ALDOT's BMD Validation Study

CAPRI Fall 2023

CONSORTIUM FOR ASPHALT PAVEMENT RESEARCH AND IMPLEMENTATION

ALDOT's BMD Validation Study

- Selected Test Methods
- Gathering Benchmarking Data
- Details about the location
- Writing the Specification

Selecting Test Methods

- Cracking Test
- Modified IDEAL-CT we call it AL-CT
  - Linked Here
  - We allow screw drive presses
  - No need to cut sample
  - Relatively fast
  - AASHTO R30 2hr to simulate plant aging

Selecting Test Methods

- Rutting Test
- HT-IDT
  - Linked Here
  - We allow screw drive presses
  - Simple
  - Use existing equipment
  - Faster than Hamburg
  - Use AASHTO R30 2hr to simulate plant aging

Benchmarking

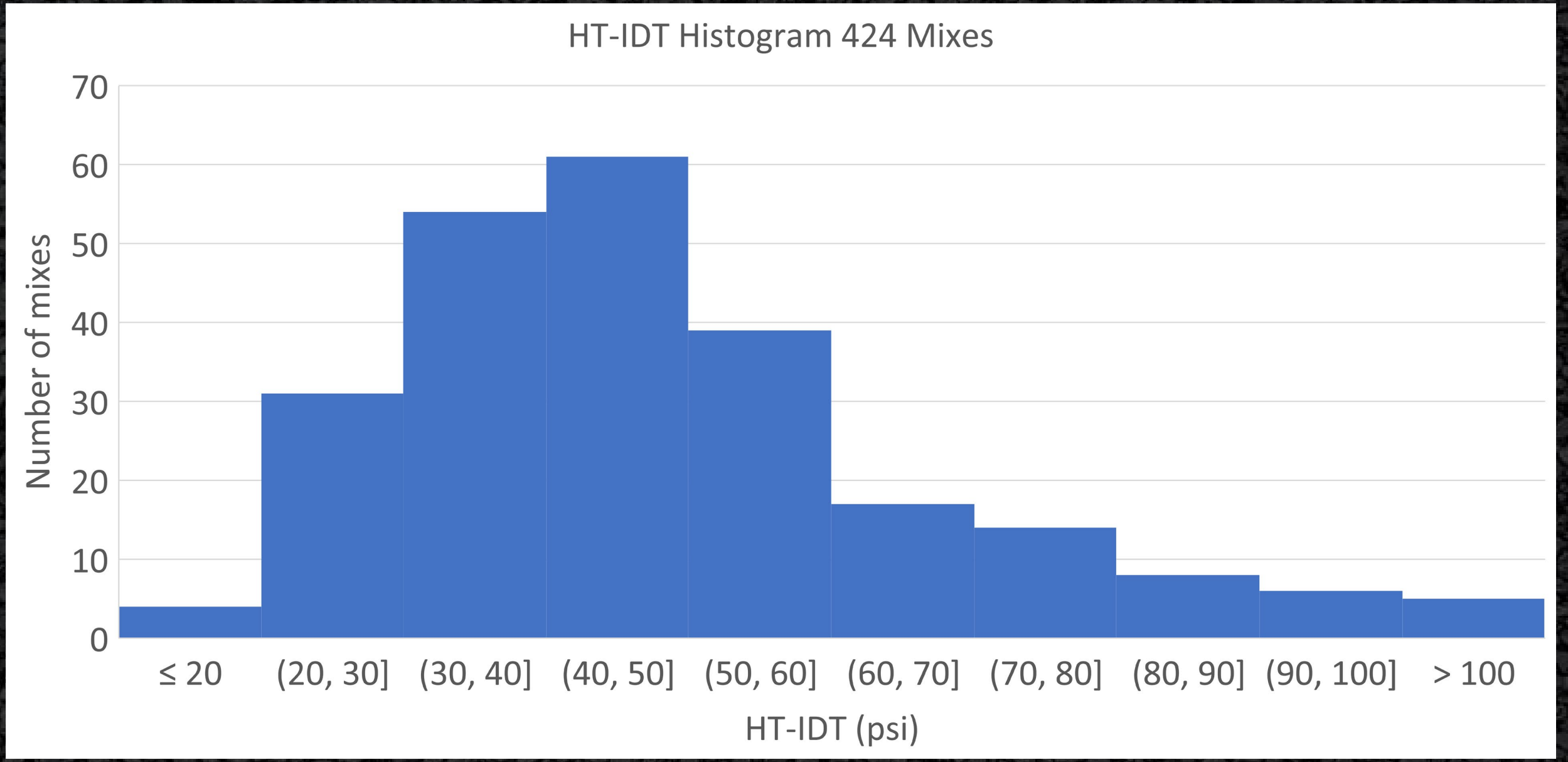
- We collected data on all approved Superpave and SMA mixes for 2 years
- You can read about it here in Asphalt Technology News
- A BIG THANK YOU to our industry association for supporting this effort

