



Presentation
will begin at
5:35 p.m.



PENNINGTON COUNTY
South Dakota

US16 Corridor Study

Intersection Build Options

Public Information Meeting #2

December 10, 2019



Housekeeping Items

- Please sign-in
- Comment card and handout
- Study website: www.us16corridor.com
- Meeting format
 - Presentation
 - Open house for questions and discussion
- Methods to provide feedback
 - Comment cards
 - Study website
 - Study contact (email, phone, mail)



Contact

USE THE COMMENT FORM BELOW OR CONTACT PROJECT MANAGEMENT WITH QUESTIONS

First Name Last Name

Email Address Phone Number

Your comment

Enter an email or phone above if you'd like to be contacted

Purpose of Today's Intersection Build Option Meeting

1. Provide brief study overview and update
2. Present US16/US16B/Catron Boulevard Intersection Build Options.
3. Present US16/Neck Yoke Road Intersection Build Options.
4. Gather feedback and answer questions.

No recommendations have been made at this point in the study.

Your feedback will assist in the refinement, analysis, and development of recommendations in next phase of study.

Study Team

- Study Contacts

Jon Wiegand

Consultant (HDR) Project Manager

Steve Gramm

SDDOT Project Manager

- Study Advisory Team



U.S. Department of Transportation
Federal Highway Administration

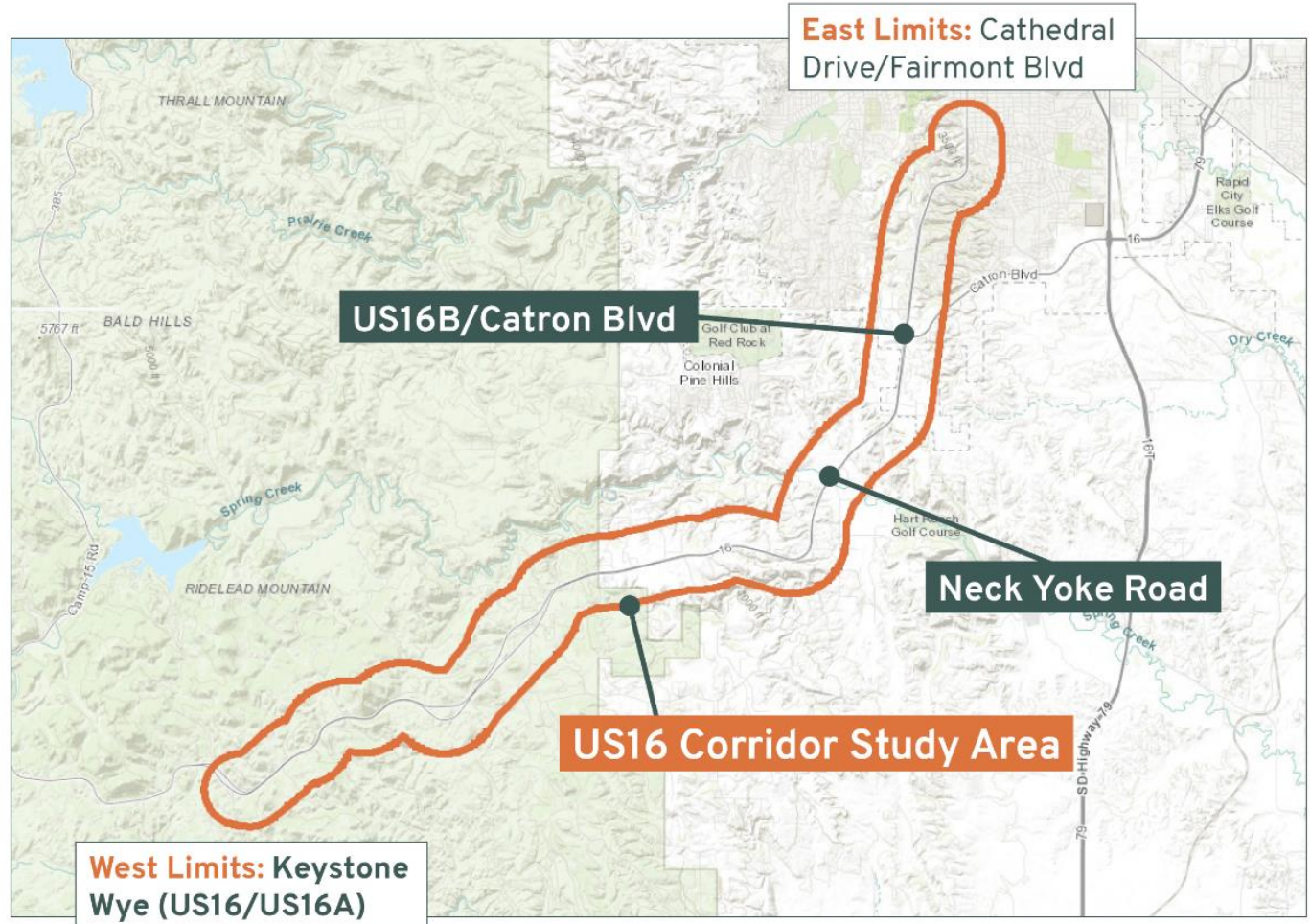


- Study Consultant



US16 Corridor Study Area

- US16 corridor
 - US16B/Catron Blvd Intersection
 - US16/Neck Yoke Road Intersection
- US16 Service Roads
- US16 Ramps at Rockerville



