather transit advisory data, including alerts and advisories pertaining to major emergencies, or man made disasters.	
<i>Requirement:</i>	Planned
6 The transit vehicle shall tailor the output of the request traveler information based on the current location of the transit vehicle.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Indiana Dunes National Lakeshore Shuttle Transit Vehicles</i>	
<i>Entity: Transit Vehicle</i>	
<i>Element: Indiana Dunes National Lakeshore Visitors Center and Park Access</i>	
<i>Entity: Parking Management</i>	
<i>Functional Area: Parking Management</i>	
Monitor vehicles and current parking availability within parking facilities. Use driver information systems (e.g., DMS) to provide parking availability and other parking facility information to drivers. Support local traffic control coordination around the parking facility.	
<i>Requirement:</i>	Planned
1 The parking element shall maintain parking lot information including static information such as hours of operation, rates, location, entrance locations, capacity, type, and constraints; as well as dynamic information such as current state of the lot, occupancy, arrival rates, and departure rates.	
<i>Requirement:</i>	Planned
2 The parking element shall share information with a traffic management center to identify queues at entrances, exits that should be used, and other information that supports coordinated local traffic control in and around the parking facility.	
<i>Requirement:</i>	Planned
3 The parking element shall manage local dynamic message signs that display messages to travelers such as the parking lot state, number of spaces available, location of entrances, and current charges.	
<i>Requirement:</i>	Planned
4 The parking element shall provide the capability to detect, count, and classify vehicles at entrances, exits, and designated locations within a parking facility.	
<i>Functional Area: Parking Electronic Payment</i>	
Parking payment collection using in-vehicle equipment (tags) or contact or proximity traveler cards used for electronic payment. Includes field elements and back-office functionality.	
<i>Requirement:</i>	Planned
1 The parking element shall detect and classify vehicles entering and exiting a parking facility (vehicle size, type, identifiable features, etc.).	
<i>Requirement:</i>	Planned
2 The parking element shall read data from the traveler card / payment instrument carried on-board the vehicle or by the traveler.	
<i>Requirement:</i>	Planned
3 The parking element shall provide an interface to the driver informing them of the success or failure of the financial transaction. This may involve a request for the driver to pull aside so the operator can resolve an issue.	
<i>Requirement:</i>	Planned
4 The parking element shall collect data on payment violations and send the data, including images of the violator and the vehicle registration data obtained from the Department of Motor Vehicles (DMV) office, to the appropriate enforcement agency.	
<i>Requirement:</i>	Planned
5 The parking element shall manage the parking lot charges, considering such factors as location, vehicle types, and times of day.	
<i>Requirement:</i>	Planned
6 The parking element shall process the financial requests and manage an interface to a Financial Institution.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Indiana Dunes National Lakeshore Visitors Center and Park Access</i>	
<i>Entity: Parking Management</i>	
<i>Functional Area: Parking Electronic Payment</i>	
Parking payment collection using in-vehicle equipment (tags) or contact or proximity traveler cards used for electronic payment. Includes field elements and back-office functionality.	
<i>Requirement:</i> 7 The parking element shall support the payment of parking lot transactions using data provided by the traveler cards / payment instruments.	Planned
<i>Requirement:</i> 8 The parking element shall process requests for parking lot charges to be paid in advance.	Potential
<i>Requirement:</i> 9 The parking element shall process requests for the advanced payment of tolls and transit fares as well as other non-transportation services, e.g. yellow-pages services.	Potential
<i>Requirement:</i> 10 The parking element shall maintain a list of invalid traveler credit identities.	Planned
<i>Functional Area: Parking Data Collection</i>	
Collection and storage of parking management information. For use by operations personnel or data archives in the region.	
<i>Requirement:</i> 1 The parking element shall collect parking management data including lot usage and charging information.	Planned
<i>Requirement:</i> 2 The parking element shall assign quality control metrics and meta-data to be stored along with the data. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.	Planned
<i>Requirement:</i> 3 The parking element shall receive and respond to requests from ITS Archives for either a catalog of the parking management data or for the data itself.	Planned
<i>Requirement:</i> 4 The parking element shall be able to produce sample products of the data available.	Planned
<i>Element: Indiana Emissions Management</i>	
<i>Entity: Emissions Management</i>	
<i>Functional Area: Emissions Data Management</i>	
Assimilation and storage of air quality measures and roadside collected emissions data; distribution for general traveler information or for use in demand management programs.	
<i>Requirement:</i> 1 The center shall collect, analyze, and store vehicle emissions data collected from roadside sensors.	Existing
<i>Requirement:</i> 2 The center shall collect, analyze, and store wide area pollution data collected from sensors that may the general (wide area) environment.	Existing
<i>Requirement:</i> 3 The center shall configure and control emissions and air quality sensors located in the field.	Existing
<i>Requirement:</i> 4 The center shall maintain a database of pollution reference data including acceptable and tolerable emissions and pollution levels for the area served by the center.	Planned

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Indiana Emissions Management</i>	
<i>Entity: Emissions Management</i>	
<i>Functional Area: Emissions Data Management</i>	
Assimilation and storage of air quality measures and roadside collected emissions data; distribution for general traveler information or for use in demand management programs.	
<i>Requirement:</i>	
5 The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for emissions.	Planned
<i>Requirement:</i>	
6 The center shall establish violation parameters, detect emissions violators, obtain the vehicle registration data from the appropriate State Department of Motor Vehicles (DMV) office, and then provide the capability to send violation information to a law enforcement agency.	Planned
<i>Requirement:</i>	
7 The center shall distribute air quality information to the media, traveler information service providers, and traffic management centers. This information may be used for information to travelers or part of demand management programs.	Existing
<i>Functional Area: Emissions Data Collection</i>	
Collection and storage of air quality and emissions management information. For use by operations personnel or data archives in the region.	
<i>Requirement:</i>	
1 The center shall collect air quality and emissions management data from various sources, including emissions sensors distributed along the roadside and wide-area sensors detecting pollution over a larger geographical area.	Existing
<i>Requirement:</i>	
2 The center shall assign quality control metrics and meta-data to be stored along with the data. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.	Planned
<i>Requirement:</i>	
3 The center shall receive and respond to requests from ITS Archives for either a catalog of the emissions management data or for the data itself.	Planned
<i>Requirement:</i>	
4 The center shall be able to produce sample products of the data available.	Planned
<i>Element: Indiana Gateway</i>	
<i>Entity: Archived Data Management</i>	
<i>Functional Area: ITS Data Repository</i>	
Collect and maintain data and data catalogs from one or more data sources. May include quality checks, error notification, and archive coordination.	
<i>Requirement:</i>	
1 The center shall collect data to be archived from one or more data sources.	Existing
<i>Requirement:</i>	
2 The center shall collect data catalogs from one or more data sources. A catalog describes the data contained in the collection of archived data and may include descriptions of the schema or structure of the data, a description of the contents of the data; e.g., time range of entries, number of entries; or a sample of the data (e. g. a thumbnail).	Existing
<i>Requirement:</i>	
3 The center shall store the archived data in a focused repository that is suited to a particular set of ITS data users.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Indiana Gateway</i>	
<i>Entity: Archived Data Management</i>	
<i>Functional Area: ITS Data Repository</i>	
Collect and maintain data and data catalogs from one or more data sources. May include quality checks, error notification, and archive coordination.	
<i>Requirement:</i>	
4 The center shall include capabilities for performing quality checks on the incoming archived data.	Existing
<i>Requirement:</i>	
5 The center shall include capabilities for error notification on the incoming archived data.	Planned
<i>Requirement:</i>	
6 The center shall include capabilities for archive to archive coordination.	Planned
<i>Requirement:</i>	
7 The center shall support a broad range of archived data management implementations, ranging from simple data marts that collect a focused set of data and serve a particular user community to large-scale data warehouses that collect, integrate, and summarize transportation data from multiple sources and serve a broad array of users within a region.	Existing
<i>Requirement:</i>	
8 The center shall perform quality checks on received data.	Planned
<i>Requirement:</i>	
9 The center shall provide the capability to execute methods on the incoming data such as cleansing, summarizations, aggregations, or transformations applied to the data before it is stored in the archive.	Planned
<i>Requirement:</i>	
10 The center shall respond to requests from the administrator interface function to maintain the archive data.	Existing
<i>Requirement:</i>	
11 When data or a catalog of data is received from the archive, the center shall generate the requested data product for the users systems.	Existing
<i>Requirement:</i>	
12 For archive data requiring financial payment, the center shall process the financial requests and manage an interface to a Financial Institution.	Potential
<i>Functional Area: Traffic and Roadside Data Archival</i>	
Collects and archives traffic and environmental information directly from the roadside for use in off-line planning, research, and analysis.	
<i>Requirement:</i>	
1 The center shall manage the collection of archive data directly from collection equipment located at the roadside.	Existing
<i>Requirement:</i>	
2 The center shall collect traffic sensor information from roadside devices.	Existing
<i>Requirement:</i>	
3 The center shall collect environmental sensor information that from roadside devices.	Existing
<i>Requirement:</i>	
4 The center shall respond to requests from the Archive Data Administer to input the parameters that control the collection process.	Existing
<i>Requirement:</i>	
5 The center shall send the request for data and control parameters to the field equipment where the information is collected and returned.	Existing
<i>Requirement:</i>	
6 The center shall record the status about the imported traffic and roadside data.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Indiana Gateway</i>	
<i>Entity: Archived Data Management</i>	
<i>Functional Area: Traffic and Roadside Data Archival</i>	
Collects and archives traffic and environmental information directly from the roadside for use in off-line planning, research, and analysis.	
<i>Requirement:</i> 7 The center shall use the status information to adjust the collection of traffic and roadside data.	Planned
<i>Functional Area: Government Reporting Systems Support</i>	
Selects and formats data residing in an ITS archive to facilitate local, state, and federal government data reporting requirements.	
<i>Requirement:</i> 1 The center shall provide data from an ITS archive to federal, state, or local government reporting systems.	Existing
<i>Requirement:</i> 2 The center shall provide the capability to select data from an ITS archive for use in government reports.	Existing
<i>Requirement:</i> 3 The center shall provide the capability to format data from an ITS archive suitable for input into government reports.	Existing
<i>Requirement:</i> 4 The center shall support requests for ITS archived data from Government Reporting Systems.	Existing
<i>Requirement:</i> 5 The center shall provide the applicable meta-data for any ITS archived data to satisfy government reporting system requests. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.	Existing
<i>Functional Area: On-Line Analysis and Mining</i>	
Advanced data analysis and mining features to support discovery of information, patterns, and correlations in large ITS archives.	
<i>Requirement:</i> 1 The center shall support the interface with Archive Data User Systems for requests for analysis of the archive data.	Existing
<i>Requirement:</i> 2 The center shall provide the capability to perform activities such as data mining, data fusion, summarizations, aggregations, and recreation from archive data. This may include multidimensional analysis, selective summarization and expansion of data details, and many other advanced analysis services.	Existing
<i>Requirement:</i> 3 The center shall receive the user's systems requests and develop the request to retrieve the data from the archive.	Existing
<i>Requirement:</i> 4 The center shall respond to users systems requests for a catalog of the archived data analysis products available.	Existing
<i>Requirement:</i> 5 For archive analysis and data mining products requiring financial payment the center shall process the financial requests and manage an interface to a Financial Institution.	Potential
<i>Entity: Commercial Vehicle Administration</i>	
<i>Functional Area: CV Data Collection</i>	
Collects and stores information related to Commercial Vehicle Operations. For use by operations personnel or data archives in the region.	
<i>Requirement:</i> 1 The center shall receive operational data from the roadside check systems as well as administration and credentials data.	Planned

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Indiana Gateway</i>	
<i>Entity: Commercial Vehicle Administration</i>	
<i>Functional Area: CV Data Collection</i>	
Collects and stores information related to Commercial Vehicle Operations. For use by operations personnel or data archives in the region.	
<i>Requirement:</i>	
2 The center shall assign quality control metrics and meta-data to be stored along with the data. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.	Planned
<i>Requirement:</i>	
3 The center shall receive and respond to requests from ITS Archives for either a catalog of the commercial vehicle operations data or for the data itself.	Planned
<i>Requirement:</i>	
4 The center shall be able to produce sample products of the data available.	Planned
<i>Entity: Emergency Management</i>	
<i>Functional Area: Emergency Routing</i>	
Routing of emergency vehicles to facilitate the quickest/safest arrival. Routes may be determined based on real-time traffic information and road conditions or routes may be provided by Traffic Management on request.	
<i>Requirement:</i>	
1 The center shall collect current traffic and road condition information for emergency vehicle route calculation.	Potential
<i>Requirement:</i>	
2 The center shall receive information on the location and status of traffic control equipment and work zones along potential emergency routes.	Potential
<i>Requirement:</i>	
3 The center shall receive status information from care facilities to determine the appropriate facility and its location.	Potential
<i>Requirement:</i>	
4 The center shall receive asset restriction information to support the dispatching of appropriate emergency resources.	Potential
<i>Requirement:</i>	
5 The center shall receive current railroad schedule information for emergency vehicle route calculation.	Potential
<i>Requirement:</i>	
6 The center shall track current emergency vehicle location and status.	Potential
<i>Requirement:</i>	
7 The center shall calculate emergency vehicle routes, under center personnel control, based on the collected traffic and road conditions information.	Potential
<i>Requirement:</i>	
8 The center shall request and receive ingress and egress routes or other specialized emergency access routes from the traffic management center.	Potential
<i>Requirement:</i>	
9 The center shall provide the capability to request special traffic control measures, such as signal preemption, from the traffic management center to facilitate emergency vehicle progress along the suggested route.	Potential
<i>Requirement:</i>	
10 Once the route is calculated the route shall be provided to the dispatch function.	Potential
<i>Requirement:</i>	
11 The center shall provide the capability for digitized map data to act as the background to the information presented to the emergency system operator.	Potential
<i>Functional Area: Emergency Early Warning System</i>	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Indiana Gateway</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Emergency Early Warning System</i>	
Monitors alerting and advisory systems, information collected by ITS surveillance and sensors, and reports from other agencies in order to identify potential, imminent, or in-progress major incidents or disasters. Notification is provided to other ITS centers to notify the traveling public.	
<i>Requirement:</i>	
1 The center shall 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).	Existing
<i>Requirement:</i>	
2 The center shall provide the capability to correlate alerts and advisories, incident information, and security sensor and surveillance data.	Existing
<i>Requirement:</i>	
3 The center shall 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.	Existing
<i>Requirement:</i>	
4 The center shall broadcast wide-area alerts and advisories to transit management centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	Planned
<i>Requirement:</i>	
5 The center shall broadcast wide-area alerts and advisories to toll administration centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	Existing
<i>Requirement:</i>	
6 The center shall broadcast wide-area alerts and advisories to traveler information service providers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	Existing
<i>Requirement:</i>	
7 The center shall broadcast wide-area alerts and advisories to maintenance centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	Planned
<i>Requirement:</i>	
8 The center shall broadcast wide-area alerts and advisories to other emergency management centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	Planned

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Indiana Gateway</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Emergency Early Warning System</i>	
Monitors alerting and advisory systems, information collected by ITS surveillance and sensors, and reports from other agencies in order to identify potential, imminent, or in-progress major incidents or disasters. Notification is provided to other ITS centers to notify the traveling public.	
<i>Requirement:</i> 9 The center shall broadcast wide-area alerts and advisories to commercial vehicle administration centers and roadside check facilities 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.	Planned
<i>Requirement:</i> 10 The center shall process status information from each of the centers that have been sent the wide-area alert.	Planned
<i>Requirement:</i> 11 The center shall coordinate the broadcast of wide-area alerts and advisories with other emergency management centers.	Planned
<i>Requirement:</i> 12 The center shall receive incident information from other transportation management centers to support the early warning system.	Existing
<i>Requirement:</i> 13 The center shall present the alert and advisory information and the status of the actions taken in response to the alert by the other centers to the emergency system operator as received from other system inputs.	Planned
<i>Requirement:</i> 14 The center shall support the entry of alert and advisory information directly from the emergency system operator.	Planned
<i>Functional Area: Emergency Environmental Monitoring</i>	
Collects current and forecast road and weather information that is used by the operator to more effectively manage incidents.	
<i>Requirement:</i> 1 The center shall 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).	Existing
<i>Requirement:</i> 2 The center shall collect current road and weather information from roadway maintenance operations.	Planned
<i>Requirement:</i> 3 The center shall assimilate current and forecast road conditions and surface weather information to support incident management.	Planned
<i>Requirement:</i> 4 The center shall present the current and forecast road and weather information to the emergency system operator.	Planned
<i>Functional Area: Emergency Data Collection</i>	
Collection and storage of information related to Emergency Management. For use by operations personnel or data archives in the region.	
<i>Requirement:</i> 1 The center shall collect emergency service data, emergency vehicle management data, emergency vehicle data, sensor and surveillance data, threat data, and incident data.	Planned
<i>Requirement:</i> 2 The center shall assign quality control metrics and meta-data to be stored along with the data. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.	Planned

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Indiana Gateway</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Emergency Data Collection</i>	
Collection and storage of information related to Emergency Management. For use by operations personnel or data archives in the region.	
<i>Requirement:</i>	
3 The center shall receive and respond to requests from ITS Archives for either a catalog of the emergency management data or for the data itself.	Planned
<i>Requirement:</i>	
4 The center shall be able to produce sample products of the data available.	Planned
<i>Entity: Emissions Management</i>	
<i>Functional Area: Emissions Data Management</i>	
Assimilation and storage of air quality measures and roadside collected emissions data; distribution for general traveler information or for use in demand management programs.	
<i>Requirement:</i>	
1 The center shall collect, analyze, and store vehicle emissions data collected from roadside sensors.	Planned
<i>Requirement:</i>	
2 The center shall collect, analyze, and store wide area pollution data collected from sensors that may the general (wide area) environment.	Planned
<i>Requirement:</i>	
3 The center shall configure and control emissions and air quality sensors located in the field.	Planned
<i>Requirement:</i>	
4 The center shall maintain a database of pollution reference data including acceptable and tolerable emissions and pollution levels for the area served by the center.	Planned
<i>Requirement:</i>	
5 The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for emissions.	Planned
<i>Requirement:</i>	
6 The center shall establish violation parameters, detect emissions violators, obtain the vehicle registration data from the appropriate State Department of Motor Vehicles (DMV) office, and then provide the capability to send violation information to a law enforcement agency.	Planned
<i>Requirement:</i>	
7 The center shall distribute air quality information to the media, traveler information service providers, and traffic management centers. This information may be used for information to travelers or part of demand management programs.	Planned
<i>Functional Area: Emissions Data Collection</i>	
Collection and storage of air quality and emissions management information. For use by operations personnel or data archives in the region.	
<i>Requirement:</i>	
1 The center shall collect air quality and emissions management data from various sources, including emissions sensors distributed along the roadside and wide-area sensors detecting pollution over a larger geographical area.	Existing
<i>Requirement:</i>	
2 The center shall assign quality control metrics and meta-data to be stored along with the data. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.	Planned

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Indiana Gateway</i>	
<i>Entity: Emissions Management</i>	
<i>Functional Area: Emissions Data Collection</i>	
Collection and storage of air quality and emissions management information. For use by operations personnel or data archives in the region.	
<i>Requirement:</i>	Planned
3 The center shall receive and respond to requests from ITS Archives for either a catalog of the emissions management data or for the data itself.	
<i>Requirement:</i>	Planned
4 The center shall be able to produce sample products of the data available.	
<i>Entity: Fleet and Freight Management</i>	
<i>Functional Area: Fleet HAZMAT Management</i>	
Notification of hazardous materials (HAZMAT) shipments to emergency management centers for commercial vehicles managed by the center - includes information on the nature of the cargo, the vehicle, and its expected route.	
<i>Requirement:</i>	Planned
1 The center shall track the routing and cargo information, including the manifest data plus the chemical characteristics of a hazardous materials (HAZMAT) load being carried by its fleet of commercial vehicles.	
<i>Requirement:</i>	Planned
2 The center shall provide information concerning commercial vehicles carrying hazardous materials (HAZMAT) upon request from an emergency management center. The information includes the nature of the cargo being carried, identity of the vehicle and unloading instructions.	
<i>Entity: Information Service Provider</i>	
<i>Functional Area: ISP Traveler Data Collection</i>	
Collects traveler information from other centers, consolidates and refines the collected data, and makes this data available to traveler information applications.	
<i>Requirement:</i>	Existing
1 The center shall collect, process, and store traffic and highway condition information, including incident information, detours and road closures, event information, recommended routes, and current speeds on specific routes.	
<i>Requirement:</i>	Existing
2 The center shall collect, process, and store maintenance and construction information, including scheduled maintenance and construction work activities and work zone activities.	
<i>Requirement:</i>	Planned
3 The center shall collect, process, and store transit routes and schedules, transit transfer options, transit fares, and real-time schedule adherence information.	
<i>Requirement:</i>	Planned
4 The center shall collect, process, and store parking information, including location, availability, and fees.	
<i>Requirement:</i>	Planned
5 The center shall collect, process, and store toll fee information.	
<i>Requirement:</i>	Existing
6 The center shall collect, process, and store current and forecast road conditions and surface weather conditions.	
<i>Requirement:</i>	Existing
7 The center shall collect, process, and store event information.	
<i>Requirement:</i>	Planned
8 The center shall collect, process, and store air quality information.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Indiana Gateway</i>	
<i>Entity: Information Service Provider</i>	
<i>Functional Area: ISP Probe Information Collection</i>	
Collection and aggregation of vehicle probe data, including calculation and dissemination of route travel times and usage. Includes environmental probe data collection, aggregation and dissemination.	
<i>Requirement:</i>	Existing
1 The center shall collect traffic probe data (speeds, travel times, etc.) from appropriately equipped vehicles and short range communications equipment.	
<i>Requirement:</i>	Planned
2 The center shall aggregate collected traffic probe data, calculate route segment travel times, route segment speeds, and route usage, and disseminate to other centers.	
<i>Requirement:</i>	Potential
3 The center shall collect environmental probe data (air temperature, exterior light status, wiper status, traction control status, etc.) from appropriately equipped vehicles and short range communications equipment.	
<i>Requirement:</i>	Potential
4 The center shall aggregate collected environmental probe data and disseminate the aggregated environmental probe data to other centers.	
<i>Requirement:</i>	Planned
5 The center shall receive traffic probe data collected by transit fleet operators and include this data in aggregated probe data provided to other centers.	
<i>Requirement:</i>	Planned
6 The center shall receive traffic probe data derived from electronic toll collection operations and include this data in aggregated probe data provided to other centers.	
<i>Functional Area: Basic Information Broadcast</i>	
Broadcast dissemination of traffic, transit, maintenance and construction, event, and weather information to traveler interface systems and vehicles.	
<i>Requirement:</i>	Existing
1 The center shall disseminate traffic and highway condition information to travelers, including incident information, detours and road closures, event information, recommended routes, and current speeds on specific routes.	
<i>Requirement:</i>	Existing
2 The center shall disseminate maintenance and construction information to travelers, including scheduled maintenance and construction work activities and work zone activities.	
<i>Requirement:</i>	Planned
3 The center shall disseminate transit routes and schedules, transit transfer options, transit fares, and real-time schedule adherence information to travelers.	
<i>Requirement:</i>	Potential
4 The center shall disseminate parking information to travelers, including location, availability, and fees.	
<i>Requirement:</i>	Planned
5 The center shall disseminate toll fee information to travelers.	
<i>Requirement:</i>	Existing
6 The center shall disseminate weather information to travelers.	
<i>Requirement:</i>	Existing
7 The center shall disseminate event information to travelers.	
<i>Requirement:</i>	Planned
8 The center shall disseminate air quality information to travelers.	
<i>Requirement:</i>	Existing
9 The center shall provide the capability to support requests from the media for traffic and incident data.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Indiana Gateway</i>	
<i>Entity: Information Service Provider</i>	
<i>Functional Area: Basic Information Broadcast</i>	
Broadcast dissemination of traffic, transit, maintenance and construction, event, and weather information to traveler interface systems and vehicles.	
<i>Requirement:</i> 10 The center shall provide the capability for a system operator to control the type and update frequency of broadcast traveler information.	Planned
<i>Functional Area: ISP Traveler Information Alerts</i>	
Provides personalized traveler information alerts, notifying travelers of relevant congestion, incidents, transit schedule delays. and other actionable information that may impact a trip. Relevant alerts are selected based on user-configurable parameters and thresholds.	
<i>Requirement:</i> 1 The center shall accept traveler profiles that establish recurring trip characteristics including route, mode, and timeframe information.	Planned
<i>Requirement:</i> 2 The center shall accept traveler profiles that define alert thresholds that establish the severity and types of alerts that are provided to each traveler.	Planned
<i>Requirement:</i> 3 The center shall disseminate personalized traffic alerts reporting congestion, incidents, delays, detours and road closures that may impact a current or planned trip.	Planned
<i>Requirement:</i> 4 The center shall disseminate personalized transit alerts reporting transit delays and service interruptions.	Planned
<i>Requirement:</i> 5 The center shall disseminate personalized parking alerts reporting parking availability and closures.	Planned
<i>Requirement:</i> 6 The center shall disseminate personalized road weather alerts reporting adverse road and weather conditions.	Planned
<i>Requirement:</i> 8 The center shall disseminate personalized event alerts reporting special event impacts on the transportation system.	Planned
<i>Requirement:</i> 9 The center shall provide an operator interface that supports monitoring and management of subscribers and the content and format of alert messages.	Existing
<i>Functional Area: Interactive Infrastructure Information</i>	
Personalized dissemination of traffic, transit, maintenance and construction, multimodal, event, and weather information to traveler interface systems and vehicles, upon request.	
<i>Requirement:</i> 1 The center shall disseminate customized traffic and highway condition information to travelers, including incident information, detours and road closures, recommended routes, and current speeds on specific routes upon request.	Existing
<i>Requirement:</i> 2 The center shall disseminate customized maintenance and construction information to travelers, including scheduled maintenance and construction work activities and work zone activities upon request.	Existing
<i>Requirement:</i> 3 The center shall disseminate customized transit routes and schedules, transit transfer options, transit fares, and real-time schedule adherence information to travelers upon request.	Planned

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Indiana Gateway</i>	
<i>Entity: Information Service Provider</i>	
<i>Functional Area: Interactive Infrastructure Information</i>	
Personalized dissemination of traffic, transit, maintenance and construction, multimodal, event, and weather information to traveler interface systems and vehicles, upon request.	
<i>Requirement:</i>	
4 The center shall disseminate customized parking information to travelers, including location, availability, and fees upon request.	Planned
<i>Requirement:</i>	
5 The center shall disseminate customized toll fee information to travelers upon request.	Planned
<i>Requirement:</i>	
6 The center shall disseminate customized weather information to travelers upon request.	Existing
<i>Requirement:</i>	
8 The center shall disseminate customized event information to travelers upon request.	Existing
<i>Requirement:</i>	
9 The center shall disseminate customized air quality information to travelers upon request.	Planned
<i>Requirement:</i>	
10 The center shall provide all traveler information based on the traveler's current location or a specific location identified by the traveler, and filter or customize the provided information accordingly.	Existing
<i>Requirement:</i>	
11 The center shall accept traveler profiles for determining the type of personalized data to send to the traveler.	Planned
<i>Requirement:</i>	
12 The center shall manage payment for services, such as tolls, transit fares, parking lot charges, map updates, and advanced payment for tolls, and provide transaction success or failure details.	Potential
<i>Requirement:</i>	
13 The center shall support requests for traveler information and advanced payment for traveler services from commercial fleet operators.	Potential
<i>Requirement:</i>	
14 The center shall provide the capability to exchange information with another traveler information service provider current or predicted data for road links that are outside the area served by the local supplier.	Planned
<i>Requirement:</i>	
15 The center shall manage updates of digitized map data and provide updates to traveler interface systems upon request.	Existing
<i>Requirement:</i>	
16 The center shall provide the capability to support requests from the media for traffic and incident data.	Existing
<i>Requirement:</i>	
17 The center shall provide the capability for a system operator to control the type and update frequency of traveler information.	Existing
<i>Functional Area: Traveler Telephone Information</i>	
Distribution of traveler information and wide-area alerts to traveler telephone information systems such as 511, based on voice-based traveler requests.	
<i>Requirement:</i>	
1 The center shall provide the capability to process voice-formatted requests for traveler information from a traveler telephone information system, and return the information in the requested format.	Planned

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Indiana Gateway</i>	
<i>Entity: Information Service Provider</i>	
<i>Functional Area: Traveler Telephone Information</i>	
Distribution of traveler information and wide-area alerts to traveler telephone information systems such as 511, based on voice-based traveler requests.	
<i>Requirement:</i>	Planned
2 The center shall provide the capability to process dual-tone multifrequency (DTMF)-based requests (touch-tone) for traveler information from a traveler telephone information system.	
<i>Requirement:</i>	Planned
3 The center shall provide the capability to process traveler information requests from a traveler telephone information system.	
<i>Requirement:</i>	Planned
4 The center shall provide information on traffic conditions in the requested voice format and for the requested location.	
<i>Requirement:</i>	Planned
5 The center shall provide work zone and roadway maintenance information in the requested voice format and for the requested location.	
<i>Requirement:</i>	Planned
6 The center shall provide roadway environment conditions information in the requested voice format and for the requested location.	
<i>Requirement:</i>	Planned
7 The center shall provide weather and event information in the requested voice format and for the requested location.	
<i>Requirement:</i>	Planned
8 The center shall provide transit service information in the requested voice format and for the requested location.	
<i>Requirement:</i>	Planned
11 The center shall provide the capability to support both specific caller requests as well as bulk upload of regional traveler information.	
<i>Requirement:</i>	Planned
12 The center shall receive and forward region-specific wide-area alert and advisory information to the traveler telephone information system, including major emergencies such as a natural or man-made disaster, civil emergency, child abductions, severe weather watches and warnings, military activities, and law enforcement warnings.	
<i>Functional Area: Infrastructure Provided Trip Planning</i>	
Generation of pre-trip and enroute trip plans for travelers (and vehicles) based on current traffic conditions, work zones, weather, and travelers constraints and preferences. Includes end-to-end trips using multiple modes, such as bicycle, transit, etc.	
<i>Requirement:</i>	Planned
1 The center shall provide the capability to provide specific pre-trip and enroute directions to travelers (and drivers), including costs, arrival times, and transfer points.	
<i>Requirement:</i>	Planned
2 The center shall include bicycle routes, walkways, skyways, and multi-use trails in the pre-trip and enroute directions it provides to travelers.	
<i>Requirement:</i>	Planned
3 The center shall support on-line route guidance for travelers using personal devices (such as PDAs).	
<i>Requirement:</i>	Planned
4 The center shall support on-line route guidance for drivers in vehicles.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Indiana Gateway</i>	
<i>Entity: Information Service Provider</i>	
<i>Functional Area: Infrastructure Provided Trip Planning</i>	
Generation of pre-trip and enroute trip plans for travelers (and vehicles) based on current traffic conditions, work zones, weather, and travelers constraints and preferences. Includes end-to-end trips using multiple modes, such as bicycle, transit, etc.	
<i>Requirement:</i>	
5 The center shall support on-line route guidance for specialty vehicles, such as commercial vehicles.	Planned
<i>Requirement:</i>	
6 The center shall generate route plans based on current and/or predicted conditions of the road network, scheduled maintenance and construction work activities, and work zone activities.	Planned
<i>Requirement:</i>	
7 The center shall generate route plans based on transit services, including fares, schedules, and requirements for travelers with special needs.	Planned
<i>Requirement:</i>	
8 The center shall generate route plans based on current asset restrictions, such as height and weight restrictions on tunnels or bridges.	Planned
<i>Requirement:</i>	
9 The center shall generate route plans based on current or forecasted weather.	Planned
<i>Requirement:</i>	
11 The center shall exchange route segment information with other centers outside the area served by the local center.	Planned
<i>Requirement:</i>	
12 The center shall generate trips based on the use of more than one mode of transport.	Planned
<i>Requirement:</i>	
13 The center shall use the preferences and constraints specified by the traveler in the trip request to select the most appropriate mode of transport.	Planned
<i>Requirement:</i>	
14 The center shall provide the capability for the traveler to confirm the proposed trip plan.	Planned
<i>Requirement:</i>	
15 The center shall log route plans, particularly for special vehicles such as those containing hazardous materials, over-sized vehicles, or motorcades, with a traffic center.	Planned
<i>Requirement:</i>	
16 The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used to determine vehicle and non-vehicle routes, trip planning, and on-line vehicle guidance.	Existing
<i>Requirement:</i>	
17 The center shall provide the capability for center personnel to control route calculation parameters.	Planned
<i>Functional Area: ISP Operational Data Repository</i>	
Processes, stores, and distributes real-time information on the state of the regional transportation system to transportation system operators.	
<i>Requirement:</i>	
1 The center shall select real-time information on the state of the regional transportation system including current traffic and road conditions, weather conditions, transit information, parking information, special event and incident information.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Indiana Gateway</i>	
<i>Entity: Information Service Provider</i>	
<i>Functional Area: ISP Operational Data Repository</i>	
Processes, stores, and distributes real-time information on the state of the regional transportation system to transportation system operators.	
<i>Requirement:</i> 2 The center shall distribute real-time transportation operations data to centers in the region. The data may be broadcast or customized based on the receiving center's specified requests or subscriptions.	Existing
<i>Requirement:</i> 3 The center shall support the capability for the system operator to monitor and control the operational data repository and information distribution service.	Existing
<i>Requirement:</i> 4 The center shall provide a web site that provides real-time transportation data to transportation system operators in the region.	Existing
<i>Functional Area: ISP Emergency Traveler Information</i>	
Distribution of emergency information to the traveling public, including evacuation information and wide-area alerts.	
<i>Requirement:</i> 1 The center shall disseminate emergency evacuation information to the traveler interface systems, including evacuation zones, shelter information, available transportation modes, road closures and detours, changes to transit services, and traffic and road conditions at the origin, destination, and along the evacuation routes.	Potential
<i>Requirement:</i> 2 The center shall provide evacuation information to shelter providers.	Potential
<i>Requirement:</i> 3 The center shall disseminate wide-area alert information to the traveler interface systems, including major emergencies such as a natural or man-made disaster, civil emergency, child abductions, severe weather watches and warnings, military activities, and law enforcement warnings.	Existing
<i>Requirement:</i> 4 The center shall provide the capability for a system operator to control the type and update frequency of emergency and wide-area alert information distributed to travelers.	Existing
<i>Functional Area: ISP Data Collection</i>	
Collection and storage of information supporting the operations of traveler information service providers. For use by operations personnel or data archives in the region.	
<i>Requirement:</i> 1 The center shall collect traveler information data, such as parking lot data, rideshare data, road network use data, vehicle probe data, and other data from traveler information system operations.	Existing
<i>Requirement:</i> 2 The center shall collect traveler requests, confirmations, and payment transaction data for traveler services provided.	Potential
<i>Requirement:</i> 3 The center shall assign quality control metrics and meta-data to be stored along with the data. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.	Planned
<i>Requirement:</i> 4 The center shall receive and respond to requests from ITS Archives for either a catalog of the traveler information data or for the data itself.	Planned

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Indiana Gateway</i>	
<i>Entity: Information Service Provider</i>	
<i>Functional Area: ISP Data Collection</i>	
Collection and storage of information supporting the operations of traveler information service providers. For use by operations personnel or data archives in the region.	
<i>Requirement:</i> 5 The center shall be able to produce sample products of the data available.	Planned
<i>Entity: Maintenance and Construction Management</i>	
<i>Functional Area: MCM Work Zone Management</i>	
Remotely monitors and supports work zone activities, controlling traffic through dynamic message signs (DMS), highway advisory radio, gates and barriers, and informing other groups of activity (e.g., traveler information systems, traffic management centers, other maintenance and construction centers).	
<i>Requirement:</i> 1 The center shall generate new work zone activity schedules for use by maintenance and construction vehicles, maintenance and construction operators, and for information coordination purposes.	Planned
<i>Requirement:</i> 2 The center shall control the collection of work zone status information including video images from cameras located in or near the work zone.	Planned
<i>Requirement:</i> 3 The center shall disseminate work zone information to other agencies and centers including traffic, transit, emergency management centers, other maintenance centers, traveler information providers, and the media.	Planned
<i>Requirement:</i> 4 The center shall control traffic in work zones by providing remote control of dynamic message signs, highway advisory radio systems, gates, and barriers located in or near the work zone.	Planned
<i>Requirement:</i> 5 The center shall exchange information with administrative systems to support the planning and scheduling of work zone activities. This information includes: equipment and consumables resupply purchase request status, personnel qualifications including training and special certifications, environmental regulations and rules that may impact maintenance activities, and requests and project requirements from contract administration.	Planned
<i>Requirement:</i> 6 The center shall collect real-time information on the state of the road network including current traffic and road conditions to support work zone scheduling and management.	Planned
<i>Functional Area: MCM Work Activity Coordination</i>	
Disseminates work activity schedules and current asset restrictions to other agencies. Work schedules are coordinated, factoring in the needs and activities of other agencies and adjacent jurisdictions.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Indiana Gateway</i>	
<i>Entity: Maintenance and Construction Management</i>	
<i>Functional Area: MCM Work Activity Coordination</i>	
Disseminates work activity schedules and current asset restrictions to other agencies. Work schedules are coordinated, factoring in the needs and activities of other agencies and adjacent jurisdictions.	
<i>Requirement:</i>	
1 The center shall 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.	Planned
<i>Requirement:</i>	
2 The center shall 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.	Planned
<i>Requirement:</i>	
3 The center shall collect and respond to feedback concerning scheduled maintenance and construction activities with other management centers such as traffic, emergency, transit, and rail operations.	Planned
<i>Requirement:</i>	
4 The center shall collect and disseminate asset restriction information levied on transportation asset usage based on infrastructure design, surveys, tests, or analyses. This includes standard facility design height, width, and weight restrictions, special restrictions such as spring weight restrictions, and temporary facility restrictions that are imposed during maintenance and construction.	Potential
<i>Requirement:</i>	
5 The center shall exchange information with administrative systems to support the planning and scheduling of maintenance and construction activities. This information includes: equipment and consumables resupply purchase request status, personnel qualifications including training and special certifications, environmental regulations and rules that may impact maintenance activities, and requests and project requirements from contract administration.	Planned
<i>Requirement:</i>	
6 The center shall exchange rail schedules and work plans with rail operations centers.	Potential
<i>Functional Area: MCM Data Collection</i>	
Collection and storage of maintenance and construction information. For use by operations personnel or data archives in the region.	
<i>Requirement:</i>	
1 The center shall collect maintenance and construction data (such as field equipment status, infrastructure status, maintenance and construction activity data) gathered from roadway, traffic, and other maintenance and construction sources.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Indiana Gateway</i>	
<i>Entity: Maintenance and Construction Management</i>	
<i>Functional Area: MCM Data Collection</i>	
Collection and storage of maintenance and construction information. For use by operations personnel or data archives in the region.	
<i>Requirement:</i>	Planned
2 The center shall assign quality control metrics and meta-data to be stored along with the data. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.	
<i>Requirement:</i>	Planned
3 The center shall receive and respond to requests from ITS Archives for either a catalog of the maintenance and construction data or for the data itself.	
<i>Requirement:</i>	Planned
4 The center shall be able to produce sample products of the data available.	
<i>Requirement:</i>	Planned
5 The center shall provide data to Asset Management to be used in updating the status of assets in the inventory.	
<i>Entity: Parking Management</i>	
<i>Functional Area: Parking Data Collection</i>	
Collection and storage of parking management information. For use by operations personnel or data archives in the region.	
<i>Requirement:</i>	Planned
1 The parking element shall collect parking management data including lot usage and charging information.	
<i>Requirement:</i>	Planned
2 The parking element shall assign quality control metrics and meta-data to be stored along with the data. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.	
<i>Requirement:</i>	Planned
3 The parking element shall receive and respond to requests from ITS Archives for either a catalog of the parking management data or for the data itself.	
<i>Requirement:</i>	Planned
4 The parking element shall be able to produce sample products of the data available.	
<i>Entity: Payment Administration</i>	
<i>Functional Area: Toll Operator Alert</i>	
Receipt/acknowledgement of alert notifications (safety/security broadcasts, child abductions, etc.) from the emergency management centers; the toll administrator controls distribution of the alert to the operators at the toll plazas.	
<i>Requirement:</i>	Existing
1 The center shall receive wide-area alerts and advisories from 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.	
<i>Requirement:</i>	Existing
2 The center shall provide an interface with the toll administration center personnel to present wide-area alert notifications and to allow the center personnel to acknowledge the input and control the dissemination of the information.	
<i>Requirement:</i>	Existing
3 The center shall distribute wide-area alert notifications to toll plazas to keep toll operators informed of identified threats that may impact toll operations or public safety on a toll facility.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Indiana Gateway</i>	
<i>Entity: Payment Administration</i>	
<i>Functional Area: Toll Operator Alert</i>	
Receipt/acknowledgement of alert notifications (safety/security broadcasts, child abductions, etc.) from the emergency management centers; the toll administrator controls distribution of the alert to the operators at the toll plazas.	
<i>Requirement:</i>	
4 The center shall return status back to the emergency management center that initiated the wide-area alert with information indicating the status of the alert from the toll operators including the information systems that are being used to provide the alert notification.	Planned
<i>Functional Area: Toll Data Collection</i>	
Collection and storage of toll operations and pricing data. For use by operations personnel or data archives in the region.	
<i>Requirement:</i>	
1 The center shall collect toll operational data and pricing data.	Planned
<i>Requirement:</i>	
2 The center shall assign quality control metrics and meta-data to be stored along with the data. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.	Planned
<i>Requirement:</i>	
3 The center shall receive and respond to requests from ITS Archives for either a catalog of the toll data or for the data itself.	Planned
<i>Requirement:</i>	
4 The center shall be able to produce sample products of the data available.	Planned
<i>Entity: Traffic Management</i>	
<i>Functional Area: Collect Traffic Surveillance</i>	
Management of traffic sensors and surveillance (CCTV) equipment, collection of current traffic conditions, and distribution of the collected information to other centers and operators.	
<i>Requirement:</i>	
1 The center shall monitor, analyze, and store traffic sensor data (speed, volume, occupancy) collected from field elements under remote control of the center.	Existing
<i>Requirement:</i>	
2 The center shall monitor, analyze, and distribute traffic images from CCTV systems under remote control of the center.	Existing
<i>Requirement:</i>	
3 The center shall monitor, analyze, and store multimodal crossing and high occupancy vehicle (HOV) lane sensor data under remote control of the center.	Potential
<i>Requirement:</i>	
4 The center shall distribute road network conditions data (raw or processed) based on collected and analyzed traffic sensor and surveillance data to other centers.	Planned
<i>Requirement:</i>	
5 The center shall respond to control data from center personnel regarding sensor and surveillance data collection, analysis, storage, and distribution.	Planned
<i>Requirement:</i>	
6 The center shall maintain a database of surveillance equipment and sensors and associated data (including the roadway on which they are located, the type of data collected, and the ownership of each)	Planned

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Indiana Gateway</i>	
<i>Entity: Traffic Management</i>	
<i>Functional Area: Collect Traffic Surveillance</i>	
Management of traffic sensors and surveillance (CCTV) equipment, collection of current traffic conditions, and distribution of the collected information to other centers and operators.	
<i>Requirement:</i>	Existing
7 The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for traffic data.	
<i>Functional Area: Traffic Data Collection</i>	
Collection and storage of traffic management data. For use by operations personnel or data archives in the region.	
<i>Requirement:</i>	Existing
1 The center shall collect traffic management data such as operational data, event logs, etc.	
<i>Requirement:</i>	Existing
2 The center shall assign quality control metrics and meta-data to be stored along with the data. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.	
<i>Requirement:</i>	Planned
3 The center shall receive and respond to requests from ITS Archives for either a catalog of the traffic data or for the data itself.	
<i>Requirement:</i>	Planned
4 The center shall be able to produce sample products of the data available.	
<i>Entity: Transit Management</i>	
<i>Functional Area: Transit Center Vehicle Tracking</i>	
Monitoring transit vehicle locations via interactions with on-board systems. Furnish users with real-time transit schedule information and maintain interface with digital map providers.	
<i>Requirement:</i>	Existing
1 The center shall monitor the locations of all transit vehicles within its network.	
<i>Requirement:</i>	Planned
2 The center shall determine adherence of transit vehicles to their assigned schedule.	
<i>Requirement:</i>	Planned
3 The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for transit tracking and dispatch.	
<i>Requirement:</i>	Existing
4 The center shall provide transit operational data to traveler information service providers.	
<i>Requirement:</i>	Existing
5 The center shall provide collected transit probe data to traffic management centers and traveler information service providers for use in measuring current traffic conditions.	
<i>Functional Area: Transit Environmental Monitoring</i>	
Current and forecast road and weather information assimilated from weather service providers and vehicle probes. The information is monitored and forwarded to other agencies to more effectively manage transit operations.	
<i>Requirement:</i>	Planned
1 The center shall assimilate current and forecast road conditions and surface weather information to more effectively manage transit operations.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Indiana Gateway</i>	
<i>Entity: Transit Management</i>	
<i>Functional Area: Transit Environmental Monitoring</i>	
Current and forecast road and weather information assimilated from weather service providers and vehicle probes. The information is monitored and forwarded to other agencies to more effectively manage transit operations.	
<i>Requirement:</i>	
2 The center shall collect current and forecast road and weather information from weather service providers and roadway maintenance centers.	Planned
<i>Functional Area: Transit Data Collection</i>	
Collection and storage of transit management data. For use by operations personnel or data archives in the region.	
<i>Requirement:</i>	
1 The center shall collect transit management data such as transit fares and passenger use, transit services, paratransit operations, transit vehicle maintenance data, etc.	Planned
<i>Requirement:</i>	
2 The center shall assign quality control metrics and meta-data to be stored along with the data. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.	Planned
<i>Requirement:</i>	
3 The center shall receive and respond to requests from ITS Archives for either a catalog of the transit data or for the data itself.	Planned
<i>Requirement:</i>	
4 The center shall be able to produce sample products of the data available.	Planned
<i>Element: Indiana State Police Commercial Vehicle Enforcement Division</i>	
<i>Entity: Commercial Vehicle Administration</i>	
<i>Functional Area: Credentials and Taxes Administration</i>	
Manage electronic filing of credentials, tax filing, and driver licensing for commercial vehicle operators. Provides commercial vehicle (including HAZMAT) route restrictions.	
<i>Requirement:</i>	
1 The center shall manage electronic credentials filing and processing for commercial vehicles.	Existing
<i>Requirement:</i>	
2 The center shall manage the filing of appropriate taxes for the operation of commercial vehicles.	Existing
<i>Requirement:</i>	
3 The center shall process requests for payments of electronic credentials and tax filing and maintain an interface to a Financial Institution.	Existing
<i>Requirement:</i>	
4 The center shall exchange credentials and tax information with other commercial vehicle administration centers - either in other states or the federal government.	Existing
<i>Requirement:</i>	
5 The center shall provide route restrictions information, including hazmat restrictions, to other centers and agencies for distribution to commercial vehicle operators. These centers and agencies may include commercial fleet and freight management operators, traveler information centers, digital map update providers, and other commercial vehicle administration centers.	Existing
<i>Requirement:</i>	
6 The center shall use information on asset restrictions received from maintenance centers to develop the commercial vehicle route restrictions and process credentials applications.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Indiana State Police Commercial Vehicle Enforcement Division</i>	
<i>Entity: Commercial Vehicle Administration</i>	
<i>Functional Area: Credentials and Taxes Administration</i>	
Manage electronic filing of credentials, tax filing, and driver licensing for commercial vehicle operators. Provides commercial vehicle (including HAZMAT) route restrictions.	
<i>Requirement:</i>	
7 The center shall provide an interface with commercial vehicle fleet and freight management centers to exchange audit and compliance review reports.	Existing
<i>Requirement:</i>	
8 The center shall provide credentials information about commercial vehicle operators and carriers to authorized requestors such as insurance agencies.	Existing
<i>Requirement:</i>	
9 The center shall receive and store information on commercial vehicle violations from enforcement agencies as part of the processing of credentials applications.	Existing
<i>Requirement:</i>	
10 The center shall manage driver licensing for commercial vehicle drivers.	Existing
<i>Requirement:</i>	
11 The center shall enroll carriers in CVO programs and support user account management.	Existing
<i>Requirement:</i>	
12 The center shall process requests for review of carrier and driver status.	Existing
<i>Requirement:</i>	
13 The center shall issue special Oversize/Overweight and HAZMAT permits in coordination with other cognizant authorities.	Existing
<i>Functional Area: CV Safety and Security Administration</i>	
Provides commercial vehicle safety and security criteria to roadside check facilities, collects and reviews safety and security data from the field, conducts wireless roadside inspections, and distributes safety and security information to other centers, carriers, and enforcement agencies.	
<i>Requirement:</i>	
1 The center shall provide commercial vehicle safety and security data to roadside check facilities.	Existing
<i>Requirement:</i>	
2 The center shall collect and review safety inspection reports and violations from the roadside check facilities and pass on appropriate portions to other commercial vehicle administrative centers and commercial vehicle fleet operators.	Existing
<i>Requirement:</i>	
3 The center shall notify enforcement agencies of commercial vehicle safety violations by individual commercial vehicles, drivers, or carriers.	Existing
<i>Requirement:</i>	
4 The center shall monitor alerting and advisory systems for security alerts and advisories.	Existing
<i>Requirement:</i>	
5 The center shall provide commercial vehicle accident reports to enforcement agencies.	Existing
<i>Requirement:</i>	
6 The center shall receive citation records from roadside check facilities.	Existing
<i>Requirement:</i>	
7 The center shall manage the citation records and provide the citations to enforcement agencies and the commercial fleet management center.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Indiana State Police Commercial Vehicle Enforcement Division</i>	
<i>Entity: Commercial Vehicle Administration</i>	
<i>Functional Area: CV Safety and Security Administration</i>	
Provides commercial vehicle safety and security criteria to roadside check facilities, collects and reviews safety and security data from the field, conducts wireless roadside inspections, and distributes safety and security information to other centers, carriers, and enforcement agencies.	
<i>Requirement:</i> 8 The center shall provide the capability for the commercial fleet management center to report required commercial vehicle repairs and other corrections of identified deficiencies.	Existing
<i>Requirement:</i> 9 The center shall support carrier enrollment in wireless roadside inspection programs.	Existing
<i>Requirement:</i> 10 The center shall manage and distribute information about trigger areas where wireless inspections will occur.	Existing
<i>Requirement:</i> 11 The center shall monitor the condition of the commercial vehicle and driver using wireless communications at identified trigger areas.	Planned
<i>Functional Area: CV Information Exchange</i>	
Exchange information concerning safety, credentialing, and operations of commercial vehicles between the center and the roadside check stations, across jurisdictions, with fleet operators and other information requestors.	
<i>Requirement:</i> 1 The center shall exchange information with roadside check facilities, including credentials and credentials status information, safety status information, daily site activity data, driver records, and citations.	Existing
<i>Requirement:</i> 2 The center shall exchange safety and credentials data among other commercial vehicle administration centers; includes border clearance status, credentials information, credentials status information, driver records, accident reports, permit information, and safety status information.	Existing
<i>Requirement:</i> 3 The center shall package data concerning commercial vehicle safety and credentials into snapshots (top-level summary and critical status information).	Existing
<i>Requirement:</i> 4 The center shall package data concerning commercial vehicle safety and credentials into profiles (detailed and historical data).	Existing
<i>Requirement:</i> 5 The center shall provide commercial vehicle credentials and safety status information to authorized requestors such as insurance agencies.	Existing
<i>Requirement:</i> 6 The center shall provide reports to the commercial vehicle fleet manager regarding fleet activity through roadside facilities including accident reports, citations, credentials status information, driver records, and safety status information.	Existing
<i>Requirement:</i> 7 The center shall provide individual drivers access to their own driver records on request.	Existing
<i>Functional Area: CV Data Collection</i>	
Collects and stores information related to Commercial Vehicle Operations. For use by operations personnel or data archives in the region.	
<i>Requirement:</i> 1 The center shall receive operational data from the roadside check systems as well as administration and credentials data.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Indiana State Police Commercial Vehicle Enforcement Division</i>	
<i>Entity: Commercial Vehicle Administration</i>	
<i>Functional Area: CV Data Collection</i>	
Collects and stores information related to Commercial Vehicle Operations. For use by operations personnel or data archives in the region.	
<i>Requirement:</i>	
2 The center shall assign quality control metrics and meta-data to be stored along with the data. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.	Existing
<i>Requirement:</i>	
3 The center shall receive and respond to requests from ITS Archives for either a catalog of the commercial vehicle operations data or for the data itself.	Planned
<i>Requirement:</i>	
4 The center shall be able to produce sample products of the data available.	Planned
<i>Entity: Emergency Management</i>	
<i>Functional Area: Emergency Call-Taking</i>	
Provides interface to the emergency call-taking systems such as the Emergency Telecommunications System (e.g., 911) that correlate call information with emergencies reported by transit agencies, commercial vehicle operators, or other public safety agencies. Allows the operator to verify the incident and forward the information to the responding agencies.	
<i>Requirement:</i>	
1 The center shall support the interface to the Emergency Telecommunications System (e.g. 911 or 7-digit call routing) to receive emergency notification information and provide it to the emergency system operator.	Existing
<i>Requirement:</i>	
2 The center shall receive emergency call information from 911 services and present the possible incident information to the emergency system operator.	Existing
<i>Requirement:</i>	
4 The center shall receive emergency call information from mayday service providers and present the possible incident information to the emergency system operator.	Existing
<i>Requirement:</i>	
5 The center shall receive emergency notification information from other public safety agencies and present the possible incident information to the emergency system operator.	Existing
<i>Requirement:</i>	
7 The center shall coordinate, correlate, and verify all emergency inputs, including those identified based on external calls and internal analysis of security sensor and surveillance data, and assign each a level of confidence.	Existing
<i>Requirement:</i>	
8 The center shall send a request for remote control of CCTV systems from a traffic management center in order to verify the reported incident.	Planned
<i>Requirement:</i>	
9 The center shall forward the verified emergency information to the responding agency based on the location and nature of the emergency.	Existing
<i>Requirement:</i>	
10 The center shall update the incident information log once the emergency system operator has verified the incident.	Existing
<i>Requirement:</i>	
11 The center shall provide the capability for digitized map data to act as the background to the emergency information presented to the emergency system operator.	Planned

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Indiana State Police Commercial Vehicle Enforcement Division	
<i>Entity:</i> Emergency Management	
<i>Functional Area:</i> Emergency Dispatch	
Dispatch emergency vehicles to incidents, tracking their location and status. Pertinent incident information is gathered and relayed to the responding units.	
<i>Requirement:</i>	
1 The center shall dispatch emergency vehicles to respond to verified emergencies under center personnel control.	Existing
<i>Requirement:</i>	
2 The center shall store the current status of all emergency vehicles available for dispatch and those that have been dispatched.	Existing
<i>Requirement:</i>	
3 The center shall relay location and incident details to the responding vehicles.	Existing
<i>Requirement:</i>	
4 The center shall track the location and status of emergency vehicles responding to an emergency based on information from the emergency vehicle.	Existing
<i>Requirement:</i>	
5 The center shall store and maintain the emergency service responses in an action log.	Existing
<i>Requirement:</i>	
6 The center shall provide the capability for digitized map data to act as the background to the information presented to the emergency system operator.	Existing
<i>Requirement:</i>	
7 The center shall receive traffic images to support dispatch of emergency vehicles.	Existing
<i>Requirement:</i>	
8 The center shall provide the capability to request remote control of traffic surveillance devices	Planned
<i>Requirement:</i>	
9 The center shall coordinate response to incidents with other Emergency Management centers to ensure appropriate resources are dispatched and utilized.	Existing
<i>Functional Area:</i> Emergency Routing	
Routing of emergency vehicles to facilitate the quickest/safest arrival. Routes may be determined based on real-time traffic information and road conditions or routes may be provided by Traffic Management on request.	
<i>Requirement:</i>	
1 The center shall collect current traffic and road condition information for emergency vehicle route calculation.	Existing
<i>Requirement:</i>	
2 The center shall receive information on the location and status of traffic control equipment and work zones along potential emergency routes.	Existing
<i>Requirement:</i>	
3 The center shall receive status information from care facilities to determine the appropriate facility and its location.	Existing
<i>Requirement:</i>	
4 The center shall receive asset restriction information to support the dispatching of appropriate emergency resources.	Existing
<i>Requirement:</i>	
6 The center shall track current emergency vehicle location and status.	Existing
<i>Requirement:</i>	
7 The center shall calculate emergency vehicle routes, under center personnel control, based on the collected traffic and road conditions information.	Existing
<i>Requirement:</i>	
8 The center shall request and receive ingress and egress routes or other specialized emergency access routes from the traffic management center.	Planned

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Indiana State Police Commercial Vehicle Enforcement Division	
<i>Entity:</i> Emergency Management	
<i>Functional Area:</i> Emergency Routing	
Routing of emergency vehicles to facilitate the quickest/safest arrival. Routes may be determined based on real-time traffic information and road conditions or routes may be provided by Traffic Management on request.	
<i>Requirement:</i>	
9 The center shall provide the capability to request special traffic control measures, such as signal preemption, from the traffic management center to facilitate emergency vehicle progress along the suggested route.	Potential
<i>Requirement:</i>	
10 Once the route is calculated the route shall be provided to the dispatch function.	Existing
<i>Requirement:</i>	
11 The center shall provide the capability for digitized map data to act as the background to the information presented to the emergency system operator.	Existing
<i>Functional Area:</i> Incident Command	
Tactical decision support, resource coordination, and communications integration among emergency management agencies for Incident Commands that are established by first responders to support local management of an incident.	
<i>Requirement:</i>	
1 The center shall 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.	Existing
<i>Requirement:</i>	
2 The center shall provide incident command communications with public safety, emergency management, transportation, and other allied response agency centers.	Existing
<i>Requirement:</i>	
3 The center shall track and maintain resource information and action plans pertaining to the incident command.	Existing
<i>Requirement:</i>	
4 The center shall 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.	Existing
<i>Requirement:</i>	
5 The center shall assess the status of responding emergency vehicles as part of an incident command.	Existing
<i>Functional Area:</i> Emergency Early Warning System	
Monitors alerting and advisory systems, information collected by ITS surveillance and sensors, and reports from other agencies in order to identify potential, imminent, or in-progress major incidents or disasters. Notification is provided to other ITS centers to notify the traveling public.	
<i>Requirement:</i>	
1 The center shall 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).	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Indiana State Police Commercial Vehicle Enforcement Division	
<i>Entity:</i> Emergency Management	
<i>Functional Area:</i> Emergency Early Warning System	
Monitors alerting and advisory systems, information collected by ITS surveillance and sensors, and reports from other agencies in order to identify potential, imminent, or in-progress major incidents or disasters. Notification is provided to other ITS centers to notify the traveling public.	
<i>Requirement:</i> 2 The center shall provide the capability to correlate alerts and advisories, incident information, and security sensor and surveillance data.	Existing
<i>Requirement:</i> 3 The center shall 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.	Existing
<i>Requirement:</i> 5 The center shall broadcast wide-area alerts and advisories to toll administration centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	Existing
<i>Requirement:</i> 6 The center shall broadcast wide-area alerts and advisories to traveler information service providers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	Existing
<i>Requirement:</i> 7 The center shall broadcast wide-area alerts and advisories to maintenance centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	Existing
<i>Requirement:</i> 8 The center shall broadcast wide-area alerts and advisories to other emergency management centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	Existing
<i>Requirement:</i> 9 The center shall broadcast wide-area alerts and advisories to commercial vehicle administration centers and roadside check facilities for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	Existing
<i>Requirement:</i> 10 The center shall process status information from each of the centers that have been sent the wide-area alert.	Existing
<i>Requirement:</i> 11 The center shall coordinate the broadcast of wide-area alerts and advisories with other emergency management centers.	Existing
<i>Requirement:</i> 12 The center shall receive incident information from other transportation management centers to support the early warning system.	Existing
<i>Requirement:</i> 13 The center shall present the alert and advisory information and the status of the actions taken in response to the alert by the other centers to the emergency system operator as received from other system inputs.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Indiana State Police Commercial Vehicle Enforcement Division	
<i>Entity:</i> Emergency Management	
<i>Functional Area:</i> Emergency Early Warning System	
Monitors alerting and advisory systems, information collected by ITS surveillance and sensors, and reports from other agencies in order to identify potential, imminent, or in-progress major incidents or disasters. Notification is provided to other ITS centers to notify the traveling public.	
<i>Requirement:</i> 14 The center shall support the entry of alert and advisory information directly from the emergency system operator.	Existing
<i>Functional Area:</i> Emergency Response Management	
Strategic emergency planning and response capabilities and broad inter-agency interfaces to support large-scale incidents and disasters, commonly associated with Emergency Operations Centers.	
<i>Requirement:</i> 1 The center shall provide strategic emergency response capabilities provided by an Emergency Operations Center for large-scale incidents and disasters.	Existing
<i>Requirement:</i> 2 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.	Existing
<i>Requirement:</i> 3 The center shall provide the capability to implement response plans and track progress through the incident by exchanging incident information and response status with allied agencies.	Existing
<i>Requirement:</i> 4 The center shall develop, coordinate with other agencies, and store emergency response plans.	Existing
<i>Requirement:</i> 5 The center shall track the availability of resources and coordinate resource sharing with allied agency centers including traffic, maintenance, or other emergency centers.	Existing
<i>Requirement:</i> 6 The center shall 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.	Existing
<i>Requirement:</i> 8 The center shall support remote control of field equipment normally under control of the traffic management center including traffic signals, dynamic message signs, gates, and barriers.	Potential
<i>Requirement:</i> 9 The center shall provide the capability to remotely control and monitor CCTV systems normally operated by a traffic management center.	Planned
<i>Requirement:</i> 11 The center shall 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.	Planned
<i>Requirement:</i> 12 The center shall provide information to the media concerning the status of an emergency response.	Existing
<i>Requirement:</i> 13 The center shall provide the capability for digitized map data to act as the background to the information presented to the emergency system operator.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Indiana State Police Commercial Vehicle Enforcement Division	
<i>Entity:</i> Emergency Management	
<i>Functional Area:</i> Emergency Response Management	
Strategic emergency planning and response capabilities and broad inter-agency interfaces to support large-scale incidents and disasters, commonly associated with Emergency Operations Centers.	
<i>Requirement:</i> 14 The center shall provide the capability for center personnel to provide inputs to the management of incidents, disasters and evacuations.	Existing
<i>Requirement:</i> 15 The center shall collect information about the status of the recovery efforts for the infrastructure during disasters.	Potential
<i>Requirement:</i> 16 The center shall provide the overall status of infrastructure recovery efforts to traveler information providers and media.	Potential
<i>Requirement:</i> 17 The center shall provide the capability to communicate information about emergency situations to local population through the Emergency Telecommunications System.	Existing
<i>Requirement:</i> 19 The center shall retrieve information from public health systems to increase preparedness for, and implement a response to biological, chemical, radiation, and other public health emergencies.	Existing
<i>Functional Area:</i> Emergency Evacuation Support	
Evacuation planning and coordination to manage evacuation and reentry of a population in the vicinity of a disaster or other emergency that poses a risk to public safety.	
<i>Requirement:</i> 1 The center shall manage inter-agency coordination of evacuation operations, from initial planning through the evacuation process and reentry.	Existing
<i>Requirement:</i> 2 The center shall develop and exchange evacuation plans with allied agencies prior to the occurrence of a disaster.	Existing
<i>Requirement:</i> 3 The center shall provide an interface to the emergency system operator to enter evacuation plans and procedures and present the operator with other agencies' plans.	Existing
<i>Requirement:</i> 4 The center shall coordinate evacuation destinations and shelter needs with shelter providers (e.g., the American Red Cross) in the region.	Existing
<i>Requirement:</i> 5 The center shall provide evacuation information to traffic, transit, maintenance and construction, rail operations, and other emergency management centers as needed.	Existing
<i>Requirement:</i> 7 The center shall 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.	Potential
<i>Requirement:</i> 8 The center shall 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.	Existing
<i>Requirement:</i> 9 The center shall monitor the progress or status of the evacuation once it begins and exchange tactical plans, prepared during the incident, with allied agencies.	Potential

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Indiana State Police Commercial Vehicle Enforcement Division	
<i>Entity:</i> Emergency Management	
<i>Functional Area:</i> Emergency Evacuation Support	
Evacuation planning and coordination to manage evacuation and reentry of a population in the vicinity of a disaster or other emergency that poses a risk to public safety.	
<i>Requirement:</i> 10 The center shall monitor the progress of the reentry process.	Potential
<i>Requirement:</i> 11 The center shall submit evacuation information to toll administration centers along with requests for changes in the toll services or fee collection during an evacuation.	Potential
<i>Requirement:</i> 12 The center shall 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.	Existing
<i>Functional Area:</i> Emergency Environmental Monitoring	
Collects current and forecast road and weather information that is used by the operator to more effectively manage incidents.	
<i>Requirement:</i> 1 The center shall 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).	Existing
<i>Requirement:</i> 2 The center shall collect current road and weather information from roadway maintenance operations.	Existing
<i>Requirement:</i> 3 The center shall assimilate current and forecast road conditions and surface weather information to support incident management.	Existing
<i>Requirement:</i> 4 The center shall present the current and forecast road and weather information to the emergency system operator.	Existing
<i>Functional Area:</i> Center Secure Area Surveillance	
Management of security surveillance devices and analysis of that data to detect potential threats. Areas under surveillance may include transit stops, transit stations, rest areas, park and ride lots, modal interchange facilities, on-board a transit vehicle, etc.	
<i>Requirement:</i> 1 The center shall remotely monitor video images and audio surveillance data collected in secure areas including facilities (e.g. transit yards) and transportation infrastructure (e.g. bridges, tunnels, interchanges, roadway infrastructure, and transit railways or guideways). The data may be raw or pre-processed in the field.	Existing
<i>Requirement:</i> 2 The center shall remotely monitor video images and audio surveillance data collected in traveler secure areas, which include transit stations, transit stops, rest areas, park and ride lots, and other fixed sites along travel routes (e.g., emergency pull-off areas and travel information centers). The data may be raw or pre-processed in the field.	Planned
<i>Requirement:</i> 4 The center shall exchange surveillance data with other emergency centers.	Existing
<i>Requirement:</i> 5 The center shall identify potential security threats based on collected security surveillance data.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Indiana State Police Commercial Vehicle Enforcement Division</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Center Secure Area Surveillance</i>	
Management of security surveillance devices and analysis of that data to detect potential threats. Areas under surveillance may include transit stops, transit stations, rest areas, park and ride lots, modal interchange facilities, on-board a transit vehicle, etc.	
<i>Requirement:</i> 6 The center shall verify potential security threats by correlating security surveillance data from multiple sources.	Existing
<i>Requirement:</i> 7 The center shall remotely control security surveillance devices in secure areas including facilities (e.g. transit yards) and transportation infrastructure (e.g. bridges, tunnels, interchanges, roadway infrastructure, and transit railways or guideways).	Existing
<i>Requirement:</i> 8 The center shall remotely control security surveillance devices in traveler secure areas, which include transit stations, transit stops, rest areas, park and ride lots, and other fixed sites along travel routes (e.g., emergency pull-off areas and travel information centers).	Planned
<i>Requirement:</i> 10 The center shall match traveler video images against a database from the Alerting and Advisory Systems of known images that may represent criminals and terrorists.	Existing
<i>Requirement:</i> 11 The center shall exchange traveler images with other emergency management centers to support traveler image matching.	Existing
<i>Requirement:</i> 12 The center shall respond to control data from center personnel regarding security surveillance data collection, processing, threat detection, and image matching.	Existing
<i>Requirement:</i> 13 The center shall monitor maintenance status of the security sensor field equipment.	Existing
<i>Functional Area: Center Secure Area Sensor Management</i>	
Management of security sensors, analysis of sensor data, correlation with surveillance data and alerts from other agencies to detect potential threats, and dissemination of threat information to other agencies. Sensors may be placed in areas such as transit stops, transit stations, rest areas, park and ride lots, modal interchange facilities, on-board a transit vehicle, etc.	
<i>Requirement:</i> 1 The center shall remotely monitor and control security sensor data collected in secure areas including facilities (e.g. transit yards) and transportation infrastructure (e.g. bridges, tunnels, interchanges, roadway infrastructure, and transit railways or guideways). The types of security sensor data include environmental threat (e.g. chemical agent, toxic industrial chemical, biological, explosives, and radiological sensors), infrastructure condition and integrity, intrusion and motion, and object detection sensors. The data may be raw or pre-processed in the field.	Existing
<i>Requirement:</i> 4 The center shall exchange security sensor data with other emergency centers.	Existing
<i>Requirement:</i> 5 The center shall identify potential security threats based on collected security sensor data.	Existing
<i>Requirement:</i> 6 The center shall verify potential security threats by correlating security sensor data from multiple sources.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Indiana State Police Commercial Vehicle Enforcement Division	
<i>Entity:</i> Emergency Management	
<i>Functional Area:</i> Center Secure Area Sensor Management	
Management of security sensors, analysis of sensor data, correlation with surveillance data and alerts from other agencies to detect potential threats, and dissemination of threat information to other agencies. Sensors may be placed in areas such as transit stops, transit stations, rest areas, park and ride lots, modal interchange facilities, on-board a transit vehicle, etc.	
<i>Requirement:</i>	
7 The center shall perform threat analysis based on correlations of security sensor and surveillance data.	Existing
<i>Requirement:</i>	
8 The center shall exchange threat analysis data with Alerting and Advisory Systems and use that data in local threat analysis processing.	Existing
<i>Requirement:</i>	
9 The center shall disseminate threat information to other agencies, including traffic, transit, maintenance, rail operations, and other emergency management centers.	Existing
<i>Requirement:</i>	
10 The center shall respond to control data from center personnel regarding security sensor data collection, processing, threat detection, and threat analysis.	Existing
<i>Requirement:</i>	
11 The center shall request activation of barriers and safeguards on request from center personnel.	Planned
<i>Requirement:</i>	
12 The center shall monitor maintenance status of the security sensor field equipment.	Existing
<i>Functional Area:</i> Center Secure Area Alarm Support	
Collection and response to silent and audible alarms received from travelers in secure areas (such as transit stops, rest areas, park-and-ride lots) and from on-board transit vehicles.	
<i>Requirement:</i>	
1 The center shall collect silent and audible alarms received from travelers in secure areas (such as transit stops, rest areas, park and ride lots, modal interchange facilities).	Existing
<i>Requirement:</i>	
3 After the alarm message has been received, the center shall generate an alarm acknowledgment to the sender.	Existing
<i>Requirement:</i>	
4 After the alarm message becomes a verified incident, the center shall determine the appropriate response.	Existing
<i>Requirement:</i>	
5 The center shall determine whether the alarm message indicates an emergency that requires the attention of public safety agencies, and forward alarm message data to the appropriate agency as necessary.	Existing
<i>Requirement:</i>	
6 The center shall forward the alarm message to center personnel and respond to the traveler or transit vehicle operator as directed by the personnel.	Existing
<i>Functional Area:</i> Mayday Support	
Collection and response to Mayday messages received from vehicles and drivers.	
<i>Requirement:</i>	
1 The center shall collect mayday messages from vehicles and drivers.	Existing
<i>Requirement:</i>	
2 The center shall collect mayday messages from travelers via personal handheld devices.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Indiana State Police Commercial Vehicle Enforcement Division	
<i>Entity:</i> Emergency Management	
<i>Functional Area:</i> Mayday Support	
Collection and response to Mayday messages received from vehicles and drivers.	
<i>Requirement:</i>	
3 The center shall acknowledge the request for emergency assistance, whether originated by the driver, automatically by the vehicle's safety systems, or by a traveler via a personal handheld device.	Existing
<i>Requirement:</i>	
4 After the mayday becomes a verified incident, the center shall determine the appropriate response to the mayday message.	Existing
<i>Requirement:</i>	
5 The center shall determine whether the mayday message indicates an emergency that requires the attention of public safety agencies, and forward mayday emergency data to the appropriate agency as necessary.	Existing
<i>Requirement:</i>	
6 The center shall support the activation of remote controlled functions requested by a vehicle, such as requests to unlock doors.	Planned
<i>Requirement:</i>	
7 The center shall request additional emergency details from or issue commands to the vehicle's security systems or vehicle driver if needed.	Existing
<i>Requirement:</i>	
8 The center shall maintain a log of all mayday signals received from vehicles.	Existing
<i>Requirement:</i>	
9 The center shall provide all mayday data to center personnel and respond to the vehicle, driver, or traveler using the portable handheld device as directed by the personnel.	Existing
<i>Functional Area:</i> Emergency Commercial Vehicle Response	
Responds to commercial vehicle and freight equipment related emergencies. Includes incidents involving hazardous materials as well as the detection of non-permitted transport of security sensitive hazmat.	
<i>Requirement:</i>	
1 The center shall receive emergency notification information from commercial vehicles, commercial vehicle check stations, or commercial fleet operators and present the possible incident information to the emergency system operator. This may include detection of non-permitted transport of security sensitive hazmat, hazardous cargo spills, etc.	Existing
<i>Requirement:</i>	
2 The center shall receive details of the cargo being carried by commercial vehicles from their commercial fleet manager for incidents involving potential hazardous materials.	Existing
<i>Requirement:</i>	
3 The center shall forward the verified emergency information to the responding agency based on the location and nature of the emergency.	Existing
<i>Requirement:</i>	
4 The center shall provide the capability to request Fleet and Freight Management to disable a specific vehicle in their fleet.	Existing
<i>Functional Area:</i> Emergency Data Collection	
Collection and storage of information related to Emergency Management. For use by operations personnel or data archives in the region.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Indiana State Police Commercial Vehicle Enforcement Division</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Emergency Data Collection</i>	
Collection and storage of information related to Emergency Management. For use by operations personnel or data archives in the region.	
<i>Requirement:</i>	Existing
1 The center shall collect emergency service data, emergency vehicle management data, emergency vehicle data, sensor and surveillance data, threat data, and incident data.	
<i>Requirement:</i>	Planned
2 The center shall assign quality control metrics and meta-data to be stored along with the data. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.	
<i>Requirement:</i>	Planned
3 The center shall receive and respond to requests from ITS Archives for either a catalog of the emergency management data or for the data itself.	
<i>Requirement:</i>	Planned
4 The center shall be able to produce sample products of the data available.	
<i>Functional Area: Emergency Transportation Operations Data Collection</i>	
Collects real-time information on the state of the regional transportation system for operational use by the center. It establishes communications with a regional repository, requests or subscribes to information relevant to the center, and distributes the received information for use.	
<i>Requirement:</i>	Planned
1 The center shall collect real-time information on the state of the regional transportation system including current traffic and road conditions, weather conditions, special event and incident information.	
<i>Requirement:</i>	Planned
2 The center shall support the capability for the system operator to monitor and control the information collection service.	
<i>Element: Indiana State Police District 13</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Emergency Call-Taking</i>	
Provides interface to the emergency call-taking systems such as the Emergency Telecommunications System (e.g., 911) that correlate call information with emergencies reported by transit agencies, commercial vehicle operators, or other public safety agencies. Allows the operator to verify the incident and forward the information to the responding agencies.	
<i>Requirement:</i>	Existing
1 The center shall support the interface to the Emergency Telecommunications System (e.g. 911 or 7-digit call routing) to receive emergency notification information and provide it to the emergency system operator.	
<i>Requirement:</i>	Existing
2 The center shall receive emergency call information from 911 services and present the possible incident information to the emergency system operator.	
<i>Requirement:</i>	Existing
4 The center shall receive emergency call information from mayday service providers and present the possible incident information to the emergency system operator.	
<i>Requirement:</i>	Existing
5 The center shall receive emergency notification information from other public safety agencies and present the possible incident information to the emergency system operator.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Indiana State Police District 13	
<i>Entity:</i> Emergency Management	
<i>Functional Area:</i> Emergency Call-Taking	
Provides interface to the emergency call-taking systems such as the Emergency Telecommunications System (e.g., 911) that correlate call information with emergencies reported by transit agencies, commercial vehicle operators, or other public safety agencies. Allows the operator to verify the incident and forward the information to the responding agencies.	
<i>Requirement:</i>	
7 The center shall coordinate, correlate, and verify all emergency inputs, including those identified based on external calls and internal analysis of security sensor and surveillance data, and assign each a level of confidence.	Existing
<i>Requirement:</i>	
8 The center shall send a request for remote control of CCTV systems from a traffic management center in order to verify the reported incident.	Planned
<i>Requirement:</i>	
9 The center shall forward the verified emergency information to the responding agency based on the location and nature of the emergency.	Existing
<i>Requirement:</i>	
10 The center shall update the incident information log once the emergency system operator has verified the incident.	Existing
<i>Requirement:</i>	
11 The center shall provide the capability for digitized map data to act as the background to the emergency information presented to the emergency system operator.	Planned
<i>Functional Area:</i> Emergency Dispatch	
Dispatch emergency vehicles to incidents, tracking their location and status. Pertinent incident information is gathered and relayed to the responding units.	
<i>Requirement:</i>	
1 The center shall dispatch emergency vehicles to respond to verified emergencies under center personnel control.	Existing
<i>Requirement:</i>	
2 The center shall store the current status of all emergency vehicles available for dispatch and those that have been dispatched.	Existing
<i>Requirement:</i>	
3 The center shall relay location and incident details to the responding vehicles.	Existing
<i>Requirement:</i>	
4 The center shall track the location and status of emergency vehicles responding to an emergency based on information from the emergency vehicle.	Existing
<i>Requirement:</i>	
5 The center shall store and maintain the emergency service responses in an action log.	Existing
<i>Requirement:</i>	
6 The center shall provide the capability for digitized map data to act as the background to the information presented to the emergency system operator.	Existing
<i>Requirement:</i>	
7 The center shall receive traffic images to support dispatch of emergency vehicles.	Existing
<i>Requirement:</i>	
8 The center shall provide the capability to request remote control of traffic surveillance devices	Planned
<i>Requirement:</i>	
9 The center shall coordinate response to incidents with other Emergency Management centers to ensure appropriate resources are dispatched and utilized.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Indiana State Police District 13</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Emergency Routing</i>	
Routing of emergency vehicles to facilitate the quickest/safest arrival. Routes may be determined based on real-time traffic information and road conditions or routes may be provided by Traffic Management on request.	
<i>Requirement:</i>	
1 The center shall collect current traffic and road condition information for emergency vehicle route calculation.	Existing
<i>Requirement:</i>	
2 The center shall receive information on the location and status of traffic control equipment and work zones along potential emergency routes.	Existing
<i>Requirement:</i>	
3 The center shall receive status information from care facilities to determine the appropriate facility and its location.	Existing
<i>Requirement:</i>	
4 The center shall receive asset restriction information to support the dispatching of appropriate emergency resources.	Existing
<i>Requirement:</i>	
6 The center shall track current emergency vehicle location and status.	Existing
<i>Requirement:</i>	
7 The center shall calculate emergency vehicle routes, under center personnel control, based on the collected traffic and road conditions information.	Existing
<i>Requirement:</i>	
8 The center shall request and receive ingress and egress routes or other specialized emergency access routes from the traffic management center.	Planned
<i>Requirement:</i>	
9 The center shall provide the capability to request special traffic control measures, such as signal preemption, from the traffic management center to facilitate emergency vehicle progress along the suggested route.	Potential
<i>Requirement:</i>	
10 Once the route is calculated the route shall be provided to the dispatch function.	Existing
<i>Requirement:</i>	
11 The center shall provide the capability for digitized map data to act as the background to the information presented to the emergency system operator.	Existing
<i>Functional Area: Incident Command</i>	
Tactical decision support, resource coordination, and communications integration among emergency management agencies for Incident Commands that are established by first responders to support local management of an incident.	
<i>Requirement:</i>	
1 The center shall 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.	Existing
<i>Requirement:</i>	
2 The center shall provide incident command communications with public safety, emergency management, transportation, and other allied response agency centers.	Existing
<i>Requirement:</i>	
3 The center shall track and maintain resource information and action plans pertaining to the incident command.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Indiana State Police District 13</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Incident Command</i>	
Tactical decision support, resource coordination, and communications integration among emergency management agencies for Incident Commands that are established by first responders to support local management of an incident.	
<i>Requirement:</i> 4 The center shall 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.	Existing
<i>Requirement:</i> 5 The center shall assess the status of responding emergency vehicles as part of an incident command.	Existing
<i>Functional Area: Emergency Early Warning System</i>	
Monitors alerting and advisory systems, information collected by ITS surveillance and sensors, and reports from other agencies in order to identify potential, imminent, or in-progress major incidents or disasters. Notification is provided to other ITS centers to notify the traveling public.	
<i>Requirement:</i> 1 The center shall 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).	Existing
<i>Requirement:</i> 2 The center shall provide the capability to correlate alerts and advisories, incident information, and security sensor and surveillance data.	Existing
<i>Requirement:</i> 3 The center shall 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.	Existing
<i>Requirement:</i> 5 The center shall broadcast wide-area alerts and advisories to toll administration centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	Existing
<i>Requirement:</i> 6 The center shall broadcast wide-area alerts and advisories to traveler information service providers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	Existing
<i>Requirement:</i> 7 The center shall broadcast wide-area alerts and advisories to maintenance centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	Existing

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Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Indiana State Police District 13</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Emergency Early Warning System</i>	
Monitors alerting and advisory systems, information collected by ITS surveillance and sensors, and reports from other agencies in order to identify potential, imminent, or in-progress major incidents or disasters. Notification is provided to other ITS centers to notify the traveling public.	
<i>Requirement:</i> 8 The center shall broadcast wide-area alerts and advisories to other emergency management centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	Existing
<i>Requirement:</i> 9 The center shall broadcast wide-area alerts and advisories to commercial vehicle administration centers and roadside check facilities for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	Existing
<i>Requirement:</i> 10 The center shall process status information from each of the centers that have been sent the wide-area alert.	Existing
<i>Requirement:</i> 11 The center shall coordinate the broadcast of wide-area alerts and advisories with other emergency management centers.	Existing
<i>Requirement:</i> 12 The center shall receive incident information from other transportation management centers to support the early warning system.	Existing
<i>Requirement:</i> 13 The center shall present the alert and advisory information and the status of the actions taken in response to the alert by the other centers to the emergency system operator as received from other system inputs.	Existing
<i>Requirement:</i> 14 The center shall support the entry of alert and advisory information directly from the emergency system operator.	Existing
<i>Functional Area: Emergency Response Management</i>	
Strategic emergency planning and response capabilities and broad inter-agency interfaces to support large-scale incidents and disasters, commonly associated with Emergency Operations Centers.	
<i>Requirement:</i> 1 The center shall provide strategic emergency response capabilities provided by an Emergency Operations Center for large-scale incidents and disasters.	Existing
<i>Requirement:</i> 2 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.	Existing
<i>Requirement:</i> 3 The center shall provide the capability to implement response plans and track progress through the incident by exchanging incident information and response status with allied agencies.	Existing
<i>Requirement:</i> 4 The center shall develop, coordinate with other agencies, and store emergency response plans.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Indiana State Police District 13</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Emergency Response Management</i>	
Strategic emergency planning and response capabilities and broad inter-agency interfaces to support large-scale incidents and disasters, commonly associated with Emergency Operations Centers.	
<i>Requirement:</i> 5 The center shall track the availability of resources and coordinate resource sharing with allied agency centers including traffic, maintenance, or other emergency centers.	Existing
<i>Requirement:</i> 6 The center shall 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.	Existing
<i>Requirement:</i> 8 The center shall support remote control of field equipment normally under control of the traffic management center including traffic signals, dynamic message signs, gates, and barriers.	Potential
<i>Requirement:</i> 9 The center shall provide the capability to remotely control and monitor CCTV systems normally operated by a traffic management center.	Planned
<i>Requirement:</i> 11 The center shall 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.	Planned
<i>Requirement:</i> 12 The center shall provide information to the media concerning the status of an emergency response.	Existing
<i>Requirement:</i> 13 The center shall provide the capability for digitized map data to act as the background to the information presented to the emergency system operator.	Existing
<i>Requirement:</i> 14 The center shall provide the capability for center personnel to provide inputs to the management of incidents, disasters and evacuations.	Existing
<i>Requirement:</i> 15 The center shall collect information about the status of the recovery efforts for the infrastructure during disasters.	Potential
<i>Requirement:</i> 16 The center shall provide the overall status of infrastructure recovery efforts to traveler information providers and media.	Potential
<i>Requirement:</i> 17 The center shall provide the capability to communicate information about emergency situations to local population through the Emergency Telecommunications System.	Existing
<i>Requirement:</i> 19 The center shall retrieve information from public health systems to increase preparedness for, and implement a response to biological, chemical, radiation, and other public health emergencies.	Existing
<i>Functional Area: Emergency Evacuation Support</i>	
Evacuation planning and coordination to manage evacuation and reentry of a population in the vicinity of a disaster or other emergency that poses a risk to public safety.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Indiana State Police District 13	
<i>Entity:</i> Emergency Management	
<i>Functional Area:</i> Emergency Evacuation Support	
Evacuation planning and coordination to manage evacuation and reentry of a population in the vicinity of a disaster or other emergency that poses a risk to public safety.	
<i>Requirement:</i>	Existing
1 The center shall manage inter-agency coordination of evacuation operations, from initial planning through the evacuation process and reentry.	
<i>Requirement:</i>	Existing
2 The center shall develop and exchange evacuation plans with allied agencies prior to the occurrence of a disaster.	
<i>Requirement:</i>	Existing
3 The center shall provide an interface to the emergency system operator to enter evacuation plans and procedures and present the operator with other agencies' plans.	
<i>Requirement:</i>	Existing
4 The center shall coordinate evacuation destinations and shelter needs with shelter providers (e.g., the American Red Cross) in the region.	
<i>Requirement:</i>	Existing
5 The center shall provide evacuation information to traffic, transit, maintenance and construction, rail operations, and other emergency management centers as needed.	
<i>Requirement:</i>	Potential
7 The center shall 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.	
<i>Requirement:</i>	Existing
8 The center shall 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.	
<i>Requirement:</i>	Potential
9 The center shall monitor the progress or status of the evacuation once it begins and exchange tactical plans, prepared during the incident, with allied agencies.	
<i>Requirement:</i>	Potential
10 The center shall monitor the progress of the reentry process.	
<i>Requirement:</i>	Potential
11 The center shall submit evacuation information to toll administration centers along with requests for changes in the toll services or fee collection during an evacuation.	
<i>Requirement:</i>	Existing
12 The center shall 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.	
<i>Functional Area:</i> Emergency Environmental Monitoring	
Collects current and forecast road and weather information that is used by the operator to more effectively manage incidents.	
<i>Requirement:</i>	Existing
1 The center shall 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).	
<i>Requirement:</i>	Existing
2 The center shall collect current road and weather information from roadway maintenance operations.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Indiana State Police District 13</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Emergency Environmental Monitoring</i>	
Collects current and forecast road and weather information that is used by the operator to more effectively manage incidents.	
<i>Requirement:</i>	Existing
3 The center shall assimilate current and forecast road conditions and surface weather information to support incident management.	
<i>Requirement:</i>	Existing
4 The center shall present the current and forecast road and weather information to the emergency system operator.	
<i>Functional Area: Center Secure Area Surveillance</i>	
Management of security surveillance devices and analysis of that data to detect potential threats. Areas under surveillance may include transit stops, transit stations, rest areas, park and ride lots, modal interchange facilities, on-board a transit vehicle, etc.	
<i>Requirement:</i>	Existing
1 The center shall remotely monitor video images and audio surveillance data collected in secure areas including facilities (e.g. transit yards) and transportation infrastructure (e.g. bridges, tunnels, interchanges, roadway infrastructure, and transit railways or guideways). The data may be raw or pre-processed in the field.	
<i>Requirement:</i>	Planned
2 The center shall remotely monitor video images and audio surveillance data collected in traveler secure areas, which include transit stations, transit stops, rest areas, park and ride lots, and other fixed sites along travel routes (e.g., emergency pull-off areas and travel information centers). The data may be raw or pre-processed in the field.	
<i>Requirement:</i>	Existing
4 The center shall exchange surveillance data with other emergency centers.	
<i>Requirement:</i>	Existing
5 The center shall identify potential security threats based on collected security surveillance data.	
<i>Requirement:</i>	Existing
6 The center shall verify potential security threats by correlating security surveillance data from multiple sources.	
<i>Requirement:</i>	Existing
7 The center shall remotely control security surveillance devices in secure areas including facilities (e.g. transit yards) and transportation infrastructure (e.g. bridges, tunnels, interchanges, roadway infrastructure, and transit railways or guideways).	
<i>Requirement:</i>	Planned
8 The center shall remotely control security surveillance devices in traveler secure areas, which include transit stations, transit stops, rest areas, park and ride lots, and other fixed sites along travel routes (e.g., emergency pull-off areas and travel information centers).	
<i>Requirement:</i>	Existing
10 The center shall match traveler video images against a database from the Alerting and Advisory Systems of known images that may represent criminals and terrorists.	
<i>Requirement:</i>	Existing
11 The center shall exchange traveler images with other emergency management centers to support traveler image matching.	
<i>Requirement:</i>	Existing
12 The center shall respond to control data from center personnel regarding security surveillance data collection, processing, threat detection, and image matching.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Indiana State Police District 13</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Center Secure Area Surveillance</i>	
Management of security surveillance devices and analysis of that data to detect potential threats. Areas under surveillance may include transit stops, transit stations, rest areas, park and ride lots, modal interchange facilities, on-board a transit vehicle, etc.	
<i>Requirement:</i> 13 The center shall monitor maintenance status of the security sensor field equipment.	Existing
<i>Functional Area: Center Secure Area Alarm Support</i>	
Collection and response to silent and audible alarms received from travelers in secure areas (such as transit stops, rest areas, park-and-ride lots) and from on-board transit vehicles.	
<i>Requirement:</i> 1 The center shall collect silent and audible alarms received from travelers in secure areas (such as transit stops, rest areas, park and ride lots, modal interchange facilities).	Existing
<i>Requirement:</i> 3 After the alarm message has been received, the center shall generate an alarm acknowledgment to the sender.	Existing
<i>Requirement:</i> 4 After the alarm message becomes a verified incident, the center shall determine the appropriate response.	Existing
<i>Requirement:</i> 5 The center shall determine whether the alarm message indicates an emergency that requires the attention of public safety agencies, and forward alarm message data to the appropriate agency as necessary.	Existing
<i>Requirement:</i> 6 The center shall forward the alarm message to center personnel and respond to the traveler or transit vehicle operator as directed by the personnel.	Existing
<i>Functional Area: Mayday Support</i>	
Collection and response to Mayday messages received from vehicles and drivers.	
<i>Requirement:</i> 1 The center shall collect mayday messages from vehicles and drivers.	Existing
<i>Requirement:</i> 2 The center shall collect mayday messages from travelers via personal handheld devices.	Existing
<i>Requirement:</i> 3 The center shall acknowledge the request for emergency assistance, whether originated by the driver, automatically by the vehicle's safety systems, or by a traveler via a personal handheld device.	Existing
<i>Requirement:</i> 4 After the mayday becomes a verified incident, the center shall determine the appropriate response to the mayday message.	Existing
<i>Requirement:</i> 5 The center shall determine whether the mayday message indicates an emergency that requires the attention of public safety agencies, and forward mayday emergency data to the appropriate agency as necessary.	Existing
<i>Requirement:</i> 6 The center shall support the activation of remote controlled functions requested by a vehicle, such as requests to unlock doors.	Planned

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Indiana State Police District 13</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Mayday Support</i>	
Collection and response to Mayday messages received from vehicles and drivers.	
<i>Requirement:</i>	
7 The center shall request additional emergency details from or issue commands to the vehicle's security systems or vehicle driver if needed.	Existing
<i>Requirement:</i>	
8 The center shall maintain a log of all mayday signals received from vehicles.	Existing
<i>Requirement:</i>	
9 The center shall provide all mayday data to center personnel and respond to the vehicle, driver, or traveler using the portable handheld device as directed by the personnel.	Existing
<i>Functional Area: Emergency Commercial Vehicle Response</i>	
Responds to commercial vehicle and freight equipment related emergencies. Includes incidents involving hazardous materials as well as the detection of non-permitted transport of security sensitive hazmat.	
<i>Requirement:</i>	
1 The center shall receive emergency notification information from commercial vehicles, commercial vehicle check stations, or commercial fleet operators and present the possible incident information to the emergency system operator. This may include detection of non-permitted transport of security sensitive hazmat, hazardous cargo spills, etc.	Existing
<i>Requirement:</i>	
2 The center shall receive details of the cargo being carried by commercial vehicles from their commercial fleet manager for incidents involving potential hazardous materials.	Existing
<i>Requirement:</i>	
3 The center shall forward the verified emergency information to the responding agency based on the location and nature of the emergency.	Existing
<i>Requirement:</i>	
4 The center shall provide the capability to request Fleet and Freight Management to disable a specific vehicle in their fleet.	Existing
<i>Functional Area: Emergency Data Collection</i>	
Collection and storage of information related to Emergency Management. For use by operations personnel or data archives in the region.	
<i>Requirement:</i>	
1 The center shall collect emergency service data, emergency vehicle management data, emergency vehicle data, sensor and surveillance data, threat data, and incident data.	Existing
<i>Requirement:</i>	
2 The center shall assign quality control metrics and meta-data to be stored along with the data. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.	Planned
<i>Requirement:</i>	
3 The center shall receive and respond to requests from ITS Archives for either a catalog of the emergency management data or for the data itself.	Planned
<i>Requirement:</i>	
4 The center shall be able to produce sample products of the data available.	Planned
<i>Functional Area: Emergency Transportation Operations Data Collection</i>	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Indiana State Police District 13</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Emergency Transportation Operations Data Collection</i>	
Collects real-time information on the state of the regional transportation system for operational use by the center. It establishes communications with a regional repository, requests or subscribes to information relevant to the center, and distributes the received information for use.	
<i>Requirement:</i>	
1 The center shall collect real-time information on the state of the regional transportation system including current traffic and road conditions, weather conditions, special event and incident information.	Planned
<i>Requirement:</i>	
2 The center shall support the capability for the system operator to monitor and control the information collection service.	Planned
<i>Element: Indiana State Police District 21 (Toll Road)</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Emergency Call-Taking</i>	
Provides interface to the emergency call-taking systems such as the Emergency Telecommunications System (e.g., 911) that correlate call information with emergencies reported by transit agencies, commercial vehicle operators, or other public safety agencies. Allows the operator to verify the incident and forward the information to the responding agencies.	
<i>Requirement:</i>	
1 The center shall support the interface to the Emergency Telecommunications System (e.g. 911 or 7-digit call routing) to receive emergency notification information and provide it to the emergency system operator.	Existing
<i>Requirement:</i>	
2 The center shall receive emergency call information from 911 services and present the possible incident information to the emergency system operator.	Existing
<i>Requirement:</i>	
4 The center shall receive emergency call information from mayday service providers and present the possible incident information to the emergency system operator.	Existing
<i>Requirement:</i>	
5 The center shall receive emergency notification information from other public safety agencies and present the possible incident information to the emergency system operator.	Existing
<i>Requirement:</i>	
7 The center shall coordinate, correlate, and verify all emergency inputs, including those identified based on external calls and internal analysis of security sensor and surveillance data, and assign each a level of confidence.	Existing
<i>Requirement:</i>	
8 The center shall send a request for remote control of CCTV systems from a traffic management center in order to verify the reported incident.	Planned
<i>Requirement:</i>	
9 The center shall forward the verified emergency information to the responding agency based on the location and nature of the emergency.	Existing
<i>Requirement:</i>	
10 The center shall update the incident information log once the emergency system operator has verified the incident.	Existing
<i>Requirement:</i>	
11 The center shall provide the capability for digitized map data to act as the background to the emergency information presented to the emergency system operator.	Planned

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Indiana State Police District 21 (Toll Road)	
<i>Entity:</i> Emergency Management	
<i>Functional Area:</i> Emergency Dispatch	
Dispatch emergency vehicles to incidents, tracking their location and status. Pertinent incident information is gathered and relayed to the responding units.	
<i>Requirement:</i>	Existing
1 The center shall dispatch emergency vehicles to respond to verified emergencies under center personnel control.	
<i>Requirement:</i>	Existing
2 The center shall store the current status of all emergency vehicles available for dispatch and those that have been dispatched.	
<i>Requirement:</i>	Existing
3 The center shall relay location and incident details to the responding vehicles.	
<i>Requirement:</i>	Existing
4 The center shall track the location and status of emergency vehicles responding to an emergency based on information from the emergency vehicle.	
<i>Requirement:</i>	Existing
5 The center shall store and maintain the emergency service responses in an action log.	
<i>Requirement:</i>	Existing
6 The center shall provide the capability for digitized map data to act as the background to the information presented to the emergency system operator.	
<i>Requirement:</i>	Existing
7 The center shall receive traffic images to support dispatch of emergency vehicles.	
<i>Requirement:</i>	Planned
8 The center shall provide the capability to request remote control of traffic surveillance devices	
<i>Requirement:</i>	Existing
9 The center shall coordinate response to incidents with other Emergency Management centers to ensure appropriate resources are dispatched and utilized.	
<i>Functional Area:</i> Emergency Routing	
Routing of emergency vehicles to facilitate the quickest/safest arrival. Routes may be determined based on real-time traffic information and road conditions or routes may be provided by Traffic Management on request.	
<i>Requirement:</i>	Existing
1 The center shall collect current traffic and road condition information for emergency vehicle route calculation.	
<i>Requirement:</i>	Existing
2 The center shall receive information on the location and status of traffic control equipment and work zones along potential emergency routes.	
<i>Requirement:</i>	Existing
3 The center shall receive status information from care facilities to determine the appropriate facility and its location.	
<i>Requirement:</i>	Existing
4 The center shall receive asset restriction information to support the dispatching of appropriate emergency resources.	
<i>Requirement:</i>	Existing
6 The center shall track current emergency vehicle location and status.	
<i>Requirement:</i>	Existing
7 The center shall calculate emergency vehicle routes, under center personnel control, based on the collected traffic and road conditions information.	
<i>Requirement:</i>	Planned
8 The center shall request and receive ingress and egress routes or other specialized emergency access routes from the traffic management center.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Indiana State Police District 21 (Toll Road)	
<i>Entity:</i> Emergency Management	
<i>Functional Area:</i> Emergency Routing	
Routing of emergency vehicles to facilitate the quickest/safest arrival. Routes may be determined based on real-time traffic information and road conditions or routes may be provided by Traffic Management on request.	
<i>Requirement:</i>	
9 The center shall provide the capability to request special traffic control measures, such as signal preemption, from the traffic management center to facilitate emergency vehicle progress along the suggested route.	Potential
<i>Requirement:</i>	
10 Once the route is calculated the route shall be provided to the dispatch function.	Existing
<i>Requirement:</i>	
11 The center shall provide the capability for digitized map data to act as the background to the information presented to the emergency system operator.	Existing
<i>Functional Area:</i> Incident Command	
Tactical decision support, resource coordination, and communications integration among emergency management agencies for Incident Commands that are established by first responders to support local management of an incident.	
<i>Requirement:</i>	
1 The center shall 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.	Existing
<i>Requirement:</i>	
2 The center shall provide incident command communications with public safety, emergency management, transportation, and other allied response agency centers.	Existing
<i>Requirement:</i>	
3 The center shall track and maintain resource information and action plans pertaining to the incident command.	Existing
<i>Requirement:</i>	
4 The center shall 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.	Existing
<i>Requirement:</i>	
5 The center shall assess the status of responding emergency vehicles as part of an incident command.	Existing
<i>Functional Area:</i> Emergency Early Warning System	
Monitors alerting and advisory systems, information collected by ITS surveillance and sensors, and reports from other agencies in order to identify potential, imminent, or in-progress major incidents or disasters. Notification is provided to other ITS centers to notify the traveling public.	
<i>Requirement:</i>	
1 The center shall 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).	Existing

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Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Indiana State Police District 21 (Toll Road)	
<i>Entity:</i> Emergency Management	
<i>Functional Area:</i> Emergency Early Warning System	
Monitors alerting and advisory systems, information collected by ITS surveillance and sensors, and reports from other agencies in order to identify potential, imminent, or in-progress major incidents or disasters. Notification is provided to other ITS centers to notify the traveling public.	
<i>Requirement:</i>	2 The center shall provide the capability to correlate alerts and advisories, incident information, and security sensor and surveillance data. Existing
<i>Requirement:</i>	3 The center shall 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. Existing
<i>Requirement:</i>	5 The center shall broadcast wide-area alerts and advisories to toll administration centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property. Existing
<i>Requirement:</i>	6 The center shall broadcast wide-area alerts and advisories to traveler information service providers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property. Existing
<i>Requirement:</i>	7 The center shall broadcast wide-area alerts and advisories to maintenance centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property. Existing
<i>Requirement:</i>	8 The center shall broadcast wide-area alerts and advisories to other emergency management centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property. Existing
<i>Requirement:</i>	9 The center shall broadcast wide-area alerts and advisories to commercial vehicle administration centers and roadside check facilities for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property. Existing
<i>Requirement:</i>	10 The center shall process status information from each of the centers that have been sent the wide-area alert. Existing
<i>Requirement:</i>	11 The center shall coordinate the broadcast of wide-area alerts and advisories with other emergency management centers. Existing
<i>Requirement:</i>	12 The center shall receive incident information from other transportation management centers to support the early warning system. Existing
<i>Requirement:</i>	13 The center shall present the alert and advisory information and the status of the actions taken in response to the alert by the other centers to the emergency system operator as received from other system inputs. Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Indiana State Police District 21 (Toll Road)	
<i>Entity:</i> Emergency Management	
<i>Functional Area:</i> Emergency Early Warning System	
Monitors alerting and advisory systems, information collected by ITS surveillance and sensors, and reports from other agencies in order to identify potential, imminent, or in-progress major incidents or disasters. Notification is provided to other ITS centers to notify the traveling public.	
<i>Requirement:</i>	Existing
14 The center shall support the entry of alert and advisory information directly from the emergency system operator.	
<i>Functional Area:</i> Emergency Response Management	
Strategic emergency planning and response capabilities and broad inter-agency interfaces to support large-scale incidents and disasters, commonly associated with Emergency Operations Centers.	
<i>Requirement:</i>	Existing
1 The center shall provide strategic emergency response capabilities provided by an Emergency Operations Center for large-scale incidents and disasters.	
<i>Requirement:</i>	Existing
2 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.	
<i>Requirement:</i>	Existing
3 The center shall provide the capability to implement response plans and track progress through the incident by exchanging incident information and response status with allied agencies.	
<i>Requirement:</i>	Existing
4 The center shall develop, coordinate with other agencies, and store emergency response plans.	
<i>Requirement:</i>	Existing
5 The center shall track the availability of resources and coordinate resource sharing with allied agency centers including traffic, maintenance, or other emergency centers.	
<i>Requirement:</i>	Existing
6 The center shall 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.	
<i>Requirement:</i>	Potential
8 The center shall support remote control of field equipment normally under control of the traffic management center including traffic signals, dynamic message signs, gates, and barriers.	
<i>Requirement:</i>	Planned
9 The center shall provide the capability to remotely control and monitor CCTV systems normally operated by a traffic management center.	
<i>Requirement:</i>	Planned
11 The center shall 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.	
<i>Requirement:</i>	Existing
12 The center shall provide information to the media concerning the status of an emergency response.	
<i>Requirement:</i>	Existing
13 The center shall provide the capability for digitized map data to act as the background to the information presented to the emergency system operator.	

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Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Indiana State Police District 21 (Toll Road)</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Emergency Response Management</i>	
Strategic emergency planning and response capabilities and broad inter-agency interfaces to support large-scale incidents and disasters, commonly associated with Emergency Operations Centers.	
<i>Requirement:</i> 14 The center shall provide the capability for center personnel to provide inputs to the management of incidents, disasters and evacuations.	Existing
<i>Requirement:</i> 15 The center shall collect information about the status of the recovery efforts for the infrastructure during disasters.	Potential
<i>Requirement:</i> 16 The center shall provide the overall status of infrastructure recovery efforts to traveler information providers and media.	Potential
<i>Requirement:</i> 17 The center shall provide the capability to communicate information about emergency situations to local population through the Emergency Telecommunications System.	Existing
<i>Requirement:</i> 19 The center shall retrieve information from public health systems to increase preparedness for, and implement a response to biological, chemical, radiation, and other public health emergencies.	Existing
<i>Functional Area: Emergency Evacuation Support</i>	
Evacuation planning and coordination to manage evacuation and reentry of a population in the vicinity of a disaster or other emergency that poses a risk to public safety.	
<i>Requirement:</i> 1 The center shall manage inter-agency coordination of evacuation operations, from initial planning through the evacuation process and reentry.	Existing
<i>Requirement:</i> 2 The center shall develop and exchange evacuation plans with allied agencies prior to the occurrence of a disaster.	Existing
<i>Requirement:</i> 3 The center shall provide an interface to the emergency system operator to enter evacuation plans and procedures and present the operator with other agencies' plans.	Existing
<i>Requirement:</i> 4 The center shall coordinate evacuation destinations and shelter needs with shelter providers (e.g., the American Red Cross) in the region.	Existing
<i>Requirement:</i> 5 The center shall provide evacuation information to traffic, transit, maintenance and construction, rail operations, and other emergency management centers as needed.	Existing
<i>Requirement:</i> 7 The center shall 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.	Potential
<i>Requirement:</i> 8 The center shall 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.	Existing
<i>Requirement:</i> 9 The center shall monitor the progress or status of the evacuation once it begins and exchange tactical plans, prepared during the incident, with allied agencies.	Potential

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Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Indiana State Police District 21 (Toll Road)</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Emergency Evacuation Support</i>	
Evacuation planning and coordination to manage evacuation and reentry of a population in the vicinity of a disaster or other emergency that poses a risk to public safety.	
<i>Requirement:</i> 10 The center shall monitor the progress of the reentry process.	Potential
<i>Requirement:</i> 11 The center shall submit evacuation information to toll administration centers along with requests for changes in the toll services or fee collection during an evacuation.	Potential
<i>Requirement:</i> 12 The center shall 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.	Existing
<i>Functional Area: Emergency Environmental Monitoring</i>	
Collects current and forecast road and weather information that is used by the operator to more effectively manage incidents.	
<i>Requirement:</i> 1 The center shall 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).	Existing
<i>Requirement:</i> 2 The center shall collect current road and weather information from roadway maintenance operations.	Existing
<i>Requirement:</i> 3 The center shall assimilate current and forecast road conditions and surface weather information to support incident management.	Existing
<i>Requirement:</i> 4 The center shall present the current and forecast road and weather information to the emergency system operator.	Existing
<i>Functional Area: Center Secure Area Surveillance</i>	
Management of security surveillance devices and analysis of that data to detect potential threats. Areas under surveillance may include transit stops, transit stations, rest areas, park and ride lots, modal interchange facilities, on-board a transit vehicle, etc.	
<i>Requirement:</i> 1 The center shall remotely monitor video images and audio surveillance data collected in secure areas including facilities (e.g. transit yards) and transportation infrastructure (e.g. bridges, tunnels, interchanges, roadway infrastructure, and transit railways or guideways). The data may be raw or pre-processed in the field.	Existing
<i>Requirement:</i> 2 The center shall remotely monitor video images and audio surveillance data collected in traveler secure areas, which include transit stations, transit stops, rest areas, park and ride lots, and other fixed sites along travel routes (e.g., emergency pull-off areas and travel information centers). The data may be raw or pre-processed in the field.	Planned
<i>Requirement:</i> 4 The center shall exchange surveillance data with other emergency centers.	Existing
<i>Requirement:</i> 5 The center shall identify potential security threats based on collected security surveillance data.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Indiana State Police District 21 (Toll Road)	
<i>Entity:</i> Emergency Management	
<i>Functional Area:</i> Center Secure Area Surveillance	
Management of security surveillance devices and analysis of that data to detect potential threats. Areas under surveillance may include transit stops, transit stations, rest areas, park and ride lots, modal interchange facilities, on-board a transit vehicle, etc.	
<i>Requirement:</i>	
6 The center shall verify potential security threats by correlating security surveillance data from multiple sources.	Existing
<i>Requirement:</i>	
7 The center shall remotely control security surveillance devices in secure areas including facilities (e.g. transit yards) and transportation infrastructure (e.g. bridges, tunnels, interchanges, roadway infrastructure, and transit railways or guideways).	Existing
<i>Requirement:</i>	
8 The center shall remotely control security surveillance devices in traveler secure areas, which include transit stations, transit stops, rest areas, park and ride lots, and other fixed sites along travel routes (e.g., emergency pull-off areas and travel information centers).	Planned
<i>Requirement:</i>	
10 The center shall match traveler video images against a database from the Alerting and Advisory Systems of known images that may represent criminals and terrorists.	Existing
<i>Requirement:</i>	
11 The center shall exchange traveler images with other emergency management centers to support traveler image matching.	Existing
<i>Requirement:</i>	
12 The center shall respond to control data from center personnel regarding security surveillance data collection, processing, threat detection, and image matching.	Existing
<i>Requirement:</i>	
13 The center shall monitor maintenance status of the security sensor field equipment.	Existing
<i>Functional Area:</i> Center Secure Area Alarm Support	
Collection and response to silent and audible alarms received from travelers in secure areas (such as transit stops, rest areas, park-and-ride lots) and from on-board transit vehicles.	
<i>Requirement:</i>	
1 The center shall collect silent and audible alarms received from travelers in secure areas (such as transit stops, rest areas, park and ride lots, modal interchange facilities).	Existing
<i>Requirement:</i>	
3 After the alarm message has been received, the center shall generate an alarm acknowledgment to the sender.	Existing
<i>Requirement:</i>	
4 After the alarm message becomes a verified incident, the center shall determine the appropriate response.	Existing
<i>Requirement:</i>	
5 The center shall determine whether the alarm message indicates an emergency that requires the attention of public safety agencies, and forward alarm message data to the appropriate agency as necessary.	Existing
<i>Requirement:</i>	
6 The center shall forward the alarm message to center personnel and respond to the traveler or transit vehicle operator as directed by the personnel.	Existing
<i>Functional Area:</i> Mayday Support	
Collection and response to Mayday messages received from vehicles and drivers.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Indiana State Police District 21 (Toll Road)</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Mayday Support</i>	
Collection and response to Mayday messages received from vehicles and drivers.	
<i>Requirement:</i>	
1 The center shall collect mayday messages from vehicles and drivers.	Existing
<i>Requirement:</i>	
2 The center shall collect mayday messages from travelers via personal handheld devices.	Existing
<i>Requirement:</i>	
3 The center shall acknowledge the request for emergency assistance, whether originated by the driver, automatically by the vehicle's safety systems, or by a traveler via a personal handheld device.	Existing
<i>Requirement:</i>	
4 After the mayday becomes a verified incident, the center shall determine the appropriate response to the mayday message.	Existing
<i>Requirement:</i>	
5 The center shall determine whether the mayday message indicates an emergency that requires the attention of public safety agencies, and forward mayday emergency data to the appropriate agency as necessary.	Existing
<i>Requirement:</i>	
6 The center shall support the activation of remote controlled functions requested by a vehicle, such as requests to unlock doors.	Planned
<i>Requirement:</i>	
7 The center shall request additional emergency details from or issue commands to the vehicle's security systems or vehicle driver if needed.	Existing
<i>Requirement:</i>	
8 The center shall maintain a log of all mayday signals received from vehicles.	Existing
<i>Requirement:</i>	
9 The center shall provide all mayday data to center personnel and respond to the vehicle, driver, or traveler using the portable handheld device as directed by the personnel.	Existing
<i>Functional Area: Emergency Commercial Vehicle Response</i>	
Responds to commercial vehicle and freight equipment related emergencies. Includes incidents involving hazardous materials as well as the detection of non-permitted transport of security sensitive hazmat.	
<i>Requirement:</i>	
1 The center shall receive emergency notification information from commercial vehicles, commercial vehicle check stations, or commercial fleet operators and present the possible incident information to the emergency system operator. This may include detection of non-permitted transport of security sensitive hazmat, hazardous cargo spills, etc.	Existing
<i>Requirement:</i>	
2 The center shall receive details of the cargo being carried by commercial vehicles from their commercial fleet manager for incidents involving potential hazardous materials.	Existing
<i>Requirement:</i>	
3 The center shall forward the verified emergency information to the responding agency based on the location and nature of the emergency.	Existing
<i>Requirement:</i>	
4 The center shall provide the capability to request Fleet and Freight Management to disable a specific vehicle in their fleet.	Existing
<i>Functional Area: Emergency Data Collection</i>	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Indiana State Police District 21 (Toll Road)	
<i>Entity:</i> Emergency Management	
<i>Functional Area:</i> Emergency Data Collection	
Collection and storage of information related to Emergency Management. For use by operations personnel or data archives in the region.	
<i>Requirement:</i>	Existing
1 The center shall collect emergency service data, emergency vehicle management data, emergency vehicle data, sensor and surveillance data, threat data, and incident data.	
<i>Requirement:</i>	Planned
2 The center shall assign quality control metrics and meta-data to be stored along with the data. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.	
<i>Requirement:</i>	Planned
3 The center shall receive and respond to requests from ITS Archives for either a catalog of the emergency management data or for the data itself.	
<i>Requirement:</i>	Planned
4 The center shall be able to produce sample products of the data available.	
<i>Functional Area:</i> Emergency Transportation Operations Data Collection	
Collects real-time information on the state of the regional transportation system for operational use by the center. It establishes communications with a regional repository, requests or subscribes to information relevant to the center, and distributes the received information for use.	
<i>Requirement:</i>	Planned
1 The center shall collect real-time information on the state of the regional transportation system including current traffic and road conditions, weather conditions, special event and incident information.	
<i>Requirement:</i>	Planned
2 The center shall support the capability for the system operator to monitor and control the information collection service.	
<i>Element:</i> Indiana Toll Road Kiosks	
<i>Entity:</i> Remote Traveler Support	
<i>Functional Area:</i> Remote Basic Information Reception	
Public traveler interface, such as a kiosk, that provides formatted traffic advisories, transit, event, and other traveler information, as well as broadcast alerts.	
<i>Requirement:</i>	Existing
1 The public interface for travelers shall receive traffic information from a center and present it to the traveler.	
<i>Requirement:</i>	Existing
2 The public interface for travelers shall receive transit information from a center and present it to the traveler.	
<i>Requirement:</i>	Existing
3 The public interface for travelers shall receive event information from a center and present it to the traveler.	
<i>Requirement:</i>	Potential
4 This public interface for travelers shall receive evacuation information from a center and present it to the traveler.	
<i>Requirement:</i>	Planned
5 The public interface for travelers shall receive wide-area alerts and present it to the traveler.	
<i>Requirement:</i>	Existing
6 The public interface for travelers shall provide the capability for digitized map data to act as the background to the information presented to the traveler.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Indiana Toll Road Kiosks	
<i>Entity:</i> Remote Traveler Support	
<i>Functional Area:</i> Remote Basic Information Reception	
Public traveler interface, such as a kiosk, that provides formatted traffic advisories, transit, event, and other traveler information, as well as broadcast alerts.	
<i>Requirement:</i>	
7 The public interface for travelers shall support traveler input in audio or manual form.	Planned
<i>Requirement:</i>	
8 The public interface for travelers shall present information to the traveler in audible or visual forms consistent with a kiosk, including those that are suitable for travelers with hearing or vision physical disabilities.	Planned
<i>Requirement:</i>	
9 The public interface for travelers shall be able to store frequently requested data.	Existing
<i>Functional Area:</i> Remote Interactive Information Reception	
Public traveler interface, such as a kiosk, that provides traffic, transit, yellow pages, special event, and other personalized traveler information services upon request.	
<i>Requirement:</i>	
1 The public interface for travelers shall receive traffic information from a center and present it to the traveler upon request.	Existing
<i>Requirement:</i>	
3 The public interface for travelers shall receive yellow pages information (such as lodging, restaurants, theaters, bicycle facilities, and other tourist activities) from a center and present it to the traveler upon request.	Existing
<i>Requirement:</i>	
4 The public interface for travelers shall receive event information from a center and present it to the traveler upon request.	Existing
<i>Requirement:</i>	
5 The public interface for travelers shall receive evacuation information from a center and present it to the traveler.	Potential
<i>Requirement:</i>	
6 The public interface for travelers shall receive wide-area alerts and present it to the traveler.	Planned
<i>Requirement:</i>	
7 The public interface for travelers shall accept reservations for confirmed trip plans.	Planned
<i>Requirement:</i>	
8 The public interface for travelers shall support payment for services, such as confirmed trip plans, confirmed traveler services, tolls, transit fares, parking lot charges, and advanced payment for tolls.	Planned
<i>Requirement:</i>	
9 The public interface for travelers shall provide an interface through which credit identities and stored credit values may be collected from tags, traveler cards, or payment instruments used by travelers.	Planned
<i>Requirement:</i>	
10 The public interface for travelers shall base requests from the traveler on the traveler's current location or a specific location identified by the traveler, and filter the provided information accordingly.	Existing
<i>Requirement:</i>	
11 The public interface for travelers shall provide digitized map data to act as the background to the information presented to the traveler.	Existing
<i>Requirement:</i>	
12 The public interface for travelers shall support traveler input in audio or manual form.	Planned

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Indiana Toll Road Kiosks</i>	
<i>Entity: Remote Traveler Support</i>	
<i>Functional Area: Remote Interactive Information Reception</i>	
Public traveler interface, such as a kiosk, that provides traffic, transit, yellow pages, special event, and other personalized traveler information services upon request.	
<i>Requirement:</i> 13 The public interface for travelers shall present information to the traveler in audible or visual forms consistent with a kiosk, including those that are suitable for travelers with hearing or vision physical disabilities.	Planned
<i>Requirement:</i> 14 The public interface for travelers shall be able to store frequently requested data.	Existing
<i>Element: Indiana Toll Road Maintenance and Construction Management System</i>	
<i>Entity: Maintenance and Construction Management</i>	
<i>Functional Area: MCM Vehicle Tracking</i>	
Remotely tracks the location of maintenance and construction vehicles and other equipment; presented to the center personnel.	
<i>Requirement:</i> 1 The center shall monitor the locations of all maintenance and construction vehicles and other equipment under its jurisdiction.	Planned
<i>Requirement:</i> 2 The center shall present location data to center personnel for the fleet of maintenance and construction vehicles and other equipment.	Planned
<i>Requirement:</i> 3 The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for maintenance and construction vehicle tracking.	Planned
<i>Functional Area: MCM Vehicle and Equipment Maintenance Management</i>	
Monitors vehicle and equipment condition, tracks maintenance history, and schedules routine and corrective maintenance.	
<i>Requirement:</i> 1 The center shall collect and analyze vehicle diagnostics information from maintenance and construction vehicles. The information includes engine temperature, mileage, tire wear, brake wear, belt wear, and any warnings or alarms concerning the operational condition of the vehicle and ancillary equipment.	Existing
<i>Requirement:</i> 2 The center shall exchange information with equipment repair facilities including status and history of repairs concerning maintenance and construction vehicles. This information includes vehicle status and diagnostic information, vehicle utilization, and coordination of when vehicles will be available for preventative and corrective maintenance.	Existing
<i>Requirement:</i> 3 The center shall schedule preventive and corrective vehicle maintenance with the equipment repair facility based on fleet health reports, maintenance records, vehicle utilization and vehicle availability schedules.	Existing
<i>Functional Area: MCM Incident Management</i>	
Supports coordinated response to incidents - share incident notifications, manage incident response resources, and coordinate overall incident situation and response among allied response organizations.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Indiana Toll Road Maintenance and Construction Management System	
<i>Entity:</i> Maintenance and Construction Management	
<i>Functional Area:</i> MCM Incident Management	
Supports coordinated response to incidents - share incident notifications, manage incident response resources, and coordinate overall incident situation and response among allied response organizations.	
<i>Requirement:</i>	Existing
1 The center shall 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.	
<i>Requirement:</i>	Existing
2 The center shall 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.	
<i>Requirement:</i>	Existing
3 The center shall 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.	
<i>Requirement:</i>	Existing
4 The center shall coordinate planning for incidents with emergency management centers - including pre-planning activities for disaster response, evacuation, and recovery operations.	
<i>Requirement:</i>	Existing
5 The center shall 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.	
<i>Requirement:</i>	Existing
6 The center shall exchange road network status assessment information with emergency management and traffic management 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.	
<i>Requirement:</i>	Existing
7 The center shall 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.	
<i>Requirement:</i>	Existing
8 The center shall receive information indicating the damage sustained by transportation assets, derived from aerial surveillance, field reports, inspections, tests, and analyses to support incident management.	
<i>Functional Area:</i> MCM Maintenance Decision Support	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Indiana Toll Road Maintenance and Construction Management System	
<i>Entity:</i> Maintenance and Construction Management	
<i>Functional Area:</i> MCM Maintenance Decision Support	
Maintenance Decision Support Systems recommend courses of action based on current and forecast environmental and road conditions (filtered and fused for specific time horizons) and additional application specific information. Recommendations and dispatch instructions are generated based on this integrated information.	
<i>Requirement:</i>	Existing
1 The center shall provide the center personnel with tailored external information, including weather or road condition observations, forecasted weather information or road conditions, current usage of treatments and materials, available resources, equipment and vehicle availability, road network information, and source reliability information.	
<i>Requirement:</i>	Existing
2 The center shall tailor the decision support information to include filtering (selection from a large amount of external information), error reduction ('smoothing' the information), fusion (combination of disparate information to match the decision needs), and analysis (creating the decision).	
<i>Requirement:</i>	Existing
3 The center shall provide an interface to the center personnel to input control parameters for the decision support process and receive decisions or information presentation.	
<i>Requirement:</i>	Existing
4 The center shall provide dispatch information to maintenance and construction vehicles based on the outputs of the decision support system, including recommended roadway treatment actions.	
<i>Functional Area:</i> MCM Winter Maintenance Management	
Manages winter road maintenance, tracking and controlling snow plow operations, roadway treatment (e.g., salt spraying and other material applications) based on weather information.	
<i>Requirement:</i>	Existing
1 The center shall respond to requests from emergency management and traffic management centers for hazard removal, field equipment repair, and other winter roadway maintenance.	
<i>Requirement:</i>	Existing
2 The center shall exchange information with administrative systems to support the planning and scheduling of winter maintenance activities. This information includes: equipment and consumables resupply purchase request status, personnel qualifications including training and special certifications, environmental regulations and rules that may impact maintenance activities, and requests and project requirements from contract administration.	
<i>Requirement:</i>	Existing
3 The center shall 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.	
<i>Requirement:</i>	Existing
4 The center shall receive equipment availability and materials storage status information from storage facilities to support the scheduling of winter maintenance activities.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Indiana Toll Road Maintenance and Construction Management System	
<i>Entity:</i> Maintenance and Construction Management	
<i>Functional Area:</i> MCM Winter Maintenance Management	
Manages winter road maintenance, tracking and controlling snow plow operations, roadway treatment (e.g., salt spraying and other material applications) based on weather information.	
<i>Requirement:</i>	
5 The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for the scheduling of winter maintenance activities.	Planned
<i>Requirement:</i>	
6 The center shall collect real-time information on the state of the regional transportation system from other centers including current traffic and road conditions, weather conditions, special event and incident information and use the collected information to support winter maintenance operations.	Existing
<i>Requirement:</i>	
7 The center shall dispatch and route winter maintenance vehicle drivers and support them with route- specific environmental, incident, advisory, threat, alert, and traffic congestion information.	Existing
<i>Requirement:</i>	
8 The center shall 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.	Existing
<i>Requirement:</i>	
9 The center shall 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.	Existing
<i>Requirement:</i>	
10 The center shall support remote control of on-board maintenance and construction vehicle systems and field equipment that is remotely controlled by the vehicle such as adjusting material application rates and spread patterns.	Planned
<i>Requirement:</i>	
11 The center shall assess the current status of all winter maintenance activities, including actual work activities performed, current locations and operational conditions of vehicles, materials and equipment inventories, field equipment status, environmental information, etc.	Existing
<i>Functional Area:</i> MCM Roadway Maintenance and Construction	
Overall management and support for routine maintenance on the roadway or right-of-way. Includes landscape maintenance, hazard removal (roadway debris, dead animals), routine maintenance activities (roadway cleaning, grass cutting), and repair and maintenance of both ITS and non-ITS equipment.	
<i>Requirement:</i>	
1 The center shall maintain an interface with asset management systems to track the inventory, restrictions, repair needs and status updates of transportation assets (pavement, bridges, signs, etc.) including location, installation and materials information, vendor/contractor, current maintenance status, standard height, width, and weight restrictions.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Indiana Toll Road Maintenance and Construction Management System	
<i>Entity:</i> Maintenance and Construction Management	
<i>Functional Area:</i> MCM Roadway Maintenance and Construction	
Overall management and support for routine maintenance on the roadway or right-of-way. Includes landscape maintenance, hazard removal (roadway debris, dead animals), routine maintenance activities (roadway cleaning, grass cutting), and repair and maintenance of both ITS and non-ITS equipment.	
<i>Requirement:</i>	
2 The center shall respond to requests from emergency management and traffic management centers for hazard removal, field equipment repair, and other roadway maintenance.	Existing
<i>Requirement:</i>	
3 The center shall exchange information with administrative systems to support the planning and scheduling of maintenance activities. This information includes: equipment and consumables resupply purchase request status, personnel qualifications including training and special certifications, environmental regulations and rules that may impact maintenance activities, and requests and project requirements from contract administration.	Existing
<i>Requirement:</i>	
4 The center shall provide emergency management and traffic management centers with information about scheduled maintenance and construction work activities including anticipated closures and impact to the roadway, alternate routes, anticipated delays, closure times, and durations.	Existing
<i>Requirement:</i>	
5 The center shall collect the status and fault data from roadside equipment, such as traffic, infrastructure, and environmental sensors, highway advisory radio and dynamic message signs, automated roadway treatment systems, barrier and safeguard systems, cameras, traffic signals and override equipment, ramp meters, short range communications equipment, security sensors and surveillance equipment, etc., and provide a cohesive view of equipment repair needs.	Potential
<i>Requirement:</i>	
6 The center shall collect the status and fault data from the centers that operate the equipment, including data for traffic, infrastructure, and environmental sensors, highway advisory radio and dynamic message signs, automated roadway treatment systems, barrier and safeguard systems, cameras, traffic signals and override equipment, ramp meters, short range communications equipment, security sensors and surveillance equipment, etc., and provide a cohesive view of equipment repair needs.	Planned
<i>Requirement:</i>	
7 The center shall receive equipment availability and materials storage status information from storage facilities to support the scheduling of roadway maintenance and construction activities.	Existing
<i>Requirement:</i>	
8 The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for the scheduling of roadway maintenance and construction activities.	Planned
<i>Requirement:</i>	
9 The center shall collect current and forecast traffic and weather information from traffic management centers and weather service providers (such as the National Weather Service and value-added sector specific meteorological services).	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Indiana Toll Road Maintenance and Construction Management System	
<i>Entity:</i> Maintenance and Construction Management	
<i>Functional Area:</i> MCM Roadway Maintenance and Construction	
Overall management and support for routine maintenance on the roadway or right-of-way. Includes landscape maintenance, hazard removal (roadway debris, dead animals), routine maintenance activities (roadway cleaning, grass cutting), and repair and maintenance of both ITS and non-ITS equipment.	
<i>Requirement:</i>	
10 The center shall dispatch and route maintenance and construction vehicle drivers and support them with route-specific environmental, incident, advisory, threat, alert, and traffic congestion information.	Existing
<i>Requirement:</i>	
11 The center shall manage an interface with center personnel to accept vehicle systems control information and remotely control maintenance and construction vehicle on-board equipment.	Planned
<i>Requirement:</i>	
12 The center shall track the status of roadway maintenance and construction activities by monitoring collected data from the dispatched vehicles and equipment.	Planned
<i>Requirement:</i>	
13 The center shall report the status of field equipment maintenance activities to the centers that operate the equipment.	Existing
<i>Functional Area:</i> MCM Work Zone Management	
Remotely monitors and supports work zone activities, controlling traffic through dynamic message signs (DMS), highway advisory radio, gates and barriers, and informing other groups of activity (e.g., traveler information systems, traffic management centers, other maintenance and construction centers).	
<i>Requirement:</i>	
1 The center shall generate new work zone activity schedules for use by maintenance and construction vehicles, maintenance and construction operators, and for information coordination purposes.	Existing
<i>Requirement:</i>	
2 The center shall control the collection of work zone status information including video images from cameras located in or near the work zone.	Existing
<i>Requirement:</i>	
3 The center shall disseminate work zone information to other agencies and centers including traffic, transit, emergency management centers, other maintenance centers, traveler information providers, and the media.	Existing
<i>Requirement:</i>	
4 The center shall control traffic in work zones by providing remote control of dynamic message signs, highway advisory radio systems, gates, and barriers located in or near the work zone.	Planned
<i>Requirement:</i>	
5 The center shall exchange information with administrative systems to support the planning and scheduling of work zone activities. This information includes: equipment and consumables resupply purchase request status, personnel qualifications including training and special certifications, environmental regulations and rules that may impact maintenance activities, and requests and project requirements from contract administration.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Indiana Toll Road Maintenance and Construction Management System	
<i>Entity:</i> Maintenance and Construction Management	
<i>Functional Area:</i> MCM Work Zone Management	
Remotely monitors and supports work zone activities, controlling traffic through dynamic message signs (DMS), highway advisory radio, gates and barriers, and informing other groups of activity (e.g., traveler information systems, traffic management centers, other maintenance and construction centers).	
<i>Requirement:</i>	Existing
6 The center shall collect real-time information on the state of the road network including current traffic and road conditions to support work zone scheduling and management.	
<i>Functional Area:</i> MCM Speed Monitoring and Warning	
Remotely monitors vehicle speeds, and informs an enforcement agency if excessive speeds are detected; primarily used in work zones.	
<i>Requirement:</i>	Existing
1 The center shall remotely control vehicle speed sensors typically placed in work zones; control parameters may include environmental and traffic conditions.	
<i>Requirement:</i>	Planned
2 The center shall collect operational status for the vehicle speed sensors; the status shall include logged information including measured speeds, warning messages displayed, and violation records.	
<i>Requirement:</i>	Existing
3 The center shall provide the capability to notify an enforcement agency when vehicle speeds in the work zone are in excess of the posted speed limit or are creating an unsafe condition based upon the current environmental or traffic conditions.	
<i>Requirement:</i>	Existing
4 The center shall collect fault data for the vehicle speed sensors for repair.	
<i>Functional Area:</i> MCM Work Zone Safety Management	
Remotely monitors work zone safety systems that detect vehicle intrusions in work zones and warns crew workers and drivers of imminent encroachment. Crew movements are also monitored so that the crew can be warned of movement beyond the designated safe zone.	
<i>Requirement:</i>	Potential
1 The center shall provide remote monitoring and control of work zone safety devices - including intrusion detection devices that have been installed in work zones or maintenance areas.	
<i>Requirement:</i>	Potential
2 The center shall provide remote monitoring and control of intrusion alert devices that have been installed in work zones or maintenance areas.	
<i>Requirement:</i>	Potential
3 The center shall collect status information of work zone safety device status from field equipment or the maintenance and construction vehicles.	
<i>Requirement:</i>	Potential
4 The center shall collect and store work zone data collected from work zone monitoring devices (such as intrusion detection or alert devices and speed monitoring devices) on-board the vehicle and at the roadside.	
<i>Functional Area:</i> MCM Work Activity Coordination	
Disseminates work activity schedules and current asset restrictions to other agencies. Work schedules are coordinated, factoring in the needs and activities of other agencies and adjacent jurisdictions.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Indiana Toll Road Maintenance and Construction Management System	
<i>Entity:</i> Maintenance and Construction Management	
<i>Functional Area:</i> MCM Work Activity Coordination	
Disseminates work activity schedules and current asset restrictions to other agencies. Work schedules are coordinated, factoring in the needs and activities of other agencies and adjacent jurisdictions.	
<i>Requirement:</i>	
1 The center shall 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.	Planned
<i>Requirement:</i>	
2 The center shall 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.	Planned
<i>Requirement:</i>	
3 The center shall collect and respond to feedback concerning scheduled maintenance and construction activities with other management centers such as traffic, emergency, transit, and rail operations.	Planned
<i>Requirement:</i>	
4 The center shall collect and disseminate asset restriction information levied on transportation asset usage based on infrastructure design, surveys, tests, or analyses. This includes standard facility design height, width, and weight restrictions, special restrictions such as spring weight restrictions, and temporary facility restrictions that are imposed during maintenance and construction.	Planned
<i>Requirement:</i>	
5 The center shall exchange information with administrative systems to support the planning and scheduling of maintenance and construction activities. This information includes: equipment and consumables resupply purchase request status, personnel qualifications including training and special certifications, environmental regulations and rules that may impact maintenance activities, and requests and project requirements from contract administration.	Existing
<i>Functional Area:</i> MCM Infrastructure Monitoring	
Remotely monitors the condition of pavement, bridges, tunnels, associated hardware, and other transportation-related infrastructure (e.g., culverts) using vehicle-based and roadway-based infrastructure monitoring sensors.	
<i>Requirement:</i>	
1 The center shall remotely control and collect data from fixed infrastructure monitoring sensors that monitor vibration, stress, temperature, surface continuity, and other condition measures.	Planned
<i>Requirement:</i>	
2 The center shall monitor maintenance vehicle-based mobile sensors and data logging devices that collect information on current infrastructure condition.	Planned

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Indiana Toll Road Maintenance and Construction Management System	
<i>Entity:</i> Maintenance and Construction Management	
<i>Functional Area:</i> MCM Infrastructure Monitoring	
Remotely monitors the condition of pavement, bridges, tunnels, associated hardware, and other transportation-related infrastructure (e.g., culverts) using vehicle-based and roadway-based infrastructure monitoring sensors.	
<i>Requirement:</i> 3 The center shall remotely collect data from vehicle probes using short range communications equipment and process this data to identify potential pavement degradation, potholes, and other rough or adverse road surface conditions.	Planned
<i>Requirement:</i> 4 The center shall process the collected information and use it to monitor the condition of pavement, bridges, tunnels, associated hardware, and other transportation-related infrastructure.	Planned
<i>Requirement:</i> 5 The center shall collect current maintenance and repair needs from the asset management system and correlate this data with data collected through infrastructure monitoring systems.	Planned
<i>Requirement:</i> 6 The center shall provide current infrastructure conditions information to the asset management system.	Planned
<i>Requirement:</i> 7 The center shall report infrastructure repair needs to the maintenance management system.	Planned
<i>Functional Area:</i> MCM Data Collection	
Collection and storage of maintenance and construction information. For use by operations personnel or data archives in the region.	
<i>Requirement:</i> 1 The center shall collect maintenance and construction data (such as field equipment status, infrastructure status, maintenance and construction activity data) gathered from roadway, traffic, and other maintenance and construction sources.	Existing
<i>Requirement:</i> 2 The center shall assign quality control metrics and meta-data to be stored along with the data. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.	Planned
<i>Requirement:</i> 3 The center shall receive and respond to requests from ITS Archives for either a catalog of the maintenance and construction data or for the data itself.	Planned
<i>Requirement:</i> 4 The center shall be able to produce sample products of the data available.	Planned
<i>Requirement:</i> 5 The center shall provide data to Asset Management to be used in updating the status of assets in the inventory.	Existing
<i>Functional Area:</i> MCM Transportation Operations Data Collection	
Collects real-time information on the state of the regional transportation system for operational use by the center. It establishes communications with a regional repository, requests or subscribes to information relevant to the center, and distributes the received information for use.	
<i>Requirement:</i> 1 The center shall collect real-time information on the state of the regional transportation system including current traffic and road conditions, weather conditions, special event and incident information.	Existing
<i>Requirement:</i> 2 The center shall support the capability for the system operator to monitor and control the information collection service.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Indiana Toll Road Maintenance and Construction Vehicles	
<i>Entity:</i> Maintenance and Construction Vehicle	
<i>Functional Area:</i> MCV Vehicle Location Tracking	
On-board systems to track vehicle location and reports the position and timestamp information to the dispatch center.	
<i>Requirement:</i>	
1 The maintenance and construction vehicle shall track its current location.	Planned
<i>Requirement:</i>	
2 The maintenance and construction vehicle shall send the time stamped vehicle location to the controlling center.	Planned
<i>Functional Area:</i> MCV Vehicle System Monitoring and Diagnostics	
On-board sensors capable of monitoring the condition of each of the vehicle systems and diagnostics that can be used to support vehicle maintenance.	
<i>Requirement:</i>	
1 The maintenance and construction vehicle shall collect vehicle diagnostics and operating status data from the maintenance vehicle platform including engine temperature, mileage, tire wear, brake wear, belt wear, and other operational status measures as well as the status of maintenance and construction-specific systems on the vehicle.	Existing
<i>Requirement:</i>	
2 The maintenance and construction vehicle shall use the diagnostic and status information to support scheduling vehicle maintenance, monitoring safety status, and informing the vehicle operator of the conditions.	Existing
<i>Requirement:</i>	
3 The maintenance and construction vehicle shall the vehicle diagnostic and safety information to an equipment repair facility.	Existing
<i>Requirement:</i>	
4 The maintenance and construction vehicle shall send the vehicle diagnostic and safety information to the controlling maintenance center.	Existing
<i>Functional Area:</i> MCV Barrier System Control	
Control automatic or remotely controlled gates and other barrier systems from a maintenance and construction vehicle.	
<i>Requirement:</i>	
1 The vehicle shall remotely control barrier systems. Barrier systems include automated or remotely controlled gates, barriers and other systems that manage entry to roadways.	Planned
<i>Requirement:</i>	
2 The vehicle shall collect barrier system operational status.	Planned
<i>Requirement:</i>	
3 The vehicle shall collect barrier system fault data.	Planned
<i>Functional Area:</i> MCV Winter Maintenance	
On-board systems that support snow plow operations and other roadway treatments (e.g., salt spraying and other material applications). Supports information sharing between snow plows.	
<i>Requirement:</i>	
1 The maintenance and construction vehicle shall track the location and status of safety systems on-board the vehicle.	Planned
<i>Requirement:</i>	
2 The maintenance and construction vehicle shall respond to control information from the center to allow remote operation of the on-board vehicle systems. These systems include winter maintenance equipment for plowing, treating, and anti-icing.	Planned
<i>Requirement:</i>	
3 The maintenance and construction vehicle shall monitor materials information including remaining quantity and current application rate of materials on the vehicle.	Existing

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Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Indiana Toll Road Maintenance and Construction Vehicles	
<i>Entity:</i> Maintenance and Construction Vehicle	
<i>Functional Area:</i> MCV Winter Maintenance	
On-board systems that support snow plow operations and other roadway treatments (e.g., salt spraying and other material applications). Supports information sharing between snow plows.	
<i>Requirement:</i>	
4 The maintenance and construction vehicle shall respond to dispatch information from the center, presented to the vehicle operator for acknowledgement and returning status.	Existing
<i>Requirement:</i>	
5 The maintenance and construction vehicle shall send operational data to the center including the operational state of the maintenance equipment (e.g., blade up/down, spreader pattern), types and quantities of materials used for construction and maintenance activities, and a record of the actual work performed.	Existing
<i>Requirement:</i>	
6 The maintenance and construction vehicle shall exchange operational and environmental data with other maintenance and construction vehicles. Operational data includes operational state of the maintenance equipment (e.g., blade up/down, spreader pattern, equipment configuration) and a record of the actual work performed while the environmental data includes environmental sensor data collected on-board a maintenance and construction vehicle, either raw or processed data.	Existing
<i>Functional Area:</i> MCV Roadway Maintenance and Construction	
On-board systems that support routine non-winter maintenance on the roadway or right-of-way. Includes landscape maintenance, hazard removal (roadway debris, dead animals), routine maintenance activities (roadway cleaning, grass cutting), and repair and maintenance of equipment on the roadway.	
<i>Requirement:</i>	
1 The maintenance and construction vehicle shall track the location and status of safety systems on-board the vehicle.	Planned
<i>Requirement:</i>	
2 The maintenance and construction vehicle shall respond to control information from the center to allow remote operation of the on-board vehicle systems. These systems include routine maintenance equipment for cutting, repairs, hazard removal, etc.	Planned
<i>Requirement:</i>	
3 The maintenance and construction vehicle shall monitor materials information including remaining quantity and current application rate of materials on the vehicle.	Existing
<i>Requirement:</i>	
4 The maintenance and construction vehicle shall respond to dispatch information from the center, presented to the vehicle operator for acknowledgement and returning status.	Existing
<i>Requirement:</i>	
5 The maintenance and construction vehicle shall send operational data to the center including the operational state of the maintenance equipment (e.g., blade up/down, spreader pattern), types and quantities of materials used for construction and maintenance activities, and a record of the actual work performed.	Existing
<i>Functional Area:</i> MCV Infrastructure Monitoring	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Indiana Toll Road Maintenance and Construction Vehicles	
<i>Entity:</i> Maintenance and Construction Vehicle	
<i>Functional Area:</i> MCV Infrastructure Monitoring	
On-board systems to monitor the condition of pavement, bridges, tunnels, associated hardware, and other transportation-related infrastructure (e.g., culverts). Includes vehicle-based sensors and communications with roadway-based infrastructure monitoring sensors.	
<i>Requirement:</i>	Planned
1 The maintenance and construction vehicle shall collect infrastructure data from on-board sensors relating to the physical characteristics of the roadway infrastructure, including pavement, bridges, culverts, signs, etc.	
<i>Requirement:</i>	Planned
2 The maintenance and construction vehicle shall collect infrastructure data from sensors located along the roadway relating to the physical characteristics of the roadway infrastructure, including pavement, bridges, culverts, signs, etc.	
<i>Requirement:</i>	Planned
3 The maintenance and construction vehicle shall provide control signals to infrastructure monitoring sensors located at the roadway.	
<i>Requirement:</i>	Planned
4 The maintenance and construction vehicle shall send current condition of pavement, bridges, culverts, signs, and other roadway infrastructure as measured by on-board sensors or read from infrastructure-based sensors to the center. The data may include raw data or images (e.g., photo logs) that indicate the current status of the infrastructure.	
<i>Requirement:</i>	Planned
5 The maintenance and construction vehicle shall respond to control information from the center to allow remote operation of the on-board vehicle systems.	
<i>Requirement:</i>	Planned
6 The maintenance and construction vehicle shall provide infrastructure sensor equipment operational status to the center.	
<i>Functional Area:</i> MCV Work Zone Support	
On-board systems that provide communications and support for local management of a work zone.	
<i>Requirement:</i>	Existing
1 The maintenance and construction vehicle shall monitor, operate, and control work zone devices located at or alongside the roadway. The devices operated on board the vehicle include driver information devices (e.g. dynamic message signs) and work zone intrusion detection and alert devices.	
<i>Requirement:</i>	Existing
2 The maintenance and construction vehicle shall provide an interface for field personnel to input status of their work zone activities.	
<i>Requirement:</i>	Existing
3 The maintenance and construction vehicle shall collect inputs from field personnel and from work zone devices on-board the maintenance and construction vehicle and send them to the controlling center.	
<i>Functional Area:</i> MCV Vehicle Safety Monitoring	
On-board systems to detect vehicle intrusions and warn crew workers and drivers of imminent encroachment. Crew movements are monitored so that the crew can be warned of movement beyond the designated safe zone. Used for stationary work zones or in mobile applications where a safe zone is maintained around the moving vehicle.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Indiana Toll Road Maintenance and Construction Vehicles	
<i>Entity:</i> Maintenance and Construction Vehicle	
<i>Functional Area:</i> MCV Vehicle Safety Monitoring	
On-board systems to detect vehicle intrusions and warn crew workers and drivers of imminent encroachment. Crew movements are monitored so that the crew can be warned of movement beyond the designated safe zone. Used for stationary work zones or in mobile applications where a safe zone is maintained around the moving vehicle.	
<i>Requirement:</i>	
1 The maintenance and construction vehicle shall detect that a vehicle has intruded upon the boundary of a work zone. The boundary of the work zone represents an area around the maintenance and construction vehicle, which may be stationary or moving.	Planned
<i>Requirement:</i>	
2 The maintenance and construction vehicle shall receive work zone warnings from the field equipment at the roadside, other maintenance and construction vehicles.	Planned
<i>Requirement:</i>	
3 The maintenance and construction vehicle shall present work zone warnings to the field personnel using direct warning signals or in-vehicle signage functions.	Planned
<i>Requirement:</i>	
4 The maintenance and construction vehicle shall monitor the crew movements to identify when a crew member is crossing the boundary between a work zone and vehicle traffic and issue an alert to the crew member.	Planned
<i>Requirement:</i>	
5 The maintenance and construction vehicle shall provide status of the work zone warning systems to the center.	Planned
<i>Element:</i> Indiana Toll Road Operations Center	
<i>Entity:</i> Emergency Management	
<i>Functional Area:</i> Incident Command	
Tactical decision support, resource coordination, and communications integration among emergency management agencies for Incident Commands that are established by first responders to support local management of an incident.	
<i>Requirement:</i>	
1 The center shall 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.	Existing
<i>Requirement:</i>	
2 The center shall provide incident command communications with public safety, emergency management, transportation, and other allied response agency centers.	Existing
<i>Requirement:</i>	
3 The center shall track and maintain resource information and action plans pertaining to the incident command.	Existing
<i>Requirement:</i>	
4 The center shall 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.	Existing
<i>Requirement:</i>	
5 The center shall assess the status of responding emergency vehicles as part of an incident command.	Planned
<i>Functional Area:</i> Service Patrol Management	
Dispatch and communication with roadway service patrol vehicles that monitor roads to aid motorists, offering rapid response to minor incidents.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Indiana Toll Road Operations Center	
<i>Entity:</i> Emergency Management	
<i>Functional Area:</i> Service Patrol Management	
Dispatch and communication with roadway service patrol vehicles that monitor roads to aid motorists, offering rapid response to minor incidents.	
<i>Requirement:</i>	
1 The center shall dispatch roadway service patrol vehicles to identified incident locations.	Potential
<i>Requirement:</i>	
2 The center shall store the current status of all service patrol vehicles available for dispatch and those that have been dispatched.	Potential
<i>Requirement:</i>	
3 The center shall share incident information collected by the service patrol with traffic, maintenance and construction, and traveler information centers for incident management, incident notification to travelers, and incident cleanup.	Potential
<i>Requirement:</i>	
4 The center shall track the location and status of service patrol vehicles.	Potential
<i>Functional Area:</i> Center Secure Area Surveillance	
Management of security surveillance devices and analysis of that data to detect potential threats. Areas under surveillance may include transit stops, transit stations, rest areas, park and ride lots, modal interchange facilities, on-board a transit vehicle, etc.	
<i>Requirement:</i>	
1 The center shall remotely monitor video images and audio surveillance data collected in secure areas including facilities (e.g. transit yards) and transportation infrastructure (e.g. bridges, tunnels, interchanges, roadway infrastructure, and transit railways or guideways). The data may be raw or pre-processed in the field.	Planned
<i>Requirement:</i>	
4 The center shall exchange surveillance data with other emergency centers.	Planned
<i>Requirement:</i>	
5 The center shall identify potential security threats based on collected security surveillance data.	Planned
<i>Requirement:</i>	
6 The center shall verify potential security threats by correlating security surveillance data from multiple sources.	Planned
<i>Requirement:</i>	
7 The center shall remotely control security surveillance devices in secure areas including facilities (e.g. transit yards) and transportation infrastructure (e.g. bridges, tunnels, interchanges, roadway infrastructure, and transit railways or guideways).	Planned
<i>Requirement:</i>	
11 The center shall exchange traveler images with other emergency management centers to support traveler image matching.	Potential
<i>Requirement:</i>	
13 The center shall monitor maintenance status of the security sensor field equipment.	Planned
<i>Functional Area:</i> Center Secure Area Sensor Management	
Management of security sensors, analysis of sensor data, correlation with surveillance data and alerts from other agencies to detect potential threats, and dissemination of threat information to other agencies. Sensors may be placed in areas such as transit stops, transit stations, rest areas, park and ride lots, modal interchange facilities, on-board a transit vehicle, etc.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Indiana Toll Road Operations Center	
<i>Entity:</i> Emergency Management	
<i>Functional Area:</i> Center Secure Area Sensor Management	
Management of security sensors, analysis of sensor data, correlation with surveillance data and alerts from other agencies to detect potential threats, and dissemination of threat information to other agencies. Sensors may be placed in areas such as transit stops, transit stations, rest areas, park and ride lots, modal interchange facilities, on-board a transit vehicle, etc.	
<i>Requirement:</i>	Potential
1 The center shall remotely monitor and control security sensor data collected in secure areas including facilities (e.g. transit yards) and transportation infrastructure (e.g. bridges, tunnels, interchanges, roadway infrastructure, and transit railways or guideways). The types of security sensor data include environmental threat (e.g. chemical agent, toxic industrial chemical, biological, explosives, and radiological sensors), infrastructure condition and integrity, intrusion and motion, and object detection sensors. The data may be raw or pre-processed in the field.	
<i>Requirement:</i>	Potential
4 The center shall exchange security sensor data with other emergency centers.	
<i>Requirement:</i>	Potential
5 The center shall identify potential security threats based on collected security sensor data.	
<i>Requirement:</i>	Potential
6 The center shall verify potential security threats by correlating security sensor data from multiple sources.	
<i>Requirement:</i>	Potential
7 The center shall perform threat analysis based on correlations of security sensor and surveillance data.	
<i>Requirement:</i>	Potential
8 The center shall exchange threat analysis data with Alerting and Advisory Systems and use that data in local threat analysis processing.	
<i>Requirement:</i>	Potential
9 The center shall disseminate threat information to other agencies, including traffic, transit, maintenance, rail operations, and other emergency management centers.	
<i>Requirement:</i>	Potential
12 The center shall monitor maintenance status of the security sensor field equipment.	
<i>Functional Area:</i> Mayday Support	
Collection and response to Mayday messages received from vehicles and drivers.	
<i>Requirement:</i>	Existing
1 The center shall collect mayday messages from vehicles and drivers.	
<i>Requirement:</i>	Existing
2 The center shall collect mayday messages from travelers via personal handheld devices.	
<i>Requirement:</i>	Existing
3 The center shall acknowledge the request for emergency assistance, whether originated by the driver, automatically by the vehicle's safety systems, or by a traveler via a personal handheld device.	
<i>Requirement:</i>	Existing
4 After the mayday becomes a verified incident, the center shall determine the appropriate response to the mayday message.	

