

# I-229 EXIT 9 (BENSON ROAD) INTERCHANGE STUDY & ENVIRONMENTAL DOCUMENT

PL0100(82) P3616, PCN 06MF

## Public Informational Meeting

October 25<sup>th</sup>, 2018

5:30 pm to 6:30 pm

Water Reclamation Facility



# PRESENTATION AGENDA

- Project History
- Environmental Process
- Purpose and Need / Discussion
- Current Study Evaluation Concepts and Process
- Next Steps



# Corridor Study Area Map

## I-229 Major Investment

### Corridor Study:

Solberg Avenue Overpass to  
60<sup>th</sup> Street N Overpass

Duration from 2013 – 2017

5 Interchange Studies

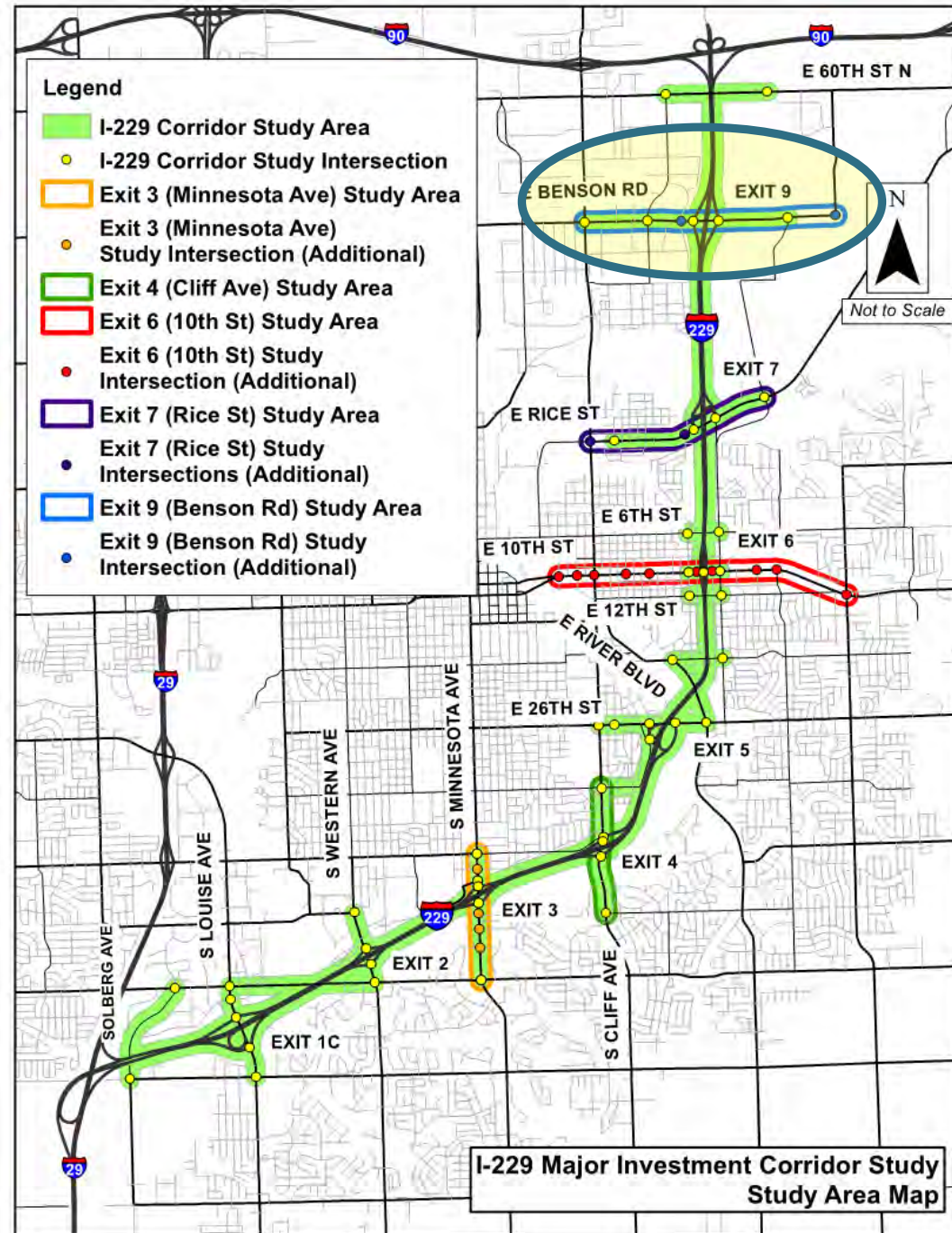
Overall I-229 Study

<http://www.i229study.com>

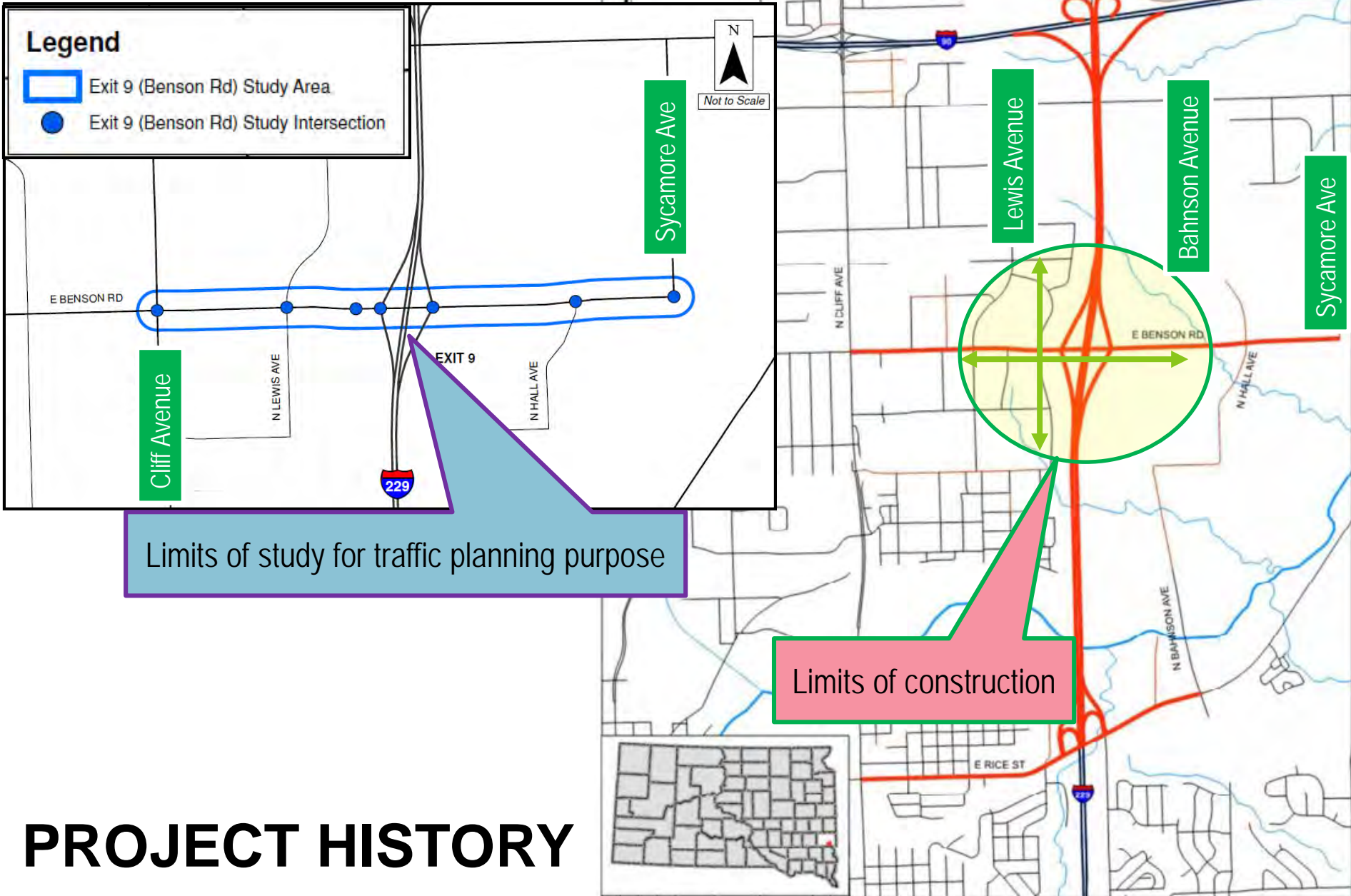
### Project Purpose:

Define and Prioritize  
Improvements required for the  
corridor over the next 30-40  
years

## PROJECT HISTORY



# Study Area Map



## PROJECT HISTORY



# BENSON ROAD CORRIDOR OVERVIEW

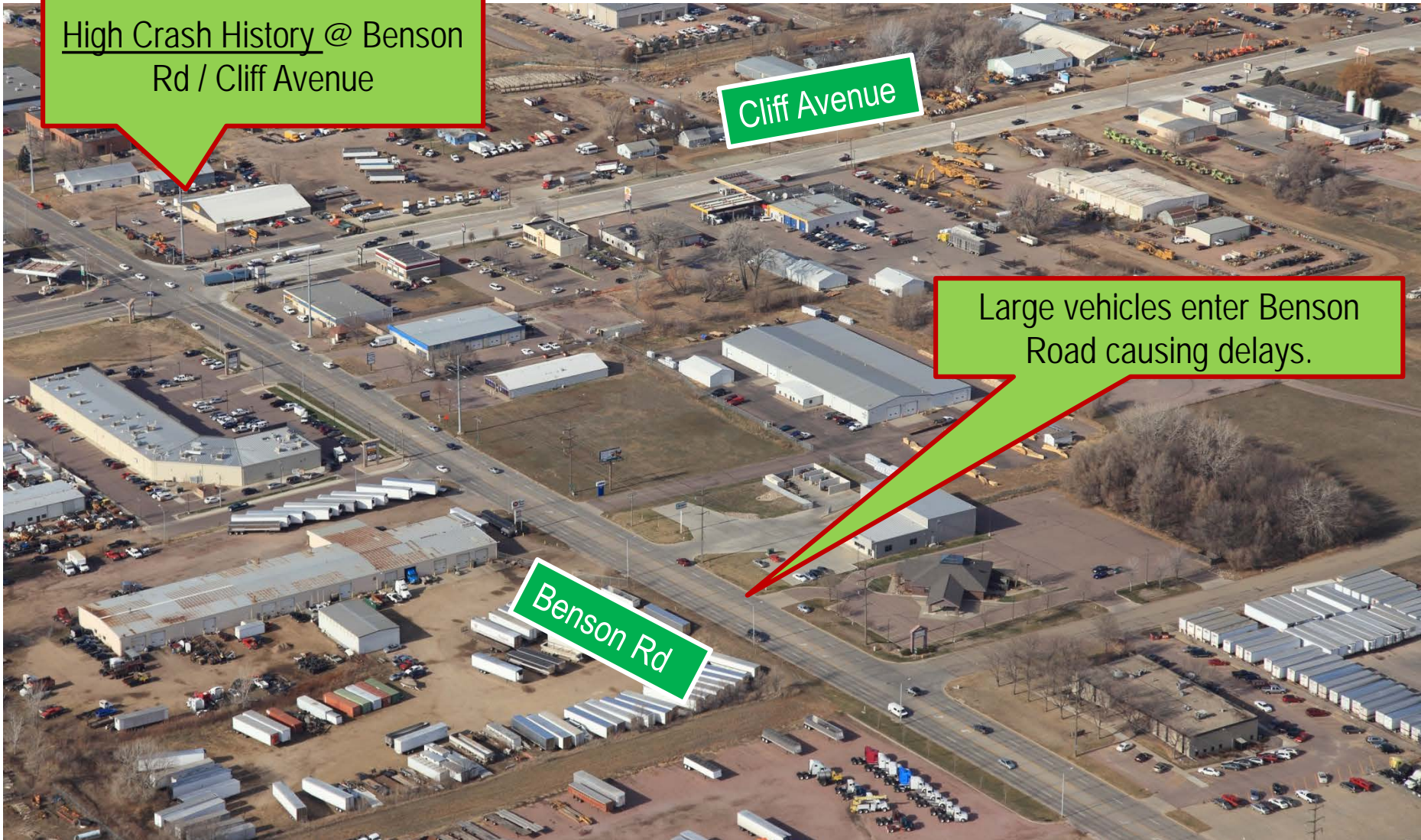
High Crash History @ Benson Rd / Cliff Avenue

Cliff Avenue

Large vehicles enter Benson Road causing delays.

