A Contractor's Perspective to ODOT's Transition to the IRI Specification for Smoothness

Background of Shelly & Sands Inc.

- Family-owned general contracting company
- We own and operate 6 aggregate facilities, 21 asphalt plants, an asphalt liquid terminal, & 1 high production concrete plant
- We always rank high in most mainline miles paved in Ohio
- Over $520 million on the books in 2015
- Perform work on all phases of construction from the ground up

Where we were…

- Profilograph Index (PI)

The Issue with the PI Scale

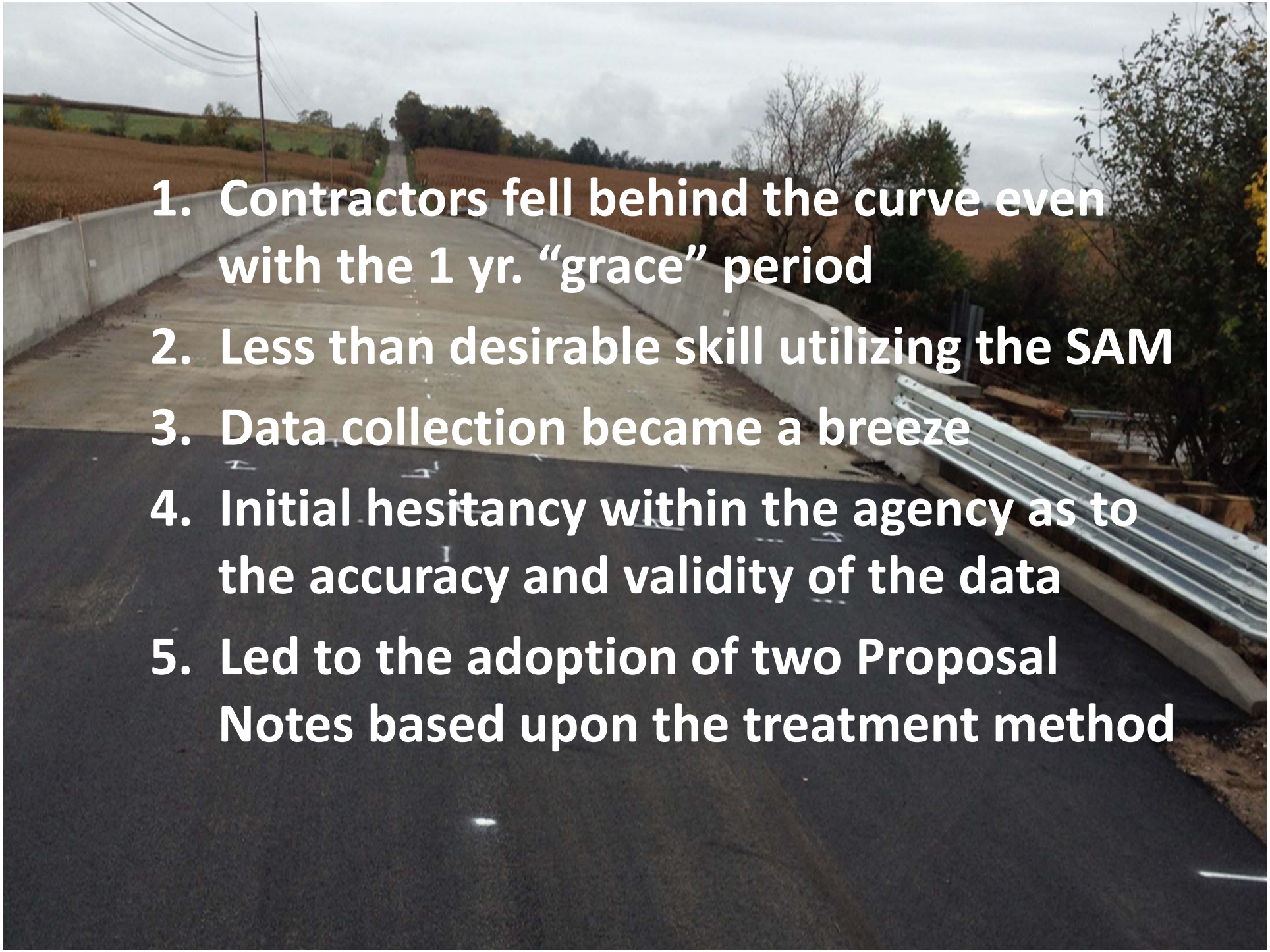
- Very linear and does not depict true localized roughness based on seat of the pants ride
- LAR can meet the specification however the ride may not reflect a “smooth” pavement
- The DOT was paying incentive on rough roads
- Data collection a time consuming process with contact devices
- So along comes IRI……..

