



Rehabilitation of Bridge No. 03819 Northbound Gold Star Bridge



Rehabilitation of Bridge No. 03819 // State Project No. 0094-0261

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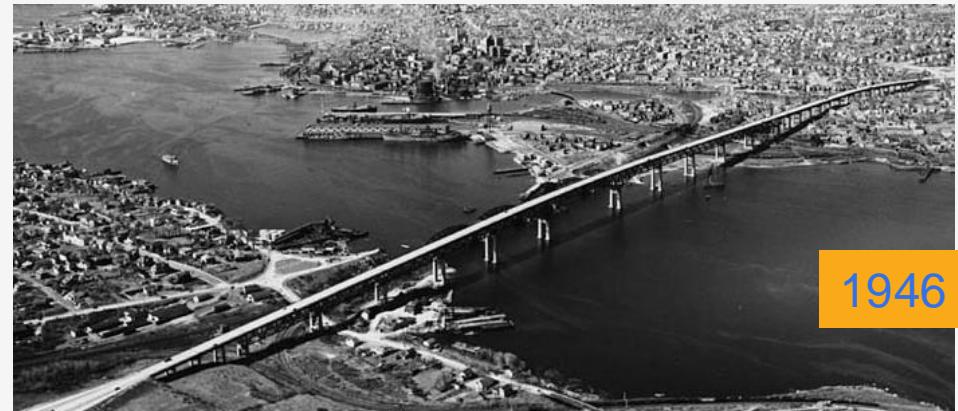
Project Location



Northbound Gold Star Memorial Bridge Overview

Bridge No. 03819 Facts:

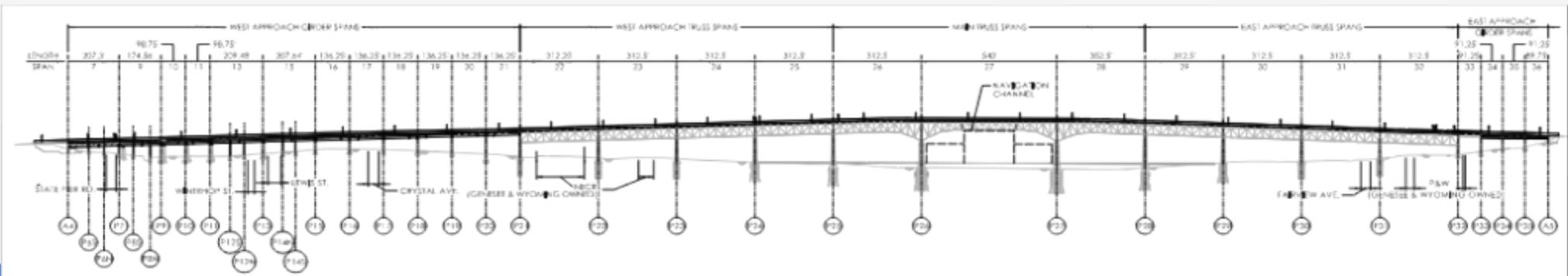
- 2nd largest and longest bridge in Connecticut (SB is slightly longer/larger)
- 2020 Average Daily Traffic = 52,000 vehicles
- Built in the 1940s and carried traffic in both directions
- Major rehabilitation occurred in 1973-1975 after a second bridge was built to carry only I-95 Southbound
- Rehabilitation of truss span superstructure currently in construction (Project No. 94-256)