US16 Corridor Study Goals

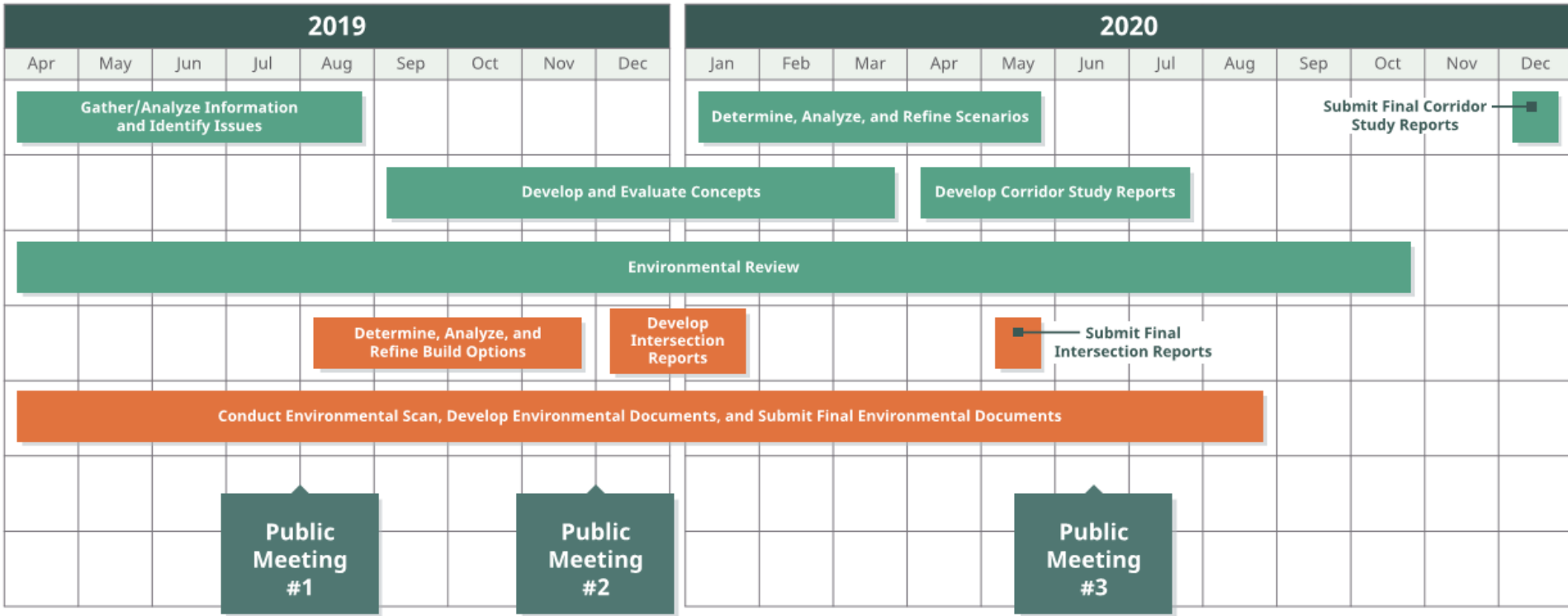
Develop a long-range plan for the US16 corridor.

- What improvements are needed over the next 20-30+ years?
- What is the timeline for those improvements?
- Develop a plan for implementation.

Primary components of the US16 Corridor Study.

1. US16 Corridor intersections, lanes, access, roadway cross-section, ITS, etc.
2. US16/US16B/Catron Boulevard intersection – FY 2026 construction project
3. US16/Neck Yoke Road intersection – FY 2026 construction project
4. Environmental documentation

US16 Corridor Study Schedule



WE ARE HERE



Intersection Build Options Overview

A. US16/US16B/Catron Boulevard intersection area

- Overview of build options
- Animations
- Preliminary evaluation measures

B. US16/Neck Yoke Road intersection area

- Overview of build options
- Preliminary evaluation measures

In consideration of time, presentation does not include all Build Option variations and evaluation measures! Please refer to layout boards and study website for full compilation.

Please hold all questions and comments for the Open House portion of the meeting!

US16/US16B/Catron Boulevard Intersection: Draft Purpose and Need

- Purpose: To improve traffic operations and safety and support the planned mix use urban development that is occurring in the area.
- Needs:
 - Long-term traffic operations
 - High crash rates
 - Rapidly urbanizing land use
- Build Options:
 1. Single Point Interchange
 2. Displaced Left Turn Intersection



Build Option 1: Single Point Interchange (SPI)

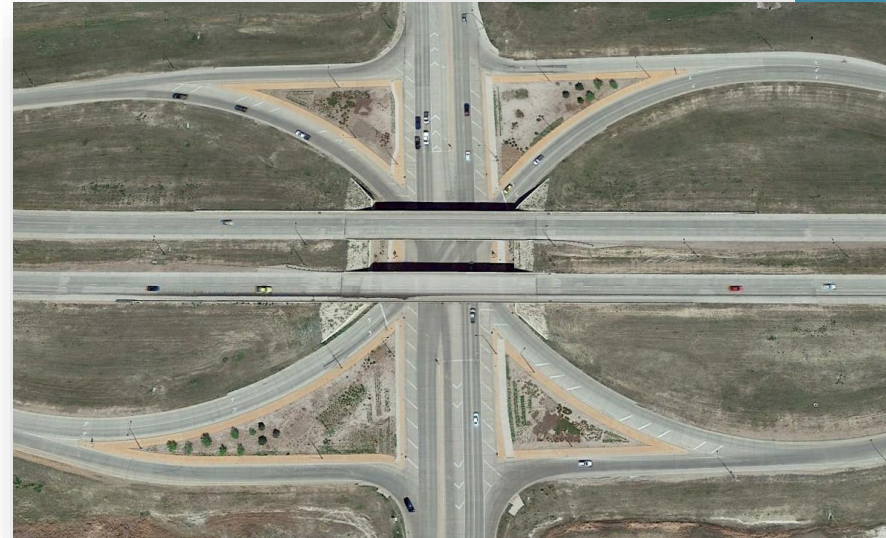
Key Design Features

- Grade-separated interchange
- US16 over US16B/Catron Blvd
- Uninterrupted flow on US16
- Intersection on US16B/Catron Blvd
- Provides greatest separation from Les Hollers Way and Healing Way (~1,100 ft.)
- Requires closure of Addison Ave & Tucker St access

Primary Build Option Variations

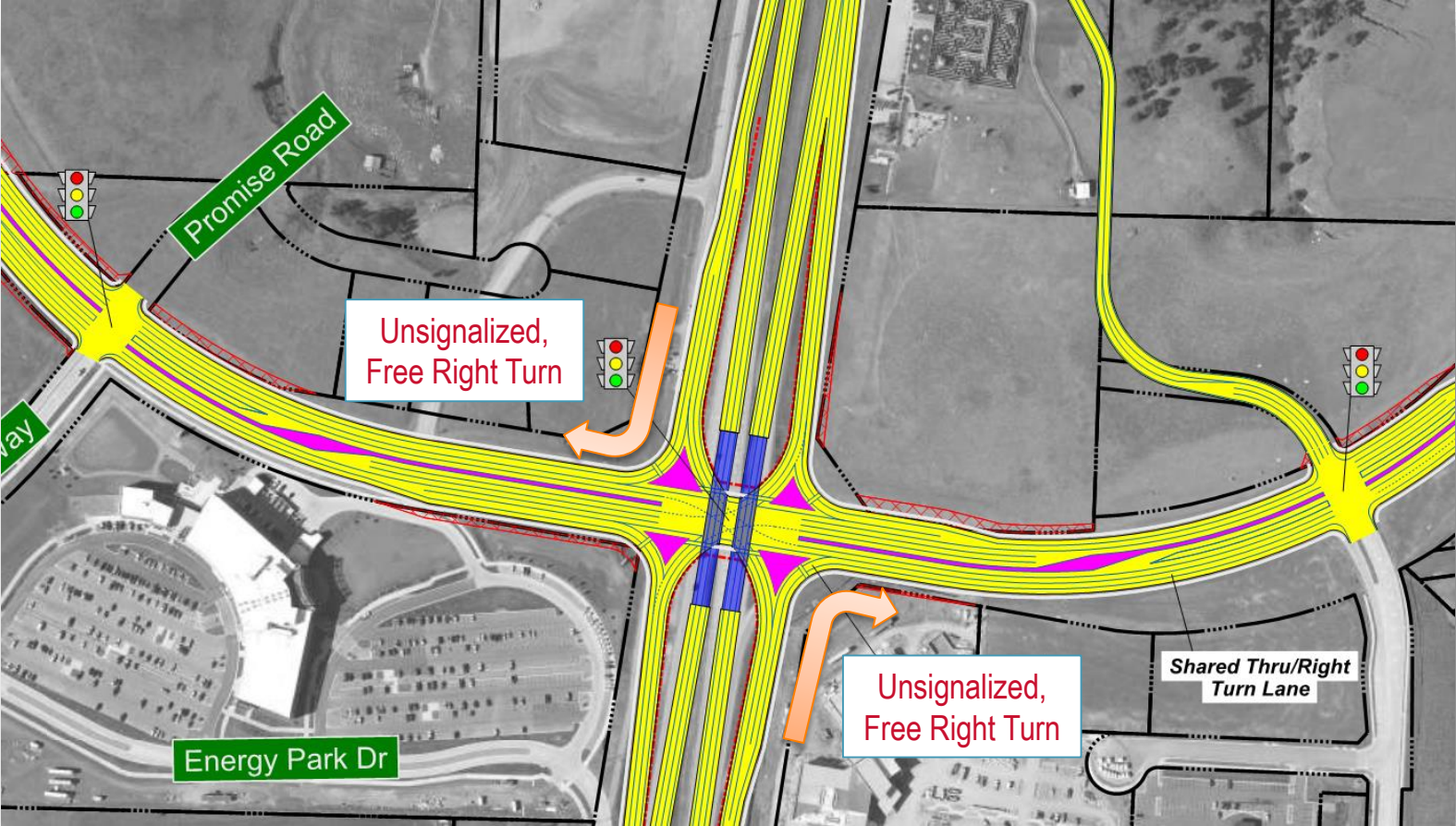
- 1.1: Free NB and SB Right Turn Lanes
- 1.2: Signalized NB and SB Dual Right Turn Lanes

