

Henderson Flood Mitigation Study

May 17, 2017

Background

- Comments from Mayor Paul Menne



Project Partners

MnDOT

City of Henderson

Le Sueur County

Sibley County

Scott County

Resource Agencies

US Army Corps of Engineers

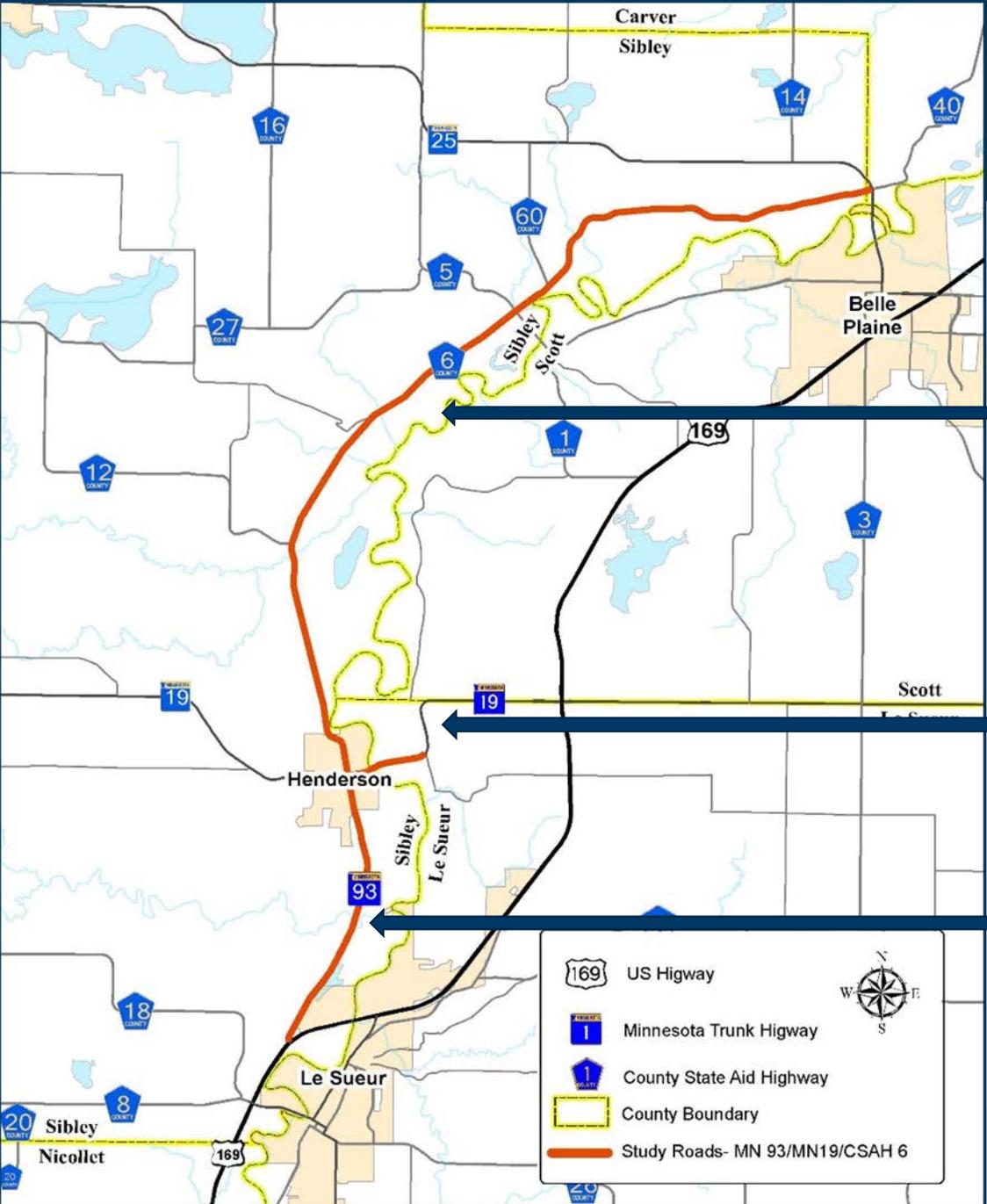
MN Department of Natural Resources

US Fish and Wildlife Service

Purpose

- Study to identify the feasibility of improvements to Highway 19, Highway 93 and County Highway 6 to minimize transportation disruption caused by seasonal flooding of the Minnesota River
- No funding has been identified for any improvements
- Results will aid the City and MnDOT in pursuing flood mitigation funding

