



Traffic Speed Deflectometer (TSD)

MNT Division and Atlanta District



9/28/2026

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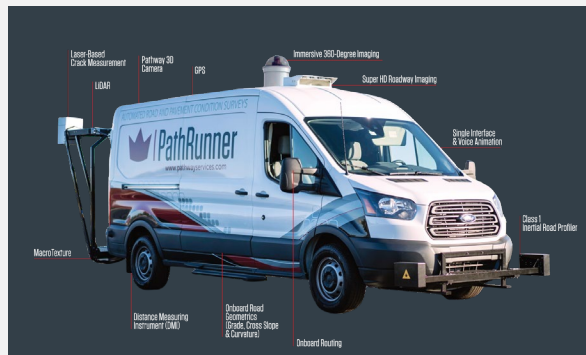
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Pavement Condition Assessment



Surface Distress
(Network Level)



FWD
(Project Level)



Ground Penetrating Radar
(Project Level)

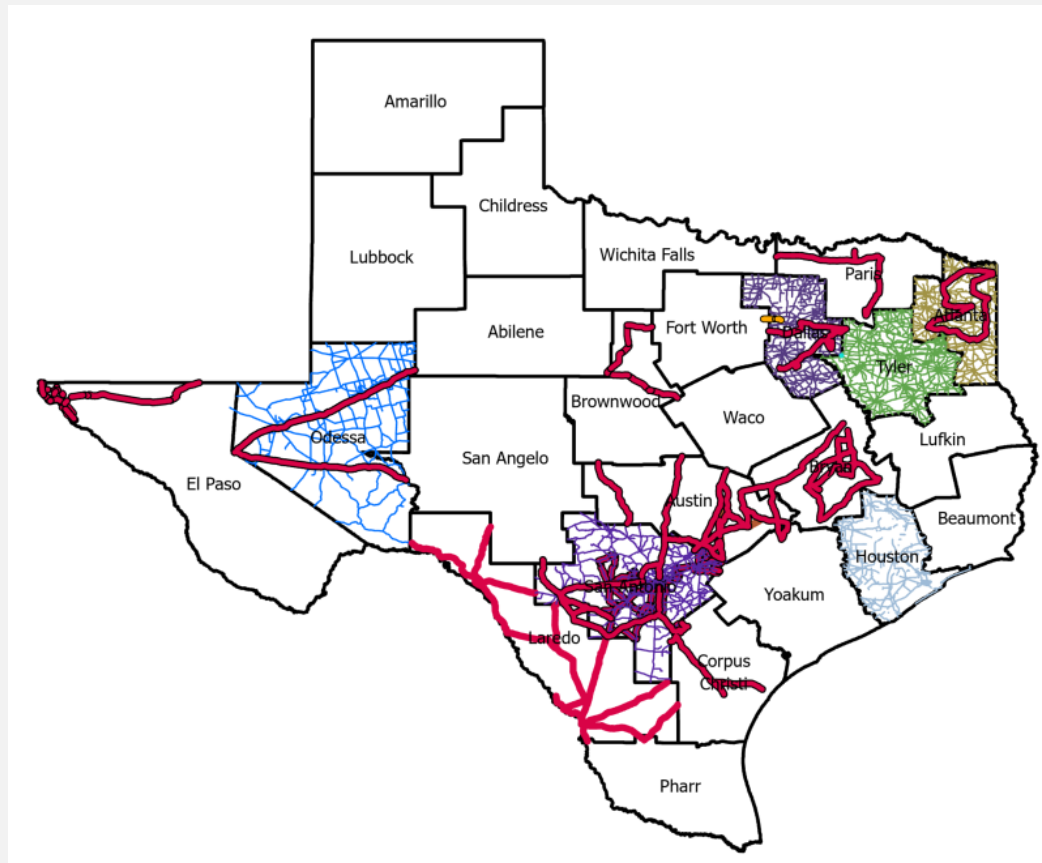
Traffic Speed Deflectometer (TSD)



Simultaneous collection of Functional + Structural data = **Comprehensive Pavement Assessment**



TSD Data Collection in Texas

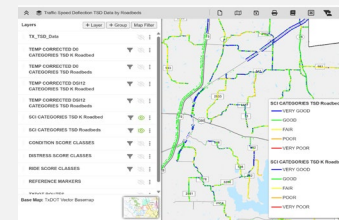


TSD Data in PA and Hawkeye

- PA TSD Data Table
- Maps
- Reports
- Hawkeye

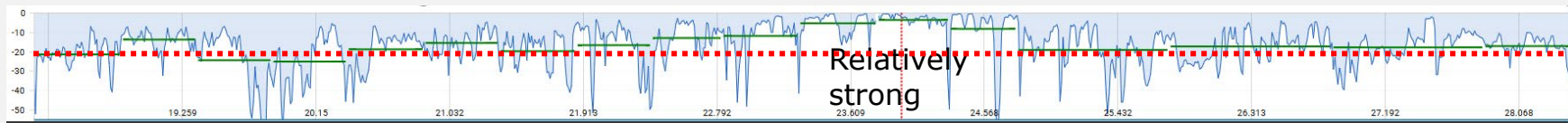
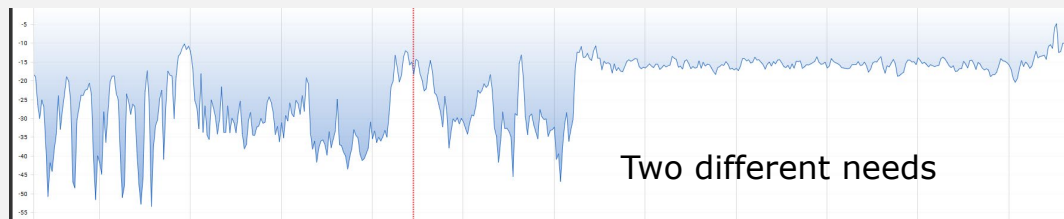
PA TSD Data Table

