Multi-Resolution Modeling of Active Transportation and Demand Management Strategies

I-380 Corridor Case Study

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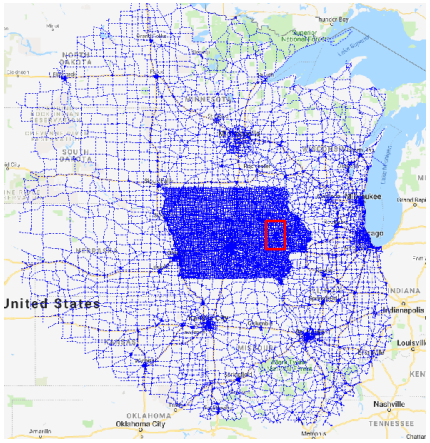
This Presentation will Show How:

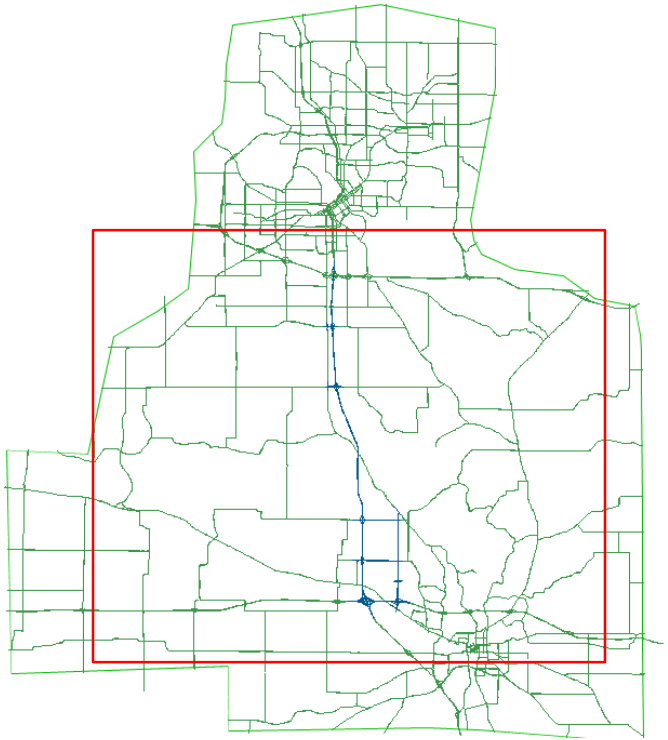
- Hybrid Modeling can better assess detailed operations within a larger study area
- Active Traffic and Demand Management (ATDM) can be considered to address daily congestion and non-recurring incidents

Why Hybrid?

Creation of the ITRAM Model Subarea

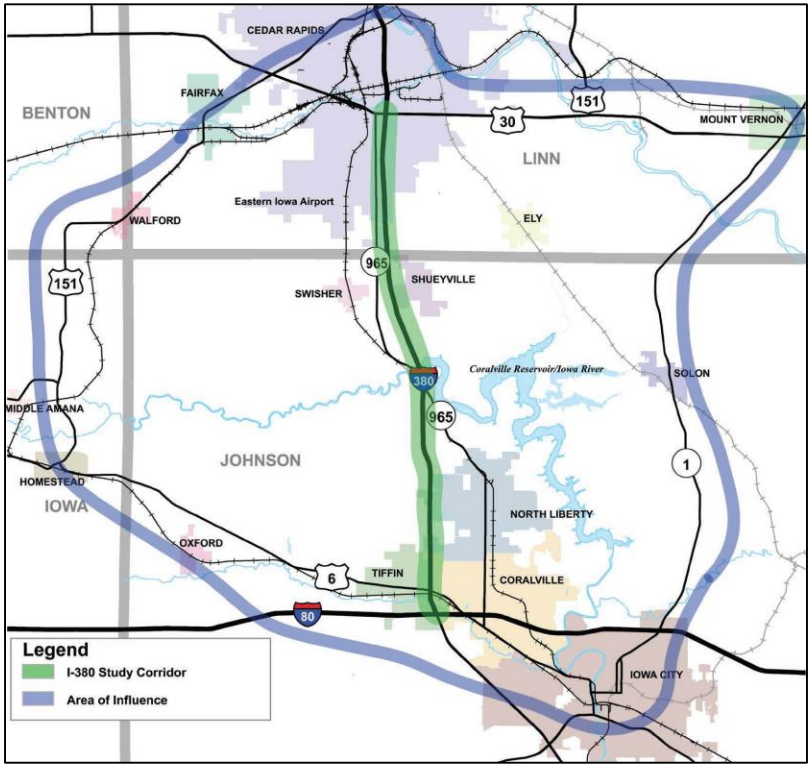
- Started with statewide (and beyond) model
- Several high-priority projects in Cedar Rapids and Iowa City area





