



State of Texas
Regional ITS Architectures and Deployment Plans
Brazos Valley Region

Regional ITS Deployment Plan

Prepared by:



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LIST OF ACRONYMS

APC	Automated Passenger Counter
ATIS	Advanced Travel Information System
ATMS	Advanced Traffic Management System
AVL	Automated Vehicle Location
CAD	Computer-Aided Dispatch
CCTV	Closed-Circuit Television
COG	Council of Governments
CVO	Commercial Vehicle Operations
DMS	Dynamic Message Sign
DPS	Department of Public Safety
EMS	Emergency Medical Services
EOC	Emergency Operations Center
ETC	Electronic Toll Collection
FHWA	Federal Highway Administration
GIS	Geographic Information System
GPS	Global Positioning System
HAR	Highway Advisory Radio
HAZMAT	Hazardous Materials
HCRS	Highway Condition Reporting System
HRI	Highway-Rail Intersections
ISD	Independent School District
ISP	Information Service Provider
ITS	Intelligent Transportation System
MDT	Mobile Data Terminal
MPO	Metropolitan Planning Organization
NTCIP	National Transportation Communications for ITS Protocol



LIST OF ACRONYMS

PTZ	Pan/Tilt/Zoom
RWIS	Road Weather Information System
TAMU	Texas A&M University
TEA-21	Transportation Equity Act for the 21st Century
TMC	Transportation Management Center
TOC	Traffic Operations Center Transit Operations Center
TTI	Texas Transportation Institute
TxDOT	Texas Department of Transportation
VIVDS	Video Image Vehicle Detector System

SUMMARY

In January 2001, the Federal Highway Administration (FHWA) issued a final rule to implement Section 5206(e) of the Transportation Equity Act for the 21st Century (TEA-21) requiring that Intelligent Transportation System (ITS) projects funded through the Highway Trust Fund conform to the National ITS Architecture and applicable standards.

To meet these requirements the Texas Department of Transportation (TxDOT) initiated the development of regional ITS architectures throughout the State of Texas. Although not required by the FHWA final rule, TxDOT took the opportunity to also develop an ITS deployment plan for each Region. The Brazos Valley Regional ITS Architecture and Regional ITS Deployment Plan was prepared as part of this initiative.

The Brazos Valley Regional ITS Deployment Plan outlines a vision for ITS deployment, and identifies and prioritizes projects that are needed to implement the ITS architecture on a short, medium, and long-term basis. In doing so, this plan also helps the Region to prioritize funding decisions. As infrastructure is incrementally built-out over a 20-year horizon, integration among key foundation systems in the Region can occur as the system grows and expands.

Stakeholders from throughout the Region participated in the development of the Regional ITS Deployment Plan. Participants included representatives from TxDOT, cities, counties, transit and public safety agencies.

Building on the dialogue, consensus and vision outlined in the Regional ITS Architecture, stakeholders in the Brazos Valley Region prioritized market packages and potential ITS projects for deployment in the Region. Projects were identified to correspond to the needs and priorities identified by the regional stakeholders, and were categorized into 5-year, 10-year, and 20-year timeframes.

The majority of ITS projects recommended for the Brazos Valley Region were identified in the following key areas:

- Travel and Traffic Management;
- Emergency Management; and
- Public Transportation Management.

Recommended ITS projects in the 5-year, 10-year, and 20-year deployment timeframes were summarized in tables for each deployment horizon. This summary included the project name and a brief description, primary responsible agency, a planning level estimate of probable cost, an indication of whether or not funding had been identified for that project, as well as an estimated duration for implementation. For each recommended ITS project, more detailed project descriptions were developed which mapped each project back to applicable market packages and also identified any prerequisite project requirements.

With the substantial amount of effort invested by stakeholders in the Brazos Valley Region to develop both the Regional ITS Architecture and the Deployment Plan, developing a plan for maintaining these important tools was a key component of the process. Stakeholders agreed that both the Regional ITS Architecture and Deployment Plan would need to be periodically reviewed and potentially updated in order to reflect current deployment status as well as to re-evaluate priorities. Stakeholders agreed that it would be appropriate to review the plan every two years. The TxDOT Bryan District was identified as the agency that should take the lead in maintaining and updating the Region's ITS Architecture and Deployment Plan, with support from a multijurisdictional committee in the Region.

1. INTRODUCTION

1.1 Project Overview

The FHWA final rule to implement Section 5206(e) of the TEA-21 requires that ITS projects funded through the Highway Trust Fund conform to the National ITS Architecture and applicable standards. The rule requests that the National ITS Architecture be used to develop a local implementation of the National ITS Architecture, which is referred to as a “Regional ITS Architecture.”

In order to meet these requirements, the TxDOT initiated the development of regional ITS architectures and deployment plans throughout the State of Texas. Although not required by the FHWA final rule, TxDOT sought to have an ITS deployment plan developed for each Region. The ITS Deployment Plan outlines a vision for ITS deployment in the Region and identifies and prioritizes projects that are needed to implement the ITS architecture on a short, medium, and long-term basis. In doing so, this plan also helps the Region to prioritize funding decisions by having a comprehensive, phased approach to the regional ITS programs, so that the infrastructure can be incrementally built-out over a 20-year horizon, and integration among key foundation systems in the Region can occur as the system grows and expands.

The Brazos Valley Regional ITS Deployment Plan was developed using the Regional ITS Architecture developed in 2003. Through the architecture development process, stakeholders reached consensus on the transportation needs in the Region that could be addressed with ITS, worked with the architecture team to customize and prioritize market packages that formed the basis for the ITS Deployment Plan, and identified the required interfaces to provide the desired level of integration of systems and agencies within the Brazos Valley Region.

The Brazos Valley Regional ITS Architecture provided the framework and prioritized the key functions and services desired by stakeholders in the Region. The ITS Deployment Plan builds on the architecture by outlining specific ITS project recommendations and strategies for the Region, and identifying deployment timeframes so that the recommended projects and strategies can be implemented over time. Agency responsibilities for implementing and operating the systems also are a key component of the ITS Deployment Plan.

1.2 Document Overview

The Brazos Valley Regional ITS Deployment Plan is organized into four key sections:

Section 1 – Introduction

This section provides a brief overview of the Brazos Valley Regional ITS Deployment Plan, as well as an overview of some of the key features and stakeholders in the Brazos Valley Region.

Section 2 – Prioritization of Market Packages

Section 2 contains the prioritized market packages for the Brazos Valley Region. Included in this section is an overview of the prioritization process and detailed descriptions of the high, medium and low priority market packages.

Section 3 – Prioritization of Planned Projects

Project recommendations have been developed for the Brazos Valley Region to provide an incremental, phased build-out of the Region’s ITS. These projects are categorized into 5-year, 10-year, and 20-year deployment timeframes. Each project recommendation includes a brief description, responsible agency, associated market package, pre-requisite projects or systems, and an estimate of probable cost. These recommendations took into consideration existing as well as planned ITS deployments in the Brazos Valley Region.

Section 4 – Procedure for Submitting ITS Projects

A procedure for maintaining the ITS Deployment Plan and submitting new projects to add to the plan is recommended in this section.

1.3 The Brazos Valley Region

1.3.1 Geography and Regional Characteristics

The Brazos Valley Region is bordered by the TxDOT Waco and Dallas Districts to the north, the TxDOT Austin District to the west, the TxDOT Tyler and Lufkin Districts to the east, and the TxDOT Yoakum and Houston Districts to the south. For the Brazos Valley Regional ITS Architecture and Deployment Plan, the study area included all ten counties that comprise the TxDOT Bryan District. The TxDOT Bryan District was used as a basis for the project Region.

The counties included in the Brazos Valley Region area:

- Brazos;
- Burleson;
- Freestone;
- Grimes;
- Leon;
- Madison;
- Milam;
- Robertson;
- Walker; and
- Washington.

TxDOT partners with local governments for roadway construction, maintenance, and traffic operations support, and serves as the responsible agency for on-system roadways in cities with populations less than 50,000. The Cities of Bryan and College Station are the only cities in the project Region with populations that exceed the 50,000 threshold.

1.3.2 Transportation Infrastructure

The Brazos Valley Region has an extensive transportation infrastructure. The primary roadway facilities include I-45, US-77, US-79, US-190, US-290, SH-6, and SH-105.

I-45 is a north-south, divided interstate highway. The effective operation of this highway is critical to the movement of goods and people through the State of Texas. I-45 extends from

Galveston on the Texas Gulf Coast to Dallas. Knowing the road and travel conditions within this transportation corridor and having the ability to disseminate this information to motorists are important elements for this project. For example, if I-45 has been closed due to a major incident or weather, and motorists are informed of the closure in advance, they can alter their travel plans with an alternate route or wait to begin their travels.

In addition to roadway infrastructure, the Easterwood Airport serves as the commercial airport for the Brazos Valley Region.

1.3.3 Existing ITS in the Brazos Valley Region

Within the Brazos Valley Region there are currently several ITS applications in place. TxDOT has several portable dynamic message signs (DMS) that are utilized primarily for displaying construction and delay information.

Video Image Vehicle Detection Systems (VIVDS) have been installed at several intersections in the Region by TxDOT. The City of Bryan and the City of College Station also have limited deployments of VIVDS in the Region.

Signal preemption for emergency vehicles is in place within the City of College Station for fire vehicles.

1.3.4 Brazos Valley Stakeholders

Stakeholder coordination and involvement is one of the key elements to the development of a regional ITS architecture and deployment plan. Because ITS often transcends traditional transportation infrastructure, it is important to involve non-traditional stakeholders in the architecture development and visioning process. Input from these stakeholders, both public and private, is a critical part of defining the interfaces, integration needs, and overall vision for ITS in the Brazos Valley Region.

The following is a list of stakeholders in the Brazos Valley Region who have participated in the project workshops or provided input to the study team as to the needs and issues that should be considered as part of the Brazos Valley Regional ITS Architecture and Deployment Plan:

- Blinn College Police Department;
- Brazos County;
- Brazos Transit;
- Brazos Valley Council of Governments;
- Bryan/College Station Chamber of Commerce;
- Bryan/College Station Metropolitan Planning Organization (MPO);
- Brazos County Emergency Management;
- City of Bryan;
- City of College Station;
- City of Huntsville;
- College Station Independent School District (ISD);



- Easterwood Airport;
- Sam Houston State University;
- Texas A&M University;
- Texas Transportation Institute;
- TxDOT Bryan District; and
- TxDOT Traffic Operations Division (Austin).

Stakeholder agencies that are participating in the development of the Brazos Valley Regional ITS Deployment Plan are listed in **Table 1** along with contact information for agency representatives that have participated.

Table 1 – Brazos Valley Stakeholder Agencies and Contacts

Stakeholder Agency	Contact	Address	Phone Number	E-Mail
Blinn College Police Dept.	Grizelda Martinez	PO Box 6030 Bryan, Texas	979-209-7418	gmartinez@blinn.edu
Brazos County	Randy Sims	300 East 26th Street, Ste 114 Bryan, Texas 77803	979-361-4102	N/A
Brazos County	Tom Golson	202 E 27th St, Ste 102 Bryan, Texas 77803	979-361-4468	tgolson@co.brazos.tx.us
Brazos County	Ray Crow	2617 Hwy 21 W Bryan, Texas 77803	979-822-2127	rcrow@co.brazos.tx.us
Brazos County Emergency Management	DeMerle Giordano	101 Regent Avenue, Ste 320 Bryan, Texas 77803	979-361-4140	demerle@co.brazos.tx.us
Brazos Transit	Kristine Box	1759 N. Earl Rudder Freeway Bryan, Texas 77803	979-778-4495	transit2@tca.net
Brazos Transit	Jennifer Montgomery	1759 N. Earl Rudder Freeway Bryan, Texas 77803	979-778-4489	jennifer_transit@tca.net
Brazos Valley Council of Governments	Michael Parks	1706 E 29th Bryan, Texas 77802	979-775-4244	mparks@bvcog.org
Brazos Valley Council of Governments	Tom Wilkinson	P.O. Drawer 4128 Bryan, Texas 77802	979-775-4244	twilkinson@bvcog.org
Bryan/College Station Chamber of Commerce	Dena Gaskin	PO Box 3579 Bryan, Texas 77805	979-260-5200	dena@bcschamber.org
Bryan/College Station Chamber of Commerce	Royce Hickman	P.O. Box 3579 Bryan, Texas 77805	979-260-5200	royce@bcschamber.org
Bryan/College Station Chamber of Commerce	Al Jones	P.O. Box 3579 Bryan, Texas 77805	979-690-6060	annjones@txcyber.com
Bryan/College Station MPO	Jennifer Bearden	3608 E 29th St, Ste 113 Bryan, Texas 77802	979-260-5298	jbeard@bcsmmpo.org
Bryan/College Station MPO	Linda LaSut	3608 E 29th St, Ste 113 Bryan, Texas 77802	979-260-5298	llasut@bcsmmpo.org



Table 1 – Brazos Valley Stakeholder Agencies and Contacts (continued)

Stakeholder Agency	Contact	Address	Phone Number	E-Mail
City of Bryan	Alex Canstansio	P.O. Box 1000 Bryan, Texas 77803	979-209-5937	N/A
City of Bryan	Norman Maurer	1111 Waco Bryan, Texas 77808	979-209-5933	N/A
City of Bryan	George Mitchell	P.O. Box 1000 Bryan, Texas 77803	979-209-5935	N/A
City of Bryan	Paul Kaspar	P.O. Box 1000 Bryan, TX 77805	979-209-5040	pkaspar@bryantx.gov
City of Bryan Police Department	Freddie Komar	301 S Texas Ave Bryan, Texas 77803	979-209-5387	komarf@ci.bryan.tx.us
City of Bryan Police Department	Wayland Rawls	301 S Texas Ave Bryan, Texas 77803	979-209-5456	rawlsw@ci.bryan.tx.us
City of College Station	Olivia Burnside	P.O. Box 9960 College Station, Texas 77842	979-764-3560	oburnside@cstx.gov
City of College Station	Ken Fogle	P.O. Box 9960 College Station, Texas 77842	979-764-3556	kfogle@cstx.gov
City of College Station	Brian Hilton	P.O. Box 9960 College Station, Texas 77842	979-764-6210	bhilton@cstx.gov
City of College Station	Lee Robinson	P.O. Box 9960 College Station, Texas 77842	979-764-3695	N/A
City of College Station	Troy Rother	2613 Texas Ave College Station, Texas 77842	979-764-3838	trother@cstx.gov
City of College Station	Pat Walker	PO Box 9960 College Station, Texas 77842	979-764-3450	N/A
City of College Station Police Department	Mike Mathews	2611 A Texas Avenue S College Station, Texas 77840	979-764-3611	mmathews@cstx.gov
City of College Station Police Department	Zeta Fail	2611 A. Texas Avenue S College Station, Texas 77840	979-764-6311	zfail@cstx.gov
City of Huntsville	City Planner	448 SH 75 N Huntsville, Texas 77320	936-294-5793	N/A
College Station ISD	Bill Conaway	2000 Welsh College Station, Texas 77840	979-764-5440	bconaway@csisd.org
Easterwood Airport	John Happ	1 McKenzie Terminal Blvd, Suite 112 College Station, Texas 77845	979-845-8511	N/A
Federal Highway Administration	Mark Olson	300 East 8th Street, Room 826 Austin, Texas 78701	512-536-5972	mark.olson@fhwa.dot.gov
Sam Houston State University Police	Charles Tacket	2424 Sam Houston Ave Huntsville, Texas 77340	936-294-1794	N/A



Table 1 – Brazos Valley Stakeholder Agencies and Contacts (continued)

Stakeholder Agency	Contact	Address	Phone Number	E-Mail
St. Joseph Regional Health Center	Tim Ottinger	2201 Franciscan Drive Bryan, Texas 77802	979-776-2458	tottinger@mail.st-joseph.org
Texas A&M University	Kathie Mathis	1250 TAMU College Station, Texas 77843-1250	979-862-3441	kmathis@tamu.edu
Texas A&M University	Doug Williams	1250 TAMU College Station, Texas 77843-1250	979-845-9700	dg-williams@tamu.edu
Texas Transportation Institute	Kevin Balke	3135 TAMU College Station, Texas 77843-3135	979-845-9899	k-balke@tamu.edu
Texas Transportation Institute	Bob Brydia	3135 TAMU College Station, Texas 77843-3135	979-845-8140	r-brydia@tamu.edu
Texas Transportation Institute	Dennis Christiansen	3135 TAMU College Station, Texas 77843-3135	979-845-1713	dennis-c@tamu.edu
Texas Transportation Institute	Curtis Herrick	2740 SW Marzin Downs Blvd Suite 227 Palm City, Florida 34990	772-781-1685	gcherrick@earthlink.net
Texas Transportation Institute	Srinivasa Sunkari	3135 TAMU College Station, Texas 77843-3135	979 845-7472	s-sunkari@tamu.edu
Texas Transportation Institute	Leonardo Ruback	3135 TAMU College Station, Texas 77843	979-862-4343	l-ruback@ttimail.tamu.edu
TxDOT – Bryan District	Bob Appleton	1300 North Texas Avenue Bryan, Texas 77803	979-778-9707	bapplet@dot.state.tx.us
TxDOT – Bryan District	Kirk Barnes	1300 North Texas Avenue Bryan, Texas 77803	979-778-9756	kbarnes@dot.state.tx.us
TxDOT – Bryan District	Chad Bohne	1300 North Texas Avenue Bryan, Texas 77803	979-778-9710	N/A
TxDOT – Bryan District	Joe Brewer	1300 North Texas Avenue Bryan, Texas 77803	979-778-9732	jbrew1@dot.state.tx.us
TxDOT – Bryan District	Lonny Traweek	1300 North Texas Avenue Bryan, Texas 77803	979-778-9714	N/A
TxDOT – Bryan District	Darla Walton	1300 North Texas Avenue Bryan, Texas 77803	979-778-9668	dwalton@dot.state.tx.us
TxDOT Austin Traffic Operations	Fabian Kalapach	125 East 11th Street Austin, Texas 78701-2483	(512) 506-5112	fkalapa@dot.state.tx.us
TxDOT Austin Traffic Operations	Alex Power	Attn: TRF-TM 125 East 11th Street Austin, Texas 78701-2483	(512) 416-3444	apower@dot.state.tx.us
TxDOT Public Transportation Division	Ben Herr	125 E. 11th Street Austin, Texas 78701-2483	(512) 416-2812	lherr@dot.state.tx.us

2. PRIORITIZATION OF MARKET PACKAGES

2.1 Prioritization Process

Of the 75 available market packages in the National ITS Architecture, 35 were selected and customized for deployment in the Brazos Valley Region. A 36th market package, Emergency Evacuation by Transit, which does not currently exist in the National ITS Architecture, was created for the Brazos Valley Region to address the needs of stakeholders. Stakeholders were asked to prioritize the market packages into high, medium, and low priorities, based on regional needs, feasibility and likelihood of deployment, and overall contribution of the market package to the goals and vision for ITS functionality in the Region. A summary of these prioritized market packages is shown in **Table 2**.

The market package prioritization was a key factor in developing recommendations for ITS deployment and integration in the Brazos Valley Region. These priorities identified the key needs and services that are desired in the Brazos Valley Region, as well as the interfaces that need to be established to provide integrated functionality and establish communication between elements.

This section includes detailed descriptions of the prioritized market packages for the Brazos Valley Region. The market packages are organized into high, medium and low priorities. It is important to note that the high, medium, and low prioritization does not necessarily correspond to any specific time frame (such as five, ten, or twenty year deployment horizon). For example, a market package can be a high priority, but because of funding or prerequisite project requirements, it might not be feasible for deployment for several years. Maturity and availability of technology were other factors for prioritizing the market packages. Other considerations included whether or not the market package was better suited for private deployment and operations rather than public. As an example, Information Service Provider (ISP)-based Route Guidance might be viewed as a valuable traveler information service for motorists in the Region, but stakeholders felt this market package was best suited for deployment by a private service provider, and as such, deemed it a low priority for agencies in the Region.

