

# 4<sup>TH</sup> STREET BRIDGE

Pueblo, Colorado

## Contractor Pre-Bid Meeting

This Presentation/Handout is FOR INFORMATION ONLY and is NOT part of the Contract Documents.  
Refer to the Contract Documents for Project Requirements.

July 18, 2007  
Pueblo Convention Center  
Fortino Grand Hall



# Welcome & Introductions

- **CDOT**
- **Consultants**
- **Attendees**

# Conference Details

- **Sign In / Sign Out**
- **Agenda**
- **Microphones**
- **Tables, Displays, and Materials**
- **Refreshments**
- **Comment/Question Cards**
- **Site Walk (optional)**

# Design Team

- Colorado DOT Region 2
- Lead Federal Agency - FHWA
- Design Consultants
  - FIGG Project Management & Bridge Engineering
  - PBS&J Civil, Roadway, Traffic, Utilities, Environmental
  - Ayres Associates Hydraulics & Drainage
  - Goodson/MWWA Geotechnical, Geology
  - The Szynskie Group Lighting & Electrical Design
  - EDAW Urban Design & Landscape Architecture
  - Abel Engineering Survey & ROW Support
- Other Stakeholders:
  - City, Railroads, Conservancy, Property Owners, Utilities

# Construction Team

- **Resident Engineer and Administration**
  - CDOT Region 2 – Dean Sandoval
- **CEI**
  - Design Office Support: FIGG Team
  - Onsite Services: PBS&J Team
  - Segmental Bridge Inspection Services - FIGG

# Project Timeline

- **Advertisement** **July 5, 2007**
- **Contractor Pre-Bid Conference** **July 18, 2007**
- **Bid Opening** **August 30, 2007**
- **Construction Duration** **(1278 calendar days)**  
**3.5 years approx**

# *Project Overview*

# Project Description

## Construction Limits Midtown Circle to Corona Ave.

Midtown Circle Dr.

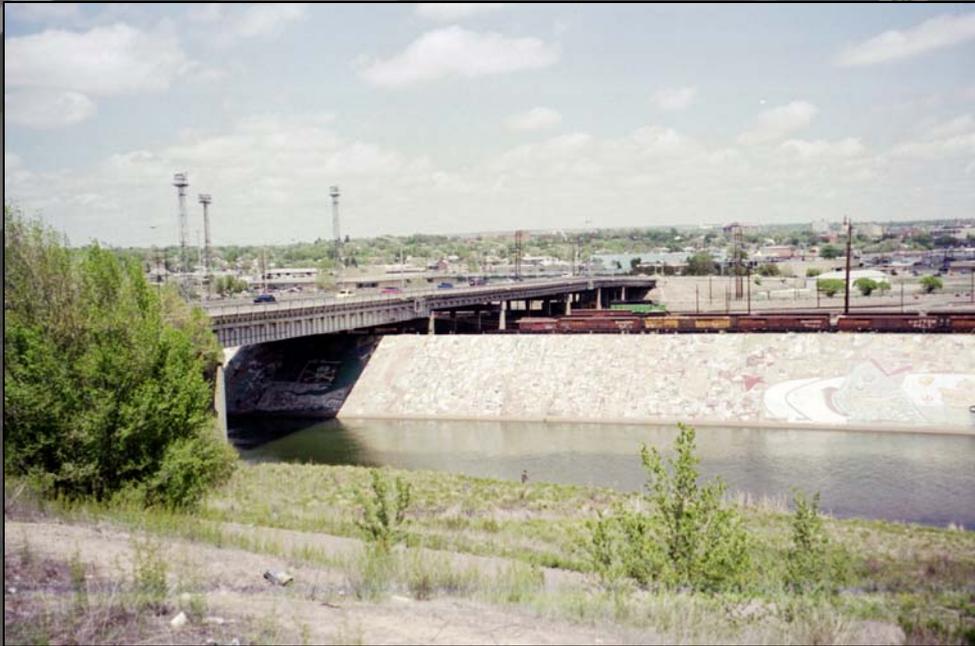
Corona



# Site Photo



# West End Features



**Bluff**  
**Arkansas River**  
**Trail**  
**Fishing Pier**  
**Kayak Course**



# *Bridge*



# Bridge

- General Layout
- Superstructure
- Substructure and Foundations
- Construction
- Demolition
- Staging / Access



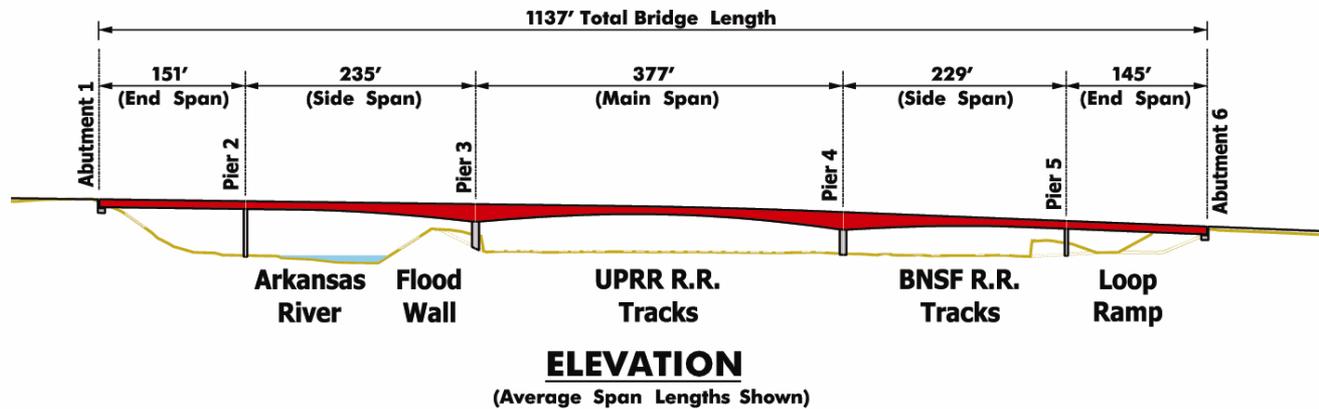
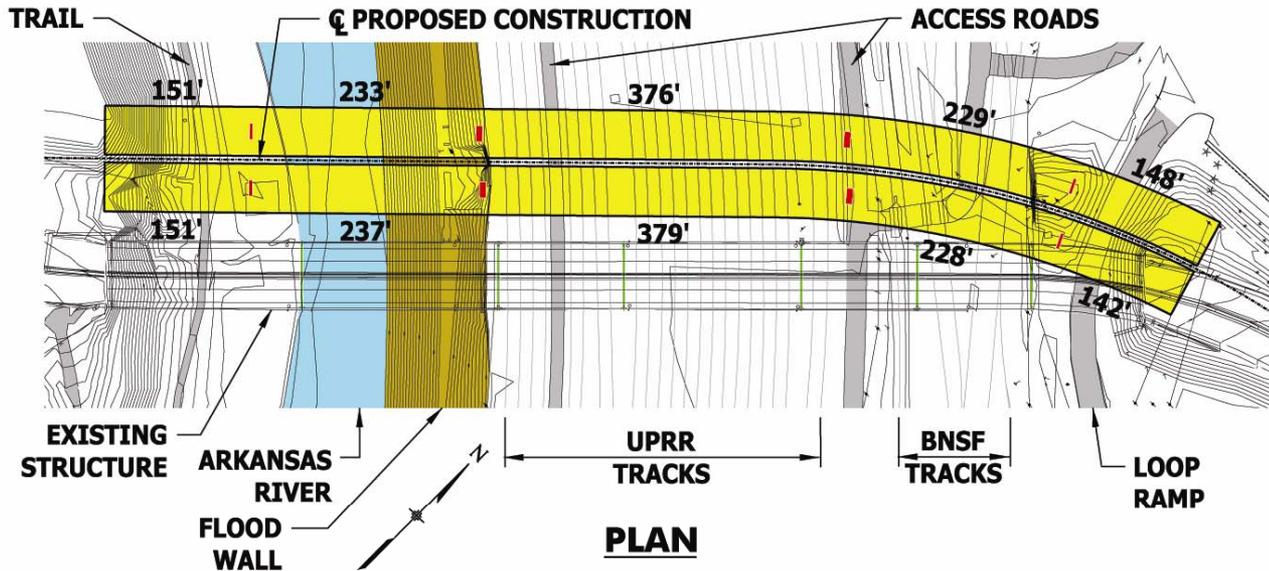
# *General Layout*

# Proposed Alignment

## North Alignment



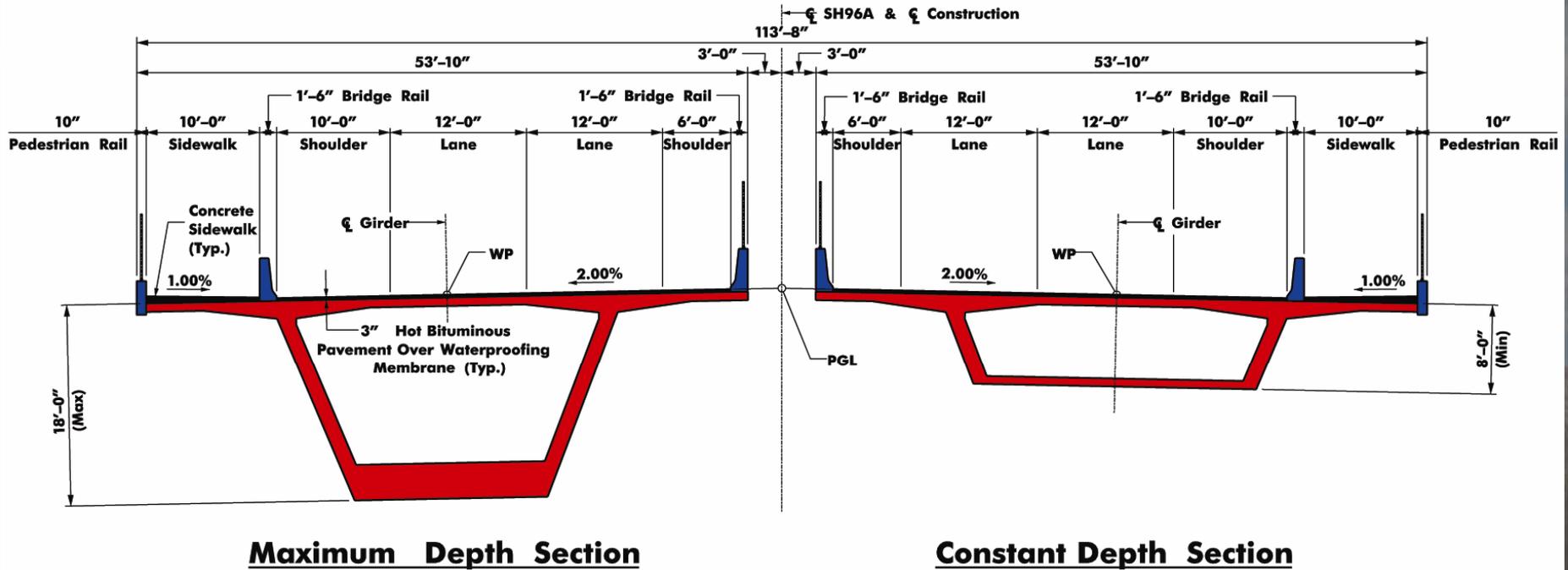
# General Layout



# Alternate Design

- **Two Bid Schedules**
  - Alternate 1: Default Bridge
  - Alternate 2: Alternate Bridge
- **Mandatory pre-bid qualification already completed.**
  - All bridges have same pier layout.
  - All bridges have haunches at Piers 3 and 4.
  - All alternatives still need to receive railroad approvals
- **Need to submit approved proposal number on the bid schedule.**
- **Contractor's Engineer has to have experience with type of bridge proposed.**
- **Same number of contract days for combined design and construction.**

# General Layout



## TYPICAL SECTIONS

4-Lane Stripe / 6-Lane Future Capacity  
Overlay: 3" HMA over Waterproofing Membrane

# Bridge Renderings



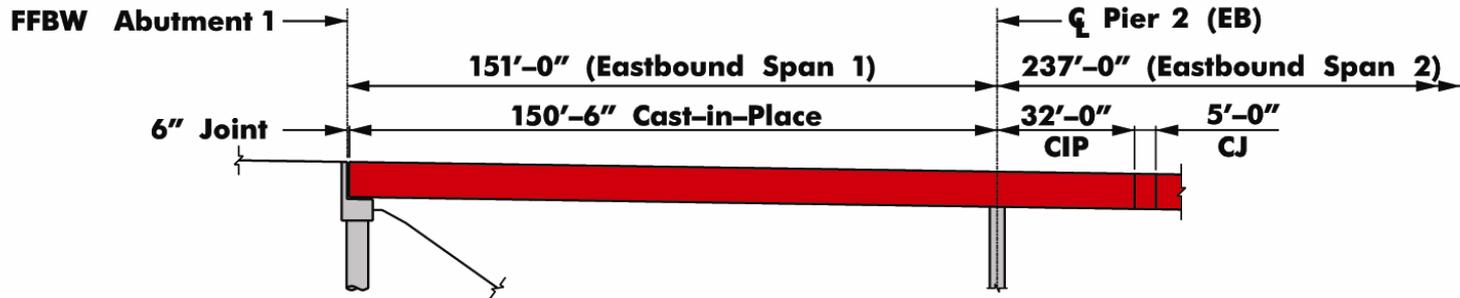
# *Superstructure*

# Superstructure

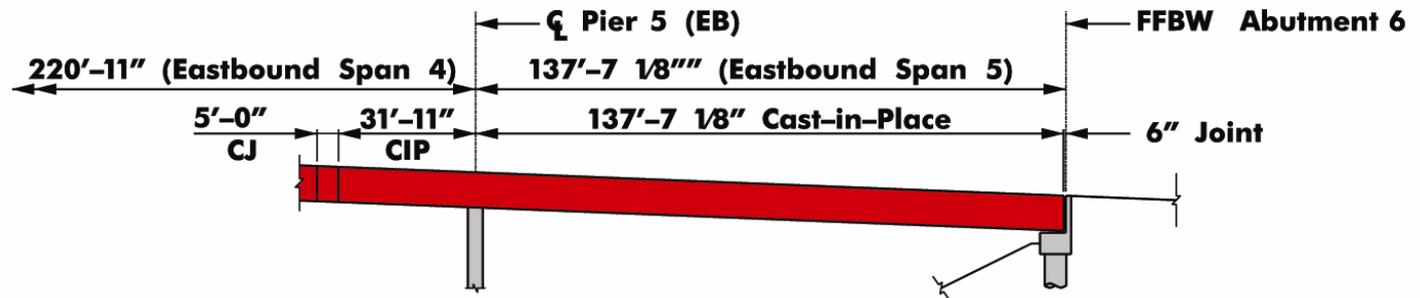
- **Cast-in-Place Post-Tensioned Concrete Box**
- **End Spans on Falsework**
- **Main Span (w/ Side Spans)**
  - CIP Balanced Cantilever Segmental from Above with Form Travelers
  - Over River, Floodwall, UPRR Yard, BNSF Yard
- **Integral Piers**
- **Class S40 Concrete w/ Fly Ash (Class F)**
- **Epoxy Coated Reinforcing**

