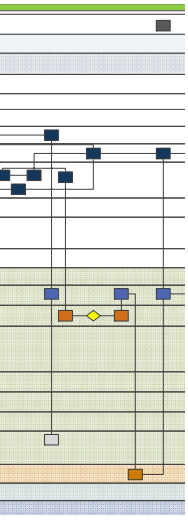
TRANSPORTATION SYSTEMS MANAGEMENT AND OPERATIONS (TSMO)



ATLANTA DISTRICT PROGRAM PLAN

May 2021

Texas Department of Transportation

Document Control

Date	Version	Description
March 26, 2021	1.0	Draft Transportation Systems Management and Operations Program Plan – For District Review
May 6, 2021	1.1	Revised Draft Transportation Systems Management and Operations Program Plan – for Stakeholder Review
May 28, 2021	Final	Final Transportation Systems Management and Operations Program Plan for Publication

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List of Acronyms

AAR	After-Action Report
AASHTO	American Association of State Highway and Transportation Officials
ATMS	Active Traffic Management Systems
BP	Business Processes (TSMO Capability Dimension)
CCTV	Closed-Circuit Television
CMF	Capability Maturity Framework
CMM	Capability Maturity Model
CO	Collaboration (TSMO Capability Dimension)
CRIS	Crash Records Information System
CU	Culture (TSMO Capability Dimension)
DMS	Dynamic Message Sign
DOT	Department of Transportation
DPS	Department of Public Safety
FHWA	Federal Highway Administration
HSIP	Highway Safety Improvement Program
ICT	Incident Clearance Time
ITS	Intelligent Transportation System
MPO	Metropolitan Planning Organization
OW	Organization and Workforce (TSMO Capability Dimension)
PM	Performance Measurement (TSMO Capability Dimension)
PSE	Planned Special Event (TSMO Focus Area)
RCT	Roadway Clearance Time
RWM	Road Weather Management (TSMO Focus Area)
ST	Systems and Technology (TSMO Capability Dimension)
SWZ	Smart Work Zone
TM	General Traffic Management (TSMO Focus Area)
TIM	Traffic Incident Management (TSMO Focus Area)
TMC	Traffic Management Center
TMS	Traffic Management Systems
TRF	TxDOT Traffic Safety Division
TSM	Traffic Signal Management (TSMO Focus Area)
TSMO	Transportation Systems Management and Operations
TTI	Texas Transportation Institute
TxDOT	Texas Department of Transportation
UTP	Unified Transportation Plan
WZM	Work Zone Management (TSMO Focus Area)

Executive Summary

What is a TSMO Program Plan?

Transportation Systems Management and Operations (TSMO) is an approach to improve mobility for all modes of transportation. TSMO uses integrated strategies that are designed to optimize the performance of existing infrastructure by preserving capacity and improving the security, safety, and reliability of the transportation system. The Texas Department of Transportation (TxDOT) Atlanta District has developed this TSMO Program Plan to identify TSMO action items that District staff can implement over the next five years to improve traffic operations.

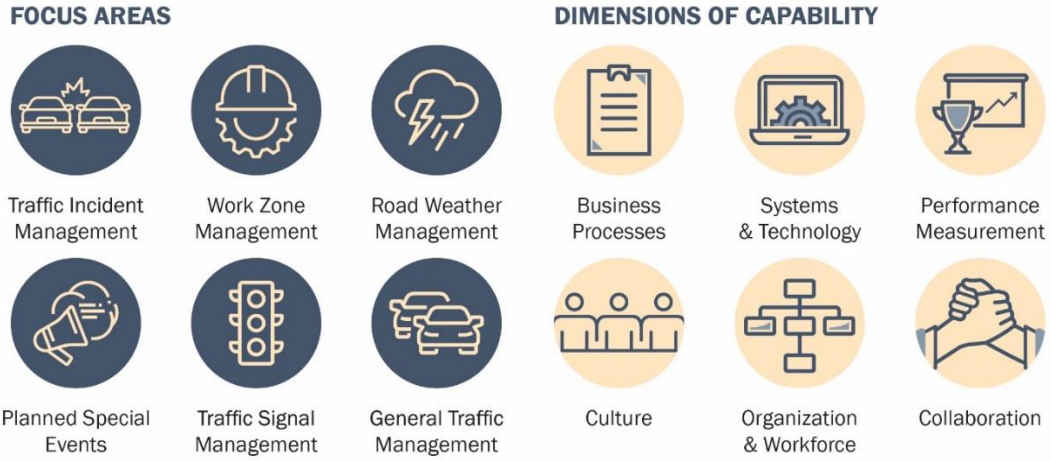
> TSMO is "an integrated set of strategies to optimize the performance of existing infrastructure through the implementation of multimodal and intermodal, cross-jurisdictional systems, services, and projects designed to preserve capacity and improve security, safety, and reliability of the transportation system." (United States Department of Transportation (DOT))

Stakeholder engagement for this TSMO Program Plan effort began in July 2020 and included outreach to District staff, neighboring state departments of transportation (DOTs), local agency partners in traffic engineering and emergency response, and regional entities such as the Texarkana Metropolitan Planning Organization (MPO). Each phase of stakeholder engagement is summarized in the timeline below.

STAKEHOLDER INVOLVEMENT TIMELINE

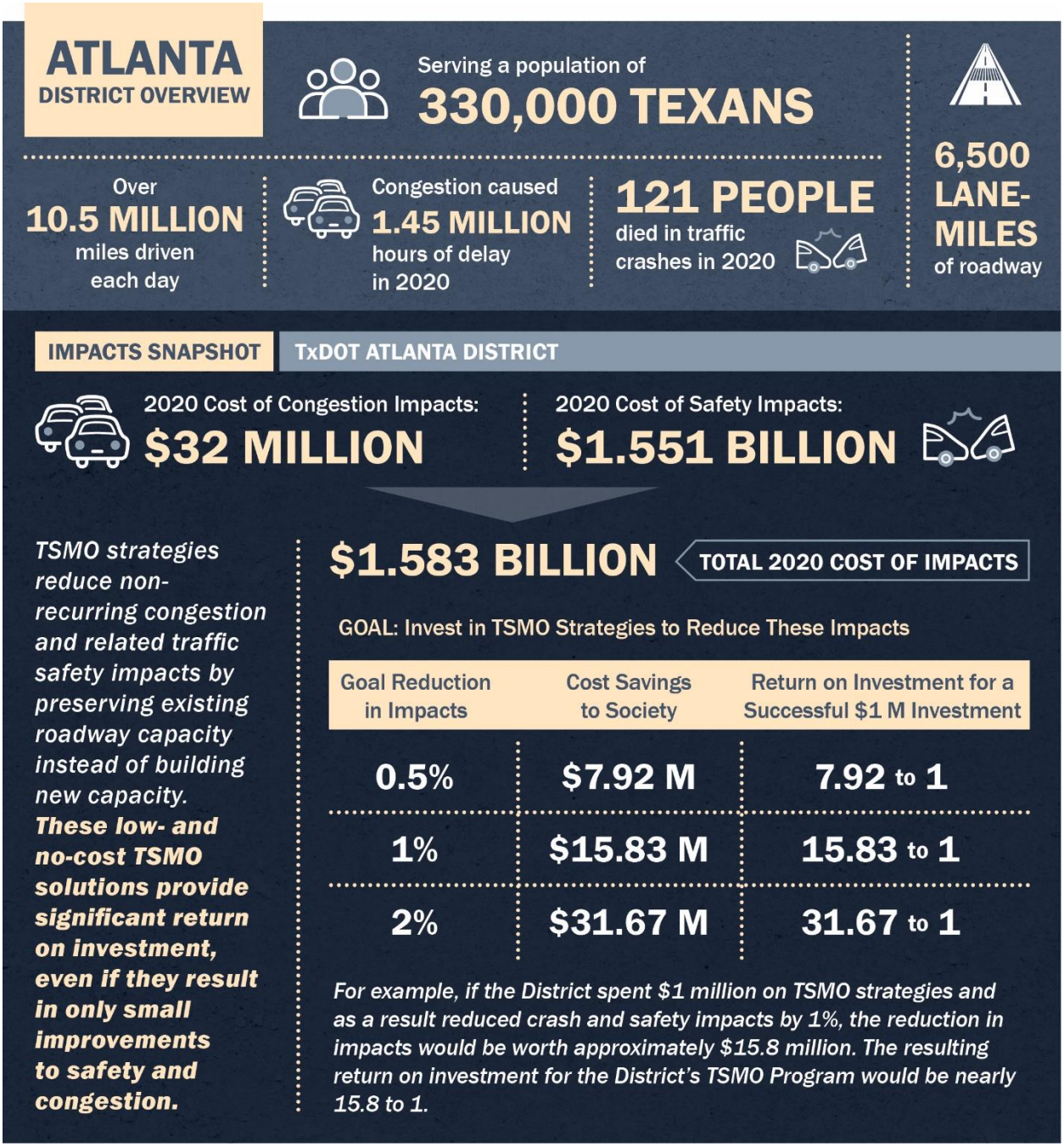
TxDOT Internal Outreach	External Partner Leadership Meetings	Outreach and Capabilities Work Sessions	TSMO Solutions (CMF) Work Sessions	Draft TSMO Program Plan	Final TSMO Program Plan and Roll Out Event
July 2020	August 2020	October 2020	January 2021	March 2021	May 2021

To develop this plan, the TxDOT Atlanta District reviewed existing data and engaged with both internal and external stakeholders through a series of meetings and workshops to identify strengths and needs related to six TSMO Focus Areas. From these strengths and needs, the TxDOT Atlanta District identified a list of potential action items that could be implemented to build on existing strengths and address ongoing needs. These action items were grouped into six TSMO Dimensions of Capability. These TSMO focus areas and dimensions of capability are shown below, with these icons used throughout the report to identify related discussion.



Why Invest in TSMO Actions?

A review of congestion and safety impacts in the TxDOT Atlanta District revealed that traffic and crashes within the District's boundaries cost travelers more than $1.58 billion in 2020. TSMO actions have been proven to reduce congestion and crash rates at levels of investment far lower than would be required for capacity-building projects. The overview below shows how investing in TSMO actions to reduce these societal costs can provide a significant return on investment for the TxDOT Atlanta District. More detail is provided in the Business Case for TSMO section of this TSMO Program Plan.



How Should the District Invest in TSMO?

The TxDOT Atlanta District chose to adopt the TSMO Program Vision, Mission, Goals, and Objectives that were developed for the TxDOT Traffic Safety Division as part of the 2018 Statewide TSMO Strategic Plan. The guiding principles below describe how the TxDOT Atlanta District plans to improve transportation for Texans through the implementation of a Districtwide TSMO program.

Based upon the District's guiding TSMO principles and existing needs identified by TxDOT and its partners, 36 action items to advance TSMO were identified for the TxDOT Atlanta District. A full list of recommended action items is in the TSMO Implementation Plan section of this TSMO Program Plan. Action items that were expected to provide some of the high benefit-cost returns and met the greatest operations needs are summarized in the tables on the next two pages. These action items have been categorized as: High Impact Action Items That Support Ongoing Efforts, High Impact-Low Cost Action Items, and "Early Win" Action Items.

Action No.	Action Description	Report Page #	TSMO Focus Area	TSMO Capability Dimension
High Impact Action Items That Support Ongoing Efforts				
ST-04	**Plan and Implement Surveillance Technology for Signals:** Identify implementation priority for cameras and necessary software enhancements to allow remote surveillance of District signals from a single software platform.	43		
ST-05	**Continue Deploying and Maintaining Intelligent Transportation Systems (ITS) Devices along Key Routes:** Continue to deploy and proactively maintain ITS devices on key routes throughout region, per direction included in the District ITS Master Plan.	44		
PM-05	**Regularly Review Severe Crash Data and Develop Mitigation Strategy:** Review aggregated Districtwide fatal and severe crash data at least annually and develop or update a Districtwide Severe Crash Mitigation Strategy from identified trends.	52		
0W-02	**Establish Staff Roles for Remote Signal Monitoring:** Establish automated notification systems and staff roles for remote monitoring, troubleshooting, and control of traffic signals along key corridors.	59		
0W-03	**Enhance Camera Monitoring Capabilities and Staff Roles:** Establish camera monitoring staff roles and improve user-friendliness of camera monitoring activities, including a video wall configuration at the signal shop and a software platform that provides a graphic interface to access camera feeds.	60		

Action No.	Action Description	Report Page #	TSMO Focus Area	TSMO Capability Dimension
High Impact-Low Cost Action Items				
BP-03	**Develop an Approach to Maintain ITS Functionality During Construction:** Develop contract language and a contract enforcement approach to keep work zone ITS functioning as intended for duration of construction projects.	32		
PM-02	**Track TIM Performance in Partnership with Texas DPS:** Partner with Texas Department of Public Safety (DPS) to begin collecting the agency's Traffic Incident Management (TIM) crash data and actively tracking TIM in the region.	49		
0W-01	**Establish Regional Multidisciplinary TIM Training:** Partner with TxDOT's Statewide TIM Coordinator to provide TIM multidisciplinary trainings and Train the Trainer programs to TxDOT staff and interested partners.	58		
C0-01	**Formalize a Regional TIM Working Group:** Conduct maintenance section-led outreach to local partners to establish a more formalized TIM program in the District, anchored by regular working group meetings to discuss TIM challenges.	62		
C0-09	**Pursue Regional Traffic Camera Sharing Agreements:** Pursue camera-sharing agreements (or updated agreements) with the Cities of Texarkana, Mount Pleasant, Marshall, and Longview to support 24-hour camera coverage of freeways from local public safety dispatch partners.	70		

Action No.	Action Description	Report Page #	TSMO Focus Area	TSMO Capability Dimension
"Early Win" Action Items				
BP-02	**Establish Criteria for Conducting After-Action Incident Reviews:** Establish a severity threshold for conducting TIM-focused after-action incident reviews and begin to conduct reviews that include other agencies involved with TIM response.	31		
ST-02	**Provide Closure Information Through Third-Party Apps:** Use third-party apps to push notifications about road closures and related impacts out to travelers.	41		
ST-06	**Implement Route Choice Corridor Management Approaches:** Implement corridor management approaches that promote route choice and detours among facilities using INRIX travel time predictions posted in real time to Dynamic Message Sign (DMS) units.	45		
C0-05	**Establish Early Involvement of First Responders in the Construction Planning Process:** Formalize involvement of first responders and public safety officials in a TIM-specific preconstruction meeting and ongoing update meetings for duration of major construction events.	66		
C0-08	**Maintain a Formal List of Partner Contact Information:** Maintain and update a formal list of partner contact information for engineering, law enforcement, emergency response, and neighboring state Department of Transportation (DOT) partners.	69		

Which TSMO Actions Would Benefit from Further Development?

Tactical plans provide a focused look at how to implement key action items. These plans can establish project details, develop and assign responsibilities, and include detailed cost and staffing estimates for specific TSMO initiatives. The TSMO Program Plan identifies several recommended Tactical Plans in the TSMO Tactical Plan Assessment section to support priority action items. Tactical plans recommended for the TxDOT Atlanta District are shown below.

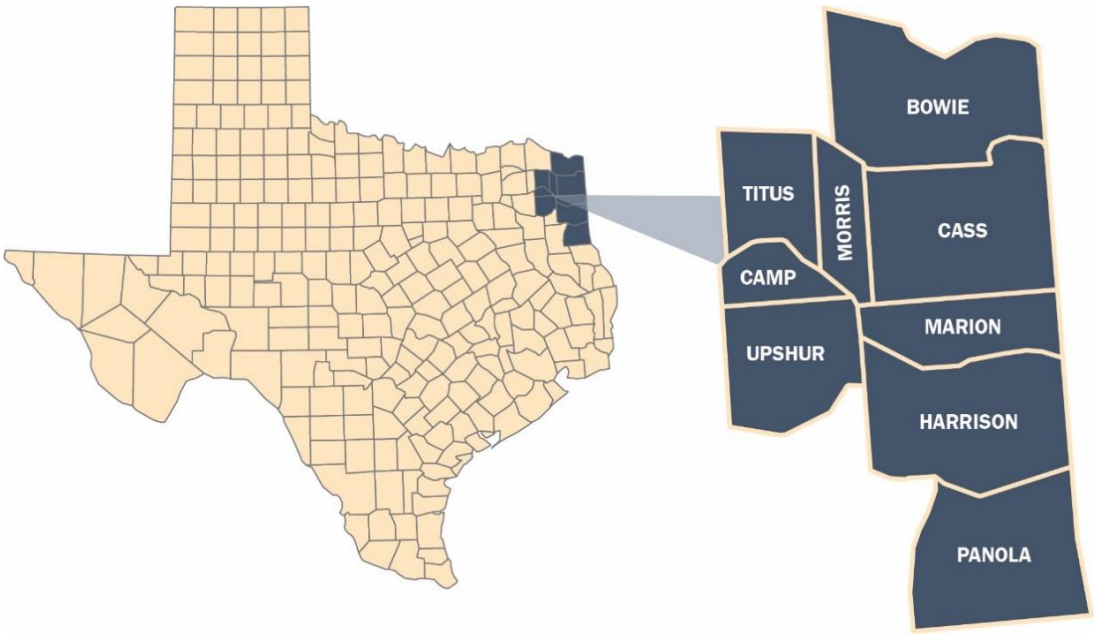
Potential Tactical Plan (with Deliverables Listed Below)	Supports District TSMO Goals						Expected Ongoing Costs	Expected Ongoing Level of Effort	Expected Return on Investment for District
	Safety	Reliability	Efficiency	Customer Service	Collaboration	Integration			
Regional TIM Program Development - Regional TIM Training and Working Group Development Strategy - Regional TIM Data Collection and Performance Measurement Plan	✓	✓			✓	✓	$		Highest
District Signal Technology Deployment and Management - District Traffic Signal Camera Deployment Plan - District Traffic Signal Technology Asset Management Plan	✓	✓	✓			✓	$$$		Highest
Regional TMC Concept Development - Concept of Operations - Systems Engineering Analysis Report (Long-Term)	✓	✓	✓	✓	✓	✓	$$$		High
Regional ITS Architecture Update - TxDOT Atlanta District Regional ITS Architecture Update			✓			✓	$		Moderate

Introduction

The Texas Department of Transportation (TxDOT) Atlanta District, shown in Figure 1, is developing and implementing a Transportation Systems Management and Operations (TSMO) program. TSMO is an approach to improve mobility for all modes of transportation using integrated strategies that are designed to optimize the performance of existing infrastructure by preserving capacity and improving the security, safety, and reliability of the transportation system.

> TSMO is "an integrated set of strategies to optimize the performance of existing infrastructure through the implementation of multimodal and intermodal, cross-jurisdictional systems, services, and projects designed to preserve capacity and improve security, safety, and reliability of the transportation system."
>
> (United States Department of Transportation (DOT))

Figure 1: TxDOT Atlanta District Map

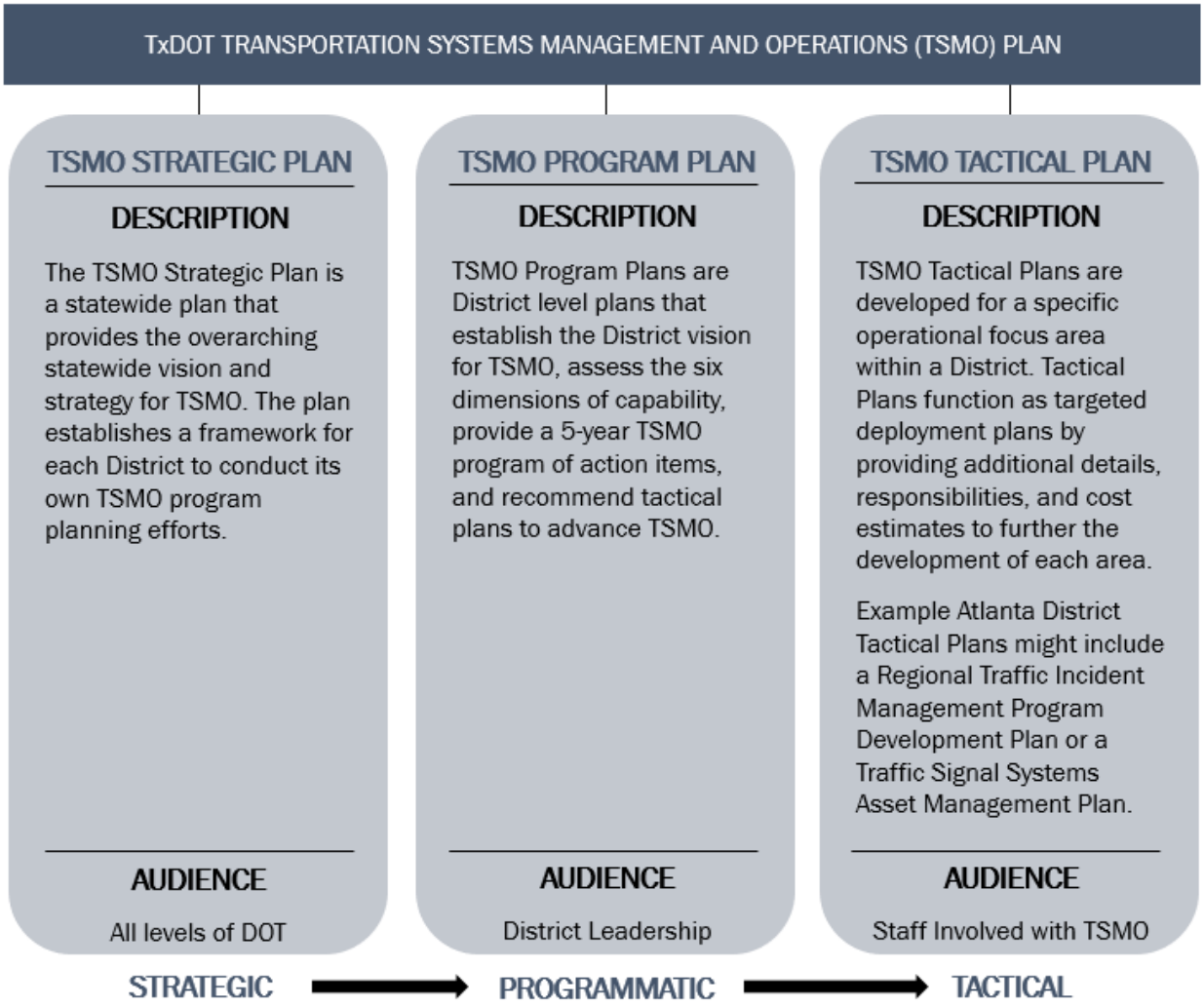


TSMO is defined specifically in federal legislation, including the Moving Ahead for Progress in the 21st Century Act (MAP-21), as well as the Fixing America's Surface Transportation (FAST) Act. The TxDOT Traffic Safety Division (TxDOT TRF) developed a Statewide TSMO Strategic Plan in 2018 that identifies statewide goals, objectives, and strategies for advancing TSMO in Texas.

In comparison to other state DOTs, TxDOT is largely decentralized. Each of TxDOT's 25 Districts has a unique set of operational challenges and constraints. As a result, each TxDOT District is developing its own TSMO Program Plan which will reference and conform to the Statewide TSMO Strategic Plan and related guidance that was finalized by TxDOT TRF in 2018. Even with consistency across each of the District TSMO Program Plans, the business case, roles and partnering approaches, and implementation strategies will be uniquely tailored to each District's transportation challenges and needs.

The Federal Highway Administration (FHWA) generally recommends that state DOT TSMO planning elements include the three levels of planning: strategic, program, and tactical. This report corresponds to the second level of TSMO planning in this hierarchy. The three levels of TSMO plans and a brief description of each is shown in Figure 2 below.

Figure 2: TxDOT Transportation Systems Management and Operations Plan Hierarchy



The TxDOT Statewide TSMO Strategic Plan was completed in 2018 as the first component of the TxDOT TSMO planning initiative. TSMO activities have been taking place throughout the state on an ad-hoc basis for decades. The TxDOT Statewide TSMO Strategic Plan defines processes to conduct TSMO consistently across the state. It also identifies the roles and responsibilities of each TxDOT Division and of individual TxDOT Districts for implementation of a statewide TSMO program.

