

# I-39/90 Technology-Driven Traffic Mitigation Measures

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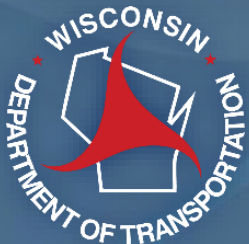
WisDOT Traffic Engineer

**Jeff Sandberg, PE, PTOE**

AECOM Traffic Engineer



2018 ITS Wisconsin Transportation Conference  
Madison, WI



**AECOM**

**October 23, 2018**

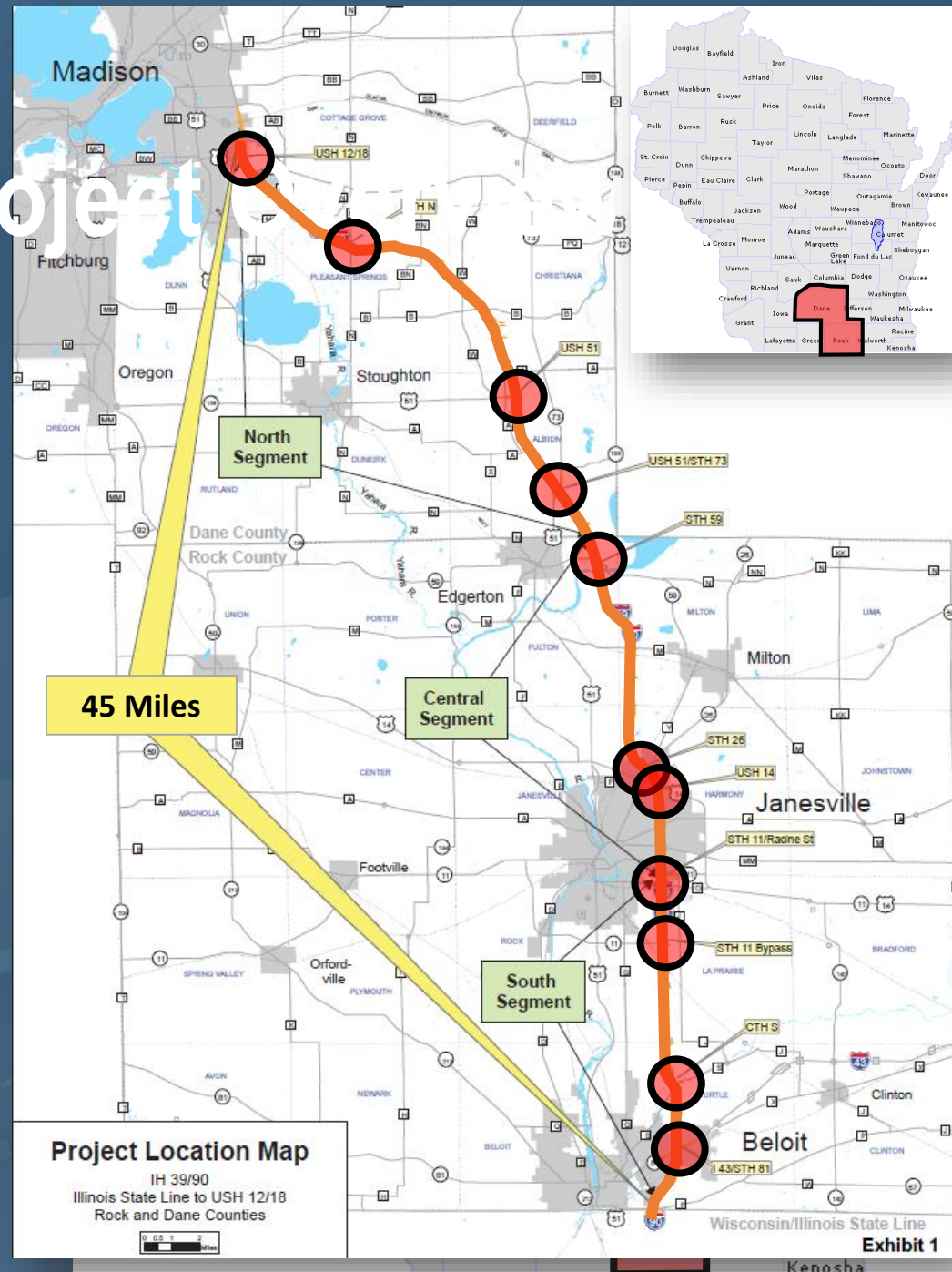
# Outline

- Project Overview
- Mitigation Measures
- Signal System Types
- System Selection
- Traffic Signal Operations
- Lessons Learned



