NORTH CAROLINA
Department of Transportation









SDI Project

Traffic Safety Unit

September 2021

USDOT Safety Data Initiative (SDI)

- Partnership –

NORTH CAROLINA
Department of Transportation

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- Project – this project is exploring what roadside features can be reliably collected from videolog data using AI methodologies

- Project Time Frame – Sep 2020 to Oct 2021

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- Available Rural 2-Lane Roadway Videolog –
  - 2017 primary routes ~8,500 Miles
  - 2018 secondary routes ~55,000 Miles

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- Potential Roadside Objects of Interest –

1a Fixed object types (in order of priority)
  - Guardrails (known data points on primary road set)
  - Guardrail ends/terminals (known data points on primary road set…..not the type, but where the ends are…..these are the most hazardous area of any guardrail)
  - Trees
  - Utility Poles
  - Signs
  - Drainage Inlets
  - Fence/Wall
  - Mailbox (may be able to just use driveways as a surrogate)
  - Rock Outcropping
  - Bridges (known data points that we may be able to give you)
  - Large Culverts (known data points on large culverts that we may be able to give you)
  - Small Culverts

1b Fixed object offset

2 Driveways

3a Ditches

3b Ditch offset

4 Road side slope

Other items that we think can be derived from the collected data
  - Fixed object density (will be calculated from data identified)
  - Driveway density (will be calculated from data identified)
  - Clear zone widths/distances (could be derived from fixed object/ditches and their offsets)
  - Hazard rating (could be derived from fixed object/ditches and their offsets)

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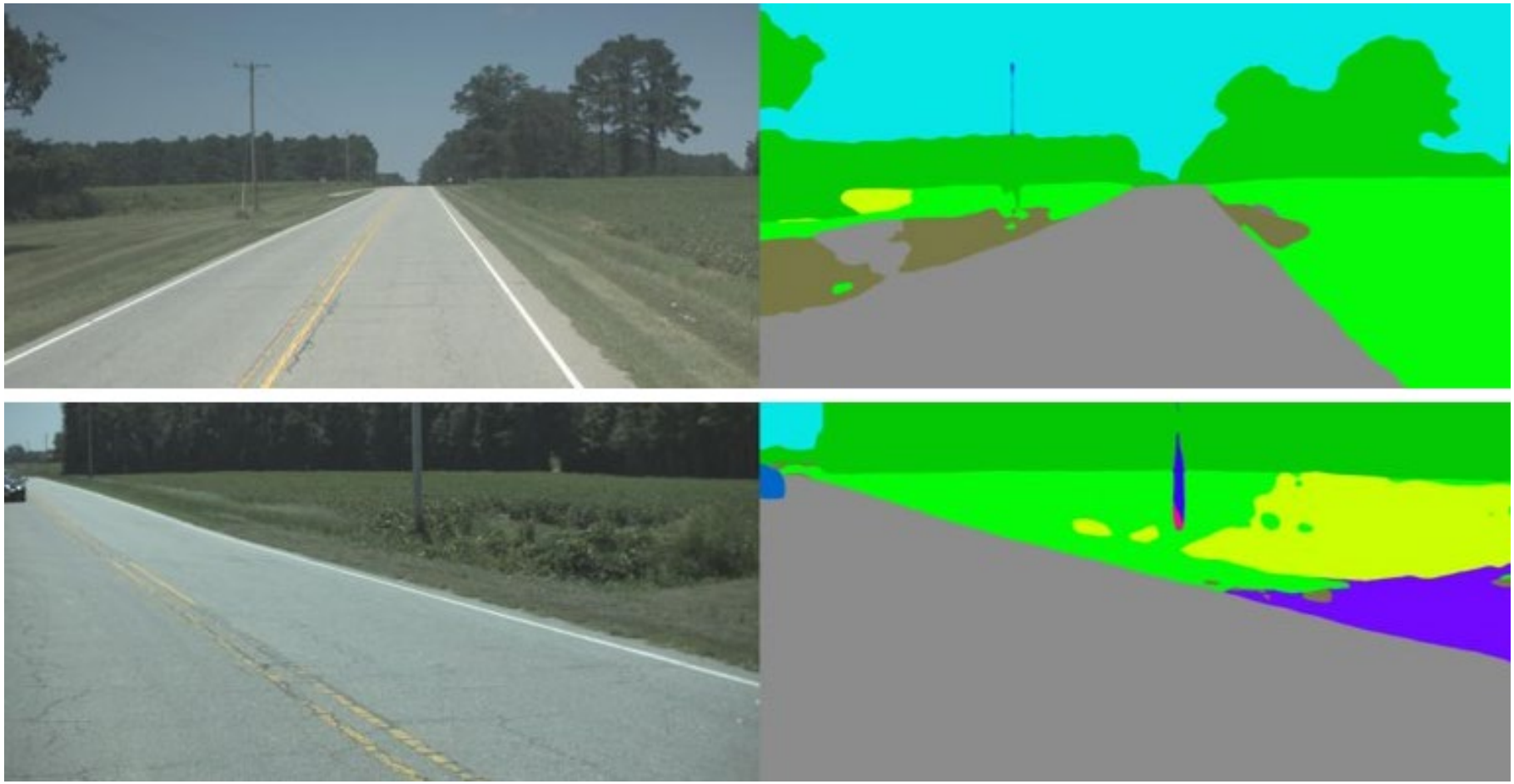
- Utilizing Pretrained Models to Extract Data
  - Notice the utility poles in the computer vision model