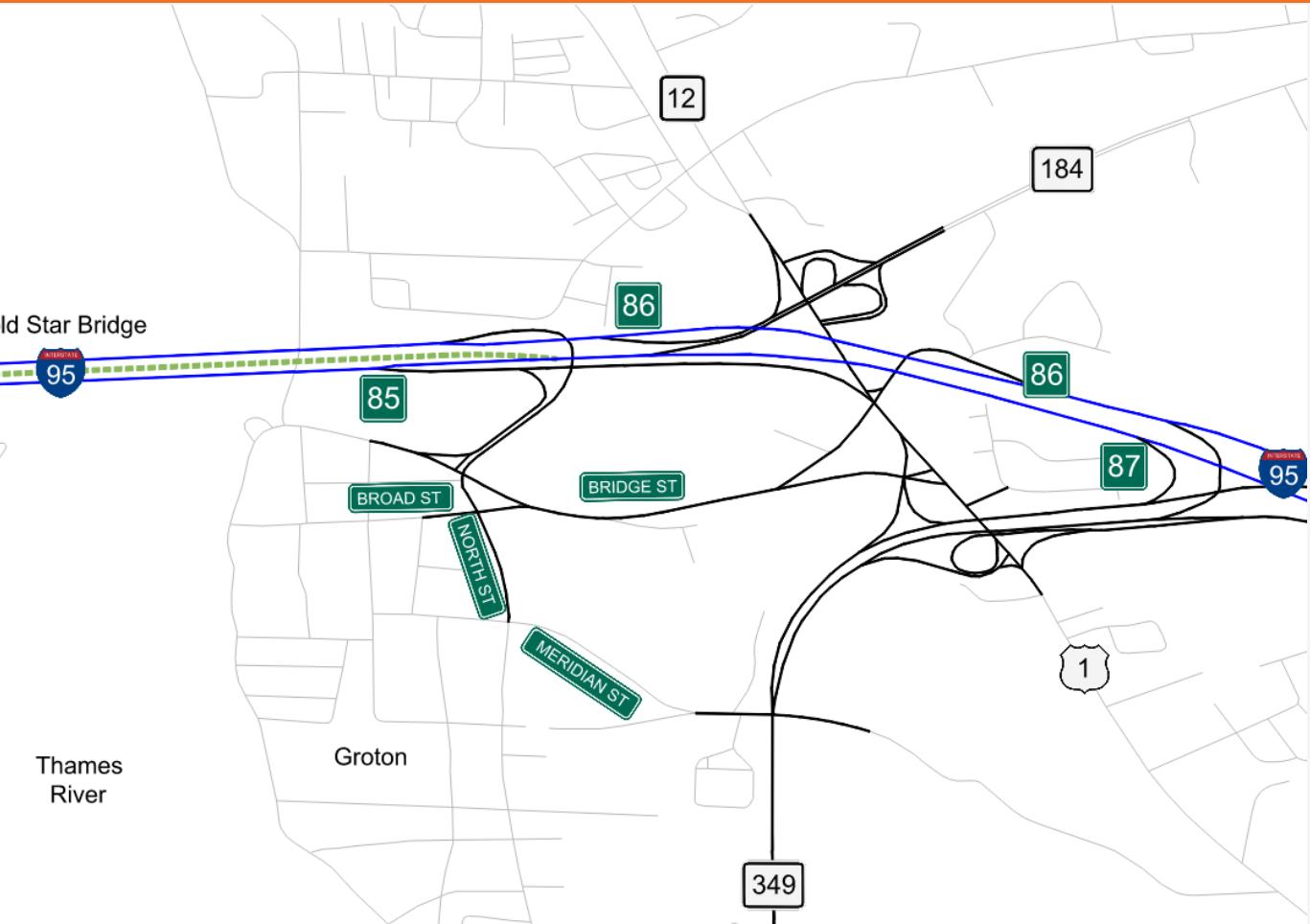
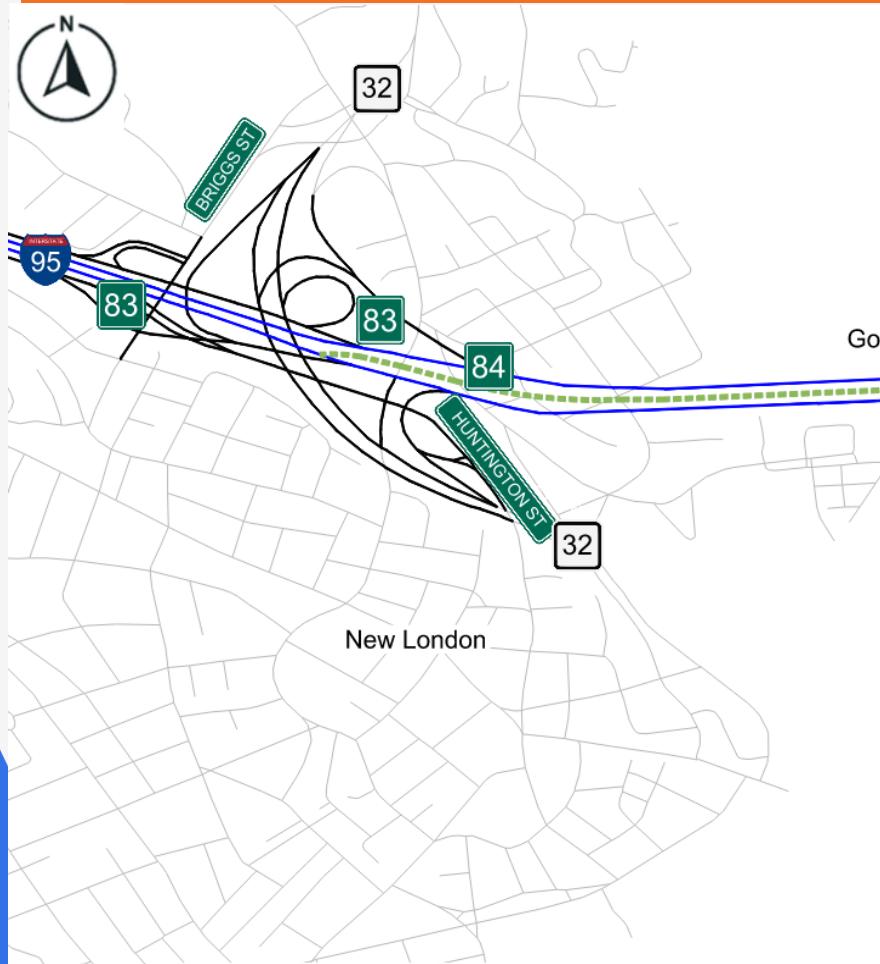
Northbound Gold Star Memorial Bridge Overview