Henderson Flood Study Alternatives



County Road 6

Highway 19

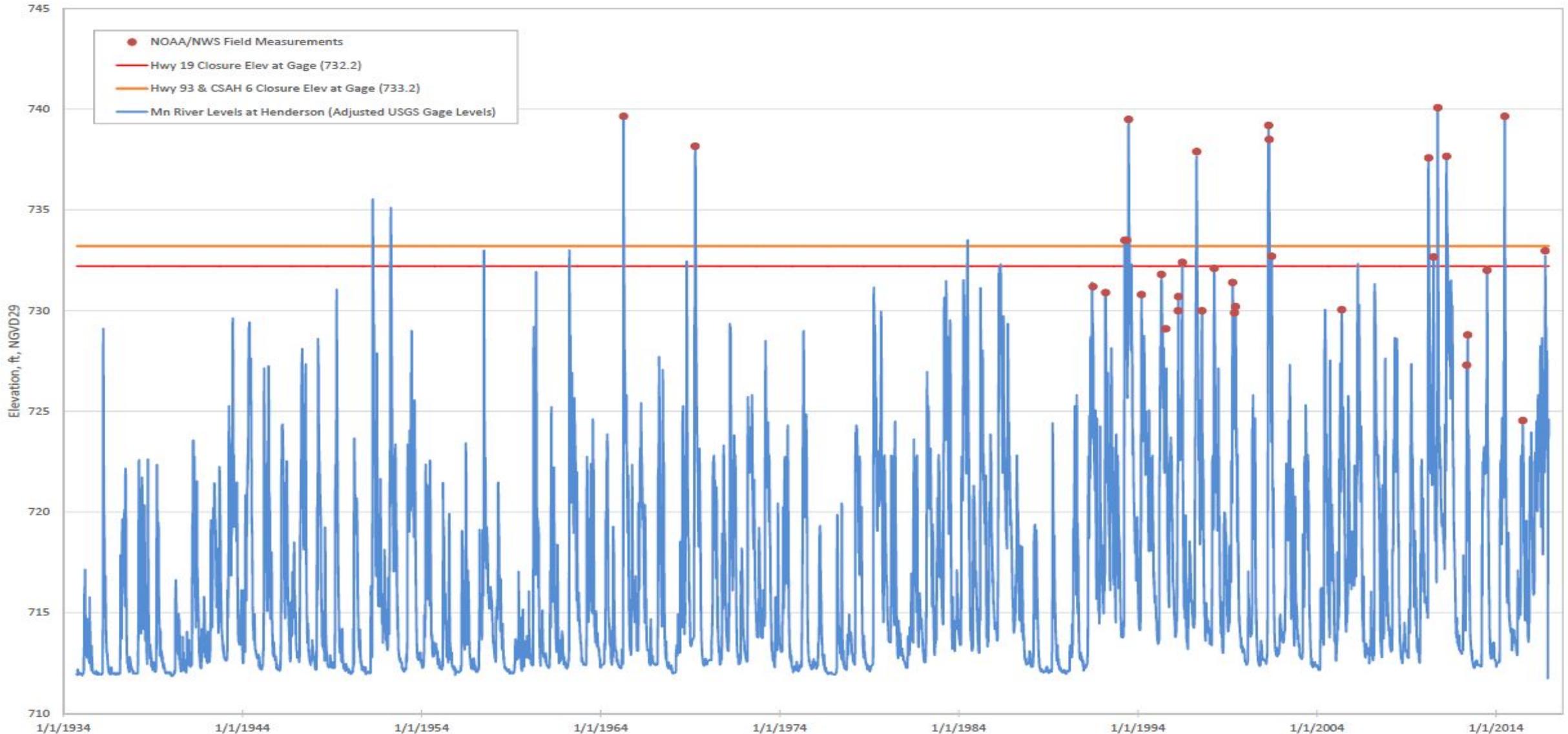
Highway 93

A better detour route was also studied

- Analysis of historical flooding
- Traffic forecasting and analysis
- Development of alternatives
- River modeling
- Evaluation of alternatives
 - Includes benefit-cost analysis
- Public and Agency involvement
- Final report