Each market package in the following subsections includes:

- A brief definition of the market package (which have been modified from the National ITS Architecture definitions);
- Any existing infrastructure from that market package that is already existing in the Brazos Valley Region;
- Agencies currently operating or maintaining systems that apply to that market package;
- Planned projects that will address some or all of the services that are contained in the market package; and
- Any additional needs to bring the market package to the desired level of deployment or functionality.



Table 2 – Summary of Prioritized Market Packages for the Brazos Valley Region

High Priority	Medium Priority	Low Priority
<ul style="list-style-type: none"> ▪ Network Surveillance ▪ Surface Street Control ▪ Traffic Information Dissemination ▪ Regional Traffic Control ▪ Incident Management System ▪ Standard Railroad Grade Crossing ▪ Railroad Operations Coordination ▪ Emergency Response ▪ Emergency Routing ▪ Transit Vehicle Tracking ▪ Transit Fixed-Route Operations ▪ Transit Passenger and Fare Management ▪ Transit Traveler Information ▪ HAZMAT Management ▪ Broadcast Traveler Information ▪ ITS Data Mart ▪ ITS Data Warehouse 	<ul style="list-style-type: none"> ▪ Parking Facility Management ▪ Reversible Lane Management ▪ Speed Monitoring ▪ Road Weather Data Collection ▪ Weather Information Processing and Distribution ▪ Roadway Maintenance and Construction ▪ Work Zone Management ▪ Maintenance and Construction Activity Coordination ▪ Demand Response Transit Operations ▪ Transit Security ▪ Multi-Modal Coordination 	<ul style="list-style-type: none"> ▪ Probe Surveillance ▪ Electronic Toll Collection ▪ Emergency Evacuation by Transit ▪ Maintenance and Construction Vehicle Tracking ▪ Maintenance and Construction Vehicle Maintenance ▪ Work Zone Safety Monitoring ▪ CV Administrative Processes ▪ ISP Based Route Guidance

2.2 High Priority Market Packages

Market packages that were selected as high priorities for the Brazos Valley Region are listed and described in **Table 3**. These market packages typically represent systems or functions that serve as foundations on which to build regional ITS programs. Listed in this section are market packages that address baseline control, monitoring and coordination technologies for surface streets and freeways, road/weather conditions data gathering, transit, incident management and emergency response.

Many of these high priority market packages have components that are in various stages of deployment and operation in the Brazos Valley Region; that is, there are already systems and technologies deployed to deliver some of these high priority services and functions. For example, the City of College Station closed loop signal systems and VIVDS have already been deployed and these are key components of the Surface Street Control market package. Although these devices are in place, this market package is still listed as a high priority. There are additional capabilities and functionality contained in this market package that are planned for implementation in the near-term, thus building on the existing infrastructure and expanding the services of this particular market package in the Brazos Valley Region.



Table 3 – High Priority Market Packages for the Brazos Valley Region

Network Surveillance (ATMS01)	High Priority
<p>This market package includes traffic detectors, other surveillance equipment, the supporting field equipment, and wireline communications to transmit the collected data back to the Traffic Management Subsystem. The derived data can be used locally or remotely. The data generated by this market package enables traffic managers to monitor traffic and road conditions, identify and verify incidents, detect equipment faults, 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.</p>	
<p>Existing Infrastructure</p> <ul style="list-style-type: none"> ▪ TxDOT Bryan TMC ▪ City of College Station Traffic Operations Center ▪ City of College Station Closed-Circuit Television (CCTV) ▪ City of Bryan Traffic Operations Center 	<p>Agency</p> <ul style="list-style-type: none"> ▪ TxDOT ▪ City of College Station ▪ City of Bryan
<p>Planned Projects</p> <ul style="list-style-type: none"> ▪ TxDOT Advanced Traffic Management System (ATMS) Implementation ▪ TxDOT CCTV 	
<p>Additional Needs</p> <ul style="list-style-type: none"> ▪ TxDOT Closed Loop Signal System Expansion Phase 1 ▪ TxDOT Bryan TMC Expansion ▪ City of Bryan Closed Loop Signal System Expansion Phase 1 ▪ City of College Station Closed Loop Signal System Expansion Phase 1 ▪ City of College Station Additional CCTV Cameras ▪ Brazos Valley Regional ITS Telecommunications Master Plan ▪ TxDOT Road Weather Information System (RWIS) Stations ▪ TXDOT Additional CCTV ▪ City of Bryan CCTV Camera Implementation ▪ City of Bryan TOC Expansion ▪ City of College Station TOC Expansion ▪ Texas A&M University Traffic Management Center ▪ TxDOT Additional RWIS Stations ▪ TxDOT Work Zone Safety Monitoring ▪ TxDOT Closed Loop Signal System Expansion Phase 2 ▪ City of Bryan Closed Loop Signal System Expansion Phase 2 ▪ City of College Station Closed Loop Signal System Expansion Phase 2 ▪ City of Bryan Rail Crossing Warning System ▪ City of College Station Rail Crossing Warning System ▪ Municipal Closed Loop Signal System Implementation 	

Table 3 – High Priority Market Packages for the Brazos Valley Region (continued)

Network Surveillance (ATMS01)	High Priority
<p>Additional Needs (continued)</p> <ul style="list-style-type: none"> ▪ TxDOT Closed Loop Signal System Expansion Phase 3 ▪ City of Bryan Closed Loop Signal System Expansion Phase 3 ▪ City of College Station Closed Loop Signal System Expansion Phase 3 ▪ Municipal Closed Loop Signal System Expansion 	
Surface Street Control (ATMS03)	High Priority
<p>This market package provides the central control and monitoring equipment, communication links, and the signal control equipment that support local surface street control and/or arterial traffic management. A range of traffic signal control systems are represented by this market package ranging from static pre-timed control systems to fully traffic responsive systems that dynamically adjust control plans and strategies based on current traffic conditions and priority requests. This market package is consistent with typical urban traffic signal control systems.</p>	
<p>Existing Infrastructure</p> <ul style="list-style-type: none"> ▪ TxDOT Bryan TMC ▪ TxDOT Closed Loop Signal System with VIVDS ▪ City of College Station Closed Loop Signal System ▪ City of College Station VIVDS and Loop Detection ▪ City of College Station Signal Preemption for Emergency Vehicles ▪ City of College Station TOC ▪ City of Bryan Closed Loop Signal System ▪ City of Bryan VIVDS and Loop Detection ▪ City of Bryan TOC 	<p>Agency</p> <ul style="list-style-type: none"> ▪ TxDOT ▪ City of College Station ▪ City of Bryan
<p>Planned Projects None identified</p>	
<p>Additional Needs</p> <ul style="list-style-type: none"> ▪ TxDOT Closed Loop Signal System Expansion Phase 1 ▪ City of Bryan Closed Loop Signal System Expansion Phase 1 ▪ City of College Station Loop Signal System Expansion Phase 1 ▪ TxDOT Bryan TMC Expansion ▪ City of College Station Additional CCTV Cameras ▪ Brazos Valley Regional ITS Telecommunications Master Plan ▪ TxDOT Bryan Emergency Vehicle Signal Preemption Expansion 	



Table 3 – High Priority Market Packages for the Brazos Valley Region (continued)

Surface Street Control (ATMS03)	High Priority
<p>Additional Needs (continued)</p> <ul style="list-style-type: none"> ▪ City of Bryan Emergency Vehicle Signal Preemption Expansion ▪ City of College Station Emergency Vehicle Signal Preemption Expansion ▪ TxDOT Closed Loop Signal System Expansion Phase 2 ▪ City of Bryan Closed Loop Signal System Expansion Phase 2 ▪ City of College Station Loop Signal System Expansion Phase 2 ▪ Municipal Closed Loop Signal System Implementation ▪ City of Bryan TOC Expansion ▪ City of College Station TOC Expansion ▪ Texas A&M University Traffic Management Center ▪ Special Event Management Reversible Lane System ▪ City of Bryan CCTV Camera Implementation ▪ City of Bryan Rail Crossing Warning System ▪ City of College Station Rail Crossing Warning System ▪ Municipal Closed Loop Signal System Implementation ▪ TxDOT Closed Loop Signal System Expansion Phase 3 ▪ City of Bryan Closed Loop Signal System Expansion Phase 3 ▪ City of College Station Loop Signal System Expansion Phase 3 ▪ Municipal Closed Loop Signal System Expansion ▪ Municipal Traffic Signal Preemption 	



Table 3 – High Priority Market Packages for the Brazos Valley Region (continued)

Traffic Information Dissemination (ATMS06)	High Priority
<p>This market package allows traffic information and road/bridge closures due to construction, maintenance, and weather, to be disseminated to drivers and vehicles using roadway equipment such as dynamic message signs or highway advisory radio.</p> <p>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.</p>	
<p>Existing Infrastructure</p> <ul style="list-style-type: none"> ▪ TxDOT Bryan TMC ▪ TxDOT Portable DMS ▪ TxDOT Highway Condition Reporting System (HCRS) ▪ City of Bryan TOC ▪ City of Bryan Portable DMS ▪ City of College Station TOC ▪ City of College Station Portable DMS 	<p>Agency</p> <ul style="list-style-type: none"> ▪ TxDOT ▪ City of Bryan ▪ City of College Station
<p>Planned Projects</p> <ul style="list-style-type: none"> ▪ TxDOT ATMS Implementation ▪ TxDOT Center-to-Center Communication (Statewide TxDOT District Communications) ▪ TxDOT HCRS Enhancement ▪ TxDOT DMS 	
<p>Additional Needs</p> <ul style="list-style-type: none"> ▪ TxDOT Bryan TMC Expansion ▪ Media Liaison and Coordination ▪ Brazos Valley Regional ITS Telecommunications Master Plan ▪ DPS/TxDOT Bryan TMC Connection ▪ Texas A&M Emergency Operations Center (EOC)/TxDOT Bryan TMC Connection ▪ State EOC/TxDOT Bryan TMC Connection ▪ City of Bryan EOC/TxDOT Bryan TMC Connection ▪ City of College Station EOC/TxDOT Bryan TMC Connection ▪ City of Bryan TOC Expansion ▪ City of College Station TOC Expansion ▪ Texas A&M University Traffic Management Center ▪ Regional 511 Advanced Traveler Information System Server ▪ TxDOT Additional DMS ▪ TxDOT Portable DMS ▪ City of Bryan Portable DMS 	



Table 3 – High Priority Market Packages for the Brazos Valley Region (continued)

Traffic Information Dissemination (ATMS06)	High Priority
<p>Additional Needs (continued)</p> <ul style="list-style-type: none"> ▪ City of College Station Portable DMS ▪ ISP Based Route Guidance ▪ Brazos Transit/TxDOT Bryan District Communications Connection ▪ City of Bryan Rail Crossing Warning System ▪ City of College Station Rail Crossing Warning System ▪ Municipal/County EOC/TxDOT Bryan TMC Connection ▪ Texas A&M Transit/City of Bryan Communication Connection ▪ Texas A&M Transit/City of College Station Communication Connection ▪ Brazos Transit/City of Bryan Communication Connection ▪ Brazos Transit/City of College Station Communication Connection 	



Table 3 – High Priority Market Packages for the Brazos Valley Region (continued)

Regional Traffic Control (ATMS07)	High Priority
<p>This market package provides for the sharing of traffic information and control among traffic management centers to support a regional control strategy. This package relies on roadside instrumentation supported by the Surface Street Control and Freeway Control Market Packages and adds hardware, software, and communications capabilities to implement traffic management strategies that are coordinated between allied traffic management centers. The extent of information and control sharing is determined through working arrangements between jurisdictions.</p>	
<p>Existing Infrastructure</p> <ul style="list-style-type: none"> ▪ TxDOT Bryan TMC ▪ City of Bryan TOC ▪ City of College Station TOC ▪ Other Texas Region TMCs 	<p>Agency</p> <ul style="list-style-type: none"> ▪ TxDOT ▪ City of Bryan ▪ City of College Station ▪ Other Texas Regions
<p>Planned Projects</p> <ul style="list-style-type: none"> ▪ TxDOT ATMS Implementation ▪ TxDOT Center-to-Center Communication (Statewide TxDOT District Communications) ▪ TxDOT Bryan TMC/Translink Communication Connection 	
<p>Additional Needs</p> <ul style="list-style-type: none"> ▪ TxDOT Bryan TMC Expansion ▪ Brazos Valley Regional ITS Telecommunications Master Plan ▪ City of Bryan TOC Expansion ▪ City of College Station TOC Expansion ▪ Texas A&M University Traffic Management Center ▪ City of Bryan TOC/City of College Station TOC Communications Connection ▪ City of Bryan TOC/TxDOT Bryan TMC Communications Connection ▪ City of College Station TOC/TxDOT Bryan TMC Communications Connection ▪ Municipal TOC/TxDOT TMC Communications Connection ▪ City of Bryan TOC/Translink Communications Connection ▪ City of College Station TOC/Translink Communications Connection 	



Table 3 – High Priority Market Packages for the Brazos Valley Region (continued)

Incident Management System (ATMS08)	High Priority
<p>This market package manages both unexpected incidents and planned events so that the impact to the transportation network and traveler safety is minimized. The market 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 weather service entities and event promoters. Information from these diverse sources is collected and correlated by this market package to detect and verify incidents and implement an appropriate response.</p> <p>The response may include traffic control strategy modifications or resource coordination between center subsystems. 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.</p> <p>Incident response also includes presentation of information to affected travelers using the Traffic Information Dissemination, Broadcast Traveler Information or Interactive Traveler Information market packages.</p>	
<p>Existing Infrastructure</p> <ul style="list-style-type: none"> ▪ TxDOT Bryan TMC ▪ City of Bryan TOC ▪ City of College Station TOC ▪ City of College Station CCTV ▪ County EOCs ▪ Municipal Government EOCs ▪ Brazos County 911 Dispatch ▪ DPS Dispatch ▪ City of College Station Dispatch 	<p>Agency</p> <ul style="list-style-type: none"> ▪ TxDOT ▪ City of Bryan ▪ City of College Station ▪ County Governments ▪ Municipal Governments ▪ Brazos County ▪ DPS
<p>Planned Projects</p> <ul style="list-style-type: none"> ▪ TxDOT ATMS Implementation ▪ TxDOT Center-to-Center Communication (Statewide TxDOT District Communications) ▪ Brazos Valley Region Automated Emergency Call-out Expansion ▪ Brazos County Virtual EOC ▪ TxDOT HCRS Enhancement ▪ TxDOT CCTV ▪ TxDOT DMS 	
<p>Additional Needs</p> <ul style="list-style-type: none"> ▪ TxDOT Bryan TMC Expansion ▪ City of College Station Additional CCTV Cameras ▪ Brazos Valley Regional ITS Telecommunications Master Plan ▪ DPS/TxDOT Bryan TMC Connection ▪ Texas A&M EOC/TxDOT Bryan TMC Connection ▪ City of Bryan EOC/TxDOT Bryan TMC Connection ▪ City of College Station EOC/TxDOT Bryan TMC Connection ▪ Brazos County Virtual EOC ▪ City of Bryan TOC Expansion 	



Table 3 – High Priority Market Packages for the Brazos Valley Region (continued)

Incident Management System (ATMS08)	High Priority
Additional Needs (continued)	
<ul style="list-style-type: none"> ▪ City of College Station TOC Expansion ▪ Texas A&M University Traffic Management Center ▪ City of Bryan TOC/City of College Station TOC Communications Connection ▪ City of Bryan TOC/TxDOT Bryan TMC Communications Connection ▪ City of College Station TOC/TxDOT Bryan TMC Communications Connection ▪ Regional 511 Advanced Traveler Information System Server ▪ TxDOT Additional CCTV ▪ Special Event Management Reversible Lane System ▪ City of Bryan CCTV Camera Implementation ▪ Municipal/County EOC/TxDOT Bryan TMC Connection ▪ TxDOT Additional DMS ▪ City of College Station Dispatch/City of College Station TOC Communications Connection ▪ Brazos County 911/City of Bryan TOC Communications Connection ▪ Brazos County 911/TxDOT Bryan TMC Communications Connection ▪ State EOC/TxDOT Bryan TMC Communications Connection ▪ TxDOT Portable DMS ▪ City of Bryan Portable DMS ▪ City of College Station Portable DMS ▪ Municipal TOC/TxDOT TMC Communications Connection ▪ Municipal/County EOC/TxDOT Bryan TMC Communications Connection ▪ Other Brazos Valley Council of Governments (COG) Counties Virtual EOCs 	



Table 3 – High Priority Market Packages for the Brazos Valley Region (continued)

Standard Railroad Grade Crossing/ Railroad Operations Coordination (ATMS13/ATMS15)	High Priority
<p>This market package manages highway traffic at highway-rail intersections (HRIs) where rail operational speeds are less than 80 miles per hour. Both passive (e.g., the crossbuck sign) and active warning systems (e.g., flashing lights and gates) are supported.</p> <p>These traditional HRI warning systems may also be augmented with other standard traffic management devices. The warning systems are activated on notification by interfaced wayside equipment of an approaching train. The equipment at the HRI may also be interconnected with adjacent signalized intersections so that local control can be adapted to highway-rail intersection activities. Health monitoring of the HRI equipment and interfaces is performed; detected abnormalities are reported to both highway and railroad officials through wayside interfaces and interfaces to the traffic management subsystem.</p> <p>The Railroad Operations Coordination component provides an additional level of strategic coordination between rail operations and traffic management centers. Rail operations provides train schedules, maintenance schedules, and any other forecast events that will result in HRI closures. This information is used to develop forecast HRI closure times and durations that may be used in advanced traffic control strategies or to enhance the quality of traveler information.</p>	
<p>Existing Infrastructure</p> <ul style="list-style-type: none"> ▪ TxDOT Bryan TMC ▪ City of Bryan TOC ▪ City of College Station TOC 	<p>Agency</p> <ul style="list-style-type: none"> ▪ TxDOT ▪ City of Bryan ▪ City of College Station
<p>Planned Projects</p> <p>None identified at this time</p>	
<p>Additional Needs</p> <ul style="list-style-type: none"> ▪ TxDOT Bryan TMC Expansion ▪ City of Bryan TOC Expansion ▪ City of College Station TOC Expansion ▪ City of Bryan Rail Crossing Warning System ▪ City of College Station Rail Crossing Warning System ▪ Texas A&M University Traffic Management Center 	

Table 3 – High Priority Market Packages for the Brazos Valley Region (continued)

Emergency Response (EM01)	High Priority
<p>This market package 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 and coordinated response between agencies.</p>	
<p>Existing Infrastructure</p> <ul style="list-style-type: none"> ▪ Municipal Public Safety Dispatch ▪ County Public Safety Dispatch ▪ Brazos County 911 ▪ Brazos County 911 Automated Call-Out System ▪ City of College Station Dispatch ▪ DPS Dispatch ▪ Private Tow/Wrecker Dispatch 	<p>Agency</p> <ul style="list-style-type: none"> ▪ Municipal Government ▪ County Government ▪ Brazos County ▪ City of College Station ▪ DPS ▪ Private Tow/Wreckers
<p>Planned Projects</p> <ul style="list-style-type: none"> ▪ Brazos Valley Region Automated Call-Out System Expansion ▪ Brazos County Virtual EOC 	
<p>Additional Needs</p> <ul style="list-style-type: none"> ▪ DPS/TxDOT Bryan TMC Connection ▪ Texas A&M EOC/TxDOT Bryan TMC Connection ▪ City of College Station EOC/TxDOT Bryan TMC Connection ▪ City of Bryan EOC/TxDOT Bryan TMC Connection ▪ City of Bryan Emergency Vehicle Automated Vehicle Location (AVL) ▪ City of College Station Emergency Vehicle AVL ▪ TxDOT Bryan Emergency Vehicle Signal Preemption Implementation ▪ City of Bryan Emergency Vehicle Signal Preemption Expansion ▪ City of College Station Emergency Vehicle Signal Preemption Expansion ▪ HAZMAT Incident Notification System ▪ City of College Station Dispatch/City of College Station TOC Communications Connection ▪ Brazos County 911/City of Bryan TOC Communications Connection ▪ Brazos County 911/TxDOT Bryan TMC Communications Connection ▪ State EOC/TxDOT Bryan TMC Communications Connection ▪ CAD Upgrade and Regional Integration ▪ Municipal/County EOC/TxDOT Bryan TMC Communications Connection ▪ Other Brazos Valley COG Counties Virtual EOCs ▪ Sam Houston State University Parking Management Enforcement and Security System 	



