



CITY OF  
GLENWOOD  
SPRINGS  
COLORADO

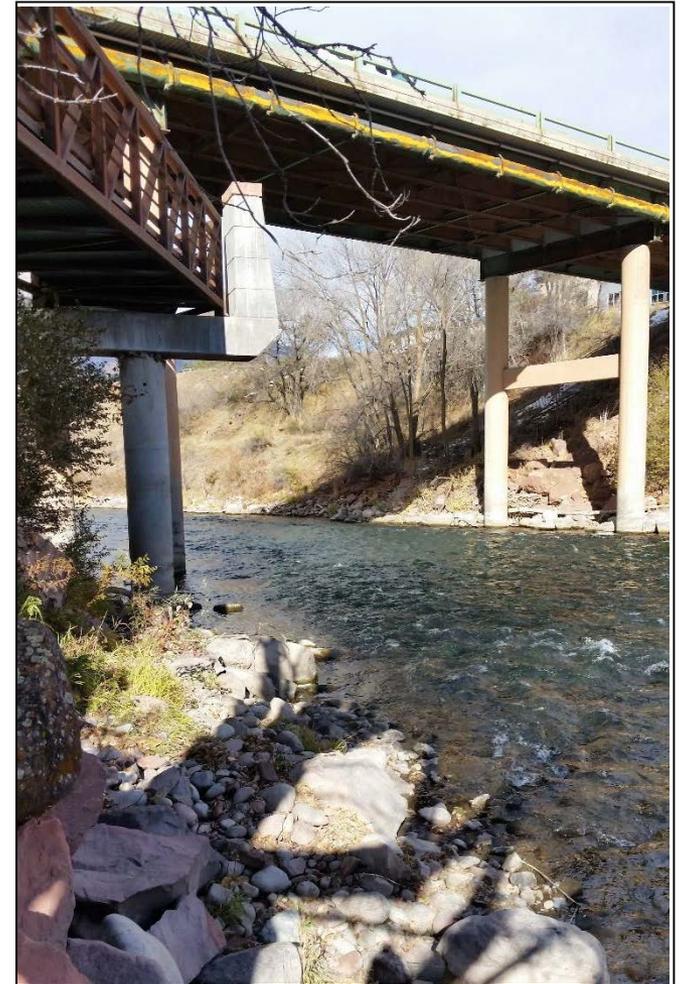
**27<sup>th</sup> Street Bridge Area Improvements  
City of Glenwood Springs Community Discussion  
November 16, 2016**



# Agenda

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- **Introductions and Project Background**
- **South Bridge Project**
- **Project Overview**
- **Traffic Analysis**
- **Alternatives Analysis**
- **Construction Impacts**
- **Aesthetic Treatments**
- **Selection Process and Summary**



# Introductions

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- **City of Glenwood Springs**

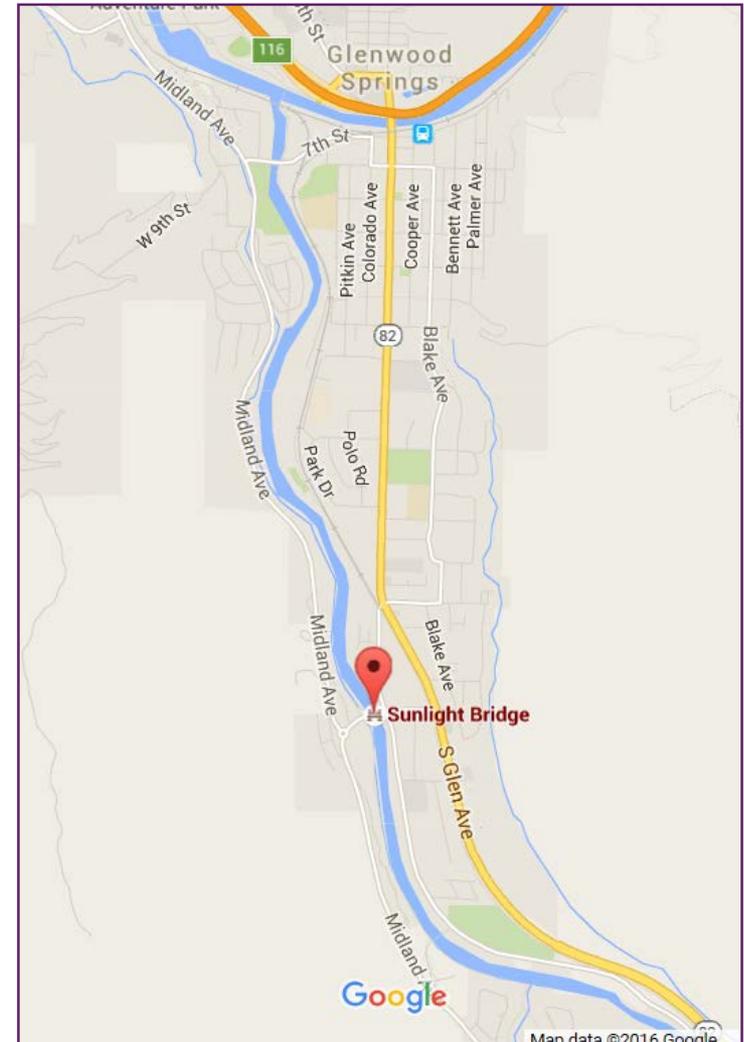
- **Design Team**

- Amec Foster Wheeler – Prime
- SGM – Traffic, Survey, and Utilities
- Yeh and Associates – Geotechnical Investigation/Engineering
- A Project Resource – ROW Services

# Project Background

## ■ 27<sup>th</sup> Street Bridge History

- CDOT/FHWA bridge evaluated every 2 years
- Sufficiency Ratings from 1-100
  - Ratings < 80 – placed on FHWA “Select List of Bridges”
  - Ratings < 50 – Qualify for bridge replacement funding

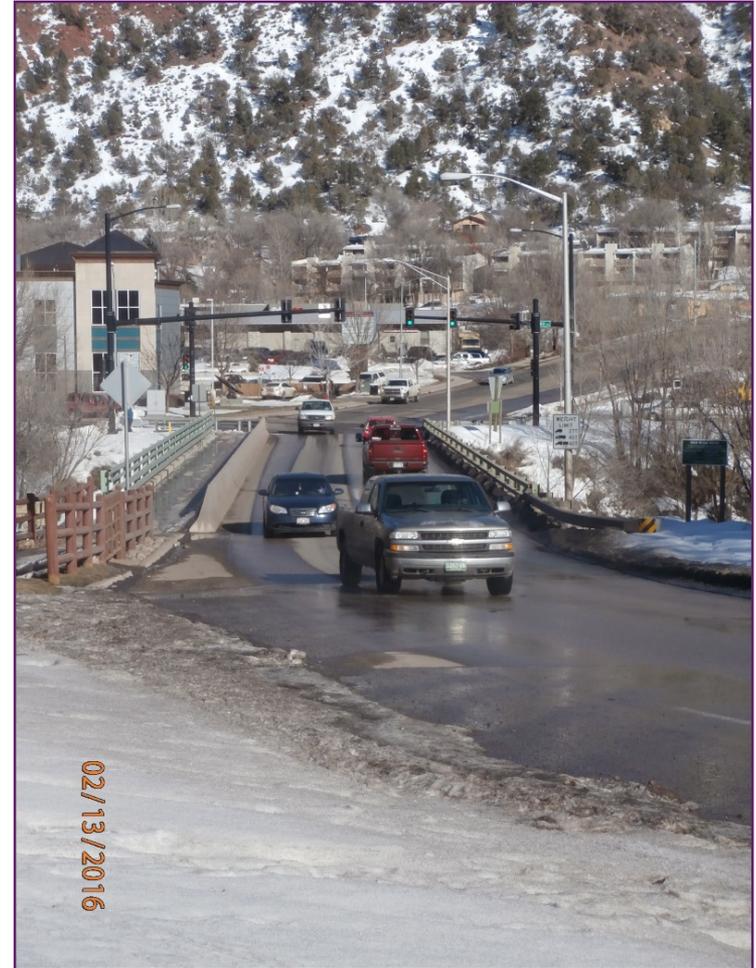


# Project Background

## ■ 27<sup>th</sup> Street Bridge History

### ■ History of 27<sup>th</sup> Street Bridge Ratings:

- 1989 – **78.1**
  - 2001 – **59.4** = Structurally Deficient
  - 2002 – **45.7** = Functionally Obsolete
  - 2011-2013 – **42.2** = Functionally Obsolete
- 
- Bridge Functionally Obsolete
  - City granted bridge replacement funding from FHWA
  - Completed RFQ process and selected design team



# South Bridge

## History and Project Need



# South Bridge

## ■ South Bridge is a safety project

The 2002 Coal Seam Fire forced the evacuation of areas south and west of Glenwood Springs, affecting over 3,000 residents.

A Federal Earmark for the project was requested by Garfield County and awarded in 2005. In 2007, the City and County began an environmental assessment for the project.

The project also helps to resolve safety issues at CR 154 and surrounding residential and business access points.



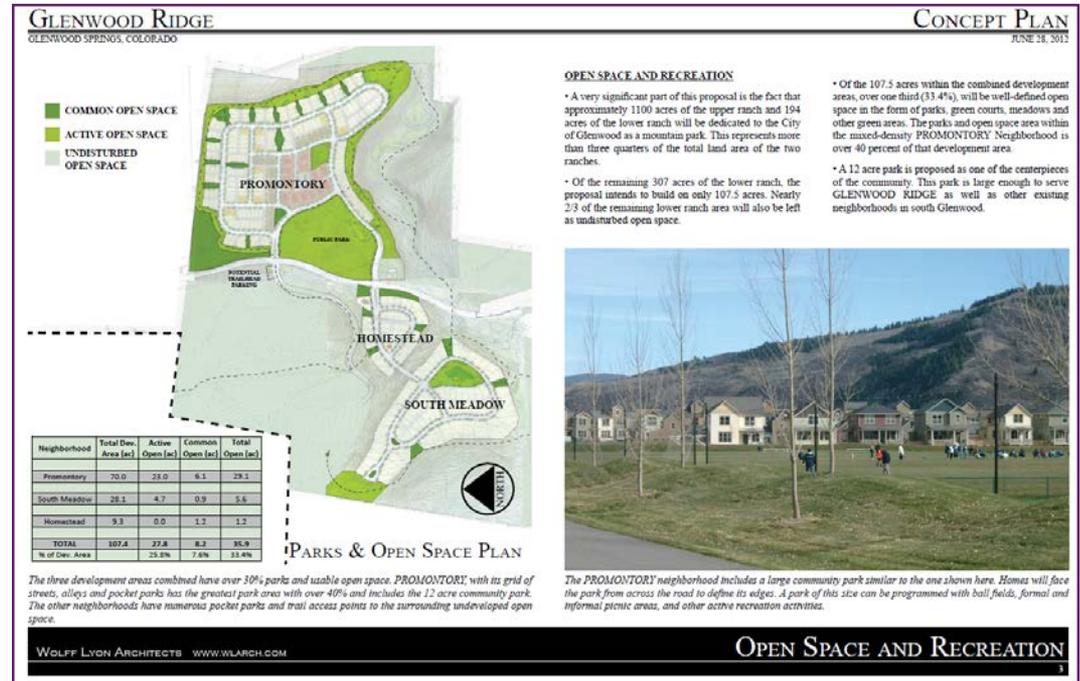
# South Bridge

## ■ South Bridge is important for future development

Since 2012, two projects have been rejected in large part due to concerns about adequate transportation infrastructure.

Three projects which greatly affect the south transportation network are under current consideration.

Approximately 300 (291 residential plus 6 commercial) units already have approval through the county for development.