# End Span Layout

## CIP on Falsework (EB Shown)



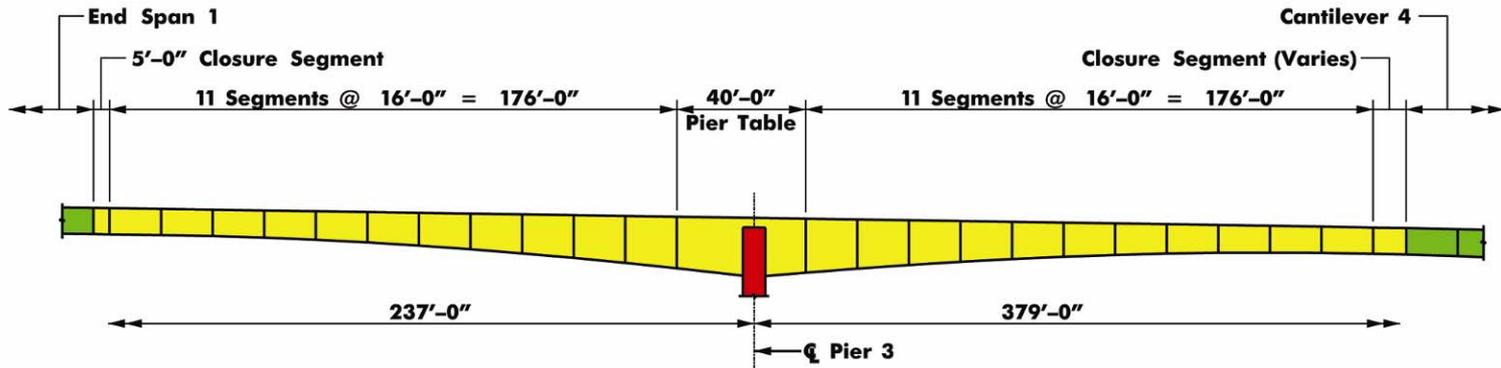
**ELEVATION - END SPAN 1 (EB)**



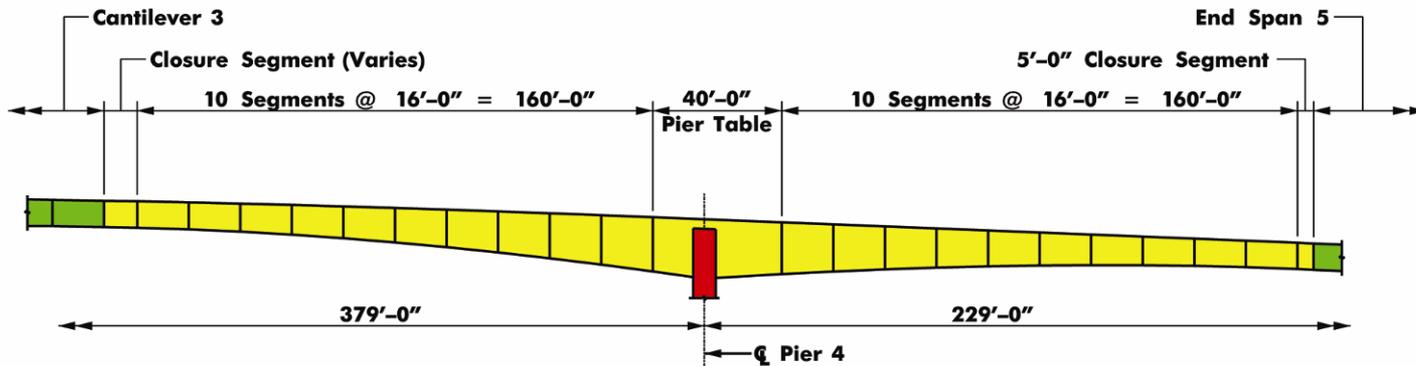
**ELEVATION - END SPAN 5 (EB)**

# Balanced Cantilever Segmental Layout

## Typical Segment Layout

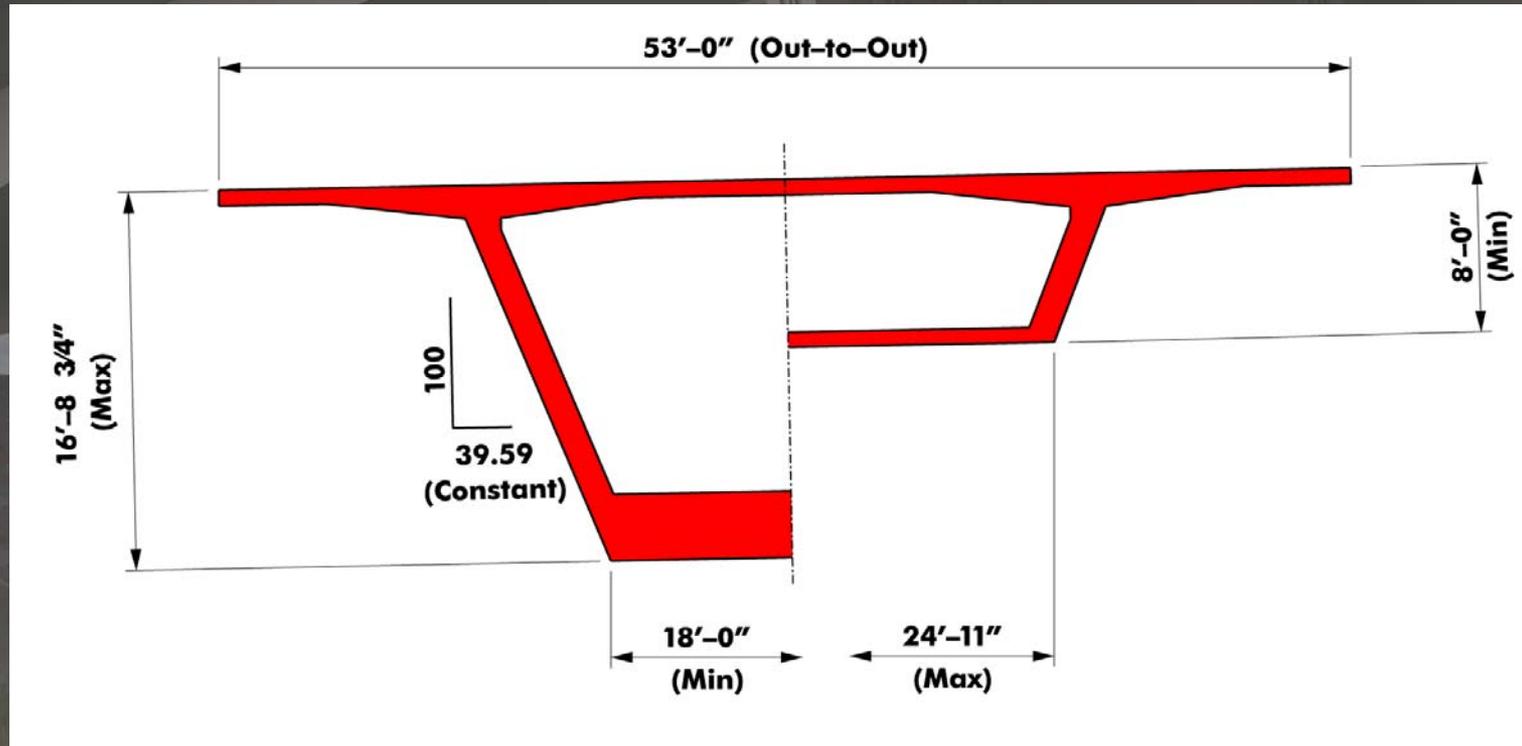


**ELEVATION - CANTILEVER 3**



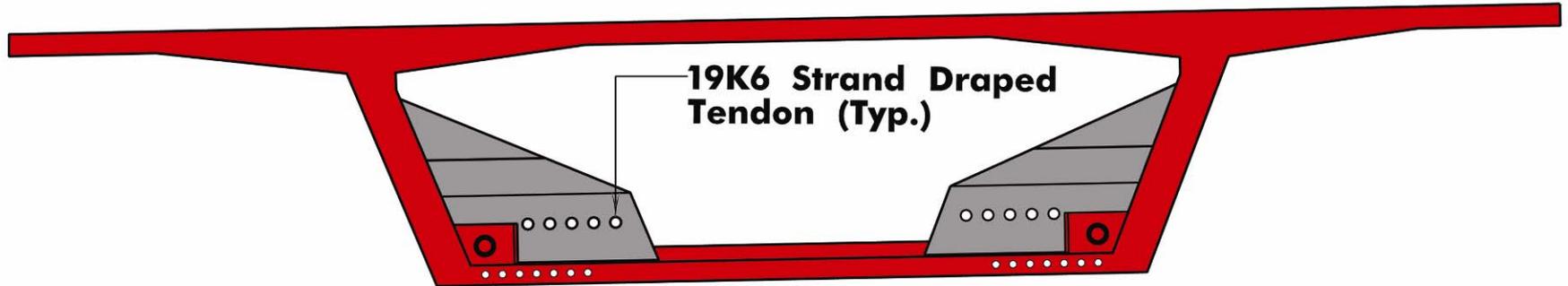
**ELEVATION - CANTILEVER 4**

# Typical Segment Cross Section



- Depth Varies from 8' to 16'-8 3/4"
- Width = 53'-0"
- Constant Web Angle
- Variable Bottom Slab Width

