Pee Dee River Historic Arch Bridge Rehabilitation and Widening Feasibility Study

John Sloan, PE

April 2017

Henley Street Bridge
Knoxville, TN – Before Construction (courtesy TDOT)

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Henley Street Bridge
Knoxville, TN – During Construction (courtesy TDOT)

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Henley Street Bridge
Knoxville, TN – After Construction (courtesy TDOT)

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NCDOT Pee Dee River Bridge Widening & Rehabilitation

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NCDOT Pee Dee River Bridge Widening & Rehabilitation

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Predecessor Bridge – Link

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Project Location
between Albemarle and Troy, North Carolina

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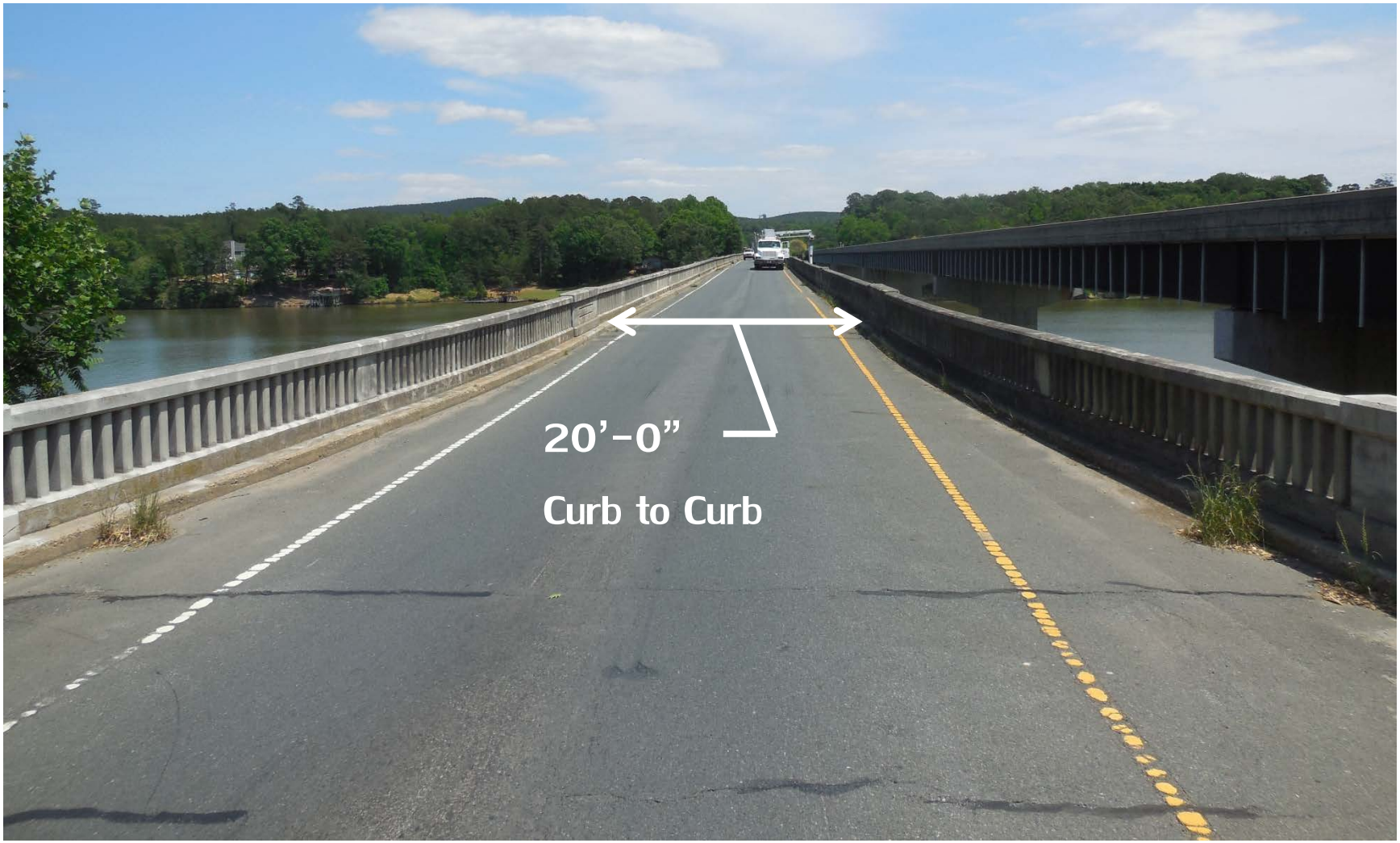
NCDOT Pee Dee River Bridge Widening & Rehabilitation
Albemarle, NC



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NCDOT Pee Dee River Bridge Widening & Rehabilitation Albemarle, NC

