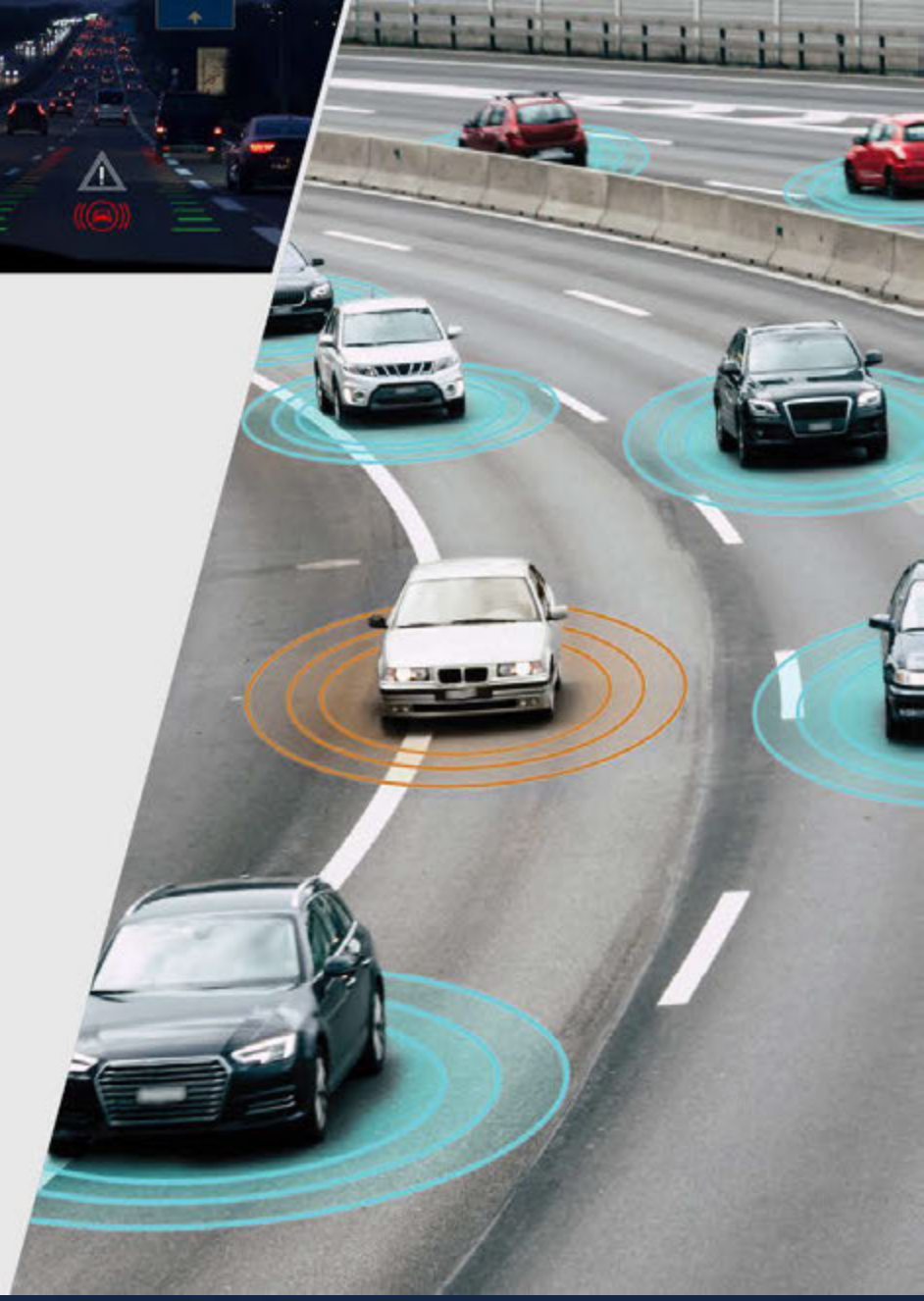
Texas Innovation Alliance

Fall In-Person Meeting

Fall 2024 Meeting

Wi-Fi: TxDOT Guest Net

Password: Headsupphonesdown



October 23, 2024

TxDOT Safety Briefing

Today's Agenda

Wi-Fi: TxDOT Guest Net
Password: Headsupphonesdown

1:00 PM | Welcome & Introductions

1:10 PM | Award Announcement: STIC Incentive Program

1:20 PM | Project Update: Broadband as a Backbone for Innovative Mobility Projects

1:30 PM | Project Update: TxDOT Broadband Program

1:45 PM | EDC-7: Next Generation Traffic Incident Management (TIM)

2:00 PM | Audience Questions

2:15 PM | Break

3:00 PM | Peer Exchange: Wrong-Way Driving

3:15 PM | Audience Questions

3:30 PM | Closing Remarks & Adjourn

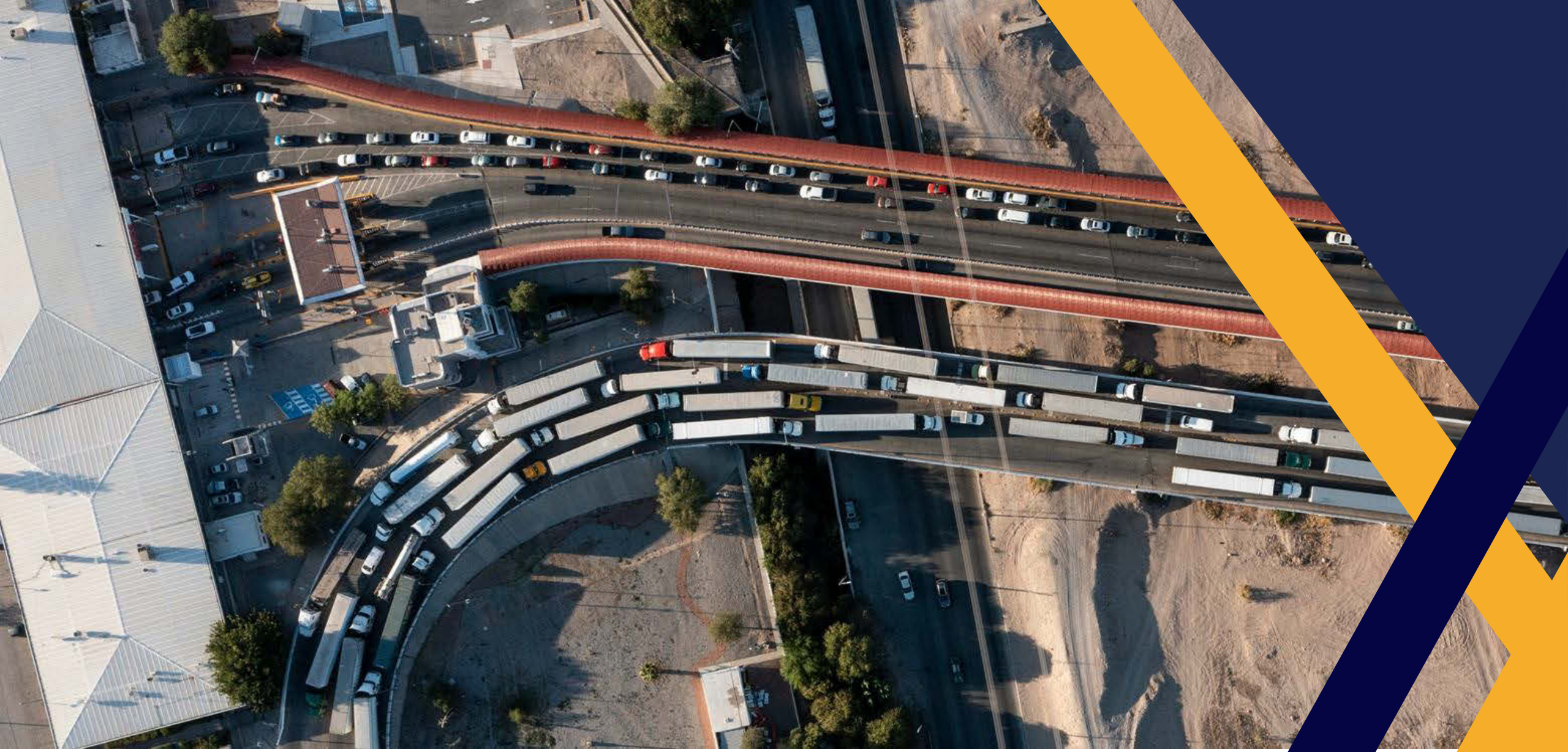
Award Announcement

STIC INCENTIVE PROGRAM

Erika Kemp, TxDOT

ITS at International Ports to Reduce Emissions Project

FY24 STIC GRANT APPLICATION



Ysleta Port of Entry

Team El Paso

Utilizing ITS at International Ports to Reduce Emissions

Omar Martinez, Valeria Aguirre Holguin, Jasmin Flores, Anna Zendt
Strategic and Legislative Affairs & Capital Improvement
City of El Paso

Focus Area: Connectivity (including Freight)

Technology Areas: Intelligent Transportation Systems

Project Partners: City of El Paso, TxDOT, Texas A&M Transportation Institute, El Paso MPO, UTEP

Challenge Definition

Reduce Congestion

Mitigate truck traffic with border wait time information.

Improve Air Quality

Lower PM2.5 and NO2 emissions from idling tucks.

Enhance Community Health

Reduce disparate impacts of respiratory diseases.

Improving the resiliency and integration of **nationally-significant international trade infrastructure**, reducing emissions and mitigating community health impacts by reducing congestion at international ports, and increasing safety, equity, and access for non-motorized travelers including pedestrians, bicyclists, and public transit users in Historically-Disadvantaged Communities.

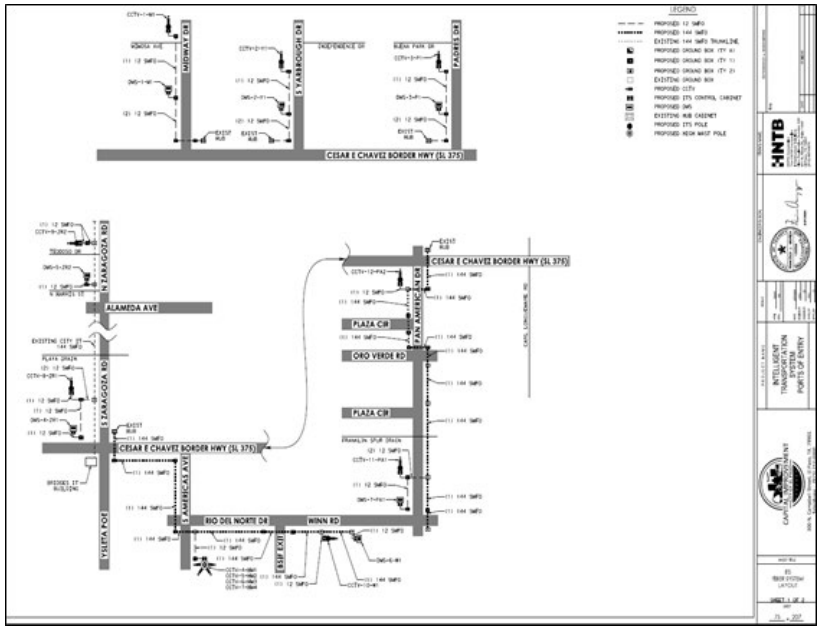
- **Freight Bottlenecks**
- **Worsening Emissions and Air Quality**
- **Health Impacts**
- **Improving pedestrian safety**

Innovation and Technology Solutions

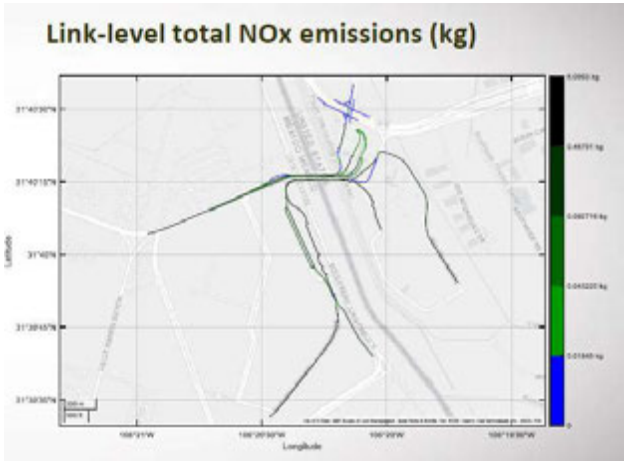
1. ITS on ports of entry: Includes software integration, fiber optic communications, lane management systems, dynamic message signs, closed-circuit television cameras, ground vehicle sensors, signal phasing and timing, and others.

2. Emission sensors: Requesting STIC funding to design and install low-cost emissions sensors. Emissions sensor data will be integrated with regional ITS systems to inform infrastructure design, operations, and efficiency improvements at ports.

3. Data sharing: Expand partnerships with the Texas A&M University Transportation Institute (TTI) and El Paso MPO to create a Dynamic Traffic Assignment (DTA) simulation model, which can simulate the binational ports system at high fidelity with 1-minute intervals and predict shifts in traffic patterns.



Impact and Performance Measures



Total emissions (kg) by vehicle class

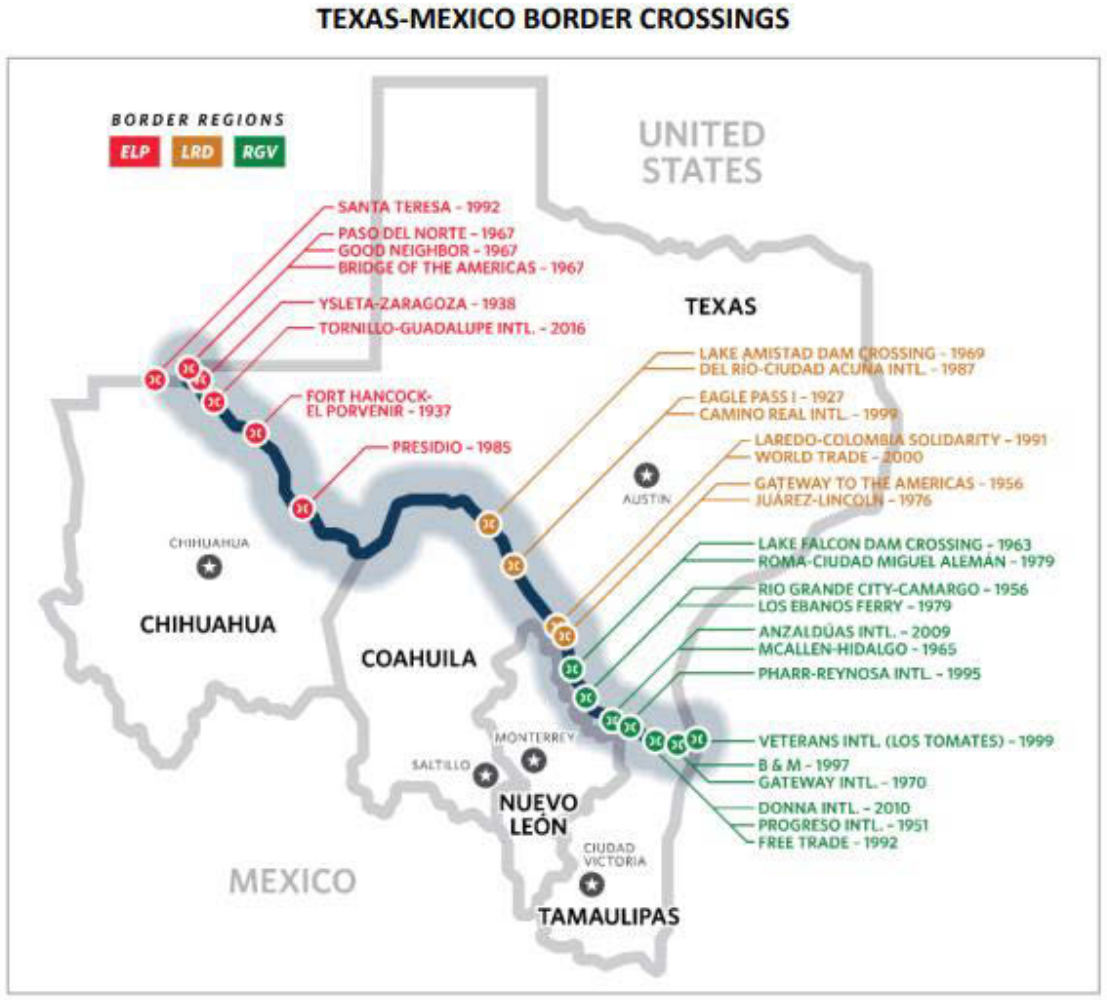
Vehicle Class	NOx	PM10	CO	CO2
Car High MPR	0.3234	0.0075	4.06	566
Car Low MPR	0.2696	0.0063	3.43	469
Car Mid MPR	1.0518	0.0246	13.50	1,822
Motorcycle	0.1450	0.0070	6.51	111
Pickup/SUV	1.9575	0.0322	9.93	1,175
SU Truck	1.8358	0.0590	1.09	340
Trailer Truck	40.2226	1.4331	16.54	6,724
Total	45.8057	1.5697	55.06	11,207

- **Meeting Emissions Standards:** The EPA 2021 designated El Paso County as a Nonattainment Area for Particulate Matter (PM) 10 and Ozone (O3) underscoring the urgency of action.

- **Public Health:** Reducing greenhouse gas emissions and mitigating community health impacts by reducing congestion at international ports. Exposure to diesel particulate matter is linked to chronic health conditions such as diabetes and heart disease.

- **National Commercial Traffic:** According to U.S. Customs and Border Protection, the BOTA Modernization Project will reroute approximately 2,000 daily southbound commercial vehicles (mostly empty) and 500 daily northbound commercial vehicles. **Failure to accommodate this traffic will result in increased truck idling and worsening emissions.**

Scalability



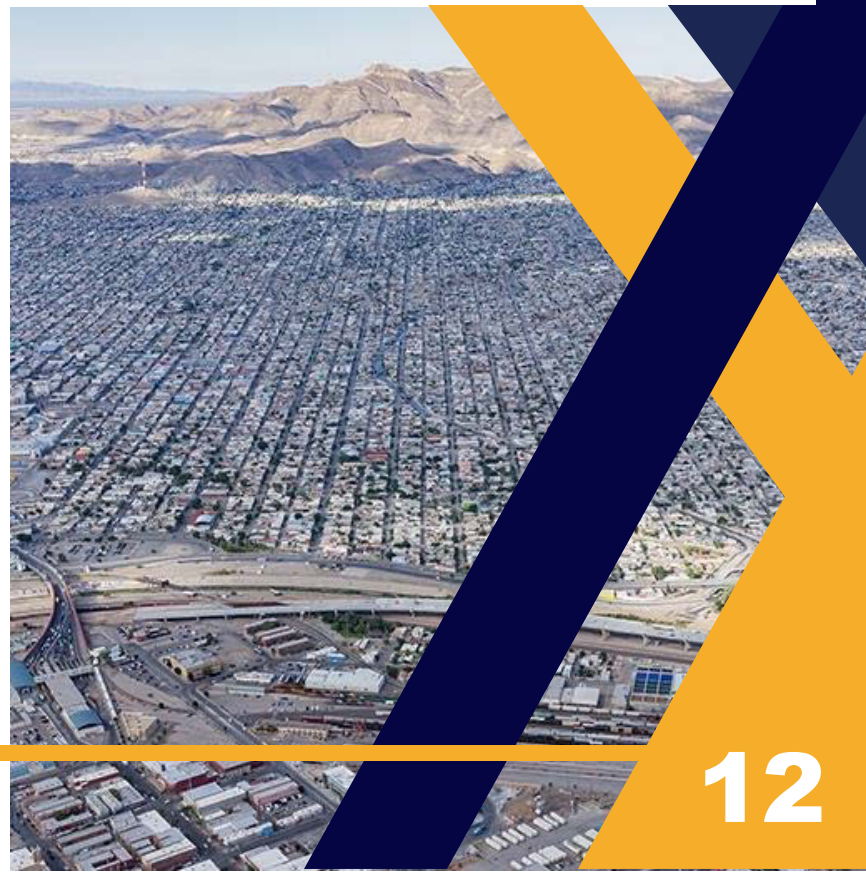
1. **National supply chain reshoring** trends along the U.S.-Mexico border are leading to increases in demand for industrial, commercial, and warehousing space in border communities.