I-380 Transmodeler Project Overview

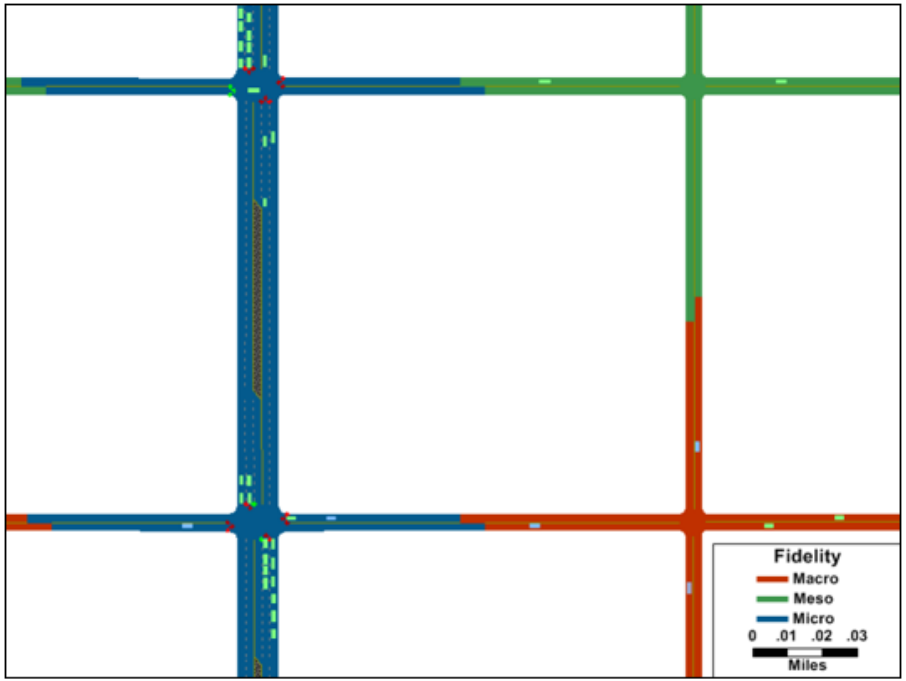
- Commuter route between Cedar Rapids and Iowa City
- Fast growing, esp. south end
- Existing congestion will only get worse
- How can life of 4-lane rural interstate be extended?



Why TransModeler?