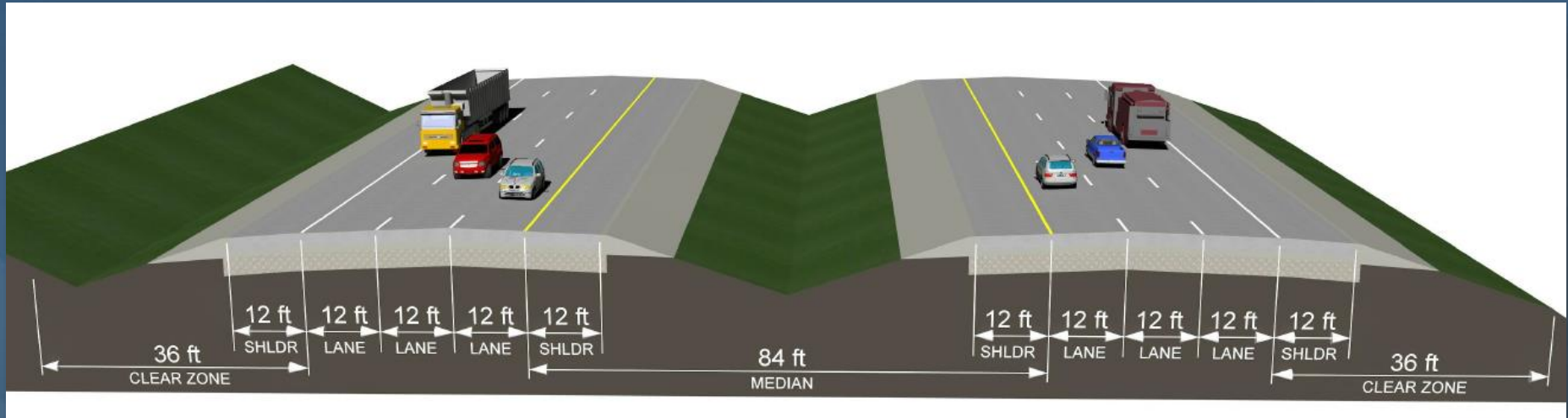
# I-39/90 Project

- Dane and Rock Co
- 45 Miles
- 11 Interchanges
- 100+ Bridges
- Construction until end of 2021

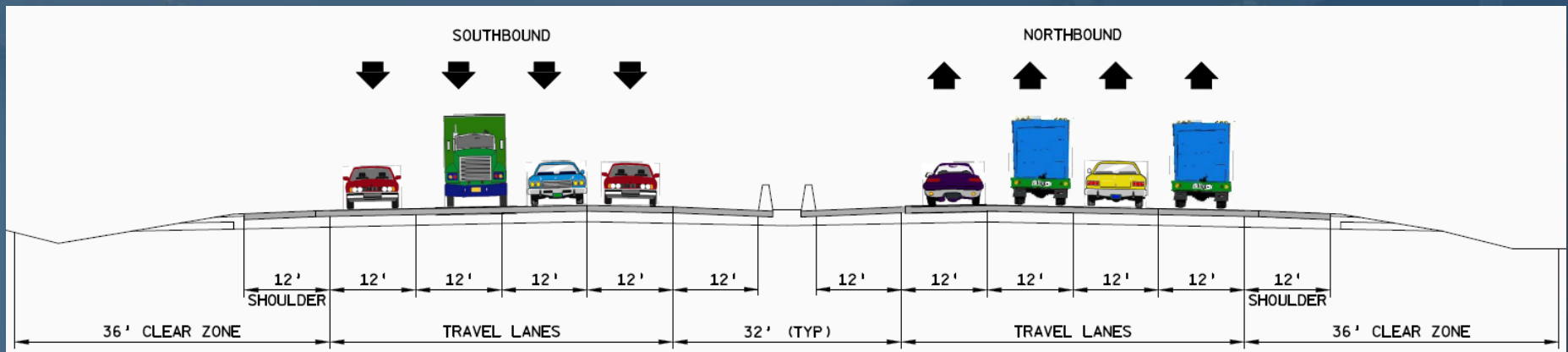


# I-39/90 Project Overview

## Three Lanes in each direction



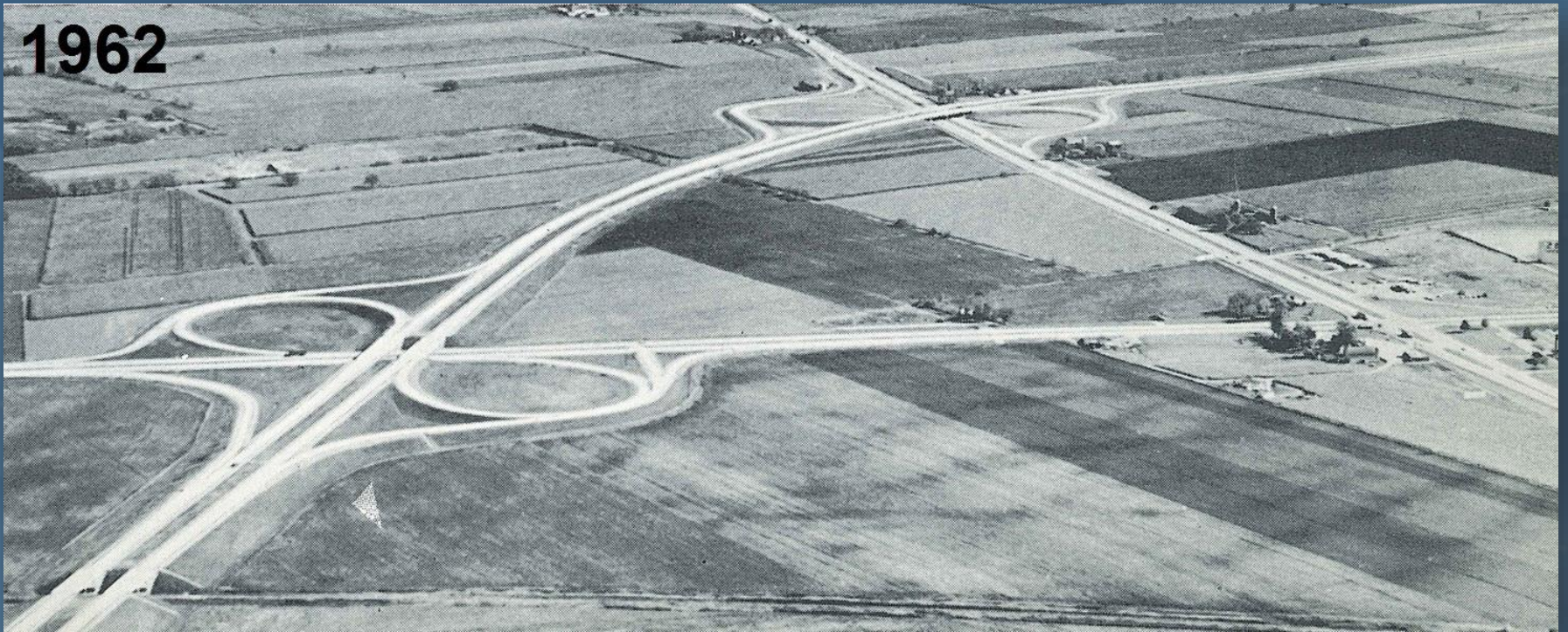
## Four Lanes in each direction – Janesville Area



