TSMO Analysis using Simulation

I-380 Corridor Case Study

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NOCoE Webinar
October 7, 2021

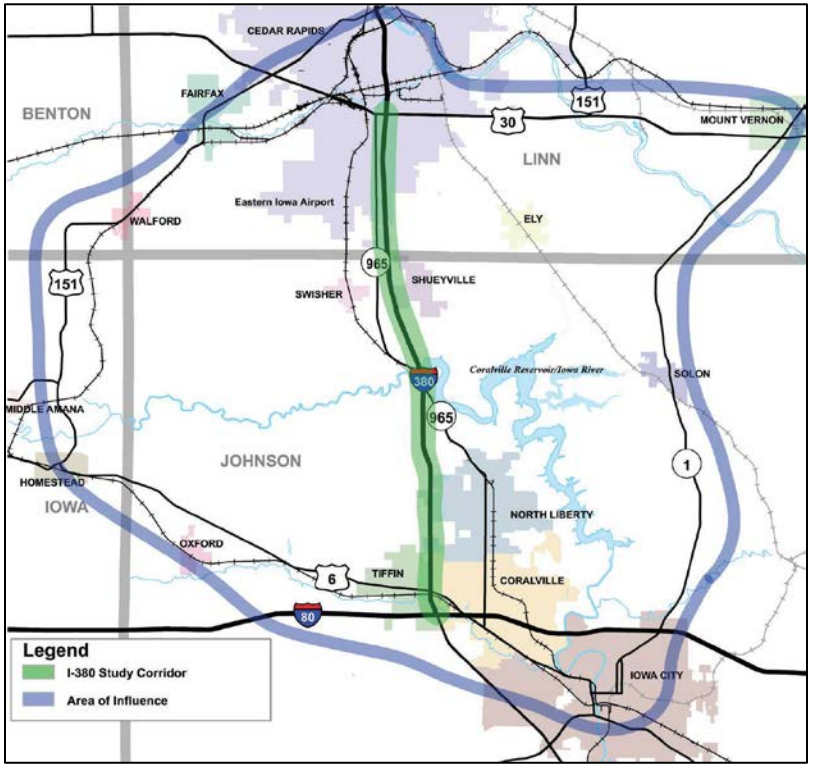
This Presentation will Show How:

- Transportation Systems Management and Operations (TSMO) can be considered to address daily congestion and non-recurring incidents

- Simulation Modeling can analyze the potential benefits of TSMO

I-380 Project Overview

- Commuter route between Cedar Rapids and Iowa City
- Fast growing
- Existing congestion will only get worse
- How can life of 4-lane rural interstate be extended?