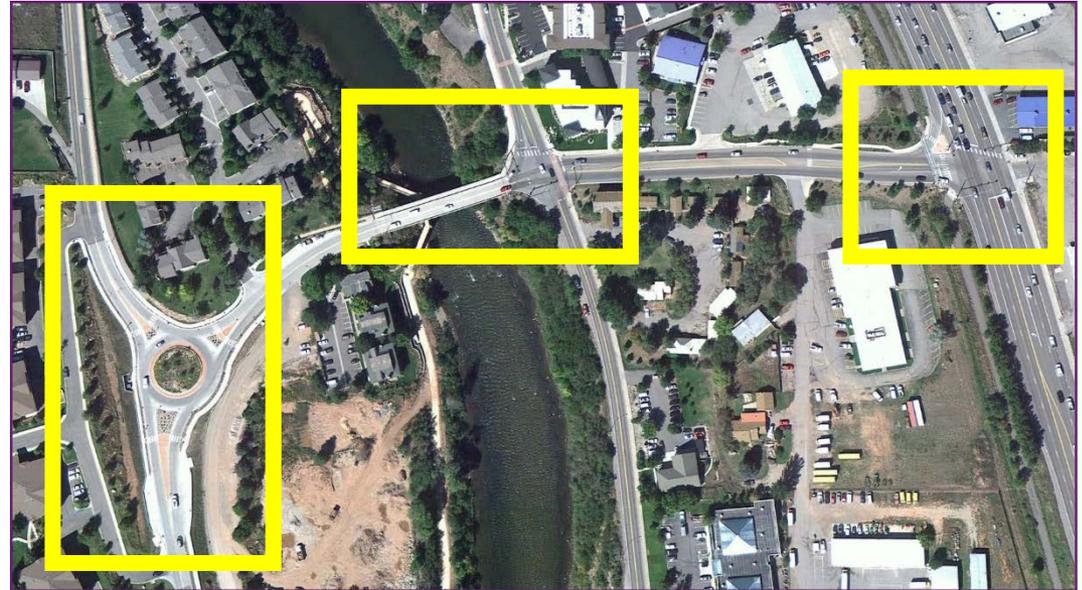


# South Bridge

## ■ South Bridge is critical to our transportation network

In 2002 the City began a transportation master planning process with the State to address severe congestion on SH 82 through town.

South Bridge was such a critical project for vehicular circulation, that the traffic model that was developed for the study included South Bridge as a built project.



# South Bridge

## ■ South Glenwood Transportation System Alternatives

If South Bridge is not built, the City and County will need to spend over 40 million to widen lanes and bridges to allow for development in south Glenwood and the County.

### With South Bridge

- South Bridge – 45 million
- Midland Avenue reconstruction – 12 million
- 27th Street Bridge reconstruction 2-3 lanes – 12 million
- Turn lane at Mount Sopris and Midland Avenue – 1.5 million

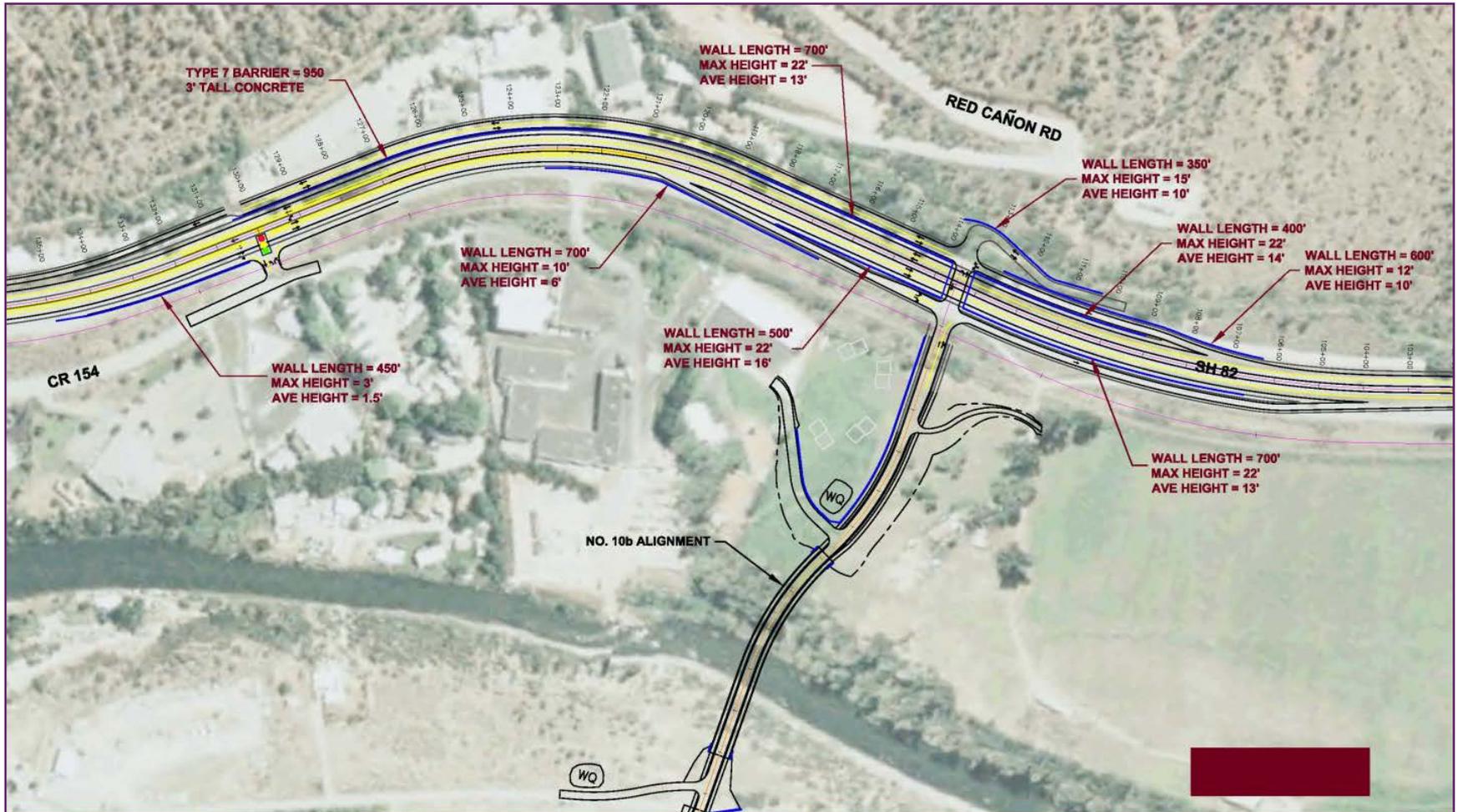
### Without South Bridge

- Midland Avenue reconstruction including additional retaining walls for left turn lanes on Midland – 15 million
- 27th Street Bridge reconstruction 4-5 lanes, intersection improvements plus right of way – 16 million
- 27th and Midland capacity improvements (widen from the bridge 350' to 27th and Midland. Add a second lane to the roundabout. Expand Midland 800' to 850' in both directions to transition back to one lane in each direction) – 6 million
- Right of way and additional lane construction from SH 82 west bound – 3 million

# South Bridge



# South Bridge

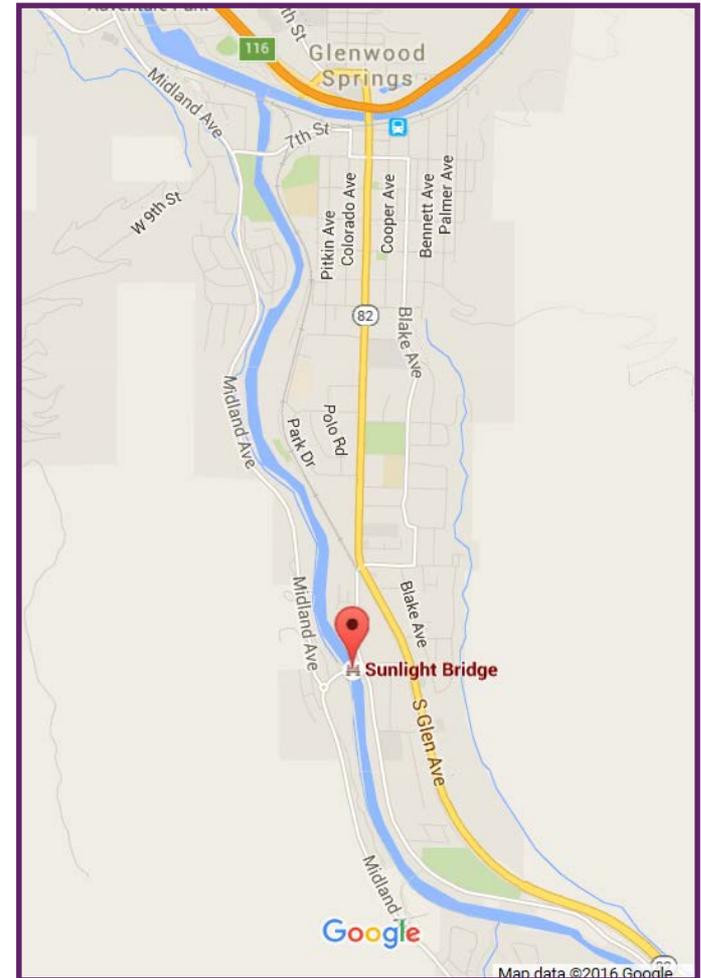


**RAISE SH82 - CONSTRUCT INTERCHANGE WITH NO. 10B**



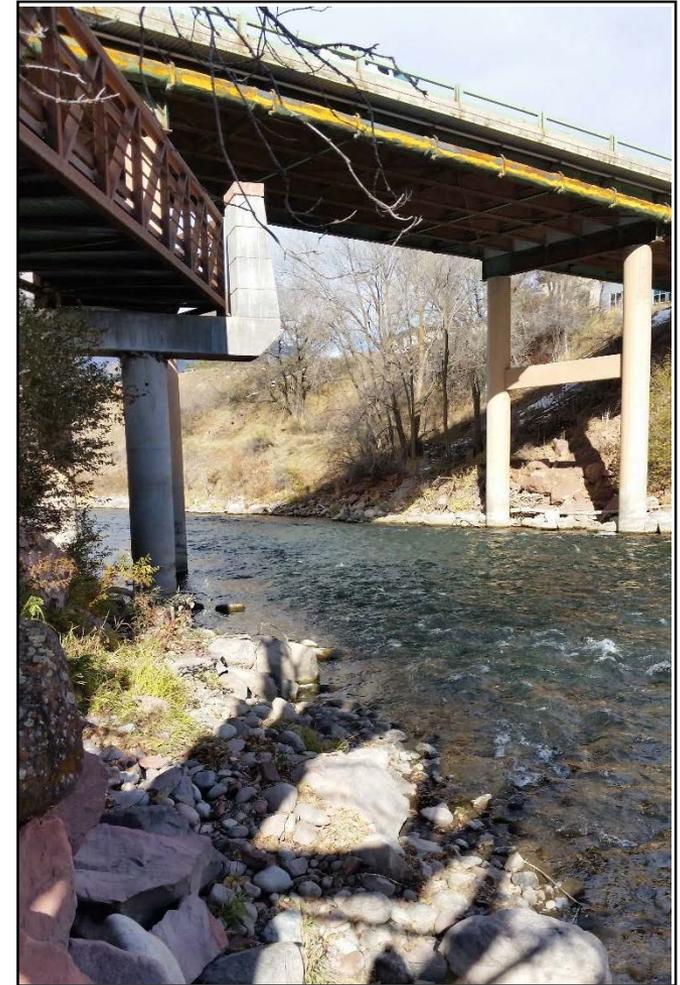
# Project Overview

- Replace the 27<sup>th</sup> Street bridge over the Roaring Fork River
- Improve the 27<sup>th</sup> Street and South Grand Avenue intersection
- Construction after the Grand Avenue Bridge Project is complete (2018)
- Bridge carries multiple utilities
  - Sewer (gravity)
  - Water
  - Gas
  - Communication