2. **ITS and emissions sensors can be replicated** along every land port in the U.S.-Mexico border (in both countries) and in other ports around the world with similar congestion issues and traffic volumes.

Project Budget

Task	Description	Amount
1		
2		
3		
4		
5		
6		

- 20% match from TXDOT
- No additional City match is required



Texas Department of Transportation

STAR Award 2024

Smart Transportation and Advanced Roadways

EP TX CITY OF EL PASO

Mission

Deliver exceptional services to support a high quality of life and place for our community

Values

Integrity, **R**espect, **E**xcellence, **A**ccountability, **P**eople

Vision

Develop a vibrant regional economy, safe and beautiful neighborhoods and exceptional recreational, cultural and educational opportunities powered by a high performing government

Local Innovative Project Showcase

PROJECT UPDATE: BROADBAND AS A BACKBONE FOR INNOVATIVE MOBILITY PROJECTS

Connor Sadro, Deep East Texas Council of Governments

BROADBAND AS A BACKBONE FOR INNOVATIVE MOBILITY

A LOOK AT PUBLIC SECTOR DIGITAL INFRASTRUCTURE IN TEXAS

Connor Sadro – Regional Broadband Director
Deep East Texas Council of Governments

A Brief History

- In a previous life… NCTCOG Transportation Planner on the Technology and Innovation Program
- Led projects that had to do with intelligent infrastructure as it related to the future of the transportation system and it's use cases
- Southeast Fort Worth Mobility Proving Ground – 2023 TIA Invitational Award
- Now, I am strictly broadband focused as the Regional Broadband Director for the Deep East Texas Council of Governments (DETCOG)

More History…

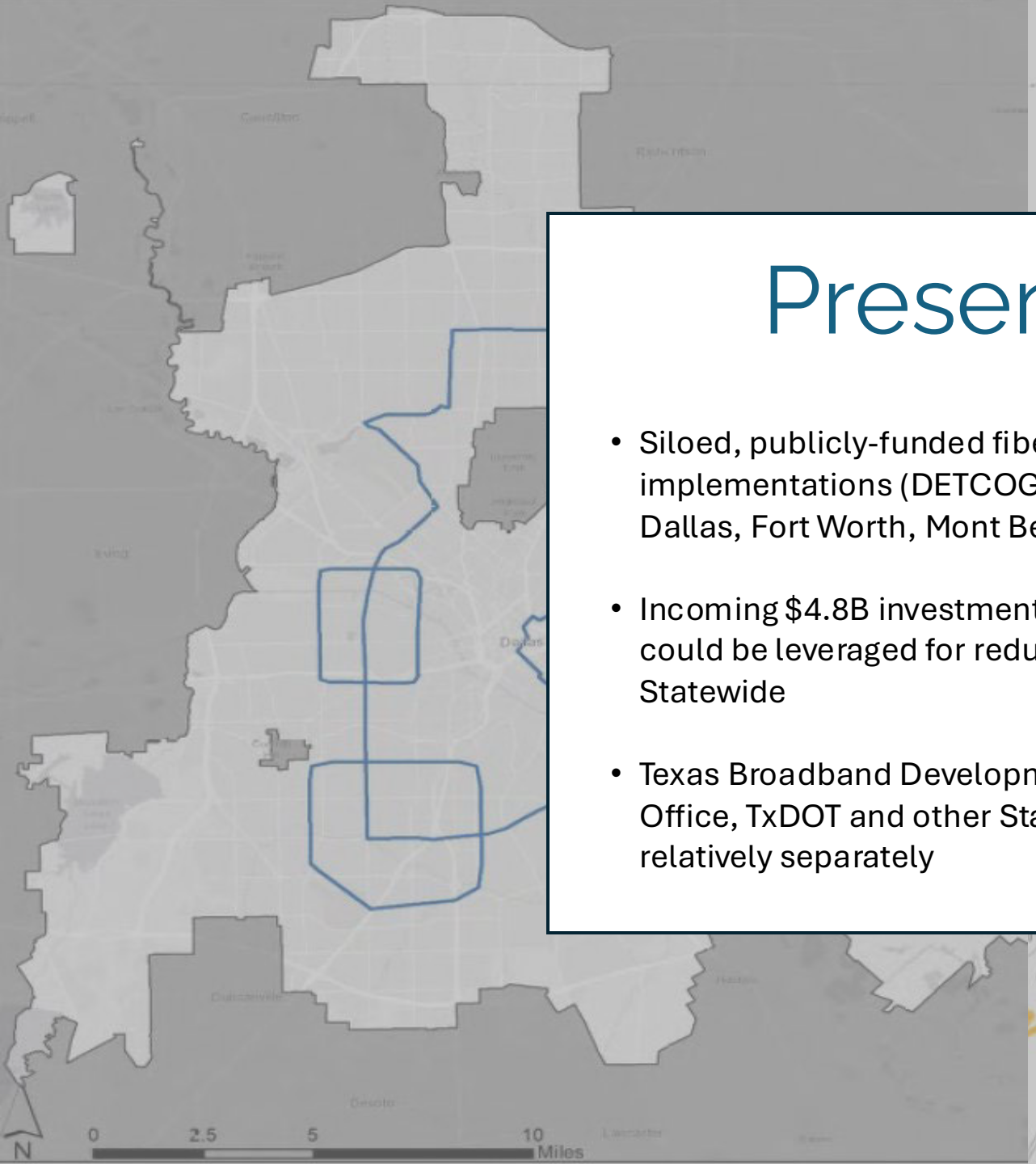
- State of Texas Broadband Development Office (BDO)
  - Largest BEAD allocation among all States – $3.3B
  - Responsible for awarding BEAD funding with competitive grants
  - Broadband Infrastructure Fund (BIF) – $1.5B
    - Supplements 20% match for BEAD grants
  - Using NTIA/FCC map to guide allocations
- Example of Legislative Challenges:
  - Utility Code 54.201 disallows a municipality from obtaining the certificate to operate as a service provider for telecommunications service
  - The City of Mont Belvieu took the code to court, won, and created MB Link
  - More have followed and will continue to follow

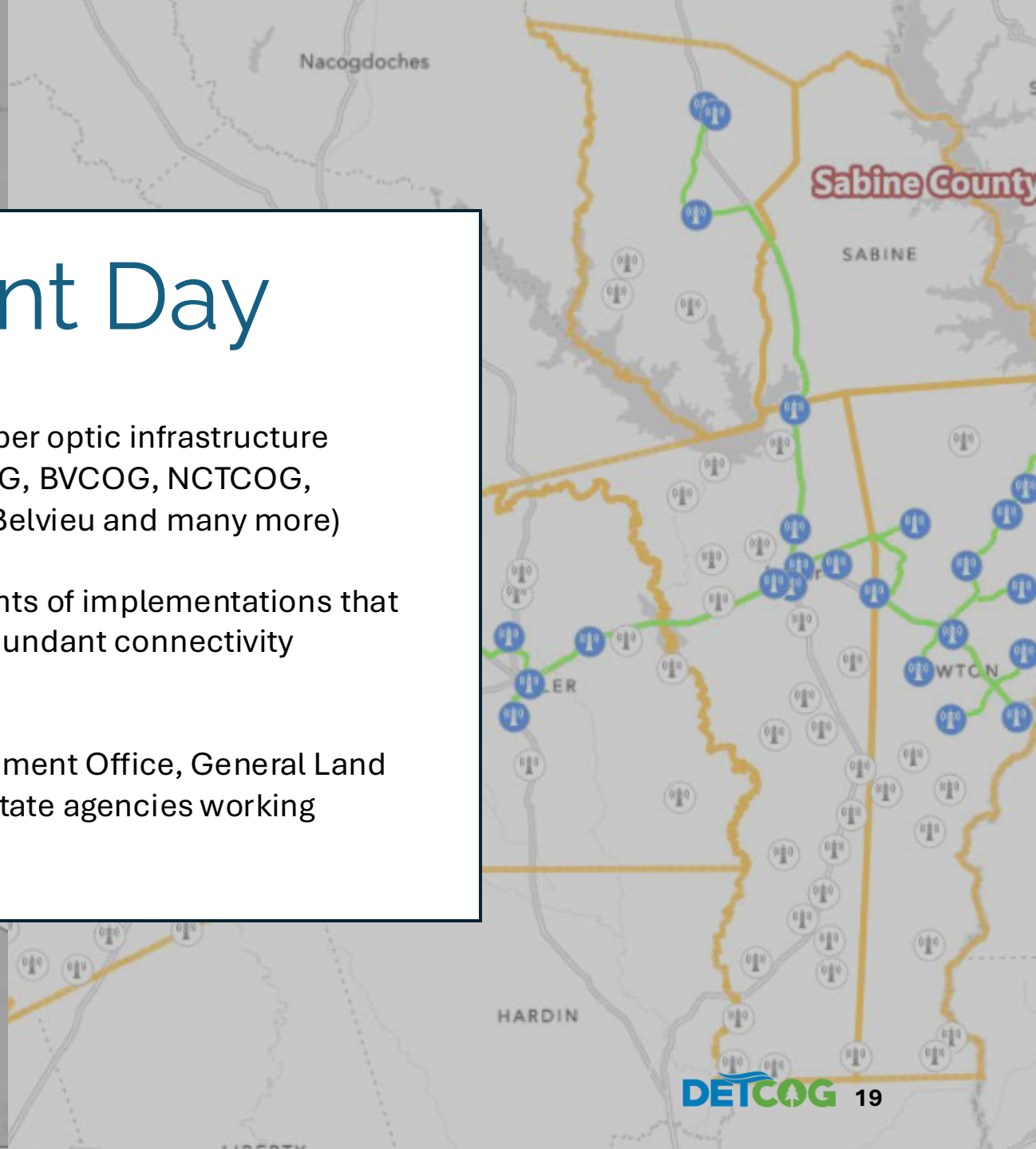
TEXAS BROADBAND DEVELOPMENT OFFICE

MB LINK
MONT BELVIEU FIBER NETWORK

Present Day

- Siloed, publicly-funded fiber optic infrastructure implementations (DETCOG, BVCOG, NCTCOG, Dallas, Fort Worth, Mont Belvieu and many more)
- Incoming $4.8B investments of implementations that could be leveraged for redundant connectivity Statewide
- Texas Broadband Development Office, General Land Office, TxDOT and other State agencies working relatively separately





RURAL LISC

TEXAS BROADBAND DEVELOPMENT OFFICE

Federal Reserve Bank of Dallas

USDA

JUST TRANSITION FUND

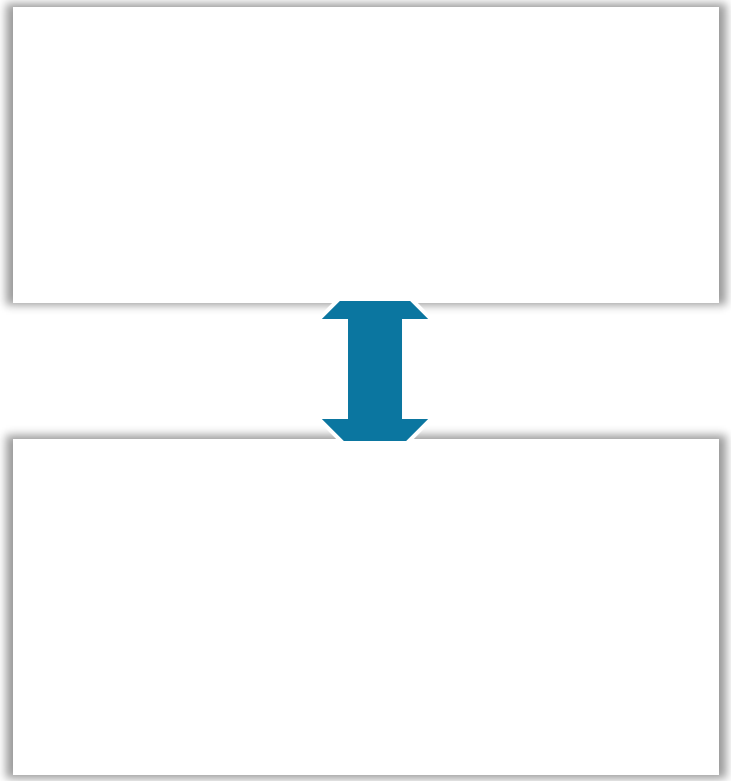
What Planning Resources Are Being Used?

- Texas Broadband Development Office Technical Assistance Program - $3M across 24 Counties
- USDA Broadband Technical Assistance - ~$100,000 per award
- Just Transition Fund - ~$80,000 per award
- Dallas Fed – Case by Case, ~$60,000 - $80,000 per award
- Rural LISC - ~$60,000 per award

… And Are They Enough?

How Can TxDOT Support Proactive Collaboration?

- Structured agreements with the Texas Broadband Development Office
  - Infrastructure task force to concatenate both agency's access to funding
- Engaging ITS Stakeholders on common ground proposals
  - Handholds? Utility Vaults?
  - What else can local and regional planners include in middle-mile plans to support further connection for TxDOT ITS initiatives?
- "Fiber Sharing" and Accessible Data Repositories
  - Statewide Intelligent Infrastructure Asset GIS Portal (Planned/Existing)
  - What collaborative efforts can TxDOT support locally?
  - Examples (NCTCOG):
    - ITS MOU for Multi-Agency Communication, Data and Video Sharing (Fiber & Communications Networks Sharing)
    - ITS TSMO Funding Criteria "Dig Once" style of leveraging transportation resources and targeting investments to facilities undergoing reconstruction.



CONTACT/QUESTIONS

Connor Sadro

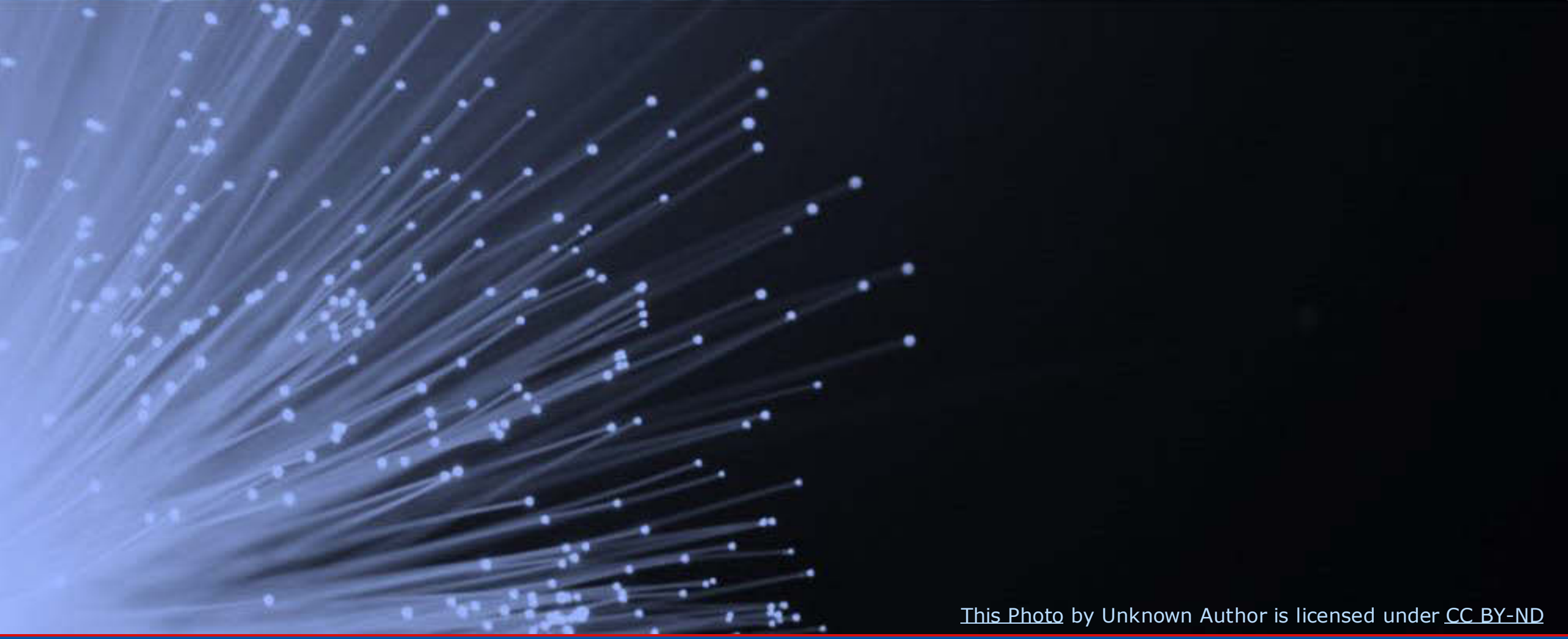
Regional Broadband Director

csadro@detcog.gov| (423) 883-5378

State Innovative Project Showcase

PROJECT UPDATE: TXDOT BROADBAND PROGRAM

Cristy Burch, TxDOT



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TxDOT Broadband Program

Cristy Burch, Broadband Coordinator

Texas Department of Transportation

October 28, 2024

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TxDOT Broadband Program

Launched in August 2023

Jointly sponsored by Right of Way and Information Technology Divisions

Advisory Board comprised of representatives across TxDOT Divisions and Districts

State and Federal requirements for broadband (TAC 201.672, 201.673, 250.002, CFR 645.307)

Broadband Program Strategies | Connect. Learn. Build.

Provide Access to ROW

Right of way shall be open via utility permit to allow access for broadband providers, and to ensure no single company has preferred access.

Maximize Resource Sharing

"Dig Once" by installing conduit duct banks during compatible highway construction projects and expand capacity by permitting or leasing conduit and fiber.

Assist Statewide Broadband Initiatives

Support the state's effort to expand broadband infrastructure to bridge the digital divide across Texas.