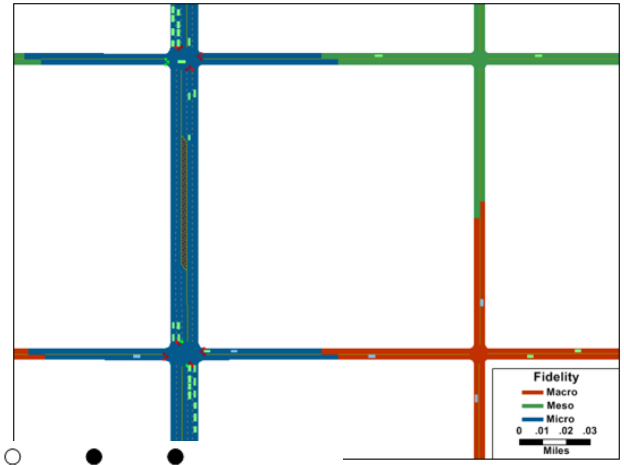


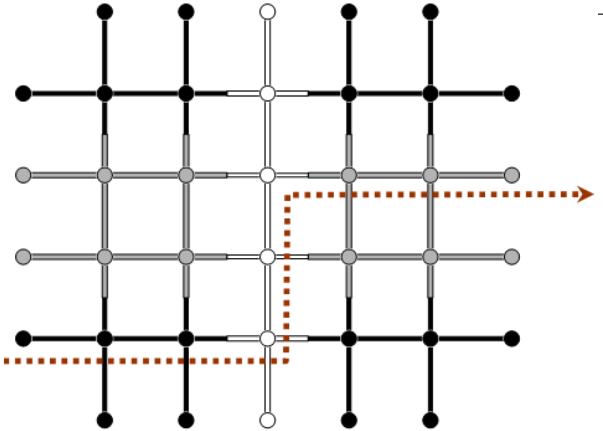
Testing TSMO Strategies

- Freeway Management
  - **Dynamic Lane and Speed Control**
  - Queue Detection Warning
  - **Ramp Metering**
  - **Hard Shoulder Running**
  - Crash Investigation Sites
- Arterial Management
  - **Advanced and Adaptive Traffic Signal Control**
  - Signal Phase and Timing (SPaT) Traffic Signals
  - Emergency Vehicle Preemption (EVP)
  - Access Management - Local Turn Restrictions

TransModeler

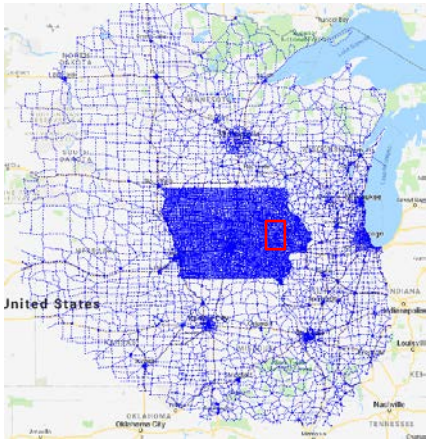
- Hybrid traffic simulator
- Supports three model fidelities
  - Microscopic
    - Car-following & lane-changing logic
  - Mesoscopic
    - Speed-density function
  - Macroscopic
    - Volume-delay function