Henderson Flooding - 16 Closures Over 80 Years

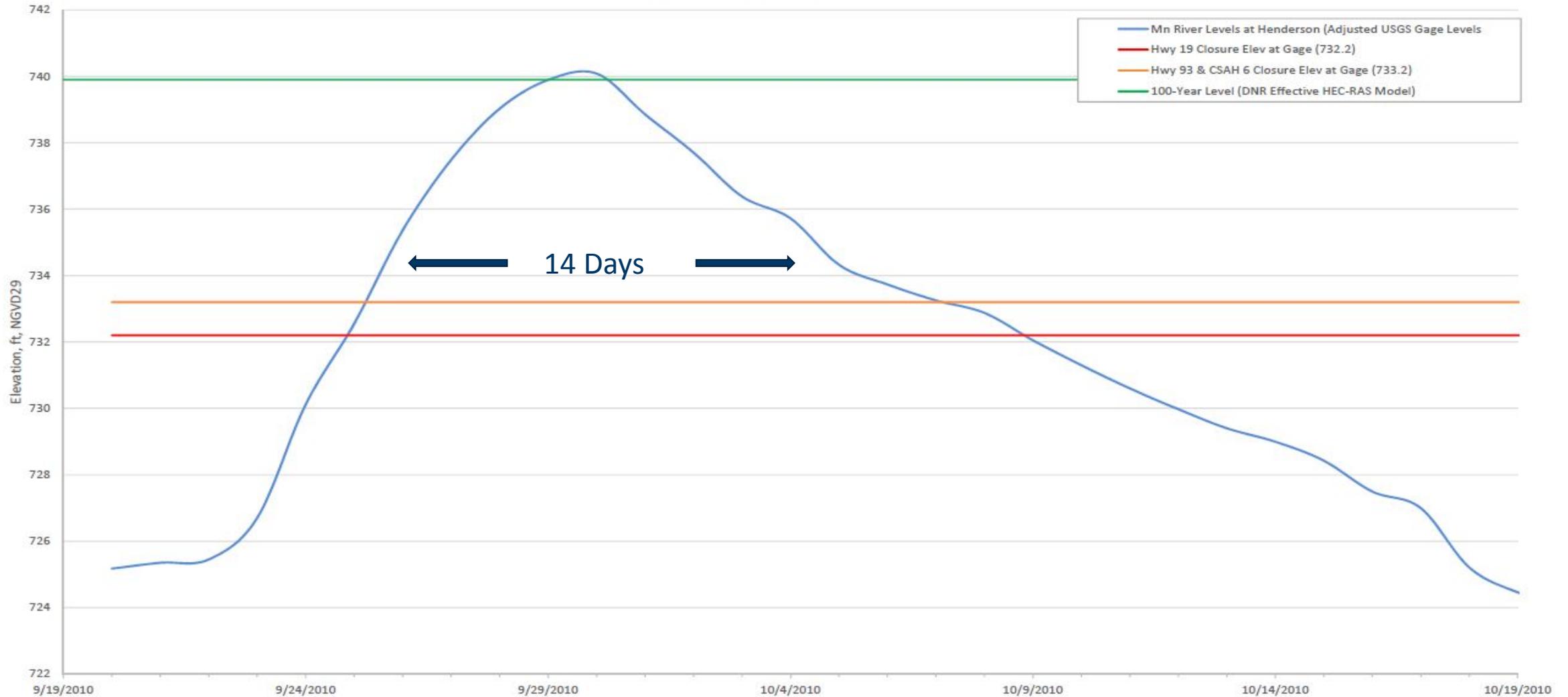


Design Flood Event – September 2010 Flood

- Highest Recorded River Level at Henderson
 - Elevation 740.1 ft at Highway 19
 - Exceeded 1965, 2014 Floods by 0.4'
- More Conservative Design than MnDNR 100-Year Level
- Consistent with Recent MnDOT Projects Along MN River

Henderson Flooding –September 2010 Event

September/October 2010 Minnesota River Levels at Henderson



Road Elevations Below the 2010 Flood Elevation

- County Road 6 – Up to 7.4 feet of water over roadway
- Highway 19 – Up to 7.2 feet of water over roadway
- Highway 93 – Up to 7.1 feet of water over roadway



Traffic Modeling

- Utilized most recent version of the MnDOT's Collar County Travel Demand Model to develop forecast and traffic routing preferences during flood closures
- Model provides Vehicle Miles Traveled and Vehicle Hours Traveled for different scenarios

MnDOT economic data was used to determine the cost of additional time and miles travelled

Average Daily Traffic Volumes



Daily Cost of Highway Closures

When Highways 19, 93 and County Hwy 6 are closed, the value of the additional time and miles traveled is:

