

Southbound US-191 Cold Creek Canyon Bridge

Mile Post 154.9 Structure Number 258

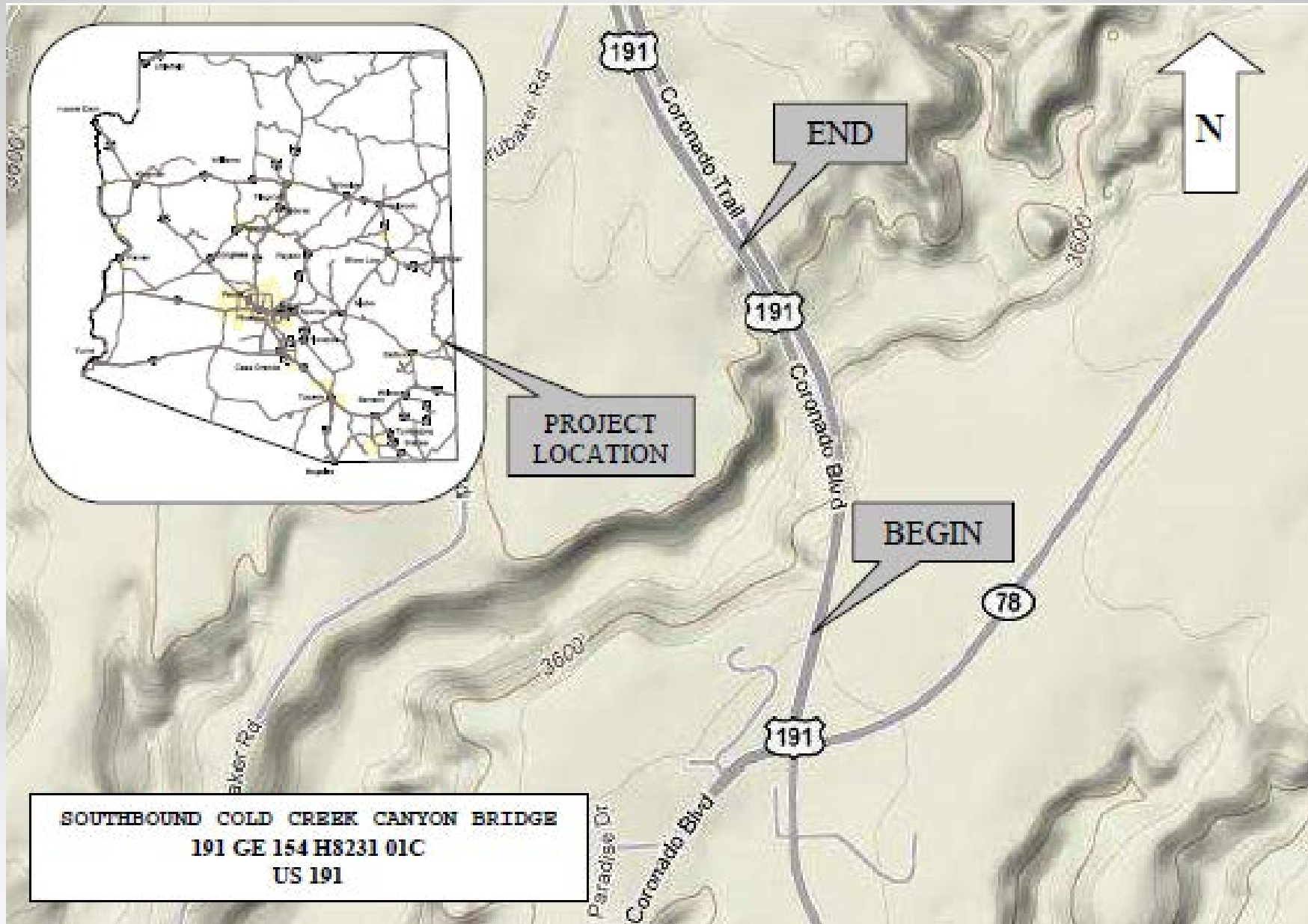
Chayan Bhattacharyya, P.E.

