



Evaluation of Mobile Advanced Road Weather Information Sensor (MARWIS) by Lufft for Indiana Winter Road Operations

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MARWIS Overview

100 measurements per second – Aggregated to 1 second in the cloud.
Measurements taken by MARWIS:

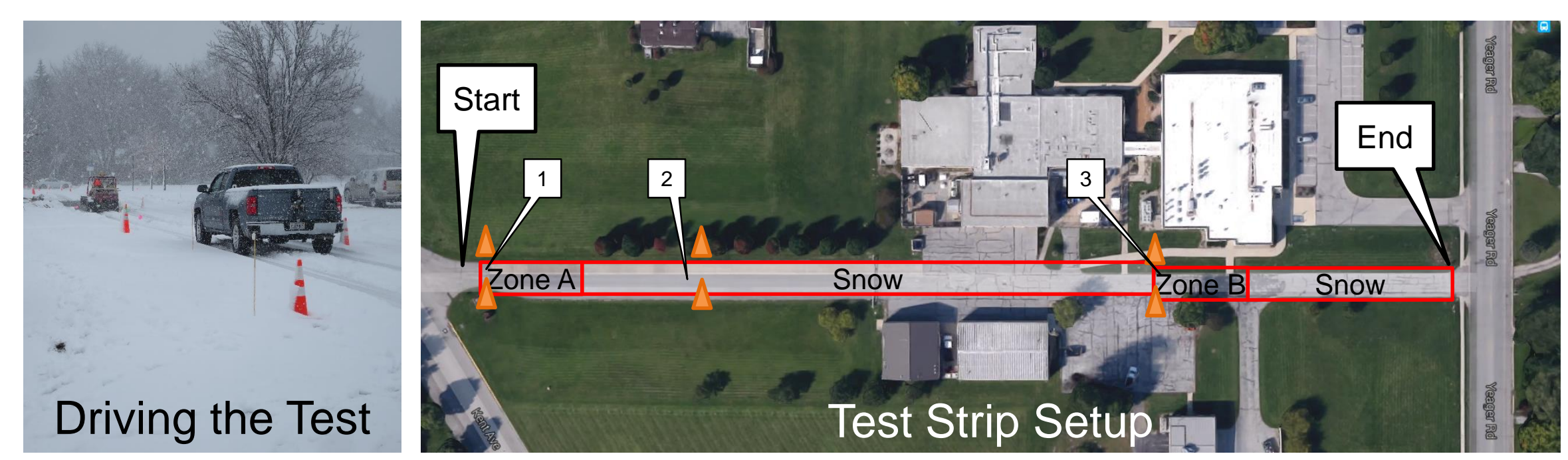
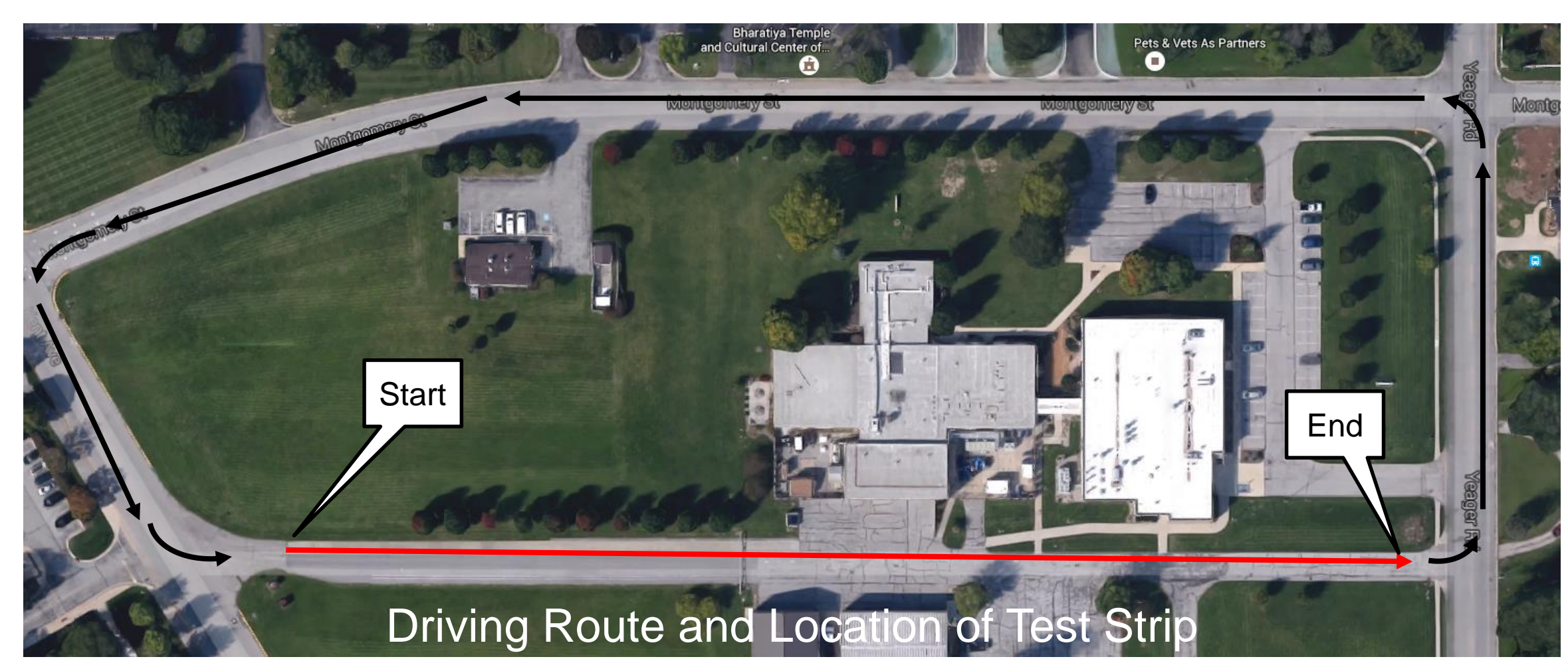
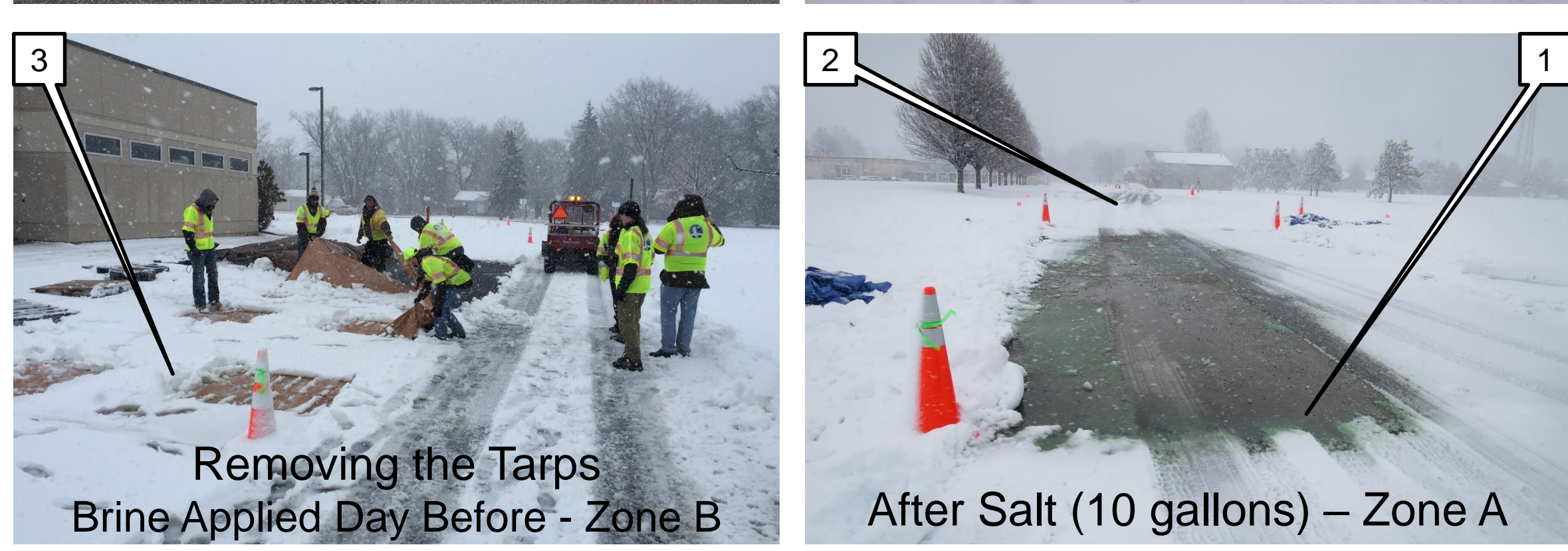
