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# Houma Regional ITS Architecture

Prepared By



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**ITS ARCHITECTURE (UPDATES)**

HOUMA-THIBODAUX REGIONAL ITS ARCHITECTURE

Presented to:



Prepared by:



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## 1 Introduction

This document describes the Intelligent Transportation System (ITS) architecture for the Houma-Thibodaux area. A Regional ITS Architecture is “a regional framework for ensuring institutional agreement and technical integration for the implementation of ITS projects or groups of projects”. This architecture conforms to Federal Highway Administration (FHWA) Final Rule 940 Part 11 which mandates that projects planning to use Federal Funds in their ITS deployments must have established an ITS Architecture for the region. Paragraph 940.9 (a) states that:

*“A regional ITS architecture shall be developed to guide the development of ITS projects and programs and be consistent with ITS strategies and projects contained in applicable transportation plans. The National ITS Architecture shall be used as a resource in the development of the regional ITS architecture. The regional ITS architecture shall be on a scale commensurate with the scope of ITS investment in the region. Provision should be made to include participation from the following agencies, as appropriate, in the development of the regional ITS architecture: Highway agencies; public safety agencies (e.g., police, fire, emergency/medical); transit operators; Federal lands agencies; State motor carrier agencies; and other operating agencies necessary to fully address regional ITS integration.”*

ITS regional architectures have been promoted by the United States Department of Transportation (USDOT) as a tool for describing, using a standard vocabulary and set of concepts, regional deployments to aid in the integration of User Services and Service Packages to address regional transportation problems. Regional ITS Architectures are also used to constrain projects, funded by the FHWA using high technology products, to highway or transit applications.

### 1.1 Background

What are Intelligent Transportation Systems or ITS? Simply put, they are the application of technology to highway or transit applications. The formal description states:

*“ITS improves transportation safety and mobility and enhances productivity through the use of advanced information and communication technologies. Intelligent transportation systems (ITS) encompass a broad range of wireless and wire line communications-based information and electronics technologies. When integrated into the transportation system's infrastructure, and in vehicles themselves, these technologies relieve congestion, improve safety and enhance American productivity.”*

To effectively apply ITS to highway and transit projects, the National ITS Architecture, initiated in 1991 and sponsored by USDOT, describes a wide range of likely ITS applications, using high technology products, for highway and transit projects. In 2001 the FHWA and Federal Transit Administration (FTA) established 23 Code of Federal Regulations (CFR) 940 Part 11, which required agencies using federal funds to establish ITS Architectures for their regions. The architecture must contain the following elements:

**Table 1: Federal Rule Compliance**

<b>FHWA Rule Element</b>	<b>Section of Document Addressing Rule</b>
(1) Description of region	<b>Section 3.1</b>
(2) Identification of participating agencies and other stakeholders	<b>Section 5</b>
(3) An operational concept that identifies the roles and responsibilities of participating agencies and stakeholders in the operation and implementation of the systems included in the regional ITS architecture	<b>Section 9</b>
(4) Any agreements (existing or new) required for operations, including at a minimum those affecting ITS project interoperability, utilization of ITS related standards, and the operation of the projects identified in the regional ITS architecture	<b>Section 13</b>
(5) System functional requirements	<b>Section 11 &amp; Turbo source file</b>
(6) Interface requirements and information exchanges with planned and existing systems and subsystems	<b>Appendix B</b>
(7) Identification of ITS standards supporting regional and national interoperability	<b>Section 12</b>
(8) The sequence of projects required for implementation	<b>Section 9.1</b>

The products derived from architecture development processes provide a number of benefits to the transportation planners and engineers. The following are examples of these benefits:

1. Establishes a common terminology for the various ITS elements needed to implement and operate ITS applications.
2. Defines those elements and the functions they perform, and identifies, in theory, all of the possible interrelationships among the ITS elements.
3. The National ITS Architecture does not dictate a specific approach to implementing or operating any ITS application; rather, it provides a common set of terms and concepts that local ITS implementers are encouraged to utilize in describing their specific ITS activities.
4. Provides a “living” planning document that promotes modularity and integration, and minimizes impacts when needs to regional issues change.
5. Promotes a thorough, coordinated and multi-jurisdictional “systems” approach to ITS and the use of a Systems Engineering process to its deployment.
6. Fosters the utilization of the “standards” that are being developed through the USDOT National ITS Architecture program.

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## **2 Acronyms and Abbreviations**

ATIS – Advanced Traveler Information Systems  
ATMS – Advanced Traffic Management Systems  
AVL – Automated Vehicle Location  
CAD – Computer Aided Dispatch  
CCTV – Closed Circuit Television  
CFR – Code of Federal Regulations  
DMS – Dynamic Message Signs  
DOTD – Department of Transportation and Development  
FHWA – Federal Highway Administration  
FTA – Federal Transit Administration  
HAR – Highway Advisory Radio  
ITS – Intelligent Transportation Systems  
LADOTD – Louisiana Department of Transportation and Development  
LSP – Louisiana State Police  
MPO – Metropolitan Planning Organization  
MS/ETMCC – Message Sets for External Traffic Management Center Communications  
MTP – Metropolitan Transportation Plan  
NTCIP – National Transportation Communications for Intelligent Transportation System Protocol  
PDA – Personal Digital Assistant  
RR – Roles and Responsibilities  
SCPDC – South Central Planning and Development Commission  
SDO – Standards Development Organizations  
TIM – Traffic Incident Management  
TIP – Transportation Improvement Program  
TMC – Traffic Management Center  
USDOT – United States Department of Transportation  
XML – Extensive Markup Language  
VHT – Vehicle Hours Traveled  
VMT – Vehicle Miles Traveled

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### **3 Architecture Scope**

The Houma-Thibodaux Regional ITS Architecture is a roadmap for transportation systems integration in the Houma-Thibodaux area. The architecture was developed through a cooperative effort by the region's transportation agencies, covering diverse modes and all major roads in the region. It represents a shared vision of how each agency's systems will work together, sharing information and resources to provide a safer, more efficient, and more effective transportation system for travelers in the region.

The architecture provides an overarching framework that spans all of the region's transportation organizations and individual transportation projects. Using the architecture, each transportation project can be viewed as an element of the overall transportation system, providing visibility into the relationship between individual transportation projects and ways to cost-effectively build an integrated transportation system over time. This chapter establishes the scope of the architecture in terms of its geographic breadth, the scope of services that are covered, and the time horizon that is addressed.

#### **3.1 Geographic Scope**

The primary region for which this ITS Architecture is being developed corresponds with the Houma-Thibodaux Metropolitan Planning Organization (HTMPO) urbanized and studied boundary. The Houma-Thibodaux metropolitan area is located approximately 50 miles south of New Orleans, Louisiana. The population of the study area is estimated to be 245,450 people by 2015 and growing to 258,968 people by 2035. Currently the mode choice for commuters to work are as follows: 80.4% single occupancy vehicle; 10.6% carpool; 2.6% work at home; 1.0% walk; 0.6% by public transportation; and 4.9% use other means. The major roadways include US 90, a major principal arterial which is being upgraded to an interstate system (I-49), LA 1, LA 20 and other principal arterials.

LADOTD has ITS devices deployed in the LA 1 corridor to Port Fourchon which is beyond the HTMPO boundary. However, this area is being included in this architecture because of its close proximity to the Houma-Thibodaux area. **Figure 1** shows the limits of Houma-Thibodaux Regional Architecture.

#### **3.2 Service Scope**

This Regional ITS Architecture covers a range of ITS services intended to address transportation needs identified within the defined geographic scope. These transportation deficiencies in the region may be existing or emerging transportation issues. Various services based on the national ITS architecture market packages shall be selected and programmed into projects to address the transportation needs in a logical manner. **Section 7** of this document shows a range of existing and planned ITS services.

#### **3.3 Timeframe**

The period for a comprehensive review of the Houma-Thibodaux Regional ITS Architecture is five years. However, the architecture will continuously evolve and changes made as needed to remain current and relevant.

#### **3.4 Maintainer**

Louisiana Department of Transportation and Development (LADOTD) will take the lead to maintain the Houma-Thibodaux ITS Architecture.

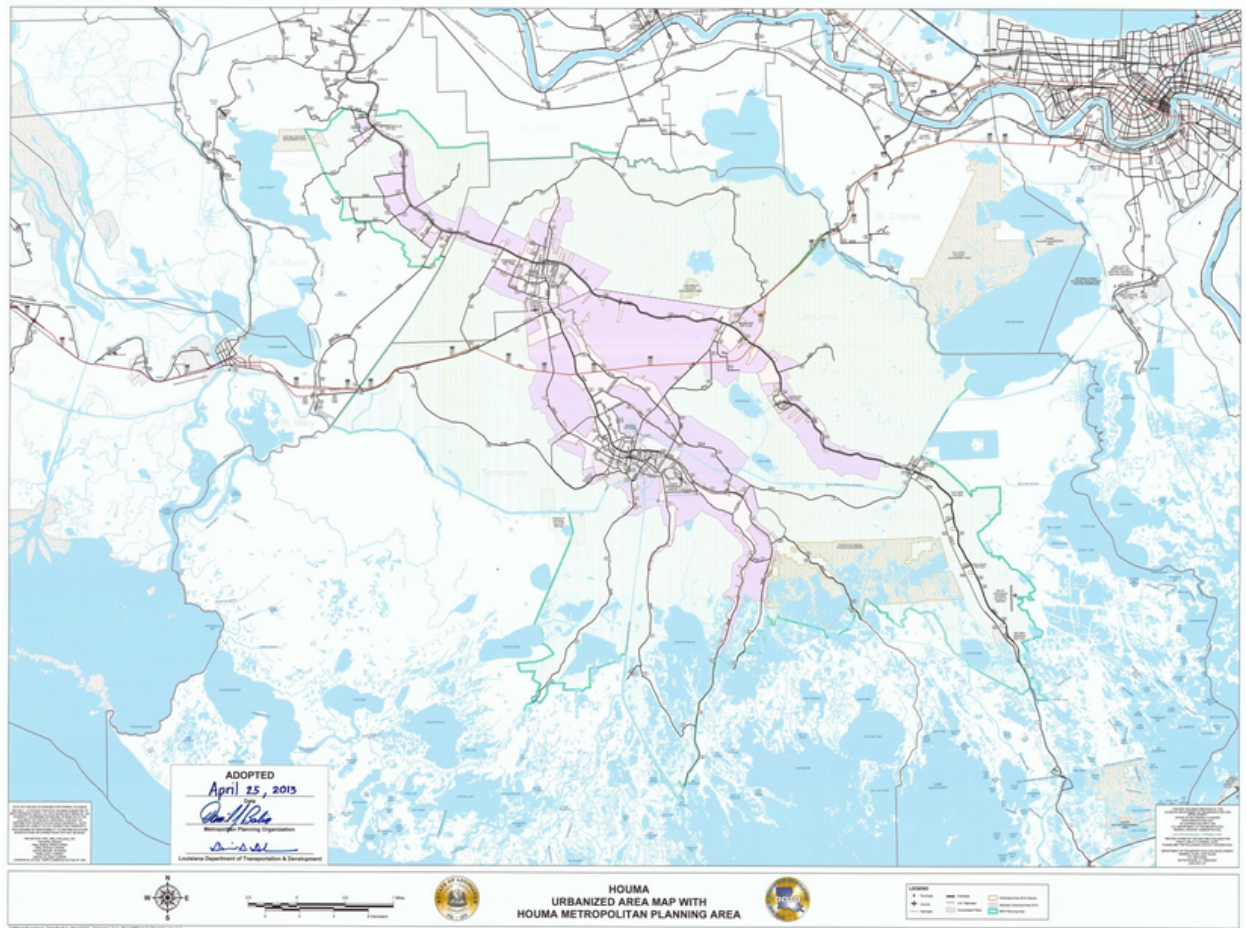


Figure 1: Houma-Thibodaux Urbanized Area Map

## 4 Relationship to Planning

The Houma-Thibodaux Regional ITS Architecture is an integral part of planning for the operations and maintenance strategies that are addressed by the regional transportation planning process. The architecture provides a framework that connects operations and maintenance objectives, and strategies with the integrated transportation system improvements that are implemented as a progressive series of ITS projects. The architecture also is used to define the data needs associated with performance monitoring that supports an informed planning process. This chapter identifies the planning objectives, strategies, and associated performance measures from the regional plan. These planning elements are connected with ITS services in the Turbo Architecture database. **Table 2** summarizes the planning objectives by South Central Planning and Development Commission.

**Table 2: Relationship to Planning**

Name	Description	PM Category	Performance Measure
Increase mobility	The primary objectives are to invest in a regional transportation management system to alleviate congestion and ensure safe hurricane evacuation. The Houma- Thibodaux Metropolitan Statistical area has a large population close to offshore industries and its location on hurricane evacuation routes makes it a very important. The combination of heavy traffic, limited routes for normal and emergency evacuation traffic, the limited ability to expand roadway capacity and the need for efficient movement of people and goods to accommodate economic expansion, all point to the requirement to operate the area's transportation system more efficiently. Current congestion issues can be attributed to capacity deficiencies and inefficient traffic control systems.	Mobility	Vehicle hours traveled (VHT)
			Vehicle miles traveled (VMT)
Enhance Safety	Enhance the safety of the transportation system during both normal travel patterns and emergency evacuations. Enhance the security of the transportation system especially related to emergency evacuation from either natural or man-made disasters.	Crashes	Crashes per year
		Fatalities	Fatalities per year
Maintaining Existing Infrastructure	System preservation to ensure network is in good state of repair to support both normal use for socio-economic activities as well as provide efficient system for evacuation during emergencies	Pavement Bridges	Pavement Condition Index
			Bridge Condition Rating
			Remaining Service Life



## 5 ITS Stakeholders

Identifying stakeholders is an important task in ITS architecture development since effective ITS involves the integration of multiple stakeholders and their transportation systems. This section describes the stakeholders who either participated in the creation of the Houma-Thibodaux Regional ITS Architecture or whom the participating stakeholders felt had to be included in the architecture. Some stakeholders have been grouped in order to better reflect mutual participation or involvement in transportation services and elements. Every stakeholder in this section is related to one or more of the transportation inventory elements described in **Table 3** either as an individual stakeholder or as a member of a stakeholder group.

**Table 3: ITS Stakeholders**

Stakeholder Name	Stakeholder Description
Acadian Ambulance	Acadian Ambulance provides emergency medical care and transportation. They have ground and air ambulance facilities strategically located in Louisiana and medics supporting offshore facilities across the Gulf, and monitoring services.
Bayou Cane Volunteer Fire Department	Bayou Cane has 4 stations responding to fires, vehicle crashes, hazardous materials calls, medical emergencies, and various rescue calls.
City of Thibodaux	The City of Thibodaux is the primary government agency responsible for emergency response and management, transportation system management, traffic management, incident management and other activities within its jurisdiction.
Houma Terrebonne Airport	Houma-Terrebonne Airport / Industrial Park provides both rotary (helicopter) and fixed wing transportation services. The facility serves for evacuations and evacuation staging, and emergency air lift. The airport facility also accommodates unmanned aerial vehicle flights.
Lafourche Parish Government	This element is responsible for the administration of Lafourche Parish. Its responsibilities include emergency preparedness, solid waste management, and coastal zone management. Hazardous conditions exist throughout the parish and this stakeholder is responsible for emergency preparedness ranging from natural hazards such as hurricanes and flooding to hazardous materials from chemical spills. This stakeholder has the authority and responsibility for direction and control of resources of Lafourche Parish towards emergency preparedness and response.
L.E. Fletcher Technical College	Fletcher Technical Community College provides shelter during emergencies.
LADOTD	Louisiana Department of Transportation and Development (LADOTD) is an arm of the Louisiana government responsible for state-wide transportation. LADOTD's responsibilities include statewide transportation system operations. This stakeholder group includes all DOTD units (ITS, Office of Planning Programming, Highway Safety, Weights and Standards, Traffic Services, and Traffic Engineering) involved in transportation planning, operations, and maintenance. Some of the typical responsibilities include incident detection and response, evacuation planning and management, transportation data collection, management, and distribution for the local region and the entire state.
Leonard J Chabert Medical Center	LJCMC provides medical services for emergencies and incidents and currently has wireless communication assets for emergency communication.
Local Public Safety Agencies	This stakeholder group includes all regional agencies that are involved in emergency, fire, police and other public safety or emergency response activities.
Louisiana State Police (Troop C)	Louisiana State Police agency is responsible for operating Louisiana State Police Centers. This includes Computer Aided Dispatch database, which collects incident/emergency detection, dispatch, response, and status information related to the Louisiana State Police officers/equipment. They provide traffic control during emergency evacuation.
Media	This stakeholder group includes local television and radio broadcast channels or stations and the print media that are responsible for disseminating transportation information like traffic conditions, incidents and roadway weather conditions.
Public	Members of the general public who own and operate various electronic devices or systems which enables them to access ITS information including PDAs, cellphones, and personal computers.
South Central Planning and Development Commission, MPO	The South Central Planning and Development Commission serves many different constituencies made especially for and by local governments in the South Central Region. It performs a wide variety of services including long-range planning, state and federal liaison. The Houma-Thibodaux Metropolitan Planning Organization is responsible for comprehensive transportation planning in the Houma-Thibodaux region. Members of this MPO include local government officials and representatives from LADOTD.

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Stakeholder Name	Stakeholder Description
Terrebonne General Medical Center	TGMC is a public, non-profit health care system that provides medical services during incidents or emergencies.
Terrebonne Parish Communications District	TPCD is the parish emergency response operations including City fire, police, 911, and any other emergency response operators. This element is responsible for the emergency response operations and management within the parish jurisdiction. In addition, this element includes the components of the Office of Emergency Preparedness, which leads, coordinates, and supports the emergency management system in order to protect lives and prevent the loss of property from all hazards. The parish OEP coordinates directly with the GOHSEP for planning and managing emergency response to major disasters on a state-wide basis.
Terrebonne Parish Consolidated Government	Terrebonne Parish Consolidated Government is the primary regional government agency responsible for all local government activities for Houma, which includes administration, assessor, city court, clerk of court, coastal restoration, DA, emergency prep, finance, homeland security and emergency preparedness, fire dept., police, housing and human services, HR, library, parks and recreation, port, public safety, public works, risk management, taxes, utilities, and water works.
Terrebonne Parish School Board	The Terrebonne Parish School Board is the overall management and oversight agency of the local schools. Schools may be used as shelter during emergencies.



## 6 ITS System Inventory

An inventory of existing and planned transportation systems is the basis for the Houma-Thibodaux Regional ITS Architecture. The transportation system inventory was developed based on input from stakeholders throughout the region. The inventory includes a list of ITS elements and the associated stakeholder responsible for system operation.

**Table 4** describes the surface transportation inventory of element for the region. A transportation element can be a center, vehicle, traveler, or field equipment. Each transportation element listed below has one or more stakeholders associated with it. In order to reduce the complexity of the architecture, some transportation elements with like functionality have been grouped together. Each transportation inventory element is mapped to at least one National ITS Architecture entity.

**Table 4: ITS Inventory**

Element Name	Element Description	Stakeholder	Element Status	Associated Entity
Acadian Ambulance Houma Dispatch	Private emergency medical service provider (i.e., ambulance service) for the Houma area.	Acadian Ambulance	Existing	Emergency Management
Airport	Houma-Terrebonne Airport / Industrial Park provides both rotary (helicopter) and fixed wing transportation services. The facility serves for evacuations and emergency and evacuation staging, as well as emergency air lift. Also the airport facility accommodates unmanned aerial vehicle flights.	Houma Terrebonne Airport	Existing	Emergency Management
Bayou Cane Volunteer Fire Department	Local fire department providing both emergency rescue and firefighting.	Bayou Cane Volunteer Fire Department	Existing	Emergency Management
DOTD Houma TMC	This element represents the traffic operations center within the area that is responsible for local traffic management activities. The typical activities include traffic monitoring, traffic data collection, operation of ITS elements (CCTV, DMS, etc.), detection and verification of incidents, traffic signal monitoring, and other traffic management related activities. This also includes communicating with other agencies, districts, TMCs, and DOTD departments such as maintenance for roadway maintenance activities.	LADOTD	Existing	Archived Data Management
				Emergency Management
				Maintenance and Construction Management
				Roadway
				Traffic Management
				Traffic Operations Personnel

Element Name	Element Description	Stakeholder	Element Status	Associated Entity
DOTD ITS Field Equipment	This element includes the equipment distributed on and along the roadway that monitors and controls traffic and monitors and manages the roadway itself. Equipment includes traffic signals, traffic detectors, environment sensors, highway advisory radios, dynamic message signs, closed circuit television (CCTV) cameras and video image processing systems, and grade crossing warning systems.	LADOTD	Existing	Roadway
DOTD ITS Section	This element represents ITS section under the LADOTD Central Office. The ITS section is responsible for state-wide operations center located in DOTD headquarters. Also, the ITS section is responsible for management information system for transportation, state-wide ITS elements operations, and maintenance. The ITS section is also responsible for maintenance of all ITS equipment in the state.	LADOTD	Existing	Archived Data Management
				Emergency Management
				Maintenance and Construction Management
				Roadway
				Traffic Management
				Traffic Operations Personnel
DOTD New Orleans TMC	The Regional Transportation Management Center (RTMC) is a facility that houses both the DOTD D02 Traffic ITS/TMC Operations and the NORPC, which allows the co-located agencies to fully plan and operate the ITS. This element represents the traffic/transportation operations center that is responsible for traffic management activities throughout New Orleans area. The typical activities include traffic monitoring, traffic data collection, operation of ITS elements (CCTV, DMS, etc.), detection and verification of incidents, traffic signal monitoring, and other traffic management related activities. This also includes communicating with other agencies, districts, TMCs, and DOTD departments such as maintenance for roadway maintenance activities.	LADOTD	Existing	Archived Data Management
				Emergency Management
				Information Service Provider
				Maintenance and Construction Management
				Roadway
				Traffic Management
DOTD Social Media	This element includes Facebook and Twitter used to disseminate transportation related information.	LADOTD	Existing	Information Service Provider

Element Name	Element Description	Stakeholder	Element Status	Associated Entity
DOTD Sub District 02 Traffic Operations	This element represents traffic operations or traffic engineering within the district office that is responsible for traffic management activities within the district jurisdiction. The typical activities include traffic monitoring, traffic data collection, operation of traffic signal, and other traffic management related activities. This also includes communicating with Traffic Management Center (TMC) and other departments like maintenance for roadway maintenance activities.	LADOTD	Existing	Archived Data Management
				Emergency Management
				Maintenance and Construction Management
				Traffic Management
DOTD Sub District 02 Traffic Signal System	This element represents traffic signals operated and maintained by the District.	LADOTD	Existing	Roadway
Dularge/Nav Draw Bridge Operators	Operator responsible for opening/closing movable bridge for waterway traffic.	LADOTD	Existing	Emergency Management
				Roadway
E911/Office of Emergency Preparedness	This element represents the parish emergency response operations including City fire, police, 911, and any other emergency response operators. This element is responsible for the emergency response operations and management within the parish jurisdiction. Also, this element includes the components of the Office of Emergency Preparedness which leads, coordinates, and supports the emergency management system in order to protect lives and prevent the loss of property from all hazards. The parish OEP coordinates directly with the GOHSEP for planning and managing emergency response to major disasters on a state-wide basis.	Terrebonne Parish Communications District	Existing	Emergency Management
Good Earth Transit	This element represents the local transit authority that includes both fixed route, and paratransit services.	Terrebonne Parish Consolidated Government	Existing	Emergency Management
				Transit Management
Houma Fire Department	Local fire department providing both emergency rescue and firefighting.	Terrebonne Parish Consolidated Government	Existing	Emergency Management
Houma ITS Central Network	This is the common ITS network for the Houma region. This element allows for the centralization of services possible during normal daily business and during an emergency including but not limited to ISP, VOIP, video conference, etc. Hardware may include servers, PRI(s), ISP modem(s), backup systems, etc.	Terrebonne Parish Consolidated Government	Existing	Emergency Management
				Traffic Management

Element Name	Element Description	Stakeholder	Element Status	Associated Entity
Houma Police Department	This element represents City of Houma Police Department dispatch center.	Terrebonne Parish Consolidated Government	Existing	Emergency Management
L.E. Fletcher Technical College	This element represents the local technical college. Traffic and emergency conditions can be provided to the student body.	L.E. Fletcher Technical College	Existing	Emergency Management
Lafourche Parish Government	This element is responsible for the administration of Lafourche Parish. Its responsibilities include emergency preparedness, solid waste management and coastal zone management. Hazardous conditions exist throughout the parish and this element is responsible for emergency preparedness ranging from natural hazards such as hurricanes and flooding to hazardous materials from chemical spills. This element has the authority and responsibility for direction and control of resources of Lafourche Parish towards emergency preparedness and response.	Lafourche Parish Government	Existing	Emergency Management
				Information Service Provider
				Maintenance and Construction Management
				Transit Management
Leonard Chabert Hospital	This element represents the local area hospital.	Leonard J Chabert Medical Center	Existing	Emergency Management
Local Print and Broadcast Media	This includes local newspapers, radio and television stations that broadcast transportation information.	Media	Existing	Information Service Provider
				Media
Louisiana 511/Website	This element provides traveler information service from LADOTD in conjunction with private partner.	LADOTD	Existing	Information Service Provider
				Telecommunications System for Traveler Information
LSP Troop C	This element represents the Louisiana State police department. The Houma-Thibodaux area is covered by Troop C.	Louisiana State Police (Troop C)	Existing	Emergency Management
Other Emergency Management	This element includes regional agencies and volunteer groups that are involved in emergency, fire, and other public safety or emergency response activities.	Local Public Safety Agencies	Existing	Emergency Management
Other Public Safety Agencies	This element includes agencies such as local police, fire or EMS offices and vehicles throughout the region that may assist with public safety in times of emergencies.	Local Public Safety Agencies	Existing	Emergency Management

Element Name	Element Description	Stakeholder	Element Status	Associated Entity
Personal Devices	This element represents primarily PDAs, pagers, smartphones etc.	Public	Existing	Personal Information Access
				Traveler
SCPDC	The South Central Planning and Development Commission serves many different constituencies in the South Central Region. Their services include long range planning, state and federal liaison among other things. It also houses the Houma-Thibodaux Metropolitan Planning Organization (MPO) which is responsible for comprehensive transportation planning in the Houma-Thibodaux region.	South Central Planning and Development Commission, MPO	Existing	Archived Data Management
Terrebonne General Hospital	This element represents the local area hospital.	Terrebonne General Medical Center	Existing	Emergency Management
Terrebonne Parish Library (Main Branch)	The main branch library serves as an emergency evacuation shelter during a declared state of emergency. The library branch facilities provide both hard copy books and internet access for local residents.	Terrebonne Parish Consolidated Government	Existing	Emergency Management
Terrebonne Parish School Board Central Office	School board central office is the overall management and oversight agency of the local schools. The central office can accommodate emergency evacuation of schools and people.	Terrebonne Parish School Board	Existing	Emergency Management
Terrebonne Parish Sheriff Office	This element represents the Terrebonne Parish Sheriff's Office's dispatch center.	Local Public Safety Agencies	Existing	Emergency Management
TPCG Consolidated Water Works	This element represents the water works office that operates and maintains the water distribution system in the area.	Terrebonne Parish Consolidated Government	Existing	Archived Data Management
				Emergency Management
TPCG Government Tower	This element represents the central office for the parish president and his administration. The tower facility is the central location for emergency operations management.	Terrebonne Parish Consolidated Government	Existing	Emergency Management
TPCG IT Office	The IT office is the central location for communications and networking for TPCG parish. The IT office operates and maintains the TPCG communication network as well as the joint agency ITS network established through DOTD and FHWA.	Terrebonne Parish Consolidated Government	Existing	Archived Data Management
				Emergency Management

Element Name	Element Description	Stakeholder	Element Status	Associated Entity
TPCG Pollution Control	This element represents the parish's pollution monitoring and response facility.	Terrebonne Parish Consolidated Government	Existing	Emergency Management
TPCG Public Works Division	This element represents the public works division of the parish government.	Terrebonne Parish Consolidated Government	Existing	Emergency Management
				Information Service Provider
TPCG Utilities Division	The Utilities Department is comprised of Administration, Electric Generation, Electric Distribution, Gas Distribution, and Solid Waste divisions. The utilities department also monitors surveillance cameras at its facilities.	Terrebonne Parish Consolidated Government	Existing	Archived Data Management
				Emergency Management
				Security Monitoring

## 6.1 Existing Regional ITS Systems and Operations

There are five systems which already exist in the Houma area and one of the goals of the program is to tie all five systems together. These are traffic management, incident management, data management, transit management, and emergency management. While each entity is able to perform its responsibilities, it is often independently done with little coordination and sometimes with duplication of effort which is a waste of resources. It is expected that implementation of ITS will address these issues and leverage the strengths of these systems to enhance operation during usual socio-economic activities and emergencies such as hurricane evacuation or hazardous waste spills. DOTD District 02 operates and maintains over 65 traffic signals in the region and only one corridor has remote communication capability with the District Office. Therefore almost all timing changes have to be performed by personnel on the field. The TMC operator is able to monitor some of the roadway network, verify and report incidents to the local response agencies using the existing 14 closed circuit television cameras. The TMC can post messages on the two (2) dynamic message signs in the area, Houma Traffic Twitter account, 511 webpage, as well as on the Way to Geaux smart phone application. Terrebonne Parish Government owns two (2) portable changeable message signs that the Sherriff's office posts messages to and logs all occurrences.