ODOT's Transition to the IRI Specification

A. ODOT ramped up ProVal training and certification requirements
B. Operated for 1 yr. under a dual spec model
   1. Contractor could elect to choose PI or IRI for lot payment calculations
   2. Allowed for contractors to familiarize themselves with IRI
   3. Lot roughness still based on bump template (0.3" in 25')
   4. Almost all contractors reported PI because it was more forgiving

PAY SCHEDULE			
PI	**IRI**	**PAY ADJUSTMENT**	
Inches per mile per 0.1 mile section (mm/km per 0.16 km section)	**Inches per mile per 0.1 mile section (m/km per 0.16 km section)**	**Pavement Thickness less than 8 inches (200 mm)**	**Pavement Thickness 8 inches (200 mm) and greater**
1 (16) or less	45 (0.71) or less	$375.00	$875.00
Over 1 to 2 (16 to 32)	Over 45 to 50 (0.71 to 0.79)	$225.00	$525.00
Over 2 to 3 (32 to 47)	Over 50 to 55 (0.79 to 0.87)	$150.00	$350.00
Over 3 to 4 (47 to 63)	Over 55 to 60 (0.87 to 0.95)	$75.00	$175.00
Over 4 to 7 (63 to 110)	Over 60 to 70 (0.95 to 1.10)	$0.00	$0.00
Over 7 to 8 (110 to 126)	Over 70 to 75 (1.10 to 1.18)	-$150.00	-$350.00
Over 8 to 9 (126 to 142)	Over 75 to 80 (1.18 to 1.26)	-$300.00	-$700.00
Over 9 to 10 (142 to 158)	Over 80 to 85 (1.26 to 1.34)	-$450.00	-$1050.00
Over 10 to 11 (158 to 174)	Over 85 to 90 (1.34 to 1.42)	-$600.00	-$1400.00
Over 11 (174)	Over 90 to 95 (1.42 to 1.50)	-$750.00	-$1750.00
	Over 95 (1.50)	(1)	(1)

Introducing the Inertial *Profiler*



1. Contractors fell behind the curve even with the 1 yr. “grace” period
2. Less than desirable skill utilizing the SAM
3. Data collection became a breeze
4. Initial hesitancy within the agency as to the accuracy and validity of the data
5. Led to the adoption of two Proposal Notes based upon the treatment method

PN 470 (Thin-Lift)

- Incentive only based specification
- Less than 3” of new pavement
- Localized roughness threshold set at ¼” in 10’
- Lot payment starts/stops 1’ from structures

Pay Schedule		
Mean International Roughness Index (Inches per mile per 0.1 mile section)	Mean International Roughness Index (m/km per 0.16 km section)	Price Adjustment Percent
45 or less	0.71 or less	105
Over 45 to 50	Over 0.71 to 0.79	103
Over 50 to 55	Over 0.79 to 0.87	102
Over 55 to 60	Over 0.87 to 0.95	101
Over 60	Over 0.95	100

PN 420

- ≥ 3” of new pavement
- Incentive/Disincentive based pay table
- Localized roughness threshold set at 160”/mi. in 25’
- Lot payment starts/stops 40’ from structures but still responsible for LAR in the transition areas

  Lot payment was initially 1’ from structures
- Can grind out of disincentive but cannot grind into incentive

  Exclusions for traffic access at ramps where paving is suspended

PAY SCHEDULE		
IRI	PAY ADJUSTMENT	
Inches per mile per 0.1 mile section (m/km per 0.16 km section)	Pavement Thickness less than 8 inches (200 mm)	Pavement Thickness 8 inches (200 mm) and greater
45 (0.71) or less	$375.00	$875.00
Over 45 to 50 (0.71 to 0.79)	$225.00	$525.00
Over 50 to 55 (0.79 to 0.87)	$150.00	$350.00
Over 55 to 60 (0.87 to 0.95)	$75.00	$175.00
Over 60 to 70 (0.95 to 1.10)	$0.00	$0.00
Over 70 to 75 (1.10 to 1.18)	-$150.00	-$350.00
Over 75 to 80 (1.18 to 1.26)	-$300.00	-$700.00
Over 80 to 85 (1.26 to 1.34)	-$450.00	-$1050.00
Over 85 to 90 (1.34 to 1.42)	-$600.00	-$1400.00
Over 90 to 95 (1.42 to 1.50)	-$750.00	-$1750.00
Over 95 (1.50)	(1)	(1)

The Numbers Game

- Contractors were not very effective figuring out IRI during the 1 year grace period
- ODOT implemented very extensive training and ramped up certification requirements at a new course to offset the delayed contractor response
- Initially confusion remained on how to interpret the data and effectively use the software
- How did ODOT arrive at the current spec???