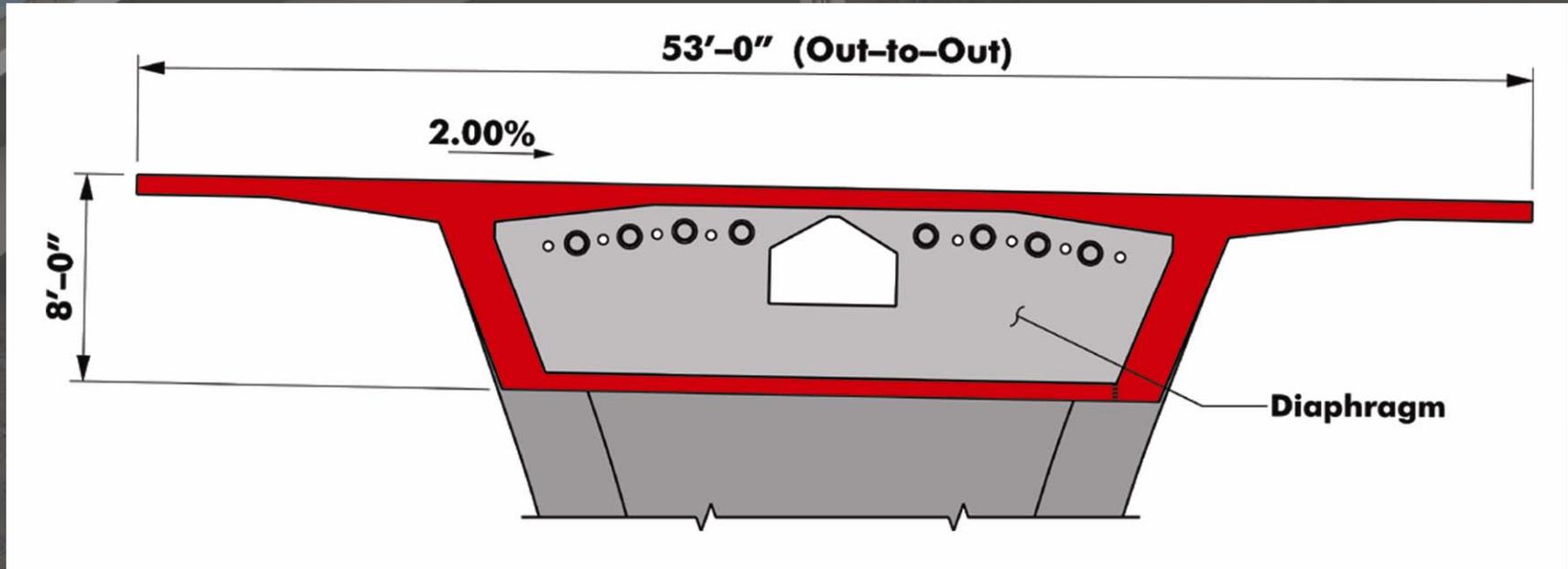
# Tendon Deviation Diaphragms



## Three Types

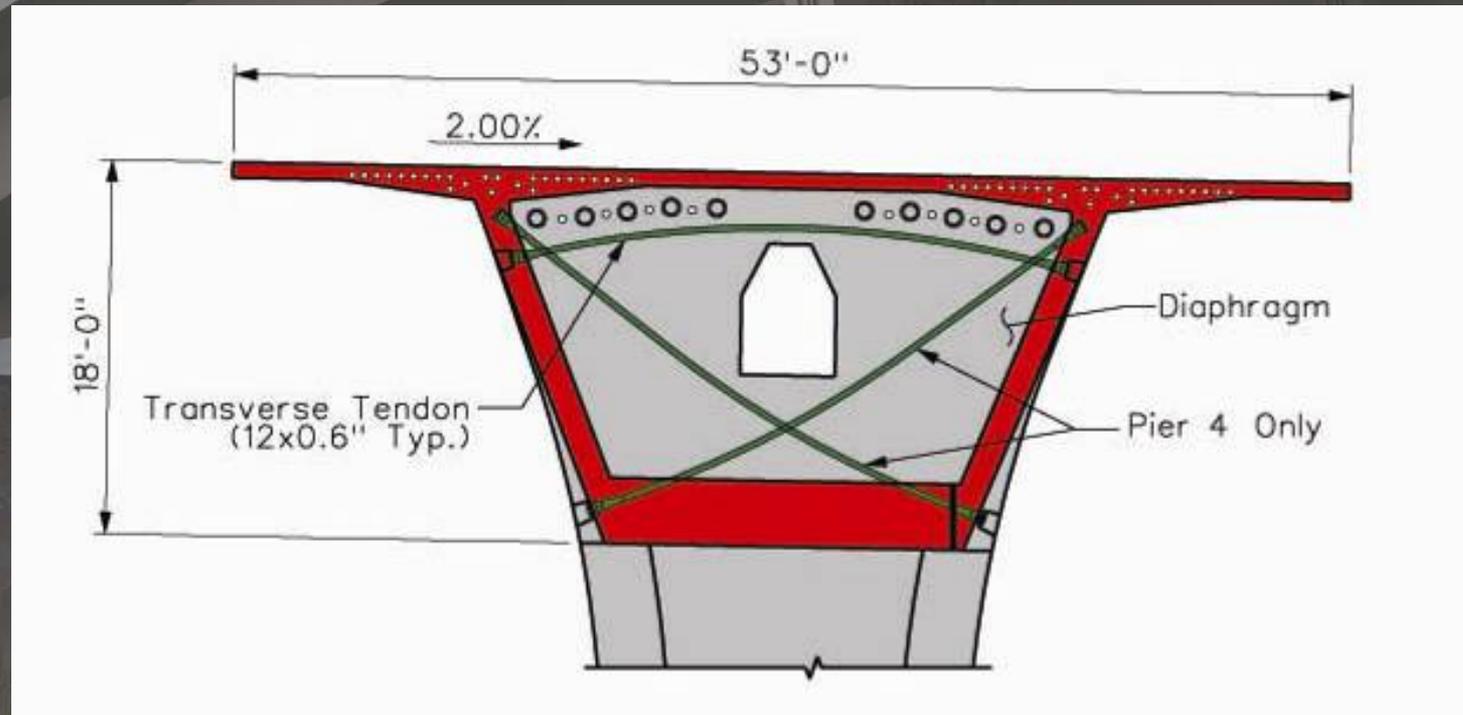
- Type IA (Constant Depth Section w/ Blister)
- Type IB (Variable Depth Section w/ Blister)
- Type II (Variable Depth Section w/o Blister)

# Pier Diaphragms 2 and 5



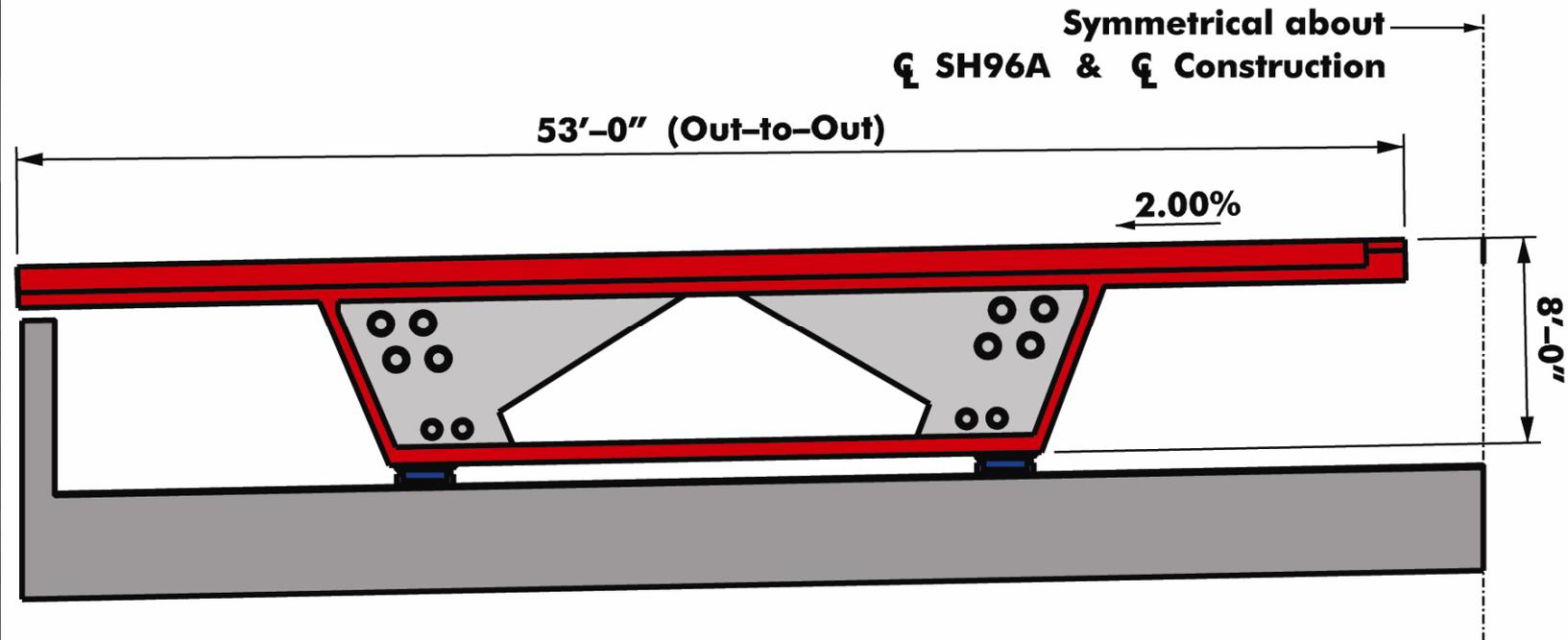
- 5'-6" Thick, w/ Access Hole
- Girder Webs Thickened to 1'-9" near Diaphragms
- Integral Connection with Piers

# Pier Tables 3 and 4



- “Platform” for Balanced Cantilever Construction
- 8'-0" Thick, w/ Access Hole
- Integral Connection w/ Piers
- Transverse Post-Tensioning

# Abutment Diaphragms 1 and 6



- 6'-0" Thick, w/Access Opening
- Support Expansion Joints
- Constructed on Pot Bearings

# *Superstructure Post-Tensioning*

*ASTM A-416, Grade 270 Low Relaxation, 7-wire strand*

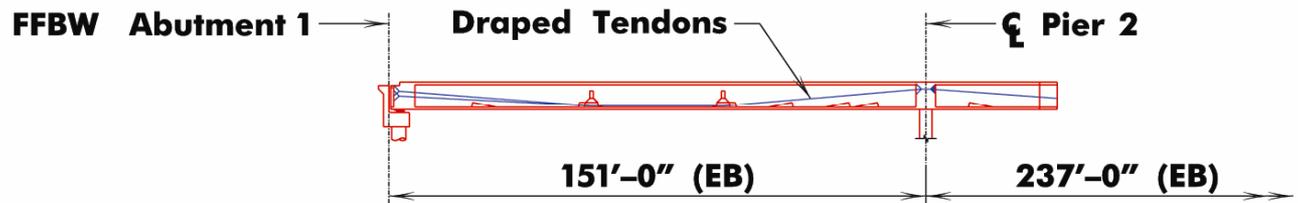
# Longitudinal Post-Tensioning - End Spans

12x0.6in



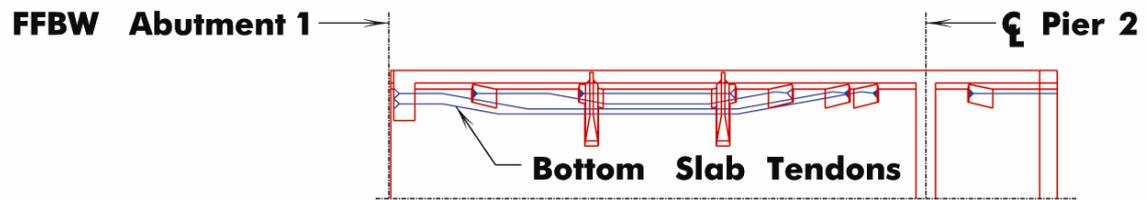
**PARTIAL PLAN - END SPAN CANTILEVER TENDONS**  
Span 1 (EB)

