



Transportation Systems Management and Operations Program Plan

TxDOT Dallas-Fort Worth Districts

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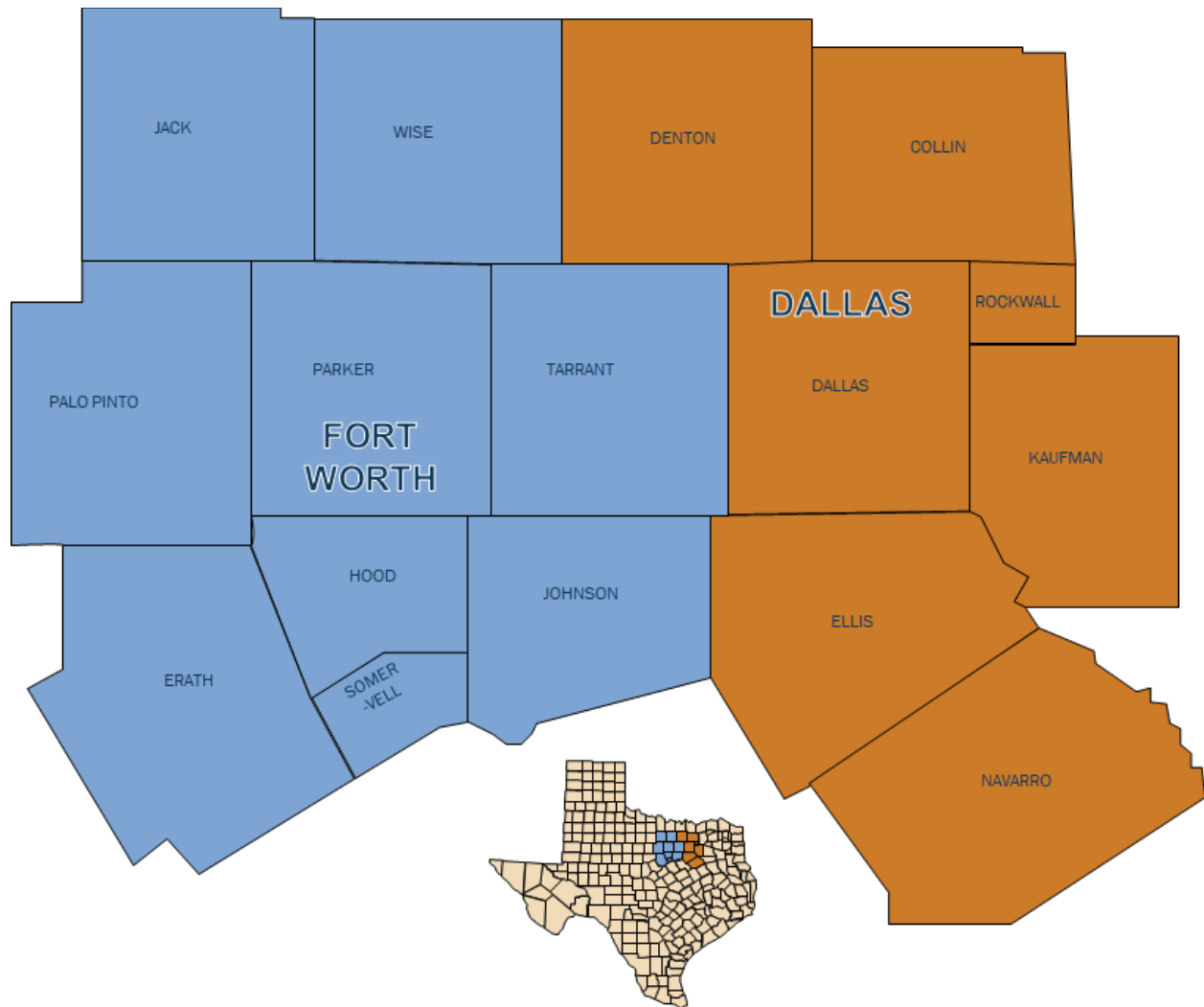
List of Acronyms