## 6.2 Transportation Issues and Needs

The discussions in this segment are based on in person meetings with stakeholders and a summary of transportation issues reported in the MTP<sup>1</sup>. The key areas of concern for the residents include improving safety, improving access and reducing congestion among other factors.

<sup>1</sup> Houma-Thibodaux MTP 2035 Prepared by Neel-Schaffer

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### **6.2.1 Emergency Evacuation**

LA 1 and US 90 are critical corridors for emergency evacuation and the interchange connecting the two is a bottleneck. Capacity improvements on LA 3235 and a connection to US 90 will enhance evacuation from South Lafourche. LA 24, Grand Caillou Road, and LA 3040 are critical corridors for emergencies and recovery. LA 24 poses a problem for evacuation since it is prone to flooding at the onset of hurricanes. Continuous surveillance is desired on these roads during emergencies and recovery. The SCPDC building serves as an OEP center for Terrebonne Parish during emergencies and a console to monitor ITS devices is available. This can serve as a backup center for the Houma TMC.

### **6.2.2 Congested Routes**

Port Fourchon is a critical and strategic national asset because it serves as the staging point for servicing oil drilling in the gulf. This includes equipment, supplies, personnel, and services needed to sustain the offshore oil and gas industry. Even though Port Fourchon is outside the MPO area the trips it generates has significant impact on traffic through the core Houma-Thibodaux area. LA 1 serves as a vital corridor for accessing Port Fourchon and a vital asset during emergencies for evacuation of residents and workers.

The local sheriff's office has indicated that local movable bridges and tunnels are safety concerns. There is heavy congestion in the LA 3040 tunnel which creates a potential hazard for travelers. Similar congestion occurs when movable bridges are closed to vehicular traffic. When the bridge opens to permit marine vessels to navigate, it causes congestion on roadway approaches. There is a desire to accommodate local traffic by notifying them of alternate routes. Traffic signals must be coordinated with movable bridge opening and bridge operators should not raise adjacent bridges at the same time so vehicular congestion can be reduced. If possible wait times at drawbridges should be posted to traveler information systems to help travelers make better decisions about planned trips or prepare them for what is ahead. Emergency providers may need to be notified of movable bridge closures for vehicular traffic.

Thibodaux experiences a high volume of traffic and the Lafourche Parish Sheriff has recommended a by-pass for the city to be built. Other transportation related issues include limited line of sight road segments, flooding and oversized loads on Lafourche Crossing on LA 1/LA 308. Vehicles with oversized loads that cannot travel along LA 1/LA 308 are typically rerouted through residential areas.

### **6.2.3 Safety**

The following roadways were identified by law enforcement agencies as high crash location:

- Hollywood Road experiences at least two crashes a day
- Vanderbilt High School and Quality Hotel are trip generators and experience crashes often during rush hour
- Intersection of Hollywood Road and LA 311
- Intersection of East Woodlawn Ranch Road at LA 57
- Intersection of Industrial Boulevard and Denley Road
- Intersection of LA 57 at Industrial Boulevard
- LA 20 through Chackbay has no shoulders and significant volume of truck traffic

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- LA 312/Lafayette Street at Bond Street
  - Roussel Street at LA 3040/Bond Street
  - LA 182 at Cougar Drive and LA 24

#### **6.2.4 Signals and Communication**

Signal improvements including the installation of new traffic signals and controllers at intersections will enhance safety and mobility. The following corridors desire upgrades to signal systems to improve progression of traffic:

- LA 24 (communications desired for active management especially during emergencies and recovery)
- LA 57 signal upgrades with communication
- Canal Boulevard signal upgrades and communication

Signals with emergency preemption will also facilitate movement of emergency vehicles and reduce response times.

#### **6.2.5 Public Transit**

The proportion of commuters who use public transit in the study area is estimated at 0.6%. Good Earth Transit is the only public bus transit service in the Houma-Thibodaux area. Weekday service is from 5:40am to 6:30pm and weekend service is from 8:30am to 4:00pm. There are a total of 12 buses and 2 paratransit buses in the fleet. AVL systems to track transit vehicles and transit signal preemption systems will enhance transit operations. Good Earth Transit desires an improvement in communication with fiber optic connectivity to the MPO network. Access to Wi-Fi is desired along transit routes. There is poor transit connectivity between Houma and its environs. There is only one route extending from Houma to Thibodaux however plans are under way to develop a circulator route to Thibodaux. Currently, no transit service is available in the southern parts of the parish.

#### **6.2.6 Port Fourchon Fiber Backbone Communication**

DOTD is currently operating a tolled bridge facility in the Port Fourchon area. An upgraded leased communications connection from the toll gantry building to the New Orleans TMC is currently being pursued. The connection is anticipated to be 25 megabits bandwidth that can be increased to 40 megabits when the Galliano Bridge ITS is completed and CCTV cameras are upgraded. This will enable a connection to the DOTD fiber backbone which provides accessibility to the Houma TMC.



## 7 ITS Services

ITS services describe what can be done to improve the efficiency, safety, and convenience of the regional transportation system through better information, advanced systems, and new technologies. Some services are specific to one primary stakeholder while others require broad stakeholder participation. This section describes the ITS services that meet the transportation needs in the region.

**Table 5: ITS Services**

Service Package	Service Package Name	Service Package Description	Service Package Status	Included Elements
AD1	ITS Data Mart	This service package provides a focused archive that houses data collected and owned by a single agency, district, private sector provider, research institution, or other organization. This focused archive typically includes data covering a single transportation mode and one jurisdiction that is collected from an operational data store and archived for future use. It provides the basic data quality, data privacy, and meta data management common to all ITS archives and provides general query and report access to archive data users.	Planned	DOTD Houma TMC
				DOTD New Orleans TMC
				LADOTD
				Terrebonne Parish School Board Central Office
				TPCG Consolidated Water Works
				TPCG Utilities Division
AD2	ITS Data Warehouse	This service package includes all the data collection and management capabilities provided by the ITS Data Mart, and adds the functionality and interface definitions that allow collection of data from multiple agencies and data sources spanning across modal and jurisdictional boundaries. It performs the additional transformations and provides the additional meta data management features that are necessary so that all this data can be managed in a single repository with consistent formats. The potential for large volumes of varied data suggests additional on-line analysis and data mining features that are also included in this service package in addition to the basic query and reporting user access features offered by the ITS Data Mart.	Planned	LADOTD
				SCPDC

Service Package	Service Package Name	Service Package Description	Service Package Status	Included Elements
APTS02	Transit Fixed-Route Operations	This service package performs automated dispatch and system monitoring for fixed-route and flexible-route transit services. This service performs scheduling activities including the creation of schedules, blocks and runs, as well as operator assignment. This service determines the transit vehicle trip performance against the schedule using AVL data and provides information displays at the Transit Management Subsystem. Static and real time transit data is exchanged with Information Service Providers where it is integrated with that from other transportation modes (e.g. rail, ferry, air) to provide the public with integrated and personalized dynamic schedules.	Planned	Good Earth Transit
APTS05	Transit Security	This service package provides for the physical security of transit passengers and transit vehicle operators. On-board equipment is deployed to perform surveillance and sensor monitoring in order to warn of potentially hazardous situations. The surveillance equipment includes video (e.g., CCTV cameras), audio systems and/or event recorder systems. The sensor equipment includes threat sensors (e.g., chemical agent, toxic industrial chemical, biological, explosives, and radiological sensors) and object detection sensors (e.g., metal detectors). Transit user or transit vehicle operator activated alarms are provided on-board. Public areas (e.g., transit stops, park and ride lots, stations) are also monitored with similar surveillance and sensor equipment and provided with transit user activated alarms. In addition this service package provides surveillance and sensor monitoring of non-public areas of transit facilities (e.g., transit yards) and transit infrastructure such as bridges, tunnels, and transit railways or bus rapid transit (BRT) guideways. The surveillance equipment includes video and/or audio systems. The sensor equipment includes threat sensors and object detection sensors as described above as well as, intrusion or motion detection sensors and infrastructure integrity monitoring (e.g., rail track continuity checking or bridge structural integrity monitoring).	Planned	Good Earth Transit
APTS06	Transit Fleet Management	This service package supports automatic transit maintenance scheduling and monitoring. On-board condition sensors monitor system status and transmit critical status information to the Transit Management Subsystem. Hardware and software in the Transit Management Subsystem processes this data and schedules preventative and corrective maintenance. The service package also supports the day to day management of the transit fleet inventory, including the assignment of specific transit vehicles to blocks.	Planned	Good Earth Transit
APTS07	Multi-modal Coordination	This service package establishes two way communications between multiple transit and traffic agencies to improve service coordination. Multimodal coordination between transit agencies can increase traveler convenience at transit transfer points and clusters (a collection of stops, stations, or terminals where transfers can be made conveniently) and also improve operating efficiency. Transit transfer information is shared between Multimodal Transportation Service Providers and Transit Agencies.	Planned	DOTD Sub District 02 Traffic Operations
				Good Earth Transit

Service Package	Service Package Name	Service Package Description	Service Package Status	Included Elements
APTS08	Transit Traveler Information	This service package provides transit users at transit stops and on-board transit vehicles with ready access to transit information. The information services include transit stop annunciation, imminent arrival signs, and real-time transit schedule displays that are of general interest to transit users. Systems that provide custom transit trip itineraries and other tailored transit information services are also represented by this service package.	Planned	Good Earth Transit
				Louisiana 511/Website
				Personal Devices
ATIS01	Broadcast Traveler Information	This service package collects traffic conditions, advisories, general public transportation, toll and parking information, incident information, roadway maintenance and construction information, air quality and weather information, and broadcasts the information to travelers using technologies such as FM subcarrier, satellite radio, cellular data broadcasts, and Internet web casts. The information may be provided directly to travelers or provided to merchants and other traveler service providers so that they can better inform their customers of travel conditions. Different from the service package ATMS06 - Traffic Information Dissemination, which provides localized HAR and DMS information capabilities, ATIS01 provides a wide area digital broadcast service. Successful deployment of this service package relies on availability of real-time traveler information from roadway instrumentation, probe vehicles or other sources.	Existing	DOTD Social Media
				Local Print and Broadcast Media
				Louisiana 511/Website
ATIS02	Interactive Traveler Information	This service package provides tailored information in response to a traveler request. Both real-time interactive request/response systems and information systems that "push" a tailored stream of information to the traveler based on a submitted profile are supported. The traveler can obtain current information regarding traffic conditions, roadway maintenance and construction, transit services, ride share/ride match, parking management, detours and pricing information. Although the Internet is the predominate network used for traveler information dissemination, a range of two-way wide-area wireless and fixed-point to fixed-point communications systems may be used to support the required data communications between the traveler and Information Service Provider. A variety of interactive devices may be used by the traveler to access information prior to a trip or en route including phone via a 511-like portal and web pages via kiosk, personal digital assistant, personal computer, and a variety of in-vehicle devices.	Planned	Personal Devices
ATMS01	Network Surveillance	This service package includes traffic detectors, other surveillance equipment, the supporting field equipment, and fixed-point to fixed-point communications to transmit the collected data back to the Traffic Management Subsystem. The derived data can be used locally such as when traffic detectors are connected directly to a	Existing	DOTD Houma TMC
				DOTD ITS Field Equipment

Service Package	Service Package Name	Service Package Description	Service Package Status	Included Elements
		signal control system or remotely (e.g., when a CCTV system sends data back to the Traffic Management Subsystem). The data generated by this service package enables traffic managers to monitor traffic and road conditions, identify and verify incidents, detect faults in indicator operations, and collect census data for traffic strategy development and long range planning. The collected data can also be analyzed and made available to users and the Information Service Provider Subsystem.		DOTD ITS Section
				DOTD New Orleans TMC
				DOTD Sub District 02 Traffic Operations
ATMS03	Traffic Signal Control	This service package provides the central control and monitoring equipment, communication links, and the signal control equipment that support traffic control at signalized intersections. A range of traffic signal control systems are represented by this service package ranging from fixed-schedule control systems to fully traffic responsive systems that dynamically adjust control plans and strategies based on current traffic conditions and priority requests. This service package is generally an intra-jurisdictional package. Systems that achieve coordination across jurisdictions by using a common time base or other strategies that do not require real time coordination would also be represented by this package. Coordination of traffic signal systems using real-time communications is covered in the ATMS07-Regional Traffic Management service package. This service package is consistent with typical traffic signal control systems.	Existing	DOTD Sub District 02 Traffic Operations
				DOTD Sub District 02 Traffic Signal System
				Dularge/Nav Draw Bridge Operators
				Houma Network Communication
ATMS06	Traffic Information Dissemination	This service package provides driver information using roadway equipment such as dynamic message signs. A wide range of information can be disseminated including traffic and road conditions, closure and detour information, travel restrictions, incident information, and emergency alerts and driver advisories. This package provides information to drivers at specific equipped locations on the road network. Careful placement of the roadway equipment provides the information at points in the network where the drivers have recourse and can tailor their routes to account for the new information. This package also covers the equipment and interfaces that provide traffic information from a traffic management center to the media (for instance via a direct tie-in between a traffic management center and radio or television station computer systems), Transit Management, Emergency Management, and Information Service Providers. A link to the Maintenance and Construction Management subsystem allows real time information on road/bridge closures and restrictions due to maintenance and construction activities to be disseminated. The sharing of transportation operations data described in this service package also supports other services like ATMS09- Traffic Decision Support and Demand Management.	Existing	DOTD Houma TMC
				DOTD New Orleans TMC
ATMS07	Regional Traffic	This service package provides for the sharing of traffic information	Existing	DOTD Houma TMC

Service Package	Service Package Name	Service Package Description	Service Package Status	Included Elements
	Management	and control among traffic management centers to support regional traffic management strategies. Regional traffic management strategies that are supported include inter-jurisdictional, real-time coordinated traffic signal control systems and coordination between freeway operations and traffic signal control within a corridor. This service package advances the ATMS03-Traffic Signal Control and ATMS04-Traffic Metering service packages by adding the communications links and integrated control strategies that enable integrated, interjurisdictional traffic management. The nature of optimization and extent of information and control sharing is determined through working arrangements between jurisdictions. This package relies principally on roadside instrumentation supported by the Traffic Signal Control and Traffic Metering service packages and adds hardware, software, and fixed-point to fixed-point communications capabilities to implement traffic management strategies that are coordinated between allied traffic management centers. Several levels of coordination are supported from sharing of information through sharing of control between traffic management centers.		DOTD New Orleans TMC
				DOTD Sub District 02 Traffic Operations
ATMS08	Traffic Incident Management System	This service package manages both unexpected incidents and planned events so that the impact to the transportation network and traveler safety is minimized. The service package includes incident detection capabilities through roadside surveillance devices (e.g. CCTV) and through regional coordination with other traffic management, maintenance and construction management and emergency management centers as well as rail operations and event promoters. Information from these diverse sources is collected and correlated by this service package to detect and verify incidents and implement an appropriate response. This service package supports traffic operations personnel in developing an appropriate response in coordination with emergency management, maintenance and construction management, and other incident response personnel to confirmed incidents. The response may include traffic control strategy modifications or resource coordination between center subsystems. Incident response also includes presentation of information to affected travelers using the Traffic Information Dissemination service package and dissemination of incident information to travelers through the Broadcast Traveler Information or Interactive Traveler Information service packages. The roadside equipment used to detect and verify incidents also allows the operator to monitor incident status as the response unfolds. The coordination with emergency management might be through a CAD system or through other communication with emergency field personnel. The coordination can also extend to tow trucks and other allied response agencies and field service personnel.	Existing	DOTD Houma TMC
				Houma Police Department
				LSP Troop C

Service Package	Service Package Name	Service Package Description	Service Package Status	Included Elements
ATMS10	Electronic Toll Collection	<p>This service package provides toll operators with the ability to collect tolls electronically and detect and process violations. The fees that are collected may be adjusted to implement demand management strategies. Field-Vehicle Communication between the roadway equipment and the vehicle is required as well as Fixed Point-Fixed Point interfaces between the toll collection equipment and transportation authorities and the financial infrastructure that supports fee collection. Toll violations are identified and electronically posted to vehicle owners. Standards, inter-agency coordination, and financial clearinghouse capabilities enable regional and ultimately national interoperability for these services. Two other service packages, APTS04: Transit Fare Collection Management and ATMS16: Parking Facility Management also provide electronic payment services. These three service packages in combination provide an integrated electronic payment system for transportation services.</p> <p>The vehicle equipment and roadside readers that these systems utilize can also be used to collect road use statistics for highway authorities. This data can be collected as a natural by-product of the toll collection process or collected by separate readers that are dedicated to probe data collection.</p>	Planned	LADOTD (Section 70)
ATMS18	Reversible Lane Management	<p>This service package provides for the management of reversible lane facilities. In addition to standard surveillance capabilities, this service package includes sensory functions that detect wrong-way vehicles and other special surveillance capabilities that mitigate safety hazards associated with reversible lanes. The package includes the field equipment, physical lane access controls, and associated control electronics that manage and control these special lanes. This service package also includes the equipment used to electronically reconfigure intersections and manage right-of-way to address dynamic demand changes and special events.</p>	Planned	DOTD Houma TMC DOTD ITS Field Equipment DOTD ITS Section DOTD New Orleans TMC DOTD Sub District 02 Traffic Operation Dularge/Nav Draw Bridge Operators Houma Network Communication
ATMS20	Drawbridge Management	<p>This service package supports systems that manage drawbridges at rivers and canals and other multimodal crossings (other than railroad grade crossings which are specifically covered by other service packages). The equipment managed by this service package includes control devices (e.g., gates, warning lights, dynamic message signs) at the drawbridge as well as the information systems that are used to keep travelers apprised of current and forecasted drawbridge status.</p>	Existing	Dularge/Nav Draw Bridge Operators

Service Package	Service Package Name	Service Package Description	Service Package Status	Included Elements
CVO10	HAZMAT Management	This service package integrates incident management capabilities with commercial vehicle tracking to assure effective treatment of HAZMAT material and incidents. HAZMAT tracking is performed by the Fleet and Freight Management Subsystem. The Emergency Management subsystem is notified by the Commercial Vehicle if an incident occurs and coordinates the response. The response is tailored based on information that is provided as part of the original incident notification or derived from supplemental information provided by the Fleet and Freight Management Subsystem. The latter information can be provided prior to the beginning of the trip or gathered following the incident depending on the selected policy and implementation.	Existing	Acadian Ambulance Houma Dispatch
				Bayou Cane Volunteer Fire Department
				DOTD Houma TMC
				DOTD New Orleans TMC
				DOTD Sub District 02 Traffic Operations
				Houma Fire Department
				Houma Police Department
				Terrebonne General Hospital
				TPCG Pollution Control
EM01	Emergency Call-Taking and Dispatch	This service package provides basic public safety call-taking and dispatch services. It includes emergency vehicle equipment, equipment used to receive and route emergency calls, and wireless communications that enable safe and rapid deployment of appropriate resources to an emergency. Coordination between Emergency Management Subsystems supports emergency notification between agencies. Wide area wireless communications between the Emergency Management Subsystem and an Emergency Vehicle supports dispatch and provision of information to responding personnel.	Existing	E911/Office of Emergency Preparedness
EM02	Emergency Routing	This service package supports automated vehicle location and dynamic routing of emergency vehicles. Traffic information, road conditions, and suggested routing information are provided to enhance emergency vehicle routing. Special priority or other specific emergency traffic control strategies can be coordinated to improve the safety and time-efficiency of responding vehicle travel on the selected route(s). The Emergency Management Subsystem provides the routing for the emergency fleet based on real-time conditions	Existing	Acadian Ambulance Houma Dispatch
				Bayou Cane Volunteer Fire Department

Service Package	Service Package Name	Service Package Description	Service Package Status	Included Elements
		and has the option of requesting a route from the Traffic Management subsystem. The Emergency Vehicle may also be equipped with dedicated short range communications for local signal preemption and the transmission of alerts to surrounding vehicles. The service provides for information exchange between care facilities and both the Emergency Management Subsystem and emergency vehicles.		DOTD Houma TMC DOTD New Orleans TMC E911/Office of Emergency Preparedness Houma Fire Department Houma Police Department
EM03	Mayday and Alarms Support	This service package allows the user (driver or non-driver) to initiate a request for emergency assistance and enables the Emergency Management Subsystem to locate the user, gather information about the incident, and determine the appropriate response. The request for assistance may be manually initiated or automated and linked to vehicle sensors. This service package also includes general surveillance capabilities that enable the Emergency Management Subsystem to remotely monitor public areas (e.g., rest stops, parking lots) to improve security in these areas. The Emergency Management Subsystem may be operated by the public sector or by a private sector telematics service provider.	Planned	E911/Office of Emergency Preparedness Good Earth Transit Houma Police Department Other Public Safety Agencies
EM06	Wide-Area Alert	This service package uses ITS driver and traveler information systems to alert the public in emergency situations such as child abductions, severe weather events, civil emergencies, and other situations that pose a threat to life and property. The alert includes information and instructions for transportation system operators and the traveling public, improving public safety and enlisting the public's help in some scenarios. The ITS technologies will supplement and support other emergency and homeland security alert systems such as the Emergency Alert System (EAS). When an emergency situation is reported and verified and the terms and conditions for system activation are satisfied, a designated agency broadcasts emergency information to traffic agencies, transit agencies, information service providers, toll operators, and others that operate ITS systems. The ITS systems, in turn, provide the alert information to transportation system operators and the traveling public using ITS technologies such as dynamic message signs, highway advisory radios, in-vehicle displays, transit displays, 511 traveler information systems, and traveler information web sites.	Existing	DOTD Houma TMC DOTD New Orleans TMC E911/Office of Emergency Preparedness Houma Police Department



Service Package	Service Package Name	Service Package Description	Service Package Status	Included Elements
EM08	Disaster Response and Recovery	<p>This service package enhances the ability of the surface transportation system to respond to and recover from disasters. It addresses the most severe incidents that require an extraordinary response from outside the local community. All types of disasters are addressed including natural disasters (hurricanes, earthquakes, floods, winter storms, tsunamis, etc.) and technological and man-made disasters (hazardous materials incidents, nuclear power plant accidents, and national security emergencies such as nuclear, chemical, biological, and radiological weapons attacks).</p> <p>The service package supports coordination of emergency response plans, including general plans developed before a disaster as well as specific tactical plans with short time horizon that are developed as part of a disaster response. The service package provides enhanced access to the scene for response personnel and resources, provides better information about the transportation system in the vicinity of the disaster, and maintains situation awareness regarding the disaster itself. In addition, this service package tracks and coordinates the transportation resources - the transportation professionals, equipment, and materials - that constitute a portion of the disaster response.</p>	Existing	<p>Acadian Ambulance Houma Dispatch</p> <p>Airport</p> <p>Bayou Cane Volunteer Fire Department</p> <p>E911/Office of Emergency Preparedness</p> <p>Good Earth Transit</p> <p>Houma Fire Department</p> <p>L.E. Fletcher Technical College</p> <p>Leonard Chabert Hospital</p> <p>Terrebonne General Hospital</p> <p>Terrebonne Parish Library (Main Branch)</p> <p>Terrebonne Parish School Board Central Office</p> <p>TPCG Consolidated Water Works</p> <p>TPCG Government Tower</p> <p>TPCG IT Office</p> <p>TPCG Pollution Control</p>

Service Package	Service Package Name	Service Package Description	Service Package Status	Included Elements
				TPCG Public Works Division
				TPCG Utilities Division
EM09	Evacuation and Reentry Management	<p>This service package supports evacuation of the general public from a disaster area and manages subsequent reentry to the disaster area. The service package addresses evacuations for all types of disasters, including disasters like hurricanes that are anticipated and occur slowly, allowing a well-planned orderly evacuation, as well as disasters like terrorist acts that occur rapidly, without warning, and allow little or no time for preparation or public warning.</p> <p>This service package supports coordination of evacuation plans among the federal, state, and local transportation, emergency, and law enforcement agencies that may be involved in a large-scale evacuation. All affected jurisdictions (e.g., states and counties) at the evacuation origin, evacuation destination, and along the evacuation route are informed of the plan. Information is shared with 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. Reversible lanes, shoulder use, closures, special signal control strategies, and other special strategies may be implemented to maximize capacity along the evacuation routes. Transit resources play an important role in an evacuation, removing many people from an evacuated area while making efficient use of limited capacity. Additional shared transit resources may be added and managed in evacuation scenarios. Resource requirements are forecast based on the evacuation plans and the necessary resources are located, shared between agencies if necessary, and deployed at the right locations at the appropriate times.</p> <p>Evacuations are also supported by EM10, the "Disaster Traveler Information" service package, which keeps the public informed during evacuations. See that service package for more information.</p>	Existing	<p>Acadian Ambulance Houma Dispatch</p> <p>Airport</p> <p>Bayou Cane Volunteer Fire Department</p> <p>DOTD Houma TMC</p> <p>E911/Office of Emergency Preparedness</p> <p>Good Earth Transit</p> <p>Houma Fire Department</p> <p>L.E. Fletcher Technical College</p> <p>Leonard Chabert Hospital</p> <p>Terrebonne General Hospital</p> <p>Terrebonne Parish Library (Main Branch)</p> <p>Terrebonne Parish School Board Central Office</p> <p>TPCG Consolidated Water Works</p>

Service Package	Service Package Name	Service Package Description	Service Package Status	Included Elements
				TPCG Government Tower
				TPCG IT Office
				TPCG Pollution Control
				TPCG Public Works Division
				TPCG Utilities Division
EM10	Disaster Traveler Information	<p>This service package uses ITS to provide disaster-related traveler information to the general public, including evacuation and reentry information and other information concerning the operation of the transportation system during a disaster. This service package collects information from multiple sources including traffic, transit, public safety, emergency management, shelter provider, and travel service provider organizations. The collected information is processed and the public is provided with real-time disaster and evacuation information using ITS traveler information systems.</p> <p>A disaster will stress the surface transportation system since it may damage transportation facilities at the same time that it places unique demands on these facilities to support public evacuation and provide access for emergency responders. Similarly, a disaster may interrupt or degrade the operation of many traveler information systems at the same time that safety-critical information must be provided to the traveling public. This service package keeps the public informed in these scenarios, using all available means to provide information about the disaster area including damage to the transportation system, detours and closures in effect, special traffic restrictions and allowances, special transit schedules, and real-time information on traffic conditions and transit system performance in and around the disaster.</p> <p>This service package also provides emergency information to assist the public with evacuations when necessary. Information on mandatory and voluntary evacuation zones, evacuation times, and instructions are provided. Available evacuation routes and destinations and current and anticipated travel conditions along those routes are provided so evacuees are prepared and know their destination and preferred evacuation route. Information on available transit services and traveler services (shelters, medical services, hotels, restaurants, gas stations, etc.) is also provided. In addition to general evacuation information, this service package provides specific evacuation trip planning information that is tailored for the evacuee based on origin, selected destination, and evacuee-specified evacuation requirements and route parameters.</p> <p>This service package augments the ATIS service packages that provide traveler information on a day-to-day basis for the surface transportation system. This service package provides focus on the special requirements for traveler information dissemination in disaster situations.</p>	Existing	E911/Office of Emergency Preparedness

Service Package	Service Package Name	Service Package Description	Service Package Status	Included Elements
MC03	Road Weather Data Collection	This service package collects current road and weather conditions using data collected from environmental sensors deployed on and about the roadway (or guideway in the case of transit related rail systems). In addition to fixed sensor stations at the roadside, sensing of the roadway environment can also occur from sensor systems located on Maintenance and Construction Vehicles. The collected environmental data is used by the Weather Information Processing and Distribution service package to process the information and make decisions on operations. The collected environmental data may be aggregated, combined with data attributes and sent to meteorological systems for data qualification and further data consolidation. The service package may also request and receive qualified data sets from meteorological systems.	Planned	DOTD ITS Field Equipment
				DOTD ITS Section
				DOTD Houma TMC
				DOTD New Orleans TMC
				DOTD Sub District 02 Traffic Operations
MC04	Weather Information Processing and Distribution	This service package processes and distributes the environmental information collected from the Road Weather Data Collection service package. This service package uses the environmental data to detect environmental hazards such as icy road conditions, high winds, dense fog, etc. so system operators and decision support systems can make decision on corrective actions to take. The continuing updates of road condition information and current temperatures can be used by system operators to more effectively deploy road maintenance resources, issue general traveler advisories, issue location specific warnings to drivers using the Traffic Information Dissemination service package, and aid operators in scheduling work activity.	Planned	DOTD Houma TMC
				DOTD ITS Section
				DOTD New Orleans TMC
				DOTD Sub District 02 Traffic Operations
MC07	Roadway Maintenance and Construction	This service package supports numerous services for scheduled and unscheduled maintenance and construction on a roadway system or right-of-way. Maintenance services would include 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 on the roadway (e.g., signs, traffic controllers, traffic detectors, dynamic message signs, traffic signals, CCTV, etc.). Environmental conditions information is also received from various weather sources to aid in scheduling maintenance and construction activities.	Existing	DOTD ITS Section
				DOTD Houma TMC
				DOTD New Orleans TMC
				DOTD Sub District 02 Traffic Operations
MC08	Work Zone Management	This service package manages work zones, controlling traffic in areas of the roadway where maintenance, construction, and utility work activities are underway. Traffic conditions are monitored using CCTV cameras and controlled using dynamic message signs (DMS), Highway Advisory Radio (HAR), gates and barriers. Work zone information is coordinated with other groups (e.g., ISP, traffic management, other maintenance and construction centers). Work zone speeds and delays are provided to the motorist prior to the work zones. This service package provides control of field equipment in all maintenance and construction areas, including fixed, portable,	Planned	DOTD ITS Field Equipment
				DOTD ITS Section
				DOTD Houma TMC
				DOTD New Orleans TMC

Service Package	Service Package Name	Service Package Description	Service Package Status	Included Elements
		and truck-mounted devices supporting both stationary and mobile work zones.		DOTD Sub District 02 Traffic Operations
MC12	Infrastructure Monitoring	This service package monitors the condition of pavement, bridges, tunnels, associated hardware, and other transportation-related infrastructure (e.g., culverts) using both fixed and vehicle-based infrastructure monitoring sensors. Fixed sensors monitor vibration, stress, temperature, continuity, and other parameters and mobile sensors and data logging devices collect information on current infrastructure condition. This service package also monitors vehicle probes for vertical acceleration data and other probe data that may be used to determine current pavement condition.	Existing	DOTD ITS Field Equipment
				DOTD ITS Section

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## 8 Interfaces between Systems

The interfaces of the transportation systems in Houma-Thibodaux Regional ITS Architecture are based on the National ITS Architecture and tailored to reflect the plan for the region. Architecture diagrams display the transportation systems in the Houma-Thibodaux Regional ITS Architecture, and more importantly, how these systems are and will be connected with one another so information can be exchanged and transportation services can be coordinated. Stakeholders may use these diagrams to identify integration opportunities. Each system in the region is represented with one of two types of diagrams: a context diagram or element specific architecture flow context diagram, both described below.