19x0.6in



**PARTIAL PLAN - END SPAN DRAPED TENDONS**  
Span 1 (EB)

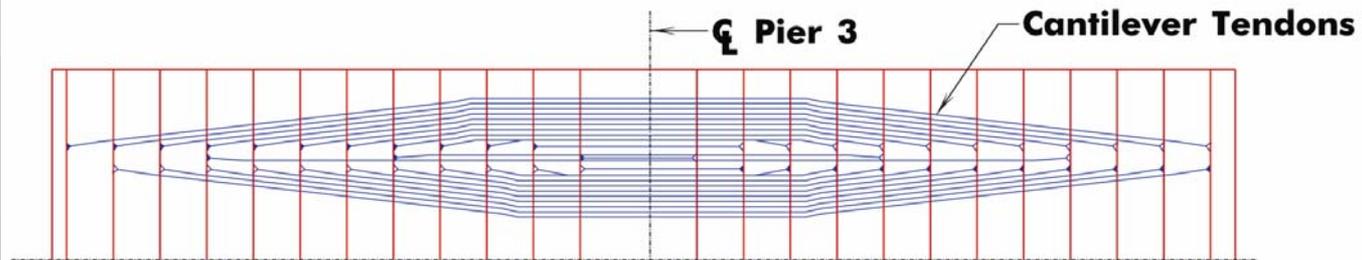
12x0.6in



**PARTIAL PLAN - END SPAN BOTTOM SLAB TENDONS**  
Span 1 (EB)

# Longitudinal Post-Tensioning – Cantilevers

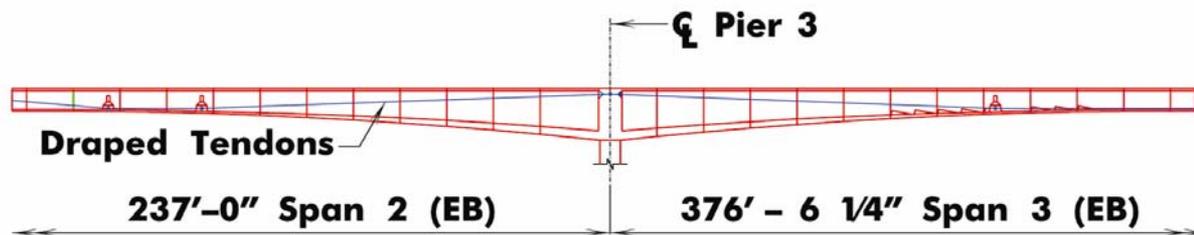
12x0.6in



**PARTIAL PLAN – CANTILEVER TENDONS**

**Cantilever 3 (EB)**

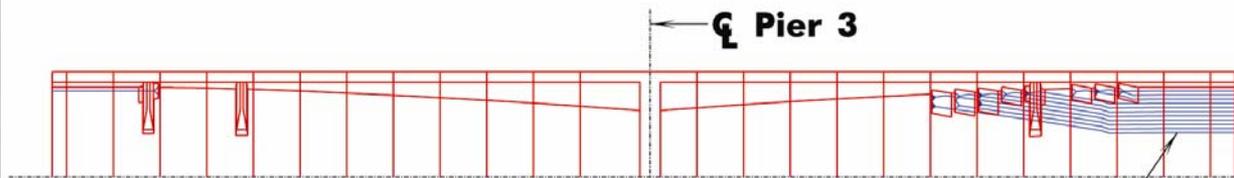
19x0.6in



**ELEVATION – DRAPED TENDONS**

**Cantilever 3 (EB)**

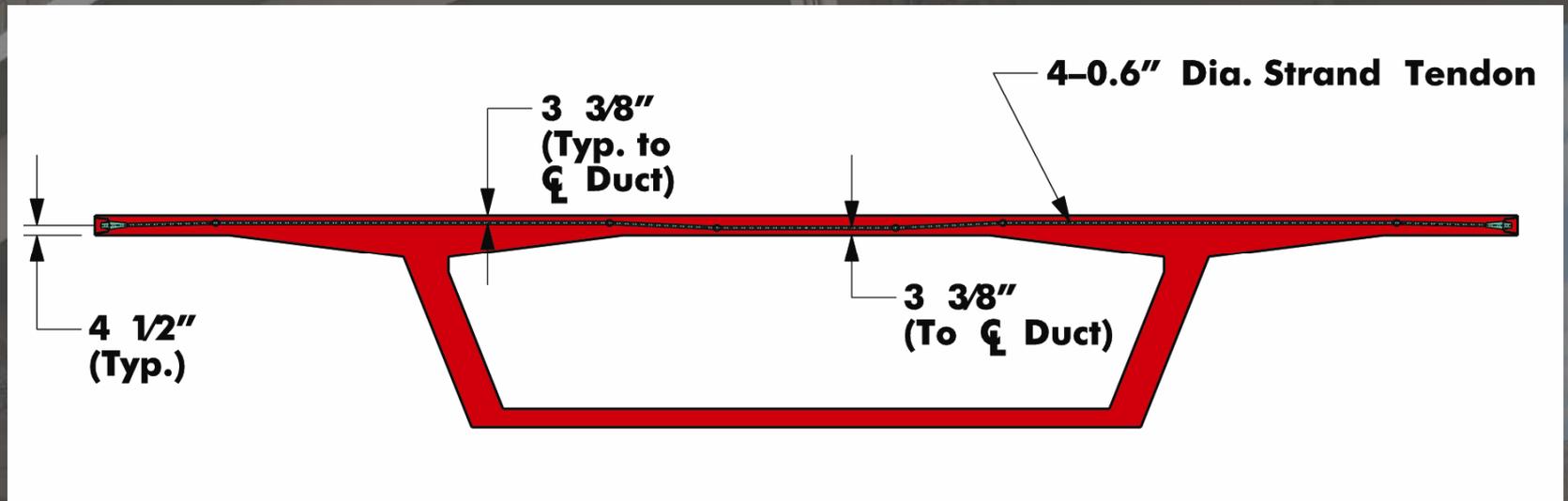
12x0.6in



**PARTIAL PLAN – BOTTOM SLAB TENDONS**

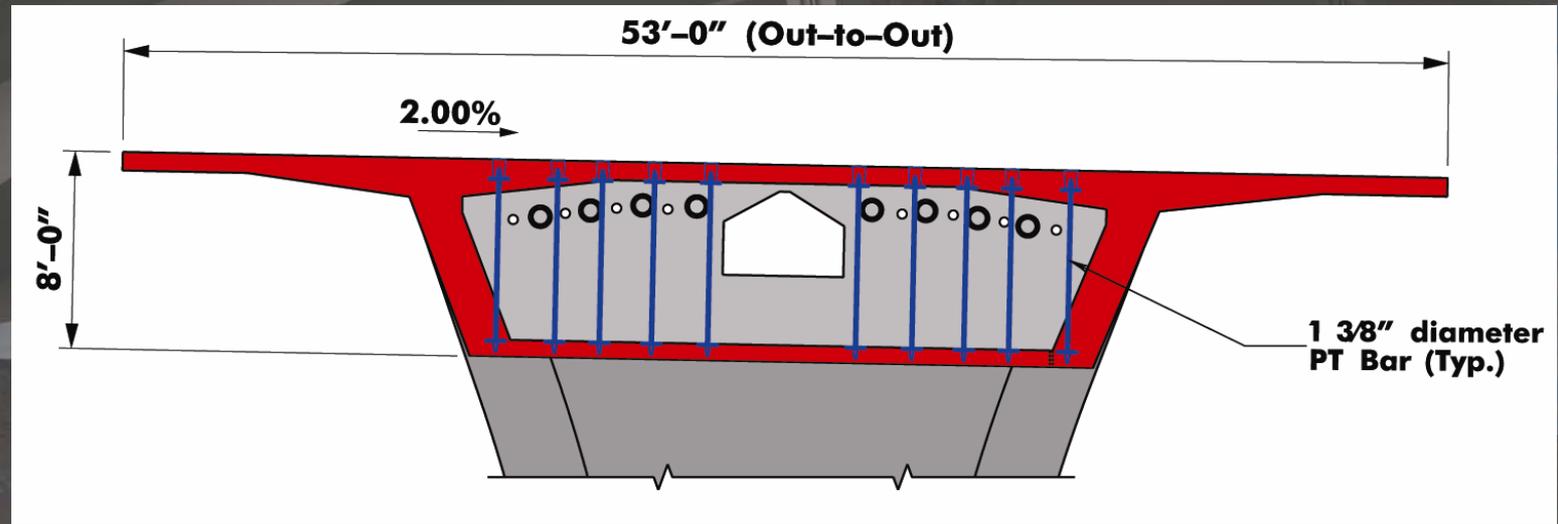
**Cantilever 3 (EB)**

# Transverse Post-Tensioning



- **Size & Spacing**
  - 4x0.6" Strand
  - Typical Spacing = 3'-3"
  - Spacing Varies in Other Regions (3'-3" maximum)

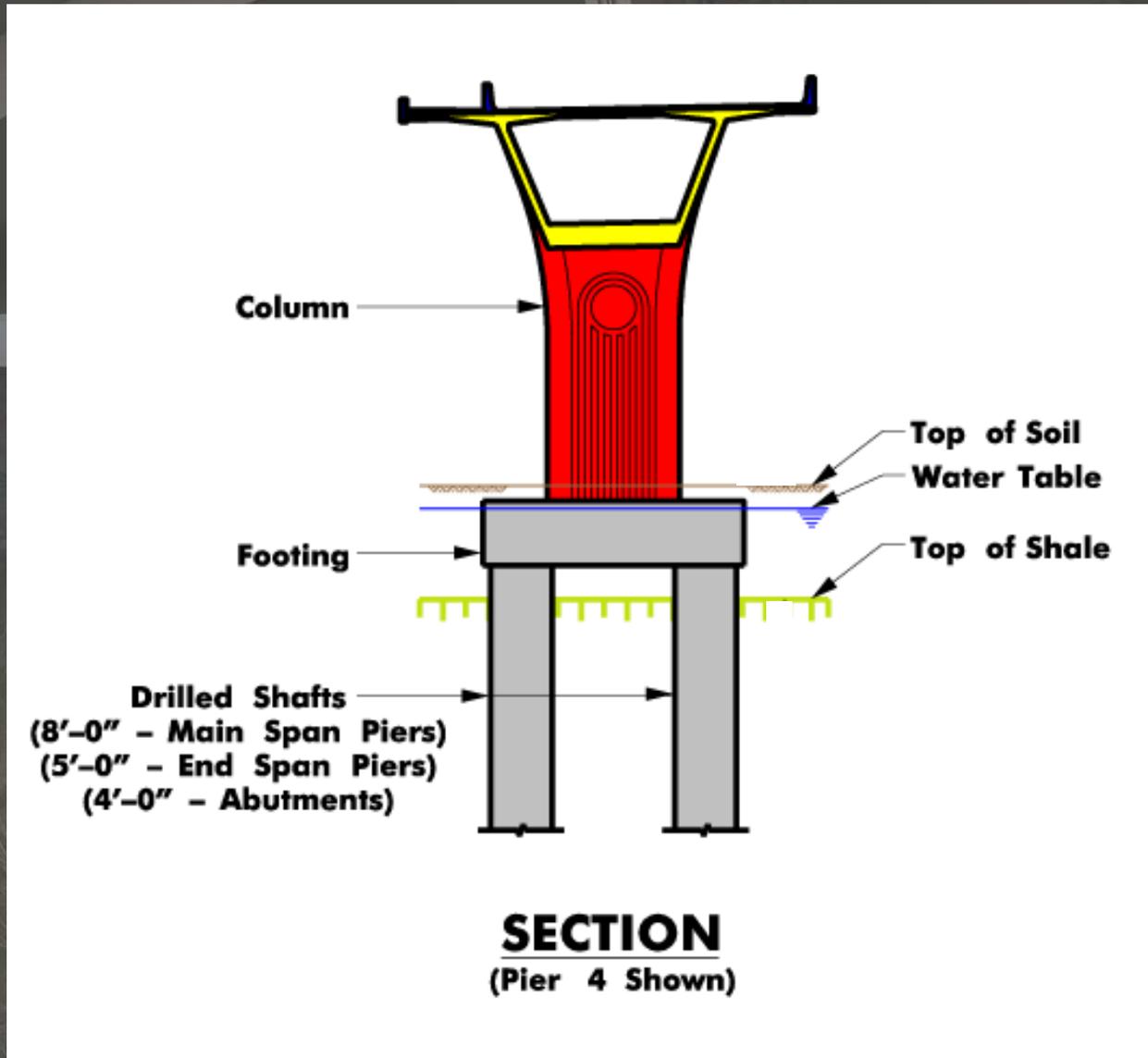
# Vertical Post-Tensioning



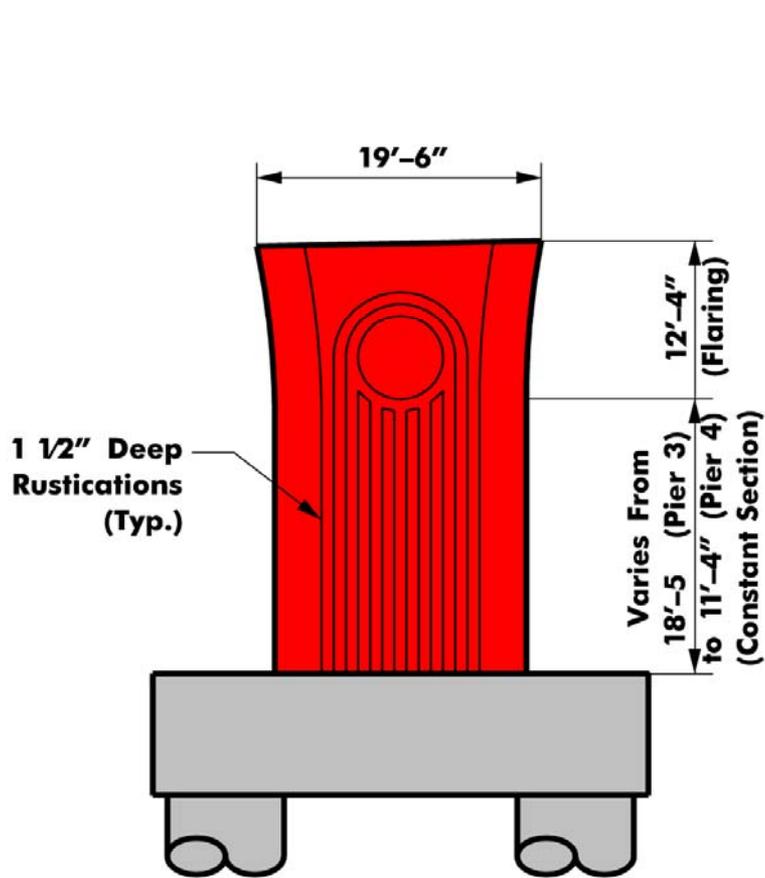
- Diaphragm & Pier Table Reinforcing
- 1 3/8" Diameter Bar
- Uncoated Deformed Thread Bar
- ASTM A-722, Type II, Grade 150

# *Substructure*

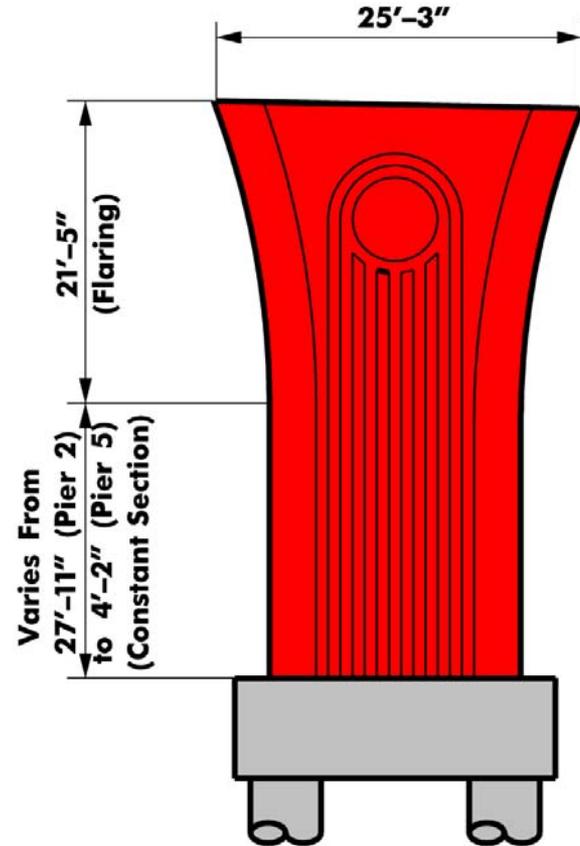
# Substructure Schematic



# Piers



**PIERS 3 AND 4**  
(Looking Upstation)



**PIERS 2 AND 5**  
(Looking Upstation)

# Abutments

Class 1 Structural  
Backfill – Mech.  
Reinforced

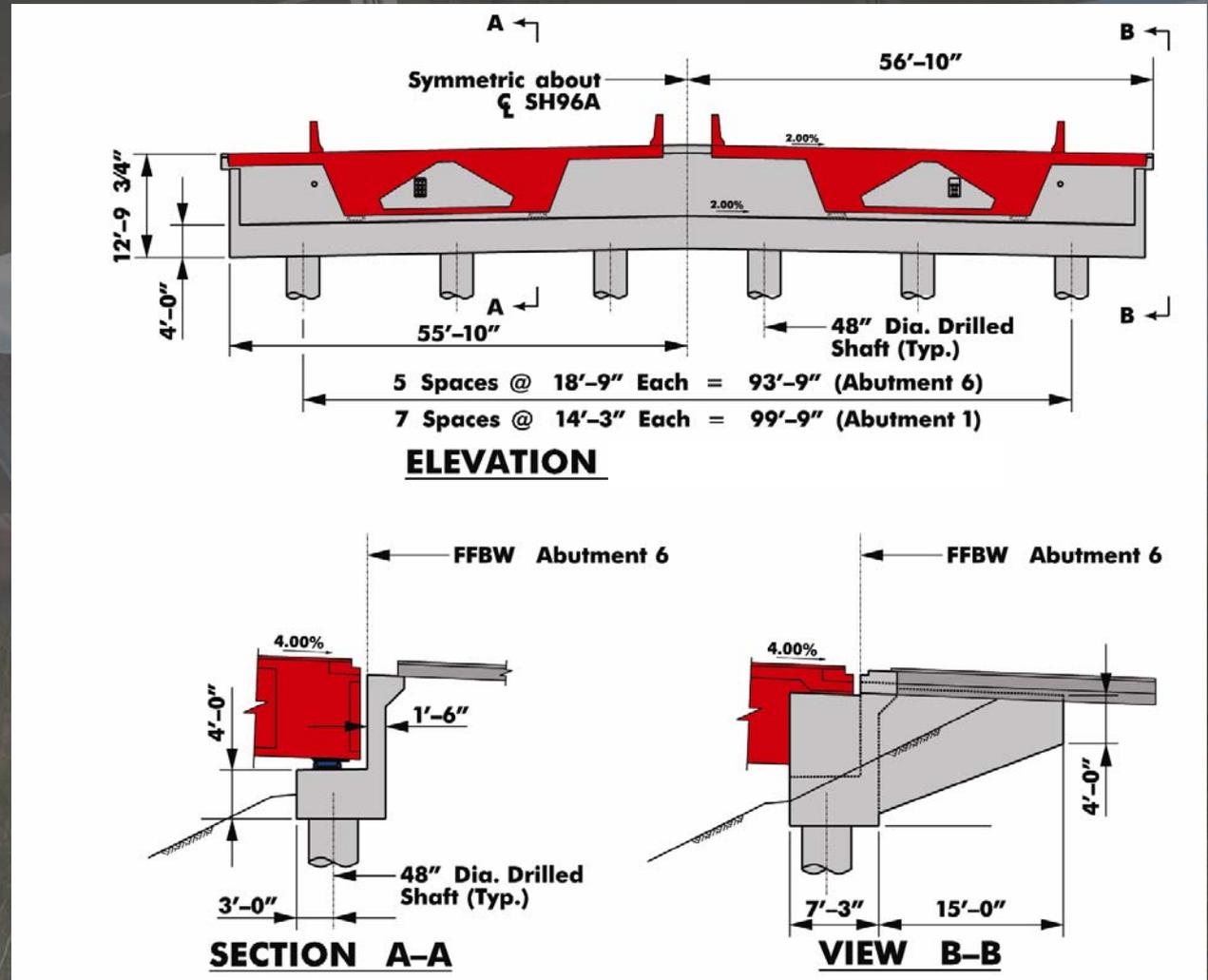
East End (Phased)