&

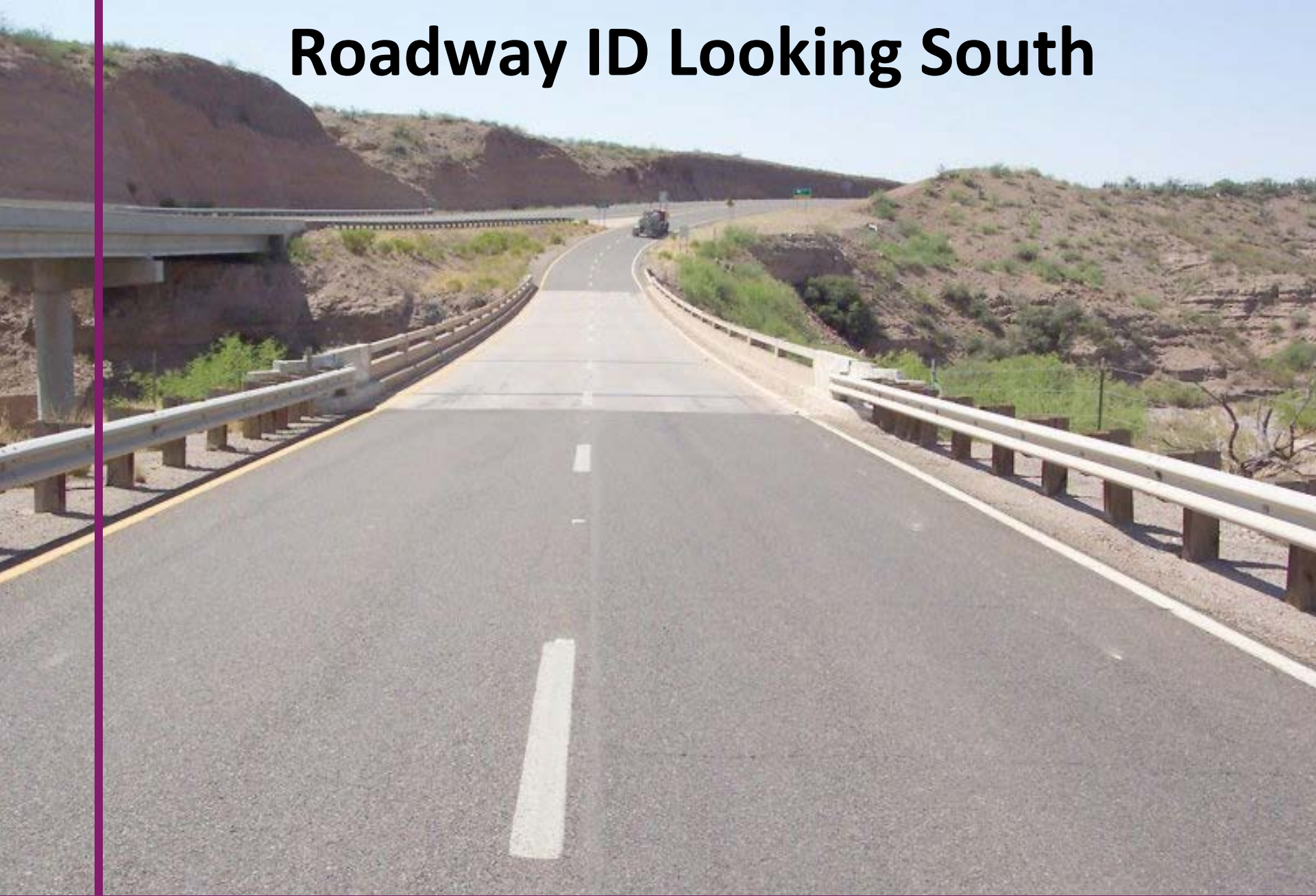
Mike Morrison, P.E.