Benchmarking

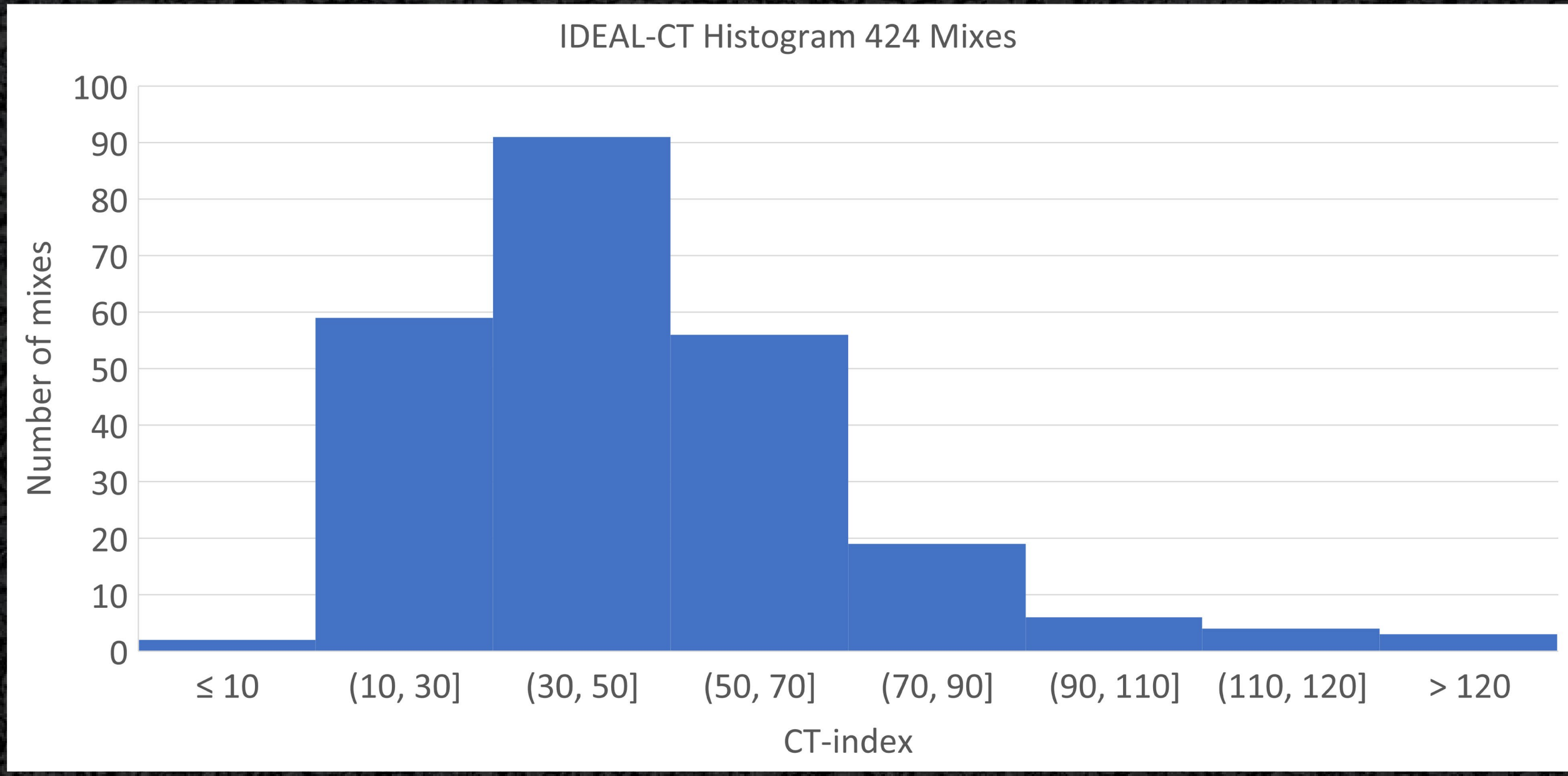
SUPERPAVE Mixes with “typical” RAP quantities