A. The IRI ranges and LAR thresholds were NOT arbitrarily selected

1. ODOT probed other states and took contractor input into consideration

   a. The set matrix lot table was considered acceptable

   b. ODOT pitched 150”/mi. LAR threshold but contractors countered with 170”-180”/mi.

   c. Settled on 160”/mi. in 25’ but contractors were still struggling

What Lies Ahead…

- ODOT looking to combine the notes
- Met with asphalt and concrete industry in the spring of 2015
- Both sides concerned about misapplication and/or exclusion of the current note(s)
- Goal is to clear up vague areas and heighten smoothness awareness through good paving practices and partnership

Mighty Pendulum Swing: IP in a QC Role

SAM feature in ProVal is a very powerful tool

- Allows for the proper identification of must grind locations to maximize the ride benefit *DMI is extremely critical*
- Can model literally any machine on the market (Diamond Grinders and Milling Machines)
- Will predict resultant IRI values post-corrective work

There is a change in focus to underlying and/or existing pavement conditions

- Sub-grade movement on multi-year projects due to freeze/thaw cycles, high sulfate areas, or reflective cracking from underlying JPCC
- Collect data and address each layer of pavement (base & intermediate)
- Goal is to fix issues before surface mix placement to minimize corrective work

460-09 (I-90) WBDL MRI Comparison

Timeline of events

Date Profiled		Average MRI (in./mi.)	% Change
No data		No data	Initial
3/29/11	End to End	141.2	-----
7/30/11	End to End	130.5	8%
5/18/12	End to End	135.9	4%
6/8/12 and 6/9/12	Profile milled	93.2	31%
N/A	Milled Prediction	83.7	
Various	Surface	40.8	55%

460-09 (I-90) WBPL MRI Comparison

Timeline of events

Date Profiled		Average MRI (in./mi.)	% Change
8/11/10	1st 18,000'	77.4	Initial
3/29/11	End to End	91.9	19%
7/30/11	End to End	85.8	7%
5/18/12	End to End	128.4	50%
6/6/12 & 6/7/12	Profile Milled	88.8	31%
N/A	Milled Prediction	81.8	
Various	Surface	40.5	54%

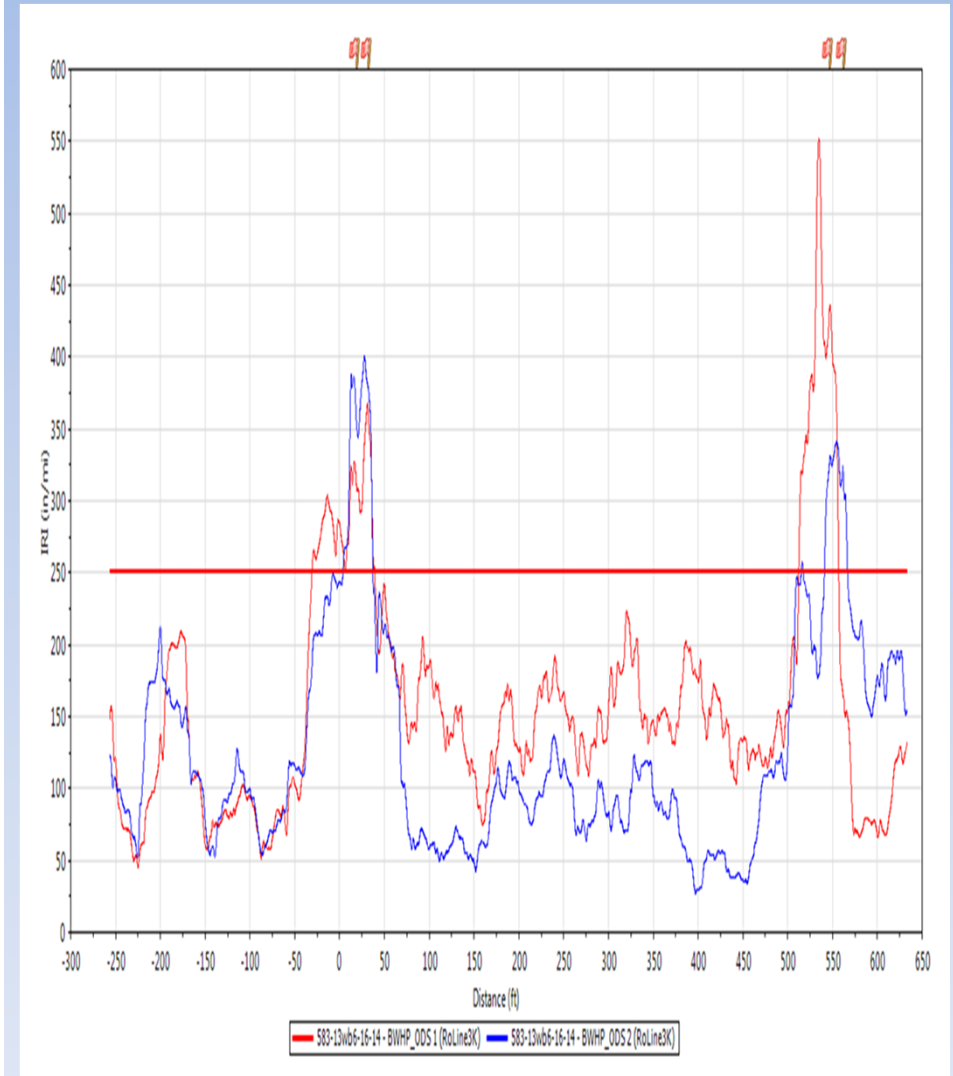
Has the Implementation been a Success???