Arizona Department of Transportation

Bridge Management Section



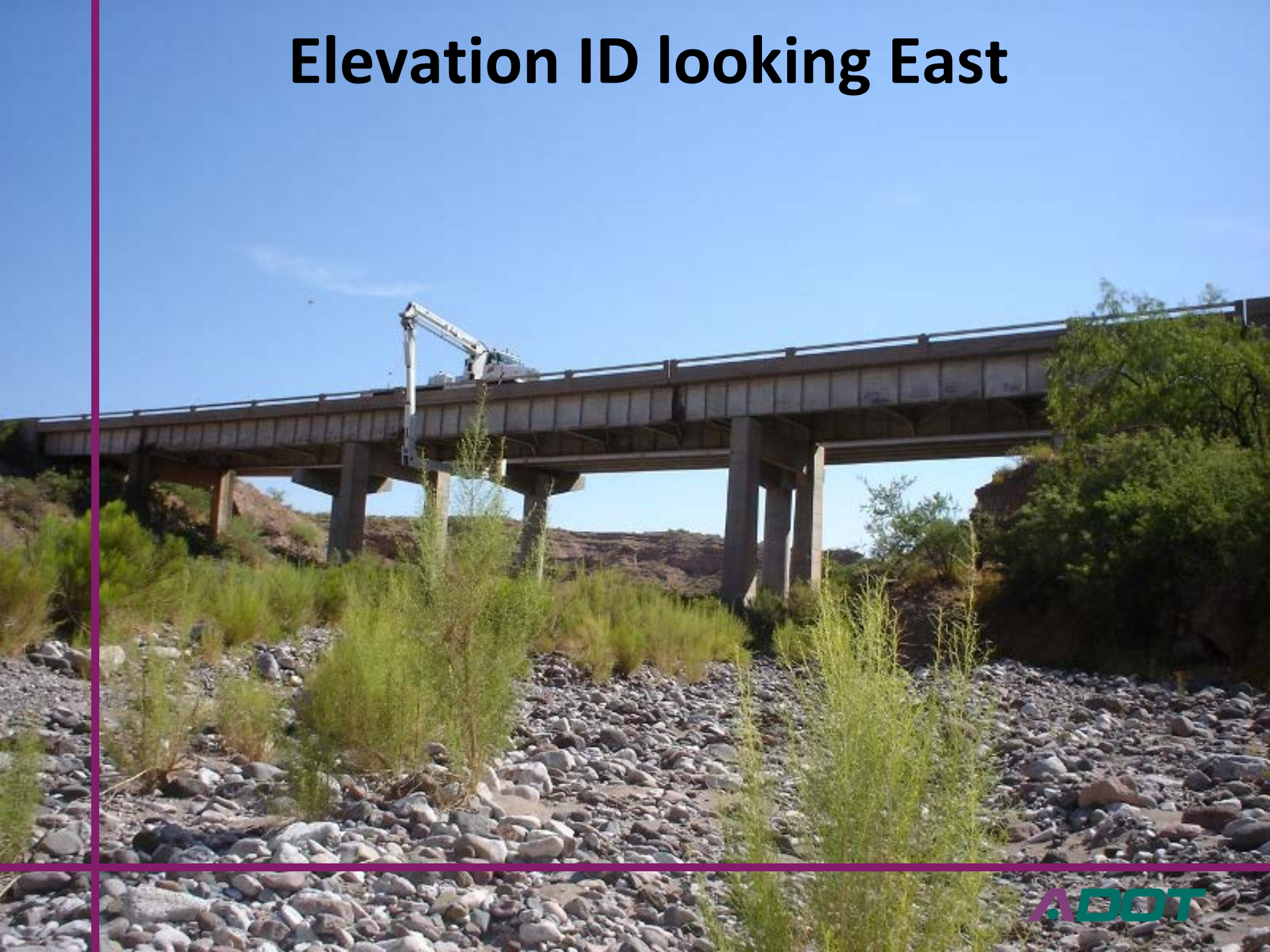
Roadway ID Looking South



Roadway ID Looking North



Elevation ID looking East



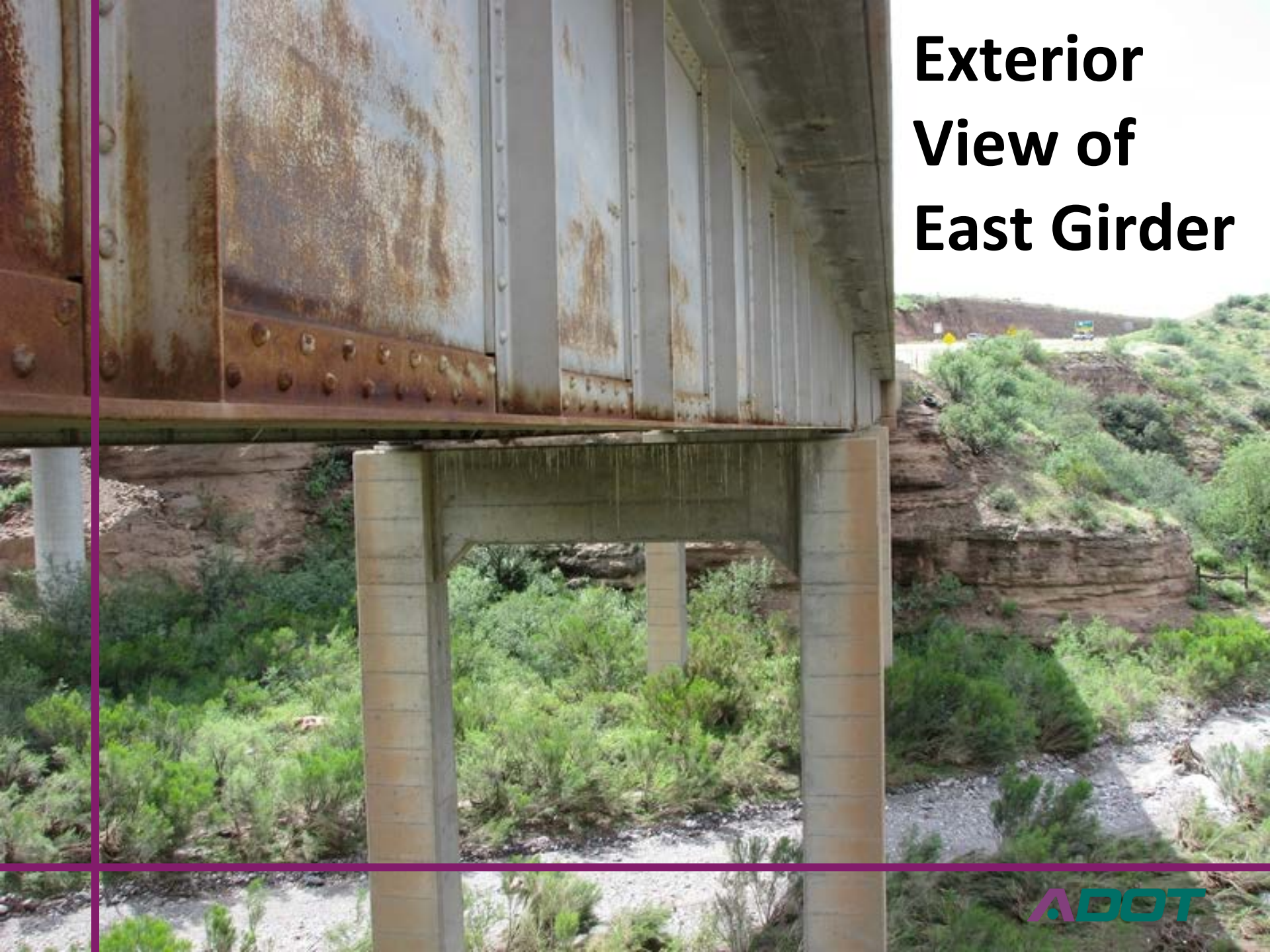
Elevation ID looking Northwest





Soffit View

Exterior View of East Girder



Exterior Pin Connection





**Interior Pin
Connection**



Southbound

Northbound



Roadway ID Showing Northbound and Southbound

Bridge Closure Looking South





**Deck Settlement at Span #3
Northwest Corner**



Close-up View of Deck Settlement



**Deck Settlement at Span #3
Northwest Corner**



Deck Settlement at NW
Corner of Span #3 (approx 8")

Plate Girder Settlement Looking East



Barrier Settlement Looking East



Bearing
separation



A photograph showing a concrete pier of a bridge structure. The pier is heavily damaged, with a large section of the concrete surface missing, exposing the internal steel reinforcement (rebar). The rebar is bent and protruding from the damaged area. The pier is supported by a steel girder above it. The background shows some green foliage and a clear sky.