Typical SPI Example:
I-90 and North Street



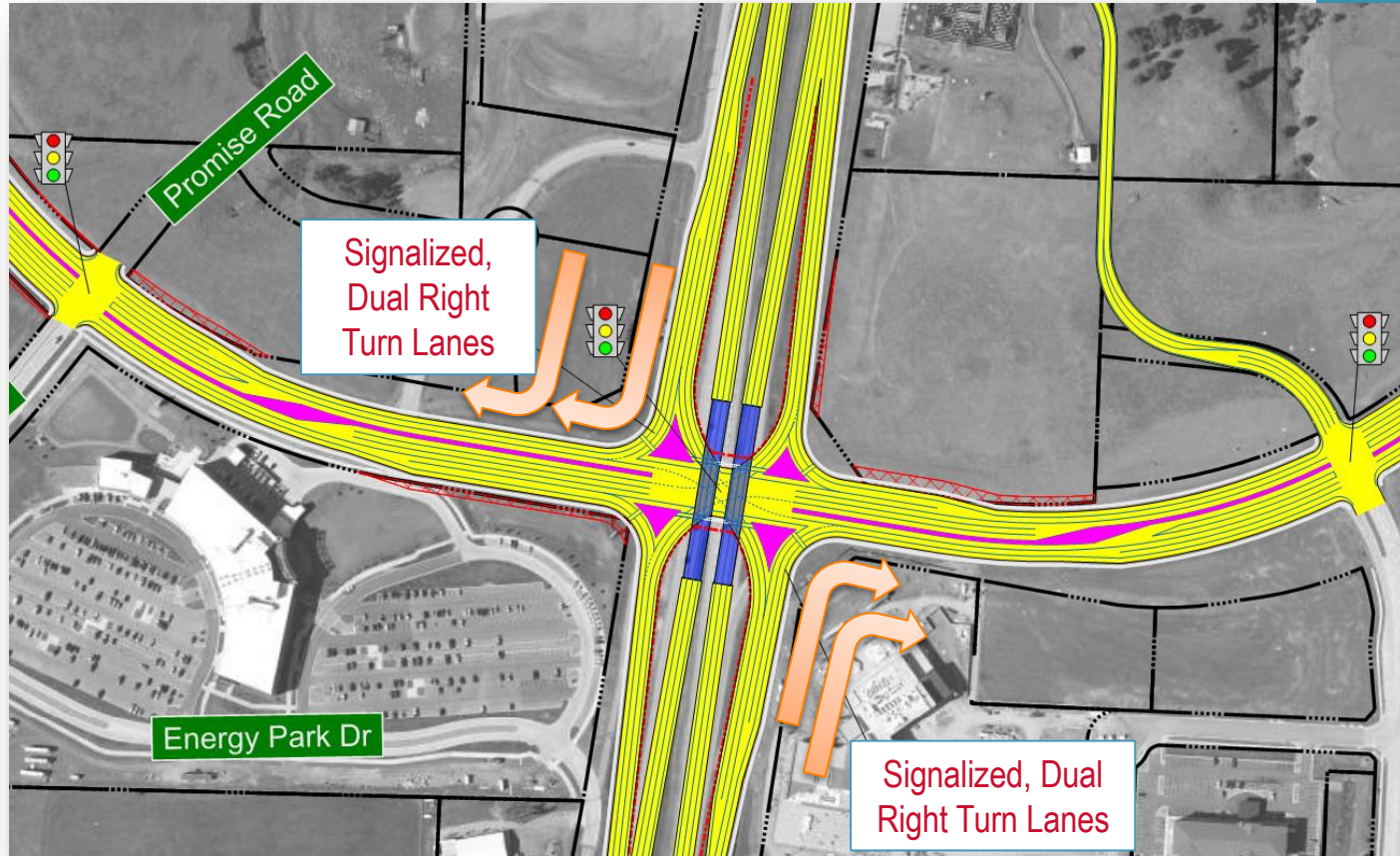
Aerial: Google Earth

SPI 1.1: Free NB and SB Right Turn Lanes



SPI 1.2: Signalized, Dual NB and SB Right Turn Lanes

- Provides a signal-controlled gap in traffic for downstream weave movement.
- No eastbound or westbound acceleration lane.



