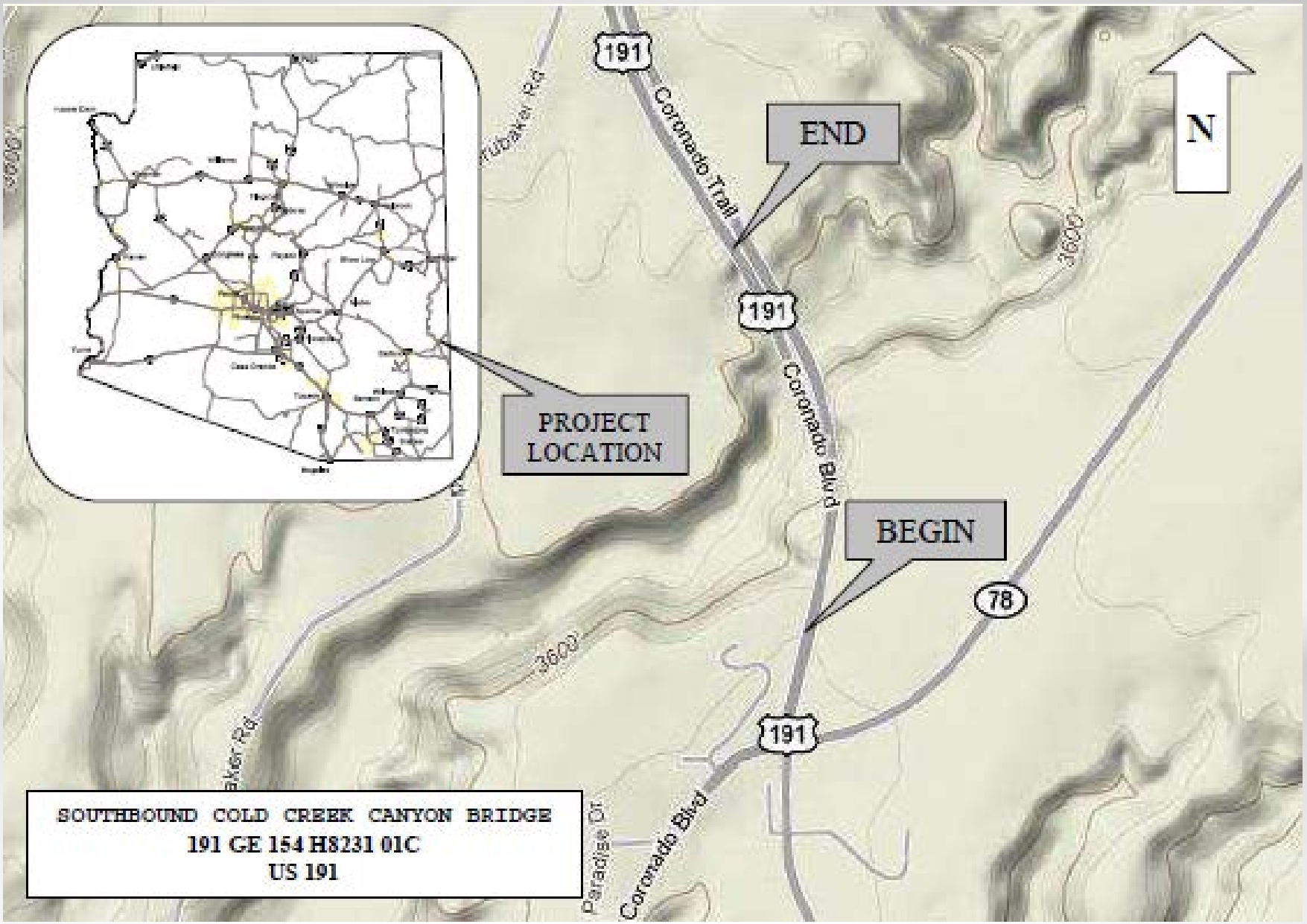
Southbound US-191
Cold Creek Canyon Bridge