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Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Indiana Toll Road Operations Center	
<i>Entity:</i> Emergency Management	
<i>Functional Area:</i> Mayday Support	
Collection and response to Mayday messages received from vehicles and drivers.	
<i>Requirement:</i> 5	The center shall determine whether the mayday message indicates an emergency that requires the attention of public safety agencies, and forward mayday emergency data to the appropriate agency as necessary. Existing
<i>Functional Area:</i> Emergency Commercial Vehicle Response	
Responds to commercial vehicle and freight equipment related emergencies. Includes incidents involving hazardous materials as well as the detection of non-permitted transport of security sensitive hazmat.	
<i>Requirement:</i> 1	The center shall receive emergency notification information from commercial vehicles, commercial vehicle check stations, or commercial fleet operators and present the possible incident information to the emergency system operator. This may include detection of non-permitted transport of security sensitive hazmat, hazardous cargo spills, etc. Existing
<i>Requirement:</i> 2	The center shall receive details of the cargo being carried by commercial vehicles from their commercial fleet manager for incidents involving potential hazardous materials. Planned
<i>Requirement:</i> 3	The center shall forward the verified emergency information to the responding agency based on the location and nature of the emergency. Existing
<i>Requirement:</i> 4	The center shall provide the capability to request Fleet and Freight Management to disable a specific vehicle in their fleet. Potential
<i>Functional Area:</i> Emergency Transportation Operations Data Collection	
Collects real-time information on the state of the regional transportation system for operational use by the center. It establishes communications with a regional repository, requests or subscribes to information relevant to the center, and distributes the received information for use.	
<i>Requirement:</i> 1	The center shall collect real-time information on the state of the regional transportation system including current traffic and road conditions, weather conditions, special event and incident information. Planned
<i>Requirement:</i> 2	The center shall support the capability for the system operator to monitor and control the information collection service. Planned
<i>Entity:</i> Emissions Management	
<i>Functional Area:</i> Emissions Data Management	
Assimilation and storage of air quality measures and roadside collected emissions data; distribution for general traveler information or for use in demand management programs.	
<i>Requirement:</i> 1	The center shall collect, analyze, and store vehicle emissions data collected from roadside sensors. Planned
<i>Requirement:</i> 2	The center shall collect, analyze, and store wide area pollution data collected from sensors that may the general (wide area) environment. Planned

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Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Indiana Toll Road Operations Center</i>	
<i>Entity: Emissions Management</i>	
<i>Functional Area: Emissions Data Management</i>	
Assimilation and storage of air quality measures and roadside collected emissions data; distribution for general traveler information or for use in demand management programs.	
<i>Requirement:</i> 3 The center shall configure and control emissions and air quality sensors located in the field.	Planned
<i>Requirement:</i> 4 The center shall maintain a database of pollution reference data including acceptable and tolerable emissions and pollution levels for the area served by the center.	Planned
<i>Requirement:</i> 5 The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for emissions.	Planned
<i>Requirement:</i> 6 The center shall establish violation parameters, detect emissions violators, obtain the vehicle registration data from the appropriate State Department of Motor Vehicles (DMV) office, and then provide the capability to send violation information to a law enforcement agency.	Potential
<i>Requirement:</i> 7 The center shall distribute air quality information to the media, traveler information service providers, and traffic management centers. This information may be used for information to travelers or part of demand management programs.	Planned
<i>Functional Area: Emissions Data Collection</i>	
Collection and storage of air quality and emissions management information. For use by operations personnel or data archives in the region.	
<i>Requirement:</i> 1 The center shall collect air quality and emissions management data from various sources, including emissions sensors distributed along the roadside and wide-area sensors detecting pollution over a larger geographical area.	Planned
<i>Requirement:</i> 2 The center shall assign quality control metrics and meta-data to be stored along with the data. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.	Planned
<i>Requirement:</i> 3 The center shall receive and respond to requests from ITS Archives for either a catalog of the emissions management data or for the data itself.	Planned
<i>Requirement:</i> 4 The center shall be able to produce sample products of the data available.	Planned
<i>Entity: Payment Administration</i>	
<i>Functional Area: Toll Administration</i>	
Management of toll collection for private and commercial vehicles, dynamic pricing, payment reconciliation with financial institutions, and violation notification to enforcement agencies.	
<i>Requirement:</i> 1 The center shall manage toll transactions, including maintaining a log of all transactions and toll pricing structure information.	Existing
<i>Requirement:</i> 2 The center shall dynamically price tolls based on current traffic condition information.	Potential

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Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Indiana Toll Road Operations Center	
<i>Entity:</i> Payment Administration	
<i>Functional Area:</i> Toll Administration	
Management of toll collection for private and commercial vehicles, dynamic pricing, payment reconciliation with financial institutions, and violation notification to enforcement agencies.	
<i>Requirement:</i>	
3 For electronic toll payments requiring financial payment, the center shall process the financial information from toll plazas and manage an interface to a Financial Institution.	Existing
<i>Requirement:</i>	
4 The center shall manage a local billing database for toll customers.	Existing
<i>Requirement:</i>	
5 The center shall manage the details of toll payment violations based on vehicle information from the toll plaza, registration information from the Department of Motor Vehicles, invalid payment information from a Financial Institution, and previous violation information stored locally, and report such violations to appropriate law enforcement agencies.	Existing
<i>Requirement:</i>	
6 The center shall calculate traffic flow based on timestamped toll transactions for vehicle travel between successive toll plazas and send to other agencies.	Existing
<i>Requirement:</i>	
7 The center shall respond to changes in toll prices from the Toll Administrator.	Existing
<i>Requirement:</i>	
8 The center shall exchange data with other toll agencies to coordinate toll transactions and pricing.	Potential
<i>Requirement:</i>	
9 The center shall support requests for advanced toll payment and provide this information to its toll plazas.	Potential
<i>Requirement:</i>	
10 The center shall support wide-area alerts from emergency centers by passing on the information to its toll plazas and the Toll Administrator.	Existing
<i>Requirement:</i>	
11 The center shall support toll transactions by commercial fleet operators.	Existing
<i>Functional Area:</i> Toll Operator Alert	
Receipt/acknowledgement of alert notifications (safety/security broadcasts, child abductions, etc.) from the emergency management centers; the toll administrator controls distribution of the alert to the operators at the toll plazas.	
<i>Requirement:</i>	
1 The center shall receive wide-area alerts and advisories from emergency management centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	Existing
<i>Requirement:</i>	
2 The center shall provide an interface with the toll administration center personnel to present wide-area alert notifications and to allow the center personnel to acknowledge the input and control the dissemination of the information.	Existing
<i>Requirement:</i>	
3 The center shall distribute wide-area alert notifications to toll plazas to keep toll operators informed of identified threats that may impact toll operations or public safety on a toll facility.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Indiana Toll Road Operations Center</i>	
<i>Entity: Payment Administration</i>	
<i>Functional Area: Toll Operator Alert</i>	
Receipt/acknowledgement of alert notifications (safety/security broadcasts, child abductions, etc.) from the emergency management centers; the toll administrator controls distribution of the alert to the operators at the toll plazas.	
<i>Requirement:</i>	Existing
4 The center shall return status back to the emergency management center that initiated the wide-area alert with information indicating the status of the alert from the toll operators including the information systems that are being used to provide the alert notification.	
<i>Functional Area: Toll Data Collection</i>	
Collection and storage of toll operations and pricing data. For use by operations personnel or data archives in the region.	
<i>Requirement:</i>	Existing
1 The center shall collect toll operational data and pricing data.	
<i>Requirement:</i>	Existing
2 The center shall assign quality control metrics and meta-data to be stored along with the data. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.	
<i>Requirement:</i>	Planned
3 The center shall receive and respond to requests from ITS Archives for either a catalog of the toll data or for the data itself.	
<i>Requirement:</i>	Planned
4 The center shall be able to produce sample products of the data available.	
<i>Entity: Traffic Management</i>	
<i>Functional Area: TMC Roadway Warning</i>	
Remotely monitors and controls field elements used to warn drivers approaching hazards. Detects and warns approaching vehicles of adverse road weather conditions, traffic conditions including queues, and obstacles or animals in the road.	
<i>Requirement:</i>	Planned
1 The center shall monitor data on traffic, environmental conditions, and other hazards collected from sensors along the roadway.	
<i>Functional Area: TMC Variable Speed Limits</i>	
Remotely monitors and controls variable speed limits systems, including equipment that monitors current traffic and environmental conditions, determines the current speed limits by lane, and displays the speed limits and additional information to drivers.	
<i>Requirement:</i>	Planned
1 The center shall monitor data on traffic and environmental conditions collected from sensors along the roadway.	
<i>Functional Area: TMC Roadway Warning</i>	
Remotely monitors and controls field elements used to warn drivers approaching hazards. Detects and warns approaching vehicles of adverse road weather conditions, traffic conditions including queues, and obstacles or animals in the road.	
<i>Requirement:</i>	Planned
2 The center shall identify hazardous road weather and surface conditions.	
<i>Functional Area: TMC Variable Speed Limits</i>	

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Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Indiana Toll Road Operations Center</i>	
<i>Entity: Traffic Management</i>	
<i>Functional Area: TMC Variable Speed Limits</i>	
Remotely monitors and controls variable speed limits systems, including equipment that monitors current traffic and environmental conditions, determines the current speed limits by lane, and displays the speed limits and additional information to drivers.	
<i>Requirement:</i> 2 Based on the measured data, the center shall calculate and set suitable speed limits by lane.	Potential
<i>Functional Area: TMC Roadway Warning</i>	
Remotely monitors and controls field elements used to warn drivers approaching hazards. Detects and warns approaching vehicles of adverse road weather conditions, traffic conditions including queues, and obstacles or animals in the road.	
<i>Requirement:</i> 3 The center shall identify hazardous traffic conditions including queues.	Planned
<i>Functional Area: TMC Variable Speed Limits</i>	
Remotely monitors and controls variable speed limits systems, including equipment that monitors current traffic and environmental conditions, determines the current speed limits by lane, and displays the speed limits and additional information to drivers.	
<i>Requirement:</i> 3 The center shall control field equipment that posts the current speed limits and displays additional information such as basic safety rules and current traffic information to drivers.	Potential
<i>Functional Area: TMC Roadway Warning</i>	
Remotely monitors and controls field elements used to warn drivers approaching hazards. Detects and warns approaching vehicles of adverse road weather conditions, traffic conditions including queues, and obstacles or animals in the road.	
<i>Requirement:</i> 4 The center shall identify debris, animals, or other encroachment on the roadway dangerous to approaching motorists.	Planned
<i>Functional Area: TMC Variable Speed Limits</i>	
Remotely monitors and controls variable speed limits systems, including equipment that monitors current traffic and environmental conditions, determines the current speed limits by lane, and displays the speed limits and additional information to drivers.	
<i>Requirement:</i> 4 The center shall monitor the operational status of the variable speed limit equipment, including fault reports.	Potential
<i>Functional Area: TMC Roadway Warning</i>	
Remotely monitors and controls field elements used to warn drivers approaching hazards. Detects and warns approaching vehicles of adverse road weather conditions, traffic conditions including queues, and obstacles or animals in the road.	
<i>Requirement:</i> 5 The center shall issue control commands to field equipment warning drivers approaching the identified hazardous conditions.	Planned
<i>Functional Area: TMC Variable Speed Limits</i>	

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Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Indiana Toll Road Operations Center	
<i>Entity:</i> Traffic Management	
<i>Functional Area:</i> TMC Variable Speed Limits	
Remotely monitors and controls variable speed limits systems, including equipment that monitors current traffic and environmental conditions, determines the current speed limits by lane, and displays the speed limits and additional information to drivers.	
<i>Requirement:</i>	Potential
5 The center shall provide center personnel current system status and respond to control data from center personnel regarding variable speed limits and	
<i>Functional Area:</i> TMC Roadway Warning	
Remotely monitors and controls field elements used to warn drivers approaching hazards. Detects and warns approaching vehicles of adverse road weather conditions, traffic conditions including queues, and obstacles or animals in the road.	
<i>Requirement:</i>	Planned
6 The center shall monitor the operational status of the dynamic warning equipment, including fault reports.	
<i>Functional Area:</i> Collect Traffic Surveillance	
Management of traffic sensors and surveillance (CCTV) equipment, collection of current traffic conditions, and distribution of the collected information to other centers and operators.	
<i>Requirement:</i>	Potential
1 The center shall monitor, analyze, and store traffic sensor data (speed, volume, occupancy) collected from field elements under remote control of the center.	
<i>Requirement:</i>	Potential
2 The center shall monitor, analyze, and distribute traffic images from CCTV systems under remote control of the center.	
<i>Requirement:</i>	Potential
4 The center shall distribute road network conditions data (raw or processed) based on collected and analyzed traffic sensor and surveillance data to other centers.	
<i>Requirement:</i>	Potential
5 The center shall respond to control data from center personnel regarding sensor and surveillance data collection, analysis, storage, and distribution.	
<i>Requirement:</i>	Potential
6 The center shall maintain a database of surveillance equipment and sensors and associated data (including the roadway on which they are located, the type of data collected, and the ownership of each)	
<i>Requirement:</i>	Potential
7 The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for traffic data.	
<i>Functional Area:</i> TMC Probe Information Collection	
Collects, assimilates, and disseminates vehicle probe data collected from roadside beacons and centers controlling transit vehicles, emergency vehicles, toll collection points, and route-guided vehicles.	
<i>Requirement:</i>	Potential
1 The center shall collect traffic probe data from vehicles via roadside field equipment.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Indiana Toll Road Operations Center	
<i>Entity:</i> Traffic Management	
<i>Functional Area:</i> TMC Probe Information Collection	
Collects, assimilates, and disseminates vehicle probe data collected from roadside beacons and centers controlling transit vehicles, emergency vehicles, toll collection points, and route-guided vehicles.	
<i>Requirement:</i>	Potential
3 The center shall collect traffic data from traveler information centers based on data from their subscriber vehicles; the data may be aggregated and initial link time calculations performed at the sending center.	
<i>Requirement:</i>	Potential
4 The center shall collect traffic data from toll administrative centers containing travel times between toll collection points for those vehicles equipped for electronic toll collection; the data may be aggregated and processed at the sending center.	
<i>Requirement:</i>	Potential
5 The center shall assimilate current and forecast traffic conditions based on collected probe data and distribute to other centers for dissemination to travelers.	
<i>Requirement:</i>	Potential
6 The center shall collect operational status for the roadside probe data collection equipment.	
<i>Requirement:</i>	Potential
7 The center shall collect fault data for the roadside probe data collection equipment for repair.	
<i>Functional Area:</i> TMC Traffic Information Dissemination	
Controls dissemination of traffic-related data to other centers, the media, and travelers via the driver information systems (DMS, HAR) that it operates.	
<i>Requirement:</i>	Potential
1 The center shall remotely control dynamic messages signs for dissemination of traffic and other information to drivers.	
<i>Requirement:</i>	Potential
2 The center shall 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.	
<i>Requirement:</i>	Potential
3 The center shall collect operational status for the driver information systems equipment (DMS, HAR, etc.).	
<i>Requirement:</i>	Potential
4 The center shall collect fault data for the driver information systems equipment (DMS, HAR, etc.) for repair.	
<i>Requirement:</i>	Potential
5 The center shall 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), and the definition of the road network itself.	
<i>Requirement:</i>	Potential
6 The center shall distribute traffic data to maintenance and construction centers, transit centers, emergency management centers, and traveler information providers.	
<i>Requirement:</i>	Potential
7 The center shall distribute traffic data to the media; the capability to provide the information in both data stream and graphical display shall be supported.	
<i>Requirement:</i>	Potential
8 The center shall provide the capability for center personnel to control the nature of the data that is available to non-traffic operations centers and the media.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Indiana Toll Road Operations Center	
<i>Entity:</i> Traffic Management	
<i>Functional Area:</i> TMC Regional Traffic Management	
Coordination between traffic management centers in order to share traffic information between centers as well as control of traffic management field equipment. This may be used during incidents and special events and during day-to-day operations.	
<i>Requirement:</i>	Planned
1 The center shall exchange traffic information with other traffic management centers including incident information, congestion data, traffic data, signal timing plans, and real-time signal control information.	
<i>Requirement:</i>	Planned
2 The center shall exchange traffic control information with other traffic management centers to support remote monitoring and control of traffic management devices (e.g. signs, sensors, signals, cameras, etc.).	
<i>Functional Area:</i> TMC Traffic Management Decision Support	
Recommends courses of action to the traffic operator based on current and forecast road and traffic conditions. Recommended actions may include predefined incident response plans, signal timing plan changes, DMS/HAR messages, lane control strategies, metering strategies, etc.	
<i>Requirement:</i>	Planned
1 The center shall provide center personnel with an integrated regional view of current and forecast road and traffic conditions including traffic incidents, special events, maintenance activities and other events or conditions that impact capacity or demand.	
<i>Requirement:</i>	Planned
2 The center shall identify network imbalances and potential courses of action.	
<i>Requirement:</i>	Planned
3 The center shall compare the impact of potential courses of action and make recommendations to the operator.	
<i>Requirement:</i>	Planned
4 The recommended actions shall include predefined incident response plans, signal timing plan changes, DMS/HAR messages, lane control strategies and freeway control strategies including ramp metering, interchange metering, and mainline metering.	
<i>Requirement:</i>	Planned
5 The recommended actions shall include multimodal strategies that include suggested transit strategies and suggested route and mode choices for travelers.	
<i>Requirement:</i>	Planned
6 The center shall provide an interface to center personnel to input control parameters for the decision support process and receive recommended actions and supporting information presentation.	
<i>Functional Area:</i> TMC Incident Detection	
Remotely monitors traffic sensor and surveillance systems to detect and verify incidents. Also monitors external advisory and incident reporting systems, intermodal freight depots, and border crossings for additional incident information. Identified incidents are reported to operations personnel and other centers.	
<i>Requirement:</i>	Existing
1 The center shall 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.	
<i>Requirement:</i>	Potential
2 The center shall collect and store traffic flow and image data from the field equipment to detect and verify incidents.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Indiana Toll Road Operations Center	
<i>Entity:</i> Traffic Management	
<i>Functional Area:</i> TMC Incident Detection	
Remotely monitors traffic sensor and surveillance systems to detect and verify incidents. Also monitors external advisory and incident reporting systems, intermodal freight depots, and border crossings for additional incident information. Identified incidents are reported to operations personnel and other centers.	
<i>Requirement:</i>	
3 The center shall receive inputs concerning upcoming events that would effect the traffic network from event promoters and traveler information service providers.	Existing
<i>Requirement:</i>	
4 The center shall exchange incident and threat information with emergency management centers as well as maintenance and construction centers; including notification of existence of incident and expected severity, location, time and nature of incident.	Existing
<i>Requirement:</i>	
5 The center shall support requests from emergency management centers and border inspection systems to remotely control sensor and surveillance equipment located in the field.	Potential
<i>Requirement:</i>	
6 The center shall provide road network conditions and traffic images to emergency management centers to support the detection, verification, and classification of incidents.	Potential
<i>Requirement:</i>	
7 The center shall provide video and traffic sensor control commands to the field equipment to detect and verify incidents.	Potential
<i>Functional Area:</i> TMC Incident Dispatch Coordination/Communication	
Formulates an incident response that takes into account the incident potential, incident impacts, and/or resources required for incident management. Facilitates the dispatch of emergency response and service vehicles and coordinates the response with cooperating agencies.	
<i>Requirement:</i>	
1 The center shall 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.	Existing
<i>Requirement:</i>	
2 The center shall coordinate planning for incidents with emergency management centers - including pre-planning activities for disaster response, evacuation, and recovery operations.	Existing
<i>Requirement:</i>	
3 The center shall support requests from emergency management centers to remotely control sensor and surveillance equipment located in the field, provide special routing for emergency vehicles, and to provide responding emergency vehicles with signal preemption.	Potential

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Indiana Toll Road Operations Center</i>	
<i>Entity: Traffic Management</i>	
<i>Functional Area: TMC Incident Dispatch Coordination/Communication</i>	
Formulates an incident response that takes into account the incident potential, incident impacts, and/or resources required for incident management. Facilitates the dispatch of emergency response and service vehicles and coordinates the response with cooperating agencies.	
<i>Requirement:</i> 4 The center shall exchange incident information with emergency management centers, maintenance and construction centers, transit centers, information service providers, and the media including description, location, traffic impact, status, expected duration, and response information.	Existing
<i>Requirement:</i> 5 The center shall 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.	Existing
<i>Requirement:</i> 6 The center shall 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.	Existing
<i>Requirement:</i> 7 The center shall provide road network conditions and traffic images to emergency management centers, maintenance and construction centers, and traveler information service providers.	Potential
<i>Requirement:</i> 8 The center shall monitor incident response performance and calculate incident response and clearance times.	Planned
<i>Requirement:</i> 9 The center shall 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.	Planned
<i>Requirement:</i> 10 The center shall coordinate information and controls with other traffic management centers.	Potential
<i>Requirement:</i> 11 The center shall receive inputs from emergency management and transit management centers to develop an overall status of the transportation system including emergency transit schedules in effect and current status and condition of the transportation infrastructure.	Planned
<i>Requirement:</i> 12 The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for traffic incident management.	Existing
<i>Functional Area: TMC Evacuation Support</i>	
Development, coordination, and execution of special traffic management strategies during evacuation and subsequent reentry of a population in the vicinity of a disaster or major emergency. Interfaces with emergency management and other traffic management centers.	
<i>Requirement:</i> 1 The center shall coordinate planning for evacuation with emergency management centers - including pre-planning activities such as establishing routes, areas to be evacuated, timing, etc.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Indiana Toll Road Operations Center	
<i>Entity:</i> Traffic Management	
<i>Functional Area:</i> TMC Evacuation Support	
Development, coordination, and execution of special traffic management strategies during evacuation and subsequent reentry of a population in the vicinity of a disaster or major emergency. Interfaces with emergency management and other traffic management centers.	
<i>Requirement:</i>	Potential
2 The center shall 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.	
<i>Requirement:</i>	Potential
3 The center shall coordinate information and controls with other traffic management centers.	
<i>Requirement:</i>	Planned
4 The center shall 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.	
<i>Functional Area:</i> TMC Traffic Network Performance Evaluation	
Measures performance and predicts travel demand patterns to support traffic flow optimization, demand management, and incident management. Collects data from surveillance equipment as well as input from other management centers including emissions, event promoters, and other TMCs.	
<i>Requirement:</i>	Potential
1 The center shall monitor, analyze, and store traffic sensor data (speed, volume, occupancy) collected from field elements under remote control of the center to support overall network performance evaluations.	
<i>Requirement:</i>	Planned
2 The center shall collect wide-area pollution data from emissions management centers to support overall network performance evaluations.	
<i>Requirement:</i>	Existing
3 The center shall collect and store plans from event promoters for major future events possibly impacting traffic to support overall network performance evaluations.	
<i>Requirement:</i>	Existing
4 The center shall collect and store anticipated route information from information service providers to support overall network performance evaluations and predictions.	
<i>Requirement:</i>	Potential
6 The center shall exchange traffic information with other traffic management centers, including incidents, congestion data, traffic data, signal timing plans, and real-time signal control information to support overall network performance evaluations.	
<i>Requirement:</i>	Existing
7 The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for network performance evaluations.	
<i>Requirement:</i>	Planned
8 The center shall provide an interface to the archive data repository to enable the operator to retrieve historical operating data for use in planning to predict future traffic patterns and conditions.	
<i>Requirement:</i>	Planned
9 This center shall use the collected information to measure overall current and forecast network performance and predict travel demand patterns.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Indiana Toll Road Operations Center	
<i>Entity:</i> Traffic Management	
<i>Functional Area:</i> TMC Environmental Monitoring	
Management of environmental sensors and assimilation of collected data with other current and forecast road conditions and surface weather information from weather service providers and roadway maintenance operations.	
<i>Requirement:</i>	Planned
1 The center shall remotely control environmental sensors that measure road surface temperature, moisture, icing, salinity, and other measures.	
<i>Requirement:</i>	Planned
2 The center shall remotely control environmental sensors that measure weather conditions including temperature, wind, humidity, precipitation, and visibility.	
<i>Requirement:</i>	Planned
3 The center shall 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.	
<i>Requirement:</i>	Existing
4 The center shall provide weather and road condition information to weather service providers and center personnel.	
<i>Requirement:</i>	Planned
5 The center shall respond to control data from center personnel regarding environmental sensor control and weather data collection and processing.	
<i>Functional Area:</i> TMC Speed Monitoring and Warning	
Remotely monitors vehicle speeds, and informs an enforcement agency if excessive speeds are detected. Also configures and controls speed warning systems that provide safe speed advisories to the motorist.	
<i>Requirement:</i>	Planned
1 The center shall remotely control vehicle speed sensors typically placed in work zones; control parameters may include environmental and traffic conditions.	
<i>Requirement:</i>	Planned
2 The center shall collect operational status for the vehicle speed sensors; the status shall include logged information including measured speeds, warning messages displayed, and violation records.	
<i>Requirement:</i>	Existing
3 The center shall provide the capability to notify an enforcement agency when vehicle speeds in the work zone are in excess of the posted speed limit or are creating an unsafe condition based upon the current environmental or traffic conditions.	
<i>Requirement:</i>	Planned
4 The center shall collect fault data for the vehicle speed sensors for repair.	
<i>Functional Area:</i> Barrier System Management	
Remotely controls barrier systems such as gates and other systems that manage entry to roadways, transportation facilities and infrastructure.	
<i>Requirement:</i>	Planned
1 The center shall remotely control barrier systems for transportation facilities and infrastructure. Barrier systems include automated or remotely controlled gates, barriers and other systems that manage entry to roadways.	
<i>Requirement:</i>	Planned
2 The center shall collect barrier system operational status.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Indiana Toll Road Operations Center	
<i>Entity:</i> Traffic Management	
<i>Functional Area:</i> Barrier System Management	
Remotely controls barrier systems such as gates and other systems that manage entry to roadways, transportation facilities and infrastructure.	
<i>Requirement:</i>	
3 The center shall collect barrier system fault data and send to the maintenance center for repair.	Planned
<i>Requirement:</i>	
4 The center shall accept requests for barrier system activation from other centers and from center personnel to support emergency response and detours.	Planned
<hr/>	
<i>Functional Area:</i> Traffic Equipment Maintenance	
Monitoring and remote diagnostics of field equipment - detect failures, issue problem reports, and track the repair or replacement of the failed equipment.	
<i>Requirement:</i>	
1 The center shall collect and store sensor (traffic, pedestrian, multimodal crossing) operational status.	Potential
<i>Requirement:</i>	
2 The center shall collect and store CCTV surveillance system (traffic, pedestrian) operational status.	Potential
<i>Requirement:</i>	
3 The center shall collect and store sensor (traffic, pedestrian, multimodal crossing) fault data and send to the maintenance center for repair.	Potential
<i>Requirement:</i>	
4 The center shall collect and store CCTV surveillance system (traffic, pedestrian) fault data send to the maintenance center for repair.	Potential
<i>Requirement:</i>	
5 The center shall collect environmental sensor operational status.	Planned
<i>Requirement:</i>	
6 The center shall collect environmental sensor equipment fault data and send to the maintenance center for repair.	Planned
<i>Requirement:</i>	
7 The center shall exchange data with maintenance centers concerning the reporting of faulty equipment and the schedule/status of their repair. Information exchanged includes details of new equipment faults, and clearances when the faults are cleared.	Planned
<i>Requirement:</i>	
8 The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for traffic maintenance data.	Planned
<hr/>	
<i>Functional Area:</i> TMC Work Zone Traffic Management	
Coordination with maintenance systems using work zone images and traveler information systems (such as DMS), and distribution of work plans so that work zones are established that have minimum traffic impact.	
<i>Requirement:</i>	
1 The center shall receive work zone images from a maintenance center.	Planned
<i>Requirement:</i>	
2 The center shall analyze work zone images for indications of a possible incident.	Planned
<i>Requirement:</i>	
3 The center shall remotely control driver information systems (such as dynamic messages signs, highway advisory radios) to advise drivers of activity around a work zone.	Potential
<i>Requirement:</i>	
4 The center shall collect operational status for the driver information systems equipment in work zones.	Planned

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Indiana Toll Road Operations Center</i>	
<i>Entity: Traffic Management</i>	
<i>Functional Area: TMC Work Zone Traffic Management</i>	
Coordination with maintenance systems using work zone images and traveler information systems (such as DMS), and distribution of work plans so that work zones are established that have minimum traffic impact.	
<i>Requirement:</i>	5 The center shall collect fault data for the driver information systems equipment in work zones for repair. Planned
<i>Requirement:</i>	6 The center shall receive proposed maintenance and construction work plans, analyze the activity as a possible incident, and provide work plan feedback to the sending center. Existing
<i>Functional Area: TMC Demand Management Coordination</i>	
Provides the capability to gather information on regional toll, parking, and transit usage and request changes to enable dynamic pricing for demand management.	
<i>Requirement:</i>	1 The center shall collect and store toll pricing data from toll administration centers, including the price for each road segment to which a toll applies, with the time and date for when it applies. Planned
<i>Requirement:</i>	5 The center shall send requests to toll administration centers to change pricing, modify restrictions, or modify operations of a toll road facility. Planned
<i>Functional Area: Traffic Data Collection</i>	
Collection and storage of traffic management data. For use by operations personnel or data archives in the region.	
<i>Requirement:</i>	1 The center shall collect traffic management data such as operational data, event logs, etc. Existing
<i>Requirement:</i>	2 The center shall assign quality control metrics and meta-data to be stored along with the data. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data. Existing
<i>Requirement:</i>	3 The center shall receive and respond to requests from ITS Archives for either a catalog of the traffic data or for the data itself. Planned
<i>Requirement:</i>	4 The center shall be able to produce sample products of the data available. Planned
<i>Functional Area: TMC Transportation Operations Data Collection</i>	
Collects real-time information on the state of the regional transportation system for operational use by the center. It establishes communications with a regional repository, requests or subscribes to information relevant to the center, and distributes the received information for use.	
<i>Requirement:</i>	1 The center shall collect real-time information on the state of the regional transportation system including current traffic and road conditions, weather conditions, special event and incident information. Potential
<i>Requirement:</i>	2 The center shall support the capability for the system operator to monitor and control the information collection service. Potential
<i>Element: Indiana Toll Road Roadside Equipment/Toll Plazas/Gantries</i>	
<i>Entity: Roadway</i>	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Indiana Toll Road Roadside Equipment/Toll Plazas/Gantries	
<i>Entity:</i> Roadway	
<i>Functional Area:</i> Roadway Basic Surveillance	
Field elements that monitor traffic conditions using loop detectors and CCTV cameras.	
<i>Requirement:</i>	Potential
1 The field element shall collect, process, digitize, and send traffic sensor data (speed, volume, and occupancy) to the center for further analysis and storage, under center control.	
<i>Requirement:</i>	Potential
2 The field element shall collect, process, and send traffic images to the center for further analysis and distribution.	
<i>Requirement:</i>	Potential
4 The field element shall return sensor and CCTV system operational status to the controlling center.	
<i>Requirement:</i>	Potential
5 The field element shall return sensor and CCTV system fault data to the controlling center for repair.	
<i>Functional Area:</i> Roadway Probe Data Communications	
Field elements that collect probe data from vehicles using short range communications.	
<i>Requirement:</i>	Potential
1 The field element shall communicate with passing vehicles for traffic data link time calculations and send collected data to the controlling center; identification will be removed to ensure anonymity.	
<i>Requirement:</i>	Potential
2 The field element shall communicate with on-board equipment on passing vehicles to collect current vehicle position, speed, and heading and a record of previous events (e.g., starts and stops, link travel times) that can be used to determine current traffic conditions.	
<i>Requirement:</i>	Potential
3 The field element shall communicate with on-board equipment on passing vehicles to collect current status information and a record of previous events (e.g., temperature, wiper status, headlight status, traction control system status) that can be used to determine road and surface weather conditions.	
<i>Requirement:</i>	Potential
4 The field element shall communicate with on-board equipment on passing vehicles to collect vehicle trip information (e.g., origin and destination information, travel times) that can be used to support transportation planning.	
<i>Requirement:</i>	Potential
5 The field element shall communicate with on-board equipment on passing vehicles to collect a history of precise positioning information that can be used to derive or verify accurate roadway geometry and lane features for use by map update providers.	
<i>Requirement:</i>	Potential
6 The field element shall aggregate and forward collected probe information to the center.	
<i>Requirement:</i>	Potential
7 The field element shall provide roadside equipment operational status to the center.	
<i>Requirement:</i>	Potential
8 The field element shall provide roadside equipment fault indication to the center for repair.	
<i>Functional Area:</i> Roadway Variable Speed Limits	
Field elements including physical overhead lane signs and associated monitoring, communications, and control electronics that are used to manage and control variable speed limits systems.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Indiana Toll Road Roadside Equipment/Toll Plazas/Gantries	
<i>Entity:</i> Roadway	
<i>Functional Area:</i> Roadway Variable Speed Limits	
Field elements including physical overhead lane signs and associated monitoring, communications, and control electronics that are used to manage and control variable speed limits systems.	
<i>Requirement:</i>	
1 The field element shall monitor traffic and environmental conditions along the roadway.	Planned
<i>Requirement:</i>	
2 The field element shall autonomously calculate and set variable speed limits based on current conditions by lane.	Potential
<i>Requirement:</i>	
3 The field element shall receive commands from the controlling center that establish speed limits by lane.	Potential
<i>Requirement:</i>	
4 The field element shall display the current speed limits per lane to drivers.	Potential
<i>Requirement:</i>	
5 The field element shall display additional information such as basic safety rules and current traffic information to drivers.	Potential
<i>Requirement:</i>	
6 The field element shall collect operational status of the variable speed limit field equipment and report the operational status to the controlling center.	Potential
<i>Requirement:</i>	
7 The field element shall monitor and report faults to the controlling center.	Potential
<i>Functional Area:</i> Roadway Warning	
Field elements used to warn drivers approaching hazards including adverse road weather conditions, traffic conditions including queues, and obstacles or animals in the road.	
<i>Requirement:</i>	
1 The field element shall monitor for hazardous traffic conditions, including queues.	Planned
<i>Requirement:</i>	
2 The field element shall monitor for hazardous road surface and local weather conditions.	Planned
<i>Requirement:</i>	
3 The field element shall monitor for debris, animals, or other objects in the travel lanes.	Planned
<i>Requirement:</i>	
4 The field element shall provide collected sensor data to the controlling center.	Planned
<i>Requirement:</i>	
5 The field element shall autonomously identify potentially hazardous conditions and activate warning signs to approaching motorists.	Planned
<i>Requirement:</i>	
6 The field element shall receive commands from the controlling center that activate warning signs to approaching motorists.	Planned
<i>Requirement:</i>	
7 The field element shall collect operational status of the warning system field equipment and report the operational status to the controlling center.	Planned
<i>Requirement:</i>	
8 The field element shall monitor and report faults to the controlling center.	Planned
<i>Functional Area:</i> Roadway Traffic Information Dissemination	
Driver information systems, such as dynamic message signs and Highway Advisory Radio (HAR).	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Indiana Toll Road Roadside Equipment/Toll Plazas/Gantries	
<i>Entity:</i> Roadway	
<i>Functional Area:</i> Roadway Traffic Information Dissemination	
Driver information systems, such as dynamic message signs and Highway Advisory Radio (HAR).	
<i>Requirement:</i>	Potential
1 The field element shall include dynamic messages signs for dissemination of traffic and other information to drivers, under center control; the DMS may be either those that display variable text messages, or those that have fixed format display(s) (e.g. vehicle restrictions, or lane open/close).	
<i>Requirement:</i>	Potential
2 The field element shall include 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, under center control.	
<i>Requirement:</i>	Potential
4 The field element shall provide operational status for the driver information systems equipment (DMS, HAR, etc.) to the center.	
<i>Requirement:</i>	Potential
5 The field element shall provide fault data for the driver information systems equipment (DMS, HAR, etc.) to the center for repair.	
<i>Functional Area:</i> Roadway Incident Detection	
Field elements that monitor traffic conditions to identify incidents. It includes traffic detectors that collect traffic flow information and identify unusual traffic conditions and advanced CCTV cameras with built-in incident detection algorithms.	
<i>Requirement:</i>	Potential
1 The field element shall collect, process, and send traffic images to the center for further analysis and distribution.	
<i>Requirement:</i>	Potential
2 The field element shall remotely process video data and provide an indication of potential incidents to the traffic management center.	
<i>Requirement:</i>	Potential
3 The field element's video devices shall be remotely controlled by a traffic management center.	
<i>Requirement:</i>	Potential
4 The field element shall provide operational status and fault data for the incident detection devices to the traffic management center.	
<i>Functional Area:</i> Roadway Equipment Coordination	
Field elements that control and send data to other field elements (such as environmental sensors that send data to a DMS or coordination between traffic controllers on adjacent intersections), without center control.	
<i>Requirement:</i>	Potential
1 The field element shall include sensors that provide data and status information to other field element devices, without center control.	
<i>Requirement:</i>	Potential
2 The field element shall include sensors that receive configuration data from other field element devices, without center control.	
<i>Requirement:</i>	Potential
3 The field element shall include devices that provide data and status information to other field element devices without center control.	
<i>Requirement:</i>	Potential
4 The field element shall include devices that receive configuration data from other field element devices, without center control.	
<i>Functional Area:</i> Roadway Field Device Monitoring	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Indiana Toll Road Roadside Equipment/Toll Plazas/Gantries	
<i>Entity:</i> Roadway	
<i>Functional Area:</i> Roadway Field Device Monitoring	
Monitors field equipment operational status and detects and reports fault conditions. Device status, configuration, and fault information are provided to a remote center and a user interface provides information locally to field personnel.	
<i>Requirement:</i>	Potential
1 The field element shall monitor the operational status (state of the device, configuration, and fault data) of connected sensors (such as traffic, infrastructure, environmental, security, speed) and devices (such as highway advisory radio, dynamic message signs, automated roadway treatment systems, barrier and safeguard systems, cameras, traffic signals, ramp meters, short range communications equipment, security surveillance equipment).	
<i>Requirement:</i>	Potential
2 The field element shall send operational status of connected field equipment to the maintenance center.	
<i>Requirement:</i>	Potential
3 The field element shall send collected fault data to the maintenance center for repair.	
<i>Requirement:</i>	Potential
4 The field element shall include a local interface that provides operational status and fault data for connected field equipment to field personnel.	
<i>Requirement:</i>	Potential
5 The field element shall include a local interface that allows field personnel to command diagnostic tests on connected field equipment.	
<i>Functional Area:</i> Roadway Emissions Monitoring	
Emissions and air quality sensors that collect vehicular emissions and area-wide air quality data.	
<i>Requirement:</i>	Planned
1 The field element shall include emissions sensors that detect levels of emissions from individual vehicles, under center control.	
<i>Requirement:</i>	Planned
2 The field element shall include air quality sensors, often distributed geographically, that detect area-wide levels of pollution, under center control.	
<i>Requirement:</i>	Planned
3 The field element shall analyze collected vehicle emissions data against reference data to determine whether or not a vehicle is violating the acceptable levels of emissions, and shall return this analysis to a center for possible enforcement action.	
<i>Requirement:</i>	Planned
4 If the emissions level detected by the emissions sensor indicates a vehicle is violating the acceptable levels of emissions, the field element shall provide the capability to display summary emissions information or warnings to passing drivers via a driver information system (such as portable messages signs, field to vehicle communications to in-vehicle signing systems, etc.).	
<i>Requirement:</i>	Planned
5 The field element shall provide emissions sensor equipment operational status to the center.	
<i>Requirement:</i>	Planned
6 The field element shall provide emissions sensor equipment fault indication to the center for repair.	
<i>Requirement:</i>	Planned
7 The field element shall provide area-wide pollution sensor equipment operational status to the center.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Indiana Toll Road Roadside Equipment/Toll Plazas/Gantries	
<i>Entity:</i> Roadway	
<i>Functional Area:</i> Roadway Emissions Monitoring	
Emissions and air quality sensors that collect vehicular emissions and area-wide air quality data.	
<i>Requirement:</i>	Planned
8 The field element shall provide area-wide pollution sensor equipment fault indication to the center for repair.	
<i>Functional Area:</i> Roadway Environmental Monitoring	
Environmental sensors, surface and sub-surface, that collect weather and road surface information. Weather conditions measured include temperature, wind, humidity, precipitation, and visibility. Sensors measure road surface temperature, moisture, icing, salinity, etc.	
<i>Requirement:</i>	Planned
1 The field element shall include surface and sub-surface environmental sensors that measure road surface temperature, moisture, icing, salinity, and other measures.	
<i>Requirement:</i>	Planned
2 The field element shall include environmental sensors that measure weather conditions including temperature, wind, humidity, precipitation, and visibility.	
<i>Requirement:</i>	Planned
3 The field element's environmental sensors shall be remotely controlled by a maintenance center.	
<i>Requirement:</i>	Planned
4 The field element's environmental sensors shall be remotely controlled by a traffic management center.	
<i>Requirement:</i>	Planned
5 The field element's environmental sensors shall be remotely controlled by weather service providers such as the National Weather Service or value-added sector specific meteorological services.	
<i>Requirement:</i>	Planned
6 The field element's environmental sensors shall be remotely controlled by a maintenance and construction vehicle.	
<i>Requirement:</i>	Planned
7 The field element shall provide environmental sensor equipment operational status to the controlling center or maintenance vehicle.	
<i>Requirement:</i>	Planned
8 The field element shall provide environmental sensor equipment fault indication to the controlling center or maintenance vehicle.	
<i>Requirement:</i>	Planned
9 The field element shall remotely aggregate environmental sensor data with environmental data collected from maintenance and construction vehicles.	
<i>Requirement:</i>	Planned
10 The field element shall provide weather and road surface condition data to centers.	
<i>Requirement:</i>	Planned
11 The field element shall provide weather and road surface condition data to maintenance and construction vehicles.	
<i>Functional Area:</i> Field Barrier System Control	
Field elements that control barrier systems such as gates and other systems that manage entry to roadways, transportation facilities and infrastructure.	
<i>Requirement:</i>	Planned
1 The field element shall activate barrier systems for transportation facilities and infrastructure under center control. Barrier systems include automated or remotely controlled gates, barriers and other systems that manage entry to roadways.	
<i>Requirement:</i>	Planned
2 The field element shall return barrier system operational status to the controlling center.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Indiana Toll Road Roadside Equipment/Toll Plazas/Gantries	
<i>Entity:</i> Roadway	
<i>Functional Area:</i> Field Barrier System Control	
Field elements that control barrier systems such as gates and other systems that manage entry to roadways, transportation facilities and infrastructure.	
<i>Requirement:</i>	
3 The field element shall return barrier system fault data to the maintenance center for repair.	Planned
<i>Requirement:</i>	
4 The field element shall receive requests for access from approaching vehicles using field-vehicle communications and validate and authenticate the requests.	Planned
<i>Requirement:</i>	
5 The field element shall grant access only to qualified vehicles.	Planned
<i>Requirement:</i>	
6 The field element shall communicate access permission status and access instructions to approaching vehicles using field-vehicle communications.	Planned
<i>Functional Area:</i> Roadway Speed Monitoring and Warning	
Vehicle speed sensors that detect excessive vehicle speeds, optionally based on conditions and vehicle type, informing drivers, centers and/or enforcement agencies of speed violations.	
<i>Requirement:</i>	
1 The field element shall include sensors to detect vehicle speeds, under traffic or maintenance center control.	Existing
<i>Requirement:</i>	
2 The field element shall include sensors to detect vehicle speeds, under enforcement agency control.	Existing
<i>Requirement:</i>	
3 If the speed detected by vehicle speed sensors is determined to be excessive, the field element shall provide a safe speed advisory to passing drivers via a driver information system (such as portable messages signs, field to vehicle communications to in-vehicle signing systems, etc.).	Planned
<i>Requirement:</i>	
4 The field element shall base speed advisories to passing drivers on environmental conditions.	Planned
<i>Requirement:</i>	
5 The field element shall monitor notify an enforcement agency when a speed violation is detected.	Existing
<i>Requirement:</i>	
6 The field element shall return operational status for the vehicle speed sensors to the controlling traffic or maintenance center; including measured speeds, warning messages displayed, and violation records.	Planned
<i>Requirement:</i>	
7 The field element shall return operational status for the vehicle speed sensors to the enforcement agency.	Existing
<i>Requirement:</i>	
8 The field element shall return fault data for the vehicle speed sensors to the controlling center for repair.	Planned
<i>Functional Area:</i> Roadway Infrastructure Monitoring	
Sensors that monitor the condition of pavement, bridges, tunnels, associated hardware, and other transportation-related infrastructure (e.g., culverts), under maintenance center and maintenance vehicle control.	
<i>Requirement:</i>	
1 The field element shall include infrastructure condition monitoring sensors that monitor the condition of pavement, bridges, tunnels, associated hardware, and other transportation-related infrastructure (e.g., culverts), under maintenance center control.	Planned

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Indiana Toll Road Roadside Equipment/Toll Plazas/Gantries	
<i>Entity:</i> Roadway	
<i>Functional Area:</i> Roadway Infrastructure Monitoring	
Sensors that monitor the condition of pavement, bridges, tunnels, associated hardware, and other transportation-related infrastructure (e.g., culverts), under maintenance center and maintenance vehicle control.	
<i>Requirement:</i>	
2 The field element shall include infrastructure condition monitoring sensors that monitor the condition of pavement, bridges, tunnels, associated hardware, and other transportation-related infrastructure (e.g., culverts), under maintenance vehicle control.	Planned
<i>Requirement:</i>	
3 The field element shall provide operational status for the infrastructure condition monitoring sensors to the maintenance center.	Planned
<i>Requirement:</i>	
4 The field element shall provide operational status for the infrastructure condition monitoring sensors to the maintenance vehicle.	Planned
<i>Requirement:</i>	
5 The field element shall provide fault data for the infrastructure condition monitoring sensors to the maintenance center for repair.	Planned
<i>Functional Area:</i> Roadway Work Zone Traffic Control	
Field elements in maintenance and construction areas including CCTV cameras, driver information systems (such as DMS), and gates/barriers that monitor and control traffic and provide information directly to drivers in affected areas.	
<i>Requirement:</i>	
1 The field element shall collect, process, and send work zone images to the center for further analysis and distribution, under center control.	Planned
<i>Requirement:</i>	
2 Under traffic and maintenance center control, the field element shall include driver information systems (such as dynamic messages signs and highway advisory radios) that advise drivers of activity around the work zone through which they are currently passing.	Planned
<i>Requirement:</i>	
3 Under the control of field personnel within maintenance vehicles, the field element shall include driver information systems (such as dynamic messages signs and highway advisory radios) that advise drivers of activity around a work zone through which they are currently passing.	Planned
<i>Requirement:</i>	
4 The field element shall control access to the work zone using automated gate or barrier systems. This includes automated flagger assistance devices that include automated gate arms and other automated gate/barrier systems.	Potential
<i>Requirement:</i>	
5 The field element shall provide operational status for the surveillance (e.g. CCTV), driver information systems, and gates/barriers in work zones to the maintenance center.	Planned
<i>Requirement:</i>	
6 The field element shall provide fault data for the surveillance (e.g. CCTV), driver information systems, and gates/barriers in work zones to the maintenance center for repair.	Planned
<i>Functional Area:</i> Roadway Work Zone Safety	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Indiana Toll Road Roadside Equipment/Toll Plazas/Gantries	
<i>Entity:</i> Roadway	
<i>Functional Area:</i> Roadway Work Zone Safety	
Work zone intrusion detection devices (to detect vehicle intrusion upon a work zone or crew worker movement across a work zone boundary) and intrusion alerting devices that provide alerts to crew and drivers.	
<i>Requirement:</i>	Potential
1 The field element shall include work zone intrusion detection devices that detect when a vehicle has intruded upon the boundary of a work zone, under center control.	
<i>Requirement:</i>	Potential
2 The field element shall include work zone intrusion detection devices that detect when crew workers have crossed the boundary between the work zone and vehicle traffic, under center control.	
<i>Requirement:</i>	Potential
3 The field element shall include work zone intrusion alerting devices that alert crew workers of a work zone emergency or safety issue such as the intrusion of a vehicle into the work zone area or movement of field crew into the travel lanes.	
<i>Requirement:</i>	Potential
4 The field element shall include work zone intrusion alerting devices that notify crew via maintenance vehicles of a work zone emergency or safety issue such as the intrusion of a vehicle into the work zone area or movement of field crew into the travel lanes.	
<i>Requirement:</i>	Potential
5 The field element shall include work zone intrusion alerting devices that alert drivers that they have intruded upon the perimeter of the work zone, or are about to do so; may provide alerts to drivers directly or via in-vehicle signing.	
<i>Requirement:</i>	Potential
6 The field element shall provide operational status for the work zone intrusion detection devices to the maintenance center.	
<i>Requirement:</i>	Potential
7 The field element shall provide fault data for the work zone intrusion detection devices to the maintenance center for repair.	
<i>Requirement:</i>	Potential
8 The field element shall provide operational status for the work zone intrusion alerting devices to the maintenance center.	
<i>Requirement:</i>	Potential
9 The field element shall provide fault data for the work zone intrusion alerting devices to the maintenance center for repair.	
<i>Functional Area:</i> Roadway Short Range Traveler Information Communications	
Field elements that distribute information to in-vehicle equipment. The information provided may be determined locally or under the control of a center.	
<i>Requirement:</i>	Potential
1 The field element shall distribute traveler information including traffic and road conditions to passing vehicles using short range communications, under center control.	
<i>Requirement:</i>	Potential
2 The field element shall distribute advisory information, such as evacuation information, wide-area alerts, incident information, work zone intrusion information, and other special information to passing vehicles using short range communications, under center control.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Indiana Toll Road Roadside Equipment/Toll Plazas/Gantries	
<i>Entity:</i> Roadway	
<i>Functional Area:</i> Roadway Short Range Traveler Information Communications	
Field elements that distribute information to in-vehicle equipment. The information provided may be determined locally or under the control of a center.	
<i>Requirement:</i>	Potential
3 The field element shall distribute indicator and fixed sign information, including static sign information (e.g., stop, curve warning, guide signs, service signs, and directional signs) and dynamic information (e.g., current signal states and local conditions warnings identified by local environmental sensors) to equipment on-board vehicles under center control.	
<i>Requirement:</i>	Potential
4 The field element shall return system operational status to the controlling center.	
<i>Requirement:</i>	Potential
5 The field element shall return system fault data to the maintenance center for repair.	
<i>Functional Area:</i> Roadway Data Collection	
Field elements to collect traffic, road, and environmental conditions information for use in transportation planning, research, and other off-line applications. Includes the sensors, supporting roadside infrastructure, and communications equipment.	
<i>Requirement:</i>	Existing
1 The field element shall collect traffic, road, and environmental conditions information.	
<i>Requirement:</i>	Existing
2 The field element shall include the sensors and supporting roadside devices that sense, collect, and send traffic, road, and environmental conditions information to a center for archival.	
<i>Requirement:</i>	Existing
3 The field element shall collect sensor status and sensor faults from roadside equipment and send it along with the recorded data to a center for archival.	
<i>Entity:</i> Roadway Payment	
<i>Functional Area:</i> Toll Plaza Toll Collection	
Roadside collection of tolls from vehicle toll tags and violation identification.	
<i>Requirement:</i>	Existing
1 The field element shall read data from passing vehicles to support toll payment transactions.	
<i>Requirement:</i>	Existing
2 The field element shall calculate the toll due based on the vehicle characteristics (vehicle size, weight, axle count, etc.) and stored toll prices.	
<i>Requirement:</i>	Existing
3 The field element shall update the stored value after debiting the toll amount and send a record of the transaction to a center.	
<i>Requirement:</i>	Existing
4 The field element shall read the credit identity from the passing vehicle and send that identity and the amount to be debited to a center.	
<i>Requirement:</i>	Potential
5 The field element shall support advanced toll payment by checking the vehicle's toll information against a stored list of advanced payments, and debiting the toll from the list in the case of a match.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Indiana Toll Road Roadside Equipment/Toll Plazas/Gantries</i>	
<i>Entity: Roadway Payment</i>	
<i>Functional Area: Toll Plaza Toll Collection</i>	
Roadside collection of tolls from vehicle toll tags and violation identification.	
<i>Requirement:</i> 6 In the case of closed toll systems, the field element shall update the vehicle on-board data with the system entry point, and upon toll system exit, use the stored data in the calculation of the toll.	Existing
<i>Requirement:</i> 7 The field element shall control roadside displays indicating success or failure of the toll transaction to the driver.	Existing
<i>Requirement:</i> 8 The field element shall control cameras, obtain images, and forward images of toll violators to a center.	Existing
<i>Requirement:</i> 9 The field element shall respond to changes in tolls from the Toll Operator.	Existing
<i>Requirement:</i> 10 The field element shall forward wide-area alert information to the Toll Operator.	Existing
<i>Element: Indiana Toll Road Travel Plazas</i>	
<i>Entity: Remote Traveler Support</i>	
<i>Functional Area: Remote Basic Information Reception</i>	
Public traveler interface, such as a kiosk, that provides formatted traffic advisories, transit, event, and other traveler information, as well as broadcast alerts.	
<i>Requirement:</i> 1 The public interface for travelers shall receive traffic information from a center and present it to the traveler.	Existing
<i>Requirement:</i> 3 The public interface for travelers shall receive event information from a center and present it to the traveler.	Existing
<i>Requirement:</i> 4 This public interface for travelers shall receive evacuation information from a center and present it to the traveler.	Potential
<i>Requirement:</i> 5 The public interface for travelers shall receive wide-area alerts and present it to the traveler.	Planned
<i>Requirement:</i> 6 The public interface for travelers shall provide the capability for digitized map data to act as the background to the information presented to the traveler.	Existing
<i>Requirement:</i> 7 The public interface for travelers shall support traveler input in audio or manual form.	Potential
<i>Requirement:</i> 8 The public interface for travelers shall present information to the traveler in audible or visual forms consistent with a kiosk, including those that are suitable for travelers with hearing or vision physical disabilities.	Potential
<i>Requirement:</i> 9 The public interface for travelers shall be able to store frequently requested data.	Existing
<i>Functional Area: Remote Interactive Information Reception</i>	
Public traveler interface, such as a kiosk, that provides traffic, transit, yellow pages, special event, and other personalized traveler information services upon request.	
<i>Requirement:</i> 1 The public interface for travelers shall receive traffic information from a center and present it to the traveler upon request.	Planned

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Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Indiana Toll Road Travel Plazas</i>	
<i>Entity: Remote Traveler Support</i>	
<i>Functional Area: Remote Interactive Information Reception</i>	
Public traveler interface, such as a kiosk, that provides traffic, transit, yellow pages, special event, and other personalized traveler information services upon request.	
<i>Requirement:</i>	
3 The public interface for travelers shall receive yellow pages information (such as lodging, restaurants, theaters, bicycle facilities, and other tourist activities) from a center and present it to the traveler upon request.	Existing
<i>Requirement:</i>	
4 The public interface for travelers shall receive event information from a center and present it to the traveler upon request.	Existing
<i>Requirement:</i>	
5 The public interface for travelers shall receive evacuation information from a center and present it to the traveler.	Potential
<i>Requirement:</i>	
6 The public interface for travelers shall receive wide-area alerts and present it to the traveler.	Planned
<i>Requirement:</i>	
7 The public interface for travelers shall accept reservations for confirmed trip plans.	Potential
<i>Requirement:</i>	
8 The public interface for travelers shall support payment for services, such as confirmed trip plans, confirmed traveler services, tolls, transit fares, parking lot charges, and advanced payment for tolls.	Potential
<i>Requirement:</i>	
10 The public interface for travelers shall base requests from the traveler on the traveler's current location or a specific location identified by the traveler, and filter the provided information accordingly.	Existing
<i>Requirement:</i>	
11 The public interface for travelers shall provide digitized map data to act as the background to the information presented to the traveler.	Existing
<i>Requirement:</i>	
12 The public interface for travelers shall support traveler input in audio or manual form.	Potential
<i>Requirement:</i>	
13 The public interface for travelers shall present information to the traveler in audible or visual forms consistent with a kiosk, including those that are suitable for travelers with hearing or vision physical disabilities.	Potential
<i>Requirement:</i>	
14 The public interface for travelers shall be able to store frequently requested data.	Existing
<i>Element: Indiana Transportation Tolling/Finance</i>	
<i>Entity: Payment Administration</i>	
<i>Functional Area: Toll Administration</i>	
Management of toll collection for private and commercial vehicles, dynamic pricing, payment reconciliation with financial institutions, and violation notification to enforcement agencies.	
<i>Requirement:</i>	
1 The center shall manage toll transactions, including maintaining a log of all transactions and toll pricing structure information.	Existing
<i>Requirement:</i>	
2 The center shall dynamically price tolls based on current traffic condition information.	Potential

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Indiana Transportation Tolling/Finance</i>	
<i>Entity: Payment Administration</i>	
<i>Functional Area: Toll Administration</i>	
Management of toll collection for private and commercial vehicles, dynamic pricing, payment reconciliation with financial institutions, and violation notification to enforcement agencies.	
<i>Requirement:</i>	
3 For electronic toll payments requiring financial payment, the center shall process the financial information from toll plazas and manage an interface to a Financial Institution.	Existing
<i>Requirement:</i>	
4 The center shall manage a local billing database for toll customers.	Existing
<i>Requirement:</i>	
5 The center shall manage the details of toll payment violations based on vehicle information from the toll plaza, registration information from the Department of Motor Vehicles, invalid payment information from a Financial Institution, and previous violation information stored locally, and report such violations to appropriate law enforcement agencies.	Existing
<i>Requirement:</i>	
6 The center shall calculate traffic flow based on timestamped toll transactions for vehicle travel between successive toll plazas and send to other agencies.	Potential
<i>Requirement:</i>	
7 The center shall respond to changes in toll prices from the Toll Administrator.	Existing
<i>Requirement:</i>	
8 The center shall exchange data with other toll agencies to coordinate toll transactions and pricing.	Existing
<i>Requirement:</i>	
9 The center shall support requests for advanced toll payment and provide this information to its toll plazas.	Potential
<i>Requirement:</i>	
10 The center shall support wide-area alerts from emergency centers by passing on the information to its toll plazas and the Toll Administrator.	Existing
<i>Requirement:</i>	
11 The center shall support toll transactions by commercial fleet operators.	Existing
<i>Functional Area: Toll Operator Alert</i>	
Receipt/acknowledgement of alert notifications (safety/security broadcasts, child abductions, etc.) from the emergency management centers; the toll administrator controls distribution of the alert to the operators at the toll plazas.	
<i>Requirement:</i>	
1 The center shall receive wide-area alerts and advisories from emergency management centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	Existing
<i>Requirement:</i>	
2 The center shall provide an interface with the toll administration center personnel to present wide-area alert notifications and to allow the center personnel to acknowledge the input and control the dissemination of the information.	Existing
<i>Requirement:</i>	
3 The center shall distribute wide-area alert notifications to toll plazas to keep toll operators informed of identified threats that may impact toll operations or public safety on a toll facility.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Indiana Transportation Tolling/Finance</i>	
<i>Entity: Payment Administration</i>	
<i>Functional Area: Toll Operator Alert</i>	
Receipt/acknowledgement of alert notifications (safety/security broadcasts, child abductions, etc.) from the emergency management centers; the toll administrator controls distribution of the alert to the operators at the toll plazas.	
<i>Requirement:</i>	Existing
4 The center shall return status back to the emergency management center that initiated the wide-area alert with information indicating the status of the alert from the toll operators including the information systems that are being used to provide the alert notification.	
<i>Functional Area: Toll Data Collection</i>	
Collection and storage of toll operations and pricing data. For use by operations personnel or data archives in the region.	
<i>Requirement:</i>	Existing
1 The center shall collect toll operational data and pricing data.	
<i>Requirement:</i>	Existing
2 The center shall assign quality control metrics and meta-data to be stored along with the data. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.	
<i>Requirement:</i>	Planned
3 The center shall receive and respond to requests from ITS Archives for either a catalog of the toll data or for the data itself.	
<i>Requirement:</i>	Planned
4 The center shall be able to produce sample products of the data available.	
<i>Element: Indiana Welcome Center</i>	
<i>Entity: Remote Traveler Support</i>	
<i>Functional Area: Remote Basic Information Reception</i>	
Public traveler interface, such as a kiosk, that provides formatted traffic advisories, transit, event, and other traveler information, as well as broadcast alerts.	
<i>Requirement:</i>	Existing
1 The public interface for travelers shall receive traffic information from a center and present it to the traveler.	
<i>Requirement:</i>	Existing
3 The public interface for travelers shall receive event information from a center and present it to the traveler.	
<i>Requirement:</i>	Potential
4 This public interface for travelers shall receive evacuation information from a center and present it to the traveler.	
<i>Requirement:</i>	Existing
5 The public interface for travelers shall receive wide-area alerts and present it to the traveler.	
<i>Requirement:</i>	Existing
6 The public interface for travelers shall provide the capability for digitized map data to act as the background to the information presented to the traveler.	
<i>Requirement:</i>	Potential
7 The public interface for travelers shall support traveler input in audio or manual form.	
<i>Requirement:</i>	Potential
8 The public interface for travelers shall present information to the traveler in audible or visual forms consistent with a kiosk, including those that are suitable for travelers with hearing or vision physical disabilities.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Indiana Welcome Center</i>	
<i>Entity: Remote Traveler Support</i>	
<i>Functional Area: Remote Basic Information Reception</i>	
Public traveler interface, such as a kiosk, that provides formatted traffic advisories, transit, event, and other traveler information, as well as broadcast alerts.	
<i>Requirement:</i> 9 The public interface for travelers shall be able to store frequently requested data.	Potential
<i>Functional Area: Remote Interactive Information Reception</i>	
Public traveler interface, such as a kiosk, that provides traffic, transit, yellow pages, special event, and other personalized traveler information services upon request.	
<i>Requirement:</i> 1 The public interface for travelers shall receive traffic information from a center and present it to the traveler upon request.	Existing
<i>Requirement:</i> 3 The public interface for travelers shall receive yellow pages information (such as lodging, restaurants, theaters, bicycle facilities, and other tourist activities) from a center and present it to the traveler upon request.	Existing
<i>Requirement:</i> 4 The public interface for travelers shall receive event information from a center and present it to the traveler upon request.	Existing
<i>Requirement:</i> 5 The public interface for travelers shall receive evacuation information from a center and present it to the traveler.	Potential
<i>Requirement:</i> 6 The public interface for travelers shall receive wide-area alerts and present it to the traveler.	Existing
<i>Requirement:</i> 7 The public interface for travelers shall accept reservations for confirmed trip plans.	Potential
<i>Requirement:</i> 8 The public interface for travelers shall support payment for services, such as confirmed trip plans, confirmed traveler services, tolls, transit fares, parking lot charges, and advanced payment for tolls.	Potential
<i>Requirement:</i> 10 The public interface for travelers shall base requests from the traveler on the traveler's current location or a specific location identified by the traveler, and filter the provided information accordingly.	Existing
<i>Requirement:</i> 11 The public interface for travelers shall provide digitized map data to act as the background to the information presented to the traveler.	Existing
<i>Requirement:</i> 12 The public interface for travelers shall support traveler input in audio or manual form.	Potential
<i>Requirement:</i> 13 The public interface for travelers shall present information to the traveler in audible or visual forms consistent with a kiosk, including those that are suitable for travelers with hearing or vision physical disabilities.	Potential
<i>Requirement:</i> 14 The public interface for travelers shall be able to store frequently requested data.	Existing
<i>Element: INDOT Arterial Multimodal Crossings</i>	
<i>Entity: Roadway</i>	
<i>Functional Area: Roadway Signal Preemption</i>	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: INDOT Arterial Multimodal Crossings</i>	
<i>Entity: Roadway</i>	
<i>Functional Area: Roadway Signal Preemption</i>	
Field elements that receive signal preemption requests from approaching emergency vehicles and overrides the current operation of the traffic signals	
<i>Requirement:</i>	
1 The field element shall respond to signal preemption requests from emergency vehicles.	Planned
<i>Functional Area: Roadway Incident Detection</i>	
Field elements that monitor traffic conditions to identify incidents. It includes traffic detectors that collect traffic flow information and identify unusual traffic conditions and advanced CCTV cameras with built-in incident detection algorithms.	
<i>Requirement:</i>	
1 The field element shall collect, process, and send traffic images to the center for further analysis and distribution.	Planned
<i>Requirement:</i>	
2 The field element shall remotely process video data and provide an indication of potential incidents to the traffic management center.	Planned
<i>Requirement:</i>	
3 The field element's video devices shall be remotely controlled by a traffic management center.	Potential
<i>Requirement:</i>	
4 The field element shall provide operational status and fault data for the incident detection devices to the traffic management center.	Planned
<i>Functional Area: Standard Rail Crossing</i>	
Field elements at highway-rail intersections (HRIs) where operational requirements do not dictate advanced features (e.g., where rail operational speeds are less than 80 miles per hour). Includes traditional HRI warning systems augmented with other standard traffic management devices.	
<i>Requirement:</i>	
1 The field element shall collect and process, traffic sensor data in the vicinity of a highway-rail intersection (HRI).	Planned
<i>Requirement:</i>	
2 The field element shall monitor the status of the highway-rail intersection (HRI) equipment, including both the current state and mode of operation and the current equipment condition, to be forwarded on to the traffic management center.	Planned
<i>Requirement:</i>	
3 The field element shall monitor the status of the highway-rail intersection (HRI) equipment, including both the current state and mode of operation and the current equipment condition, to be forwarded on to the rail wayside equipment.	Existing
<i>Requirement:</i>	
4 The field element shall receive track status from the rail wayside equipment that can be passed on to the traffic management center. This may include the current status of the tracks and whether a train is approaching.	Planned
<i>Requirement:</i>	
5 The field element shall collect pedestrian images and pedestrian sensor data, and respond to pedestrian crossing requests via display, audio signal, or other manner.	Planned
<i>Requirement:</i>	
6 The field element shall control the dynamic message signs (DMS) in the vicinity of a highway-rail intersection (HRI) to advise drivers, cyclists, and pedestrians of approaching trains.	Potential

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: INDOT Arterial Multimodal Crossings</i>	
<i>Entity: Roadway</i>	
<i>Functional Area: Standard Rail Crossing</i>	
Field elements at highway-rail intersections (HRIs) where operational requirements do not dictate advanced features (e.g., where rail operational speeds are less than 80 miles per hour). Includes traditional HRI warning systems augmented with other standard traffic management devices.	
<i>Requirement:</i>	Existing
7 The field element shall close the highway-rail intersection (HRI) when a train is approaching using gates, lights/signs, barriers, and traffic control signals.	
<i>Requirement:</i>	Planned
8 The field element shall support the integrated control of adjacent traffic signals to clear an area in advance of an approaching train and to manage traffic around the intersection.	
<i>Requirement:</i>	Planned
9 The field element shall forward rail traffic advisories received from the Wayside Equipment to the traffic management center.	
<i>Functional Area: Advanced Rail Crossing</i>	
Field elements at highway-rail intersections (HRIs) where operational requirements demand advanced features (e.g., where rail operational speeds are greater than 80 miles per hour). Capabilities from the Standard Rail Crossing plus systems which preclude entrance into the intersection when the barriers are activated, additional arriving train information, and detection of blocked intersections.	
<i>Requirement:</i>	Planned
1 The field element shall collect and process, traffic sensor data in the vicinity of a highway-rail intersection (HRI).	
<i>Requirement:</i>	Planned
2 The field element shall determine whether the highway-rail intersection (HRI) is blocked by traffic in the roadway or some other obstruction.	
<i>Requirement:</i>	Planned
3 The field element shall notify the traffic management center and the rail wayside equipment of any intersection blockages, including trapped vehicles or other obstructions.	
<i>Requirement:</i>	Planned
4 The field element shall monitor the status of the highway-rail intersection (HRI) equipment, including both the current state and mode of operation and the current equipment condition, to be forwarded on to the traffic management center.	
<i>Requirement:</i>	Planned
5 The field element shall monitor the status of the highway-rail intersection (HRI) equipment, including both the current state and mode of operation and the current equipment condition, to be forwarded on to the rail wayside equipment.	
<i>Requirement:</i>	Planned
6 The field element shall receive track status and arriving train information from the rail wayside equipment that can be passed on to the traffic management center. This may include the current status of the tracks and when a train is expected and/or how long the crossing will be closed.	
<i>Requirement:</i>	Planned
7 The field element shall collect pedestrian images and pedestrian sensor data, and respond to pedestrian crossing requests via display, audio signal, or other manner.	
<i>Requirement:</i>	Potential
8 The field element shall control the dynamic message signs (DMS) in the vicinity of a highway-rail intersection (HRI) to advise drivers, cyclists, and pedestrians of approaching trains.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: INDOT Arterial Multimodal Crossings</i>	
<i>Entity: Roadway</i>	
<i>Functional Area: Advanced Rail Crossing</i>	
Field elements at highway-rail intersections (HRIs) where operational requirements demand advanced features (e.g., where rail operational speeds are greater than 80 miles per hour). Capabilities from the Standard Rail Crossing plus systems which preclude entrance into the intersection when the barriers are activated, additional arriving train information, and detection of blocked intersections.	
<i>Requirement:</i>	Planned
9 The field element shall close the highway-rail intersection (HRI) when a train is approaching with enough time for traffic to safely clear the crossing using gates, lights/signs, barriers, and traffic control signals.	
<i>Requirement:</i>	Planned
10 The field element shall support the integrated control of adjacent traffic signals to clear an area in advance of an approaching train and to manage traffic around the intersection.	
<i>Requirement:</i>	Planned
11 The field element shall forward rail traffic advisories received from the Wayside Equipment to the traffic management center.	
<i>Requirement:</i>	Planned
12 The field element shall provide approaching train advisories using field-vehicle communications to vehicles approaching the grade crossing.	
<i>Functional Area: Roadway Equipment Coordination</i>	
Field elements that control and send data to other field elements (such as environmental sensors that send data to a DMS or coordination between traffic controllers on adjacent intersections), without center control.	
<i>Requirement:</i>	Planned
1 The field element shall include sensors that provide data and status information to other field element devices, without center control.	
<i>Requirement:</i>	Planned
2 The field element shall include sensors that receive configuration data from other field element devices, without center control.	
<i>Requirement:</i>	Planned
3 The field element shall include devices that provide data and status information to other field element devices without center control.	
<i>Requirement:</i>	Planned
4 The field element shall include devices that receive configuration data from other field element devices, without center control.	
<i>Functional Area: Roadway Field Device Monitoring</i>	
Monitors field equipment operational status and detects and reports fault conditions. Device status, configuration, and fault information are provided to a remote center and a user interface provides information locally to field personnel.	
<i>Requirement:</i>	Planned
1 The field element shall monitor the operational status (state of the device, configuration, and fault data) of connected sensors (such as traffic, infrastructure, environmental, security, speed) and devices (such as highway advisory radio, dynamic message signs, automated roadway treatment systems, barrier and safeguard systems, cameras, traffic signals, ramp meters, short range communications equipment, security surveillance equipment).	
<i>Requirement:</i>	Planned
2 The field element shall send operational status of connected field equipment to the maintenance center.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:INDOT Arterial Multimodal Crossings</i>	
<i>Entity: Roadway</i>	
<i>Functional Area: Roadway Field Device Monitoring</i>	
Monitors field equipment operational status and detects and reports fault conditions. Device status, configuration, and fault information are provided to a remote center and a user interface provides information locally to field personnel.	
<i>Requirement:</i> 3 The field element shall send collected fault data to the maintenance center for repair.	Planned
<i>Requirement:</i> 4 The field element shall include a local interface that provides operational status and fault data for connected field equipment to field personnel.	Planned
<i>Requirement:</i> 5 The field element shall include a local interface that allows field personnel to command diagnostic tests on connected field equipment.	Planned
<i>Functional Area: Roadway Environmental Monitoring</i>	
Environmental sensors, surface and sub-surface, that collect weather and road surface information. Weather conditions measured include temperature, wind, humidity, precipitation, and visibility. Sensors measure road surface temperature, moisture, icing, salinity, etc.	
<i>Requirement:</i> 1 The field element shall include surface and sub-surface environmental sensors that measure road surface temperature, moisture, icing, salinity, and other measures.	Planned
<i>Requirement:</i> 2 The field element shall include environmental sensors that measure weather conditions including temperature, wind, humidity, precipitation, and visibility.	Planned
<i>Requirement:</i> 3 The field element's environmental sensors shall be remotely controlled by a maintenance center.	Planned
<i>Requirement:</i> 4 The field element's environmental sensors shall be remotely controlled by a traffic management center.	Planned
<i>Requirement:</i> 5 The field element's environmental sensors shall be remotely controlled by weather service providers such as the National Weather Service or value-added sector specific meteorological services.	Potential
<i>Requirement:</i> 6 The field element's environmental sensors shall be remotely controlled by a maintenance and construction vehicle.	Potential
<i>Requirement:</i> 7 The field element shall provide environmental sensor equipment operational status to the controlling center or maintenance vehicle.	Planned
<i>Requirement:</i> 8 The field element shall provide environmental sensor equipment fault indication to the controlling center or maintenance vehicle.	Planned
<i>Requirement:</i> 9 The field element shall remotely aggregate environmental sensor data with environmental data collected from maintenance and construction vehicles.	Potential
<i>Requirement:</i> 10 The field element shall provide weather and road surface condition data to centers.	Planned
<i>Requirement:</i> 11 The field element shall provide weather and road surface condition data to maintenance and construction vehicles.	Potential
<i>Functional Area: Field Barrier System Control</i>	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: INDOT Arterial Multimodal Crossings</i>	
<i>Entity: Roadway</i>	
Functional Area: Field Barrier System Control	
Field elements that control barrier systems such as gates and other systems that manage entry to roadways, transportation facilities and infrastructure.	
<i>Requirement:</i>	
1 The field element shall activate barrier systems for transportation facilities and infrastructure under center control. Barrier systems include automated or remotely controlled gates, barriers and other systems that manage entry to roadways.	Planned
<i>Requirement:</i>	
2 The field element shall return barrier system operational status to the controlling center.	Planned
<i>Requirement:</i>	
3 The field element shall return barrier system fault data to the maintenance center for repair.	Planned
<i>Requirement:</i>	
4 The field element shall receive requests for access from approaching vehicles using field-vehicle communications and validate and authenticate the requests.	Planned
<i>Requirement:</i>	
5 The field element shall grant access only to qualified vehicles.	Planned
<i>Requirement:</i>	
6 The field element shall communicate access permission status and access instructions to approaching vehicles using field-vehicle communications.	Planned
Functional Area: Multimodal Crossing Control	
Field elements to monitor and control traffic at multimodal crossings, such as draw bridges and other crossings between highway traffic and other modes; does not include highway-rail intersection.	
<i>Requirement:</i>	
1 The field element shall include sensors to monitor requests from non-highway traffic to cross at multimodal crossings for specified durations (such as draw bridges and miscellaneous other interference crossings between highway traffic and other modes such as river traffic, aircraft, etc.); the sensors are under center control.	Existing
<i>Requirement:</i>	
2 The field element shall include signals to control traffic at multimodal crossings on surface streets, under center control.	Existing
<i>Requirement:</i>	
3 The field element shall include driver information systems (such as dynamic messages signs, highway advisory radios (HAR), and equipment that controls warning lights and gates) that advise drivers at multimodal crossings, under center control.	Potential
<i>Requirement:</i>	
4 The field element shall provide operational status for the sensors, signals, and driver information systems equipment at multimodal crossings to the center.	Existing
<i>Requirement:</i>	
5 The field element shall provide fault data for the sensors, signals, and driver information systems equipment at multimodal crossings to the center for repair.	Existing
<i>Requirement:</i>	
6 The field element shall forward all requests for right-of-way at multimodal crossings to the controlling center.	Existing
Functional Area: Roadway Data Collection	
Field elements to collect traffic, road, and environmental conditions information for use in transportation planning, research, and other off-line applications. Includes the sensors, supporting roadside infrastructure, and communications equipment.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:INDOT Arterial Multimodal Crossings</i>	
<i>Entity: Roadway</i>	
<i>Functional Area: Roadway Data Collection</i>	
Field elements to collect traffic, road, and environmental conditions information for use in transportation planning, research, and other off-line applications. Includes the sensors, supporting roadside infrastructure, and communications equipment.	
<i>Requirement:</i>	
1 The field element shall collect traffic, road, and environmental conditions information.	Planned
<i>Requirement:</i>	
2 The field element shall include the sensors and supporting roadside devices that sense, collect, and send traffic, road, and environmental conditions information to a center for archival.	Planned
<i>Requirement:</i>	
3 The field element shall collect sensor status and sensor faults from roadside equipment and send it along with the recorded data to a center for archival.	Planned
<i>Element:INDOT Field Equipment</i>	
<i>Entity: Roadway</i>	
<i>Functional Area: Roadway Basic Surveillance</i>	
Field elements that monitor traffic conditions using loop detectors and CCTV cameras.	
<i>Requirement:</i>	
1 The field element shall collect, process, digitize, and send traffic sensor data (speed, volume, and occupancy) to the center for further analysis and storage, under center control.	Existing
<i>Requirement:</i>	
2 The field element shall collect, process, and send traffic images to the center for further analysis and distribution.	Potential
<i>Requirement:</i>	
4 The field element shall return sensor and CCTV system operational status to the controlling center.	Potential
<i>Requirement:</i>	
5 The field element shall return sensor and CCTV system fault data to the controlling center for repair.	Potential
<i>Functional Area: Roadway Probe Data Communications</i>	
Field elements that collect probe data from vehicles using short range communications.	
<i>Requirement:</i>	
1 The field element shall communicate with passing vehicles for traffic data link time calculations and send collected data to the controlling center; identification will be removed to ensure anonymity.	Existing
<i>Requirement:</i>	
2 The field element shall communicate with on-board equipment on passing vehicles to collect current vehicle position, speed, and heading and a record of previous events (e.g., starts and stops, link travel times) that can be used to determine current traffic conditions.	Existing
<i>Requirement:</i>	
3 The field element shall communicate with on-board equipment on passing vehicles to collect current status information and a record of previous events (e.g., temperature, wiper status, headlight status, traction control system status) that can be used to determine road and surface weather conditions.	Potential

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Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: INDOT Field Equipment</i>	
<i>Entity: Roadway</i>	
<i>Functional Area: Roadway Probe Data Communications</i>	
Field elements that collect probe data from vehicles using short range communications.	
<i>Requirement:</i> 4 The field element shall communicate with on-board equipment on passing vehicles to collect vehicle trip information (e.g., origin and destination information, travel times) that can be used to support transportation planning.	Existing
<i>Requirement:</i> 5 The field element shall communicate with on-board equipment on passing vehicles to collect a history of precise positioning information that can be used to derive or verify accurate roadway geometry and lane features for use by map update providers.	Potential
<i>Requirement:</i> 6 The field element shall aggregate and forward collected probe information to the center.	Existing
<i>Requirement:</i> 7 The field element shall provide roadside equipment operational status to the center.	Existing
<i>Requirement:</i> 8 The field element shall provide roadside equipment fault indication to the center for repair.	Existing
<i>Functional Area: Roadway Signal Controls</i>	
Field elements including traffic signal controllers for use at signalized intersections; also supports pedestrian crossings.	
<i>Requirement:</i> 1 The field element shall control traffic signals under center control.	Existing
<i>Requirement:</i> 2 The field element shall respond to pedestrian crossing requests by accommodating the pedestrian crossing.	Existing
<i>Requirement:</i> 3 The field element shall provide the capability to notify the traffic management center of pedestrian calls and pedestrian accommodations.	Potential
<i>Requirement:</i> 4 The field element shall report the current signal control information to the center.	Existing
<i>Requirement:</i> 5 The field element shall report current preemption status to the center.	Planned
<i>Requirement:</i> 6 The field element shall return traffic signal controller operational status to the center.	Existing
<i>Requirement:</i> 7 The field element shall return traffic signal controller fault data to the center.	Existing
<i>Functional Area: Field Management Stations Operation</i>	
Supports direct communications between field management stations and the local field equipment under their control.	
<i>Requirement:</i> 1 The field management station shall accept configuration information from the center.	Existing
<i>Requirement:</i> 2 The field management station shall pass data provided by the center to local field devices and report data from the field devices back to the center.	Existing
<i>Functional Area: Roadway Signal Preemption</i>	
Field elements that receive signal preemption requests from approaching emergency vehicles and overrides the current operation of the traffic signals	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:INDOT Field Equipment</i>	
<i>Entity: Roadway</i>	
<i>Functional Area: Roadway Signal Preemption</i>	
Field elements that receive signal preemption requests from approaching emergency vehicles and overrides the current operation of the traffic signals	
<i>Requirement:</i>	
1 The field element shall respond to signal preemption requests from emergency vehicles.	Planned
<i>Functional Area: Roadway Variable Speed Limits</i>	
Field elements including physical overhead lane signs and associated monitoring, communications, and control electronics that are used to manage and control variable speed limits systems.	
<i>Requirement:</i>	
1 The field element shall monitor traffic and environmental conditions along the roadway.	Potential
<i>Requirement:</i>	
2 The field element shall autonomously calculate and set variable speed limits based on current conditions by lane.	Potential
<i>Requirement:</i>	
3 The field element shall receive commands from the controlling center that establish speed limits by lane.	Potential
<i>Requirement:</i>	
4 The field element shall display the current speed limits per lane to drivers.	Potential
<i>Requirement:</i>	
5 The field element shall display additional information such as basic safety rules and current traffic information to drivers.	Potential
<i>Requirement:</i>	
6 The field element shall collect operational status of the variable speed limit field equipment and report the operational status to the controlling center.	Potential
<i>Requirement:</i>	
7 The field element shall monitor and report faults to the controlling center.	Potential
<i>Functional Area: Roadway Warning</i>	
Field elements used to warn drivers approaching hazards including adverse road weather conditions, traffic conditions including queues, and obstacles or animals in the road.	
<i>Requirement:</i>	
1 The field element shall monitor for hazardous traffic conditions, including queues.	Planned
<i>Requirement:</i>	
2 The field element shall monitor for hazardous road surface and local weather conditions.	Planned
<i>Requirement:</i>	
3 The field element shall monitor for debris, animals, or other objects in the travel lanes.	Planned
<i>Requirement:</i>	
4 The field element shall provide collected sensor data to the controlling center.	Planned
<i>Requirement:</i>	
5 The field element shall autonomously identify potentially hazardous conditions and activate warning signs to approaching motorists.	Planned
<i>Requirement:</i>	
6 The field element shall receive commands from the controlling center that activate warning signs to approaching motorists.	Planned
<i>Requirement:</i>	
7 The field element shall collect operational status of the warning system field equipment and report the operational status to the controlling center.	Planned

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Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: INDOT Field Equipment</i>	
<i>Entity: Roadway</i>	
<i>Functional Area: Roadway Warning</i>	
Field elements used to warn drivers approaching hazards including adverse road weather conditions, traffic conditions including queues, and obstacles or animals in the road.	
<i>Requirement:</i>	Planned
8 The field element shall monitor and report faults to the controlling center.	
<i>Functional Area: Roadway Traffic Information Dissemination</i>	
Driver information systems, such as dynamic message signs and Highway Advisory Radio (HAR).	
<i>Requirement:</i>	Existing
1 The field element shall include dynamic messages signs for dissemination of traffic and other information to drivers, under center control; the DMS may be either those that display variable text messages, or those that have fixed format display(s) (e.g. vehicle restrictions, or lane open/close).	
<i>Requirement:</i>	Existing
2 The field element shall include 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, under center control.	
<i>Requirement:</i>	Potential
3 The field element shall include pedestrian information systems under center control (e.g. warning pedestrians of a potential hazard, or providing mandatory instructions as to the availability of pedestrian access).	
<i>Requirement:</i>	Existing
4 The field element shall provide operational status for the driver information systems equipment (DMS, HAR, etc.) to the center.	
<i>Requirement:</i>	Existing
5 The field element shall provide fault data for the driver information systems equipment (DMS, HAR, etc.) to the center for repair.	
<i>Functional Area: Roadway Incident Detection</i>	
Field elements that monitor traffic conditions to identify incidents. It includes traffic detectors that collect traffic flow information and identify unusual traffic conditions and advanced CCTV cameras with built-in incident detection algorithms.	
<i>Requirement:</i>	Potential
1 The field element shall collect, process, and send traffic images to the center for further analysis and distribution.	
<i>Requirement:</i>	Potential
2 The field element shall remotely process video data and provide an indication of potential incidents to the traffic management center.	
<i>Requirement:</i>	Potential
3 The field element's video devices shall be remotely controlled by a traffic management center.	
<i>Requirement:</i>	Potential
4 The field element shall provide operational status and fault data for the incident detection devices to the traffic management center.	
<i>Functional Area: Roadway Equipment Coordination</i>	
Field elements that control and send data to other field elements (such as environmental sensors that send data to a DMS or coordination between traffic controllers on adjacent intersections), without center control.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: INDOT Field Equipment</i>	
<i>Entity: Roadway</i>	
<i>Functional Area: Roadway Equipment Coordination</i>	
Field elements that control and send data to other field elements (such as environmental sensors that send data to a DMS or coordination between traffic controllers on adjacent intersections), without center control.	
<i>Requirement:</i>	Potential
1 The field element shall include sensors that provide data and status information to other field element devices, without center control.	
<i>Requirement:</i>	Potential
2 The field element shall include sensors that receive configuration data from other field element devices, without center control.	
<i>Requirement:</i>	Potential
3 The field element shall include devices that provide data and status information to other field element devices without center control.	
<i>Requirement:</i>	Potential
4 The field element shall include devices that receive configuration data from other field element devices, without center control.	
<i>Functional Area: Roadway Field Device Monitoring</i>	
Monitors field equipment operational status and detects and reports fault conditions. Device status, configuration, and fault information are provided to a remote center and a user interface provides information locally to field personnel.	
<i>Requirement:</i>	Existing
1 The field element shall monitor the operational status (state of the device, configuration, and fault data) of connected sensors (such as traffic, infrastructure, environmental, security, speed) and devices (such as highway advisory radio, dynamic message signs, automated roadway treatment systems, barrier and safeguard systems, cameras, traffic signals, ramp meters, short range communications equipment, security surveillance equipment).	
<i>Requirement:</i>	Existing
2 The field element shall send operational status of connected field equipment to the maintenance center.	
<i>Requirement:</i>	Existing
3 The field element shall send collected fault data to the maintenance center for repair.	
<i>Requirement:</i>	Existing
4 The field element shall include a local interface that provides operational status and fault data for connected field equipment to field personnel.	
<i>Requirement:</i>	Existing
5 The field element shall include a local interface that allows field personnel to command diagnostic tests on connected field equipment.	
<i>Functional Area: Roadway Environmental Monitoring</i>	
Environmental sensors, surface and sub-surface, that collect weather and road surface information. Weather conditions measured include temperature, wind, humidity, precipitation, and visibility. Sensors measure road surface temperature, moisture, icing, salinity, etc.	
<i>Requirement:</i>	Existing
1 The field element shall include surface and sub-surface environmental sensors that measure road surface temperature, moisture, icing, salinity, and other measures.	
<i>Requirement:</i>	Existing
2 The field element shall include environmental sensors that measure weather conditions including temperature, wind, humidity, precipitation, and visibility.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: INDOT Field Equipment</i>	
<i>Entity: Roadway</i>	
<i>Functional Area: Roadway Environmental Monitoring</i>	
Environmental sensors, surface and sub-surface, that collect weather and road surface information. Weather conditions measured include temperature, wind, humidity, precipitation, and visibility. Sensors measure road surface temperature, moisture, icing, salinity, etc.	
<i>Requirement:</i> 3 The field element's environmental sensors shall be remotely controlled by a maintenance center.	Planned
<i>Requirement:</i> 4 The field element's environmental sensors shall be remotely controlled by a traffic management center.	Potential
<i>Requirement:</i> 5 The field element's environmental sensors shall be remotely controlled by weather service providers such as the National Weather Service or value-added sector specific meteorological services.	Potential
<i>Requirement:</i> 6 The field element's environmental sensors shall be remotely controlled by a maintenance and construction vehicle.	Potential
<i>Requirement:</i> 7 The field element shall provide environmental sensor equipment operational status to the controlling center or maintenance vehicle.	Existing
<i>Requirement:</i> 8 The field element shall provide environmental sensor equipment fault indication to the controlling center or maintenance vehicle.	Existing
<i>Requirement:</i> 9 The field element shall remotely aggregate environmental sensor data with environmental data collected from maintenance and construction vehicles.	Planned
<i>Requirement:</i> 10 The field element shall provide weather and road surface condition data to centers.	Existing
<i>Requirement:</i> 11 The field element shall provide weather and road surface condition data to maintenance and construction vehicles.	Existing
<i>Functional Area: Field Barrier System Control</i>	
Field elements that control barrier systems such as gates and other systems that manage entry to roadways, transportation facilities and infrastructure.	
<i>Requirement:</i> 1 The field element shall activate barrier systems for transportation facilities and infrastructure under center control. Barrier systems include automated or remotely controlled gates, barriers and other systems that manage entry to roadways.	Planned
<i>Requirement:</i> 2 The field element shall return barrier system operational status to the controlling center.	Planned
<i>Requirement:</i> 3 The field element shall return barrier system fault data to the maintenance center for repair.	Planned
<i>Requirement:</i> 4 The field element shall receive requests for access from approaching vehicles using field-vehicle communications and validate and authenticate the requests.	Planned
<i>Requirement:</i> 5 The field element shall grant access only to qualified vehicles.	Planned
<i>Requirement:</i> 6 The field element shall communicate access permission status and access instructions to approaching vehicles using field-vehicle communications.	Planned
<i>Functional Area: Roadway Speed Monitoring and Warning</i>	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: INDOT Field Equipment</i>	
<i>Entity: Roadway</i>	
<i>Functional Area: Roadway Speed Monitoring and Warning</i>	
Vehicle speed sensors that detect excessive vehicle speeds, optionally based on conditions and vehicle type, informing drivers, centers and/or enforcement agencies of speed violations.	
<i>Requirement:</i>	Existing
1 The field element shall include sensors to detect vehicle speeds, under traffic or maintenance center control.	
<i>Requirement:</i>	Planned
2 The field element shall include sensors to detect vehicle speeds, under enforcement agency control.	
<i>Requirement:</i>	Existing
3 If the speed detected by vehicle speed sensors is determined to be excessive, the field element shall provide a safe speed advisory to passing drivers via a driver information system (such as portable messages signs, field to vehicle communications to in-vehicle signing systems, etc.).	
<i>Requirement:</i>	Planned
4 The field element shall base speed advisories to passing drivers on environmental conditions.	
<i>Requirement:</i>	Planned
5 The field element shall monitor notify an enforcement agency when a speed violation is detected.	
<i>Requirement:</i>	Existing
6 The field element shall return operational status for the vehicle speed sensors to the controlling traffic or maintenance center; including measured speeds, warning messages displayed, and violation records.	
<i>Requirement:</i>	Planned
7 The field element shall return operational status for the vehicle speed sensors to the enforcement agency.	
<i>Requirement:</i>	Existing
8 The field element shall return fault data for the vehicle speed sensors to the controlling center for repair.	
<i>Functional Area: Roadway Infrastructure Monitoring</i>	
Sensors that monitor the condition of pavement, bridges, tunnels, associated hardware, and other transportation-related infrastructure (e.g., culverts), under maintenance center and maintenance vehicle control.	
<i>Requirement:</i>	Planned
1 The field element shall include infrastructure condition monitoring sensors that monitor the condition of pavement, bridges, tunnels, associated hardware, and other transportation-related infrastructure (e.g., culverts), under maintenance center control.	
<i>Requirement:</i>	Planned
2 The field element shall include infrastructure condition monitoring sensors that monitor the condition of pavement, bridges, tunnels, associated hardware, and other transportation-related infrastructure (e.g., culverts), under maintenance vehicle control.	
<i>Requirement:</i>	Planned
3 The field element shall provide operational status for the infrastructure condition monitoring sensors to the maintenance center.	
<i>Requirement:</i>	Planned
4 The field element shall provide operational status for the infrastructure condition monitoring sensors to the maintenance vehicle.	
<i>Requirement:</i>	Planned
5 The field element shall provide fault data for the infrastructure condition monitoring sensors to the maintenance center for repair.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: INDOT Field Equipment</i>	
<i>Entity: Roadway</i>	
<i>Functional Area: Roadway Work Zone Traffic Control</i>	
Field elements in maintenance and construction areas including CCTV cameras, driver information systems (such as DMS), and gates/barriers that monitor and control traffic and provide information directly to drivers in affected areas.	
<i>Requirement:</i>	
1 The field element shall collect, process, and send work zone images to the center for further analysis and distribution, under center control.	Potential
<i>Requirement:</i>	
2 Under traffic and maintenance center control, the field element shall include driver information systems (such as dynamic messages signs and highway advisory radios) that advise drivers of activity around the work zone through which they are currently passing.	Existing
<i>Requirement:</i>	
3 Under the control of field personnel within maintenance vehicles, the field element shall include driver information systems (such as dynamic messages signs and highway advisory radios) that advise drivers of activity around a work zone through which they are currently passing.	Existing
<i>Requirement:</i>	
4 The field element shall control access to the work zone using automated gate or barrier systems. This includes automated flagger assistance devices that include automated gate arms and other automated gate/barrier systems.	Planned
<i>Requirement:</i>	
5 The field element shall provide operational status for the surveillance (e.g. CCTV), driver information systems, and gates/barriers in work zones to the maintenance center.	Existing
<i>Requirement:</i>	
6 The field element shall provide fault data for the surveillance (e.g. CCTV), driver information systems, and gates/barriers in work zones to the maintenance center for repair.	Existing
<i>Functional Area: Roadway Work Zone Safety</i>	
Work zone intrusion detection devices (to detect vehicle intrusion upon a work zone or crew worker movement across a work zone boundary) and intrusion alerting devices that provide alerts to crew and drivers.	
<i>Requirement:</i>	
1 The field element shall include work zone intrusion detection devices that detect when a vehicle has intruded upon the boundary of a work zone, under center control.	Potential
<i>Requirement:</i>	
2 The field element shall include work zone intrusion detection devices that detect when crew workers have crossed the boundary between the work zone and vehicle traffic, under center control.	Potential
<i>Requirement:</i>	
3 The field element shall include work zone intrusion alerting devices that alert crew workers of a work zone emergency or safety issue such as the intrusion of a vehicle into the work zone area or movement of field crew into the travel lanes.	Potential
<i>Requirement:</i>	
4 The field element shall include work zone intrusion alerting devices that notify crew via maintenance vehicles of a work zone emergency or safety issue such as the intrusion of a vehicle into the work zone area or movement of field crew into the travel lanes.	Potential

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:INDOT Field Equipment</i>	
<i>Entity: Roadway</i>	
<i>Functional Area: Roadway Work Zone Safety</i>	
Work zone intrusion detection devices (to detect vehicle intrusion upon a work zone or crew worker movement across a work zone boundary) and intrusion alerting devices that provide alerts to crew and drivers.	
<i>Requirement:</i> 5 The field element shall include work zone intrusion alerting devices that alert drivers that they have intruded upon the perimeter of the work zone, or are about to do so; may provide alerts to drivers directly or via in-vehicle signing.	Potential
<i>Requirement:</i> 6 The field element shall provide operational status for the work zone intrusion detection devices to the maintenance center.	Potential
<i>Requirement:</i> 7 The field element shall provide fault data for the work zone intrusion detection devices to the maintenance center for repair.	Potential
<i>Requirement:</i> 8 The field element shall provide operational status for the work zone intrusion alerting devices to the maintenance center.	Potential
<i>Requirement:</i> 9 The field element shall provide fault data for the work zone intrusion alerting devices to the maintenance center for repair.	Potential
<i>Functional Area: Roadway Data Collection</i>	
Field elements to collect traffic, road, and environmental conditions information for use in transportation planning, research, and other off-line applications. Includes the sensors, supporting roadside infrastructure, and communications equipment.	
<i>Requirement:</i> 1 The field element shall collect traffic, road, and environmental conditions information.	Existing
<i>Requirement:</i> 2 The field element shall include the sensors and supporting roadside devices that sense, collect, and send traffic, road, and environmental conditions information to a center for archival.	Existing
<i>Requirement:</i> 3 The field element shall collect sensor status and sensor faults from roadside equipment and send it along with the recorded data to a center for archival.	Existing
<i>Element:INDOT Maintenance and Construction Management System</i>	
<i>Entity: Maintenance and Construction Management</i>	
<i>Functional Area: MCM Vehicle Tracking</i>	
Remotely tracks the location of maintenance and construction vehicles and other equipment; presented to the center personnel.	
<i>Requirement:</i> 1 The center shall monitor the locations of all maintenance and construction vehicles and other equipment under its jurisdiction.	Planned
<i>Requirement:</i> 2 The center shall present location data to center personnel for the fleet of maintenance and construction vehicles and other equipment.	Planned
<i>Requirement:</i> 3 The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for maintenance and construction vehicle tracking.	Planned
<i>Functional Area: MCM Vehicle and Equipment Maintenance Management</i>	
Monitors vehicle and equipment condition, tracks maintenance history, and schedules routine and corrective maintenance.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: INDOT Maintenance and Construction Management System</i>	
<i>Entity: Maintenance and Construction Management</i>	
<i>Functional Area: MCM Vehicle and Equipment Maintenance Management</i>	
Monitors vehicle and equipment condition, tracks maintenance history, and schedules routine and corrective maintenance.	
<i>Requirement:</i>	Existing
1 The center shall collect and analyze vehicle diagnostics information from maintenance and construction vehicles. The information includes engine temperature, mileage, tire wear, brake wear, belt wear, and any warnings or alarms concerning the operational condition of the vehicle and ancillary equipment.	
<i>Requirement:</i>	Existing
2 The center shall exchange information with equipment repair facilities including status and history of repairs concerning maintenance and construction vehicles. This information includes vehicle status and diagnostic information, vehicle utilization, and coordination of when vehicles will be available for preventative and corrective maintenance.	
<i>Requirement:</i>	Existing
3 The center shall schedule preventive and corrective vehicle maintenance with the equipment repair facility based on fleet health reports, maintenance records, vehicle utilization and vehicle availability schedules.	
<i>Functional Area: MCM Incident Management</i>	
Supports coordinated response to incidents - share incident notifications, manage incident response resources, and coordinate overall incident situation and response among allied response organizations.	
<i>Requirement:</i>	Existing
1 The center shall 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.	
<i>Requirement:</i>	Existing
2 The center shall 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.	
<i>Requirement:</i>	Existing
3 The center shall 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.	
<i>Requirement:</i>	Existing
4 The center shall coordinate planning for incidents with emergency management centers - including pre-planning activities for disaster response, evacuation, and recovery operations.	
<i>Requirement:</i>	Existing
5 The center shall 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.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: INDOT Maintenance and Construction Management System</i>	
<i>Entity: Maintenance and Construction Management</i>	
<i>Functional Area: MCM Incident Management</i>	
Supports coordinated response to incidents - share incident notifications, manage incident response resources, and coordinate overall incident situation and response among allied response organizations.	
<i>Requirement:</i>	Existing
6 The center shall exchange road network status assessment information with emergency management and traffic management 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.	
<i>Requirement:</i>	Existing
7 The center shall 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.	
<i>Requirement:</i>	Existing
8 The center shall receive information indicating the damage sustained by transportation assets, derived from aerial surveillance, field reports, inspections, tests, and analyses to support incident management.	
<i>Functional Area: MCM Maintenance Decision Support</i>	
Maintenance Decision Support Systems recommend courses of action based on current and forecast environmental and road conditions (filtered and fused for specific time horizons) and additional application specific information. Recommendations and dispatch instructions are generated based on this integrated information.	
<i>Requirement:</i>	Existing
1 The center shall provide the center personnel with tailored external information, including weather or road condition observations, forecasted weather information or road conditions, current usage of treatments and materials, available resources, equipment and vehicle availability, road network information, and source reliability information.	
<i>Requirement:</i>	Existing
2 The center shall tailor the decision support information to include filtering (selection from a large amount of external information), error reduction ('smoothing' the information), fusion (combination of disparate information to match the decision needs), and analysis (creating the decision).	
<i>Requirement:</i>	Existing
3 The center shall provide an interface to the center personnel to input control parameters for the decision support process and receive decisions or information presentation.	
<i>Requirement:</i>	Existing
4 The center shall provide dispatch information to maintenance and construction vehicles based on the outputs of the decision support system, including recommended roadway treatment actions.	
<i>Functional Area: MCM Winter Maintenance Management</i>	
Manages winter road maintenance, tracking and controlling snow plow operations, roadway treatment (e.g., salt spraying and other material applications) based on weather information.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: INDOT Maintenance and Construction Management System</i>	
<i>Entity: Maintenance and Construction Management</i>	
<i>Functional Area: MCM Winter Maintenance Management</i>	
Manages winter road maintenance, tracking and controlling snow plow operations, roadway treatment (e.g., salt spraying and other material applications) based on weather information.	
<i>Requirement:</i>	
1 The center shall respond to requests from emergency management and traffic management centers for hazard removal, field equipment repair, and other winter roadway maintenance.	Existing
<i>Requirement:</i>	
2 The center shall exchange information with administrative systems to support the planning and scheduling of winter maintenance activities. This information includes: equipment and consumables resupply purchase request status, personnel qualifications including training and special certifications, environmental regulations and rules that may impact maintenance activities, and requests and project requirements from contract administration.	Existing
<i>Requirement:</i>	
3 The center shall 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.	Existing
<i>Requirement:</i>	
4 The center shall receive equipment availability and materials storage status information from storage facilities to support the scheduling of winter maintenance activities.	Existing
<i>Requirement:</i>	
5 The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for the scheduling of winter maintenance activities.	Planned
<i>Requirement:</i>	
6 The center shall collect real-time information on the state of the regional transportation system from other centers including current traffic and road conditions, weather conditions, special event and incident information and use the collected information to support winter maintenance operations.	Existing
<i>Requirement:</i>	
7 The center shall dispatch and route winter maintenance vehicle drivers and support them with route- specific environmental, incident, advisory, threat, alert, and traffic congestion information.	Existing
<i>Requirement:</i>	
8 The center shall 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.	Existing
<i>Requirement:</i>	
9 The center shall 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.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: INDOT Maintenance and Construction Management System</i>	
<i>Entity: Maintenance and Construction Management</i>	
<i>Functional Area: MCM Winter Maintenance Management</i>	
Manages winter road maintenance, tracking and controlling snow plow operations, roadway treatment (e.g., salt spraying and other material applications) based on weather information.	
<i>Requirement:</i>	
10 The center shall support remote control of on-board maintenance and construction vehicle systems and field equipment that is remotely controlled by the vehicle such as adjusting material application rates and spread patterns.	Planned
<i>Requirement:</i>	
11 The center shall assess the current status of all winter maintenance activities, including actual work activities performed, current locations and operational conditions of vehicles, materials and equipment inventories, field equipment status, environmental information, etc.	Existing
<i>Functional Area: MCM Roadway Maintenance and Construction</i>	
Overall management and support for routine maintenance on the roadway or right-of-way. Includes landscape maintenance, hazard removal (roadway debris, dead animals), routine maintenance activities (roadway cleaning, grass cutting), and repair and maintenance of both ITS and non-ITS equipment.	
<i>Requirement:</i>	
1 The center shall maintain an interface with asset management systems to track the inventory, restrictions, repair needs and status updates of transportation assets (pavement, bridges, signs, etc.) including location, installation and materials information, vendor/contractor, current maintenance status, standard height, width, and weight restrictions.	Existing
<i>Requirement:</i>	
2 The center shall respond to requests from emergency management and traffic management centers for hazard removal, field equipment repair, and other roadway maintenance.	Existing
<i>Requirement:</i>	
3 The center shall exchange information with administrative systems to support the planning and scheduling of maintenance activities. This information includes: equipment and consumables resupply purchase request status, personnel qualifications including training and special certifications, environmental regulations and rules that may impact maintenance activities, and requests and project requirements from contract administration.	Existing
<i>Requirement:</i>	
4 The center shall provide emergency management and traffic management centers with information about scheduled maintenance and construction work activities including anticipated closures and impact to the roadway, alternate routes, anticipated delays, closure times, and durations.	Existing
<i>Requirement:</i>	
5 The center shall collect the status and fault data from roadside equipment, such as traffic, infrastructure, and environmental sensors, highway advisory radio and dynamic message signs, automated roadway treatment systems, barrier and safeguard systems, cameras, traffic signals and override equipment, ramp meters, short range communications equipment, security sensors and surveillance equipment, etc., and provide a cohesive view of equipment repair needs.	Potential

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: INDOT Maintenance and Construction Management System</i>	
<i>Entity: Maintenance and Construction Management</i>	
<i>Functional Area: MCM Roadway Maintenance and Construction</i>	
Overall management and support for routine maintenance on the roadway or right-of-way. Includes landscape maintenance, hazard removal (roadway debris, dead animals), routine maintenance activities (roadway cleaning, grass cutting), and repair and maintenance of both ITS and non-ITS equipment.	
<i>Requirement:</i>	
6 The center shall collect the status and fault data from the centers that operate the equipment, including data for traffic, infrastructure, and environmental sensors, highway advisory radio and dynamic message signs, automated roadway treatment systems, barrier and safeguard systems, cameras, traffic signals and override equipment, ramp meters, short range communications equipment, security sensors and surveillance equipment, etc., and provide a cohesive view of equipment repair needs.	Planned
<i>Requirement:</i>	
7 The center shall receive equipment availability and materials storage status information from storage facilities to support the scheduling of roadway maintenance and construction activities.	Existing
<i>Requirement:</i>	
8 The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for the scheduling of roadway maintenance and construction activities.	Planned
<i>Requirement:</i>	
9 The center shall collect current and forecast traffic and weather information from traffic management centers and weather service providers (such as the National Weather Service and value-added sector specific meteorological services).	Existing
<i>Requirement:</i>	
10 The center shall dispatch and route maintenance and construction vehicle drivers and support them with route-specific environmental, incident, advisory, threat, alert, and traffic congestion information.	Existing
<i>Requirement:</i>	
11 The center shall manage an interface with center personnel to accept vehicle systems control information and remotely control maintenance and construction vehicle on-board equipment.	Existing
<i>Requirement:</i>	
12 The center shall track the status of roadway maintenance and construction activities by monitoring collected data from the dispatched vehicles and equipment.	Existing
<i>Requirement:</i>	
13 The center shall report the status of field equipment maintenance activities to the centers that operate the equipment.	Existing
<i>Functional Area: MCM Work Zone Management</i>	
Remotely monitors and supports work zone activities, controlling traffic through dynamic message signs (DMS), highway advisory radio, gates and barriers, and informing other groups of activity (e.g., traveler information systems, traffic management centers, other maintenance and construction centers).	
<i>Requirement:</i>	
1 The center shall generate new work zone activity schedules for use by maintenance and construction vehicles, maintenance and construction operators, and for information coordination purposes.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: INDOT Maintenance and Construction Management System</i>	
<i>Entity: Maintenance and Construction Management</i>	
<i>Functional Area: MCM Work Zone Management</i>	
Remotely monitors and supports work zone activities, controlling traffic through dynamic message signs (DMS), highway advisory radio, gates and barriers, and informing other groups of activity (e.g., traveler information systems, traffic management centers, other maintenance and construction centers).	
<i>Requirement:</i> 2 The center shall control the collection of work zone status information including video images from cameras located in or near the work zone.	Existing
<i>Requirement:</i> 3 The center shall disseminate work zone information to other agencies and centers including traffic, transit, emergency management centers, other maintenance centers, traveler information providers, and the media.	Existing
<i>Requirement:</i> 4 The center shall control traffic in work zones by providing remote control of dynamic message signs, highway advisory radio systems, gates, and barriers located in or near the work zone.	Planned
<i>Requirement:</i> 5 The center shall exchange information with administrative systems to support the planning and scheduling of work zone activities. This information includes: equipment and consumables resupply purchase request status, personnel qualifications including training and special certifications, environmental regulations and rules that may impact maintenance activities, and requests and project requirements from contract administration.	Existing
<i>Requirement:</i> 6 The center shall collect real-time information on the state of the road network including current traffic and road conditions to support work zone scheduling and management.	Existing
<i>Functional Area: MCM Speed Monitoring and Warning</i>	
Remotely monitors vehicle speeds, and informs an enforcement agency if excessive speeds are detected; primarily used in work zones.	
<i>Requirement:</i> 1 The center shall remotely control vehicle speed sensors typically placed in work zones; control parameters may include environmental and traffic conditions.	Existing
<i>Requirement:</i> 2 The center shall collect operational status for the vehicle speed sensors; the status shall include logged information including measured speeds, warning messages displayed, and violation records.	Planned
<i>Requirement:</i> 3 The center shall provide the capability to notify an enforcement agency when vehicle speeds in the work zone are in excess of the posted speed limit or are creating an unsafe condition based upon the current environmental or traffic conditions.	Existing
<i>Requirement:</i> 4 The center shall collect fault data for the vehicle speed sensors for repair.	Existing
<i>Functional Area: MCM Work Zone Safety Management</i>	
Remotely monitors work zone safety systems that detect vehicle intrusions in work zones and warns crew workers and drivers of imminent encroachment. Crew movements are also monitored so that the crew can be warned of movement beyond the designated safe zone.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: INDOT Maintenance and Construction Management System</i>	
<i>Entity: Maintenance and Construction Management</i>	
<i>Functional Area: MCM Work Zone Safety Management</i>	
Remotely monitors work zone safety systems that detect vehicle intrusions in work zones and warns crew workers and drivers of imminent encroachment. Crew movements are also monitored so that the crew can be warned of movement beyond the designated safe zone.	
<i>Requirement:</i>	
1 The center shall provide remote monitoring and control of work zone safety devices - including intrusion detection devices that have been installed in work zones or maintenance areas.	Potential
<i>Requirement:</i>	
2 The center shall provide remote monitoring and control of intrusion alert devices that have been installed in work zones or maintenance areas.	Potential
<i>Requirement:</i>	
3 The center shall collect status information of work zone safety device status from field equipment or the maintenance and construction vehicles.	Potential
<i>Requirement:</i>	
4 The center shall collect and store work zone data collected from work zone monitoring devices (such as intrusion detection or alert devices and speed monitoring devices) on-board the vehicle and at the roadside.	Potential
<i>Functional Area: MCM Work Activity Coordination</i>	
Disseminates work activity schedules and current asset restrictions to other agencies. Work schedules are coordinated, factoring in the needs and activities of other agencies and adjacent jurisdictions.	
<i>Requirement:</i>	
1 The center shall 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.	Planned
<i>Requirement:</i>	
2 The center shall 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.	Planned
<i>Requirement:</i>	
3 The center shall collect and respond to feedback concerning scheduled maintenance and construction activities with other management centers such as traffic, emergency, transit, and rail operations.	Planned
<i>Requirement:</i>	
4 The center shall collect and disseminate asset restriction information levied on transportation asset usage based on infrastructure design, surveys, tests, or analyses. This includes standard facility design height, width, and weight restrictions, special restrictions such as spring weight restrictions, and temporary facility restrictions that are imposed during maintenance and construction.	Planned

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: INDOT Maintenance and Construction Management System</i>	
<i>Entity: Maintenance and Construction Management</i>	
<i>Functional Area: MCM Work Activity Coordination</i>	
Disseminates work activity schedules and current asset restrictions to other agencies. Work schedules are coordinated, factoring in the needs and activities of other agencies and adjacent jurisdictions.	
<i>Requirement:</i> 5 The center shall exchange information with administrative systems to support the planning and scheduling of maintenance and construction activities. This information includes: equipment and consumables resupply purchase request status, personnel qualifications including training and special certifications, environmental regulations and rules that may impact maintenance activities, and requests and project requirements from contract administration.	Existing
<i>Requirement:</i> 6 The center shall exchange rail schedules and work plans with rail operations centers.	Planned
<i>Functional Area: MCM Infrastructure Monitoring</i>	
Remotely monitors the condition of pavement, bridges, tunnels, associated hardware, and other transportation-related infrastructure (e.g., culverts) using vehicle-based and roadway-based infrastructure monitoring sensors.	
<i>Requirement:</i> 1 The center shall remotely control and collect data from fixed infrastructure monitoring sensors that monitor vibration, stress, temperature, surface continuity, and other condition measures.	Planned
<i>Requirement:</i> 2 The center shall monitor maintenance vehicle-based mobile sensors and data logging devices that collect information on current infrastructure condition.	Planned
<i>Requirement:</i> 3 The center shall remotely collect data from vehicle probes using short range communications equipment and process this data to identify potential pavement degradation, potholes, and other rough or adverse road surface conditions.	Planned
<i>Requirement:</i> 4 The center shall process the collected information and use it to monitor the condition of pavement, bridges, tunnels, associated hardware, and other transportation-related infrastructure.	Planned
<i>Requirement:</i> 5 The center shall collect current maintenance and repair needs from the asset management system and correlate this data with data collected through infrastructure monitoring systems.	Planned
<i>Requirement:</i> 6 The center shall provide current infrastructure conditions information to the asset management system.	Planned
<i>Requirement:</i> 7 The center shall report infrastructure repair needs to the maintenance management system.	Planned
<i>Functional Area: MCM Data Collection</i>	
Collection and storage of maintenance and construction information. For use by operations personnel or data archives in the region.	
<i>Requirement:</i> 1 The center shall collect maintenance and construction data (such as field equipment status, infrastructure status, maintenance and construction activity data) gathered from roadway, traffic, and other maintenance and construction sources.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: INDOT Maintenance and Construction Management System</i>	
<i>Entity: Maintenance and Construction Management</i>	
<i>Functional Area: MCM Data Collection</i>	
Collection and storage of maintenance and construction information. For use by operations personnel or data archives in the region.	
<i>Requirement:</i>	
2 The center shall assign quality control metrics and meta-data to be stored along with the data. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.	Planned
<i>Requirement:</i>	
3 The center shall receive and respond to requests from ITS Archives for either a catalog of the maintenance and construction data or for the data itself.	Planned
<i>Requirement:</i>	
4 The center shall be able to produce sample products of the data available.	Planned
<i>Requirement:</i>	
5 The center shall provide data to Asset Management to be used in updating the status of assets in the inventory.	Existing
<i>Functional Area: MCM Transportation Operations Data Collection</i>	
Collects real-time information on the state of the regional transportation system for operational use by the center. It establishes communications with a regional repository, requests or subscribes to information relevant to the center, and distributes the received information for use.	
<i>Requirement:</i>	
1 The center shall collect real-time information on the state of the regional transportation system including current traffic and road conditions, weather conditions, special event and incident information.	Existing
<i>Requirement:</i>	
2 The center shall support the capability for the system operator to monitor and control the information collection service.	Existing
<i>Element: INDOT Maintenance and Construction Vehicles</i>	
<i>Entity: Maintenance and Construction Vehicle</i>	
<i>Functional Area: MCV Vehicle Location Tracking</i>	
On-board systems to track vehicle location and reports the position and timestamp information to the dispatch center.	
<i>Requirement:</i>	
1 The maintenance and construction vehicle shall track its current location.	Planned
<i>Requirement:</i>	
2 The maintenance and construction vehicle shall send the time stamped vehicle location to the controlling center.	Planned
<i>Functional Area: MCV Vehicle System Monitoring and Diagnostics</i>	
On-board sensors capable of monitoring the condition of each of the vehicle systems and diagnostics that can be used to support vehicle maintenance.	
<i>Requirement:</i>	
1 The maintenance and construction vehicle shall collect vehicle diagnostics and operating status data from the maintenance vehicle platform including engine temperature, mileage, tire wear, brake wear, belt wear, and other operational status measures as well as the status of maintenance and construction-specific systems on the vehicle.	Existing
<i>Requirement:</i>	
2 The maintenance and construction vehicle shall use the diagnostic and status information to support scheduling vehicle maintenance, monitoring safety status, and informing the vehicle operator of the conditions.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: INDOT Maintenance and Construction Vehicles</i>	
<i>Entity: Maintenance and Construction Vehicle</i>	
<i>Functional Area: MCV Vehicle System Monitoring and Diagnostics</i>	
On-board sensors capable of monitoring the condition of each of the vehicle systems and diagnostics that can be used to support vehicle maintenance.	
<i>Requirement:</i>	
3 The maintenance and construction vehicle shall the vehicle diagnostic and safety information to an equipment repair facility.	Existing
<i>Requirement:</i>	
4 The maintenance and construction vehicle shall send the vehicle diagnostic and safety information to the controlling maintenance center.	Existing
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<i>Functional Area: MCV Barrier System Control</i>	
Control automatic or remotely controlled gates and other barrier systems from a maintenance and construction vehicle.	
<i>Requirement:</i>	
1 The vehicle shall remotely control barrier systems. Barrier systems include automated or remotely controlled gates, barriers and other systems that manage entry to roadways.	Planned
<i>Requirement:</i>	
2 The vehicle shall collect barrier system operational status.	Planned
<i>Requirement:</i>	
3 The vehicle shall collect barrier system fault data.	Planned
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<i>Functional Area: MCV Winter Maintenance</i>	
On-board systems that support snow plow operations and other roadway treatments (e.g., salt spraying and other material applications). Supports information sharing between snow plows.	
<i>Requirement:</i>	
1 The maintenance and construction vehicle shall track the location and status of safety systems on-board the vehicle.	Planned
<i>Requirement:</i>	
2 The maintenance and construction vehicle shall respond to control information from the center to allow remote operation of the on-board vehicle systems. These systems include winter maintenance equipment for plowing, treating, and anti-icing.	Planned
<i>Requirement:</i>	
3 The maintenance and construction vehicle shall monitor materials information including remaining quantity and current application rate of materials on the vehicle.	Existing
<i>Requirement:</i>	
4 The maintenance and construction vehicle shall respond to dispatch information from the center, presented to the vehicle operator for acknowledgement and returning status.	Existing
<i>Requirement:</i>	
5 The maintenance and construction vehicle shall send operational data to the center including the operational state of the maintenance equipment (e.g., blade up/down, spreader pattern), types and quantities of materials used for construction and maintenance activities, and a record of the actual work performed.	Existing
<i>Requirement:</i>	
6 The maintenance and construction vehicle shall exchange operational and environmental data with other maintenance and construction vehicles. Operational data includes operational state of the maintenance equipment (e.g., blade up/down, spreader pattern, equipment configuration) and a record of the actual work performed while the environmental data includes environmental sensor data collected on-board a maintenance and construction vehicle, either raw or processed data.	Existing
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<i>Functional Area: MCV Roadway Maintenance and Construction</i>	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: INDOT Maintenance and Construction Vehicles</i>	
<i>Entity: Maintenance and Construction Vehicle</i>	
<i>Functional Area: MCV Roadway Maintenance and Construction</i>	
On-board systems that support routine non-winter maintenance on the roadway or right-of-way. Includes landscape maintenance, hazard removal (roadway debris, dead animals), routine maintenance activities (roadway cleaning, grass cutting), and repair and maintenance of equipment on the roadway.	
<i>Requirement:</i>	
1 The maintenance and construction vehicle shall track the location and status of safety systems on-board the vehicle.	Planned
<i>Requirement:</i>	
2 The maintenance and construction vehicle shall respond to control information from the center to allow remote operation of the on-board vehicle systems. These systems include routine maintenance equipment for cutting, repairs, hazard removal, etc.	Planned
<i>Requirement:</i>	
3 The maintenance and construction vehicle shall monitor materials information including remaining quantity and current application rate of materials on the vehicle.	Existing
<i>Requirement:</i>	
4 The maintenance and construction vehicle shall respond to dispatch information from the center, presented to the vehicle operator for acknowledgement and returning status.	Existing
<i>Requirement:</i>	
5 The maintenance and construction vehicle shall send operational data to the center including the operational state of the maintenance equipment (e.g., blade up/down, spreader pattern), types and quantities of materials used for construction and maintenance activities, and a record of the actual work performed.	Existing
<i>Functional Area: MCV Infrastructure Monitoring</i>	
On-board systems to monitor the condition of pavement, bridges, tunnels, associated hardware, and other transportation-related infrastructure (e.g., culverts). Includes vehicle-based sensors and communications with roadway-based infrastructure monitoring sensors.	
<i>Requirement:</i>	
1 The maintenance and construction vehicle shall collect infrastructure data from on-board sensors relating to the physical characteristics of the roadway infrastructure, including pavement, bridges, culverts, signs, etc.	Planned
<i>Requirement:</i>	
2 The maintenance and construction vehicle shall collect infrastructure data from sensors located along the roadway relating to the physical characteristics of the roadway infrastructure, including pavement, bridges, culverts, signs, etc.	Planned
<i>Requirement:</i>	
3 The maintenance and construction vehicle shall provide control signals to infrastructure monitoring sensors located at the roadway.	Planned
<i>Requirement:</i>	
4 The maintenance and construction vehicle shall send current condition of pavement, bridges, culverts, signs, and other roadway infrastructure as measured by on-board sensors or read from infrastructure-based sensors to the center. The data may include raw data or images (e.g., photo logs) that indicate the current status of the infrastructure.	Planned
<i>Requirement:</i>	
5 The maintenance and construction vehicle shall respond to control information from the center to allow remote operation of the on-board vehicle systems.	Planned

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:INDOT Maintenance and Construction Vehicles</i>	
<i>Entity: Maintenance and Construction Vehicle</i>	
<i>Functional Area: MCV Infrastructure Monitoring</i>	
On-board systems to monitor the condition of pavement, bridges, tunnels, associated hardware, and other transportation-related infrastructure (e.g., culverts). Includes vehicle-based sensors and communications with roadway-based infrastructure monitoring sensors.	
<i>Requirement:</i>	
6 The maintenance and construction vehicle shall provide infrastructure sensor equipment operational status to the center.	Planned
<i>Functional Area: MCV Work Zone Support</i>	
On-board systems that provide communications and support for local management of a work zone.	
<i>Requirement:</i>	
1 The maintenance and construction vehicle shall monitor, operate, and control work zone devices located at or alongside the roadway. The devices operated on board the vehicle include driver information devices (e.g. dynamic message signs) and work zone intrusion detection and alert devices.	Existing
<i>Requirement:</i>	
2 The maintenance and construction vehicle shall provide an interface for field personnel to input status of their work zone activities.	Existing
<i>Requirement:</i>	
3 The maintenance and construction vehicle shall collect inputs from field personnel and from work zone devices on-board the maintenance and construction vehicle and send them to the controlling center.	Existing
<i>Functional Area: MCV Vehicle Safety Monitoring</i>	
On-board systems to detect vehicle intrusions and warn crew workers and drivers of imminent encroachment. Crew movements are monitored so that the crew can be warned of movement beyond the designated safe zone. Used for stationary work zones or in mobile applications where a safe zone is maintained around the moving vehicle.	
<i>Requirement:</i>	
1 The maintenance and construction vehicle shall detect that a vehicle has intruded upon the boundary of a work zone. The boundary of the work zone represents an area around the maintenance and construction vehicle, which may be stationary or moving.	Planned
<i>Requirement:</i>	
2 The maintenance and construction vehicle shall receive work zone warnings from the field equipment at the roadside, other maintenance and construction vehicles.	Planned
<i>Requirement:</i>	
3 The maintenance and construction vehicle shall present work zone warnings to the field personnel using direct warning signals or in-vehicle signage functions.	Planned
<i>Requirement:</i>	
4 The maintenance and construction vehicle shall monitor the crew movements to identify when a crew member is crossing the boundary between a work zone and vehicle traffic and issue an alert to the crew member.	Planned
<i>Requirement:</i>	
5 The maintenance and construction vehicle shall provide status of the work zone warning systems to the center.	Planned
<i>Element:INDOT Traffic Management</i>	
<i>Entity: Archived Data Management</i>	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:INDOT Traffic Management</i>	
<i>Entity: Archived Data Management</i>	
<i>Functional Area: ITS Data Repository</i>	
Collect and maintain data and data catalogs from one or more data sources. May include quality checks, error notification, and archive coordination.	
<i>Requirement:</i>	Existing
1 The center shall collect data to be archived from one or more data sources.	
<i>Requirement:</i>	Existing
2 The center shall collect data catalogs from one or more data sources. A catalog describes the data contained in the collection of archived data and may include descriptions of the schema or structure of the data, a description of the contents of the data; e.g., time range of entries, number of entries; or a sample of the data (e. g. a thumbnail).	
<i>Requirement:</i>	Existing
3 The center shall store the archived data in a focused repository that is suited to a particular set of ITS data users.	
<i>Requirement:</i>	Existing
4 The center shall include capabilities for performing quality checks on the incoming archived data.	
<i>Requirement:</i>	Existing
5 The center shall include capabilities for error notification on the incoming archived data.	
<i>Requirement:</i>	Existing
6 The center shall include capabilities for archive to archive coordination.	
<i>Requirement:</i>	Existing
7 The center shall support a broad range of archived data management implementations, ranging from simple data marts that collect a focused set of data and serve a particular user community to large-scale data warehouses that collect, integrate, and summarize transportation data from multiple sources and serve a broad array of users within a region.	
<i>Requirement:</i>	Existing
8 The center shall perform quality checks on received data.	
<i>Requirement:</i>	Existing
9 The center shall provide the capability to execute methods on the incoming data such as cleansing, summarizations, aggregations, or transformations applied to the data before it is stored in the archive.	
<i>Requirement:</i>	Existing
10 The center shall respond to requests from the administrator interface function to maintain the archive data.	
<i>Requirement:</i>	Existing
11 When data or a catalog of data is received from the archive, the center shall generate the requested data product for the users systems.	
<i>Requirement:</i>	Potential
12 For archive data requiring financial payment, the center shall process the financial requests and manage an interface to a Financial Institution.	
<i>Functional Area: Traffic and Roadside Data Archival</i>	
Collects and archives traffic and environmental information directly from the roadside for use in off-line planning, research, and analysis.	
<i>Requirement:</i>	Existing
1 The center shall manage the collection of archive data directly from collection equipment located at the roadside.	
<i>Requirement:</i>	Existing
2 The center shall collect traffic sensor information from roadside devices.	
<i>Requirement:</i>	Potential
3 The center shall collect environmental sensor information that from roadside devices.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: INDOT Traffic Management</i>	
<i>Entity: Archived Data Management</i>	
<i>Functional Area: Traffic and Roadside Data Archival</i>	
Collects and archives traffic and environmental information directly from the roadside for use in off-line planning, research, and analysis.	
<i>Requirement:</i>	
4 The center shall respond to requests from the Archive Data Administer to input the parameters that control the collection process.	Existing
<i>Requirement:</i>	
5 The center shall send the request for data and control parameters to the field equipment where the information is collected and returned.	Existing
<i>Requirement:</i>	
6 The center shall record the status about the imported traffic and roadside data.	Existing
<i>Requirement:</i>	
7 The center shall use the status information to adjust the collection of traffic and roadside data.	Existing
<i>Functional Area: On-Line Analysis and Mining</i>	
Advanced data analysis and mining features to support discovery of information, patterns, and correlations in large ITS archives.	
<i>Requirement:</i>	
1 The center shall support the interface with Archive Data User Systems for requests for analysis of the archive data.	Existing
<i>Requirement:</i>	
2 The center shall provide the capability to perform activities such as data mining, data fusion, summarizations, aggregations, and recreation from archive data. This may include multidimensional analysis, selective summarization and expansion of data details, and many other advanced analysis services.	Existing
<i>Requirement:</i>	
3 The center shall receive the user's systems requests and develop the request to retrieve the data from the archive.	Existing
<i>Requirement:</i>	
4 The center shall respond to users systems requests for a catalog of the archived data analysis products available.	Existing
<i>Requirement:</i>	
5 For archive analysis and data mining products requiring financial payment the center shall process the financial requests and manage an interface to a Financial Institution.	Potential
<i>Entity: Traffic Management</i>	
<i>Functional Area: Collect Traffic Surveillance</i>	
Management of traffic sensors and surveillance (CCTV) equipment, collection of current traffic conditions, and distribution of the collected information to other centers and operators.	
<i>Requirement:</i>	
1 The center shall monitor, analyze, and store traffic sensor data (speed, volume, occupancy) collected from field elements under remote control of the center.	Existing
<i>Requirement:</i>	
2 The center shall monitor, analyze, and distribute traffic images from CCTV systems under remote control of the center.	Potential
<i>Requirement:</i>	
4 The center shall distribute road network conditions data (raw or processed) based on collected and analyzed traffic sensor and surveillance data to other centers.	Existing
<i>Requirement:</i>	
5 The center shall respond to control data from center personnel regarding sensor and surveillance data collection, analysis, storage, and distribution.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: INDOT Traffic Management</i>	
<i>Entity: Traffic Management</i>	
<i>Functional Area: Collect Traffic Surveillance</i>	
Management of traffic sensors and surveillance (CCTV) equipment, collection of current traffic conditions, and distribution of the collected information to other centers and operators.	
<i>Requirement:</i>	
6 The center shall maintain a database of surveillance equipment and sensors and associated data (including the roadway on which they are located, the type of data collected, and the ownership of each)	Existing
<i>Requirement:</i>	
7 The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for traffic data.	Existing
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<i>Functional Area: TMC Probe Information Collection</i>	
Collects, assimilates, and disseminates vehicle probe data collected from roadside beacons and centers controlling transit vehicles, emergency vehicles, toll collection points, and route-guided vehicles.	
<i>Requirement:</i>	
1 The center shall collect traffic probe data from vehicles via roadside field equipment.	Existing
<i>Requirement:</i>	
2 The center shall collect road condition data from probe-equipped transit vehicles via transit management centers; the data may be aggregated and preliminarily processed at the sending center.	Planned
<i>Requirement:</i>	
3 The center shall collect traffic data from traveler information centers based on data from their subscriber vehicles; the data may be aggregated and initial link time calculations performed at the sending center.	Existing
<i>Requirement:</i>	
4 The center shall collect traffic data from toll administrative centers containing travel times between toll collection points for those vehicles equipped for electronic toll collection; the data may be aggregated and processed at the sending center.	Planned
<i>Requirement:</i>	
5 The center shall assimilate current and forecast traffic conditions based on collected probe data and distribute to other centers for dissemination to travelers.	Existing
<i>Requirement:</i>	
6 The center shall collect operational status for the roadside probe data collection equipment.	Existing
<i>Requirement:</i>	
7 The center shall collect fault data for the roadside probe data collection equipment for repair.	Existing
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<i>Functional Area: TMC Signal Control</i>	
Remotely controls traffic signal controllers to implement traffic management strategies at signalized intersections based on traffic conditions, incidents, emergency vehicle preemptions, pedestrian crossings, etc.	
<i>Requirement:</i>	
1 The center shall remotely control traffic signal controllers.	Existing
<i>Requirement:</i>	
2 The center shall accept notifications of pedestrian calls.	Planned
<i>Requirement:</i>	
3 The center shall collect traffic signal controller operational status and compare against the control information sent by the center.	Existing
<i>Requirement:</i>	
4 The center shall collect traffic signal controller fault data from the field.	Existing

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Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: INDOT Traffic Management</i>	
<i>Entity: Traffic Management</i>	
<i>Functional Area: TMC Signal Control</i>	
Remotely controls traffic signal controllers to implement traffic management strategies at signalized intersections based on traffic conditions, incidents, emergency vehicle preemptions, pedestrian crossings, etc.	
<i>Requirement:</i>	
5 The center shall manage (define, store and modify) control plans to coordinate signalized intersections, to be engaged at the direction of center personnel or according to a daily schedule.	Existing
<i>Requirement:</i>	
6 The center shall implement control plans to coordinate signalized intersections based on data from sensors.	Existing
<i>Requirement:</i>	
7 The center shall manage boundaries of the control sections used within the signal system.	Existing
<i>Requirement:</i>	
8 The center shall maintain traffic signal coordination including synchronizing clocks throughout the system.	Existing
<i>Functional Area: TMC Traffic Information Dissemination</i>	
Controls dissemination of traffic-related data to other centers, the media, and travelers via the driver information systems (DMS, HAR) that it operates.	
<i>Requirement:</i>	
1 The center shall remotely control dynamic messages signs for dissemination of traffic and other information to drivers.	Potential
<i>Requirement:</i>	
2 The center shall 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.	Potential
<i>Requirement:</i>	
3 The center shall collect operational status for the driver information systems equipment (DMS, HAR, etc.).	Potential
<i>Requirement:</i>	
4 The center shall collect fault data for the driver information systems equipment (DMS, HAR, etc.) for repair.	Potential
<i>Requirement:</i>	
5 The center shall 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), and the definition of the road network itself.	Existing
<i>Requirement:</i>	
6 The center shall distribute traffic data to maintenance and construction centers, transit centers, emergency management centers, and traveler information providers.	Existing
<i>Requirement:</i>	
7 The center shall distribute traffic data to the media; the capability to provide the information in both data stream and graphical display shall be supported.	Existing
<i>Requirement:</i>	
8 The center shall provide the capability for center personnel to control the nature of the data that is available to non-traffic operations centers and the media.	Existing
<i>Functional Area: TMC Regional Traffic Management</i>	
Coordination between traffic management centers in order to share traffic information between centers as well as control of traffic management field equipment. This may be used during incidents and special events and during day-to-day operations.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:INDOT Traffic Management</i>	
<i>Entity: Traffic Management</i>	
<i>Functional Area: TMC Regional Traffic Management</i>	
Coordination between traffic management centers in order to share traffic information between centers as well as control of traffic management field equipment. This may be used during incidents and special events and during day-to-day operations.	
<i>Requirement:</i>	Planned
1 The center shall exchange traffic information with other traffic management centers including incident information, congestion data, traffic data, signal timing plans, and real-time signal control information.	
<i>Requirement:</i>	Planned
2 The center shall exchange traffic control information with other traffic management centers to support remote monitoring and control of traffic management devices (e.g. signs, sensors, signals, cameras, etc.).	
<i>Functional Area: TMC Traffic Management Decision Support</i>	
Recommends courses of action to the traffic operator based on current and forecast road and traffic conditions. Recommended actions may include predefined incident response plans, signal timing plan changes, DMS/HAR messages, lane control strategies, metering strategies, etc.	
<i>Requirement:</i>	Planned
1 The center shall provide center personnel with an integrated regional view of current and forecast road and traffic conditions including traffic incidents, special events, maintenance activities and other events or conditions that impact capacity or demand.	
<i>Requirement:</i>	Planned
2 The center shall identify network imbalances and potential courses of action.	
<i>Requirement:</i>	Planned
3 The center shall compare the impact of potential courses of action and make recommendations to the operator.	
<i>Requirement:</i>	Planned
4 The recommended actions shall include predefined incident response plans, signal timing plan changes, DMS/HAR messages, lane control strategies and freeway control strategies including ramp metering, interchange metering, and mainline metering.	
<i>Requirement:</i>	Planned
5 The recommended actions shall include multimodal strategies that include suggested transit strategies and suggested route and mode choices for travelers.	
<i>Requirement:</i>	Planned
6 The center shall provide an interface to center personnel to input control parameters for the decision support process and receive recommended actions and supporting information presentation.	
<i>Functional Area: TMC Incident Dispatch Coordination/Communication</i>	
Formulates an incident response that takes into account the incident potential, incident impacts, and/or resources required for incident management. Facilitates the dispatch of emergency response and service vehicles and coordinates the response with cooperating agencies.	

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Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:INDOT Traffic Management</i>	
<i>Entity: Traffic Management</i>	
<i>Functional Area: TMC Incident Dispatch Coordination/Communication</i>	
Formulates an incident response that takes into account the incident potential, incident impacts, and/or resources required for incident management. Facilitates the dispatch of emergency response and service vehicles and coordinates the response with cooperating agencies.	
<i>Requirement:</i>	
1 The center shall 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.	Existing
<i>Requirement:</i>	
2 The center shall coordinate planning for incidents with emergency management centers - including pre-planning activities for disaster response, evacuation, and recovery operations.	Existing
<i>Requirement:</i>	
3 The center shall support requests from emergency management centers to remotely control sensor and surveillance equipment located in the field, provide special routing for emergency vehicles, and to provide responding emergency vehicles with signal preemption.	Planned
<i>Requirement:</i>	
4 The center shall exchange incident information with emergency management centers, maintenance and construction centers, transit centers, information service providers, and the media including description, location, traffic impact, status, expected duration, and response information.	Existing
<i>Requirement:</i>	
5 The center shall 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.	Planned
<i>Requirement:</i>	
6 The center shall 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.	Existing
<i>Requirement:</i>	
7 The center shall provide road network conditions and traffic images to emergency management centers, maintenance and construction centers, and traveler information service providers.	Planned
<i>Requirement:</i>	
8 The center shall monitor incident response performance and calculate incident response and clearance times.	Planned
<i>Requirement:</i>	
9 The center shall 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.	Planned
<i>Requirement:</i>	
10 The center shall coordinate information and controls with other traffic management centers.	Planned

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Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: INDOT Traffic Management</i>	
<i>Entity: Traffic Management</i>	
<i>Functional Area: TMC Incident Dispatch Coordination/Communication</i>	
Formulates an incident response that takes into account the incident potential, incident impacts, and/or resources required for incident management. Facilitates the dispatch of emergency response and service vehicles and coordinates the response with cooperating agencies.	
<i>Requirement:</i> 11 The center shall receive inputs from emergency management and transit management centers to develop an overall status of the transportation system including emergency transit schedules in effect and current status and condition of the transportation infrastructure.	Planned
<i>Requirement:</i> 12 The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for traffic incident management.	Existing
<i>Functional Area: TMC Traffic Network Performance Evaluation</i>	
Measures performance and predicts travel demand patterns to support traffic flow optimization, demand management, and incident management. Collects data from surveillance equipment as well as input from other management centers including emissions, event promoters, and other TMCs.	
<i>Requirement:</i> 1 The center shall monitor, analyze, and store traffic sensor data (speed, volume, occupancy) collected from field elements under remote control of the center to support overall network performance evaluations.	Existing
<i>Requirement:</i> 2 The center shall collect wide-area pollution data from emissions management centers to support overall network performance evaluations.	Planned
<i>Requirement:</i> 3 The center shall collect and store plans from event promoters for major future events possibly impacting traffic to support overall network performance evaluations.	Existing
<i>Requirement:</i> 4 The center shall collect and store anticipated route information from information service providers to support overall network performance evaluations and predictions.	Existing
<i>Requirement:</i> 5 The center shall exchange information with transit management centers including details current transit routes, the level of service on each route, and the progress of individual vehicles along their routes for use in forecasting demand and estimating current transportation network performance.	Planned
<i>Requirement:</i> 6 The center shall exchange traffic information with other traffic management centers, including incidents, congestion data, traffic data, signal timing plans, and real-time signal control information to support overall network performance evaluations.	Existing
<i>Requirement:</i> 7 The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for network performance evaluations.	Existing
<i>Requirement:</i> 8 The center shall provide an interface to the archive data repository to enable the operator to retrieve historical operating data for use in planning to predict future traffic patterns and conditions.	Existing

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Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> INDOT Traffic Management	
<i>Entity:</i> Traffic Management	
<i>Functional Area:</i> TMC Traffic Network Performance Evaluation	
Measures performance and predicts travel demand patterns to support traffic flow optimization, demand management, and incident management. Collects data from surveillance equipment as well as input from other management centers including emissions, event promoters, and other TMCs.	
<i>Requirement:</i>	Existing
9 This center shall use the collected information to measure overall current and forecast network performance and predict travel demand patterns.	
<i>Functional Area:</i> HRI Traffic Management	
Remotely monitor and control highway-rail intersection (HRI) equipment, includes standard speed active warning systems and high speed systems which provide additional information on approaching trains and detect and report on obstructions in the HRI.	
<i>Requirement:</i>	Planned
1 The center shall remotely control highway-rail intersection (HRI) equipment located in the field.	
<i>Requirement:</i>	Existing
2 The center shall accept collect highway-rail intersection (HRI) advisory or alert data from rail operations centers.	
<i>Requirement:</i>	Existing
3 The center shall collect highway-rail intersection (HRI) equipment operational status and compare against the control information sent by the center.	
<i>Requirement:</i>	Planned
4 The center shall provide the highway-rail intersection (HRI) equipment operational status to rail operations centers.	
<i>Requirement:</i>	Planned
5 The center shall collect incident information related to a highway-rail intersection (HRI), such as intersection blockages or crashes or equipment malfunctions.	
<i>Requirement:</i>	Planned
6 The center shall implement control plans to coordinate signalized intersections around highway-rail intersections (HRI), under control of center personnel, based on data from sensors and surveillance monitoring traffic conditions, incidents, equipment faults, pedestrian crossings, etc.	
<i>Functional Area:</i> Rail Operations Coordination	
Coordination between rail operations and traffic management centers - exchanging train schedules, maintenance schedules, as well as incidents and priority messages that impact highway-rail intersections (HRIs). Supports advanced traffic control strategies and enhanced traveler information.	
<i>Requirement:</i>	Planned
1 The center shall exchange highway-rail intersection (HRI) information with rail operations centers. This information may include event schedules, requests for information from the Rail Operators, incident notification based on rail operations messages, and priority messages like notifications of a HAZMAT spill, equipment failure, or an intersection blockage.	
<i>Requirement:</i>	Planned
2 The center shall receive highway-rail intersection (HRI) maintenance schedules, train schedules, and incident notifications from rail operations centers.	
<i>Requirement:</i>	Planned
3 The center shall use the rail operations information to develop forecast HRI closure times and durations which may be applied in advanced traffic control strategies or delivered as enhanced traveler information.	

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Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: INDOT Traffic Management</i>	
<i>Entity: Traffic Management</i>	
<i>Functional Area: Barrier System Management</i>	
Remotely controls barrier systems such as gates and other systems that manage entry to roadways, transportation facilities and infrastructure.	
<i>Requirement:</i>	
1 The center shall remotely control barrier systems for transportation facilities and infrastructure. Barrier systems include automated or remotely controlled gates, barriers and other systems that manage entry to roadways.	Planned
<i>Requirement:</i>	
2 The center shall collect barrier system operational status.	Planned
<i>Requirement:</i>	
3 The center shall collect barrier system fault data and send to the maintenance center for repair.	Planned
<i>Requirement:</i>	
4 The center shall accept requests for barrier system activation from other centers and from center personnel to support emergency response and detours.	Planned
<i>Functional Area: Traffic Equipment Maintenance</i>	
Monitoring and remote diagnostics of field equipment - detect failures, issue problem reports, and track the repair or replacement of the failed equipment.	
<i>Requirement:</i>	
1 The center shall collect and store sensor (traffic, pedestrian, multimodal crossing) operational status.	Existing
<i>Requirement:</i>	
2 The center shall collect and store CCTV surveillance system (traffic, pedestrian) operational status.	Potential
<i>Requirement:</i>	
3 The center shall collect and store sensor (traffic, pedestrian, multimodal crossing) fault data and send to the maintenance center for repair.	Existing
<i>Requirement:</i>	
4 The center shall collect and store CCTV surveillance system (traffic, pedestrian) fault data send to the maintenance center for repair.	Potential
<i>Requirement:</i>	
5 The center shall collect environmental sensor operational status.	Planned
<i>Requirement:</i>	
6 The center shall collect environmental sensor equipment fault data and send to the maintenance center for repair.	Planned
<i>Requirement:</i>	
7 The center shall exchange data with maintenance centers concerning the reporting of faulty equipment and the schedule/status of their repair. Information exchanged includes details of new equipment faults, and clearances when the faults are cleared.	Existing
<i>Requirement:</i>	
8 The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for traffic maintenance data.	Existing
<i>Functional Area: TMC Work Zone Traffic Management</i>	
Coordination with maintenance systems using work zone images and traveler information systems (such as DMS), and distribution of work plans so that work zones are established that have minimum traffic impact.	
<i>Requirement:</i>	
1 The center shall receive work zone images from a maintenance center.	Potential
<i>Requirement:</i>	
2 The center shall analyze work zone images for indications of a possible incident.	Potential

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: INDOT Traffic Management</i>	
<i>Entity: Traffic Management</i>	
<i>Functional Area: TMC Work Zone Traffic Management</i>	
Coordination with maintenance systems using work zone images and traveler information systems (such as DMS), and distribution of work plans so that work zones are established that have minimum traffic impact.	
<i>Requirement:</i>	
3 The center shall remotely control driver information systems (such as dynamic messages signs, highway advisory radios) to advise drivers of activity around a work zone.	Potential
<i>Requirement:</i>	
4 The center shall collect operational status for the driver information systems equipment in work zones.	Existing
<i>Requirement:</i>	
5 The center shall collect fault data for the driver information systems equipment in work zones for repair.	Existing
<i>Requirement:</i>	
6 The center shall receive proposed maintenance and construction work plans, analyze the activity as a possible incident, and provide work plan feedback to the sending center.	Existing
<i>Functional Area: TMC Demand Management Coordination</i>	
Provides the capability to gather information on regional toll, parking, and transit usage and request changes to enable dynamic pricing for demand management.	
<i>Requirement:</i>	
1 The center shall collect and store toll pricing data from toll administration centers, including the price for each road segment to which a toll applies, with the time and date for when it applies.	Planned
<i>Requirement:</i>	
2 The center shall collect and store parking information from parking management providers including lot locations, features (e.g. ability to handle oversized vehicles), capacity, type, hours of operation and rates.	Planned
<i>Requirement:</i>	
3 The center shall collect and store transit fare and schedule information from transit management centers.	Planned
<i>Requirement:</i>	
4 The center shall collect and store current transit, parking, and toll fee schedule information provided by regional traveler information systems.	Planned
<i>Requirement:</i>	
5 The center shall send requests to toll administration centers to change pricing, modify restrictions, or modify operations of a toll road facility.	Potential
<i>Requirement:</i>	
6 The center shall send requests to parking management providers to change the current parking lot charging structure.	Potential
<i>Requirement:</i>	
7 The center shall send requests to transit management centers to change the current transit services - schedules or fares of the transit services including park-and-ride lots.	Potential
<i>Functional Area: Traffic Data Collection</i>	
Collection and storage of traffic management data. For use by operations personnel or data archives in the region.	
<i>Requirement:</i>	
1 The center shall collect traffic management data such as operational data, event logs, etc.	Existing
<i>Requirement:</i>	
2 The center shall assign quality control metrics and meta-data to be stored along with the data. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:INDOT Traffic Management</i>	
<i>Entity: Traffic Management</i>	
<i>Functional Area: Traffic Data Collection</i>	
Collection and storage of traffic management data. For use by operations personnel or data archives in the region.	
<i>Requirement:</i> 3 The center shall receive and respond to requests from ITS Archives for either a catalog of the traffic data or for the data itself.	Existing
<i>Requirement:</i> 4 The center shall be able to produce sample products of the data available.	Existing
<i>Functional Area: TMC Transportation Operations Data Collection</i>	
Collects real-time information on the state of the regional transportation system for operational use by the center. It establishes communications with a regional repository, requests or subscribes to information relevant to the center, and distributes the received information for use.	
<i>Requirement:</i> 1 The center shall collect real-time information on the state of the regional transportation system including current traffic and road conditions, weather conditions, special event and incident information.	Existing
<i>Requirement:</i> 2 The center shall support the capability for the system operator to monitor and control the information collection service.	Existing
<i>Element:INDOT-Northwest District Arterial TMC</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Incident Command</i>	
Tactical decision support, resource coordination, and communications integration among emergency management agencies for Incident Commands that are established by first responders to support local management of an incident.	
<i>Requirement:</i> 1 The center shall 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.	Potential
<i>Requirement:</i> 2 The center shall provide incident command communications with public safety, emergency management, transportation, and other allied response agency centers.	Potential
<i>Requirement:</i> 3 The center shall track and maintain resource information and action plans pertaining to the incident command.	Potential
<i>Requirement:</i> 4 The center shall 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.	Potential
<i>Requirement:</i> 5 The center shall assess the status of responding emergency vehicles as part of an incident command.	Potential
<i>Functional Area: Service Patrol Management</i>	
Dispatch and communication with roadway service patrol vehicles that monitor roads to aid motorists, offering rapid response to minor incidents.	
<i>Requirement:</i> 1 The center shall dispatch roadway service patrol vehicles to identified incident locations.	Potential

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Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:INDOT-Northwest District Arterial TMC</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Service Patrol Management</i>	
Dispatch and communication with roadway service patrol vehicles that monitor roads to aid motorists, offering rapid response to minor incidents.	
<i>Requirement:</i>	Potential
2 The center shall store the current status of all service patrol vehicles available for dispatch and those that have been dispatched.	
<i>Requirement:</i>	Potential
3 The center shall share incident information collected by the service patrol with traffic, maintenance and construction, and traveler information centers for incident management, incident notification to travelers, and incident cleanup.	
<i>Requirement:</i>	Potential
4 The center shall track the location and status of service patrol vehicles.	
<i>Functional Area: Center Secure Area Surveillance</i>	
Management of security surveillance devices and analysis of that data to detect potential threats. Areas under surveillance may include transit stops, transit stations, rest areas, park and ride lots, modal interchange facilities, on-board a transit vehicle, etc.	
<i>Requirement:</i>	Potential
1 The center shall remotely monitor video images and audio surveillance data collected in secure areas including facilities (e.g. transit yards) and transportation infrastructure (e.g. bridges, tunnels, interchanges, roadway infrastructure, and transit railways or guideways). The data may be raw or pre-processed in the field.	
<i>Requirement:</i>	Potential
2 The center shall remotely monitor video images and audio surveillance data collected in traveler secure areas, which include transit stations, transit stops, rest areas, park and ride lots, and other fixed sites along travel routes (e.g., emergency pull-off areas and travel information centers). The data may be raw or pre-processed in the field.	
<i>Requirement:</i>	Potential
3 The center shall remotely monitor video images and audio surveillance data collected on-board transit vehicles. The data may be raw or pre-processed in the field.	
<i>Requirement:</i>	Potential
4 The center shall exchange surveillance data with other emergency centers.	
<i>Requirement:</i>	Potential
5 The center shall identify potential security threats based on collected security surveillance data.	
<i>Requirement:</i>	Potential
6 The center shall verify potential security threats by correlating security surveillance data from multiple sources.	
<i>Requirement:</i>	Potential
7 The center shall remotely control security surveillance devices in secure areas including facilities (e.g. transit yards) and transportation infrastructure (e.g. bridges, tunnels, interchanges, roadway infrastructure, and transit railways or guideways).	
<i>Requirement:</i>	Potential
8 The center shall remotely control security surveillance devices in traveler secure areas, which include transit stations, transit stops, rest areas, park and ride lots, and other fixed sites along travel routes (e.g., emergency pull-off areas and travel information centers).	

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Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:INDOT-Northwest District Arterial TMC</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Center Secure Area Surveillance</i>	
Management of security surveillance devices and analysis of that data to detect potential threats. Areas under surveillance may include transit stops, transit stations, rest areas, park and ride lots, modal interchange facilities, on-board a transit vehicle, etc.	
<i>Requirement:</i>	Potential
9 The center shall remotely control security surveillance devices on-board transit vehicles.	
<i>Requirement:</i>	Potential
10 The center shall match traveler video images against a database from the Alerting and Advisory Systems of known images that may represent criminals and terrorists.	
<i>Requirement:</i>	Potential
11 The center shall exchange traveler images with other emergency management centers to support traveler image matching.	
<i>Requirement:</i>	Potential
12 The center shall respond to control data from center personnel regarding security surveillance data collection, processing, threat detection, and image matching.	
<i>Requirement:</i>	Potential
13 The center shall monitor maintenance status of the security sensor field equipment.	
<i>Functional Area: Center Secure Area Sensor Management</i>	
Management of security sensors, analysis of sensor data, correlation with surveillance data and alerts from other agencies to detect potential threats, and dissemination of threat information to other agencies. Sensors may be placed in areas such as transit stops, transit stations, rest areas, park and ride lots, modal interchange facilities, on-board a transit vehicle, etc.	
<i>Requirement:</i>	Potential
1 The center shall remotely monitor and control security sensor data collected in secure areas including facilities (e.g. transit yards) and transportation infrastructure (e.g. bridges, tunnels, interchanges, roadway infrastructure, and transit railways or guideways). The types of security sensor data include environmental threat (e.g. chemical agent, toxic industrial chemical, biological, explosives, and radiological sensors), infrastructure condition and integrity, intrusion and motion, and object detection sensors. The data may be raw or pre-processed in the field.	
<i>Requirement:</i>	Potential
2 The center shall remotely monitor and control security sensor data collected in traveler secure areas, which include transit stations, transit stops, rest areas, park and ride lots, and other fixed sites along travel routes (e.g., emergency pull-off areas and travel information centers). The types of security sensor data include environmental threat (e.g. chemical agent, toxic industrial chemical, biological, explosives, and radiological sensors), intrusion and motion, and object detection sensors. The data may be raw or pre-processed in the field.	
<i>Requirement:</i>	Potential
3 The center shall remotely monitor and control security sensor data collected on-board transit vehicles. The types of security sensor data include environmental threat (e.g. chemical agent, toxic industrial chemical, biological, explosives, and radiological sensors) and object detection sensors. The data may be raw or pre-processed in the field.	
<i>Requirement:</i>	Potential
4 The center shall exchange security sensor data with other emergency centers.	

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Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: INDOT-Northwest District Arterial TMC</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Center Secure Area Sensor Management</i>	
Management of security sensors, analysis of sensor data, correlation with surveillance data and alerts from other agencies to detect potential threats, and dissemination of threat information to other agencies. Sensors may be placed in areas such as transit stops, transit stations, rest areas, park and ride lots, modal interchange facilities, on-board a transit vehicle, etc.	
<i>Requirement:</i>	
5 The center shall identify potential security threats based on collected security sensor data.	Potential
<i>Requirement:</i>	
6 The center shall verify potential security threats by correlating security sensor data from multiple sources.	Potential
<i>Requirement:</i>	
7 The center shall perform threat analysis based on correlations of security sensor and surveillance data.	Potential
<i>Requirement:</i>	
8 The center shall exchange threat analysis data with Alerting and Advisory Systems and use that data in local threat analysis processing.	Potential
<i>Requirement:</i>	
9 The center shall disseminate threat information to other agencies, including traffic, transit, maintenance, rail operations, and other emergency management centers.	Potential
<i>Requirement:</i>	
10 The center shall respond to control data from center personnel regarding security sensor data collection, processing, threat detection, and threat analysis.	Potential
<i>Requirement:</i>	
11 The center shall request activation of barriers and safeguards on request from center personnel.	Potential
<i>Requirement:</i>	
12 The center shall monitor maintenance status of the security sensor field equipment.	Potential
<i>Functional Area: Center Secure Area Alarm Support</i>	
Collection and response to silent and audible alarms received from travelers in secure areas (such as transit stops, rest areas, park-and-ride lots) and from on-board transit vehicles.	
<i>Requirement:</i>	
1 The center shall collect silent and audible alarms received from travelers in secure areas (such as transit stops, rest areas, park and ride lots, modal interchange facilities).	Potential
<i>Requirement:</i>	
2 The center shall collect silent and audible alarms received from transit vehicles, originated by the traveler or the transit vehicle operator.	Potential
<i>Requirement:</i>	
3 After the alarm message has been received, the center shall generate an alarm acknowledgment to the sender.	Potential
<i>Requirement:</i>	
4 After the alarm message becomes a verified incident, the center shall determine the appropriate response.	Potential
<i>Requirement:</i>	
5 The center shall determine whether the alarm message indicates an emergency that requires the attention of public safety agencies, and forward alarm message data to the appropriate agency as necessary.	Potential
<i>Requirement:</i>	
6 The center shall forward the alarm message to center personnel and respond to the traveler or transit vehicle operator as directed by the personnel.	Potential

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Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> INDOT-Northwest District Arterial TMC	
<i>Entity:</i> Emergency Management	
<i>Functional Area:</i> Mayday Support	
Collection and response to Mayday messages received from vehicles and drivers.	
<i>Requirement:</i>	Potential
1 The center shall collect mayday messages from vehicles and drivers.	
<i>Requirement:</i>	Potential
2 The center shall collect mayday messages from travelers via personal handheld devices.	
<i>Requirement:</i>	Potential
3 The center shall acknowledge the request for emergency assistance, whether originated by the driver, automatically by the vehicle's safety systems, or by a traveler via a personal handheld device.	
<i>Requirement:</i>	Potential
4 After the mayday becomes a verified incident, the center shall determine the appropriate response to the mayday message.	
<i>Requirement:</i>	Potential
5 The center shall determine whether the mayday message indicates an emergency that requires the attention of public safety agencies, and forward mayday emergency data to the appropriate agency as necessary.	
<i>Requirement:</i>	Potential
6 The center shall support the activation of remote controlled functions requested by a vehicle, such as requests to unlock doors.	
<i>Requirement:</i>	Potential
7 The center shall request additional emergency details from or issue commands to the vehicle's security systems or vehicle driver if needed.	
<i>Requirement:</i>	Potential
8 The center shall maintain a log of all mayday signals received from vehicles.	
<i>Requirement:</i>	Potential
9 The center shall provide all mayday data to center personnel and respond to the vehicle, driver, or traveler using the portable handheld device as directed by the personnel.	
<i>Functional Area:</i> Emergency Commercial Vehicle Response	
Responds to commercial vehicle and freight equipment related emergencies. Includes incidents involving hazardous materials as well as the detection of non-permitted transport of security sensitive hazmat.	
<i>Requirement:</i>	Potential
1 The center shall receive emergency notification information from commercial vehicles, commercial vehicle check stations, or commercial fleet operators and present the possible incident information to the emergency system operator. This may include detection of non-permitted transport of security sensitive hazmat, hazardous cargo spills, etc.	
<i>Requirement:</i>	Potential
2 The center shall receive details of the cargo being carried by commercial vehicles from their commercial fleet manager for incidents involving potential hazardous materials.	
<i>Requirement:</i>	Potential
3 The center shall forward the verified emergency information to the responding agency based on the location and nature of the emergency.	
<i>Requirement:</i>	Potential
4 The center shall provide the capability to request Fleet and Freight Management to disable a specific vehicle in their fleet.	
<i>Functional Area:</i> Emergency Transportation Operations Data Collection	

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Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> INDOT-Northwest District Arterial TMC	
<i>Entity:</i> Emergency Management	
<i>Functional Area:</i> Emergency Transportation Operations Data Collection	
Collects real-time information on the state of the regional transportation system for operational use by the center. It establishes communications with a regional repository, requests or subscribes to information relevant to the center, and distributes the received information for use.	
<i>Requirement:</i>	Potential
1 The center shall collect real-time information on the state of the regional transportation system including current traffic and road conditions, weather conditions, special event and incident information.	
<i>Requirement:</i>	Potential
2 The center shall support the capability for the system operator to monitor and control the information collection service.	
<i>Entity:</i> Traffic Management	
<i>Functional Area:</i> TMC Roadway Warning	
Remotely monitors and controls field elements used to warn drivers approaching hazards. Detects and warns approaching vehicles of adverse road weather conditions, traffic conditions including queues, and obstacles or animals in the road.	
<i>Requirement:</i>	Potential
1 The center shall monitor data on traffic, environmental conditions, and other hazards collected from sensors along the roadway.	
<i>Functional Area:</i> TMC Variable Speed Limits	
Remotely monitors and controls variable speed limits systems, including equipment that monitors current traffic and environmental conditions, determines the current speed limits by lane, and displays the speed limits and additional information to drivers.	
<i>Requirement:</i>	Potential
1 The center shall monitor data on traffic and environmental conditions collected from sensors along the roadway.	
<i>Requirement:</i>	Potential
2 Based on the measured data, the center shall calculate and set suitable speed limits by lane.	
<i>Functional Area:</i> TMC Roadway Warning	
Remotely monitors and controls field elements used to warn drivers approaching hazards. Detects and warns approaching vehicles of adverse road weather conditions, traffic conditions including queues, and obstacles or animals in the road.	
<i>Requirement:</i>	Potential
2 The center shall identify hazardous road weather and surface conditions.	
<i>Functional Area:</i> TMC Variable Speed Limits	
Remotely monitors and controls variable speed limits systems, including equipment that monitors current traffic and environmental conditions, determines the current speed limits by lane, and displays the speed limits and additional information to drivers.	
<i>Requirement:</i>	Potential
3 The center shall control field equipment that posts the current speed limits and displays additional information such as basic safety rules and current traffic information to drivers.	
<i>Functional Area:</i> TMC Roadway Warning	

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Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> INDOT-Northwest District Arterial TMC	
<i>Entity:</i> Traffic Management	
<i>Functional Area:</i> TMC Roadway Warning	
Remotely monitors and controls field elements used to warn drivers approaching hazards. Detects and warns approaching vehicles of adverse road weather conditions, traffic conditions including queues, and obstacles or animals in the road.	
<i>Requirement:</i>	Potential
3 The center shall identify hazardous traffic conditions including queues.	
<i>Requirement:</i>	Potential
4 The center shall identify debris, animals, or other encroachment on the roadway dangerous to approaching motorists.	
<i>Functional Area:</i> TMC Variable Speed Limits	
Remotely monitors and controls variable speed limits systems, including equipment that monitors current traffic and environmental conditions, determines the current speed limits by lane, and displays the speed limits and additional information to drivers.	
<i>Requirement:</i>	Potential
4 The center shall monitor the operational status of the variable speed limit equipment, including fault reports.	
<i>Requirement:</i>	Potential
5 The center shall provide center personnel current system status and respond to control data from center personnel regarding variable speed limits and	
<i>Functional Area:</i> TMC Roadway Warning	
Remotely monitors and controls field elements used to warn drivers approaching hazards. Detects and warns approaching vehicles of adverse road weather conditions, traffic conditions including queues, and obstacles or animals in the road.	
<i>Requirement:</i>	Potential
5 The center shall issue control commands to field equipment warning drivers approaching the identified hazardous conditions.	
<i>Requirement:</i>	Potential
6 The center shall monitor the operational status of the dynamic warning equipment, including fault reports.	
<i>Functional Area:</i> Collect Traffic Surveillance	
Management of traffic sensors and surveillance (CCTV) equipment, collection of current traffic conditions, and distribution of the collected information to other centers and operators.	
<i>Requirement:</i>	Potential
1 The center shall monitor, analyze, and store traffic sensor data (speed, volume, occupancy) collected from field elements under remote control of the center.	
<i>Requirement:</i>	Potential
2 The center shall monitor, analyze, and distribute traffic images from CCTV systems under remote control of the center.	
<i>Requirement:</i>	Potential
3 The center shall monitor, analyze, and store multimodal crossing and high occupancy vehicle (HOV) lane sensor data under remote control of the center.	
<i>Requirement:</i>	Potential
4 The center shall distribute road network conditions data (raw or processed) based on collected and analyzed traffic sensor and surveillance data to other centers.	
<i>Requirement:</i>	Potential
5 The center shall respond to control data from center personnel regarding sensor and surveillance data collection, analysis, storage, and distribution.	

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Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:INDOT-Northwest District Arterial TMC</i>	
<i>Entity: Traffic Management</i>	
<i>Functional Area: Collect Traffic Surveillance</i>	
Management of traffic sensors and surveillance (CCTV) equipment, collection of current traffic conditions, and distribution of the collected information to other centers and operators.	
<i>Requirement:</i>	
6 The center shall maintain a database of surveillance equipment and sensors and associated data (including the roadway on which they are located, the type of data collected, and the ownership of each)	Potential
<i>Requirement:</i>	
7 The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for traffic data.	Potential
<i>Functional Area: TMC Probe Information Collection</i>	
Collects, assimilates, and disseminates vehicle probe data collected from roadside beacons and centers controlling transit vehicles, emergency vehicles, toll collection points, and route-guided vehicles.	
<i>Requirement:</i>	
1 The center shall collect traffic probe data from vehicles via roadside field equipment.	Potential
<i>Requirement:</i>	
2 The center shall collect road condition data from probe-equipped transit vehicles via transit management centers; the data may be aggregated and preliminarily processed at the sending center.	Potential
<i>Requirement:</i>	
3 The center shall collect traffic data from traveler information centers based on data from their subscriber vehicles; the data may be aggregated and initial link time calculations performed at the sending center.	Potential
<i>Requirement:</i>	
4 The center shall collect traffic data from toll administrative centers containing travel times between toll collection points for those vehicles equipped for electronic toll collection; the data may be aggregated and processed at the sending center.	Potential
<i>Requirement:</i>	
5 The center shall assimilate current and forecast traffic conditions based on collected probe data and distribute to other centers for dissemination to travelers.	Potential
<i>Requirement:</i>	
6 The center shall collect operational status for the roadside probe data collection equipment.	Potential
<i>Requirement:</i>	
7 The center shall collect fault data for the roadside probe data collection equipment for repair.	Potential
<i>Functional Area: TMC Signal Control</i>	
Remotely controls traffic signal controllers to implement traffic management strategies at signalized intersections based on traffic conditions, incidents, emergency vehicle preemptions, pedestrian crossings, etc.	
<i>Requirement:</i>	
1 The center shall remotely control traffic signal controllers.	Potential
<i>Requirement:</i>	
2 The center shall accept notifications of pedestrian calls.	Potential
<i>Requirement:</i>	
3 The center shall collect traffic signal controller operational status and compare against the control information sent by the center.	Potential
<i>Requirement:</i>	
4 The center shall collect traffic signal controller fault data from the field.	Potential

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Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> INDOT-Northwest District Arterial TMC	
<i>Entity:</i> Traffic Management	
<i>Functional Area:</i> TMC Signal Control	
Remotely controls traffic signal controllers to implement traffic management strategies at signalized intersections based on traffic conditions, incidents, emergency vehicle preemptions, pedestrian crossings, etc.	
<i>Requirement:</i>	Potential
5 The center shall manage (define, store and modify) control plans to coordinate signalized intersections, to be engaged at the direction of center personnel or according to a daily schedule.	
<i>Requirement:</i>	Potential
6 The center shall implement control plans to coordinate signalized intersections based on data from sensors.	
<i>Requirement:</i>	Potential
7 The center shall manage boundaries of the control sections used within the signal system.	
<i>Requirement:</i>	Potential
8 The center shall maintain traffic signal coordination including synchronizing clocks throughout the system.	
<i>Functional Area:</i> TMC Traffic Information Dissemination	
Controls dissemination of traffic-related data to other centers, the media, and travelers via the driver information systems (DMS, HAR) that it operates.	
<i>Requirement:</i>	Potential
1 The center shall remotely control dynamic messages signs for dissemination of traffic and other information to drivers.	
<i>Requirement:</i>	Potential
2 The center shall 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.	
<i>Requirement:</i>	Potential
3 The center shall collect operational status for the driver information systems equipment (DMS, HAR, etc.).	
<i>Requirement:</i>	Potential
4 The center shall collect fault data for the driver information systems equipment (DMS, HAR, etc.) for repair.	
<i>Requirement:</i>	Potential
5 The center shall 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), and the definition of the road network itself.	
<i>Requirement:</i>	Potential
6 The center shall distribute traffic data to maintenance and construction centers, transit centers, emergency management centers, and traveler information providers.	
<i>Requirement:</i>	Potential
7 The center shall distribute traffic data to the media; the capability to provide the information in both data stream and graphical display shall be supported.	
<i>Requirement:</i>	Potential
8 The center shall provide the capability for center personnel to control the nature of the data that is available to non-traffic operations centers and the media.	
<i>Functional Area:</i> TMC Regional Traffic Management	
Coordination between traffic management centers in order to share traffic information between centers as well as control of traffic management field equipment. This may be used during incidents and special events and during day-to-day operations.	

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Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:INDOT-Northwest District Arterial TMC</i>	
<i>Entity: Traffic Management</i>	
<i>Functional Area: TMC Regional Traffic Management</i>	
Coordination between traffic management centers in order to share traffic information between centers as well as control of traffic management field equipment. This may be used during incidents and special events and during day-to-day operations.	
<i>Requirement:</i>	Potential
1 The center shall exchange traffic information with other traffic management centers including incident information, congestion data, traffic data, signal timing plans, and real-time signal control information.	
<i>Requirement:</i>	Potential
2 The center shall exchange traffic control information with other traffic management centers to support remote monitoring and control of traffic management devices (e.g. signs, sensors, signals, cameras, etc.).	
<i>Functional Area: TMC Traffic Management Decision Support</i>	
Recommends courses of action to the traffic operator based on current and forecast road and traffic conditions. Recommended actions may include predefined incident response plans, signal timing plan changes, DMS/HAR messages, lane control strategies, metering strategies, etc.	
<i>Requirement:</i>	Potential
1 The center shall provide center personnel with an integrated regional view of current and forecast road and traffic conditions including traffic incidents, special events, maintenance activities and other events or conditions that impact capacity or demand.	
<i>Requirement:</i>	Potential
2 The center shall identify network imbalances and potential courses of action.	
<i>Requirement:</i>	Potential
3 The center shall compare the impact of potential courses of action and make recommendations to the operator.	
<i>Requirement:</i>	Potential
4 The recommended actions shall include predefined incident response plans, signal timing plan changes, DMS/HAR messages, lane control strategies and freeway control strategies including ramp metering, interchange metering, and mainline metering.	
<i>Requirement:</i>	Potential
5 The recommended actions shall include multimodal strategies that include suggested transit strategies and suggested route and mode choices for travelers.	
<i>Requirement:</i>	Potential
6 The center shall provide an interface to center personnel to input control parameters for the decision support process and receive recommended actions and supporting information presentation.	
<i>Functional Area: TMC Incident Detection</i>	
Remotely monitors traffic sensor and surveillance systems to detect and verify incidents. Also monitors external advisory and incident reporting systems, intermodal freight depots, and border crossings for additional incident information. Identified incidents are reported to operations personnel and other centers.	
<i>Requirement:</i>	Potential
1 The center shall 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.	
<i>Requirement:</i>	Potential
2 The center shall collect and store traffic flow and image data from the field equipment to detect and verify incidents.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:INDOT-Northwest District Arterial TMC</i>	
<i>Entity: Traffic Management</i>	
<i>Functional Area: TMC Incident Detection</i>	
Remotely monitors traffic sensor and surveillance systems to detect and verify incidents. Also monitors external advisory and incident reporting systems, intermodal freight depots, and border crossings for additional incident information. Identified incidents are reported to operations personnel and other centers.	
<i>Requirement:</i> 3 The center shall receive inputs concerning upcoming events that would effect the traffic network from event promoters and traveler information service providers.	Potential
<i>Requirement:</i> 4 The center shall exchange incident and threat information with emergency management centers as well as maintenance and construction centers; including notification of existence of incident and expected severity, location, time and nature of incident.	Potential
<i>Requirement:</i> 5 The center shall support requests from emergency management centers and border inspection systems to remotely control sensor and surveillance equipment located in the field.	Potential
<i>Requirement:</i> 6 The center shall provide road network conditions and traffic images to emergency management centers to support the detection, verification, and classification of incidents.	Potential
<i>Requirement:</i> 7 The center shall provide video and traffic sensor control commands to the field equipment to detect and verify incidents.	Potential
<i>Functional Area: TMC Incident Dispatch Coordination/Communication</i>	
Formulates an incident response that takes into account the incident potential, incident impacts, and/or resources required for incident management. Facilitates the dispatch of emergency response and service vehicles and coordinates the response with cooperating agencies.	
<i>Requirement:</i> 1 The center shall 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.	Potential
<i>Requirement:</i> 2 The center shall coordinate planning for incidents with emergency management centers - including pre-planning activities for disaster response, evacuation, and recovery operations.	Potential
<i>Requirement:</i> 3 The center shall support requests from emergency management centers to remotely control sensor and surveillance equipment located in the field, provide special routing for emergency vehicles, and to provide responding emergency vehicles with signal preemption.	Potential

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: INDOT-Northwest District Arterial TMC</i>	
<i>Entity: Traffic Management</i>	
<i>Functional Area: TMC Incident Dispatch Coordination/Communication</i>	
Formulates an incident response that takes into account the incident potential, incident impacts, and/or resources required for incident management. Facilitates the dispatch of emergency response and service vehicles and coordinates the response with cooperating agencies.	
<i>Requirement:</i> 4 The center shall exchange incident information with emergency management centers, maintenance and construction centers, transit centers, information service providers, and the media including description, location, traffic impact, status, expected duration, and response information.	Potential
<i>Requirement:</i> 5 The center shall 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.	Potential
<i>Requirement:</i> 6 The center shall 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.	Potential
<i>Requirement:</i> 7 The center shall provide road network conditions and traffic images to emergency management centers, maintenance and construction centers, and traveler information service providers.	Potential
<i>Requirement:</i> 8 The center shall monitor incident response performance and calculate incident response and clearance times.	Potential
<i>Requirement:</i> 9 The center shall 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.	Potential
<i>Requirement:</i> 10 The center shall coordinate information and controls with other traffic management centers.	Potential
<i>Requirement:</i> 11 The center shall receive inputs from emergency management and transit management centers to develop an overall status of the transportation system including emergency transit schedules in effect and current status and condition of the transportation infrastructure.	Potential
<i>Requirement:</i> 12 The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for traffic incident management.	Potential
<i>Functional Area: TMC Evacuation Support</i>	
Development, coordination, and execution of special traffic management strategies during evacuation and subsequent reentry of a population in the vicinity of a disaster or major emergency. Interfaces with emergency management and other traffic management centers.	
<i>Requirement:</i> 1 The center shall coordinate planning for evacuation with emergency management centers - including pre-planning activities such as establishing routes, areas to be evacuated, timing, etc.	Potential

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: INDOT-Northwest District Arterial TMC</i>	
<i>Entity: Traffic Management</i>	
<i>Functional Area: TMC Evacuation Support</i>	
Development, coordination, and execution of special traffic management strategies during evacuation and subsequent reentry of a population in the vicinity of a disaster or major emergency. Interfaces with emergency management and other traffic management centers.	
<i>Requirement:</i>	Potential
2 The center shall 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.	
<i>Requirement:</i>	Potential
3 The center shall coordinate information and controls with other traffic management centers.	
<i>Requirement:</i>	Potential
4 The center shall 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.	
<i>Functional Area: TMC Traffic Network Performance Evaluation</i>	
Measures performance and predicts travel demand patterns to support traffic flow optimization, demand management, and incident management. Collects data from surveillance equipment as well as input from other management centers including emissions, event promoters, and other TMCs.	
<i>Requirement:</i>	Potential
1 The center shall monitor, analyze, and store traffic sensor data (speed, volume, occupancy) collected from field elements under remote control of the center to support overall network performance evaluations.	
<i>Requirement:</i>	Potential
2 The center shall collect wide-area pollution data from emissions management centers to support overall network performance evaluations.	
<i>Requirement:</i>	Potential
3 The center shall collect and store plans from event promoters for major future events possibly impacting traffic to support overall network performance evaluations.	
<i>Requirement:</i>	Potential
4 The center shall collect and store anticipated route information from information service providers to support overall network performance evaluations and predictions.	
<i>Requirement:</i>	Potential
5 The center shall exchange information with transit management centers including details current transit routes, the level of service on each route, and the progress of individual vehicles along their routes for use in forecasting demand and estimating current transportation network performance.	
<i>Requirement:</i>	Potential
6 The center shall exchange traffic information with other traffic management centers, including incidents, congestion data, traffic data, signal timing plans, and real-time signal control information to support overall network performance evaluations.	
<i>Requirement:</i>	Potential
7 The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for network performance evaluations.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> INDOT-Northwest District Arterial TMC	
<i>Entity:</i> Traffic Management	
<i>Functional Area:</i> TMC Traffic Network Performance Evaluation	
Measures performance and predicts travel demand patterns to support traffic flow optimization, demand management, and incident management. Collects data from surveillance equipment as well as input from other management centers including emissions, event promoters, and other TMCs.	
<i>Requirement:</i>	Potential
8 The center shall provide an interface to the archive data repository to enable the operator to retrieve historical operating data for use in planning to predict future traffic patterns and conditions.	
<i>Requirement:</i>	Potential
9 This center shall use the collected information to measure overall current and forecast network performance and predict travel demand patterns.	
<i>Functional Area:</i> TMC Environmental Monitoring	
Management of environmental sensors and assimilation of collected data with other current and forecast road conditions and surface weather information from weather service providers and roadway maintenance operations.	
<i>Requirement:</i>	Potential
1 The center shall remotely control environmental sensors that measure road surface temperature, moisture, icing, salinity, and other measures.	
<i>Requirement:</i>	Potential
2 The center shall remotely control environmental sensors that measure weather conditions including temperature, wind, humidity, precipitation, and visibility.	
<i>Requirement:</i>	Potential
3 The center shall 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.	
<i>Requirement:</i>	Potential
4 The center shall provide weather and road condition information to weather service providers and center personnel.	
<i>Requirement:</i>	Potential
5 The center shall respond to control data from center personnel regarding environmental sensor control and weather data collection and processing.	
<i>Functional Area:</i> HRI Traffic Management	
Remotely monitor and control highway-rail intersection (HRI) equipment, includes standard speed active warning systems and high speed systems which provide additional information on approaching trains and detect and report on obstructions in the HRI.	
<i>Requirement:</i>	Potential
1 The center shall remotely control highway-rail intersection (HRI) equipment located in the field.	
<i>Requirement:</i>	Potential
2 The center shall accept collect highway-rail intersection (HRI) advisory or alert data from rail operations centers.	
<i>Requirement:</i>	Potential
3 The center shall collect highway-rail intersection (HRI) equipment operational status and compare against the control information sent by the center.	
<i>Requirement:</i>	Potential
4 The center shall provide the highway-rail intersection (HRI) equipment operational status to rail operations centers.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> INDOT-Northwest District Arterial TMC	
<i>Entity:</i> Traffic Management	
<i>Functional Area:</i> HRI Traffic Management	
Remotely monitor and control highway-rail intersection (HRI) equipment, includes standard speed active warning systems and high speed systems which provide additional information on approaching trains and detect and report on obstructions in the HRI.	
<i>Requirement:</i>	Potential
5 The center shall collect incident information related to a highway-rail intersection (HRI), such as intersection blockages or crashes or equipment malfunctions.	
<i>Requirement:</i>	Potential
6 The center shall implement control plans to coordinate signalized intersections around highway-rail intersections (HRI), under control of center personnel, based on data from sensors and surveillance monitoring traffic conditions, incidents, equipment faults, pedestrian crossings, etc.	
<i>Functional Area:</i> Rail Operations Coordination	
Coordination between rail operations and traffic management centers - exchanging train schedules, maintenance schedules, as well as incidents and priority messages that impact highway-rail intersections (HRIs). Supports advanced traffic control strategies and enhanced traveler information.	
<i>Requirement:</i>	Potential
1 The center shall exchange highway-rail intersection (HRI) information with rail operations centers. This information may include event schedules, requests for information from the Rail Operators, incident notification based on rail operations messages, and priority messages like notifications of a HAZMAT spill, equipment failure, or an intersection blockage.	
<i>Requirement:</i>	Potential
2 The center shall receive highway-rail intersection (HRI) maintenance schedules, train schedules, and incident notifications from rail operations centers.	
<i>Requirement:</i>	Potential
3 The center shall use the rail operations information to develop forecast HRI closure times and durations which may be applied in advanced traffic control strategies or delivered as enhanced traveler information.	
<i>Functional Area:</i> TMC Speed Monitoring and Warning	
Remotely monitors vehicle speeds, and informs an enforcement agency if excessive speeds are detected. Also configures and controls speed warning systems that provide safe speed advisories to the motorist.	
<i>Requirement:</i>	Potential
1 The center shall remotely control vehicle speed sensors typically placed in work zones; control parameters may include environmental and traffic conditions.	
<i>Requirement:</i>	Potential
2 The center shall collect operational status for the vehicle speed sensors; the status shall include logged information including measured speeds, warning messages displayed, and violation records.	
<i>Requirement:</i>	Potential
3 The center shall provide the capability to notify an enforcement agency when vehicle speeds in the work zone are in excess of the posted speed limit or are creating an unsafe condition based upon the current environmental or traffic conditions.	
<i>Requirement:</i>	Potential
4 The center shall collect fault data for the vehicle speed sensors for repair.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> INDOT-Northwest District Arterial TMC	
<i>Entity:</i> Traffic Management	
<i>Functional Area:</i> TMC Multimodal Crossing Management	
Remotely monitors and manages multimodal crossings, such as draw bridges and other crossings between highway traffic and other modes; does not include highway-rail intersection.	
<i>Requirement:</i>	Potential
1 The center shall receive requests from non-highway traffic to cross at multimodal crossings for specified durations (such as draw bridges and miscellaneous other interference crossings between highway traffic and other modes such as river traffic, aircraft, etc.)	
<i>Requirement:</i>	Potential
2 The center shall remotely control traffic signal controllers for use at major multimodal crossings.	
<i>Requirement:</i>	Potential
3 The center shall remotely control driver information systems (such as dynamic messages signs, highway advisory radios (HAR), and equipment that controls warning lights and gates) to notify drivers of closure durations and times at multimodal crossings.	
<i>Requirement:</i>	Potential
4 The center shall collect operational status for the equipment at multimodal crossings.	
<i>Requirement:</i>	Potential
5 The center shall collect fault data for the equipment at multimodal crossings for repair.	
<i>Requirement:</i>	Potential
6 The center shall receive and respond to requests for right-of-way at multimodal crossings.	
<i>Requirement:</i>	Potential
7 The center shall collect and analyze the planned multimodal crossing closures as a possible incident.	
<i>Requirement:</i>	Potential
8 The center shall distribute multimodal crossing information to other centers for dissemination to travelers.	
<i>Functional Area:</i> Barrier System Management	
Remotely controls barrier systems such as gates and other systems that manage entry to roadways, transportation facilities and infrastructure.	
<i>Requirement:</i>	Potential
1 The center shall remotely control barrier systems for transportation facilities and infrastructure. Barrier systems include automated or remotely controlled gates, barriers and other systems that manage entry to roadways.	
<i>Requirement:</i>	Potential
2 The center shall collect barrier system operational status.	
<i>Requirement:</i>	Potential
3 The center shall collect barrier system fault data and send to the maintenance center for repair.	
<i>Requirement:</i>	Potential
4 The center shall accept requests for barrier system activation from other centers and from center personnel to support emergency response and detours.	
<i>Functional Area:</i> Traffic Equipment Maintenance	
Monitoring and remote diagnostics of field equipment - detect failures, issue problem reports, and track the repair or replacement of the failed equipment.	
<i>Requirement:</i>	Potential
1 The center shall collect and store sensor (traffic, pedestrian, multimodal crossing) operational status.	
<i>Requirement:</i>	Potential
2 The center shall collect and store CCTV surveillance system (traffic, pedestrian) operational status.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> INDOT-Northwest District Arterial TMC	
<i>Entity:</i> Traffic Management	
<i>Functional Area:</i> Traffic Equipment Maintenance	
Monitoring and remote diagnostics of field equipment - detect failures, issue problem reports, and track the repair or replacement of the failed equipment.	
<i>Requirement:</i>	Potential
3 The center shall collect and store sensor (traffic, pedestrian, multimodal crossing) fault data and send to the maintenance center for repair.	
<i>Requirement:</i>	Potential
4 The center shall collect and store CCTV surveillance system (traffic, pedestrian) fault data send to the maintenance center for repair.	
<i>Requirement:</i>	Potential
5 The center shall collect environmental sensor operational status.	
<i>Requirement:</i>	Potential
6 The center shall collect environmental sensor equipment fault data and send to the maintenance center for repair.	
<i>Requirement:</i>	Potential
7 The center shall exchange data with maintenance centers concerning the reporting of faulty equipment and the schedule/status of their repair. Information exchanged includes details of new equipment faults, and clearances when the faults are cleared.	
<i>Requirement:</i>	Potential
8 The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for traffic maintenance data.	
<i>Functional Area:</i> TMC Work Zone Traffic Management	
Coordination with maintenance systems using work zone images and traveler information systems (such as DMS), and distribution of work plans so that work zones are established that have minimum traffic impact.	
<i>Requirement:</i>	Potential
1 The center shall receive work zone images from a maintenance center.	
<i>Requirement:</i>	Potential
2 The center shall analyze work zone images for indications of a possible incident.	
<i>Requirement:</i>	Potential
3 The center shall remotely control driver information systems (such as dynamic messages signs, highway advisory radios) to advise drivers of activity around a work zone.	
<i>Requirement:</i>	Potential
4 The center shall collect operational status for the driver information systems equipment in work zones.	
<i>Requirement:</i>	Potential
5 The center shall collect fault data for the driver information systems equipment in work zones for repair.	
<i>Requirement:</i>	Potential
6 The center shall receive proposed maintenance and construction work plans, analyze the activity as a possible incident, and provide work plan feedback to the sending center.	
<i>Functional Area:</i> TMC Demand Management Coordination	
Provides the capability to gather information on regional toll, parking, and transit usage and request changes to enable dynamic pricing for demand management.	
<i>Requirement:</i>	Potential
1 The center shall collect and store toll pricing data from toll administration centers, including the price for each road segment to which a toll applies, with the time and date for when it applies.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: INDOT-Northwest District Arterial TMC</i>	
<i>Entity: Traffic Management</i>	
<i>Functional Area: TMC Demand Management Coordination</i>	
Provides the capability to gather information on regional toll, parking, and transit usage and request changes to enable dynamic pricing for demand management.	
<i>Requirement:</i>	Potential
2 The center shall collect and store parking information from parking management providers including lot locations, features (e.g. ability to handle oversized vehicles), capacity, type, hours of operation and rates.	
<i>Requirement:</i>	Potential
3 The center shall collect and store transit fare and schedule information from transit management centers.	
<i>Requirement:</i>	Potential
4 The center shall collect and store current transit, parking, and toll fee schedule information provided by regional traveler information systems.	
<i>Requirement:</i>	Potential
5 The center shall send requests to toll administration centers to change pricing, modify restrictions, or modify operations of a toll road facility.	
<i>Requirement:</i>	Potential
6 The center shall send requests to parking management providers to change the current parking lot charging structure.	
<i>Requirement:</i>	Potential
7 The center shall send requests to transit management centers to change the current transit services - schedules or fares of the transit services including park-and-ride lots.	
<i>Functional Area: TMC Multimodal Coordination</i>	
Provides traffic signal priority for transit vehicles based on center-to-center communications with the transit management center; also exchange traffic and transit information.	
<i>Requirement:</i>	Potential
1 The center shall respond to requests from transit management centers for signal priority at one or more intersections along a particular transit route.	
<i>Requirement:</i>	Potential
2 The center shall exchange information with transit management centers including details current transit routes, the level of service on each route, and the progress of individual vehicles along their routes.	
<i>Functional Area: Traffic Data Collection</i>	
Collection and storage of traffic management data. For use by operations personnel or data archives in the region.	
<i>Requirement:</i>	Potential
1 The center shall collect traffic management data such as operational data, event logs, etc.	
<i>Requirement:</i>	Potential
2 The center shall assign quality control metrics and meta-data to be stored along with the data. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.	
<i>Requirement:</i>	Potential
3 The center shall receive and respond to requests from ITS Archives for either a catalog of the traffic data or for the data itself.	
<i>Requirement:</i>	Potential
4 The center shall be able to produce sample products of the data available.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:INDOT-Northwest District Arterial TMC</i>	
<i>Entity: Traffic Management</i>	
<i>Functional Area: TMC Transportation Operations Data Collection</i>	
Collects real-time information on the state of the regional transportation system for operational use by the center. It establishes communications with a regional repository, requests or subscribes to information relevant to the center, and distributes the received information for use.	
<i>Requirement:</i>	
1 The center shall collect real-time information on the state of the regional transportation system including current traffic and road conditions, weather conditions, special event and incident information.	Potential
<i>Requirement:</i>	
2 The center shall support the capability for the system operator to monitor and control the information collection service.	Potential
<i>Element:INDOT-Northwest District Arterial TMC Kiosks</i>	
<i>Entity: Remote Traveler Support</i>	
<i>Functional Area: Remote Basic Information Reception</i>	
Public traveler interface, such as a kiosk, that provides formatted traffic advisories, transit, event, and other traveler information, as well as broadcast alerts.	
<i>Requirement:</i>	
1 The public interface for travelers shall receive traffic information from a center and present it to the traveler.	Potential
<i>Requirement:</i>	
2 The public interface for travelers shall receive transit information from a center and present it to the traveler.	Potential
<i>Requirement:</i>	
3 The public interface for travelers shall receive event information from a center and present it to the traveler.	Potential
<i>Requirement:</i>	
4 This public interface for travelers shall receive evacuation information from a center and present it to the traveler.	Potential
<i>Requirement:</i>	
5 The public interface for travelers shall receive wide-area alerts and present it to the traveler.	Potential
<i>Requirement:</i>	
6 The public interface for travelers shall provide the capability for digitized map data to act as the background to the information presented to the traveler.	Potential
<i>Requirement:</i>	
7 The public interface for travelers shall support traveler input in audio or manual form.	Potential
<i>Requirement:</i>	
8 The public interface for travelers shall present information to the traveler in audible or visual forms consistent with a kiosk, including those that are suitable for travelers with hearing or vision physical disabilities.	Potential
<i>Requirement:</i>	
9 The public interface for travelers shall be able to store frequently requested data.	Potential
<i>Functional Area: Remote Interactive Information Reception</i>	
Public traveler interface, such as a kiosk, that provides traffic, transit, yellow pages, special event, and other personalized traveler information services upon request.	
<i>Requirement:</i>	
1 The public interface for travelers shall receive traffic information from a center and present it to the traveler upon request.	Potential
<i>Requirement:</i>	
2 The public interface for travelers shall receive transit information from a center and present it to the traveler upon request.	Potential

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Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:INDOT-Northwest District Arterial TMC Kiosks</i>	
<i>Entity: Remote Traveler Support</i>	
<i>Functional Area: Remote Interactive Information Reception</i>	
Public traveler interface, such as a kiosk, that provides traffic, transit, yellow pages, special event, and other personalized traveler information services upon request.	
<i>Requirement:</i>	Potential
3 The public interface for travelers shall receive yellow pages information (such as lodging, restaurants, theaters, bicycle facilities, and other tourist activities) from a center and present it to the traveler upon request.	
<i>Requirement:</i>	Potential
4 The public interface for travelers shall receive event information from a center and present it to the traveler upon request.	
<i>Requirement:</i>	Potential
5 The public interface for travelers shall receive evacuation information from a center and present it to the traveler.	
<i>Requirement:</i>	Potential
6 The public interface for travelers shall receive wide-area alerts and present it to the traveler.	
<i>Requirement:</i>	Potential
7 The public interface for travelers shall accept reservations for confirmed trip plans.	
<i>Requirement:</i>	Potential
8 The public interface for travelers shall support payment for services, such as confirmed trip plans, confirmed traveler services, tolls, transit fares, parking lot charges, and advanced payment for tolls.	
<i>Requirement:</i>	Potential
9 The public interface for travelers shall provide an interface through which credit identities and stored credit values may be collected from tags, traveler cards, or payment instruments used by travelers.	
<i>Requirement:</i>	Potential
10 The public interface for travelers shall base requests from the traveler on the traveler's current location or a specific location identified by the traveler, and filter the provided information accordingly.	
<i>Requirement:</i>	Potential
11 The public interface for travelers shall provide digitized map data to act as the background to the information presented to the traveler.	
<i>Requirement:</i>	Potential
12 The public interface for travelers shall support traveler input in audio or manual form.	
<i>Requirement:</i>	Potential
13 The public interface for travelers shall present information to the traveler in audible or visual forms consistent with a kiosk, including those that are suitable for travelers with hearing or vision physical disabilities.	
<i>Requirement:</i>	Potential
14 The public interface for travelers shall be able to store frequently requested data.	
<i>Requirement:</i>	Potential
15 The public interface for travelers shall provide an interface to establish and manage user VMT accounts, process VMT payments, and access VMT reports under user control.	