Single Point Interchange Alternative 1.1a
(North/South US 16 Right Turns Unsignalized)



US 16

Catron Blvd

Single Point Interchange Alternative 1.2a
(North/South US 16 Right Turns Signalized)



Build Option 2: Displaced Left Turn (DLT) Intersection

Key Design Features

- At-grade intersection
- Interrupted flow on US16
- Left turns occur at upstream crossover intersection
 - Improves signal timing & overall operations
- Provides least separation from Les Hollers Way and Healing Way (~700 ft.)
- Allows consideration of maintaining access to Addison Ave & Tucker St

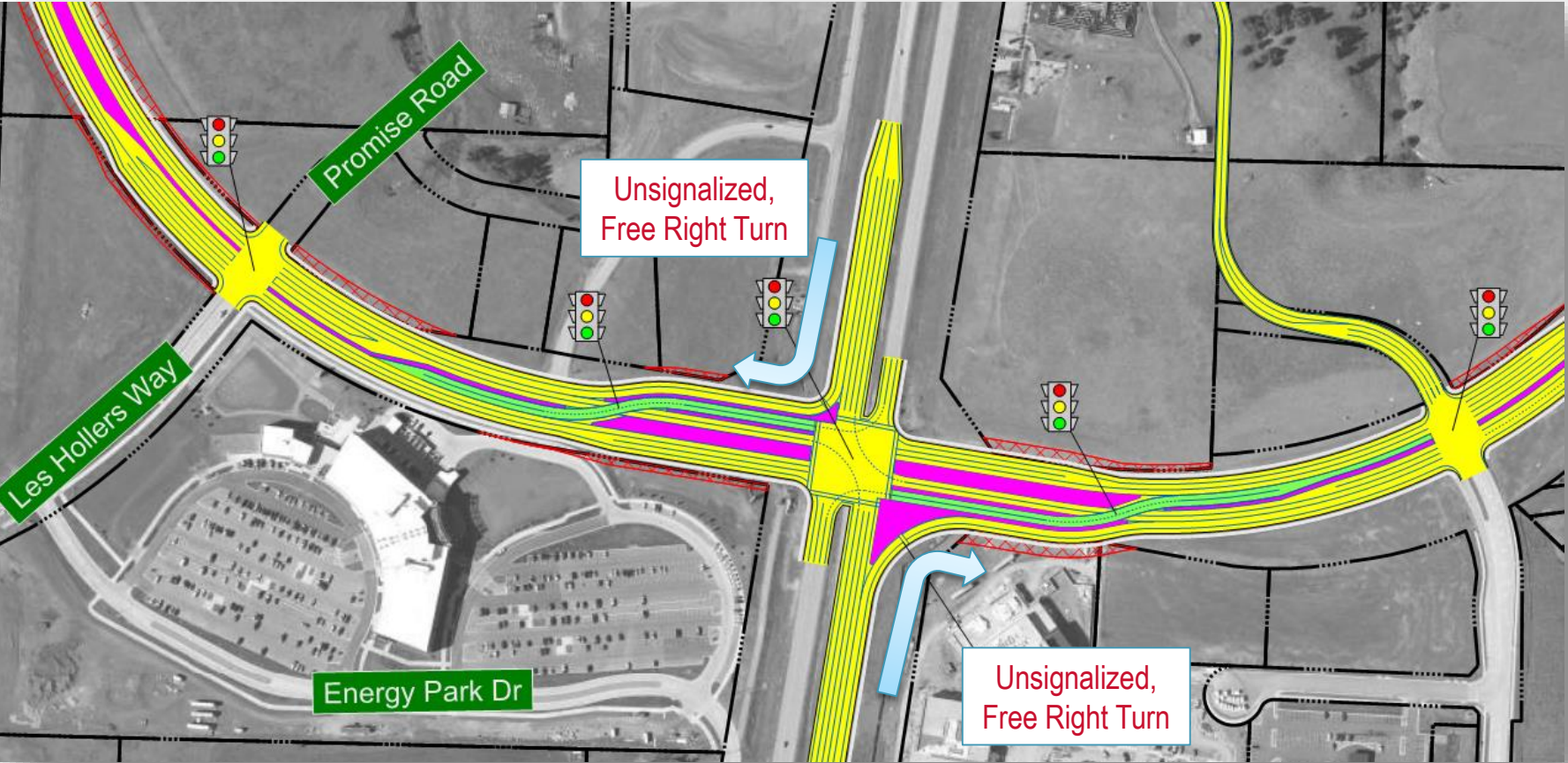
Primary Build Option Variations

- 2.1: Free NB and SB Right Turn Lanes
- 2.2: Signalized NB and SB Dual Right Turn Lanes
- 2.3: All right turns signalized at main intersection