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- Utilizing People to Annotate Images to Better Train the Pretrained Models
  - Do you see Guardrail in the Image? Making sure the computer vision recognized the same.

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Route 40001001057

Home / Routes / 40001001057

Overall

Image Count

1,666

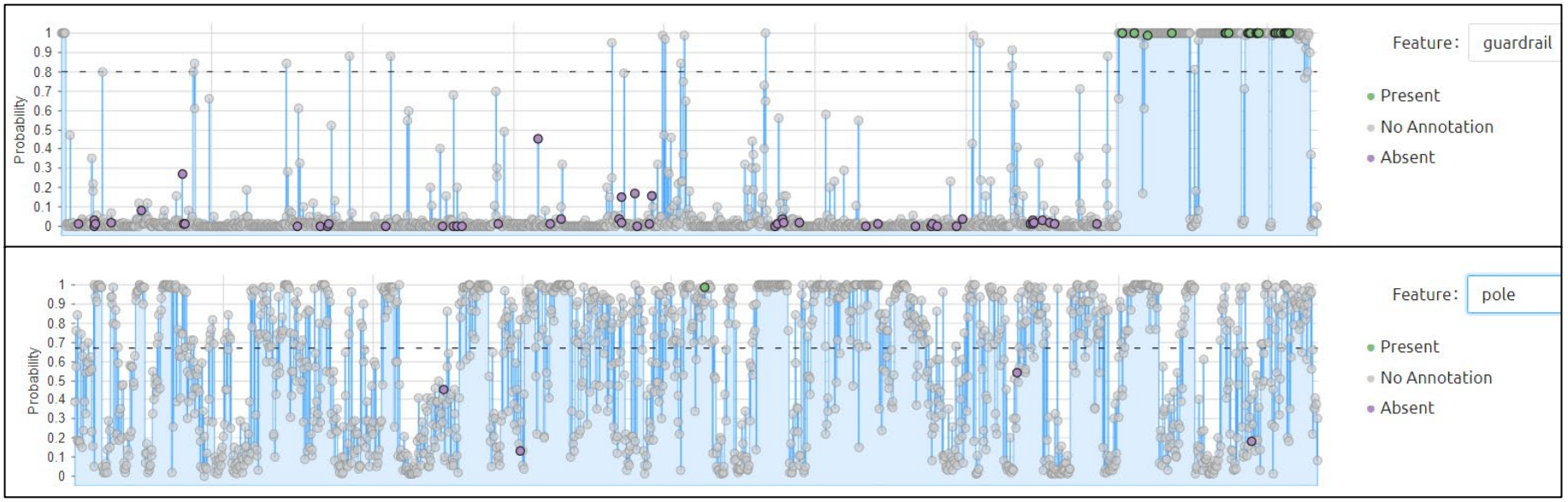
Route Length

8.5360 miles

Annotations

Guardrail	Present	Absent	None
76 / 1666	26	50	1,590

Pole	Present	Absent	None
5 / 1666	1	4	1,661



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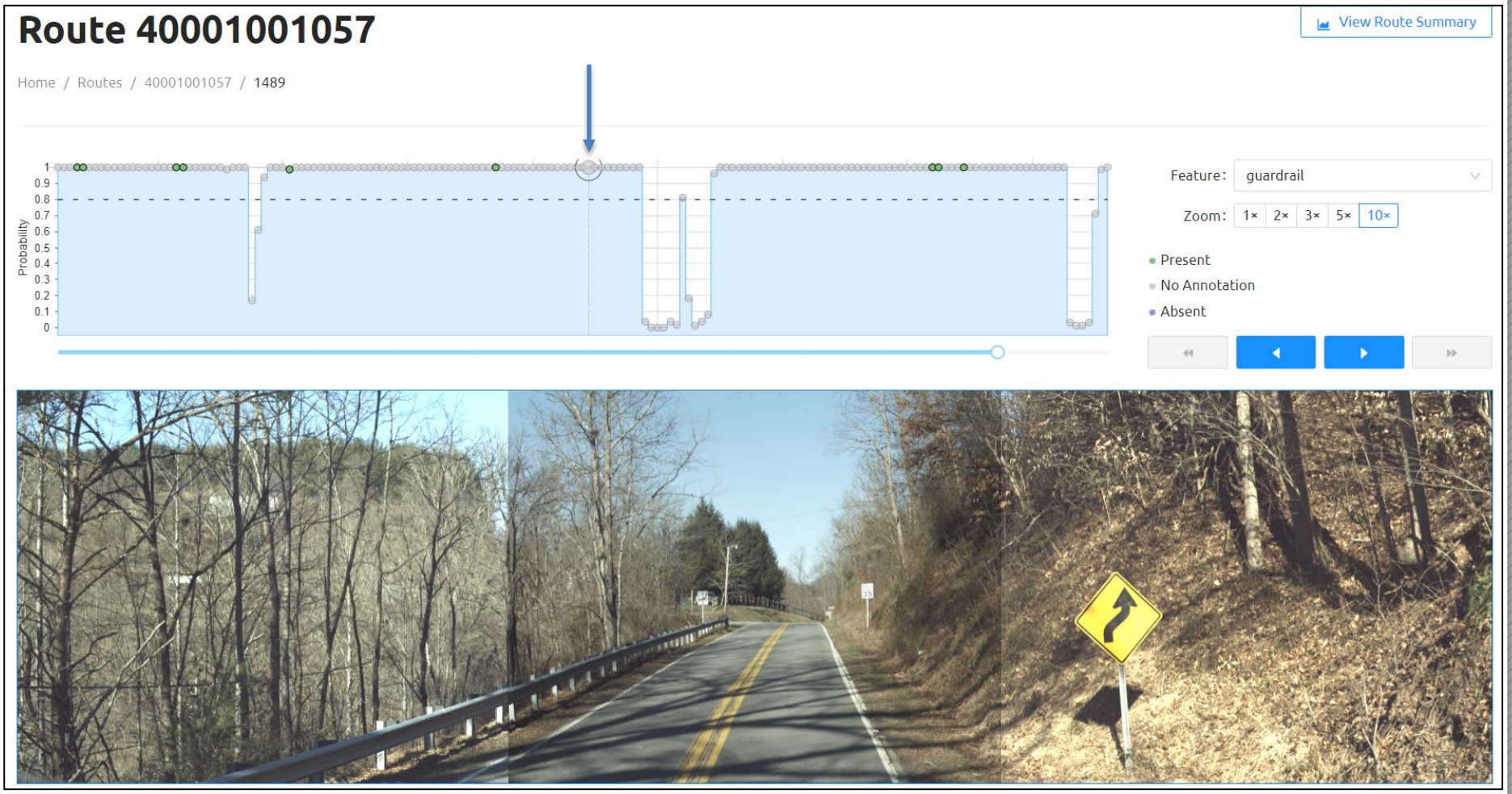
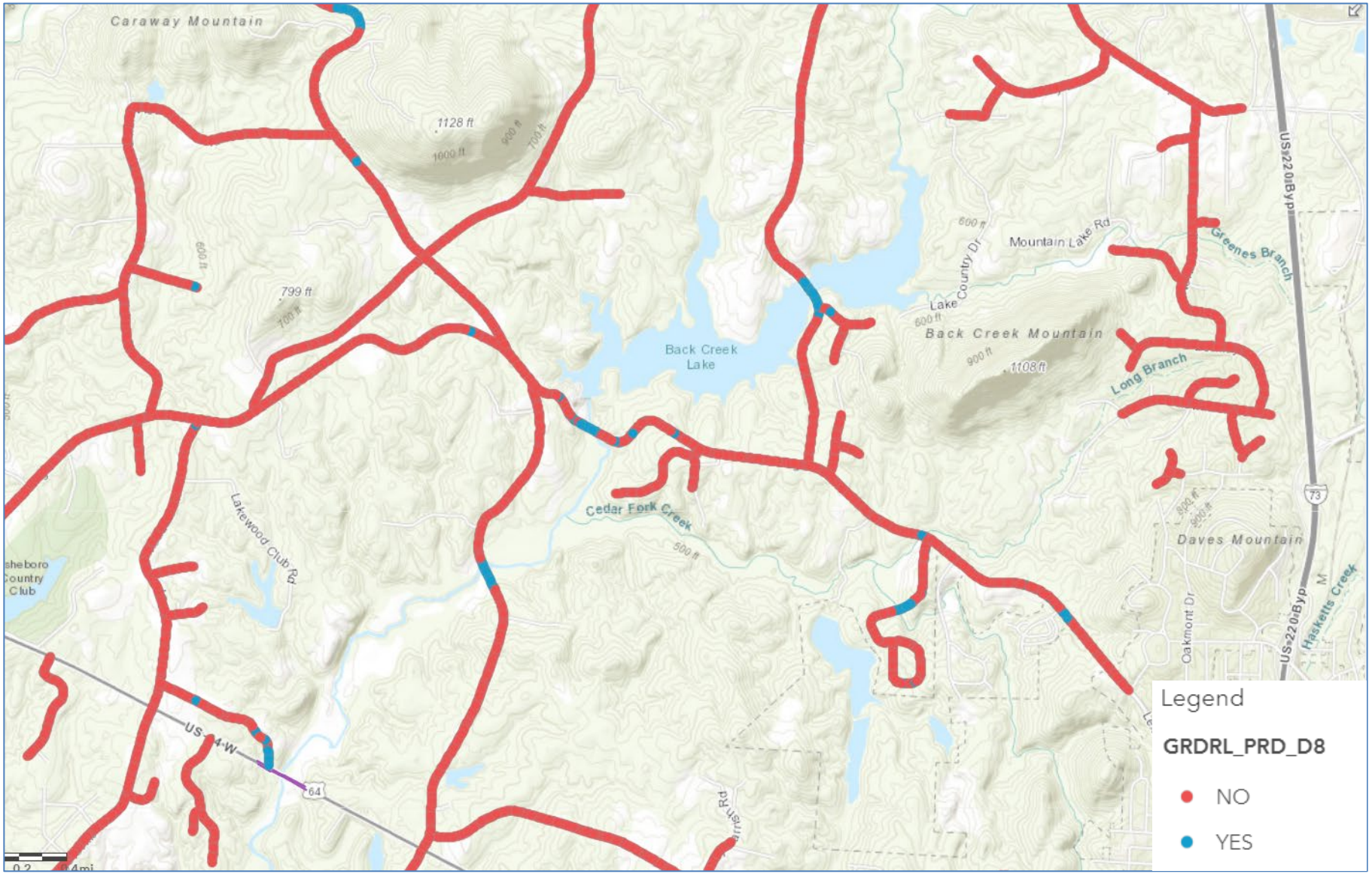