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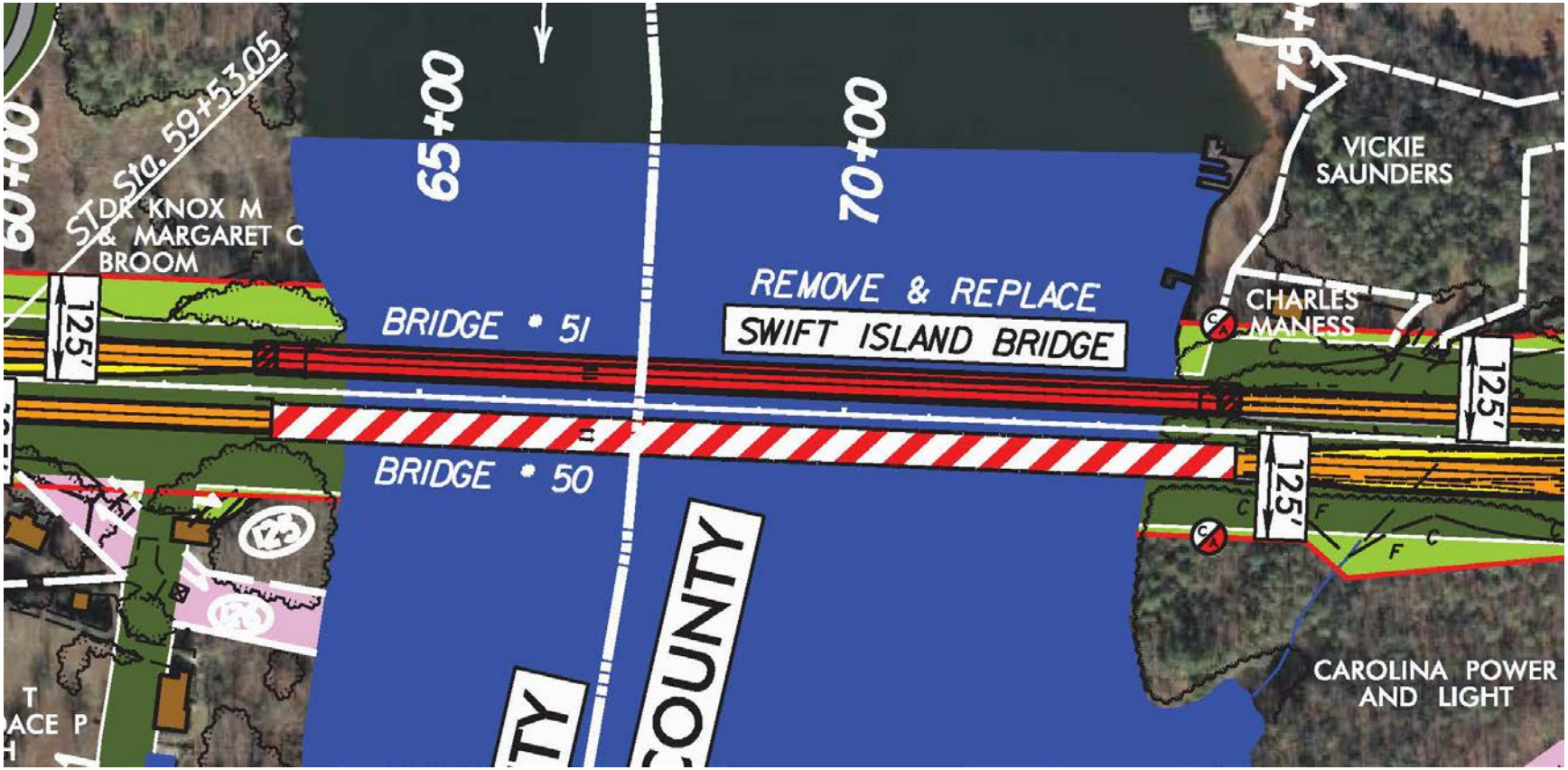
Public Hearing Map Alternate 4
Remove the Arch Bridge and Replace It with a Conventional Bridge