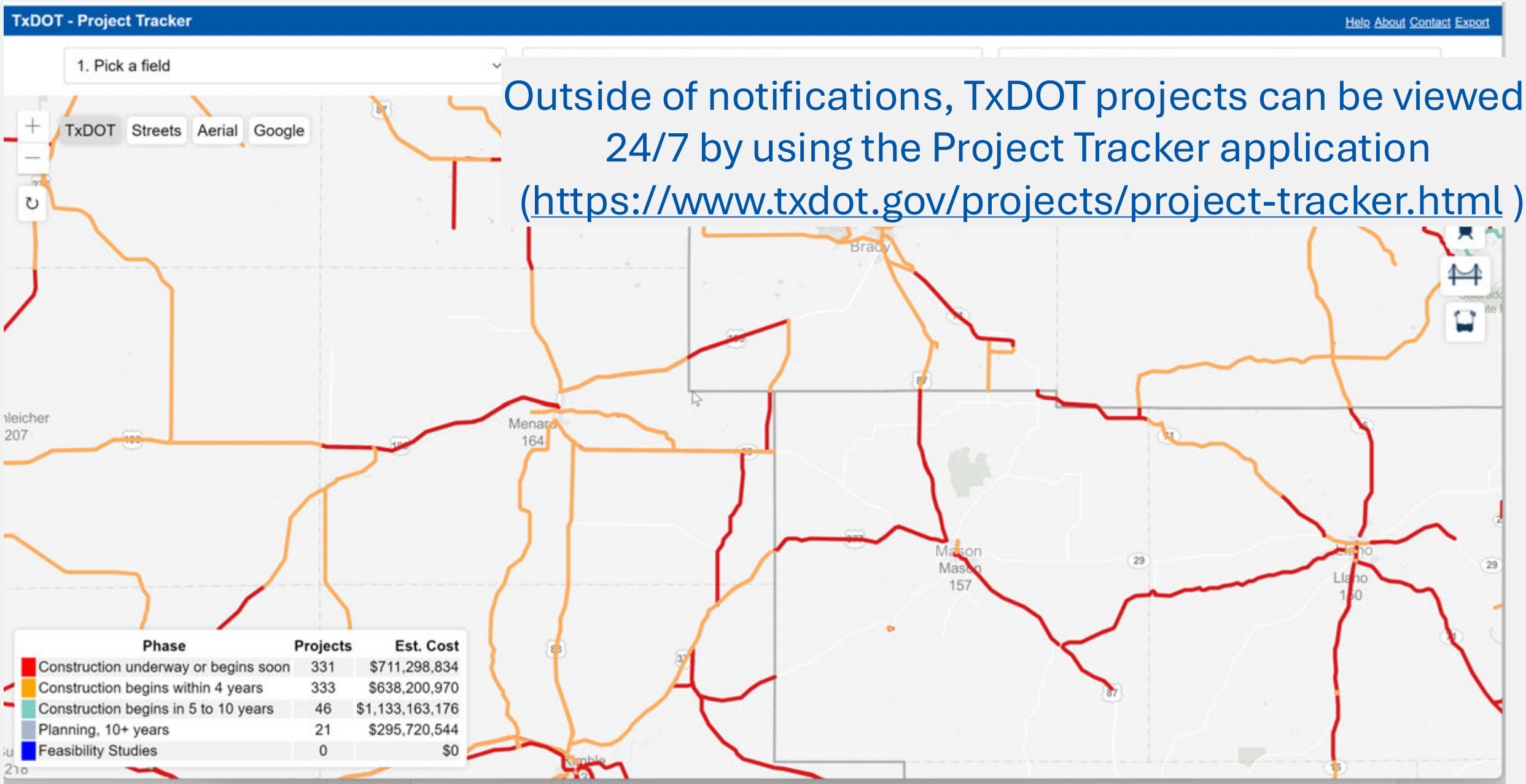
Foster TxDOT Broadband Capacity

Facilitate the growth of TxDOT broadband infrastructure to promote agency initiatives for workforce connectivity and intelligent transportation systems.

Opportunities to Collaborate

TxDOT Project Notification

- Broadband providers can register to be notified of the State Transportation Improvement Program (STIP)
- Communication of the annual STIP allows an opportunity to coordinate broadband infrastructure installation in state rights of way



Outside of notifications, TxDOT projects can be viewed 24/7 by using the Project Tracker application (https://www.txdot.gov/projects/project-tracker.html)

Local Utility Coordinators = your key to knowledge

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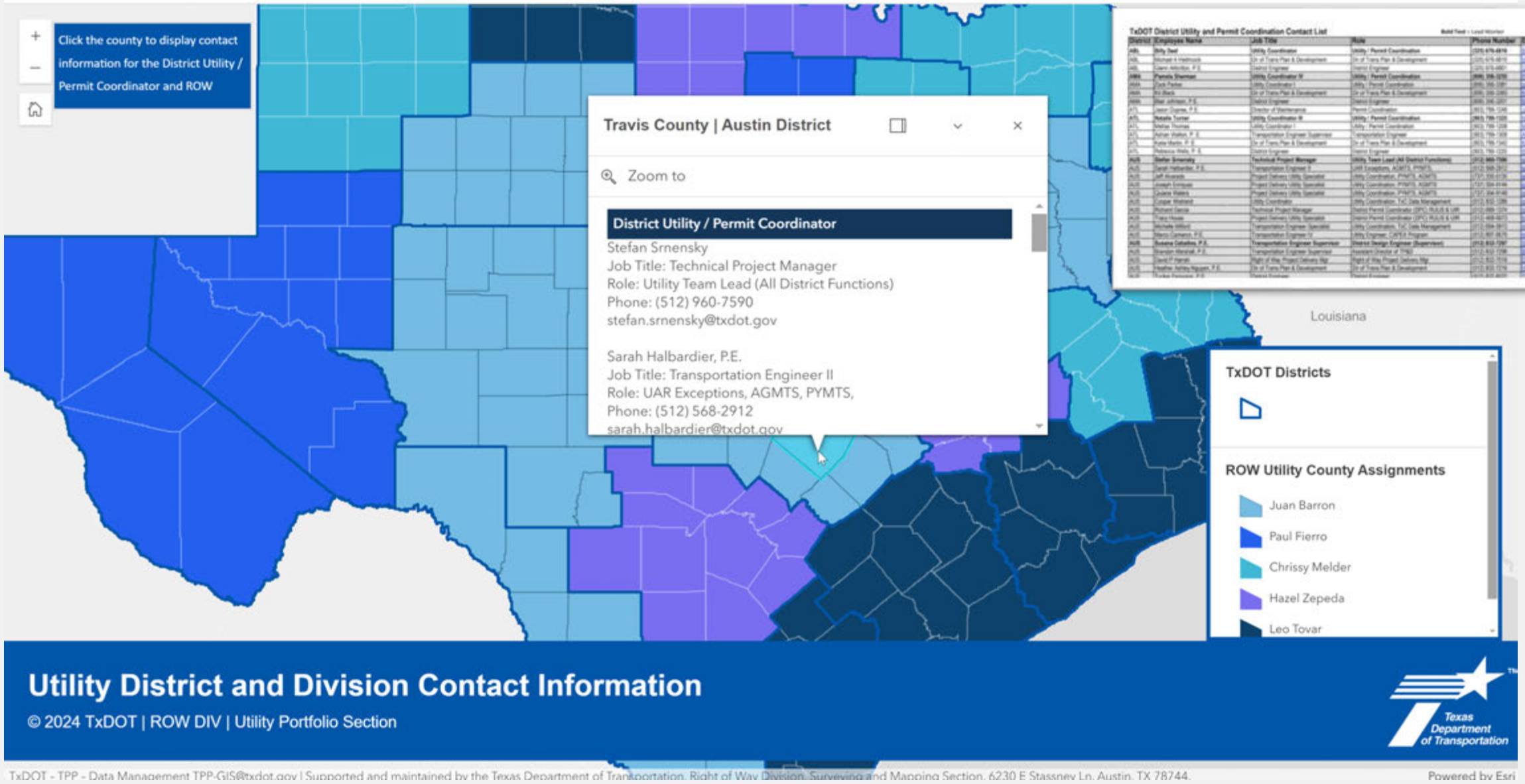
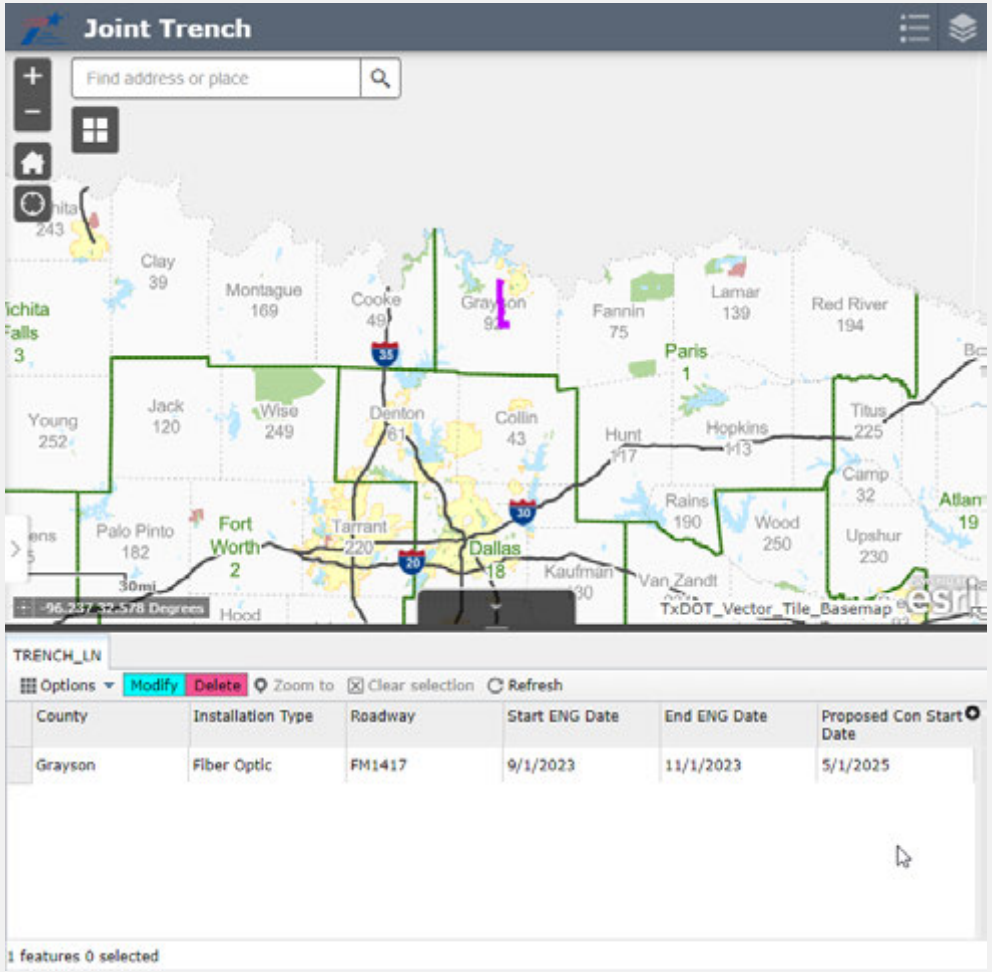


https://www.txdot.gov/business/resources/utility-accommodations.html

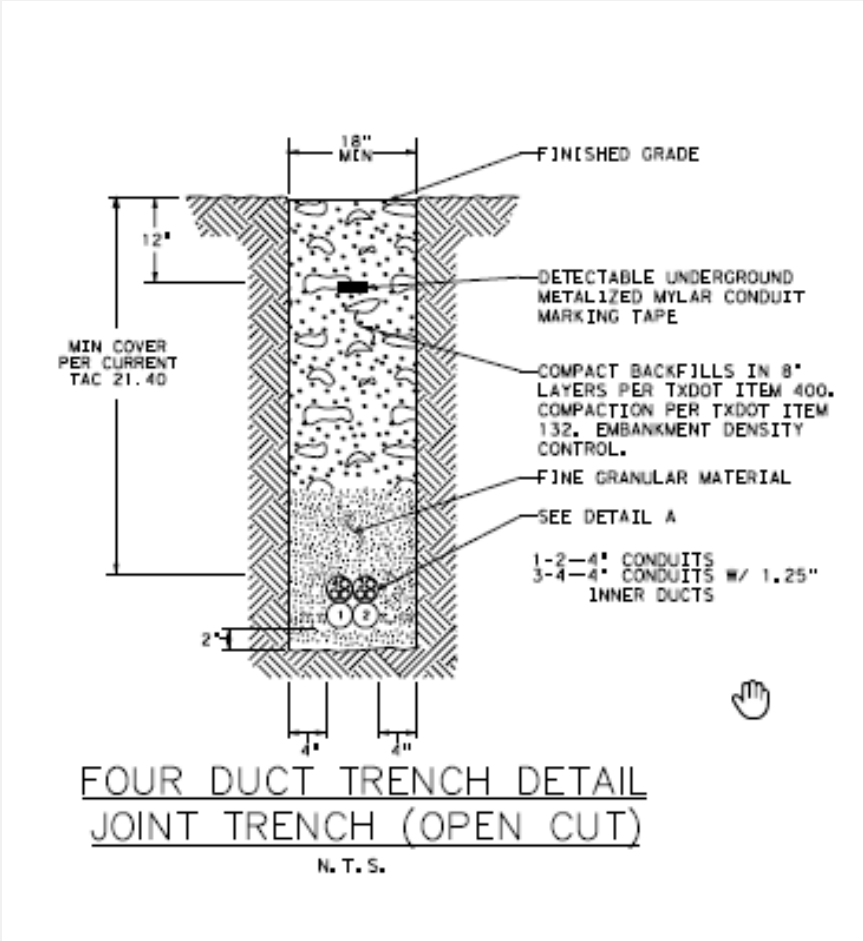
Joint Trenching Application

- https://maps.dot.state.tx.us/JTA/
- Providers can enter a planned route and contact email.
- When overlapping routes occur, an introductory email is sent to associated providers.
- ISPs conduct coordination and negotiations.
- TxDOT typically does not assist with the actual coordination between ISPs.



Joint Duct Bank

- Statewide Special Specification SS 6526 (14), "Joint Duct Bank"
- Available for use in July 2024 letting
- Duct bank is built in conjunction with TxDOT construction project
- TxDOT discussions underway regarding process for occupying ducts



Utility Joint Bid

- Utility built as part of a TxDOT Construction Project
- Cost share opportunity
- Potential for time savings
- Any TxDOT project that receives federal aid must comply with Buy America Act

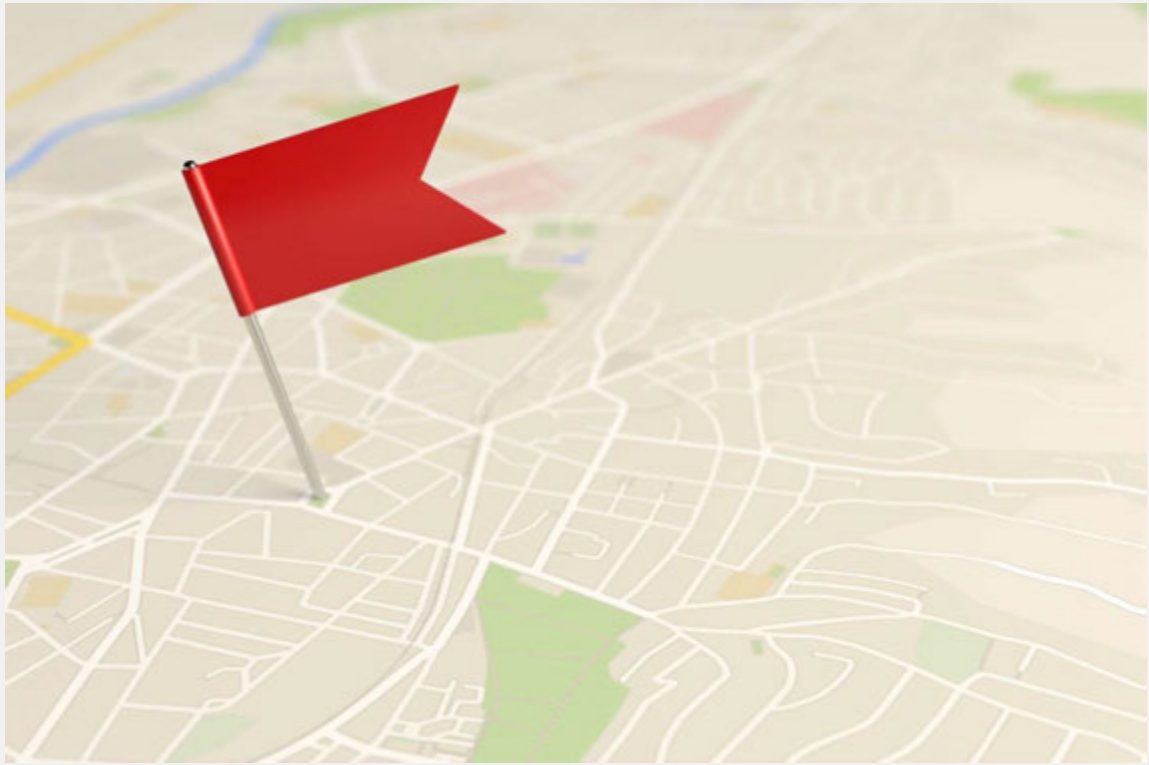
Utility Week

- Hosted by Right of Way Division
- Typically 2-4 days in Austin
- Attendees include traditional utility companies, consultants, TxDOT Right of Way & permitting staff
- Learn about new initiatives from ROW and RULIS improvements

Opportunities for Broadband Planning

Mapping

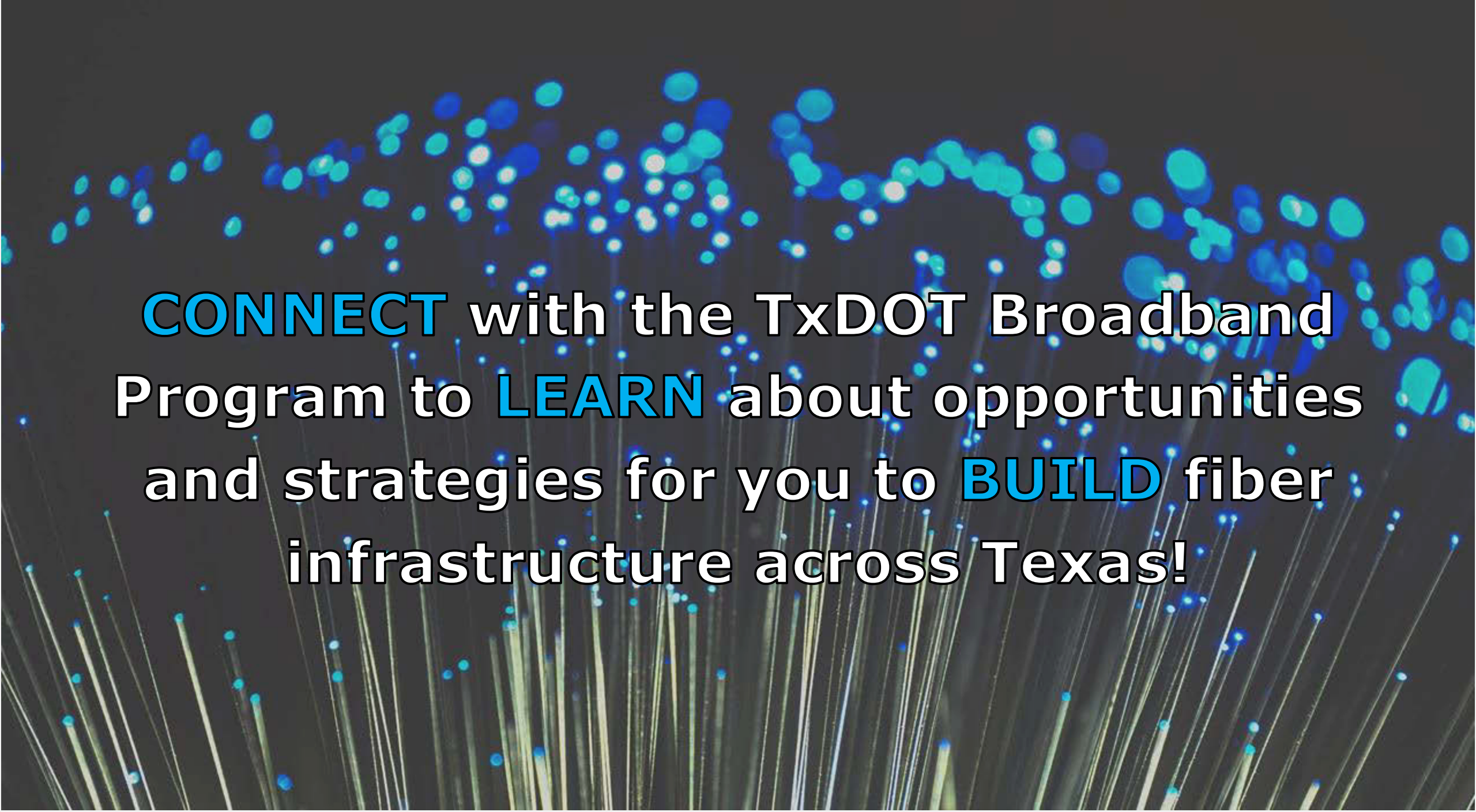
- Mapping TxDOT broadband infrastructure
- Digital delivery of as built documentation
- Share conduit map online



Broadband Expansion

Need a prioritization strategy for conduit and fiber that supports emerging transportation technologies.