- Decorative Slope  
Paving

West End

- 12" Riprap

Backwall Phasing



# Drilled Shaft Foundations

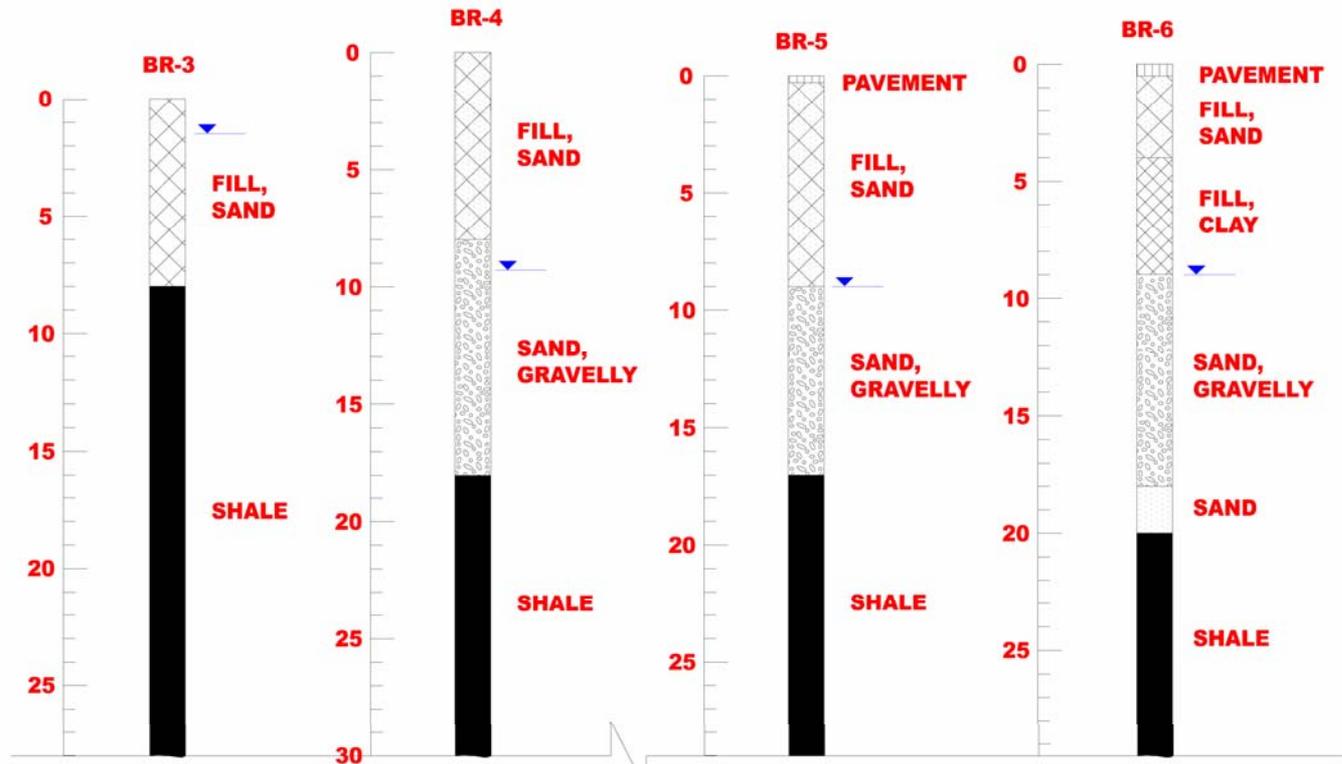
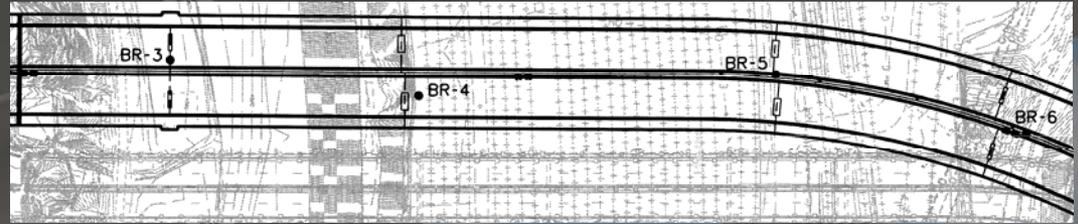
- **Min. Shale Sockets: 25'-43'**
  - Monument Pedestals: 12'-20'
- **Construction Considerations**
  - Arkansas River Level
  - Groundwater Level
  - Temporary Casing to Shale
  - Cross Hole Sonic Logging
  - Material Capture and Disposal

# Subsurface

## Bridge Piers

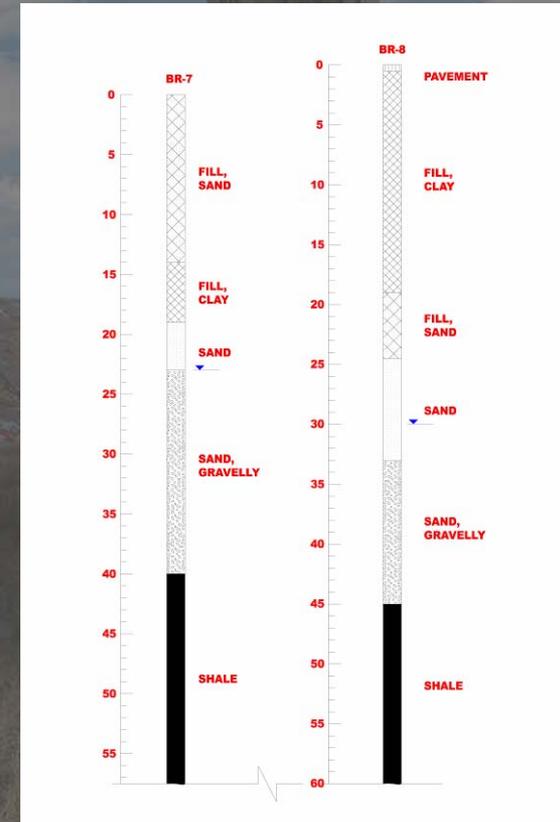
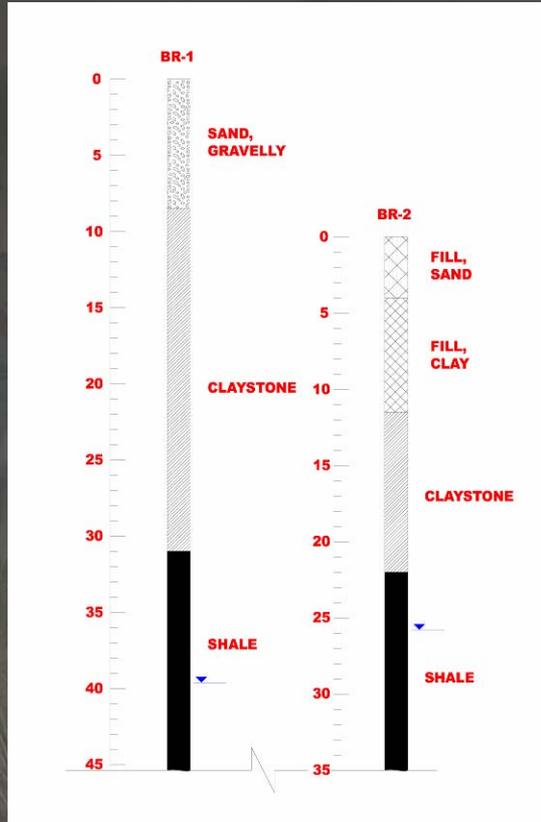
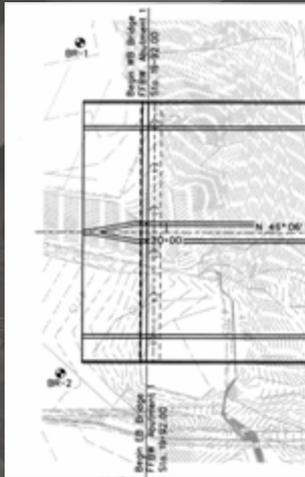
River Pier: 8' Fill Sand Over Shale

Others: 8 to 10' Fill, 8-12' Sand (gravelly), Shale



# Subsurface

## Abutments



Sand (gravelly) or Fill, Claystone, Shale

20 to 25' Fill, 15-20' Sand (gravelly), Shale

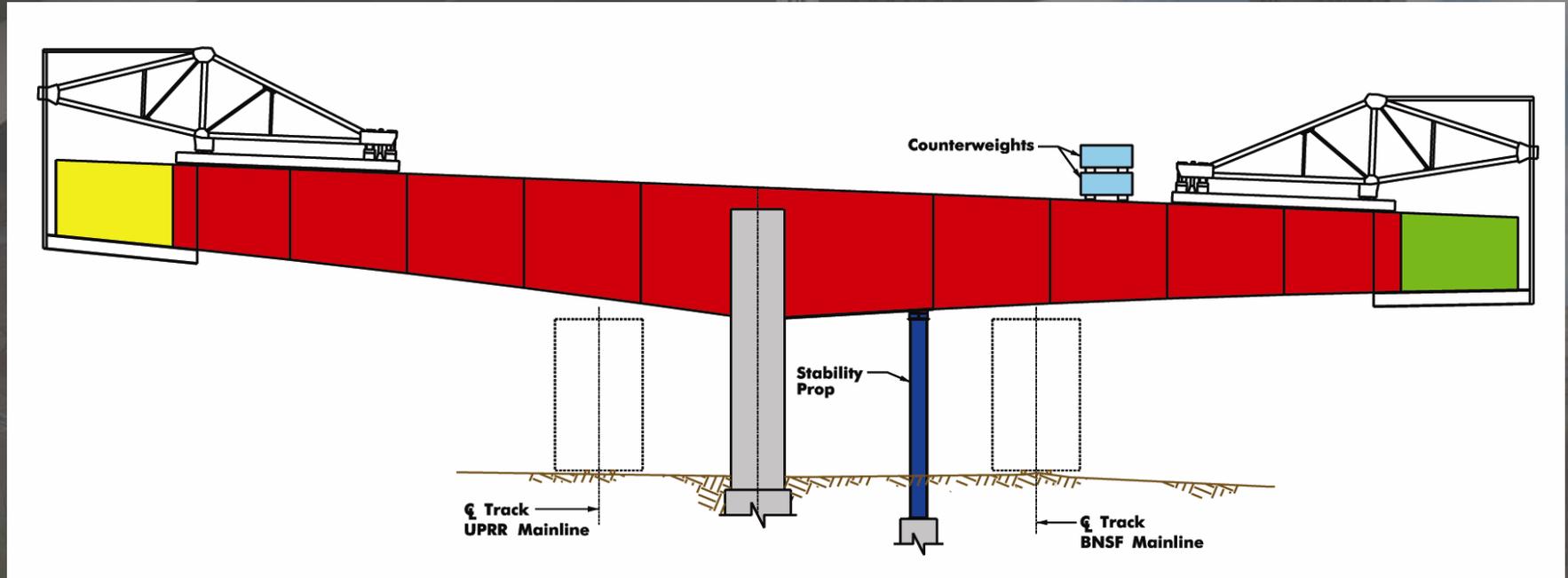
# Bearings & Joints

- **Piers**
  - Integral Piers
  - No Bearings
- **Abutments**
  - 8 Pot Bearings (2/girder)
  - 4 Guided Expansion
  - 4 Non-Guided Expansion
  - Max Axial: 1234 kip (Service)
  - Max lateral: 76 kips (service)
  - Modular Expansion Joints