TransModeler

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

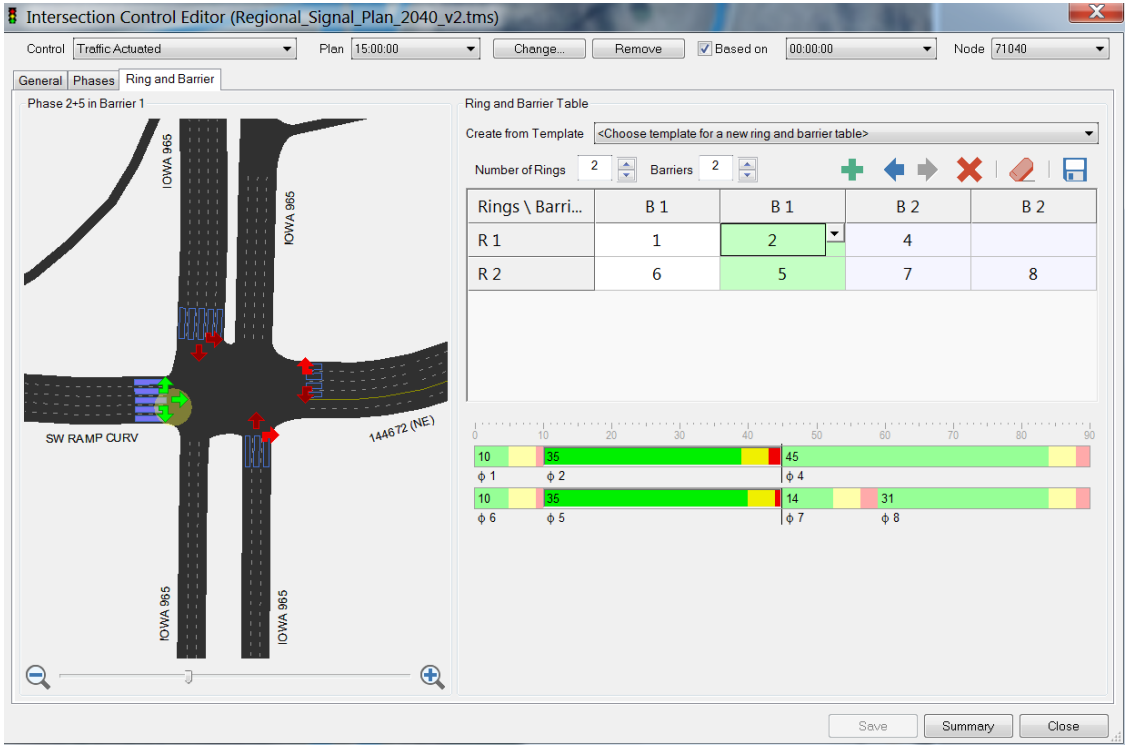


Matrix Estimation on the Subarea OD

- Existing ODME
  - Seed matrix from subarea cut
  - Insert known count targets throughout the network
  - Run Origin-Destination Matrix Estimation (ODME) to adjust OD to match targets
- 2040 ODME
  - Used existing as seed matrix
  - Gathered all known recent forecasts within the study area to use as targets