Local/regional plans exist – need coordination from a statewide perspective



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Broadband Program

Broadband@txdot.gov

Scan to add contact information.

Cristy Burch
Broadband Coordinator
Cristy.Burch@txdot.gov
M: 512.413.2045

Every Day Counts (EDC)

EDC-7: NEXT GENERATION TRAFFIC INCIDENT MANAGEMENT (TIM)

Sean Qian, Traffiqure

QureTraffic: AI-powered Predictive Analytics for Traffic Incident Management

Sean Qian

CEO, TraffiQure Technologies

admin@TraffiQure.com

Carnegie Mellon University
Civil and Environmental Engineering

TraffiQure

TraffiQure Technologies

- CMU R&D, Mobility Data Analytics Center
  - 15+ years' research on AI/ML and mobility
  - 17M+ research projects
    - FHWA, DOE, state DOTs, MPO, OEM…
- TraffiQure LLC
  - Tech deployment & commercialization
  - Current contracts
    - FHWA, BTS, MPO, state/local

QureTraffic 1.0

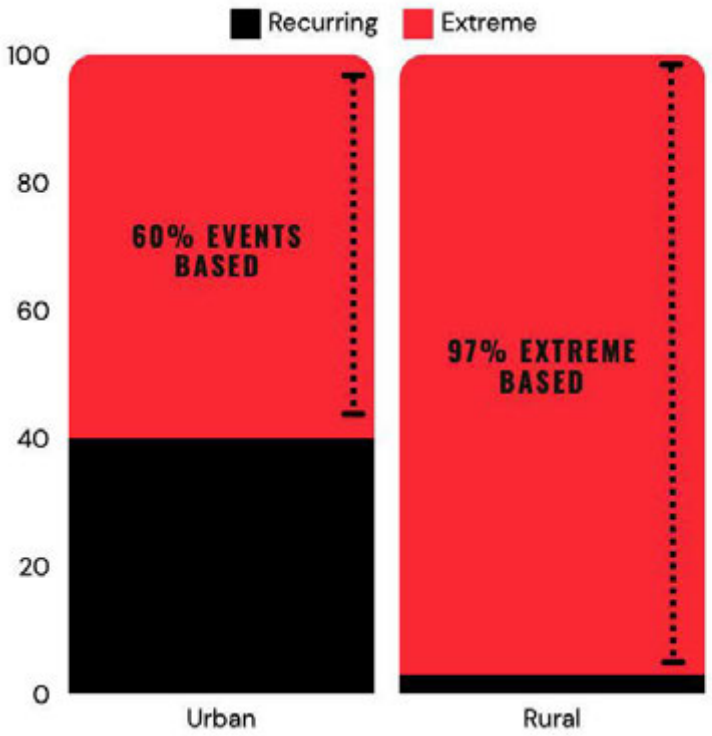
Predictive Analytics

Traffic operation powered with ML

PA (2019), MD (2023), FL (2024)

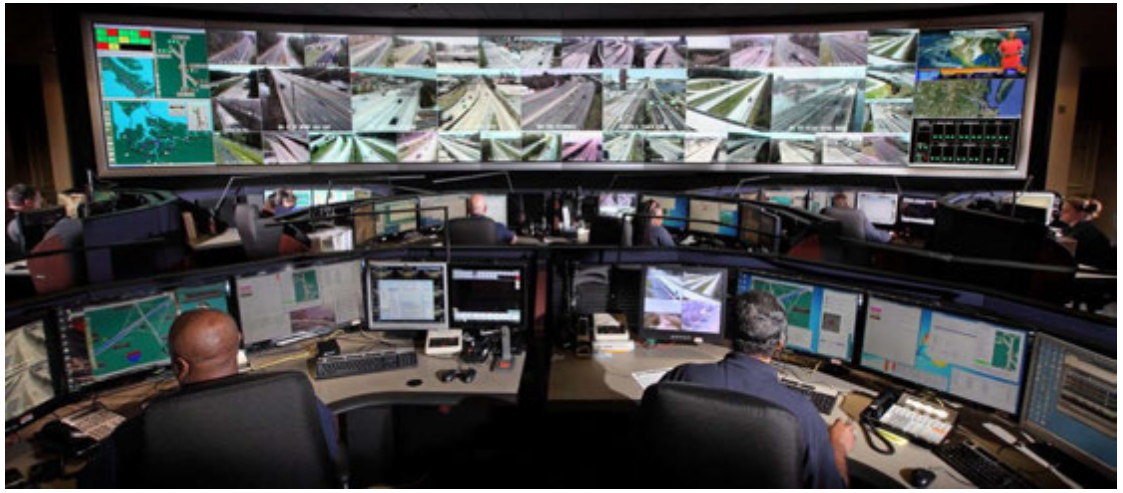
Initial support from Mobility21 UTC and FHWA EAR

Non-recurrent incidents



Pain points

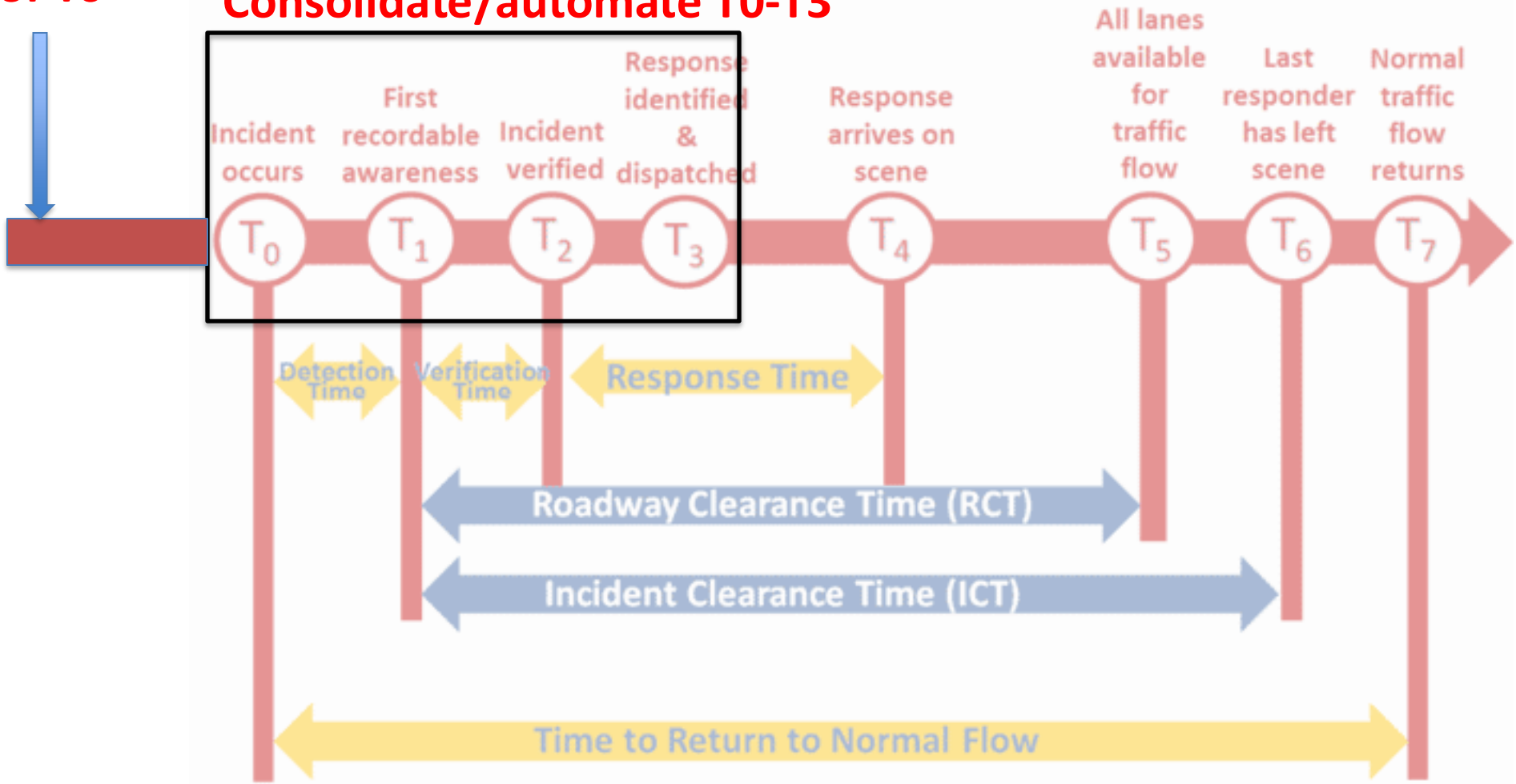
- Incident report not timely (or missing)
- Data overload
- Lack of workforce
- Manual process: inefficient, erroneous



Our goal

Get ahead of T0

Consolidate/automate T0-T3



Problems

- Predict/Detect an incident for each ½ mi road segment 30min ahead (up to 2 hours)
  - Goal: 15~25min ahead of Waze
  - 24/7
- Impact of non-recurrent traffic
- Proactive actions before too late:
  - e.g., Contingency signal timing plans, DMS, queue warning, lane control, ramp metering, tolling, etc.

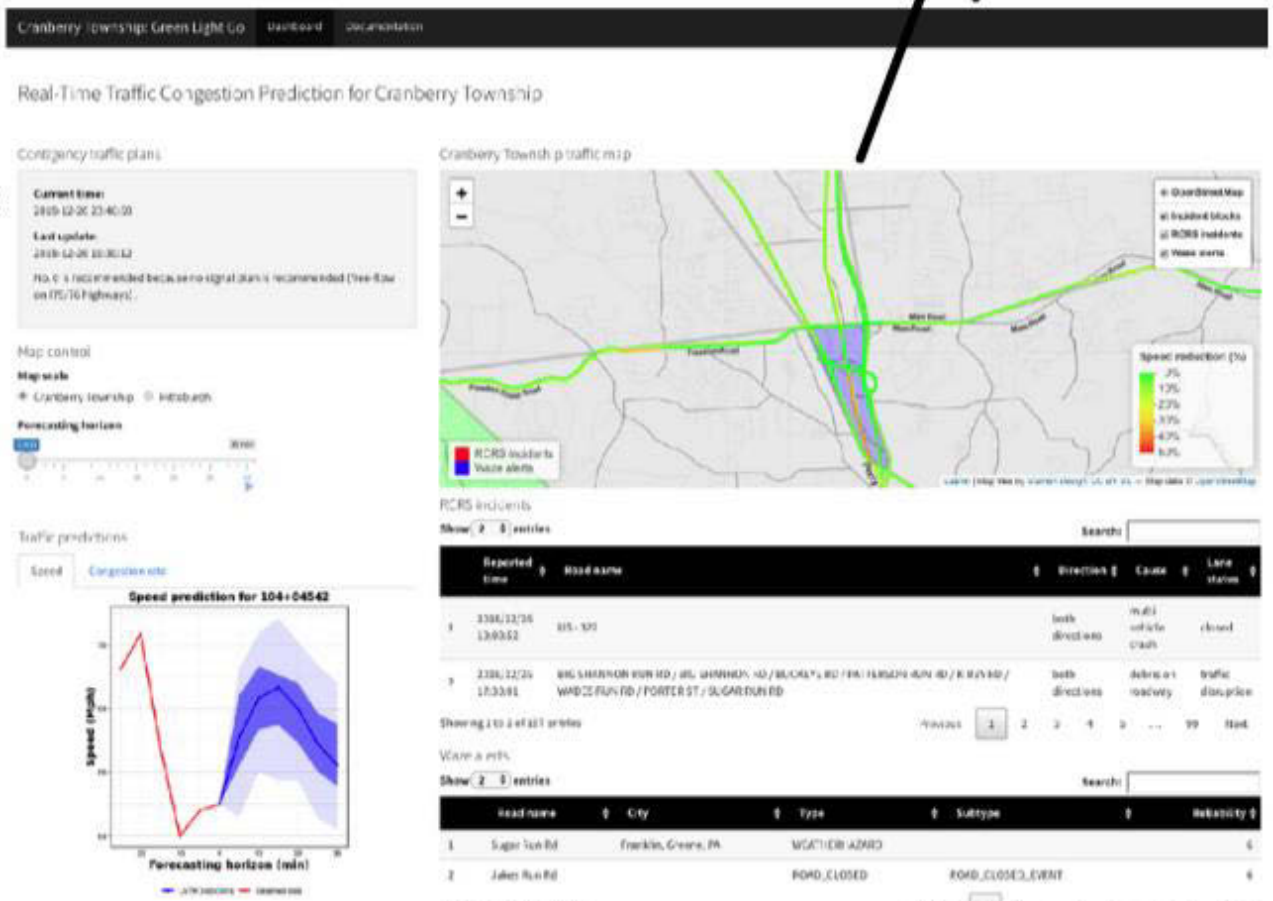
Why is this useful?

- Predictive information (not reactive)
- Automating the process and decision making
- Reduce heavy data/info load to TMC staff
- Recommend optimal actions in advance

AI-powered engine

Adjustable Coverage Area

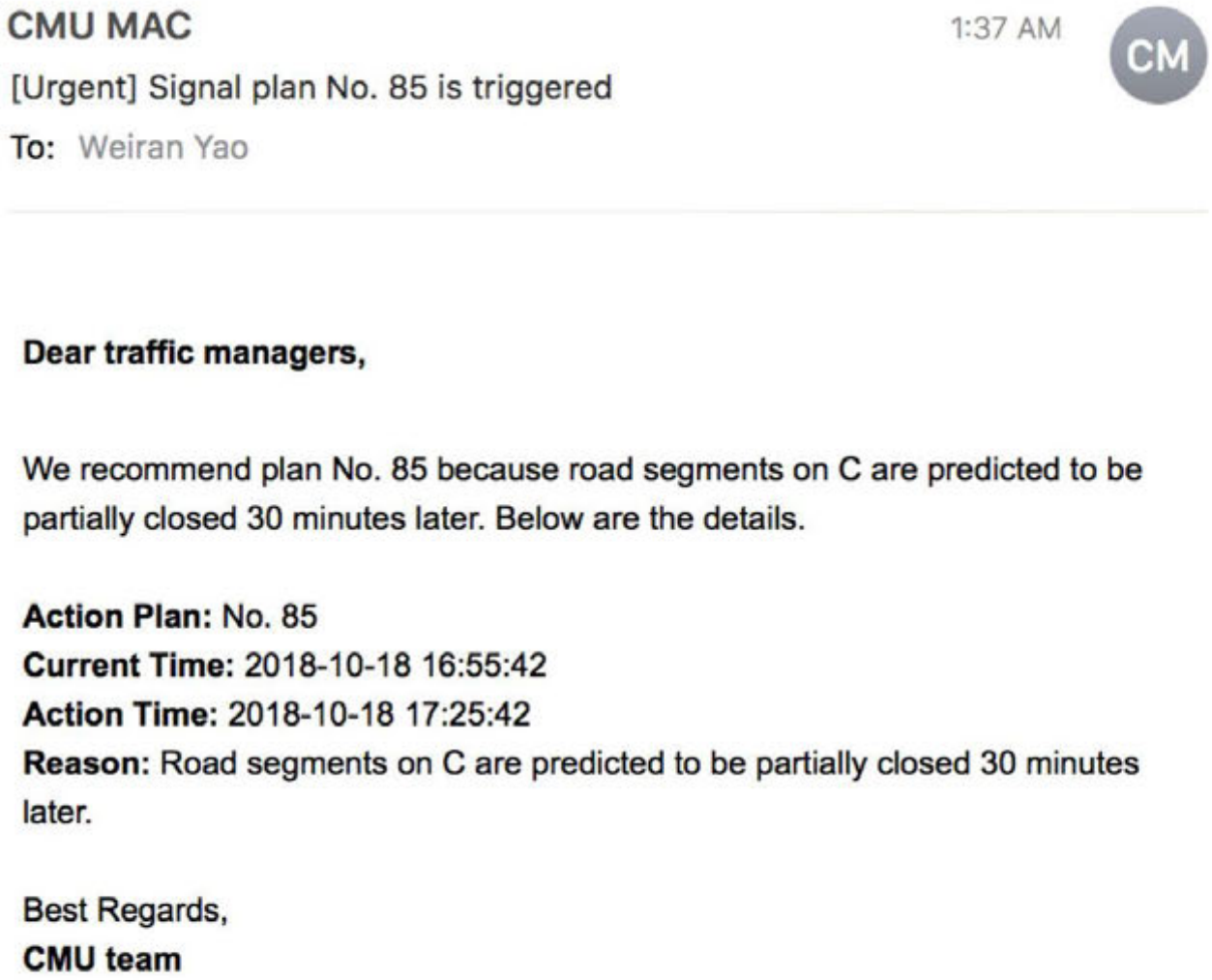
Event Prediction & Plan Recommendation



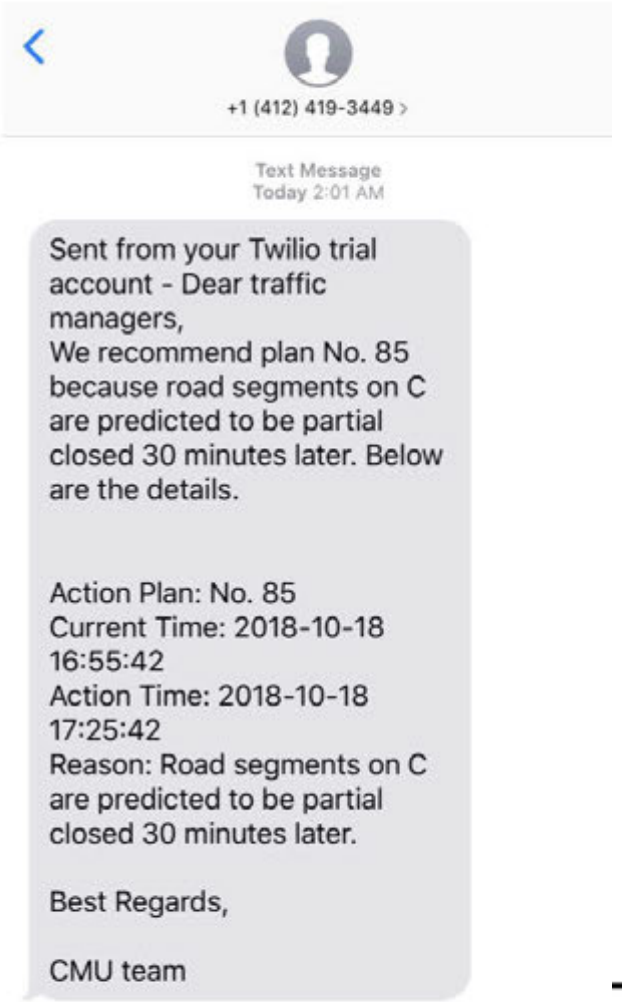
AI Prediction Horizon

Forward-Looking KPIs

To TMC operators



(a) Email notification sample.