	Average	Median	Max	Min	SD	Count
HT-IDT (psi)	49.10	45.15	158.8	19.16	21.12	239
CT Index	47.23	43.53	342.9	6.26	30.65	240

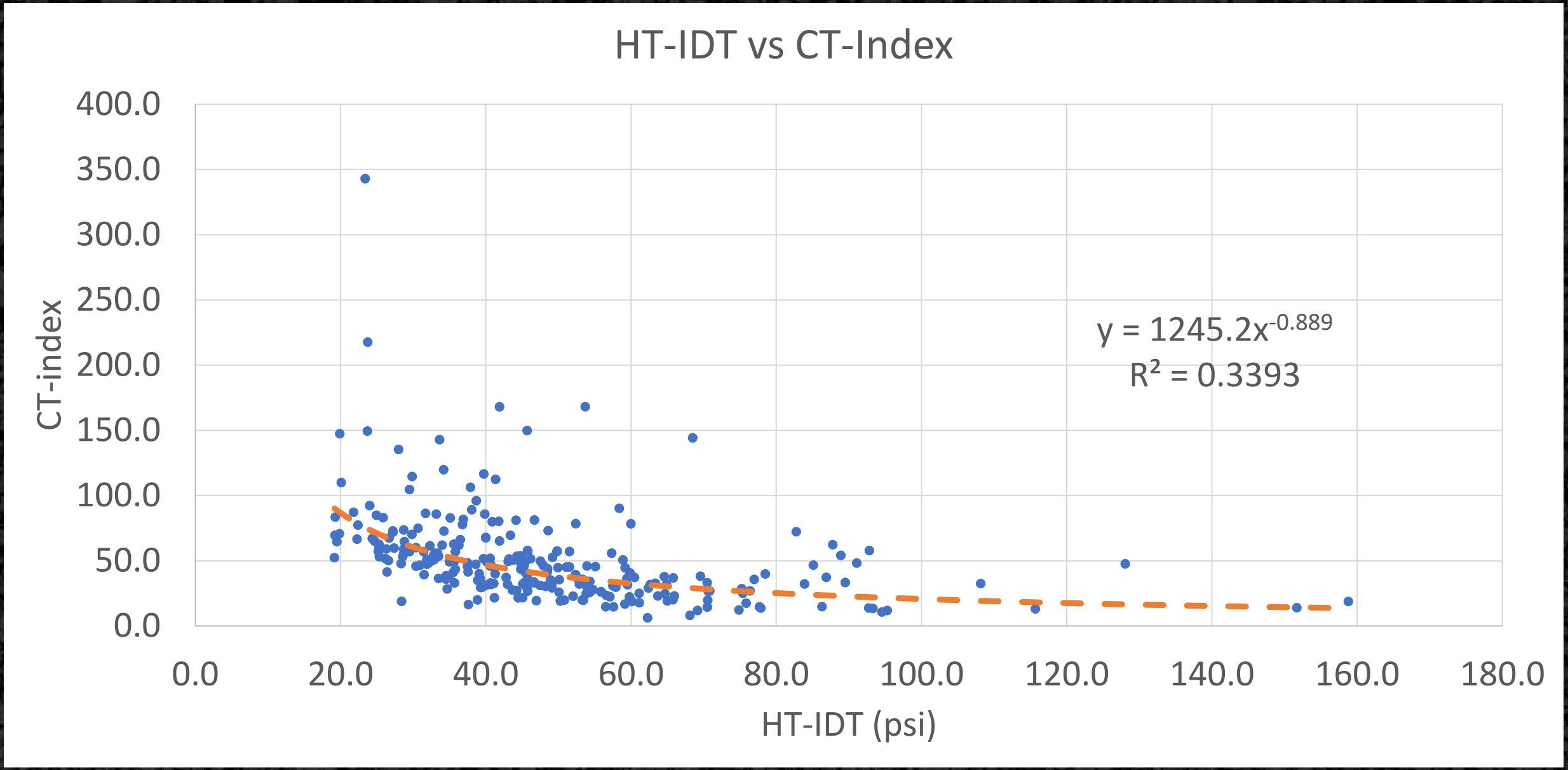