Following the development of this framework, the second component of the TxDOT TSMO planning initiative is to develop district-level TSMO program plans. The Austin District was the first of the 25 TxDOT Districts to develop a TSMO Program Plan, completing theirs in June 2018. Other TxDOT Districts began development of their TSMO Program Plans in 2019 and 2020.

Each District's TSMO Program Plan focuses on strategies that can be implemented within the next five years, after which the Program Plan should be updated to assess progress and to identify new focus areas and strategies. Potential TSMO Tactical Plans will be identified for the TxDOT Atlanta District as a part of this TSMO Program Plan. The structure of the TxDOT Atlanta District TSMO planning initiative is shown in Figure 3.

Figure 3: Atlanta District TSMO Structure

The development of the TxDOT Atlanta District TSMO Program Plan involved individual agency outreach meetings and group workshops with both internal TxDOT stakeholders and external local and regional agency partners such as city transportation staff, regional planning organization staff, law enforcement and emergency response officials, and staff from neighboring state DOTs. These partners were asked to provide initial input on regional operational challenges, to give feedback on existing regional capabilities to address those challenges, and to discuss strategies that the region could enact to improve those regional capabilities. The stakeholder engagement timeline for this effort is shown in Figure 4, and a detailed list of participants is included in Appendix A. Due to travel restrictions related to the COVID-19 pandemic, all outreach was conducted virtually.

Figure 4: Atlanta District TSMO Stakeholder Engagement Timeline

Program Plan Format

In the **Business Case for TSMO** section, the TxDOT Atlanta District TSMO Program Plan estimates the potential benefit-cost ratio for adopting TSMO priorities throughout the District. This business case includes available metrics on congestion and safety and an assessment of existing societal costs related to delay and crashes within the District. This information is analyzed alongside available funding sources and some of the regional

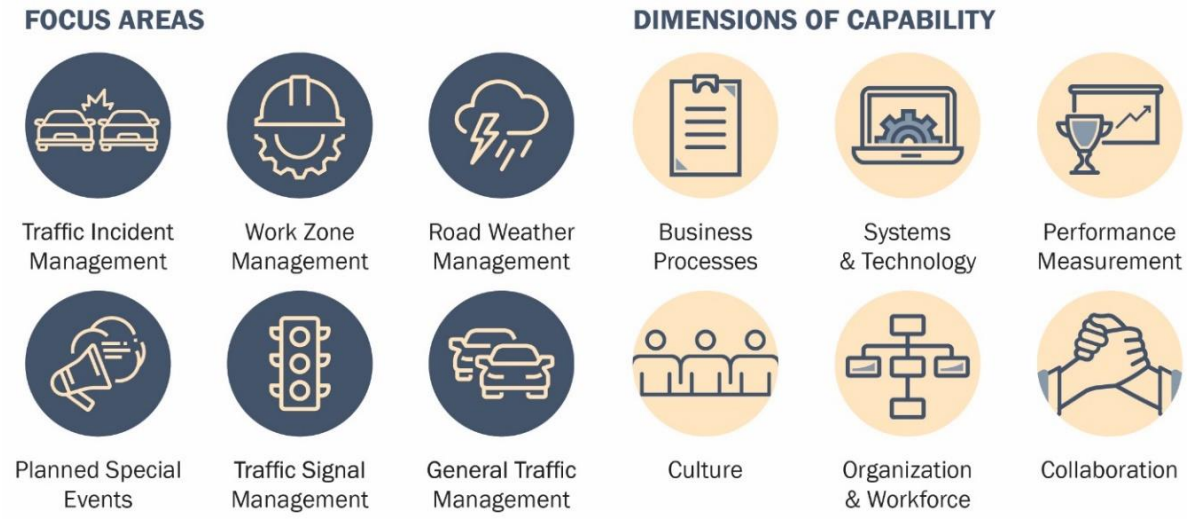
operational challenges that TxDOT Atlanta District staff and external partners identified. An explanation is provided as to how TSMO strategies might reduce these societal costs and address funding and operational challenges that the TxDOT Atlanta District has identified as a priority.

The **TSMO Vision, Mission, Goals, and Objectives** section introduces the Statewide TSMO Vision and Mission, both of which were developed as part of the 2018 TxDOT TSMO Strategic Plan. The section then lists the TSMO goals and objectives that the TxDOT Atlanta District selected as part of this program planning process.

The **Capability Maturity Model** (CMM) section provides an overview of the self-assessment process and the assessment results that TxDOT Atlanta District and partner agency stakeholders reported for six standard capability dimensions: Business Processes (BP), Systems and Technology (ST), Performance Measurement (PM), Culture (CU), Organization and Workforce (OW), and Collaboration (CO). The section describes how each of these results and related stakeholder feedback showed the TxDOT Atlanta District's existing capabilities in responding to six of the most typical TSMO focus areas: Traffic Management (TM), Traffic Signal Management (TSM), Road Weather Management (RWM), Work Zone Management (WZM), Planned Special Events (PSE), and Traffic Incident Management (TIM).

Descriptions of recommended TSMO action items and relevant case studies of best practices from other TxDOT Districts and state DOTs are included in the CMM section, and the icons shown in Figure 5 are used to relate the recommended action items to each TSMO capability dimension and focus area. Each recommended TSMO action item is detailed on its own page, and each page includes discussion on the underlying need for the action item, a guide for how that action item could potentially be implemented, and the anticipated benefits of implementing the action.

Figure 5: TSMO Focus Areas and Dimensions of Capability

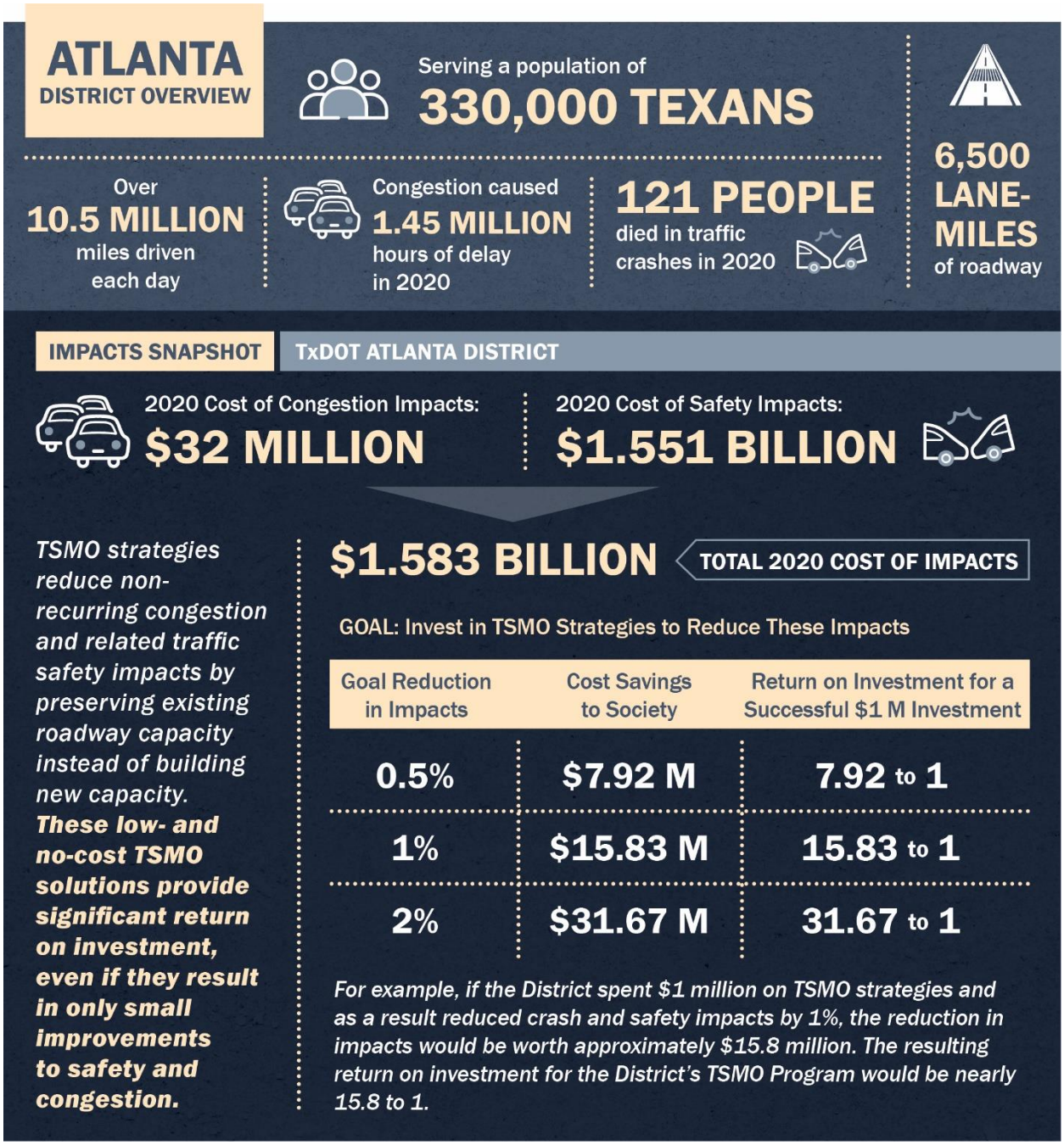


The **TSMO Implementation Plan** section shows all recommended TSMO action items for the TxDOT Atlanta District to undertake for the next five years in both a summary table and an implementation schedule. Finally, focus areas and related action items that would benefit from further planning or development prior to program implementation are summarized in the **TSMO Tactical Plan Needs Assessment** section.

Business Case for TSMO

Figure 6 below summarizes the business case for investing in TSMO strategies in the TxDOT Atlanta District. More detailed analysis of funding sources, congestion impacts, and safety impacts is provided on the pages that follow in this section.

Figure 6: TxDOT Atlanta District Overview and TSMO Impacts Snapshot



Funding Impacts

The number of people living in Texas has increased by more than 15 percent in the last ten years. Adding transportation network capacity and optimizing the use of available funding have become increasingly challenging as the population of Texas continues to grow. As a result, TxDOT has emphasized transitioning transportation funding and resources from conventional capacity-adding methods to a focus on managing and operating the transportation network through investing in technology and Traffic Management Systems (TMS), as well as leveraging resources among regional partner agencies and the private sector.

The 2050 Texas Transportation Plan goal to **Deliver the Right Projects** corresponds closely with addressing funding challenges using TSMO strategies.

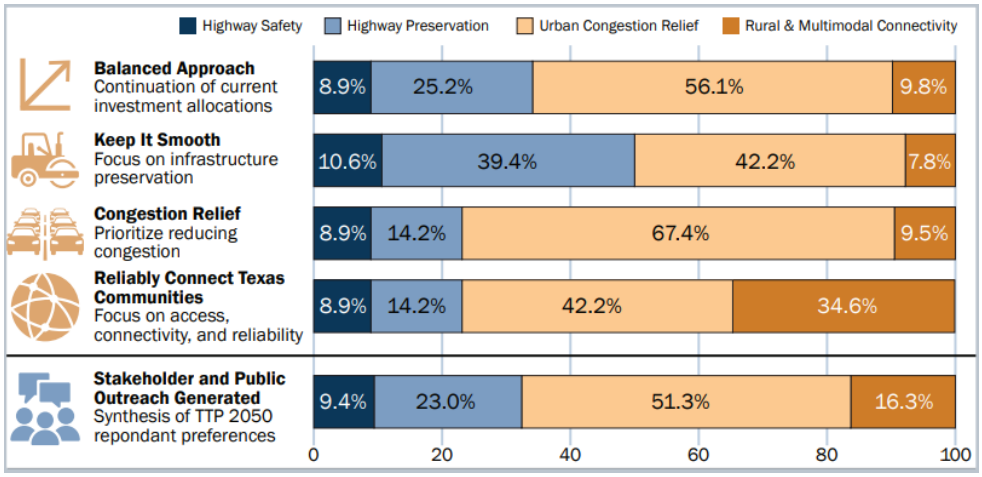
TxDOT Goal: Deliver the Right Projects

Detailed objectives include:

- Reduce user costs
- Identify and maintain reliable funding
- Improve analytic capabilities to maximize the value of investments
- Fairly distribute transportation benefits and costs
- Strategically deploy innovative technology to increase effectiveness and efficiency of the system
- Maintain sustainable funding

FHWA studies have shown that operational improvements to increase mobility without adding capacity typically have a higher benefit-cost ratio than infrastructure projects that build additional lane miles of capacity, especially when life-cycle costs are considered for both project types. With transportation demand growing, integrating TSMO into existing TxDOT Atlanta District processes will help TxDOT staff identify and prioritize cost-efficient operations and systems management methods to improve system reliability and safety, thus optimizing available capacity. TSMO will support projects that can bridge the gap between existing needs and available funding. Figure 7 shows several potential investment scenarios for TxDOT over the next 30 years. [1]

Figure 7: 2050 Texas Transportation Plan Potential Funding Scenarios



The Texas 2020 Unified Transportation Program (UTP) established a planning target of $1,077,880,000 in project funding for the TxDOT Atlanta District over the next 10 years.[2] The UTP also established a planning target of an additional $36,780,000 in project funding for the Texarkana MPO over the next 10 years.[2] A breakdown by funding category of these planning targets over the next 10 years for the TxDOT Atlanta District from the UTP is shown in Figure 8. Note that additional MPO target funding amounts are not included in this figure.

Figure 8: TxDOT Atlanta District 10-Year Planning Targets by Category

Based on these planning targets, statewide connectivity corridor projects (Category 4) as well as preventive maintenance and rehabilitation projects (Category 1) are key investment areas that the TxDOT Atlanta District will focus on over the next 10 years. TSMO strategies can be applied to both investment areas, and especially to improvements focused on statewide connectivity corridor projects. Several of the key projects related to these investment areas are:

- Widening I-20 to six lanes and adding continuous frontage roads in Harrison County
- Widening I-30 to six lanes and adding frontage roads, ramps, and turnarounds in Bowie County
- Conversion and extension of State Loop 390 to a freeway in Harrison County, near Marshall
- Constructing a grade-separated interchange at the US-59 intersection with FM 1794 in Panola County
- Replacing the bridge along State Highway 155 where it crosses Lake O' the Pines

Agencies that place importance on TSMO in long-range planning, project development, system completion, and system maintenance have a strong basis for devoting funding to these strategies because operations and management activities can improve congestion while minimizing or delaying the need for physical capacity improvements. Through TSMO planning, funding is reserved to include TMS in conventional construction, asset management techniques, upgrades to existing infrastructure, workforce resources, and other operational strategies.

Congestion Impacts

The 2050 Texas Transportation Plan goal **Optimize System Performance: Movement of People and Goods** can be addressed using TSMO strategies.

TxDOT Goal: Optimize System Performance - Movement of People and Goods

Detailed objectives include:

- Reduce congestion through both traditional and alternative strategies
- Enable reliable travel times
- Increase travel options/connections
- Ensure freight can move efficiently
- Increase access to jobs, services, and activity centers
- Leverage transportation assets to support economic growth and vitality

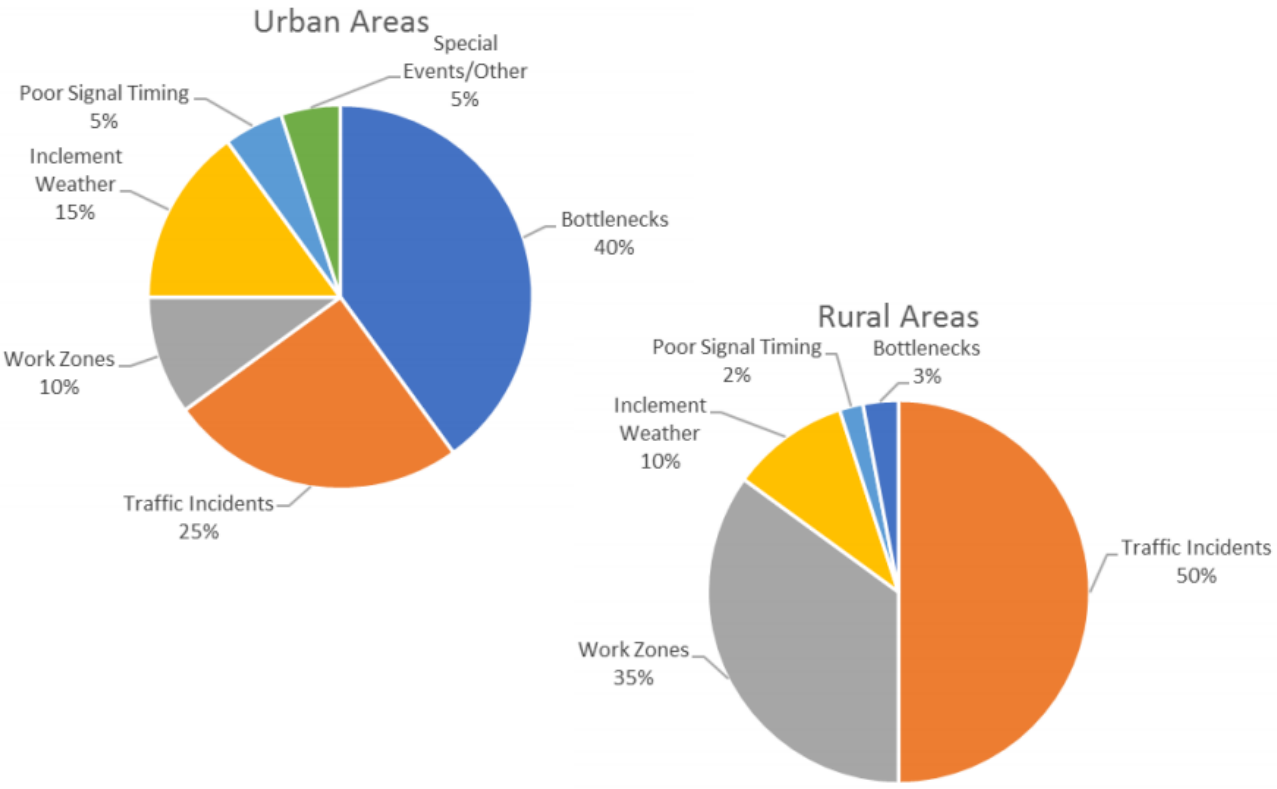
TSMO planning identifies strategies beyond typical capacity enhancements that reduce congestion. Since TSMO strategies are mostly focused on non-recurring congestion, they are typically more effective at improving travel time reliability when compared to capacity enhancements.

The Texas Demographic Center (TDC) reports the population of the TxDOT Atlanta District has increased by two percent since 2010.[3] In addition to local commuters, the City of Texarkana, TX is visited by an estimated 317 thousand tourists annually.[4] As annual vehicle miles traveled continue to increase, congestion will grow unless innovative, proactive actions are taken.

One of the keys to maintaining economic vitality within the TxDOT Atlanta District is effective management of commute times. The United States Census Bureau tracks average commute time data through its Journey to Work questionnaire as part of the American Community Survey. Between 2010 and 2018, the average commute time for residents of Bowie and Harrison counties within the TxDOT Atlanta District has decreased by four percent, from 20.47 to 19.56 minutes.[5]

While the District has successfully managed commute times in the Texarkana and Longview-Marshall regions, many of the largest congestion impacts in other areas throughout the District occur due to events that limit roadway capacity, such as traffic incidents and planned road work. FHWA's breakdown of these congestion sources taken from nationwide data is shown in Figure 9 for both urban and rural areas.[6]

Figure 9: Nationwide Causes of Congestion in Urban and Rural Areas (FHWA)



In 2020, the Texas Transportation Institute (TTI) estimated an annual total delay of approximately 1,456,437 passenger-hours along major thoroughfares within the District. This total is inclusive of an estimated annual freight vehicle delay of 73,966 driver-hours along those same major thoroughfares. Using Texas-specific user cost values, this congestion resulted in a societal cost of $31,998,708 within the TxDOT Atlanta District in 2020.[7] The majority of these impacts likely resulted from capacity-limiting events, rather than bottlenecks.

TSMO allows for the inclusion of operations strategies that result in the improved management of incidents, work zones, weather events, and planned special events, thereby reducing the congestion impacts and related societal costs of these interferences on the Atlanta District transportation network.

Safety Impacts

The 2050 Texas Transportation Plan goal to **Promote Safety** corresponds with many TSMO strategies.

TxDOT Goal: Promote Safety

Detailed objectives include:

- Work with stakeholders to identify and develop proven and data-driven strategies, countermeasures, and programs
- Reduce crashes and lessen crash severity by implementing engineering solutions
- Use education and outreach to promote safe driving, bicycling, and pedestrian activities
- Coordinate with first responders to improve incident response times

TSMO planning identifies technologies or systems that can be incorporated into existing or planned infrastructure to improve the safety of road users, whether they be drivers, cyclists, or pedestrians. In addition to the objectives outlined in the 2050 Texas Transportation Plan, the Texas Transportation Commission adopted a Road to Zero Goal in 2019. The goal is the elimination of all deaths on Texas roadways by 2050, with a midway goal of halving the number of deaths on Texas roadways by 2035. The implementation of TSMO strategies will be essential in reducing and eventually eliminating deaths on Texas roadways.

In 2020, there were 6,544 reported crashes in the TxDOT Atlanta District.[8] In those crashes, 121 people died and 324 people suffered an incapacitating injury. A summary of 2020 crashes in the TxDOT Atlanta District, including the count of certain crash types that could be targeted by TSMO strategies, is shown below in Table 1. Using Texas-specific user cost values, these crashes and associated damages resulted in a societal cost of $1,551,350,000 within the TxDOT Atlanta District in 2019.[9]

Table 1: 2020 Summary of Crashes by Type Within the TxDOT Atlanta District

	Fatal (K)	Serious Injury (A)	Minor Injury (B)	Possible Injury (C)	No Injury (O)	Unknown Severity
Total Crashes	106	255	758	939	4291	195
Total Persons Affected	121	324	1058	1511	11751	195
Inclement Weather Crashes - Rain or Fog	14	28	97	130	703	28
Inclement Weather Crashes – Winter Weather	0	0	1	0	4	0
Work Zone Crashes	3	8	12	18	83	0
Intersection Crashes	19	58	219	315	1049	12
Commercial Vehicle Crashes	16	21	80	68	498	7

When TSMO activities are considered in project development, such as during planning for roadway reconstruction, solutions to improve safety for all modes of transportation can be identified and implemented. Furthermore, TSMO strategies aimed at reducing non-recurring sources of congestion and improving traveler information can improve driver expectancy and improve driver awareness of conditions that increase crash risks. Finally, TSMO strategies can help protect those who spend time working in the roadway, including TxDOT employees and contractors, public safety officers, and emergency responders.

The Value of Mainstreaming TSMO

The business case for TSMO is grounded in the fact that funding for the TxDOT Atlanta District to solve existing congestion challenges through capacity enhancements alone is not readily available. FHWA congestion research shows that most of the congestion that road users experience in the United States is not a result of capacity bottlenecks. Instead, most congestion occurs due to non-recurring shocks to the network such as traffic incidents, inclement weather, or work zones. In rural areas, nearly all congestion impacts come from these non-recurring sources.

TSMO strategies integrate TMS into the planning, design, and construction of District facilities. One group of strategies, the use of Intelligent Transportation Systems (ITS) deployments such as closed-circuit television (CCTV) cameras or dynamic message signs (DMS), has been used by TxDOT for decades and in the TxDOT Atlanta District for the past 15 years. The use of ITS as well as other TMS and TSMO strategies allows for more nimble operation and maintenance of the facilities once they are constructed. Successful integration of TMS allows agencies who maintain the transportation network to respond more quickly and to better mitigate the adverse effects of many sources of non-recurring congestion, thereby reducing the amount of congestion and making roads safer.