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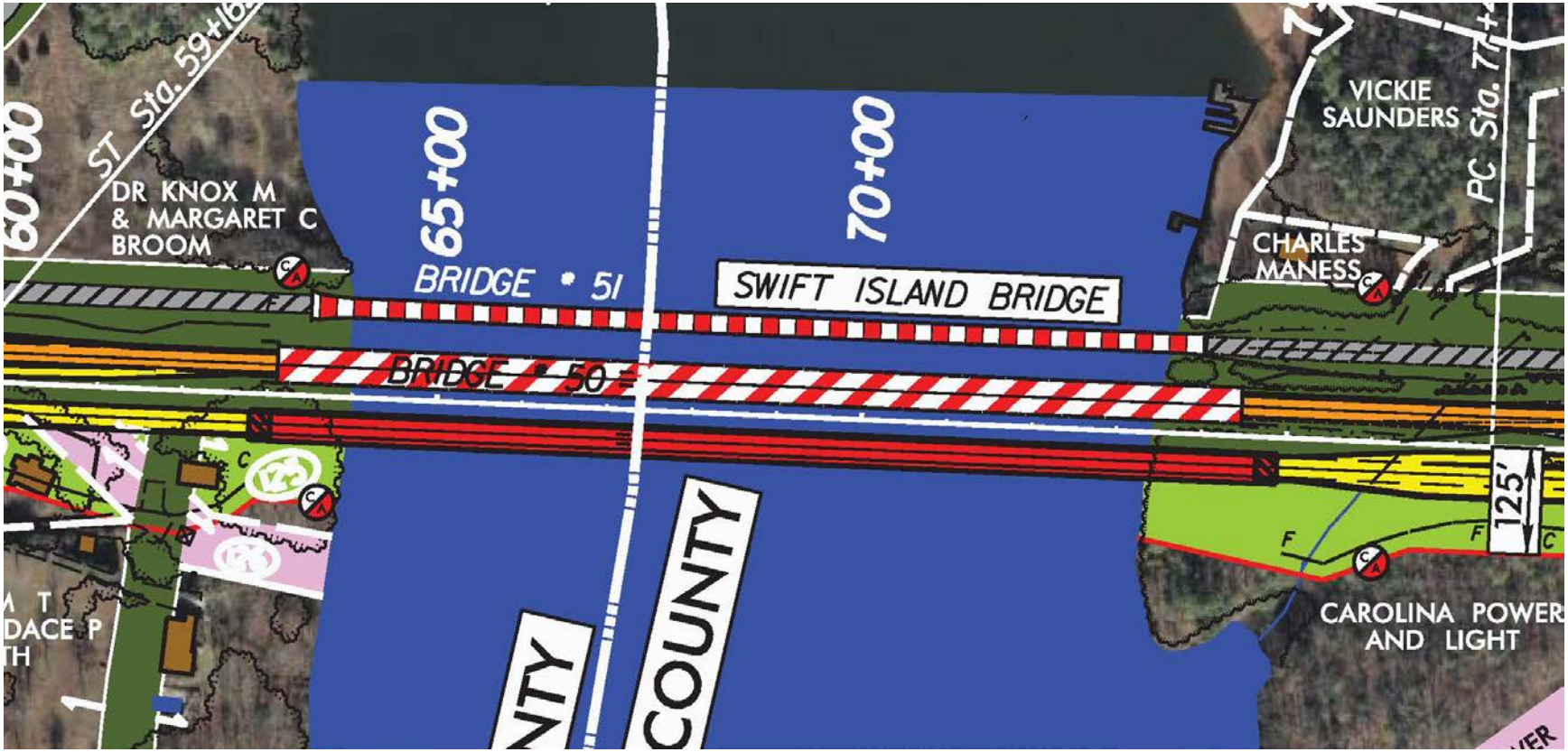
Public Hearing Map Alternate 1
New Bridge to the South – Arch Bridge Preserved as a Bike & Pedestrian Facility



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2016 Feasibility Study

Feasibility Study Team

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

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INFRASTRUCTURE ENGINEERS, INC.
ingenuity & agility