*Element:INDOT-Northwest District Arterial TMC Roadside Equipment**Entity: Roadway**Functional Area: Roadway Basic Surveillance*

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

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Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: INDOT-Northwest District Arterial TMC Roadside Equipment</i>	
<i>Entity: Roadway</i>	
<i>Functional Area: Roadway Basic Surveillance</i>	
Field elements that monitor traffic conditions using loop detectors and CCTV cameras.	
<i>Requirement:</i>	Potential
1 The field element shall collect, process, digitize, and send traffic sensor data (speed, volume, and occupancy) to the center for further analysis and storage, under center control.	
<i>Requirement:</i>	Potential
2 The field element shall collect, process, and send traffic images to the center for further analysis and distribution.	
<i>Requirement:</i>	Potential
4 The field element shall return sensor and CCTV system operational status to the controlling center.	
<i>Requirement:</i>	Potential
5 The field element shall return sensor and CCTV system fault data to the controlling center for repair.	
<i>Functional Area: Roadway Probe Data Communications</i>	
Field elements that collect probe data from vehicles using short range communications.	
<i>Requirement:</i>	Potential
1 The field element shall communicate with passing vehicles for traffic data link time calculations and send collected data to the controlling center; identification will be removed to ensure anonymity.	
<i>Requirement:</i>	Potential
2 The field element shall communicate with on-board equipment on passing vehicles to collect current vehicle position, speed, and heading and a record of previous events (e.g., starts and stops, link travel times) that can be used to determine current traffic conditions.	
<i>Requirement:</i>	Potential
3 The field element shall communicate with on-board equipment on passing vehicles to collect current status information and a record of previous events (e.g., temperature, wiper status, headlight status, traction control system status) that can be used to determine road and surface weather conditions.	
<i>Requirement:</i>	Potential
4 The field element shall communicate with on-board equipment on passing vehicles to collect vehicle trip information (e.g., origin and destination information, travel times) that can be used to support transportation planning.	
<i>Requirement:</i>	Potential
5 The field element shall communicate with on-board equipment on passing vehicles to collect a history of precise positioning information that can be used to derive or verify accurate roadway geometry and lane features for use by map update providers.	
<i>Requirement:</i>	Potential
6 The field element shall aggregate and forward collected probe information to the center.	
<i>Requirement:</i>	Potential
7 The field element shall provide roadside equipment operational status to the center.	
<i>Requirement:</i>	Potential
8 The field element shall provide roadside equipment fault indication to the center for repair.	
<i>Functional Area: Roadway Signal Controls</i>	
Field elements including traffic signal controllers for use at signalized intersections; also supports pedestrian crossings.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> INDOT-Northwest District Arterial TMC Roadside Equipment	
<i>Entity:</i> Roadway	
<i>Functional Area:</i> Roadway Signal Controls	
Field elements including traffic signal controllers for use at signalized intersections; also supports pedestrian crossings.	
<i>Requirement:</i>	Potential
1 The field element shall control traffic signals under center control.	
<i>Requirement:</i>	Potential
2 The field element shall respond to pedestrian crossing requests by accommodating the pedestrian crossing.	
<i>Requirement:</i>	Potential
3 The field element shall provide the capability to notify the traffic management center of pedestrian calls and pedestrian accommodations.	
<i>Requirement:</i>	Potential
4 The field element shall report the current signal control information to the center.	
<i>Requirement:</i>	Potential
5 The field element shall report current preemption status to the center.	
<i>Requirement:</i>	Potential
6 The field element shall return traffic signal controller operational status to the center.	
<i>Requirement:</i>	Potential
7 The field element shall return traffic signal controller fault data to the center.	
<i>Functional Area:</i> Field Management Stations Operation	
Supports direct communications between field management stations and the local field equipment under their control.	
<i>Requirement:</i>	Potential
1 The field management station shall accept configuration information from the center.	
<i>Requirement:</i>	Potential
2 The field management station shall pass data provided by the center to local field devices and report data from the field devices back to the center.	
<i>Functional Area:</i> Roadway Signal Preemption	
Field elements that receive signal preemption requests from approaching emergency vehicles and overrides the current operation of the traffic signals	
<i>Requirement:</i>	Potential
1 The field element shall respond to signal preemption requests from emergency vehicles.	
<i>Functional Area:</i> Roadway Variable Speed Limits	
Field elements including physical overhead lane signs and associated monitoring, communications, and control electronics that are used to manage and control variable speed limits systems.	
<i>Requirement:</i>	Potential
1 The field element shall monitor traffic and environmental conditions along the roadway.	
<i>Requirement:</i>	Potential
2 The field element shall autonomously calculate and set variable speed limits based on current conditions by lane.	
<i>Requirement:</i>	Potential
3 The field element shall receive commands from the controlling center that establish speed limits by lane.	
<i>Requirement:</i>	Potential
4 The field element shall display the current speed limits per lane to drivers.	
<i>Requirement:</i>	Potential
5 The field element shall display additional information such as basic safety rules and current traffic information to drivers.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> INDOT-Northwest District Arterial TMC Roadside Equipment	
<i>Entity:</i> Roadway	
<i>Functional Area:</i> Roadway Variable Speed Limits	
Field elements including physical overhead lane signs and associated monitoring, communications, and control electronics that are used to manage and control variable speed limits systems.	
<i>Requirement:</i>	Potential
6 The field element shall collect operational status of the variable speed limit field equipment and report the operational status to the controlling center.	
<i>Requirement:</i>	Potential
7 The field element shall monitor and report faults to the controlling center.	
<i>Functional Area:</i> Roadway Warning	
Field elements used to warn drivers approaching hazards including adverse road weather conditions, traffic conditions including queues, and obstacles or animals in the road.	
<i>Requirement:</i>	Potential
1 The field element shall monitor for hazardous traffic conditions, including queues.	
<i>Requirement:</i>	Potential
2 The field element shall monitor for hazardous road surface and local weather conditions.	
<i>Requirement:</i>	Potential
3 The field element shall monitor for debris, animals, or other objects in the travel lanes.	
<i>Requirement:</i>	Potential
4 The field element shall provide collected sensor data to the controlling center.	
<i>Requirement:</i>	Potential
5 The field element shall autonomously identify potentially hazardous conditions and activate warning signs to approaching motorists.	
<i>Requirement:</i>	Potential
6 The field element shall receive commands from the controlling center that activate warning signs to approaching motorists.	
<i>Requirement:</i>	Potential
7 The field element shall collect operational status of the warning system field equipment and report the operational status to the controlling center.	
<i>Requirement:</i>	Potential
8 The field element shall monitor and report faults to the controlling center.	
<i>Functional Area:</i> Roadway Traffic Information Dissemination	
Driver information systems, such as dynamic message signs and Highway Advisory Radio (HAR).	
<i>Requirement:</i>	Potential
1 The field element shall include dynamic messages signs for dissemination of traffic and other information to drivers, under center control; the DMS may be either those that display variable text messages, or those that have fixed format display(s) (e.g. vehicle restrictions, or lane open/close).	
<i>Requirement:</i>	Potential
2 The field element shall include 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, under center control.	
<i>Requirement:</i>	Potential
3 The field element shall include pedestrian information systems under center control (e.g. warning pedestrians of a potential hazard, or providing mandatory instructions as to the availability of pedestrian access).	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> INDOT-Northwest District Arterial TMC Roadside Equipment	
<i>Entity:</i> Roadway	
<i>Functional Area:</i> Roadway Traffic Information Dissemination	
Driver information systems, such as dynamic message signs and Highway Advisory Radio (HAR).	
<i>Requirement:</i>	Potential
4 The field element shall provide operational status for the driver information systems equipment (DMS, HAR, etc.) to the center.	
<i>Requirement:</i>	Potential
5 The field element shall provide fault data for the driver information systems equipment (DMS, HAR, etc.) to the center for repair.	
<i>Functional Area:</i> Roadway Incident Detection	
Field elements that monitor traffic conditions to identify incidents. It includes traffic detectors that collect traffic flow information and identify unusual traffic conditions and advanced CCTV cameras with built-in incident detection algorithms.	
<i>Requirement:</i>	Potential
1 The field element shall collect, process, and send traffic images to the center for further analysis and distribution.	
<i>Requirement:</i>	Potential
2 The field element shall remotely process video data and provide an indication of potential incidents to the traffic management center.	
<i>Requirement:</i>	Potential
3 The field element's video devices shall be remotely controlled by a traffic management center.	
<i>Requirement:</i>	Potential
4 The field element shall provide operational status and fault data for the incident detection devices to the traffic management center.	
<i>Functional Area:</i> Advanced Rail Crossing	
Field elements at highway-rail intersections (HRIs) where operational requirements demand advanced features (e.g., where rail operational speeds are greater than 80 miles per hour). Capabilities from the Standard Rail Crossing plus systems which preclude entrance into the intersection when the barriers are activated, additional arriving train information, and detection of blocked intersections.	
<i>Requirement:</i>	Potential
1 The field element shall collect and process, traffic sensor data in the vicinity of a highway-rail intersection (HRI).	
<i>Requirement:</i>	Potential
2 The field element shall determine whether the highway-rail intersection (HRI) is blocked by traffic in the roadway or some other obstruction.	
<i>Requirement:</i>	Potential
3 The field element shall notify the traffic management center and the rail wayside equipment of any intersection blockages, including trapped vehicles or other obstructions.	
<i>Requirement:</i>	Potential
4 The field element shall monitor the status of the highway-rail intersection (HRI) equipment, including both the current state and mode of operation and the current equipment condition, to be forwarded on to the traffic management center.	
<i>Requirement:</i>	Potential
5 The field element shall monitor the status of the highway-rail intersection (HRI) equipment, including both the current state and mode of operation and the current equipment condition, to be forwarded on to the rail wayside equipment.	

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Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> INDOT-Northwest District Arterial TMC Roadside Equipment	
<i>Entity:</i> Roadway	
<i>Functional Area:</i> Advanced Rail Crossing	
Field elements at highway-rail intersections (HRIs) where operational requirements demand advanced features (e.g., where rail operational speeds are greater than 80 miles per hour). Capabilities from the Standard Rail Crossing plus systems which preclude entrance into the intersection when the barriers are activated, additional arriving train information, and detection of blocked intersections.	
<i>Requirement:</i>	Potential
6 The field element shall receive track status and arriving train information from the rail wayside equipment that can be passed on to the traffic management center. This may include the current status of the tracks and when a train is expected and/or how long the crossing will be closed.	
<i>Requirement:</i>	Potential
7 The field element shall collect pedestrian images and pedestrian sensor data, and respond to pedestrian crossing requests via display, audio signal, or other manner.	
<i>Requirement:</i>	Potential
8 The field element shall control the dynamic message signs (DMS) in the vicinity of a highway-rail intersection (HRI) to advise drivers, cyclists, and pedestrians of approaching trains.	
<i>Requirement:</i>	Potential
9 The field element shall close the highway-rail intersection (HRI) when a train is approaching with enough time for traffic to safely clear the crossing using gates, lights/signs, barriers, and traffic control signals.	
<i>Requirement:</i>	Potential
10 The field element shall support the integrated control of adjacent traffic signals to clear an area in advance of an approaching train and to manage traffic around the intersection.	
<i>Requirement:</i>	Potential
11 The field element shall forward rail traffic advisories received from the Wayside Equipment to the traffic management center.	
<i>Requirement:</i>	Potential
12 The field element shall provide approaching train advisories using field-vehicle communications to vehicles approaching the grade crossing.	
<i>Functional Area:</i> Roadway Equipment Coordination	
Field elements that control and send data to other field elements (such as environmental sensors that send data to a DMS or coordination between traffic controllers on adjacent intersections), without center control.	
<i>Requirement:</i>	Potential
1 The field element shall include sensors that provide data and status information to other field element devices, without center control.	
<i>Requirement:</i>	Potential
2 The field element shall include sensors that receive configuration data from other field element devices, without center control.	
<i>Requirement:</i>	Potential
3 The field element shall include devices that provide data and status information to other field element devices without center control.	
<i>Requirement:</i>	Potential
4 The field element shall include devices that receive configuration data from other field element devices, without center control.	
<i>Functional Area:</i> Roadway Field Device Monitoring	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> INDOT-Northwest District Arterial TMC Roadside Equipment	
<i>Entity:</i> Roadway	
<i>Functional Area:</i> Roadway Field Device Monitoring	
Monitors field equipment operational status and detects and reports fault conditions. Device status, configuration, and fault information are provided to a remote center and a user interface provides information locally to field personnel.	
<i>Requirement:</i>	Potential
1 The field element shall monitor the operational status (state of the device, configuration, and fault data) of connected sensors (such as traffic, infrastructure, environmental, security, speed) and devices (such as highway advisory radio, dynamic message signs, automated roadway treatment systems, barrier and safeguard systems, cameras, traffic signals, ramp meters, short range communications equipment, security surveillance equipment).	
<i>Requirement:</i>	Potential
2 The field element shall send operational status of connected field equipment to the maintenance center.	
<i>Requirement:</i>	Potential
3 The field element shall send collected fault data to the maintenance center for repair.	
<i>Requirement:</i>	Potential
4 The field element shall include a local interface that provides operational status and fault data for connected field equipment to field personnel.	
<i>Requirement:</i>	Potential
5 The field element shall include a local interface that allows field personnel to command diagnostic tests on connected field equipment.	
<i>Functional Area:</i> Roadway Environmental Monitoring	
Environmental sensors, surface and sub-surface, that collect weather and road surface information. Weather conditions measured include temperature, wind, humidity, precipitation, and visibility. Sensors measure road surface temperature, moisture, icing, salinity, etc.	
<i>Requirement:</i>	Potential
1 The field element shall include surface and sub-surface environmental sensors that measure road surface temperature, moisture, icing, salinity, and other measures.	
<i>Requirement:</i>	Potential
2 The field element shall include environmental sensors that measure weather conditions including temperature, wind, humidity, precipitation, and visibility.	
<i>Requirement:</i>	Potential
3 The field element's environmental sensors shall be remotely controlled by a maintenance center.	
<i>Requirement:</i>	Potential
4 The field element's environmental sensors shall be remotely controlled by a traffic management center.	
<i>Requirement:</i>	Potential
5 The field element's environmental sensors shall be remotely controlled by weather service providers such as the National Weather Service or value-added sector specific meteorological services.	
<i>Requirement:</i>	Potential
6 The field element's environmental sensors shall be remotely controlled by a maintenance and construction vehicle.	
<i>Requirement:</i>	Potential
7 The field element shall provide environmental sensor equipment operational status to the controlling center or maintenance vehicle.	
<i>Requirement:</i>	Potential
8 The field element shall provide environmental sensor equipment fault indication to the controlling center or maintenance vehicle.	

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Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> INDOT-Northwest District Arterial TMC Roadside Equipment	
<i>Entity:</i> Roadway	
<i>Functional Area:</i> Roadway Environmental Monitoring	
Environmental sensors, surface and sub-surface, that collect weather and road surface information. Weather conditions measured include temperature, wind, humidity, precipitation, and visibility. Sensors measure road surface temperature, moisture, icing, salinity, etc.	
<i>Requirement:</i>	Potential
9 The field element shall remotely aggregate environmental sensor data with environmental data collected from maintenance and construction vehicles.	
<i>Requirement:</i>	Potential
10 The field element shall provide weather and road surface condition data to centers.	
<i>Requirement:</i>	Potential
11 The field element shall provide weather and road surface condition data to maintenance and construction vehicles.	
<i>Functional Area:</i> Field Barrier System Control	
Field elements that control barrier systems such as gates and other systems that manage entry to roadways, transportation facilities and infrastructure.	
<i>Requirement:</i>	Potential
1 The field element shall activate barrier systems for transportation facilities and infrastructure under center control. Barrier systems include automated or remotely controlled gates, barriers and other systems that manage entry to roadways.	
<i>Requirement:</i>	Potential
2 The field element shall return barrier system operational status to the controlling center.	
<i>Requirement:</i>	Potential
3 The field element shall return barrier system fault data to the maintenance center for repair.	
<i>Requirement:</i>	Potential
4 The field element shall receive requests for access from approaching vehicles using field-vehicle communications and validate and authenticate the requests.	
<i>Requirement:</i>	Potential
5 The field element shall grant access only to qualified vehicles.	
<i>Requirement:</i>	Potential
6 The field element shall communicate access permission status and access instructions to approaching vehicles using field-vehicle communications.	
<i>Functional Area:</i> Roadway Speed Monitoring and Warning	
Vehicle speed sensors that detect excessive vehicle speeds, optionally based on conditions and vehicle type, informing drivers, centers and/or enforcement agencies of speed violations.	
<i>Requirement:</i>	Potential
1 The field element shall include sensors to detect vehicle speeds, under traffic or maintenance center control.	
<i>Requirement:</i>	Potential
2 The field element shall include sensors to detect vehicle speeds, under enforcement agency control.	
<i>Requirement:</i>	Potential
3 If the speed detected by vehicle speed sensors is determined to be excessive, the field element shall provide a safe speed advisory to passing drivers via a driver information system (such as portable messages signs, field to vehicle communications to in-vehicle signing systems, etc.).	
<i>Requirement:</i>	Potential
4 The field element shall base speed advisories to passing drivers on environmental conditions.	

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Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> INDOT-Northwest District Arterial TMC Roadside Equipment	
<i>Entity:</i> Roadway	
<i>Functional Area:</i> Roadway Speed Monitoring and Warning	
Vehicle speed sensors that detect excessive vehicle speeds, optionally based on conditions and vehicle type, informing drivers, centers and/or enforcement agencies of speed violations.	
<i>Requirement:</i>	Potential
5 The field element shall monitor notify an enforcement agency when a speed violation is detected.	
<i>Requirement:</i>	Potential
6 The field element shall return operational status for the vehicle speed sensors to the controlling traffic or maintenance center; including measured speeds, warning messages displayed, and violation records.	
<i>Requirement:</i>	Potential
7 The field element shall return operational status for the vehicle speed sensors to the enforcement agency.	
<i>Requirement:</i>	Potential
8 The field element shall return fault data for the vehicle speed sensors to the controlling center for repair.	
<i>Functional Area:</i> Multimodal Crossing Control	
Field elements to monitor and control traffic at multimodal crossings, such as draw bridges and other crossings between highway traffic and other modes; does not include highway-rail intersection.	
<i>Requirement:</i>	Potential
1 The field element shall include sensors to monitor requests from non-highway traffic to cross at multimodal crossings for specified durations (such as draw bridges and miscellaneous other interference crossings between highway traffic and other modes such as river traffic, aircraft, etc.); the sensors are under center control.	
<i>Requirement:</i>	Potential
2 The field element shall include signals to control traffic at multimodal crossings on surface streets, under center control.	
<i>Requirement:</i>	Potential
3 The field element shall include driver information systems (such as dynamic messages signs, highway advisory radios (HAR), and equipment that controls warning lights and gates) that advise drivers at multimodal crossings, under center control.	
<i>Requirement:</i>	Potential
4 The field element shall provide operational status for the sensors, signals, and driver information systems equipment at multimodal crossings to the center.	
<i>Requirement:</i>	Potential
5 The field element shall provide fault data for the sensors, signals, and driver information systems equipment at multimodal crossings to the center for repair.	
<i>Requirement:</i>	Potential
6 The field element shall forward all requests for right-of-way at multimodal crossings to the controlling center.	
<i>Functional Area:</i> Roadway Work Zone Traffic Control	
Field elements in maintenance and construction areas including CCTV cameras, driver information systems (such as DMS), and gates/barriers that monitor and control traffic and provide information directly to drivers in affected areas.	
<i>Requirement:</i>	Potential
1 The field element shall collect, process, and send work zone images to the center for further analysis and distribution, under center control.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> INDOT-Northwest District Arterial TMC Roadside Equipment	
<i>Entity:</i> Roadway	
<i>Functional Area:</i> Roadway Work Zone Traffic Control	
Field elements in maintenance and construction areas including CCTV cameras, driver information systems (such as DMS), and gates/barriers that monitor and control traffic and provide information directly to drivers in affected areas.	
<i>Requirement:</i>	Potential
2 Under traffic and maintenance center control, the field element shall include driver information systems (such as dynamic messages signs and highway advisory radios) that advise drivers of activity around the work zone through which they are currently passing.	
<i>Requirement:</i>	Potential
3 Under the control of field personnel within maintenance vehicles, the field element shall include driver information systems (such as dynamic messages signs and highway advisory radios) that advise drivers of activity around a work zone through which they are currently passing.	
<i>Requirement:</i>	Potential
4 The field element shall control access to the work zone using automated gate or barrier systems. This includes automated flagger assistance devices that include automated gate arms and other automated gate/barrier systems.	
<i>Requirement:</i>	Potential
5 The field element shall provide operational status for the surveillance (e.g. CCTV), driver information systems, and gates/barriers in work zones to the maintenance center.	
<i>Requirement:</i>	Potential
6 The field element shall provide fault data for the surveillance (e.g. CCTV), driver information systems, and gates/barriers in work zones to the maintenance center for repair.	
<i>Functional Area:</i> Roadway Work Zone Safety	
Work zone intrusion detection devices (to detect vehicle intrusion upon a work zone or crew worker movement across a work zone boundary) and intrusion alerting devices that provide alerts to crew and drivers.	
<i>Requirement:</i>	Potential
1 The field element shall include work zone intrusion detection devices that detect when a vehicle has intruded upon the boundary of a work zone, under center control.	
<i>Requirement:</i>	Potential
2 The field element shall include work zone intrusion detection devices that detect when crew workers have crossed the boundary between the work zone and vehicle traffic, under center control.	
<i>Requirement:</i>	Potential
3 The field element shall include work zone intrusion alerting devices that alert crew workers of a work zone emergency or safety issue such as the intrusion of a vehicle into the work zone area or movement of field crew into the travel lanes.	
<i>Requirement:</i>	Potential
4 The field element shall include work zone intrusion alerting devices that notify crew via maintenance vehicles of a work zone emergency or safety issue such as the intrusion of a vehicle into the work zone area or movement of field crew into the travel lanes.	
<i>Requirement:</i>	Potential
5 The field element shall include work zone intrusion alerting devices that alert drivers that they have intruded upon the perimeter of the work zone, or are about to do so; may provide alerts to drivers directly or via in-vehicle signing.	

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Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:INDOT-Northwest District Arterial TMC Roadside Equipment</i>	
<i>Entity: Roadway</i>	
<i>Functional Area: Roadway Work Zone Safety</i>	
Work zone intrusion detection devices (to detect vehicle intrusion upon a work zone or crew worker movement across a work zone boundary) and intrusion alerting devices that provide alerts to crew and drivers.	
<i>Requirement:</i>	Potential
6 The field element shall provide operational status for the work zone intrusion detection devices to the maintenance center.	
<i>Requirement:</i>	Potential
7 The field element shall provide fault data for the work zone intrusion detection devices to the maintenance center for repair.	
<i>Requirement:</i>	Potential
8 The field element shall provide operational status for the work zone intrusion alerting devices to the maintenance center.	
<i>Requirement:</i>	Potential
9 The field element shall provide fault data for the work zone intrusion alerting devices to the maintenance center for repair.	
<i>Functional Area: Roadway Data Collection</i>	
Field elements to collect traffic, road, and environmental conditions information for use in transportation planning, research, and other off-line applications. Includes the sensors, supporting roadside infrastructure, and communications equipment.	
<i>Requirement:</i>	Potential
1 The field element shall collect traffic, road, and environmental conditions information.	
<i>Requirement:</i>	Potential
2 The field element shall include the sensors and supporting roadside devices that sense, collect, and send traffic, road, and environmental conditions information to a center for archival.	
<i>Requirement:</i>	Potential
3 The field element shall collect sensor status and sensor faults from roadside equipment and send it along with the recorded data to a center for archival.	
<i>Element:INDOT-Northwest District Arterial TMCs Inspection Facilities.</i>	
<i>Entity: Commercial Vehicle Check</i>	
<i>Functional Area: Roadside Electronic Screening</i>	
Roadside check facility equipment to communicate with commercial vehicles at mainline speeds - reading tag data, identification, weight and vehicle characteristics, and credential checking. Determines whether a pull-in message should be generated, allowing for inspectors to override.	
<i>Requirement:</i>	Potential
1 The roadside check facility equipment shall detect the presence of commercial vehicles and freight equipment approaching a facility. Sensors can differentiate between different types of vehicles and determine the number of axles, gross vehicle weight, and the identification of the vehicle and its cargo.	
<i>Requirement:</i>	Potential
2 The roadside check facility equipment shall receive the credential and credentials status information (e.g. snapshots) from the commercial vehicle administration center to maintain an up to date list of which vehicles have been cleared (enrolled) to potentially pass through without stopping.	
<i>Requirement:</i>	Potential
3 The roadside check facility equipment shall receive commercial vehicle violation records and carriers, vehicles, and drivers of interest from appropriate law enforcement agencies.	

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Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: INDOT-Northwest District Arterial TMCs Inspection Facilities.</i>	
<i>Entity: Commercial Vehicle Check</i>	
<i>Functional Area: Roadside Electronic Screening</i>	
Roadside check facility equipment to communicate with commercial vehicles at mainline speeds - reading tag data, identification, weight and vehicle characteristics, and credential checking. Determines whether a pull-in message should be generated, allowing for inspectors to override.	
<i>Requirement:</i>	Potential
4 The roadside check facility equipment shall provide an interface to inspectors in the field to allow them to monitor and if necessary override the pull-in decisions made by the system.	
<i>Requirement:</i>	Potential
5 The roadside check facility equipment shall request and input electronic screening data from the commercial vehicle's electronic tag data.	
<i>Requirement:</i>	Potential
6 The roadside check facility equipment shall collect safety data from the commercial vehicle and its freight equipment.	
<i>Requirement:</i>	Potential
7 The roadside check facility equipment shall send a pass/pull-in notification to the commercial vehicle and its driver based on the information received from the vehicle, the administration center, enforcement agencies, and the inspector. The message may be sent to the on-board equipment in the commercial vehicle or transmitted to the driver using equipment such as dynamic message signs, red-green lights, flashing signs, etc.	
<i>Requirement:</i>	Potential
8 The roadside check facility equipment shall verify that pull-in requests are heeded by drivers, notifying the facility operator if a vehicle fails to pull in as requested.	
<i>Requirement:</i>	Potential
9 The roadside check facility equipment shall monitor alerting and advisory systems for security alerts and advisories.	
<i>Requirement:</i>	Potential
10 The roadside check facility equipment shall send a record of daily activities at the facility including summaries of screening events and inspections to the commercial vehicle administration center.	
<i>Functional Area: Roadside WIM</i>	
Roadside check facility equipment to detect and measure the weight commercial vehicles at high speed. Can include an interface to the credential checking or it can be a stand alone package with display.	
<i>Requirement:</i>	Potential
1 The roadside check facility equipment shall detect the presence of commercial vehicles and freight equipment approaching a facility. Sensors can differentiate between different types of vehicles and determine the number of axles, gross vehicle weight, weight per axle, and the identification of the vehicle and its cargo.	
<i>Requirement:</i>	Potential
2 The roadside check facility equipment shall request and input electronic screening data from the commercial vehicle's electronic tag data.	
<i>Requirement:</i>	Potential
3 The roadside check facility equipment shall send a pass/pull-in notification to the commercial vehicle and its driver based on the information received from the vehicle and the measurements taken. The message may be sent to the on-board equipment in the commercial vehicle or transmitted to the driver using equipment such as dynamic message signs, red-green lights, flashing signs, etc.	

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Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> INDOT-Northwest District Arterial TMCs Inspection Facilities.	
<i>Entity:</i> Commercial Vehicle Check	
<i>Functional Area:</i> Roadside Safety and Security Inspection	
Roadside check facility equipment to provide the capabilities to automate the roadside safety inspection process including wireless roadside inspections and use of hand held devices to rapidly inspect the vehicle and driver.	
<i>Requirement:</i>	Potential
1 The roadside check facility equipment shall receive information concerning commercial vehicles and freight equipment approaching a facility that are being pulled in for safety and security inspections.	
<i>Requirement:</i>	Potential
2 The roadside check facility equipment shall receive the safety and security inspection and status information from the commercial vehicle administration center to include information such as safety ratings, inspection summaries, and violation summaries. Corresponds to the safety portion of CVISN "snapshots."	
<i>Requirement:</i>	Potential
3 The roadside check facility equipment shall provide an interface to inspectors in the field to allow them to safety inspection data including overrides to the pull-in decisions made by the system.	
<i>Requirement:</i>	Potential
4 The roadside check facility equipment shall request and input electronic safety data from the commercial vehicle's electronic tag data. This includes driver logs, on-board safety data, safety inspection records, commercial vehicle breach information, as well as freight equipment information.	
<i>Requirement:</i>	Potential
5 The roadside check facility equipment shall send a pass/pull-in notification to the commercial vehicle and its driver based on the information received from the vehicle, the administration center, and the inspector. The message may be sent to the on-board equipment in the commercial vehicle or transmitted to the driver using equipment such as dynamic message signs, red-green lights, flashing signs, etc.	
<i>Requirement:</i>	Potential
6 The roadside check facility equipment shall receive information about a breach or tamper event on a commercial vehicle or its attached freight equipment which includes identity, type of breach, location, and time.	
<i>Requirement:</i>	Potential
7 The roadside check facility equipment shall receive driver records, accident reports, and citation records from the commercial vehicle administration center to support driver identification and access to driver credentials and history information.	
<i>Requirement:</i>	Potential
8 The roadside check facility equipment shall read expected driver identity characteristics (e.g., PIN codes and biometric data) from the commercial vehicle equipment to support safety and security checking.	
<i>Requirement:</i>	Potential
9 The roadside check facility equipment shall read the driver identification card provided by the commercial vehicle driver and support cross-check of the identification data with driver records.	
<i>Requirement:</i>	Potential
10 The roadside check facility equipment shall forward results of the roadside safety inspections to the commercial vehicle administration center.	

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Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> INDOT-Northwest District Arterial TMCs Inspection Facilities.	
<i>Entity:</i> Commercial Vehicle Check	
<i>Functional Area:</i> Roadside Safety and Security Inspection	
Roadside check facility equipment to provide the capabilities to automate the roadside safety inspection process including wireless roadside inspections and use of hand held devices to rapidly inspect the vehicle and driver.	
<i>Requirement:</i>	Potential
11 The roadside check facility equipment shall support wireless roadside inspections that are conducted remotely, forwarding data provided by the commercial vehicle via Field-Vehicle communications to the center that performs the safety assessment.	
<i>Functional Area:</i> Citation and Accident Electronic Recording	
Roadside check facility equipment records results of roadside inspections and forwards information to the commercial vehicle administration center. Includes accident reports, violations, citations, and the daily site activity data.	
<i>Requirement:</i>	Potential
1 The roadside check facility equipment shall record the results of roadside inspections carried using an inspector's hand held terminal interface.	
<i>Requirement:</i>	Potential
2 The roadside check facility equipment shall provide an interface for an inspector to add comments to the inspection results.	
<i>Requirement:</i>	Potential
3 The roadside check facility equipment shall forward results of the roadside inspections to the commercial vehicle administration center either as needed or on a periodic basis. These reports include accident reports, violation notifications, citations, and daily site activity logs.	
<i>Requirement:</i>	Potential
4 The roadside check facility equipment shall receive driver records from the commercial vehicle administration center to support driver identification and collection of driver credentials and history information.	
<i>Requirement:</i>	Potential
5 The roadside check facility equipment shall collect safety data from the commercial vehicle and its freight equipment to help characterize the circumstances surrounding an accident.	
<i>Requirement:</i>	Potential
6 The roadside check facility equipment shall read the driver identification card provided by the commercial vehicle driver and support cross-check of the identification data with driver records.	
<i>Functional Area:</i> Roadside HAZMAT Detection	
Roadside check facility equipment to detect and identify commercial vehicles carrying hazardous materials. Compare data with registered credentials and determines whether a pull-in message should be generated - notify emergency management if a problem occurs.	
<i>Requirement:</i>	Potential
1 The roadside check facility equipment shall detect the presence of commercial vehicles and freight equipment approaching a facility. Sensors can differentiate between different types of vehicles and determine the number of axles, gross vehicle weight, presence of security sensitive hazardous materials, and the identification of the vehicle and its cargo.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: INDOT-Northwest District Arterial TMCs Inspection Facilities.</i>	
<i>Entity: Commercial Vehicle Check</i>	
<i>Functional Area: Roadside HAZMAT Detection</i>	
Roadside check facility equipment to detect and identify commercial vehicles carrying hazardous materials. Compare data with registered credentials and determines whether a pull-in message should be generated - notify emergency management if a problem occurs.	
<i>Requirement:</i>	Potential
2 The roadside check facility equipment shall detect the presence of security sensitive substance, e.g. detection of radiation or ammonia compounds, carried on-board commercial vehicles and freight equipment approaching a facility. This data is acquired by roadside sensors from the freight equipment electronically, optically, or manually.	
<i>Requirement:</i>	Potential
3 The roadside check facility equipment shall receive the credential information (e.g. snapshots) from the commercial vehicle administration center to maintain an up to date list of which vehicles with hazardous materials shipments have been cleared (enrolled).	
<i>Requirement:</i>	Potential
4 The roadside check facility equipment shall send a pass/pull-in notification to the commercial vehicle and its driver based on the hazmat information received from the vehicle, the freight equipment, or the administration center. The message may be sent to the on-board equipment in the commercial vehicle or transmitted to the driver using equipment such as dynamic message signs, red-green lights, flashing signs, etc.	
<i>Requirement:</i>	Potential
5 The roadside check facility equipment shall raise and forward an alarm to the appropriate emergency management center if the hazmat-carrying commercial vehicle does not stop, or in the case of a positive identification of an unpermitted security sensitive hazmat cargo, to coordinate a traffic stop or some other action with respect to the offending commercial vehicle. The alarm will include information concerning the security sensitive hazmat detected at the roadside including the location, appropriate identifiers, route deviation, or assignment mismatches between the driver, commercial vehicle, or the freight equipment.	
<i>Element: Kiosks, Yellow Pages, and Other Remote Traveler Support</i>	
<i>Entity: Remote Traveler Support</i>	
<i>Functional Area: Remote Basic Information Reception</i>	
Public traveler interface, such as a kiosk, that provides formatted traffic advisories, transit, event, and other traveler information, as well as broadcast alerts.	
<i>Requirement:</i>	Potential
1 The public interface for travelers shall receive traffic information from a center and present it to the traveler.	
<i>Requirement:</i>	Potential
2 The public interface for travelers shall receive transit information from a center and present it to the traveler.	
<i>Requirement:</i>	Potential
3 The public interface for travelers shall receive event information from a center and present it to the traveler.	
<i>Requirement:</i>	Potential
4 This public interface for travelers shall receive evacuation information from a center and present it to the traveler.	
<i>Requirement:</i>	Potential
5 The public interface for travelers shall receive wide-area alerts and present it to the traveler.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Kiosks, Yellow Pages, and Other Remote Traveler Support</i>	
<i>Entity: Remote Traveler Support</i>	
<i>Functional Area: Remote Basic Information Reception</i>	
Public traveler interface, such as a kiosk, that provides formatted traffic advisories, transit, event, and other traveler information, as well as broadcast alerts.	
<i>Requirement:</i>	Potential
6 The public interface for travelers shall provide the capability for digitized map data to act as the background to the information presented to the traveler.	
<i>Requirement:</i>	Potential
7 The public interface for travelers shall support traveler input in audio or manual form.	
<i>Requirement:</i>	Potential
8 The public interface for travelers shall present information to the traveler in audible or visual forms consistent with a kiosk, including those that are suitable for travelers with hearing or vision physical disabilities.	
<i>Requirement:</i>	Potential
9 The public interface for travelers shall be able to store frequently requested data.	
<i>Functional Area: Remote Interactive Information Reception</i>	
Public traveler interface, such as a kiosk, that provides traffic, transit, yellow pages, special event, and other personalized traveler information services upon request.	
<i>Requirement:</i>	Potential
1 The public interface for travelers shall receive traffic information from a center and present it to the traveler upon request.	
<i>Requirement:</i>	Potential
2 The public interface for travelers shall receive transit information from a center and present it to the traveler upon request.	
<i>Requirement:</i>	Potential
3 The public interface for travelers shall receive yellow pages information (such as lodging, restaurants, theaters, bicycle facilities, and other tourist activities) from a center and present it to the traveler upon request.	
<i>Requirement:</i>	Potential
4 The public interface for travelers shall receive event information from a center and present it to the traveler upon request.	
<i>Requirement:</i>	Potential
5 The public interface for travelers shall receive evacuation information from a center and present it to the traveler.	
<i>Requirement:</i>	Potential
6 The public interface for travelers shall receive wide-area alerts and present it to the traveler.	
<i>Requirement:</i>	Potential
7 The public interface for travelers shall accept reservations for confirmed trip plans.	
<i>Requirement:</i>	Potential
8 The public interface for travelers shall support payment for services, such as confirmed trip plans, confirmed traveler services, tolls, transit fares, parking lot charges, and advanced payment for tolls.	
<i>Requirement:</i>	Potential
9 The public interface for travelers shall provide an interface through which credit identities and stored credit values may be collected from tags, traveler cards, or payment instruments used by travelers.	
<i>Requirement:</i>	Potential
10 The public interface for travelers shall base requests from the traveler on the traveler's current location or a specific location identified by the traveler, and filter the provided information accordingly.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Kiosks, Yellow Pages, and Other Remote Traveler Support</i>	
<i>Entity: Remote Traveler Support</i>	
<i>Functional Area: Remote Interactive Information Reception</i>	
Public traveler interface, such as a kiosk, that provides traffic, transit, yellow pages, special event, and other personalized traveler information services upon request.	
<i>Requirement:</i>	Potential
11 The public interface for travelers shall provide digitized map data to act as the background to the information presented to the traveler.	
<i>Requirement:</i>	Potential
12 The public interface for travelers shall support traveler input in audio or manual form.	
<i>Requirement:</i>	Potential
13 The public interface for travelers shall present information to the traveler in audible or visual forms consistent with a kiosk, including those that are suitable for travelers with hearing or vision physical disabilities.	
<i>Requirement:</i>	Potential
14 The public interface for travelers shall be able to store frequently requested data.	
<i>Functional Area: Remote Transit Information Services</i>	
Public traveler interface that provides real-time travel-related information at transit stops and multi-modal transfer points, including general annunciation, display of imminent arrival information, the latest available information on transit routes, schedules, transfer options, available services, fares, and real-time schedule adherence.	
<i>Requirement:</i>	Potential
1 The public interface for travelers shall collect and provide real-time travel-related information at transit stops, multi-modal transfer points, and other public transportation areas.	
<i>Requirement:</i>	Potential
2 The public interface for travelers shall collect and present to the transit traveler information on transit routes, schedules, and real-time schedule adherence.	
<i>Requirement:</i>	Potential
3 The public interface for travelers shall provide support for general annunciation and/or display of imminent arrival information and other information of general interest to transit users.	
<i>Requirement:</i>	Potential
4 The public interface for travelers shall present information to the traveler in a form suitable for travelers with physical disabilities.	
<i>Element: Lake County E-911 Center</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Emergency Call-Taking</i>	
Provides interface to the emergency call-taking systems such as the Emergency Telecommunications System (e.g., 911) that correlate call information with emergencies reported by transit agencies, commercial vehicle operators, or other public safety agencies. Allows the operator to verify the incident and forward the information to the responding agencies.	
<i>Requirement:</i>	Existing
1 The center shall support the interface to the Emergency Telecommunications System (e.g. 911 or 7-digit call routing) to receive emergency notification information and provide it to the emergency system operator.	
<i>Requirement:</i>	Existing
2 The center shall receive emergency call information from 911 services and present the possible incident information to the emergency system operator.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Lake County E-911 Center</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Emergency Call-Taking</i>	
Provides interface to the emergency call-taking systems such as the Emergency Telecommunications System (e.g., 911) that correlate call information with emergencies reported by transit agencies, commercial vehicle operators, or other public safety agencies. Allows the operator to verify the incident and forward the information to the responding agencies.	
<i>Requirement:</i>	
4 The center shall receive emergency call information from mayday service providers and present the possible incident information to the emergency system operator.	Existing
<i>Requirement:</i>	
5 The center shall receive emergency notification information from other public safety agencies and present the possible incident information to the emergency system operator.	Existing
<i>Requirement:</i>	
6 The center shall receive emergency notification information from public transit systems and present the possible incident information to the emergency system operator.	Existing
<i>Requirement:</i>	
7 The center shall coordinate, correlate, and verify all emergency inputs, including those identified based on external calls and internal analysis of security sensor and surveillance data, and assign each a level of confidence.	Existing
<i>Requirement:</i>	
8 The center shall send a request for remote control of CCTV systems from a traffic management center in order to verify the reported incident.	Planned
<i>Requirement:</i>	
9 The center shall forward the verified emergency information to the responding agency based on the location and nature of the emergency.	Existing
<i>Requirement:</i>	
10 The center shall update the incident information log once the emergency system operator has verified the incident.	Existing
<i>Requirement:</i>	
11 The center shall provide the capability for digitized map data to act as the background to the emergency information presented to the emergency system operator.	Planned
<i>Functional Area: Emergency Dispatch</i>	
Dispatch emergency vehicles to incidents, tracking their location and status. Pertinent incident information is gathered and relayed to the responding units.	
<i>Requirement:</i>	
1 The center shall dispatch emergency vehicles to respond to verified emergencies under center personnel control.	Existing
<i>Requirement:</i>	
2 The center shall store the current status of all emergency vehicles available for dispatch and those that have been dispatched.	Existing
<i>Requirement:</i>	
3 The center shall relay location and incident details to the responding vehicles.	Existing
<i>Requirement:</i>	
4 The center shall track the location and status of emergency vehicles responding to an emergency based on information from the emergency vehicle.	Existing
<i>Requirement:</i>	
5 The center shall store and maintain the emergency service responses in an action log.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Lake County E-911 Center</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Emergency Dispatch</i>	
Dispatch emergency vehicles to incidents, tracking their location and status. Pertinent incident information is gathered and relayed to the responding units.	
<i>Requirement:</i>	
6 The center shall provide the capability for digitized map data to act as the background to the information presented to the emergency system operator.	Planned
<i>Requirement:</i>	
7 The center shall receive traffic images to support dispatch of emergency vehicles.	Existing
<i>Requirement:</i>	
8 The center shall provide the capability to request remote control of traffic surveillance devices	Planned
<i>Requirement:</i>	
9 The center shall coordinate response to incidents with other Emergency Management centers to ensure appropriate resources are dispatched and utilized.	Existing
<i>Functional Area: Emergency Routing</i>	
Routing of emergency vehicles to facilitate the quickest/safest arrival. Routes may be determined based on real-time traffic information and road conditions or routes may be provided by Traffic Management on request.	
<i>Requirement:</i>	
1 The center shall collect current traffic and road condition information for emergency vehicle route calculation.	Existing
<i>Requirement:</i>	
2 The center shall receive information on the location and status of traffic control equipment and work zones along potential emergency routes.	Existing
<i>Requirement:</i>	
3 The center shall receive status information from care facilities to determine the appropriate facility and its location.	Existing
<i>Requirement:</i>	
4 The center shall receive asset restriction information to support the dispatching of appropriate emergency resources.	Existing
<i>Requirement:</i>	
5 The center shall receive current railroad schedule information for emergency vehicle route calculation.	Planned
<i>Requirement:</i>	
6 The center shall track current emergency vehicle location and status.	Existing
<i>Requirement:</i>	
7 The center shall calculate emergency vehicle routes, under center personnel control, based on the collected traffic and road conditions information.	Existing
<i>Requirement:</i>	
8 The center shall request and receive ingress and egress routes or other specialized emergency access routes from the traffic management center.	Planned
<i>Requirement:</i>	
9 The center shall provide the capability to request special traffic control measures, such as signal preemption, from the traffic management center to facilitate emergency vehicle progress along the suggested route.	Potential
<i>Requirement:</i>	
10 Once the route is calculated the route shall be provided to the dispatch function.	Existing
<i>Requirement:</i>	
11 The center shall provide the capability for digitized map data to act as the background to the information presented to the emergency system operator.	Planned

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Lake County E-911 Center	
<i>Entity:</i> Emergency Management	
<i>Functional Area:</i> Incident Command	
Tactical decision support, resource coordination, and communications integration among emergency management agencies for Incident Commands that are established by first responders to support local management of an incident.	
<i>Requirement:</i>	Existing
1 The center shall 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.	
<i>Requirement:</i>	Existing
2 The center shall provide incident command communications with public safety, emergency management, transportation, and other allied response agency centers.	
<i>Requirement:</i>	Existing
3 The center shall track and maintain resource information and action plans pertaining to the incident command.	
<i>Requirement:</i>	Existing
4 The center shall 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.	
<i>Requirement:</i>	Existing
5 The center shall assess the status of responding emergency vehicles as part of an incident command.	
<i>Functional Area:</i> Emergency Early Warning System	
Monitors alerting and advisory systems, information collected by ITS surveillance and sensors, and reports from other agencies in order to identify potential, imminent, or in-progress major incidents or disasters. Notification is provided to other ITS centers to notify the traveling public.	
<i>Requirement:</i>	Existing
1 The center shall 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).	
<i>Requirement:</i>	Existing
2 The center shall provide the capability to correlate alerts and advisories, incident information, and security sensor and surveillance data.	
<i>Requirement:</i>	Planned
3 The center shall 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.	
<i>Requirement:</i>	Planned
4 The center shall broadcast wide-area alerts and advisories to transit management centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Lake County E-911 Center</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Emergency Early Warning System</i>	
Monitors alerting and advisory systems, information collected by ITS surveillance and sensors, and reports from other agencies in order to identify potential, imminent, or in-progress major incidents or disasters. Notification is provided to other ITS centers to notify the traveling public.	
<i>Requirement:</i> 5 The center shall broadcast wide-area alerts and advisories to toll administration 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.	Planned
<i>Requirement:</i> 6 The center shall broadcast wide-area alerts and advisories to traveler information service providers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	Planned
<i>Requirement:</i> 7 The center shall broadcast wide-area alerts and advisories to maintenance centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	Planned
<i>Requirement:</i> 8 The center shall broadcast wide-area alerts and advisories to other emergency management centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	Planned
<i>Requirement:</i> 9 The center shall broadcast wide-area alerts and advisories to commercial vehicle administration centers and roadside check facilities 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.	Planned
<i>Requirement:</i> 10 The center shall process status information from each of the centers that have been sent the wide-area alert.	Planned
<i>Requirement:</i> 11 The center shall coordinate the broadcast of wide-area alerts and advisories with other emergency management centers.	Existing
<i>Requirement:</i> 12 The center shall receive incident information from other transportation management centers to support the early warning system.	Existing
<i>Requirement:</i> 13 The center shall present the alert and advisory information and the status of the actions taken in response to the alert by the other centers to the emergency system operator as received from other system inputs.	Existing
<i>Requirement:</i> 14 The center shall support the entry of alert and advisory information directly from the emergency system operator.	Existing
<i>Functional Area: Emergency Response Management</i>	
Strategic emergency planning and response capabilities and broad inter-agency interfaces to support large-scale incidents and disasters, commonly associated with Emergency Operations Centers.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Lake County E-911 Center	
<i>Entity:</i> Emergency Management	
<i>Functional Area:</i> Emergency Response Management	
Strategic emergency planning and response capabilities and broad inter-agency interfaces to support large-scale incidents and disasters, commonly associated with Emergency Operations Centers.	
<i>Requirement:</i>	
1 The center shall provide strategic emergency response capabilities provided by an Emergency Operations Center for large-scale incidents and disasters.	Existing
<i>Requirement:</i>	
2 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.	Existing
<i>Requirement:</i>	
3 The center shall provide the capability to implement response plans and track progress through the incident by exchanging incident information and response status with allied agencies.	Existing
<i>Requirement:</i>	
4 The center shall develop, coordinate with other agencies, and store emergency response plans.	Existing
<i>Requirement:</i>	
5 The center shall track the availability of resources and coordinate resource sharing with allied agency centers including traffic, maintenance, or other emergency centers.	Existing
<i>Requirement:</i>	
6 The center shall 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.	Existing
<i>Requirement:</i>	
7 The center shall receive event scheduling information from Event Promoters.	Planned
<i>Requirement:</i>	
8 The center shall support remote control of field equipment normally under control of the traffic management center including traffic signals, dynamic message signs, gates, and barriers.	Potential
<i>Requirement:</i>	
9 The center shall provide the capability to remotely control and monitor CCTV systems normally operated by a traffic management center.	Planned
<i>Requirement:</i>	
10 The center shall provide the capability to request transit resource availability from transit centers for use during disaster and evacuation operations.	Existing
<i>Requirement:</i>	
11 The center shall 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.	Planned
<i>Requirement:</i>	
12 The center shall provide information to the media concerning the status of an emergency response.	Existing
<i>Requirement:</i>	
13 The center shall provide the capability for digitized map data to act as the background to the information presented to the emergency system operator.	Planned

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Lake County E-911 Center	
<i>Entity:</i> Emergency Management	
<i>Functional Area:</i> Emergency Response Management	
Strategic emergency planning and response capabilities and broad inter-agency interfaces to support large-scale incidents and disasters, commonly associated with Emergency Operations Centers.	
<i>Requirement:</i> 14 The center shall provide the capability for center personnel to provide inputs to the management of incidents, disasters and evacuations.	Existing
<i>Requirement:</i> 15 The center shall collect information about the status of the recovery efforts for the infrastructure during disasters.	Potential
<i>Requirement:</i> 16 The center shall provide the overall status of infrastructure recovery efforts to traveler information providers and media.	Potential
<i>Requirement:</i> 17 The center shall provide the capability to communicate information about emergency situations to local population through the Emergency Telecommunications System.	Existing
<i>Requirement:</i> 18 The center shall 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.	Planned
<i>Requirement:</i> 19 The center shall retrieve information from public health systems to increase preparedness for, and implement a response to biological, chemical, radiation, and other public health emergencies.	Existing
<i>Functional Area:</i> Emergency Evacuation Support	
Evacuation planning and coordination to manage evacuation and reentry of a population in the vicinity of a disaster or other emergency that poses a risk to public safety.	
<i>Requirement:</i> 1 The center shall manage inter-agency coordination of evacuation operations, from initial planning through the evacuation process and reentry.	Planned
<i>Requirement:</i> 2 The center shall develop and exchange evacuation plans with allied agencies prior to the occurrence of a disaster.	Existing
<i>Requirement:</i> 3 The center shall provide an interface to the emergency system operator to enter evacuation plans and procedures and present the operator with other agencies' plans.	Existing
<i>Requirement:</i> 4 The center shall coordinate evacuation destinations and shelter needs with shelter providers (e.g., the American Red Cross) in the region.	Existing
<i>Requirement:</i> 5 The center shall provide evacuation information to traffic, transit, maintenance and construction, rail operations, and other emergency management centers as needed.	Planned
<i>Requirement:</i> 6 The center shall request resources from transit agencies as needed to support the evacuation.	Planned
<i>Requirement:</i> 7 The center shall 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.	Potential

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Lake County E-911 Center</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Emergency Evacuation Support</i>	
Evacuation planning and coordination to manage evacuation and reentry of a population in the vicinity of a disaster or other emergency that poses a risk to public safety.	
<i>Requirement:</i> 8 The center shall 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.	Planned
<i>Requirement:</i> 9 The center shall monitor the progress or status of the evacuation once it begins and exchange tactical plans, prepared during the incident, with allied agencies.	Potential
<i>Requirement:</i> 10 The center shall monitor the progress of the reentry process.	Potential
<i>Requirement:</i> 11 The center shall submit evacuation information to toll administration centers along with requests for changes in the toll services or fee collection during an evacuation.	Potential
<i>Requirement:</i> 12 The center shall 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.	Existing
<i>Functional Area: Emergency Environmental Monitoring</i>	
Collects current and forecast road and weather information that is used by the operator to more effectively manage incidents.	
<i>Requirement:</i> 1 The center shall 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).	Existing
<i>Requirement:</i> 2 The center shall collect current road and weather information from roadway maintenance operations.	Existing
<i>Requirement:</i> 3 The center shall assimilate current and forecast road conditions and surface weather information to support incident management.	Existing
<i>Requirement:</i> 4 The center shall present the current and forecast road and weather information to the emergency system operator.	Existing
<i>Functional Area: Center Secure Area Surveillance</i>	
Management of security surveillance devices and analysis of that data to detect potential threats. Areas under surveillance may include transit stops, transit stations, rest areas, park and ride lots, modal interchange facilities, on-board a transit vehicle, etc.	
<i>Requirement:</i> 1 The center shall remotely monitor video images and audio surveillance data collected in secure areas including facilities (e.g. transit yards) and transportation infrastructure (e.g. bridges, tunnels, interchanges, roadway infrastructure, and transit railways or guideways). The data may be raw or pre-processed in the field.	Planned

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Lake County E-911 Center</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Center Secure Area Surveillance</i>	
Management of security surveillance devices and analysis of that data to detect potential threats. Areas under surveillance may include transit stops, transit stations, rest areas, park and ride lots, modal interchange facilities, on-board a transit vehicle, etc.	
<i>Requirement:</i>	
2 The center shall remotely monitor video images and audio surveillance data collected in traveler secure areas, which include transit stations, transit stops, rest areas, park and ride lots, and other fixed sites along travel routes (e.g., emergency pull-off areas and travel information centers). The data may be raw or pre-processed in the field.	Planned
<i>Requirement:</i>	
3 The center shall remotely monitor video images and audio surveillance data collected on-board transit vehicles. The data may be raw or pre-processed in the field.	Planned
<i>Requirement:</i>	
4 The center shall exchange surveillance data with other emergency centers.	Planned
<i>Requirement:</i>	
5 The center shall identify potential security threats based on collected security surveillance data.	Planned
<i>Requirement:</i>	
6 The center shall verify potential security threats by correlating security surveillance data from multiple sources.	Planned
<i>Requirement:</i>	
7 The center shall remotely control security surveillance devices in secure areas including facilities (e.g. transit yards) and transportation infrastructure (e.g. bridges, tunnels, interchanges, roadway infrastructure, and transit railways or guideways).	Planned
<i>Requirement:</i>	
8 The center shall remotely control security surveillance devices in traveler secure areas, which include transit stations, transit stops, rest areas, park and ride lots, and other fixed sites along travel routes (e.g., emergency pull-off areas and travel information centers).	Planned
<i>Requirement:</i>	
9 The center shall remotely control security surveillance devices on-board transit vehicles.	Planned
<i>Requirement:</i>	
10 The center shall match traveler video images against a database from the Alerting and Advisory Systems of known images that may represent criminals and terrorists.	Planned
<i>Requirement:</i>	
11 The center shall exchange traveler images with other emergency management centers to support traveler image matching.	Planned
<i>Requirement:</i>	
12 The center shall respond to control data from center personnel regarding security surveillance data collection, processing, threat detection, and image matching.	Planned
<i>Requirement:</i>	
13 The center shall monitor maintenance status of the security sensor field equipment.	Planned
<i>Functional Area: Center Secure Area Alarm Support</i>	
Collection and response to silent and audible alarms received from travelers in secure areas (such as transit stops, rest areas, park-and-ride lots) and from on-board transit vehicles.	
<i>Requirement:</i>	
1 The center shall collect silent and audible alarms received from travelers in secure areas (such as transit stops, rest areas, park and ride lots, modal interchange facilities).	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Lake County E-911 Center</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Center Secure Area Alarm Support</i>	
Collection and response to silent and audible alarms received from travelers in secure areas (such as transit stops, rest areas, park-and-ride lots) and from on-board transit vehicles.	
<i>Requirement:</i>	Existing
2 The center shall collect silent and audible alarms received from transit vehicles, originated by the traveler or the transit vehicle operator.	
<i>Requirement:</i>	Existing
3 After the alarm message has been received, the center shall generate an alarm acknowledgment to the sender.	
<i>Requirement:</i>	Existing
4 After the alarm message becomes a verified incident, the center shall determine the appropriate response.	
<i>Requirement:</i>	Existing
5 The center shall determine whether the alarm message indicates an emergency that requires the attention of public safety agencies, and forward alarm message data to the appropriate agency as necessary.	
<i>Requirement:</i>	Existing
6 The center shall forward the alarm message to center personnel and respond to the traveler or transit vehicle operator as directed by the personnel.	
<i>Functional Area: Mayday Support</i>	
Collection and response to Mayday messages received from vehicles and drivers.	
<i>Requirement:</i>	Existing
1 The center shall collect mayday messages from vehicles and drivers.	
<i>Requirement:</i>	Existing
2 The center shall collect mayday messages from travelers via personal handheld devices.	
<i>Requirement:</i>	Existing
3 The center shall acknowledge the request for emergency assistance, whether originated by the driver, automatically by the vehicle's safety systems, or by a traveler via a personal handheld device.	
<i>Requirement:</i>	Existing
4 After the mayday becomes a verified incident, the center shall determine the appropriate response to the mayday message.	
<i>Requirement:</i>	Existing
5 The center shall determine whether the mayday message indicates an emergency that requires the attention of public safety agencies, and forward mayday emergency data to the appropriate agency as necessary.	
<i>Requirement:</i>	Planned
6 The center shall support the activation of remote controlled functions requested by a vehicle, such as requests to unlock doors.	
<i>Requirement:</i>	Existing
7 The center shall request additional emergency details from or issue commands to the vehicle's security systems or vehicle driver if needed.	
<i>Requirement:</i>	Existing
8 The center shall maintain a log of all mayday signals received from vehicles.	
<i>Requirement:</i>	Existing
9 The center shall provide all mayday data to center personnel and respond to the vehicle, driver, or traveler using the portable handheld device as directed by the personnel.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Lake County E-911 Center</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Emergency Commercial Vehicle Response</i>	
Responds to commercial vehicle and freight equipment related emergencies. Includes incidents involving hazardous materials as well as the detection of non-permitted transport of security sensitive hazmat.	
<i>Requirement:</i>	
1 The center shall receive emergency notification information from commercial vehicles, commercial vehicle check stations, or commercial fleet operators and present the possible incident information to the emergency system operator. This may include detection of non-permitted transport of security sensitive hazmat, hazardous cargo spills, etc.	Existing
<i>Requirement:</i>	
2 The center shall receive details of the cargo being carried by commercial vehicles from their commercial fleet manager for incidents involving potential hazardous materials.	Existing
<i>Requirement:</i>	
3 The center shall forward the verified emergency information to the responding agency based on the location and nature of the emergency.	Existing
<i>Requirement:</i>	
4 The center shall provide the capability to request Fleet and Freight Management to disable a specific vehicle in their fleet.	Planned
<i>Functional Area: Emergency Data Collection</i>	
Collection and storage of information related to Emergency Management. For use by operations personnel or data archives in the region.	
<i>Requirement:</i>	
1 The center shall collect emergency service data, emergency vehicle management data, emergency vehicle data, sensor and surveillance data, threat data, and incident data.	Existing
<i>Requirement:</i>	
2 The center shall assign quality control metrics and meta-data to be stored along with the data. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.	Existing
<i>Requirement:</i>	
3 The center shall receive and respond to requests from ITS Archives for either a catalog of the emergency management data or for the data itself.	Planned
<i>Requirement:</i>	
4 The center shall be able to produce sample products of the data available.	Planned
<i>Functional Area: Emergency Transportation Operations Data Collection</i>	
Collects real-time information on the state of the regional transportation system for operational use by the center. It establishes communications with a regional repository, requests or subscribes to information relevant to the center, and distributes the received information for use.	
<i>Requirement:</i>	
1 The center shall collect real-time information on the state of the regional transportation system including current traffic and road conditions, weather conditions, special event and incident information.	Existing
<i>Requirement:</i>	
2 The center shall support the capability for the system operator to monitor and control the information collection service.	Existing
<i>Element: Lake County Emergency Operations Center</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Emergency Call-Taking</i>	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Lake County Emergency Operations Center	
<i>Entity:</i> Emergency Management	
<i>Functional Area:</i> Emergency Call-Taking	
Provides interface to the emergency call-taking systems such as the Emergency Telecommunications System (e.g., 911) that correlate call information with emergencies reported by transit agencies, commercial vehicle operators, or other public safety agencies. Allows the operator to verify the incident and forward the information to the responding agencies.	
<i>Requirement:</i>	
1 The center shall support the interface to the Emergency Telecommunications System (e.g. 911 or 7-digit call routing) to receive emergency notification information and provide it to the emergency system operator.	Existing
<i>Requirement:</i>	
2 The center shall receive emergency call information from 911 services and present the possible incident information to the emergency system operator.	Existing
<i>Requirement:</i>	
4 The center shall receive emergency call information from mayday service providers and present the possible incident information to the emergency system operator.	Existing
<i>Requirement:</i>	
5 The center shall receive emergency notification information from other public safety agencies and present the possible incident information to the emergency system operator.	Existing
<i>Requirement:</i>	
6 The center shall receive emergency notification information from public transit systems and present the possible incident information to the emergency system operator.	Existing
<i>Requirement:</i>	
7 The center shall coordinate, correlate, and verify all emergency inputs, including those identified based on external calls and internal analysis of security sensor and surveillance data, and assign each a level of confidence.	Existing
<i>Requirement:</i>	
8 The center shall send a request for remote control of CCTV systems from a traffic management center in order to verify the reported incident.	Planned
<i>Requirement:</i>	
9 The center shall forward the verified emergency information to the responding agency based on the location and nature of the emergency.	Existing
<i>Requirement:</i>	
10 The center shall update the incident information log once the emergency system operator has verified the incident.	Existing
<i>Requirement:</i>	
11 The center shall provide the capability for digitized map data to act as the background to the emergency information presented to the emergency system operator.	Planned
<i>Functional Area:</i> Emergency Dispatch	
Dispatch emergency vehicles to incidents, tracking their location and status. Pertinent incident information is gathered and relayed to the responding units.	
<i>Requirement:</i>	
1 The center shall dispatch emergency vehicles to respond to verified emergencies under center personnel control.	Existing
<i>Requirement:</i>	
2 The center shall store the current status of all emergency vehicles available for dispatch and those that have been dispatched.	Existing
<i>Requirement:</i>	
3 The center shall relay location and incident details to the responding vehicles.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Lake County Emergency Operations Center	
<i>Entity:</i> Emergency Management	
<i>Functional Area:</i> Emergency Dispatch	
Dispatch emergency vehicles to incidents, tracking their location and status. Pertinent incident information is gathered and relayed to the responding units.	
<i>Requirement:</i>	
4 The center shall track the location and status of emergency vehicles responding to an emergency based on information from the emergency vehicle.	Existing
<i>Requirement:</i>	
5 The center shall store and maintain the emergency service responses in an action log.	Existing
<i>Requirement:</i>	
6 The center shall provide the capability for digitized map data to act as the background to the information presented to the emergency system operator.	Planned
<i>Requirement:</i>	
7 The center shall receive traffic images to support dispatch of emergency vehicles.	Planned
<i>Requirement:</i>	
8 The center shall provide the capability to request remote control of traffic surveillance devices	Planned
<i>Requirement:</i>	
9 The center shall coordinate response to incidents with other Emergency Management centers to ensure appropriate resources are dispatched and utilized.	Existing
<i>Functional Area:</i> Emergency Routing	
Routing of emergency vehicles to facilitate the quickest/safest arrival. Routes may be determined based on real-time traffic information and road conditions or routes may be provided by Traffic Management on request.	
<i>Requirement:</i>	
1 The center shall collect current traffic and road condition information for emergency vehicle route calculation.	Existing
<i>Requirement:</i>	
2 The center shall receive information on the location and status of traffic control equipment and work zones along potential emergency routes.	Existing
<i>Requirement:</i>	
3 The center shall receive status information from care facilities to determine the appropriate facility and its location.	Existing
<i>Requirement:</i>	
4 The center shall receive asset restriction information to support the dispatching of appropriate emergency resources.	Existing
<i>Requirement:</i>	
5 The center shall receive current railroad schedule information for emergency vehicle route calculation.	Planned
<i>Requirement:</i>	
6 The center shall track current emergency vehicle location and status.	Existing
<i>Requirement:</i>	
7 The center shall calculate emergency vehicle routes, under center personnel control, based on the collected traffic and road conditions information.	Existing
<i>Requirement:</i>	
8 The center shall request and receive ingress and egress routes or other specialized emergency access routes from the traffic management center.	Planned
<i>Requirement:</i>	
9 The center shall provide the capability to request special traffic control measures, such as signal preemption, from the traffic management center to facilitate emergency vehicle progress along the suggested route.	Potential

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Lake County Emergency Operations Center	
<i>Entity:</i> Emergency Management	
<i>Functional Area:</i> Emergency Routing	
Routing of emergency vehicles to facilitate the quickest/safest arrival. Routes may be determined based on real-time traffic information and road conditions or routes may be provided by Traffic Management on request.	
<i>Requirement:</i>	
10 Once the route is calculated the route shall be provided to the dispatch function.	Existing
<i>Requirement:</i>	
11 The center shall provide the capability for digitized map data to act as the background to the information presented to the emergency system operator.	Planned
<i>Functional Area:</i> Incident Command	
Tactical decision support, resource coordination, and communications integration among emergency management agencies for Incident Commands that are established by first responders to support local management of an incident.	
<i>Requirement:</i>	
1 The center shall 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.	Existing
<i>Requirement:</i>	
2 The center shall provide incident command communications with public safety, emergency management, transportation, and other allied response agency centers.	Existing
<i>Requirement:</i>	
3 The center shall track and maintain resource information and action plans pertaining to the incident command.	Existing
<i>Requirement:</i>	
4 The center shall 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.	Existing
<i>Requirement:</i>	
5 The center shall assess the status of responding emergency vehicles as part of an incident command.	Existing
<i>Functional Area:</i> Emergency Early Warning System	
Monitors alerting and advisory systems, information collected by ITS surveillance and sensors, and reports from other agencies in order to identify potential, imminent, or in-progress major incidents or disasters. Notification is provided to other ITS centers to notify the traveling public.	
<i>Requirement:</i>	
1 The center shall 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).	Existing
<i>Requirement:</i>	
2 The center shall provide the capability to correlate alerts and advisories, incident information, and security sensor and surveillance data.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Lake County Emergency Operations Center</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Emergency Early Warning System</i>	
Monitors alerting and advisory systems, information collected by ITS surveillance and sensors, and reports from other agencies in order to identify potential, imminent, or in-progress major incidents or disasters. Notification is provided to other ITS centers to notify the traveling public.	
<i>Requirement:</i> 3 The center shall 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.	Existing
<i>Requirement:</i> 4 The center shall broadcast wide-area alerts and advisories to transit management centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	Existing
<i>Requirement:</i> 5 The center shall broadcast wide-area alerts and advisories to toll administration centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	Existing
<i>Requirement:</i> 6 The center shall broadcast wide-area alerts and advisories to traveler information service providers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	Existing
<i>Requirement:</i> 7 The center shall broadcast wide-area alerts and advisories to maintenance centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	Existing
<i>Requirement:</i> 8 The center shall broadcast wide-area alerts and advisories to other emergency management centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	Existing
<i>Requirement:</i> 9 The center shall broadcast wide-area alerts and advisories to commercial vehicle administration centers and roadside check facilities for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	Existing
<i>Requirement:</i> 10 The center shall process status information from each of the centers that have been sent the wide-area alert.	Existing
<i>Requirement:</i> 11 The center shall coordinate the broadcast of wide-area alerts and advisories with other emergency management centers.	Existing
<i>Requirement:</i> 12 The center shall receive incident information from other transportation management centers to support the early warning system.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Lake County Emergency Operations Center</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Emergency Early Warning System</i>	
Monitors alerting and advisory systems, information collected by ITS surveillance and sensors, and reports from other agencies in order to identify potential, imminent, or in-progress major incidents or disasters. Notification is provided to other ITS centers to notify the traveling public.	
<i>Requirement:</i> 13 The center shall present the alert and advisory information and the status of the actions taken in response to the alert by the other centers to the emergency system operator as received from other system inputs.	Existing
<i>Requirement:</i> 14 The center shall support the entry of alert and advisory information directly from the emergency system operator.	Existing
<i>Functional Area: Emergency Response Management</i>	
Strategic emergency planning and response capabilities and broad inter-agency interfaces to support large-scale incidents and disasters, commonly associated with Emergency Operations Centers.	
<i>Requirement:</i> 1 The center shall provide strategic emergency response capabilities provided by an Emergency Operations Center for large-scale incidents and disasters.	Existing
<i>Requirement:</i> 2 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.	Existing
<i>Requirement:</i> 3 The center shall provide the capability to implement response plans and track progress through the incident by exchanging incident information and response status with allied agencies.	Existing
<i>Requirement:</i> 4 The center shall develop, coordinate with other agencies, and store emergency response plans.	Existing
<i>Requirement:</i> 5 The center shall track the availability of resources and coordinate resource sharing with allied agency centers including traffic, maintenance, or other emergency centers.	Existing
<i>Requirement:</i> 6 The center shall 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.	Existing
<i>Requirement:</i> 8 The center shall support remote control of field equipment normally under control of the traffic management center including traffic signals, dynamic message signs, gates, and barriers.	Potential
<i>Requirement:</i> 9 The center shall provide the capability to remotely control and monitor CCTV systems normally operated by a traffic management center.	Planned
<i>Requirement:</i> 10 The center shall provide the capability to request transit resource availability from transit centers for use during disaster and evacuation operations.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Lake County Emergency Operations Center	
<i>Entity:</i> Emergency Management	
<i>Functional Area:</i> Emergency Response Management	
Strategic emergency planning and response capabilities and broad inter-agency interfaces to support large-scale incidents and disasters, commonly associated with Emergency Operations Centers.	
<i>Requirement:</i>	
11 The center shall 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.	Planned
<i>Requirement:</i>	
12 The center shall provide information to the media concerning the status of an emergency response.	Existing
<i>Requirement:</i>	
13 The center shall provide the capability for digitized map data to act as the background to the information presented to the emergency system operator.	Planned
<i>Requirement:</i>	
14 The center shall provide the capability for center personnel to provide inputs to the management of incidents, disasters and evacuations.	Existing
<i>Requirement:</i>	
15 The center shall collect information about the status of the recovery efforts for the infrastructure during disasters.	Existing
<i>Requirement:</i>	
16 The center shall provide the overall status of infrastructure recovery efforts to traveler information providers and media.	Existing
<i>Requirement:</i>	
17 The center shall provide the capability to communicate information about emergency situations to local population through the Emergency Telecommunications System.	Existing
<i>Requirement:</i>	
18 The center shall 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.	Planned
<i>Requirement:</i>	
19 The center shall retrieve information from public health systems to increase preparedness for, and implement a response to biological, chemical, radiation, and other public health emergencies.	Existing
<i>Functional Area:</i> Emergency Evacuation Support	
Evacuation planning and coordination to manage evacuation and reentry of a population in the vicinity of a disaster or other emergency that poses a risk to public safety.	
<i>Requirement:</i>	
1 The center shall manage inter-agency coordination of evacuation operations, from initial planning through the evacuation process and reentry.	Existing
<i>Requirement:</i>	
2 The center shall develop and exchange evacuation plans with allied agencies prior to the occurrence of a disaster.	Existing
<i>Requirement:</i>	
3 The center shall provide an interface to the emergency system operator to enter evacuation plans and procedures and present the operator with other agencies' plans.	Existing
<i>Requirement:</i>	
4 The center shall coordinate evacuation destinations and shelter needs with shelter providers (e.g., the American Red Cross) in the region.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Lake County Emergency Operations Center	
<i>Entity:</i> Emergency Management	
<i>Functional Area:</i> Emergency Evacuation Support	
Evacuation planning and coordination to manage evacuation and reentry of a population in the vicinity of a disaster or other emergency that poses a risk to public safety.	
<i>Requirement:</i>	
5 The center shall provide evacuation information to traffic, transit, maintenance and construction, rail operations, and other emergency management centers as needed.	Existing
<i>Requirement:</i>	
6 The center shall request resources from transit agencies as needed to support the evacuation.	Existing
<i>Requirement:</i>	
7 The center shall 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.	Potential
<i>Requirement:</i>	
8 The center shall 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.	Existing
<i>Requirement:</i>	
9 The center shall monitor the progress or status of the evacuation once it begins and exchange tactical plans, prepared during the incident, with allied agencies.	Existing
<i>Requirement:</i>	
10 The center shall monitor the progress of the reentry process.	Existing
<i>Requirement:</i>	
11 The center shall submit evacuation information to toll administration centers along with requests for changes in the toll services or fee collection during an evacuation.	Potential
<i>Requirement:</i>	
12 The center shall 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.	Existing
<i>Functional Area:</i> Emergency Environmental Monitoring	
Collects current and forecast road and weather information that is used by the operator to more effectively manage incidents.	
<i>Requirement:</i>	
1 The center shall 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).	Existing
<i>Requirement:</i>	
2 The center shall collect current road and weather information from roadway maintenance operations.	Existing
<i>Requirement:</i>	
3 The center shall assimilate current and forecast road conditions and surface weather information to support incident management.	Existing
<i>Requirement:</i>	
4 The center shall present the current and forecast road and weather information to the emergency system operator.	Existing
<i>Functional Area:</i> Center Secure Area Surveillance	
Management of security surveillance devices and analysis of that data to detect potential threats. Areas under surveillance may include transit stops, transit stations, rest areas, park and ride lots, modal interchange facilities, on-board a transit vehicle, etc.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Lake County Emergency Operations Center</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Center Secure Area Surveillance</i>	
Management of security surveillance devices and analysis of that data to detect potential threats. Areas under surveillance may include transit stops, transit stations, rest areas, park and ride lots, modal interchange facilities, on-board a transit vehicle, etc.	
<i>Requirement:</i>	Planned
1 The center shall remotely monitor video images and audio surveillance data collected in secure areas including facilities (e.g. transit yards) and transportation infrastructure (e.g. bridges, tunnels, interchanges, roadway infrastructure, and transit railways or guideways). The data may be raw or pre-processed in the field.	
<i>Requirement:</i>	Planned
2 The center shall remotely monitor video images and audio surveillance data collected in traveler secure areas, which include transit stations, transit stops, rest areas, park and ride lots, and other fixed sites along travel routes (e.g., emergency pull-off areas and travel information centers). The data may be raw or pre-processed in the field.	
<i>Requirement:</i>	Planned
3 The center shall remotely monitor video images and audio surveillance data collected on-board transit vehicles. The data may be raw or pre-processed in the field.	
<i>Requirement:</i>	Planned
4 The center shall exchange surveillance data with other emergency centers.	
<i>Requirement:</i>	Planned
5 The center shall identify potential security threats based on collected security surveillance data.	
<i>Requirement:</i>	Planned
6 The center shall verify potential security threats by correlating security surveillance data from multiple sources.	
<i>Requirement:</i>	Planned
7 The center shall remotely control security surveillance devices in secure areas including facilities (e.g. transit yards) and transportation infrastructure (e.g. bridges, tunnels, interchanges, roadway infrastructure, and transit railways or guideways).	
<i>Requirement:</i>	Planned
8 The center shall remotely control security surveillance devices in traveler secure areas, which include transit stations, transit stops, rest areas, park and ride lots, and other fixed sites along travel routes (e.g., emergency pull-off areas and travel information centers).	
<i>Requirement:</i>	Planned
9 The center shall remotely control security surveillance devices on-board transit vehicles.	
<i>Requirement:</i>	Planned
10 The center shall match traveler video images against a database from the Alerting and Advisory Systems of known images that may represent criminals and terrorists.	
<i>Requirement:</i>	Planned
11 The center shall exchange traveler images with other emergency management centers to support traveler image matching.	
<i>Requirement:</i>	Planned
12 The center shall respond to control data from center personnel regarding security surveillance data collection, processing, threat detection, and image matching.	
<i>Requirement:</i>	Planned
13 The center shall monitor maintenance status of the security sensor field equipment.	

Functional Area: Center Secure Area Alarm Support

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Lake County Emergency Operations Center	
<i>Entity:</i> Emergency Management	
<i>Functional Area:</i> Center Secure Area Alarm Support	
Collection and response to silent and audible alarms received from travelers in secure areas (such as transit stops, rest areas, park-and-ride lots) and from on-board transit vehicles.	
<i>Requirement:</i>	Existing
1 The center shall collect silent and audible alarms received from travelers in secure areas (such as transit stops, rest areas, park and ride lots, modal interchange facilities).	
<i>Requirement:</i>	Existing
2 The center shall collect silent and audible alarms received from transit vehicles, originated by the traveler or the transit vehicle operator.	
<i>Requirement:</i>	Existing
3 After the alarm message has been received, the center shall generate an alarm acknowledgment to the sender.	
<i>Requirement:</i>	Existing
4 After the alarm message becomes a verified incident, the center shall determine the appropriate response.	
<i>Requirement:</i>	Existing
5 The center shall determine whether the alarm message indicates an emergency that requires the attention of public safety agencies, and forward alarm message data to the appropriate agency as necessary.	
<i>Requirement:</i>	Existing
6 The center shall forward the alarm message to center personnel and respond to the traveler or transit vehicle operator as directed by the personnel.	
<i>Functional Area:</i> Mayday Support	
Collection and response to Mayday messages received from vehicles and drivers.	
<i>Requirement:</i>	Existing
1 The center shall collect mayday messages from vehicles and drivers.	
<i>Requirement:</i>	Existing
2 The center shall collect mayday messages from travelers via personal handheld devices.	
<i>Requirement:</i>	Existing
3 The center shall acknowledge the request for emergency assistance, whether originated by the driver, automatically by the vehicle's safety systems, or by a traveler via a personal handheld device.	
<i>Requirement:</i>	Existing
4 After the mayday becomes a verified incident, the center shall determine the appropriate response to the mayday message.	
<i>Requirement:</i>	Existing
5 The center shall determine whether the mayday message indicates an emergency that requires the attention of public safety agencies, and forward mayday emergency data to the appropriate agency as necessary.	
<i>Requirement:</i>	Planned
6 The center shall support the activation of remote controlled functions requested by a vehicle, such as requests to unlock doors.	
<i>Requirement:</i>	Existing
7 The center shall request additional emergency details from or issue commands to the vehicle's security systems or vehicle driver if needed.	
<i>Requirement:</i>	Existing
8 The center shall maintain a log of all mayday signals received from vehicles.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Lake County Emergency Operations Center	
<i>Entity:</i> Emergency Management	
<i>Functional Area:</i> Mayday Support	
Collection and response to Mayday messages received from vehicles and drivers.	
<i>Requirement:</i> 9 The center shall provide all mayday data to center personnel and respond to the vehicle, driver, or traveler using the portable handheld device as directed by the personnel.	Existing
<i>Functional Area:</i> Emergency Commercial Vehicle Response	
Responds to commercial vehicle and freight equipment related emergencies. Includes incidents involving hazardous materials as well as the detection of non-permitted transport of security sensitive hazmat.	
<i>Requirement:</i> 1 The center shall receive emergency notification information from commercial vehicles, commercial vehicle check stations, or commercial fleet operators and present the possible incident information to the emergency system operator. This may include detection of non-permitted transport of security sensitive hazmat, hazardous cargo spills, etc.	Existing
<i>Requirement:</i> 2 The center shall receive details of the cargo being carried by commercial vehicles from their commercial fleet manager for incidents involving potential hazardous materials.	Existing
<i>Requirement:</i> 3 The center shall forward the verified emergency information to the responding agency based on the location and nature of the emergency.	Existing
<i>Requirement:</i> 4 The center shall provide the capability to request Fleet and Freight Management to disable a specific vehicle in their fleet.	Planned
<i>Functional Area:</i> Emergency Data Collection	
Collection and storage of information related to Emergency Management. For use by operations personnel or data archives in the region.	
<i>Requirement:</i> 1 The center shall collect emergency service data, emergency vehicle management data, emergency vehicle data, sensor and surveillance data, threat data, and incident data.	Existing
<i>Requirement:</i> 2 The center shall assign quality control metrics and meta-data to be stored along with the data. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.	Existing
<i>Requirement:</i> 3 The center shall receive and respond to requests from ITS Archives for either a catalog of the emergency management data or for the data itself.	Planned
<i>Requirement:</i> 4 The center shall be able to produce sample products of the data available.	Planned
<i>Functional Area:</i> Emergency Transportation Operations Data Collection	
Collects real-time information on the state of the regional transportation system for operational use by the center. It establishes communications with a regional repository, requests or subscribes to information relevant to the center, and distributes the received information for use.	
<i>Requirement:</i> 1 The center shall collect real-time information on the state of the regional transportation system including current traffic and road conditions, weather conditions, special event and incident information.	Planned

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Lake County Emergency Operations Center</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Emergency Transportation Operations Data Collection</i>	
Collects real-time information on the state of the regional transportation system for operational use by the center. It establishes communications with a regional repository, requests or subscribes to information relevant to the center, and distributes the received information for use.	
<i>Requirement:</i> 2 The center shall support the capability for the system operator to monitor and control the information collection service.	Planned
<i>Element: Lake County Field Equipment</i>	
<i>Entity: Roadway</i>	
<i>Functional Area: Roadway Probe Data Communications</i>	
Field elements that collect probe data from vehicles using short range communications.	
<i>Requirement:</i> 1 The field element shall communicate with passing vehicles for traffic data link time calculations and send collected data to the controlling center; identification will be removed to ensure anonymity.	Potential
<i>Requirement:</i> 2 The field element shall communicate with on-board equipment on passing vehicles to collect current vehicle position, speed, and heading and a record of previous events (e.g., starts and stops, link travel times) that can be used to determine current traffic conditions.	Potential
<i>Requirement:</i> 3 The field element shall communicate with on-board equipment on passing vehicles to collect current status information and a record of previous events (e.g., temperature, wiper status, headlight status, traction control system status) that can be used to determine road and surface weather conditions.	Potential
<i>Requirement:</i> 4 The field element shall communicate with on-board equipment on passing vehicles to collect vehicle trip information (e.g., origin and destination information, travel times) that can be used to support transportation planning.	Potential
<i>Requirement:</i> 5 The field element shall communicate with on-board equipment on passing vehicles to collect a history of precise positioning information that can be used to derive or verify accurate roadway geometry and lane features for use by map update providers.	Potential
<i>Requirement:</i> 6 The field element shall aggregate and forward collected probe information to the center.	Potential
<i>Requirement:</i> 7 The field element shall provide roadside equipment operational status to the center.	Potential
<i>Requirement:</i> 8 The field element shall provide roadside equipment fault indication to the center for repair.	Potential
<i>Functional Area: Roadway Signal Controls</i>	
Field elements including traffic signal controllers for use at signalized intersections; also supports pedestrian crossings.	
<i>Requirement:</i> 1 The field element shall control traffic signals under center control.	Existing
<i>Requirement:</i> 2 The field element shall respond to pedestrian crossing requests by accommodating the pedestrian crossing.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Lake County Field Equipment	
<i>Entity:</i> Roadway	
<i>Functional Area:</i> Roadway Signal Controls	
Field elements including traffic signal controllers for use at signalized intersections; also supports pedestrian crossings.	
<i>Requirement:</i>	
3 The field element shall provide the capability to notify the traffic management center of pedestrian calls and pedestrian accommodations.	Potential
<i>Requirement:</i>	
4 The field element shall report the current signal control information to the center.	Existing
<i>Requirement:</i>	
5 The field element shall report current preemption status to the center.	Planned
<i>Requirement:</i>	
6 The field element shall return traffic signal controller operational status to the center.	Existing
<i>Requirement:</i>	
7 The field element shall return traffic signal controller fault data to the center.	Existing
<i>Functional Area:</i> Field Management Stations Operation	
Supports direct communications between field management stations and the local field equipment under their control.	
<i>Requirement:</i>	
1 The field management station shall accept configuration information from the center.	Existing
<i>Requirement:</i>	
2 The field management station shall pass data provided by the center to local field devices and report data from the field devices back to the center.	Existing
<i>Functional Area:</i> Roadway Signal Preemption	
Field elements that receive signal preemption requests from approaching emergency vehicles and overrides the current operation of the traffic signals	
<i>Requirement:</i>	
1 The field element shall respond to signal preemption requests from emergency vehicles.	Planned
<i>Functional Area:</i> Roadway Equipment Coordination	
Field elements that control and send data to other field elements (such as environmental sensors that send data to a DMS or coordination between traffic controllers on adjacent intersections), without center control.	
<i>Requirement:</i>	
1 The field element shall include sensors that provide data and status information to other field element devices, without center control.	Potential
<i>Requirement:</i>	
2 The field element shall include sensors that receive configuration data from other field element devices, without center control.	Potential
<i>Requirement:</i>	
3 The field element shall include devices that provide data and status information to other field element devices without center control.	Potential
<i>Requirement:</i>	
4 The field element shall include devices that receive configuration data from other field element devices, without center control.	Potential
<i>Functional Area:</i> Roadway Field Device Monitoring	
Monitors field equipment operational status and detects and reports fault conditions. Device status, configuration, and fault information are provided to a remote center and a user interface provides information locally to field personnel.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Lake County Field Equipment	
<i>Entity:</i> Roadway	
<i>Functional Area:</i> Roadway Field Device Monitoring	
Monitors field equipment operational status and detects and reports fault conditions. Device status, configuration, and fault information are provided to a remote center and a user interface provides information locally to field personnel.	
<i>Requirement:</i>	Existing
1 The field element shall monitor the operational status (state of the device, configuration, and fault data) of connected sensors (such as traffic, infrastructure, environmental, security, speed) and devices (such as highway advisory radio, dynamic message signs, automated roadway treatment systems, barrier and safeguard systems, cameras, traffic signals, ramp meters, short range communications equipment, security surveillance equipment).	
<i>Requirement:</i>	Existing
2 The field element shall send operational status of connected field equipment to the maintenance center.	
<i>Requirement:</i>	Existing
3 The field element shall send collected fault data to the maintenance center for repair.	
<i>Requirement:</i>	Existing
4 The field element shall include a local interface that provides operational status and fault data for connected field equipment to field personnel.	
<i>Requirement:</i>	Existing
5 The field element shall include a local interface that allows field personnel to command diagnostic tests on connected field equipment.	
<i>Functional Area:</i> Roadway Environmental Monitoring	
Environmental sensors, surface and sub-surface, that collect weather and road surface information. Weather conditions measured include temperature, wind, humidity, precipitation, and visibility. Sensors measure road surface temperature, moisture, icing, salinity, etc.	
<i>Requirement:</i>	Existing
1 The field element shall include surface and sub-surface environmental sensors that measure road surface temperature, moisture, icing, salinity, and other measures.	
<i>Requirement:</i>	Existing
2 The field element shall include environmental sensors that measure weather conditions including temperature, wind, humidity, precipitation, and visibility.	
<i>Requirement:</i>	Planned
3 The field element's environmental sensors shall be remotely controlled by a maintenance center.	
<i>Requirement:</i>	Potential
4 The field element's environmental sensors shall be remotely controlled by a traffic management center.	
<i>Requirement:</i>	Potential
5 The field element's environmental sensors shall be remotely controlled by weather service providers such as the National Weather Service or value-added sector specific meteorological services.	
<i>Requirement:</i>	Potential
6 The field element's environmental sensors shall be remotely controlled by a maintenance and construction vehicle.	
<i>Requirement:</i>	Existing
7 The field element shall provide environmental sensor equipment operational status to the controlling center or maintenance vehicle.	
<i>Requirement:</i>	Existing
8 The field element shall provide environmental sensor equipment fault indication to the controlling center or maintenance vehicle.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Lake County Field Equipment	
<i>Entity:</i> Roadway	
<i>Functional Area:</i> Roadway Environmental Monitoring	
Environmental sensors, surface and sub-surface, that collect weather and road surface information. Weather conditions measured include temperature, wind, humidity, precipitation, and visibility. Sensors measure road surface temperature, moisture, icing, salinity, etc.	
<i>Requirement:</i>	
9 The field element shall remotely aggregate environmental sensor data with environmental data collected from maintenance and construction vehicles.	Planned
<i>Requirement:</i>	
10 The field element shall provide weather and road surface condition data to centers.	Existing
<i>Requirement:</i>	
11 The field element shall provide weather and road surface condition data to maintenance and construction vehicles.	Existing
<i>Functional Area:</i> Field Barrier System Control	
Field elements that control barrier systems such as gates and other systems that manage entry to roadways, transportation facilities and infrastructure.	
<i>Requirement:</i>	
1 The field element shall activate barrier systems for transportation facilities and infrastructure under center control. Barrier systems include automated or remotely controlled gates, barriers and other systems that manage entry to roadways.	Potential
<i>Requirement:</i>	
2 The field element shall return barrier system operational status to the controlling center.	Potential
<i>Requirement:</i>	
3 The field element shall return barrier system fault data to the maintenance center for repair.	Potential
<i>Requirement:</i>	
4 The field element shall receive requests for access from approaching vehicles using field-vehicle communications and validate and authenticate the requests.	Potential
<i>Requirement:</i>	
5 The field element shall grant access only to qualified vehicles.	Potential
<i>Requirement:</i>	
6 The field element shall communicate access permission status and access instructions to approaching vehicles using field-vehicle communications.	Potential
<i>Functional Area:</i> Roadway Speed Monitoring and Warning	
Vehicle speed sensors that detect excessive vehicle speeds, optionally based on conditions and vehicle type, informing drivers, centers and/or enforcement agencies of speed violations.	
<i>Requirement:</i>	
1 The field element shall include sensors to detect vehicle speeds, under traffic or maintenance center control.	Existing
<i>Requirement:</i>	
2 The field element shall include sensors to detect vehicle speeds, under enforcement agency control.	Planned
<i>Requirement:</i>	
3 If the speed detected by vehicle speed sensors is determined to be excessive, the field element shall provide a safe speed advisory to passing drivers via a driver information system (such as portable messages signs, field to vehicle communications to in-vehicle signing systems, etc.).	Existing
<i>Requirement:</i>	
4 The field element shall base speed advisories to passing drivers on environmental conditions.	Planned

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Lake County Field Equipment	
<i>Entity:</i> Roadway	
<i>Functional Area:</i> Roadway Speed Monitoring and Warning	
Vehicle speed sensors that detect excessive vehicle speeds, optionally based on conditions and vehicle type, informing drivers, centers and/or enforcement agencies of speed violations.	
<i>Requirement:</i>	Planned
5 The field element shall monitor notify an enforcement agency when a speed violation is detected.	
<i>Requirement:</i>	Existing
6 The field element shall return operational status for the vehicle speed sensors to the controlling traffic or maintenance center; including measured speeds, warning messages displayed, and violation records.	
<i>Requirement:</i>	Planned
7 The field element shall return operational status for the vehicle speed sensors to the enforcement agency.	
<i>Requirement:</i>	Existing
8 The field element shall return fault data for the vehicle speed sensors to the controlling center for repair.	
<i>Functional Area:</i> Roadway Infrastructure Monitoring	
Sensors that monitor the condition of pavement, bridges, tunnels, associated hardware, and other transportation-related infrastructure (e.g., culverts), under maintenance center and maintenance vehicle control.	
<i>Requirement:</i>	Potential
1 The field element shall include infrastructure condition monitoring sensors that monitor the condition of pavement, bridges, tunnels, associated hardware, and other transportation-related infrastructure (e.g., culverts), under maintenance center control.	
<i>Requirement:</i>	Potential
2 The field element shall include infrastructure condition monitoring sensors that monitor the condition of pavement, bridges, tunnels, associated hardware, and other transportation-related infrastructure (e.g., culverts), under maintenance vehicle control.	
<i>Requirement:</i>	Potential
3 The field element shall provide operational status for the infrastructure condition monitoring sensors to the maintenance center.	
<i>Requirement:</i>	Potential
4 The field element shall provide operational status for the infrastructure condition monitoring sensors to the maintenance vehicle.	
<i>Requirement:</i>	Potential
5 The field element shall provide fault data for the infrastructure condition monitoring sensors to the maintenance center for repair.	
<i>Functional Area:</i> Roadway Work Zone Traffic Control	
Field elements in maintenance and construction areas including CCTV cameras, driver information systems (such as DMS), and gates/barriers that monitor and control traffic and provide information directly to drivers in affected areas.	
<i>Requirement:</i>	Potential
1 The field element shall collect, process, and send work zone images to the center for further analysis and distribution, under center control.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Lake County Field Equipment	
<i>Entity:</i> Roadway	
<i>Functional Area:</i> Roadway Work Zone Traffic Control	
Field elements in maintenance and construction areas including CCTV cameras, driver information systems (such as DMS), and gates/barriers that monitor and control traffic and provide information directly to drivers in affected areas.	
<i>Requirement:</i> 2 Under traffic and maintenance center control, the field element shall include driver information systems (such as dynamic messages signs and highway advisory radios) that advise drivers of activity around the work zone through which they are currently passing.	Existing
<i>Requirement:</i> 3 Under the control of field personnel within maintenance vehicles, the field element shall include driver information systems (such as dynamic messages signs and highway advisory radios) that advise drivers of activity around a work zone through which they are currently passing.	Existing
<i>Requirement:</i> 4 The field element shall control access to the work zone using automated gate or barrier systems. This includes automated flagger assistance devices that include automated gate arms and other automated gate/barrier systems.	Planned
<i>Requirement:</i> 5 The field element shall provide operational status for the surveillance (e.g. CCTV), driver information systems, and gates/barriers in work zones to the maintenance center.	Existing
<i>Requirement:</i> 6 The field element shall provide fault data for the surveillance (e.g. CCTV), driver information systems, and gates/barriers in work zones to the maintenance center for repair.	Existing
<i>Functional Area:</i> Roadway Work Zone Safety	
Work zone intrusion detection devices (to detect vehicle intrusion upon a work zone or crew worker movement across a work zone boundary) and intrusion alerting devices that provide alerts to crew and drivers.	
<i>Requirement:</i> 1 The field element shall include work zone intrusion detection devices that detect when a vehicle has intruded upon the boundary of a work zone, under center control.	Potential
<i>Requirement:</i> 2 The field element shall include work zone intrusion detection devices that detect when crew workers have crossed the boundary between the work zone and vehicle traffic, under center control.	Potential
<i>Requirement:</i> 3 The field element shall include work zone intrusion alerting devices that alert crew workers of a work zone emergency or safety issue such as the intrusion of a vehicle into the work zone area or movement of field crew into the travel lanes.	Potential
<i>Requirement:</i> 4 The field element shall include work zone intrusion alerting devices that notify crew via maintenance vehicles of a work zone emergency or safety issue such as the intrusion of a vehicle into the work zone area or movement of field crew into the travel lanes.	Potential
<i>Requirement:</i> 5 The field element shall include work zone intrusion alerting devices that alert drivers that they have intruded upon the perimeter of the work zone, or are about to do so; may provide alerts to drivers directly or via in-vehicle signing.	Potential

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Lake County Field Equipment</i>	
<i>Entity: Roadway</i>	
<i>Functional Area: Roadway Work Zone Safety</i>	
Work zone intrusion detection devices (to detect vehicle intrusion upon a work zone or crew worker movement across a work zone boundary) and intrusion alerting devices that provide alerts to crew and drivers.	
<i>Requirement:</i>	Potential
6 The field element shall provide operational status for the work zone intrusion detection devices to the maintenance center.	
<i>Requirement:</i>	Potential
7 The field element shall provide fault data for the work zone intrusion detection devices to the maintenance center for repair.	
<i>Requirement:</i>	Potential
8 The field element shall provide operational status for the work zone intrusion alerting devices to the maintenance center.	
<i>Requirement:</i>	Potential
9 The field element shall provide fault data for the work zone intrusion alerting devices to the maintenance center for repair.	
<i>Functional Area: Roadway Data Collection</i>	
Field elements to collect traffic, road, and environmental conditions information for use in transportation planning, research, and other off-line applications. Includes the sensors, supporting roadside infrastructure, and communications equipment.	
<i>Requirement:</i>	Existing
1 The field element shall collect traffic, road, and environmental conditions information.	
<i>Requirement:</i>	Existing
2 The field element shall include the sensors and supporting roadside devices that sense, collect, and send traffic, road, and environmental conditions information to a center for archival.	
<i>Requirement:</i>	Existing
3 The field element shall collect sensor status and sensor faults from roadside equipment and send it along with the recorded data to a center for archival.	
<i>Element: Lake County Highway Department</i>	
<i>Entity: Traffic Management</i>	
<i>Functional Area: TMC Probe Information Collection</i>	
Collects, assimilates, and disseminates vehicle probe data collected from roadside beacons and centers controlling transit vehicles, emergency vehicles, toll collection points, and route-guided vehicles.	
<i>Requirement:</i>	Potential
1 The center shall collect traffic probe data from vehicles via roadside field equipment.	
<i>Requirement:</i>	Potential
2 The center shall collect road condition data from probe-equipped transit vehicles via transit management centers; the data may be aggregated and preliminarily processed at the sending center.	
<i>Requirement:</i>	Potential
3 The center shall collect traffic data from traveler information centers based on data from their subscriber vehicles; the data may be aggregated and initial link time calculations performed at the sending center.	
<i>Requirement:</i>	Potential
4 The center shall collect traffic data from toll administrative centers containing travel times between toll collection points for those vehicles equipped for electronic toll collection; the data may be aggregated and processed at the sending center.	
<i>Requirement:</i>	Potential
5 The center shall assimilate current and forecast traffic conditions based on collected probe data and distribute to other centers for dissemination to travelers.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Lake County Highway Department	
<i>Entity:</i> Traffic Management	
<i>Functional Area:</i> TMC Probe Information Collection	
Collects, assimilates, and disseminates vehicle probe data collected from roadside beacons and centers controlling transit vehicles, emergency vehicles, toll collection points, and route-guided vehicles.	
<i>Requirement:</i>	
6 The center shall collect operational status for the roadside probe data collection equipment.	Potential
<i>Requirement:</i>	
7 The center shall collect fault data for the roadside probe data collection equipment for repair.	Potential
<i>Functional Area:</i> TMC Signal Control	
Remotely controls traffic signal controllers to implement traffic management strategies at signalized intersections based on traffic conditions, incidents, emergency vehicle preemptions, pedestrian crossings, etc.	
<i>Requirement:</i>	
1 The center shall remotely control traffic signal controllers.	Existing
<i>Requirement:</i>	
2 The center shall accept notifications of pedestrian calls.	Planned
<i>Requirement:</i>	
3 The center shall collect traffic signal controller operational status and compare against the control information sent by the center.	Existing
<i>Requirement:</i>	
4 The center shall collect traffic signal controller fault data from the field.	Existing
<i>Requirement:</i>	
5 The center shall manage (define, store and modify) control plans to coordinate signalized intersections, to be engaged at the direction of center personnel or according to a daily schedule.	Existing
<i>Requirement:</i>	
6 The center shall implement control plans to coordinate signalized intersections based on data from sensors.	Existing
<i>Requirement:</i>	
7 The center shall manage boundaries of the control sections used within the signal system.	Existing
<i>Requirement:</i>	
8 The center shall maintain traffic signal coordination including synchronizing clocks throughout the system.	Existing
<i>Functional Area:</i> TMC Regional Traffic Management	
Coordination between traffic management centers in order to share traffic information between centers as well as control of traffic management field equipment. This may be used during incidents and special events and during day-to-day operations.	
<i>Requirement:</i>	
1 The center shall exchange traffic information with other traffic management centers including incident information, congestion data, traffic data, signal timing plans, and real-time signal control information.	Planned
<i>Requirement:</i>	
2 The center shall exchange traffic control information with other traffic management centers to support remote monitoring and control of traffic management devices (e.g. signs, sensors, signals, cameras, etc.).	Planned
<i>Functional Area:</i> TMC Traffic Management Decision Support	
Recommends courses of action to the traffic operator based on current and forecast road and traffic conditions. Recommended actions may include predefined incident response plans, signal timing plan changes, DMS/HAR messages, lane control strategies, metering strategies, etc.	

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Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Lake County Highway Department</i>	
<i>Entity: Traffic Management</i>	
Functional Area: TMC Traffic Management Decision Support	
Recommends courses of action to the traffic operator based on current and forecast road and traffic conditions. Recommended actions may include predefined incident response plans, signal timing plan changes, DMS/HAR messages, lane control strategies, metering strategies, etc.	
<i>Requirement:</i>	Planned
1 The center shall provide center personnel with an integrated regional view of current and forecast road and traffic conditions including traffic incidents, special events, maintenance activities and other events or conditions that impact capacity or demand.	
<i>Requirement:</i>	Planned
2 The center shall identify network imbalances and potential courses of action.	
<i>Requirement:</i>	Planned
3 The center shall compare the impact of potential courses of action and make recommendations to the operator.	
<i>Requirement:</i>	Planned
4 The recommended actions shall include predefined incident response plans, signal timing plan changes, DMS/HAR messages, lane control strategies and freeway control strategies including ramp metering, interchange metering, and mainline metering.	
<i>Requirement:</i>	Planned
5 The recommended actions shall include multimodal strategies that include suggested transit strategies and suggested route and mode choices for travelers.	
<i>Requirement:</i>	Planned
6 The center shall provide an interface to center personnel to input control parameters for the decision support process and receive recommended actions and supporting information presentation.	
Functional Area: TMC Incident Dispatch Coordination/Communication	
Formulates an incident response that takes into account the incident potential, incident impacts, and/or resources required for incident management. Facilitates the dispatch of emergency response and service vehicles and coordinates the response with cooperating agencies.	
<i>Requirement:</i>	Existing
1 The center shall 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.	
<i>Requirement:</i>	Existing
2 The center shall coordinate planning for incidents with emergency management centers - including pre-planning activities for disaster response, evacuation, and recovery operations.	
<i>Requirement:</i>	Planned
3 The center shall support requests from emergency management centers to remotely control sensor and surveillance equipment located in the field, provide special routing for emergency vehicles, and to provide responding emergency vehicles with signal preemption.	

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Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Lake County Highway Department</i>	
<i>Entity: Traffic Management</i>	
<i>Functional Area: TMC Incident Dispatch Coordination/Communication</i>	
Formulates an incident response that takes into account the incident potential, incident impacts, and/or resources required for incident management. Facilitates the dispatch of emergency response and service vehicles and coordinates the response with cooperating agencies.	
<i>Requirement:</i> 4 The center shall exchange incident information with emergency management centers, maintenance and construction centers, transit centers, information service providers, and the media including description, location, traffic impact, status, expected duration, and response information.	Existing
<i>Requirement:</i> 5 The center shall 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.	Potential
<i>Requirement:</i> 6 The center shall 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.	Planned
<i>Requirement:</i> 7 The center shall provide road network conditions and traffic images to emergency management centers, maintenance and construction centers, and traveler information service providers.	Potential
<i>Requirement:</i> 8 The center shall monitor incident response performance and calculate incident response and clearance times.	Planned
<i>Requirement:</i> 9 The center shall 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.	Planned
<i>Requirement:</i> 10 The center shall coordinate information and controls with other traffic management centers.	Potential
<i>Requirement:</i> 11 The center shall receive inputs from emergency management and transit management centers to develop an overall status of the transportation system including emergency transit schedules in effect and current status and condition of the transportation infrastructure.	Planned
<i>Requirement:</i> 12 The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for traffic incident management.	Planned
<i>Functional Area: TMC Evacuation Support</i>	
Development, coordination, and execution of special traffic management strategies during evacuation and subsequent reentry of a population in the vicinity of a disaster or major emergency. Interfaces with emergency management and other traffic management centers.	
<i>Requirement:</i> 1 The center shall coordinate planning for evacuation with emergency management centers - including pre-planning activities such as establishing routes, areas to be evacuated, timing, etc.	Existing

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Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Lake County Highway Department	
<i>Entity:</i> Traffic Management	
<i>Functional Area:</i> TMC Evacuation Support	
Development, coordination, and execution of special traffic management strategies during evacuation and subsequent reentry of a population in the vicinity of a disaster or major emergency. Interfaces with emergency management and other traffic management centers.	
<i>Requirement:</i>	Potential
2 The center shall 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.	
<i>Requirement:</i>	Potential
3 The center shall coordinate information and controls with other traffic management centers.	
<i>Requirement:</i>	Potential
4 The center shall 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.	
<i>Functional Area:</i> TMC Traffic Network Performance Evaluation	
Measures performance and predicts travel demand patterns to support traffic flow optimization, demand management, and incident management. Collects data from surveillance equipment as well as input from other management centers including emissions, event promoters, and other TMCs.	
<i>Requirement:</i>	Potential
1 The center shall monitor, analyze, and store traffic sensor data (speed, volume, occupancy) collected from field elements under remote control of the center to support overall network performance evaluations.	
<i>Requirement:</i>	Potential
2 The center shall collect wide-area pollution data from emissions management centers to support overall network performance evaluations.	
<i>Requirement:</i>	Planned
3 The center shall collect and store plans from event promoters for major future events possibly impacting traffic to support overall network performance evaluations.	
<i>Requirement:</i>	Planned
4 The center shall collect and store anticipated route information from information service providers to support overall network performance evaluations and predictions.	
<i>Requirement:</i>	Potential
5 The center shall exchange information with transit management centers including details current transit routes, the level of service on each route, and the progress of individual vehicles along their routes for use in forecasting demand and estimating current transportation network performance.	
<i>Requirement:</i>	Planned
6 The center shall exchange traffic information with other traffic management centers, including incidents, congestion data, traffic data, signal timing plans, and real-time signal control information to support overall network performance evaluations.	
<i>Requirement:</i>	Planned
7 The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for network performance evaluations.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Lake County Highway Department	
<i>Entity:</i> Traffic Management	
<i>Functional Area:</i> TMC Traffic Network Performance Evaluation	
Measures performance and predicts travel demand patterns to support traffic flow optimization, demand management, and incident management. Collects data from surveillance equipment as well as input from other management centers including emissions, event promoters, and other TMCs.	
<i>Requirement:</i>	Planned
8 The center shall provide an interface to the archive data repository to enable the operator to retrieve historical operating data for use in planning to predict future traffic patterns and conditions.	
<i>Requirement:</i>	Planned
9 This center shall use the collected information to measure overall current and forecast network performance and predict travel demand patterns.	
<i>Functional Area:</i> HRI Traffic Management	
Remotely monitor and control highway-rail intersection (HRI) equipment, includes standard speed active warning systems and high speed systems which provide additional information on approaching trains and detect and report on obstructions in the HRI.	
<i>Requirement:</i>	Planned
1 The center shall remotely control highway-rail intersection (HRI) equipment located in the field.	
<i>Requirement:</i>	Planned
2 The center shall accept collect highway-rail intersection (HRI) advisory or alert data from rail operations centers.	
<i>Requirement:</i>	Planned
3 The center shall collect highway-rail intersection (HRI) equipment operational status and compare against the control information sent by the center.	
<i>Requirement:</i>	Planned
4 The center shall provide the highway-rail intersection (HRI) equipment operational status to rail operations centers.	
<i>Requirement:</i>	Planned
5 The center shall collect incident information related to a highway-rail intersection (HRI), such as intersection blockages or crashes or equipment malfunctions.	
<i>Requirement:</i>	Planned
6 The center shall implement control plans to coordinate signalized intersections around highway-rail intersections (HRI), under control of center personnel, based on data from sensors and surveillance monitoring traffic conditions, incidents, equipment faults, pedestrian crossings, etc.	
<i>Functional Area:</i> Rail Operations Coordination	
Coordination between rail operations and traffic management centers - exchanging train schedules, maintenance schedules, as well as incidents and priority messages that impact highway-rail intersections (HRIs). Supports advanced traffic control strategies and enhanced traveler information.	
<i>Requirement:</i>	Planned
1 The center shall exchange highway-rail intersection (HRI) information with rail operations centers. This information may include event schedules, requests for information from the Rail Operators, incident notification based on rail operations messages, and priority messages like notifications of a HAZMAT spill, equipment failure, or an intersection blockage.	
<i>Requirement:</i>	Planned
2 The center shall receive highway-rail intersection (HRI) maintenance schedules, train schedules, and incident notifications from rail operations centers.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Lake County Highway Department	
<i>Entity:</i> Traffic Management	
<i>Functional Area:</i> Rail Operations Coordination	
Coordination between rail operations and traffic management centers - exchanging train schedules, maintenance schedules, as well as incidents and priority messages that impact highway-rail intersections (HRIs). Supports advanced traffic control strategies and enhanced traveler information.	
<i>Requirement:</i>	Planned
3 The center shall use the rail operations information to develop forecast HRI closure times and durations which may be applied in advanced traffic control strategies or delivered as enhanced traveler information.	
<i>Functional Area:</i> TMC Speed Monitoring and Warning	
Remotely monitors vehicle speeds, and informs an enforcement agency if excessive speeds are detected. Also configures and controls speed warning systems that provide safe speed advisories to the motorist.	
<i>Requirement:</i>	Existing
1 The center shall remotely control vehicle speed sensors typically placed in work zones; control parameters may include environmental and traffic conditions.	
<i>Requirement:</i>	Existing
2 The center shall collect operational status for the vehicle speed sensors; the status shall include logged information including measured speeds, warning messages displayed, and violation records.	
<i>Requirement:</i>	Existing
3 The center shall provide the capability to notify an enforcement agency when vehicle speeds in the work zone are in excess of the posted speed limit or are creating an unsafe condition based upon the current environmental or traffic conditions.	
<i>Requirement:</i>	Existing
4 The center shall collect fault data for the vehicle speed sensors for repair.	
<i>Functional Area:</i> TMC Multimodal Crossing Management	
Remotely monitors and manages multimodal crossings, such as draw bridges and other crossings between highway traffic and other modes; does not include highway-rail intersection.	
<i>Requirement:</i>	Planned
1 The center shall receive requests from non-highway traffic to cross at multimodal crossings for specified durations (such as draw bridges and miscellaneous other interference crossings between highway traffic and other modes such as river traffic, aircraft, etc.)	
<i>Requirement:</i>	Planned
2 The center shall remotely control traffic signal controllers for use at major multimodal crossings.	
<i>Requirement:</i>	Potential
3 The center shall remotely control driver information systems (such as dynamic messages signs, highway advisory radios (HAR), and equipment that controls warning lights and gates) to notify drivers of closure durations and times at multimodal crossings.	
<i>Requirement:</i>	Planned
4 The center shall collect operational status for the equipment at multimodal crossings.	
<i>Requirement:</i>	Planned
5 The center shall collect fault data for the equipment at multimodal crossings for repair.	
<i>Requirement:</i>	Planned
6 The center shall receive and respond to requests for right-of-way at multimodal crossings.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Lake County Highway Department	
<i>Entity:</i> Traffic Management	
<i>Functional Area:</i> TMC Multimodal Crossing Management	
Remotely monitors and manages multimodal crossings, such as draw bridges and other crossings between highway traffic and other modes; does not include highway-rail intersection.	
<i>Requirement:</i>	
7 The center shall collect and analyze the planned multimodal crossing closures as a possible incident.	Planned
<i>Requirement:</i>	
8 The center shall distribute multimodal crossing information to other centers for dissemination to travelers.	Planned
<i>Functional Area:</i> Barrier System Management	
Remotely controls barrier systems such as gates and other systems that manage entry to roadways, transportation facilities and infrastructure.	
<i>Requirement:</i>	
1 The center shall remotely control barrier systems for transportation facilities and infrastructure. Barrier systems include automated or remotely controlled gates, barriers and other systems that manage entry to roadways.	Potential
<i>Requirement:</i>	
2 The center shall collect barrier system operational status.	Potential
<i>Requirement:</i>	
3 The center shall collect barrier system fault data and send to the maintenance center for repair.	Potential
<i>Requirement:</i>	
4 The center shall accept requests for barrier system activation from other centers and from center personnel to support emergency response and detours.	Potential
<i>Functional Area:</i> Traffic Equipment Maintenance	
Monitoring and remote diagnostics of field equipment - detect failures, issue problem reports, and track the repair or replacement of the failed equipment.	
<i>Requirement:</i>	
1 The center shall collect and store sensor (traffic, pedestrian, multimodal crossing) operational status.	Existing
<i>Requirement:</i>	
3 The center shall collect and store sensor (traffic, pedestrian, multimodal crossing) fault data and send to the maintenance center for repair.	Potential
<i>Requirement:</i>	
5 The center shall collect environmental sensor operational status.	Existing
<i>Requirement:</i>	
6 The center shall collect environmental sensor equipment fault data and send to the maintenance center for repair.	Existing
<i>Requirement:</i>	
7 The center shall exchange data with maintenance centers concerning the reporting of faulty equipment and the schedule/status of their repair. Information exchanged includes details of new equipment faults, and clearances when the faults are cleared.	Existing
<i>Requirement:</i>	
8 The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for traffic maintenance data.	Planned
<i>Functional Area:</i> TMC Demand Management Coordination	
Provides the capability to gather information on regional toll, parking, and transit usage and request changes to enable dynamic pricing for demand management.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Lake County Highway Department	
<i>Entity:</i> Traffic Management	
<i>Functional Area:</i> TMC Demand Management Coordination	
Provides the capability to gather information on regional toll, parking, and transit usage and request changes to enable dynamic pricing for demand management.	
<i>Requirement:</i>	Planned
1 The center shall collect and store toll pricing data from toll administration centers, including the price for each road segment to which a toll applies, with the time and date for when it applies.	
<i>Requirement:</i>	Planned
2 The center shall collect and store parking information from parking management providers including lot locations, features (e.g. ability to handle oversized vehicles), capacity, type, hours of operation and rates.	
<i>Requirement:</i>	Planned
3 The center shall collect and store transit fare and schedule information from transit management centers.	
<i>Requirement:</i>	Planned
4 The center shall collect and store current transit, parking, and toll fee schedule information provided by regional traveler information systems.	
<i>Requirement:</i>	Planned
5 The center shall send requests to toll administration centers to change pricing, modify restrictions, or modify operations of a toll road facility.	
<i>Requirement:</i>	Planned
6 The center shall send requests to parking management providers to change the current parking lot charging structure.	
<i>Requirement:</i>	Planned
7 The center shall send requests to transit management centers to change the current transit services - schedules or fares of the transit services including park-and-ride lots.	
<i>Functional Area:</i> Traffic Data Collection	
Collection and storage of traffic management data. For use by operations personnel or data archives in the region.	
<i>Requirement:</i>	Existing
1 The center shall collect traffic management data such as operational data, event logs, etc.	
<i>Requirement:</i>	Existing
2 The center shall assign quality control metrics and meta-data to be stored along with the data. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.	
<i>Requirement:</i>	Planned
3 The center shall receive and respond to requests from ITS Archives for either a catalog of the traffic data or for the data itself.	
<i>Requirement:</i>	Planned
4 The center shall be able to produce sample products of the data available.	
<i>Functional Area:</i> TMC Transportation Operations Data Collection	
Collects real-time information on the state of the regional transportation system for operational use by the center. It establishes communications with a regional repository, requests or subscribes to information relevant to the center, and distributes the received information for use.	
<i>Requirement:</i>	Existing
1 The center shall collect real-time information on the state of the regional transportation system including current traffic and road conditions, weather conditions, special event and incident information.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Lake County Highway Department</i>	
<i>Entity: Traffic Management</i>	
<i>Functional Area: TMC Transportation Operations Data Collection</i>	
Collects real-time information on the state of the regional transportation system for operational use by the center. It establishes communications with a regional repository, requests or subscribes to information relevant to the center, and distributes the received information for use.	
<i>Requirement:</i>	Existing
2 The center shall support the capability for the system operator to monitor and control the information collection service.	
<i>Element: Lake County Maintenance and Construction Management System</i>	
<i>Entity: Maintenance and Construction Management</i>	
<i>Functional Area: MCM Vehicle Tracking</i>	
Remotely tracks the location of maintenance and construction vehicles and other equipment; presented to the center personnel.	
<i>Requirement:</i>	Planned
1 The center shall monitor the locations of all maintenance and construction vehicles and other equipment under its jurisdiction.	
<i>Requirement:</i>	Planned
2 The center shall present location data to center personnel for the fleet of maintenance and construction vehicles and other equipment.	
<i>Requirement:</i>	Planned
3 The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for maintenance and construction vehicle tracking.	
<i>Functional Area: MCM Vehicle and Equipment Maintenance Management</i>	
Monitors vehicle and equipment condition, tracks maintenance history, and schedules routine and corrective maintenance.	
<i>Requirement:</i>	Existing
1 The center shall collect and analyze vehicle diagnostics information from maintenance and construction vehicles. The information includes engine temperature, mileage, tire wear, brake wear, belt wear, and any warnings or alarms concerning the operational condition of the vehicle and ancillary equipment.	
<i>Requirement:</i>	Existing
2 The center shall exchange information with equipment repair facilities including status and history of repairs concerning maintenance and construction vehicles. This information includes vehicle status and diagnostic information, vehicle utilization, and coordination of when vehicles will be available for preventative and corrective maintenance.	
<i>Requirement:</i>	Existing
3 The center shall schedule preventive and corrective vehicle maintenance with the equipment repair facility based on fleet health reports, maintenance records, vehicle utilization and vehicle availability schedules.	
<i>Functional Area: MCM Incident Management</i>	
Supports coordinated response to incidents - share incident notifications, manage incident response resources, and coordinate overall incident situation and response among allied response organizations.	
<i>Requirement:</i>	Existing
1 The center shall 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.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Lake County Maintenance and Construction Management System	
<i>Entity:</i> Maintenance and Construction Management	
<i>Functional Area:</i> MCM Incident Management	
Supports coordinated response to incidents - share incident notifications, manage incident response resources, and coordinate overall incident situation and response among allied response organizations.	
<i>Requirement:</i>	Existing
2 The center shall 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.	
<i>Requirement:</i>	Existing
3 The center shall 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.	
<i>Requirement:</i>	Existing
4 The center shall coordinate planning for incidents with emergency management centers - including pre-planning activities for disaster response, evacuation, and recovery operations.	
<i>Requirement:</i>	Existing
5 The center shall 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.	
<i>Requirement:</i>	Existing
6 The center shall exchange road network status assessment information with emergency management and traffic management 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.	
<i>Requirement:</i>	Existing
7 The center shall 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.	
<i>Requirement:</i>	Existing
8 The center shall receive information indicating the damage sustained by transportation assets, derived from aerial surveillance, field reports, inspections, tests, and analyses to support incident management.	
<i>Functional Area:</i> MCM Maintenance Decision Support	
Maintenance Decision Support Systems recommend courses of action based on current and forecast environmental and road conditions (filtered and fused for specific time horizons) and additional application specific information. Recommendations and dispatch instructions are generated based on this integrated information.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Lake County Maintenance and Construction Management System	
<i>Entity:</i> Maintenance and Construction Management	
<i>Functional Area:</i> MCM Maintenance Decision Support	
Maintenance Decision Support Systems recommend courses of action based on current and forecast environmental and road conditions (filtered and fused for specific time horizons) and additional application specific information. Recommendations and dispatch instructions are generated based on this integrated information.	
<i>Requirement:</i>	Existing
1 The center shall provide the center personnel with tailored external information, including weather or road condition observations, forecasted weather information or road conditions, current usage of treatments and materials, available resources, equipment and vehicle availability, road network information, and source reliability information.	
<i>Requirement:</i>	Existing
2 The center shall tailor the decision support information to include filtering (selection from a large amount of external information), error reduction ('smoothing' the information), fusion (combination of disparate information to match the decision needs), and analysis (creating the decision).	
<i>Requirement:</i>	Existing
3 The center shall provide an interface to the center personnel to input control parameters for the decision support process and receive decisions or information presentation.	
<i>Requirement:</i>	Existing
4 The center shall provide dispatch information to maintenance and construction vehicles based on the outputs of the decision support system, including recommended roadway treatment actions.	
<i>Functional Area:</i> MCM Winter Maintenance Management	
Manages winter road maintenance, tracking and controlling snow plow operations, roadway treatment (e.g., salt spraying and other material applications) based on weather information.	
<i>Requirement:</i>	Existing
1 The center shall respond to requests from emergency management and traffic management centers for hazard removal, field equipment repair, and other winter roadway maintenance.	
<i>Requirement:</i>	Existing
2 The center shall exchange information with administrative systems to support the planning and scheduling of winter maintenance activities. This information includes: equipment and consumables resupply purchase request status, personnel qualifications including training and special certifications, environmental regulations and rules that may impact maintenance activities, and requests and project requirements from contract administration.	
<i>Requirement:</i>	Existing
3 The center shall 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.	
<i>Requirement:</i>	Existing
4 The center shall receive equipment availability and materials storage status information from storage facilities to support the scheduling of winter maintenance activities.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Lake County Maintenance and Construction Management System	
<i>Entity:</i> Maintenance and Construction Management	
<i>Functional Area:</i> MCM Winter Maintenance Management	
Manages winter road maintenance, tracking and controlling snow plow operations, roadway treatment (e.g., salt spraying and other material applications) based on weather information.	
<i>Requirement:</i>	
5 The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for the scheduling of winter maintenance activities.	Planned
<i>Requirement:</i>	
6 The center shall collect real-time information on the state of the regional transportation system from other centers including current traffic and road conditions, weather conditions, special event and incident information and use the collected information to support winter maintenance operations.	Existing
<i>Requirement:</i>	
7 The center shall dispatch and route winter maintenance vehicle drivers and support them with route- specific environmental, incident, advisory, threat, alert, and traffic congestion information.	Existing
<i>Requirement:</i>	
8 The center shall 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.	Existing
<i>Requirement:</i>	
9 The center shall 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.	Existing
<i>Requirement:</i>	
10 The center shall support remote control of on-board maintenance and construction vehicle systems and field equipment that is remotely controlled by the vehicle such as adjusting material application rates and spread patterns.	Planned
<i>Requirement:</i>	
11 The center shall assess the current status of all winter maintenance activities, including actual work activities performed, current locations and operational conditions of vehicles, materials and equipment inventories, field equipment status, environmental information, etc.	Existing
<i>Functional Area:</i> MCM Roadway Maintenance and Construction	
Overall management and support for routine maintenance on the roadway or right-of-way. Includes landscape maintenance, hazard removal (roadway debris, dead animals), routine maintenance activities (roadway cleaning, grass cutting), and repair and maintenance of both ITS and non-ITS equipment.	
<i>Requirement:</i>	
1 The center shall maintain an interface with asset management systems to track the inventory, restrictions, repair needs and status updates of transportation assets (pavement, bridges, signs, etc.) including location, installation and materials information, vendor/contractor, current maintenance status, standard height, width, and weight restrictions.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Lake County Maintenance and Construction Management System</i>	
<i>Entity: Maintenance and Construction Management</i>	
<i>Functional Area: MCM Roadway Maintenance and Construction</i>	
Overall management and support for routine maintenance on the roadway or right-of-way. Includes landscape maintenance, hazard removal (roadway debris, dead animals), routine maintenance activities (roadway cleaning, grass cutting), and repair and maintenance of both ITS and non-ITS equipment.	
<i>Requirement:</i>	
2 The center shall respond to requests from emergency management and traffic management centers for hazard removal, field equipment repair, and other roadway maintenance.	Existing
<i>Requirement:</i>	
3 The center shall exchange information with administrative systems to support the planning and scheduling of maintenance activities. This information includes: equipment and consumables resupply purchase request status, personnel qualifications including training and special certifications, environmental regulations and rules that may impact maintenance activities, and requests and project requirements from contract administration.	Existing
<i>Requirement:</i>	
4 The center shall provide emergency management and traffic management centers with information about scheduled maintenance and construction work activities including anticipated closures and impact to the roadway, alternate routes, anticipated delays, closure times, and durations.	Existing
<i>Requirement:</i>	
5 The center shall collect the status and fault data from roadside equipment, such as traffic, infrastructure, and environmental sensors, highway advisory radio and dynamic message signs, automated roadway treatment systems, barrier and safeguard systems, cameras, traffic signals and override equipment, ramp meters, short range communications equipment, security sensors and surveillance equipment, etc., and provide a cohesive view of equipment repair needs.	Potential
<i>Requirement:</i>	
6 The center shall collect the status and fault data from the centers that operate the equipment, including data for traffic, infrastructure, and environmental sensors, highway advisory radio and dynamic message signs, automated roadway treatment systems, barrier and safeguard systems, cameras, traffic signals and override equipment, ramp meters, short range communications equipment, security sensors and surveillance equipment, etc., and provide a cohesive view of equipment repair needs.	Potential
<i>Requirement:</i>	
7 The center shall receive equipment availability and materials storage status information from storage facilities to support the scheduling of roadway maintenance and construction activities.	Existing
<i>Requirement:</i>	
8 The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for the scheduling of roadway maintenance and construction activities.	Planned
<i>Requirement:</i>	
9 The center shall collect current and forecast traffic and weather information from traffic management centers and weather service providers (such as the National Weather Service and value-added sector specific meteorological services).	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Lake County Maintenance and Construction Management System	
<i>Entity:</i> Maintenance and Construction Management	
<i>Functional Area:</i> MCM Roadway Maintenance and Construction	
Overall management and support for routine maintenance on the roadway or right-of-way. Includes landscape maintenance, hazard removal (roadway debris, dead animals), routine maintenance activities (roadway cleaning, grass cutting), and repair and maintenance of both ITS and non-ITS equipment.	
<i>Requirement:</i>	
10 The center shall dispatch and route maintenance and construction vehicle drivers and support them with route-specific environmental, incident, advisory, threat, alert, and traffic congestion information.	Existing
<i>Requirement:</i>	
11 The center shall manage an interface with center personnel to accept vehicle systems control information and remotely control maintenance and construction vehicle on-board equipment.	Planned
<i>Requirement:</i>	
12 The center shall track the status of roadway maintenance and construction activities by monitoring collected data from the dispatched vehicles and equipment.	Planned
<i>Requirement:</i>	
13 The center shall report the status of field equipment maintenance activities to the centers that operate the equipment.	Existing
<i>Functional Area:</i> MCM Work Zone Management	
Remotely monitors and supports work zone activities, controlling traffic through dynamic message signs (DMS), highway advisory radio, gates and barriers, and informing other groups of activity (e.g., traveler information systems, traffic management centers, other maintenance and construction centers).	
<i>Requirement:</i>	
1 The center shall generate new work zone activity schedules for use by maintenance and construction vehicles, maintenance and construction operators, and for information coordination purposes.	Existing
<i>Requirement:</i>	
2 The center shall control the collection of work zone status information including video images from cameras located in or near the work zone.	Existing
<i>Requirement:</i>	
3 The center shall disseminate work zone information to other agencies and centers including traffic, transit, emergency management centers, other maintenance centers, traveler information providers, and the media.	Existing
<i>Requirement:</i>	
4 The center shall control traffic in work zones by providing remote control of dynamic message signs, highway advisory radio systems, gates, and barriers located in or near the work zone.	Potential
<i>Requirement:</i>	
5 The center shall exchange information with administrative systems to support the planning and scheduling of work zone activities. This information includes: equipment and consumables resupply purchase request status, personnel qualifications including training and special certifications, environmental regulations and rules that may impact maintenance activities, and requests and project requirements from contract administration.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Lake County Maintenance and Construction Management System	
<i>Entity:</i> Maintenance and Construction Management	
<i>Functional Area:</i> MCM Work Zone Management	
Remotely monitors and supports work zone activities, controlling traffic through dynamic message signs (DMS), highway advisory radio, gates and barriers, and informing other groups of activity (e.g., traveler information systems, traffic management centers, other maintenance and construction centers).	
<i>Requirement:</i>	Existing
6 The center shall collect real-time information on the state of the road network including current traffic and road conditions to support work zone scheduling and management.	
<i>Functional Area:</i> MCM Speed Monitoring and Warning	
Remotely monitors vehicle speeds, and informs an enforcement agency if excessive speeds are detected; primarily used in work zones.	
<i>Requirement:</i>	Existing
1 The center shall remotely control vehicle speed sensors typically placed in work zones; control parameters may include environmental and traffic conditions.	
<i>Requirement:</i>	Planned
2 The center shall collect operational status for the vehicle speed sensors; the status shall include logged information including measured speeds, warning messages displayed, and violation records.	
<i>Requirement:</i>	Existing
3 The center shall provide the capability to notify an enforcement agency when vehicle speeds in the work zone are in excess of the posted speed limit or are creating an unsafe condition based upon the current environmental or traffic conditions.	
<i>Requirement:</i>	Existing
4 The center shall collect fault data for the vehicle speed sensors for repair.	
<i>Functional Area:</i> MCM Work Zone Safety Management	
Remotely monitors work zone safety systems that detect vehicle intrusions in work zones and warns crew workers and drivers of imminent encroachment. Crew movements are also monitored so that the crew can be warned of movement beyond the designated safe zone.	
<i>Requirement:</i>	Potential
1 The center shall provide remote monitoring and control of work zone safety devices - including intrusion detection devices that have been installed in work zones or maintenance areas.	
<i>Requirement:</i>	Potential
2 The center shall provide remote monitoring and control of intrusion alert devices that have been installed in work zones or maintenance areas.	
<i>Requirement:</i>	Potential
3 The center shall collect status information of work zone safety device status from field equipment or the maintenance and construction vehicles.	
<i>Requirement:</i>	Potential
4 The center shall collect and store work zone data collected from work zone monitoring devices (such as intrusion detection or alert devices and speed monitoring devices) on-board the vehicle and at the roadside.	
<i>Functional Area:</i> MCM Work Activity Coordination	
Disseminates work activity schedules and current asset restrictions to other agencies. Work schedules are coordinated, factoring in the needs and activities of other agencies and adjacent jurisdictions.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Lake County Maintenance and Construction Management System</i>	
<i>Entity: Maintenance and Construction Management</i>	
<i>Functional Area: MCM Work Activity Coordination</i>	
Disseminates work activity schedules and current asset restrictions to other agencies. Work schedules are coordinated, factoring in the needs and activities of other agencies and adjacent jurisdictions.	
<i>Requirement:</i> 1 The center shall 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.	Planned
<i>Requirement:</i> 2 The center shall 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.	Planned
<i>Requirement:</i> 3 The center shall collect and respond to feedback concerning scheduled maintenance and construction activities with other management centers such as traffic, emergency, transit, and rail operations.	Planned
<i>Requirement:</i> 4 The center shall collect and disseminate asset restriction information levied on transportation asset usage based on infrastructure design, surveys, tests, or analyses. This includes standard facility design height, width, and weight restrictions, special restrictions such as spring weight restrictions, and temporary facility restrictions that are imposed during maintenance and construction.	Planned
<i>Requirement:</i> 5 The center shall exchange information with administrative systems to support the planning and scheduling of maintenance and construction activities. This information includes: equipment and consumables resupply purchase request status, personnel qualifications including training and special certifications, environmental regulations and rules that may impact maintenance activities, and requests and project requirements from contract administration.	Existing
<i>Requirement:</i> 6 The center shall exchange rail schedules and work plans with rail operations centers.	Planned
<i>Functional Area: MCM Infrastructure Monitoring</i>	
Remotely monitors the condition of pavement, bridges, tunnels, associated hardware, and other transportation-related infrastructure (e.g., culverts) using vehicle-based and roadway-based infrastructure monitoring sensors.	
<i>Requirement:</i> 1 The center shall remotely control and collect data from fixed infrastructure monitoring sensors that monitor vibration, stress, temperature, surface continuity, and other condition measures.	Planned
<i>Requirement:</i> 2 The center shall monitor maintenance vehicle-based mobile sensors and data logging devices that collect information on current infrastructure condition.	Planned

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Lake County Maintenance and Construction Management System</i>	
<i>Entity: Maintenance and Construction Management</i>	
<i>Functional Area: MCM Infrastructure Monitoring</i>	
Remotely monitors the condition of pavement, bridges, tunnels, associated hardware, and other transportation-related infrastructure (e.g., culverts) using vehicle-based and roadway-based infrastructure monitoring sensors.	
<i>Requirement:</i> 3 The center shall remotely collect data from vehicle probes using short range communications equipment and process this data to identify potential pavement degradation, potholes, and other rough or adverse road surface conditions.	Planned
<i>Requirement:</i> 4 The center shall process the collected information and use it to monitor the condition of pavement, bridges, tunnels, associated hardware, and other transportation-related infrastructure.	Planned
<i>Requirement:</i> 5 The center shall collect current maintenance and repair needs from the asset management system and correlate this data with data collected through infrastructure monitoring systems.	Planned
<i>Requirement:</i> 6 The center shall provide current infrastructure conditions information to the asset management system.	Planned
<i>Requirement:</i> 7 The center shall report infrastructure repair needs to the maintenance management system.	Planned
<i>Functional Area: MCM Data Collection</i>	
Collection and storage of maintenance and construction information. For use by operations personnel or data archives in the region.	
<i>Requirement:</i> 1 The center shall collect maintenance and construction data (such as field equipment status, infrastructure status, maintenance and construction activity data) gathered from roadway, traffic, and other maintenance and construction sources.	Existing
<i>Requirement:</i> 2 The center shall assign quality control metrics and meta-data to be stored along with the data. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.	Planned
<i>Requirement:</i> 3 The center shall receive and respond to requests from ITS Archives for either a catalog of the maintenance and construction data or for the data itself.	Planned
<i>Requirement:</i> 4 The center shall be able to produce sample products of the data available.	Planned
<i>Requirement:</i> 5 The center shall provide data to Asset Management to be used in updating the status of assets in the inventory.	Existing
<i>Functional Area: MCM Transportation Operations Data Collection</i>	
Collects real-time information on the state of the regional transportation system for operational use by the center. It establishes communications with a regional repository, requests or subscribes to information relevant to the center, and distributes the received information for use.	
<i>Requirement:</i> 1 The center shall collect real-time information on the state of the regional transportation system including current traffic and road conditions, weather conditions, special event and incident information.	Existing
<i>Requirement:</i> 2 The center shall support the capability for the system operator to monitor and control the information collection service.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Lake County Maintenance and Construction Vehicles</i>	
<i>Entity: Maintenance and Construction Vehicle</i>	
<i>Functional Area: MCV Vehicle Location Tracking</i>	
On-board systems to track vehicle location and reports the position and timestamp information to the dispatch center.	
<i>Requirement:</i>	
1 The maintenance and construction vehicle shall track its current location.	Planned
<i>Requirement:</i>	
2 The maintenance and construction vehicle shall send the time stamped vehicle location to the controlling center.	Planned
<i>Functional Area: MCV Vehicle System Monitoring and Diagnostics</i>	
On-board sensors capable of monitoring the condition of each of the vehicle systems and diagnostics that can be used to support vehicle maintenance.	
<i>Requirement:</i>	
1 The maintenance and construction vehicle shall collect vehicle diagnostics and operating status data from the maintenance vehicle platform including engine temperature, mileage, tire wear, brake wear, belt wear, and other operational status measures as well as the status of maintenance and construction-specific systems on the vehicle.	Existing
<i>Requirement:</i>	
2 The maintenance and construction vehicle shall use the diagnostic and status information to support scheduling vehicle maintenance, monitoring safety status, and informing the vehicle operator of the conditions.	Existing
<i>Requirement:</i>	
3 The maintenance and construction vehicle shall the vehicle diagnostic and safety information to an equipment repair facility.	Existing
<i>Requirement:</i>	
4 The maintenance and construction vehicle shall send the vehicle diagnostic and safety information to the controlling maintenance center.	Existing
<i>Functional Area: MCV Barrier System Control</i>	
Control automatic or remotely controlled gates and other barrier systems from a maintenance and construction vehicle.	
<i>Requirement:</i>	
1 The vehicle shall remotely control barrier systems. Barrier systems include automated or remotely controlled gates, barriers and other systems that manage entry to roadways.	Potential
<i>Requirement:</i>	
2 The vehicle shall collect barrier system operational status.	Potential
<i>Requirement:</i>	
3 The vehicle shall collect barrier system fault data.	Potential
<i>Functional Area: MCV Winter Maintenance</i>	
On-board systems that support snow plow operations and other roadway treatments (e.g., salt spraying and other material applications). Supports information sharing between snow plows.	
<i>Requirement:</i>	
1 The maintenance and construction vehicle shall track the location and status of safety systems on-board the vehicle.	Planned
<i>Requirement:</i>	
2 The maintenance and construction vehicle shall respond to control information from the center to allow remote operation of the on-board vehicle systems. These systems include winter maintenance equipment for plowing, treating, and anti-icing.	Planned
<i>Requirement:</i>	
3 The maintenance and construction vehicle shall monitor materials information including remaining quantity and current application rate of materials on the vehicle.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Lake County Maintenance and Construction Vehicles</i>	
<i>Entity: Maintenance and Construction Vehicle</i>	
<i>Functional Area: MCV Winter Maintenance</i>	
On-board systems that support snow plow operations and other roadway treatments (e.g., salt spraying and other material applications). Supports information sharing between snow plows.	
<i>Requirement:</i>	
4 The maintenance and construction vehicle shall respond to dispatch information from the center, presented to the vehicle operator for acknowledgement and returning status.	Existing
<i>Requirement:</i>	
5 The maintenance and construction vehicle shall send operational data to the center including the operational state of the maintenance equipment (e.g., blade up/down, spreader pattern), types and quantities of materials used for construction and maintenance activities, and a record of the actual work performed.	Existing
<i>Requirement:</i>	
6 The maintenance and construction vehicle shall exchange operational and environmental data with other maintenance and construction vehicles. Operational data includes operational state of the maintenance equipment (e.g., blade up/down, spreader pattern, equipment configuration) and a record of the actual work performed while the environmental data includes environmental sensor data collected on-board a maintenance and construction vehicle, either raw or processed data.	Existing
<i>Functional Area: MCV Roadway Maintenance and Construction</i>	
On-board systems that support routine non-winter maintenance on the roadway or right-of-way. Includes landscape maintenance, hazard removal (roadway debris, dead animals), routine maintenance activities (roadway cleaning, grass cutting), and repair and maintenance of equipment on the roadway.	
<i>Requirement:</i>	
1 The maintenance and construction vehicle shall track the location and status of safety systems on-board the vehicle.	Planned
<i>Requirement:</i>	
2 The maintenance and construction vehicle shall respond to control information from the center to allow remote operation of the on-board vehicle systems. These systems include routine maintenance equipment for cutting, repairs, hazard removal, etc.	Planned
<i>Requirement:</i>	
3 The maintenance and construction vehicle shall monitor materials information including remaining quantity and current application rate of materials on the vehicle.	Existing
<i>Requirement:</i>	
4 The maintenance and construction vehicle shall respond to dispatch information from the center, presented to the vehicle operator for acknowledgement and returning status.	Existing
<i>Requirement:</i>	
5 The maintenance and construction vehicle shall send operational data to the center including the operational state of the maintenance equipment (e.g., blade up/down, spreader pattern), types and quantities of materials used for construction and maintenance activities, and a record of the actual work performed.	Existing
<i>Functional Area: MCV Infrastructure Monitoring</i>	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Lake County Maintenance and Construction Vehicles</i>	
<i>Entity: Maintenance and Construction Vehicle</i>	
<i>Functional Area: MCV Infrastructure Monitoring</i>	
On-board systems to monitor the condition of pavement, bridges, tunnels, associated hardware, and other transportation-related infrastructure (e.g., culverts). Includes vehicle-based sensors and communications with roadway-based infrastructure monitoring sensors.	
<i>Requirement:</i>	Planned
1 The maintenance and construction vehicle shall collect infrastructure data from on-board sensors relating to the physical characteristics of the roadway infrastructure, including pavement, bridges, culverts, signs, etc.	
<i>Requirement:</i>	Planned
2 The maintenance and construction vehicle shall collect infrastructure data from sensors located along the roadway relating to the physical characteristics of the roadway infrastructure, including pavement, bridges, culverts, signs, etc.	
<i>Requirement:</i>	Planned
3 The maintenance and construction vehicle shall provide control signals to infrastructure monitoring sensors located at the roadway.	
<i>Requirement:</i>	Planned
4 The maintenance and construction vehicle shall send current condition of pavement, bridges, culverts, signs, and other roadway infrastructure as measured by on-board sensors or read from infrastructure-based sensors to the center. The data may include raw data or images (e.g., photo logs) that indicate the current status of the infrastructure.	
<i>Requirement:</i>	Planned
5 The maintenance and construction vehicle shall respond to control information from the center to allow remote operation of the on-board vehicle systems.	
<i>Requirement:</i>	Planned
6 The maintenance and construction vehicle shall provide infrastructure sensor equipment operational status to the center.	
<i>Functional Area: MCV Work Zone Support</i>	
On-board systems that provide communications and support for local management of a work zone.	
<i>Requirement:</i>	Existing
1 The maintenance and construction vehicle shall monitor, operate, and control work zone devices located at or alongside the roadway. The devices operated on board the vehicle include driver information devices (e.g. dynamic message signs) and work zone intrusion detection and alert devices.	
<i>Requirement:</i>	Existing
2 The maintenance and construction vehicle shall provide an interface for field personnel to input status of their work zone activities.	
<i>Requirement:</i>	Existing
3 The maintenance and construction vehicle shall collect inputs from field personnel and from work zone devices on-board the maintenance and construction vehicle and send them to the controlling center.	
<i>Functional Area: MCV Vehicle Safety Monitoring</i>	
On-board systems to detect vehicle intrusions and warn crew workers and drivers of imminent encroachment. Crew movements are monitored so that the crew can be warned of movement beyond the designated safe zone. Used for stationary work zones or in mobile applications where a safe zone is maintained around the moving vehicle.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Lake County Maintenance and Construction Vehicles</i>	
<i>Entity: Maintenance and Construction Vehicle</i>	
<i>Functional Area: MCV Vehicle Safety Monitoring</i>	
On-board systems to detect vehicle intrusions and warn crew workers and drivers of imminent encroachment. Crew movements are monitored so that the crew can be warned of movement beyond the designated safe zone. Used for stationary work zones or in mobile applications where a safe zone is maintained around the moving vehicle.	
<i>Requirement:</i>	
1 The maintenance and construction vehicle shall detect that a vehicle has intruded upon the boundary of a work zone. The boundary of the work zone represents an area around the maintenance and construction vehicle, which may be stationary or moving.	Planned
<i>Requirement:</i>	
2 The maintenance and construction vehicle shall receive work zone warnings from the field equipment at the roadside, other maintenance and construction vehicles.	Planned
<i>Requirement:</i>	
3 The maintenance and construction vehicle shall present work zone warnings to the field personnel using direct warning signals or in-vehicle signage functions.	Planned
<i>Requirement:</i>	
4 The maintenance and construction vehicle shall monitor the crew movements to identify when a crew member is crossing the boundary between a work zone and vehicle traffic and issue an alert to the crew member.	Planned
<i>Requirement:</i>	
5 The maintenance and construction vehicle shall provide status of the work zone warning systems to the center.	Planned
<i>Element: Lake County Multimodal Crossings</i>	
<i>Entity: Roadway</i>	
<i>Functional Area: Roadway Signal Preemption</i>	
Field elements that receive signal preemption requests from approaching emergency vehicles and overrides the current operation of the traffic signals	
<i>Requirement:</i>	
1 The field element shall respond to signal preemption requests from emergency vehicles.	Planned
<i>Functional Area: Roadway Incident Detection</i>	
Field elements that monitor traffic conditions to identify incidents. It includes traffic detectors that collect traffic flow information and identify unusual traffic conditions and advanced CCTV cameras with built-in incident detection algorithms.	
<i>Requirement:</i>	
1 The field element shall collect, process, and send traffic images to the center for further analysis and distribution.	Planned
<i>Requirement:</i>	
2 The field element shall remotely process video data and provide an indication of potential incidents to the traffic management center.	Planned
<i>Requirement:</i>	
3 The field element's video devices shall be remotely controlled by a traffic management center.	Potential
<i>Requirement:</i>	
4 The field element shall provide operational status and fault data for the incident detection devices to the traffic management center.	Planned
<i>Functional Area: Standard Rail Crossing</i>	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Lake County Multimodal Crossings	
<i>Entity:</i> Roadway	
<i>Functional Area:</i> Standard Rail Crossing	
Field elements at highway-rail intersections (HRIs) where operational requirements do not dictate advanced features (e.g., where rail operational speeds are less than 80 miles per hour). Includes traditional HRI warning systems augmented with other standard traffic management devices.	
<i>Requirement:</i>	
1 The field element shall collect and process, traffic sensor data in the vicinity of a highway-rail intersection (HRI).	Planned
<i>Requirement:</i>	
2 The field element shall monitor the status of the highway-rail intersection (HRI) equipment, including both the current state and mode of operation and the current equipment condition, to be forwarded on to the traffic management center.	Planned
<i>Requirement:</i>	
3 The field element shall monitor the status of the highway-rail intersection (HRI) equipment, including both the current state and mode of operation and the current equipment condition, to be forwarded on to the rail wayside equipment.	Existing
<i>Requirement:</i>	
4 The field element shall receive track status from the rail wayside equipment that can be passed on to the traffic management center. This may include the current status of the tracks and whether a train is approaching.	Planned
<i>Requirement:</i>	
5 The field element shall collect pedestrian images and pedestrian sensor data, and respond to pedestrian crossing requests via display, audio signal, or other manner.	Planned
<i>Requirement:</i>	
6 The field element shall control the dynamic message signs (DMS) in the vicinity of a highway-rail intersection (HRI) to advise drivers, cyclists, and pedestrians of approaching trains.	Potential
<i>Requirement:</i>	
7 The field element shall close the highway-rail intersection (HRI) when a train is approaching using gates, lights/signs, barriers, and traffic control signals.	Existing
<i>Requirement:</i>	
8 The field element shall support the integrated control of adjacent traffic signals to clear an area in advance of an approaching train and to manage traffic around the intersection.	Planned
<i>Requirement:</i>	
9 The field element shall forward rail traffic advisories received from the Wayside Equipment to the traffic management center.	Planned
<i>Functional Area:</i> Advanced Rail Crossing	
Field elements at highway-rail intersections (HRIs) where operational requirements demand advanced features (e.g., where rail operational speeds are greater than 80 miles per hour). Capabilities from the Standard Rail Crossing plus systems which preclude entrance into the intersection when the barriers are activated, additional arriving train information, and detection of blocked intersections.	
<i>Requirement:</i>	
1 The field element shall collect and process, traffic sensor data in the vicinity of a highway-rail intersection (HRI).	Planned
<i>Requirement:</i>	
2 The field element shall determine whether the highway-rail intersection (HRI) is blocked by traffic in the roadway or some other obstruction.	Planned
<i>Requirement:</i>	
3 The field element shall notify the traffic management center and the rail wayside equipment of any intersection blockages, including trapped vehicles or other obstructions.	Planned

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Lake County Multimodal Crossings</i>	
<i>Entity: Roadway</i>	
<i>Functional Area: Advanced Rail Crossing</i>	
Field elements at highway-rail intersections (HRIs) where operational requirements demand advanced features (e.g., where rail operational speeds are greater than 80 miles per hour). Capabilities from the Standard Rail Crossing plus systems which preclude entrance into the intersection when the barriers are activated, additional arriving train information, and detection of blocked intersections.	
<i>Requirement:</i>	
4 The field element shall monitor the status of the highway-rail intersection (HRI) equipment, including both the current state and mode of operation and the current equipment condition, to be forwarded on to the traffic management center.	Planned
<i>Requirement:</i>	
5 The field element shall monitor the status of the highway-rail intersection (HRI) equipment, including both the current state and mode of operation and the current equipment condition, to be forwarded on to the rail wayside equipment.	Planned
<i>Requirement:</i>	
6 The field element shall receive track status and arriving train information from the rail wayside equipment that can be passed on to the traffic management center. This may include the current status of the tracks and when a train is expected and/or how long the crossing will be closed.	Planned
<i>Requirement:</i>	
7 The field element shall collect pedestrian images and pedestrian sensor data, and respond to pedestrian crossing requests via display, audio signal, or other manner.	Planned
<i>Requirement:</i>	
8 The field element shall control the dynamic message signs (DMS) in the vicinity of a highway-rail intersection (HRI) to advise drivers, cyclists, and pedestrians of approaching trains.	Potential
<i>Requirement:</i>	
9 The field element shall close the highway-rail intersection (HRI) when a train is approaching with enough time for traffic to safely clear the crossing using gates, lights/signs, barriers, and traffic control signals.	Planned
<i>Requirement:</i>	
10 The field element shall support the integrated control of adjacent traffic signals to clear an area in advance of an approaching train and to manage traffic around the intersection.	Planned
<i>Requirement:</i>	
11 The field element shall forward rail traffic advisories received from the Wayside Equipment to the traffic management center.	Planned
<i>Requirement:</i>	
12 The field element shall provide approaching train advisories using field-vehicle communications to vehicles approaching the grade crossing.	Planned
<i>Functional Area: Roadway Equipment Coordination</i>	
Field elements that control and send data to other field elements (such as environmental sensors that send data to a DMS or coordination between traffic controllers on adjacent intersections), without center control.	
<i>Requirement:</i>	
1 The field element shall include sensors that provide data and status information to other field element devices, without center control.	Planned
<i>Requirement:</i>	
2 The field element shall include sensors that receive configuration data from other field element devices, without center control.	Planned

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Lake County Multimodal Crossings	
<i>Entity:</i> Roadway	
<i>Functional Area:</i> Roadway Equipment Coordination	
Field elements that control and send data to other field elements (such as environmental sensors that send data to a DMS or coordination between traffic controllers on adjacent intersections), without center control.	
<i>Requirement:</i>	Planned
3 The field element shall include devices that provide data and status information to other field element devices without center control.	
<i>Requirement:</i>	Planned
4 The field element shall include devices that receive configuration data from other field element devices, without center control.	
<i>Functional Area:</i> Roadway Field Device Monitoring	
Monitors field equipment operational status and detects and reports fault conditions. Device status, configuration, and fault information are provided to a remote center and a user interface provides information locally to field personnel.	
<i>Requirement:</i>	Planned
1 The field element shall monitor the operational status (state of the device, configuration, and fault data) of connected sensors (such as traffic, infrastructure, environmental, security, speed) and devices (such as highway advisory radio, dynamic message signs, automated roadway treatment systems, barrier and safeguard systems, cameras, traffic signals, ramp meters, short range communications equipment, security surveillance equipment).	
<i>Requirement:</i>	Planned
2 The field element shall send operational status of connected field equipment to the maintenance center.	
<i>Requirement:</i>	Planned
3 The field element shall send collected fault data to the maintenance center for repair.	
<i>Requirement:</i>	Planned
4 The field element shall include a local interface that provides operational status and fault data for connected field equipment to field personnel.	
<i>Requirement:</i>	Planned
5 The field element shall include a local interface that allows field personnel to command diagnostic tests on connected field equipment.	
<i>Functional Area:</i> Roadway Environmental Monitoring	
Environmental sensors, surface and sub-surface, that collect weather and road surface information. Weather conditions measured include temperature, wind, humidity, precipitation, and visibility. Sensors measure road surface temperature, moisture, icing, salinity, etc.	
<i>Requirement:</i>	Planned
1 The field element shall include surface and sub-surface environmental sensors that measure road surface temperature, moisture, icing, salinity, and other measures.	
<i>Requirement:</i>	Planned
2 The field element shall include environmental sensors that measure weather conditions including temperature, wind, humidity, precipitation, and visibility.	
<i>Requirement:</i>	Planned
3 The field element's environmental sensors shall be remotely controlled by a maintenance center.	
<i>Requirement:</i>	Planned
4 The field element's environmental sensors shall be remotely controlled by a traffic management center.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Lake County Multimodal Crossings</i>	
<i>Entity: Roadway</i>	
<i>Functional Area: Roadway Environmental Monitoring</i>	
Environmental sensors, surface and sub-surface, that collect weather and road surface information. Weather conditions measured include temperature, wind, humidity, precipitation, and visibility. Sensors measure road surface temperature, moisture, icing, salinity, etc.	
<i>Requirement:</i> 5 The field element's environmental sensors shall be remotely controlled by weather service providers such as the National Weather Service or value-added sector specific meteorological services.	Potential
<i>Requirement:</i> 6 The field element's environmental sensors shall be remotely controlled by a maintenance and construction vehicle.	Potential
<i>Requirement:</i> 7 The field element shall provide environmental sensor equipment operational status to the controlling center or maintenance vehicle.	Planned
<i>Requirement:</i> 8 The field element shall provide environmental sensor equipment fault indication to the controlling center or maintenance vehicle.	Planned
<i>Requirement:</i> 9 The field element shall remotely aggregate environmental sensor data with environmental data collected from maintenance and construction vehicles.	Potential
<i>Requirement:</i> 10 The field element shall provide weather and road surface condition data to centers.	Planned
<i>Requirement:</i> 11 The field element shall provide weather and road surface condition data to maintenance and construction vehicles.	Potential
<i>Functional Area: Field Barrier System Control</i>	
Field elements that control barrier systems such as gates and other systems that manage entry to roadways, transportation facilities and infrastructure.	
<i>Requirement:</i> 1 The field element shall activate barrier systems for transportation facilities and infrastructure under center control. Barrier systems include automated or remotely controlled gates, barriers and other systems that manage entry to roadways.	Planned
<i>Requirement:</i> 2 The field element shall return barrier system operational status to the controlling center.	Planned
<i>Requirement:</i> 3 The field element shall return barrier system fault data to the maintenance center for repair.	Planned
<i>Requirement:</i> 4 The field element shall receive requests for access from approaching vehicles using field-vehicle communications and validate and authenticate the requests.	Planned
<i>Requirement:</i> 5 The field element shall grant access only to qualified vehicles.	Planned
<i>Requirement:</i> 6 The field element shall communicate access permission status and access instructions to approaching vehicles using field-vehicle communications.	Planned
<i>Functional Area: Multimodal Crossing Control</i>	
Field elements to monitor and control traffic at multimodal crossings, such as draw bridges and other crossings between highway traffic and other modes; does not include highway-rail intersection.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Lake County Multimodal Crossings</i>	
<i>Entity: Roadway</i>	
<i>Functional Area: Multimodal Crossing Control</i>	
Field elements to monitor and control traffic at multimodal crossings, such as draw bridges and other crossings between highway traffic and other modes; does not include highway-rail intersection.	
<i>Requirement:</i>	
1 The field element shall include sensors to monitor requests from non-highway traffic to cross at multimodal crossings for specified durations (such as draw bridges and miscellaneous other interference crossings between highway traffic and other modes such as river traffic, aircraft, etc.); the sensors are under center control.	Existing
<i>Requirement:</i>	
2 The field element shall include signals to control traffic at multimodal crossings on surface streets, under center control.	Existing
<i>Requirement:</i>	
3 The field element shall include driver information systems (such as dynamic messages signs, highway advisory radios (HAR), and equipment that controls warning lights and gates) that advise drivers at multimodal crossings, under center control.	Potential
<i>Requirement:</i>	
4 The field element shall provide operational status for the sensors, signals, and driver information systems equipment at multimodal crossings to the center.	Existing
<i>Requirement:</i>	
5 The field element shall provide fault data for the sensors, signals, and driver information systems equipment at multimodal crossings to the center for repair.	Existing
<i>Requirement:</i>	
6 The field element shall forward all requests for right-of-way at multimodal crossings to the controlling center.	Existing
<i>Functional Area: Roadway Data Collection</i>	
Field elements to collect traffic, road, and environmental conditions information for use in transportation planning, research, and other off-line applications. Includes the sensors, supporting roadside infrastructure, and communications equipment.	
<i>Requirement:</i>	
1 The field element shall collect traffic, road, and environmental conditions information.	Planned
<i>Requirement:</i>	
2 The field element shall include the sensors and supporting roadside devices that sense, collect, and send traffic, road, and environmental conditions information to a center for archival.	Planned
<i>Requirement:</i>	
3 The field element shall collect sensor status and sensor faults from roadside equipment and send it along with the recorded data to a center for archival.	Planned
<i>Element: Lake County Sheriff Department</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Emergency Call-Taking</i>	
Provides interface to the emergency call-taking systems such as the Emergency Telecommunications System (e.g., 911) that correlate call information with emergencies reported by transit agencies, commercial vehicle operators, or other public safety agencies. Allows the operator to verify the incident and forward the information to the responding agencies.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Lake County Sheriff Department	
<i>Entity:</i> Emergency Management	
<i>Functional Area:</i> Emergency Call-Taking	
Provides interface to the emergency call-taking systems such as the Emergency Telecommunications System (e.g., 911) that correlate call information with emergencies reported by transit agencies, commercial vehicle operators, or other public safety agencies. Allows the operator to verify the incident and forward the information to the responding agencies.	
<i>Requirement:</i>	
1 The center shall support the interface to the Emergency Telecommunications System (e.g. 911 or 7-digit call routing) to receive emergency notification information and provide it to the emergency system operator.	Existing
<i>Requirement:</i>	
2 The center shall receive emergency call information from 911 services and present the possible incident information to the emergency system operator.	Existing
<i>Requirement:</i>	
4 The center shall receive emergency call information from mayday service providers and present the possible incident information to the emergency system operator.	Existing
<i>Requirement:</i>	
5 The center shall receive emergency notification information from other public safety agencies and present the possible incident information to the emergency system operator.	Existing
<i>Requirement:</i>	
6 The center shall receive emergency notification information from public transit systems and present the possible incident information to the emergency system operator.	Existing
<i>Requirement:</i>	
7 The center shall coordinate, correlate, and verify all emergency inputs, including those identified based on external calls and internal analysis of security sensor and surveillance data, and assign each a level of confidence.	Existing
<i>Requirement:</i>	
8 The center shall send a request for remote control of CCTV systems from a traffic management center in order to verify the reported incident.	Potential
<i>Requirement:</i>	
9 The center shall forward the verified emergency information to the responding agency based on the location and nature of the emergency.	Existing
<i>Requirement:</i>	
10 The center shall update the incident information log once the emergency system operator has verified the incident.	Existing
<i>Requirement:</i>	
11 The center shall provide the capability for digitized map data to act as the background to the emergency information presented to the emergency system operator.	Existing
<i>Functional Area:</i> Emergency Dispatch	
Dispatch emergency vehicles to incidents, tracking their location and status. Pertinent incident information is gathered and relayed to the responding units.	
<i>Requirement:</i>	
1 The center shall dispatch emergency vehicles to respond to verified emergencies under center personnel control.	Existing
<i>Requirement:</i>	
2 The center shall store the current status of all emergency vehicles available for dispatch and those that have been dispatched.	Existing
<i>Requirement:</i>	
3 The center shall relay location and incident details to the responding vehicles.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Lake County Sheriff Department</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Emergency Dispatch</i>	
Dispatch emergency vehicles to incidents, tracking their location and status. Pertinent incident information is gathered and relayed to the responding units.	
<i>Requirement:</i>	
4 The center shall track the location and status of emergency vehicles responding to an emergency based on information from the emergency vehicle.	Existing
<i>Requirement:</i>	
5 The center shall store and maintain the emergency service responses in an action log.	Existing
<i>Requirement:</i>	
6 The center shall provide the capability for digitized map data to act as the background to the information presented to the emergency system operator.	Existing
<i>Requirement:</i>	
7 The center shall receive traffic images to support dispatch of emergency vehicles.	Existing
<i>Requirement:</i>	
8 The center shall provide the capability to request remote control of traffic surveillance devices	Potential
<i>Requirement:</i>	
9 The center shall coordinate response to incidents with other Emergency Management centers to ensure appropriate resources are dispatched and utilized.	Existing
<i>Functional Area: Emergency Routing</i>	
Routing of emergency vehicles to facilitate the quickest/safest arrival. Routes may be determined based on real-time traffic information and road conditions or routes may be provided by Traffic Management on request.	
<i>Requirement:</i>	
1 The center shall collect current traffic and road condition information for emergency vehicle route calculation.	Existing
<i>Requirement:</i>	
2 The center shall receive information on the location and status of traffic control equipment and work zones along potential emergency routes.	Existing
<i>Requirement:</i>	
3 The center shall receive status information from care facilities to determine the appropriate facility and its location.	Existing
<i>Requirement:</i>	
4 The center shall receive asset restriction information to support the dispatching of appropriate emergency resources.	Existing
<i>Requirement:</i>	
5 The center shall receive current railroad schedule information for emergency vehicle route calculation.	Planned
<i>Requirement:</i>	
6 The center shall track current emergency vehicle location and status.	Existing
<i>Requirement:</i>	
7 The center shall calculate emergency vehicle routes, under center personnel control, based on the collected traffic and road conditions information.	Existing
<i>Requirement:</i>	
8 The center shall request and receive ingress and egress routes or other specialized emergency access routes from the traffic management center.	Existing
<i>Requirement:</i>	
9 The center shall provide the capability to request special traffic control measures, such as signal preemption, from the traffic management center to facilitate emergency vehicle progress along the suggested route.	Potential