Table 3 – High Priority Market Packages for the Brazos Valley Region (continued)

Emergency Routing (EM02)	High Priority
<p>This market package supports automated vehicle location and dynamic routing of emergency vehicles. The service also supports coordination with the Traffic Management Subsystem, collecting detailed road network conditions and requesting special priority or other specific emergency traffic control strategies on the selected route(s). The service provides for information exchange between care facilities and both the Emergency Management Subsystem and emergency vehicles.</p>	
<p>Existing Infrastructure</p> <ul style="list-style-type: none"> ▪ City of Bryan Emergency Vehicle Signal Preemption ▪ City of College Station Emergency Vehicle Signal Preemption 	<p>Agency</p> <ul style="list-style-type: none"> ▪ City of Bryan ▪ City of College Station
<p>Planned Projects</p> <ul style="list-style-type: none"> ▪ Brazos County Virtual EOC 	
<p>Additional Needs</p> <ul style="list-style-type: none"> ▪ TxDOT Bryan Emergency Vehicle Signal Preemption ▪ City of Bryan Emergency Vehicle Signal Preemption Expansion ▪ City of College Station Emergency Vehicle Signal Preemption Expansion ▪ DPS/TxDOT Bryan TMC Connection ▪ Texas A&M EOC/TxDOT Bryan TMC Connection ▪ City of Bryan EOC/TxDOT Bryan TMC Connection ▪ City of College Station EOC/TxDOT Bryan TMC Connection ▪ City of Bryan Emergency Vehicle AVL ▪ City of College Station Emergency Vehicle AVL ▪ Brazos County Virtual EOC ▪ City of College Station Dispatch/City of College Station TOC Communications Connection ▪ Brazos County 911/City of Bryan TOC Communications Connection ▪ Brazos County 911/TxDOT Bryan TMC Communications Connection ▪ State EOC/TxDOT Bryan TMC Communications Connection ▪ CAD Upgrade and Regional Integration ▪ Municipal Traffic Signal Preemption ▪ Municipal/County EOC/TxDOT Bryan TMC Communications Connection ▪ Other Brazos Valley COG Counties Virtual EOCs 	



Table 3 – High Priority Market Packages for the Brazos Valley Region (continued)

Transit Vehicle Tracking (APTS1)	High Priority
<p>This market package monitors current transit vehicle location using an Automated Vehicle Location System. The location data may be used to determine real time schedule adherence and update the transit system’s schedule in real-time.</p>	
<p>Existing Infrastructure</p> <ul style="list-style-type: none"> ▪ Brazos Transit Operations Center with CAD ▪ Texas A&M University Transit Dispatch 	<p>Agency</p> <ul style="list-style-type: none"> ▪ Brazos Transit ▪ Texas A&M University (TAMU)
<p>Planned Projects None identified at this time</p>	
<p>Additional Needs</p> <ul style="list-style-type: none"> ▪ Brazos Transit AVL and Mobile Data Terminals ▪ Texas A&M Transit CAD ▪ Texas A&M Transit AVL and Mobile Data Terminals ▪ College Station ISD AVL 	



Table 3 – High Priority Market Packages for the Brazos Valley Region (continued)

Transit Fixed-Route Operations (APTS2)	High Priority
<p>This market package performs vehicle routing and scheduling, as well as Automated driver assignment and system monitoring for fixed-route transit services. This service determines current schedule performance using AVL data and provides information displays for 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.</p>	
<p>Existing Infrastructure</p> <ul style="list-style-type: none"> ▪ Brazos Transit Operations Center with CAD ▪ Texas A&M University Transit Dispatch 	<p>Agency</p> <ul style="list-style-type: none"> ▪ Brazos Transit ▪ TAMU
<p>Planned Projects</p> <p>None identified at this time</p>	
<p>Additional Needs</p> <ul style="list-style-type: none"> ▪ Brazos Transit AVL and Mobile Data Terminals ▪ Texas A&M Transit CAD ▪ Texas A&M Transit AVL and Mobile Data Terminals ▪ Brazos Transit/Texas A&M Transit Communications Connection ▪ Brazos Transit/TxDOT Bryan TMC Communications Connection ▪ Texas A&M Transit Web-based Ride Scheduling and Travel Data ▪ Brazos Transit Web-based Ride Scheduling and Travel Data Phase 1 ▪ Brazos Transit/City of Bryan TOC Communications Connection ▪ Brazos Transit/City of College Station TOC Communications Connection ▪ Texas A&M Transit/City of College Station TOC Communications Connection ▪ Texas A&M Transit/City of Bryan TOC Communications Connection ▪ Texas A&M Transit/Translink Communications Connection ▪ Brazos Transit/Municipal TOC Communications Connection ▪ Brazos Transit Web-based Ride Scheduling and Travel Data Phase 2 ▪ College Station ISD AVL ▪ College Station ISD On-Board Transit Security System 	



Table 3 – High Priority Market Packages for the Brazos Valley Region (continued)

Transit Passenger and Fare Management (APTS4)	High Priority
<p>This market package manages passenger loading and fare payments on-board vehicles using electronic means. It allows transit users to use a traveler card or other electronic payment device. Sensors mounted on the vehicle permit the driver and central operations to determine vehicle loads, and readers located either in the infrastructure or on-board the transit vehicle allow electronic fare payment. Data is processed, stored, and displayed on the transit vehicle and communicated as needed to the Transit Management Subsystem.</p>	
<p>Existing Infrastructure</p> <ul style="list-style-type: none"> ▪ Brazos Transit Operations Center with CAD ▪ Texas A&M University Transit Dispatch 	<p>Agency</p> <ul style="list-style-type: none"> ▪ Brazos Transit ▪ TAMU
<p>Planned Projects</p> <p>None identified at this time</p>	
<p>Additional Needs</p> <ul style="list-style-type: none"> ▪ Regional Traveler Card ▪ Brazos Transit Automated Passenger Counters 	



Table 3 – High Priority Market Packages for the Brazos Valley Region (continued)

Transit Traveler Information (APTS8)	High Priority
<p>This market 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 market package.</p>	
<p>Existing Infrastructure</p> <ul style="list-style-type: none"> ▪ Brazos Transit Operations Center with CAD ▪ Brazos Transit Website ▪ Texas A&M University Transit Dispatch ▪ Texas A&M Transit Website 	<p>Agency</p> <ul style="list-style-type: none"> ▪ Brazos Transit ▪ TAMU
<p>Planned Projects</p> <ul style="list-style-type: none"> ▪ None identified at this time 	
<p>Additional Needs</p> <ul style="list-style-type: none"> ▪ Texas A&M Transit CAD ▪ Texas A&M Transit Web-based Ride Scheduling and Travel Data ▪ Brazos Transit AVL and Mobile Data Terminals ▪ Texas A&M Transit AVL and Mobile Data Terminals ▪ Brazos Transit/Texas A&M Transit Communications Connection ▪ Brazos Transit Web-based Ride Scheduling and Travel Data Phase 1 ▪ Texas A&M Transit Real-time Bus Information Travel Kiosks ▪ Brazos Transit Real-time Bus Information Travel Kiosks ▪ Brazos Transit Web-based Ride Scheduling and Travel Data Phase 2 ▪ Texas A&M Transit/City of College Station TOC Communication Connection ▪ Texas A&M Transit/City of Bryan TOC Communications Connection ▪ Texas A&M Transit/Translink Communication Connection ▪ College Station ISD AVL 	



Table 3 – High Priority Market Packages for the Brazos Valley Region (continued)

HAZMAT Management (CVO10)	High Priority
<p>This market package integrates incident management capabilities with commercial vehicle tracking to assure effective treatment of HAZMAT materials 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 prior to the beginning of the trip or gathered following the incident depending on the selected policy and implementation.</p>	
<p>Existing Infrastructure</p> <ul style="list-style-type: none"> ▪ DPS Dispatch ▪ City of College Station Fire Department 	<p>Agency</p> <ul style="list-style-type: none"> ▪ DPS ▪ City of College Station
<p>Planned Projects</p> <p>None identified at this time</p>	
<p>Additional Needs</p> <ul style="list-style-type: none"> ▪ HAZMAT Incident Notification System ▪ HAZMAT Rail Incident Notification System 	



Table 3 – High Priority Market Packages for the Brazos Valley Region (continued)

Broadcast Traveler Information (ATIS1)	High Priority
<p>This market package collects traffic conditions, advisories, general public transportation information, toll and parking information, incident information, air quality and weather information, and broadly disseminates this information through existing infrastructure and low cost user equipment (e.g., FM subcarrier, cellular data broadcast). This market package differs from the Traffic Information Dissemination market package, which provides localized HAR and DMS information capabilities.</p> <p>The information may be provided directly to travelers by an information service provider (ISP) or other traveler service providers so that they can better inform travelers of conditions. Successful deployment of this market package relies on availability of real-time traveler information from roadway instrumentation, probe vehicles or other sources.</p>	
<p>Existing Infrastructure</p> <ul style="list-style-type: none"> ▪ TxDOT Bryan TMC ▪ TxDOT HCRS ▪ TxDOT Bryan District Web Page ▪ City of Bryan TOC ▪ City of College Station TOC 	<p>Agency</p> <ul style="list-style-type: none"> ▪ TxDOT ▪ City of Bryan ▪ City of College Station
<p>Planned Projects</p> <ul style="list-style-type: none"> ▪ TxDOT HCRS Enhancement 	
<p>Additional Needs</p> <ul style="list-style-type: none"> ▪ Media Liaison and Coordination ▪ Brazos Valley Regional ITS Telecommunications Master Plan ▪ Regional 511 Advanced Traveler Information System Server ▪ ISP Based Route Guidance 	

Table 3 – High Priority Market Packages for the Brazos Valley Region (continued)

ITS Data Mart (AD1)	High Priority
<p>This market package provides a focused archive that houses data collected and owned by a single agency, district, private sector provider, research institution, or other organization.</p> <p>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 general query and report access to archive data users.</p>	
<p>Existing Infrastructure</p> <ul style="list-style-type: none"> ▪ TxDOT Bryan District Public Transportation Management System ▪ TxDOT Bryan District Pavement Management System ▪ Statewide Crash Records Information System ▪ Translink Data Warehouse ▪ Traffic Counts and Accident Location Database for Brazos County ▪ TAMU Transit Ridership Database 	<p>Agency</p> <ul style="list-style-type: none"> ▪ TxDOT ▪ DPS ▪ Texas Transportation Institute (TTI) ▪ Bryan/College Station MPO ▪ TAMU
<p>Planned Projects</p> <p>None identified at this time</p>	
<p>Additional Needs</p> <p>None identified at this time</p>	

ITS Data Warehouse (AD2)	High Priority
<p>This market package includes all of the data collection and management capabilities provided by the ITS Data Mart, and adds the functionality and interface definitions that allow the collection of data from multiple agencies and data sources spanning across modal and jurisdictional boundaries. It performs the additional transformations and provides the additional data management features that are necessary so that all the data can be managed in a single repository. The potential for large volumes of carried data suggests additional on-line analysis and data mining features that are also included in this market package in addition to the basic query and reporting user access features offered by the ITS Data Mart.</p>	
<p>Existing Infrastructure</p> <ul style="list-style-type: none"> ▪ Translink Data Warehouse 	<p>Agency</p> <ul style="list-style-type: none"> ▪ TTI
<p>Planned Projects</p> <ul style="list-style-type: none"> ▪ TxDOT Bryan TMC/Translink Communications Connection 	
<p>Additional Needs</p> <ul style="list-style-type: none"> ▪ Brazos Valley COG ITS Data Warehouse ▪ MPO Data Warehouse ▪ Translink ITS Data Warehouse 	

2.3 Medium Priority Market Packages

Table 4 outlines market packages that were deemed medium priority by stakeholders in the Brazos Valley Region. These market packages were identified as useful and desirable services and functions for the Region, although very few of these market packages have existing infrastructure in place or planned over the next few years. The feasibility of funding for these market packages was a factor in the prioritization. Availability and maturity of technology also was a consideration, particularly for the maintenance and construction management market packages. Many of these market packages were recently developed and added to the National ITS Architecture, and are not yet widely deployed.

Table 4 – Medium Priority Market Packages for the Brazos Valley Region

Parking Facility Management (ATMS16)	Medium Priority
This market package provides enhanced monitoring and management of parking facilities. It assists in the management of parking operations, coordinates with transportation authorities, and supports electronic collection of parking fees. This market package collects current parking status, shares this data with Information Service Providers and Traffic Management, and collects parking fees using the same in-vehicle equipment utilized for electronic toll collection or contact or proximity traveler cards used for electronic payment.	
Existing Infrastructure None identified at this time	Agency
Planned Projects None identified at this time	
Additional Needs <ul style="list-style-type: none"> ▪ Regional Traveler Card ▪ Texas A&M University Parking Information and Reservation System ▪ Sam Houston State University Parking Information and Reservation System ▪ Sam Houston State University Parking Management Enforcement and Security System 	

Reversible Lane Management (ATMS18)	Medium Priority
This market package provides for the management of reversible lane facilities. In addition to standard surveillance capabilities, this market 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 market package also includes the equipment used to electronically reconfigure intersections and manage right-of-way to address dynamic demand changes and special events.	
Existing Infrastructure None Identified at this time	Agency Not applicable
Planned Projects None identified at this time	
Additional Needs <ul style="list-style-type: none"> ▪ Special Event Management Reversible Lane System 	

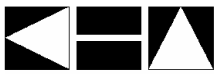


Table 4 – Medium Priority Market Packages for the Brazos Valley Region (continued)

Speed Monitoring (ATMS19)	Medium Priority
<p>This market package monitors the speeds of vehicles traveling through a roadway system. If the speed is determined to be excessive, roadside equipment can suggest a safe driving speed. Environmental conditions may be monitored and factored in to the safe speed advisories that are provided to the motorist. This service can also support notifications to an enforcement agency to enforce the speed limit on a roadway system.</p>	
<p>Existing Infrastructure</p> <ul style="list-style-type: none"> ▪ TxDOT Bryan Portable Speed Trailers with DMS ▪ Bryan Police Department Portable Speed Trailers ▪ College Station Police Department Portable Speed Trailers 	<p>Agency</p> <ul style="list-style-type: none"> ▪ TxDOT ▪ City of Bryan ▪ City of College Station
<p>Planned Projects None identified at this time</p>	
<p>Additional Needs None identified at this time</p>	

Road Weather Data Collection (MC03)	Medium Priority
<p>This market package collects current road and weather conditions using data collected from environmental sensors deployed on and about the roadway. In addition to fixed road weather information system (RWIS) 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 Market Package to process the information and help operators make decisions on operations.</p>	
<p>Existing Infrastructure None identified at this time</p>	<p>Agency</p>
<p>Planned Projects None identified at this time</p>	
<p>Additional Needs</p> <ul style="list-style-type: none"> ▪ TxDOT RWIS Stations ▪ TxDOT Additional RWIS Stations 	



Table 4 – Medium Priority Market Packages for the Brazos Valley Region (continued)

Weather Information Processing and Distribution (MC04)	Medium Priority
<p>This market package processes and distributes the environmental information collected from the Road Weather Data Collection market package. This market package uses the environmental data to detect environmental hazards such as icy road conditions, high winds, and dense fog, so system operators and decision support systems can make decisions 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 market package, and aid operators in scheduling work activity.</p>	
<p>Existing Infrastructure</p> <ul style="list-style-type: none"> ▪ TxDOT Bryan TMC ▪ TxDOT HCRS 	<p>Agency</p> <ul style="list-style-type: none"> ▪ TxDOT
<p>Planned Projects</p> <ul style="list-style-type: none"> ▪ TxDOT ATMS Implementation ▪ TxDOT Center to Center Communication (Statewide TxDOT District Communications) ▪ TxDOT HCRS Enhancement 	
<p>Additional Needs</p> <ul style="list-style-type: none"> ▪ TxDOT Bryan TMC Expansion ▪ Media Liaison and Coordination ▪ Regional 511 Advanced Travel Information System Server ▪ TxDOT RWIS Stations ▪ TxDOT Additional RWIS Stations 	

Roadway Maintenance and Construction (MC07)	Medium Priority
<p>This market 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, routine maintenance activities, and repair and maintenance of both ITS and non-ITS equipment on the roadway. Environmental conditions information is also received from various weather sources to aid in scheduling maintenance and construction activities.</p>	
<p>Existing Infrastructure</p> <p>None identified at this time</p>	<p>Agency</p>
<p>Planned Projects</p> <ul style="list-style-type: none"> ▪ TxDOT HCRS Enhancement 	
<p>Additional Needs</p> <ul style="list-style-type: none"> ▪ TXDOT RWIS Stations ▪ TxDOT Additional RWIS Stations 	



Table 4 – Medium Priority Market Packages for the Brazos Valley Region (continued)

Work Zone Management (MC08)	Medium Priority
<p>This market package directs activity in work zones, controlling traffic through portable DMS and informing other groups of activity (e.g., ISP, TM, other maintenance and construction centers) for better coordination management. Work zone speeds and delays are provided to the motorist prior to the work zones.</p>	
<p>Existing Infrastructure</p> <ul style="list-style-type: none"> ▪ TxDOT Portable DMS ▪ TxDOT Work Zone Speed Trailers with DMS ▪ TxDOT HCRS 	<p>Agency</p> <ul style="list-style-type: none"> ▪ TxDOT
<p>Planned Projects</p> <ul style="list-style-type: none"> ▪ TxDOT Center-to-Center Communications (Statewide TxDOT District Communications) ▪ TxDOT HCRS Enhancements ▪ TxDOT DMS 	
<p>Additional Needs</p> <ul style="list-style-type: none"> ▪ TxDOT Additional DMS ▪ TxDOT Portable DMS ▪ City of Bryan Portable DMS ▪ City of College Station Portable DMS ▪ TxDOT Work Zone Safety Monitoring ▪ Regional 511 Advanced Travel Information System Server 	

Maintenance and Construction Activity Coordination (MC10)	Medium Priority
<p>This market package supports the dissemination of maintenance and construction activity information to centers which can utilize it as part of their operations, or to the Information Service Providers who can provide the information to travelers.</p>	
<p>Existing Infrastructure</p> <ul style="list-style-type: none"> ▪ TxDOT HCRS 	<p>Agency</p> <ul style="list-style-type: none"> ▪ TxDOT
<p>Planned Projects</p> <ul style="list-style-type: none"> ▪ TxDOT HCRS Enhancement ▪ TxDOT Center to Center Communications 	
<p>Additional Needs</p> <ul style="list-style-type: none"> ▪ Media Liaison and Coordination ▪ City of College Station Maintenance Vehicle and Equipment AVL ▪ Regional 511 Advanced Travel Information System Server ▪ Municipal/County Maintenance and Construction Vehicle AVL ▪ City of Bryan Maintenance and Construction Vehicle AVL ▪ City of College Station Maintenance and Construction Vehicle AVL 	



Table 4 – Medium Priority Market Packages for the Brazos Valley Region (continued)