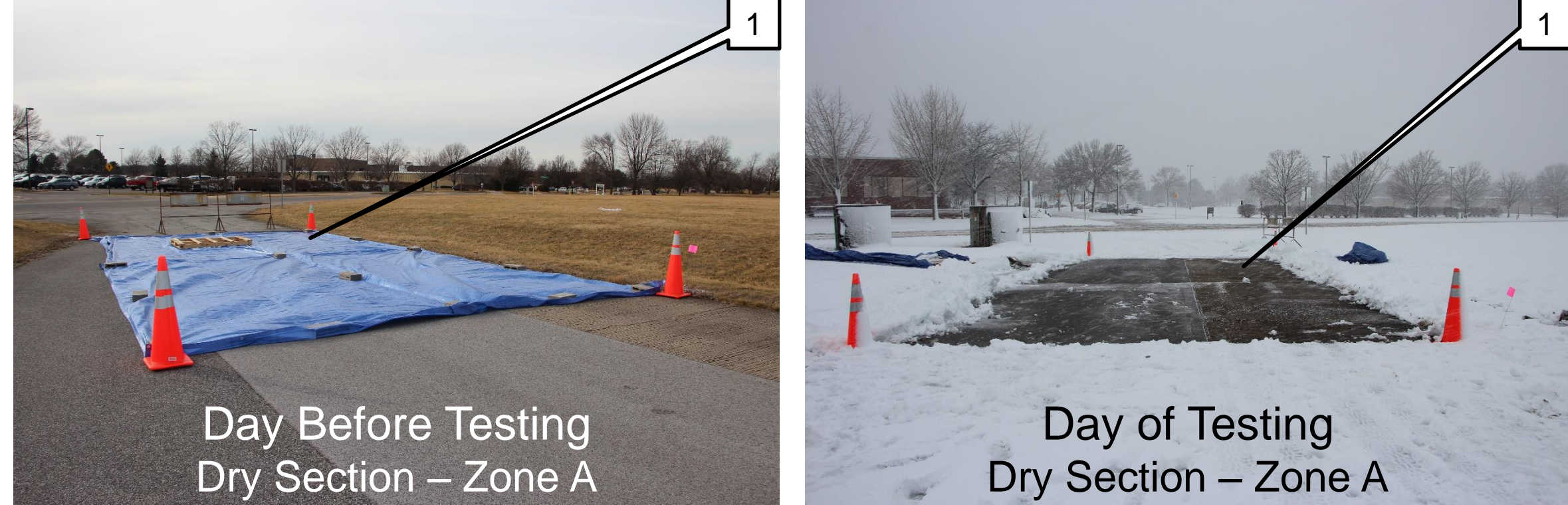
- Road Condition
- Road Surface Temperature
- Water Film Height
- Dew Point Temperature
- Friction
- Relative Humidity Above Road Surface
- Ice Percentage



