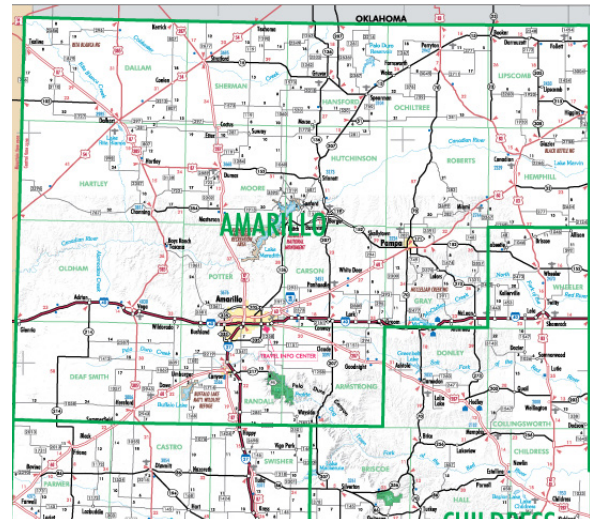
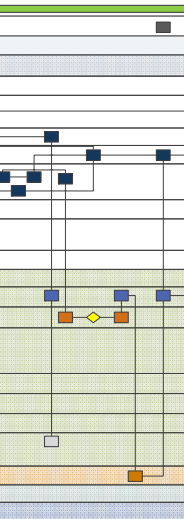


TRANSPORTATION SYSTEMS MANAGEMENT AND OPERATIONS (TSMO)



AMARILLO DISTRICT PROGRAM PLAN

March 2021



Document Revision History

Version Number	Date	Description of Change	Author
0.1	10/26/2020	Draft v2 for Working Group Review	AECOM Team
0.2	02/04/2021	Final Draft for TxDOT Review	AECOM Team
1.0	03/30/2021	Final Version 1.0	AECOM Team

Table of Contents

List of Acronyms	v
Executive Summary	1
TSMO Vision, Mission, and Goals	2
The Business Case for TSMO	2
Update Process.....	3
Proposed Early Actions	4
Introduction	5
Program Plan Format.....	5
What is TSMO?	6
How is the Amarillo District Using TSMO Today?	7
Amarillo District Boundaries	8
Stakeholder Involvement.....	8
Business Case for TSMO in the Amarillo District	10
TSMO Vision, Mission, Goals, and Objectives.....	13
Amarillo District TSMO Goals and Objectives.....	13
Capability Maturity Model.....	15
Introduction to the CMM Process	15
Business Processes	18
Systems and Technology	20
Performance Measurement.....	21
Organization and Workforce	22
Culture	22
Collaboration	22
Capability Maturity Frameworks	23
TSMO Implementation Plan.....	24
TSMO Implementation Plan Process	45
TSMO Tactical Plan Assessment	47
Tactical Plan Criteria.....	47

Tactical Plan Components	47
Recommended Tactical Plans	48
References	50

List of Tables

Table 1: Current TSMO Activities in the Amarillo District.....	7
Table 2: Statewide and Amarillo District TSMO Goals and Objectives.....	13
Table 3: Amarillo District Capability Maturity Assessment by Workshop Stakeholders.....	16
Table 4: CMM Assessment Criteria	17
Table 5: Amarillo District TSMO Implementation Plan Actions	26
Table 6: Implementation of TSMO Statewide Initiatives and Collaboration with Other Districts	45

List of Figures

Figure 1: TxDOT Amarillo District Area Map.....	8
Figure 2: Stakeholder Outreach Process.....	9
Figure 3: Amarillo District Business Case for TSMO — Drivers, Challenges/Opportunities, and Strategies...	10
Figure 4: Capability Maturity Dimensions.....	15
Figure 5: Amarillo District Organizational Chart.....	19
Figure 6: Project Development and Feedback Loop.....	20
Figure 7: Targeted Opportunities Identified by the CMF Review.....	24
Figure 8: Amarillo District TSMO Plan Update Process.....	46
Figure 9: Systems Engineering “V” Diagram.....	49

List of Appendices

Appendix A: One-Page Summaries	52
Appendix B: List of Stakeholders and Acknowledgements.....	69

List of Acronyms

Acronym	Definition
AADT	Average Annual Daily Traffic
AASHTO	American Association of State Highway and Transportation Officials
AMA	Amarillo District
BP	Business Processes
CAT	Cooperative Automated Transportation
CMM	Capability Maturity Model
CMF	Capability Maturity Framework
ConOps	Concept of Operations
CRCS	Connected Roadway Classification System
CRIS	Crash Records Information System
DE	District Engineer
DMS	Dynamic Message Sign
DOT	Department of Transportation
DPS	Department of Public Safety
EOC	Emergency Operations Center
FHWA	Federal Highway Administration
FTE	Full Time Equivalent (referring to full-time staff position)
FY	Fiscal Year
HCRS	Highway Condition Reporting System
ICM	Integrated Corridor Management
ITS	Intelligent Transportation Systems
MAP-21	Moving Ahead for Progress in the 21 st Century Act
MPO	Metropolitan Planning Organization
NHS	National Highway System
NWS	National Weather Service

Acronym	Definition
O&M	Operations & Maintenance
OW	Organization and Workforce
PIO	Public Involvement Office
PM	Performance Measurement
PMIS	Pavement Management Information System
PS&E	Plans, Specifications & Estimates
PSEMP	Project Systems Engineering Management Plan
SHRP	Strategic Highway Research Program
ST	Systems and Technology
TIM	Traffic Incident Management
TMC	Transportation Management Center
TMP	Traffic Management Plan
TMS	Traffic Management System
TP&D	Transportation Planning & Development
TRF	Traffic Division (Central Office)
TTI	Texas A&M Transportation Institute
TxDOT	Texas Department of Transportation
UTP	Unified Transportation Program

Executive Summary

The Amarillo District Transportation Systems and Management Operations (TSMO) Program Plan documents the Amarillo District's strategic vision and goals, current TSMO processes, and recommended actions to implement data-driven decisions to make the transportation network safer, more efficient, and reliable.

The Plan includes recommendations to improve workforce development, business practices, collaboration, and performance management to support, streamline, and institutionalize TSMO projects and practices.

WHAT IS TSMO?

TSMO represents a philosophical shift in how agencies manage their transportation systems in recognition of the limits of traditional roadway capacity expansion for managing congestion and operations. It employs state-of-the-art traffic management practices coordinated across multiple jurisdictions, agencies, and modes.

TSMO BENEFITS

Provides the most cost-effective means to improve:

- Safety
- Congestion
- Mobility and reliability
- Multimodal connectivity
- Emergency response
- Maintenance of overall system
- Optimization of existing Infrastructure
- Customer service

Mitigates the negative impacts on traffic from:



TRAFFIC INCIDENTS



WORK ZONES



ADVERSE WEATHER CONDITIONS

Benefits many areas of the project life cycle:



TSMO Vision, Mission, and Goals

STATEWIDE TSMO VISION

Improve safety and mobility for all modes of transportation by integrating planning, design, operations, construction, and maintenance activities and acknowledging all opportunities for innovation.

STATEWIDE TSMO MISSION

Through innovation, collaboration, and performance-based decision-making, transportation facilities are developed, constructed, maintained, and operated cost-effectively, with the end user in mind.

GOALS



SAFETY



RELIABILITY



EFFICIENCY



**CUSTOMER
SERVICE**



COLLABORATION



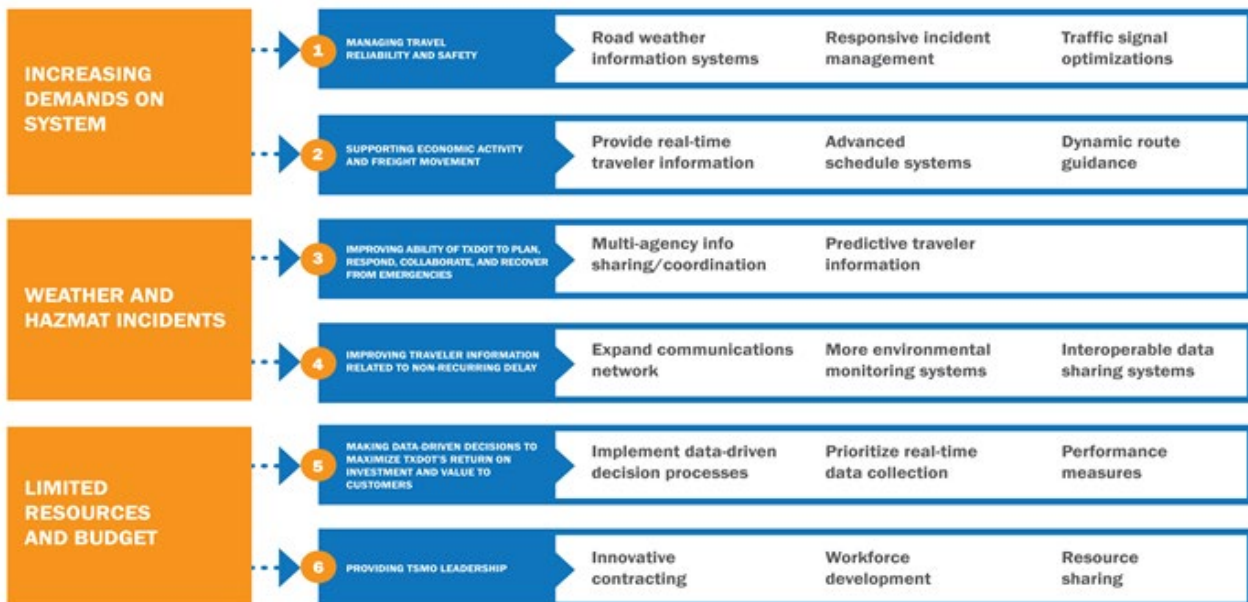
INTEGRATION

The Business Case for TSMO

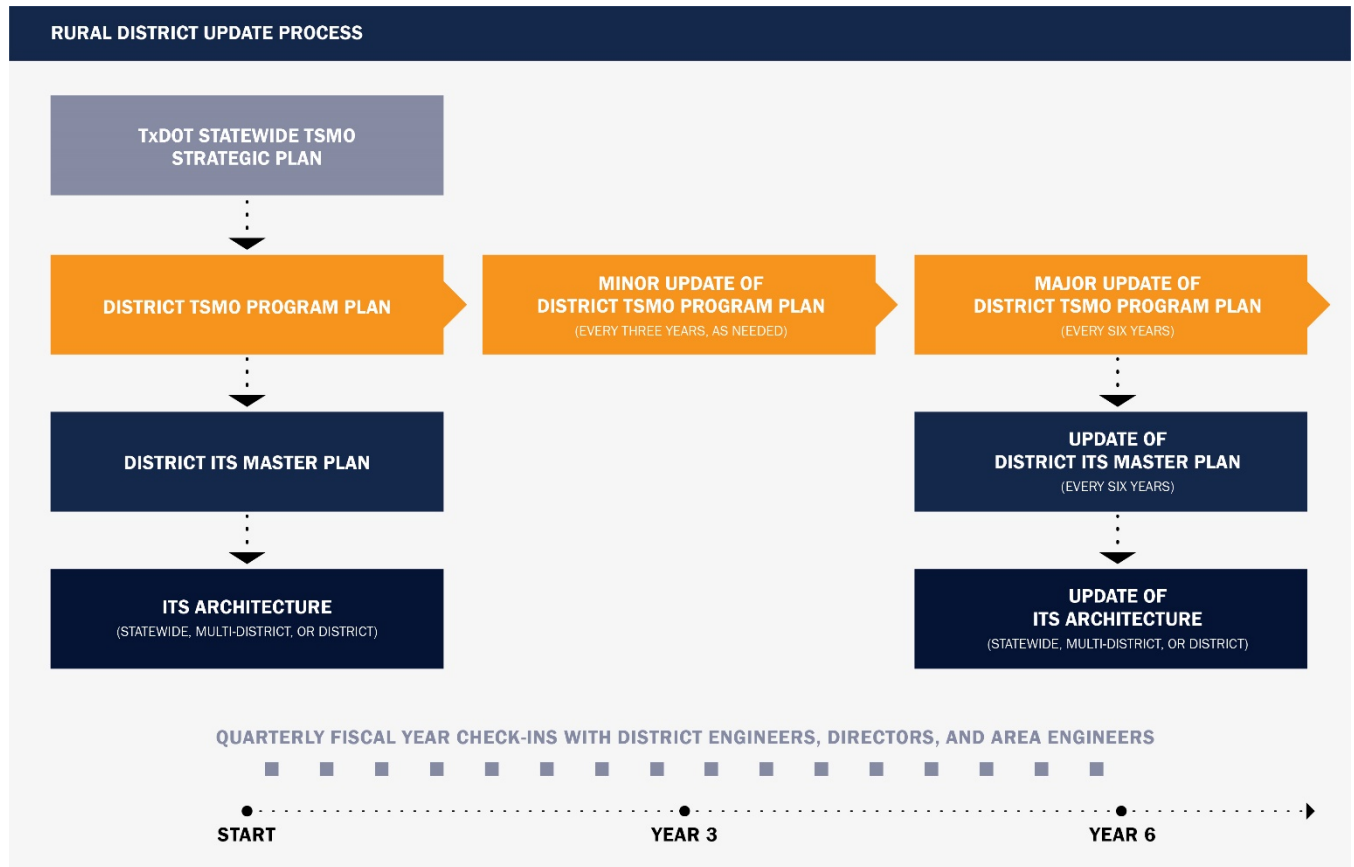
KEY DRIVERS:

CHALLENGES/ OPPORTUNITIES:





STRATEGIES:



Update Process



Proposed Early Actions

 Business Processes	
BP01	Expand TSMO Program Coordinator role and responsibilities to facilitate (TSMO) program implementation.
BP03	Incorporate stand-alone ITS projects into TxDOT's 10- year Unified Transportation Program (UTP).
BP08	Improve Preparedness, Response and Recovery. Continue public awareness and education programs to ensure citizens reduce their vulnerability. Engage in, and provide input to, the statewide Comprehensive Emergency Management Plan.
 Organization and Workforce	
OW01	Identify and create a clear career path for TSMO positions within TxDOT including TSMO Coordinator and ITS Analyst.
OW04	Share TSMO training opportunities (through TRF or external sources) with AMA staff.
 Collaboration (CO)	
C002	Meet every quarter (as part of District staff meeting) with representatives from the TP&D, Construction, and Operations departments and the three Area Offices to review TSMO implementation status.
 Culture (CU)	
CU01	Develop checklist for regular ongoing stakeholder/partner outreach to keep stake holders informed of AMA projects.
CU05	Document TSMO Activities.

Introduction

The Amarillo District Transportation System Management and Operations Program Plan (Amarillo TSMO Plan) prioritizes reliable strategies for operations and management of the existing transportation infrastructure to utilize it at its full potential. The Amarillo TSMO Plan supports the TxDOT TSMO Statewide Strategic Plan (see References) by providing a district-level approach. Strategies including traffic incident management, traveler information, work zone management, and freight management will help transportation engineers and planners to proactively manage the system in real time and improve system efficiency. TSMO has become a key strategy to prepare for ever-increasing congestion, limited funding, and the expanding role of technology in our transportation network.

The Amarillo TSMO Plan includes recommendations to improve workforce development, business practices, collaboration and performance measurement designed to support, streamline, and institutionalize TSMO projects and practices. Implementing the Amarillo TSMO Plan will improve project delivery processes by integrating mobility-focused solutions throughout the planning, programming, design, construction, operations, and maintenance phases. By collaborating with partner agencies and implementing data-driven decisions, the transportation network will be safer, more efficient, and improve reliability for all travelers.

Program Plan Format

Key components of the Amarillo TSMO Plan include:

- An introduction to TSMO and description of the Amarillo District boundaries
- The business case for why TSMO is needed in the Amarillo District
- The TxDOT statewide mission, vision, goals, and objectives on which the Amarillo TSMO objectives were created form the foundation of the action items in the implementation plan
- A discussion of the capability maturity model (CMM) dimensions with the successes and challenges of the District identified in each of the six dimensions
- A TSMO Implementation Plan of actions including priority, timeline, Amarillo District lead, resources, and partners (e.g. adjacent districts, adjacent states, Traffic Safety Division, external agencies); a maintenance plan is also included for continuous implementation between plan updates.
- Recommendations for the development of tactical plans for traffic incident management, traffic management, work zone management, and traffic signal management.

What is TSMO?

Traditionally, roadway capacity expansion has been the primary tool for managing transportation congestion and operations. However, capacity expansion does not adequately address the needs of the modern transportation system:

- Increasing demand often overwhelms new capacity projects even before completion
- Limited funding requires that departments must decide between maintaining the system they have or adding more capacity
- The expanding role of technology including connected and automated vehicles, traveler information, system maintenance, and safety improvements

PHILOSOPHICAL SHIFT

TSMO represents a philosophical shift in how agencies manage their transportation systems. It employs state-of-the-art traffic management practices coordinated across multiple jurisdictions, agencies, and modes.

Implementing a TSMO plan encourages the Amarillo District and partners to evaluate a broad range of options other than capacity solutions, to solve safety, mobility and reliability challenges.

The Amarillo TSMO Plan supports District Traffic Management Systems (TMS) performance measures, a priority identified by TxDOT's Chief Engineer. Initial metrics identified include TMS asset operational uptime, incident clearance times, level of travel time reliability, and TMS coverage. The Chief Engineer's memos are included in the appendix of the TxDOT TSMO Statewide Strategic Plan.

TSMO will be integrated into existing plans, programs, and business processes as much as possible. Like the Amarillo District, each TxDOT district is developing a District TSMO Program Plan.

TSMO BENEFITS

Provides the most cost-effective means to improve:

- Safety
- Congestion
- Mobility and reliability
- Multimodal connectivity
- Emergency response
- Maintenance of overall system
- Optimization of existing infrastructure
- Customer service

Mitigates the negative impacts on traffic from:



TRAFFIC INCIDENTS



WORK ZONES



ADVERSE WEATHER CONDITIONS

Benefits many areas of the project life cycle:



How is the Amarillo District Using TSMO Today?

The TxDOT Amarillo District is responsible for planning, programming, design, construction, operations and maintenance of projects within the District. Within each of these areas, the TxDOT Amarillo District is already applying TSMO tools at varying levels and consistency. Table 1 provides an overview of current TSMO activities districtwide, and at the divisions within TxDOT Amarillo District: Transportation Planning and Development,

Construction, and Operations. The current TSMO activities were reviewed as part of the Capability Maturity Model, described later in this report. More detail on the present status of TSMO can be found in the “Amarillo District Transportation Systems Management and Operations (TSMO) Program Plan Development State of the Practice Report, September 2020.