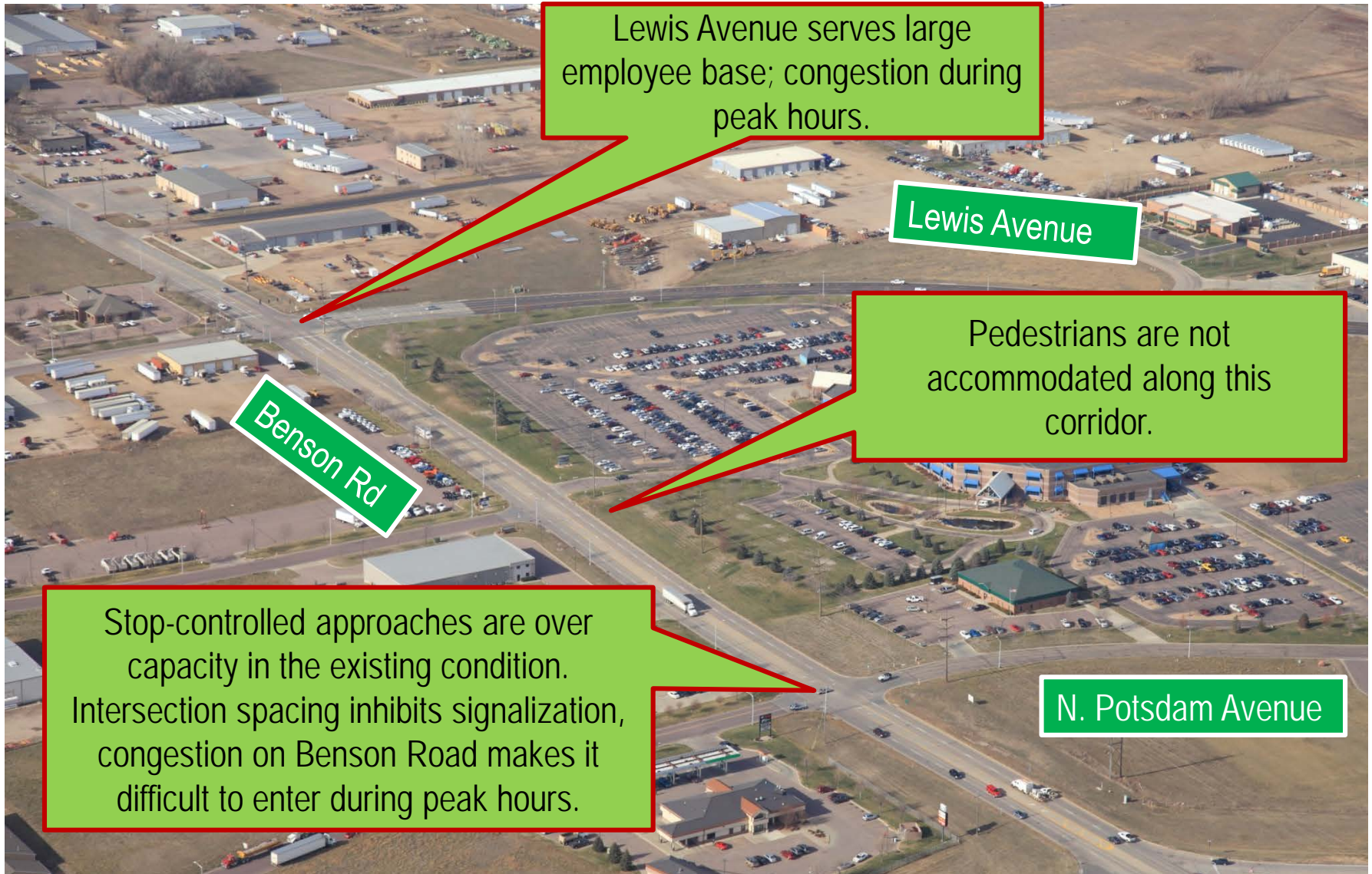
Benson Rd

## PROJECT HISTORY





# BENSON ROAD CORRIDOR OVERVIEW



Lewis Avenue serves large employee base; congestion during peak hours.

Lewis Avenue

Pedestrians are not accommodated along this corridor.

Benson Rd

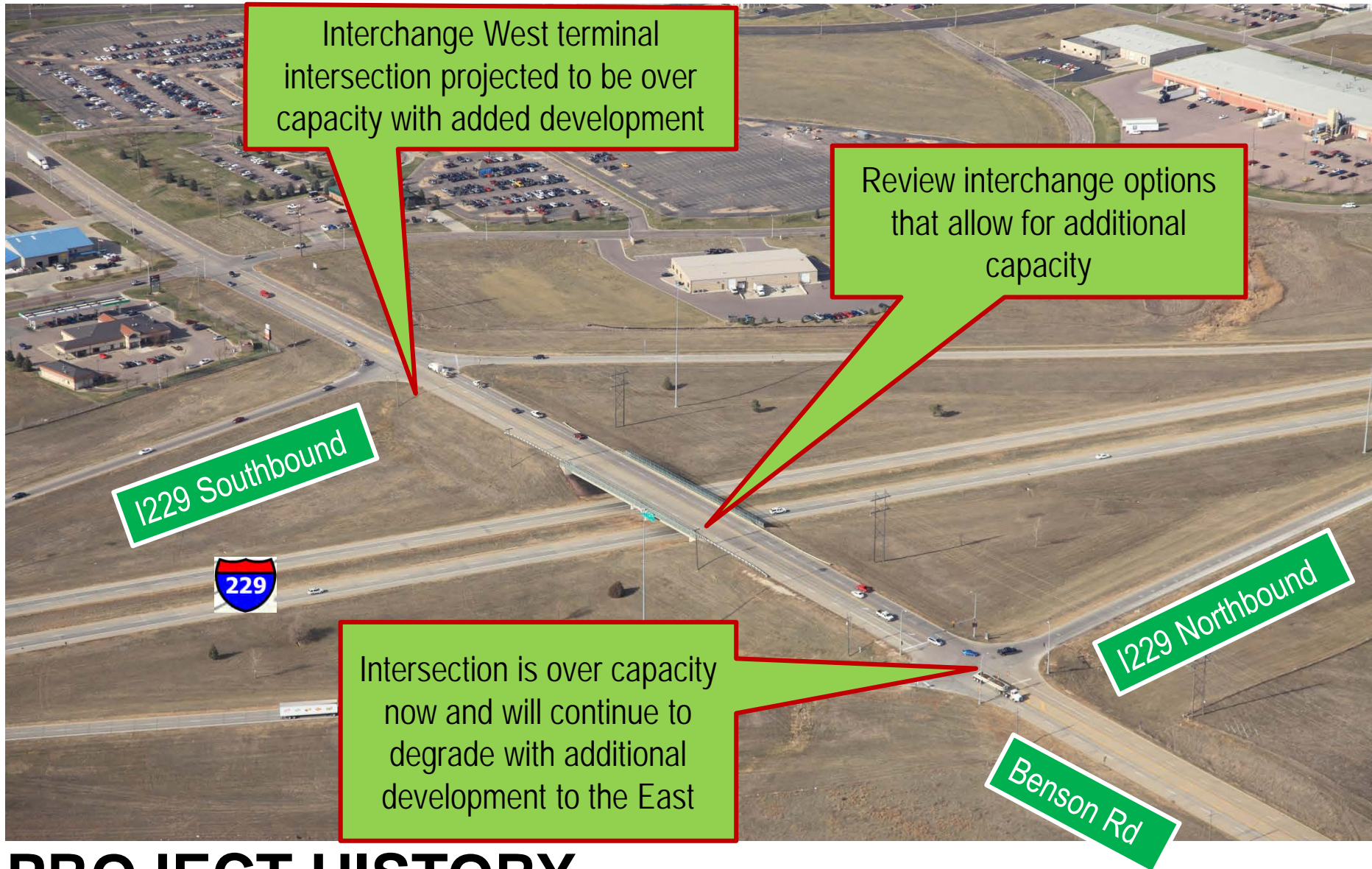
Stop-controlled approaches are over capacity in the existing condition. Intersection spacing inhibits signalization, congestion on Benson Road makes it difficult to enter during peak hours.

N. Potsdam Avenue

## PROJECT HISTORY



# BENSON ROAD CORRIDOR OVERVIEW



Interchange West terminal intersection projected to be over capacity with added development

Review interchange options that allow for additional capacity

I229 Southbound



I229 Northbound

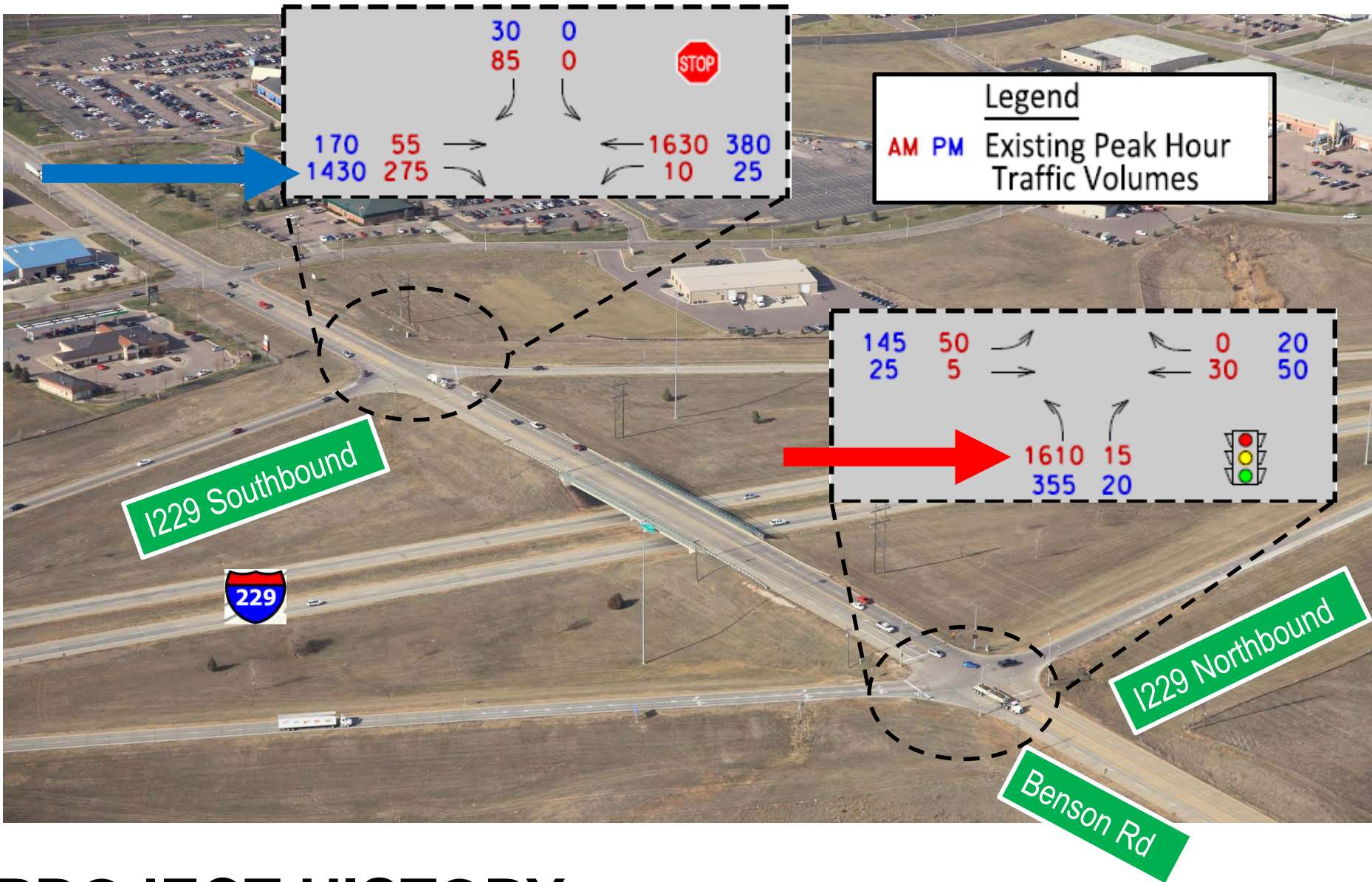
Intersection is over capacity now and will continue to degrade with additional development to the East

Benson Rd

## PROJECT HISTORY



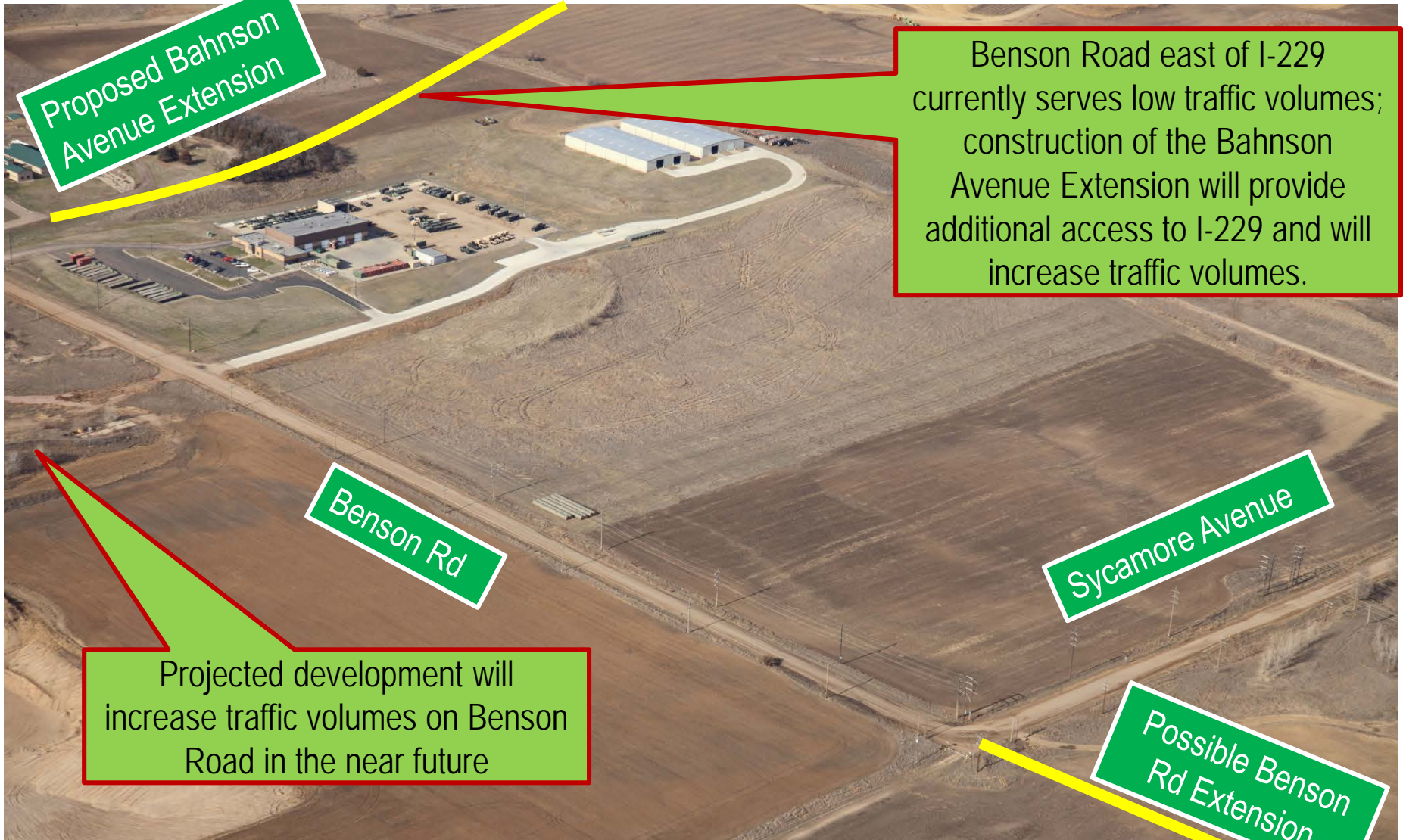
# EXISTING TRAFFIC VOLUMES



## PROJECT HISTORY



# BENSON ROAD CORRIDOR OVERVIEW



Proposed Bahnson Avenue Extension

Benson Road east of I-229 currently serves low traffic volumes; construction of the Bahnson Avenue Extension will provide additional access to I-229 and will increase traffic volumes.