A context diagram shows a particular system and all other systems with which it shares information. Interconnects are represented as single lines and indicate information sharing without specifying the type of information being shared or the direction of the information movement. Architecture flow diagrams show the information (i.e. architecture flows) movement between the various systems. Descriptions of the architecture flow definitions are included in **Appendix A**. The architecture flows and context diagrams are included in **Appendix B**.

Information about the interfaces of the systems in the region is contained in the Turbo Architecture™ database. Turbo Architecture™ can be used to create tailored interconnect and architecture flow diagrams for any system in the database.

## 9 Operational Concept

The Operational Concept lists the roles and responsibilities (RR) that each participating agency must take on to provide the ITS services included in the ITS Architecture. Changing needs may arise that will require an agreement to be formed between all affected parties that defines new or additional roles. Defining the roles and responsibilities of the participating stakeholders in the region and the willingness of agencies to accept their roles and responsibilities is an important step in realizing the common goal of an interoperable ITS system throughout the region.

The *Louisiana Statewide ITS Implementation and Telecommunications Plan* details the operational responsibilities of stakeholders under three (3) distinct operational regimes and the primary agency responsible for operations. These are normal, incident and emergency operations with LADOTD, LSP and GOHSEP respectively as the primary agency responsible for operations. **Table 5** summarizes the roles and responsibilities of each stakeholder for the Houma-Thibodaux Regional ITS architecture.

**Table 6: Operational Concept**

RR Area Name	Stakeholder	RR Description	RR Status
Archived Data System	City of Thibodaux	Incident response	Existing
	City of Thibodaux	crash data collection	
	LADOTD	Traffic data collection	
	LADOTD	Traffic operations	
	South Central Planning and Development Commission, MPO	Archive data management	
		Transportation planning	
Arterial Management	LADOTD	Event monitoring	Existing
		Infrastructure monitoring	
		Motorist information system	
		Traffic data collection	
Emergency Management	City of Thibodaux	Incident response	Existing
		Incident management	
	LADOTD	Event monitoring	
		Infrastructure monitoring	
		Traffic control	
	Leonard J Chabert Medical Center	Medical response	
	Louisiana State Police (Troop C)	Emergency response	
Incident Management	City of Thibodaux	Incident management	Existing
		Incident response	
	LADOTD	Event monitoring	
		Infrastructure monitoring	
		Motorist information systems	
		Traffic control	
		Traffic data collection	
	Leonard J Chabert Medical Center	Medical response	

RR Area Name	Stakeholder	RR Description	RR Status
	Louisiana State Police (Troop C)	Emergency response	
		Incident response	
		Traffic control	
	Media	Motorist information	
	Public	End user of traveler information	
	South Central Planning and Development Commission, MPO	Transportation planning	
	Terrebonne General Medical Center	Medical response	
Maintenance and Construction	City of Thibodaux	Surface street maintenance and construction	Existing
		Infrastructure monitoring	
		ITS Field Equipment maintenance and construction	
		Traffic signal system maintenance and construction	
		ITS Software and hardware maintenance	
		Roadway maintenance and construction	
	South Central Planning and Development Commission, MPO	Archive data management	
Surface Street Management	LADOTD	Traffic operations	Existing
	Media	Motorist information	
	South Central Planning and Development Commission, MPO	Traffic data collection	
	South Central Planning and Development Commission, MPO	Transportation planning	
Transit Management	Local Public Safety Agencies	Transit security and emergency response	Existing
	Media	Transit traveler information	
	Public	Recipient of transit information for travel decision making	
	Terrebonne Parish Consolidated Government	Coordination of emergency evacuation with Good Earth Transit	
		Planning, operations and management of transit system	
Traveler Information	LADOTD	Motorist information systems	Existing
	Media	Motorist information	
	Public	End user of traveler information	

## 9.1 ITS Deployment Plan – Sequence of Planned Projects

The Houma-Thibodaux Regional ITS Architecture is ultimately implemented one ITS project at a time. **Table 6** lists the projects that have been identified as part of the regional ITS architecture definition. The Turbo Architecture database includes further details of some projects and detailed schematics are also presented in **APPENDIX C**.



Table 7: Projects Sequence

Name	Description	Service Scope	Geographic Scope	Priority	Service Packages	Design Cost			Capital Cost			O&M			Total Cost		
LA 57 Grand Caillou Road Signal Upgrades and Fiber Optic	Fiber and Traffic Signal System Upgrades and Communication	Upgrade includes support poles, cabinets, controllers, detection, wiring, indications, signage, fiber optic communication, software and integration.	Extending ITS network from Van to Industrial with signal improvements at the following intersections: -Industrial Blvd -Moffet Rd -Oaklawn Rd -Prospect Blvd -East St -Elysian Dr -Jane Ave -Patterson St -Van Ave	1	ATMS03 ATMS07	\$ 91,200.00	-	\$ 174,000.00	\$1,824,000.00	-	\$ 2,174,000.00	\$ 273,600.00	-	\$ 543,500.00	\$ 2,188,800.00	-	\$ 2,891,500.00
LA 3040 Signal Upgrades and Fiber Optic	Fiber and Traffic Signal System Upgrades and Communication	This project includes upgrade of traffic signal equipment, fiber optic or wireless communication, head end management equipment and software	Extend fiber optic network and signal improvements at the following intersections: -Savanne Rd - Enterprise Dr - Hollywood Rd - Corporate Dr - St. Charles St - Polk St - Lafayette St -Goode St - Roussel St - Barrow St	1	ATMS03 ATMS07	\$ 175,350.00	-	\$ 327,200.00	\$3,507,000.00	-	\$ 4,090,000.00	\$ 526,050.00	-	\$ 1,022,500.00	\$ 4,208,400.00	-	\$ 5,439,700.00
LA 311 Signal Upgrades	Fiber and Traffic Signal System Upgrades and Communication	This project includes upgrade of traffic signal equipment, fiber optic or wireless communication, head end management equipment and software	Extend fiber optic network and improve signals at the following intersections: -Equity Blvd - Hollywood Rd - Mystic Blvd - St. Charles St - Polk St - Lafayette St - Barrow St	1	ATMS03 ATMS07	\$ 84,650.00	-	\$ 157,200.00	\$1,693,000.00	-	\$ 1,965,000.00	\$ 253,950.00	-	\$ 491,250.00	\$ 2,031,600.00	-	\$ 2,613,450.00
DOTD-3040 Tunnel ITS Deployment	Deploy ITS equipment and communications	This project will include CCTV cameras and communication using fiber optic or wireless and integration with the TMC	Install conduit and fiber optic communication in 3040 Tunnel with CCTV cameras for surveillance and incident detection	1	ATMS01 ATMS07	\$2,250.00	-	\$4,000.00	\$45,000.00	-	\$50,000.00	\$6,750.00	-	\$12,500.00	\$54,000.00	-	\$66,500.00

Name	Description	Service Scope	Geographic Scope	Priority	Service Packages	Design Cost			Capital Cost			O&M			Total Cost		
Houma Phase V	Deploy CCTV Cameras and DMS equipment	This project covers the deployment of CCTV Cameras and DMS with communications using either wireless or fiber optic	3040 WB prior to tunnel (static with flashes) US 90 DMS WB prior to LA 316 (full size DMS) US 90 DMS EB prior to LA 311 (full size DMS) LA 311 SB prior to Savanne Road (smaller DMS) LA 182 DMS SB prior to LA 3087 (small size) LA 24 SB prior to LA 660 (smaller DMS)	1	ATMS01 ATMS07 ATIS01	\$89,250.00	-	\$157,080.00	\$1,785,000.00	-	\$1,963,500.00	\$267,750.00	-	\$490,875.00	\$2,142,000.00	-	\$2,611,455.00
Houma CCTV Cameras	Provide CCTV to facilitate traffic surveillance especially during hurricane evacuation	The project is envisioned to include closed circuit television cameras and communications, whether wireless or fiber optic and integration to the TMC	LA 57 LA 3040 LA 3185 @ LA 1 LA 20 @ Gerald T Peltier Drive	1	ATMS01 ATMS06 ATMS07	\$60,000.00	-	\$115,200.00	\$1,200,000.00	-	\$1,440,000.00	\$180,000.00	-	\$360,000.00	\$1,440,000.00	-	\$1,915,200.00
Backbone Fiber Optic Connection to LONI	This project will install fiber optic communication from the hub at Schriever to a new hub near US 90	Construct new hub building near US 90, install new fiber optic communication with integration to LONI	Pull fiber through existing conduit along LA 24 and construct new hub building	2	ATMS07	\$ 56,000.00	-	\$ 94,000.00	\$ 1,107,000.00	-	\$ 1,163,000.00	\$ 167,000.00	-	\$ 291,000.00	\$ 1,330,000.00	-	\$ 1,548,000.00
Houma Transit	Deploy Automated Vehicle Location system for transit vehicles and signal preemption	This project will include provision of real time vehicle tracking system and scheduling/dispatch software. Improvements in transit schedule adherence through signal preemption.	Good Earth Transit	2	APTS01 APTS02	\$12,500.00	-	\$60,000.00	\$250,000.00	-	\$750,000.00	\$37,500.00	-	\$187,500.00	\$300,000.00	-	\$997,500.00
Houma Police Department Fiber Optic Communication	Upgrade Communications	Installation of fiber optic and integration with LONI network	Fiber optic drop cable connection from proposed fiber on LA 3040 to Houma Police Department and integration into LONI network.	2	ATMS07	\$750.00	-	\$1,600.00	\$15,000.00	-	\$20,000.00	\$2,250.00	-	\$5,000.00	\$18,000.00	-	\$26,600.00
Emergency Vehicle Signal Preemption	Upgrade existing emergency vehicle detection systems to GPS based systems to facilitate emergency routing.	Detection and communication	Signalized intersections within city limits	2	ATMS01 ATMS03	\$267,900.00	-	\$445,760.00	\$5,358,000.00	-	\$5,572,000.00	\$803,700.00	-	\$1,393,000.00	\$6,429,600.00	-	\$7,410,760.00
TMC Backup at SCPDC	Provide a console to monitor ITS devices during emergencies	This project will provide a back up console for traffic surveillance, incident detection and coordination of traffic incident management and traveler information during emergencies	TMC Console at SCPDC and integration	2	ATMS01 ATMS06 ATMS07 ATMS08	\$2,500.00	-	\$4,400.00	\$50,000.00	-	\$55,000.00	\$7,500.00	-	\$13,750.00	\$60,000.00	-	\$73,150.00

Name	Description	Service Scope	Geographic Scope	Priority	Service Packages	Design Cost			Capital Cost			O&M			Total Cost		
LA 20 Signal Upgrades and Communication (Thibodaux)	Fiber and Traffic Signal System Upgrades and Communication	This project includes upgrade of traffic signal equipment, fiber optic or wireless communication, head end management equipment and software	Improve signals and communication on LA 20 from LA 1 to Thibodaux City limits. 6 Signals with TS2 controllers and communication, -LA 308 - LA 1 - Glenwild Dr - Melrose Dr - Rienzi Dr - Rue Loudun	3	ATMS03 ATMS07	\$ 51,450.00	-	\$ 97,920.00	\$1,029,000.00	-	\$ 1,224,000.00	\$ 154,350.00	-	\$ 306,000.00	\$ 1,234,800.00	-	\$ 1,627,920.00
LONI	Upgrade communications	This project will include provision of fiber optic communication and connections to existing LONI network	Fiber optic on LA 1 through downtown Thibodaux to Shriever and LA 1/20. Use connection at Nicolas LA 1/20 (LONI) connection	3	ATMS07	\$ 55,350.00	-	\$ 93,040.00	\$1,107,000.00	-	\$ 1,163,000.00	\$ 166,050.00	-	\$ 290,750.00	\$ 1,328,400.00	-	\$ 1,546,790.00
Thibodaux ITS	Deploy ITS equipment and communications	This project covers the deployment of CCTV cameras, DMS and communications using either wireless or fiber optic and intersection improvements along LA 20	CCTV LA 1 @ 308 CCTV at Walmart DMS on LA 20  Thibodaux LA 20 intersections -LA -LA 308 -Rue Loudun -Rienzi Drive -Glenwild Drive	3	ATMS01 ATMS07 ATIS01	\$69,000.00	-	\$126,400.00	\$1,380,000.00	-	\$1,580,000.00	\$207,000.00	-	\$395,000.00	\$1,656,000.00	-	\$2,101,400.00
Lafourche Signal Upgrades and Communication	Signal coordination in the Lafourche area with communication and integration	Upgrade includes support poles, cabinets, controllers, detection, wiring, indications, signage, fiber optic communication or licensed wireless communication and integration.	Lafourche Intersections along LA 1 to tie into existing devices and communications in the Lafourche area	3	ATMS03 ATMS07	\$125,000.00	-	\$220,000.00	\$2,500,000.00	-	\$2,750,000.00	\$375,000.00	-	\$687,500.00	\$3,000,000.00	-	\$3,657,500.00
Chabert Medical Center Fiber Optic	This project will enhance connectivity and reliability of the existing connection to the fiber backbone.	Installation of fiber optic and integration with LONI network	Chabert Medical Center	3	EM08	\$2,250.00	-	\$4,000.00	\$45,000.00	-	\$50,000.00	\$6,750.00	-	\$12,500.00	\$54,000.00	-	\$66,500.00

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## 9.2 Operations and Maintenance of Regional ITS

**Table 8** provides operation and maintenance (O&M) responsibilities that have been identified/assigned to a particular agency for each applicable service package. Although, such O&M arrangements may differ at a project level based on specific agencies involved, the operations and maintenance requirements section under each service package provides guidelines on which agency should assume the maintenance responsibilities for each ITS component.

LADOTD has in place a maintenance plan<sup>2</sup> detailing how ITS devices are maintained. The goal of the plan is to improve the ITS system reliability and maximize benefits while reducing the life cycle cost. In this plan ITS maintenance may be classified in two ways: routine (preventive) maintenance; and responsive maintenance.

Routine (or preventive) maintenance is performed at regularly scheduled intervals to ensure ITS devices are kept in optimal operating conditions during their service life. Routine maintenance aims to identify incipient defects or faults and address them before they occur. Routine maintenance helps to reduce or mitigate the failure of ITS devices. The approach used for routine maintenance typically mimics the manufacturers required schedule and procedures for caring for ITS devices and components. LADOTD has developed a detailed device checklist and standardized reporting for this process and integrated the process into the maintenance management system (MMS). Routine maintenance is also used by LADOTD for system evaluation and systemic change of devices nearing the end of useful life.

Responsive maintenance is used to rectify failures of ITS devices. This may require repair of defective device or replacement of device. The urgency to visit a site for diagnostics and repair is determined by the criticality of the site or device for operations which LADOTD determines in advance as high, medium or low priority. Responsive maintenance may be flexible and can be deferred until an opportune time to reduce cost and impact. For instance, it may be combined with other work to reduce impact on traffic.

In instances where failed components of devices are critical for operations, immediate repair to restore functionality is used and this is referred to as emergency maintenance. Emergency maintenance is similar to responsive maintenance and they both share similar criteria except that emergency maintenance is escalated to restore functionality as soon as possible.

## 9.3 ITS Funding

LADOTD ITS Section has a capital budget of \$10 million each year as part of the highway funding program, which is allocated statewide on a prioritized basis depending on need. Ideally, each region receives portions of this money to apply toward ITS needs; however there is currently no dedicated funding source in the associated Transportation Improvement Program (TIP) for the Houma-Thibodaux region. As part of the follow-up to this architecture effort, it is recommended that the SCPDC, being the regional planning entity, work together with LADOTD and the other Houma-Thibodaux stakeholders to pursue funding sources for the ITS deployment within the region.

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<sup>2</sup> *ITS Maintenance Plan (August 2010)*

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## **10 Architecture Maintenance Plan**

This section discusses the proposed Maintenance Plan for the regional ITS Architecture.

FHWA's Final Rule on ITS Architecture and Standards (23 CFR Part 940) requires development of an architecture maintenance plan. Paragraph 940.9 (f) states that:

"The agencies and other stakeholders participating in the development of the regional ITS architecture shall develop and implement procedures and responsibilities for maintaining it, as needs evolve within the region."

In January 2004, FHWA issued guidance for developing and maintaining regional ITS infrastructure ([http://ops.fhwa.dot.gov/its\\_arch\\_imp/guidance.htm](http://ops.fhwa.dot.gov/its_arch_imp/guidance.htm)). The Maintenance Plan for the Houma-Thibodaux Regional ITS Architecture is based on the guidelines provided by FHWA's White Paper 1 on what should be contained in an architecture maintenance plan in order to be compliant with FHWA requirements. The White Paper on this subject is available at [http://ops.fhwa.dot.gov/its\\_arch\\_imp/policy\\_1.htm](http://ops.fhwa.dot.gov/its_arch_imp/policy_1.htm). This report provides some background on the need for architecture maintenance and addresses key issues under the following headings:

Why Maintain a Regional ITS Architecture?

Who Will Maintain the Architecture?

When will the Architecture be updated?

What will be maintained?

How will the Architecture be maintained?

### **10.1 Why Maintain a Regional ITS Architecture**

As ITS projects are implemented, this architecture document will need to be updated to reflect new ITS priorities and strategies that emerge through the transportation planning process. It will also need to be updated to account for expansion in ITS scope and to allow for the evolution and incorporation of new ideas. The goal of the maintenance plan is to guide controlled updates to the regional ITS architecture baseline so that it continues to accurately reflect the region's existing ITS capabilities and future plans.

### **10.2 Who Will Maintain the Architecture?**

Ideally all stakeholders should participate in the architecture maintenance process. In practice, typically, one or two agencies take the lead responsibility to maintain the regional ITS architecture. The primary requirements of the regional architecture maintainer are the mission/authority to perform such functions and the necessary skills to perform the same. The mission of the ITS architecture maintainer most closely resembles a regional planning body that, as consistent with its mission, has the authority to initiate, update, and document changes in regional planning documents. For the Houma-Thibodaux ITS Architecture, the LADOTD will assume the role of the ITS Architecture keeper and maintainer as indicated in Section 3.4.

Architecture maintenance is recurring, and is a necessary long-term effort. To be effective in ITS architecture maintenance, LADOTD will need to have staff that:

Is knowledgeable of the existing regional ITS architecture. This implies a detailed technical understanding of the various parts of the architecture and how changes would affect each part.

Has an understanding of transportation systems in the region. This understanding can reside jointly in the group of agencies/ stakeholders who participate in the maintenance process.

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Has an understanding of the tools used to create (and to update) the architecture. This might include, for example, knowledge of the Turbo Architecture™ tool, if that is used to hold some of the architecture information.

As the agency with the lead responsibility for maintaining the architecture, LADOTD needs to have the skills within its own organization and/or use a qualified consultant. In either case, the agency needs the necessary funding to support the maintenance effort. Although LADOTD will lead the architecture maintenance activities, like all other regional planning activities, ITS architecture maintenance will take close coordination between other major stakeholders<sup>3</sup> in the region, including:

Louisiana Department of Transportation and Development (LADOTD) District 02

LADOTD ITS Section

TPCG

Louisiana State Police (Troop C)

South Central Planning and Development Commission

Following this architecture adoption by the MPO, it is recommended that the Regional ITS Architecture Maintenance Committee meet at least once a year to:

Review progress in ITS implementation projects

Verify that the regional ITS architecture Turbo Architecture™ source file is kept up to date with the region's ITS projects

Update plans for future deployments by each regional stakeholder

Review changes in State and National ITS Architectures, regulations, and requirements, if any

Determine any needs for an update to the Houma-Thibodaux Regional ITS Architecture

### **10.3 When will the architecture be updated?**

The regional ITS architecture is not static. It must change as plans change, as ITS projects are implemented, and as the ITS needs and services evolve in the region.

At a minimum, the regional ITS architecture will be reviewed annually by the Regional ITS Architecture Maintenance Committee. The Regional ITS Architecture Maintenance Committee may meet and perform architecture updates more frequently to keep with the pace of the region's ITS implementation. Annual or more frequent updates will include integrating completed projects into the regional ITS architecture Turbo Architecture™ source file. A one page summary of the change will be added as an appendix to the regional ITS architecture document.

Regardless of the frequency selected for periodic updates, it is recommended that the Committee recognize the potential need for "Exception Maintenance" to occur in the event of major project implementations, major revisions to the National ITS Architecture, or to meet the requirements of future regulations.

It is recommended that the regional ITS architecture is fully updated every five years, prior to the periodic updating of the Regional Transportation Improvement Program (TIP), which occurs once a year.

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<sup>3</sup> Note – Other stakeholders may be included as necessary based on ITS development and deployment activities.

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Upon recommendation of the Regional Architecture Maintenance Committee, the MPO Technical Advisory Committee will make a resolution to accept any revisions/changes/updates to the ITS architecture.

The following list includes many of the events that may cause change to a regional ITS architecture:

#### **10.3.1 Changes in Regional Needs**

Regional ITS architectures are created to support transportation planning in addressing regional needs. Over time these needs can change and the corresponding aspects of the regional ITS architecture that addresses these needs may need to be updated. These changes in needs should be expressed in updates to planning documents such as the Regional Transportation Plan.

#### **10.3.2 New Stakeholders**

Regional ITS architectures are created to support transportation planning in addressing regional needs. Over time these needs can change and the corresponding aspects of the regional ITS architecture that addresses these needs may need to be updated. These changes in needs should be expressed in updates to planning documents such as the Regional Transportation Plan.

#### **10.3.3 Changes in scope of service considered**

The range of services considered by the regional ITS architecture expands. This might happen because the National ITS Architecture has been expanded and updated to include new user services or to better define how existing elements satisfy the user services. The National ITS Architecture may have expanded to include a user service that has been discussed in a region, but not in the regional ITS architecture, or was included in only a very cursory manner. Changes in the National ITS Architecture are not of themselves a reason to update a regional ITS architecture, but a region may want to consider any new services in the context of their regional needs.

#### **10.3.4 Changes in stakeholder of element names**

An agency's name or the name used to describe their element(s) undergoes change. Transportation agencies occasionally merge, split, or just renames them. In addition, element names may evolve as projects are defined. The regional ITS architecture should be updated to use the current, correct names for both stakeholders and elements.

#### **10.3.5 Changes in other architectures**

A regional ITS architecture covers not only elements and interfaces within a region, but also interfaces to elements in adjoining regions. Changes in the regional ITS architecture in one region may necessitate changes in the architecture in an adjoining region to maintain consistency between the two. Architectures may also overlap (e.g. a statewide ITS architecture and a regional ITS architecture for a region within the state) and a change in one might necessitate a change in the other.

There are several changes relating to project definition that will cause the need for updates to the regional ITS architecture.

#### **10.3.6 Changes due to Project Definitions or Implementation**

When actually defined or implemented, a project may add, subtract or modify elements, interfaces, or information flows from the regional ITS architecture. Because the regional ITS architecture is meant to describe the current, as well as future, regional implementation of ITS, it must be updated to correctly reflect how the developed projects integrate into the region.

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### **10.3.7 Changes due to Project Addition/Deletion**

Occasionally a project will be added or deleted through the planning process, or through project delivery, and some aspects of the regional ITS architecture that are associated with the project may be expanded, changed, or removed.

### **10.3.8 Changes in Project Priority**

Due to funding constraints, or other considerations, the planned project sequencing may change. Delaying a project may have a ripple effect on other projects that depend on it. Raising the priority for a project's implementation may impact other projects that are related to it.

## **10.4 What will be maintained?**

Those constituent parts of a regional ITS architecture that will be maintained are referred to as the "baseline." This section considers the different "parts" of the regional ITS architecture and whether they should be a part of the baseline. Baseline parts are annually updated within the regional ITS architecture Turbo file and every five years within the document. The parts discussed are:

- Description of Region
- Participating Agencies and Stakeholders
- Operational Concept
- Agreements
- System Functional Requirements
- Interface Requirements
- ITS Standards
- Sequence of Projects

One of the benefits of a regional ITS architecture is to enable the efficient exchange of information between ITS elements in a region and with elements outside the region. Efficiency refers to the economical deployment of ITS elements and their interfaces. The result of these ITS deployments should be contributions to the safe and efficient operation of the surface transportation network. Each of the components in the regional ITS architecture below have a role in this economy and an appropriate effort should be levied to maintain them.

### **10.4.1 Description of Region**

This description includes the geographic scope, service scope, architecture timeframe and maintainer, and helps frame each of the following parts of a regional ITS architecture. Geographic scope defines the ITS elements that are "in" the region, although additional ITS elements outside the region may be needed to be described if they communicate ITS information to elements inside the region. Service scope defines which services are included in a regional ITS architecture. Architecture timeframe is the time (in years) into the future that the regional ITS architecture will consider.

### **10.4.2 List of Stakeholders**

Stakeholders are of great importance to the definition of the architecture. Within a region, they may consolidate or separate and such changes should be reflected in the architecture. Furthermore, stakeholders that have not been engaged in the past may be approached through outreach to be sure that the regional ITS architecture represents their ITS requirements as well. The stakeholders should be described in architecture documentation (and may also reside in a database representing aspects of the regional ITS architecture). Their listing and description should be part of the baseline.



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#### **10.4.3 Operational Concepts**

It is crucial that the operational concepts which might be represented as roles and responsibilities or as customized market packages in a regional ITS architecture accurately represent the consensus vision of how the stakeholders want their ITS to operate for the benefit of surface transportation users. These should be reviewed and, if necessary, changed to represent both what has been deployed (which may have been shown as “planned” in the earlier version of the regional ITS architecture) and the current consensus view of the stakeholders. Many of the remaining maintenance efforts will depend on the outcome of the changes made here. The operational concept will reside in the architecture documentation and possibly in a diagramming tool if a customized market package approach is used, and should be part of the baseline.

#### **10.4.4 List of ITS Elements**

The inventory of ITS elements is a key aspect of the regional ITS architecture. Changes in stakeholders as well as operational concepts may impact the inventory of ITS elements. Furthermore, recent implementation of ITS elements may change their individual status (e.g. from planned to existing). The list of elements is often contained in architecture documentation and is key information in any architecture database. It is a key aspect of the baseline.

#### **10.4.5 List of Agreements**

One of the greatest values of a regional ITS architecture is to identify where information will cross an agency boundary, which may indicate a need for an agency agreement. An update to the list of agreements can follow the update to the Operational Concept and/or interfaces between elements. The list of agreements will usually be found in the architecture documentation. This listing should be a part of the baseline.