Concrete Surface Failure of Pier #3 South Face

Close-up View

A photograph of a large, rectangular piece of spalled concrete. The concrete is light brown and shows significant surface damage, including several horizontal and vertical cracks. A yellow measuring tape is stretched vertically along the right side of the concrete. A blue and black work glove and a small yellow sticky note are placed on the concrete surface for scale. The background consists of dark, rocky soil and some green vegetation.

**Spalled Concrete
from Pier #3**



Pier No #3
(Near North End)
→

Pier #3 Top View of SW Bearing

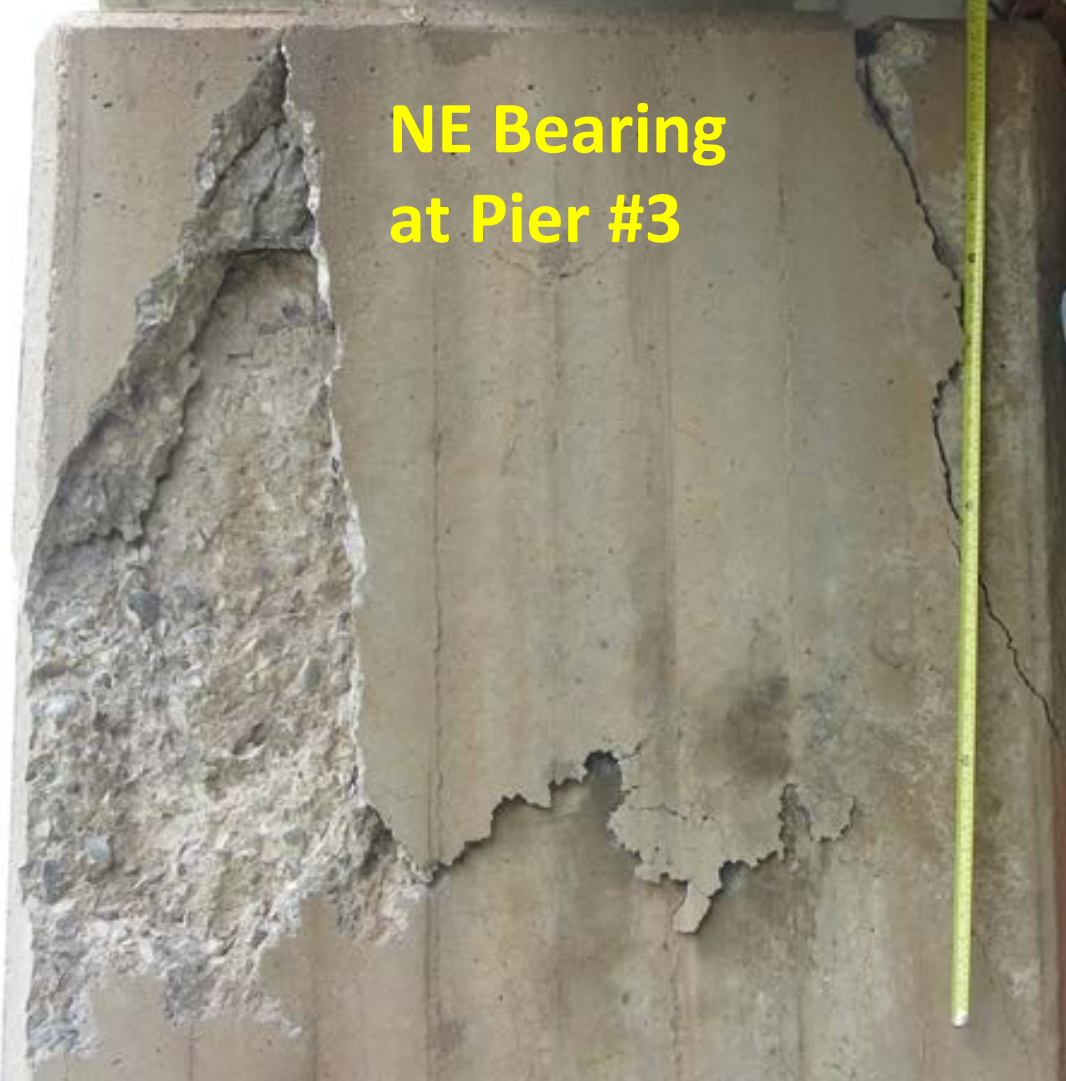
The image shows the interior of a bridge pier, labeled as Pier #3. It features a complex network of steel beams and girders supporting a concrete structure. The concrete is light-colored and shows signs of wear, including cracks and peeling. The steel is dark and appears to be made of heavy-duty material. The view is from a low angle, looking through the pier towards a natural landscape with green vegetation and a stream.