Benson Rd

Sycamore Avenue

Possible Benson Rd Extension

Projected development will increase traffic volumes on Benson Road in the near future

## PROJECT HISTORY

# CONCEPT EVALUATION PROCESS

- Evaluation Factors:

Option	Description	Traffic Operations	Safety	Environmental	Property Impacts	Construction & ROW Cost	DRAFT Recommendation
Concept ID	Interchange and Corridor Type	<ul style="list-style-type: none"> <li>•Traffic Delay</li> <li>•Level of Service</li> <li>•Interchange Year of Failure</li> </ul>	Predicted Crash Reduction during 2012-2035	Potential impact to wetlands, historical resources, threatened and endangered species, public lands, and floodplains	Total Right of Way (ROW) Required and Acquisitions	Total Construction Cost (including ROW)	<p style="text-align: center;"><b>Advance</b> <b>or</b> <b>Eliminate</b></p>

- Evaluation Matrix to Compare Concepts
- Recommended Action

## PROJECT HISTORY

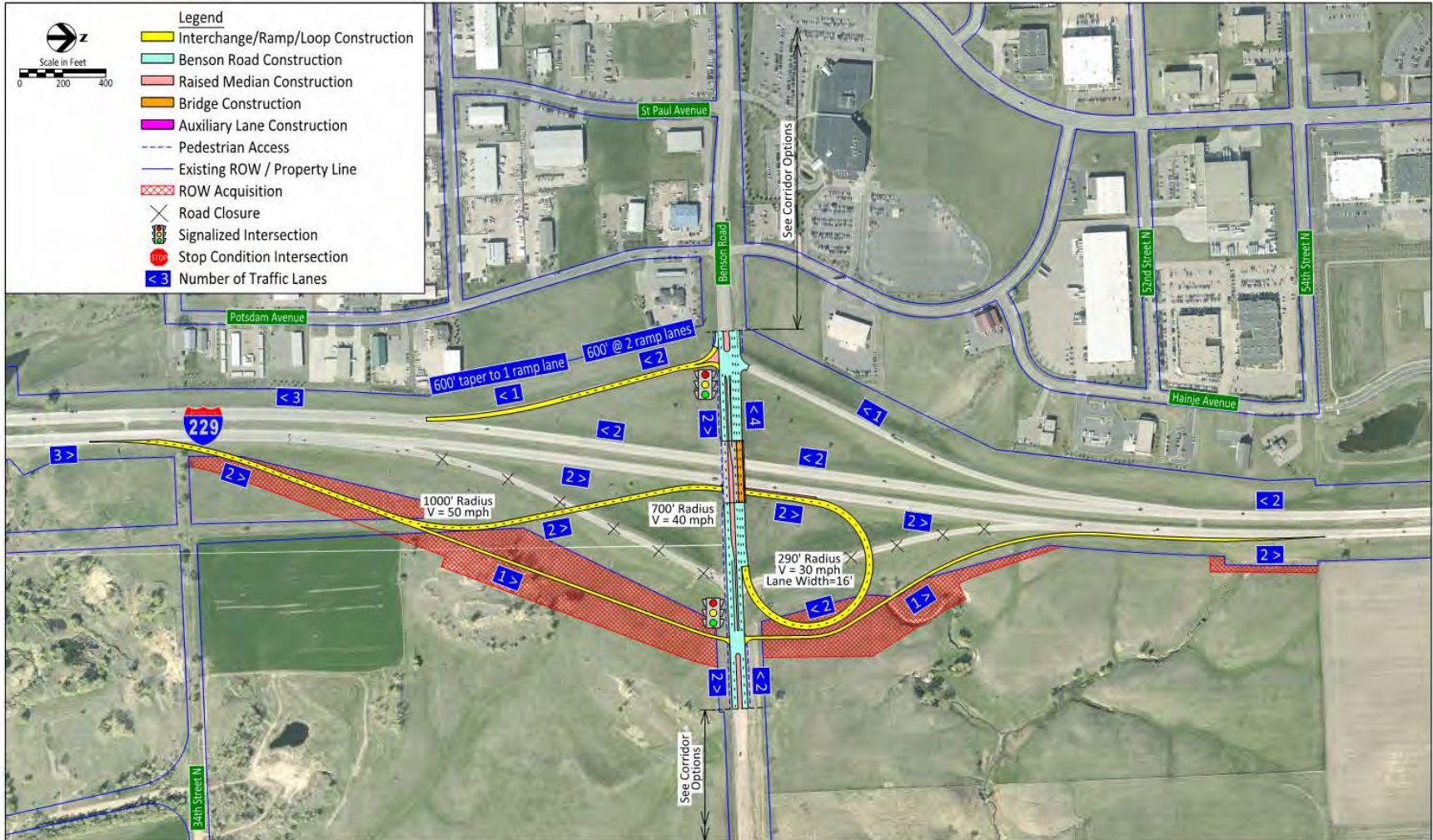






# CONCEPTS FOR FURTHER CONSIDERATION

## BENSON-1B



# PROJECT HISTORY

Benson Road Corridor  
2-Lane Northeast Quadrant Loop with 2-Lane SB On-Ramp

I-229 Major Investment Corridor Study

Sioux Falls, South Dakota

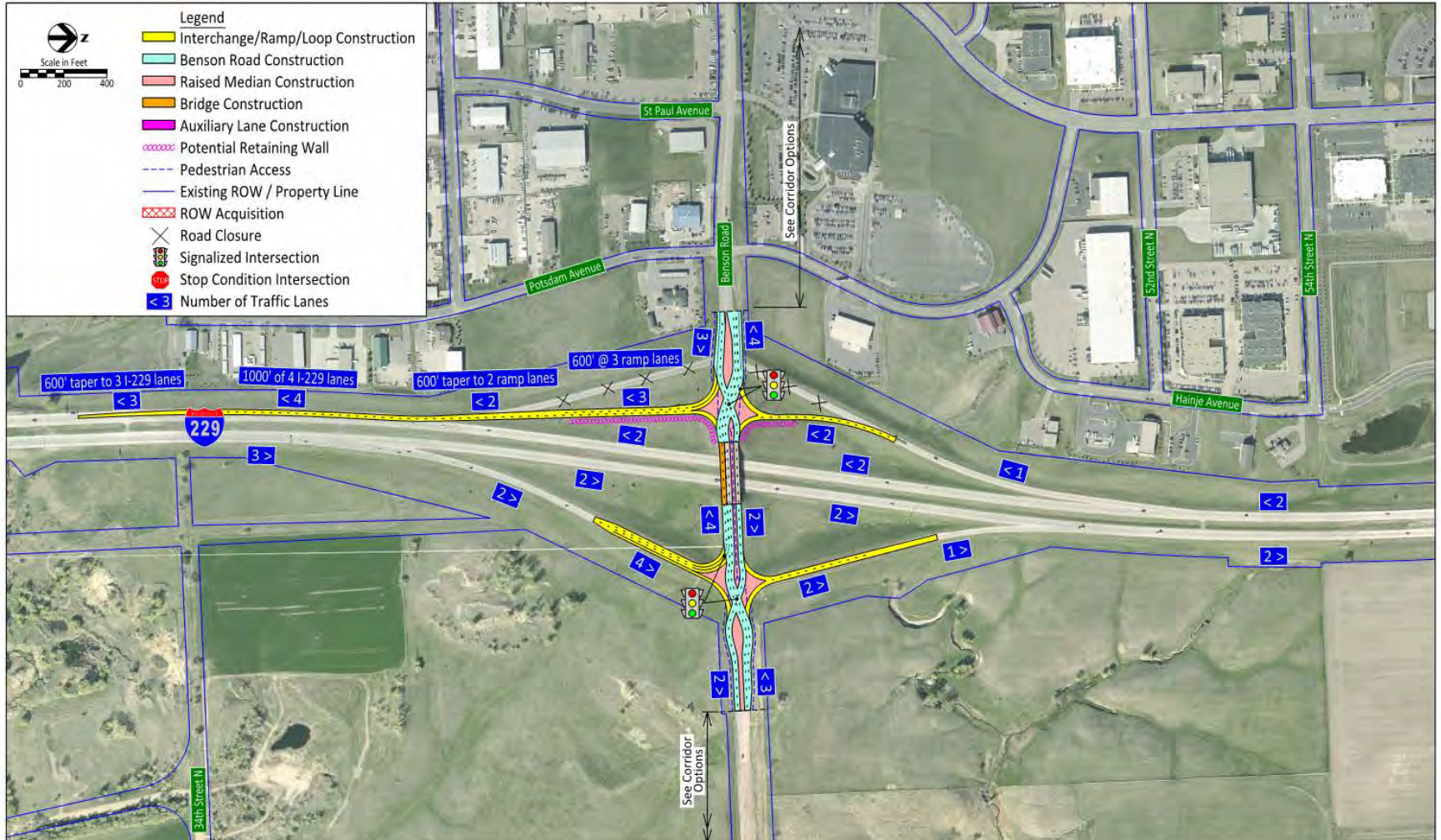
Figure  
Benson-1b

12/6/2016



# CONCEPTS FOR FURTHER CONSIDERATION

## BENSON-4



# PROJECT HISTORY

Benson Road Corridor  
Diverging Diamond Interchange  
I-229 Major Investment Corridor Study

Figure  
Benson-4  
Sioux Falls, South Dakota  
12/6/2016



# CONCEPTS FOR FURTHER CONSIDERATION

## BENSON IMPROVEMENTS



## PROJECT HISTORY



# BENSON ROAD PRELIMINARY PROJECT PRIORITY

- Benson Road Interchange and Corridor improvements = High Priority
- Project Development Process = 5 year timeline when initiated by SDDOT & City
  - Prepare Interchange Modification Justification Report and Environmental Document
  - Develop Project Design
  - Acquire Right of Way
  - Construction

# ENVIRONMENTAL PROCESS



**Consensus Building Process**

Implied Consent

Consensus on Evaluation

Consensus on Final Alternatives

Consensus on Purpose and Need

Consensus on Study Approach and Scope



# ENVIRONMENTAL PROCESS



Consensus Building Process

Consensus on Study Approach and Scope

Consensus on Purpose and Need

Consensus on Final

Cons

- Major Environmental Considerations
  - Wetlands / Streams / Floodplain
  - Land Use Impacts
  - Cultural Resource Findings
  - Economic Impacts
  - Environmental Conditions Noted
  - Input from the Public / Stakeholders

# PURPOSE AND NEED

**PROJECT PURPOSE:** To improve traffic operations and enhance mobility for other modes of transportation (i.e. Transit, Bikes, Pedestrians)

## **PROJECT NEED:**









- 1.) Capacity for existing and future traffic volumes
- 2.) lack of accessibility for non-automobile transportation

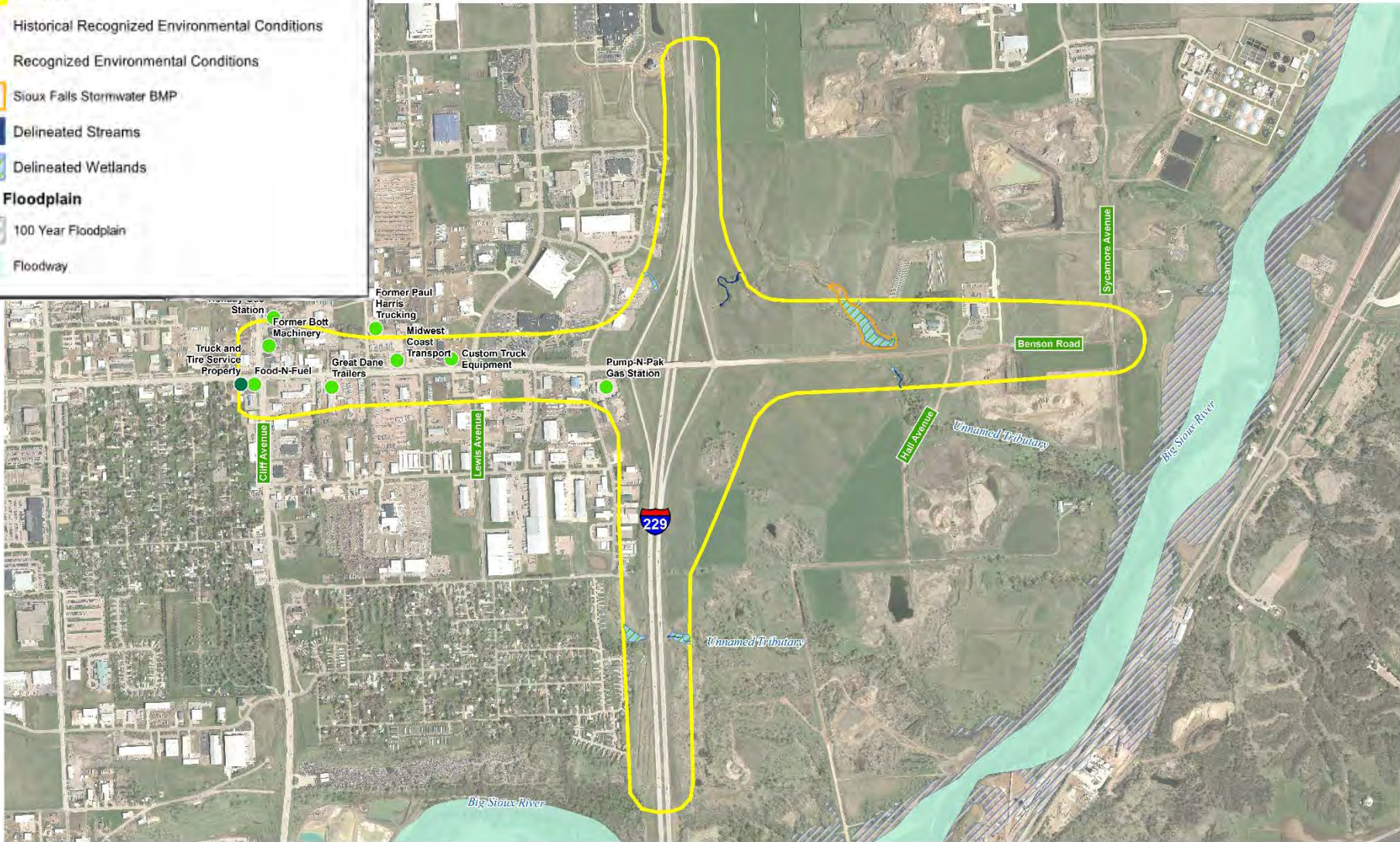
Location	Existing		2045 No-Build	
	AM	PM	AM	PM
Benson Road and Cliff Avenue	LOS B	LOS B	LOS B	LOS C
Benson Road and Lewis Avenue	LOS B	LOS C	LOS B	LOS C
Benson Road and Potsdam Avenue	<b>LOS F</b>	<b>LOS F</b>	<b>LOS F</b>	<b>LOS F</b>
Benson Road and I-229 SB Ramp Terminal	<b>LOS D</b>	LOS A	<b>LOS F</b>	<b>LOS F</b>
Benson Road and I-229 NB Ramp Terminal	<b>LOS F</b>	LOS B	<b>LOS F</b>	LOS B
Benson Road and Hall Avenue	LOS A	LOS B	<b>LOS F</b>	<b>LOS F</b>



