

MnROAD – NCAT Preservation Study TPF –5(375)

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MnDOT

National Pavement Preservation Conference

npcc23

IMPACTS AND BENEFITS FROM PAVEMENT PRESERVATION
September 18-21 • J.W. Marriott Hotel • Indianapolis, Indiana



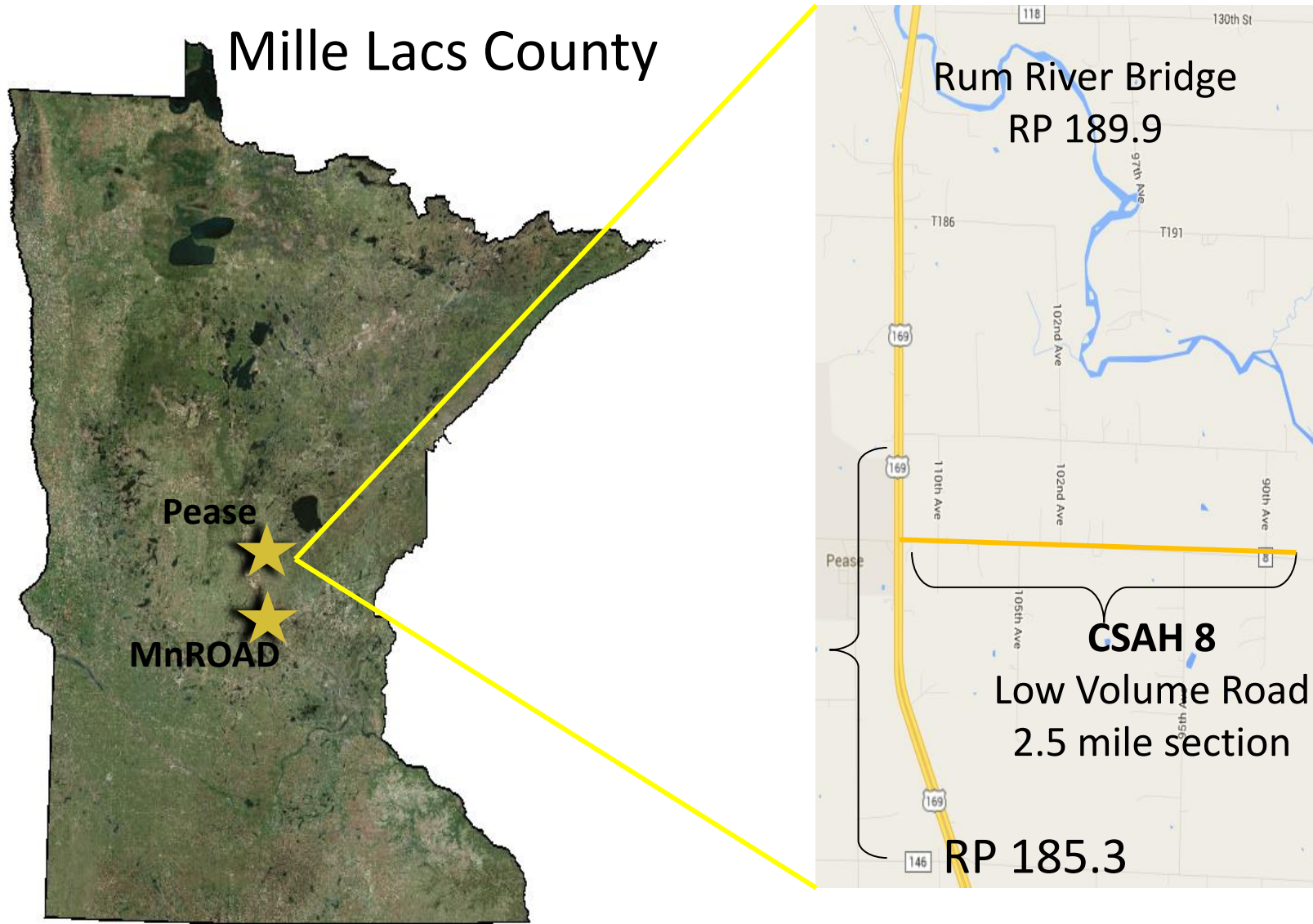
MICHIGAN STATE
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Purpose

- ▶ MnDOT site
 - Surface treatments
 - Rehabilitation treatments
- ▶ Online data sources
- ▶ Performance data
- ▶ Observations

National Pavement Preservation Study



National Pavement Preservation Study (Northern Test Sections)

Minnesota DOT Road Research Project (MnROAD)

National Center for Asphalt Technology (NCAT)