#### **10.4.6 Interfaces between Elements**

Interfaces between elements define the “details” of the architecture. They are the detailed description of how the various ITSs are or will be integrated throughout the timeframe of the architecture. These details are usually held in Turbo Architecture™ source file. They are a key aspect of the architecture baseline and one that will likely see the greatest amount of change during the maintenance process.

#### **10.4.7 System Functional Requirements**

High-level functions are allocated to ITS elements as part of the regional ITS architecture. These can serve as a starting point for the functional definition of projects that map to portions of the regional ITS architecture. This information is he usually held in the Turbo Architecture™ source file.

#### **10.4.8 Applicable ITS Standards**

The selection of standards depends on the information exchange requirements. In addition, the maintenance process should consider how ITS standards may have evolved and matured since the last update and consider how any change in the “standards environment” may impact previous regional standards choices (especially where competing standards exist). For example, if Extensive Markup Language (XML) based Center-To-Center standards reach a high level of maturity, reliability, and cost-effectiveness, then a regional standards technology decision may be made to transition from investments in other standards technologies (e.g. Common Object Request Broker Architecture (CORBA) to XML). The description of the standards environment for the region, as well as the details of which standards apply to the architecture, should be part of the baseline.

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#### **10.4.9 Project Sequencing**

While project sequencing is partly determined by functional dependencies (e.g. “surveillance” must be a precursor to “traffic management”), the reality is that most project sequences are local policy decisions. Project sequences should be reviewed to make sure that they are in line with current policy decisions. Furthermore, policy makers should be informed of the sequences and their input should be sought to make the project sequences coincide with their expectations. This is crucial to eliminate the possibility of the regional ITS architecture becoming irrelevant. The project sequencing should be included in the architecture documentation and may also be held in a spreadsheet or database.

#### **10.5 How will the architecture be maintained?**

LADOTD ITS Section (Section 56) will oversee and ensure that the regional architecture is maintained. LADOTD will utilize its contracted consulting services contract for ITS Traffic Incident Management (TIM) Program TMC Operations Staffing and Systems Engineering Support for this effort. The guidelines contained within FHWA’s Regional ITS Architecture Maintenance White Paper will be helpful in guiding the maintenance effort. In addition to detailing the recommended maintenance process, the White Paper also contains examples of Maintenance Plans developed by a range of agencies and regions throughout the country.

## 11 Functional Requirements

Each ITS system operated by the stakeholders must perform certain functions to effectively deliver the ITS services desired by the region. The primary functions that each system needs to perform are broadly defined in the Houma-Thibodaux Regional Architecture. The high-level requirements are grouped into functional areas that identify requirements associated with each selected ITS service.

**Table 8: Functional Requirements (Sample)**

Element Name	Entity Name	Functional Area	Requirement ID	Requirement	Status
DOTD Sub District 02 Traffic Operations	Roadway Subsystem	Roadway Basic Surveillance	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	Planned
			2	The field element shall collect, process, and send traffic images to the center for further analysis and distribution	Planned
			3	The field element shall collect, digitize, and send multimodal crossing and high occupancy vehicle (HOV)	Not Planned
			4	The field element shall return sensor and CCTV system operational status to the controlling center	Planned
			5	The field element shall return sensor and CCTV system fault data to the controlling center for repair	Planned
For the entire table of functional requirements, see the regional ITS architecture Turbo Architecture source file.					

## 12 ITS Standards

Standardizing the flow of information between the systems is essential to cost-effectively integrating ITS throughout the region. ITS standards are fundamental to the establishment of an open ITS environment that achieves the goal of interoperability for ITS. Standards facilitate deployment of interoperable systems at local, regional, and national levels without impeding innovation as technology advances and new approaches evolve.

Establishing standards for exchanging information among ITS systems is important not only from an interoperability point of view; it also provides interchangeability and expandability thereby reducing risk and cost. Since an agency using standardized interfaces can select among multiple vendors for products and applications, competition is maintained and prices are lower in the long term.

Standards Development Organizations (SDO) are developing ITS standards that support interoperability and interchangeability. Several of the communication standards overlap in applicability. This provides flexibility in the design of ITS systems allowing agencies to choose the most applicable standard for their needs. Before systems are designed, all stakeholders involved in the applicable ITS service(s) should decide upon the standards and their specifics that will be used. Once a decision is made, all future systems should use the agreed upon standards.

**Table 9: Applicable ITS Standards**

SDO	Document ID	Standard Title	Standard Type	User Defined
AASHTO/ITE	ITE TMDD	Traffic Management Data Dictionary (TMDD) and Message Sets for External Traffic Management Center Communications (MS/ETMCC)	Message/Data	No
AASHTO/ITE/NEMA	NTCIP 1201	Global Object Definitions	Message/Data	No
AASHTO/ITE/NEMA	NTCIP 1202	Object Definitions for Actuated Traffic Signal Controller (ASC) Units	Message/Data	No
AASHTO/ITE/NEMA	NTCIP 1203	Object Definitions for Dynamic Message Signs (DMS)	Message/Data	No
AASHTO/ITE/NEMA	NTCIP 1204	Object Definitions for Environmental Sensor Stations (ESS)	Message/Data	No
AASHTO/ITE/NEMA	NTCIP 1205	Object Definitions for Closed Circuit Television (CCTV) Camera Control	Message/Data	No
AASHTO/ITE/NEMA	NTCIP 1206	Object Definitions for Data Collection and Monitoring (DCM) Devices	Message/Data	No
AASHTO/ITE/NEMA	NTCIP 1208	Object Definitions for Closed Circuit Television (CCTV) Switching	Message/Data	No
AASHTO/ITE/NEMA	NTCIP 1209	Data Element Definitions for Transportation Sensor Systems (TSS)	Message/Data	No
AASHTO/ITE/NEMA	NTCIP 1210	Field Management Stations (FMS) - Part 1: Object Definitions for Signal System Masters	Message/Data	No
AASHTO/ITE/NEMA	NTCIP 1211	Object Definitions for Signal Control and Prioritization (SCP)	Message/Data	No

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SDO	Document ID	Standard Title	Standard Type	User Defined
AASHTO/ITE/NEMA	NTCIP 1214	Object Definitions for Conflict Monitor Units (CMU)	Message/Data	No
AASHTO/ITE/NEMA	NTCIP C2C	NTCIP Center-to-Center Standards Group	Group	No
AASHTO/ITE/NEMA	NTCIP C2F	NTCIP Center-to-Field Standards Group	Group	No
ASTM	ASTM E2468-05	Standard Practice for Metadata to Support Archived Data Management Systems	Other	No
ASTM	ASTM E2665-08	Standard Specifications for Archiving ITS-Generated Traffic Monitoring Data	Message/Data	No
ASTM/IEEE/SAE	DSRC 5GHz	Dedicated Short Range Communication at 5.9 GHz Standards Group	Group	No
IEEE	IEEE IM	Incident Management Standards Group	Group	No
SAE	ATIS General Use	Advanced Traveler Information Systems (ATIS) General Use Standards Group	Group	No

### 13 Agreements

This section identifies the list of existing and future agreements between each of the stakeholder organizations whose ITS systems were or will be exchanging information generated prior to implementing relevant projects. This list identifies the agreements that should be established but does not define the agreements themselves.

**Table 10: Summary of Agreements**

Agreement Title	Agreement Status	Description	Lead Stakeholder	Associated Stakeholders
Cooperative Endeavor Agreement	Planned	The CEA provides for the ownership and maintenance of certain equipment and establishes guidelines and procedures for the support of any equipment and hardware required to facilitate connection of each Party to the common ITS network, referred to as Houma ITS (HITS), and establish acceptable levels of reliability regarding interruption of service to any other Party on the same shared fiber ring. The HITS network is made available via dedicated fiber optic strands in the Louisiana Department of Transportation and Development (LADOTD) ITS backbone cable, TPCG dedicated fiber optics, and dedicated wireless links.	Terrebonne Parish Consolidated Government	Acadian Ambulance
				Bayou Cane Volunteer Fire Department
				Consolidated Water Works
				Houma Fire Department
				L.E. Fletcher Technical College
				LADOTD
				Leonard J Chabert Medical Center
				South Central Planning and Development Commission, MPO
				Terrebonne General Medical Center
				Terrebonne Parish Communications District
				Terrebonne Parish Consolidated Government
				Terrebonne Parish Library
				Terrebonne Parish School Board

Agreement Title	Agreement Status	Description	Lead Stakeholder	Associated Stakeholders
Houma ITS Network Connections	Existing	DOTD's ITS backbone provides a communications link between the various DOTD district and local agencies' offices. In the Houma area, this network consists primarily of a fiber optic cable backbone with available fiber for numerous field devices and center connections.	LADOTD	Acadian Ambulance
				Bayou Cane Volunteer Fire Department
				L.E. Fletcher Technical College
				Louisiana State Police (Troop C)
				Terrebonne Parish Communications District
				Terrebonne Parish School Board
Network Administration for the Common Intelligent Transportation System (ITS) Communications Network	Existing	DOTD has made available dedicated fiber optic and wireless communications to TPCG and TPCG will serve as the network administration agency for the connected facilities in the Houma-Thibodaux Metropolitan area. TPCG shall be responsible for the system administration and continuous operation of network. TPCG may enter into other agreements with the parties connected to the network and furnish DOTD for review and prior approval.	LADOTD	LADOTD
				Terrebonne Parish Consolidated Government
Wireless Connections	Existing	LADOTD will provide wireless communication between some agencies. Wireless communication requires a minimum of two wireless node sites with transceivers to transmit and receive data. DOTD shall provide the local entities involved in this agreement with the required node communication equipment including but not limited to radio transceiver(s), antenna, cabling, installation and configuration to establish the communication link. This agreement does not provide business network hardware, software, and/or its configuration required for utilizing the established link.	LADOTD	Bayou Cane Volunteer Fire Department
				Leonard J Chabert Medical Center
				Terrebonne Parish Consolidated Government

## APPENDIX A - Architecture Flow Definitions

Flow Name	Flow Description
[general office business data]	This is typical data including reports, plans, time sheets, video conference, VOIP, etc which are required for an agency to conduct business. This may include internet service.
[GIS data request]	Interface with GIS server for obtaining data
[GIS data response]	Raw and/or processed GIS data from GIS server as requested
[security images]	Images provided from security cameras for facility and infrastructure monitoring
alert notification	Notification of a major emergency such as a natural or man-made disaster, civil emergency, or child abduction for distribution to the public. The flow identifies the alert originator, the nature of the emergency, the geographic area affected by the emergency, the effective time period, and information and instructions necessary for the public to respond to the alert. This flow may also identify specific information that should not be released to the public.
alert notification coordination	Coordination of emergency alerts to be distributed to the public. This includes notification of a major emergency such as a natural or man-made disaster, civil emergency, or child abduction for distribution to the public and status of the public notification.
alert status	Information indicating the current status of the emergency alert including identification of the traveler and driver information systems that are being used to provide the alert.
archive requests	A request to a data source for information on available data (i.e. "catalog") or a request that defines the data to be archived. The request can be a general subscription intended to initiate a continuous or regular data stream or a specific request intended to initiate a one-time response from the recipient.
archived data product requests	A user-specified request for archived data products (i.e. data, meta data, or data catalogs). The request also includes information that is used to identify and authenticate the user and support electronic payment requirements, if any.
archived data products	Raw or processed data, meta data, data catalogs and other data products provided to a user system upon request. The response may also include any associated transaction information.
barrier system control	Information used to configure and control barrier systems that are represented by gates, barriers and other automated or remotely controlled systems used to manage entry to roadways.
barrier system status	Current operating status of barrier systems. Barrier systems represent gates, barriers and other automated or remotely controlled systems used to manage entry to roadways. Status of the systems includes operating condition and current operational state.
current asset restrictions	Restrictions levied on transportation asset usage based on infrastructure design, surveys, tests, or analyses. This includes standard facility design height, width, and weight restrictions, special restrictions such as spring weight restrictions, and temporary facility restrictions that are imposed during maintenance and construction.
data collection and monitoring control	Information used to configure and control data collection and monitoring systems.



Flow Name	Flow Description
emergency archive data	Logged emergency information including information that characterizes identified incidents (routine highway incidents through disasters), corresponding incident response information, evacuation information, surveillance data, threat data, and resource information. Content may include a catalog of available information, the actual information to be archived, and associated meta data that describes the archived information.
emergency plan coordination	Information that supports coordination of emergency management plans, continuity of operations plans, emergency response and recovery plans, evacuation plans, and other emergency plans between agencies. This includes general plans that are coordinated prior to an incident and shorter duration tactical plans that are prepared during an incident.
emergency traffic control information	Status of a special traffic control strategy or system activation implemented in response to an emergency traffic control request, a request for emergency access routes, a request for evacuation, a request to activate closure systems, a request to employ driver information systems to support public safety objectives, or other special requests. Identifies the selected traffic control strategy and system control status.
emergency transit schedule information	Information on transit schedule and service changes that adapt the service to better meet needs of responders and the general public in an emergency situation, including special service schedules supporting evacuation.
environmental probe data	Data from vehicle safety and convenience systems that can be used to estimate environmental conditions, including measured air temperature, exterior light status, wiper status, sun sensor status, rain sensor status, traction control status, anti-lock brake status, and other collected vehicle system status and sensor information. The collected data is reported along with the location, heading, and time that the data was collected. Both current data and snapshots of recent events (e.g., traction control or anti-lock brake system activations) may be reported.
environmental sensor data	Current road conditions (e.g., surface temperature, subsurface temperature, moisture, icing, treatment status) and surface weather conditions (e.g., air temperature, wind speed, precipitation, visibility) as measured and reported by fixed and/or mobile environmental sensors. Operational status of the sensors is also included.
environmental sensors control	Data used to configure and control environmental sensors.
evacuation coordination	Coordination of information regarding a pending or in-process evacuation. Includes evacuation zones, evacuation times, evacuation routes, forecast network conditions, and reentry times.
evacuation information	Evacuation instructions and information including evacuation zones, evacuation times, and reentry times.
field device status	Reports from field equipment (sensors, signals, signs, controllers, etc.) which indicate current operational status.
incident command information coordination	Information that supports local management of an incident. It includes resource deployment status, hazardous material information, traffic, road, and weather conditions, evacuation advice, and other information that enables emergency or maintenance personnel in the field to implement an effective, safe incident response.
incident information	Notification of existence of incident and expected severity, location, time and nature of incident. As additional information is gathered and the incident evolves, updated incident information is provided. Incidents include any event that impacts transportation system operation ranging from routine incidents (e.g., disabled vehicle at the side of the road) through large-scale natural or human-caused disasters that involve loss of life, injuries, extensive property damage, and multi-jurisdictional response. This also includes special events, closures, and other planned events that may impact the transportation system.

Flow Name	Flow Description
incident information for media	Report of current desensitized incident information prepared for public dissemination through the media.
incident response coordination	Incident response procedures and current incident response status that are shared between allied response agencies to support a coordinated response to incidents. This flow provides current situation information, including a summary of incident status and its impact on the transportation system and other infrastructure, and current and planned response activities. This flow also coordinates a positive hand off of responsibility for all or part of an incident response between agencies.
incident response status	Status of the current incident response including a summary of incident status and its impact on the transportation system, traffic management strategies implemented at the site (e.g., closures, diversions, traffic signal control overrides), and current and planned response activities.
infrastructure monitoring sensor data	Data read from infrastructure-based sensors that monitor the condition or integrity of transportation infrastructure including bridges, tunnels, interchanges, pavement, culverts, signs, transit rail or guideway, and other roadway infrastructure. Includes sensor data and the operational status of the sensors.
interactive traveler information	Traveler information provided in response to a traveler request. The provided information includes traffic and road conditions, advisories, incidents, payment information, transit services, parking information, weather information, and other travel-related data updates and confirmations.
maint and constr work plans	Future construction and maintenance work schedules and activities including anticipated closures with anticipated impact to the roadway, alternate routes, anticipated delays, closure times, and durations.
resource coordination	Coordination of resource inventory information, specific resource status information, resource prioritization and reallocation between jurisdictions, and specific requests for resources and responses that service those requests.
resource deployment status	Status of resource deployment identifying the resources (vehicles, equipment, materials, and personnel) available and their current status. General resource inventory information and specific status of deployed resources may be included.
resource request	A request for resources to implement special traffic control measures, assist in clean up, verify an incident, etc. The request may poll for resource availability or request pre-staging, staging, or immediate deployment of resources. Resources may be explicitly requested or a service may be requested and the specific resource deployment may be determined by the responding agency.
right-of-way request notification	Notice that a request has occurred for signal prioritization, signal preemption, pedestrian call, multi-modal crossing activation, or other source for right-of-way.
road network conditions	Current and forecasted traffic information, road and weather conditions, and other road network status. Either raw data, processed data, or some combination of both may be provided by this architecture flow. Information on diversions and alternate routes, closures, and special traffic restrictions (lane/shoulder use, weight restrictions, width restrictions, HOV requirements) in effect is included along with a definition of the links, nodes, and routes that make up the road network.
road weather information	Road conditions and weather information that are made available by road maintenance operations to other transportation system operators.
roadside archive data	A broad set of data derived from roadside sensors that include current traffic conditions, environmental conditions, and any other data that can be directly collected by roadside sensors. This data also indicates the status of the sensors and reports of any identified sensor faults.

Flow Name	Flow Description
roadway equipment coordination	The direct flow of information between field equipment. This includes transfer of information between sensors and driver information systems (e.g., DMS, HAR, variable speed limit signs, dynamic lane signs) or control devices (e.g., traffic signals, ramp meters), direct coordination between adjacent control devices, interfaces between detection and warning or alarm systems, and any other direct communications between field equipment.
roadway information system data	Information used to initialize, configure, and control roadside systems that provide driver information (e.g., dynamic message signs, highway advisory radio, beacon systems). This flow can provide message content and delivery attributes, local message store maintenance requests, control mode commands, status queries, and all other commands and associated parameters that support remote management of these systems.
roadway information system status	Current operating status of dynamic message signs, highway advisory radios, beacon systems, or other configurable field equipment that provides dynamic information to the driver.
roadway maintenance status	Summary of maintenance fleet operations affecting the road network. This includes the status of winter maintenance (snow plow schedule and current status).
signal control commands	Control of traffic signal controllers or field masters including clock synchronization.
signal control device configuration	Data used to configure traffic signal control equipment including local controllers and system masters.
signal control plans	Traffic signal timing parameters including minimum green time and interval durations for basic operation and cycle length, splits, offset, phase sequence, etc. for coordinated systems.
signal control status	Operational and status data of traffic signal control equipment including operating condition and current indications.
signal fault data	Faults from traffic signal control equipment.
signal system configuration	Data used to configure traffic signal systems including configuring control sections and mode of operation (time based or traffic responsive).
threat information coordination	Sensor, surveillance, and threat data including raw and processed data that is collected by sensor and surveillance equipment located in secure areas.
traffic flow	Raw and/or processed traffic detector data which allows derivation of traffic flow variables (e.g., speed, volume, and density measures) and associated information (e.g., congestion, potential incidents). This flow includes the traffic data and the operational status of the traffic detectors.
traffic images	High fidelity, real-time traffic images suitable for surveillance monitoring by the operator or for use in machine vision applications.
traffic sensor control	Information used to configure and control traffic sensor systems.
traveler alerts	Traveler information alerts reporting congestion, incidents, adverse road or weather conditions, parking availability, transit service delays or interruptions, and other information that may impact the traveler. Relevant alerts are provided based on traveler-supplied profile information including trip characteristics and preferences.

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Flow Name	Flow Description
traveler archive data	Data associated with traveler information services including service requests, facility usage, rideshare, routing, and traveler payment transaction data. Content may include a catalog of available information, the actual information to be archived, and associated meta data that describes the archived information.
traveler information for media	General traveler information regarding incidents, unusual traffic conditions, transit issues, or other advisory information that has been desensitized and provided to the media.
work zone information	Summary of maintenance and construction work zone activities affecting the road network including the nature of the maintenance or construction activity, location, impact to the roadway, expected time(s) and duration of impact, anticipated delays, alternate routes, and suggested speed limits. This information may be augmented with images that provide a visual indication of current work zone status and traffic impacts.