Table 1: Current TSMO Activities in the Amarillo District

Group	TSMO Activity
Districtwide	<ul style="list-style-type: none">▪ Amarillo District FY 20-23 Safety Plan, which supports statewide Road to Zero initiative▪ Staff cross-training program▪ Robust traveler information program using traditional and social media▪ Inter-jurisdictional project and emergency coordination▪ Crash Records Information System (CRIS)
TP&D	<ul style="list-style-type: none">▪ ITS technologies are included in project planning and programming phase▪ ITS technology being integrated into current design work▪ Statewide, Regional and Local data resources and plans
Construction	<ul style="list-style-type: none">▪ Statewide tools used to determine use of law enforcement and speed reduction in construction zones▪ Statewide decision tool used to identify need for Smart Work Zone applications▪ Alternate procurement methods to increase flexibility for including TSMO▪ Three-year holiday schedule for scheduling construction and staff availability▪ Contract Administration Best Practices Checklist
Operations	<ul style="list-style-type: none">▪ Recent and programmed upgrades to traffic signal controllers▪ ITS Regional Architecture developed in 2003▪ ITS devices in use include cameras and dynamic message signs▪ ITS Master Plan under development▪ Communications system that includes T1 and cellular, with fiber optic cable under consideration▪ Pavement Analyst and Pavement Management Information System, Four-Year Plan▪ Collaborative incident response with law enforcement▪ Crash data collection and monthly review of fatal crashes▪ Statewide blanket purchase order agreements for ITS devices

Amarillo District Boundaries

The TxDOT Amarillo District is shown in Figure 1, and includes 17 counties. Figure 1 highlights the larger cities in the district. Covering an area of almost 360 square miles, the Amarillo Metropolitan Planning Organization is located within the Amarillo District boundaries and serves the City of Amarillo and parts of Potter and Randall Counties.

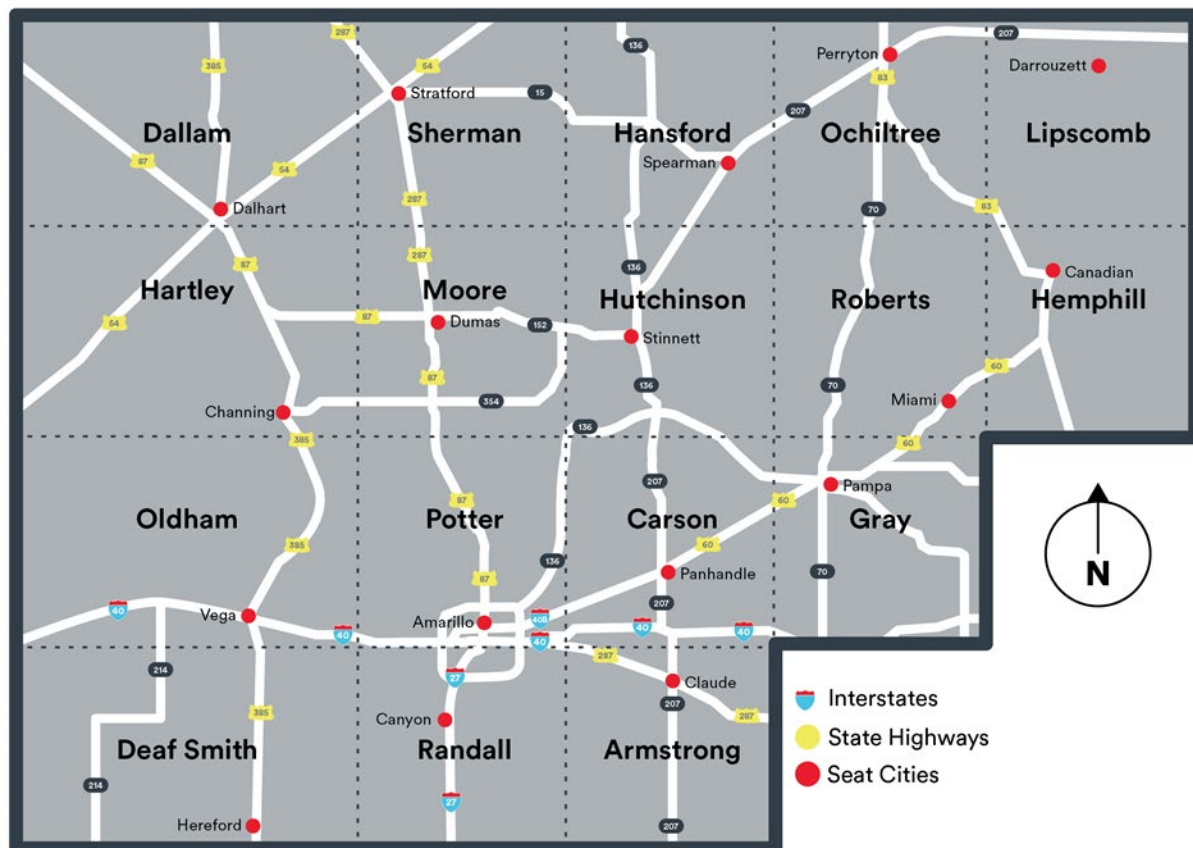
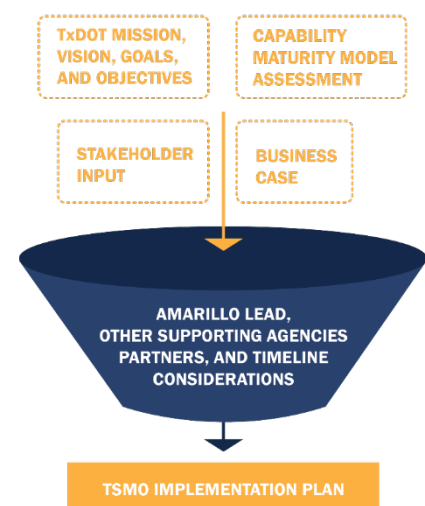


Figure 1: TxDOT Amarillo District Area Map

Stakeholder Involvement

Stakeholders from a variety of practice areas within the Amarillo District were engaged in the development of the Amarillo TSMO Plan. Representatives from each practice area participated on a Working Group that guided the development of this plan. A Stakeholder Workshop was held on April 22, 2020. In addition to discussions regarding TSMO processes and benefits, a major focus of the Workshop was stakeholder discussions regarding procedures and actions associated with three scenarios: Incident on Urban Interstate Highway, Work Zones on Arterial/State Highway, and Planning and Programming During plan, specification and estimate (PS&E) Development. The scenarios were designed to elicit responses that



would help identify and define the status of TSMO in the Amarillo District and to identify measures to improve TSMO processes and effectiveness. The scenarios were presented to the stakeholders, followed by responses from the stakeholders on a typical reaction to the scenarios.

The workshop included participation from numerous external stakeholders such as other districts, TRF, cities, counties, the MPO, The FHWA, and law enforcement. The stakeholder process is shown in Figure 2 and stakeholders are listed in Appendix B.

Stakeholders also participated in an assessment of TSMO-related processes and institutional dimensions using the Capability Maturity Model (CMM) survey.

The Amarillo TSMO Plan effort was led by the District's Operations section. The District Engineer (DE) participated as much as possible throughout the development of this plan. The Director of Operations and other Operations staff also provided status updates to the DE as this TSMO Plan was developed.

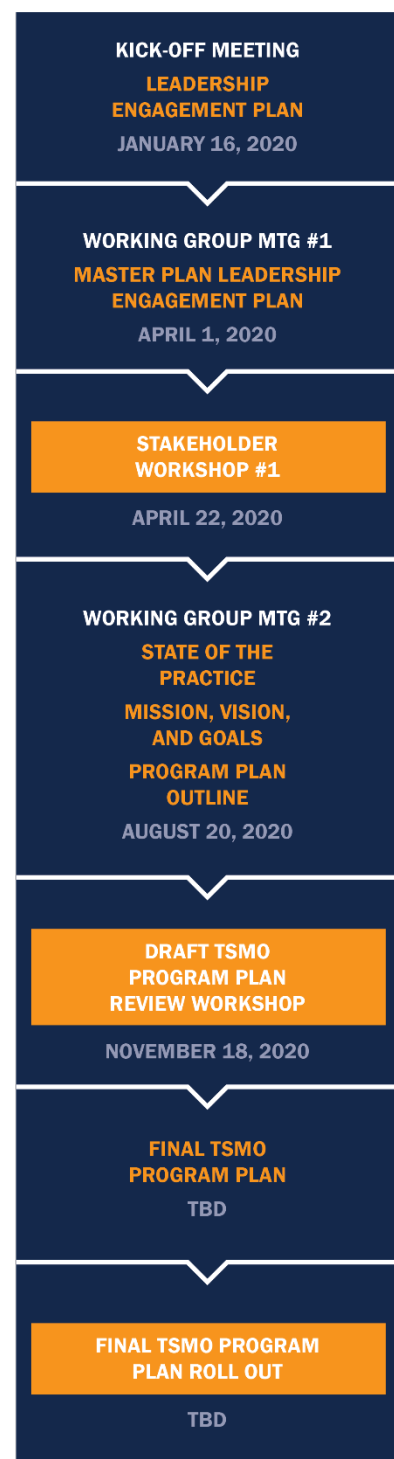
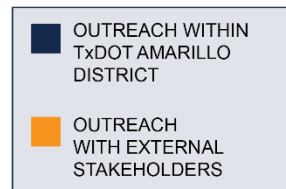


Figure 2: Stakeholder Outreach Process

Business Case for TSMO in the Amarillo District

The business case for TSMO is built on providing TxDOT and its partners a robust set of strategies to maintain safety and reliability of the transportation system in the face of increased regional growth, severe weather, major construction projects, and limited resources and budget.

Figure 3 summarizes the business case for TSMO in the Amarillo District, highlighting the key drivers in the district, challenges and/or opportunities resulting from these drivers, and relevant TSMO strategies to address them. The paragraphs that follow provide additional discussion about the business case.

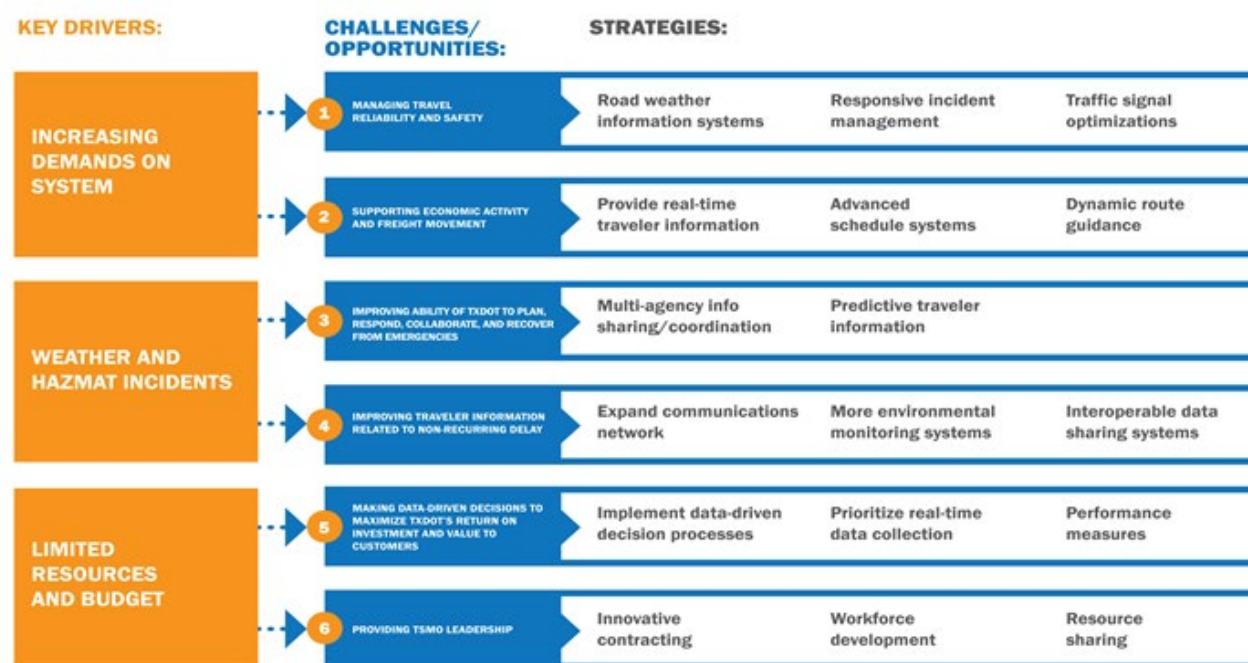


Figure 3: Amarillo District Business Case for TSMO — Drivers, Challenges/Opportunities, and Strategies

Challenge #1: Managing Travel Reliability and Safety

In the Amarillo District, Interstate 40 and Interstate 27 (IH 40 and IH 27) classify as primary highway freight system roadways, one of the most critical highway portions of the United States (US). Closures or slowdowns on these facilities can result in long delays, long detour routes, and diversions of high traffic volumes onto urban streets or rural roads without the capacity to carry such traffic loads.

The Amarillo District is committed to the formal Road to Zero goal adopted by the Texas Transportation Commission to achieve zero fatalities on roadways by 2050 and to cut fatalities in half by 2035. According to a Crash Records Information System (CRIS) query, from 2016 to 2018, highways and streets in the Amarillo District experienced approximately 8000 total crashes per year, 64 fatalities per year on average and over 1,000 possible injury crashes per year on average. For 2018 and 2019, the query revealed an average of 228 possible serious injuries per year. The District has adopted, and actively implements, the “Amarillo District FY

20-23 Safety Plan,” developed in response to the Texas Transportation Commission’s adoption of the “Road to Zero” mission for the State of Texas. The safety plan includes projects planned for fiscal years 2020 through 2023. The three priorities of the Safety Plan include District Project Priorities, District Systemic Priorities, and the District Off-System Coalition Plan. Projects under consideration include traffic signal improvements, safety illumination projects, median barrier improvements, roadway width improvements, intersection improvements, guardrail improvements, safety treatment of fixed objects, and addition of passing lanes.

TSMO strategies improve safety by addressing congestion that is unpredictable. Strategies that reduce conflict points, provide information to travelers, and allow quicker incident response are becoming more widely available:

- Road weather information systems can reduce traveler delay and lower crash rates by 7 to 83 percent.
- Traffic incident management can decrease incident duration by 30 to 40 percent.
- Traffic signal optimization can decrease delay substantially (13 to 94 percent) while improving safety at a fraction of the cost of infrastructure capacity expansion.
- Smart work zone management results in improved safety to both traveling public and construction workers.

Challenge #2: Support Economic Activity and Freight Movement

Truck traffic represents a major contributor to the Average Annual Daily Traffic (AADT) for several designated truck routes. IH-40’s primary function is to facilitate long-distance travel and trade, with trucks on rural areas of IH-40 comprising approximately 46 to over 50 percent of the AADT. IH 27 has truck percentages in the 20 to 25 percent range.

Strategies to manage and operate the transportation system protect the supply chain and help meet just-in-time delivery schedules in a safe and timely manner:

- New transportation strategies make goods movements more predictable and efficient, translating into lower costs for goods and enhanced economic competitiveness.
- Real-time information about travel conditions, weather, and road work helps truck drivers and dispatchers to make informed, safe decisions about travel routes and schedules.
- Highways on the TxDOT Freight Network within the District are US 87, US 54, US 287, US 385, IH 40, US 60, and IH 27. TSMO freight strategies include advanced technologies that optimize freight movement scheduling and dynamic route guidance. These strategies, if deployed, could use real-time information on traffic conditions on I-40 and I-27 to recommend optimal truck routes.

Challenge #3: Improving the Ability of TxDOT to Emergency Planning, Response, Collaboration and Recovery

Flooding was noted as a concern and an on-going challenge due to the frequency of heavy rainfall events. In addition to short-term flooding from heavy rainfall events, concerns also include emergency response. The Amarillo District noted the need for more robust and reliable ITS communications. Currently, there are not enough cameras, flood gauges, or access for reliable remote assessment (extent of snow or ice, roadway water depth measurement and verification) of flooding and operational issues. TSMO capabilities including improved monitoring of facilities, interoperable systems, enhanced field-to-center communication links, and data sharing will help the Amarillo District with greater preparedness, situational awareness, and the ability to manage the roadway system.

Challenge #4: Improving Traveler Information Related to Non-Recurring Delay

Many of the travel decisions, especially for freight and long-distance through travel, are made outside the regional boundaries. Consequently, travelers and truck traffic arriving in the Amarillo District may not be aware of work zones, lane closures, or weather-related capacity restrictions. TSMO strategies like predictive traveler information, especially for long-distance travel (e.g., the I-35 Work Zone Project), might be particularly useful in combination with statewide resources.

Challenge #5: Making Data-Driven Decisions to Maximize TxDOT's Return on Investment and Value to Customers

TSMO strategies are generally low-cost compared to capacity investments. More importantly, they are extremely cost-effective in terms of the impacts produced. By utilizing the data generated by TSMO and combining it with existing TxDOT resources, investments for both TSMO or for other transportation investments can be based on performance and cost-benefit analysis, including social costs. TSMO is a catalyst to establish and ensure the availability of reliable real-time data sources, expert staff, and clear performance measures to effectively collect, report, and share data and to monitor performance for the region.

Challenge #6: Providing TSMO Leadership

Compared to large urban districts, the region has fewer resources in terms of workforce, funding and systems to devote to TSMO. Limited TSMO asset management tools and practices make it difficult to plan for system maintenance, technology upgrades and replacement. This creates the need for the District to integrate TSMO into transportation planning, programming, scoping, and engineering, with more collaboration between highway design and operations. The case to creatively address operations & maintenance (O&M) and IT issues associated with TSMO assets (intelligent transportation system (ITS) infrastructure, back-office systems, traffic signal infrastructure, and priority treatments) through innovative contracting, workforce development, and resource sharing (with Austin Divisions and other districts) are critical to TSMO in the District.

TSMO Vision, Mission, Goals, and Objectives

STATEWIDE TSMO VISION

Improve safety and mobility for all modes of transportation by integrating planning, design, operations, construction, and maintenance activities and acknowledging all opportunities for innovation.

STATEWIDE TSMO MISSION

Through innovation, collaboration, and performance-based decision-making, transportation facilities are developed, constructed, maintained, and operated cost-effectively, with the end user in mind.

The Amarillo District supports the statewide TSMO vision, mission and goals and has developed district-specific objectives to support the statewide goals as described in this section.

Amarillo District TSMO Goals and Objectives

The Amarillo District supports each of the six statewide TSMO goals (safety, reliability, efficiency, customer service, collaboration, and integration) and has developed objectives for the district under each goal to support ongoing monitoring of the effectiveness of the TSMO program plan. Measurable objectives have been set where baseline data is available to track performance. Other objectives are aspirational and should be revisited with future TSMO Plan updates once the district has established more performance metrics and data sources. The Amarillo District objectives are listed in Table 2 along with the corresponding statewide goals.

Table 2: Statewide and Amarillo District TSMO Goals and Objectives

Goal	Strategic Statewide Objectives	Strategic Amarillo District Objectives
Safety	Reduce crashes and fatalities through continuous improvement of traffic management systems and procedures.	<ul style="list-style-type: none"> Reduce 5-year rolling average fatalities by half by 2035. Reduce fatalities to approach zero by 2050. Reduce severe injury crashes by half by 2035. Reduce work zone crashes by half by 2035. Review fatality and serious injury crashes annually to determine countermeasure strategies.
Reliability	Optimize travel times on transportation systems in critical corridors to ensure travelers are reaching their destinations in the amount of time they expected for the journey.	<ul style="list-style-type: none"> Increase percent of person-miles traveled on the Interstate system that are reliable. Increase percent of person-miles traveled on the non- Interstate national highway system (NHS) that are reliable. Reduce delay caused by work zones or system maintenance. Reduce average incident clearance time on highways by 45%.