Courtesy of Lufft

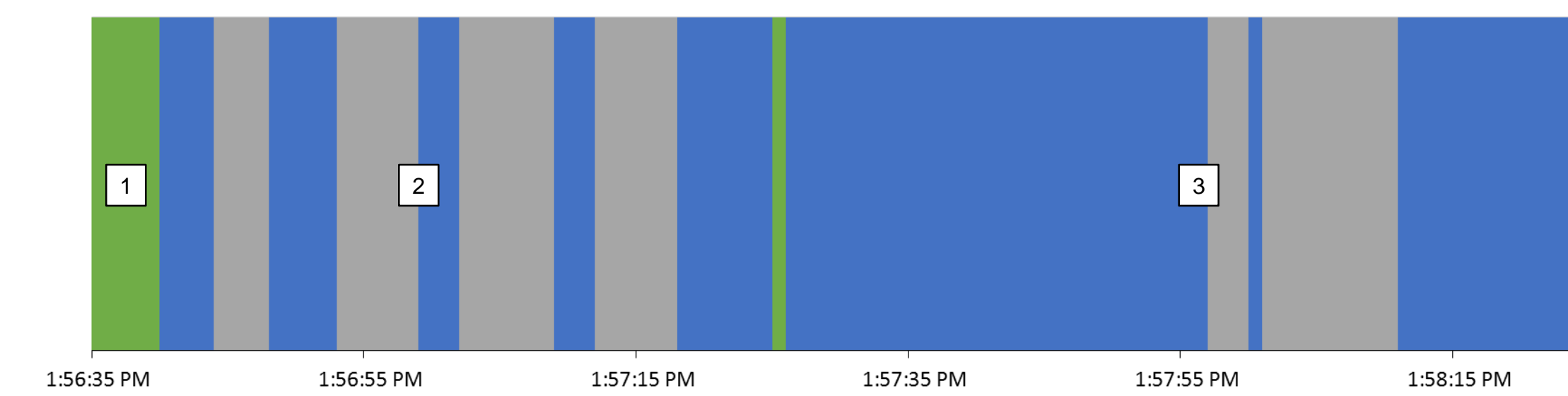


Test Bed Prep, Layout, and Procedure

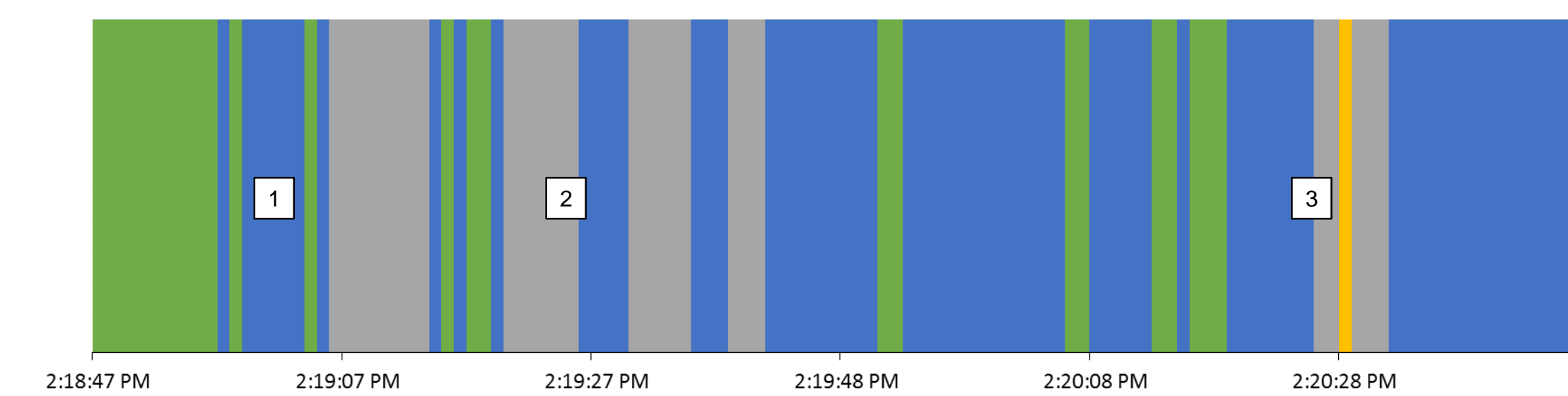


Road Condition Evaluation from Wheel Track Sensor

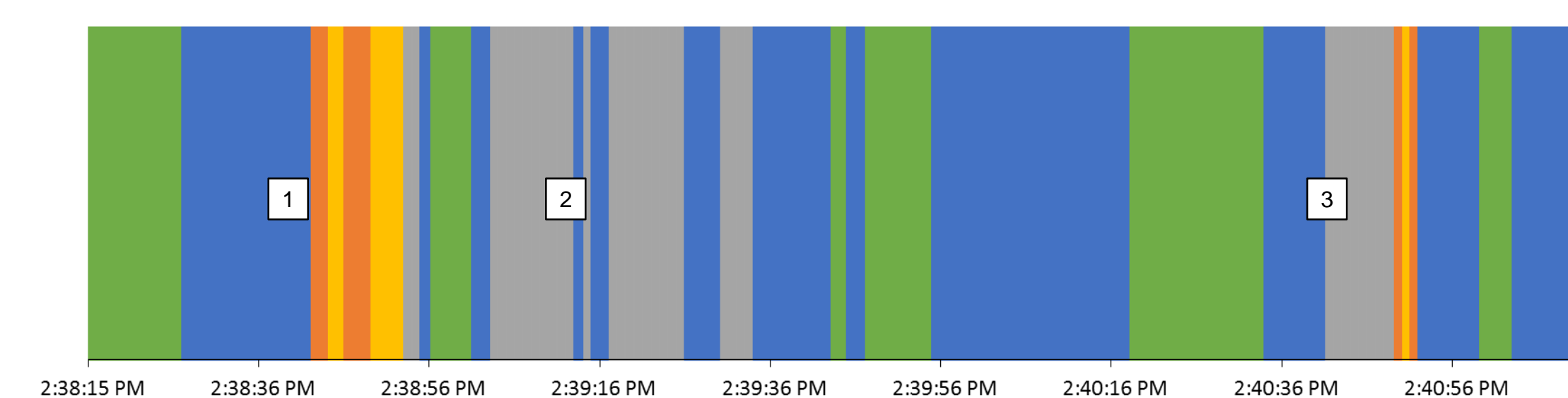
chemically wet freezing ice snow covered snow/ice covered