- Longitudinal features appear to be captured successfully, blue arrow is placement of images

USDOT Safety Data Initiative (SDI)



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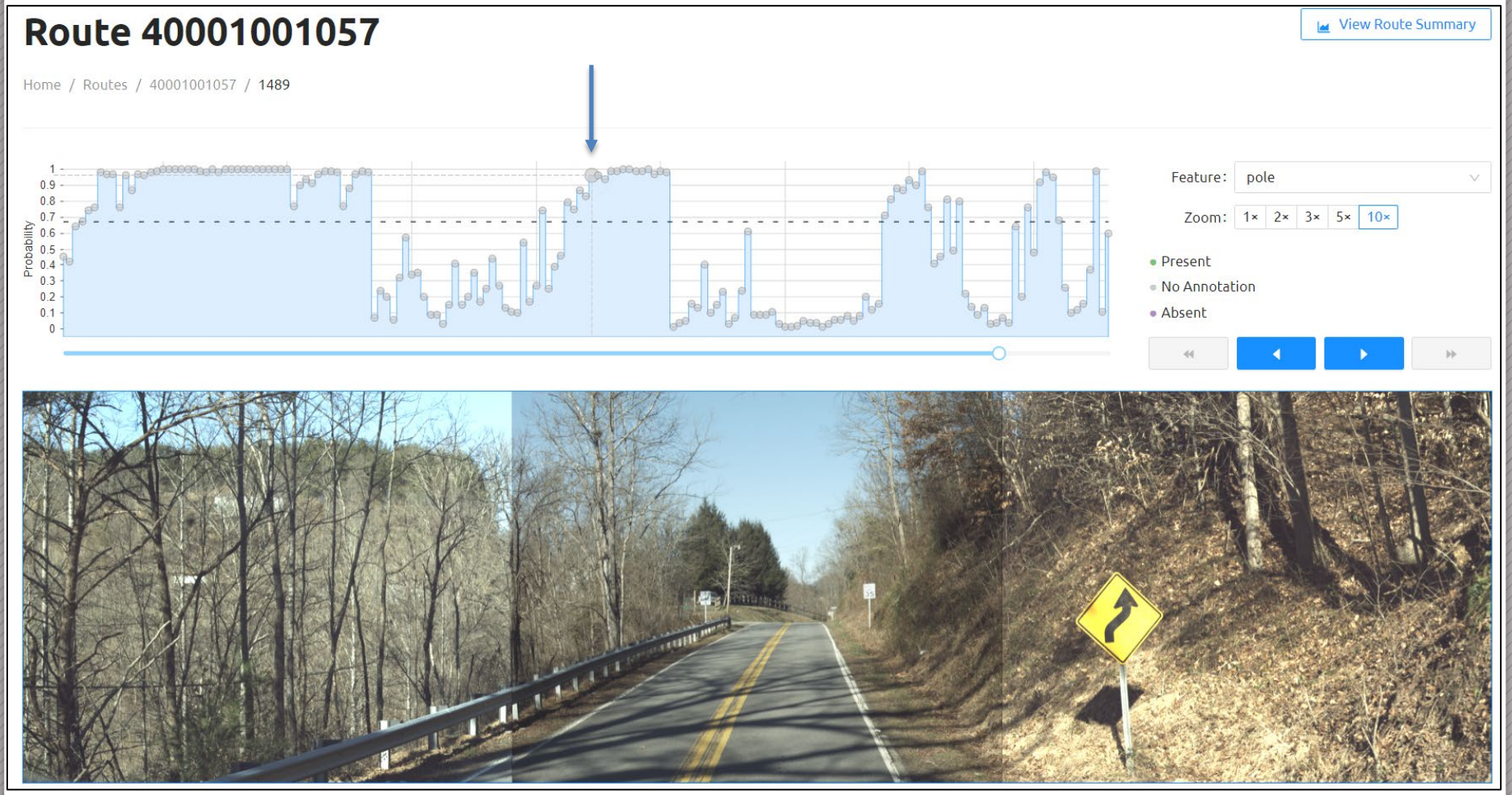