Mile Post 154.9 Structure Number 258

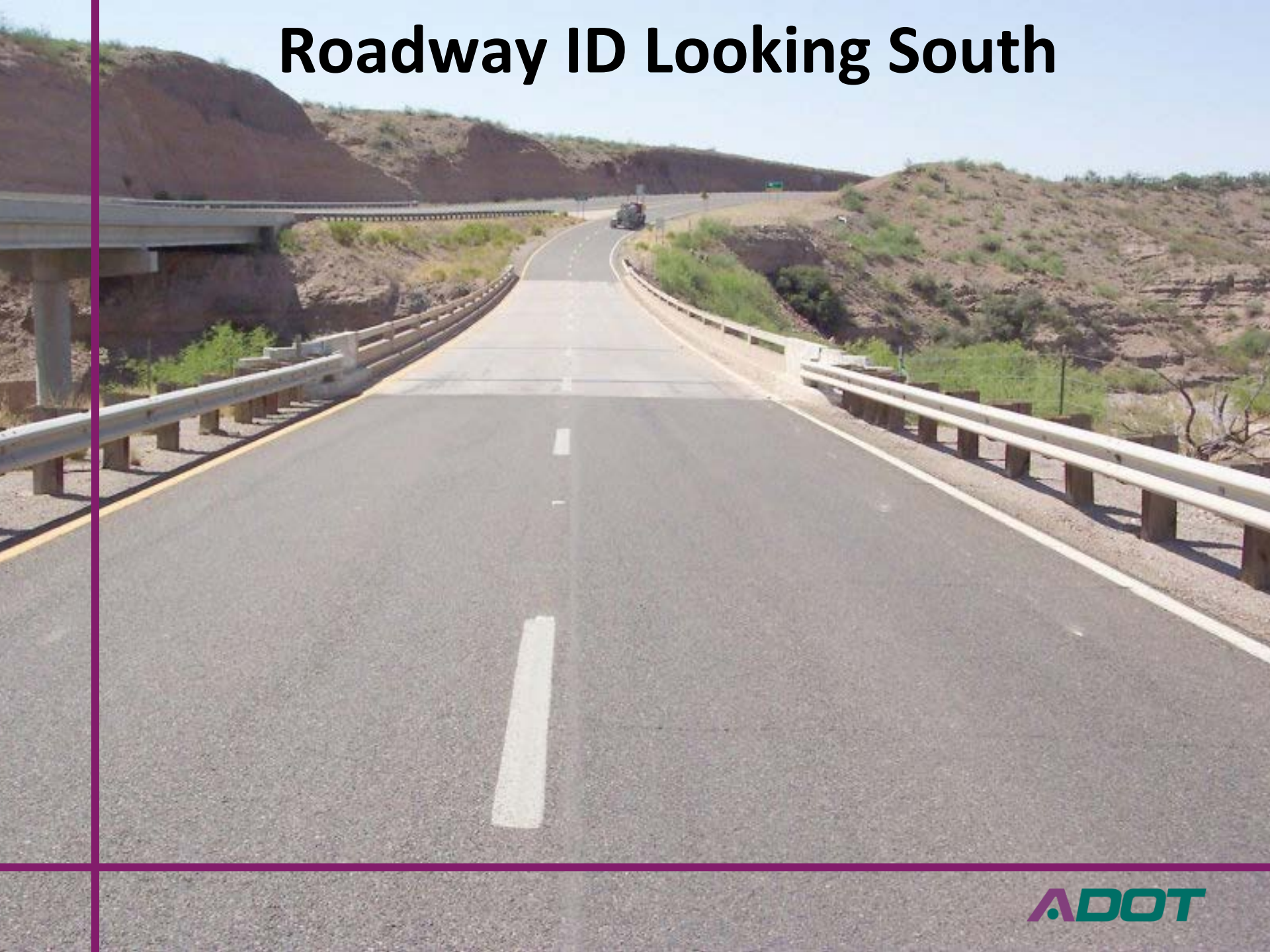
Chayan Bhattacharyya, P.E.
&
Mike Morrison, P.E.