# ENVIRONMENTAL CONSIDERATIONS

## LEGEND

-  Study Area
-  Historical Recognized Environmental Conditions
-  Recognized Environmental Conditions
-  Sioux Falls Stormwater BMP
-  Delineated Streams
-  Delineated Wetlands
- FEMA Floodplain**
-  100 Year Floodplain
-  Floodway



0 Miles 0.4

# EVALUATION CONCEPTS FOR CONSIDERATION

The Final Three (3) Options from I-229 Major Investment Corridor Study at Exit 9 were further screened, refined, and compared as part of this advanced document process. The final three (3) options after additional considerations turned into 7 total options....

- Figure I-1 – Alternative Scenario 1a
- Figure I-2 – Alternative Scenario 1b
- Figure I-3 – Alternative Scenario 1c
- Figure I-4 – Alternative Scenario 1d
- Figure I-5 – Alternative Scenario 1e
- Figure I-6 – Alternative Scenario 4a
- Figure I-7 – Alternative Scenario 4b



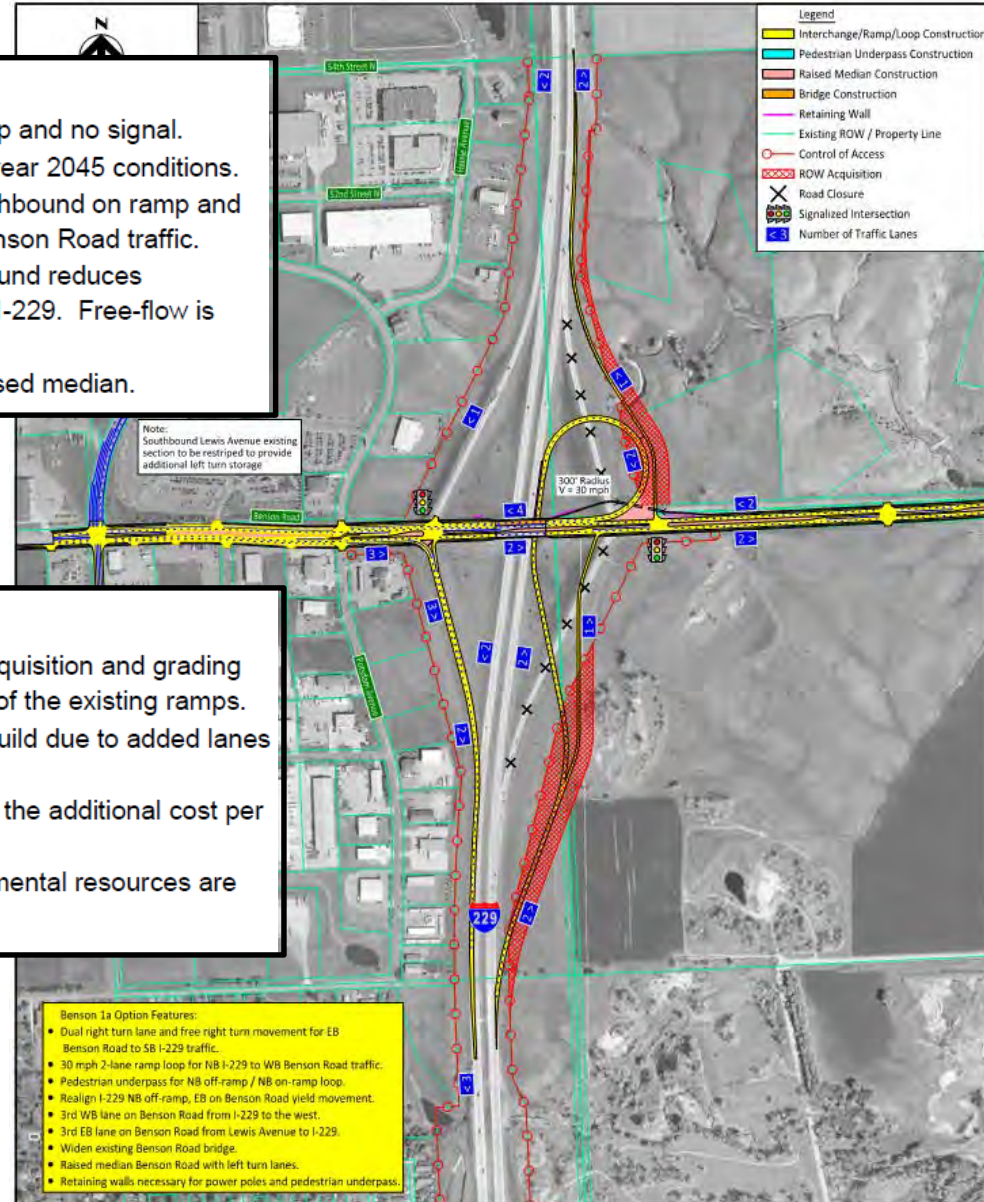
# OPTIONS FOR CONSIDERATION – Scenario 1a

## Benefits of Option 1a:

- Free flow northbound I-229 to westbound Benson Road due to loop and no signal.
- Traffic Level of Service (LOS) B is forecast at the interchange for year 2045 conditions.
- Pedestrian underpass reduces conflict with vehicles using the northbound on ramp and the larger volume of traffic on the loop ramp for the westbound Benson Road traffic.
- Free-flow dual rights on Benson Road eastbound to I-229 southbound reduces congestion/queuing on Benson Road between Lewis Avenue and I-229. Free-flow is only interrupted for pedestrian movement.
- Access management treatments considered with installation of raised median.

## Drawbacks of Option 1a:

- The construction of the ramps requires substantial right of way acquisition and grading costs associated with constructing a new loop ramp and removal of the existing ramps.
- Option 1a could result in additional crashes compared to the no-build due to added lanes and additional length on some of the ramps.
- Although the pedestrian underpass in this option reduces conflict, the additional cost per pedestrian and bicycle user is high.
- Due to the increased right of way and grading impacts to environmental resources are higher with this option compared to non-loop ramp options.



Drawn By: B. Miller  
Date: 5/14/2018  
Chk'd By: P. Sanow  
Date: 5/14/2018  
Revision: 10/8/2018