Demand Response Transit Operations (APTS3)	Medium Priority
<p>This market package performs vehicle routing and scheduling as well as Automated driver assignment and monitoring for demand responsive transit services. This package monitors the current status of the transit fleet and supports allocation of these fleet resources to service incoming requests for transit service while also considering traffic conditions. The Transit Management Subsystem provides the necessary data processing and information display to assist the transit operator in making optimal use of the transit fleet. This service includes the capability for a traveler request for personalized transit services to be made through the Information Service Provider (ISP) Subsystem.</p>	
<p>Existing Infrastructure</p> <ul style="list-style-type: none"> ▪ Brazos Transit Operations Center with CAD ▪ Texas A&M University Transit Dispatch 	<p>Agency</p> <ul style="list-style-type: none"> ▪ Brazos Transit ▪ TAMU Transit
<p>Planned Projects</p> <ul style="list-style-type: none"> ▪ None identified at this time 	
<p>Additional Needs</p> <ul style="list-style-type: none"> ▪ Brazos Transit AVL and Mobile Data Terminals ▪ Texas A&M Transit CAD ▪ Texas A&M Transit AVL and Mobile Data Terminals ▪ Brazos Transit/Texas A&M Transit Communication Connection ▪ Brazos Transit/TxDOT Bryan TMC Communications Connection ▪ Texas A&M Transit Web-based Ride Scheduling and Travel Data ▪ Brazos Transit Web-based Ride Scheduling and Travel Data Phase 1 ▪ Brazos Transit/City of Bryan TOC Communications Connection ▪ Brazos Transit/City of College Station TOC Communications Connection ▪ Texas A&M Transit/City of College Station TOC Communications Connection ▪ Texas A&M Transit/City of Bryan TOC Communications Connection ▪ Texas A&M Transit/Translink Communications Connection ▪ Brazos Transit/Municipal TOC Communications Connection ▪ Brazos Transit Web-based Ride Scheduling and Travel Data Phase 2 ▪ College Station ISD AVL ▪ College Station ISD On-board Transit Security System 	

Table 4 – Medium Priority Market Packages for the Brazos Valley Region (continued)

Transit Security (APTS5)	Medium Priority
<p>This market package provides for the physical security of transit passengers. An on-board security system is deployed to perform surveillance and warn of potentially hazardous situations. Public areas (e.g. stops, park and ride lots, stations) are also monitored.</p> <p>Information is communicated to the Transit Management Subsystem using wireless or wireline infrastructure. Security related information is also transmitted to the Emergency Management Subsystem when an emergency is identified that requires an external response. Incident information is communicated to the Information Service Provider.</p>	
Existing Infrastructure	Agency
None identified at this time	
Planned Projects	
None identified at this time	
Additional Needs	
<ul style="list-style-type: none"> ▪ Texas A&M Transit On-board Transit Security Cameras ▪ College Station ISD On-board Transit Security System 	

Multi-modal Coordination (APTS7)	Medium Priority
<p>This market 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 transfer points and also improve operating efficiency. Coordination between traffic and transit management is intended to improve on-time performance of the transit system to the extent that this can be accommodated without degrading overall performance of the traffic network. More limited local coordination between the transit vehicle and the individual intersection for signal priority is also supported by this package.</p>	
Existing Infrastructure	Agency
None identified at this time	
Planned Projects	
None identified at this time	
Additional Needs	
<ul style="list-style-type: none"> ▪ Brazos Transit/Texas A&M Transit Communications Connection ▪ Brazos Transit/TxDOT Bryan TMC Communications Connection ▪ Brazos Transit Real-time Bus Information Travel Kiosks ▪ Texas A&M Transit Real-time Bus Information Travel Kiosks ▪ Brazos Transit/City of Bryan TOC Communications Connection ▪ Brazos Transit/City of College Station TOC Communications Connection ▪ Texas A&M Transit/City of College Station TOC Communications Connection ▪ Texas A&M Transit/City of Bryan TOC Communications Connection ▪ Brazos Transit/Municipal TOC Communications Connection 	



2.4 Low Priority Market Packages

Eight of the market packages that were identified and customized for the Brazos Valley Region were ranked as low priority by stakeholders. These market packages are listed in **Table 5**. The services contained in these lower priority market packages were deemed useful and desirable for the Region, but stakeholders did not feel that public agencies should put a strong focus on these market packages in the near-term. These market packages were included as part of the Regional ITS Architecture so as not to preclude them from future deployment in the Region.

Some of these market packages were identified as candidates for private sector deployment and operations, such as ISP-Based Route Guidance. Others, such as Maintenance and Construction Vehicle Maintenance, are just more feasible for future implementation.

Table 5 – Low Priority Market Packages for the Brazos Valley Region

Market Package Name	Description	Comments
Probe Surveillance (ATMS02)	<p>This market package provides an alternative approach for surveillance of the roadway network. Two general implementation paths are supported by this market package: 1) wide-area wireless communications between the vehicle and Information Service and 2) dedicated short range communications between the vehicle and roadside is used to provide equivalent information directly to the Traffic Management Subsystem.</p> <p>It requires either wide area or short-range communications equipment, roadside beacons and wireline communications for the short-range communications option, data reduction software, and utilizes wireline links between the Traffic Management Subsystem and Information Service Provider Subsystem to share the collected information. Both “Opt out” and “Opt in” strategies are available to ensure the user has the ability to turn off the probe functions to ensure individual privacy.</p>	<p>Probe surveillance was not deemed a high priority market package at the time of the initial architecture development in the Brazos Valley Region. For probe data to be consistent and accurately reflect current conditions there must be a quantifiable amount of vehicles equipped with probes on the roadways at any given time.</p> <p>The Brazos Valley Region might want to investigate the feasibility of using probe surveillance in the future to assist with determining near-real-time volume information on roads or freeways. Potential probe vehicle candidates could be buses or vehicles with electronic toll tags.</p>



Table 5 – Low Priority Market Packages for the Brazos Valley Region (continued)

Market Package Name	Description	Comments
Electronic Toll Collection (ATMS 10)	<p>This market 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. Dedicated short-range communication between the roadway equipment and the vehicle is required as well as wireline interfaces between the toll collection equipment and transportation authorities and the financial infrastructure that supports fee collection. Vehicle tags of toll violators are read and electronically posted to vehicle owners. Standards, inter-agency coordination, and financial clearinghouse capabilities enable regional, and ultimately national interoperability for these services. The toll tags and roadside readers that these systems utilize also can 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>	<p>Electronic Toll Collection was not deemed a high priority because there are currently no toll roads or planned toll roads in the Region.</p> <p>It is possible that the Region will build a toll facility in the future at which point this market package would become a higher priority.</p>
Emergency Evacuation by Transit (EMEX1)	<p>This is a user defined market package created for the Brazos Valley Region to meet stakeholder needs. The market package will allow coordination directly from EOCs to transit agencies to assist in the evacuation of those without transportation means. It provides for automated service requests and real time updating of routes and status for EOC coordinators.</p> <p>Some of the user defined flows will provide 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.</p>	<p>This market package was not deemed a high priority at this time but addresses an issue that the Region needs to incorporate into future disaster planning efforts.</p>



Table 5 – Low Priority Market Packages for the Brazos Valley Region (continued)

Market Package Name	Description	Comments
Maintenance and Construction Vehicle Tracking (MC01)	This market package will track the location of maintenance and construction vehicles and other equipment to ascertain the progress of their activities. These activities can include ensuring the correct roads are being plowed and work activity is being performed at the correct locations.	This market package was not deemed a high priority at this time, however, it was expected that the information from this market package may be useful to the Region some time in the future if maintenance activities were to become more automated. Included in this market package would be instrumentation of maintenance and construction vehicles with AVL.
Maintenance and Construction Vehicle Maintenance (MC02)	This market package performs vehicle maintenance scheduling and manages both routine and corrective maintenance activities on vehicles and other maintenance and construction equipment. It includes on board sensors capable of Automatically performing diagnostics for maintenance and construction vehicles, and the systems that collect this diagnostic information and use it to schedule and manage vehicle maintenance.	Based on the current state of technology, this market package was not identified as needed in the Brazos Valley Region at this time. As technology evolves, the Region may consider implementation of this market package in the future.
Work Zone Safety Monitoring (MC09)	This market package includes systems and strategies to improve work crew safety and reduce collisions between the motoring public and maintenance vehicles and activities. Included in this market package is detection for vehicle intrusions to the work zone and warning systems to alert workers and drivers of potential safety hazards. This market package support both stationary and mobile work zones.	Based on the current state of technology, this market package was not identified as needed in the Brazos Valley Region at this time. As technology evolves, the Region may consider implementation of this market package in the future.
CV Administrative Processes (CVO04)	This market package provides for electronic application, processing, fee collection, issuance, and distribution of CVO credential and tax filing. Through this process, carriers, drivers, and vehicles may be enrolled in the electronic clearance program provided by a separate market package which allows commercial vehicles to be screened at mainline speeds at roadside check facilities. Through this enrollment process, current profile databases are maintained in the Commercial Vehicle Administration subsystem and snapshots of this database are made available to the roadside check facilities to support the electronic clearance process.	This market package will be implemented primarily through the statewide CVISN program. On a Regional level, it will include permitting for oversize, overweight, and other special vehicles from municipal or county governments.



Table 5 – Low Priority Market Packages for the Brazos Valley Region (continued)

Market Package Name	Description	Comments
ISP-Based Route Guidance (ATIS5)	This market package offers the user pre-trip route planning and turn-by-turn route guidance services, which are generated by an Information Service Provider (ISP). Routes may be based on static information or reflect real time network conditions. This approach simplifies the user equipment requirements and can provide the infrastructure better information on which to predict future traffic. The package includes two way data communications and optionally also equips the vehicle with the databases, location determination capability, and display technology to support turn by turn route guidance.	This market package is best suited for deployment and ongoing operations by a private sector ISP. Fee-based subscription services are typically required for delivery of this service. Stakeholders recognized a need to support this market package but will not take an active role in its implementation.

3. PRIORITIZATION OF PROJECTS

In order to achieve the vision of the Regional ITS Architecture, a Region must deploy carefully developed projects that provide the functionality and interoperability identified in the architecture. A key step toward that vision is the development of an ITS Deployment Plan that identifies specific projects, timeframes, and responsible agencies.

Input from all stakeholders is required in order for the stakeholders to have ownership of the ITS Deployment Plan and also to be sure that the plan has realistically identified projects and timeframes for the Region. Cost is another important factor. Cost can vary a great deal for many ITS elements, depending on the level of deployment, maturity of the technology, type of communications, etc. For example, freeway network surveillance could be adequately achieved for one Region by the deployment of still frame CCTV cameras only at freeway interchanges. In another Region, there may be a desire for full motion cameras deployed at one mile intervals to provide complete coverage of the freeway. The infrastructure and telecommunications costs for these two projects would vary a great deal, yet either one could be suitable for a particular Region.

In order to achieve input from stakeholders, a workshop was held in the Brazos Valley Region on October 23, 2003 to present the draft Regional ITS Deployment Plan and discuss potential projects. Each project recommended for the Regional ITS Deployment Plan was discussed, and consensus was reached by the stakeholders on the project description and the timeframe for implementation.

In the following sections, projects are categorized into short-term projects (5-year deployment timeframe), mid-term projects (10-year deployment timeframe), and long-term projects (20-year deployment timeframe). For each timeframe, a summary table has been included that provides a brief project description, responsible agency, probable cost, an indication as to whether funding has been identified, and an estimated duration for the project to be designed and implemented. The agency identified as the responsible agency will be responsible for implementation, operations and maintenance unless otherwise noted.

Following each table, a more detailed description of individual projects is included. This section also lists the market packages associated with each project and any pre-requisite projects that are required.

3.1 Short-Term Projects (5-Year)

Table 6 provides a description of projects for the Brazos Valley Region in the 5-year timeframe. These projects represent the highest priority for the Region and should be strongly considered for implementation in the short-term. Immediately following **Table 6** are project descriptions for each of the short-term recommendations.

3.2 Mid-Term Projects (10-Year)

Table 7 provides a description of projects in the 10-year timeframe. Several of these projects are continuations of projects that will begin in the 5-year timeframe. These projects are important to the Region, but will need further review at the time of their deployment to ensure they are still a priority for the Region. Immediately following **Table 7** are project descriptions for each of the mid-term recommendations.



3.3 Long-Term Projects (20-Year)

Table 8 provides a description of projects in the 20-year timeframe. While these projects represent market packages and anticipated future needs identified for the Region, they will need to be closely reviewed prior to implementation. It is expected that a major update to the Region's ITS Deployment Plan will occur prior to year 10 which would allow stakeholders to reassess these long-term projects to be sure that they are still feasible for the Region. Immediately following **Table 8** are project descriptions for each of the long-term recommendations.



Table 6 – Short-Term Projects (5-Year)

Program Area/Project	Description	Responsible Agency*	Probable Cost**	Funding Identified	Estimated Project Duration
<i>Travel and Traffic Management</i>					
TxDOT Advanced Traffic Management System (ATMS) Implementation	Implement TxDOT ATMS in TxDOT Bryan Traffic Management Center (TMC)	TxDOT	N/A	Yes	2 years
TxDOT Center-to-Center Communication (Statewide TxDOT District Communications)	Enhance coordination with other TxDOT Districts through implementation of center-to-center communications between TxDOT TMCs	TxDOT	N/A	Yes	1 year
TxDOT Closed Loop Signal System Expansion Phase 1	Expand TxDOT closed loop signal system at signalized intersections throughout the Region. Also includes the implementation of VIVDS.	TxDOT	To Be Determined	No	2 years
TxDOT DMS	Implement 2 DMS along Highway 6 for traffic information dissemination	TxDOT/TransLink	\$100,000/sign	Yes	2 years
TxDOT CCTV	Implement 5 CCTV cameras along Highway 6 and arterial routes in the Region for traffic monitoring and incident detection	TxDOT/TransLink	\$20,000-\$25,000/site	Yes	2 years
TxDOT Bryan TMC Expansion	Expand the TxDOT Bryan TMC. The expansion includes the implementation of end equipment to allow video feed and control for VIVDS and CCTV camera pan/tilt/zoom (PTZ).	TxDOT/TransLink	\$200,000	No	1 year
TxDOT Bryan TMC/Translink Communications Connection	Implement a connection between Translink and the TxDOT Bryan TMC to allow video sharing, traffic data sharing, and other joint functions. Control capabilities included in the project will only be used by TxDOT personnel operating from Translink during an event or emergency.	TxDOT/TTI	To Be Determined	Yes	1 year
City of Bryan Closed Loop Signal System Expansion Phase 1	Expand City of Bryan closed loop signal system at additional signalized intersections in the City of Bryan. Also includes the implementation of VIVDS.	Implementation: TxDOT Maintenance and Operation: City of Bryan	To Be Determined	No	2 years



Table 6 – Short-Term Projects (5-Year) (continued)

Program Area/Project	Description	Responsible Agency*	Probable Cost**	Funding Identified	Estimated Project Duration
Travel and Traffic Management (continued)					
City of College Station Closed Loop Signal System Expansion Phase 1	Expand City of College Station closed loop signal system at additional signalized intersections in the City of College Station. Also includes the implementation of VIVDS.	City of College Station	To Be Determined	No	2 years
City of College Station Additional CCTV Cameras	Implement additional CCTV cameras at select locations in the City of College Station for traffic monitoring and incident detection	City of College Station	\$20,000-\$25,000/site	No	2 years
Texas A&M University Parking Information and Reservation System	Implement parking system for Texas A&M University that would display parking information and allow reservations online	TAMU	\$200,000	No	1 year
Media Liaison and Coordination	Develop agreements/enhanced coordination with local media to improve information sharing and dissemination. Provide CCTV camera feeds to media.	TxDOT/City of Bryan /City of College Station/TransLink	N/A	N/A	6 months
Brazos Valley Regional ITS Telecommunications Master Plan	Develop Regional Telecommunications Master Plan including needs analysis and recommendations	TxDOT/City of Bryan/City of College Station/TAMU	\$100,000	No	6 months
Emergency Management					
DPS/TxDOT Bryan TMC Connection	Install connection between DPS and TxDOT Bryan TMC for CCTV camera shared monitoring and control and data sharing	TxDOT/DPS	\$200,000	No	3 months
Texas A&M EOC/TxDOT Bryan TMC Connection	Install connection between the Texas A&M EOC and TxDOT Bryan TMC for emergency coordination	TxDOT/TAMU	To Be Determined	No	3 months
State EOC/TxDOT Bryan TMC Communications Connection	Establish a connection between the State EOC and the TxDOT Bryan TMC for coordination and sharing of incident and traffic information	State EOC/TxDOT	To Be Determined	No	1 year
City of Bryan EOC/TxDOT Bryan TMC Connection	Install connection between the City of Bryan EOC and TxDOT Bryan TMC for emergency coordination	TxDOT/City of Bryan	To Be Determined	No	3 months



Table 6 – Short-Term Projects (5-Year) (continued)

Program Area/Project	Description	Responsible Agency*	Probable Cost**	Funding Identified	Estimated Project Duration
Emergency Management (continued)					
City of College Station EOC/TxDOT Bryan TMC Connection	Install connection between the City of College Station EOC and TxDOT Bryan TMC for emergency coordination	TxDOT/City of Bryan	To Be Determined	No	3 months
City of Bryan Emergency Vehicle AVL	Implement AVL on fire, Emergency Medical Services (EMS), and police vehicles for real-time location information	City of Bryan	\$10,000/vehicle (Includes software)	No	2 years
City of College Station Emergency Vehicle AVL	Implement AVL on fire, EMS, and police vehicles for real-time location information	City of College Station	\$10,000/vehicle (Includes software)	No	2 years
Brazos Valley Region Automated Emergency Call-Out System Expansion	Expand the existing automated call-out system to include the rest of the Region	Regional Emergency Management Agencies	\$80,000	Yes	6 months
Brazos County Virtual EOC	Establish connections between emergency management agencies in Brazos County to form a virtual EOC	Brazos Valley COG	\$45,000	Yes	1 year
TxDOT Bryan Emergency Vehicle Signal Preemption Implementation	Implement signal pre-emption for emergency vehicles at TxDOT Bryan District Signals	TxDOT	To Be Determined	No	1 year
City of Bryan Emergency Vehicle Signal Preemption Expansion	Expand the number of intersections with signal pre-emption for emergency vehicles at City of Bryan intersections	City of Bryan	\$8,000-\$10,000/ intersection	No	1 year
City of College Station Emergency Vehicle Signal Preemption Expansion	Expand the number of intersections with signal pre-emption for emergency vehicles at City of College Station intersections as new intersections are signalized	City of College Station	\$8,000-\$10,000/ intersection	No	1 year



Table 6 – Short-Term Projects (5-Year) (continued)

Program Area/Project	Description	Responsible Agency*	Probable Cost**	Funding Identified	Estimated Project Duration
<i>Maintenance and Construction Management</i>					
TxDOT HCRS Enhancement	Implement enhancements to the Highway Conditions Reporting System (HCRS)	TxDOT	N/A	Yes (statewide initiative)	1 year
<i>Public Transportation Management</i>					
Regional Traveler Card	Implement Regional Traveler Card for payment of transit trips, parking fees and taxis	City of College Station/City of Bryan/Sam Houston State University/TAMU	To Be Determined	No	2 years
Brazos Transit/Texas A&M Transit Communication Connection	Implement a link between Brazos Transit and Texas A&M Transit to provide Brazos Transit the ability to share schedules and real time information between agencies	Brazos Transit/TAMU	To Be Determined	No	1 year
Brazos Transit AVL and Mobile Data Terminals	Implement AVL and mobile data terminals to provide location information of buses and enable communication	Brazos Transit	\$10,000/vehicle (Includes software)	Yes	6 months
Texas A&M Transit Computer Aided Dispatch (CAD)	Implement a CAD system for the Texas A&M Transit that will be compatible with Brazos Valley Transit	TAMU	To Be Determined	No	6 months
Texas A&M Transit AVL and Mobile Data Terminals	Implement AVL and mobile data terminals to provide location information of buses and enable communication	TAMU	\$10,000/vehicle (Includes software)	No	6 months
Texas A&M Transit Web-based Ride Scheduling and Travel Data	Provide web-based ride scheduling and real-time travel data via the internet	TAMU	\$100,000	No	6 months
Brazos Transit/TxDOT Bryan District Communications Connection	Implement a connection between the Brazos Transit dispatch center and the TxDOT Bryan District	Brazos Transit/TxDOT	To Be Determined	No	1 year
Brazos Transit Web-based Ride Scheduling and Travel Data Phase 1	Provide real-time travel data via the internet for demand response vehicles	Brazos Transit	\$40,000	No	6 months



Table 6 – Short-Term Projects (5-Year) (continued)

Program Area/Project	Description	Responsible Agency*	Probable Cost**	Funding Identified	Estimated Project Duration
Commercial Vehicle Operations					
HAZMAT Incident Notification System	Implement incident notification system for vehicles carrying hazardous materials	DPS/Municipal Public Safety Dispatch/County Public Safety Dispatch	To Be Determined	No	1 year
HAZMAT Rail Incident Notification System	Implement incident notification system for rail cars carrying hazardous materials	DPS/Municipal Public Safety Dispatch/County Public Safety Dispatch	To Be Determined	No	1 year
Archived Data					
Brazos Valley COG ITS Data Warehouse	Expand data warehouse to include automated archival of data from City of College Station, City of Bryan, Brazos Transit, and TxDOT Bryan TMC	Brazos Valley COG	\$200,000	No	3 years
MPO Data Warehouse	Implement a data warehouse to archive data from cities and transit agencies in the Bryan/College Station MPO service area	Bryan/College Station MPO	\$100,000	No	3 years
Translink ITS Data Warehouse	Expand data warehouse to include automated archival of data from around the Region	TTI	\$200,000	No	3 years

*Agency listed is responsible for implementation, operations and maintenance unless otherwise noted.