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Lake County Sheriff Department	
<i>Entity:</i> Emergency Management	
<i>Functional Area:</i> Emergency Routing	
Routing of emergency vehicles to facilitate the quickest/safest arrival. Routes may be determined based on real-time traffic information and road conditions or routes may be provided by Traffic Management on request.	
<i>Requirement:</i>	
10 Once the route is calculated the route shall be provided to the dispatch function.	Existing
<i>Requirement:</i>	
11 The center shall provide the capability for digitized map data to act as the background to the information presented to the emergency system operator.	Existing
<i>Functional Area:</i> Incident Command	
Tactical decision support, resource coordination, and communications integration among emergency management agencies for Incident Commands that are established by first responders to support local management of an incident.	
<i>Requirement:</i>	
1 The center shall 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.	Existing
<i>Requirement:</i>	
2 The center shall provide incident command communications with public safety, emergency management, transportation, and other allied response agency centers.	Existing
<i>Requirement:</i>	
3 The center shall track and maintain resource information and action plans pertaining to the incident command.	Existing
<i>Requirement:</i>	
4 The center shall 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.	Existing
<i>Requirement:</i>	
5 The center shall assess the status of responding emergency vehicles as part of an incident command.	Planned
<i>Functional Area:</i> Emergency Early Warning System	
Monitors alerting and advisory systems, information collected by ITS surveillance and sensors, and reports from other agencies in order to identify potential, imminent, or in-progress major incidents or disasters. Notification is provided to other ITS centers to notify the traveling public.	
<i>Requirement:</i>	
1 The center shall 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).	Existing
<i>Requirement:</i>	
2 The center shall provide the capability to correlate alerts and advisories, incident information, and security sensor and surveillance data.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Lake County Sheriff Department</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Emergency Early Warning System</i>	
Monitors alerting and advisory systems, information collected by ITS surveillance and sensors, and reports from other agencies in order to identify potential, imminent, or in-progress major incidents or disasters. Notification is provided to other ITS centers to notify the traveling public.	
<i>Requirement:</i> 3 The center shall 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.	Existing
<i>Requirement:</i> 4 The center shall broadcast wide-area alerts and advisories to transit management centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	Planned
<i>Requirement:</i> 5 The center shall broadcast wide-area alerts and advisories to toll administration centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	Existing
<i>Requirement:</i> 6 The center shall broadcast wide-area alerts and advisories to traveler information service providers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	Existing
<i>Requirement:</i> 7 The center shall broadcast wide-area alerts and advisories to maintenance centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	Existing
<i>Requirement:</i> 8 The center shall broadcast wide-area alerts and advisories to other emergency management centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	Existing
<i>Requirement:</i> 9 The center shall broadcast wide-area alerts and advisories to commercial vehicle administration centers and roadside check facilities for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	Existing
<i>Requirement:</i> 10 The center shall process status information from each of the centers that have been sent the wide-area alert.	Planned
<i>Requirement:</i> 11 The center shall coordinate the broadcast of wide-area alerts and advisories with other emergency management centers.	Existing
<i>Requirement:</i> 12 The center shall receive incident information from other transportation management centers to support the early warning system.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Lake County Sheriff Department</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Emergency Early Warning System</i>	
Monitors alerting and advisory systems, information collected by ITS surveillance and sensors, and reports from other agencies in order to identify potential, imminent, or in-progress major incidents or disasters. Notification is provided to other ITS centers to notify the traveling public.	
<i>Requirement:</i> 13 The center shall present the alert and advisory information and the status of the actions taken in response to the alert by the other centers to the emergency system operator as received from other system inputs.	Planned
<i>Requirement:</i> 14 The center shall support the entry of alert and advisory information directly from the emergency system operator.	Existing
<i>Functional Area: Emergency Response Management</i>	
Strategic emergency planning and response capabilities and broad inter-agency interfaces to support large-scale incidents and disasters, commonly associated with Emergency Operations Centers.	
<i>Requirement:</i> 1 The center shall provide strategic emergency response capabilities provided by an Emergency Operations Center for large-scale incidents and disasters.	Existing
<i>Requirement:</i> 2 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.	Existing
<i>Requirement:</i> 3 The center shall provide the capability to implement response plans and track progress through the incident by exchanging incident information and response status with allied agencies.	Existing
<i>Requirement:</i> 4 The center shall develop, coordinate with other agencies, and store emergency response plans.	Existing
<i>Requirement:</i> 5 The center shall track the availability of resources and coordinate resource sharing with allied agency centers including traffic, maintenance, or other emergency centers.	Planned
<i>Requirement:</i> 6 The center shall 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.	Existing
<i>Requirement:</i> 7 The center shall receive event scheduling information from Event Promoters.	Existing
<i>Requirement:</i> 8 The center shall support remote control of field equipment normally under control of the traffic management center including traffic signals, dynamic message signs, gates, and barriers.	Potential
<i>Requirement:</i> 9 The center shall provide the capability to remotely control and monitor CCTV systems normally operated by a traffic management center.	Potential
<i>Requirement:</i> 10 The center shall provide the capability to request transit resource availability from transit centers for use during disaster and evacuation operations.	Potential

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Lake County Sheriff Department	
<i>Entity:</i> Emergency Management	
<i>Functional Area:</i> Emergency Response Management	
Strategic emergency planning and response capabilities and broad inter-agency interfaces to support large-scale incidents and disasters, commonly associated with Emergency Operations Centers.	
<i>Requirement:</i> 11	The center shall 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. Potential
<i>Requirement:</i> 12	The center shall provide information to the media concerning the status of an emergency response. Existing
<i>Requirement:</i> 13	The center shall provide the capability for digitized map data to act as the background to the information presented to the emergency system operator. Existing
<i>Requirement:</i> 14	The center shall provide the capability for center personnel to provide inputs to the management of incidents, disasters and evacuations. Existing
<i>Requirement:</i> 15	The center shall collect information about the status of the recovery efforts for the infrastructure during disasters. Potential
<i>Requirement:</i> 16	The center shall provide the overall status of infrastructure recovery efforts to traveler information providers and media. Potential
<i>Requirement:</i> 17	The center shall provide the capability to communicate information about emergency situations to local population through the Emergency Telecommunications System. Existing
<i>Requirement:</i> 18	The center shall 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. Potential
<i>Requirement:</i> 19	The center shall retrieve information from public health systems to increase preparedness for, and implement a response to biological, chemical, radiation, and other public health emergencies. Existing
<i>Functional Area:</i> Emergency Evacuation Support	
Evacuation planning and coordination to manage evacuation and reentry of a population in the vicinity of a disaster or other emergency that poses a risk to public safety.	
<i>Requirement:</i> 1	The center shall manage inter-agency coordination of evacuation operations, from initial planning through the evacuation process and reentry. Existing
<i>Requirement:</i> 2	The center shall develop and exchange evacuation plans with allied agencies prior to the occurrence of a disaster. Existing
<i>Requirement:</i> 3	The center shall provide an interface to the emergency system operator to enter evacuation plans and procedures and present the operator with other agencies' plans. Existing
<i>Requirement:</i> 4	The center shall coordinate evacuation destinations and shelter needs with shelter providers (e.g., the American Red Cross) in the region. Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Lake County Sheriff Department	
<i>Entity:</i> Emergency Management	
<i>Functional Area:</i> Emergency Evacuation Support	
Evacuation planning and coordination to manage evacuation and reentry of a population in the vicinity of a disaster or other emergency that poses a risk to public safety.	
<i>Requirement:</i>	
5 The center shall provide evacuation information to traffic, transit, maintenance and construction, rail operations, and other emergency management centers as needed.	Existing
<i>Requirement:</i>	
6 The center shall request resources from transit agencies as needed to support the evacuation.	Potential
<i>Requirement:</i>	
7 The center shall 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.	Potential
<i>Requirement:</i>	
8 The center shall 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.	Potential
<i>Requirement:</i>	
9 The center shall monitor the progress or status of the evacuation once it begins and exchange tactical plans, prepared during the incident, with allied agencies.	Potential
<i>Requirement:</i>	
10 The center shall monitor the progress of the reentry process.	Potential
<i>Requirement:</i>	
11 The center shall submit evacuation information to toll administration centers along with requests for changes in the toll services or fee collection during an evacuation.	Potential
<i>Requirement:</i>	
12 The center shall 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.	Existing
<i>Functional Area:</i> Emergency Environmental Monitoring	
Collects current and forecast road and weather information that is used by the operator to more effectively manage incidents.	
<i>Requirement:</i>	
1 The center shall 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).	Existing
<i>Requirement:</i>	
2 The center shall collect current road and weather information from roadway maintenance operations.	Existing
<i>Requirement:</i>	
3 The center shall assimilate current and forecast road conditions and surface weather information to support incident management.	Existing
<i>Requirement:</i>	
4 The center shall present the current and forecast road and weather information to the emergency system operator.	Existing
<i>Functional Area:</i> Mayday Support	
Collection and response to Mayday messages received from vehicles and drivers.	
<i>Requirement:</i>	
1 The center shall collect mayday messages from vehicles and drivers.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Lake County Sheriff Department	
<i>Entity:</i> Emergency Management	
<i>Functional Area:</i> Mayday Support	
Collection and response to Mayday messages received from vehicles and drivers.	
<i>Requirement:</i>	
2 The center shall collect mayday messages from travelers via personal handheld devices.	Existing
<i>Requirement:</i>	
3 The center shall acknowledge the request for emergency assistance, whether originated by the driver, automatically by the vehicle's safety systems, or by a traveler via a personal handheld device.	Existing
<i>Requirement:</i>	
4 After the mayday becomes a verified incident, the center shall determine the appropriate response to the mayday message.	Existing
<i>Requirement:</i>	
5 The center shall determine whether the mayday message indicates an emergency that requires the attention of public safety agencies, and forward mayday emergency data to the appropriate agency as necessary.	Existing
<i>Requirement:</i>	
6 The center shall support the activation of remote controlled functions requested by a vehicle, such as requests to unlock doors.	Potential
<i>Requirement:</i>	
7 The center shall request additional emergency details from or issue commands to the vehicle's security systems or vehicle driver if needed.	Existing
<i>Requirement:</i>	
8 The center shall maintain a log of all mayday signals received from vehicles.	Existing
<i>Requirement:</i>	
9 The center shall provide all mayday data to center personnel and respond to the vehicle, driver, or traveler using the portable handheld device as directed by the personnel.	Existing
<i>Functional Area:</i> Emergency Commercial Vehicle Response	
Responds to commercial vehicle and freight equipment related emergencies. Includes incidents involving hazardous materials as well as the detection of non-permitted transport of security sensitive hazmat.	
<i>Requirement:</i>	
1 The center shall receive emergency notification information from commercial vehicles, commercial vehicle check stations, or commercial fleet operators and present the possible incident information to the emergency system operator. This may include detection of non-permitted transport of security sensitive hazmat, hazardous cargo spills, etc.	Existing
<i>Requirement:</i>	
2 The center shall receive details of the cargo being carried by commercial vehicles from their commercial fleet manager for incidents involving potential hazardous materials.	Existing
<i>Requirement:</i>	
3 The center shall forward the verified emergency information to the responding agency based on the location and nature of the emergency.	Existing
<i>Requirement:</i>	
4 The center shall provide the capability to request Fleet and Freight Management to disable a specific vehicle in their fleet.	Potential
<i>Functional Area:</i> Emergency Data Collection	
Collection and storage of information related to Emergency Management. For use by operations personnel or data archives in the region.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Lake County Sheriff Department	
<i>Entity:</i> Emergency Management	
<i>Functional Area:</i> Emergency Data Collection	
Collection and storage of information related to Emergency Management. For use by operations personnel or data archives in the region.	
<i>Requirement:</i>	
1 The center shall collect emergency service data, emergency vehicle management data, emergency vehicle data, sensor and surveillance data, threat data, and incident data.	Existing
<i>Requirement:</i>	
2 The center shall assign quality control metrics and meta-data to be stored along with the data. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.	Existing
<i>Requirement:</i>	
3 The center shall receive and respond to requests from ITS Archives for either a catalog of the emergency management data or for the data itself.	Planned
<i>Requirement:</i>	
4 The center shall be able to produce sample products of the data available.	Planned
<i>Element:</i> Lake Michigan Interstate Gateway Alliance (LMIGA) Archive	
<i>Entity:</i> Archived Data Management	
<i>Functional Area:</i> ITS Data Repository	
Collect and maintain data and data catalogs from one or more data sources. May include quality checks, error notification, and archive coordination.	
<i>Requirement:</i>	
1 The center shall collect data to be archived from one or more data sources.	Existing
<i>Requirement:</i>	
2 The center shall collect data catalogs from one or more data sources. A catalog describes the data contained in the collection of archived data and may include descriptions of the schema or structure of the data, a description of the contents of the data; e.g., time range of entries, number of entries; or a sample of the data (e. g. a thumbnail).	Existing
<i>Requirement:</i>	
3 The center shall store the archived data in a focused repository that is suited to a particular set of ITS data users.	Existing
<i>Requirement:</i>	
4 The center shall include capabilities for performing quality checks on the incoming archived data.	Existing
<i>Requirement:</i>	
5 The center shall include capabilities for error notification on the incoming archived data.	Existing
<i>Requirement:</i>	
6 The center shall include capabilities for archive to archive coordination.	Planned
<i>Requirement:</i>	
7 The center shall support a broad range of archived data management implementations, ranging from simple data marts that collect a focused set of data and serve a particular user community to large-scale data warehouses that collect, integrate, and summarize transportation data from multiple sources and serve a broad array of users within a region.	Existing
<i>Requirement:</i>	
8 The center shall perform quality checks on received data.	Planned
<i>Requirement:</i>	
9 The center shall provide the capability to execute methods on the incoming data such as cleansing, summarizations, aggregations, or transformations applied to the data before it is stored in the archive.	Planned

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Lake Michigan Interstate Gateway Alliance (LMIGA) Archive</i>	
<i>Entity: Archived Data Management</i>	
<i>Functional Area: ITS Data Repository</i>	
Collect and maintain data and data catalogs from one or more data sources. May include quality checks, error notification, and archive coordination.	
<i>Requirement:</i>	
10 The center shall respond to requests from the administrator interface function to maintain the archive data.	Existing
<i>Requirement:</i>	
11 When data or a catalog of data is received from the archive, the center shall generate the requested data product for the users systems.	Existing
<i>Requirement:</i>	
12 For archive data requiring financial payment, the center shall process the financial requests and manage an interface to a Financial Institution.	Potential
<i>Functional Area: Traffic and Roadside Data Archival</i>	
Collects and archives traffic and environmental information directly from the roadside for use in off-line planning, research, and analysis.	
<i>Requirement:</i>	
1 The center shall manage the collection of archive data directly from collection equipment located at the roadside.	Existing
<i>Requirement:</i>	
2 The center shall collect traffic sensor information from roadside devices.	Existing
<i>Requirement:</i>	
3 The center shall collect environmental sensor information that from roadside devices.	Existing
<i>Requirement:</i>	
4 The center shall respond to requests from the Archive Data Administer to input the parameters that control the collection process.	Existing
<i>Requirement:</i>	
5 The center shall send the request for data and control parameters to the field equipment where the information is collected and returned.	Existing
<i>Requirement:</i>	
6 The center shall record the status about the imported traffic and roadside data.	Existing
<i>Requirement:</i>	
7 The center shall use the status information to adjust the collection of traffic and roadside data.	Planned
<i>Functional Area: Government Reporting Systems Support</i>	
Selects and formats data residing in an ITS archive to facilitate local, state, and federal government data reporting requirements.	
<i>Requirement:</i>	
1 The center shall provide data from an ITS archive to federal, state, or local government reporting systems.	Existing
<i>Requirement:</i>	
2 The center shall provide the capability to select data from an ITS archive for use in government reports.	Existing
<i>Requirement:</i>	
3 The center shall provide the capability to format data from an ITS archive suitable for input into government reports.	Existing
<i>Requirement:</i>	
4 The center shall support requests for ITS archived data from Government Reporting Systems.	Existing
<i>Requirement:</i>	
5 The center shall provide the applicable meta-data for any ITS archived data to satisfy government reporting system requests. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Lake Michigan Interstate Gateway Alliance (LMIGA) Archive</i>	
<i>Entity: Archived Data Management</i>	
<i>Functional Area: On-Line Analysis and Mining</i>	
Advanced data analysis and mining features to support discovery of information, patterns, and correlations in large ITS archives.	
<i>Requirement:</i>	Existing
1 The center shall support the interface with Archive Data User Systems for requests for analysis of the archive data.	
<i>Requirement:</i>	Existing
2 The center shall provide the capability to perform activities such as data mining, data fusion, summarizations, aggregations, and recreation from archive data. This may include multidimensional analysis, selective summarization and expansion of data details, and many other advanced analysis services.	
<i>Requirement:</i>	Existing
3 The center shall receive the user's systems requests and develop the request to retrieve the data from the archive.	
<i>Requirement:</i>	Existing
4 The center shall respond to users systems requests for a catalog of the archived data analysis products available.	
<i>Requirement:</i>	Potential
5 For archive analysis and data mining products requiring financial payment the center shall process the financial requests and manage an interface to a Financial Institution.	
<i>Element: Lake Michigan Interstate Gateway Alliance (LMIGA) Website</i>	
<i>Entity: Information Service Provider</i>	
<i>Functional Area: ISP Traveler Data Collection</i>	
Collects traveler information from other centers, consolidates and refines the collected data, and makes this data available to traveler information applications.	
<i>Requirement:</i>	Existing
1 The center shall collect, process, and store traffic and highway condition information, including incident information, detours and road closures, event information, recommended routes, and current speeds on specific routes.	
<i>Requirement:</i>	Existing
2 The center shall collect, process, and store maintenance and construction information, including scheduled maintenance and construction work activities and work zone activities.	
<i>Requirement:</i>	Planned
3 The center shall collect, process, and store transit routes and schedules, transit transfer options, transit fares, and real-time schedule adherence information.	
<i>Requirement:</i>	Planned
4 The center shall collect, process, and store parking information, including location, availability, and fees.	
<i>Requirement:</i>	Planned
5 The center shall collect, process, and store toll fee information.	
<i>Requirement:</i>	Existing
6 The center shall collect, process, and store current and forecast road conditions and surface weather conditions.	
<i>Requirement:</i>	Existing
7 The center shall collect, process, and store event information.	
<i>Requirement:</i>	Planned
8 The center shall collect, process, and store air quality information.	
<i>Functional Area: ISP Probe Information Collection</i>	
Collection and aggregation of vehicle probe data, including calculation and dissemination of route travel times and usage. Includes environmental probe data collection, aggregation and dissemination.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Lake Michigan Interstate Gateway Alliance (LMIGA) Website	
<i>Entity:</i> Information Service Provider	
<i>Functional Area:</i> ISP Probe Information Collection	
Collection and aggregation of vehicle probe data, including calculation and dissemination of route travel times and usage. Includes environmental probe data collection, aggregation and dissemination.	
<i>Requirement:</i>	Existing
1 The center shall collect traffic probe data (speeds, travel times, etc.) from appropriately equipped vehicles and short range communications equipment.	
<i>Requirement:</i>	Planned
2 The center shall aggregate collected traffic probe data, calculate route segment travel times, route segment speeds, and route usage, and disseminate to other centers.	
<i>Requirement:</i>	Potential
3 The center shall collect environmental probe data (air temperature, exterior light status, wiper status, traction control status, etc.) from appropriately equipped vehicles and short range communications equipment.	
<i>Requirement:</i>	Potential
4 The center shall aggregate collected environmental probe data and disseminate the aggregated environmental probe data to other centers.	
<i>Requirement:</i>	Planned
5 The center shall receive traffic probe data collected by transit fleet operators and include this data in aggregated probe data provided to other centers.	
<i>Requirement:</i>	Planned
6 The center shall receive traffic probe data derived from electronic toll collection operations and include this data in aggregated probe data provided to other centers.	
<i>Functional Area:</i> Basic Information Broadcast	
Broadcast dissemination of traffic, transit, maintenance and construction, event, and weather information to traveler interface systems and vehicles.	
<i>Requirement:</i>	Existing
1 The center shall disseminate traffic and highway condition information to travelers, including incident information, detours and road closures, event information, recommended routes, and current speeds on specific routes.	
<i>Requirement:</i>	Existing
2 The center shall disseminate maintenance and construction information to travelers, including scheduled maintenance and construction work activities and work zone activities.	
<i>Requirement:</i>	Planned
3 The center shall disseminate transit routes and schedules, transit transfer options, transit fares, and real-time schedule adherence information to travelers.	
<i>Requirement:</i>	Potential
4 The center shall disseminate parking information to travelers, including location, availability, and fees.	
<i>Requirement:</i>	Planned
5 The center shall disseminate toll fee information to travelers.	
<i>Requirement:</i>	Existing
6 The center shall disseminate weather information to travelers.	
<i>Requirement:</i>	Existing
7 The center shall disseminate event information to travelers.	
<i>Requirement:</i>	Planned
8 The center shall disseminate air quality information to travelers.	
<i>Requirement:</i>	Existing
9 The center shall provide the capability to support requests from the media for traffic and incident data.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Lake Michigan Interstate Gateway Alliance (LMIGA) Website	
<i>Entity:</i> Information Service Provider	
<i>Functional Area:</i> Basic Information Broadcast	
Broadcast dissemination of traffic, transit, maintenance and construction, event, and weather information to traveler interface systems and vehicles.	
<i>Requirement:</i> 10	The center shall provide the capability for a system operator to control the type and update frequency of broadcast traveler information. Planned
<i>Functional Area:</i> ISP Traveler Information Alerts	
Provides personalized traveler information alerts, notifying travelers of relevant congestion, incidents, transit schedule delays. and other actionable information that may impact a trip. Relevant alerts are selected based on user-configurable parameters and thresholds.	
<i>Requirement:</i> 1	The center shall accept traveler profiles that establish recurring trip characteristics including route, mode, and timeframe information. Planned
<i>Requirement:</i> 2	The center shall accept traveler profiles that define alert thresholds that establish the severity and types of alerts that are provided to each traveler. Planned
<i>Requirement:</i> 3	The center shall disseminate personalized traffic alerts reporting congestion, incidents, delays, detours and road closures that may impact a current or planned trip. Planned
<i>Requirement:</i> 4	The center shall disseminate personalized transit alerts reporting transit delays and service interruptions. Planned
<i>Requirement:</i> 5	The center shall disseminate personalized parking alerts reporting parking availability and closures. Planned
<i>Requirement:</i> 6	The center shall disseminate personalized road weather alerts reporting adverse road and weather conditions. Planned
<i>Requirement:</i> 8	The center shall disseminate personalized event alerts reporting special event impacts on the transportation system. Planned
<i>Requirement:</i> 9	The center shall provide an operator interface that supports monitoring and management of subscribers and the content and format of alert messages. Existing
<i>Functional Area:</i> Interactive Infrastructure Information	
Personalized dissemination of traffic, transit, maintenance and construction, multimodal, event, and weather information to traveler interface systems and vehicles, upon request.	
<i>Requirement:</i> 1	The center shall disseminate customized traffic and highway condition information to travelers, including incident information, detours and road closures, recommended routes, and current speeds on specific routes upon request. Existing
<i>Requirement:</i> 2	The center shall disseminate customized maintenance and construction information to travelers, including scheduled maintenance and construction work activities and work zone activities upon request. Existing
<i>Requirement:</i> 3	The center shall disseminate customized transit routes and schedules, transit transfer options, transit fares, and real-time schedule adherence information to travelers upon request. Planned

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Lake Michigan Interstate Gateway Alliance (LMIGA) Website	
<i>Entity:</i> Information Service Provider	
<i>Functional Area:</i> Interactive Infrastructure Information	
Personalized dissemination of traffic, transit, maintenance and construction, multimodal, event, and weather information to traveler interface systems and vehicles, upon request.	
<i>Requirement:</i>	
4 The center shall disseminate customized parking information to travelers, including location, availability, and fees upon request.	Planned
<i>Requirement:</i>	
5 The center shall disseminate customized toll fee information to travelers upon request.	Planned
<i>Requirement:</i>	
6 The center shall disseminate customized weather information to travelers upon request.	Existing
<i>Requirement:</i>	
8 The center shall disseminate customized event information to travelers upon request.	Existing
<i>Requirement:</i>	
9 The center shall disseminate customized air quality information to travelers upon request.	Planned
<i>Requirement:</i>	
10 The center shall provide all traveler information based on the traveler's current location or a specific location identified by the traveler, and filter or customize the provided information accordingly.	Existing
<i>Requirement:</i>	
11 The center shall accept traveler profiles for determining the type of personalized data to send to the traveler.	Planned
<i>Requirement:</i>	
12 The center shall manage payment for services, such as tolls, transit fares, parking lot charges, map updates, and advanced payment for tolls, and provide transaction success or failure details.	Potential
<i>Requirement:</i>	
13 The center shall support requests for traveler information and advanced payment for traveler services from commercial fleet operators.	Potential
<i>Requirement:</i>	
14 The center shall provide the capability to exchange information with another traveler information service provider current or predicted data for road links that are outside the area served by the local supplier.	Planned
<i>Requirement:</i>	
15 The center shall manage updates of digitized map data and provide updates to traveler interface systems upon request.	Existing
<i>Requirement:</i>	
16 The center shall provide the capability to support requests from the media for traffic and incident data.	Existing
<i>Requirement:</i>	
17 The center shall provide the capability for a system operator to control the type and update frequency of traveler information.	Existing
<i>Functional Area:</i> Traveler Telephone Information	
Distribution of traveler information and wide-area alerts to traveler telephone information systems such as 511, based on voice-based traveler requests.	
<i>Requirement:</i>	
1 The center shall provide the capability to process voice-formatted requests for traveler information from a traveler telephone information system, and return the information in the requested format.	Planned

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Lake Michigan Interstate Gateway Alliance (LMIGA) Website	
<i>Entity:</i> Information Service Provider	
<i>Functional Area:</i> Traveler Telephone Information	
Distribution of traveler information and wide-area alerts to traveler telephone information systems such as 511, based on voice-based traveler requests.	
<i>Requirement:</i> 2 The center shall provide the capability to process dual-tone multifrequency (DTMF)-based requests (touch-tone) for traveler information from a traveler telephone information system.	Planned
<i>Requirement:</i> 3 The center shall provide the capability to process traveler information requests from a traveler telephone information system.	Planned
<i>Requirement:</i> 4 The center shall provide information on traffic conditions in the requested voice format and for the requested location.	Planned
<i>Requirement:</i> 5 The center shall provide work zone and roadway maintenance information in the requested voice format and for the requested location.	Planned
<i>Requirement:</i> 6 The center shall provide roadway environment conditions information in the requested voice format and for the requested location.	Planned
<i>Requirement:</i> 7 The center shall provide weather and event information in the requested voice format and for the requested location.	Planned
<i>Requirement:</i> 8 The center shall provide transit service information in the requested voice format and for the requested location.	Planned
<i>Requirement:</i> 11 The center shall provide the capability to support both specific caller requests as well as bulk upload of regional traveler information.	Planned
<i>Requirement:</i> 12 The center shall receive and forward region-specific wide-area alert and advisory information to the traveler telephone information system, including major emergencies such as a natural or man-made disaster, civil emergency, child abductions, severe weather watches and warnings, military activities, and law enforcement warnings.	Planned
<i>Functional Area:</i> Infrastructure Provided Trip Planning	
Generation of pre-trip and enroute trip plans for travelers (and vehicles) based on current traffic conditions, work zones, weather, and travelers constraints and preferences. Includes end-to-end trips using multiple modes, such as bicycle, transit, etc.	
<i>Requirement:</i> 1 The center shall provide the capability to provide specific pre-trip and enroute directions to travelers (and drivers), including costs, arrival times, and transfer points.	Planned
<i>Requirement:</i> 2 The center shall include bicycle routes, walkways, skyways, and multi-use trails in the pre-trip and enroute directions it provides to travelers.	Planned
<i>Requirement:</i> 3 The center shall support on-line route guidance for travelers using personal devices (such as PDAs).	Planned
<i>Requirement:</i> 4 The center shall support on-line route guidance for drivers in vehicles.	Planned

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Lake Michigan Interstate Gateway Alliance (LMIGA) Website	
<i>Entity:</i> Information Service Provider	
<i>Functional Area:</i> Infrastructure Provided Trip Planning	
Generation of pre-trip and enroute trip plans for travelers (and vehicles) based on current traffic conditions, work zones, weather, and travelers constraints and preferences. Includes end-to-end trips using multiple modes, such as bicycle, transit, etc.	
<i>Requirement:</i>	Planned
5 The center shall support on-line route guidance for specialty vehicles, such as commercial vehicles.	
<i>Requirement:</i>	Planned
6 The center shall generate route plans based on current and/or predicted conditions of the road network, scheduled maintenance and construction work activities, and work zone activities.	
<i>Requirement:</i>	Planned
7 The center shall generate route plans based on transit services, including fares, schedules, and requirements for travelers with special needs.	
<i>Requirement:</i>	Planned
8 The center shall generate route plans based on current asset restrictions, such as height and weight restrictions on tunnels or bridges.	
<i>Requirement:</i>	Planned
9 The center shall generate route plans based on current or forecasted weather.	
<i>Requirement:</i>	Planned
11 The center shall exchange route segment information with other centers outside the area served by the local center.	
<i>Requirement:</i>	Planned
12 The center shall generate trips based on the use of more than one mode of transport.	
<i>Requirement:</i>	Planned
13 The center shall use the preferences and constraints specified by the traveler in the trip request to select the most appropriate mode of transport.	
<i>Requirement:</i>	Planned
14 The center shall provide the capability for the traveler to confirm the proposed trip plan.	
<i>Requirement:</i>	Planned
15 The center shall log route plans, particularly for special vehicles such as those containing hazardous materials, over-sized vehicles, or motorcades, with a traffic center.	
<i>Requirement:</i>	Existing
16 The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used to determine vehicle and non-vehicle routes, trip planning, and on-line vehicle guidance.	
<i>Requirement:</i>	Planned
17 The center shall provide the capability for center personnel to control route calculation parameters.	
<i>Functional Area:</i> ISP Operational Data Repository	
Processes, stores, and distributes real-time information on the state of the regional transportation system to transportation system operators.	
<i>Requirement:</i>	Existing
1 The center shall select real-time information on the state of the regional transportation system including current traffic and road conditions, weather conditions, transit information, parking information, special event and incident information.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Lake Michigan Interstate Gateway Alliance (LMIGA) Website	
<i>Entity:</i> Information Service Provider	
<i>Functional Area:</i> ISP Operational Data Repository	
Processes, stores, and distributes real-time information on the state of the regional transportation system to transportation system operators.	
<i>Requirement:</i>	Existing
2 The center shall distribute real-time transportation operations data to centers in the region. The data may be broadcast or customized based on the receiving center's specified requests or subscriptions.	
<i>Requirement:</i>	Existing
3 The center shall support the capability for the system operator to monitor and control the operational data repository and information distribution service.	
<i>Requirement:</i>	Existing
4 The center shall provide a web site that provides real-time transportation data to transportation system operators in the region.	
<i>Functional Area:</i> ISP Emergency Traveler Information	
Distribution of emergency information to the traveling public, including evacuation information and wide-area alerts.	
<i>Requirement:</i>	Potential
1 The center shall disseminate emergency evacuation information to the traveler interface systems, including evacuation zones, shelter information, available transportation modes, road closures and detours, changes to transit services, and traffic and road conditions at the origin, destination, and along the evacuation routes.	
<i>Requirement:</i>	Potential
2 The center shall provide evacuation information to shelter providers.	
<i>Requirement:</i>	Existing
3 The center shall disseminate wide-area alert information to the traveler interface systems, including major emergencies such as a natural or man-made disaster, civil emergency, child abductions, severe weather watches and warnings, military activities, and law enforcement warnings.	
<i>Requirement:</i>	Existing
4 The center shall provide the capability for a system operator to control the type and update frequency of emergency and wide-area alert information distributed to travelers.	
<i>Functional Area:</i> ISP Data Collection	
Collection and storage of information supporting the operations of traveler information service providers. For use by operations personnel or data archives in the region.	
<i>Requirement:</i>	Existing
1 The center shall collect traveler information data, such as parking lot data, rideshare data, road network use data, vehicle probe data, and other data from traveler information system operations.	
<i>Requirement:</i>	Potential
2 The center shall collect traveler requests, confirmations, and payment transaction data for traveler services provided.	
<i>Requirement:</i>	Planned
3 The center shall assign quality control metrics and meta-data to be stored along with the data. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.	
<i>Requirement:</i>	Planned
4 The center shall receive and respond to requests from ITS Archives for either a catalog of the traveler information data or for the data itself.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Lake Michigan Interstate Gateway Alliance (LMIGA) Website</i>	
<i>Entity: Information Service Provider</i>	
<i>Functional Area: ISP Data Collection</i>	
Collection and storage of information supporting the operations of traveler information service providers. For use by operations personnel or data archives in the region.	
<i>Requirement:</i> 5 The center shall be able to produce sample products of the data available.	Planned
<i>Element: LaPorte County E-911 Communications Center</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Emergency Call-Taking</i>	
Provides interface to the emergency call-taking systems such as the Emergency Telecommunications System (e.g., 911) that correlate call information with emergencies reported by transit agencies, commercial vehicle operators, or other public safety agencies. Allows the operator to verify the incident and forward the information to the responding agencies.	
<i>Requirement:</i> 1 The center shall support the interface to the Emergency Telecommunications System (e.g. 911 or 7-digit call routing) to receive emergency notification information and provide it to the emergency system operator.	Existing
<i>Requirement:</i> 2 The center shall receive emergency call information from 911 services and present the possible incident information to the emergency system operator.	Existing
<i>Requirement:</i> 4 The center shall receive emergency call information from mayday service providers and present the possible incident information to the emergency system operator.	Existing
<i>Requirement:</i> 5 The center shall receive emergency notification information from other public safety agencies and present the possible incident information to the emergency system operator.	Existing
<i>Requirement:</i> 6 The center shall receive emergency notification information from public transit systems and present the possible incident information to the emergency system operator.	Existing
<i>Requirement:</i> 7 The center shall coordinate, correlate, and verify all emergency inputs, including those identified based on external calls and internal analysis of security sensor and surveillance data, and assign each a level of confidence.	Existing
<i>Requirement:</i> 8 The center shall send a request for remote control of CCTV systems from a traffic management center in order to verify the reported incident.	Planned
<i>Requirement:</i> 9 The center shall forward the verified emergency information to the responding agency based on the location and nature of the emergency.	Existing
<i>Requirement:</i> 10 The center shall update the incident information log once the emergency system operator has verified the incident.	Existing
<i>Requirement:</i> 11 The center shall provide the capability for digitized map data to act as the background to the emergency information presented to the emergency system operator.	Planned
<i>Functional Area: Emergency Dispatch</i>	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: LaPorte County E-911 Communications Center</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Emergency Dispatch</i>	
Dispatch emergency vehicles to incidents, tracking their location and status. Pertinent incident information is gathered and relayed to the responding units.	
<i>Requirement:</i>	
1 The center shall dispatch emergency vehicles to respond to verified emergencies under center personnel control.	Existing
<i>Requirement:</i>	
2 The center shall store the current status of all emergency vehicles available for dispatch and those that have been dispatched.	Existing
<i>Requirement:</i>	
3 The center shall relay location and incident details to the responding vehicles.	Existing
<i>Requirement:</i>	
4 The center shall track the location and status of emergency vehicles responding to an emergency based on information from the emergency vehicle.	Existing
<i>Requirement:</i>	
5 The center shall store and maintain the emergency service responses in an action log.	Existing
<i>Requirement:</i>	
6 The center shall provide the capability for digitized map data to act as the background to the information presented to the emergency system operator.	Planned
<i>Requirement:</i>	
7 The center shall receive traffic images to support dispatch of emergency vehicles.	Existing
<i>Requirement:</i>	
8 The center shall provide the capability to request remote control of traffic surveillance devices	Planned
<i>Requirement:</i>	
9 The center shall coordinate response to incidents with other Emergency Management centers to ensure appropriate resources are dispatched and utilized.	Existing
<i>Functional Area: Emergency Routing</i>	
Routing of emergency vehicles to facilitate the quickest/safest arrival. Routes may be determined based on real-time traffic information and road conditions or routes may be provided by Traffic Management on request.	
<i>Requirement:</i>	
1 The center shall collect current traffic and road condition information for emergency vehicle route calculation.	Existing
<i>Requirement:</i>	
2 The center shall receive information on the location and status of traffic control equipment and work zones along potential emergency routes.	Existing
<i>Requirement:</i>	
3 The center shall receive status information from care facilities to determine the appropriate facility and its location.	Existing
<i>Requirement:</i>	
4 The center shall receive asset restriction information to support the dispatching of appropriate emergency resources.	Existing
<i>Requirement:</i>	
5 The center shall receive current railroad schedule information for emergency vehicle route calculation.	Planned
<i>Requirement:</i>	
6 The center shall track current emergency vehicle location and status.	Existing
<i>Requirement:</i>	
7 The center shall calculate emergency vehicle routes, under center personnel control, based on the collected traffic and road conditions information.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: LaPorte County E-911 Communications Center</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Emergency Routing</i>	
Routing of emergency vehicles to facilitate the quickest/safest arrival. Routes may be determined based on real-time traffic information and road conditions or routes may be provided by Traffic Management on request.	
<i>Requirement:</i> 8 The center shall request and receive ingress and egress routes or other specialized emergency access routes from the traffic management center.	Planned
<i>Requirement:</i> 9 The center shall provide the capability to request special traffic control measures, such as signal preemption, from the traffic management center to facilitate emergency vehicle progress along the suggested route.	Potential
<i>Requirement:</i> 10 Once the route is calculated the route shall be provided to the dispatch function.	Existing
<i>Requirement:</i> 11 The center shall provide the capability for digitized map data to act as the background to the information presented to the emergency system operator.	Planned
<i>Functional Area: Incident Command</i>	
Tactical decision support, resource coordination, and communications integration among emergency management agencies for Incident Commands that are established by first responders to support local management of an incident.	
<i>Requirement:</i> 1 The center shall 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.	Existing
<i>Requirement:</i> 2 The center shall provide incident command communications with public safety, emergency management, transportation, and other allied response agency centers.	Existing
<i>Requirement:</i> 3 The center shall track and maintain resource information and action plans pertaining to the incident command.	Existing
<i>Requirement:</i> 4 The center shall 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.	Existing
<i>Requirement:</i> 5 The center shall assess the status of responding emergency vehicles as part of an incident command.	Existing
<i>Functional Area: Emergency Early Warning System</i>	
Monitors alerting and advisory systems, information collected by ITS surveillance and sensors, and reports from other agencies in order to identify potential, imminent, or in-progress major incidents or disasters. Notification is provided to other ITS centers to notify the traveling public.	
<i>Requirement:</i> 1 The center shall 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).	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: LaPorte County E-911 Communications Center</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Emergency Early Warning System</i>	
Monitors alerting and advisory systems, information collected by ITS surveillance and sensors, and reports from other agencies in order to identify potential, imminent, or in-progress major incidents or disasters. Notification is provided to other ITS centers to notify the traveling public.	
<i>Requirement:</i>	
2 The center shall provide the capability to correlate alerts and advisories, incident information, and security sensor and surveillance data.	Existing
<i>Requirement:</i>	
3 The center shall 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.	Planned
<i>Requirement:</i>	
4 The center shall broadcast wide-area alerts and advisories to transit management centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	Planned
<i>Requirement:</i>	
5 The center shall broadcast wide-area alerts and advisories to toll administration 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.	Planned
<i>Requirement:</i>	
6 The center shall broadcast wide-area alerts and advisories to traveler information service providers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	Planned
<i>Requirement:</i>	
7 The center shall broadcast wide-area alerts and advisories to maintenance centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	Planned
<i>Requirement:</i>	
8 The center shall broadcast wide-area alerts and advisories to other emergency management centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	Planned
<i>Requirement:</i>	
9 The center shall broadcast wide-area alerts and advisories to commercial vehicle administration centers and roadside check facilities 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.	Planned
<i>Requirement:</i>	
10 The center shall process status information from each of the centers that have been sent the wide-area alert.	Planned
<i>Requirement:</i>	
11 The center shall coordinate the broadcast of wide-area alerts and advisories with other emergency management centers.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: LaPorte County E-911 Communications Center</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Emergency Early Warning System</i>	
Monitors alerting and advisory systems, information collected by ITS surveillance and sensors, and reports from other agencies in order to identify potential, imminent, or in-progress major incidents or disasters. Notification is provided to other ITS centers to notify the traveling public.	
<i>Requirement:</i> 12 The center shall receive incident information from other transportation management centers to support the early warning system.	Existing
<i>Requirement:</i> 13 The center shall present the alert and advisory information and the status of the actions taken in response to the alert by the other centers to the emergency system operator as received from other system inputs.	Existing
<i>Requirement:</i> 14 The center shall support the entry of alert and advisory information directly from the emergency system operator.	Existing
<i>Functional Area: Emergency Response Management</i>	
Strategic emergency planning and response capabilities and broad inter-agency interfaces to support large-scale incidents and disasters, commonly associated with Emergency Operations Centers.	
<i>Requirement:</i> 1 The center shall provide strategic emergency response capabilities provided by an Emergency Operations Center for large-scale incidents and disasters.	Existing
<i>Requirement:</i> 2 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.	Existing
<i>Requirement:</i> 3 The center shall provide the capability to implement response plans and track progress through the incident by exchanging incident information and response status with allied agencies.	Existing
<i>Requirement:</i> 4 The center shall develop, coordinate with other agencies, and store emergency response plans.	Existing
<i>Requirement:</i> 5 The center shall track the availability of resources and coordinate resource sharing with allied agency centers including traffic, maintenance, or other emergency centers.	Existing
<i>Requirement:</i> 6 The center shall 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.	Existing
<i>Requirement:</i> 7 The center shall receive event scheduling information from Event Promoters.	Existing
<i>Requirement:</i> 8 The center shall support remote control of field equipment normally under control of the traffic management center including traffic signals, dynamic message signs, gates, and barriers.	Potential
<i>Requirement:</i> 9 The center shall provide the capability to remotely control and monitor CCTV systems normally operated by a traffic management center.	Planned

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> LaPorte County E-911 Communications Center	
<i>Entity:</i> Emergency Management	
<i>Functional Area:</i> Emergency Response Management	
Strategic emergency planning and response capabilities and broad inter-agency interfaces to support large-scale incidents and disasters, commonly associated with Emergency Operations Centers.	
<i>Requirement:</i> 10 The center shall provide the capability to request transit resource availability from transit centers for use during disaster and evacuation operations.	Existing
<i>Requirement:</i> 11 The center shall 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.	Planned
<i>Requirement:</i> 12 The center shall provide information to the media concerning the status of an emergency response.	Existing
<i>Requirement:</i> 13 The center shall provide the capability for digitized map data to act as the background to the information presented to the emergency system operator.	Planned
<i>Requirement:</i> 14 The center shall provide the capability for center personnel to provide inputs to the management of incidents, disasters and evacuations.	Existing
<i>Requirement:</i> 15 The center shall collect information about the status of the recovery efforts for the infrastructure during disasters.	Potential
<i>Requirement:</i> 16 The center shall provide the overall status of infrastructure recovery efforts to traveler information providers and media.	Potential
<i>Requirement:</i> 17 The center shall provide the capability to communicate information about emergency situations to local population through the Emergency Telecommunications System.	Existing
<i>Requirement:</i> 18 The center shall 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.	Planned
<i>Requirement:</i> 19 The center shall retrieve information from public health systems to increase preparedness for, and implement a response to biological, chemical, radiation, and other public health emergencies.	Existing
<i>Functional Area:</i> Emergency Evacuation Support	
Evacuation planning and coordination to manage evacuation and reentry of a population in the vicinity of a disaster or other emergency that poses a risk to public safety.	
<i>Requirement:</i> 1 The center shall manage inter-agency coordination of evacuation operations, from initial planning through the evacuation process and reentry.	Planned
<i>Requirement:</i> 2 The center shall develop and exchange evacuation plans with allied agencies prior to the occurrence of a disaster.	Existing
<i>Requirement:</i> 3 The center shall provide an interface to the emergency system operator to enter evacuation plans and procedures and present the operator with other agencies' plans.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: LaPorte County E-911 Communications Center</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Emergency Evacuation Support</i>	
Evacuation planning and coordination to manage evacuation and reentry of a population in the vicinity of a disaster or other emergency that poses a risk to public safety.	
<i>Requirement:</i>	
4 The center shall coordinate evacuation destinations and shelter needs with shelter providers (e.g., the American Red Cross) in the region.	Existing
<i>Requirement:</i>	
5 The center shall provide evacuation information to traffic, transit, maintenance and construction, rail operations, and other emergency management centers as needed.	Planned
<i>Requirement:</i>	
6 The center shall request resources from transit agencies as needed to support the evacuation.	Planned
<i>Requirement:</i>	
7 The center shall 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.	Potential
<i>Requirement:</i>	
8 The center shall 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.	Planned
<i>Requirement:</i>	
9 The center shall monitor the progress or status of the evacuation once it begins and exchange tactical plans, prepared during the incident, with allied agencies.	Potential
<i>Requirement:</i>	
10 The center shall monitor the progress of the reentry process.	Potential
<i>Requirement:</i>	
11 The center shall submit evacuation information to toll administration centers along with requests for changes in the toll services or fee collection during an evacuation.	Potential
<i>Requirement:</i>	
12 The center shall 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.	Existing
<i>Functional Area: Emergency Environmental Monitoring</i>	
Collects current and forecast road and weather information that is used by the operator to more effectively manage incidents.	
<i>Requirement:</i>	
1 The center shall 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).	Existing
<i>Requirement:</i>	
2 The center shall collect current road and weather information from roadway maintenance operations.	Existing
<i>Requirement:</i>	
3 The center shall assimilate current and forecast road conditions and surface weather information to support incident management.	Existing
<i>Requirement:</i>	
4 The center shall present the current and forecast road and weather information to the emergency system operator.	Existing
<i>Functional Area: Center Secure Area Surveillance</i>	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: LaPorte County E-911 Communications Center</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Center Secure Area Surveillance</i>	
Management of security surveillance devices and analysis of that data to detect potential threats. Areas under surveillance may include transit stops, transit stations, rest areas, park and ride lots, modal interchange facilities, on-board a transit vehicle, etc.	
<i>Requirement:</i>	
1 The center shall remotely monitor video images and audio surveillance data collected in secure areas including facilities (e.g. transit yards) and transportation infrastructure (e.g. bridges, tunnels, interchanges, roadway infrastructure, and transit railways or guideways). The data may be raw or pre-processed in the field.	Planned
<i>Requirement:</i>	
2 The center shall remotely monitor video images and audio surveillance data collected in traveler secure areas, which include transit stations, transit stops, rest areas, park and ride lots, and other fixed sites along travel routes (e.g., emergency pull-off areas and travel information centers). The data may be raw or pre-processed in the field.	Planned
<i>Requirement:</i>	
3 The center shall remotely monitor video images and audio surveillance data collected on-board transit vehicles. The data may be raw or pre-processed in the field.	Planned
<i>Requirement:</i>	
4 The center shall exchange surveillance data with other emergency centers.	Planned
<i>Requirement:</i>	
5 The center shall identify potential security threats based on collected security surveillance data.	Planned
<i>Requirement:</i>	
6 The center shall verify potential security threats by correlating security surveillance data from multiple sources.	Planned
<i>Requirement:</i>	
7 The center shall remotely control security surveillance devices in secure areas including facilities (e.g. transit yards) and transportation infrastructure (e.g. bridges, tunnels, interchanges, roadway infrastructure, and transit railways or guideways).	Planned
<i>Requirement:</i>	
8 The center shall remotely control security surveillance devices in traveler secure areas, which include transit stations, transit stops, rest areas, park and ride lots, and other fixed sites along travel routes (e.g., emergency pull-off areas and travel information centers).	Planned
<i>Requirement:</i>	
9 The center shall remotely control security surveillance devices on-board transit vehicles.	Planned
<i>Requirement:</i>	
10 The center shall match traveler video images against a database from the Alerting and Advisory Systems of known images that may represent criminals and terrorists.	Planned
<i>Requirement:</i>	
11 The center shall exchange traveler images with other emergency management centers to support traveler image matching.	Planned
<i>Requirement:</i>	
12 The center shall respond to control data from center personnel regarding security surveillance data collection, processing, threat detection, and image matching.	Planned
<i>Requirement:</i>	
13 The center shall monitor maintenance status of the security sensor field equipment.	Planned

Functional Area: Center Secure Area Alarm Support

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: LaPorte County E-911 Communications Center</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Center Secure Area Alarm Support</i>	
Collection and response to silent and audible alarms received from travelers in secure areas (such as transit stops, rest areas, park-and-ride lots) and from on-board transit vehicles.	
<i>Requirement:</i>	Existing
1 The center shall collect silent and audible alarms received from travelers in secure areas (such as transit stops, rest areas, park and ride lots, modal interchange facilities).	
<i>Requirement:</i>	Existing
2 The center shall collect silent and audible alarms received from transit vehicles, originated by the traveler or the transit vehicle operator.	
<i>Requirement:</i>	Existing
3 After the alarm message has been received, the center shall generate an alarm acknowledgment to the sender.	
<i>Requirement:</i>	Existing
4 After the alarm message becomes a verified incident, the center shall determine the appropriate response.	
<i>Requirement:</i>	Existing
5 The center shall determine whether the alarm message indicates an emergency that requires the attention of public safety agencies, and forward alarm message data to the appropriate agency as necessary.	
<i>Requirement:</i>	Existing
6 The center shall forward the alarm message to center personnel and respond to the traveler or transit vehicle operator as directed by the personnel.	
<i>Functional Area: Mayday Support</i>	
Collection and response to Mayday messages received from vehicles and drivers.	
<i>Requirement:</i>	Existing
1 The center shall collect mayday messages from vehicles and drivers.	
<i>Requirement:</i>	Existing
2 The center shall collect mayday messages from travelers via personal handheld devices.	
<i>Requirement:</i>	Existing
3 The center shall acknowledge the request for emergency assistance, whether originated by the driver, automatically by the vehicle's safety systems, or by a traveler via a personal handheld device.	
<i>Requirement:</i>	Existing
4 After the mayday becomes a verified incident, the center shall determine the appropriate response to the mayday message.	
<i>Requirement:</i>	Existing
5 The center shall determine whether the mayday message indicates an emergency that requires the attention of public safety agencies, and forward mayday emergency data to the appropriate agency as necessary.	
<i>Requirement:</i>	Planned
6 The center shall support the activation of remote controlled functions requested by a vehicle, such as requests to unlock doors.	
<i>Requirement:</i>	Existing
7 The center shall request additional emergency details from or issue commands to the vehicle's security systems or vehicle driver if needed.	
<i>Requirement:</i>	Existing
8 The center shall maintain a log of all mayday signals received from vehicles.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> LaPorte County E-911 Communications Center	
<i>Entity:</i> Emergency Management	
<i>Functional Area:</i> Mayday Support	
Collection and response to Mayday messages received from vehicles and drivers.	
<i>Requirement:</i>	Existing
9 The center shall provide all mayday data to center personnel and respond to the vehicle, driver, or traveler using the portable handheld device as directed by the personnel.	
<i>Functional Area:</i> Emergency Commercial Vehicle Response	
Responds to commercial vehicle and freight equipment related emergencies. Includes incidents involving hazardous materials as well as the detection of non-permitted transport of security sensitive hazmat.	
<i>Requirement:</i>	Existing
1 The center shall receive emergency notification information from commercial vehicles, commercial vehicle check stations, or commercial fleet operators and present the possible incident information to the emergency system operator. This may include detection of non-permitted transport of security sensitive hazmat, hazardous cargo spills, etc.	
<i>Requirement:</i>	Existing
2 The center shall receive details of the cargo being carried by commercial vehicles from their commercial fleet manager for incidents involving potential hazardous materials.	
<i>Requirement:</i>	Existing
3 The center shall forward the verified emergency information to the responding agency based on the location and nature of the emergency.	
<i>Requirement:</i>	Planned
4 The center shall provide the capability to request Fleet and Freight Management to disable a specific vehicle in their fleet.	
<i>Functional Area:</i> Emergency Data Collection	
Collection and storage of information related to Emergency Management. For use by operations personnel or data archives in the region.	
<i>Requirement:</i>	Existing
1 The center shall collect emergency service data, emergency vehicle management data, emergency vehicle data, sensor and surveillance data, threat data, and incident data.	
<i>Requirement:</i>	Existing
2 The center shall assign quality control metrics and meta-data to be stored along with the data. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.	
<i>Requirement:</i>	Planned
3 The center shall receive and respond to requests from ITS Archives for either a catalog of the emergency management data or for the data itself.	
<i>Requirement:</i>	Planned
4 The center shall be able to produce sample products of the data available.	
<i>Functional Area:</i> Emergency Transportation Operations Data Collection	
Collects real-time information on the state of the regional transportation system for operational use by the center. It establishes communications with a regional repository, requests or subscribes to information relevant to the center, and distributes the received information for use.	
<i>Requirement:</i>	Existing
1 The center shall collect real-time information on the state of the regional transportation system including current traffic and road conditions, weather conditions, special event and incident information.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: LaPorte County E-911 Communications Center</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Emergency Transportation Operations Data Collection</i>	
Collects real-time information on the state of the regional transportation system for operational use by the center. It establishes communications with a regional repository, requests or subscribes to information relevant to the center, and distributes the received information for use.	
<i>Requirement:</i> 2 The center shall support the capability for the system operator to monitor and control the information collection service.	Existing
<i>Element: LaPorte County Emergency Operations Center</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Emergency Call-Taking</i>	
Provides interface to the emergency call-taking systems such as the Emergency Telecommunications System (e.g., 911) that correlate call information with emergencies reported by transit agencies, commercial vehicle operators, or other public safety agencies. Allows the operator to verify the incident and forward the information to the responding agencies.	
<i>Requirement:</i> 1 The center shall support the interface to the Emergency Telecommunications System (e.g. 911 or 7-digit call routing) to receive emergency notification information and provide it to the emergency system operator.	Existing
<i>Requirement:</i> 2 The center shall receive emergency call information from 911 services and present the possible incident information to the emergency system operator.	Existing
<i>Requirement:</i> 4 The center shall receive emergency call information from mayday service providers and present the possible incident information to the emergency system operator.	Existing
<i>Requirement:</i> 5 The center shall receive emergency notification information from other public safety agencies and present the possible incident information to the emergency system operator.	Existing
<i>Requirement:</i> 6 The center shall receive emergency notification information from public transit systems and present the possible incident information to the emergency system operator.	Existing
<i>Requirement:</i> 7 The center shall coordinate, correlate, and verify all emergency inputs, including those identified based on external calls and internal analysis of security sensor and surveillance data, and assign each a level of confidence.	Existing
<i>Requirement:</i> 8 The center shall send a request for remote control of CCTV systems from a traffic management center in order to verify the reported incident.	Planned
<i>Requirement:</i> 9 The center shall forward the verified emergency information to the responding agency based on the location and nature of the emergency.	Existing
<i>Requirement:</i> 10 The center shall update the incident information log once the emergency system operator has verified the incident.	Existing
<i>Requirement:</i> 11 The center shall provide the capability for digitized map data to act as the background to the emergency information presented to the emergency system operator.	Planned
<i>Functional Area: Emergency Dispatch</i>	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: LaPorte County Emergency Operations Center</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Emergency Dispatch</i>	
Dispatch emergency vehicles to incidents, tracking their location and status. Pertinent incident information is gathered and relayed to the responding units.	
<i>Requirement:</i>	
1 The center shall dispatch emergency vehicles to respond to verified emergencies under center personnel control.	Existing
<i>Requirement:</i>	
2 The center shall store the current status of all emergency vehicles available for dispatch and those that have been dispatched.	Existing
<i>Requirement:</i>	
3 The center shall relay location and incident details to the responding vehicles.	Existing
<i>Requirement:</i>	
4 The center shall track the location and status of emergency vehicles responding to an emergency based on information from the emergency vehicle.	Existing
<i>Requirement:</i>	
5 The center shall store and maintain the emergency service responses in an action log.	Existing
<i>Requirement:</i>	
6 The center shall provide the capability for digitized map data to act as the background to the information presented to the emergency system operator.	Planned
<i>Requirement:</i>	
7 The center shall receive traffic images to support dispatch of emergency vehicles.	Planned
<i>Requirement:</i>	
8 The center shall provide the capability to request remote control of traffic surveillance devices	Planned
<i>Requirement:</i>	
9 The center shall coordinate response to incidents with other Emergency Management centers to ensure appropriate resources are dispatched and utilized.	Existing
<i>Functional Area: Emergency Routing</i>	
Routing of emergency vehicles to facilitate the quickest/safest arrival. Routes may be determined based on real-time traffic information and road conditions or routes may be provided by Traffic Management on request.	
<i>Requirement:</i>	
1 The center shall collect current traffic and road condition information for emergency vehicle route calculation.	Existing
<i>Requirement:</i>	
2 The center shall receive information on the location and status of traffic control equipment and work zones along potential emergency routes.	Existing
<i>Requirement:</i>	
3 The center shall receive status information from care facilities to determine the appropriate facility and its location.	Existing
<i>Requirement:</i>	
4 The center shall receive asset restriction information to support the dispatching of appropriate emergency resources.	Existing
<i>Requirement:</i>	
5 The center shall receive current railroad schedule information for emergency vehicle route calculation.	Planned
<i>Requirement:</i>	
6 The center shall track current emergency vehicle location and status.	Existing
<i>Requirement:</i>	
7 The center shall calculate emergency vehicle routes, under center personnel control, based on the collected traffic and road conditions information.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: LaPorte County Emergency Operations Center</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Emergency Routing</i>	
Routing of emergency vehicles to facilitate the quickest/safest arrival. Routes may be determined based on real-time traffic information and road conditions or routes may be provided by Traffic Management on request.	
<i>Requirement:</i> 8 The center shall request and receive ingress and egress routes or other specialized emergency access routes from the traffic management center.	Planned
<i>Requirement:</i> 9 The center shall provide the capability to request special traffic control measures, such as signal preemption, from the traffic management center to facilitate emergency vehicle progress along the suggested route.	Potential
<i>Requirement:</i> 10 Once the route is calculated the route shall be provided to the dispatch function.	Existing
<i>Requirement:</i> 11 The center shall provide the capability for digitized map data to act as the background to the information presented to the emergency system operator.	Planned
<i>Functional Area: Incident Command</i>	
Tactical decision support, resource coordination, and communications integration among emergency management agencies for Incident Commands that are established by first responders to support local management of an incident.	
<i>Requirement:</i> 1 The center shall 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.	Existing
<i>Requirement:</i> 2 The center shall provide incident command communications with public safety, emergency management, transportation, and other allied response agency centers.	Existing
<i>Requirement:</i> 3 The center shall track and maintain resource information and action plans pertaining to the incident command.	Existing
<i>Requirement:</i> 4 The center shall 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.	Existing
<i>Requirement:</i> 5 The center shall assess the status of responding emergency vehicles as part of an incident command.	Existing
<i>Functional Area: Emergency Early Warning System</i>	
Monitors alerting and advisory systems, information collected by ITS surveillance and sensors, and reports from other agencies in order to identify potential, imminent, or in-progress major incidents or disasters. Notification is provided to other ITS centers to notify the traveling public.	
<i>Requirement:</i> 1 The center shall 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).	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: LaPorte County Emergency Operations Center</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Emergency Early Warning System</i>	
Monitors alerting and advisory systems, information collected by ITS surveillance and sensors, and reports from other agencies in order to identify potential, imminent, or in-progress major incidents or disasters. Notification is provided to other ITS centers to notify the traveling public.	
<i>Requirement:</i> 2 The center shall provide the capability to correlate alerts and advisories, incident information, and security sensor and surveillance data.	Existing
<i>Requirement:</i> 3 The center shall 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.	Existing
<i>Requirement:</i> 4 The center shall broadcast wide-area alerts and advisories to transit management centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	Existing
<i>Requirement:</i> 5 The center shall broadcast wide-area alerts and advisories to toll administration centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	Existing
<i>Requirement:</i> 6 The center shall broadcast wide-area alerts and advisories to traveler information service providers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	Existing
<i>Requirement:</i> 7 The center shall broadcast wide-area alerts and advisories to maintenance centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	Existing
<i>Requirement:</i> 8 The center shall broadcast wide-area alerts and advisories to other emergency management centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	Existing
<i>Requirement:</i> 9 The center shall broadcast wide-area alerts and advisories to commercial vehicle administration centers and roadside check facilities for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	Existing
<i>Requirement:</i> 10 The center shall process status information from each of the centers that have been sent the wide-area alert.	Existing
<i>Requirement:</i> 11 The center shall coordinate the broadcast of wide-area alerts and advisories with other emergency management centers.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: LaPorte County Emergency Operations Center</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Emergency Early Warning System</i>	
Monitors alerting and advisory systems, information collected by ITS surveillance and sensors, and reports from other agencies in order to identify potential, imminent, or in-progress major incidents or disasters. Notification is provided to other ITS centers to notify the traveling public.	
<i>Requirement:</i> 12 The center shall receive incident information from other transportation management centers to support the early warning system.	Existing
<i>Requirement:</i> 13 The center shall present the alert and advisory information and the status of the actions taken in response to the alert by the other centers to the emergency system operator as received from other system inputs.	Existing
<i>Requirement:</i> 14 The center shall support the entry of alert and advisory information directly from the emergency system operator.	Existing
<i>Functional Area: Emergency Response Management</i>	
Strategic emergency planning and response capabilities and broad inter-agency interfaces to support large-scale incidents and disasters, commonly associated with Emergency Operations Centers.	
<i>Requirement:</i> 1 The center shall provide strategic emergency response capabilities provided by an Emergency Operations Center for large-scale incidents and disasters.	Existing
<i>Requirement:</i> 2 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.	Existing
<i>Requirement:</i> 3 The center shall provide the capability to implement response plans and track progress through the incident by exchanging incident information and response status with allied agencies.	Existing
<i>Requirement:</i> 4 The center shall develop, coordinate with other agencies, and store emergency response plans.	Existing
<i>Requirement:</i> 5 The center shall track the availability of resources and coordinate resource sharing with allied agency centers including traffic, maintenance, or other emergency centers.	Existing
<i>Requirement:</i> 6 The center shall 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.	Existing
<i>Requirement:</i> 8 The center shall support remote control of field equipment normally under control of the traffic management center including traffic signals, dynamic message signs, gates, and barriers.	Potential
<i>Requirement:</i> 9 The center shall provide the capability to remotely control and monitor CCTV systems normally operated by a traffic management center.	Planned
<i>Requirement:</i> 10 The center shall provide the capability to request transit resource availability from transit centers for use during disaster and evacuation operations.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> LaPorte County Emergency Operations Center	
<i>Entity:</i> Emergency Management	
<i>Functional Area:</i> Emergency Response Management	
Strategic emergency planning and response capabilities and broad inter-agency interfaces to support large-scale incidents and disasters, commonly associated with Emergency Operations Centers.	
<i>Requirement:</i>	
11 The center shall 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.	Planned
<i>Requirement:</i>	
12 The center shall provide information to the media concerning the status of an emergency response.	Existing
<i>Requirement:</i>	
13 The center shall provide the capability for digitized map data to act as the background to the information presented to the emergency system operator.	Planned
<i>Requirement:</i>	
14 The center shall provide the capability for center personnel to provide inputs to the management of incidents, disasters and evacuations.	Existing
<i>Requirement:</i>	
15 The center shall collect information about the status of the recovery efforts for the infrastructure during disasters.	Existing
<i>Requirement:</i>	
16 The center shall provide the overall status of infrastructure recovery efforts to traveler information providers and media.	Existing
<i>Requirement:</i>	
17 The center shall provide the capability to communicate information about emergency situations to local population through the Emergency Telecommunications System.	Existing
<i>Requirement:</i>	
18 The center shall 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.	Planned
<i>Requirement:</i>	
19 The center shall retrieve information from public health systems to increase preparedness for, and implement a response to biological, chemical, radiation, and other public health emergencies.	Existing
<i>Functional Area:</i> Emergency Evacuation Support	
Evacuation planning and coordination to manage evacuation and reentry of a population in the vicinity of a disaster or other emergency that poses a risk to public safety.	
<i>Requirement:</i>	
1 The center shall manage inter-agency coordination of evacuation operations, from initial planning through the evacuation process and reentry.	Existing
<i>Requirement:</i>	
2 The center shall develop and exchange evacuation plans with allied agencies prior to the occurrence of a disaster.	Existing
<i>Requirement:</i>	
3 The center shall provide an interface to the emergency system operator to enter evacuation plans and procedures and present the operator with other agencies' plans.	Existing
<i>Requirement:</i>	
4 The center shall coordinate evacuation destinations and shelter needs with shelter providers (e.g., the American Red Cross) in the region.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: LaPorte County Emergency Operations Center</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Emergency Evacuation Support</i>	
Evacuation planning and coordination to manage evacuation and reentry of a population in the vicinity of a disaster or other emergency that poses a risk to public safety.	
<i>Requirement:</i>	
5 The center shall provide evacuation information to traffic, transit, maintenance and construction, rail operations, and other emergency management centers as needed.	Existing
<i>Requirement:</i>	
6 The center shall request resources from transit agencies as needed to support the evacuation.	Existing
<i>Requirement:</i>	
7 The center shall 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.	Potential
<i>Requirement:</i>	
8 The center shall 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.	Existing
<i>Requirement:</i>	
9 The center shall monitor the progress or status of the evacuation once it begins and exchange tactical plans, prepared during the incident, with allied agencies.	Existing
<i>Requirement:</i>	
10 The center shall monitor the progress of the reentry process.	Existing
<i>Requirement:</i>	
11 The center shall submit evacuation information to toll administration centers along with requests for changes in the toll services or fee collection during an evacuation.	Potential
<i>Requirement:</i>	
12 The center shall 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.	Existing
<i>Functional Area: Emergency Environmental Monitoring</i>	
Collects current and forecast road and weather information that is used by the operator to more effectively manage incidents.	
<i>Requirement:</i>	
1 The center shall 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).	Existing
<i>Requirement:</i>	
2 The center shall collect current road and weather information from roadway maintenance operations.	Existing
<i>Requirement:</i>	
3 The center shall assimilate current and forecast road conditions and surface weather information to support incident management.	Existing
<i>Requirement:</i>	
4 The center shall present the current and forecast road and weather information to the emergency system operator.	Existing
<i>Functional Area: Center Secure Area Surveillance</i>	
Management of security surveillance devices and analysis of that data to detect potential threats. Areas under surveillance may include transit stops, transit stations, rest areas, park and ride lots, modal interchange facilities, on-board a transit vehicle, etc.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: LaPorte County Emergency Operations Center</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Center Secure Area Surveillance</i>	
Management of security surveillance devices and analysis of that data to detect potential threats. Areas under surveillance may include transit stops, transit stations, rest areas, park and ride lots, modal interchange facilities, on-board a transit vehicle, etc.	
<i>Requirement:</i>	Planned
1 The center shall remotely monitor video images and audio surveillance data collected in secure areas including facilities (e.g. transit yards) and transportation infrastructure (e.g. bridges, tunnels, interchanges, roadway infrastructure, and transit railways or guideways). The data may be raw or pre-processed in the field.	
<i>Requirement:</i>	Planned
2 The center shall remotely monitor video images and audio surveillance data collected in traveler secure areas, which include transit stations, transit stops, rest areas, park and ride lots, and other fixed sites along travel routes (e.g., emergency pull-off areas and travel information centers). The data may be raw or pre-processed in the field.	
<i>Requirement:</i>	Planned
3 The center shall remotely monitor video images and audio surveillance data collected on-board transit vehicles. The data may be raw or pre-processed in the field.	
<i>Requirement:</i>	Planned
4 The center shall exchange surveillance data with other emergency centers.	
<i>Requirement:</i>	Planned
5 The center shall identify potential security threats based on collected security surveillance data.	
<i>Requirement:</i>	Planned
6 The center shall verify potential security threats by correlating security surveillance data from multiple sources.	
<i>Requirement:</i>	Planned
7 The center shall remotely control security surveillance devices in secure areas including facilities (e.g. transit yards) and transportation infrastructure (e.g. bridges, tunnels, interchanges, roadway infrastructure, and transit railways or guideways).	
<i>Requirement:</i>	Planned
8 The center shall remotely control security surveillance devices in traveler secure areas, which include transit stations, transit stops, rest areas, park and ride lots, and other fixed sites along travel routes (e.g., emergency pull-off areas and travel information centers).	
<i>Requirement:</i>	Planned
9 The center shall remotely control security surveillance devices on-board transit vehicles.	
<i>Requirement:</i>	Planned
10 The center shall match traveler video images against a database from the Alerting and Advisory Systems of known images that may represent criminals and terrorists.	
<i>Requirement:</i>	Planned
11 The center shall exchange traveler images with other emergency management centers to support traveler image matching.	
<i>Requirement:</i>	Planned
12 The center shall respond to control data from center personnel regarding security surveillance data collection, processing, threat detection, and image matching.	
<i>Requirement:</i>	Planned
13 The center shall monitor maintenance status of the security sensor field equipment.	

Functional Area: Center Secure Area Alarm Support

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: LaPorte County Emergency Operations Center</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Center Secure Area Alarm Support</i>	
Collection and response to silent and audible alarms received from travelers in secure areas (such as transit stops, rest areas, park-and-ride lots) and from on-board transit vehicles.	
<i>Requirement:</i>	Existing
1 The center shall collect silent and audible alarms received from travelers in secure areas (such as transit stops, rest areas, park and ride lots, modal interchange facilities).	
<i>Requirement:</i>	Existing
2 The center shall collect silent and audible alarms received from transit vehicles, originated by the traveler or the transit vehicle operator.	
<i>Requirement:</i>	Existing
3 After the alarm message has been received, the center shall generate an alarm acknowledgment to the sender.	
<i>Requirement:</i>	Existing
4 After the alarm message becomes a verified incident, the center shall determine the appropriate response.	
<i>Requirement:</i>	Existing
5 The center shall determine whether the alarm message indicates an emergency that requires the attention of public safety agencies, and forward alarm message data to the appropriate agency as necessary.	
<i>Requirement:</i>	Existing
6 The center shall forward the alarm message to center personnel and respond to the traveler or transit vehicle operator as directed by the personnel.	
<i>Functional Area: Mayday Support</i>	
Collection and response to Mayday messages received from vehicles and drivers.	
<i>Requirement:</i>	Existing
1 The center shall collect mayday messages from vehicles and drivers.	
<i>Requirement:</i>	Existing
2 The center shall collect mayday messages from travelers via personal handheld devices.	
<i>Requirement:</i>	Existing
3 The center shall acknowledge the request for emergency assistance, whether originated by the driver, automatically by the vehicle's safety systems, or by a traveler via a personal handheld device.	
<i>Requirement:</i>	Existing
4 After the mayday becomes a verified incident, the center shall determine the appropriate response to the mayday message.	
<i>Requirement:</i>	Existing
5 The center shall determine whether the mayday message indicates an emergency that requires the attention of public safety agencies, and forward mayday emergency data to the appropriate agency as necessary.	
<i>Requirement:</i>	Planned
6 The center shall support the activation of remote controlled functions requested by a vehicle, such as requests to unlock doors.	
<i>Requirement:</i>	Existing
7 The center shall request additional emergency details from or issue commands to the vehicle's security systems or vehicle driver if needed.	
<i>Requirement:</i>	Existing
8 The center shall maintain a log of all mayday signals received from vehicles.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> LaPorte County Emergency Operations Center	
<i>Entity:</i> Emergency Management	
<i>Functional Area:</i> Mayday Support	
Collection and response to Mayday messages received from vehicles and drivers.	
<i>Requirement:</i>	Existing
9 The center shall provide all mayday data to center personnel and respond to the vehicle, driver, or traveler using the portable handheld device as directed by the personnel.	
<i>Functional Area:</i> Emergency Commercial Vehicle Response	
Responds to commercial vehicle and freight equipment related emergencies. Includes incidents involving hazardous materials as well as the detection of non-permitted transport of security sensitive hazmat.	
<i>Requirement:</i>	Existing
1 The center shall receive emergency notification information from commercial vehicles, commercial vehicle check stations, or commercial fleet operators and present the possible incident information to the emergency system operator. This may include detection of non-permitted transport of security sensitive hazmat, hazardous cargo spills, etc.	
<i>Requirement:</i>	Existing
2 The center shall receive details of the cargo being carried by commercial vehicles from their commercial fleet manager for incidents involving potential hazardous materials.	
<i>Requirement:</i>	Existing
3 The center shall forward the verified emergency information to the responding agency based on the location and nature of the emergency.	
<i>Requirement:</i>	Planned
4 The center shall provide the capability to request Fleet and Freight Management to disable a specific vehicle in their fleet.	
<i>Functional Area:</i> Emergency Data Collection	
Collection and storage of information related to Emergency Management. For use by operations personnel or data archives in the region.	
<i>Requirement:</i>	Existing
1 The center shall collect emergency service data, emergency vehicle management data, emergency vehicle data, sensor and surveillance data, threat data, and incident data.	
<i>Requirement:</i>	Existing
2 The center shall assign quality control metrics and meta-data to be stored along with the data. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.	
<i>Requirement:</i>	Planned
3 The center shall receive and respond to requests from ITS Archives for either a catalog of the emergency management data or for the data itself.	
<i>Requirement:</i>	Planned
4 The center shall be able to produce sample products of the data available.	
<i>Functional Area:</i> Emergency Transportation Operations Data Collection	
Collects real-time information on the state of the regional transportation system for operational use by the center. It establishes communications with a regional repository, requests or subscribes to information relevant to the center, and distributes the received information for use.	
<i>Requirement:</i>	Planned
1 The center shall collect real-time information on the state of the regional transportation system including current traffic and road conditions, weather conditions, special event and incident information.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: LaPorte County Emergency Operations Center</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Emergency Transportation Operations Data Collection</i>	
Collects real-time information on the state of the regional transportation system for operational use by the center. It establishes communications with a regional repository, requests or subscribes to information relevant to the center, and distributes the received information for use.	
<i>Requirement:</i>	Planned
2 The center shall support the capability for the system operator to monitor and control the information collection service.	
<i>Element: LaPorte County Field Equipment</i>	
<i>Entity: Roadway</i>	
<i>Functional Area: Roadway Probe Data Communications</i>	
Field elements that collect probe data from vehicles using short range communications.	
<i>Requirement:</i>	Potential
1 The field element shall communicate with passing vehicles for traffic data link time calculations and send collected data to the controlling center; identification will be removed to ensure anonymity.	
<i>Requirement:</i>	Potential
2 The field element shall communicate with on-board equipment on passing vehicles to collect current vehicle position, speed, and heading and a record of previous events (e.g., starts and stops, link travel times) that can be used to determine current traffic conditions.	
<i>Requirement:</i>	Potential
3 The field element shall communicate with on-board equipment on passing vehicles to collect current status information and a record of previous events (e.g., temperature, wiper status, headlight status, traction control system status) that can be used to determine road and surface weather conditions.	
<i>Requirement:</i>	Potential
4 The field element shall communicate with on-board equipment on passing vehicles to collect vehicle trip information (e.g., origin and destination information, travel times) that can be used to support transportation planning.	
<i>Requirement:</i>	Potential
5 The field element shall communicate with on-board equipment on passing vehicles to collect a history of precise positioning information that can be used to derive or verify accurate roadway geometry and lane features for use by map update providers.	
<i>Requirement:</i>	Potential
6 The field element shall aggregate and forward collected probe information to the center.	
<i>Requirement:</i>	Potential
7 The field element shall provide roadside equipment operational status to the center.	
<i>Requirement:</i>	Potential
8 The field element shall provide roadside equipment fault indication to the center for repair.	
<i>Functional Area: Roadway Signal Controls</i>	
Field elements including traffic signal controllers for use at signalized intersections; also supports pedestrian crossings.	
<i>Requirement:</i>	Existing
1 The field element shall control traffic signals under center control.	
<i>Requirement:</i>	Existing
2 The field element shall respond to pedestrian crossing requests by accommodating the pedestrian crossing.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> LaPorte County Field Equipment	
<i>Entity:</i> Roadway	
<i>Functional Area:</i> Roadway Signal Controls	
Field elements including traffic signal controllers for use at signalized intersections; also supports pedestrian crossings.	
<i>Requirement:</i>	
3 The field element shall provide the capability to notify the traffic management center of pedestrian calls and pedestrian accommodations.	Potential
<i>Requirement:</i>	
4 The field element shall report the current signal control information to the center.	Existing
<i>Requirement:</i>	
5 The field element shall report current preemption status to the center.	Planned
<i>Requirement:</i>	
6 The field element shall return traffic signal controller operational status to the center.	Existing
<i>Requirement:</i>	
7 The field element shall return traffic signal controller fault data to the center.	Existing
<i>Functional Area:</i> Field Management Stations Operation	
Supports direct communications between field management stations and the local field equipment under their control.	
<i>Requirement:</i>	
1 The field management station shall accept configuration information from the center.	Existing
<i>Requirement:</i>	
2 The field management station shall pass data provided by the center to local field devices and report data from the field devices back to the center.	Existing
<i>Functional Area:</i> Roadway Signal Preemption	
Field elements that receive signal preemption requests from approaching emergency vehicles and overrides the current operation of the traffic signals	
<i>Requirement:</i>	
1 The field element shall respond to signal preemption requests from emergency vehicles.	Planned
<i>Functional Area:</i> Roadway Equipment Coordination	
Field elements that control and send data to other field elements (such as environmental sensors that send data to a DMS or coordination between traffic controllers on adjacent intersections), without center control.	
<i>Requirement:</i>	
1 The field element shall include sensors that provide data and status information to other field element devices, without center control.	Potential
<i>Requirement:</i>	
2 The field element shall include sensors that receive configuration data from other field element devices, without center control.	Potential
<i>Requirement:</i>	
3 The field element shall include devices that provide data and status information to other field element devices without center control.	Potential
<i>Requirement:</i>	
4 The field element shall include devices that receive configuration data from other field element devices, without center control.	Potential
<i>Functional Area:</i> Roadway Field Device Monitoring	
Monitors field equipment operational status and detects and reports fault conditions. Device status, configuration, and fault information are provided to a remote center and a user interface provides information locally to field personnel.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: LaPorte County Field Equipment</i>	
<i>Entity: Roadway</i>	
<i>Functional Area: Roadway Field Device Monitoring</i>	
Monitors field equipment operational status and detects and reports fault conditions. Device status, configuration, and fault information are provided to a remote center and a user interface provides information locally to field personnel.	
<i>Requirement:</i>	
1 The field element shall monitor the operational status (state of the device, configuration, and fault data) of connected sensors (such as traffic, infrastructure, environmental, security, speed) and devices (such as highway advisory radio, dynamic message signs, automated roadway treatment systems, barrier and safeguard systems, cameras, traffic signals, ramp meters, short range communications equipment, security surveillance equipment).	Existing
<i>Requirement:</i>	
2 The field element shall send operational status of connected field equipment to the maintenance center.	Existing
<i>Requirement:</i>	
3 The field element shall send collected fault data to the maintenance center for repair.	Existing
<i>Requirement:</i>	
4 The field element shall include a local interface that provides operational status and fault data for connected field equipment to field personnel.	Existing
<i>Requirement:</i>	
5 The field element shall include a local interface that allows field personnel to command diagnostic tests on connected field equipment.	Existing
<i>Functional Area: Roadway Environmental Monitoring</i>	
Environmental sensors, surface and sub-surface, that collect weather and road surface information. Weather conditions measured include temperature, wind, humidity, precipitation, and visibility. Sensors measure road surface temperature, moisture, icing, salinity, etc.	
<i>Requirement:</i>	
1 The field element shall include surface and sub-surface environmental sensors that measure road surface temperature, moisture, icing, salinity, and other measures.	Existing
<i>Requirement:</i>	
2 The field element shall include environmental sensors that measure weather conditions including temperature, wind, humidity, precipitation, and visibility.	Existing
<i>Requirement:</i>	
3 The field element's environmental sensors shall be remotely controlled by a maintenance center.	Planned
<i>Requirement:</i>	
4 The field element's environmental sensors shall be remotely controlled by a traffic management center.	Potential
<i>Requirement:</i>	
5 The field element's environmental sensors shall be remotely controlled by weather service providers such as the National Weather Service or value-added sector specific meteorological services.	Potential
<i>Requirement:</i>	
6 The field element's environmental sensors shall be remotely controlled by a maintenance and construction vehicle.	Potential
<i>Requirement:</i>	
7 The field element shall provide environmental sensor equipment operational status to the controlling center or maintenance vehicle.	Existing
<i>Requirement:</i>	
8 The field element shall provide environmental sensor equipment fault indication to the controlling center or maintenance vehicle.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> LaPorte County Field Equipment	
<i>Entity:</i> Roadway	
<i>Functional Area:</i> Roadway Environmental Monitoring	
Environmental sensors, surface and sub-surface, that collect weather and road surface information. Weather conditions measured include temperature, wind, humidity, precipitation, and visibility. Sensors measure road surface temperature, moisture, icing, salinity, etc.	
<i>Requirement:</i>	
9 The field element shall remotely aggregate environmental sensor data with environmental data collected from maintenance and construction vehicles.	Planned
<i>Requirement:</i>	
10 The field element shall provide weather and road surface condition data to centers.	Existing
<i>Requirement:</i>	
11 The field element shall provide weather and road surface condition data to maintenance and construction vehicles.	Existing
<i>Functional Area:</i> Field Barrier System Control	
Field elements that control barrier systems such as gates and other systems that manage entry to roadways, transportation facilities and infrastructure.	
<i>Requirement:</i>	
1 The field element shall activate barrier systems for transportation facilities and infrastructure under center control. Barrier systems include automated or remotely controlled gates, barriers and other systems that manage entry to roadways.	Potential
<i>Requirement:</i>	
2 The field element shall return barrier system operational status to the controlling center.	Potential
<i>Requirement:</i>	
3 The field element shall return barrier system fault data to the maintenance center for repair.	Potential
<i>Requirement:</i>	
4 The field element shall receive requests for access from approaching vehicles using field-vehicle communications and validate and authenticate the requests.	Potential
<i>Requirement:</i>	
5 The field element shall grant access only to qualified vehicles.	Potential
<i>Requirement:</i>	
6 The field element shall communicate access permission status and access instructions to approaching vehicles using field-vehicle communications.	Potential
<i>Functional Area:</i> Roadway Speed Monitoring and Warning	
Vehicle speed sensors that detect excessive vehicle speeds, optionally based on conditions and vehicle type, informing drivers, centers and/or enforcement agencies of speed violations.	
<i>Requirement:</i>	
1 The field element shall include sensors to detect vehicle speeds, under traffic or maintenance center control.	Existing
<i>Requirement:</i>	
2 The field element shall include sensors to detect vehicle speeds, under enforcement agency control.	Planned
<i>Requirement:</i>	
3 If the speed detected by vehicle speed sensors is determined to be excessive, the field element shall provide a safe speed advisory to passing drivers via a driver information system (such as portable messages signs, field to vehicle communications to in-vehicle signing systems, etc.).	Existing
<i>Requirement:</i>	
4 The field element shall base speed advisories to passing drivers on environmental conditions.	Planned

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: LaPorte County Field Equipment</i>	
<i>Entity: Roadway</i>	
<i>Functional Area: Roadway Speed Monitoring and Warning</i>	
Vehicle speed sensors that detect excessive vehicle speeds, optionally based on conditions and vehicle type, informing drivers, centers and/or enforcement agencies of speed violations.	
<i>Requirement:</i> 5 The field element shall monitor notify an enforcement agency when a speed violation is detected.	Planned
<i>Requirement:</i> 6 The field element shall return operational status for the vehicle speed sensors to the controlling traffic or maintenance center; including measured speeds, warning messages displayed, and violation records.	Existing
<i>Requirement:</i> 7 The field element shall return operational status for the vehicle speed sensors to the enforcement agency.	Planned
<i>Requirement:</i> 8 The field element shall return fault data for the vehicle speed sensors to the controlling center for repair.	Existing
<i>Functional Area: Roadway Infrastructure Monitoring</i>	
Sensors that monitor the condition of pavement, bridges, tunnels, associated hardware, and other transportation-related infrastructure (e.g., culverts), under maintenance center and maintenance vehicle control.	
<i>Requirement:</i> 1 The field element shall include infrastructure condition monitoring sensors that monitor the condition of pavement, bridges, tunnels, associated hardware, and other transportation-related infrastructure (e.g., culverts), under maintenance center control.	Potential
<i>Requirement:</i> 2 The field element shall include infrastructure condition monitoring sensors that monitor the condition of pavement, bridges, tunnels, associated hardware, and other transportation-related infrastructure (e.g., culverts), under maintenance vehicle control.	Potential
<i>Requirement:</i> 3 The field element shall provide operational status for the infrastructure condition monitoring sensors to the maintenance center.	Potential
<i>Requirement:</i> 4 The field element shall provide operational status for the infrastructure condition monitoring sensors to the maintenance vehicle.	Potential
<i>Requirement:</i> 5 The field element shall provide fault data for the infrastructure condition monitoring sensors to the maintenance center for repair.	Potential
<i>Functional Area: Roadway Work Zone Traffic Control</i>	
Field elements in maintenance and construction areas including CCTV cameras, driver information systems (such as DMS), and gates/barriers that monitor and control traffic and provide information directly to drivers in affected areas.	
<i>Requirement:</i> 1 The field element shall collect, process, and send work zone images to the center for further analysis and distribution, under center control.	Potential

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Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: LaPorte County Field Equipment</i>	
<i>Entity: Roadway</i>	
<i>Functional Area: Roadway Work Zone Traffic Control</i>	
Field elements in maintenance and construction areas including CCTV cameras, driver information systems (such as DMS), and gates/barriers that monitor and control traffic and provide information directly to drivers in affected areas.	
<i>Requirement:</i> 2 Under traffic and maintenance center control, the field element shall include driver information systems (such as dynamic messages signs and highway advisory radios) that advise drivers of activity around the work zone through which they are currently passing.	Existing
<i>Requirement:</i> 3 Under the control of field personnel within maintenance vehicles, the field element shall include driver information systems (such as dynamic messages signs and highway advisory radios) that advise drivers of activity around a work zone through which they are currently passing.	Existing
<i>Requirement:</i> 4 The field element shall control access to the work zone using automated gate or barrier systems. This includes automated flagger assistance devices that include automated gate arms and other automated gate/barrier systems.	Planned
<i>Requirement:</i> 5 The field element shall provide operational status for the surveillance (e.g. CCTV), driver information systems, and gates/barriers in work zones to the maintenance center.	Existing
<i>Requirement:</i> 6 The field element shall provide fault data for the surveillance (e.g. CCTV), driver information systems, and gates/barriers in work zones to the maintenance center for repair.	Existing
<i>Functional Area: Roadway Work Zone Safety</i>	
Work zone intrusion detection devices (to detect vehicle intrusion upon a work zone or crew worker movement across a work zone boundary) and intrusion alerting devices that provide alerts to crew and drivers.	
<i>Requirement:</i> 1 The field element shall include work zone intrusion detection devices that detect when a vehicle has intruded upon the boundary of a work zone, under center control.	Potential
<i>Requirement:</i> 2 The field element shall include work zone intrusion detection devices that detect when crew workers have crossed the boundary between the work zone and vehicle traffic, under center control.	Potential
<i>Requirement:</i> 3 The field element shall include work zone intrusion alerting devices that alert crew workers of a work zone emergency or safety issue such as the intrusion of a vehicle into the work zone area or movement of field crew into the travel lanes.	Potential
<i>Requirement:</i> 4 The field element shall include work zone intrusion alerting devices that notify crew via maintenance vehicles of a work zone emergency or safety issue such as the intrusion of a vehicle into the work zone area or movement of field crew into the travel lanes.	Potential
<i>Requirement:</i> 5 The field element shall include work zone intrusion alerting devices that alert drivers that they have intruded upon the perimeter of the work zone, or are about to do so; may provide alerts to drivers directly or via in-vehicle signing.	Potential

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Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: LaPorte County Field Equipment</i>	
<i>Entity: Roadway</i>	
<i>Functional Area: Roadway Work Zone Safety</i>	
Work zone intrusion detection devices (to detect vehicle intrusion upon a work zone or crew worker movement across a work zone boundary) and intrusion alerting devices that provide alerts to crew and drivers.	
<i>Requirement:</i>	6 The field element shall provide operational status for the work zone intrusion detection devices to the maintenance center. Potential
<i>Requirement:</i>	7 The field element shall provide fault data for the work zone intrusion detection devices to the maintenance center for repair. Potential
<i>Requirement:</i>	8 The field element shall provide operational status for the work zone intrusion alerting devices to the maintenance center. Potential
<i>Requirement:</i>	9 The field element shall provide fault data for the work zone intrusion alerting devices to the maintenance center for repair. Potential
<i>Functional Area: Roadway Data Collection</i>	
Field elements to collect traffic, road, and environmental conditions information for use in transportation planning, research, and other off-line applications. Includes the sensors, supporting roadside infrastructure, and communications equipment.	
<i>Requirement:</i>	1 The field element shall collect traffic, road, and environmental conditions information. Existing
<i>Requirement:</i>	2 The field element shall include the sensors and supporting roadside devices that sense, collect, and send traffic, road, and environmental conditions information to a center for archival. Existing
<i>Requirement:</i>	3 The field element shall collect sensor status and sensor faults from roadside equipment and send it along with the recorded data to a center for archival. Existing
<i>Element: LaPorte County Highway Department</i>	
<i>Entity: Traffic Management</i>	
<i>Functional Area: TMC Probe Information Collection</i>	
Collects, assimilates, and disseminates vehicle probe data collected from roadside beacons and centers controlling transit vehicles, emergency vehicles, toll collection points, and route-guided vehicles.	
<i>Requirement:</i>	1 The center shall collect traffic probe data from vehicles via roadside field equipment. Potential
<i>Requirement:</i>	2 The center shall collect road condition data from probe-equipped transit vehicles via transit management centers; the data may be aggregated and preliminarily processed at the sending center. Potential
<i>Requirement:</i>	3 The center shall collect traffic data from traveler information centers based on data from their subscriber vehicles; the data may be aggregated and initial link time calculations performed at the sending center. Potential
<i>Requirement:</i>	4 The center shall collect traffic data from toll administrative centers containing travel times between toll collection points for those vehicles equipped for electronic toll collection; the data may be aggregated and processed at the sending center. Potential
<i>Requirement:</i>	5 The center shall assimilate current and forecast traffic conditions based on collected probe data and distribute to other centers for dissemination to travelers. Potential

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> LaPorte County Highway Department	
<i>Entity:</i> Traffic Management	
<i>Functional Area:</i> TMC Probe Information Collection	
Collects, assimilates, and disseminates vehicle probe data collected from roadside beacons and centers controlling transit vehicles, emergency vehicles, toll collection points, and route-guided vehicles.	
<i>Requirement:</i>	
6 The center shall collect operational status for the roadside probe data collection equipment.	Potential
<i>Requirement:</i>	
7 The center shall collect fault data for the roadside probe data collection equipment for repair.	Potential
<i>Functional Area:</i> TMC Signal Control	
Remotely controls traffic signal controllers to implement traffic management strategies at signalized intersections based on traffic conditions, incidents, emergency vehicle preemptions, pedestrian crossings, etc.	
<i>Requirement:</i>	
1 The center shall remotely control traffic signal controllers.	Existing
<i>Requirement:</i>	
2 The center shall accept notifications of pedestrian calls.	Planned
<i>Requirement:</i>	
3 The center shall collect traffic signal controller operational status and compare against the control information sent by the center.	Existing
<i>Requirement:</i>	
4 The center shall collect traffic signal controller fault data from the field.	Existing
<i>Requirement:</i>	
5 The center shall manage (define, store and modify) control plans to coordinate signalized intersections, to be engaged at the direction of center personnel or according to a daily schedule.	Existing
<i>Requirement:</i>	
6 The center shall implement control plans to coordinate signalized intersections based on data from sensors.	Existing
<i>Requirement:</i>	
7 The center shall manage boundaries of the control sections used within the signal system.	Existing
<i>Requirement:</i>	
8 The center shall maintain traffic signal coordination including synchronizing clocks throughout the system.	Existing
<i>Functional Area:</i> TMC Regional Traffic Management	
Coordination between traffic management centers in order to share traffic information between centers as well as control of traffic management field equipment. This may be used during incidents and special events and during day-to-day operations.	
<i>Requirement:</i>	
1 The center shall exchange traffic information with other traffic management centers including incident information, congestion data, traffic data, signal timing plans, and real-time signal control information.	Planned
<i>Requirement:</i>	
2 The center shall exchange traffic control information with other traffic management centers to support remote monitoring and control of traffic management devices (e.g. signs, sensors, signals, cameras, etc.).	Planned
<i>Functional Area:</i> TMC Traffic Management Decision Support	
Recommends courses of action to the traffic operator based on current and forecast road and traffic conditions. Recommended actions may include predefined incident response plans, signal timing plan changes, DMS/HAR messages, lane control strategies, metering strategies, etc.	

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Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: LaPorte County Highway Department</i>	
<i>Entity: Traffic Management</i>	
<i>Functional Area: TMC Traffic Management Decision Support</i>	
Recommends courses of action to the traffic operator based on current and forecast road and traffic conditions. Recommended actions may include predefined incident response plans, signal timing plan changes, DMS/HAR messages, lane control strategies, metering strategies, etc.	
<i>Requirement:</i>	Planned
1 The center shall provide center personnel with an integrated regional view of current and forecast road and traffic conditions including traffic incidents, special events, maintenance activities and other events or conditions that impact capacity or demand.	
<i>Requirement:</i>	Planned
2 The center shall identify network imbalances and potential courses of action.	
<i>Requirement:</i>	Planned
3 The center shall compare the impact of potential courses of action and make recommendations to the operator.	
<i>Requirement:</i>	Planned
4 The recommended actions shall include predefined incident response plans, signal timing plan changes, DMS/HAR messages, lane control strategies and freeway control strategies including ramp metering, interchange metering, and mainline metering.	
<i>Requirement:</i>	Planned
5 The recommended actions shall include multimodal strategies that include suggested transit strategies and suggested route and mode choices for travelers.	
<i>Requirement:</i>	Planned
6 The center shall provide an interface to center personnel to input control parameters for the decision support process and receive recommended actions and supporting information presentation.	
<i>Functional Area: TMC Incident Dispatch Coordination/Communication</i>	
Formulates an incident response that takes into account the incident potential, incident impacts, and/or resources required for incident management. Facilitates the dispatch of emergency response and service vehicles and coordinates the response with cooperating agencies.	
<i>Requirement:</i>	Existing
1 The center shall 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.	
<i>Requirement:</i>	Existing
2 The center shall coordinate planning for incidents with emergency management centers - including pre-planning activities for disaster response, evacuation, and recovery operations.	
<i>Requirement:</i>	Planned
3 The center shall support requests from emergency management centers to remotely control sensor and surveillance equipment located in the field, provide special routing for emergency vehicles, and to provide responding emergency vehicles with signal preemption.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: LaPorte County Highway Department</i>	
<i>Entity: Traffic Management</i>	
<i>Functional Area: TMC Incident Dispatch Coordination/Communication</i>	
Formulates an incident response that takes into account the incident potential, incident impacts, and/or resources required for incident management. Facilitates the dispatch of emergency response and service vehicles and coordinates the response with cooperating agencies.	
<i>Requirement:</i> 4 The center shall exchange incident information with emergency management centers, maintenance and construction centers, transit centers, information service providers, and the media including description, location, traffic impact, status, expected duration, and response information.	Existing
<i>Requirement:</i> 5 The center shall 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.	Potential
<i>Requirement:</i> 6 The center shall 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.	Planned
<i>Requirement:</i> 7 The center shall provide road network conditions and traffic images to emergency management centers, maintenance and construction centers, and traveler information service providers.	Potential
<i>Requirement:</i> 8 The center shall monitor incident response performance and calculate incident response and clearance times.	Planned
<i>Requirement:</i> 9 The center shall 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.	Planned
<i>Requirement:</i> 10 The center shall coordinate information and controls with other traffic management centers.	Potential
<i>Requirement:</i> 11 The center shall receive inputs from emergency management and transit management centers to develop an overall status of the transportation system including emergency transit schedules in effect and current status and condition of the transportation infrastructure.	Planned
<i>Requirement:</i> 12 The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for traffic incident management.	Planned
<i>Functional Area: TMC Evacuation Support</i>	
Development, coordination, and execution of special traffic management strategies during evacuation and subsequent reentry of a population in the vicinity of a disaster or major emergency. Interfaces with emergency management and other traffic management centers.	
<i>Requirement:</i> 1 The center shall coordinate planning for evacuation with emergency management centers - including pre-planning activities such as establishing routes, areas to be evacuated, timing, etc.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: LaPorte County Highway Department</i>	
<i>Entity: Traffic Management</i>	
<i>Functional Area: TMC Evacuation Support</i>	
Development, coordination, and execution of special traffic management strategies during evacuation and subsequent reentry of a population in the vicinity of a disaster or major emergency. Interfaces with emergency management and other traffic management centers.	
<i>Requirement:</i>	Potential
2 The center shall 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.	
<i>Requirement:</i>	Potential
3 The center shall coordinate information and controls with other traffic management centers.	
<i>Requirement:</i>	Potential
4 The center shall 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.	
<i>Functional Area: TMC Traffic Network Performance Evaluation</i>	
Measures performance and predicts travel demand patterns to support traffic flow optimization, demand management, and incident management. Collects data from surveillance equipment as well as input from other management centers including emissions, event promoters, and other TMCs.	
<i>Requirement:</i>	Potential
1 The center shall monitor, analyze, and store traffic sensor data (speed, volume, occupancy) collected from field elements under remote control of the center to support overall network performance evaluations.	
<i>Requirement:</i>	Potential
2 The center shall collect wide-area pollution data from emissions management centers to support overall network performance evaluations.	
<i>Requirement:</i>	Planned
3 The center shall collect and store plans from event promoters for major future events possibly impacting traffic to support overall network performance evaluations.	
<i>Requirement:</i>	Planned
4 The center shall collect and store anticipated route information from information service providers to support overall network performance evaluations and predictions.	
<i>Requirement:</i>	Potential
5 The center shall exchange information with transit management centers including details current transit routes, the level of service on each route, and the progress of individual vehicles along their routes for use in forecasting demand and estimating current transportation network performance.	
<i>Requirement:</i>	Planned
6 The center shall exchange traffic information with other traffic management centers, including incidents, congestion data, traffic data, signal timing plans, and real-time signal control information to support overall network performance evaluations.	
<i>Requirement:</i>	Planned
7 The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for network performance evaluations.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: LaPorte County Highway Department</i>	
<i>Entity: Traffic Management</i>	
<i>Functional Area: TMC Traffic Network Performance Evaluation</i>	
Measures performance and predicts travel demand patterns to support traffic flow optimization, demand management, and incident management. Collects data from surveillance equipment as well as input from other management centers including emissions, event promoters, and other TMCs.	
<i>Requirement:</i>	Planned
8 The center shall provide an interface to the archive data repository to enable the operator to retrieve historical operating data for use in planning to predict future traffic patterns and conditions.	
<i>Requirement:</i>	Planned
9 This center shall use the collected information to measure overall current and forecast network performance and predict travel demand patterns.	
<i>Functional Area: HRI Traffic Management</i>	
Remotely monitor and control highway-rail intersection (HRI) equipment, includes standard speed active warning systems and high speed systems which provide additional information on approaching trains and detect and report on obstructions in the HRI.	
<i>Requirement:</i>	Planned
1 The center shall remotely control highway-rail intersection (HRI) equipment located in the field.	
<i>Requirement:</i>	Planned
2 The center shall accept collect highway-rail intersection (HRI) advisory or alert data from rail operations centers.	
<i>Requirement:</i>	Planned
3 The center shall collect highway-rail intersection (HRI) equipment operational status and compare against the control information sent by the center.	
<i>Requirement:</i>	Planned
4 The center shall provide the highway-rail intersection (HRI) equipment operational status to rail operations centers.	
<i>Requirement:</i>	Planned
5 The center shall collect incident information related to a highway-rail intersection (HRI), such as intersection blockages or crashes or equipment malfunctions.	
<i>Requirement:</i>	Planned
6 The center shall implement control plans to coordinate signalized intersections around highway-rail intersections (HRI), under control of center personnel, based on data from sensors and surveillance monitoring traffic conditions, incidents, equipment faults, pedestrian crossings, etc.	
<i>Functional Area: Rail Operations Coordination</i>	
Coordination between rail operations and traffic management centers - exchanging train schedules, maintenance schedules, as well as incidents and priority messages that impact highway-rail intersections (HRIs). Supports advanced traffic control strategies and enhanced traveler information.	
<i>Requirement:</i>	Planned
1 The center shall exchange highway-rail intersection (HRI) information with rail operations centers. This information may include event schedules, requests for information from the Rail Operators, incident notification based on rail operations messages, and priority messages like notifications of a HAZMAT spill, equipment failure, or an intersection blockage.	
<i>Requirement:</i>	Planned
2 The center shall receive highway-rail intersection (HRI) maintenance schedules, train schedules, and incident notifications from rail operations centers.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> LaPorte County Highway Department	
<i>Entity:</i> Traffic Management	
<i>Functional Area:</i> Rail Operations Coordination	
Coordination between rail operations and traffic management centers - exchanging train schedules, maintenance schedules, as well as incidents and priority messages that impact highway-rail intersections (HRIs). Supports advanced traffic control strategies and enhanced traveler information.	
<i>Requirement:</i>	Planned
3 The center shall use the rail operations information to develop forecast HRI closure times and durations which may be applied in advanced traffic control strategies or delivered as enhanced traveler information.	
<i>Functional Area:</i> TMC Speed Monitoring and Warning	
Remotely monitors vehicle speeds, and informs an enforcement agency if excessive speeds are detected. Also configures and controls speed warning systems that provide safe speed advisories to the motorist.	
<i>Requirement:</i>	Existing
1 The center shall remotely control vehicle speed sensors typically placed in work zones; control parameters may include environmental and traffic conditions.	
<i>Requirement:</i>	Existing
2 The center shall collect operational status for the vehicle speed sensors; the status shall include logged information including measured speeds, warning messages displayed, and violation records.	
<i>Requirement:</i>	Existing
3 The center shall provide the capability to notify an enforcement agency when vehicle speeds in the work zone are in excess of the posted speed limit or are creating an unsafe condition based upon the current environmental or traffic conditions.	
<i>Requirement:</i>	Existing
4 The center shall collect fault data for the vehicle speed sensors for repair.	
<i>Functional Area:</i> TMC Multimodal Crossing Management	
Remotely monitors and manages multimodal crossings, such as draw bridges and other crossings between highway traffic and other modes; does not include highway-rail intersection.	
<i>Requirement:</i>	Planned
1 The center shall receive requests from non-highway traffic to cross at multimodal crossings for specified durations (such as draw bridges and miscellaneous other interference crossings between highway traffic and other modes such as river traffic, aircraft, etc.)	
<i>Requirement:</i>	Planned
2 The center shall remotely control traffic signal controllers for use at major multimodal crossings.	
<i>Requirement:</i>	Potential
3 The center shall remotely control driver information systems (such as dynamic messages signs, highway advisory radios (HAR), and equipment that controls warning lights and gates) to notify drivers of closure durations and times at multimodal crossings.	
<i>Requirement:</i>	Planned
4 The center shall collect operational status for the equipment at multimodal crossings.	
<i>Requirement:</i>	Planned
5 The center shall collect fault data for the equipment at multimodal crossings for repair.	
<i>Requirement:</i>	Planned
6 The center shall receive and respond to requests for right-of-way at multimodal crossings.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: LaPorte County Highway Department</i>	
<i>Entity: Traffic Management</i>	
<i>Functional Area: TMC Multimodal Crossing Management</i>	
Remotely monitors and manages multimodal crossings, such as draw bridges and other crossings between highway traffic and other modes; does not include highway-rail intersection.	
<i>Requirement:</i> 7 The center shall collect and analyze the planned multimodal crossing closures as a possible incident.	Planned
<i>Requirement:</i> 8 The center shall distribute multimodal crossing information to other centers for dissemination to travelers.	Planned
<i>Functional Area: Barrier System Management</i>	
Remotely controls barrier systems such as gates and other systems that manage entry to roadways, transportation facilities and infrastructure.	
<i>Requirement:</i> 1 The center shall remotely control barrier systems for transportation facilities and infrastructure. Barrier systems include automated or remotely controlled gates, barriers and other systems that manage entry to roadways.	Potential
<i>Requirement:</i> 2 The center shall collect barrier system operational status.	Potential
<i>Requirement:</i> 3 The center shall collect barrier system fault data and send to the maintenance center for repair.	Potential
<i>Requirement:</i> 4 The center shall accept requests for barrier system activation from other centers and from center personnel to support emergency response and detours.	Potential
<i>Functional Area: Traffic Equipment Maintenance</i>	
Monitoring and remote diagnostics of field equipment - detect failures, issue problem reports, and track the repair or replacement of the failed equipment.	
<i>Requirement:</i> 1 The center shall collect and store sensor (traffic, pedestrian, multimodal crossing) operational status.	Existing
<i>Requirement:</i> 3 The center shall collect and store sensor (traffic, pedestrian, multimodal crossing) fault data and send to the maintenance center for repair.	Potential
<i>Requirement:</i> 5 The center shall collect environmental sensor operational status.	Existing
<i>Requirement:</i> 6 The center shall collect environmental sensor equipment fault data and send to the maintenance center for repair.	Existing
<i>Requirement:</i> 7 The center shall exchange data with maintenance centers concerning the reporting of faulty equipment and the schedule/status of their repair. Information exchanged includes details of new equipment faults, and clearances when the faults are cleared.	Existing
<i>Requirement:</i> 8 The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for traffic maintenance data.	Planned
<i>Functional Area: TMC Demand Management Coordination</i>	
Provides the capability to gather information on regional toll, parking, and transit usage and request changes to enable dynamic pricing for demand management.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> LaPorte County Highway Department	
<i>Entity:</i> Traffic Management	
<i>Functional Area:</i> TMC Demand Management Coordination	
Provides the capability to gather information on regional toll, parking, and transit usage and request changes to enable dynamic pricing for demand management.	
<i>Requirement:</i>	Planned
1 The center shall collect and store toll pricing data from toll administration centers, including the price for each road segment to which a toll applies, with the time and date for when it applies.	
<i>Requirement:</i>	Planned
2 The center shall collect and store parking information from parking management providers including lot locations, features (e.g. ability to handle oversized vehicles), capacity, type, hours of operation and rates.	
<i>Requirement:</i>	Planned
3 The center shall collect and store transit fare and schedule information from transit management centers.	
<i>Requirement:</i>	Planned
4 The center shall collect and store current transit, parking, and toll fee schedule information provided by regional traveler information systems.	
<i>Requirement:</i>	Planned
5 The center shall send requests to toll administration centers to change pricing, modify restrictions, or modify operations of a toll road facility.	
<i>Requirement:</i>	Planned
6 The center shall send requests to parking management providers to change the current parking lot charging structure.	
<i>Requirement:</i>	Planned
7 The center shall send requests to transit management centers to change the current transit services - schedules or fares of the transit services including park-and-ride lots.	
<i>Functional Area:</i> Traffic Data Collection	
Collection and storage of traffic management data. For use by operations personnel or data archives in the region.	
<i>Requirement:</i>	Existing
1 The center shall collect traffic management data such as operational data, event logs, etc.	
<i>Requirement:</i>	Existing
2 The center shall assign quality control metrics and meta-data to be stored along with the data. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.	
<i>Requirement:</i>	Planned
3 The center shall receive and respond to requests from ITS Archives for either a catalog of the traffic data or for the data itself.	
<i>Requirement:</i>	Planned
4 The center shall be able to produce sample products of the data available.	
<i>Functional Area:</i> TMC Transportation Operations Data Collection	
Collects real-time information on the state of the regional transportation system for operational use by the center. It establishes communications with a regional repository, requests or subscribes to information relevant to the center, and distributes the received information for use.	
<i>Requirement:</i>	Existing
1 The center shall collect real-time information on the state of the regional transportation system including current traffic and road conditions, weather conditions, special event and incident information.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: LaPorte County Highway Department</i>	
<i>Entity: Traffic Management</i>	
<i>Functional Area: TMC Transportation Operations Data Collection</i>	
Collects real-time information on the state of the regional transportation system for operational use by the center. It establishes communications with a regional repository, requests or subscribes to information relevant to the center, and distributes the received information for use.	
<i>Requirement:</i>	Existing
2 The center shall support the capability for the system operator to monitor and control the information collection service.	
<i>Element: LaPorte County Maintenance and Construction Management System</i>	
<i>Entity: Maintenance and Construction Management</i>	
<i>Functional Area: MCM Vehicle Tracking</i>	
Remotely tracks the location of maintenance and construction vehicles and other equipment; presented to the center personnel.	
<i>Requirement:</i>	Planned
1 The center shall monitor the locations of all maintenance and construction vehicles and other equipment under its jurisdiction.	
<i>Requirement:</i>	Planned
2 The center shall present location data to center personnel for the fleet of maintenance and construction vehicles and other equipment.	
<i>Requirement:</i>	Planned
3 The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for maintenance and construction vehicle tracking.	
<i>Functional Area: MCM Vehicle and Equipment Maintenance Management</i>	
Monitors vehicle and equipment condition, tracks maintenance history, and schedules routine and corrective maintenance.	
<i>Requirement:</i>	Existing
1 The center shall collect and analyze vehicle diagnostics information from maintenance and construction vehicles. The information includes engine temperature, mileage, tire wear, brake wear, belt wear, and any warnings or alarms concerning the operational condition of the vehicle and ancillary equipment.	
<i>Requirement:</i>	Existing
2 The center shall exchange information with equipment repair facilities including status and history of repairs concerning maintenance and construction vehicles. This information includes vehicle status and diagnostic information, vehicle utilization, and coordination of when vehicles will be available for preventative and corrective maintenance.	
<i>Requirement:</i>	Existing
3 The center shall schedule preventive and corrective vehicle maintenance with the equipment repair facility based on fleet health reports, maintenance records, vehicle utilization and vehicle availability schedules.	
<i>Functional Area: MCM Incident Management</i>	
Supports coordinated response to incidents - share incident notifications, manage incident response resources, and coordinate overall incident situation and response among allied response organizations.	
<i>Requirement:</i>	Existing
1 The center shall 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.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: LaPorte County Maintenance and Construction Management System</i>	
<i>Entity: Maintenance and Construction Management</i>	
<i>Functional Area: MCM Incident Management</i>	
Supports coordinated response to incidents - share incident notifications, manage incident response resources, and coordinate overall incident situation and response among allied response organizations.	
<i>Requirement:</i>	
2 The center shall 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.	Existing
<i>Requirement:</i>	
3 The center shall 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.	Existing
<i>Requirement:</i>	
4 The center shall coordinate planning for incidents with emergency management centers - including pre-planning activities for disaster response, evacuation, and recovery operations.	Existing
<i>Requirement:</i>	
5 The center shall 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.	Existing
<i>Requirement:</i>	
6 The center shall exchange road network status assessment information with emergency management and traffic management 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.	Existing
<i>Requirement:</i>	
7 The center shall 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.	Existing
<i>Requirement:</i>	
8 The center shall receive information indicating the damage sustained by transportation assets, derived from aerial surveillance, field reports, inspections, tests, and analyses to support incident management.	Existing
<i>Functional Area: MCM Maintenance Decision Support</i>	
Maintenance Decision Support Systems recommend courses of action based on current and forecast environmental and road conditions (filtered and fused for specific time horizons) and additional application specific information. Recommendations and dispatch instructions are generated based on this integrated information.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> LaPorte County Maintenance and Construction Management System	
<i>Entity:</i> Maintenance and Construction Management	
<i>Functional Area:</i> MCM Maintenance Decision Support	
Maintenance Decision Support Systems recommend courses of action based on current and forecast environmental and road conditions (filtered and fused for specific time horizons) and additional application specific information. Recommendations and dispatch instructions are generated based on this integrated information.	
<i>Requirement:</i>	Existing
1 The center shall provide the center personnel with tailored external information, including weather or road condition observations, forecasted weather information or road conditions, current usage of treatments and materials, available resources, equipment and vehicle availability, road network information, and source reliability information.	
<i>Requirement:</i>	Existing
2 The center shall tailor the decision support information to include filtering (selection from a large amount of external information), error reduction ('smoothing' the information), fusion (combination of disparate information to match the decision needs), and analysis (creating the decision).	
<i>Requirement:</i>	Existing
3 The center shall provide an interface to the center personnel to input control parameters for the decision support process and receive decisions or information presentation.	
<i>Requirement:</i>	Existing
4 The center shall provide dispatch information to maintenance and construction vehicles based on the outputs of the decision support system, including recommended roadway treatment actions.	
<i>Functional Area:</i> MCM Winter Maintenance Management	
Manages winter road maintenance, tracking and controlling snow plow operations, roadway treatment (e.g., salt spraying and other material applications) based on weather information.	
<i>Requirement:</i>	Existing
1 The center shall respond to requests from emergency management and traffic management centers for hazard removal, field equipment repair, and other winter roadway maintenance.	
<i>Requirement:</i>	Existing
2 The center shall exchange information with administrative systems to support the planning and scheduling of winter maintenance activities. This information includes: equipment and consumables resupply purchase request status, personnel qualifications including training and special certifications, environmental regulations and rules that may impact maintenance activities, and requests and project requirements from contract administration.	
<i>Requirement:</i>	Existing
3 The center shall 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.	
<i>Requirement:</i>	Existing
4 The center shall receive equipment availability and materials storage status information from storage facilities to support the scheduling of winter maintenance activities.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> LaPorte County Maintenance and Construction Management System	
<i>Entity:</i> Maintenance and Construction Management	
<i>Functional Area:</i> MCM Winter Maintenance Management	
Manages winter road maintenance, tracking and controlling snow plow operations, roadway treatment (e.g., salt spraying and other material applications) based on weather information.	
<i>Requirement:</i>	
5 The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for the scheduling of winter maintenance activities.	Planned
<i>Requirement:</i>	
6 The center shall collect real-time information on the state of the regional transportation system from other centers including current traffic and road conditions, weather conditions, special event and incident information and use the collected information to support winter maintenance operations.	Existing
<i>Requirement:</i>	
7 The center shall dispatch and route winter maintenance vehicle drivers and support them with route- specific environmental, incident, advisory, threat, alert, and traffic congestion information.	Existing
<i>Requirement:</i>	
8 The center shall 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.	Existing
<i>Requirement:</i>	
9 The center shall 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.	Existing
<i>Requirement:</i>	
10 The center shall support remote control of on-board maintenance and construction vehicle systems and field equipment that is remotely controlled by the vehicle such as adjusting material application rates and spread patterns.	Planned
<i>Requirement:</i>	
11 The center shall assess the current status of all winter maintenance activities, including actual work activities performed, current locations and operational conditions of vehicles, materials and equipment inventories, field equipment status, environmental information, etc.	Existing
<i>Functional Area:</i> MCM Roadway Maintenance and Construction	
Overall management and support for routine maintenance on the roadway or right-of-way. Includes landscape maintenance, hazard removal (roadway debris, dead animals), routine maintenance activities (roadway cleaning, grass cutting), and repair and maintenance of both ITS and non-ITS equipment.	
<i>Requirement:</i>	
1 The center shall maintain an interface with asset management systems to track the inventory, restrictions, repair needs and status updates of transportation assets (pavement, bridges, signs, etc.) including location, installation and materials information, vendor/contractor, current maintenance status, standard height, width, and weight restrictions.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: LaPorte County Maintenance and Construction Management System</i>	
<i>Entity: Maintenance and Construction Management</i>	
<i>Functional Area: MCM Roadway Maintenance and Construction</i>	
Overall management and support for routine maintenance on the roadway or right-of-way. Includes landscape maintenance, hazard removal (roadway debris, dead animals), routine maintenance activities (roadway cleaning, grass cutting), and repair and maintenance of both ITS and non-ITS equipment.	
<i>Requirement:</i>	
2 The center shall respond to requests from emergency management and traffic management centers for hazard removal, field equipment repair, and other roadway maintenance.	Existing
<i>Requirement:</i>	
3 The center shall exchange information with administrative systems to support the planning and scheduling of maintenance activities. This information includes: equipment and consumables resupply purchase request status, personnel qualifications including training and special certifications, environmental regulations and rules that may impact maintenance activities, and requests and project requirements from contract administration.	Existing
<i>Requirement:</i>	
4 The center shall provide emergency management and traffic management centers with information about scheduled maintenance and construction work activities including anticipated closures and impact to the roadway, alternate routes, anticipated delays, closure times, and durations.	Existing
<i>Requirement:</i>	
5 The center shall collect the status and fault data from roadside equipment, such as traffic, infrastructure, and environmental sensors, highway advisory radio and dynamic message signs, automated roadway treatment systems, barrier and safeguard systems, cameras, traffic signals and override equipment, ramp meters, short range communications equipment, security sensors and surveillance equipment, etc., and provide a cohesive view of equipment repair needs.	Potential
<i>Requirement:</i>	
6 The center shall collect the status and fault data from the centers that operate the equipment, including data for traffic, infrastructure, and environmental sensors, highway advisory radio and dynamic message signs, automated roadway treatment systems, barrier and safeguard systems, cameras, traffic signals and override equipment, ramp meters, short range communications equipment, security sensors and surveillance equipment, etc., and provide a cohesive view of equipment repair needs.	Potential
<i>Requirement:</i>	
7 The center shall receive equipment availability and materials storage status information from storage facilities to support the scheduling of roadway maintenance and construction activities.	Existing
<i>Requirement:</i>	
8 The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for the scheduling of roadway maintenance and construction activities.	Planned
<i>Requirement:</i>	
9 The center shall collect current and forecast traffic and weather information from traffic management centers and weather service providers (such as the National Weather Service and value-added sector specific meteorological services).	Existing

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Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> LaPorte County Maintenance and Construction Management System	
<i>Entity:</i> Maintenance and Construction Management	
<i>Functional Area:</i> MCM Roadway Maintenance and Construction	
Overall management and support for routine maintenance on the roadway or right-of-way. Includes landscape maintenance, hazard removal (roadway debris, dead animals), routine maintenance activities (roadway cleaning, grass cutting), and repair and maintenance of both ITS and non-ITS equipment.	
<i>Requirement:</i>	
10 The center shall dispatch and route maintenance and construction vehicle drivers and support them with route-specific environmental, incident, advisory, threat, alert, and traffic congestion information.	Existing
<i>Requirement:</i>	
11 The center shall manage an interface with center personnel to accept vehicle systems control information and remotely control maintenance and construction vehicle on-board equipment.	Planned
<i>Requirement:</i>	
12 The center shall track the status of roadway maintenance and construction activities by monitoring collected data from the dispatched vehicles and equipment.	Planned
<i>Requirement:</i>	
13 The center shall report the status of field equipment maintenance activities to the centers that operate the equipment.	Existing
<i>Functional Area:</i> MCM Work Zone Management	
Remotely monitors and supports work zone activities, controlling traffic through dynamic message signs (DMS), highway advisory radio, gates and barriers, and informing other groups of activity (e.g., traveler information systems, traffic management centers, other maintenance and construction centers).	
<i>Requirement:</i>	
1 The center shall generate new work zone activity schedules for use by maintenance and construction vehicles, maintenance and construction operators, and for information coordination purposes.	Existing
<i>Requirement:</i>	
2 The center shall control the collection of work zone status information including video images from cameras located in or near the work zone.	Existing
<i>Requirement:</i>	
3 The center shall disseminate work zone information to other agencies and centers including traffic, transit, emergency management centers, other maintenance centers, traveler information providers, and the media.	Existing
<i>Requirement:</i>	
4 The center shall control traffic in work zones by providing remote control of dynamic message signs, highway advisory radio systems, gates, and barriers located in or near the work zone.	Potential
<i>Requirement:</i>	
5 The center shall exchange information with administrative systems to support the planning and scheduling of work zone activities. This information includes: equipment and consumables resupply purchase request status, personnel qualifications including training and special certifications, environmental regulations and rules that may impact maintenance activities, and requests and project requirements from contract administration.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> LaPorte County Maintenance and Construction Management System	
<i>Entity:</i> Maintenance and Construction Management	
<i>Functional Area:</i> MCM Work Zone Management	
Remotely monitors and supports work zone activities, controlling traffic through dynamic message signs (DMS), highway advisory radio, gates and barriers, and informing other groups of activity (e.g., traveler information systems, traffic management centers, other maintenance and construction centers).	
<i>Requirement:</i> 6	The center shall collect real-time information on the state of the road network including current traffic and road conditions to support work zone scheduling and management. Existing
<i>Functional Area:</i> MCM Speed Monitoring and Warning	
Remotely monitors vehicle speeds, and informs an enforcement agency if excessive speeds are detected; primarily used in work zones.	
<i>Requirement:</i> 1	The center shall remotely control vehicle speed sensors typically placed in work zones; control parameters may include environmental and traffic conditions. Existing
<i>Requirement:</i> 2	The center shall collect operational status for the vehicle speed sensors; the status shall include logged information including measured speeds, warning messages displayed, and violation records. Planned
<i>Requirement:</i> 3	The center shall provide the capability to notify an enforcement agency when vehicle speeds in the work zone are in excess of the posted speed limit or are creating an unsafe condition based upon the current environmental or traffic conditions. Existing
<i>Requirement:</i> 4	The center shall collect fault data for the vehicle speed sensors for repair. Existing
<i>Functional Area:</i> MCM Work Zone Safety Management	
Remotely monitors work zone safety systems that detect vehicle intrusions in work zones and warns crew workers and drivers of imminent encroachment. Crew movements are also monitored so that the crew can be warned of movement beyond the designated safe zone.	
<i>Requirement:</i> 1	The center shall provide remote monitoring and control of work zone safety devices - including intrusion detection devices that have been installed in work zones or maintenance areas. Potential
<i>Requirement:</i> 2	The center shall provide remote monitoring and control of intrusion alert devices that have been installed in work zones or maintenance areas. Potential
<i>Requirement:</i> 3	The center shall collect status information of work zone safety device status from field equipment or the maintenance and construction vehicles. Potential
<i>Requirement:</i> 4	The center shall collect and store work zone data collected from work zone monitoring devices (such as intrusion detection or alert devices and speed monitoring devices) on-board the vehicle and at the roadside. Potential
<i>Functional Area:</i> MCM Work Activity Coordination	
Disseminates work activity schedules and current asset restrictions to other agencies. Work schedules are coordinated, factoring in the needs and activities of other agencies and adjacent jurisdictions.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: LaPorte County Maintenance and Construction Management System</i>	
<i>Entity: Maintenance and Construction Management</i>	
<i>Functional Area: MCM Work Activity Coordination</i>	
Disseminates work activity schedules and current asset restrictions to other agencies. Work schedules are coordinated, factoring in the needs and activities of other agencies and adjacent jurisdictions.	
<i>Requirement:</i>	
1 The center shall 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.	Planned
<i>Requirement:</i>	
2 The center shall 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.	Planned
<i>Requirement:</i>	
3 The center shall collect and respond to feedback concerning scheduled maintenance and construction activities with other management centers such as traffic, emergency, transit, and rail operations.	Planned
<i>Requirement:</i>	
4 The center shall collect and disseminate asset restriction information levied on transportation asset usage based on infrastructure design, surveys, tests, or analyses. This includes standard facility design height, width, and weight restrictions, special restrictions such as spring weight restrictions, and temporary facility restrictions that are imposed during maintenance and construction.	Planned
<i>Requirement:</i>	
5 The center shall exchange information with administrative systems to support the planning and scheduling of maintenance and construction activities. This information includes: equipment and consumables resupply purchase request status, personnel qualifications including training and special certifications, environmental regulations and rules that may impact maintenance activities, and requests and project requirements from contract administration.	Existing
<i>Requirement:</i>	
6 The center shall exchange rail schedules and work plans with rail operations centers.	Planned
<i>Functional Area: MCM Infrastructure Monitoring</i>	
Remotely monitors the condition of pavement, bridges, tunnels, associated hardware, and other transportation-related infrastructure (e.g., culverts) using vehicle-based and roadway-based infrastructure monitoring sensors.	
<i>Requirement:</i>	
1 The center shall remotely control and collect data from fixed infrastructure monitoring sensors that monitor vibration, stress, temperature, surface continuity, and other condition measures.	Planned
<i>Requirement:</i>	
2 The center shall monitor maintenance vehicle-based mobile sensors and data logging devices that collect information on current infrastructure condition.	Planned

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> LaPorte County Maintenance and Construction Management System	
<i>Entity:</i> Maintenance and Construction Management	
<i>Functional Area:</i> MCM Infrastructure Monitoring	
Remotely monitors the condition of pavement, bridges, tunnels, associated hardware, and other transportation-related infrastructure (e.g., culverts) using vehicle-based and roadway-based infrastructure monitoring sensors.	
<i>Requirement:</i>	
3 The center shall remotely collect data from vehicle probes using short range communications equipment and process this data to identify potential pavement degradation, potholes, and other rough or adverse road surface conditions.	Planned
<i>Requirement:</i>	
4 The center shall process the collected information and use it to monitor the condition of pavement, bridges, tunnels, associated hardware, and other transportation-related infrastructure.	Planned
<i>Requirement:</i>	
5 The center shall collect current maintenance and repair needs from the asset management system and correlate this data with data collected through infrastructure monitoring systems.	Planned
<i>Requirement:</i>	
6 The center shall provide current infrastructure conditions information to the asset management system.	Planned
<i>Requirement:</i>	
7 The center shall report infrastructure repair needs to the maintenance management system.	Planned
<i>Functional Area:</i> MCM Data Collection	
Collection and storage of maintenance and construction information. For use by operations personnel or data archives in the region.	
<i>Requirement:</i>	
1 The center shall collect maintenance and construction data (such as field equipment status, infrastructure status, maintenance and construction activity data) gathered from roadway, traffic, and other maintenance and construction sources.	Existing
<i>Requirement:</i>	
2 The center shall assign quality control metrics and meta-data to be stored along with the data. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.	Planned
<i>Requirement:</i>	
3 The center shall receive and respond to requests from ITS Archives for either a catalog of the maintenance and construction data or for the data itself.	Planned
<i>Requirement:</i>	
4 The center shall be able to produce sample products of the data available.	Planned
<i>Requirement:</i>	
5 The center shall provide data to Asset Management to be used in updating the status of assets in the inventory.	Existing
<i>Functional Area:</i> MCM Transportation Operations Data Collection	
Collects real-time information on the state of the regional transportation system for operational use by the center. It establishes communications with a regional repository, requests or subscribes to information relevant to the center, and distributes the received information for use.	
<i>Requirement:</i>	
1 The center shall collect real-time information on the state of the regional transportation system including current traffic and road conditions, weather conditions, special event and incident information.	Existing
<i>Requirement:</i>	
2 The center shall support the capability for the system operator to monitor and control the information collection service.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> LaPorte County Maintenance and Construction Vehicles	
<i>Entity:</i> Maintenance and Construction Vehicle	
<i>Functional Area:</i> MCV Vehicle Location Tracking	
On-board systems to track vehicle location and reports the position and timestamp information to the dispatch center.	
<i>Requirement:</i>	Planned
1 The maintenance and construction vehicle shall track its current location.	
<i>Requirement:</i>	Planned
2 The maintenance and construction vehicle shall send the time stamped vehicle location to the controlling center.	
<i>Functional Area:</i> MCV Vehicle System Monitoring and Diagnostics	
On-board sensors capable of monitoring the condition of each of the vehicle systems and diagnostics that can be used to support vehicle maintenance.	
<i>Requirement:</i>	Existing
1 The maintenance and construction vehicle shall collect vehicle diagnostics and operating status data from the maintenance vehicle platform including engine temperature, mileage, tire wear, brake wear, belt wear, and other operational status measures as well as the status of maintenance and construction-specific systems on the vehicle.	
<i>Requirement:</i>	Existing
2 The maintenance and construction vehicle shall use the diagnostic and status information to support scheduling vehicle maintenance, monitoring safety status, and informing the vehicle operator of the conditions.	
<i>Requirement:</i>	Existing
3 The maintenance and construction vehicle shall the vehicle diagnostic and safety information to an equipment repair facility.	
<i>Requirement:</i>	Existing
4 The maintenance and construction vehicle shall send the vehicle diagnostic and safety information to the controlling maintenance center.	
<i>Functional Area:</i> MCV Barrier System Control	
Control automatic or remotely controlled gates and other barrier systems from a maintenance and construction vehicle.	
<i>Requirement:</i>	Potential
1 The vehicle shall remotely control barrier systems. Barrier systems include automated or remotely controlled gates, barriers and other systems that manage entry to roadways.	
<i>Requirement:</i>	Potential
2 The vehicle shall collect barrier system operational status.	
<i>Requirement:</i>	Potential
3 The vehicle shall collect barrier system fault data.	
<i>Functional Area:</i> MCV Winter Maintenance	
On-board systems that support snow plow operations and other roadway treatments (e.g., salt spraying and other material applications). Supports information sharing between snow plows.	
<i>Requirement:</i>	Planned
1 The maintenance and construction vehicle shall track the location and status of safety systems on-board the vehicle.	
<i>Requirement:</i>	Planned
2 The maintenance and construction vehicle shall respond to control information from the center to allow remote operation of the on-board vehicle systems. These systems include winter maintenance equipment for plowing, treating, and anti-icing.	
<i>Requirement:</i>	Existing
3 The maintenance and construction vehicle shall monitor materials information including remaining quantity and current application rate of materials on the vehicle.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: LaPorte County Maintenance and Construction Vehicles</i>	
<i>Entity: Maintenance and Construction Vehicle</i>	
<i>Functional Area: MCV Winter Maintenance</i>	
On-board systems that support snow plow operations and other roadway treatments (e.g., salt spraying and other material applications). Supports information sharing between snow plows.	
<i>Requirement:</i>	
4 The maintenance and construction vehicle shall respond to dispatch information from the center, presented to the vehicle operator for acknowledgement and returning status.	Existing
<i>Requirement:</i>	
5 The maintenance and construction vehicle shall send operational data to the center including the operational state of the maintenance equipment (e.g., blade up/down, spreader pattern), types and quantities of materials used for construction and maintenance activities, and a record of the actual work performed.	Existing
<i>Requirement:</i>	
6 The maintenance and construction vehicle shall exchange operational and environmental data with other maintenance and construction vehicles. Operational data includes operational state of the maintenance equipment (e.g., blade up/down, spreader pattern, equipment configuration) and a record of the actual work performed while the environmental data includes environmental sensor data collected on-board a maintenance and construction vehicle, either raw or processed data.	Existing
<i>Functional Area: MCV Roadway Maintenance and Construction</i>	
On-board systems that support routine non-winter maintenance on the roadway or right-of-way. Includes landscape maintenance, hazard removal (roadway debris, dead animals), routine maintenance activities (roadway cleaning, grass cutting), and repair and maintenance of equipment on the roadway.	
<i>Requirement:</i>	
1 The maintenance and construction vehicle shall track the location and status of safety systems on-board the vehicle.	Planned
<i>Requirement:</i>	
2 The maintenance and construction vehicle shall respond to control information from the center to allow remote operation of the on-board vehicle systems. These systems include routine maintenance equipment for cutting, repairs, hazard removal, etc.	Planned
<i>Requirement:</i>	
3 The maintenance and construction vehicle shall monitor materials information including remaining quantity and current application rate of materials on the vehicle.	Existing
<i>Requirement:</i>	
4 The maintenance and construction vehicle shall respond to dispatch information from the center, presented to the vehicle operator for acknowledgement and returning status.	Existing
<i>Requirement:</i>	
5 The maintenance and construction vehicle shall send operational data to the center including the operational state of the maintenance equipment (e.g., blade up/down, spreader pattern), types and quantities of materials used for construction and maintenance activities, and a record of the actual work performed.	Existing
<i>Functional Area: MCV Infrastructure Monitoring</i>	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: LaPorte County Maintenance and Construction Vehicles</i>	
<i>Entity: Maintenance and Construction Vehicle</i>	
<i>Functional Area: MCV Infrastructure Monitoring</i>	
On-board systems to monitor the condition of pavement, bridges, tunnels, associated hardware, and other transportation-related infrastructure (e.g., culverts). Includes vehicle-based sensors and communications with roadway-based infrastructure monitoring sensors.	
<i>Requirement:</i>	Planned
1 The maintenance and construction vehicle shall collect infrastructure data from on-board sensors relating to the physical characteristics of the roadway infrastructure, including pavement, bridges, culverts, signs, etc.	
<i>Requirement:</i>	Planned
2 The maintenance and construction vehicle shall collect infrastructure data from sensors located along the roadway relating to the physical characteristics of the roadway infrastructure, including pavement, bridges, culverts, signs, etc.	
<i>Requirement:</i>	Planned
3 The maintenance and construction vehicle shall provide control signals to infrastructure monitoring sensors located at the roadway.	
<i>Requirement:</i>	Planned
4 The maintenance and construction vehicle shall send current condition of pavement, bridges, culverts, signs, and other roadway infrastructure as measured by on-board sensors or read from infrastructure-based sensors to the center. The data may include raw data or images (e.g., photo logs) that indicate the current status of the infrastructure.	
<i>Requirement:</i>	Planned
5 The maintenance and construction vehicle shall respond to control information from the center to allow remote operation of the on-board vehicle systems.	
<i>Requirement:</i>	Planned
6 The maintenance and construction vehicle shall provide infrastructure sensor equipment operational status to the center.	
<i>Functional Area: MCV Work Zone Support</i>	
On-board systems that provide communications and support for local management of a work zone.	
<i>Requirement:</i>	Existing
1 The maintenance and construction vehicle shall monitor, operate, and control work zone devices located at or alongside the roadway. The devices operated on board the vehicle include driver information devices (e.g. dynamic message signs) and work zone intrusion detection and alert devices.	
<i>Requirement:</i>	Existing
2 The maintenance and construction vehicle shall provide an interface for field personnel to input status of their work zone activities.	
<i>Requirement:</i>	Existing
3 The maintenance and construction vehicle shall collect inputs from field personnel and from work zone devices on-board the maintenance and construction vehicle and send them to the controlling center.	
<i>Functional Area: MCV Vehicle Safety Monitoring</i>	
On-board systems to detect vehicle intrusions and warn crew workers and drivers of imminent encroachment. Crew movements are monitored so that the crew can be warned of movement beyond the designated safe zone. Used for stationary work zones or in mobile applications where a safe zone is maintained around the moving vehicle.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: LaPorte County Maintenance and Construction Vehicles</i>	
<i>Entity: Maintenance and Construction Vehicle</i>	
<i>Functional Area: MCV Vehicle Safety Monitoring</i>	
On-board systems to detect vehicle intrusions and warn crew workers and drivers of imminent encroachment. Crew movements are monitored so that the crew can be warned of movement beyond the designated safe zone. Used for stationary work zones or in mobile applications where a safe zone is maintained around the moving vehicle.	
<i>Requirement:</i>	Planned
1 The maintenance and construction vehicle shall detect that a vehicle has intruded upon the boundary of a work zone. The boundary of the work zone represents an area around the maintenance and construction vehicle, which may be stationary or moving.	
<i>Requirement:</i>	Planned
2 The maintenance and construction vehicle shall receive work zone warnings from the field equipment at the roadside, other maintenance and construction vehicles.	
<i>Requirement:</i>	Planned
3 The maintenance and construction vehicle shall present work zone warnings to the field personnel using direct warning signals or in-vehicle signage functions.	
<i>Requirement:</i>	Planned
4 The maintenance and construction vehicle shall monitor the crew movements to identify when a crew member is crossing the boundary between a work zone and vehicle traffic and issue an alert to the crew member.	
<i>Requirement:</i>	Planned
5 The maintenance and construction vehicle shall provide status of the work zone warning systems to the center.	
<i>Element: LaPorte County Multimodal Crossings</i>	
<i>Entity: Roadway</i>	
<i>Functional Area: Roadway Signal Preemption</i>	
Field elements that receive signal preemption requests from approaching emergency vehicles and overrides the current operation of the traffic signals	
<i>Requirement:</i>	Planned
1 The field element shall respond to signal preemption requests from emergency vehicles.	
<i>Functional Area: Roadway Incident Detection</i>	
Field elements that monitor traffic conditions to identify incidents. It includes traffic detectors that collect traffic flow information and identify unusual traffic conditions and advanced CCTV cameras with built-in incident detection algorithms.	
<i>Requirement:</i>	Planned
1 The field element shall collect, process, and send traffic images to the center for further analysis and distribution.	
<i>Requirement:</i>	Planned
2 The field element shall remotely process video data and provide an indication of potential incidents to the traffic management center.	
<i>Requirement:</i>	Potential
3 The field element's video devices shall be remotely controlled by a traffic management center.	
<i>Requirement:</i>	Planned
4 The field element shall provide operational status and fault data for the incident detection devices to the traffic management center.	
<i>Functional Area: Standard Rail Crossing</i>	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: LaPorte County Multimodal Crossings</i>	
<i>Entity: Roadway</i>	
<i>Functional Area: Standard Rail Crossing</i>	
Field elements at highway-rail intersections (HRIs) where operational requirements do not dictate advanced features (e.g., where rail operational speeds are less than 80 miles per hour). Includes traditional HRI warning systems augmented with other standard traffic management devices.	
<i>Requirement:</i>	
1 The field element shall collect and process, traffic sensor data in the vicinity of a highway-rail intersection (HRI).	Planned
<i>Requirement:</i>	
2 The field element shall monitor the status of the highway-rail intersection (HRI) equipment, including both the current state and mode of operation and the current equipment condition, to be forwarded on to the traffic management center.	Planned
<i>Requirement:</i>	
3 The field element shall monitor the status of the highway-rail intersection (HRI) equipment, including both the current state and mode of operation and the current equipment condition, to be forwarded on to the rail wayside equipment.	Existing
<i>Requirement:</i>	
4 The field element shall receive track status from the rail wayside equipment that can be passed on to the traffic management center. This may include the current status of the tracks and whether a train is approaching.	Planned
<i>Requirement:</i>	
5 The field element shall collect pedestrian images and pedestrian sensor data, and respond to pedestrian crossing requests via display, audio signal, or other manner.	Planned
<i>Requirement:</i>	
6 The field element shall control the dynamic message signs (DMS) in the vicinity of a highway-rail intersection (HRI) to advise drivers, cyclists, and pedestrians of approaching trains.	Potential
<i>Requirement:</i>	
7 The field element shall close the highway-rail intersection (HRI) when a train is approaching using gates, lights/signs, barriers, and traffic control signals.	Existing
<i>Requirement:</i>	
8 The field element shall support the integrated control of adjacent traffic signals to clear an area in advance of an approaching train and to manage traffic around the intersection.	Planned
<i>Requirement:</i>	
9 The field element shall forward rail traffic advisories received from the Wayside Equipment to the traffic management center.	Planned
<i>Functional Area: Advanced Rail Crossing</i>	
Field elements at highway-rail intersections (HRIs) where operational requirements demand advanced features (e.g., where rail operational speeds are greater than 80 miles per hour). Capabilities from the Standard Rail Crossing plus systems which preclude entrance into the intersection when the barriers are activated, additional arriving train information, and detection of blocked intersections.	
<i>Requirement:</i>	
1 The field element shall collect and process, traffic sensor data in the vicinity of a highway-rail intersection (HRI).	Planned
<i>Requirement:</i>	
2 The field element shall determine whether the highway-rail intersection (HRI) is blocked by traffic in the roadway or some other obstruction.	Planned
<i>Requirement:</i>	
3 The field element shall notify the traffic management center and the rail wayside equipment of any intersection blockages, including trapped vehicles or other obstructions.	Planned

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: LaPorte County Multimodal Crossings</i>	
<i>Entity: Roadway</i>	
<i>Functional Area: Advanced Rail Crossing</i>	
Field elements at highway-rail intersections (HRIs) where operational requirements demand advanced features (e.g., where rail operational speeds are greater than 80 miles per hour). Capabilities from the Standard Rail Crossing plus systems which preclude entrance into the intersection when the barriers are activated, additional arriving train information, and detection of blocked intersections.	
<i>Requirement:</i>	
4 The field element shall monitor the status of the highway-rail intersection (HRI) equipment, including both the current state and mode of operation and the current equipment condition, to be forwarded on to the traffic management center.	Planned
<i>Requirement:</i>	
5 The field element shall monitor the status of the highway-rail intersection (HRI) equipment, including both the current state and mode of operation and the current equipment condition, to be forwarded on to the rail wayside equipment.	Planned
<i>Requirement:</i>	
6 The field element shall receive track status and arriving train information from the rail wayside equipment that can be passed on to the traffic management center. This may include the current status of the tracks and when a train is expected and/or how long the crossing will be closed.	Planned
<i>Requirement:</i>	
7 The field element shall collect pedestrian images and pedestrian sensor data, and respond to pedestrian crossing requests via display, audio signal, or other manner.	Planned
<i>Requirement:</i>	
8 The field element shall control the dynamic message signs (DMS) in the vicinity of a highway-rail intersection (HRI) to advise drivers, cyclists, and pedestrians of approaching trains.	Potential
<i>Requirement:</i>	
9 The field element shall close the highway-rail intersection (HRI) when a train is approaching with enough time for traffic to safely clear the crossing using gates, lights/signs, barriers, and traffic control signals.	Planned
<i>Requirement:</i>	
10 The field element shall support the integrated control of adjacent traffic signals to clear an area in advance of an approaching train and to manage traffic around the intersection.	Planned
<i>Requirement:</i>	
11 The field element shall forward rail traffic advisories received from the Wayside Equipment to the traffic management center.	Planned
<i>Requirement:</i>	
12 The field element shall provide approaching train advisories using field-vehicle communications to vehicles approaching the grade crossing.	Planned
<i>Functional Area: Roadway Equipment Coordination</i>	
Field elements that control and send data to other field elements (such as environmental sensors that send data to a DMS or coordination between traffic controllers on adjacent intersections), without center control.	
<i>Requirement:</i>	
1 The field element shall include sensors that provide data and status information to other field element devices, without center control.	Planned
<i>Requirement:</i>	
2 The field element shall include sensors that receive configuration data from other field element devices, without center control.	Planned

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: LaPorte County Multimodal Crossings</i>	
<i>Entity: Roadway</i>	
<i>Functional Area: Roadway Equipment Coordination</i>	
Field elements that control and send data to other field elements (such as environmental sensors that send data to a DMS or coordination between traffic controllers on adjacent intersections), without center control.	
<i>Requirement:</i>	Planned
3 The field element shall include devices that provide data and status information to other field element devices without center control.	
<i>Requirement:</i>	Planned
4 The field element shall include devices that receive configuration data from other field element devices, without center control.	
<i>Functional Area: Roadway Field Device Monitoring</i>	
Monitors field equipment operational status and detects and reports fault conditions. Device status, configuration, and fault information are provided to a remote center and a user interface provides information locally to field personnel.	
<i>Requirement:</i>	Planned
1 The field element shall monitor the operational status (state of the device, configuration, and fault data) of connected sensors (such as traffic, infrastructure, environmental, security, speed) and devices (such as highway advisory radio, dynamic message signs, automated roadway treatment systems, barrier and safeguard systems, cameras, traffic signals, ramp meters, short range communications equipment, security surveillance equipment).	
<i>Requirement:</i>	Planned
2 The field element shall send operational status of connected field equipment to the maintenance center.	
<i>Requirement:</i>	Planned
3 The field element shall send collected fault data to the maintenance center for repair.	
<i>Requirement:</i>	Planned
4 The field element shall include a local interface that provides operational status and fault data for connected field equipment to field personnel.	
<i>Requirement:</i>	Planned
5 The field element shall include a local interface that allows field personnel to command diagnostic tests on connected field equipment.	
<i>Functional Area: Roadway Environmental Monitoring</i>	
Environmental sensors, surface and sub-surface, that collect weather and road surface information. Weather conditions measured include temperature, wind, humidity, precipitation, and visibility. Sensors measure road surface temperature, moisture, icing, salinity, etc.	
<i>Requirement:</i>	Planned
1 The field element shall include surface and sub-surface environmental sensors that measure road surface temperature, moisture, icing, salinity, and other measures.	
<i>Requirement:</i>	Planned
2 The field element shall include environmental sensors that measure weather conditions including temperature, wind, humidity, precipitation, and visibility.	
<i>Requirement:</i>	Planned
3 The field element's environmental sensors shall be remotely controlled by a maintenance center.	
<i>Requirement:</i>	Planned
4 The field element's environmental sensors shall be remotely controlled by a traffic management center.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: LaPorte County Multimodal Crossings</i>	
<i>Entity: Roadway</i>	
<i>Functional Area: Roadway Environmental Monitoring</i>	
Environmental sensors, surface and sub-surface, that collect weather and road surface information. Weather conditions measured include temperature, wind, humidity, precipitation, and visibility. Sensors measure road surface temperature, moisture, icing, salinity, etc.	
<i>Requirement:</i> 5 The field element's environmental sensors shall be remotely controlled by weather service providers such as the National Weather Service or value-added sector specific meteorological services.	Potential
<i>Requirement:</i> 6 The field element's environmental sensors shall be remotely controlled by a maintenance and construction vehicle.	Potential
<i>Requirement:</i> 7 The field element shall provide environmental sensor equipment operational status to the controlling center or maintenance vehicle.	Planned
<i>Requirement:</i> 8 The field element shall provide environmental sensor equipment fault indication to the controlling center or maintenance vehicle.	Planned
<i>Requirement:</i> 9 The field element shall remotely aggregate environmental sensor data with environmental data collected from maintenance and construction vehicles.	Potential
<i>Requirement:</i> 10 The field element shall provide weather and road surface condition data to centers.	Planned
<i>Requirement:</i> 11 The field element shall provide weather and road surface condition data to maintenance and construction vehicles.	Potential
<i>Functional Area: Field Barrier System Control</i>	
Field elements that control barrier systems such as gates and other systems that manage entry to roadways, transportation facilities and infrastructure.	
<i>Requirement:</i> 1 The field element shall activate barrier systems for transportation facilities and infrastructure under center control. Barrier systems include automated or remotely controlled gates, barriers and other systems that manage entry to roadways.	Planned
<i>Requirement:</i> 2 The field element shall return barrier system operational status to the controlling center.	Planned
<i>Requirement:</i> 3 The field element shall return barrier system fault data to the maintenance center for repair.	Planned
<i>Requirement:</i> 4 The field element shall receive requests for access from approaching vehicles using field-vehicle communications and validate and authenticate the requests.	Planned
<i>Requirement:</i> 5 The field element shall grant access only to qualified vehicles.	Planned
<i>Requirement:</i> 6 The field element shall communicate access permission status and access instructions to approaching vehicles using field-vehicle communications.	Planned
<i>Functional Area: Multimodal Crossing Control</i>	
Field elements to monitor and control traffic at multimodal crossings, such as draw bridges and other crossings between highway traffic and other modes; does not include highway-rail intersection.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: LaPorte County Multimodal Crossings</i>	
<i>Entity: Roadway</i>	
<i>Functional Area: Multimodal Crossing Control</i>	
Field elements to monitor and control traffic at multimodal crossings, such as draw bridges and other crossings between highway traffic and other modes; does not include highway-rail intersection.	
<i>Requirement:</i>	Existing
1 The field element shall include sensors to monitor requests from non-highway traffic to cross at multimodal crossings for specified durations (such as draw bridges and miscellaneous other interference crossings between highway traffic and other modes such as river traffic, aircraft, etc.); the sensors are under center control.	
<i>Requirement:</i>	Existing
2 The field element shall include signals to control traffic at multimodal crossings on surface streets, under center control.	
<i>Requirement:</i>	Potential
3 The field element shall include driver information systems (such as dynamic messages signs, highway advisory radios (HAR), and equipment that controls warning lights and gates) that advise drivers at multimodal crossings, under center control.	
<i>Requirement:</i>	Existing
4 The field element shall provide operational status for the sensors, signals, and driver information systems equipment at multimodal crossings to the center.	
<i>Requirement:</i>	Existing
5 The field element shall provide fault data for the sensors, signals, and driver information systems equipment at multimodal crossings to the center for repair.	
<i>Requirement:</i>	Existing
6 The field element shall forward all requests for right-of-way at multimodal crossings to the controlling center.	
<i>Functional Area: Roadway Data Collection</i>	
Field elements to collect traffic, road, and environmental conditions information for use in transportation planning, research, and other off-line applications. Includes the sensors, supporting roadside infrastructure, and communications equipment.	
<i>Requirement:</i>	Planned
1 The field element shall collect traffic, road, and environmental conditions information.	
<i>Requirement:</i>	Planned
2 The field element shall include the sensors and supporting roadside devices that sense, collect, and send traffic, road, and environmental conditions information to a center for archival.	
<i>Requirement:</i>	Planned
3 The field element shall collect sensor status and sensor faults from roadside equipment and send it along with the recorded data to a center for archival.	
<i>Element: LaPorte County Sheriff Office</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Emergency Call-Taking</i>	
Provides interface to the emergency call-taking systems such as the Emergency Telecommunications System (e.g., 911) that correlate call information with emergencies reported by transit agencies, commercial vehicle operators, or other public safety agencies. Allows the operator to verify the incident and forward the information to the responding agencies.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: LaPorte County Sheriff Office</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Emergency Call-Taking</i>	
Provides interface to the emergency call-taking systems such as the Emergency Telecommunications System (e.g., 911) that correlate call information with emergencies reported by transit agencies, commercial vehicle operators, or other public safety agencies. Allows the operator to verify the incident and forward the information to the responding agencies.	
<i>Requirement:</i>	Existing
1 The center shall support the interface to the Emergency Telecommunications System (e.g. 911 or 7-digit call routing) to receive emergency notification information and provide it to the emergency system operator.	
<i>Requirement:</i>	Existing
2 The center shall receive emergency call information from 911 services and present the possible incident information to the emergency system operator.	
<i>Requirement:</i>	Existing
4 The center shall receive emergency call information from mayday service providers and present the possible incident information to the emergency system operator.	
<i>Requirement:</i>	Existing
5 The center shall receive emergency notification information from other public safety agencies and present the possible incident information to the emergency system operator.	
<i>Requirement:</i>	Existing
6 The center shall receive emergency notification information from public transit systems and present the possible incident information to the emergency system operator.	
<i>Requirement:</i>	Existing
7 The center shall coordinate, correlate, and verify all emergency inputs, including those identified based on external calls and internal analysis of security sensor and surveillance data, and assign each a level of confidence.	
<i>Requirement:</i>	Potential
8 The center shall send a request for remote control of CCTV systems from a traffic management center in order to verify the reported incident.	
<i>Requirement:</i>	Existing
9 The center shall forward the verified emergency information to the responding agency based on the location and nature of the emergency.	
<i>Requirement:</i>	Existing
10 The center shall update the incident information log once the emergency system operator has verified the incident.	
<i>Requirement:</i>	Existing
11 The center shall provide the capability for digitized map data to act as the background to the emergency information presented to the emergency system operator.	
<i>Functional Area: Emergency Dispatch</i>	
Dispatch emergency vehicles to incidents, tracking their location and status. Pertinent incident information is gathered and relayed to the responding units.	
<i>Requirement:</i>	Existing
1 The center shall dispatch emergency vehicles to respond to verified emergencies under center personnel control.	
<i>Requirement:</i>	Existing
2 The center shall store the current status of all emergency vehicles available for dispatch and those that have been dispatched.	
<i>Requirement:</i>	Existing
3 The center shall relay location and incident details to the responding vehicles.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: LaPorte County Sheriff Office</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Emergency Dispatch</i>	
Dispatch emergency vehicles to incidents, tracking their location and status. Pertinent incident information is gathered and relayed to the responding units.	
<i>Requirement:</i>	
4 The center shall track the location and status of emergency vehicles responding to an emergency based on information from the emergency vehicle.	Existing
<i>Requirement:</i>	
5 The center shall store and maintain the emergency service responses in an action log.	Existing
<i>Requirement:</i>	
6 The center shall provide the capability for digitized map data to act as the background to the information presented to the emergency system operator.	Existing
<i>Requirement:</i>	
7 The center shall receive traffic images to support dispatch of emergency vehicles.	Existing
<i>Requirement:</i>	
8 The center shall provide the capability to request remote control of traffic surveillance devices	Potential
<i>Requirement:</i>	
9 The center shall coordinate response to incidents with other Emergency Management centers to ensure appropriate resources are dispatched and utilized.	Existing
<i>Functional Area: Emergency Routing</i>	
Routing of emergency vehicles to facilitate the quickest/safest arrival. Routes may be determined based on real-time traffic information and road conditions or routes may be provided by Traffic Management on request.	
<i>Requirement:</i>	
1 The center shall collect current traffic and road condition information for emergency vehicle route calculation.	Existing
<i>Requirement:</i>	
2 The center shall receive information on the location and status of traffic control equipment and work zones along potential emergency routes.	Existing
<i>Requirement:</i>	
3 The center shall receive status information from care facilities to determine the appropriate facility and its location.	Existing
<i>Requirement:</i>	
4 The center shall receive asset restriction information to support the dispatching of appropriate emergency resources.	Existing
<i>Requirement:</i>	
5 The center shall receive current railroad schedule information for emergency vehicle route calculation.	Planned
<i>Requirement:</i>	
6 The center shall track current emergency vehicle location and status.	Existing
<i>Requirement:</i>	
7 The center shall calculate emergency vehicle routes, under center personnel control, based on the collected traffic and road conditions information.	Existing
<i>Requirement:</i>	
8 The center shall request and receive ingress and egress routes or other specialized emergency access routes from the traffic management center.	Existing
<i>Requirement:</i>	
9 The center shall provide the capability to request special traffic control measures, such as signal preemption, from the traffic management center to facilitate emergency vehicle progress along the suggested route.	Potential

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: LaPorte County Sheriff Office</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Emergency Routing</i>	
Routing of emergency vehicles to facilitate the quickest/safest arrival. Routes may be determined based on real-time traffic information and road conditions or routes may be provided by Traffic Management on request.	
<i>Requirement:</i>	
10 Once the route is calculated the route shall be provided to the dispatch function.	Existing
<i>Requirement:</i>	
11 The center shall provide the capability for digitized map data to act as the background to the information presented to the emergency system operator.	Existing
<i>Functional Area: Incident Command</i>	
Tactical decision support, resource coordination, and communications integration among emergency management agencies for Incident Commands that are established by first responders to support local management of an incident.	
<i>Requirement:</i>	
1 The center shall 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.	Existing
<i>Requirement:</i>	
2 The center shall provide incident command communications with public safety, emergency management, transportation, and other allied response agency centers.	Existing
<i>Requirement:</i>	
3 The center shall track and maintain resource information and action plans pertaining to the incident command.	Existing
<i>Requirement:</i>	
4 The center shall 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.	Existing
<i>Requirement:</i>	
5 The center shall assess the status of responding emergency vehicles as part of an incident command.	Planned
<i>Functional Area: Emergency Early Warning System</i>	
Monitors alerting and advisory systems, information collected by ITS surveillance and sensors, and reports from other agencies in order to identify potential, imminent, or in-progress major incidents or disasters. Notification is provided to other ITS centers to notify the traveling public.	
<i>Requirement:</i>	
1 The center shall 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).	Existing
<i>Requirement:</i>	
2 The center shall provide the capability to correlate alerts and advisories, incident information, and security sensor and surveillance data.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: LaPorte County Sheriff Office</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Emergency Early Warning System</i>	
Monitors alerting and advisory systems, information collected by ITS surveillance and sensors, and reports from other agencies in order to identify potential, imminent, or in-progress major incidents or disasters. Notification is provided to other ITS centers to notify the traveling public.	
<i>Requirement:</i> 3 The center shall 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.	Existing
<i>Requirement:</i> 4 The center shall broadcast wide-area alerts and advisories to transit management centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	Planned
<i>Requirement:</i> 5 The center shall broadcast wide-area alerts and advisories to toll administration centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	Existing
<i>Requirement:</i> 6 The center shall broadcast wide-area alerts and advisories to traveler information service providers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	Existing
<i>Requirement:</i> 7 The center shall broadcast wide-area alerts and advisories to maintenance centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	Existing
<i>Requirement:</i> 8 The center shall broadcast wide-area alerts and advisories to other emergency management centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	Existing
<i>Requirement:</i> 9 The center shall broadcast wide-area alerts and advisories to commercial vehicle administration centers and roadside check facilities for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	Existing
<i>Requirement:</i> 10 The center shall process status information from each of the centers that have been sent the wide-area alert.	Planned
<i>Requirement:</i> 11 The center shall coordinate the broadcast of wide-area alerts and advisories with other emergency management centers.	Existing
<i>Requirement:</i> 12 The center shall receive incident information from other transportation management centers to support the early warning system.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: LaPorte County Sheriff Office</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Emergency Early Warning System</i>	
Monitors alerting and advisory systems, information collected by ITS surveillance and sensors, and reports from other agencies in order to identify potential, imminent, or in-progress major incidents or disasters. Notification is provided to other ITS centers to notify the traveling public.	
<i>Requirement:</i> 13 The center shall present the alert and advisory information and the status of the actions taken in response to the alert by the other centers to the emergency system operator as received from other system inputs.	Planned
<i>Requirement:</i> 14 The center shall support the entry of alert and advisory information directly from the emergency system operator.	Existing
<i>Functional Area: Emergency Response Management</i>	
Strategic emergency planning and response capabilities and broad inter-agency interfaces to support large-scale incidents and disasters, commonly associated with Emergency Operations Centers.	
<i>Requirement:</i> 1 The center shall provide strategic emergency response capabilities provided by an Emergency Operations Center for large-scale incidents and disasters.	Existing
<i>Requirement:</i> 2 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.	Existing
<i>Requirement:</i> 3 The center shall provide the capability to implement response plans and track progress through the incident by exchanging incident information and response status with allied agencies.	Existing
<i>Requirement:</i> 4 The center shall develop, coordinate with other agencies, and store emergency response plans.	Existing
<i>Requirement:</i> 5 The center shall track the availability of resources and coordinate resource sharing with allied agency centers including traffic, maintenance, or other emergency centers.	Planned
<i>Requirement:</i> 6 The center shall 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.	Existing
<i>Requirement:</i> 7 The center shall receive event scheduling information from Event Promoters.	Existing
<i>Requirement:</i> 8 The center shall support remote control of field equipment normally under control of the traffic management center including traffic signals, dynamic message signs, gates, and barriers.	Potential
<i>Requirement:</i> 9 The center shall provide the capability to remotely control and monitor CCTV systems normally operated by a traffic management center.	Potential
<i>Requirement:</i> 10 The center shall provide the capability to request transit resource availability from transit centers for use during disaster and evacuation operations.	Potential

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> LaPorte County Sheriff Office	
<i>Entity:</i> Emergency Management	
<i>Functional Area:</i> Emergency Response Management	
Strategic emergency planning and response capabilities and broad inter-agency interfaces to support large-scale incidents and disasters, commonly associated with Emergency Operations Centers.	
<i>Requirement:</i> 11 The center shall 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.	Potential
<i>Requirement:</i> 12 The center shall provide information to the media concerning the status of an emergency response.	Existing
<i>Requirement:</i> 13 The center shall provide the capability for digitized map data to act as the background to the information presented to the emergency system operator.	Existing
<i>Requirement:</i> 14 The center shall provide the capability for center personnel to provide inputs to the management of incidents, disasters and evacuations.	Existing
<i>Requirement:</i> 15 The center shall collect information about the status of the recovery efforts for the infrastructure during disasters.	Potential
<i>Requirement:</i> 16 The center shall provide the overall status of infrastructure recovery efforts to traveler information providers and media.	Potential
<i>Requirement:</i> 17 The center shall provide the capability to communicate information about emergency situations to local population through the Emergency Telecommunications System.	Existing
<i>Requirement:</i> 18 The center shall 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.	Potential
<i>Requirement:</i> 19 The center shall retrieve information from public health systems to increase preparedness for, and implement a response to biological, chemical, radiation, and other public health emergencies.	Existing
<i>Functional Area:</i> Emergency Evacuation Support	
Evacuation planning and coordination to manage evacuation and reentry of a population in the vicinity of a disaster or other emergency that poses a risk to public safety.	
<i>Requirement:</i> 1 The center shall manage inter-agency coordination of evacuation operations, from initial planning through the evacuation process and reentry.	Existing
<i>Requirement:</i> 2 The center shall develop and exchange evacuation plans with allied agencies prior to the occurrence of a disaster.	Existing
<i>Requirement:</i> 3 The center shall provide an interface to the emergency system operator to enter evacuation plans and procedures and present the operator with other agencies' plans.	Existing
<i>Requirement:</i> 4 The center shall coordinate evacuation destinations and shelter needs with shelter providers (e.g., the American Red Cross) in the region.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> LaPorte County Sheriff Office	
<i>Entity:</i> Emergency Management	
<i>Functional Area:</i> Emergency Evacuation Support	
Evacuation planning and coordination to manage evacuation and reentry of a population in the vicinity of a disaster or other emergency that poses a risk to public safety.	
<i>Requirement:</i>	
5 The center shall provide evacuation information to traffic, transit, maintenance and construction, rail operations, and other emergency management centers as needed.	Existing
<i>Requirement:</i>	
6 The center shall request resources from transit agencies as needed to support the evacuation.	Potential
<i>Requirement:</i>	
7 The center shall 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.	Potential
<i>Requirement:</i>	
8 The center shall 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.	Potential
<i>Requirement:</i>	
9 The center shall monitor the progress or status of the evacuation once it begins and exchange tactical plans, prepared during the incident, with allied agencies.	Potential
<i>Requirement:</i>	
10 The center shall monitor the progress of the reentry process.	Potential
<i>Requirement:</i>	
11 The center shall submit evacuation information to toll administration centers along with requests for changes in the toll services or fee collection during an evacuation.	Potential
<i>Requirement:</i>	
12 The center shall 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.	Existing
<i>Functional Area:</i> Emergency Environmental Monitoring	
Collects current and forecast road and weather information that is used by the operator to more effectively manage incidents.	
<i>Requirement:</i>	
1 The center shall 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).	Existing
<i>Requirement:</i>	
2 The center shall collect current road and weather information from roadway maintenance operations.	Existing
<i>Requirement:</i>	
3 The center shall assimilate current and forecast road conditions and surface weather information to support incident management.	Existing
<i>Requirement:</i>	
4 The center shall present the current and forecast road and weather information to the emergency system operator.	Existing
<i>Functional Area:</i> Mayday Support	
Collection and response to Mayday messages received from vehicles and drivers.	
<i>Requirement:</i>	
1 The center shall collect mayday messages from vehicles and drivers.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: LaPorte County Sheriff Office</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Mayday Support</i>	
Collection and response to Mayday messages received from vehicles and drivers.	
<i>Requirement:</i> 2 The center shall collect mayday messages from travelers via personal handheld devices.	Existing
<i>Requirement:</i> 3 The center shall acknowledge the request for emergency assistance, whether originated by the driver, automatically by the vehicle's safety systems, or by a traveler via a personal handheld device.	Existing
<i>Requirement:</i> 4 After the mayday becomes a verified incident, the center shall determine the appropriate response to the mayday message.	Existing
<i>Requirement:</i> 5 The center shall determine whether the mayday message indicates an emergency that requires the attention of public safety agencies, and forward mayday emergency data to the appropriate agency as necessary.	Existing
<i>Requirement:</i> 6 The center shall support the activation of remote controlled functions requested by a vehicle, such as requests to unlock doors.	Potential
<i>Requirement:</i> 7 The center shall request additional emergency details from or issue commands to the vehicle's security systems or vehicle driver if needed.	Existing
<i>Requirement:</i> 8 The center shall maintain a log of all mayday signals received from vehicles.	Existing
<i>Requirement:</i> 9 The center shall provide all mayday data to center personnel and respond to the vehicle, driver, or traveler using the portable handheld device as directed by the personnel.	Existing
<i>Functional Area: Emergency Commercial Vehicle Response</i>	
Responds to commercial vehicle and freight equipment related emergencies. Includes incidents involving hazardous materials as well as the detection of non-permitted transport of security sensitive hazmat.	
<i>Requirement:</i> 1 The center shall receive emergency notification information from commercial vehicles, commercial vehicle check stations, or commercial fleet operators and present the possible incident information to the emergency system operator. This may include detection of non-permitted transport of security sensitive hazmat, hazardous cargo spills, etc.	Existing
<i>Requirement:</i> 2 The center shall receive details of the cargo being carried by commercial vehicles from their commercial fleet manager for incidents involving potential hazardous materials.	Existing
<i>Requirement:</i> 3 The center shall forward the verified emergency information to the responding agency based on the location and nature of the emergency.	Existing
<i>Requirement:</i> 4 The center shall provide the capability to request Fleet and Freight Management to disable a specific vehicle in their fleet.	Potential
<i>Element: Local Emergency Services</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Emergency Call-Taking</i>	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Local Emergency Services	
<i>Entity:</i> Emergency Management	
<i>Functional Area:</i> Emergency Call-Taking	
Provides interface to the emergency call-taking systems such as the Emergency Telecommunications System (e.g., 911) that correlate call information with emergencies reported by transit agencies, commercial vehicle operators, or other public safety agencies. Allows the operator to verify the incident and forward the information to the responding agencies.	
<i>Requirement:</i>	
1 The center shall support the interface to the Emergency Telecommunications System (e.g. 911 or 7-digit call routing) to receive emergency notification information and provide it to the emergency system operator.	Existing
<i>Requirement:</i>	
2 The center shall receive emergency call information from 911 services and present the possible incident information to the emergency system operator.	Existing
<i>Requirement:</i>	
4 The center shall receive emergency call information from mayday service providers and present the possible incident information to the emergency system operator.	Existing
<i>Requirement:</i>	
5 The center shall receive emergency notification information from other public safety agencies and present the possible incident information to the emergency system operator.	Existing
<i>Requirement:</i>	
6 The center shall receive emergency notification information from public transit systems and present the possible incident information to the emergency system operator.	Existing
<i>Requirement:</i>	
7 The center shall coordinate, correlate, and verify all emergency inputs, including those identified based on external calls and internal analysis of security sensor and surveillance data, and assign each a level of confidence.	Existing
<i>Requirement:</i>	
8 The center shall send a request for remote control of CCTV systems from a traffic management center in order to verify the reported incident.	Planned
<i>Requirement:</i>	
9 The center shall forward the verified emergency information to the responding agency based on the location and nature of the emergency.	Existing
<i>Requirement:</i>	
10 The center shall update the incident information log once the emergency system operator has verified the incident.	Existing
<i>Requirement:</i>	
11 The center shall provide the capability for digitized map data to act as the background to the emergency information presented to the emergency system operator.	Planned
<i>Functional Area:</i> Emergency Dispatch	
Dispatch emergency vehicles to incidents, tracking their location and status. Pertinent incident information is gathered and relayed to the responding units.	
<i>Requirement:</i>	
1 The center shall dispatch emergency vehicles to respond to verified emergencies under center personnel control.	Existing
<i>Requirement:</i>	
2 The center shall store the current status of all emergency vehicles available for dispatch and those that have been dispatched.	Existing
<i>Requirement:</i>	
3 The center shall relay location and incident details to the responding vehicles.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Local Emergency Services</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Emergency Dispatch</i>	
Dispatch emergency vehicles to incidents, tracking their location and status. Pertinent incident information is gathered and relayed to the responding units.	
<i>Requirement:</i>	
4 The center shall track the location and status of emergency vehicles responding to an emergency based on information from the emergency vehicle.	Existing
<i>Requirement:</i>	
5 The center shall store and maintain the emergency service responses in an action log.	Existing
<i>Requirement:</i>	
6 The center shall provide the capability for digitized map data to act as the background to the information presented to the emergency system operator.	Planned
<i>Requirement:</i>	
7 The center shall receive traffic images to support dispatch of emergency vehicles.	Existing
<i>Requirement:</i>	
8 The center shall provide the capability to request remote control of traffic surveillance devices	Planned
<i>Requirement:</i>	
9 The center shall coordinate response to incidents with other Emergency Management centers to ensure appropriate resources are dispatched and utilized.	Existing
<i>Functional Area: Emergency Routing</i>	
Routing of emergency vehicles to facilitate the quickest/safest arrival. Routes may be determined based on real-time traffic information and road conditions or routes may be provided by Traffic Management on request.	
<i>Requirement:</i>	
1 The center shall collect current traffic and road condition information for emergency vehicle route calculation.	Existing
<i>Requirement:</i>	
2 The center shall receive information on the location and status of traffic control equipment and work zones along potential emergency routes.	Existing
<i>Requirement:</i>	
3 The center shall receive status information from care facilities to determine the appropriate facility and its location.	Existing
<i>Requirement:</i>	
4 The center shall receive asset restriction information to support the dispatching of appropriate emergency resources.	Existing
<i>Requirement:</i>	
5 The center shall receive current railroad schedule information for emergency vehicle route calculation.	Planned
<i>Requirement:</i>	
6 The center shall track current emergency vehicle location and status.	Existing
<i>Requirement:</i>	
7 The center shall calculate emergency vehicle routes, under center personnel control, based on the collected traffic and road conditions information.	Existing
<i>Requirement:</i>	
8 The center shall request and receive ingress and egress routes or other specialized emergency access routes from the traffic management center.	Planned
<i>Requirement:</i>	
9 The center shall provide the capability to request special traffic control measures, such as signal preemption, from the traffic management center to facilitate emergency vehicle progress along the suggested route.	Potential

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Local Emergency Services	
<i>Entity:</i> Emergency Management	
<i>Functional Area:</i> Emergency Routing	
Routing of emergency vehicles to facilitate the quickest/safest arrival. Routes may be determined based on real-time traffic information and road conditions or routes may be provided by Traffic Management on request.	
<i>Requirement:</i>	
10 Once the route is calculated the route shall be provided to the dispatch function.	Existing
<i>Requirement:</i>	
11 The center shall provide the capability for digitized map data to act as the background to the information presented to the emergency system operator.	Planned
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<i>Functional Area:</i> Incident Command	
Tactical decision support, resource coordination, and communications integration among emergency management agencies for Incident Commands that are established by first responders to support local management of an incident.	
<i>Requirement:</i>	
1 The center shall 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.	Existing
<i>Requirement:</i>	
2 The center shall provide incident command communications with public safety, emergency management, transportation, and other allied response agency centers.	Existing
<i>Requirement:</i>	
3 The center shall track and maintain resource information and action plans pertaining to the incident command.	Existing
<i>Requirement:</i>	
4 The center shall 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.	Existing
<i>Requirement:</i>	
5 The center shall assess the status of responding emergency vehicles as part of an incident command.	Existing
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<i>Functional Area:</i> Service Patrol Management	
Dispatch and communication with roadway service patrol vehicles that monitor roads to aid motorists, offering rapid response to minor incidents.	
<i>Requirement:</i>	
1 The center shall dispatch roadway service patrol vehicles to identified incident locations.	Existing
<i>Requirement:</i>	
2 The center shall store the current status of all service patrol vehicles available for dispatch and those that have been dispatched.	Existing
<i>Requirement:</i>	
3 The center shall share incident information collected by the service patrol with traffic, maintenance and construction, and traveler information centers for incident management, incident notification to travelers, and incident cleanup.	Existing
<i>Requirement:</i>	
4 The center shall track the location and status of service patrol vehicles.	Existing
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<i>Functional Area:</i> Emergency Early Warning System	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Local Emergency Services</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Emergency Early Warning System</i>	
Monitors alerting and advisory systems, information collected by ITS surveillance and sensors, and reports from other agencies in order to identify potential, imminent, or in-progress major incidents or disasters. Notification is provided to other ITS centers to notify the traveling public.	
<i>Requirement:</i>	
1 The center shall 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).	Existing
<i>Requirement:</i>	
2 The center shall provide the capability to correlate alerts and advisories, incident information, and security sensor and surveillance data.	Existing
<i>Requirement:</i>	
3 The center shall 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.	Planned
<i>Requirement:</i>	
4 The center shall broadcast wide-area alerts and advisories to transit management centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	Planned
<i>Requirement:</i>	
5 The center shall broadcast wide-area alerts and advisories to toll administration 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.	Planned
<i>Requirement:</i>	
6 The center shall broadcast wide-area alerts and advisories to traveler information service providers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	Planned
<i>Requirement:</i>	
7 The center shall broadcast wide-area alerts and advisories to maintenance centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	Planned
<i>Requirement:</i>	
8 The center shall broadcast wide-area alerts and advisories to other emergency management centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	Planned

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Local Emergency Services</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Emergency Early Warning System</i>	
Monitors alerting and advisory systems, information collected by ITS surveillance and sensors, and reports from other agencies in order to identify potential, imminent, or in-progress major incidents or disasters. Notification is provided to other ITS centers to notify the traveling public.	
<i>Requirement:</i> 9 The center shall broadcast wide-area alerts and advisories to commercial vehicle administration centers and roadside check facilities 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.	Planned
<i>Requirement:</i> 10 The center shall process status information from each of the centers that have been sent the wide-area alert.	Planned
<i>Requirement:</i> 11 The center shall coordinate the broadcast of wide-area alerts and advisories with other emergency management centers.	Existing
<i>Requirement:</i> 12 The center shall receive incident information from other transportation management centers to support the early warning system.	Existing
<i>Requirement:</i> 13 The center shall present the alert and advisory information and the status of the actions taken in response to the alert by the other centers to the emergency system operator as received from other system inputs.	Existing
<i>Requirement:</i> 14 The center shall support the entry of alert and advisory information directly from the emergency system operator.	Existing
<i>Functional Area: Emergency Response Management</i>	
Strategic emergency planning and response capabilities and broad inter-agency interfaces to support large-scale incidents and disasters, commonly associated with Emergency Operations Centers.	
<i>Requirement:</i> 1 The center shall provide strategic emergency response capabilities provided by an Emergency Operations Center for large-scale incidents and disasters.	Existing
<i>Requirement:</i> 2 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.	Existing
<i>Requirement:</i> 3 The center shall provide the capability to implement response plans and track progress through the incident by exchanging incident information and response status with allied agencies.	Existing
<i>Requirement:</i> 4 The center shall develop, coordinate with other agencies, and store emergency response plans.	Existing
<i>Requirement:</i> 5 The center shall track the availability of resources and coordinate resource sharing with allied agency centers including traffic, maintenance, or other emergency centers.	Existing
<i>Requirement:</i> 6 The center shall 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.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Local Emergency Services</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Emergency Response Management</i>	
Strategic emergency planning and response capabilities and broad inter-agency interfaces to support large-scale incidents and disasters, commonly associated with Emergency Operations Centers.	
<i>Requirement:</i>	
7 The center shall receive event scheduling information from Event Promoters.	Existing
<i>Requirement:</i>	
8 The center shall support remote control of field equipment normally under control of the traffic management center including traffic signals, dynamic message signs, gates, and barriers.	Potential
<i>Requirement:</i>	
9 The center shall provide the capability to remotely control and monitor CCTV systems normally operated by a traffic management center.	Planned
<i>Requirement:</i>	
10 The center shall provide the capability to request transit resource availability from transit centers for use during disaster and evacuation operations.	Existing
<i>Requirement:</i>	
11 The center shall 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.	Planned
<i>Requirement:</i>	
12 The center shall provide information to the media concerning the status of an emergency response.	Existing
<i>Requirement:</i>	
13 The center shall provide the capability for digitized map data to act as the background to the information presented to the emergency system operator.	Planned
<i>Requirement:</i>	
14 The center shall provide the capability for center personnel to provide inputs to the management of incidents, disasters and evacuations.	Existing
<i>Requirement:</i>	
15 The center shall collect information about the status of the recovery efforts for the infrastructure during disasters.	Potential
<i>Requirement:</i>	
16 The center shall provide the overall status of infrastructure recovery efforts to traveler information providers and media.	Potential
<i>Requirement:</i>	
17 The center shall provide the capability to communicate information about emergency situations to local population through the Emergency Telecommunications System.	Existing
<i>Requirement:</i>	
18 The center shall 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.	Planned
<i>Requirement:</i>	
19 The center shall retrieve information from public health systems to increase preparedness for, and implement a response to biological, chemical, radiation, and other public health emergencies.	Existing

Functional Area: Emergency Evacuation Support

Evacuation planning and coordination to manage evacuation and reentry of a population in the vicinity of a disaster or other emergency that poses a risk to public safety.