FISCAL YEAR	COUNTY	RESPONSIBLE DISTRICT	ROAD ID	LANE CODE	STARTING DATE	ENDING DATE	SC	SC CATEGORY	TEMP CONNECTED TO CATEGORY	TEMP CONNECTED DATA
2025	175 - NAWAHO	18 - DALLAS	FM0055-K	1	28.272	28.282	0.000	VERY GOOD	VERY GOOD	GOOD
2025	175 - NAWAHO	18 - DALLAS	FM0055-K	1	28.242	28.252	0.000	VERY GOOD	VERY GOOD	VERY GOOD
2025	175 - NAWAHO	18 - DALLAS	FM0055-K	1	28.262	28.272	0.000	VERY GOOD	VERY GOOD	VERY GOOD
2025	175 - NAWAHO	18 - DALLAS	FM0055-K	1	28.282	28.292	0.000	VERY GOOD	VERY GOOD	VERY GOOD
2025	175 - NAWAHO	18 - DALLAS	FM0055-K	1	28.292	28.302	0.000	VERY GOOD	VERY GOOD	VERY GOOD
2025	175 - NAWAHO	18 - DALLAS	FM0055-K	1	28.302	28.312	0.000	VERY GOOD	VERY GOOD	VERY GOOD
2025	175 - NAWAHO	18 - DALLAS	FM0055-K	1	28.312	28.322	0.000	VERY GOOD	VERY GOOD	VERY GOOD
2025	175 - NAWAHO	18 - DALLAS	FM0055-K	1	28.322	28.332	0.000	VERY GOOD	VERY GOOD	VERY GOOD
2025	175 - NAWAHO	18 - DALLAS	FM0055-K	1	28.332	28.342	0.000	VERY GOOD	VERY GOOD	VERY GOOD
2025	175 - NAWAHO	18 - DALLAS	FM0055-K	1	28.342	28.352	0.000	VERY GOOD	VERY GOOD	VERY GOOD
2025	175 - NAWAHO	18 - DALLAS	FM0055-K	1	28.352	28.362	0.000	VERY GOOD	VERY GOOD	VERY GOOD
2025	175 - NAWAHO	18 - DALLAS	FM0055-K	1	28.362	28.372	0.000	VERY GOOD	VERY GOOD	VERY GOOD
2025	175 - NAWAHO	18 - DALLAS	FM0055-K	1	28.372	28.382	0.000	VERY GOOD	VERY GOOD	VERY GOOD
2025	175 - NAWAHO	18 - DALLAS	FM0055-K	1	28.382	28.392	0.000	VERY GOOD	VERY GOOD	VERY GOOD
2025	175 - NAWAHO	18 - DALLAS	FM0055-K	1	28.392	28.402	0.000	VERY GOOD	VERY GOOD	VERY GOOD
2025	175 - NAWAHO	18 - DALLAS	FM0055-K	1	28.402	28.412	0.000	VERY GOOD	VERY GOOD	VERY GOOD
2025	175 - NAWAHO	18 - DALLAS	FM0055-K	1	28.412	28.422	0.000	VERY GOOD	VERY GOOD	VERY GOOD



Applications

- Identify what type of treatment, when, and where
 - Treatment type
 - Define scope
 - Spot base repairs



Treatment Change: Dallas Example

FM2450

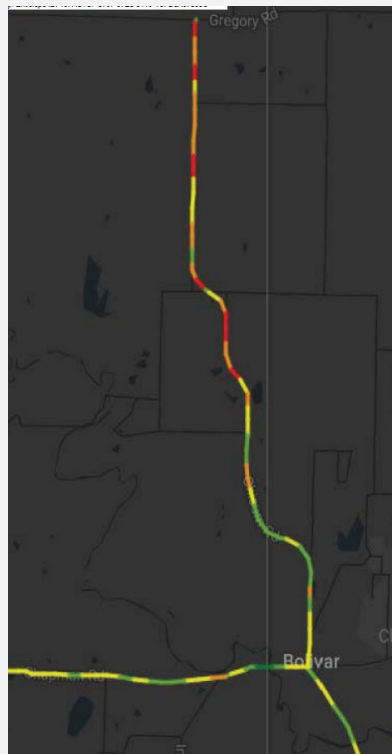
- Denton County
- AADT (2025): 2,196
- 20-Year ESALs: 554,000
- DFOs: 0 to 4.881

Rehab Strategy

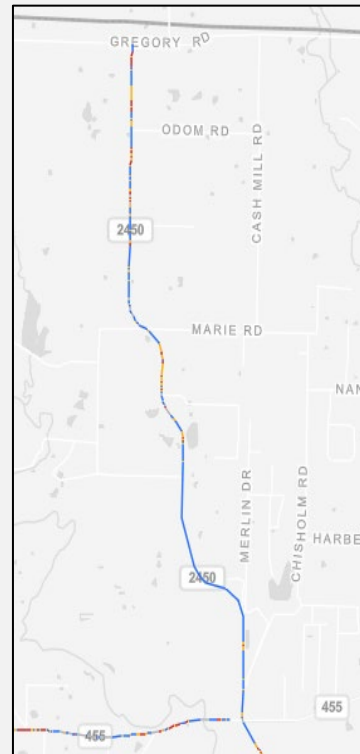
- 2-inch SP-C PG 64-22 SAC-B
- 12-inch Flexible Base
- 6-inch Cement Stabilized Base

Revised Scope for the Southern Portion

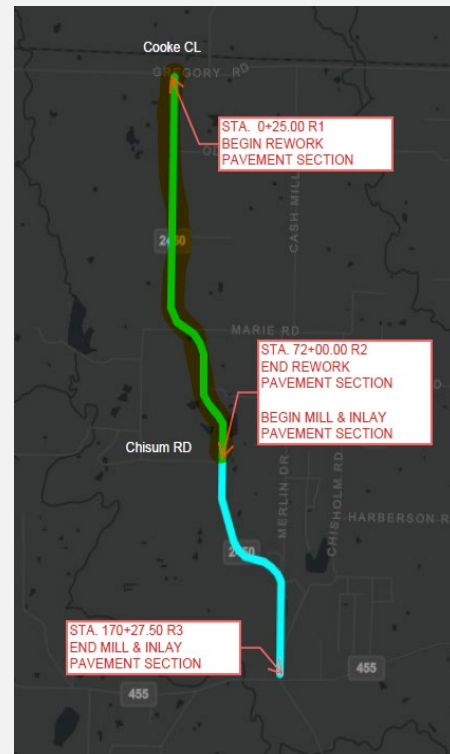
- Mill 2-inch existing pavement
- Inlay 2-inch SP-C PG64-22 SAC-B