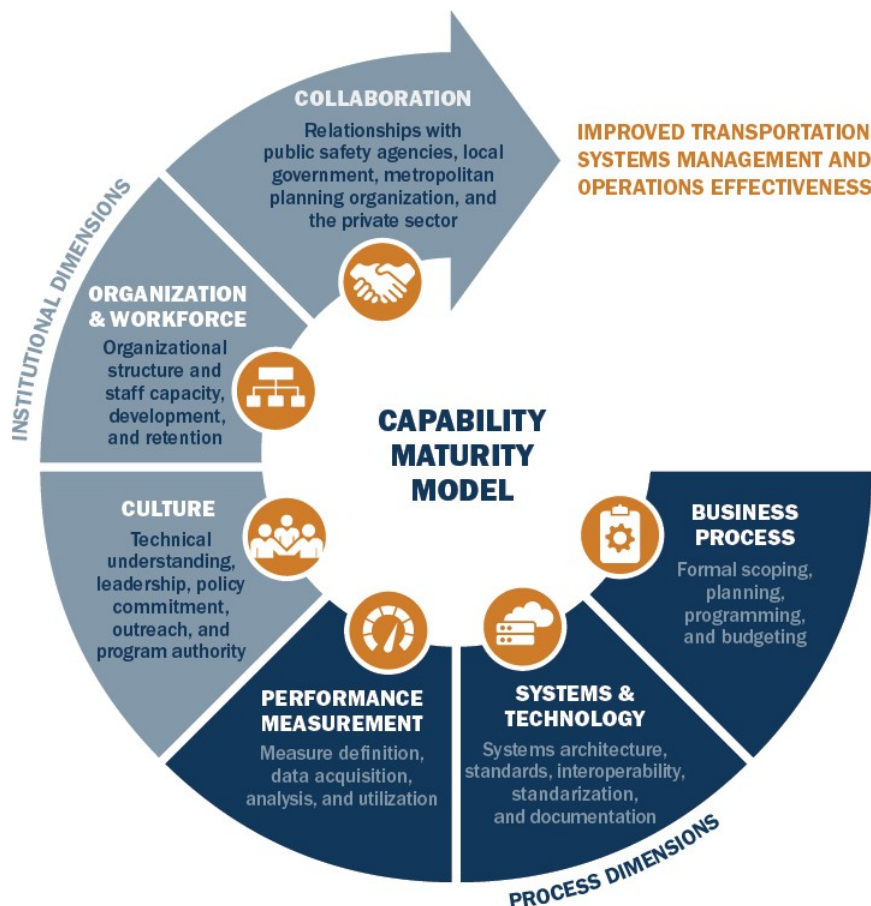
Goal	Strategic Statewide Objectives	Strategic Amarillo District Objectives
Efficiency	Implement projects that optimize existing transportation system capacity and vehicular throughput	<ul style="list-style-type: none"> ▪ Maintain the rate of growth in facility miles experiencing recurring congestion at less than the population growth rate. ▪ Maintain a program of evaluating 100 percent of signals for retiming every three years.
Customer Service	Provide timely and accurate travel information to customers so they can make informed mobility decisions.	<ul style="list-style-type: none"> ▪ Reduce time between incident/emergency verification and posting an alert to traveler information outlets (e.g. DMS, website, social media). ▪ Reduce the time between recovery from incident/emergency and removal of traveler alerts for that incident. ▪ Increase number of repeat visitors to Amarillo section of DriveTexas.org
Collaboration	Proactively manage and operate an integrated transportation system through multi-jurisdictional coordination, internal collaboration, and cooperation between various transportation disciplines and partner agencies.	<ul style="list-style-type: none"> ▪ Meet once per fiscal year quarter with representatives from the four core sections and the three Area Offices to review TSMO implementation status. ▪ Hold after-action review meetings with attendance from the majority of the agencies involved in the response to an incident or adverse weather event. ▪ Increase the number of major capital projects reviewed for regional construction coordination to 100 percent in three years.
Integration	Prioritize TSMO as a core objective in the agency's planning, design, construction, operations, and maintenance activities.	<ul style="list-style-type: none"> ▪ Increase incident detection capabilities on urbanized IH-40 and IH- 27 to achieve 100 percent TMS coverage by 2030. ▪ Include TMS coverage on 100 percent of new projects within five years. ▪ Maintain 90 percent TMS asset operational uptime annually. TMS assets down due to active construction projects are not to be included in operational uptime percentage calculations. ▪ Expand network monitoring to 100 percent of traffic signals over the next five years. ▪ Increase number of ITS-related assets in use for incident and emergency detection/response. ▪ Conduct joint training exercises in the region.

Capability Maturity Model

This section includes an introduction to the Capability Maturity Model (CMM) process and an assessment of how each of the six dimensions applies to the Amarillo District. The six dimensions are business processes, systems and technology, performance measurement, organization and workforce, culture, and collaboration.

Introduction to the CMM Process

Existing capabilities, gaps and needs for TSMO in the Amarillo District were identified through a combination of interviews and workshops. Tools used to gather capabilities were the TSMO Capability Maturity Model and Frameworks. The CMM self-assessment framework, shown in Figure 4, is comprised of six dimensions of capability—three process-oriented dimensions and three institutional dimensions. The Capability Maturity Frameworks (CMFs) are based on the same dimensions but are focused on specific aspects of TSMO like work zone management.



Source: Strategic Highway Research Program (SHRP2), American Association of State and Highway Officials (AASHTO), and Federal Highway Administration (FHWA-HOP-17-017)

Figure 4: Capability Maturity Dimensions

The use of the capability maturity concepts provides an approach to review common barriers to adoption and success of TSMO and allows agencies to understand and identify actions for improvement of institutional issues that an agency faces on a continual and consistent basis. The process fosters an agency's ability to develop consensus around needed agency improvements; identify their immediate priorities for improvements; and identify concrete actions to continuously improve capabilities to plan, design, and implement TSMO.

Consistent with the Strategic Highway Research Program 2 (SHRP2) guidance and other federal CMM and CMF guidance (see References), the capabilities for each dimension are described as a matrix that defines the process improvement areas and levels (from Level 1, ad-hoc, to Level 4, optimized level of capability). Table 4 on the next page includes this matrix, which shows how each of the six dimensions is assessed for each level. Following a self-assessment process, specific actions are identified to increase capabilities across the desired process areas.

The capability assessment process, tool, and instructions were discussed with stakeholders during the workshop webinar. The overall assessment of capability for the Amarillo District provided in Table 3 below is based on the input provided during the CMM workshop. Stakeholders at the workshop rated themselves near a Level 2 for business processes and collaboration, noting that the rating for collaboration for planned events and emergency operations was higher. They rated themselves a Level 1 for systems and technology, performance measurement, organization and workforce, and culture.

Table 3: Amarillo District Capability Maturity Assessment by Workshop Stakeholders













Dimension	Level 1	Level 2	Level 3	Level 4
Business Processes				
Systems and Technology				
Performance Measures				
Organization and Workforce				
Culture				
Collaboration				

Table 4: CMM Assessment Criteria

Dimension	Level 1 – PERFORMED	Level 2 – MANAGED	Level 3 – INTEGRATED	Level 4 – OPTIMIZED
 Business Processes	Processes related to TSMO activities ad hoc and un-integrated	Multi-year, statewide TSMO plan and program exists with deficiencies, evaluation, and strategies	Programming, budgeting, and project development processes for TSMO standardized and documented	Processes streamlined and subject to continuous improvement
 Systems & Technology	Ad hoc approaches outside systematic systems engineering	Systems engineering employed and consistently used for ConOps, architecture, and systems development	Systems and technology standardized, documented, and trained statewide, and new technology incorporated	Systems and technology routinely upgraded and utilized to improve efficiency performance
 Performance Measurement	No regular performance measurement related to TSMO	TSMO strategies measurement largely via outputs, with limited after-action analyses	Outcome measures identified and consistently used for TSMO strategies improvement	Mission-related outputs/outcomes data is routinely utilized for management, reported internally and externally, and archived
 Organization & Workforce	Fragmented roles based on legacy organization and available skills	Relationship among roles and units rationalized and core staff capacities identified	Top level management position and core staff for TSMO established in central office and districts	Professionalization and certification of operations core capacity positions, including performance incentives
 Culture	Value of TSMO not widely understood beyond champions	Agency-wide appreciation of the value and role of TSMO	TSMO accepted as a formal core program	Explicit agency commitment to TSMO as key strategy to achieve full range of mobility, safety, and livability/sustainability objectives
 Collaboration	Relationships on informal, infrequent, and personal basis	Regular collaboration at regional level	Collaborative interagency adjustment of roles/responsibilities by formal interagency agreements	High level of operations coordination institutionalized among key players – public and private

Source: Strategic Highway Research Program (SHRP2), American Association of State and Highway Officials (AASHTO), and Federal Highway Administration (FHWA-HOP-17-017)

Business Processes

The TSMO program at the TxDOT Amarillo District is championed by the District Engineer. Directors of Construction, Transportation Planning and Development (TP&D), and Transportation Operations departments report to the District Engineer and conduct TSMO practices in their domain. As TSMO is related to all three divisions within the department, all three Directors practice TSMO at varying degrees. The three Area Offices in Amarillo, Dumas, and Pampa coordinate the TSMO process at the field level. The Area Engineer for each Area Office reports directly to the District Engineer but also coordinates TSMO efforts with the Directors and support staff of the three core departments. The Safety and Public Information Office (PIO) report directly to the District Engineer and support all districtwide functions, including TSMO. Figure 5 provides a high-level overview of the Amarillo District's organizational chart. Staff at the District may find the current detailed organizational chart with additional sub-departments, names of District leadership, and full-time equivalent (FTE) numbers at any time on TxDOT's Intranet.

The project development process at the TxDOT Amarillo District comprises six steps: Planning, Programming, Design, Construction, Operations, and Maintenance. While this process has typically been used to develop more traditional capital improvement projects, it also supports the development of projects that use TSMO strategies. Projects are identified through the planning process and prioritized projects progress through the process as funding and resources permit. Figure 6 illustrates that successes or challenges experienced in the process are communicated back to groups responsible for earlier stages so that practices are improved. Some performance metrics are also used to support the project development cycle. In the TxDOT Amarillo District, this feedback loop is functional, especially for larger projects, and is strongest between Design and Construction and between Construction and Maintenance.

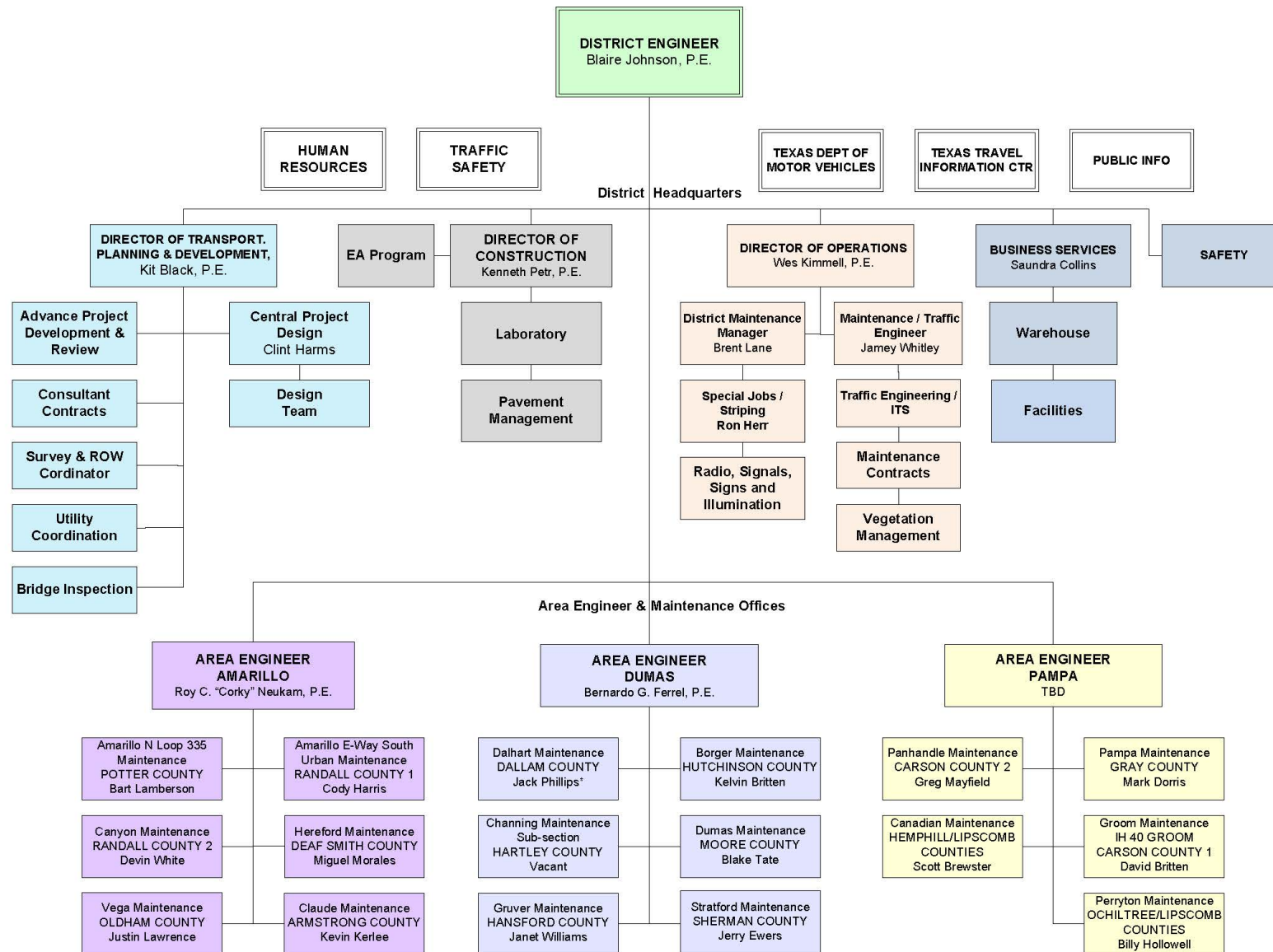


Figure 5: Amarillo District Organizational Chart

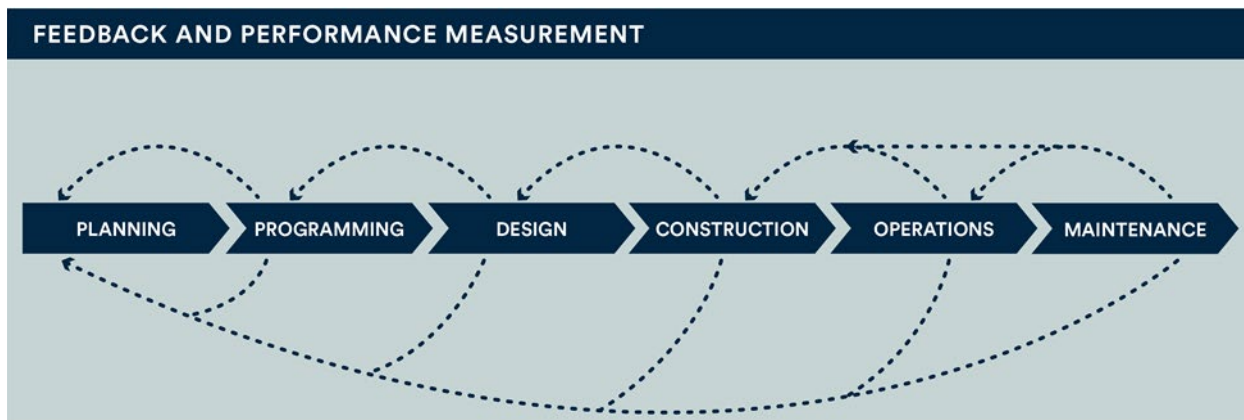


Figure 6: Project Development and Feedback Loop

TxDOT Amarillo District is already applying TSMO tools at varying levels and consistency throughout the Project Development process. AMA Stakeholders rated the business processes near a Level 2 and noted that while TxDOT does have a multi-year statewide TSMO plan, many of TxDOT AMA's processes related to TSMO activities are ad-hoc or not integrated. TxDOT AMA staff noted that their effectiveness has improved in the last year. For example, TxDOT AMA has implemented a pavement plan and a safety plan, and they conduct regular safety audits. Additionally, TxDOT AMA noted that agency collaboration is improving.

Systems and Technology

The TxDOT Amarillo district has started developing an ITS Master Plan and plans to pursue funding for implementation. This document will help the TxDOT Amarillo District decide where and how to implement TSMO strategies and feed into the planning and programming part of the project development process. The TxDOT Amarillo District will track the implementation of the ITS Master Plan and update the plan as needed. The TxDOT Amarillo District noted a preference for multi-district or statewide ITS architecture that the district provides input on but not one they maintain.

ITS devices currently used by the TxDOT Amarillo District include cameras and dynamic message signs. Initially, ITS devices were added as change orders to existing construction projects. Now, ITS devices that support TSMO strategies such as cameras, detection, and dynamic message signs are being included with projects during the District's planning and programming phases. Within the District boundaries, TP&D coordinates with the MPO and local jurisdictions for project planning and funding (primarily Category 2 on-system).

The TxDOT Amarillo District currently uses cellular modems for communications to traffic signals and ITS devices. The TxDOT Amarillo District may consider developing a plan for how to establish their communications network. Operations staff manage the TxDOT Amarillo District's ITS devices 24 hours per day, 7 days per week.

The TxDOT Amarillo District uses Lonestar (TxDOT's statewide advanced traffic management system) and camera feeds to support TSMO during emergencies.

The TxDOT Amarillo District has been updating traffic signal controllers and is expected to complete this effort districtwide in accordance with its 4-year plan. Although traffic signal timing updates are done from time to

time on an as-needed basis, the TxDOT Amarillo District is considering a three-year schedule. The TxDOT Amarillo District does not currently have a central traffic signal system for remote traffic signal management. TxDOT Amarillo District uses Pavement Analyst and Pavement Management Information System (PMIS) for pavement asset management. This includes the use of infrared cameras on vans to assess pavement conditions. They have plans to add asset inventories.

Performance Measurement

TxDOT has adopted a statewide “Road to Zero” initiative to reduce fatalities on state highways by half by 2035 and to zero by 2050. The public messaging for this initiative is #EndTheStreakTX. The Amarillo District recently developed a District Safety Plan to support this initiative, which included TSMO strategies. The Texas A&M Transportation Institute (TTI) is developing a new safety- driven data tool to support safety analysis statewide.