APPENDIX B - Houma-Thibodaux Regional Architecture Flow and Context Diagrams

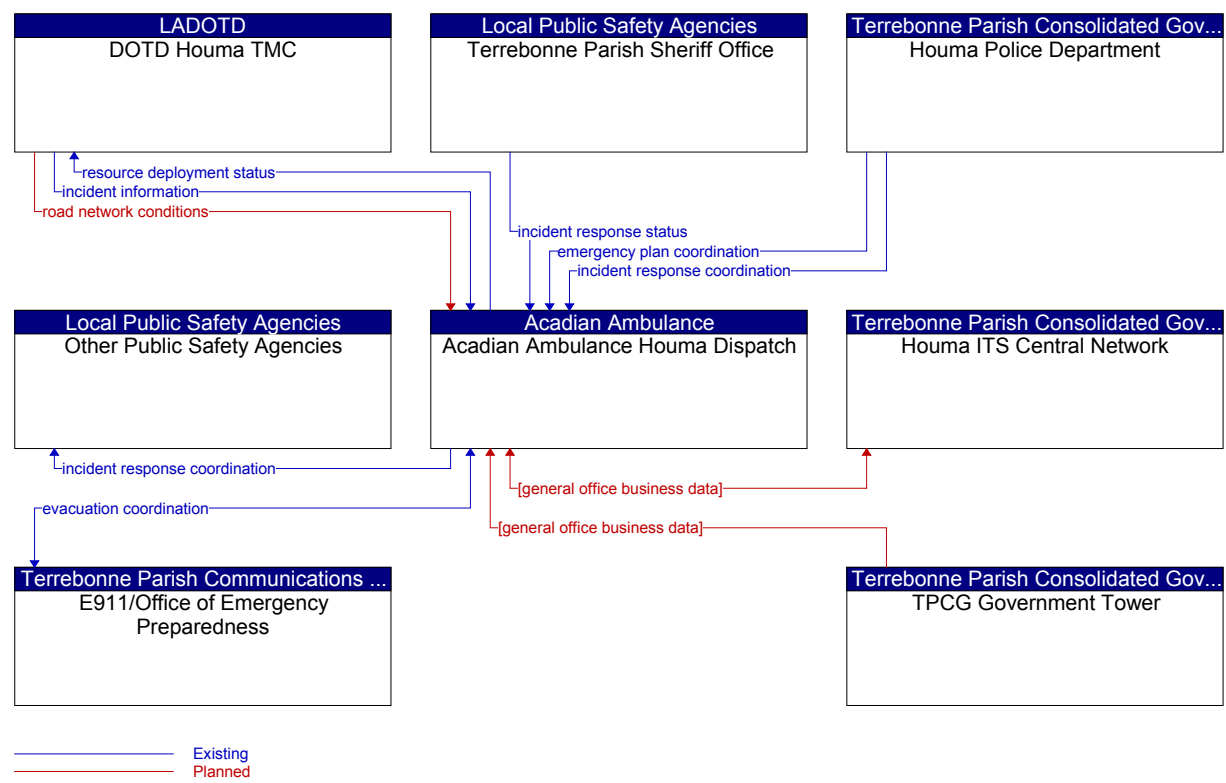


Figure 2: Acadian Ambulance Houma Dispatch Flow Context Diagram

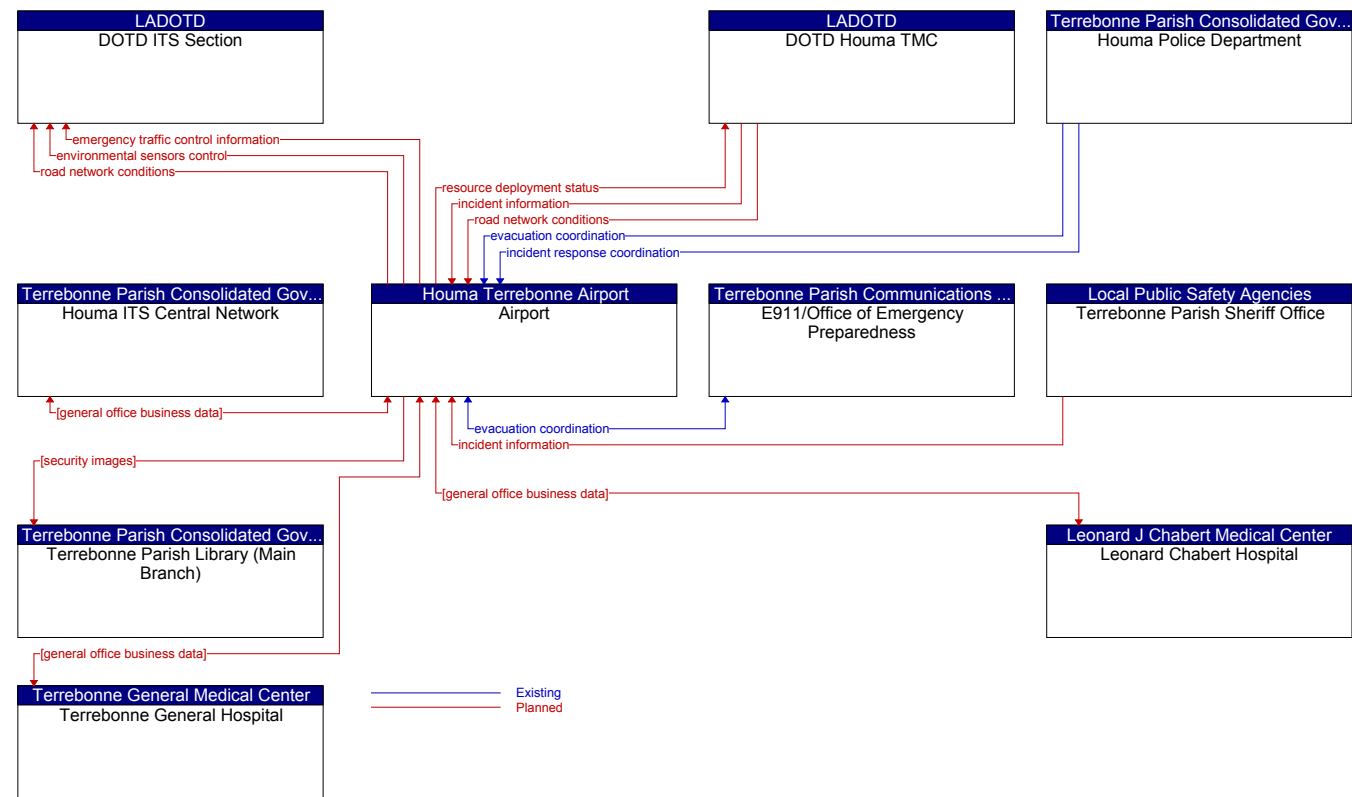


Figure 3: Airport Flow Context Diagram

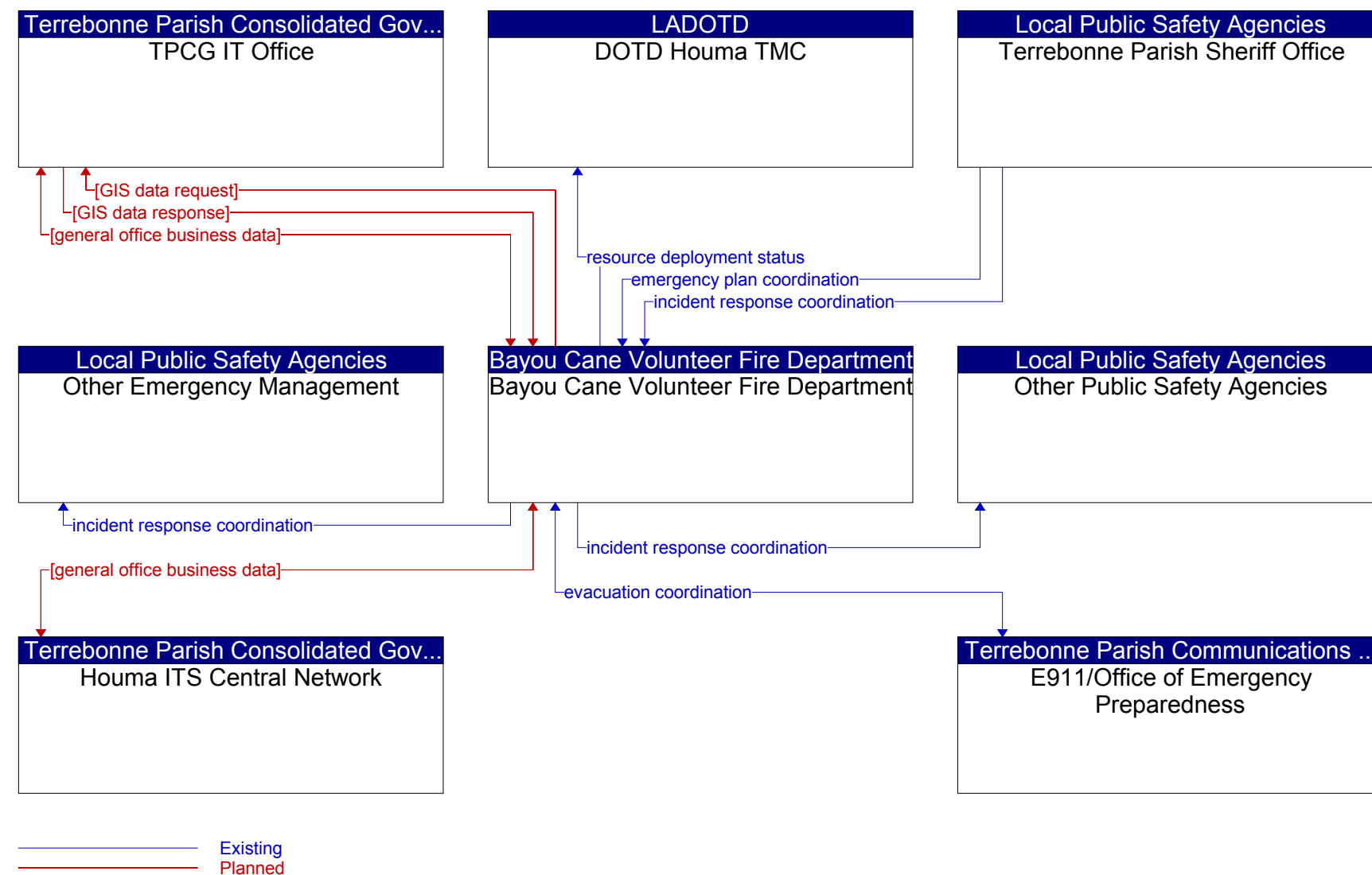


Figure 4: Bayou Cane Volunteer Fire Department Flow Context Diagram

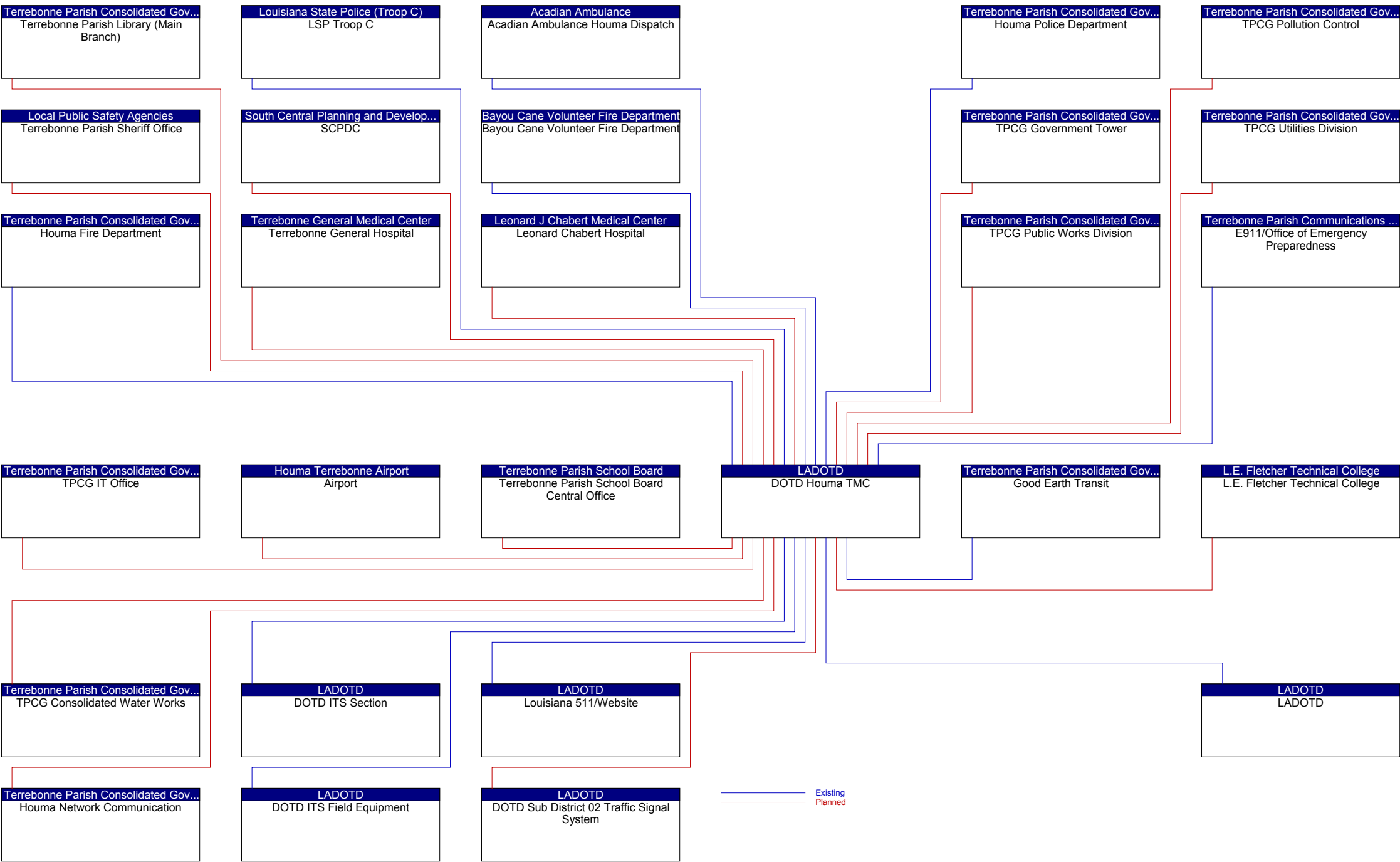


Figure 5: DOTD Houma TMC Interconnect Context Diagram

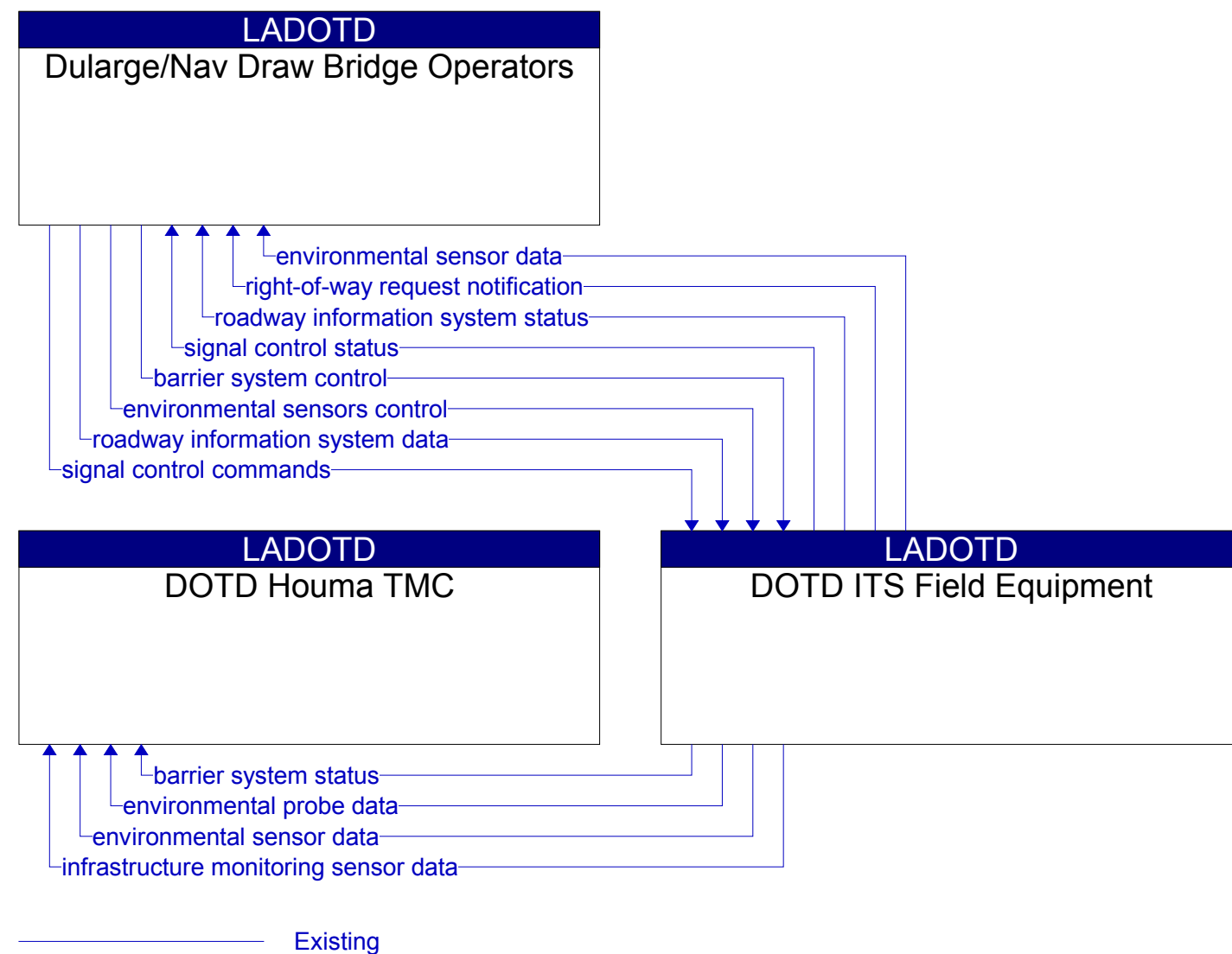


Figure 6: DOTD ITS Field Equipment Flow Context Diagram

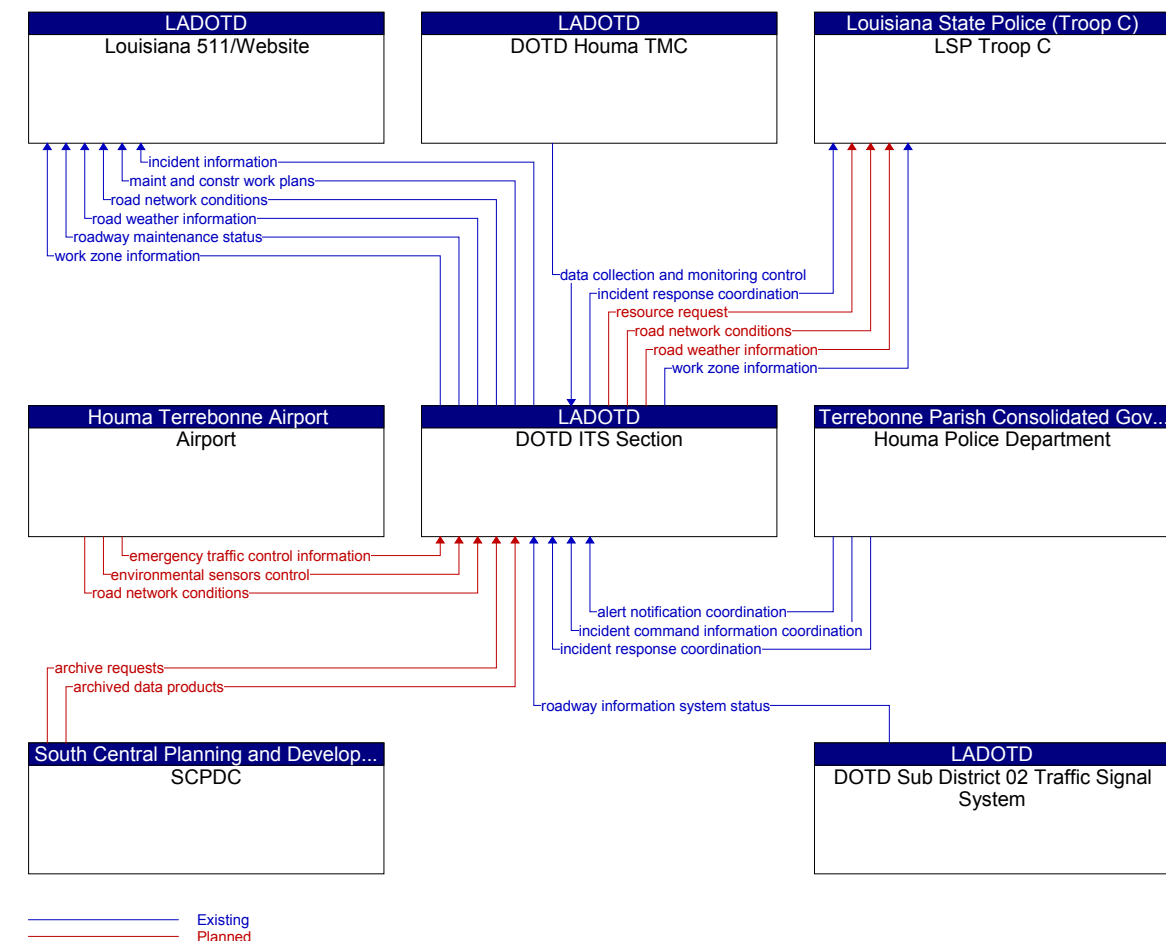


Figure 7: DOTD ITS Section Flow Context Diagram



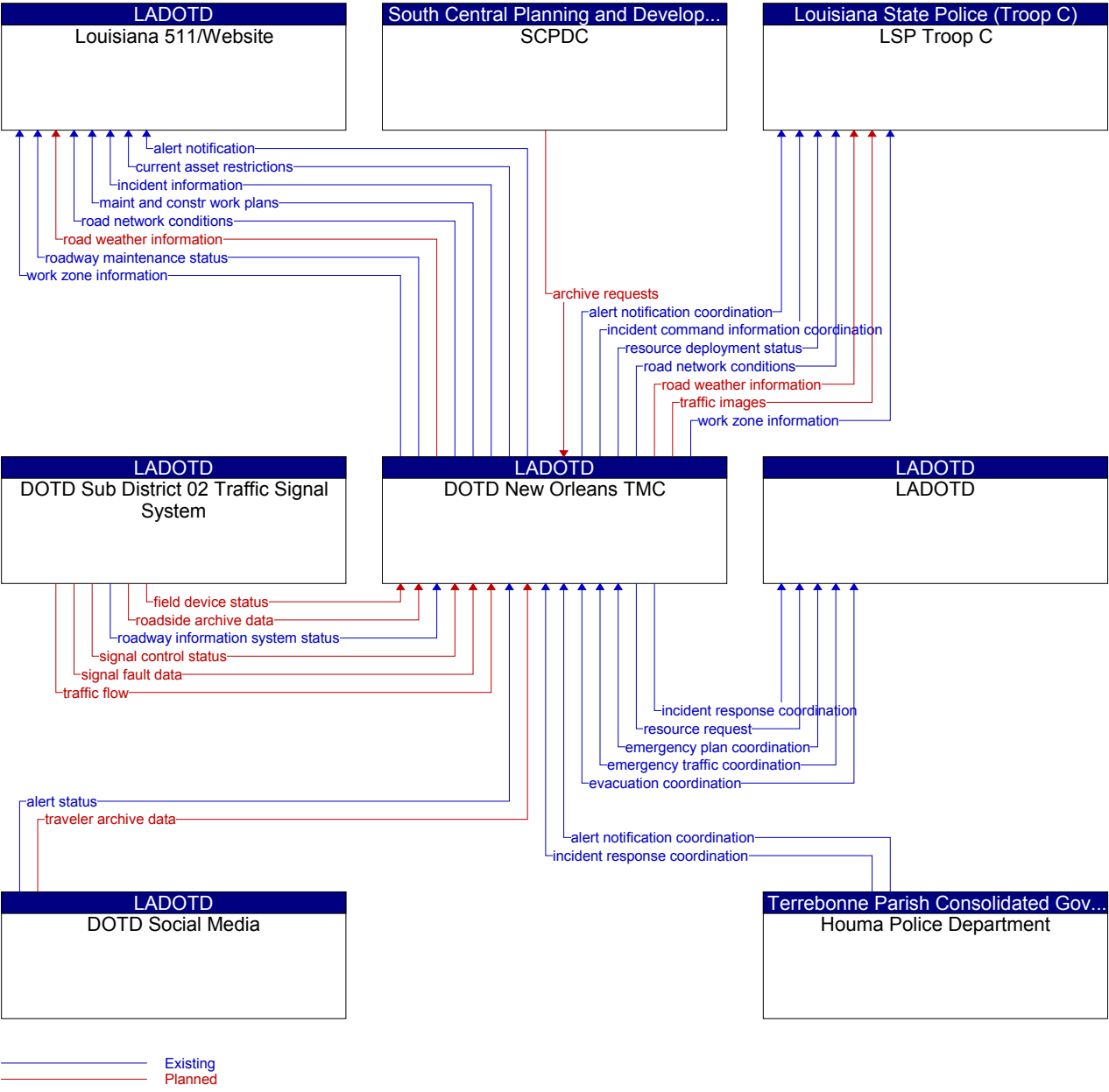


Figure 8: DOTD New Orleans TMC Flow Context Diagram

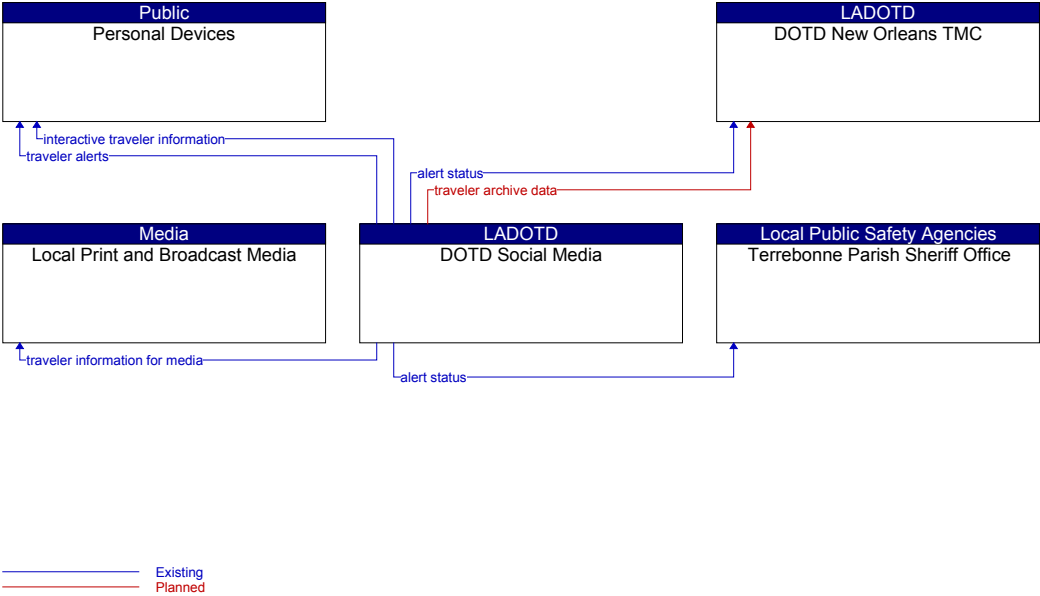
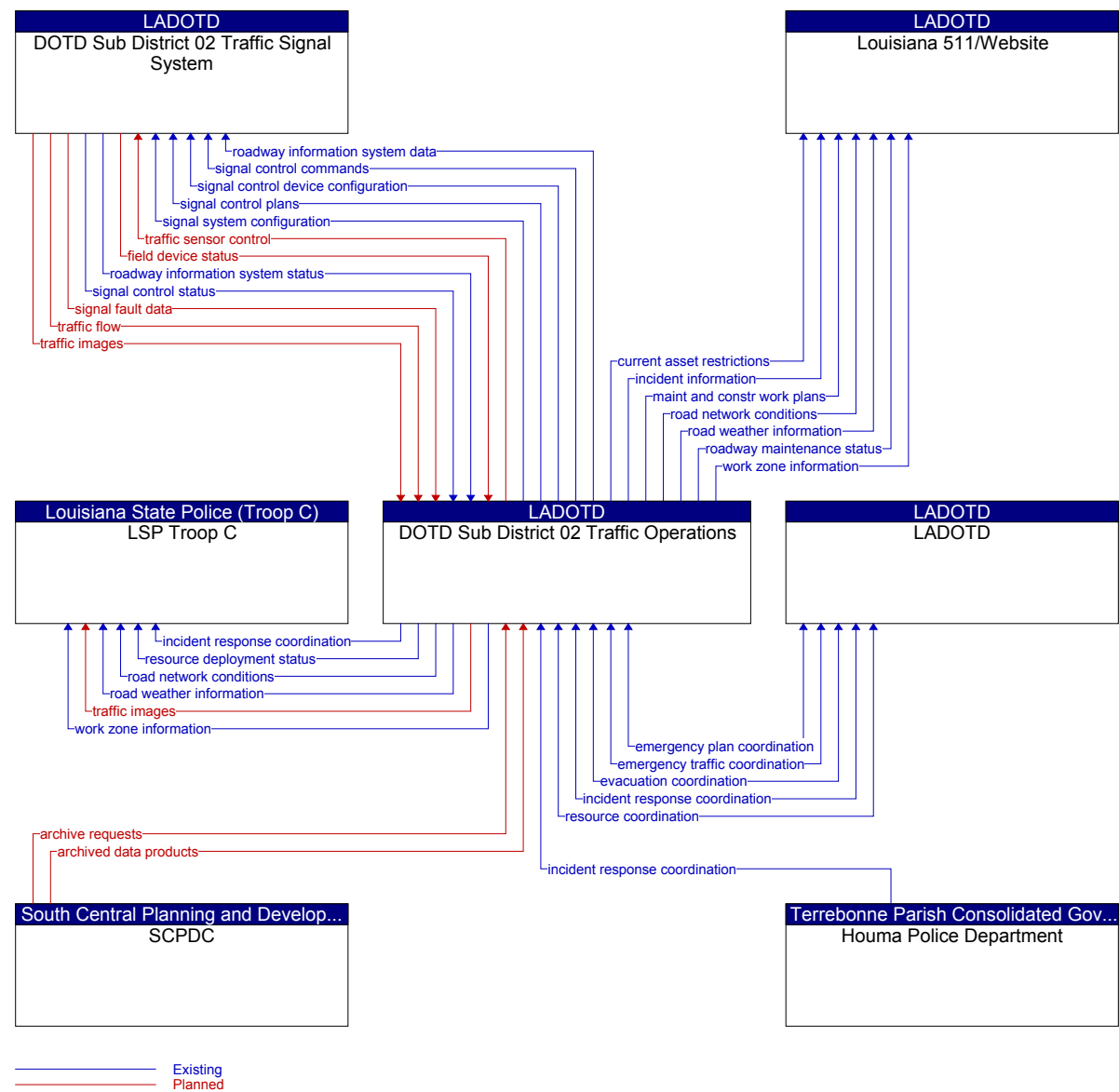
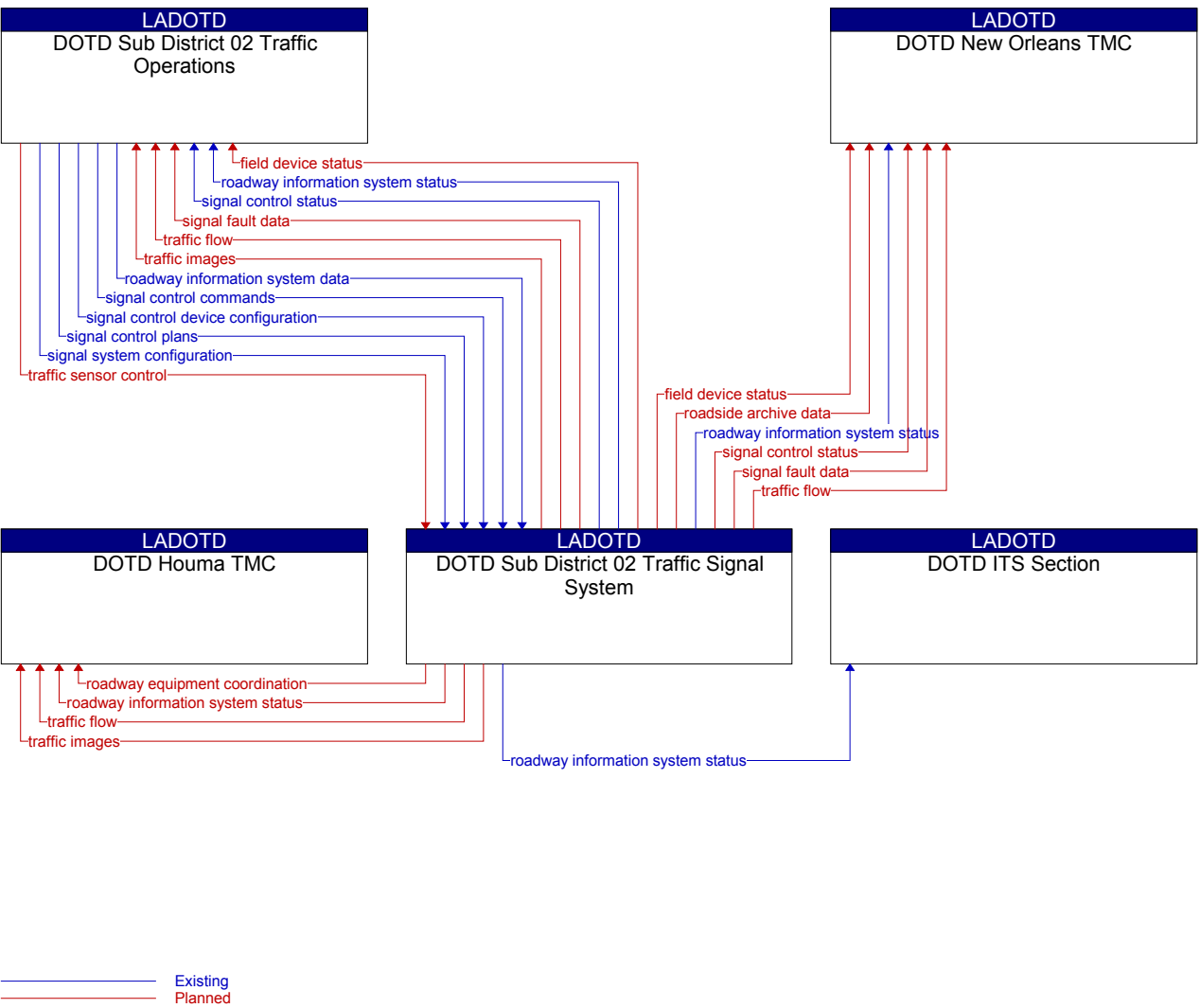


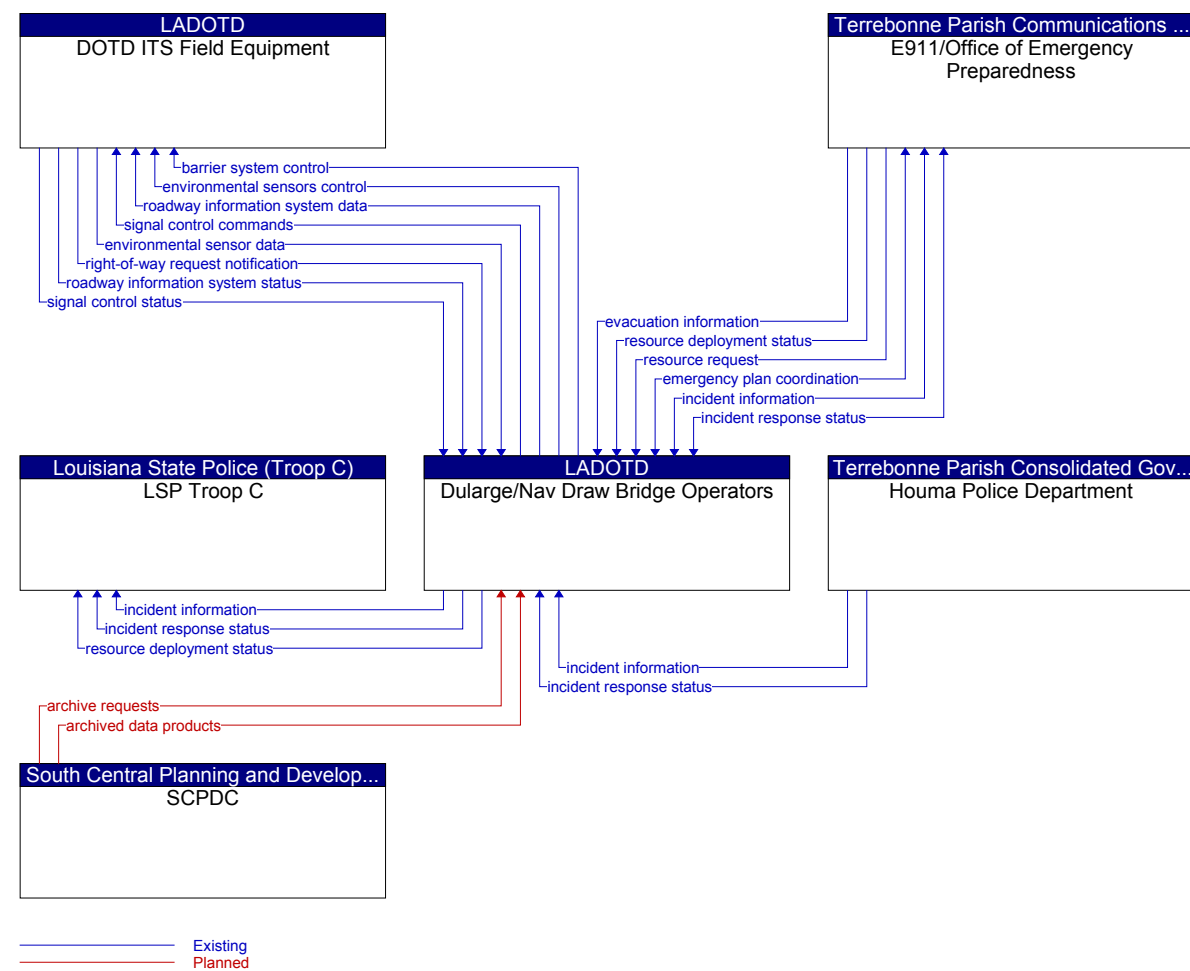
Figure 9: DOTD Social Media Flow Context Diagram