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Local Emergency Services</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Emergency Evacuation Support</i>	
Evacuation planning and coordination to manage evacuation and reentry of a population in the vicinity of a disaster or other emergency that poses a risk to public safety.	
<i>Requirement:</i>	
1 The center shall manage inter-agency coordination of evacuation operations, from initial planning through the evacuation process and reentry.	Planned
<i>Requirement:</i>	
2 The center shall develop and exchange evacuation plans with allied agencies prior to the occurrence of a disaster.	Existing
<i>Requirement:</i>	
3 The center shall provide an interface to the emergency system operator to enter evacuation plans and procedures and present the operator with other agencies' plans.	Existing
<i>Requirement:</i>	
4 The center shall coordinate evacuation destinations and shelter needs with shelter providers (e.g., the American Red Cross) in the region.	Existing
<i>Requirement:</i>	
5 The center shall provide evacuation information to traffic, transit, maintenance and construction, rail operations, and other emergency management centers as needed.	Planned
<i>Requirement:</i>	
6 The center shall request resources from transit agencies as needed to support the evacuation.	Planned
<i>Requirement:</i>	
7 The center shall 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.	Potential
<i>Requirement:</i>	
8 The center shall 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.	Planned
<i>Requirement:</i>	
9 The center shall monitor the progress or status of the evacuation once it begins and exchange tactical plans, prepared during the incident, with allied agencies.	Potential
<i>Requirement:</i>	
10 The center shall monitor the progress of the reentry process.	Potential
<i>Requirement:</i>	
11 The center shall submit evacuation information to toll administration centers along with requests for changes in the toll services or fee collection during an evacuation.	Potential
<i>Requirement:</i>	
12 The center shall 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.	Existing
<i>Functional Area: Emergency Environmental Monitoring</i>	
Collects current and forecast road and weather information that is used by the operator to more effectively manage incidents.	
<i>Requirement:</i>	
1 The center shall 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).	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Local Emergency Services</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Emergency Environmental Monitoring</i>	
Collects current and forecast road and weather information that is used by the operator to more effectively manage incidents.	
<i>Requirement:</i> 2 The center shall collect current road and weather information from roadway maintenance operations.	Existing
<i>Requirement:</i> 3 The center shall assimilate current and forecast road conditions and surface weather information to support incident management.	Existing
<i>Requirement:</i> 4 The center shall present the current and forecast road and weather information to the emergency system operator.	Existing
<i>Functional Area: Center Secure Area Surveillance</i>	
Management of security surveillance devices and analysis of that data to detect potential threats. Areas under surveillance may include transit stops, transit stations, rest areas, park and ride lots, modal interchange facilities, on-board a transit vehicle, etc.	
<i>Requirement:</i> 1 The center shall remotely monitor video images and audio surveillance data collected in secure areas including facilities (e.g. transit yards) and transportation infrastructure (e.g. bridges, tunnels, interchanges, roadway infrastructure, and transit railways or guideways). The data may be raw or pre-processed in the field.	Planned
<i>Requirement:</i> 2 The center shall remotely monitor video images and audio surveillance data collected in traveler secure areas, which include transit stations, transit stops, rest areas, park and ride lots, and other fixed sites along travel routes (e.g., emergency pull-off areas and travel information centers). The data may be raw or pre-processed in the field.	Planned
<i>Requirement:</i> 3 The center shall remotely monitor video images and audio surveillance data collected on-board transit vehicles. The data may be raw or pre-processed in the field.	Planned
<i>Requirement:</i> 4 The center shall exchange surveillance data with other emergency centers.	Planned
<i>Requirement:</i> 5 The center shall identify potential security threats based on collected security surveillance data.	Planned
<i>Requirement:</i> 6 The center shall verify potential security threats by correlating security surveillance data from multiple sources.	Planned
<i>Requirement:</i> 7 The center shall remotely control security surveillance devices in secure areas including facilities (e.g. transit yards) and transportation infrastructure (e.g. bridges, tunnels, interchanges, roadway infrastructure, and transit railways or guideways).	Planned
<i>Requirement:</i> 8 The center shall remotely control security surveillance devices in traveler secure areas, which include transit stations, transit stops, rest areas, park and ride lots, and other fixed sites along travel routes (e.g., emergency pull-off areas and travel information centers).	Planned
<i>Requirement:</i> 9 The center shall remotely control security surveillance devices on-board transit vehicles.	Planned

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Local Emergency Services</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Center Secure Area Surveillance</i>	
Management of security surveillance devices and analysis of that data to detect potential threats. Areas under surveillance may include transit stops, transit stations, rest areas, park and ride lots, modal interchange facilities, on-board a transit vehicle, etc.	
<i>Requirement:</i>	
10 The center shall match traveler video images against a database from the Alerting and Advisory Systems of known images that may represent criminals and terrorists.	Planned
<i>Requirement:</i>	
11 The center shall exchange traveler images with other emergency management centers to support traveler image matching.	Planned
<i>Requirement:</i>	
12 The center shall respond to control data from center personnel regarding security surveillance data collection, processing, threat detection, and image matching.	Planned
<i>Requirement:</i>	
13 The center shall monitor maintenance status of the security sensor field equipment.	Planned
<i>Functional Area: Center Secure Area Alarm Support</i>	
Collection and response to silent and audible alarms received from travelers in secure areas (such as transit stops, rest areas, park-and-ride lots) and from on-board transit vehicles.	
<i>Requirement:</i>	
1 The center shall collect silent and audible alarms received from travelers in secure areas (such as transit stops, rest areas, park and ride lots, modal interchange facilities).	Existing
<i>Requirement:</i>	
2 The center shall collect silent and audible alarms received from transit vehicles, originated by the traveler or the transit vehicle operator.	Existing
<i>Requirement:</i>	
3 After the alarm message has been received, the center shall generate an alarm acknowledgment to the sender.	Existing
<i>Requirement:</i>	
4 After the alarm message becomes a verified incident, the center shall determine the appropriate response.	Existing
<i>Requirement:</i>	
5 The center shall determine whether the alarm message indicates an emergency that requires the attention of public safety agencies, and forward alarm message data to the appropriate agency as necessary.	Existing
<i>Requirement:</i>	
6 The center shall forward the alarm message to center personnel and respond to the traveler or transit vehicle operator as directed by the personnel.	Existing
<i>Functional Area: Mayday Support</i>	
Collection and response to Mayday messages received from vehicles and drivers.	
<i>Requirement:</i>	
1 The center shall collect mayday messages from vehicles and drivers.	Existing
<i>Requirement:</i>	
2 The center shall collect mayday messages from travelers via personal handheld devices.	Existing
<i>Requirement:</i>	
3 The center shall acknowledge the request for emergency assistance, whether originated by the driver, automatically by the vehicle's safety systems, or by a traveler via a personal handheld device.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Local Emergency Services</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Mayday Support</i>	
Collection and response to Mayday messages received from vehicles and drivers.	
<i>Requirement:</i>	Existing
4 After the mayday becomes a verified incident, the center shall determine the appropriate response to the mayday message.	
<i>Requirement:</i>	Existing
5 The center shall determine whether the mayday message indicates an emergency that requires the attention of public safety agencies, and forward mayday emergency data to the appropriate agency as necessary.	
<i>Requirement:</i>	Planned
6 The center shall support the activation of remote controlled functions requested by a vehicle, such as requests to unlock doors.	
<i>Requirement:</i>	Existing
7 The center shall request additional emergency details from or issue commands to the vehicle's security systems or vehicle driver if needed.	
<i>Requirement:</i>	Existing
8 The center shall maintain a log of all mayday signals received from vehicles.	
<i>Requirement:</i>	Existing
9 The center shall provide all mayday data to center personnel and respond to the vehicle, driver, or traveler using the portable handheld device as directed by the personnel.	
<i>Functional Area: Emergency Commercial Vehicle Response</i>	
Responds to commercial vehicle and freight equipment related emergencies. Includes incidents involving hazardous materials as well as the detection of non-permitted transport of security sensitive hazmat.	
<i>Requirement:</i>	Existing
1 The center shall receive emergency notification information from commercial vehicles, commercial vehicle check stations, or commercial fleet operators and present the possible incident information to the emergency system operator. This may include detection of non-permitted transport of security sensitive hazmat, hazardous cargo spills, etc.	
<i>Requirement:</i>	Existing
2 The center shall receive details of the cargo being carried by commercial vehicles from their commercial fleet manager for incidents involving potential hazardous materials.	
<i>Requirement:</i>	Existing
3 The center shall forward the verified emergency information to the responding agency based on the location and nature of the emergency.	
<i>Requirement:</i>	Planned
4 The center shall provide the capability to request Fleet and Freight Management to disable a specific vehicle in their fleet.	
<i>Functional Area: Emergency Data Collection</i>	
Collection and storage of information related to Emergency Management. For use by operations personnel or data archives in the region.	
<i>Requirement:</i>	Existing
1 The center shall collect emergency service data, emergency vehicle management data, emergency vehicle data, sensor and surveillance data, threat data, and incident data.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Local Emergency Services</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Emergency Data Collection</i>	
Collection and storage of information related to Emergency Management. For use by operations personnel or data archives in the region.	
<i>Requirement:</i>	Existing
2 The center shall assign quality control metrics and meta-data to be stored along with the data. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.	
<i>Requirement:</i>	Planned
3 The center shall receive and respond to requests from ITS Archives for either a catalog of the emergency management data or for the data itself.	
<i>Requirement:</i>	Planned
4 The center shall be able to produce sample products of the data available.	
<i>Functional Area: Emergency Transportation Operations Data Collection</i>	
Collects real-time information on the state of the regional transportation system for operational use by the center. It establishes communications with a regional repository, requests or subscribes to information relevant to the center, and distributes the received information for use.	
<i>Requirement:</i>	Existing
1 The center shall collect real-time information on the state of the regional transportation system including current traffic and road conditions, weather conditions, special event and incident information.	
<i>Requirement:</i>	Existing
2 The center shall support the capability for the system operator to monitor and control the information collection service.	
<i>Element: Local Emergency Telecommunications Systems</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Emergency Call-Taking</i>	
Provides interface to the emergency call-taking systems such as the Emergency Telecommunications System (e.g., 911) that correlate call information with emergencies reported by transit agencies, commercial vehicle operators, or other public safety agencies. Allows the operator to verify the incident and forward the information to the responding agencies.	
<i>Requirement:</i>	Existing
1 The center shall support the interface to the Emergency Telecommunications System (e.g. 911 or 7-digit call routing) to receive emergency notification information and provide it to the emergency system operator.	
<i>Requirement:</i>	Existing
2 The center shall receive emergency call information from 911 services and present the possible incident information to the emergency system operator.	
<i>Requirement:</i>	Existing
4 The center shall receive emergency call information from mayday service providers and present the possible incident information to the emergency system operator.	
<i>Requirement:</i>	Existing
5 The center shall receive emergency notification information from other public safety agencies and present the possible incident information to the emergency system operator.	
<i>Requirement:</i>	Existing
6 The center shall receive emergency notification information from public transit systems and present the possible incident information to the emergency system operator.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Local Emergency Telecommunications Systems</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Emergency Call-Taking</i>	
Provides interface to the emergency call-taking systems such as the Emergency Telecommunications System (e.g., 911) that correlate call information with emergencies reported by transit agencies, commercial vehicle operators, or other public safety agencies. Allows the operator to verify the incident and forward the information to the responding agencies.	
<i>Requirement:</i>	
7 The center shall coordinate, correlate, and verify all emergency inputs, including those identified based on external calls and internal analysis of security sensor and surveillance data, and assign each a level of confidence.	Existing
<i>Requirement:</i>	
8 The center shall send a request for remote control of CCTV systems from a traffic management center in order to verify the reported incident.	Planned
<i>Requirement:</i>	
9 The center shall forward the verified emergency information to the responding agency based on the location and nature of the emergency.	Existing
<i>Requirement:</i>	
10 The center shall update the incident information log once the emergency system operator has verified the incident.	Existing
<i>Requirement:</i>	
11 The center shall provide the capability for digitized map data to act as the background to the emergency information presented to the emergency system operator.	Planned
<i>Functional Area: Emergency Dispatch</i>	
Dispatch emergency vehicles to incidents, tracking their location and status. Pertinent incident information is gathered and relayed to the responding units.	
<i>Requirement:</i>	
1 The center shall dispatch emergency vehicles to respond to verified emergencies under center personnel control.	Existing
<i>Requirement:</i>	
2 The center shall store the current status of all emergency vehicles available for dispatch and those that have been dispatched.	Existing
<i>Requirement:</i>	
3 The center shall relay location and incident details to the responding vehicles.	Existing
<i>Requirement:</i>	
4 The center shall track the location and status of emergency vehicles responding to an emergency based on information from the emergency vehicle.	Existing
<i>Requirement:</i>	
5 The center shall store and maintain the emergency service responses in an action log.	Existing
<i>Requirement:</i>	
6 The center shall provide the capability for digitized map data to act as the background to the information presented to the emergency system operator.	Planned
<i>Requirement:</i>	
7 The center shall receive traffic images to support dispatch of emergency vehicles.	Existing
<i>Requirement:</i>	
8 The center shall provide the capability to request remote control of traffic surveillance devices	Planned
<i>Requirement:</i>	
9 The center shall coordinate response to incidents with other Emergency Management centers to ensure appropriate resources are dispatched and utilized.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Local Emergency Telecommunications Systems</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Emergency Routing</i>	
Routing of emergency vehicles to facilitate the quickest/safest arrival. Routes may be determined based on real-time traffic information and road conditions or routes may be provided by Traffic Management on request.	
<i>Requirement:</i>	
1 The center shall collect current traffic and road condition information for emergency vehicle route calculation.	Existing
<i>Requirement:</i>	
2 The center shall receive information on the location and status of traffic control equipment and work zones along potential emergency routes.	Existing
<i>Requirement:</i>	
3 The center shall receive status information from care facilities to determine the appropriate facility and its location.	Existing
<i>Requirement:</i>	
4 The center shall receive asset restriction information to support the dispatching of appropriate emergency resources.	Existing
<i>Requirement:</i>	
5 The center shall receive current railroad schedule information for emergency vehicle route calculation.	Planned
<i>Requirement:</i>	
6 The center shall track current emergency vehicle location and status.	Existing
<i>Requirement:</i>	
7 The center shall calculate emergency vehicle routes, under center personnel control, based on the collected traffic and road conditions information.	Existing
<i>Requirement:</i>	
8 The center shall request and receive ingress and egress routes or other specialized emergency access routes from the traffic management center.	Planned
<i>Requirement:</i>	
9 The center shall provide the capability to request special traffic control measures, such as signal preemption, from the traffic management center to facilitate emergency vehicle progress along the suggested route.	Potential
<i>Requirement:</i>	
10 Once the route is calculated the route shall be provided to the dispatch function.	Existing
<i>Requirement:</i>	
11 The center shall provide the capability for digitized map data to act as the background to the information presented to the emergency system operator.	Planned
<i>Functional Area: Incident Command</i>	
Tactical decision support, resource coordination, and communications integration among emergency management agencies for Incident Commands that are established by first responders to support local management of an incident.	
<i>Requirement:</i>	
1 The center shall 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.	Existing
<i>Requirement:</i>	
2 The center shall provide incident command communications with public safety, emergency management, transportation, and other allied response agency centers.	Existing
<i>Requirement:</i>	
3 The center shall track and maintain resource information and action plans pertaining to the incident command.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Local Emergency Telecommunications Systems</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Incident Command</i>	
Tactical decision support, resource coordination, and communications integration among emergency management agencies for Incident Commands that are established by first responders to support local management of an incident.	
<i>Requirement:</i>	
4 The center shall 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.	Existing
<i>Requirement:</i>	
5 The center shall assess the status of responding emergency vehicles as part of an incident command.	Existing
<i>Functional Area: Emergency Early Warning System</i>	
Monitors alerting and advisory systems, information collected by ITS surveillance and sensors, and reports from other agencies in order to identify potential, imminent, or in-progress major incidents or disasters. Notification is provided to other ITS centers to notify the traveling public.	
<i>Requirement:</i>	
1 The center shall 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).	Existing
<i>Requirement:</i>	
2 The center shall provide the capability to correlate alerts and advisories, incident information, and security sensor and surveillance data.	Existing
<i>Requirement:</i>	
3 The center shall 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.	Planned
<i>Requirement:</i>	
4 The center shall broadcast wide-area alerts and advisories to transit management centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	Planned
<i>Requirement:</i>	
5 The center shall broadcast wide-area alerts and advisories to toll administration 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.	Planned
<i>Requirement:</i>	
6 The center shall broadcast wide-area alerts and advisories to traveler information service providers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	Planned

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Local Emergency Telecommunications Systems	
<i>Entity:</i> Emergency Management	
<i>Functional Area:</i> Emergency Early Warning System	
Monitors alerting and advisory systems, information collected by ITS surveillance and sensors, and reports from other agencies in order to identify potential, imminent, or in-progress major incidents or disasters. Notification is provided to other ITS centers to notify the traveling public.	
<i>Requirement:</i> 7 The center shall broadcast wide-area alerts and advisories to maintenance centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	Planned
<i>Requirement:</i> 8 The center shall broadcast wide-area alerts and advisories to other emergency management centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	Planned
<i>Requirement:</i> 9 The center shall broadcast wide-area alerts and advisories to commercial vehicle administration centers and roadside check facilities 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.	Planned
<i>Requirement:</i> 10 The center shall process status information from each of the centers that have been sent the wide-area alert.	Planned
<i>Requirement:</i> 11 The center shall coordinate the broadcast of wide-area alerts and advisories with other emergency management centers.	Existing
<i>Requirement:</i> 12 The center shall receive incident information from other transportation management centers to support the early warning system.	Existing
<i>Requirement:</i> 13 The center shall present the alert and advisory information and the status of the actions taken in response to the alert by the other centers to the emergency system operator as received from other system inputs.	Existing
<i>Requirement:</i> 14 The center shall support the entry of alert and advisory information directly from the emergency system operator.	Existing
<i>Functional Area:</i> Emergency Response Management	
Strategic emergency planning and response capabilities and broad inter-agency interfaces to support large-scale incidents and disasters, commonly associated with Emergency Operations Centers.	
<i>Requirement:</i> 1 The center shall provide strategic emergency response capabilities provided by an Emergency Operations Center for large-scale incidents and disasters.	Existing
<i>Requirement:</i> 2 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.	Existing
<i>Requirement:</i> 3 The center shall provide the capability to implement response plans and track progress through the incident by exchanging incident information and response status with allied agencies.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Local Emergency Telecommunications Systems</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Emergency Response Management</i>	
Strategic emergency planning and response capabilities and broad inter-agency interfaces to support large-scale incidents and disasters, commonly associated with Emergency Operations Centers.	
<i>Requirement:</i> 4 The center shall develop, coordinate with other agencies, and store emergency response plans.	Existing
<i>Requirement:</i> 5 The center shall track the availability of resources and coordinate resource sharing with allied agency centers including traffic, maintenance, or other emergency centers.	Existing
<i>Requirement:</i> 6 The center shall 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.	Existing
<i>Requirement:</i> 7 The center shall receive event scheduling information from Event Promoters.	Existing
<i>Requirement:</i> 8 The center shall support remote control of field equipment normally under control of the traffic management center including traffic signals, dynamic message signs, gates, and barriers.	Potential
<i>Requirement:</i> 9 The center shall provide the capability to remotely control and monitor CCTV systems normally operated by a traffic management center.	Planned
<i>Requirement:</i> 10 The center shall provide the capability to request transit resource availability from transit centers for use during disaster and evacuation operations.	Existing
<i>Requirement:</i> 11 The center shall 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.	Planned
<i>Requirement:</i> 12 The center shall provide information to the media concerning the status of an emergency response.	Existing
<i>Requirement:</i> 13 The center shall provide the capability for digitized map data to act as the background to the information presented to the emergency system operator.	Planned
<i>Requirement:</i> 14 The center shall provide the capability for center personnel to provide inputs to the management of incidents, disasters and evacuations.	Existing
<i>Requirement:</i> 15 The center shall collect information about the status of the recovery efforts for the infrastructure during disasters.	Potential
<i>Requirement:</i> 16 The center shall provide the overall status of infrastructure recovery efforts to traveler information providers and media.	Potential
<i>Requirement:</i> 17 The center shall provide the capability to communicate information about emergency situations to local population through the Emergency Telecommunications System.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Local Emergency Telecommunications Systems</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Emergency Response Management</i>	
Strategic emergency planning and response capabilities and broad inter-agency interfaces to support large-scale incidents and disasters, commonly associated with Emergency Operations Centers.	
<i>Requirement:</i> 18 The center shall 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.	Planned
<i>Requirement:</i> 19 The center shall retrieve information from public health systems to increase preparedness for, and implement a response to biological, chemical, radiation, and other public health emergencies.	Existing
<i>Functional Area: Emergency Evacuation Support</i>	
Evacuation planning and coordination to manage evacuation and reentry of a population in the vicinity of a disaster or other emergency that poses a risk to public safety.	
<i>Requirement:</i> 1 The center shall manage inter-agency coordination of evacuation operations, from initial planning through the evacuation process and reentry.	Planned
<i>Requirement:</i> 2 The center shall develop and exchange evacuation plans with allied agencies prior to the occurrence of a disaster.	Existing
<i>Requirement:</i> 3 The center shall provide an interface to the emergency system operator to enter evacuation plans and procedures and present the operator with other agencies' plans.	Existing
<i>Requirement:</i> 4 The center shall coordinate evacuation destinations and shelter needs with shelter providers (e.g., the American Red Cross) in the region.	Existing
<i>Requirement:</i> 5 The center shall provide evacuation information to traffic, transit, maintenance and construction, rail operations, and other emergency management centers as needed.	Planned
<i>Requirement:</i> 6 The center shall request resources from transit agencies as needed to support the evacuation.	Planned
<i>Requirement:</i> 7 The center shall 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.	Potential
<i>Requirement:</i> 8 The center shall 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.	Planned
<i>Requirement:</i> 9 The center shall monitor the progress or status of the evacuation once it begins and exchange tactical plans, prepared during the incident, with allied agencies.	Potential
<i>Requirement:</i> 10 The center shall monitor the progress of the reentry process.	Potential
<i>Requirement:</i> 11 The center shall submit evacuation information to toll administration centers along with requests for changes in the toll services or fee collection during an evacuation.	Potential

Table 6

Architecture	Status	
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)	
<i>Element:</i> Local Emergency Telecommunications Systems		
<i>Entity:</i> Emergency Management		
<i>Functional Area:</i> Emergency Evacuation Support		
Evacuation planning and coordination to manage evacuation and reentry of a population in the vicinity of a disaster or other emergency that poses a risk to public safety.		
<i>Requirement:</i> 12	The center shall 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.	Existing
<i>Functional Area:</i> Emergency Environmental Monitoring		
Collects current and forecast road and weather information that is used by the operator to more effectively manage incidents.		
<i>Requirement:</i> 1	The center shall 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).	Existing
<i>Requirement:</i> 2	The center shall collect current road and weather information from roadway maintenance operations.	Existing
<i>Requirement:</i> 3	The center shall assimilate current and forecast road conditions and surface weather information to support incident management.	Existing
<i>Requirement:</i> 4	The center shall present the current and forecast road and weather information to the emergency system operator.	Existing
<i>Functional Area:</i> Mayday Support		
Collection and response to Mayday messages received from vehicles and drivers.		
<i>Requirement:</i> 1	The center shall collect mayday messages from vehicles and drivers.	Existing
<i>Requirement:</i> 2	The center shall collect mayday messages from travelers via personal handheld devices.	Existing
<i>Requirement:</i> 3	The center shall acknowledge the request for emergency assistance, whether originated by the driver, automatically by the vehicle's safety systems, or by a traveler via a personal handheld device.	Existing
<i>Requirement:</i> 4	After the mayday becomes a verified incident, the center shall determine the appropriate response to the mayday message.	Existing
<i>Requirement:</i> 5	The center shall determine whether the mayday message indicates an emergency that requires the attention of public safety agencies, and forward mayday emergency data to the appropriate agency as necessary.	Existing
<i>Requirement:</i> 6	The center shall support the activation of remote controlled functions requested by a vehicle, such as requests to unlock doors.	Planned
<i>Requirement:</i> 7	The center shall request additional emergency details from or issue commands to the vehicle's security systems or vehicle driver if needed.	Existing
<i>Requirement:</i> 8	The center shall maintain a log of all mayday signals received from vehicles.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Local Emergency Telecommunications Systems</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Mayday Support</i>	
Collection and response to Mayday messages received from vehicles and drivers.	
<i>Requirement:</i>	Existing
9 The center shall provide all mayday data to center personnel and respond to the vehicle, driver, or traveler using the portable handheld device as directed by the personnel.	
<i>Functional Area: Emergency Data Collection</i>	
Collection and storage of information related to Emergency Management. For use by operations personnel or data archives in the region.	
<i>Requirement:</i>	Existing
1 The center shall collect emergency service data, emergency vehicle management data, emergency vehicle data, sensor and surveillance data, threat data, and incident data.	
<i>Requirement:</i>	Existing
2 The center shall assign quality control metrics and meta-data to be stored along with the data. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.	
<i>Requirement:</i>	Planned
3 The center shall receive and respond to requests from ITS Archives for either a catalog of the emergency management data or for the data itself.	
<i>Requirement:</i>	Planned
4 The center shall be able to produce sample products of the data available.	
<i>Functional Area: Emergency Transportation Operations Data Collection</i>	
Collects real-time information on the state of the regional transportation system for operational use by the center. It establishes communications with a regional repository, requests or subscribes to information relevant to the center, and distributes the received information for use.	
<i>Requirement:</i>	Existing
1 The center shall collect real-time information on the state of the regional transportation system including current traffic and road conditions, weather conditions, special event and incident information.	
<i>Requirement:</i>	Existing
2 The center shall support the capability for the system operator to monitor and control the information collection service.	
<i>Element: Local Emergency Vehicles</i>	
<i>Entity: Emergency Vehicle</i>	
<i>Functional Area: On-board EV En Route Support</i>	
On-board systems for gathering of dispatch and routing information for emergency vehicle personnel, vehicle tracking, communications with care facilities, and signal preemption via short range communication directly with traffic control equipment at the roadside.	
<i>Requirement:</i>	Existing
1 The emergency vehicle, including roadway service patrols, shall track its current location.	
<i>Requirement:</i>	Existing
2 The emergency vehicle, including roadway service patrols, shall send the vehicle's location and operational data to the center for emergency management and dispatch.	
<i>Requirement:</i>	Existing
3 The emergency vehicle, including roadway service patrols, shall receive incident details and a suggested route when dispatched to a scene.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Local Emergency Vehicles</i>	
<i>Entity: Emergency Vehicle</i>	
<i>Functional Area: On-board EV En Route Support</i>	
On-board systems for gathering of dispatch and routing information for emergency vehicle personnel, vehicle tracking, communications with care facilities, and signal preemption via short range communication directly with traffic control equipment at the roadside.	
<i>Requirement:</i>	
4 The emergency vehicle shall send the current en route status (including estimated time of arrival) and requests for emergency dispatch updates.	Existing
<i>Requirement:</i>	
5 The emergency vehicle shall send requests to traffic signal control equipment at the roadside to preempt the signal.	Potential
<i>Requirement:</i>	
6 The emergency vehicle shall provide the personnel on-board with dispatch information, including incident type and location, and forward an acknowledgment from personnel to the center that the vehicle is on its way to the incident scene.	Existing
<i>Requirement:</i>	
7 The emergency vehicle shall send patient status information to the care facility along with a request for further information.	Existing
<i>Requirement:</i>	
8 The emergency vehicle shall forward care facility status information to emergency vehicle personnel, including the location, specialized services, quality of care, waiting time, number of rooms available, and emergency room status of hospitals or emergency care providers.	Existing
<i>Requirement:</i>	
9 The emergency vehicle shall send the vehicle's location, speed and direction to other vehicles in the area.	Planned
<i>Functional Area: On-board EV Incident Management Communication</i>	
On-board systems provide communications support to first responders. Incident information is provided to dispatched emergency personnel. Emergency personnel transmit information about the incident and response status.	
<i>Requirement:</i>	
1 The emergency vehicle shall receive dispatch instructions sufficient to enable emergency personnel in the field to implement an effective incident response. It includes local traffic, road, and weather conditions, hazardous material information, and the current status of resources that have been allocated to an incident.	Existing
<i>Requirement:</i>	
2 The emergency vehicle shall provide an interface to the center for emergency personnel to transmit information about the incident site such as the extent of injuries, identification of vehicles and people involved, hazardous material, etc.	Existing
<i>Requirement:</i>	
3 The emergency vehicle shall provide an interface to the center for emergency personnel to transmit information about the current incident response status such as the identification of the resources on site, site management strategies in effect, and current clearance status.	Existing
<i>Requirement:</i>	
4 The emergency vehicle shall provide traffic incident information to approaching vehicles using short range communications..	Planned
<i>Functional Area: On-Board EV Barrier System Control</i>	
Control automatic or remotely controlled gates and other barrier systems from an emergency vehicle.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Local Emergency Vehicles</i>	
<i>Entity: Emergency Vehicle</i>	
<i>Functional Area: On-Board EV Barrier System Control</i>	
Control automatic or remotely controlled gates and other barrier systems from an emergency vehicle.	
<i>Requirement:</i>	1 The vehicle shall remotely control barrier systems. Barrier systems include automated or remotely controlled gates, barriers and other systems that manage entry to roadways. Planned
<i>Requirement:</i>	2 The vehicle shall collect barrier system operational status. Planned
<i>Requirement:</i>	3 The vehicle shall collect barrier system fault data. Planned
<i>Element: Local Field Equipment</i>	
<i>Entity: Roadway</i>	
<i>Functional Area: Roadway Probe Data Communications</i>	
Field elements that collect probe data from vehicles using short range communications.	
<i>Requirement:</i>	1 The field element shall communicate with passing vehicles for traffic data link time calculations and send collected data to the controlling center; identification will be removed to ensure anonymity. Potential
<i>Requirement:</i>	2 The field element shall communicate with on-board equipment on passing vehicles to collect current vehicle position, speed, and heading and a record of previous events (e.g., starts and stops, link travel times) that can be used to determine current traffic conditions. Potential
<i>Requirement:</i>	3 The field element shall communicate with on-board equipment on passing vehicles to collect current status information and a record of previous events (e.g., temperature, wiper status, headlight status, traction control system status) that can be used to determine road and surface weather conditions. Potential
<i>Requirement:</i>	4 The field element shall communicate with on-board equipment on passing vehicles to collect vehicle trip information (e.g., origin and destination information, travel times) that can be used to support transportation planning. Potential
<i>Requirement:</i>	5 The field element shall communicate with on-board equipment on passing vehicles to collect a history of precise positioning information that can be used to derive or verify accurate roadway geometry and lane features for use by map update providers. Potential
<i>Requirement:</i>	6 The field element shall aggregate and forward collected probe information to the center. Potential
<i>Requirement:</i>	7 The field element shall provide roadside equipment operational status to the center. Potential
<i>Requirement:</i>	8 The field element shall provide roadside equipment fault indication to the center for repair. Potential
<i>Functional Area: Roadway Signal Controls</i>	
Field elements including traffic signal controllers for use at signalized intersections; also supports pedestrian crossings.	
<i>Requirement:</i>	1 The field element shall control traffic signals under center control. Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Local Field Equipment	
<i>Entity:</i> Roadway	
<i>Functional Area:</i> Roadway Signal Controls	
Field elements including traffic signal controllers for use at signalized intersections; also supports pedestrian crossings.	
<i>Requirement:</i>	
2 The field element shall respond to pedestrian crossing requests by accommodating the pedestrian crossing.	Existing
<i>Requirement:</i>	
3 The field element shall provide the capability to notify the traffic management center of pedestrian calls and pedestrian accommodations.	Potential
<i>Requirement:</i>	
4 The field element shall report the current signal control information to the center.	Existing
<i>Requirement:</i>	
5 The field element shall report current preemption status to the center.	Planned
<i>Requirement:</i>	
6 The field element shall return traffic signal controller operational status to the center.	Existing
<i>Requirement:</i>	
7 The field element shall return traffic signal controller fault data to the center.	Existing
<i>Functional Area:</i> Field Management Stations Operation	
Supports direct communications between field management stations and the local field equipment under their control.	
<i>Requirement:</i>	
1 The field management station shall accept configuration information from the center.	Existing
<i>Requirement:</i>	
2 The field management station shall pass data provided by the center to local field devices and report data from the field devices back to the center.	Existing
<i>Functional Area:</i> Roadway Signal Preemption	
Field elements that receive signal preemption requests from approaching emergency vehicles and overrides the current operation of the traffic signals	
<i>Requirement:</i>	
1 The field element shall respond to signal preemption requests from emergency vehicles.	Planned
<i>Functional Area:</i> Roadway Equipment Coordination	
Field elements that control and send data to other field elements (such as environmental sensors that send data to a DMS or coordination between traffic controllers on adjacent intersections), without center control.	
<i>Requirement:</i>	
1 The field element shall include sensors that provide data and status information to other field element devices, without center control.	Potential
<i>Requirement:</i>	
2 The field element shall include sensors that receive configuration data from other field element devices, without center control.	Potential
<i>Requirement:</i>	
3 The field element shall include devices that provide data and status information to other field element devices without center control.	Potential
<i>Requirement:</i>	
4 The field element shall include devices that receive configuration data from other field element devices, without center control.	Potential
<i>Functional Area:</i> Roadway Field Device Monitoring	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Local Field Equipment</i>	
<i>Entity: Roadway</i>	
<i>Functional Area: Roadway Field Device Monitoring</i>	
Monitors field equipment operational status and detects and reports fault conditions. Device status, configuration, and fault information are provided to a remote center and a user interface provides information locally to field personnel.	
<i>Requirement:</i>	
1 The field element shall monitor the operational status (state of the device, configuration, and fault data) of connected sensors (such as traffic, infrastructure, environmental, security, speed) and devices (such as highway advisory radio, dynamic message signs, automated roadway treatment systems, barrier and safeguard systems, cameras, traffic signals, ramp meters, short range communications equipment, security surveillance equipment).	Existing
<i>Requirement:</i>	
2 The field element shall send operational status of connected field equipment to the maintenance center.	Existing
<i>Requirement:</i>	
3 The field element shall send collected fault data to the maintenance center for repair.	Existing
<i>Requirement:</i>	
4 The field element shall include a local interface that provides operational status and fault data for connected field equipment to field personnel.	Existing
<i>Requirement:</i>	
5 The field element shall include a local interface that allows field personnel to command diagnostic tests on connected field equipment.	Existing
<i>Functional Area: Roadway Environmental Monitoring</i>	
Environmental sensors, surface and sub-surface, that collect weather and road surface information. Weather conditions measured include temperature, wind, humidity, precipitation, and visibility. Sensors measure road surface temperature, moisture, icing, salinity, etc.	
<i>Requirement:</i>	
1 The field element shall include surface and sub-surface environmental sensors that measure road surface temperature, moisture, icing, salinity, and other measures.	Existing
<i>Requirement:</i>	
2 The field element shall include environmental sensors that measure weather conditions including temperature, wind, humidity, precipitation, and visibility.	Existing
<i>Requirement:</i>	
3 The field element's environmental sensors shall be remotely controlled by a maintenance center.	Planned
<i>Requirement:</i>	
4 The field element's environmental sensors shall be remotely controlled by a traffic management center.	Potential
<i>Requirement:</i>	
5 The field element's environmental sensors shall be remotely controlled by weather service providers such as the National Weather Service or value-added sector specific meteorological services.	Potential
<i>Requirement:</i>	
6 The field element's environmental sensors shall be remotely controlled by a maintenance and construction vehicle.	Potential
<i>Requirement:</i>	
7 The field element shall provide environmental sensor equipment operational status to the controlling center or maintenance vehicle.	Existing
<i>Requirement:</i>	
8 The field element shall provide environmental sensor equipment fault indication to the controlling center or maintenance vehicle.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Local Field Equipment</i>	
<i>Entity: Roadway</i>	
<i>Functional Area: Roadway Environmental Monitoring</i>	
Environmental sensors, surface and sub-surface, that collect weather and road surface information. Weather conditions measured include temperature, wind, humidity, precipitation, and visibility. Sensors measure road surface temperature, moisture, icing, salinity, etc.	
<i>Requirement:</i>	
9 The field element shall remotely aggregate environmental sensor data with environmental data collected from maintenance and construction vehicles.	Planned
<i>Requirement:</i>	
10 The field element shall provide weather and road surface condition data to centers.	Existing
<i>Requirement:</i>	
11 The field element shall provide weather and road surface condition data to maintenance and construction vehicles.	Existing
<i>Functional Area: Field Barrier System Control</i>	
Field elements that control barrier systems such as gates and other systems that manage entry to roadways, transportation facilities and infrastructure.	
<i>Requirement:</i>	
1 The field element shall activate barrier systems for transportation facilities and infrastructure under center control. Barrier systems include automated or remotely controlled gates, barriers and other systems that manage entry to roadways.	Potential
<i>Requirement:</i>	
2 The field element shall return barrier system operational status to the controlling center.	Potential
<i>Requirement:</i>	
3 The field element shall return barrier system fault data to the maintenance center for repair.	Potential
<i>Requirement:</i>	
4 The field element shall receive requests for access from approaching vehicles using field-vehicle communications and validate and authenticate the requests.	Potential
<i>Requirement:</i>	
5 The field element shall grant access only to qualified vehicles.	Potential
<i>Requirement:</i>	
6 The field element shall communicate access permission status and access instructions to approaching vehicles using field-vehicle communications.	Potential
<i>Functional Area: Roadway Speed Monitoring and Warning</i>	
Vehicle speed sensors that detect excessive vehicle speeds, optionally based on conditions and vehicle type, informing drivers, centers and/or enforcement agencies of speed violations.	
<i>Requirement:</i>	
1 The field element shall include sensors to detect vehicle speeds, under traffic or maintenance center control.	Existing
<i>Requirement:</i>	
2 The field element shall include sensors to detect vehicle speeds, under enforcement agency control.	Planned
<i>Requirement:</i>	
3 If the speed detected by vehicle speed sensors is determined to be excessive, the field element shall provide a safe speed advisory to passing drivers via a driver information system (such as portable messages signs, field to vehicle communications to in-vehicle signing systems, etc.).	Existing
<i>Requirement:</i>	
4 The field element shall base speed advisories to passing drivers on environmental conditions.	Planned

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Local Field Equipment</i>	
<i>Entity: Roadway</i>	
<i>Functional Area: Roadway Speed Monitoring and Warning</i>	
Vehicle speed sensors that detect excessive vehicle speeds, optionally based on conditions and vehicle type, informing drivers, centers and/or enforcement agencies of speed violations.	
<i>Requirement:</i> 5 The field element shall monitor notify an enforcement agency when a speed violation is detected.	Planned
<i>Requirement:</i> 6 The field element shall return operational status for the vehicle speed sensors to the controlling traffic or maintenance center; including measured speeds, warning messages displayed, and violation records.	Existing
<i>Requirement:</i> 7 The field element shall return operational status for the vehicle speed sensors to the enforcement agency.	Planned
<i>Requirement:</i> 8 The field element shall return fault data for the vehicle speed sensors to the controlling center for repair.	Existing
<i>Functional Area: Roadway Infrastructure Monitoring</i>	
Sensors that monitor the condition of pavement, bridges, tunnels, associated hardware, and other transportation-related infrastructure (e.g., culverts), under maintenance center and maintenance vehicle control.	
<i>Requirement:</i> 1 The field element shall include infrastructure condition monitoring sensors that monitor the condition of pavement, bridges, tunnels, associated hardware, and other transportation-related infrastructure (e.g., culverts), under maintenance center control.	Potential
<i>Requirement:</i> 2 The field element shall include infrastructure condition monitoring sensors that monitor the condition of pavement, bridges, tunnels, associated hardware, and other transportation-related infrastructure (e.g., culverts), under maintenance vehicle control.	Potential
<i>Requirement:</i> 3 The field element shall provide operational status for the infrastructure condition monitoring sensors to the maintenance center.	Potential
<i>Requirement:</i> 4 The field element shall provide operational status for the infrastructure condition monitoring sensors to the maintenance vehicle.	Potential
<i>Requirement:</i> 5 The field element shall provide fault data for the infrastructure condition monitoring sensors to the maintenance center for repair.	Potential
<i>Functional Area: Roadway Work Zone Traffic Control</i>	
Field elements in maintenance and construction areas including CCTV cameras, driver information systems (such as DMS), and gates/barriers that monitor and control traffic and provide information directly to drivers in affected areas.	
<i>Requirement:</i> 1 The field element shall collect, process, and send work zone images to the center for further analysis and distribution, under center control.	Potential

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Local Field Equipment</i>	
<i>Entity: Roadway</i>	
<i>Functional Area: Roadway Work Zone Traffic Control</i>	
Field elements in maintenance and construction areas including CCTV cameras, driver information systems (such as DMS), and gates/barriers that monitor and control traffic and provide information directly to drivers in affected areas.	
<i>Requirement:</i>	
2 Under traffic and maintenance center control, the field element shall include driver information systems (such as dynamic messages signs and highway advisory radios) that advise drivers of activity around the work zone through which they are currently passing.	Existing
<i>Requirement:</i>	
3 Under the control of field personnel within maintenance vehicles, the field element shall include driver information systems (such as dynamic messages signs and highway advisory radios) that advise drivers of activity around a work zone through which they are currently passing.	Existing
<i>Requirement:</i>	
4 The field element shall control access to the work zone using automated gate or barrier systems. This includes automated flagger assistance devices that include automated gate arms and other automated gate/barrier systems.	Planned
<i>Requirement:</i>	
5 The field element shall provide operational status for the surveillance (e.g. CCTV), driver information systems, and gates/barriers in work zones to the maintenance center.	Existing
<i>Requirement:</i>	
6 The field element shall provide fault data for the surveillance (e.g. CCTV), driver information systems, and gates/barriers in work zones to the maintenance center for repair.	Existing
<i>Functional Area: Roadway Work Zone Safety</i>	
Work zone intrusion detection devices (to detect vehicle intrusion upon a work zone or crew worker movement across a work zone boundary) and intrusion alerting devices that provide alerts to crew and drivers.	
<i>Requirement:</i>	
1 The field element shall include work zone intrusion detection devices that detect when a vehicle has intruded upon the boundary of a work zone, under center control.	Potential
<i>Requirement:</i>	
2 The field element shall include work zone intrusion detection devices that detect when crew workers have crossed the boundary between the work zone and vehicle traffic, under center control.	Potential
<i>Requirement:</i>	
3 The field element shall include work zone intrusion alerting devices that alert crew workers of a work zone emergency or safety issue such as the intrusion of a vehicle into the work zone area or movement of field crew into the travel lanes.	Potential
<i>Requirement:</i>	
4 The field element shall include work zone intrusion alerting devices that notify crew via maintenance vehicles of a work zone emergency or safety issue such as the intrusion of a vehicle into the work zone area or movement of field crew into the travel lanes.	Potential
<i>Requirement:</i>	
5 The field element shall include work zone intrusion alerting devices that alert drivers that they have intruded upon the perimeter of the work zone, or are about to do so; may provide alerts to drivers directly or via in-vehicle signing.	Potential

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Local Field Equipment</i>	
<i>Entity: Roadway</i>	
<i>Functional Area: Roadway Work Zone Safety</i>	
Work zone intrusion detection devices (to detect vehicle intrusion upon a work zone or crew worker movement across a work zone boundary) and intrusion alerting devices that provide alerts to crew and drivers.	
<i>Requirement:</i> 6 The field element shall provide operational status for the work zone intrusion detection devices to the maintenance center.	Potential
<i>Requirement:</i> 7 The field element shall provide fault data for the work zone intrusion detection devices to the maintenance center for repair.	Potential
<i>Requirement:</i> 8 The field element shall provide operational status for the work zone intrusion alerting devices to the maintenance center.	Potential
<i>Requirement:</i> 9 The field element shall provide fault data for the work zone intrusion alerting devices to the maintenance center for repair.	Potential
<i>Functional Area: Roadway Data Collection</i>	
Field elements to collect traffic, road, and environmental conditions information for use in transportation planning, research, and other off-line applications. Includes the sensors, supporting roadside infrastructure, and communications equipment.	
<i>Requirement:</i> 1 The field element shall collect traffic, road, and environmental conditions information.	Existing
<i>Requirement:</i> 2 The field element shall include the sensors and supporting roadside devices that sense, collect, and send traffic, road, and environmental conditions information to a center for archival.	Existing
<i>Requirement:</i> 3 The field element shall collect sensor status and sensor faults from roadside equipment and send it along with the recorded data to a center for archival.	Existing
<i>Element: Local Maintenance and Construction Management System</i>	
<i>Entity: Maintenance and Construction Management</i>	
<i>Functional Area: MCM Vehicle Tracking</i>	
Remotely tracks the location of maintenance and construction vehicles and other equipment; presented to the center personnel.	
<i>Requirement:</i> 1 The center shall monitor the locations of all maintenance and construction vehicles and other equipment under its jurisdiction.	Planned
<i>Requirement:</i> 2 The center shall present location data to center personnel for the fleet of maintenance and construction vehicles and other equipment.	Planned
<i>Requirement:</i> 3 The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for maintenance and construction vehicle tracking.	Planned
<i>Functional Area: MCM Vehicle and Equipment Maintenance Management</i>	
Monitors vehicle and equipment condition, tracks maintenance history, and schedules routine and corrective maintenance.	
<i>Requirement:</i> 1 The center shall collect and analyze vehicle diagnostics information from maintenance and construction vehicles. The information includes engine temperature, mileage, tire wear, brake wear, belt wear, and any warnings or alarms concerning the operational condition of the vehicle and ancillary equipment.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Local Maintenance and Construction Management System	
<i>Entity:</i> Maintenance and Construction Management	
<i>Functional Area:</i> MCM Vehicle and Equipment Maintenance Management	
Monitors vehicle and equipment condition, tracks maintenance history, and schedules routine and corrective maintenance.	
<i>Requirement:</i>	
2 The center shall exchange information with equipment repair facilities including status and history of repairs concerning maintenance and construction vehicles. This information includes vehicle status and diagnostic information, vehicle utilization, and coordination of when vehicles will be available for preventative and corrective maintenance.	Existing
<i>Requirement:</i>	
3 The center shall schedule preventive and corrective vehicle maintenance with the equipment repair facility based on fleet health reports, maintenance records, vehicle utilization and vehicle availability schedules.	Existing
<i>Functional Area:</i> MCM Incident Management	
Supports coordinated response to incidents - share incident notifications, manage incident response resources, and coordinate overall incident situation and response among allied response organizations.	
<i>Requirement:</i>	
1 The center shall 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.	Existing
<i>Requirement:</i>	
2 The center shall 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.	Existing
<i>Requirement:</i>	
3 The center shall 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.	Existing
<i>Requirement:</i>	
4 The center shall coordinate planning for incidents with emergency management centers - including pre-planning activities for disaster response, evacuation, and recovery operations.	Existing
<i>Requirement:</i>	
5 The center shall 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.	Existing
<i>Requirement:</i>	
6 The center shall exchange road network status assessment information with emergency management and traffic management 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.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Local Maintenance and Construction Management System</i>	
<i>Entity: Maintenance and Construction Management</i>	
<i>Functional Area: MCM Incident Management</i>	
Supports coordinated response to incidents - share incident notifications, manage incident response resources, and coordinate overall incident situation and response among allied response organizations.	
<i>Requirement:</i> 7 The center shall 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.	Existing
<i>Requirement:</i> 8 The center shall receive information indicating the damage sustained by transportation assets, derived from aerial surveillance, field reports, inspections, tests, and analyses to support incident management.	Existing
<i>Functional Area: MCM Maintenance Decision Support</i>	
Maintenance Decision Support Systems recommend courses of action based on current and forecast environmental and road conditions (filtered and fused for specific time horizons) and additional application specific information. Recommendations and dispatch instructions are generated based on this integrated information.	
<i>Requirement:</i> 1 The center shall provide the center personnel with tailored external information, including weather or road condition observations, forecasted weather information or road conditions, current usage of treatments and materials, available resources, equipment and vehicle availability, road network information, and source reliability information.	Existing
<i>Requirement:</i> 2 The center shall tailor the decision support information to include filtering (selection from a large amount of external information), error reduction ('smoothing' the information), fusion (combination of disparate information to match the decision needs), and analysis (creating the decision).	Existing
<i>Requirement:</i> 3 The center shall provide an interface to the center personnel to input control parameters for the decision support process and receive decisions or information presentation.	Existing
<i>Requirement:</i> 4 The center shall provide dispatch information to maintenance and construction vehicles based on the outputs of the decision support system, including recommended roadway treatment actions.	Existing
<i>Functional Area: MCM Winter Maintenance Management</i>	
Manages winter road maintenance, tracking and controlling snow plow operations, roadway treatment (e.g., salt spraying and other material applications) based on weather information.	
<i>Requirement:</i> 1 The center shall respond to requests from emergency management and traffic management centers for hazard removal, field equipment repair, and other winter roadway maintenance.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Local Maintenance and Construction Management System</i>	
<i>Entity: Maintenance and Construction Management</i>	
<i>Functional Area: MCM Winter Maintenance Management</i>	
Manages winter road maintenance, tracking and controlling snow plow operations, roadway treatment (e.g., salt spraying and other material applications) based on weather information.	
<i>Requirement:</i>	
2 The center shall exchange information with administrative systems to support the planning and scheduling of winter maintenance activities. This information includes: equipment and consumables resupply purchase request status, personnel qualifications including training and special certifications, environmental regulations and rules that may impact maintenance activities, and requests and project requirements from contract administration.	Existing
<i>Requirement:</i>	
3 The center shall 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.	Existing
<i>Requirement:</i>	
4 The center shall receive equipment availability and materials storage status information from storage facilities to support the scheduling of winter maintenance activities.	Existing
<i>Requirement:</i>	
5 The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for the scheduling of winter maintenance activities.	Planned
<i>Requirement:</i>	
6 The center shall collect real-time information on the state of the regional transportation system from other centers including current traffic and road conditions, weather conditions, special event and incident information and use the collected information to support winter maintenance operations.	Existing
<i>Requirement:</i>	
7 The center shall dispatch and route winter maintenance vehicle drivers and support them with route- specific environmental, incident, advisory, threat, alert, and traffic congestion information.	Existing
<i>Requirement:</i>	
8 The center shall 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.	Existing
<i>Requirement:</i>	
9 The center shall 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.	Existing
<i>Requirement:</i>	
10 The center shall support remote control of on-board maintenance and construction vehicle systems and field equipment that is remotely controlled by the vehicle such as adjusting material application rates and spread patterns.	Planned

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Local Maintenance and Construction Management System</i>	
<i>Entity: Maintenance and Construction Management</i>	
<i>Functional Area: MCM Winter Maintenance Management</i>	
Manages winter road maintenance, tracking and controlling snow plow operations, roadway treatment (e.g., salt spraying and other material applications) based on weather information.	
<i>Requirement:</i>	
11 The center shall assess the current status of all winter maintenance activities, including actual work activities performed, current locations and operational conditions of vehicles, materials and equipment inventories, field equipment status, environmental information, etc.	Existing
<i>Functional Area: MCM Roadway Maintenance and Construction</i>	
Overall management and support for routine maintenance on the roadway or right-of-way. Includes landscape maintenance, hazard removal (roadway debris, dead animals), routine maintenance activities (roadway cleaning, grass cutting), and repair and maintenance of both ITS and non-ITS equipment.	
<i>Requirement:</i>	
1 The center shall maintain an interface with asset management systems to track the inventory, restrictions, repair needs and status updates of transportation assets (pavement, bridges, signs, etc.) including location, installation and materials information, vendor/contractor, current maintenance status, standard height, width, and weight restrictions.	Existing
<i>Requirement:</i>	
2 The center shall respond to requests from emergency management and traffic management centers for hazard removal, field equipment repair, and other roadway maintenance.	Existing
<i>Requirement:</i>	
3 The center shall exchange information with administrative systems to support the planning and scheduling of maintenance activities. This information includes: equipment and consumables resupply purchase request status, personnel qualifications including training and special certifications, environmental regulations and rules that may impact maintenance activities, and requests and project requirements from contract administration.	Existing
<i>Requirement:</i>	
4 The center shall provide emergency management and traffic management centers with information about scheduled maintenance and construction work activities including anticipated closures and impact to the roadway, alternate routes, anticipated delays, closure times, and durations.	Existing
<i>Requirement:</i>	
5 The center shall collect the status and fault data from roadside equipment, such as traffic, infrastructure, and environmental sensors, highway advisory radio and dynamic message signs, automated roadway treatment systems, barrier and safeguard systems, cameras, traffic signals and override equipment, ramp meters, short range communications equipment, security sensors and surveillance equipment, etc., and provide a cohesive view of equipment repair needs.	Potential

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Local Maintenance and Construction Management System	
<i>Entity:</i> Maintenance and Construction Management	
<i>Functional Area:</i> MCM Roadway Maintenance and Construction	
Overall management and support for routine maintenance on the roadway or right-of-way. Includes landscape maintenance, hazard removal (roadway debris, dead animals), routine maintenance activities (roadway cleaning, grass cutting), and repair and maintenance of both ITS and non-ITS equipment.	
<i>Requirement:</i>	
6 The center shall collect the status and fault data from the centers that operate the equipment, including data for traffic, infrastructure, and environmental sensors, highway advisory radio and dynamic message signs, automated roadway treatment systems, barrier and safeguard systems, cameras, traffic signals and override equipment, ramp meters, short range communications equipment, security sensors and surveillance equipment, etc., and provide a cohesive view of equipment repair needs.	Potential
<i>Requirement:</i>	
7 The center shall receive equipment availability and materials storage status information from storage facilities to support the scheduling of roadway maintenance and construction activities.	Existing
<i>Requirement:</i>	
8 The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for the scheduling of roadway maintenance and construction activities.	Planned
<i>Requirement:</i>	
9 The center shall collect current and forecast traffic and weather information from traffic management centers and weather service providers (such as the National Weather Service and value-added sector specific meteorological services).	Existing
<i>Requirement:</i>	
10 The center shall dispatch and route maintenance and construction vehicle drivers and support them with route-specific environmental, incident, advisory, threat, alert, and traffic congestion information.	Existing
<i>Requirement:</i>	
11 The center shall manage an interface with center personnel to accept vehicle systems control information and remotely control maintenance and construction vehicle on-board equipment.	Planned
<i>Requirement:</i>	
12 The center shall track the status of roadway maintenance and construction activities by monitoring collected data from the dispatched vehicles and equipment.	Planned
<i>Requirement:</i>	
13 The center shall report the status of field equipment maintenance activities to the centers that operate the equipment.	Existing
<i>Functional Area:</i> MCM Work Zone Management	
Remotely monitors and supports work zone activities, controlling traffic through dynamic message signs (DMS), highway advisory radio, gates and barriers, and informing other groups of activity (e.g., traveler information systems, traffic management centers, other maintenance and construction centers).	
<i>Requirement:</i>	
1 The center shall generate new work zone activity schedules for use by maintenance and construction vehicles, maintenance and construction operators, and for information coordination purposes.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Local Maintenance and Construction Management System</i>	
<i>Entity: Maintenance and Construction Management</i>	
<i>Functional Area: MCM Work Zone Management</i>	
Remotely monitors and supports work zone activities, controlling traffic through dynamic message signs (DMS), highway advisory radio, gates and barriers, and informing other groups of activity (e.g., traveler information systems, traffic management centers, other maintenance and construction centers).	
<i>Requirement:</i>	
2 The center shall control the collection of work zone status information including video images from cameras located in or near the work zone.	Existing
<i>Requirement:</i>	
3 The center shall disseminate work zone information to other agencies and centers including traffic, transit, emergency management centers, other maintenance centers, traveler information providers, and the media.	Existing
<i>Requirement:</i>	
4 The center shall control traffic in work zones by providing remote control of dynamic message signs, highway advisory radio systems, gates, and barriers located in or near the work zone.	Potential
<i>Requirement:</i>	
5 The center shall exchange information with administrative systems to support the planning and scheduling of work zone activities. This information includes: equipment and consumables resupply purchase request status, personnel qualifications including training and special certifications, environmental regulations and rules that may impact maintenance activities, and requests and project requirements from contract administration.	Existing
<i>Requirement:</i>	
6 The center shall collect real-time information on the state of the road network including current traffic and road conditions to support work zone scheduling and management.	Existing
<i>Functional Area: MCM Speed Monitoring and Warning</i>	
Remotely monitors vehicle speeds, and informs an enforcement agency if excessive speeds are detected; primarily used in work zones.	
<i>Requirement:</i>	
1 The center shall remotely control vehicle speed sensors typically placed in work zones; control parameters may include environmental and traffic conditions.	Existing
<i>Requirement:</i>	
2 The center shall collect operational status for the vehicle speed sensors; the status shall include logged information including measured speeds, warning messages displayed, and violation records.	Planned
<i>Requirement:</i>	
3 The center shall provide the capability to notify an enforcement agency when vehicle speeds in the work zone are in excess of the posted speed limit or are creating an unsafe condition based upon the current environmental or traffic conditions.	Existing
<i>Requirement:</i>	
4 The center shall collect fault data for the vehicle speed sensors for repair.	Existing
<i>Functional Area: MCM Work Zone Safety Management</i>	
Remotely monitors work zone safety systems that detect vehicle intrusions in work zones and warns crew workers and drivers of imminent encroachment. Crew movements are also monitored so that the crew can be warned of movement beyond the designated safe zone.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Local Maintenance and Construction Management System</i>	
<i>Entity: Maintenance and Construction Management</i>	
<i>Functional Area: MCM Work Zone Safety Management</i>	
Remotely monitors work zone safety systems that detect vehicle intrusions in work zones and warns crew workers and drivers of imminent encroachment. Crew movements are also monitored so that the crew can be warned of movement beyond the designated safe zone.	
<i>Requirement:</i>	
1 The center shall provide remote monitoring and control of work zone safety devices - including intrusion detection devices that have been installed in work zones or maintenance areas.	Potential
<i>Requirement:</i>	
2 The center shall provide remote monitoring and control of intrusion alert devices that have been installed in work zones or maintenance areas.	Potential
<i>Requirement:</i>	
3 The center shall collect status information of work zone safety device status from field equipment or the maintenance and construction vehicles.	Potential
<i>Requirement:</i>	
4 The center shall collect and store work zone data collected from work zone monitoring devices (such as intrusion detection or alert devices and speed monitoring devices) on-board the vehicle and at the roadside.	Potential
<i>Functional Area: MCM Work Activity Coordination</i>	
Disseminates work activity schedules and current asset restrictions to other agencies. Work schedules are coordinated, factoring in the needs and activities of other agencies and adjacent jurisdictions.	
<i>Requirement:</i>	
1 The center shall 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.	Planned
<i>Requirement:</i>	
2 The center shall 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.	Planned
<i>Requirement:</i>	
3 The center shall collect and respond to feedback concerning scheduled maintenance and construction activities with other management centers such as traffic, emergency, transit, and rail operations.	Planned
<i>Requirement:</i>	
4 The center shall collect and disseminate asset restriction information levied on transportation asset usage based on infrastructure design, surveys, tests, or analyses. This includes standard facility design height, width, and weight restrictions, special restrictions such as spring weight restrictions, and temporary facility restrictions that are imposed during maintenance and construction.	Planned

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Local Maintenance and Construction Management System	
<i>Entity:</i> Maintenance and Construction Management	
<i>Functional Area:</i> MCM Work Activity Coordination	
Disseminates work activity schedules and current asset restrictions to other agencies. Work schedules are coordinated, factoring in the needs and activities of other agencies and adjacent jurisdictions.	
<i>Requirement:</i> 5 The center shall exchange information with administrative systems to support the planning and scheduling of maintenance and construction activities. This information includes: equipment and consumables resupply purchase request status, personnel qualifications including training and special certifications, environmental regulations and rules that may impact maintenance activities, and requests and project requirements from contract administration.	Existing
<i>Requirement:</i> 6 The center shall exchange rail schedules and work plans with rail operations centers.	Planned
<i>Functional Area:</i> MCM Infrastructure Monitoring	
Remotely monitors the condition of pavement, bridges, tunnels, associated hardware, and other transportation-related infrastructure (e.g., culverts) using vehicle-based and roadway-based infrastructure monitoring sensors.	
<i>Requirement:</i> 1 The center shall remotely control and collect data from fixed infrastructure monitoring sensors that monitor vibration, stress, temperature, surface continuity, and other condition measures.	Planned
<i>Requirement:</i> 2 The center shall monitor maintenance vehicle-based mobile sensors and data logging devices that collect information on current infrastructure condition.	Planned
<i>Requirement:</i> 3 The center shall remotely collect data from vehicle probes using short range communications equipment and process this data to identify potential pavement degradation, potholes, and other rough or adverse road surface conditions.	Planned
<i>Requirement:</i> 4 The center shall process the collected information and use it to monitor the condition of pavement, bridges, tunnels, associated hardware, and other transportation-related infrastructure.	Planned
<i>Requirement:</i> 5 The center shall collect current maintenance and repair needs from the asset management system and correlate this data with data collected through infrastructure monitoring systems.	Planned
<i>Requirement:</i> 6 The center shall provide current infrastructure conditions information to the asset management system.	Planned
<i>Requirement:</i> 7 The center shall report infrastructure repair needs to the maintenance management system.	Planned
<i>Functional Area:</i> MCM Data Collection	
Collection and storage of maintenance and construction information. For use by operations personnel or data archives in the region.	
<i>Requirement:</i> 1 The center shall collect maintenance and construction data (such as field equipment status, infrastructure status, maintenance and construction activity data) gathered from roadway, traffic, and other maintenance and construction sources.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Local Maintenance and Construction Management System</i>	
<i>Entity: Maintenance and Construction Management</i>	
<i>Functional Area: MCM Data Collection</i>	
Collection and storage of maintenance and construction information. For use by operations personnel or data archives in the region.	
<i>Requirement:</i> 2 The center shall assign quality control metrics and meta-data to be stored along with the data. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.	Planned
<i>Requirement:</i> 3 The center shall receive and respond to requests from ITS Archives for either a catalog of the maintenance and construction data or for the data itself.	Planned
<i>Requirement:</i> 4 The center shall be able to produce sample products of the data available.	Planned
<i>Requirement:</i> 5 The center shall provide data to Asset Management to be used in updating the status of assets in the inventory.	Existing
<i>Functional Area: MCM Transportation Operations Data Collection</i>	
Collects real-time information on the state of the regional transportation system for operational use by the center. It establishes communications with a regional repository, requests or subscribes to information relevant to the center, and distributes the received information for use.	
<i>Requirement:</i> 1 The center shall collect real-time information on the state of the regional transportation system including current traffic and road conditions, weather conditions, special event and incident information.	Existing
<i>Requirement:</i> 2 The center shall support the capability for the system operator to monitor and control the information collection service.	Existing
<i>Element: Local Maintenance and Construction Vehicles</i>	
<i>Entity: Maintenance and Construction Vehicle</i>	
<i>Functional Area: MCV Vehicle Location Tracking</i>	
On-board systems to track vehicle location and reports the position and timestamp information to the dispatch center.	
<i>Requirement:</i> 1 The maintenance and construction vehicle shall track its current location.	Planned
<i>Requirement:</i> 2 The maintenance and construction vehicle shall send the time stamped vehicle location to the controlling center.	Planned
<i>Functional Area: MCV Vehicle System Monitoring and Diagnostics</i>	
On-board sensors capable of monitoring the condition of each of the vehicle systems and diagnostics that can be used to support vehicle maintenance.	
<i>Requirement:</i> 1 The maintenance and construction vehicle shall collect vehicle diagnostics and operating status data from the maintenance vehicle platform including engine temperature, mileage, tire wear, brake wear, belt wear, and other operational status measures as well as the status of maintenance and construction-specific systems on the vehicle.	Existing
<i>Requirement:</i> 2 The maintenance and construction vehicle shall use the diagnostic and status information to support scheduling vehicle maintenance, monitoring safety status, and informing the vehicle operator of the conditions.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Local Maintenance and Construction Vehicles</i>	
<i>Entity: Maintenance and Construction Vehicle</i>	
<i>Functional Area: MCV Vehicle System Monitoring and Diagnostics</i>	
On-board sensors capable of monitoring the condition of each of the vehicle systems and diagnostics that can be used to support vehicle maintenance.	
<i>Requirement:</i>	
3 The maintenance and construction vehicle shall the vehicle diagnostic and safety information to an equipment repair facility.	Existing
<i>Requirement:</i>	
4 The maintenance and construction vehicle shall send the vehicle diagnostic and safety information to the controlling maintenance center.	Existing
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<i>Functional Area: MCV Barrier System Control</i>	
Control automatic or remotely controlled gates and other barrier systems from a maintenance and construction vehicle.	
<i>Requirement:</i>	
1 The vehicle shall remotely control barrier systems. Barrier systems include automated or remotely controlled gates, barriers and other systems that manage entry to roadways.	Potential
<i>Requirement:</i>	
2 The vehicle shall collect barrier system operational status.	Potential
<i>Requirement:</i>	
3 The vehicle shall collect barrier system fault data.	Potential
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<i>Functional Area: MCV Winter Maintenance</i>	
On-board systems that support snow plow operations and other roadway treatments (e.g., salt spraying and other material applications). Supports information sharing between snow plows.	
<i>Requirement:</i>	
1 The maintenance and construction vehicle shall track the location and status of safety systems on-board the vehicle.	Planned
<i>Requirement:</i>	
2 The maintenance and construction vehicle shall respond to control information from the center to allow remote operation of the on-board vehicle systems. These systems include winter maintenance equipment for plowing, treating, and anti-icing.	Planned
<i>Requirement:</i>	
3 The maintenance and construction vehicle shall monitor materials information including remaining quantity and current application rate of materials on the vehicle.	Existing
<i>Requirement:</i>	
4 The maintenance and construction vehicle shall respond to dispatch information from the center, presented to the vehicle operator for acknowledgement and returning status.	Existing
<i>Requirement:</i>	
5 The maintenance and construction vehicle shall send operational data to the center including the operational state of the maintenance equipment (e.g., blade up/down, spreader pattern), types and quantities of materials used for construction and maintenance activities, and a record of the actual work performed.	Existing
<i>Requirement:</i>	
6 The maintenance and construction vehicle shall exchange operational and environmental data with other maintenance and construction vehicles. Operational data includes operational state of the maintenance equipment (e.g., blade up/down, spreader pattern, equipment configuration) and a record of the actual work performed while the environmental data includes environmental sensor data collected on-board a maintenance and construction vehicle, either raw or processed data.	Existing
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<i>Functional Area: MCV Roadway Maintenance and Construction</i>	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Local Maintenance and Construction Vehicles</i>	
<i>Entity: Maintenance and Construction Vehicle</i>	
<i>Functional Area: MCV Roadway Maintenance and Construction</i>	
On-board systems that support routine non-winter maintenance on the roadway or right-of-way. Includes landscape maintenance, hazard removal (roadway debris, dead animals), routine maintenance activities (roadway cleaning, grass cutting), and repair and maintenance of equipment on the roadway.	
<i>Requirement:</i>	
1 The maintenance and construction vehicle shall track the location and status of safety systems on-board the vehicle.	Planned
<i>Requirement:</i>	
2 The maintenance and construction vehicle shall respond to control information from the center to allow remote operation of the on-board vehicle systems. These systems include routine maintenance equipment for cutting, repairs, hazard removal, etc.	Planned
<i>Requirement:</i>	
3 The maintenance and construction vehicle shall monitor materials information including remaining quantity and current application rate of materials on the vehicle.	Existing
<i>Requirement:</i>	
4 The maintenance and construction vehicle shall respond to dispatch information from the center, presented to the vehicle operator for acknowledgement and returning status.	Existing
<i>Requirement:</i>	
5 The maintenance and construction vehicle shall send operational data to the center including the operational state of the maintenance equipment (e.g., blade up/down, spreader pattern), types and quantities of materials used for construction and maintenance activities, and a record of the actual work performed.	Existing
<i>Functional Area: MCV Infrastructure Monitoring</i>	
On-board systems to monitor the condition of pavement, bridges, tunnels, associated hardware, and other transportation-related infrastructure (e.g., culverts). Includes vehicle-based sensors and communications with roadway-based infrastructure monitoring sensors.	
<i>Requirement:</i>	
1 The maintenance and construction vehicle shall collect infrastructure data from on-board sensors relating to the physical characteristics of the roadway infrastructure, including pavement, bridges, culverts, signs, etc.	Planned
<i>Requirement:</i>	
2 The maintenance and construction vehicle shall collect infrastructure data from sensors located along the roadway relating to the physical characteristics of the roadway infrastructure, including pavement, bridges, culverts, signs, etc.	Planned
<i>Requirement:</i>	
3 The maintenance and construction vehicle shall provide control signals to infrastructure monitoring sensors located at the roadway.	Planned
<i>Requirement:</i>	
4 The maintenance and construction vehicle shall send current condition of pavement, bridges, culverts, signs, and other roadway infrastructure as measured by on-board sensors or read from infrastructure-based sensors to the center. The data may include raw data or images (e.g., photo logs) that indicate the current status of the infrastructure.	Planned
<i>Requirement:</i>	
5 The maintenance and construction vehicle shall respond to control information from the center to allow remote operation of the on-board vehicle systems.	Planned

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Local Maintenance and Construction Vehicles</i>	
<i>Entity: Maintenance and Construction Vehicle</i>	
<i>Functional Area: MCV Infrastructure Monitoring</i>	
On-board systems to monitor the condition of pavement, bridges, tunnels, associated hardware, and other transportation-related infrastructure (e.g., culverts). Includes vehicle-based sensors and communications with roadway-based infrastructure monitoring sensors.	
<i>Requirement:</i>	
6 The maintenance and construction vehicle shall provide infrastructure sensor equipment operational status to the center.	Planned
<i>Functional Area: MCV Work Zone Support</i>	
On-board systems that provide communications and support for local management of a work zone.	
<i>Requirement:</i>	
1 The maintenance and construction vehicle shall monitor, operate, and control work zone devices located at or alongside the roadway. The devices operated on board the vehicle include driver information devices (e.g. dynamic message signs) and work zone intrusion detection and alert devices.	Existing
<i>Requirement:</i>	
2 The maintenance and construction vehicle shall provide an interface for field personnel to input status of their work zone activities.	Existing
<i>Requirement:</i>	
3 The maintenance and construction vehicle shall collect inputs from field personnel and from work zone devices on-board the maintenance and construction vehicle and send them to the controlling center.	Existing
<i>Functional Area: MCV Vehicle Safety Monitoring</i>	
On-board systems to detect vehicle intrusions and warn crew workers and drivers of imminent encroachment. Crew movements are monitored so that the crew can be warned of movement beyond the designated safe zone. Used for stationary work zones or in mobile applications where a safe zone is maintained around the moving vehicle.	
<i>Requirement:</i>	
1 The maintenance and construction vehicle shall detect that a vehicle has intruded upon the boundary of a work zone. The boundary of the work zone represents an area around the maintenance and construction vehicle, which may be stationary or moving.	Planned
<i>Requirement:</i>	
2 The maintenance and construction vehicle shall receive work zone warnings from the field equipment at the roadside, other maintenance and construction vehicles.	Planned
<i>Requirement:</i>	
3 The maintenance and construction vehicle shall present work zone warnings to the field personnel using direct warning signals or in-vehicle signage functions.	Planned
<i>Requirement:</i>	
4 The maintenance and construction vehicle shall monitor the crew movements to identify when a crew member is crossing the boundary between a work zone and vehicle traffic and issue an alert to the crew member.	Planned
<i>Requirement:</i>	
5 The maintenance and construction vehicle shall provide status of the work zone warning systems to the center.	Planned
<i>Element: Local Multimodal Crossings</i>	
<i>Entity: Roadway</i>	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Local Multimodal Crossings</i>	
<i>Entity: Roadway</i>	
<i>Functional Area: Roadway Signal Preemption</i>	
Field elements that receive signal preemption requests from approaching emergency vehicles and overrides the current operation of the traffic signals	
<i>Requirement:</i>	Planned
1 The field element shall respond to signal preemption requests from emergency vehicles.	
<i>Functional Area: Roadway Incident Detection</i>	
Field elements that monitor traffic conditions to identify incidents. It includes traffic detectors that collect traffic flow information and identify unusual traffic conditions and advanced CCTV cameras with built-in incident detection algorithms.	
<i>Requirement:</i>	Planned
1 The field element shall collect, process, and send traffic images to the center for further analysis and distribution.	
<i>Requirement:</i>	Planned
2 The field element shall remotely process video data and provide an indication of potential incidents to the traffic management center.	
<i>Requirement:</i>	Potential
3 The field element's video devices shall be remotely controlled by a traffic management center.	
<i>Requirement:</i>	Planned
4 The field element shall provide operational status and fault data for the incident detection devices to the traffic management center.	
<i>Functional Area: Standard Rail Crossing</i>	
Field elements at highway-rail intersections (HRIs) where operational requirements do not dictate advanced features (e.g., where rail operational speeds are less than 80 miles per hour). Includes traditional HRI warning systems augmented with other standard traffic management devices.	
<i>Requirement:</i>	Planned
1 The field element shall collect and process, traffic sensor data in the vicinity of a highway-rail intersection (HRI).	
<i>Requirement:</i>	Planned
2 The field element shall monitor the status of the highway-rail intersection (HRI) equipment, including both the current state and mode of operation and the current equipment condition, to be forwarded on to the traffic management center.	
<i>Requirement:</i>	Existing
3 The field element shall monitor the status of the highway-rail intersection (HRI) equipment, including both the current state and mode of operation and the current equipment condition, to be forwarded on to the rail wayside equipment.	
<i>Requirement:</i>	Planned
4 The field element shall receive track status from the rail wayside equipment that can be passed on to the traffic management center. This may include the current status of the tracks and whether a train is approaching.	
<i>Requirement:</i>	Planned
5 The field element shall collect pedestrian images and pedestrian sensor data, and respond to pedestrian crossing requests via display, audio signal, or other manner.	
<i>Requirement:</i>	Potential
6 The field element shall control the dynamic message signs (DMS) in the vicinity of a highway-rail intersection (HRI) to advise drivers, cyclists, and pedestrians of approaching trains.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Local Multimodal Crossings</i>	
<i>Entity: Roadway</i>	
<i>Functional Area: Standard Rail Crossing</i>	
Field elements at highway-rail intersections (HRIs) where operational requirements do not dictate advanced features (e.g., where rail operational speeds are less than 80 miles per hour). Includes traditional HRI warning systems augmented with other standard traffic management devices.	
<i>Requirement:</i>	Existing
7 The field element shall close the highway-rail intersection (HRI) when a train is approaching using gates, lights/signs, barriers, and traffic control signals.	
<i>Requirement:</i>	Planned
8 The field element shall support the integrated control of adjacent traffic signals to clear an area in advance of an approaching train and to manage traffic around the intersection.	
<i>Requirement:</i>	Planned
9 The field element shall forward rail traffic advisories received from the Wayside Equipment to the traffic management center.	
<i>Functional Area: Advanced Rail Crossing</i>	
Field elements at highway-rail intersections (HRIs) where operational requirements demand advanced features (e.g., where rail operational speeds are greater than 80 miles per hour). Capabilities from the Standard Rail Crossing plus systems which preclude entrance into the intersection when the barriers are activated, additional arriving train information, and detection of blocked intersections.	
<i>Requirement:</i>	Planned
1 The field element shall collect and process, traffic sensor data in the vicinity of a highway-rail intersection (HRI).	
<i>Requirement:</i>	Planned
2 The field element shall determine whether the highway-rail intersection (HRI) is blocked by traffic in the roadway or some other obstruction.	
<i>Requirement:</i>	Planned
3 The field element shall notify the traffic management center and the rail wayside equipment of any intersection blockages, including trapped vehicles or other obstructions.	
<i>Requirement:</i>	Planned
4 The field element shall monitor the status of the highway-rail intersection (HRI) equipment, including both the current state and mode of operation and the current equipment condition, to be forwarded on to the traffic management center.	
<i>Requirement:</i>	Planned
5 The field element shall monitor the status of the highway-rail intersection (HRI) equipment, including both the current state and mode of operation and the current equipment condition, to be forwarded on to the rail wayside equipment.	
<i>Requirement:</i>	Planned
6 The field element shall receive track status and arriving train information from the rail wayside equipment that can be passed on to the traffic management center. This may include the current status of the tracks and when a train is expected and/or how long the crossing will be closed.	
<i>Requirement:</i>	Planned
7 The field element shall collect pedestrian images and pedestrian sensor data, and respond to pedestrian crossing requests via display, audio signal, or other manner.	
<i>Requirement:</i>	Potential
8 The field element shall control the dynamic message signs (DMS) in the vicinity of a highway-rail intersection (HRI) to advise drivers, cyclists, and pedestrians of approaching trains.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Local Multimodal Crossings</i>	
<i>Entity: Roadway</i>	
<i>Functional Area: Advanced Rail Crossing</i>	
Field elements at highway-rail intersections (HRIs) where operational requirements demand advanced features (e.g., where rail operational speeds are greater than 80 miles per hour). Capabilities from the Standard Rail Crossing plus systems which preclude entrance into the intersection when the barriers are activated, additional arriving train information, and detection of blocked intersections.	
<i>Requirement:</i>	Planned
9 The field element shall close the highway-rail intersection (HRI) when a train is approaching with enough time for traffic to safely clear the crossing using gates, lights/signs, barriers, and traffic control signals.	
<i>Requirement:</i>	Planned
10 The field element shall support the integrated control of adjacent traffic signals to clear an area in advance of an approaching train and to manage traffic around the intersection.	
<i>Requirement:</i>	Planned
11 The field element shall forward rail traffic advisories received from the Wayside Equipment to the traffic management center.	
<i>Requirement:</i>	Planned
12 The field element shall provide approaching train advisories using field-vehicle communications to vehicles approaching the grade crossing.	
<i>Functional Area: Roadway Equipment Coordination</i>	
Field elements that control and send data to other field elements (such as environmental sensors that send data to a DMS or coordination between traffic controllers on adjacent intersections), without center control.	
<i>Requirement:</i>	Planned
1 The field element shall include sensors that provide data and status information to other field element devices, without center control.	
<i>Requirement:</i>	Planned
2 The field element shall include sensors that receive configuration data from other field element devices, without center control.	
<i>Requirement:</i>	Planned
3 The field element shall include devices that provide data and status information to other field element devices without center control.	
<i>Requirement:</i>	Planned
4 The field element shall include devices that receive configuration data from other field element devices, without center control.	
<i>Functional Area: Roadway Field Device Monitoring</i>	
Monitors field equipment operational status and detects and reports fault conditions. Device status, configuration, and fault information are provided to a remote center and a user interface provides information locally to field personnel.	
<i>Requirement:</i>	Planned
1 The field element shall monitor the operational status (state of the device, configuration, and fault data) of connected sensors (such as traffic, infrastructure, environmental, security, speed) and devices (such as highway advisory radio, dynamic message signs, automated roadway treatment systems, barrier and safeguard systems, cameras, traffic signals, ramp meters, short range communications equipment, security surveillance equipment).	
<i>Requirement:</i>	Planned
2 The field element shall send operational status of connected field equipment to the maintenance center.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Local Multimodal Crossings</i>	
<i>Entity: Roadway</i>	
<i>Functional Area: Roadway Field Device Monitoring</i>	
Monitors field equipment operational status and detects and reports fault conditions. Device status, configuration, and fault information are provided to a remote center and a user interface provides information locally to field personnel.	
<i>Requirement:</i> 3 The field element shall send collected fault data to the maintenance center for repair.	Planned
<i>Requirement:</i> 4 The field element shall include a local interface that provides operational status and fault data for connected field equipment to field personnel.	Planned
<i>Requirement:</i> 5 The field element shall include a local interface that allows field personnel to command diagnostic tests on connected field equipment.	Planned
<i>Functional Area: Roadway Environmental Monitoring</i>	
Environmental sensors, surface and sub-surface, that collect weather and road surface information. Weather conditions measured include temperature, wind, humidity, precipitation, and visibility. Sensors measure road surface temperature, moisture, icing, salinity, etc.	
<i>Requirement:</i> 1 The field element shall include surface and sub-surface environmental sensors that measure road surface temperature, moisture, icing, salinity, and other measures.	Planned
<i>Requirement:</i> 2 The field element shall include environmental sensors that measure weather conditions including temperature, wind, humidity, precipitation, and visibility.	Planned
<i>Requirement:</i> 3 The field element's environmental sensors shall be remotely controlled by a maintenance center.	Planned
<i>Requirement:</i> 4 The field element's environmental sensors shall be remotely controlled by a traffic management center.	Planned
<i>Requirement:</i> 5 The field element's environmental sensors shall be remotely controlled by weather service providers such as the National Weather Service or value-added sector specific meteorological services.	Potential
<i>Requirement:</i> 6 The field element's environmental sensors shall be remotely controlled by a maintenance and construction vehicle.	Potential
<i>Requirement:</i> 7 The field element shall provide environmental sensor equipment operational status to the controlling center or maintenance vehicle.	Planned
<i>Requirement:</i> 8 The field element shall provide environmental sensor equipment fault indication to the controlling center or maintenance vehicle.	Planned
<i>Requirement:</i> 9 The field element shall remotely aggregate environmental sensor data with environmental data collected from maintenance and construction vehicles.	Potential
<i>Requirement:</i> 10 The field element shall provide weather and road surface condition data to centers.	Planned
<i>Requirement:</i> 11 The field element shall provide weather and road surface condition data to maintenance and construction vehicles.	Potential
<i>Functional Area: Field Barrier System Control</i>	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Local Multimodal Crossings</i>	
<i>Entity: Roadway</i>	
<i>Functional Area: Field Barrier System Control</i>	
Field elements that control barrier systems such as gates and other systems that manage entry to roadways, transportation facilities and infrastructure.	
<i>Requirement:</i>	
1 The field element shall activate barrier systems for transportation facilities and infrastructure under center control. Barrier systems include automated or remotely controlled gates, barriers and other systems that manage entry to roadways.	Planned
<i>Requirement:</i>	
2 The field element shall return barrier system operational status to the controlling center.	Planned
<i>Requirement:</i>	
3 The field element shall return barrier system fault data to the maintenance center for repair.	Planned
<i>Requirement:</i>	
4 The field element shall receive requests for access from approaching vehicles using field-vehicle communications and validate and authenticate the requests.	Planned
<i>Requirement:</i>	
5 The field element shall grant access only to qualified vehicles.	Planned
<i>Requirement:</i>	
6 The field element shall communicate access permission status and access instructions to approaching vehicles using field-vehicle communications.	Planned
<i>Functional Area: Multimodal Crossing Control</i>	
Field elements to monitor and control traffic at multimodal crossings, such as draw bridges and other crossings between highway traffic and other modes; does not include highway-rail intersection.	
<i>Requirement:</i>	
1 The field element shall include sensors to monitor requests from non-highway traffic to cross at multimodal crossings for specified durations (such as draw bridges and miscellaneous other interference crossings between highway traffic and other modes such as river traffic, aircraft, etc.); the sensors are under center control.	Existing
<i>Requirement:</i>	
2 The field element shall include signals to control traffic at multimodal crossings on surface streets, under center control.	Existing
<i>Requirement:</i>	
3 The field element shall include driver information systems (such as dynamic messages signs, highway advisory radios (HAR), and equipment that controls warning lights and gates) that advise drivers at multimodal crossings, under center control.	Potential
<i>Requirement:</i>	
4 The field element shall provide operational status for the sensors, signals, and driver information systems equipment at multimodal crossings to the center.	Existing
<i>Requirement:</i>	
5 The field element shall provide fault data for the sensors, signals, and driver information systems equipment at multimodal crossings to the center for repair.	Existing
<i>Requirement:</i>	
6 The field element shall forward all requests for right-of-way at multimodal crossings to the controlling center.	Existing
<i>Functional Area: Roadway Data Collection</i>	
Field elements to collect traffic, road, and environmental conditions information for use in transportation planning, research, and other off-line applications. Includes the sensors, supporting roadside infrastructure, and communications equipment.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Local Multimodal Crossings</i>	
<i>Entity: Roadway</i>	
<i>Functional Area: Roadway Data Collection</i>	
Field elements to collect traffic, road, and environmental conditions information for use in transportation planning, research, and other off-line applications. Includes the sensors, supporting roadside infrastructure, and communications equipment.	
<i>Requirement:</i>	
1 The field element shall collect traffic, road, and environmental conditions information.	Planned
<i>Requirement:</i>	
2 The field element shall include the sensors and supporting roadside devices that sense, collect, and send traffic, road, and environmental conditions information to a center for archival.	Planned
<i>Requirement:</i>	
3 The field element shall collect sensor status and sensor faults from roadside equipment and send it along with the recorded data to a center for archival.	Planned
<i>Element: Local Streets Departments</i>	
<i>Entity: Traffic Management</i>	
<i>Functional Area: TMC Probe Information Collection</i>	
Collects, assimilates, and disseminates vehicle probe data collected from roadside beacons and centers controlling transit vehicles, emergency vehicles, toll collection points, and route-guided vehicles.	
<i>Requirement:</i>	
1 The center shall collect traffic probe data from vehicles via roadside field equipment.	Potential
<i>Requirement:</i>	
2 The center shall collect road condition data from probe-equipped transit vehicles via transit management centers; the data may be aggregated and preliminarily processed at the sending center.	Potential
<i>Requirement:</i>	
3 The center shall collect traffic data from traveler information centers based on data from their subscriber vehicles; the data may be aggregated and initial link time calculations performed at the sending center.	Potential
<i>Requirement:</i>	
4 The center shall collect traffic data from toll administrative centers containing travel times between toll collection points for those vehicles equipped for electronic toll collection; the data may be aggregated and processed at the sending center.	Potential
<i>Requirement:</i>	
5 The center shall assimilate current and forecast traffic conditions based on collected probe data and distribute to other centers for dissemination to travelers.	Potential
<i>Requirement:</i>	
6 The center shall collect operational status for the roadside probe data collection equipment.	Potential
<i>Requirement:</i>	
7 The center shall collect fault data for the roadside probe data collection equipment for repair.	Potential
<i>Functional Area: TMC Signal Control</i>	
Remotely controls traffic signal controllers to implement traffic management strategies at signalized intersections based on traffic conditions, incidents, emergency vehicle preemptions, pedestrian crossings, etc.	
<i>Requirement:</i>	
1 The center shall remotely control traffic signal controllers.	Existing
<i>Requirement:</i>	
2 The center shall accept notifications of pedestrian calls.	Planned

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Local Streets Departments</i>	
<i>Entity: Traffic Management</i>	
<i>Functional Area: TMC Signal Control</i>	
Remotely controls traffic signal controllers to implement traffic management strategies at signalized intersections based on traffic conditions, incidents, emergency vehicle preemptions, pedestrian crossings, etc.	
<i>Requirement:</i>	Existing
3 The center shall collect traffic signal controller operational status and compare against the control information sent by the center.	
<i>Requirement:</i>	Existing
4 The center shall collect traffic signal controller fault data from the field.	
<i>Requirement:</i>	Existing
5 The center shall manage (define, store and modify) control plans to coordinate signalized intersections, to be engaged at the direction of center personnel or according to a daily schedule.	
<i>Requirement:</i>	Existing
6 The center shall implement control plans to coordinate signalized intersections based on data from sensors.	
<i>Requirement:</i>	Existing
7 The center shall manage boundaries of the control sections used within the signal system.	
<i>Requirement:</i>	Existing
8 The center shall maintain traffic signal coordination including synchronizing clocks throughout the system.	
<i>Functional Area: TMC Regional Traffic Management</i>	
Coordination between traffic management centers in order to share traffic information between centers as well as control of traffic management field equipment. This may be used during incidents and special events and during day-to-day operations.	
<i>Requirement:</i>	Planned
1 The center shall exchange traffic information with other traffic management centers including incident information, congestion data, traffic data, signal timing plans, and real-time signal control information.	
<i>Requirement:</i>	Planned
2 The center shall exchange traffic control information with other traffic management centers to support remote monitoring and control of traffic management devices (e.g. signs, sensors, signals, cameras, etc.).	
<i>Functional Area: TMC Traffic Management Decision Support</i>	
Recommends courses of action to the traffic operator based on current and forecast road and traffic conditions. Recommended actions may include predefined incident response plans, signal timing plan changes, DMS/HAR messages, lane control strategies, metering strategies, etc.	
<i>Requirement:</i>	Planned
1 The center shall provide center personnel with an integrated regional view of current and forecast road and traffic conditions including traffic incidents, special events, maintenance activities and other events or conditions that impact capacity or demand.	
<i>Requirement:</i>	Planned
2 The center shall identify network imbalances and potential courses of action.	
<i>Requirement:</i>	Planned
3 The center shall compare the impact of potential courses of action and make recommendations to the operator.	
<i>Requirement:</i>	Planned
4 The recommended actions shall include predefined incident response plans, signal timing plan changes, DMS/HAR messages, lane control strategies and freeway control strategies including ramp metering, interchange metering, and mainline metering.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Local Streets Departments</i>	
<i>Entity: Traffic Management</i>	
<i>Functional Area: TMC Traffic Management Decision Support</i>	
<p>Recommends courses of action to the traffic operator based on current and forecast road and traffic conditions. Recommended actions may include predefined incident response plans, signal timing plan changes, DMS/HAR messages, lane control strategies, metering strategies, etc.</p>	
<p><i>Requirement:</i> 5 The recommended actions shall include multimodal strategies that include suggested transit strategies and suggested route and mode choices for travelers.</p>	Planned
<p><i>Requirement:</i> 6 The center shall provide an interface to center personnel to input control parameters for the decision support process and receive recommended actions and supporting information presentation.</p>	Planned
<i>Functional Area: TMC Incident Dispatch Coordination/Communication</i>	
<p>Formulates an incident response that takes into account the incident potential, incident impacts, and/or resources required for incident management. Facilitates the dispatch of emergency response and service vehicles and coordinates the response with cooperating agencies.</p>	
<p><i>Requirement:</i> 1 The center shall 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.</p>	Existing
<p><i>Requirement:</i> 2 The center shall coordinate planning for incidents with emergency management centers - including pre-planning activities for disaster response, evacuation, and recovery operations.</p>	Existing
<p><i>Requirement:</i> 3 The center shall support requests from emergency management centers to remotely control sensor and surveillance equipment located in the field, provide special routing for emergency vehicles, and to provide responding emergency vehicles with signal preemption.</p>	Planned
<p><i>Requirement:</i> 4 The center shall exchange incident information with emergency management centers, maintenance and construction centers, transit centers, information service providers, and the media including description, location, traffic impact, status, expected duration, and response information.</p>	Existing
<p><i>Requirement:</i> 5 The center shall 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.</p>	Potential
<p><i>Requirement:</i> 6 The center shall 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.</p>	Planned

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Local Streets Departments</i>	
<i>Entity: Traffic Management</i>	
<i>Functional Area: TMC Incident Dispatch Coordination/Communication</i>	
Formulates an incident response that takes into account the incident potential, incident impacts, and/or resources required for incident management. Facilitates the dispatch of emergency response and service vehicles and coordinates the response with cooperating agencies.	
<i>Requirement:</i> 7 The center shall provide road network conditions and traffic images to emergency management centers, maintenance and construction centers, and traveler information service providers.	Potential
<i>Requirement:</i> 8 The center shall monitor incident response performance and calculate incident response and clearance times.	Planned
<i>Requirement:</i> 9 The center shall 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.	Planned
<i>Requirement:</i> 10 The center shall coordinate information and controls with other traffic management centers.	Potential
<i>Requirement:</i> 11 The center shall receive inputs from emergency management and transit management centers to develop an overall status of the transportation system including emergency transit schedules in effect and current status and condition of the transportation infrastructure.	Planned
<i>Requirement:</i> 12 The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for traffic incident management.	Planned
<i>Functional Area: TMC Evacuation Support</i>	
Development, coordination, and execution of special traffic management strategies during evacuation and subsequent reentry of a population in the vicinity of a disaster or major emergency. Interfaces with emergency management and other traffic management centers.	
<i>Requirement:</i> 1 The center shall coordinate planning for evacuation with emergency management centers - including pre-planning activities such as establishing routes, areas to be evacuated, timing, etc.	Existing
<i>Requirement:</i> 2 The center shall 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.	Potential
<i>Requirement:</i> 3 The center shall coordinate information and controls with other traffic management centers.	Potential
<i>Requirement:</i> 4 The center shall 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.	Potential
<i>Functional Area: TMC Traffic Network Performance Evaluation</i>	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Local Streets Departments</i>	
<i>Entity: Traffic Management</i>	
<i>Functional Area: TMC Traffic Network Performance Evaluation</i>	
Measures performance and predicts travel demand patterns to support traffic flow optimization, demand management, and incident management. Collects data from surveillance equipment as well as input from other management centers including emissions, event promoters, and other TMCs.	
<i>Requirement:</i>	Potential
1 The center shall monitor, analyze, and store traffic sensor data (speed, volume, occupancy) collected from field elements under remote control of the center to support overall network performance evaluations.	
<i>Requirement:</i>	Potential
2 The center shall collect wide-area pollution data from emissions management centers to support overall network performance evaluations.	
<i>Requirement:</i>	Planned
3 The center shall collect and store plans from event promoters for major future events possibly impacting traffic to support overall network performance evaluations.	
<i>Requirement:</i>	Planned
4 The center shall collect and store anticipated route information from information service providers to support overall network performance evaluations and predictions.	
<i>Requirement:</i>	Potential
5 The center shall exchange information with transit management centers including details current transit routes, the level of service on each route, and the progress of individual vehicles along their routes for use in forecasting demand and estimating current transportation network performance.	
<i>Requirement:</i>	Planned
6 The center shall exchange traffic information with other traffic management centers, including incidents, congestion data, traffic data, signal timing plans, and real-time signal control information to support overall network performance evaluations.	
<i>Requirement:</i>	Planned
7 The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for network performance evaluations.	
<i>Requirement:</i>	Planned
8 The center shall provide an interface to the archive data repository to enable the operator to retrieve historical operating data for use in planning to predict future traffic patterns and conditions.	
<i>Requirement:</i>	Planned
9 This center shall use the collected information to measure overall current and forecast network performance and predict travel demand patterns.	
<i>Functional Area: HRI Traffic Management</i>	
Remotely monitor and control highway-rail intersection (HRI) equipment, includes standard speed active warning systems and high speed systems which provide additional information on approaching trains and detect and report on obstructions in the HRI.	
<i>Requirement:</i>	Planned
1 The center shall remotely control highway-rail intersection (HRI) equipment located in the field.	
<i>Requirement:</i>	Planned
2 The center shall accept collect highway-rail intersection (HRI) advisory or alert data from rail operations centers.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Local Streets Departments</i>	
<i>Entity: Traffic Management</i>	
<i>Functional Area: HRI Traffic Management</i>	
Remotely monitor and control highway-rail intersection (HRI) equipment, includes standard speed active warning systems and high speed systems which provide additional information on approaching trains and detect and report on obstructions in the HRI.	
<i>Requirement:</i>	Planned
3 The center shall collect highway-rail intersection (HRI) equipment operational status and compare against the control information sent by the center.	
<i>Requirement:</i>	Planned
4 The center shall provide the highway-rail intersection (HRI) equipment operational status to rail operations centers.	
<i>Requirement:</i>	Planned
5 The center shall collect incident information related to a highway-rail intersection (HRI), such as intersection blockages or crashes or equipment malfunctions.	
<i>Requirement:</i>	Planned
6 The center shall implement control plans to coordinate signalized intersections around highway-rail intersections (HRI), under control of center personnel, based on data from sensors and surveillance monitoring traffic conditions, incidents, equipment faults, pedestrian crossings, etc.	
<i>Functional Area: Rail Operations Coordination</i>	
Coordination between rail operations and traffic management centers - exchanging train schedules, maintenance schedules, as well as incidents and priority messages that impact highway-rail intersections (HRIs). Supports advanced traffic control strategies and enhanced traveler information.	
<i>Requirement:</i>	Planned
1 The center shall exchange highway-rail intersection (HRI) information with rail operations centers. This information may include event schedules, requests for information from the Rail Operators, incident notification based on rail operations messages, and priority messages like notifications of a HAZMAT spill, equipment failure, or an intersection blockage.	
<i>Requirement:</i>	Planned
2 The center shall receive highway-rail intersection (HRI) maintenance schedules, train schedules, and incident notifications from rail operations centers.	
<i>Requirement:</i>	Planned
3 The center shall use the rail operations information to develop forecast HRI closure times and durations which may be applied in advanced traffic control strategies or delivered as enhanced traveler information.	
<i>Functional Area: TMC Speed Monitoring and Warning</i>	
Remotely monitors vehicle speeds, and informs an enforcement agency if excessive speeds are detected. Also configures and controls speed warning systems that provide safe speed advisories to the motorist.	
<i>Requirement:</i>	Existing
1 The center shall remotely control vehicle speed sensors typically placed in work zones; control parameters may include environmental and traffic conditions.	
<i>Requirement:</i>	Existing
2 The center shall collect operational status for the vehicle speed sensors; the status shall include logged information including measured speeds, warning messages displayed, and violation records.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Local Streets Departments</i>	
<i>Entity: Traffic Management</i>	
<i>Functional Area: TMC Speed Monitoring and Warning</i>	
Remotely monitors vehicle speeds, and informs an enforcement agency if excessive speeds are detected. Also configures and controls speed warning systems that provide safe speed advisories to the motorist.	
<i>Requirement:</i>	Existing
3 The center shall provide the capability to notify an enforcement agency when vehicle speeds in the work zone are in excess of the posted speed limit or are creating an unsafe condition based upon the current environmental or traffic conditions.	
<i>Requirement:</i>	Existing
4 The center shall collect fault data for the vehicle speed sensors for repair.	
<i>Functional Area: TMC Multimodal Crossing Management</i>	
Remotely monitors and manages multimodal crossings, such as draw bridges and other crossings between highway traffic and other modes; does not include highway-rail intersection.	
<i>Requirement:</i>	Planned
1 The center shall receive requests from non-highway traffic to cross at multimodal crossings for specified durations (such as draw bridges and miscellaneous other interference crossings between highway traffic and other modes such as river traffic, aircraft, etc.)	
<i>Requirement:</i>	Planned
2 The center shall remotely control traffic signal controllers for use at major multimodal crossings.	
<i>Requirement:</i>	Potential
3 The center shall remotely control driver information systems (such as dynamic messages signs, highway advisory radios (HAR), and equipment that controls warning lights and gates) to notify drivers of closure durations and times at multimodal crossings.	
<i>Requirement:</i>	Planned
4 The center shall collect operational status for the equipment at multimodal crossings.	
<i>Requirement:</i>	Planned
5 The center shall collect fault data for the equipment at multimodal crossings for repair.	
<i>Requirement:</i>	Planned
6 The center shall receive and respond to requests for right-of-way at multimodal crossings.	
<i>Requirement:</i>	Planned
7 The center shall collect and analyze the planned multimodal crossing closures as a possible incident.	
<i>Requirement:</i>	Planned
8 The center shall distribute multimodal crossing information to other centers for dissemination to travelers.	
<i>Functional Area: Barrier System Management</i>	
Remotely controls barrier systems such as gates and other systems that manage entry to roadways, transportation facilities and infrastructure.	
<i>Requirement:</i>	Potential
1 The center shall remotely control barrier systems for transportation facilities and infrastructure. Barrier systems include automated or remotely controlled gates, barriers and other systems that manage entry to roadways.	
<i>Requirement:</i>	Potential
2 The center shall collect barrier system operational status.	
<i>Requirement:</i>	Potential
3 The center shall collect barrier system fault data and send to the maintenance center for repair.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Local Streets Departments</i>	
<i>Entity: Traffic Management</i>	
<i>Functional Area: Barrier System Management</i>	
Remotely controls barrier systems such as gates and other systems that manage entry to roadways, transportation facilities and infrastructure.	
<i>Requirement:</i>	Potential
4 The center shall accept requests for barrier system activation from other centers and from center personnel to support emergency response and detours.	
<i>Functional Area: Traffic Equipment Maintenance</i>	
Monitoring and remote diagnostics of field equipment - detect failures, issue problem reports, and track the repair or replacement of the failed equipment.	
<i>Requirement:</i>	Existing
1 The center shall collect and store sensor (traffic, pedestrian, multimodal crossing) operational status.	
<i>Requirement:</i>	Potential
3 The center shall collect and store sensor (traffic, pedestrian, multimodal crossing) fault data and send to the maintenance center for repair.	
<i>Requirement:</i>	Existing
5 The center shall collect environmental sensor operational status.	
<i>Requirement:</i>	Existing
6 The center shall collect environmental sensor equipment fault data and send to the maintenance center for repair.	
<i>Requirement:</i>	Existing
7 The center shall exchange data with maintenance centers concerning the reporting of faulty equipment and the schedule/status of their repair. Information exchanged includes details of new equipment faults, and clearances when the faults are cleared.	
<i>Requirement:</i>	Planned
8 The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for traffic maintenance data.	
<i>Functional Area: TMC Demand Management Coordination</i>	
Provides the capability to gather information on regional toll, parking, and transit usage and request changes to enable dynamic pricing for demand management.	
<i>Requirement:</i>	Planned
1 The center shall collect and store toll pricing data from toll administration centers, including the price for each road segment to which a toll applies, with the time and date for when it applies.	
<i>Requirement:</i>	Planned
2 The center shall collect and store parking information from parking management providers including lot locations, features (e.g. ability to handle oversized vehicles), capacity, type, hours of operation and rates.	
<i>Requirement:</i>	Planned
3 The center shall collect and store transit fare and schedule information from transit management centers.	
<i>Requirement:</i>	Planned
4 The center shall collect and store current transit, parking, and toll fee schedule information provided by regional traveler information systems.	
<i>Requirement:</i>	Planned
5 The center shall send requests to toll administration centers to change pricing, modify restrictions, or modify operations of a toll road facility.	
<i>Requirement:</i>	Planned
6 The center shall send requests to parking management providers to change the current parking lot charging structure.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Local Streets Departments</i>	
<i>Entity: Traffic Management</i>	
<i>Functional Area: TMC Demand Management Coordination</i>	
Provides the capability to gather information on regional toll, parking, and transit usage and request changes to enable dynamic pricing for demand management.	
<i>Requirement:</i>	Planned
7 The center shall send requests to transit management centers to change the current transit services - schedules or fares of the transit services including park-and-ride lots.	
<i>Functional Area: Traffic Data Collection</i>	
Collection and storage of traffic management data. For use by operations personnel or data archives in the region.	
<i>Requirement:</i>	Existing
1 The center shall collect traffic management data such as operational data, event logs, etc.	
<i>Requirement:</i>	Existing
2 The center shall assign quality control metrics and meta-data to be stored along with the data. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.	
<i>Requirement:</i>	Planned
3 The center shall receive and respond to requests from ITS Archives for either a catalog of the traffic data or for the data itself.	
<i>Requirement:</i>	Planned
4 The center shall be able to produce sample products of the data available.	
<i>Functional Area: TMC Transportation Operations Data Collection</i>	
Collects real-time information on the state of the regional transportation system for operational use by the center. It establishes communications with a regional repository, requests or subscribes to information relevant to the center, and distributes the received information for use.	
<i>Requirement:</i>	Existing
1 The center shall collect real-time information on the state of the regional transportation system including current traffic and road conditions, weather conditions, special event and incident information.	
<i>Requirement:</i>	Existing
2 The center shall support the capability for the system operator to monitor and control the information collection service.	
<i>Element: Local TMCs</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Incident Command</i>	
Tactical decision support, resource coordination, and communications integration among emergency management agencies for Incident Commands that are established by first responders to support local management of an incident.	
<i>Requirement:</i>	Potential
1 The center shall 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.	
<i>Requirement:</i>	Potential
2 The center shall provide incident command communications with public safety, emergency management, transportation, and other allied response agency centers.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Local TMCs</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Incident Command</i>	
Tactical decision support, resource coordination, and communications integration among emergency management agencies for Incident Commands that are established by first responders to support local management of an incident.	
<i>Requirement:</i>	3 The center shall track and maintain resource information and action plans pertaining to the incident command. Potential
<i>Requirement:</i>	4 The center shall 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. Potential
<i>Requirement:</i>	5 The center shall assess the status of responding emergency vehicles as part of an incident command. Potential
<i>Functional Area: Service Patrol Management</i>	
Dispatch and communication with roadway service patrol vehicles that monitor roads to aid motorists, offering rapid response to minor incidents.	
<i>Requirement:</i>	1 The center shall dispatch roadway service patrol vehicles to identified incident locations. Potential
<i>Requirement:</i>	2 The center shall store the current status of all service patrol vehicles available for dispatch and those that have been dispatched. Potential
<i>Requirement:</i>	3 The center shall share incident information collected by the service patrol with traffic, maintenance and construction, and traveler information centers for incident management, incident notification to travelers, and incident cleanup. Potential
<i>Requirement:</i>	4 The center shall track the location and status of service patrol vehicles. Potential
<i>Functional Area: Center Secure Area Surveillance</i>	
Management of security surveillance devices and analysis of that data to detect potential threats. Areas under surveillance may include transit stops, transit stations, rest areas, park and ride lots, modal interchange facilities, on-board a transit vehicle, etc.	
<i>Requirement:</i>	1 The center shall remotely monitor video images and audio surveillance data collected in secure areas including facilities (e.g. transit yards) and transportation infrastructure (e.g. bridges, tunnels, interchanges, roadway infrastructure, and transit railways or guideways). The data may be raw or pre-processed in the field. Potential
<i>Requirement:</i>	2 The center shall remotely monitor video images and audio surveillance data collected in traveler secure areas, which include transit stations, transit stops, rest areas, park and ride lots, and other fixed sites along travel routes (e.g., emergency pull-off areas and travel information centers). The data may be raw or pre-processed in the field. Potential
<i>Requirement:</i>	3 The center shall remotely monitor video images and audio surveillance data collected on-board transit vehicles. The data may be raw or pre-processed in the field. Potential

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Local TMCs</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Center Secure Area Surveillance</i>	
Management of security surveillance devices and analysis of that data to detect potential threats. Areas under surveillance may include transit stops, transit stations, rest areas, park and ride lots, modal interchange facilities, on-board a transit vehicle, etc.	
<i>Requirement:</i>	Potential
4 The center shall exchange surveillance data with other emergency centers.	
<i>Requirement:</i>	Potential
5 The center shall identify potential security threats based on collected security surveillance data.	
<i>Requirement:</i>	Potential
6 The center shall verify potential security threats by correlating security surveillance data from multiple sources.	
<i>Requirement:</i>	Potential
7 The center shall remotely control security surveillance devices in secure areas including facilities (e.g. transit yards) and transportation infrastructure (e.g. bridges, tunnels, interchanges, roadway infrastructure, and transit railways or guideways).	
<i>Requirement:</i>	Potential
8 The center shall remotely control security surveillance devices in traveler secure areas, which include transit stations, transit stops, rest areas, park and ride lots, and other fixed sites along travel routes (e.g., emergency pull-off areas and travel information centers).	
<i>Requirement:</i>	Potential
9 The center shall remotely control security surveillance devices on-board transit vehicles.	
<i>Requirement:</i>	Potential
10 The center shall match traveler video images against a database from the Alerting and Advisory Systems of known images that may represent criminals and terrorists.	
<i>Requirement:</i>	Potential
11 The center shall exchange traveler images with other emergency management centers to support traveler image matching.	
<i>Requirement:</i>	Potential
12 The center shall respond to control data from center personnel regarding security surveillance data collection, processing, threat detection, and image matching.	
<i>Requirement:</i>	Potential
13 The center shall monitor maintenance status of the security sensor field equipment.	
<i>Functional Area: Center Secure Area Sensor Management</i>	
Management of security sensors, analysis of sensor data, correlation with surveillance data and alerts from other agencies to detect potential threats, and dissemination of threat information to other agencies. Sensors may be placed in areas such as transit stops, transit stations, rest areas, park and ride lots, modal interchange facilities, on-board a transit vehicle, etc.	
<i>Requirement:</i>	Potential
1 The center shall remotely monitor and control security sensor data collected in secure areas including facilities (e.g. transit yards) and transportation infrastructure (e.g. bridges, tunnels, interchanges, roadway infrastructure, and transit railways or guideways). The types of security sensor data include environmental threat (e.g. chemical agent, toxic industrial chemical, biological, explosives, and radiological sensors), infrastructure condition and integrity, intrusion and motion, and object detection sensors. The data may be raw or pre-processed in the field.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Local TMCs	
<i>Entity:</i> Emergency Management	
<i>Functional Area:</i> Center Secure Area Sensor Management	
Management of security sensors, analysis of sensor data, correlation with surveillance data and alerts from other agencies to detect potential threats, and dissemination of threat information to other agencies. Sensors may be placed in areas such as transit stops, transit stations, rest areas, park and ride lots, modal interchange facilities, on-board a transit vehicle, etc.	
<i>Requirement:</i>	2 The center shall remotely monitor and control security sensor data collected in traveler secure areas, which include transit stations, transit stops, rest areas, park and ride lots, and other fixed sites along travel routes (e.g., emergency pull-off areas and travel information centers). The types of security sensor data include environmental threat (e.g. chemical agent, toxic industrial chemical, biological, explosives, and radiological sensors), intrusion and motion, and object detection sensors. The data may be raw or pre-processed in the field. Potential
<i>Requirement:</i>	3 The center shall remotely monitor and control security sensor data collected on-board transit vehicles. The types of security sensor data include environmental threat (e.g. chemical agent, toxic industrial chemical, biological, explosives, and radiological sensors) and object detection sensors. The data may be raw or pre-processed in the field. Potential
<i>Requirement:</i>	4 The center shall exchange security sensor data with other emergency centers. Potential
<i>Requirement:</i>	5 The center shall identify potential security threats based on collected security sensor data. Potential
<i>Requirement:</i>	6 The center shall verify potential security threats by correlating security sensor data from multiple sources. Potential
<i>Requirement:</i>	7 The center shall perform threat analysis based on correlations of security sensor and surveillance data. Potential
<i>Requirement:</i>	8 The center shall exchange threat analysis data with Alerting and Advisory Systems and use that data in local threat analysis processing. Potential
<i>Requirement:</i>	9 The center shall disseminate threat information to other agencies, including traffic, transit, maintenance, rail operations, and other emergency management centers. Potential
<i>Requirement:</i>	10 The center shall respond to control data from center personnel regarding security sensor data collection, processing, threat detection, and threat analysis. Potential
<i>Requirement:</i>	11 The center shall request activation of barriers and safeguards on request from center personnel. Potential
<i>Requirement:</i>	12 The center shall monitor maintenance status of the security sensor field equipment. Potential
<i>Functional Area:</i> Center Secure Area Alarm Support	
Collection and response to silent and audible alarms received from travelers in secure areas (such as transit stops, rest areas, park-and-ride lots) and from on-board transit vehicles.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Local TMCs	
<i>Entity:</i> Emergency Management	
<i>Functional Area:</i> Center Secure Area Alarm Support	
Collection and response to silent and audible alarms received from travelers in secure areas (such as transit stops, rest areas, park-and-ride lots) and from on-board transit vehicles.	
<i>Requirement:</i>	Potential
1 The center shall collect silent and audible alarms received from travelers in secure areas (such as transit stops, rest areas, park and ride lots, modal interchange facilities).	
<i>Requirement:</i>	Potential
2 The center shall collect silent and audible alarms received from transit vehicles, originated by the traveler or the transit vehicle operator.	
<i>Requirement:</i>	Potential
3 After the alarm message has been received, the center shall generate an alarm acknowledgment to the sender.	
<i>Requirement:</i>	Potential
4 After the alarm message becomes a verified incident, the center shall determine the appropriate response.	
<i>Requirement:</i>	Potential
5 The center shall determine whether the alarm message indicates an emergency that requires the attention of public safety agencies, and forward alarm message data to the appropriate agency as necessary.	
<i>Requirement:</i>	Potential
6 The center shall forward the alarm message to center personnel and respond to the traveler or transit vehicle operator as directed by the personnel.	
<i>Functional Area:</i> Mayday Support	
Collection and response to Mayday messages received from vehicles and drivers.	
<i>Requirement:</i>	Potential
1 The center shall collect mayday messages from vehicles and drivers.	
<i>Requirement:</i>	Potential
2 The center shall collect mayday messages from travelers via personal handheld devices.	
<i>Requirement:</i>	Potential
3 The center shall acknowledge the request for emergency assistance, whether originated by the driver, automatically by the vehicle's safety systems, or by a traveler via a personal handheld device.	
<i>Requirement:</i>	Potential
4 After the mayday becomes a verified incident, the center shall determine the appropriate response to the mayday message.	
<i>Requirement:</i>	Potential
5 The center shall determine whether the mayday message indicates an emergency that requires the attention of public safety agencies, and forward mayday emergency data to the appropriate agency as necessary.	
<i>Requirement:</i>	Potential
6 The center shall support the activation of remote controlled functions requested by a vehicle, such as requests to unlock doors.	
<i>Requirement:</i>	Potential
7 The center shall request additional emergency details from or issue commands to the vehicle's security systems or vehicle driver if needed.	
<i>Requirement:</i>	Potential
8 The center shall maintain a log of all mayday signals received from vehicles.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Local TMCs</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Mayday Support</i>	
Collection and response to Mayday messages received from vehicles and drivers.	
<i>Requirement:</i>	Potential
9 The center shall provide all mayday data to center personnel and respond to the vehicle, driver, or traveler using the portable handheld device as directed by the personnel.	
<i>Functional Area: Emergency Commercial Vehicle Response</i>	
Responds to commercial vehicle and freight equipment related emergencies. Includes incidents involving hazardous materials as well as the detection of non-permitted transport of security sensitive hazmat.	
<i>Requirement:</i>	Potential
1 The center shall receive emergency notification information from commercial vehicles, commercial vehicle check stations, or commercial fleet operators and present the possible incident information to the emergency system operator. This may include detection of non-permitted transport of security sensitive hazmat, hazardous cargo spills, etc.	
<i>Requirement:</i>	Potential
2 The center shall receive details of the cargo being carried by commercial vehicles from their commercial fleet manager for incidents involving potential hazardous materials.	
<i>Requirement:</i>	Potential
3 The center shall forward the verified emergency information to the responding agency based on the location and nature of the emergency.	
<i>Requirement:</i>	Potential
4 The center shall provide the capability to request Fleet and Freight Management to disable a specific vehicle in their fleet.	
<i>Functional Area: Emergency Transportation Operations Data Collection</i>	
Collects real-time information on the state of the regional transportation system for operational use by the center. It establishes communications with a regional repository, requests or subscribes to information relevant to the center, and distributes the received information for use.	
<i>Requirement:</i>	Potential
1 The center shall collect real-time information on the state of the regional transportation system including current traffic and road conditions, weather conditions, special event and incident information.	
<i>Requirement:</i>	Potential
2 The center shall support the capability for the system operator to monitor and control the information collection service.	
<i>Entity: Traffic Management</i>	
<i>Functional Area: TMC Roadway Warning</i>	
Remotely monitors and controls field elements used to warn drivers approaching hazards. Detects and warns approaching vehicles of adverse road weather conditions, traffic conditions including queues, and obstacles or animals in the road.	
<i>Requirement:</i>	Potential
1 The center shall monitor data on traffic, environmental conditions, and other hazards collected from sensors along the roadway.	
<i>Functional Area: TMC Variable Speed Limits</i>	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Local TMCs</i>	
<i>Entity: Traffic Management</i>	
<i>Functional Area: TMC Variable Speed Limits</i>	
Remotely monitors and controls variable speed limits systems, including equipment that monitors current traffic and environmental conditions, determines the current speed limits by lane, and displays the speed limits and additional information to drivers.	
<i>Requirement:</i>	Potential
1 The center shall monitor data on traffic and environmental conditions collected from sensors along the roadway.	
<i>Requirement:</i>	Potential
2 Based on the measured data, the center shall calculate and set suitable speed limits by lane.	
<i>Functional Area: TMC Roadway Warning</i>	
Remotely monitors and controls field elements used to warn drivers approaching hazards. Detects and warns approaching vehicles of adverse road weather conditions, traffic conditions including queues, and obstacles or animals in the road.	
<i>Requirement:</i>	Potential
2 The center shall identify hazardous road weather and surface conditions.	
<i>Functional Area: TMC Variable Speed Limits</i>	
Remotely monitors and controls variable speed limits systems, including equipment that monitors current traffic and environmental conditions, determines the current speed limits by lane, and displays the speed limits and additional information to drivers.	
<i>Requirement:</i>	Potential
3 The center shall control field equipment that posts the current speed limits and displays additional information such as basic safety rules and current traffic information to drivers.	
<i>Functional Area: TMC Roadway Warning</i>	
Remotely monitors and controls field elements used to warn drivers approaching hazards. Detects and warns approaching vehicles of adverse road weather conditions, traffic conditions including queues, and obstacles or animals in the road.	
<i>Requirement:</i>	Potential
3 The center shall identify hazardous traffic conditions including queues.	
<i>Functional Area: TMC Variable Speed Limits</i>	
Remotely monitors and controls variable speed limits systems, including equipment that monitors current traffic and environmental conditions, determines the current speed limits by lane, and displays the speed limits and additional information to drivers.	
<i>Requirement:</i>	Potential
4 The center shall monitor the operational status of the variable speed limit equipment, including fault reports.	
<i>Functional Area: TMC Roadway Warning</i>	
Remotely monitors and controls field elements used to warn drivers approaching hazards. Detects and warns approaching vehicles of adverse road weather conditions, traffic conditions including queues, and obstacles or animals in the road.	
<i>Requirement:</i>	Potential
4 The center shall identify debris, animals, or other encroachment on the roadway dangerous to approaching motorists.	
<i>Functional Area: TMC Variable Speed Limits</i>	

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Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Local TMCs</i>	
<i>Entity: Traffic Management</i>	
<i>Functional Area: TMC Variable Speed Limits</i>	
Remotely monitors and controls variable speed limits systems, including equipment that monitors current traffic and environmental conditions, determines the current speed limits by lane, and displays the speed limits and additional information to drivers.	
<i>Requirement:</i>	Potential
5 The center shall provide center personnel current system status and respond to control data from center personnel regarding variable speed limits and	
<i>Functional Area: TMC Roadway Warning</i>	
Remotely monitors and controls field elements used to warn drivers approaching hazards. Detects and warns approaching vehicles of adverse road weather conditions, traffic conditions including queues, and obstacles or animals in the road.	
<i>Requirement:</i>	Potential
5 The center shall issue control commands to field equipment warning drivers approaching the identified hazardous conditions.	
<i>Requirement:</i>	Potential
6 The center shall monitor the operational status of the dynamic warning equipment, including fault reports.	
<i>Functional Area: Collect Traffic Surveillance</i>	
Management of traffic sensors and surveillance (CCTV) equipment, collection of current traffic conditions, and distribution of the collected information to other centers and operators.	
<i>Requirement:</i>	Potential
1 The center shall monitor, analyze, and store traffic sensor data (speed, volume, occupancy) collected from field elements under remote control of the center.	
<i>Requirement:</i>	Potential
2 The center shall monitor, analyze, and distribute traffic images from CCTV systems under remote control of the center.	
<i>Requirement:</i>	Potential
3 The center shall monitor, analyze, and store multimodal crossing and high occupancy vehicle (HOV) lane sensor data under remote control of the center.	
<i>Requirement:</i>	Potential
4 The center shall distribute road network conditions data (raw or processed) based on collected and analyzed traffic sensor and surveillance data to other centers.	
<i>Requirement:</i>	Potential
5 The center shall respond to control data from center personnel regarding sensor and surveillance data collection, analysis, storage, and distribution.	
<i>Requirement:</i>	Potential
6 The center shall maintain a database of surveillance equipment and sensors and associated data (including the roadway on which they are located, the type of data collected, and the ownership of each)	
<i>Requirement:</i>	Potential
7 The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for traffic data.	
<i>Functional Area: TMC Probe Information Collection</i>	
Collects, assimilates, and disseminates vehicle probe data collected from roadside beacons and centers controlling transit vehicles, emergency vehicles, toll collection points, and route-guided vehicles.	

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Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Local TMCs</i>	
<i>Entity: Traffic Management</i>	
<i>Functional Area: TMC Probe Information Collection</i>	
Collects, assimilates, and disseminates vehicle probe data collected from roadside beacons and centers controlling transit vehicles, emergency vehicles, toll collection points, and route-guided vehicles.	
<i>Requirement:</i>	Potential
1 The center shall collect traffic probe data from vehicles via roadside field equipment.	
<i>Requirement:</i>	Potential
2 The center shall collect road condition data from probe-equipped transit vehicles via transit management centers; the data may be aggregated and preliminarily processed at the sending center.	
<i>Requirement:</i>	Potential
3 The center shall collect traffic data from traveler information centers based on data from their subscriber vehicles; the data may be aggregated and initial link time calculations performed at the sending center.	
<i>Requirement:</i>	Potential
4 The center shall collect traffic data from toll administrative centers containing travel times between toll collection points for those vehicles equipped for electronic toll collection; the data may be aggregated and processed at the sending center.	
<i>Requirement:</i>	Potential
5 The center shall assimilate current and forecast traffic conditions based on collected probe data and distribute to other centers for dissemination to travelers.	
<i>Requirement:</i>	Potential
6 The center shall collect operational status for the roadside probe data collection equipment.	
<i>Requirement:</i>	Potential
7 The center shall collect fault data for the roadside probe data collection equipment for repair.	
<i>Functional Area: TMC Signal Control</i>	
Remotely controls traffic signal controllers to implement traffic management strategies at signalized intersections based on traffic conditions, incidents, emergency vehicle preemptions, pedestrian crossings, etc.	
<i>Requirement:</i>	Potential
1 The center shall remotely control traffic signal controllers.	
<i>Requirement:</i>	Potential
2 The center shall accept notifications of pedestrian calls.	
<i>Requirement:</i>	Potential
3 The center shall collect traffic signal controller operational status and compare against the control information sent by the center.	
<i>Requirement:</i>	Potential
4 The center shall collect traffic signal controller fault data from the field.	
<i>Requirement:</i>	Potential
5 The center shall manage (define, store and modify) control plans to coordinate signalized intersections, to be engaged at the direction of center personnel or according to a daily schedule.	
<i>Requirement:</i>	Potential
6 The center shall implement control plans to coordinate signalized intersections based on data from sensors.	
<i>Requirement:</i>	Potential
7 The center shall manage boundaries of the control sections used within the signal system.	
<i>Requirement:</i>	Potential
8 The center shall maintain traffic signal coordination including synchronizing clocks throughout the system.	
<i>Functional Area: TMC Traffic Information Dissemination</i>	
Controls dissemination of traffic-related data to other centers, the media, and travelers via the driver information systems (DMS, HAR) that it operates.	

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Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Local TMCs</i>	
<i>Entity: Traffic Management</i>	
<i>Functional Area: TMC Traffic Information Dissemination</i>	
Controls dissemination of traffic-related data to other centers, the media, and travelers via the driver information systems (DMS, HAR) that it operates.	
<i>Requirement:</i>	Potential
1 The center shall remotely control dynamic messages signs for dissemination of traffic and other information to drivers.	
<i>Requirement:</i>	Potential
2 The center shall 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.	
<i>Requirement:</i>	Potential
3 The center shall collect operational status for the driver information systems equipment (DMS, HAR, etc.).	
<i>Requirement:</i>	Potential
4 The center shall collect fault data for the driver information systems equipment (DMS, HAR, etc.) for repair.	
<i>Requirement:</i>	Potential
5 The center shall 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), and the definition of the road network itself.	
<i>Requirement:</i>	Potential
6 The center shall distribute traffic data to maintenance and construction centers, transit centers, emergency management centers, and traveler information providers.	
<i>Requirement:</i>	Potential
7 The center shall distribute traffic data to the media; the capability to provide the information in both data stream and graphical display shall be supported.	
<i>Requirement:</i>	Potential
8 The center shall provide the capability for center personnel to control the nature of the data that is available to non-traffic operations centers and the media.	
<i>Functional Area: TMC Regional Traffic Management</i>	
Coordination between traffic management centers in order to share traffic information between centers as well as control of traffic management field equipment. This may be used during incidents and special events and during day-to-day operations.	
<i>Requirement:</i>	Potential
1 The center shall exchange traffic information with other traffic management centers including incident information, congestion data, traffic data, signal timing plans, and real-time signal control information.	
<i>Requirement:</i>	Potential
2 The center shall exchange traffic control information with other traffic management centers to support remote monitoring and control of traffic management devices (e.g. signs, sensors, signals, cameras, etc.).	
<i>Functional Area: TMC Traffic Management Decision Support</i>	
Recommends courses of action to the traffic operator based on current and forecast road and traffic conditions. Recommended actions may include predefined incident response plans, signal timing plan changes, DMS/HAR messages, lane control strategies, metering strategies, etc.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Local TMCs</i>	
<i>Entity: Traffic Management</i>	
<i>Functional Area: TMC Traffic Management Decision Support</i>	
<p>Recommends courses of action to the traffic operator based on current and forecast road and traffic conditions. Recommended actions may include predefined incident response plans, signal timing plan changes, DMS/HAR messages, lane control strategies, metering strategies, etc.</p>	
<i>Requirement:</i>	Potential
1 The center shall provide center personnel with an integrated regional view of current and forecast road and traffic conditions including traffic incidents, special events, maintenance activities and other events or conditions that impact capacity or demand.	
<i>Requirement:</i>	Potential
2 The center shall identify network imbalances and potential courses of action.	
<i>Requirement:</i>	Potential
3 The center shall compare the impact of potential courses of action and make recommendations to the operator.	
<i>Requirement:</i>	Potential
4 The recommended actions shall include predefined incident response plans, signal timing plan changes, DMS/HAR messages, lane control strategies and freeway control strategies including ramp metering, interchange metering, and mainline metering.	
<i>Requirement:</i>	Potential
5 The recommended actions shall include multimodal strategies that include suggested transit strategies and suggested route and mode choices for travelers.	
<i>Requirement:</i>	Potential
6 The center shall provide an interface to center personnel to input control parameters for the decision support process and receive recommended actions and supporting information presentation.	
<i>Functional Area: TMC Incident Detection</i>	
<p>Remotely monitors traffic sensor and surveillance systems to detect and verify incidents. Also monitors external advisory and incident reporting systems, intermodal freight depots, and border crossings for additional incident information. Identified incidents are reported to operations personnel and other centers.</p>	
<i>Requirement:</i>	Potential
1 The center shall 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.	
<i>Requirement:</i>	Potential
2 The center shall collect and store traffic flow and image data from the field equipment to detect and verify incidents.	
<i>Requirement:</i>	Potential
3 The center shall receive inputs concerning upcoming events that would effect the traffic network from event promoters and traveler information service providers.	
<i>Requirement:</i>	Potential
4 The center shall exchange incident and threat information with emergency management centers as well as maintenance and construction centers; including notification of existence of incident and expected severity, location, time and nature of incident.	
<i>Requirement:</i>	Potential
5 The center shall support requests from emergency management centers and border inspection systems to remotely control sensor and surveillance equipment located in the field.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Local TMCs</i>	
<i>Entity: Traffic Management</i>	
<i>Functional Area: TMC Incident Detection</i>	
Remotely monitors traffic sensor and surveillance systems to detect and verify incidents. Also monitors external advisory and incident reporting systems, intermodal freight depots, and border crossings for additional incident information. Identified incidents are reported to operations personnel and other centers.	
<i>Requirement:</i> 6 The center shall provide road network conditions and traffic images to emergency management centers to support the detection, verification, and classification of incidents.	Potential
<i>Requirement:</i> 7 The center shall provide video and traffic sensor control commands to the field equipment to detect and verify incidents.	Potential
<i>Functional Area: TMC Incident Dispatch Coordination/Communication</i>	
Formulates an incident response that takes into account the incident potential, incident impacts, and/or resources required for incident management. Facilitates the dispatch of emergency response and service vehicles and coordinates the response with cooperating agencies.	
<i>Requirement:</i> 1 The center shall 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.	Potential
<i>Requirement:</i> 2 The center shall coordinate planning for incidents with emergency management centers - including pre-planning activities for disaster response, evacuation, and recovery operations.	Potential
<i>Requirement:</i> 3 The center shall support requests from emergency management centers to remotely control sensor and surveillance equipment located in the field, provide special routing for emergency vehicles, and to provide responding emergency vehicles with signal preemption.	Potential
<i>Requirement:</i> 4 The center shall exchange incident information with emergency management centers, maintenance and construction centers, transit centers, information service providers, and the media including description, location, traffic impact, status, expected duration, and response information.	Potential
<i>Requirement:</i> 5 The center shall 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.	Potential
<i>Requirement:</i> 6 The center shall 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.	Potential

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Local TMCs</i>	
<i>Entity: Traffic Management</i>	
<i>Functional Area: TMC Incident Dispatch Coordination/Communication</i>	
Formulates an incident response that takes into account the incident potential, incident impacts, and/or resources required for incident management. Facilitates the dispatch of emergency response and service vehicles and coordinates the response with cooperating agencies.	
<i>Requirement:</i>	Potential
7 The center shall provide road network conditions and traffic images to emergency management centers, maintenance and construction centers, and traveler information service providers.	
<i>Requirement:</i>	Potential
8 The center shall monitor incident response performance and calculate incident response and clearance times.	
<i>Requirement:</i>	Potential
9 The center shall 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.	
<i>Requirement:</i>	Potential
10 The center shall coordinate information and controls with other traffic management centers.	
<i>Requirement:</i>	Potential
11 The center shall receive inputs from emergency management and transit management centers to develop an overall status of the transportation system including emergency transit schedules in effect and current status and condition of the transportation infrastructure.	
<i>Requirement:</i>	Potential
12 The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for traffic incident management.	
<i>Functional Area: TMC Evacuation Support</i>	
Development, coordination, and execution of special traffic management strategies during evacuation and subsequent reentry of a population in the vicinity of a disaster or major emergency. Interfaces with emergency management and other traffic management centers.	
<i>Requirement:</i>	Potential
1 The center shall coordinate planning for evacuation with emergency management centers - including pre-planning activities such as establishing routes, areas to be evacuated, timing, etc.	
<i>Requirement:</i>	Potential
2 The center shall 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.	
<i>Requirement:</i>	Potential
3 The center shall coordinate information and controls with other traffic management centers.	
<i>Requirement:</i>	Potential
4 The center shall 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.	
<i>Functional Area: TMC Traffic Network Performance Evaluation</i>	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Local TMCs	
<i>Entity:</i> Traffic Management	
<i>Functional Area:</i> TMC Traffic Network Performance Evaluation	
Measures performance and predicts travel demand patterns to support traffic flow optimization, demand management, and incident management. Collects data from surveillance equipment as well as input from other management centers including emissions, event promoters, and other TMCs.	
<i>Requirement:</i>	Potential
1 The center shall monitor, analyze, and store traffic sensor data (speed, volume, occupancy) collected from field elements under remote control of the center to support overall network performance evaluations.	
<i>Requirement:</i>	Potential
2 The center shall collect wide-area pollution data from emissions management centers to support overall network performance evaluations.	
<i>Requirement:</i>	Potential
3 The center shall collect and store plans from event promoters for major future events possibly impacting traffic to support overall network performance evaluations.	
<i>Requirement:</i>	Potential
4 The center shall collect and store anticipated route information from information service providers to support overall network performance evaluations and predictions.	
<i>Requirement:</i>	Potential
5 The center shall exchange information with transit management centers including details current transit routes, the level of service on each route, and the progress of individual vehicles along their routes for use in forecasting demand and estimating current transportation network performance.	
<i>Requirement:</i>	Potential
6 The center shall exchange traffic information with other traffic management centers, including incidents, congestion data, traffic data, signal timing plans, and real-time signal control information to support overall network performance evaluations.	
<i>Requirement:</i>	Potential
7 The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for network performance evaluations.	
<i>Requirement:</i>	Potential
8 The center shall provide an interface to the archive data repository to enable the operator to retrieve historical operating data for use in planning to predict future traffic patterns and conditions.	
<i>Requirement:</i>	Potential
9 This center shall use the collected information to measure overall current and forecast network performance and predict travel demand patterns.	
<i>Functional Area:</i> TMC Environmental Monitoring	
Management of environmental sensors and assimilation of collected data with other current and forecast road conditions and surface weather information from weather service providers and roadway maintenance operations.	
<i>Requirement:</i>	Potential
1 The center shall remotely control environmental sensors that measure road surface temperature, moisture, icing, salinity, and other measures.	
<i>Requirement:</i>	Potential
2 The center shall remotely control environmental sensors that measure weather conditions including temperature, wind, humidity, precipitation, and visibility.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Local TMCs	
<i>Entity:</i> Traffic Management	
<i>Functional Area:</i> TMC Environmental Monitoring	
Management of environmental sensors and assimilation of collected data with other current and forecast road conditions and surface weather information from weather service providers and roadway maintenance operations.	
<i>Requirement:</i>	Potential
3 The center shall 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.	
<i>Requirement:</i>	Potential
4 The center shall provide weather and road condition information to weather service providers and center personnel.	
<i>Requirement:</i>	Potential
5 The center shall respond to control data from center personnel regarding environmental sensor control and weather data collection and processing.	
<i>Functional Area:</i> HRI Traffic Management	
Remotely monitor and control highway-rail intersection (HRI) equipment, includes standard speed active warning systems and high speed systems which provide additional information on approaching trains and detect and report on obstructions in the HRI.	
<i>Requirement:</i>	Potential
1 The center shall remotely control highway-rail intersection (HRI) equipment located in the field.	
<i>Requirement:</i>	Potential
2 The center shall accept collect highway-rail intersection (HRI) advisory or alert data from rail operations centers.	
<i>Requirement:</i>	Potential
3 The center shall collect highway-rail intersection (HRI) equipment operational status and compare against the control information sent by the center.	
<i>Requirement:</i>	Potential
4 The center shall provide the highway-rail intersection (HRI) equipment operational status to rail operations centers.	
<i>Requirement:</i>	Potential
5 The center shall collect incident information related to a highway-rail intersection (HRI), such as intersection blockages or crashes or equipment malfunctions.	
<i>Requirement:</i>	Potential
6 The center shall implement control plans to coordinate signalized intersections around highway-rail intersections (HRI), under control of center personnel, based on data from sensors and surveillance monitoring traffic conditions, incidents, equipment faults, pedestrian crossings, etc.	
<i>Functional Area:</i> Rail Operations Coordination	
Coordination between rail operations and traffic management centers - exchanging train schedules, maintenance schedules, as well as incidents and priority messages that impact highway-rail intersections (HRIs). Supports advanced traffic control strategies and enhanced traveler information.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Local TMCs	
<i>Entity:</i> Traffic Management	
<i>Functional Area:</i> Rail Operations Coordination	
Coordination between rail operations and traffic management centers - exchanging train schedules, maintenance schedules, as well as incidents and priority messages that impact highway-rail intersections (HRIs). Supports advanced traffic control strategies and enhanced traveler information.	
<i>Requirement:</i>	Potential
1 The center shall exchange highway-rail intersection (HRI) information with rail operations centers. This information may include event schedules, requests for information from the Rail Operators, incident notification based on rail operations messages, and priority messages like notifications of a HAZMAT spill, equipment failure, or an intersection blockage.	
<i>Requirement:</i>	Potential
2 The center shall receive highway-rail intersection (HRI) maintenance schedules, train schedules, and incident notifications from rail operations centers.	
<i>Requirement:</i>	Potential
3 The center shall use the rail operations information to develop forecast HRI closure times and durations which may be applied in advanced traffic control strategies or delivered as enhanced traveler information.	
<i>Functional Area:</i> TMC Speed Monitoring and Warning	
Remotely monitors vehicle speeds, and informs an enforcement agency if excessive speeds are detected. Also configures and controls speed warning systems that provide safe speed advisories to the motorist.	
<i>Requirement:</i>	Potential
1 The center shall remotely control vehicle speed sensors typically placed in work zones; control parameters may include environmental and traffic conditions.	
<i>Requirement:</i>	Potential
2 The center shall collect operational status for the vehicle speed sensors; the status shall include logged information including measured speeds, warning messages displayed, and violation records.	
<i>Requirement:</i>	Potential
3 The center shall provide the capability to notify an enforcement agency when vehicle speeds in the work zone are in excess of the posted speed limit or are creating an unsafe condition based upon the current environmental or traffic conditions.	
<i>Requirement:</i>	Potential
4 The center shall collect fault data for the vehicle speed sensors for repair.	
<i>Functional Area:</i> TMC Multimodal Crossing Management	
Remotely monitors and manages multimodal crossings, such as draw bridges and other crossings between highway traffic and other modes; does not include highway-rail intersection.	
<i>Requirement:</i>	Potential
1 The center shall receive requests from non-highway traffic to cross at multimodal crossings for specified durations (such as draw bridges and miscellaneous other interference crossings between highway traffic and other modes such as river traffic, aircraft, etc.)	
<i>Requirement:</i>	Potential
2 The center shall remotely control traffic signal controllers for use at major multimodal crossings.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Local TMCs</i>	
<i>Entity: Traffic Management</i>	
<i>Functional Area: TMC Multimodal Crossing Management</i>	
Remotely monitors and manages multimodal crossings, such as draw bridges and other crossings between highway traffic and other modes; does not include highway-rail intersection.	
<i>Requirement:</i>	Potential
3 The center shall remotely control driver information systems (such as dynamic messages signs, highway advisory radios (HAR), and equipment that controls warning lights and gates) to notify drivers of closure durations and times at multimodal crossings.	
<i>Requirement:</i>	Potential
4 The center shall collect operational status for the equipment at multimodal crossings.	
<i>Requirement:</i>	Potential
5 The center shall collect fault data for the equipment at multimodal crossings for repair.	
<i>Requirement:</i>	Potential
6 The center shall receive and respond to requests for right-of-way at multimodal crossings.	
<i>Requirement:</i>	Potential
7 The center shall collect and analyze the planned multimodal crossing closures as a possible incident.	
<i>Requirement:</i>	Potential
8 The center shall distribute multimodal crossing information to other centers for dissemination to travelers.	
<i>Functional Area: Barrier System Management</i>	
Remotely controls barrier systems such as gates and other systems that manage entry to roadways, transportation facilities and infrastructure.	
<i>Requirement:</i>	Potential
1 The center shall remotely control barrier systems for transportation facilities and infrastructure. Barrier systems include automated or remotely controlled gates, barriers and other systems that manage entry to roadways.	
<i>Requirement:</i>	Potential
2 The center shall collect barrier system operational status.	
<i>Requirement:</i>	Potential
3 The center shall collect barrier system fault data and send to the maintenance center for repair.	
<i>Requirement:</i>	Potential
4 The center shall accept requests for barrier system activation from other centers and from center personnel to support emergency response and detours.	
<i>Functional Area: Traffic Equipment Maintenance</i>	
Monitoring and remote diagnostics of field equipment - detect failures, issue problem reports, and track the repair or replacement of the failed equipment.	
<i>Requirement:</i>	Potential
1 The center shall collect and store sensor (traffic, pedestrian, multimodal crossing) operational status.	
<i>Requirement:</i>	Potential
2 The center shall collect and store CCTV surveillance system (traffic, pedestrian) operational status.	
<i>Requirement:</i>	Potential
3 The center shall collect and store sensor (traffic, pedestrian, multimodal crossing) fault data and send to the maintenance center for repair.	
<i>Requirement:</i>	Potential
4 The center shall collect and store CCTV surveillance system (traffic, pedestrian) fault data send to the maintenance center for repair.	
<i>Requirement:</i>	Potential
5 The center shall collect environmental sensor operational status.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Local TMCs	
<i>Entity:</i> Traffic Management	
<i>Functional Area:</i> Traffic Equipment Maintenance	
Monitoring and remote diagnostics of field equipment - detect failures, issue problem reports, and track the repair or replacement of the failed equipment.	
<i>Requirement:</i>	Potential
6 The center shall collect environmental sensor equipment fault data and send to the maintenance center for repair.	
<i>Requirement:</i>	Potential
7 The center shall exchange data with maintenance centers concerning the reporting of faulty equipment and the schedule/status of their repair. Information exchanged includes details of new equipment faults, and clearances when the faults are cleared.	
<i>Requirement:</i>	Potential
8 The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for traffic maintenance data.	
<i>Functional Area:</i> TMC Work Zone Traffic Management	
Coordination with maintenance systems using work zone images and traveler information systems (such as DMS), and distribution of work plans so that work zones are established that have minimum traffic impact.	
<i>Requirement:</i>	Potential
1 The center shall receive work zone images from a maintenance center.	
<i>Requirement:</i>	Potential
2 The center shall analyze work zone images for indications of a possible incident.	
<i>Requirement:</i>	Potential
3 The center shall remotely control driver information systems (such as dynamic messages signs, highway advisory radios) to advise drivers of activity around a work zone.	
<i>Requirement:</i>	Potential
4 The center shall collect operational status for the driver information systems equipment in work zones.	
<i>Requirement:</i>	Potential
5 The center shall collect fault data for the driver information systems equipment in work zones for repair.	
<i>Requirement:</i>	Potential
6 The center shall receive proposed maintenance and construction work plans, analyze the activity as a possible incident, and provide work plan feedback to the sending center.	
<i>Functional Area:</i> TMC Demand Management Coordination	
Provides the capability to gather information on regional toll, parking, and transit usage and request changes to enable dynamic pricing for demand management.	
<i>Requirement:</i>	Potential
1 The center shall collect and store toll pricing data from toll administration centers, including the price for each road segment to which a toll applies, with the time and date for when it applies.	
<i>Requirement:</i>	Potential
2 The center shall collect and store parking information from parking management providers including lot locations, features (e.g. ability to handle oversized vehicles), capacity, type, hours of operation and rates.	
<i>Requirement:</i>	Potential
3 The center shall collect and store transit fare and schedule information from transit management centers.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Local TMCs	
<i>Entity:</i> Traffic Management	
<i>Functional Area:</i> TMC Demand Management Coordination	
Provides the capability to gather information on regional toll, parking, and transit usage and request changes to enable dynamic pricing for demand management.	
<i>Requirement:</i>	Potential
4 The center shall collect and store current transit, parking, and toll fee schedule information provided by regional traveler information systems.	
<i>Requirement:</i>	Potential
5 The center shall send requests to toll administration centers to change pricing, modify restrictions, or modify operations of a toll road facility.	
<i>Requirement:</i>	Potential
6 The center shall send requests to parking management providers to change the current parking lot charging structure.	
<i>Requirement:</i>	Potential
7 The center shall send requests to transit management centers to change the current transit services - schedules or fares of the transit services including park-and-ride lots.	
<i>Functional Area:</i> TMC Multimodal Coordination	
Provides traffic signal priority for transit vehicles based on center-to-center communications with the transit management center; also exchange traffic and transit information.	
<i>Requirement:</i>	Potential
1 The center shall respond to requests from transit management centers for signal priority at one or more intersections along a particular transit route.	
<i>Requirement:</i>	Potential
2 The center shall exchange information with transit management centers including details current transit routes, the level of service on each route, and the progress of individual vehicles along their routes.	
<i>Functional Area:</i> Traffic Data Collection	
Collection and storage of traffic management data. For use by operations personnel or data archives in the region.	
<i>Requirement:</i>	Potential
1 The center shall collect traffic management data such as operational data, event logs, etc.	
<i>Requirement:</i>	Potential
2 The center shall assign quality control metrics and meta-data to be stored along with the data. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.	
<i>Requirement:</i>	Potential
3 The center shall receive and respond to requests from ITS Archives for either a catalog of the traffic data or for the data itself.	
<i>Requirement:</i>	Potential
4 The center shall be able to produce sample products of the data available.	
<i>Functional Area:</i> TMC Transportation Operations Data Collection	
Collects real-time information on the state of the regional transportation system for operational use by the center. It establishes communications with a regional repository, requests or subscribes to information relevant to the center, and distributes the received information for use.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Local TMCs</i>	
<i>Entity: Traffic Management</i>	
<i>Functional Area: TMC Transportation Operations Data Collection</i>	
Collects real-time information on the state of the regional transportation system for operational use by the center. It establishes communications with a regional repository, requests or subscribes to information relevant to the center, and distributes the received information for use.	
<i>Requirement:</i>	Potential
1 The center shall collect real-time information on the state of the regional transportation system including current traffic and road conditions, weather conditions, special event and incident information.	
<i>Requirement:</i>	Potential
2 The center shall support the capability for the system operator to monitor and control the information collection service.	
<i>Element: Local TMCs Inspection Facilities</i>	
<i>Entity: Commercial Vehicle Check</i>	
<i>Functional Area: Roadside Electronic Screening</i>	
Roadside check facility equipment to communicate with commercial vehicles at mainline speeds - reading tag data, identification, weight and vehicle characteristics, and credential checking. Determines whether a pull-in message should be generated, allowing for inspectors to override.	
<i>Requirement:</i>	Potential
1 The roadside check facility equipment shall detect the presence of commercial vehicles and freight equipment approaching a facility. Sensors can differentiate between different types of vehicles and determine the number of axles, gross vehicle weight, and the identification of the vehicle and its cargo.	
<i>Requirement:</i>	Potential
2 The roadside check facility equipment shall receive the credential and credentials status information (e.g. snapshots) from the commercial vehicle administration center to maintain an up to date list of which vehicles have been cleared (enrolled) to potentially pass through without stopping.	
<i>Requirement:</i>	Potential
3 The roadside check facility equipment shall receive commercial vehicle violation records and carriers, vehicles, and drivers of interest from appropriate law enforcement agencies.	
<i>Requirement:</i>	Potential
4 The roadside check facility equipment shall provide an interface to inspectors in the field to allow them to monitor and if necessary override the pull-in decisions made by the system.	
<i>Requirement:</i>	Potential
5 The roadside check facility equipment shall request and input electronic screening data from the commercial vehicle's electronic tag data.	
<i>Requirement:</i>	Potential
6 The roadside check facility equipment shall collect safety data from the commercial vehicle and its freight equipment.	
<i>Requirement:</i>	Potential
7 The roadside check facility equipment shall send a pass/pull-in notification to the commercial vehicle and its driver based on the information received from the vehicle, the administration center, enforcement agencies, and the inspector. The message may be sent to the on-board equipment in the commercial vehicle or transmitted to the driver using equipment such as dynamic message signs, red-green lights, flashing signs, etc.	
<i>Requirement:</i>	Potential
8 The roadside check facility equipment shall verify that pull-in requests are heeded by drivers, notifying the facility operator if a vehicle fails to pull in as requested.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Local TMCs Inspection Facilities	
<i>Entity:</i> Commercial Vehicle Check	
<i>Functional Area:</i> Roadside Electronic Screening	
Roadside check facility equipment to communicate with commercial vehicles at mainline speeds - reading tag data, identification, weight and vehicle characteristics, and credential checking. Determines whether a pull-in message should be generated, allowing for inspectors to override.	
<i>Requirement:</i>	Potential
9 The roadside check facility equipment shall monitor alerting and advisory systems for security alerts and advisories.	
<i>Requirement:</i>	Potential
10 The roadside check facility equipment shall send a record of daily activities at the facility including summaries of screening events and inspections to the commercial vehicle administration center.	
<i>Functional Area:</i> Roadside WIM	
Roadside check facility equipment to detect and measure the weight commercial vehicles at high speed. Can include an interface to the credential checking or it can be a stand alone package with display.	
<i>Requirement:</i>	Potential
1 The roadside check facility equipment shall detect the presence of commercial vehicles and freight equipment approaching a facility. Sensors can differentiate between different types of vehicles and determine the number of axles, gross vehicle weight, weight per axle, and the identification of the vehicle and its cargo.	
<i>Requirement:</i>	Potential
2 The roadside check facility equipment shall request and input electronic screening data from the commercial vehicle's electronic tag data.	
<i>Requirement:</i>	Potential
3 The roadside check facility equipment shall send a pass/pull-in notification to the commercial vehicle and its driver based on the information received from the vehicle and the measurements taken. The message may be sent to the on-board equipment in the commercial vehicle or transmitted to the driver using equipment such as dynamic message signs, red-green lights, flashing signs, etc.	
<i>Functional Area:</i> Roadside Safety and Security Inspection	
Roadside check facility equipment to provide the capabilities to automate the roadside safety inspection process including wireless roadside inspections and use of hand held devices to rapidly inspect the vehicle and driver.	
<i>Requirement:</i>	Potential
1 The roadside check facility equipment shall receive information concerning commercial vehicles and freight equipment approaching a facility that are being pulled in for safety and security inspections.	
<i>Requirement:</i>	Potential
2 The roadside check facility equipment shall receive the safety and security inspection and status information from the commercial vehicle administration center to include information such as safety ratings, inspection summaries, and violation summaries. Corresponds to the safety portion of CVISN "snapshots."	
<i>Requirement:</i>	Potential
3 The roadside check facility equipment shall provide an interface to inspectors in the field to allow them to safety inspection data including overrides to the pull-in decisions made by the system.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Local TMCs Inspection Facilities</i>	
<i>Entity: Commercial Vehicle Check</i>	
<i>Functional Area: Roadside Safety and Security Inspection</i>	
Roadside check facility equipment to provide the capabilities to automate the roadside safety inspection process including wireless roadside inspections and use of hand held devices to rapidly inspect the vehicle and driver.	
<i>Requirement:</i> 4 The roadside check facility equipment shall request and input electronic safety data from the commercial vehicle's electronic tag data. This includes driver logs, on-board safety data, safety inspection records, commercial vehicle breach information, as well as freight equipment information.	Potential
<i>Requirement:</i> 5 The roadside check facility equipment shall send a pass/pull-in notification to the commercial vehicle and its driver based on the information received from the vehicle, the administration center, and the inspector. The message may be sent to the on-board equipment in the commercial vehicle or transmitted to the driver using equipment such as dynamic message signs, red-green lights, flashing signs, etc.	Potential
<i>Requirement:</i> 6 The roadside check facility equipment shall receive information about a breach or tamper event on a commercial vehicle or its attached freight equipment which includes identity, type of breach, location, and time.	Potential
<i>Requirement:</i> 7 The roadside check facility equipment shall receive driver records, accident reports, and citation records from the commercial vehicle administration center to support driver identification and access to driver credentials and history information.	Potential
<i>Requirement:</i> 8 The roadside check facility equipment shall read expected driver identity characteristics (e.g., PIN codes and biometric data) from the commercial vehicle equipment to support safety and security checking.	Potential
<i>Requirement:</i> 9 The roadside check facility equipment shall read the driver identification card provided by the commercial vehicle driver and support cross-check of the identification data with driver records.	Potential
<i>Requirement:</i> 10 The roadside check facility equipment shall forward results of the roadside safety inspections to the commercial vehicle administration center.	Potential
<i>Functional Area: Citation and Accident Electronic Recording</i>	
Roadside check facility equipment records results of roadside inspections and forwards information to the commercial vehicle administration center. Includes accident reports, violations, citations, and the daily site activity data.	
<i>Requirement:</i> 1 The roadside check facility equipment shall record the results of roadside inspections carried using an inspector's hand held terminal interface.	Potential
<i>Requirement:</i> 2 The roadside check facility equipment shall provide an interface for an inspector to add comments to the inspection results.	Potential

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Local TMCs Inspection Facilities</i>	
<i>Entity: Commercial Vehicle Check</i>	
<i>Functional Area: Citation and Accident Electronic Recording</i>	
Roadside check facility equipment records results of roadside inspections and forwards information to the commercial vehicle administration center. Includes accident reports, violations, citations, and the daily site activity data.	
<i>Requirement:</i>	
3 The roadside check facility equipment shall forward results of the roadside inspections to the commercial vehicle administration center either as needed or on a periodic basis. These reports include accident reports, violation notifications, citations, and daily site activity logs.	Potential
<i>Requirement:</i>	
4 The roadside check facility equipment shall receive driver records from the commercial vehicle administration center to support driver identification and collection of driver credentials and history information.	Potential
<i>Requirement:</i>	
5 The roadside check facility equipment shall collect safety data from the commercial vehicle and its freight equipment to help characterize the circumstances surrounding an accident.	Potential
<i>Requirement:</i>	
6 The roadside check facility equipment shall read the driver identification card provided by the commercial vehicle driver and support cross-check of the identification data with driver records.	Potential
<i>Functional Area: Roadside HAZMAT Detection</i>	
Roadside check facility equipment to detect and identify commercial vehicles carrying hazardous materials. Compare data with registered credentials and determines whether a pull-in message should be generated - notify emergency management if a problem occurs.	
<i>Requirement:</i>	
1 The roadside check facility equipment shall detect the presence of commercial vehicles and freight equipment approaching a facility. Sensors can differentiate between different types of vehicles and determine the number of axles, gross vehicle weight, presence of security sensitive hazardous materials, and the identification of the vehicle and its cargo.	Potential
<i>Requirement:</i>	
2 The roadside check facility equipment shall detect the presence of security sensitive substance, e.g. detection of radiation or ammonia compounds, carried on-board commercial vehicles and freight equipment approaching a facility. This data is acquired by roadside sensors from the freight equipment electronically, optically, or manually.	Potential
<i>Requirement:</i>	
3 The roadside check facility equipment shall receive the credential information (e.g. snapshots) from the commercial vehicle administration center to maintain an up to date list of which vehicles with hazardous materials shipments have been cleared (enrolled).	Potential
<i>Requirement:</i>	
4 The roadside check facility equipment shall send a pass/pull-in notification to the commercial vehicle and its driver based on the hazmat information received from the vehicle, the freight equipment, or the administration center. The message may be sent to the on-board equipment in the commercial vehicle or transmitted to the driver using equipment such as dynamic message signs, red-green lights, flashing signs, etc.	Potential

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Local TMCs Inspection Facilities</i>	
<i>Entity: Commercial Vehicle Check</i>	
<i>Functional Area: Roadside HAZMAT Detection</i>	
Roadside check facility equipment to detect and identify commercial vehicles carrying hazardous materials. Compare data with registered credentials and determines whether a pull-in message should be generated - notify emergency management if a problem occurs.	
<i>Requirement:</i>	Potential
5 The roadside check facility equipment shall raise and forward an alarm to the appropriate emergency management center if the hazmat-carrying commercial vehicle does not stop, or in the case of a positive identification of an unpermitted security sensitive hazmat cargo, to coordinate a traffic stop or some other action with respect to the offending commercial vehicle. The alarm will include information concerning the security sensitive hazmat detected at the roadside including the location, appropriate identifiers, route deviation, or assignment mismatches between the driver, commercial vehicle, or the freight equipment.	
<i>Element: Local TMCs Kiosks</i>	
<i>Entity: Remote Traveler Support</i>	
<i>Functional Area: Remote Basic Information Reception</i>	
Public traveler interface, such as a kiosk, that provides formatted traffic advisories, transit, event, and other traveler information, as well as broadcast alerts.	
<i>Requirement:</i>	Potential
1 The public interface for travelers shall receive traffic information from a center and present it to the traveler.	
<i>Requirement:</i>	Potential
2 The public interface for travelers shall receive transit information from a center and present it to the traveler.	
<i>Requirement:</i>	Potential
3 The public interface for travelers shall receive event information from a center and present it to the traveler.	
<i>Requirement:</i>	Potential
4 This public interface for travelers shall receive evacuation information from a center and present it to the traveler.	
<i>Requirement:</i>	Potential
5 The public interface for travelers shall receive wide-area alerts and present it to the traveler.	
<i>Requirement:</i>	Potential
6 The public interface for travelers shall provide the capability for digitized map data to act as the background to the information presented to the traveler.	
<i>Requirement:</i>	Potential
7 The public interface for travelers shall support traveler input in audio or manual form.	
<i>Requirement:</i>	Potential
8 The public interface for travelers shall present information to the traveler in audible or visual forms consistent with a kiosk, including those that are suitable for travelers with hearing or vision physical disabilities.	
<i>Requirement:</i>	Potential
9 The public interface for travelers shall be able to store frequently requested data.	
<i>Functional Area: Remote Interactive Information Reception</i>	
Public traveler interface, such as a kiosk, that provides traffic, transit, yellow pages, special event, and other personalized traveler information services upon request.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Local TMCs Kiosks</i>	
<i>Entity: Remote Traveler Support</i>	
<i>Functional Area: Remote Interactive Information Reception</i>	
Public traveler interface, such as a kiosk, that provides traffic, transit, yellow pages, special event, and other personalized traveler information services upon request.	
<i>Requirement:</i>	Potential
1 The public interface for travelers shall receive traffic information from a center and present it to the traveler upon request.	
<i>Requirement:</i>	Potential
2 The public interface for travelers shall receive transit information from a center and present it to the traveler upon request.	
<i>Requirement:</i>	Potential
3 The public interface for travelers shall receive yellow pages information (such as lodging, restaurants, theaters, bicycle facilities, and other tourist activities) from a center and present it to the traveler upon request.	
<i>Requirement:</i>	Potential
4 The public interface for travelers shall receive event information from a center and present it to the traveler upon request.	
<i>Requirement:</i>	Potential
5 The public interface for travelers shall receive evacuation information from a center and present it to the traveler.	
<i>Requirement:</i>	Potential
6 The public interface for travelers shall receive wide-area alerts and present it to the traveler.	
<i>Requirement:</i>	Potential
7 The public interface for travelers shall accept reservations for confirmed trip plans.	
<i>Requirement:</i>	Potential
8 The public interface for travelers shall support payment for services, such as confirmed trip plans, confirmed traveler services, tolls, transit fares, parking lot charges, and advanced payment for tolls.	
<i>Requirement:</i>	Potential
9 The public interface for travelers shall provide an interface through which credit identities and stored credit values may be collected from tags, traveler cards, or payment instruments used by travelers.	
<i>Requirement:</i>	Potential
10 The public interface for travelers shall base requests from the traveler on the traveler's current location or a specific location identified by the traveler, and filter the provided information accordingly.	
<i>Requirement:</i>	Potential
11 The public interface for travelers shall provide digitized map data to act as the background to the information presented to the traveler.	
<i>Requirement:</i>	Potential
12 The public interface for travelers shall support traveler input in audio or manual form.	
<i>Requirement:</i>	Potential
13 The public interface for travelers shall present information to the traveler in audible or visual forms consistent with a kiosk, including those that are suitable for travelers with hearing or vision physical disabilities.	
<i>Requirement:</i>	Potential
14 The public interface for travelers shall be able to store frequently requested data.	