# I-39/90 Project Overview

## Why Improve?

1962



# I-39/90 Project Overview

## Why Improve?



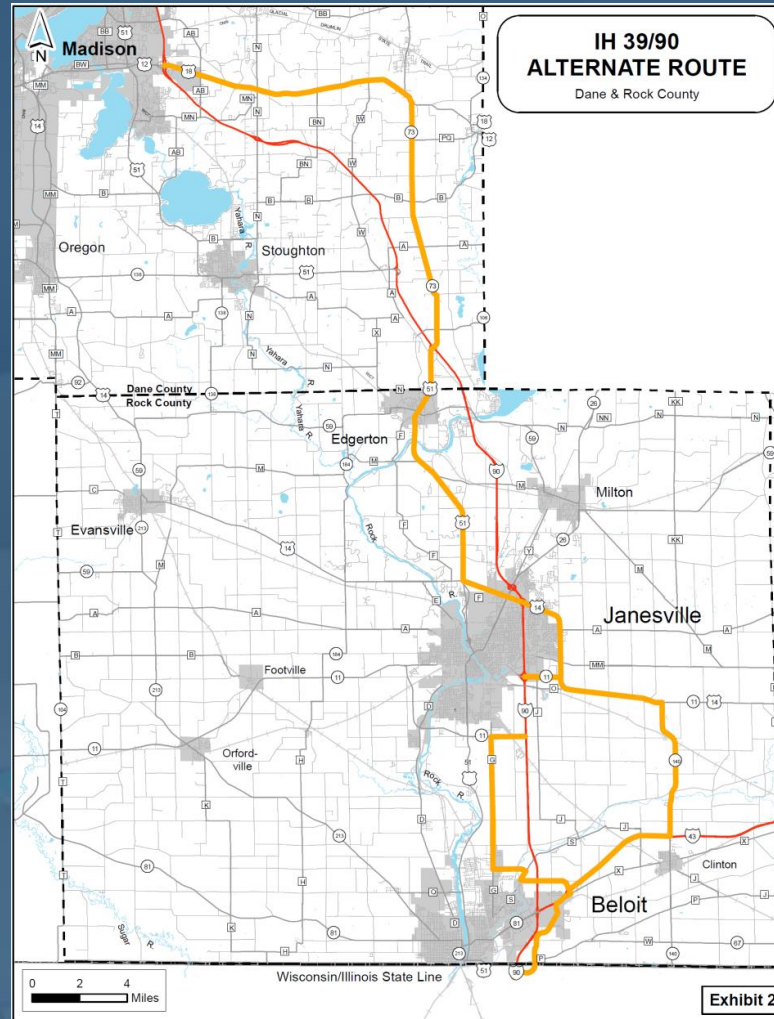
# I-39/90 Project Overview

## Why Improve?



# Mitigation Measures

## Alternate Routes





# Mitigation Measures

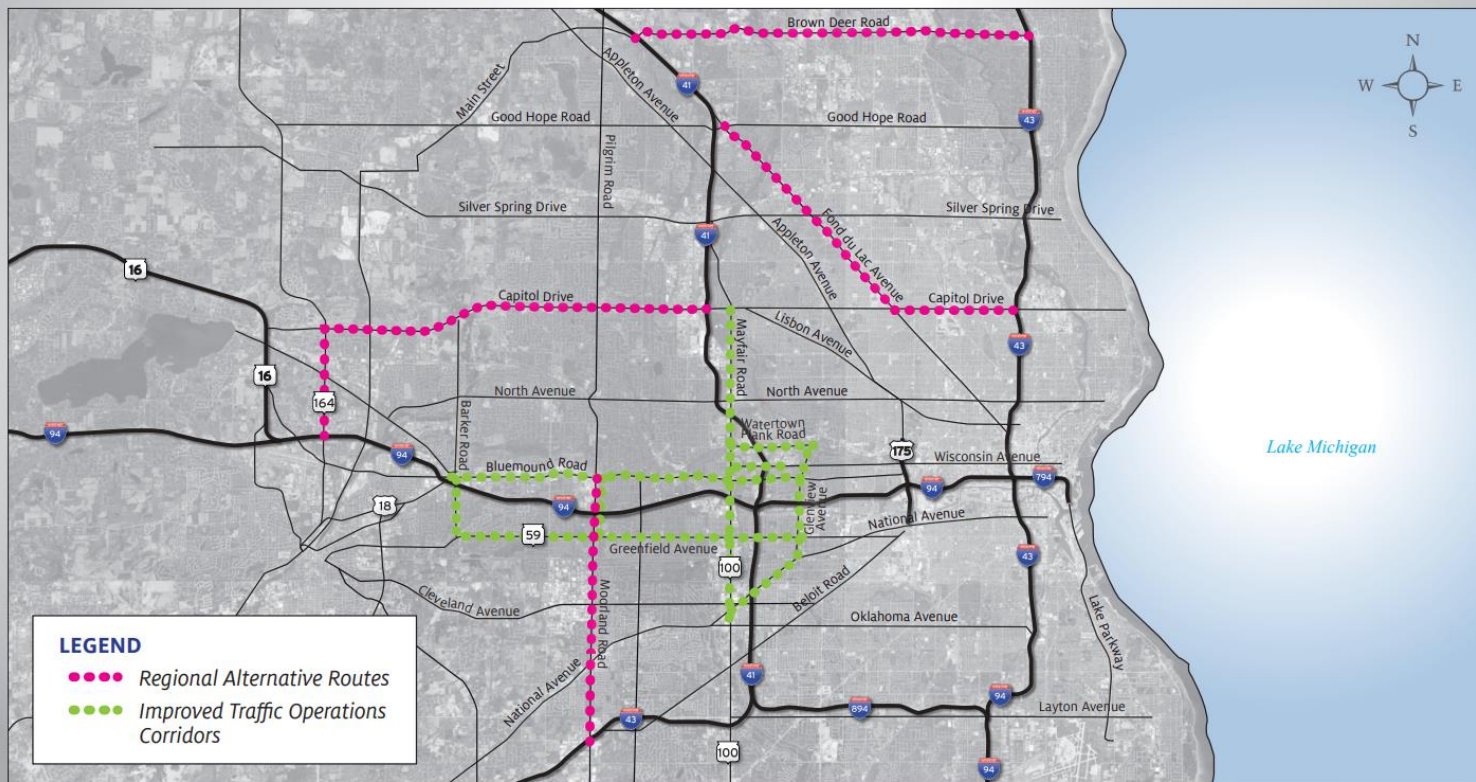
## Alternate Routes – Zoo Interchange



WISCONSIN DEPARTMENT OF TRANSPORTATION