Alternative Scenario 1a  
2-Lane Northeast Quadrant Loop with 3-Lane SB On-Ramp

I-229 Exit 9 (Benson Road) IMJR

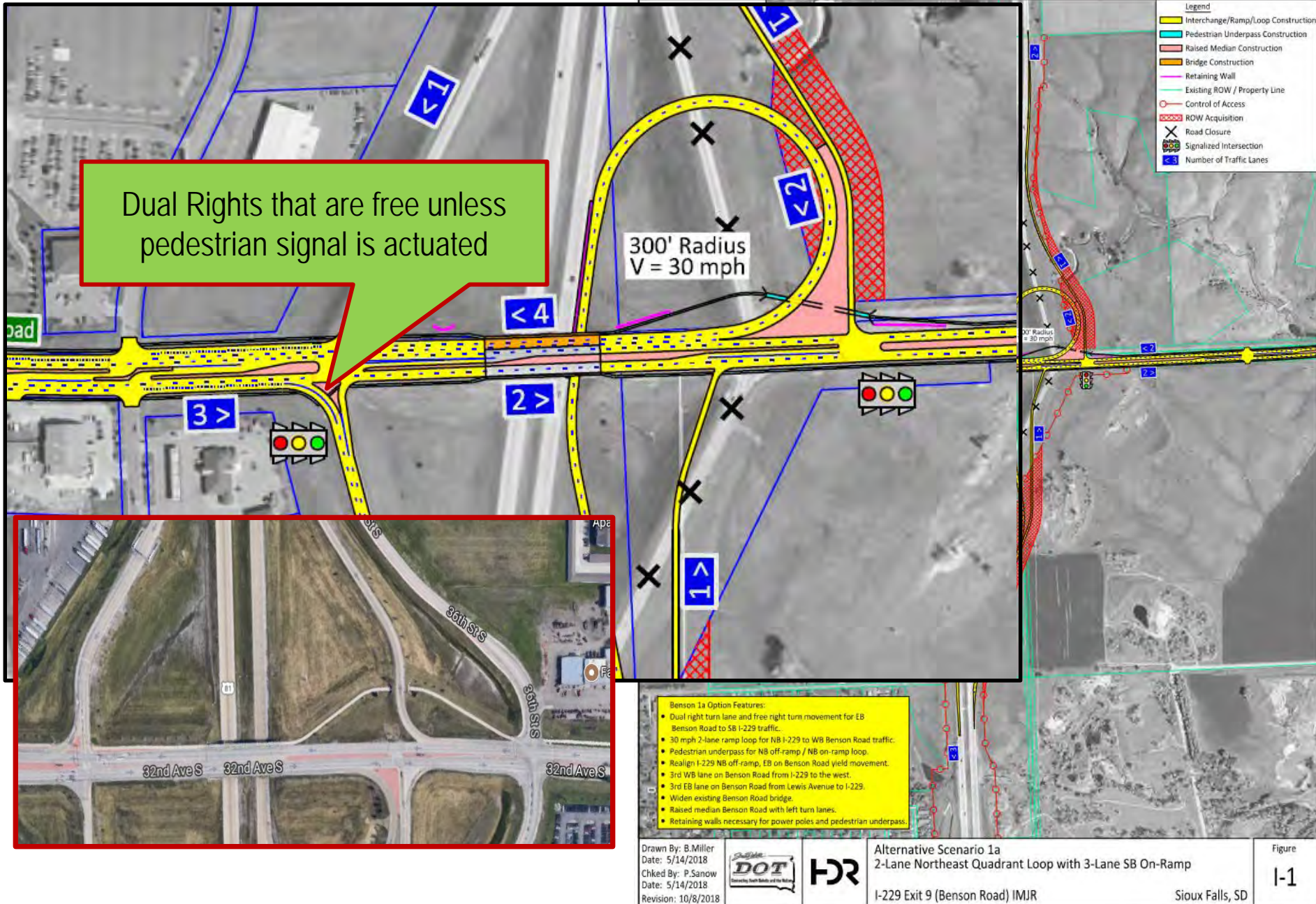
Figure

I-1

Sioux Falls, SD

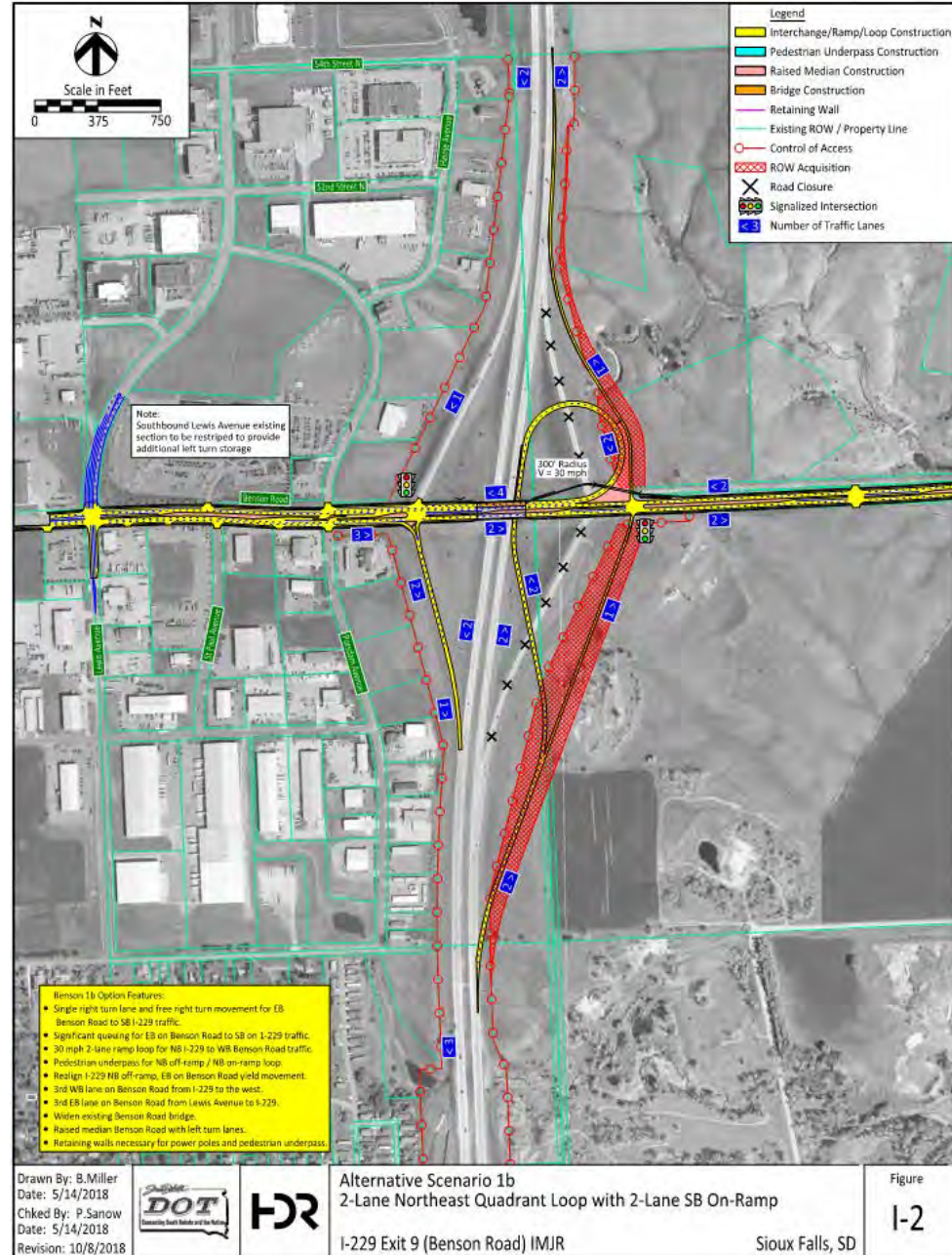


# OPTIONS FOR CONSIDERATION – Scenario 1a



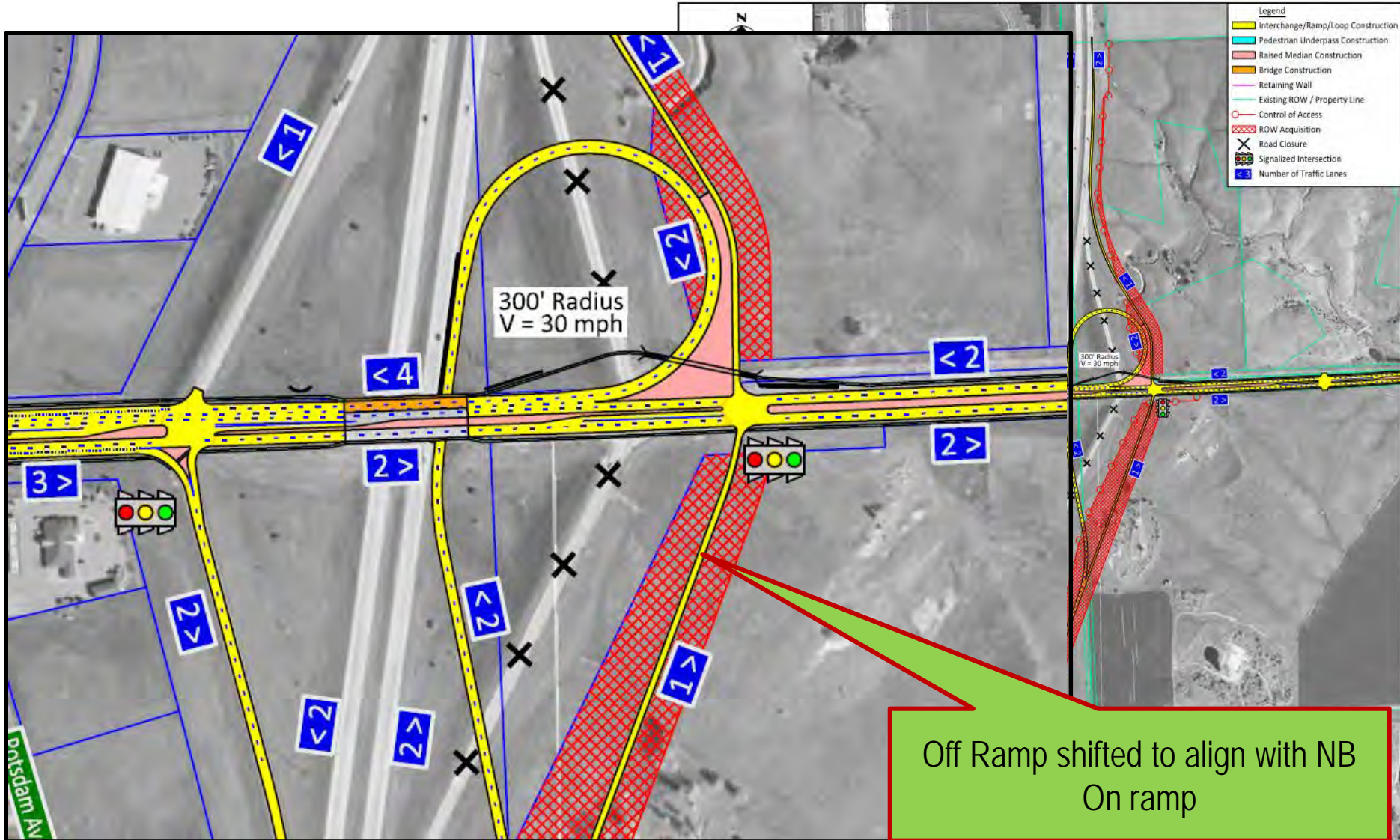


# OPTIONS FOR CONSIDERATION – Scenario 1b





# OPTIONS FOR CONSIDERATION – Scenario 1b



Off Ramp shifted to align with NB On ramp

- 3rd EB lane on Benson Road from Lewis Avenue to I-229
- Widen existing Benson Road bridge.
- Raised median Benson Road with left turn lanes.
- Retaining walls necessary for power poles and pedestrian underpass.

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 Date: 5/14/2018  
 Chkd By: P. Sanow  
 Date: 5/14/2018  
 Revision: 10/8/2018



Alternative Scenario 1b  
 2-Lane Northeast Quadrant Loop with 2-Lane SB On-Ramp

I-229 Exit 9 (Benson Road) IMJR

Figure

I-2

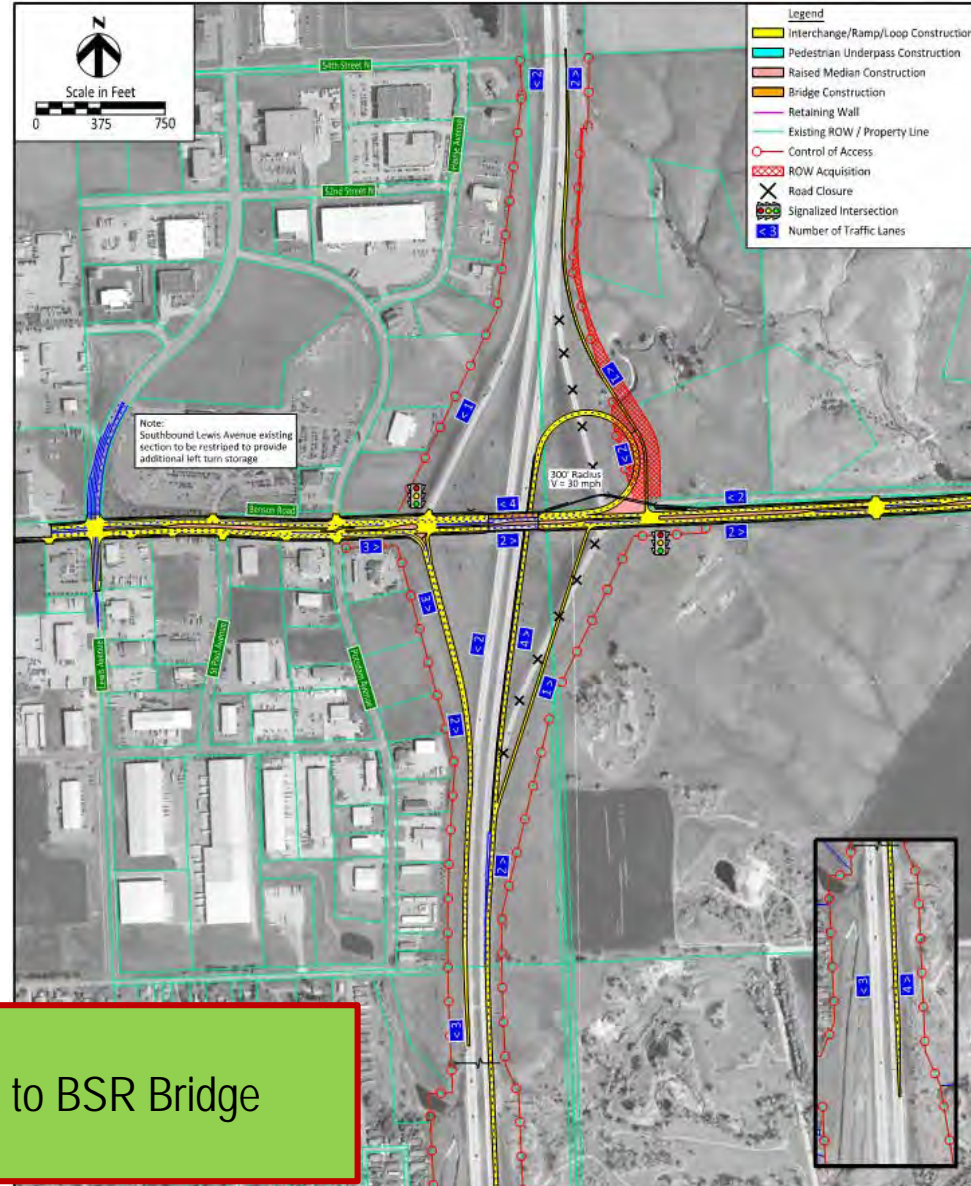
Sioux Falls, SD



# OPTIONS FOR CONSIDERATION – Scenario 1c



Added Lane to BSR Bridge



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Date: 5/14/2018  
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Date: 5/14/2018  
Revision: 10/8/2018



Alternative Scenario 1c  
2-Lane Collector - Distributor (CD) Lane Northeast Quadrant Loop  
with 3-Lane SB On-Ramp  
I-229 Exit 9 (Benson Road) IMJR

Figure  
I-3

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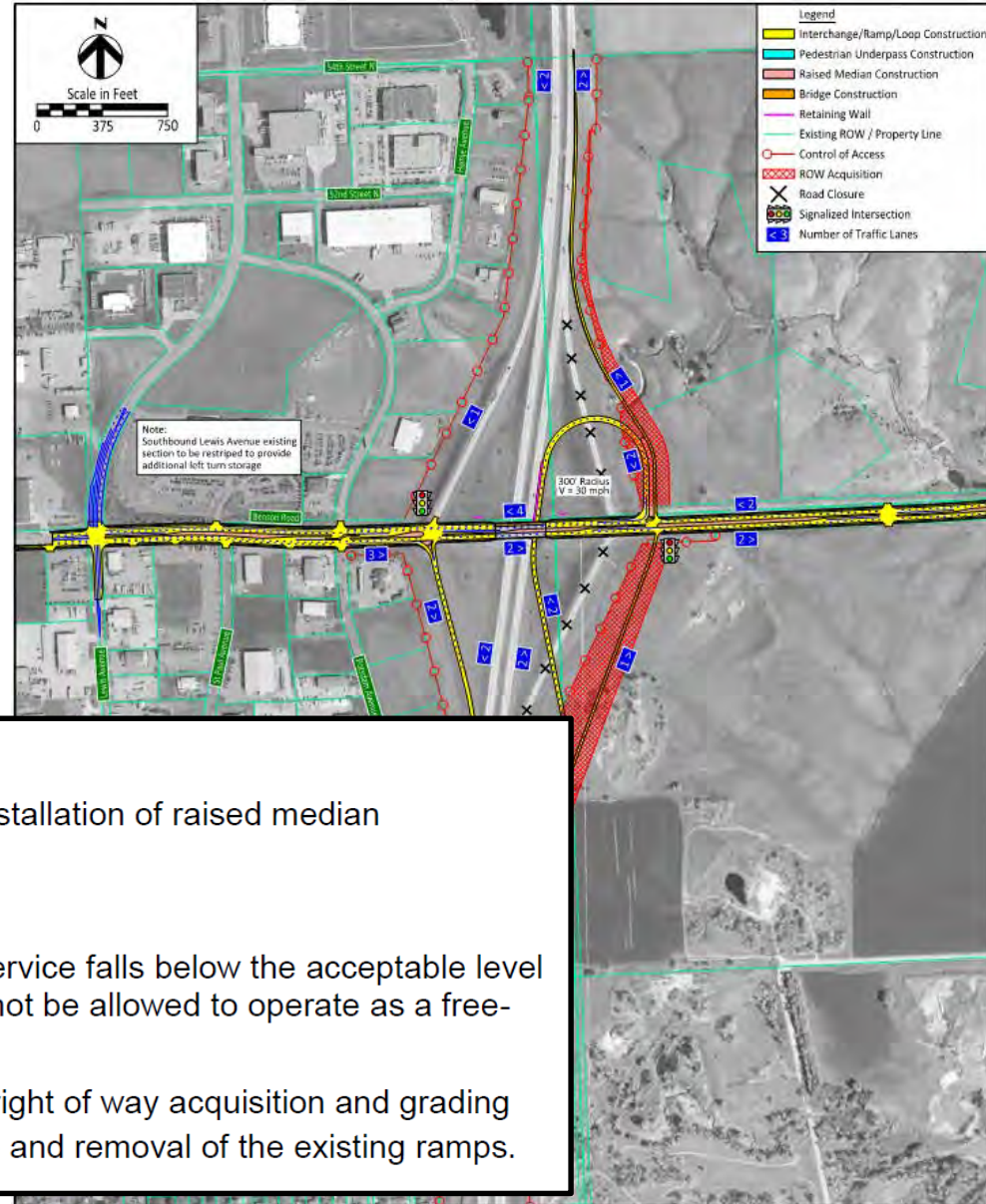
# Rendered Loop Ramp Option