- Point features appear to be captured, but in longitudinal perspective, blue arrow is placement of images

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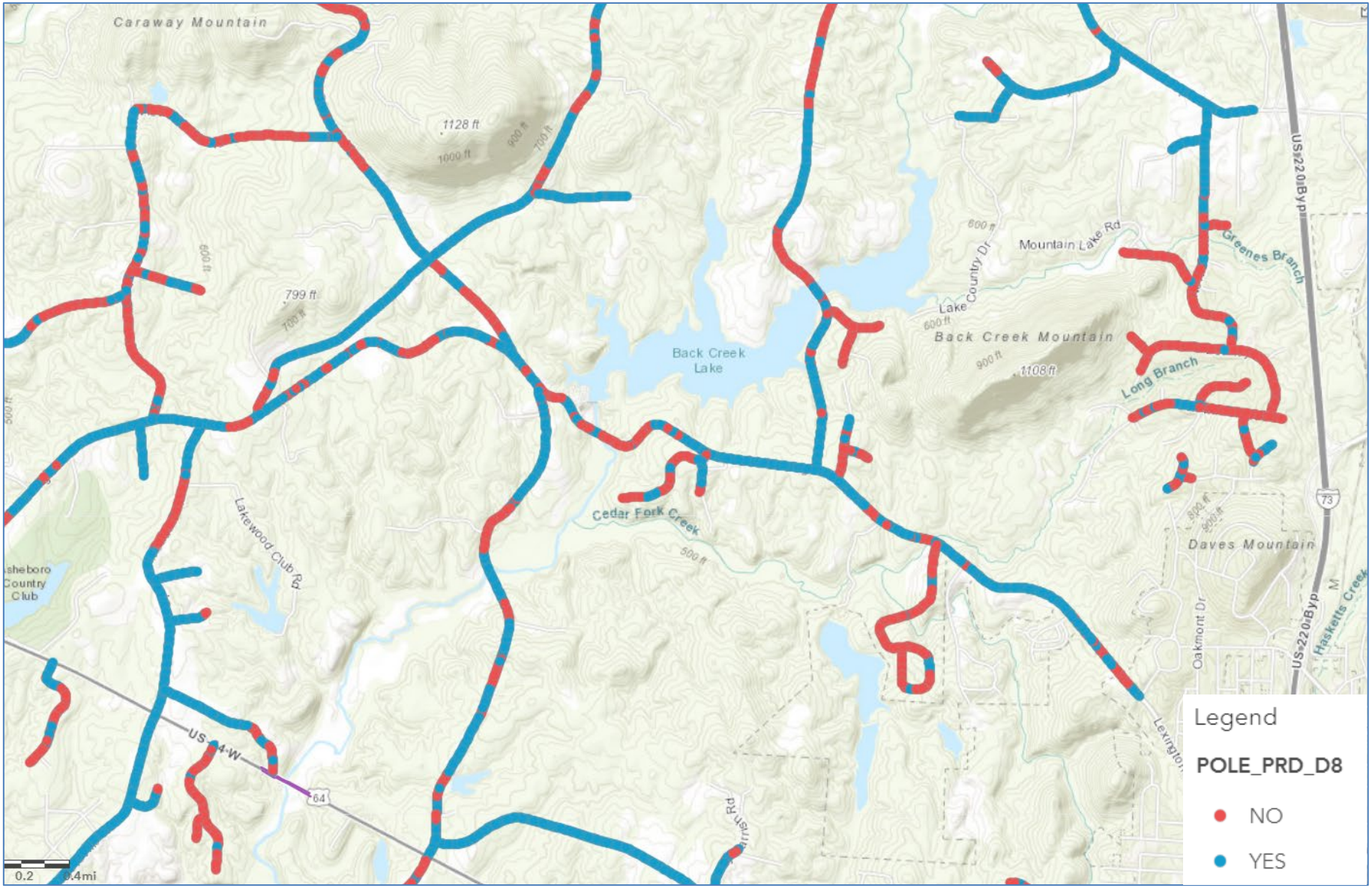