\$87,000 per day in today's dollars

Benefit - Cost

- A benefit-cost analysis is being used to help compare the economic advantages and disadvantages of the three alternatives.
- The total benefit dollars are then compared to the total costs for each alternative.
- **For this planning study, it is the relative comparison of the benefit cost ratios that will be used to compare alternatives**
- Benefits Include:
 - Vehicle miles travelled
 - Vehicle hours travelled
 - Operations and maintenance
- Costs Include:
 - Construction
 - Right-of-Way
 - Engineering
 - Flood Mitigation
 - *Costs are approximate and should only be used for relative comparison between alternatives*

Design Assumptions

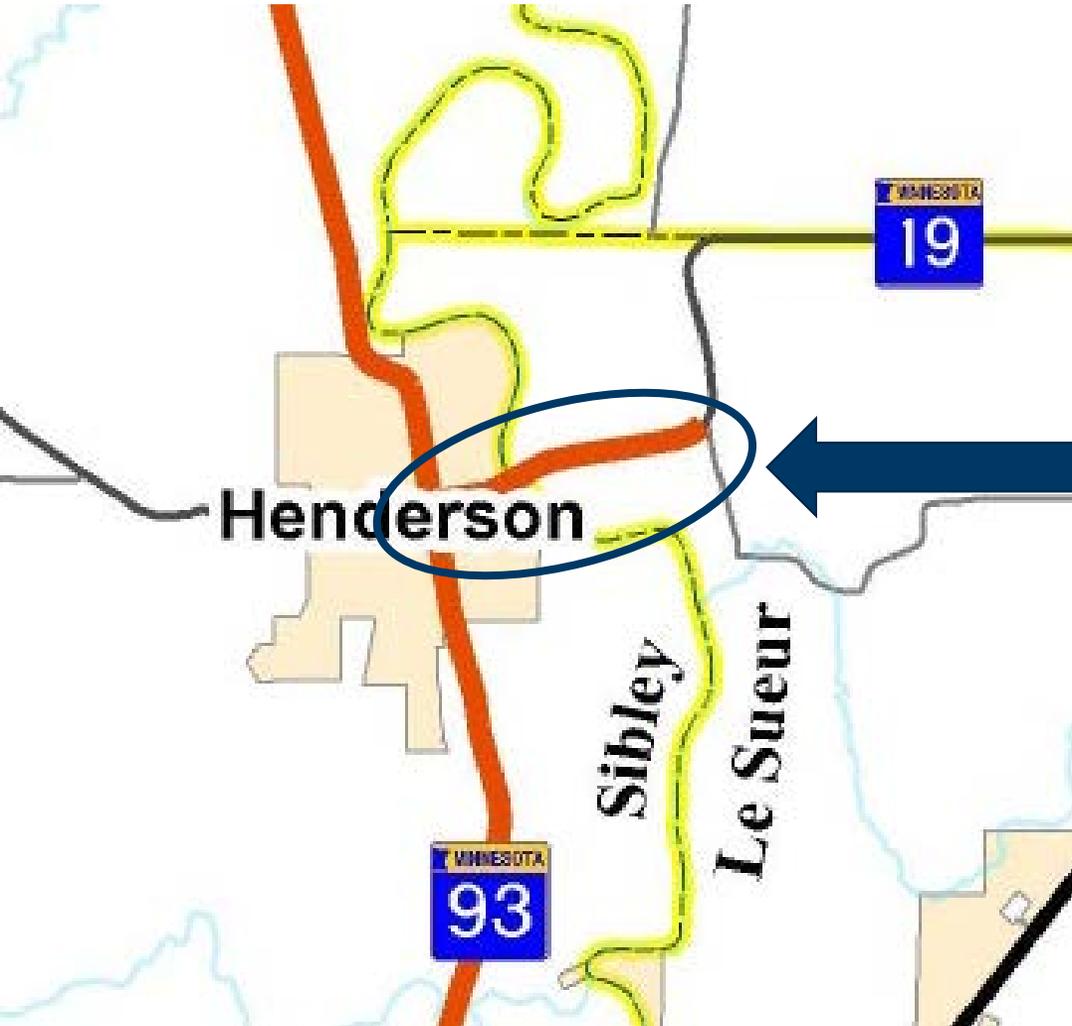
- Design road segments to be a minimum 1-foot above 2010 flood event
- Design roadways and bridges to match existing widths
- Design roadways to 10 ton design
- Each alternative includes modifying the existing Henderson Levee system
- The alternatives have been designed to have sufficient waterway opening to prevent any increase in water levels

Why Not Just Raise The Road?

- Raising the road would act as a dike or dam and restrict the river causing impacts up stream to adjacent properties
- The regulations do not allow fill in the floodway that will cause the river to rise

You may have noticed the recent projects that raised Highway 169. Those projects were permitted because they did not cause the river to raise.