**The design has not been undertaken and thus this is only an opinion of probable cost for planning purposes.



Travel and Traffic Management

TxDOT Advanced Traffic Management System (ATMS) Implementation

Associated Market Packages:

- Network Surveillance (ATMS01)
- Traffic Information Dissemination (ATMS06)
- Regional Traffic Control (ATMS07)
- Incident Management System (ATMS08)
- Weather Information Processing and Distribution (MC04)

Prerequisite Projects: None

Description: This project involves the implementation of ATMS software to facilitate control of DMS, CCTV cameras and other TxDOT field equipment.

The TxDOT ATMS is a software and hardware based platform developed by the TxDOT Traffic Operations Division. The function of this software is to provide a platform for the integration of various subsystems. The high level functions of the TxDOT ATMS include:

- Collect traffic information (e.g., speed, incidents, lane closures) through a variety of collection methods such as loops, video image detection, etc.;
- Data archiving;
- Graphical map with traffic information;
- Status information, command and control for DMS, ramp metering and CCTV;
- Video switching; and
- User ID/password provided with each transaction for tracking use and establishing device control authority.

Future development efforts include software modules to provide status information and command/control of HAR and environmental sensors (such as flood detection systems). An integrated maintenance database management module is also under development. Lastly, several modules are currently being upgraded to support recently approved National Transportation Communications for ITS Protocol (NTCIP) standards for CCTV, Center-to-Center Communications, and data collection devices.

This ATMS implementation project will include the software and hardware necessary to have an operational central system to routinely poll devices and support archiving of data.

TxDOT Center-to-Center Communication (Statewide TxDOT District Communications)

Associated Market Packages:

- Traffic Information Dissemination (ATMS06)
- Regional Traffic Control and Coordination (ATMS07)
- Incident Management System (ATMS08)
- Weather Information Processing and Distribution (MC04)
- Work Zone Management (MC08)
- Maintenance and Construction Activity Coordination (MC10)

Prerequisite Projects: TxDOT Advanced Traffic Management System (ATMS) Implementation

Description: The Center-to-Center Communications project will enhance coordination with TxDOT Districts through connection to the statewide center-to-center core infrastructure. A communication backbone must be developed with sufficient capacity between the TxDOT Bryan District Office and existing center-to-center infrastructure. Determination of whether the backbone should be TxDOT owned, leased, or a combination thereof will be determined at a later date. The software required to support center-to-center communications is integrated with the TxDOT developed ATMS, so significant software development efforts are not anticipated. Resources will be required to oversee installation of the communications backbone between the TxDOT Bryan District Office and statewide center-to-center facilities. As part of connecting to the statewide center-to-center infrastructure, the Brazos Valley Region will provide data to the statewide web server and statewide data archiving database. In return, access to information from other TxDOT Districts (and potentially other agencies) will be available to enhance operations throughout the Region. For example, one anticipated use would be to allow the TxDOT Forth Worth TMC to control DMS signs in the TxDOT Bryan District after hours for posting of Amber Alert messages.

TxDOT Closed Loop Signal System Expansion Phase 1

Associated Market Packages:

- Network Surveillance (ATMS01)
- Surface Street Control (ATMS03)

Prerequisite Projects: None

Description: Expand the closed loop signal system by converting existing signalized intersections to the closed-loop signal system. New signals that are installed as part of other projects will become part of the closed loop signal system. This project also includes the installation of VIVDS.

TxDOT Dynamic Message Signs (DMS)

Associated Market Packages:

- Traffic Information Dissemination (ATMS06)
- Incident Management System (ATMS08)
- Work Zone Management (MC08)

Prerequisite Projects: None

Description: This project consists of the deployment of permanent DMS along State Highway 6 for purposes of traffic information dissemination and incident management. DMS also will be utilized in conjunction with emergency evacuation coordination (i.e., HAZMAT, weather, etc.). The estimated cost per sign is approximately \$100,000.

TxDOT CCTV

Associated Market Packages:

- Network Surveillance (ATMS01)
- Incident Management (ATMS08)

Prerequisite Projects: None

Description: This project includes the deployment of CCTV cameras along key segments of roadway in the Brazos Valley Region. The CCTV cameras can be used for incident detection and verification, to monitor congestion and to aid in the dispatch of emergency vehicles. The information gathered by the CCTV cameras (video feed) can be shared with the area emergency management agencies.

TxDOT Bryan TMC Expansion

Associated Market Packages:

- Network Surveillance (ATMS01)
- Surface Street Control (ATMS03)
- Traffic Information Dissemination (ATMS06)
- Regional Traffic Control (ATMS07)
- Incident Management System (ATMS08)
- Railroad Operations Coordination (ATMS15)
- Weather Information Processing and Distribution (MC04)

Prerequisite Projects: None

Description: This project includes the expansion of the capabilities of the TxDOT Bryan TMC. Currently, the TMC is used primarily to monitor the operations of the controllers and detectors at signalized intersections. Additionally, VIVDS video images are not currently being transmitted to the TMC. The planned expansion of the TMC would include the implementation of end equipment to allow the transmission of the video feed from the VIVDS in the field back to the TMC. This project would

also include the capabilities to control the VIVDS remotely from the TMC as well as control of the PTZ of the planned CCTV cameras.

The estimated cost associated with this expansion is \$200,000.

TxDOT Bryan TMC/Translink Communications Connection

Associated Market Packages:

- Regional Traffic Control (ATMS07)

Prerequisite Projects: None

Description: Install telecommunications connection between Translink and the TxDOT Bryan TMC to allow for CCTV camera shared monitoring and data sharing. Control capabilities will be included in the connection, but device control will only be performed by TxDOT personnel located in the Translink facility for traffic control during an event or an emergency. Cost of this connection will be determined based on the communications method chosen.

City of Bryan Closed Loop Signal System Expansion Phase 1

Associated Market Packages:

- Network Surveillance (ATMS01)
- Surface Street Control (ATMS03)

Prerequisite Projects: None

Description: Expand the closed loop signal system in the City of Bryan. This project will be implemented by TxDOT and then turned over to the City of Bryan for operations and maintenance.

City of College Station Closed Loop Signal System Expansion Phase 1

Associated Market Packages:

- Network Surveillance (ATMS01)
- Surface Street Control (ATMS03)

Prerequisite Projects: None

Description: Expand the closed loop signal system in the City of College Station.

City of College Station Additional CCTV Cameras

Associated Market Packages:

- Network Surveillance (ATMS01)
- Surface Street Control (ATMS03)
- Incident Management (ATMS08)

Prerequisite Projects: None

Description: This project includes the deployment of additional CCTV cameras at key locations in the City of College Station. The CCTV cameras will be used for traffic monitoring and incident detection. The information gathered by the CCTV cameras (video feed) can be shared with area emergency management agencies.

Texas A&M University Parking Information and Reservation System

Associated Market Packages:

- Parking Facility Management (ATMS16)

Prerequisite Projects: None

Description: Install a parking management system that would provide parking information to motorists entering the campus and direct them to parking lots or decks with empty spaces. The system would also allow online parking reservations. Parking management systems have proven to reduce delays/congestion and improve air quality around areas where motorists may “circle” a venue in search of an available parking location. Parking and event management systems are composed of two subsystems. The first subsystem monitors the availability of parking spaces at a facility based on gate counts of vehicles entering and exiting the facility. More sophisticated subsystems count how many spaces are available based on individual parking stall presence detectors. The second major subsystem provides motorists with dynamic parking information on the major streets approaching the venue(s). The information is routinely disseminated using a combination of static and dynamic signing.

Media Liaison and Coordination

Associated Market Packages:

- Traffic Information Dissemination (ATMS06)
- Weather Information Processing and Distribution (MC04)
- Maintenance and Construction Activity Coordination (MC10)
- Broadcast Traveler Information (ATIS1)

Prerequisite Projects: None

Description: Develop stronger liaison and coordination with local media to disseminate traveler information. Develop a link for local media to tap into CCTV camera images for dissemination of traffic and weather advisories to the public via television and radio news broadcasts. Most television and radio stations typically already have microwave licenses and infrastructure in place to support

wireless transmission of video. Therefore, TxDOT should provide a connection point at the TMC for media providers (e.g., video switch including video images and traffic conditions map), but not design and install the entire connection between the TMC and the media. An initial task in the project will be to meet with interested news providers to determine information needs to support media interface design activities. Each agency that will be sharing information directly with the media will likely need an agreement or policy in place to determine what type of information will be shared. A subgroup of the stakeholders will need to work on the process of sharing data with the media and what broadcasts will be allowed to attempt to provide similar data to the media from each individual stakeholder.

Brazos Valley Regional ITS Telecommunications Master Plan

Associated Market Packages:

- Network Surveillance (ATMS01)
- Surface Street Control (ATMS03)
- Traffic Information Dissemination (ATMS06)
- Regional Traffic Control (ATMS07)
- Incident Management System (ATMS08)
- Broadcast Traveler Information (ATIS1)

Prerequisite Projects: None

Description: Develop a Regional ITS Telecommunications Master Plan for the Brazos Valley Region. The Plan would include needs identification and technology alternatives analysis, and will ultimately develop recommendations for region-wide ITS and traffic-related communications. A network to serve center-to-center needs (among traffic management centers, emergency management centers, and 911 centers, both within the Region and inter-Regional) and field-to-center links (from the TMCs out to the ATMS field devices, traffic signals, etc.) will be defined. The plan will investigate technology and transmission media options, comparing technologies, bandwidths, life cycle costs, and other requirements against the Region's needs and goals.

The outcome of these efforts will be a phased plan for transportation and ITS communications throughout the Region over a 20-year period. Strong coordination with public safety is encouraged since there may be significant benefits in combining capital improvement funds to install telecommunications infrastructure to support interagency coordination needs. The estimated cost to develop this plan is \$100,000.

Emergency Management

DPS/TxDOT Bryan TMC Connection

Associated Market Packages:

- Traffic Information Dissemination (ATMS 06)
- Incident Management System (ATMS08)
- Emergency Response (EM01)
- Emergency Routing (EM02)

Prerequisite Projects: None

Description: Install telecommunications connection and end equipment from the DPS dispatch center to TxDOT Bryan TMC to share CCTV and incident data/images and provide information on current road conditions that could assist with incident/emergency management. The cost for this project will depend on the communications used to implement the connection (i.e., fiber connection or leased lines).

Texas A&M EOC/TxDOT Bryan TMC Connection

Associated Market Packages:

- Traffic Information Dissemination (ATMS06)
- Incident Management System (ATMS08)
- Emergency Response (EM01)
- Emergency Routing (EM02)

Prerequisite Projects: None

Description: Install telecommunications connection and end equipment from the Texas A&M EOC to the TxDOT Bryan TMC to share CCTV and incident data/images and provide information on current road conditions that could assist with incident/emergency management. The cost for this project will depend on the communications used to implement the connection (i.e., fiber connection or leased lines).

State EOC/TxDOT Bryan TMC Communications Connection

Associated Market Packages:

- Traffic Information Dissemination (ATMS 06)
- Incident Management System (ATMS08)
- Emergency Response (EM01)
- Emergency Routing (EM02)

Prerequisite Projects: None

Description: Install telecommunications connection and end equipment from the State EOC to the TxDOT Bryan TMC to share CCTV and incident data/images and provide information on current road conditions that could assist with incident/emergency management. The cost for this project will depend on the communications used to implement the connection (i.e., fiber connection or leased lines).

City of Bryan EOC/TxDOT Bryan TMC Connection

Associated Market Packages:

- Traffic Information Dissemination (ATMS 06)
- Incident Management System (ATMS08)
- Emergency Response (EM01)
- Emergency Routing (EM02)

Prerequisite Projects: None

Description: Install telecommunications connection and end equipment from the City of Bryan EOC to the TxDOT Bryan TMC to share CCTV and incident data/images and provide information on current road conditions that could assist with incident/emergency management. The cost for this project will depend on the communications used to implement the connection (i.e., fiber connection or leased lines).

City of College Station EOC/TxDOT Bryan TMC Connection

Associated Market Packages:

- Traffic Information Dissemination (ATMS 06)
- Incident Management System (ATMS08)
- Emergency Response (EM01)
- Emergency Routing (EM02)

Prerequisite Projects: None

Description: Install telecommunications connection and end equipment from the City of College Station EOC to the TxDOT Bryan TMC to share CCTV and incident data/images and provide information on current road conditions that could assist with incident/emergency management. The cost for this project will depend on the communications used to implement the connection (i.e., fiber connection or leased lines).

City of Bryan Emergency Vehicle AVL

Associated Market Packages:

- Emergency Response (EM01)
- Emergency Vehicle Routing (EM02)

Prerequisite Projects: None

Description: Install AVL on City of Bryan fire, police and EMS vehicles. The AVL system will convey information regarding real-time vehicle location to the dispatch centers, which will allow for enhanced dispatch, routing (or re-routing), as well as provide for precise vehicle location information in the event of a breakdown or emergency situation. AVL systems measure actual, real-time position of vehicles, and relay that information back to a dispatch center, usually via global positioning system.

Costs will vary depending on the number of vehicles equipped with the units. For planning purposes, it is estimated that the cost per vehicle is approximately \$10,000.

City of College Station Emergency Vehicle AVL

Associated Market Packages:

- Emergency Response (EM01)
- Emergency Vehicle Routing (EM02)

Prerequisite Projects: None

Description: Install AVL on City of College Station fire, police and EMS vehicles. The AVL system will convey information regarding real-time vehicle location to the dispatch centers, which will allow for enhanced dispatch, routing (or re-routing), as well as provide for precise vehicle location information in the event of a breakdown or emergency situation. AVL systems measure actual, real-time position of vehicles, and relay that information back to a dispatch center, usually via global positioning system.

Costs will vary depending on the number of vehicles equipped with the units. For planning purposes, it is estimated that the cost per vehicle is approximately \$10,000.

Brazos Valley Region Automated Emergency Call-Out System Expansion

Associated Market Packages:

- Incident Management System (ATMS08)

Prerequisite Projects: None

Description: Expand the existing system to include the rest of the Region. The emergency call-out system notifies the public of emergency events in the Region. The system would call every household in an area and play a recorded message with details of action required on the part of the resident. This could be information regarding a prison escapee, hazardous materials spill, or other incident where a large segment of the community needs to be made aware of an emergency condition.

Brazos County Virtual Emergency Operations Center (EOC)

Associated Market Packages:

- Incident Management System (ATMS08)
- Emergency Response (EM01)
- Emergency Routing (EM02)

Prerequisite Projects: None

Description: Rather than provide for a physical EOC, this project will create a virtual EOC by establishing connections between the different emergency management agencies in Brazos County. The virtual EOC will provide a forum for emergency management officials to work together on incident management tasks without having to be in the same physical location. From their own offices and dispatch centers, officials can carry out emergency plans and coordinate response efforts. This project is estimated to cost \$45,000.

TxDOT Bryan Emergency Vehicle Signal Preemption Implementation

Associated Market Packages:

- Surface Street Control (ATMS03)
- Emergency Response (EM01)
- Emergency Routing (EM02)

Prerequisite Projects: None

Description: Equip traffic signals in the TxDOT Bryan District with traffic signal preemption equipment. Typical installations include mounting hardware at the intersection and on each vehicle authorized to preempt the signal. The intersection equipment includes a detector(s) positioned at the intersection approach(es) connected to the traffic signal controller. As a vehicle equipped with a preemption emitter approaches an intersection, the detector activates a change in signal timing to allow fast and safe passage. Preemption systems have proven to improve safety of emergency personnel and vehicles en-route to an incident.

City of Bryan Emergency Vehicle Signal Preemption Expansion

Associated Market Packages:

- Surface Street Control (ATMS03)
- Emergency Response (EM01)
- Emergency Routing (EM02)

Prerequisite Projects: None

Description: Equip additional traffic signals in the City of Bryan with traffic signal preemption equipment. Typical installations include mounting hardware at the intersection and on each vehicle authorized to preempt the signal. The intersection equipment includes a detector(s) positioned at the intersection approach(es) connected to the traffic signal controller. As a vehicle equipped with a preemption emitter approaches an intersection, the detector activates a change in signal timing to allow fast and safe passage. Preemption systems have proven to improve safety of emergency personnel and vehicles en-route to an incident. The estimated cost per intersection is \$8,000 to \$10,000.

City of College Station Emergency Vehicle Signal Preemption Expansion

Associated Market Packages:

- Surface Street Control (ATMS03)
- Emergency Response (EM01)
- Emergency Routing (EM02)

Prerequisite Projects: None

Description: Equip additional traffic signals in the City of College Station with traffic signal preemption equipment. Typical installations include mounting hardware at the intersection and on each vehicle authorized to preempt the signal. The intersection equipment includes a detector(s) positioned at the intersection approach(es) connected to the traffic signal controller. As a vehicle equipped with a

preemption emitter approaches an intersection, the detector activates a change in signal timing to allow fast and safe passage. Preemption systems have proven to improve safety of emergency personnel and vehicles en-route to an incident. The estimated cost per intersection is \$8,000 to \$10,000.

Maintenance and Construction Management

TxDOT HCRS Enhancement

Associated Market Packages:

- Traffic Information Dissemination (ATMS06)
- Incident Management System (ATMS08)
- Broadcast Traveler Information (ATIS1)
- Weather Information Processing and Distribution (MC04)
- Roadway Maintenance and Construction (MC07)
- Work Zone Management (MC08)
- Maintenance and Construction Activity Coordination (MC10)

Prerequisite Projects: None

Description: TxDOT's HCRS will be enhanced on a statewide basis. The HCRS will use data from the Bryan District Office, both automated (ATMS) and manually entered. It is envisioned that the ATMS software will enhance the data collection and consolidation processes for automated information. This is a statewide effort; the Bryan District will be affected by this project, and will contribute information to the HCRS, but will not be responsible for funding the enhancements or for the implementation schedule.

Public Transportation Management

Regional Traveler Card

Associated Market Packages:

- Transit Passenger and Fare Management (APTS4)
- Parking Facility Management (ATMS16)

Prerequisite Projects: None

Description: Implement a Regional Traveler Card that could be used as a common payment method for transit, parking and taxi fares. It is likely that the City of College Station would take the lead on implementing this project and establishing the reconciliation network. Traveler Cards could be purchased online or at kiosks in parking garages and transit transfer stations.

