# North State Street – US Hwy 101 Intersection/Interchange Alternatives Analysis

**Board of Supervisors Presentation**

February 4, 2020

# Project Location

# Level of Service

| # | Intersection | Control Type[1,2] | Target LOS | AM Peak Hour | | | PM Peak Hour | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Delay | LOS | Warrant Met?[3] | Delay | LOS | Warrant Met?[3] |
| 1 | Lake Mendocino Dr & N State St | Signal | C | 19.5 | B | - | 12.2 | B | - |
| 2 | Hensley Creek Rd & N State St | SSSC | C | 19.7 | C | - | 14.3 | B | - |
| **3** | **Olive Ave & N State St** | **TWSC** | **C** | **48.5** | **E** | **No** | **32.2** | **D** | **No** |
| **4** | **Kunzler Ranch Rd & N State St** | **TWSC** | **C** | **114.7** | **F** | **No** | **80.6** | **F** | **Yes** |
| **5** | **Orr Springs Rd & N State St** | **TWSC** | **C** | **26.1** | **D** | **No** | 19.6 | C | - |
| **6** | **US 101 NB Ramps & N State St** | **TWSC** | **C** | **109.1** | **F** | **Yes** | **32.8** | **D** | **Yes** |
| **7** | **US 101 SB Off Ramp & N State St** | **TWSC** | **C** | **158.5** | **F** | **Yes** | **28.6** | **D** | **Yes** |
| 8 | US 101 SB On Ramp & N State St | TWSC | C | 4.1 | A | - | 6.4 | A | - |
| 9 | Kuki Ln & N State St | Signal | C | 14.4 | B | - | 26.6 | C | - |
| **10** | **Empire Dr/Ford Rd & N State St** | **Signal** | **C** | **46.8** | **D** | **-** | **37.7** | **D** | **-** |
| 11 | Ford Rd & Masonite Rd | TWSC | C | 5.7 | A | - | 5.1 | A | - |
| 12 | Low Gap Rd/Brush St & N State St | Signal | C | 8.7 | A | - | 8.7 | A | - |
| 13 | Brush St & Orchard Ave | TWSC | C | 10.5 | B | - | 10.6 | B | - |
| 14 | Ford St & N State St | TWSC | C | 18.2 | C | - | 21.1 | C | - |
| 15 | Ford St & N Orchard Ave | TWSC | C | 9.7 | A | - | 9.8 | A | - |
| 16 | Kuki Ln & Lovers Ln | TWSC | C | 15.7 | C | - | 11.1 | B | - |

*Notes:*
*1. SSSC = Side Street Stop Control*
*2.TWSC = Two Way Stop Control*
*3. LOS = Delay based on worst minor street approach for TWSC intersections, average of all approaches for Signal*
*4. Warrant = Based on California MUTCD Warrant 3*