Benson Road Corridor    Concept Benson-1A    2-Lane Northeast Quadrant Loop with 3-Lane SB On-Ramp



# OPTIONS FOR CONSIDERATION – Scenario 1d



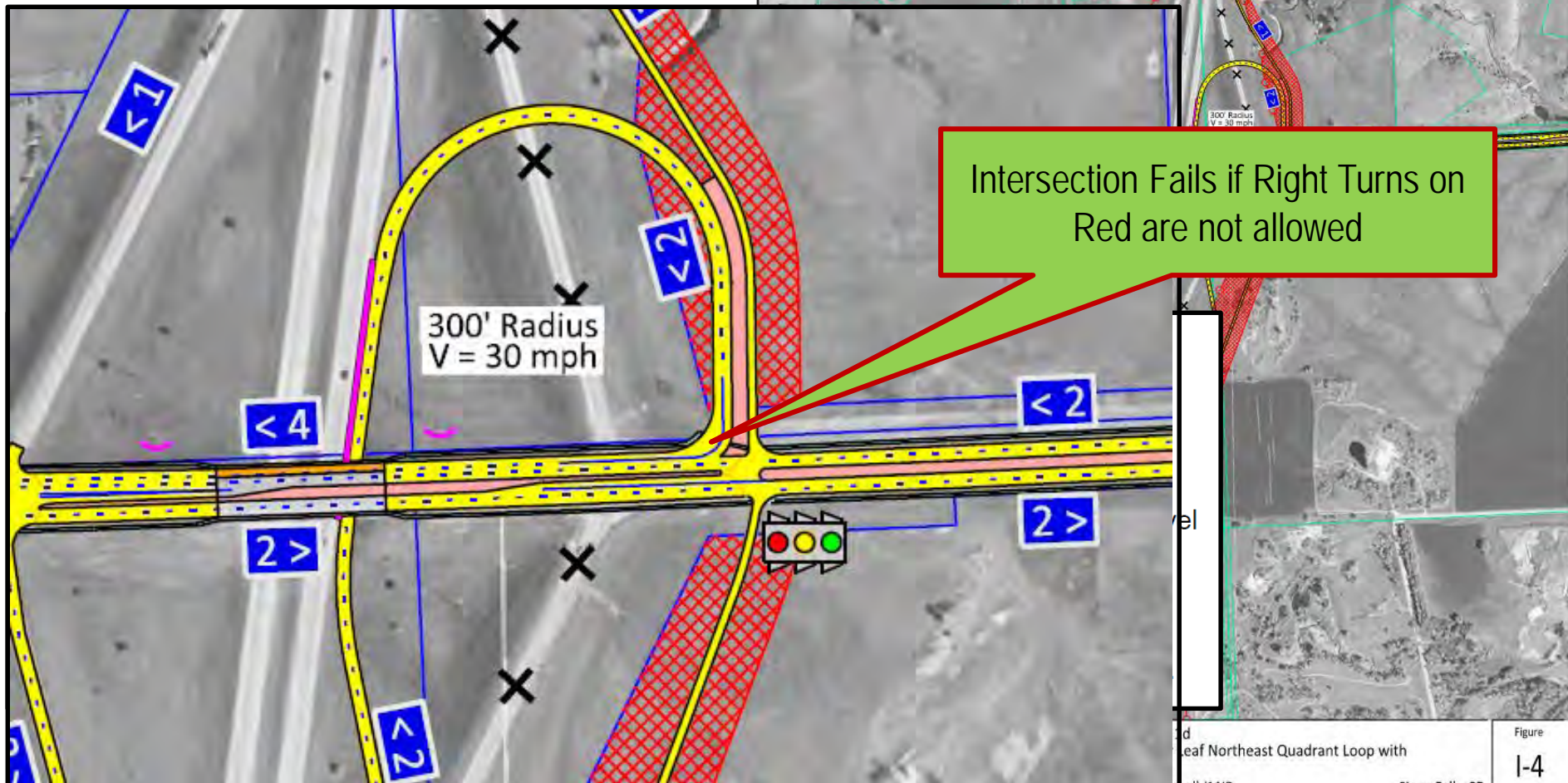
## Benefits of Option 1d:

- Access Management treatments considered with installation of raised median

## Drawbacks of Option 1d:

- Does not meet Purpose and Need. The Level of Service falls below the acceptable level C because the right turn on red movements would not be allowed to operate as a free-flow movement.
- The construction of the ramps requires substantial right of way acquisition and grading costs associated with constructing a new loop ramp and removal of the existing ramps.

# OPTIONS FOR CONSIDERATION – Scenario 1d





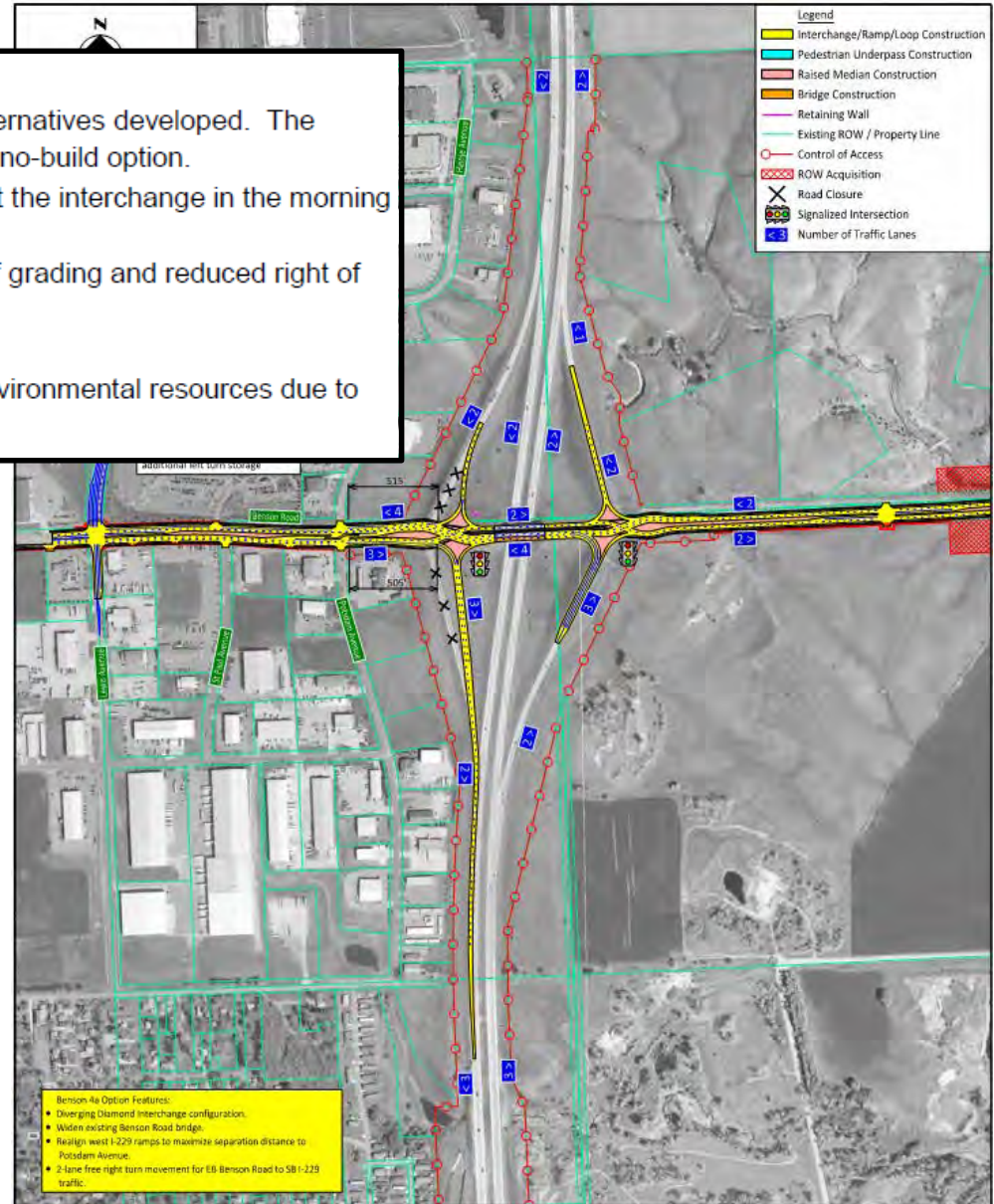




# OPTIONS FOR CONSIDERATION – Scenario 4a

## Benefits of Option 4a:

- Fewer crashes expected compared to the other build alternatives developed. The predicted annual traffic accidents reduces 25% from the no-build option.
- Traffic Level of Service (LOS) C is worst case forecast at the interchange in the morning for the northbound ramp for year 2045 conditions.
- Cost of construction reasonable due to limited amount of grading and reduced right of way acquisition.
- Requires no additional right of way on I-229.
- Fewer impacts to wildlife habitat, wetlands, and other environmental resources due to less grading and right of way.



**Benson 4a Option Features:**

- Diverging Diamond Interchange configuration.
- Widen existing Benson Road bridge.
- Realign west I-229 ramps to maximize separation distance to Potsdam Avenue.
- 2 lane free right turn movement for EB Benson Road to SB I-229 traffic.

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Date: 5/14/2018  
Chkd By: P.Sanow  
Date: 5/14/2018  
Revision: 10/8/2018



Alternative Scenario 4a  
Diverging Diamond Interchange with 3-Lane SB On-Ramp  
Add 2 WB Lanes to Existing Overpass.  
I-229 Exit 9 (Benson Road) IMJR

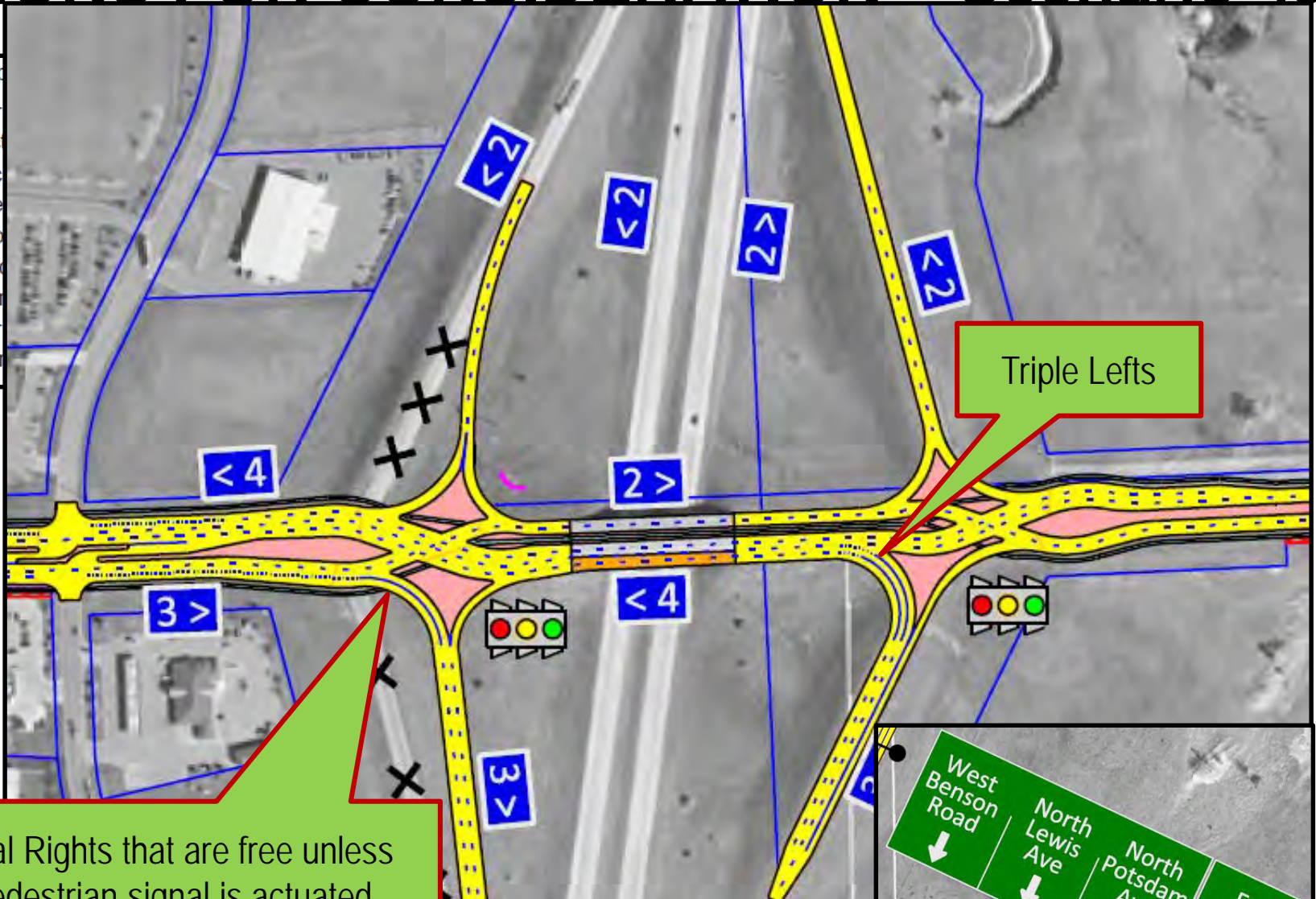
Figure  
I-6  
Sioux Falls, SD



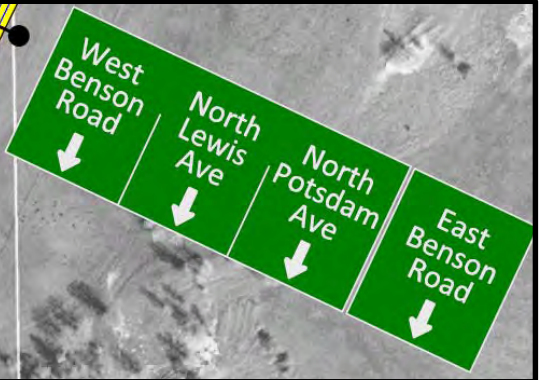
# OPTIONS FOR CONSIDERATION – Scenario 4a

## Benefits of Op

- Fewer predic
- Traffic for the
- Cost of way ac
- Requir
- Fewer less gr



Dual Rights that are free unless pedestrian signal is actuated



Drawing: B. Miller  
 Date: 5/14/2018  
 Checked: P. Sanow  
 Date: 5/14/2018  
 Revision: 10/8/2018

Alternative S  
 Diverging Dia  
 Add 2 WB Lanes to Existing Overpass.  
 I-229 Exit 9 (Benson Road) IMJR



# OPTIONS FOR CONSIDERATION – Scenario 4a



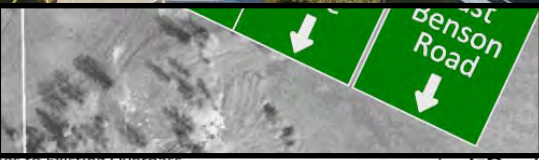
- Diverging diamond interchange configuration
- Widen existing Benson Road bridge.
- Realign west I-229 ramps to maximize separation distance to Potsdam Avenue.
- 2 lane free right turn movement for EB Benson Road to SB I-229 traffic.