Building necessary infrastructure and maintaining it have historically been the core goals of TxDOT's transportation project planning process, while operating and managing the performance of that infrastructure have traditionally not been as highly prioritized. TSMO justifies investment in technology and TMS infrastructure to facilitate the integration of management and operations into the transportation system. Promoting and formalizing TMS deployment and maintenance ensures operational asset uptime, which in turn enables regional transportation agencies to provide greater traveler information, traffic incident management, road weather management, safer work zones, and more.

TSMO planning fosters the cultural shift required to prioritize the dedicated funding of operational improvements and TMS. It also establishes a framework for performance measurement and continuous improvement to enhance safety and mobility throughout the District. Ultimately, this brings the District closer to achieving the TxDOT mission statement: "Through collaboration and leadership, we deliver a safe, reliable, and integrated transportation system that enables the movement of people and goods."

TSMO Vision, Mission, Goals, and Objectives

The TxDOT Atlanta District TSMO Program mission, vision, goals, and objectives match the items developed for the statewide TxDOT TSMO Strategic Plan. TSMO leadership at the TxDOT Atlanta District determined that the District TSMO vision, mission, goals, and objectives should be the same as the statewide TSMO vision, mission, goals, and objectives. These items are shown below in Figure 10.

Figure 10: TxDOT Atlanta District TSMO Program Plan Goals and Objectives

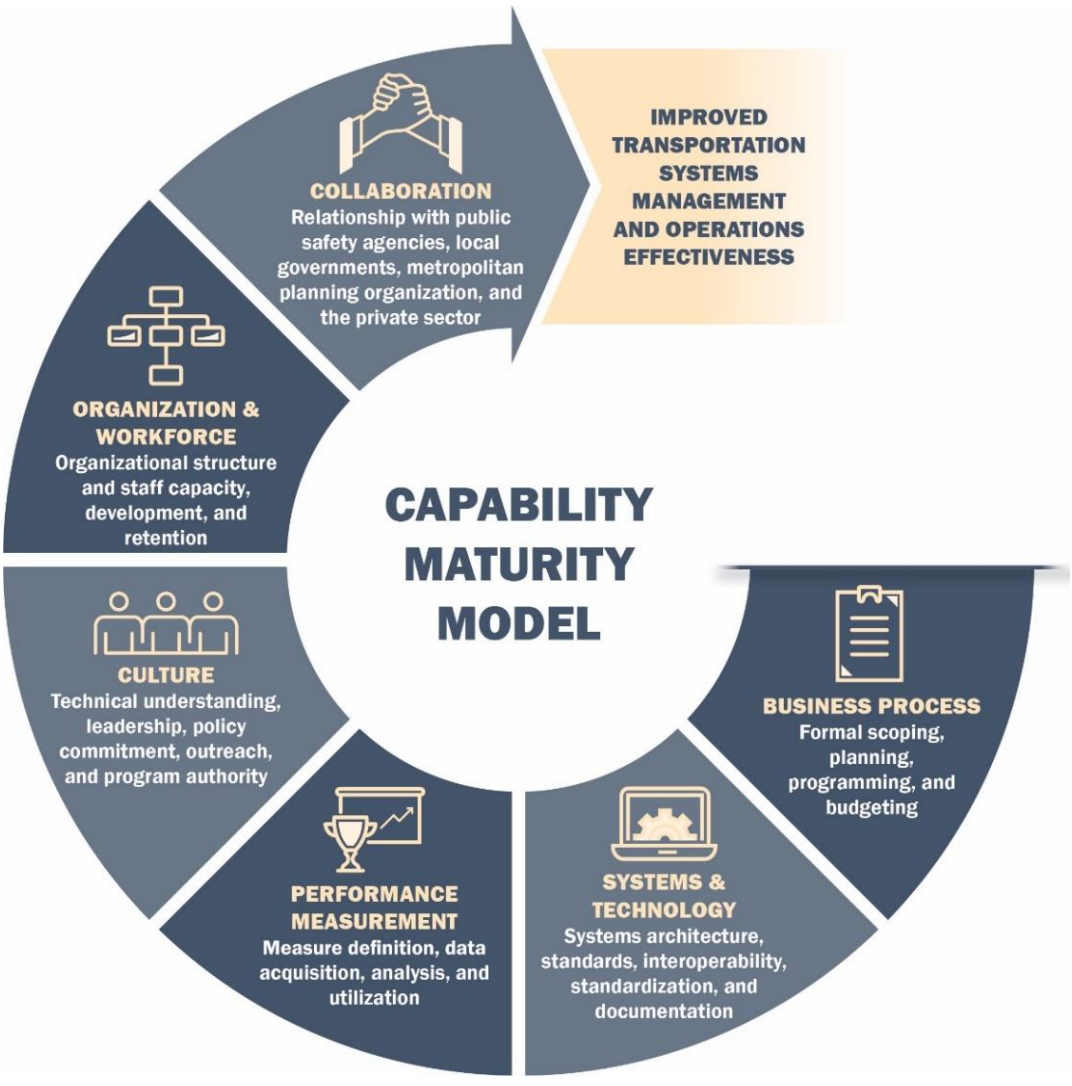
Capability Maturity Model

A Capability Maturity Model (CMM) is a systematic methodology in which a program or organization is evaluated to determine a level of achievement for specific attributes. The American Association of State Highway Transportation Officials (AASHTO) adapted the CMM approach, originally developed for the information technology industry, so that it could be used to gauge a transportation agency's capabilities in addressing various operational challenges related to TSMO. The CMM is a self-assessment and relies on direct input from internal and external stakeholders to assess the strengths and weaknesses across a range of different program perspectives.

Dimensions of TSMO Capability

The CMM is based on the concept that there are six core areas, referred to as 'dimensions' that are critical for improving program efficiency and effectiveness. These dimensions, as well as processes and activities within TxDOT that correspond to each one, are shown in Figure 11.

Figure 11: CMM Dimensions of TSMO Capability



TSMO Focus Areas

The AASHTO CMM assessed the TxDOT Atlanta District's capabilities across the six dimensions of capability shown in Figure 11 for six different focus areas (often referred to as Capability Maturity Frameworks, or CMFs). These focus areas are:

- **Traffic Incident Management (TIM):** The institutional capability to detect, respond to, and clear traffic incidents so that normal operations can be restored safely and quickly.
- **Work Zone Management (WZM):** The institutional capability to assess and mitigate work zone impacts.
- **Road Weather Management (RWM):** The institutional capability to respond to adverse weather conditions through both maintenance and operations activities.
- **Planned Special Events (PSE):** The institutional capability to manage traffic impacts generated by events at permanent event venues, temporary venues, or ones that occur on the road network itself.
- **Traffic Signal Management (TSM):** The institutional capability to effectively design, operate, and maintain traffic signals.
- **Traffic Management (TM):** The institutional capability to manage the movement of traffic on roadways within a region, including through corridor management.

Introduction to the CMM Process

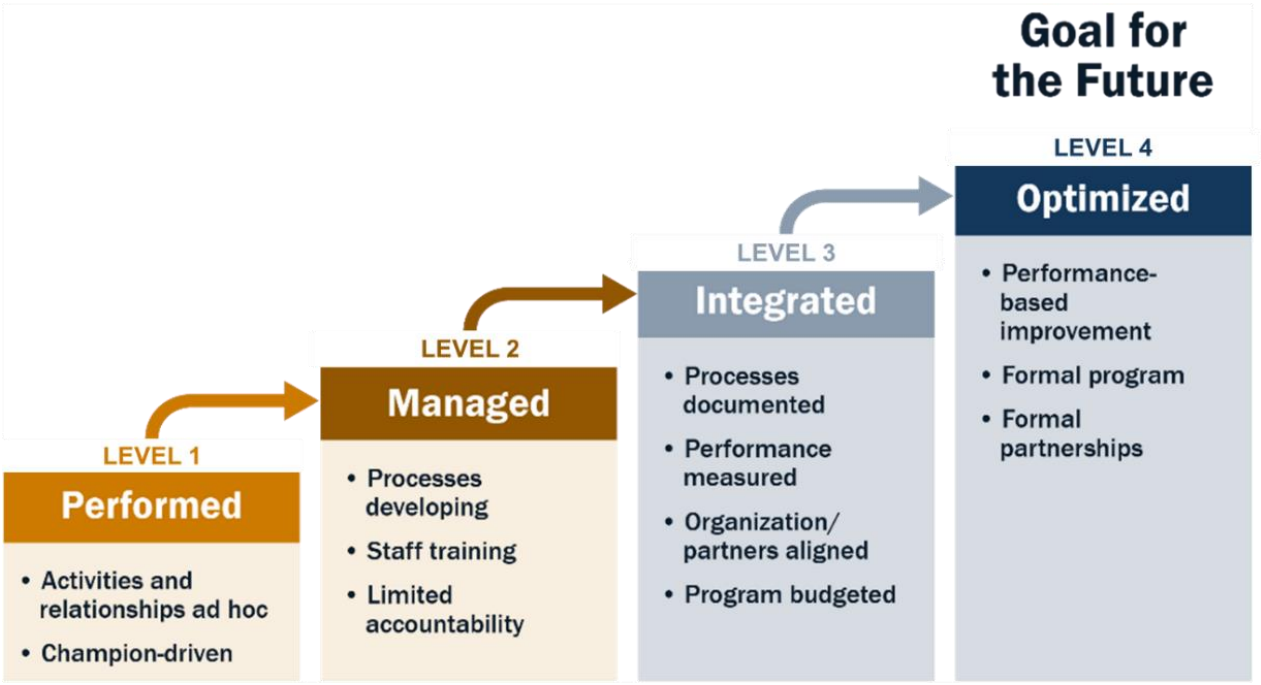
Each of the TSMO capabilities evaluated in the CMM assessment are classified as one of four levels of organizational maturity by stakeholders through a facilitated self-assessment process. The base level, or Level 1, is the Performed level. The top level, or Level 4, is the Optimized level. It is important to note that the levels are not grades, they merely reflect how the organization currently operates within a particular TSMO capability.

As shown in Figure 12, Level 1, Performed, means the TSMO capability is completed on an ad-hoc basis, usually by one or two individual champions. Level 2, Managed, may involve more individuals on a team performing the activity and beginning to integrate the activity into other processes; however, there is little accountability for achieving performance measures.

At Level 3, Integrated, the program dimension is part of a more formalized process, there are established performance measures, and activities are structured to work toward performance objectives. At this stage, processes are more clearly defined and there is some recognized, organizational support for the activities, including dedicated budgets.

When an organization has achieved Level 4, Optimized, the capability is largely institutionalized and formalized, with strong collaboration and recognition of roles and responsibilities by agency staff and partners. At this level, there is also a more formal commitment for ongoing performance-based improvements.

Figure 12: CMM Levels of Maturity



Each of the capabilities were evaluated for the TxDOT Atlanta District at three CMM workshops held virtually with both TxDOT and partner agency staff in October 2020 using Microsoft Teams meeting software. The first of these workshops on October 7th covered Planned Special Events, Work Zone Management, and Road Weather Management. On October 8th, the second workshop covered Traffic Incident Management and the third workshop covered Traffic Management and Traffic Signal Management. Capability responses were refined later through an individual interview with TxDOT Atlanta District operations staff.

Figure 13 shows where the TxDOT Atlanta District ranked itself overall for each of the TSMO capability dimensions. Based on the CMM assessment, the District currently sees itself operating at CMM Level 1 in the performance measurement CMM capability dimension and at CMM Level 2 in all other capability dimensions. Figure 14-Figure 19 show CMM capability dimension rankings as they specifically apply to each of the six TSMO focus areas.

Figure 13: TxDOT Atlanta District CMM Assessment

Overall Capabilities				
TSMO Capability Dimensions	Level 1 Performed	Level 2 Managed	Level 3 Integrated	Level 4 Optimized
Business Processes		●		
Systems & Technology		●		

Performance Measurement				
Culture				
Organization & Workforce				
Collaboration				

Following completion of the CMM assessment, District TSMO leadership selected two of the focus areas as the subject of Capability Maturity Framework (CMF) workshops that were held in January 2021. These workshops provided an opportunity for interested stakeholders to meet and identify action items that would allow the TxDOT Atlanta District to advance in the CMM assessment for each capability dimension within a given TSMO focus area. The District held a workshop on January 7th that focused on general traffic management in the region and a second workshop on January 21st that focused on traffic incident management.

Input from individual stakeholder meetings and CMM and CMF workshops is summarized on the pages that follow and organized by focus area. Additional information related to the District's existing practices in each of these focus areas is provided in the TxDOT Atlanta District TSMO State of the Practice Report.

Traffic Incident Management District Assessment

Figure 14 shows where the District ranked itself for each of the TSMO capabilities regarding TIM. The TxDOT Atlanta District generally performs TIM activities on an ad hoc basis since no formal TIM program exists as of March 2021.

TIM is currently considered in planning for construction and work zones on major projects, but not for special events or weather-related events. For construction projects with significant impacts, such as the ongoing Interstate 30 (I-30) widening project, the construction contractor must develop and implement a TIM plan. This TIM plan typically requires contractors to modify traffic control when an incident occurs and to serve as a point-of-contact for tow truck and emergency services dispatch if needed. When an incident occurs, the contractor must also notify TxDOT so District staff are aware of the incident and can publish traveler information regarding the incident and verify that the proper actions are taken by the contractor at the incident scene.

Existing capabilities for TIM related to performance measurement are limited to observation via camera feeds along major corridors and on scene data collection by local public safety agencies. There is good communication between the TxDOT Maintenance Sections and Department of Public Safety (DPS) in responding to a traffic incident. TIM personnel know who to contact, however there is a need to define roles and responsibilities to ensure that incident clearance times (ICTs) are reduced.

When Texas DPS responds to incidents that occur within the region, the agency collects TIM performance data including ICT and roadway clearance time (RCT). Currently, the District uses DMS to alert and divert the traveling public away from incident impact areas. However, there is not a standardized process for communicating incident information to local and through travelers.

Figure 14: TxDOT Atlanta District CMM Assessment for Traffic Incident Management

Focus Area: Traffic Incident Management				
TSMO Capability Dimensions	Level 1 Performed	Level 2 Managed	Level 3 Integrated	Level 4 Optimized
Business Processes	●			
Systems & Technology		●		
Performance Measurement		●		
Culture	●			
Organization & Workforce		●		
Collaboration	●			

Work Zone Management District Assessment

Figure 15 shows where the District ranked itself for each of the TSMO capabilities regarding WZM. The TxDOT Atlanta District is documenting processes and standards to integrate its WZM activities with local partner agencies. Currently, the TxDOT Atlanta District coordinates construction projects internally and conducts pre-construction meetings with external stakeholders for large projects such as reconstruction efforts on Interstate 30 (I-30). Once a construction project is complete, the WZM plans from pre-construction meetings are evaluated to understand successes and identify areas of improvement. The use of available technologies and system resources, such as Smart Work Zone (SWZ) field devices to address WZM needs, is increasing throughout the TxDOT Atlanta District.

The TxDOT Atlanta District does not collect WZM performance measurement data, although SWZ devices are deployed on a regular basis for major construction projects. There is limited knowledge within the District of what new technologies are most essential for work zone safety and of how to budget for the inclusion of this technology on road construction sites. To improve existing work zones, the District identified the need for better functionality for deployed work zone ITS components.

External coordination consists of regularly hosted pre-construction meetings to inform local stakeholder agencies such as municipalities and the Texarkana MPO of TxDOT construction projects planned in the region. While these meetings are extended to local municipalities when large projects are planned, external stakeholders are not regularly included in discussions about more granular project details. Some of these discussions could be enhanced with input from local first responder agencies and public safety officials as well as continued communication with local sheriff departments and Texas DPS officers throughout the duration of major construction projects.

Figure 15: TxDOT Atlanta District CMM Assessment for Work Zone Management

Focus Area: Work Zone Management				
TSMO Capability Dimensions	Level 1 Performed	Level 2 Managed	Level 3 Integrated	Level 4 Optimized
Business Processes			●	
Systems & Technology			●	
Performance Measurement	●			
Culture		●		
Organization & Workforce		●		
Collaboration			●	

Road Weather Management District Assessment

Within the TxDOT Atlanta District and between Districts there is coordination among maintenance, traffic operations, and other stakeholders to support RWM. The District reports weather information on the DriveTexas website and via social media, but provides minimal updates on road closures, detours or treatments following severe weather events along roads via DMS. Typical costs are generally known for TxDOT's RWM activities, however budgets are not specifically outlined for the District. Figure 16 shows where the District ranked itself for each of the TSMO capabilities regarding RWM.

The TxDOT Atlanta District engages in regular coordination with National Oceanic and Atmospheric Administration (NOAA) so that the District can develop preset plans for managing upcoming weather events. Winter weather management is handled by existing TxDOT staff who are assigned roles and responsibilities for when storms or winter weather occur. Cross-training is provided for maintenance staff who serve local jurisdictions by pre-treating and clearing TxDOT roads that go through their cities. Roadway conditions and operations are monitored via camera to see if additional winter maintenance is needed.

The TxDOT Atlanta District has self-identified the need for improved traveler information for weather-related roadway impacts and the need to educate local drivers about flood warning signage. Discussions with stakeholders of how to respond to areas that flood frequently also led to the District identifying the need to deploy technology to allow for remote surveillance of roads that often flood. Currently, time and staffing resources are deployed to investigate and validate flooding situations, where technology could be assisting and limiting the demand on staff resources.

Figure 16: TxDOT Atlanta District CMM Assessment for Road Weather Management

Focus Area: Road Weather Management				
TSMO Capability Dimensions	Level 1 Performed	Level 2 Managed	Level 3 Integrated	Level 4 Optimized
Business Processes		●		
Systems & Technology		●		
Performance Measurement	●			
Culture			●	
Organization & Workforce			●	
Collaboration			●	

Planned Special Event District Assessment

Figure 17 shows where the District ranked itself for each of the TSMO capabilities regarding PSE management. The TxDOT Atlanta District does not participate in or provide resources to local agencies for PSEs. PSE management is executed by local agencies within the District.

The TxDOT Atlanta District has not designated formal PSE job functions for its staff. Since there is no involvement from TxDOT in PSEs, there is no formal budgeting for PSE planning and no PSE traffic data is captured or shared.

PSE operations roles and responsibilities are mutually understood by TxDOT and local stakeholder agencies. Cities are responsible for traffic management during an event and can request support from TxDOT if necessary. No needs were specifically identified by stakeholders or the District for PSE management. There are some basic and low effort exercises that would help the District anticipate and prepare for future PSE activities, should they arise. Maintaining a District special events calendar and conducting planning meetings or after-action reviews focused on traffic operations surrounding special events can improve District readiness.

Figure 17: TxDOT Atlanta District CMM Assessment for Planned Special Events

Focus Area: Planned Special Events				
TSMO Capability Dimensions	Level 1 Performed	Level 2 Managed	Level 3 Integrated	Level 4 Optimized
Business Processes	●			
Systems & Technology	●			
Performance Measurement	●			
Culture	●			
Organization & Workforce	●			
Collaboration		●		

Traffic Signal Management District Assessment

Figure 18 shows where the District ranked itself for each of the TSMO capabilities regarding TSM. The District system includes 152 signals. The TxDOT Atlanta District has a cohesive approach to TSM since District signal design, construction, and maintenance teams work in the same office.

The TxDOT Atlanta District currently conducts TSM planning activities that are guided by a combination of identified safety concerns as well as routine maintenance and asset management needs. Traffic signal upgrades that address safety issues are typically funded through existing safety programs available to projects that occur on the TxDOT road system. The District has installed some intersection visibility lighting, installed flashing yellow arrow signal heads, completed signal retiming, and conducted other signal enhancements to address safety concerns as needed. Maintenance funds are used for general signal maintenance projects and improvements per the District's existing asset management programs.

Approximately 60 percent of TxDOT Atlanta District signals now have cellular modems that allow remote traffic signal troubleshooting. In the past, the primary means of identifying signal operations issues or service disruptions had been through user complaints. The increased deployment of cellular modems throughout the region improves communication with traffic signals, enabling remote traffic signal operations modifications and traffic count data collection efforts in those locations. Currently, data is collected and reviewed from deployed signal technology on a reactive basis. District staff generally only collect traffic signal data for analysis when a complaint is submitted or an incident occurs. As part of its ongoing deployment of cellular modems at signal locations, the District has standardized signal maintenance procedures for signal technicians to become familiar with new controller types, cellular modems, and detection capabilities to improve continuity of operations. The District also has begun to install retroreflective signal backplates at intersections Districtwide.

Figure 18: TxDOT Atlanta District CMM Assessment for Traffic Signal Management

Focus Area: Traffic Signal Management				
TSMO Capability Dimensions	Level 1 Performed	Level 2 Managed	Level 3 Integrated	Level 4 Optimized
Business Processes		●		
Systems & Technology		●		
Performance Measurement	●			
Culture		●		
Organization & Workforce		●		
Collaboration		●		

General Traffic Management District Assessment

Figure 19 shows where the District ranked itself for each of the TSMO capabilities regarding general traffic management. The TxDOT Atlanta District generally approaches general traffic management through a collaborative effort among departments within the District, and through sustained communication between the main District office and maintenance sections in each county. However, the District engages only in limited traffic management coordination with local jurisdictions.

Recent improvements to general traffic management in the District include the implementation and operation of SWZs and the roll out of software to allow for the remote monitoring of signal status. The District does not currently collect general traffic management performance measurement data along roadways in the District. Most local agencies do not have the resources to easily measure transportation network performance. Currently, there is no facility for regional general traffic management operations where municipalities, TxDOT, and emergency management services can collaborate to improve traffic operations in the region.

The TxDOT Atlanta District has self-identified the need for improved collaboration across the region and cross-jurisdictionally for better general traffic management, preferably through the establishment of a regional traffic management center (TMC) in the Texarkana area as a long-term goal. Currently, the only remote monitoring done by District staff is via IP camera feeds and the Lonestar Active Traffic Management System (ATMS) application installed on staff computers. Additionally, corridor management and improved vehicle progression through enhanced traffic signal timing are long-term goals for the District. District staff and local stakeholders established that there is a need for performance data collection on major roadways. The District has sought to prioritize deploying ITS devices such as CCTV cameras and DMS boards along major roadways at key intersections, interchanges, infrastructure locations, routing decision points, and crash hot spots in the region.

Figure 19: TxDOT Atlanta District CMM Assessment for General Traffic Management

Focus Area: General Traffic Management				
TSMO Capability Dimensions	Level 1 Performed	Level 2 Managed	Level 3 Integrated	Level 4 Optimized
Business Processes		●		
Systems & Technology	●			
Performance Measurement	●			
Culture		●		
Organization & Workforce			●	
Collaboration		●		

Recommended TSMO Action Items

From the capability maturity assessment process conducted for each of the six TSMO focus areas, the TxDOT Atlanta District identified 36 recommended action items to advance TSMO both internally within the District and externally in cooperation with partners throughout the region. These recommended action items are explained in detail within this document via one-page Action Item Sheets. Each sheet is organized via a standard template and includes the following information about each action item:

- **Action Number:** An identifier for each recommended action item, organized by CMM capability dimension: Business Processes (BP), Systems & Technology (ST), Performance Measurement (PM), Culture (CU), Organization & Workforce (OW), and Collaboration (CO).
- **Action Title and Objective:** A brief action item title, as well as a more detailed statement summarizing the intent of the action item.
- **Focus Area:** Identifies which TSMO focus area the action item supports: Traffic Incident Management, Work Zone Management, Road Weather Management, Planned Special Events, Traffic Signal Management, and General Traffic Management.
- **Action Lead:** Identifies the individual at the TxDOT Atlanta District who will take ownership of the action and will oversee that implementation progresses as planned.
- **Partners:** Identifies TxDOT staff and external stakeholders that will contribute to implementation of the recommended action item.
- **Supports District TSMO Goals:** Identifies which of the District's TSMO goals the action item supports: Safety, Reliability, Efficiency, Customer Service, Collaboration, or Integration.
- **Need:** Identifies existing needs or limitations within the District that could be addressed by the action item.
- **Implementation Steps:** Breaks down the action item into two or more steps that the District should take to successfully implement the action item, along with items the District might need to consider as the action is implemented.
- **Expected Benefits:** Identifies how the action item meets the District's needs and summarizes the expected benefits of implementation in terms of improved internal District operations, external partner agency relationships, traffic operations, and traffic safety.