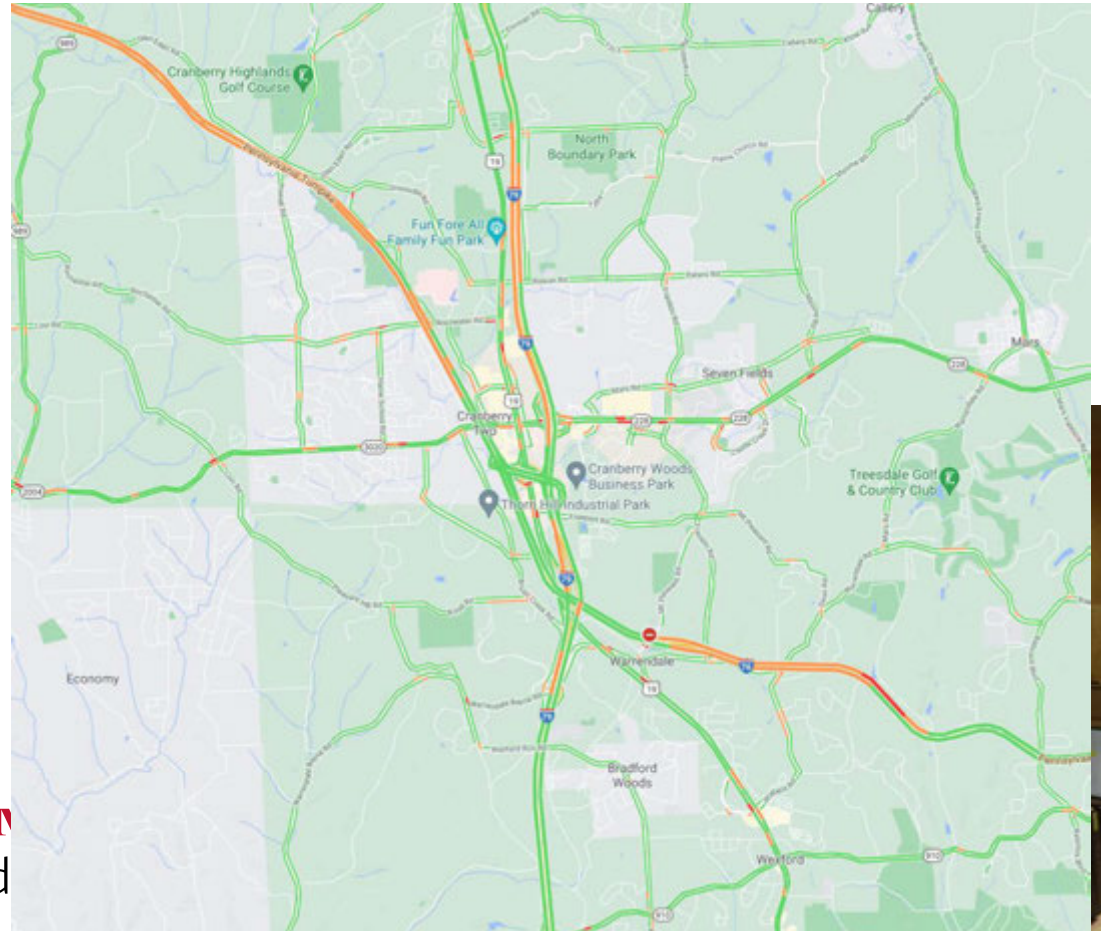
(b) Text notification sample.

Features

AI: automating decisions from massive data	
Software as a Service	Work with any ATMS, no disruption Only need a smartphone, a browser Minimum workforce training
Prediction and proactive action	Anomaly starts Anomaly ends
Any extreme events	Flooding, landslides, etc.

Example: a PA TMC

- Remote access to signal controllers and DMS

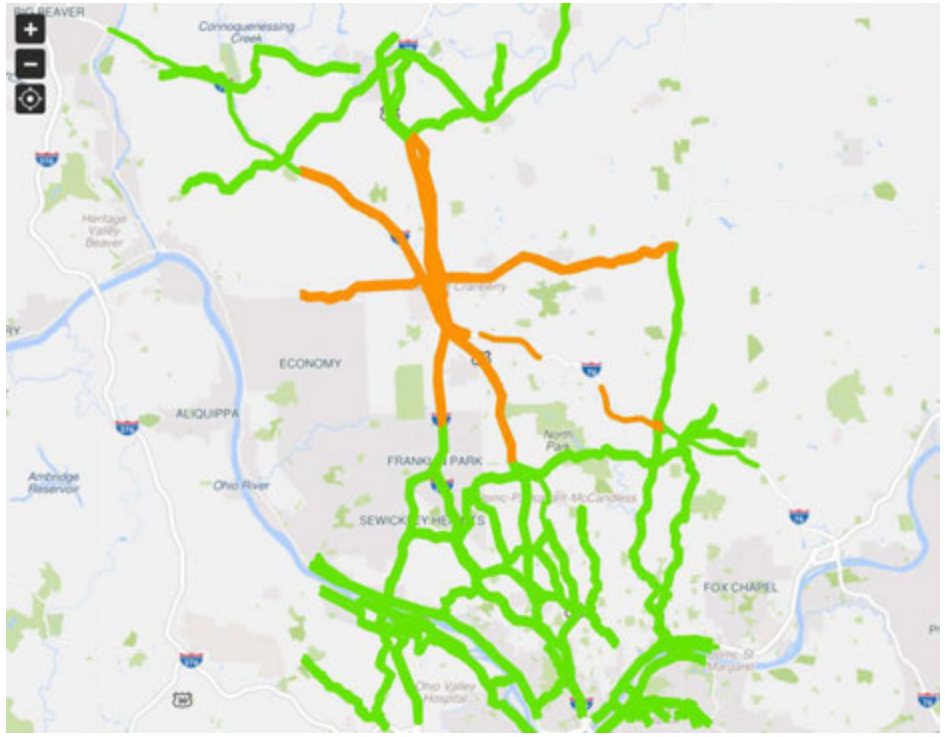


Example: a PA TMC

- VERY Early anomaly prediction: GAN and Transformer
- Recommendations

Action Plan Number	Description	
	Full Closure	
81 (AM) 82 (PM)	(A) I-79 Southbound	Closure north of Route 228
83 (AM) 84 (PM)	(B) I-79 Northbound	Closure north of Route 228
	Partial Closure	
85 (AM)	(C) I-79 Southbound	Closure south of Route 228
86 (MID/PM)	(D) I-79 Northbound	Closure south of Route 228
87 (MID/PM)	(E) I-76 (PA Turnpike) Eastbound	Closure east of Cranberry Twp
88 (MID/PM)	(F) I-76 (PA Turnpike) Westbound	Closure west of Cranberry Twp
	Weather Related Plans	
89 (MID/PM)	Incident Weather Timing Plan (Snow)	
	Holiday Shopping Timing Plans	
92-98	Holiday Shopping Timing Plan	

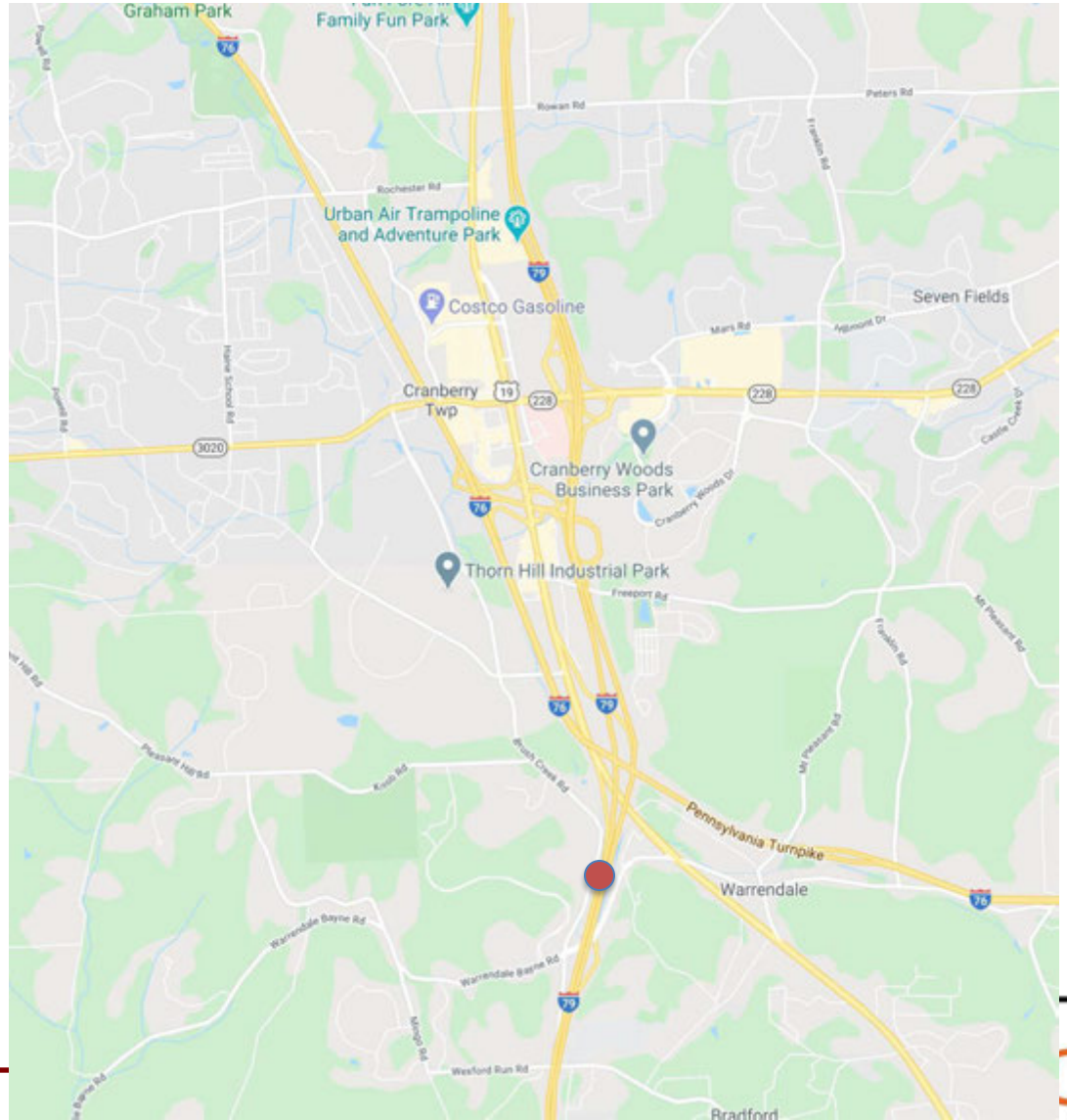
Data



Probe speeds, Waze, weather, RCRS

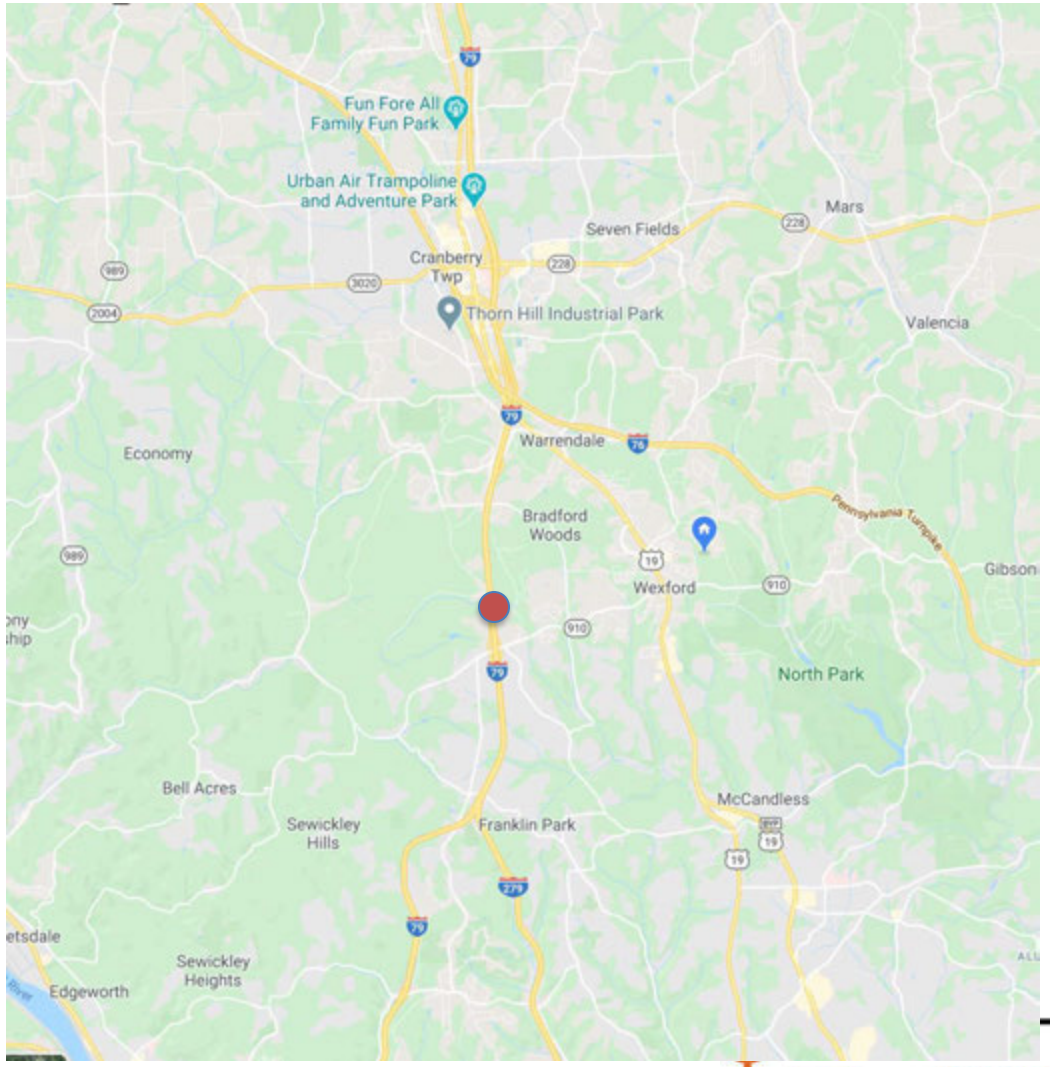
Example 1

- Crash on I-79 SB on Oct 18, 2018
- Reported to the TMC managers between 5:45 PM and 6:00 PM
- This would have been picked up by 4:55pm, to start plan No. 85
- The termination of No.85 would have been suggested by 5:55pm



Example 2

- Crash on I79 SB on Jan 30, 2019
- RCRS reported 6:39am, Waze reports started 6:15am
- This would have been picked up by our model by 6:00am.