# Project Overview

- Provide a safe route
- Develop a 20-year solution
- Keep the Atkinson Trail in current location
- Minimize impacts to:
  - Traffic
  - Pedestrians
  - Utilities
  - Adjacent landowners
  - The Roaring Fork River
  - Boaters



# Traffic Analysis



## ■ South Glenwood travelshed description

- City limits south of 27th/Midland and west of River
- CR 156 (Old Cardiff Bridge Road)
- CR 127 (Three Mile Road)
- CR 163 (Airport Road)
- CR 114 (Four Mile Road)
- **Includes: 1541 residential units, elementary school, municipal airport, ski area, and other uses**
- **Approved, unbuilt residential stock = 291 units**

## ■ Existing Corridor Traffic Operations

Table 1  
Baseline Intersection Level of Service Summary

Control at S. Grand	Intersection	AM		PM	
		LOS	DELAY <sup>1</sup> (s)	LOS	DELAY (s)
Existing Signal Timing	Midland Roundabout	B	10.1	A	9.3
	S. Grand Signal	B	13.4	F	175.7
	SH 82 Signal	B	16.7	D	39.6
AM Turn Restrict.	Midland Roundabout	C	16.8	A	9.3
	S. Grand Signal w/ AM Restriction	C	30.4	F	175.7
	SH 82 Signal	C	31.2	D	39.6
Split-Phase Signal	Midland Roundabout	B	11.5	A	8.7
	S. Grand Split-Phase Signal	C	30.9	F	183.7
	SH 82 Signal	B	17.1	D	36.5
Mini Roundabout	Midland Roundabout	B	12.4	B	11.2
	S. Grand Mini Roundabout	D	31.2	F	92.7
	SH 82 Signal	B	13.8	D	51.8

1 – Delay expressed as average delay per vehicle in seconds/vehicle.

## ■ Existing Corridor Improvement Needs

- CDOT striping and signal project (10/16)
- Exclusive westbound right turn at 27th/Midland roundabout

**Table 3**  
**Improved Baseline Intersection Level of Service Summary**

	Intersection	AM		PM	
		LOS	DELAY <sub>1</sub> (s)	LOS	DELAY (s)
Existing Signal Timing	Midland Roundabout	B	10.1	A	5.3
	S. Grand Signal	B	13.4	D	38.5
	SH 82 Signal	B	16.7	C	23.1
Mini Round- about	Midland Roundabout	B	13.1	A	4.3
	S. Grand Mini Roundabout	C	17.1	C	16.7
	SH 82 Signal	C	23.9	C	23.1

1 – Delay expressed as average delay per vehicle in seconds/vehicle.

# Traffic Analysis

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## ■ 20-Year Traffic Volumes

### ■ Future traffic (20-Year) assumptions:

- South Bridge is open!
- Buildout of approved residential units in travelshed

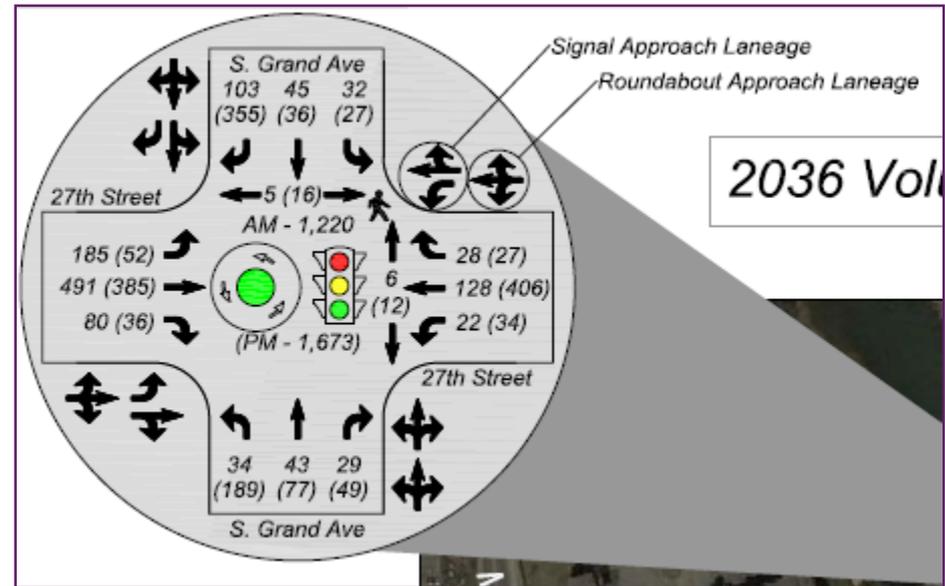
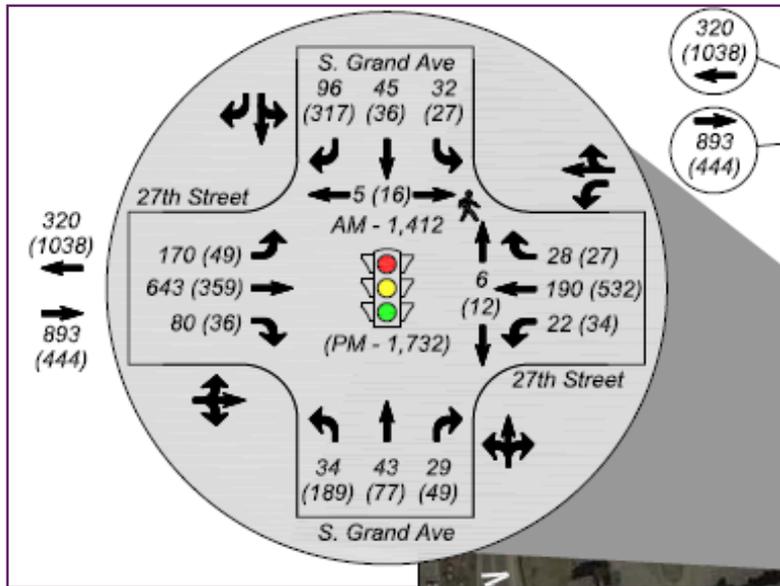
### ■ Development of 20-Year volumes

1. Reduce 27th Street volumes by 40% (per EA)
2. Add 60% of buildout traffic generated
3. Assign new traffic per existing distributions
4. Grow unaffected movements by CDOT factor

# Traffic Analysis



## ■ 20-Year Traffic Volume Comparison



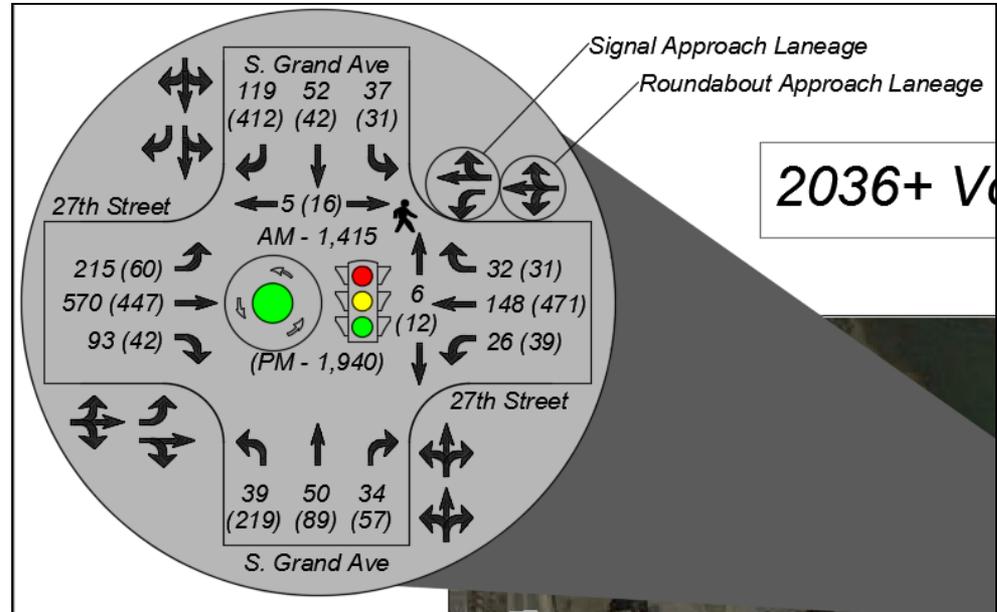
2016 Existing Traffic Volumes

2036 Buildout Traffic Volumes  
With South Bridge

**= NET REDUCTION**

## ■ 20-Year Traffic Volumes with Additional Growth

Add 16% growth to 20-year volumes to account for additional growth that could occur after South Bridge is built.



**2036 Buildout with Additional Growth Traffic Volumes With South Bridge**

**= Acceptable Operations**

# Traffic Analysis

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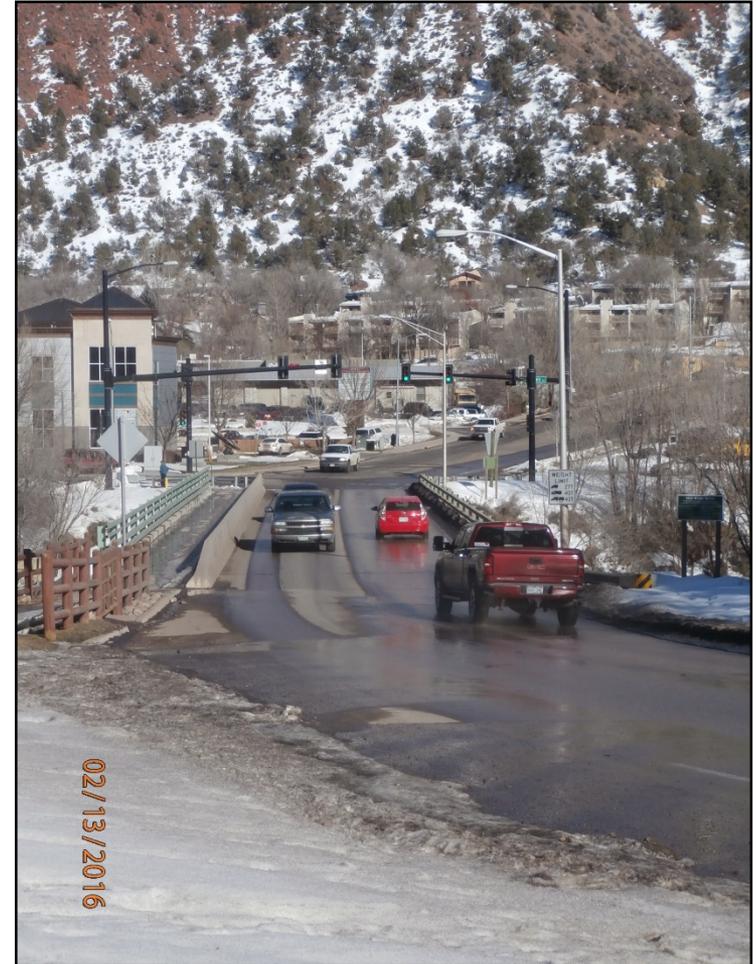


## ■ Conclusions:

- Exclusive westbound right at 27th/Midland
- Two-lane bridge with roundabout at 27th/S. Grand
- Three-lane bridge with signal at 27th/S. Grand

# Alternatives Analysis

- Signal vs roundabout
  - Signal: Three-lane bridge includes a left turn lane
  - Roundabout: Two-lane bridge with a single-lane roundabout
- Pedestrian bridge vs attached sidewalk
- Alignment and construction
- Bridge layout