US-169 NB Lane

CSAH-8 EB and WB Lanes

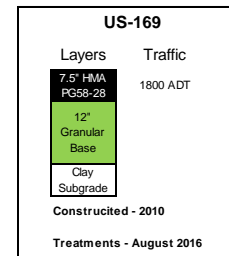
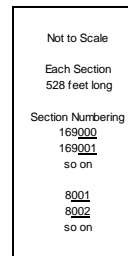
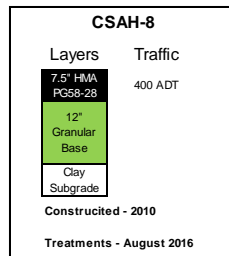
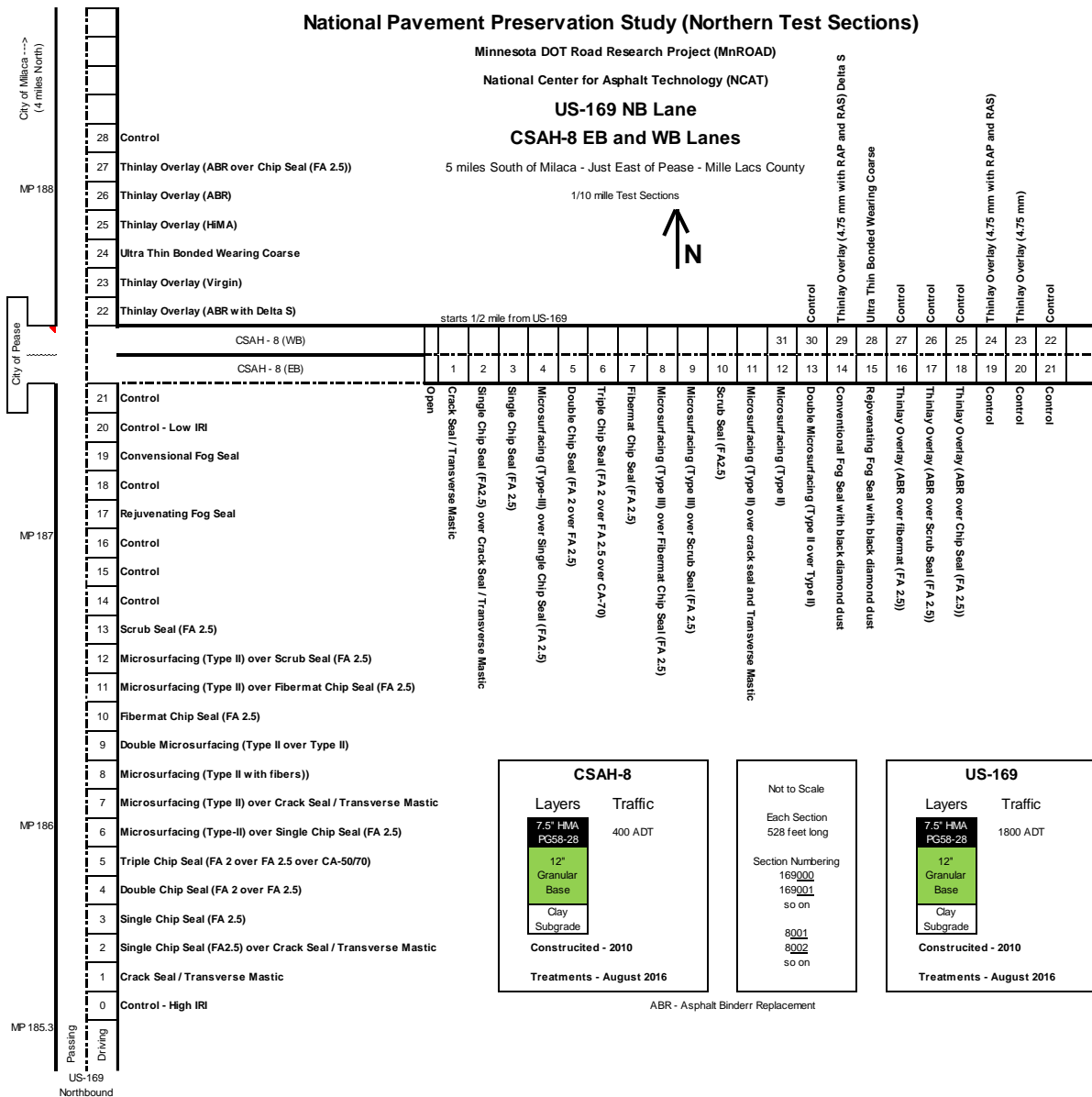
5 miles South of Milaca - Just East of Pease - Mille Lacs County

1/10 mile Test Sections



**Northern
High Traffic
Preservation
on US-169**

**Northern
Low Traffic
Preservation
CSAH-8**



ABR - Asphalt Binderr Replacement

MnDOT Pavement Preservation website

- ▶ History and test sections
- ▶ MN, NCAT, and 70th street recycle
- ▶ **Construction application data**
- ▶ Field reviews
- ▶ Distress maps
- ▶ Link to NCAT papers
- ▶ <https://www.dot.state.mn.us/mnroad/ncat-partnership/pavement-preservation/index.html>

YouTube Drone Video

- ▶ MnROAD channel for **spring 2023**
- ▶ National Road Research Alliance channel **2021**
- ▶ About 2:10 – 2:25 per cell
- ▶ Use the cell map from PP website

What are we seeing? !!