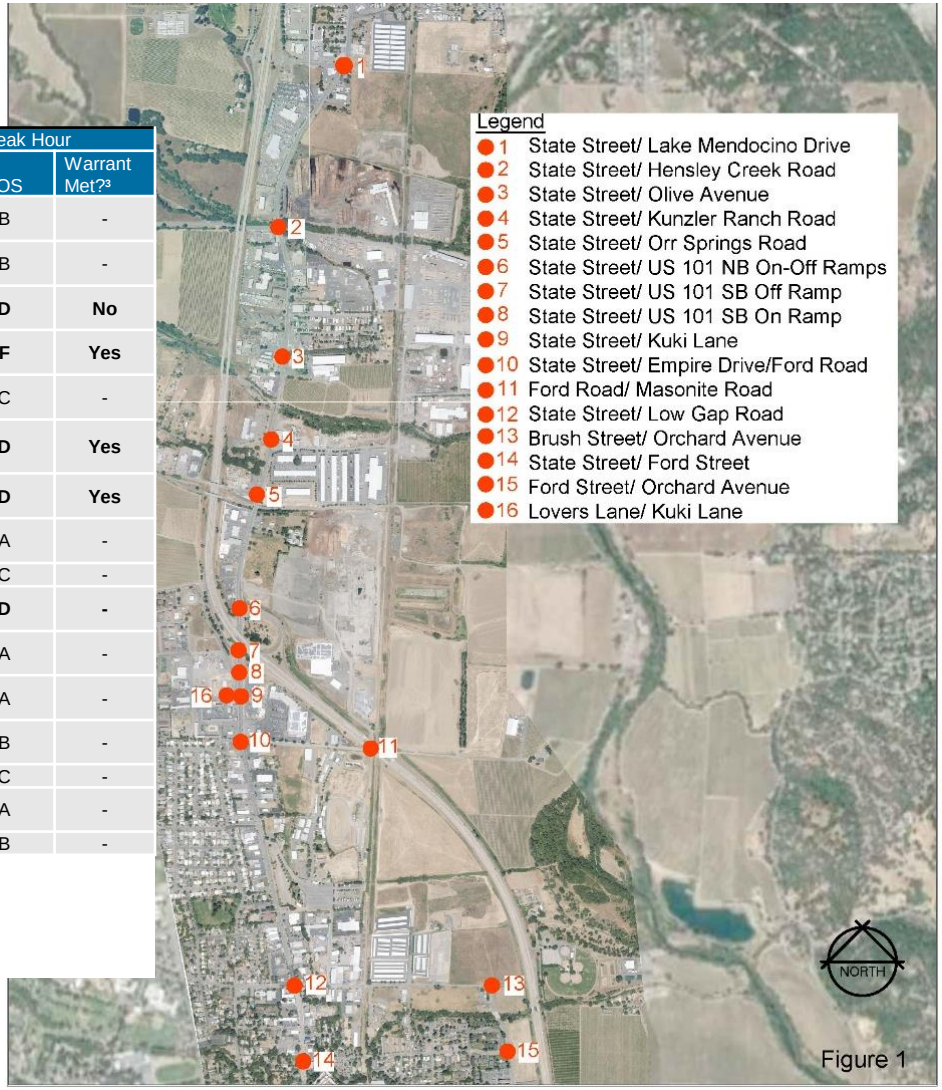


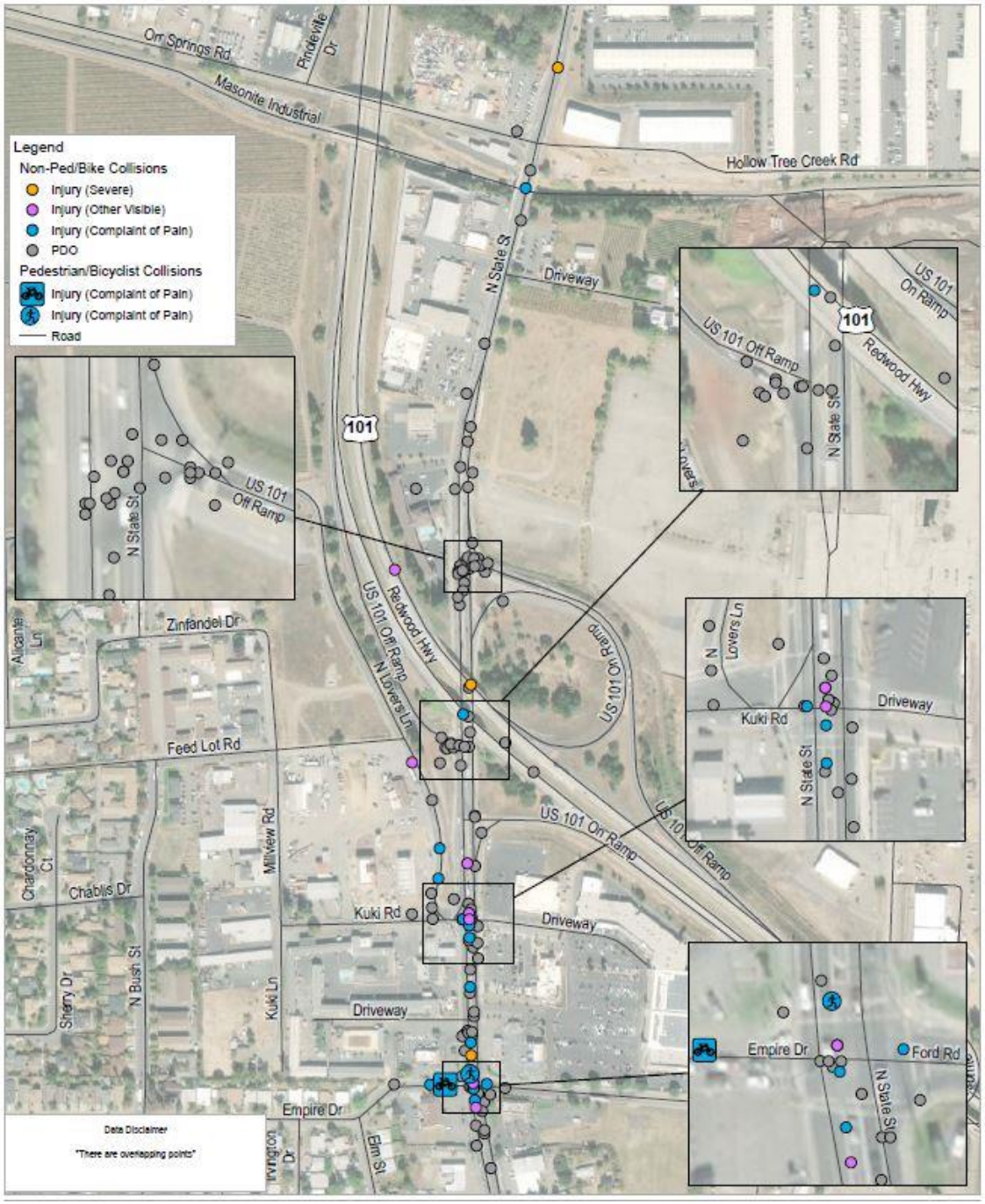
Figure 1

# Level of Service

**Traffic Operations will Deteriorate to Level of Service "D" or "F" along Corridor Without Improvement**


# Collision Summary

- 2014 to 2018
- 3 Mile Corridor
- 167 Collisions
- Mostly Rear End (40.7%) and Broadside (26.9%)
- 14 Vehicle/Ped (8.4%)
- **<u>3</u> Fatalities**
- **<u>18</u> Severe Injuries**



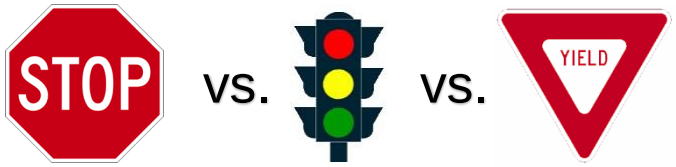
# Purpose/Need

- Relieve Traffic Congestion
- Improve Traffic Safety
- Minimize Delay