Benchmarking



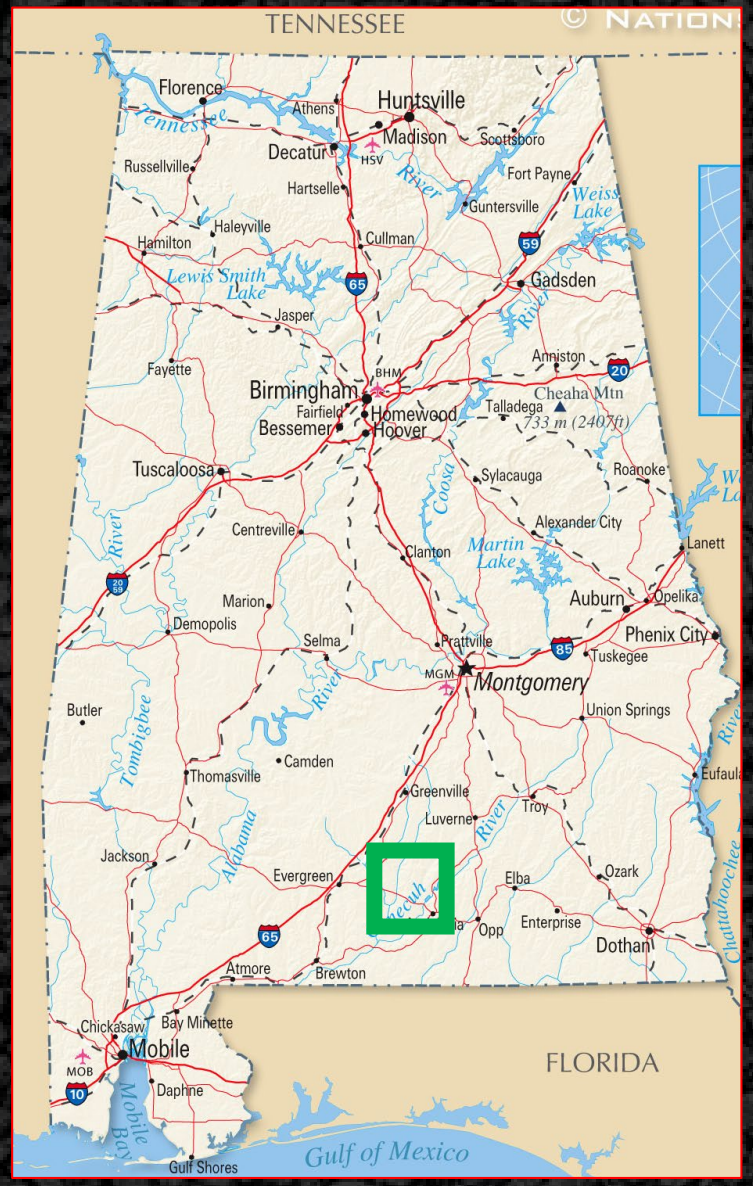
Benchmarking

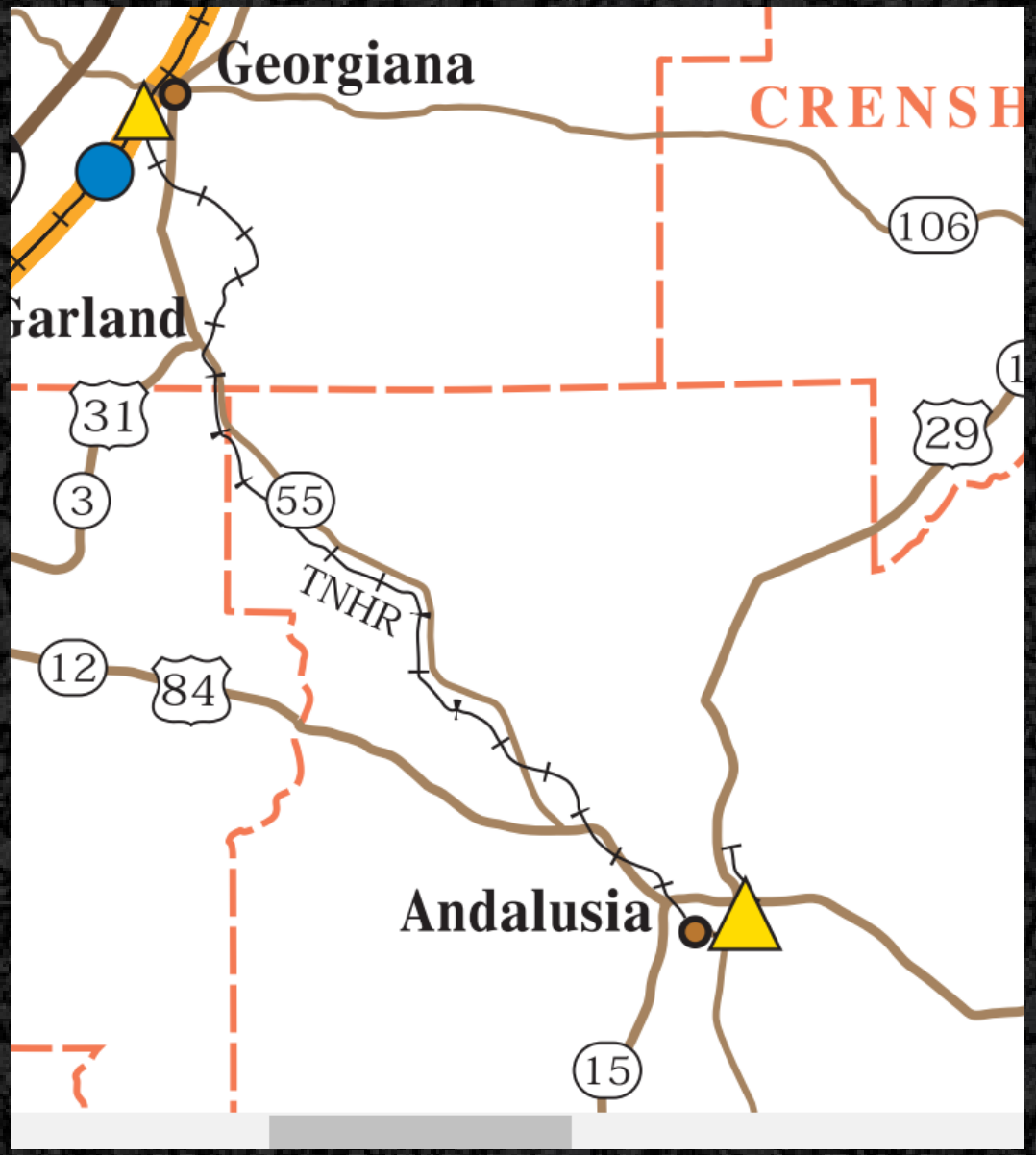


Benchmarking



Validation Study Location