Functional Area: Remote Transit Information Services

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Local TMCs Kiosks</i>	
<i>Entity: Remote Traveler Support</i>	
<i>Functional Area: Remote Transit Information Services</i>	
Public traveler interface that provides real-time travel-related information at transit stops and multi-modal transfer points, including general annunciation, display of imminent arrival information, the latest available information on transit routes, schedules, transfer options, available services, fares, and real-time schedule adherence.	
<i>Requirement:</i>	Potential
1 The public interface for travelers shall collect and provide real-time travel-related information at transit stops, multi-modal transfer points, and other public transportation areas.	
<i>Requirement:</i>	Potential
2 The public interface for travelers shall collect and present to the transit traveler information on transit routes, schedules, and real-time schedule adherence.	
<i>Requirement:</i>	Potential
3 The public interface for travelers shall provide support for general annunciation and/or display of imminent arrival information and other information of general interest to transit users.	
<i>Requirement:</i>	Potential
4 The public interface for travelers shall present information to the traveler in a form suitable for travelers with physical disabilities.	
<i>Element: Local TMCs Roadside Equipment</i>	
<i>Entity: Roadway</i>	
<i>Functional Area: Roadway Basic Surveillance</i>	
Field elements that monitor traffic conditions using loop detectors and CCTV cameras.	
<i>Requirement:</i>	Potential
1 The field element shall collect, process, digitize, and send traffic sensor data (speed, volume, and occupancy) to the center for further analysis and storage, under center control.	
<i>Requirement:</i>	Potential
2 The field element shall collect, process, and send traffic images to the center for further analysis and distribution.	
<i>Requirement:</i>	Potential
4 The field element shall return sensor and CCTV system operational status to the controlling center.	
<i>Requirement:</i>	Potential
5 The field element shall return sensor and CCTV system fault data to the controlling center for repair.	
<i>Functional Area: Roadway Probe Data Communications</i>	
Field elements that collect probe data from vehicles using short range communications.	
<i>Requirement:</i>	Potential
1 The field element shall communicate with passing vehicles for traffic data link time calculations and send collected data to the controlling center; identification will be removed to ensure anonymity.	
<i>Requirement:</i>	Potential
2 The field element shall communicate with on-board equipment on passing vehicles to collect current vehicle position, speed, and heading and a record of previous events (e.g., starts and stops, link travel times) that can be used to determine current traffic conditions.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Local TMCs Roadside Equipment</i>	
<i>Entity: Roadway</i>	
<i>Functional Area: Roadway Probe Data Communications</i>	
Field elements that collect probe data from vehicles using short range communications.	
<i>Requirement:</i> 3 The field element shall communicate with on-board equipment on passing vehicles to collect current status information and a record of previous events (e.g., temperature, wiper status, headlight status, traction control system status) that can be used to determine road and surface weather conditions.	Potential
<i>Requirement:</i> 4 The field element shall communicate with on-board equipment on passing vehicles to collect vehicle trip information (e.g., origin and destination information, travel times) that can be used to support transportation planning.	Potential
<i>Requirement:</i> 5 The field element shall communicate with on-board equipment on passing vehicles to collect a history of precise positioning information that can be used to derive or verify accurate roadway geometry and lane features for use by map update providers.	Potential
<i>Requirement:</i> 6 The field element shall aggregate and forward collected probe information to the center.	Potential
<i>Requirement:</i> 7 The field element shall provide roadside equipment operational status to the center.	Potential
<i>Requirement:</i> 8 The field element shall provide roadside equipment fault indication to the center for repair.	Potential
<i>Functional Area: Roadway Signal Controls</i>	
Field elements including traffic signal controllers for use at signalized intersections; also supports pedestrian crossings.	
<i>Requirement:</i> 1 The field element shall control traffic signals under center control.	Potential
<i>Requirement:</i> 2 The field element shall respond to pedestrian crossing requests by accommodating the pedestrian crossing.	Potential
<i>Requirement:</i> 3 The field element shall provide the capability to notify the traffic management center of pedestrian calls and pedestrian accommodations.	Potential
<i>Requirement:</i> 4 The field element shall report the current signal control information to the center.	Potential
<i>Requirement:</i> 5 The field element shall report current preemption status to the center.	Potential
<i>Requirement:</i> 6 The field element shall return traffic signal controller operational status to the center.	Potential
<i>Requirement:</i> 7 The field element shall return traffic signal controller fault data to the center.	Potential
<i>Functional Area: Field Management Stations Operation</i>	
Supports direct communications between field management stations and the local field equipment under their control.	
<i>Requirement:</i> 1 The field management station shall accept configuration information from the center.	Potential

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Local TMCs Roadside Equipment	
<i>Entity:</i> Roadway	
<i>Functional Area:</i> Field Management Stations Operation	
Supports direct communications between field management stations and the local field equipment under their control.	
<i>Requirement:</i>	Potential
2 The field management station shall pass data provided by the center to local field devices and report data from the field devices back to the center.	
<i>Functional Area:</i> Roadway Signal Preemption	
Field elements that receive signal preemption requests from approaching emergency vehicles and overrides the current operation of the traffic signals	
<i>Requirement:</i>	Potential
1 The field element shall respond to signal preemption requests from emergency vehicles.	
<i>Functional Area:</i> Roadway Variable Speed Limits	
Field elements including physical overhead lane signs and associated monitoring, communications, and control electronics that are used to manage and control variable speed limits systems.	
<i>Requirement:</i>	Potential
1 The field element shall monitor traffic and environmental conditions along the roadway.	
<i>Requirement:</i>	Potential
2 The field element shall autonomously calculate and set variable speed limits based on current conditions by lane.	
<i>Requirement:</i>	Potential
3 The field element shall receive commands from the controlling center that establish speed limits by lane.	
<i>Requirement:</i>	Potential
4 The field element shall display the current speed limits per lane to drivers.	
<i>Requirement:</i>	Potential
5 The field element shall display additional information such as basic safety rules and current traffic information to drivers.	
<i>Requirement:</i>	Potential
6 The field element shall collect operational status of the variable speed limit field equipment and report the operational status to the controlling center.	
<i>Requirement:</i>	Potential
7 The field element shall monitor and report faults to the controlling center.	
<i>Functional Area:</i> Roadway Warning	
Field elements used to warn drivers approaching hazards including adverse road weather conditions, traffic conditions including queues, and obstacles or animals in the road.	
<i>Requirement:</i>	Potential
1 The field element shall monitor for hazardous traffic conditions, including queues.	
<i>Requirement:</i>	Potential
2 The field element shall monitor for hazardous road surface and local weather conditions.	
<i>Requirement:</i>	Potential
3 The field element shall monitor for debris, animals, or other objects in the travel lanes.	
<i>Requirement:</i>	Potential
4 The field element shall provide collected sensor data to the controlling center.	
<i>Requirement:</i>	Potential
5 The field element shall autonomously identify potentially hazardous conditions and activate warning signs to approaching motorists.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Local TMCs Roadside Equipment	
<i>Entity:</i> Roadway	
<i>Functional Area:</i> Roadway Warning	
Field elements used to warn drivers approaching hazards including adverse road weather conditions, traffic conditions including queues, and obstacles or animals in the road.	
<i>Requirement:</i>	Potential
6 The field element shall receive commands from the controlling center that activate warning signs to approaching motorists.	
<i>Requirement:</i>	Potential
7 The field element shall collect operational status of the warning system field equipment and report the operational status to the controlling center.	
<i>Requirement:</i>	Potential
8 The field element shall monitor and report faults to the controlling center.	
<i>Functional Area:</i> Roadway Traffic Information Dissemination	
Driver information systems, such as dynamic message signs and Highway Advisory Radio (HAR).	
<i>Requirement:</i>	Potential
1 The field element shall include dynamic messages signs for dissemination of traffic and other information to drivers, under center control; the DMS may be either those that display variable text messages, or those that have fixed format display(s) (e.g. vehicle restrictions, or lane open/close).	
<i>Requirement:</i>	Potential
2 The field element shall include 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, under center control.	
<i>Requirement:</i>	Potential
3 The field element shall include pedestrian information systems under center control (e.g. warning pedestrians of a potential hazard, or providing mandatory instructions as to the availability of pedestrian access).	
<i>Requirement:</i>	Potential
4 The field element shall provide operational status for the driver information systems equipment (DMS, HAR, etc.) to the center.	
<i>Requirement:</i>	Potential
5 The field element shall provide fault data for the driver information systems equipment (DMS, HAR, etc.) to the center for repair.	
<i>Functional Area:</i> Roadway Incident Detection	
Field elements that monitor traffic conditions to identify incidents. It includes traffic detectors that collect traffic flow information and identify unusual traffic conditions and advanced CCTV cameras with built-in incident detection algorithms.	
<i>Requirement:</i>	Potential
1 The field element shall collect, process, and send traffic images to the center for further analysis and distribution.	
<i>Requirement:</i>	Potential
2 The field element shall remotely process video data and provide an indication of potential incidents to the traffic management center.	
<i>Requirement:</i>	Potential
3 The field element's video devices shall be remotely controlled by a traffic management center.	
<i>Requirement:</i>	Potential
4 The field element shall provide operational status and fault data for the incident detection devices to the traffic management center.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Local TMCs Roadside Equipment</i>	
<i>Entity: Roadway</i>	
<i>Functional Area: Advanced Rail Crossing</i>	
Field elements at highway-rail intersections (HRIs) where operational requirements demand advanced features (e.g., where rail operational speeds are greater than 80 miles per hour). Capabilities from the Standard Rail Crossing plus systems which preclude entrance into the intersection when the barriers are activated, additional arriving train information, and detection of blocked intersections.	
<i>Requirement:</i>	Potential
1 The field element shall collect and process, traffic sensor data in the vicinity of a highway-rail intersection (HRI).	
<i>Requirement:</i>	Potential
2 The field element shall determine whether the highway-rail intersection (HRI) is blocked by traffic in the roadway or some other obstruction.	
<i>Requirement:</i>	Potential
3 The field element shall notify the traffic management center and the rail wayside equipment of any intersection blockages, including trapped vehicles or other obstructions.	
<i>Requirement:</i>	Potential
4 The field element shall monitor the status of the highway-rail intersection (HRI) equipment, including both the current state and mode of operation and the current equipment condition, to be forwarded on to the traffic management center.	
<i>Requirement:</i>	Potential
5 The field element shall monitor the status of the highway-rail intersection (HRI) equipment, including both the current state and mode of operation and the current equipment condition, to be forwarded on to the rail wayside equipment.	
<i>Requirement:</i>	Potential
6 The field element shall receive track status and arriving train information from the rail wayside equipment that can be passed on to the traffic management center. This may include the current status of the tracks and when a train is expected and/or how long the crossing will be closed.	
<i>Requirement:</i>	Potential
7 The field element shall collect pedestrian images and pedestrian sensor data, and respond to pedestrian crossing requests via display, audio signal, or other manner.	
<i>Requirement:</i>	Potential
8 The field element shall control the dynamic message signs (DMS) in the vicinity of a highway-rail intersection (HRI) to advise drivers, cyclists, and pedestrians of approaching trains.	
<i>Requirement:</i>	Potential
9 The field element shall close the highway-rail intersection (HRI) when a train is approaching with enough time for traffic to safely clear the crossing using gates, lights/signs, barriers, and traffic control signals.	
<i>Requirement:</i>	Potential
10 The field element shall support the integrated control of adjacent traffic signals to clear an area in advance of an approaching train and to manage traffic around the intersection.	
<i>Requirement:</i>	Potential
11 The field element shall forward rail traffic advisories received from the Wayside Equipment to the traffic management center.	
<i>Requirement:</i>	Potential
12 The field element shall provide approaching train advisories using field-vehicle communications to vehicles approaching the grade crossing.	
<i>Functional Area: Roadway Equipment Coordination</i>	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Local TMCs Roadside Equipment	
<i>Entity:</i> Roadway	
<i>Functional Area:</i> Roadway Equipment Coordination	
Field elements that control and send data to other field elements (such as environmental sensors that send data to a DMS or coordination between traffic controllers on adjacent intersections), without center control.	
<i>Requirement:</i>	Potential
1 The field element shall include sensors that provide data and status information to other field element devices, without center control.	
<i>Requirement:</i>	Potential
2 The field element shall include sensors that receive configuration data from other field element devices, without center control.	
<i>Requirement:</i>	Potential
3 The field element shall include devices that provide data and status information to other field element devices without center control.	
<i>Requirement:</i>	Potential
4 The field element shall include devices that receive configuration data from other field element devices, without center control.	
<i>Functional Area:</i> Roadway Field Device Monitoring	
Monitors field equipment operational status and detects and reports fault conditions. Device status, configuration, and fault information are provided to a remote center and a user interface provides information locally to field personnel.	
<i>Requirement:</i>	Potential
1 The field element shall monitor the operational status (state of the device, configuration, and fault data) of connected sensors (such as traffic, infrastructure, environmental, security, speed) and devices (such as highway advisory radio, dynamic message signs, automated roadway treatment systems, barrier and safeguard systems, cameras, traffic signals, ramp meters, short range communications equipment, security surveillance equipment).	
<i>Requirement:</i>	Potential
2 The field element shall send operational status of connected field equipment to the maintenance center.	
<i>Requirement:</i>	Potential
3 The field element shall send collected fault data to the maintenance center for repair.	
<i>Requirement:</i>	Potential
4 The field element shall include a local interface that provides operational status and fault data for connected field equipment to field personnel.	
<i>Requirement:</i>	Potential
5 The field element shall include a local interface that allows field personnel to command diagnostic tests on connected field equipment.	
<i>Functional Area:</i> Roadway Environmental Monitoring	
Environmental sensors, surface and sub-surface, that collect weather and road surface information. Weather conditions measured include temperature, wind, humidity, precipitation, and visibility. Sensors measure road surface temperature, moisture, icing, salinity, etc.	
<i>Requirement:</i>	Potential
1 The field element shall include surface and sub-surface environmental sensors that measure road surface temperature, moisture, icing, salinity, and other measures.	
<i>Requirement:</i>	Potential
2 The field element shall include environmental sensors that measure weather conditions including temperature, wind, humidity, precipitation, and visibility.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Local TMCs Roadside Equipment</i>	
<i>Entity: Roadway</i>	
<i>Functional Area: Roadway Environmental Monitoring</i>	
Environmental sensors, surface and sub-surface, that collect weather and road surface information. Weather conditions measured include temperature, wind, humidity, precipitation, and visibility. Sensors measure road surface temperature, moisture, icing, salinity, etc.	
<i>Requirement:</i>	
3 The field element's environmental sensors shall be remotely controlled by a maintenance center.	Potential
<i>Requirement:</i>	
4 The field element's environmental sensors shall be remotely controlled by a traffic management center.	Potential
<i>Requirement:</i>	
5 The field element's environmental sensors shall be remotely controlled by weather service providers such as the National Weather Service or value-added sector specific meteorological services.	Potential
<i>Requirement:</i>	
6 The field element's environmental sensors shall be remotely controlled by a maintenance and construction vehicle.	Potential
<i>Requirement:</i>	
7 The field element shall provide environmental sensor equipment operational status to the controlling center or maintenance vehicle.	Potential
<i>Requirement:</i>	
8 The field element shall provide environmental sensor equipment fault indication to the controlling center or maintenance vehicle.	Potential
<i>Requirement:</i>	
9 The field element shall remotely aggregate environmental sensor data with environmental data collected from maintenance and construction vehicles.	Potential
<i>Requirement:</i>	
10 The field element shall provide weather and road surface condition data to centers.	Potential
<i>Requirement:</i>	
11 The field element shall provide weather and road surface condition data to maintenance and construction vehicles.	Potential
<i>Functional Area: Field Barrier System Control</i>	
Field elements that control barrier systems such as gates and other systems that manage entry to roadways, transportation facilities and infrastructure.	
<i>Requirement:</i>	
1 The field element shall activate barrier systems for transportation facilities and infrastructure under center control. Barrier systems include automated or remotely controlled gates, barriers and other systems that manage entry to roadways.	Potential
<i>Requirement:</i>	
2 The field element shall return barrier system operational status to the controlling center.	Potential
<i>Requirement:</i>	
3 The field element shall return barrier system fault data to the maintenance center for repair.	Potential
<i>Requirement:</i>	
4 The field element shall receive requests for access from approaching vehicles using field-vehicle communications and validate and authenticate the requests.	Potential
<i>Requirement:</i>	
5 The field element shall grant access only to qualified vehicles.	Potential
<i>Requirement:</i>	
6 The field element shall communicate access permission status and access instructions to approaching vehicles using field-vehicle communications.	Potential
<i>Functional Area: Roadway Speed Monitoring and Warning</i>	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Local TMCs Roadside Equipment</i>	
<i>Entity: Roadway</i>	
<i>Functional Area: Roadway Speed Monitoring and Warning</i>	
Vehicle speed sensors that detect excessive vehicle speeds, optionally based on conditions and vehicle type, informing drivers, centers and/or enforcement agencies of speed violations.	
<i>Requirement:</i>	Potential
1 The field element shall include sensors to detect vehicle speeds, under traffic or maintenance center control.	
<i>Requirement:</i>	Potential
2 The field element shall include sensors to detect vehicle speeds, under enforcement agency control.	
<i>Requirement:</i>	Potential
3 If the speed detected by vehicle speed sensors is determined to be excessive, the field element shall provide a safe speed advisory to passing drivers via a driver information system (such as portable messages signs, field to vehicle communications to in-vehicle signing systems, etc.).	
<i>Requirement:</i>	Potential
4 The field element shall base speed advisories to passing drivers on environmental conditions.	
<i>Requirement:</i>	Potential
5 The field element shall monitor notify an enforcement agency when a speed violation is detected.	
<i>Requirement:</i>	Potential
6 The field element shall return operational status for the vehicle speed sensors to the controlling traffic or maintenance center; including measured speeds, warning messages displayed, and violation records.	
<i>Requirement:</i>	Potential
7 The field element shall return operational status for the vehicle speed sensors to the enforcement agency.	
<i>Requirement:</i>	Potential
8 The field element shall return fault data for the vehicle speed sensors to the controlling center for repair.	
<i>Functional Area: Multimodal Crossing Control</i>	
Field elements to monitor and control traffic at multimodal crossings, such as draw bridges and other crossings between highway traffic and other modes; does not include highway-rail intersection.	
<i>Requirement:</i>	Potential
1 The field element shall include sensors to monitor requests from non-highway traffic to cross at multimodal crossings for specified durations (such as draw bridges and miscellaneous other interference crossings between highway traffic and other modes such as river traffic, aircraft, etc.); the sensors are under center control.	
<i>Requirement:</i>	Potential
2 The field element shall include signals to control traffic at multimodal crossings on surface streets, under center control.	
<i>Requirement:</i>	Potential
3 The field element shall include driver information systems (such as dynamic messages signs, highway advisory radios (HAR), and equipment that controls warning lights and gates) that advise drivers at multimodal crossings, under center control.	
<i>Requirement:</i>	Potential
4 The field element shall provide operational status for the sensors, signals, and driver information systems equipment at multimodal crossings to the center.	
<i>Requirement:</i>	Potential
5 The field element shall provide fault data for the sensors, signals, and driver information systems equipment at multimodal crossings to the center for repair.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Local TMCs Roadside Equipment</i>	
<i>Entity: Roadway</i>	
<i>Functional Area: Multimodal Crossing Control</i>	
Field elements to monitor and control traffic at multimodal crossings, such as draw bridges and other crossings between highway traffic and other modes; does not include highway-rail intersection.	
<i>Requirement:</i>	
6 The field element shall forward all requests for right-of-way at multimodal crossings to the controlling center.	Potential
<i>Functional Area: Roadway Work Zone Traffic Control</i>	
Field elements in maintenance and construction areas including CCTV cameras, driver information systems (such as DMS), and gates/barriers that monitor and control traffic and provide information directly to drivers in affected areas.	
<i>Requirement:</i>	
1 The field element shall collect, process, and send work zone images to the center for further analysis and distribution, under center control.	Potential
<i>Requirement:</i>	
2 Under traffic and maintenance center control, the field element shall include driver information systems (such as dynamic messages signs and highway advisory radios) that advise drivers of activity around the work zone through which they are currently passing.	Potential
<i>Requirement:</i>	
3 Under the control of field personnel within maintenance vehicles, the field element shall include driver information systems (such as dynamic messages signs and highway advisory radios) that advise drivers of activity around a work zone through which they are currently passing.	Potential
<i>Requirement:</i>	
4 The field element shall control access to the work zone using automated gate or barrier systems. This includes automated flagger assistance devices that include automated gate arms and other automated gate/barrier systems.	Potential
<i>Requirement:</i>	
5 The field element shall provide operational status for the surveillance (e.g. CCTV), driver information systems, and gates/barriers in work zones to the maintenance center.	Potential
<i>Requirement:</i>	
6 The field element shall provide fault data for the surveillance (e.g. CCTV), driver information systems, and gates/barriers in work zones to the maintenance center for repair.	Potential
<i>Functional Area: Roadway Work Zone Safety</i>	
Work zone intrusion detection devices (to detect vehicle intrusion upon a work zone or crew worker movement across a work zone boundary) and intrusion alerting devices that provide alerts to crew and drivers.	
<i>Requirement:</i>	
1 The field element shall include work zone intrusion detection devices that detect when a vehicle has intruded upon the boundary of a work zone, under center control.	Potential
<i>Requirement:</i>	
2 The field element shall include work zone intrusion detection devices that detect when crew workers have crossed the boundary between the work zone and vehicle traffic, under center control.	Potential
<i>Requirement:</i>	
3 The field element shall include work zone intrusion alerting devices that alert crew workers of a work zone emergency or safety issue such as the intrusion of a vehicle into the work zone area or movement of field crew into the travel lanes.	Potential

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Local TMCs Roadside Equipment</i>	
<i>Entity: Roadway</i>	
<i>Functional Area: Roadway Work Zone Safety</i>	
Work zone intrusion detection devices (to detect vehicle intrusion upon a work zone or crew worker movement across a work zone boundary) and intrusion alerting devices that provide alerts to crew and drivers.	
<i>Requirement:</i> 4 The field element shall include work zone intrusion alerting devices that notify crew via maintenance vehicles of a work zone emergency or safety issue such as the intrusion of a vehicle into the work zone area or movement of field crew into the travel lanes.	Potential
<i>Requirement:</i> 5 The field element shall include work zone intrusion alerting devices that alert drivers that they have intruded upon the perimeter of the work zone, or are about to do so; may provide alerts to drivers directly or via in-vehicle signing.	Potential
<i>Requirement:</i> 6 The field element shall provide operational status for the work zone intrusion detection devices to the maintenance center.	Potential
<i>Requirement:</i> 7 The field element shall provide fault data for the work zone intrusion detection devices to the maintenance center for repair.	Potential
<i>Requirement:</i> 8 The field element shall provide operational status for the work zone intrusion alerting devices to the maintenance center.	Potential
<i>Requirement:</i> 9 The field element shall provide fault data for the work zone intrusion alerting devices to the maintenance center for repair.	Potential
<i>Functional Area: Roadway Data Collection</i>	
Field elements to collect traffic, road, and environmental conditions information for use in transportation planning, research, and other off-line applications. Includes the sensors, supporting roadside infrastructure, and communications equipment.	
<i>Requirement:</i> 1 The field element shall collect traffic, road, and environmental conditions information.	Potential
<i>Requirement:</i> 2 The field element shall include the sensors and supporting roadside devices that sense, collect, and send traffic, road, and environmental conditions information to a center for archival.	Potential
<i>Requirement:</i> 3 The field element shall collect sensor status and sensor faults from roadside equipment and send it along with the recorded data to a center for archival.	Potential
<i>Element: MCT Agency Management</i>	
<i>Entity: Transit Management</i>	
<i>Functional Area: Transit Center Connection Protection</i>	
Manages the coordination of transit transfers between routes, including routes on different modes. Also supports the capability for travelers to obtain connection protection throughout a trip.	
<i>Requirement:</i> 1 The center shall manage service requests for routing of an individual through the transit system.	Existing
<i>Requirement:</i> 2 The center shall provide transit plans for both fixed and demand responsive transit to transit passengers.	Existing
<i>Requirement:</i> 3 The center shall be able to coordinate with Other Transit Management systems or Multimodal Transportation Service Providers in order to provide a complete multimodal trip plan.	Planned

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> MCT Agency Management	
<i>Entity:</i> Transit Management	
<i>Functional Area:</i> Transit Center Connection Protection	
Manages the coordination of transit transfers between routes, including routes on different modes. Also supports the capability for travelers to obtain connection protection throughout a trip.	
<i>Requirement:</i>	
4 The center shall track the passenger through the transit network, and coordinate with Other TRM and Multimodal Transportation Service Providers so that the passenger makes efficient connections between the transit system and other transit systems or other modes of transportation.	Planned
<i>Functional Area:</i> Transit Center Vehicle Tracking	
Monitoring transit vehicle locations via interactions with on-board systems. Furnish users with real-time transit schedule information and maintain interface with digital map providers.	
<i>Requirement:</i>	
1 The center shall monitor the locations of all transit vehicles within its network.	Existing
<i>Requirement:</i>	
2 The center shall determine adherence of transit vehicles to their assigned schedule.	Existing
<i>Requirement:</i>	
3 The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for transit tracking and dispatch.	Existing
<i>Requirement:</i>	
4 The center shall provide transit operational data to traveler information service providers.	Planned
<i>Requirement:</i>	
5 The center shall provide collected transit probe data to traffic management centers and traveler information service providers for use in measuring current traffic conditions.	Existing
<i>Functional Area:</i> Transit Center Fixed-Route Operations	
Management of fixed route transit operations. Planning, scheduling, and dispatch associated with fixed and flexible route transit services. Updates customer service operator systems, and provides current vehicle schedule adherence and optimum scenarios for schedule adjustment.	
<i>Requirement:</i>	
1 The center shall generate transit routes and schedules based on such factors as parameters input by the system operator, road network conditions, incident information, operational data on current routes and schedules, and digitized map data.	Existing
<i>Requirement:</i>	
2 The center shall provide the interface to the system operator to control the generation of new routes and schedules (transit services) including the ability to review and update the parameters used by the routes and schedules generation processes and to initiate these processes	Existing
<i>Requirement:</i>	
3 The center shall be able to generate special routes and schedules to support an incident, disaster, evacuation, or other emergency.	Existing
<i>Requirement:</i>	
4 The center shall dispatch fixed route or flexible route transit vehicles	Existing
<i>Requirement:</i>	
5 The center shall collect transit operational data for use in the generation of routes and schedules.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> MCT Agency Management	
<i>Entity:</i> Transit Management	
<i>Functional Area:</i> Transit Center Fixed-Route Operations	
Management of fixed route transit operations. Planning, scheduling, and dispatch associated with fixed and flexible route transit services. Updates customer service operator systems, and provides current vehicle schedule adherence and optimum scenarios for schedule adjustment.	
<i>Requirement:</i>	Existing
6 The center shall provide instructions or corrective actions to the transit vehicle operators based upon operational needs.	
<i>Requirement:</i>	Existing
7 The center shall manage large deviations of individual transit vehicles, deviations in rural areas, and deviations of large numbers of vehicles.	
<i>Requirement:</i>	Existing
8 The center shall 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.	
<i>Requirement:</i>	Existing
9 The center shall exchange information with Maintenance and Construction Operations concerning work zones, roadway conditions, asset restrictions, work plans, etc.	
<i>Requirement:</i>	Existing
10 The center shall disseminate up-to-date schedules and route information to other centers for fixed and flexible route services.	
<i>Requirement:</i>	Existing
11 The center shall provide an interface to the archive data repository to enable the operator to retrieve historical operating data for use in planning transit routes and schedules.	
<i>Functional Area:</i> Transit Center Paratransit Operations	
Management of demand response transit services, including paratransit. Planning and scheduling of these services. Supports automated vehicle dispatch and automatically updates customer service operator systems.	
<i>Requirement:</i>	Existing
1 The center shall process trip requests for demand responsive transit services, i.e. paratransit. Sources of the requests may include traveler information service providers.	
<i>Requirement:</i>	Existing
2 The center shall monitor the operational status of the demand response vehicles including status of passenger pick-up and drop-off.	
<i>Requirement:</i>	Existing
3 The center shall generate demand response transit (including paratransit) routes and schedules based on such factors as parameters input by the system operator, what other demand responsive transit schedules have been planned, the availability and location of vehicles, the relevance of any fixed transit routes and schedules, road network information, and incident information.	
<i>Requirement:</i>	Existing
4 The center shall dispatch demand response (paratransit) transit vehicles.	
<i>Requirement:</i>	Existing
5 The center shall exchange information with Maintenance and Construction Operations concerning work zones, roadway conditions, asset restrictions, work plans, etc.	
<i>Requirement:</i>	Existing
6 The center shall disseminate up-to-date schedules and route information to other centers for demand responsive transit services (paratransit).	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> MCT Agency Management	
<i>Entity:</i> Transit Management	
<i>Functional Area:</i> Transit Center Paratransit Operations	
Management of demand response transit services, including paratransit. Planning and scheduling of these services. Supports automated vehicle dispatch and automatically updates customer service operator systems.	
<i>Requirement:</i>	Existing
7 The center shall collect the log of passenger boardings and alightings from the paratransit vehicles.	
<i>Functional Area:</i> Transit Center Fare Management	
Management of fare collection at the center - includes setting and distributing fare information, central processing of fares for transit as well as other ITS services, links to financial institutions and enforcement agencies.	
<i>Requirement:</i>	Potential
1 The center shall manage the actual value of transit fares for each segment of each regular transit route, including the transmission of the information to transit vehicles and transit stops or stations.	
<i>Requirement:</i>	Potential
3 The center shall process the financial requests from the transit vehicles or roadside and manage an interface to a Financial Institution.	
<i>Requirement:</i>	Potential
4 The center shall support the payment of transit fare transactions using data provided by the traveler cards / payment instruments.	
<i>Requirement:</i>	Potential
6 The center shall process requests for transit fares to be paid in advance.	
<i>Requirement:</i>	Potential
8 The center shall be capable of establishing emergency fare structures to override all other fares during disasters, states of emergency, or evacuations.	
<i>Requirement:</i>	Potential
10 The center shall collect fare statistics data to implement variable and flexible fare structures.	
<i>Requirement:</i>	Potential
11 The center shall exchange fare and load information with other transit management centers, including potential Centralized Payments facilities.	
<i>Requirement:</i>	Potential
12 The center shall provide transit fare information to other centers, including traveler information providers upon request.	
<i>Functional Area:</i> Transit Center Passenger Counting	
Receives and processes transit vehicle loading data using two-way communications from equipped transit vehicles.	
<i>Requirement:</i>	Potential
1 The center shall collect passenger count information from each transit vehicle.	
<i>Requirement:</i>	Potential
2 The center shall calculate transit ridership data by route, route segment, transit stop, time of day, and day of week based on the collected passenger count information.	
<i>Requirement:</i>	Potential
3 The center shall make the compiled ridership data available to the system operator and other applications.	
<i>Functional Area:</i> Transit Center Security	
Monitor transit vehicle operator or traveler activated alarms; authenticate transit vehicle operators; remotely disable a transit vehicle; alert operators, travelers, and police to potential incidents identified by these security features.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> MCT Agency Management	
<i>Entity:</i> Transit Management	
<i>Functional Area:</i> Transit Center Security	
Monitor transit vehicle operator or traveler activated alarms; authenticate transit vehicle operators; remotely disable a transit vehicle; alert operators, travelers, and police to potential incidents identified by these security features.	
<i>Requirement:</i>	Existing
1 The center shall monitor transit vehicle operational data to determine if the transit vehicle is off-route and assess whether a security incident is occurring.	
<i>Requirement:</i>	Existing
2 The center shall receive reports of emergencies on-board transit vehicles entered directly by the transit vehicle operator or from a traveler through interfaces such as panic buttons or alarm switches.	
<i>Requirement:</i>	Existing
4 The center shall exchange transit incident information along with other service data with other transit agencies.	
<i>Requirement:</i>	Existing
5 The center shall receive information pertaining to a wide-area alert such as weather alerts, disaster situations, or child abductions. This information may come from Emergency Management or from other Alerting and Advisory Systems.	
<i>Requirement:</i>	Planned
6 The center shall send wide-area alert information to travelers (on-board transit vehicles or at stations/stops) and transit vehicle operators.	
<i>Requirement:</i>	Existing
7 The center shall coordinate the response to security incidents involving transit with other agencies including Emergency Management, other transit agencies, media, traffic management, and traveler information service providers.	
<i>Requirement:</i>	Existing
8 The center shall receive threat information and status on the integrity of the transit infrastructure.	
<i>Requirement:</i>	Planned
9 The center shall provide support to remotely disable (or reset the disabling of) a transit vehicle in service.	
<i>Functional Area:</i> Transit Vehicle Operator Assignment	
Assignment of transit operators to runs in a fair manner while minimizing labor and overtime services, considering operator preferences, qualifications, accumulated work hours, and other information about each operator.	
<i>Requirement:</i>	Existing
1 The center shall 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.	
<i>Requirement:</i>	Existing
2 The center shall assess the transit vehicle operator's availability based on previous work assignments, accumulated hours, plus health and vacation commitments.	
<i>Requirement:</i>	Existing
3 The center shall assign transit vehicle operators to transit schedules based on their eligibility, route preferences, seniority, and transit vehicle availability.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> MCT Agency Management	
<i>Entity:</i> Transit Management	
<i>Functional Area:</i> Transit Vehicle Operator Assignment	
Assignment of transit operators to runs in a fair manner while minimizing labor and overtime services, considering operator preferences, qualifications, accumulated work hours, and other information about each operator.	
<i>Requirement:</i>	Existing
4 The center shall provide an interface through which the transit vehicle operator information can be maintained - either from the transit vehicle operator, center personnel, or other functions.	
<i>Requirement:</i>	Existing
5 The center shall generate supplemental vehicle operator assignments as required due to change events that occur during the operating day.	
<i>Functional Area:</i> Transit Garage Maintenance	
Collect operational and maintenance data from transit vehicles, manage vehicle service histories, automatically generate preventative maintenance schedules, and provide information to service personnel.	
<i>Requirement:</i>	Existing
2 The center shall monitor the condition of a transit vehicle to analyze brake, drive train, sensors, fuel, steering, tire, processor, communications equipment, and transit vehicle mileage to identify mileage based maintenance, out-of-specification or imminent failure conditions.	
<i>Requirement:</i>	Planned
3 The center shall generate transit vehicle maintenance schedules that identify the maintenance or repair to be performed and when the work is to be done.	
<i>Requirement:</i>	Planned
4 The center shall generate transit vehicle availability listings, current and forecast, to support transit vehicle assignment planning based, in part, on the transit vehicle maintenance schedule.	
<i>Requirement:</i>	Existing
5 The center shall assign technicians to a transit vehicle maintenance schedule, based upon such factors as personnel eligibility, work assignments, preferences and seniority.	
<i>Requirement:</i>	Planned
6 The center shall verify that the transit vehicle maintenance activities were performed correctly, using the transit vehicle's status, the maintenance personnel's work assignment, and the transit maintenance schedules.	
<i>Requirement:</i>	Planned
7 The center shall generate a time-stamped maintenance log of all maintenance activities performed on a transit vehicle.	
<i>Functional Area:</i> Transit Vehicle Assignment	
Assigns individual transit vehicles to vehicle blocks and downloads this information to the transit vehicle, updating assignments as necessitated by changes. It also provides an inventory management function that stores attributes about each of the transit vehicles.	
<i>Requirement:</i>	Existing
1 The center shall assign individual transit vehicles to transit blocks.	
<i>Requirement:</i>	Existing
3 The center shall provide an exception handling process for the vehicle assignment function. This process shall generate new supplemental vehicle assignments as required due to change events which occur during the operating day.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> MCT Agency Management	
<i>Entity:</i> Transit Management	
<i>Functional Area:</i> Transit Vehicle Assignment	
Assigns individual transit vehicles to vehicle blocks and downloads this information to the transit vehicle, updating assignments as necessitated by changes. It also provides an inventory management function that stores attributes about each of the transit vehicles.	
<i>Requirement:</i> 5 The center shall generate transit vehicle availability listings, current and forecast, to support transit vehicle assignment planning.	Planned
<i>Requirement:</i> 6 The center shall provide transit operations personnel with the capability to update transit vehicle assignments and receive reports on transit vehicle inventory status.	Planned
<i>Functional Area:</i> Transit Center Information Services	
Provide interactive traveler information to travelers (on-board transit vehicles, at stops/stations, using personal devices), traveler information service providers, media, and other transit organizations. Includes routes, schedules, transfer options, fares, real-time schedule adherence, current incidents, weather conditions, yellow pages, and special events.	
<i>Requirement:</i> 1 The center shall provide travelers using public transportation with traffic and advisory information upon request. Such information may include transit routes, schedules, transfer options, fares, real-time schedule adherence, current incidents, weather conditions, and special events.	Existing
<i>Requirement:</i> 2 The center shall provide transit information to the media including details of deviations from schedule of regular transit services.	Existing
<i>Requirement:</i> 3 The center shall exchange transit schedules, real-time arrival information, fare schedules, and general transit service information with other transit organizations to support transit traveler information systems.	Planned
<i>Requirement:</i> 4 The center shall provide transit service information to traveler information service providers including routes, schedules, schedule adherence, and fare information as well as transit service information during evacuation.	Planned
<i>Requirement:</i> 6 The center shall broadcast transit advisory data, including alerts and advisories pertaining to major emergencies, or man made disasters.	Existing
<i>Functional Area:</i> Transit Environmental Monitoring	
Current and forecast road and weather information assimilated from weather service providers and vehicle probes. The information is monitored and forwarded to other agencies to more effectively manage transit operations.	
<i>Requirement:</i> 1 The center shall assimilate current and forecast road conditions and surface weather information to more effectively manage transit operations.	Existing
<i>Requirement:</i> 2 The center shall collect current and forecast road and weather information from weather service providers and roadway maintenance centers.	Existing
<i>Functional Area:</i> Transit Center Multi-Modal Coordination	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> MCT Agency Management	
<i>Entity:</i> Transit Management	
<i>Functional Area:</i> Transit Center Multi-Modal Coordination	
Coordinate schedules with other agencies and modes, including transit transfer cluster and transfer point information.	
<i>Requirement:</i>	
1 The center shall coordinate schedules and services between transit agencies, traffic management, maintenance and construction operations, parking management, and other surface or air transportation modes.	Planned
<i>Requirement:</i>	
2 The center shall share transfer cluster and transfer point information with multimodal transportation service providers, other transit agencies, and traveler information service providers. A transfer cluster is a collection of stop points, stations, or terminals where transfers can be made conveniently.	Planned
<i>Requirement:</i>	
3 The center shall accept requests from traffic management to change routes and schedules as part of the implementation of demand management strategies.	Planned
<i>Requirement:</i>	
4 The center shall coordinate transit services for special events, planning services for the event and managing transit services on the day of the event.	Existing
<i>Requirement:</i>	
5 The center shall provide transit operations personnel with the capability to control and monitor transit service coordination activities.	Planned
<i>Functional Area:</i> Transit Evacuation Support	
Support evacuation and subsequent reentry of a population in the vicinity of a disaster or other emergency. Coordinate regional evacuation plans and resources including transit and school bus fleets.	
<i>Requirement:</i>	
1 The center shall manage the use of transit resources to support evacuation and subsequent reentry of a population in the vicinity of a disaster or other emergency.	Potential
<i>Requirement:</i>	
2 The center shall coordinate regional evacuation plans with Emergency Management - identifying the transit role in an evacuation and the transit resources that would be used.	Existing
<i>Requirement:</i>	
3 The center shall coordinate the use of transit and school bus fleets during an evacuation, supporting evacuation of those with special needs and the general population.	Potential
<i>Requirement:</i>	
4 The center shall adjust and update transit service and fare schedules and provide that information to other agencies as they coordinate evacuations.	Potential
<i>Functional Area:</i> Transit Data Collection	
Collection and storage of transit management data. For use by operations personnel or data archives in the region.	
<i>Requirement:</i>	
1 The center shall collect transit management data such as transit fares and passenger use, transit services, paratransit operations, transit vehicle maintenance data, etc.	Existing
<i>Requirement:</i>	
2 The center shall assign quality control metrics and meta-data to be stored along with the data. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> MCT Agency Management	
<i>Entity:</i> Transit Management	
<i>Functional Area:</i> Transit Data Collection	
Collection and storage of transit management data. For use by operations personnel or data archives in the region.	
<i>Requirement:</i>	
3 The center shall receive and respond to requests from ITS Archives for either a catalog of the transit data or for the data itself.	Planned
<i>Requirement:</i>	
4 The center shall be able to produce sample products of the data available.	Planned
<i>Functional Area:</i> Transit Transportation Operations Data Collection	
Collects real-time information on the state of the regional transportation system for operational use by the center. It establishes communications with a regional repository, requests or subscribes to information relevant to the center, and distributes the received information for use.	
<i>Requirement:</i>	
1 The center shall collect real-time information on the state of the regional transportation system including current traffic and road conditions, weather conditions, special event and incident information.	Existing
<i>Requirement:</i>	
2 The center shall support the capability for the system operator to monitor and control the information collection service.	Existing
<i>Element:</i> MCT Transit Vehicles	
<i>Entity:</i> Transit Vehicle	
<i>Functional Area:</i> On-board Connection Protection	
Monitors vehicle schedule performance and provides it to the transit center for connection protection processing. Also recognizes travelers who have arranged for connection protection and provides information regarding them to the transit center.	
<i>Requirement:</i>	
1 The transit vehicle shall monitor vehicle schedule performance and provides it to the transit center for connection protection processing.	Existing
<i>Requirement:</i>	
2 The transit vehicle shall receive operator instructions from the transit center relating to managing connection protection.	Existing
<i>Requirement:</i>	
3 The transit vehicle shall recognizes individual travelers who have arranged for connection protection and provides information regarding them to the transit center.	Planned
<i>Functional Area:</i> On-board Transit Trip Monitoring	
Support fleet management with automatic vehicle location (AVL) and automated mileage and fuel reporting and auditing.	
<i>Requirement:</i>	
1 The transit vehicle shall track the current location of the transit vehicle.	Existing
<i>Requirement:</i>	
2 The transit vehicle shall support the computation of the location of a transit vehicle using on-board sensors to augment the location determination function. This may include proximity to the transit stops or other known reference points as well as recording trip length.	Potential
<i>Requirement:</i>	
3 The transit vehicle shall record transit trip monitoring data including vehicle mileage and fuel usage.	Potential

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> MCT Transit Vehicles	
<i>Entity:</i> Transit Vehicle	
<i>Functional Area:</i> On-board Transit Trip Monitoring	
Support fleet management with automatic vehicle location (AVL) and automated mileage and fuel reporting and auditing.	
<i>Requirement:</i>	
4 The transit vehicle shall record transit trip monitoring data including operational status information such as doors open/closed, running times, etc.	Potential
<i>Requirement:</i>	
5 The transit vehicle shall send the transit vehicle trip monitoring data to center-based trip monitoring functions.	Existing
<i>Functional Area:</i> On-board Schedule Management	
Collecting of data for schedule generation and adjustment on-board a transit vehicle. Supports communication between the vehicle, operator, and center.	
<i>Requirement:</i>	
1 The transit vehicle shall receive a vehicle assignment including transit route information, transit service instructions, traffic information, road conditions, and other information for the operator.	Potential
<i>Requirement:</i>	
2 The transit vehicle shall use the route information and its current location to determine the deviation from the predetermined schedule.	Potential
<i>Requirement:</i>	
3 The transit vehicle shall calculate the estimated times of arrival (ETA) at transit stops.	Potential
<i>Requirement:</i>	
4 The transit vehicle shall determine scenarios to correct the schedule deviation.	Potential
<i>Requirement:</i>	
5 The transit vehicle shall provide the schedule deviations and instructions for schedule corrections to the transit vehicle operator if the deviation is small, or the transit vehicle is operating in an urban area.	Potential
<i>Requirement:</i>	
6 The transit vehicle shall send the schedule deviation and estimated arrival time information to the center.	Potential
<i>Requirement:</i>	
7 The transit vehicle shall support the operations of a flexible route service. This may include requests for route deviations that would then lead to schedule corrective actions.	Potential
<i>Requirement:</i>	
8 The transit vehicle shall notify the transit center of vehicle location and operational status as the vehicle exits and returns to the transit facility to support future vehicle assignments.	Potential
<i>Functional Area:</i> On-board Paratransit Operations	
On-board systems to manage paratransit and flexible-route dispatch requests, including multi-stop runs. Passenger data is collected and provided to the center.	
<i>Requirement:</i>	
2 The transit vehicle shall receive the status of demand responsive or flexible-route transit schedules and passenger loading from the transit vehicle operator.	Existing
<i>Requirement:</i>	
3 The transit vehicle shall provide the transit vehicle operator instructions about the demand responsive or flexible-route transit schedule that has been confirmed from the center.	Existing
<i>Requirement:</i>	
4 The transit vehicle shall provide the capability to log passenger boardings and alightings and make passenger use data available to the transit center.	Planned

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> MCT Transit Vehicles	
<i>Entity:</i> Transit Vehicle	
<i>Functional Area:</i> On-board Transit Fare Management	
On-board systems provide fare collection using a travelers non-monetary fare medium. Collected fare data are made available to the center.	
<i>Requirement:</i>	
1 The transit vehicle shall read data from the traveler card / payment instrument presented by boarding passengers.	Potential
<i>Requirement:</i>	
2 The transit vehicle shall provide an image of all travelers which shall be used for violation processing of those who do not have a traveler card / payment instrument or whose transit fare transaction fails.	Potential
<i>Requirement:</i>	
3 The transit vehicle shall determine the traveler's travel routing based on the transit vehicle's current location and the traveler's destination.	Potential
<i>Requirement:</i>	
4 The transit vehicle shall calculate the traveler's fare based on the origin and destination provided by the traveler as well as factors such as the transit routing, transit fare category, traveler history, and route-specific information.	Potential
<i>Requirement:</i>	
5 The transit vehicle shall have access to the complete range of transit services (routes and schedules) that are available to the traveler.	Existing
<i>Requirement:</i>	
6 The transit vehicle shall provide a transit fare payment interface that is suitable for travelers with physical disabilities.	Existing
<i>Requirement:</i>	
7 The transit vehicle shall include a database on-board the transit vehicle for use in fare processing from which the fares for all possible trips within the transit operational network can be determined.	Potential
<i>Requirement:</i>	
8 The transit vehicle shall support an emergency fare structure overriding all other fares that can be activated during disasters, states of emergency or evacuations.	Potential
<i>Requirement:</i>	
10 The transit vehicle shall provide fare statistics data to the center.	Potential
<i>Functional Area:</i> On-board Passenger Counting	
On-board systems collect transit vehicle loading data and make it available to the center.	
<i>Requirement:</i>	
1 The transit vehicle shall count passengers boarding and alighting.	Existing
<i>Requirement:</i>	
2 The passenger counts shall be related to location to support association of passenger counts with routes, route segments, or bus stops.	Planned
<i>Requirement:</i>	
3 The passenger counts shall be timestamped so that ridership can be measured by time of day and day of week.	Existing
<i>Requirement:</i>	
4 The transit vehicle shall send the collected passenger count information to the transit center.	Existing
<i>Functional Area:</i> On-board Transit Security	
On-board video/audio surveillance systems, threat sensors, and object detection sensors to enhance security and safety on-board a transit vehicles. Also includes silent alarms activated by transit user or vehicle operator, operator authentication, and remote vehicle disabling.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> MCT Transit Vehicles	
<i>Entity:</i> Transit Vehicle	
<i>Functional Area:</i> On-board Transit Security	
On-board video/audio surveillance systems, threat sensors, and object detection sensors to enhance security and safety on-board a transit vehicles. Also includes silent alarms activated by transit user or vehicle operator, operator authentication, and remote vehicle disabling.	
<i>Requirement:</i>	Existing
1 The transit vehicle shall perform video and audio surveillance inside of transit vehicles and output raw video or audio data for either local monitoring (for processing or direct output to the transit vehicle operator), remote monitoring or for local storage (e.g., in an event recorder).	
<i>Requirement:</i>	Existing
2 The transit vehicle shall perform local monitoring of video or audio surveillance data collected inside of transit vehicles, and identify potential incidents or threats based on received processing parameters.	
<i>Requirement:</i>	Existing
3 The transit vehicle shall output an indication of potential incidents or threats and the processed video or audio information to the center along with the vehicle's current location.	
<i>Requirement:</i>	Potential
4 The transit vehicle shall detect potential threats via sensors for chemical agents, toxic industrial chemicals, biological agents, explosives, and radiation.	
<i>Requirement:</i>	Potential
5 The transit vehicle shall detect potential threats via object detection sensors (e.g. metal detectors).	
<i>Requirement:</i>	Potential
6 The transit vehicle shall output an indication of potential incidents or threats and the processed sensor information to the center along with the vehicle's current location.	
<i>Requirement:</i>	Potential
7 The transit vehicle shall accept sensor control data to allow remote control of the sensors.	
<i>Requirement:</i>	Planned
8 The transit vehicle shall monitor and output surveillance and sensor equipment status and fault indications.	
<i>Requirement:</i>	Potential
9 The transit vehicle shall accept emergency inputs from either the transit vehicle operator or a traveler through such interfaces as panic buttons, silent or audible alarms, etc.	
<i>Requirement:</i>	Existing
10 The transit vehicle shall output reported emergencies to the center.	
<i>Requirement:</i>	Existing
11 The transit vehicle shall receive acknowledgments of the emergency request from the center and output this acknowledgment to the transit vehicle operator or to the travelers.	
<i>Requirement:</i>	Existing
12 The transit vehicle shall be capable of receiving an emergency message for broadcast to the travelers or to the transit vehicle operator.	
<i>Requirement:</i>	Planned
13 The transit vehicle shall be capable of disabling or enabling the transit vehicle based on commands from the center or authentic inputs from the transit vehicle operator.	
<i>Requirement:</i>	Potential
14 The transit vehicle shall perform authentication of the transit vehicle operator.	

Functional Area: **On-board Maintenance**

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> MCT Transit Vehicles	
<i>Entity:</i> Transit Vehicle	
<i>Functional Area:</i> On-board Maintenance	
On-board systems to collect and process transit vehicle maintenance data including mileage and vehicle operating conditions for use in scheduling future vehicle maintenance.	
<i>Requirement:</i>	Planned
1 The transit vehicle shall collect and process vehicle mileage data available to sensors on-board.	
<i>Requirement:</i>	Planned
2 The transit vehicle shall collect and process the transit vehicle's operating conditions such as engine temperature, oil pressure, brake wear, internal lighting, environmental controls, etc.	
<i>Requirement:</i>	Planned
3 The transit vehicle shall transmit vehicle maintenance data to the center to be used for scheduling future vehicle maintenance.	
<i>Functional Area:</i> On-board Transit Information Services	
On-board systems to furnish next-stop annunciation as well as interactive travel-related information, including routes, schedules, transfer options, fares, real-time schedule adherence, current incidents, weather conditions, non-motorized transportation services, and special events.	
<i>Requirement:</i>	Planned
1 The transit vehicle shall enable traffic and travel advisory information to be requested and output to the traveler. Such information may include transit routes, schedules, transfer options, fares, real-time schedule adherence, current incidents, weather conditions, and special events.	
<i>Requirement:</i>	Planned
3 The transit vehicle shall broadcast advisories about the imminent arrival of the transit vehicle at the next stop via an on-board automated annunciation system.	
<i>Requirement:</i>	Planned
4 The transit vehicle shall support input and output forms that are suitable for travelers with physical disabilities.	
<i>Requirement:</i>	Existing
5 The transit vehicle shall gather transit advisory data, including alerts and advisories pertaining to major emergencies, or man made disasters.	
<i>Requirement:</i>	Planned
6 The transit vehicle shall tailor the output of the request traveler information based on the current location of the transit vehicle.	
<i>Element:</i> Media	
<i>Entity:</i> Information Service Provider	
<i>Functional Area:</i> ISP Traveler Data Collection	
Collects traveler information from other centers, consolidates and refines the collected data, and makes this data available to traveler information applications.	
<i>Requirement:</i>	Existing
1 The center shall collect, process, and store traffic and highway condition information, including incident information, detours and road closures, event information, recommended routes, and current speeds on specific routes.	
<i>Requirement:</i>	Existing
2 The center shall collect, process, and store maintenance and construction information, including scheduled maintenance and construction work activities and work zone activities.	
<i>Requirement:</i>	Existing
3 The center shall collect, process, and store transit routes and schedules, transit transfer options, transit fares, and real-time schedule adherence information.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:Media</i>	
<i>Entity: Information Service Provider</i>	
<i>Functional Area: ISP Traveler Data Collection</i>	
Collects traveler information from other centers, consolidates and refines the collected data, and makes this data available to traveler information applications.	
<i>Requirement:</i>	
4 The center shall collect, process, and store parking information, including location, availability, and fees.	Planned
<i>Requirement:</i>	
5 The center shall collect, process, and store toll fee information.	Existing
<i>Requirement:</i>	
6 The center shall collect, process, and store current and forecast road conditions and surface weather conditions.	Existing
<i>Requirement:</i>	
7 The center shall collect, process, and store event information.	Existing
<i>Requirement:</i>	
8 The center shall collect, process, and store air quality information.	Existing
<i>Functional Area: Basic Information Broadcast</i>	
Broadcast dissemination of traffic, transit, maintenance and construction, event, and weather information to traveler interface systems and vehicles.	
<i>Requirement:</i>	
1 The center shall disseminate traffic and highway condition information to travelers, including incident information, detours and road closures, event information, recommended routes, and current speeds on specific routes.	Existing
<i>Requirement:</i>	
2 The center shall disseminate maintenance and construction information to travelers, including scheduled maintenance and construction work activities and work zone activities.	Existing
<i>Requirement:</i>	
3 The center shall disseminate transit routes and schedules, transit transfer options, transit fares, and real-time schedule adherence information to travelers.	Existing
<i>Requirement:</i>	
4 The center shall disseminate parking information to travelers, including location, availability, and fees.	Planned
<i>Requirement:</i>	
5 The center shall disseminate toll fee information to travelers.	Existing
<i>Requirement:</i>	
6 The center shall disseminate weather information to travelers.	Existing
<i>Requirement:</i>	
7 The center shall disseminate event information to travelers.	Existing
<i>Requirement:</i>	
8 The center shall disseminate air quality information to travelers.	Existing
<i>Requirement:</i>	
9 The center shall provide the capability to support requests from the media for traffic and incident data.	Existing
<i>Requirement:</i>	
10 The center shall provide the capability for a system operator to control the type and update frequency of broadcast traveler information.	Existing
<i>Functional Area: ISP Traveler Information Alerts</i>	
Provides personalized traveler information alerts, notifying travelers of relevant congestion, incidents, transit schedule delays, and other actionable information that may impact a trip. Relevant alerts are selected based on user-configurable parameters and thresholds.	
<i>Requirement:</i>	
1 The center shall accept traveler profiles that establish recurring trip characteristics including route, mode, and timeframe information.	Potential

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Media</i>	
<i>Entity: Information Service Provider</i>	
<i>Functional Area: ISP Traveler Information Alerts</i>	
Provides personalized traveler information alerts, notifying travelers of relevant congestion, incidents, transit schedule delays, and other actionable information that may impact a trip. Relevant alerts are selected based on user-configurable parameters and thresholds.	
<i>Requirement:</i> 2 The center shall accept traveler profiles that define alert thresholds that establish the severity and types of alerts that are provided to each traveler.	Potential
<i>Requirement:</i> 3 The center shall disseminate personalized traffic alerts reporting congestion, incidents, delays, detours and road closures that may impact a current or planned trip.	Potential
<i>Requirement:</i> 4 The center shall disseminate personalized transit alerts reporting transit delays and service interruptions.	Potential
<i>Requirement:</i> 5 The center shall disseminate personalized parking alerts reporting parking availability and closures.	Potential
<i>Requirement:</i> 6 The center shall disseminate personalized road weather alerts reporting adverse road and weather conditions.	Potential
<i>Requirement:</i> 7 The center shall disseminate personalized multimodal transportation service alerts including ferry and air travel delays, port closures, and service interruptions.	Potential
<i>Requirement:</i> 8 The center shall disseminate personalized event alerts reporting special event impacts on the transportation system.	Potential
<i>Requirement:</i> 9 The center shall provide an operator interface that supports monitoring and management of subscribers and the content and format of alert messages.	Existing
<i>Functional Area: Interactive Infrastructure Information</i>	
Personalized dissemination of traffic, transit, maintenance and construction, multimodal, event, and weather information to traveler interface systems and vehicles, upon request.	
<i>Requirement:</i> 1 The center shall disseminate customized traffic and highway condition information to travelers, including incident information, detours and road closures, recommended routes, and current speeds on specific routes upon request.	Existing
<i>Requirement:</i> 2 The center shall disseminate customized maintenance and construction information to travelers, including scheduled maintenance and construction work activities and work zone activities upon request.	Existing
<i>Requirement:</i> 3 The center shall disseminate customized transit routes and schedules, transit transfer options, transit fares, and real-time schedule adherence information to travelers upon request.	Potential
<i>Requirement:</i> 4 The center shall disseminate customized parking information to travelers, including location, availability, and fees upon request.	Potential
<i>Requirement:</i> 5 The center shall disseminate customized toll fee information to travelers upon request.	Existing
<i>Requirement:</i> 6 The center shall disseminate customized weather information to travelers upon request.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:Media</i>	
<i>Entity: Information Service Provider</i>	
<i>Functional Area: Interactive Infrastructure Information</i>	
Personalized dissemination of traffic, transit, maintenance and construction, multimodal, event, and weather information to traveler interface systems and vehicles, upon request.	
<i>Requirement:</i> 7 The center shall disseminate customized multimodal transportation service information (for example, from ferry and airline operators), including transfer points and other information, to travelers upon request.	Existing
<i>Requirement:</i> 8 The center shall disseminate customized event information to travelers upon request.	Existing
<i>Requirement:</i> 9 The center shall disseminate customized air quality information to travelers upon request.	Existing
<i>Requirement:</i> 10 The center shall provide all traveler information based on the traveler's current location or a specific location identified by the traveler, and filter or customize the provided information accordingly.	Existing
<i>Requirement:</i> 11 The center shall accept traveler profiles for determining the type of personalized data to send to the traveler.	Potential
<i>Requirement:</i> 14 The center shall provide the capability to exchange information with another traveler information service provider current or predicted data for road links that are outside the area served by the local supplier.	Existing
<i>Requirement:</i> 15 The center shall manage updates of digitized map data and provide updates to traveler interface systems upon request.	Planned
<i>Requirement:</i> 16 The center shall provide the capability to support requests from the media for traffic and incident data.	Existing
<i>Requirement:</i> 17 The center shall provide the capability for a system operator to control the type and update frequency of traveler information.	Existing
<i>Functional Area: Traveler Telephone Information</i>	
Distribution of traveler information and wide-area alerts to traveler telephone information systems such as 511, based on voice-based traveler requests.	
<i>Requirement:</i> 1 The center shall provide the capability to process voice-formatted requests for traveler information from a traveler telephone information system, and return the information in the requested format.	Planned
<i>Requirement:</i> 2 The center shall provide the capability to process dual-tone multifrequency (DTMF)-based requests (touch-tone) for traveler information from a traveler telephone information system.	Planned
<i>Requirement:</i> 3 The center shall provide the capability to process traveler information requests from a traveler telephone information system.	Planned
<i>Requirement:</i> 4 The center shall provide information on traffic conditions in the requested voice format and for the requested location.	Planned
<i>Requirement:</i> 5 The center shall provide work zone and roadway maintenance information in the requested voice format and for the requested location.	Planned

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:Media</i>	
<i>Entity: Information Service Provider</i>	
<i>Functional Area: Traveler Telephone Information</i>	
Distribution of traveler information and wide-area alerts to traveler telephone information systems such as 511, based on voice-based traveler requests.	
<i>Requirement:</i>	
6 The center shall provide roadway environment conditions information in the requested voice format and for the requested location.	Planned
<i>Requirement:</i>	
7 The center shall provide weather and event information in the requested voice format and for the requested location.	Planned
<i>Requirement:</i>	
8 The center shall provide transit service information in the requested voice format and for the requested location.	Planned
<i>Requirement:</i>	
9 The center shall provide yellow pages services information in the requested voice format and for the requested location.	Planned
<i>Requirement:</i>	
10 The center shall provide current ferry and rail schedule and airport status information in the requested voice format and for the requested location.	Planned
<i>Requirement:</i>	
11 The center shall provide the capability to support both specific caller requests as well as bulk upload of regional traveler information.	Planned
<i>Requirement:</i>	
12 The center shall receive and forward region-specific wide-area alert and advisory information to the traveler telephone information system, including major emergencies such as a natural or man-made disaster, civil emergency, child abductions, severe weather watches and warnings, military activities, and law enforcement warnings.	Planned
<i>Functional Area: ISP Emergency Traveler Information</i>	
Distribution of emergency information to the traveling public, including evacuation information and wide-area alerts.	
<i>Requirement:</i>	
1 The center shall disseminate emergency evacuation information to the traveler interface systems, including evacuation zones, shelter information, available transportation modes, road closures and detours, changes to transit services, and traffic and road conditions at the origin, destination, and along the evacuation routes.	Existing
<i>Requirement:</i>	
2 The center shall provide evacuation information to shelter providers.	Potential
<i>Requirement:</i>	
3 The center shall disseminate wide-area alert information to the traveler interface systems, including major emergencies such as a natural or man-made disaster, civil emergency, child abductions, severe weather watches and warnings, military activities, and law enforcement warnings.	Existing
<i>Requirement:</i>	
4 The center shall provide the capability for a system operator to control the type and update frequency of emergency and wide-area alert information distributed to travelers.	Existing
<i>Element:NICTD Agency Management</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Incident Command</i>	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> NICTD Agency Management	
<i>Entity:</i> Emergency Management	
<i>Functional Area:</i> Incident Command	
Tactical decision support, resource coordination, and communications integration among emergency management agencies for Incident Commands that are established by first responders to support local management of an incident.	
<i>Requirement:</i>	
1 The center shall 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.	Existing
<i>Requirement:</i>	
2 The center shall provide incident command communications with public safety, emergency management, transportation, and other allied response agency centers.	Existing
<i>Requirement:</i>	
3 The center shall track and maintain resource information and action plans pertaining to the incident command.	Existing
<i>Requirement:</i>	
4 The center shall 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.	Existing
<i>Requirement:</i>	
5 The center shall assess the status of responding emergency vehicles as part of an incident command.	Planned
<i>Functional Area:</i> Mayday Support	
Collection and response to Mayday messages received from vehicles and drivers.	
<i>Requirement:</i>	
1 The center shall collect mayday messages from vehicles and drivers.	Existing
<i>Requirement:</i>	
2 The center shall collect mayday messages from travelers via personal handheld devices.	Existing
<i>Requirement:</i>	
3 The center shall acknowledge the request for emergency assistance, whether originated by the driver, automatically by the vehicle's safety systems, or by a traveler via a personal handheld device.	Existing
<i>Requirement:</i>	
4 After the mayday becomes a verified incident, the center shall determine the appropriate response to the mayday message.	Existing
<i>Requirement:</i>	
5 The center shall determine whether the mayday message indicates an emergency that requires the attention of public safety agencies, and forward mayday emergency data to the appropriate agency as necessary.	Existing
<i>Requirement:</i>	
6 The center shall support the activation of remote controlled functions requested by a vehicle, such as requests to unlock doors.	Planned
<i>Requirement:</i>	
7 The center shall request additional emergency details from or issue commands to the vehicle's security systems or vehicle driver if needed.	Existing
<i>Requirement:</i>	
8 The center shall maintain a log of all mayday signals received from vehicles.	Planned

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> NICTD Agency Management	
<i>Entity:</i> Emergency Management	
<i>Functional Area:</i> Mayday Support	
Collection and response to Mayday messages received from vehicles and drivers.	
<i>Requirement:</i>	Planned
9 The center shall provide all mayday data to center personnel and respond to the vehicle, driver, or traveler using the portable handheld device as directed by the personnel.	
<i>Entity:</i> Transit Management	
<i>Functional Area:</i> Transit Center Connection Protection	
Manages the coordination of transit transfers between routes, including routes on different modes. Also supports the capability for travelers to obtain connection protection throughout a trip.	
<i>Requirement:</i>	Existing
1 The center shall manage service requests for routing of an individual through the transit system.	
<i>Requirement:</i>	Planned
2 The center shall provide transit plans for both fixed and demand responsive transit to transit passengers.	
<i>Requirement:</i>	Planned
3 The center shall be able to coordinate with Other Transit Management systems or Multimodal Transportation Service Providers in order to provide a complete multimodal trip plan.	
<i>Requirement:</i>	Planned
4 The center shall track the passenger through the transit network, and coordinate with Other TRM and Multimodal Transportation Service Providers so that the passenger makes efficient connections between the transit system and other transit systems or other modes of transportation.	
<i>Functional Area:</i> Transit Center Vehicle Tracking	
Monitoring transit vehicle locations via interactions with on-board systems. Furnish users with real-time transit schedule information and maintain interface with digital map providers.	
<i>Requirement:</i>	Existing
1 The center shall monitor the locations of all transit vehicles within its network.	
<i>Requirement:</i>	Existing
2 The center shall determine adherence of transit vehicles to their assigned schedule.	
<i>Requirement:</i>	Planned
3 The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for transit tracking and dispatch.	
<i>Requirement:</i>	Planned
4 The center shall provide transit operational data to traveler information service providers.	
<i>Functional Area:</i> Transit Center Fixed-Route Operations	
Management of fixed route transit operations. Planning, scheduling, and dispatch associated with fixed and flexible route transit services. Updates customer service operator systems, and provides current vehicle schedule adherence and optimum scenarios for schedule adjustment.	
<i>Requirement:</i>	Existing
1 The center shall generate transit routes and schedules based on such factors as parameters input by the system operator, road network conditions, incident information, operational data on current routes and schedules, and digitized map data.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> NICTD Agency Management	
<i>Entity:</i> Transit Management	
<i>Functional Area:</i> Transit Center Fixed-Route Operations	
Management of fixed route transit operations. Planning, scheduling, and dispatch associated with fixed and flexible route transit services. Updates customer service operator systems, and provides current vehicle schedule adherence and optimum scenarios for schedule adjustment.	
<i>Requirement:</i> 2	The center shall provide the interface to the system operator to control the generation of new routes and schedules (transit services) including the ability to review and update the parameters used by the routes and schedules generation processes and to initiate these processes
	Existing
<i>Requirement:</i> 3	The center shall be able to generate special routes and schedules to support an incident, disaster, evacuation, or other emergency.
	Existing
<i>Requirement:</i> 4	The center shall dispatch fixed route or flexible route transit vehicles
	Existing
<i>Requirement:</i> 5	The center shall collect transit operational data for use in the generation of routes and schedules.
	Existing
<i>Requirement:</i> 6	The center shall provide instructions or corrective actions to the transit vehicle operators based upon operational needs.
	Existing
<i>Requirement:</i> 8	The center shall 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.
	Existing
<i>Requirement:</i> 9	The center shall exchange information with Maintenance and Construction Operations concerning work zones, roadway conditions, asset restrictions, work plans, etc.
	Existing
<i>Requirement:</i> 10	The center shall disseminate up-to-date schedules and route information to other centers for fixed and flexible route services.
	Existing
<i>Requirement:</i> 11	The center shall provide an interface to the archive data repository to enable the operator to retrieve historical operating data for use in planning transit routes and schedules.
	Existing
<i>Functional Area:</i> Transit Center Fare Management	
Management of fare collection at the center - includes setting and distributing fare information, central processing of fares for transit as well as other ITS services, links to financial institutions and enforcement agencies.	
<i>Requirement:</i> 1	The center shall manage the actual value of transit fares for each segment of each regular transit route, including the transmission of the information to transit vehicles and transit stops or stations.
	Existing
<i>Requirement:</i> 2	The center shall provide the capability for a system operator to manage the transit fares and control the exchange of transit fare information.
	Existing
<i>Requirement:</i> 3	The center shall process the financial requests from the transit vehicles or roadside and manage an interface to a Financial Institution.
	Existing
<i>Requirement:</i> 4	The center shall support the payment of transit fare transactions using data provided by the traveler cards / payment instruments.
	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> NICTD Agency Management	
<i>Entity:</i> Transit Management	
<i>Functional Area:</i> Transit Center Fare Management	
Management of fare collection at the center - includes setting and distributing fare information, central processing of fares for transit as well as other ITS services, links to financial institutions and enforcement agencies.	
<i>Requirement:</i>	
6 The center shall process requests for transit fares to be paid in advance.	Existing
<i>Requirement:</i>	
8 The center shall be capable of establishing emergency fare structures to override all other fares during disasters, states of emergency, or evacuations.	Existing
<i>Requirement:</i>	
10 The center shall collect fare statistics data to implement variable and flexible fare structures.	Existing
<i>Requirement:</i>	
11 The center shall exchange fare and load information with other transit management centers, including potential Centralized Payments facilities.	Potential
<i>Requirement:</i>	
12 The center shall provide transit fare information to other centers, including traveler information providers upon request.	Existing
<i>Functional Area:</i> Transit Center Passenger Counting	
Receives and processes transit vehicle loading data using two-way communications from equipped transit vehicles.	
<i>Requirement:</i>	
1 The center shall collect passenger count information from each transit vehicle.	Existing
<i>Requirement:</i>	
2 The center shall calculate transit ridership data by route, route segment, transit stop, time of day, and day of week based on the collected passenger count information.	Existing
<i>Requirement:</i>	
3 The center shall make the compiled ridership data available to the system operator and other applications.	Existing
<i>Functional Area:</i> Transit Center Security	
Monitor transit vehicle operator or traveler activated alarms; authenticate transit vehicle operators; remotely disable a transit vehicle; alert operators, travelers, and police to potential incidents identified by these security features.	
<i>Requirement:</i>	
1 The center shall monitor transit vehicle operational data to determine if the transit vehicle is off-route and assess whether a security incident is occurring.	Existing
<i>Requirement:</i>	
2 The center shall receive reports of emergencies on-board transit vehicles entered directly by the transit vehicle operator or from a traveler through interfaces such as panic buttons or alarm switches.	Existing
<i>Requirement:</i>	
3 The center shall support the back-office portion of functionality to authenticate transit vehicle operators.	Potential
<i>Requirement:</i>	
4 The center shall exchange transit incident information along with other service data with other transit agencies.	Existing
<i>Requirement:</i>	
5 The center shall receive information pertaining to a wide-area alert such as weather alerts, disaster situations, or child abductions. This information may come from Emergency Management or from other Alerting and Advisory Systems.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> NICTD Agency Management	
<i>Entity:</i> Transit Management	
<i>Functional Area:</i> Transit Center Security	
Monitor transit vehicle operator or traveler activated alarms; authenticate transit vehicle operators; remotely disable a transit vehicle; alert operators, travelers, and police to potential incidents identified by these security features.	
<i>Requirement:</i>	Existing
6 The center shall send wide-area alert information to travelers (on-board transit vehicles or at stations/stops) and transit vehicle operators.	
<i>Requirement:</i>	Existing
7 The center shall coordinate the response to security incidents involving transit with other agencies including Emergency Management, other transit agencies, media, traffic management, and traveler information service providers.	
<i>Requirement:</i>	Existing
8 The center shall receive threat information and status on the integrity of the transit infrastructure.	
<i>Requirement:</i>	Potential
9 The center shall provide support to remotely disable (or reset the disabling of) a transit vehicle in service.	
<i>Functional Area:</i> Transit Vehicle Operator Assignment	
Assignment of transit operators to runs in a fair manner while minimizing labor and overtime services, considering operator preferences, qualifications, accumulated work hours, and other information about each operator.	
<i>Requirement:</i>	Existing
1 The center shall 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.	
<i>Requirement:</i>	Existing
2 The center shall assess the transit vehicle operator's availability based on previous work assignments, accumulated hours, plus health and vacation commitments.	
<i>Requirement:</i>	Existing
3 The center shall assign transit vehicle operators to transit schedules based on their eligibility, route preferences, seniority, and transit vehicle availability.	
<i>Requirement:</i>	Existing
4 The center shall provide an interface through which the transit vehicle operator information can be maintained - either from the transit vehicle operator, center personnel, or other functions.	
<i>Requirement:</i>	Existing
5 The center shall generate supplemental vehicle operator assignments as required due to change events that occur during the operating day.	
<i>Functional Area:</i> Transit Vehicle Assignment	
Assigns individual transit vehicles to vehicle blocks and downloads this information to the transit vehicle, updating assignments as necessitated by changes. It also provides an inventory management function that stores attributes about each of the transit vehicles.	
<i>Requirement:</i>	Existing
1 The center shall assign individual transit vehicles to transit blocks.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> NICTD Agency Management	
<i>Entity:</i> Transit Management	
<i>Functional Area:</i> Transit Vehicle Assignment	
Assigns individual transit vehicles to vehicle blocks and downloads this information to the transit vehicle, updating assignments as necessitated by changes. It also provides an inventory management function that stores attributes about each of the transit vehicles.	
<i>Requirement:</i> 3 The center shall provide an exception handling process for the vehicle assignment function. This process shall generate new supplemental vehicle assignments as required due to change events which occur during the operating day.	Existing
<i>Requirement:</i> 4 The center shall provide an inventory management function for the transit facility that stores functional attributes about each vehicle owned by the transit operator. The functional attributes permit the planning and assignment functions to match vehicles with routes based on suitability for the types of service required by the particular routes.	Existing
<i>Requirement:</i> 5 The center shall generate transit vehicle availability listings, current and forecast, to support transit vehicle assignment planning.	Existing
<i>Requirement:</i> 6 The center shall provide transit operations personnel with the capability to update transit vehicle assignments and receive reports on transit vehicle inventory status.	Existing
<i>Functional Area:</i> Transit Center Information Services	
Provide interactive traveler information to travelers (on-board transit vehicles, at stops/stations, using personal devices), traveler information service providers, media, and other transit organizations. Includes routes, schedules, transfer options, fares, real-time schedule adherence, current incidents, weather conditions, yellow pages, and special events.	
<i>Requirement:</i> 1 The center shall provide travelers using public transportation with traffic and advisory information upon request. Such information may include transit routes, schedules, transfer options, fares, real-time schedule adherence, current incidents, weather conditions, and special events.	Existing
<i>Requirement:</i> 2 The center shall provide transit information to the media including details of deviations from schedule of regular transit services.	Existing
<i>Requirement:</i> 3 The center shall exchange transit schedules, real-time arrival information, fare schedules, and general transit service information with other transit organizations to support transit traveler information systems.	Planned
<i>Requirement:</i> 4 The center shall provide transit service information to traveler information service providers including routes, schedules, schedule adherence, and fare information as well as transit service information during evacuation.	Planned
<i>Requirement:</i> 6 The center shall broadcast transit advisory data, including alerts and advisories pertaining to major emergencies, or man made disasters.	Existing
<i>Functional Area:</i> Transit Environmental Monitoring	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> NICTD Agency Management	
<i>Entity:</i> Transit Management	
<i>Functional Area:</i> Transit Environmental Monitoring	
Current and forecast road and weather information assimilated from weather service providers and vehicle probes. The information is monitored and forwarded to other agencies to more effectively manage transit operations.	
<i>Requirement:</i>	1 The center shall assimilate current and forecast road conditions and surface weather information to more effectively manage transit operations. Existing
<i>Requirement:</i>	2 The center shall collect current and forecast road and weather information from weather service providers and roadway maintenance centers. Existing
<i>Functional Area:</i> Transit Center Multi-Modal Coordination	
Coordinate schedules with other agencies and modes, including transit transfer cluster and transfer point information.	
<i>Requirement:</i>	1 The center shall coordinate schedules and services between transit agencies, traffic management, maintenance and construction operations, parking management, and other surface or air transportation modes. Planned
<i>Requirement:</i>	2 The center shall share transfer cluster and transfer point information with multimodal transportation service providers, other transit agencies, and traveler information service providers. A transfer cluster is a collection of stop points, stations, or terminals where transfers can be made conveniently. Planned
<i>Requirement:</i>	3 The center shall accept requests from traffic management to change routes and schedules as part of the implementation of demand management strategies. Planned
<i>Requirement:</i>	4 The center shall coordinate transit services for special events, planning services for the event and managing transit services on the day of the event. Existing
<i>Requirement:</i>	5 The center shall provide transit operations personnel with the capability to control and monitor transit service coordination activities. Planned
<i>Functional Area:</i> Transit Evacuation Support	
Support evacuation and subsequent reentry of a population in the vicinity of a disaster or other emergency. Coordinate regional evacuation plans and resources including transit and school bus fleets.	
<i>Requirement:</i>	1 The center shall manage the use of transit resources to support evacuation and subsequent reentry of a population in the vicinity of a disaster or other emergency. Potential
<i>Requirement:</i>	2 The center shall coordinate regional evacuation plans with Emergency Management - identifying the transit role in an evacuation and the transit resources that would be used. Existing
<i>Requirement:</i>	3 The center shall coordinate the use of transit and school bus fleets during an evacuation, supporting evacuation of those with special needs and the general population. Potential
<i>Requirement:</i>	4 The center shall adjust and update transit service and fare schedules and provide that information to other agencies as they coordinate evacuations. Potential

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> NICTD Agency Management	
<i>Entity:</i> Transit Management	
<i>Functional Area:</i> Transit Data Collection	
Collection and storage of transit management data. For use by operations personnel or data archives in the region.	
<i>Requirement:</i>	Existing
1 The center shall collect transit management data such as transit fares and passenger use, transit services, paratransit operations, transit vehicle maintenance data, etc.	
<i>Requirement:</i>	Existing
2 The center shall assign quality control metrics and meta-data to be stored along with the data. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.	
<i>Requirement:</i>	Planned
3 The center shall receive and respond to requests from ITS Archives for either a catalog of the transit data or for the data itself.	
<i>Requirement:</i>	Planned
4 The center shall be able to produce sample products of the data available.	
<i>Functional Area:</i> Transit Transportation Operations Data Collection	
Collects real-time information on the state of the regional transportation system for operational use by the center. It establishes communications with a regional repository, requests or subscribes to information relevant to the center, and distributes the received information for use.	
<i>Requirement:</i>	Existing
1 The center shall collect real-time information on the state of the regional transportation system including current traffic and road conditions, weather conditions, special event and incident information.	
<i>Requirement:</i>	Existing
2 The center shall support the capability for the system operator to monitor and control the information collection service.	
<i>Element:</i> NICTD Kiosks	
<i>Entity:</i> Remote Traveler Support	
<i>Functional Area:</i> Remote Basic Information Reception	
Public traveler interface, such as a kiosk, that provides formatted traffic advisories, transit, event, and other traveler information, as well as broadcast alerts.	
<i>Requirement:</i>	Existing
1 The public interface for travelers shall receive traffic information from a center and present it to the traveler.	
<i>Requirement:</i>	Existing
2 The public interface for travelers shall receive transit information from a center and present it to the traveler.	
<i>Requirement:</i>	Existing
3 The public interface for travelers shall receive event information from a center and present it to the traveler.	
<i>Requirement:</i>	Potential
4 This public interface for travelers shall receive evacuation information from a center and present it to the traveler.	
<i>Requirement:</i>	Existing
5 The public interface for travelers shall receive wide-area alerts and present it to the traveler.	
<i>Requirement:</i>	Planned
6 The public interface for travelers shall provide the capability for digitized map data to act as the background to the information presented to the traveler.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> NICTD Kiosks	
<i>Entity:</i> Remote Traveler Support	
<i>Functional Area:</i> Remote Basic Information Reception	
Public traveler interface, such as a kiosk, that provides formatted traffic advisories, transit, event, and other traveler information, as well as broadcast alerts.	
<i>Requirement:</i>	
7 The public interface for travelers shall support traveler input in audio or manual form.	Existing
<i>Requirement:</i>	
8 The public interface for travelers shall present information to the traveler in audible or visual forms consistent with a kiosk, including those that are suitable for travelers with hearing or vision physical disabilities.	Existing
<i>Requirement:</i>	
9 The public interface for travelers shall be able to store frequently requested data.	Planned
<i>Functional Area:</i> Remote Interactive Information Reception	
Public traveler interface, such as a kiosk, that provides traffic, transit, yellow pages, special event, and other personalized traveler information services upon request.	
<i>Requirement:</i>	
1 The public interface for travelers shall receive traffic information from a center and present it to the traveler upon request.	Existing
<i>Requirement:</i>	
2 The public interface for travelers shall receive transit information from a center and present it to the traveler upon request.	Existing
<i>Requirement:</i>	
3 The public interface for travelers shall receive yellow pages information (such as lodging, restaurants, theaters, bicycle facilities, and other tourist activities) from a center and present it to the traveler upon request.	Planned
<i>Requirement:</i>	
4 The public interface for travelers shall receive event information from a center and present it to the traveler upon request.	Existing
<i>Requirement:</i>	
5 The public interface for travelers shall receive evacuation information from a center and present it to the traveler.	Potential
<i>Requirement:</i>	
6 The public interface for travelers shall receive wide-area alerts and present it to the traveler.	Existing
<i>Requirement:</i>	
7 The public interface for travelers shall accept reservations for confirmed trip plans.	Existing
<i>Requirement:</i>	
8 The public interface for travelers shall support payment for services, such as confirmed trip plans, confirmed traveler services, tolls, transit fares, parking lot charges, and advanced payment for tolls.	Existing
<i>Requirement:</i>	
9 The public interface for travelers shall provide an interface through which credit identities and stored credit values may be collected from tags, traveler cards, or payment instruments used by travelers.	Existing
<i>Requirement:</i>	
10 The public interface for travelers shall base requests from the traveler on the traveler's current location or a specific location identified by the traveler, and filter the provided information accordingly.	Existing
<i>Requirement:</i>	
11 The public interface for travelers shall provide digitized map data to act as the background to the information presented to the traveler.	Planned

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> NICTD Kiosks	
<i>Entity:</i> Remote Traveler Support	
<i>Functional Area:</i> Remote Interactive Information Reception	
Public traveler interface, such as a kiosk, that provides traffic, transit, yellow pages, special event, and other personalized traveler information services upon request.	
<i>Requirement:</i>	
12 The public interface for travelers shall support traveler input in audio or manual form.	Existing
<i>Requirement:</i>	
13 The public interface for travelers shall present information to the traveler in audible or visual forms consistent with a kiosk, including those that are suitable for travelers with hearing or vision physical disabilities.	Existing
<i>Requirement:</i>	
14 The public interface for travelers shall be able to store frequently requested data.	Planned
<i>Functional Area:</i> Traveler Secure Area Surveillance	
Security surveillance devices that monitor traveler-frequented areas such as transit stops and rest stops.	
<i>Requirement:</i>	
1 The field element shall include video and/or audio surveillance of traveler secure areas including transit stations, transit stops, rest areas, park and ride lots, and other fixed sites along travel routes (e.g., emergency pull-off areas and traveler information centers).	Existing
<i>Requirement:</i>	
2 The field element shall be remotely controlled by a center.	Existing
<i>Requirement:</i>	
3 The field element shall provide equipment status and fault indication of surveillance equipment to a center.	Existing
<i>Requirement:</i>	
4 The field element shall provide raw video or audio data.	Existing
<i>Requirement:</i>	
5 The field element shall remotely process video and audio data and provide an indication of potential incidents or threats to a center.	Existing
<i>Functional Area:</i> Traveler Secure Area Sensor Monitoring	
Security sensors monitoring traveler-frequented areas such as transit stops, park-and-ride lots, and rest areas for environmental threats, intrusion and motion, and object detection.	
<i>Requirement:</i>	
1 The field element shall include security sensors that monitor conditions in traveler secure areas, which include transit stations, transit stops, rest areas, park and ride lots, and other fixed sites along travel routes (e.g., emergency pull-off areas and travel information centers).	Potential
<i>Requirement:</i>	
2 The field element shall be remotely controlled by a center.	Potential
<i>Requirement:</i>	
3 The field element shall provide equipment status and fault indication of security sensor equipment to a center.	Potential
<i>Requirement:</i>	
4 The field element shall include environmental threat sensors (e.g. chemical agent, toxic industrial chemical, biological, explosives, and radiological).	Potential
<i>Requirement:</i>	
5 The field element shall include motion and intrusion detection sensors.	Potential
<i>Requirement:</i>	
6 The field element shall include object detection sensors (such as metal detectors).	Potential
<i>Requirement:</i>	
7 The field element shall provide raw security sensor data.	Potential

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> NICTD Kiosks	
<i>Entity:</i> Remote Traveler Support	
<i>Functional Area:</i> Traveler Secure Area Sensor Monitoring	
Security sensors monitoring traveler-frequented areas such as transit stops, park-and-ride lots, and rest areas for environmental threats, intrusion and motion, and object detection.	
<i>Requirement:</i>	Potential
8 The field element shall remotely process security sensor data and provide an indication of potential incidents or threats to a center.	
<i>Functional Area:</i> Remote Traveler Security	
Public traveler interface that provides the capability for travelers to report an emergency or activate a panic button to summon assistance in areas such as transit stops, park-and-ride areas, etc.	
<i>Requirement:</i>	Existing
1 The public interface for travelers shall provide the capability for a traveler to report an emergency and summon assistance from secure areas such as transit stops, transit stations, modal transfer facilities, rest stops, park-and-ride areas, travel information areas, and emergency pull off areas.	
<i>Requirement:</i>	Existing
2 When initiated by a traveler, the public interface for travelers shall forward a request for assistance to an emergency management function and acknowledge the request.	
<i>Requirement:</i>	Existing
3 The public interface for travelers shall provide the capability to broadcast a message to advise or warn a traveler.	
<i>Requirement:</i>	Existing
4 The public interface for travelers shall accept input and provide information to the traveler in a form suitable for travelers with physical disabilities.	
<i>Functional Area:</i> Remote Transit Information Services	
Public traveler interface that provides real-time travel-related information at transit stops and multi-modal transfer points, including general annunciation, display of imminent arrival information, the latest available information on transit routes, schedules, transfer options, available services, fares, and real-time schedule adherence.	
<i>Requirement:</i>	Planned
1 The public interface for travelers shall collect and provide real-time travel-related information at transit stops, multi-modal transfer points, and other public transportation areas.	
<i>Requirement:</i>	Existing
2 The public interface for travelers shall collect and present to the transit traveler information on transit routes, schedules, and real-time schedule adherence.	
<i>Requirement:</i>	Existing
3 The public interface for travelers shall provide support for general annunciation and/or display of imminent arrival information and other information of general interest to transit users.	
<i>Requirement:</i>	Existing
4 The public interface for travelers shall present information to the traveler in a form suitable for travelers with physical disabilities.	
<i>Functional Area:</i> Remote Transit Fare Management	
Public traveler interface, such as a kiosk, that provides the capability for the traveler to use a common fare medium for transit fares, tolls, and/or parking lot charges, to calculate the amount due and identify payment problems.	
<i>Requirement:</i>	Existing
1 The public interface for travelers shall accept and process current transit passenger fare collection information.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: NICTD Kiosks</i>	
<i>Entity: Remote Traveler Support</i>	
<i>Functional Area: Remote Transit Fare Management</i>	
Public traveler interface, such as a kiosk, that provides the capability for the traveler to use a common fare medium for transit fares, tolls, and/or parking lot charges, to calculate the amount due and identify payment problems.	
<i>Requirement:</i>	
2 The public interface for travelers shall calculate a fare based on the origin and destination provided by the traveler, in conjunction with transit routing, transit fare category, and transit user history.	Existing
<i>Requirement:</i>	
3 The public interface for travelers shall provide an interface to a transit user traveler card in support of payment for transit fares, tolls, and/or parking lot charges. The stored credit value data from the card shall be collected and updated based on the fare or other charges, or the credit identity shall be collected.	Existing
<i>Requirement:</i>	
4 The public interface for travelers shall provide information to the center for financial authorization and transaction processing.	Existing
<i>Requirement:</i>	
5 The public interface for travelers shall provide an image of all travelers purchasing rides or services to be used for violation processing.	Potential
<i>Requirement:</i>	
6 The public interface for travelers shall determine the routing based on the traveler's destination and the location of the closest transit stop from which a route request is being made.	Existing
<i>Requirement:</i>	
7 The public interface for travelers shall create fare statistics data based upon data collected at a transit stop.	Existing
<i>Requirement:</i>	
8 The public interface for travelers shall present information to the traveler in a form suitable for travelers with physical disabilities.	Existing
<i>Element: NICTD Parking</i>	
<i>Entity: Parking Management</i>	
<i>Functional Area: Parking Management</i>	
Monitor vehicles and current parking availability within parking facilities. Use driver information systems (e.g., DMS) to provide parking availability and other parking facility information to drivers. Support local traffic control coordination around the parking facility.	
<i>Requirement:</i>	
1 The parking element shall maintain parking lot information including static information such as hours of operation, rates, location, entrance locations, capacity, type, and constraints; as well as dynamic information such as current state of the lot, occupancy, arrival rates, and departure rates.	Existing
<i>Requirement:</i>	
2 The parking element shall share information with a traffic management center to identify queues at entrances, exits that should be used, and other information that supports coordinated local traffic control in and around the parking facility.	Potential
<i>Requirement:</i>	
3 The parking element shall manage local dynamic message signs that display messages to travelers such as the parking lot state, number of spaces available, location of entrances, and current charges.	Potential
<i>Requirement:</i>	
4 The parking element shall provide the capability to detect, count, and classify vehicles at entrances, exits, and designated locations within a parking facility.	Planned

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> NICTD Parking	
<i>Entity:</i> Parking Management	
<i>Functional Area:</i> Parking Electronic Payment	
Parking payment collection using in-vehicle equipment (tags) or contact or proximity traveler cards used for electronic payment. Includes field elements and back-office functionality.	
<i>Requirement:</i>	Planned
1 The parking element shall detect and classify vehicles entering and exiting a parking facility (vehicle size, type, identifiable features, etc.).	
<i>Requirement:</i>	Planned
2 The parking element shall read data from the traveler card / payment instrument carried on-board the vehicle or by the traveler.	
<i>Requirement:</i>	Planned
3 The parking element shall provide an interface to the driver informing them of the success or failure of the financial transaction. This may involve a request for the driver to pull aside so the operator can resolve an issue.	
<i>Requirement:</i>	Planned
4 The parking element shall collect data on payment violations and send the data, including images of the violator and the vehicle registration data obtained from the Department of Motor Vehicles (DMV) office, to the appropriate enforcement agency.	
<i>Requirement:</i>	Planned
5 The parking element shall manage the parking lot charges, considering such factors as location, vehicle types, and times of day.	
<i>Requirement:</i>	Planned
6 The parking element shall process the financial requests and manage an interface to a Financial Institution.	
<i>Requirement:</i>	Planned
7 The parking element shall support the payment of parking lot transactions using data provided by the traveler cards / payment instruments.	
<i>Requirement:</i>	Planned
8 The parking element shall process requests for parking lot charges to be paid in advance.	
<i>Requirement:</i>	Planned
10 The parking element shall maintain a list of invalid traveler credit identities.	
<i>Functional Area:</i> Parking Data Collection	
Collection and storage of parking management information. For use by operations personnel or data archives in the region.	
<i>Requirement:</i>	Planned
1 The parking element shall collect parking management data including lot usage and charging information.	
<i>Requirement:</i>	Planned
2 The parking element shall assign quality control metrics and meta-data to be stored along with the data. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.	
<i>Requirement:</i>	Planned
3 The parking element shall receive and respond to requests from ITS Archives for either a catalog of the parking management data or for the data itself.	
<i>Requirement:</i>	Planned
4 The parking element shall be able to produce sample products of the data available.	
<i>Element:</i> NICTD Rail Transit Vehicles	
<i>Entity:</i> Transit Vehicle	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> NICTD Rail Transit Vehicles	
<i>Entity:</i> Transit Vehicle	
<i>Functional Area:</i> On-board Connection Protection	
Monitors vehicle schedule performance and provides it to the transit center for connection protection processing. Also recognizes travelers who have arranged for connection protection and provides information regarding them to the transit center.	
<i>Requirement:</i>	
1 The transit vehicle shall monitor vehicle schedule performance and provides it to the transit center for connection protection processing.	Existing
<i>Requirement:</i>	
2 The transit vehicle shall receive operator instructions from the transit center relating to managing connection protection.	Existing
<i>Requirement:</i>	
3 The transit vehicle shall recognizes individual travelers who have arranged for connection protection and provides information regarding them to the transit center.	Planned
<i>Functional Area:</i> On-board Transit Trip Monitoring	
Support fleet management with automatic vehicle location (AVL) and automated mileage and fuel reporting and auditing.	
<i>Requirement:</i>	
1 The transit vehicle shall track the current location of the transit vehicle.	Existing
<i>Requirement:</i>	
2 The transit vehicle shall support the computation of the location of a transit vehicle using on-board sensors to augment the location determination function. This may include proximity to the transit stops or other known reference points as well as recording trip length.	Existing
<i>Requirement:</i>	
3 The transit vehicle shall record transit trip monitoring data including vehicle mileage and fuel usage.	Potential
<i>Requirement:</i>	
4 The transit vehicle shall record transit trip monitoring data including operational status information such as doors open/closed, running times, etc.	Potential
<i>Requirement:</i>	
5 The transit vehicle shall send the transit vehicle trip monitoring data to center-based trip monitoring functions.	Existing
<i>Functional Area:</i> On-board Schedule Management	
Collecting of data for schedule generation and adjustment on-board a transit vehicle. Supports communication between the vehicle, operator, and center.	
<i>Requirement:</i>	
1 The transit vehicle shall receive a vehicle assignment including transit route information, transit service instructions, traffic information, road conditions, and other information for the operator.	Potential
<i>Requirement:</i>	
2 The transit vehicle shall use the route information and its current location to determine the deviation from the predetermined schedule.	Potential
<i>Requirement:</i>	
3 The transit vehicle shall calculate the estimated times of arrival (ETA) at transit stops.	Potential
<i>Requirement:</i>	
4 The transit vehicle shall determine scenarios to correct the schedule deviation.	Potential

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> NICTD Rail Transit Vehicles	
<i>Entity:</i> Transit Vehicle	
<i>Functional Area:</i> On-board Schedule Management	
Collecting of data for schedule generation and adjustment on-board a transit vehicle. Supports communication between the vehicle, operator, and center.	
<i>Requirement:</i> 5 The transit vehicle shall provide the schedule deviations and instructions for schedule corrections to the transit vehicle operator if the deviation is small, or the transit vehicle is operating in an urban area.	Potential
<i>Requirement:</i> 6 The transit vehicle shall send the schedule deviation and estimated arrival time information to the center.	Potential
<i>Requirement:</i> 7 The transit vehicle shall support the operations of a flexible route service. This may include requests for route deviations that would then lead to schedule corrective actions.	Potential
<i>Requirement:</i> 8 The transit vehicle shall notify the transit center of vehicle location and operational status as the vehicle exits and returns to the transit facility to support future vehicle assignments.	Potential
<i>Functional Area:</i> On-board Transit Fare Management	
On-board systems provide fare collection using a travelers non-monetary fare medium. Collected fare data are made available to the center.	
<i>Requirement:</i> 1 The transit vehicle shall read data from the traveler card / payment instrument presented by boarding passengers.	Existing
<i>Requirement:</i> 2 The transit vehicle shall provide an image of all travelers which shall be used for violation processing of those who do not have a traveler card / payment instrument or whose transit fare transaction fails.	Potential
<i>Requirement:</i> 3 The transit vehicle shall determine the traveler's travel routing based on the transit vehicle's current location and the traveler's destination.	Existing
<i>Requirement:</i> 4 The transit vehicle shall calculate the traveler's fare based on the origin and destination provided by the traveler as well as factors such as the transit routing, transit fare category, traveler history, and route-specific information.	Existing
<i>Requirement:</i> 5 The transit vehicle shall have access to the complete range of transit services (routes and schedules) that are available to the traveler.	Existing
<i>Requirement:</i> 6 The transit vehicle shall provide a transit fare payment interface that is suitable for travelers with physical disabilities.	Existing
<i>Requirement:</i> 7 The transit vehicle shall include a database on-board the transit vehicle for use in fare processing from which the fares for all possible trips within the transit operational network can be determined.	Existing
<i>Requirement:</i> 8 The transit vehicle shall support an emergency fare structure overriding all other fares that can be activated during disasters, states of emergency or evacuations.	Existing
<i>Requirement:</i> 10 The transit vehicle shall provide fare statistics data to the center.	Existing
<i>Functional Area:</i> On-board Passenger Counting	
On-board systems collect transit vehicle loading data and make it available to the center.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> NICTD Rail Transit Vehicles	
<i>Entity:</i> Transit Vehicle	
<i>Functional Area:</i> On-board Passenger Counting	
On-board systems collect transit vehicle loading data and make it available to the center.	
<i>Requirement:</i>	
1 The transit vehicle shall count passengers boarding and alighting.	Potential
<i>Requirement:</i>	
2 The passenger counts shall be related to location to support association of passenger counts with routes, route segments, or bus stops.	Existing
<i>Requirement:</i>	
3 The passenger counts shall be timestamped so that ridership can be measured by time of day and day of week.	Existing
<i>Requirement:</i>	
4 The transit vehicle shall send the collected passenger count information to the transit center.	Potential
<i>Functional Area:</i> On-board Transit Security	
On-board video/audio surveillance systems, threat sensors, and object detection sensors to enhance security and safety on-board a transit vehicles. Also includes silent alarms activated by transit user or vehicle operator, operator authentication, and remote vehicle disabling.	
<i>Requirement:</i>	
1 The transit vehicle shall perform video and audio surveillance inside of transit vehicles and output raw video or audio data for either local monitoring (for processing or direct output to the transit vehicle operator), remote monitoring or for local storage (e.g., in an event recorder).	Existing
<i>Requirement:</i>	
2 The transit vehicle shall perform local monitoring of video or audio surveillance data collected inside of transit vehicles, and identify potential incidents or threats based on received processing parameters.	Existing
<i>Requirement:</i>	
3 The transit vehicle shall output an indication of potential incidents or threats and the processed video or audio information to the center along with the vehicle's current location.	Existing
<i>Requirement:</i>	
4 The transit vehicle shall detect potential threats via sensors for chemical agents, toxic industrial chemicals, biological agents, explosives, and radiation.	Potential
<i>Requirement:</i>	
5 The transit vehicle shall detect potential threats via object detection sensors (e.g. metal detectors).	Potential
<i>Requirement:</i>	
6 The transit vehicle shall output an indication of potential incidents or threats and the processed sensor information to the center along with the vehicle's current location.	Potential
<i>Requirement:</i>	
7 The transit vehicle shall accept sensor control data to allow remote control of the sensors.	Potential
<i>Requirement:</i>	
8 The transit vehicle shall monitor and output surveillance and sensor equipment status and fault indications.	Planned
<i>Requirement:</i>	
9 The transit vehicle shall accept emergency inputs from either the transit vehicle operator or a traveler through such interfaces as panic buttons, silent or audible alarms, etc.	Potential
<i>Requirement:</i>	
10 The transit vehicle shall output reported emergencies to the center.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> NICTD Rail Transit Vehicles	
<i>Entity:</i> Transit Vehicle	
<i>Functional Area:</i> On-board Transit Security	
On-board video/audio surveillance systems, threat sensors, and object detection sensors to enhance security and safety on-board a transit vehicles. Also includes silent alarms activated by transit user or vehicle operator, operator authentication, and remote vehicle disabling.	
<i>Requirement:</i> 11 The transit vehicle shall receive acknowledgments of the emergency request from the center and output this acknowledgment to the transit vehicle operator or to the travelers.	Existing
<i>Requirement:</i> 12 The transit vehicle shall be capable of receiving an emergency message for broadcast to the travelers or to the transit vehicle operator.	Existing
<i>Requirement:</i> 13 The transit vehicle shall be capable of disabling or enabling the transit vehicle based on commands from the center or authentic inputs from the transit vehicle operator.	Planned
<i>Requirement:</i> 14 The transit vehicle shall perform authentication of the transit vehicle operator.	Potential
<i>Functional Area:</i> On-board Maintenance	
On-board systems to collect and process transit vehicle maintenance data including mileage and vehicle operating conditions for use in scheduling future vehicle maintenance.	
<i>Requirement:</i> 1 The transit vehicle shall collect and process vehicle mileage data available to sensors on-board.	Planned
<i>Requirement:</i> 2 The transit vehicle shall collect and process the transit vehicle's operating conditions such as engine temperature, oil pressure, brake wear, internal lighting, environmental controls, etc.	Planned
<i>Requirement:</i> 3 The transit vehicle shall transmit vehicle maintenance data to the center to be used for scheduling future vehicle maintenance.	Planned
<i>Functional Area:</i> On-board Transit Information Services	
On-board systems to furnish next-stop annunciation as well as interactive travel-related information, including routes, schedules, transfer options, fares, real-time schedule adherence, current incidents, weather conditions, non-motorized transportation services, and special events.	
<i>Requirement:</i> 1 The transit vehicle shall enable traffic and travel advisory information to be requested and output to the traveler. Such information may include transit routes, schedules, transfer options, fares, real-time schedule adherence, current incidents, weather conditions, and special events.	Planned
<i>Requirement:</i> 3 The transit vehicle shall broadcast advisories about the imminent arrival of the transit vehicle at the next stop via an on-board automated annunciation system.	Planned
<i>Requirement:</i> 4 The transit vehicle shall support input and output forms that are suitable for travelers with physical disabilities.	Planned
<i>Requirement:</i> 5 The transit vehicle shall gather transit advisory data, including alerts and advisories pertaining to major emergencies, or man made disasters.	Existing
<i>Requirement:</i> 6 The transit vehicle shall tailor the output of the request traveler information based on the current location of the transit vehicle.	Planned

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> NICTD Rail Transit Vehicles	
<i>Entity:</i> Transit Vehicle	
<i>Element:</i> NIRPC Data Archive	
<i>Entity:</i> Archived Data Management	
<i>Functional Area:</i> ITS Data Repository	
Collect and maintain data and data catalogs from one or more data sources. May include quality checks, error notification, and archive coordination.	
<i>Requirement:</i>	Existing
1 The center shall collect data to be archived from one or more data sources.	
<i>Requirement:</i>	Existing
2 The center shall collect data catalogs from one or more data sources. A catalog describes the data contained in the collection of archived data and may include descriptions of the schema or structure of the data, a description of the contents of the data; e.g., time range of entries, number of entries; or a sample of the data (e.g. a thumbnail).	
<i>Requirement:</i>	Existing
3 The center shall store the archived data in a focused repository that is suited to a particular set of ITS data users.	
<i>Requirement:</i>	Existing
4 The center shall include capabilities for performing quality checks on the incoming archived data.	
<i>Requirement:</i>	Planned
5 The center shall include capabilities for error notification on the incoming archived data.	
<i>Requirement:</i>	Planned
6 The center shall include capabilities for archive to archive coordination.	
<i>Requirement:</i>	Existing
7 The center shall support a broad range of archived data management implementations, ranging from simple data marts that collect a focused set of data and serve a particular user community to large-scale data warehouses that collect, integrate, and summarize transportation data from multiple sources and serve a broad array of users within a region.	
<i>Requirement:</i>	Existing
8 The center shall perform quality checks on received data.	
<i>Requirement:</i>	Existing
9 The center shall provide the capability to execute methods on the incoming data such as cleansing, summarizations, aggregations, or transformations applied to the data before it is stored in the archive.	
<i>Requirement:</i>	Existing
10 The center shall respond to requests from the administrator interface function to maintain the archive data.	
<i>Requirement:</i>	Existing
11 When data or a catalog of data is received from the archive, the center shall generate the requested data product for the users systems.	
<i>Requirement:</i>	Potential
12 For archive data requiring financial payment, the center shall process the financial requests and manage an interface to a Financial Institution.	
<i>Functional Area:</i> Traffic and Roadside Data Archival	
Collects and archives traffic and environmental information directly from the roadside for use in off-line planning, research, and analysis.	
<i>Requirement:</i>	Existing
1 The center shall manage the collection of archive data directly from collection equipment located at the roadside.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> NIRPC Data Archive	
<i>Entity:</i> Archived Data Management	
<i>Functional Area:</i> Traffic and Roadside Data Archival	
Collects and archives traffic and environmental information directly from the roadside for use in off-line planning, research, and analysis.	
<i>Requirement:</i>	Existing
2 The center shall collect traffic sensor information from roadside devices.	
<i>Requirement:</i>	Potential
3 The center shall collect environmental sensor information that from roadside devices.	
<i>Requirement:</i>	Existing
4 The center shall respond to requests from the Archive Data Administrator to input the parameters that control the collection process.	
<i>Requirement:</i>	Potential
5 The center shall send the request for data and control parameters to the field equipment where the information is collected and returned.	
<i>Requirement:</i>	Existing
6 The center shall record the status about the imported traffic and roadside data.	
<i>Requirement:</i>	Existing
7 The center shall use the status information to adjust the collection of traffic and roadside data.	
<i>Functional Area:</i> Government Reporting Systems Support	
Selects and formats data residing in an ITS archive to facilitate local, state, and federal government data reporting requirements.	
<i>Requirement:</i>	Existing
1 The center shall provide data from an ITS archive to federal, state, or local government reporting systems.	
<i>Requirement:</i>	Existing
2 The center shall provide the capability to select data from an ITS archive for use in government reports.	
<i>Requirement:</i>	Existing
3 The center shall provide the capability to format data from an ITS archive suitable for input into government reports.	
<i>Requirement:</i>	Existing
4 The center shall support requests for ITS archived data from Government Reporting Systems.	
<i>Requirement:</i>	Existing
5 The center shall provide the applicable meta-data for any ITS archived data to satisfy government reporting system requests. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.	
<i>Functional Area:</i> On-Line Analysis and Mining	
Advanced data analysis and mining features to support discovery of information, patterns, and correlations in large ITS archives.	
<i>Requirement:</i>	Existing
1 The center shall support the interface with Archive Data User Systems for requests for analysis of the archive data.	
<i>Requirement:</i>	Existing
2 The center shall provide the capability to perform activities such as data mining, data fusion, summarizations, aggregations, and recreation from archive data. This may include multidimensional analysis, selective summarization and expansion of data details, and many other advanced analysis services.	
<i>Requirement:</i>	Existing
3 The center shall receive the user's systems requests and develop the request to retrieve the data from the archive.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> NIRPC Data Archive	
<i>Entity:</i> Archived Data Management	
<i>Functional Area:</i> On-Line Analysis and Mining	
Advanced data analysis and mining features to support discovery of information, patterns, and correlations in large ITS archives.	
<i>Requirement:</i>	Existing
4 The center shall respond to users systems requests for a catalog of the archived data analysis products available.	
<i>Requirement:</i>	Potential
5 For archive analysis and data mining products requiring financial payment the center shall process the financial requests and manage an interface to a Financial Institution.	
<i>Element:</i> North Township Dial-a-Ride Agency Management	
<i>Entity:</i> Transit Management	
<i>Functional Area:</i> Transit Center Vehicle Tracking	
Monitoring transit vehicle locations via interactions with on-board systems. Furnish users with real-time transit schedule information and maintain interface with digital map providers.	
<i>Requirement:</i>	Existing
1 The center shall monitor the locations of all transit vehicles within its network.	
<i>Requirement:</i>	Existing
2 The center shall determine adherence of transit vehicles to their assigned schedule.	
<i>Requirement:</i>	Planned
3 The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for transit tracking and dispatch.	
<i>Requirement:</i>	Planned
4 The center shall provide transit operational data to traveler information service providers.	
<i>Requirement:</i>	Existing
5 The center shall provide collected transit probe data to traffic management centers and traveler information service providers for use in measuring current traffic conditions.	
<i>Functional Area:</i> Transit Center Paratransit Operations	
Management of demand response transit services, including paratransit. Planning and scheduling of these services. Supports automated vehicle dispatch and automatically updates customer service operator systems.	
<i>Requirement:</i>	Existing
1 The center shall process trip requests for demand responsive transit services, i.e. paratransit. Sources of the requests may include traveler information service providers.	
<i>Requirement:</i>	Existing
2 The center shall monitor the operational status of the demand response vehicles including status of passenger pick-up and drop-off.	
<i>Requirement:</i>	Existing
3 The center shall generate demand response transit (including paratransit) routes and schedules based on such factors as parameters input by the system operator, what other demand responsive transit schedules have been planned, the availability and location of vehicles, the relevance of any fixed transit routes and schedules, road network information, and incident information.	
<i>Requirement:</i>	Existing
4 The center shall dispatch demand response (paratransit) transit vehicles.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> North Township Dial-a-Ride Agency Management	
<i>Entity:</i> Transit Management	
<i>Functional Area:</i> Transit Center Paratransit Operations	
Management of demand response transit services, including paratransit. Planning and scheduling of these services. Supports automated vehicle dispatch and automatically updates customer service operator systems.	
<i>Requirement:</i> 5	The center shall exchange information with Maintenance and Construction Operations concerning work zones, roadway conditions, asset restrictions, work plans, etc. Planned
<i>Requirement:</i> 6	The center shall disseminate up-to-date schedules and route information to other centers for demand responsive transit services (paratransit). Planned
<i>Requirement:</i> 7	The center shall collect the log of passenger boardings and alightings from the paratransit vehicles. Existing
<i>Functional Area:</i> Transit Center Passenger Counting	
Receives and processes transit vehicle loading data using two-way communications from equipped transit vehicles.	
<i>Requirement:</i> 1	The center shall collect passenger count information from each transit vehicle. Existing
<i>Requirement:</i> 3	The center shall make the compiled ridership data available to the system operator and other applications. Existing
<i>Functional Area:</i> Transit Center Security	
Monitor transit vehicle operator or traveler activated alarms; authenticate transit vehicle operators; remotely disable a transit vehicle; alert operators, travelers, and police to potential incidents identified by these security features.	
<i>Requirement:</i> 1	The center shall monitor transit vehicle operational data to determine if the transit vehicle is off-route and assess whether a security incident is occurring. Potential
<i>Requirement:</i> 2	The center shall receive reports of emergencies on-board transit vehicles entered directly by the transit vehicle operator or from a traveler through interfaces such as panic buttons or alarm switches. Planned
<i>Requirement:</i> 3	The center shall support the back-office portion of functionality to authenticate transit vehicle operators. Potential
<i>Requirement:</i> 4	The center shall exchange transit incident information along with other service data with other transit agencies. Planned
<i>Requirement:</i> 5	The center shall receive information pertaining to a wide-area alert such as weather alerts, disaster situations, or child abductions. This information may come from Emergency Management or from other Alerting and Advisory Systems. Existing
<i>Requirement:</i> 6	The center shall send wide-area alert information to travelers (on-board transit vehicles or at stations/stops) and transit vehicle operators. Planned
<i>Requirement:</i> 7	The center shall coordinate the response to security incidents involving transit with other agencies including Emergency Management, other transit agencies, media, traffic management, and traveler information service providers. Planned

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: North Township Dial-a-Ride Agency Management</i>	
<i>Entity: Transit Management</i>	
<i>Functional Area: Transit Center Security</i>	
Monitor transit vehicle operator or traveler activated alarms; authenticate transit vehicle operators; remotely disable a transit vehicle; alert operators, travelers, and police to potential incidents identified by these security features.	
<i>Requirement:</i> 8 The center shall receive threat information and status on the integrity of the transit infrastructure.	Potential
<i>Requirement:</i> 9 The center shall provide support to remotely disable (or reset the disabling of) a transit vehicle in service.	Potential
<i>Functional Area: Transit Vehicle Operator Assignment</i>	
Assignment of transit operators to runs in a fair manner while minimizing labor and overtime services, considering operator preferences, qualifications, accumulated work hours, and other information about each operator.	
<i>Requirement:</i> 1 The center shall 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.	Existing
<i>Requirement:</i> 2 The center shall assess the transit vehicle operator's availability based on previous work assignments, accumulated hours, plus health and vacation commitments.	Existing
<i>Requirement:</i> 3 The center shall assign transit vehicle operators to transit schedules based on their eligibility, route preferences, seniority, and transit vehicle availability.	Existing
<i>Requirement:</i> 4 The center shall provide an interface through which the transit vehicle operator information can be maintained - either from the transit vehicle operator, center personnel, or other functions.	Existing
<i>Requirement:</i> 5 The center shall generate supplemental vehicle operator assignments as required due to change events that occur during the operating day.	Existing
<i>Functional Area: Transit Center Information Services</i>	
Provide interactive traveler information to travelers (on-board transit vehicles, at stops/stations, using personal devices), traveler information service providers, media, and other transit organizations. Includes routes, schedules, transfer options, fares, real-time schedule adherence, current incidents, weather conditions, yellow pages, and special events.	
<i>Requirement:</i> 1 The center shall provide travelers using public transportation with traffic and advisory information upon request. Such information may include transit routes, schedules, transfer options, fares, real-time schedule adherence, current incidents, weather conditions, and special events.	Existing
<i>Requirement:</i> 6 The center shall broadcast transit advisory data, including alerts and advisories pertaining to major emergencies, or man made disasters.	Existing
<i>Functional Area: Transit Environmental Monitoring</i>	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> North Township Dial-a-Ride Agency Management	
<i>Entity:</i> Transit Management	
<i>Functional Area:</i> Transit Environmental Monitoring	
Current and forecast road and weather information assimilated from weather service providers and vehicle probes. The information is monitored and forwarded to other agencies to more effectively manage transit operations.	
<i>Requirement:</i>	Existing
1 The center shall assimilate current and forecast road conditions and surface weather information to more effectively manage transit operations.	
<i>Requirement:</i>	Existing
2 The center shall collect current and forecast road and weather information from weather service providers and roadway maintenance centers.	
<i>Functional Area:</i> Transit Center Multi-Modal Coordination	
Coordinate schedules with other agencies and modes, including transit transfer cluster and transfer point information.	
<i>Requirement:</i>	Planned
1 The center shall coordinate schedules and services between transit agencies, traffic management, maintenance and construction operations, parking management, and other surface or air transportation modes.	
<i>Requirement:</i>	Planned
2 The center shall share transfer cluster and transfer point information with multimodal transportation service providers, other transit agencies, and traveler information service providers. A transfer cluster is a collection of stop points, stations, or terminals where transfers can be made conveniently.	
<i>Requirement:</i>	Potential
3 The center shall accept requests from traffic management to change routes and schedules as part of the implementation of demand management strategies.	
<i>Requirement:</i>	Planned
4 The center shall coordinate transit services for special events, planning services for the event and managing transit services on the day of the event.	
<i>Requirement:</i>	Planned
5 The center shall provide transit operations personnel with the capability to control and monitor transit service coordination activities.	
<i>Functional Area:</i> Transit Evacuation Support	
Support evacuation and subsequent reentry of a population in the vicinity of a disaster or other emergency. Coordinate regional evacuation plans and resources including transit and school bus fleets.	
<i>Requirement:</i>	Potential
1 The center shall manage the use of transit resources to support evacuation and subsequent reentry of a population in the vicinity of a disaster or other emergency.	
<i>Requirement:</i>	Planned
2 The center shall coordinate regional evacuation plans with Emergency Management - identifying the transit role in an evacuation and the transit resources that would be used.	
<i>Requirement:</i>	Potential
3 The center shall coordinate the use of transit and school bus fleets during an evacuation, supporting evacuation of those with special needs and the general population.	
<i>Requirement:</i>	Potential
4 The center shall adjust and update transit service and fare schedules and provide that information to other agencies as they coordinate evacuations.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> North Township Dial-a-Ride Agency Management	
<i>Entity:</i> Transit Management	
<i>Functional Area:</i> Transit Data Collection	
Collection and storage of transit management data. For use by operations personnel or data archives in the region.	
<i>Requirement:</i>	Existing
1 The center shall collect transit management data such as transit fares and passenger use, transit services, paratransit operations, transit vehicle maintenance data, etc.	
<i>Requirement:</i>	Planned
2 The center shall assign quality control metrics and meta-data to be stored along with the data. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.	
<i>Requirement:</i>	Planned
3 The center shall receive and respond to requests from ITS Archives for either a catalog of the transit data or for the data itself.	
<i>Requirement:</i>	Planned
4 The center shall be able to produce sample products of the data available.	
<i>Functional Area:</i> Transit Transportation Operations Data Collection	
Collects real-time information on the state of the regional transportation system for operational use by the center. It establishes communications with a regional repository, requests or subscribes to information relevant to the center, and distributes the received information for use.	
<i>Requirement:</i>	Existing
1 The center shall collect real-time information on the state of the regional transportation system including current traffic and road conditions, weather conditions, special event and incident information.	
<i>Requirement:</i>	Existing
2 The center shall support the capability for the system operator to monitor and control the information collection service.	
<i>Element:</i> North Township Dial-a-Ride Transit Vehicles	
<i>Entity:</i> Transit Vehicle	
<i>Functional Area:</i> On-board Transit Trip Monitoring	
Support fleet management with automatic vehicle location (AVL) and automated mileage and fuel reporting and auditing.	
<i>Requirement:</i>	Existing
1 The transit vehicle shall track the current location of the transit vehicle.	
<i>Requirement:</i>	Potential
2 The transit vehicle shall support the computation of the location of a transit vehicle using on-board sensors to augment the location determination function. This may include proximity to the transit stops or other known reference points as well as recording trip length.	
<i>Requirement:</i>	Potential
3 The transit vehicle shall record transit trip monitoring data including vehicle mileage and fuel usage.	
<i>Requirement:</i>	Potential
4 The transit vehicle shall record transit trip monitoring data including operational status information such as doors open/closed, running times, etc.	
<i>Requirement:</i>	Existing
5 The transit vehicle shall send the transit vehicle trip monitoring data to center-based trip monitoring functions.	
<i>Functional Area:</i> On-board Schedule Management	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> North Township Dial-a-Ride Transit Vehicles	
<i>Entity:</i> Transit Vehicle	
<i>Functional Area:</i> On-board Schedule Management	
Collecting of data for schedule generation and adjustment on-board a transit vehicle. Supports communication between the vehicle, operator, and center.	
<i>Requirement:</i>	Potential
1 The transit vehicle shall receive a vehicle assignment including transit route information, transit service instructions, traffic information, road conditions, and other information for the operator.	
<i>Requirement:</i>	Potential
2 The transit vehicle shall use the route information and its current location to determine the deviation from the predetermined schedule.	
<i>Requirement:</i>	Potential
3 The transit vehicle shall calculate the estimated times of arrival (ETA) at transit stops.	
<i>Requirement:</i>	Potential
4 The transit vehicle shall determine scenarios to correct the schedule deviation.	
<i>Requirement:</i>	Potential
5 The transit vehicle shall provide the schedule deviations and instructions for schedule corrections to the transit vehicle operator if the deviation is small, or the transit vehicle is operating in an urban area.	
<i>Requirement:</i>	Potential
6 The transit vehicle shall send the schedule deviation and estimated arrival time information to the center.	
<i>Requirement:</i>	Potential
7 The transit vehicle shall support the operations of a flexible route service. This may include requests for route deviations that would then lead to schedule corrective actions.	
<i>Requirement:</i>	Potential
8 The transit vehicle shall notify the transit center of vehicle location and operational status as the vehicle exits and returns to the transit facility to support future vehicle assignments.	
<i>Functional Area:</i> On-board Paratransit Operations	
On-board systems to manage paratransit and flexible-route dispatch requests, including multi-stop runs. Passenger data is collected and provided to the center.	
<i>Requirement:</i>	Potential
1 The transit vehicle shall manage data input to sensor(s) on-board a transit vehicle to determine the vehicle's availability for use in demand responsive and flexible-route transit services based on identity, type, and passenger capacity.	
<i>Requirement:</i>	Existing
2 The transit vehicle shall receive the status of demand responsive or flexible-route transit schedules and passenger loading from the transit vehicle operator.	
<i>Requirement:</i>	Existing
3 The transit vehicle shall provide the transit vehicle operator instructions about the demand responsive or flexible-route transit schedule that has been confirmed from the center.	
<i>Requirement:</i>	Existing
4 The transit vehicle shall provide the capability to log passenger boardings and alightings and make passenger use data available to the transit center.	
<i>Functional Area:</i> On-board Passenger Counting	
On-board systems collect transit vehicle loading data and make it available to the center.	
<i>Requirement:</i>	Potential
1 The transit vehicle shall count passengers boarding and alighting.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> North Township Dial-a-Ride Transit Vehicles	
<i>Entity:</i> Transit Vehicle	
<i>Functional Area:</i> On-board Passenger Counting	
On-board systems collect transit vehicle loading data and make it available to the center.	
<i>Requirement:</i>	
2 The passenger counts shall be related to location to support association of passenger counts with routes, route segments, or bus stops.	Potential
<i>Requirement:</i>	
3 The passenger counts shall be timestamped so that ridership can be measured by time of day and day of week.	Potential
<i>Requirement:</i>	
4 The transit vehicle shall send the collected passenger count information to the transit center.	Potential
<i>Functional Area:</i> On-board Transit Security	
On-board video/audio surveillance systems, threat sensors, and object detection sensors to enhance security and safety on-board a transit vehicles. Also includes silent alarms activated by transit user or vehicle operator, operator authentication, and remote vehicle disabling.	
<i>Requirement:</i>	
1 The transit vehicle shall perform video and audio surveillance inside of transit vehicles and output raw video or audio data for either local monitoring (for processing or direct output to the transit vehicle operator), remote monitoring or for local storage (e.g., in an event recorder).	Planned
<i>Requirement:</i>	
2 The transit vehicle shall perform local monitoring of video or audio surveillance data collected inside of transit vehicles, and identify potential incidents or threats based on received processing parameters.	Planned
<i>Requirement:</i>	
3 The transit vehicle shall output an indication of potential incidents or threats and the processed video or audio information to the center along with the vehicle's current location.	Planned
<i>Requirement:</i>	
4 The transit vehicle shall detect potential threats via sensors for chemical agents, toxic industrial chemicals, biological agents, explosives, and radiation.	Potential
<i>Requirement:</i>	
5 The transit vehicle shall detect potential threats via object detection sensors (e.g. metal detectors).	Potential
<i>Requirement:</i>	
6 The transit vehicle shall output an indication of potential incidents or threats and the processed sensor information to the center along with the vehicle's current location.	Potential
<i>Requirement:</i>	
7 The transit vehicle shall accept sensor control data to allow remote control of the sensors.	Potential
<i>Requirement:</i>	
8 The transit vehicle shall monitor and output surveillance and sensor equipment status and fault indications.	Planned
<i>Requirement:</i>	
9 The transit vehicle shall accept emergency inputs from either the transit vehicle operator or a traveler through such interfaces as panic buttons, silent or audible alarms, etc.	Planned
<i>Requirement:</i>	
10 The transit vehicle shall output reported emergencies to the center.	Planned

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> North Township Dial-a-Ride Transit Vehicles	
<i>Entity:</i> Transit Vehicle	
<i>Functional Area:</i> On-board Transit Security	
On-board video/audio surveillance systems, threat sensors, and object detection sensors to enhance security and safety on-board a transit vehicles. Also includes silent alarms activated by transit user or vehicle operator, operator authentication, and remote vehicle disabling.	
<i>Requirement:</i> 11 The transit vehicle shall receive acknowledgments of the emergency request from the center and output this acknowledgment to the transit vehicle operator or to the travelers.	Planned
<i>Requirement:</i> 12 The transit vehicle shall be capable of receiving an emergency message for broadcast to the travelers or to the transit vehicle operator.	Planned
<i>Requirement:</i> 13 The transit vehicle shall be capable of disabling or enabling the transit vehicle based on commands from the center or authentic inputs from the transit vehicle operator.	Potential
<i>Requirement:</i> 14 The transit vehicle shall perform authentication of the transit vehicle operator.	Potential
<i>Element:</i> Northwest Indiana Archive	
<i>Entity:</i> Archived Data Management	
<i>Functional Area:</i> ITS Data Repository	
Collect and maintain data and data catalogs from one or more data sources. May include quality checks, error notification, and archive coordination.	
<i>Requirement:</i> 1 The center shall collect data to be archived from one or more data sources.	Potential
<i>Requirement:</i> 2 The center shall collect data catalogs from one or more data sources. A catalog describes the data contained in the collection of archived data and may include descriptions of the schema or structure of the data, a description of the contents of the data; e.g., time range of entries, number of entries; or a sample of the data (e. g. a thumbnail).	Potential
<i>Requirement:</i> 3 The center shall store the archived data in a focused repository that is suited to a particular set of ITS data users.	Potential
<i>Requirement:</i> 4 The center shall include capabilities for performing quality checks on the incoming archived data.	Potential
<i>Requirement:</i> 5 The center shall include capabilities for error notification on the incoming archived data.	Potential
<i>Requirement:</i> 6 The center shall include capabilities for archive to archive coordination.	Potential
<i>Requirement:</i> 7 The center shall support a broad range of archived data management implementations, ranging from simple data marts that collect a focused set of data and serve a particular user community to large-scale data warehouses that collect, integrate, and summarize transportation data from multiple sources and serve a broad array of users within a region.	Potential
<i>Requirement:</i> 8 The center shall perform quality checks on received data.	Potential

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Northwest Indiana Archive	
<i>Entity:</i> Archived Data Management	
<i>Functional Area:</i> ITS Data Repository	
Collect and maintain data and data catalogs from one or more data sources. May include quality checks, error notification, and archive coordination.	
<i>Requirement:</i> 9	The center shall provide the capability to execute methods on the incoming data such as cleansing, summarizations, aggregations, or transformations applied to the data before it is stored in the archive. Potential
<i>Requirement:</i> 10	The center shall respond to requests from the administrator interface function to maintain the archive data. Potential
<i>Requirement:</i> 11	When data or a catalog of data is received from the archive, the center shall generate the requested data product for the users systems. Potential
<i>Requirement:</i> 12	For archive data requiring financial payment, the center shall process the financial requests and manage an interface to a Financial Institution. Potential
<i>Functional Area:</i> Traffic and Roadside Data Archival	
Collects and archives traffic and environmental information directly from the roadside for use in off-line planning, research, and analysis.	
<i>Requirement:</i> 1	The center shall manage the collection of archive data directly from collection equipment located at the roadside. Potential
<i>Requirement:</i> 2	The center shall collect traffic sensor information from roadside devices. Potential
<i>Requirement:</i> 3	The center shall collect environmental sensor information that from roadside devices. Potential
<i>Requirement:</i> 4	The center shall respond to requests from the Archive Data Administer to input the parameters that control the collection process. Potential
<i>Requirement:</i> 5	The center shall send the request for data and control parameters to the field equipment where the information is collected and returned. Potential
<i>Requirement:</i> 6	The center shall record the status about the imported traffic and roadside data. Potential
<i>Requirement:</i> 7	The center shall use the status information to adjust the collection of traffic and roadside data. Potential
<i>Functional Area:</i> Government Reporting Systems Support	
Selects and formats data residing in an ITS archive to facilitate local, state, and federal government data reporting requirements.	
<i>Requirement:</i> 1	The center shall provide data from an ITS archive to federal, state, or local government reporting systems. Potential
<i>Requirement:</i> 2	The center shall provide the capability to select data from an ITS archive for use in government reports. Potential
<i>Requirement:</i> 3	The center shall provide the capability to format data from an ITS archive suitable for input into government reports. Potential
<i>Requirement:</i> 4	The center shall support requests for ITS archived data from Government Reporting Systems. Potential

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Northwest Indiana Archive	
<i>Entity:</i> Archived Data Management	
<i>Functional Area:</i> Government Reporting Systems Support	
Selects and formats data residing in an ITS archive to facilitate local, state, and federal government data reporting requirements.	
<i>Requirement:</i>	Potential
5 The center shall provide the applicable meta-data for any ITS archived data to satisfy government reporting system requests. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.	
<i>Functional Area:</i> On-Line Analysis and Mining	
Advanced data analysis and mining features to support discovery of information, patterns, and correlations in large ITS archives.	
<i>Requirement:</i>	Potential
1 The center shall support the interface with Archive Data User Systems for requests for analysis of the archive data.	
<i>Requirement:</i>	Potential
2 The center shall provide the capability to perform activities such as data mining, data fusion, summarizations, aggregations, and recreation from archive data. This may include multidimensional analysis, selective summarization and expansion of data details, and many other advanced analysis services.	
<i>Requirement:</i>	Potential
3 The center shall receive the user's systems requests and develop the request to retrieve the data from the archive.	
<i>Requirement:</i>	Potential
4 The center shall respond to users systems requests for a catalog of the archived data analysis products available.	
<i>Requirement:</i>	Potential
5 For archive analysis and data mining products requiring financial payment the center shall process the financial requests and manage an interface to a Financial Institution.	
<i>Element:</i> Opportunity Enterprises Agency Management	
<i>Entity:</i> Transit Management	
<i>Functional Area:</i> Transit Center Vehicle Tracking	
Monitoring transit vehicle locations via interactions with on-board systems. Furnish users with real-time transit schedule information and maintain interface with digital map providers.	
<i>Requirement:</i>	Potential
1 The center shall monitor the locations of all transit vehicles within its network.	
<i>Requirement:</i>	Potential
2 The center shall determine adherence of transit vehicles to their assigned schedule.	
<i>Requirement:</i>	Potential
3 The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for transit tracking and dispatch.	
<i>Requirement:</i>	Potential
4 The center shall provide transit operational data to traveler information service providers.	
<i>Requirement:</i>	Potential
5 The center shall provide collected transit probe data to traffic management centers and traveler information service providers for use in measuring current traffic conditions.	
<i>Functional Area:</i> Transit Center Paratransit Operations	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Opportunity Enterprises Agency Management</i>	
<i>Entity: Transit Management</i>	
<i>Functional Area: Transit Center Paratransit Operations</i>	
Management of demand response transit services, including paratransit. Planning and scheduling of these services. Supports automated vehicle dispatch and automatically updates customer service operator systems.	
<i>Requirement:</i>	Existing
1 The center shall process trip requests for demand responsive transit services, i.e. paratransit. Sources of the requests may include traveler information service providers.	
<i>Requirement:</i>	Existing
2 The center shall monitor the operational status of the demand response vehicles including status of passenger pick-up and drop-off.	
<i>Requirement:</i>	Existing
3 The center shall generate demand response transit (including paratransit) routes and schedules based on such factors as parameters input by the system operator, what other demand responsive transit schedules have been planned, the availability and location of vehicles, the relevance of any fixed transit routes and schedules, road network information, and incident information.	
<i>Requirement:</i>	Existing
4 The center shall dispatch demand response (paratransit) transit vehicles.	
<i>Requirement:</i>	Planned
5 The center shall exchange information with Maintenance and Construction Operations concerning work zones, roadway conditions, asset restrictions, work plans, etc.	
<i>Requirement:</i>	Planned
6 The center shall disseminate up-to-date schedules and route information to other centers for demand responsive transit services (paratransit).	
<i>Requirement:</i>	Existing
7 The center shall collect the log of passenger boardings and alightings from the paratransit vehicles.	
<i>Functional Area: Transit Center Fare Management</i>	
Management of fare collection at the center - includes setting and distributing fare information, central processing of fares for transit as well as other ITS services, links to financial institutions and enforcement agencies.	
<i>Requirement:</i>	Potential
2 The center shall provide the capability for a system operator to manage the transit fares and control the exchange of transit fare information.	
<i>Requirement:</i>	Potential
3 The center shall process the financial requests from the transit vehicles or roadside and manage an interface to a Financial Institution.	
<i>Requirement:</i>	Potential
4 The center shall support the payment of transit fare transactions using data provided by the traveler cards / payment instruments.	
<i>Requirement:</i>	Potential
5 The center shall collect data on fare payment violations and send the data, including images of the violator, to the appropriate enforcement agency.	
<i>Requirement:</i>	Existing
6 The center shall process requests for transit fares to be paid in advance.	
<i>Requirement:</i>	Potential
8 The center shall be capable of establishing emergency fare structures to override all other fares during disasters, states of emergency, or evacuations.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Opportunity Enterprises Agency Management	
<i>Entity:</i> Transit Management	
<i>Functional Area:</i> Transit Center Fare Management	
Management of fare collection at the center - includes setting and distributing fare information, central processing of fares for transit as well as other ITS services, links to financial institutions and enforcement agencies.	
<i>Requirement:</i>	
10 The center shall collect fare statistics data to implement variable and flexible fare structures.	Potential
<i>Requirement:</i>	
11 The center shall exchange fare and load information with other transit management centers, including potential Centralized Payments facilities.	Potential
<i>Requirement:</i>	
12 The center shall provide transit fare information to other centers, including traveler information providers upon request.	Potential
<i>Functional Area:</i> Transit Center Passenger Counting	
Receives and processes transit vehicle loading data using two-way communications from equipped transit vehicles.	
<i>Requirement:</i>	
1 The center shall collect passenger count information from each transit vehicle.	Existing
<i>Requirement:</i>	
3 The center shall make the compiled ridership data available to the system operator and other applications.	Existing
<i>Functional Area:</i> Transit Center Security	
Monitor transit vehicle operator or traveler activated alarms; authenticate transit vehicle operators; remotely disable a transit vehicle; alert operators, travelers, and police to potential incidents identified by these security features.	
<i>Requirement:</i>	
1 The center shall monitor transit vehicle operational data to determine if the transit vehicle is off-route and assess whether a security incident is occurring.	Potential
<i>Requirement:</i>	
2 The center shall receive reports of emergencies on-board transit vehicles entered directly by the transit vehicle operator or from a traveler through interfaces such as panic buttons or alarm switches.	Planned
<i>Requirement:</i>	
3 The center shall support the back-office portion of functionality to authenticate transit vehicle operators.	Potential
<i>Requirement:</i>	
4 The center shall exchange transit incident information along with other service data with other transit agencies.	Planned
<i>Requirement:</i>	
5 The center shall receive information pertaining to a wide-area alert such as weather alerts, disaster situations, or child abductions. This information may come from Emergency Management or from other Alerting and Advisory Systems.	Existing
<i>Requirement:</i>	
6 The center shall send wide-area alert information to travelers (on-board transit vehicles or at stations/stops) and transit vehicle operators.	Planned
<i>Requirement:</i>	
7 The center shall coordinate the response to security incidents involving transit with other agencies including Emergency Management, other transit agencies, media, traffic management, and traveler information service providers.	Planned
<i>Requirement:</i>	
8 The center shall receive threat information and status on the integrity of the transit infrastructure.	Potential

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Opportunity Enterprises Agency Management</i>	
<i>Entity: Transit Management</i>	
<i>Functional Area: Transit Center Security</i>	
Monitor transit vehicle operator or traveler activated alarms; authenticate transit vehicle operators; remotely disable a transit vehicle; alert operators, travelers, and police to potential incidents identified by these security features.	
<i>Requirement:</i> 9	The center shall provide support to remotely disable (or reset the disabling of) a transit vehicle in service. Potential
<i>Functional Area: Transit Vehicle Operator Assignment</i>	
Assignment of transit operators to runs in a fair manner while minimizing labor and overtime services, considering operator preferences, qualifications, accumulated work hours, and other information about each operator.	
<i>Requirement:</i> 1	The center shall 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. Existing
<i>Requirement:</i> 2	The center shall assess the transit vehicle operator's availability based on previous work assignments, accumulated hours, plus health and vacation commitments. Existing
<i>Requirement:</i> 3	The center shall assign transit vehicle operators to transit schedules based on their eligibility, route preferences, seniority, and transit vehicle availability. Existing
<i>Requirement:</i> 4	The center shall provide an interface through which the transit vehicle operator information can be maintained - either from the transit vehicle operator, center personnel, or other functions. Existing
<i>Requirement:</i> 5	The center shall generate supplemental vehicle operator assignments as required due to change events that occur during the operating day. Existing
<i>Functional Area: Transit Center Information Services</i>	
Provide interactive traveler information to travelers (on-board transit vehicles, at stops/stations, using personal devices), traveler information service providers, media, and other transit organizations. Includes routes, schedules, transfer options, fares, real-time schedule adherence, current incidents, weather conditions, yellow pages, and special events.	
<i>Requirement:</i> 1	The center shall provide travelers using public transportation with traffic and advisory information upon request. Such information may include transit routes, schedules, transfer options, fares, real-time schedule adherence, current incidents, weather conditions, and special events. Existing
<i>Requirement:</i> 6	The center shall broadcast transit advisory data, including alerts and advisories pertaining to major emergencies, or man made disasters. Existing
<i>Functional Area: Transit Environmental Monitoring</i>	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Opportunity Enterprises Agency Management</i>	
<i>Entity: Transit Management</i>	
<i>Functional Area: Transit Environmental Monitoring</i>	
Current and forecast road and weather information assimilated from weather service providers and vehicle probes. The information is monitored and forwarded to other agencies to more effectively manage transit operations.	
<i>Requirement:</i>	1 The center shall assimilate current and forecast road conditions and surface weather information to more effectively manage transit operations. Existing
<i>Requirement:</i>	2 The center shall collect current and forecast road and weather information from weather service providers and roadway maintenance centers. Existing
<i>Functional Area: Transit Center Multi-Modal Coordination</i>	
Coordinate schedules with other agencies and modes, including transit transfer cluster and transfer point information.	
<i>Requirement:</i>	1 The center shall coordinate schedules and services between transit agencies, traffic management, maintenance and construction operations, parking management, and other surface or air transportation modes. Planned
<i>Requirement:</i>	2 The center shall share transfer cluster and transfer point information with multimodal transportation service providers, other transit agencies, and traveler information service providers. A transfer cluster is a collection of stop points, stations, or terminals where transfers can be made conveniently. Planned
<i>Requirement:</i>	3 The center shall accept requests from traffic management to change routes and schedules as part of the implementation of demand management strategies. Potential
<i>Requirement:</i>	4 The center shall coordinate transit services for special events, planning services for the event and managing transit services on the day of the event. Planned
<i>Requirement:</i>	5 The center shall provide transit operations personnel with the capability to control and monitor transit service coordination activities. Planned
<i>Functional Area: Transit Evacuation Support</i>	
Support evacuation and subsequent reentry of a population in the vicinity of a disaster or other emergency. Coordinate regional evacuation plans and resources including transit and school bus fleets.	
<i>Requirement:</i>	1 The center shall manage the use of transit resources to support evacuation and subsequent reentry of a population in the vicinity of a disaster or other emergency. Potential
<i>Requirement:</i>	2 The center shall coordinate regional evacuation plans with Emergency Management - identifying the transit role in an evacuation and the transit resources that would be used. Planned
<i>Requirement:</i>	3 The center shall coordinate the use of transit and school bus fleets during an evacuation, supporting evacuation of those with special needs and the general population. Potential
<i>Requirement:</i>	4 The center shall adjust and update transit service and fare schedules and provide that information to other agencies as they coordinate evacuations. Potential

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Opportunity Enterprises Agency Management</i>	
<i>Entity: Transit Management</i>	
<i>Functional Area: Transit Data Collection</i>	
Collection and storage of transit management data. For use by operations personnel or data archives in the region.	
<i>Requirement:</i>	1 The center shall collect transit management data such as transit fares and passenger use, transit services, paratransit operations, transit vehicle maintenance data, etc. Existing
<i>Requirement:</i>	2 The center shall assign quality control metrics and meta-data to be stored along with the data. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data. Planned
<i>Requirement:</i>	3 The center shall receive and respond to requests from ITS Archives for either a catalog of the transit data or for the data itself. Planned
<i>Requirement:</i>	4 The center shall be able to produce sample products of the data available. Planned
<i>Functional Area: Transit Transportation Operations Data Collection</i>	
Collects real-time information on the state of the regional transportation system for operational use by the center. It establishes communications with a regional repository, requests or subscribes to information relevant to the center, and distributes the received information for use.	
<i>Requirement:</i>	1 The center shall collect real-time information on the state of the regional transportation system including current traffic and road conditions, weather conditions, special event and incident information. Existing
<i>Requirement:</i>	2 The center shall support the capability for the system operator to monitor and control the information collection service. Existing
<i>Element: Opportunity Enterprises Transit Vehicles</i>	
<i>Entity: Transit Vehicle</i>	
<i>Functional Area: On-board Transit Trip Monitoring</i>	
Support fleet management with automatic vehicle location (AVL) and automated mileage and fuel reporting and auditing.	
<i>Requirement:</i>	1 The transit vehicle shall track the current location of the transit vehicle. Potential
<i>Requirement:</i>	2 The transit vehicle shall support the computation of the location of a transit vehicle using on-board sensors to augment the location determination function. This may include proximity to the transit stops or other known reference points as well as recording trip length. Potential
<i>Requirement:</i>	3 The transit vehicle shall record transit trip monitoring data including vehicle mileage and fuel usage. Potential
<i>Requirement:</i>	4 The transit vehicle shall record transit trip monitoring data including operational status information such as doors open/closed, running times, etc. Potential
<i>Requirement:</i>	5 The transit vehicle shall send the transit vehicle trip monitoring data to center-based trip monitoring functions. Potential
<i>Functional Area: On-board Schedule Management</i>	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Opportunity Enterprises Transit Vehicles</i>	
<i>Entity: Transit Vehicle</i>	
<i>Functional Area: On-board Schedule Management</i>	
Collecting of data for schedule generation and adjustment on-board a transit vehicle. Supports communication between the vehicle, operator, and center.	
<i>Requirement:</i>	Potential
1 The transit vehicle shall receive a vehicle assignment including transit route information, transit service instructions, traffic information, road conditions, and other information for the operator.	
<i>Requirement:</i>	Potential
2 The transit vehicle shall use the route information and its current location to determine the deviation from the predetermined schedule.	
<i>Requirement:</i>	Potential
3 The transit vehicle shall calculate the estimated times of arrival (ETA) at transit stops.	
<i>Requirement:</i>	Potential
4 The transit vehicle shall determine scenarios to correct the schedule deviation.	
<i>Requirement:</i>	Potential
5 The transit vehicle shall provide the schedule deviations and instructions for schedule corrections to the transit vehicle operator if the deviation is small, or the transit vehicle is operating in an urban area.	
<i>Requirement:</i>	Potential
6 The transit vehicle shall send the schedule deviation and estimated arrival time information to the center.	
<i>Requirement:</i>	Potential
7 The transit vehicle shall support the operations of a flexible route service. This may include requests for route deviations that would then lead to schedule corrective actions.	
<i>Requirement:</i>	Potential
8 The transit vehicle shall notify the transit center of vehicle location and operational status as the vehicle exits and returns to the transit facility to support future vehicle assignments.	
<i>Functional Area: On-board Paratransit Operations</i>	
On-board systems to manage paratransit and flexible-route dispatch requests, including multi-stop runs. Passenger data is collected and provided to the center.	
<i>Requirement:</i>	Potential
1 The transit vehicle shall manage data input to sensor(s) on-board a transit vehicle to determine the vehicle's availability for use in demand responsive and flexible-route transit services based on identity, type, and passenger capacity.	
<i>Requirement:</i>	Existing
2 The transit vehicle shall receive the status of demand responsive or flexible-route transit schedules and passenger loading from the transit vehicle operator.	
<i>Requirement:</i>	Existing
3 The transit vehicle shall provide the transit vehicle operator instructions about the demand responsive or flexible-route transit schedule that has been confirmed from the center.	
<i>Requirement:</i>	Existing
4 The transit vehicle shall provide the capability to log passenger boardings and alightings and make passenger use data available to the transit center.	
<i>Functional Area: On-board Transit Fare Management</i>	
On-board systems provide fare collection using a travelers non-monetary fare medium. Collected fare data are made available to the center.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Opportunity Enterprises Transit Vehicles</i>	
<i>Entity: Transit Vehicle</i>	
<i>Functional Area: On-board Transit Fare Management</i>	
On-board systems provide fare collection using a travelers non-monetary fare medium. Collected fare data are made available to the center.	
<i>Requirement:</i>	1 The transit vehicle shall read data from the traveler card / payment instrument presented by boarding passengers. Potential
<i>Requirement:</i>	2 The transit vehicle shall provide an image of all travelers which shall be used for violation processing of those who do not have a traveler card / payment instrument or whose transit fare transaction fails. Potential
<i>Requirement:</i>	3 The transit vehicle shall determine the traveler's travel routing based on the transit vehicle's current location and the traveler's destination. Potential
<i>Requirement:</i>	4 The transit vehicle shall calculate the traveler's fare based on the origin and destination provided by the traveler as well as factors such as the transit routing, transit fare category, traveler history, and route-specific information. Potential
<i>Requirement:</i>	6 The transit vehicle shall provide a transit fare payment interface that is suitable for travelers with physical disabilities. Existing
<i>Requirement:</i>	8 The transit vehicle shall support an emergency fare structure overriding all other fares that can be activated during disasters, states of emergency or evacuations. Potential
<i>Requirement:</i>	10 The transit vehicle shall provide fare statistics data to the center. Potential
<i>Functional Area: On-board Passenger Counting</i>	
On-board systems collect transit vehicle loading data and make it available to the center.	
<i>Requirement:</i>	1 The transit vehicle shall count passengers boarding and alighting. Potential
<i>Requirement:</i>	2 The passenger counts shall be related to location to support association of passenger counts with routes, route segments, or bus stops. Potential
<i>Requirement:</i>	3 The passenger counts shall be timestamped so that ridership can be measured by time of day and day of week. Potential
<i>Requirement:</i>	4 The transit vehicle shall send the collected passenger count information to the transit center. Potential
<i>Functional Area: On-board Transit Security</i>	
On-board video/audio surveillance systems, threat sensors, and object detection sensors to enhance security and safety on-board a transit vehicles. Also includes silent alarms activated by transit user or vehicle operator, operator authentication, and remote vehicle disabling.	
<i>Requirement:</i>	1 The transit vehicle shall perform video and audio surveillance inside of transit vehicles and output raw video or audio data for either local monitoring (for processing or direct output to the transit vehicle operator), remote monitoring or for local storage (e.g., in an event recorder). Planned
<i>Requirement:</i>	2 The transit vehicle shall perform local monitoring of video or audio surveillance data collected inside of transit vehicles, and identify potential incidents or threats based on received processing parameters. Planned

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Opportunity Enterprises Transit Vehicles</i>	
<i>Entity: Transit Vehicle</i>	
<i>Functional Area: On-board Transit Security</i>	
On-board video/audio surveillance systems, threat sensors, and object detection sensors to enhance security and safety on-board a transit vehicles. Also includes silent alarms activated by transit user or vehicle operator, operator authentication, and remote vehicle disabling.	
<i>Requirement:</i>	
3 The transit vehicle shall output an indication of potential incidents or threats and the processed video or audio information to the center along with the vehicle's current location.	Planned
<i>Requirement:</i>	
4 The transit vehicle shall detect potential threats via sensors for chemical agents, toxic industrial chemicals, biological agents, explosives, and radiation.	Potential
<i>Requirement:</i>	
5 The transit vehicle shall detect potential threats via object detection sensors (e.g. metal detectors).	Potential
<i>Requirement:</i>	
6 The transit vehicle shall output an indication of potential incidents or threats and the processed sensor information to the center along with the vehicle's current location.	Potential
<i>Requirement:</i>	
7 The transit vehicle shall accept sensor control data to allow remote control of the sensors.	Potential
<i>Requirement:</i>	
8 The transit vehicle shall monitor and output surveillance and sensor equipment status and fault indications.	Planned
<i>Requirement:</i>	
9 The transit vehicle shall accept emergency inputs from either the transit vehicle operator or a traveler through such interfaces as panic buttons, silent or audible alarms, etc.	Planned
<i>Requirement:</i>	
10 The transit vehicle shall output reported emergencies to the center.	Planned
<i>Requirement:</i>	
11 The transit vehicle shall receive acknowledgments of the emergency request from the center and output this acknowledgment to the transit vehicle operator or to the travelers.	Planned
<i>Requirement:</i>	
12 The transit vehicle shall be capable of receiving an emergency message for broadcast to the travelers or to the transit vehicle operator.	Planned
<i>Requirement:</i>	
13 The transit vehicle shall be capable of disabling or enabling the transit vehicle based on commands from the center or authentic inputs from the transit vehicle operator.	Potential
<i>Requirement:</i>	
14 The transit vehicle shall perform authentication of the transit vehicle operator.	Potential
<i>Element: Parking Management</i>	
<i>Entity: Parking Management</i>	
<i>Functional Area: Parking Management</i>	
Monitor vehicles and current parking availability within parking facilities. Use driver information systems (e.g., DMS) to provide parking availability and other parking facility information to drivers. Support local traffic control coordination around the parking facility.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Parking Management</i>	
<i>Entity: Parking Management</i>	
<i>Functional Area: Parking Management</i>	
Monitor vehicles and current parking availability within parking facilities. Use driver information systems (e.g., DMS) to provide parking availability and other parking facility information to drivers. Support local traffic control coordination around the parking facility.	
<i>Requirement:</i>	
1 The parking element shall maintain parking lot information including static information such as hours of operation, rates, location, entrance locations, capacity, type, and constraints; as well as dynamic information such as current state of the lot, occupancy, arrival rates, and departure rates.	Existing
<i>Requirement:</i>	
2 The parking element shall share information with a traffic management center to identify queues at entrances, exits that should be used, and other information that supports coordinated local traffic control in and around the parking facility.	Potential
<i>Requirement:</i>	
3 The parking element shall manage local dynamic message signs that display messages to travelers such as the parking lot state, number of spaces available, location of entrances, and current charges.	Potential
<i>Requirement:</i>	
4 The parking element shall provide the capability to detect, count, and classify vehicles at entrances, exits, and designated locations within a parking facility.	Existing
<i>Functional Area: Parking Electronic Payment</i>	
Parking payment collection using in-vehicle equipment (tags) or contact or proximity traveler cards used for electronic payment. Includes field elements and back-office functionality.	
<i>Requirement:</i>	
1 The parking element shall detect and classify vehicles entering and exiting a parking facility (vehicle size, type, identifiable features, etc.).	Existing
<i>Requirement:</i>	
2 The parking element shall read data from the traveler card / payment instrument carried on-board the vehicle or by the traveler.	Existing
<i>Requirement:</i>	
3 The parking element shall provide an interface to the driver informing them of the success or failure of the financial transaction. This may involve a request for the driver to pull aside so the operator can resolve an issue.	Existing
<i>Requirement:</i>	
4 The parking element shall collect data on payment violations and send the data, including images of the violator and the vehicle registration data obtained from the Department of Motor Vehicles (DMV) office, to the appropriate enforcement agency.	Planned
<i>Requirement:</i>	
5 The parking element shall manage the parking lot charges, considering such factors as location, vehicle types, and times of day.	Existing
<i>Requirement:</i>	
6 The parking element shall process the financial requests and manage an interface to a Financial Institution.	Existing
<i>Requirement:</i>	
7 The parking element shall support the payment of parking lot transactions using data provided by the traveler cards / payment instruments.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Parking Management</i>	
<i>Entity: Parking Management</i>	
<i>Functional Area: Parking Electronic Payment</i>	
Parking payment collection using in-vehicle equipment (tags) or contact or proximity traveler cards used for electronic payment. Includes field elements and back-office functionality.	
<i>Requirement:</i> 8 The parking element shall process requests for parking lot charges to be paid in advance.	Existing
<i>Requirement:</i> 10 The parking element shall maintain a list of invalid traveler credit identities.	Potential
<i>Functional Area: Parking Data Collection</i>	
Collection and storage of parking management information. For use by operations personnel or data archives in the region.	
<i>Requirement:</i> 1 The parking element shall collect parking management data including lot usage and charging information.	Existing
<i>Requirement:</i> 2 The parking element shall assign quality control metrics and meta-data to be stored along with the data. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.	Planned
<i>Requirement:</i> 3 The parking element shall receive and respond to requests from ITS Archives for either a catalog of the parking management data or for the data itself.	Planned
<i>Requirement:</i> 4 The parking element shall be able to produce sample products of the data available.	Planned
<i>Element: PCACS Agency Management</i>	
<i>Entity: Transit Management</i>	
<i>Functional Area: Transit Center Vehicle Tracking</i>	
Monitoring transit vehicle locations via interactions with on-board systems. Furnish users with real-time transit schedule information and maintain interface with digital map providers.	
<i>Requirement:</i> 1 The center shall monitor the locations of all transit vehicles within its network.	Existing
<i>Requirement:</i> 2 The center shall determine adherence of transit vehicles to their assigned schedule.	Existing
<i>Requirement:</i> 3 The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for transit tracking and dispatch.	Planned
<i>Requirement:</i> 4 The center shall provide transit operational data to traveler information service providers.	Planned
<i>Requirement:</i> 5 The center shall provide collected transit probe data to traffic management centers and traveler information service providers for use in measuring current traffic conditions.	Existing
<i>Functional Area: Transit Center Paratransit Operations</i>	
Management of demand response transit services, including paratransit. Planning and scheduling of these services. Supports automated vehicle dispatch and automatically updates customer service operator systems.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:PCACS Agency Management</i>	
<i>Entity: Transit Management</i>	
<i>Functional Area: Transit Center Paratransit Operations</i>	
Management of demand response transit services, including paratransit. Planning and scheduling of these services. Supports automated vehicle dispatch and automatically updates customer service operator systems.	
<i>Requirement:</i>	Existing
1 The center shall process trip requests for demand responsive transit services, i.e. paratransit. Sources of the requests may include traveler information service providers.	
<i>Requirement:</i>	Existing
2 The center shall monitor the operational status of the demand response vehicles including status of passenger pick-up and drop-off.	
<i>Requirement:</i>	Existing
3 The center shall generate demand response transit (including paratransit) routes and schedules based on such factors as parameters input by the system operator, what other demand responsive transit schedules have been planned, the availability and location of vehicles, the relevance of any fixed transit routes and schedules, road network information, and incident information.	
<i>Requirement:</i>	Existing
4 The center shall dispatch demand response (paratransit) transit vehicles.	
<i>Requirement:</i>	Planned
5 The center shall exchange information with Maintenance and Construction Operations concerning work zones, roadway conditions, asset restrictions, work plans, etc.	
<i>Requirement:</i>	Planned
6 The center shall disseminate up-to-date schedules and route information to other centers for demand responsive transit services (paratransit).	
<i>Requirement:</i>	Existing
7 The center shall collect the log of passenger boardings and alightings from the paratransit vehicles.	
<i>Functional Area: Transit Center Fare Management</i>	
Management of fare collection at the center - includes setting and distributing fare information, central processing of fares for transit as well as other ITS services, links to financial institutions and enforcement agencies.	
<i>Requirement:</i>	Potential
2 The center shall provide the capability for a system operator to manage the transit fares and control the exchange of transit fare information.	
<i>Requirement:</i>	Potential
3 The center shall process the financial requests from the transit vehicles or roadside and manage an interface to a Financial Institution.	
<i>Requirement:</i>	Potential
4 The center shall support the payment of transit fare transactions using data provided by the traveler cards / payment instruments.	
<i>Requirement:</i>	Potential
5 The center shall collect data on fare payment violations and send the data, including images of the violator, to the appropriate enforcement agency.	
<i>Requirement:</i>	Existing
6 The center shall process requests for transit fares to be paid in advance.	
<i>Requirement:</i>	Potential
8 The center shall be capable of establishing emergency fare structures to override all other fares during disasters, states of emergency, or evacuations.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: PCACS Agency Management</i>	
<i>Entity: Transit Management</i>	
<i>Functional Area: Transit Center Fare Management</i>	
Management of fare collection at the center - includes setting and distributing fare information, central processing of fares for transit as well as other ITS services, links to financial institutions and enforcement agencies.	
<i>Requirement:</i>	
10 The center shall collect fare statistics data to implement variable and flexible fare structures.	Potential
<i>Requirement:</i>	
11 The center shall exchange fare and load information with other transit management centers, including potential Centralized Payments facilities.	Potential
<i>Requirement:</i>	
12 The center shall provide transit fare information to other centers, including traveler information providers upon request.	Potential
<i>Functional Area: Transit Center Passenger Counting</i>	
Receives and processes transit vehicle loading data using two-way communications from equipped transit vehicles.	
<i>Requirement:</i>	
1 The center shall collect passenger count information from each transit vehicle.	Existing
<i>Requirement:</i>	
3 The center shall make the compiled ridership data available to the system operator and other applications.	Existing
<i>Functional Area: Transit Center Security</i>	
Monitor transit vehicle operator or traveler activated alarms; authenticate transit vehicle operators; remotely disable a transit vehicle; alert operators, travelers, and police to potential incidents identified by these security features.	
<i>Requirement:</i>	
1 The center shall monitor transit vehicle operational data to determine if the transit vehicle is off-route and assess whether a security incident is occurring.	Potential
<i>Requirement:</i>	
2 The center shall receive reports of emergencies on-board transit vehicles entered directly by the transit vehicle operator or from a traveler through interfaces such as panic buttons or alarm switches.	Planned
<i>Requirement:</i>	
3 The center shall support the back-office portion of functionality to authenticate transit vehicle operators.	Potential
<i>Requirement:</i>	
4 The center shall exchange transit incident information along with other service data with other transit agencies.	Planned
<i>Requirement:</i>	
5 The center shall receive information pertaining to a wide-area alert such as weather alerts, disaster situations, or child abductions. This information may come from Emergency Management or from other Alerting and Advisory Systems.	Existing
<i>Requirement:</i>	
6 The center shall send wide-area alert information to travelers (on-board transit vehicles or at stations/stops) and transit vehicle operators.	Planned
<i>Requirement:</i>	
7 The center shall coordinate the response to security incidents involving transit with other agencies including Emergency Management, other transit agencies, media, traffic management, and traveler information service providers.	Planned
<i>Requirement:</i>	
8 The center shall receive threat information and status on the integrity of the transit infrastructure.	Potential

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> PCACS Agency Management	
<i>Entity:</i> Transit Management	
<i>Functional Area:</i> Transit Center Security	
Monitor transit vehicle operator or traveler activated alarms; authenticate transit vehicle operators; remotely disable a transit vehicle; alert operators, travelers, and police to potential incidents identified by these security features.	
<i>Requirement:</i> 9	The center shall provide support to remotely disable (or reset the disabling of) a transit vehicle in service. Potential
<i>Functional Area:</i> Transit Vehicle Operator Assignment	
Assignment of transit operators to runs in a fair manner while minimizing labor and overtime services, considering operator preferences, qualifications, accumulated work hours, and other information about each operator.	
<i>Requirement:</i> 1	The center shall 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. Existing
<i>Requirement:</i> 2	The center shall assess the transit vehicle operator's availability based on previous work assignments, accumulated hours, plus health and vacation commitments. Existing
<i>Requirement:</i> 3	The center shall assign transit vehicle operators to transit schedules based on their eligibility, route preferences, seniority, and transit vehicle availability. Existing
<i>Requirement:</i> 4	The center shall provide an interface through which the transit vehicle operator information can be maintained - either from the transit vehicle operator, center personnel, or other functions. Existing
<i>Requirement:</i> 5	The center shall generate supplemental vehicle operator assignments as required due to change events that occur during the operating day. Existing
<i>Functional Area:</i> Transit Center Information Services	
Provide interactive traveler information to travelers (on-board transit vehicles, at stops/stations, using personal devices), traveler information service providers, media, and other transit organizations. Includes routes, schedules, transfer options, fares, real-time schedule adherence, current incidents, weather conditions, yellow pages, and special events.	
<i>Requirement:</i> 1	The center shall provide travelers using public transportation with traffic and advisory information upon request. Such information may include transit routes, schedules, transfer options, fares, real-time schedule adherence, current incidents, weather conditions, and special events. Existing
<i>Requirement:</i> 6	The center shall broadcast transit advisory data, including alerts and advisories pertaining to major emergencies, or man made disasters. Existing
<i>Functional Area:</i> Transit Environmental Monitoring	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> PCACS Agency Management	
<i>Entity:</i> Transit Management	
<i>Functional Area:</i> Transit Environmental Monitoring	
Current and forecast road and weather information assimilated from weather service providers and vehicle probes. The information is monitored and forwarded to other agencies to more effectively manage transit operations.	
<i>Requirement:</i>	Existing
1 The center shall assimilate current and forecast road conditions and surface weather information to more effectively manage transit operations.	
<i>Requirement:</i>	Existing
2 The center shall collect current and forecast road and weather information from weather service providers and roadway maintenance centers.	
<i>Functional Area:</i> Transit Center Multi-Modal Coordination	
Coordinate schedules with other agencies and modes, including transit transfer cluster and transfer point information.	
<i>Requirement:</i>	Planned
1 The center shall coordinate schedules and services between transit agencies, traffic management, maintenance and construction operations, parking management, and other surface or air transportation modes.	
<i>Requirement:</i>	Planned
2 The center shall share transfer cluster and transfer point information with multimodal transportation service providers, other transit agencies, and traveler information service providers. A transfer cluster is a collection of stop points, stations, or terminals where transfers can be made conveniently.	
<i>Requirement:</i>	Potential
3 The center shall accept requests from traffic management to change routes and schedules as part of the implementation of demand management strategies.	
<i>Requirement:</i>	Planned
4 The center shall coordinate transit services for special events, planning services for the event and managing transit services on the day of the event.	
<i>Requirement:</i>	Planned
5 The center shall provide transit operations personnel with the capability to control and monitor transit service coordination activities.	
<i>Functional Area:</i> Transit Evacuation Support	
Support evacuation and subsequent reentry of a population in the vicinity of a disaster or other emergency. Coordinate regional evacuation plans and resources including transit and school bus fleets.	
<i>Requirement:</i>	Potential
1 The center shall manage the use of transit resources to support evacuation and subsequent reentry of a population in the vicinity of a disaster or other emergency.	
<i>Requirement:</i>	Planned
2 The center shall coordinate regional evacuation plans with Emergency Management - identifying the transit role in an evacuation and the transit resources that would be used.	
<i>Requirement:</i>	Potential
3 The center shall coordinate the use of transit and school bus fleets during an evacuation, supporting evacuation of those with special needs and the general population.	
<i>Requirement:</i>	Potential
4 The center shall adjust and update transit service and fare schedules and provide that information to other agencies as they coordinate evacuations.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:PCACS Agency Management</i>	
<i>Entity: Transit Management</i>	
<i>Functional Area: Transit Data Collection</i>	
Collection and storage of transit management data. For use by operations personnel or data archives in the region.	
<i>Requirement:</i>	1 The center shall collect transit management data such as transit fares and passenger use, transit services, paratransit operations, transit vehicle maintenance data, etc. Existing
<i>Requirement:</i>	2 The center shall assign quality control metrics and meta-data to be stored along with the data. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data. Planned
<i>Requirement:</i>	3 The center shall receive and respond to requests from ITS Archives for either a catalog of the transit data or for the data itself. Planned
<i>Requirement:</i>	4 The center shall be able to produce sample products of the data available. Planned
<i>Functional Area: Transit Transportation Operations Data Collection</i>	
Collects real-time information on the state of the regional transportation system for operational use by the center. It establishes communications with a regional repository, requests or subscribes to information relevant to the center, and distributes the received information for use.	
<i>Requirement:</i>	1 The center shall collect real-time information on the state of the regional transportation system including current traffic and road conditions, weather conditions, special event and incident information. Existing
<i>Requirement:</i>	2 The center shall support the capability for the system operator to monitor and control the information collection service. Existing
<i>Element:PCACS Transit Vehicles</i>	
<i>Entity: Transit Vehicle</i>	
<i>Functional Area: On-board Transit Trip Monitoring</i>	
Support fleet management with automatic vehicle location (AVL) and automated mileage and fuel reporting and auditing.	
<i>Requirement:</i>	1 The transit vehicle shall track the current location of the transit vehicle. Existing
<i>Requirement:</i>	2 The transit vehicle shall support the computation of the location of a transit vehicle using on-board sensors to augment the location determination function. This may include proximity to the transit stops or other known reference points as well as recording trip length. Potential
<i>Requirement:</i>	3 The transit vehicle shall record transit trip monitoring data including vehicle mileage and fuel usage. Potential
<i>Requirement:</i>	4 The transit vehicle shall record transit trip monitoring data including operational status information such as doors open/closed, running times, etc. Potential
<i>Requirement:</i>	5 The transit vehicle shall send the transit vehicle trip monitoring data to center-based trip monitoring functions. Existing
<i>Functional Area: On-board Schedule Management</i>	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: PCACS Transit Vehicles</i>	
<i>Entity: Transit Vehicle</i>	
<i>Functional Area: On-board Schedule Management</i>	
Collecting of data for schedule generation and adjustment on-board a transit vehicle. Supports communication between the vehicle, operator, and center.	
<i>Requirement:</i>	Potential
1 The transit vehicle shall receive a vehicle assignment including transit route information, transit service instructions, traffic information, road conditions, and other information for the operator.	
<i>Requirement:</i>	Potential
2 The transit vehicle shall use the route information and its current location to determine the deviation from the predetermined schedule.	
<i>Requirement:</i>	Potential
3 The transit vehicle shall calculate the estimated times of arrival (ETA) at transit stops.	
<i>Requirement:</i>	Potential
4 The transit vehicle shall determine scenarios to correct the schedule deviation.	
<i>Requirement:</i>	Potential
5 The transit vehicle shall provide the schedule deviations and instructions for schedule corrections to the transit vehicle operator if the deviation is small, or the transit vehicle is operating in an urban area.	
<i>Requirement:</i>	Potential
6 The transit vehicle shall send the schedule deviation and estimated arrival time information to the center.	
<i>Requirement:</i>	Potential
7 The transit vehicle shall support the operations of a flexible route service. This may include requests for route deviations that would then lead to schedule corrective actions.	
<i>Requirement:</i>	Potential
8 The transit vehicle shall notify the transit center of vehicle location and operational status as the vehicle exits and returns to the transit facility to support future vehicle assignments.	
<i>Functional Area: On-board Paratransit Operations</i>	
On-board systems to manage paratransit and flexible-route dispatch requests, including multi-stop runs. Passenger data is collected and provided to the center.	
<i>Requirement:</i>	Potential
1 The transit vehicle shall manage data input to sensor(s) on-board a transit vehicle to determine the vehicle's availability for use in demand responsive and flexible-route transit services based on identity, type, and passenger capacity.	
<i>Requirement:</i>	Existing
2 The transit vehicle shall receive the status of demand responsive or flexible-route transit schedules and passenger loading from the transit vehicle operator.	
<i>Requirement:</i>	Existing
3 The transit vehicle shall provide the transit vehicle operator instructions about the demand responsive or flexible-route transit schedule that has been confirmed from the center.	
<i>Requirement:</i>	Existing
4 The transit vehicle shall provide the capability to log passenger boardings and alightings and make passenger use data available to the transit center.	
<i>Functional Area: On-board Transit Fare Management</i>	
On-board systems provide fare collection using a travelers non-monetary fare medium. Collected fare data are made available to the center.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> PCACS Transit Vehicles	
<i>Entity:</i> Transit Vehicle	
<i>Functional Area:</i> On-board Transit Fare Management	
On-board systems provide fare collection using a travelers non-monetary fare medium. Collected fare data are made available to the center.	
<i>Requirement:</i>	
1 The transit vehicle shall read data from the traveler card / payment instrument presented by boarding passengers.	Potential
<i>Requirement:</i>	
2 The transit vehicle shall provide an image of all travelers which shall be used for violation processing of those who do not have a traveler card / payment instrument or whose transit fare transaction fails.	Potential
<i>Requirement:</i>	
3 The transit vehicle shall determine the traveler's travel routing based on the transit vehicle's current location and the traveler's destination.	Potential
<i>Requirement:</i>	
4 The transit vehicle shall calculate the traveler's fare based on the origin and destination provided by the traveler as well as factors such as the transit routing, transit fare category, traveler history, and route-specific information.	Potential
<i>Requirement:</i>	
6 The transit vehicle shall provide a transit fare payment interface that is suitable for travelers with physical disabilities.	Existing
<i>Requirement:</i>	
8 The transit vehicle shall support an emergency fare structure overriding all other fares that can be activated during disasters, states of emergency or evacuations.	Potential
<i>Requirement:</i>	
10 The transit vehicle shall provide fare statistics data to the center.	Potential
<i>Functional Area:</i> On-board Passenger Counting	
On-board systems collect transit vehicle loading data and make it available to the center.	
<i>Requirement:</i>	
1 The transit vehicle shall count passengers boarding and alighting.	Potential
<i>Requirement:</i>	
2 The passenger counts shall be related to location to support association of passenger counts with routes, route segments, or bus stops.	Potential
<i>Requirement:</i>	
3 The passenger counts shall be timestamped so that ridership can be measured by time of day and day of week.	Potential
<i>Requirement:</i>	
4 The transit vehicle shall send the collected passenger count information to the transit center.	Potential
<i>Functional Area:</i> On-board Transit Security	
On-board video/audio surveillance systems, threat sensors, and object detection sensors to enhance security and safety on-board a transit vehicles. Also includes silent alarms activated by transit user or vehicle operator, operator authentication, and remote vehicle disabling.	
<i>Requirement:</i>	
1 The transit vehicle shall perform video and audio surveillance inside of transit vehicles and output raw video or audio data for either local monitoring (for processing or direct output to the transit vehicle operator), remote monitoring or for local storage (e.g., in an event recorder).	Planned
<i>Requirement:</i>	
2 The transit vehicle shall perform local monitoring of video or audio surveillance data collected inside of transit vehicles, and identify potential incidents or threats based on received processing parameters.	Planned

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:PCACS Transit Vehicles</i>	
<i>Entity: Transit Vehicle</i>	
<i>Functional Area: On-board Transit Security</i>	
On-board video/audio surveillance systems, threat sensors, and object detection sensors to enhance security and safety on-board a transit vehicles. Also includes silent alarms activated by transit user or vehicle operator, operator authentication, and remote vehicle disabling.	
<i>Requirement:</i>	
3 The transit vehicle shall output an indication of potential incidents or threats and the processed video or audio information to the center along with the vehicle's current location.	Planned
<i>Requirement:</i>	
4 The transit vehicle shall detect potential threats via sensors for chemical agents, toxic industrial chemicals, biological agents, explosives, and radiation.	Potential
<i>Requirement:</i>	
5 The transit vehicle shall detect potential threats via object detection sensors (e.g. metal detectors).	Potential
<i>Requirement:</i>	
6 The transit vehicle shall output an indication of potential incidents or threats and the processed sensor information to the center along with the vehicle's current location.	Potential
<i>Requirement:</i>	
7 The transit vehicle shall accept sensor control data to allow remote control of the sensors.	Potential
<i>Requirement:</i>	
8 The transit vehicle shall monitor and output surveillance and sensor equipment status and fault indications.	Planned
<i>Requirement:</i>	
9 The transit vehicle shall accept emergency inputs from either the transit vehicle operator or a traveler through such interfaces as panic buttons, silent or audible alarms, etc.	Planned
<i>Requirement:</i>	
10 The transit vehicle shall output reported emergencies to the center.	Planned
<i>Requirement:</i>	
11 The transit vehicle shall receive acknowledgments of the emergency request from the center and output this acknowledgment to the transit vehicle operator or to the travelers.	Planned
<i>Requirement:</i>	
12 The transit vehicle shall be capable of receiving an emergency message for broadcast to the travelers or to the transit vehicle operator.	Planned
<i>Requirement:</i>	
13 The transit vehicle shall be capable of disabling or enabling the transit vehicle based on commands from the center or authentic inputs from the transit vehicle operator.	Potential
<i>Requirement:</i>	
14 The transit vehicle shall perform authentication of the transit vehicle operator.	Potential
<i>Element:Personal Travel Information Access</i>	
<i>Entity: Personal Information Access</i>	
<i>Functional Area: Personal Basic Information Reception</i>	
Personal traveler interface that provides formatted traffic advisories, transit, event, and other traveler information, as well as broadcast alerts. Devices include personal computers and personal portable devices such as PDAs and pagers.	
<i>Requirement:</i>	
1 The personal traveler interface shall receive traffic information from a center and present it to the traveler.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Personal Travel Information Access</i>	
<i>Entity: Personal Information Access</i>	
<i>Functional Area: Personal Basic Information Reception</i>	
Personal traveler interface that provides formatted traffic advisories, transit, event, and other traveler information, as well as broadcast alerts. Devices include personal computers and personal portable devices such as PDAs and pagers.	
<i>Requirement:</i> 2 The personal traveler interface shall receive transit information from a center and present it to the traveler.	Existing
<i>Requirement:</i> 3 The personal traveler interface shall receive event information from a center and present it to the traveler.	Existing
<i>Requirement:</i> 4 The personal traveler interface shall receive evacuation information from a center and present it to the traveler.	Potential
<i>Requirement:</i> 5 The personal traveler interface shall receive wide-area alerts and present it to the traveler.	Existing
<i>Requirement:</i> 6 The personal traveler interface shall provide the capability for digitized map data to act as the background to the information presented to the traveler.	Existing
<i>Requirement:</i> 7 The personal traveler interface shall support traveler input in audio or manual form.	Existing
<i>Requirement:</i> 8 The personal traveler interface shall present information to the traveler in audible or visual forms, consistent with a personal device.	Existing
<i>Functional Area: Personal Interactive Information Reception</i>	
Personal traveler interface that provides traffic, transit, yellow pages, event, and trip planning information, and other personalized traveler information services upon request. Devices include personal computers and personal portable devices such as PDAs.	
<i>Requirement:</i> 1 The personal traveler interface shall receive traffic information from a center and present it to the traveler upon request.	Existing
<i>Requirement:</i> 2 The personal traveler interface shall receive transit information from a center and present it to the traveler upon request.	Existing
<i>Requirement:</i> 3 The personal traveler interface shall receive traveler services information (such as lodging, restaurants, theaters, bicycle facilities, and other tourist activities) from a center and present it to the traveler upon request.	Existing
<i>Requirement:</i> 4 The personal traveler interface shall receive event information from a center and present it to the traveler upon request.	Existing
<i>Requirement:</i> 5 The personal traveler interface shall receive evacuation information from a center and present it to the traveler.	Potential
<i>Requirement:</i> 6 The personal traveler interface shall receive wide-area alerts and present it to the traveler.	Existing
<i>Requirement:</i> 7 The personal traveler interface shall accept reservations for confirmed trip plans.	Existing
<i>Requirement:</i> 8 The personal traveler interface shall support payment for services, such as confirmed trip plans, tolls, transit fares, parking lot charges, map updates, and advanced payment for tolls.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Personal Travel Information Access</i>	
<i>Entity: Personal Information Access</i>	
<i>Functional Area: Personal Interactive Information Reception</i>	
Personal traveler interface that provides traffic, transit, yellow pages, event, and trip planning information, and other personalized traveler information services upon request. Devices include personal computers and personal portable devices such as PDAs.	
<i>Requirement:</i>	Existing
9 The personal traveler interface shall provide an interface through which credit identity, stored credit value, or traveler information may be collected from a traveler card being used by a traveler with a personal device.	
<i>Requirement:</i>	Existing
10 The personal traveler interface shall base requests from the traveler on the traveler's current location or a specific location identified by the traveler, and filter the provided information accordingly.	
<i>Requirement:</i>	Existing
11 The personal traveler interface shall provide digitized map data to act as the background to the information presented to the traveler.	
<i>Requirement:</i>	Existing
12 The personal traveler interface shall support traveler input in audio or manual form.	
<i>Requirement:</i>	Existing
13 The personal traveler interface shall present information to the traveler in audible or visual forms consistent with a personal device, and suitable for travelers with hearing and vision physical disabilities.	
<i>Requirement:</i>	Existing
14 The personal traveler interface shall be able to store frequently requested or used data, including the traveler's identity, home and work locations, etc.	
<i>Requirement:</i>	Existing
15 The personal traveler interface shall receive travel alerts and present them to the traveler. Relevant alerts are provided based on pre-supplied trip characteristics and preferences.	
<i>Requirement:</i>	Existing
16 The personal traveler interface shall accept personal preferences, recurring trip characteristics, and traveler alert subscription information from the traveler and send this information to a center to support customized traveler information services.	
<i>Functional Area: Personal Location Determination</i>	
Provides current location of a personal device from GPS or similar technology and uses this information for navigation, guidance, and emergency notification systems.	
<i>Requirement:</i>	Existing
1 The personal traveler interface shall provide the traveler's current location. It is intended for use by traveler personal navigation and guidance systems, as well as emergency notification systems.	
<i>Functional Area: Personal Autonomous Route Guidance</i>	
Personal traveler interface that provides route guidance using a digital map stored locally. Devices include personal computers and personal portable devices such as PDAs and pagers.	
<i>Requirement:</i>	Existing
1 The personal traveler interface shall provide the capability for a traveler to obtain route guidance from a specified source to a destination.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Personal Travel Information Access	
<i>Entity:</i> Personal Information Access	
<i>Functional Area:</i> Personal Autonomous Route Guidance	
Personal traveler interface that provides route guidance using a digital map stored locally. Devices include personal computers and personal portable devices such as PDAs and pagers.	
<i>Requirement:</i>	Existing
2 The personal traveler interface shall calculate the requested route using data obtained from a navigable map database stored in the device.	
<i>Requirement:</i>	Existing
3 The personal traveler interface shall provide multi-modal guidance for the shortest route, within the preferences and constraints specified by the traveler.	
<i>Requirement:</i>	Existing
4 The personal traveler interface shall present information to the traveler in audible or visual forms consistent with a personal device, and suitable for travelers with hearing and vision physical disabilities.	
<i>Requirement:</i>	Existing
5 The personal traveler interface shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used for route guidance.	
<i>Functional Area:</i> Personal Trip Planning and Route Guidance	
Personal traveler interface that coordinates with a traveler information center to provide a trip plan that is tailored to the traveler's preferences. During the trip, the route plan can be modified to account for new information. Devices include desktop computers at home, work, or at major trip generation sites, plus personal portable devices such as PDAs and pagers.	
<i>Requirement:</i>	Existing
1 The personal traveler interface shall provide the capability for a traveler to request and confirm multi-modal route guidance from a specified source to a destination.	
<i>Requirement:</i>	Existing
2 The personal traveler interface shall forward the request for route guidance to a traveler information center for route calculation.	
<i>Requirement:</i>	Existing
3 The personal traveler interface shall forward user preferences, background information, constraints, and payment information to the supplying traveler information center.	
<i>Requirement:</i>	Existing
4 The personal traveler interface shall present information to the traveler in audible or visual forms consistent with a personal device, and suitable for travelers with hearing and vision physical disabilities.	
<i>Requirement:</i>	Existing
5 The personal traveler interface shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used for route guidance displays.	
<i>Functional Area:</i> Personal Mayday I/F	
Personal traveler interface, such as a PDA, that provides the capability for travelers to report an emergency or activate a panic button to summon assistance.	
<i>Requirement:</i>	Existing
1 The personal traveler interface shall provide the capability for a traveler to report an emergency and summon assistance.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Personal Travel Information Access</i>	
<i>Entity: Personal Information Access</i>	
<i>Functional Area: Personal Mayday I/F</i>	
Personal traveler interface, such as a PDA, that provides the capability for travelers to report an emergency or activate a panic button to summon assistance.	
<i>Requirement:</i> 2 The personal traveler interface shall provide the capability to accept input from a traveler via a panic button or some other functionally similar form of input device provided as part of the traveler's personal portable device.	Potential
<i>Requirement:</i> 3 When initiated by a traveler, the personal traveler interface shall forward a request for assistance to the center containing the traveler's current location and identity.	Existing
<i>Requirement:</i> 4 The personal traveler interface shall acknowledge the request for emergency assistance.	Existing
<i>Element: Porter County Central Communications</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Emergency Call-Taking</i>	
Provides interface to the emergency call-taking systems such as the Emergency Telecommunications System (e.g., 911) that correlate call information with emergencies reported by transit agencies, commercial vehicle operators, or other public safety agencies. Allows the operator to verify the incident and forward the information to the responding agencies.	
<i>Requirement:</i> 1 The center shall support the interface to the Emergency Telecommunications System (e.g. 911 or 7-digit call routing) to receive emergency notification information and provide it to the emergency system operator.	Existing
<i>Requirement:</i> 2 The center shall receive emergency call information from 911 services and present the possible incident information to the emergency system operator.	Existing
<i>Requirement:</i> 4 The center shall receive emergency call information from mayday service providers and present the possible incident information to the emergency system operator.	Existing
<i>Requirement:</i> 5 The center shall receive emergency notification information from other public safety agencies and present the possible incident information to the emergency system operator.	Existing
<i>Requirement:</i> 6 The center shall receive emergency notification information from public transit systems and present the possible incident information to the emergency system operator.	Existing
<i>Requirement:</i> 7 The center shall coordinate, correlate, and verify all emergency inputs, including those identified based on external calls and internal analysis of security sensor and surveillance data, and assign each a level of confidence.	Existing
<i>Requirement:</i> 8 The center shall send a request for remote control of CCTV systems from a traffic management center in order to verify the reported incident.	Planned
<i>Requirement:</i> 9 The center shall forward the verified emergency information to the responding agency based on the location and nature of the emergency.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Porter County Central Communications	
<i>Entity:</i> Emergency Management	
<i>Functional Area:</i> Emergency Call-Taking	
Provides interface to the emergency call-taking systems such as the Emergency Telecommunications System (e.g., 911) that correlate call information with emergencies reported by transit agencies, commercial vehicle operators, or other public safety agencies. Allows the operator to verify the incident and forward the information to the responding agencies.	
<i>Requirement:</i> 10 The center shall update the incident information log once the emergency system operator has verified the incident.	Existing
<i>Requirement:</i> 11 The center shall provide the capability for digitized map data to act as the background to the emergency information presented to the emergency system operator.	Planned
<i>Functional Area:</i> Emergency Dispatch	
Dispatch emergency vehicles to incidents, tracking their location and status. Pertinent incident information is gathered and relayed to the responding units.	
<i>Requirement:</i> 1 The center shall dispatch emergency vehicles to respond to verified emergencies under center personnel control.	Existing
<i>Requirement:</i> 2 The center shall store the current status of all emergency vehicles available for dispatch and those that have been dispatched.	Existing
<i>Requirement:</i> 3 The center shall relay location and incident details to the responding vehicles.	Existing
<i>Requirement:</i> 4 The center shall track the location and status of emergency vehicles responding to an emergency based on information from the emergency vehicle.	Existing
<i>Requirement:</i> 5 The center shall store and maintain the emergency service responses in an action log.	Existing
<i>Requirement:</i> 6 The center shall provide the capability for digitized map data to act as the background to the information presented to the emergency system operator.	Planned
<i>Requirement:</i> 7 The center shall receive traffic images to support dispatch of emergency vehicles.	Existing
<i>Requirement:</i> 8 The center shall provide the capability to request remote control of traffic surveillance devices	Planned
<i>Requirement:</i> 9 The center shall coordinate response to incidents with other Emergency Management centers to ensure appropriate resources are dispatched and utilized.	Existing
<i>Functional Area:</i> Emergency Routing	
Routing of emergency vehicles to facilitate the quickest/safest arrival. Routes may be determined based on real-time traffic information and road conditions or routes may be provided by Traffic Management on request.	
<i>Requirement:</i> 1 The center shall collect current traffic and road condition information for emergency vehicle route calculation.	Existing
<i>Requirement:</i> 2 The center shall receive information on the location and status of traffic control equipment and work zones along potential emergency routes.	Existing
<i>Requirement:</i> 3 The center shall receive status information from care facilities to determine the appropriate facility and its location.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Porter County Central Communications	
<i>Entity:</i> Emergency Management	
<i>Functional Area:</i> Emergency Routing	
Routing of emergency vehicles to facilitate the quickest/safest arrival. Routes may be determined based on real-time traffic information and road conditions or routes may be provided by Traffic Management on request.	
<i>Requirement:</i>	Existing
4 The center shall receive asset restriction information to support the dispatching of appropriate emergency resources.	
<i>Requirement:</i>	Planned
5 The center shall receive current railroad schedule information for emergency vehicle route calculation.	
<i>Requirement:</i>	Existing
6 The center shall track current emergency vehicle location and status.	
<i>Requirement:</i>	Existing
7 The center shall calculate emergency vehicle routes, under center personnel control, based on the collected traffic and road conditions information.	
<i>Requirement:</i>	Planned
8 The center shall request and receive ingress and egress routes or other specialized emergency access routes from the traffic management center.	
<i>Requirement:</i>	Potential
9 The center shall provide the capability to request special traffic control measures, such as signal preemption, from the traffic management center to facilitate emergency vehicle progress along the suggested route.	
<i>Requirement:</i>	Existing
10 Once the route is calculated the route shall be provided to the dispatch function.	
<i>Requirement:</i>	Planned
11 The center shall provide the capability for digitized map data to act as the background to the information presented to the emergency system operator.	
<i>Functional Area:</i> Incident Command	
Tactical decision support, resource coordination, and communications integration among emergency management agencies for Incident Commands that are established by first responders to support local management of an incident.	
<i>Requirement:</i>	Existing
1 The center shall 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.	
<i>Requirement:</i>	Existing
2 The center shall provide incident command communications with public safety, emergency management, transportation, and other allied response agency centers.	
<i>Requirement:</i>	Existing
3 The center shall track and maintain resource information and action plans pertaining to the incident command.	
<i>Requirement:</i>	Existing
4 The center shall 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.	
<i>Requirement:</i>	Existing
5 The center shall assess the status of responding emergency vehicles as part of an incident command.	
<i>Functional Area:</i> Emergency Early Warning System	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Porter County Central Communications</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Emergency Early Warning System</i>	
Monitors alerting and advisory systems, information collected by ITS surveillance and sensors, and reports from other agencies in order to identify potential, imminent, or in-progress major incidents or disasters. Notification is provided to other ITS centers to notify the traveling public.	
<i>Requirement:</i>	
1 The center shall 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).	Existing
<i>Requirement:</i>	
2 The center shall provide the capability to correlate alerts and advisories, incident information, and security sensor and surveillance data.	Existing
<i>Requirement:</i>	
3 The center shall 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.	Planned
<i>Requirement:</i>	
4 The center shall broadcast wide-area alerts and advisories to transit management centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	Planned
<i>Requirement:</i>	
5 The center shall broadcast wide-area alerts and advisories to toll administration 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.	Planned
<i>Requirement:</i>	
6 The center shall broadcast wide-area alerts and advisories to traveler information service providers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	Planned
<i>Requirement:</i>	
7 The center shall broadcast wide-area alerts and advisories to maintenance centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	Planned
<i>Requirement:</i>	
8 The center shall broadcast wide-area alerts and advisories to other emergency management centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	Planned

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Porter County Central Communications	
<i>Entity:</i> Emergency Management	
<i>Functional Area:</i> Emergency Early Warning System	
Monitors alerting and advisory systems, information collected by ITS surveillance and sensors, and reports from other agencies in order to identify potential, imminent, or in-progress major incidents or disasters. Notification is provided to other ITS centers to notify the traveling public.	
<i>Requirement:</i>	
9 The center shall broadcast wide-area alerts and advisories to commercial vehicle administration centers and roadside check facilities 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.	Planned
<i>Requirement:</i>	
10 The center shall process status information from each of the centers that have been sent the wide-area alert.	Planned
<i>Requirement:</i>	
11 The center shall coordinate the broadcast of wide-area alerts and advisories with other emergency management centers.	Existing
<i>Requirement:</i>	
12 The center shall receive incident information from other transportation management centers to support the early warning system.	Existing
<i>Requirement:</i>	
13 The center shall present the alert and advisory information and the status of the actions taken in response to the alert by the other centers to the emergency system operator as received from other system inputs.	Existing
<i>Requirement:</i>	
14 The center shall support the entry of alert and advisory information directly from the emergency system operator.	Existing
<i>Functional Area:</i> Emergency Response Management	
Strategic emergency planning and response capabilities and broad inter-agency interfaces to support large-scale incidents and disasters, commonly associated with Emergency Operations Centers.	
<i>Requirement:</i>	
1 The center shall provide strategic emergency response capabilities provided by an Emergency Operations Center for large-scale incidents and disasters.	Existing
<i>Requirement:</i>	
2 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.	Existing
<i>Requirement:</i>	
3 The center shall provide the capability to implement response plans and track progress through the incident by exchanging incident information and response status with allied agencies.	Existing
<i>Requirement:</i>	
4 The center shall develop, coordinate with other agencies, and store emergency response plans.	Existing
<i>Requirement:</i>	
5 The center shall track the availability of resources and coordinate resource sharing with allied agency centers including traffic, maintenance, or other emergency centers.	Existing
<i>Requirement:</i>	
6 The center shall 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.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Porter County Central Communications	
<i>Entity:</i> Emergency Management	
<i>Functional Area:</i> Emergency Response Management	
Strategic emergency planning and response capabilities and broad inter-agency interfaces to support large-scale incidents and disasters, commonly associated with Emergency Operations Centers.	
<i>Requirement:</i>	
7 The center shall receive event scheduling information from Event Promoters.	Planned
<i>Requirement:</i>	
8 The center shall support remote control of field equipment normally under control of the traffic management center including traffic signals, dynamic message signs, gates, and barriers.	Potential
<i>Requirement:</i>	
9 The center shall provide the capability to remotely control and monitor CCTV systems normally operated by a traffic management center.	Planned
<i>Requirement:</i>	
10 The center shall provide the capability to request transit resource availability from transit centers for use during disaster and evacuation operations.	Existing
<i>Requirement:</i>	
11 The center shall 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.	Planned
<i>Requirement:</i>	
12 The center shall provide information to the media concerning the status of an emergency response.	Existing
<i>Requirement:</i>	
13 The center shall provide the capability for digitized map data to act as the background to the information presented to the emergency system operator.	Planned
<i>Requirement:</i>	
14 The center shall provide the capability for center personnel to provide inputs to the management of incidents, disasters and evacuations.	Existing
<i>Requirement:</i>	
15 The center shall collect information about the status of the recovery efforts for the infrastructure during disasters.	Potential
<i>Requirement:</i>	
16 The center shall provide the overall status of infrastructure recovery efforts to traveler information providers and media.	Potential
<i>Requirement:</i>	
17 The center shall provide the capability to communicate information about emergency situations to local population through the Emergency Telecommunications System.	Existing
<i>Requirement:</i>	
18 The center shall 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.	Planned
<i>Requirement:</i>	
19 The center shall retrieve information from public health systems to increase preparedness for, and implement a response to biological, chemical, radiation, and other public health emergencies.	Existing

Functional Area: **Emergency Evacuation Support**

Evacuation planning and coordination to manage evacuation and reentry of a population in the vicinity of a disaster or other emergency that poses a risk to public safety.