Pier #3

NE Bearing

NW Bearing

**NE Bearing
at Pier #3**





NE Bearing at Pier #3

Deck Removal











JLG LIFT

Volvo Re

888-899-VOLVO
www.volvorentals.com

ADOT



New Southbound Bridge

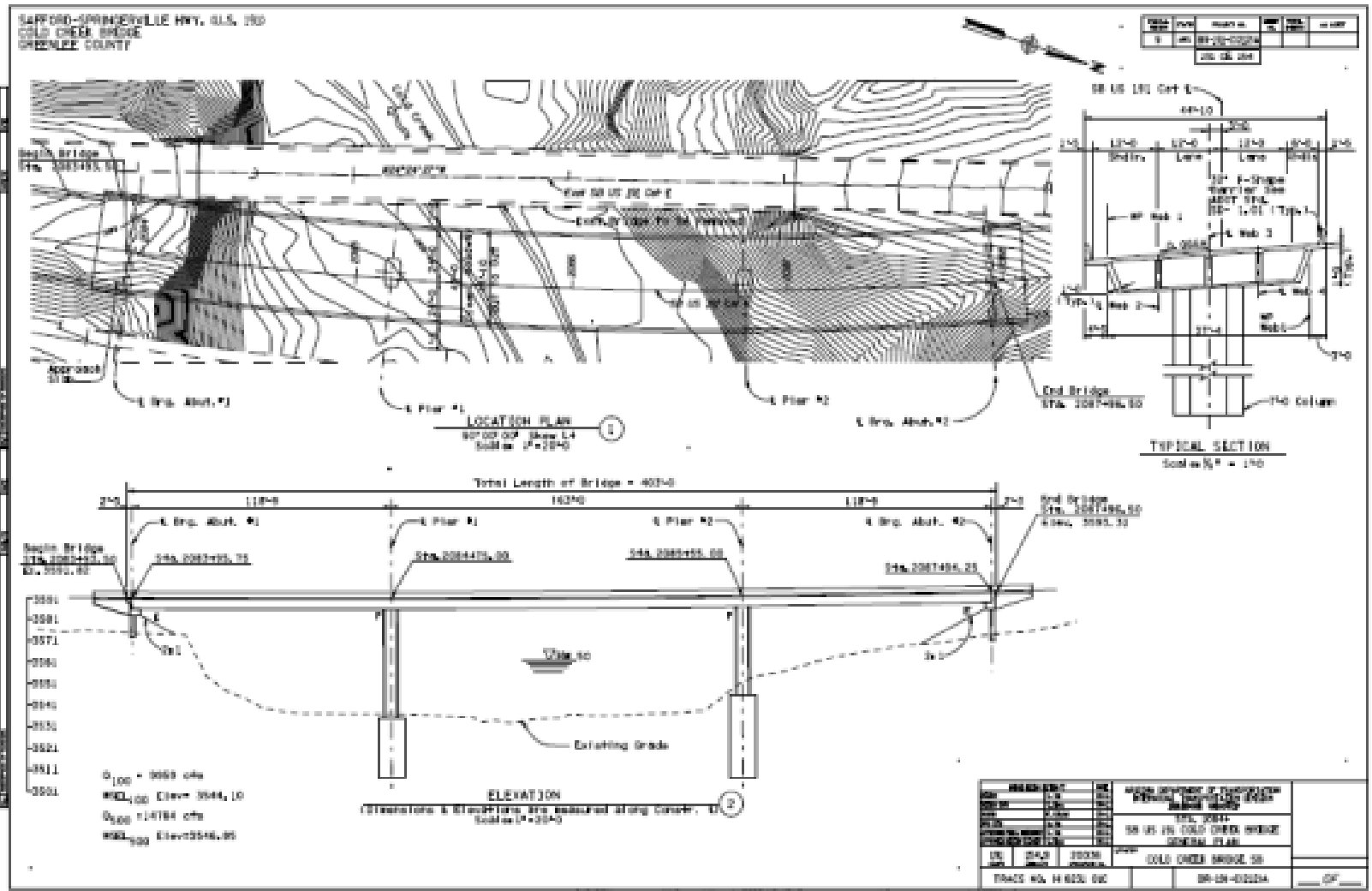
Design Considerations

- ▶ Structure Cost
- ▶ Constructability
- ▶ Bridge Aesthetics