- For the most part we have made significant strides
- Misapplication remains an issue
- ➢ Not all roads are created equal
- A-Team vs. B-,C-, & D-Team
- Led to the introduction of the new PN 555 (Surface Smoothness for Bridges and Transitions)

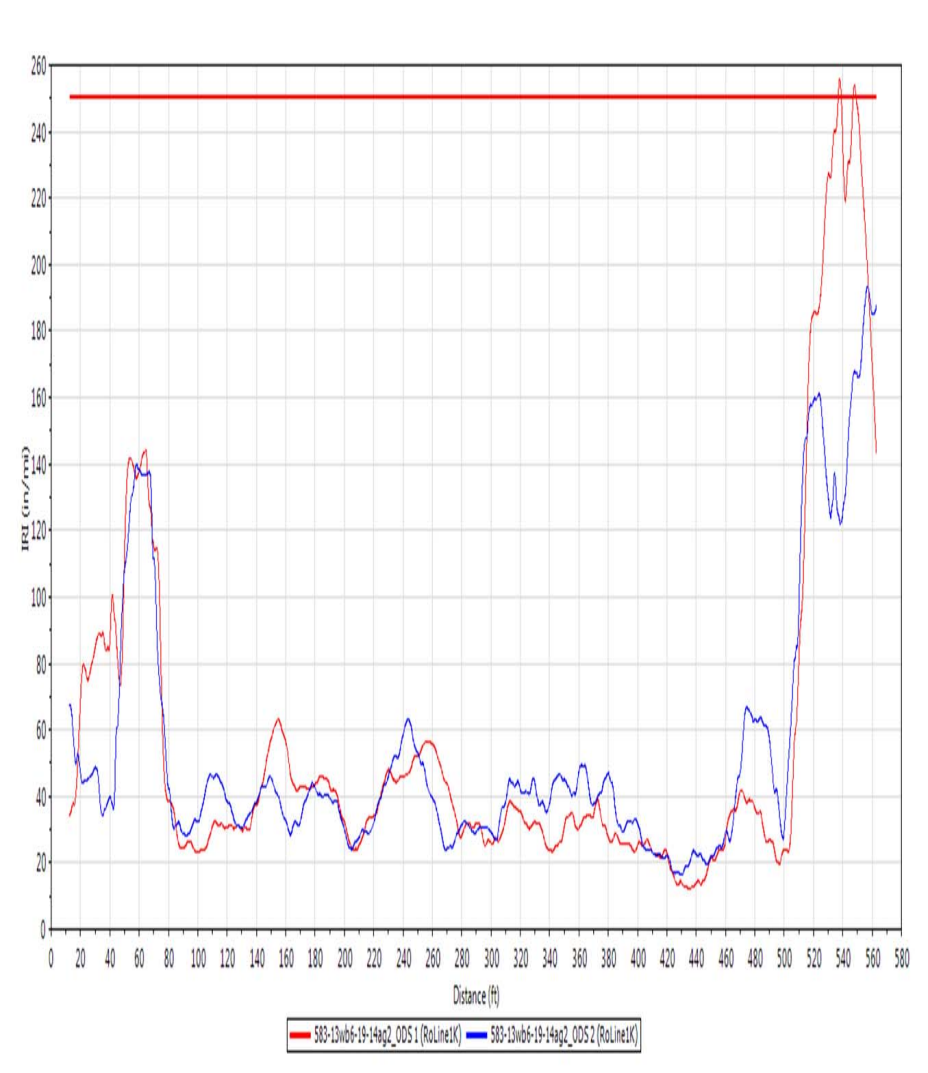
PN 555

- Yet another necessary wake-up call
- The "encounter" = 25' of entry pavement, entry approach, deck, exit approach, & 25' of exit pavement