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Porter County Central Communications	
<i>Entity:</i> Emergency Management	
<i>Functional Area:</i> Emergency Evacuation Support	
Evacuation planning and coordination to manage evacuation and reentry of a population in the vicinity of a disaster or other emergency that poses a risk to public safety.	
<i>Requirement:</i>	
1 The center shall manage inter-agency coordination of evacuation operations, from initial planning through the evacuation process and reentry.	Planned
<i>Requirement:</i>	
2 The center shall develop and exchange evacuation plans with allied agencies prior to the occurrence of a disaster.	Existing
<i>Requirement:</i>	
3 The center shall provide an interface to the emergency system operator to enter evacuation plans and procedures and present the operator with other agencies' plans.	Existing
<i>Requirement:</i>	
4 The center shall coordinate evacuation destinations and shelter needs with shelter providers (e.g., the American Red Cross) in the region.	Existing
<i>Requirement:</i>	
5 The center shall provide evacuation information to traffic, transit, maintenance and construction, rail operations, and other emergency management centers as needed.	Planned
<i>Requirement:</i>	
6 The center shall request resources from transit agencies as needed to support the evacuation.	Planned
<i>Requirement:</i>	
7 The center shall 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.	Potential
<i>Requirement:</i>	
8 The center shall 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.	Planned
<i>Requirement:</i>	
9 The center shall monitor the progress or status of the evacuation once it begins and exchange tactical plans, prepared during the incident, with allied agencies.	Potential
<i>Requirement:</i>	
10 The center shall monitor the progress of the reentry process.	Potential
<i>Requirement:</i>	
11 The center shall submit evacuation information to toll administration centers along with requests for changes in the toll services or fee collection during an evacuation.	Potential
<i>Requirement:</i>	
12 The center shall 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.	Existing
<i>Functional Area:</i> Emergency Environmental Monitoring	
Collects current and forecast road and weather information that is used by the operator to more effectively manage incidents.	
<i>Requirement:</i>	
1 The center shall 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).	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Porter County Central Communications</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Emergency Environmental Monitoring</i>	
Collects current and forecast road and weather information that is used by the operator to more effectively manage incidents.	
<i>Requirement:</i>	Existing
2 The center shall collect current road and weather information from roadway maintenance operations.	
<i>Requirement:</i>	Existing
3 The center shall assimilate current and forecast road conditions and surface weather information to support incident management.	
<i>Requirement:</i>	Existing
4 The center shall present the current and forecast road and weather information to the emergency system operator.	
<i>Functional Area: Center Secure Area Surveillance</i>	
Management of security surveillance devices and analysis of that data to detect potential threats. Areas under surveillance may include transit stops, transit stations, rest areas, park and ride lots, modal interchange facilities, on-board a transit vehicle, etc.	
<i>Requirement:</i>	Planned
1 The center shall remotely monitor video images and audio surveillance data collected in secure areas including facilities (e.g. transit yards) and transportation infrastructure (e.g. bridges, tunnels, interchanges, roadway infrastructure, and transit railways or guideways). The data may be raw or pre-processed in the field.	
<i>Requirement:</i>	Planned
2 The center shall remotely monitor video images and audio surveillance data collected in traveler secure areas, which include transit stations, transit stops, rest areas, park and ride lots, and other fixed sites along travel routes (e.g., emergency pull-off areas and travel information centers). The data may be raw or pre-processed in the field.	
<i>Requirement:</i>	Planned
3 The center shall remotely monitor video images and audio surveillance data collected on-board transit vehicles. The data may be raw or pre-processed in the field.	
<i>Requirement:</i>	Planned
4 The center shall exchange surveillance data with other emergency centers.	
<i>Requirement:</i>	Planned
5 The center shall identify potential security threats based on collected security surveillance data.	
<i>Requirement:</i>	Planned
6 The center shall verify potential security threats by correlating security surveillance data from multiple sources.	
<i>Requirement:</i>	Planned
7 The center shall remotely control security surveillance devices in secure areas including facilities (e.g. transit yards) and transportation infrastructure (e.g. bridges, tunnels, interchanges, roadway infrastructure, and transit railways or guideways).	
<i>Requirement:</i>	Planned
8 The center shall remotely control security surveillance devices in traveler secure areas, which include transit stations, transit stops, rest areas, park and ride lots, and other fixed sites along travel routes (e.g., emergency pull-off areas and travel information centers).	
<i>Requirement:</i>	Planned
9 The center shall remotely control security surveillance devices on-board transit vehicles.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Porter County Central Communications	
<i>Entity:</i> Emergency Management	
<i>Functional Area:</i> Center Secure Area Surveillance	
Management of security surveillance devices and analysis of that data to detect potential threats. Areas under surveillance may include transit stops, transit stations, rest areas, park and ride lots, modal interchange facilities, on-board a transit vehicle, etc.	
<i>Requirement:</i>	Planned
10 The center shall match traveler video images against a database from the Alerting and Advisory Systems of known images that may represent criminals and terrorists.	
<i>Requirement:</i>	Planned
11 The center shall exchange traveler images with other emergency management centers to support traveler image matching.	
<i>Requirement:</i>	Planned
12 The center shall respond to control data from center personnel regarding security surveillance data collection, processing, threat detection, and image matching.	
<i>Requirement:</i>	Planned
13 The center shall monitor maintenance status of the security sensor field equipment.	
<i>Functional Area:</i> Center Secure Area Alarm Support	
Collection and response to silent and audible alarms received from travelers in secure areas (such as transit stops, rest areas, park-and-ride lots) and from on-board transit vehicles.	
<i>Requirement:</i>	Existing
1 The center shall collect silent and audible alarms received from travelers in secure areas (such as transit stops, rest areas, park and ride lots, modal interchange facilities).	
<i>Requirement:</i>	Existing
2 The center shall collect silent and audible alarms received from transit vehicles, originated by the traveler or the transit vehicle operator.	
<i>Requirement:</i>	Existing
3 After the alarm message has been received, the center shall generate an alarm acknowledgment to the sender.	
<i>Requirement:</i>	Existing
4 After the alarm message becomes a verified incident, the center shall determine the appropriate response.	
<i>Requirement:</i>	Existing
5 The center shall determine whether the alarm message indicates an emergency that requires the attention of public safety agencies, and forward alarm message data to the appropriate agency as necessary.	
<i>Requirement:</i>	Existing
6 The center shall forward the alarm message to center personnel and respond to the traveler or transit vehicle operator as directed by the personnel.	
<i>Functional Area:</i> Mayday Support	
Collection and response to Mayday messages received from vehicles and drivers.	
<i>Requirement:</i>	Existing
1 The center shall collect mayday messages from vehicles and drivers.	
<i>Requirement:</i>	Existing
2 The center shall collect mayday messages from travelers via personal handheld devices.	
<i>Requirement:</i>	Existing
3 The center shall acknowledge the request for emergency assistance, whether originated by the driver, automatically by the vehicle's safety systems, or by a traveler via a personal handheld device.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Porter County Central Communications	
<i>Entity:</i> Emergency Management	
<i>Functional Area:</i> Mayday Support	
Collection and response to Mayday messages received from vehicles and drivers.	
<i>Requirement:</i>	
4 After the mayday becomes a verified incident, the center shall determine the appropriate response to the mayday message.	Existing
<i>Requirement:</i>	
5 The center shall determine whether the mayday message indicates an emergency that requires the attention of public safety agencies, and forward mayday emergency data to the appropriate agency as necessary.	Existing
<i>Requirement:</i>	
6 The center shall support the activation of remote controlled functions requested by a vehicle, such as requests to unlock doors.	Planned
<i>Requirement:</i>	
7 The center shall request additional emergency details from or issue commands to the vehicle's security systems or vehicle driver if needed.	Existing
<i>Requirement:</i>	
8 The center shall maintain a log of all mayday signals received from vehicles.	Existing
<i>Requirement:</i>	
9 The center shall provide all mayday data to center personnel and respond to the vehicle, driver, or traveler using the portable handheld device as directed by the personnel.	Existing
<i>Functional Area:</i> Emergency Commercial Vehicle Response	
Responds to commercial vehicle and freight equipment related emergencies. Includes incidents involving hazardous materials as well as the detection of non-permitted transport of security sensitive hazmat.	
<i>Requirement:</i>	
1 The center shall receive emergency notification information from commercial vehicles, commercial vehicle check stations, or commercial fleet operators and present the possible incident information to the emergency system operator. This may include detection of non-permitted transport of security sensitive hazmat, hazardous cargo spills, etc.	Existing
<i>Requirement:</i>	
2 The center shall receive details of the cargo being carried by commercial vehicles from their commercial fleet manager for incidents involving potential hazardous materials.	Existing
<i>Requirement:</i>	
3 The center shall forward the verified emergency information to the responding agency based on the location and nature of the emergency.	Existing
<i>Requirement:</i>	
4 The center shall provide the capability to request Fleet and Freight Management to disable a specific vehicle in their fleet.	Planned
<i>Functional Area:</i> Emergency Data Collection	
Collection and storage of information related to Emergency Management. For use by operations personnel or data archives in the region.	
<i>Requirement:</i>	
1 The center shall collect emergency service data, emergency vehicle management data, emergency vehicle data, sensor and surveillance data, threat data, and incident data.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Porter County Central Communications</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Emergency Data Collection</i>	
Collection and storage of information related to Emergency Management. For use by operations personnel or data archives in the region.	
<i>Requirement:</i>	Existing
2 The center shall assign quality control metrics and meta-data to be stored along with the data. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.	
<i>Requirement:</i>	Planned
3 The center shall receive and respond to requests from ITS Archives for either a catalog of the emergency management data or for the data itself.	
<i>Requirement:</i>	Planned
4 The center shall be able to produce sample products of the data available.	
<i>Functional Area: Emergency Transportation Operations Data Collection</i>	
Collects real-time information on the state of the regional transportation system for operational use by the center. It establishes communications with a regional repository, requests or subscribes to information relevant to the center, and distributes the received information for use.	
<i>Requirement:</i>	Existing
1 The center shall collect real-time information on the state of the regional transportation system including current traffic and road conditions, weather conditions, special event and incident information.	
<i>Requirement:</i>	Existing
2 The center shall support the capability for the system operator to monitor and control the information collection service.	
<i>Element: Porter County Emergency Operations Center</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Emergency Call-Taking</i>	
Provides interface to the emergency call-taking systems such as the Emergency Telecommunications System (e.g., 911) that correlate call information with emergencies reported by transit agencies, commercial vehicle operators, or other public safety agencies. Allows the operator to verify the incident and forward the information to the responding agencies.	
<i>Requirement:</i>	Existing
1 The center shall support the interface to the Emergency Telecommunications System (e.g. 911 or 7-digit call routing) to receive emergency notification information and provide it to the emergency system operator.	
<i>Requirement:</i>	Existing
2 The center shall receive emergency call information from 911 services and present the possible incident information to the emergency system operator.	
<i>Requirement:</i>	Existing
4 The center shall receive emergency call information from mayday service providers and present the possible incident information to the emergency system operator.	
<i>Requirement:</i>	Existing
5 The center shall receive emergency notification information from other public safety agencies and present the possible incident information to the emergency system operator.	
<i>Requirement:</i>	Existing
6 The center shall receive emergency notification information from public transit systems and present the possible incident information to the emergency system operator.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Porter County Emergency Operations Center	
<i>Entity:</i> Emergency Management	
<i>Functional Area:</i> Emergency Call-Taking	
Provides interface to the emergency call-taking systems such as the Emergency Telecommunications System (e.g., 911) that correlate call information with emergencies reported by transit agencies, commercial vehicle operators, or other public safety agencies. Allows the operator to verify the incident and forward the information to the responding agencies.	
<i>Requirement:</i>	
7 The center shall coordinate, correlate, and verify all emergency inputs, including those identified based on external calls and internal analysis of security sensor and surveillance data, and assign each a level of confidence.	Existing
<i>Requirement:</i>	
8 The center shall send a request for remote control of CCTV systems from a traffic management center in order to verify the reported incident.	Planned
<i>Requirement:</i>	
9 The center shall forward the verified emergency information to the responding agency based on the location and nature of the emergency.	Existing
<i>Requirement:</i>	
10 The center shall update the incident information log once the emergency system operator has verified the incident.	Existing
<i>Requirement:</i>	
11 The center shall provide the capability for digitized map data to act as the background to the emergency information presented to the emergency system operator.	Planned
<i>Functional Area:</i> Emergency Dispatch	
Dispatch emergency vehicles to incidents, tracking their location and status. Pertinent incident information is gathered and relayed to the responding units.	
<i>Requirement:</i>	
1 The center shall dispatch emergency vehicles to respond to verified emergencies under center personnel control.	Existing
<i>Requirement:</i>	
2 The center shall store the current status of all emergency vehicles available for dispatch and those that have been dispatched.	Existing
<i>Requirement:</i>	
3 The center shall relay location and incident details to the responding vehicles.	Existing
<i>Requirement:</i>	
4 The center shall track the location and status of emergency vehicles responding to an emergency based on information from the emergency vehicle.	Existing
<i>Requirement:</i>	
5 The center shall store and maintain the emergency service responses in an action log.	Existing
<i>Requirement:</i>	
6 The center shall provide the capability for digitized map data to act as the background to the information presented to the emergency system operator.	Planned
<i>Requirement:</i>	
7 The center shall receive traffic images to support dispatch of emergency vehicles.	Planned
<i>Requirement:</i>	
8 The center shall provide the capability to request remote control of traffic surveillance devices	Planned
<i>Requirement:</i>	
9 The center shall coordinate response to incidents with other Emergency Management centers to ensure appropriate resources are dispatched and utilized.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Porter County Emergency Operations Center	
<i>Entity:</i> Emergency Management	
<i>Functional Area:</i> Emergency Routing	
Routing of emergency vehicles to facilitate the quickest/safest arrival. Routes may be determined based on real-time traffic information and road conditions or routes may be provided by Traffic Management on request.	
<i>Requirement:</i>	Existing
1 The center shall collect current traffic and road condition information for emergency vehicle route calculation.	
<i>Requirement:</i>	Existing
2 The center shall receive information on the location and status of traffic control equipment and work zones along potential emergency routes.	
<i>Requirement:</i>	Existing
3 The center shall receive status information from care facilities to determine the appropriate facility and its location.	
<i>Requirement:</i>	Existing
4 The center shall receive asset restriction information to support the dispatching of appropriate emergency resources.	
<i>Requirement:</i>	Planned
5 The center shall receive current railroad schedule information for emergency vehicle route calculation.	
<i>Requirement:</i>	Existing
6 The center shall track current emergency vehicle location and status.	
<i>Requirement:</i>	Existing
7 The center shall calculate emergency vehicle routes, under center personnel control, based on the collected traffic and road conditions information.	
<i>Requirement:</i>	Planned
8 The center shall request and receive ingress and egress routes or other specialized emergency access routes from the traffic management center.	
<i>Requirement:</i>	Potential
9 The center shall provide the capability to request special traffic control measures, such as signal preemption, from the traffic management center to facilitate emergency vehicle progress along the suggested route.	
<i>Requirement:</i>	Existing
10 Once the route is calculated the route shall be provided to the dispatch function.	
<i>Requirement:</i>	Planned
11 The center shall provide the capability for digitized map data to act as the background to the information presented to the emergency system operator.	
<i>Functional Area:</i> Incident Command	
Tactical decision support, resource coordination, and communications integration among emergency management agencies for Incident Commands that are established by first responders to support local management of an incident.	
<i>Requirement:</i>	Existing
1 The center shall 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.	
<i>Requirement:</i>	Existing
2 The center shall provide incident command communications with public safety, emergency management, transportation, and other allied response agency centers.	
<i>Requirement:</i>	Existing
3 The center shall track and maintain resource information and action plans pertaining to the incident command.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Porter County Emergency Operations Center</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Incident Command</i>	
Tactical decision support, resource coordination, and communications integration among emergency management agencies for Incident Commands that are established by first responders to support local management of an incident.	
<i>Requirement:</i>	Existing
4 The center shall 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.	
<i>Requirement:</i>	Existing
5 The center shall assess the status of responding emergency vehicles as part of an incident command.	
<i>Functional Area: Emergency Early Warning System</i>	
Monitors alerting and advisory systems, information collected by ITS surveillance and sensors, and reports from other agencies in order to identify potential, imminent, or in-progress major incidents or disasters. Notification is provided to other ITS centers to notify the traveling public.	
<i>Requirement:</i>	Existing
1 The center shall 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).	
<i>Requirement:</i>	Existing
2 The center shall provide the capability to correlate alerts and advisories, incident information, and security sensor and surveillance data.	
<i>Requirement:</i>	Existing
3 The center shall 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.	
<i>Requirement:</i>	Existing
4 The center shall broadcast wide-area alerts and advisories to transit management centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	
<i>Requirement:</i>	Existing
5 The center shall broadcast wide-area alerts and advisories to toll administration 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.	
<i>Requirement:</i>	Existing
6 The center shall broadcast wide-area alerts and advisories to traveler information service providers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Porter County Emergency Operations Center	
<i>Entity:</i> Emergency Management	
<i>Functional Area:</i> Emergency Early Warning System	
Monitors alerting and advisory systems, information collected by ITS surveillance and sensors, and reports from other agencies in order to identify potential, imminent, or in-progress major incidents or disasters. Notification is provided to other ITS centers to notify the traveling public.	
<i>Requirement:</i> 7 The center shall broadcast wide-area alerts and advisories to maintenance centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	Existing
<i>Requirement:</i> 8 The center shall broadcast wide-area alerts and advisories to other emergency management centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	Existing
<i>Requirement:</i> 9 The center shall broadcast wide-area alerts and advisories to commercial vehicle administration centers and roadside check facilities for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	Existing
<i>Requirement:</i> 10 The center shall process status information from each of the centers that have been sent the wide-area alert.	Existing
<i>Requirement:</i> 11 The center shall coordinate the broadcast of wide-area alerts and advisories with other emergency management centers.	Existing
<i>Requirement:</i> 12 The center shall receive incident information from other transportation management centers to support the early warning system.	Existing
<i>Requirement:</i> 13 The center shall present the alert and advisory information and the status of the actions taken in response to the alert by the other centers to the emergency system operator as received from other system inputs.	Existing
<i>Requirement:</i> 14 The center shall support the entry of alert and advisory information directly from the emergency system operator.	Existing
<i>Functional Area:</i> Emergency Response Management	
Strategic emergency planning and response capabilities and broad inter-agency interfaces to support large-scale incidents and disasters, commonly associated with Emergency Operations Centers.	
<i>Requirement:</i> 1 The center shall provide strategic emergency response capabilities provided by an Emergency Operations Center for large-scale incidents and disasters.	Existing
<i>Requirement:</i> 2 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.	Existing
<i>Requirement:</i> 3 The center shall provide the capability to implement response plans and track progress through the incident by exchanging incident information and response status with allied agencies.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Porter County Emergency Operations Center	
<i>Entity:</i> Emergency Management	
<i>Functional Area:</i> Emergency Response Management	
Strategic emergency planning and response capabilities and broad inter-agency interfaces to support large-scale incidents and disasters, commonly associated with Emergency Operations Centers.	
<i>Requirement:</i>	
4 The center shall develop, coordinate with other agencies, and store emergency response plans.	Existing
<i>Requirement:</i>	
5 The center shall track the availability of resources and coordinate resource sharing with allied agency centers including traffic, maintenance, or other emergency centers.	Existing
<i>Requirement:</i>	
6 The center shall 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.	Existing
<i>Requirement:</i>	
8 The center shall support remote control of field equipment normally under control of the traffic management center including traffic signals, dynamic message signs, gates, and barriers.	Potential
<i>Requirement:</i>	
9 The center shall provide the capability to remotely control and monitor CCTV systems normally operated by a traffic management center.	Planned
<i>Requirement:</i>	
10 The center shall provide the capability to request transit resource availability from transit centers for use during disaster and evacuation operations.	Existing
<i>Requirement:</i>	
11 The center shall 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.	Planned
<i>Requirement:</i>	
12 The center shall provide information to the media concerning the status of an emergency response.	Existing
<i>Requirement:</i>	
13 The center shall provide the capability for digitized map data to act as the background to the information presented to the emergency system operator.	Planned
<i>Requirement:</i>	
14 The center shall provide the capability for center personnel to provide inputs to the management of incidents, disasters and evacuations.	Existing
<i>Requirement:</i>	
15 The center shall collect information about the status of the recovery efforts for the infrastructure during disasters.	Existing
<i>Requirement:</i>	
16 The center shall provide the overall status of infrastructure recovery efforts to traveler information providers and media.	Existing
<i>Requirement:</i>	
17 The center shall provide the capability to communicate information about emergency situations to local population through the Emergency Telecommunications System.	Existing
<i>Requirement:</i>	
18 The center shall 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.	Planned

Table 6

Architecture	Status	
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)	
<i>Element:</i> Porter County Emergency Operations Center		
<i>Entity:</i> Emergency Management		
<i>Functional Area:</i> Emergency Response Management		
Strategic emergency planning and response capabilities and broad inter-agency interfaces to support large-scale incidents and disasters, commonly associated with Emergency Operations Centers.		
<i>Requirement:</i> 19	The center shall retrieve information from public health systems to increase preparedness for, and implement a response to biological, chemical, radiation, and other public health emergencies.	Existing
<i>Functional Area:</i> Emergency Evacuation Support		
Evacuation planning and coordination to manage evacuation and reentry of a population in the vicinity of a disaster or other emergency that poses a risk to public safety.		
<i>Requirement:</i> 1	The center shall manage inter-agency coordination of evacuation operations, from initial planning through the evacuation process and reentry.	Existing
<i>Requirement:</i> 2	The center shall develop and exchange evacuation plans with allied agencies prior to the occurrence of a disaster.	Existing
<i>Requirement:</i> 3	The center shall provide an interface to the emergency system operator to enter evacuation plans and procedures and present the operator with other agencies' plans.	Existing
<i>Requirement:</i> 4	The center shall coordinate evacuation destinations and shelter needs with shelter providers (e.g., the American Red Cross) in the region.	Existing
<i>Requirement:</i> 5	The center shall provide evacuation information to traffic, transit, maintenance and construction, rail operations, and other emergency management centers as needed.	Existing
<i>Requirement:</i> 6	The center shall request resources from transit agencies as needed to support the evacuation.	Existing
<i>Requirement:</i> 7	The center shall 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.	Potential
<i>Requirement:</i> 8	The center shall 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.	Existing
<i>Requirement:</i> 9	The center shall monitor the progress or status of the evacuation once it begins and exchange tactical plans, prepared during the incident, with allied agencies.	Existing
<i>Requirement:</i> 10	The center shall monitor the progress of the reentry process.	Existing
<i>Requirement:</i> 11	The center shall submit evacuation information to toll administration centers along with requests for changes in the toll services or fee collection during an evacuation.	Potential
<i>Requirement:</i> 12	The center shall 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.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Porter County Emergency Operations Center	
<i>Entity:</i> Emergency Management	
<i>Functional Area:</i> Emergency Environmental Monitoring	
Collects current and forecast road and weather information that is used by the operator to more effectively manage incidents.	
<i>Requirement:</i>	Existing
1 The center shall 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).	
<i>Requirement:</i>	Existing
2 The center shall collect current road and weather information from roadway maintenance operations.	
<i>Requirement:</i>	Existing
3 The center shall assimilate current and forecast road conditions and surface weather information to support incident management.	
<i>Requirement:</i>	Existing
4 The center shall present the current and forecast road and weather information to the emergency system operator.	
<i>Functional Area:</i> Center Secure Area Surveillance	
Management of security surveillance devices and analysis of that data to detect potential threats. Areas under surveillance may include transit stops, transit stations, rest areas, park and ride lots, modal interchange facilities, on-board a transit vehicle, etc.	
<i>Requirement:</i>	Planned
1 The center shall remotely monitor video images and audio surveillance data collected in secure areas including facilities (e.g. transit yards) and transportation infrastructure (e.g. bridges, tunnels, interchanges, roadway infrastructure, and transit railways or guideways). The data may be raw or pre-processed in the field.	
<i>Requirement:</i>	Planned
2 The center shall remotely monitor video images and audio surveillance data collected in traveler secure areas, which include transit stations, transit stops, rest areas, park and ride lots, and other fixed sites along travel routes (e.g., emergency pull-off areas and travel information centers). The data may be raw or pre-processed in the field.	
<i>Requirement:</i>	Planned
3 The center shall remotely monitor video images and audio surveillance data collected on-board transit vehicles. The data may be raw or pre-processed in the field.	
<i>Requirement:</i>	Planned
4 The center shall exchange surveillance data with other emergency centers.	
<i>Requirement:</i>	Planned
5 The center shall identify potential security threats based on collected security surveillance data.	
<i>Requirement:</i>	Planned
6 The center shall verify potential security threats by correlating security surveillance data from multiple sources.	
<i>Requirement:</i>	Planned
7 The center shall remotely control security surveillance devices in secure areas including facilities (e.g. transit yards) and transportation infrastructure (e.g. bridges, tunnels, interchanges, roadway infrastructure, and transit railways or guideways).	
<i>Requirement:</i>	Planned
8 The center shall remotely control security surveillance devices in traveler secure areas, which include transit stations, transit stops, rest areas, park and ride lots, and other fixed sites along travel routes (e.g., emergency pull-off areas and travel information centers).	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Porter County Emergency Operations Center	
<i>Entity:</i> Emergency Management	
<i>Functional Area:</i> Center Secure Area Surveillance	
Management of security surveillance devices and analysis of that data to detect potential threats. Areas under surveillance may include transit stops, transit stations, rest areas, park and ride lots, modal interchange facilities, on-board a transit vehicle, etc.	
<i>Requirement:</i>	
9 The center shall remotely control security surveillance devices on-board transit vehicles.	Planned
<i>Requirement:</i>	
10 The center shall match traveler video images against a database from the Alerting and Advisory Systems of known images that may represent criminals and terrorists.	Planned
<i>Requirement:</i>	
11 The center shall exchange traveler images with other emergency management centers to support traveler image matching.	Planned
<i>Requirement:</i>	
12 The center shall respond to control data from center personnel regarding security surveillance data collection, processing, threat detection, and image matching.	Planned
<i>Requirement:</i>	
13 The center shall monitor maintenance status of the security sensor field equipment.	Planned
<i>Functional Area:</i> Center Secure Area Alarm Support	
Collection and response to silent and audible alarms received from travelers in secure areas (such as transit stops, rest areas, park-and-ride lots) and from on-board transit vehicles.	
<i>Requirement:</i>	
1 The center shall collect silent and audible alarms received from travelers in secure areas (such as transit stops, rest areas, park and ride lots, modal interchange facilities).	Existing
<i>Requirement:</i>	
2 The center shall collect silent and audible alarms received from transit vehicles, originated by the traveler or the transit vehicle operator.	Existing
<i>Requirement:</i>	
3 After the alarm message has been received, the center shall generate an alarm acknowledgment to the sender.	Existing
<i>Requirement:</i>	
4 After the alarm message becomes a verified incident, the center shall determine the appropriate response.	Existing
<i>Requirement:</i>	
5 The center shall determine whether the alarm message indicates an emergency that requires the attention of public safety agencies, and forward alarm message data to the appropriate agency as necessary.	Existing
<i>Requirement:</i>	
6 The center shall forward the alarm message to center personnel and respond to the traveler or transit vehicle operator as directed by the personnel.	Existing
<i>Functional Area:</i> Mayday Support	
Collection and response to Mayday messages received from vehicles and drivers.	
<i>Requirement:</i>	
1 The center shall collect mayday messages from vehicles and drivers.	Existing
<i>Requirement:</i>	
2 The center shall collect mayday messages from travelers via personal handheld devices.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Porter County Emergency Operations Center	
<i>Entity:</i> Emergency Management	
<i>Functional Area:</i> Mayday Support	
Collection and response to Mayday messages received from vehicles and drivers.	
<i>Requirement:</i>	Existing
3 The center shall acknowledge the request for emergency assistance, whether originated by the driver, automatically by the vehicle's safety systems, or by a traveler via a personal handheld device.	
<i>Requirement:</i>	Existing
4 After the mayday becomes a verified incident, the center shall determine the appropriate response to the mayday message.	
<i>Requirement:</i>	Existing
5 The center shall determine whether the mayday message indicates an emergency that requires the attention of public safety agencies, and forward mayday emergency data to the appropriate agency as necessary.	
<i>Requirement:</i>	Planned
6 The center shall support the activation of remote controlled functions requested by a vehicle, such as requests to unlock doors.	
<i>Requirement:</i>	Existing
7 The center shall request additional emergency details from or issue commands to the vehicle's security systems or vehicle driver if needed.	
<i>Requirement:</i>	Existing
8 The center shall maintain a log of all mayday signals received from vehicles.	
<i>Requirement:</i>	Existing
9 The center shall provide all mayday data to center personnel and respond to the vehicle, driver, or traveler using the portable handheld device as directed by the personnel.	
<i>Functional Area:</i> Emergency Commercial Vehicle Response	
Responds to commercial vehicle and freight equipment related emergencies. Includes incidents involving hazardous materials as well as the detection of non-permitted transport of security sensitive hazmat.	
<i>Requirement:</i>	Existing
1 The center shall receive emergency notification information from commercial vehicles, commercial vehicle check stations, or commercial fleet operators and present the possible incident information to the emergency system operator. This may include detection of non-permitted transport of security sensitive hazmat, hazardous cargo spills, etc.	
<i>Requirement:</i>	Existing
2 The center shall receive details of the cargo being carried by commercial vehicles from their commercial fleet manager for incidents involving potential hazardous materials.	
<i>Requirement:</i>	Existing
3 The center shall forward the verified emergency information to the responding agency based on the location and nature of the emergency.	
<i>Requirement:</i>	Planned
4 The center shall provide the capability to request Fleet and Freight Management to disable a specific vehicle in their fleet.	
<i>Functional Area:</i> Emergency Data Collection	
Collection and storage of information related to Emergency Management. For use by operations personnel or data archives in the region.	
<i>Requirement:</i>	Existing
1 The center shall collect emergency service data, emergency vehicle management data, emergency vehicle data, sensor and surveillance data, threat data, and incident data.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Porter County Emergency Operations Center</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Emergency Data Collection</i>	
Collection and storage of information related to Emergency Management. For use by operations personnel or data archives in the region.	
<i>Requirement:</i>	
2 The center shall assign quality control metrics and meta-data to be stored along with the data. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.	Existing
<i>Requirement:</i>	
3 The center shall receive and respond to requests from ITS Archives for either a catalog of the emergency management data or for the data itself.	Planned
<i>Requirement:</i>	
4 The center shall be able to produce sample products of the data available.	Planned
<i>Functional Area: Emergency Transportation Operations Data Collection</i>	
Collects real-time information on the state of the regional transportation system for operational use by the center. It establishes communications with a regional repository, requests or subscribes to information relevant to the center, and distributes the received information for use.	
<i>Requirement:</i>	
1 The center shall collect real-time information on the state of the regional transportation system including current traffic and road conditions, weather conditions, special event and incident information.	Planned
<i>Requirement:</i>	
2 The center shall support the capability for the system operator to monitor and control the information collection service.	Planned
<i>Element: Porter County Field Equipment</i>	
<i>Entity: Roadway</i>	
<i>Functional Area: Roadway Probe Data Communications</i>	
Field elements that collect probe data from vehicles using short range communications.	
<i>Requirement:</i>	
1 The field element shall communicate with passing vehicles for traffic data link time calculations and send collected data to the controlling center; identification will be removed to ensure anonymity.	Potential
<i>Requirement:</i>	
2 The field element shall communicate with on-board equipment on passing vehicles to collect current vehicle position, speed, and heading and a record of previous events (e.g., starts and stops, link travel times) that can be used to determine current traffic conditions.	Potential
<i>Requirement:</i>	
3 The field element shall communicate with on-board equipment on passing vehicles to collect current status information and a record of previous events (e.g., temperature, wiper status, headlight status, traction control system status) that can be used to determine road and surface weather conditions.	Potential
<i>Requirement:</i>	
4 The field element shall communicate with on-board equipment on passing vehicles to collect vehicle trip information (e.g., origin and destination information, travel times) that can be used to support transportation planning.	Potential

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Porter County Field Equipment	
<i>Entity:</i> Roadway	
<i>Functional Area:</i> Roadway Probe Data Communications	
Field elements that collect probe data from vehicles using short range communications.	
<i>Requirement:</i> 5 The field element shall communicate with on-board equipment on passing vehicles to collect a history of precise positioning information that can be used to derive or verify accurate roadway geometry and lane features for use by map update providers.	Potential
<i>Requirement:</i> 6 The field element shall aggregate and forward collected probe information to the center.	Potential
<i>Requirement:</i> 7 The field element shall provide roadside equipment operational status to the center.	Potential
<i>Requirement:</i> 8 The field element shall provide roadside equipment fault indication to the center for repair.	Potential
<i>Functional Area:</i> Roadway Signal Controls	
Field elements including traffic signal controllers for use at signalized intersections; also supports pedestrian crossings.	
<i>Requirement:</i> 1 The field element shall control traffic signals under center control.	Existing
<i>Requirement:</i> 2 The field element shall respond to pedestrian crossing requests by accommodating the pedestrian crossing.	Existing
<i>Requirement:</i> 3 The field element shall provide the capability to notify the traffic management center of pedestrian calls and pedestrian accommodations.	Potential
<i>Requirement:</i> 4 The field element shall report the current signal control information to the center.	Existing
<i>Requirement:</i> 5 The field element shall report current preemption status to the center.	Planned
<i>Requirement:</i> 6 The field element shall return traffic signal controller operational status to the center.	Existing
<i>Requirement:</i> 7 The field element shall return traffic signal controller fault data to the center.	Existing
<i>Functional Area:</i> Field Management Stations Operation	
Supports direct communications between field management stations and the local field equipment under their control.	
<i>Requirement:</i> 1 The field management station shall accept configuration information from the center.	Existing
<i>Requirement:</i> 2 The field management station shall pass data provided by the center to local field devices and report data from the field devices back to the center.	Existing
<i>Functional Area:</i> Roadway Signal Preemption	
Field elements that receive signal preemption requests from approaching emergency vehicles and overrides the current operation of the traffic signals	
<i>Requirement:</i> 1 The field element shall respond to signal preemption requests from emergency vehicles.	Planned
<i>Functional Area:</i> Roadway Equipment Coordination	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Porter County Field Equipment	
<i>Entity:</i> Roadway	
<i>Functional Area:</i> Roadway Equipment Coordination	
Field elements that control and send data to other field elements (such as environmental sensors that send data to a DMS or coordination between traffic controllers on adjacent intersections), without center control.	
<i>Requirement:</i>	Potential
1 The field element shall include sensors that provide data and status information to other field element devices, without center control.	
<i>Requirement:</i>	Potential
2 The field element shall include sensors that receive configuration data from other field element devices, without center control.	
<i>Requirement:</i>	Potential
3 The field element shall include devices that provide data and status information to other field element devices without center control.	
<i>Requirement:</i>	Potential
4 The field element shall include devices that receive configuration data from other field element devices, without center control.	
<i>Functional Area:</i> Roadway Field Device Monitoring	
Monitors field equipment operational status and detects and reports fault conditions. Device status, configuration, and fault information are provided to a remote center and a user interface provides information locally to field personnel.	
<i>Requirement:</i>	Existing
1 The field element shall monitor the operational status (state of the device, configuration, and fault data) of connected sensors (such as traffic, infrastructure, environmental, security, speed) and devices (such as highway advisory radio, dynamic message signs, automated roadway treatment systems, barrier and safeguard systems, cameras, traffic signals, ramp meters, short range communications equipment, security surveillance equipment).	
<i>Requirement:</i>	Existing
2 The field element shall send operational status of connected field equipment to the maintenance center.	
<i>Requirement:</i>	Existing
3 The field element shall send collected fault data to the maintenance center for repair.	
<i>Requirement:</i>	Existing
4 The field element shall include a local interface that provides operational status and fault data for connected field equipment to field personnel.	
<i>Requirement:</i>	Existing
5 The field element shall include a local interface that allows field personnel to command diagnostic tests on connected field equipment.	
<i>Functional Area:</i> Roadway Environmental Monitoring	
Environmental sensors, surface and sub-surface, that collect weather and road surface information. Weather conditions measured include temperature, wind, humidity, precipitation, and visibility. Sensors measure road surface temperature, moisture, icing, salinity, etc.	
<i>Requirement:</i>	Existing
1 The field element shall include surface and sub-surface environmental sensors that measure road surface temperature, moisture, icing, salinity, and other measures.	
<i>Requirement:</i>	Existing
2 The field element shall include environmental sensors that measure weather conditions including temperature, wind, humidity, precipitation, and visibility.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Porter County Field Equipment</i>	
<i>Entity: Roadway</i>	
<i>Functional Area: Roadway Environmental Monitoring</i>	
Environmental sensors, surface and sub-surface, that collect weather and road surface information. Weather conditions measured include temperature, wind, humidity, precipitation, and visibility. Sensors measure road surface temperature, moisture, icing, salinity, etc.	
<i>Requirement:</i>	
3 The field element's environmental sensors shall be remotely controlled by a maintenance center.	Planned
<i>Requirement:</i>	
4 The field element's environmental sensors shall be remotely controlled by a traffic management center.	Potential
<i>Requirement:</i>	
5 The field element's environmental sensors shall be remotely controlled by weather service providers such as the National Weather Service or value-added sector specific meteorological services.	Potential
<i>Requirement:</i>	
6 The field element's environmental sensors shall be remotely controlled by a maintenance and construction vehicle.	Potential
<i>Requirement:</i>	
7 The field element shall provide environmental sensor equipment operational status to the controlling center or maintenance vehicle.	Existing
<i>Requirement:</i>	
8 The field element shall provide environmental sensor equipment fault indication to the controlling center or maintenance vehicle.	Existing
<i>Requirement:</i>	
9 The field element shall remotely aggregate environmental sensor data with environmental data collected from maintenance and construction vehicles.	Planned
<i>Requirement:</i>	
10 The field element shall provide weather and road surface condition data to centers.	Existing
<i>Requirement:</i>	
11 The field element shall provide weather and road surface condition data to maintenance and construction vehicles.	Existing
<i>Functional Area: Field Barrier System Control</i>	
Field elements that control barrier systems such as gates and other systems that manage entry to roadways, transportation facilities and infrastructure.	
<i>Requirement:</i>	
1 The field element shall activate barrier systems for transportation facilities and infrastructure under center control. Barrier systems include automated or remotely controlled gates, barriers and other systems that manage entry to roadways.	Potential
<i>Requirement:</i>	
2 The field element shall return barrier system operational status to the controlling center.	Potential
<i>Requirement:</i>	
3 The field element shall return barrier system fault data to the maintenance center for repair.	Potential
<i>Requirement:</i>	
4 The field element shall receive requests for access from approaching vehicles using field-vehicle communications and validate and authenticate the requests.	Potential
<i>Requirement:</i>	
5 The field element shall grant access only to qualified vehicles.	Potential
<i>Requirement:</i>	
6 The field element shall communicate access permission status and access instructions to approaching vehicles using field-vehicle communications.	Potential
<i>Functional Area: Roadway Speed Monitoring and Warning</i>	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Porter County Field Equipment</i>	
<i>Entity: Roadway</i>	
<i>Functional Area: Roadway Speed Monitoring and Warning</i>	
Vehicle speed sensors that detect excessive vehicle speeds, optionally based on conditions and vehicle type, informing drivers, centers and/or enforcement agencies of speed violations.	
<i>Requirement:</i>	Existing
1 The field element shall include sensors to detect vehicle speeds, under traffic or maintenance center control.	
<i>Requirement:</i>	Planned
2 The field element shall include sensors to detect vehicle speeds, under enforcement agency control.	
<i>Requirement:</i>	Existing
3 If the speed detected by vehicle speed sensors is determined to be excessive, the field element shall provide a safe speed advisory to passing drivers via a driver information system (such as portable messages signs, field to vehicle communications to in-vehicle signing systems, etc.).	
<i>Requirement:</i>	Planned
4 The field element shall base speed advisories to passing drivers on environmental conditions.	
<i>Requirement:</i>	Planned
5 The field element shall monitor notify an enforcement agency when a speed violation is detected.	
<i>Requirement:</i>	Existing
6 The field element shall return operational status for the vehicle speed sensors to the controlling traffic or maintenance center; including measured speeds, warning messages displayed, and violation records.	
<i>Requirement:</i>	Planned
7 The field element shall return operational status for the vehicle speed sensors to the enforcement agency.	
<i>Requirement:</i>	Existing
8 The field element shall return fault data for the vehicle speed sensors to the controlling center for repair.	
<i>Functional Area: Roadway Infrastructure Monitoring</i>	
Sensors that monitor the condition of pavement, bridges, tunnels, associated hardware, and other transportation-related infrastructure (e.g., culverts), under maintenance center and maintenance vehicle control.	
<i>Requirement:</i>	Potential
1 The field element shall include infrastructure condition monitoring sensors that monitor the condition of pavement, bridges, tunnels, associated hardware, and other transportation-related infrastructure (e.g., culverts), under maintenance center control.	
<i>Requirement:</i>	Potential
2 The field element shall include infrastructure condition monitoring sensors that monitor the condition of pavement, bridges, tunnels, associated hardware, and other transportation-related infrastructure (e.g., culverts), under maintenance vehicle control.	
<i>Requirement:</i>	Potential
3 The field element shall provide operational status for the infrastructure condition monitoring sensors to the maintenance center.	
<i>Requirement:</i>	Potential
4 The field element shall provide operational status for the infrastructure condition monitoring sensors to the maintenance vehicle.	
<i>Requirement:</i>	Potential
5 The field element shall provide fault data for the infrastructure condition monitoring sensors to the maintenance center for repair.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Porter County Field Equipment</i>	
<i>Entity: Roadway</i>	
<i>Functional Area: Roadway Work Zone Traffic Control</i>	
Field elements in maintenance and construction areas including CCTV cameras, driver information systems (such as DMS), and gates/barriers that monitor and control traffic and provide information directly to drivers in affected areas.	
<i>Requirement:</i>	Potential
1 The field element shall collect, process, and send work zone images to the center for further analysis and distribution, under center control.	
<i>Requirement:</i>	Existing
2 Under traffic and maintenance center control, the field element shall include driver information systems (such as dynamic messages signs and highway advisory radios) that advise drivers of activity around the work zone through which they are currently passing.	
<i>Requirement:</i>	Existing
3 Under the control of field personnel within maintenance vehicles, the field element shall include driver information systems (such as dynamic messages signs and highway advisory radios) that advise drivers of activity around a work zone through which they are currently passing.	
<i>Requirement:</i>	Planned
4 The field element shall control access to the work zone using automated gate or barrier systems. This includes automated flagger assistance devices that include automated gate arms and other automated gate/barrier systems.	
<i>Requirement:</i>	Existing
5 The field element shall provide operational status for the surveillance (e.g. CCTV), driver information systems, and gates/barriers in work zones to the maintenance center.	
<i>Requirement:</i>	Existing
6 The field element shall provide fault data for the surveillance (e.g. CCTV), driver information systems, and gates/barriers in work zones to the maintenance center for repair.	
<i>Functional Area: Roadway Work Zone Safety</i>	
Work zone intrusion detection devices (to detect vehicle intrusion upon a work zone or crew worker movement across a work zone boundary) and intrusion alerting devices that provide alerts to crew and drivers.	
<i>Requirement:</i>	Potential
1 The field element shall include work zone intrusion detection devices that detect when a vehicle has intruded upon the boundary of a work zone, under center control.	
<i>Requirement:</i>	Potential
2 The field element shall include work zone intrusion detection devices that detect when crew workers have crossed the boundary between the work zone and vehicle traffic, under center control.	
<i>Requirement:</i>	Potential
3 The field element shall include work zone intrusion alerting devices that alert crew workers of a work zone emergency or safety issue such as the intrusion of a vehicle into the work zone area or movement of field crew into the travel lanes.	
<i>Requirement:</i>	Potential
4 The field element shall include work zone intrusion alerting devices that notify crew via maintenance vehicles of a work zone emergency or safety issue such as the intrusion of a vehicle into the work zone area or movement of field crew into the travel lanes.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Porter County Field Equipment</i>	
<i>Entity: Roadway</i>	
<i>Functional Area: Roadway Work Zone Safety</i>	
Work zone intrusion detection devices (to detect vehicle intrusion upon a work zone or crew worker movement across a work zone boundary) and intrusion alerting devices that provide alerts to crew and drivers.	
<i>Requirement:</i> 5 The field element shall include work zone intrusion alerting devices that alert drivers that they have intruded upon the perimeter of the work zone, or are about to do so; may provide alerts to drivers directly or via in-vehicle signing.	Potential
<i>Requirement:</i> 6 The field element shall provide operational status for the work zone intrusion detection devices to the maintenance center.	Potential
<i>Requirement:</i> 7 The field element shall provide fault data for the work zone intrusion detection devices to the maintenance center for repair.	Potential
<i>Requirement:</i> 8 The field element shall provide operational status for the work zone intrusion alerting devices to the maintenance center.	Potential
<i>Requirement:</i> 9 The field element shall provide fault data for the work zone intrusion alerting devices to the maintenance center for repair.	Potential
<i>Functional Area: Roadway Data Collection</i>	
Field elements to collect traffic, road, and environmental conditions information for use in transportation planning, research, and other off-line applications. Includes the sensors, supporting roadside infrastructure, and communications equipment.	
<i>Requirement:</i> 1 The field element shall collect traffic, road, and environmental conditions information.	Existing
<i>Requirement:</i> 2 The field element shall include the sensors and supporting roadside devices that sense, collect, and send traffic, road, and environmental conditions information to a center for archival.	Existing
<i>Requirement:</i> 3 The field element shall collect sensor status and sensor faults from roadside equipment and send it along with the recorded data to a center for archival.	Existing
<i>Element: Porter County Highway Department</i>	
<i>Entity: Traffic Management</i>	
<i>Functional Area: TMC Probe Information Collection</i>	
Collects, assimilates, and disseminates vehicle probe data collected from roadside beacons and centers controlling transit vehicles, emergency vehicles, toll collection points, and route-guided vehicles.	
<i>Requirement:</i> 1 The center shall collect traffic probe data from vehicles via roadside field equipment.	Potential
<i>Requirement:</i> 2 The center shall collect road condition data from probe-equipped transit vehicles via transit management centers; the data may be aggregated and preliminarily processed at the sending center.	Potential
<i>Requirement:</i> 3 The center shall collect traffic data from traveler information centers based on data from their subscriber vehicles; the data may be aggregated and initial link time calculations performed at the sending center.	Potential

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Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Porter County Highway Department</i>	
<i>Entity: Traffic Management</i>	
Functional Area: TMC Probe Information Collection	
Collects, assimilates, and disseminates vehicle probe data collected from roadside beacons and centers controlling transit vehicles, emergency vehicles, toll collection points, and route-guided vehicles.	
<i>Requirement:</i>	Potential
4 The center shall collect traffic data from toll administrative centers containing travel times between toll collection points for those vehicles equipped for electronic toll collection; the data may be aggregated and processed at the sending center.	
<i>Requirement:</i>	Potential
5 The center shall assimilate current and forecast traffic conditions based on collected probe data and distribute to other centers for dissemination to travelers.	
<i>Requirement:</i>	Potential
6 The center shall collect operational status for the roadside probe data collection equipment.	
<i>Requirement:</i>	Potential
7 The center shall collect fault data for the roadside probe data collection equipment for repair.	
Functional Area: TMC Signal Control	
Remotely controls traffic signal controllers to implement traffic management strategies at signalized intersections based on traffic conditions, incidents, emergency vehicle preemptions, pedestrian crossings, etc.	
<i>Requirement:</i>	Existing
1 The center shall remotely control traffic signal controllers.	
<i>Requirement:</i>	Planned
2 The center shall accept notifications of pedestrian calls.	
<i>Requirement:</i>	Existing
3 The center shall collect traffic signal controller operational status and compare against the control information sent by the center.	
<i>Requirement:</i>	Existing
4 The center shall collect traffic signal controller fault data from the field.	
<i>Requirement:</i>	Existing
5 The center shall manage (define, store and modify) control plans to coordinate signalized intersections, to be engaged at the direction of center personnel or according to a daily schedule.	
<i>Requirement:</i>	Existing
6 The center shall implement control plans to coordinate signalized intersections based on data from sensors.	
<i>Requirement:</i>	Existing
7 The center shall manage boundaries of the control sections used within the signal system.	
<i>Requirement:</i>	Existing
8 The center shall maintain traffic signal coordination including synchronizing clocks throughout the system.	
Functional Area: TMC Regional Traffic Management	
Coordination between traffic management centers in order to share traffic information between centers as well as control of traffic management field equipment. This may be used during incidents and special events and during day-to-day operations.	
<i>Requirement:</i>	Planned
1 The center shall exchange traffic information with other traffic management centers including incident information, congestion data, traffic data, signal timing plans, and real-time signal control information.	
<i>Requirement:</i>	Planned
2 The center shall exchange traffic control information with other traffic management centers to support remote monitoring and control of traffic management devices (e.g. signs, sensors, signals, cameras, etc.).	

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Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Porter County Highway Department	
<i>Entity:</i> Traffic Management	
<i>Functional Area:</i> TMC Traffic Management Decision Support	
Recommends courses of action to the traffic operator based on current and forecast road and traffic conditions. Recommended actions may include predefined incident response plans, signal timing plan changes, DMS/HAR messages, lane control strategies, metering strategies, etc.	
<i>Requirement:</i>	Planned
1 The center shall provide center personnel with an integrated regional view of current and forecast road and traffic conditions including traffic incidents, special events, maintenance activities and other events or conditions that impact capacity or demand.	
<i>Requirement:</i>	Planned
2 The center shall identify network imbalances and potential courses of action.	
<i>Requirement:</i>	Planned
3 The center shall compare the impact of potential courses of action and make recommendations to the operator.	
<i>Requirement:</i>	Planned
4 The recommended actions shall include predefined incident response plans, signal timing plan changes, DMS/HAR messages, lane control strategies and freeway control strategies including ramp metering, interchange metering, and mainline metering.	
<i>Requirement:</i>	Planned
5 The recommended actions shall include multimodal strategies that include suggested transit strategies and suggested route and mode choices for travelers.	
<i>Requirement:</i>	Planned
6 The center shall provide an interface to center personnel to input control parameters for the decision support process and receive recommended actions and supporting information presentation.	
<i>Functional Area:</i> TMC Incident Dispatch Coordination/Communication	
Formulates an incident response that takes into account the incident potential, incident impacts, and/or resources required for incident management. Facilitates the dispatch of emergency response and service vehicles and coordinates the response with cooperating agencies.	
<i>Requirement:</i>	Existing
1 The center shall 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.	
<i>Requirement:</i>	Existing
2 The center shall coordinate planning for incidents with emergency management centers - including pre-planning activities for disaster response, evacuation, and recovery operations.	
<i>Requirement:</i>	Planned
3 The center shall support requests from emergency management centers to remotely control sensor and surveillance equipment located in the field, provide special routing for emergency vehicles, and to provide responding emergency vehicles with signal preemption.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Porter County Highway Department</i>	
<i>Entity: Traffic Management</i>	
<i>Functional Area: TMC Incident Dispatch Coordination/Communication</i>	
Formulates an incident response that takes into account the incident potential, incident impacts, and/or resources required for incident management. Facilitates the dispatch of emergency response and service vehicles and coordinates the response with cooperating agencies.	
<i>Requirement:</i> 4 The center shall exchange incident information with emergency management centers, maintenance and construction centers, transit centers, information service providers, and the media including description, location, traffic impact, status, expected duration, and response information.	Existing
<i>Requirement:</i> 5 The center shall 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.	Potential
<i>Requirement:</i> 6 The center shall 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.	Planned
<i>Requirement:</i> 7 The center shall provide road network conditions and traffic images to emergency management centers, maintenance and construction centers, and traveler information service providers.	Potential
<i>Requirement:</i> 8 The center shall monitor incident response performance and calculate incident response and clearance times.	Planned
<i>Requirement:</i> 9 The center shall 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.	Planned
<i>Requirement:</i> 10 The center shall coordinate information and controls with other traffic management centers.	Potential
<i>Requirement:</i> 11 The center shall receive inputs from emergency management and transit management centers to develop an overall status of the transportation system including emergency transit schedules in effect and current status and condition of the transportation infrastructure.	Planned
<i>Requirement:</i> 12 The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for traffic incident management.	Planned
<i>Functional Area: TMC Evacuation Support</i>	
Development, coordination, and execution of special traffic management strategies during evacuation and subsequent reentry of a population in the vicinity of a disaster or major emergency. Interfaces with emergency management and other traffic management centers.	
<i>Requirement:</i> 1 The center shall coordinate planning for evacuation with emergency management centers - including pre-planning activities such as establishing routes, areas to be evacuated, timing, etc.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Porter County Highway Department</i>	
<i>Entity: Traffic Management</i>	
<i>Functional Area: TMC Evacuation Support</i>	
Development, coordination, and execution of special traffic management strategies during evacuation and subsequent reentry of a population in the vicinity of a disaster or major emergency. Interfaces with emergency management and other traffic management centers.	
<i>Requirement:</i>	Potential
2 The center shall 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.	
<i>Requirement:</i>	Potential
3 The center shall coordinate information and controls with other traffic management centers.	
<i>Requirement:</i>	Potential
4 The center shall 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.	
<i>Functional Area: TMC Traffic Network Performance Evaluation</i>	
Measures performance and predicts travel demand patterns to support traffic flow optimization, demand management, and incident management. Collects data from surveillance equipment as well as input from other management centers including emissions, event promoters, and other TMCs.	
<i>Requirement:</i>	Potential
1 The center shall monitor, analyze, and store traffic sensor data (speed, volume, occupancy) collected from field elements under remote control of the center to support overall network performance evaluations.	
<i>Requirement:</i>	Potential
2 The center shall collect wide-area pollution data from emissions management centers to support overall network performance evaluations.	
<i>Requirement:</i>	Planned
3 The center shall collect and store plans from event promoters for major future events possibly impacting traffic to support overall network performance evaluations.	
<i>Requirement:</i>	Planned
4 The center shall collect and store anticipated route information from information service providers to support overall network performance evaluations and predictions.	
<i>Requirement:</i>	Potential
5 The center shall exchange information with transit management centers including details current transit routes, the level of service on each route, and the progress of individual vehicles along their routes for use in forecasting demand and estimating current transportation network performance.	
<i>Requirement:</i>	Planned
6 The center shall exchange traffic information with other traffic management centers, including incidents, congestion data, traffic data, signal timing plans, and real-time signal control information to support overall network performance evaluations.	
<i>Requirement:</i>	Planned
7 The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for network performance evaluations.	

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Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Porter County Highway Department	
<i>Entity:</i> Traffic Management	
<i>Functional Area:</i> TMC Traffic Network Performance Evaluation	
Measures performance and predicts travel demand patterns to support traffic flow optimization, demand management, and incident management. Collects data from surveillance equipment as well as input from other management centers including emissions, event promoters, and other TMCs.	
<i>Requirement:</i>	Planned
8 The center shall provide an interface to the archive data repository to enable the operator to retrieve historical operating data for use in planning to predict future traffic patterns and conditions.	
<i>Requirement:</i>	Planned
9 This center shall use the collected information to measure overall current and forecast network performance and predict travel demand patterns.	
<i>Functional Area:</i> HRI Traffic Management	
Remotely monitor and control highway-rail intersection (HRI) equipment, includes standard speed active warning systems and high speed systems which provide additional information on approaching trains and detect and report on obstructions in the HRI.	
<i>Requirement:</i>	Planned
1 The center shall remotely control highway-rail intersection (HRI) equipment located in the field.	
<i>Requirement:</i>	Planned
2 The center shall accept collect highway-rail intersection (HRI) advisory or alert data from rail operations centers.	
<i>Requirement:</i>	Planned
3 The center shall collect highway-rail intersection (HRI) equipment operational status and compare against the control information sent by the center.	
<i>Requirement:</i>	Planned
4 The center shall provide the highway-rail intersection (HRI) equipment operational status to rail operations centers.	
<i>Requirement:</i>	Planned
5 The center shall collect incident information related to a highway-rail intersection (HRI), such as intersection blockages or crashes or equipment malfunctions.	
<i>Requirement:</i>	Planned
6 The center shall implement control plans to coordinate signalized intersections around highway-rail intersections (HRI), under control of center personnel, based on data from sensors and surveillance monitoring traffic conditions, incidents, equipment faults, pedestrian crossings, etc.	
<i>Functional Area:</i> Rail Operations Coordination	
Coordination between rail operations and traffic management centers - exchanging train schedules, maintenance schedules, as well as incidents and priority messages that impact highway-rail intersections (HRIs). Supports advanced traffic control strategies and enhanced traveler information.	
<i>Requirement:</i>	Planned
1 The center shall exchange highway-rail intersection (HRI) information with rail operations centers. This information may include event schedules, requests for information from the Rail Operators, incident notification based on rail operations messages, and priority messages like notifications of a HAZMAT spill, equipment failure, or an intersection blockage.	
<i>Requirement:</i>	Planned
2 The center shall receive highway-rail intersection (HRI) maintenance schedules, train schedules, and incident notifications from rail operations centers.	

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Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Porter County Highway Department	
<i>Entity:</i> Traffic Management	
<i>Functional Area:</i> Rail Operations Coordination	
Coordination between rail operations and traffic management centers - exchanging train schedules, maintenance schedules, as well as incidents and priority messages that impact highway-rail intersections (HRIs). Supports advanced traffic control strategies and enhanced traveler information.	
<i>Requirement:</i>	Planned
3 The center shall use the rail operations information to develop forecast HRI closure times and durations which may be applied in advanced traffic control strategies or delivered as enhanced traveler information.	
<i>Functional Area:</i> TMC Speed Monitoring and Warning	
Remotely monitors vehicle speeds, and informs an enforcement agency if excessive speeds are detected. Also configures and controls speed warning systems that provide safe speed advisories to the motorist.	
<i>Requirement:</i>	Existing
1 The center shall remotely control vehicle speed sensors typically placed in work zones; control parameters may include environmental and traffic conditions.	
<i>Requirement:</i>	Existing
2 The center shall collect operational status for the vehicle speed sensors; the status shall include logged information including measured speeds, warning messages displayed, and violation records.	
<i>Requirement:</i>	Existing
3 The center shall provide the capability to notify an enforcement agency when vehicle speeds in the work zone are in excess of the posted speed limit or are creating an unsafe condition based upon the current environmental or traffic conditions.	
<i>Requirement:</i>	Existing
4 The center shall collect fault data for the vehicle speed sensors for repair.	
<i>Functional Area:</i> TMC Multimodal Crossing Management	
Remotely monitors and manages multimodal crossings, such as draw bridges and other crossings between highway traffic and other modes; does not include highway-rail intersection.	
<i>Requirement:</i>	Planned
1 The center shall receive requests from non-highway traffic to cross at multimodal crossings for specified durations (such as draw bridges and miscellaneous other interference crossings between highway traffic and other modes such as river traffic, aircraft, etc.)	
<i>Requirement:</i>	Planned
2 The center shall remotely control traffic signal controllers for use at major multimodal crossings.	
<i>Requirement:</i>	Potential
3 The center shall remotely control driver information systems (such as dynamic messages signs, highway advisory radios (HAR), and equipment that controls warning lights and gates) to notify drivers of closure durations and times at multimodal crossings.	
<i>Requirement:</i>	Planned
4 The center shall collect operational status for the equipment at multimodal crossings.	
<i>Requirement:</i>	Planned
5 The center shall collect fault data for the equipment at multimodal crossings for repair.	
<i>Requirement:</i>	Planned
6 The center shall receive and respond to requests for right-of-way at multimodal crossings.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Porter County Highway Department	
<i>Entity:</i> Traffic Management	
<i>Functional Area:</i> TMC Multimodal Crossing Management	
Remotely monitors and manages multimodal crossings, such as draw bridges and other crossings between highway traffic and other modes; does not include highway-rail intersection.	
<i>Requirement:</i>	
7 The center shall collect and analyze the planned multimodal crossing closures as a possible incident.	Planned
<i>Requirement:</i>	
8 The center shall distribute multimodal crossing information to other centers for dissemination to travelers.	Planned
<i>Functional Area:</i> Barrier System Management	
Remotely controls barrier systems such as gates and other systems that manage entry to roadways, transportation facilities and infrastructure.	
<i>Requirement:</i>	
1 The center shall remotely control barrier systems for transportation facilities and infrastructure. Barrier systems include automated or remotely controlled gates, barriers and other systems that manage entry to roadways.	Potential
<i>Requirement:</i>	
2 The center shall collect barrier system operational status.	Potential
<i>Requirement:</i>	
3 The center shall collect barrier system fault data and send to the maintenance center for repair.	Potential
<i>Requirement:</i>	
4 The center shall accept requests for barrier system activation from other centers and from center personnel to support emergency response and detours.	Potential
<i>Functional Area:</i> Traffic Equipment Maintenance	
Monitoring and remote diagnostics of field equipment - detect failures, issue problem reports, and track the repair or replacement of the failed equipment.	
<i>Requirement:</i>	
1 The center shall collect and store sensor (traffic, pedestrian, multimodal crossing) operational status.	Existing
<i>Requirement:</i>	
3 The center shall collect and store sensor (traffic, pedestrian, multimodal crossing) fault data and send to the maintenance center for repair.	Potential
<i>Requirement:</i>	
5 The center shall collect environmental sensor operational status.	Existing
<i>Requirement:</i>	
6 The center shall collect environmental sensor equipment fault data and send to the maintenance center for repair.	Existing
<i>Requirement:</i>	
7 The center shall exchange data with maintenance centers concerning the reporting of faulty equipment and the schedule/status of their repair. Information exchanged includes details of new equipment faults, and clearances when the faults are cleared.	Existing
<i>Requirement:</i>	
8 The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for traffic maintenance data.	Planned
<i>Functional Area:</i> TMC Demand Management Coordination	
Provides the capability to gather information on regional toll, parking, and transit usage and request changes to enable dynamic pricing for demand management.	

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Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Porter County Highway Department</i>	
<i>Entity: Traffic Management</i>	
<i>Functional Area: TMC Demand Management Coordination</i>	
Provides the capability to gather information on regional toll, parking, and transit usage and request changes to enable dynamic pricing for demand management.	
<i>Requirement:</i>	Planned
1 The center shall collect and store toll pricing data from toll administration centers, including the price for each road segment to which a toll applies, with the time and date for when it applies.	
<i>Requirement:</i>	Planned
2 The center shall collect and store parking information from parking management providers including lot locations, features (e.g. ability to handle oversized vehicles), capacity, type, hours of operation and rates.	
<i>Requirement:</i>	Planned
3 The center shall collect and store transit fare and schedule information from transit management centers.	
<i>Requirement:</i>	Planned
4 The center shall collect and store current transit, parking, and toll fee schedule information provided by regional traveler information systems.	
<i>Requirement:</i>	Planned
5 The center shall send requests to toll administration centers to change pricing, modify restrictions, or modify operations of a toll road facility.	
<i>Requirement:</i>	Planned
6 The center shall send requests to parking management providers to change the current parking lot charging structure.	
<i>Requirement:</i>	Planned
7 The center shall send requests to transit management centers to change the current transit services - schedules or fares of the transit services including park-and-ride lots.	
<i>Functional Area: Traffic Data Collection</i>	
Collection and storage of traffic management data. For use by operations personnel or data archives in the region.	
<i>Requirement:</i>	Existing
1 The center shall collect traffic management data such as operational data, event logs, etc.	
<i>Requirement:</i>	Existing
2 The center shall assign quality control metrics and meta-data to be stored along with the data. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.	
<i>Requirement:</i>	Planned
3 The center shall receive and respond to requests from ITS Archives for either a catalog of the traffic data or for the data itself.	
<i>Requirement:</i>	Planned
4 The center shall be able to produce sample products of the data available.	
<i>Functional Area: TMC Transportation Operations Data Collection</i>	
Collects real-time information on the state of the regional transportation system for operational use by the center. It establishes communications with a regional repository, requests or subscribes to information relevant to the center, and distributes the received information for use.	
<i>Requirement:</i>	Existing
1 The center shall collect real-time information on the state of the regional transportation system including current traffic and road conditions, weather conditions, special event and incident information.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Porter County Highway Department</i>	
<i>Entity: Traffic Management</i>	
<i>Functional Area: TMC Transportation Operations Data Collection</i>	
Collects real-time information on the state of the regional transportation system for operational use by the center. It establishes communications with a regional repository, requests or subscribes to information relevant to the center, and distributes the received information for use.	
<i>Requirement:</i> 2 The center shall support the capability for the system operator to monitor and control the information collection service.	Existing
<i>Element: Porter County Maintenance and Construction Management System</i>	
<i>Entity: Maintenance and Construction Management</i>	
<i>Functional Area: MCM Vehicle Tracking</i>	
Remotely tracks the location of maintenance and construction vehicles and other equipment; presented to the center personnel.	
<i>Requirement:</i> 1 The center shall monitor the locations of all maintenance and construction vehicles and other equipment under its jurisdiction.	Planned
<i>Requirement:</i> 2 The center shall present location data to center personnel for the fleet of maintenance and construction vehicles and other equipment.	Planned
<i>Requirement:</i> 3 The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for maintenance and construction vehicle tracking.	Planned
<i>Functional Area: MCM Vehicle and Equipment Maintenance Management</i>	
Monitors vehicle and equipment condition, tracks maintenance history, and schedules routine and corrective maintenance.	
<i>Requirement:</i> 1 The center shall collect and analyze vehicle diagnostics information from maintenance and construction vehicles. The information includes engine temperature, mileage, tire wear, brake wear, belt wear, and any warnings or alarms concerning the operational condition of the vehicle and ancillary equipment.	Existing
<i>Requirement:</i> 2 The center shall exchange information with equipment repair facilities including status and history of repairs concerning maintenance and construction vehicles. This information includes vehicle status and diagnostic information, vehicle utilization, and coordination of when vehicles will be available for preventative and corrective maintenance.	Existing
<i>Requirement:</i> 3 The center shall schedule preventive and corrective vehicle maintenance with the equipment repair facility based on fleet health reports, maintenance records, vehicle utilization and vehicle availability schedules.	Existing
<i>Functional Area: MCM Incident Management</i>	
Supports coordinated response to incidents - share incident notifications, manage incident response resources, and coordinate overall incident situation and response among allied response organizations.	
<i>Requirement:</i> 1 The center shall 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.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Porter County Maintenance and Construction Management System	
<i>Entity:</i> Maintenance and Construction Management	
<i>Functional Area:</i> MCM Incident Management	
Supports coordinated response to incidents - share incident notifications, manage incident response resources, and coordinate overall incident situation and response among allied response organizations.	
<i>Requirement:</i>	Existing
2 The center shall 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.	
<i>Requirement:</i>	Existing
3 The center shall 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.	
<i>Requirement:</i>	Existing
4 The center shall coordinate planning for incidents with emergency management centers - including pre-planning activities for disaster response, evacuation, and recovery operations.	
<i>Requirement:</i>	Existing
5 The center shall 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.	
<i>Requirement:</i>	Existing
6 The center shall exchange road network status assessment information with emergency management and traffic management 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.	
<i>Requirement:</i>	Existing
7 The center shall 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.	
<i>Requirement:</i>	Existing
8 The center shall receive information indicating the damage sustained by transportation assets, derived from aerial surveillance, field reports, inspections, tests, and analyses to support incident management.	
<i>Functional Area:</i> MCM Maintenance Decision Support	
Maintenance Decision Support Systems recommend courses of action based on current and forecast environmental and road conditions (filtered and fused for specific time horizons) and additional application specific information. Recommendations and dispatch instructions are generated based on this integrated information.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Porter County Maintenance and Construction Management System</i>	
<i>Entity: Maintenance and Construction Management</i>	
<i>Functional Area: MCM Maintenance Decision Support</i>	
Maintenance Decision Support Systems recommend courses of action based on current and forecast environmental and road conditions (filtered and fused for specific time horizons) and additional application specific information. Recommendations and dispatch instructions are generated based on this integrated information.	
<i>Requirement:</i>	Existing
1 The center shall provide the center personnel with tailored external information, including weather or road condition observations, forecasted weather information or road conditions, current usage of treatments and materials, available resources, equipment and vehicle availability, road network information, and source reliability information.	
<i>Requirement:</i>	Existing
2 The center shall tailor the decision support information to include filtering (selection from a large amount of external information), error reduction ('smoothing' the information), fusion (combination of disparate information to match the decision needs), and analysis (creating the decision).	
<i>Requirement:</i>	Existing
3 The center shall provide an interface to the center personnel to input control parameters for the decision support process and receive decisions or information presentation.	
<i>Requirement:</i>	Existing
4 The center shall provide dispatch information to maintenance and construction vehicles based on the outputs of the decision support system, including recommended roadway treatment actions.	
<i>Functional Area: MCM Winter Maintenance Management</i>	
Manages winter road maintenance, tracking and controlling snow plow operations, roadway treatment (e.g., salt spraying and other material applications) based on weather information.	
<i>Requirement:</i>	Existing
1 The center shall respond to requests from emergency management and traffic management centers for hazard removal, field equipment repair, and other winter roadway maintenance.	
<i>Requirement:</i>	Existing
2 The center shall exchange information with administrative systems to support the planning and scheduling of winter maintenance activities. This information includes: equipment and consumables resupply purchase request status, personnel qualifications including training and special certifications, environmental regulations and rules that may impact maintenance activities, and requests and project requirements from contract administration.	
<i>Requirement:</i>	Existing
3 The center shall 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.	
<i>Requirement:</i>	Existing
4 The center shall receive equipment availability and materials storage status information from storage facilities to support the scheduling of winter maintenance activities.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Porter County Maintenance and Construction Management System</i>	
<i>Entity: Maintenance and Construction Management</i>	
<i>Functional Area: MCM Winter Maintenance Management</i>	
Manages winter road maintenance, tracking and controlling snow plow operations, roadway treatment (e.g., salt spraying and other material applications) based on weather information.	
<i>Requirement:</i>	
5 The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for the scheduling of winter maintenance activities.	Planned
<i>Requirement:</i>	
6 The center shall collect real-time information on the state of the regional transportation system from other centers including current traffic and road conditions, weather conditions, special event and incident information and use the collected information to support winter maintenance operations.	Existing
<i>Requirement:</i>	
7 The center shall dispatch and route winter maintenance vehicle drivers and support them with route- specific environmental, incident, advisory, threat, alert, and traffic congestion information.	Existing
<i>Requirement:</i>	
8 The center shall 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.	Existing
<i>Requirement:</i>	
9 The center shall 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.	Existing
<i>Requirement:</i>	
10 The center shall support remote control of on-board maintenance and construction vehicle systems and field equipment that is remotely controlled by the vehicle such as adjusting material application rates and spread patterns.	Planned
<i>Requirement:</i>	
11 The center shall assess the current status of all winter maintenance activities, including actual work activities performed, current locations and operational conditions of vehicles, materials and equipment inventories, field equipment status, environmental information, etc.	Existing
<i>Functional Area: MCM Roadway Maintenance and Construction</i>	
Overall management and support for routine maintenance on the roadway or right-of-way. Includes landscape maintenance, hazard removal (roadway debris, dead animals), routine maintenance activities (roadway cleaning, grass cutting), and repair and maintenance of both ITS and non-ITS equipment.	
<i>Requirement:</i>	
1 The center shall maintain an interface with asset management systems to track the inventory, restrictions, repair needs and status updates of transportation assets (pavement, bridges, signs, etc.) including location, installation and materials information, vendor/contractor, current maintenance status, standard height, width, and weight restrictions.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Porter County Maintenance and Construction Management System	
<i>Entity:</i> Maintenance and Construction Management	
<i>Functional Area:</i> MCM Roadway Maintenance and Construction	
Overall management and support for routine maintenance on the roadway or right-of-way. Includes landscape maintenance, hazard removal (roadway debris, dead animals), routine maintenance activities (roadway cleaning, grass cutting), and repair and maintenance of both ITS and non-ITS equipment.	
<i>Requirement:</i>	
2 The center shall respond to requests from emergency management and traffic management centers for hazard removal, field equipment repair, and other roadway maintenance.	Existing
<i>Requirement:</i>	
3 The center shall exchange information with administrative systems to support the planning and scheduling of maintenance activities. This information includes: equipment and consumables resupply purchase request status, personnel qualifications including training and special certifications, environmental regulations and rules that may impact maintenance activities, and requests and project requirements from contract administration.	Existing
<i>Requirement:</i>	
4 The center shall provide emergency management and traffic management centers with information about scheduled maintenance and construction work activities including anticipated closures and impact to the roadway, alternate routes, anticipated delays, closure times, and durations.	Existing
<i>Requirement:</i>	
5 The center shall collect the status and fault data from roadside equipment, such as traffic, infrastructure, and environmental sensors, highway advisory radio and dynamic message signs, automated roadway treatment systems, barrier and safeguard systems, cameras, traffic signals and override equipment, ramp meters, short range communications equipment, security sensors and surveillance equipment, etc., and provide a cohesive view of equipment repair needs.	Potential
<i>Requirement:</i>	
6 The center shall collect the status and fault data from the centers that operate the equipment, including data for traffic, infrastructure, and environmental sensors, highway advisory radio and dynamic message signs, automated roadway treatment systems, barrier and safeguard systems, cameras, traffic signals and override equipment, ramp meters, short range communications equipment, security sensors and surveillance equipment, etc., and provide a cohesive view of equipment repair needs.	Potential
<i>Requirement:</i>	
7 The center shall receive equipment availability and materials storage status information from storage facilities to support the scheduling of roadway maintenance and construction activities.	Existing
<i>Requirement:</i>	
8 The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for the scheduling of roadway maintenance and construction activities.	Planned
<i>Requirement:</i>	
9 The center shall collect current and forecast traffic and weather information from traffic management centers and weather service providers (such as the National Weather Service and value-added sector specific meteorological services).	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Porter County Maintenance and Construction Management System	
<i>Entity:</i> Maintenance and Construction Management	
<i>Functional Area:</i> MCM Roadway Maintenance and Construction	
Overall management and support for routine maintenance on the roadway or right-of-way. Includes landscape maintenance, hazard removal (roadway debris, dead animals), routine maintenance activities (roadway cleaning, grass cutting), and repair and maintenance of both ITS and non-ITS equipment.	
<i>Requirement:</i>	
10 The center shall dispatch and route maintenance and construction vehicle drivers and support them with route-specific environmental, incident, advisory, threat, alert, and traffic congestion information.	Existing
<i>Requirement:</i>	
11 The center shall manage an interface with center personnel to accept vehicle systems control information and remotely control maintenance and construction vehicle on-board equipment.	Planned
<i>Requirement:</i>	
12 The center shall track the status of roadway maintenance and construction activities by monitoring collected data from the dispatched vehicles and equipment.	Planned
<i>Requirement:</i>	
13 The center shall report the status of field equipment maintenance activities to the centers that operate the equipment.	Existing
<i>Functional Area:</i> MCM Work Zone Management	
Remotely monitors and supports work zone activities, controlling traffic through dynamic message signs (DMS), highway advisory radio, gates and barriers, and informing other groups of activity (e.g., traveler information systems, traffic management centers, other maintenance and construction centers).	
<i>Requirement:</i>	
1 The center shall generate new work zone activity schedules for use by maintenance and construction vehicles, maintenance and construction operators, and for information coordination purposes.	Existing
<i>Requirement:</i>	
2 The center shall control the collection of work zone status information including video images from cameras located in or near the work zone.	Existing
<i>Requirement:</i>	
3 The center shall disseminate work zone information to other agencies and centers including traffic, transit, emergency management centers, other maintenance centers, traveler information providers, and the media.	Existing
<i>Requirement:</i>	
4 The center shall control traffic in work zones by providing remote control of dynamic message signs, highway advisory radio systems, gates, and barriers located in or near the work zone.	Potential
<i>Requirement:</i>	
5 The center shall exchange information with administrative systems to support the planning and scheduling of work zone activities. This information includes: equipment and consumables resupply purchase request status, personnel qualifications including training and special certifications, environmental regulations and rules that may impact maintenance activities, and requests and project requirements from contract administration.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Porter County Maintenance and Construction Management System</i>	
<i>Entity: Maintenance and Construction Management</i>	
<i>Functional Area: MCM Work Zone Management</i>	
Remotely monitors and supports work zone activities, controlling traffic through dynamic message signs (DMS), highway advisory radio, gates and barriers, and informing other groups of activity (e.g., traveler information systems, traffic management centers, other maintenance and construction centers).	
<i>Requirement:</i> 6 The center shall collect real-time information on the state of the road network including current traffic and road conditions to support work zone scheduling and management.	Existing
<i>Functional Area: MCM Speed Monitoring and Warning</i>	
Remotely monitors vehicle speeds, and informs an enforcement agency if excessive speeds are detected; primarily used in work zones.	
<i>Requirement:</i> 1 The center shall remotely control vehicle speed sensors typically placed in work zones; control parameters may include environmental and traffic conditions.	Existing
<i>Requirement:</i> 2 The center shall collect operational status for the vehicle speed sensors; the status shall include logged information including measured speeds, warning messages displayed, and violation records.	Planned
<i>Requirement:</i> 3 The center shall provide the capability to notify an enforcement agency when vehicle speeds in the work zone are in excess of the posted speed limit or are creating an unsafe condition based upon the current environmental or traffic conditions.	Existing
<i>Requirement:</i> 4 The center shall collect fault data for the vehicle speed sensors for repair.	Existing
<i>Functional Area: MCM Work Zone Safety Management</i>	
Remotely monitors work zone safety systems that detect vehicle intrusions in work zones and warns crew workers and drivers of imminent encroachment. Crew movements are also monitored so that the crew can be warned of movement beyond the designated safe zone.	
<i>Requirement:</i> 1 The center shall provide remote monitoring and control of work zone safety devices - including intrusion detection devices that have been installed in work zones or maintenance areas.	Potential
<i>Requirement:</i> 2 The center shall provide remote monitoring and control of intrusion alert devices that have been installed in work zones or maintenance areas.	Potential
<i>Requirement:</i> 3 The center shall collect status information of work zone safety device status from field equipment or the maintenance and construction vehicles.	Potential
<i>Requirement:</i> 4 The center shall collect and store work zone data collected from work zone monitoring devices (such as intrusion detection or alert devices and speed monitoring devices) on-board the vehicle and at the roadside.	Potential
<i>Functional Area: MCM Work Activity Coordination</i>	
Disseminates work activity schedules and current asset restrictions to other agencies. Work schedules are coordinated, factoring in the needs and activities of other agencies and adjacent jurisdictions.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Porter County Maintenance and Construction Management System</i>	
<i>Entity: Maintenance and Construction Management</i>	
<i>Functional Area: MCM Work Activity Coordination</i>	
Disseminates work activity schedules and current asset restrictions to other agencies. Work schedules are coordinated, factoring in the needs and activities of other agencies and adjacent jurisdictions.	
<i>Requirement:</i> 1 The center shall 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.	Planned
<i>Requirement:</i> 2 The center shall 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.	Planned
<i>Requirement:</i> 3 The center shall collect and respond to feedback concerning scheduled maintenance and construction activities with other management centers such as traffic, emergency, transit, and rail operations.	Planned
<i>Requirement:</i> 4 The center shall collect and disseminate asset restriction information levied on transportation asset usage based on infrastructure design, surveys, tests, or analyses. This includes standard facility design height, width, and weight restrictions, special restrictions such as spring weight restrictions, and temporary facility restrictions that are imposed during maintenance and construction.	Planned
<i>Requirement:</i> 5 The center shall exchange information with administrative systems to support the planning and scheduling of maintenance and construction activities. This information includes: equipment and consumables resupply purchase request status, personnel qualifications including training and special certifications, environmental regulations and rules that may impact maintenance activities, and requests and project requirements from contract administration.	Existing
<i>Requirement:</i> 6 The center shall exchange rail schedules and work plans with rail operations centers.	Planned
<i>Functional Area: MCM Infrastructure Monitoring</i>	
Remotely monitors the condition of pavement, bridges, tunnels, associated hardware, and other transportation-related infrastructure (e.g., culverts) using vehicle-based and roadway-based infrastructure monitoring sensors.	
<i>Requirement:</i> 1 The center shall remotely control and collect data from fixed infrastructure monitoring sensors that monitor vibration, stress, temperature, surface continuity, and other condition measures.	Planned
<i>Requirement:</i> 2 The center shall monitor maintenance vehicle-based mobile sensors and data logging devices that collect information on current infrastructure condition.	Planned

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Porter County Maintenance and Construction Management System	
<i>Entity:</i> Maintenance and Construction Management	
<i>Functional Area:</i> MCM Infrastructure Monitoring	
Remotely monitors the condition of pavement, bridges, tunnels, associated hardware, and other transportation-related infrastructure (e.g., culverts) using vehicle-based and roadway-based infrastructure monitoring sensors.	
<i>Requirement:</i>	
3 The center shall remotely collect data from vehicle probes using short range communications equipment and process this data to identify potential pavement degradation, potholes, and other rough or adverse road surface conditions.	Planned
<i>Requirement:</i>	
4 The center shall process the collected information and use it to monitor the condition of pavement, bridges, tunnels, associated hardware, and other transportation-related infrastructure.	Planned
<i>Requirement:</i>	
5 The center shall collect current maintenance and repair needs from the asset management system and correlate this data with data collected through infrastructure monitoring systems.	Planned
<i>Requirement:</i>	
6 The center shall provide current infrastructure conditions information to the asset management system.	Planned
<i>Requirement:</i>	
7 The center shall report infrastructure repair needs to the maintenance management system.	Planned
<i>Functional Area:</i> MCM Data Collection	
Collection and storage of maintenance and construction information. For use by operations personnel or data archives in the region.	
<i>Requirement:</i>	
1 The center shall collect maintenance and construction data (such as field equipment status, infrastructure status, maintenance and construction activity data) gathered from roadway, traffic, and other maintenance and construction sources.	Existing
<i>Requirement:</i>	
2 The center shall assign quality control metrics and meta-data to be stored along with the data. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.	Planned
<i>Requirement:</i>	
3 The center shall receive and respond to requests from ITS Archives for either a catalog of the maintenance and construction data or for the data itself.	Planned
<i>Requirement:</i>	
4 The center shall be able to produce sample products of the data available.	Planned
<i>Requirement:</i>	
5 The center shall provide data to Asset Management to be used in updating the status of assets in the inventory.	Existing
<i>Functional Area:</i> MCM Transportation Operations Data Collection	
Collects real-time information on the state of the regional transportation system for operational use by the center. It establishes communications with a regional repository, requests or subscribes to information relevant to the center, and distributes the received information for use.	
<i>Requirement:</i>	
1 The center shall collect real-time information on the state of the regional transportation system including current traffic and road conditions, weather conditions, special event and incident information.	Existing
<i>Requirement:</i>	
2 The center shall support the capability for the system operator to monitor and control the information collection service.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Porter County Maintenance and Construction Vehicles	
<i>Entity:</i> Maintenance and Construction Vehicle	
<i>Functional Area:</i> MCV Vehicle Location Tracking	
On-board systems to track vehicle location and reports the position and timestamp information to the dispatch center.	
<i>Requirement:</i>	
1 The maintenance and construction vehicle shall track its current location.	Planned
<i>Requirement:</i>	
2 The maintenance and construction vehicle shall send the time stamped vehicle location to the controlling center.	Planned
<i>Functional Area:</i> MCV Vehicle System Monitoring and Diagnostics	
On-board sensors capable of monitoring the condition of each of the vehicle systems and diagnostics that can be used to support vehicle maintenance.	
<i>Requirement:</i>	
1 The maintenance and construction vehicle shall collect vehicle diagnostics and operating status data from the maintenance vehicle platform including engine temperature, mileage, tire wear, brake wear, belt wear, and other operational status measures as well as the status of maintenance and construction-specific systems on the vehicle.	Existing
<i>Requirement:</i>	
2 The maintenance and construction vehicle shall use the diagnostic and status information to support scheduling vehicle maintenance, monitoring safety status, and informing the vehicle operator of the conditions.	Existing
<i>Requirement:</i>	
3 The maintenance and construction vehicle shall the vehicle diagnostic and safety information to an equipment repair facility.	Existing
<i>Requirement:</i>	
4 The maintenance and construction vehicle shall send the vehicle diagnostic and safety information to the controlling maintenance center.	Existing
<i>Functional Area:</i> MCV Barrier System Control	
Control automatic or remotely controlled gates and other barrier systems from a maintenance and construction vehicle.	
<i>Requirement:</i>	
1 The vehicle shall remotely control barrier systems. Barrier systems include automated or remotely controlled gates, barriers and other systems that manage entry to roadways.	Potential
<i>Requirement:</i>	
2 The vehicle shall collect barrier system operational status.	Potential
<i>Requirement:</i>	
3 The vehicle shall collect barrier system fault data.	Potential
<i>Functional Area:</i> MCV Winter Maintenance	
On-board systems that support snow plow operations and other roadway treatments (e.g., salt spraying and other material applications). Supports information sharing between snow plows.	
<i>Requirement:</i>	
1 The maintenance and construction vehicle shall track the location and status of safety systems on-board the vehicle.	Planned
<i>Requirement:</i>	
2 The maintenance and construction vehicle shall respond to control information from the center to allow remote operation of the on-board vehicle systems. These systems include winter maintenance equipment for plowing, treating, and anti-icing.	Planned
<i>Requirement:</i>	
3 The maintenance and construction vehicle shall monitor materials information including remaining quantity and current application rate of materials on the vehicle.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Porter County Maintenance and Construction Vehicles</i>	
<i>Entity: Maintenance and Construction Vehicle</i>	
<i>Functional Area: MCV Winter Maintenance</i>	
On-board systems that support snow plow operations and other roadway treatments (e.g., salt spraying and other material applications). Supports information sharing between snow plows.	
<i>Requirement:</i>	
4 The maintenance and construction vehicle shall respond to dispatch information from the center, presented to the vehicle operator for acknowledgement and returning status.	Existing
<i>Requirement:</i>	
5 The maintenance and construction vehicle shall send operational data to the center including the operational state of the maintenance equipment (e.g., blade up/down, spreader pattern), types and quantities of materials used for construction and maintenance activities, and a record of the actual work performed.	Existing
<i>Requirement:</i>	
6 The maintenance and construction vehicle shall exchange operational and environmental data with other maintenance and construction vehicles. Operational data includes operational state of the maintenance equipment (e.g., blade up/down, spreader pattern, equipment configuration) and a record of the actual work performed while the environmental data includes environmental sensor data collected on-board a maintenance and construction vehicle, either raw or processed data.	Existing
<i>Functional Area: MCV Roadway Maintenance and Construction</i>	
On-board systems that support routine non-winter maintenance on the roadway or right-of-way. Includes landscape maintenance, hazard removal (roadway debris, dead animals), routine maintenance activities (roadway cleaning, grass cutting), and repair and maintenance of equipment on the roadway.	
<i>Requirement:</i>	
1 The maintenance and construction vehicle shall track the location and status of safety systems on-board the vehicle.	Planned
<i>Requirement:</i>	
2 The maintenance and construction vehicle shall respond to control information from the center to allow remote operation of the on-board vehicle systems. These systems include routine maintenance equipment for cutting, repairs, hazard removal, etc.	Planned
<i>Requirement:</i>	
3 The maintenance and construction vehicle shall monitor materials information including remaining quantity and current application rate of materials on the vehicle.	Existing
<i>Requirement:</i>	
4 The maintenance and construction vehicle shall respond to dispatch information from the center, presented to the vehicle operator for acknowledgement and returning status.	Existing
<i>Requirement:</i>	
5 The maintenance and construction vehicle shall send operational data to the center including the operational state of the maintenance equipment (e.g., blade up/down, spreader pattern), types and quantities of materials used for construction and maintenance activities, and a record of the actual work performed.	Existing
<i>Functional Area: MCV Infrastructure Monitoring</i>	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Porter County Maintenance and Construction Vehicles</i>	
<i>Entity: Maintenance and Construction Vehicle</i>	
<i>Functional Area: MCV Infrastructure Monitoring</i>	
On-board systems to monitor the condition of pavement, bridges, tunnels, associated hardware, and other transportation-related infrastructure (e.g., culverts). Includes vehicle-based sensors and communications with roadway-based infrastructure monitoring sensors.	
<i>Requirement:</i>	
1 The maintenance and construction vehicle shall collect infrastructure data from on-board sensors relating to the physical characteristics of the roadway infrastructure, including pavement, bridges, culverts, signs, etc.	Planned
<i>Requirement:</i>	
2 The maintenance and construction vehicle shall collect infrastructure data from sensors located along the roadway relating to the physical characteristics of the roadway infrastructure, including pavement, bridges, culverts, signs, etc.	Planned
<i>Requirement:</i>	
3 The maintenance and construction vehicle shall provide control signals to infrastructure monitoring sensors located at the roadway.	Planned
<i>Requirement:</i>	
4 The maintenance and construction vehicle shall send current condition of pavement, bridges, culverts, signs, and other roadway infrastructure as measured by on-board sensors or read from infrastructure-based sensors to the center. The data may include raw data or images (e.g., photo logs) that indicate the current status of the infrastructure.	Planned
<i>Requirement:</i>	
5 The maintenance and construction vehicle shall respond to control information from the center to allow remote operation of the on-board vehicle systems.	Planned
<i>Requirement:</i>	
6 The maintenance and construction vehicle shall provide infrastructure sensor equipment operational status to the center.	Planned
<i>Functional Area: MCV Work Zone Support</i>	
On-board systems that provide communications and support for local management of a work zone.	
<i>Requirement:</i>	
1 The maintenance and construction vehicle shall monitor, operate, and control work zone devices located at or alongside the roadway. The devices operated on board the vehicle include driver information devices (e.g. dynamic message signs) and work zone intrusion detection and alert devices.	Existing
<i>Requirement:</i>	
2 The maintenance and construction vehicle shall provide an interface for field personnel to input status of their work zone activities.	Existing
<i>Requirement:</i>	
3 The maintenance and construction vehicle shall collect inputs from field personnel and from work zone devices on-board the maintenance and construction vehicle and send them to the controlling center.	Existing
<i>Functional Area: MCV Vehicle Safety Monitoring</i>	
On-board systems to detect vehicle intrusions and warn crew workers and drivers of imminent encroachment. Crew movements are monitored so that the crew can be warned of movement beyond the designated safe zone. Used for stationary work zones or in mobile applications where a safe zone is maintained around the moving vehicle.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Porter County Maintenance and Construction Vehicles</i>	
<i>Entity: Maintenance and Construction Vehicle</i>	
<i>Functional Area: MCV Vehicle Safety Monitoring</i>	
On-board systems to detect vehicle intrusions and warn crew workers and drivers of imminent encroachment. Crew movements are monitored so that the crew can be warned of movement beyond the designated safe zone. Used for stationary work zones or in mobile applications where a safe zone is maintained around the moving vehicle.	
<i>Requirement:</i>	Planned
1 The maintenance and construction vehicle shall detect that a vehicle has intruded upon the boundary of a work zone. The boundary of the work zone represents an area around the maintenance and construction vehicle, which may be stationary or moving.	
<i>Requirement:</i>	Planned
2 The maintenance and construction vehicle shall receive work zone warnings from the field equipment at the roadside, other maintenance and construction vehicles.	
<i>Requirement:</i>	Planned
3 The maintenance and construction vehicle shall present work zone warnings to the field personnel using direct warning signals or in-vehicle signage functions.	
<i>Requirement:</i>	Planned
4 The maintenance and construction vehicle shall monitor the crew movements to identify when a crew member is crossing the boundary between a work zone and vehicle traffic and issue an alert to the crew member.	
<i>Requirement:</i>	Planned
5 The maintenance and construction vehicle shall provide status of the work zone warning systems to the center.	
<i>Element: Porter County Multimodal Crossings</i>	
<i>Entity: Roadway</i>	
<i>Functional Area: Roadway Signal Preemption</i>	
Field elements that receive signal preemption requests from approaching emergency vehicles and overrides the current operation of the traffic signals	
<i>Requirement:</i>	Planned
1 The field element shall respond to signal preemption requests from emergency vehicles.	
<i>Functional Area: Roadway Incident Detection</i>	
Field elements that monitor traffic conditions to identify incidents. It includes traffic detectors that collect traffic flow information and identify unusual traffic conditions and advanced CCTV cameras with built-in incident detection algorithms.	
<i>Requirement:</i>	Planned
1 The field element shall collect, process, and send traffic images to the center for further analysis and distribution.	
<i>Requirement:</i>	Planned
2 The field element shall remotely process video data and provide an indication of potential incidents to the traffic management center.	
<i>Requirement:</i>	Potential
3 The field element's video devices shall be remotely controlled by a traffic management center.	
<i>Requirement:</i>	Planned
4 The field element shall provide operational status and fault data for the incident detection devices to the traffic management center.	
<i>Functional Area: Standard Rail Crossing</i>	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Porter County Multimodal Crossings</i>	
<i>Entity: Roadway</i>	
<i>Functional Area: Standard Rail Crossing</i>	
Field elements at highway-rail intersections (HRIs) where operational requirements do not dictate advanced features (e.g., where rail operational speeds are less than 80 miles per hour). Includes traditional HRI warning systems augmented with other standard traffic management devices.	
<i>Requirement:</i>	
1 The field element shall collect and process, traffic sensor data in the vicinity of a highway-rail intersection (HRI).	Planned
<i>Requirement:</i>	
2 The field element shall monitor the status of the highway-rail intersection (HRI) equipment, including both the current state and mode of operation and the current equipment condition, to be forwarded on to the traffic management center.	Planned
<i>Requirement:</i>	
3 The field element shall monitor the status of the highway-rail intersection (HRI) equipment, including both the current state and mode of operation and the current equipment condition, to be forwarded on to the rail wayside equipment.	Existing
<i>Requirement:</i>	
4 The field element shall receive track status from the rail wayside equipment that can be passed on to the traffic management center. This may include the current status of the tracks and whether a train is approaching.	Planned
<i>Requirement:</i>	
5 The field element shall collect pedestrian images and pedestrian sensor data, and respond to pedestrian crossing requests via display, audio signal, or other manner.	Planned
<i>Requirement:</i>	
6 The field element shall control the dynamic message signs (DMS) in the vicinity of a highway-rail intersection (HRI) to advise drivers, cyclists, and pedestrians of approaching trains.	Potential
<i>Requirement:</i>	
7 The field element shall close the highway-rail intersection (HRI) when a train is approaching using gates, lights/signs, barriers, and traffic control signals.	Existing
<i>Requirement:</i>	
8 The field element shall support the integrated control of adjacent traffic signals to clear an area in advance of an approaching train and to manage traffic around the intersection.	Planned
<i>Requirement:</i>	
9 The field element shall forward rail traffic advisories received from the Wayside Equipment to the traffic management center.	Planned
<i>Functional Area: Advanced Rail Crossing</i>	
Field elements at highway-rail intersections (HRIs) where operational requirements demand advanced features (e.g., where rail operational speeds are greater than 80 miles per hour). Capabilities from the Standard Rail Crossing plus systems which preclude entrance into the intersection when the barriers are activated, additional arriving train information, and detection of blocked intersections.	
<i>Requirement:</i>	
1 The field element shall collect and process, traffic sensor data in the vicinity of a highway-rail intersection (HRI).	Planned
<i>Requirement:</i>	
2 The field element shall determine whether the highway-rail intersection (HRI) is blocked by traffic in the roadway or some other obstruction.	Planned
<i>Requirement:</i>	
3 The field element shall notify the traffic management center and the rail wayside equipment of any intersection blockages, including trapped vehicles or other obstructions.	Planned

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Porter County Multimodal Crossings</i>	
<i>Entity: Roadway</i>	
<i>Functional Area: Advanced Rail Crossing</i>	
Field elements at highway-rail intersections (HRIs) where operational requirements demand advanced features (e.g., where rail operational speeds are greater than 80 miles per hour). Capabilities from the Standard Rail Crossing plus systems which preclude entrance into the intersection when the barriers are activated, additional arriving train information, and detection of blocked intersections.	
<i>Requirement:</i>	
4 The field element shall monitor the status of the highway-rail intersection (HRI) equipment, including both the current state and mode of operation and the current equipment condition, to be forwarded on to the traffic management center.	Planned
<i>Requirement:</i>	
5 The field element shall monitor the status of the highway-rail intersection (HRI) equipment, including both the current state and mode of operation and the current equipment condition, to be forwarded on to the rail wayside equipment.	Planned
<i>Requirement:</i>	
6 The field element shall receive track status and arriving train information from the rail wayside equipment that can be passed on to the traffic management center. This may include the current status of the tracks and when a train is expected and/or how long the crossing will be closed.	Planned
<i>Requirement:</i>	
7 The field element shall collect pedestrian images and pedestrian sensor data, and respond to pedestrian crossing requests via display, audio signal, or other manner.	Planned
<i>Requirement:</i>	
8 The field element shall control the dynamic message signs (DMS) in the vicinity of a highway-rail intersection (HRI) to advise drivers, cyclists, and pedestrians of approaching trains.	Potential
<i>Requirement:</i>	
9 The field element shall close the highway-rail intersection (HRI) when a train is approaching with enough time for traffic to safely clear the crossing using gates, lights/signs, barriers, and traffic control signals.	Planned
<i>Requirement:</i>	
10 The field element shall support the integrated control of adjacent traffic signals to clear an area in advance of an approaching train and to manage traffic around the intersection.	Planned
<i>Requirement:</i>	
11 The field element shall forward rail traffic advisories received from the Wayside Equipment to the traffic management center.	Planned
<i>Requirement:</i>	
12 The field element shall provide approaching train advisories using field-vehicle communications to vehicles approaching the grade crossing.	Planned
<i>Functional Area: Roadway Equipment Coordination</i>	
Field elements that control and send data to other field elements (such as environmental sensors that send data to a DMS or coordination between traffic controllers on adjacent intersections), without center control.	
<i>Requirement:</i>	
1 The field element shall include sensors that provide data and status information to other field element devices, without center control.	Planned
<i>Requirement:</i>	
2 The field element shall include sensors that receive configuration data from other field element devices, without center control.	Planned

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Porter County Multimodal Crossings</i>	
<i>Entity: Roadway</i>	
<i>Functional Area: Roadway Equipment Coordination</i>	
Field elements that control and send data to other field elements (such as environmental sensors that send data to a DMS or coordination between traffic controllers on adjacent intersections), without center control.	
<i>Requirement:</i>	Planned
3 The field element shall include devices that provide data and status information to other field element devices without center control.	
<i>Requirement:</i>	Planned
4 The field element shall include devices that receive configuration data from other field element devices, without center control.	
<i>Functional Area: Roadway Field Device Monitoring</i>	
Monitors field equipment operational status and detects and reports fault conditions. Device status, configuration, and fault information are provided to a remote center and a user interface provides information locally to field personnel.	
<i>Requirement:</i>	Planned
1 The field element shall monitor the operational status (state of the device, configuration, and fault data) of connected sensors (such as traffic, infrastructure, environmental, security, speed) and devices (such as highway advisory radio, dynamic message signs, automated roadway treatment systems, barrier and safeguard systems, cameras, traffic signals, ramp meters, short range communications equipment, security surveillance equipment).	
<i>Requirement:</i>	Planned
2 The field element shall send operational status of connected field equipment to the maintenance center.	
<i>Requirement:</i>	Planned
3 The field element shall send collected fault data to the maintenance center for repair.	
<i>Requirement:</i>	Planned
4 The field element shall include a local interface that provides operational status and fault data for connected field equipment to field personnel.	
<i>Requirement:</i>	Planned
5 The field element shall include a local interface that allows field personnel to command diagnostic tests on connected field equipment.	
<i>Functional Area: Roadway Environmental Monitoring</i>	
Environmental sensors, surface and sub-surface, that collect weather and road surface information. Weather conditions measured include temperature, wind, humidity, precipitation, and visibility. Sensors measure road surface temperature, moisture, icing, salinity, etc.	
<i>Requirement:</i>	Planned
1 The field element shall include surface and sub-surface environmental sensors that measure road surface temperature, moisture, icing, salinity, and other measures.	
<i>Requirement:</i>	Planned
2 The field element shall include environmental sensors that measure weather conditions including temperature, wind, humidity, precipitation, and visibility.	
<i>Requirement:</i>	Planned
3 The field element's environmental sensors shall be remotely controlled by a maintenance center.	
<i>Requirement:</i>	Planned
4 The field element's environmental sensors shall be remotely controlled by a traffic management center.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Porter County Multimodal Crossings</i>	
<i>Entity: Roadway</i>	
<i>Functional Area: Roadway Environmental Monitoring</i>	
Environmental sensors, surface and sub-surface, that collect weather and road surface information. Weather conditions measured include temperature, wind, humidity, precipitation, and visibility. Sensors measure road surface temperature, moisture, icing, salinity, etc.	
<i>Requirement:</i> 5 The field element's environmental sensors shall be remotely controlled by weather service providers such as the National Weather Service or value-added sector specific meteorological services.	Potential
<i>Requirement:</i> 6 The field element's environmental sensors shall be remotely controlled by a maintenance and construction vehicle.	Potential
<i>Requirement:</i> 7 The field element shall provide environmental sensor equipment operational status to the controlling center or maintenance vehicle.	Planned
<i>Requirement:</i> 8 The field element shall provide environmental sensor equipment fault indication to the controlling center or maintenance vehicle.	Planned
<i>Requirement:</i> 9 The field element shall remotely aggregate environmental sensor data with environmental data collected from maintenance and construction vehicles.	Potential
<i>Requirement:</i> 10 The field element shall provide weather and road surface condition data to centers.	Planned
<i>Requirement:</i> 11 The field element shall provide weather and road surface condition data to maintenance and construction vehicles.	Potential
<i>Functional Area: Field Barrier System Control</i>	
Field elements that control barrier systems such as gates and other systems that manage entry to roadways, transportation facilities and infrastructure.	
<i>Requirement:</i> 1 The field element shall activate barrier systems for transportation facilities and infrastructure under center control. Barrier systems include automated or remotely controlled gates, barriers and other systems that manage entry to roadways.	Planned
<i>Requirement:</i> 2 The field element shall return barrier system operational status to the controlling center.	Planned
<i>Requirement:</i> 3 The field element shall return barrier system fault data to the maintenance center for repair.	Planned
<i>Requirement:</i> 4 The field element shall receive requests for access from approaching vehicles using field-vehicle communications and validate and authenticate the requests.	Planned
<i>Requirement:</i> 5 The field element shall grant access only to qualified vehicles.	Planned
<i>Requirement:</i> 6 The field element shall communicate access permission status and access instructions to approaching vehicles using field-vehicle communications.	Planned
<i>Functional Area: Multimodal Crossing Control</i>	
Field elements to monitor and control traffic at multimodal crossings, such as draw bridges and other crossings between highway traffic and other modes; does not include highway-rail intersection.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Porter County Multimodal Crossings</i>	
<i>Entity: Roadway</i>	
<i>Functional Area: Multimodal Crossing Control</i>	
Field elements to monitor and control traffic at multimodal crossings, such as draw bridges and other crossings between highway traffic and other modes; does not include highway-rail intersection.	
<i>Requirement:</i>	Existing
1 The field element shall include sensors to monitor requests from non-highway traffic to cross at multimodal crossings for specified durations (such as draw bridges and miscellaneous other interference crossings between highway traffic and other modes such as river traffic, aircraft, etc.); the sensors are under center control.	
<i>Requirement:</i>	Existing
2 The field element shall include signals to control traffic at multimodal crossings on surface streets, under center control.	
<i>Requirement:</i>	Potential
3 The field element shall include driver information systems (such as dynamic messages signs, highway advisory radios (HAR), and equipment that controls warning lights and gates) that advise drivers at multimodal crossings, under center control.	
<i>Requirement:</i>	Existing
4 The field element shall provide operational status for the sensors, signals, and driver information systems equipment at multimodal crossings to the center.	
<i>Requirement:</i>	Existing
5 The field element shall provide fault data for the sensors, signals, and driver information systems equipment at multimodal crossings to the center for repair.	
<i>Requirement:</i>	Existing
6 The field element shall forward all requests for right-of-way at multimodal crossings to the controlling center.	
<i>Functional Area: Roadway Data Collection</i>	
Field elements to collect traffic, road, and environmental conditions information for use in transportation planning, research, and other off-line applications. Includes the sensors, supporting roadside infrastructure, and communications equipment.	
<i>Requirement:</i>	Planned
1 The field element shall collect traffic, road, and environmental conditions information.	
<i>Requirement:</i>	Planned
2 The field element shall include the sensors and supporting roadside devices that sense, collect, and send traffic, road, and environmental conditions information to a center for archival.	
<i>Requirement:</i>	Planned
3 The field element shall collect sensor status and sensor faults from roadside equipment and send it along with the recorded data to a center for archival.	
<i>Element: Porter County Sheriff Department</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Emergency Call-Taking</i>	
Provides interface to the emergency call-taking systems such as the Emergency Telecommunications System (e.g., 911) that correlate call information with emergencies reported by transit agencies, commercial vehicle operators, or other public safety agencies. Allows the operator to verify the incident and forward the information to the responding agencies.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Porter County Sheriff Department	
<i>Entity:</i> Emergency Management	
<i>Functional Area:</i> Emergency Call-Taking	
Provides interface to the emergency call-taking systems such as the Emergency Telecommunications System (e.g., 911) that correlate call information with emergencies reported by transit agencies, commercial vehicle operators, or other public safety agencies. Allows the operator to verify the incident and forward the information to the responding agencies.	
<i>Requirement:</i>	Existing
1 The center shall support the interface to the Emergency Telecommunications System (e.g. 911 or 7-digit call routing) to receive emergency notification information and provide it to the emergency system operator.	
<i>Requirement:</i>	Existing
2 The center shall receive emergency call information from 911 services and present the possible incident information to the emergency system operator.	
<i>Requirement:</i>	Existing
4 The center shall receive emergency call information from mayday service providers and present the possible incident information to the emergency system operator.	
<i>Requirement:</i>	Existing
5 The center shall receive emergency notification information from other public safety agencies and present the possible incident information to the emergency system operator.	
<i>Requirement:</i>	Existing
6 The center shall receive emergency notification information from public transit systems and present the possible incident information to the emergency system operator.	
<i>Requirement:</i>	Existing
7 The center shall coordinate, correlate, and verify all emergency inputs, including those identified based on external calls and internal analysis of security sensor and surveillance data, and assign each a level of confidence.	
<i>Requirement:</i>	Potential
8 The center shall send a request for remote control of CCTV systems from a traffic management center in order to verify the reported incident.	
<i>Requirement:</i>	Existing
9 The center shall forward the verified emergency information to the responding agency based on the location and nature of the emergency.	
<i>Requirement:</i>	Existing
10 The center shall update the incident information log once the emergency system operator has verified the incident.	
<i>Requirement:</i>	Existing
11 The center shall provide the capability for digitized map data to act as the background to the emergency information presented to the emergency system operator.	
<i>Functional Area:</i> Emergency Dispatch	
Dispatch emergency vehicles to incidents, tracking their location and status. Pertinent incident information is gathered and relayed to the responding units.	
<i>Requirement:</i>	Existing
1 The center shall dispatch emergency vehicles to respond to verified emergencies under center personnel control.	
<i>Requirement:</i>	Existing
2 The center shall store the current status of all emergency vehicles available for dispatch and those that have been dispatched.	
<i>Requirement:</i>	Existing
3 The center shall relay location and incident details to the responding vehicles.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Porter County Sheriff Department</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Emergency Dispatch</i>	
Dispatch emergency vehicles to incidents, tracking their location and status. Pertinent incident information is gathered and relayed to the responding units.	
<i>Requirement:</i>	
4 The center shall track the location and status of emergency vehicles responding to an emergency based on information from the emergency vehicle.	Existing
<i>Requirement:</i>	
5 The center shall store and maintain the emergency service responses in an action log.	Existing
<i>Requirement:</i>	
6 The center shall provide the capability for digitized map data to act as the background to the information presented to the emergency system operator.	Existing
<i>Requirement:</i>	
7 The center shall receive traffic images to support dispatch of emergency vehicles.	Existing
<i>Requirement:</i>	
8 The center shall provide the capability to request remote control of traffic surveillance devices	Potential
<i>Requirement:</i>	
9 The center shall coordinate response to incidents with other Emergency Management centers to ensure appropriate resources are dispatched and utilized.	Existing
<i>Functional Area: Emergency Routing</i>	
Routing of emergency vehicles to facilitate the quickest/safest arrival. Routes may be determined based on real-time traffic information and road conditions or routes may be provided by Traffic Management on request.	
<i>Requirement:</i>	
1 The center shall collect current traffic and road condition information for emergency vehicle route calculation.	Existing
<i>Requirement:</i>	
2 The center shall receive information on the location and status of traffic control equipment and work zones along potential emergency routes.	Existing
<i>Requirement:</i>	
3 The center shall receive status information from care facilities to determine the appropriate facility and its location.	Existing
<i>Requirement:</i>	
4 The center shall receive asset restriction information to support the dispatching of appropriate emergency resources.	Existing
<i>Requirement:</i>	
5 The center shall receive current railroad schedule information for emergency vehicle route calculation.	Planned
<i>Requirement:</i>	
6 The center shall track current emergency vehicle location and status.	Existing
<i>Requirement:</i>	
7 The center shall calculate emergency vehicle routes, under center personnel control, based on the collected traffic and road conditions information.	Existing
<i>Requirement:</i>	
8 The center shall request and receive ingress and egress routes or other specialized emergency access routes from the traffic management center.	Existing
<i>Requirement:</i>	
9 The center shall provide the capability to request special traffic control measures, such as signal preemption, from the traffic management center to facilitate emergency vehicle progress along the suggested route.	Potential

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Porter County Sheriff Department	
<i>Entity:</i> Emergency Management	
<i>Functional Area:</i> Emergency Routing	
Routing of emergency vehicles to facilitate the quickest/safest arrival. Routes may be determined based on real-time traffic information and road conditions or routes may be provided by Traffic Management on request.	
<i>Requirement:</i>	
10 Once the route is calculated the route shall be provided to the dispatch function.	Existing
<i>Requirement:</i>	
11 The center shall provide the capability for digitized map data to act as the background to the information presented to the emergency system operator.	Existing
<i>Functional Area:</i> Incident Command	
Tactical decision support, resource coordination, and communications integration among emergency management agencies for Incident Commands that are established by first responders to support local management of an incident.	
<i>Requirement:</i>	
1 The center shall 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.	Existing
<i>Requirement:</i>	
2 The center shall provide incident command communications with public safety, emergency management, transportation, and other allied response agency centers.	Existing
<i>Requirement:</i>	
3 The center shall track and maintain resource information and action plans pertaining to the incident command.	Existing
<i>Requirement:</i>	
4 The center shall 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.	Existing
<i>Requirement:</i>	
5 The center shall assess the status of responding emergency vehicles as part of an incident command.	Planned
<i>Functional Area:</i> Emergency Early Warning System	
Monitors alerting and advisory systems, information collected by ITS surveillance and sensors, and reports from other agencies in order to identify potential, imminent, or in-progress major incidents or disasters. Notification is provided to other ITS centers to notify the traveling public.	
<i>Requirement:</i>	
1 The center shall 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).	Existing
<i>Requirement:</i>	
2 The center shall provide the capability to correlate alerts and advisories, incident information, and security sensor and surveillance data.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Porter County Sheriff Department</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Emergency Early Warning System</i>	
Monitors alerting and advisory systems, information collected by ITS surveillance and sensors, and reports from other agencies in order to identify potential, imminent, or in-progress major incidents or disasters. Notification is provided to other ITS centers to notify the traveling public.	
<i>Requirement:</i> 3 The center shall 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.	Existing
<i>Requirement:</i> 4 The center shall broadcast wide-area alerts and advisories to transit management centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	Planned
<i>Requirement:</i> 5 The center shall broadcast wide-area alerts and advisories to toll administration centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	Existing
<i>Requirement:</i> 6 The center shall broadcast wide-area alerts and advisories to traveler information service providers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	Existing
<i>Requirement:</i> 7 The center shall broadcast wide-area alerts and advisories to maintenance centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	Existing
<i>Requirement:</i> 8 The center shall broadcast wide-area alerts and advisories to other emergency management centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	Existing
<i>Requirement:</i> 9 The center shall broadcast wide-area alerts and advisories to commercial vehicle administration centers and roadside check facilities for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	Existing
<i>Requirement:</i> 10 The center shall process status information from each of the centers that have been sent the wide-area alert.	Planned
<i>Requirement:</i> 11 The center shall coordinate the broadcast of wide-area alerts and advisories with other emergency management centers.	Existing
<i>Requirement:</i> 12 The center shall receive incident information from other transportation management centers to support the early warning system.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Porter County Sheriff Department</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Emergency Early Warning System</i>	
Monitors alerting and advisory systems, information collected by ITS surveillance and sensors, and reports from other agencies in order to identify potential, imminent, or in-progress major incidents or disasters. Notification is provided to other ITS centers to notify the traveling public.	
<i>Requirement:</i> 13 The center shall present the alert and advisory information and the status of the actions taken in response to the alert by the other centers to the emergency system operator as received from other system inputs.	Planned
<i>Requirement:</i> 14 The center shall support the entry of alert and advisory information directly from the emergency system operator.	Existing
<i>Functional Area: Emergency Response Management</i>	
Strategic emergency planning and response capabilities and broad inter-agency interfaces to support large-scale incidents and disasters, commonly associated with Emergency Operations Centers.	
<i>Requirement:</i> 1 The center shall provide strategic emergency response capabilities provided by an Emergency Operations Center for large-scale incidents and disasters.	Existing
<i>Requirement:</i> 2 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.	Existing
<i>Requirement:</i> 3 The center shall provide the capability to implement response plans and track progress through the incident by exchanging incident information and response status with allied agencies.	Existing
<i>Requirement:</i> 4 The center shall develop, coordinate with other agencies, and store emergency response plans.	Existing
<i>Requirement:</i> 5 The center shall track the availability of resources and coordinate resource sharing with allied agency centers including traffic, maintenance, or other emergency centers.	Planned
<i>Requirement:</i> 6 The center shall 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.	Existing
<i>Requirement:</i> 7 The center shall receive event scheduling information from Event Promoters.	Existing
<i>Requirement:</i> 8 The center shall support remote control of field equipment normally under control of the traffic management center including traffic signals, dynamic message signs, gates, and barriers.	Potential
<i>Requirement:</i> 9 The center shall provide the capability to remotely control and monitor CCTV systems normally operated by a traffic management center.	Potential
<i>Requirement:</i> 10 The center shall provide the capability to request transit resource availability from transit centers for use during disaster and evacuation operations.	Potential

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Porter County Sheriff Department	
<i>Entity:</i> Emergency Management	
<i>Functional Area:</i> Emergency Response Management	
Strategic emergency planning and response capabilities and broad inter-agency interfaces to support large-scale incidents and disasters, commonly associated with Emergency Operations Centers.	
<i>Requirement:</i> 11	The center shall 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. Potential
<i>Requirement:</i> 12	The center shall provide information to the media concerning the status of an emergency response. Existing
<i>Requirement:</i> 13	The center shall provide the capability for digitized map data to act as the background to the information presented to the emergency system operator. Existing
<i>Requirement:</i> 14	The center shall provide the capability for center personnel to provide inputs to the management of incidents, disasters and evacuations. Existing
<i>Requirement:</i> 15	The center shall collect information about the status of the recovery efforts for the infrastructure during disasters. Potential
<i>Requirement:</i> 16	The center shall provide the overall status of infrastructure recovery efforts to traveler information providers and media. Potential
<i>Requirement:</i> 17	The center shall provide the capability to communicate information about emergency situations to local population through the Emergency Telecommunications System. Existing
<i>Requirement:</i> 18	The center shall 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. Potential
<i>Requirement:</i> 19	The center shall retrieve information from public health systems to increase preparedness for, and implement a response to biological, chemical, radiation, and other public health emergencies. Existing
<i>Functional Area:</i> Emergency Evacuation Support	
Evacuation planning and coordination to manage evacuation and reentry of a population in the vicinity of a disaster or other emergency that poses a risk to public safety.	
<i>Requirement:</i> 1	The center shall manage inter-agency coordination of evacuation operations, from initial planning through the evacuation process and reentry. Existing
<i>Requirement:</i> 2	The center shall develop and exchange evacuation plans with allied agencies prior to the occurrence of a disaster. Existing
<i>Requirement:</i> 3	The center shall provide an interface to the emergency system operator to enter evacuation plans and procedures and present the operator with other agencies' plans. Existing
<i>Requirement:</i> 4	The center shall coordinate evacuation destinations and shelter needs with shelter providers (e.g., the American Red Cross) in the region. Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Porter County Sheriff Department	
<i>Entity:</i> Emergency Management	
<i>Functional Area:</i> Emergency Evacuation Support	
Evacuation planning and coordination to manage evacuation and reentry of a population in the vicinity of a disaster or other emergency that poses a risk to public safety.	
<i>Requirement:</i>	
5 The center shall provide evacuation information to traffic, transit, maintenance and construction, rail operations, and other emergency management centers as needed.	Existing
<i>Requirement:</i>	
6 The center shall request resources from transit agencies as needed to support the evacuation.	Potential
<i>Requirement:</i>	
7 The center shall 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.	Potential
<i>Requirement:</i>	
8 The center shall 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.	Potential
<i>Requirement:</i>	
9 The center shall monitor the progress or status of the evacuation once it begins and exchange tactical plans, prepared during the incident, with allied agencies.	Potential
<i>Requirement:</i>	
10 The center shall monitor the progress of the reentry process.	Potential
<i>Requirement:</i>	
11 The center shall submit evacuation information to toll administration centers along with requests for changes in the toll services or fee collection during an evacuation.	Potential
<i>Requirement:</i>	
12 The center shall 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.	Existing
<i>Functional Area:</i> Emergency Environmental Monitoring	
Collects current and forecast road and weather information that is used by the operator to more effectively manage incidents.	
<i>Requirement:</i>	
1 The center shall 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).	Existing
<i>Requirement:</i>	
2 The center shall collect current road and weather information from roadway maintenance operations.	Existing
<i>Requirement:</i>	
3 The center shall assimilate current and forecast road conditions and surface weather information to support incident management.	Existing
<i>Requirement:</i>	
4 The center shall present the current and forecast road and weather information to the emergency system operator.	Existing
<i>Functional Area:</i> Mayday Support	
Collection and response to Mayday messages received from vehicles and drivers.	
<i>Requirement:</i>	
1 The center shall collect mayday messages from vehicles and drivers.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Porter County Sheriff Department	
<i>Entity:</i> Emergency Management	
<i>Functional Area:</i> Mayday Support	
Collection and response to Mayday messages received from vehicles and drivers.	
<i>Requirement:</i>	
2 The center shall collect mayday messages from travelers via personal handheld devices.	Existing
<i>Requirement:</i>	
3 The center shall acknowledge the request for emergency assistance, whether originated by the driver, automatically by the vehicle's safety systems, or by a traveler via a personal handheld device.	Existing
<i>Requirement:</i>	
4 After the mayday becomes a verified incident, the center shall determine the appropriate response to the mayday message.	Existing
<i>Requirement:</i>	
5 The center shall determine whether the mayday message indicates an emergency that requires the attention of public safety agencies, and forward mayday emergency data to the appropriate agency as necessary.	Existing
<i>Requirement:</i>	
6 The center shall support the activation of remote controlled functions requested by a vehicle, such as requests to unlock doors.	Potential
<i>Requirement:</i>	
7 The center shall request additional emergency details from or issue commands to the vehicle's security systems or vehicle driver if needed.	Existing
<i>Requirement:</i>	
8 The center shall maintain a log of all mayday signals received from vehicles.	Existing
<i>Requirement:</i>	
9 The center shall provide all mayday data to center personnel and respond to the vehicle, driver, or traveler using the portable handheld device as directed by the personnel.	Existing
<i>Functional Area:</i> Emergency Commercial Vehicle Response	
Responds to commercial vehicle and freight equipment related emergencies. Includes incidents involving hazardous materials as well as the detection of non-permitted transport of security sensitive hazmat.	
<i>Requirement:</i>	
1 The center shall receive emergency notification information from commercial vehicles, commercial vehicle check stations, or commercial fleet operators and present the possible incident information to the emergency system operator. This may include detection of non-permitted transport of security sensitive hazmat, hazardous cargo spills, etc.	Existing
<i>Requirement:</i>	
2 The center shall receive details of the cargo being carried by commercial vehicles from their commercial fleet manager for incidents involving potential hazardous materials.	Existing
<i>Requirement:</i>	
3 The center shall forward the verified emergency information to the responding agency based on the location and nature of the emergency.	Existing
<i>Requirement:</i>	
4 The center shall provide the capability to request Fleet and Freight Management to disable a specific vehicle in their fleet.	Potential
<i>Functional Area:</i> Emergency Data Collection	
Collection and storage of information related to Emergency Management. For use by operations personnel or data archives in the region.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Porter County Sheriff Department</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Emergency Data Collection</i>	
Collection and storage of information related to Emergency Management. For use by operations personnel or data archives in the region.	
<i>Requirement:</i>	
1 The center shall collect emergency service data, emergency vehicle management data, emergency vehicle data, sensor and surveillance data, threat data, and incident data.	Existing
<i>Requirement:</i>	
2 The center shall assign quality control metrics and meta-data to be stored along with the data. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.	Existing
<i>Requirement:</i>	
3 The center shall receive and respond to requests from ITS Archives for either a catalog of the emergency management data or for the data itself.	Planned
<i>Requirement:</i>	
4 The center shall be able to produce sample products of the data available.	Planned
<i>Element: Private Information Service Providers</i>	
<i>Entity: Information Service Provider</i>	
<i>Functional Area: ISP Traveler Data Collection</i>	
Collects traveler information from other centers, consolidates and refines the collected data, and makes this data available to traveler information applications.	
<i>Requirement:</i>	
1 The center shall collect, process, and store traffic and highway condition information, including incident information, detours and road closures, event information, recommended routes, and current speeds on specific routes.	Existing
<i>Requirement:</i>	
2 The center shall collect, process, and store maintenance and construction information, including scheduled maintenance and construction work activities and work zone activities.	Existing
<i>Requirement:</i>	
3 The center shall collect, process, and store transit routes and schedules, transit transfer options, transit fares, and real-time schedule adherence information.	Existing
<i>Requirement:</i>	
4 The center shall collect, process, and store parking information, including location, availability, and fees.	Planned
<i>Requirement:</i>	
5 The center shall collect, process, and store toll fee information.	Existing
<i>Requirement:</i>	
6 The center shall collect, process, and store current and forecast road conditions and surface weather conditions.	Existing
<i>Requirement:</i>	
7 The center shall collect, process, and store event information.	Existing
<i>Requirement:</i>	
8 The center shall collect, process, and store air quality information.	Existing
<i>Functional Area: ISP Probe Information Collection</i>	
Collection and aggregation of vehicle probe data, including calculation and dissemination of route travel times and usage. Includes environmental probe data collection, aggregation and dissemination.	
<i>Requirement:</i>	
1 The center shall collect traffic probe data (speeds, travel times, etc.) from appropriately equipped vehicles and short range communications equipment.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Private Information Service Providers</i>	
<i>Entity: Information Service Provider</i>	
<i>Functional Area: ISP Probe Information Collection</i>	
Collection and aggregation of vehicle probe data, including calculation and dissemination of route travel times and usage. Includes environmental probe data collection, aggregation and dissemination.	
<i>Requirement:</i>	
2 The center shall aggregate collected traffic probe data, calculate route segment travel times, route segment speeds, and route usage, and disseminate to other centers.	Existing
<i>Requirement:</i>	
3 The center shall collect environmental probe data (air temperature, exterior light status, wiper status, traction control status, etc.) from appropriately equipped vehicles and short range communications equipment.	Potential
<i>Requirement:</i>	
4 The center shall aggregate collected environmental probe data and disseminate the aggregated environmental probe data to other centers.	Potential
<i>Requirement:</i>	
5 The center shall receive traffic probe data collected by transit fleet operators and include this data in aggregated probe data provided to other centers.	Existing
<i>Requirement:</i>	
6 The center shall receive traffic probe data derived from electronic toll collection operations and include this data in aggregated probe data provided to other centers.	Existing
<i>Functional Area: Basic Information Broadcast</i>	
Broadcast dissemination of traffic, transit, maintenance and construction, event, and weather information to traveler interface systems and vehicles.	
<i>Requirement:</i>	
1 The center shall disseminate traffic and highway condition information to travelers, including incident information, detours and road closures, event information, recommended routes, and current speeds on specific routes.	Existing
<i>Requirement:</i>	
2 The center shall disseminate maintenance and construction information to travelers, including scheduled maintenance and construction work activities and work zone activities.	Existing
<i>Requirement:</i>	
3 The center shall disseminate transit routes and schedules, transit transfer options, transit fares, and real-time schedule adherence information to travelers.	Existing
<i>Requirement:</i>	
4 The center shall disseminate parking information to travelers, including location, availability, and fees.	Planned
<i>Requirement:</i>	
5 The center shall disseminate toll fee information to travelers.	Existing
<i>Requirement:</i>	
6 The center shall disseminate weather information to travelers.	Existing
<i>Requirement:</i>	
7 The center shall disseminate event information to travelers.	Existing
<i>Requirement:</i>	
8 The center shall disseminate air quality information to travelers.	Existing
<i>Requirement:</i>	
9 The center shall provide the capability to support requests from the media for traffic and incident data.	Existing
<i>Requirement:</i>	
10 The center shall provide the capability for a system operator to control the type and update frequency of broadcast traveler information.	Existing
<i>Functional Area: ISP Traveler Information Alerts</i>	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Private Information Service Providers</i>	
<i>Entity: Information Service Provider</i>	
<i>Functional Area: ISP Traveler Information Alerts</i>	
Provides personalized traveler information alerts, notifying travelers of relevant congestion, incidents, transit schedule delays, and other actionable information that may impact a trip. Relevant alerts are selected based on user-configurable parameters and thresholds.	
<i>Requirement:</i>	
1 The center shall accept traveler profiles that establish recurring trip characteristics including route, mode, and timeframe information.	Existing
<i>Requirement:</i>	
2 The center shall accept traveler profiles that define alert thresholds that establish the severity and types of alerts that are provided to each traveler.	Existing
<i>Requirement:</i>	
3 The center shall disseminate personalized traffic alerts reporting congestion, incidents, delays, detours and road closures that may impact a current or planned trip.	Existing
<i>Requirement:</i>	
4 The center shall disseminate personalized transit alerts reporting transit delays and service interruptions.	Existing
<i>Requirement:</i>	
5 The center shall disseminate personalized parking alerts reporting parking availability and closures.	Planned
<i>Requirement:</i>	
6 The center shall disseminate personalized road weather alerts reporting adverse road and weather conditions.	Existing
<i>Requirement:</i>	
7 The center shall disseminate personalized multimodal transportation service alerts including ferry and air travel delays, port closures, and service interruptions.	Potential
<i>Requirement:</i>	
8 The center shall disseminate personalized event alerts reporting special event impacts on the transportation system.	Existing
<i>Requirement:</i>	
9 The center shall provide an operator interface that supports monitoring and management of subscribers and the content and format of alert messages.	Existing
<i>Functional Area: Interactive Infrastructure Information</i>	
Personalized dissemination of traffic, transit, maintenance and construction, multimodal, event, and weather information to traveler interface systems and vehicles, upon request.	
<i>Requirement:</i>	
1 The center shall disseminate customized traffic and highway condition information to travelers, including incident information, detours and road closures, recommended routes, and current speeds on specific routes upon request.	Existing
<i>Requirement:</i>	
2 The center shall disseminate customized maintenance and construction information to travelers, including scheduled maintenance and construction work activities and work zone activities upon request.	Existing
<i>Requirement:</i>	
3 The center shall disseminate customized transit routes and schedules, transit transfer options, transit fares, and real-time schedule adherence information to travelers upon request.	Existing
<i>Requirement:</i>	
4 The center shall disseminate customized parking information to travelers, including location, availability, and fees upon request.	Planned
<i>Requirement:</i>	
5 The center shall disseminate customized toll fee information to travelers upon request.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Private Information Service Providers</i>	
<i>Entity: Information Service Provider</i>	
<i>Functional Area: Interactive Infrastructure Information</i>	
Personalized dissemination of traffic, transit, maintenance and construction, multimodal, event, and weather information to traveler interface systems and vehicles, upon request.	
<i>Requirement:</i>	
6 The center shall disseminate customized weather information to travelers upon request.	Existing
<i>Requirement:</i>	
7 The center shall disseminate customized multimodal transportation service information (for example, from ferry and airline operators), including transfer points and other information, to travelers upon request.	Potential
<i>Requirement:</i>	
8 The center shall disseminate customized event information to travelers upon request.	Existing
<i>Requirement:</i>	
9 The center shall disseminate customized air quality information to travelers upon request.	Planned
<i>Requirement:</i>	
10 The center shall provide all traveler information based on the traveler's current location or a specific location identified by the traveler, and filter or customize the provided information accordingly.	Existing
<i>Requirement:</i>	
11 The center shall accept traveler profiles for determining the type of personalized data to send to the traveler.	Existing
<i>Requirement:</i>	
12 The center shall manage payment for services, such as tolls, transit fares, parking lot charges, map updates, and advanced payment for tolls, and provide transaction success or failure details.	Existing
<i>Requirement:</i>	
13 The center shall support requests for traveler information and advanced payment for traveler services from commercial fleet operators.	Existing
<i>Requirement:</i>	
14 The center shall provide the capability to exchange information with another traveler information service provider current or predicted data for road links that are outside the area served by the local supplier.	Planned
<i>Requirement:</i>	
15 The center shall manage updates of digitized map data and provide updates to traveler interface systems upon request.	Existing
<i>Requirement:</i>	
16 The center shall provide the capability to support requests from the media for traffic and incident data.	Existing
<i>Requirement:</i>	
17 The center shall provide the capability for a system operator to control the type and update frequency of traveler information.	Existing
<i>Functional Area: Traveler Telephone Information</i>	
Distribution of traveler information and wide-area alerts to traveler telephone information systems such as 511, based on voice-based traveler requests.	
<i>Requirement:</i>	
1 The center shall provide the capability to process voice-formatted requests for traveler information from a traveler telephone information system, and return the information in the requested format.	Planned

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Private Information Service Providers	
<i>Entity:</i> Information Service Provider	
<i>Functional Area:</i> Traveler Telephone Information	
Distribution of traveler information and wide-area alerts to traveler telephone information systems such as 511, based on voice-based traveler requests.	
<i>Requirement:</i>	Planned
2 The center shall provide the capability to process dual-tone multifrequency (DTMF)-based requests (touch-tone) for traveler information from a traveler telephone information system.	
<i>Requirement:</i>	Planned
3 The center shall provide the capability to process traveler information requests from a traveler telephone information system.	
<i>Requirement:</i>	Planned
4 The center shall provide information on traffic conditions in the requested voice format and for the requested location.	
<i>Requirement:</i>	Planned
5 The center shall provide work zone and roadway maintenance information in the requested voice format and for the requested location.	
<i>Requirement:</i>	Planned
6 The center shall provide roadway environment conditions information in the requested voice format and for the requested location.	
<i>Requirement:</i>	Planned
7 The center shall provide weather and event information in the requested voice format and for the requested location.	
<i>Requirement:</i>	Planned
8 The center shall provide transit service information in the requested voice format and for the requested location.	
<i>Requirement:</i>	Planned
11 The center shall provide the capability to support both specific caller requests as well as bulk upload of regional traveler information.	
<i>Requirement:</i>	Planned
12 The center shall receive and forward region-specific wide-area alert and advisory information to the traveler telephone information system, including major emergencies such as a natural or man-made disaster, civil emergency, child abductions, severe weather watches and warnings, military activities, and law enforcement warnings.	
<i>Functional Area:</i> Infrastructure Provided Trip Planning	
Generation of pre-trip and enroute trip plans for travelers (and vehicles) based on current traffic conditions, work zones, weather, and travelers constraints and preferences. Includes end-to-end trips using multiple modes, such as bicycle, transit, etc.	
<i>Requirement:</i>	Existing
1 The center shall provide the capability to provide specific pre-trip and enroute directions to travelers (and drivers), including costs, arrival times, and transfer points.	
<i>Requirement:</i>	Existing
2 The center shall include bicycle routes, walkways, skyways, and multi-use trails in the pre-trip and enroute directions it provides to travelers.	
<i>Requirement:</i>	Existing
3 The center shall support on-line route guidance for travelers using personal devices (such as PDAs).	
<i>Requirement:</i>	Existing
4 The center shall support on-line route guidance for drivers in vehicles.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Private Information Service Providers</i>	
<i>Entity: Information Service Provider</i>	
<i>Functional Area: Infrastructure Provided Trip Planning</i>	
Generation of pre-trip and enroute trip plans for travelers (and vehicles) based on current traffic conditions, work zones, weather, and travelers constraints and preferences. Includes end-to-end trips using multiple modes, such as bicycle, transit, etc.	
<i>Requirement:</i> 5 The center shall support on-line route guidance for specialty vehicles, such as commercial vehicles.	Existing
<i>Requirement:</i> 6 The center shall generate route plans based on current and/or predicted conditions of the road network, scheduled maintenance and construction work activities, and work zone activities.	Existing
<i>Requirement:</i> 7 The center shall generate route plans based on transit services, including fares, schedules, and requirements for travelers with special needs.	Potential
<i>Requirement:</i> 8 The center shall generate route plans based on current asset restrictions, such as height and weight restrictions on tunnels or bridges.	Existing
<i>Requirement:</i> 9 The center shall generate route plans based on current or forecasted weather.	Planned
<i>Requirement:</i> 10 The center shall generate route plans based on ferry, rail, air, or other multimodal transportation data.	Potential
<i>Requirement:</i> 11 The center shall exchange route segment information with other centers outside the area served by the local center.	Planned
<i>Requirement:</i> 12 The center shall generate trips based on the use of more than one mode of transport.	Existing
<i>Requirement:</i> 13 The center shall use the preferences and constraints specified by the traveler in the trip request to select the most appropriate mode of transport.	Existing
<i>Requirement:</i> 14 The center shall provide the capability for the traveler to confirm the proposed trip plan.	Existing
<i>Requirement:</i> 15 The center shall log route plans, particularly for special vehicles such as those containing hazardous materials, over-sized vehicles, or motorcades, with a traffic center.	Existing
<i>Requirement:</i> 16 The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used to determine vehicle and non-vehicle routes, trip planning, and on-line vehicle guidance.	Existing
<i>Requirement:</i> 17 The center shall provide the capability for center personnel to control route calculation parameters.	Existing
<i>Functional Area: ISP Operational Data Repository</i>	
Processes, stores, and distributes real-time information on the state of the regional transportation system to transportation system operators.	
<i>Requirement:</i> 1 The center shall select real-time information on the state of the regional transportation system including current traffic and road conditions, weather conditions, transit information, parking information, special event and incident information.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Private Information Service Providers</i>	
<i>Entity: Information Service Provider</i>	
<i>Functional Area: ISP Operational Data Repository</i>	
Processes, stores, and distributes real-time information on the state of the regional transportation system to transportation system operators.	
<i>Requirement:</i>	Existing
2 The center shall distribute real-time transportation operations data to centers in the region. The data may be broadcast or customized based on the receiving center's specified requests or subscriptions.	
<i>Requirement:</i>	Existing
3 The center shall support the capability for the system operator to monitor and control the operational data repository and information distribution service.	
<i>Requirement:</i>	Existing
4 The center shall provide a web site that provides real-time transportation data to transportation system operators in the region.	
<i>Functional Area: ISP Emergency Traveler Information</i>	
Distribution of emergency information to the traveling public, including evacuation information and wide-area alerts.	
<i>Requirement:</i>	Potential
1 The center shall disseminate emergency evacuation information to the traveler interface systems, including evacuation zones, shelter information, available transportation modes, road closures and detours, changes to transit services, and traffic and road conditions at the origin, destination, and along the evacuation routes.	
<i>Requirement:</i>	Potential
2 The center shall provide evacuation information to shelter providers.	
<i>Requirement:</i>	Existing
3 The center shall disseminate wide-area alert information to the traveler interface systems, including major emergencies such as a natural or man-made disaster, civil emergency, child abductions, severe weather watches and warnings, military activities, and law enforcement warnings.	
<i>Requirement:</i>	Existing
4 The center shall provide the capability for a system operator to control the type and update frequency of emergency and wide-area alert information distributed to travelers.	
<i>Functional Area: ISP Data Collection</i>	
Collection and storage of information supporting the operations of traveler information service providers. For use by operations personnel or data archives in the region.	
<i>Requirement:</i>	Existing
1 The center shall collect traveler information data, such as parking lot data, rideshare data, road network use data, vehicle probe data, and other data from traveler information system operations.	
<i>Requirement:</i>	Existing
2 The center shall collect traveler requests, confirmations, and payment transaction data for traveler services provided.	
<i>Requirement:</i>	Existing
3 The center shall assign quality control metrics and meta-data to be stored along with the data. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.	
<i>Requirement:</i>	Planned
4 The center shall receive and respond to requests from ITS Archives for either a catalog of the traveler information data or for the data itself.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Private Information Service Providers</i>	
<i>Entity: Information Service Provider</i>	
<i>Functional Area: ISP Data Collection</i>	
Collection and storage of information supporting the operations of traveler information service providers. For use by operations personnel or data archives in the region.	
<i>Requirement:</i>	Existing
5 The center shall be able to produce sample products of the data available.	
<i>Element: Private Maintenance and Construction Management System</i>	
<i>Entity: Maintenance and Construction Management</i>	
<i>Functional Area: MCM Vehicle Tracking</i>	
Remotely tracks the location of maintenance and construction vehicles and other equipment; presented to the center personnel.	
<i>Requirement:</i>	Planned
1 The center shall monitor the locations of all maintenance and construction vehicles and other equipment under its jurisdiction.	
<i>Requirement:</i>	Planned
2 The center shall present location data to center personnel for the fleet of maintenance and construction vehicles and other equipment.	
<i>Requirement:</i>	Planned
3 The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for maintenance and construction vehicle tracking.	
<i>Functional Area: MCM Vehicle and Equipment Maintenance Management</i>	
Monitors vehicle and equipment condition, tracks maintenance history, and schedules routine and corrective maintenance.	
<i>Requirement:</i>	Existing
1 The center shall collect and analyze vehicle diagnostics information from maintenance and construction vehicles. The information includes engine temperature, mileage, tire wear, brake wear, belt wear, and any warnings or alarms concerning the operational condition of the vehicle and ancillary equipment.	
<i>Requirement:</i>	Existing
2 The center shall exchange information with equipment repair facilities including status and history of repairs concerning maintenance and construction vehicles. This information includes vehicle status and diagnostic information, vehicle utilization, and coordination of when vehicles will be available for preventative and corrective maintenance.	
<i>Requirement:</i>	Existing
3 The center shall schedule preventive and corrective vehicle maintenance with the equipment repair facility based on fleet health reports, maintenance records, vehicle utilization and vehicle availability schedules.	
<i>Functional Area: MCM Incident Management</i>	
Supports coordinated response to incidents - share incident notifications, manage incident response resources, and coordinate overall incident situation and response among allied response organizations.	
<i>Requirement:</i>	Existing
1 The center shall 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.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Private Maintenance and Construction Management System</i>	
<i>Entity: Maintenance and Construction Management</i>	
<i>Functional Area: MCM Incident Management</i>	
Supports coordinated response to incidents - share incident notifications, manage incident response resources, and coordinate overall incident situation and response among allied response organizations.	
<i>Requirement:</i> 2 The center shall 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.	Existing
<i>Requirement:</i> 3 The center shall 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.	Existing
<i>Requirement:</i> 4 The center shall coordinate planning for incidents with emergency management centers - including pre-planning activities for disaster response, evacuation, and recovery operations.	Existing
<i>Requirement:</i> 5 The center shall 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.	Existing
<i>Requirement:</i> 6 The center shall exchange road network status assessment information with emergency management and traffic management 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.	Existing
<i>Requirement:</i> 7 The center shall 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.	Existing
<i>Requirement:</i> 8 The center shall receive information indicating the damage sustained by transportation assets, derived from aerial surveillance, field reports, inspections, tests, and analyses to support incident management.	Existing
<i>Functional Area: MCM Maintenance Decision Support</i>	
Maintenance Decision Support Systems recommend courses of action based on current and forecast environmental and road conditions (filtered and fused for specific time horizons) and additional application specific information. Recommendations and dispatch instructions are generated based on this integrated information.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Private Maintenance and Construction Management System</i>	
<i>Entity: Maintenance and Construction Management</i>	
<i>Functional Area: MCM Maintenance Decision Support</i>	
Maintenance Decision Support Systems recommend courses of action based on current and forecast environmental and road conditions (filtered and fused for specific time horizons) and additional application specific information. Recommendations and dispatch instructions are generated based on this integrated information.	
<i>Requirement:</i>	Existing
1 The center shall provide the center personnel with tailored external information, including weather or road condition observations, forecasted weather information or road conditions, current usage of treatments and materials, available resources, equipment and vehicle availability, road network information, and source reliability information.	
<i>Requirement:</i>	Existing
2 The center shall tailor the decision support information to include filtering (selection from a large amount of external information), error reduction ('smoothing' the information), fusion (combination of disparate information to match the decision needs), and analysis (creating the decision).	
<i>Requirement:</i>	Existing
3 The center shall provide an interface to the center personnel to input control parameters for the decision support process and receive decisions or information presentation.	
<i>Requirement:</i>	Existing
4 The center shall provide dispatch information to maintenance and construction vehicles based on the outputs of the decision support system, including recommended roadway treatment actions.	
<i>Functional Area: MCM Winter Maintenance Management</i>	
Manages winter road maintenance, tracking and controlling snow plow operations, roadway treatment (e.g., salt spraying and other material applications) based on weather information.	
<i>Requirement:</i>	Existing
1 The center shall respond to requests from emergency management and traffic management centers for hazard removal, field equipment repair, and other winter roadway maintenance.	
<i>Requirement:</i>	Existing
2 The center shall exchange information with administrative systems to support the planning and scheduling of winter maintenance activities. This information includes: equipment and consumables resupply purchase request status, personnel qualifications including training and special certifications, environmental regulations and rules that may impact maintenance activities, and requests and project requirements from contract administration.	
<i>Requirement:</i>	Existing
3 The center shall 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.	
<i>Requirement:</i>	Existing
4 The center shall receive equipment availability and materials storage status information from storage facilities to support the scheduling of winter maintenance activities.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Private Maintenance and Construction Management System</i>	
<i>Entity: Maintenance and Construction Management</i>	
<i>Functional Area: MCM Winter Maintenance Management</i>	
Manages winter road maintenance, tracking and controlling snow plow operations, roadway treatment (e.g., salt spraying and other material applications) based on weather information.	
<i>Requirement:</i>	
5 The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for the scheduling of winter maintenance activities.	Potential
<i>Requirement:</i>	
6 The center shall collect real-time information on the state of the regional transportation system from other centers including current traffic and road conditions, weather conditions, special event and incident information and use the collected information to support winter maintenance operations.	Existing
<i>Requirement:</i>	
7 The center shall dispatch and route winter maintenance vehicle drivers and support them with route- specific environmental, incident, advisory, threat, alert, and traffic congestion information.	Existing
<i>Requirement:</i>	
8 The center shall 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.	Existing
<i>Requirement:</i>	
9 The center shall 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.	Existing
<i>Requirement:</i>	
10 The center shall support remote control of on-board maintenance and construction vehicle systems and field equipment that is remotely controlled by the vehicle such as adjusting material application rates and spread patterns.	Planned
<i>Requirement:</i>	
11 The center shall assess the current status of all winter maintenance activities, including actual work activities performed, current locations and operational conditions of vehicles, materials and equipment inventories, field equipment status, environmental information, etc.	Existing
<i>Functional Area: MCM Roadway Maintenance and Construction</i>	
Overall management and support for routine maintenance on the roadway or right-of-way. Includes landscape maintenance, hazard removal (roadway debris, dead animals), routine maintenance activities (roadway cleaning, grass cutting), and repair and maintenance of both ITS and non-ITS equipment.	
<i>Requirement:</i>	
1 The center shall maintain an interface with asset management systems to track the inventory, restrictions, repair needs and status updates of transportation assets (pavement, bridges, signs, etc.) including location, installation and materials information, vendor/contractor, current maintenance status, standard height, width, and weight restrictions.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Private Maintenance and Construction Management System</i>	
<i>Entity: Maintenance and Construction Management</i>	
<i>Functional Area: MCM Roadway Maintenance and Construction</i>	
Overall management and support for routine maintenance on the roadway or right-of-way. Includes landscape maintenance, hazard removal (roadway debris, dead animals), routine maintenance activities (roadway cleaning, grass cutting), and repair and maintenance of both ITS and non-ITS equipment.	
<i>Requirement:</i>	
2 The center shall respond to requests from emergency management and traffic management centers for hazard removal, field equipment repair, and other roadway maintenance.	Existing
<i>Requirement:</i>	
3 The center shall exchange information with administrative systems to support the planning and scheduling of maintenance activities. This information includes: equipment and consumables resupply purchase request status, personnel qualifications including training and special certifications, environmental regulations and rules that may impact maintenance activities, and requests and project requirements from contract administration.	Existing
<i>Requirement:</i>	
4 The center shall provide emergency management and traffic management centers with information about scheduled maintenance and construction work activities including anticipated closures and impact to the roadway, alternate routes, anticipated delays, closure times, and durations.	Existing
<i>Requirement:</i>	
5 The center shall collect the status and fault data from roadside equipment, such as traffic, infrastructure, and environmental sensors, highway advisory radio and dynamic message signs, automated roadway treatment systems, barrier and safeguard systems, cameras, traffic signals and override equipment, ramp meters, short range communications equipment, security sensors and surveillance equipment, etc., and provide a cohesive view of equipment repair needs.	Potential
<i>Requirement:</i>	
6 The center shall collect the status and fault data from the centers that operate the equipment, including data for traffic, infrastructure, and environmental sensors, highway advisory radio and dynamic message signs, automated roadway treatment systems, barrier and safeguard systems, cameras, traffic signals and override equipment, ramp meters, short range communications equipment, security sensors and surveillance equipment, etc., and provide a cohesive view of equipment repair needs.	Potential
<i>Requirement:</i>	
7 The center shall receive equipment availability and materials storage status information from storage facilities to support the scheduling of roadway maintenance and construction activities.	Existing
<i>Requirement:</i>	
8 The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for the scheduling of roadway maintenance and construction activities.	Planned
<i>Requirement:</i>	
9 The center shall collect current and forecast traffic and weather information from traffic management centers and weather service providers (such as the National Weather Service and value-added sector specific meteorological services).	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Private Maintenance and Construction Management System</i>	
<i>Entity: Maintenance and Construction Management</i>	
<i>Functional Area: MCM Roadway Maintenance and Construction</i>	
Overall management and support for routine maintenance on the roadway or right-of-way. Includes landscape maintenance, hazard removal (roadway debris, dead animals), routine maintenance activities (roadway cleaning, grass cutting), and repair and maintenance of both ITS and non-ITS equipment.	
<i>Requirement:</i>	
10 The center shall dispatch and route maintenance and construction vehicle drivers and support them with route-specific environmental, incident, advisory, threat, alert, and traffic congestion information.	Existing
<i>Requirement:</i>	
11 The center shall manage an interface with center personnel to accept vehicle systems control information and remotely control maintenance and construction vehicle on-board equipment.	Planned
<i>Requirement:</i>	
12 The center shall track the status of roadway maintenance and construction activities by monitoring collected data from the dispatched vehicles and equipment.	Planned
<i>Requirement:</i>	
13 The center shall report the status of field equipment maintenance activities to the centers that operate the equipment.	Existing
<i>Functional Area: MCM Work Zone Management</i>	
Remotely monitors and supports work zone activities, controlling traffic through dynamic message signs (DMS), highway advisory radio, gates and barriers, and informing other groups of activity (e.g., traveler information systems, traffic management centers, other maintenance and construction centers).	
<i>Requirement:</i>	
1 The center shall generate new work zone activity schedules for use by maintenance and construction vehicles, maintenance and construction operators, and for information coordination purposes.	Existing
<i>Requirement:</i>	
2 The center shall control the collection of work zone status information including video images from cameras located in or near the work zone.	Existing
<i>Requirement:</i>	
3 The center shall disseminate work zone information to other agencies and centers including traffic, transit, emergency management centers, other maintenance centers, traveler information providers, and the media.	Existing
<i>Requirement:</i>	
4 The center shall control traffic in work zones by providing remote control of dynamic message signs, highway advisory radio systems, gates, and barriers located in or near the work zone.	Potential
<i>Requirement:</i>	
5 The center shall exchange information with administrative systems to support the planning and scheduling of work zone activities. This information includes: equipment and consumables resupply purchase request status, personnel qualifications including training and special certifications, environmental regulations and rules that may impact maintenance activities, and requests and project requirements from contract administration.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Private Maintenance and Construction Management System</i>	
<i>Entity: Maintenance and Construction Management</i>	
<i>Functional Area: MCM Work Zone Management</i>	
Remotely monitors and supports work zone activities, controlling traffic through dynamic message signs (DMS), highway advisory radio, gates and barriers, and informing other groups of activity (e.g., traveler information systems, traffic management centers, other maintenance and construction centers).	
<i>Requirement:</i>	Existing
6 The center shall collect real-time information on the state of the road network including current traffic and road conditions to support work zone scheduling and management.	
<i>Functional Area: MCM Speed Monitoring and Warning</i>	
Remotely monitors vehicle speeds, and informs an enforcement agency if excessive speeds are detected; primarily used in work zones.	
<i>Requirement:</i>	Existing
1 The center shall remotely control vehicle speed sensors typically placed in work zones; control parameters may include environmental and traffic conditions.	
<i>Requirement:</i>	Planned
2 The center shall collect operational status for the vehicle speed sensors; the status shall include logged information including measured speeds, warning messages displayed, and violation records.	
<i>Requirement:</i>	Existing
3 The center shall provide the capability to notify an enforcement agency when vehicle speeds in the work zone are in excess of the posted speed limit or are creating an unsafe condition based upon the current environmental or traffic conditions.	
<i>Requirement:</i>	Existing
4 The center shall collect fault data for the vehicle speed sensors for repair.	
<i>Functional Area: MCM Work Zone Safety Management</i>	
Remotely monitors work zone safety systems that detect vehicle intrusions in work zones and warns crew workers and drivers of imminent encroachment. Crew movements are also monitored so that the crew can be warned of movement beyond the designated safe zone.	
<i>Requirement:</i>	Potential
1 The center shall provide remote monitoring and control of work zone safety devices - including intrusion detection devices that have been installed in work zones or maintenance areas.	
<i>Requirement:</i>	Potential
2 The center shall provide remote monitoring and control of intrusion alert devices that have been installed in work zones or maintenance areas.	
<i>Requirement:</i>	Potential
3 The center shall collect status information of work zone safety device status from field equipment or the maintenance and construction vehicles.	
<i>Requirement:</i>	Potential
4 The center shall collect and store work zone data collected from work zone monitoring devices (such as intrusion detection or alert devices and speed monitoring devices) on-board the vehicle and at the roadside.	
<i>Functional Area: MCM Work Activity Coordination</i>	
Disseminates work activity schedules and current asset restrictions to other agencies. Work schedules are coordinated, factoring in the needs and activities of other agencies and adjacent jurisdictions.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Private Maintenance and Construction Management System</i>	
<i>Entity: Maintenance and Construction Management</i>	
<i>Functional Area: MCM Work Activity Coordination</i>	
Disseminates work activity schedules and current asset restrictions to other agencies. Work schedules are coordinated, factoring in the needs and activities of other agencies and adjacent jurisdictions.	
<i>Requirement:</i> 1 The center shall 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.	Planned
<i>Requirement:</i> 2 The center shall 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.	Planned
<i>Requirement:</i> 3 The center shall collect and respond to feedback concerning scheduled maintenance and construction activities with other management centers such as traffic, emergency, transit, and rail operations.	Planned
<i>Requirement:</i> 4 The center shall collect and disseminate asset restriction information levied on transportation asset usage based on infrastructure design, surveys, tests, or analyses. This includes standard facility design height, width, and weight restrictions, special restrictions such as spring weight restrictions, and temporary facility restrictions that are imposed during maintenance and construction.	Planned
<i>Requirement:</i> 5 The center shall exchange information with administrative systems to support the planning and scheduling of maintenance and construction activities. This information includes: equipment and consumables resupply purchase request status, personnel qualifications including training and special certifications, environmental regulations and rules that may impact maintenance activities, and requests and project requirements from contract administration.	Existing
<i>Requirement:</i> 6 The center shall exchange rail schedules and work plans with rail operations centers.	Planned
<i>Functional Area: MCM Infrastructure Monitoring</i>	
Remotely monitors the condition of pavement, bridges, tunnels, associated hardware, and other transportation-related infrastructure (e.g., culverts) using vehicle-based and roadway-based infrastructure monitoring sensors.	
<i>Requirement:</i> 1 The center shall remotely control and collect data from fixed infrastructure monitoring sensors that monitor vibration, stress, temperature, surface continuity, and other condition measures.	Planned
<i>Requirement:</i> 2 The center shall monitor maintenance vehicle-based mobile sensors and data logging devices that collect information on current infrastructure condition.	Planned