Brazos Transit/Texas A&M Transit Communication Connection

Associated Market Packages:

- Transit Fixed-Route Operations (APTS2)
- Demand-Response Transit Operations (APTS3)
- Multi-Modal Coordination (APTS7)
- Transit Traveler Information (APTS8)

Prerequisite Projects: None

Description: Implement a link between Brazos Transit and Texas A&M Transit to provide the transit agencies with the ability to share schedules and real time information.

Brazos Transit AVL and Mobile Data Terminals

Associated Market Packages:

- Transit Vehicle Tracking (APTS1)
- Transit Fixed-Route Operations (APTS2)
- Demand-Response Transit Operations (APTS3)
- Transit Traveler Information (APTS8)

Prerequisite Projects: None

Description: Install AVL and Mobile Data Terminal (MDT) units on Brazos Transit vehicles. The AVL system will convey information regarding real-time vehicle location to the Transit Operations Center, which will allow for enhanced system monitoring, scheduling, routing (or re-routing), as well as provide for precise bus location information in the event of a breakdown or emergency situation. AVL systems measure actual, real-time position of transit vehicles, and relay that information back to a transit operations center, usually via global positioning system. Used with a geographic information system map, bus locations can be displayed for any vehicles in the fleet equipped with the on-board AVL unit. AVL, in conjunction with CAD, allows for improved bus tracking capability, as well as archiving and managing historical data. AVL systems also can be equipped with additional features, including tie-ins to alarm/security systems, vehicle component monitoring, and Automated passenger counter and fare payment systems. Information from the AVL/CAD system can be used by transit managers for real-time operations and management as well as for transit traveler information. In areas where AVL technology has been installed on buses, agencies report a 5-25 percent increase in on-time performance, which translates directly to improved efficiency and operations.

Mobile data terminals allow bus operators to send and receive digital messages. Mobile data terminals can be used by dispatchers to notify drivers of adverse conditions, route changes, or other impacts to the route. MDTs can also transmit information from the driver to the dispatch center, including status, disruptions, or silent alarms. An additional feature that can be built-in to the MDT is the ability for vehicle-to-vehicle digital communications, in addition to the vehicle-to-center communications.

Cost will vary depending on the number of vehicles equipped with AVL/MDT systems, as well as the functions and features designed into the systems (above the basic location and digital communication functions). The estimated cost is \$10,000 per vehicle.

Texas A&M Transit Computer Aided Dispatch (CAD)

Associated Market Packages:

- Transit Vehicle Tracking (APTS1)
- Transit Fixed-Route Operations (APTS2)
- Demand-Response Transit Operations (APTS3)
- Transit Traveler Information (APTS8)

Prerequisite Projects: None

Description: Implement CAD for Texas A&M Transit Services to monitor and manage transit operations. The CAD system will provide data processing support to assist the dispatchers in managing communications with vehicles and generate management reports. The main goal of this project is to use automation to plan daily optimal routes where origins, destinations, common locations, and client requested times and equipment needs are grouped so that the most efficient routes with the maximum number of shared rides (several clients sharing a vehicle) are created for the paratransit services.

This CAD system will provide reporting functions, by automatically logging all communications between the dispatch center and the driver, including time, vehicle/driver ID, nature of the communication, and response.

Texas A&M Transit AVL and Mobile Data Terminals

Associated Market Packages:

- Transit Vehicle Tracking (APTS1)
- Transit Fixed-Route Operations (APTS2)
- Demand-Response Transit Operations (APTS3)
- Transit Traveler Information (APTS8)

Prerequisite Projects: None

Description: Install AVL and MDT units on Texas A&M transit vehicles. The AVL system will convey information regarding real-time vehicle location to the Transit Operations Center, which will allow for enhanced system monitoring, scheduling, routing (or re-routing), as well as provide for precise bus location information in the event of a breakdown or emergency situation. AVL systems measure actual, real-time position of transit vehicles, and relay that information back to a transit operations center, usually via global positioning system. Used with a geographic information system map, bus locations can be displayed for any vehicles in the fleet equipped with the on-board AVL unit. AVL, in conjunction with CAD, allows for improved bus tracking capability, as well as archiving and managing historical data. AVL systems also can be equipped with additional features, including tie-ins to alarm/security systems, vehicle component monitoring, and Automated passenger counter and fare payment systems. Information from the AVL/CAD system can be used by transit managers for real-time operations and management as well as for transit traveler information. In areas where AVL technology has been installed on buses, agencies report a 5-25 percent increase in on-time performance, which translates directly to improved efficiency and operations.

Mobile data terminals allow bus operators to send and receive digital messages. Mobile data terminals can be used by dispatchers to notify drivers of adverse conditions, route changes, or other impacts to the route. MDTs can also transmit information from the driver to the dispatch center, including status, disruptions, or silent alarms. An additional feature that can be built-in to the MDT is the ability for vehicle-to-vehicle digital communications, in addition to the vehicle-to-center communications.

Cost will vary depending on the number of vehicles equipped with AVL/MDT systems, as well as the functions and features designed into the systems (above the basic location and digital communication functions). The estimated cost is \$10,000 per vehicle.

Texas A&M Transit Web-based Ride Scheduling and Travel Data

Associated Market Packages:

- Transit Fixed-Route Operations (APTS2)
- Demand Response Transit Operations (APTS3)
- Transit Traveler Information (APTS8)

Prerequisite Projects: Texas A&M Transit CAD

Description: This project will include the publishing of real-time transit data on the TAMU Transit website. Patrons of TAMU Transit fixed-route and paratransit operations will benefit from real-time as well as static information presented on this website. Users of the system will be able to enter their origination and destination addresses and the system will identify the best routes and times for arrivals for the trip. Web-based ride scheduling for demand-response transit is included in this project. The estimated cost for the project is \$100,000.

Brazos Transit/TxDOT Bryan District Communications Connection

Associated Market Packages:

- Traffic Information Dissemination (ATMS06)
- Transit Fixed-Route Operations (APTS2)
- Demand-Response Transit Operations (APTS3)
- Multi-Modal Coordination (APTS7)

Prerequisite Projects: None

Description: Implement communications link between the Bryan District TMC and Brazos Transit. This center-to-center application area supports coordination with traffic management centers to obtain near real-time traffic conditions on transit routes in order to generate optimum schedules and alternate routes when necessary. In addition, information on service/fleet performance and transit incident information and schedules will be provided to the TMC.

The extent to which information and coordination are shared between the centers will be determined through working arrangements among the agencies/jurisdictions involved.



Brazos Transit Web-based Ride Scheduling and Travel Data Phase 1

Associated Market Packages:

- Transit Fixed-Route Operations (APTS2)
- Demand Response Transit Operations (APTS3)
- Transit Traveler Information (APTS8)

Prerequisite Projects: Brazos Transit AVL and MDTs

Description: This project will include the publishing of real-time transit data on Brazos Transit website for demand response vehicles. Patrons of Brazos Transit paratransit operations will benefit from real-time as well as static information presented on this website. The estimated cost for the project is \$40,000.

Commercial Vehicles Operations

HAZMAT Incident Notification System

Associated Market Packages:

- Emergency Response (EM01)
- HAZMAT Management (CVO10)

Prerequisite Projects: None

Description: Implement incident notification system for vehicles carrying hazardous materials. When an incident occurs in which a vehicle carrying hazardous materials was involved a notice is sent to the local public safety office that monitors the area in which the incident occurred. The message contains information regarding the materials being transported by the commercial vehicle to the emergency response agency so that emergency personnel can understand what types of material they will be encountering and the best and safest method to use in the clean-up.

HAZMAT Rail Incident Notification System

Associated Market Packages:

- HAZMAT Management (CVO10)

Prerequisite Projects: None

Description: Implement incident notification system for rail cars carrying hazardous materials. When an incident occurs in which a rail car carrying hazardous materials was involved a notice is sent to the local public safety office that monitors the area in which the incident occurred. The message contains information regarding the materials being transported to the emergency response agency so that emergency personnel can understand what types of material they will be encountering and the best and safest method to use in the clean-up.



Archived Data Management

Brazos Valley COG ITS Data Warehouse

Associated Market Packages:

- ITS Data Mart (AD1)

Prerequisite Projects: None

Description: Expand existing data warehouse to include automated archival of data from the City of College Station, City of Bryan, Brazos Transit and TxDOT Bryan TMC. This project will implement a system to collect, store and process transportation data from selected locations. This project will design the frequency, quantity, and quality of data to be collected and stored. User interfaces will be required at each local agency to be able to access, search, and upload archived data as needed. The interface will likely be web-based.

MPO Data Warehouse

Associated Market Packages:

- ITS Data Mart (AD1)

Prerequisite Projects: None

Description: Implement a system to collect, store and process transportation data from selected locations. This project will design the frequency, quantity, and quality of data to be collected and stored. User interfaces will be required at each local agency to be able to access, search, and upload archived data as needed. The interface will likely be web-based.

Translink ITS Data Warehouse

Associated Market Packages:

- ITS Data Mart (AD1)

Prerequisite Projects: None

Description: Expand existing data warehouse to include automated archival of data from around the Region. This project will implement a system to collect, store and process transportation data from selected locations. This project will design the frequency, quantity, and quality of data to be collected and stored. User interfaces will be required at each local agency to be able to access, search, and upload archived data as needed. The interface will likely be web-based.



Table 7 – Mid-Term Projects (10-Year)

Program Area/Project	Description	Responsible Agency*	Probable Cost**	Funding Identified	Estimated Project Duration
<i>Travel and Traffic Management</i>					
TxDOT Closed Loop Signal System Expansion Phase 2	Continue expansion of closed loop signal system at TxDOT intersections throughout the Region	TxDOT	To Be Determined	No	1 year
TxDOT Additional DMS	Implement additional DMS in the Region for traffic information dissemination	TxDOT	\$100,000/sign	No	2 years
TxDOT Additional CCTV	Implement additional CCTV cameras at select locations on in the Region for traffic monitoring and incident detection	TxDOT	\$20,000-\$25,000/site	No	2 years
Special Event Management Reversible Lane System	Implement a reversible lane system in the City of College Station and Texas A&M Campus to facilitate the movement of traffic during football games and other events	TxDOT/City of College Station/TAMU/City of Bryan	To Be Determined	No	2 years
City of Bryan Closed Loop Signal System Expansion Phase 2	Continue implementation of closed loop signal systems in the City of Bryan. Also includes the implementation of VIVDS.	City of Bryan	To Be Determined	No	2 years
City of Bryan CCTV Camera Implementation	Implement CCTV cameras at major intersections in the City of Bryan	City of Bryan	\$20,000-\$25,000/site	No	2 years
City of Bryan TOC Expansion	Expand the City of Bryan TOC to increase its functionality. The expansion includes the implementation of end equipment to allow video feed and control for VIVDS and CCTV camera pan/tilt/zoom (PTZ).	City of Bryan	\$100,000	No	1 year
City of College Station Closed Loop Signal System Expansion Phase 2	Continue implementation of closed loop signal systems in the City of College Station. Also includes the implementation of VIVDS.	City of College Station	To Be Determined	No	2 years
City of College Station TOC Expansion	Expand and upgrade the City of College Station TOC to increase its functionality.	City of College Station	\$100,000	No	1 year
Texas A&M University Traffic Management Center	Establish a traffic management center at the TransLink facility on the Texas A&M Campus for monitoring and control of traffic during special events	TAMU/TTI	To Be Determined	No	1 year



Table 7 – Mid-Term Projects (10-Year) (continued)

Program Area/Project	Description	Responsible Agency*	Probable Cost**	Funding Identified	Estimated Project Duration
<i>Travel and Traffic Management (continued)</i>					
City of Bryan Rail Crossing Warning System	Implement warning system to alert drivers of approaching trains and expected wait times	City of Bryan/Railroad operators	\$500,000	No	1 year
City of College Station Rail Crossing Warning System	Implement warning system to alert drivers of approaching trains and expected wait times	City of College Station/Railroad operators	\$500,000	No	1 year
City of Bryan TOC/City of College Station TOC Communications Connection	Implement a connection between the City of Bryan TOC and the City of College Station TOC to allow video sharing, traffic data sharing, and other joint functions.	City of Bryan/City of College Station	To Be Determined	No	6 months
City of Bryan TOC/TxDOT Bryan TMC Communications Connection	Implement a connection between the City of Bryan TOC and the TxDOT Bryan TMC to allow video sharing, traffic data sharing, and other joint functions.	City of Bryan/TxDOT	To Be Determined	No	6 months
City of College Station TOC/TxDOT Bryan TMC Communications Connection	Implement a connection between the City of College Station TOC and the TxDOT Bryan TMC to allow video sharing, traffic data sharing, and other joint functions	City of College Station/TxDOT	To Be Determined	No	6 months
City of Bryan TOC/Translink Communications Connection	Implement a connection between the City of Bryan TOC and Translink to allow video sharing, traffic data sharing, and other joint functions. Control capabilities will be included in the project, but only used by City of Bryan personnel operating from Translink during an event or emergency.	City of Bryan/TTI	To Be Determined	No	1 year
City of College Station TOC/Translink Communications Connection	Implement a connection between the City of College Station TOC and Translink to allow video sharing, traffic data sharing, and other joint functions. Control capabilities will be included in the project, but only used by City of College Station personnel operating from Translink during an event or emergency.	City of College Station/TTI	To Be Determined	No	1 year



Table 7 – Mid-Term Projects (10-Year) (continued)

Program Area/Project	Description	Responsible Agency*	Probable Cost**	Funding Identified	Estimated Project Duration
<i>Travel and Traffic Management (continued)</i>					
Municipal Closed Loop Signal System Implementation	Implement closed loop signal systems in other cities in the Region as needed	Brazos Valley Region Cities	To Be Determined	No	2 years
Regional 511 Advanced Traveler Information System Server	Implement advanced traveler information system (ATIS) server in the TxDOT Bryan TMC that will collect, consolidate, and distribute traveler information to a 511 based phone system, web, and private Information Service Providers (ISPs)	TxDOT	To Be Determined	No	1 year
<i>Emergency Management</i>					
City of College Station Dispatch/City of College Station TOC Communications Connection	Establish a connection between the City of College Station Dispatch and the City of College Station TOC for coordination and sharing of incident and traffic information	City of College Station	To Be Determined	No	1 year
Brazos County 911/City of Bryan TOC Communications Connection	Establish a connection between the Brazos County 911 Center and the City of Bryan TOC for coordination and sharing of incident and traffic information	Brazos County/City of Bryan	To Be Determined	No	1 year
Brazos County 911/TxDOT Bryan TMC Communications Connection	Establish a connection between the Brazos County 911 Center and the TxDOT Bryan TMC for coordination and sharing of incident and traffic information	Brazos County/TxDOT	To Be Determined	No	1 year
Computer Aided Dispatch Upgrade and Regional Integration	Develop and implement a common CAD system for emergency dispatch in the Region. A common system will allow dispatch integration and facilitate emergency response.	Emergency Management Agencies	To Be Determined	No	5 years
Other Brazos Valley COG Counties Virtual EOCs	Establish connections between emergency management agencies in the county to form a virtual EOC	Brazos Valley COG	\$45,000/county	No	1 year
Sam Houston State University Parking Management Enforcement and Security System	Implement a system of CCTV cameras in the Sam Houston State University parking garage for parking enforcement and security monitoring.	Sam Houston State University	To Be Determined	No	6 months



Table 7 – Mid-Term Projects (10-Year) (continued)

Program Area/Project	Description	Responsible Agency*	Probable Cost**	Funding Identified	Estimated Project Duration
<i>Maintenance and Construction Management</i>					
TxDOT RWIS Stations	Install RWIS stations to collect road weather information in the Bryan District. Project will include a sensor for ice detection.	TxDOT	\$25,000/station	No	6 months
TxDOT Portable DMS	Procure additional portable DMS for use by TxDOT maintenance crews	TxDOT	\$30,000/sign	No	6 months
City of Bryan Portable DMS	Procure additional portable DMS for use by City of Bryan maintenance crews	City of Bryan	\$30,000/sign	No	6 months
City of College Station Portable DMS	Procure additional portable DMS for use by City of College Station maintenance crews	City of College Station	\$30,000/sign	No	6 months
City of College Station Maintenance Vehicle and Equipment AVL	Install automated vehicle location (AVL) devices on City of College Station maintenance vehicles and equipment so that in the event of an incident the vehicles and equipment that are most appropriate and closest to where they are needed can be located and deployed	City of College Station	\$10,000/vehicle (Includes software)	No	6 months
<i>Public Transportation Management</i>					
Brazos Transit/City of Bryan TOC Communications Connection	Implement a connection between the Brazos Transit dispatch center and the City of Bryan TOC	Brazos Transit/City of Bryan	To Be Determined	No	1 year
Brazos Transit/City of College Station TOC Communications Connection	Implement a connection between the Brazos Transit dispatch center and the City of College Station TOC	Brazos Transit/City of College Station	To Be Determined	No	1 year
Brazos Transit Web-based Ride Scheduling and Travel Data Phase 2	Provide real-time travel data via the internet for fixed route vehicles as well as web based ride scheduling for demand response vehicles	Brazos Transit	\$60,000	No	6 months
Texas A&M Transit/City of College Station TOC Communications Connection	Implement a connection between the Texas A&M Transit dispatch center and the City of College Station TOC	TAMU/City of College Station	To Be Determined	No	1 year



Table 7 – Mid-Term Projects (10-Year) (continued)

Program Area/Project	Description	Responsible Agency*	Probable Cost**	Funding Identified	Estimated Project Duration
Public Transportation Management (continued)					
Texas A&M Transit/Translink Communications Connection	Implement a connection between the Texas A&M Transit dispatch center and Translink for coordination during events	TAMU/TTI	To Be Determined	No	1 year
Texas A&M Transit Real-time Bus Information Travel Kiosks	Provide real-time bus information at transfer stations including time to next bus arrival	Texas A&M Transit	\$60,000	No	9 months
Brazos Transit Real-time Bus Information Travel Kiosks	Provide real-time bus information at transfer stations including time to next bus arrival	Brazos Transit	\$60,000	No	9 months
College Station ISD AVL	Install AVL on College Station ISD Buses	College Station ISD	\$10,000/vehicle (Includes software)	No	6 months
College Station ISD On-board Transit Security System	Install security cameras and mayday buttons on buses and paratransit vehicles	College Station ISD	To Be Determined	No	6 months

*Agency listed is responsible for implementation, operations and maintenance unless otherwise noted.

**The design has not been undertaken and thus this is only an opinion of probable cost for planning purposes.

Brazos Valley Region Mid-Term Projects (10-Year)

Travel and Traffic Management

TxDOT Closed Loop Signal System Expansion Phase 2

Associated Market Packages:

- Network Surveillance (ATMS01)
- Surface Street Control (ATMS03)

Prerequisite Projects: TxDOT Closed Loop Signal System Phase 1

Description: Expand the closed loop signal system by integrating additional signals and implementing VIVDS at select TxDOT intersections throughout the Region.

TxDOT Additional DMS

Associated Market Packages:

- Traffic Information Dissemination (ATMS06)
- Incident Management System (ATMS08)
- Work Zone Management (MC08)

Prerequisite Projects: TxDOT DMS

Description: This project continues the deployment of permanent DMS at locations along roadways in the Region for purposes of traffic information dissemination and incident management. DMS also will be utilized in conjunction with emergency evacuation coordination (i.e., HAZMAT, weather, etc.). The estimated cost per sign is approximately \$100,000.

TxDOT Additional CCTV

Associated Market Packages:

- Network Surveillance (ATMS01)
- Incident Management (ATMS08)

Prerequisite Projects: TxDOT CCTV

Description: This project includes the deployment of additional CCTV cameras along key segments of roadway in the Brazos Valley Region. The CCTV cameras can be used for incident detection and verification, to monitor congestion and to aid in the dispatch of emergency vehicles. The information gathered by the CCTV cameras (video feed) can be shared with the area emergency management agencies.