Arizona Department of Transportation
Bridge Management Section

ADOT

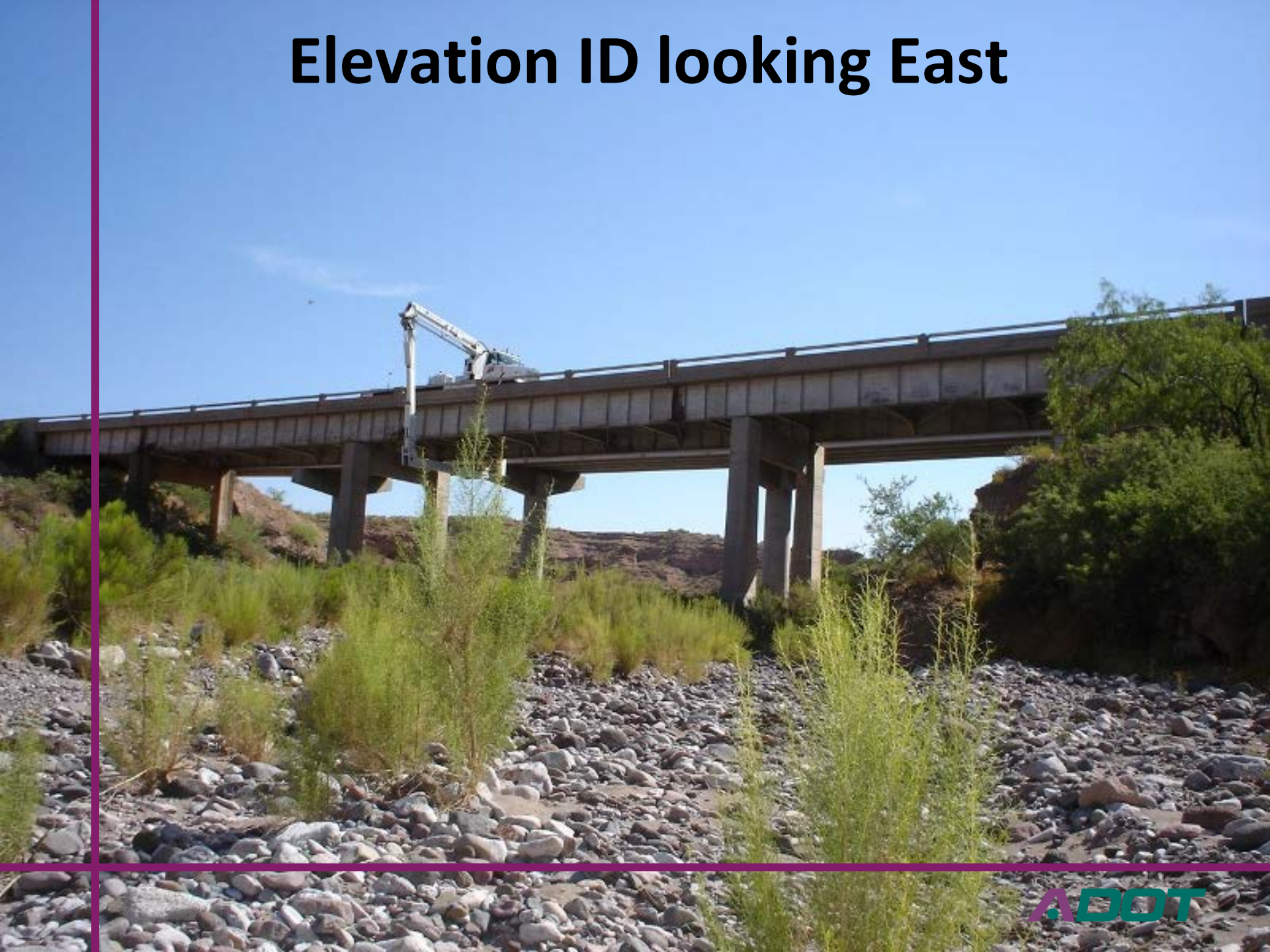

191
Coronado Trail
END
N
191
Coronado Blvd
PROJECT LOCATION
BEGIN
78
191
Coronado Blvd
Paradise Dr
SOUTHBOUND COLD CREEK CANYON BRIDGE
191 GE 154 H8231 01C
US 191