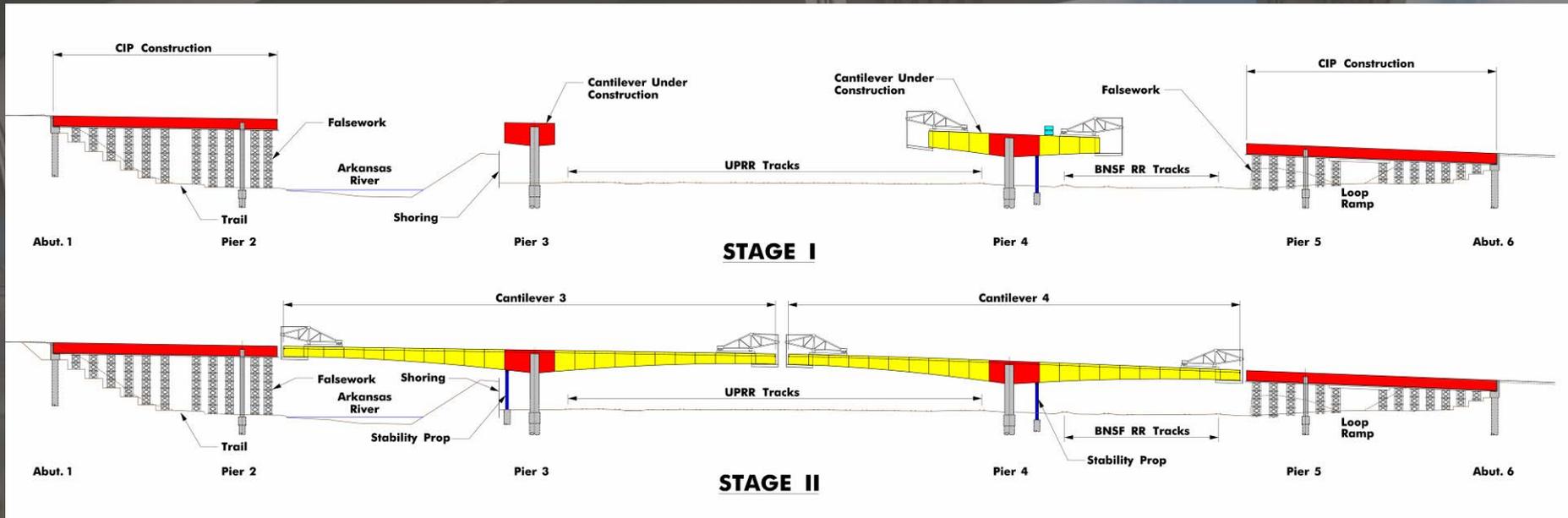


# Superstructure Erection

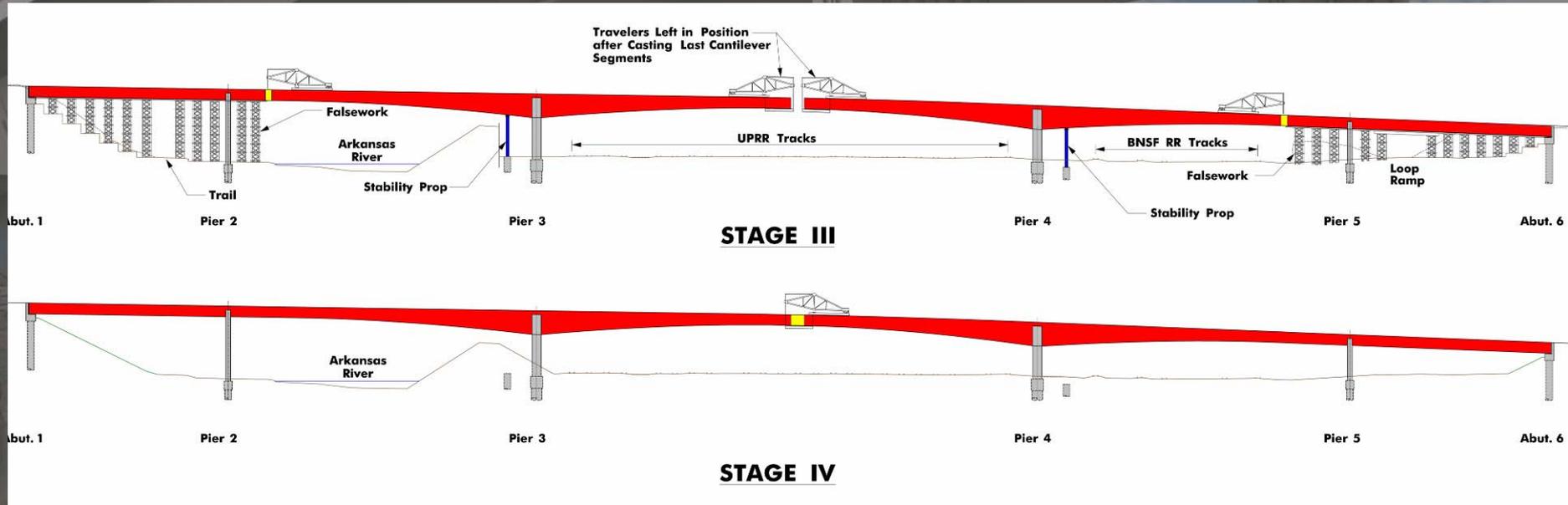
## Segment Casting and Temporary Prop



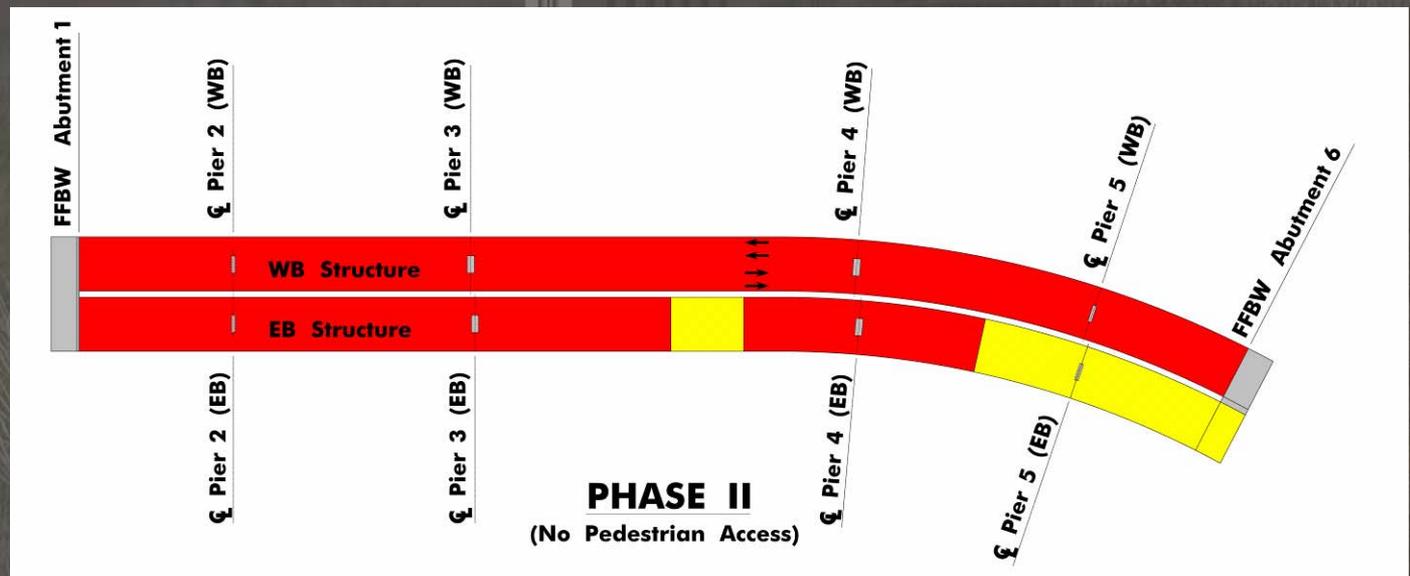
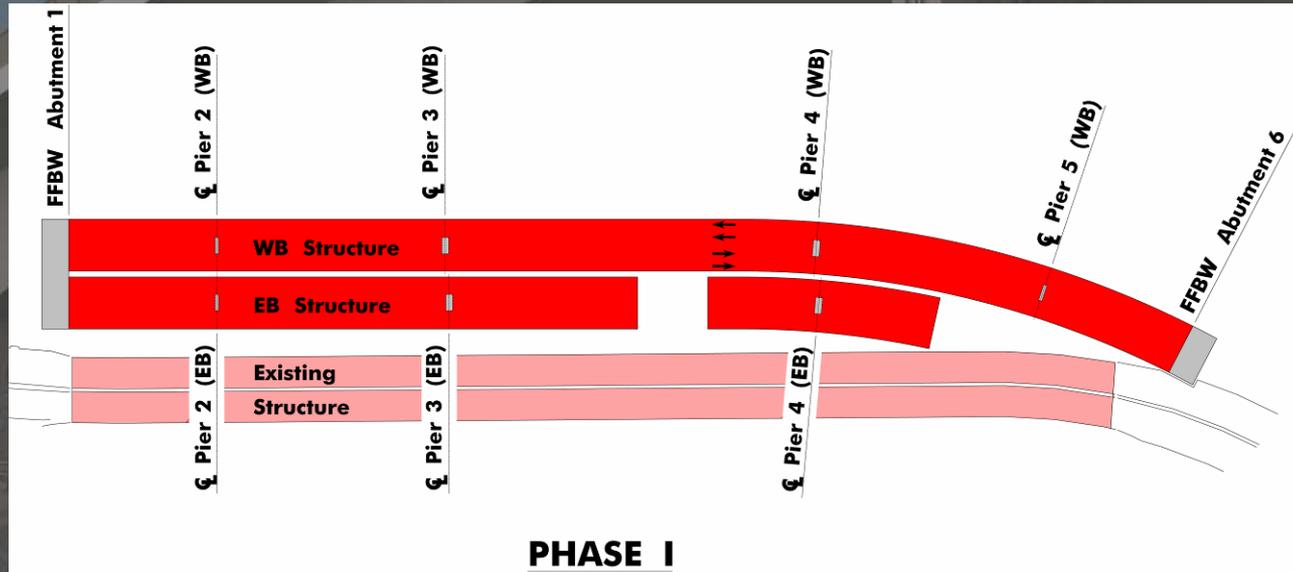
# Bridge Construction Overview



# Bridge Construction Overview



# Bridge Phasing



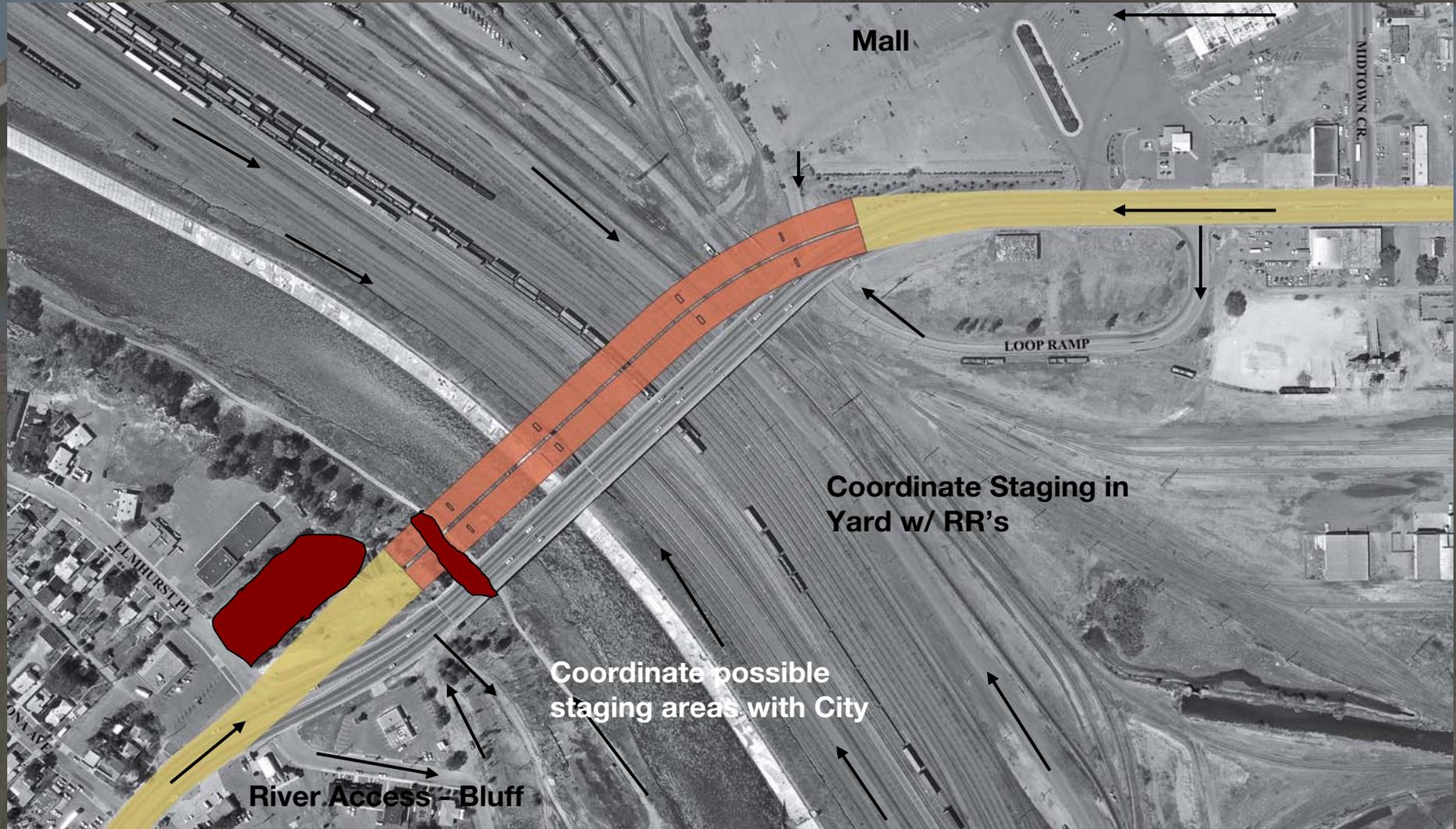
# Traffic Control

- Suggested Phasing Per Plans
- Deviation requires Engineer Approval
- No Lane Closures – 7 to 9 am, 4 to 6 pm
  - except noted in incentive/disincentive specification
- Maintain access to businesses, roadways, driveways
  - Unless approved otherwise by Engineer
- Keep Loop Ramp Open (except Phase IA)
- Maintain Mall access at all times
- Maintain Pedestrian Access
  - (except per incentive/disincentive specification)
- Pedestrian Detour and Public Involvement Plan
- Other requirements per Special Provisions