- Improve Pedestrian and Bicycle Access
- Enhance Economic Vitality
- Facilitate Goods Movement

# Intersection Control Evaluation (ICE)

## An Important Design Decision Tool

Side by side comparison of intersection control strategies

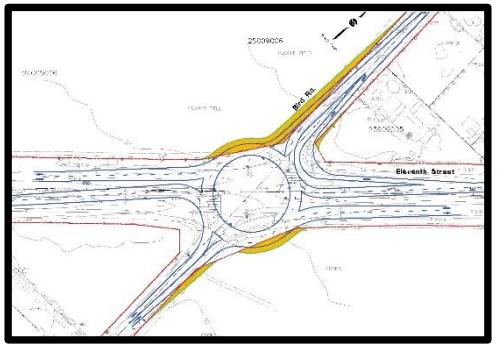



ALSO used as a side by side comparison of similar control strategies

Evaluation is documented for use in:

Public Outreach

Potential Challenges to the Project (R/W acquisitions)



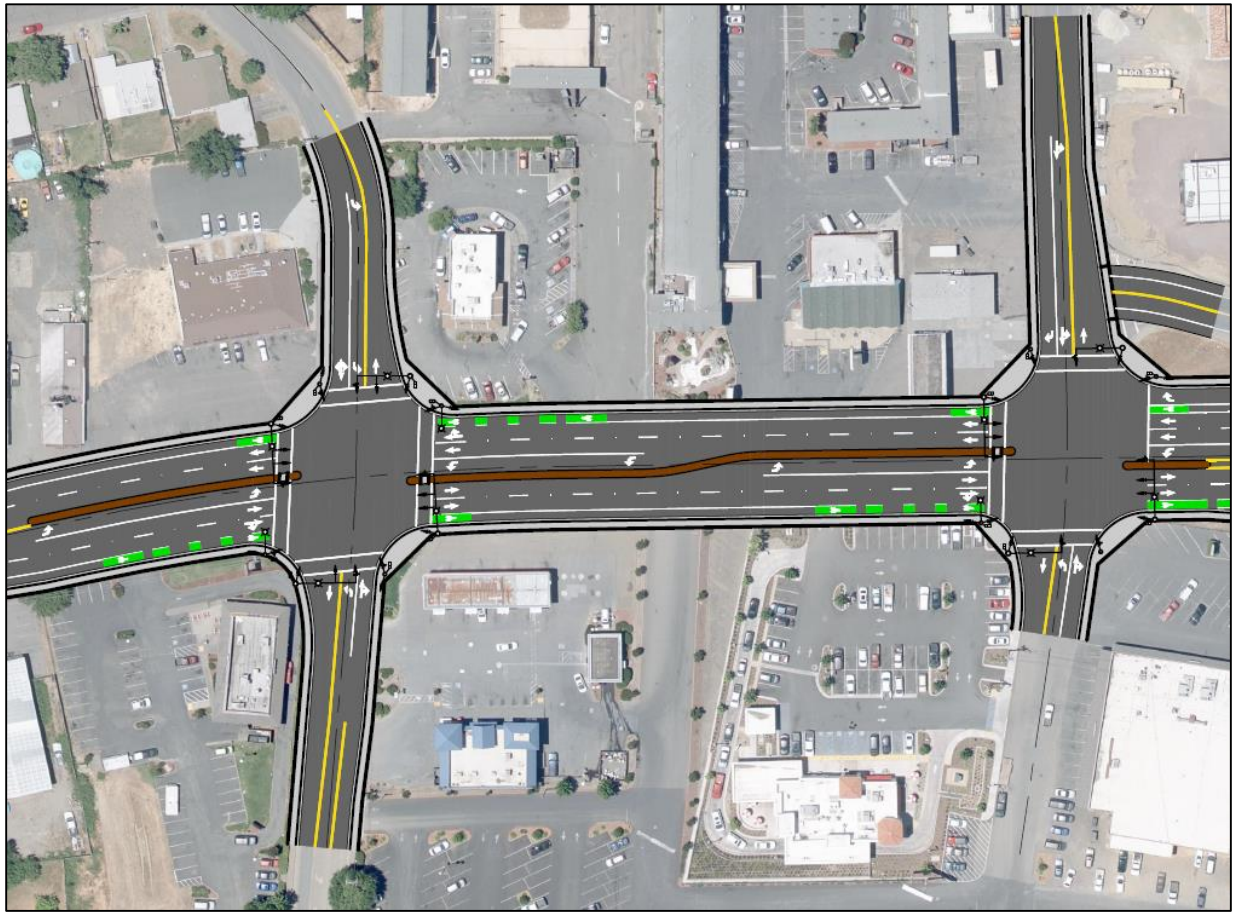
End result leads to a **<u>Single Alternative</u>**