Roadway ID Looking South



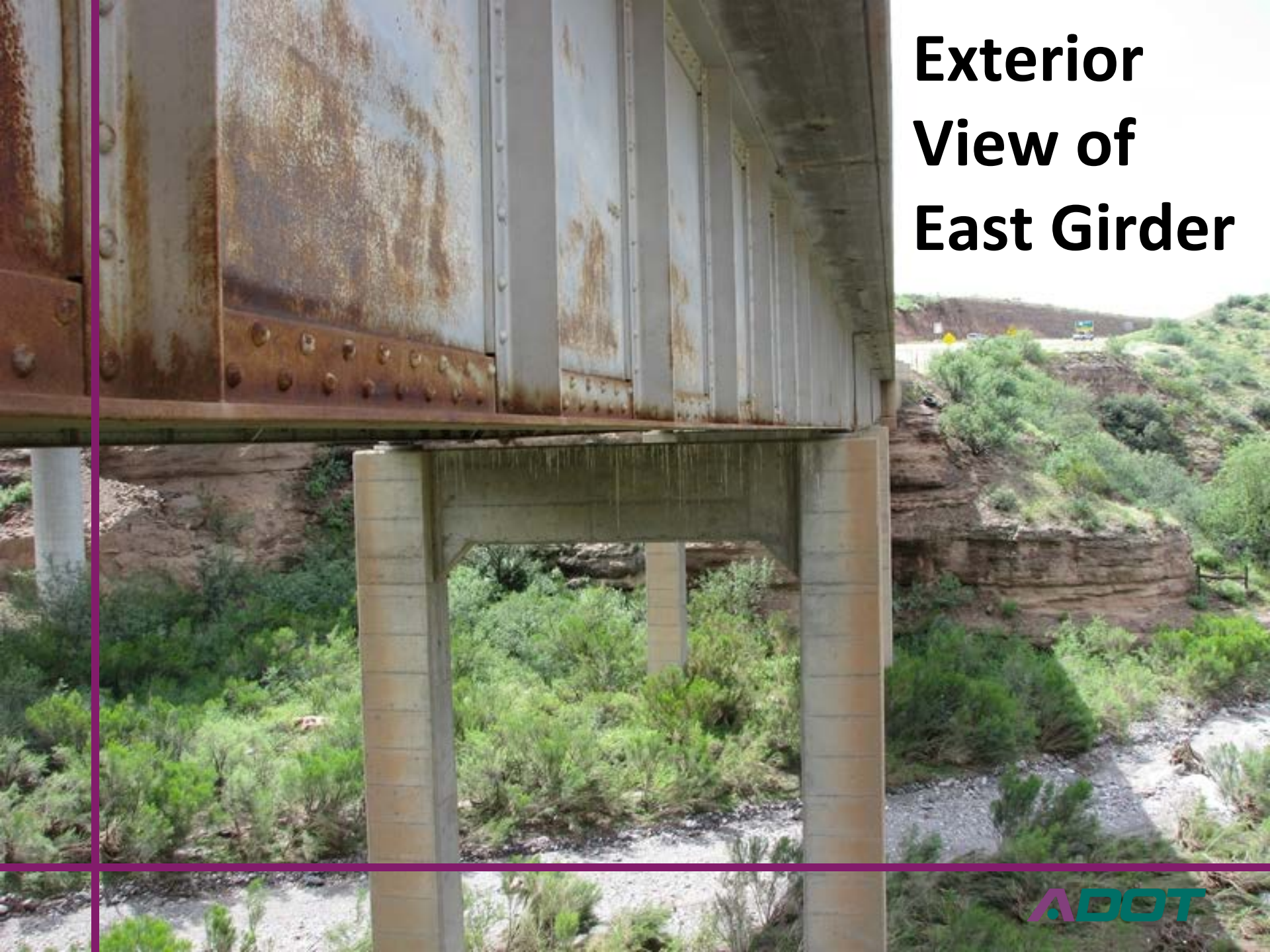
Roadway ID Looking North

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


Cold Creek SB #258 MP 154.9 US191 2/24/11
Drop deck
Deck Settlement at NW
Corner of Span #3 (approx 8”)