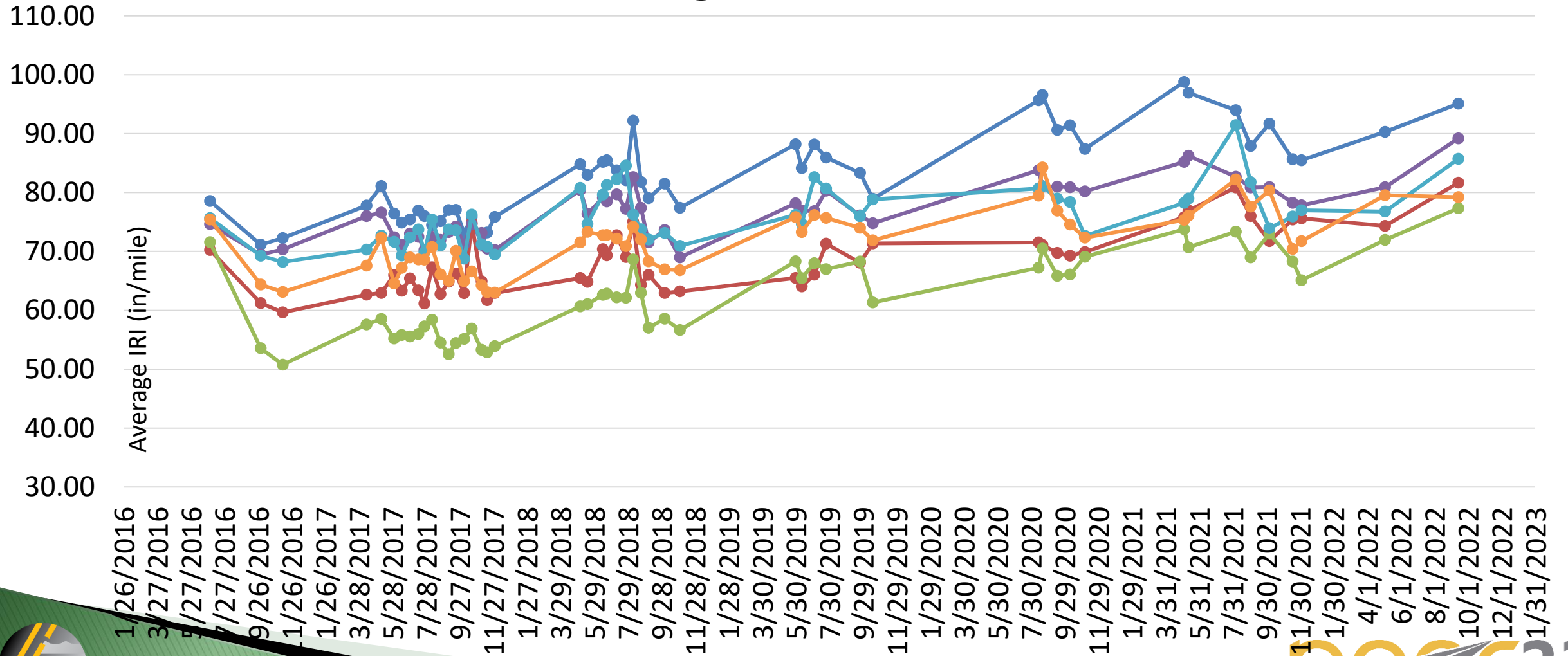
- ▶ Effects of wet / freeze thaw
- ▶ Micro milling before a thinlay to improve IRI
- ▶ Mastic improves IRI on transverse thermal cracks
- ▶ No rutting
- ▶ Combination treatments doing well



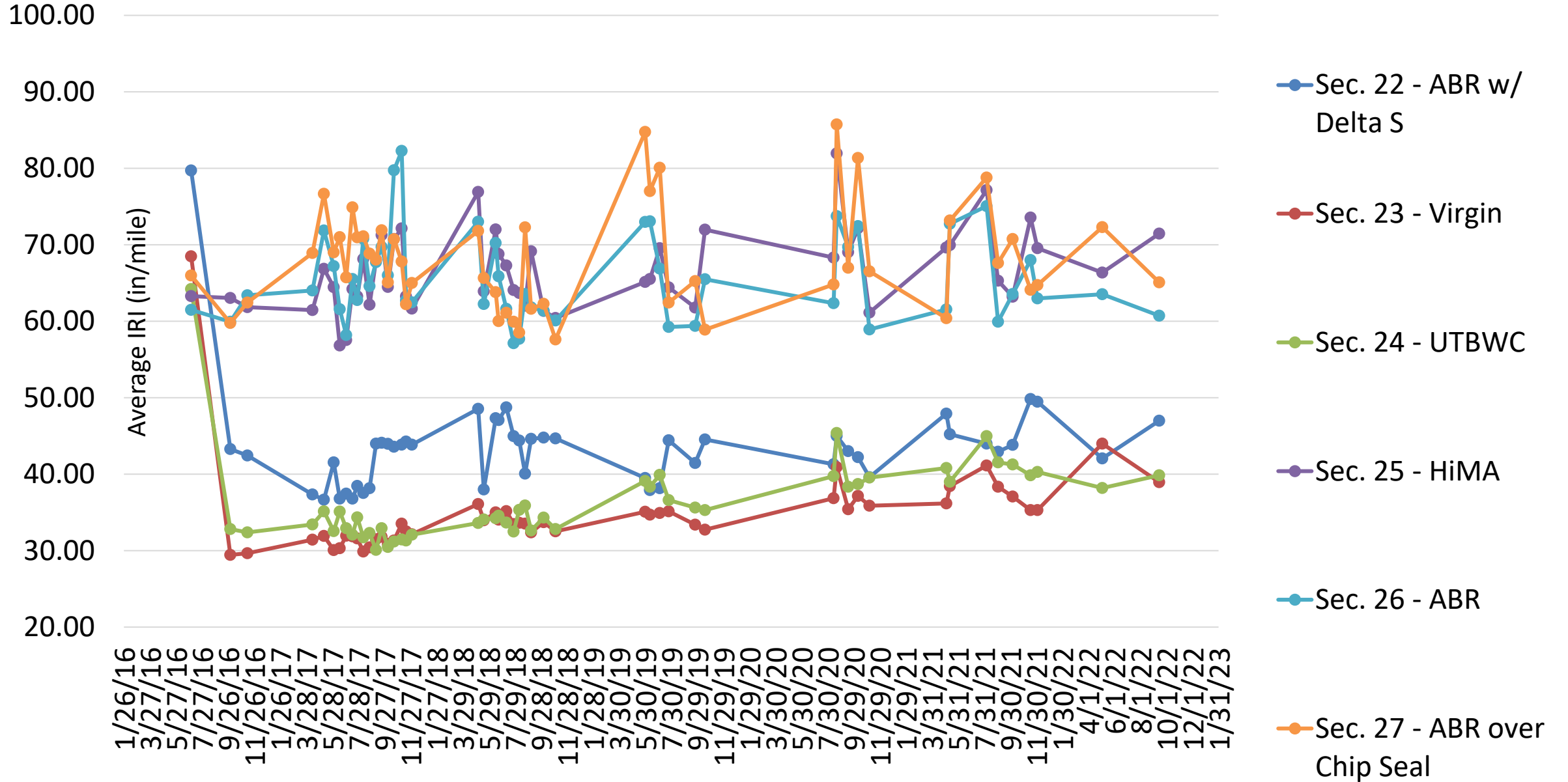
- ▶ CSAH 8 chip seal section with transverse crack
 - ▶ 2/28/2020