TSD Maximum Deflection D_0

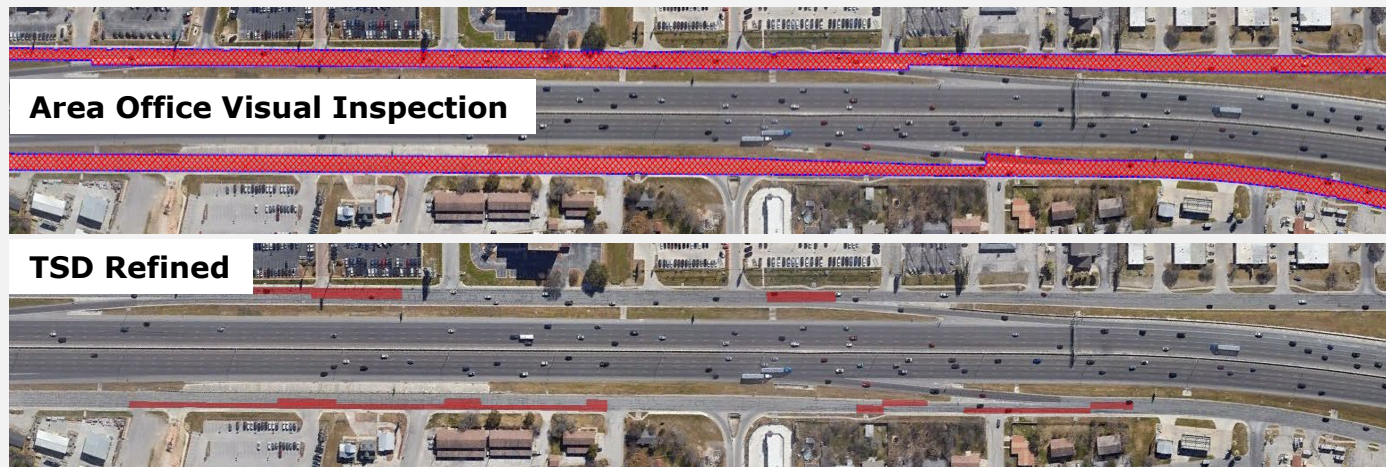


TSD SCI



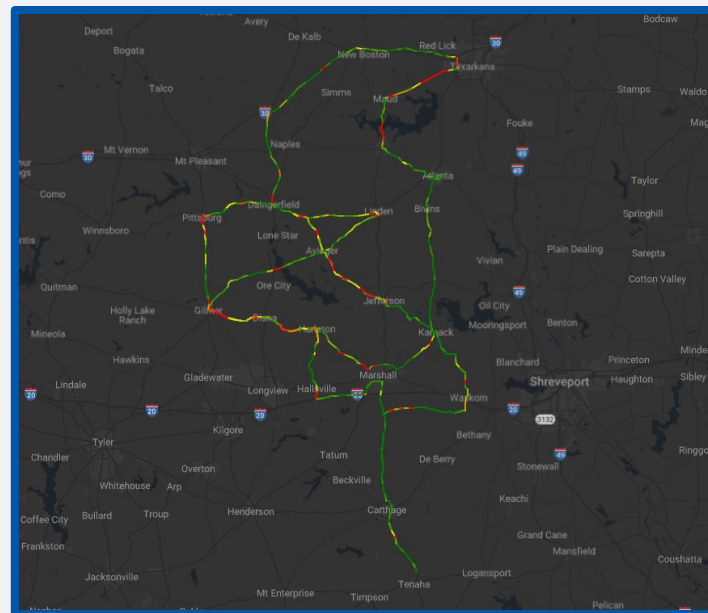
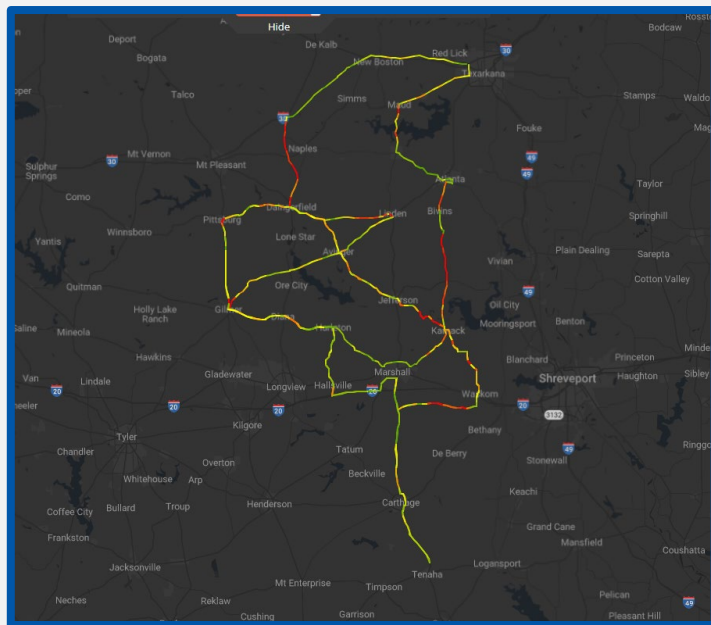
Spot Base Repair: San Antonio Example