DRAFT  
October 2013

### ALTERNATIVE ROUTES DURING CONSTRUCTION

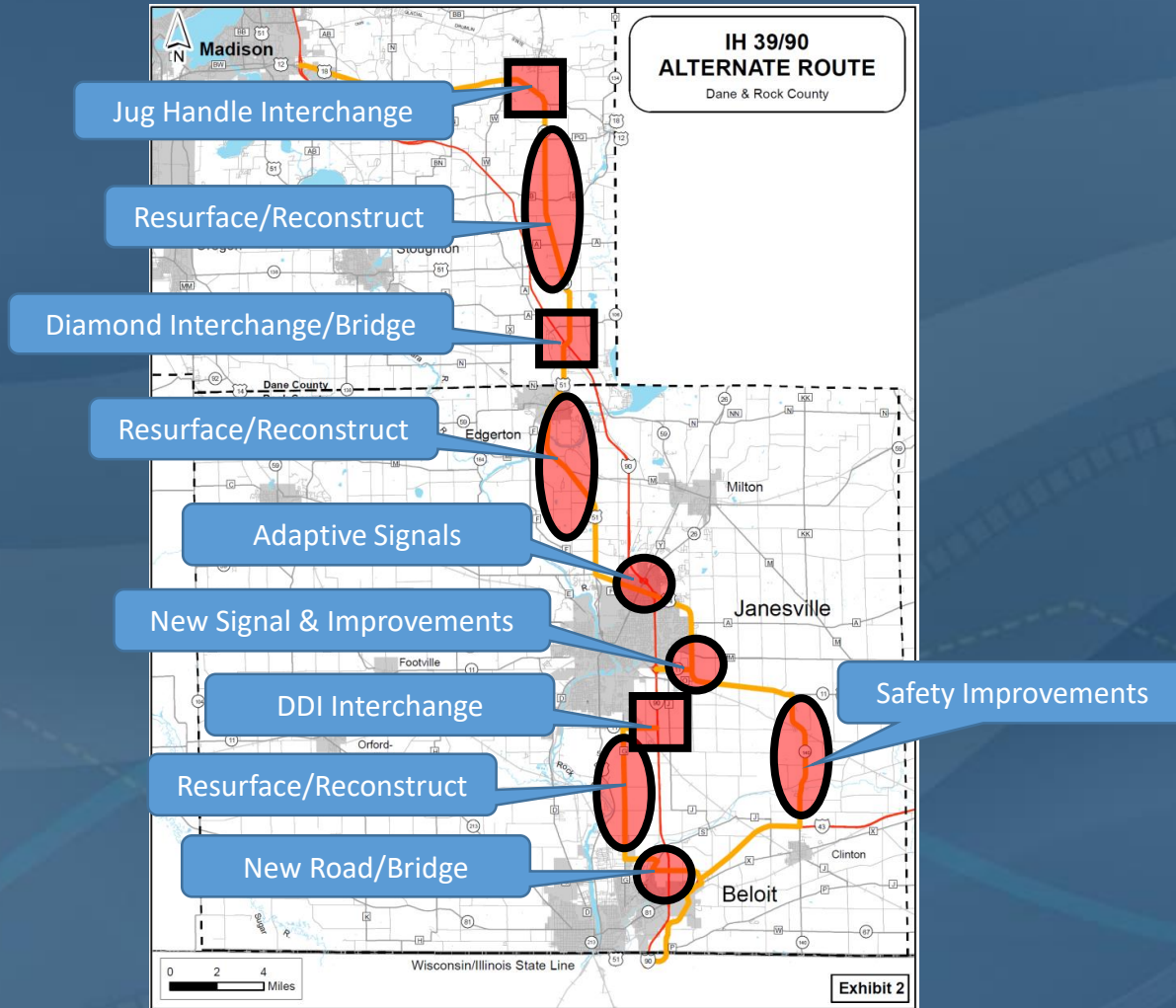


**LEGEND**

- Regional Alternative Routes
- Improved Traffic Operations Corridors

# Mitigation Measures

## Alternate Route Improvements



# Mitigation Measures

## Alternate Route Travel Times