Run 5
Before Salt
Application

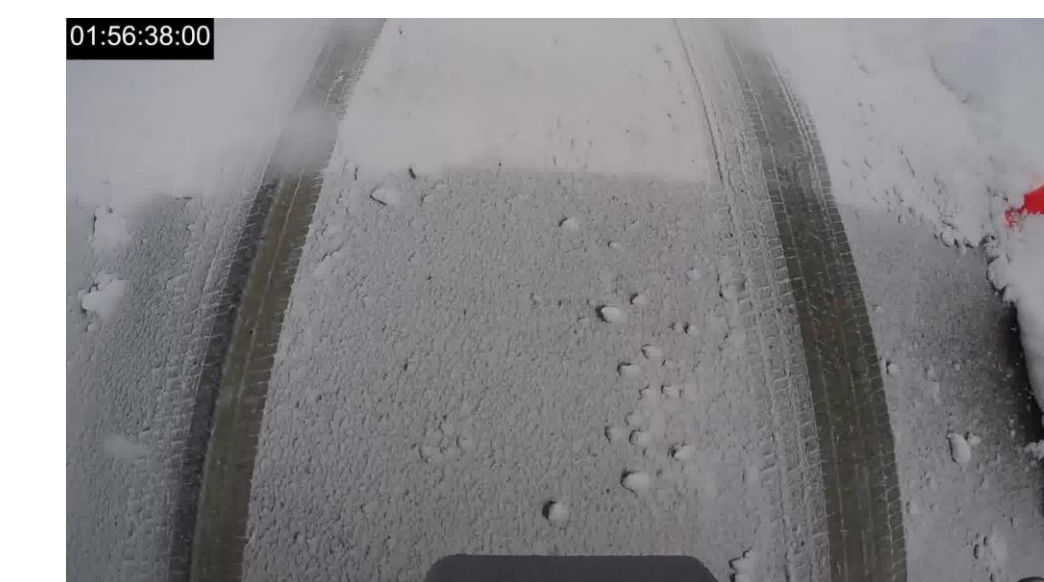


Run 8
After Salt
Application

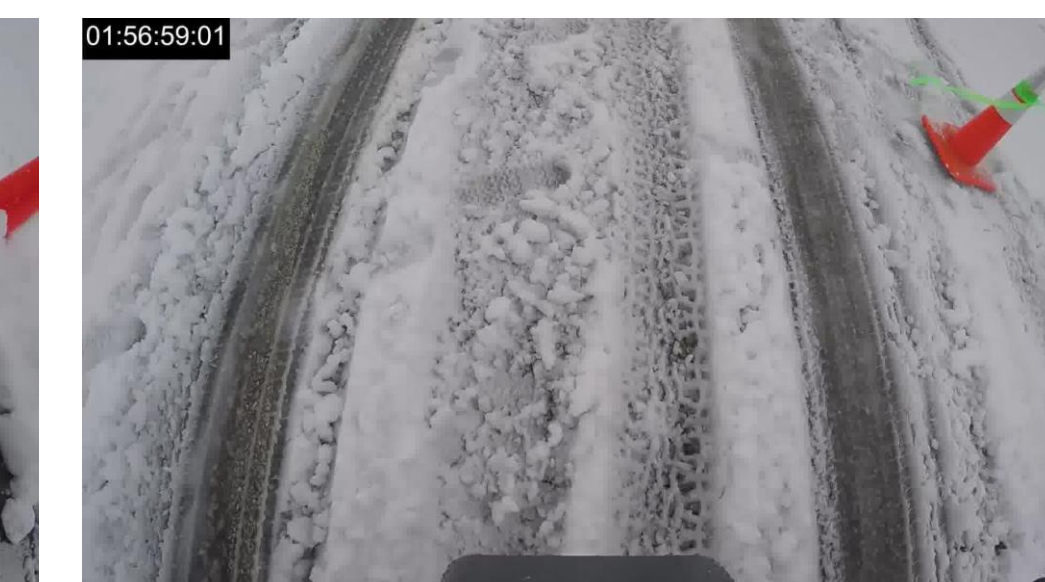


Run 11