Impacts of freeze and thaw

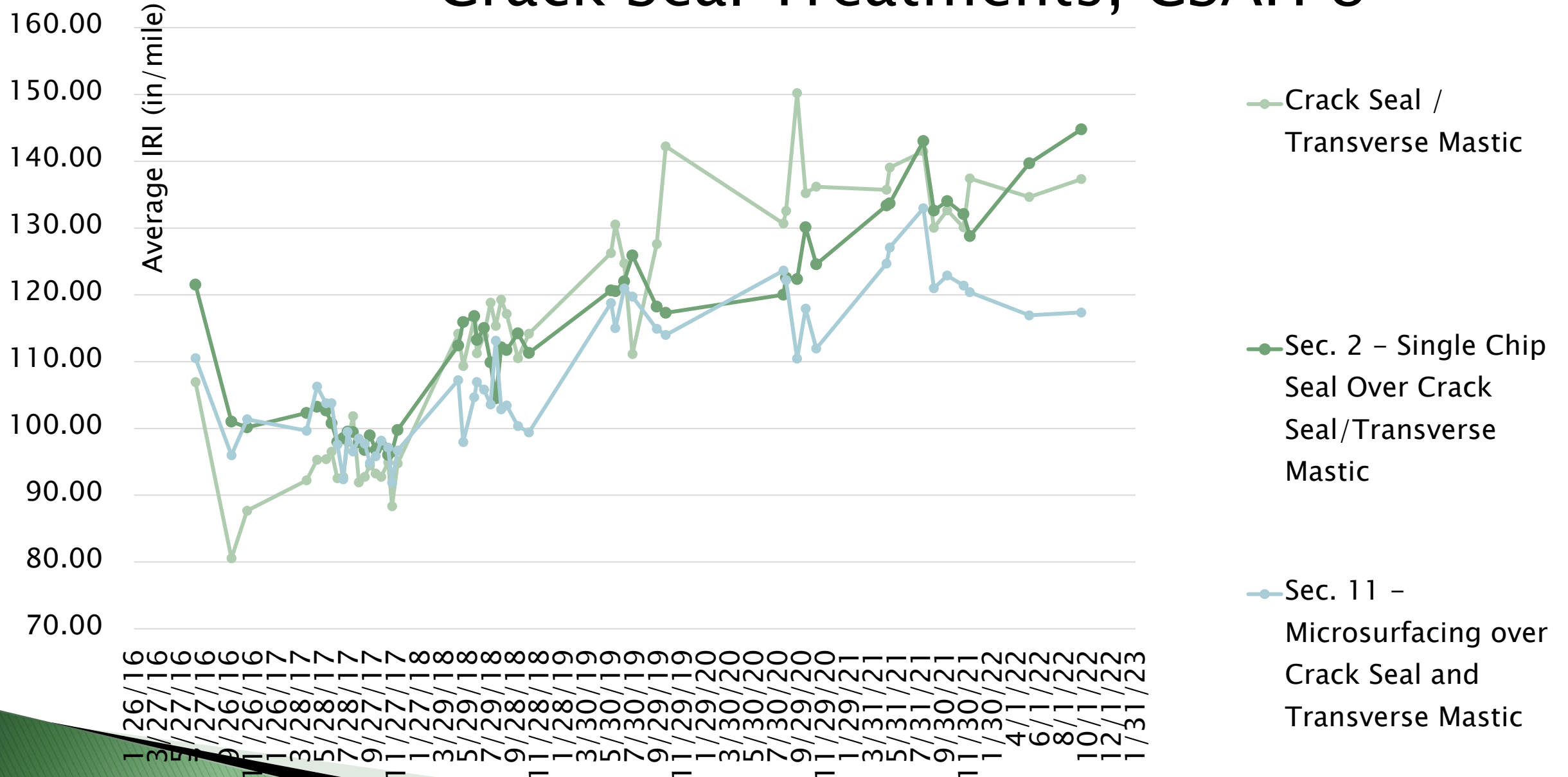
Microsurfacing Treatments, US 169



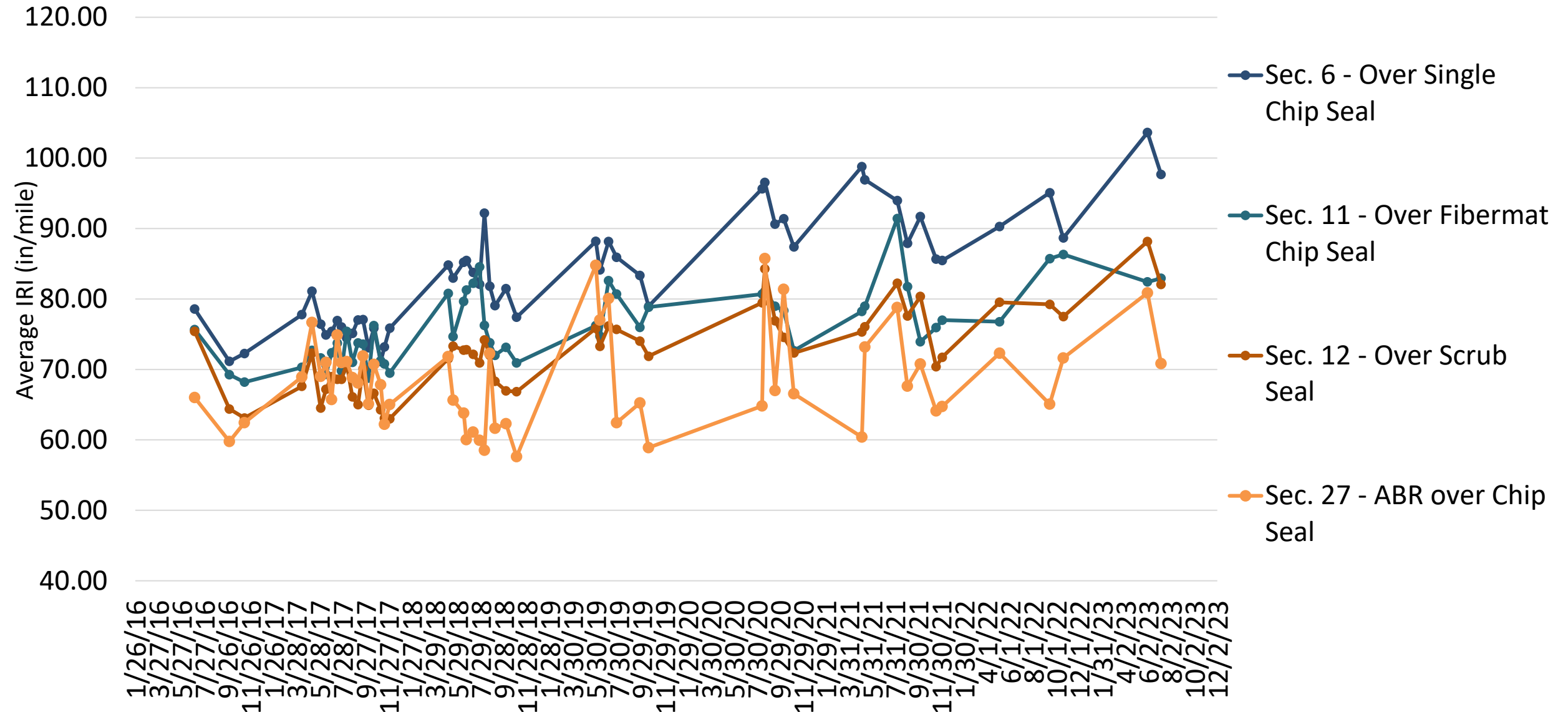
Thinlay Treatments, US 169



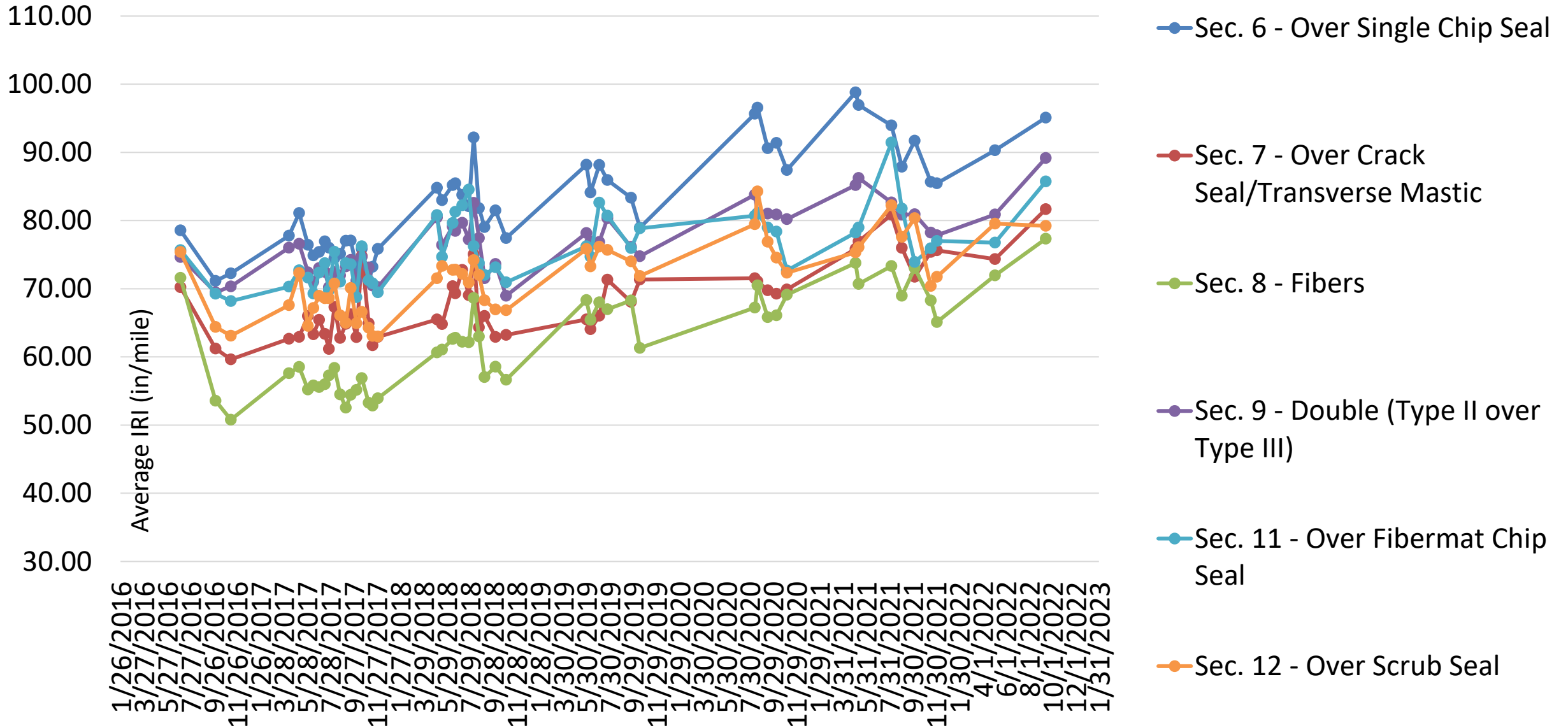
Crack Seal Treatments, CSAH 8