# Alternatives Analysis

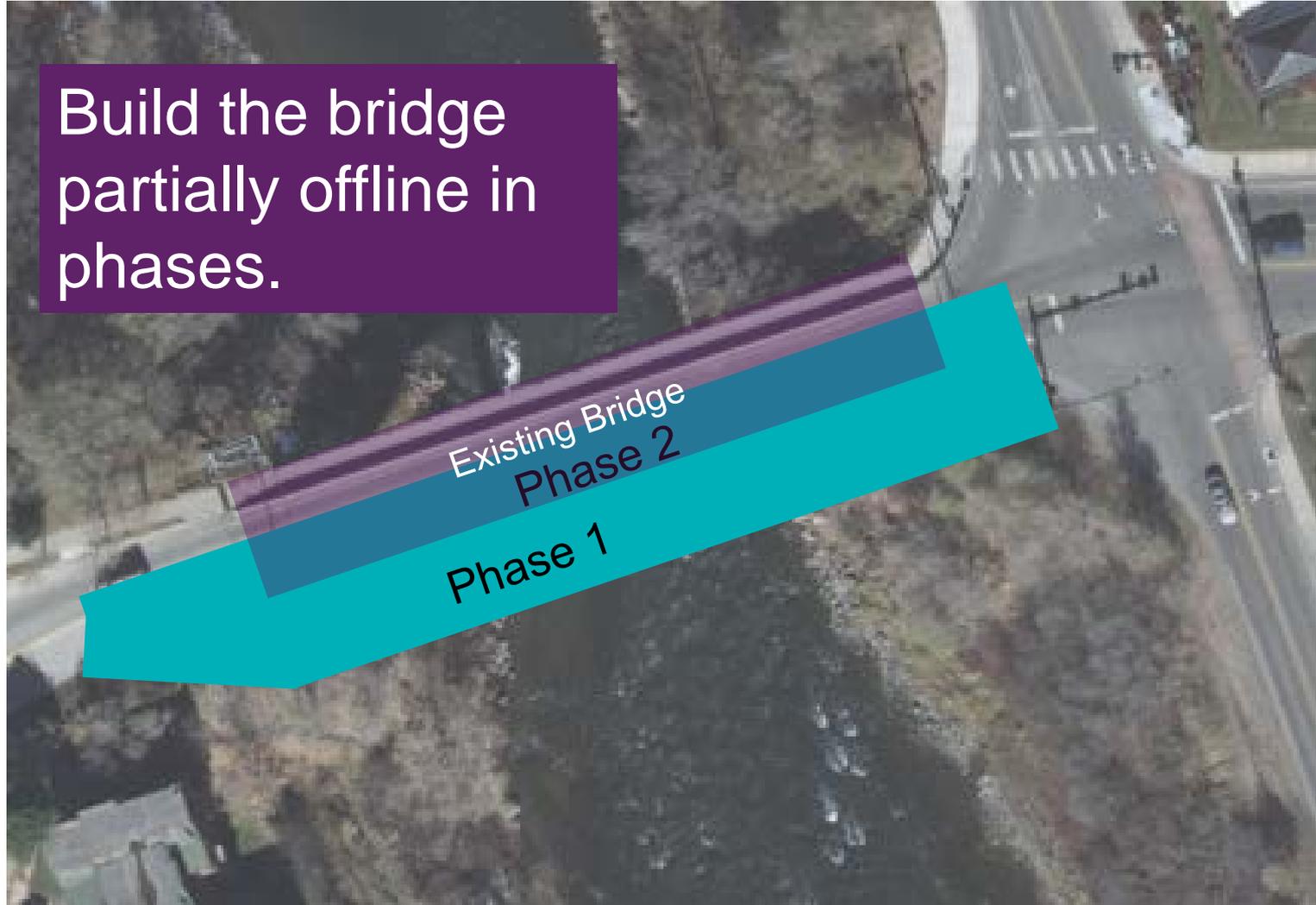


# Alternatives Analysis



# Alternatives Analysis

Build the bridge partially offline in phases.



# Alternatives Analysis

Build the bridge  
on the existing  
alignment.

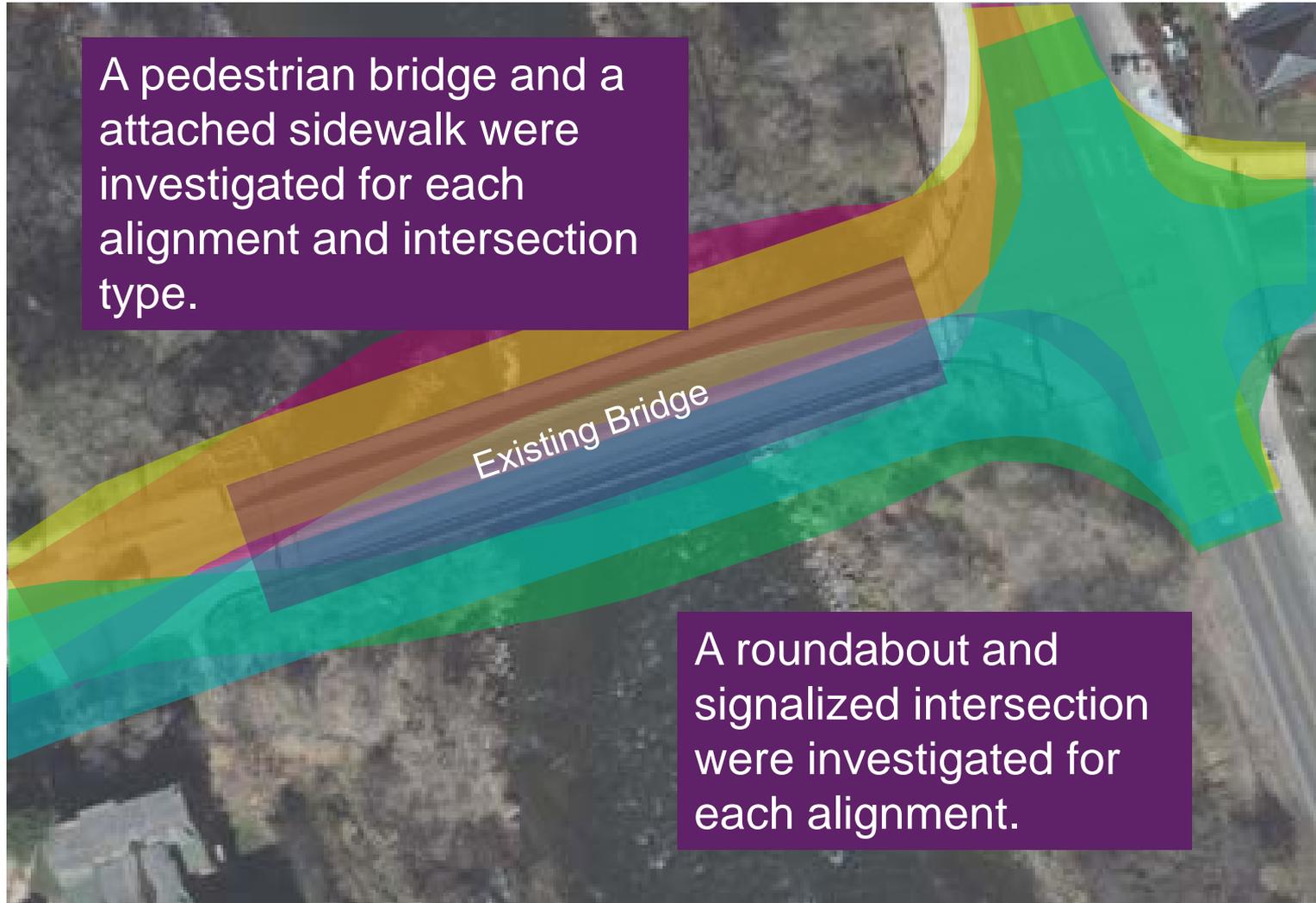
New Construction

Temporary

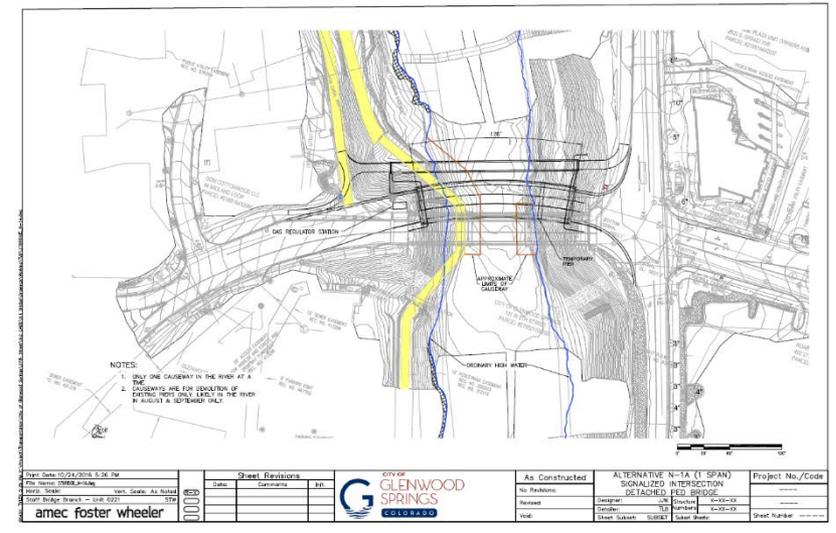
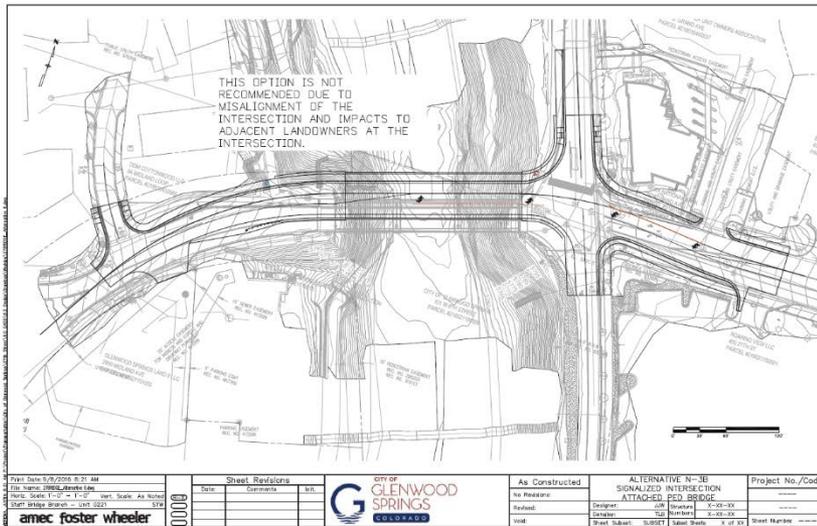
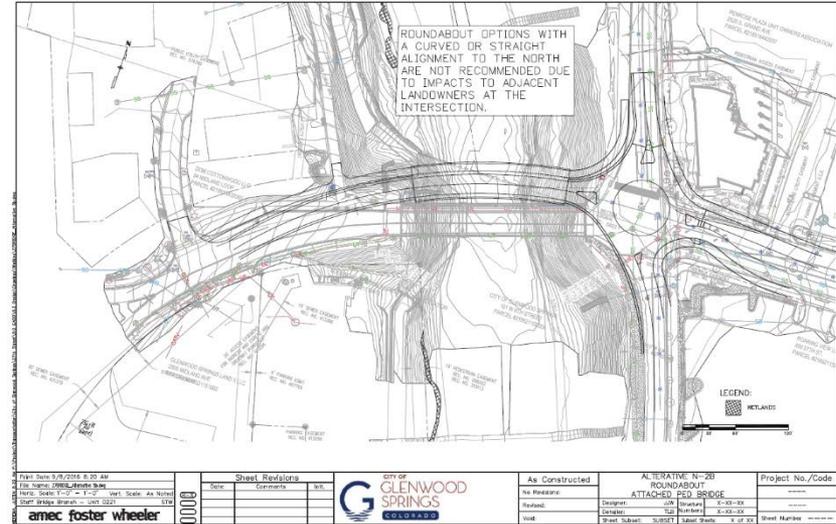
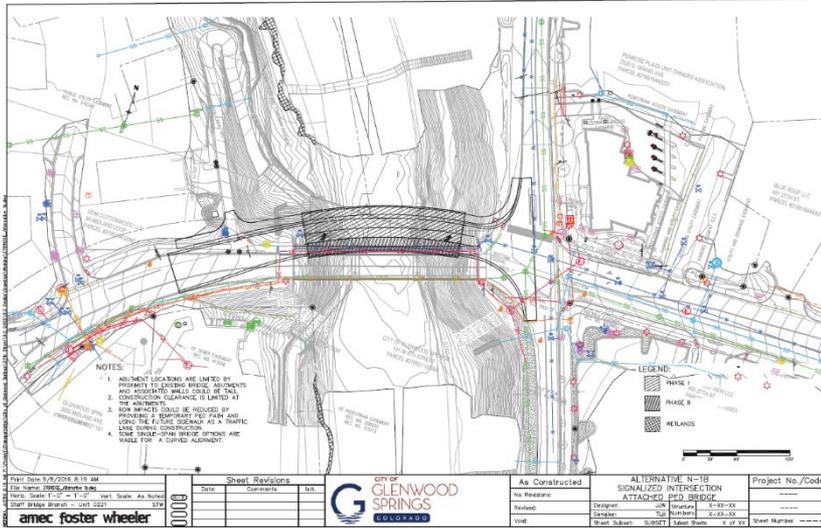
Full closure.