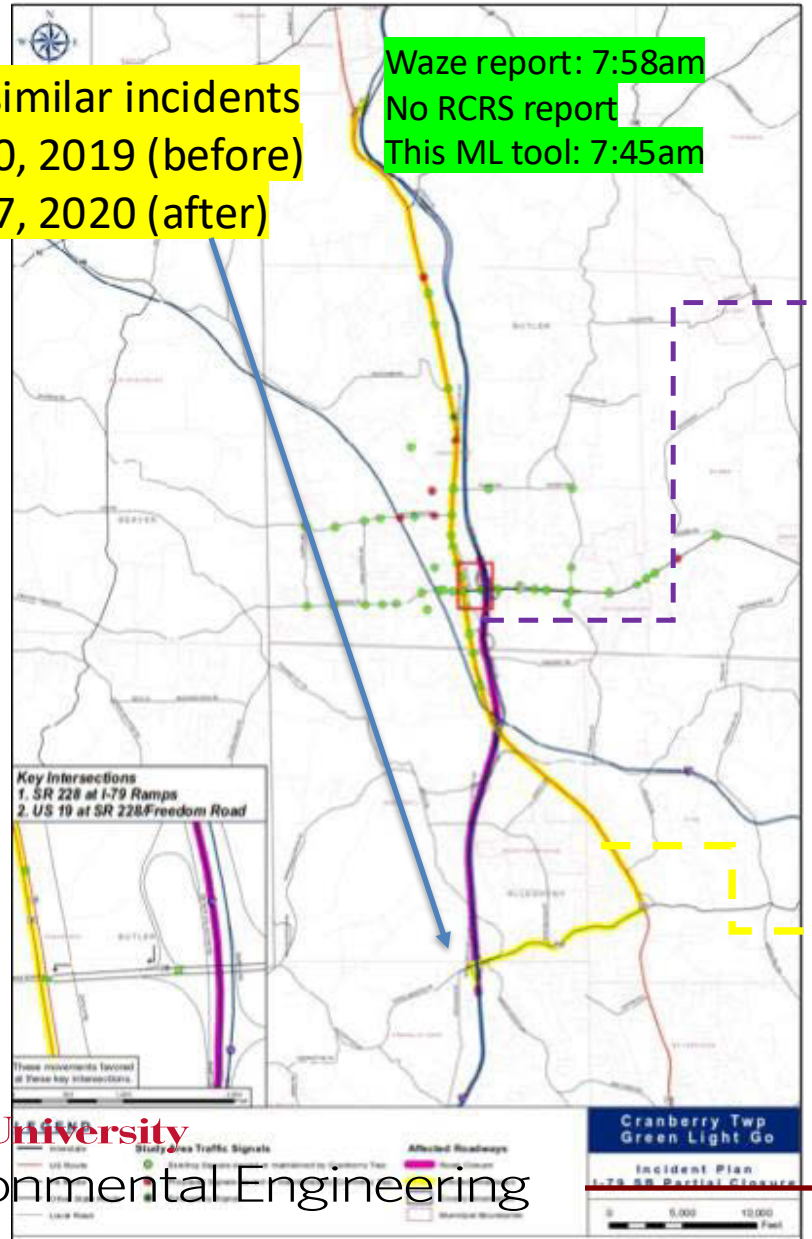


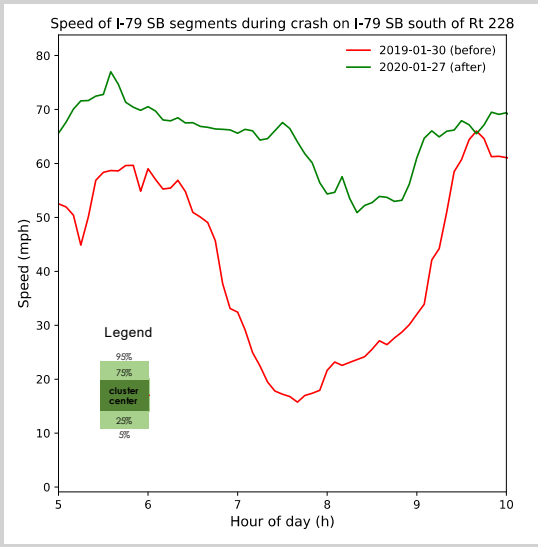
Before-and-after analysis of congestion management in Cranberry Township

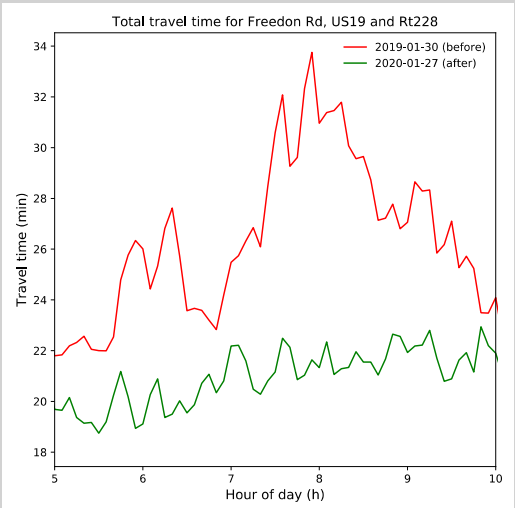
Congested segments and **affected** segments

Two similar incidents
Jan 30, 2019 (before)
Jan 27, 2020 (after)

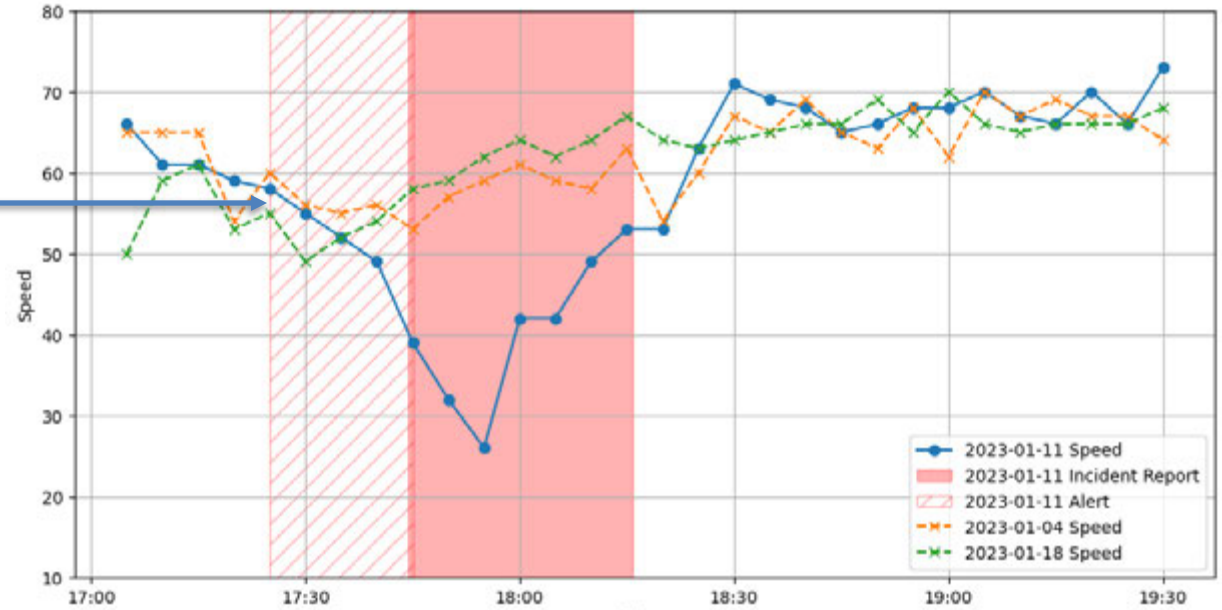
Waze report: 7:58am
No RCRS report
This ML tool: 7:45am





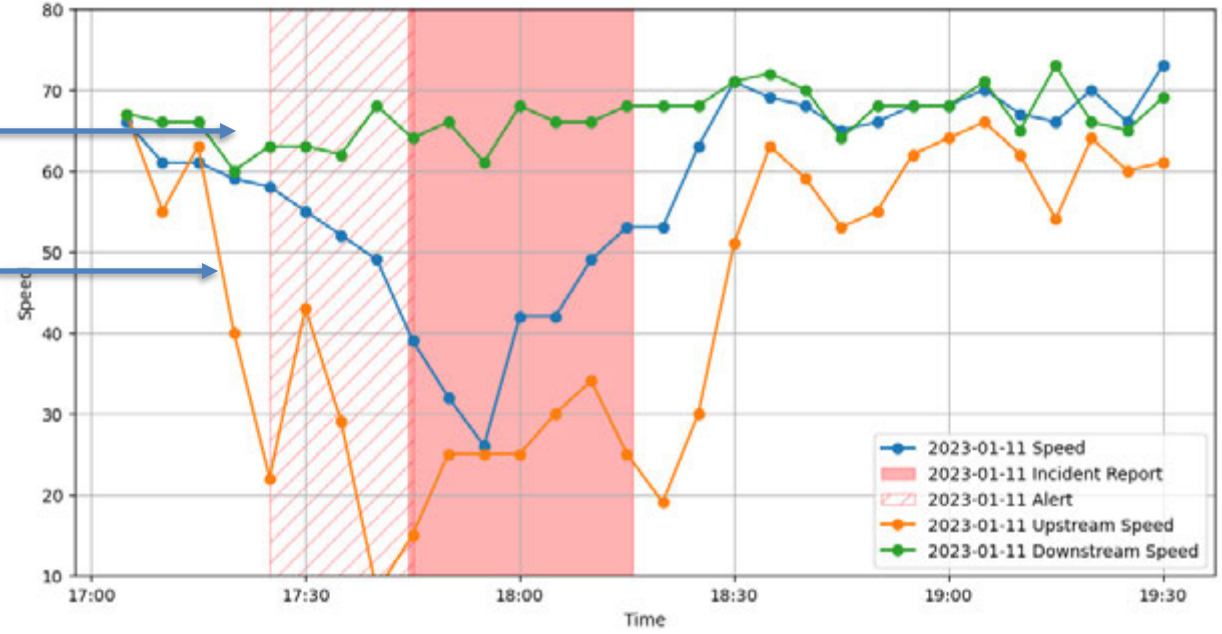


17:25 alert



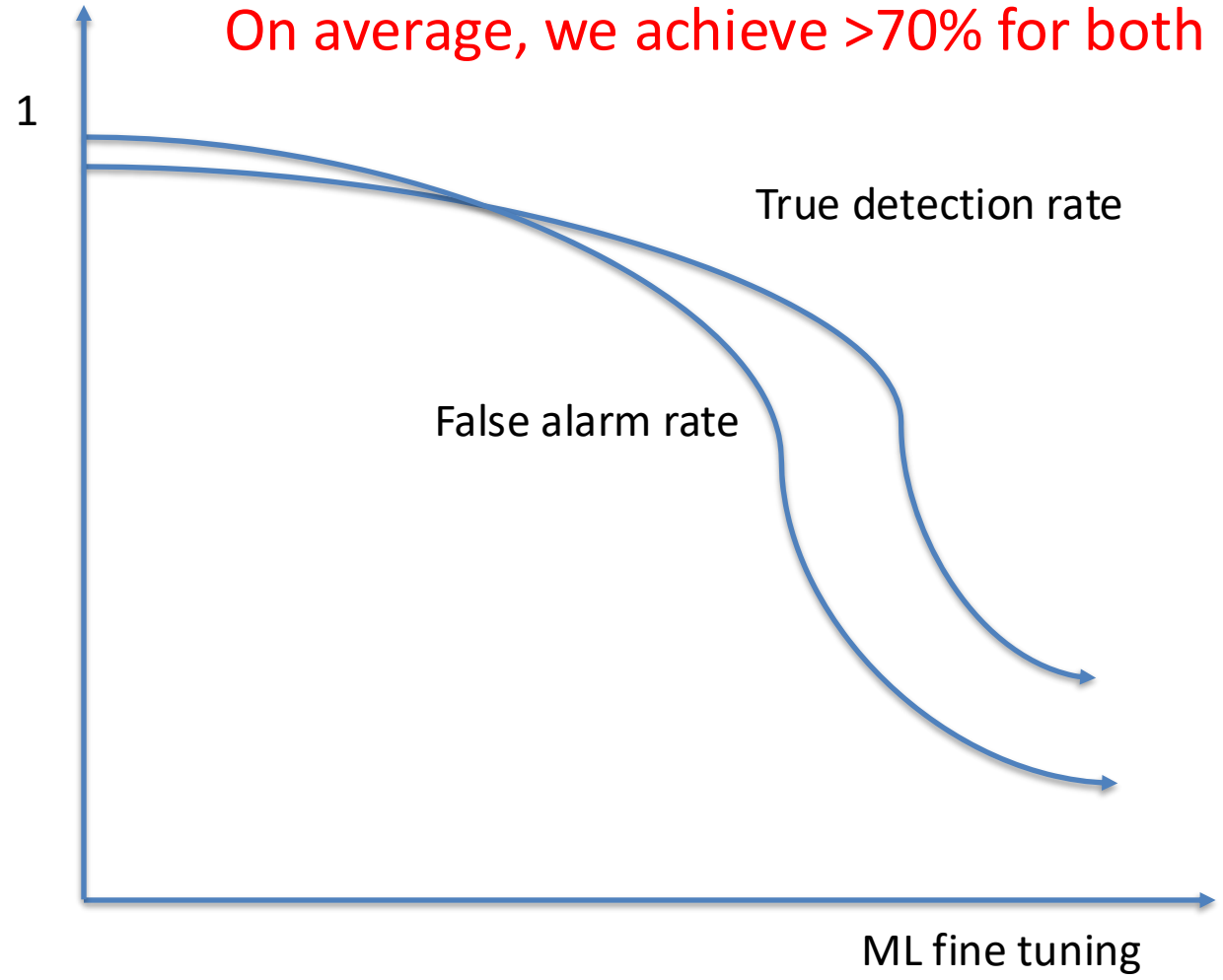
Downstream traffic free-flow

Upstream traffic break down



Performance Trade-off

On average, we achieve >70% for both



AI-powered results

AUDIENCE QUESTIONS

BREAK

Peer Exchange

WRONG-WAY DRIVING

Moderator: Josh Shideler, TranStar

Gabriel Garcia & Daniel Garcia, TxDOT Pharr District

Juan Marfil, TxDOT Corpus Christi District

Marc Jacobson, City of San Antonio

Peer Exchange

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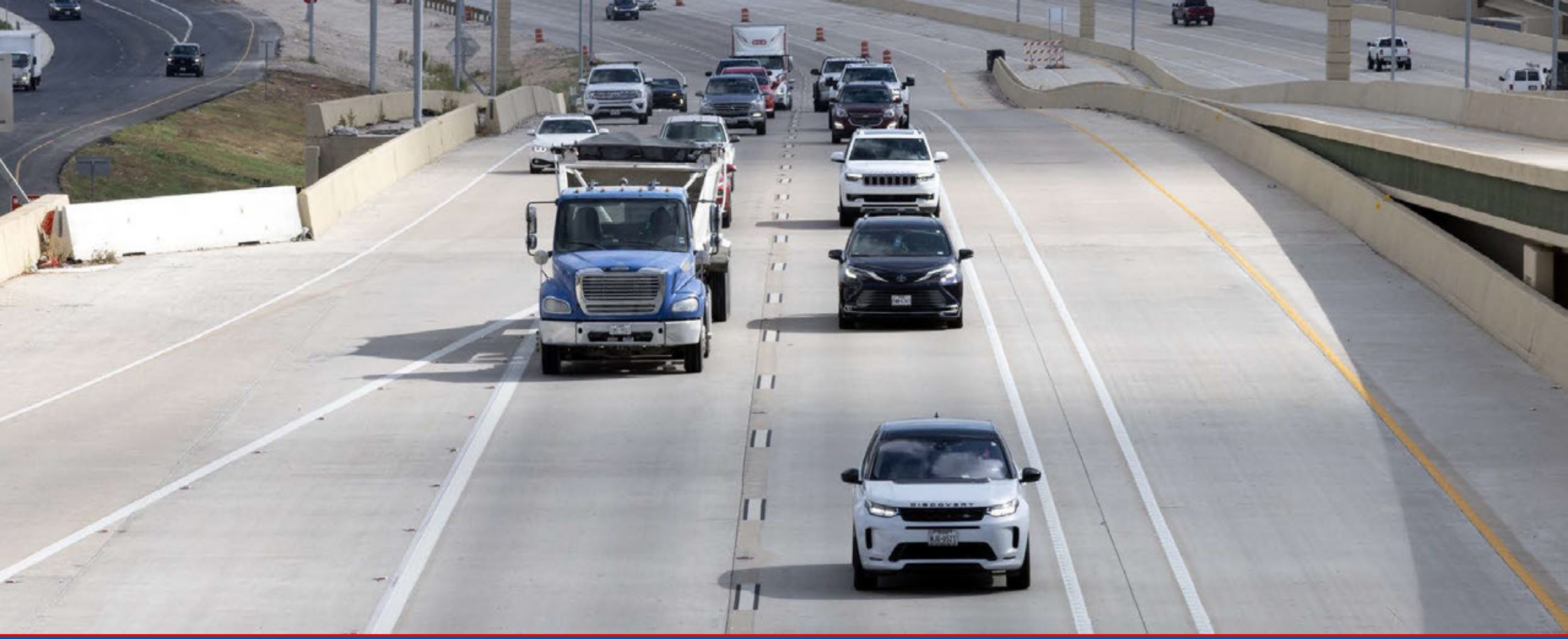