The TxDOT Amarillo District reported that they measure uptime on dynamic messaging signs and response time to traffic signal calls. The TxDOT Amarillo District noted that while they measure different parameters related to TSMO, performance measurement is not fully utilized and could be improved by pulling the data together to inform decisions on a systematic basis. Detailed crash data is available but capabilities to query and utilize the data is still emerging in the region. The TMS Status Report includes the following performance measures, which are tied to the District Engineer’s performance evaluation:

- TMS asset operational uptime
- Incident clearance times
- Level of travel time reliability
- TMS system coverage

The TxDOT Amarillo District intends to work toward adding district-level performance measures for safety, mobility, traveler information, and collaboration. Initially, the available data sources and data collection methods will be identified to develop the performance measures of interest to the Amarillo District.

Additionally, the current performance measurement data can be used to create a data clearing house. The district can use the performance metrics to promote success stories to share among other TxDOT districts, as well as with the general public.

From a practical standpoint, the TxDOT Amarillo District will require additional staffing capabilities to develop, collect, and monitor performance measures for TSMO. The district would also have to rely on statewide efforts at performance measure definition to ensure that its measures are consistent with statewide needs. This is particularly important for traffic incident management, MAP-21 reporting, reliability and safety- related measures.

Organization and Workforce

The existing organizational structure of the TxDOT Amarillo District is comprised of members from business, operations, planning and development, construction, and maintenance. Many of these District employees already perform TSMO activities; however, standardizing collaboration in all projects will promote TSMO, and defining the person responsible for ensuring this activity is performed as intended will further enable the success of TSMO in the District. The TxDOT Amarillo District has identified a potential new role for following staff position.

- TSMO Coordinator – Coordinate and review data, manage operations, and performance measurement. It is possible that these responsibilities could be assigned to a traffic engineer or a safety engineer that the District is planning to hire. Coordinate District progress toward mainstreaming TSMO including integrating TSMO into all stages of project development and delivery, funding requests, training, and interagency coordination

The TxDOT Amarillo District is challenged with retaining staff due to the competitive market and a younger generation of staff with different needs and expectations. Currently, TSMO activities are diffused across many positions within TxDOT. To promote retention, a career path for operations within TxDOT could be identified more broadly across TxDOT.

The TxDOT Amarillo District implements a program that rotates junior staff into the four core discipline areas and Area Offices. This allows staff to cross-train and collaborate between sections, which is critical to successful TSMO practice and supports the implementation of TSMO across program areas. The TxDOT Amarillo District plans to focus on internal training to develop a TSMO-competent workforce that continues beyond individual champions and grows roots in the organization. Additionally, the District intends to evaluate its role as a training clearinghouse for capacity building and to share information and opportunities with stakeholder agencies.

Culture

The TxDOT Amarillo District has a strong relational culture, and it is important to supplement the personal communication with technology. The availability of funding to build capacity can affect prioritization of TSMO efforts, and it was noted that focusing on operations offices within each TxDOT district can help focus on effective operations within existing facilities. Given the statewide focus on TSMO, the TxDOT Amarillo District expects to improve the culture in the context of TSMO.

Collaboration

The workshop participants rated collaboration close to a Level 2 and noted they are effective because of the strong longstanding relationships in the District. These relationships support coordinated construction traffic management planning, traffic control, and strategic assistance by law enforcement. The group identified the need for supplementing communication with data to improve situational awareness among agencies. Examples of ongoing regional collaboration include:

- Project and operations coordination with the Childress and Lubbock Districts.
- Area Office coordination with local jurisdictions during the project development process
- Quarterly coordination meetings between the TxDOT Amarillo District and the City of Amarillo

An example of ad-hoc or as needed collaboration and coordination includes:

- Amarillo District maintenance crews assist law enforcement agencies and local jurisdictions on a routine basis in responding to traffic incidents including helping protect a crash scene with temporary traffic control devices, clearing debris, and checking flood conditions during heavy rainfall events.

Capability Maturity Frameworks

The Amarillo TSMO Plan Working Group performed Capability Maturity Framework (CMF) reviews on six Capability Maturity Frameworks (CMFs) for the Amarillo District: Traffic Management, Road Weather Management, Work Zone Management, Traffic Signal Management, Traffic Incident Management, and Planned Special Events. A CMF review applies the same CMM dimensions of Business Process, Systems & Technology, Performance Measurement, Workforce, Culture, and Collaboration to very specific transportation operations and management practices. The CMF review highlighted some targeted opportunities for the TxDOT Amarillo District, summarized in Figure 7. These are included, with other action items, in the Amarillo District TSMO Implementation Plan.

KEY ACTIVITIES TO SUPPORT EFFECTIVE TSMO



TRAFFIC MANAGEMENT

- Explore linkage with Waze and the private sector for data for congestion management
- Partner with Port of Beaumont and private industry to improve freight management
- Create remote traffic management center (TMC)
- Develop automated permit coordination with cities (e.g., truck routes, overweight or over-height vehicle routes), similar to the work zone coordination tool



ROAD WEATHER MANAGEMENT

- Develop relationship with National Weather Service to have earlier access to weather data to support emergency operations and DPS



WORK ZONE MANAGEMENT

- Develop work zone and utility work coordination database for planned and ongoing activities. Share information and monitor impacts (e.g., queues and undesirable traffic diversions with partner jurisdictions)
- Continue the use of statewide decision tools to determine the need for Smart Work Zones, law enforcement support for speed zone compliance, and application of reduced speed in construction zones
- Establish needed agreements between law enforcement and agency for work zone management purposes
- Establish a feedback mechanism to ensure contractor suggestions regarding work zone management are acknowledged and considered within the agency's traffic management plan process
- Perform post-construction conferences with contractors to evaluate the effectiveness of project traffic management plans
- Expand the use of alternate procurement methods such as A+B, design-build, and lane rentals to improve opportunities for incorporating emerging technology into project construction
- Improve effectiveness of construction management and work zone management

Figure 7: Targeted Opportunities Identified by the CMF Review

TSMO Implementation Plan

This section includes a prioritized implementation plan for advancing TSMO in the Amarillo District over the next four years. Based on the discussions and action needs for the Amarillo District brought forward in the Working Group meetings, stakeholder meetings within the district, and then further discussed through the Capability Maturity Model (CMM) and Capability Maturity Framework (CMF) surveys and workshops, numerous action items were identified. Table 5 includes the following information as it relates to each of the TSMO strategy action items:

- **Action Number:** Provides a number for identification and tracking of the action. The initials stand for the related CMM dimension: business processes (BP), systems and technology (ST), performance measurement (PM), organization and workforce (OW), culture (CU) and collaboration (CO).

- **Action Description:** Provides a brief description of the action, which may include multiple steps.
- **Supports District TSMO Goals:** Identifies which of the TSMO goals the action supports. Some actions may not directly support a goal, but their implementation will help in achieving the goal. The six statewide TSMO goals supported by the district are described in Table 2: safety, reliability, efficiency, customer service, collaboration, and integration.
- **Priority:** Classifies actions as High, Medium, or Low Priority based on the time it will take to implement the action, the urgency of the action, whether other actions are dependent on the action being completed first, or available resources. Generally high priority actions will be implemented within the next year, medium priority actions will be completed in the next two to three years and low priority actions will be completed starting in the fourth year and re-evaluated in the next planning cycle. Priorities may shift as major events occur or staffing and funding resources change.
- **Timeline:** Identifies the approximate time it will take to accomplish the action item. A target fiscal year (September 1 through August 31) has been identified.
- **TxDOT Amarillo District Lead:** Identifies the individual at the Amarillo District who will take ownership of the action and will ensure that implementation progresses as planned.
- **TxDOT Support:** Identifies specific TxDOT staff, sections, divisions, or adjacent districts to support the action.
- **Partners:** Identifies external stakeholders needed for coordination or resources for successful action implementation.
- **Resources:** Identifies staff, funding, and other tools needed to support the action.
- **Measures of Success:** Provides performance metrics that will help action tracking and reporting.

Table 5: Amarillo District TSMO Implementation Plan Actions

Action No.	Action Description	Supports District TSMO Goals						Priority	Timeline	TxDOT Amarillo District Lead	TxDOT Amarillo Support	Partners	Resources	Measures of Success
		Safety	Reliability	Efficiency	Cust. Service	Collaboration	Integration							
Business Processes (BP)														
BP01	Expand TSMO Program Coordinator role and responsibilities to facilitate program implementation and TSMO integration into all aspects of project delivery process across within the Amarillo District (TP&D, Construction, Operations, Maintenance, Safety, PIO, Area Offices).	X	X	X	X	X	X	High	FY21	Operations Director, TSMO Coordinator	District Engineer		Medium Staff Effort/Hours	% complete until finalized

Action No.	Action Description	Supports District TSMO Goals						Priority	Timeline	TxDOT Amarillo District Lead	TxDOT Amarillo Support	Partners	Resources	Measures of Success
		Safety	Reliability	Efficiency	Cust. Service	Collaboration	Integration							
BP02	Align ITS/Signal O&M Funding with TSMO Goals.													
	1) Develop O&M funding methodology that considers applicable FHWA Fast Act (Reauthorization) guidelines.													
	2) Request/program ITS funds to cover life cycle costs (deployment + O&M).	X	X	X	X			High	FY21	Operations Director, TSMO Coordinator	District Engineer	TRF	Medium Staff Effort	% complete until finalized each year
	3) Provide an equitable balance of O&M funds for ITS/Signals as compared to roadways, bridges and other TxDOT facilities.													
	4) Charge backs for contractors that damage critical ITS infrastructure (e.g., fiber).													
BP03	Incorporate stand-alone ITS projects into TxDOT's 10- year Unified Transportation Program (UTP). Update list every year as part of the UTP's annual update cycle.	X	X	X	X	X	X	High	Annually	Operations Director	TSMO Coordinator, TP&D		Low Staff Effort	% complete until finalized each year

Action No.	Action Description	Supports District TSMO Goals						Priority	Timeline	TxDOT Amarillo District Lead	TxDOT Amarillo Support	Partners	Resources	Measures of Success
		Safety	Reliability	Efficiency	Cust. Service	Collaboration	Integration							
BP04	Create workstation-based traffic management center (TMC)- develop systems engineering (plan for how to use TMC, roles and responsibilities, training for staff, etc.).	X	X		X	X		High	FY21	ITS Analyst	Operations Director, TSMO Coordinator	TRF	High Staff Effort for planning, implementa- tion, man- agement	Fully functioning TMC
BP05	Update TSMO Program Plan and ITS Master Plan as per the recommended cycle established by TRF. Update ITS Architecture upon completion of the ITS Master Plan.	X	X		X	X		Medium	FY22	TSMO Coordinator		TRF, External Stakehold- ers	Medium Staff Effort for data collection and analysis	% complete until finalized

Action No.	Action Description	Supports District TSMO Goals						Priority	Timeline	TxDOT Amarillo District Lead	TxDOT Amarillo Support	Partners	Resources	Measures of Success
		Safety	Reliability	Efficiency	Cust. Service	Collaboration	Integration							
BP06	Improve Operational Interoperability. 1) Adopt business processes that emphasize standardized procedures. 2) Develop Interoperability Plan addressing people, processes, systems and technologies 3) Revisit from statewide perspective to establish/reinforce consistency and stakeholder inclusion. 4) Develop SOPs that address diverse scenarios for rural areas that include sharing operational functions to accommodate fail-over operations, weather events, incidents, work zone management, and possible staffing shortages.													
			X	X		X	X	Medium	FY22	TSMO Coordinator		TRF, Childress District, Lubbock District, External Stakehold- ers	Medium Staff Effort	% complete until finalized, on- going status check/updat es
BP07	Adopt TxDOT Statewide <u>TSMO Standard Operating Procedures, August 2020, Version 1.0</u> for Active Traffic Management, Emergency Management, Equipment Failure Management, and Incident Management.	X	X	X	X	X	X	Medium	FY23	TSMO Coordinator	Operations Director, District Engineer	TRF, Childress District, Lubbock District	Medium Staff Effort	% complete until finalized

Action No.	Action Description	Supports District TSMO Goals						Priority	Timeline	TxDOT Amarillo District Lead	TxDOT Amarillo Support	Partners	Resources	Measures of Success
		Safety	Reliability	Efficiency	Cust. Service	Collaboration	Integration							
BP08	<p>Improve Preparedness, Response and Recovery.</p> <p>1) Continue public awareness and education programs to ensure citizens reduce their vulnerability.</p> <p>a) Engage in, and provide input to, the statewide Comprehensive Emergency Management Plan to: (a) provide consistency and interoperability among districts to prepare for, respond to, and recover from natural or manmade incidents, and (b) serve as a management tool providing policy, assigning responsibilities, describing processes, and delegating authority to managers to align emergency response actions.</p>	X	X	X	X	X	X	High	FY21	Operations Director, TSMO Coordinator	Safety Officer(s), Public Information Officer	TRF, External Stakehold- ers (Partner Agencies, First Respond- ers, TIM)	Low Staff Effort	% complete until process finalized, ongoing status check/ updates

Action No.	Action Description	Supports District TSMO Goals						Priority	Timeline	TxDOT Amarillo District Lead	TxDOT Amarillo Support	Partners	Resources	Measures of Success
		Safety	Reliability	Efficiency	Cust. Service	Collaboration	Integration							
Systems and Technology														
ST01	1) Conduct systems engineering for roadway flood management system. Identify how it would work, roles and responsibilities, etc. Review systems implemented in other districts and apply lessons learned. 2) Conduct pilot project and evaluate effectiveness before expanding system locations.	X	X	X	X	X		High	FY21	TP&D Director	IT Analyst, Area Offices	TRF, USGS, City of Amarillo, Drainage Districts	High Staff Effort, technology & equipment	% complete until systems engineering & pilot project finalized; ongoing % of flood events where monitoring equipment provided remote data
ST02	Develop and implement lifecycle management plan to replace outdated ITS equipment.	X	X	X	X		X	Low	FY24	IT Analyst	TSMO Coordinator	TRF	Low Staff Effort for data collection and analysis	% complete until finalized

Action No.	Action Description	Supports District TSMO Goals						Priority	Timeline	TxDOT Amarillo District Lead	TxDOT Amarillo Support	Partners	Resources	Measures of Success
		Safety	Reliability	Efficiency	Cust. Service	Collaboration	Integration							
ST03	Conduct Roadway Classification System (CRCS) Analysis to assess the readiness of roadway to support Cooperative Automated Transportation (CAT) applications for project planning and prioritization, exploring data exchange and open data needs, and identifying gaps and opportunities for enhancing CAT readiness.	X	X	X		X	X	Low	FY24	TSMO Coordinator, TP&D		TRF, FHWA, CRCS	Low Staff Effort	% complete until finalized
ST04	Improve performance along strategic corridors. Integrated Corridor Management (ICM) may include integrated policies among stakeholders, communications among network operators and stakeholders, and improving the efficiency of cross-network junctions and interfaces. Develop strategy for retiming signals along major freeway corridors and parallel arterials using edge computing.	X	X	X	X	X	X	Low	FY23	Operations Director, TSMO Coordinator		TRF, Dallas District ICM Team, External Stakeholders (Partner Agencies)	Medium Staff Effort	% complete until finalized, on-going status checks

Action No.	Action Description	Supports District TSMO Goals						Priority	Timeline	TxDOT Amarillo District Lead	TxDOT Amarillo Support	Partners	Resources	Measures of Success
		Safety	Reliability	Efficiency	Cust. Service	Collaboration	Integration							
ST05	Develop comprehensive traffic signal system plan that addresses management, traffic signal operations, signal timing practices, traffic monitoring and data collection, performance metrics, and maintenance.	X	X	X	X	X	X	High	FY21	Operations Director, TSMO Coordinator		TRF, External Stakeholders (City of Amarillo)	High Staff Effort	% complete until finalized, on-going status checks
ST06	Implement Lonestar Enhancements such as remote CCTV access between districts, and real time traffic information for better incident management. Other LoneStar applications to consider include Automated Vehicle Locator (for TxDOT vehicles), Contact Notification Applications, and Travel Times Applications.	X	X	X	X		X	Medium	FY23	TSMO Coordinator		TRF	Medium Staff Effort	% complete until finalized, on-going status checks

Action No.	Action Description	Supports District TSMO Goals						Priority	Timeline	TxDOT Amarillo District Lead	TxDOT Amarillo Support	Partners	Resources	Measures of Success
		Safety	Reliability	Efficiency	Cust. Service	Collaboration	Integration							
Performance Measurement (PM)														
PM01	Enhance the Use of Performance Measures													
	1) Conduct compliance reviews of temporary traffic control in work zones, including multi-disciplinary reviews of construction plans beginning in the early phase of plan development.													
	2) Establish construction phase communications teams to improve communications among stakeholders and the public, including contractor, consultants, PIOs, mobility coordinators, etc.	X	X	X	X	X	X	High	FY22	Operations Director, TSMO Coordinator		TRF, External Stakeholders	High Staff Effort	% complete until each step finalized, on-going status checks/updates
	3) Establish performance measure dashboards that may be posted on the TMC video wall, workstations, or website to better monitor the impacts of construction. These dashboards may be used to track “actual versus expected” travel time reliability impacts due to construction and maintenance operations.													
	4) Establish dashboards to monitor, report, and mitigate crash potential (i.e., primary and secondary) through more effective work zone methods.													

Action No.	Action Description	Supports District TSMO Goals						Priority	Timeline	TxDOT Amarillo District Lead	TxDOT Amarillo Support	Partners	Resources	Measures of Success
		Safety	Reliability	Efficiency	Cust. Service	Collaboration	Integration							
PM02	Develop and implement data-driven performance feedback loop for TSMO project elements (i.e., performance monitoring including metrics, data needs and frequency, and feedback to project development cycle												Medium	
	1) Identify performance measurement data sources.	X	X	X	X	X	X	High	FY21	Traffic Safety Engineer	TSMO Coordinator, Operations Director	TRF, External Stakehold- ers	Staff Effort for planning, implementa- tion, manage- ment, data collection and analysis	% complete until each step finalized, on- going status checks/ updates
	2) Identify gaps in data needed to measure performance.													
	3) Create accessible regional maps-based data, procedures to access and maintain, and identify lead department.													
PM03	1) Establish checklist and hold post-construction conferences with contractors to evaluate the effectiveness of work zone management.	X	X			X	X	Medium	FY23	TSMO Coordinator	Construction, Area Offices	External stakehold- ers (Con- tractors, Consult- ants)	Low Staff Effort for planning, implementa- tion, man- agement	% complete until finalized
	2) Establish a feedback mechanism so that findings from conferences are considered and applied to future policies or projects.													