- ▶ Construction Duration
- ▶ Traffic Impacts
- ▶ Environmental Impacts
- ▶ Channel Hydraulics
- ▶ Bridge Drainage
- ▶ Roadway Geometry
- ▶ Seismic Performance Category

Structure Types Considered

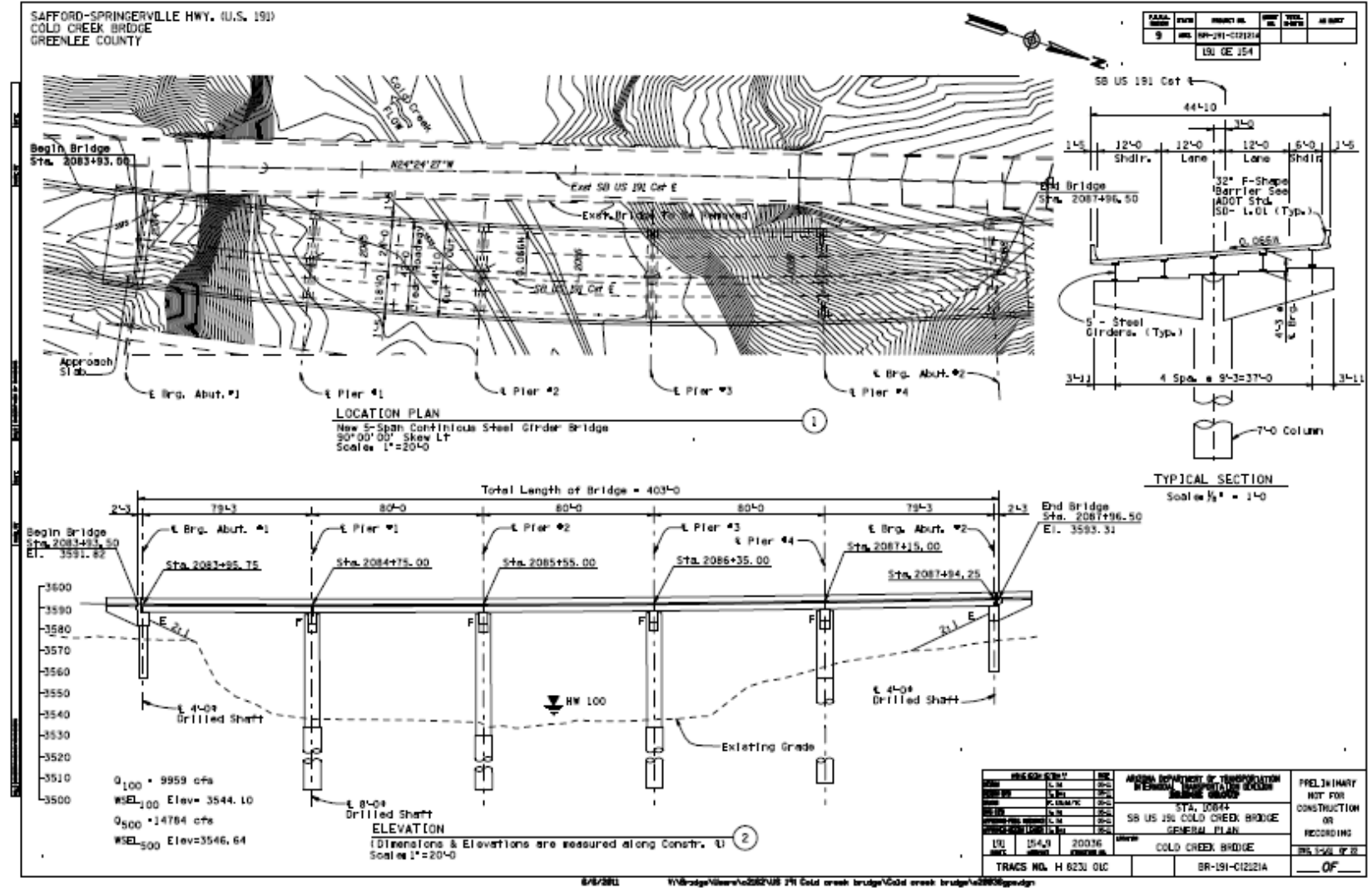
- ▶ Precast AASHTO Girder Bridge
- ▶ Steel Girder Bridge
- ▶ CIP Post-Tensioned Box Girder Bridge