# Evaluated Intersections

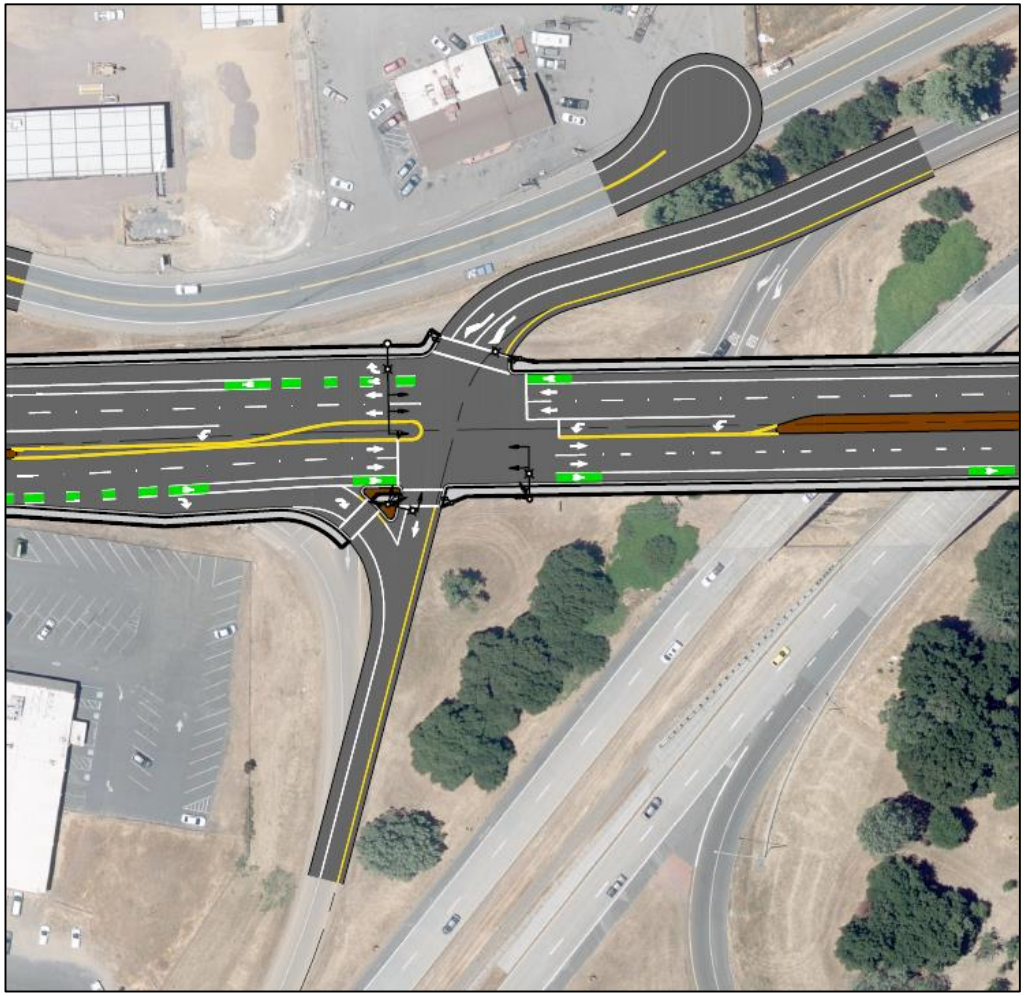
# Signal Build Alternative

# Signal Alternative – Southern Intersections

# Signal Alternative – Southern Intx Detailed

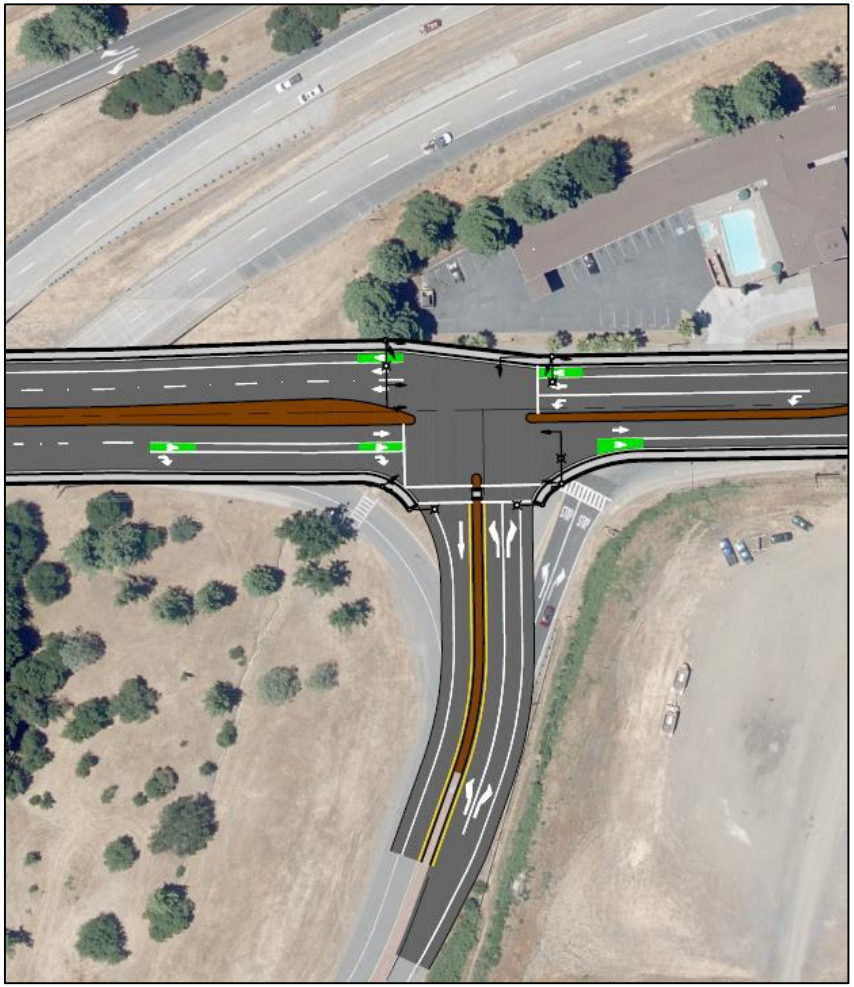


# Signal Alternative – Southern Intx Detailed



# Signal Alternative – Northern Intersections

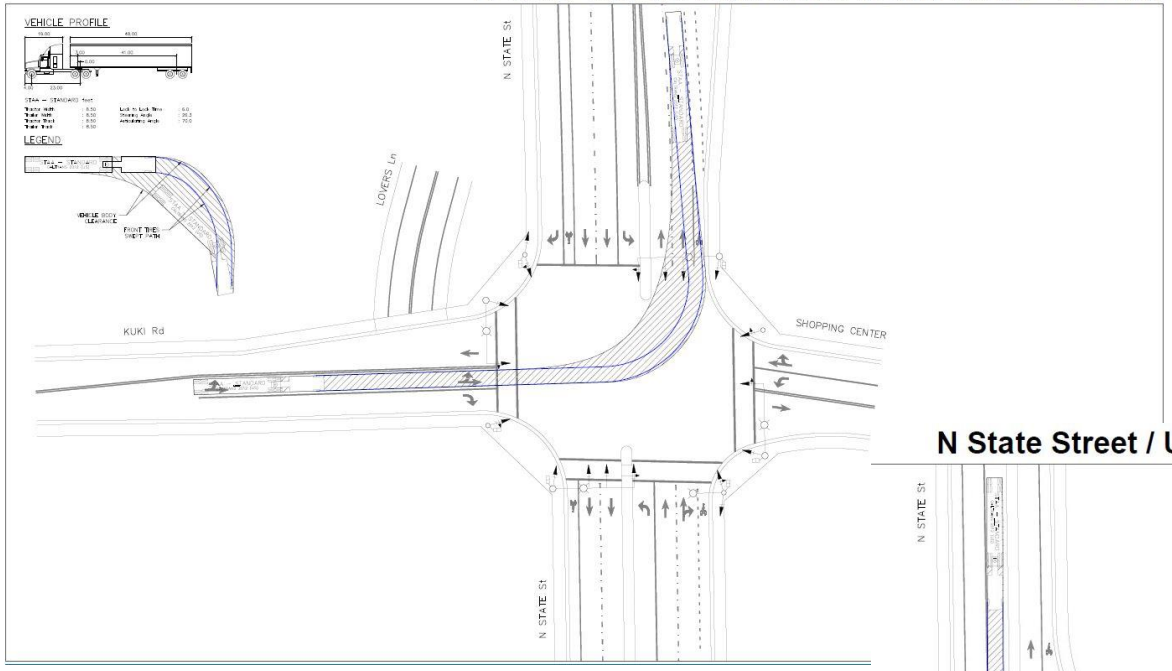
# Signal Alternative – Northern Intx Detailed



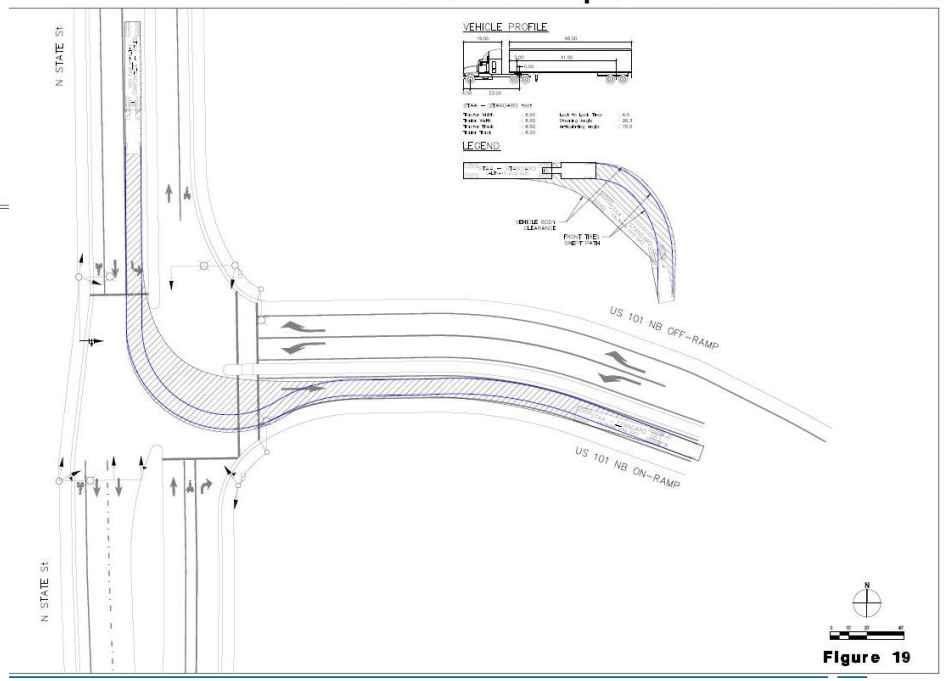
# Signal Alternative – Northern Intx Detailed