# Incentive / Disincentive

- **One way traffic each direction**
  - Phases IA, IB, IC, 2A
  - Maximum total duration – 162 days
  - \$ 10 K / day, \$ 90 K maximum
- **No Pedestrian Access across Bridge**
  - Phase II
  - Maximum total duration – 320 days
  - \$ 500 / day, \$ 10 K maximum

# Possible Access & Staging Areas



Yard Access - 'B' Street

# Schedule

- **Allowable Project Duration – 3.5 years**
- **Assumptions**
  - Single pair of form travelers
  - No delays from utilities relocations
  - No environmental or access delays
  - No railroad imposed delays
  - Eight week initial traveler assembly
  - Two segments cast every 5 to 6 days with an initial 8 day learning curve
  - Span 1 EB and WB concurrent
  - No work over BNSF in 4<sup>th</sup> Quarter
  - No work stoppages
  - Lost days built into schedule
  - **Alternate bridge has same number of calendar days for design and construction**

***Demolition & Misc.  
Removals***



# Bridge Demolition

- **Superstructure and Piers (Per RR)**
- **Existing Abutments**
  - Full East End w/ Partial Pile Removal (Staged)
  - Partial West End to below Finished Grade
- **Anticipated Phasing:**
  - Constructed as much as possible “off-line”
  - Begin Demolition Once Traffic is Relocated to New WB Bridge
  - Remove Spans 1 & 2
  - Finish Spans 4 & 5 of new EB Bridge, while Completing Demolition of Existing Bridge (Spans 3-7)
- **Include Bridge/Floodwall Stairs**

# Miscellaneous Removals

## West End



# Miscellaneous Removals

## East End



# Building Demolition

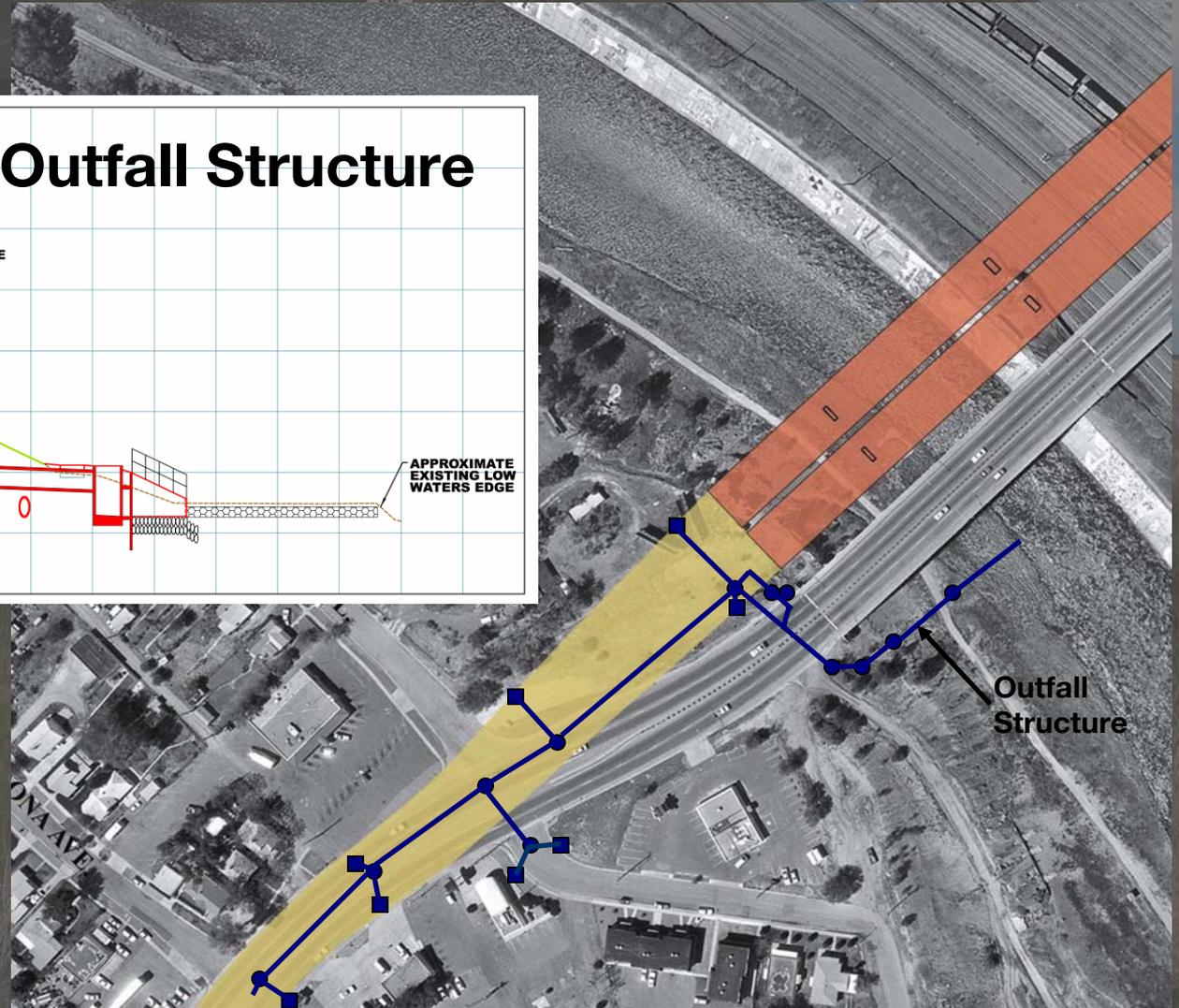
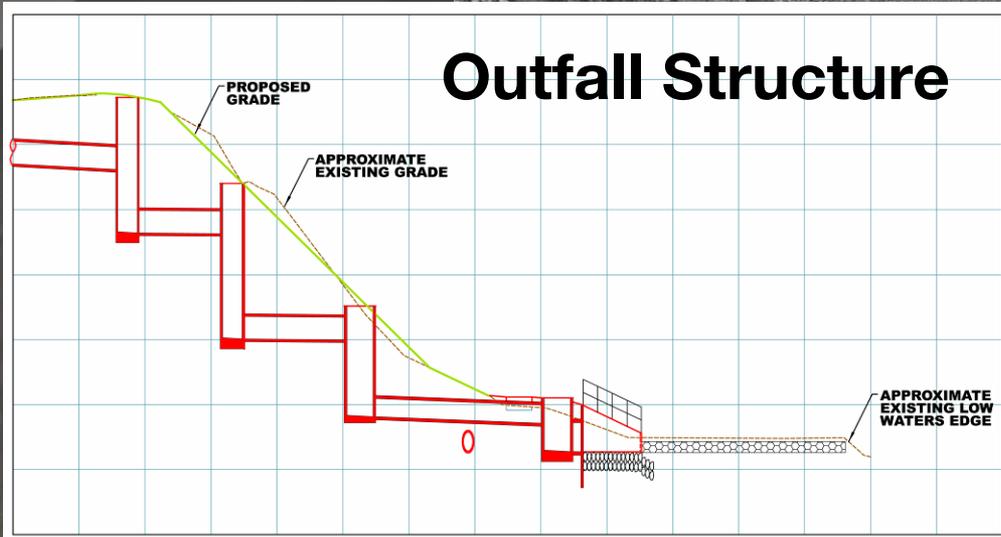
- **Building Demo**
  - Bluff Residence
  - Commercial Building within Loop Ramp
- **Billboards**



# Approach Work

# Drainage

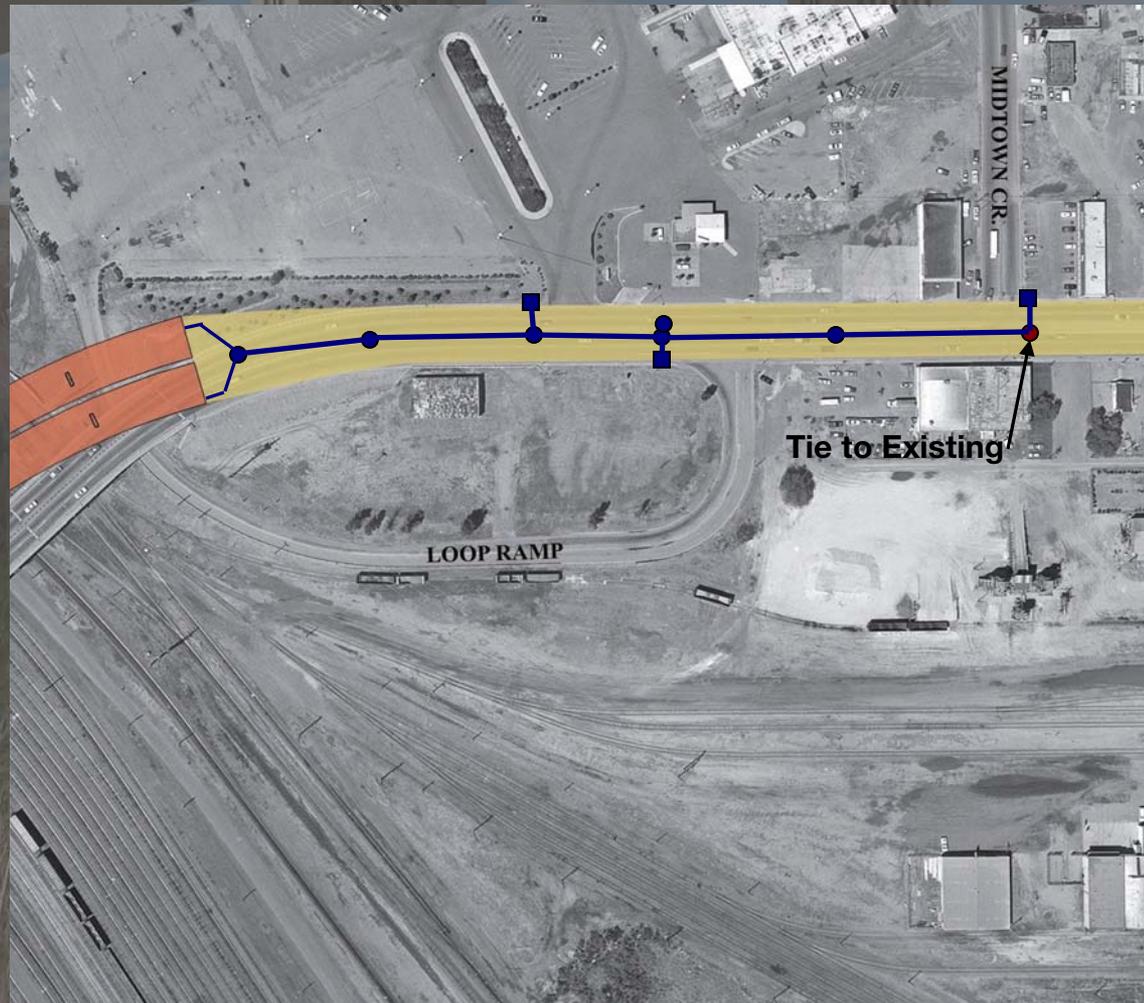
## New Drainage System West End



# Drainage

## New Drainage System East End

- Connect Bridge Drains (2)
- Tie to Existing System at Midtown Circle Dr.

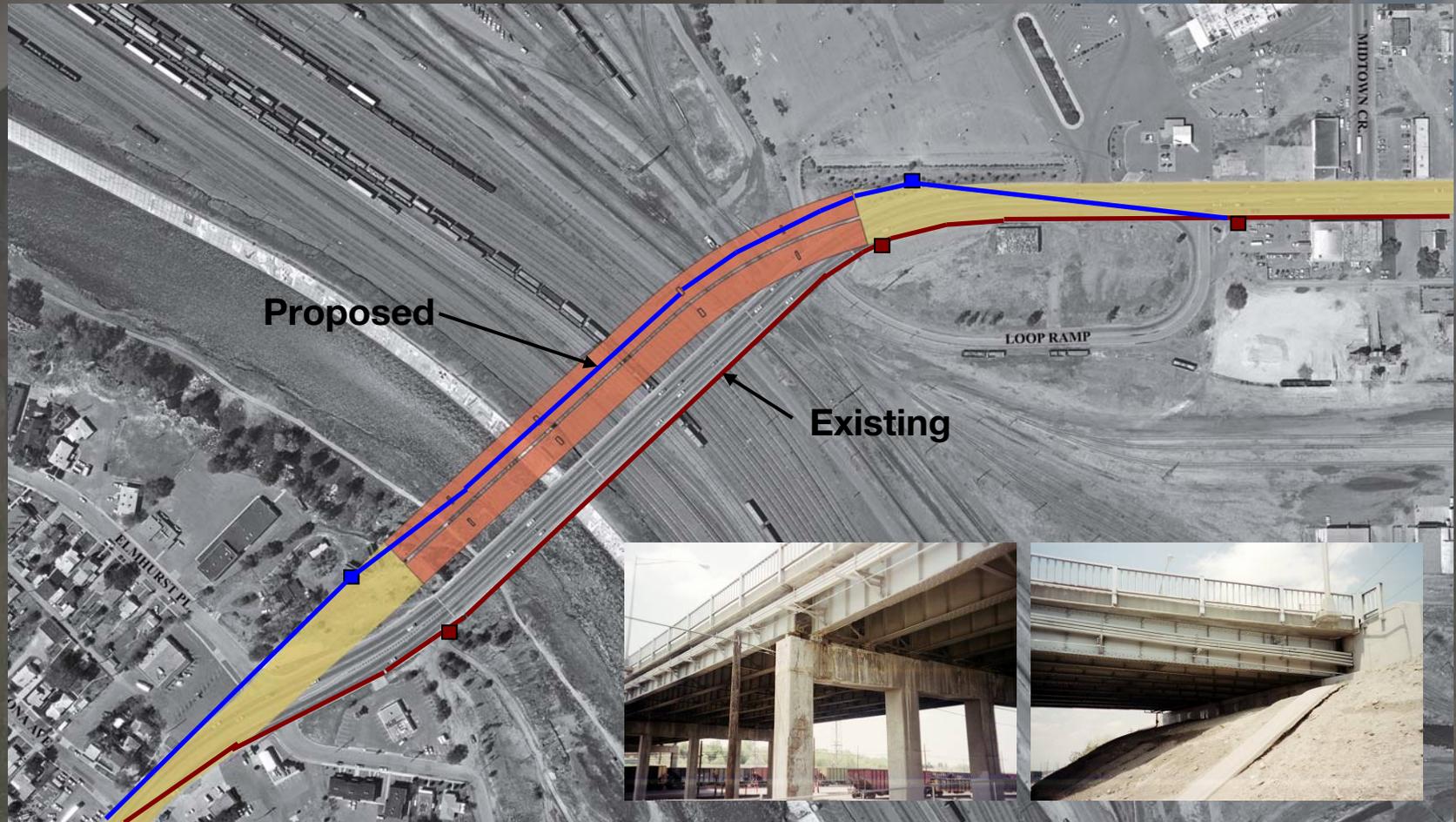


# Utilities

- **Qwest Communications**
- **Future CDOT/City Communicatios**
- **Xcel Energy - Gas**
- **Aquila Electric**
  - **Distribution**
    - street lighting
    - Irrigation system
    - Box girder interior maintenance/power system
  - **Transmission Lines**
- **Railroads (by Railroad)**
  - **Light Towers**
  - **Power, Communications, Gas Distribution**
- **Board of Water Works**
  - **Vertical Adjustments**
  - **West end water line is asbestos pipe**