Accelerated Bridge  
Construction (ABC)  
investigated.

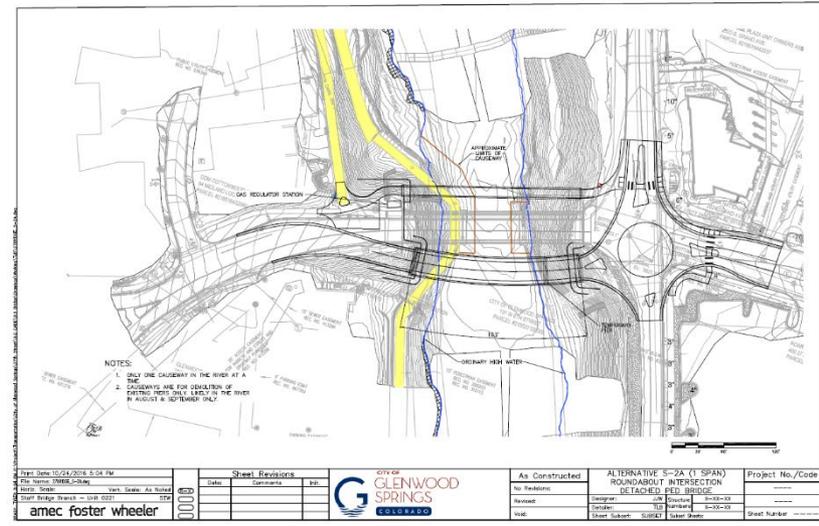
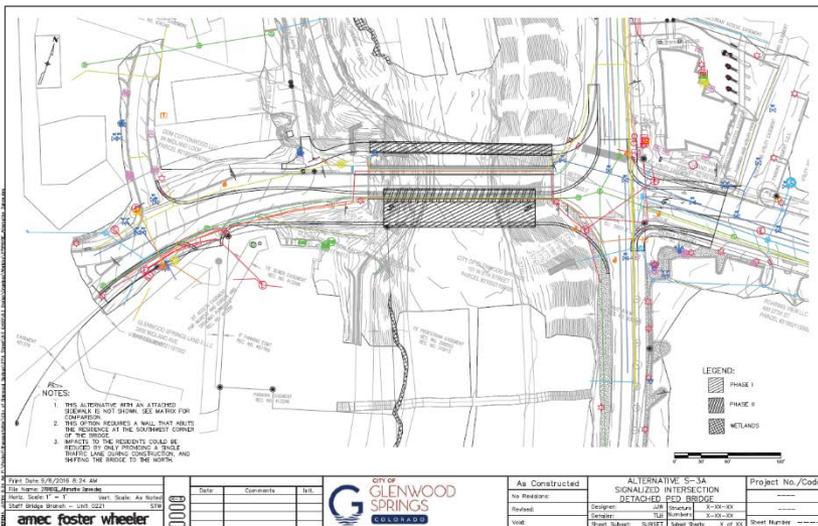
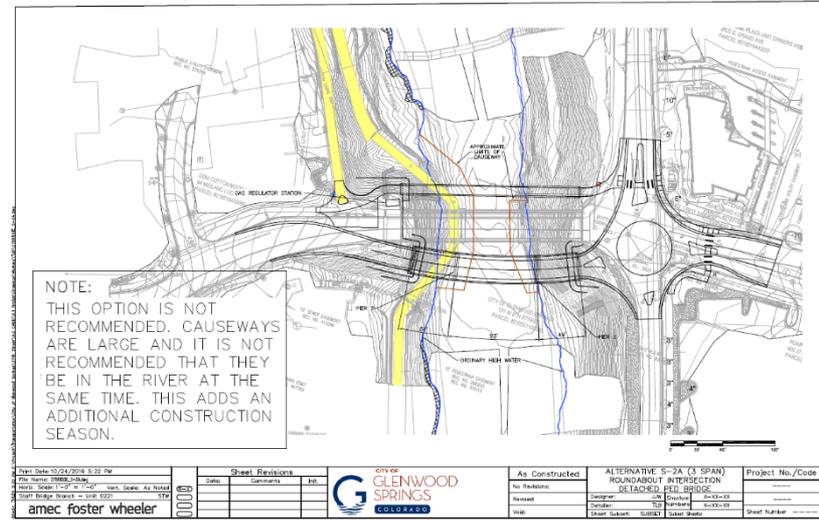
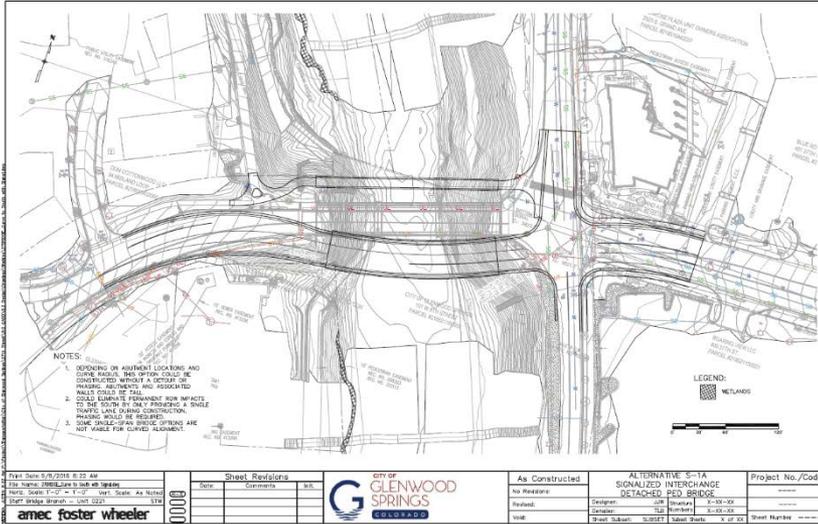
# Alternatives Analysis



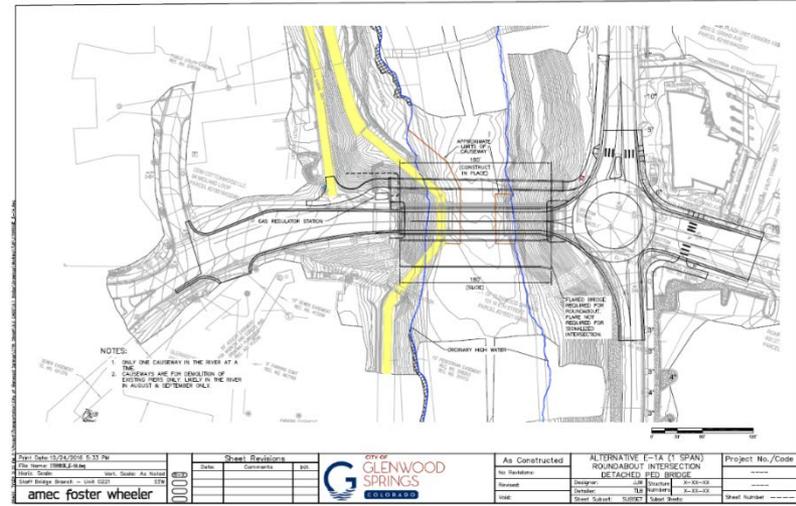
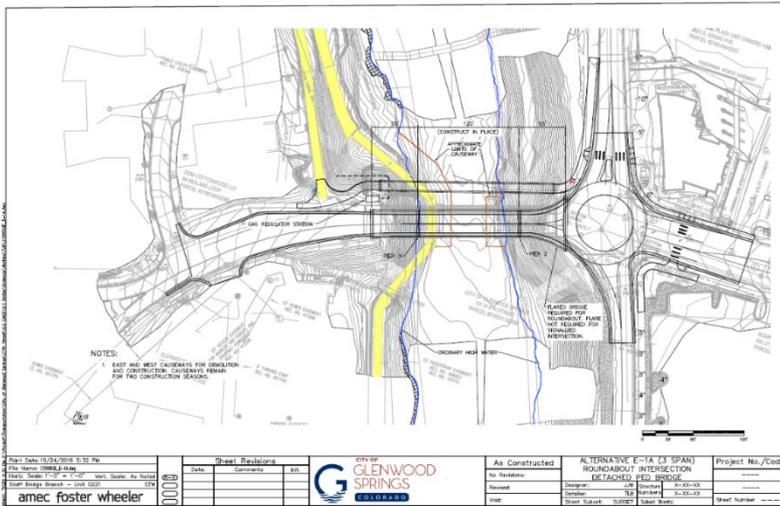
# Alternatives Analysis