# Signal - Truck Accommodations

## N State Street / Kuki Road Truck Turns - EB Left




## N State Street / US 101 On/Off Ramps Truck Turns - SB Left



A **“Complete Street”** goal is to be safe, comfortable and convenient **<u>for all users</u>** – pedestrians, bicyclists, motorists and transit riders of all ages and abilities.

# Why Modern Roundabouts?

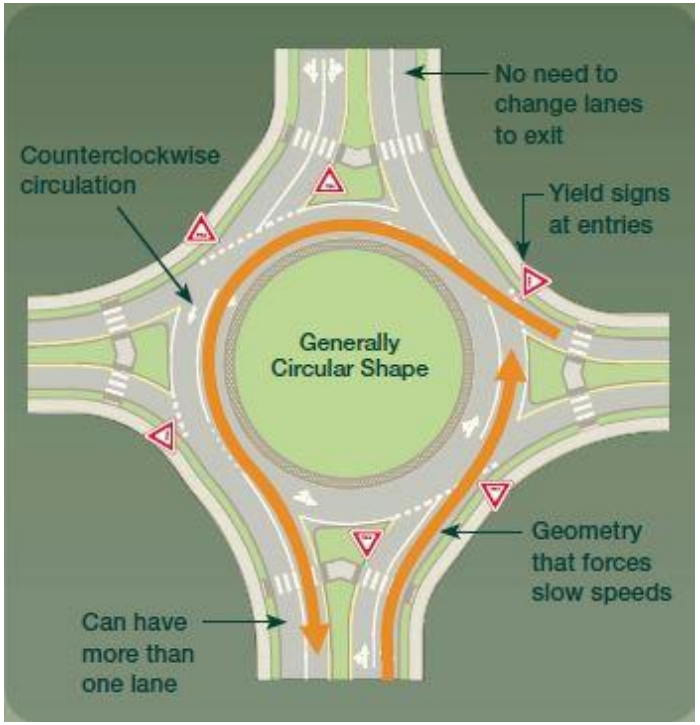
Improve Safety for ALL modes

Reduce Congestion

Reduce Pollution and Fuel Use

Save Money

**Modern Roundabout**




Source: Roundabouts : An Informational Guide. FHWA

# What Are NOT Modern Roundabouts?

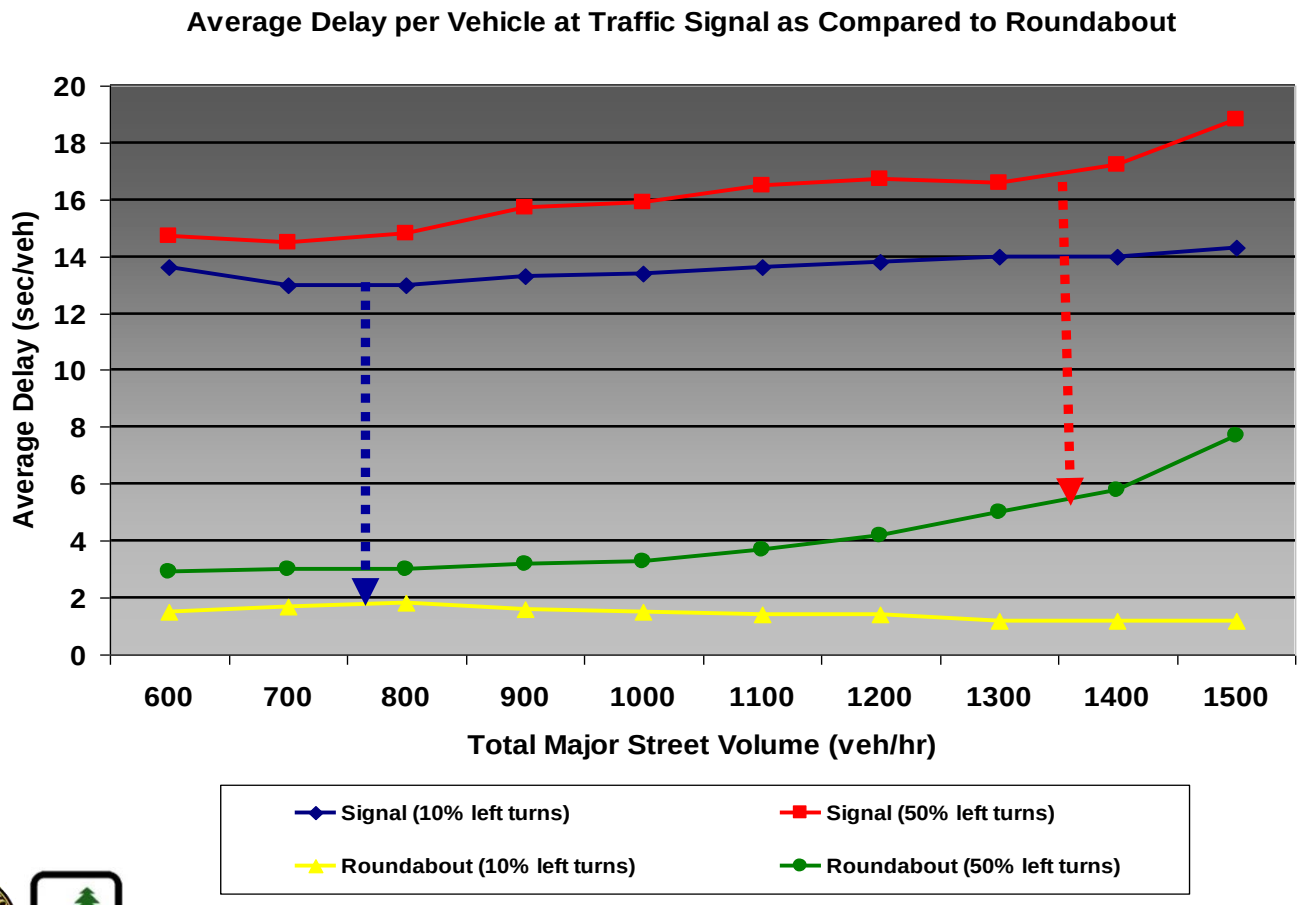
Rotaries



Traffic Calming Circles

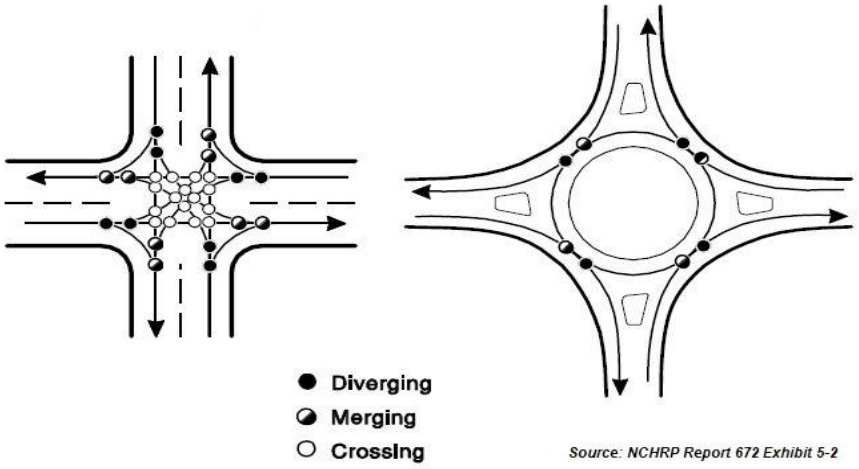
# Why Roundabouts?