Texas Innovation Alliance

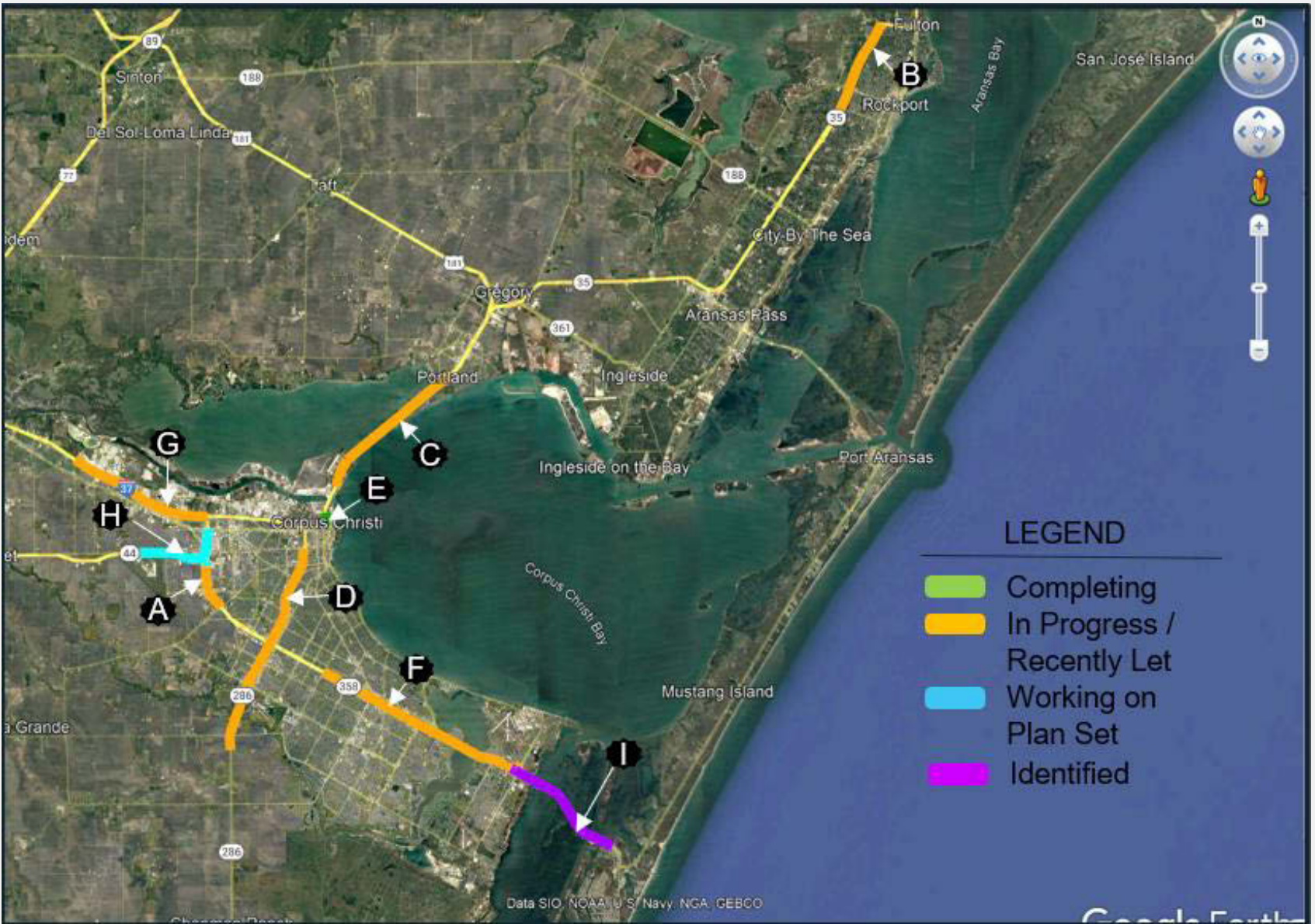
Peer Exchange: Wrong Way Driving

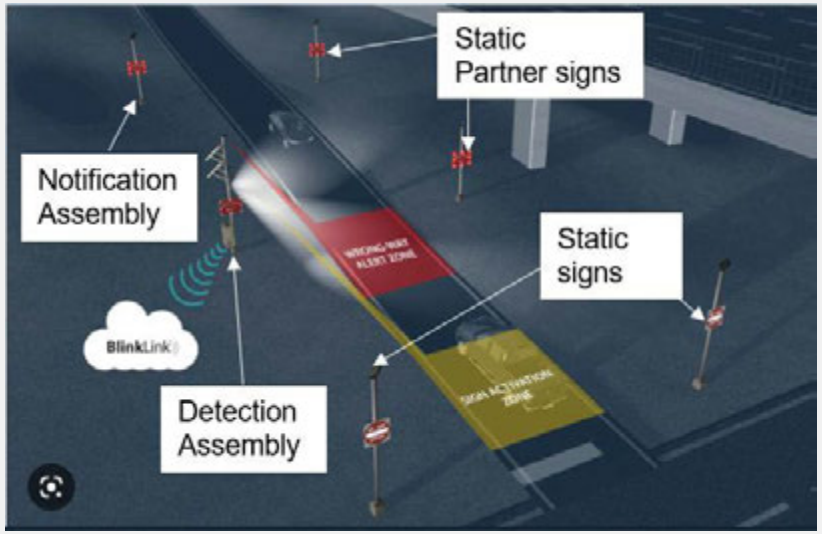
CRP District

Texas Department of Transportation

October 28, 2024

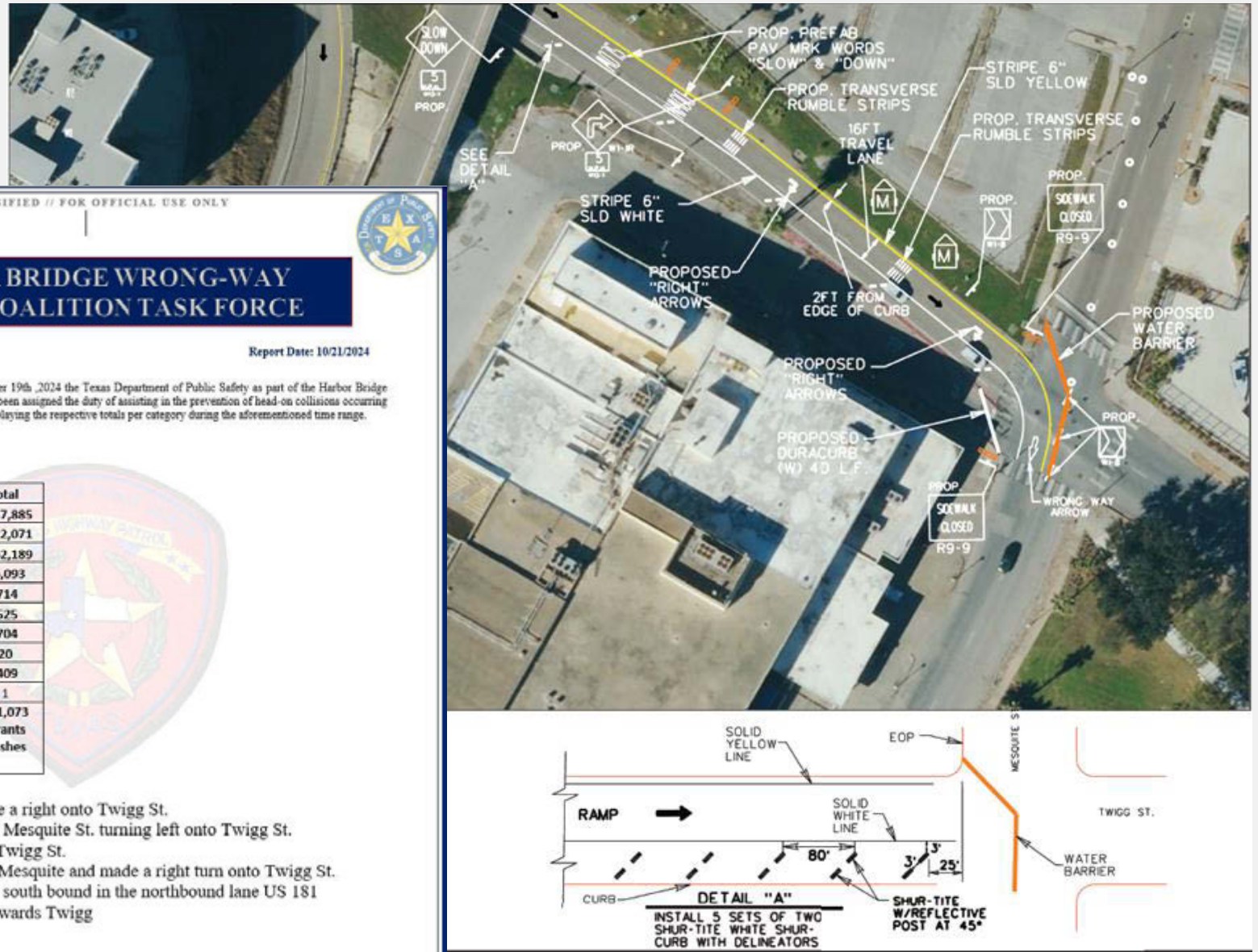
Wrong Way Driver Advance Technologies Implementation





Typical Detection and Notification Setup

Exit Ramp to Twigg - Detection



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HARBOR BRIDGE WRONG-WAY DRIVER COALITION TASK FORCE

Report Date: 10/21/2024

(U) Executive Summary

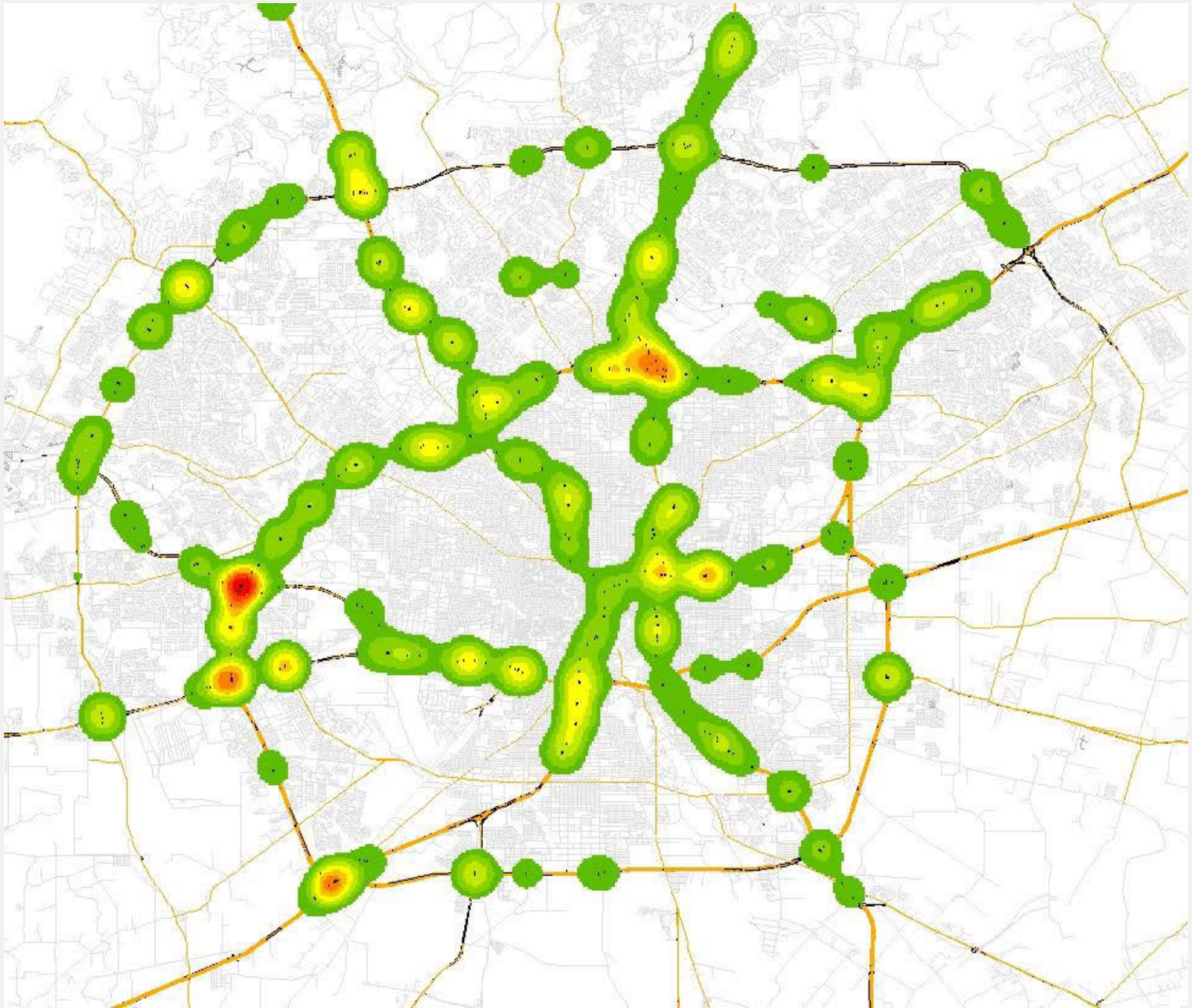
(U//FOUO) March 11th, 2023, through October 19th ,2024 the Texas Department of Public Safety as part of the Harbor Bridge Wrong-Way Driver Coalition Task Force has been assigned the duty of assisting in the prevention of head-on collisions occurring on the Harbor Bridge. Below are statistics displaying the respective totals per category during the aforementioned time range.

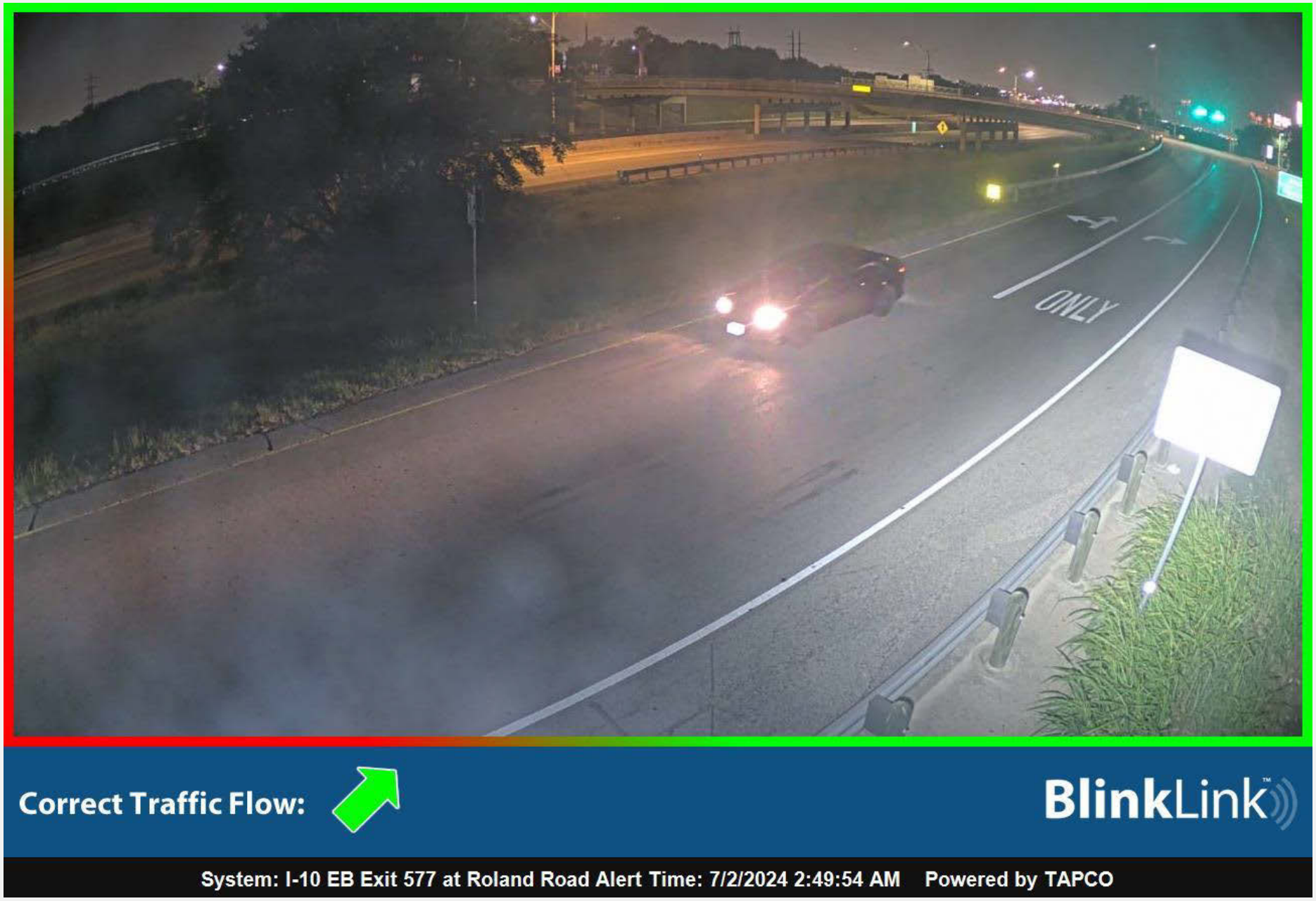
	Total
Total Stops	57,885
Citations	22,071
Warnings	62,189
Speed Citations	6,093
Seatbelt Citations	714
DWI Arrests	525
Narcotics Arrests	704
Wrong-Way Drivers	20
Motorist Assists	409
Camera Hits	1
Other	1,073 Warrants &Crashes

8-Traveled on Chaparral made a right onto Twigg St.
3-Traveled the wrong-way on Mesquite St. turning left onto Twigg St.
3-Turned off Water St. on to Twigg St.
2-Traveled right direction on Mesquite and made a right turn onto Twigg St.
1-Made a U-turn and traveled south bound in the northbound lane US 181
1-Wrong-way on Mesquite towards Twigg
2 Mesquite onto Twigg.

Detection Zone

WB67 Turn




ONLY
Correct Traffic Flow:
BlinkLink
System: I-10 EB Exit 577 at Roland Road Alert Time: 7/2/2024 2:49:54 AM Powered by TAPCO

Correct Traffic Flow:
BlinkLink
System: I-410 SB Exit 39 WW White Rd Alert Time: 8/15/2024 3:29:21 AM Powered by TAPCO

WRONG WAY
WRONG WAY
WRONG WAY

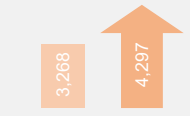
DO NOT
ENTER

TrafiSense AI PoE S/N:605899
10/21/24 01:34:14 AM
2
1

San Antonio

Freeway Performance Report
April-June (Q2) 2024

SYSTEM DELAY/MILE

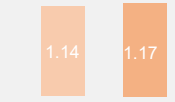


+31%

Daily vehicle delay hours per directional mile

Overall delay was substantially higher in the spring compared with a year ago,

TRAVEL TIME INDEX

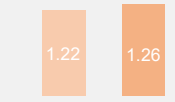


3 points

Peak period vs. off peak travel times

and during AM and PM peaks delay was a bit higher…

PLANNING TIME INDEX

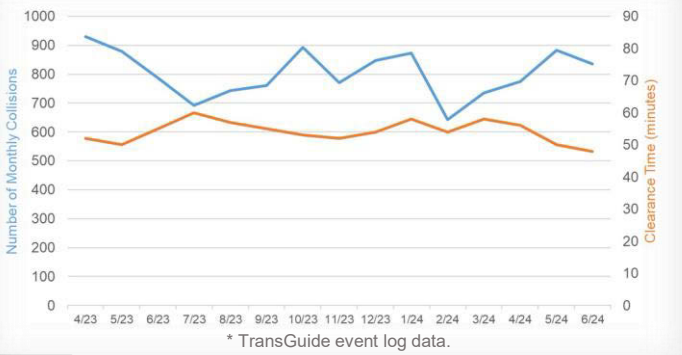


4 points

Unreliability (variability) of travel

with trip times less predictable compared to last year.

51 ***minutes*** *was the average* ***clearance time*** *recorded for TransGuide-managed collisions in Q2 of 2024.*

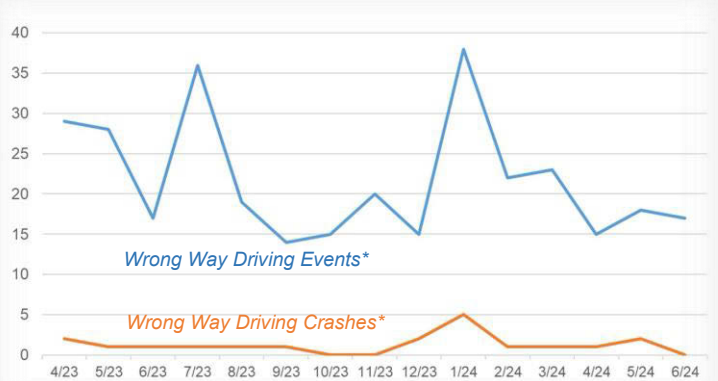


* TransGuide event log data.

Since 2011, traffic management and enforcement agencies from the San Antonio region have worked together to reduce wrong way driving. Their efforts have resulted in the potential ***saving of***

110 ***lives.***

Year	WWD Events	WWD Caught
2011-2015	1020	47
2016-2020	924	36
2021	155	9
2022	108	8
2023	236	6
2024 (Q1-2)	133	4



* TransGuide event log data.