Alternative #1 - CIP Post-Tensioned Box Girder Bridge



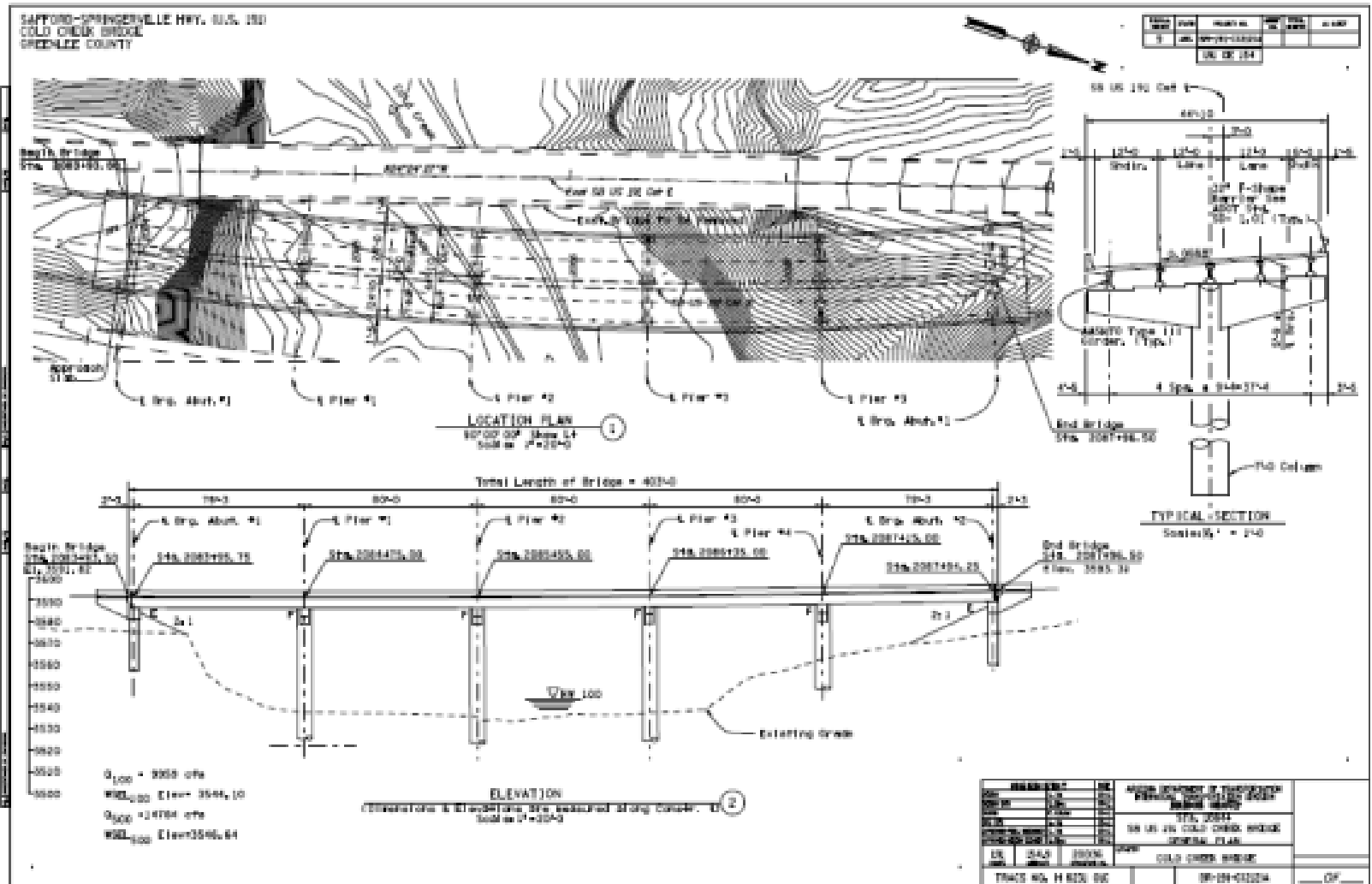
Cost Estimate: \$2,358,376

Alternative #2 - Steel Girder Bridge



Cost Estimate: \$2,411,033

Alternative #3 - Precast AASHTO Type IV Girder Bridge



Cost Estimate: \$2,181,991

Northbound Bridge



- ▶ **413-foot Five Span Bridge built in 1982**
- ▶ **Hammerhead Piers with 7-foot Diameter Columns**
- ▶ **AASHTO Type IV Precast Girders**