Bridge No. 03819 Facts:

- Girder Spans:
 - Spans 7-21: Steel Built-Up Deck Girder-Floorbeam-Stringer
 - Spans 33-36: Welded Steel Plate Girder-Floorbeam-Stringer
- Approach Truss Spans (#22-25, 29-32):
 - Steel Deck Truss-Floorbeam-Stringer Superstructure
- Main Truss Spans (#26-28):
 - Steel Deck Truss-Floorbeam-Stringer Superstructure
 - Suspended Span with Pin and Hangers in Span 27
- Reinforced Concrete Piers and Abutments and Steel Rocker Columns in West Approach Spans



Project Area



Project No. 94-261 Purpose and Need

Purpose:

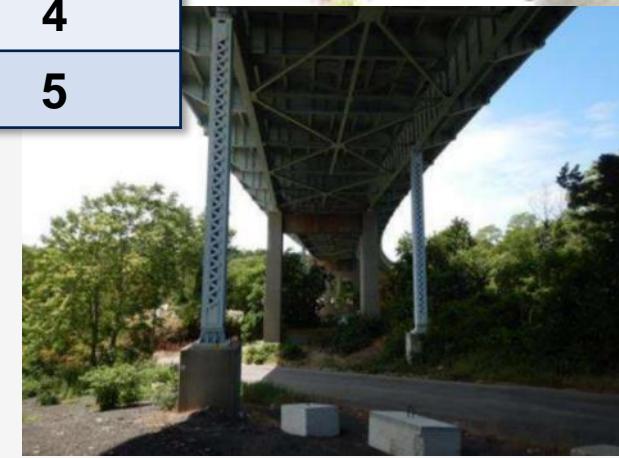
- Increase Structural Capacity to Allow Permit Vehicles
- Restore the Bridge to a Condition Rating of “Satisfactory”.