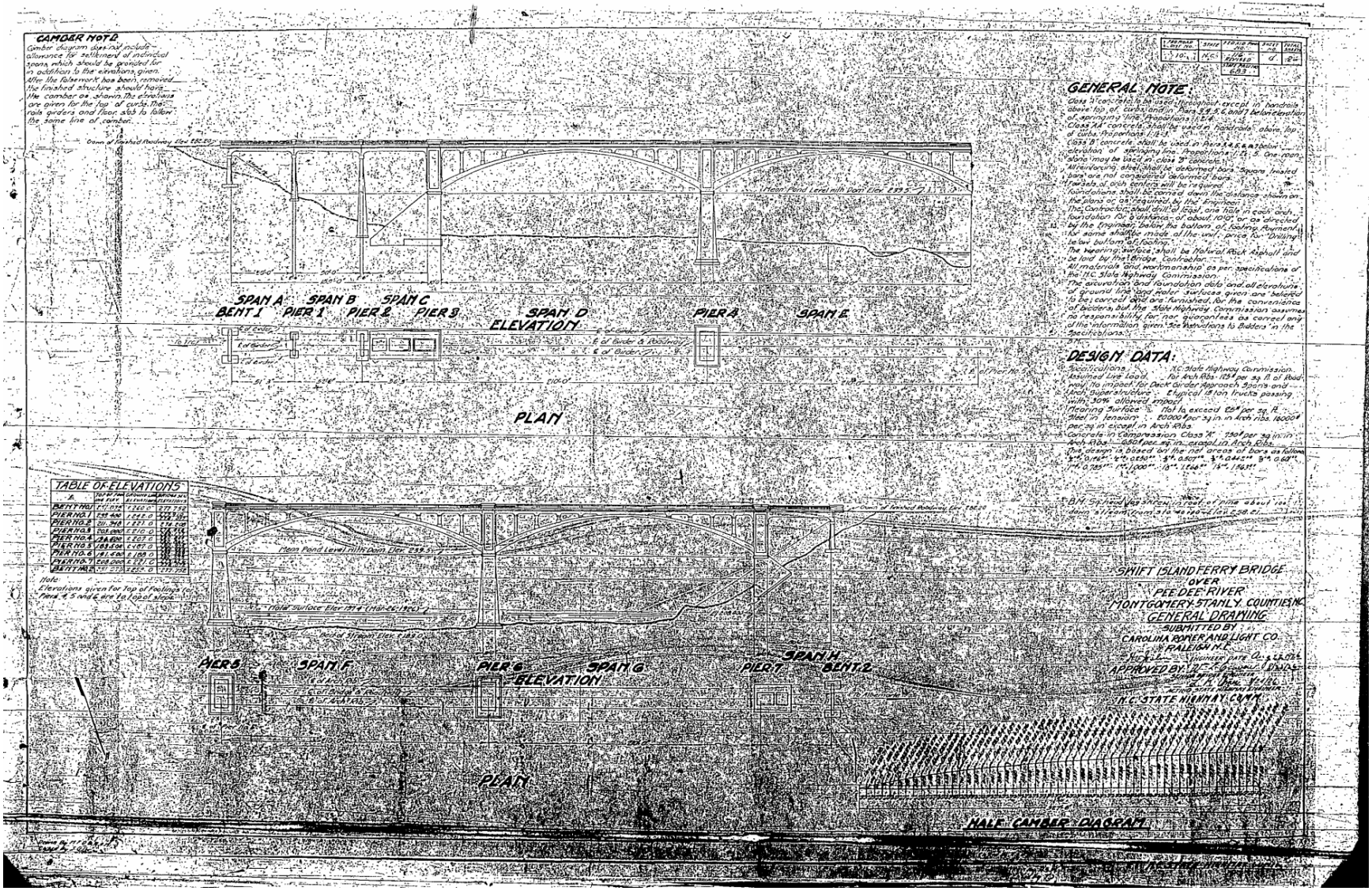
FALCON ENGINEERING

SCS SIVA CORROSION SERVICES, INC.
Materials, Corrosion, and NDT Specialists

Feasibility Study Scope of Work

- Load rating of the existing bridge
- Load rating of the bridge with a proposed superstructure
- Above water inspection
- Underwater inspection (Infrastructure Engineers)
- Geotechnical investigation (Falcon Engineering)
- Material testing, corrosion protection, and service life analysis (Siva Corrosion Services)
- Consultation for NEPA and historic preservation
- Final feasibility study summary document