After
Aggressive Salt
Application

Cross-Section 1



Cross-Section 2

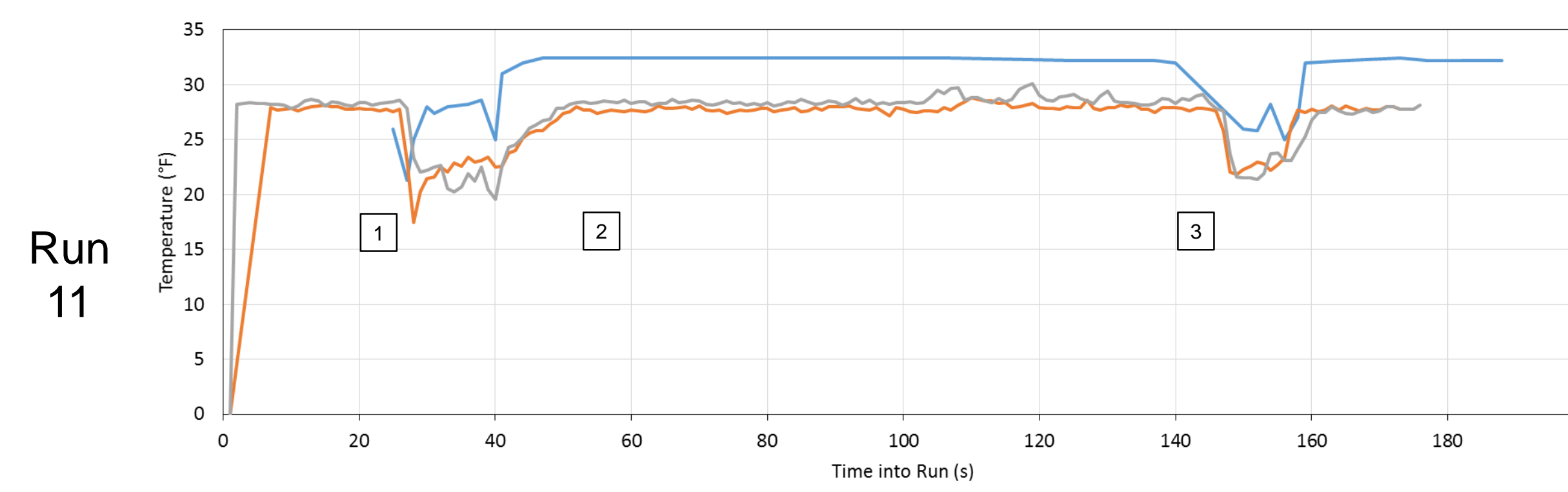
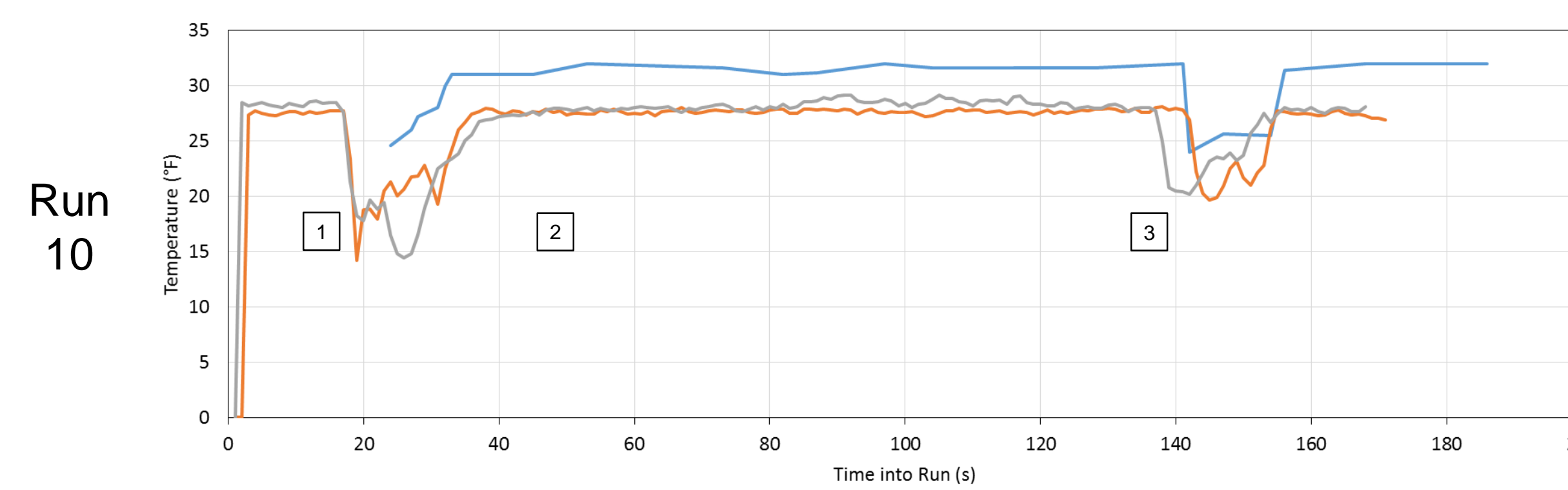