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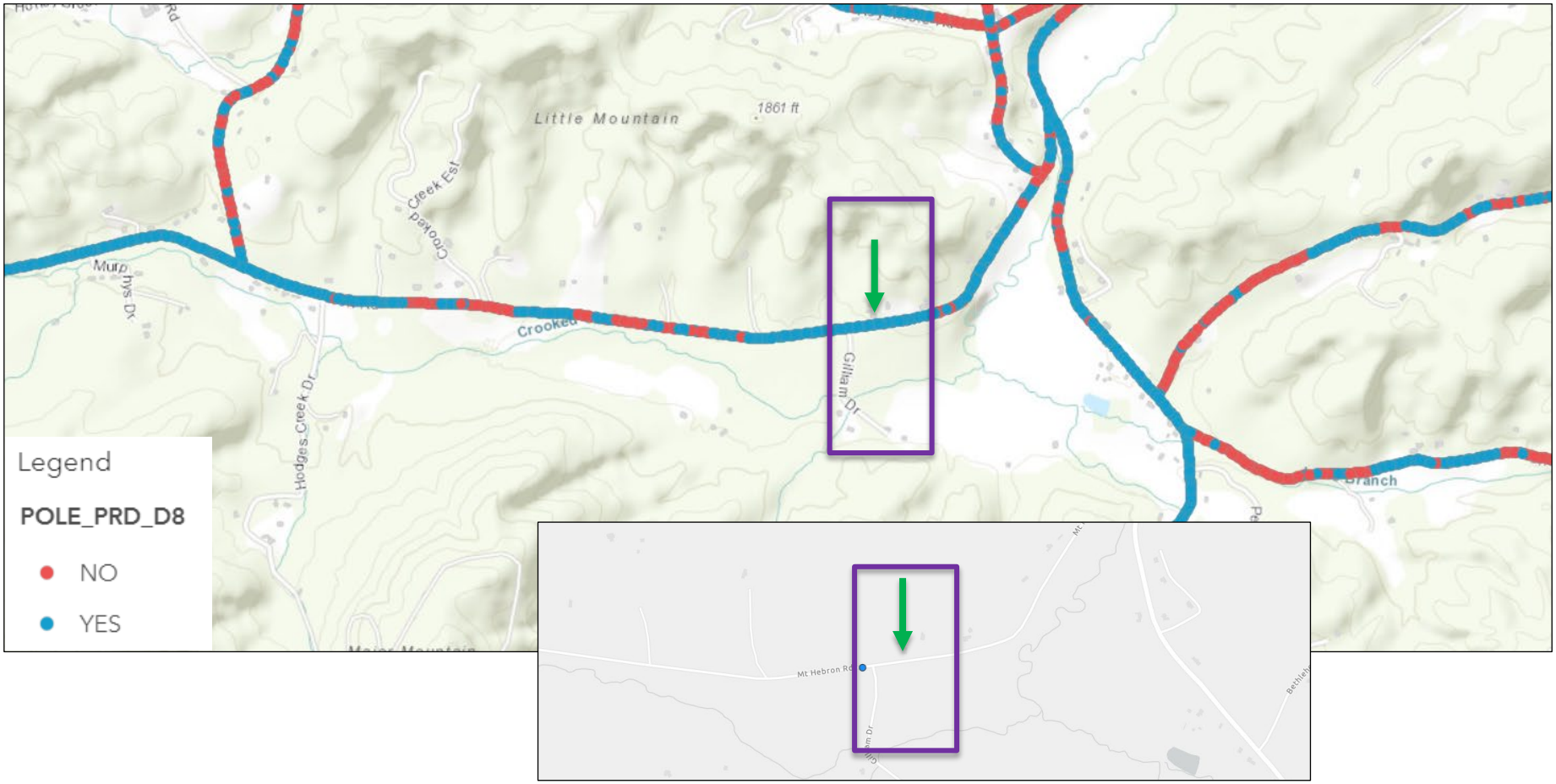
- Point features assessed with all three images, the middle images may capture more “yes” scenarios then applicable
- Green arrow is the “pole”, blue arrow is placement of images