Validation Study Location

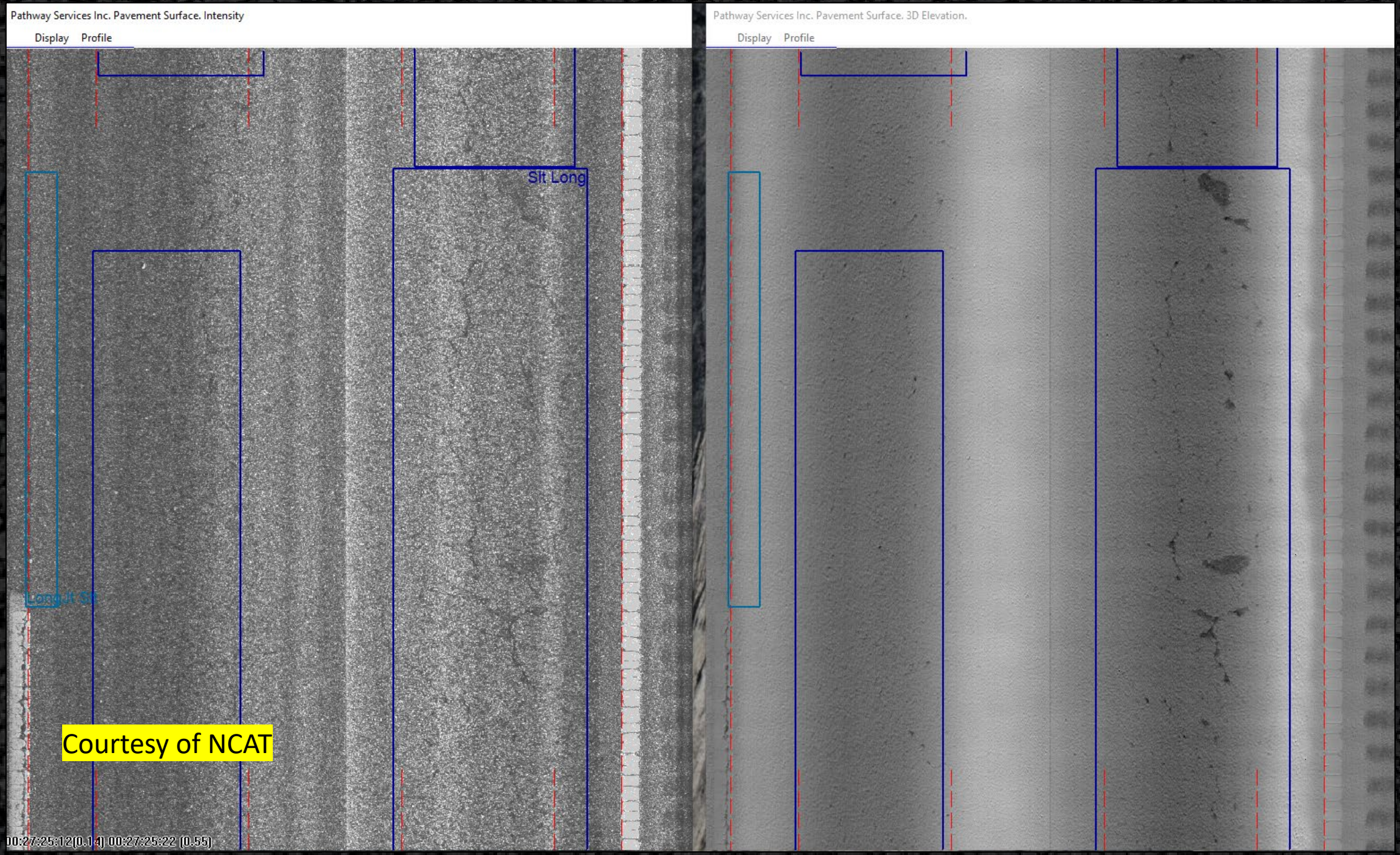
- Populare route to the beach, traffic is ≈90% cars
- Rural undivided 4 lane
- ESAL range C/D = 3.55 MESALs 20yr
- Repaved in 2009 w/
  - “G” treatment
    - (0.27 ft^3/sy of #78 agg and 0.31 gal/sy liquid)
  - 80 lb leveling layer
  - 165lb wearing surface