Project	Initial Repair Identification Method	Initial Base-Repair Quantity	Initial Base-Repair Cost	TSD-Refined Quantity	TSD-Refined Base-Repair Cost	Estimated Base-Repair Savings
US 57 Overlay with Base Repair	FWD + PathWeb	16,000 SY	\$510,000	13,500 SY	\$430,000	\$80,000
US 87 Mill & Inlay with Base Repairs	FWD + PathWeb	7,000 SY	\$220,000	2,500 SY	\$80,000	\$140,000
IH-35 Mill & Inlay with Base Repairs	Area Office Visual Inspection	183,474 SY	\$6,054,642	25,030 SY	\$825,990	\$5,228,652



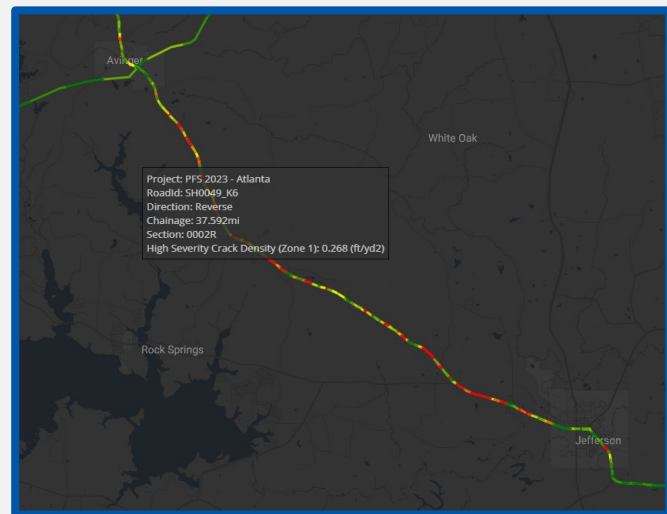
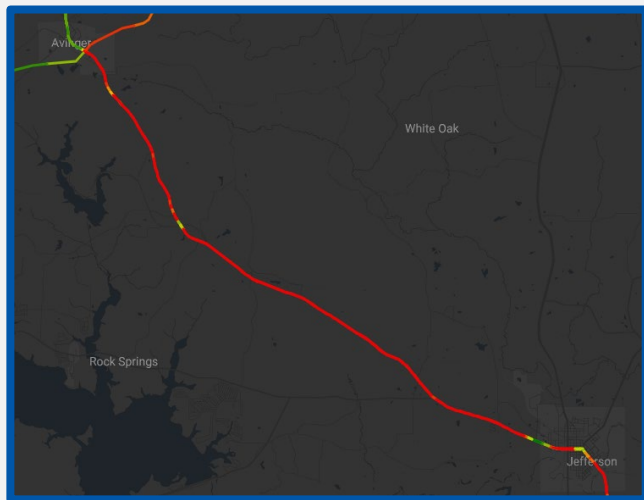
Atlanta District TSD Experience – How it Started

- Mean Profile Depth
- High Severity Crack Density



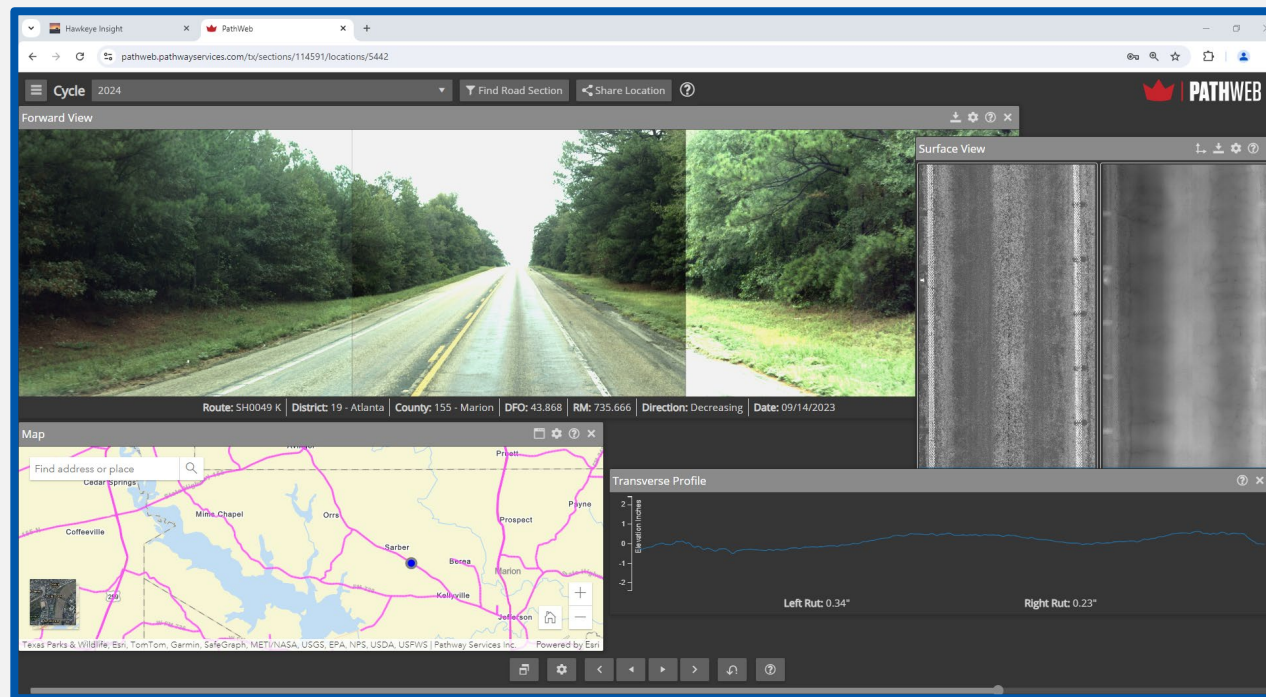
Atlanta District – Project Level Examples

- SH 49: Avinger to Jefferson (Looking Back)
 - Shown with High Severity Crack Density and Max Deflections