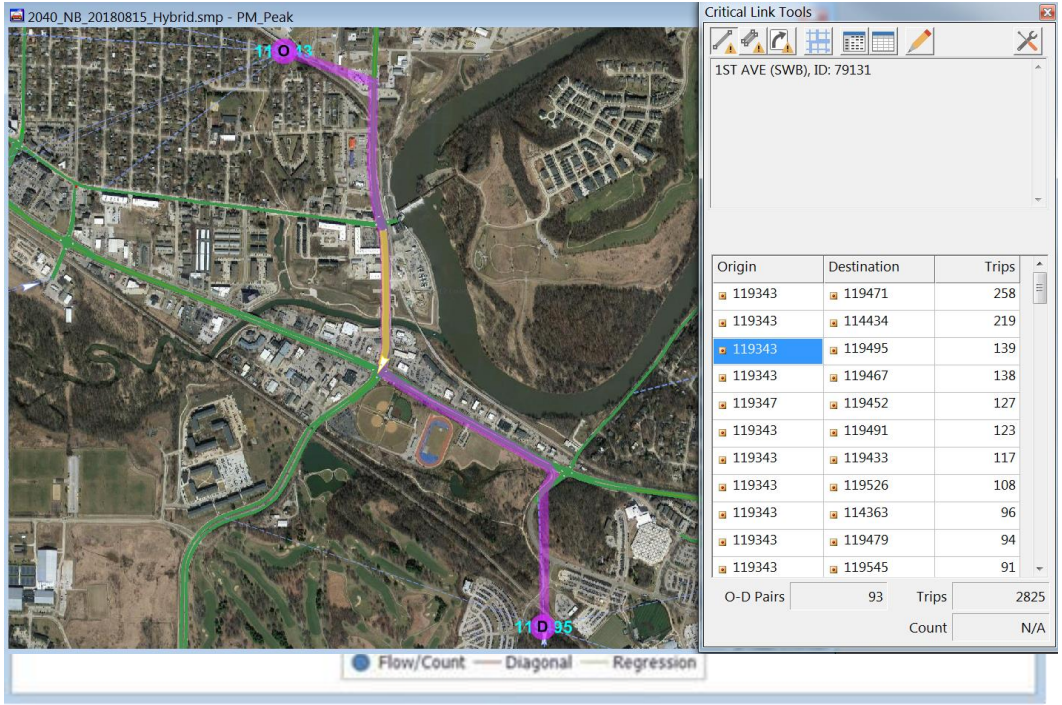
Network Refinement

- Links
- Connectors
- Intersections
- Speed Limits
- Signal Timings



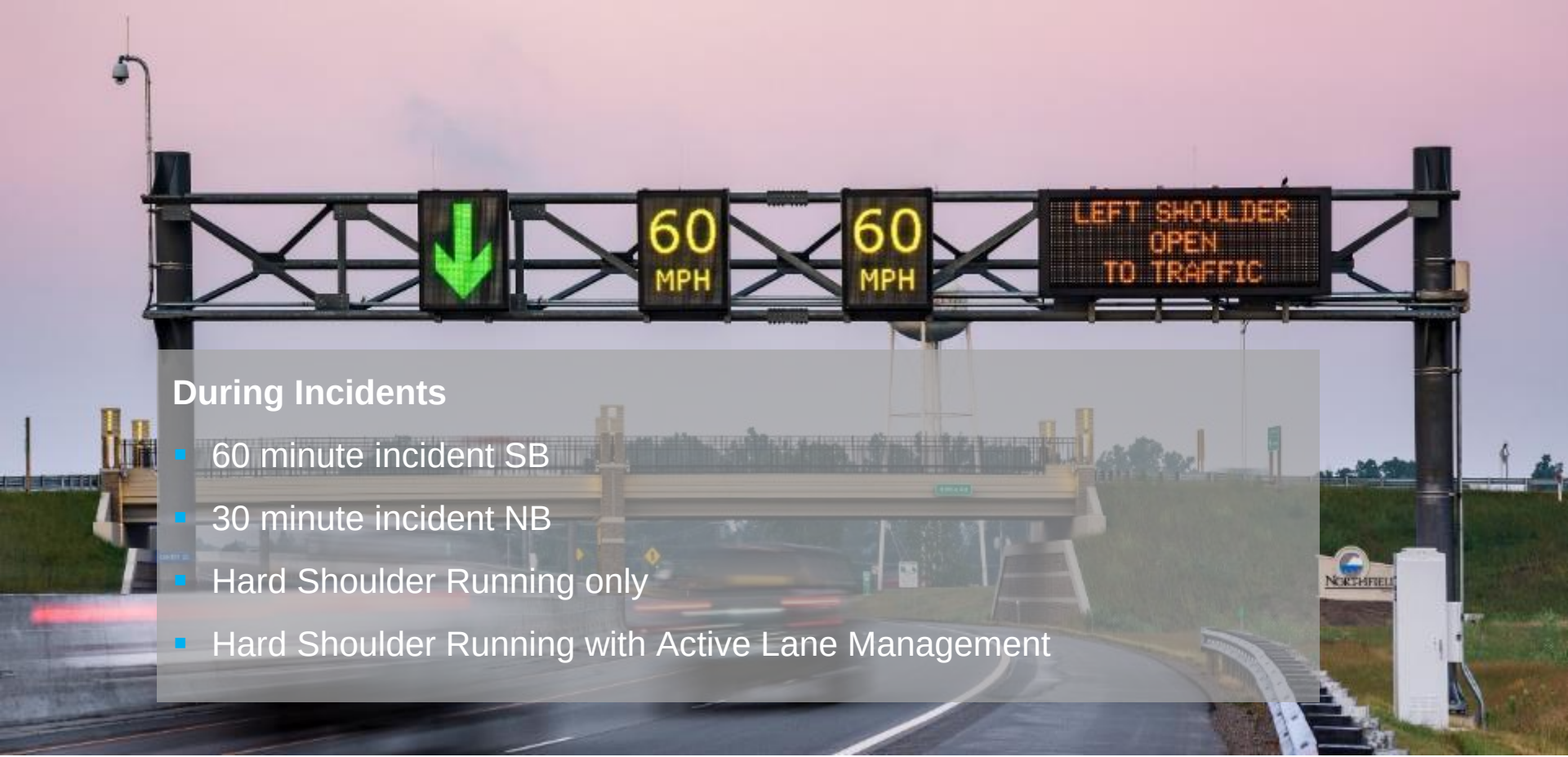
Calibration

- Hourly volume counts
- Queuing
- Reasonable Route Choice



Testing ATDM Strategies

- Freeway Management
  - **Active Lane 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