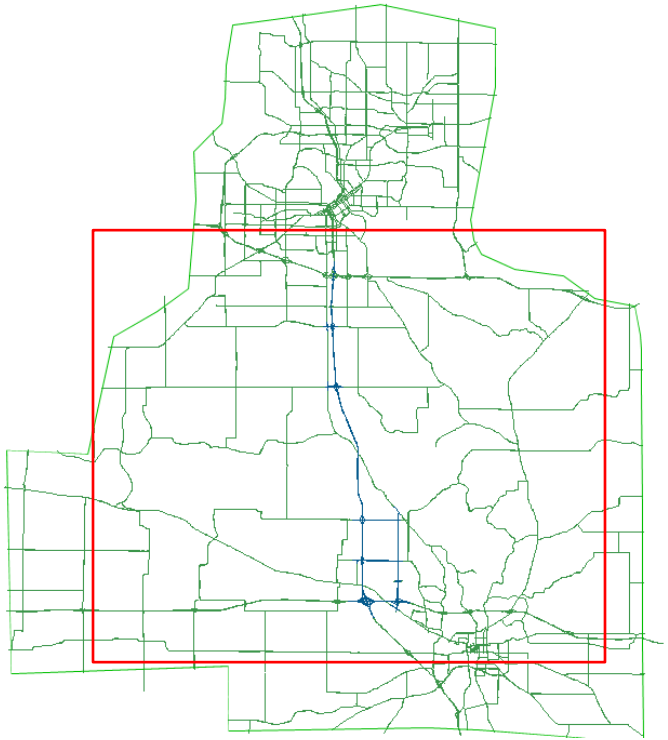




Creation of the ITRAM Model Subarea

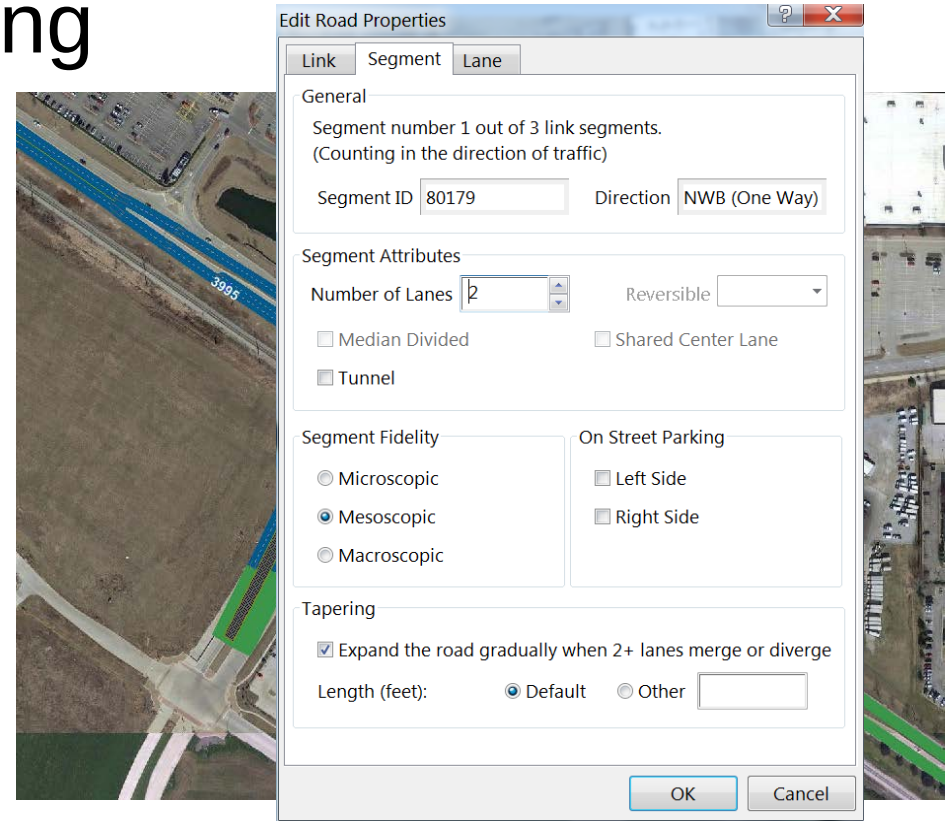
- Started with statewide (and beyond) model
- Several high-priority projects in Cedar Rapids and Iowa City area