In addition to the information listed above, some Action Item Sheets may also include the following reference information:

- **Strategy and Best Practice:** An example of a program like the described action item that has already been implemented elsewhere around Texas or around the United States. Benefit-cost information from these similar programs is included when available.
- **Resources:** Links to resources published by TxDOT TRF that can support the implementation of a recommended action item by providing more detailed program direction or decision support.

Action Item Sheets are included on the following pages, organized by TSMO capability dimension. The full list of action items is also summarized in the TSMO Implementation Plan section.

Business Processes

Within the CMM, business processes refer to an agency's internal activities and tasks that allow it to meet its TSMO goals. Considerations include how an agency plans, programs, and budgets for TSMO projects. Business processes may also refer to how an agency follows its internal protocol to implement specific TSMO projects. Table 2 shows the recommended Business Processes action items for the TxDOT Atlanta District.

Table 2: TxDOT Atlanta District TSMO Recommended Action Items - Business Processes

CMM Capability Dimension	Action Item Number	Action Item Description
Business Processes	BP-01	**Formalize a Response Approach for Commercial Vehicle Incidents**
	BP-02	**Establish Criteria for Conducting After-Action Incident Reviews**
	BP-03	**Develop an Approach to Maintain ITS Functionality During Construction**
	BP-04	**Establish Work Zone Accessibility Criteria for First Responders**
	BP-05	**Use TxDOT's Smart Work Zone Decision Tool and Deployment Guidelines**
	BP-06	**Conduct Post-Special Event Reviews as Needed**
	BP-07	**Develop and Maintain an Events Schedule**
	BP-08	**Formalize Active Management of Signal Battery Backup Units**
	BP-09	**Integrate Existing Regional GIS Mapping Datasets**

BP-01: Formalize a Response Approach for Commercial Vehicle Incidents

SCHEDULE	2021	2022		2023		2024		2025		2026
	H2	H1	H2	H1	H2	H1	H2	H1	H2	H1

Focus Area:
Traffic Incident Management

Action Item Lead:
District Director of Maintenance

Partners:
TxDOT TRF, ATL Operations, Texas DPS, Local Public Safety Agencies

Goals Addressed:

Safety	✓
Reliability	✓
Efficiency	✓
Customer Service	
Collaboration	✓
Integration	

Objective: Develop a regional approach for responding to and quickly clearing commercial vehicle incidents on District freeways.

Need: The TxDOT Atlanta District generally performs TIM activities on an ad hoc basis since no formal TIM program exists. Commercial vehicle incidents are not as common as passenger car incidents; therefore, the response and clearance processes are not perfected by practicing nor engrained through repetition. Another factor that lengthens commercial vehicle incidents is that the equipment necessary for these large-scale clearances is not readily available because it is typically more expensive and rarely used. Agencies throughout the District have towing contracts in place, but most tow companies must subcontract out heavy-towing duties, increasing response times. District staff identified the need to reduce commercial vehicle incident response and clearance times.

Implementation Step #1: Survey regional availability and reliability of private service providers for heavy wrecker and spill cleanup. Engage with private towing service providers, first responders, and freight carriers in a forum to discuss TxDOT's goals of rapid clearance, review existing state laws supporting these goals, and build relationships among those involved in response.

Implementation Step #2: Review Freight Movement Study data and Crash Records Information System (CRIS) crash data to identify commercial motor vehicle (CMV) key corridors, crash hotspots, high-volume times of day, and priority road segments on which to focus major incident clearance resources and efforts.

Implementation Step #3: As commercial vehicle crashes occur, track and log response activities to maintain a record of the response, and then conduct post-crash reviews with all involved response agencies to review how each incident was handled (see Action Item BP-02). Establish TIM trainings specific for commercial vehicle incident response and clearance (see Action Item OW-01).

Expected Benefits: Currently, commercial vehicle incidents often take hours, to clear because of the logistical challenges they present. Developing a standard approach for dispatching the appropriate equipment more quickly to clear these large-scale incidents would greatly reduce ICT. Minimizing response and clearance times in turn decreases congestion, improves safety of first responders on the scene, and reduces the risk of secondary crashes.

BP-02: Establish Criteria for Conducting After-Action Incident Reviews

SCHEDULE	2021	2022		2023		2024		2025		2026
	H2	H1	H2	H1	H2	H1	H2	H1	H2	H1

Focus Area:
Traffic Incident Management

Action Item Lead:
District Director of Transportation Operations

Partners:
TxDOT TRF, ATL Operations, Area Engineers, Local Transportation Agencies

Goals Addressed:

Safety	✓
Reliability	✓
Efficiency	✓
Customer Service	
Collaboration	✓
Integration	✓

Objective: Establish a severity threshold for conducting TIM-focused after-action incident reviews and begin to conduct reviews that include other agencies involved with TIM response.

Need: The TxDOT Atlanta District generally performs TIM activities on an ad hoc basis since no formal TIM program exists. Stakeholders and District staff identified that coordinating after-action reviews among the involved local agencies following each major incident would improve incident response and operations.

Implementation Step #1: Establish formal thresholds that determine when after-action incident reviews are warranted. For example, if an incident takes a certain amount of time or longer to clear, or if an incident involves more than a specified number of vehicles, then a review would be required.

Implementation Step #2: Develop a review meeting format based upon existing statewide guidance. TxDOT has an After-Action Report (AAR) form for TIM Teams to use, included in Appendix B. The form includes a checklist and prompts that the District can use to comprehensively outline details of an incident such as which agencies were involved, what went well, training needs, and lessons learned.

Implementation Step #3: Conduct after-action incident reviews with all agencies that were involved in the response, such as law enforcement and emergency response. Conduct reviews within several weeks of the incident and distribute the final AAR so all agencies involved get the feedback.

Expected Benefits: Identifying what worked well and what needs to be improved during incident response and clearance is essential in minimizing delays, which in turn can reduce other incident issues, such as secondary crashes. Without after-action reviews, responders are likely to repeat practices that hamper TIM efforts.

Strategy and Best Practice

The Florida DOT (FDOT) developed a TIM Strategic Plan in 2019, which includes an after-action review process. The goal of the multiagency, multidiscipline review is to determine areas to improve and identify best practices. Florida's Turnpike uses the acronym STEALTH (Set time of incident, Tone of discussion, Execution of incident, Analyze incident execution, determine Lessons learned, Tie lessons learned to future improvement, and end on a High note) to direct the review discussion.

BP-03: Develop an Approach to Maintain ITS Functionality During Construction

SCHEDULE	2021	2022		2023		2024		2025		2026
	H2	H1	H2	H1	H2	H1	H2	H1	H2	H1

Focus Area:
Work Zone Management

Action Item Lead:
District Director of Construction

Partners:
ATL Construction, ATL Operations, Area Offices

Goals Addressed:

Safety	✓
Reliability	✓
Efficiency	
Customer Service	
Collaboration	✓
Integration	✓

Objective: Develop contract language and a contract enforcement approach to keep work zone ITS functioning as intended for the duration of construction projects.

Need: The TxDOT Atlanta District faces challenges with work zone ITS devices functioning properly throughout construction. It is easy for deployed devices to get bumped or moved and reset incorrectly during the project. Currently, construction contracts do not include language that disincentivizes incorrectly deployed work zone ITS. As a result, there is no mechanism in place to ensure effective monitoring of the work zone and accurate data collection.

Implementation Step #1: Coordinate with the TxDOT TRF to adopt contract language that disincentivizes contractors from incorrectly deployed work zone ITS, based on existing construction contracts in other Districts that include similar provisions.

Implementation Step #2: Review the Statewide SWZ Guidelines and SWZ System Go/No-Go Decision Tool (see Action Item BP-05) to identify the appropriate SWZ ITS devices to deploy. Determine the procedures and performance measures necessary to ensure each deployed ITS device functions properly and effectively.

Implementation Step #3: Establish a method of enforcement. The contract may include incentives/disincentives for maintaining ITS functionality during construction, but enforcing these will generally require TxDOT staff to check the equipment either remotely or via work zone drive-throughs.

Expected Benefits: If a work zone ITS device is not functioning properly, it may not be able to warn motorists of closures or queues, measure speeds or travel times, or detect incidents. Developing contract language that establishes the requirement of ensuring proper ITS device function during construction, identifies the responsible party for the maintenance of devices, and allows for some form of enforcement through disincentives will increase the likelihood that deployed devices function as intended. Functioning ITS around and within a work zone increases safety and the quality of traveler information. ITS can also allow for monitoring of performance measures, which can lead to improvements in work zone operations on future projects.

BP-04: Establish Work Zone Accessibility Criteria for First Responders

SCHEDULE	2021	2022		2023		2024		2025		2026
	H2	H1	H2	H1	H2	H1	H2	H1	H2	H1

Focus Area:
Work Zone Management

Action Item Lead:
District Director of Construction

Partners:
ATL Construction, ATL Operations, Local Public Safety Agencies, Texas DPS

Goals Addressed:

Safety	✓
Reliability	✓
Efficiency	
Customer Service	
Collaboration	✓
Integration	✓

Objective: Establish work zone design criteria and implementation procedures to maintain acceptable first responder and law enforcement access during both freeway and non-freeway incidents.

Need: Emergency responders must have the ability to access incidents that occur within work zones. When first responders try to get to an incident, the scene is sometimes blocked by temporary concrete construction barriers or equipment, preventing quick incident clearance and intensifying traffic and safety impacts of the incident.

Implementation Step #1: Develop criteria for determining when TIM response measures should be implemented. Factors to consider might include distance between entry points on a freeway, shoulder width, or ease of access from frontage roads.

Implementation Step #2: Coordinate with first responders to develop a list of standard strategies to support TIM in construction work zones, such as use of movable barriers, emergency pull-off areas, or staged towing services. TIM protocols for work zones might also involve resource sharing discussions, such as providing first responders access to TxDOT camera feeds or identifying locally relevant resources or other assistance that TxDOT maintenance sections or contractors could provide to assist with traffic control in an incident influence area. Identify when each of these strategies might be warranted.

Implementation Step #3: Add these criteria and strategies to the District's existing project specification development and letting processes.

Expected Benefits: Maintaining first responder accessibility to roadways allows incident clearance to happen as fast as possible and prevents further delays by reducing public safety agency response times. Camera feeds and other resource agreements would provide responders with the information needed to ensure they bring the appropriate equipment to the scene and the traffic control support needed to manage the scene safely.

BP-05: Use TxDOT's Smart Work Zone Decision Tool and Deployment Guidelines

SCHEDULE	2021	2022		2023		2024		2025		2026
	H2	H1	H2	H1	H2	H1	H2	H1	H2	H1

Focus Area:
Work Zone Management

Action Item Lead:
District Director of Construction

Partners:
TxDOT TRF, ATL Construction, ATL Operations

Goals Addressed:

Safety	✓
Reliability	✓
Efficiency	
Customer Service	✓
Collaboration	
Integration	✓

Objective: Adapt TxDOT's existing SWZ guidance and deployment decision tool when determining which work zone ITS technologies to use for District construction projects.

Need: Work zone ITS is not consistently being used throughout the District. A decision tool is needed to aid in the standardization of SWZ systems deployment. TxDOT TRF developed SWZ Guidelines and a SWZ System Go/No-Go Decision Tool to aid work zone ITS device selection for construction projects statewide. The Atlanta District is not yet utilizing these resources.

Implementation Step #1: Review available work zone ITS technologies specified in the TxDOT's SWZ Guidelines. Utilize the existing SWZ System Go/No-Go Decision Tool to select appropriate SWZ ITS devices for upcoming projects.

Implementation Step #2: Incorporate work zone ITS into construction contracts when the Statewide Decision Tree for SWZ Systems warrants them. Add SWZ System criteria and strategies to the project spec development and letting process.

Implementation Step #3: Track instances of work zone ITS deployments on projects to monitor frequency of usage and performance measures.

Implementation Step #4: Continuously identify existing SWZ deployment strengths and weaknesses within the District, vet new technologies as they become available, and maintain guidelines that include current technologies and strategies.

Expected Benefits: A decision tool for when to deploy certain work zone ITS technologies can improve the safety of a work zone for motorists and construction workers while controlling construction costs. Providing drivers with more warning about an upcoming work zone allows them to make more informed decisions and prepare for potential hazards on the road ahead. Standardizing the use of work zone ITS devices can also better establish driver expectations for work zones, further increasing safety.

Resources: SWZ Guidelines and the System Go/No-Go Decision Tool are both available for download at:

https://www.txdot.gov/inside-txdot/division/traffic/smart-work-zones.html

BP-06: Conduct Post-Special Event Reviews as Needed

SCHEDULE	2021	2022		2023		2024		2025		2026
	H2	H1	H2	H1	H2	H1	H2	H1	H2	H1
	Ongoing…									

Focus Area:
Planned Special Events

Action Item Lead:
District Director of Transportation Operations

Partners:
ATL Operations, Area Engineers, Local Transportation Agencies, Event Organizers

Goals Addressed:

Safety	
Reliability	
Efficiency	
Customer Service	
Collaboration	✓
Integration	✓

Objective: Conduct planning meetings and after-action reviews as needed to debrief on traffic management performance during major special events.

Need: While TxDOT staff noted that special event operations are generally uncommon in the Atlanta District, in the case that special events are planned in the future, post-event reviews would allow for decision makers to revisit negative traffic impacts from event operations and to determine whether these potentially could have been avoided through modified traffic operations. It is anticipated that these reviews would only be conducted following large events and would not take the place of any existing event management processes for smaller events.

Implementation Step #1: Establish criteria to determine when post-special event reviews are warranted, possibly based upon anticipated road user costs or event attendance.

Implementation Step #2: Gather and summarize both operations data and anecdotal accounts of event impacts soon after special events conclude, and operations return to normal.

Implementation Step #3: When warranted, conduct post-special event reviews that include TxDOT Operations and Maintenance staff, local partner agencies, and event organizer representatives.

Expected Benefits: Holding post-special event reviews within several days of the conclusion of major events would allow TxDOT staff and event managers to discuss unique operational challenges or unexpected traffic impacts that arose during the project. Reviewing operations data collected in the event impact area allows for staff to match spikes in delay or documented crashes with specific traffic control schemes or potential conflict points created by event-modified operations.

Strategy and Best Practice

The FHWA published the Managing Travel for Planned Special Events Handbook in 2003 which is regularly updated on their website. Chapter 10 of the handbook outlines Post-Event Activities and provides a great resource on the importance of a post-event report and the key components. A post event report should include an Operational Cost Analysis, Qualitative Evaluation and Quantitative Evaluation.

BP-07: Develop and Maintain an Events Schedule

Focus Area:
Planned Special Events

Action Item Lead:
District Public Information Officer

Partners:
ATL Operations, Local Transportation Agencies, Event Organizers

Goals Addressed:

Safety	
Reliability	
Efficiency	
Customer Service	✓
Collaboration	✓
Integration	

SCHEDULE	2021	2022		2023		2024		2025		2026
	H2	H1	H2	H1	H2	H1	H2	H1	H2	H1
		Ongoing…								

Objective: Develop and maintain a schedule of planned special events occurring in the District.

Need: The TxDOT Atlanta District does not participate in or provide resources to local agencies for planned special events. Event management is organized, executed, and monitored by local agencies and communities in the District. Cities are responsible for traffic management during events and can request support from TxDOT if necessary. Although the District does not consider planned special event management a high priority at this time, it does recognize the benefits of developing and maintaining a schedule of upcoming events that have the potential to create traffic impacts.

Implementation Step #1: Create a calendar with known recurring or other upcoming events.

Implementation Step #2: Determine event size and impact thresholds that would justify an event's inclusion on the schedule.

Implementation Step #3: Develop a process for allowing event organizers to add their events to the District's calendar. The District website could have a request form or event entry option for event organizers to submit their event to the calendar, which would be added to the calendar upon District staff approval.

Expected Benefits: Maintaining a District special events calendar can improve District readiness for assisting local agencies with TM. The calendar can be reviewed as part of regular operations staff meetings to identify and plan for upcoming events as necessary through a combination of outreach to local partners and broadcast of traveler information related to anticipated impacts.

BP-08: Formalize Active Management of Signal Battery Backup Units

SCHEDULE	2021	2022		2023		2024		2025		2026
	H2	H1	H2	H1	H2	H1	H2	H1	H2	H1

Focus Area:
Traffic Signal Management

Action Item Lead:
District Traffic Engineer

Partners:
ATL Operations, ATL Maintenance

Goals Addressed:

Safety	✓
Reliability	✓
Efficiency	✓
Customer Service	
Collaboration	
Integration	✓

Objective: Develop a formal budgeting, deployment, and asset management approach for traffic signal battery backup systems deployed throughout the District.

Need: In the past, the Atlanta District has not kept a detailed record of the installation of traffic signal battery backup systems and when they would need to be replaced. The District is typically unaware of when a battery backup system needs to be replaced until a power outage results in dark signals because there is no established maintenance approach to verify that the systems are still functioning.

District staff use battery backup systems to prevent the likelihood of signals going dark during short-term power interruptions. Motorists may not know how to react when a signal is dark, and some may not even notice that the intersection is signalized and as a result fail to slow down or stop at the intersection.

Implementation Step #1: Complete an inventory of existing traffic signal battery backup systems and conduct testing to verify the working condition of each battery bank. Identify signals and areas within the District that do not currently have a battery backup system installed.

Implementation Step #2: Prioritize signals for new battery backup system deployment, taking intersection volumes, corridor, and location into consideration. Track the status of all deployed systems Districtwide in a single database.

Implementation Step #3: Develop an implementation and maintenance plan that includes routine device testing and an asset management schedule based on battery backup system lifespans. Incorporate costs of new system deployment and end-of-life system replacement into the District's budgeting process.

Implementation Step #4: Educate the public on how to navigate a signal whose power source has been interrupted, whether the signal is completely dark or flashing red (see Action Item CU-03).

Expected Benefits: Traffic signal battery backup systems prevent traffic signals from going dark during short- and medium-term power outages. Establishing a deployment and asset management plan that includes routine testing will decrease the chances that a signal will completely lose power, which in turn will reduce the likelihood of drivers passing through the signalized intersection without stopping.

BP-09: Integrate Existing Regional GIS Mapping Datasets

Focus Area:
General Traffic Management

Action Item Lead:
District Director of Transportation Operations

Partners:
ATL Operations, Local Transportation Agencies, Ark-Tex COG, Texarkana MPO

Goals Addressed:

Safety	
Reliability	
Efficiency	
Customer Service	✓
Collaboration	✓
Integration	✓

SCHEDULE	2021	2022		2023		2024		2025		2026
	H2	H1	H2	H1	H2	H1	H2	H1	H2	H1

Objective: Integrate existing TxDOT and Ark-Tex COG GIS mapping datasets to improve ease of analysis for grant applications and other required data reporting.

Need: Staff at the Texarkana MPO identified the need to access TxDOT and Ark-Tex COG data, preferably through an integrated database with a map display. The MPOs are required to report certain data to FHWA that cities do not or cannot currently collect due to a lack of resources and technological capabilities, but TxDOT and Ark-Tex COG already collect many of these data types. For example, TxDOT maintains a traffic count database while Ark-Tex COG maintains an address location GIS dataset that is used for emergency response and dispatching. The MPO currently has minimal access to any of this data for the region and does not wish to collect it when it is already available elsewhere.

Implementation Step #1: Meet with the Texarkana MPO to identify what data would be included in the database. TxDOT currently reports traffic volumes, jurisdiction/boundary, road ownership, road functional class, and other metrics through its Statewide Planning Map. As a result, this existing database may serve as a useful starting point for local efforts.

Implementation Step #2: Reach out to Ark-Tex COG to request identified datasets that could be integrated into TxDOT's database and mapping applications. Host a version of this database locally for use by the MPO and its regional partners.

Implementation Step #3: Publicize the existence of the database to partner agencies and the public.

Expected Benefits: Providing MPOs with access to TxDOT and Ark-Tex COG data in one place saves stakeholders time and resources they would have needed for their own data collection efforts. This minimizes redundancy and improves efficiency across the District overall. MPOs would be able to more easily complete required data reporting tasks, keeping them in compliance with federal requirements. MPOs also work with member cities to complete competitive grant applications, which could be strengthened by data that TxDOT and Ark-Tex COG currently collect and maintain (see Action Item CO-10).

Systems & Technology

Systems and technology refer to an agency's systems engineering, regional architectures, and procurement processes that allow the agency to increase the value and functionality of a high-technology project, service, or system. Considerations include how an agency integrates ITS components regionally so that TSMO projects and services are deployed in an organized manner. Table 3 shows the recommended Systems and Technology action items for the TxDOT Atlanta District.

Table 3: TxDOT Atlanta District TSMO Recommended Action Items – Systems & Technology

CMM Capability Dimension	Action Item Number	Action Item Description
Systems & Technology	ST-01	**Install Signage for Improved Incident Location Self-Identification**
	ST-02	**Provide Closure Information Through Third-Party Apps**
	ST-03	**Complete Cellular Modem Deployment to Signals**
	ST-04	**Plan and Implement Surveillance Technology for Signals**
	ST-05	**Continue Deploying and Maintaining ITS Devices along Key Routes**
	ST-06	**Implement Route Choice Corridor Management Approaches**
	ST-07	**Develop a Multi-State TMC Concept of Operations**

ST-01: Install Signage for Improved Incident Location Self-Identification

SCHEDULE	2021	2022		2023		2024		2025		2026
	H2	H1	H2	H1	H2	H1	H2	H1	H2	H1

Focus Area:
Traffic Incident Management

Action Item Lead:
District Traffic Engineer

Partners:
ATL Operations, ATL Maintenance

Goals Addressed:

Safety	
Reliability	
Efficiency	✓
Customer Service	✓
Collaboration	
Integration	

Objective: Add location identification signage to freeway flyovers and interchange ramps to help people better identify their location after a crash.

Need: The TxDOT Atlanta District identified the need for additional location identification signage on freeway flyovers and ramps to improve TIM incident location verification. There is minimal existing camera coverage throughout the District to aid with incident detection, verification, and location. Emergency dispatchers primarily depend on motorists' ability to specify where they are located, which leads to issues when the incident has occurred on an unfamiliar or unnamed road, or a segment with a complex geometry.

Implementation Step #1: Identify gaps in location markers along freeway flyovers and ramps. Potentially focus on or prioritize areas near crash hotspots or freeway segments with complex geometries.

Implementation Step #2: Determine a target spacing for freeway ramp markers and standard orientation of location identification signage on flyovers and ramps.

Implementation Step #3: Install freeway ramp markers in the locations identified.

Expected Benefits: Increasing the frequency of roadway reference markers and installing more location identification signage ensures an accurate report of an incident's location. Local travelers may be familiar with the area and road network but may not know the best way to describe a specific point along a freeway, especially if the roadway geometry is complex. A motorist from out of town would likely struggle to explain their location since they do not know the names of landmarks or interchanges. Providing more location identification signage helps drivers quickly and accurately inform responders of where they are exactly. This can reduce incident verification and response times.

ST-02: Provide Closure Information Though Third-Party Apps

SCHEDULE	2021	2022		2023		2024		2025		2026
	H2	H1	H2	H1	H2	H1	H2	H1	H2	H1
	Ongoing...									

Focus Area:
Work Zone Management

Action Item Lead:
District Public Information Officer

Partners:
Private Third-Party Providers, ATL Operations, ATL Construction

Goals Addressed:

Safety	
Reliability	✓
Efficiency	
Customer Service	✓
Collaboration	✓
Integration	✓

Objective: Use third-party apps to push notifications about road closures and related impacts out to travelers.

Need: Stakeholders noted a need to broadcast work zone closure information and related potential traffic impacts beyond the use of press releases, DMS, and the DriveTexas website. Each year more travelers rely on third-party navigation apps to route them while travelling, especially when navigating through areas where traffic patterns and best routes are especially susceptible to both typical congestion and atypical events that impact roadway capacity.

Third-party navigation apps such as Waze maintain "trusted provider" programs available to public transportation agencies that permit those agencies to share updates regarding traffic impacting events, which then are integrated into their platforms so that users are informed of those events or are routed around them.