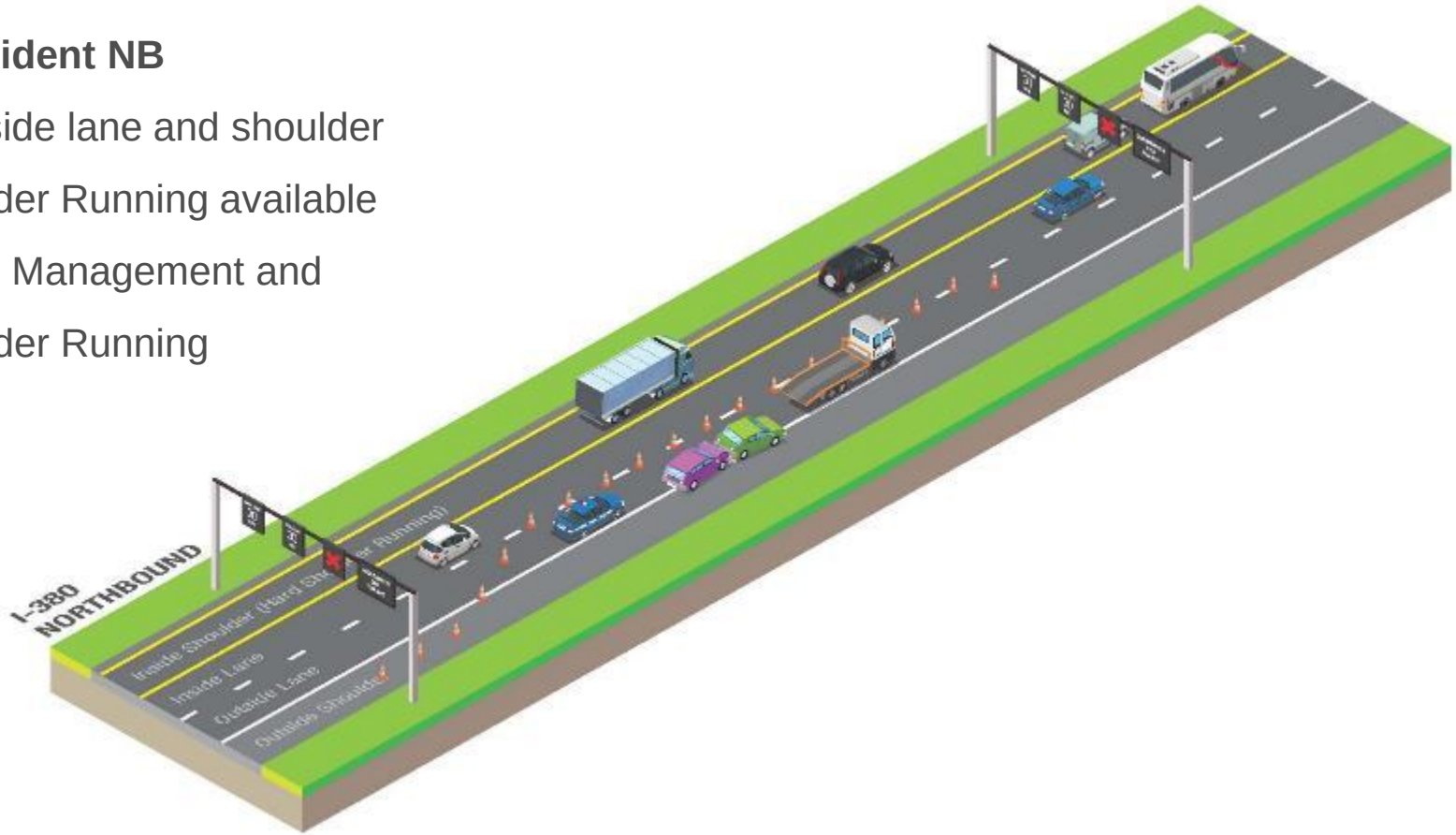
During Incidents

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

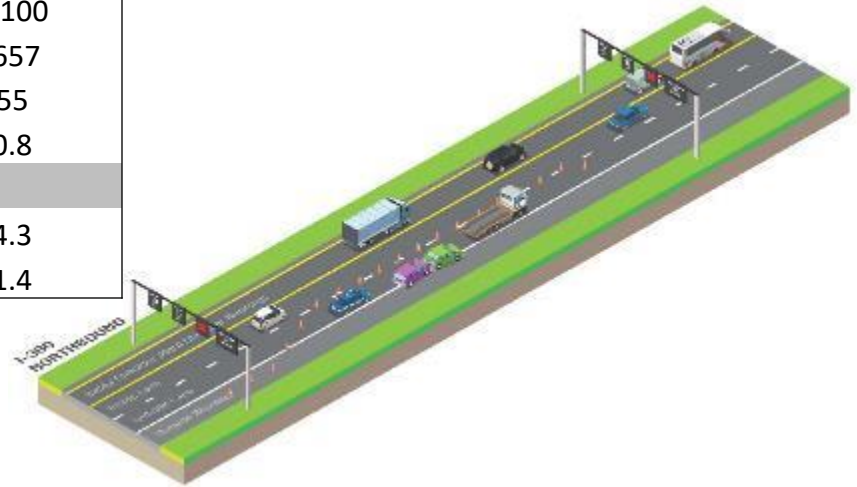
ATDM/ICM INCIDENT SCENARIOS