Original Arch Bridge Plans



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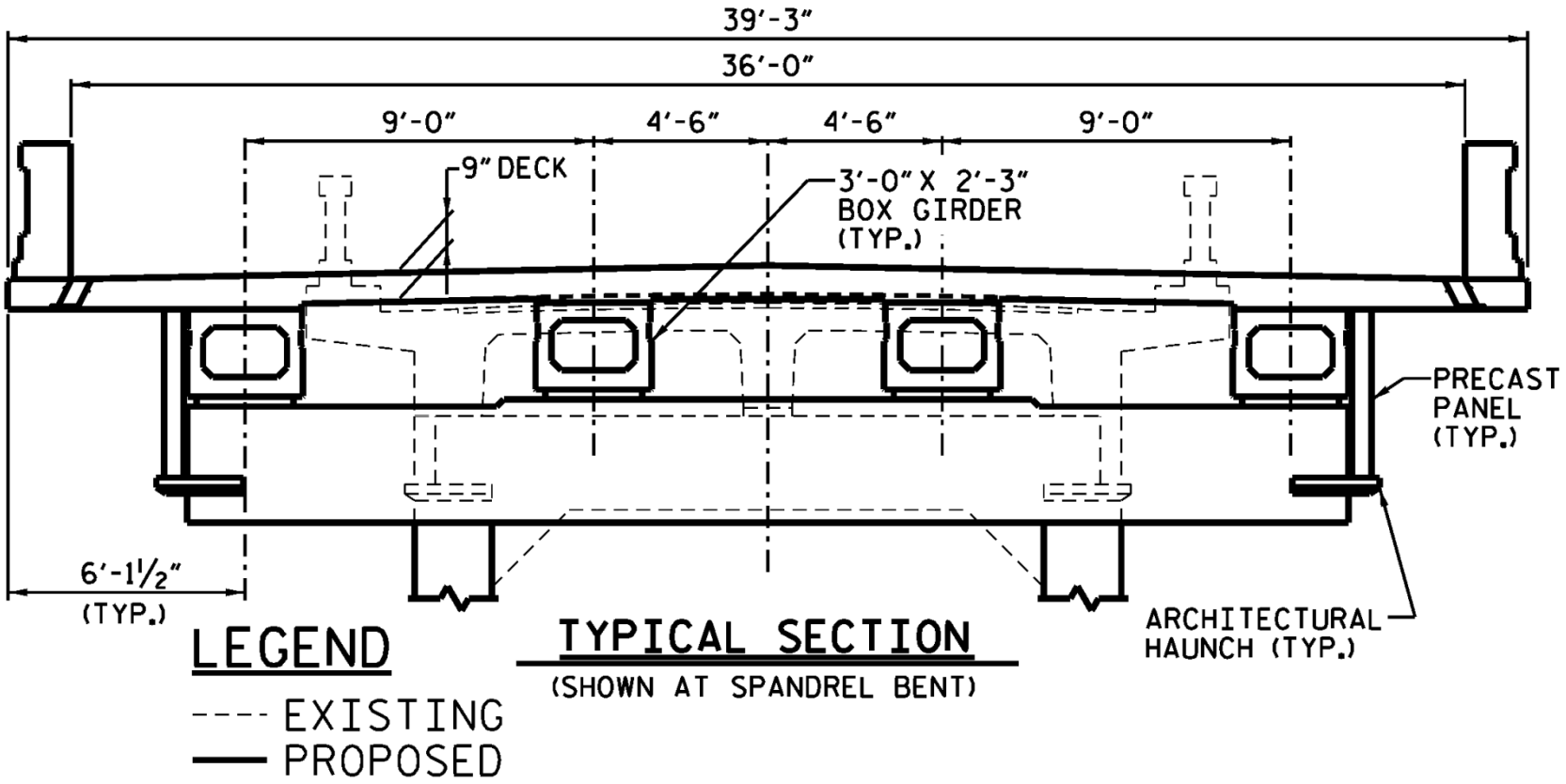
Proposed Typical Section



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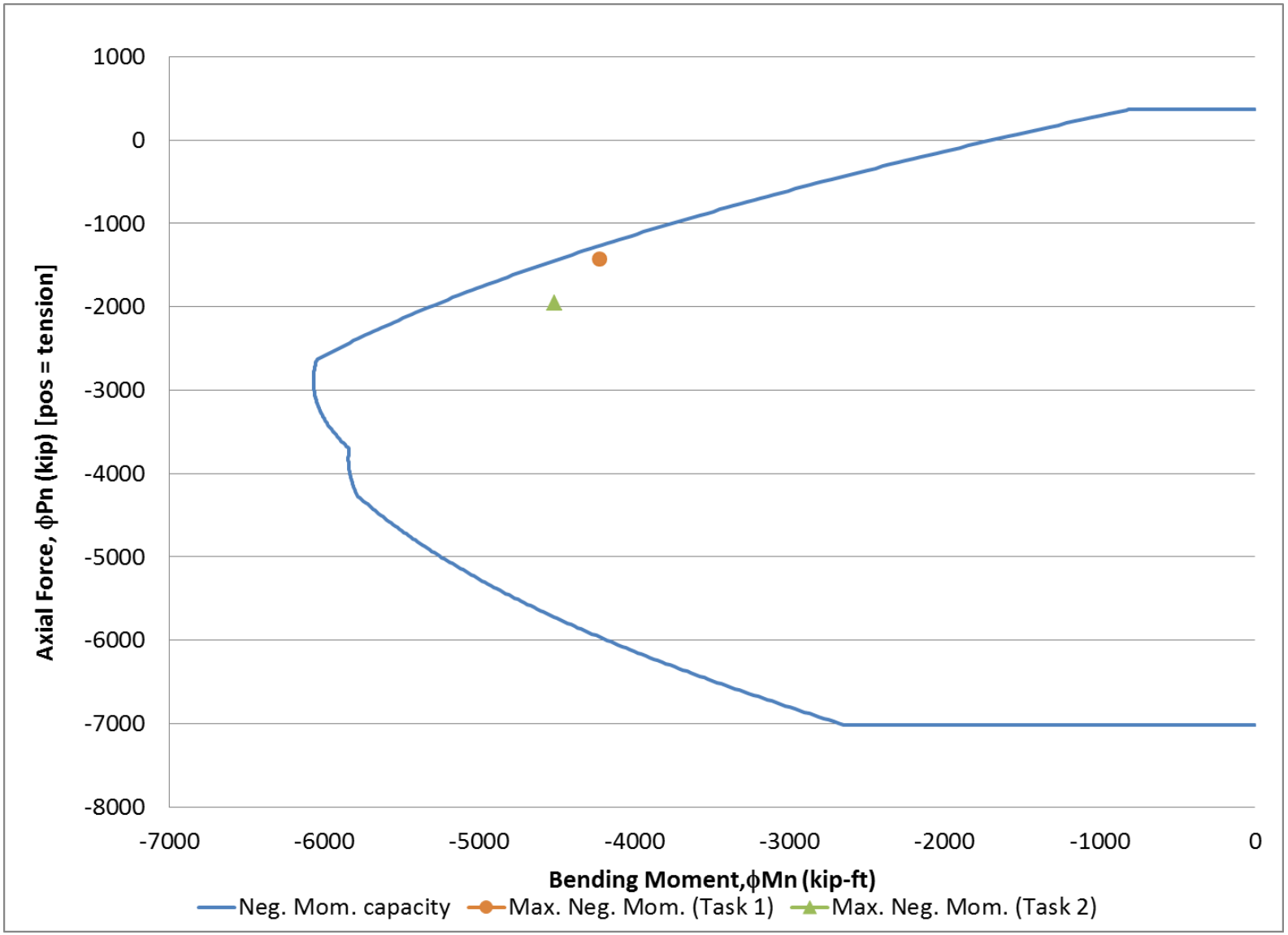
Arch Rib Interaction Diagram at the Springline