**Figure 10: DOTD Sub District 02 Traffic Operations Flow Context Diagram**



**Figure 11: DOTD Sub District 02 Traffic Signal System Flow Context Diagram**



**Figure 12: Dularge/Nav Draw Bridge Operators Flow Context Diagram**

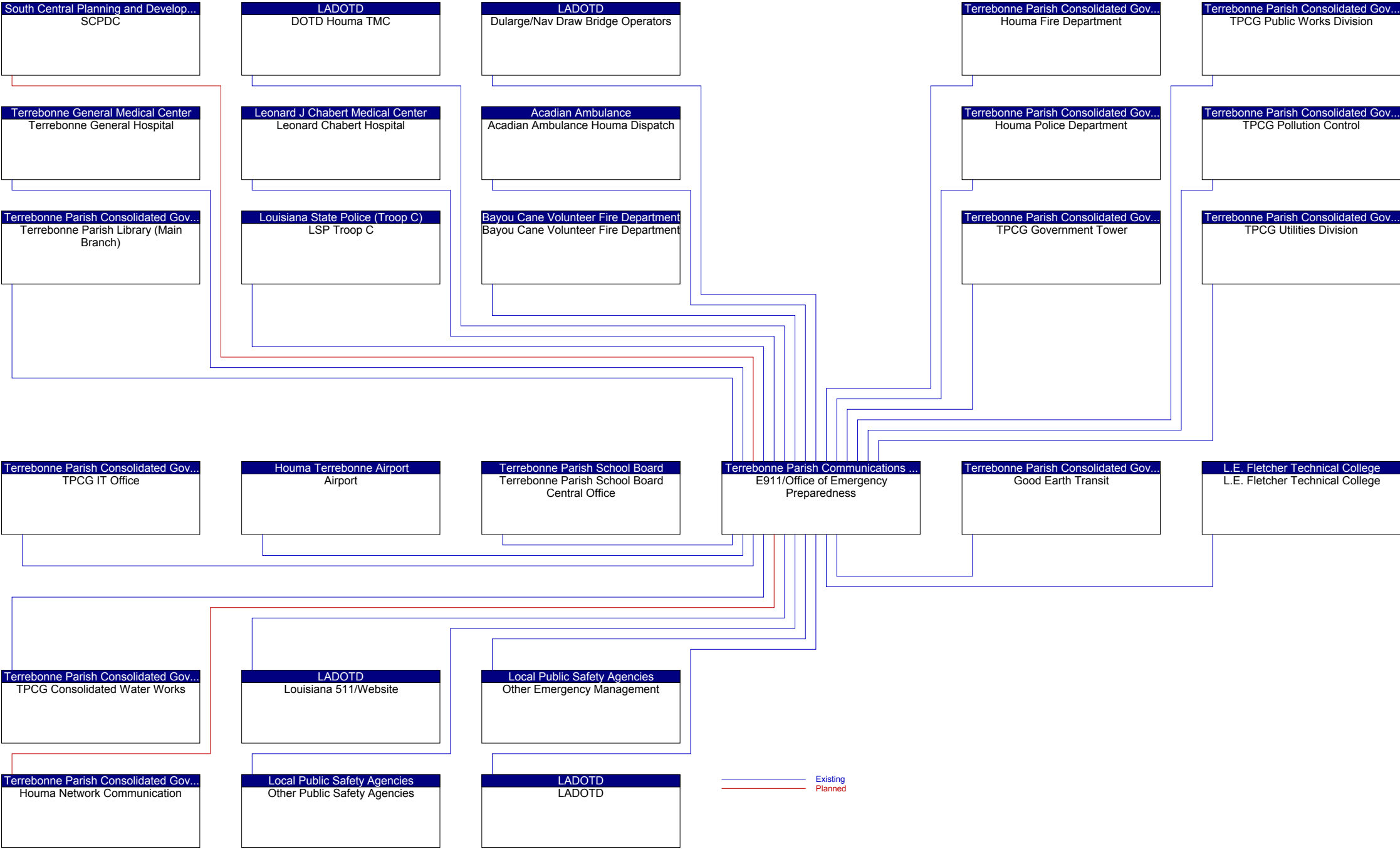


Figure 13: E911 Office of Emergency Preparedness Interconnect Context Diagram

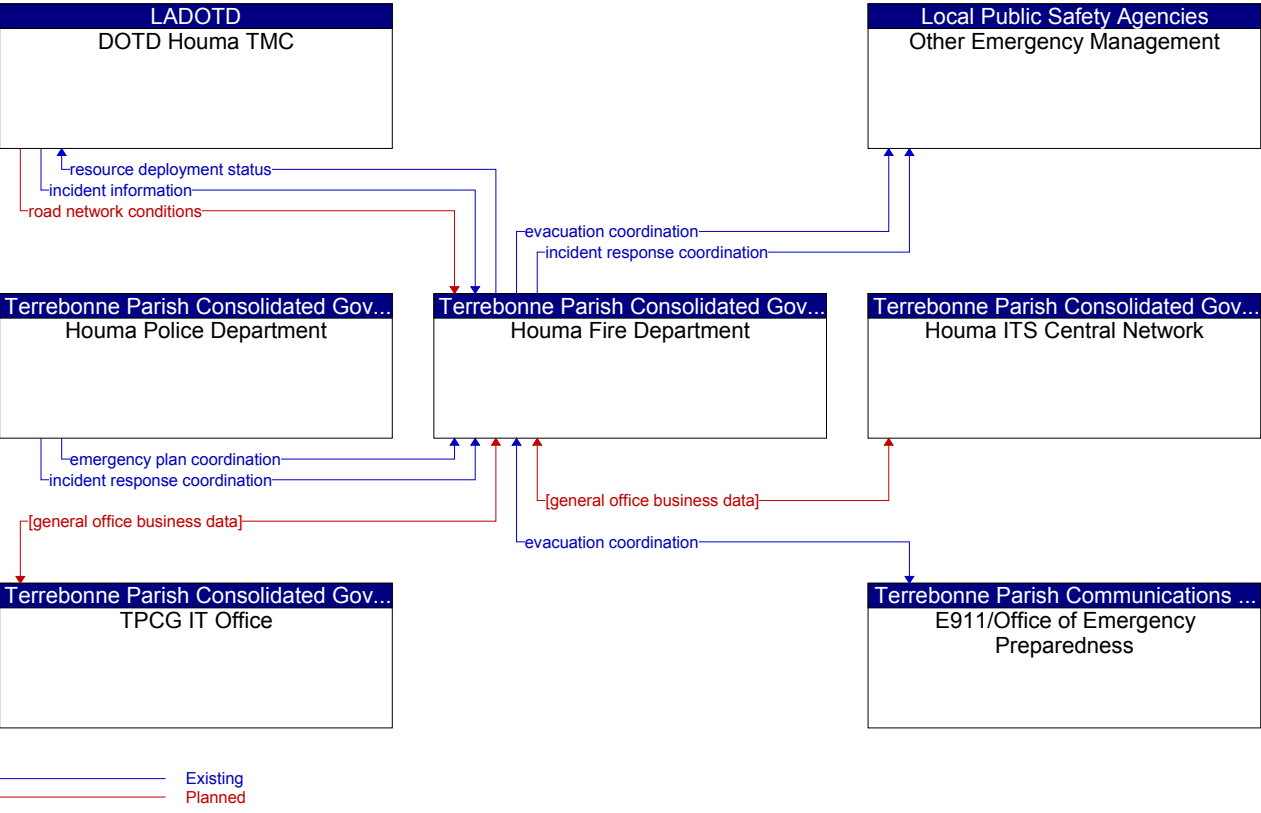
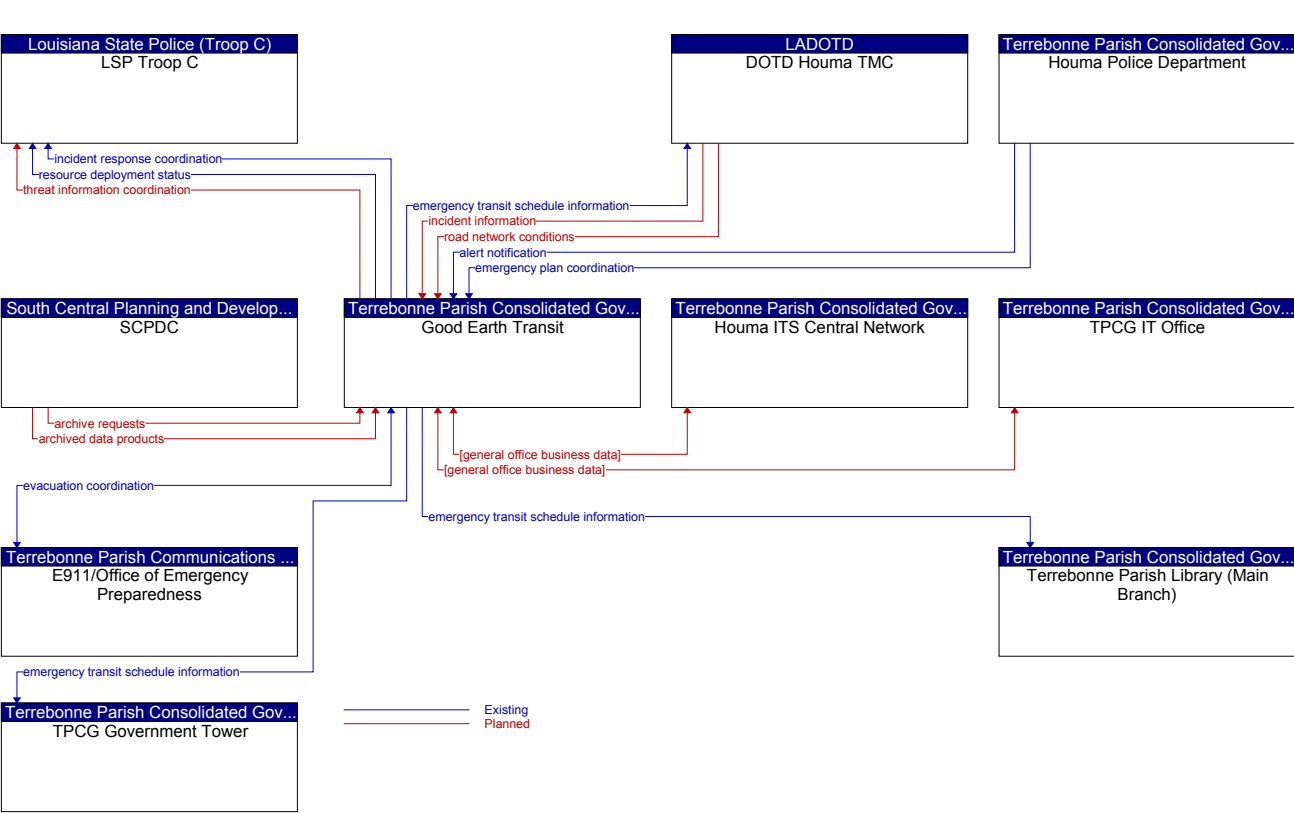


Figure 14: Good Earth Transit Flow Context Diagram

Figure 15: Houma Fire Department Flow Context Diagram

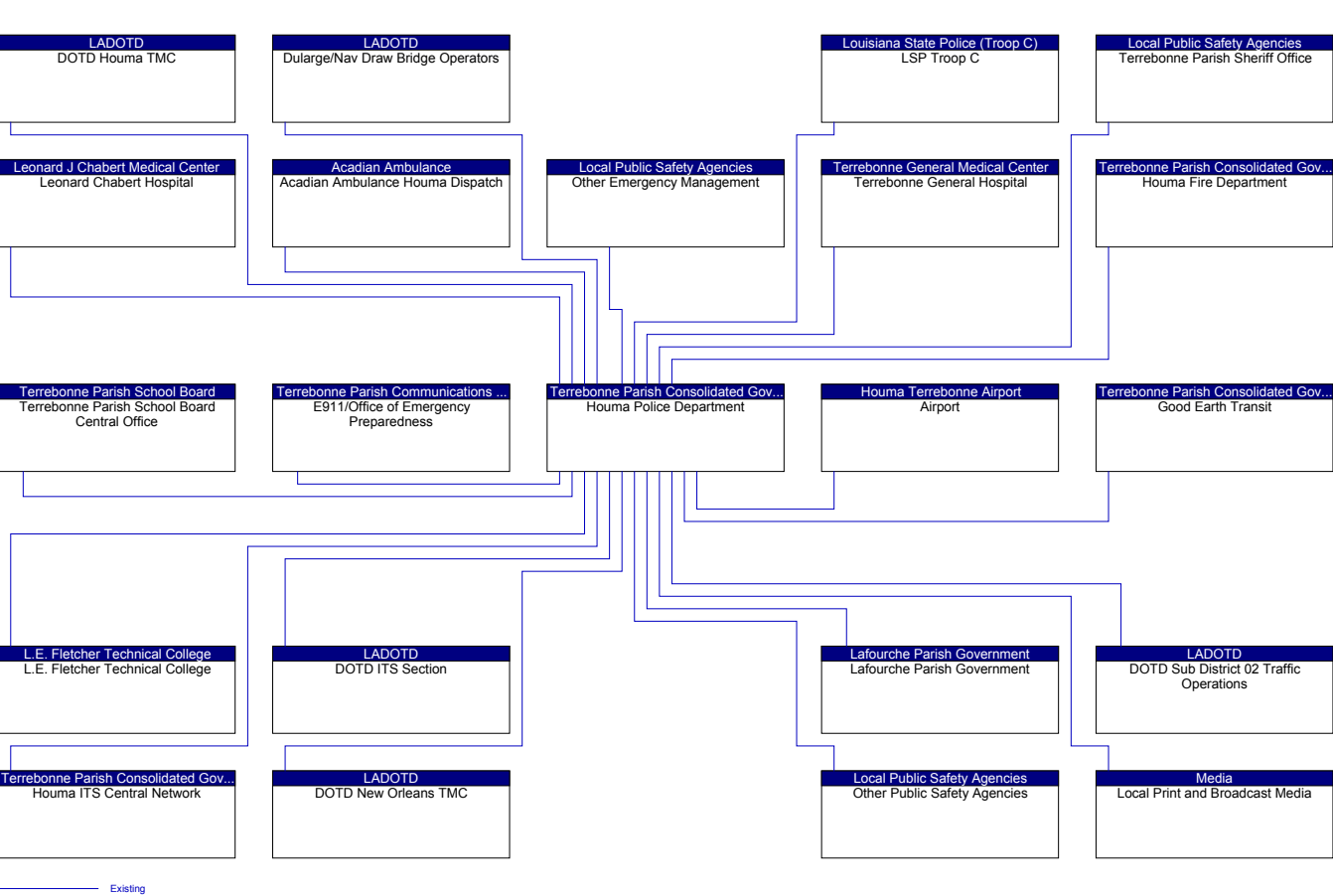
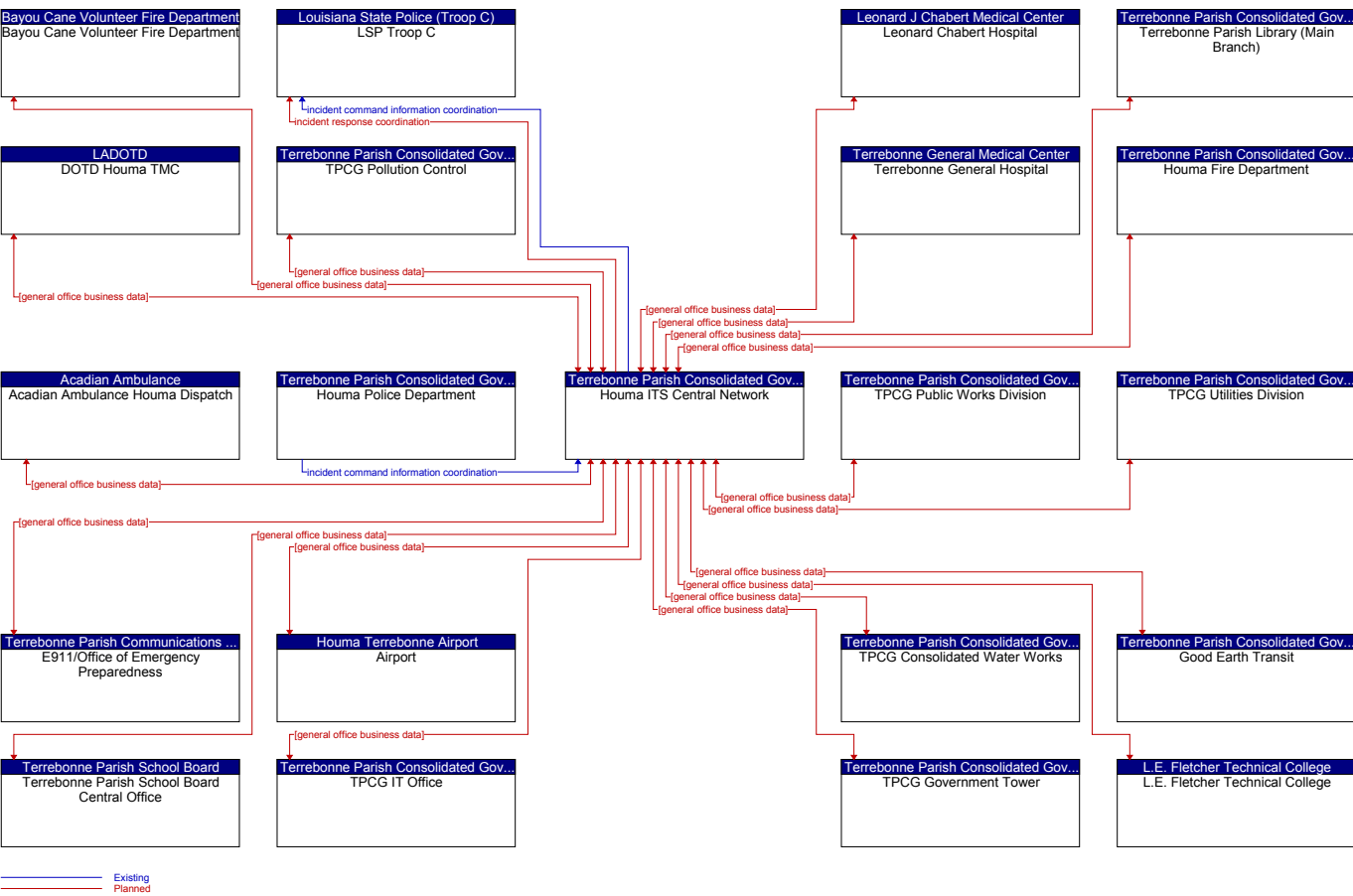