Implementation Step #1: Establish "trusted provider" status with third-party navigation applications (such as Waze, through their Connected Citizens Program – more information available at https://www.waze.com/ccp).

Implementation Step #2: Update staff roles to designate responsibility for pushing details about construction events and PSEs that impact travel lanes to partner third-party apps.

Expected Benefits: Establishing these partnerships with third-party navigation app vendors will increase the reach of traveler-focused work zone closure messaging beyond the existing methods available internally to TxDOT Districts. With a larger number of travelers either aware of or actively routed around areas impacted by work zones, fewer vehicles pass through those work zones. As a result, congestion and traffic incident risks related to end-of-queue crashes are both reduced.

Strategy and Best Practice

The Port Authority of New York and New Jersey uses crowdsourced incident and congestion data via the Waze Connected Citizens Program to push out information such as road closures, detour routes, and preferred routes to influence traffic behavior. Crowdsourced data can help manage traffic through construction sites in real time by providing awareness of new incidents and congested spots. This allows the quicker dispatch of field units to incident scenes and better congestion mitigation.

ST-03: Complete Cellular Modem Deployment to Signals

SCHEDULE	2021	2022		2023		2024		2025		2026
	H2	H1	H2	H1	H2	H1	H2	H1	H2	H1

Focus Area:
Traffic Signal Management

Action Item Lead:
District Traffic Engineer

Partners:
ATL Operations, ATL Maintenance

Goals Addressed:

Safety	✓
Reliability	✓
Efficiency	✓
Customer Service	✓
Collaboration	
Integration	✓

Objective: Complete the ongoing deployment of cellular modems to signal cabinets Districtwide.

Need: The TxDOT Atlanta District is in the process of deploying cellular modems at its traffic signal locations. Traffic signals with remote communication capabilities allow efficient signal operation through both the active management of traffic progression and the ability to quickly identify signal outages to minimize congestion and improve safety. Communication is a critical part of TMS, delivering traffic data and video from intersections to the District Office.

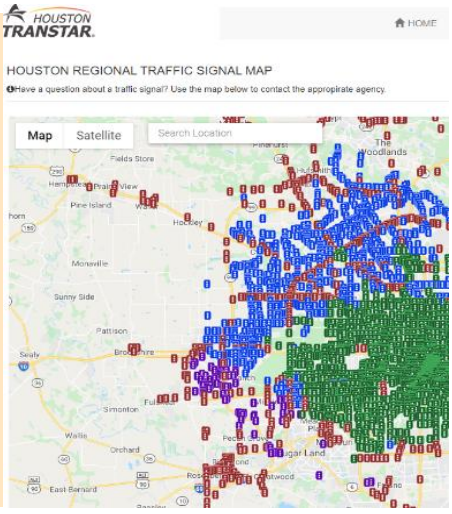
Implementation Step #1: Continue and complete systemwide deployment of cellular modems at TxDOT Atlanta District traffic signal locations. Plan and implement surveillance technologies for signals and CCTV cameras (see Action Items ST-04 & ST-05).

Implementation Step #2: Verify that communications are operable to signals Districtwide once deployment is complete, and address communications malfunctions as needed.

Expected Benefits: Installing cellular modems in signal cabinets enables communication with, as well as remote monitoring and control of, signals and cameras. These functions can be used to collect data, detect outages, and adjust timings, resulting in reduced traffic delays and safer intersection operations.

Strategy and Best Practice

Houston TranStar, a partnership for transportation and emergency management between TxDOT, Harris County, City of Houston, and Houston Metro, coordinates transportation operations in a centralized TMC. As a part of TranStar, more than 3,000 traffic signals throughout the region were incorporated using wireless modem communication into a Regional Computerized Traffic Signal System (RCTSS) to allow for management of all signals within each jurisdiction. RCTSS provides TranStar with the ability to modify arterial signal timings in response to traffic incidents through the traffic signal modernizations and the ability to modify signal timings



ST-04: Plan and Implement Surveillance Technology for Signals

Focus Area:
Traffic Signal Management

Action Item Lead:
District Traffic Engineer

Partners:
ATL Operations, ATL Maintenance

Goals Addressed:

Safety	✓
Reliability	✓
Efficiency	✓
Customer Service	
Collaboration	
Integration	✓

SCHEDULE	2021	2022		2023		2024		2025		2026
	H2	H1	H2	H1	H2	H1	H2	H1	H2	H1

Objective: Identify implementation priority for cameras and necessary software enhancements to allow remote surveillance of District signals from a single software platform.

Need: The TxDOT Atlanta District has minimal traffic signal surveillance. Currently, many signals throughout the District do not have any cameras installed, and those that do are generally used solely for vehicle detection to support signal operations, rather than for signal surveillance. The signal camera monitoring platform that the TxDOT Atlanta District uses requires the staff to input the specific camera IP address to pull up the video feed, instead of selecting cameras by location.

Implementation Step #1: Complete cellular modem deployment at signals Districtwide (see Action Item ST-03).

Implementation Step #2: Identify signalized intersections with operational challenges and crash hotspots to determine priority signal locations for initial camera deployments. Install cameras at these locations as funding allows.

Implementation Step #3: Adopt user-friendly software to allow for surveillance of deployed signal cameras from a single interface, as opposed to individual surveillance via separate IP addresses (see Action Item OW-03).

Expected Benefits: The benefits of deploying more cameras to increase video surveillance coverage can be optimized by improving the accessibility to the camera feeds. Adopting a single platform that provides access to all cameras within the District enhances operators' ability to monitor traffic and detect any issues. With a more user-friendly interface and camera selection based on location instead of camera ID, staff can easily track congestion and incidents along corridors instead of going through each camera until the right feed is pulled up.

ST-05: Continue Deploying and Maintaining ITS Devices along Key Routes

SCHEDULE	2021	2022		2023		2024		2025		2026
	H2	H1	H2	H1	H2	H1	H2	H1	H2	H1
	Ongoing…									

Focus Area:
General Traffic Management

Action Item Lead:
District Traffic Engineer

Partners:
ATL Construction, ATL Operations, ATL Advance Planning & Development

Goals Addressed:

Safety	✓
Reliability	✓
Efficiency	✓
Customer Service	✓
Collaboration	✓
Integration	✓

Objective: Continue to deploy and proactively maintain ITS devices on key routes throughout region, per direction included in the District ITS Master Plan.

Need: The District has sought to prioritize deploying ITS devices such as CCTV cameras and DMS units along major roadways at key intersections, interchanges, infrastructure locations, routing decision points, and crash hotspots in the region. The District uses DMS to alert travelers of changing road conditions and divert the traveling public away from incident impact areas. However, nearly all existing DMS in the District are located on freeways. Existing capabilities for TIM related performance measurement and road weather condition monitoring are limited to observation via camera feeds along major corridors, while many other highly-trafficked segments in the region have no camera coverage at all.

Implementation Step #1: Review the District ITS Master Plan to identify priority ITS devices and locations. Inventory existing ITS devices to determine remaining lifespan and expected future maintenance and replacement needs.

Implementation Step #2: Review upcoming construction and maintenance projects to determine if, when, and where new or replacement devices could be incorporated into project designs.

Implementation Step #3: Update the Atlanta District Regional ITS Architecture to accurately reflect new ITS plans and deployments. Verify that ITS device deployments will be fully compatible and meet all agency needs once operational.

Implementation Step #4: Continue ITS device deployment and establish a maintenance and end-of-life replacement schedule for deployed devices.

Expected Benefits: Greater CCTV camera coverage enables District staff to better monitor traffic conditions and quickly detect operations issues throughout the region. Camera coverage also allows staff to monitor DMS status. Additional DMS boards improve information dissemination, assisting drivers with route choice and making them aware of possible upcoming congestion as they approach key decision points.

ST-06: Implement Route Choice Corridor Management Approaches

SCHEDULE	2021	2022		2023		2024		2025		2026
	H2	H1	H2	H1	H2	H1	H2	H1	H2	H1

Focus Area:
General Traffic Management

Action Item Lead:
District Director of Maintenance

Partners:
ATL Operations, TxDOT TRF

Goals Addressed:

Safety	
Reliability	✓
Efficiency	✓
Customer Service	✓
Collaboration	
Integration	✓

Objective: Implement corridor management approaches that promote route choice and detours among facilities using INRIX travel time predictions posted in real time to DMS units.

Need: TxDOT TRF has contracted with INRIX, a third-party provider, to make probe-based travel data available to all TxDOT Districts. The TxDOT Atlanta District should engage with TxDOT TRF staff to learn more about the data that is available and to secure technical assistance with integrating this data source into Lonestar ATMS.

Implementation Step #1: Engage with TxDOT TRF to improve District knowledge of capabilities available through the existing agency partnership with third-party probe-based traffic data providers, such as INRIX.

Implementation Step #2: Update Lonestar ATMS functionality to incorporate real-time probe-based data feeds and display travel time information for route segments on key corridors throughout the District.

Implementation Step #3: Identify key decision points and roadways frequently used as detour routes to determine priority locations for DMS deployment (see Action Item ST-05). Identify DMS units and an associated messaging strategy to schedule and begin display of real-time probe-based travel time information along District freeways.

Implementation Step #4: Integrate and then publicize availability of travel-time information on the public facing TxDOT ITS website.

Expected Benefits: Displaying travel time estimates using real-time information provides a valuable source of information for the travelling public. If the traveling public has accurate information provided to them, then they can make informed decisions on the routing of their trip and can better estimate their expected arrival time. Real-time travel time information can be disseminated through DMS or through online platforms. Travel time information is respected by drivers and found to be effective in encouraging trip behavior changes that have a positive effect on road network congestion and safety.

ST-07: Develop a Multi-State TMC Concept of Operations

Focus Area:
General Traffic Management

Action Item Lead:
District Director of Transportation Operations

Partners:
TxDOT TRF, ATL Operations, Local Transportation Agencies, Local Public Safety Agencies, ArDOT, LADOTD, ODOT

Goals Addressed:

Safety	
Reliability	✓
Efficiency	✓
Customer Service	✓
Collaboration	✓
Integration	✓

SCHEDULE	2021	2022		2023		2024		2025		2026
	H2	H1	H2	H1	H2	H1	H2	H1	H2	H1
						Ongoing...				

Objective: Develop a concept of operations and gauge partner agency interest for a potential multi-state regional TMC based out of Texarkana.

Need: The TxDOT Atlanta District has limited communication and coordination with its neighboring states. The funding for a multi-state TMC is not currently available and existing operations demands do not warrant one in the near future. Although the District staff do not see establishing a TMC as a priority right now, it is important to start considering what it will take to develop a TMC to ensure the resources and infrastructure are in place once there is a greater need and demonstrated interest from partners at TxDOT and in neighboring states.

Implementation Step #1: Complete a systems engineering analysis and concept of operations document to identify TMC needs, objectives, and functional requirements for successful implementation.

Implementation Step #2: Identify what agency staff and how many would sit at the TMC, identify potential funding sources, and identify potential locations for the TMC that meet space and communications connectivity requirements, likely in Texarkana.

Implementation Step #3: Occasionally follow up with partners at neighboring state DOTs to determine interest in moving a regional TMC concept forward.

Expected Benefits: A multi-state regional TMC would allow the TxDOT Atlanta District to detect, verify, and respond to incidents more quickly; actively supervise operations for planned construction and special events; manage traffic signal corridors and adjust timings; and coordinate directly with collocated traffic engineering and public safety partner agency staff as well as neighboring state DOT staff. The District's major east/west corridors, as well as some north/south segments, extend through either Arkansas, Oklahoma, or Louisiana, making it essential to establish and maintain communication with these neighboring states. An incident or construction closure on one side of the border may impact traffic on the other side. A TMC would enable more efficient and effective traffic operations coordination throughout the multi-state region.

Performance Measurement

TSMO programs are tracked by agencies through performance measures to manage progress and assess benefits of implemented projects and processes. Well-defined performance measures help make informed decisions and prioritize projects. Performance measures drive the success of TSMO programs by allowing agencies to realize and quantify improvements in the short-term through the effective use of TSMO strategies. Table 4 shows the recommended Performance Measurement action items for the TxDOT Atlanta District.

Table 4: TxDOT Atlanta District TSMO Recommended Action Items – Performance Measurement

CMM Capability Dimension	Action Item Number	Action Item Description
Performance Measurement 	PM-01	**Monitor Towing Company Performance**
	PM-02	**Track TIM Performance in Partnership with Texas DPS**
	PM-03	**Establish Traffic Signal Maintenance Performance Measures**
	PM-04	**Develop Districtwide Traffic Operations Performance Measures**
	PM-05	**Regularly Review Severe Crash Data and Develop Mitigation Strategy**

PM-01: Monitor Towing Company Performance

Focus Area:
Traffic Incident Management

Action Item Lead:
District Director of Transportation Operations

Partners:
ATL Operations, Texas DPS, Local Public Safety Agencies, County Sheriffs

Goals Addressed:

Safety	✓
Reliability	✓
Efficiency	
Customer Service	
Collaboration	✓
Integration	

SCHEDULE	2021	2022		2023		2024		2025		2026
	H2	H1	H2	H1	H2	H1	H2	H1	H2	H1
	Ongoing…									

Objective: Partner with Texas DPS and local municipalities to monitor performance of tow companies and establish expectations or baselines that must be met.

Need: Tow trucks that respond to incidents within the TxDOT Atlanta District are generally quick to report to the scene, but take their time cleaning up the incident and clearing debris. Local agencies such as a City Police Department or County Sheriff Office maintain tow company rotation contracts; however, companies are not currently penalized for substandard performance. Long cleanups result in longer delays, more congestion, and a higher risk of secondary crashes. The District identified the need to track and improve tow company performance in order to reduce ICT.

Implementation Step #1: Identify performance measures to track, such as incident response and clearance times. Set goals for the identified performance measures that are specific to the tow company operator performance.

Implementation Step #2: Invite towing companies and representatives from agencies who maintain their contracts to incident after-action reviews (see Action Item BP-02) when warranted and include discussion of tow company performance as part of the review.

Implementation Step #3: Encourage agencies that maintain the towing contracts to incorporate penalties for substandard performance into contracts.

Expected Benefits: Monitoring tow company performance and possibly introducing incentive or disincentive language into existing locally maintained towing contracts and rotation lists can encourage faster incident cleanups. Establishing performance expectations or baselines that must be met can provide agencies with tools to ensure that only qualified and compliant towing providers remain on rotation lists. It is essential to quickly clear an incident to reduce delays, congestion, and driver frustration. A shorter ICT also means responder and motorist safety is improved because on-scene personnel are not exposed to moving traffic and drivers do not have to navigate around potential obstacles for as long, which reduces the likelihood that secondary crashes occur.

PM-02: Track TIM Performance in Partnership with Texas DPS

Focus Area:
Traffic Incident Management

Action Item Lead:
District Director of Transportation Operations

Partners:
TxDOT TRF, ATL Operations, Texas DPS, Local Public Safety Agencies

Goals Addressed:

Safety	✓
Reliability	✓
Efficiency	
Customer Service	
Collaboration	✓
Integration	✓

SCHEDULE	2021	2022		2023		2024		2025		2026
	H2	H1	H2	H1	H2	H1	H2	H1	H2	H1
	Ongoing…									

Objective: Partner with Texas DPS to begin collecting the agency's TIM-related crash data and actively tracking TIM in the region.

Need: The TxDOT Atlanta District is not currently collecting data because staff do not actively monitor operations or record incident details in Lonestar. Texas DPS collects some TIM data, so the District staff identified the need to obtain this data to track performance measures such as secondary crashes, verifying arrivals/departures of responders for ICT, and traffic flow for RCT.

Implementation Step #1: Encourage Texas DPS to prioritize TIM data collection and District operations staff to log TIM performance measures in Lonestar when managing incident response. Identify additional data sources that can assist with tracking incident details when cameras cannot. The Crash Records Information System (CRIS) database could be considered for tracking RCT, ICT, and secondary crashes for DPS-managed incidents, while INRIX could be considered for calculating time to return to normal flow.

Implementation Step #2: Develop a process for regularly collecting TIM data from CRIS, which will soon include RCT, ICT, and secondary crashes for all responders (not just Texas DPS). Establish a historical database of TIM performance data.

Implementation Step #3: Regularly review recent TIM metrics as part of TxDOT operations team meetings and TIM team meetings. Analyze performance measures to identify areas for improvement and set program performance targets.

Expected Benefits: TIM data collection can enhance TIM programs. With better data, agencies can quantify program performance, demonstrate program effectiveness, and improve TIM planning and resource management. This data is important for after-action incident reviews (see Action Item BP-02) to identify what worked well and what can be improved. The data can also be used to identify incident hotspots and potential ways to minimize hazards.

Strategy and Best Practice

The Maryland DOT has a program called Coordinated Highways Action Response Team (CHART). CHART staff maintain a database that tracks each traffic incident, cataloging the location, lane closures, and the number of vehicles involved. Through performance measurement and related resulting action items, CHART achieved a reduction of 13% to 41% in incident duration for each incident evaluation period, demonstrating the value of tracking performance and its emphasis resulting in significant percentage reductions in ICT.

PM-03: Establish Traffic Signal Maintenance Performance Measures

SCHEDULE	2021	2022		2023		2024		2025		2026
	H2	H1	H2	H1	H2	H1	H2	H1	H2	H1

Focus Area:
Traffic Signal Management

Action Item Lead:
District Signal Shop Manager

Partners:
ATL Operations, ATL Maintenance

Goals Addressed:

Safety	
Reliability	✓
Efficiency	✓
Customer Service	
Collaboration	
Integration	✓

Objective: Establish maintenance-related traffic signal performance measures and targets.

Need: The TxDOT Atlanta District has a cohesive approach to TSM because design, construction, and maintenance teams operate out of the same office location. This arrangement allows for direct communication between engineers and signal technicians. The District currently conducts TSM planning activities that are guided by a combination of identified safety concerns as well as routine maintenance and asset management needs. In order to determine these needs, the District must improve its collection of traffic signal maintenance data and analyze signal performance measures.

Implementation Step #1: Identify performance measures to track and set goals related to regular maintenance. Consider tracking preventative maintenance, equipment and device installation dates and life cycles, signal work history, etc.

Implementation Step #2: Develop a routine for maintenance procedures, such as performing status checks remotely via deployed cellular modems often, and in-person technician visits to signal locations less often. Collect and review data to identify areas of improvement.

Expected Benefits: Establishing traffic signal performance measures for maintenance activities allows for improved signal operations. Preventative maintenance, typically conducted twice a year in other Districts, verifies signal function and preemptively detects possible issues. Tracking installation and life cycles of devices can also prevent unexpected signal failures. Keeping record of why signal technicians did work on a signal, what they did, and when they did it, can help with troubleshooting when needed.

Strategy and Best Practice

The Public Works Department of Arlington County, Virginia, including the Transportation Engineering and Operations (TE&O) Bureau, are evaluated based on the number of comments and complaints received from the public each year. County staff are required to take every comment into consideration and act on it in a timely manner, while prioritizing the agency's signal timing operations objectives.

PM-04: Develop Districtwide Traffic Operations Performance Measures

Focus Area:
General Traffic Management

Action Item Lead:
District Director of Transportation Operations

Partners:
TxDOT TRF, ATL Operations

Goals Addressed:

Safety	✓
Reliability	✓
Efficiency	✓
Customer Service	
Collaboration	✓
Integration	✓

SCHEDULE	2021	2022		2023		2024		2025		2026
	H2	H1	H2	H1	H2	H1	H2	H1	H2	H1

Objective: Develop Districtwide traffic operations performance measures using TxDOT's INRIX probe-based data subscription and begin to track these using automated delay alerts and summary reports.

Need: Through a statewide contract, the TxDOT Atlanta District has access to probe-based traffic operations data and related analysis metrics, including vehicle speeds, travel times, and travel time reliability and planning indices. TxDOT TRF is offering support to Districts looking to learn how to use this data to assist with TM, provide better traveler information, and track traffic operations performance.

Implementation Step #1: Engage with TxDOT TRF to train operations staff on performance measurement capabilities related to existing agency agreements with probe-based traffic data providers, such as INRIX.

Implementation Step #2: Establish baseline traffic operations data from the past five years on routes of interest to set reasonable performance goals. Set up an automated alert system through INRIX for use when delays exceed identified thresholds.

Implementation Step #3: Begin quarterly measurement of traffic operations performance compared to baseline or previous year data to assess state of mobility on key District routes.

Expected Benefits: Performance measures help determine progress toward specific defined traffic operations objectives. This includes both quantitative evidence, such as the measurement of travel times and reliability, and qualitative evidence, such as the measurement of traveler satisfaction and perceptions. Once goals are established, the District will be able to identify locations within the region where goals are not being met and use this feedback to focus investment.

PM-05: Regularly Review Severe Crash Data and Develop Mitigation Strategy

Focus Area:
General Traffic Management

Action Item Lead:
District Director of Transportation Operations

Partners:
TxDOT TRF, ATL Operations, ATL Advance Planning & Development, Texas DPS, Local Public Safety Agencies, Local Transportation Agencies

Goals Addressed:

Safety	✓
Reliability	
Efficiency	✓
Customer Service	
Collaboration	✓
Integration	✓

SCHEDULE	2021	2022		2023		2024		2025		2026
	H2	H1	H2	H1	H2	H1	H2	H1	H2	H1
	Ongoing...									

Objective: Review aggregated Districtwide fatal and severe crash data at least annually and develop or update a Districtwide Severe Crash Mitigation Strategy from identified trends.

Need: While the total number of crashes in the TxDOT Atlanta District decreased in 2020 compared to previous years, the total number of recorded fatal crashes increased by approximately 50 percent. The number of severe but non-fatal crashes also increased in 2020. District staff currently conduct after-incident reviews for individual fatal crashes but have identified a need to review severe crash data in aggregate to better identify trends and potential District actions to systemically reduce the incidence of severe crashes.

Implementation Step #1: Develop or procure an analytics tool that processes available crash data from the state CRIS database and public safety officials and allows users to identify and visualize trends in aggregated severe crash data for the District.

Implementation Step #2: Analyze severe and fatal crash data from the most recent five years to identify trends and possible systemic safety concerns. Use these insights to develop and annually update a Districtwide Severe Crash Mitigation Strategy document.

Implementation Step #3: Implement recommendations from the Severe Crash Mitigation Strategy document as funding allows and reconduct this severe and fatal crash analysis each year to measure year-over-year progress in mitigating severe and fatal crashes within the District.

Expected Benefits: The development of an analytics tool and strategy document for mitigating severe crashes within the District will help staff identify both operational strategies and systemic countermeasures that can be implemented to address observed severe crash trends. The cost to society of severe and fatal crashes in the TxDOT Atlanta District exceeded $1 billion in 2020, so the implementation of relatively low-cost countermeasures within the District that target some of the most commonly observed severe crash types would likely yield a very high benefit-cost ratio if effective.

Culture

TSMO culture within an agency is dependent on engaged staff who adhere and implement TSMO goals. Staff can positively improve TSMO culture by critically analyzing daily activities to adhere to and meet program objectives. Considerations involved in creating a TSMO culture include a technical understanding, strong leadership, outreach, and buy-in of program authority. Table 5 shows the recommended Culture action items for the TxDOT Atlanta District.

Table 5: TxDOT Atlanta District TSMO Recommended Action Items - Culture

CMM Capability Dimension	Action Item Number	Action Item Description
Culture 	CU-01	**Develop Joint TIM Traffic Control Procedures with Law Enforcement**
	CU-02	**Conduct Regular Work Zone Management Practice Reviews**
	CU-03	**Continue Investments in Safe Driving Public Education**

CU-01: Develop Joint TIM Traffic Control Procedures with Law Enforcement

SCHEDULE	2021	2022		2023		2024		2025		2026
	H2	H1	H2	H1	H2	H1	H2	H1	H2	H1

Focus Area:
Traffic Incident Management

Action Item Lead:
District Director of Maintenance

Partners:
ATL Operations, Local Public Safety Agencies, Texas DPS

Goals Addressed:

Safety	✓
Reliability	✓
Efficiency	
Customer Service	
Collaboration	✓
Integration	

Objective: Coordinate with law enforcement to maintain traffic control and queue warning for major incidents until the roadway is fully cleared.