# Utilities

## Qwest Communications



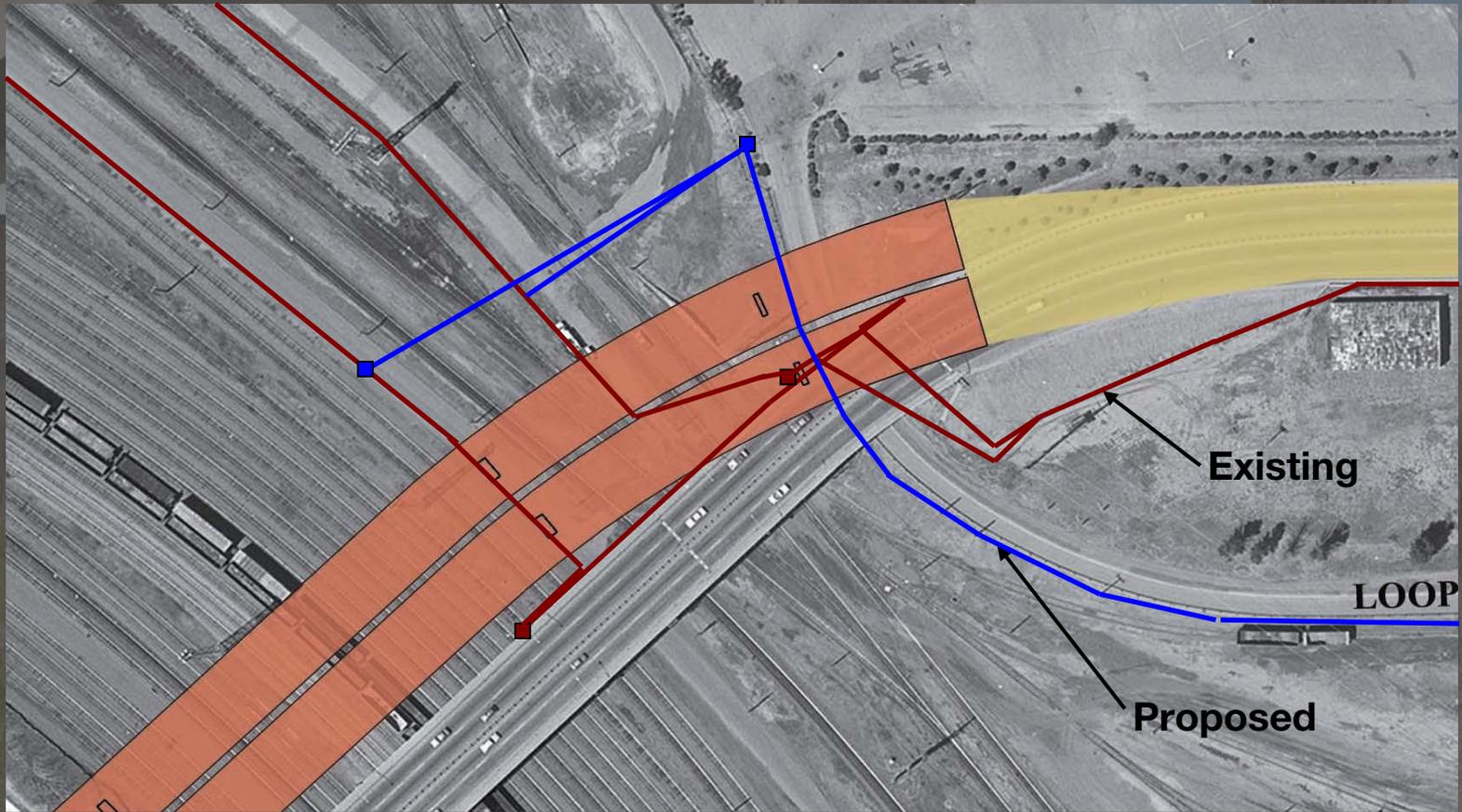
# Utilities

## Future CDOT/City Communications Conduit



# Utilities

## Xcel Energy Gas Lines



# Utilities

## Aquila Electric – Transmission Lines

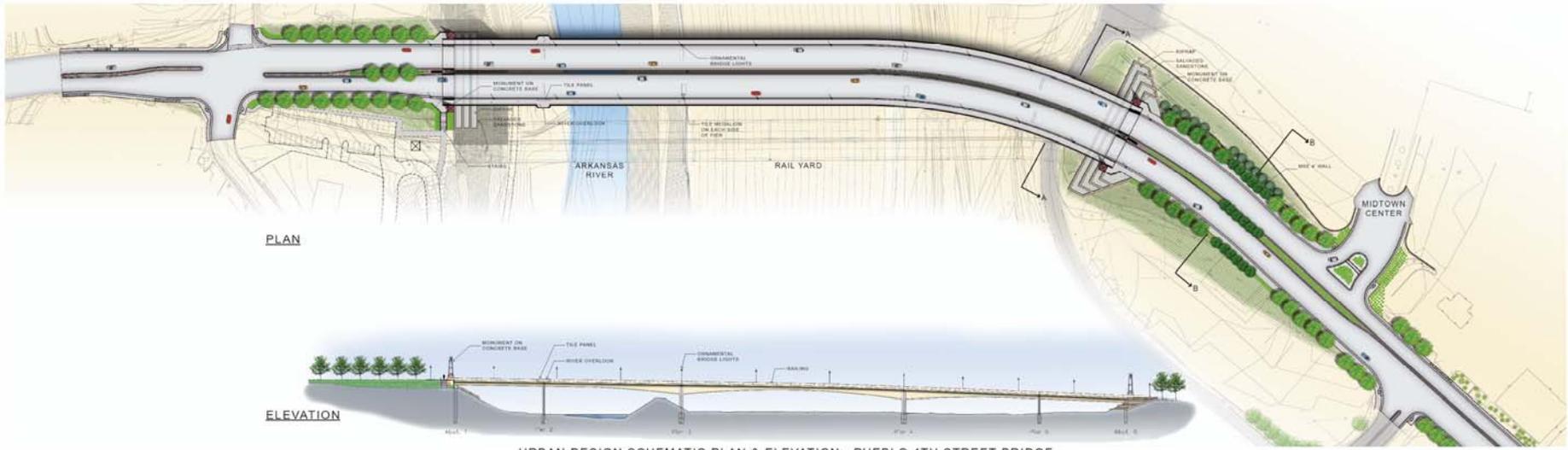


# Lighting

- **Decorative Street Lights**
- **Under-Bridge Lights**
- **Maintenance Lighting and Power Within Superstructure Girders**
- **Temporary Lighting WB Bridge During Construction**



# Landscaping



URBAN DESIGN SCHEMATIC PLAN & ELEVATION: PUEBLO 4TH STREET BRIDGE



TEAM LEADER  
HODD BRIDGE ENGINEERING INC.

OCTOBER 15, 2008



# SPECIAL PROVISIONS



# Insurance Requirements

- **Project Special Provision Rev 107 (page 30-34)**
  - Higher amounts for some of the standard insurances
  - Coverage for
    - Contractors Pollution Legal Liability Insurance \$5M
    - Umbrella or excess Liability insurance \$5M
    - Builders risk insurance
- **Different Requirements for Alternate Bridge**
  - Professional Liability higher \$5M
  - Umbrella or Excess Liability \$10M
  - Additional requirement
- **Comply with UPRR and BNSF Requirements**

# Environmental / Permits

- **Environmental Considerations**
  - Erosion Control
  - Wetlands Protection / Mitigation
  - Swallows
  - Protection from Falling Debris
  - City Ordinances (Noise, Dust, Trash, etc.)
- **Permits**
  - NPDES (Colorado)
  - Project Permitted under Nationwide 23 (incl. 404)

# Wetlands

- Along the Arkansas River (West Bank)
- Shown in Plans
- Comply with USACOE Permit (available from CDOT RE)
- Temporary Impacts are allowed per the Special Provisions

# Public Information Services

- **Designate a Public Information Manager**
- **Provide local contact information**
- **Distribute Project Flyers**
  - Local businesses and residents within the project limits
  - One week prior to start of construction
  - One week prior to any lane closures
  - One flyer per 6 months (minimum)
- **Host two Public Meetings**
  - First prior to start of construction
  - Second at mid-point of construction
- **Construction Signs with duration and contact**
- **Monthly Bus Passes**
  - When Pedestrian Access is Restricted from the Bridge (Phase II)
  - Coordinate with CDOT and City bus service

# Trail Use

- **Maintain Pedestrian Access to River and Trail**
  - Haul Road
  - Arkansas River Trail
- **Provide Pedestrian Detour Plan**
  - Advance notice for any trail closure or river use closure.
  - Need to sign areas and fence delineation.
- **Rebuild Portion of Trail per Trail Plans**
- **Maintain Haul Road and finish with ABC**

# ADA Requirements

- **ADA compliance is required during construction and will be enforced.**
  - **Need to provide temporary wheel chair ramps – asphalt or wooden.**
  - **Need to provide guidance for blind people - detectable. Bottom edge shall be provided.**
  - **Need to physically block areas where pedestrians are not allowed. Tape, rope or plastic hung between devices is not acceptable.**

# Railroad Requirements

- **Special Provisions**
- **Construction Clearances**
  - UPRR: 12' horizontal, 21' vertical
  - BNSF: 15' horizontal, 21.5' vertical
- **Permanent Clearances (per plans)**
  - UPRR: 18' horizontal, 23' vertical
  - BNSF: 18' horizontal, 24' vertical
- **Flagging**
  - UPRR and BNSF
  - When work is within 25' of centerline track  
(including equipment extensions)
  - Follow proper notification procedures
  - Paid by F/A up to contract limit

# Special Construction Requirements

- **BNSF 4<sup>th</sup> Quarter No Work (w/out approval)**
- **Coordinate all access and staging**  
(CDOT, City, Conservancy, Railroads, Property Owners)
- **Maintain Yard Roads Open per Railroads**  
(re-align and finish East Yard Road upon construction completion to railroad satisfaction)
- **Provide Temp. Yard Lighting**  
(where construction activities reduce yard light levels)
- **Comply with Pueblo Ordinances**
- **No work shall interfere with State Fair (August)**
- **Storm Sewer Outfall Phasing**
  - complete outfall & trunk line within first 150 days
  - Complete seeding and planting ASAP to establish channel vegetation

# Contractor's Personnel

## Personnel Requirements:

- **Construction Manager:**
  - Minimum 3 years construction management experience
- **Project Manager:**
  - Prior experience at supervisory level
  - In overall charge, on site full time
- **Foundation Superintendent:**
  - Experience in large diameter drilled shafts and Footings
  - On site full time during foundation construction
- **Structures Superintendent:**
  - Experience in balanced cantilever and on-falsework construction, or other heavy construction
  - In overall charge, on site full time during this work
- **2<sup>nd</sup> Structures Superintendent:**
  - Same as Structures Superintendent
  - Assume control when Structures Superintendent not available
  - Can perform other duties

# Contractor's Personnel

## Personnel Requirements (cont.):

- **Geometry Control Technician(s):**
  - Experience in Segmental Balanced Cantilever Casting Geometry Control
  - Cast in Place on Falsework Experience
- **Contractor's Engineer:**
  - Registered Colorado PE
  - Successful Experience in Design and Construction of CIP Segmental Balanced Cantilever bridges
  - Successful Experience in Design and Construction of CIP bridges built on falsework
  - Available as per the special provisions
- **PT Grouting Supervisor:**
  - Directly supervise all grouting and grouting personnel
  - Experience as per the special provision
  - ASBI Certified

# Contractor's Personnel

## Personnel Requirements (cont.):

- QC Manager:
  - Minimum 1 year QC related experience
  - Not supervised by Contractor's Production Section
  - QC is sole duty (for pre-stressed concrete)

## Award Dependent Submittal

- Documentation must be submitted to CDOT within 5 days after bid letting
- CDOT will accept/deny proposed individuals within 5 days after receipt
- CDOT may request revisions

# Expected Revision Under Ad

- **Stormwater Management**
  - Change Erosion Control supervisor to days rather than lump sum
  - If Contractor is out of compliance, he will have 48 hours to correct
  - Written violation is issued if not corrected and given another 48 hours to correct.
  - \$500/day fine issued if still out of compliance.
  - Contractor's ECS will be responsible for tracking and documenting BMP's installed and submitting weekly erosion control schedule.

# *Question and Answer*

# Contact

- **Follow Up Questions / Comments**
  - **Contact CDOT Directly**
  - **Dean Sandoval**
    - **(719) 546-5440**
  - **Minutes, Question Responses, and Sign In Sheet will be posted to website and meeting minutes.**