## Increased Capacity & Reduced Delay



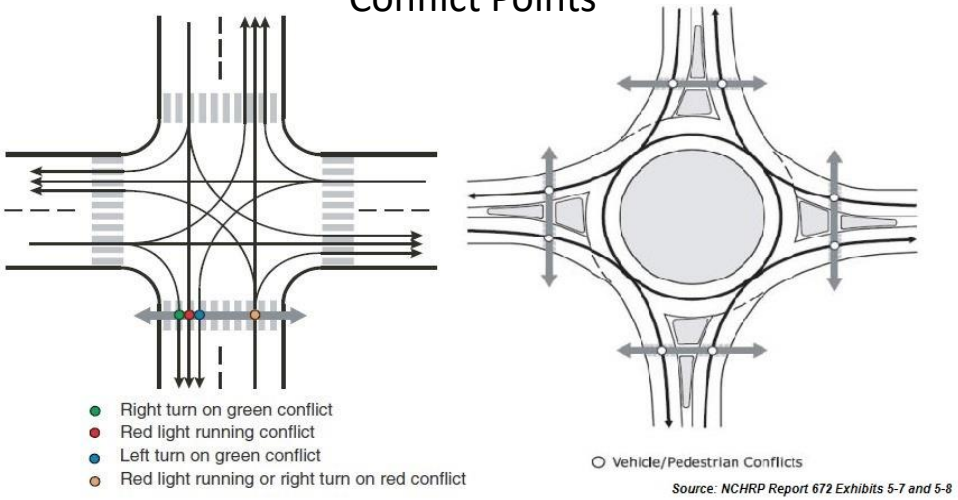
# Roundabout Safety Overview

Vehicle
Conflict Points



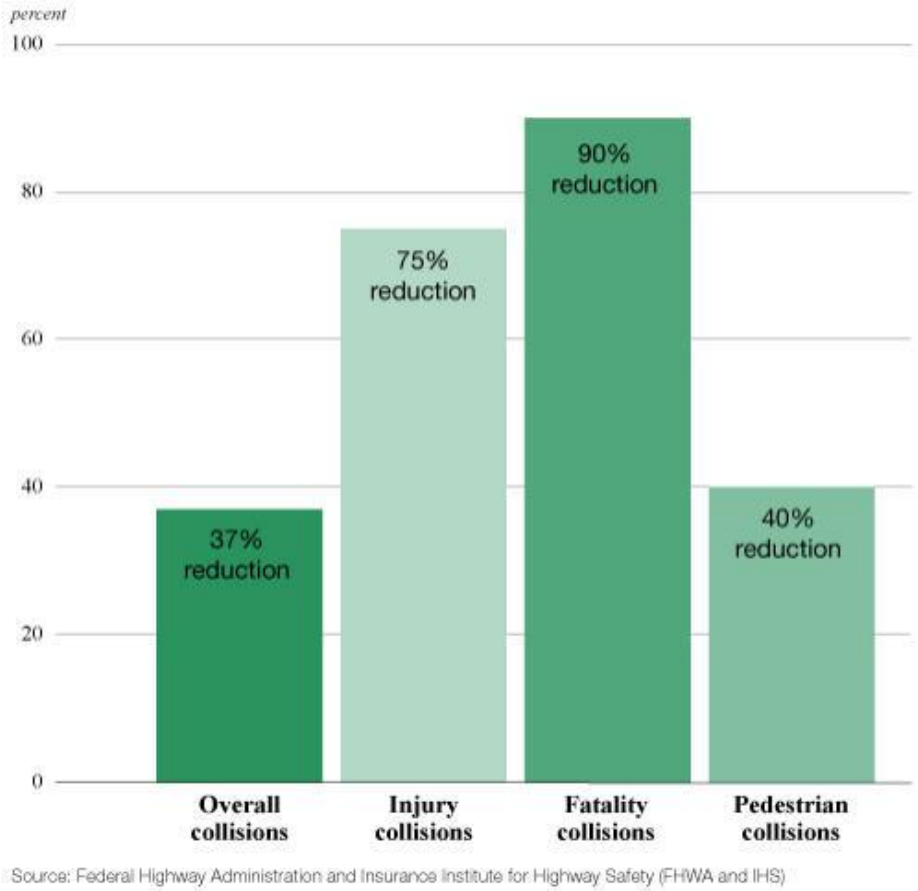

Source: National Cooperative Highway Research Program
Report 672 Exhibit 5-2

Pedestrian
Conflict Points



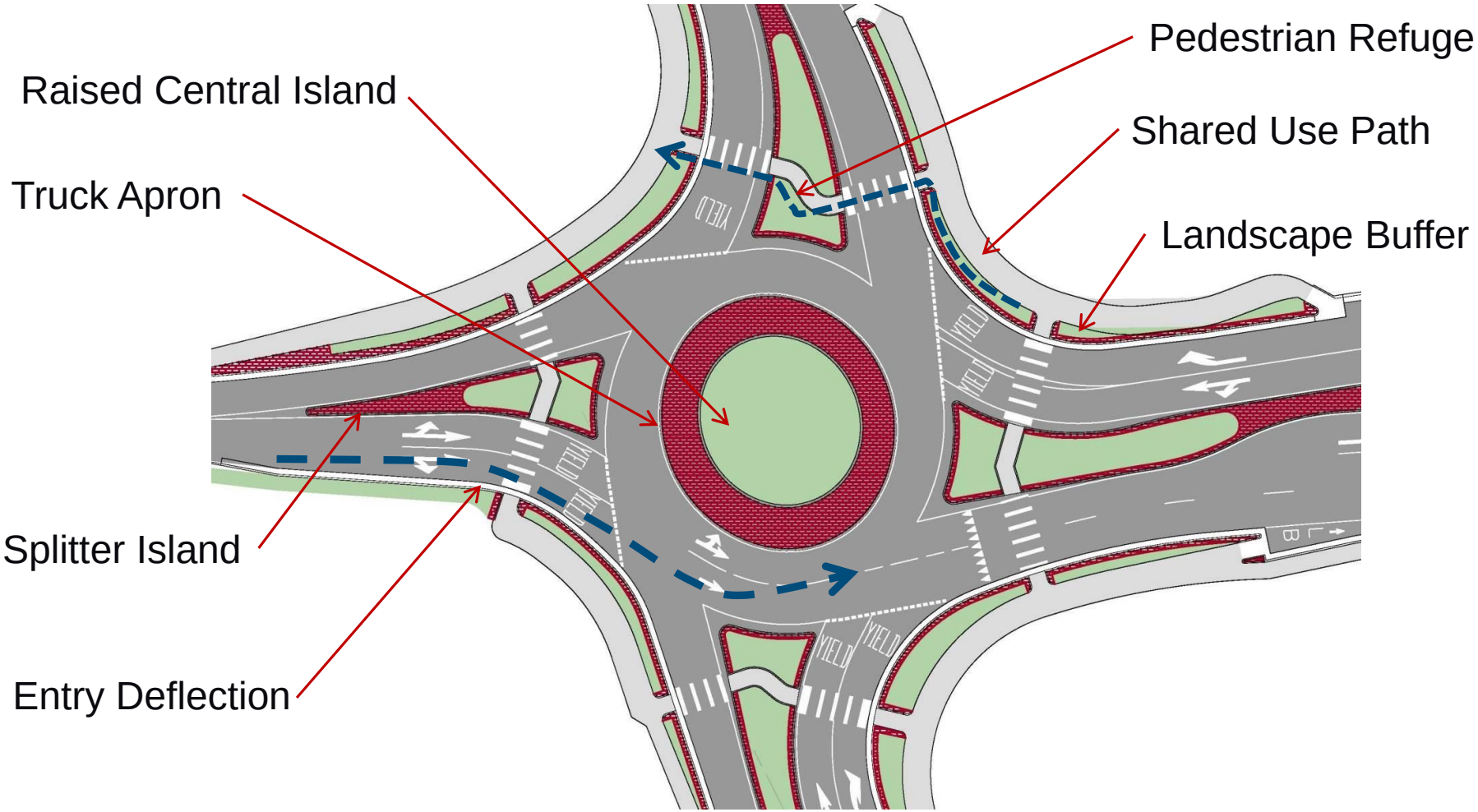

Source: National Cooperative Highway Research
Program
Report 672 Exhibit 5-7/8

# Crash Reductions

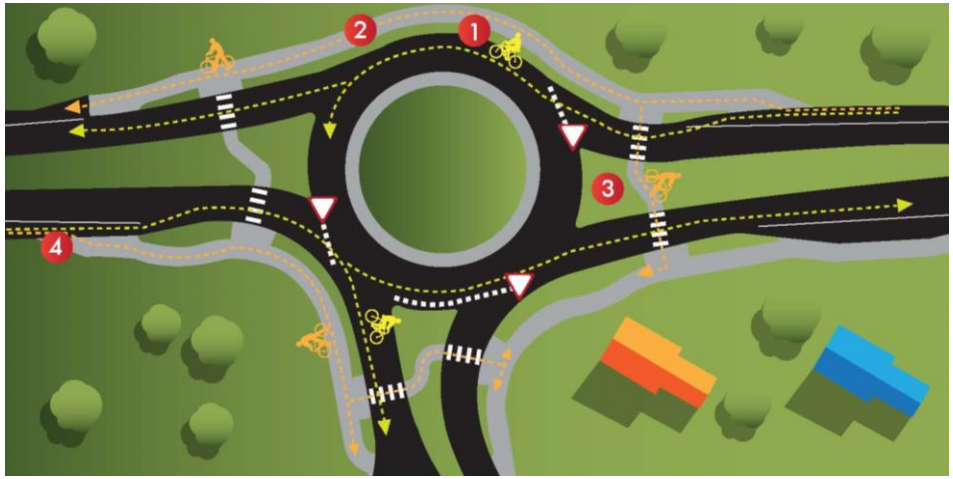



Source: Federal Highway Administration and Insurance Institute for Highway Safety (FHWA and IHS)

# Design Elements of a Modern Roundabout



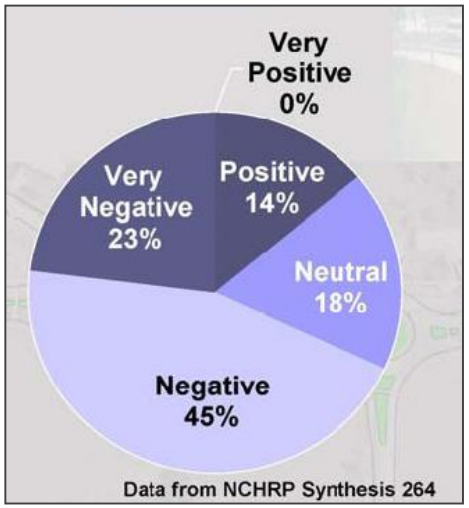
# Bicycle Movements



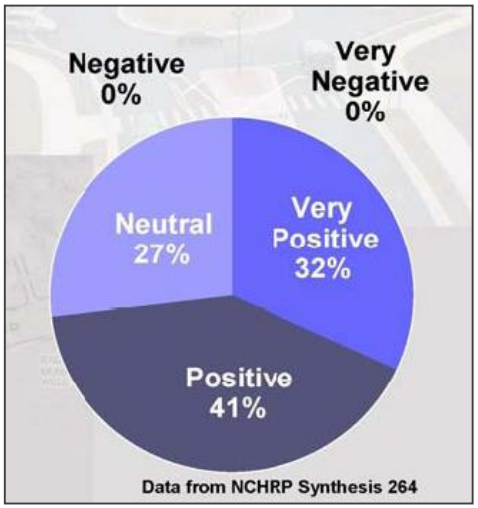

1. Experienced Riders travel as a vehicle
2. Novice Riders use Shared Path
3. Pedestrian Refuges are wide enough to shelter bicyclists
4. Enter and Exit Shared Path from bike ramps located away from the intersection