Action No.	Action Description	Supports District TSMO Goals						Priority	Timeline	TxDOT Amarillo District Lead	TxDOT Amarillo Support	Partners	Resources	Measures of Success
		Safety	Reliability	Efficiency	Cust. Service	Collaboration	Integration							
Organization and Workforce (OW)														
OW01	1) Identify and create a clear career path for TSMO positions within TxDOT including TSMO Coordinator and ITS Analyst.					X	X	High	FY21	Operations Director	District Engineer	TRF	Low Staff Effort	Have clearly defined TSMO positions and hire to fill those positions
OW02	Develop and implement TSMO on-boarding for new AMA staff. Incorporate into existing on-boarding processes if possible.	X	X	X	X	X	X	Medium	FY23	TSMO Coordinator	Operations Director, District Engineer		Medium Staff Effort	% complete until process finalized, % of new employees that have completed on-boarding

Action No.	Action Description	Supports District TSMO Goals						Priority	Timeline	TxDOT Amarillo District Lead	TxDOT Amarillo Support	Partners	Resources	Measures of Success
		Safety	Reliability	Efficiency	Cust. Service	Collaboration	Integration							
OW03	Recruit and Maintain Key TSMO Staff.													
	<p>1) A formal training program should be developed and implemented to support a succession plan.</p> <p>2) The program should consider a variety of training methods such as training on demand, in the control room, in the field, in a classroom (or virtual classroom), or some combination thereof.</p> <p>3) The program should be developed in modules to avoid information overload and provide trainees a logical training curriculum to keep pace with their level of experience as they advance.</p>	X	X	X	X	X	X	High	FY22	Operations Director, TSMO Coordinator, Human Resources		TRF	High Staff Effort for planning, implementa- tion, man- agement	% complete until process finalized, on- going assessment and upgrades
OW04	Share TSMO training opportunities (through TRF or external sources) with AMA staff	X	X	X	X	X	X	Medium	Ongoing	TSMO Coordinator	Operations Director, District Engineer		Low Staff Effort	% of training opportunities shared with AMA staff

Action No.	Action Description	Supports District TSMO Goals						Priority	Timeline	TxDOT Amarillo District Lead	TxDOT Amarillo Support	Partners	Resources	Measures of Success
		Safety	Reliability	Efficiency	Cust. Service	Collaboration	Integration							
OW05	Develop and Maintain Learning Management System to offer training to staff and stakeholders anytime, anywhere including training materials (video, presentations, quizzes, etc.), on-line options, recurrent skills training, tracking completion and performance data, and flexible reporting.			X	X	X		High	FY21	TSMO Coordinator, Human Resources		TRF	High Staff Effort	% complete until finalized, on-going status checks/updates
Culture (CU)														
CU01	Develop checklist for regular ongoing stakeholder/partner outreach to keep stakeholders informed of AMA projects and points of contact and vice versa. Consider actions such as: * Develop formal process for initial meeting with new mayors, county judges, agency traffic engineers, etc. * Regular outreach (e.g. quarterly meeting/call/email) by Area Engineers, Directors, and DE with county and city officials * Periodic review of newsletter distribution list				X	X	X	High	FY21	Public Information Officer, TSMO Coordinator	District Engineer, Directors, Area Engineers	External Stakeholders (Partner Agencies)	Medium Staff Effort	% complete until checklist finalized; % complete each fiscal year

Action No.	Action Description	Supports District TSMO Goals						Priority	Timeline	TxDOT Amarillo District Lead	TxDOT Amarillo Support	Partners	Resources	Measures of Success
		Safety	Reliability	Efficiency	Cust. Service	Collaboration	Integration							
CU02	<p>Develop an action plan to establish a culture of TSMO within the district.</p> <p>Determine activities to promote TSMO and invite staff involvement across departments to increase knowledge, investment, and commitment. Ideas for incorporating culture:</p> <p>* Include TSMO coordinator in project meetings to provide TSMO updates, to listen, and to identify ways to include TSMO</p> <p>* Highlight TSMO activities, successes, benefits, and performance metrics in the district's monthly newsletter, emails, and/or district meetings</p> <p>* Post TSMO information on pin boards throughout district offices</p>				X	X	X	Medium	FY22	TSMO Coordinator	District Engineer, Directors, Area Engineers	TRF	Medium Staff Effort for planning, implementa- tion, man- agement	Staff understand- ing of importance of TSMO, inclusion of TSMO throughout AMA processes

Action No.	Action Description	Supports District TSMO Goals						Priority	Timeline	TxDOT Amarillo District Lead	TxDOT Amarillo Support	Partners	Resources	Measures of Success
		Safety	Reliability	Efficiency	Cust. Service	Collaboration	Integration							
CU03	Establish a regional work zone steering committee of key champions and core AMA TP&D, Construction and Area Office staff. Use this committee to share results of recent and ongoing innovative work zone management efforts.					X	X	Medium	FY22	Construction Director	Construction, TP&D, Area Offices, TSMO Coordinator. Safety Officer		Medium Staff Effort for planning, implementation, management	% complete until process finalized, ongoing status check that committee is meeting

Action No.	Action Description	Supports District TSMO Goals						Priority	Timeline	TxDOT Amarillo District Lead	TxDOT Amarillo Support	Partners	Resources	Measures of Success
		Safety	Reliability	Efficiency	Cust. Service	Collaboration	Integration							
CU04	Optimize TxDOT's ITS Infrastructure During Pandemic Events.													
	1) Advising on where COVID testing stations are located, their wait times, and associated traffic queue management within the vicinity of these facilities; 2) Supporting call centers as a secondary backup to take calls during overflow situations; 3) Developing SOPs for similar pandemic situations based on lessons learned; 3) Dynamic messaging indicating what facilities are open or closed and other public service announcements; and 4) Providing daily updates on performance measures.	X	X	X	X	X	X	High	FY21	Operations Director	District Engineer	TRF, External Stakeholders (Medical Community, Law Enforcement)	Medium Staff Effort	On-going
CU05	Document TSMO Activities.													% complete until finalized, on-going status checks/ updates
	1) Develop templates for incident and operations data capture. 2) Develop SOPs for business processes.			X		X	X	High	FY21	TSMO Coordinator	Operations Director	TRF	Medium Staff Effort	

Action No.	Action Description	Supports District TSMO Goals						Priority	Timeline	TxDOT Amarillo District Lead	TxDOT Amarillo Support	Partners	Resources	Measures of Success
		Safety	Reliability	Efficiency	Cust. Service	Collaboration	Integration							
Collaboration (CO)														
CO01	Work with Stakeholders to Safely Reduce Incident Duration.													
	1) Establish a regional Traffic Incident Management (TIM) team to communicate and coordinate best practices and training that focus on quick clearance initiatives.													
	2) Establish regional TIM Plan to:													
	a) Improve communications and incident notifications with stakeholders (work zones).													
	b) Develop interagency agreements to strengthen agency partnerships.	X	X	X	X	X	X	High	FY21	Operations Director	Safety Officer(s), Public information Officer, Area Offices	External Stakehold-ers (Law Enforce-ment, First Respond-ers)	High Staff Effort for planning, implementa-tion man-agement	% complete until finalized, on-going status checks/updates
	c) Developing effective and relevant SOPs.													
	d) Assess TMC/TIM integrated operations to improve effectiveness.													
	3) Assign a TIM Coordinator to manage agency outreach, meetings, speakers, after-action-reviews, training, documentation, and data management. Data fields are being added to the CRIS reports to capture incident timelines, secondary crashes and first responders struck-by incidents.													

Action No.	Action Description	Supports District TSMO Goals						Priority	Timeline	TxDOT Amarillo District Lead	TxDOT Amarillo Support	Partners	Resources	Measures of Success
		Safety	Reliability	Efficiency	Cust. Service	Collaboration	Integration							
C002	Meet every quarter (as part of District staff meeting) with representatives from the TP&D, Construction, and Operations departments and the three Area Offices to review TSMO implementation status					X	X	High	Quarterly	TSMO Coordinator	District Engineer, Directors of TP&D Construction, Operations, & Maintenance; Area Engineers		Low Staff Effort for planning, management	Meeting held quarterly with ongoing status updates of this table

Action No.	Action Description	Supports District TSMO Goals						Priority	Timeline	TxDOT Amarillo District Lead	TxDOT Amarillo Support	Partners	Resources	Measures of Success
		Safety	Reliability	Efficiency	Cust. Service	Collaboration	Integration							
C003	<p>Implement the Pathfinder Project (FHWA-HOP-16-086 and Pathfinder online toolkit) developed by the Federal Highway Administration (FHWA) and the National Weather Service (NWS) to support emergency weather operations.</p> <ul style="list-style-type: none"> * Identify partners * Determine qualifying collaboration events * Select communication mediums and set procedures * Establish point person at each participating entity * Synchronize forecast schedules * Establish definitions and create shared resources * Create shared Impact message for the public * Conduct post event review, archive data, and document operating procedures 	X	X			X	X	High	FY21	TSMO Coordinator	Public Information Officer, Safety Officer(s)	TRF, NWS, DPS, FHWA, Emergency Respond- ers	Medium Staff Effort for planning, implementa- tion, man- agement	% complete until finalized

In addition to efforts led by the Amarillo District, part of the implementation plan includes working with TRF to roll out statewide initiatives at the district or working with other districts who may be leading efforts. Table 6 includes an overview of other TxDOT initiatives and the Amarillo District's role. This list will continue to evolve as more statewide initiatives are rolled out and the Amarillo District continues to collaborate with other districts.

Table 6: Implementation of TSMO Statewide Initiatives and Collaboration with Other Districts

Initiative	TxDOT Lead	Amarillo District Role
TxDOT ITS Design Manual- The development of a statewide manual is underway. TRF has been reaching out to the districts to gather existing practices, standards, and specs.	TRF	AMA ITS Analyst: Provide review input as requested by TRF.
Third Party Data Integration- TRF is currently working with third party data providers to evaluate how to supplement TxDOT mobility data (e.g. volume, speed) to provide coverage where there are currently gaps.	TRF	AMA TSMO Coordinator & PIO: Provide input on gaps on system coverage as requested by TRF.
TSMO Training- TRF has provided and will continue to provide training opportunities for TSMO, including presentations and discussions at the annual Traffic Safety/Operations/ Maintenance Conference and annual Short Course. Other webinars or in-person trainings may also be available.	TRF	Participate in available training opportunities. Share new knowledge with applicable AMA staff.
Highway Conditions Reporting System (HCRS)- Determine if there is an external interface for district partners (e.g. cities, counties) to enter planned and ongoing construction information into HCRS, which also populates the DriveTexas.org website.	TRF	If an external interface is or becomes available, provide outreach and training to stakeholders within the district.

TSMO Implementation Plan Process

The Amarillo District TSMO Implementation Plan is intended to be a living document that is updated as progress on actions gets made or as things change, as illustrated in Figure 8. A key activity in maintaining the plan is the quarterly check-in of progress of the implementation plan. Once per quarter the Director of Operations will coordinate with the District Engineer to include TSMO Program Plan status as an agenda item on the DE's monthly staff meeting. This staff meeting includes the DE; Directors of TP&D, Construction, Operations and Maintenance; and Area Engineers. This will allow staff to provide status updates on progress made on action items and discuss if any changes are needed to upcoming action items. Part of this check-in will include an ongoing performance assessment using the objectives and measures established as part of this plan. As the district continues to refine performance metrics and include new data sources, existing and aspirational objectives should be re-visited as part of the TSMO Plan update process.

Overall, the Amarillo District plans to update the TSMO Program Plan (including CMF surveys), ITS Master Plan, and ITS architecture on a six-year cycle with an interim minor update to the TSMO Program Plan every three years as shown in Figure 8. The Amarillo District is currently developing an ITS Master Plan. As discussed previously, the regional ITS architecture has not been updated for some time. The Traffic Safety Division is assessing whether every district needs a separate ITS architecture or if broader architectures should be developed. The Amarillo District noted a preference for a multi-district or statewide ITS architecture on which the District provides input but does not maintain.

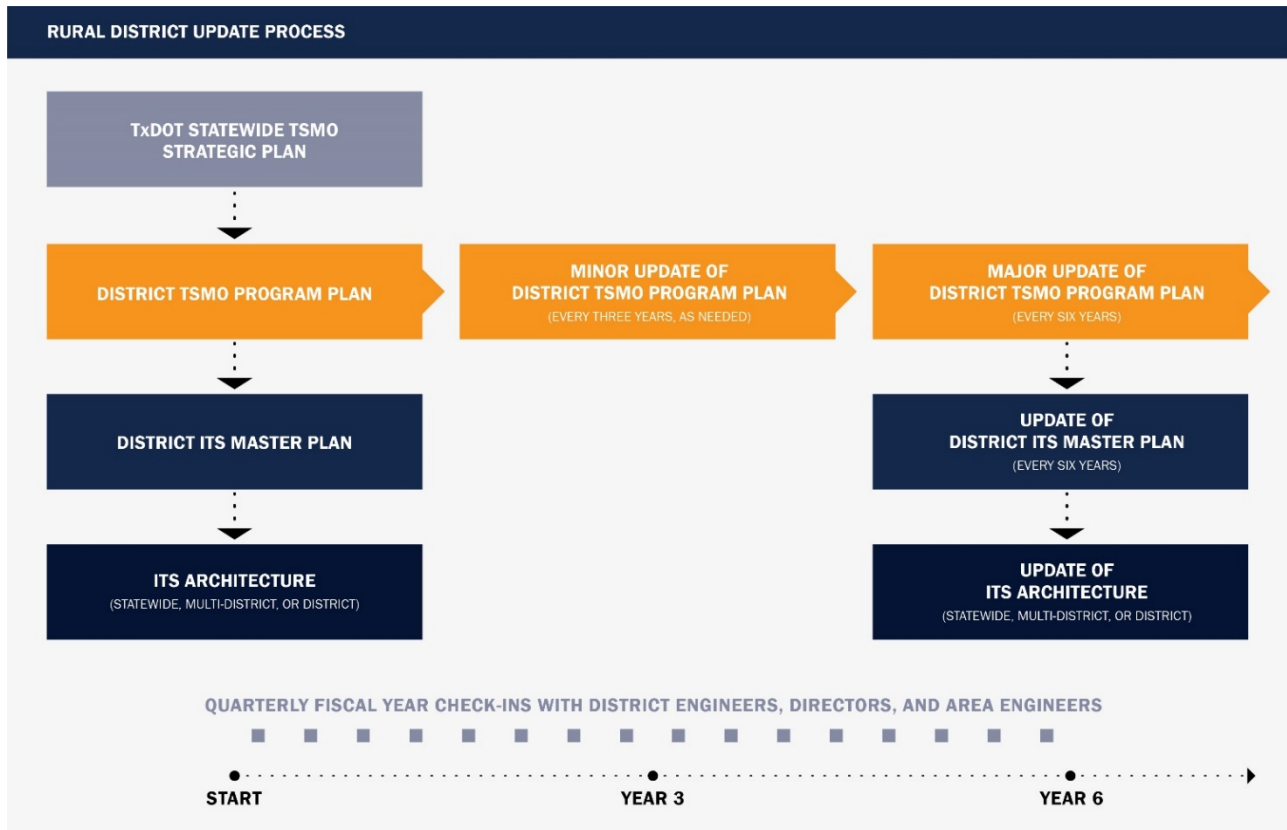


Figure 8: Amarillo District TSMO Plan Update Process

TSMO Tactical Plan Assessment

This TSMO Program Plan has established the Amarillo District's *strategic* elements—relating TSMO strategies to the district's mission, vision, and goals—and *programmatic* elements—organizational structure and business processes necessary to support TSMO implementation. This third and final piece focuses on the *tactical* elements—the actions necessary to operationalize the services, programs, and priorities identified in the Implementation Plan.

A TSMO Tactical Plan should be developed for each of the Amarillo District prioritized services, activities, or projects to be advanced in the near-term. This section describes tactical plan criteria, tactical plan components, and recommended tactical plans.

Tactical Plan Criteria

Tactical criteria were developed by the Traffic Safety Division using qualitative descriptors with the intent that, as tactical plans advance to implementation, quantitative analyses will be performed (e.g., cost estimates, benefit-cost ratios, funding sources, detailed schedules). Criteria for tactical plans applied at the strategic plan level are as follows:

- Alignment with TxDOT's mission, vision, and goals (safety, reliability, efficiency, customer service, collaboration, and integration)
- TxDOT Amarillo District staff support (e.g., low, medium, high)
- Stakeholder partnerships (e.g., internal, external)
- Costs (e.g., low, medium, or high for initial and recurring costs)
- Return-on-investment (e.g., low, medium, high)

Tactical Plan Components

A TSMO Tactical Plan will be developed for each of the Amarillo District's prioritized services, activities, or projects, as identified in the next section on Recommended Tactical Plans. Each Tactical Plan will contain the following components:

1. A description of the prioritized service, activity, or project
2. An identification of the key enabling implementation guidelines and policies
3. An investment/financial plan
4. An annual action/deployment plan
5. An identification of the performance measures to be used to monitor and evaluate investments These five tactical plan components are described more fully below.

Description of the Prioritized Service, Activity, or Project

Describe the initiative and how it supports the district's TSMO goals and objectives. Describe existing services such as devices and systems, staffing, priorities, and stakeholder coordination. Perform a gap analysis to review how emerging technologies, operating models, data acquisition and utilization, resources and staffing, and business process relate to the initiative. Describe the future of the initiative.

Supporting Implementation Policies and Guidelines

Identify the relevant TxDOT, district, or federal policies and guidelines needed for the specific service or strategy. Examples include standards and specifications for communications technologies, guidelines for selection or deployment of ITS devices, policies and guidance on public/private data sharing initiatives, decision-making guidelines for implementation, and service levels standards for devices.

Investment/Financial Plan

Effective planning for TSMO involves identifying the costs associated with deployment of services, which may include new infrastructure investments, technology purchases, staff time and resources, or other resources. Use benefit/cost or other criteria analysis methods to support project prioritization and funding requests. Identify current funding resources for the deployment and any potential funding sources that could be matched to the initiative or each action item or project.

Annual Action Plans

Drawing from funding resources and opportunities to integrate TSMO in other activities and projects, develop a set of specific actions for deployment, on an annualized timeframe. These annual plans should be developed in coordination with larger district or agency planning efforts and integrated in standard programs, which often have a four-year timeframe.

Tracking Progress: Performance Assessment

Finally, the TSMO Tactical Plan should address how performance analysis will be conducted to measure the effectiveness of tactics in meeting program objectives. Select from the metrics identified earlier in this Program Plan to be used to conduct on-going monitoring of system performance and project evaluation. Clearly identify how we will measure how well we are meeting the program's stated objectives. Also identify what data are currently available and what additional data is still needed. Finally, consider ways that data can be used to tell success stories to justify future TSMO investments and to promote a TSMO culture within the district.