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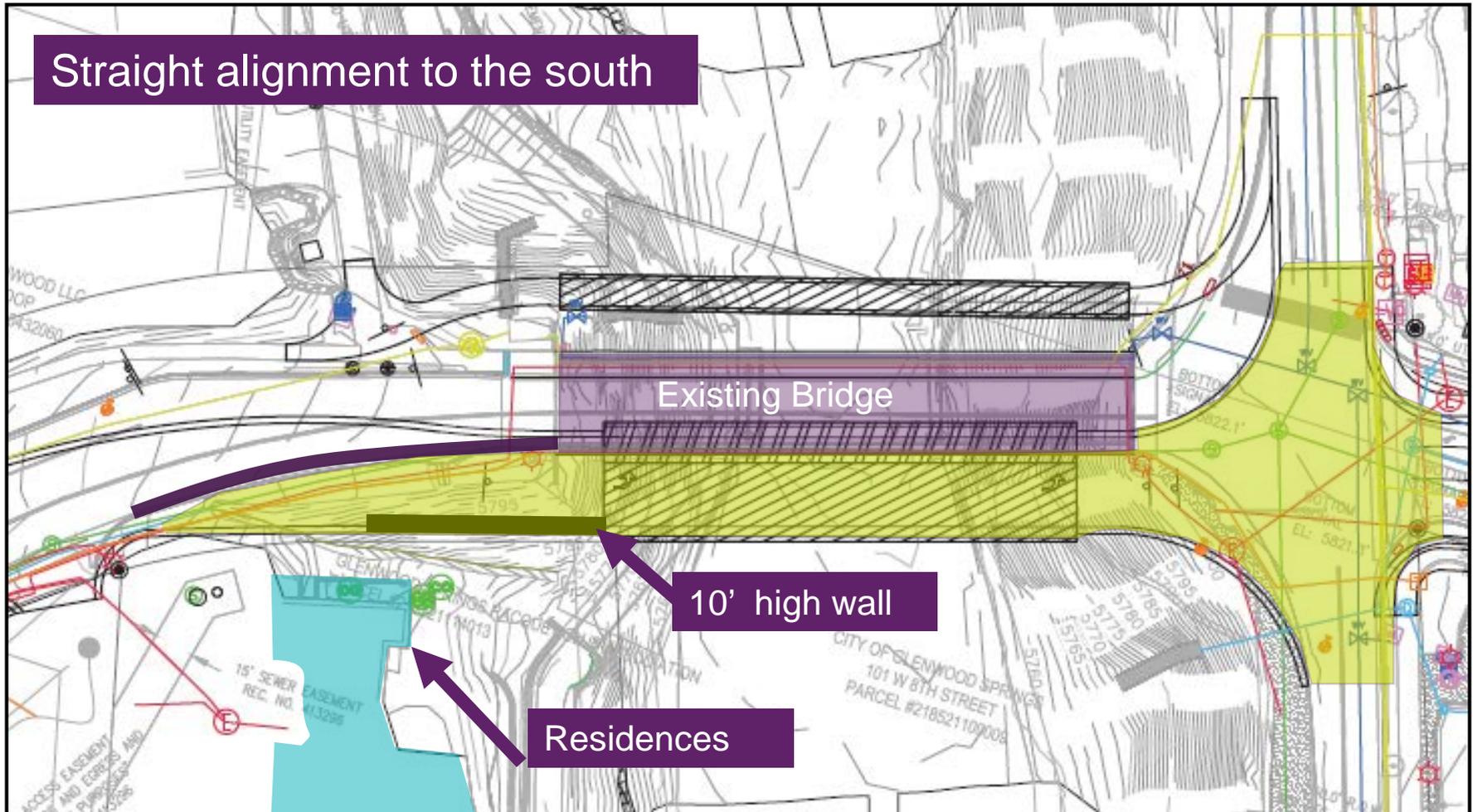
# Alternatives Analysis

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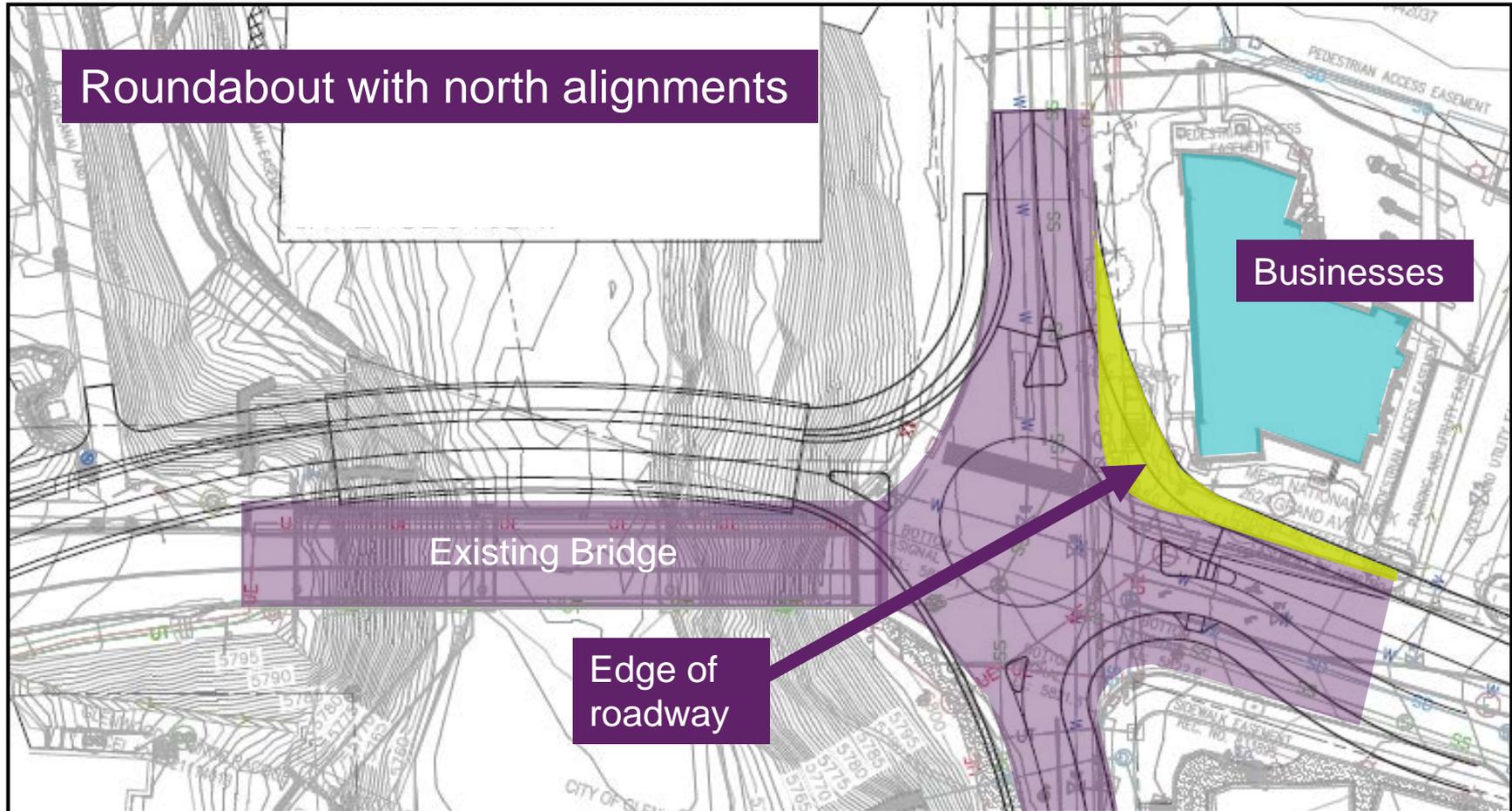


- Alternatives eliminated by the project team for:
  - Impacts to adjacent landowners
  - Misalignment of the intersection
  - Constructability
  - Impacts to the Roaring Fork River