Special Event Management Reversible Lane System

Associated Market Packages:

- Surface Street Control (ATMS03)
- Incident Management (ATMS08)
- Reversible Lane Management (ATMS18)

Prerequisite Projects: None

Description: This project includes the implementation of a reversible lane system including roadways in the City of Bryan, City of College Station and on the Texas A&M campus. The primary use of these reversible lanes would be to assist in the management of traffic congestion associated with events on the Texas A&M Campus. A reversible lane system would allow existing roadway capacity to be maximized during periods of highly directional traffic.

City of Bryan Closed Loop Signal System Expansion Phase 2

Associated Market Packages:

- Network Surveillance (ATMS01)
- Surface Street Control (ATMS03)

Prerequisite Projects: None

Description: Continue to expand the closed loop signal system in the City of Bryan. This project will likely be implemented by TxDOT and then turned over to the City of Bryan for operations and maintenance.

City of Bryan CCTV Camera Implementation

Associated Market Packages:

- Network Surveillance (ATMS01)
- Surface Street Control (ATMS03)
- Incident Management System (ATMS08)

Prerequisite Projects: None

Description: This project includes the deployment of CCTV cameras at selected intersections in the City of Bryan. The CCTV cameras can be used to monitor congestion associated with recurring events and signal control adjusted according to the vehicular demand. The information gathered by the CCTV cameras (video feed) can be shared with the TxDOT District Office for shared or after-hours viewing/monitoring.

City of Bryan TOC Expansion

Associated Market Packages:

- Network Surveillance (ATMS01)
- Surface Street Control (ATMS03)
- Traffic Information Dissemination (ATMS06)
- Regional Traffic Control (ATMS07)
- Incident Management System (ATMS08)
- Railroad Operations Coordination (ATMS15)

Prerequisite Projects: None

Description: This project includes the expansion of the capabilities of the City of Bryan TOC. Currently, the City of Bryan TOC is used primarily to monitor the operations of the controllers and detectors at signalized intersections. Additionally, VIVDS video images are not currently being transmitted to the TMC. The planned expansion of the TMC would include the implementation of end equipment to allow the transmission of the video feed from the VIVDS in the field back to the TMC. This project would also include the capabilities to control the VIVDS remotely from the TMC as well as control of the PTZ of the CCTV cameras.

The estimated cost associated with this expansion is \$100,000.

City of College Station Closed Loop Signal System Expansion Phase 2

Associated Market Packages:

- Network Surveillance (ATMS01)
- Surface Street Control (ATMS03)

Prerequisite Projects: None

Description: Continue to expand the closed loop signal system in the City of College Station.

City of College Station TOC Expansion

Associated Market Packages:

- Network Surveillance (ATMS01)
- Surface Street Control (ATMS03)
- Traffic Information Dissemination (ATMS06)
- Regional Traffic Control (ATMS07)
- Incident Management System (ATMS08)
- Railroad Operations Coordination (ATMS15)

Prerequisite Projects: None

Description: This project includes the expansion of the capabilities of the City of College Station TOC to increase its capabilities. Currently, the TOC is used primarily to monitor the operations of the controllers and detectors at signalized intersections. Additionally, VIVDS video images are not currently being transmitted to the TMC. The planned expansion of the TMC would include the implementation of end equipment to allow the transmission of the video feed from the VIVDS in the field back to the TMC. This project would also include the capabilities to control the VIVDS remotely from the TMC as well as control of the PTZ of the CCTV cameras.

The estimated cost associated with this expansion is \$100,000.

Texas A&M University Traffic Management Center (TMC)

Associated Market Packages:

- Network Surveillance (ATMS01)
- Surface Street Control (ATMS03)
- Traffic Information Dissemination (ATMS06)
- Regional Traffic Control (ATMS07)
- Incident Management System (ATMS08)
- Railroad Operations Coordination (ATMS15)

Prerequisite Projects: None

Description: The TMC will be a central facility for monitoring, controlling, and managing transportation systems on the Texas A&M Campus. Incidents will be detected and verified and incident information will be provided to the appropriate agencies, such as fire and police dispatch, and also to third party providers. Some ITS technologies that will be used by this center are CCTV cameras, lane control signal and traffic detectors.

This project will likely be established in connection with Translink, perhaps even co-located in the Translink facility.

City of Bryan Rail Crossing Warning System

Associated Market Packages:

- Network Surveillance (ATMS01)
- Surface Street Control (ATMS03)
- Traffic Information Dissemination (ATMS06)
- Standard Railroad Grade Crossing (ATMS13)
- Railroad Operations Coordination (ATMS15)

Prerequisite Projects: None

Description: This project will include highway/rail intersection warning systems that will alert motorists of arriving trains, amount of time the train will occupy the crossing, and the length of time a motorist can expect to be delayed. The deployment of instrumentation will be along roadways at railroad grade crossings. Information will be gathered either directly from the railroad operators or from sensors placed along the railroad right-of-way that monitor train length and speed. Data will be transferred from the field sensors to the City of Bryan TOC where operators can make decisions regarding changes in signal operations to facilitate flow around the closed crossing or to clear traffic once the train has passed the crossing.

The estimated cost for this project is \$500,000.

City of College Station Rail Crossing Warning System

Associated Market Packages:

- Network Surveillance (ATMS01)
- Surface Street Control (ATMS03)
- Traffic Information Dissemination (ATMS06)
- Standard Railroad Grade Crossing (ATMS13)
- Railroad Operations Coordination (ATMS15)

Prerequisite Projects: None

Description: This project will include highway/rail intersection warning systems that will alert motorists of arriving trains, amount of time the train will occupy the crossing, and the length of time a motorist can expect to be delayed. The deployment of instrumentation will be along roadways at railroad grade crossings. Information will be gathered either directly from the railroad operators or from sensors placed along the railroad right-of-way that monitor train length and speed. Data will be transferred from the field sensors to the City of College Station TOC where operators can make decisions regarding changes in signal operations to facilitate flow around the closed crossing or to clear traffic once the train has passed the crossing.

The estimated cost for this project is \$500,000.

City of Bryan TOC/City of College Station TOC Communications Connection

Associated Market Packages:

- Regional Traffic Control (ATMS07)
- Incident Management System (ATMS08)

Prerequisite Projects: None

Description: Install connection between the City of Bryan TOC and the City of College Station TOC to allow video sharing, traffic data sharing and other joint functions. The type of connection (fiber, wireless, leased line) will need to be determined prior to implementation of this project based on desired band width and cost of technologies available.

City of Bryan TOC/TxDOT Bryan TMC Communications Connection

Associated Market Packages:

- Regional Traffic Control (ATMS07)
- Incident Management System (ATMS08)

Prerequisite Projects: None

Description: Install connection between the City of Bryan TOC and the TxDOT Bryan TMC to allow video sharing, traffic data sharing and other joint functions. The type of connection (fiber, wireless, leased line) will need to be determined prior to implementation of this project based on desired band width and cost of technologies available.

City of College Station TOC/TxDOT Bryan TMC Communications Connection

Associated Market Packages:

- Regional Traffic Control (ATMS07)
- Incident Management System (ATMS08)

Prerequisite Projects: None

Description: Install connection between the City of College Station TOC and the TxDOT Bryan TMC to allow video sharing, traffic data sharing and other joint functions. The type of connection (fiber, wireless, leased line) will need to be determined prior to implementation of this project based on desired band width and cost of technologies available.

City of Bryan TOC/Translink Communications Connection

Associated Market Packages:

- Regional Traffic Control (ATMS07)

Prerequisite Projects: None

Description: Install connection between the City of Bryan TOC and Translink to allow video sharing, traffic data sharing and other joint functions. The type of connection (fiber, wireless, leased line) will need to be determined prior to implementation of this project based on desired band width and cost of technologies available.

City of College Station TOC/Translink Communications Connection

Associated Market Packages:

- Regional Traffic Control (ATMS07)

Prerequisite Projects: None

Description: Install connection between the City of College Station TOC and Translink to allow video sharing, traffic data sharing and other joint functions. The type of connection (fiber, wireless, leased line) will need to be determined prior to implementation of this project based on desired band width and cost of technologies available.

Municipal Closed Loop Signal System Implementation

Associated Market Packages:

- Network Surveillance (ATMS01)
- Surface Street Control (ATMS03)

Prerequisite Projects: None

Description: Implement a closed loop signal system in smaller cities in the Brazos Valley Region.

Regional 511 Advanced Travel Information System Server

Associated Market Packages:

- Traffic Information Dissemination (ATMS06)
- Incident Management System (ATMS08)
- Broadcast Traveler Information (ATIS1)
- ISP-Based Route Guidance Support (ATIS5)
- Weather Information Processing and Distribution (MC04)
- Work Zone Management (MC08)
- Maintenance and Construction Activity Coordination (MC10)

Prerequisite Projects: TxDOT ATMS, TxDOT Center-to-Center Communications, TxDOT Highway Condition Reporting System Enhancements

Description: Install a server dedicated to ATIS in the TxDOT Bryan District Office. This server would be installed as part of a 511 rollout in Texas and would provide a gateway for public and private entities to access current conditions, closures, restrictions, weather, and other valuable travel information. Relevant data from the ATMS and HCRS would be sent to the ATIS server where it would be consolidated and ‘packaged’ for distribution via phone (511) and also web and to private partners who desire access to information in the Brazos Valley Region. These private partners could include local media and information service providers, which would link to the ATIS server to download information, or obtain real-time feeds, depending on the link provided by the private partner. Appropriate security measures and firewalls could be designed into the server to allow or restrict access to registered, authorized users. By fusing various types of data from a variety of sources (traffic management, incident management, and others), this data can be converted to usable information for travelers as well as other agencies.

Emergency Management

City of College Station Dispatch/City of College Station TOC Communications Connection

Associated Market Packages:

- Incident Management System (ATMS08)
- Emergency Response (EM01)
- Emergency Routing (EM02)

Prerequisite Projects: None

Description: Install telecommunications connection between the City of College Station Dispatch and City of College Station TOC to allow for CCTV camera shared monitoring and control and data sharing. Cost of this connection will be determined based on the communications method chosen.

Brazos County 911/City of Bryan TOC Communications Connection

Associated Market Packages:

- Incident Management System (ATMS08)
- Emergency Response (EM01)
- Emergency Routing (EM02)

Prerequisite Projects: None

Description: Install telecommunications connection between the Brazos County 911 Dispatch and City of Bryan TOC to allow for CCTV camera shared monitoring and control and data sharing. Cost of this connection will be determined based on the communications method chosen.

Brazos County 911/TxDOT Bryan TMC Communications Connection

Associated Market Packages:

- Incident Management System (ATMS08)
- Emergency Response (EM01)
- Emergency Routing (EM02)

Prerequisite Projects: None

Description: Install telecommunications connection between the Brazos County 911 Dispatch and TxDOT TMC Bryan District to allow for CCTV camera shared monitoring and control and data sharing. Cost of this connection will be determined based on the communications method chosen.

Computer Aided Dispatch Upgrade and Regional Integration

Associated Market Packages:

- Incident Management System (ATMS08)
- Emergency Response (EM01)
- Emergency Routing (EM02)

Prerequisite Projects: None

Description: Implement a common CAD system for emergency dispatch in the Region. An integrated common system would allow seamless dispatch and vehicle tracking across jurisdictional boundaries and facilitate emergency response efforts.

Other Brazos Valley COG Counties Virtual Emergency Operations Centers (EOCs)

Associated Market Packages:

- Incident Management System (ATMS08)
- Emergency Response (EM01)
- Emergency Routing (EM02)

Prerequisite Projects: None

Description: Rather than provide for a physical EOC, this project will create a virtual EOC by establishing connections between the different emergency management agencies in a county. The virtual EOC will provide a forum for emergency management official to work together on incident management tasks without having to be in the same physical location. From their own offices and dispatch centers, officials can carry out emergency plans and coordinate response efforts. This project is estimated to cost \$45,000 per county in the Brazos Valley COG.

Sam Houston State University Parking Management Enforcement and Security System

Associated Market Packages:

- Emergency Response (EM01)
- Parking Facility Management (ATMS16)

Prerequisite Projects: None

Description: This project provides CCTV cameras in the parking decks on campus for the purpose of parking enforcement and security surveillance.

Maintenance and Construction Management

TxDOT RWIS Stations

Associated Market Packages:

- Network Surveillance (ATMS01)
- Road Weather Data Collection (MC03)
- Weather Information Processing and Distribution (MC04)
- Roadway Maintenance and Construction (MC07)

Prerequisite Projects: None

Description: Install RWIS stations in the Brazos Valley Region. The RWIS will be remotely monitored from the TxDOT Bryan TMC. Real time weather information improves response time, increases winter maintenance efficiency and minimizes the traveling public's exposure to hazardous weather related roadway conditions. Archived RWIS information also provides valuable historic information for planning purposes. Data including temperature (atmospheric and pavement), precipitation, wind, humidity, visibility (white out/heavy fog) and even pavement surface conditions (i.e., snow, chemical)

are collected by sensors placed at the roadside (typically on a 30 foot tower) and embedded in the roadway. Remote processing units placed along the roadway communicate with various types of road and weather sensors. Data from the units are transmitted to the central ATMS server, via dial-up modem or other low bandwidth telecommunications methods, which will be located at the TxDOT Bryan TMC. A future module for the ATMS software will support environmental sensor data and provides collection, archiving, and distribution of the data.

The estimated cost for one RWIS station is \$25,000.

TxDOT Portable DMS

Associated Market Packages:

- Traffic Information Dissemination (ATMS06)
- Incident Management System (ATMS08)
- Work Zone Management (MC08)

Prerequisite Projects: None

Description: Portable DMS are a valuable tool to communicate existing and future closures, restrictions, detours, alternate routes, and other important information to motorists while they are en-route. These signs can be used at or near work zones to notify motorists of activity and appropriate measures to take (i.e., detour, slow down), but also can be mobilized at specific locations as conditions warrant, such as flooding or other closures. Portable DMS can be stand-alone signs or mounted to the back of a maintenance vehicle. Programming is typically done manually at the sign. The TxDOT Bryan District Office currently has access to portable DMS that can be used in the Region. This project will procure additional portable DMS. The estimated cost is \$30,000 a sign.

City of Bryan Portable DMS

Associated Market Packages:

- Traffic Information Dissemination (ATMS06)
- Incident Management System (ATMS08)
- Work Zone Management (MC08)

Prerequisite Projects: None

Description: This project would procure additional portable DMS for the City of Bryan maintenance crews. Portable DMS are a valuable tool to communicate existing and future closures, restrictions, detours, alternate routes, and other important information to motorists while they are en-route. These signs can be used at or near work zones to notify motorists of activity and appropriate measures to take (i.e., detour, slow down), but also can be mobilized at specific locations as conditions warrant, such as flooding or other closures. Portable DMS can be stand-alone signs or mounted to the back of a maintenance vehicle. Programming is typically done manually at the sign. The estimated cost is \$30,000 per sign.

City of College Station Portable DMS

Associated Market Packages:

- Traffic Information Dissemination (ATMS06)
- Incident Management System (ATMS08)
- Work Zone Management (MC08)

Prerequisite Projects: None

Description: This project would procure additional portable DMS for the City of College Station maintenance crews. Portable DMS are a valuable tool to communicate existing and future closures, restrictions, detours, alternate routes, and other important information to motorists while they are en-route. These signs can be used at or near work zones to notify motorists of activity and appropriate measures to take (i.e., detour, slow down), but also can be mobilized at specific locations as conditions warrant, such as flooding or other closures. Portable DMS can be stand-alone signs or mounted to the back of a maintenance vehicle. Programming is typically done manually at the sign. The estimated cost is \$30,000 per sign.

City of College Station Maintenance Vehicle and Equipment AVL

Associated Market Packages:

- Maintenance and Construction Vehicle Tracking (MC01)
- Maintenance and Construction Activity Coordination (MC10)

Prerequisite Projects: None

Description: Similar to the transit AVL project, the maintenance and construction AVL project includes equipping City of College Station maintenance vehicles or other heavy equipment with global positioning system (GPS) based vehicle locators. It is envisioned that the location of the vehicle would be overlaid on a basemap showing real-time positions of each equipped vehicle. The main purpose of the system is to assist dispatchers and supervisors to better manage the fleet of vehicles. For example, if a report of a spill occurred on a major roadway, a supervisor could quickly determine what vehicle is closest and best equipped to clean up the spill.

Public Transportation Management

Brazos Transit/City of Bryan TOC Communications Connection

Associated Market Packages:

- Traffic Information Dissemination (ATMS06)
- Transit Fixed-Route Operations (APTS2)
- Demand-Response Transit Operations (APTS3)
- Multi-modal Coordination (APTS7)

Prerequisite Projects: None

Description: Implement communications link between the City of Bryan and Brazos Transit. This center-to-center application area supports coordination with traffic management centers to obtain near real-time traffic conditions on transit routes in order to generate optimum schedules and alternate routes when necessary. In addition, information on service/fleet performance and transit incident information and schedules will be provided to the TOC.

The extent to which information and coordination are shared between the centers will be determined through working arrangements among the agencies/jurisdictions involved.

Brazos Transit/City of College Station TOC Communications Connection

Associated Market Packages:

- Traffic Information Dissemination (ATMS06)
- Transit Fixed-Route Operations (APTS2)
- Demand-Response Transit Operations (APTS3)
- Multi-modal Coordination (APTS7)

Prerequisite Projects: None

Description: Implement communications link between the City of College Station and Brazos Transit. This center-to-center application area supports coordination with traffic management centers to obtain near real-time traffic conditions on transit routes in order to generate optimum schedules and alternate routes when necessary. In addition, information on service/fleet performance and transit incident information and schedules will be provided to the TOC.

The extent to which information and coordination are shared between the centers will be determined through working arrangements among the agencies/jurisdictions involved.

Brazos Transit Web-based Ride Scheduling and Travel Data Phase 2

Associated Market Packages:

- Transit Fixed-Route Operations (APTS2)
- Demand Response Transit Operations (APTS3)
- Transit Traveler Information (APTS8)

Prerequisite Projects: Brazos Transit AVL and MDTs, Web-based Ride Scheduling and Travel Data Phase 1

Description: This project is a continuation of the phase one project in the short term and will include the publishing of real-time transit data on Brazos Transit website for fixed route vehicles. Patrons of Brazos Transit paratransit and fixed route service operations will benefit from real-time as well as static information presented on this website. Users of the system will be able to enter their origination and destination addresses and the system will identify the best routes and arrival times for the trip and allow paratransit patrons to schedule a ride. The estimated cost for the project is \$60,000.

Texas A&M Transit/City of College Station TOC Communications Connection

Associated Market Packages:

- Traffic Information Dissemination (ATMS06)
- Transit Fixed-Route Operations (APTS2)
- Demand-Response Transit Operations (APTS3)
- Multi-Modal Coordination (APTS7)

Prerequisite Projects: None

Description: Implement communications link between the City of College Station and Texas A&M Transit. This center-to-center application area supports coordination with traffic management centers to obtain near real-time traffic conditions on transit routes in order to generate optimum schedules and alternate routes when necessary. In addition, information on service/fleet performance and transit incident information and schedules will be provided to the TOC.

The extent to which information and coordination are shared between the centers will be determined through working arrangements among the agencies/jurisdictions involved.

Texas A&M Transit/Translink Communications Connection

Associated Market Packages:

- Traffic Information Dissemination (ATMS06)
- Transit Fixed-Route Operations (APTS2)
- Demand-Response Transit Operations (APTS3)

Prerequisite Projects: None

Description: Implement communications link between the Translink and Texas A&M Transit. This center-to-center application area supports coordination with traffic management centers to obtain near real-time traffic conditions on transit routes in order to generate optimum schedules and alternate routes when necessary. In addition, information on service/fleet performance and transit incident information and schedules will be provided to the TOC.

The extent to which information and coordination are shared between the centers will be determined through working arrangements among the agencies/jurisdictions involved.