Plate Girder Settlement Looking East

Barrier Settlement Looking East

Bearing separation


Concrete Surface
Failure of Pier #3
South Face


Cold Creek SB #258 MP 154.9 US191 2/24/11
Pier
Close-up View


Spalled Concrete
from Pier #3

Pier #3 Top View of SW Bearing


Pier #3
NE Bearing
NW Bearing


NE Bearing
at Pier #3


NE Bearing at Pier #3

Deck Removal


VOLVO
Volvo Rents


JLG LIFT

New Southbound Bridge

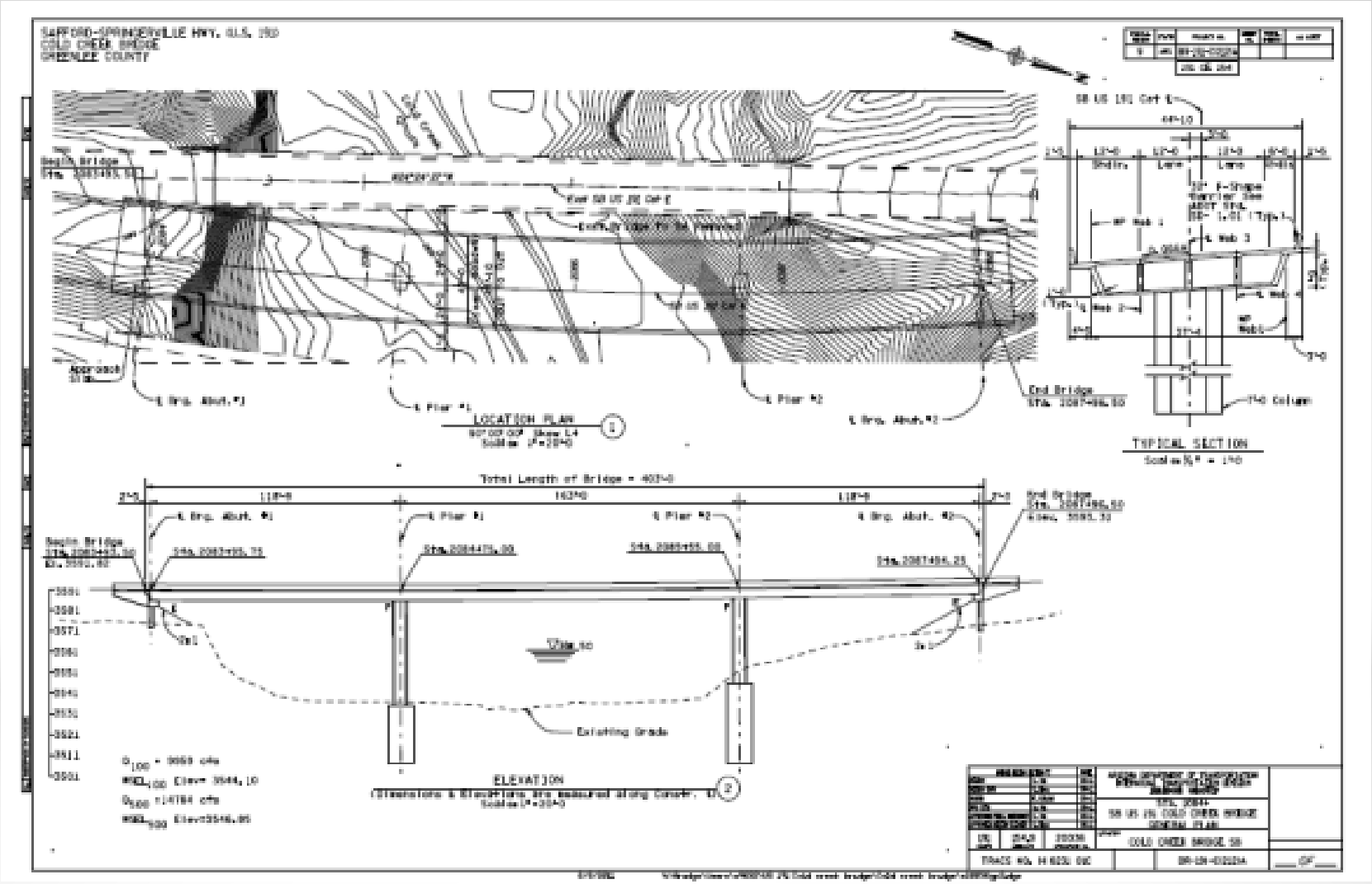
Design Considerations

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

Structure Types Considered

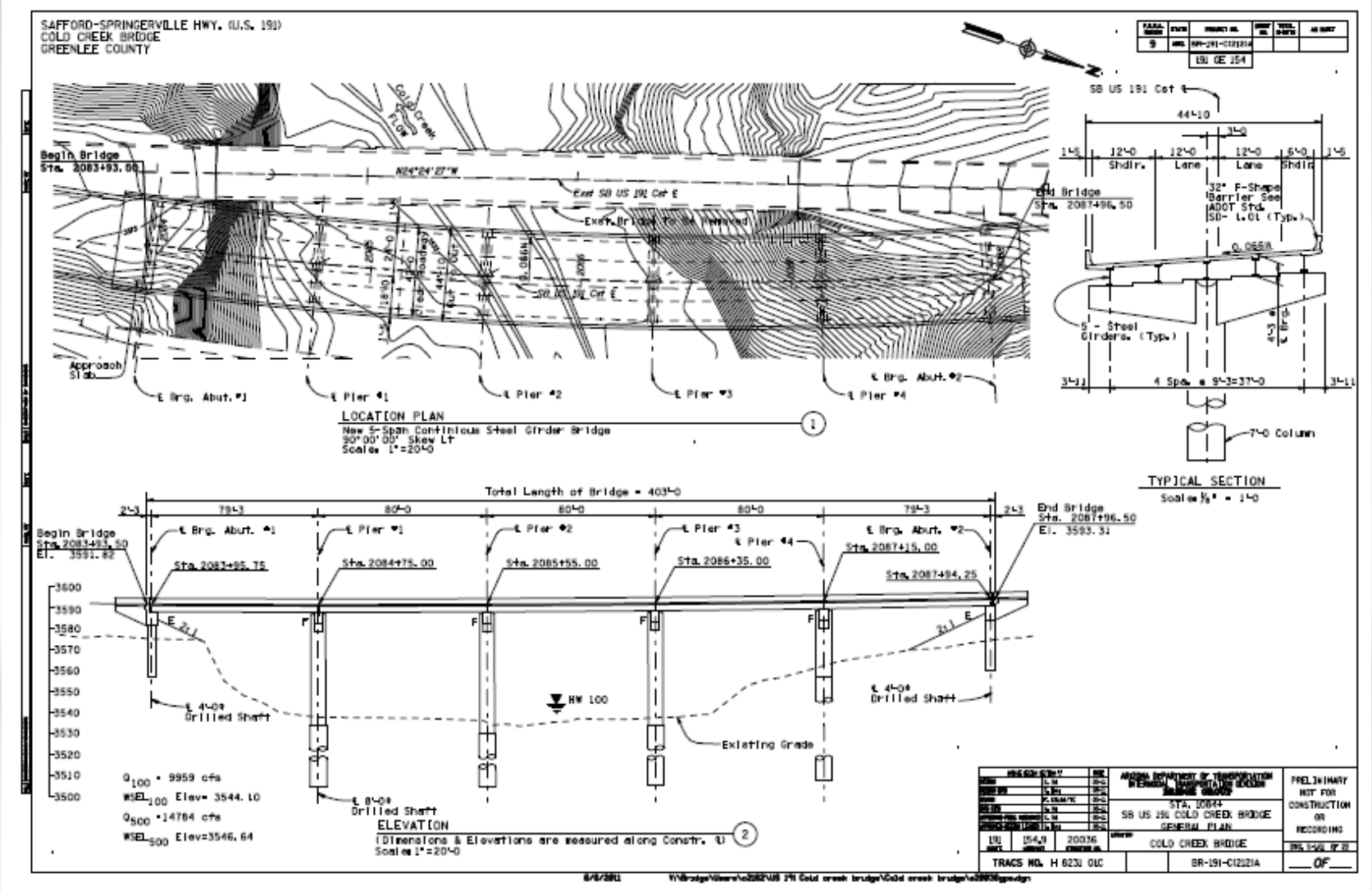
- Precast AASHTO Girder Bridge
- Steel Girder Bridge
- CIP Post-Tensioned Box Girder Bridge