# Mitigation Measures

## Railroad Detection



# Mitigation Measures

## Queue Warning System



# Traffic Operations During Incidents



I-39/90 @ WIS 73

# Rural Alternate Route



WIS 73

# Urban Alternate Route



USH 14



WIS 26



# Urban Alternate Route

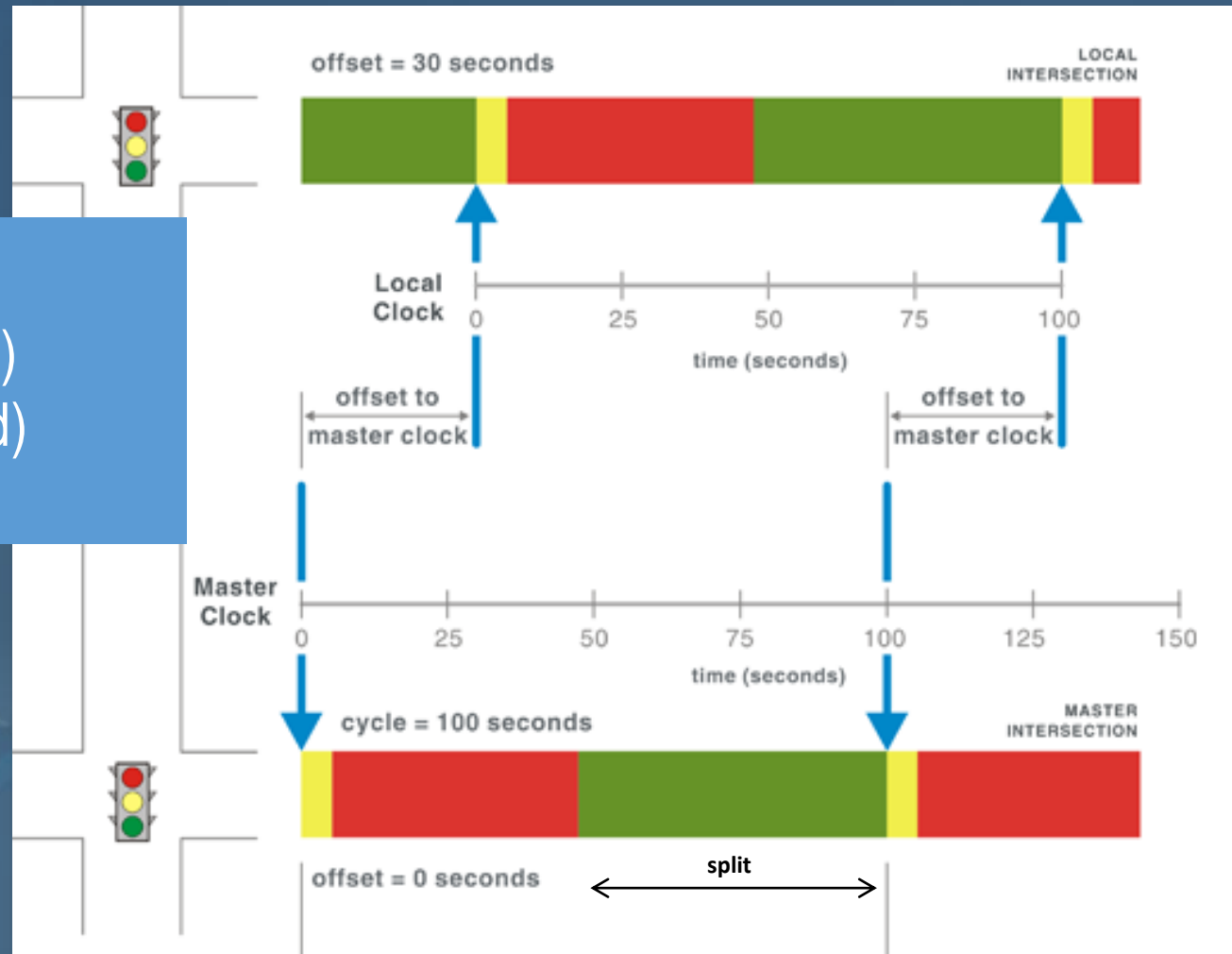