Need: The TxDOT Atlanta District generally performs TIM activities on an ad hoc basis since no formal TIM program exists. The District self-identified the need to standardize its involvement in the incident response process. The District also noted the need for its partners to extend local law enforcement presence during incidents to provide continued scene protection and end of queue warning, and to assist towing contractors. Once the vehicles have been removed from the scene, cleanup personnel taking care of debris and other damages are still exposed to traffic and need traffic control to be maintained for their safety.

Implementation Step #1: Review law enforcement's roles in incident response, with an emphasis on traffic control support. Jointly develop standard protocol for traffic control used in different situations, in coordination with local law enforcement.

Implementation Step #2: Include law enforcement in after-action reviews to identify areas of improvement related to traffic control support (see Action Item BP-02).

Implementation Step #3: Gauge interest among responders for attending regularly scheduled regional TIM working group meetings with TxDOT staff and other responders (see Action Item CO-01) and include discussions about traffic control support expectations in working group meetings.

Expected Benefits: Providing traffic control for the entire duration of an incident clearance is essential in maintaining safety for motorists and responders and can reduce secondary crashes. Lane closures and scene protection increase the buffer between moving vehicles and exposed responding personnel. End of queue warnings alert drivers to slow down for upcoming closures or congestion and become aware of responders working around the scene.

Strategy and Best Practice

The Washington Department of Transportation (WDOT), Washington State Patrol (WSP), and WA Fire Chiefs (WFC) outline an Incident Response Program in a formal document. This document establishes agency roles in reaching the mutual quick-clearance goal of clearing incidents within 90 minutes. The IR Program identifies WSP's responsibility in establishing emergency temporary traffic control for crashes and other serious incidents.

CU-02: Conduct Regular Work Zone Management Practice Reviews

Focus Area:
Work Zone Management

Action Item Lead:
District Director of Construction

Partners:
ATL Operations, ATL Construction, Area Offices, Local Public Safety Agencies, Texas DPS

Goals Addressed:

Safety	✓
Reliability	✓
Efficiency	✓
Customer Service	
Collaboration	✓
Integration	✓

SCHEDULE	2021	2022		2023		2024		2025		2026
	H2	H1	H2	H1	H2	H1	H2	H1	H2	H1
	Ongoing…									

Objective: Regularly assess compiled lessons learned related to work zone management and determine which should be incorporated as best practices into agency standards, manuals, or other work zone guidance.

Need: Within the Atlanta District, construction project staff conduct daily "tailgate reviews" to discuss lessons learned and prepare for the following day. These casual meetings typically do not include other TxDOT staff, law enforcement, or other public safety agencies that would greatly benefit from sharing work zone strengths and weaknesses, new technologies, and best practices.

Implementation Step #1: Continue to conduct tailgate reviews after daily construction activities and compile lessons learned.

Implementation Step #2: Review work zone flagged crash data and interview law enforcement and work zone personnel regarding incidents and near misses to identify the most common issues and possible countermeasures.

Implementation Step #3: Hold meetings several times per year with District operations and construction staff to identify areas of improvement regarding WZM. Maintain updated work zone technology guidelines and processes based on the outcomes of these meetings.

Expected Benefits: Meeting regularly to discuss work zone operations and updating agency standards, manuals, and guidelines with new management strategies supports traffic operations as well as the safety of motorists and construction personnel. Project planners and designers are able to use this updated guidance to more effectively mitigate the traffic and safety impacts associated with work zones.

Strategy and Best Practice

The Kansas DOT (KDOT) has implemented into their processes a Work Zone Review Team responsible for performing an onsite scan of project work zones throughout the state. As they scan the work zones, participants list positive and negative aspects of the operation. The review team analyzes all work zone collision data in the state for each year and documents the contributing circumstances. KDOT also has a Traffic Control Review Team that randomly selects construction and maintenance work areas on the State Highway System to determine if improvements are needed for the agency's traffic control procedures.

CU-03: Reinvest in Safe Driving Public Education

SCHEDULE	2021	2022		2023		2024		2025		2026
	H2	H1	H2	H1	H2	H1	H2	H1	H2	H1
	Ongoing…									

Focus Area:
General Traffic Management

Action Item Lead:
District Traffic Safety Specialist

Partners:
TxDOT TRF, ATL Operations, ATL Public Information Office, Local Transportation Agencies

Goals Addressed:

Safety	✓
Reliability	
Efficiency	
Customer Service	✓
Collaboration	✓
Integration	✓

Objective: Reinvest in communication and education campaigns to encourage driver caution in situations such as flooded roads, icy bridges, and malfunctioning or dark signals.

Need: The TxDOT Atlanta District expressed interest in bringing back its public communication and education campaigns to improve driver awareness and safety. Currently, there is minimal weather related ITS deployed throughout the District, as well as a lack of traffic signal battery backup systems. Therefore, drivers may encounter hazardous road weather conditions and dark signals but may not know how to appropriately approach these situations.

Implementation Step #1: Adapt previous education campaigns, and develop new material as needed, related to navigating weather-impacted roadways or dark signals. Include seasonal areas of focus in education campaigns, such as how to navigate ice in the winter and flooding in the spring.

Implementation Step #2: Conduct public surveys and identify and track safety performance measures related to inclement weather and dark signals to assess the effectiveness of public education campaigns in these topic areas.

Expected Benefits: Establishing driver awareness of road weather conditions, closures, and malfunctioning signals is essential in maintaining safety. Public communication and education campaigns can improve motorists' perception of these potentially dangerous driving scenarios and increase the likelihood that the driver reacts appropriately, increasing safety.

Organization & Workforce

The Organization & Workforce component of TSMO planning addresses how the program will be delivered through institutional and organizational changes. There are many ways to structure TSMO programs and not all agencies will require major changes to existing organization and staffing. Agencies are encouraged to evaluate each possible solution and select the organizational structure that will work best with the desired outcomes for their TSMO program. Considerations involved in determining organizational structure include program status, workforce capability, staff development and recruitment, and staff retention. Table 6 shows the recommended Organization & Workforce action items for the TxDOT Atlanta District.

Table 6: TxDOT Atlanta District TSMO Recommended Action Items – Organization & Workforce

CMM Capability Dimension	Action Item Number	Action Item Description
Organization & Workforce	OW-01	**Establish Regional Multidisciplinary TIM Training**
	OW-02	**Establish Staff Roles for Remote Signal Monitoring**
	OW-03	**Enhance Camera Monitoring Capabilities and Staff Roles**

OW-01: Establish Regional Multidisciplinary TIM Training

SCHEDULE	2021	2022		2023		2024		2025		2026
	H2	H1	H2	H1	H2	H1	H2	H1	H2	H1
	Ongoing...									

Focus Area:
Traffic Incident Management

Action Item Lead:
District Director of Transportation Operations

Partners:
TxDOT Statewide TIM Coordinator, ATL Maintenance, ATL Operations, Local Transportation and Public Safety Agencies, Texas DPS

Goals Addressed:

Safety	✓
Reliability	✓
Efficiency	
Customer Service	✓
Collaboration	✓
Integration	✓

Objective: Partner with TxDOT's Statewide TIM Coordinator to provide TIM multidisciplinary trainings and Train the Trainer programs to TxDOT staff and interested partners.

Need: Multidisciplinary TIM training is a core component of a successful TIM program. TxDOT TRF has been partnering with TxDOT Districts and TIM working groups across Texas to conduct training. Training typically involves representatives from TxDOT, police, fire, EMS, local city transportation staff, and other staff such as TMC or service patrol operators if they are present within the region.

Implementation Step #1: Develop a TIM training program by adapting statewide TIM training material and the Strategic Highway Research Program 2 (SHRP2) trainings to focus on local TIM needs. Identify who will lead the trainings and outline which agencies should be involved.

Implementation Step #2: Coordinate with TxDOT TRF to adapt the existing Train the Trainer program to fit the Atlanta District's TIM needs. Provide Train the Trainer sessions to interested personnel to initiate the TIM multidisciplinary trainings.

Implementation Step #3: Offer regional TIM training opportunities at least once per year. Continuously update trainings to incorporate new technologies, strategies, lessons learned, and best practices.

Expected Benefits: Benefits of multidisciplinary TIM training include a better understanding of each agency's roles and capabilities when responding to incidents, the ability to discuss response strategies using tabletop exercises that resemble real life situations, and the establishment of a baseline competency regarding incident management in the region. Train the Trainer courses would build the region's capacity for conducting its own TIM training as needed when new staff or stakeholders become involved in incident management.

Strategy and Best Practice

In the Dallas-Fort Worth Region, the North-Central Texas Council of Governments provides a free TIM training course. The multidisciplinary course supports a coordinated response to traffic incidents that builds partnerships, enhances safety for emergency personnel, reduces secondary crashes, and increases reliability by shortening response and clearance times. Specific courses have been designed for first responders, traffic managers, and executive level policy makers.

OW-02: Establish Staff Roles for Remote Signal Monitoring

SCHEDULE	2021	2022		2023		2024		2025		2026
	H2	H1	H2	H1	H2	H1	H2	H1	H2	H1

Focus Area:
Traffic Signal Management

Action Item Lead:
District Signal Shop Manager

Partners:
ATL Operations, ATL Maintenance

Goals Addressed:

Safety	✓
Reliability	✓
Efficiency	✓
Customer Service	
Collaboration	
Integration	✓

Objective: Establish automated notification systems and staff roles for remote monitoring, troubleshooting, and control of traffic signals along key corridors.

Need: The TxDOT Atlanta District is in the process of deploying cellular modems to all signals which will allow for remote control of and communication with District signal equipment. Approximately 60 percent of the District signals now have cellular modems that allow remote traffic signal troubleshooting. In addition, the District will soon acquire use of software (made by Skyline Technology Solutions) that will allow for remote monitoring of traffic signal status. In the past, the primary means of identifying signal operations issues or service disruptions had been through user complaints. This expansion of signal communication also enables remote traffic signal operations modifications and traffic count data collection.

Implementation Step #1: Continue systemwide deployment of cellular modems and signal surveillance technology at TxDOT Atlanta District traffic signal locations (see Action Items ST-03 & ST-04).

Implementation Step #2: Determine staff roles for accessing, monitoring, troubleshooting, and controlling traffic signals. Plan for and set up quick-access controls at the TxDOT Atlanta District Office to view the status of signals systemwide from a single map or table-based interface.

Implementation Step #3: Set up automated notifications to District Operations staff and Maintenance Supervisors to send alerts whenever signal communications are lost or a signal malfunction is detected. Develop protocol for who is notified both within TxDOT and externally when this occurs.

Expected Benefits: Once communication with traffic signals has been established and surveillance technology has been deployed, District staff will be able to quickly detect signal malfunctions, dispatch signal technicians to troubleshoot issues, and remotely control the signal in the case that the timings must be adjusted to relieve congestion. Immediately identifying signal malfunctions is essential for maintaining safety, as drivers may get confused by or completely ignore a malfunctioning or dark signal. The ability to remotely adjust signal timings can improve corridor operations in response to changes in traffic patterns.

OW-03: Enhance Camera Monitoring Capabilities and Staff Roles

Focus Area:
General Traffic Management

Action Item Lead:
District Director of Transportation Operations

Partners:
ATL Operations, ATL Maintenance

Goals Addressed:

Safety	
Reliability	
Efficiency	✓
Customer Service	
Collaboration	
Integration	✓

SCHEDULE	2021	2022		2023		2024		2025		2026
	H2	H1	H2	H1	H2	H1	H2	H1	H2	H1

Objective: Establish CCTV camera monitoring staff roles and improve user-friendliness of camera monitoring activities, including a video wall configuration at the signal shop and a software platform that provides a graphic interface to access camera feeds.

Need: The signal camera monitoring platform that the TxDOT Atlanta District uses requires the staff input the specific camera IP address to pull up the video feed, rather than selecting cameras by location. To change the view of a camera, the staff also must have the camera's IP address. District staff have access to a few other agencies' cameras, however these also use a different software, further preventing operators from quickly switching between cameras. These challenges result in limited active camera monitoring and little to no passive monitoring at freeways and key routes.

Implementation Step #1: Continue and complete systemwide deployment of CCTV cameras (see Action Item ST-05).

Implementation Step #2: Identify the current issues with accessing camera feeds, such as the inability to find a camera by its location. Invest in a software to establish a single location for accessing all camera feeds within the TxDOT Atlanta District.

Implementation Step #3: Establish staff roles for camera monitoring and pursue camera sharing agreements with local partner agencies (see Action Item CO-09).

Implementation Step #4: Invest in video wall configuration at the District office for better active and passive camera monitoring. The District may incorporate an incident detection function to automatically switch to a camera when it detects something.

Expected Benefits: The benefits of deploying more cameras to increase video surveillance coverage can be optimized by improving accessibility to and increasing active and passive monitoring of the CCTV camera feeds. A video wall configuration would mitigate the issues related to viewing individual cameras and enhances operators' ability to monitor traffic and detect any issues. An automated detection system could reduce incident detection and verification times and quickly provide responders with the necessary details.

Collaboration

The TSMO collaboration component is vital to emphasize the importance of partner agencies and stakeholders working together to meet regional transportation goals. Collaboration should take place in every aspect of TSMO programming; from early in developing TSMO strategic elements such as vision, mission, goals, and objectives to throughout implementation of projects, programs, and services. Considerations should include partnerships among different levels of government like public safety agencies, both internal agency and external stakeholder collaboration, and partnerships with the private sector. Table 7 shows the recommended Collaboration action items for the TxDOT Atlanta District.

Table 7: TxDOT Atlanta District TSMO Recommended Action Items - Collaboration

CMM Capability Dimension	Action Item Number	Action Item Description
Collaboration 	CO-01	**Formalize a Regional TIM Working Group**
	CO-02	**Standardize TIM Communication Protocol**
	CO-03	**Share Detailed Incident Information with Neighboring State DOTs**
	CO-04	**Standardize Communicating Work Zone Information to Local Partners**
	CO-05	**Establish Early Involvement of First Responders in the Construction Planning Process**
	CO-06	**Formalize a Process for Sharing Work Zone Notices Between States**
	CO-07	**Develop Signal Corridor Management Strategies with Partner Agencies**
	CO-08	**Maintain a Formal List of Partner Contact Information**
	CO-09	**Pursue Regional Traffic Camera Sharing Agreements**
	CO-10	**Improve Collaboration with Local Agencies for Safety Funding Programs**

CO-01: Formalize a Regional TIM Working Group

SCHEDULE	2021	2022		2023		2024		2025		2026
	H2	H1	H2	H1	H2	H1	H2	H1	H2	H1

Focus Area:
Traffic Incident Management

Action Item Lead:
District Director of Maintenance

Partners:
TxDOT TRF, ATL Operations, ATL Maintenance, Area Engineers, Local Public Safety Agencies, Texas DPS

Goals Addressed:

Safety	✓
Reliability	✓
Efficiency	✓
Customer Service	
Collaboration	✓
Integration	✓

Objective: Conduct maintenance section-led outreach to local partners to establish a more formalized TIM program in the District, anchored by regular working group meetings to discuss TIM challenges.

Need: The TxDOT Atlanta District does not have a regional TIM working group that meets regularly to discuss TIM-related training opportunities, best practices, and after-action incident reviews. Outreach for the formation of this group must start at the local level. District staff determined that maintenance sections should reach out to local partner agencies, law enforcement, and first responders to initiate the discussion of establishing a TIM working group.

Implementation Step #1: Coordinate with the District Maintenance Sections to identify local partners at the county level, such as local sheriff, police, and fire departments, to involve in TIM working group outreach. Conduct outreach to share the District's goals for quick clearance of incidents, existing state laws supporting these goals, and upcoming training opportunities.

Implementation Step #2: Gauge interest for organizing and hosting regularly scheduled regional TIM working group meetings with TxDOT staff and responders. Items to consider when organizing these meetings include the frequency, location, agendas, and attendee list for working group meetings.

Implementation Step #3: Conduct regularly scheduled regional TIM working group meetings, with support from the TxDOT TRF Statewide TIM Coordinator.

Expected Benefits: TIM working groups consisting of stakeholders from throughout the region can meet on a regular basis to discuss current initiatives and challenges related to TIM. These working groups can conduct after-action reviews of high-impact incidents and can feature guest presenters to showcase new technology or resources that incident managers could potentially incorporate into TIM response.

Strategy and Best Practice

The Austin-Area Incident Management for Highways (AIMHigh) Team in Austin, TX meet every other month to discuss TIM challenges and accomplishments. Meetings are facilitated by a contractor who encourages participation from first responders and other partners in the region. The team includes representatives from federal, state, and local transportation agencies; state and local law enforcement agencies; fire and rescue agencies; EMS; the local towing association; and the regional MPO.

CO-02: Standardize TIM Communication Protocol

SCHEDULE	2021	2022		2023		2024		2025		2026
	H2	H1	H2	H1	H2	H1	H2	H1	H2	H1

Focus Area:
Traffic Incident Management

Action Item Lead:
District Director of Maintenance

Partners:
Texas DPS, Local Public Safety Agencies, ATL Operations, ATL Maintenance

Goals Addressed:

Safety	
Reliability	
Efficiency	
Customer Service	
Collaboration	✓
Integration	✓

Objective: Standardize communication protocol among law enforcement, maintenance sections, and the District office to improve TIM information sharing.

Need: The TxDOT Atlanta District communicates well between its Maintenance Sections and Texas DPS when responding to a traffic incident. However, this communication relies on already established relationships between different agency staff and there is not a standardized process for communicating incident information. If staff from one of the agencies leaves, the personal connections between agencies may be lost, severing that line of communication. Texas DPS occasionally begins work on an incident without informing TxDOT, so District staff are not aware and do not know to update DMS messages to alert and divert the traveling public away from impacted areas. The lack of existing camera coverage prevents District staff from always detecting incidents on their own.

Implementation Step #1: Develop and maintain current local public safety and emergency response point-of-contact lists at the District and Area level (see Action Item CO-08). Develop protocol for determining when and how to share TIM-related updates among key contacts at TxDOT, DPS, and local public safety agencies.

Implementation Step #2: Identify agency responsibilities and chain of communication for incident information based on existing best practices that District staff follow.

Implementation Step #3: Establish roles for disseminating incident information to the public. Consider an automated notification or dispatch system to initiate response from TxDOT once an incident is detected/verified by Texas DPS.

Expected Benefits: Standardized communication protocol for the dissemination of incident information can ensure that each agency involved in TIM has the information it needs to effectively manage a traffic incident, as well as provide resources for drivers to make informed route choices. Not informing all partner agencies about an incident or not alerting the public can be detrimental to TIM activities by delaying response, increasing ICT, prolonging traffic delays, and decreasing the safety of motorists and responders. Updating travel information to include closures and delays can redirect drivers away from the incident and warn them of potential queues, reducing congestion and the likelihood for secondary crashes to occur.

CO-03: Share Detailed Incident Information with Neighboring State DOTs

SCHEDULE	2021	2022		2023		2024		2025		2026
	H2	H1	H2	H1	H2	H1	H2	H1	H2	H1

Focus Area:
Traffic Incident Management

Action Item Lead:
District Public Information Officer

Partners:
ATL Operations, ATL Public Information Office, ArDOT, LADOTD, ODOT

Goals Addressed:

Safety	
Reliability	
Efficiency	
Customer Service	✓
Collaboration	✓
Integration	✓

Objective: Develop SOPs for providing neighboring state DOTs with detailed traffic incident information for incidents that impact key routes.

Need: The TxDOT Atlanta District has limited TIM-related communication and coordination with its neighboring states, generally led by maintenance sections. The District's major east/west corridors, as well as some north/south segments, extend through either Arkansas, Oklahoma, or Louisiana. An incident in one state may have traffic impacts that continue across the border, resulting in the need to notify affected neighboring states and provide incident details for them to post on DMS. Although the funding for a multi-state regional TMC that would allow the District to detect, verify, and respond to incidents more quickly is not readily available, establishing communication with neighboring states is a key initial step towards developing the foundation for a multi-state TMC and is essential for effective regional TIM activities.

Implementation Step #1: Complete traffic signal and CCTV camera deployment to enhance incident detection, verification, and monitoring capabilities (see Action Items ST-04 & ST-05).

Implementation Step #2: Identify leads and agency staff for neighboring state DOTs from the regional contact list (see Action Item CO-08) and determine when to contact each based on key corridors that traverse state borders. Develop protocol for determining how to share incident-related updates and what incident details must be provided, as well as questions to ask when receiving information from another state.

Implementation Step #3: Consider pursuing camera sharing agreements with neighboring states DOTs.

Expected Benefits: Establishing standard protocol for disseminating traffic incident information across state lines can improve coordination among responders and enable drivers to make more informed route choices. Providing neighboring states with incident details allows them to post messages on DMS units near the incident for motorists approaching from the other side of the state boundary. This alerts drivers and encourages them to divert to an alternate route which in return decreases congestion, delays, driver frustration, and the risk of secondary crashes.

CO-04: Standardize Communicating Work Zone Information to Local Partners

SCHEDULE	2021	2022		2023		2024		2025		2026
	H2	H1	H2	H1	H2	H1	H2	H1	H2	H1

Focus Area:
Work Zone Management

Action Item Lead:
District Public Information Officer

Partners:
Area Engineers, ATL Construction, ATL Public Information Office

Goals Addressed:

Safety	
Reliability	
Efficiency	
Customer Service	
Collaboration	✓
Integration	✓

Objective: Standardize a District process for communicating construction impacts to local partners, including agency roles that should be contacted, based upon anticipated project complexity.

Need: The TxDOT Atlanta District is generally good at communicating construction projects and anticipated impacts to local partners. However, some cities are occasionally unaware of the District's construction or maintenance activities that occur on state routes within that city's jurisdiction. While TxDOT involves local city partners and their constituents in preconstruction meetings and other public engagement events, city representatives noted that communication of schedule changes as construction began was often inconsistent.

Implementation Step #1: Identify local transportation agency contacts from the District contact list (see Action Item CO-08) that should receive construction information updates.

Implementation Step #2: Establish protocol for when and how to notify the appropriate contacts of updates related to construction activities, schedules, and anticipated impacts. Notification of these partners should occur via regular public information officer updates as well as direct outreach from local area engineers.

Expected Benefits: Improving construction update information dissemination can help the District maintain good working relations with its local partners. If local partners are more aware of upcoming construction, they can coordinate with TxDOT to possibly incorporate other projects or upgrades planned in the vicinity. This would minimize the frequency and number of closures and other construction related traffic impacts. During a project, providing updated closure information to the public as construction schedules and impacts change can help better manage expectations of drivers and local businesses or property owners that may be impacted by construction.

CO-05: Establish Early Involvement of First Responders in the Construction Planning Process

SCHEDULE	2021	2022		2023		2024		2025		2026
	H2	H1	H2	H1	H2	H1	H2	H1	H2	H1

Focus Area:

Work Zone Management

Action Item Lead:

District Director of Construction

Partners:

ATL Operations, ATL Construction, Local Public Safety Agencies

Goals Addressed:

Safety	✓
Reliability	✓
Efficiency	✓
Customer Service	
Collaboration	✓
Integration	✓

Objective: Formalize involvement of first responders and public safety officials in a TIM-specific preconstruction meeting and ongoing update meetings for duration of major construction events.

Need: In regard to WZM, the TxDOT Atlanta District's external coordination consists of regularly hosted pre-construction meetings to inform local stakeholder agencies of TxDOT construction projects planned in the region. Some of these discussions, especially ones related to work zone design, could be enhanced with input from local first responder agencies and public safety officials. TxDOT also noted a need to maintain communication with local public safety agencies and Texas DPS officers throughout the duration of major construction projects.

Implementation Step #1: Determine construction impacts for a given project and identify first responder and public safety contacts representing jurisdictions that will be impacted (see Action Item CO-08).

Implementation Step #2: Involve contacts in initial stages of the construction planning process to ensure first responders are aware of the project impacts and can provide input regarding work zone planning and design.