Atlanta District – Project Level Examples

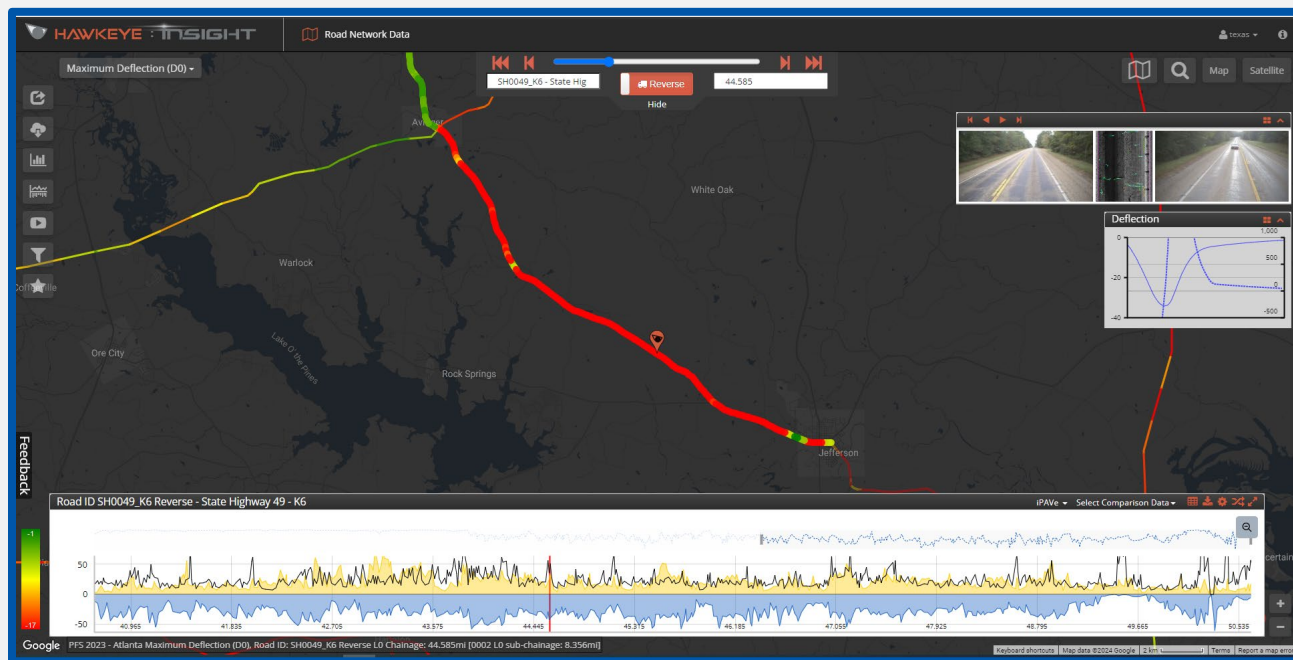
- SH 49: Avinger to Jefferson



- Using PathWeb to look closer and compare data

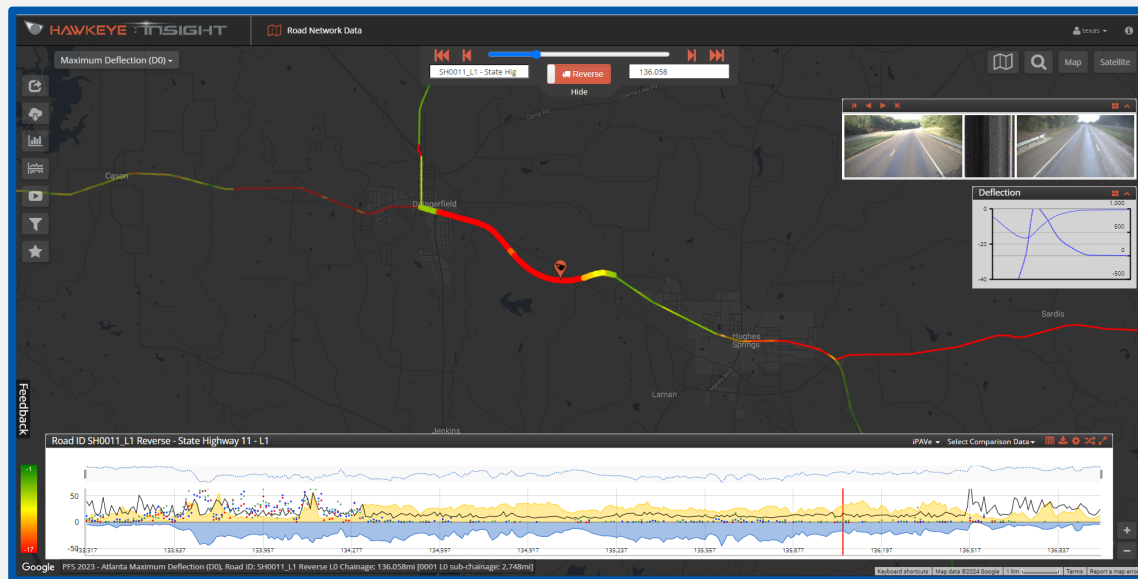
Atlanta District – Project Level Examples