Need:

- Extend service life
- Ensure long-term performance
- Improve system safety
- Full deck replacement
- Structural steel strengthening and condition repairs
- Substructure concrete repairs



Existing Field Conditions



ITEM	CONDITION	RATING
Deck	Poor	4
Superstructure	Poor	4
Substructure	Fair	5



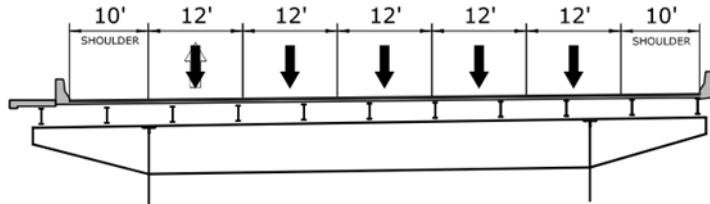
Bridge Rehabilitation Work

- Strengthen and repair structural steel members in the girder spans
- Replace all bearings on the girder spans and truss spans
- Replace existing bridge deck and joints
- Replace existing parapet and fence with MASH compliant 3-rail steel barrier and stainless-steel mesh fence
- Full superstructure painting
- Replace concrete approach slabs
- Repair concrete substructures
- Install new light standards and support framing
- Replace overhead sign structures
- Install Polyester Polymer Concrete (PPC) overlay

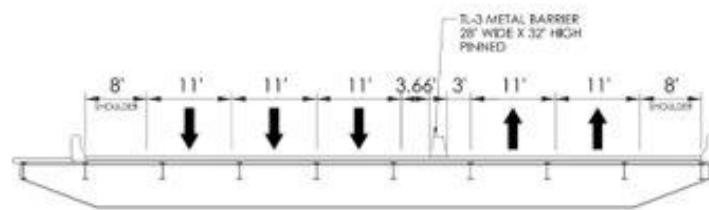


Crossover Maintenance & Protection of Traffic (MPT)