DLT Example:
Madison Ave in
Loveland, CO

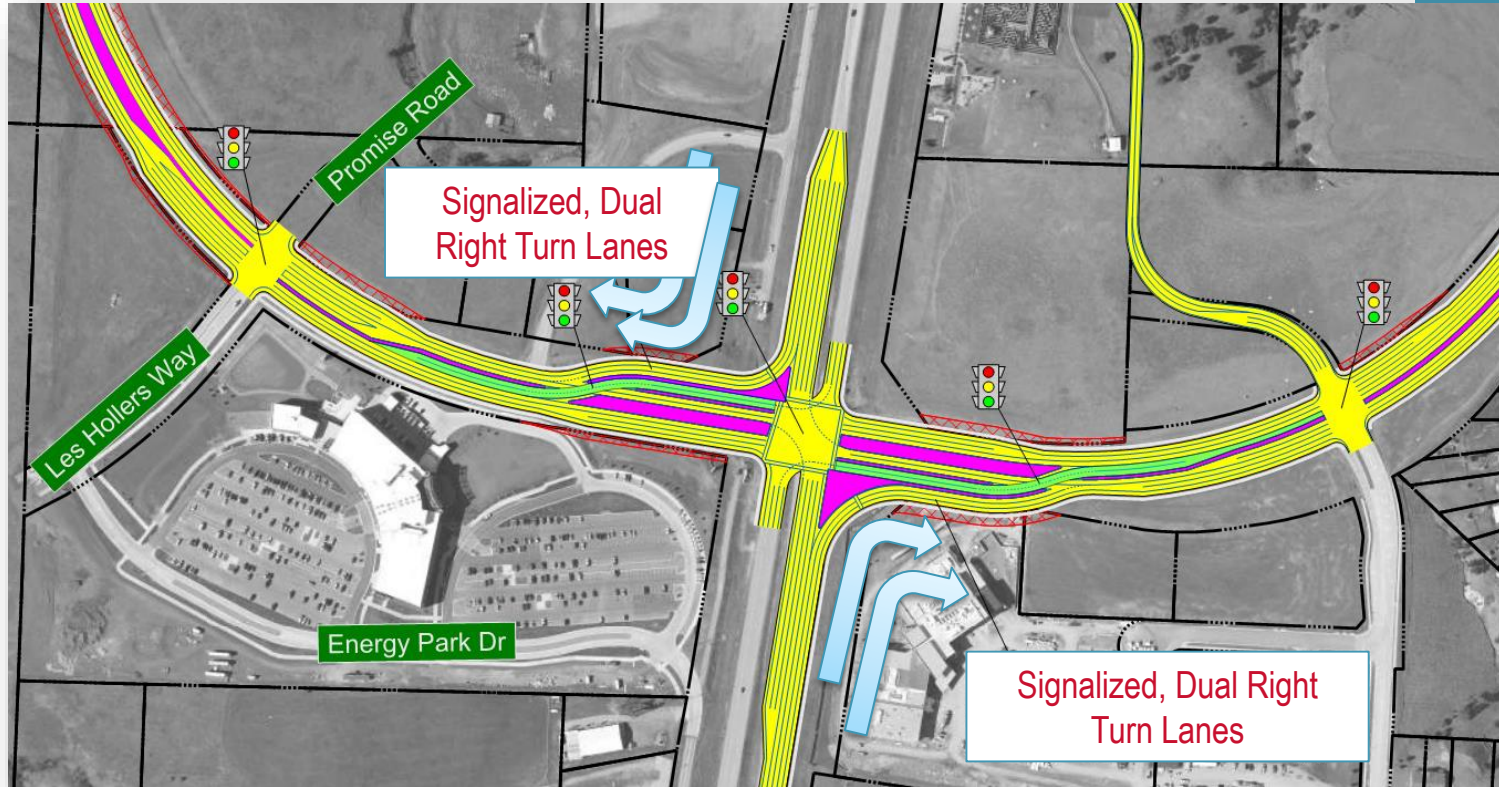


DLT 2.1: Free NB and SB Right Turn Lanes



DLT 2.2: Signalized, Dual NB and SB Right Turn Lanes

- Provides a signal-controlled gap in traffic for downstream weave movement.
- No eastbound or westbound acceleration lane.



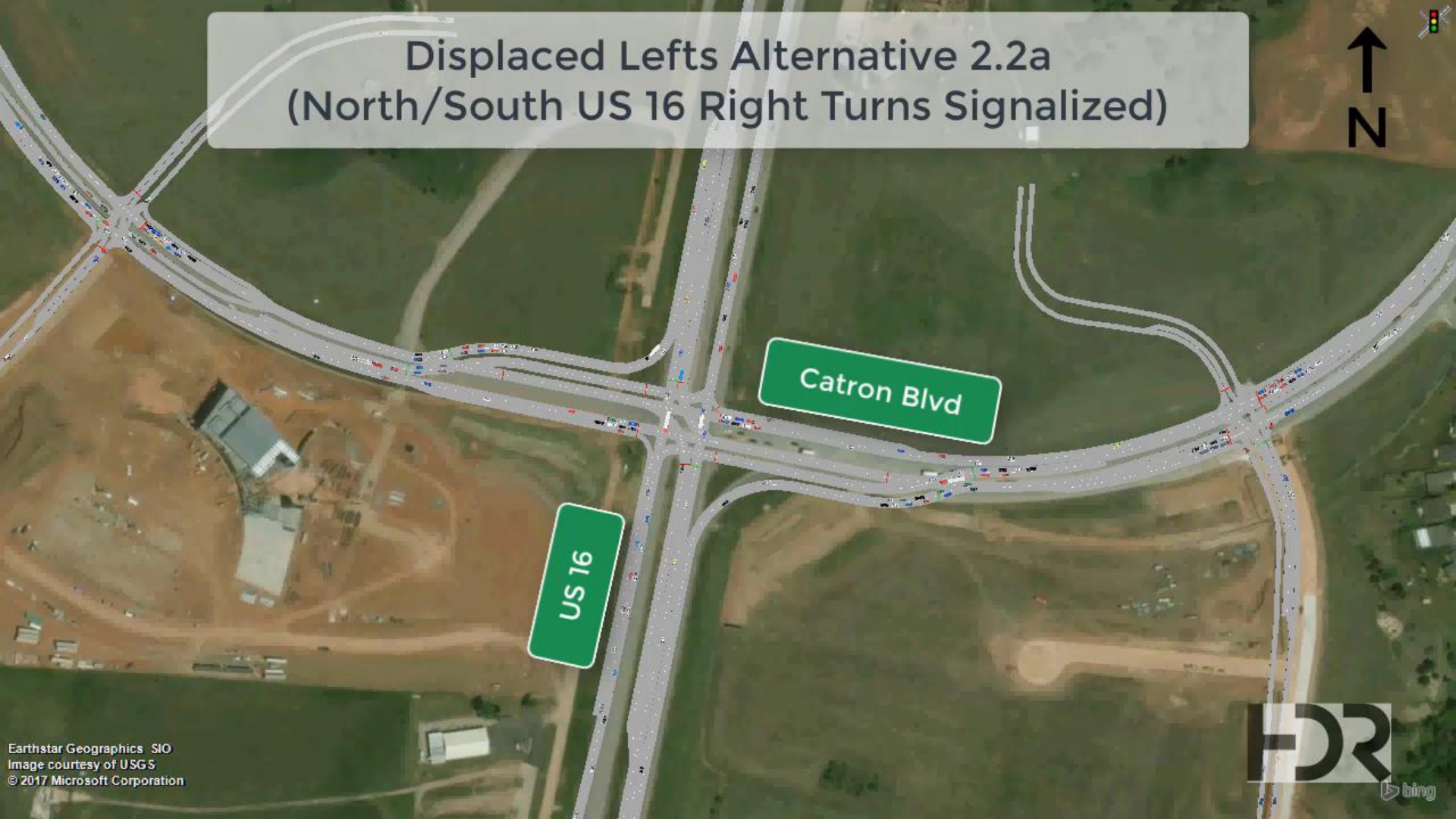
Displaced Lefts Alternative 2.1a
(North/South US 16 Right Turns Unsignalized)



US 16

Catron Blvd

Displaced Lefts Alternative 2.2a (North/South US 16 Right Turns Signalized)



Catron Blvd

US 16

Potential US16 Typical Sections and Speed

Each Build Option is compatible with a variety of cross-sections and does not necessarily dictate a future speed.

Examples being considered

- 4-lane divided - with depressed median
- 4-lane divided - with raised median
 - *Variety of cross-sectional features*
- Variations representing range of speeds ~45-55+ mph
- All incorporate pedestrian/bicycle connectivity
- May be applied singularly or in combination

- *Considerations include access density, traffic operations, safety, cross-sectional features, and goals for the facility.*



Build Option Access Summary

Promise Road – Potential future signalized intersection

- SPI: Design speed considerations
- DLT: OK

Tucker Street

- SPI: Closed (within ramp segment)
- DLT: Considered for further analysis

Addison Avenue

- SPI: Closed (within ramp segment)
- DLT: Considered for further analysis

Section Line Road – considered for further analysis



Preliminary Analysis Measure Overview

- 2050 Peak Hour (morning and afternoon) Traffic Operations
- Predictive Safety
- Construction Costs

2050 Peak Hour (Commute) Traffic Operations Summary

Intersection Delay	1. Single Point Interchange	2. Displaced Left Turn Intersection
Main Intersection Delay & LOS	<i>LOS C</i> <i>< 35 sec delay</i>	<i>LOS C</i> <i>< 35 sec delay</i>
'Total' Intersection Delay	22 – 33 sec	28 – 37 sec

Travel Time	1. Single Point Interchange	2. Displaced Left Turn Intersection
US16 Corridor Travel Time	<i>120 – 130 sec</i>	140 – 155 sec
Area Travel Time (<i>microsimulation analysis</i>)	<i>85 – 90 sec</i>	95 – 105 sec