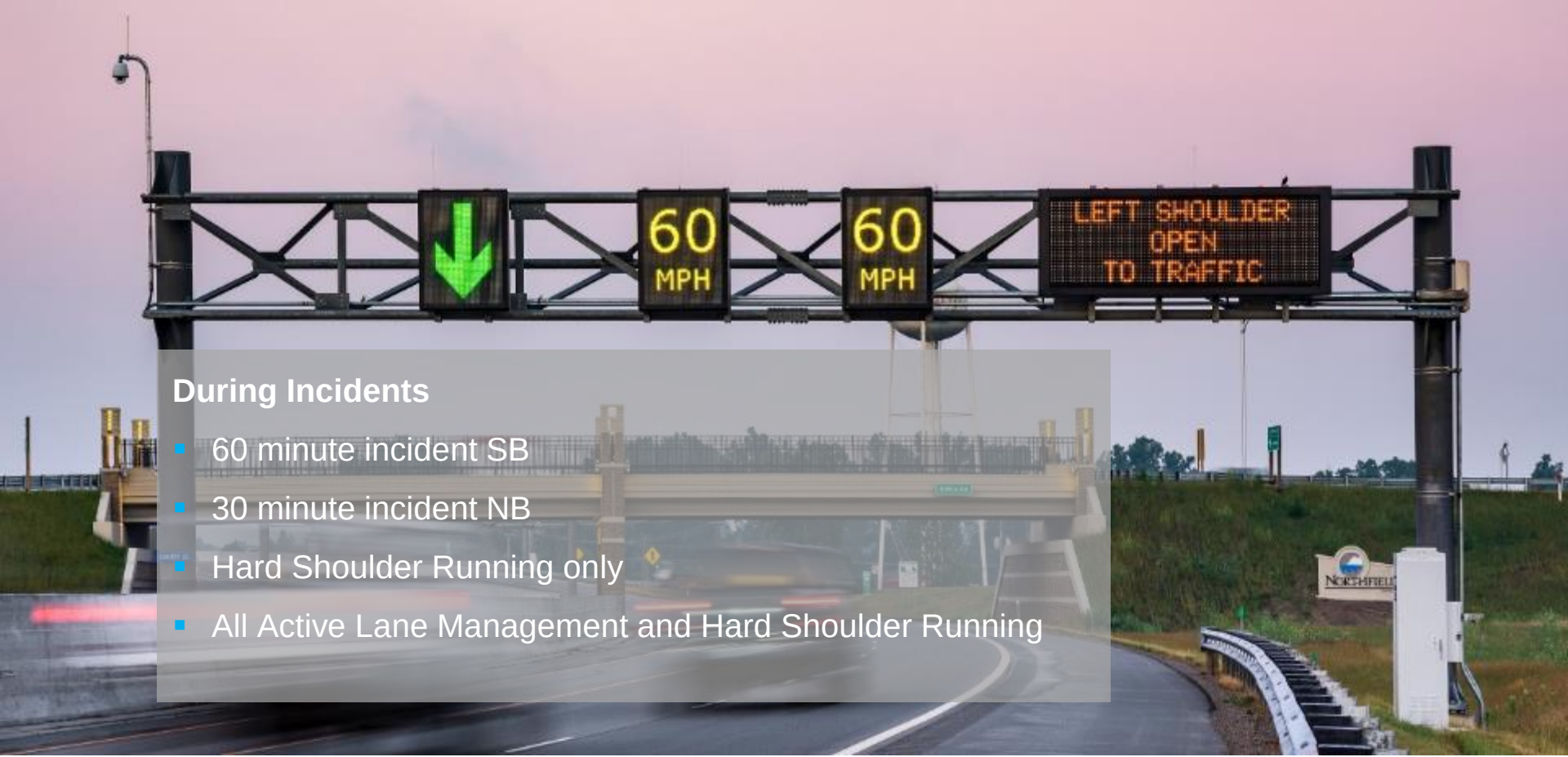




Multiresolution Modeling

- Segment Fidelity
- Micro = More Detail
- Meso = Limited Detail





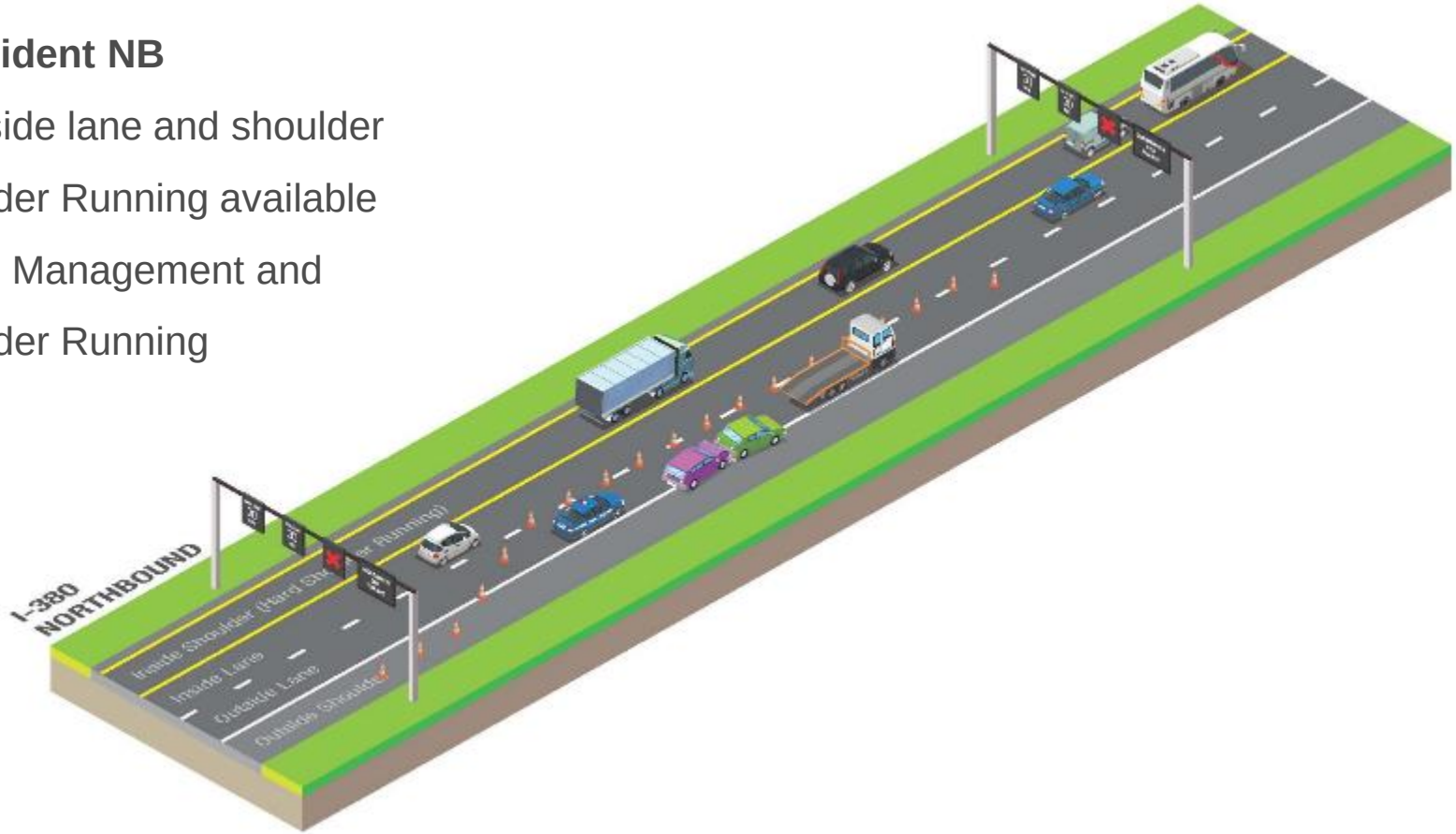
During Incidents

- 60 minute incident SB
- 30 minute incident NB
- Hard Shoulder Running only