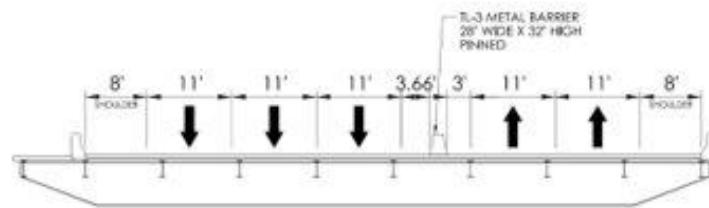
SOUTHBOUND



EXISTING CONDITION

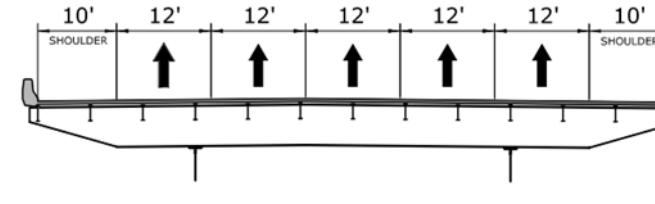


STAGE 1

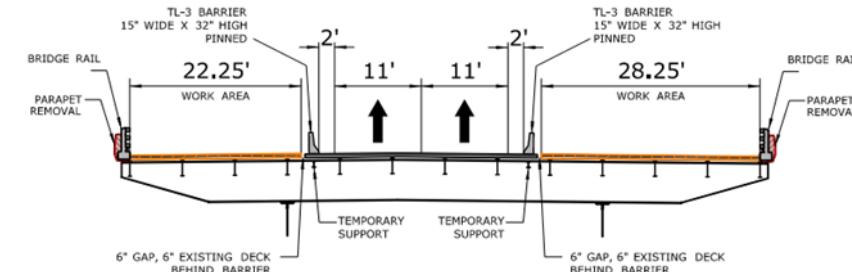


STAGE 2

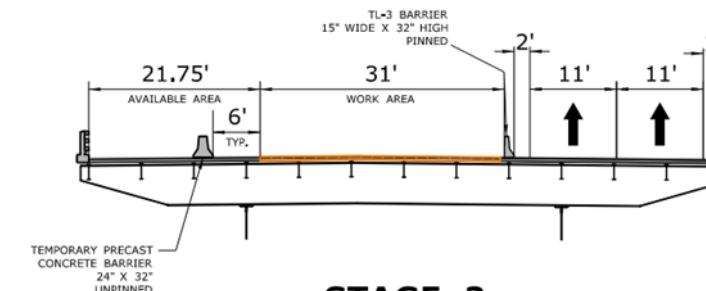
NORTHBOUND



EXISTING CONDITION



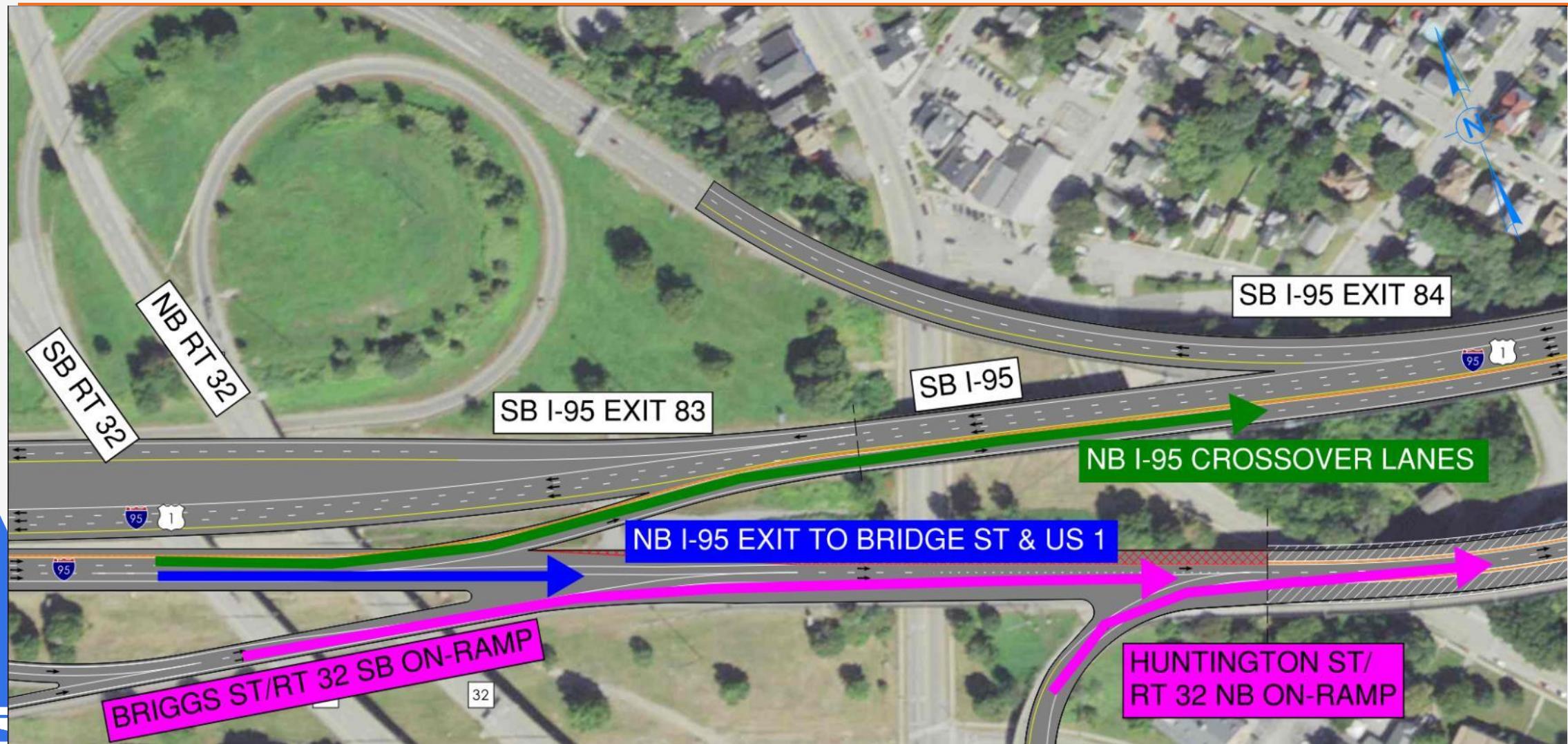
STAGE 1



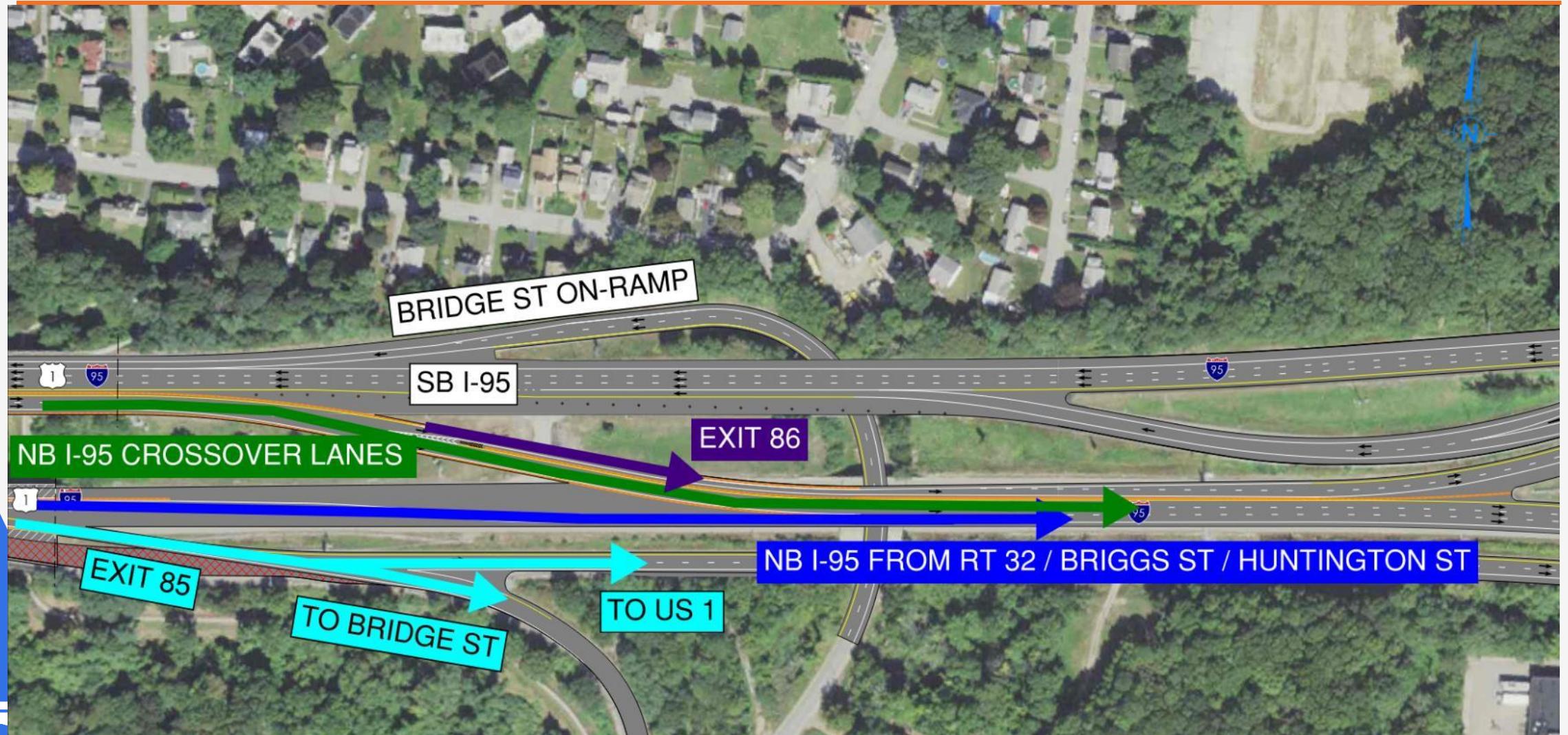
STAGE 2



Crossover Maintenance & Protection of Traffic (MPT) - New London



Crossover Maintenance & Protection of Traffic (MPT) - Groton



Structural Solutions

Girder sistering (the addition of a second girder line adjacent to each existing girder) will be used to increase the structure capacity of the west approach girder spans 7-21.

To accommodate the sister girders, the existing seventy-six (76) floorbeams in span 7 to 21 will be modified.

Girder deepening (the addition of a girder segment to the existing girder) will be used to increase the capacity of the existing girders in spans 35-36.