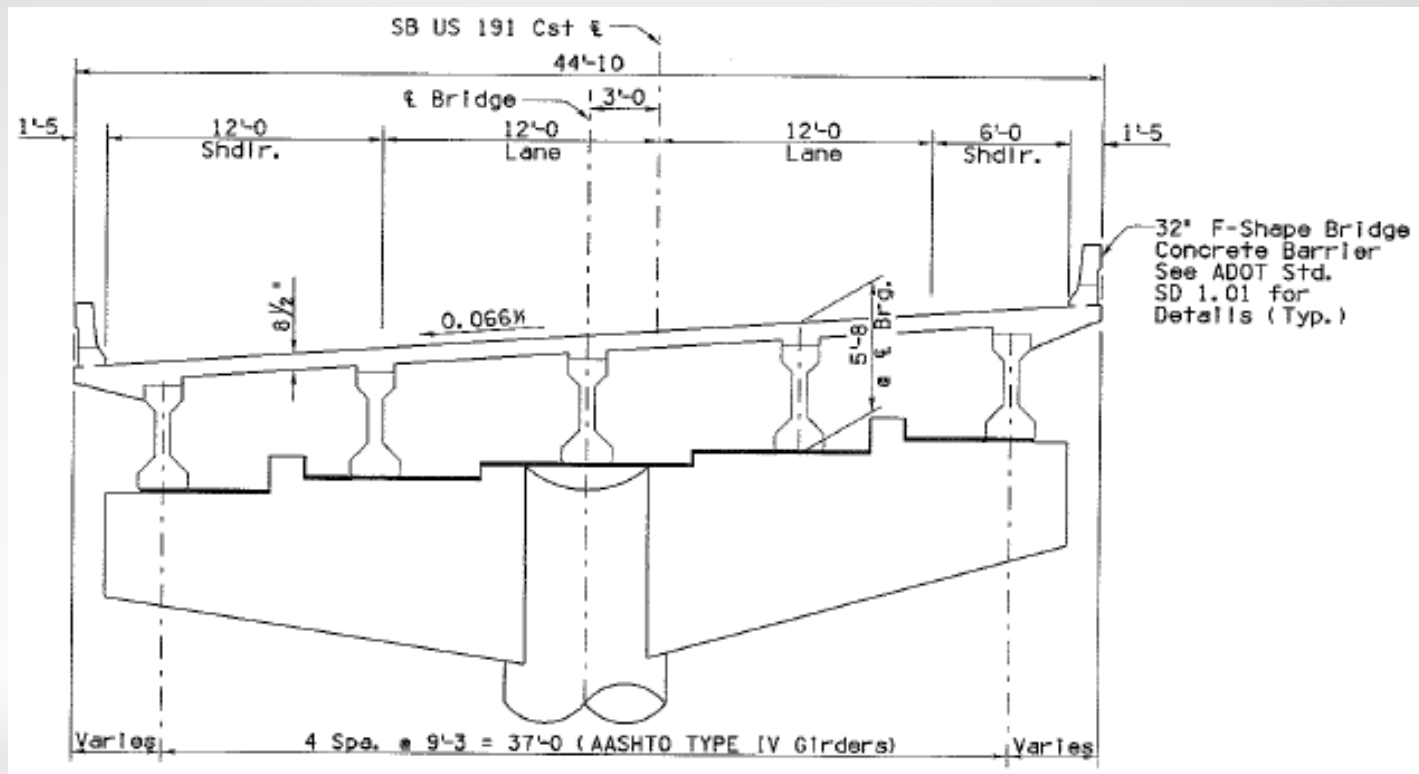


▶ **Northbound Bridge Underside of Structure**



Bridge Structure Alternative Selected

Prestressed Precast AASHTO Type IV Girder Bridge



- ▶ Total Bridge Length: 403-feet (5-Span Bridge)
- ▶ Horizontal Curve (R = 2022 ft L = 1678 ft)
- ▶ Vertical Sag Curve (g1 = -5.0000% g2 = 5.7628%)
- ▶ Seismic Performance Category: A (acc = 0.05 g)

Foundations

- ▶ **Rock Socketed Drilled Shafts**
- ▶ **Gila Group Conglomerate Bedrock**
- ▶ **RQD = 82% to 100% (mostly 100%)**
- ▶ **Unconfined Compressive Strength of 2000 psi**



▶ **Construction Access Road.**

Girder Erection



- ▶ NB Bridge remained open during girder erection (one lane with flaggers).
- ▶ 78' to 80' Type IV AASHTO Girders (High Performance SCC Concrete).











Deck Reinforcing



Deck Overhang Formwork



- 400-foot Continuous Deck Pour.
- Recover Hydration Stabilizer Concrete Retardant.





Forming 34-inch F-Shape Barriers and Transitions

Substructure



Hammerhead Piers (42-foot Wide Cap, 7-foot Diameter Columns)



Stepped Pier Cap to accommodate a 6.6% Superelevation.

Matching Span and Pier Configuration

New Bridge Looking South

New Bridge Looking North

Stay-in-Place Deck Forms



- NB roadway alignment before SB bridge closure (2001).
- Note the lower SB alignment.



New SB Roadway Alignment (5-feet higher than NB Alignment).

Cold Creek Canyon Bridge to Old Safford Road Bridge Replacement and Pavement Preservation

- **New SB Bridge expected to open to traffic by Fall of 2013.**
- **Bridge Removal \$164,000 (\$22/sqft).**
- **Cost of New Southbound Bridge \$1.9 M (\$167/sqft).**

Questions?