4.2%

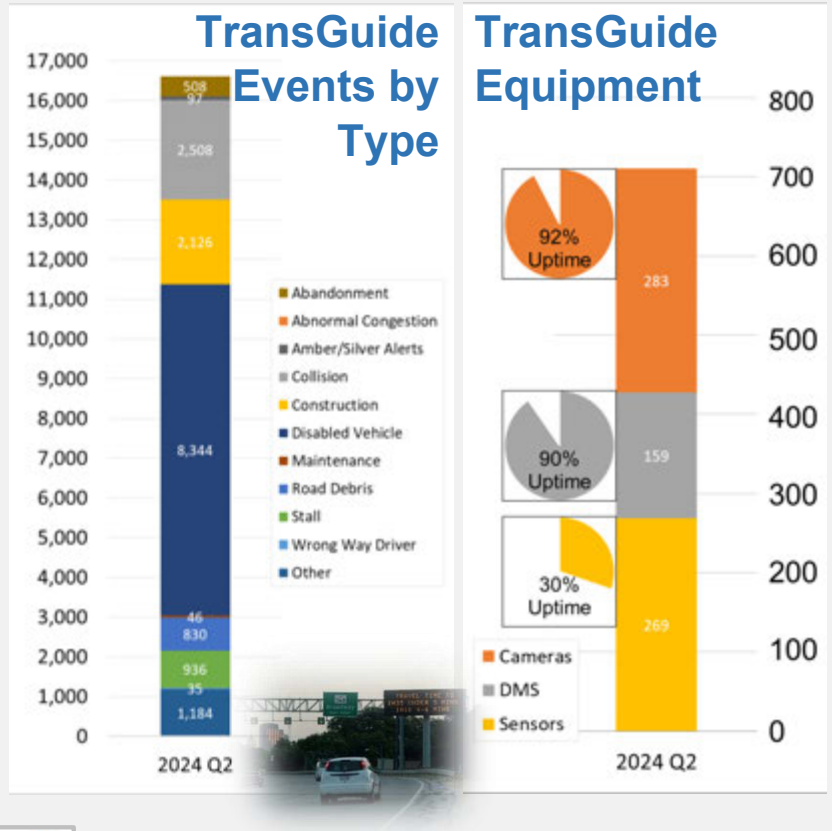
of San Antonio's freeway crashes in Q2 of 2024 were **secondary crashes**. *The quicker we respond to all crashes, the better chance we have of reducing secondary crashes.*

Quarter	Secondary Crashes
2023 Q2	4.6%
2023 Q3	4.6%
2023 Q4	4.2%
2024 Q1	4.2%
2024 Q2	4.2%

*The Texas State Operations network issues missing person advisories in cooperation with public agency and private partners to notify the public of missing person cases. TxDOT and TransGuide participate in posting messages regarding **AMBER Alerts**, which **had an extremely high success rate between 2017 and 2020**.*

Alert Type	Found Safe/Activations					
Year	2017	2018	2019	2020	2021	2022
AMBER Alert	17/22	13/13	21/22	48*/38	n/a	n/a
Silver Alert	104/109	84/94	107/108	109/117	n/a	n/a
Blue Alert	1/1**	1/1**	3/3**	0/0**	n/a	n/a
Endangered Missing	2/2	4/4	9/13	15/15	n/a	n/a
CLEAR***			1/1	24/31	n/a	n/a

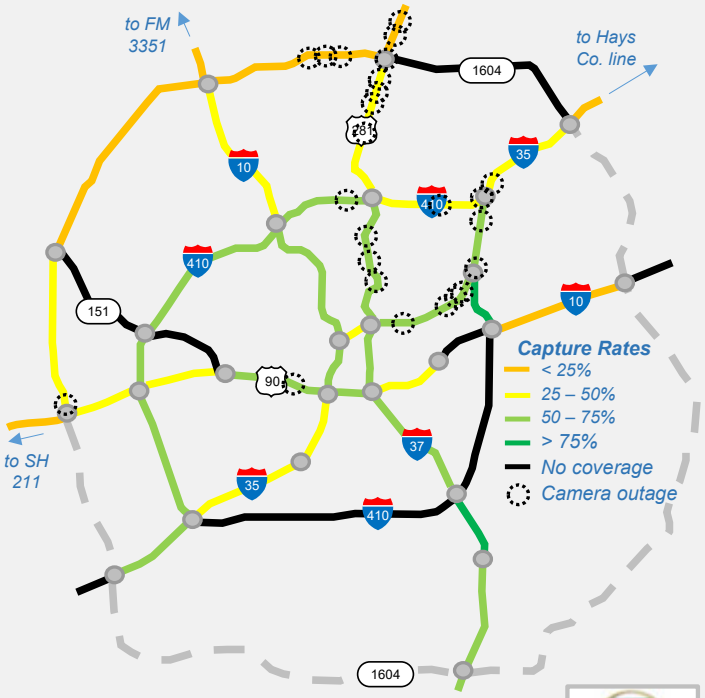
* siblings included in count; ** suspects found; *** Coordinated Law Enforcement Adult Rescue



42%

*of San Antonio's total freeway **crashes** – and all severe crashes – were **managed** by TransGuide operators in Q2 of 2024.*

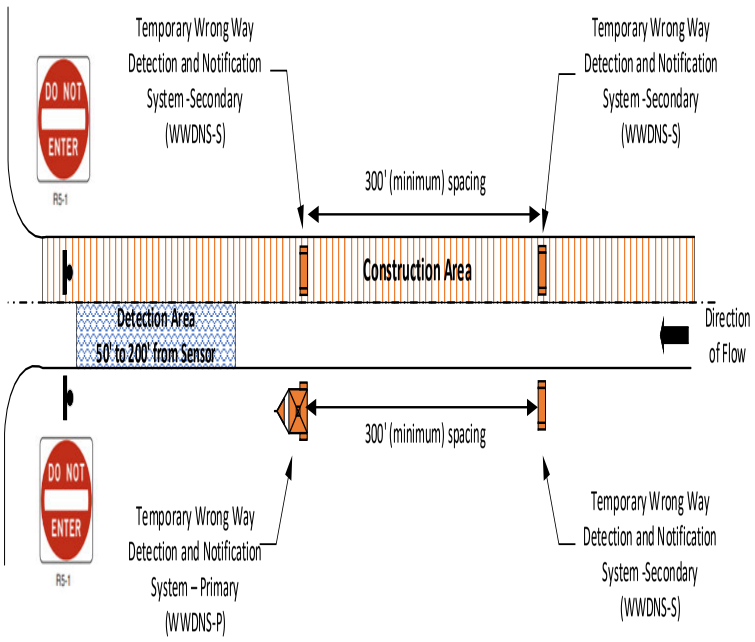
TransGuide Operator Capture Rate by Corridor (KABCO Crashes, Q2 2024)	
Interstate Highway 10	43%
Interstate Highway 35	34%
Interstate Highway 37	68%
Loop 410	56%
Loop 1604	13%
US Highway 90	55%
US Highway 281	41%

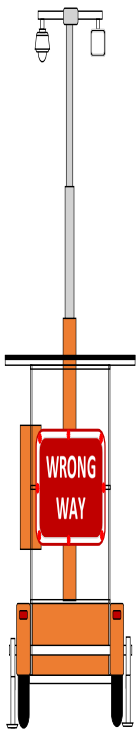


Connecting you with Texas.

TYPICAL INSTALLATION

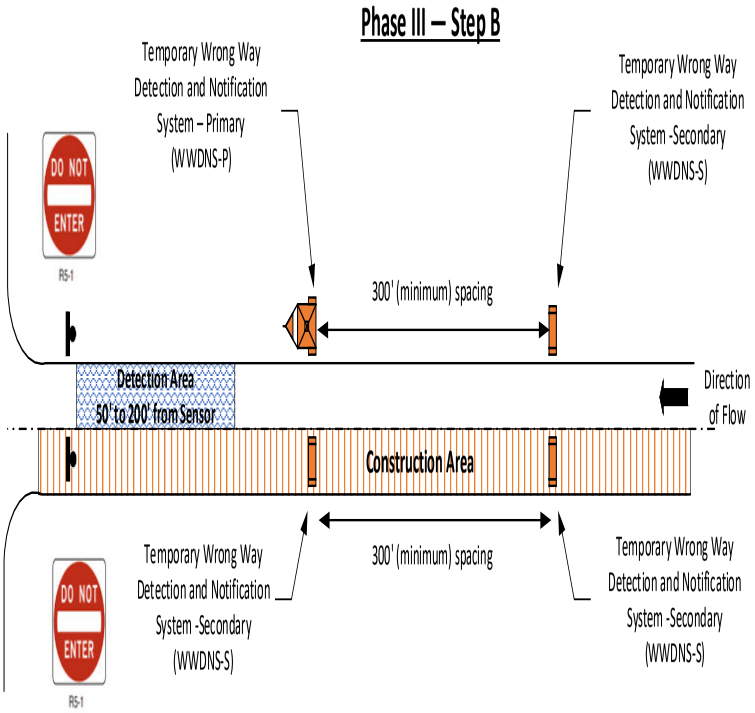
Phase III – Step A

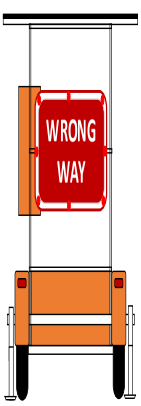




Trailer Assembly with Temporary Wrong Way Detection and Notification System – Primary (WWDNS-P)

Phase III – Step B



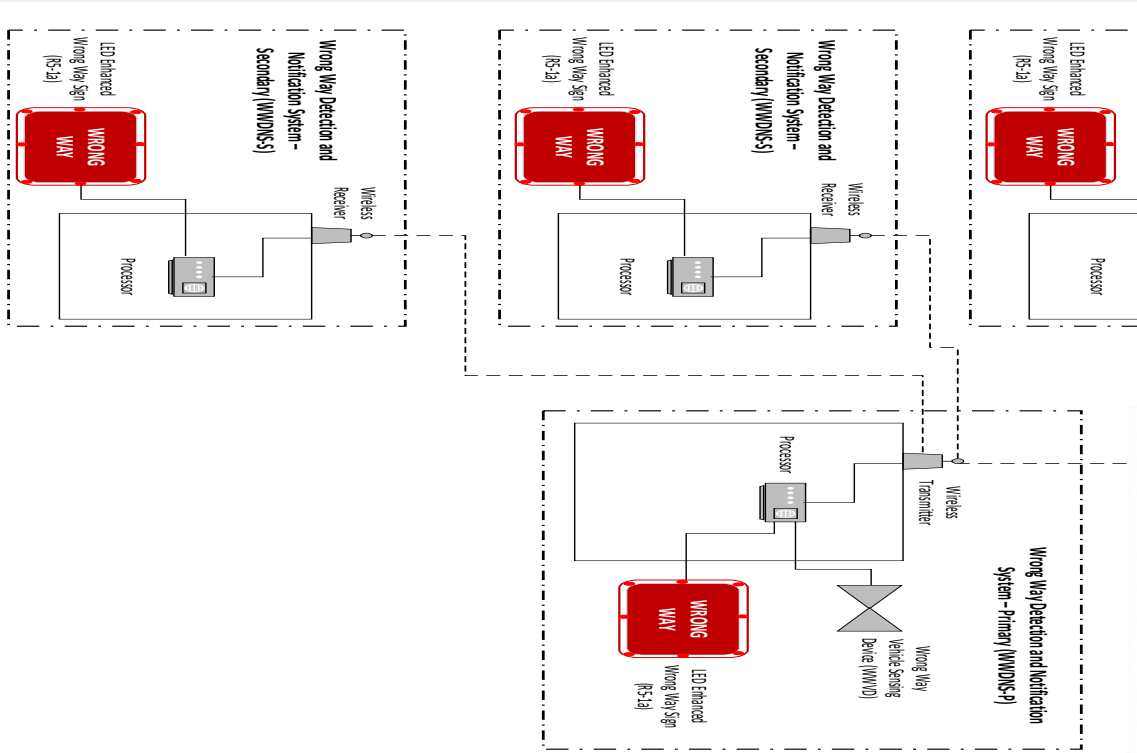


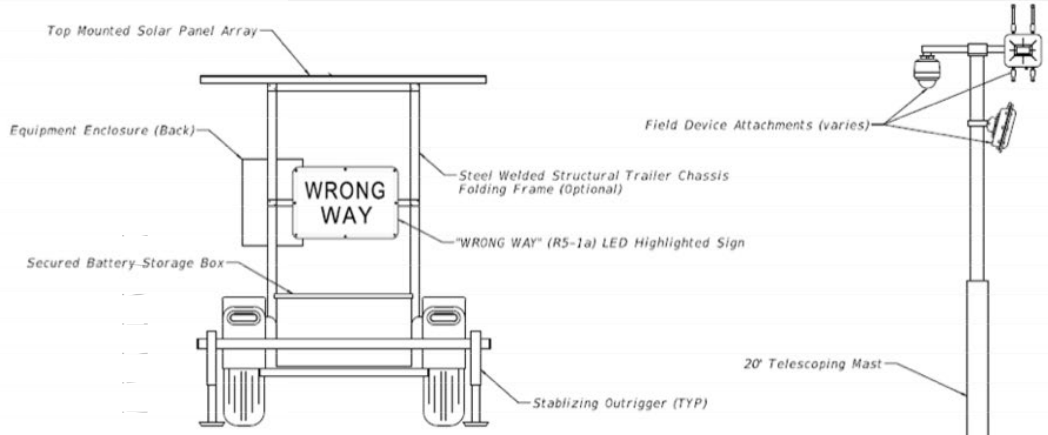
Trailer Assembly with Temporary Wrong Way Detection and Notification System - Secondary (WWDNS-S)

NOTES:

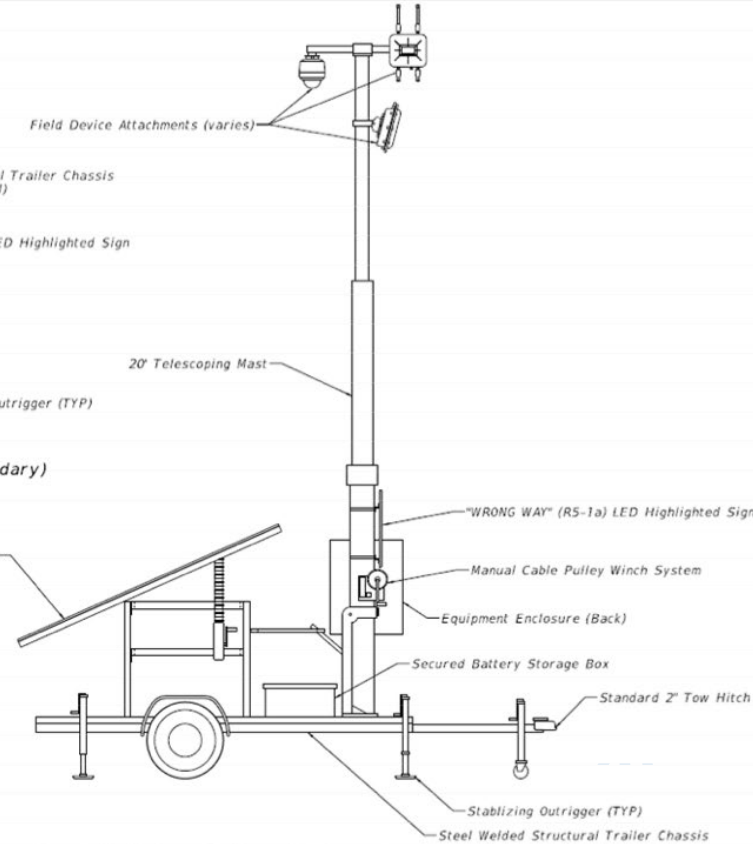
1. The Engineer shall approve the placement of primary and secondary temporary wrong way detection system.
2. Length of detection and verification zone depends to detection technology selected for use. Consult manufacturers guidelines from recommended detection zone placement and lengths.

Texas Department of Transportation





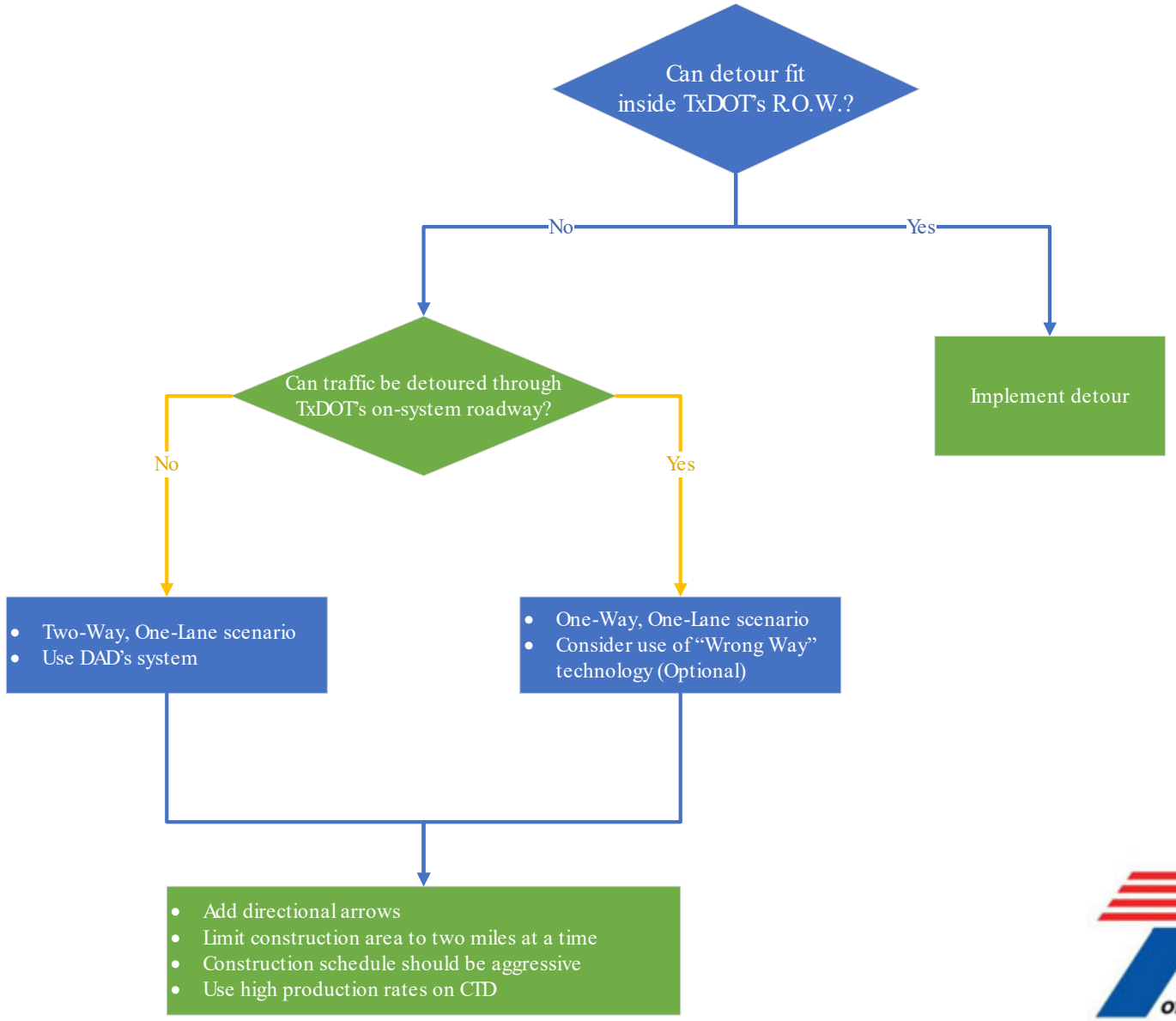
Smart Work Zone Trailer w/ LED Highlight Sign (WWVDS Secondary)



Smart Work Zone Trailer w/ Telescoping Mast (Field Devices Vary)

NOTES:

1. Ultimate configuration shown; not all field devices and equipment will be necessary for all sites. Refer to Smart Work Zone Plans for additional information.
2. Contractor shall be responsible for providing a complete Smart Work Zone trailer assembly sized for the appropriate voltage and power draw for each for continuous operation (24/7). Complete trailer assemblies include appropriately sized electrical conductors, power supplies, solar panel arrays, solar controller, and battery arrays.


Can detour fit inside TxDOT's R.O.W.?
No
Yes
Implement detour
Can traffic be detoured through TxDOT's on-system roadway?
No
Yes
Two-Way, One-Lane scenario
Use DAD's system
One-Way, One-Lane scenario
Consider use of "Wrong Way" technology (Optional)
Add directional arrows
Limit construction area to two miles at a time
Construction schedule should be aggressive
Use high production rates on CTD

HELP
#EndTheStreakTX
End the streak of daily deaths on Texas roadways.
TxDOT.gov (Keyword: #EndTheStreakTX)
#EndTheStreakTX Toolkit

Thank you!

Feedback Survey

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