Highway 19 Design Summary



- Build 2680 foot long bridge over the Minnesota River Valley
- Raise Highway 19 up to 8.2 feet for 1800 feet

Highway 19 Design Summary

Bridge Length = 2680 feet

Right-of-Way = 2 acres

Wetland Impacts = 2 acres

Approximate Project Cost with Trail on Bridge = \$40 million (2017 \$)

Benefit /Cost = 0.19

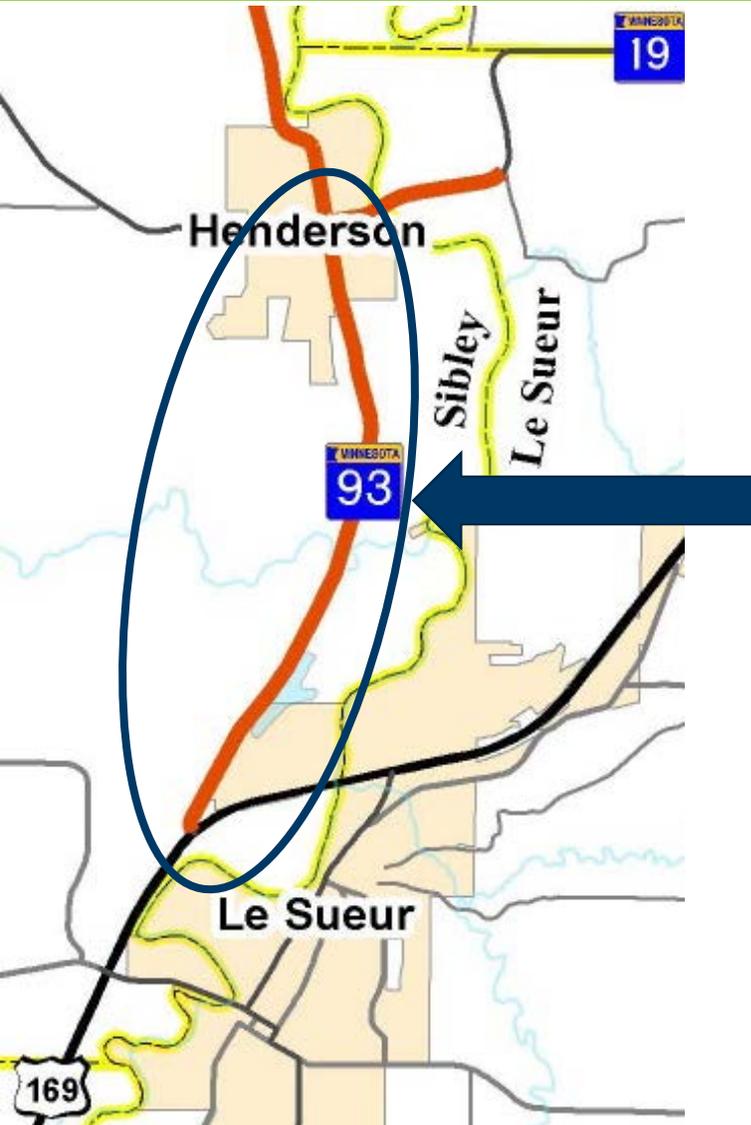
Approximate Project Cost with no Trail on Bridge = \$36 million (2017 \$)