AASHTO	American Association of State Highway and Transportation Officials
ACVB	Austin Convention and Visitor's Bureau
AIM High	Austin area Incident Management for Highways
ATMS	Active Traffic Management Systems
ATSPM	Automated Traffic Signal Performance Measures
AWWS	Automated Wind Warning System
CMM	Capability Maturity Model
ConOps	Concept of Operations
DOT	Department of Transportation
FAST	Fixing America's Surface Transportation Act
FHWA	Federal Highway Administration
HERO	Highway Emergency Response Operator
ICM	Integrated Corridor Management
IMD	Information Management Division
ITS	Intelligent Transportation System
MAP-21	Moving Ahead for Progress in the 21st Century Act
MPO	Metropolitan Planning Organization
MPPM	Modernize Portfolio and Project Management
NHI	National Highway Institute
NOCoe	National Operations Center of Excellence
ODOT	Oregon Department of Transportation
RTP	Regional Transportation Plan
SEA	Systems Engineering Analysis
SLRTP	Statewide Long-Range Transportation Plan
TIM	Traffic Incident Management
TIP	Transportation Improvement Program
TMC	Traffic Management Center
TMS	Traffic Management Systems
TRB	Transportation Research Board
TRF	Traffic Operations Division
TRF-TM	Traffic Operations Division—Traffic Management Section
TSDC	Texas State Data Center
TSMO	Transportation Systems Management and Operations
TTI	Texas Transportation Institute
TTP	Texas Transportation Plan
TxDOT	Texas Department of Transportation
UTP	Unified Transportation Plan

Project Overview

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

Figure 1: TxDOT Dallas and Fort Worth District Map



The project is being managed jointly by the TxDOT Dallas and Fort Worth Districts with the Fort Worth District providing administrative oversight. Members of the Project steering committee, which provide direction to the project, include the following:

Table 1: Project Steering Committee

Division/Districts	Team Member	Email Address
TxDOT Dallas District	Chris Blain	Christopher.Blain@txdot.gov
TxDOT Dallas District	Craig Burgan	Craig.Burgan@txdot.gov
TxDOT Fort Worth District	Korin Adkins	Korin.Adkins@txdot.gov
TxDOT Fort Worth District	Kimberly Clarida	Kimberly.Clarida@txdot.gov
TxDOT Fort Worth District	Carlos Molina	Carlos.Molina@txdot.gov
TxDOT Fort Worth District	Theresa Poer	Theresa.Poer@txdot.gov

The mission of TxDOT is stated as *Through collaboration and leadership, we deliver a safe, reliable, and integrated transportation system that enables the movement of people and goods.* The mission statement is included here as a reminder that TSMO program planning supports TxDOT's mission. Essentially, the purpose of a TSMO Program Plan in the region is to evaluate how the existing transportation network is functioning with the aim of improving operations.

Summary of Outreach Activities

The development of the TxDOT Dallas-Fort Worth Districts TSMO Program Plan involved individual agency outreach meetings and group workshops with both internal TxDOT stakeholders and external local and regional agency partners such as city transportation staff, law enforcement and emergency response officials. These partners were asked to provide initial input on regional operational challenges, to give feedback on existing regional capabilities to address those challenges, and to participate in work sessions to develop strategies to improve those regional capabilities. Prior to these meetings, the project began with an internal TxDOT project kick-off meeting, meetings with both District Engineers, and partnering meetings with senior leadership from other agencies throughout the Dallas-Fort Worth Region.

Project Kick-off Meeting

The initial project kick-off meeting for the Dallas-Fort Worth District TSMO Program Plan was held in September 2019 at the Fort Worth District Office. Attendees established the Project Steering Committee and identified key partners and TSMO priorities to consider for the plan. The meeting involved the following participants:

Table 2: Project Kick-off Meeting Attendees

Agency	Attendees
TxDOT Fort Worth District	Alex Bell Kimberly Clarida Matt Evans Carlos Molina Chuck Osemeke Theresa Poer Anthony White Dicky White
TxDOT Traffic Safety Division	Joe Hunt
Federal Highway Administration	Millie Hayes

District Engineer Meetings

To build interest and get an endorsement for the development of the TSMO program plan, separate meetings were conducted with the District Engineers of each district. These meetings were also important to identify the appropriate people for the Project Steering Committee to help facilitate the development of the plan.