Cross-Section 3

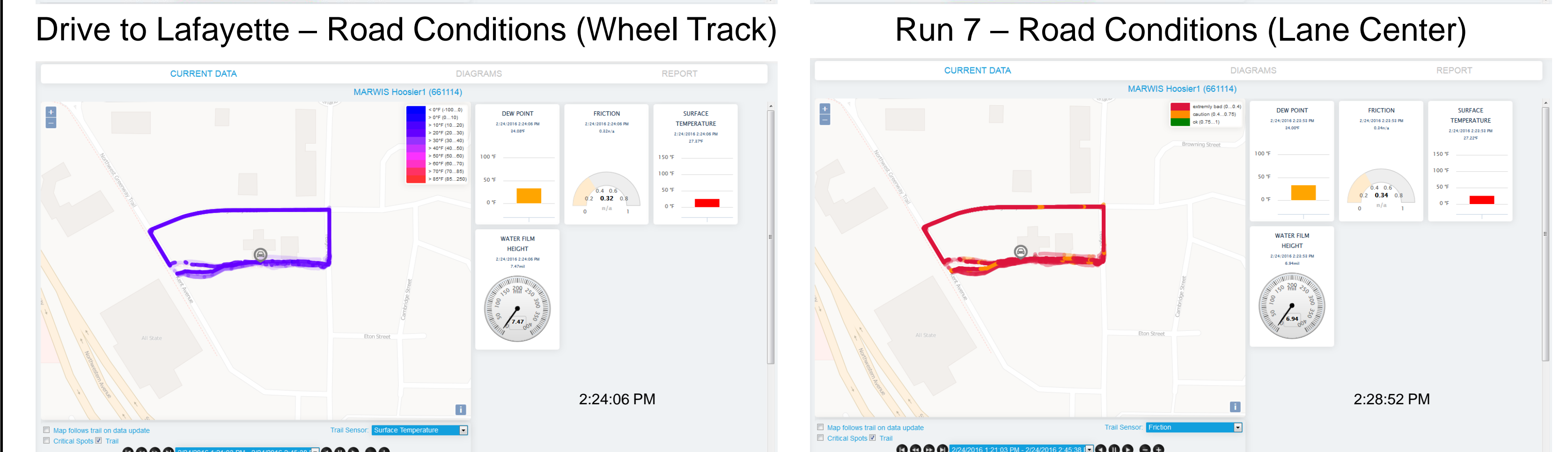
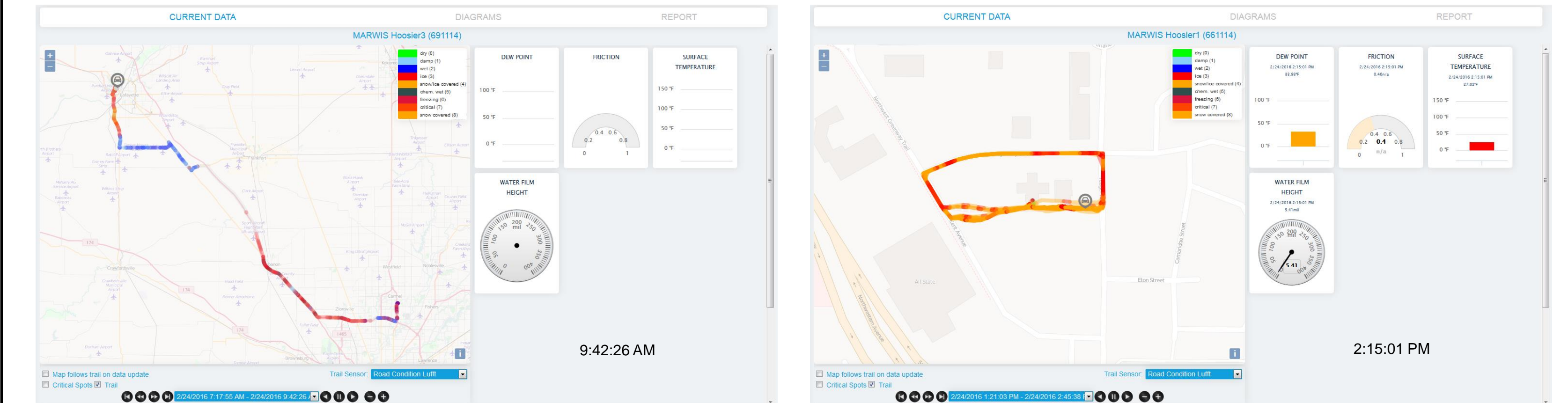