Drawn By: B.Miller  
 Date: 5/14/2018  
 Chkd By: P.Sanow  
 Date: 5/14/2018  
 Revision: 10/8/2018



Alternative S  
 Diverging Dia  
 Add 2 WB Lanes to Existing Overpass.  
 I-229 Exit 9 (Benson Road) IMJR





# OPTIONS FOR CONSIDERATION – Scenario 4a



- Diverging diamond interchange configuration
- Widen existing Benson Road bridge.
- Realign west I-229 ramps to maximize separation distance to Potsdam Avenue.
- 2 lane free right turn movement for EB Benson Road to SB I-229 traffic.



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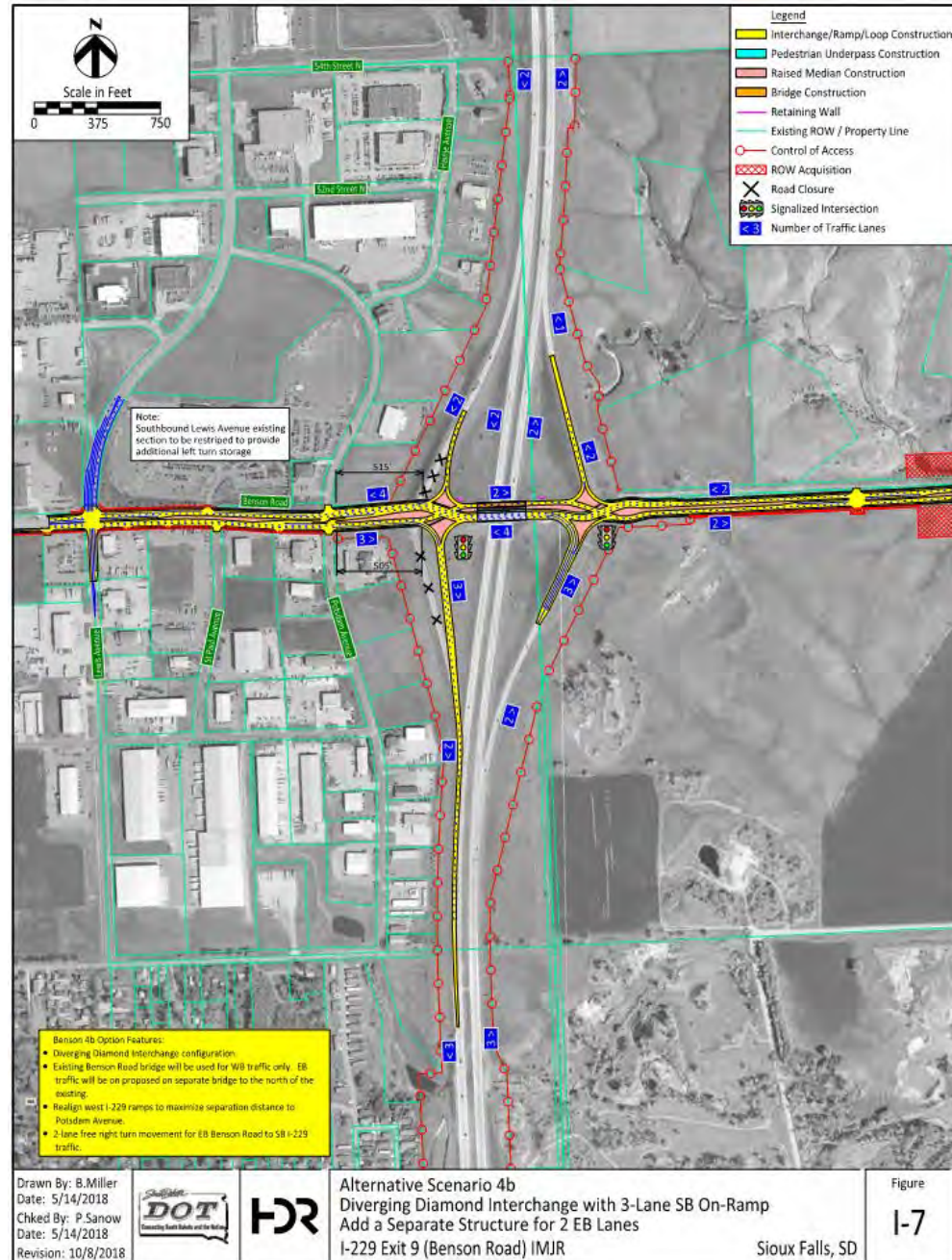
Alternative S  
Diverging Dia  
Add 2 WB Lanes to Existing Overpass.  
I-229 Exit 9 (Benson Road) IMJR

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I-0



# OPTIONS FOR CONSIDERATION – Scenario 4b



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Date: 5/14/2018  
Chkd By: P.Sanow  
Date: 5/14/2018  
Revision: 10/8/2018



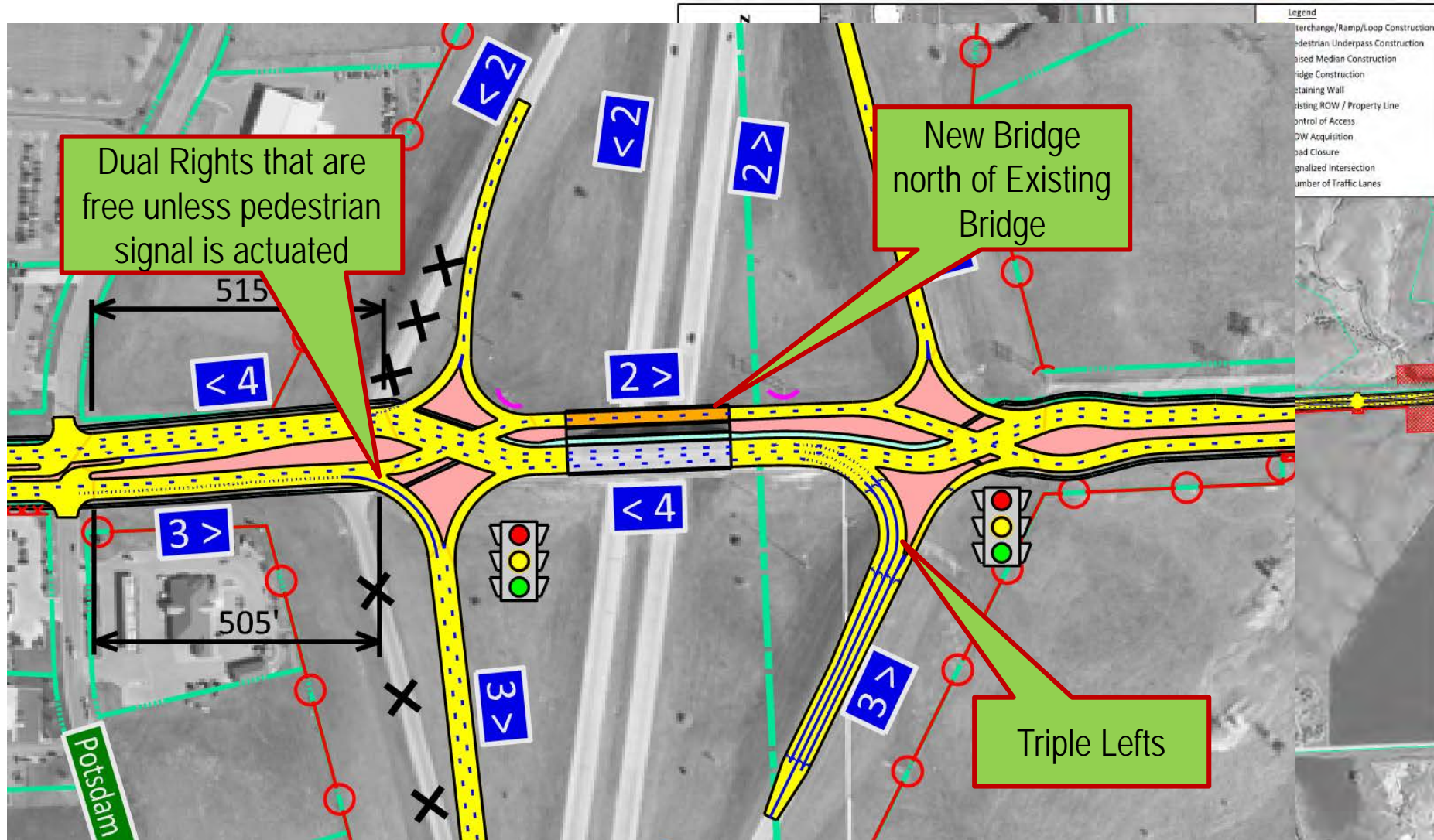
Alternative Scenario 4b  
Diverging Diamond Interchange with 3-Lane SB On-Ramp  
Add a Separate Structure for 2 EB Lanes  
I-229 Exit 9 (Benson Road) IMJR

Figure  
1-7

Sioux Falls, SD



# OPTIONS FOR CONSIDERATION – Scenario 4b



- Diverging Diamond Interchange configuration.
- Existing Benson Road bridge will be used for WB traffic only. EB traffic will be on proposed on separate bridge to the north of the existing.
- Realign west I-229 ramps to maximize separation distance to Potsdam Avenue.
- 2 lane free right turn movement for EB Benson Road to SB I-229 traffic.

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Date: 5/14/2018  
Chkd By: P.Sanow  
Date: 5/14/2018  
Revision: 10/8/2018



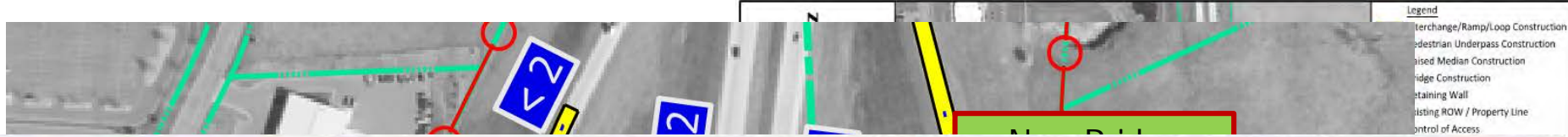
Alternative Scenario 4b  
Diverging Diamond Interchange with 3-Lane SB On-Ramp  
Add a Separate Structure for 2 EB Lanes  
I-229 Exit 9 (Benson Road) IMJR

Figure  
I-7

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# OPTIONS FOR CONSIDERATION – Scenario 4b



**Diverging Diamond Interchange  
IL Route 59 at I-88**



Date: 5/14/2018  
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 Revision: 10/8/2018



Diverging Diamond Interchange with 3-Lane SB On-Ramp  
 Add a Separate Structure for 2 EB Lanes  
 I-229 Exit 9 (Benson Road) IMJR