Alternative #1 - CIP Post-Tensioned Box Girder Bridge



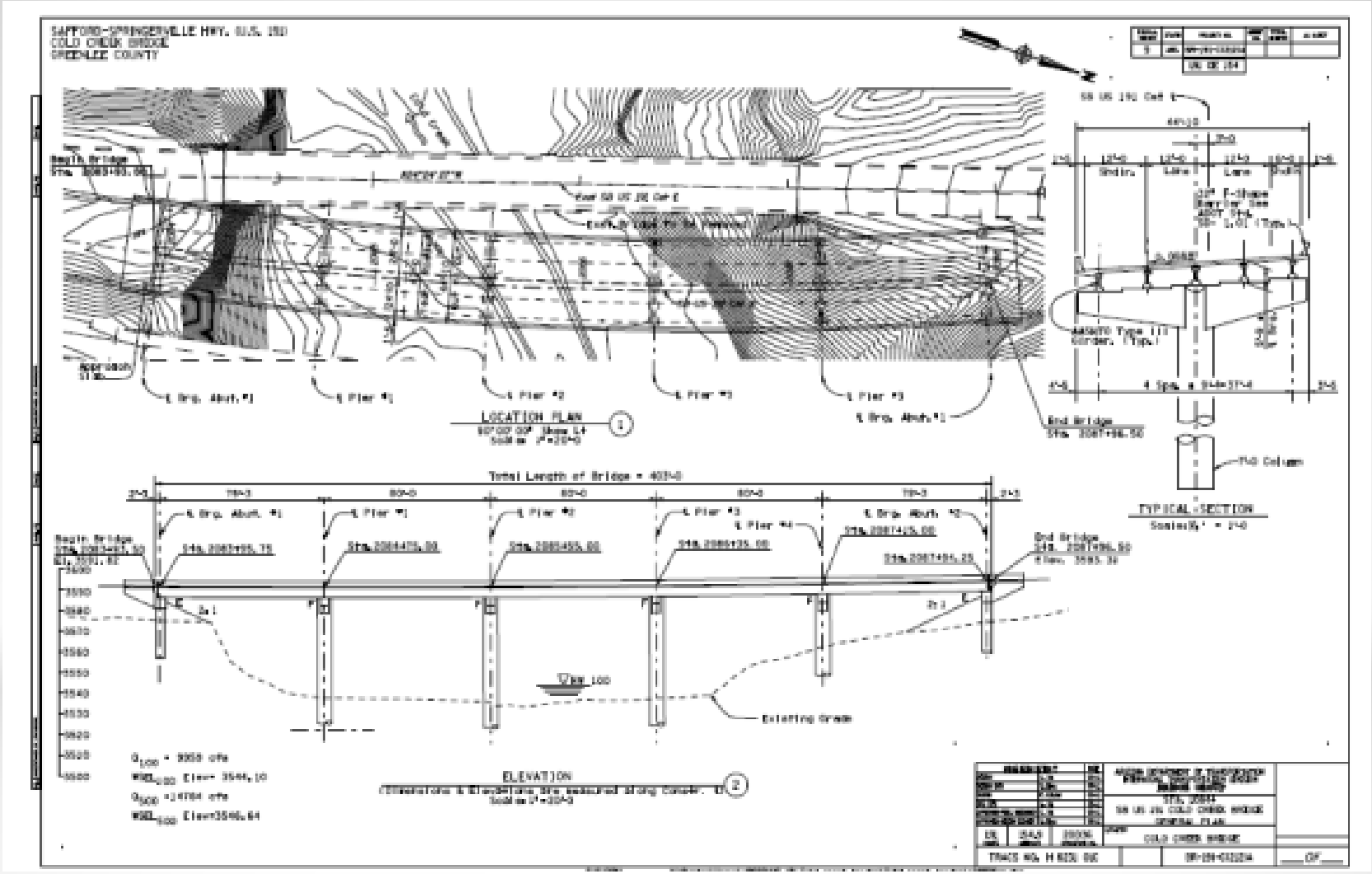
Cost Estimate: $2,358,376

Alternative #2 - Steel Girder Bridge



Cost Estimate: $2,411,033