USDOT Safety Data Initiative (SDI)



- Middle image included, a lot of “yes” to pole values (shown in blue)
- Green arrow is the “pole”

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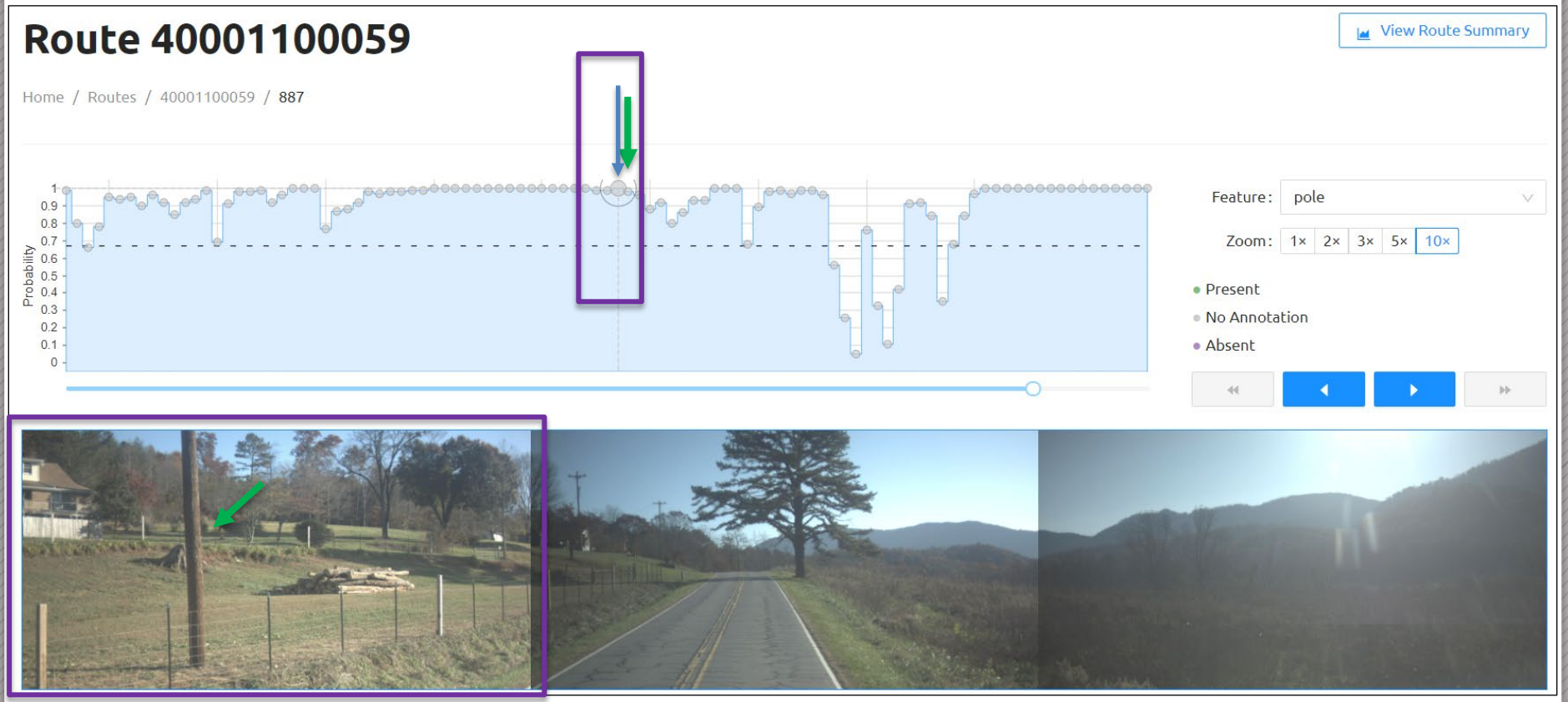