Figure 16: Houma ITS Central Flow Context Diagram

Figure 17: Houma Police Department Interconnect Context Diagram

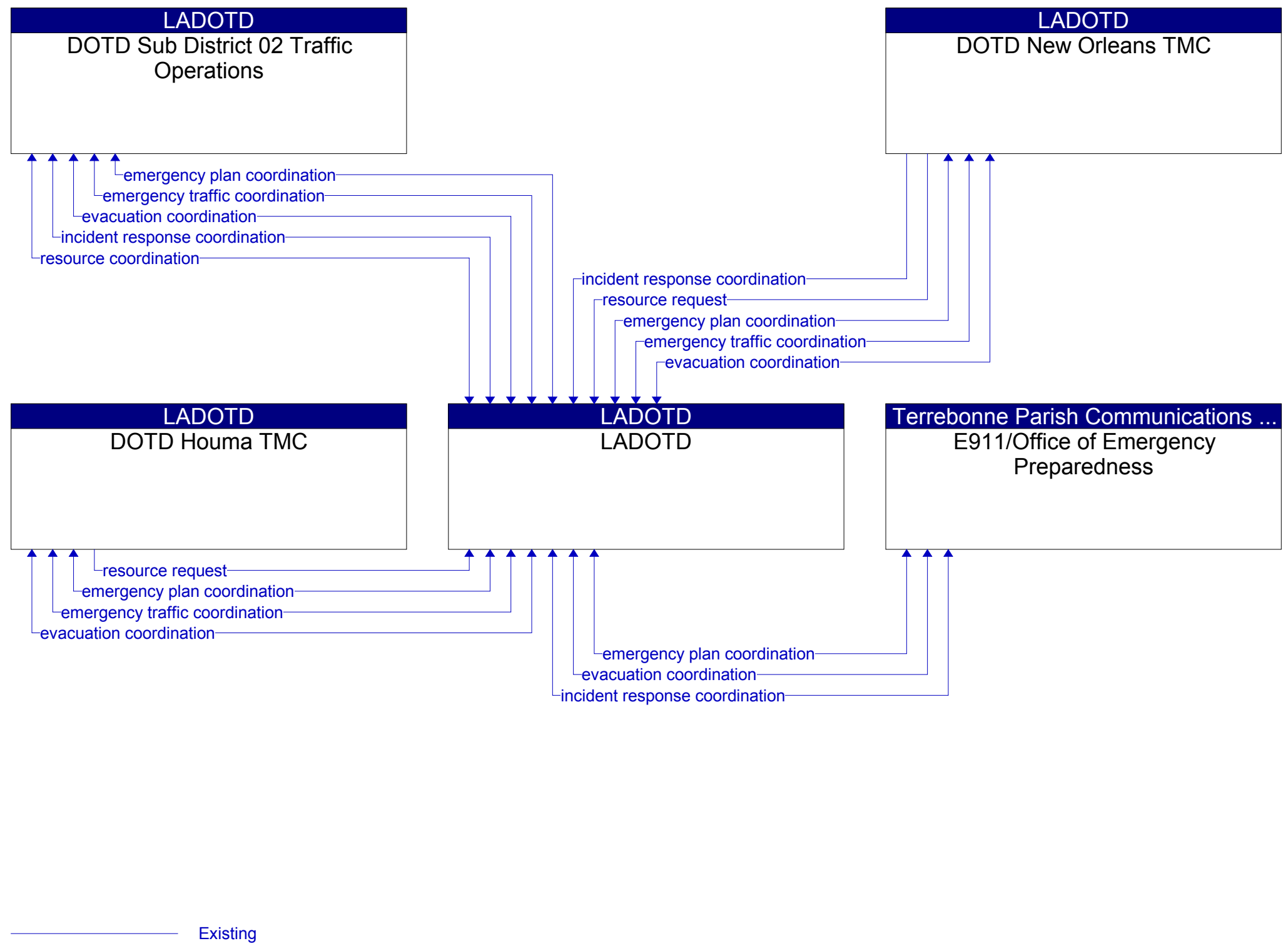


Figure 18: LADOTD Flow Context Diagram

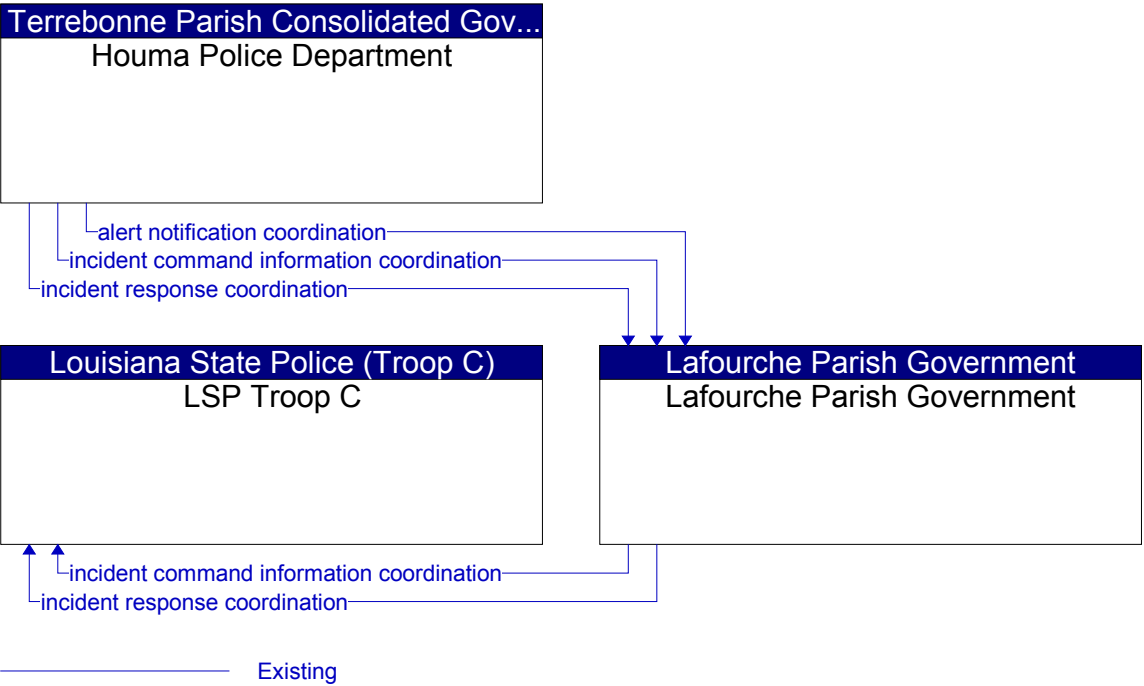


Figure 19: Lafourche Parish Government Flow Context Diagram

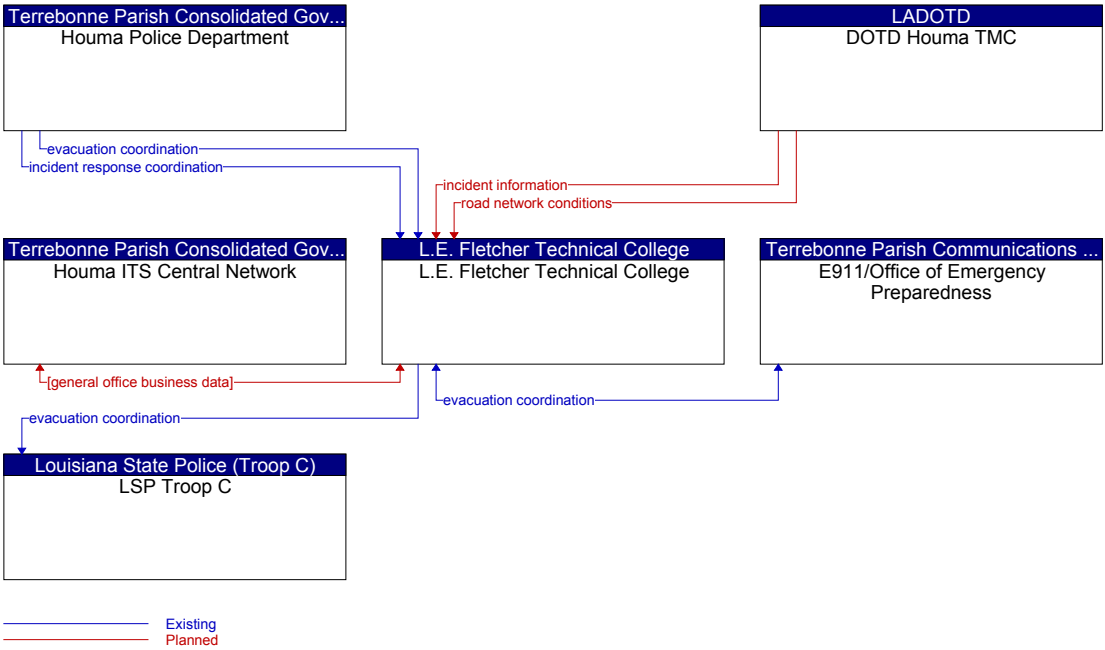


Figure 20: L.E. Fletcher Technical College Flow Context Diagram



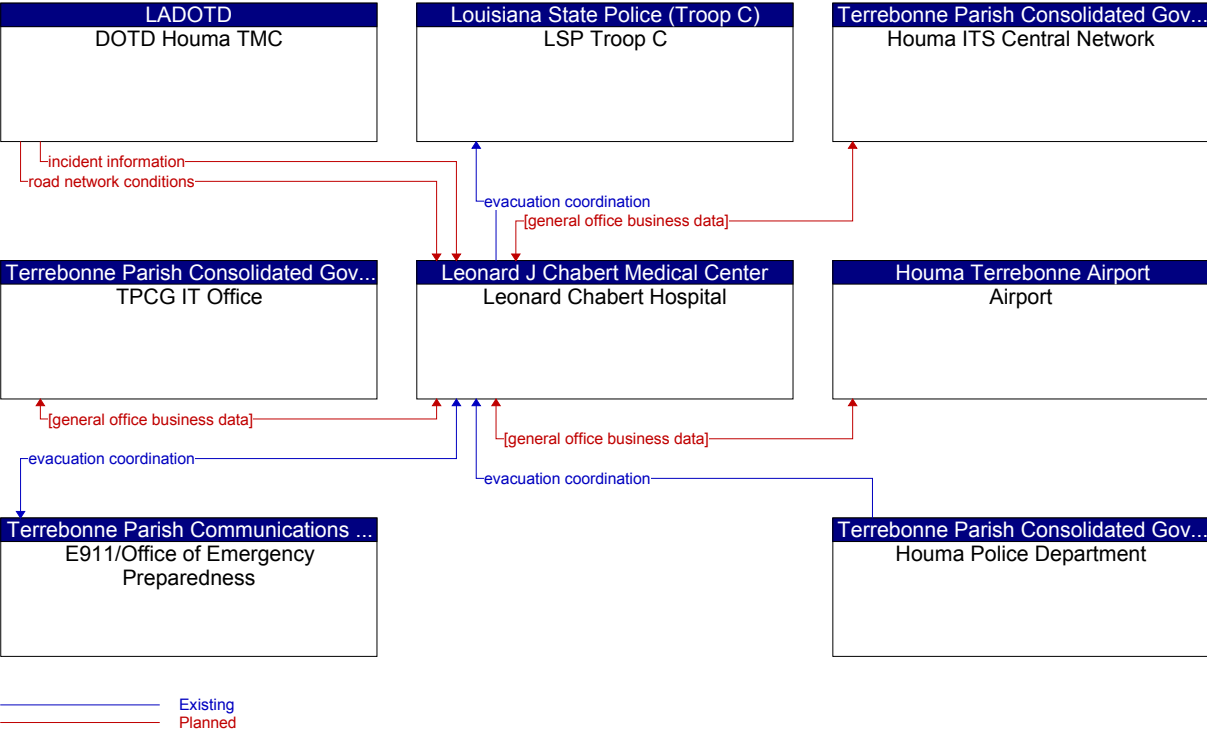


Figure 21: E911 Leonard Chabert Hospital Flow Context Diagram

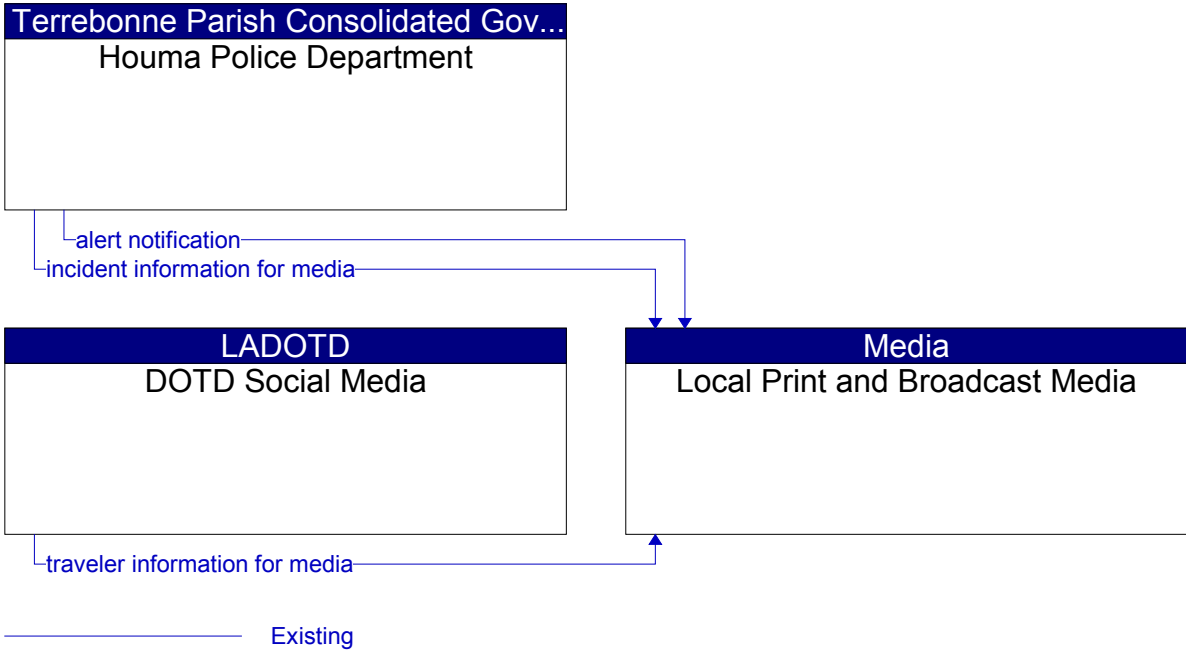


Figure 22: Local Print and Broadcast Media Flow Context Diagram

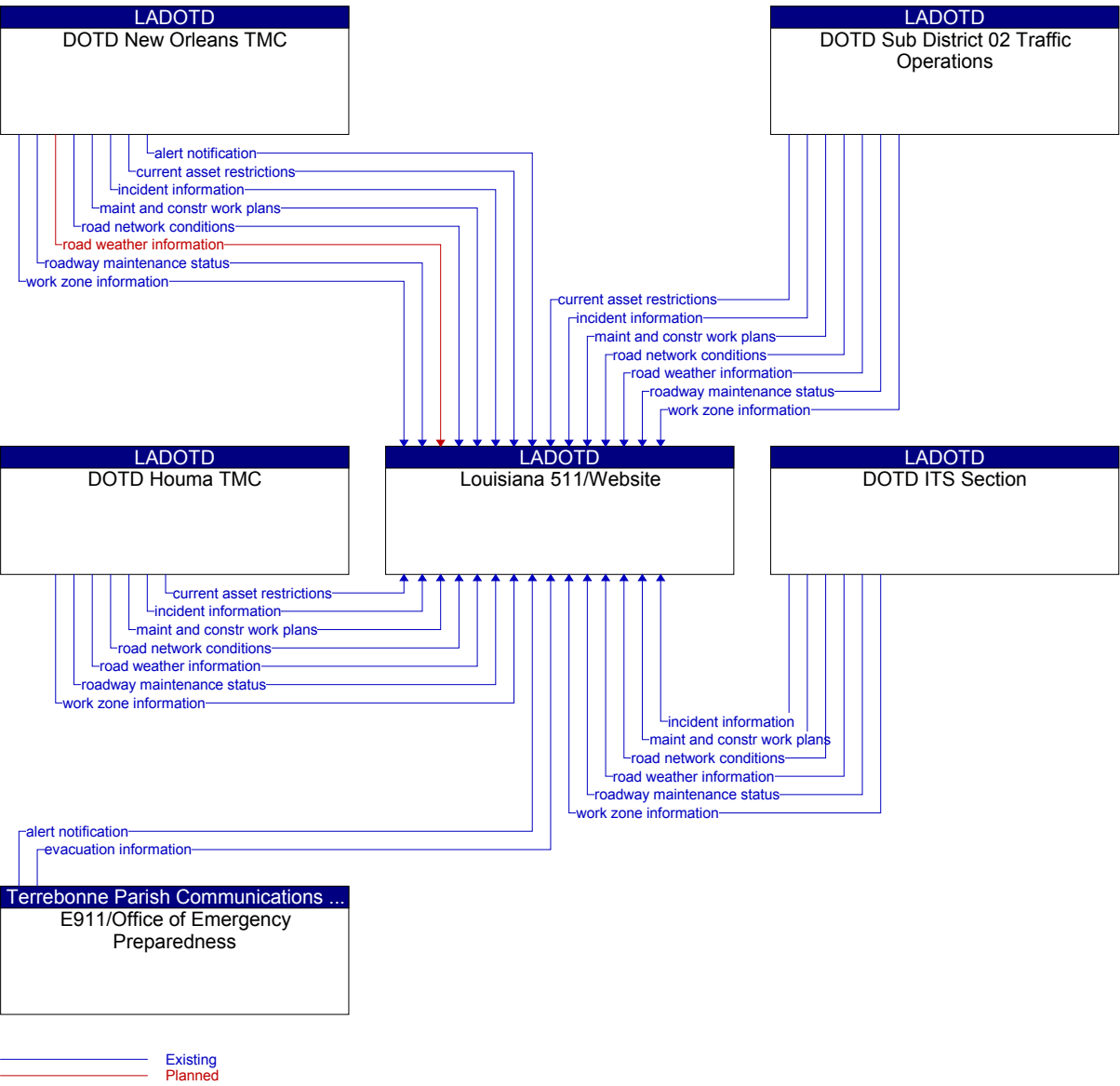


Figure 23: Louisiana 511/Website Flow Context Diagram

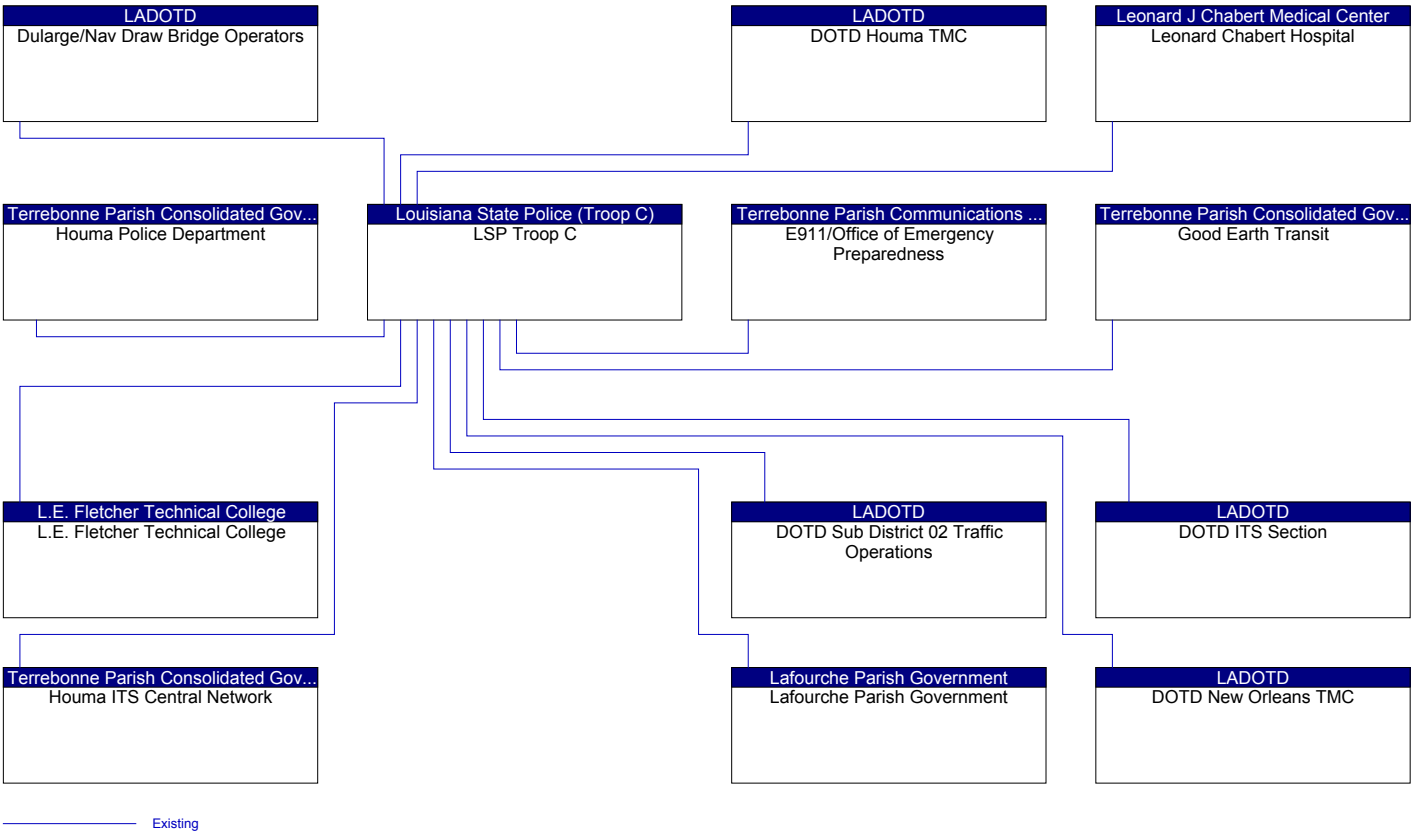


Figure 24: Louisiana State Police Troop C Interconnect Context Diagram

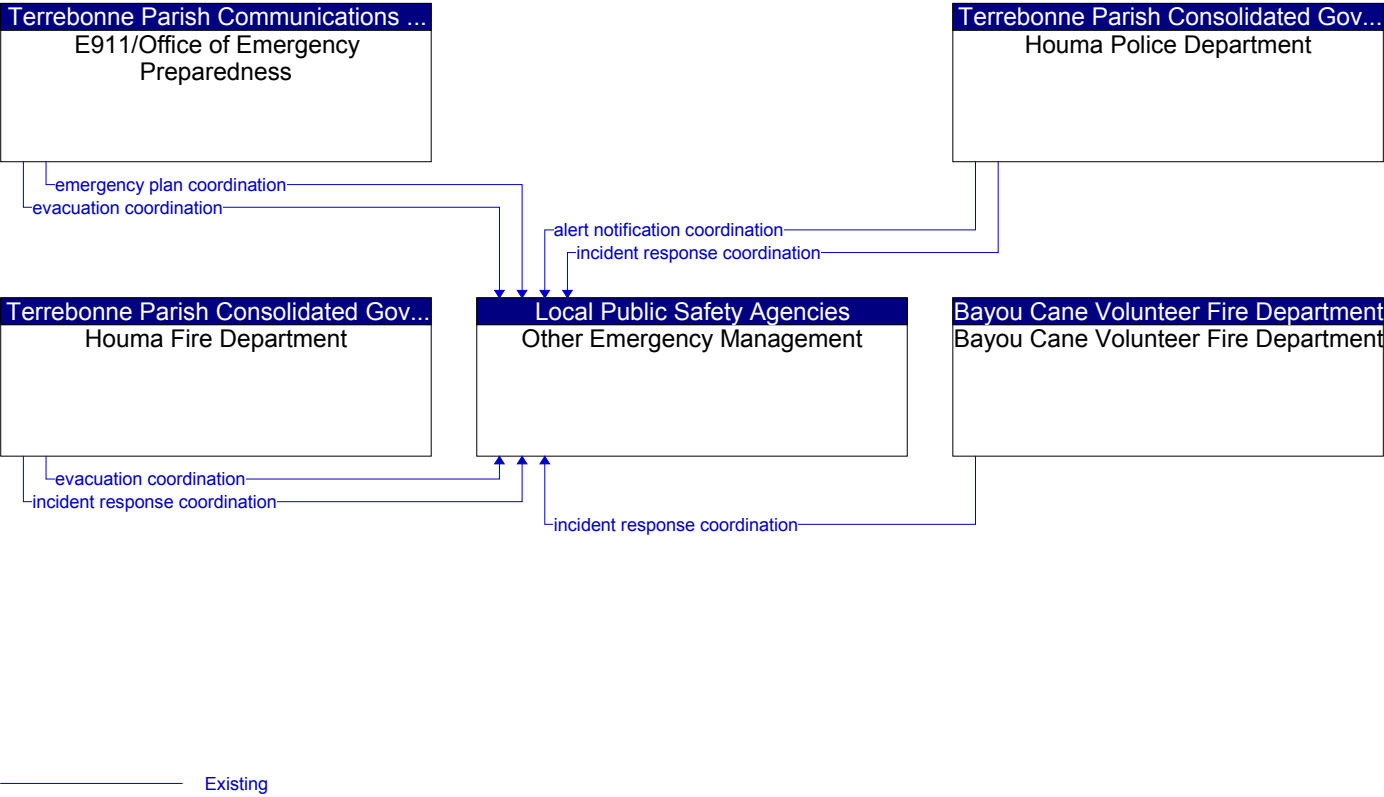


Figure 25: Other Emergency Management Flow Context Diagram

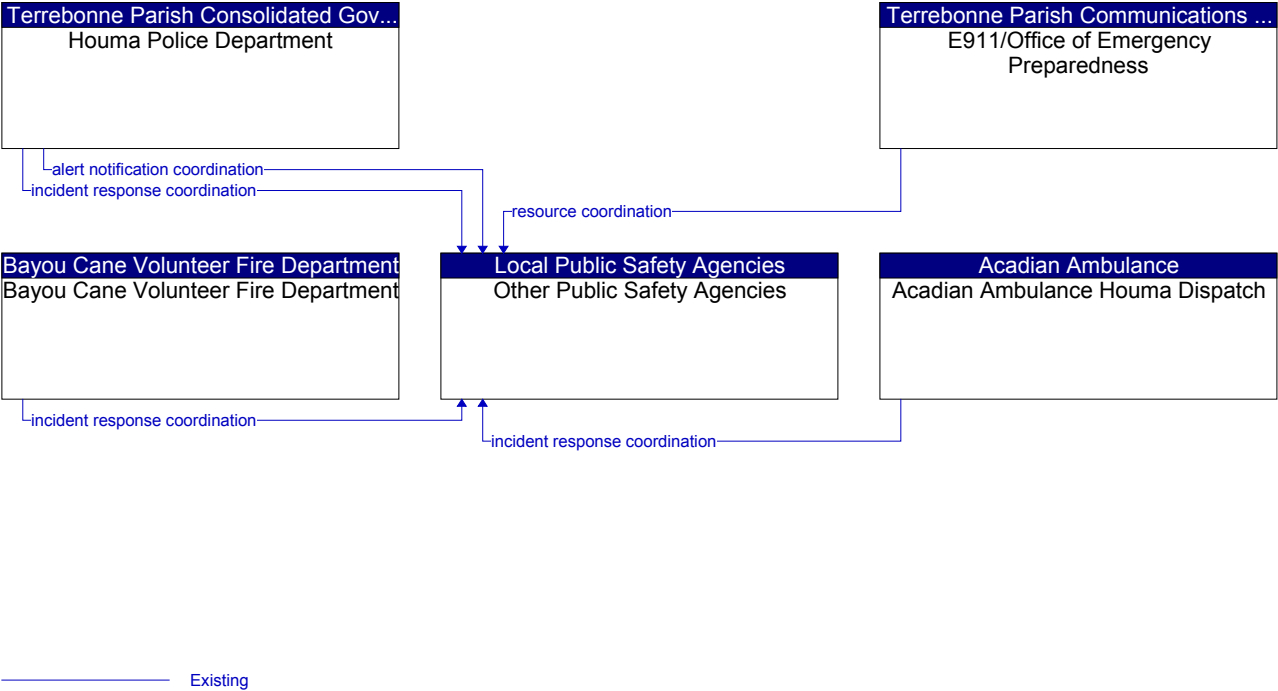


Figure 26: Other Public Safety Agencies Flow Context Diagram

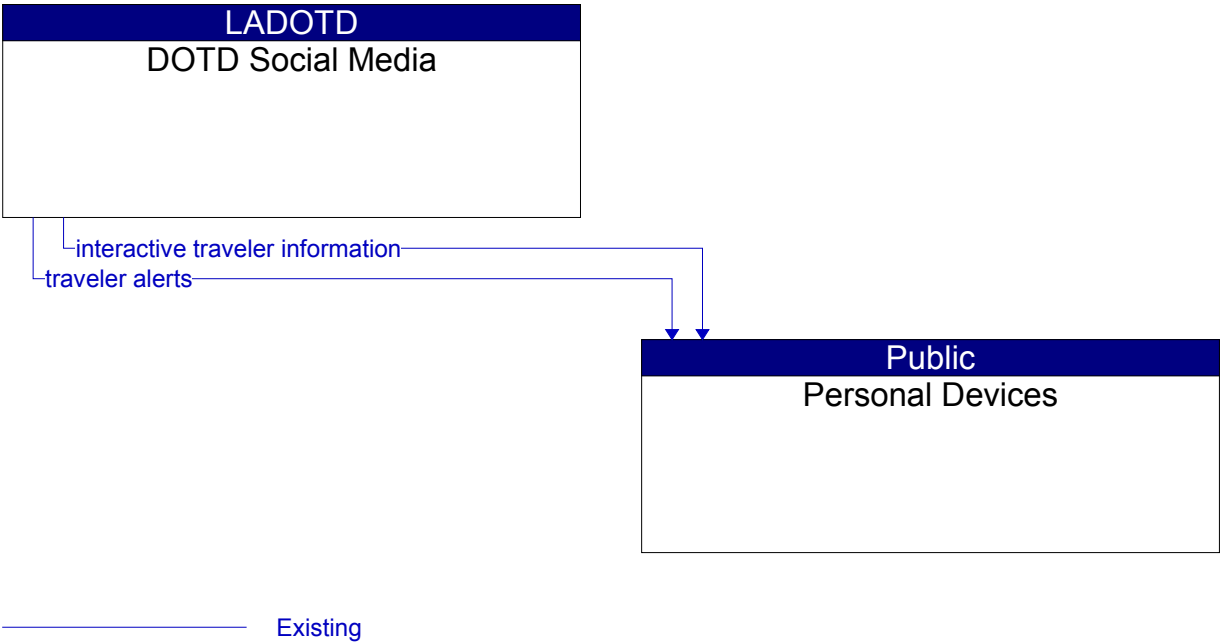


Figure 27: Personal Devices Flow Context Diagram

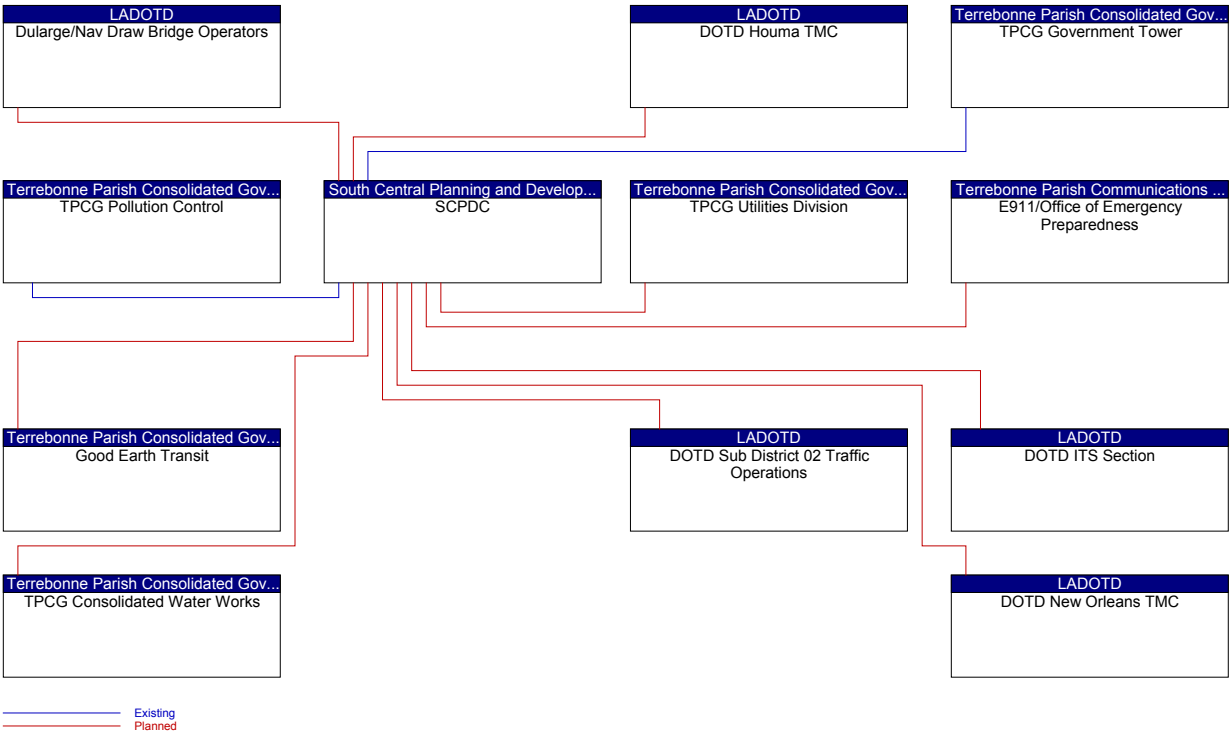