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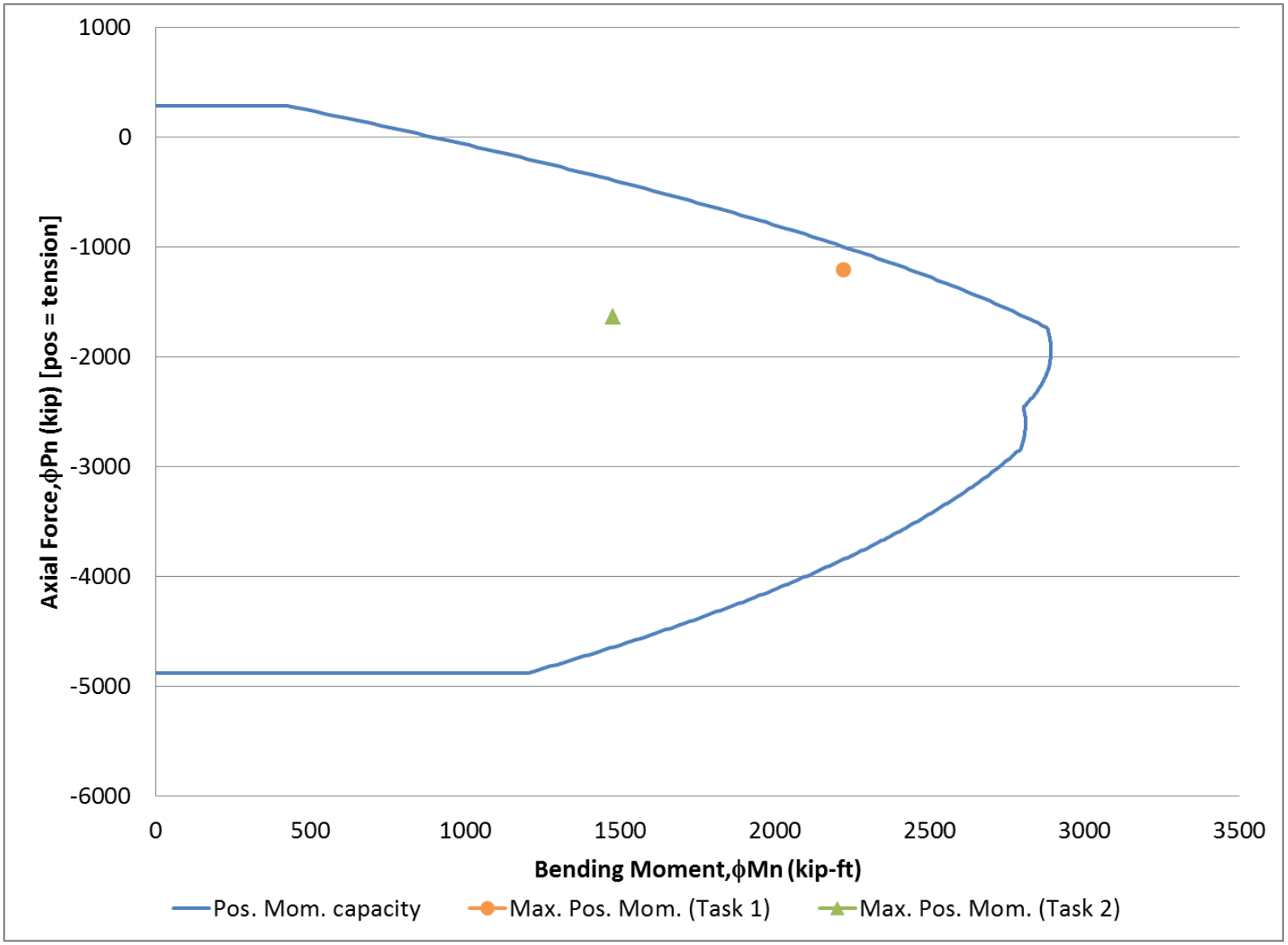
Arch Rib Interaction Diagram at 1/3 Span