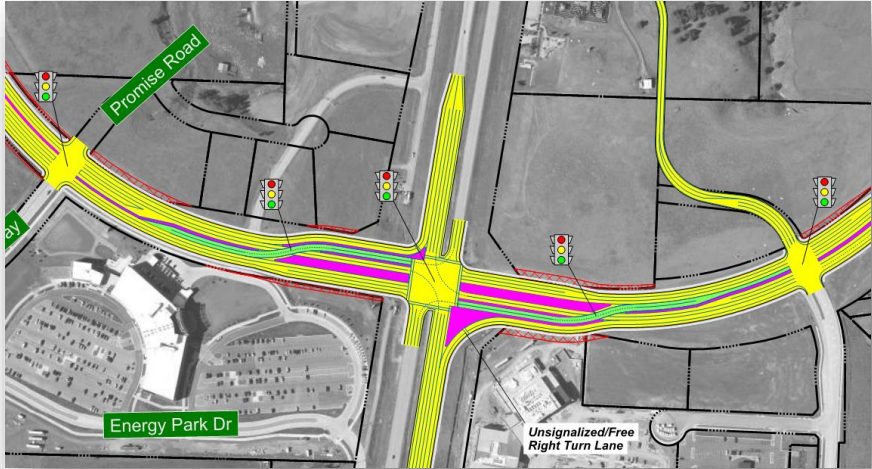
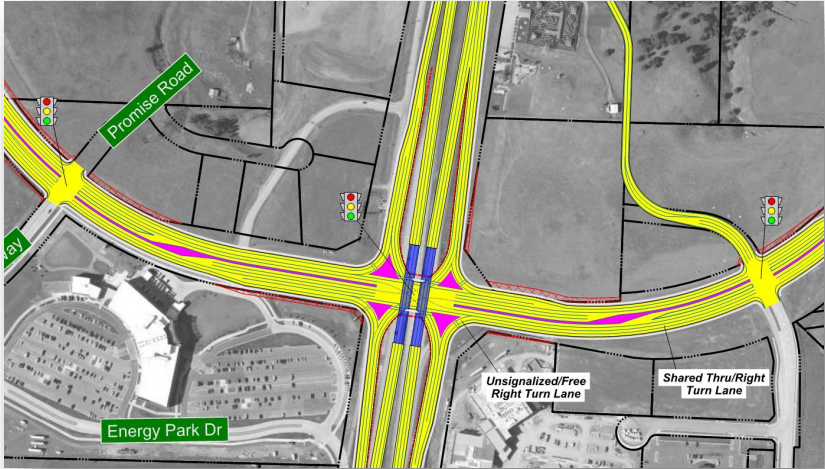
Predictive Safety Summary (25 years)

- *Predicted reduction in crashes based on geometric modifications and future-year traffic volumes.*

Injury Crashes	1. Single Point Interchange	2. Displaced Left Turn Intersection	<i>No-Build Condition</i>
Addison & Tucker Closed	<i>26% reduction</i>	23% reduction	<i>Baseline</i>
Addison & Tucker Open	n/a	10% reduction	

Cost Summary

	1. Single Point Interchange	2. Displaced Left Turn Intersection
Construction + ROW Cost	\$29M - \$30M	\$14M - \$18M



US16/Neck Yoke Road Intersection: Draft Purpose and Need

- Purpose: To improve safety and access management in the area of Neck Yoke Road.
- Needs:
 - High weighted crash rate (severe crashes)
 - Multiple access points
 - Long-term traffic operations

Build Options

- Reduced Conflict Intersection (RCI)
- Signalized Intersection
- *Both include access consolidation to a single access point.*



Build Option 1: Reduced Conflict Intersection (RCI)

Key Design Features

- $\frac{3}{4}$ access at main intersection w/ U-turns.
 - *Eliminates high severity conflict point.*
- Minimal impact to US16 through traffic
 - US16 through traffic does not stop.

Build Options

- 1.1: at Neck Yoke Road
- 1.2: at Central Driveway
- 1.3: at Central Driveway with US16 Realignment