- All Active Lane Management and Hard Shoulder Running

TSMO/ICM INCIDENT SCENARIOS

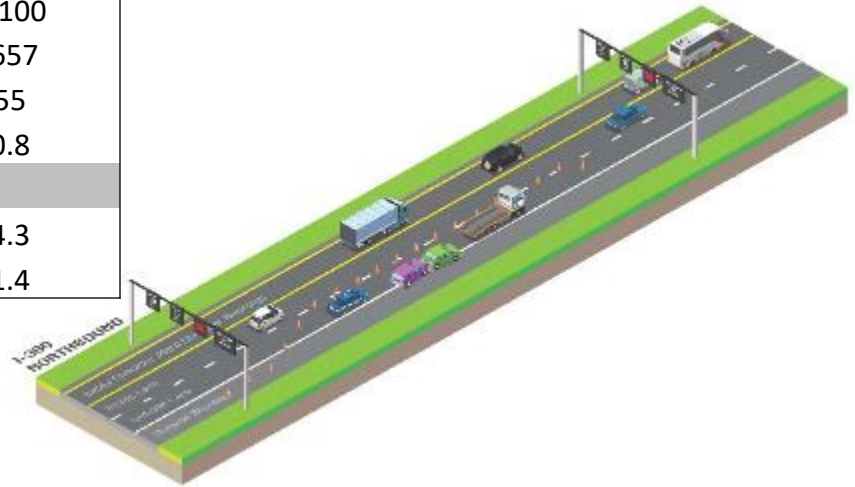
30 Minute Incident NB

- Closed outside lane and shoulder
- Hard Shoulder Running available
- Active Lane Management and Hard Shoulder Running