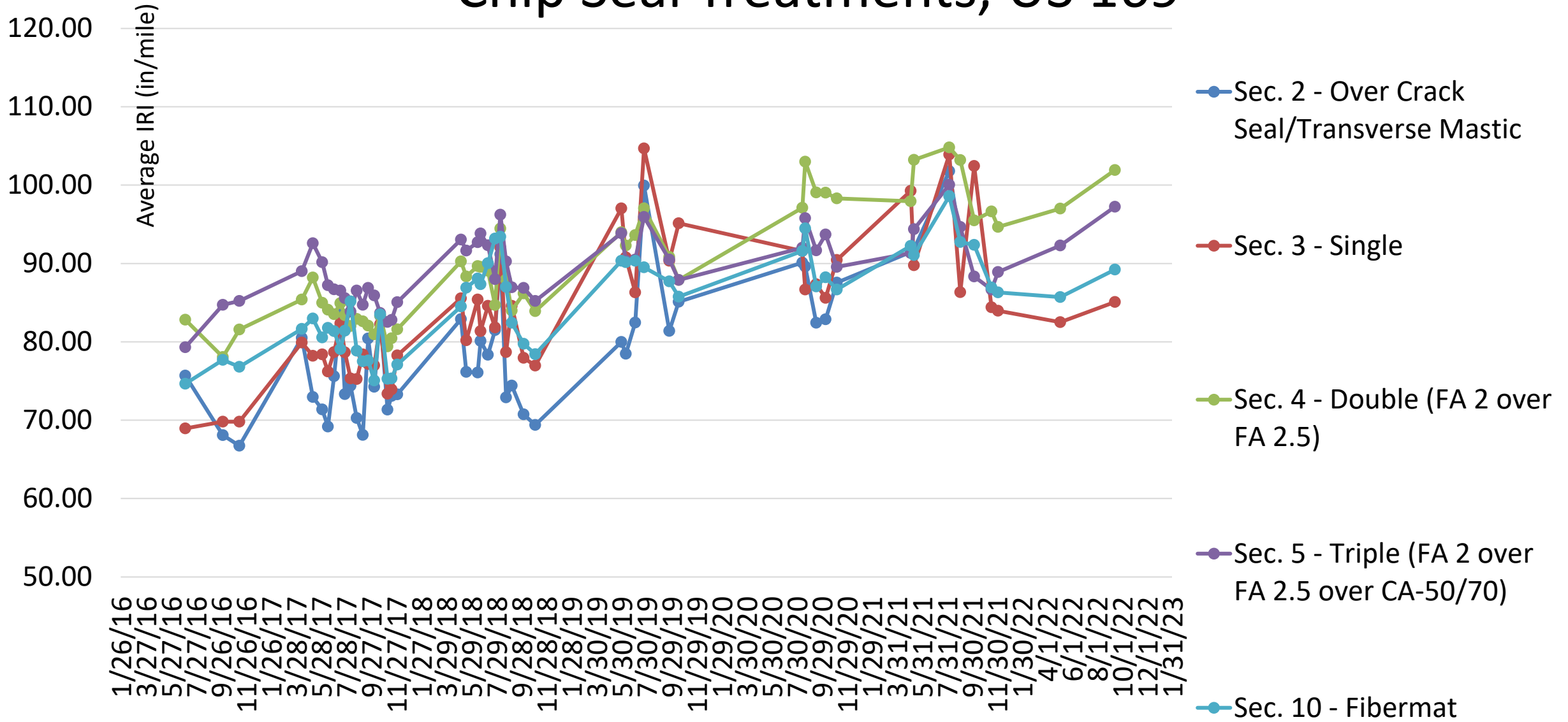
Combination Treatments, US 169



Microsurfacing Treatments, US 169



Chip Seal Treatments, US 169



70th Street Purpose

- Completed in Aug 2019, 4 winters
- Pre construction condition
- Rehabilitation results

70th Street

- EB= Albertville, MN
- WB= Otsego, MN
- ≈1 mile
- Challenges:
 - Very short time frame
 - 8/19/2019 – 8/23/2019
 - ~ 0.1 mile sections
 - Closure on 1 lane ≈2,700 AADT
 - Partnership
 - Equipment Compatibility
 - Coordination