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Private Maintenance and Construction Management System</i>	
<i>Entity: Maintenance and Construction Management</i>	
<i>Functional Area: MCM Infrastructure Monitoring</i>	
Remotely monitors the condition of pavement, bridges, tunnels, associated hardware, and other transportation-related infrastructure (e.g., culverts) using vehicle-based and roadway-based infrastructure monitoring sensors.	
<i>Requirement:</i>	
3 The center shall remotely collect data from vehicle probes using short range communications equipment and process this data to identify potential pavement degradation, potholes, and other rough or adverse road surface conditions.	Planned
<i>Requirement:</i>	
4 The center shall process the collected information and use it to monitor the condition of pavement, bridges, tunnels, associated hardware, and other transportation-related infrastructure.	Planned
<i>Requirement:</i>	
5 The center shall collect current maintenance and repair needs from the asset management system and correlate this data with data collected through infrastructure monitoring systems.	Planned
<i>Requirement:</i>	
6 The center shall provide current infrastructure conditions information to the asset management system.	Planned
<i>Requirement:</i>	
7 The center shall report infrastructure repair needs to the maintenance management system.	Planned
<i>Functional Area: MCM Data Collection</i>	
Collection and storage of maintenance and construction information. For use by operations personnel or data archives in the region.	
<i>Requirement:</i>	
1 The center shall collect maintenance and construction data (such as field equipment status, infrastructure status, maintenance and construction activity data) gathered from roadway, traffic, and other maintenance and construction sources.	Existing
<i>Requirement:</i>	
2 The center shall assign quality control metrics and meta-data to be stored along with the data. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.	Planned
<i>Requirement:</i>	
3 The center shall receive and respond to requests from ITS Archives for either a catalog of the maintenance and construction data or for the data itself.	Planned
<i>Requirement:</i>	
4 The center shall be able to produce sample products of the data available.	Planned
<i>Requirement:</i>	
5 The center shall provide data to Asset Management to be used in updating the status of assets in the inventory.	Existing
<i>Functional Area: MCM Transportation Operations Data Collection</i>	
Collects real-time information on the state of the regional transportation system for operational use by the center. It establishes communications with a regional repository, requests or subscribes to information relevant to the center, and distributes the received information for use.	
<i>Requirement:</i>	
1 The center shall collect real-time information on the state of the regional transportation system including current traffic and road conditions, weather conditions, special event and incident information.	Existing
<i>Requirement:</i>	
2 The center shall support the capability for the system operator to monitor and control the information collection service.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> Private Maintenance and Construction Vehicles	
<i>Entity:</i> Maintenance and Construction Vehicle	
<i>Functional Area:</i> MCV Vehicle Location Tracking	
On-board systems to track vehicle location and reports the position and timestamp information to the dispatch center.	
<i>Requirement:</i>	
1 The maintenance and construction vehicle shall track its current location.	Planned
<i>Requirement:</i>	
2 The maintenance and construction vehicle shall send the time stamped vehicle location to the controlling center.	Planned
<i>Functional Area:</i> MCV Vehicle System Monitoring and Diagnostics	
On-board sensors capable of monitoring the condition of each of the vehicle systems and diagnostics that can be used to support vehicle maintenance.	
<i>Requirement:</i>	
1 The maintenance and construction vehicle shall collect vehicle diagnostics and operating status data from the maintenance vehicle platform including engine temperature, mileage, tire wear, brake wear, belt wear, and other operational status measures as well as the status of maintenance and construction-specific systems on the vehicle.	Existing
<i>Requirement:</i>	
2 The maintenance and construction vehicle shall use the diagnostic and status information to support scheduling vehicle maintenance, monitoring safety status, and informing the vehicle operator of the conditions.	Existing
<i>Requirement:</i>	
3 The maintenance and construction vehicle shall the vehicle diagnostic and safety information to an equipment repair facility.	Existing
<i>Requirement:</i>	
4 The maintenance and construction vehicle shall send the vehicle diagnostic and safety information to the controlling maintenance center.	Existing
<i>Functional Area:</i> MCV Barrier System Control	
Control automatic or remotely controlled gates and other barrier systems from a maintenance and construction vehicle.	
<i>Requirement:</i>	
1 The vehicle shall remotely control barrier systems. Barrier systems include automated or remotely controlled gates, barriers and other systems that manage entry to roadways.	Potential
<i>Requirement:</i>	
2 The vehicle shall collect barrier system operational status.	Potential
<i>Requirement:</i>	
3 The vehicle shall collect barrier system fault data.	Potential
<i>Functional Area:</i> MCV Winter Maintenance	
On-board systems that support snow plow operations and other roadway treatments (e.g., salt spraying and other material applications). Supports information sharing between snow plows.	
<i>Requirement:</i>	
1 The maintenance and construction vehicle shall track the location and status of safety systems on-board the vehicle.	Planned
<i>Requirement:</i>	
2 The maintenance and construction vehicle shall respond to control information from the center to allow remote operation of the on-board vehicle systems. These systems include winter maintenance equipment for plowing, treating, and anti-icing.	Planned
<i>Requirement:</i>	
3 The maintenance and construction vehicle shall monitor materials information including remaining quantity and current application rate of materials on the vehicle.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Private Maintenance and Construction Vehicles</i>	
<i>Entity: Maintenance and Construction Vehicle</i>	
<i>Functional Area: MCV Winter Maintenance</i>	
On-board systems that support snow plow operations and other roadway treatments (e.g., salt spraying and other material applications). Supports information sharing between snow plows.	
<i>Requirement:</i>	
4 The maintenance and construction vehicle shall respond to dispatch information from the center, presented to the vehicle operator for acknowledgement and returning status.	Existing
<i>Requirement:</i>	
5 The maintenance and construction vehicle shall send operational data to the center including the operational state of the maintenance equipment (e.g., blade up/down, spreader pattern), types and quantities of materials used for construction and maintenance activities, and a record of the actual work performed.	Existing
<i>Requirement:</i>	
6 The maintenance and construction vehicle shall exchange operational and environmental data with other maintenance and construction vehicles. Operational data includes operational state of the maintenance equipment (e.g., blade up/down, spreader pattern, equipment configuration) and a record of the actual work performed while the environmental data includes environmental sensor data collected on-board a maintenance and construction vehicle, either raw or processed data.	Existing
<i>Functional Area: MCV Roadway Maintenance and Construction</i>	
On-board systems that support routine non-winter maintenance on the roadway or right-of-way. Includes landscape maintenance, hazard removal (roadway debris, dead animals), routine maintenance activities (roadway cleaning, grass cutting), and repair and maintenance of equipment on the roadway.	
<i>Requirement:</i>	
1 The maintenance and construction vehicle shall track the location and status of safety systems on-board the vehicle.	Planned
<i>Requirement:</i>	
2 The maintenance and construction vehicle shall respond to control information from the center to allow remote operation of the on-board vehicle systems. These systems include routine maintenance equipment for cutting, repairs, hazard removal, etc.	Planned
<i>Requirement:</i>	
3 The maintenance and construction vehicle shall monitor materials information including remaining quantity and current application rate of materials on the vehicle.	Existing
<i>Requirement:</i>	
4 The maintenance and construction vehicle shall respond to dispatch information from the center, presented to the vehicle operator for acknowledgement and returning status.	Existing
<i>Requirement:</i>	
5 The maintenance and construction vehicle shall send operational data to the center including the operational state of the maintenance equipment (e.g., blade up/down, spreader pattern), types and quantities of materials used for construction and maintenance activities, and a record of the actual work performed.	Existing
<i>Functional Area: MCV Infrastructure Monitoring</i>	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Private Maintenance and Construction Vehicles</i>	
<i>Entity: Maintenance and Construction Vehicle</i>	
<i>Functional Area: MCV Infrastructure Monitoring</i>	
On-board systems to monitor the condition of pavement, bridges, tunnels, associated hardware, and other transportation-related infrastructure (e.g., culverts). Includes vehicle-based sensors and communications with roadway-based infrastructure monitoring sensors.	
<i>Requirement:</i>	
1 The maintenance and construction vehicle shall collect infrastructure data from on-board sensors relating to the physical characteristics of the roadway infrastructure, including pavement, bridges, culverts, signs, etc.	Planned
<i>Requirement:</i>	
2 The maintenance and construction vehicle shall collect infrastructure data from sensors located along the roadway relating to the physical characteristics of the roadway infrastructure, including pavement, bridges, culverts, signs, etc.	Planned
<i>Requirement:</i>	
3 The maintenance and construction vehicle shall provide control signals to infrastructure monitoring sensors located at the roadway.	Planned
<i>Requirement:</i>	
4 The maintenance and construction vehicle shall send current condition of pavement, bridges, culverts, signs, and other roadway infrastructure as measured by on-board sensors or read from infrastructure-based sensors to the center. The data may include raw data or images (e.g., photo logs) that indicate the current status of the infrastructure.	Planned
<i>Requirement:</i>	
5 The maintenance and construction vehicle shall respond to control information from the center to allow remote operation of the on-board vehicle systems.	Planned
<i>Requirement:</i>	
6 The maintenance and construction vehicle shall provide infrastructure sensor equipment operational status to the center.	Planned
<i>Functional Area: MCV Work Zone Support</i>	
On-board systems that provide communications and support for local management of a work zone.	
<i>Requirement:</i>	
1 The maintenance and construction vehicle shall monitor, operate, and control work zone devices located at or alongside the roadway. The devices operated on board the vehicle include driver information devices (e.g. dynamic message signs) and work zone intrusion detection and alert devices.	Existing
<i>Requirement:</i>	
2 The maintenance and construction vehicle shall provide an interface for field personnel to input status of their work zone activities.	Existing
<i>Requirement:</i>	
3 The maintenance and construction vehicle shall collect inputs from field personnel and from work zone devices on-board the maintenance and construction vehicle and send them to the controlling center.	Existing
<i>Functional Area: MCV Vehicle Safety Monitoring</i>	
On-board systems to detect vehicle intrusions and warn crew workers and drivers of imminent encroachment. Crew movements are monitored so that the crew can be warned of movement beyond the designated safe zone. Used for stationary work zones or in mobile applications where a safe zone is maintained around the moving vehicle.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Private Maintenance and Construction Vehicles</i>	
<i>Entity: Maintenance and Construction Vehicle</i>	
<i>Functional Area: MCV Vehicle Safety Monitoring</i>	
On-board systems to detect vehicle intrusions and warn crew workers and drivers of imminent encroachment. Crew movements are monitored so that the crew can be warned of movement beyond the designated safe zone. Used for stationary work zones or in mobile applications where a safe zone is maintained around the moving vehicle.	
<i>Requirement:</i>	
1 The maintenance and construction vehicle shall detect that a vehicle has intruded upon the boundary of a work zone. The boundary of the work zone represents an area around the maintenance and construction vehicle, which may be stationary or moving.	Planned
<i>Requirement:</i>	
2 The maintenance and construction vehicle shall receive work zone warnings from the field equipment at the roadside, other maintenance and construction vehicles.	Planned
<i>Requirement:</i>	
3 The maintenance and construction vehicle shall present work zone warnings to the field personnel using direct warning signals or in-vehicle signage functions.	Planned
<i>Requirement:</i>	
4 The maintenance and construction vehicle shall monitor the crew movements to identify when a crew member is crossing the boundary between a work zone and vehicle traffic and issue an alert to the crew member.	Planned
<i>Requirement:</i>	
5 The maintenance and construction vehicle shall provide status of the work zone warning systems to the center.	Planned
<i>Element: Private Towing Companies</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Emergency Call-Taking</i>	
Provides interface to the emergency call-taking systems such as the Emergency Telecommunications System (e.g., 911) that correlate call information with emergencies reported by transit agencies, commercial vehicle operators, or other public safety agencies. Allows the operator to verify the incident and forward the information to the responding agencies.	
<i>Requirement:</i>	
1 The center shall support the interface to the Emergency Telecommunications System (e.g. 911 or 7-digit call routing) to receive emergency notification information and provide it to the emergency system operator.	Existing
<i>Requirement:</i>	
2 The center shall receive emergency call information from 911 services and present the possible incident information to the emergency system operator.	Existing
<i>Requirement:</i>	
4 The center shall receive emergency call information from mayday service providers and present the possible incident information to the emergency system operator.	Existing
<i>Requirement:</i>	
5 The center shall receive emergency notification information from other public safety agencies and present the possible incident information to the emergency system operator.	Existing
<i>Requirement:</i>	
6 The center shall receive emergency notification information from public transit systems and present the possible incident information to the emergency system operator.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Private Towing Companies</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Emergency Call-Taking</i>	
Provides interface to the emergency call-taking systems such as the Emergency Telecommunications System (e.g., 911) that correlate call information with emergencies reported by transit agencies, commercial vehicle operators, or other public safety agencies. Allows the operator to verify the incident and forward the information to the responding agencies.	
<i>Requirement:</i> 7 The center shall coordinate, correlate, and verify all emergency inputs, including those identified based on external calls and internal analysis of security sensor and surveillance data, and assign each a level of confidence.	Existing
<i>Requirement:</i> 8 The center shall send a request for remote control of CCTV systems from a traffic management center in order to verify the reported incident.	Potential
<i>Requirement:</i> 9 The center shall forward the verified emergency information to the responding agency based on the location and nature of the emergency.	Existing
<i>Requirement:</i> 10 The center shall update the incident information log once the emergency system operator has verified the incident.	Existing
<i>Requirement:</i> 11 The center shall provide the capability for digitized map data to act as the background to the emergency information presented to the emergency system operator.	Existing
<i>Functional Area: Emergency Dispatch</i>	
Dispatch emergency vehicles to incidents, tracking their location and status. Pertinent incident information is gathered and relayed to the responding units.	
<i>Requirement:</i> 1 The center shall dispatch emergency vehicles to respond to verified emergencies under center personnel control.	Existing
<i>Requirement:</i> 2 The center shall store the current status of all emergency vehicles available for dispatch and those that have been dispatched.	Existing
<i>Requirement:</i> 3 The center shall relay location and incident details to the responding vehicles.	Existing
<i>Requirement:</i> 4 The center shall track the location and status of emergency vehicles responding to an emergency based on information from the emergency vehicle.	Existing
<i>Requirement:</i> 5 The center shall store and maintain the emergency service responses in an action log.	Existing
<i>Requirement:</i> 6 The center shall provide the capability for digitized map data to act as the background to the information presented to the emergency system operator.	Existing
<i>Requirement:</i> 7 The center shall receive traffic images to support dispatch of emergency vehicles.	Existing
<i>Requirement:</i> 8 The center shall provide the capability to request remote control of traffic surveillance devices	Potential
<i>Requirement:</i> 9 The center shall coordinate response to incidents with other Emergency Management centers to ensure appropriate resources are dispatched and utilized.	Existing
<i>Functional Area: Emergency Routing</i>	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Private Towing Companies</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Emergency Routing</i>	
Routing of emergency vehicles to facilitate the quickest/safest arrival. Routes may be determined based on real-time traffic information and road conditions or routes may be provided by Traffic Management on request.	
<i>Requirement:</i>	
1 The center shall collect current traffic and road condition information for emergency vehicle route calculation.	Existing
<i>Requirement:</i>	
2 The center shall receive information on the location and status of traffic control equipment and work zones along potential emergency routes.	Existing
<i>Requirement:</i>	
3 The center shall receive status information from care facilities to determine the appropriate facility and its location.	Existing
<i>Requirement:</i>	
4 The center shall receive asset restriction information to support the dispatching of appropriate emergency resources.	Existing
<i>Requirement:</i>	
5 The center shall receive current railroad schedule information for emergency vehicle route calculation.	Planned
<i>Requirement:</i>	
6 The center shall track current emergency vehicle location and status.	Existing
<i>Requirement:</i>	
7 The center shall calculate emergency vehicle routes, under center personnel control, based on the collected traffic and road conditions information.	Existing
<i>Requirement:</i>	
8 The center shall request and receive ingress and egress routes or other specialized emergency access routes from the traffic management center.	Existing
<i>Requirement:</i>	
9 The center shall provide the capability to request special traffic control measures, such as signal preemption, from the traffic management center to facilitate emergency vehicle progress along the suggested route.	Potential
<i>Requirement:</i>	
10 Once the route is calculated the route shall be provided to the dispatch function.	Existing
<i>Requirement:</i>	
11 The center shall provide the capability for digitized map data to act as the background to the information presented to the emergency system operator.	Existing
<i>Functional Area: Incident Command</i>	
Tactical decision support, resource coordination, and communications integration among emergency management agencies for Incident Commands that are established by first responders to support local management of an incident.	
<i>Requirement:</i>	
1 The center shall 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.	Existing
<i>Requirement:</i>	
2 The center shall provide incident command communications with public safety, emergency management, transportation, and other allied response agency centers.	Existing
<i>Requirement:</i>	
3 The center shall track and maintain resource information and action plans pertaining to the incident command.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Private Towing Companies</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Incident Command</i>	
Tactical decision support, resource coordination, and communications integration among emergency management agencies for Incident Commands that are established by first responders to support local management of an incident.	
<i>Requirement:</i>	Existing
4 The center shall 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.	
<i>Requirement:</i>	Existing
5 The center shall assess the status of responding emergency vehicles as part of an incident command.	
<i>Functional Area: Service Patrol Management</i>	
Dispatch and communication with roadway service patrol vehicles that monitor roads to aid motorists, offering rapid response to minor incidents.	
<i>Requirement:</i>	Existing
1 The center shall dispatch roadway service patrol vehicles to identified incident locations.	
<i>Requirement:</i>	Existing
2 The center shall store the current status of all service patrol vehicles available for dispatch and those that have been dispatched.	
<i>Requirement:</i>	Existing
3 The center shall share incident information collected by the service patrol with traffic, maintenance and construction, and traveler information centers for incident management, incident notification to travelers, and incident cleanup.	
<i>Requirement:</i>	Existing
4 The center shall track the location and status of service patrol vehicles.	
<i>Functional Area: Emergency Early Warning System</i>	
Monitors alerting and advisory systems, information collected by ITS surveillance and sensors, and reports from other agencies in order to identify potential, imminent, or in-progress major incidents or disasters. Notification is provided to other ITS centers to notify the traveling public.	
<i>Requirement:</i>	Existing
1 The center shall 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).	
<i>Requirement:</i>	Existing
2 The center shall provide the capability to correlate alerts and advisories, incident information, and security sensor and surveillance data.	
<i>Requirement:</i>	Existing
3 The center shall 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.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Private Towing Companies</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Emergency Early Warning System</i>	
Monitors alerting and advisory systems, information collected by ITS surveillance and sensors, and reports from other agencies in order to identify potential, imminent, or in-progress major incidents or disasters. Notification is provided to other ITS centers to notify the traveling public.	
<i>Requirement:</i> 4 The center shall broadcast wide-area alerts and advisories to transit management centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	Planned
<i>Requirement:</i> 5 The center shall broadcast wide-area alerts and advisories to toll administration centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	Existing
<i>Requirement:</i> 6 The center shall broadcast wide-area alerts and advisories to traveler information service providers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	Existing
<i>Requirement:</i> 7 The center shall broadcast wide-area alerts and advisories to maintenance centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	Existing
<i>Requirement:</i> 8 The center shall broadcast wide-area alerts and advisories to other emergency management centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	Existing
<i>Requirement:</i> 9 The center shall broadcast wide-area alerts and advisories to commercial vehicle administration centers and roadside check facilities for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	Existing
<i>Requirement:</i> 10 The center shall process status information from each of the centers that have been sent the wide-area alert.	Planned
<i>Requirement:</i> 11 The center shall coordinate the broadcast of wide-area alerts and advisories with other emergency management centers.	Existing
<i>Requirement:</i> 12 The center shall receive incident information from other transportation management centers to support the early warning system.	Existing
<i>Requirement:</i> 13 The center shall present the alert and advisory information and the status of the actions taken in response to the alert by the other centers to the emergency system operator as received from other system inputs.	Planned
<i>Requirement:</i> 14 The center shall support the entry of alert and advisory information directly from the emergency system operator.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Private Towing Companies</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Emergency Response Management</i>	
Strategic emergency planning and response capabilities and broad inter-agency interfaces to support large-scale incidents and disasters, commonly associated with Emergency Operations Centers.	
<i>Requirement:</i>	
1 The center shall provide strategic emergency response capabilities provided by an Emergency Operations Center for large-scale incidents and disasters.	Existing
<i>Requirement:</i>	
2 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.	Existing
<i>Requirement:</i>	
3 The center shall provide the capability to implement response plans and track progress through the incident by exchanging incident information and response status with allied agencies.	Existing
<i>Requirement:</i>	
4 The center shall develop, coordinate with other agencies, and store emergency response plans.	Existing
<i>Requirement:</i>	
5 The center shall track the availability of resources and coordinate resource sharing with allied agency centers including traffic, maintenance, or other emergency centers.	Existing
<i>Requirement:</i>	
6 The center shall 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.	Existing
<i>Requirement:</i>	
8 The center shall support remote control of field equipment normally under control of the traffic management center including traffic signals, dynamic message signs, gates, and barriers.	Potential
<i>Requirement:</i>	
9 The center shall provide the capability to remotely control and monitor CCTV systems normally operated by a traffic management center.	Potential
<i>Requirement:</i>	
11 The center shall 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.	Planned
<i>Requirement:</i>	
12 The center shall provide information to the media concerning the status of an emergency response.	Existing
<i>Requirement:</i>	
13 The center shall provide the capability for digitized map data to act as the background to the information presented to the emergency system operator.	Existing
<i>Requirement:</i>	
14 The center shall provide the capability for center personnel to provide inputs to the management of incidents, disasters and evacuations.	Existing
<i>Requirement:</i>	
15 The center shall collect information about the status of the recovery efforts for the infrastructure during disasters.	Existing
<i>Requirement:</i>	
16 The center shall provide the overall status of infrastructure recovery efforts to traveler information providers and media.	Planned

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Private Towing Companies</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Emergency Response Management</i>	
Strategic emergency planning and response capabilities and broad inter-agency interfaces to support large-scale incidents and disasters, commonly associated with Emergency Operations Centers.	
<i>Requirement:</i>	
17 The center shall provide the capability to communicate information about emergency situations to local population through the Emergency Telecommunications System.	Potential
<i>Functional Area: Emergency Evacuation Support</i>	
Evacuation planning and coordination to manage evacuation and reentry of a population in the vicinity of a disaster or other emergency that poses a risk to public safety.	
<i>Requirement:</i>	
1 The center shall manage inter-agency coordination of evacuation operations, from initial planning through the evacuation process and reentry.	Planned
<i>Requirement:</i>	
2 The center shall develop and exchange evacuation plans with allied agencies prior to the occurrence of a disaster.	Planned
<i>Requirement:</i>	
3 The center shall provide an interface to the emergency system operator to enter evacuation plans and procedures and present the operator with other agencies' plans.	Planned
<i>Requirement:</i>	
4 The center shall coordinate evacuation destinations and shelter needs with shelter providers (e.g., the American Red Cross) in the region.	Potential
<i>Requirement:</i>	
5 The center shall provide evacuation information to traffic, transit, maintenance and construction, rail operations, and other emergency management centers as needed.	Planned
<i>Requirement:</i>	
6 The center shall request resources from transit agencies as needed to support the evacuation.	Potential
<i>Requirement:</i>	
7 The center shall 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.	Potential
<i>Requirement:</i>	
8 The center shall 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.	Potential
<i>Requirement:</i>	
9 The center shall monitor the progress or status of the evacuation once it begins and exchange tactical plans, prepared during the incident, with allied agencies.	Planned
<i>Requirement:</i>	
10 The center shall monitor the progress of the reentry process.	Potential
<i>Requirement:</i>	
11 The center shall submit evacuation information to toll administration centers along with requests for changes in the toll services or fee collection during an evacuation.	Potential
<i>Requirement:</i>	
12 The center shall 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.	Existing
<i>Functional Area: Emergency Environmental Monitoring</i>	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Private Towing Companies</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Emergency Environmental Monitoring</i>	
Collects current and forecast road and weather information that is used by the operator to more effectively manage incidents.	
<i>Requirement:</i>	Existing
1 The center shall 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).	
<i>Requirement:</i>	Existing
2 The center shall collect current road and weather information from roadway maintenance operations.	
<i>Requirement:</i>	Existing
3 The center shall assimilate current and forecast road conditions and surface weather information to support incident management.	
<i>Requirement:</i>	Existing
4 The center shall present the current and forecast road and weather information to the emergency system operator.	
<i>Functional Area: Mayday Support</i>	
Collection and response to Mayday messages received from vehicles and drivers.	
<i>Requirement:</i>	Existing
1 The center shall collect mayday messages from vehicles and drivers.	
<i>Requirement:</i>	Existing
2 The center shall collect mayday messages from travelers via personal handheld devices.	
<i>Requirement:</i>	Existing
3 The center shall acknowledge the request for emergency assistance, whether originated by the driver, automatically by the vehicle's safety systems, or by a traveler via a personal handheld device.	
<i>Requirement:</i>	Existing
4 After the mayday becomes a verified incident, the center shall determine the appropriate response to the mayday message.	
<i>Requirement:</i>	Existing
5 The center shall determine whether the mayday message indicates an emergency that requires the attention of public safety agencies, and forward mayday emergency data to the appropriate agency as necessary.	
<i>Requirement:</i>	Potential
6 The center shall support the activation of remote controlled functions requested by a vehicle, such as requests to unlock doors.	
<i>Requirement:</i>	Existing
7 The center shall request additional emergency details from or issue commands to the vehicle's security systems or vehicle driver if needed.	
<i>Requirement:</i>	Existing
8 The center shall maintain a log of all mayday signals received from vehicles.	
<i>Requirement:</i>	Existing
9 The center shall provide all mayday data to center personnel and respond to the vehicle, driver, or traveler using the portable handheld device as directed by the personnel.	
<i>Functional Area: Emergency Commercial Vehicle Response</i>	
Responds to commercial vehicle and freight equipment related emergencies. Includes incidents involving hazardous materials as well as the detection of non-permitted transport of security sensitive hazmat.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Private Towing Companies</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Emergency Commercial Vehicle Response</i>	
Responds to commercial vehicle and freight equipment related emergencies. Includes incidents involving hazardous materials as well as the detection of non-permitted transport of security sensitive hazmat.	
<i>Requirement:</i>	Existing
1 The center shall receive emergency notification information from commercial vehicles, commercial vehicle check stations, or commercial fleet operators and present the possible incident information to the emergency system operator. This may include detection of non-permitted transport of security sensitive hazmat, hazardous cargo spills, etc.	
<i>Requirement:</i>	Existing
2 The center shall receive details of the cargo being carried by commercial vehicles from their commercial fleet manager for incidents involving potential hazardous materials.	
<i>Requirement:</i>	Existing
3 The center shall forward the verified emergency information to the responding agency based on the location and nature of the emergency.	
<i>Requirement:</i>	Potential
4 The center shall provide the capability to request Fleet and Freight Management to disable a specific vehicle in their fleet.	
<i>Functional Area: Emergency Data Collection</i>	
Collection and storage of information related to Emergency Management. For use by operations personnel or data archives in the region.	
<i>Requirement:</i>	Existing
1 The center shall collect emergency service data, emergency vehicle management data, emergency vehicle data, sensor and surveillance data, threat data, and incident data.	
<i>Requirement:</i>	Planned
2 The center shall assign quality control metrics and meta-data to be stored along with the data. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.	
<i>Requirement:</i>	Planned
3 The center shall receive and respond to requests from ITS Archives for either a catalog of the emergency management data or for the data itself.	
<i>Requirement:</i>	Planned
4 The center shall be able to produce sample products of the data available.	
<i>Functional Area: Emergency Transportation Operations Data Collection</i>	
Collects real-time information on the state of the regional transportation system for operational use by the center. It establishes communications with a regional repository, requests or subscribes to information relevant to the center, and distributes the received information for use.	
<i>Requirement:</i>	Existing
1 The center shall collect real-time information on the state of the regional transportation system including current traffic and road conditions, weather conditions, special event and incident information.	
<i>Requirement:</i>	Existing
2 The center shall support the capability for the system operator to monitor and control the information collection service.	
<i>Element: Private Towing Companies Tow Vehicles</i>	
<i>Entity: Emergency Vehicle</i>	
<i>Functional Area: On-board EV En Route Support</i>	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Private Towing Companies Tow Vehicles</i>	
<i>Entity: Emergency Vehicle</i>	
<i>Functional Area: On-board EV En Route Support</i>	
On-board systems for gathering of dispatch and routing information for emergency vehicle personnel, vehicle tracking, communications with care facilities, and signal preemption via short range communication directly with traffic control equipment at the roadside.	
<i>Requirement:</i>	Existing
1 The emergency vehicle, including roadway service patrols, shall track its current location.	
<i>Requirement:</i>	Existing
2 The emergency vehicle, including roadway service patrols, shall send the vehicle's location and operational data to the center for emergency management and dispatch.	
<i>Requirement:</i>	Existing
3 The emergency vehicle, including roadway service patrols, shall receive incident details and a suggested route when dispatched to a scene.	
<i>Requirement:</i>	Existing
4 The emergency vehicle shall send the current en route status (including estimated time of arrival) and requests for emergency dispatch updates.	
<i>Requirement:</i>	Potential
5 The emergency vehicle shall send requests to traffic signal control equipment at the roadside to preempt the signal.	
<i>Requirement:</i>	Existing
6 The emergency vehicle shall provide the personnel on-board with dispatch information, including incident type and location, and forward an acknowledgment from personnel to the center that the vehicle is on its way to the incident scene.	
<i>Requirement:</i>	Existing
7 The emergency vehicle shall send patient status information to the care facility along with a request for further information.	
<i>Requirement:</i>	Potential
9 The emergency vehicle shall send the vehicle's location, speed and direction to other vehicles in the area.	
<i>Functional Area: On-board EV Incident Management Communication</i>	
On-board systems provide communications support to first responders. Incident information is provided to dispatched emergency personnel. Emergency personnel transmit information about the incident and response status.	
<i>Requirement:</i>	Existing
1 The emergency vehicle shall receive dispatch instructions sufficient to enable emergency personnel in the field to implement an effective incident response. It includes local traffic, road, and weather conditions, hazardous material information, and the current status of resources that have been allocated to an incident.	
<i>Requirement:</i>	Existing
2 The emergency vehicle shall provide an interface to the center for emergency personnel to transmit information about the incident site such as the extent of injuries, identification of vehicles and people involved, hazardous material, etc.	
<i>Requirement:</i>	Existing
3 The emergency vehicle shall provide an interface to the center for emergency personnel to transmit information about the current incident response status such as the identification of the resources on site, site management strategies in effect, and current clearance status.	
<i>Requirement:</i>	Potential
4 The emergency vehicle shall provide traffic incident information to approaching vehicles using short range communications..	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Private Towing Companies Tow Vehicles</i>	
<i>Entity: Emergency Vehicle</i>	
<i>Functional Area: On-Board EV Barrier System Control</i>	
Control automatic or remotely controlled gates and other barrier systems from an emergency vehicle.	
<i>Requirement:</i>	Planned
1 The vehicle shall remotely control barrier systems. Barrier systems include automated or remotely controlled gates, barriers and other systems that manage entry to roadways.	
<i>Requirement:</i>	Potential
2 The vehicle shall collect barrier system operational status.	
<i>Requirement:</i>	Potential
3 The vehicle shall collect barrier system fault data.	
<i>Element: RTA Operations</i>	
<i>Entity: Transit Management</i>	
<i>Functional Area: Transit Center Multi-Modal Coordination</i>	
Coordinate schedules with other agencies and modes, including transit transfer cluster and transfer point information.	
<i>Requirement:</i>	Planned
1 The center shall coordinate schedules and services between transit agencies, traffic management, maintenance and construction operations, parking management, and other surface or air transportation modes.	
<i>Requirement:</i>	Planned
2 The center shall share transfer cluster and transfer point information with multimodal transportation service providers, other transit agencies, and traveler information service providers. A transfer cluster is a collection of stop points, stations, or terminals where transfers can be made conveniently.	
<i>Requirement:</i>	Planned
3 The center shall accept requests from traffic management to change routes and schedules as part of the implementation of demand management strategies.	
<i>Requirement:</i>	Planned
4 The center shall coordinate transit services for special events, planning services for the event and managing transit services on the day of the event.	
<i>Requirement:</i>	Planned
5 The center shall provide transit operations personnel with the capability to control and monitor transit service coordination activities.	
<i>Element: SLCCS Agency Management</i>	
<i>Entity: Transit Management</i>	
<i>Functional Area: Transit Center Vehicle Tracking</i>	
Monitoring transit vehicle locations via interactions with on-board systems. Furnish users with real-time transit schedule information and maintain interface with digital map providers.	
<i>Requirement:</i>	Existing
1 The center shall monitor the locations of all transit vehicles within its network.	
<i>Requirement:</i>	Existing
2 The center shall determine adherence of transit vehicles to their assigned schedule.	
<i>Requirement:</i>	Existing
3 The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for transit tracking and dispatch.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: SLCCS Agency Management</i>	
<i>Entity: Transit Management</i>	
<i>Functional Area: Transit Center Vehicle Tracking</i>	
Monitoring transit vehicle locations via interactions with on-board systems. Furnish users with real-time transit schedule information and maintain interface with digital map providers.	
<i>Requirement:</i> 4 The center shall provide transit operational data to traveler information service providers.	Planned
<i>Requirement:</i> 5 The center shall provide collected transit probe data to traffic management centers and traveler information service providers for use in measuring current traffic conditions.	Existing
<i>Functional Area: Transit Center Paratransit Operations</i>	
Management of demand response transit services, including paratransit. Planning and scheduling of these services. Supports automated vehicle dispatch and automatically updates customer service operator systems.	
<i>Requirement:</i> 1 The center shall process trip requests for demand responsive transit services, i.e. paratransit. Sources of the requests may include traveler information service providers.	Existing
<i>Requirement:</i> 2 The center shall monitor the operational status of the demand response vehicles including status of passenger pick-up and drop-off.	Existing
<i>Requirement:</i> 3 The center shall generate demand response transit (including paratransit) routes and schedules based on such factors as parameters input by the system operator, what other demand responsive transit schedules have been planned, the availability and location of vehicles, the relevance of any fixed transit routes and schedules, road network information, and incident information.	Existing
<i>Requirement:</i> 4 The center shall dispatch demand response (paratransit) transit vehicles.	Existing
<i>Requirement:</i> 5 The center shall exchange information with Maintenance and Construction Operations concerning work zones, roadway conditions, asset restrictions, work plans, etc.	Planned
<i>Requirement:</i> 6 The center shall disseminate up-to-date schedules and route information to other centers for demand responsive transit services (paratransit).	Planned
<i>Requirement:</i> 7 The center shall collect the log of passenger boardings and alightings from the paratransit vehicles.	Existing
<i>Functional Area: Transit Center Fare Management</i>	
Management of fare collection at the center - includes setting and distributing fare information, central processing of fares for transit as well as other ITS services, links to financial institutions and enforcement agencies.	
<i>Requirement:</i> 2 The center shall provide the capability for a system operator to manage the transit fares and control the exchange of transit fare information.	Existing
<i>Requirement:</i> 3 The center shall process the financial requests from the transit vehicles or roadside and manage an interface to a Financial Institution.	Potential
<i>Requirement:</i> 4 The center shall support the payment of transit fare transactions using data provided by the traveler cards / payment instruments.	Potential

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> SLCCS Agency Management	
<i>Entity:</i> Transit Management	
<i>Functional Area:</i> Transit Center Fare Management	
Management of fare collection at the center - includes setting and distributing fare information, central processing of fares for transit as well as other ITS services, links to financial institutions and enforcement agencies.	
<i>Requirement:</i>	
5 The center shall collect data on fare payment violations and send the data, including images of the violator, to the appropriate enforcement agency.	Potential
<i>Requirement:</i>	
6 The center shall process requests for transit fares to be paid in advance.	Existing
<i>Requirement:</i>	
8 The center shall be capable of establishing emergency fare structures to override all other fares during disasters, states of emergency, or evacuations.	Existing
<i>Requirement:</i>	
10 The center shall collect fare statistics data to implement variable and flexible fare structures.	Potential
<i>Requirement:</i>	
11 The center shall exchange fare and load information with other transit management centers, including potential Centralized Payments facilities.	Potential
<i>Requirement:</i>	
12 The center shall provide transit fare information to other centers, including traveler information providers upon request.	Potential
<i>Functional Area:</i> Transit Center Passenger Counting	
Receives and processes transit vehicle loading data using two-way communications from equipped transit vehicles.	
<i>Requirement:</i>	
1 The center shall collect passenger count information from each transit vehicle.	Existing
<i>Requirement:</i>	
3 The center shall make the compiled ridership data available to the system operator and other applications.	Existing
<i>Functional Area:</i> Transit Center Security	
Monitor transit vehicle operator or traveler activated alarms; authenticate transit vehicle operators; remotely disable a transit vehicle; alert operators, travelers, and police to potential incidents identified by these security features.	
<i>Requirement:</i>	
1 The center shall monitor transit vehicle operational data to determine if the transit vehicle is off-route and assess whether a security incident is occurring.	Existing
<i>Requirement:</i>	
2 The center shall receive reports of emergencies on-board transit vehicles entered directly by the transit vehicle operator or from a traveler through interfaces such as panic buttons or alarm switches.	Planned
<i>Requirement:</i>	
3 The center shall support the back-office portion of functionality to authenticate transit vehicle operators.	Potential
<i>Requirement:</i>	
4 The center shall exchange transit incident information along with other service data with other transit agencies.	Planned
<i>Requirement:</i>	
5 The center shall receive information pertaining to a wide-area alert such as weather alerts, disaster situations, or child abductions. This information may come from Emergency Management or from other Alerting and Advisory Systems.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> SLCCS Agency Management	
<i>Entity:</i> Transit Management	
<i>Functional Area:</i> Transit Center Security	
Monitor transit vehicle operator or traveler activated alarms; authenticate transit vehicle operators; remotely disable a transit vehicle; alert operators, travelers, and police to potential incidents identified by these security features.	
<i>Requirement:</i>	
6 The center shall send wide-area alert information to travelers (on-board transit vehicles or at stations/stops) and transit vehicle operators.	Planned
<i>Requirement:</i>	
7 The center shall coordinate the response to security incidents involving transit with other agencies including Emergency Management, other transit agencies, media, traffic management, and traveler information service providers.	Planned
<i>Requirement:</i>	
8 The center shall receive threat information and status on the integrity of the transit infrastructure.	Potential
<i>Requirement:</i>	
9 The center shall provide support to remotely disable (or reset the disabling of) a transit vehicle in service.	Potential
<i>Functional Area:</i> Transit Vehicle Operator Assignment	
Assignment of transit operators to runs in a fair manner while minimizing labor and overtime services, considering operator preferences, qualifications, accumulated work hours, and other information about each operator.	
<i>Requirement:</i>	
1 The center shall 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.	Existing
<i>Requirement:</i>	
2 The center shall assess the transit vehicle operator's availability based on previous work assignments, accumulated hours, plus health and vacation commitments.	Existing
<i>Requirement:</i>	
3 The center shall assign transit vehicle operators to transit schedules based on their eligibility, route preferences, seniority, and transit vehicle availability.	Existing
<i>Requirement:</i>	
4 The center shall provide an interface through which the transit vehicle operator information can be maintained - either from the transit vehicle operator, center personnel, or other functions.	Existing
<i>Requirement:</i>	
5 The center shall generate supplemental vehicle operator assignments as required due to change events that occur during the operating day.	Existing
<i>Functional Area:</i> Transit Center Information Services	
Provide interactive traveler information to travelers (on-board transit vehicles, at stops/stations, using personal devices), traveler information service providers, media, and other transit organizations. Includes routes, schedules, transfer options, fares, real-time schedule adherence, current incidents, weather conditions, yellow pages, and special events.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> SLCCS Agency Management	
<i>Entity:</i> Transit Management	
<i>Functional Area:</i> Transit Center Information Services	
Provide interactive traveler information to travelers (on-board transit vehicles, at stops/stations, using personal devices), traveler information service providers, media, and other transit organizations. Includes routes, schedules, transfer options, fares, real-time schedule adherence, current incidents, weather conditions, yellow pages, and special events.	
<i>Requirement:</i>	Existing
1 The center shall provide travelers using public transportation with traffic and advisory information upon request. Such information may include transit routes, schedules, transfer options, fares, real-time schedule adherence, current incidents, weather conditions, and special events.	
<i>Requirement:</i>	Existing
6 The center shall broadcast transit advisory data, including alerts and advisories pertaining to major emergencies, or man made disasters.	
<i>Functional Area:</i> Transit Environmental Monitoring	
Current and forecast road and weather information assimilated from weather service providers and vehicle probes. The information is monitored and forwarded to other agencies to more effectively manage transit operations.	
<i>Requirement:</i>	Existing
1 The center shall assimilate current and forecast road conditions and surface weather information to more effectively manage transit operations.	
<i>Requirement:</i>	Existing
2 The center shall collect current and forecast road and weather information from weather service providers and roadway maintenance centers.	
<i>Functional Area:</i> Transit Center Multi-Modal Coordination	
Coordinate schedules with other agencies and modes, including transit transfer cluster and transfer point information.	
<i>Requirement:</i>	Planned
1 The center shall coordinate schedules and services between transit agencies, traffic management, maintenance and construction operations, parking management, and other surface or air transportation modes.	
<i>Requirement:</i>	Planned
2 The center shall share transfer cluster and transfer point information with multimodal transportation service providers, other transit agencies, and traveler information service providers. A transfer cluster is a collection of stop points, stations, or terminals where transfers can be made conveniently.	
<i>Requirement:</i>	Potential
3 The center shall accept requests from traffic management to change routes and schedules as part of the implementation of demand management strategies.	
<i>Requirement:</i>	Planned
4 The center shall coordinate transit services for special events, planning services for the event and managing transit services on the day of the event.	
<i>Requirement:</i>	Planned
5 The center shall provide transit operations personnel with the capability to control and monitor transit service coordination activities.	
<i>Functional Area:</i> Transit Evacuation Support	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: SLCCS Agency Management</i>	
<i>Entity: Transit Management</i>	
<i>Functional Area: Transit Evacuation Support</i>	
Support evacuation and subsequent reentry of a population in the vicinity of a disaster or other emergency. Coordinate regional evacuation plans and resources including transit and school bus fleets.	
<i>Requirement:</i>	
1 The center shall manage the use of transit resources to support evacuation and subsequent reentry of a population in the vicinity of a disaster or other emergency.	Potential
<i>Requirement:</i>	
2 The center shall coordinate regional evacuation plans with Emergency Management - identifying the transit role in an evacuation and the transit resources that would be used.	Planned
<i>Requirement:</i>	
3 The center shall coordinate the use of transit and school bus fleets during an evacuation, supporting evacuation of those with special needs and the general population.	Potential
<i>Requirement:</i>	
4 The center shall adjust and update transit service and fare schedules and provide that information to other agencies as they coordinate evacuations.	Potential
<i>Functional Area: Transit Data Collection</i>	
Collection and storage of transit management data. For use by operations personnel or data archives in the region.	
<i>Requirement:</i>	
1 The center shall collect transit management data such as transit fares and passenger use, transit services, paratransit operations, transit vehicle maintenance data, etc.	Existing
<i>Requirement:</i>	
2 The center shall assign quality control metrics and meta-data to be stored along with the data. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.	Planned
<i>Requirement:</i>	
3 The center shall receive and respond to requests from ITS Archives for either a catalog of the transit data or for the data itself.	Planned
<i>Requirement:</i>	
4 The center shall be able to produce sample products of the data available.	Planned
<i>Functional Area: Transit Transportation Operations Data Collection</i>	
Collects real-time information on the state of the regional transportation system for operational use by the center. It establishes communications with a regional repository, requests or subscribes to information relevant to the center, and distributes the received information for use.	
<i>Requirement:</i>	
1 The center shall collect real-time information on the state of the regional transportation system including current traffic and road conditions, weather conditions, special event and incident information.	Existing
<i>Requirement:</i>	
2 The center shall support the capability for the system operator to monitor and control the information collection service.	Existing
<i>Element: SLCCS Transit Vehicles</i>	
<i>Entity: Transit Vehicle</i>	
<i>Functional Area: On-board Transit Trip Monitoring</i>	
Support fleet management with automatic vehicle location (AVL) and automated mileage and fuel reporting and auditing.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> SLCCS Transit Vehicles	
<i>Entity:</i> Transit Vehicle	
<i>Functional Area:</i> On-board Transit Trip Monitoring	
Support fleet management with automatic vehicle location (AVL) and automated mileage and fuel reporting and auditing.	
<i>Requirement:</i>	1 The transit vehicle shall track the current location of the transit vehicle. Existing
<i>Requirement:</i>	2 The transit vehicle shall support the computation of the location of a transit vehicle using on-board sensors to augment the location determination function. This may include proximity to the transit stops or other known reference points as well as recording trip length. Potential
<i>Requirement:</i>	3 The transit vehicle shall record transit trip monitoring data including vehicle mileage and fuel usage. Potential
<i>Requirement:</i>	4 The transit vehicle shall record transit trip monitoring data including operational status information such as doors open/closed, running times, etc. Potential
<i>Requirement:</i>	5 The transit vehicle shall send the transit vehicle trip monitoring data to center-based trip monitoring functions. Existing
<i>Functional Area:</i> On-board Schedule Management	
Collecting of data for schedule generation and adjustment on-board a transit vehicle. Supports communication between the vehicle, operator, and center.	
<i>Requirement:</i>	1 The transit vehicle shall receive a vehicle assignment including transit route information, transit service instructions, traffic information, road conditions, and other information for the operator. Potential
<i>Requirement:</i>	2 The transit vehicle shall use the route information and its current location to determine the deviation from the predetermined schedule. Potential
<i>Requirement:</i>	3 The transit vehicle shall calculate the estimated times of arrival (ETA) at transit stops. Potential
<i>Requirement:</i>	4 The transit vehicle shall determine scenarios to correct the schedule deviation. Potential
<i>Requirement:</i>	5 The transit vehicle shall provide the schedule deviations and instructions for schedule corrections to the transit vehicle operator if the deviation is small, or the transit vehicle is operating in an urban area. Potential
<i>Requirement:</i>	6 The transit vehicle shall send the schedule deviation and estimated arrival time information to the center. Potential
<i>Requirement:</i>	7 The transit vehicle shall support the operations of a flexible route service. This may include requests for route deviations that would then lead to schedule corrective actions. Potential
<i>Requirement:</i>	8 The transit vehicle shall notify the transit center of vehicle location and operational status as the vehicle exits and returns to the transit facility to support future vehicle assignments. Potential
<i>Functional Area:</i> On-board Paratransit Operations	
On-board systems to manage paratransit and flexible-route dispatch requests, including multi-stop runs. Passenger data is collected and provided to the center.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> SLCCS Transit Vehicles	
<i>Entity:</i> Transit Vehicle	
<i>Functional Area:</i> On-board Paratransit Operations	
On-board systems to manage paratransit and flexible-route dispatch requests, including multi-stop runs. Passenger data is collected and provided to the center.	
<i>Requirement:</i>	Potential
1 The transit vehicle shall manage data input to sensor(s) on-board a transit vehicle to determine the vehicle's availability for use in demand responsive and flexible-route transit services based on identity, type, and passenger capacity.	
<i>Requirement:</i>	Existing
2 The transit vehicle shall receive the status of demand responsive or flexible-route transit schedules and passenger loading from the transit vehicle operator.	
<i>Requirement:</i>	Existing
3 The transit vehicle shall provide the transit vehicle operator instructions about the demand responsive or flexible-route transit schedule that has been confirmed from the center.	
<i>Requirement:</i>	Existing
4 The transit vehicle shall provide the capability to log passenger boardings and alightings and make passenger use data available to the transit center.	
<i>Functional Area:</i> On-board Transit Fare Management	
On-board systems provide fare collection using a travelers non-monetary fare medium. Collected fare data are made available to the center.	
<i>Requirement:</i>	Potential
1 The transit vehicle shall read data from the traveler card / payment instrument presented by boarding passengers.	
<i>Requirement:</i>	Potential
2 The transit vehicle shall provide an image of all travelers which shall be used for violation processing of those who do not have a traveler card / payment instrument or whose transit fare transaction fails.	
<i>Requirement:</i>	Potential
3 The transit vehicle shall determine the traveler's travel routing based on the transit vehicle's current location and the traveler's destination.	
<i>Requirement:</i>	Potential
4 The transit vehicle shall calculate the traveler's fare based on the origin and destination provided by the traveler as well as factors such as the transit routing, transit fare category, traveler history, and route-specific information.	
<i>Requirement:</i>	Existing
6 The transit vehicle shall provide a transit fare payment interface that is suitable for travelers with physical disabilities.	
<i>Requirement:</i>	Existing
8 The transit vehicle shall support an emergency fare structure overriding all other fares that can be activated during disasters, states of emergency or evacuations.	
<i>Requirement:</i>	Existing
10 The transit vehicle shall provide fare statistics data to the center.	
<i>Functional Area:</i> On-board Passenger Counting	
On-board systems collect transit vehicle loading data and make it available to the center.	
<i>Requirement:</i>	Potential
1 The transit vehicle shall count passengers boarding and alighting.	
<i>Requirement:</i>	Potential
2 The passenger counts shall be related to location to support association of passenger counts with routes, route segments, or bus stops.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> SLCCS Transit Vehicles	
<i>Entity:</i> Transit Vehicle	
<i>Functional Area:</i> On-board Passenger Counting	
On-board systems collect transit vehicle loading data and make it available to the center.	
<i>Requirement:</i>	
3 The passenger counts shall be timestamped so that ridership can be measured by time of day and day of week.	Potential
<i>Requirement:</i>	
4 The transit vehicle shall send the collected passenger count information to the transit center.	Potential
<i>Functional Area:</i> On-board Transit Security	
On-board video/audio surveillance systems, threat sensors, and object detection sensors to enhance security and safety on-board a transit vehicles. Also includes silent alarms activated by transit user or vehicle operator, operator authentication, and remote vehicle disabling.	
<i>Requirement:</i>	
1 The transit vehicle shall perform video and audio surveillance inside of transit vehicles and output raw video or audio data for either local monitoring (for processing or direct output to the transit vehicle operator), remote monitoring or for local storage (e.g., in an event recorder).	Planned
<i>Requirement:</i>	
2 The transit vehicle shall perform local monitoring of video or audio surveillance data collected inside of transit vehicles, and identify potential incidents or threats based on received processing parameters.	Planned
<i>Requirement:</i>	
3 The transit vehicle shall output an indication of potential incidents or threats and the processed video or audio information to the center along with the vehicle's current location.	Planned
<i>Requirement:</i>	
4 The transit vehicle shall detect potential threats via sensors for chemical agents, toxic industrial chemicals, biological agents, explosives, and radiation.	Potential
<i>Requirement:</i>	
5 The transit vehicle shall detect potential threats via object detection sensors (e.g. metal detectors).	Potential
<i>Requirement:</i>	
6 The transit vehicle shall output an indication of potential incidents or threats and the processed sensor information to the center along with the vehicle's current location.	Potential
<i>Requirement:</i>	
7 The transit vehicle shall accept sensor control data to allow remote control of the sensors.	Potential
<i>Requirement:</i>	
8 The transit vehicle shall monitor and output surveillance and sensor equipment status and fault indications.	Planned
<i>Requirement:</i>	
9 The transit vehicle shall accept emergency inputs from either the transit vehicle operator or a traveler through such interfaces as panic buttons, silent or audible alarms, etc.	Planned
<i>Requirement:</i>	
10 The transit vehicle shall output reported emergencies to the center.	Planned
<i>Requirement:</i>	
11 The transit vehicle shall receive acknowledgments of the emergency request from the center and output this acknowledgment to the transit vehicle operator or to the travelers.	Planned

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: SLCCS Transit Vehicles</i>	
<i>Entity: Transit Vehicle</i>	
<i>Functional Area: On-board Transit Security</i>	
On-board video/audio surveillance systems, threat sensors, and object detection sensors to enhance security and safety on-board a transit vehicles. Also includes silent alarms activated by transit user or vehicle operator, operator authentication, and remote vehicle disabling.	
<i>Requirement:</i> 12 The transit vehicle shall be capable of receiving an emergency message for broadcast to the travelers or to the transit vehicle operator.	Planned
<i>Requirement:</i> 13 The transit vehicle shall be capable of disabling or enabling the transit vehicle based on commands from the center or authentic inputs from the transit vehicle operator.	Potential
<i>Requirement:</i> 14 The transit vehicle shall perform authentication of the transit vehicle operator.	Potential
<i>Element: TransPorte Agency Management</i>	
<i>Entity: Transit Management</i>	
<i>Functional Area: Transit Center Vehicle Tracking</i>	
Monitoring transit vehicle locations via interactions with on-board systems. Furnish users with real-time transit schedule information and maintain interface with digital map providers.	
<i>Requirement:</i> 1 The center shall monitor the locations of all transit vehicles within its network.	Existing
<i>Requirement:</i> 2 The center shall determine adherence of transit vehicles to their assigned schedule.	Existing
<i>Requirement:</i> 3 The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for transit tracking and dispatch.	Planned
<i>Requirement:</i> 4 The center shall provide transit operational data to traveler information service providers.	Planned
<i>Requirement:</i> 5 The center shall provide collected transit probe data to traffic management centers and traveler information service providers for use in measuring current traffic conditions.	Existing
<i>Functional Area: Transit Center Paratransit Operations</i>	
Management of demand response transit services, including paratransit. Planning and scheduling of these services. Supports automated vehicle dispatch and automatically updates customer service operator systems.	
<i>Requirement:</i> 1 The center shall process trip requests for demand responsive transit services, i.e. paratransit. Sources of the requests may include traveler information service providers.	Existing
<i>Requirement:</i> 2 The center shall monitor the operational status of the demand response vehicles including status of passenger pick-up and drop-off.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: TransPorte Agency Management</i>	
<i>Entity: Transit Management</i>	
<i>Functional Area: Transit Center Paratransit Operations</i>	
Management of demand response transit services, including paratransit. Planning and scheduling of these services. Supports automated vehicle dispatch and automatically updates customer service operator systems.	
<i>Requirement:</i> 3 The center shall generate demand response transit (including paratransit) routes and schedules based on such factors as parameters input by the system operator, what other demand responsive transit schedules have been planned, the availability and location of vehicles, the relevance of any fixed transit routes and schedules, road network information, and incident information.	Existing
<i>Requirement:</i> 4 The center shall dispatch demand response (paratransit) transit vehicles.	Existing
<i>Requirement:</i> 5 The center shall exchange information with Maintenance and Construction Operations concerning work zones, roadway conditions, asset restrictions, work plans, etc.	Planned
<i>Requirement:</i> 6 The center shall disseminate up-to-date schedules and route information to other centers for demand responsive transit services (paratransit).	Planned
<i>Requirement:</i> 7 The center shall collect the log of passenger boardings and alightings from the paratransit vehicles.	Existing
<i>Functional Area: Transit Center Fare Management</i>	
Management of fare collection at the center - includes setting and distributing fare information, central processing of fares for transit as well as other ITS services, links to financial institutions and enforcement agencies.	
<i>Requirement:</i> 2 The center shall provide the capability for a system operator to manage the transit fares and control the exchange of transit fare information.	Potential
<i>Requirement:</i> 3 The center shall process the financial requests from the transit vehicles or roadside and manage an interface to a Financial Institution.	Potential
<i>Requirement:</i> 4 The center shall support the payment of transit fare transactions using data provided by the traveler cards / payment instruments.	Potential
<i>Requirement:</i> 5 The center shall collect data on fare payment violations and send the data, including images of the violator, to the appropriate enforcement agency.	Potential
<i>Requirement:</i> 6 The center shall process requests for transit fares to be paid in advance.	Existing
<i>Requirement:</i> 8 The center shall be capable of establishing emergency fare structures to override all other fares during disasters, states of emergency, or evacuations.	Potential
<i>Requirement:</i> 10 The center shall collect fare statistics data to implement variable and flexible fare structures.	Potential
<i>Requirement:</i> 11 The center shall exchange fare and load information with other transit management centers, including potential Centralized Payments facilities.	Potential

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: TransPorte Agency Management</i>	
<i>Entity: Transit Management</i>	
<i>Functional Area: Transit Center Fare Management</i>	
Management of fare collection at the center - includes setting and distributing fare information, central processing of fares for transit as well as other ITS services, links to financial institutions and enforcement agencies.	
<i>Requirement:</i> 12 The center shall provide transit fare information to other centers, including traveler information providers upon request.	Potential
<i>Functional Area: Transit Center Passenger Counting</i>	
Receives and processes transit vehicle loading data using two-way communications from equipped transit vehicles.	
<i>Requirement:</i> 1 The center shall collect passenger count information from each transit vehicle.	Existing
<i>Requirement:</i> 3 The center shall make the compiled ridership data available to the system operator and other applications.	Existing
<i>Functional Area: Transit Center Security</i>	
Monitor transit vehicle operator or traveler activated alarms; authenticate transit vehicle operators; remotely disable a transit vehicle; alert operators, travelers, and police to potential incidents identified by these security features.	
<i>Requirement:</i> 1 The center shall monitor transit vehicle operational data to determine if the transit vehicle is off-route and assess whether a security incident is occurring.	Potential
<i>Requirement:</i> 2 The center shall receive reports of emergencies on-board transit vehicles entered directly by the transit vehicle operator or from a traveler through interfaces such as panic buttons or alarm switches.	Planned
<i>Requirement:</i> 3 The center shall support the back-office portion of functionality to authenticate transit vehicle operators.	Potential
<i>Requirement:</i> 4 The center shall exchange transit incident information along with other service data with other transit agencies.	Planned
<i>Requirement:</i> 5 The center shall receive information pertaining to a wide-area alert such as weather alerts, disaster situations, or child abductions. This information may come from Emergency Management or from other Alerting and Advisory Systems.	Existing
<i>Requirement:</i> 6 The center shall send wide-area alert information to travelers (on-board transit vehicles or at stations/stops) and transit vehicle operators.	Planned
<i>Requirement:</i> 7 The center shall coordinate the response to security incidents involving transit with other agencies including Emergency Management, other transit agencies, media, traffic management, and traveler information service providers.	Planned
<i>Requirement:</i> 8 The center shall receive threat information and status on the integrity of the transit infrastructure.	Potential
<i>Requirement:</i> 9 The center shall provide support to remotely disable (or reset the disabling of) a transit vehicle in service.	Potential
<i>Functional Area: Transit Vehicle Operator Assignment</i>	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: TransPorte Agency Management</i>	
<i>Entity: Transit Management</i>	
<i>Functional Area: Transit Vehicle Operator Assignment</i>	
Assignment of transit operators to runs in a fair manner while minimizing labor and overtime services, considering operator preferences, qualifications, accumulated work hours, and other information about each operator.	
<i>Requirement:</i>	Existing
1 The center shall 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.	
<i>Requirement:</i>	Existing
2 The center shall assess the transit vehicle operator's availability based on previous work assignments, accumulated hours, plus health and vacation commitments.	
<i>Requirement:</i>	Existing
3 The center shall assign transit vehicle operators to transit schedules based on their eligibility, route preferences, seniority, and transit vehicle availability.	
<i>Requirement:</i>	Existing
4 The center shall provide an interface through which the transit vehicle operator information can be maintained - either from the transit vehicle operator, center personnel, or other functions.	
<i>Requirement:</i>	Existing
5 The center shall generate supplemental vehicle operator assignments as required due to change events that occur during the operating day.	
<i>Functional Area: Transit Center Information Services</i>	
Provide interactive traveler information to travelers (on-board transit vehicles, at stops/stations, using personal devices), traveler information service providers, media, and other transit organizations. Includes routes, schedules, transfer options, fares, real-time schedule adherence, current incidents, weather conditions, yellow pages, and special events.	
<i>Requirement:</i>	Existing
1 The center shall provide travelers using public transportation with traffic and advisory information upon request. Such information may include transit routes, schedules, transfer options, fares, real-time schedule adherence, current incidents, weather conditions, and special events.	
<i>Requirement:</i>	Existing
6 The center shall broadcast transit advisory data, including alerts and advisories pertaining to major emergencies, or man made disasters.	
<i>Functional Area: Transit Environmental Monitoring</i>	
Current and forecast road and weather information assimilated from weather service providers and vehicle probes. The information is monitored and forwarded to other agencies to more effectively manage transit operations.	
<i>Requirement:</i>	Existing
1 The center shall assimilate current and forecast road conditions and surface weather information to more effectively manage transit operations.	
<i>Requirement:</i>	Existing
2 The center shall collect current and forecast road and weather information from weather service providers and roadway maintenance centers.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> TransPorte Agency Management	
<i>Entity:</i> Transit Management	
<i>Functional Area:</i> Transit Center Multi-Modal Coordination	
Coordinate schedules with other agencies and modes, including transit transfer cluster and transfer point information.	
<i>Requirement:</i>	
1 The center shall coordinate schedules and services between transit agencies, traffic management, maintenance and construction operations, parking management, and other surface or air transportation modes.	Planned
<i>Requirement:</i>	
2 The center shall share transfer cluster and transfer point information with multimodal transportation service providers, other transit agencies, and traveler information service providers. A transfer cluster is a collection of stop points, stations, or terminals where transfers can be made conveniently.	Planned
<i>Requirement:</i>	
3 The center shall accept requests from traffic management to change routes and schedules as part of the implementation of demand management strategies.	Potential
<i>Requirement:</i>	
4 The center shall coordinate transit services for special events, planning services for the event and managing transit services on the day of the event.	Planned
<i>Requirement:</i>	
5 The center shall provide transit operations personnel with the capability to control and monitor transit service coordination activities.	Planned
<i>Functional Area:</i> Transit Evacuation Support	
Support evacuation and subsequent reentry of a population in the vicinity of a disaster or other emergency. Coordinate regional evacuation plans and resources including transit and school bus fleets.	
<i>Requirement:</i>	
1 The center shall manage the use of transit resources to support evacuation and subsequent reentry of a population in the vicinity of a disaster or other emergency.	Potential
<i>Requirement:</i>	
2 The center shall coordinate regional evacuation plans with Emergency Management - identifying the transit role in an evacuation and the transit resources that would be used.	Planned
<i>Requirement:</i>	
3 The center shall coordinate the use of transit and school bus fleets during an evacuation, supporting evacuation of those with special needs and the general population.	Potential
<i>Requirement:</i>	
4 The center shall adjust and update transit service and fare schedules and provide that information to other agencies as they coordinate evacuations.	Potential
<i>Functional Area:</i> Transit Data Collection	
Collection and storage of transit management data. For use by operations personnel or data archives in the region.	
<i>Requirement:</i>	
1 The center shall collect transit management data such as transit fares and passenger use, transit services, paratransit operations, transit vehicle maintenance data, etc.	Existing
<i>Requirement:</i>	
2 The center shall assign quality control metrics and meta-data to be stored along with the data. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.	Planned

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: TransPorte Agency Management</i>	
<i>Entity: Transit Management</i>	
<i>Functional Area: Transit Data Collection</i>	
Collection and storage of transit management data. For use by operations personnel or data archives in the region.	
<i>Requirement:</i>	
3 The center shall receive and respond to requests from ITS Archives for either a catalog of the transit data or for the data itself.	Planned
<i>Requirement:</i>	
4 The center shall be able to produce sample products of the data available.	Planned
<i>Functional Area: Transit Transportation Operations Data Collection</i>	
Collects real-time information on the state of the regional transportation system for operational use by the center. It establishes communications with a regional repository, requests or subscribes to information relevant to the center, and distributes the received information for use.	
<i>Requirement:</i>	
1 The center shall collect real-time information on the state of the regional transportation system including current traffic and road conditions, weather conditions, special event and incident information.	Existing
<i>Requirement:</i>	
2 The center shall support the capability for the system operator to monitor and control the information collection service.	Existing
<i>Element: TransPorte Transit Vehicles</i>	
<i>Entity: Transit Vehicle</i>	
<i>Functional Area: On-board Transit Trip Monitoring</i>	
Support fleet management with automatic vehicle location (AVL) and automated mileage and fuel reporting and auditing.	
<i>Requirement:</i>	
1 The transit vehicle shall track the current location of the transit vehicle.	Existing
<i>Requirement:</i>	
2 The transit vehicle shall support the computation of the location of a transit vehicle using on-board sensors to augment the location determination function. This may include proximity to the transit stops or other known reference points as well as recording trip length.	Potential
<i>Requirement:</i>	
3 The transit vehicle shall record transit trip monitoring data including vehicle mileage and fuel usage.	Potential
<i>Requirement:</i>	
4 The transit vehicle shall record transit trip monitoring data including operational status information such as doors open/closed, running times, etc.	Potential
<i>Requirement:</i>	
5 The transit vehicle shall send the transit vehicle trip monitoring data to center-based trip monitoring functions.	Existing
<i>Functional Area: On-board Schedule Management</i>	
Collecting of data for schedule generation and adjustment on-board a transit vehicle. Supports communication between the vehicle, operator, and center.	
<i>Requirement:</i>	
1 The transit vehicle shall receive a vehicle assignment including transit route information, transit service instructions, traffic information, road conditions, and other information for the operator.	Potential

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: TransPorte Transit Vehicles</i>	
<i>Entity: Transit Vehicle</i>	
<i>Functional Area: On-board Schedule Management</i>	
Collecting of data for schedule generation and adjustment on-board a transit vehicle. Supports communication between the vehicle, operator, and center.	
<i>Requirement:</i> 2 The transit vehicle shall use the route information and its current location to determine the deviation from the predetermined schedule.	Potential
<i>Requirement:</i> 3 The transit vehicle shall calculate the estimated times of arrival (ETA) at transit stops.	Potential
<i>Requirement:</i> 4 The transit vehicle shall determine scenarios to correct the schedule deviation.	Potential
<i>Requirement:</i> 5 The transit vehicle shall provide the schedule deviations and instructions for schedule corrections to the transit vehicle operator if the deviation is small, or the transit vehicle is operating in an urban area.	Potential
<i>Requirement:</i> 6 The transit vehicle shall send the schedule deviation and estimated arrival time information to the center.	Potential
<i>Requirement:</i> 7 The transit vehicle shall support the operations of a flexible route service. This may include requests for route deviations that would then lead to schedule corrective actions.	Potential
<i>Requirement:</i> 8 The transit vehicle shall notify the transit center of vehicle location and operational status as the vehicle exits and returns to the transit facility to support future vehicle assignments.	Potential
<i>Functional Area: On-board Paratransit Operations</i>	
On-board systems to manage paratransit and flexible-route dispatch requests, including multi-stop runs. Passenger data is collected and provided to the center.	
<i>Requirement:</i> 1 The transit vehicle shall manage data input to sensor(s) on-board a transit vehicle to determine the vehicle's availability for use in demand responsive and flexible-route transit services based on identity, type, and passenger capacity.	Potential
<i>Requirement:</i> 2 The transit vehicle shall receive the status of demand responsive or flexible-route transit schedules and passenger loading from the transit vehicle operator.	Existing
<i>Requirement:</i> 3 The transit vehicle shall provide the transit vehicle operator instructions about the demand responsive or flexible-route transit schedule that has been confirmed from the center.	Existing
<i>Requirement:</i> 4 The transit vehicle shall provide the capability to log passenger boardings and alightings and make passenger use data available to the transit center.	Existing
<i>Functional Area: On-board Transit Fare Management</i>	
On-board systems provide fare collection using a travelers non-monetary fare medium. Collected fare data are made available to the center.	
<i>Requirement:</i> 1 The transit vehicle shall read data from the traveler card / payment instrument presented by boarding passengers.	Potential

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: TransPorte Transit Vehicles</i>	
<i>Entity: Transit Vehicle</i>	
<i>Functional Area: On-board Transit Fare Management</i>	
On-board systems provide fare collection using a travelers non-monetary fare medium. Collected fare data are made available to the center.	
<i>Requirement:</i> 2 The transit vehicle shall provide an image of all travelers which shall be used for violation processing of those who do not have a traveler card / payment instrument or whose transit fare transaction fails.	Potential
<i>Requirement:</i> 3 The transit vehicle shall determine the traveler's travel routing based on the transit vehicle's current location and the traveler's destination.	Potential
<i>Requirement:</i> 4 The transit vehicle shall calculate the traveler's fare based on the origin and destination provided by the traveler as well as factors such as the transit routing, transit fare category, traveler history, and route-specific information.	Potential
<i>Requirement:</i> 6 The transit vehicle shall provide a transit fare payment interface that is suitable for travelers with physical disabilities.	Existing
<i>Requirement:</i> 8 The transit vehicle shall support an emergency fare structure overriding all other fares that can be activated during disasters, states of emergency or evacuations.	Potential
<i>Requirement:</i> 10 The transit vehicle shall provide fare statistics data to the center.	Potential
<i>Functional Area: On-board Passenger Counting</i>	
On-board systems collect transit vehicle loading data and make it available to the center.	
<i>Requirement:</i> 1 The transit vehicle shall count passengers boarding and alighting.	Potential
<i>Requirement:</i> 2 The passenger counts shall be related to location to support association of passenger counts with routes, route segments, or bus stops.	Potential
<i>Requirement:</i> 3 The passenger counts shall be timestamped so that ridership can be measured by time of day and day of week.	Potential
<i>Requirement:</i> 4 The transit vehicle shall send the collected passenger count information to the transit center.	Potential
<i>Functional Area: On-board Transit Security</i>	
On-board video/audio surveillance systems, threat sensors, and object detection sensors to enhance security and safety on-board a transit vehicles. Also includes silent alarms activated by transit user or vehicle operator, operator authentication, and remote vehicle disabling.	
<i>Requirement:</i> 1 The transit vehicle shall perform video and audio surveillance inside of transit vehicles and output raw video or audio data for either local monitoring (for processing or direct output to the transit vehicle operator), remote monitoring or for local storage (e.g., in an event recorder).	Planned
<i>Requirement:</i> 2 The transit vehicle shall perform local monitoring of video or audio surveillance data collected inside of transit vehicles, and identify potential incidents or threats based on received processing parameters.	Planned

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: TransPorte Transit Vehicles</i>	
<i>Entity: Transit Vehicle</i>	
<i>Functional Area: On-board Transit Security</i>	
On-board video/audio surveillance systems, threat sensors, and object detection sensors to enhance security and safety on-board a transit vehicles. Also includes silent alarms activated by transit user or vehicle operator, operator authentication, and remote vehicle disabling.	
<i>Requirement:</i> 3 The transit vehicle shall output an indication of potential incidents or threats and the processed video or audio information to the center along with the vehicle's current location.	Planned
<i>Requirement:</i> 4 The transit vehicle shall detect potential threats via sensors for chemical agents, toxic industrial chemicals, biological agents, explosives, and radiation.	Potential
<i>Requirement:</i> 5 The transit vehicle shall detect potential threats via object detection sensors (e.g. metal detectors).	Potential
<i>Requirement:</i> 6 The transit vehicle shall output an indication of potential incidents or threats and the processed sensor information to the center along with the vehicle's current location.	Potential
<i>Requirement:</i> 7 The transit vehicle shall accept sensor control data to allow remote control of the sensors.	Potential
<i>Requirement:</i> 8 The transit vehicle shall monitor and output surveillance and sensor equipment status and fault indications.	Planned
<i>Requirement:</i> 9 The transit vehicle shall accept emergency inputs from either the transit vehicle operator or a traveler through such interfaces as panic buttons, silent or audible alarms, etc.	Planned
<i>Requirement:</i> 10 The transit vehicle shall output reported emergencies to the center.	Planned
<i>Requirement:</i> 11 The transit vehicle shall receive acknowledgments of the emergency request from the center and output this acknowledgment to the transit vehicle operator or to the travelers.	Planned
<i>Requirement:</i> 12 The transit vehicle shall be capable of receiving an emergency message for broadcast to the travelers or to the transit vehicle operator.	Planned
<i>Requirement:</i> 13 The transit vehicle shall be capable of disabling or enabling the transit vehicle based on commands from the center or authentic inputs from the transit vehicle operator.	Potential
<i>Requirement:</i> 14 The transit vehicle shall perform authentication of the transit vehicle operator.	Potential
<i>Element: Triangle Transit Agency Management</i>	
<i>Entity: Transit Management</i>	
<i>Functional Area: Transit Center Connection Protection</i>	
Manages the coordination of transit transfers between routes, including routes on different modes. Also supports the capability for travelers to obtain connection protection throughout a trip.	
<i>Requirement:</i> 1 The center shall manage service requests for routing of an individual through the transit system.	Planned
<i>Requirement:</i> 2 The center shall provide transit plans for both fixed and demand responsive transit to transit passengers.	Planned

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Triangle Transit Agency Management</i>	
<i>Entity: Transit Management</i>	
<i>Functional Area: Transit Center Connection Protection</i>	
Manages the coordination of transit transfers between routes, including routes on different modes. Also supports the capability for travelers to obtain connection protection throughout a trip.	
<i>Requirement:</i>	Planned
3 The center shall be able to coordinate with Other Transit Management systems or Multimodal Transportation Service Providers in order to provide a complete multimodal trip plan.	
<i>Requirement:</i>	Planned
4 The center shall track the passenger through the transit network, and coordinate with Other TRM and Multimodal Transportation Service Providers so that the passenger makes efficient connections between the transit system and other transit systems or other modes of transportation.	
<i>Functional Area: Transit Center Vehicle Tracking</i>	
Monitoring transit vehicle locations via interactions with on-board systems. Furnish users with real-time transit schedule information and maintain interface with digital map providers.	
<i>Requirement:</i>	Planned
1 The center shall monitor the locations of all transit vehicles within its network.	
<i>Requirement:</i>	Planned
2 The center shall determine adherence of transit vehicles to their assigned schedule.	
<i>Requirement:</i>	Planned
3 The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for transit tracking and dispatch.	
<i>Requirement:</i>	Planned
4 The center shall provide transit operational data to traveler information service providers.	
<i>Requirement:</i>	Planned
5 The center shall provide collected transit probe data to traffic management centers and traveler information service providers for use in measuring current traffic conditions.	
<i>Functional Area: Transit Center Fixed-Route Operations</i>	
Management of fixed route transit operations. Planning, scheduling, and dispatch associated with fixed and flexible route transit services. Updates customer service operator systems, and provides current vehicle schedule adherence and optimum scenarios for schedule adjustment.	
<i>Requirement:</i>	Planned
1 The center shall generate transit routes and schedules based on such factors as parameters input by the system operator, road network conditions, incident information, operational data on current routes and schedules, and digitized map data.	
<i>Requirement:</i>	Planned
2 The center shall provide the interface to the system operator to control the generation of new routes and schedules (transit services) including the ability to review and update the parameters used by the routes and schedules generation processes and to initiate these processes	
<i>Requirement:</i>	Planned
3 The center shall be able to generate special routes and schedules to support an incident, disaster, evacuation, or other emergency.	
<i>Requirement:</i>	Planned
4 The center shall dispatch fixed route or flexible route transit vehicles	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Triangle Transit Agency Management</i>	
<i>Entity: Transit Management</i>	
<i>Functional Area: Transit Center Fixed-Route Operations</i>	
Management of fixed route transit operations. Planning, scheduling, and dispatch associated with fixed and flexible route transit services. Updates customer service operator systems, and provides current vehicle schedule adherence and optimum scenarios for schedule adjustment.	
<i>Requirement:</i>	
5 The center shall collect transit operational data for use in the generation of routes and schedules.	Planned
<i>Requirement:</i>	
6 The center shall provide instructions or corrective actions to the transit vehicle operators based upon operational needs.	Planned
<i>Requirement:</i>	
7 The center shall manage large deviations of individual transit vehicles, deviations in rural areas, and deviations of large numbers of vehicles.	Planned
<i>Requirement:</i>	
8 The center shall 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.	Planned
<i>Requirement:</i>	
9 The center shall exchange information with Maintenance and Construction Operations concerning work zones, roadway conditions, asset restrictions, work plans, etc.	Planned
<i>Requirement:</i>	
10 The center shall disseminate up-to-date schedules and route information to other centers for fixed and flexible route services.	Planned
<i>Requirement:</i>	
11 The center shall provide an interface to the archive data repository to enable the operator to retrieve historical operating data for use in planning transit routes and schedules.	Planned
<i>Functional Area: Transit Center Paratransit Operations</i>	
Management of demand response transit services, including paratransit. Planning and scheduling of these services. Supports automated vehicle dispatch and automatically updates customer service operator systems.	
<i>Requirement:</i>	
1 The center shall process trip requests for demand responsive transit services, i.e. paratransit. Sources of the requests may include traveler information service providers.	Potential
<i>Requirement:</i>	
2 The center shall monitor the operational status of the demand response vehicles including status of passenger pick-up and drop-off.	Potential
<i>Requirement:</i>	
3 The center shall generate demand response transit (including paratransit) routes and schedules based on such factors as parameters input by the system operator, what other demand responsive transit schedules have been planned, the availability and location of vehicles, the relevance of any fixed transit routes and schedules, road network information, and incident information.	Potential
<i>Requirement:</i>	
4 The center shall dispatch demand response (paratransit) transit vehicles.	Potential
<i>Requirement:</i>	
5 The center shall exchange information with Maintenance and Construction Operations concerning work zones, roadway conditions, asset restrictions, work plans, etc.	Planned

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Triangle Transit Agency Management</i>	
<i>Entity: Transit Management</i>	
<i>Functional Area: Transit Center Paratransit Operations</i>	
Management of demand response transit services, including paratransit. Planning and scheduling of these services. Supports automated vehicle dispatch and automatically updates customer service operator systems.	
<i>Requirement:</i>	Potential
6 The center shall disseminate up-to-date schedules and route information to other centers for demand responsive transit services (paratransit).	
<i>Requirement:</i>	Potential
7 The center shall collect the log of passenger boardings and alightings from the paratransit vehicles.	
<i>Functional Area: Transit Center Fare Management</i>	
Management of fare collection at the center - includes setting and distributing fare information, central processing of fares for transit as well as other ITS services, links to financial institutions and enforcement agencies.	
<i>Requirement:</i>	Planned
1 The center shall manage the actual value of transit fares for each segment of each regular transit route, including the transmission of the information to transit vehicles and transit stops or stations.	
<i>Requirement:</i>	Planned
3 The center shall process the financial requests from the transit vehicles or roadside and manage an interface to a Financial Institution.	
<i>Requirement:</i>	Planned
4 The center shall support the payment of transit fare transactions using data provided by the traveler cards / payment instruments.	
<i>Requirement:</i>	Planned
6 The center shall process requests for transit fares to be paid in advance.	
<i>Requirement:</i>	Planned
8 The center shall be capable of establishing emergency fare structures to override all other fares during disasters, states of emergency, or evacuations.	
<i>Requirement:</i>	Potential
10 The center shall collect fare statistics data to implement variable and flexible fare structures.	
<i>Requirement:</i>	Potential
11 The center shall exchange fare and load information with other transit management centers, including potential Centralized Payments facilities.	
<i>Requirement:</i>	Planned
12 The center shall provide transit fare information to other centers, including traveler information providers upon request.	
<i>Functional Area: Transit Center Passenger Counting</i>	
Receives and processes transit vehicle loading data using two-way communications from equipped transit vehicles.	
<i>Requirement:</i>	Potential
1 The center shall collect passenger count information from each transit vehicle.	
<i>Requirement:</i>	Potential
2 The center shall calculate transit ridership data by route, route segment, transit stop, time of day, and day of week based on the collected passenger count information.	
<i>Requirement:</i>	Potential
3 The center shall make the compiled ridership data available to the system operator and other applications.	
<i>Functional Area: Transit Center Security</i>	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Triangle Transit Agency Management</i>	
<i>Entity: Transit Management</i>	
<i>Functional Area: Transit Center Security</i>	
Monitor transit vehicle operator or traveler activated alarms; authenticate transit vehicle operators; remotely disable a transit vehicle; alert operators, travelers, and police to potential incidents identified by these security features.	
<i>Requirement:</i>	
1 The center shall monitor transit vehicle operational data to determine if the transit vehicle is off-route and assess whether a security incident is occurring.	Planned
<i>Requirement:</i>	
2 The center shall receive reports of emergencies on-board transit vehicles entered directly by the transit vehicle operator or from a traveler through interfaces such as panic buttons or alarm switches.	Planned
<i>Requirement:</i>	
3 The center shall support the back-office portion of functionality to authenticate transit vehicle operators.	Potential
<i>Requirement:</i>	
4 The center shall exchange transit incident information along with other service data with other transit agencies.	Planned
<i>Requirement:</i>	
5 The center shall receive information pertaining to a wide-area alert such as weather alerts, disaster situations, or child abductions. This information may come from Emergency Management or from other Alerting and Advisory Systems.	Planned
<i>Requirement:</i>	
6 The center shall send wide-area alert information to travelers (on-board transit vehicles or at stations/stops) and transit vehicle operators.	Planned
<i>Requirement:</i>	
7 The center shall coordinate the response to security incidents involving transit with other agencies including Emergency Management, other transit agencies, media, traffic management, and traveler information service providers.	Planned
<i>Requirement:</i>	
8 The center shall receive threat information and status on the integrity of the transit infrastructure.	Planned
<i>Requirement:</i>	
9 The center shall provide support to remotely disable (or reset the disabling of) a transit vehicle in service.	Potential
<i>Functional Area: Transit Vehicle Operator Assignment</i>	
Assignment of transit operators to runs in a fair manner while minimizing labor and overtime services, considering operator preferences, qualifications, accumulated work hours, and other information about each operator.	
<i>Requirement:</i>	
1 The center shall 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.	Planned
<i>Requirement:</i>	
2 The center shall assess the transit vehicle operator's availability based on previous work assignments, accumulated hours, plus health and vacation commitments.	Planned

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Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Triangle Transit Agency Management</i>	
<i>Entity: Transit Management</i>	
<i>Functional Area: Transit Vehicle Operator Assignment</i>	
Assignment of transit operators to runs in a fair manner while minimizing labor and overtime services, considering operator preferences, qualifications, accumulated work hours, and other information about each operator.	
<i>Requirement:</i>	Planned
3 The center shall assign transit vehicle operators to transit schedules based on their eligibility, route preferences, seniority, and transit vehicle availability.	
<i>Requirement:</i>	Planned
4 The center shall provide an interface through which the transit vehicle operator information can be maintained - either from the transit vehicle operator, center personnel, or other functions.	
<i>Requirement:</i>	Planned
5 The center shall generate supplemental vehicle operator assignments as required due to change events that occur during the operating day.	
<i>Functional Area: Transit Garage Maintenance</i>	
Collect operational and maintenance data from transit vehicles, manage vehicle service histories, automatically generate preventative maintenance schedules, and provide information to service personnel.	
<i>Requirement:</i>	Planned
2 The center shall monitor the condition of a transit vehicle to analyze brake, drive train, sensors, fuel, steering, tire, processor, communications equipment, and transit vehicle mileage to identify mileage based maintenance, out-of-specification or imminent failure conditions.	
<i>Requirement:</i>	Planned
3 The center shall generate transit vehicle maintenance schedules that identify the maintenance or repair to be performed and when the work is to be done.	
<i>Requirement:</i>	Planned
4 The center shall generate transit vehicle availability listings, current and forecast, to support transit vehicle assignment planning based, in part, on the transit vehicle maintenance schedule.	
<i>Requirement:</i>	Planned
5 The center shall assign technicians to a transit vehicle maintenance schedule, based upon such factors as personnel eligibility, work assignments, preferences and seniority.	
<i>Requirement:</i>	Planned
6 The center shall verify that the transit vehicle maintenance activities were performed correctly, using the transit vehicle's status, the maintenance personnel's work assignment, and the transit maintenance schedules.	
<i>Requirement:</i>	Planned
7 The center shall generate a time-stamped maintenance log of all maintenance activities performed on a transit vehicle.	
<i>Functional Area: Transit Vehicle Assignment</i>	
Assigns individual transit vehicles to vehicle blocks and downloads this information to the transit vehicle, updating assignments as necessitated by changes. It also provides an inventory management function that stores attributes about each of the transit vehicles.	
<i>Requirement:</i>	Planned
1 The center shall assign individual transit vehicles to transit blocks.	

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Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Triangle Transit Agency Management</i>	
<i>Entity: Transit Management</i>	
<i>Functional Area: Transit Vehicle Assignment</i>	
Assigns individual transit vehicles to vehicle blocks and downloads this information to the transit vehicle, updating assignments as necessitated by changes. It also provides an inventory management function that stores attributes about each of the transit vehicles.	
<i>Requirement:</i>	Planned
3 The center shall provide an exception handling process for the vehicle assignment function. This process shall generate new supplemental vehicle assignments as required due to change events which occur during the operating day.	
<i>Requirement:</i>	Planned
5 The center shall generate transit vehicle availability listings, current and forecast, to support transit vehicle assignment planning.	
<i>Requirement:</i>	Planned
6 The center shall provide transit operations personnel with the capability to update transit vehicle assignments and receive reports on transit vehicle inventory status.	
<i>Functional Area: Transit Center Information Services</i>	
Provide interactive traveler information to travelers (on-board transit vehicles, at stops/stations, using personal devices), traveler information service providers, media, and other transit organizations. Includes routes, schedules, transfer options, fares, real-time schedule adherence, current incidents, weather conditions, yellow pages, and special events.	
<i>Requirement:</i>	Planned
1 The center shall provide travelers using public transportation with traffic and advisory information upon request. Such information may include transit routes, schedules, transfer options, fares, real-time schedule adherence, current incidents, weather conditions, and special events.	
<i>Requirement:</i>	Planned
2 The center shall provide transit information to the media including details of deviations from schedule of regular transit services.	
<i>Requirement:</i>	Planned
3 The center shall exchange transit schedules, real-time arrival information, fare schedules, and general transit service information with other transit organizations to support transit traveler information systems.	
<i>Requirement:</i>	Planned
4 The center shall provide transit service information to traveler information service providers including routes, schedules, schedule adherence, and fare information as well as transit service information during evacuation.	
<i>Requirement:</i>	Planned
6 The center shall broadcast transit advisory data, including alerts and advisories pertaining to major emergencies, or man made disasters.	
<i>Functional Area: Transit Environmental Monitoring</i>	
Current and forecast road and weather information assimilated from weather service providers and vehicle probes. The information is monitored and forwarded to other agencies to more effectively manage transit operations.	
<i>Requirement:</i>	Planned
1 The center shall assimilate current and forecast road conditions and surface weather information to more effectively manage transit operations.	

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Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Triangle Transit Agency Management</i>	
<i>Entity: Transit Management</i>	
<i>Functional Area: Transit Environmental Monitoring</i>	
Current and forecast road and weather information assimilated from weather service providers and vehicle probes. The information is monitored and forwarded to other agencies to more effectively manage transit operations.	
<i>Requirement:</i>	Planned
2 The center shall collect current and forecast road and weather information from weather service providers and roadway maintenance centers.	
<i>Functional Area: Transit Center Multi-Modal Coordination</i>	
Coordinate schedules with other agencies and modes, including transit transfer cluster and transfer point information.	
<i>Requirement:</i>	Planned
1 The center shall coordinate schedules and services between transit agencies, traffic management, maintenance and construction operations, parking management, and other surface or air transportation modes.	
<i>Requirement:</i>	Planned
2 The center shall share transfer cluster and transfer point information with multimodal transportation service providers, other transit agencies, and traveler information service providers. A transfer cluster is a collection of stop points, stations, or terminals where transfers can be made conveniently.	
<i>Requirement:</i>	Planned
3 The center shall accept requests from traffic management to change routes and schedules as part of the implementation of demand management strategies.	
<i>Requirement:</i>	Planned
4 The center shall coordinate transit services for special events, planning services for the event and managing transit services on the day of the event.	
<i>Requirement:</i>	Planned
5 The center shall provide transit operations personnel with the capability to control and monitor transit service coordination activities.	
<i>Functional Area: Transit Evacuation Support</i>	
Support evacuation and subsequent reentry of a population in the vicinity of a disaster or other emergency. Coordinate regional evacuation plans and resources including transit and school bus fleets.	
<i>Requirement:</i>	Potential
1 The center shall manage the use of transit resources to support evacuation and subsequent reentry of a population in the vicinity of a disaster or other emergency.	
<i>Requirement:</i>	Planned
2 The center shall coordinate regional evacuation plans with Emergency Management - identifying the transit role in an evacuation and the transit resources that would be used.	
<i>Requirement:</i>	Potential
3 The center shall coordinate the use of transit and school bus fleets during an evacuation, supporting evacuation of those with special needs and the general population.	
<i>Requirement:</i>	Potential
4 The center shall adjust and update transit service and fare schedules and provide that information to other agencies as they coordinate evacuations.	
<i>Functional Area: Transit Data Collection</i>	
Collection and storage of transit management data. For use by operations personnel or data archives in the region.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Triangle Transit Agency Management</i>	
<i>Entity: Transit Management</i>	
<i>Functional Area: Transit Data Collection</i>	
Collection and storage of transit management data. For use by operations personnel or data archives in the region.	
<i>Requirement:</i>	1 The center shall collect transit management data such as transit fares and passenger use, transit services, paratransit operations, transit vehicle maintenance data, etc. Planned
<i>Requirement:</i>	2 The center shall assign quality control metrics and meta-data to be stored along with the data. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data. Planned
<i>Requirement:</i>	3 The center shall receive and respond to requests from ITS Archives for either a catalog of the transit data or for the data itself. Planned
<i>Requirement:</i>	4 The center shall be able to produce sample products of the data available. Planned
<i>Functional Area: Transit Transportation Operations Data Collection</i>	
Collects real-time information on the state of the regional transportation system for operational use by the center. It establishes communications with a regional repository, requests or subscribes to information relevant to the center, and distributes the received information for use.	
<i>Requirement:</i>	1 The center shall collect real-time information on the state of the regional transportation system including current traffic and road conditions, weather conditions, special event and incident information. Planned
<i>Requirement:</i>	2 The center shall support the capability for the system operator to monitor and control the information collection service. Planned
<i>Element: Triangle Transit Transit Vehicles</i>	
<i>Entity: Transit Vehicle</i>	
<i>Functional Area: On-board Connection Protection</i>	
Monitors vehicle schedule performance and provides it to the transit center for connection protection processing. Also recognizes travelers who have arranged for connection protection and provides information regarding them to the transit center.	
<i>Requirement:</i>	1 The transit vehicle shall monitor vehicle schedule performance and provides it to the transit center for connection protection processing. Planned
<i>Requirement:</i>	2 The transit vehicle shall receive operator instructions from the transit center relating to managing connection protection. Planned
<i>Requirement:</i>	3 The transit vehicle shall recognizes individual travelers who have arranged for connection protection and provides information regarding them to the transit center. Planned
<i>Functional Area: On-board Transit Trip Monitoring</i>	
Support fleet management with automatic vehicle location (AVL) and automated mileage and fuel reporting and auditing.	
<i>Requirement:</i>	1 The transit vehicle shall track the current location of the transit vehicle. Potential

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Triangle Transit Transit Vehicles</i>	
<i>Entity: Transit Vehicle</i>	
<i>Functional Area: On-board Transit Trip Monitoring</i>	
Support fleet management with automatic vehicle location (AVL) and automated mileage and fuel reporting and auditing.	
<i>Requirement:</i>	Potential
2 The transit vehicle shall support the computation of the location of a transit vehicle using on-board sensors to augment the location determination function. This may include proximity to the transit stops or other known reference points as well as recording trip length.	
<i>Requirement:</i>	Potential
3 The transit vehicle shall record transit trip monitoring data including vehicle mileage and fuel usage.	
<i>Requirement:</i>	Potential
4 The transit vehicle shall record transit trip monitoring data including operational status information such as doors open/closed, running times, etc.	
<i>Requirement:</i>	Potential
5 The transit vehicle shall send the transit vehicle trip monitoring data to center-based trip monitoring functions.	
<i>Functional Area: On-board Schedule Management</i>	
Collecting of data for schedule generation and adjustment on-board a transit vehicle. Supports communication between the vehicle, operator, and center.	
<i>Requirement:</i>	Potential
1 The transit vehicle shall receive a vehicle assignment including transit route information, transit service instructions, traffic information, road conditions, and other information for the operator.	
<i>Requirement:</i>	Potential
2 The transit vehicle shall use the route information and its current location to determine the deviation from the predetermined schedule.	
<i>Requirement:</i>	Potential
3 The transit vehicle shall calculate the estimated times of arrival (ETA) at transit stops.	
<i>Requirement:</i>	Potential
4 The transit vehicle shall determine scenarios to correct the schedule deviation.	
<i>Requirement:</i>	Potential
5 The transit vehicle shall provide the schedule deviations and instructions for schedule corrections to the transit vehicle operator if the deviation is small, or the transit vehicle is operating in an urban area.	
<i>Requirement:</i>	Potential
6 The transit vehicle shall send the schedule deviation and estimated arrival time information to the center.	
<i>Requirement:</i>	Potential
7 The transit vehicle shall support the operations of a flexible route service. This may include requests for route deviations that would then lead to schedule corrective actions.	
<i>Requirement:</i>	Potential
8 The transit vehicle shall notify the transit center of vehicle location and operational status as the vehicle exits and returns to the transit facility to support future vehicle assignments.	
<i>Functional Area: On-board Paratransit Operations</i>	
On-board systems to manage paratransit and flexible-route dispatch requests, including multi-stop runs. Passenger data is collected and provided to the center.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Triangle Transit Transit Vehicles</i>	
<i>Entity: Transit Vehicle</i>	
Functional Area: On-board Paratransit Operations	
On-board systems to manage paratransit and flexible-route dispatch requests, including multi-stop runs. Passenger data is collected and provided to the center.	
<i>Requirement:</i> 2 The transit vehicle shall receive the status of demand responsive or flexible-route transit schedules and passenger loading from the transit vehicle operator.	Potential
<i>Requirement:</i> 3 The transit vehicle shall provide the transit vehicle operator instructions about the demand responsive or flexible-route transit schedule that has been confirmed from the center.	Potential
<i>Requirement:</i> 4 The transit vehicle shall provide the capability to log passenger boardings and alightings and make passenger use data available to the transit center.	Potential
Functional Area: On-board Transit Fare Management	
On-board systems provide fare collection using a travelers non-monetary fare medium. Collected fare data are made available to the center.	
<i>Requirement:</i> 1 The transit vehicle shall read data from the traveler card / payment instrument presented by boarding passengers.	Potential
<i>Requirement:</i> 2 The transit vehicle shall provide an image of all travelers which shall be used for violation processing of those who do not have a traveler card / payment instrument or whose transit fare transaction fails.	Potential
<i>Requirement:</i> 3 The transit vehicle shall determine the traveler's travel routing based on the transit vehicle's current location and the traveler's destination.	Potential
<i>Requirement:</i> 4 The transit vehicle shall calculate the traveler's fare based on the origin and destination provided by the traveler as well as factors such as the transit routing, transit fare category, traveler history, and route-specific information.	Potential
<i>Requirement:</i> 5 The transit vehicle shall have access to the complete range of transit services (routes and schedules) that are available to the traveler.	Planned
<i>Requirement:</i> 6 The transit vehicle shall provide a transit fare payment interface that is suitable for travelers with physical disabilities.	Planned
<i>Requirement:</i> 7 The transit vehicle shall include a database on-board the transit vehicle for use in fare processing from which the fares for all possible trips within the transit operational network can be determined.	Potential
<i>Requirement:</i> 8 The transit vehicle shall support an emergency fare structure overriding all other fares that can be activated during disasters, states of emergency or evacuations.	Potential
<i>Requirement:</i> 10 The transit vehicle shall provide fare statistics data to the center.	Potential
Functional Area: On-board Passenger Counting	
On-board systems collect transit vehicle loading data and make it available to the center.	
<i>Requirement:</i> 1 The transit vehicle shall count passengers boarding and alighting.	Potential

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Triangle Transit Transit Vehicles</i>	
<i>Entity: Transit Vehicle</i>	
<i>Functional Area: On-board Passenger Counting</i>	
On-board systems collect transit vehicle loading data and make it available to the center.	
<i>Requirement:</i> 2 The passenger counts shall be related to location to support association of passenger counts with routes, route segments, or bus stops.	Potential
<i>Requirement:</i> 3 The passenger counts shall be timestamped so that ridership can be measured by time of day and day of week.	Potential
<i>Requirement:</i> 4 The transit vehicle shall send the collected passenger count information to the transit center.	Potential
<i>Functional Area: On-board Transit Security</i>	
On-board video/audio surveillance systems, threat sensors, and object detection sensors to enhance security and safety on-board a transit vehicles. Also includes silent alarms activated by transit user or vehicle operator, operator authentication, and remote vehicle disabling.	
<i>Requirement:</i> 1 The transit vehicle shall perform video and audio surveillance inside of transit vehicles and output raw video or audio data for either local monitoring (for processing or direct output to the transit vehicle operator), remote monitoring or for local storage (e.g., in an event recorder).	Planned
<i>Requirement:</i> 2 The transit vehicle shall perform local monitoring of video or audio surveillance data collected inside of transit vehicles, and identify potential incidents or threats based on received processing parameters.	Planned
<i>Requirement:</i> 3 The transit vehicle shall output an indication of potential incidents or threats and the processed video or audio information to the center along with the vehicle's current location.	Planned
<i>Requirement:</i> 4 The transit vehicle shall detect potential threats via sensors for chemical agents, toxic industrial chemicals, biological agents, explosives, and radiation.	Potential
<i>Requirement:</i> 5 The transit vehicle shall detect potential threats via object detection sensors (e.g. metal detectors).	Potential
<i>Requirement:</i> 6 The transit vehicle shall output an indication of potential incidents or threats and the processed sensor information to the center along with the vehicle's current location.	Potential
<i>Requirement:</i> 7 The transit vehicle shall accept sensor control data to allow remote control of the sensors.	Potential
<i>Requirement:</i> 8 The transit vehicle shall monitor and output surveillance and sensor equipment status and fault indications.	Planned
<i>Requirement:</i> 9 The transit vehicle shall accept emergency inputs from either the transit vehicle operator or a traveler through such interfaces as panic buttons, silent or audible alarms, etc.	Potential
<i>Requirement:</i> 10 The transit vehicle shall output reported emergencies to the center.	Planned

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Triangle Transit Transit Vehicles</i>	
<i>Entity: Transit Vehicle</i>	
<i>Functional Area: On-board Transit Security</i>	
On-board video/audio surveillance systems, threat sensors, and object detection sensors to enhance security and safety on-board a transit vehicles. Also includes silent alarms activated by transit user or vehicle operator, operator authentication, and remote vehicle disabling.	
<i>Requirement:</i> 11 The transit vehicle shall receive acknowledgments of the emergency request from the center and output this acknowledgment to the transit vehicle operator or to the travelers.	Planned
<i>Requirement:</i> 12 The transit vehicle shall be capable of receiving an emergency message for broadcast to the travelers or to the transit vehicle operator.	Planned
<i>Requirement:</i> 13 The transit vehicle shall be capable of disabling or enabling the transit vehicle based on commands from the center or authentic inputs from the transit vehicle operator.	Planned
<i>Requirement:</i> 14 The transit vehicle shall perform authentication of the transit vehicle operator.	Potential
<i>Functional Area: On-board Maintenance</i>	
On-board systems to collect and process transit vehicle maintenance data including mileage and vehicle operating conditions for use in scheduling future vehicle maintenance.	
<i>Requirement:</i> 1 The transit vehicle shall collect and process vehicle mileage data available to sensors on-board.	Planned
<i>Requirement:</i> 2 The transit vehicle shall collect and process the transit vehicle's operating conditions such as engine temperature, oil pressure, brake wear, internal lighting, environmental controls, etc.	Planned
<i>Requirement:</i> 3 The transit vehicle shall transmit vehicle maintenance data to the center to be used for scheduling future vehicle maintenance.	Planned
<i>Functional Area: On-board Transit Information Services</i>	
On-board systems to furnish next-stop annunciation as well as interactive travel-related information, including routes, schedules, transfer options, fares, real-time schedule adherence, current incidents, weather conditions, non-motorized transportation services, and special events.	
<i>Requirement:</i> 1 The transit vehicle shall enable traffic and travel advisory information to be requested and output to the traveler. Such information may include transit routes, schedules, transfer options, fares, real-time schedule adherence, current incidents, weather conditions, and special events.	Planned
<i>Requirement:</i> 3 The transit vehicle shall broadcast advisories about the imminent arrival of the transit vehicle at the next stop via an on-board automated annunciation system.	Planned
<i>Requirement:</i> 4 The transit vehicle shall support input and output forms that are suitable for travelers with physical disabilities.	Planned
<i>Requirement:</i> 5 The transit vehicle shall gather transit advisory data, including alerts and advisories pertaining to major emergencies, or man made disasters.	Planned
<i>Requirement:</i> 6 The transit vehicle shall tailor the output of the request traveler information based on the current location of the transit vehicle.	Planned

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Triangle Transit Transit Vehicles</i>	
<i>Entity: Transit Vehicle</i>	
<i>Element: US Coast Guard Michigan City Station Dispatch</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Emergency Call-Taking</i>	
Provides interface to the emergency call-taking systems such as the Emergency Telecommunications System (e.g., 911) that correlate call information with emergencies reported by transit agencies, commercial vehicle operators, or other public safety agencies. Allows the operator to verify the incident and forward the information to the responding agencies.	
<i>Requirement:</i>	
1 The center shall support the interface to the Emergency Telecommunications System (e.g. 911 or 7-digit call routing) to receive emergency notification information and provide it to the emergency system operator.	Existing
<i>Requirement:</i>	
2 The center shall receive emergency call information from 911 services and present the possible incident information to the emergency system operator.	Existing
<i>Requirement:</i>	
4 The center shall receive emergency call information from mayday service providers and present the possible incident information to the emergency system operator.	Existing
<i>Requirement:</i>	
5 The center shall receive emergency notification information from other public safety agencies and present the possible incident information to the emergency system operator.	Existing
<i>Requirement:</i>	
7 The center shall coordinate, correlate, and verify all emergency inputs, including those identified based on external calls and internal analysis of security sensor and surveillance data, and assign each a level of confidence.	Existing
<i>Requirement:</i>	
9 The center shall forward the verified emergency information to the responding agency based on the location and nature of the emergency.	Existing
<i>Requirement:</i>	
10 The center shall update the incident information log once the emergency system operator has verified the incident.	Existing
<i>Requirement:</i>	
11 The center shall provide the capability for digitized map data to act as the background to the emergency information presented to the emergency system operator.	Existing
<i>Functional Area: Emergency Dispatch</i>	
Dispatch emergency vehicles to incidents, tracking their location and status. Pertinent incident information is gathered and relayed to the responding units.	
<i>Requirement:</i>	
1 The center shall dispatch emergency vehicles to respond to verified emergencies under center personnel control.	Existing
<i>Requirement:</i>	
2 The center shall store the current status of all emergency vehicles available for dispatch and those that have been dispatched.	Existing
<i>Requirement:</i>	
3 The center shall relay location and incident details to the responding vehicles.	Existing
<i>Requirement:</i>	
4 The center shall track the location and status of emergency vehicles responding to an emergency based on information from the emergency vehicle.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> US Coast Guard Michigan City Station Dispatch	
<i>Entity:</i> Emergency Management	
<i>Functional Area:</i> Emergency Dispatch	
Dispatch emergency vehicles to incidents, tracking their location and status. Pertinent incident information is gathered and relayed to the responding units.	
<i>Requirement:</i> 5 The center shall store and maintain the emergency service responses in an action log.	Existing
<i>Requirement:</i> 6 The center shall provide the capability for digitized map data to act as the background to the information presented to the emergency system operator.	Existing
<i>Requirement:</i> 9 The center shall coordinate response to incidents with other Emergency Management centers to ensure appropriate resources are dispatched and utilized.	Existing
<i>Functional Area:</i> Emergency Routing	
Routing of emergency vehicles to facilitate the quickest/safest arrival. Routes may be determined based on real-time traffic information and road conditions or routes may be provided by Traffic Management on request.	
<i>Requirement:</i> 3 The center shall receive status information from care facilities to determine the appropriate facility and its location.	Existing
<i>Requirement:</i> 6 The center shall track current emergency vehicle location and status.	Existing
<i>Requirement:</i> 11 The center shall provide the capability for digitized map data to act as the background to the information presented to the emergency system operator.	Existing
<i>Functional Area:</i> Incident Command	
Tactical decision support, resource coordination, and communications integration among emergency management agencies for Incident Commands that are established by first responders to support local management of an incident.	
<i>Requirement:</i> 1 The center shall 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.	Existing
<i>Requirement:</i> 2 The center shall provide incident command communications with public safety, emergency management, transportation, and other allied response agency centers.	Existing
<i>Requirement:</i> 3 The center shall track and maintain resource information and action plans pertaining to the incident command.	Existing
<i>Requirement:</i> 4 The center shall 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.	Existing
<i>Requirement:</i> 5 The center shall assess the status of responding emergency vehicles as part of an incident command.	Existing
<i>Functional Area:</i> Emergency Early Warning System	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> US Coast Guard Michigan City Station Dispatch	
<i>Entity:</i> Emergency Management	
<i>Functional Area:</i> Emergency Early Warning System	
Monitors alerting and advisory systems, information collected by ITS surveillance and sensors, and reports from other agencies in order to identify potential, imminent, or in-progress major incidents or disasters. Notification is provided to other ITS centers to notify the traveling public.	
<i>Requirement:</i>	
1 The center shall 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).	Existing
<i>Requirement:</i>	
2 The center shall provide the capability to correlate alerts and advisories, incident information, and security sensor and surveillance data.	Existing
<i>Requirement:</i>	
3 The center shall 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.	Existing
<i>Requirement:</i>	
6 The center shall broadcast wide-area alerts and advisories to traveler information service providers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	Existing
<i>Requirement:</i>	
8 The center shall broadcast wide-area alerts and advisories to other emergency management centers for emergency situations such as severe weather events, civil emergencies, child abduction (AMBER alert system), military activities, and other situations that pose a threat to life and property.	Existing
<i>Requirement:</i>	
10 The center shall process status information from each of the centers that have been sent the wide-area alert.	Existing
<i>Requirement:</i>	
11 The center shall coordinate the broadcast of wide-area alerts and advisories with other emergency management centers.	Existing
<i>Requirement:</i>	
12 The center shall receive incident information from other transportation management centers to support the early warning system.	Potential
<i>Requirement:</i>	
13 The center shall present the alert and advisory information and the status of the actions taken in response to the alert by the other centers to the emergency system operator as received from other system inputs.	Potential
<i>Requirement:</i>	
14 The center shall support the entry of alert and advisory information directly from the emergency system operator.	Existing
<i>Functional Area:</i> Emergency Response Management	
Strategic emergency planning and response capabilities and broad inter-agency interfaces to support large-scale incidents and disasters, commonly associated with Emergency Operations Centers.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> US Coast Guard Michigan City Station Dispatch	
<i>Entity:</i> Emergency Management	
<i>Functional Area:</i> Emergency Response Management	
Strategic emergency planning and response capabilities and broad inter-agency interfaces to support large-scale incidents and disasters, commonly associated with Emergency Operations Centers.	
<i>Requirement:</i> 1 The center shall provide strategic emergency response capabilities provided by an Emergency Operations Center for large-scale incidents and disasters.	Existing
<i>Requirement:</i> 2 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.	Existing
<i>Requirement:</i> 3 The center shall provide the capability to implement response plans and track progress through the incident by exchanging incident information and response status with allied agencies.	Existing
<i>Requirement:</i> 4 The center shall develop, coordinate with other agencies, and store emergency response plans.	Existing
<i>Requirement:</i> 5 The center shall track the availability of resources and coordinate resource sharing with allied agency centers including traffic, maintenance, or other emergency centers.	Existing
<i>Requirement:</i> 6 The center shall 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.	Existing
<i>Requirement:</i> 12 The center shall provide information to the media concerning the status of an emergency response.	Existing
<i>Requirement:</i> 13 The center shall provide the capability for digitized map data to act as the background to the information presented to the emergency system operator.	Existing
<i>Requirement:</i> 14 The center shall provide the capability for center personnel to provide inputs to the management of incidents, disasters and evacuations.	Existing
<i>Requirement:</i> 17 The center shall provide the capability to communicate information about emergency situations to local population through the Emergency Telecommunications System.	Planned
<i>Requirement:</i> 18 The center shall 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.	Planned
<i>Requirement:</i> 19 The center shall retrieve information from public health systems to increase preparedness for, and implement a response to biological, chemical, radiation, and other public health emergencies.	Existing
<i>Functional Area:</i> Emergency Evacuation Support	
Evacuation planning and coordination to manage evacuation and reentry of a population in the vicinity of a disaster or other emergency that poses a risk to public safety.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> US Coast Guard Michigan City Station Dispatch	
<i>Entity:</i> Emergency Management	
<i>Functional Area:</i> Emergency Evacuation Support	
Evacuation planning and coordination to manage evacuation and reentry of a population in the vicinity of a disaster or other emergency that poses a risk to public safety.	
<i>Requirement:</i>	Potential
1 The center shall manage inter-agency coordination of evacuation operations, from initial planning through the evacuation process and reentry.	
<i>Requirement:</i>	Potential
2 The center shall develop and exchange evacuation plans with allied agencies prior to the occurrence of a disaster.	
<i>Requirement:</i>	Potential
3 The center shall provide an interface to the emergency system operator to enter evacuation plans and procedures and present the operator with other agencies' plans.	
<i>Requirement:</i>	Potential
4 The center shall coordinate evacuation destinations and shelter needs with shelter providers (e.g., the American Red Cross) in the region.	
<i>Requirement:</i>	Potential
5 The center shall provide evacuation information to traffic, transit, maintenance and construction, rail operations, and other emergency management centers as needed.	
<i>Requirement:</i>	Potential
8 The center shall 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.	
<i>Requirement:</i>	Potential
9 The center shall monitor the progress or status of the evacuation once it begins and exchange tactical plans, prepared during the incident, with allied agencies.	
<i>Requirement:</i>	Potential
10 The center shall monitor the progress of the reentry process.	
<i>Requirement:</i>	Existing
12 The center shall 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.	
<i>Functional Area:</i> Emergency Environmental Monitoring	
Collects current and forecast road and weather information that is used by the operator to more effectively manage incidents.	
<i>Requirement:</i>	Existing
1 The center shall 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).	
<i>Requirement:</i>	Existing
3 The center shall assimilate current and forecast road conditions and surface weather information to support incident management.	
<i>Requirement:</i>	Existing
4 The center shall present the current and forecast road and weather information to the emergency system operator.	
<i>Functional Area:</i> Mayday Support	
Collection and response to Mayday messages received from vehicles and drivers.	
<i>Requirement:</i>	Existing
1 The center shall collect mayday messages from vehicles and drivers.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element:</i> US Coast Guard Michigan City Station Dispatch	
<i>Entity:</i> Emergency Management	
<i>Functional Area:</i> Mayday Support	
Collection and response to Mayday messages received from vehicles and drivers.	
<i>Requirement:</i>	Existing
2 The center shall collect mayday messages from travelers via personal handheld devices.	
<i>Requirement:</i>	Existing
3 The center shall acknowledge the request for emergency assistance, whether originated by the driver, automatically by the vehicle's safety systems, or by a traveler via a personal handheld device.	
<i>Requirement:</i>	Existing
4 After the mayday becomes a verified incident, the center shall determine the appropriate response to the mayday message.	
<i>Requirement:</i>	Existing
5 The center shall determine whether the mayday message indicates an emergency that requires the attention of public safety agencies, and forward mayday emergency data to the appropriate agency as necessary.	
<i>Requirement:</i>	Existing
7 The center shall request additional emergency details from or issue commands to the vehicle's security systems or vehicle driver if needed.	
<i>Requirement:</i>	Existing
8 The center shall maintain a log of all mayday signals received from vehicles.	
<i>Requirement:</i>	Existing
9 The center shall provide all mayday data to center personnel and respond to the vehicle, driver, or traveler using the portable handheld device as directed by the personnel.	
<i>Functional Area:</i> Emergency Commercial Vehicle Response	
Responds to commercial vehicle and freight equipment related emergencies. Includes incidents involving hazardous materials as well as the detection of non-permitted transport of security sensitive hazmat.	
<i>Requirement:</i>	Existing
1 The center shall receive emergency notification information from commercial vehicles, commercial vehicle check stations, or commercial fleet operators and present the possible incident information to the emergency system operator. This may include detection of non-permitted transport of security sensitive hazmat, hazardous cargo spills, etc.	
<i>Requirement:</i>	Existing
2 The center shall receive details of the cargo being carried by commercial vehicles from their commercial fleet manager for incidents involving potential hazardous materials.	
<i>Requirement:</i>	Existing
3 The center shall forward the verified emergency information to the responding agency based on the location and nature of the emergency.	
<i>Requirement:</i>	Potential
4 The center shall provide the capability to request Fleet and Freight Management to disable a specific vehicle in their fleet.	
<i>Functional Area:</i> Emergency Data Collection	
Collection and storage of information related to Emergency Management. For use by operations personnel or data archives in the region.	
<i>Requirement:</i>	Existing
1 The center shall collect emergency service data, emergency vehicle management data, emergency vehicle data, sensor and surveillance data, threat data, and incident data.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: US Coast Guard Michigan City Station Dispatch</i>	
<i>Entity: Emergency Management</i>	
<i>Functional Area: Emergency Data Collection</i>	
Collection and storage of information related to Emergency Management. For use by operations personnel or data archives in the region.	
<i>Requirement:</i>	
2 The center shall assign quality control metrics and meta-data to be stored along with the data. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.	Planned
<i>Requirement:</i>	
3 The center shall receive and respond to requests from ITS Archives for either a catalog of the emergency management data or for the data itself.	Planned
<i>Requirement:</i>	
4 The center shall be able to produce sample products of the data available.	Planned
<i>Element: US Coast Guard Vessels</i>	
<i>Entity: Emergency Vehicle</i>	
<i>Functional Area: On-board EV En Route Support</i>	
On-board systems for gathering of dispatch and routing information for emergency vehicle personnel, vehicle tracking, communications with care facilities, and signal preemption via short range communication directly with traffic control equipment at the roadside.	
<i>Requirement:</i>	
1 The emergency vehicle, including roadway service patrols, shall track its current location.	Existing
<i>Requirement:</i>	
2 The emergency vehicle, including roadway service patrols, shall send the vehicle's location and operational data to the center for emergency management and dispatch.	Existing
<i>Requirement:</i>	
3 The emergency vehicle, including roadway service patrols, shall receive incident details and a suggested route when dispatched to a scene.	Existing
<i>Requirement:</i>	
4 The emergency vehicle shall send the current en route status (including estimated time of arrival) and requests for emergency dispatch updates.	Existing
<i>Requirement:</i>	
6 The emergency vehicle shall provide the personnel on-board with dispatch information, including incident type and location, and forward an acknowledgment from personnel to the center that the vehicle is on its way to the incident scene.	Existing
<i>Requirement:</i>	
7 The emergency vehicle shall send patient status information to the care facility along with a request for further information.	Existing
<i>Requirement:</i>	
8 The emergency vehicle shall forward care facility status information to emergency vehicle personnel, including the location, specialized services, quality of care, waiting time, number of rooms available, and emergency room status of hospitals or emergency care providers.	Planned
<i>Requirement:</i>	
9 The emergency vehicle shall send the vehicle's location, speed and direction to other vehicles in the area.	Potential
<i>Functional Area: On-board EV Incident Management Communication</i>	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: US Coast Guard Vessels</i>	
<i>Entity: Emergency Vehicle</i>	
<i>Functional Area: On-board EV Incident Management Communication</i>	
On-board systems provide communications support to first responders. Incident information is provided to dispatched emergency personnel. Emergency personnel transmit information about the incident and response status.	
<i>Requirement:</i>	
1 The emergency vehicle shall receive dispatch instructions sufficient to enable emergency personnel in the field to implement an effective incident response. It includes local traffic, road, and weather conditions, hazardous material information, and the current status of resources that have been allocated to an incident.	Existing
<i>Requirement:</i>	
2 The emergency vehicle shall provide an interface to the center for emergency personnel to transmit information about the incident site such as the extent of injuries, identification of vehicles and people involved, hazardous material, etc.	Existing
<i>Requirement:</i>	
3 The emergency vehicle shall provide an interface to the center for emergency personnel to transmit information about the current incident response status such as the identification of the resources on site, site management strategies in effect, and current clearance status.	Existing
<i>Requirement:</i>	
4 The emergency vehicle shall provide traffic incident information to approaching vehicles using short range communications..	Potential
<i>Element: Valparaiso Transit Agency Management</i>	
<i>Entity: Transit Management</i>	
<i>Functional Area: Transit Center Connection Protection</i>	
Manages the coordination of transit transfers between routes, including routes on different modes. Also supports the capability for travelers to obtain connection protection throughout a trip.	
<i>Requirement:</i>	
1 The center shall manage service requests for routing of an individual through the transit system.	Existing
<i>Requirement:</i>	
2 The center shall provide transit plans for both fixed and demand responsive transit to transit passengers.	Existing
<i>Requirement:</i>	
3 The center shall be able to coordinate with Other Transit Management systems or Multimodal Transportation Service Providers in order to provide a complete multimodal trip plan.	Planned
<i>Requirement:</i>	
4 The center shall track the passenger through the transit network, and coordinate with Other TRM and Multimodal Transportation Service Providers so that the passenger makes efficient connections between the transit system and other transit systems or other modes of transportation.	Planned
<i>Functional Area: Transit Center Vehicle Tracking</i>	
Monitoring transit vehicle locations via interactions with on-board systems. Furnish users with real-time transit schedule information and maintain interface with digital map providers.	
<i>Requirement:</i>	
1 The center shall monitor the locations of all transit vehicles within its network.	Existing
<i>Requirement:</i>	
2 The center shall determine adherence of transit vehicles to their assigned schedule.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Valparaiso Transit Agency Management</i>	
<i>Entity: Transit Management</i>	
<i>Functional Area: Transit Center Vehicle Tracking</i>	
Monitoring transit vehicle locations via interactions with on-board systems. Furnish users with real-time transit schedule information and maintain interface with digital map providers.	
<i>Requirement:</i>	
3 The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for transit tracking and dispatch.	Planned
<i>Requirement:</i>	
4 The center shall provide transit operational data to traveler information service providers.	Planned
<i>Requirement:</i>	
5 The center shall provide collected transit probe data to traffic management centers and traveler information service providers for use in measuring current traffic conditions.	Existing
<i>Functional Area: Transit Center Fixed-Route Operations</i>	
Management of fixed route transit operations. Planning, scheduling, and dispatch associated with fixed and flexible route transit services. Updates customer service operator systems, and provides current vehicle schedule adherence and optimum scenarios for schedule adjustment.	
<i>Requirement:</i>	
1 The center shall generate transit routes and schedules based on such factors as parameters input by the system operator, road network conditions, incident information, operational data on current routes and schedules, and digitized map data.	Existing
<i>Requirement:</i>	
2 The center shall provide the interface to the system operator to control the generation of new routes and schedules (transit services) including the ability to review and update the parameters used by the routes and schedules generation processes and to initiate these processes	Existing
<i>Requirement:</i>	
3 The center shall be able to generate special routes and schedules to support an incident, disaster, evacuation, or other emergency.	Existing
<i>Requirement:</i>	
4 The center shall dispatch fixed route or flexible route transit vehicles	Existing
<i>Requirement:</i>	
5 The center shall collect transit operational data for use in the generation of routes and schedules.	Existing
<i>Requirement:</i>	
6 The center shall provide instructions or corrective actions to the transit vehicle operators based upon operational needs.	Existing
<i>Requirement:</i>	
7 The center shall manage large deviations of individual transit vehicles, deviations in rural areas, and deviations of large numbers of vehicles.	Existing
<i>Requirement:</i>	
8 The center shall 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.	Existing
<i>Requirement:</i>	
9 The center shall exchange information with Maintenance and Construction Operations concerning work zones, roadway conditions, asset restrictions, work plans, etc.	Existing
<i>Requirement:</i>	
10 The center shall disseminate up-to-date schedules and route information to other centers for fixed and flexible route services.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Valparaiso Transit Agency Management</i>	
<i>Entity: Transit Management</i>	
<i>Functional Area: Transit Center Fixed-Route Operations</i>	
Management of fixed route transit operations. Planning, scheduling, and dispatch associated with fixed and flexible route transit services. Updates customer service operator systems, and provides current vehicle schedule adherence and optimum scenarios for schedule adjustment.	
<i>Requirement:</i>	Existing
11 The center shall provide an interface to the archive data repository to enable the operator to retrieve historical operating data for use in planning transit routes and schedules.	
<i>Functional Area: Transit Center Paratransit Operations</i>	
Management of demand response transit services, including paratransit. Planning and scheduling of these services. Supports automated vehicle dispatch and automatically updates customer service operator systems.	
<i>Requirement:</i>	Existing
1 The center shall process trip requests for demand responsive transit services, i.e. paratransit. Sources of the requests may include traveler information service providers.	
<i>Requirement:</i>	Existing
2 The center shall monitor the operational status of the demand response vehicles including status of passenger pick-up and drop-off.	
<i>Requirement:</i>	Existing
3 The center shall generate demand response transit (including paratransit) routes and schedules based on such factors as parameters input by the system operator, what other demand responsive transit schedules have been planned, the availability and location of vehicles, the relevance of any fixed transit routes and schedules, road network information, and incident information.	
<i>Requirement:</i>	Existing
4 The center shall dispatch demand response (paratransit) transit vehicles.	
<i>Requirement:</i>	Existing
5 The center shall exchange information with Maintenance and Construction Operations concerning work zones, roadway conditions, asset restrictions, work plans, etc.	
<i>Requirement:</i>	Existing
6 The center shall disseminate up-to-date schedules and route information to other centers for demand responsive transit services (paratransit).	
<i>Requirement:</i>	Existing
7 The center shall collect the log of passenger boardings and alightings from the paratransit vehicles.	
<i>Functional Area: Transit Center Fare Management</i>	
Management of fare collection at the center - includes setting and distributing fare information, central processing of fares for transit as well as other ITS services, links to financial institutions and enforcement agencies.	
<i>Requirement:</i>	Existing
1 The center shall manage the actual value of transit fares for each segment of each regular transit route, including the transmission of the information to transit vehicles and transit stops or stations.	
<i>Requirement:</i>	Existing
3 The center shall process the financial requests from the transit vehicles or roadside and manage an interface to a Financial Institution.	
<i>Requirement:</i>	Existing
4 The center shall support the payment of transit fare transactions using data provided by the traveler cards / payment instruments.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Valparaiso Transit Agency Management</i>	
<i>Entity: Transit Management</i>	
<i>Functional Area: Transit Center Fare Management</i>	
Management of fare collection at the center - includes setting and distributing fare information, central processing of fares for transit as well as other ITS services, links to financial institutions and enforcement agencies.	
<i>Requirement:</i>	
6 The center shall process requests for transit fares to be paid in advance.	Existing
<i>Requirement:</i>	
8 The center shall be capable of establishing emergency fare structures to override all other fares during disasters, states of emergency, or evacuations.	Existing
<i>Requirement:</i>	
10 The center shall collect fare statistics data to implement variable and flexible fare structures.	Potential
<i>Requirement:</i>	
11 The center shall exchange fare and load information with other transit management centers, including potential Centralized Payments facilities.	Potential
<i>Requirement:</i>	
12 The center shall provide transit fare information to other centers, including traveler information providers upon request.	Existing
<i>Functional Area: Transit Center Passenger Counting</i>	
Receives and processes transit vehicle loading data using two-way communications from equipped transit vehicles.	
<i>Requirement:</i>	
1 The center shall collect passenger count information from each transit vehicle.	Potential
<i>Requirement:</i>	
2 The center shall calculate transit ridership data by route, route segment, transit stop, time of day, and day of week based on the collected passenger count information.	Potential
<i>Requirement:</i>	
3 The center shall make the compiled ridership data available to the system operator and other applications.	Potential
<i>Functional Area: Transit Center Security</i>	
Monitor transit vehicle operator or traveler activated alarms; authenticate transit vehicle operators; remotely disable a transit vehicle; alert operators, travelers, and police to potential incidents identified by these security features.	
<i>Requirement:</i>	
1 The center shall monitor transit vehicle operational data to determine if the transit vehicle is off-route and assess whether a security incident is occurring.	Existing
<i>Requirement:</i>	
2 The center shall receive reports of emergencies on-board transit vehicles entered directly by the transit vehicle operator or from a traveler through interfaces such as panic buttons or alarm switches.	Existing
<i>Requirement:</i>	
3 The center shall support the back-office portion of functionality to authenticate transit vehicle operators.	Potential
<i>Requirement:</i>	
4 The center shall exchange transit incident information along with other service data with other transit agencies.	Existing
<i>Requirement:</i>	
5 The center shall receive information pertaining to a wide-area alert such as weather alerts, disaster situations, or child abductions. This information may come from Emergency Management or from other Alerting and Advisory Systems.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Valparaiso Transit Agency Management</i>	
<i>Entity: Transit Management</i>	
<i>Functional Area: Transit Center Security</i>	
Monitor transit vehicle operator or traveler activated alarms; authenticate transit vehicle operators; remotely disable a transit vehicle; alert operators, travelers, and police to potential incidents identified by these security features.	
<i>Requirement:</i> 6 The center shall send wide-area alert information to travelers (on-board transit vehicles or at stations/stops) and transit vehicle operators.	Existing
<i>Requirement:</i> 7 The center shall coordinate the response to security incidents involving transit with other agencies including Emergency Management, other transit agencies, media, traffic management, and traveler information service providers.	Existing
<i>Requirement:</i> 8 The center shall receive threat information and status on the integrity of the transit infrastructure.	Existing
<i>Requirement:</i> 9 The center shall provide support to remotely disable (or reset the disabling of) a transit vehicle in service.	Potential
<i>Functional Area: Transit Vehicle Operator Assignment</i>	
Assignment of transit operators to runs in a fair manner while minimizing labor and overtime services, considering operator preferences, qualifications, accumulated work hours, and other information about each operator.	
<i>Requirement:</i> 1 The center shall 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.	Existing
<i>Requirement:</i> 2 The center shall assess the transit vehicle operator's availability based on previous work assignments, accumulated hours, plus health and vacation commitments.	Existing
<i>Requirement:</i> 3 The center shall assign transit vehicle operators to transit schedules based on their eligibility, route preferences, seniority, and transit vehicle availability.	Existing
<i>Requirement:</i> 4 The center shall provide an interface through which the transit vehicle operator information can be maintained - either from the transit vehicle operator, center personnel, or other functions.	Existing
<i>Requirement:</i> 5 The center shall generate supplemental vehicle operator assignments as required due to change events that occur during the operating day.	Existing
<i>Functional Area: Transit Garage Maintenance</i>	
Collect operational and maintenance data from transit vehicles, manage vehicle service histories, automatically generate preventative maintenance schedules, and provide information to service personnel.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Valparaiso Transit Agency Management</i>	
<i>Entity: Transit Management</i>	
<i>Functional Area: Transit Garage Maintenance</i>	
Collect operational and maintenance data from transit vehicles, manage vehicle service histories, automatically generate preventative maintenance schedules, and provide information to service personnel.	
<i>Requirement:</i> 2 The center shall monitor the condition of a transit vehicle to analyze brake, drive train, sensors, fuel, steering, tire, processor, communications equipment, and transit vehicle mileage to identify mileage based maintenance, out-of-specification or imminent failure conditions.	Existing
<i>Requirement:</i> 3 The center shall generate transit vehicle maintenance schedules that identify the maintenance or repair to be performed and when the work is to be done.	Planned
<i>Requirement:</i> 4 The center shall generate transit vehicle availability listings, current and forecast, to support transit vehicle assignment planning based, in part, on the transit vehicle maintenance schedule.	Planned
<i>Requirement:</i> 5 The center shall assign technicians to a transit vehicle maintenance schedule, based upon such factors as personnel eligibility, work assignments, preferences and seniority.	Existing
<i>Requirement:</i> 6 The center shall verify that the transit vehicle maintenance activities were performed correctly, using the transit vehicle's status, the maintenance personnel's work assignment, and the transit maintenance schedules.	Planned
<i>Requirement:</i> 7 The center shall generate a time-stamped maintenance log of all maintenance activities performed on a transit vehicle.	Planned
<i>Functional Area: Transit Vehicle Assignment</i>	
Assigns individual transit vehicles to vehicle blocks and downloads this information to the transit vehicle, updating assignments as necessitated by changes. It also provides an inventory management function that stores attributes about each of the transit vehicles.	
<i>Requirement:</i> 1 The center shall assign individual transit vehicles to transit blocks.	Existing
<i>Requirement:</i> 3 The center shall provide an exception handling process for the vehicle assignment function. This process shall generate new supplemental vehicle assignments as required due to change events which occur during the operating day.	Existing
<i>Requirement:</i> 5 The center shall generate transit vehicle availability listings, current and forecast, to support transit vehicle assignment planning.	Planned
<i>Requirement:</i> 6 The center shall provide transit operations personnel with the capability to update transit vehicle assignments and receive reports on transit vehicle inventory status.	Planned
<i>Functional Area: Transit Center Information Services</i>	
Provide interactive traveler information to travelers (on-board transit vehicles, at stops/stations, using personal devices), traveler information service providers, media, and other transit organizations. Includes routes, schedules, transfer options, fares, real-time schedule adherence, current incidents, weather conditions, yellow pages, and special events.	

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Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Valparaiso Transit Agency Management</i>	
<i>Entity: Transit Management</i>	
<i>Functional Area: Transit Center Information Services</i>	
Provide interactive traveler information to travelers (on-board transit vehicles, at stops/stations, using personal devices), traveler information service providers, media, and other transit organizations. Includes routes, schedules, transfer options, fares, real-time schedule adherence, current incidents, weather conditions, yellow pages, and special events.	
<i>Requirement:</i>	Existing
1 The center shall provide travelers using public transportation with traffic and advisory information upon request. Such information may include transit routes, schedules, transfer options, fares, real-time schedule adherence, current incidents, weather conditions, and special events.	
<i>Requirement:</i>	Existing
2 The center shall provide transit information to the media including details of deviations from schedule of regular transit services.	
<i>Requirement:</i>	Planned
3 The center shall exchange transit schedules, real-time arrival information, fare schedules, and general transit service information with other transit organizations to support transit traveler information systems.	
<i>Requirement:</i>	Planned
4 The center shall provide transit service information to traveler information service providers including routes, schedules, schedule adherence, and fare information as well as transit service information during evacuation.	
<i>Requirement:</i>	Existing
6 The center shall broadcast transit advisory data, including alerts and advisories pertaining to major emergencies, or man made disasters.	
<i>Functional Area: Transit Environmental Monitoring</i>	
Current and forecast road and weather information assimilated from weather service providers and vehicle probes. The information is monitored and forwarded to other agencies to more effectively manage transit operations.	
<i>Requirement:</i>	Existing
1 The center shall assimilate current and forecast road conditions and surface weather information to more effectively manage transit operations.	
<i>Requirement:</i>	Existing
2 The center shall collect current and forecast road and weather information from weather service providers and roadway maintenance centers.	
<i>Functional Area: Transit Center Multi-Modal Coordination</i>	
Coordinate schedules with other agencies and modes, including transit transfer cluster and transfer point information.	
<i>Requirement:</i>	Planned
1 The center shall coordinate schedules and services between transit agencies, traffic management, maintenance and construction operations, parking management, and other surface or air transportation modes.	
<i>Requirement:</i>	Planned
2 The center shall share transfer cluster and transfer point information with multimodal transportation service providers, other transit agencies, and traveler information service providers. A transfer cluster is a collection of stop points, stations, or terminals where transfers can be made conveniently.	

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Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Valparaiso Transit Agency Management</i>	
<i>Entity: Transit Management</i>	
<i>Functional Area: Transit Center Multi-Modal Coordination</i>	
Coordinate schedules with other agencies and modes, including transit transfer cluster and transfer point information.	
<i>Requirement:</i> 3 The center shall accept requests from traffic management to change routes and schedules as part of the implementation of demand management strategies.	Planned
<i>Requirement:</i> 4 The center shall coordinate transit services for special events, planning services for the event and managing transit services on the day of the event.	Existing
<i>Requirement:</i> 5 The center shall provide transit operations personnel with the capability to control and monitor transit service coordination activities.	Planned
<i>Functional Area: Transit Evacuation Support</i>	
Support evacuation and subsequent reentry of a population in the vicinity of a disaster or other emergency. Coordinate regional evacuation plans and resources including transit and school bus fleets.	
<i>Requirement:</i> 1 The center shall manage the use of transit resources to support evacuation and subsequent reentry of a population in the vicinity of a disaster or other emergency.	Potential
<i>Requirement:</i> 2 The center shall coordinate regional evacuation plans with Emergency Management - identifying the transit role in an evacuation and the transit resources that would be used.	Existing
<i>Requirement:</i> 3 The center shall coordinate the use of transit and school bus fleets during an evacuation, supporting evacuation of those with special needs and the general population.	Potential
<i>Requirement:</i> 4 The center shall adjust and update transit service and fare schedules and provide that information to other agencies as they coordinate evacuations.	Potential
<i>Functional Area: Transit Data Collection</i>	
Collection and storage of transit management data. For use by operations personnel or data archives in the region.	
<i>Requirement:</i> 1 The center shall collect transit management data such as transit fares and passenger use, transit services, paratransit operations, transit vehicle maintenance data, etc.	Existing
<i>Requirement:</i> 2 The center shall assign quality control metrics and meta-data to be stored along with the data. Meta-data may include attributes that describe the source and quality of the data and the conditions surrounding the collection of the data.	Existing
<i>Requirement:</i> 3 The center shall receive and respond to requests from ITS Archives for either a catalog of the transit data or for the data itself.	Planned
<i>Requirement:</i> 4 The center shall be able to produce sample products of the data available.	Planned
<i>Functional Area: Transit Transportation Operations Data Collection</i>	

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Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Valparaiso Transit Agency Management</i>	
<i>Entity: Transit Management</i>	
<i>Functional Area: Transit Transportation Operations Data Collection</i>	
Collects real-time information on the state of the regional transportation system for operational use by the center. It establishes communications with a regional repository, requests or subscribes to information relevant to the center, and distributes the received information for use.	
<i>Requirement:</i>	
1 The center shall collect real-time information on the state of the regional transportation system including current traffic and road conditions, weather conditions, special event and incident information.	Existing
<i>Requirement:</i>	
2 The center shall support the capability for the system operator to monitor and control the information collection service.	Existing
<i>Element: Valparaiso Transit Transit Vehicles</i>	
<i>Entity: Transit Vehicle</i>	
<i>Functional Area: On-board Connection Protection</i>	
Monitors vehicle schedule performance and provides it to the transit center for connection protection processing. Also recognizes travelers who have arranged for connection protection and provides information regarding them to the transit center.	
<i>Requirement:</i>	
1 The transit vehicle shall monitor vehicle schedule performance and provides it to the transit center for connection protection processing.	Existing
<i>Requirement:</i>	
2 The transit vehicle shall receive operator instructions from the transit center relating to managing connection protection.	Existing
<i>Requirement:</i>	
3 The transit vehicle shall recognizes individual travelers who have arranged for connection protection and provides information regarding them to the transit center.	Planned
<i>Functional Area: On-board Transit Trip Monitoring</i>	
Support fleet management with automatic vehicle location (AVL) and automated mileage and fuel reporting and auditing.	
<i>Requirement:</i>	
1 The transit vehicle shall track the current location of the transit vehicle.	Existing
<i>Requirement:</i>	
2 The transit vehicle shall support the computation of the location of a transit vehicle using on-board sensors to augment the location determination function. This may include proximity to the transit stops or other known reference points as well as recording trip length.	Potential
<i>Requirement:</i>	
3 The transit vehicle shall record transit trip monitoring data including vehicle mileage and fuel usage.	Potential
<i>Requirement:</i>	
4 The transit vehicle shall record transit trip monitoring data including operational status information such as doors open/closed, running times, etc.	Potential
<i>Requirement:</i>	
5 The transit vehicle shall send the transit vehicle trip monitoring data to center-based trip monitoring functions.	Existing
<i>Functional Area: On-board Schedule Management</i>	
Collecting of data for schedule generation and adjustment on-board a transit vehicle. Supports communication between the vehicle, operator, and center.	

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Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Valparaiso Transit Transit Vehicles</i>	
<i>Entity: Transit Vehicle</i>	
<i>Functional Area: On-board Schedule Management</i>	
Collecting of data for schedule generation and adjustment on-board a transit vehicle. Supports communication between the vehicle, operator, and center.	
<i>Requirement:</i>	Potential
1 The transit vehicle shall receive a vehicle assignment including transit route information, transit service instructions, traffic information, road conditions, and other information for the operator.	
<i>Requirement:</i>	Potential
2 The transit vehicle shall use the route information and its current location to determine the deviation from the predetermined schedule.	
<i>Requirement:</i>	Potential
3 The transit vehicle shall calculate the estimated times of arrival (ETA) at transit stops.	
<i>Requirement:</i>	Potential
4 The transit vehicle shall determine scenarios to correct the schedule deviation.	
<i>Requirement:</i>	Potential
5 The transit vehicle shall provide the schedule deviations and instructions for schedule corrections to the transit vehicle operator if the deviation is small, or the transit vehicle is operating in an urban area.	
<i>Requirement:</i>	Potential
6 The transit vehicle shall send the schedule deviation and estimated arrival time information to the center.	
<i>Requirement:</i>	Potential
7 The transit vehicle shall support the operations of a flexible route service. This may include requests for route deviations that would then lead to schedule corrective actions.	
<i>Requirement:</i>	Potential
8 The transit vehicle shall notify the transit center of vehicle location and operational status as the vehicle exits and returns to the transit facility to support future vehicle assignments.	
<i>Functional Area: On-board Paratransit Operations</i>	
On-board systems to manage paratransit and flexible-route dispatch requests, including multi-stop runs. Passenger data is collected and provided to the center.	
<i>Requirement:</i>	Existing
2 The transit vehicle shall receive the status of demand responsive or flexible-route transit schedules and passenger loading from the transit vehicle operator.	
<i>Requirement:</i>	Existing
3 The transit vehicle shall provide the transit vehicle operator instructions about the demand responsive or flexible-route transit schedule that has been confirmed from the center.	
<i>Requirement:</i>	Existing
4 The transit vehicle shall provide the capability to log passenger boardings and alightings and make passenger use data available to the transit center.	
<i>Functional Area: On-board Transit Fare Management</i>	
On-board systems provide fare collection using a travelers non-monetary fare medium. Collected fare data are made available to the center.	
<i>Requirement:</i>	Existing
1 The transit vehicle shall read data from the traveler card / payment instrument presented by boarding passengers.	

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Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Valparaiso Transit Transit Vehicles</i>	
<i>Entity: Transit Vehicle</i>	
<i>Functional Area: On-board Transit Fare Management</i>	
On-board systems provide fare collection using a travelers non-monetary fare medium. Collected fare data are made available to the center.	
<i>Requirement:</i>	
2 The transit vehicle shall provide an image of all travelers which shall be used for violation processing of those who do not have a traveler card / payment instrument or whose transit fare transaction fails.	Potential
<i>Requirement:</i>	
3 The transit vehicle shall determine the traveler's travel routing based on the transit vehicle's current location and the traveler's destination.	Existing
<i>Requirement:</i>	
4 The transit vehicle shall calculate the traveler's fare based on the origin and destination provided by the traveler as well as factors such as the transit routing, transit fare category, traveler history, and route-specific information.	Existing
<i>Requirement:</i>	
5 The transit vehicle shall have access to the complete range of transit services (routes and schedules) that are available to the traveler.	Existing
<i>Requirement:</i>	
6 The transit vehicle shall provide a transit fare payment interface that is suitable for travelers with physical disabilities.	Existing
<i>Requirement:</i>	
7 The transit vehicle shall include a database on-board the transit vehicle for use in fare processing from which the fares for all possible trips within the transit operational network can be determined.	Existing
<i>Requirement:</i>	
8 The transit vehicle shall support an emergency fare structure overriding all other fares that can be activated during disasters, states of emergency or evacuations.	Existing
<i>Requirement:</i>	
10 The transit vehicle shall provide fare statistics data to the center.	Existing
<i>Functional Area: On-board Passenger Counting</i>	
On-board systems collect transit vehicle loading data and make it available to the center.	
<i>Requirement:</i>	
1 The transit vehicle shall count passengers boarding and alighting.	Potential
<i>Requirement:</i>	
2 The passenger counts shall be related to location to support association of passenger counts with routes, route segments, or bus stops.	Potential
<i>Requirement:</i>	
3 The passenger counts shall be timestamped so that ridership can be measured by time of day and day of week.	Potential
<i>Requirement:</i>	
4 The transit vehicle shall send the collected passenger count information to the transit center.	Potential
<i>Functional Area: On-board Transit Security</i>	
On-board video/audio surveillance systems, threat sensors, and object detection sensors to enhance security and safety on-board a transit vehicles. Also includes silent alarms activated by transit user or vehicle operator, operator authentication, and remote vehicle disabling.	

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Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Valparaiso Transit Transit Vehicles</i>	
<i>Entity: Transit Vehicle</i>	
<i>Functional Area: On-board Transit Security</i>	
On-board video/audio surveillance systems, threat sensors, and object detection sensors to enhance security and safety on-board a transit vehicles. Also includes silent alarms activated by transit user or vehicle operator, operator authentication, and remote vehicle disabling.	
<i>Requirement:</i> 1 The transit vehicle shall perform video and audio surveillance inside of transit vehicles and output raw video or audio data for either local monitoring (for processing or direct output to the transit vehicle operator), remote monitoring or for local storage (e.g., in an event recorder).	Existing
<i>Requirement:</i> 2 The transit vehicle shall perform local monitoring of video or audio surveillance data collected inside of transit vehicles, and identify potential incidents or threats based on received processing parameters.	Existing
<i>Requirement:</i> 3 The transit vehicle shall output an indication of potential incidents or threats and the processed video or audio information to the center along with the vehicle's current location.	Existing
<i>Requirement:</i> 4 The transit vehicle shall detect potential threats via sensors for chemical agents, toxic industrial chemicals, biological agents, explosives, and radiation.	Potential
<i>Requirement:</i> 5 The transit vehicle shall detect potential threats via object detection sensors (e.g. metal detectors).	Potential
<i>Requirement:</i> 6 The transit vehicle shall output an indication of potential incidents or threats and the processed sensor information to the center along with the vehicle's current location.	Potential
<i>Requirement:</i> 7 The transit vehicle shall accept sensor control data to allow remote control of the sensors.	Potential
<i>Requirement:</i> 8 The transit vehicle shall monitor and output surveillance and sensor equipment status and fault indications.	Planned
<i>Requirement:</i> 9 The transit vehicle shall accept emergency inputs from either the transit vehicle operator or a traveler through such interfaces as panic buttons, silent or audible alarms, etc.	Potential
<i>Requirement:</i> 10 The transit vehicle shall output reported emergencies to the center.	Existing
<i>Requirement:</i> 11 The transit vehicle shall receive acknowledgments of the emergency request from the center and output this acknowledgment to the transit vehicle operator or to the travelers.	Existing
<i>Requirement:</i> 12 The transit vehicle shall be capable of receiving an emergency message for broadcast to the travelers or to the transit vehicle operator.	Existing
<i>Requirement:</i> 13 The transit vehicle shall be capable of disabling or enabling the transit vehicle based on commands from the center or authentic inputs from the transit vehicle operator.	Planned
<i>Requirement:</i> 14 The transit vehicle shall perform authentication of the transit vehicle operator.	Potential

Functional Area: On-board Maintenance

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Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Valparaiso Transit Transit Vehicles</i>	
<i>Entity: Transit Vehicle</i>	
<i>Functional Area: On-board Maintenance</i>	
On-board systems to collect and process transit vehicle maintenance data including mileage and vehicle operating conditions for use in scheduling future vehicle maintenance.	
<i>Requirement:</i>	Planned
1 The transit vehicle shall collect and process vehicle mileage data available to sensors on-board.	
<i>Requirement:</i>	Planned
2 The transit vehicle shall collect and process the transit vehicle's operating conditions such as engine temperature, oil pressure, brake wear, internal lighting, environmental controls, etc.	
<i>Requirement:</i>	Planned
3 The transit vehicle shall transmit vehicle maintenance data to the center to be used for scheduling future vehicle maintenance.	
<i>Functional Area: On-board Transit Information Services</i>	
On-board systems to furnish next-stop annunciation as well as interactive travel-related information, including routes, schedules, transfer options, fares, real-time schedule adherence, current incidents, weather conditions, non-motorized transportation services, and special events.	
<i>Requirement:</i>	Planned
1 The transit vehicle shall enable traffic and travel advisory information to be requested and output to the traveler. Such information may include transit routes, schedules, transfer options, fares, real-time schedule adherence, current incidents, weather conditions, and special events.	
<i>Requirement:</i>	Planned
3 The transit vehicle shall broadcast advisories about the imminent arrival of the transit vehicle at the next stop via an on-board automated annunciation system.	
<i>Requirement:</i>	Planned
4 The transit vehicle shall support input and output forms that are suitable for travelers with physical disabilities.	
<i>Requirement:</i>	Existing
5 The transit vehicle shall gather transit advisory data, including alerts and advisories pertaining to major emergencies, or man made disasters.	
<i>Requirement:</i>	Planned
6 The transit vehicle shall tailor the output of the request traveler information based on the current location of the transit vehicle.	
<i>Element: Vehicle ITS Equipment</i>	
<i>Entity: Vehicle</i>	
<i>Functional Area: Basic Vehicle Reception</i>	
Provides drivers basic transportation information including formatted traffic advisories, event, and other traveler information as well as broadcast alerts.	
<i>Requirement:</i>	Existing
1 The vehicle shall receive formatted traffic information from a center and present it to the driver.	
<i>Requirement:</i>	Planned
2 The vehicle shall receive transit information from a center and present it to the driver.	
<i>Requirement:</i>	Existing
3 The vehicle shall receive event information from a center and present it to the driver.	
<i>Requirement:</i>	Potential
4 The vehicle shall receive evacuation information from a center and present it to the driver.	
<i>Requirement:</i>	Existing
5 The vehicle shall receive wide-area alerts and present it to the driver.	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Vehicle ITS Equipment</i>	
<i>Entity: Vehicle</i>	
<i>Functional Area: Basic Vehicle Reception</i>	
Provides drivers basic transportation information including formatted traffic advisories, event, and other traveler information as well as broadcast alerts.	
<i>Requirement:</i>	
6 The vehicle shall provide data from the vehicle itself to the driver. This vehicle data may include vehicle conditions, environmental conditions, safety or position warnings.	Existing
<i>Requirement:</i>	
7 The vehicle shall prioritize safety and warning messages to supersede advisory and broadcast messages.	Existing
<i>Requirement:</i>	
8 The vehicle shall support driver input in audio or manual form.	Existing
<i>Requirement:</i>	
9 The vehicle shall present information to the driver in audible or visual forms without impairing the driver's ability to control the vehicle in a safe manner.	Existing
<i>Functional Area: Interactive Vehicle Reception</i>	
Provides drivers with traffic, maintenance and construction, transit, yellow pages, event, and weather information upon request.	
<i>Requirement:</i>	
1 The vehicle shall receive formatted traffic and travel advisories from a center and present them to the driver upon request.	Existing
<i>Requirement:</i>	
2 The vehicle shall receive travel alerts from a center and present them to the driver. Relevant alerts are provided based on pre-supplied trip characteristics and preferences.	Existing
<i>Requirement:</i>	
3 The vehicle shall receive yellow pages information (such as lodging, restaurants, theaters, and other tourist activities) from a center and present it to the driver upon request.	Existing
<i>Requirement:</i>	
4 The vehicle shall receive event information from a center and present it to the driver upon request.	Existing
<i>Requirement:</i>	
5 The vehicle shall collect vehicle data and present it to the driver (including vehicle conditions, environmental conditions, safety and position warnings, and enhanced vision images) upon request.	Planned
<i>Requirement:</i>	
6 The vehicle shall provide the capability of translating signage for presentation to the driver, including fixed signage, situational messages, or work zone intrusion messages.	Planned
<i>Requirement:</i>	
7 The vehicle shall accept reservations for yellow pages services, non-motorized transportation information and event information.	Existing
<i>Requirement:</i>	
8 The vehicle shall prioritize safety and warning messages to supersede advisory and broadcast messages.	Existing
<i>Requirement:</i>	
9 The vehicle shall base requests from the driver on the vehicle's current location, and filter the provided information accordingly.	Existing
<i>Requirement:</i>	
10 The vehicle shall accept personal preferences, recurring trip characteristics, and traveler alert subscription information from the driver and send this information to a center to support customized traveler information services.	Existing
<i>Requirement:</i>	
11 The vehicle shall support driver input in audio or manual form.	Existing
<i>Requirement:</i>	
12 The vehicle shall present information to the driver in audible or visual forms without impairing the driver's ability to control the vehicle in a safe manner.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Vehicle ITS Equipment</i>	
<i>Entity: Vehicle</i>	
<i>Functional Area: Vehicle Autonomous Route Guidance</i>	
Provides route guidance to a driver using a digital map stored on-board. Advanced features may include an interface to traveler information centers to input broadcast traffic conditions to enhance the route calculation.	
<i>Requirement:</i>	
1 The vehicle shall provide the capability for a driver to obtain route guidance from a specified source to a destination.	Existing
<i>Requirement:</i>	
2 The vehicle shall calculate the requested route using data obtained from a navigable map database stored on-board.	Existing
<i>Requirement:</i>	
3 The vehicle shall provide guidance for the shortest route, within the preferences and constraints specified by the driver.	Existing
<i>Requirement:</i>	
4 The vehicle shall present information to the driver in audible or visual forms without impairing the driver's ability to control the vehicle in a safe manner.	Existing
<i>Requirement:</i>	
5 The vehicle shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used for route guidance.	Existing
<i>Requirement:</i>	
6 The vehicle shall receive inputs of broadcast traffic conditions from a traveler information center to enhance route guidance calculations.	Existing
<i>Functional Area: Vehicle Trip Planning and Route Guidance</i>	
In-vehicle system that coordinates with a traveler information center to provide a suggested trip plan that is tailored to the driver's preferences. During the trip, the route plan can be modified to account for new information.	
<i>Requirement:</i>	
1 The vehicle shall provide the capability for a driver to request and confirm multi-modal route guidance from a specified source to a destination.	Existing
<i>Requirement:</i>	
2 The vehicle shall forward the request for route guidance to a traveler information center for route calculation.	Existing
<i>Requirement:</i>	
3 The vehicle shall forward user preferences, background information, constraints, and payment information to the supplying traveler information center.	Potential
<i>Requirement:</i>	
4 The vehicle shall present information to the driver in audible or visual forms without impairing the driver's ability to control the vehicle in a safe manner.	Existing
<i>Requirement:</i>	
5 The vehicle shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used for route guidance.	Existing
<i>Functional Area: Vehicle Location Determination</i>	
Receives current location of the vehicle from GPS or other positioning technology and provides this information to other in-vehicle functions.	
<i>Requirement:</i>	
1 The vehicle shall provide the vehicle's current location to other in-vehicle functions.	Existing

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Vehicle ITS Equipment</i>	
<i>Entity: Vehicle</i>	
<i>Functional Area: Vehicle Location Determination</i>	
Receives current location of the vehicle from GPS or other positioning technology and provides this information to other in-vehicle functions.	
<i>Requirement:</i>	Existing
2 The vehicle shall calculate the location from one or more data sources including positioning systems such as GPS, sensors that track vehicle movement, and maps used to determine the likely vehicle route.	
<i>Functional Area: Vehicle Toll/Parking Interface</i>	
On-board systems to support paying toll without stopping and pay for parking without the use of cash through the use of an active tag interface and debit/credit card interface.	
<i>Requirement:</i>	Existing
1 The vehicle shall respond to requests from toll collection equipment for credit identity, stored value card cash, etc.	
<i>Requirement:</i>	Planned
2 The vehicle shall respond to request from parking field equipment for credit identity, stored value card cash, etc.	
<i>Requirement:</i>	Potential
3 The vehicle shall provide an interface to the driver to make requests for advance payments of tolls, parking, and transit fares and present the status of electronic payment transactions.	
<i>Requirement:</i>	Potential
4 The vehicle shall provide an interface with the traveler card / payment instrument carried on-board the vehicle - to exchange identity information and payment transactions.	
<i>Requirement:</i>	Existing
5 The vehicle shall present information to the driver in audible or visual forms without impairing the driver's ability to control the vehicle in a safe manner.	
<i>Functional Area: Vehicle Traffic Probe Support</i>	
On-board systems that identify location, measure traffic conditions such as link travel time and speed and transmit data to a center or roadside equipment.	
<i>Requirement:</i>	Existing
1 The vehicle shall respond to requests from short range communications equipment for identification information that can be used to collect basic probe information; the field equipment will remove identification information to ensure anonymity.	
<i>Requirement:</i>	Existing
2 The vehicle shall track its current vehicle position, speed, and heading and record snapshots of events (e.g., starts and stops, link travel times) that can be used to determine current traffic conditions.	
<i>Requirement:</i>	Existing
3 The vehicle shall record vehicle trip information (e.g., travel times, origin and destination information for vehicles that opt in) that can be used to support transportation planning.	
<i>Requirement:</i>	Potential
4 The vehicle shall transmit collected probe data to the center.	
<i>Requirement:</i>	Potential
5 The vehicle shall transmit collected probe data to field equipment located along the roadway.	
<i>Requirement:</i>	Potential
6 The vehicle shall report the number of vehicle occupants to field equipment located along the roadway.	
<i>Functional Area: Vehicle Environmental Probe Support</i>	

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Vehicle ITS Equipment</i>	
<i>Entity: Vehicle</i>	
<i>Functional Area: Vehicle Environmental Probe Support</i>	
Vehicle probes with added capability and intelligence to sense and send road conditions as the vehicle travels; may include road conditions and surface weather information.	
<i>Requirement:</i>	1 The vehicle shall collect and process environmental sensor data, including air temperature and rain sensors. Existing
<i>Requirement:</i>	2 The vehicle shall monitor the status of vehicle convenience and safety systems (wiper status, headlight status, traction control system status) that can be used to measure environmental conditions and record snapshots of significant events in these systems. Potential
<i>Requirement:</i>	3 The vehicle shall transmit environmental probe data to the center along with location and timestamp information. Potential
<i>Requirement:</i>	4 The vehicle shall transmit environmental probe data to field equipment located along the roadway using short range communications. Potential
<i>Functional Area: Vehicle Safety Monitoring System</i>	
On-board systems to diagnose critical components of the vehicle and warn the driver of potential dangers, including steering, braking, acceleration, emissions, fuel economy, engine performance, etc.	
<i>Requirement:</i>	1 The vehicle shall collect and monitor data concerning the safety of the vehicle - including, steering, braking, acceleration, emissions, fuel economy, engine performance, etc. Existing
<i>Requirement:</i>	2 The vehicle shall determine the status of the vehicle in terms of its continued ability to operate in a safe manner. Existing
<i>Requirement:</i>	3 The vehicle shall provide warnings to the driver of potential dangers based on sensor input and analysis concerning the safety of the vehicle. Existing
<i>Requirement:</i>	4 The vehicle shall present information to the driver in audible or visual forms without impairing the driver's ability to control the vehicle in a safe manner. Existing
<i>Functional Area: Vehicle Short Range Traveler Information Reception</i>	
Provides drivers with road condition, environmental, advisory, and other traveler information received via short range communications.	
<i>Requirement:</i>	1 The vehicle shall receive traveler information including traffic and road conditions, incident information, maintenance and construction information, event information, transit information, parking information, and weather information. Existing
<i>Requirement:</i>	2 The vehicle shall receive advisory information, such as evacuation information, proximity to a maintenance and construction vehicle, wide-area alerts, work zone intrusion information, and other special information. Planned
<i>Requirement:</i>	3 The vehicle shall receive indicator and fixed sign information including static sign information (e.g., stop, curve warning, guide signs, service signs, and directional signs) and dynamic information (e.g., current signal states and local conditions warnings identified by local environmental sensors). Potential

Table 6

Architecture	Status
Northwest Indiana Regional Intelligent Transportation System (Region)	(Region)
<i>Element: Vehicle ITS Equipment</i>	
<i>Entity: Vehicle</i>	
<i>Functional Area: Vehicle Short Range Traveler Information Reception</i>	
Provides drivers with road condition, environmental, advisory, and other traveler information received via short range communications.	
<i>Requirement:</i>	
4 The vehicle shall store a translation table for road sign and message templates used for in-vehicle display.	Potential
<i>Requirement:</i>	
5 The vehicle shall present the received information to the driver in audible or visual forms without impairing the driver's ability to control the vehicle in a safe manner.	Existing
<i>Functional Area: Vehicle Mayday I/F</i>	
In-vehicle capability for drivers or collision detection sensors onboard a vehicle to report an emergency and summon assistance.	
<i>Requirement:</i>	
1 The vehicle shall provide the capability for a driver to report an emergency and summon assistance.	Existing
<i>Requirement:</i>	
2 The vehicle shall provide the capability to accept input from a driver via a panic button or some other functionally similar form of input device provided as part of the in-vehicle equipment.	Existing
<i>Requirement:</i>	
3 The vehicle shall provide the capability to automatically identify that a collision has occurred using equipment such as collision detection sensors with an interface to mayday type equipment that would automatically detect vehicle problems and send appropriate distress signals to a center.	Planned
<i>Requirement:</i>	
4 The vehicle shall forward a request for assistance to a center containing the driver's current location, its identity and basic vehicle data relevant to its current condition, as well as any other data, such as personal medical history, vehicle orientation, etc., that may be developed in-vehicle by other systems.	Existing
<i>Requirement:</i>	
5 The vehicle shall acknowledge the driver's request for emergency assistance.	Existing
<i>Requirement:</i>	
6 The vehicle shall provide further details about the emergency to the center upon request from that function.	Potential