30 Minute Incident NB

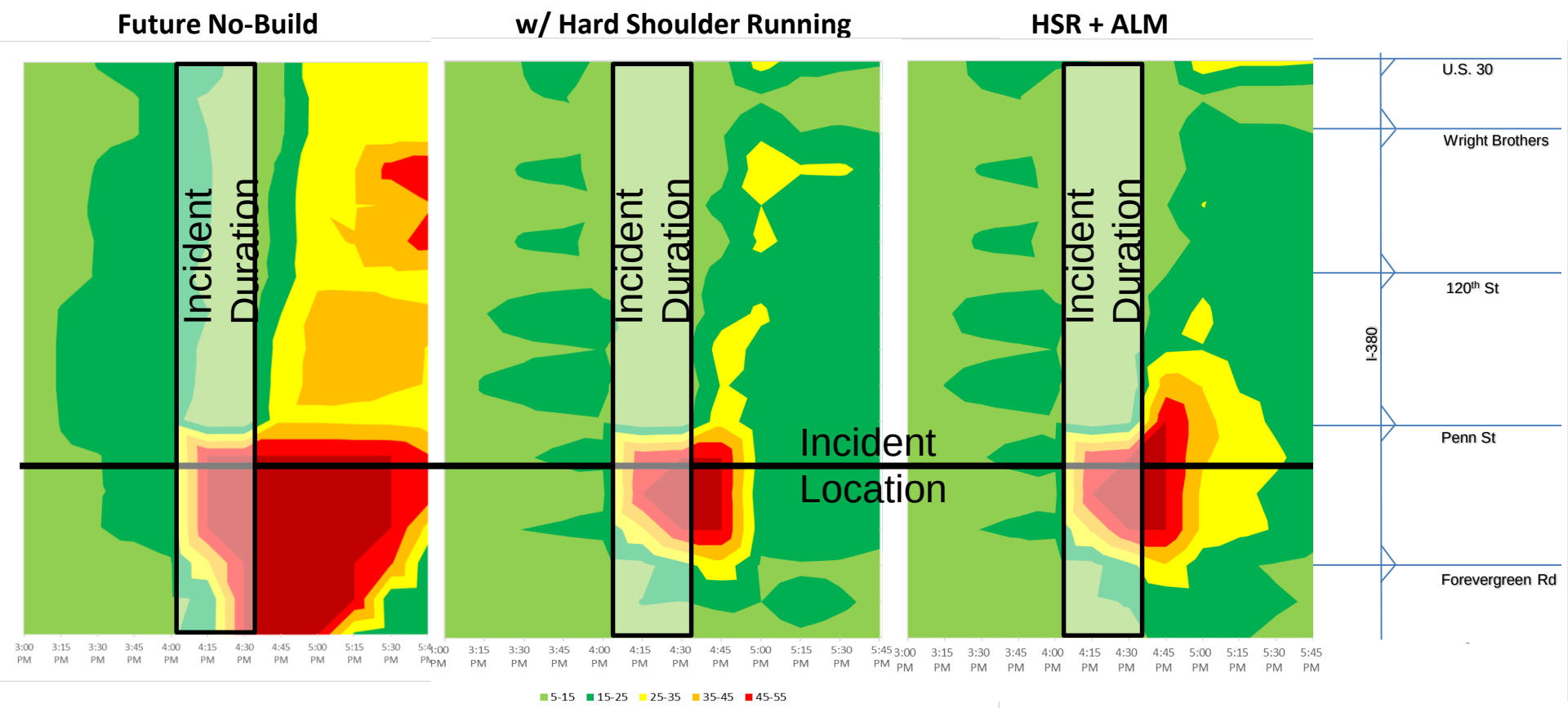
- Closed outside lane and shoulder
- Hard Shoulder Running available
- Active Lane Management and Hard Shoulder Running