Benefit /Cost = 0.22

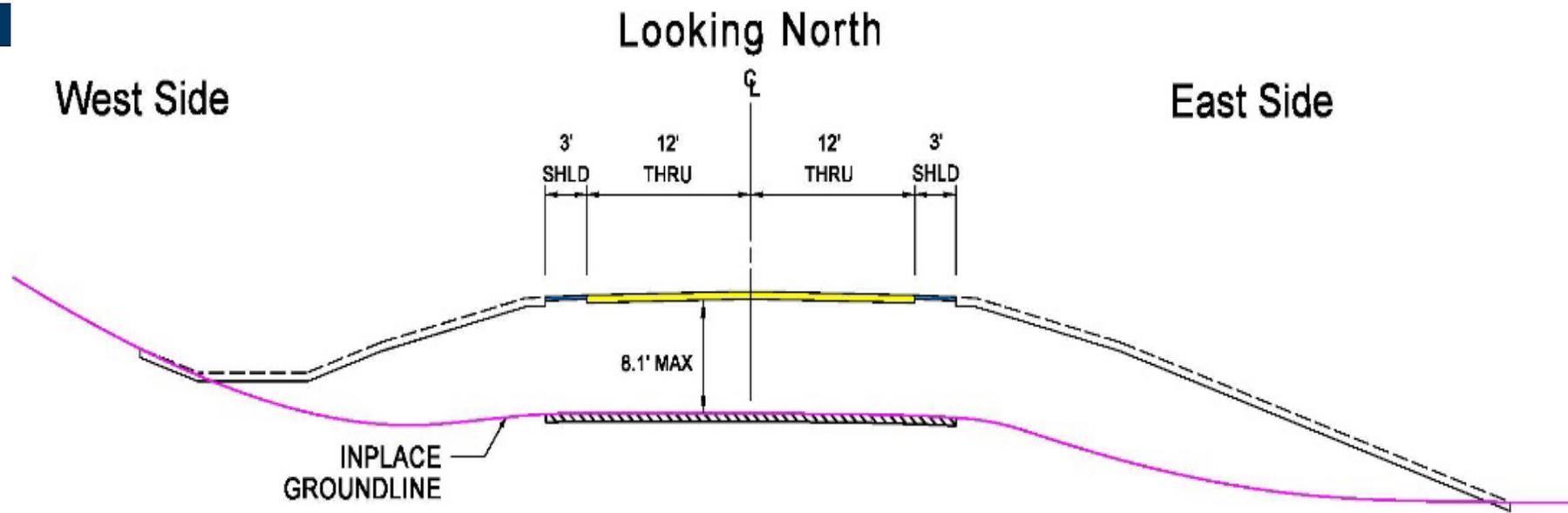
Pros/Cons

- Serves the highest level of traffic by providing the most direct travel route
- Provides another crossing of the river during flood years
- Restores natural floodplain conditions
 - Permitting agency support
- Highest Cost

Highway 93 Design Summary



TYPICAL SECTION HIGHWAY 93



Highway 93 Design Summary

Reconstructed Roadway Length = 3.4 miles

Includes replacement of Rush Creek Bridge

Mitigation for fill in floodplain is to lower portions of Highway 19 without increasing flood frequency

Approximate Project Cost Estimate = \$14 million (2017 \$)