Alternative #3 - Precast AASHTO Type IV Girder Bridge



Cost Estimate: $2,181,991

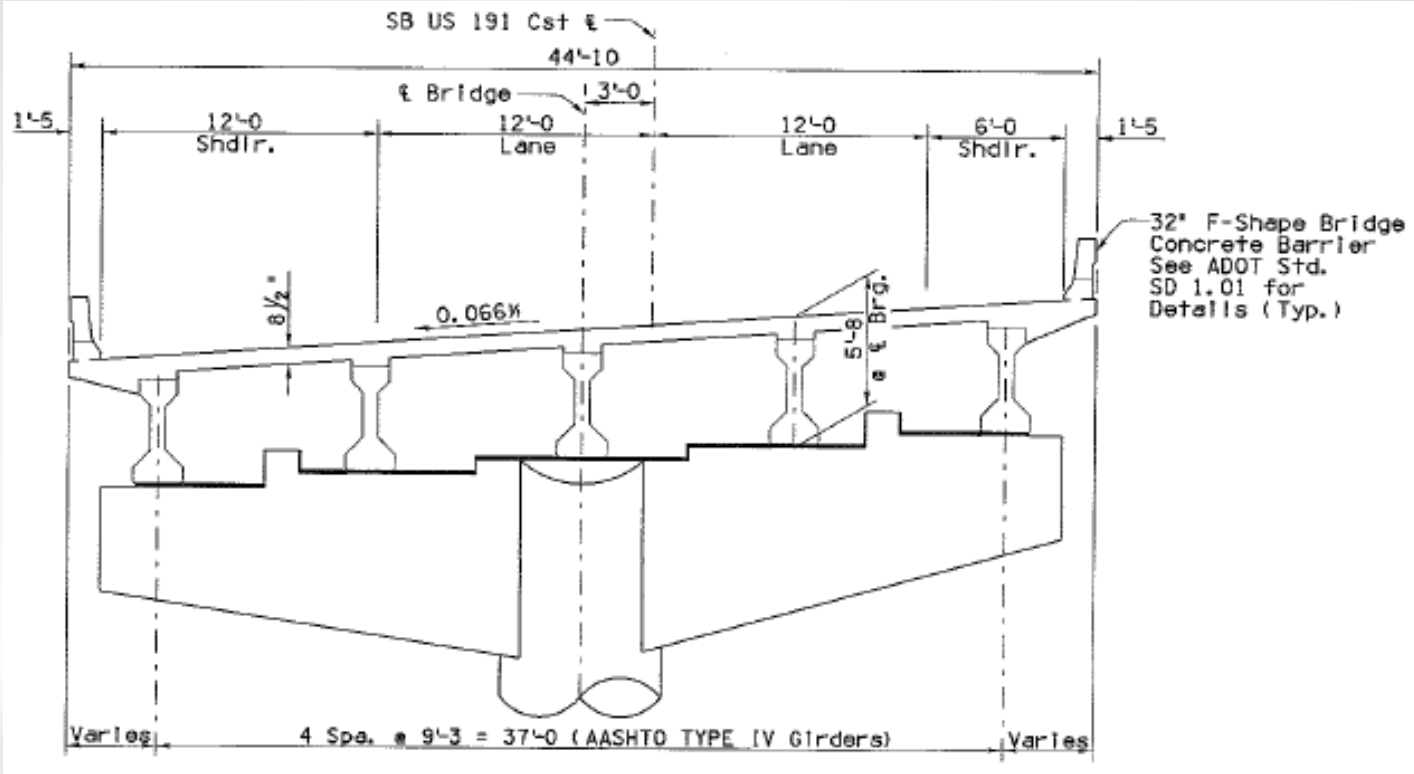
Northbound Bridge

- 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?