Texas A&M Transit Real-time Bus Information Travel Kiosks

Associated Market Packages:

- Multi-Modal Coordination (APTS7)
- Transit Traveler Information (APTS8)

Prerequisite Projects: Texas A&M Transit AVL and Mobile Data Terminals

Description: Install static and real-time transit and traveler information devices at transit transfer stations in the Region. The project will build on information available from the transit AVL project. Kiosks, monitors, or dynamic signs will relay information on current bus operating conditions (e.g., Next bus – 5 minutes, on schedule, delayed 10 minutes, etc.).

Brazos Transit Real-time Bus Information Travel Kiosks

Associated Market Packages:

- Multi-Modal Coordination (APTS7)
- Transit Traveler Information (APTS8)

Prerequisite Projects: Brazos Transit AVL and Mobile Data Terminals

Description: Install static and real-time transit and traveler information devices at transit transfer stations in the Region. The project will build on information available from the transit AVL project. Kiosks, monitors, or dynamic signs will relay information on current bus operating conditions (e.g., Next bus – 5 minutes, on schedule, delayed 10 minutes, etc.).

College Station ISD Automated Vehicle Location (AVL)

Associated Market Packages:

- Transit Vehicle Tracking (APTS1)
- Transit Fixed Route Operations (APTS2)
- Demand Response Transit Operations (APTS3)
- Transit Traveler Information (APTS8)

Prerequisite Projects: None

Description: Install AVL on College Station ISD Buses and other student transportation vehicles. The AVL system will convey information regarding real-time vehicle location to the bus dispatch center, which will allow for enhanced system monitoring, scheduling, routing (or re-routing), as well as provide for precise bus location information in the event of a breakdown or emergency situation. AVL systems measure actual, real-time position of transit vehicles, and relay that information back to a transit operations center, usually via global positioning system. Used with a geographic information system map, bus locations can be displayed for any vehicles in the fleet equipped with the on-board AVL unit. AVL, in conjunction with CAD, allows for improved bus tracking capability, as well as archiving and managing historical data. AVL systems also can be equipped with additional features, including tie-ins to alarm/security systems, and vehicle component monitoring.

Costs will vary depending on the number of vehicles equipped with the on-board AVL unit. For planning purposes, it is estimated that the cost per vehicle is approximately \$10,000.

College Station ISD On-board Transit Security System

Associated Market Packages:

- Transit Fixed Route Operations (APTS2)
- Demand Response Transit Operations (APTS3)
- Transit Security (APTS5)

Prerequisite Projects: None

Description: This project will install security cameras and alarm buttons on College Station ISD vehicles. If the driver feels there is a threat on the bus, the bus has been involved in an accident, or any other situation occurs where the driver may need assistance, he or she can activate the alarm. The alarm notifies the dispatch center of the potential problem so that help can be dispatched. The security cameras would be for local recording only.



Table 8 – Long-Term Projects (20-Year)

Program Area/Project	Description	Responsible Agency*	Probable Cost**	Funding Identified	Estimated Project Duration
Travel and Traffic Management					
TxDOT Closed Loop Signal System Expansion Phase 3	Continue expansion of closed loop signal system at TxDOT intersections throughout the Region. Also includes the implementation of VIVDS.	TxDOT	To Be Determined	No	1 year
City of Bryan Closed Loop Signal System Expansion Phase 3	Continue implementation of closed loop signal systems in the City of Bryan. Also includes the implementation of VIVDS.	City of Bryan	To Be Determined	No	2 years
City of College Station Closed Loop Signal System Expansion Phase 3	Continue implementation of closed loop signal systems in the City of College Station. Also includes the implementation of VIVDS.	City of College Station	To Be Determined	No	2 years
Municipal Closed Loop Signal System Expansion	Expand closed loop signal systems in other cities in the Region as needed	Brazos Valley Region Cities	To Be Determined	No	2 years
Sam Houston State University Parking Information and Reservation System	Implement parking system for Sam Houston State University and associated privately operated parking garages that would display parking information and allow reservations online	Sam Houston State University/Parking Garage Operators	\$200,000	No	1 year
Municipal TOC/TxDOT TMC Communications Connection	Implement a connection between Municipal TOC and the TxDOT Bryan TMC to allow video sharing, traffic data sharing, and other joint functions	Brazos Valley Region Cities/TxDOT	To Be Determined	No	6 months
ISP-based Route Guidance	Provided direct support to ISP-based route guidance systems through sharing of traveler information	Public Agencies/Private Sector	Public: \$100,000	No	1 year
Emergency Management					
Municipal Traffic Signal Preemption	Implement signal pre-emption at intersections for emergency vehicles in other cities as needed. Project includes equipment for emergency vehicles.	Brazos Valley Region Cities	To Be Determined	No	1 year
Municipal/County EOC/TxDOT Bryan TMC Communications Connection	Establish a connection between the TxDOT Bryan TMC and municipal/county EOCs for coordination and sharing of incident information as needed	TxDOT/Brazos Valley Region Cities	To Be Determined	No	1 year



Table 8 – Long-Term Projects (20-Year) (continued)

Program Area/Project	Description	Responsible Agency*	Probable Cost**	Funding Identified	Estimated Project Duration
<i>Maintenance and Construction Management</i>					
TxDOT Additional RWIS Stations	Install additional RWIS stations to collect road weather information in the Bryan District. Project will include a sensor for ice detection.	TxDOT	\$25,000/ station	No	6 months
TxDOT Work Zone Safety Monitoring	Implement portable work zone safety monitoring equipment at work zones	TxDOT	\$500,000	No	1 year
Municipal/County Maintenance and Construction Vehicle AVL	Installation of AVL system on maintenance and construction vehicles as needed	Brazos Valley Region Cities/Counties	\$10,000/vehicle (Includes software)	No	1 year
TxDOT Bryan Maintenance and Construction Vehicle AVL	Installation of AVL system on maintenance and construction vehicles	TxDOT	\$10,000/vehicle (Includes software)	No	1 year
City of Bryan Maintenance and Construction Vehicle AVL	Installation of AVL system on maintenance and construction vehicles	City of Bryan	\$10,000/vehicle (Includes software)	No	1 year
<i>Public Transportation Management</i>					
Brazos Transit Automated Passenger Counters	Implement passive system on fixed route buses to accurately count ridership	Brazos Transit	\$2,000/vehicle	No	6 months
Texas A&M Transit/City of Bryan TOC Communications Connection	Implement a connection between the Texas A&M Transit dispatch center and the City of Bryan TOC	TAMU/City of Bryan	To Be Determined	No	1 year
Texas A&M Transit On-board Transit Security Cameras	Install security cameras on buses and paratransit vehicles	Texas A&M Transit	To Be Determined	No	6 months
Brazos Transit/Municipal TOC Communications Connection	Implement a connection between the Texas A&M Transit dispatch center and the other cities TOCs as needed	Brazos Transit/Brazos Valley Region Cities	To Be Determined	No	1 year

*Agency listed is responsible for implementation, operations and maintenance unless otherwise noted.

**The design has not been undertaken and thus this is only an opinion of probable cost for planning purposes.



Brazos Valley Region Long-Term Projects (20-Year)

Travel and Traffic Management

TxDOT Closed Loop Signal System Expansion Phase 3

Associated Market Packages:

- Network Surveillance (ATMS01)
- Surface Street Control (ATMS03)

Prerequisite Projects: TxDOT Closed Loop Signal System Expansion Phase 1, TxDOT Closed Loop Signal System Expansion Phase 2

Description: Expand the closed loop signal system by integrating additional signals and implementing VIVDS at select TxDOT intersections throughout the Region.

City of Bryan Closed Loop Signal System Expansion Phase 3

Associated Market Packages:

- Network Surveillance (ATMS01)
- Surface Street Control (ATMS03)

Prerequisite Projects: City of Bryan Closed Loop Signal System Expansion Phase 1, City of Bryan Closed Loop Signal System Expansion Phase 2

Description: Continue to expand the closed loop signal system in the City of Bryan. This project will likely be implemented by TxDOT and then turned over to the City of Bryan for operations and maintenance.

City of College Station Closed Loop Signal System Expansion Phase 3

Associated Market Packages:

- Network Surveillance (ATMS01)
- Surface Street Control (ATMS03)

Prerequisite Projects: City of College Station Closed Loop Signal System Expansion Phase 1, City of College Station Closed Loop Signal System Expansion Phase 2

Description: Continue to expand the closed loop signal system in the City of College Station.

Municipal Closed Loop Signal System Expansion

Associated Market Packages:

- Network Surveillance (ATMS01)
- Surface Street Control (ATMS03)

Prerequisite Projects: None

Description: Expand the closed loop signal systems in smaller cities in the Brazos Valley Region.

Sam Houston State University Parking Information and Reservation System

Associated Market Packages:

- Parking Facility Management (ATMS16)

Prerequisite Projects: None

Description: Install a parking management system that would provide parking information to motorists entering the campus and direct them to parking lots or decks with empty spaces. The system would also allow online parking reservations. Parking management systems have proven to reduce delays/congestion and improve air quality around areas where motorists may “circle” a venue in search of an available parking location. Parking and event management systems are composed of two subsystems. The first subsystem monitors the availability of parking spaces at a facility based on gate counts of vehicles entering and exiting the facility. More sophisticated subsystems count how many spaces are available based on individual parking stall presence detectors. The second major subsystem provides motorists with dynamic parking information on the major streets approaching the venue(s). The information is routinely disseminated using a combination of static and dynamic signing.

Municipal TOC/TxDOT TMC Communications Connection

Associated Market Packages:

- Regional Traffic Control (ATMS07)
- Incident Management System (ATMS08)

Prerequisite Projects: None

Description: Install a connection between Municipal TOCs and the TxDOT Bryan TMC to allow video sharing, traffic data sharing and other joint functions. The type of connection (fiber, wireless, leased line) will need to be determined prior to implementation of this project based on desired band width and cost of technologies available.

ISP-Based Route Guidance

Associated Market Packages:

- Traffic Information Dissemination (ATMS06)
- Broadcast Traveler Information (ATIS1)
- ISP-Based Route Guidance (ATIS6)

Prerequisite Projects: TxDOT Advanced Traffic Management System (ATMS) Implementation

Description: Provide ISPs with data relative to current travel conditions. The project extends current static capabilities of the OnStar, in-vehicle route guidance systems (or equivalent) currently being equipped in new vehicles (OnStar is equipped on some GM, Acura, Audi, Saab, and Subaru models). Currently, the OnStar system will help guide a motorist to a location based on static information. By providing real-time traveler information to ISPs, the guidance systems could modify the recommended route based on dynamic roadway conditions (e.g., variation on congestion levels, accidents, roadwork, etc.). The project will require a public/private sector partnership, because route guidance and navigation services are typically subscription services.

Emergency Management

Municipal Traffic Signal Preemption

Associated Market Packages:

- Surface Street Control (ATMS03)
- Emergency Response (EM01)
- Emergency Routing (EM02)

Prerequisite Projects: None

Description: Equip traffic signals in the municipalities in the Brazos Valley Region with traffic signal preemption equipment. Typical installations include mounting hardware at the intersection and on each vehicle authorized to preempt the signal. The intersection equipment includes a detector(s) positioned at the intersection approach(es) connected to the traffic signal controller. As a vehicle equipped with a preemption emitter approaches an intersection, the detector activates a change in signal timing to allow fast and safe passage. Preemption systems have proven to improve safety of emergency personnel and vehicles en-route to an incident.



Municipal/County EOC/TxDOT Bryan TMC Connection

Associated Market Packages:

- Traffic Information Dissemination (ATMS06)
- Incident Management System (ATMS08)
- Emergency Response (EM01)
- Emergency Routing (EM02)

Prerequisite Projects: None

Description: Install telecommunications connection and end equipment from the Municipal/County EOCs to the TxDOT Bryan TMC to share CCTV and incident data/images and provide information on current road conditions that could assist with incident/emergency management. The cost for this project will depend on the communications used to implement the connection (i.e., fiber connection or leased lines).

Maintenance and Construction Management

TxDOT Additional RWIS Stations

Associated Market Packages:

- Network Surveillance (ATMS01)
- Road Weather Data Collection (MC03)
- Weather Information Processing and Distribution (MC04)
- Roadway Maintenance and Construction (MC07)

Prerequisite Projects: TxDOT RWIS Stations

Description: Install additional RWIS stations in the Brazos Valley Region. The RWIS will be remotely monitored from the TxDOT Bryan TMC. Real time weather information improves response time, increases winter maintenance efficiency and minimizes the traveling public's exposure to hazardous weather related roadway conditions. Archived RWIS information also provides valuable historic information for planning purposes. Data including temperature (atmospheric and pavement), precipitation, wind, humidity, visibility (white out/heavy fog) and even pavement surface conditions (i.e., snow, chemical) are collected by sensors placed at the roadside (typically on a 30 foot tower) and embedded in the roadway. Remote processing units placed along the roadway communicate with various types of road and weather sensors. Data from the units are transmitted to the central ATMS server, via dial-up modem or other low bandwidth telecommunications methods, which will be located at the TxDOT Bryan TMC. A future module for the ATMS software will support environmental sensor data and provides collection, archiving, and distribution of the data.

The estimated cost for one RWIS station is \$25,000.

TxDOT Work Zone Safety Monitoring

Associated Market Packages:

- Network Surveillance (ATMS01)
- Work Zone Safety Monitoring (MC09)

Prerequisite Projects: None

Description: This project will include the use of advanced warning systems to detect unauthorized vehicles that have entered the perimeter of the work zone. The intent of such systems is to help decrease the number of accidents in work zones due to motorists getting too close to workers or their equipment. Intrusion detection devices can alert construction workers and the motorist that the motorist has entered the safe zone and should take evasive action. It is anticipated that this project will be conducted on and possibly required by TxDOT on a per-project basis.

Municipal/County Maintenance and Construction Vehicle AVL

Associated Market Packages:

- Maintenance and Construction Vehicle Tracking (MC01)
- Maintenance and Construction Activity Coordination (MC10)

Prerequisite Projects: None

Description: Similar to the transit AVL project, the maintenance and construction AVL project includes equipping municipal or county maintenance and construction vehicles with GPS based vehicle locators. It is envisioned that the location of the vehicle would be overlaid on a basemap showing real-time positions of each equipped vehicle. The main purpose of the system is to assist dispatchers and supervisors to better manage the fleet of vehicles. For example, if a report of a spill occurred on a major roadway, a supervisor could quickly determine what vehicle is closest and best equipped to clean up the spill.

TxDOT Bryan Maintenance and Construction Vehicle AVL

Associated Market Packages:

- Maintenance and Construction Vehicle Tracking (MC01)
- Maintenance and Construction Activity Coordination (MC10)

Prerequisite Projects: None

Description: Similar to the transit AVL project, the maintenance and construction AVL project includes TxDOT Bryan District maintenance and construction vehicles with GPS based vehicle locators. It is envisioned that the location of the vehicle would be overlaid on a basemap showing real-time positions of each equipped vehicle. The main purpose of the system is to assist dispatchers and supervisors to better manage the fleet of vehicles. For example, if a report of a spill occurred on a major roadway, a supervisor could quickly determine what vehicle is closest and best equipped to clean up the spill.

City of Bryan Maintenance and Construction Vehicle AVL

Associated Market Packages:

- Maintenance and Construction Vehicle Tracking (MC01)
- Maintenance and Construction Activity Coordination (MC10)

Prerequisite Projects: None

Description: Similar to the transit AVL project, the maintenance and construction AVL project includes equipping City of Bryan maintenance and construction vehicles with GPS based vehicle locators. It is envisioned that the location of the vehicle would be overlaid on a basemap showing real-time positions of each equipped vehicle. The main purpose of the system is to assist dispatchers and supervisors to better manage the fleet of vehicles. For example, if a report of a spill occurred on a major roadway, a supervisor could quickly determine what vehicle is closest and best equipped to clean up the spill.

Public Transportation Management

Brazos Transit Automated Passenger Counters

Associated Market Packages:

- Transit Passenger and Fare Management (APTS4)

Prerequisite Projects: None

Description: Install Automated Passenger Counter (APC) systems on transit vehicles to accurately count ridership. APC systems collect ridership information and can determine total boardings and alightings at each stop through the use of AVL to determine where those boardings and alightings take place.

This project is estimated to cost \$2,000 per vehicle.

Texas A&M Transit/City of Bryan TOC Communications Connection

Associated Market Packages:

- Traffic Information Dissemination (ATMS06)
- Transit Fixed-Route Operations (APTS2)
- Demand-Response Transit Operations (APTS3)
- Multi-modal Coordination (APTS7)

Prerequisite Projects: None

Description: Implement communications link between the City of Bryan TOC and the Texas A&M Transit Operations Center. This center-to-center application supports coordination with traffic management centers to obtain near real-time traffic conditions on transit routes in order to generate optimum schedules and alternate routes when necessary. In addition, information on service/fleet performance and incident information and schedules will be provided to the TOC.

The extent to which information and coordination are shared between the centers will be determined through working arrangements among the agencies/jurisdictions involved. The cost for this project will depend on the communications used to implement the connection (i.e., fiber connection or leased lines).

Texas A&M Transit On-board Transit Security Cameras

Associated Market Packages:

- Transit Security (APTS5)

Prerequisite Projects: None

Description: This project will include the installation of security cameras on TAMU Transit buses and paratransit vehicles. Cameras will be for on-board recording only, and are not envisioned to be monitored remotely from the TAMU Transit Dispatch. Video will be stored for a pre-determined amount of time via video tape or emerging digital video recording technology. While the main objective of on-board surveillance projects has been to identify individuals committing criminal acts or creating disturbances on buses, there have been noticeable maintenance benefits such as a reduction of litter and debris.

Brazos Transit/Municipal TOC Communications Connection

Associated Market Packages:

- Traffic Information Dissemination (ATMS06)
- Transit Fixed-Route Operations (APTS2)
- Demand-Response Transit Operations (APTS3)
- Multi-modal Coordination (APTS7)

Prerequisite Projects: None

Description: Implement communications link between the Municipal TOCs and the Brazos Transit Operations Center. This center-to-center application supports coordination with traffic management centers to obtain near real-time traffic conditions on transit routes in order to generate optimum schedules and alternate routes when necessary. In addition, information on service/fleet performance and incident information and schedules will be provided to the TOC.

The extent to which information and coordination are shared between the centers will be determined through working arrangements among the agencies/jurisdictions involved. The cost for this project will depend on the communications used to implement the connection (i.e., fiber connection or leased lines).

4. MAINTAINING THE REGIONAL ITS ARCHITECTURE AND DEPLOYMENT PLAN

The Brazos Valley Regional ITS Deployment Plan is a living document. The recommended projects and their timeframes for implementation reflect the needs of the Region at the time the plan was developed. It is expected that the needs of the Region will change as ITS deployments are put into place, population and travel patterns change, and as new technology is developed. In order for the ITS Deployment Plan to remain a useful document for Regional stakeholders, the plan must be updated over time.

TxDOT will serve as the lead agency for maintaining both the Brazos Valley Regional ITS Architecture and the ITS Deployment Plan, however, these plans will continue to be driven by stakeholder consensus rather than a single stakeholder.

At the ITS Deployment Plan Meeting in October 2003, stakeholders recommended that a meeting be held every two years to review the existing Regional ITS Architecture and ITS Deployment Plan. Any new market packages that have been added to the National Architecture should be reviewed to see if they are applicable to the Brazos Valley Region. Data flows in existing market packages should also be reviewed to determine if any planned/future flows have been implemented. The Deployment Plan will be updated to reflect projects that have been deployed, new projects that are necessary, and to reprioritize projects currently shown in the plan. Projects that are added to the ITS Deployment Plan should also be reviewed closely to determine if they fit into the ITS Architecture for the Brazos Valley Region. If a new project does not fit into the ITS Architecture, then the ITS Architecture will need to be revised to include the necessary links and data flows for the project. Any changes to the geographic scope of the Region should be agreed upon by the stakeholders.

Both the Brazos Valley Regional ITS Architecture and the ITS Deployment Plan were developed with a consensus approach from the stakeholders. In order for these documents to continue to reflect the needs of the Region, changes in the documents will need to be driven by consensus of all of the stakeholders.