9/28/2023

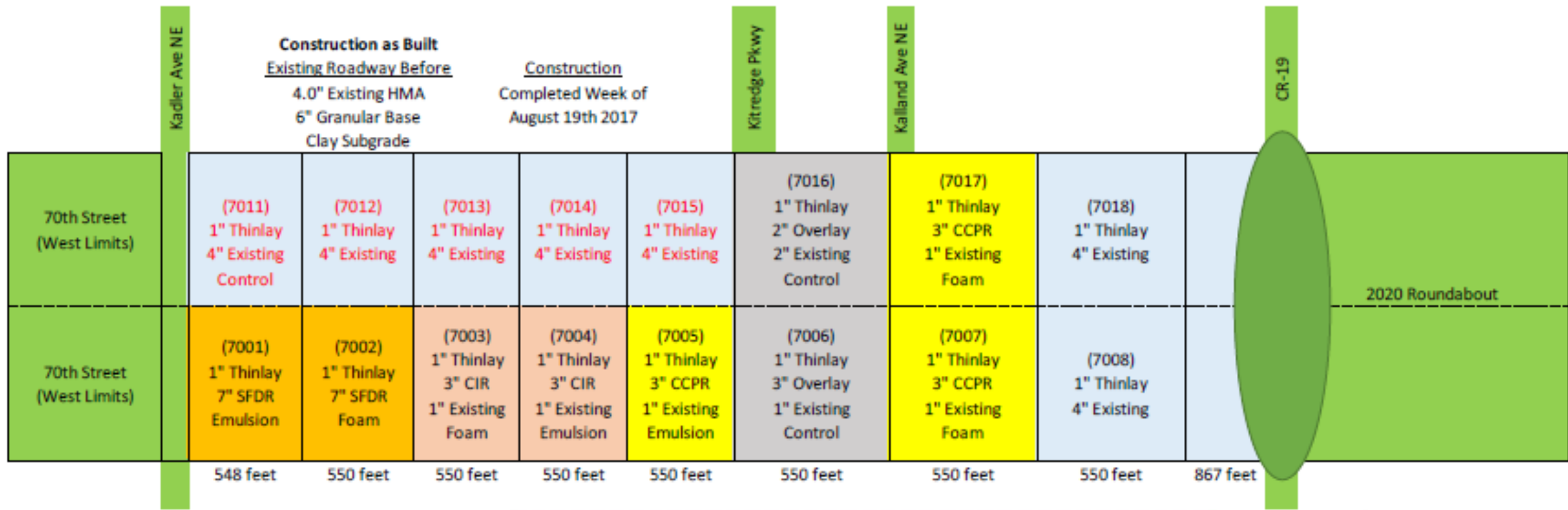


Figure 4 Test Section Layout

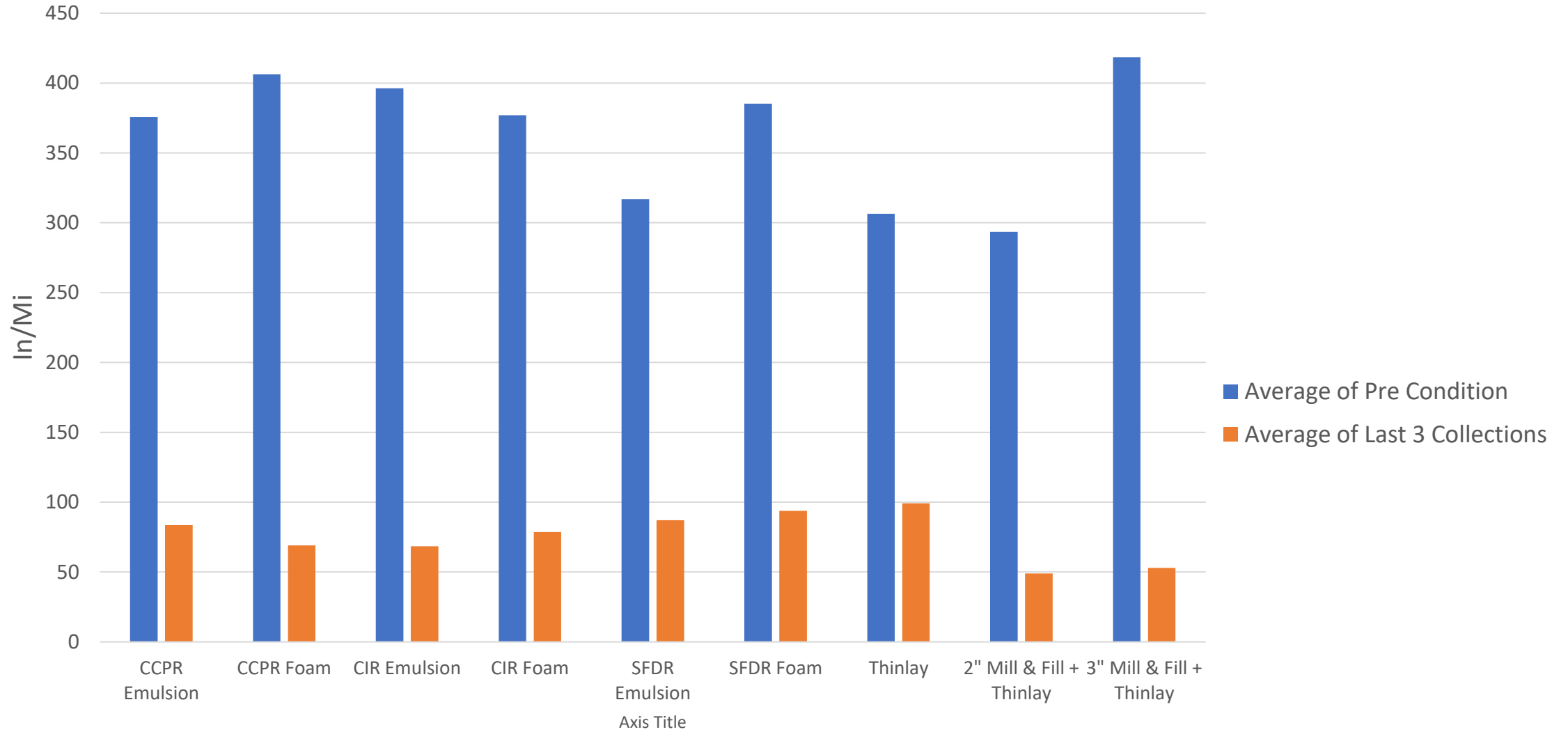


Visual Cracking data

Description	Group	Section	PRE	POST	1/3/2020	5/28/2020	10/14/2020	1/4/2021	8/25/2021	1/13/2022	8/30/2022
SFDR Emulsion	TREAT	7001		0.00	1.43	4.65	4.73	4.87	5.48	6.13	6.90
SFDR Foam	TREAT	7002		0.00	1.83	3.67	3.80	4.22	6.75	7.40	8.00
CIR Foam	TREAT	7003		0.00	0.00	0.15	0.20	0.60	2.20	2.48	3.07
CIR Emulsion	TREAT	7004		0.00	0.00	0.15	0.32	0.38	1.75	1.90	2.15
CCPR Emulsion	TREAT	7005		0.00	0.00	0.00	0.03	0.05	1.22	1.68	2.10
3" Mill & Fill + Thinlay	CONV	7006		0.00	0.00	0.00	0.00	0.00	0.20	0.20	0.36
CCPR Foam	TREAT	7007		0.00	0.00	0.00	0.00	0.00	0.98	1.37	1.91
Thinlay	CONTROL	7008		0.00	1.87	3.38	4.80	5.63	9.03	15.00	15.77
Thinlay <small>9/28/2023</small>	CONTROL	7011		0.00	4.23	11.22	11.88	14.15	18.77	30.08	31.82
Thinlay	CONTROL	7012		0.00	2.37	6.30	6.82	8.35	12.65	20.20	21.23
Thinlay	CONTROL	7013		0.00	2.78	5.62	6.13	7.67	11.53	18.97	21.48
Thinlay	CONTROL	7014		0.00	7.35	10.70	11.57	13.02	17.08	26.90	28.35
Thinlay	CONTROL	7015		0.00	1.83	4.38	4.87	5.80	12.02	20.52	22.33
2" Mill & Fill + Thinlay	CONV	7016		0.00	0.00	0.00	0.00	0.00	0.28	0.52	1.50
CCPR Foam	TREAT	7017		0.00	0.00	0.00	0.00	0.00	0.98	1.22	1.37
Thinlay	CONTROL	7018		0.00	0.55	2.13	2.28	3.43	10.07	14.68	17.02