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Inspection Results – Arch Piers

Inspection Results – Arch Piers

Progression of Deterioration – Crack

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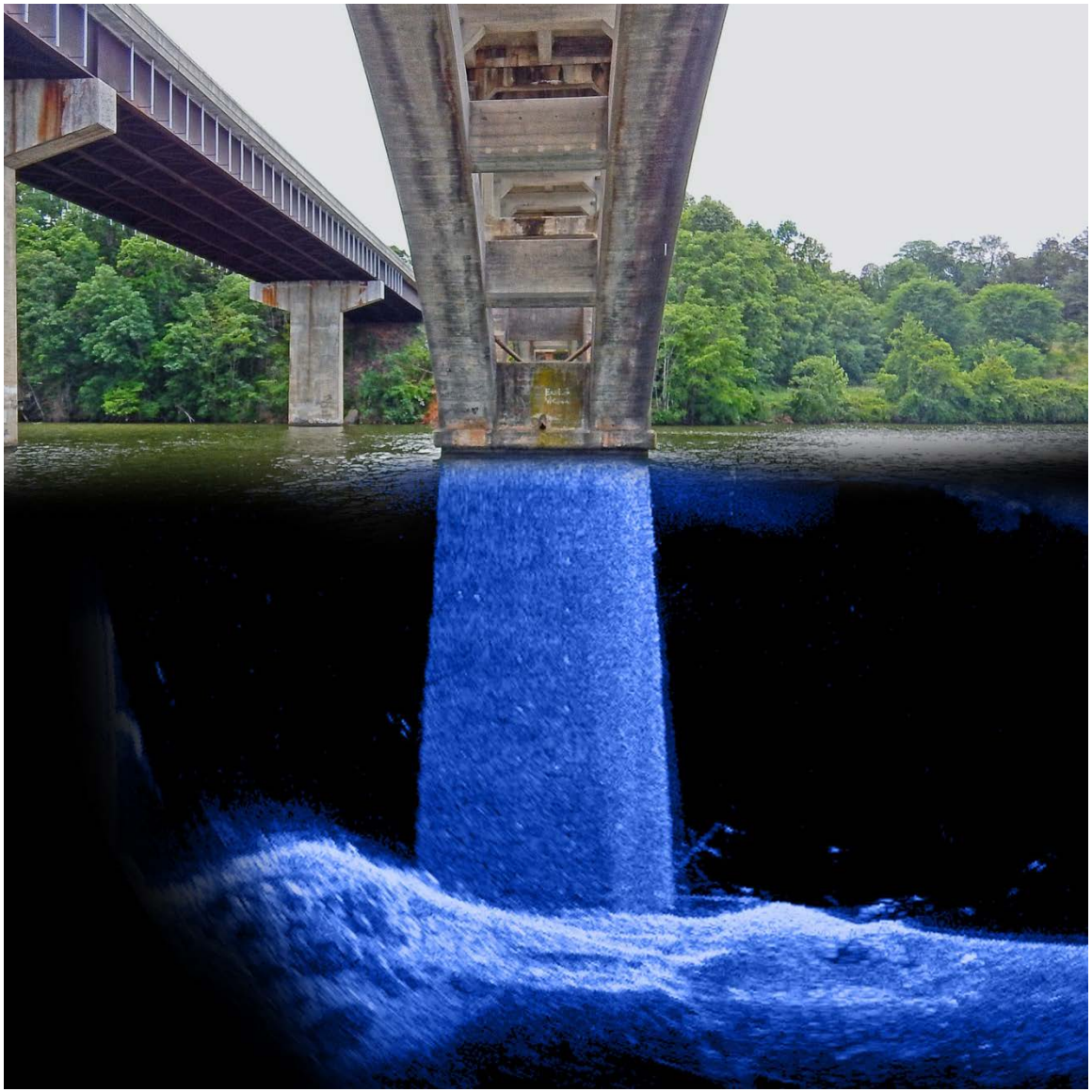
Progression of Deterioration – Delamination

Progression of Deterioration – Spall

Underwater Inspection (photo courtesy IE)