- 265' ≤ subject to MRI and LAR thresholds
- > 265' subject to only LAR thresholds
- MRI must be >130"/mi. or it needs to be corrected to >100"/mi.
- LAR threshold of 250"/mi. in 25' raised to 350"/mi. in 25' within 25' either side of a steel armored expansion joint
- Significant growing pains but we are making steady progress

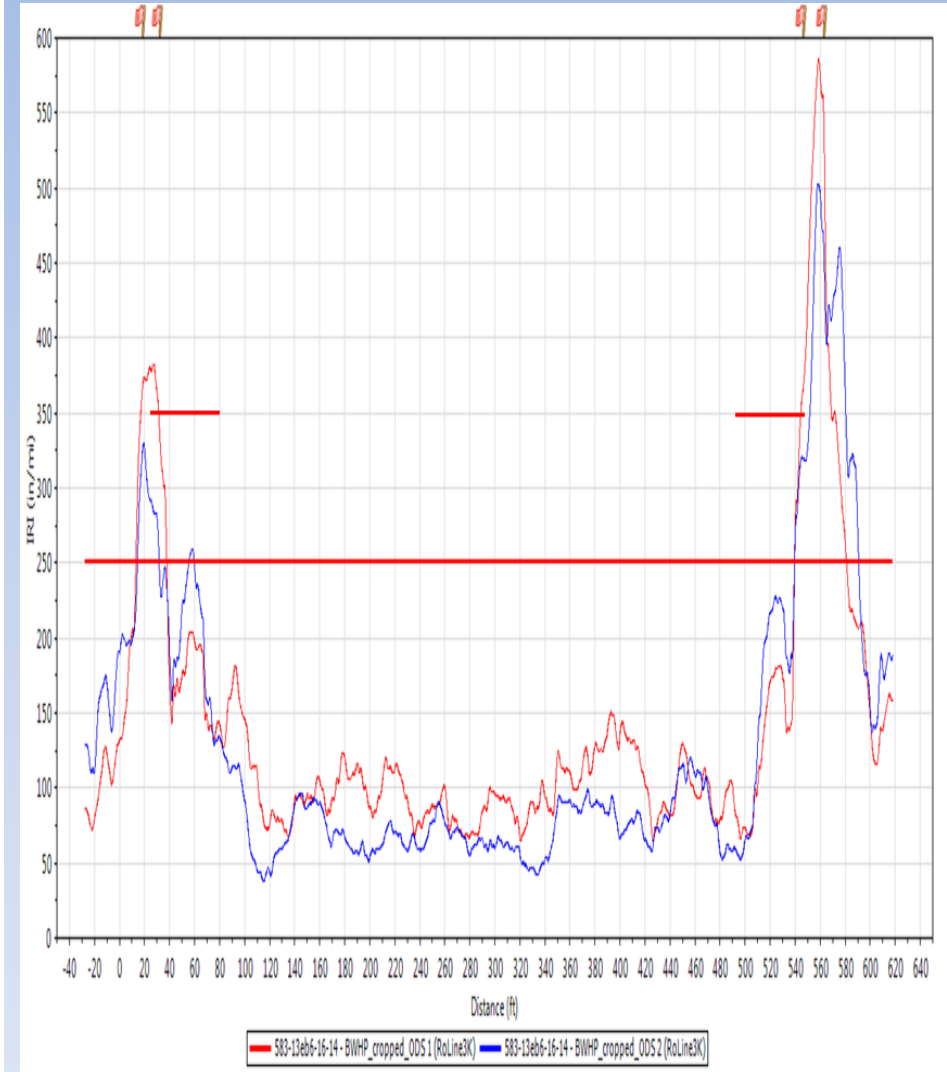
Pre-grind MRI = 152.6”/mi.