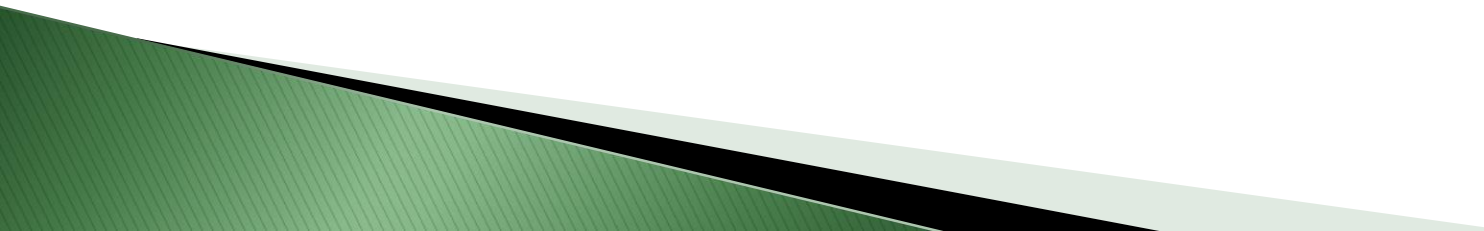
Average IRI

Average IRI



Section	Description	Group	INITIAL	10/23/19	8/11/20	9/2/20	9/16/20	10/8/20	4/25/22	5/4/22	10/12/22	12/6/22	2/17/23	3/20/23	4/27/23	6/21/23
7001	SFDR Emulsion	TREAT	316.85	76.33	79.78	84.97	82.00	77.55	88.23	87.17	88.60	85.40	140.65	160.57	90.90	89.93
7002	SFDR Foam	TREAT	385.30	66.88	73.70	75.90	74.23	75.65	84.03	84.80	104.35	92.15	127.35	124.60	101.90	126.87
7003	CIR Foam	TREAT	377.00	67.72	71.77	70.32	71.42	72.18	77.83	75.67	79.78	80.48	120.25	167.10	85.00	90.50
7004	CIR Emulsion	TREAT	396.25	69.08	66.62	69.13	70.58	66.87	67.33	66.77	69.00	69.28	92.50	120.33	77.40	77.63
7005	CCPR Emulsion	TREAT	375.65	74.33	86.27	77.30	80.22	81.95	88.63	84.27	83.77	82.63	124.50	140.27	86.80	82.25
7006	3" Mill & Fill + Thinlay	CONV	418.40	48.52	50.08	53.15	49.23	54.15	54.63	52.27	53.37	53.05	82.60	90.13	54.70	55.10
7007	CCPR Foam	TREAT	428.90	60.88	66.73	62.85	69.50	61.78	67.83	65.90	71.07	72.65	117.35	110.37	71.70	75.28
7008	Thinlay	CONTROL	428.90	89.20	107.77	107.42	108.57	102.47	114.63	112.87	118.73	117.30	153.55	160.87	115.50	122.48
7011	Thinlay	CONTROL	318.65	81.73	96.80	97.27	94.55	96.38	110.47	111.17	113.78	136.60	189.60	225.80	128.55	127.90
7012	Thinlay	CONTROL	306.80	75.62	82.47	80.77	83.52	83.78	95.83	90.33	95.07	95.93	139.25	188.73	102.35	104.87
7013	Thinlay	CONTROL	274.25	65.30	77.25	75.50	75.78	73.82	74.23	76.00	74.28	76.03	107.05	135.43	77.10	77.02
7014	Thinlay	CONTROL	334.60	78.43	87.23	86.22	87.90	87.50	88.57	89.37	92.37	87.40	123.95	129.47	86.05	95.03
7015	Thinlay	CONTROL	297.90	72.40	86.08	84.92	84.70	82.95	89.73	88.07	90.60	98.15	144.30	168.53	94.15	97.65
7016	2" Mill & Fill + Thinlay	CONV	293.50	42.33	45.97	44.02	44.87	44.83	48.47	47.67	48.38	50.98	90.10	123.90	53.75	55.33
7017	CCPR Foam	TREAT	383.85	63.90	68.35	70.28	68.27	67.47	67.93	67.77	67.95	68.88	105.95	109.07	70.60	68.62
7018	Thinlay	CONTROL	383.85	89.97	98.97	96.38	99.53	97.62	105.40	105.03	107.92	104.55	147.45	141.50	105.90	108.32

Thoughts

- ▶ Good IRI after 7 years
 - ▶ Good initial improvement in IRI
 - ▶ Good life extension in good IRI
 - ▶ Low cost per lane mile/yr in good condition
 - ▶ Roughness increases from fall to spring, decreases from spring to fall.
- 



U.S. Department of Transportation
Federal Highway Administration



Safe. Smart. Sustainable Pavements Through Innovative Research



at AUBURN UNIVERSITY

THANKS!

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