The following meetings were conducted with the indicated staff:

Table 3: Fort Worth District Engineer Meeting

Fort Worth District Engineer Meeting – November 4, 2019
Loyl Bussell (District Engineer) – TxDOT FTW
Theresa Poer – TxDOT FTW
John Cordary Jr – TxDOT FTW

Table 4: Dallas District Engineer Meeting

Dallas District Engineer Meeting – January 21, 2020
Mo Burr (District Engineer) – TxDOT DAL
John Hudspeth – TxDOT DAL
Chris Blain – TxDOT DAL
Craig Burgan – TxDOT DAL
Brandi Bush – TxDOT DAL
Joe Hunt – TxDOT TRF

Partner Senior Leadership Meetings

Partner agency input and support will be paramount in the development of a well-rounded TSMO program plan and a regional perspective. A series of meetings were conducted with partner agency senior leadership to gain endorsement and identify partner agency personnel to participate in future engagement efforts. The initial leadership engagement meetings were designed to identify what partnering agencies can expect related to involvement, commitment, and anticipated benefits. The following meetings were conducted with the indicated staff:

Table 5: Partner Senior Leadership Meetings

Partner Agency	Meeting Date	Attendees
City of Frisco	February 25, 2020	Brian Moen Curtis Jarecki
DART	February 27, 2020	Todd Plesko
City of McKinney	February 27, 2020	Gary Graham Thuan Huynh
City of Irving	March 3, 2020	Nathan Benditz Daniel Vedral Monsur Ahmed
City of Fort Worth	March 4, 2020	Yang Jin Rajnish (Raj) Gupta Aziz Rahman
North Central Texas Council of Governments (NCTCOG)	March 4, 2020	Marian Thompson Jeff Hathcock Gregory Masoia Eric Quintana Natalie Bettger Sonya Landrum Tom Bamonte Collin Moffett Mike Johnson Shannon Stevenson
North Texas Tollway Authority (NTTA)	March 4, 2020	Yang Ouyang Matthew Sneed Eric Hempell
City of Garland	March 4, 2020	Wayne Kurfees
DFW Airport	March 5, 2020	Gregory Royster Kelly Rattan
City of Plano	March 5, 2020	Robert Saylor Brian Shewski
City of Richardson	March 5, 2020	Rama Dhanikonda
City of Dallas	March 6, 2020	Michael Rogers Srinivasa Veeramallu Joseph Marchione

Stakeholder Outreach Workshops

The stakeholder outreach workshops were conducted to bring a larger group together for an overview of the TSMO Program Plan project and a discussion of operational challenges as well as potential solutions. The first portion of the workshop provided some education about the TSMO Program Plan before opening the discussion up to all attendees. Three stakeholder outreach workshops were conducted. The workshops were set up to target three sub-sets of attendees: TxDOT Dallas District Staff, TxDOT Fort Worth District Staff, and Regional Partner Agency Staff. As expected the workshop that targeted all of the regional partner agencies in the DFW area had the greatest number of attendees.

Table 6: Stakeholder Outreach Workshops

Workshop	Date	Number of attendees
TxDOT Dallas District	May 13, 2020	29
TxDOT Fort Worth District	May 19, 2020	35
Region Partner Agencies	May 20, 2020	77

Individual Stakeholder Meetings

The individual stakeholder meetings were conducted to allow agencies to meet one-on-one to speak about the TSMO Program Plan. The partnering agencies that requested one-on-one meetings were contacted to further discuss additional conversations of operational challenges within their agency. The below individual meetings were conducted:

Table 7: Individual Stakeholder Meetings

Partner Agency	Meeting Date	Attendees
City of Plano	June 10, 2020	Robert Saylor
City of McKinney	June 19, 2020	Thaun Huynh
TxDOT Dallas District (Denton Area Office)	June 22, 2020	Tina Massey
TxDOT Dallas District	June 23, 2020	Jeffrey Bush