- SH 49: Avinger to Jefferson



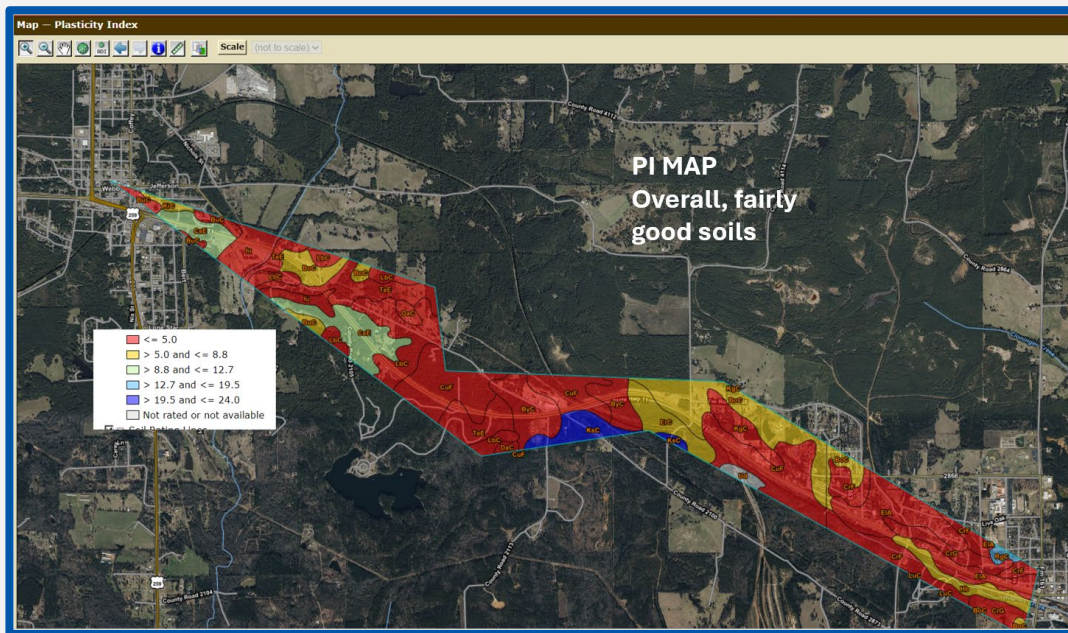
- Looking closer in Hawkeye
- Deflections below in blue
- Rutting above in yellow

- SH 11: Hughes Springs to Daingerfield
 - Maximum deflections shown
 - The proposed project limits do not have the same substructure



Atlanta District – Project Level Experience

- SH 11: Hughes Springs to Daingerfield
 - During Design using FPS, the decision was made to request subgrade modulus to more accurately depict the roadway.



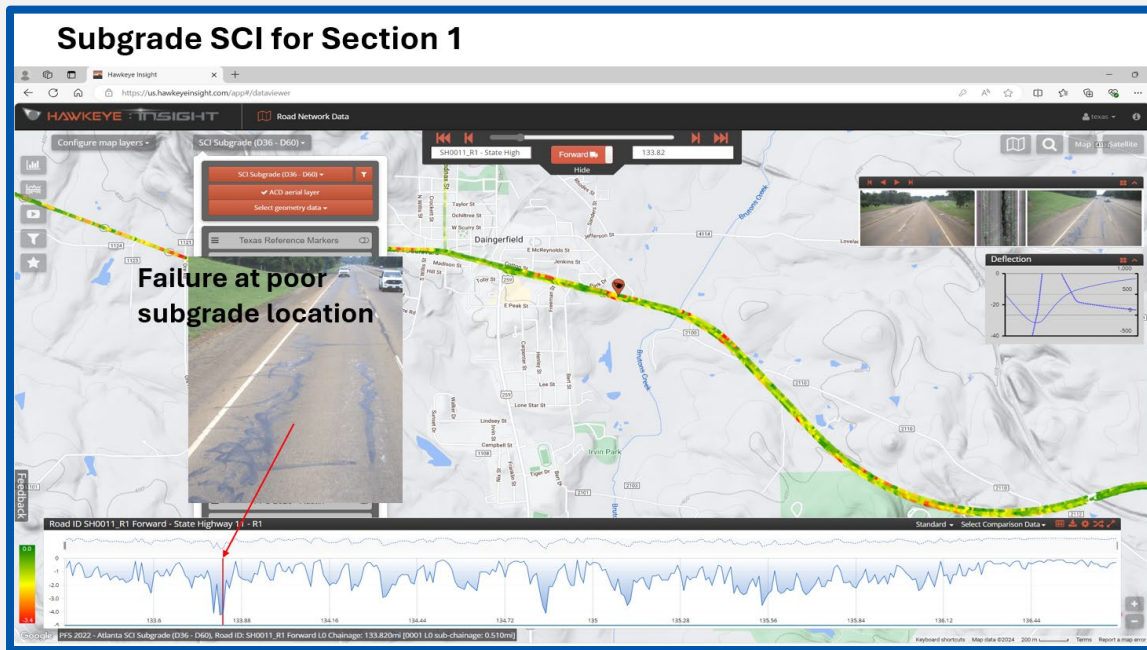
Atlanta District – Project Level Experience

SECTION	End of section	DMI	Length of section	E sub (ksi)	Comments
1	Bridge	26+4500 ft	3.2 m	8 – 10*	Deflections 30 to 40 mils common Very variable subgrade some low values less than 8 ksi Cracked condition first 1.5 miles 4- 5 inches HMA Lots of thick patches added Potentially some stripping
2	Start of JCP	28+3100 ft	1.75m	18 ksi	Low deflections (typically less than 10 mils) good subgrade strength HMA 3 to 4 inches (no major patching)
3	Hughes Spring	29+4500ft	1.25m	18 ksi	Very thin layer < 1inch (seals?) over JCP Very low deflections

* To be discussed

- TTI used the deflection data from TSD and proposed subgrade moduli values for the project area
- Moduli used as FPS 23 input