Recommended Tactical Plans

Based on regional mobility challenges and priorities identified by stakeholders, it is recommended the following tactical plans be developed:

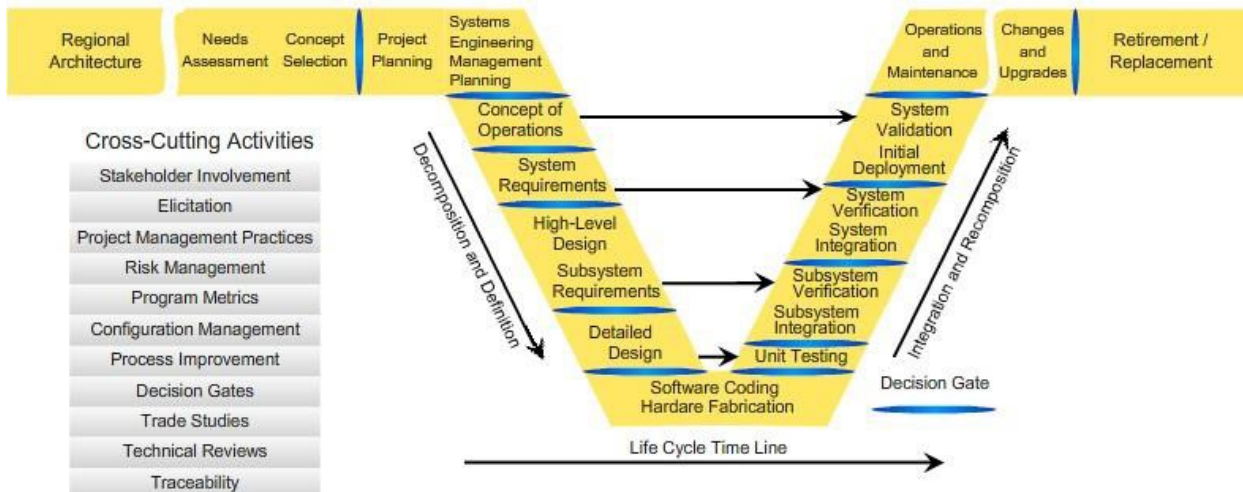
- **Traffic Incident Management** – The Amarillo District currently participates in several incident management strategies. An incident management tactical plan will formalize existing activities, establish sustainable

funding, and provide an opportunity to implement new strategies, such as dynamic alternate routing or first responder training.

- **Traffic Management** – The Amarillo District actively deploys and operates ITS field devices. A traffic management tactical plan will expand and accelerate device deployment, establish a more robust TMC, effectively integrate systems and subsystems, establish a regional Traffic Management Team, and provide meaningful performance metrics.
- **Work Zone Management** – A work zone management tactical plan optimizes safety for both workers and motorists for both short term operations (restriping, paving, overlays, sealcoats) and larger, longer term projects by expanding awareness, involvement and coordination.
- **Traffic Signal Management** – The Amarillo District operates traffic signals throughout the region that travelers rely on for proper operations. A traffic signal management tactical plan will establish sustainable funding for upgrades, timing and maintenance; and enhance operations through deliberate implementation.

It is recommended the above tactical plans be initiated within a year of the finalization of this Amarillo District TSMO Program Plan and that they be added as appendixes to this TSMO Program Plan. Tactical plans in addition to those recommended in this document may also be completed as necessary. The tactical plan development effort will be led by the District TSMO Coordinator, who may choose to complete the plans in-house or through a consultant. Some tactical plans for the Amarillo District could be interconnected with tactical plans from other districts based on the needs to successfully implement the plan.

Phase -1	Phase 0	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
Interfacing with Planning and the Regional Architecture	Concept Exploration and Benefits Analysis	Project Planning and Concept of Operations Development	System Definition and Design	System Development and Implementation	Validation, Operations and Maintenance, Changes & Upgrades	System Retirement / Replacement



Source: FHWA

Figure 9: Systems Engineering "V" Diagram

References

TxDOT Transportation Systems Management and Operations (TSMO) Statewide Strategic Plan,
<https://ftp.txdot.gov/pub/txdot-info/trf/tsmo/tsmo-statewide-strategic-plan.pdf>

FHWA Capability Maturity Frameworks for Transportation Systems Management and Operations (TSM&O)
Program Areas, <https://ops.fhwa.dot.gov/publications/fhwahop16031/index.htm>

FHWA Organizing and Reliability – Capability Maturity Model Assessment and Implementation Plans Executive
Summary, <https://ops.fhwa.dot.gov/docs/cmmexesum/index.htm#toc>

FHWA Systems Engineering Guidebook for Intelligent Transportation Systems,
<https://www.fhwa.dot.gov/cadiv/segb/files/segbversion3.pdf>

Amarillo District TSMO Program

Program Plan

Appendices

Appendix A: One-Page Summaries

FOCUS AREA

BUSINESS PROCESSES

Strategy #01

TSMO Program Coordinator Role Expansion

Expand TSMO Program Coordinator role and responsibilities to facilitate program implementation and TSMO integration into all aspects of project delivery process across within the Amarillo District (TP&D, Construction, Operations, Maintenance, Safety, PIO, Area Offices).



SAFETY



RELIABILITY



EFFICIENCY



**CUSTOMER
SERVICE**



COLLABORATION



INTEGRATION

COST



PRIORITY



TIMELINE

FY21

TXDOT AMARILLO DISTRICT LEAD

Operations Director/TSMO Coordinator

TXDOT AMARILLO SUPPORT

District Engineer

PARTNERS

N / A

RESOURCES



Strategy #02

Align ITS/Signal O&M Funding with TSMO Goals

1. Develop O&M funding methodology that considers applicable FHWA Fast Act (Reauthorization) guidelines.
2. Request/program ITS funds to cover life cycle costs (deployment + O&M).
3. Provide an equitable balance of O&M funds for ITS/Signals as compared to roadways, bridges and other TxDOT facilities.
4. Charge backs for contractors that damage critical ITS infrastructure (e.g., fiber).



SAFETY



RELIABILITY



EFFICIENCY



**CUSTOMER
SERVICE**

COST



PRIORITY



TIMELINE

FY21

TXDOT AMARILLO DISTRICT LEAD

Operations Director/TSMO Coordinator

TXDOT AMARILLO SUPPORT

District Engineer

PARTNERS

TRF

RESOURCES



FOCUS AREA BUSINESS PROCESSES

Strategy #03

Unified Transportation Program (UTP) Annual Update Cycle

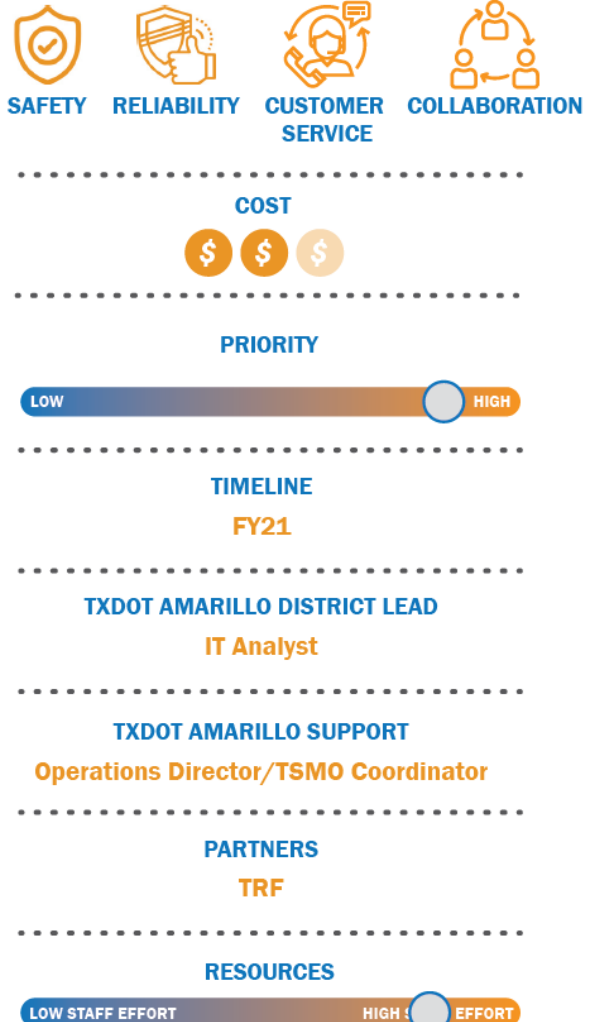
Incorporate stand-alone ITS projects into TxDOT's 10-year Unified Transportation Program (UTP). Update list every year as part of the UTP's annual update cycle.



Strategy #04

Workstation-based Traffic Management Center (TMC)

Create workstation-based traffic management center (TMC)- develop systems engineering (plan for how to use TMC, roles and responsibilities, training for staff, etc.).

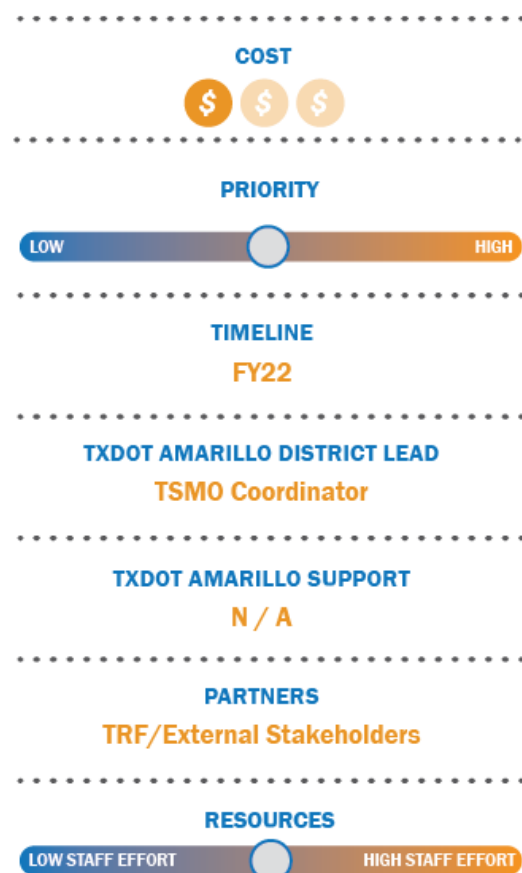


FOCUS AREA BUSINESS PROCESSES

Strategy #05

TSMO Program Plan and ITS Master Plan TRF Updates

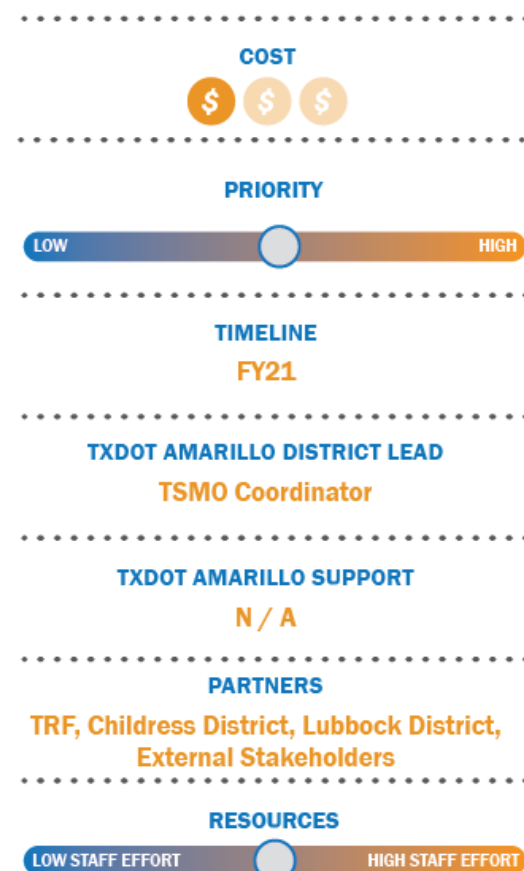
Update TSMO Program Plan and ITS Master Plan as per the recommended cycle established by TRF. Update ITS Architecture upon completion of the ITS Master Plan.



Strategy #06

Improve Operational Interoperability

1. Adopt business processes that emphasize standardized procedures.
2. Develop Interoperability Plan addressing people, processes, systems and technologies
3. Revisit from statewide perspective to establish/reinforce consistency and stakeholder inclusion.
4. Develop SOPs that address diverse scenarios for rural areas that include sharing operational functions to accommodate fail-over operations, weather events, incidents, work zone management, and possible staffing shortages.

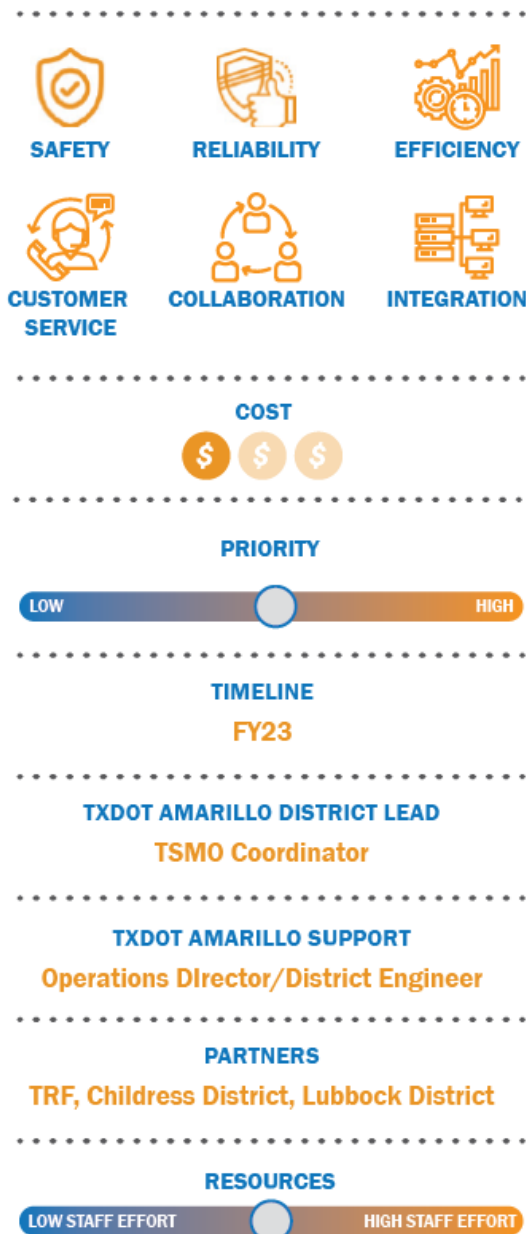


FOCUS AREA BUSINESS PROCESSES

Strategy #07

TxDOT Statewide TSMO Standard Operation Procedure Adoption

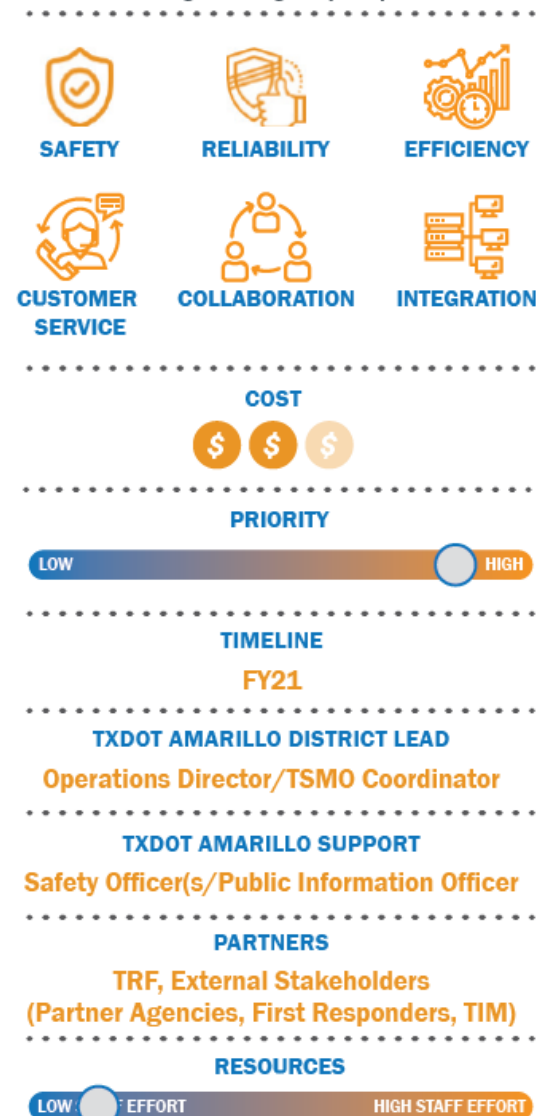
Adopt TxDOT Statewide TSMO Standard Operating Procedures, August 2020, Version 1.0 for Active Traffic Management, Emergency Management, Equipment Failure Management, and Incident Management.



Strategy #08

Improve Preparedness, Response and Recovery

- Continue public awareness and education programs to ensure citizens reduce their vulnerability.
 - Engage in, and provide input to, the statewide Comprehensive Emergency Management Plan to: (a) provide consistency and interoperability among districts to prepare for, respond to, and recover from natural or manmade incidents, and (b) serve as a management tool providing policy, assigning responsibilities, describing processes, and delegating authority to managers to align emergency response actions.

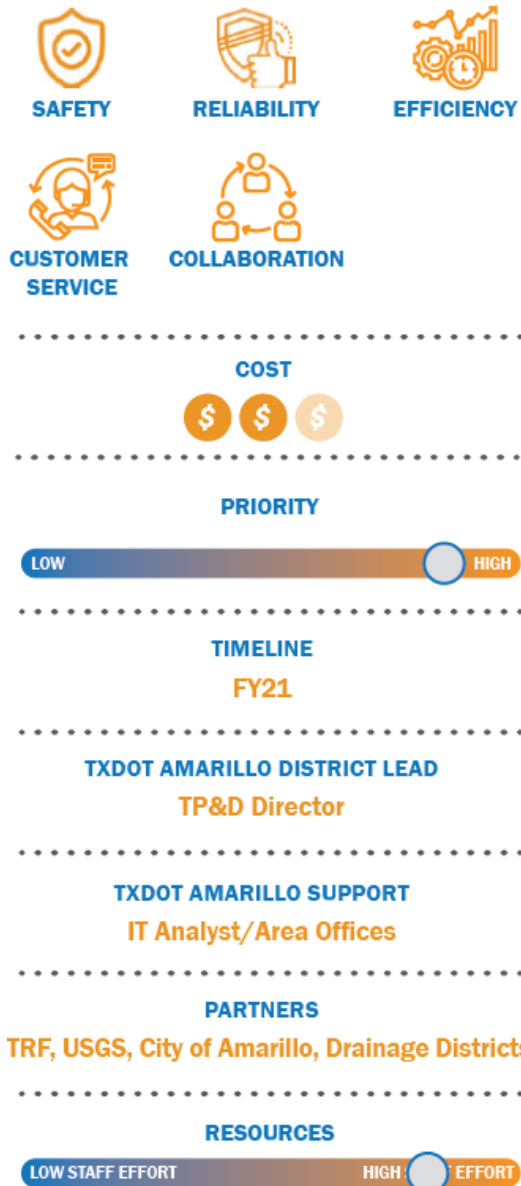


FOCUS AREA SYSTEMS & TECHNOLOGY

Strategy #01

Systems Engineering and Pilot Project

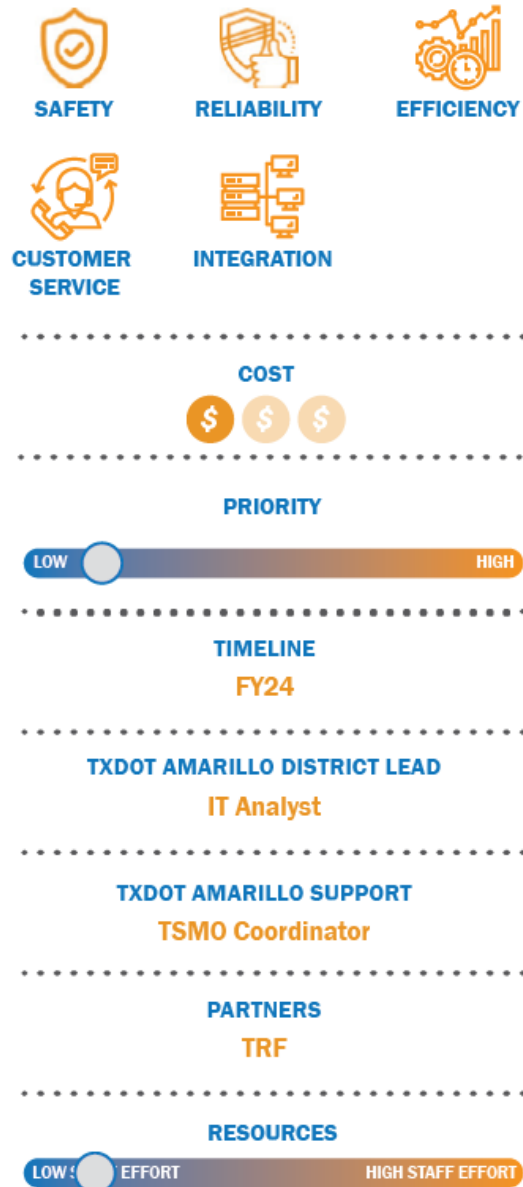
1. Conduct systems engineering for roadway flood management system. Identify how it would work, roles and responsibilities, etc. Review systems implemented in other districts and apply lessons learned.
2. Conduct pilot project and evaluate effectiveness before expanding system locations.