Transition to Virtual Stakeholder Engagement Due to COVID-19

Unfortunately, the stakeholder outreach phase was impacted by COVID-19. All stakeholder outreach efforts through February 2020 were conducted in person. However, the stakeholder outreach workshops that were originally scheduled to occur in-person in late March 2020 had to be re-scheduled due to the COVID-19 pandemic and work from home orders that impacted TxDOT and most of the stakeholder partner agencies in the DFW Region. After allowing some time for agencies to adjust, it became evident the workshops would need to be conducted virtually to allow the project to proceed. The first virtual outreach workshop was conducted via WebEx. After conducting the first workshop, TxDOT determined the preferred platform moving forward would

be Microsoft Teams; outreach workshops two and three and all subsequent outreach efforts were conducted via Teams.

Input from Stakeholder Engagement

Established Project Priorities from Internal TxDOT Leadership

Leadership in both Districts understand the importance of operations. Emphasis needs to be on clearly identifying and explaining the benefits of improved operations. This will be crucial in order to continue to justify funding in operations. The Districts are doing well in terms of operations for planned special events and road weather management but there are many areas for improvement in traffic incident management, work zone management, and traffic signal management.

District leadership emphasized the importance of reaching out to regional partners, including the North Central Texas Council of Government (NCTCOG), North Texas Tollway Authority (NTTA) and the cities in both Districts. TxDOT works closely with its partners in the Region and operational improvement will require continue close partnerships.

Established Project Priorities from External Partner Agency Leadership

The External Partner Agency Leadership input and support assisted in the discussion within the Outreach Meeting. There were numerous examples in relation to TSMO that supported the overall conversation. With the external partner agency leadership meetings, endorsement of their partnership for the TSMO program plan from all agencies were approved. The meetings discussed their expectation in terms of their involvement, commitment, and anticipated benefits. The meetings discussed in detail the areas of growth and improvements that the agencies want to see occur within this TSMO Program Plan.

Stakeholder Input from Outreach Activities

The project work groups evaluated several operations strategies that have been applied by DOTs and transportation agencies across the country; and in doing so, they have made substantial positive impacts on the safety, mobility, and reliability of the surface transportation network. The strategies reviewed and considered at the workshops were:

- Traveler Information
- Managed Lanes
- Traffic Signal Coordination
- Special Event Management
- Road Weather Management
- Freight Management
- Integrated Corridor Management
- Work Zone Management
- Traffic Incident Management
- Active Traffic Management

At each of the three workshops, attendees identified the top strategies they felt the region should focus on. Although these strategies rose above in the workshop polling, attendees were able to contribute conversation to any of the topics. Strategies are listed in Table 8 in order of poll ranking for each workshop.

Table 8: Top Strategies Identified by Workshop

Workshop	Top Strategies Identified
TxDOT Dallas Workshop	Traffic Incident Management Work Zone Management Traffic Signal Coordination
TxDOT Fort Worth Workshop	Traffic Signal Coordination Traffic Incident Management Work Zone Management Freight Management
Regional Partner Agency Workshop	Traffic Incident Management Traffic Signal Coordination Active Traffic Management Work Zone Management

Workshop discussions centered around these focused topics and are summarized below from a regional perspective.

Traffic Incident Management (TIM)

Traffic incident management involves the TxDOT District and partner response to traffic incidents. When traffic incident management is conducted effectively, it can reduce congestion, improve travel reliability, and improve safety.

There are several efforts and activities underway for Traffic Incident Management. Successful measures discussed include the SHRP2Train-the-Trainer Program and the TIM Coalition, which focuses on conducting After Action Reviews (AAR) and debriefing after long-term closures. Fire and rescue agencies consistently place a high importance on ensuring staff receive the SHRP2 training course.

From a coordination standpoint, there are strong partnerships with major counties for emergency traffic control. The emphasis is on reopening the lane. Crash response and incident clearance by Dallas County Sheriff has been working well. Still some areas have “dead zones” or “no man’s land” which leads to increased response times and causes confusion among responding agencies. Often multiple agencies will respond due to lack of clarity on jurisdictional ownership. The result is that the first on-scene becomes de facto incident commander.