Implementation Step #3: Include responders in project meetings throughout construction so they are updated on closures and road access restrictions. Invite responders to participate in WZM best practice reviews when they are scheduled (see Action Item CU-02).

Expected Benefits: Establishing first responders' involvement early in the construction planning process enables them to hold TxDOT to the standards outlined in Action Item BP-02. Initial responder input and maintained responder inclusion throughout the construction process allows partners to capture TIM concerns that may not be addressed in the standard work zone design guidelines, thereby improving incident response in the work zone.

Strategy and Best Practice

Pennsylvania DOT requires an Incident Management Plan for long–term construction projects. Freeway projects normally require a preconstruction meeting with emergency responders. Implementing this formal procedure provides the opportunity for contractors, DOT, and emergency services to discuss on-ramp closures as part of the construction phasing.

CO-06: Formalize a Process for Sharing Work Zone Notices Between States

SCHEDULE	2021	2022		2023		2024		2025		2026
	H2	H1	H2	H1	H2	H1	H2	H1	H2	H1

Focus Area:

Work Zone Management

Action Item Lead:

District Area Engineers

Partners:

Area Offices, ATL Operations, ATL Construction, ATL Public Information Office, ArDOT, LADOTD, ODOT

Goals Addressed:

Safety	
Reliability	
Efficiency	
Customer Service	✓
Collaboration	✓
Integration	✓

Objective: Develop an Area Engineer-led formal process for sharing and promoting work zone notices on key routes between states on DMS and other traveler information outlets.

Need: The TxDOT Atlanta District has limited coordination with its neighboring states and no standard protocol for sharing work zone information. The District's major east/west corridors, as well as some north/south segments, extend through either Arkansas, Oklahoma, or Louisiana. A construction project in one state may have traffic impacts that continue across the border, resulting in the need to notify affected states and provide work zone details for them to post on their DMS to provide public traveler information.

Implementation Step #1: Identify leads and agency staff for neighboring state DOTs from the regional contact list (see Action Item CO-08) and determine when to contact each based on work zone impacts to key corridors that cross state borders.

Implementation Step #2: Develop protocol for determining how to share construction-related updates and what project and impact details must be provided, as well as questions to ask when receiving construction information from another state.

Implementation Step #3: Coordinate with neighboring states to review available work zone ITS technologies specified in the TxDOT's SWZ Guidelines to support queue warning and speed monitoring for projects that occur at state borders.

Expected Benefits: A formal process for sharing work zone information between states would create a more cohesive and coordinated traveler information system along corridors that cross state lines. States would also be able to collaborate on upcoming projects to avoid concurrent closures and support work zone ITS use.

Strategy and Best Practice

The FHWA and sixteen major transportation agencies in the New York, New Jersey, and Connecticut metropolitan region formed the Transportation Operations Coordinating Committee (TRANSCOM). This committee disseminates construction information, including incident and delay data, to hundreds of transportation agencies within and around New York. This allows better road project coordination between agencies and states, and provides updated traveler information to the public, greatly improving mobility throughout the region.

CO-07: Develop Signal Corridor Management Strategies with Partner Agencies

SCHEDULE	2021	2022		2023		2024		2025		2026
	H2	H1	H2	H1	H2	H1	H2	H1	H2	H1

Focus Area:
Traffic Signal Management

Action Item Lead:
District Traffic Engineer

Partners:
ATL Operations, Local Transportation Agencies, ArDOT, LADOTD

Goals Addressed:

Safety	✓
Reliability	✓
Efficiency	✓
Customer Service	
Collaboration	✓
Integration	

Objective: Develop corridor management and performance measurement strategies in collaboration with neighboring state and local partners to improve mobility along key signalized corridors.

Need: The TxDOT Atlanta District borders the states of Arkansas, Louisiana, and Oklahoma, and the city of Texarkana straddles the border of Texas and Arkansas. Due to the changes in jurisdiction along many major arterial corridors in the region, the District identified a need to improve cross-jurisdictional signal coordination. The District currently does not monitor or collect data to support signalized corridor performance measures, nor does it collaborate with neighboring TxDOT Districts or states to collaboratively update coordinated signal timings along corridors.

Implementation Step #1: Coordinate with local partners as well as neighboring TxDOT Districts and states to identify key signalized corridors within the region that cross jurisdictional boundaries, including ones that serve Texarkana and Longview. Discuss operational challenges and signal bottlenecks for these corridors.

Implementation Step #2: Continue and complete systemwide deployment of cellular modems at TxDOT Atlanta District traffic signal locations to establish communication and control of District signals (see Action Item ST-03).

Implementation Step #3: Identify corridor performance measures to track and set goals. Monitor signal corridor performance and update coordination patterns as needed, sharing this data with partners so that they can update timings accordingly for the signals that they maintain along the same corridor.

Expected Benefits: Better corridor signal coordination can eliminate unnecessary starting and stopping, decrease travel times, and prevent driver frustration. Minimizing these common issues can improve traffic flow and lead to reductions in congestion, rear-end collisions, waiting time, and fuel consumption.

Strategy and Best Practice

The Utah DOT (UDOT) developed a Traffic Signal Management Plan (TSMP) to provide framework for the maintenance, design and operation of the traffic signal system. This plan includes incident management signal adjustments and special event support guidance to improve the coordination and compatibility of signals across jurisdictional boundaries during incidents, special events, and adverse weather.

CO-08: Maintain a Formal List of Partner Contact Information

Focus Area:
General Traffic Management

Action Item Lead:
District Director of Transportation Operations

Partners:
TxDOT TRF, ATL Operations, Local Transportation Agencies, Local Public Safety Agencies, ArDOT, LADOTD, ODOT, Texas DPS, Texarkana MPO, Ark-Tex COG

Goals Addressed:

Safety	
Reliability	
Efficiency	
Customer Service	
Collaboration	✓
Integration	✓

SCHEDULE	2021	2022		2023		2024		2025		2026
	H2	H1	H2	H1	H2	H1	H2	H1	H2	H1
	Ongoing...									

Objective: Maintain and update a formal list of partner contact information for engineering, law enforcement, emergency response, and neighboring DOT partners.

Need: TxDOT Atlanta District staff and partner agencies will at times have outdated contact information and do not know who specifically to contact within an agency in different situations. Much of the contact between partners now is dependent on individual working relationships that would be impacted by staff turnover at either agency. Making available a list of regional agency points of contact would allow any District staff member to reach out to other agencies as needed.

Implementation Step #1: Develop key contact lists for TxDOT Atlanta District staff, counterparts from neighboring Districts, local transportation agency staff, local public safety staff, Texas DPS staff, ARDOT staff, ODOT staff, and LADOTD staff.

Implementation Step #2: Reference the list as needed to share traffic updates, and review and revise the key contact list annually to reflect staffing changes.

Expected Benefits: A formal, regularly updated list of agencies and key contacts related to traffic operations can establish efficient communication protocol and result in effective dissemination of information to local partner agencies and the public. Maintaining a current contact list by consistently updating it enables District staff to contact the appropriate agencies and staff for different situations to ensure the information is in the right hands and does not get lost.

CO-09: Pursue Regional Traffic Camera Sharing Agreements

SCHEDULE	2021	2022		2023		2024		2025		2026
	H2	H1	H2	H1	H2	H1	H2	H1	H2	H1

Focus Area:
General Traffic Management

Action Item Lead:
District Director of Transportation Operations

Partners:
ATL Operations, Local Transportation Agencies, Local Public Safety Agencies

Goals Addressed:

Safety	
Reliability	
Efficiency	✓
Customer Service	✓
Collaboration	✓
Integration	

Objective: Pursue camera-sharing agreements (or updated agreements) with the Cities of Texarkana, Mount Pleasant, Marshall, and Longview to support 24-hour camera coverage of freeways from local public safety dispatch partners.

Need: District staff expressed interest in sharing access to camera feeds with cities along freeways within the TxDOT Atlanta District to enable traffic monitoring throughout the entire day and night. As the District deploys CCTV cameras, the ability to monitor traffic is greatly improved. However, there is currently not a way for the major cities in the District to benefit from these devices when they are not being utilized by District staff.

Implementation Step #1: Plan and implement CCTV cameras according to the ITS Master Plan (see Action Item ST-05). Invest in a software to establish a single location for accessing all District and local partner camera feeds within the TxDOT Atlanta District.

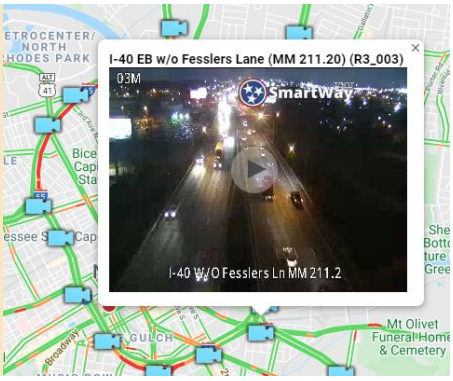
Implementation Step #2: Develop camera sharing agreements with interested cities and agencies. Coordinate with TxDOT TRF for guidance with developing agreement language.

Implementation Step #3: Work with partners with new access to camera feeds to encourage notification of TxDOT after hours when partners detect incidents.

Expected Benefits: Access to District CCTV camera feeds allows local partner agencies to monitor traffic when the Atlanta District office is not staffed, thereby assisting with incident detection and verification. Shared camera access can lead to cost savings as multiple agencies no longer have to install their own cameras on routes that are already covered by existing deployments. Resource sharing agreements can also improve inter-agency relationships and cross-jurisdictional coordination in other areas such as WZM.

Strategy and Best Practice

The Tennessee DOT (TDOT) emphasizes the benefits of sharing real-time video with transportation agencies, emergency responders, and the public. TDOT's written agreement grants access to traffic footage for actions that support TDOT's traffic management goals. In return, emergency responders and private entities are required to assist TDOT by reporting incidents, roadway obstructions, signal failures, etc., and to attend TIM trainings.



CO-10: Improve Collaboration with Local Agencies for Safety Funding Programs

SCHEDULE	2021	2022		2023		2024		2025		2026
	H2	H1	H2	H1	H2	H1	H2	H1	H2	H1

Focus Area:
General Traffic Management

Action Item Lead:
District Director of Transportation Operations

Partners:
ATL Operations, Local Transportation Agencies, Texarkana MPO, Ark-Tex COG

Goals Addressed:

Safety	✓
Reliability	
Efficiency	
Customer Service	✓
Collaboration	✓
Integration	✓

Objective: Provide more opportunities for collaboration and outreach with local agencies when preparing project applications for TxDOT safety funding programs.

Need: Local agencies would like more guidance from TxDOT on how to prepare a competitive application to increase chances of receiving funding for safety projects through the state's Highway Safety Improvement Program (HSIP). Partner agencies are not always aware when applications are being accepted for various safety funding programs and are often unsure what information to provide in order to submit a competitive application. TxDOT and Texas DPS both already collect much of the data required and can connect partner agencies with this data and how to interpret it to support HSIP and other grant applications.

Implementation Step #1: Identify an internal champion within the TxDOT Atlanta District to lead outreach to partner agencies when funding for state safety programs such as HSIP becomes available.

Implementation Step #2: Conduct outreach in the form of webinars and offer to host meetings with individual cities to provide an opportunity for interested local agencies to learn more about funding programs and to get assistance with applying.

Expected Benefits: More information and guidance from TxDOT would allow local agencies to prepare more competitive applications for TxDOT's safety-focused funding programs. Indicating District support for projects would also give the applications a boost, since many award points to applications that demonstrate multiple agencies supporting the project. Providing this support also builds working relationships with partner agencies and shows that TxDOT values their goals of maximizing the use of their existing funding to deliver safety-related roadway improvements to their constituents.

TSMO Implementation Plan

This section summarizes the 36 recommended action items for advancing TSMO in the TxDOT Atlanta District over the next five years. Its contents are based on the existing strengths and needs that the Atlanta District and regional stakeholders identified over the course of the TSMO Plan's development. The Implementation Plan is shown in Table 8 through Table 13, and in the schedule on the following pages shown in Figure 20. Table 8 through Table 13 include the following information for each recommended action item:

- **Action Number:** An identifier for each recommended action item, organized by CMM capability dimension: Business Processes (BP), Systems & Technology (ST), Performance Measurement (PM), Culture (CU), Organization & Workforce (OW), and Collaboration (CO).
- **Action Description:** Provides a brief description of the action, which may include multiple steps.
- **Program Plan Page Number:** A reference to TSMO Program Plan page number with more detailed discussion contained in the Action Item Sheets located in the Capability Maturity Model section of the report.
- **Action Lead:** Identifies the individual at the TxDOT Atlanta District who will take ownership of the action and will oversee that implementation progresses as planned.
- **Supports District TSMO Goals:** Identifies which of the District's TSMO goals the action item supports: Safety, Reliability, Efficiency, Customer Service, Collaboration, or Integration.
- **Partners:** Identifies TxDOT staff and external stakeholders that will contribute to implementation of the recommended action item.
- **Cost:** Provides a semi-quantitative opinion of the level of fiscal resources that TxDOT would need to commit to implement the recommended action item.
- **Effort:** Provides a semi-quantitative opinion of the level of effort that TxDOT would need to dedicate to implement the recommended action item.
- **Related Action Items:** Lists the Action Numbers of related action items that could be implemented either concurrently or subsequently if the District chose to focus on specific program areas or further developing relationships with specific stakeholders.

Separately, the implementation plan schedule provides a year-by-year roadmap for implementing each recommended action item. All action items are shown with recommended timeframes at a half-year level of detail for the next five years, beginning with the second half of 2021.

The TxDOT Atlanta District TSMO Program Plan is an unconstrained planning document focused on near-term implementation priorities. While all action items listed could potentially be implemented within the next five years, no funding is currently allocated for any of these action items unless otherwise specifically stated in this plan. Action items will be implemented as District resources permit.

Table 8: TxDOT Atlanta District TSMO Implementation Plan for Business Processes

Action No.	Action Description	Program Plan Page #	Action Lead	Supports District TSMO Goals						Partners	Cost	Effort	TSMO Focus Area	Related Action Items
				Safety	Reliability	Efficiency	Customer Service	Collaboration	Integration					
Business Processes (BP)														
BP-01	**Formalize a Response Approach for Commercial Vehicle Incidents:** Develop a regional approach for responding to and quickly clearing commercial vehicle incidents on District freeways.	30	District Director of Maintenance	✓	✓	✓		✓		TxDOT TRF, ATL Operations, Texas DPS, Local Public Safety Agencies	$$			PM-01, 0W-01, C0-01, C0-02, C0-08
BP-02	**Establish Criteria for Conducting After-Action Incident Reviews:** Establish a severity threshold for conducting TIM-focused after-action incident reviews and begin to conduct reviews that include other agencies involved with TIM response.	31	District Director of Transportation Operations	✓	✓	✓		✓	✓	TxDOT TRF, ATL Operations, ATL Area Offices, ATL Maintenance, Local Public Safety Agencies, Texas DPS	$			PM-01, PM-02, CU-01, C0-01
BP-03	**Develop an Approach to Maintain ITS Functionality During Construction:** Develop contract language and a contract enforcement approach to keep work zone ITS functioning as intended for the duration of construction projects.	32	District Director of Construction	✓	✓			✓	✓	ATL Construction, ATL Operations, ATL Area Offices	$			BP-05, ST-05, CU-02
BP-04	**Establish Work Zone Accessibility Criteria for First Responders:** Establish work zone design criteria and implementation procedures to maintain acceptable first responder and law enforcement access during both freeway and non-freeway incidents.	33	District Director of Construction	✓	✓			✓	✓	ATL Construction, ATL Operations, Local Public Safety Agencies, Texas DPS	$			C0-05
BP-05	**Use TxDOT's Smart Work Zone Decision Tool and Deployment Guidelines:** Adapt TxDOT's existing SWZ guidance and deployment decision tool when determining which work zone ITS technologies to use for District construction projects.	34	District Director of Construction	✓	✓		✓		✓	TxDOT TRF, ATL Construction, ATL Operations	$			BP-03, ST-05
BP-06	**Conduct Post-Special Event Reviews as Needed:** Conduct planning meetings and after-action reviews as needed to debrief on traffic management performance during major special events.	35	District Director of Transportation Operations					✓	✓	ATL Operations, ATL Area Engineers, Local Transportation Agencies, Event Organizers	$			BP-07
BP-07	**Develop and Maintain an Events Schedule:** Develop and maintain a schedule of planned special events occurring in the District.	36	District Public Information Officer				✓	✓		ATL Operations, Local Transportation Agencies, Event Organizers	$			BP-06, ST-02
BP-08	**Formalize Active Management of Signal Battery Backup Units:** Develop a formal budgeting, deployment, and asset management approach for traffic signal battery back-up units deployed throughout the District.	37	District Traffic Engineer	✓	✓	✓			✓	ATL Operations, ATL Maintenance	$$			PM-03
BP-09	**Integrate Existing Regional GIS Mapping Datasets:** Integrate existing TxDOT and Ark-Tex COG GIS mapping datasets to improve ease of analysis for grant applications and other required data reporting.	38	District Director of Transportation Operations				✓	✓	✓	ATL Operations, Local Transportation Agencies, Ark-Tex COG, Texarkana MPO	$$			C0-10

Table 9: TxDOT Atlanta District TSMO Implementation Plan for Systems & Technology

Action No.	Action Description	Program Plan Page #	Action Lead	Supports District TSMO Goals						Partners	Cost	Effort	TSMO Focus Area	Related Action Items
				Safety	Reliability	Efficiency	Customer Service	Collaboration	Integration					
Systems & Technology (ST)														
ST-01	**Install Signage for Improved Incident Location Self-Identification:** Add location identification signage to freeway flyovers and interchange ramps to help people better identify their location after a crash.	40	District Traffic Engineer			✓	✓			ATL Operations, ATL Maintenance	$$			
ST-02	**Provide Closure Information Through Third-Party Apps:** Use third-party apps to push notifications about road closures and related impacts out to travelers.	41	District Public Information Officer		✓		✓	✓	✓	Private Third-Party Providers, ATL Operations, ATL Construction	$			BP-07, CO-04, CO-06
ST-03	**Complete Cellular Modem Deployment to Signals:** Complete the ongoing deployment of cellular modems to signal cabinets Districtwide.	42	District Traffic Engineer	✓	✓	✓	✓		✓	ATL Operations, ATL Maintenance	$$			ST-04, PM-03, OW-03
ST-04	**Plan and Implement Surveillance Technology for Signals:** Identify implementation priority for cameras and necessary software enhancements to allow remote surveillance of District signals from a single software platform.	43	District Traffic Engineer	✓	✓	✓		✓	✓	ATL Operations, ATL Maintenance	$$$			ST-03, ST-05, OW-03, CO-09
ST-05	**Continue Deploying and Maintaining ITS Devices along Key Routes:** Continue to deploy and proactively maintain ITS devices on key routes throughout region, per direction included in the District ITS Master Plan.	44	District Traffic Engineer	✓	✓	✓	✓	✓	✓	ATL Construction, ATL Operations, ATL Advance Planning & Development	$$$			BP-03, BP-05, ST-04
ST-06	**Implement Route Choice Corridor Management Approaches:** Implement corridor management approaches that promote route choice and detours among facilities using INRIX travel time predictions posted in real time to DMS units.	45	District Director of Maintenance		✓	✓	✓		✓	ATL Operations, TxDOT TRF	$			
ST-07	**Develop a Multi-State TMC Concept of Operations:** Develop a concept of operations and gauge partner agency interest for a potential multi-state regional TMC based out of Texarkana.	46	District Director of Transportation Operations		✓	✓	✓	✓	✓	TxDOT TRF, ATL Operations, Local Transportation Agencies, Local Public Safety Agencies, ArDOT, LADOTD, ODOT	$$			PM-04, CO-09

Table 10: TxDOT Atlanta District TSMO Implementation Plan for Performance Measurement

Action No.	Action Description	Program Plan Page #	Action Lead	Supports District TSMO Goals						Partners	Cost	Effort	TSMO Focus Area	Related Action Items
				Safety	Reliability	Efficiency	Customer Service	Collaboration	Integration					
Performance Measurement (PM)														
PM-01	**Monitor Towing Company Performance:** Partner with Texas DPS and local municipalities to monitor performance of tow companies and establish expectations or baselines that must be met.	48	District Director of Transportation Operations	✓	✓			✓		ATL Operations, Texas DPS, Local Public Safety Agencies, County Sheriffs	$			BP-01, BP-02, PM-02
PM-02	**Track TIM Performance in Partnership with Texas DPS:** Partner with Texas DPS to begin collecting the agency's TIM-related crash data and actively tracking TIM in the region.	49	District Director of Transportation Operations	✓	✓			✓	✓	TxDOT TRF, ATL Operations, Texas DPS, Local Public Safety Agencies	$			BP-02, PM-01, CO-01
PM-03	**Establish Traffic Signal Maintenance Performance Measures:** Establish maintenance-related traffic signal performance measures and targets.	50	District Signal Shop Manager		✓	✓			✓	ATL Operations, ATL Maintenance	$			BP-08, ST-04
PM-04	**Develop Districtwide Traffic Operations Performance Measures:** Develop Districtwide traffic operations performance measures using TxDOT's INRIX probe-based data subscription and begin to track these using automated delay alerts and summary reports.	51	District Director of Transportation Operations	✓	✓	✓		✓	✓	TxDOT TRF, ATL Operations	$			ST-06
PM-05	**Regularly Review Severe Crash Data and Develop Mitigation Strategy:** Review aggregated Districtwide fatal and severe crash data at least annually and develop or update a Districtwide Severe Crash Mitigation Strategy from identified trends.	52	District Director of Transportation Operations	✓		✓		✓	✓	TxDOT TRF, ATL Operations, ATL Advance Planning & Development, Texas DPS, Local Public Safety Agencies, Local Transportation Agencies	$			

Table 11: TxDOT Atlanta District TSMO Implementation Plan for Culture

Action No.	Action Description	Program Plan Page #	Action Lead	Supports District TSMO Goals						Partners	Cost	Effort	TSMO Focus Area	Related Action Items
				Safety	Reliability	Efficiency	Customer Service	Collaboration	Integration					
Culture (CU)														
CU-01	**Develop Joint TIM Traffic Control Procedures with Law Enforcement:** Coordinate with law enforcement to maintain traffic control and queue warning for major incidents until the roadway is fully cleared.	54	District Director of Maintenance	✓	✓			✓		ATL Operations, Local Public Safety Agencies, Texas DPS	$			BP-02, OW-01
CU-02	**Conduct Regular Work Zone Management Practice Reviews:** Regularly assess compiled lessons learned related to work zone management and determine which should be incorporated as best practices into agency standards, manuals, or other work zone guidance.	55	District Director of Construction	✓	✓	✓		✓	✓	ATL Operations, ATL Construction, ATL Area Offices, Local Public Safety Agencies, Texas DPS	$			BP-03
CU-03	**Reinvest in Safe Driving Public Education:** Reinvest in communication and education campaigns to encourage driver caution in situations such as flooded roads, icy bridges, and malfunctioning or dark signals.	56	District Traffic Safety Specialist	✓			✓	✓	✓	TxDOT TRF, ATL Operations, ATL Public Information Office, Local Transportation Agencies	$$			

Table 12: TxDOT Atlanta District TSMO Implementation Plan for Organization & Workforce

Action No.	Action Description	Program Plan Page #	Action Lead	Supports District TSMO Goals						Partners	Cost	Effort	TSMO Focus Area	Related Action Items
				Safety	Reliability	Efficiency	Customer Service	Collaboration	Integration					
Organization & Workforce (OW)														
OW-01	**Establish Regional Multidisciplinary TIM Training:** Partner with TxDOT's Statewide TIM Coordinator to provide TIM multidisciplinary trainings and Train the Trainer programs to TxDOT staff and interested partners.	58	District Director of Transportation Operations	✓	✓		✓	✓	✓	TxDOT Statewide TIM Coordinator, ATL Maintenance, ATL Operations, Local Transportation Agencies, Local Public Safety Agencies, Texas DPS	$			CU-01, CO-01
OW-02	**Establish Staff Roles for Remote Signal Monitoring:** Establish automated notification systems and staff roles for remote monitoring, troubleshooting, and control of traffic signals along key corridors.	59	District Signal Shop Manager	✓	✓	✓			✓	ATL Operations, ATL Maintenance	$$			OW-03
OW-03	**Enhance Camera Monitoring Capabilities and Staff Roles:** Establish CCTV camera monitoring staff roles and improve user-friendliness of camera monitoring activities, including a video wall configuration at the signal shop and a software platform that provides a graphic interface to access camera feeds.	60	District Director of Transportation Operations			✓			✓	ATL Operations, ATL Maintenance	$$$			ST-03, ST-04, OW-02