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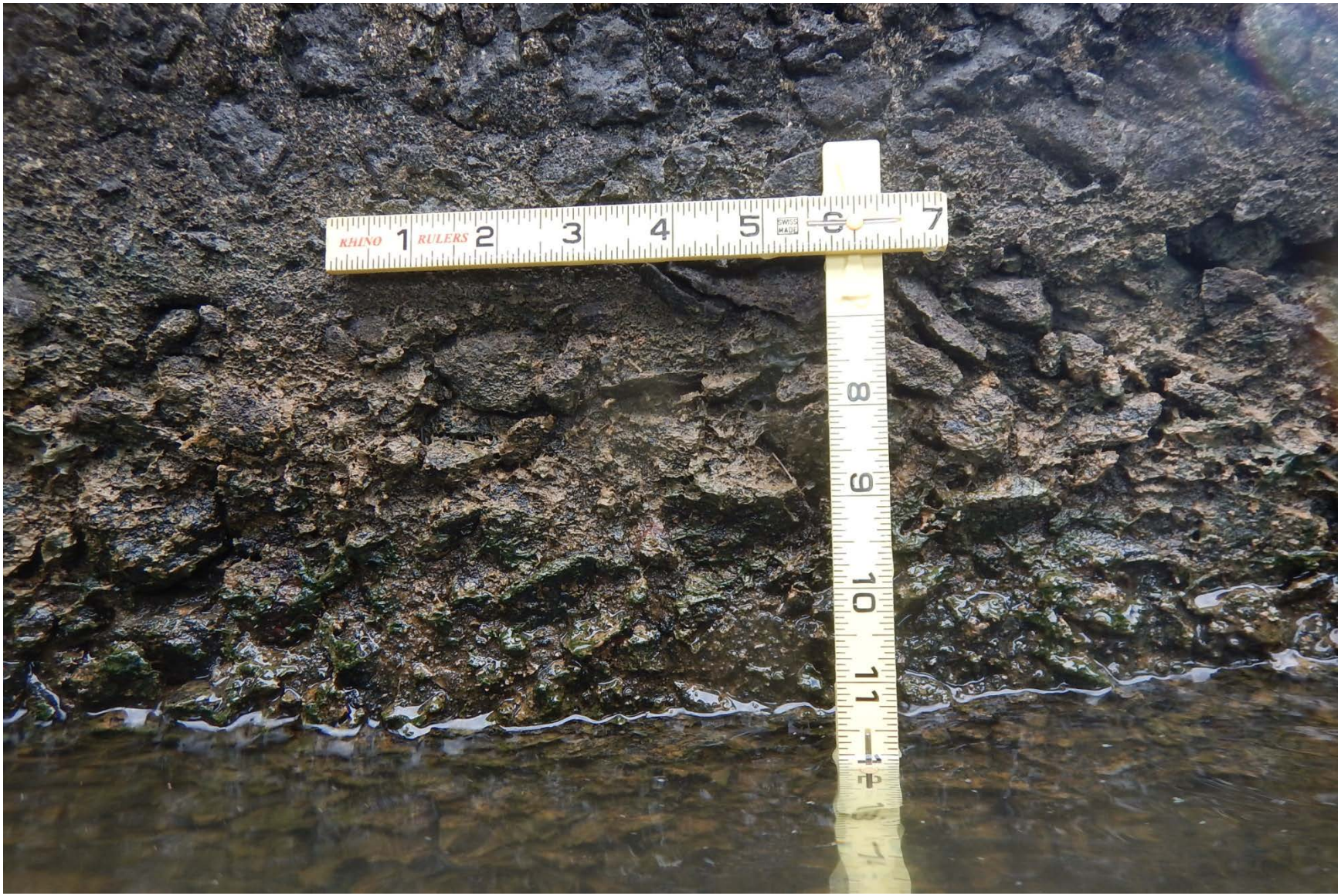
Underwater Inspection (photo courtesy IE)



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Inspection Results – Arch Ribs

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Deck Expansion Joints at 1/3 of the Arch Span

Scaling at the Top of the Arch Rib near the Springline

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Corrosion Protection and Service Life Analysis

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Corrosion Protection and Service Life Analysis

Proposed Visualization

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Conclusions

- Eliminate as many joints as possible. Maintain & replace joints regularly if they can't be eliminated.
- Document every defect with a photo and a sketch during inspection.
- Cracks parallel to a corner indicate corrosion has initiated in the longitudinal reinforcement. Crack injection is not the appropriate repair methodology.
- Concrete Jacket repair at the waterline.
- Replace piers down to the arch rib springline.
- Arch rib strengthening is not anticipated.

Conclusions

- This alternative is the Least Environmentally Damaging Practicable Alternative in accordance with NEPA.
- No Adverse Effects upon the historic structure (with conditions) in accordance with Section 106 of the Historic Preservation Act.
- De Minimus impact in accordance with Department of Transportation Act of 1966.
- 75 year service life is projected.
- $4.3 million estimated savings compared to constructing a new bridge south of the existing bridges.


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