Right-of-Way = 25 acres

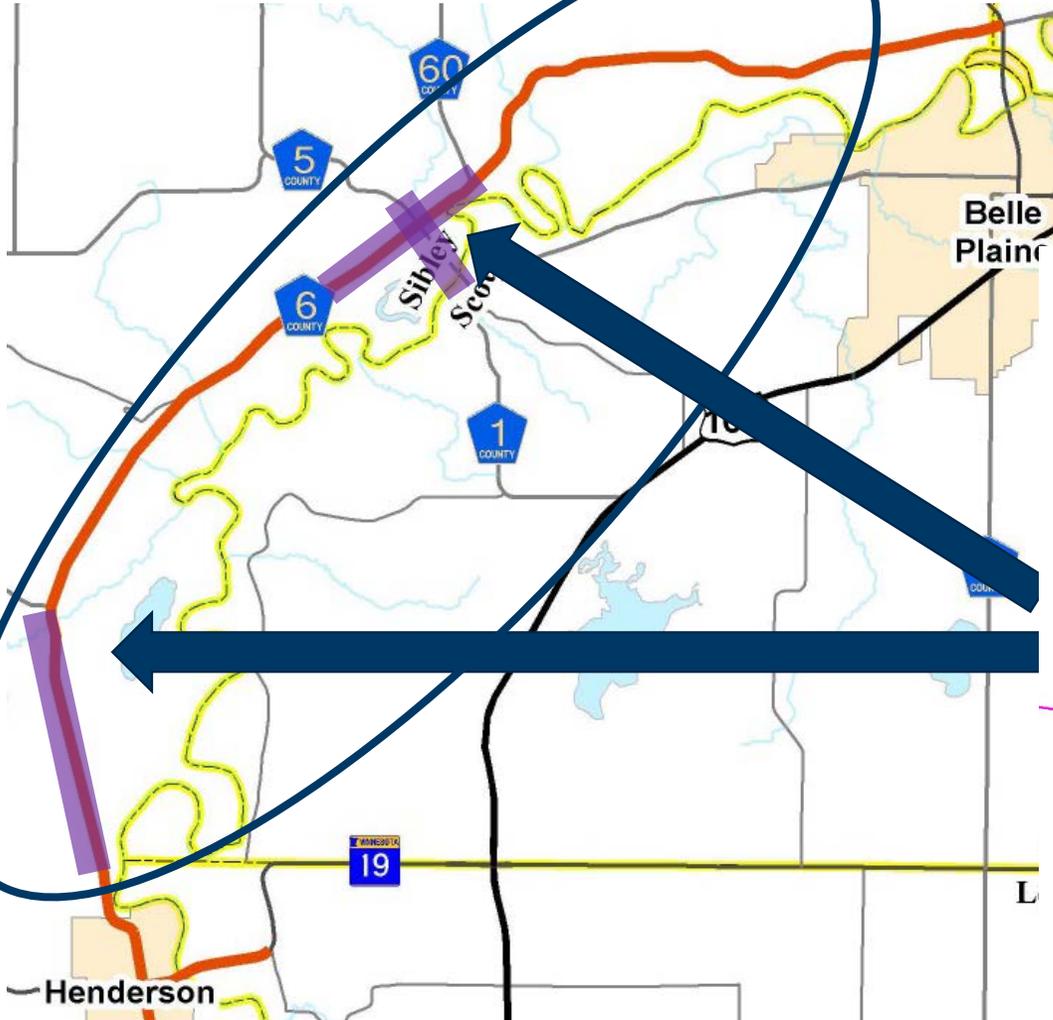
Wetland Impacts = 5 acres

Benefit /Cost = 0.45

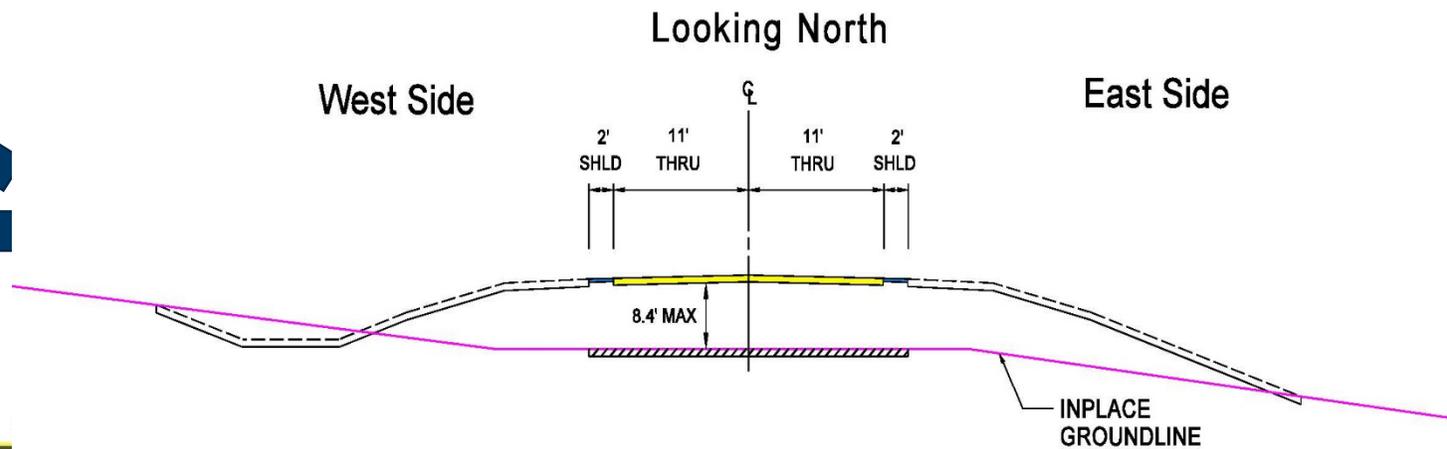
Pros/Cons

- Serves the second highest level of traffic
- Lowest Cost
- Highest Benefit/Cost Ratio
- Acquires the most property
- Would also have construction impacts on Highway 19

County Highway 6 Design Summary



TYPICAL SECTION COUNTY HIGHWAY 6



County Highway 6 Design Summary

Reconstructed Roadway Length = 4.3 miles

Mitigation for fill in floodplain is to excavate an area from within the floodplain and to lower a portion of County Road 5 to offset the fill to raise County Road 6

Approximate Project Cost Estimate = \$16 million (2017 \$)