# Public Opinion of Roundabouts

**Before Roundabout Installation**

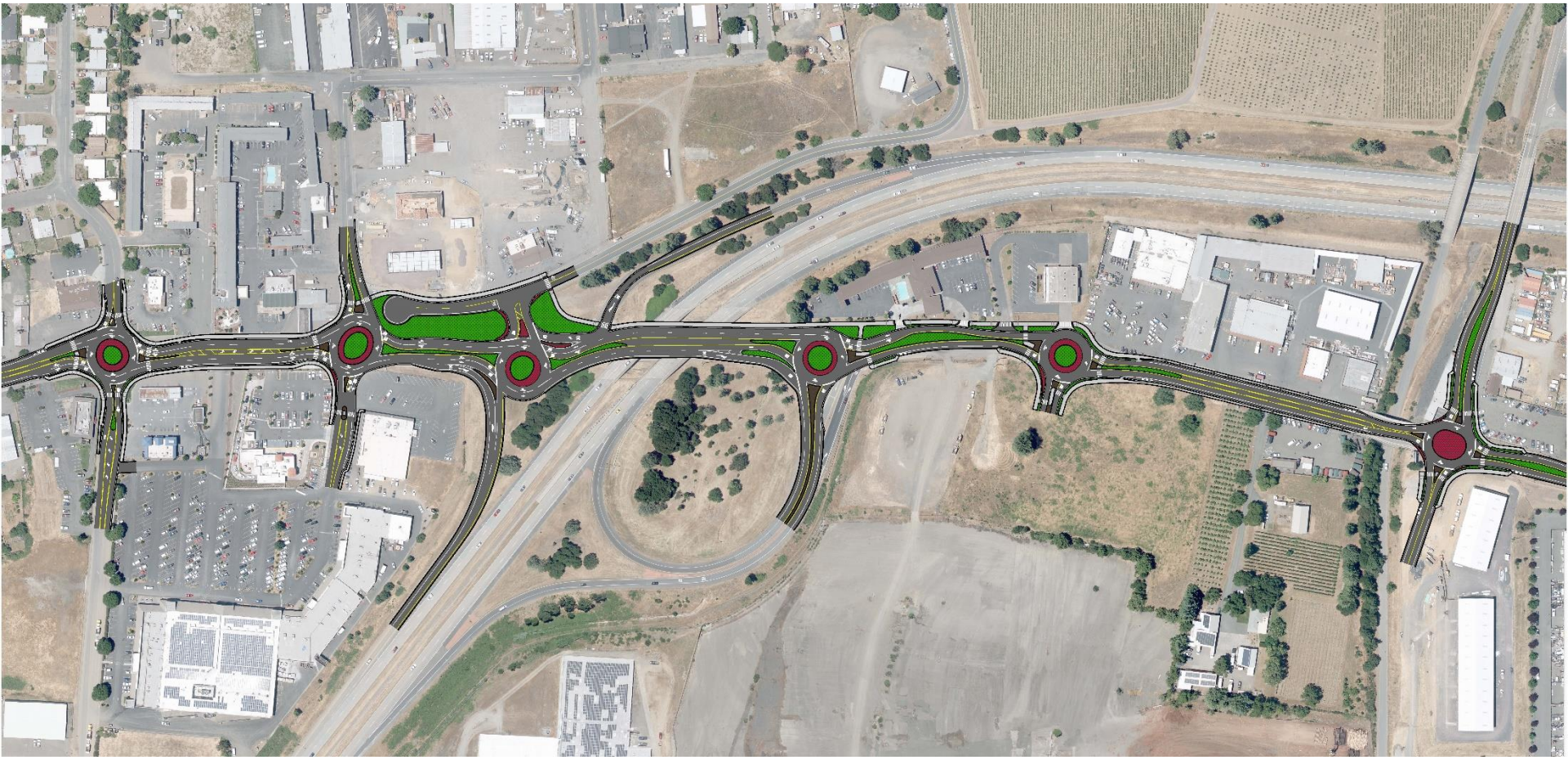



**After Roundabout Installation**




**Public Perception Changed from 68% Negative to *73% Positive* after Installation**

# Roundabout Build Alternative



# Roundabout Alternative – Southern Intersections

# Roundabout Alternative – Southern Intx Detailed

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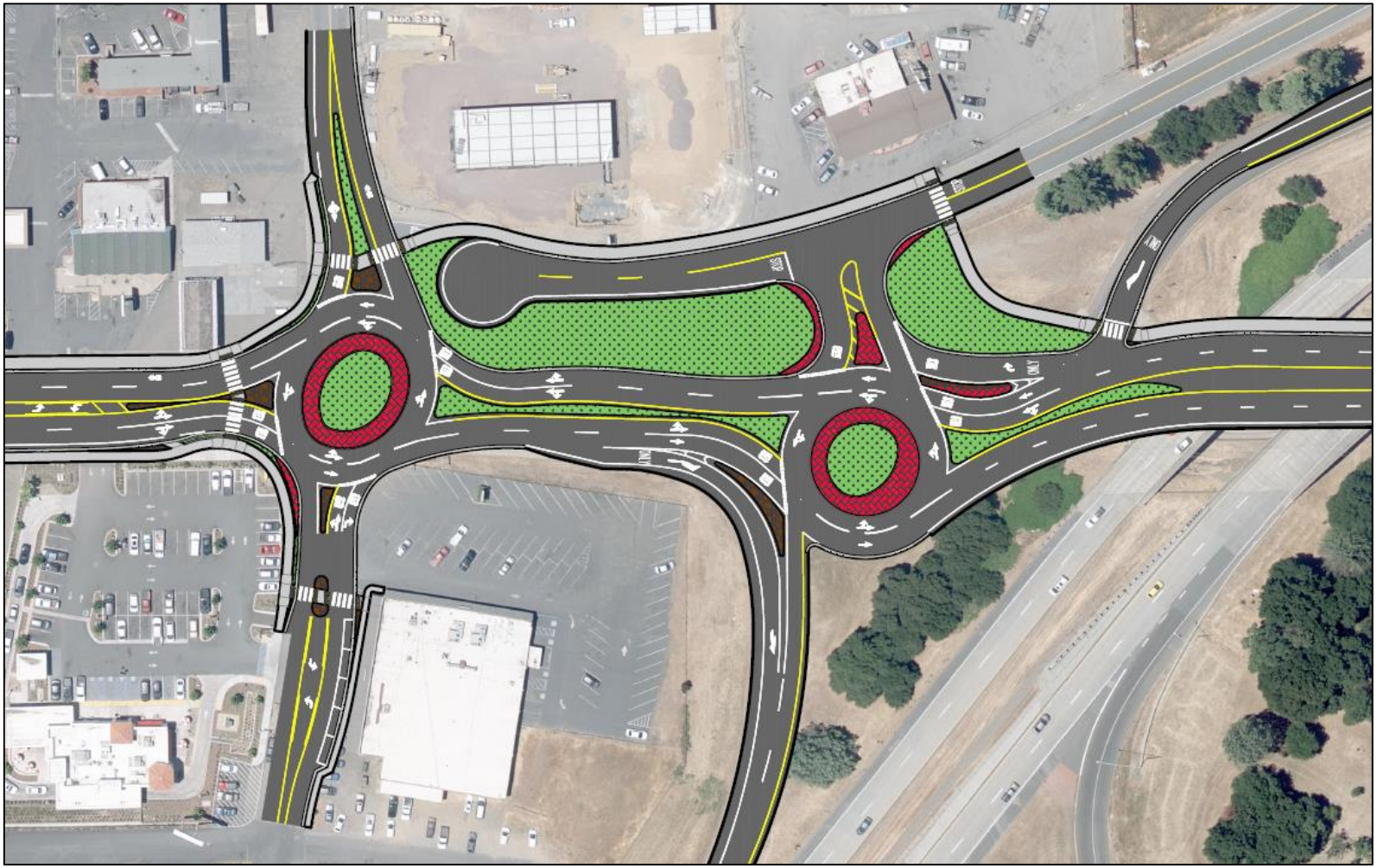

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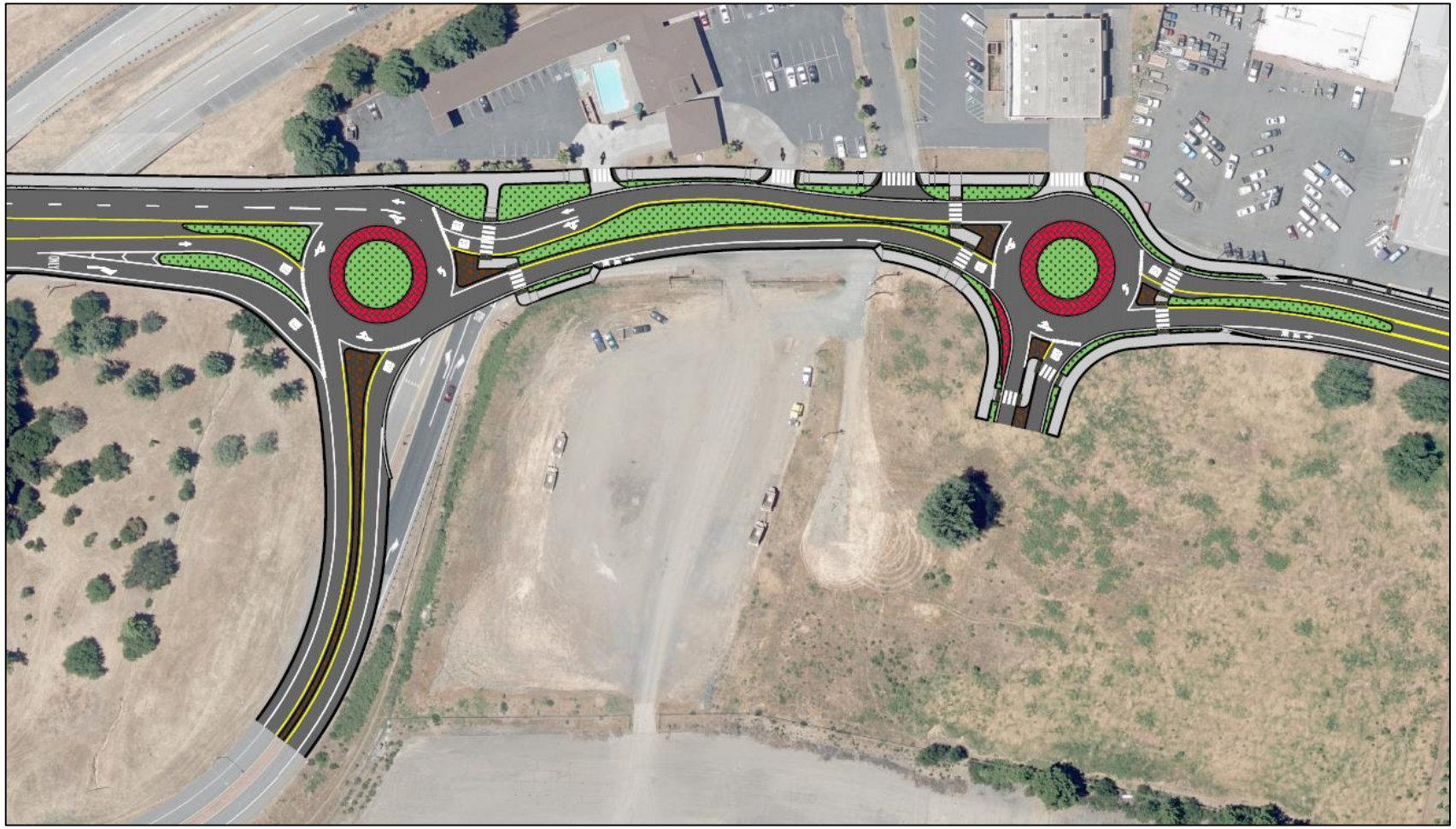