Temperature Evaluation

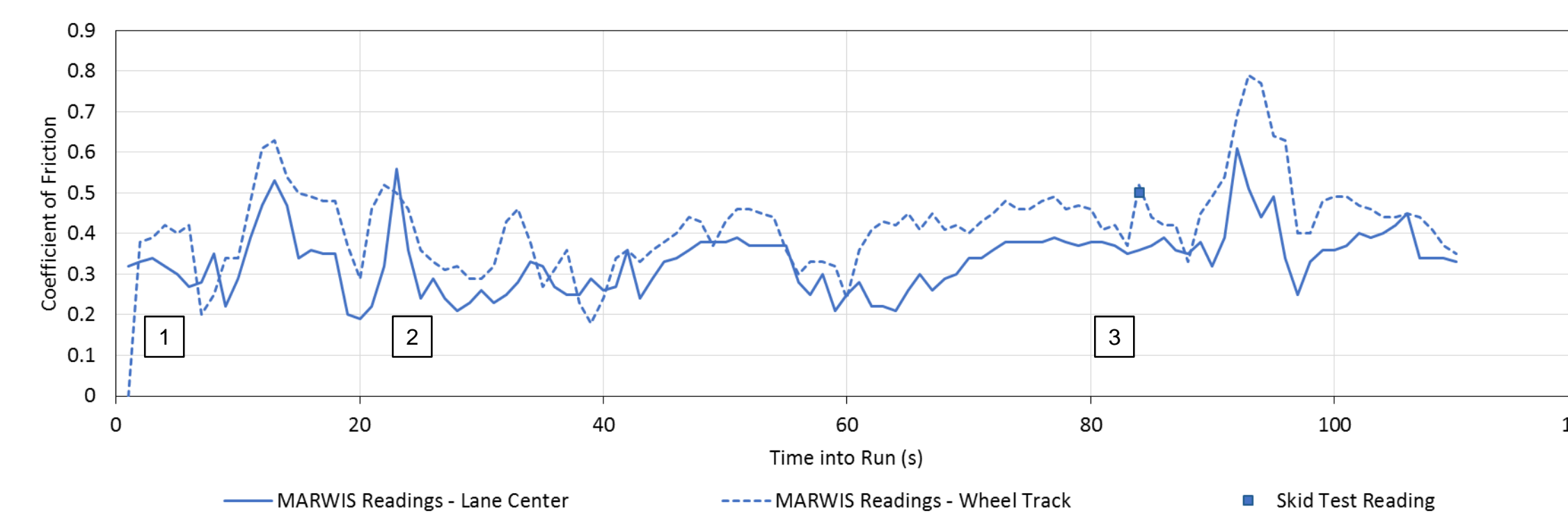
Probe Readings MARWIS Readings - Lane Center MARWIS Readings - Wheel Track



Screen Captures from Live MARWIS Site



Friction Evaluation



Observations

- ✓ Systematic temperature offset of -4°F compared to probe readings
- ✓ Skid test empirical results consistent with MARWIS friction readings
- ✓ Wheel track friction > lane center friction
- ? "Chemically wet" not consistently observed by MARWIS where expected