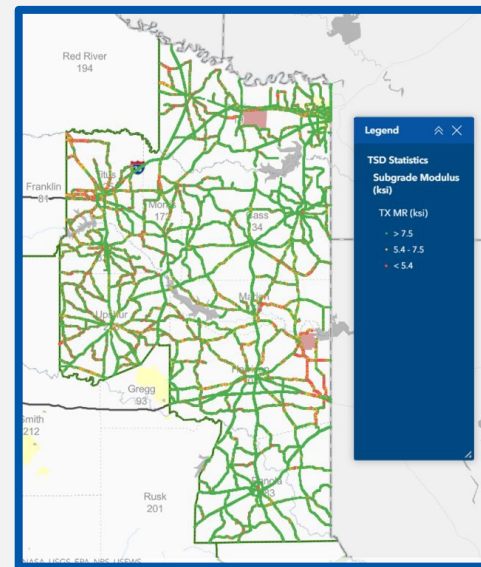
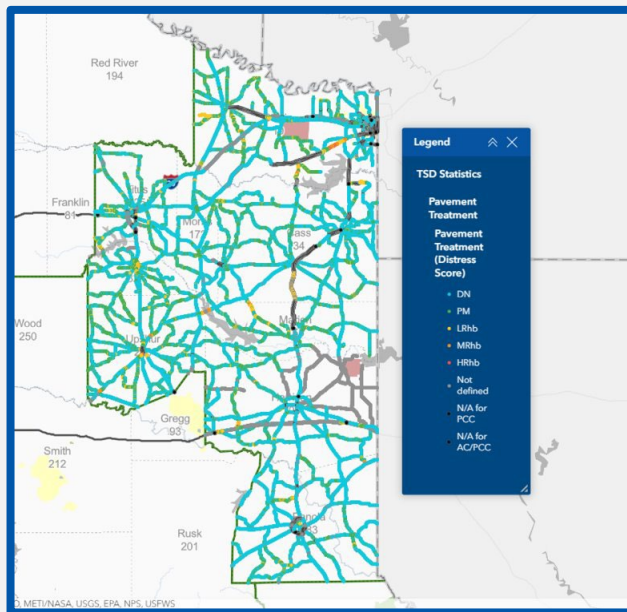
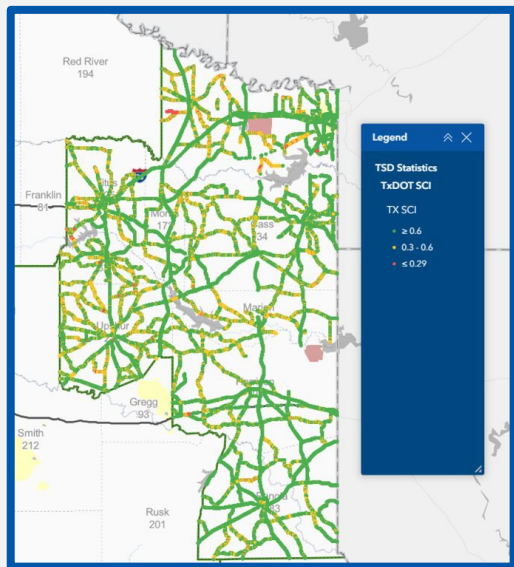
Atlanta District – Project Level Experience



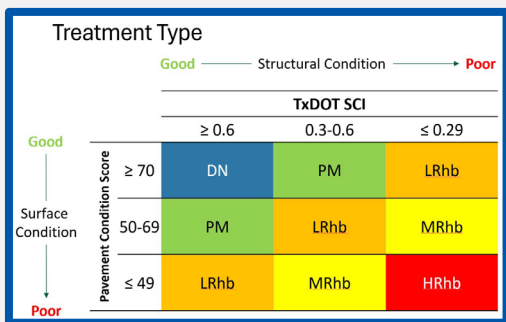
- SH 11: Hughes Springs to Daingerfield
 - Shared areas of concern for subgrade issues during design

Atlanta District – TSD Experience Now

Utilizing NCE Tool



Atlanta District – TSD Experience Now



TSD-based Procedure: FM0124K

DFO from		0	0.156	0.656	1.156	1.656	2.003	2.503	3.003	3.503	3.996	4.496	4.996	5.496	5.935	6.435	6.935	7.435	7.928	8.428	8.928	9.783	10.01	10.51	11.01	11.51	11.98	12.48	12.98	13.48	13.97	14.47	14.97	
DS		64	92	99	97	100	99	100	99	100	97	100	100	100	98	93	92	93	92	97	94	100	82	88	71	80	77	69	88	78	78	85	84	85
RS		2.6	3.4	3.4	3.4	3.9	3.8	3.4	3.3	3.3	3.3	3.4	3.6	3.3	3.5	2.9	3.5	3.1	2.7	2.6	2.3	3.2	3.6	3.2	3.5	3.6	3.5	3.4	3.1	3.5	3.3	3.3	3.0	
CS		61	92	99	97	100	99	100	99	100	97	100	100	100	98	93	92	93	90	89	77	82	98	71	80	77	69	88	78	78	85	84	56	
AADT		563	563	563	563	563	563	563	563	563	563	563	563	563	563	563	563	1,344	1,958	2,291	2,291	926	926	926	926	926	926	926	661	661	661	661	661	284,000
ESAL		251,000	251,000	251,000	251,000	251,000	251,000	251,000	251,000	251,000	251,000	251,000	251,000	251,000	251,000	251,000	251,000	394,000	448,000	550,000	550,000	305,000	305,000	305,000	305,000	305,000	305,000	305,000	284,000	284,000	284,000	284,000	284,000	
Type		6	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	
Treat		PM	DN	DN	DN	DN	DN	PM	PM	DN	PM	DN	DN	DN	PM	DN	PM	PM	PM	PM	PM	PM	PM	DN	PM	DN	DN	DN	DN	PM	DN	DN	DN	PM
D0 MED		29.0	22.7	21.8	21.9	22.9	19.7	19.0	21.6	20.2	18.9	19.9	24.7	18.2	23.3	25.3	25.6	27.9	23.8	31.4	28.1	27.2	28.3	34.0	37.5	37.4	31.1	34.6	28.5	27.0	33.2	41.3	38.1	
D0																																		
Area																																		
D0-1D12																																		
D12-D24																																		
Utility		19	55	53	53	52	62	71	56	63	69	66	47	73	55	42	42	10	18	7	13	15	6	4	2	2	9	15	35	36	23	9	6	
Structure		Poor	Good	Good	Good	Good	Good	Good	Good	Good	Good	Good	Fair	Good	Good	Fair	Fair	Very Poor	Poor	Very Poor	Poor	Poor	Very Poor	Very Poor	Very Poor	Very Poor	Very Poor	Very Poor	Poor	Fair	Fair	Fair	Very Poor	Very Poor