Frequent meetings are conducted with first responders, however, communication is sometimes challenging. The agencies are looking at different avenues to improve communication. The interoperable radio system is in its testing phase and is being developed to help improve response time. Another measure is to establish focused TIM teams to assist in reducing incident clearance. The benefits of establishing these teams would be the stronger relationships and ability to build on local knowledge which will aid in improved response based on local characteristics. Additionally, Fort Worth is looking to use other crash investigation strategies to also reduce incident clearance times, such as photogrammetry and/or drones. Current incident data is tracked through Lonestar.

TxDOT is currently partnering with the NCTCOG to provide TIM responder training. There is not a formal policy for who should attend the training. Establishing structure for the classifications that should be required to attend would be beneficial and help to standardize abilities and set expectations. Many of the local agencies

are also partnering with NCTCOG for this training. The police have a 4-hour course requirement to graduate from the police academy. The towing industry could also benefit from attending this training.

Availability of staff resources has been a challenge in some cases to implement emergency traffic control. Dallas County alone requires high levels of traffic control frequently within a single day. Police have the ability to close lanes quickly, but TxDOT follows a different protocol that some partners are not familiar with which often leads to slower lane closures. The 911 dispatch could expedite an incident notification to the TMC that would allow TMC operators to efficiently implement traffic control and improve safety. The TxDOT Fort Worth District is working on a checklist to detail the actions necessary during a response.

Information processing is another challenge. Once a plan is developed it takes time to get all partners up to speed and implementing all facets. There have been some recent challenges with staff turnover within agencies and the new dynamics this introduces. The continual development of relationships is critical. Strong personalities and ego can change the dynamics of a situation, particularly during a response when stress levels are elevated. Strong foundational relationships will help to mitigate coordination issues.

The following were identified to potentially benefit TIM in the region:

- Notification system for active incidents (mentioned in Partner Agency meeting)
- Formal policy on who should attend the TIM responder training (mentioned in TxDOT Dallas and Fort Worth District meetings)
- Encouraging the towing industry to participate in TIM responder training (mentioned in TxDOT Fort Worth District meeting)
- Streamline 911 dispatch incident notification to TMC (mentioned in TxDOT Fort Worth District meeting)
- Improved coordination along jurisdictional boundaries (mentioned in TxDOT Dallas District and Partner Agency meetings)
- Analysis on how data can be used to drive project development (mentioned in TxDOT Fort Worth District meeting)
- Analysis on how data can be used for corridor studies (mentioned in TxDOT Fort Worth District meeting)

Traffic Signal Systems

Traffic signal management involves the Dallas and Fort Worth District's management of their traffic signal system, which includes all District owned and operated signals. For the purposes of this plan, recommendations may also be developed for working better with partner agencies that manage their own signal systems.

TxDOT uses fixed timing plans for the signals under their management. There is currently a project underway to get all TxDOT signals upgraded with communications to allow for more active management; the new system will allow the implementation of newer technologies. Some local cities are also considering similar systems.

Staff resources can present a challenge for divisions and local agencies. For many local agencies the upgrade and maintenance of systems is currently more complaint driven. The COG has a process in place where local agencies identify corridors for consideration of retiming. There are also some contracts in place to support certain efforts; i.e. TxDOT signal timing plans done by consultants. Based on staff availability, traffic signal management is currently more reactive, better data and advanced notification of issues would help target resources to effectively mitigate congestion. TxDOT staff also manage inspection of municipal maintenance activities to correspond with reimbursements as described in municipal agreements.

The Fort Worth District described their signal staffing levels during their workshop. The current Fort Worth District staffing levels are:

- Signal Shop has 3 staff members to manage timing plans
- Signal Design team has 3 dedicated staff members
- Signal Maintenance is conducted through signal shop; resource constraints make this reactive; using some maintenance contracts to supplement

Staffing levels were not discussed during the Dallas District workshop.

TxDOT has the ultimate responsibility for maintenance of their own signals, but not for municipal signals, however there is a maintenance contractor for addressing fiber cuts. The maintenance contractor has very high response rate for device repair/replacement; there are no incentives built-in, but there are specific performance requirements.