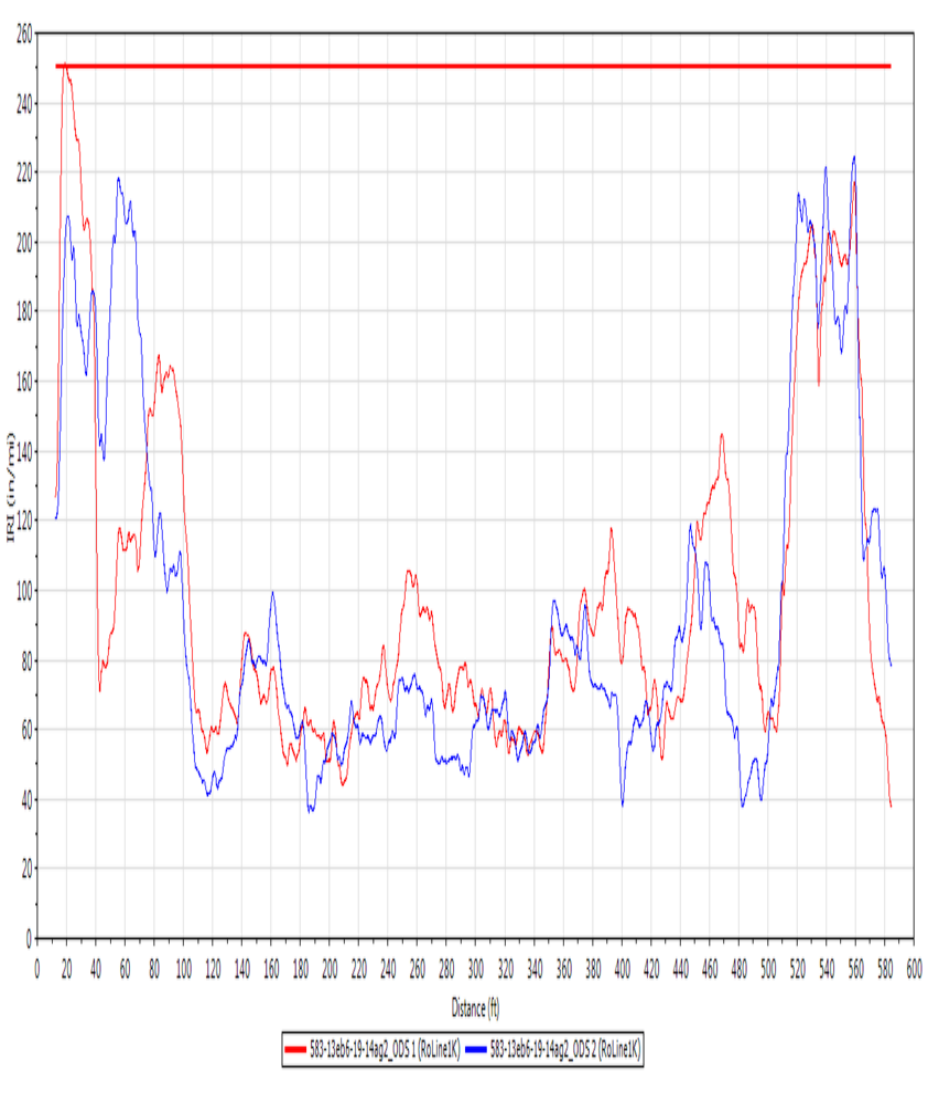
Post-grind MRI = 57.3”/mi.



Pre-grind MRI = 129.6”/mi.



Post-grind MRI = 95.5”/mi.



QUESTIONS???

JEFF McGOWAN

Asphalt • Driveways • Parking Lots • Roadways • Airports
Quality Control • Quality Assurance

SHELLY & SANDS

MAR-ZANE MATERIALS LLC

MAR-ZANE MATERIALS, INC.

SHELLY & SANDS, INC.
1794 Moxahala Avenue
P.O. Box 1685
Zanesville, OH
43702-1685

Office 740-453-0127
Fax 740-453-6095
Cell 740-819-4348
jmcgowan@shellyandsands.com