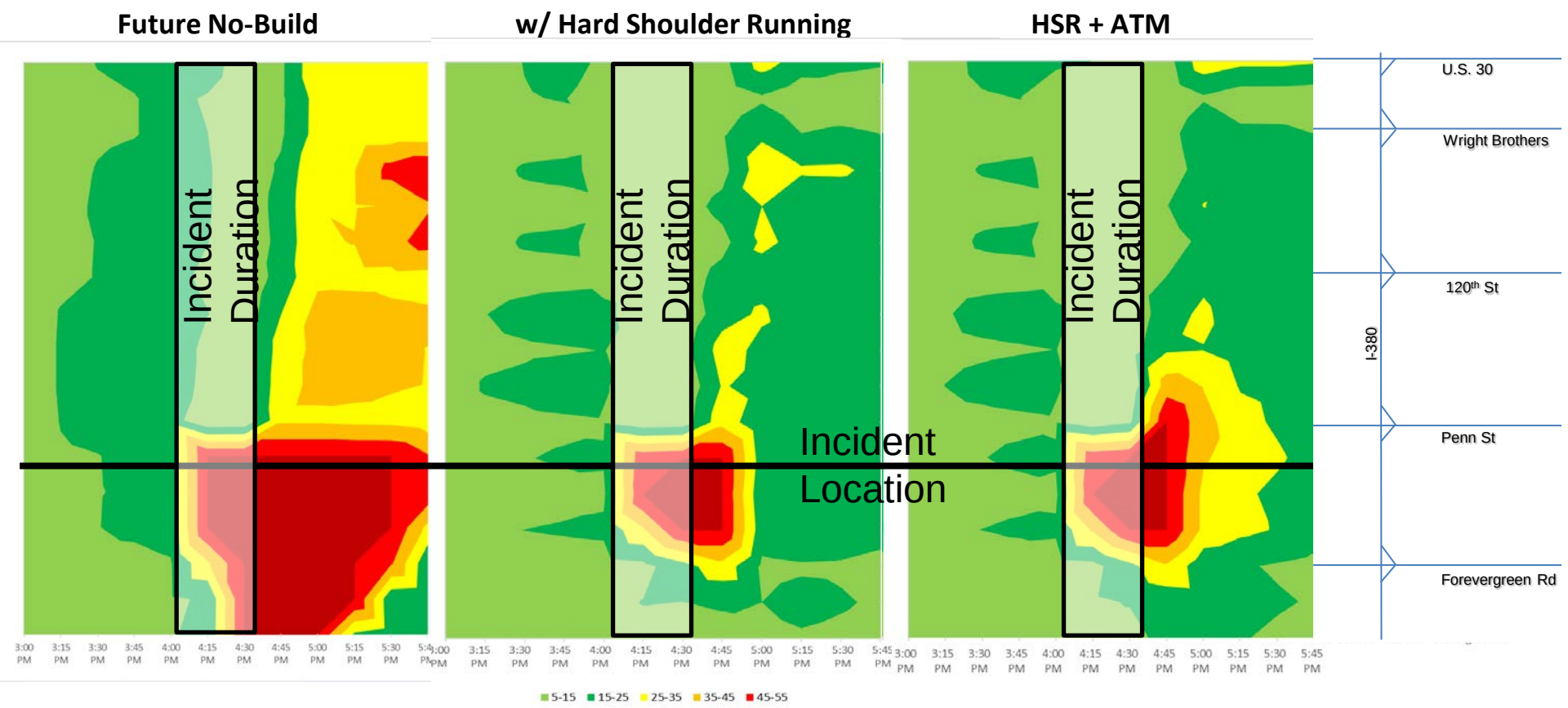
Video

	30 Minute Afternoon Incident NB		
	FNB	Hard Shoulder Only	Hard Shoulder & Active Lane Mgt
Level of Service @	**PM**	**PM**	**PM**
I-80 to Penn	**F**	**F**	**F**
Penn to 120th	**E**	**D**	**F**
120th to Wright	**F**	**D**	**C**
Wright to US 30	**D**	**C**	**C**
VMT/VHT/VHD			
VMT	76,458	86,897	84,100
VHT	1,826	1,639	1,657
VHD	734	398	455
VMT/VHT	41.9	53.0	50.8
Travel Time			
I-380 SB	14.7	14.3	14.3
I-380 NB	28.5	19.9	21.4



PM 30 MINUTE INCIDENT NB

100 YEARS OF INFRASTRUCTURE SOLUTIONS



PM 30 MINUTE INCIDENT NB

100 YEARS OF INFRASTRUCTURE SOLUTIONS

Future of I-380

- Simulation demonstrated benefits of TSMO
- Pavement condition of I-380 ultimately determined fate
- Reconstruction of six-lane freeway would not preclude TSMO strategies

Thank you!

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