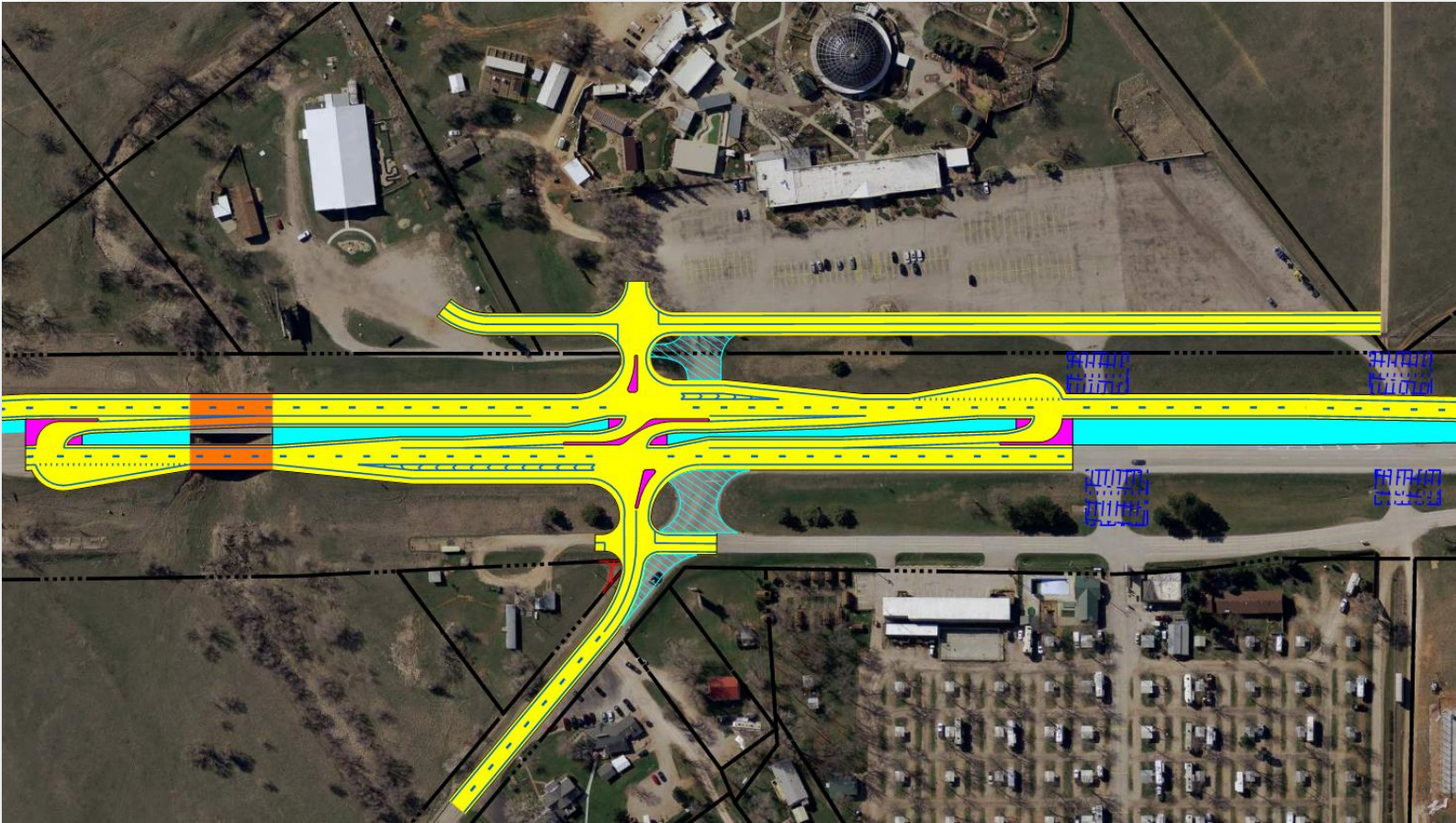
U-Turn

$\frac{3}{4}$ Main Intersection

U-Turn

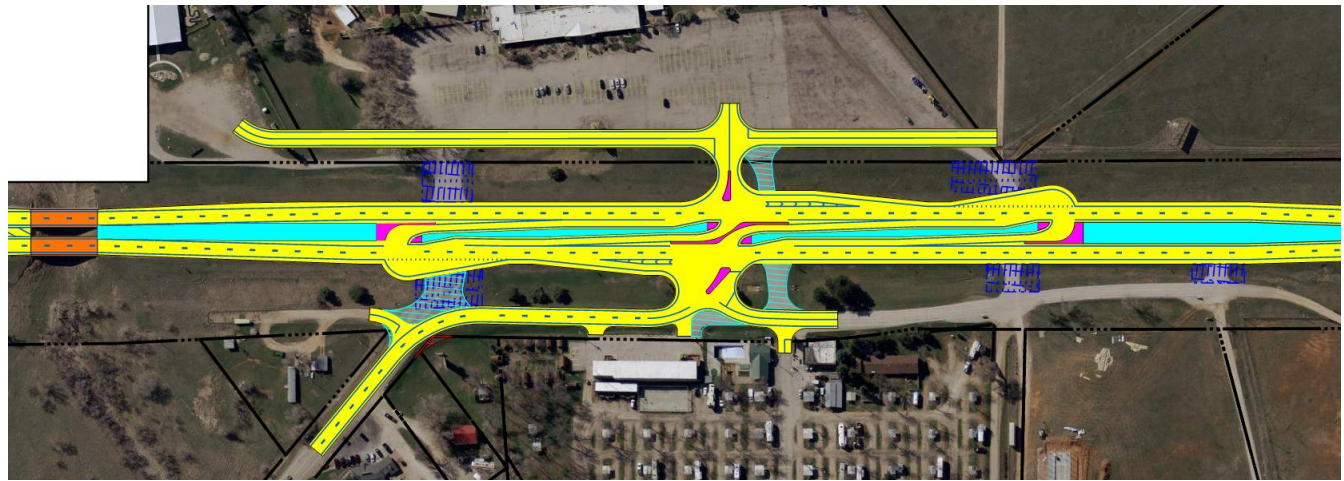
RCI Example:
US169 in Le Sueur, MN

RCI 1.1: At Neck Yoke Road

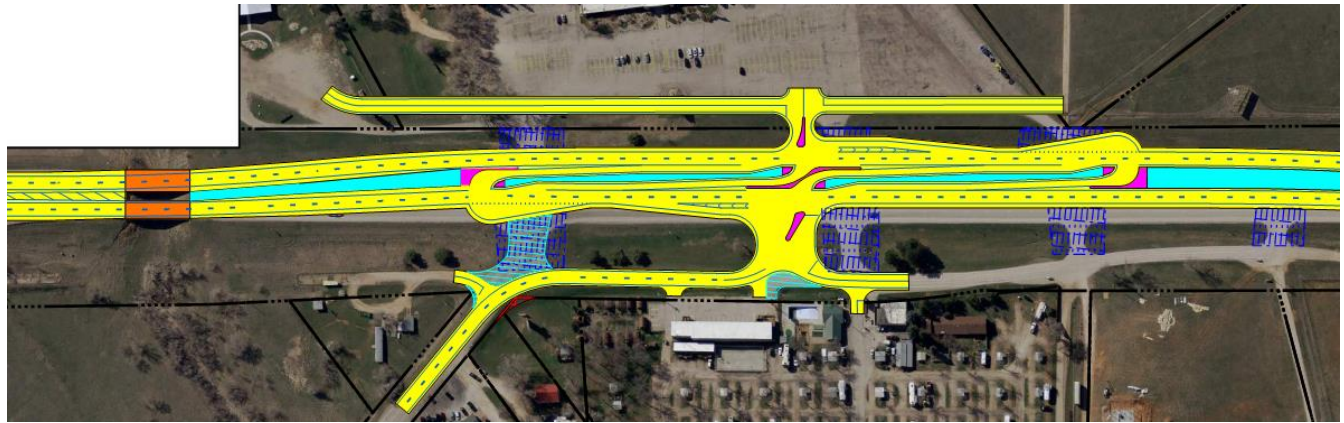


RCI 1.2 and 1.3: At Central Driveway

On current US16 alignment



US16 alignment shifted towards Reptile Gardens



Build Option 2: Signalized Intersection

Key Design Features

- Signalized, full access intersection.
- US16 traffic may need to stop due to signal.
- Additional lane needed to address lane utilization and trucks stopping/accelerating at bottom of hill.