Management of construction activities has been a challenge. There needs to be better internal coordination of construction projects, and TxDOT needs to ensure all operational strategies are considered and integrated. There is currently no formal process to ensure signal groups are involved in the project development process. Signal timings are often affected by construction activities and if effects span multiple jurisdictions or agencies, additional coordination efforts are needed.

The following were identified to potentially benefit Traffic Signal System Management in the Region:

- Upgrade detection to support better timing plans (mentioned in TxDOT Fort Worth District meeting)
- Connect real time data back to traffic management center (TMC) (mentioned in TxDOT Fort Worth District meeting)
- Develop alternate plans for diverting traffic from freeways (mentioned in TxDOT Fort Worth District meeting)
- Develop proactive approach to retiming corridors (mentioned in TxDOT Fort Worth District meeting)
- Develop formal notification system of construction projects, their schedules and completion (mentioned in TxDOT Fort Worth District meeting)
- Documentation of coordinated corridors to manage maintenance strategies (mentioned in Partner Agency meeting)
- Improved coordination between multiple jurisdictions or agencies (mentioned in TxDOT Fort Worth District meeting)
- Broader knowledge and visibility of TxDOT standards and technologies being implemented (mentioned in Partner Agency meeting)
- Maintenance staff training of new technologies (mentioned in Partner Agency meeting)
- Consistent PMs across the region; including normalization of terminology and metrics (mentioned in Partner Agency meeting)

Work Zone Management (WZM)

Work Zone Management involves the district and partner agency management before, during, and after planned construction events, which when done well can reduce congestion, improve travel reliability, and improve safety.

Some local agencies have a center-to-center (C2C) connection and are able to share real time data with DFW 511 system. This 511 data is also connected to Waze. Feedback is currently being collected on methods to improve the system and have better performance measures.

The TxDOT website is currently being used to monitor incidents and lane closures. Area Engineers are accustomed to managing multiple work zones and ensuring coordination of lane impacts. A couple of routine coordination activities noted are:

- Many cities/agencies attend weekly construction meetings.
- Field coordination of work zones occurs between the field staff and the contractor.

The Highway Condition Reporting System (HCRS) tracks lane closures and portrays them on a single map each day. However, it is a challenge to stay informed of work zone geometry; i.e. access points for workers and first responders. Smart Work Zones would be ideal, but funding could be an issue. Additionally, it may be challenging for some contractors to manage technology. Some of the issues currently are simply getting the contractor out of the road during defined times. Knowledge of when a work zone is backing up and queueing on surface streets is desired for integrating with signal timing to mitigate the issue. There is currently a pilot project for automated messages to be generated to Waze when safety service vehicles activate lights.

The following were identified to potentially benefit Work Zone Management in the region:

- Involve Traffic Operations Engineer for all major projects (mentioned in TxDOT Fort Worth District meeting)
- Work Zone education training and awareness of available resources (mentioned in TxDOT Fort Worth District meeting)
- Develop alternate plans for diverting traffic from freeways (mentioned in TxDOT Fort Worth District meeting)
- Advanced notification of lane closures (mentioned in Partner Agency meeting)

Traffic Management

Traffic management involves the district management of road traffic conditions.

There are data sources available that would help facilitate efficient management of traffic. Establishing consistent use of this data would further its impact. One challenge is keeping pace with technology and end-of-life for existing equipment; however, the TxDOT Dallas District feels it has been able to stay ahead of the curve.

The following were identified as ways to enhance the use of data and potentially benefit Traffic Management in the region:

- Better notification alerts from data sources (mentioned in Partner Agency meeting)
- Using and connecting data to make decisions (the City of Frisco is working to use high res data for performance management) (mentioned in Partner Agency meeting)
- Allow the data to drive the allocation of resources (i.e. focusing effort in most impactful places) (mentioned in Partner Agency meeting)
- Be proactive with maintenance based on data (mentioned in TxDOT Dallas District meeting)
- Additional resources to capture and analyze collected data (mentioned in Partner Agency meeting)
- Regional pool of resources to support data management (this could support freight management also) (mentioned in Partner Agency meeting)
- Using performance measures to support Business Case for funding allocation (mentioned in Partner Agency meeting)

Freight Management

Freight management involves the district management of freight movement and impacts on traffic conditions.