Right-of-Way = 11 acres

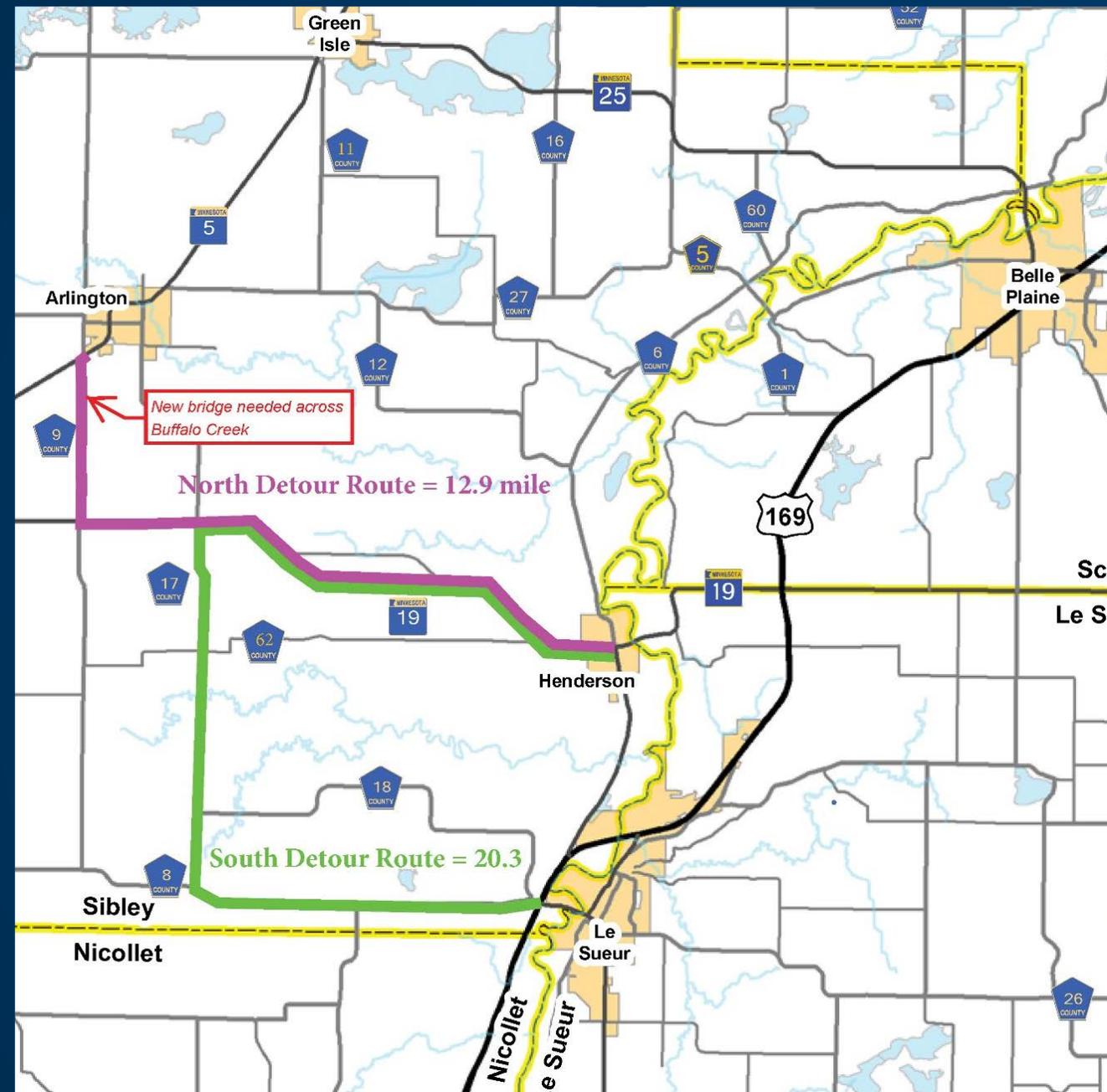
Wetland Impacts = 8 acres

Benefit /Cost = 0.12

Pros/Cons

- Serves the fewest vehicles
- Lowest Benefit/Cost
- Project would lower the overtopping elevation of County Road 5
- More challenging to implement given the mitigation requirements involving the floodplain excavation

Better Detour Route Alternative



- North route is 12.9 miles and uses County Highway 9
Approximate Cost = \$23.6 million
- South route is 20.3 miles and uses County Road 17 and 8
Approximate Cost = \$24.3 million
- Traffic modelling shows South route would be more highly utilized than the North (2 X)
- ***Costs are approximate and should only be used for relative comparison between alternatives***

Next Steps

- Review Public Feedback
- Prepare Report
- Investigate Funding Opportunities

Open House Stations

- Flooding History
- Traffic Forecasting and Analysis
- Alternatives
- River Modeling
- Comment Cards



For More Information Please Visit the Project Website

mndot.gov/d7/projects/hwy19study

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Thank you!

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