Figure 28: SCPDC Interconnect Context Diagram

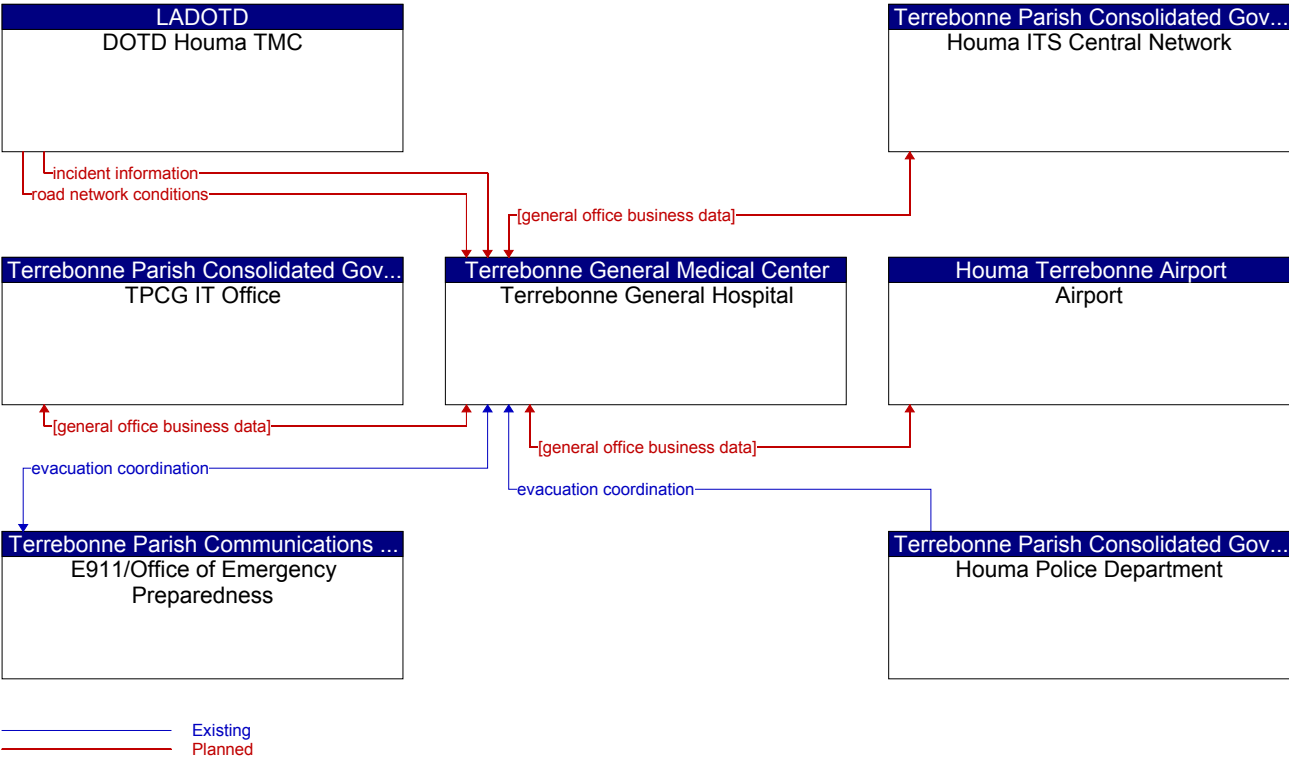


Figure 29: Terrebonne Parish General Hospital Flow Context Diagram

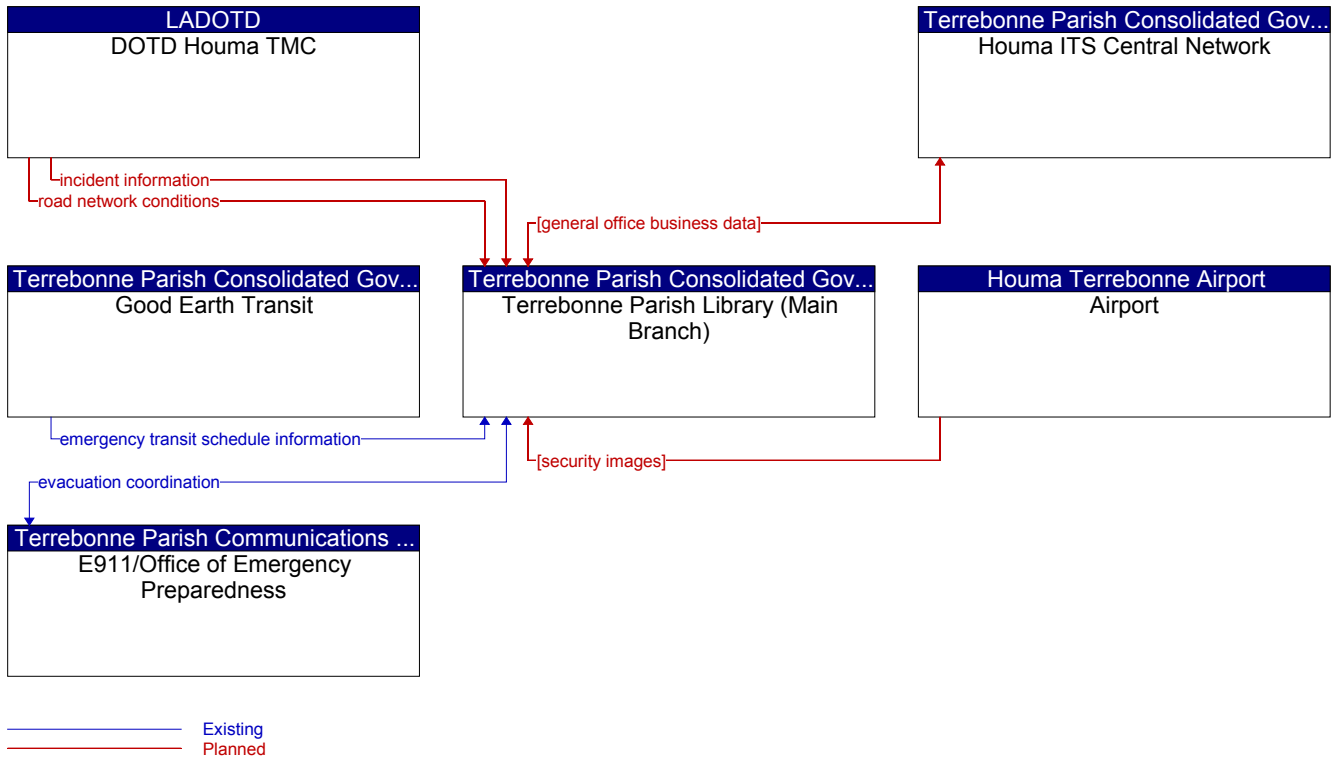
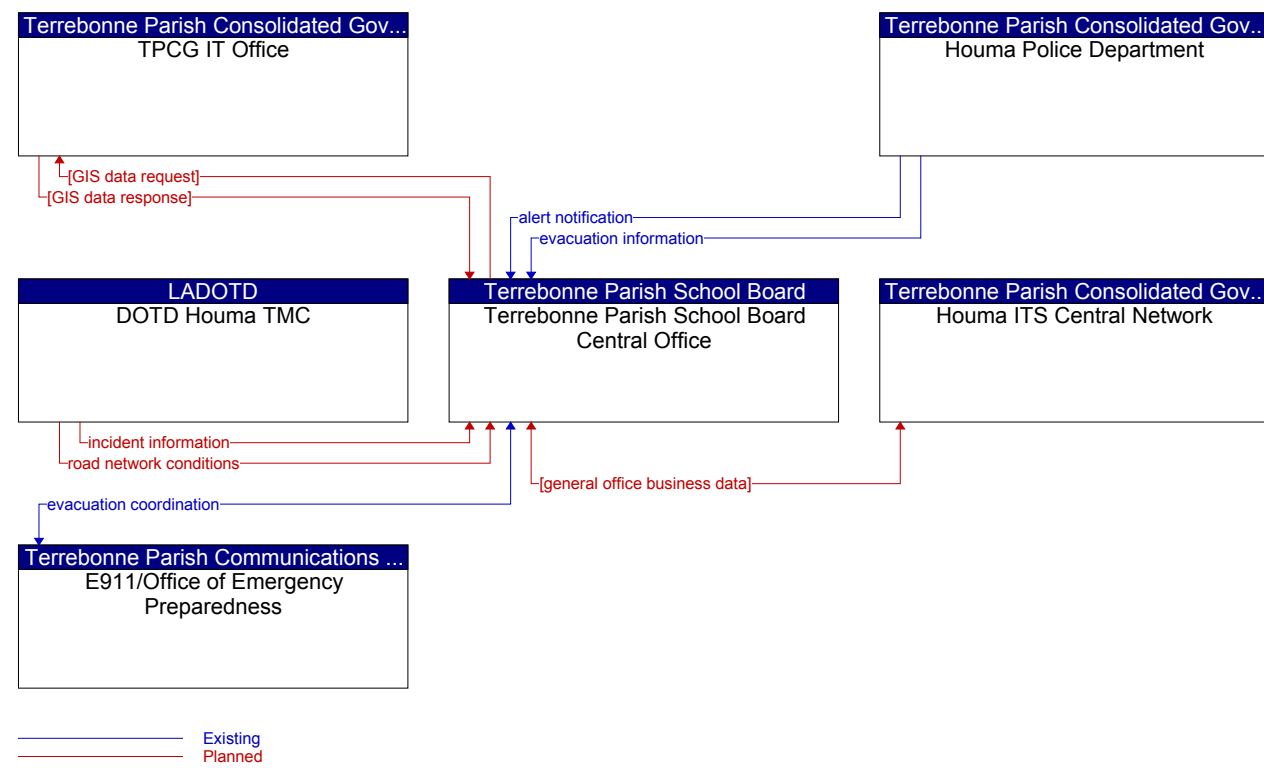
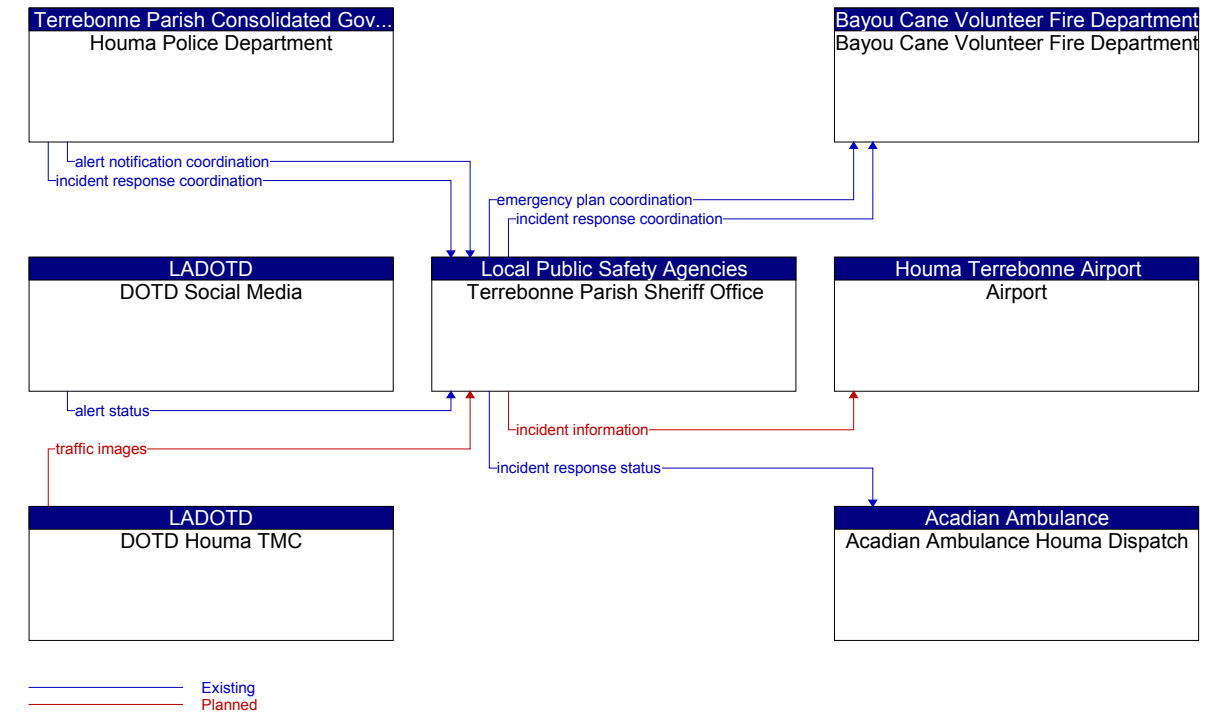


Figure 30: Terrebonne Parish Library (Main Branch) Flow Context Diagram



**Figure 31: Terrebonne Parish School Board Central Office Flow Context Diagram**



**Figure 32: Terrebonne Parish Sherriff Office Flow Context Diagram**

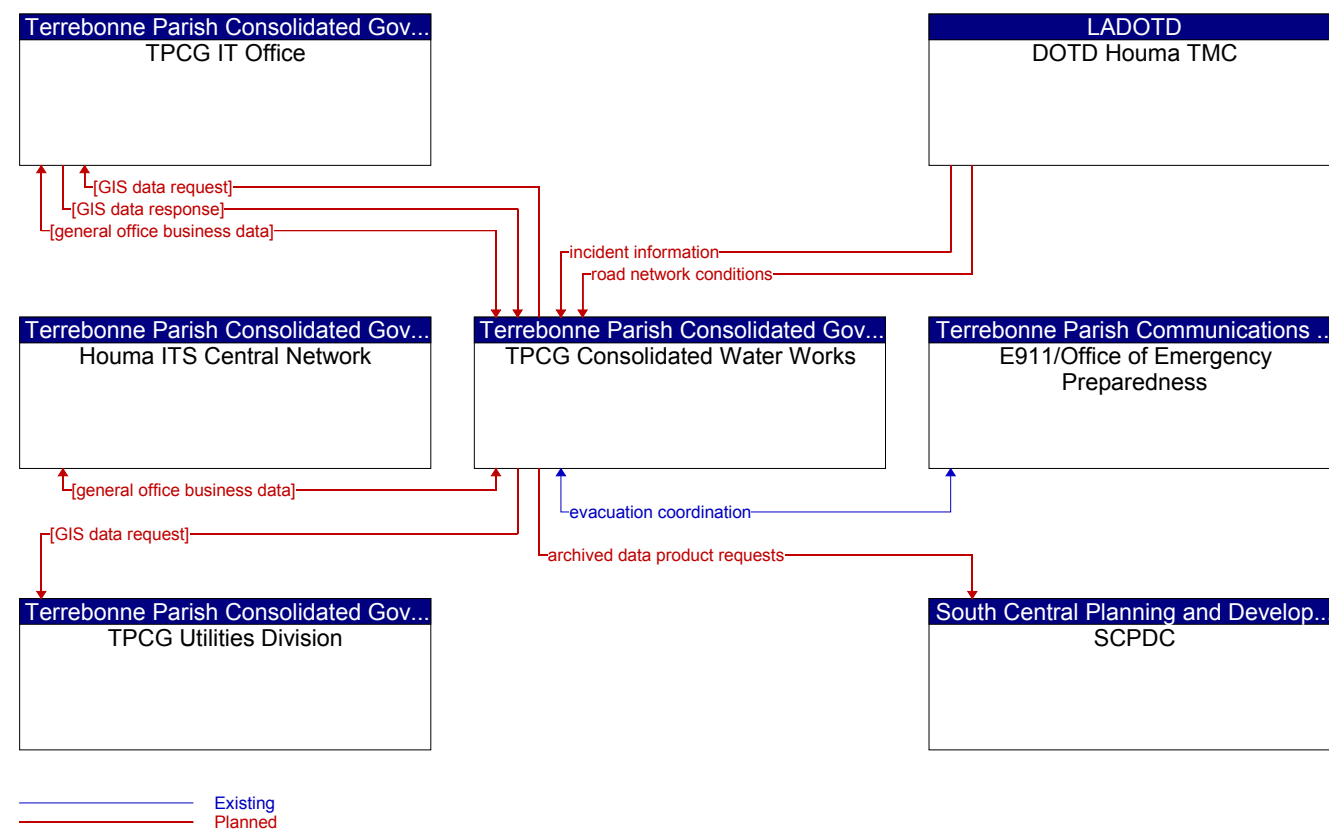


Figure 33: TPCG Consolidated Water Works Flow Context Diagram

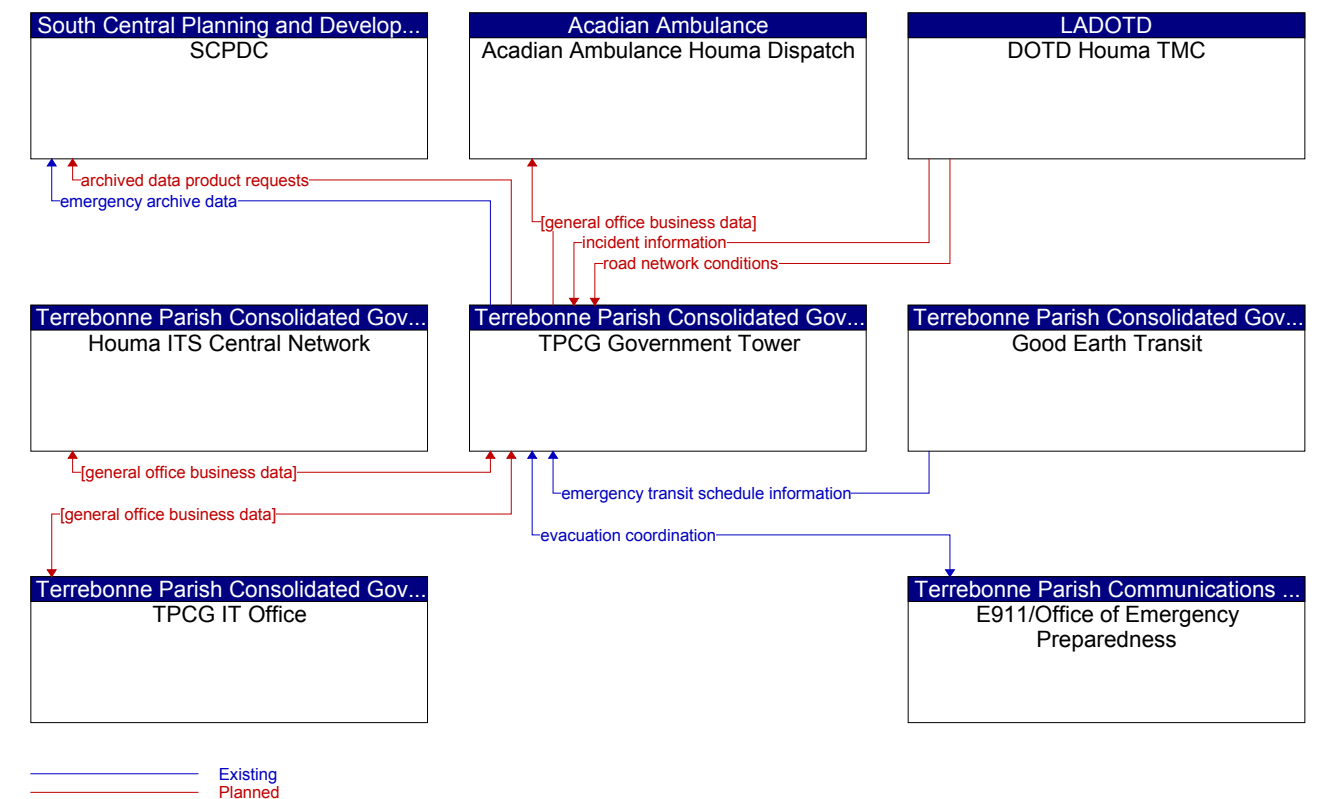


Figure 34: TPCG Government Tower Flow Context Diagram

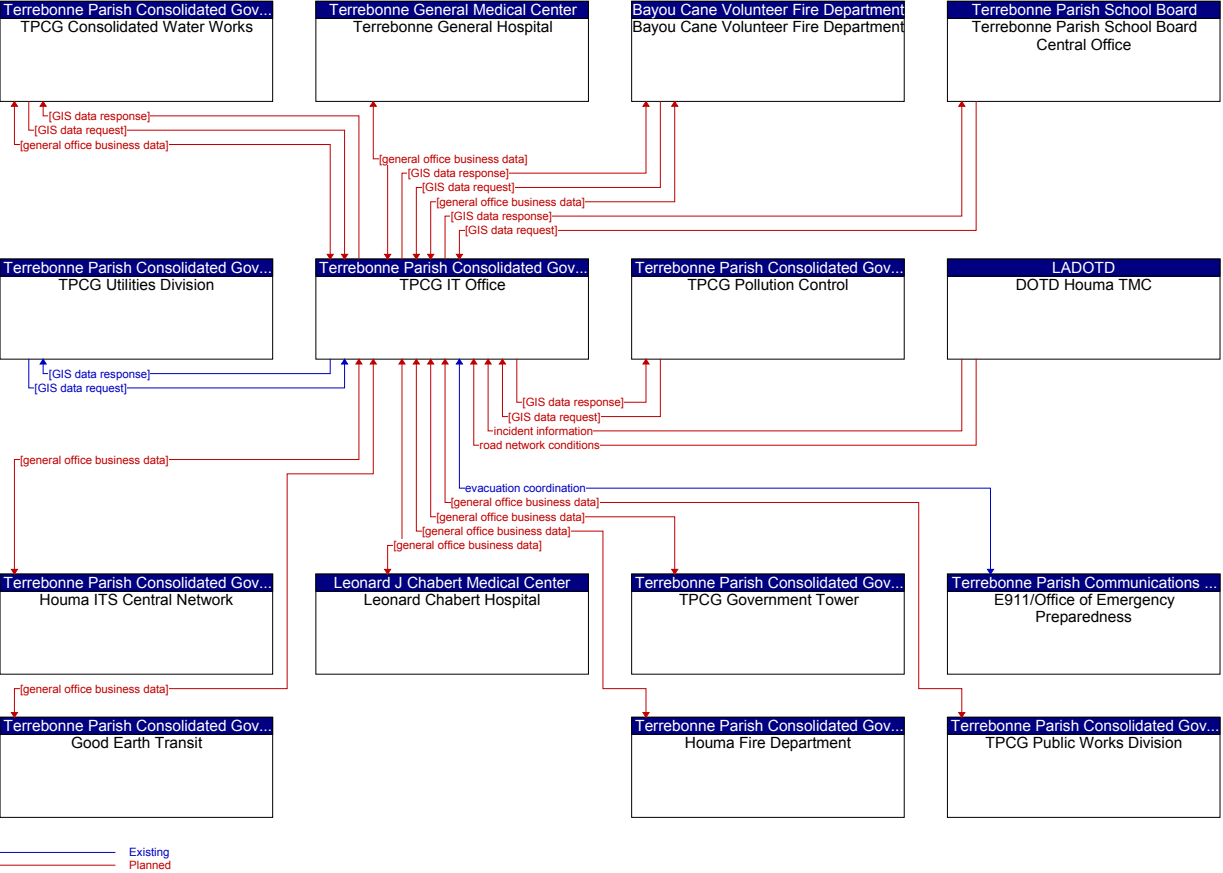


Figure 35: TPCG IT Office Flow Context Diagram

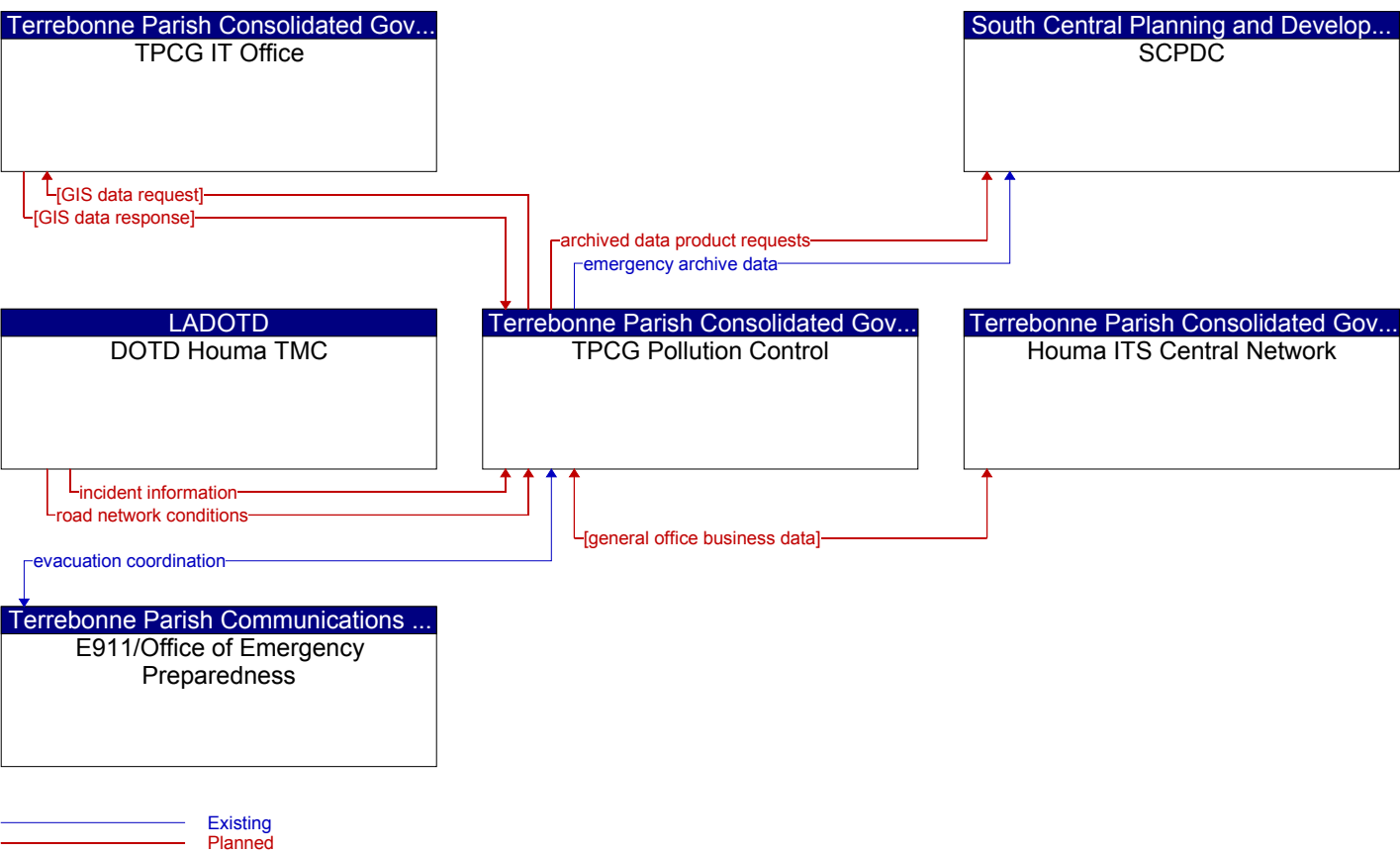


Figure 36: TPCG Pollution Control Flow Context Diagram



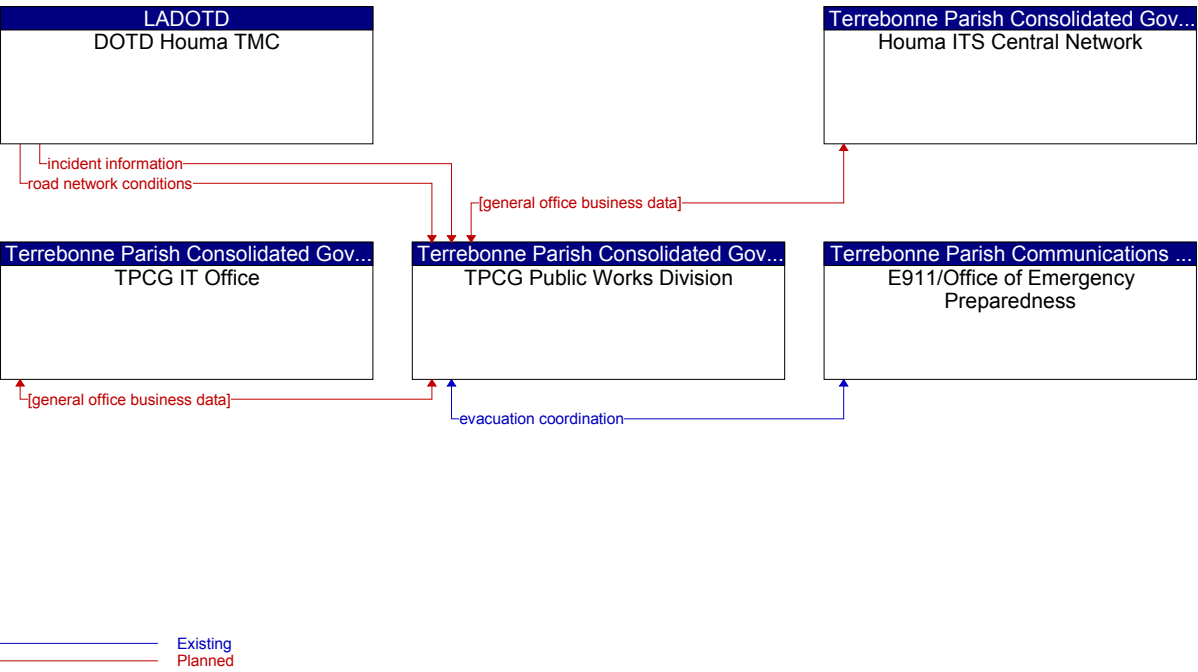


Figure 37: TPCG Public Works Division Flow Context Diagram

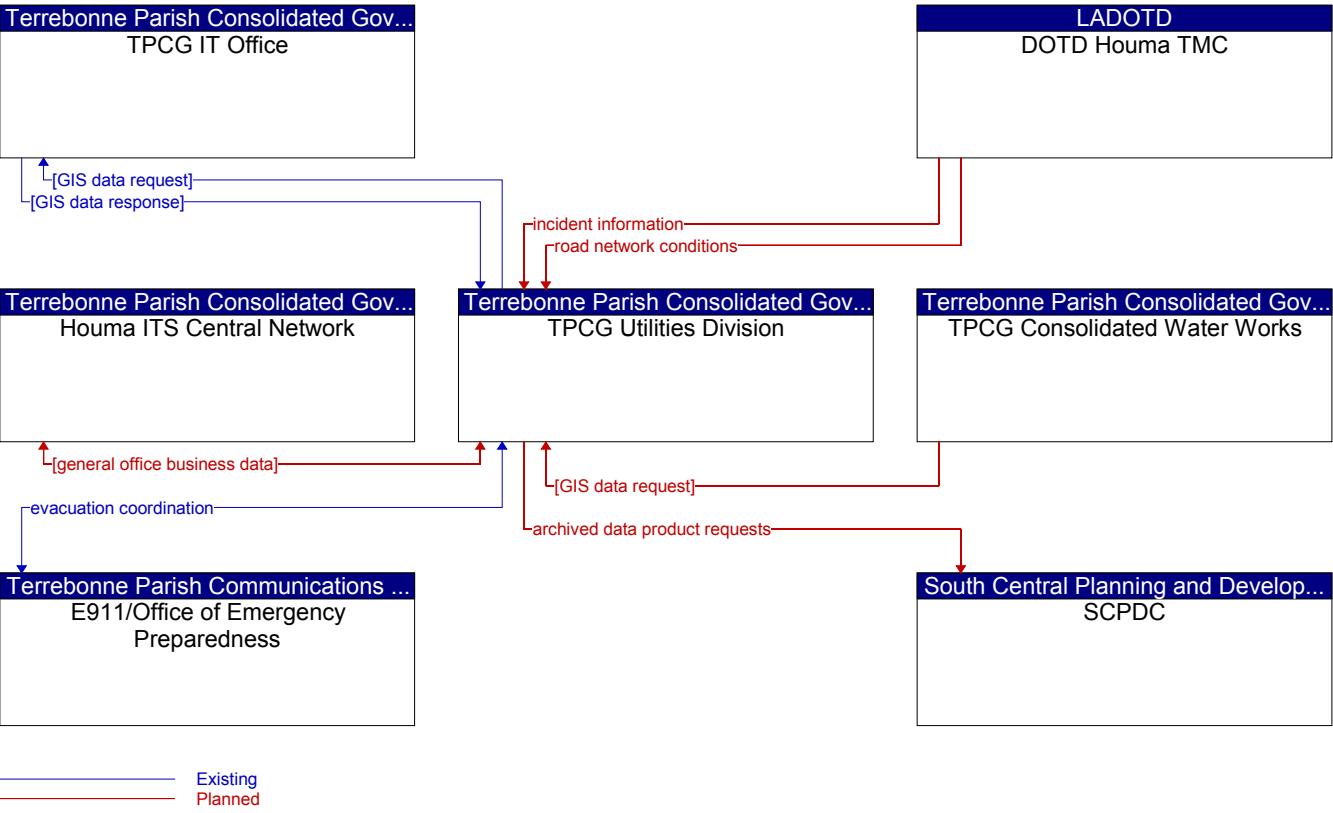


Figure 38: TPCG Utilities Division Flow Context Diagram

APPENDIX C - ITS Deployment Plan Detailed Schematics