Sioux Falls, SD



# Rendered DDI Option



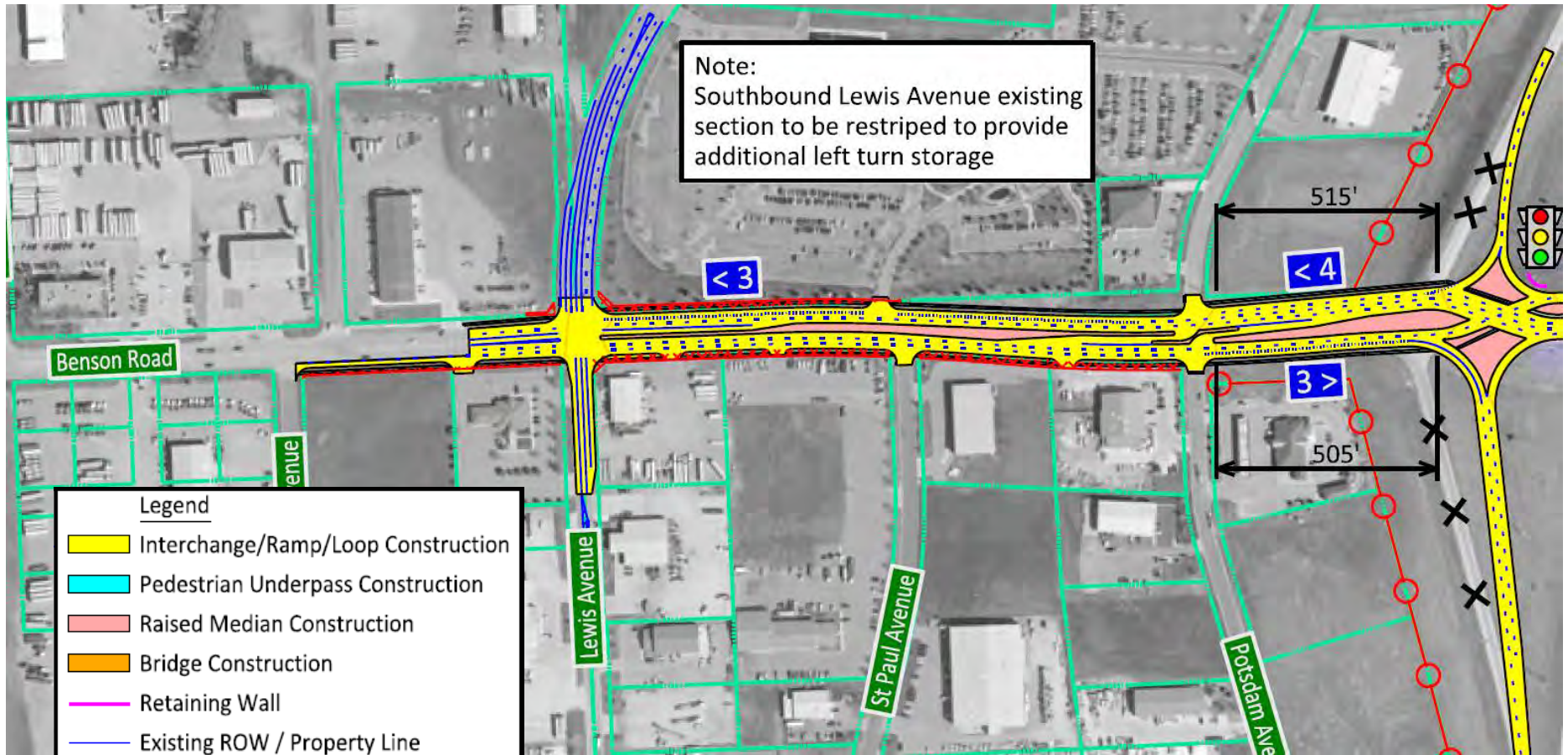
Benson Road Corridor

Concept Benson-4

Diverging Diamond Interchange



# OPTIONS FOR CONSIDERATION Benson Road West of I-229



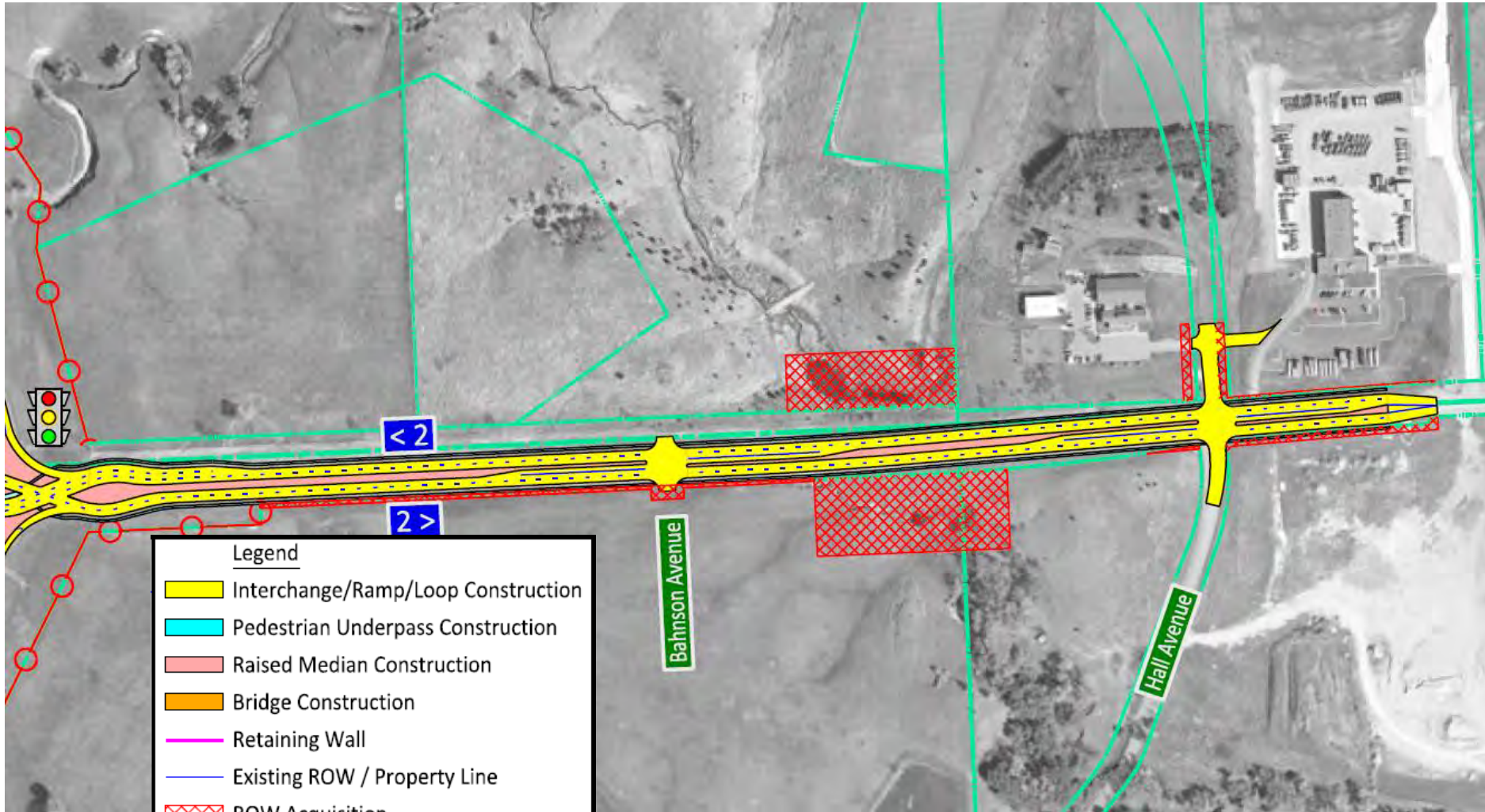
**Legend**

- Interchange/Ramp/Loop Construction
- Pedestrian Underpass Construction
- Raised Median Construction
- Bridge Construction
- Retaining Wall
- Existing ROW / Property Line
- ROW Acquisition
- X Road Closure
- Signalized Intersection
- < 3 Number of Traffic Lanes



# OPTIONS FOR CONSIDERATION

## Benson Road East of I-229



**Legend**

- Interchange/Ramp/Loop Construction
- Pedestrian Underpass Construction
- Raised Median Construction
- Bridge Construction
- Retaining Wall
- Existing ROW / Property Line
- ROW Acquisition
- Road Closure
- Signalized Intersection
- Number of Traffic Lanes

# PROJECT EVALUATION CATEGORIES

Meets Purpose and Need Criteria			Year 2045 Traffic Operations								Safety		Driver/ Public Perception	Construction Impacts	Comparative Costs (5)							Applicable Env. Impacts				
Improve Traffic Operations	Improves Multimodal Mobility	Provides Adequate Separation to Nearest Access (1)	Northbound Ramp Intersection		Southbound Ramp Intersection		Southbound Off Ramp	Northbound On Ramp	Southbound Weaving	Northbound Weaving	Predicted Annual Total Crashes Year of opening to 2045	Predicted Annual Fatality and Injury Crashes Year of opening to 2045	Driver Familiarity	Maintenance of Traffic during Construction	Allows for Phased Construction	Bridge (6)	Retaining Wall	Pedestrian Underpass	Benson Road	I-229 Ramps	20% Contingencies (not included on bridge)	ROW Acquisition	Total	Wetlands (4)	Potential Traditional Cltural Property	Habitat
			Worst LOS AM/PM	Worst Delay AM/PM	Worst LOS AM/PM	Worst Delay AM/PM	Worst LOS AM/PM	Worst LOS AM/PM	Worst LOS AM/PM	Worst LOS AM/PM	#	#				M \$	M \$	M \$	M \$	M \$	M \$	M \$	M \$	acres		

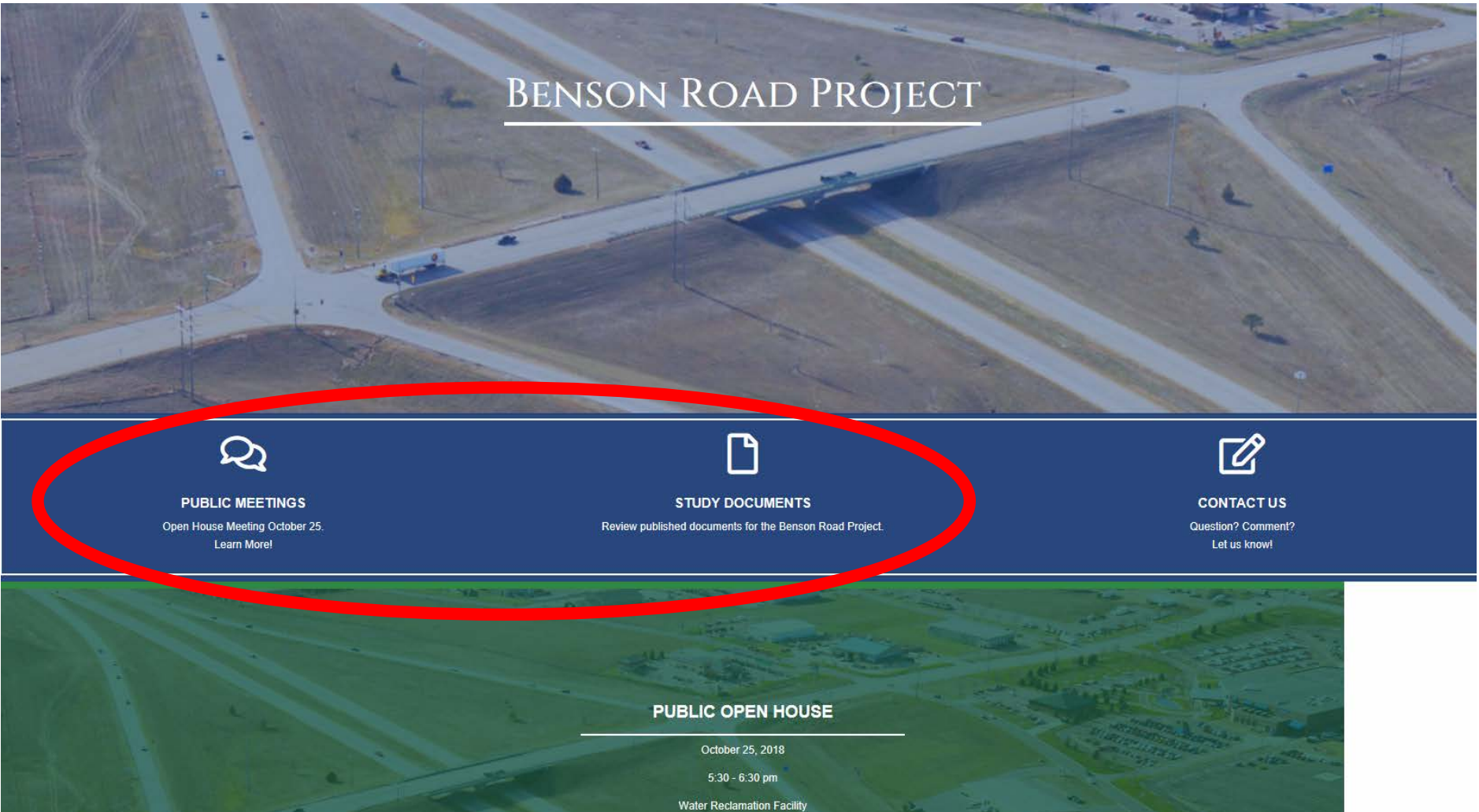


# NEXT STEPS

- **Hold Initial Public Meeting – TODAY!!!!**
- Submit Draft Interchange Justification Modification Report – October 2018
- Hold 2<sup>nd</sup> Public Meeting (Present Preferred Option) – February/March 2019
- Submit Final Environmental Documentation – April 2019
- Prelim and Final Design – Nov 2018 thru May 2020
- Permitting and ROW – May 2020 thru Dec 2021
- Project Bid 2022 with Construction in 2023

# PROJECT WEBSITE

- Website: <http://www.bensonroadproject.com>





# Comments

- Email me: [Jason.Kjenstad@hdrinc.com](mailto:Jason.Kjenstad@hdrinc.com)
- Leave comment on Website: <http://www.bensonroadproject.com>

← → ↻ 🏠 ⓘ www.bensonroadproject.com/index.html 📖 ☆ ⚙️ 📝 📄

**Comment Card**  
I-229 Exit 9 (Benson Road) Interchange Study and Environmental Document  
Public Open House  
PL0100 (82) P3616, PCN 06MF  
October 25<sup>th</sup>, 2018

Comments:

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Name: \_\_\_\_\_ Address: \_\_\_\_\_

Phone: \_\_\_\_\_ E-mail: \_\_\_\_\_

**For your comments to be considered, please return by November 5<sup>th</sup>, 2018.**  
Comments can also be e-mailed to: [sausen@siouxfalls.org](mailto:sausen@siouxfalls.org)

  
**CONTACT US**  
Question? Comment?  
Let us know!

# PROJECT CONTACTS:

**Jason Kjenstad** – HDR Engineering, Inc.  
605-977-7740 or [jason.kjenstad@hdrinc.com](mailto:jason.kjenstad@hdrinc.com)

**Aaron Fagerness**– HDR Engineering, Inc.  
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**Shannon Ausen** – City of Sioux Falls  
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**Steve Gramm** – SDDOT Project Development  
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**Stacy Duchene** – SDDOT Project Coordinator  
605-367-5680 or [stacy.duchene@state.sd.us](mailto:stacy.duchene@state.sd.us)



**Thanks for attending!**