# Traffic Signal System



# Signal System Types

## Time-Base Coordinated Operation

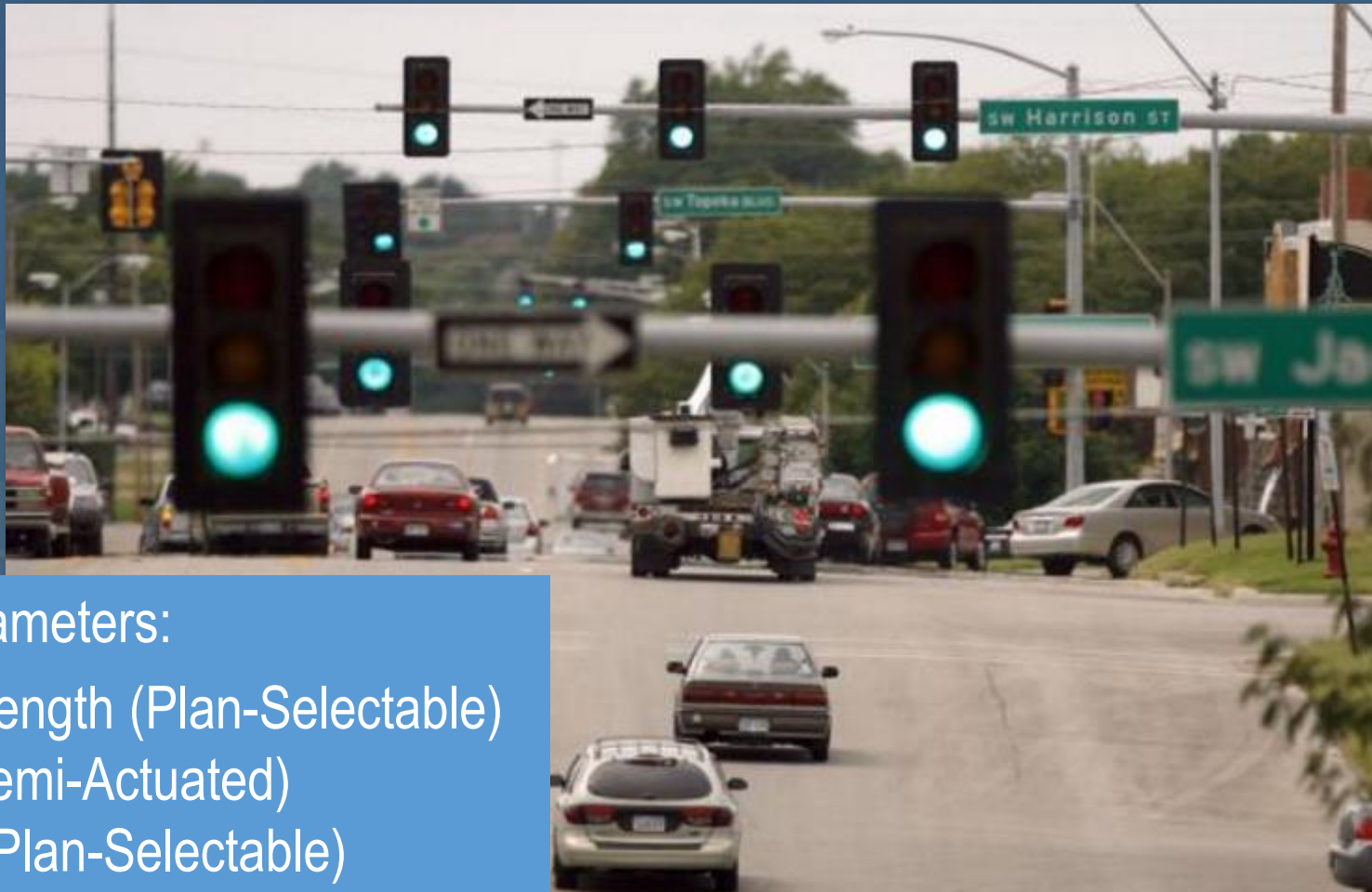


### Key Parameters:

- Cycle Length (Fixed)
- Split (Semi-Actuated)
- Offset (Fixed)

# Signal System Types

## Traffic Responsive Operation



### Key Parameters:

- Cycle Length (Plan-Selectable)
- Split (Semi-Actuated)
- Offset (Plan-Selectable)