- Point features assessed with left or right images only, no middle images; may capture less “yes” scenarios for more accuracy (dependent on curvature)
- Green arrow is the “pole”, blue arrow is placement of images

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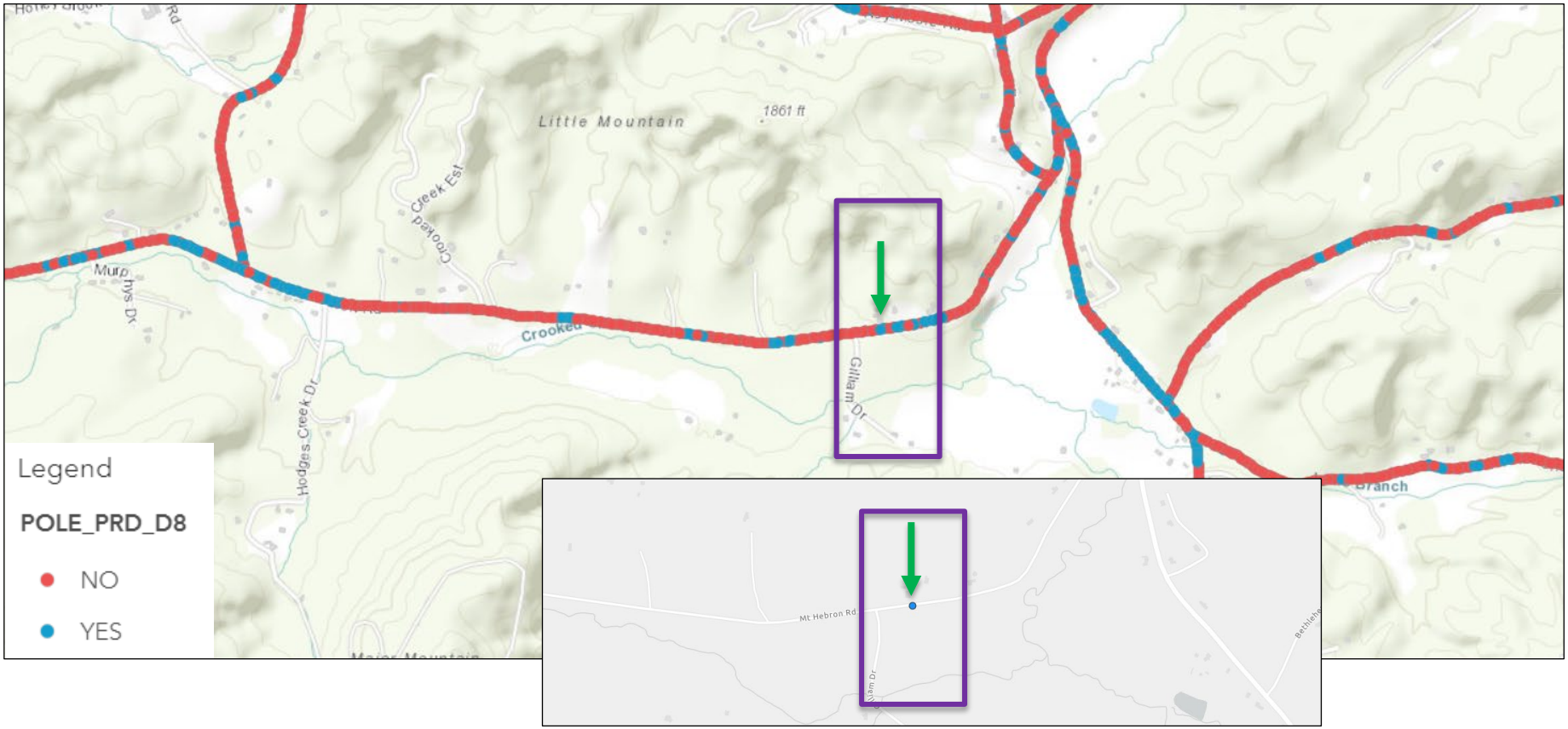

- Left image only, a lot LESS of “yes” to pole values (shown in blue)
- Green arrow is the “pole”

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- In Summary –
- AI methodologies can be utilized to extract information from video log imagery
- Longitudinal items are captured well
- Point items are captured well, but the point position has questionable accuracy, utilizing left or right imagery assessment only may improve on narrow point item locations
- Knowing longitudinal and horizontal distance to a point object in future algorithms may assist

Questions / Discussion