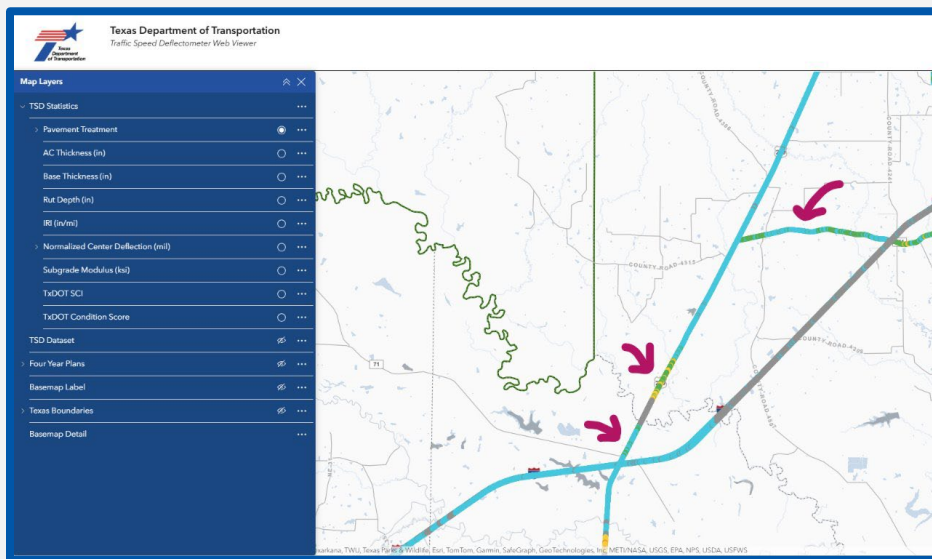
PA

TSD Def

Parameters

Combined Score

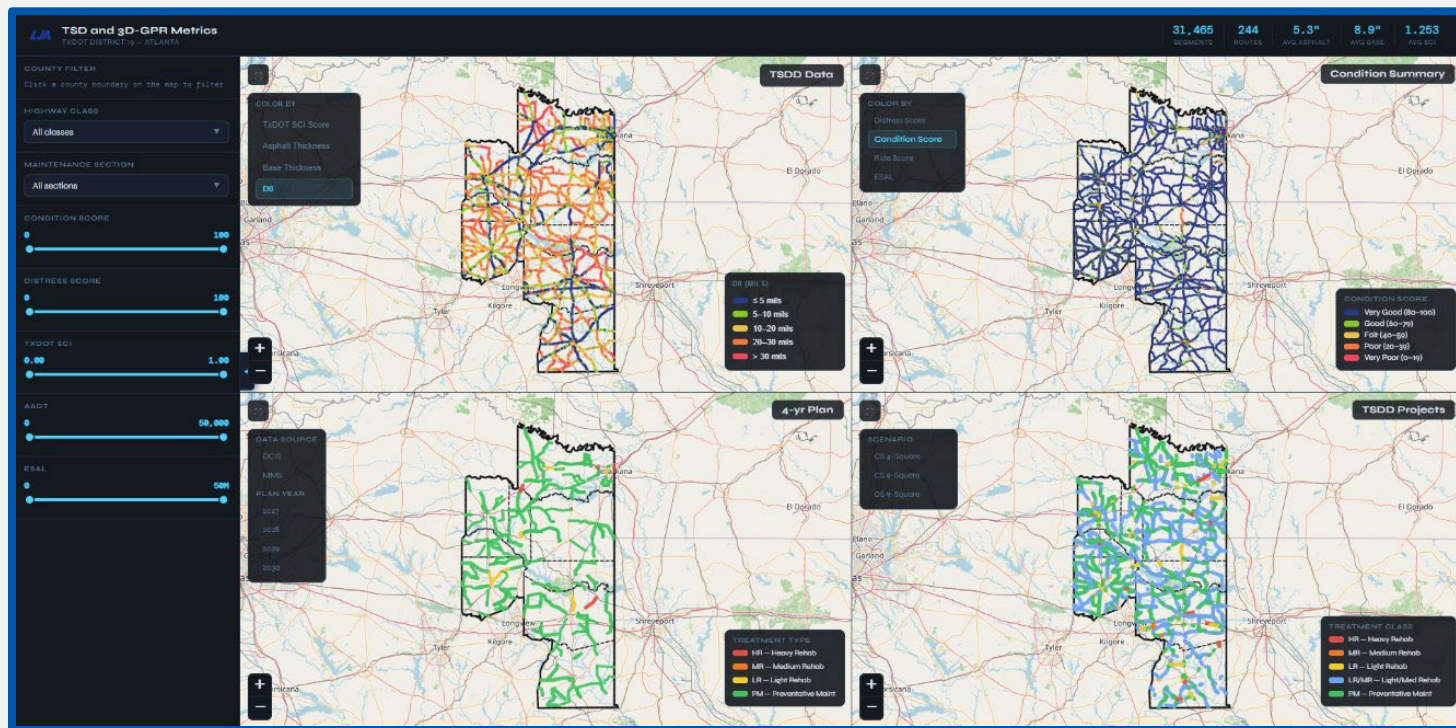
Atlanta District – TSD Experience Now



Original Scope	Modified Scope
Full Depth Rehab Full length	Full Depth Rehab Partial / Mill and Inlay Partial
Original Estimate: \$11,882,314.86	Updated Estimate: \$9,107,636.15

Cost Savings = \$ 2,774,678

Atlanta District – TSD Experience Now



Web based tool used to show various maps with overlays and syncing functions created by LJA

Atlanta District Summary

- District Utilization
 - Project Selection at a Network Level
 - 4-YR Planning
 - Worst/Most Distressed Substructure More Easily Denoted
 - Project Development and Design
 - Cross Slope (Does it need improvement?)
 - Moduli Values (Pavement design inputs for FPS 23)

Smart Pavement Investment - TSD

- Assesses pavement structural condition continuously at the highway speed
- Provides **safer, faster, and network-wide coverage** without lane closures
- Strengthen pavement planning by combining surface and structural data
- Supports the right treatment, at the right locations, at the right time
- Helps TxDOT **identify needs earlier, design more effectively, and invest resources where they deliver the greatest impact**

Thank You

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