# Signal System Types

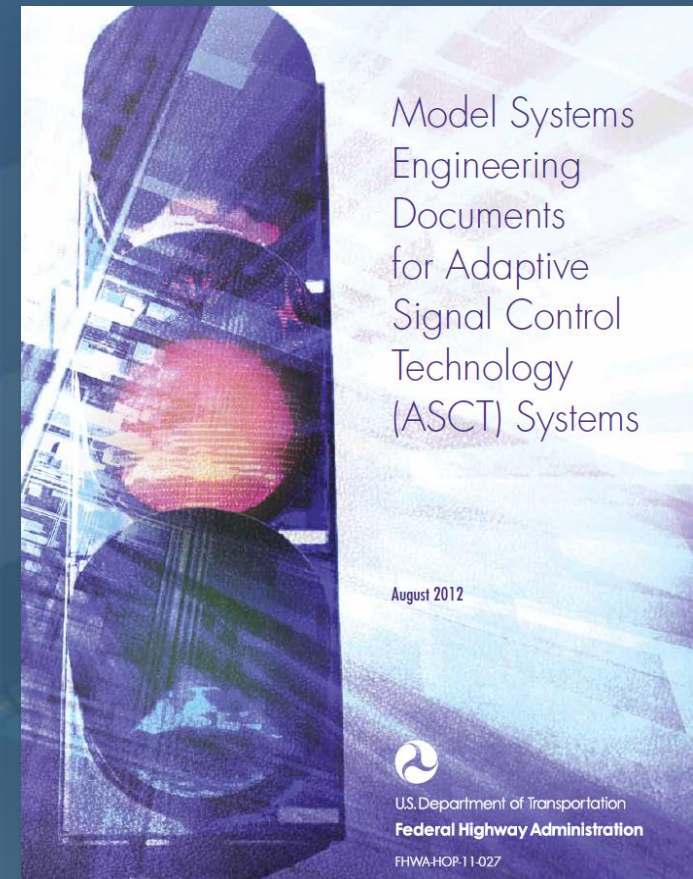
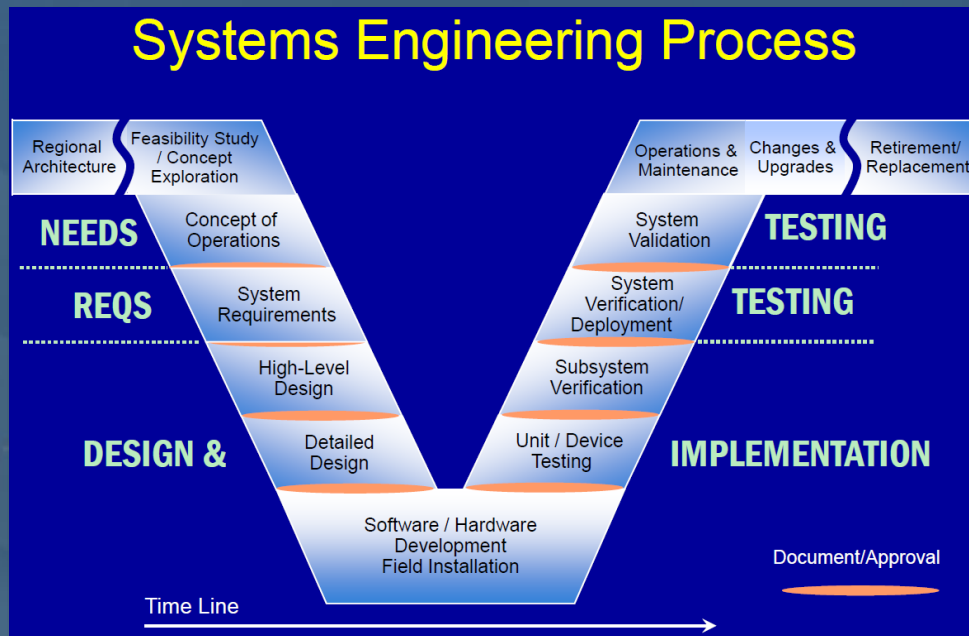
## Adaptive Operation

Key Parameters:

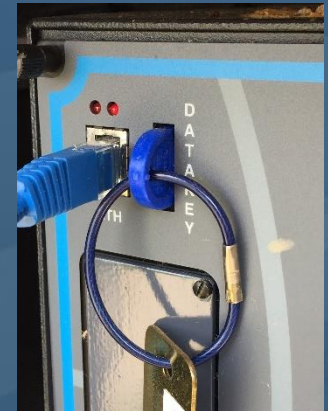
- Cycle Length (Optimized)
- Splits (Optimized)
- Offsets (Optimized)



# System Justification



# System Selection



System comprised of two modules:

- Centracs Adaptive (optimizes splits, offsets)
- Centracs Responsive (optimizes cycle length)