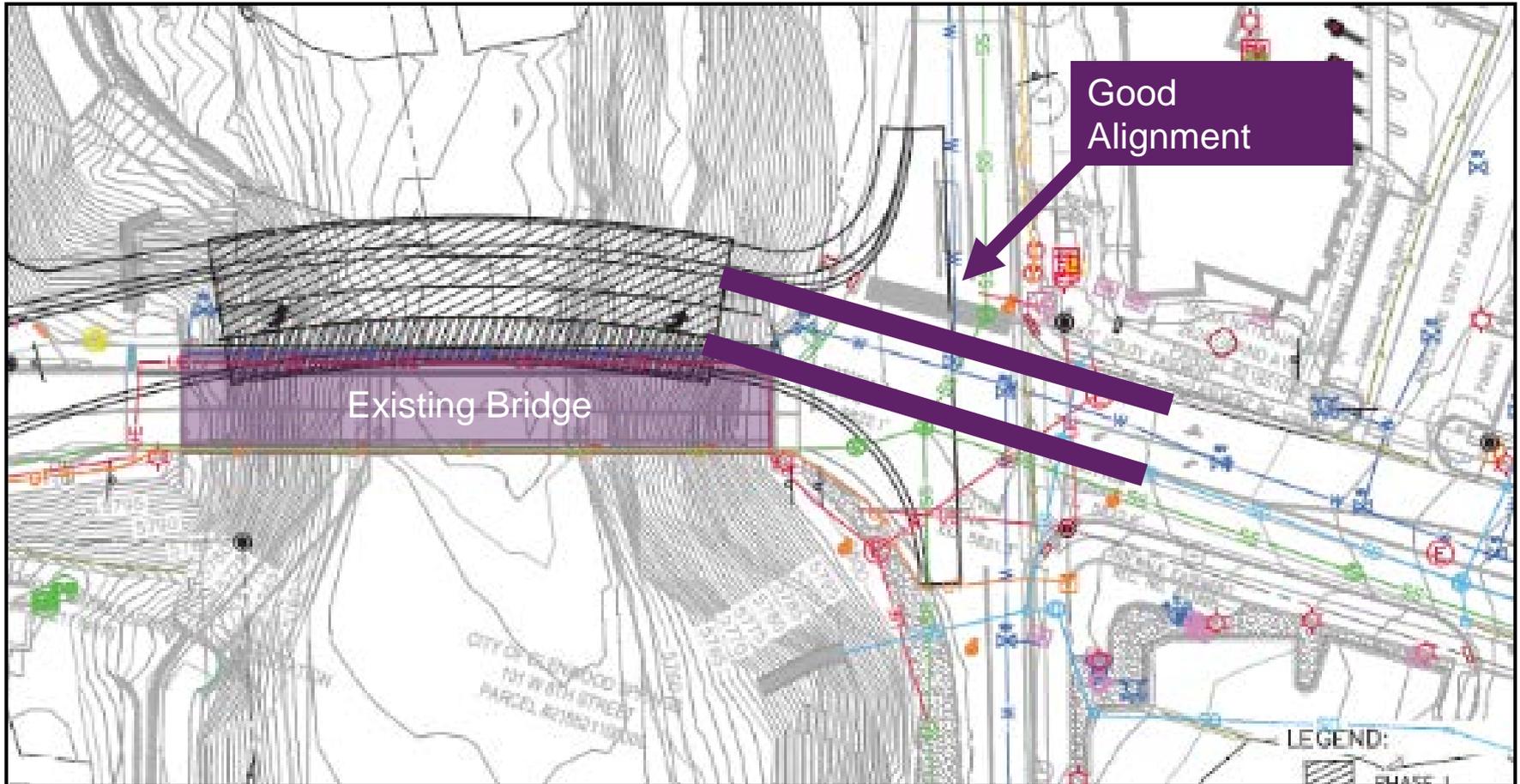
# Alternatives Analysis



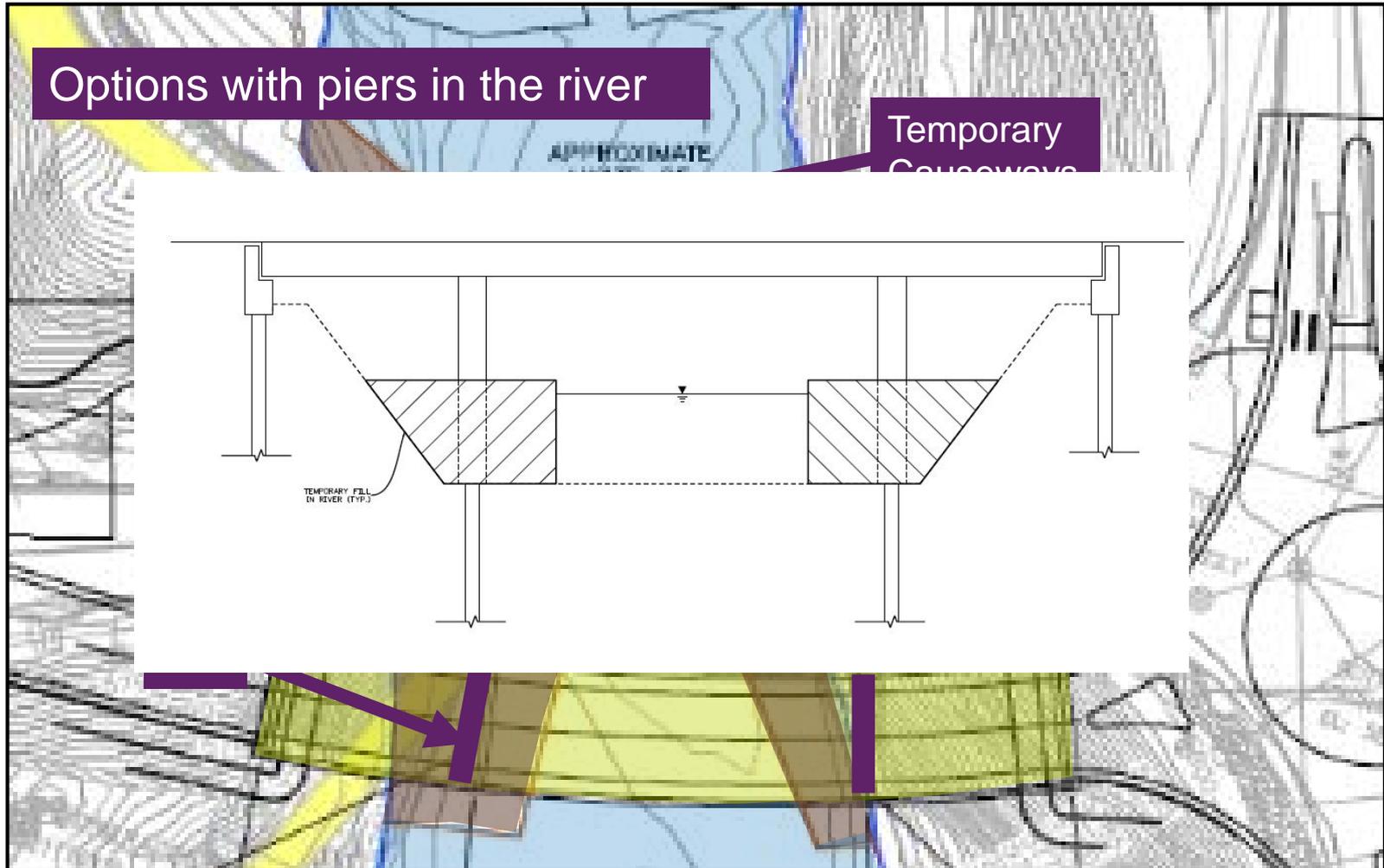
# Alternatives Analysis



# Alternatives Analysis



# Alternatives Analysis



# Alternatives Analysis

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- Pedestrian bridge selected instead of an attached sidewalk:
  - Improved pedestrian experience
  - Additional flexibility for relocating utilities
  - Cost of a pedestrian bridge is only slightly higher than adding a sidewalk to the bridge

# Alternatives Analysis

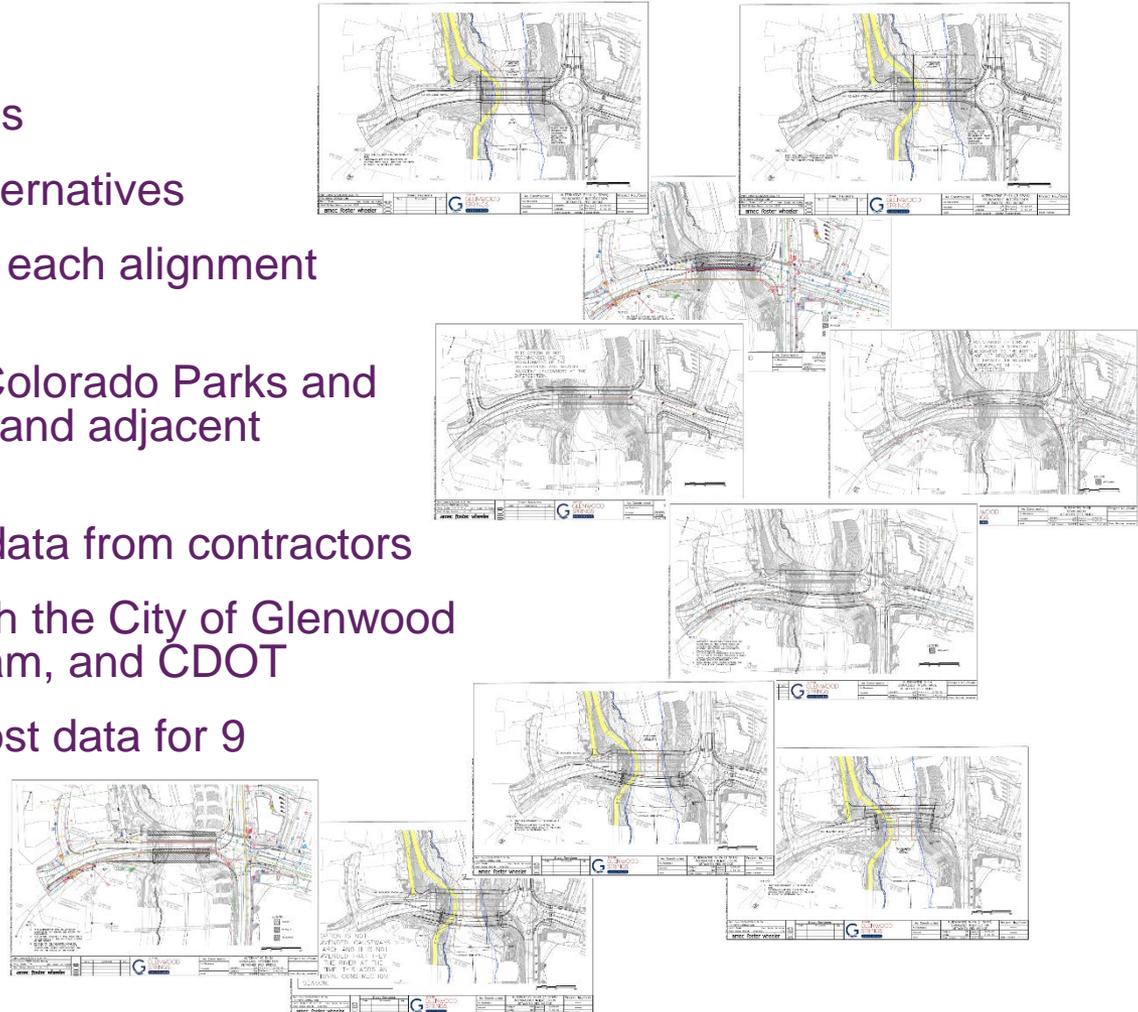
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- Roundabout vs signalized intersection:
  - Both improve traffic operations (roundabout performs slightly better)
  - For alignments to the north, a roundabout won't work
  - Roundabouts require more walls and construction in the intersection
  - Signalized intersections require 3-lane bridges (more expensive)

# Alternatives Analysis

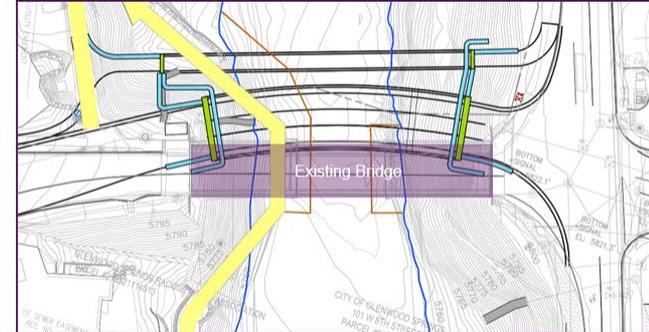
- Five month process
- Completed a traffic analysis
- Considered 30 different alternatives
- We evaluated feasibility of each alignment considered
- Coordinated with CDOT, Colorado Parks and Wildlife, utility companies, and adjacent landowners.
- Gathered constructability data from contractors
- Held multiple meetings with the City of Glenwood Springs, the consultant team, and CDOT
- Developed comparative cost data for 9 alternatives