Strategy #02

Lifecycle Management Plan

Develop and implement lifecycle management plan to replace outdated ITS equipment.



FOCUS AREA SYSTEMS & TECHNOLOGY

Strategy #03

Roadway Classification System Analysis

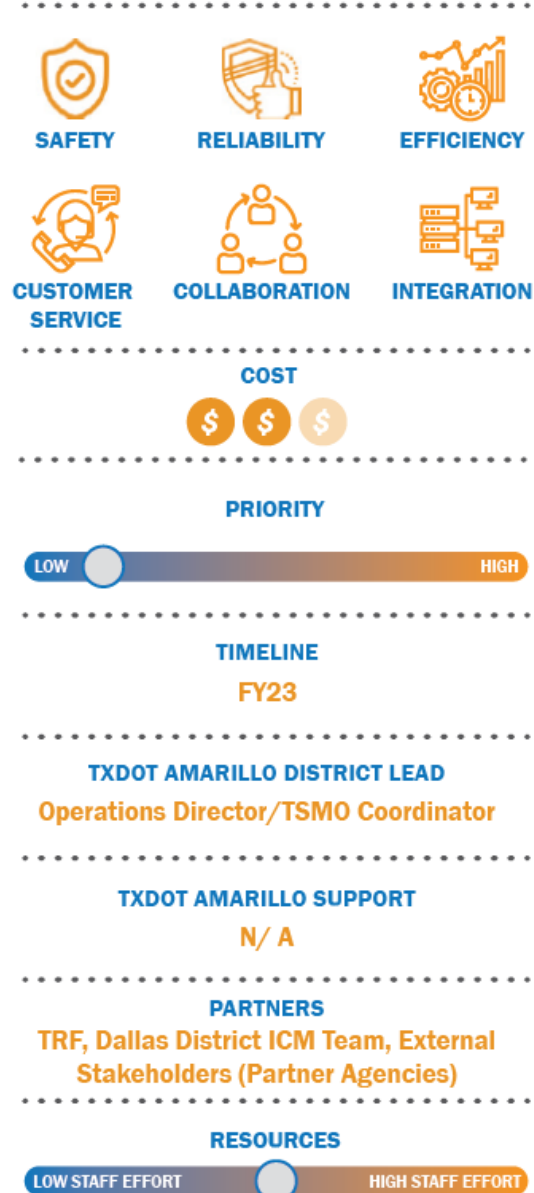
Conduct Roadway Classification System (CRCS) Analysis to assess the readiness of roadway to support Cooperative Automated Transportation (CAT) applications for project planning and prioritization, exploring data exchange and open data needs, and identifying gaps and opportunities for enhancing CAT readiness.



Strategy #04

Strategic Corridor Performance Improvements

Improve performance along strategic corridors. Integrated Corridor Management (ICM) may include integrated policies among stakeholders, communications among network operators and stakeholders, and improving the efficiency of cross-network junctions and interfaces. Develop strategy for retiming signals along major freeway corridors and parallel arterials using edge computing.

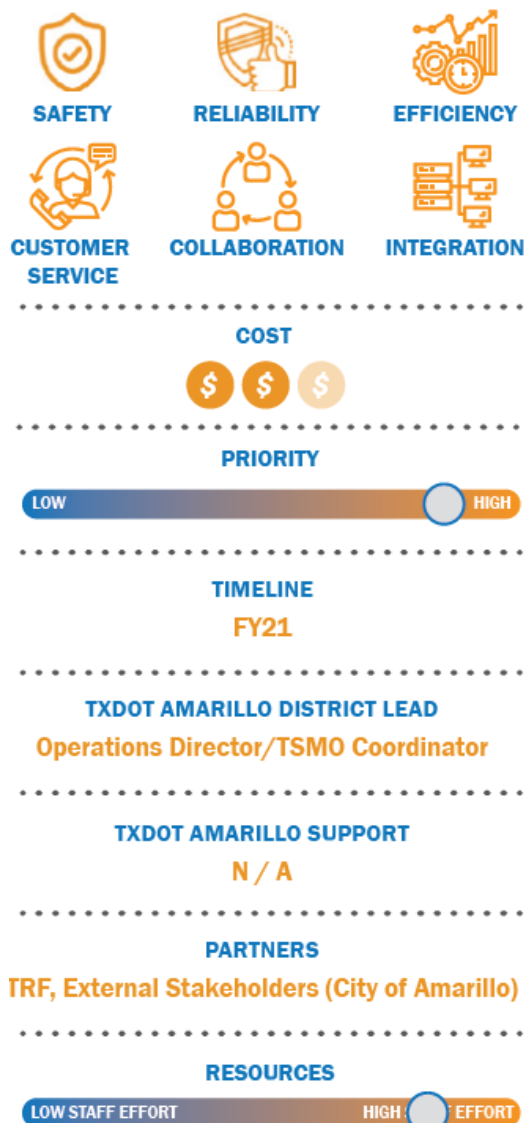


FOCUS AREA SYSTEMS & TECHNOLOGY

Strategy #05

Comprehensive Signal System Plan

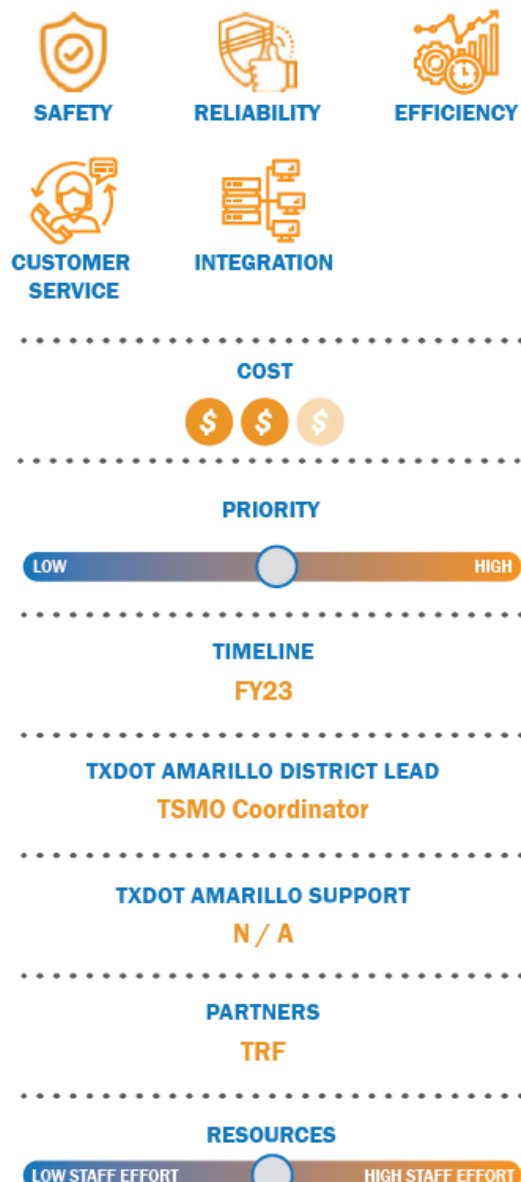
Develop comprehensive traffic signal system plan that addresses management, traffic signal operations, signal timing practices, traffic monitoring and data collection, performance metrics, and maintenance. The comprehensive traffic signal system plan should include estimated staffing and funding needs for O&M, and such information should be fed to and support the development and implementation of BP02.



Strategy #06

Lonestar Enhancement Implementation

Implement Lonestar Enhancements such as remote CCTV access between districts, and real time traffic information for better incident management. Other LoneStar applications to consider include Automated Vehicle Locator (for TxDOT vehicles), Contact Notification Applications, and Travel Times Applications.



FOCUS AREA PERFORMANCE MEASUREMENT

Strategy #01

Enhance the Use of Performance Measures

1. Conduct compliance reviews of temporary traffic control in work zones, including multi-disciplinary reviews of construction plans beginning in the early phase of plan development.
2. Establish construction phase communications teams to improve communications among stakeholders and the public, including contractor, consultants, PIOs, mobility coordinators, etc.
3. Establish performance measure dashboards that may be posted on the TMC video wall, workstations, or website to better monitor the impacts of construction. These dashboards may be used to track “actual versus expected” travel time reliability impacts due to construction and maintenance operations.
4. Establish dashboards to monitor, report, and mitigate crash potential (i.e., primary and secondary) through more effective work zone methods.



SAFETY



RELIABILITY



EFFICIENCY



CUSTOMER SERVICE



COLLABORATION



INTEGRATION

COST



PRIORITY

LOW

HIGH

TIMELINE

FY22

TXDOT AMARILLO DISTRICT LEAD

Operations Director/TSMO Coordinator

TXDOT AMARILLO SUPPORT

N / A

PARTNERS

TRF, External Stakeholders

RESOURCES

LOW STAFF EFFORT

HIGH

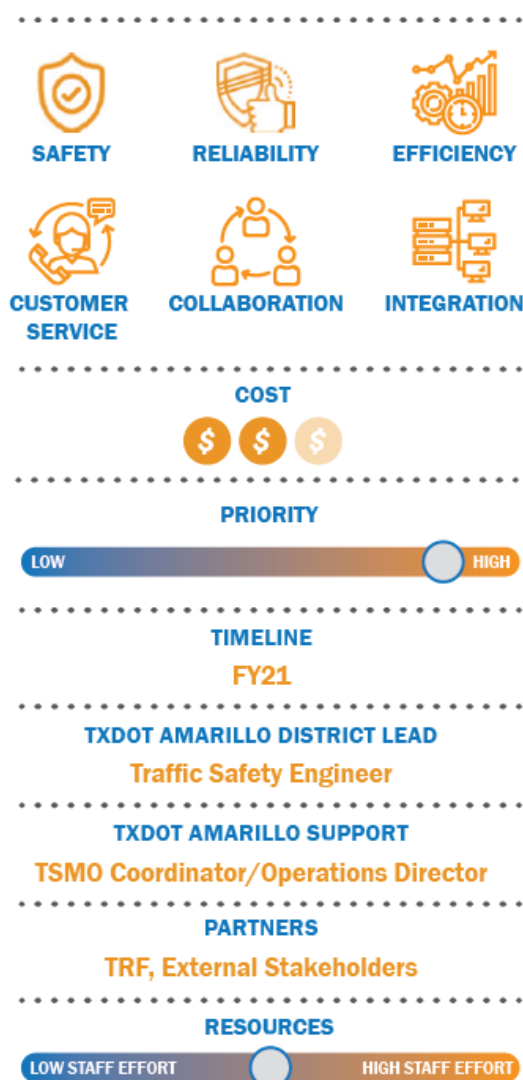
EFFORT

Strategy #02

Data-Driven Performance Feedback Loop

Develop and implement data-driven performance feedback loop for TSMO project elements (i.e., performance monitoring including metrics, data needs and frequency, and feedback to project development cycle)

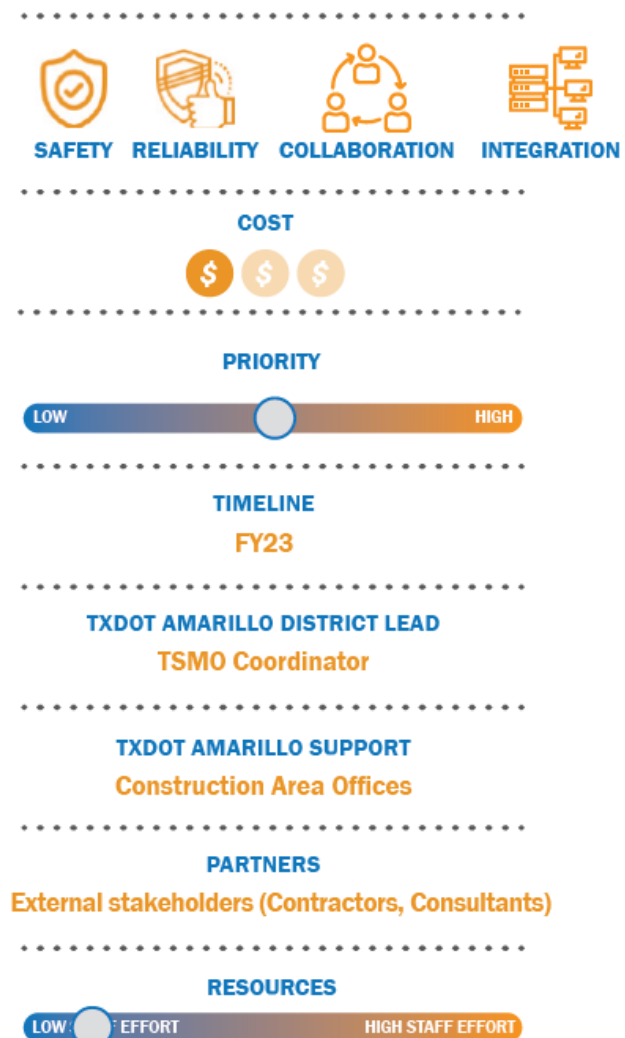
1. Identify performance measurement data sources.
2. Identify gaps in data needed to measure performance.
3. Create accessible regional maps-based data, procedures to access and maintain, and identify lead department.



Strategy #03

Checklist and Feedback Mechanisms

1. Establish checklist and hold post-construction conferences with contractors to evaluate the effectiveness of work zone management.
2. Establish a feedback mechanism so that findings from conferences are considered and applied to future policies or projects.



Strategy #01

TSMO Coordinator and IT Analyst
within TxDOT

1. Identify and create a clear career path for TSMO positions within TxDOT including TSMO Coordinator and ITS Analyst.



COLLABORATION



INTEGRATION

COST



PRIORITY



TIMELINE

FY21

TXDOT AMARILLO DISTRICT LEAD

Operations Director

TXDOT AMARILLO SUPPORT

District Engineer

PARTNERS

TRF

RESOURCES



Strategy #02

TSMO On-Boarding for New AMA Staff

Develop and implement TSMO on-boarding for new AMA staff. Incorporate into existing on-boarding processes if possible.



SAFETY



RELIABILITY



EFFICIENCY

CUSTOMER
SERVICE

COLLABORATION



INTEGRATION

COST



PRIORITY



TIMELINE

FY23

TXDOT AMARILLO DISTRICT LEAD

TSMO Coordinator

TXDOT AMARILLO SUPPORT

Operations Director/District Engineer

PARTNERS

N / A

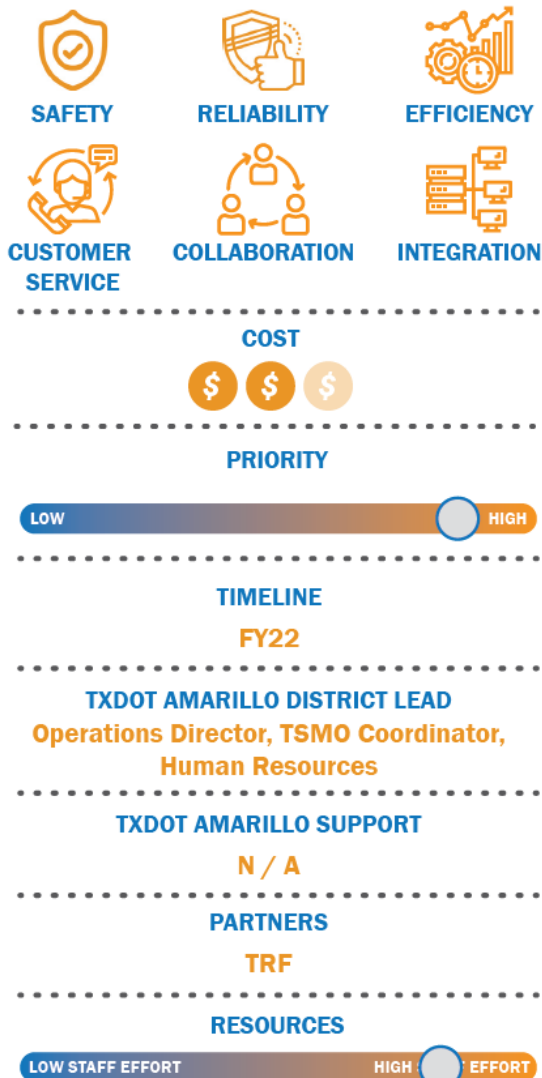
RESOURCES



Strategy #03

Recruit and Maintain Key TSMO Staff.

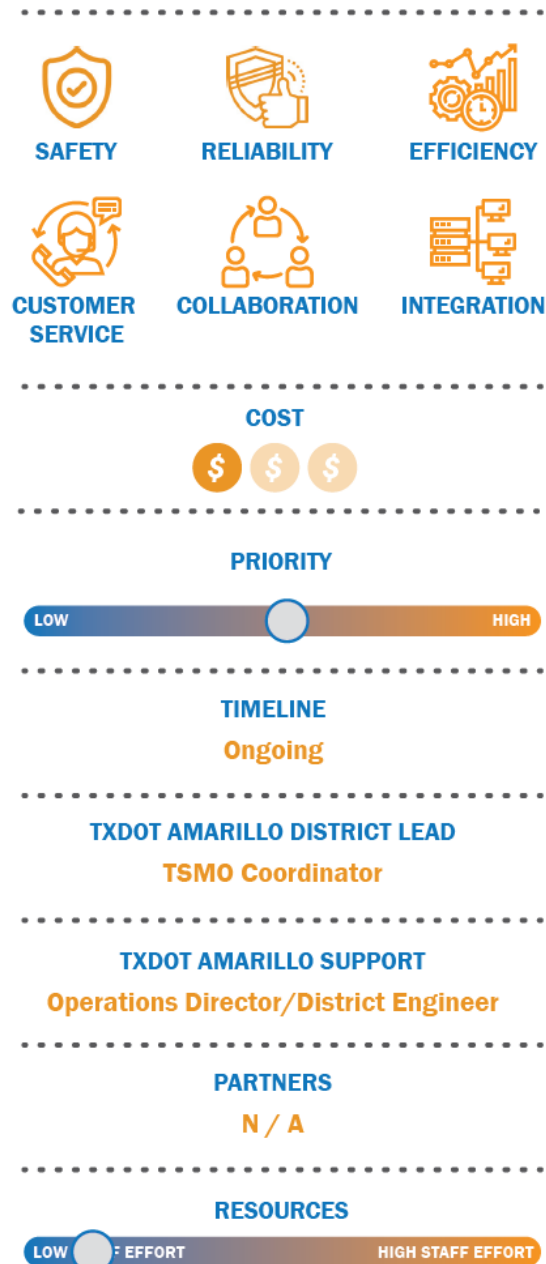
1. A formal training program should be developed and implemented to support a succession plan.
2. The program should consider a variety of training methods such as training on demand, in the control room, in the field, in a classroom (or virtual classroom), or some combination thereof.
3. The program should be developed in modules to avoid information overload and provide trainees a logical training curriculum to keep pace with their level of experience as they advance.