Build Options

- 2.1: at Neck Yoke Road
- 2.2: at Central Driveway

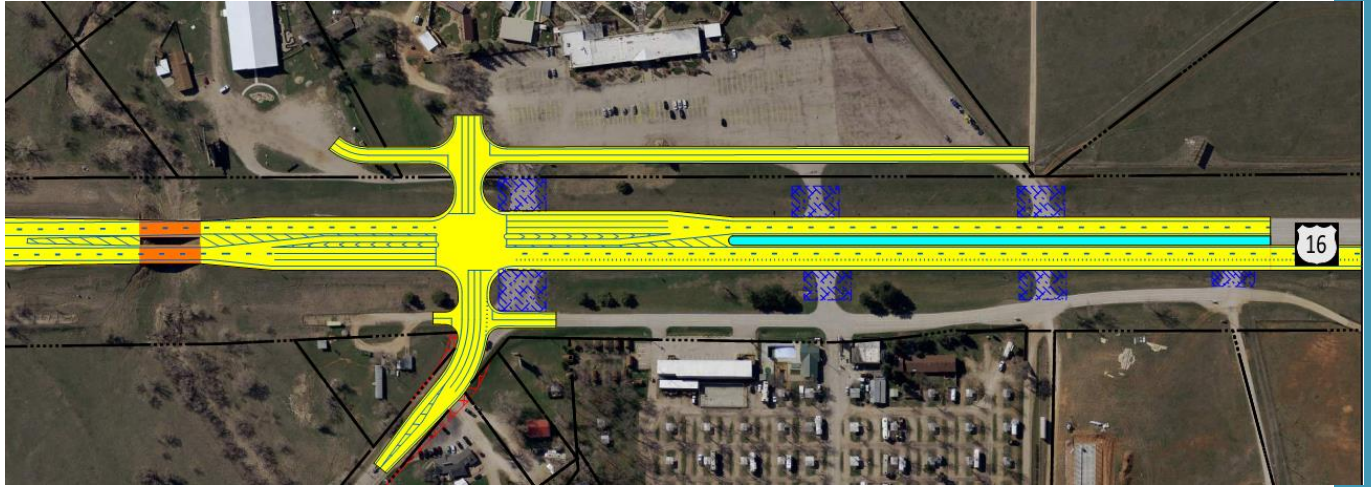


Signalized Intersection Truck/Car
Lane Utilization Example
Hwy 2, Lincoln, NE

Signal 2.1 and 2.2: Signalized Intersections

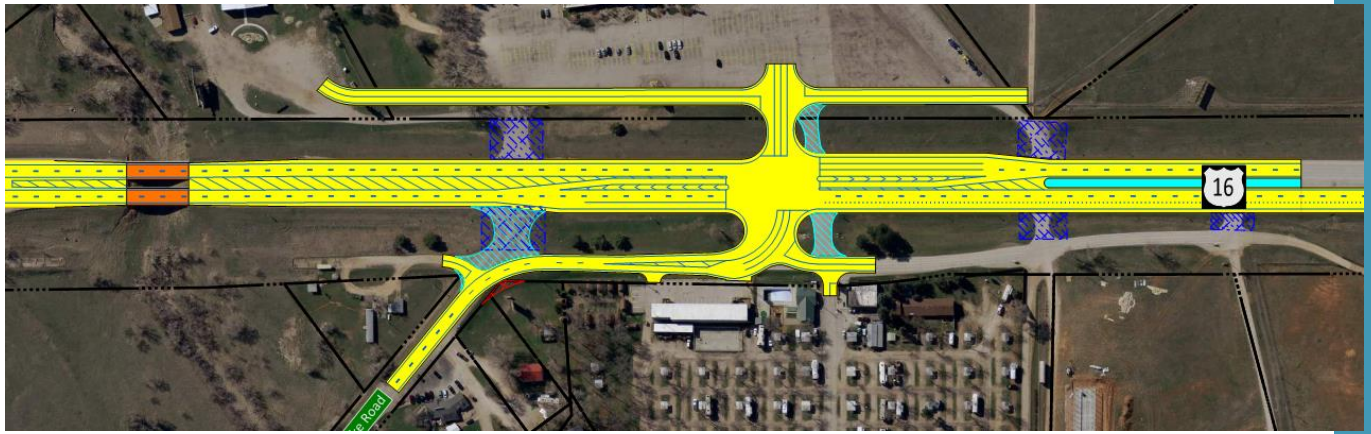
At Neck Yoke Road Intersection

- Eastbound third lane needed



At Central Driveway

- Eastbound third lane needed



2050 Peak Hour Traffic Operations Summary

	1. Reduced Conflict Intersection	2. Signalized Intersection
Main Intersection Delay & LOS	<i>LOS A < 10 sec delay</i>	LOS B < 20 sec delay
'Total' Intersection Travel Time	<i>4 – 8 sec</i>	15 – 19 sec
<i>US16 traffic need to stop?</i>	<i>NO</i>	Yes
<i>Additional through lane needed?</i>	<i>NO</i>	Yes

Predictive Safety Summary (25 years)

- *Predicted reduction in crashes based on geometric modifications and future-year traffic volumes.*

Injury Crashes	1. Reduced Conflict Intersection	2. Signalized Intersection	<i>No-Build Condition</i>
1 access (main)	66% reduction	59% reduction	<i>Baseline</i>

- *When comparing the 'main access treatments', a signalized intersection results in over 2x more crashes than an RCI.*

Cost Summary

	1. Reduced Conflict Intersection	2. Signalized Intersection
Construction + ROW Cost	\$4.8M - \$5.4M	\$5.5M - \$5.7M

Next Steps...

- Intersection Build Options: compile feedback, refine build options, complete analysis, and develop recommendations (early 2020)
- Corridor Concepts: continue developing concepts for summer 2020 public meeting



Today's Open House

Intersection Build Options

- Layout boards
- Preliminary evaluation measure boards
- Environmental boards
- Animations
- Reduced conflict intersection video

Initial US16 Corridor Concepts

- Preliminary layouts of potential concepts south of Neck Yoke Road

Thank You!

- Please provide feedback on corridor transportation needs
 - *Deadline: December 24, 2019*
- Study website: www.us16corridor.com
- Next Meeting: Summer 2020

Study Contacts

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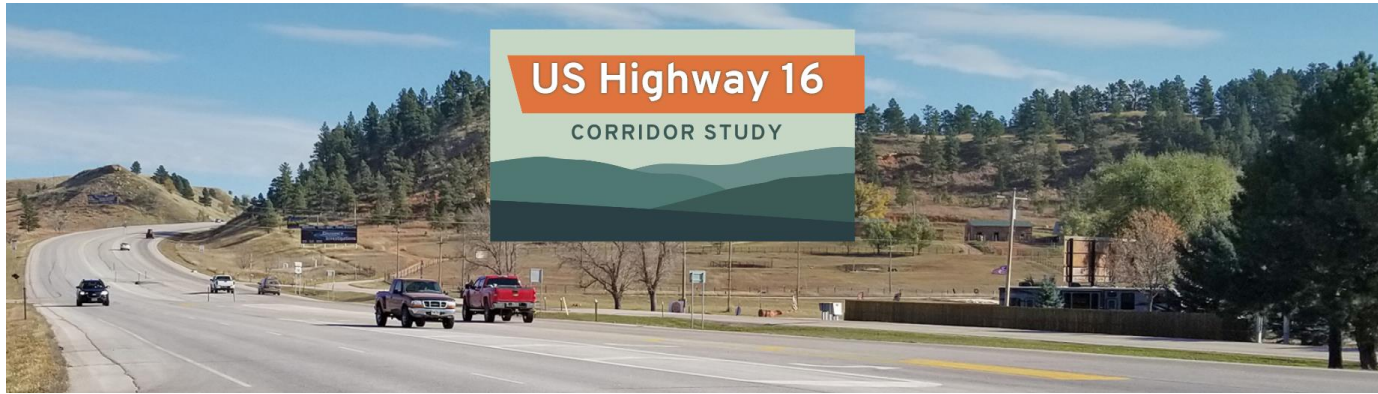
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