# Recommended Alternatives

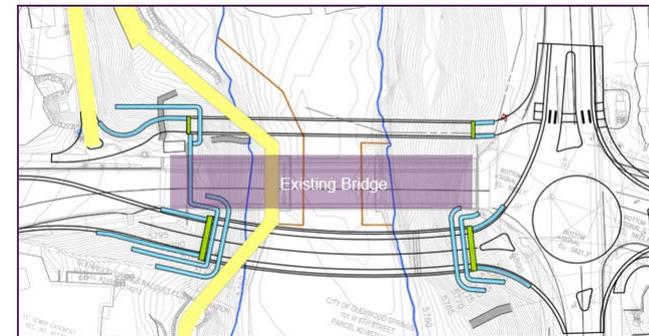
## 1. Curved alignment to the north

- Three-lane bridge with signal
- Built partially offline in phases



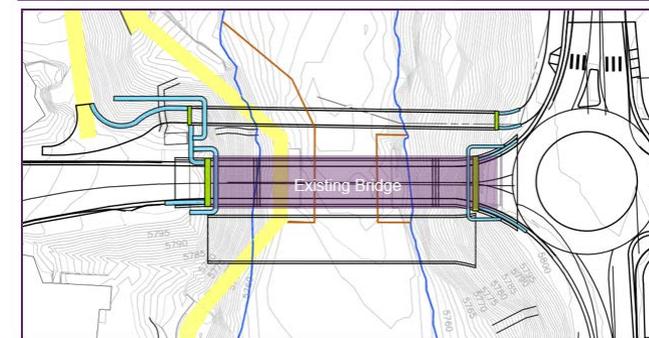
## 2. Curved alignment to the south

- Two-lane bridge with roundabout
- Built offline

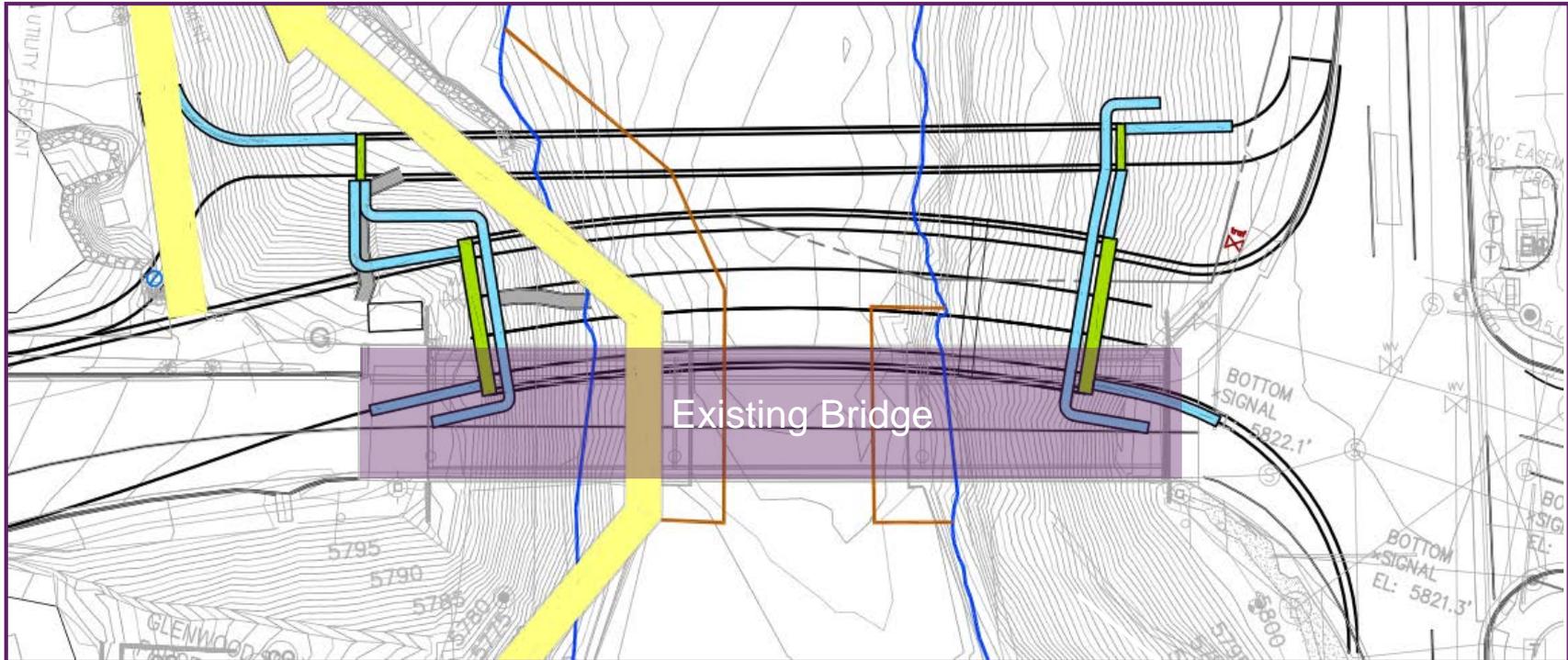


## 3. Existing alignment

- Two-lane bridge with roundabout
- Built offline and slid into place



# Curved alignment to the north



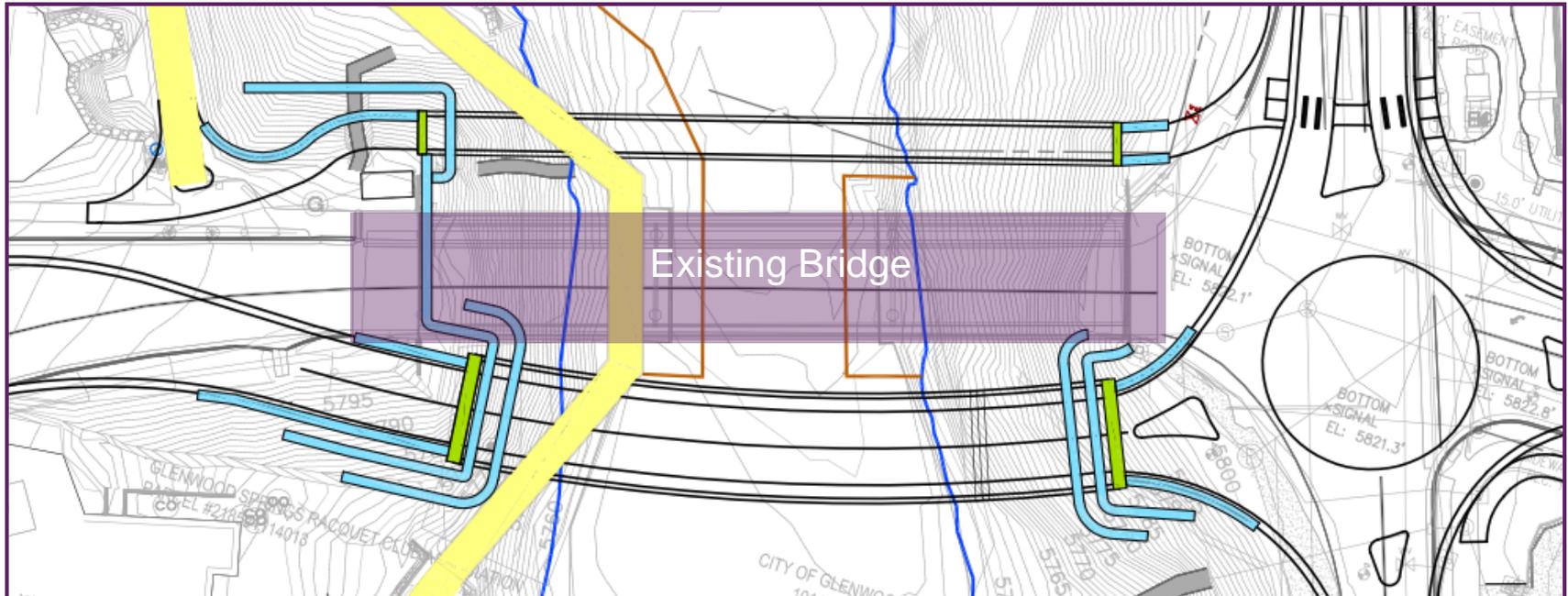
## ■ Pros

- Two lanes open during construction
- Minimal impacts to adjacent landowners

## ■ Cons

- Requires relocation of regulator station
- Curved sewer line
- Increased number of disturbed areas
- Longest construction duration

# Curved alignment to the south



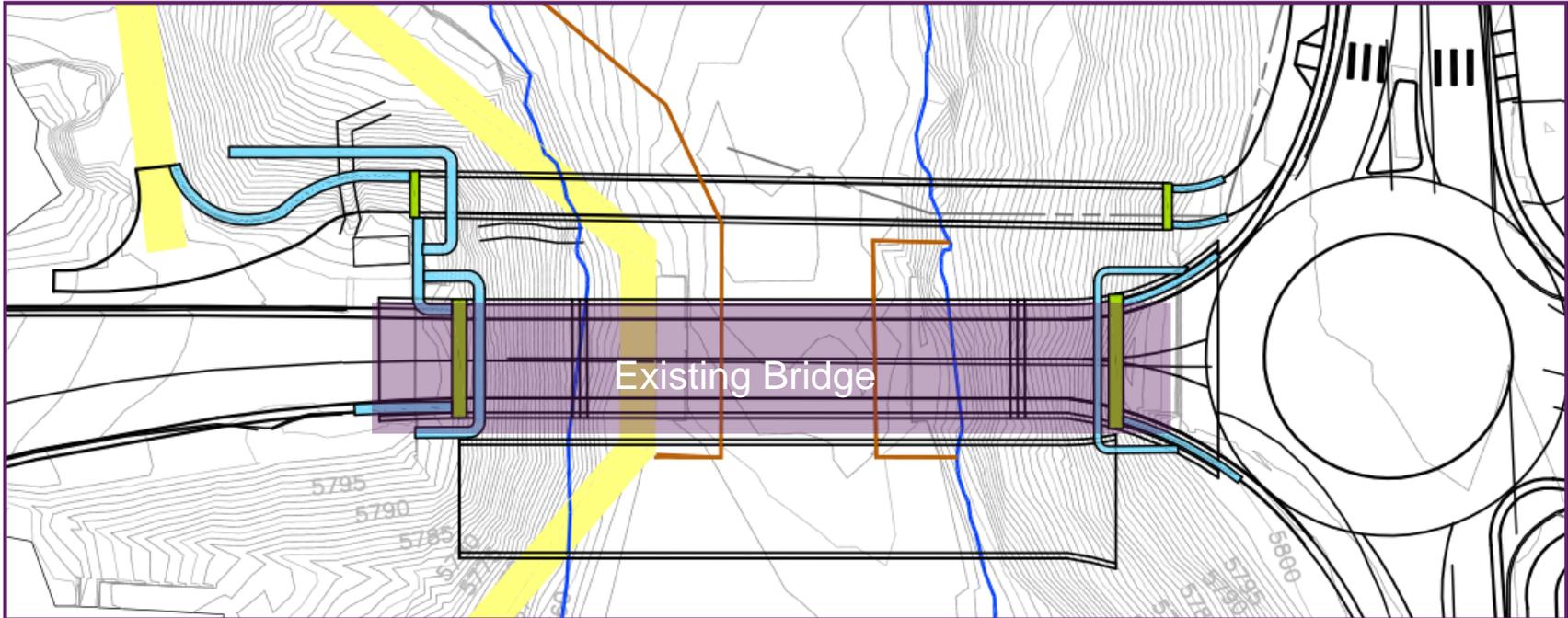
## ■ Pros

- Two lanes open during construction
- One season of construction

## ■ Cons

- Impacts to southwest residences
- Curved sewer line
- Increased number of disturbed areas

# Existing alignment (bridge slide)



## ■ Pros

- No significant permanent impacts
- One season of construction

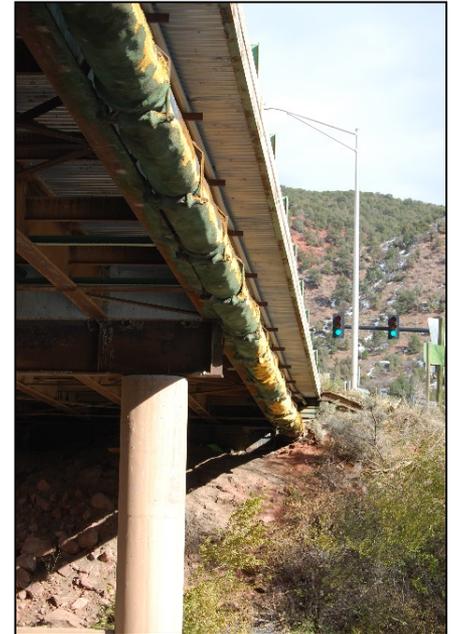
## ■ Cons

- Full closure during demo and bridge slide
- Round-the-clock construction during closure

# Construction Impacts

## ■ Utilities

- Goal is to minimize interruption to utility service.
- Pedestrian bridge to permanently carry a portion of the utilities.
- Other utilities will be placed on pedestrian bridge temporarily during construction.



# Construction Impacts

## ■ What to expect during construction:

- Atkinson Trail will be closed during bridge demolition and girder placement work
- Atkinson Trail impacts include potential need for temporary detour or overhead safeguards during work



# Construction Impacts

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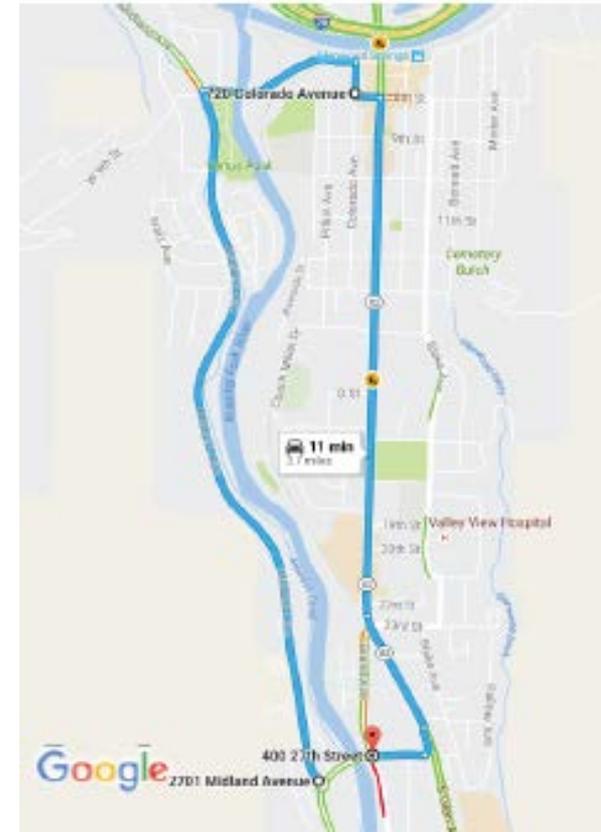


## ■ What to expect during construction:

- Construction to begin after the Grand Avenue Bridge project is complete
- 27<sup>th</sup> Street will have night closures during girder placement work
- South Grand Ave and 27<sup>th</sup> Street Intersection will have phased construction and traffic shifts
- Access to businesses will be maintained - may change during phases
- Contractor may need lanes on South Grand Avenue for staging (temporary)

# Construction Impacts

- **Detour route during bridge slide**
  - Midland Avenue to 8th Street to Grand Avenue
    - 3.5 miles out-of-direction travel
    - 2.5 miles increase for emergency response
    - 8th Street and Midland Avenue will exceed capacity, likely doubling travel times



# Aesthetic Treatments

## ■ Bridge

- Standard CDOT bridge rail
- Constant depth girders
- Abutments protected by rip-rap



# Aesthetic Treatments

## ■ Walls

- Types: MSE, Rockery, Cast-In-Place
- Heights: 10-ft at Abutments  
6-ft at Tiers
- Finishes
- Tiers spaced for planting



# Selection Process

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- **Many aspects must be considered**
- **Temporary vs permanent impacts must be weighed**
- **Best option may be difficult to determine when there are competing priorities**
- **Funding**