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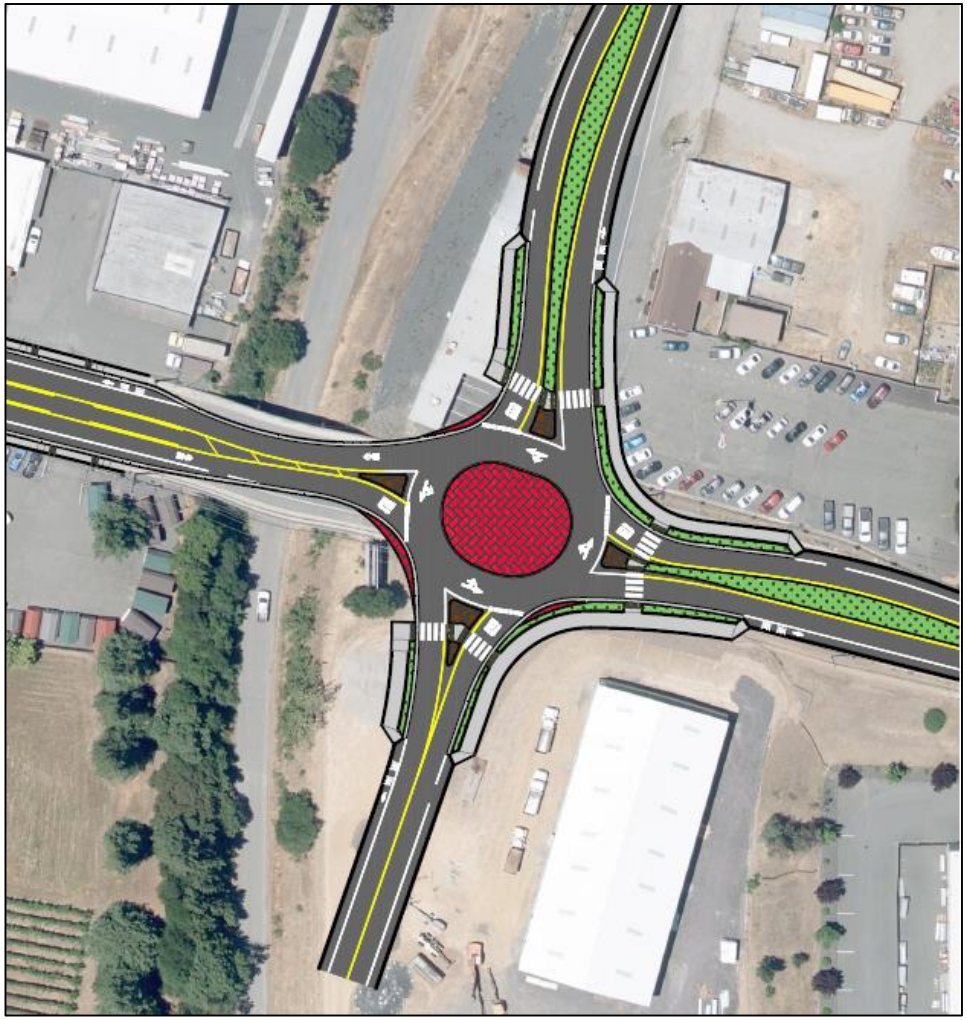
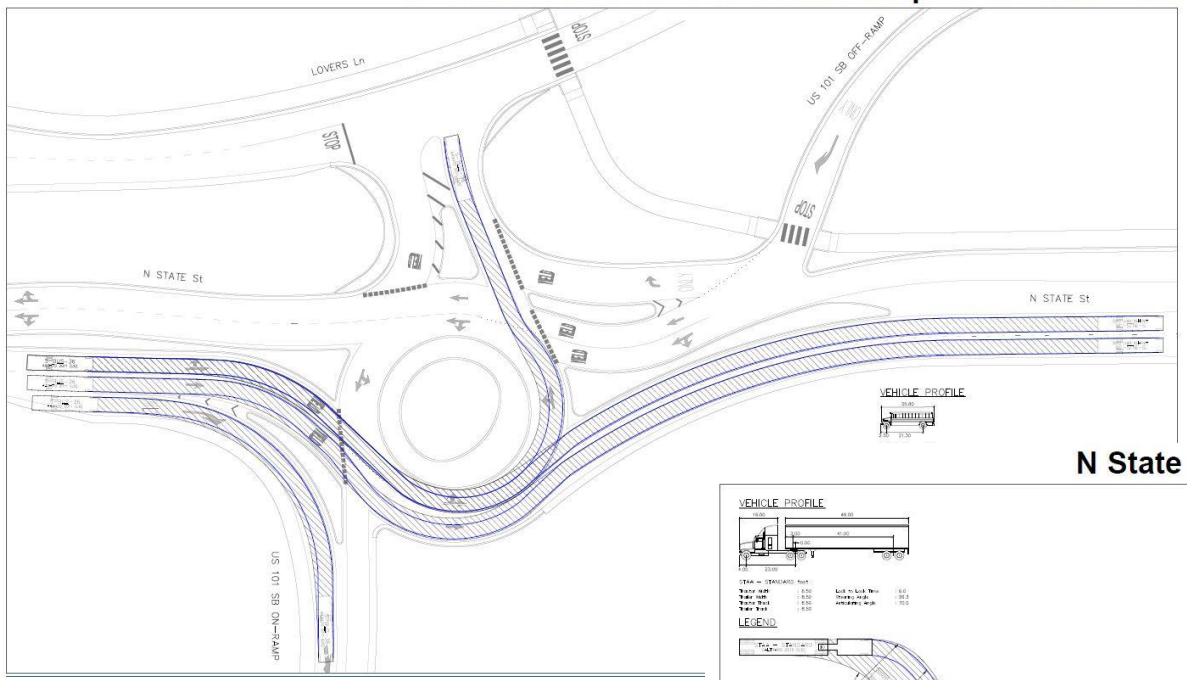


# Roundabout - Bus/Truck Accommodations

## N State Street / US 101 On/Off Ramps Bus Turns - NB




## N State Street / Kuki Road Truck Turns - SB Left & Right

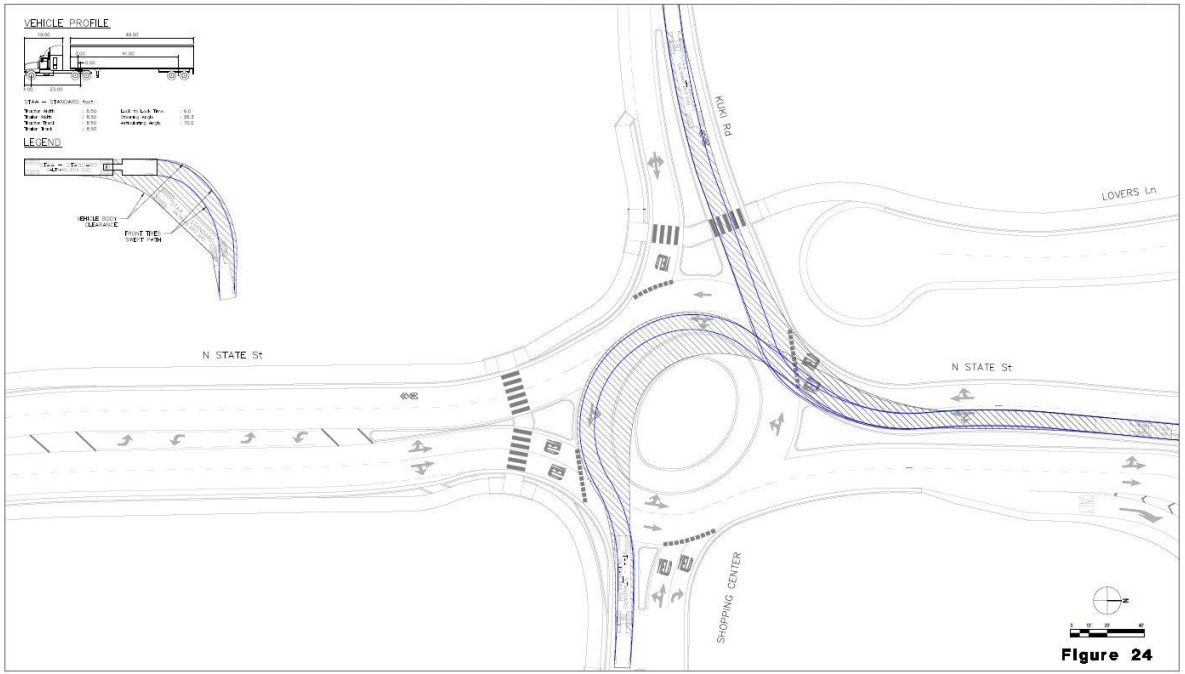



Figure 24

# Evaluated Intersections

# ICE Alternative Evaluation

| Metric | Traffic Signal | | | | | | Roundabout | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 1 | 2 | 3 | 4 | 5 | 6 |
| Cost | ✓ | ✓ | ✓ | ½ | ✗ | ✗ | ✗ | ✗ | ✗ | ½ | ✓ | ✓ |
| Complete Streets | ✗ | ✗ | ✗ | ½ | ½ | ½ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Safety | ½ | ½ | ½ | ½ | ½ | ½ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Design Challenges | ✓ | ✓ | ✓ | ½ | ½ | ✗ | ½ | ½ | ✗ | ✓ | ✓ | ✓ |
| Environmental Impacts | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Reduce Right of Way Impacts | ✗ | ✗ | ✓ | ½ | ✗ | ✗ | ½ | ½ | ✓ | ½ | ½ | ✓ |
| Constructability | ½ | ½ | ½ | ½ | ½ | ✗ | ½ | ½ | ½ | ✓ | ½ | ✓ |

Legend:

✗ Doesn't Meet Metric As Well

½ Semi Meets Metric

✓ Meets Metric

# Project Delivery Outline

**Current Phase**

- Project Alternative Analysis/Feasibility
- ICE

**Next Phase****

- Preliminary Engineering (PE)
- Environmental Document (ED) Preparation
- Approval of Project Report & ED

**Ultimate Goal**

- Begin Final Design
- Identify Right of Way Needs
- Right of Way/ Easement Acquisition
- Final Design/Preparation of Construction Documents

**Funding for PA&ED programmed for KUKI and 101 Interchange intersections starting 2020

# Questions?

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