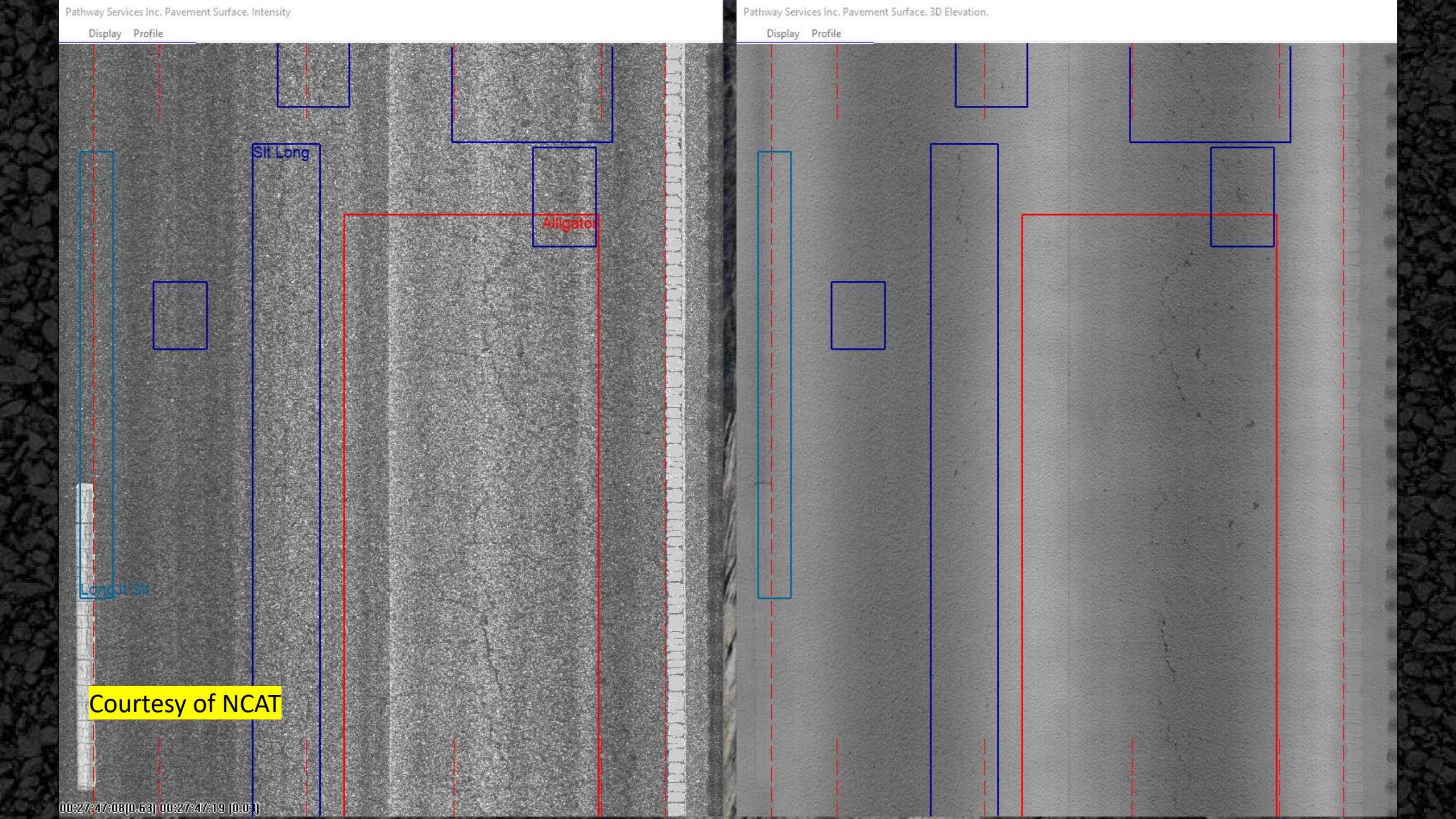
Validation Study Location

- Current Build up:
  - 7.79” HMA
  - 6” soil agg base
- Current distress in study lane and area
  - 1/8 to 1/4” rutting
  - Level 1 severity (1/4”) longitudinal cracking
  - PCR rating of 52
    - Poor score driven by age and cracking
    - Ride quality and rutting are both good

Validation Study Location

- This project will
  - Micro mill 1.5 in.
  - Overlay 165 lb of 3/4” MAS trial mix
- Six 1000 ft trial sections
  - North bound outside lane
  - STA 238+18.24 to STA 298+18.24
  - MP 35.86 to MP 37.00
  - Approx 1000 tons per section


Pathway Services Inc. Pavement Surface. Intensity
Display
Profile
Slt Long
Pathway Services Inc. Pavement Surface. 3D Elevation.
Display
Profile
Courtesy of NCAT


Pathway Services Inc. Pavement Surface. Intensity
Display Profile
Slt Long
Alligato
Long.it Slt
Courtesy of NCAT
00:27:47:08(0.63) 00:27:47:19 (0.03)
Pathway Services Inc. Pavement Surface. 3D Elevation.
Display Profile

Specification

- Our first attempt at a validation study was postponed
  - Did not involve all stake holders early enough in the process
    - Must involve, Industry, Academia, FHWA, and DOT Area Office, and Construction Bureau EARLY
  - How will the mix be paid for?
  - What happens when some mix doesn’t meet the BMD criteria?
  - Is it worth delaying the project?
  - Do all stake holders have a clear picture of the project and objective?

Specification

- Opening paragraph that outlines:
  - Mix will be designed to meet the BMD Criteria ranges