	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

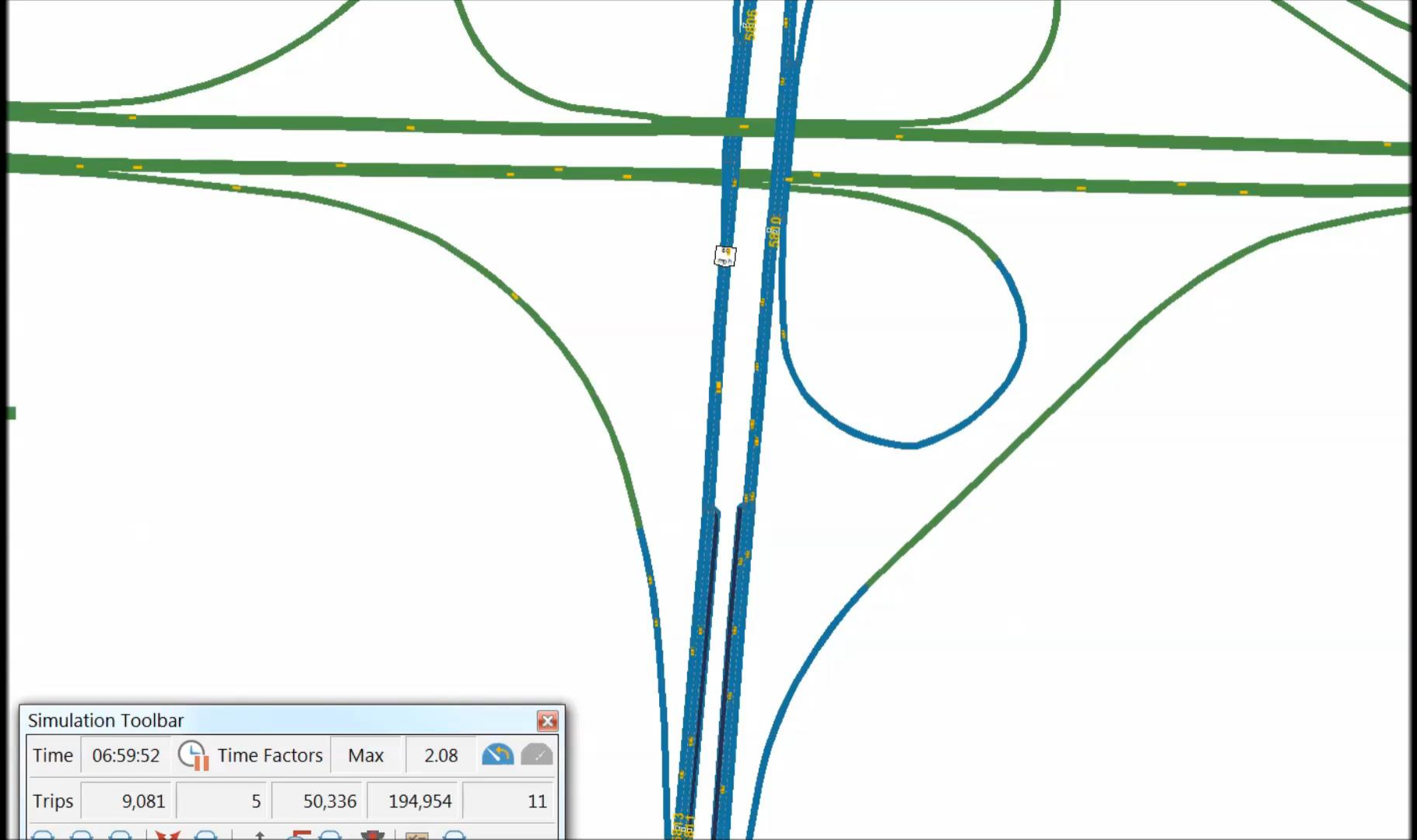


PM 30 MINUTE INCIDENT NB



PM 30 MINUTE INCIDENT NB

100 YEARS OF INFRASTRUCTURE SOLUTIONS


Simulation Toolbar
Time
06:59:52
Time Factors
Max
2.08
Trips
9,081
5
50,336
194,954
11

Thank you. Questions?

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