Strategy #04

TSMO Training Opportunities

Share TSMO training opportunities (through TRF or external sources) with AMA staff



Strategy #05

Learning Management System Development

Develop and Maintain Learning Management System to offer training to staff and stakeholders anytime, anywhere including training materials (video, presentations, quizzes, etc.), on-line options, recurrent skills training, tracking completion and performance data, and flexible reporting.



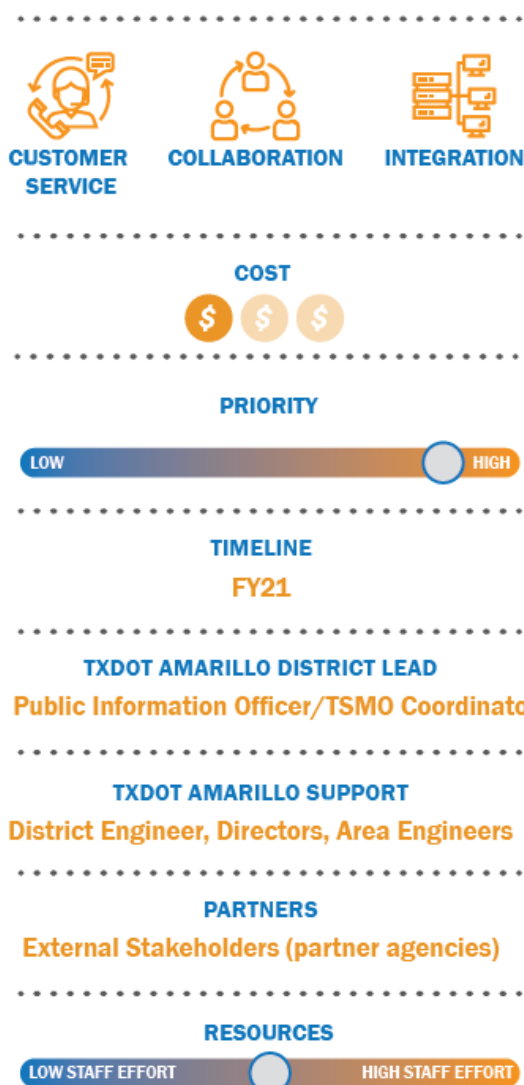
FOCUS AREA CULTURE

Strategy #01

Stakeholder Outreach Checklist

Develop checklist for regular ongoing stakeholder/partner outreach to keep stakeholders informed of AMA projects and points of contact and vice versa. Consider actions such as:

- Develop formal process for initial meeting with new mayors, county judges, agency traffic engineers, etc.
- Regular outreach (e.g. quarterly meeting/call/email) by Area Engineers, Directors, and DE with county and city officials
- Periodic review of newsletter distribution list

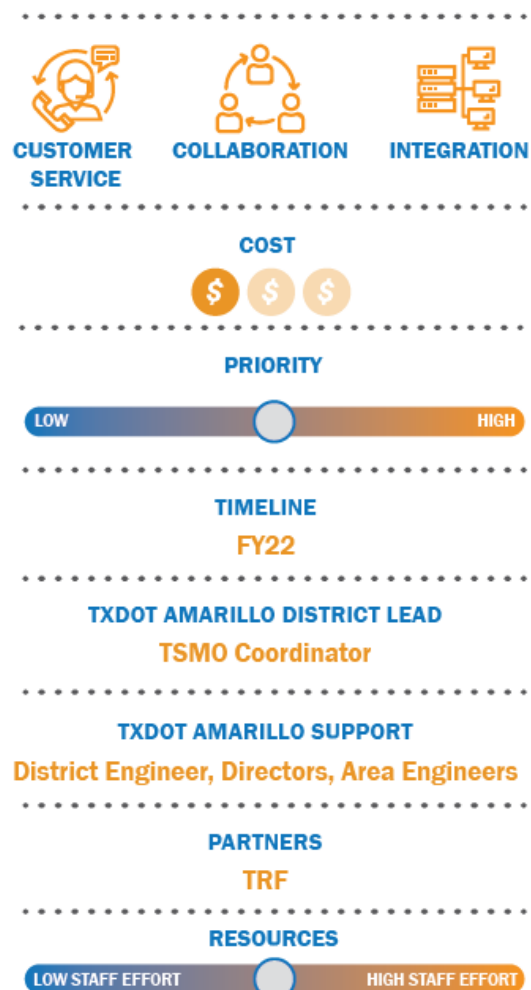


Strategy #02

TSMO Cultural Action Plan

Develop an action plan to establish a culture of TSMO within the district. Determine activities to promote TSMO and invite staff involvement across departments to increase knowledge, investment, and commitment. Ideas for incorporating culture:

- Include TSMO coordinator in project meetings to provide TSMO updates, to listen, and to identify ways to include TSMO
- Highlight TSMO activities, successes, benefits, and performance metrics in the district's monthly newsletter, emails, and/or district meetings
- Post TSMO information on pin boards throughout district offices

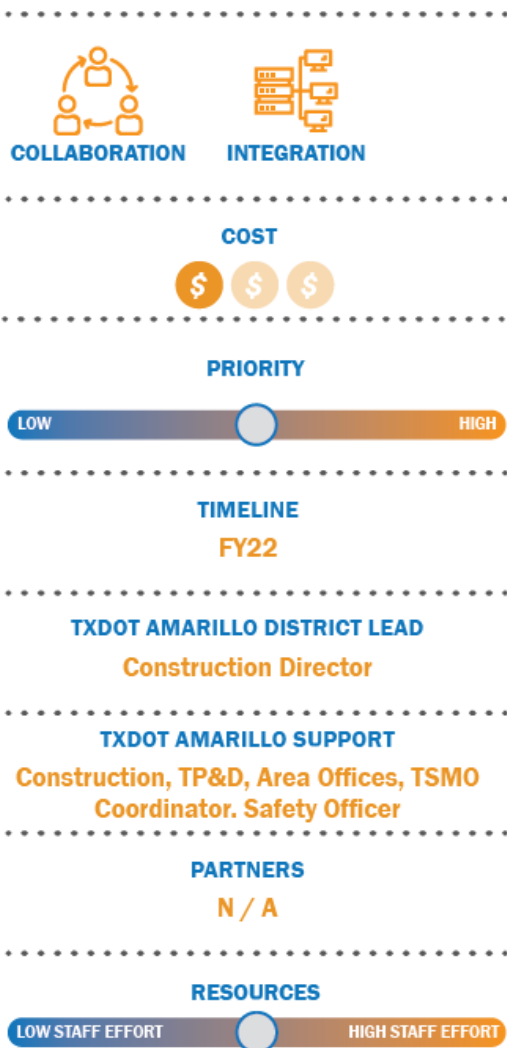


FOCUS AREA CULTURE

Strategy #03

Regional Work Zone Steering Committee

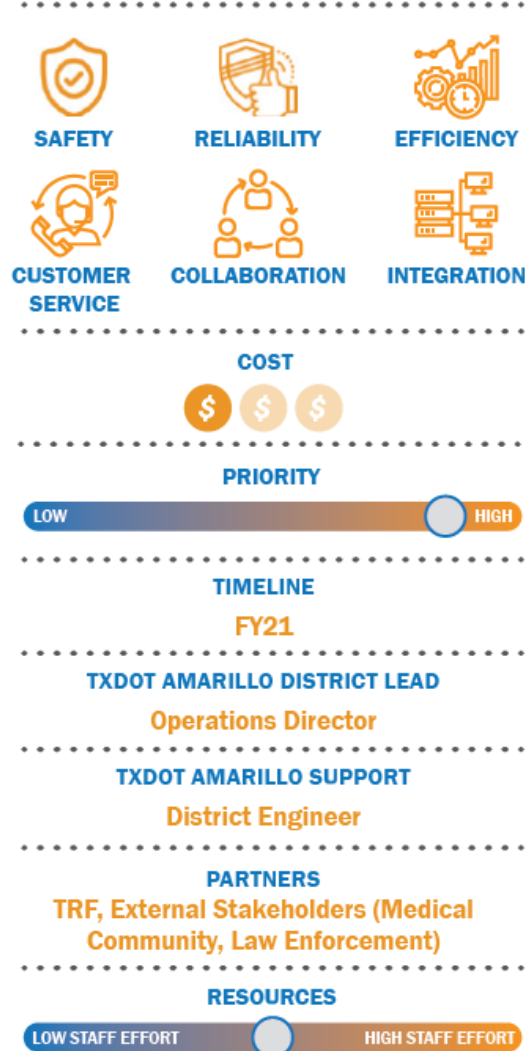
Establish a regional work zone steering committee of key champions and core AMA TP&D, Construction and Area Office staff. Use this committee to share results of recent and ongoing innovative work zone management efforts.



Strategy #04

Optimize TxDOT's ITS Infrastructure During Pandemic Events.

1. Advising on where COVID testing stations are located, their wait times, and associated traffic queue management within the vicinity of these facilities;
2. Supporting call centers as a secondary backup to take calls during overflow situations;
3. Developing SOPs for similar pandemic situations based on lessons learned;
4. Dynamic messaging indicating what facilities are open or closed and other public service announcements; and
5. Providing daily updates on performance measures.

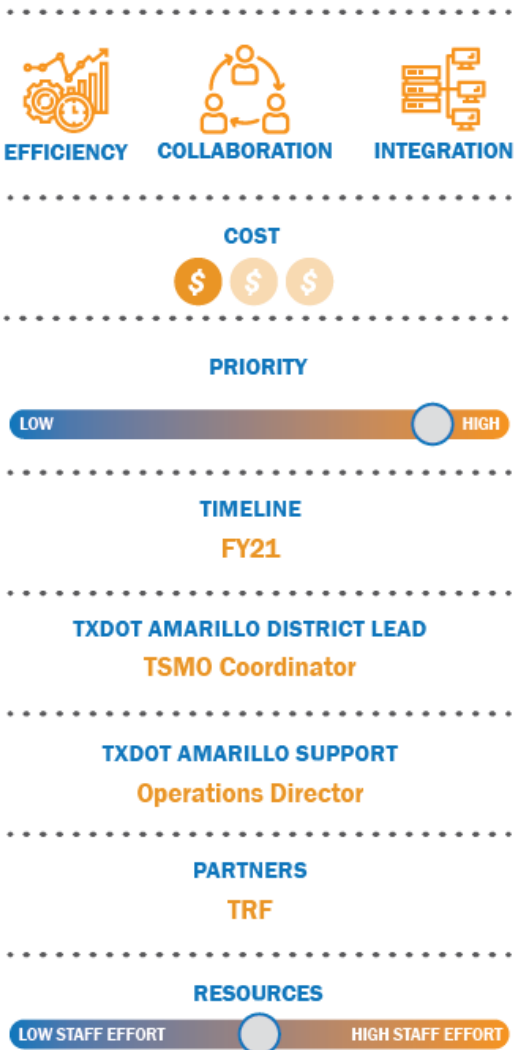


FOCUS AREA
CULTURE

Strategy #05

Document TSMO Activities.

1. Develop templates for incident and operations data capture.
2. Develop SOPs for business processes



FOCUS AREA COLLABORATION

Strategy #01

Work with Stakeholders to Safely Reduce Incident Duration.

1. Establish a regional Traffic Incident Management (TIM) team to communicate and coordinate best practices and training that focus on quick clearance initiatives.
2. Establish regional TIM Plan to:
 - a) Improve communications and incident notifications with stakeholders (work zones).
 - b) Develop interagency agreements to strengthen agency partnerships.
 - c) Developing effective and relevant SOPs.
 - d) Assess TMC/TIM integrated operations to improve effectiveness.
3. Assign a TIM Coordinator to manage agency outreach, meetings, speakers, after-action-reviews, training, documentation, and data management. Data fields are being added to the CRIS reports to capture incident timelines, secondary crashes and first responders struck-by incidents.



TXDOT AMARILLO DISTRICT LEAD

Operations Director

TXDOT AMARILLO SUPPORT

Safety Officer(s), Public information Officer,
Area Offices

PARTNERS

External Stakeholders (Law Enforcement,
First Responders)

RESOURCES

LOW STAFF EFFORT

HIGH

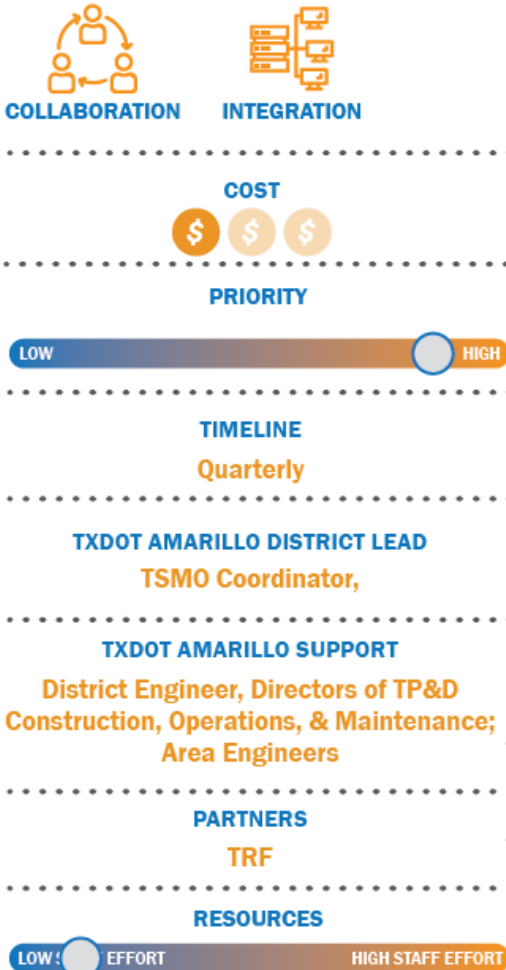
EFFORT

FOCUS AREA COLLABORATION

Strategy #02

Quarterly Meetings

Meet every quarter (as part of District staff meeting) with representatives from the TP&D, Construction, and Operations departments and the three Area Offices to review TSMO implementation status

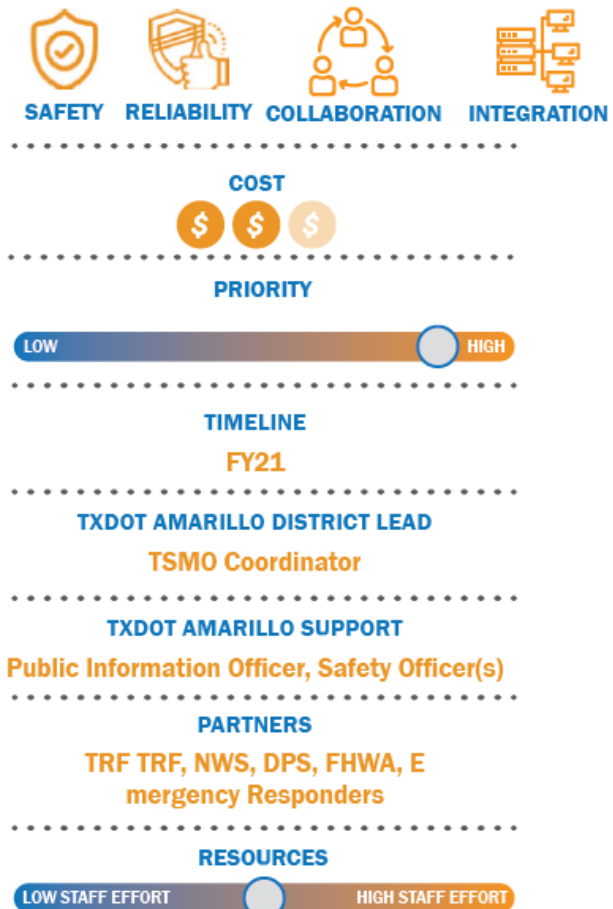


Strategy #03

Pathfinder Project

Implement the Pathfinder Project (FHWA-HOP-16-086 and Pathfinder online toolkit) developed by the Federal Highway Administration (FHWA) and the National Weather Service (NWS) to support emergency weather operations.

- Identify partners
- Determine qualifying collaboration events
- Select communication mediums and set procedures
- Establish point person at each participating entity
- Synchronize forecast schedules
- Establish definitions and create shared resources
- Create shared Impact message for the public
- Conduct post event review, archive data, and document operating procedures



Appendix B: List of Stakeholders

TxDOT Amarillo TSMO – TSMO Stakeholder Workshop #1

Wednesday, April 22, 2020

Location: Microsoft Teams Meeting

Meeting Attendees on Microsoft Teams

Agency	Name	Title
TxDOT Amarillo District TSMO Coordinator	Tiffany Pulliam	District Traffic Engineer
TxDOT Amarillo District TSMO Champion	Blair Johnson	District Director of Operations
TxDOT Amarillo District	Corky Neukam	Area Engineer
TxDOT Amarillo District	Bernardo Ferrel	Area Engineer
TxDOT Amarillo District	Wes Kimmell	Area Engineer
TxDOT Amarillo District	Kit Black	District Transportation Planning / Programming
TxDOT Wichita Falls District TSMO Coordinator	Travis Herrell	District Transportation Engineer / Supervisor
TxDOT Traffic Management	Barbara Russell	Transportation Engineer
TxDOT Traffic Management	Charles Tapp	Transportation Engineer
FHWA, Texas Division	Mille Hayes	Safety and Traffic Operations Specialist
Amarillo MPO	Travis Muno	MPO Administrator
Amarillo MPO	Cody Balzen	MPO Senior Planner
Panhandle Regional Planning Commission	Dustin Meyer	Local Government Services Director - Transportation Planning
Panhandle Regional Planning Commission	Krishna Perkins	
Potter County Sheriff Office	John Coffee	Potter County Sheriff's Office
City of Amarillo	Michael J. Padilla	Traffic Field Superintendent
City of Amarillo	Dawood Alani	Traffic Engineer
City of Canyon Public Works	Dan Reese	Director of Public Works
Project Consultant Team	Ming-Shiun Lee	AECOM
	Dan Nelson	AECOM
	Mark Conway	Walter P Moore
	Veronica Briagas	Walter P Moore
	Scot Love	Maldonado Burkett
	Bhavya Krishna Sontineni	Maldonado Burkett
	Rhett Dollins	Maldonado Burkett
	Melanie Young	Maldonado Burkett

Prepared by:



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