Table 13: TxDOT Atlanta District TSMO Implementation Plan for Collaboration

Action No.	Action Description	Program Plan Page #	Action Lead	Supports District TSMO Goals						Partners	Cost	Effort	TSMO Focus Area	Related Action Items
				Safety	Reliability	Efficiency	Customer Service	Collaboration	Integration					
Collaboration (CO)														
CO-01	**Formalize a Regional TIM Working Group:** Conduct maintenance section-led outreach to local partners to establish a more formalized TIM program in the District, anchored by regular working group meetings to discuss TIM challenges.	62	District Director of Maintenance	✓	✓	✓		✓	✓	TxDOT TRF, ATL Operations, ATL Maintenance, ATL Area Engineers, Local Public Safety Agencies, Texas DPS	$			BP-01, PM-02, OW-01
CO-02	**Standardize TIM Communication Protocol:** Standardize communication protocol among law enforcement, maintenance sections, and the District office to improve TIM information sharing.	63	District Director of Maintenance					✓	✓	Texas DPS, Local Public Safety Agencies, ATL Operations, ATL Maintenance	$			BP-01, CU-01
CO-03	**Share Detailed Incident Information with Neighboring State DOTs:** Develop SOPs for providing neighboring state DOTs with detailed traffic incident information for incidents that impact key routes.	64	District Public Information Officer				✓	✓	✓	ATL Operations, ATL Public Information Office, ArDOT, LADOTD, ODOT	$			CO-08, CO-09
CO-04	**Standardize Communicating Work Zone Information to Local Partners:** Standardize a District process for communicating construction impacts to local partners, including agency roles that should be contacted, based upon anticipated project complexity.	65	District Public Information Officer				✓	✓	✓	ATL Area Engineers, ATL Construction, ATL Public Information Office	$			ST-02, CO-08
CO-05	**Establish Early Involvement of First Responders in the Construction Planning Process:** Formalize involvement of first responders and public safety officials in a TIM-specific preconstruction meeting and ongoing update meetings for duration of major construction events.	66	District Director of Construction	✓	✓	✓		✓	✓	ATL Operations, ATL Construction, Local Public Safety Agencies	$			BP-04
CO-06	**Formalize a Process for Sharing Work Zone Notices Between States:** Develop an Area Engineer-led formal process for sharing and promoting work zone notices on key routes between states on DMS and other traveler information outlets.	67	District Area Engineers				✓	✓	✓	ATL Area Offices, ATL Operations, ATL Construction, ATL Public Information Office, ArDOT, LADOTD, ODOT	$			ST-02, CO-08
CO-07	**Develop Signal Corridor Management Strategies with Partner Agencies:** Develop corridor management and performance measurement strategies in collaboration with neighboring state and local partners to improve mobility along key signalized corridors.	68	District Traffic Engineer	✓	✓	✓		✓		ATL Operations, Local Transportation Agencies, ArDOT, LADOTD	$			CO-08
CO-08	**Maintain a Formal List of Partner Contact Information:** Maintain and update a formal list of partner contact information for engineering, law enforcement, emergency response, and neighboring DOT partners.	69	District Director of Transportation Operations					✓	✓	TxDOT TRF, ATL Operations, Local Transportation Agencies, Local Public Safety Agencies, ArDOT, LADOTD, ODOT, Texas DPS, Texarkana MPO, Ark-Tex COG	$			CO-03, CO-06, CO-07
CO-09	**Pursue Regional Traffic Camera Sharing Agreements:** Pursue camera-sharing agreements (or updated agreements) with the Cities of Texarkana, Mount Pleasant, Marshall, and Longview to support 24-hour camera coverage of freeways from local public safety dispatch partners.	70	District Director of Transportation Operations			✓	✓	✓		ATL Operations, Local Trasnportation Agencies, Local Public Safety Agencies	$			ST-04, ST-07, CO-03
CO-10	**Improve Collaboration with Local Agencies for Safety Funding Programs:** Provide more opportunities for collaboration and outreach with local agencies when preparing project applications for TxDOT safety funding programs.	71	District Director of Transportation Operations	✓			✓	✓	✓	ATL Operations, Local Transportation Agencies, Texarkana MPO, Ark-Tex COG	$			BP-09

Figure 20: TxDOT Atlanta District TSMO Implementation Schedule

Task Name	2021	2022		2023		2024		2025		2026
	H2	H1	H2	H1	H2	H1	H2	H1	H2	H1
BUSINESS PROCESSES										
BP-01: Formalize a Response Approach for Commercial Vehicle Incidents										
BP-02: Establish Criteria for Conducting After-Action Incident Reviews										
BP-03: Develop an Approach to Maintain ITS Functionality During Construction										
BP-04: Establish Work Zone Accessibility Criteria for First Responders										
BP-05: Use TxDOT's Smart Work Zone Decision Tool and Deployment Guidelines										
BP-06: Conduct Post-Special Event Reviews as Needed								*Ongoing*		
BP-07: Develop and Maintain an Events Schedule								*Ongoing*		
BP-08: Formalize Active Management of Signal Battery Backup Units										
BP-09: Integrate Existing Regional GIS Mapping Datasets										
SYSTEMS & TECHNOLOGY										
ST-01: Install Signage for Improved Incident Location Self-Identification										
ST-02: Provide Closure Information Through Third-Party Apps								*Ongoing*		
ST-03: Complete Cellular Modem Deployments to Signals										
ST-04: Plan and Implement Surveillance Technology for Signals										
ST-05: Continue Deploying and Maintaining ITS Devices along Key Routes								*Ongoing*		
ST-06: Implement Route Choice Corridor Management Approaches										
ST-07: Develop a Multi-State TMC Concept of Operations								*Ongoing*		
PERFORMANCE MEASUREMENT										
PM-01: Monitor Towing Company Performance								*Ongoing*		
PM-02: Track TIM Performance in Partnership with Texas DPS								*Ongoing*		
PM-03: Establish Traffic Signal Maintenance Performance Measures										
PM-04: Develop Districtwide Traffic Operations Performance Measures										
PM-05: Regularly Review Severe Crash Data and Develop Mitigation Strategy								*Ongoing*		
CULTURE										
CU-01: Develop Joint TIM Traffic Control Procedures with Law Enforcement										
CU-02: Conduct Regular Work Zone Management Practice Reviews								*Ongoing*		
CU-03: Continue Investments in Safe Driving Public Education								*Ongoing*		
ORGANIZATION & WORKFORCE										
OW-01: Establish Regional Multidisciplinary TIM Training								*Ongoing*		
OW-02: Establish Staff Roles for Remote Signal Monitoring										
OW-03: Enhance Camera Monitoring Capabilities and Staff Roles										
COLLABORATION										
CO-01: Formalize a Regional TIM Working Group										
CO-02: Standardize TIM Communication Protocol										
CO-03: Share Detailed Incident Information with Neighboring State DOTs										
CO-04: Standardize Communicating Work Zone Information to Local Partners										
CO-05: Establish Early Involvement of First Responders in the Construction Planning Process										
CO-06: Formalize a Process for Sharing Work Zone Notices Between States										
CO-07: Develop Signal Corridor Management Strategies with Partner Agencies										
CO-08: Maintain a Formal List of Partner Contact Information								*Ongoing*		
CO-09: Pursue Regional Traffic Camera Sharing Agreements										
CO-10: Improve Collaboration with Local Agencies for Safety Funding Programs										

TSMO Tactical Plan Assessment

TSMO Tactical Plans allow the TxDOT Atlanta District to establish greater detail in how to act upon some of the high priority recommended action items included in the TSMO Program Plan. Tactical Plans can establish project details, assign responsibilities, and include cost and staff estimates for specific initiatives. Often, Tactical Plans establish further direction regarding a specific TSMO capability dimension (for example, performance measurement), focus area (for example, TIM), or a service within the scope of a TSMO focus area (for example, winter road management, within the RWM focus area).

Tactical Plan Criteria

Based on the transportation challenges in the region, and priorities identified by regional stakeholders, several Tactical Plans are recommended for the TxDOT Atlanta District. Plans are displayed according to the following criteria:

- Alignment with the TxDOT Atlanta District TSMO Goals: Safety, Reliability, Efficiency, Customer Service, Collaboration, and Integration
- Stakeholder partnerships required for successful implementation
- Level of anticipated initial and ongoing costs anticipated for successful implementation
- Level of District staff support anticipated for successful implementation
- Expected return on investment anticipated, pending successful implementation
- Action items from this TSMO Program Plan within the Tactical Plan's scope

Tactical Plan Components

The following components are typically included in TSMO Tactical Plans:

- A detailed account of existing activities within the District and region, including who is responsible, a schedule of when and how the activities are executed, and other considerations
- Recommendations for new activities, or changes to existing activities that would support the aim of the Tactical Plan
- A description of how the recommended activities will be integrated with existing business processes
- A detailed schedule for up-front and ongoing recommended activities
- Up-front and ongoing cost estimates for implementation of recommended activities
- Performance measures that would allow for tracking the progress of recommended activities

Recommended Tactical Plans

Recommend TSMO Tactical Plans are included on the next page in Table 14.

Table 14: TxDOT Atlanta District Potential TSMO Tactical Plans

Potential Tactical Plan (with Deliverables Listed Below)	Supports District TSMO Goals						Key Internal and External Partners	Expected Ongoing Costs	Expected Ongoing Level of Effort	Expected Return on Investment for District
	Safety	Reliability	Efficiency	Customer Service	Collaboration	Integration				
Districtwide Severe Crash Mitigation Strategy - CRIS Data Trend Visualizer - Districtwide Severe Crash Mitigation Action Plan	✓		✓		✓	✓	TxDOT Traffic Safety Division, ATL Operations, ATL Area Offices, ATL Maintenance, Local Public Safety Agencies, Texas DPS	$$		Highest
Regional TIM Program Development - Regional TIM Training and Working Group Development Strategy - Regional TIM Data Collection and Performance Measurement Plan	✓	✓			✓	✓	TxDOT Traffic Safety Division, ATL Operations, ATL Area Offices, ATL Maintenance, Local Public Safety Agencies, Texas DPS	$		Highest
District Signal Technology Deployment and Management - District Traffic Signal Camera Deployment Plan - District Traffic Signal Technology Asset Management Plan	✓	✓	✓			✓	ATL Operations, ATL Maintenance	$$$		Highest
Regional TMC Concept Development - Concept of Operations - Systems Engineering Analysis Report (Long-Term)	✓	✓	✓	✓	✓	✓	TxDOT Traffic Safety Division, ATL Operations, Local Transportation Agencies, Local Public Safety Agencies, ArDOT, LADOTD, ODOT	$$$		High
Regional ITS Architecture Update - TxDOT Atlanta District Regional ITS Architecture Update			✓			✓	ATL Operations	$		Moderate

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Appendices

Appendix A – Stakeholder Involvement Database

Appendix A - Stakeholder Involvement Database

Organization	Name	Position/Role	Leadership Meeting Participant	Outreach/CMM Participant	Solutions/CMF Participant	Deliverable Reviewer
Ark-Tex Council of Governments	Mary Beth Rudel	Deputy Director	X		X	
Ark-Tex Council of Governments	Chris Brown	Executive Director	X			
City of Marshall	Eric Powell	Public Works Director		X		
City of Marshall	Randy Pritchard	Deputy Emergency Management Coordinaotr				X
City of Mount Pleasant	Andrew Zagars	Public Works Director/City Engineer			X	
City of Mount Pleasant	Kyle Holcomb	Interim Chief of Police		X		
City of Texarkana	Jonathan Wade	Associate City Engineer	X	X		
FHWA - Texas Division	Millie Hayes	Safety and Traffic Operations Specialist			X	
FHWA - Texas Division	Tymli Frierson	Area Engineer			X	
ODOT	Alan Stevenson	Statewide TMC Manager		X	X	
Texarkana MPO	Jo Anne Gray	Assistant Planner			X	
Texarkana MPO	ReaDonna Jones	Director of Texarkana MPO	X	X	X	
Texas DPS	James Ammons	Lieutenant			X	
Texas DPS	Kevin Gray	Captain			X	
Texas DPS	Russell Cooper	Sergeant			X	
TxDOT	Barbara Russell	TSMO Statewide Project Manager		X	X	
TxDOT ATL	Carl Peters	Dangerfield/Mount Pleasant Maintenance Supervisor		X	X	
TxDOT ATL	Chris Moore	Gilmer Maintenance Supervisor		X	X	
TxDOT ATL	Christina Trowler	District Traffic Engineer	X	X	X	X
TxDOT ATL	David McDonald	Statewide TIM Coordinator		X	X	
TxDOT ATL	Deanne Simmons	Planning Director		X		
TxDOT ATL	Doug Simmons	Linden Maintenance Division			X	
TxDOT ATL	Fred Crowder	Daingerfield Maintenance Division		X		
TxDOT ATL	Glenn Yowell	District Bridge Engineer		X		
TxDOT ATL	Irene Webster	Traffic Safety Specialist		X	X	
TxDOT ATL	Jason Dupree	Director of Maintenance		X	X	
TxDOT ATL	Jay Green	New Boston Maintenance Supervisor		X	X	
TxDOT ATL	Jim Barron	Linden Maintenance Supervisor		X		
TxDOT ATL	Katie Martin	Advanced Planning Engineer		X		
TxDOT ATL	Keith Johnson			X		
TxDOT ATL	Kimberly Garner	Director of Construction		X		
TxDOT ATL	Kyle Weatherford	Carthage Maintenance Supervisor		X	X	
TxDOT ATL	Matt Burns	Marshall Maintenance Supervisor		X	X	
TxDOT ATL	Michael Smith	Marshall Maintenance Division			X	
TxDOT ATL	Nick Norman	Dangerfield Maintenance Division		X		
TxDOT ATL	Paul Wong	Texarkana Office Area Engineer		X		
TxDOT ATL	Rebecca Wells	Director of Operations	X	X	X	X
TxDOT ATL	Robert Smith	Jefferson Maintenance Supervisor		X	X	
TxDOT ATL	Stephen Metcalf	Marshall Maintenance Division		X		
TxDOT ATL	Paul James	Signal Shop Supervisor	X			
TxDOT ATL	Garrett Aslin	ITS, Planning, and Design	X			
TxDOT ATL	Jonathan Carter	Designer	X			

Appendix B – TxDOT Incident After-Action Report Form

AFTER ACTION REPORT

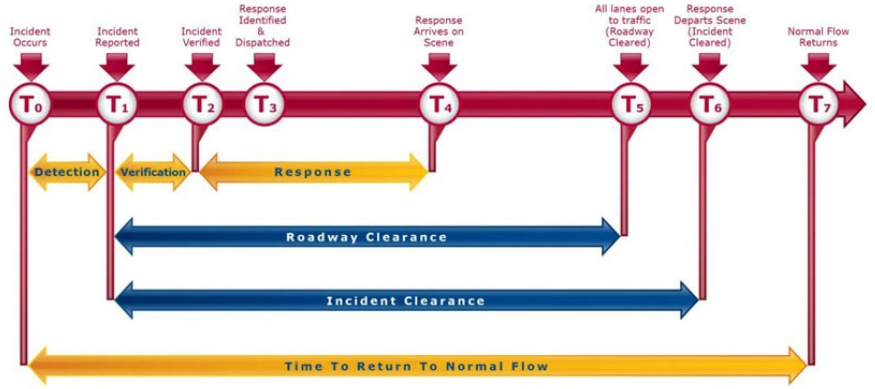
TEXAS DEPT. OF TRANSPORTATION

Traffic Incident Management Teams

INCIDENT INFORMATION							
District Lonestar#		**Level:**	Select Level	**Conditions:** Select Condition			
Select Day	**Date:**		**Time:**(HR:MN)			**Incident Type:**	☐ Traffic Crash
Location:						☐ HAZMAT	☐ Oil Spill
CMV: ☐ Yes ☐ No			**Construction Zone:** ☐ Yes ☐ No			**PD/FD CAD#**	
			Secondary Crash: ☐ Yes ☐ No				

INCIDENT TIMELINE

INCIDENT MILESTONE	TIME
T0 –Incident Occurrence	
T1 – Incident Reported	
T2 – Incident Verified	
T3a – Police Dispatched*	
T3a – Fire Rescue Dispatched*	
T3b – SSP Dispatched	
T3c – Response Plan Activated	
T4a – Police Arrived*	
T4a – Fire Rescue Arrived*	
T4b – SSP Arrived	
T5 – All Lanes Opened	
T6 – Responder Departs	
T7 – Normal Traffic Flow	



*Note: CAD data will be utilized for these times; if no times are available Lonestar data will be utilized.

NOTIFICATIONS

TYPE	TIME	TYPE	TIME
TMC EMAIL ALERT		Medical Examiner	
SSP/HERO		News Media	
DOT		Other_____	
Wrecker			
Police			
Fire Rescue			

INCIDENT SUMMARY:

Reviewed by: _____
Position: _____
Date: _____

AFTER ACTION REPORT

TEXAS DEPT. OF TRANSPORTATION

Traffic Incident Management Teams

AAR MEETING LOCATION AND MODERATOR:
MEETING NOTES/QUESTIONS/COMMENTS:
RESOURCES NEEDED:

ISSUES:

WHAT WENT WELL?

TRAINING NEEDS?

ACTION ITEMS/LESSONS LEARNED/RECOMMENDATIONS:

AFTER ACTION REPORT

TEXAS DEPT. OF TRANSPORTATION

Traffic Incident Management Teams

AAR SIGN IN SHEET (please print clearly)				
Name	**Title**	**Agency**	**Phone**	**Email Address**

AFTER ACTION REPORT

TEXAS DEPT. OF TRANSPORTATION

Traffic Incident Management Teams

AAR SIGN IN SHEET (please print clearly)				
Name	**Title**	**Agency**	**Phone**	**Email Address**

Texas Department of Transportation
Traffic Incident Management
After-Action Review Report (a.k.a., Post Incident Analysis)
Best Practices

After Action Reports – a document capturing an incident timeline, responding agencies, communications, issues, lessons learned and action items to improve future incident response and clearance. The AAR is created following a meeting of all involved first responders and agencies where a pro-active, non-confrontational approach is taken and usually includes scene documentation/photos, agency CAD reports and a tabletop review. AAR meetings are usually conducted by a lead agency representative that facilitates the time and location, agenda, audio-visuals, distributes meeting minutes and follows up on any action items. AAR reports can be captured on a shared filed system or database categorizing incident types, clearance methods and other related items to allow for historical access and benefit.

AAR Basics:

- **Assign an AAR Coordinator and alternate to manage meetings -** AAR facilitators should have a background in traffic incident management, understand the incident command system, each agencies responsibilities, incident timelines and be skilled in general meeting conduct and have professional writing skills.
- Develop AAR Meeting **Activation Requirements** - Develop an agreed upon AAR activation plan based on incident severity, location and impact. For less severe impacting incident, some agencies have "mini AARs" with selected agencies; sometimes at their station to resolve a particular matter but following basic AAR guideline principles.

It is important to understand what issues affected the decision making process from the actual first responders.

ACTIVATION RECOMMENDATION: Incidents involving first responder, hazmat or limited access highway blocked over 4 hours.

- Set **timeline to schedule AAR meetings** following the incident. Options: 1) immediately after the incident; 2) within 48-72 hours and no more than two weeks after the incident.
- **Get the actual participants** to take part in the AAR meeting, since other agency representative may not be able to relay the decision making process based on the information available in an agency report.
- Determine whether fire/police may have already scheduled an ARR meeting and ask to be included.
- Some agencies facilitate AAR meetings with the use of conference calls in concert or as alternative but **face-to-face meetings are most effective**.
- It is crucial to **capture the action items and lessons learned to report at the next TIM meeting** to show results and progress. At the same time, organizers can educate TIM team members about the overall AAR meeting benefits and set their expectations for the next incident.
- Have agencies **send Computer Aided Dispatch (CAD) or crash reports ahead of time** to the AAR coordination, so that he or she can compile and compare timelines and details; then use information as discussion points at the AAR meeting.

*Some agency representatives have been reluctant to attend AARs because they felt they will be blamed. AAR coordinators have been able to change this perspective by showing that **AAR meetings are an opportunity to realize future benefits and understanding each agencies needs and objectives at crashes.***

- The person running the AAR meeting should take the approach to follow the agenda but **really try to engage participants – interviewing first responders about what they saw and what happened**.
- AAR coordinator should be careful not to allow finger pointing by turning a negative into improving operations in the future.

  Prepare an AAR standard operating procedure document, update as needed and train AAR coordinators on the procedure.

AAR MEETING PLAN CHECKLIST

- ☐ Prepare incident summary (location, times, agencies involved, incident description, incident impact). Contact any or all of the following agencies by phone and/or email:
  - ☐ Law enforcement (primary, backup)
  - ☐ Fire rescue (primary, backup)
  - ☐ Maintenance (DOT, county, municipal)
  - ☐ Wrecker companies
  - ☐ Environmental
  - ☐ HAZMAT Vendor
  - ☐ Medical Examiner
  - ☐ Other (NTSB, airport, emergency operations center, etc.)
- ☐ Obtain agency data reports before AAR meeting (incident reports, CAD, photographs
- ☐ Select meeting time/location
- ☐ Send email meeting invite to all first responders that were at scene. Include appropriate related transportation officials and supervisors.
- ☐ Prepare meeting materials:
  - ☐ Agenda template:
  - ☐ Incident brief description of date, time, location, weather/roadway conditions, etc.
  - ☐ Purpose of AAR
  - ☐ Synopsis of Event
  - ☐ List of involved agencies
  - ☐ Agency report reviews
  - ☐ Questions/Comments (issues, problems, successes and general comments)
  - ☐ Slides (include agenda, incident description, aerial photo/map, incident photographs)
  - ☐ Handouts
  - ☐ Sign in sheet (name, agency, email, phone)
- ☐ Reconfirm meeting room availability
- ☐ Send meeting reminder one day prior

CONDUCTING AN AFTER ACTION REPORT MEETING:

- ☐ Assign meeting note taker
- ☐ Distribute printed copies of agenda
- ☐ Confirm all have signed in
- ☐ Conduct self-introductions
- ☐ Describe purpose and goals of AAR
- ☐ Review slides with incident summary description
- ☐ Begin agency report/interview of participants. Ask each agency/company representative if they have anything to add about their response and involvement in the incident.
- ☐ Review each question/comment in depth, encouraging discussion from all of the participants.
- ☐ Take notes of key points, questions and action items for final report

AAR TIMELINE

Upon determination of an AAR:

TASK	TIMELINE*
Contact first responders	Within 1-2 days of incident
Reserve AAR meeting room	Within 1-2 days of incident
Invite first responders	Within 1-2 days of incident
Request agency reports be sent prior to meeting	Within 1-2 days of incident
Prepare AAR agenda	Within 3-4 days of incident
Prepare meeting materials	Within 3-4 days of incident
Conduct AAR meeting	Within 3-14 days of incident
Complete Final AAR	Within 3 weeks of incident
Distribute Final AAR	Within 4 weeks of incident

*Timeline compressed if AAR immediately after incident

AAR FINAL REPORT - A final AAR will be compiled for the lead agency and distributed to all first responders. The report should include the following elements:

- Incident Summary
- Location of AAR Meeting
- Meeting Notes
- Resources Needed
- Issues
- Lessons Learned
- Training Needs Identified
- Action Items/Recommendation
- Sign In Sheet

Prepared by:

Final Version