  - Mix will be produced to meet the VOLUMETRIC mix requirements given in the mix design, if it does it will be paid at 100%
  - BMD testing is still required during construction for information purposes once per test section.

Specification

- Opening paragraph that outlines:
  - Objective
  - Multiple trial sections
  - Contractor may design several mixes changing:
    - Binder grade, and source
    - Aggregates
    - RAP and RAS content and source
    - Additives
    - Gyrations
  - There will be lots of extra sampling and testing

Specification

- Volumetric changes:
  - Allowing 35% RAP in surface
  - Allowing over 35% RAP with friction testing
  - RAS allowed in surface
  - AC% acceptable range ± 0.30%
  - Air Voids ± 0.50%
  - Gradation requirements:
    - Min 100% pass 3/4”
    - Min 90% pass 1/2”
  - Allow other binder grades to meet BMD requirements

Specification

Target HT-IDT and CT index for Each Test Section		
Test Section	Design HT-IDT	Design CT index
1	14-18 psi Low	55-77 Med
2	14-18 psi Low	83-117 High
3	20-30 psi Med	27-39 Low
4	20-30 psi Med	83-117 High
5	35-45 psi High	27-39 Low
6	35-45 psi High	55-77 Med

Specification

Production Gradation Tolerances For Trial Sections	
Sieve Size Range	Tolerance (percent retained by mass)
Larger than or equal to No. 8	+/- 7%
No. 16 to No. 100	+/- 4%
No. 200	+/- 2%

Monitoring Plan

- This is a State Highway System project so it will be monitored every other year in our pavement management system by Pathways for:
  - Rutting
  - Cracking
  - IRI
- We are considering asking pathways to monitor it every year

Questions ?

hartzogz@dot.state.al.us