The main concerns in the region with freight traffic are the impact on local facilities (wear-and-tear), impact on traffic operations and parking capacity needs. The District is looking at smart corridors and emerging technologies for how they could help to manage freight, but cost is a major consideration.

Some of the smaller agencies have had challenges with varying delivery times to businesses and the larger impacts it has on traffic congestion. Many agencies are exploring an option to provide convenient dedicated parking/unloading spots if companies guarantee deliveries would occur in that specific window.

The following were identified to potentially benefit Freight Management in the region:

- Providing notification to local agencies of over-weight/over-height vehicles when vehicles will pass through local routes (mentioned in Partner Agency meeting)
- Use of dedicated parking/unloading spots for businesses if deliveries are guaranteed in a specific window (mentioned in Partner Agency meeting)
- Connected Freight Corridor – assisting freight traffic to navigate through work zones and routes based on real time traffic conditions (mentioned in Partner Agency meeting)

Key Takeaways from Initial TSMO Outreach

From the outreach meeting, the agencies provided great feedback regarding the TSMO strategies. The agencies voiced recommendations on areas and issues within the TSMO strategies. The following table displays the recommended areas/issues that can benefit the region:

Table 9: Recommendations to Benefit the Region

TSMO Strategy	Recommendations that can Benefit the Region	Agency
Traffic Incident Management	Notification System for active incidents	Partner Agency
	TIM responder training (mandatory vs. voluntary attendance)	TxDOT Dallas and Fort Worth Districts
	911 dispatch incident notification to TMC	TxDOT Fort Worth District
	Communication and Coordination along jurisdictional boundaries	TxDOT Dallas District and Partner Agency
	Performance Measures used for future projects	TxDOT Fort Worth District
	Performance Measures used for corridor studies	TxDOT Fort Worth District
Traffic Signal Coordination	Upgrade detection to support efficient timing plans	TxDOT Fort Worth District
	Signal connectivity to the traffic management center (TMC)	TxDOT Fort Worth District
	Develop alternate plans for diverting traffic from freeways	TxDOT Fort Worth District
	Develop proactive approach to retiming corridors	TxDOT Fort Worth District
	Develop formal notification system of construction projects, their schedules and completion	TxDOT Fort Worth District
	Documentation of coordinated corridors to manage maintenance strategies	Partner Agency
	Improved coordination between multiple jurisdictions or agencies	TxDOT Fort Worth District
	Broader knowledge and visibility of TxDOT standards and technologies being implemented	Partner Agency
	Maintenance staff training of new technologies	Partner Agency

	Consistent PMs across the region; including normalization of terminology and metrics	Partner Agency
Work Zone Management	Involve Traffic Operations Engineer for all major projects	TxDOT Fort Worth District
	Work Zone education training and awareness of available resources	TxDOT Fort Worth District
	Develop alternate plans for diverting traffic from freeways	TxDOT Fort Worth District
	Advanced notification of lane closures	Partner Agency
Traffic Management	Better notification alerts from data sources	Partner Agency
	Using and connecting data to make decisions	Partner Agency/ City of Frisco
	Allow the data to drive the allocation of resources (i.e. focusing effort in most impactful places)	Partner Agency
	Be proactive with maintenance based on data	TxDOT Dallas District
	Additional resources to capture and analyze collected data	Partner Agency
	Regional pool of resources to support data management	Partner Agency
Freight Management	Using performance measures to support Business Case for funding allocation	Partner Agency
	Providing notification to local agencies of over-weight/over-height vehicles when vehicles will pass through local routes	Partner Agency
	Use of dedicated parking/unloading spots for businesses if deliveries are guaranteed in a specific window	Partner Agency
	Connected Freight Corridor – assisting freight traffic to navigate through work zones and routes based on real time traffic conditions	Partner Agency
	Regional pool of resources to support data management	Partner Agency

The program plan will address majority of the recommendations provided within the outreach agency meetings conducted. The primary focus will be on traffic incident management, traffic signal coordination, work zone management, traffic management, and freight management.