# System Operation

## Centracs Adaptive / Responsive

### Pattern Selection

Detector  
Data

Computations

Pattern  
Selection

### Offset Tuning

Flow  
Profile

Centracs®

Westbound  
Exit Detector

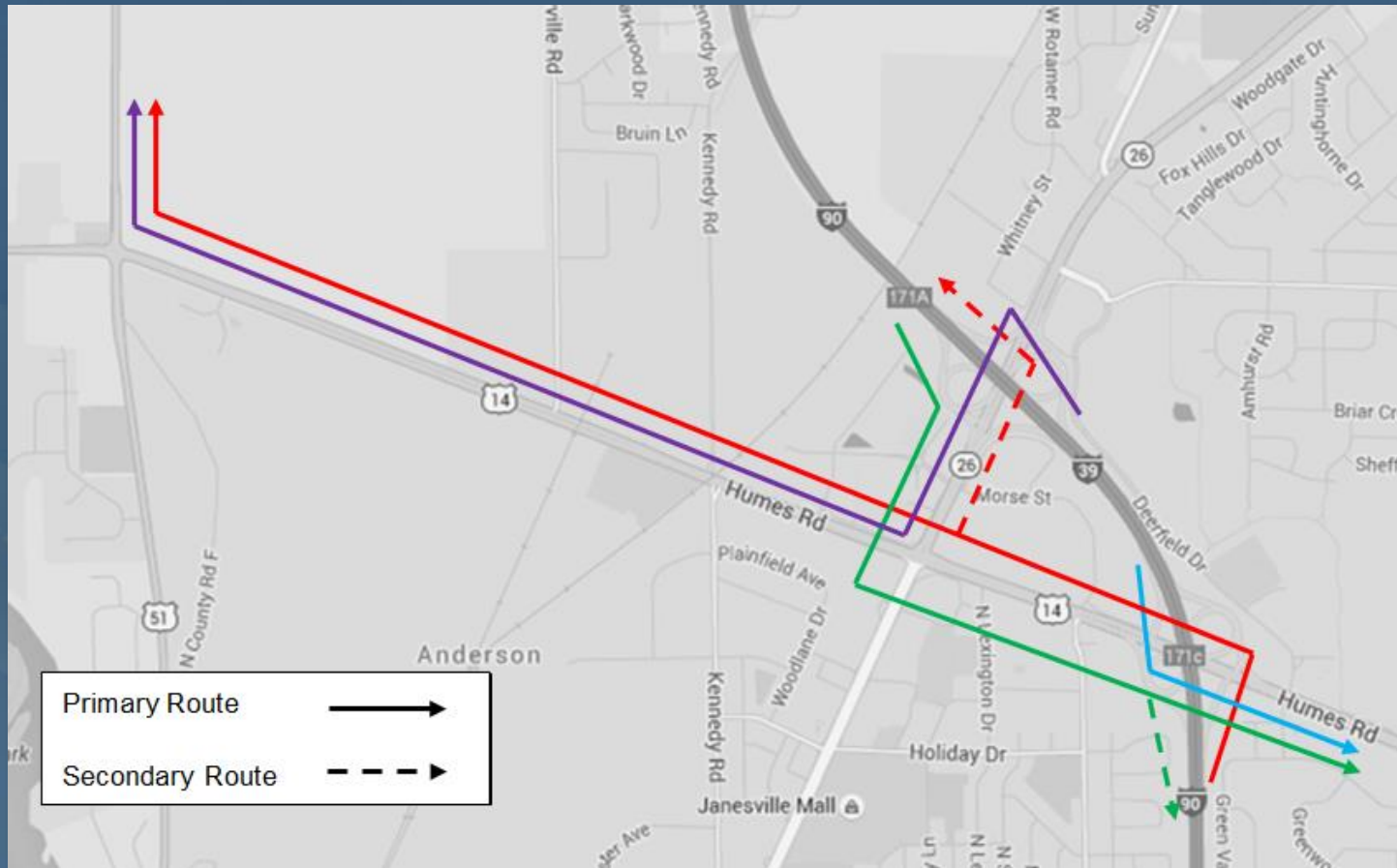
### Split Tuning





# System Operation










## Diversion Trigger System



# System Operation

## System Validation - On/Off Study

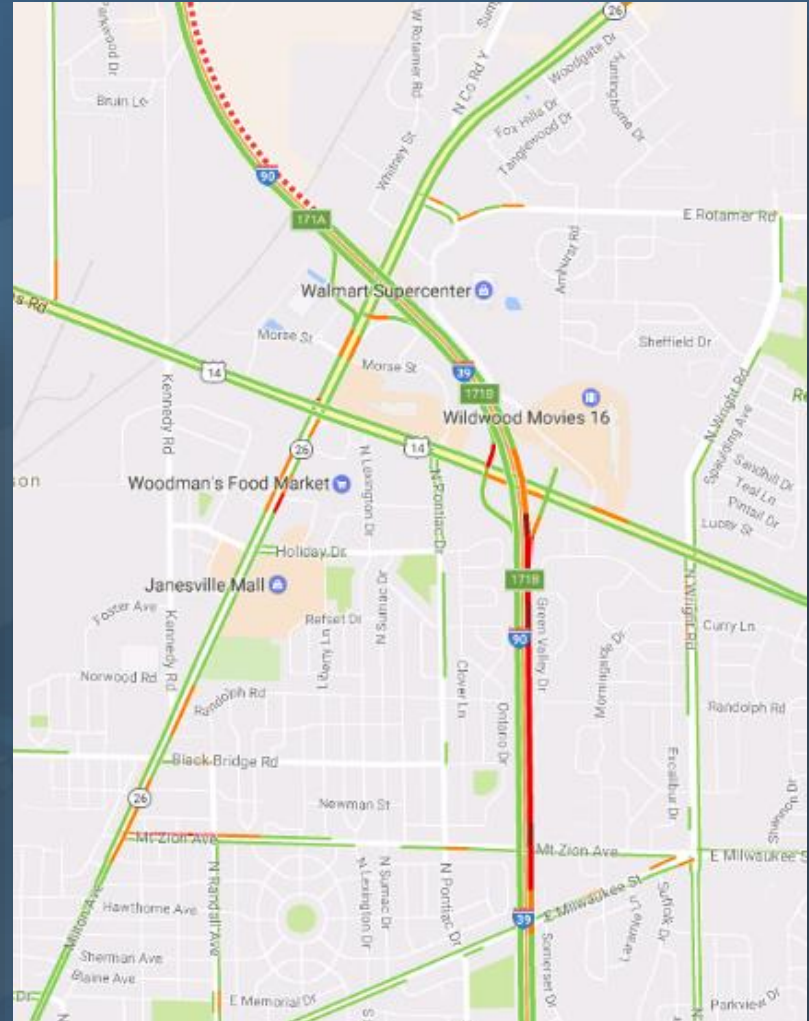
### Measures of Effectiveness (MOEs)

MOE	Typical Weekday	Friday PM Peak
Arrivals on Green		
Platoon Ratio		
Travel Time		
 <b>Operations Worsened</b>	 <b>No Change</b>	 <b>Operations Improved</b>

# System Operation

## Diversion Event

- May, 2017
- Planned Overnight Closure of I-39/90



# Lessons Learned

- Vehicle detection and communications are critical to properly-functioning adaptive signal system.
- Maintenance and operations of adaptive signal systems adjacent to active work zones is time consuming.
- Maintenance and operations of adaptive signal systems within active work zones may be impractical.
- Adaptive signal systems are great at prioritizing mainline traffic. Be prepared for complaints about side-road wait times.

# Questions?

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