Cover plating will be used to increase the capacity of the existing girder G36-2 in Spans 35-36, and both girders in Spans 35B and 36B.

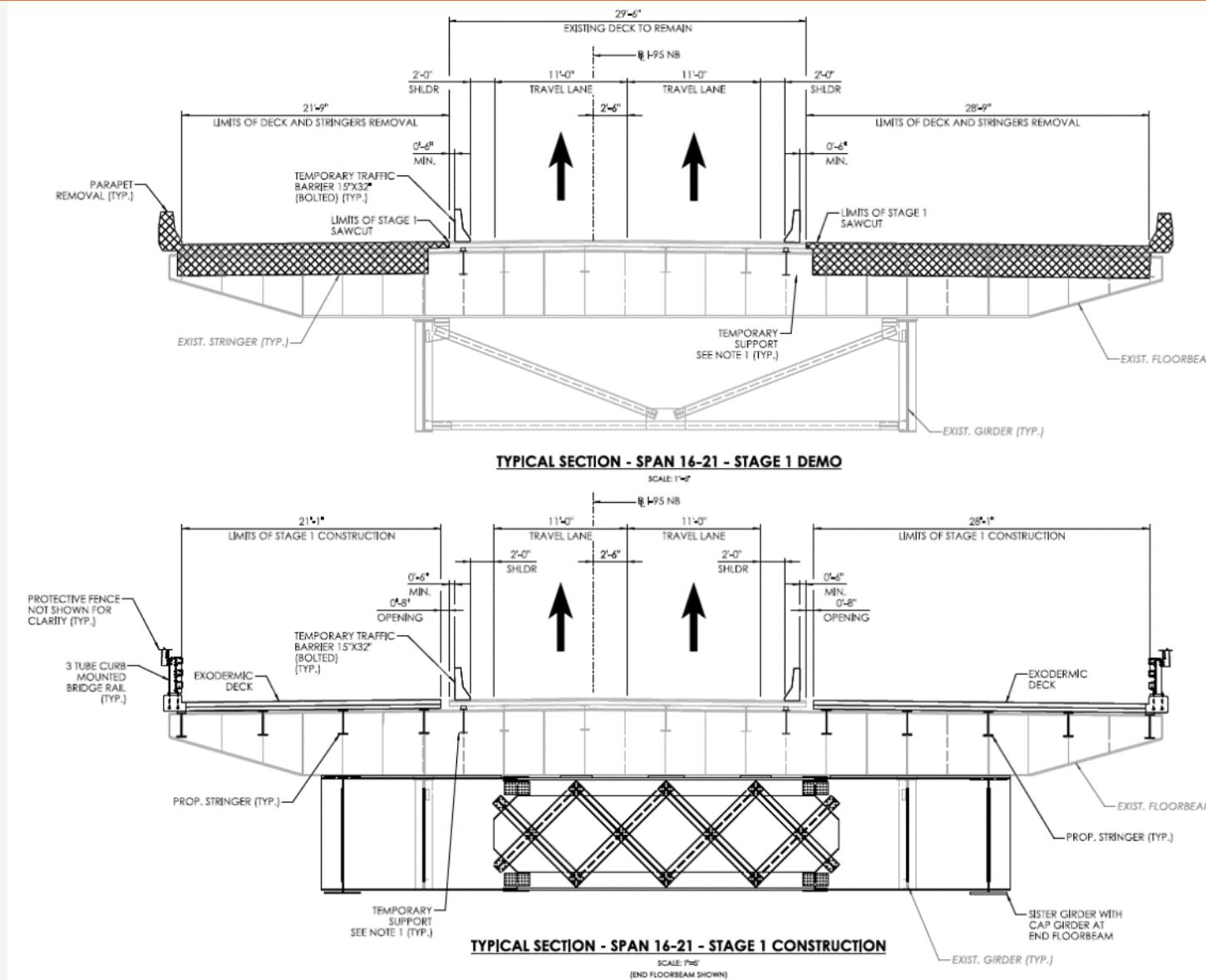
Portal Bracing: All twelve (12) approach truss portal bracings and four (4) main truss portal bracings will be replaced.

Pin and Hangers: in-kind replacement

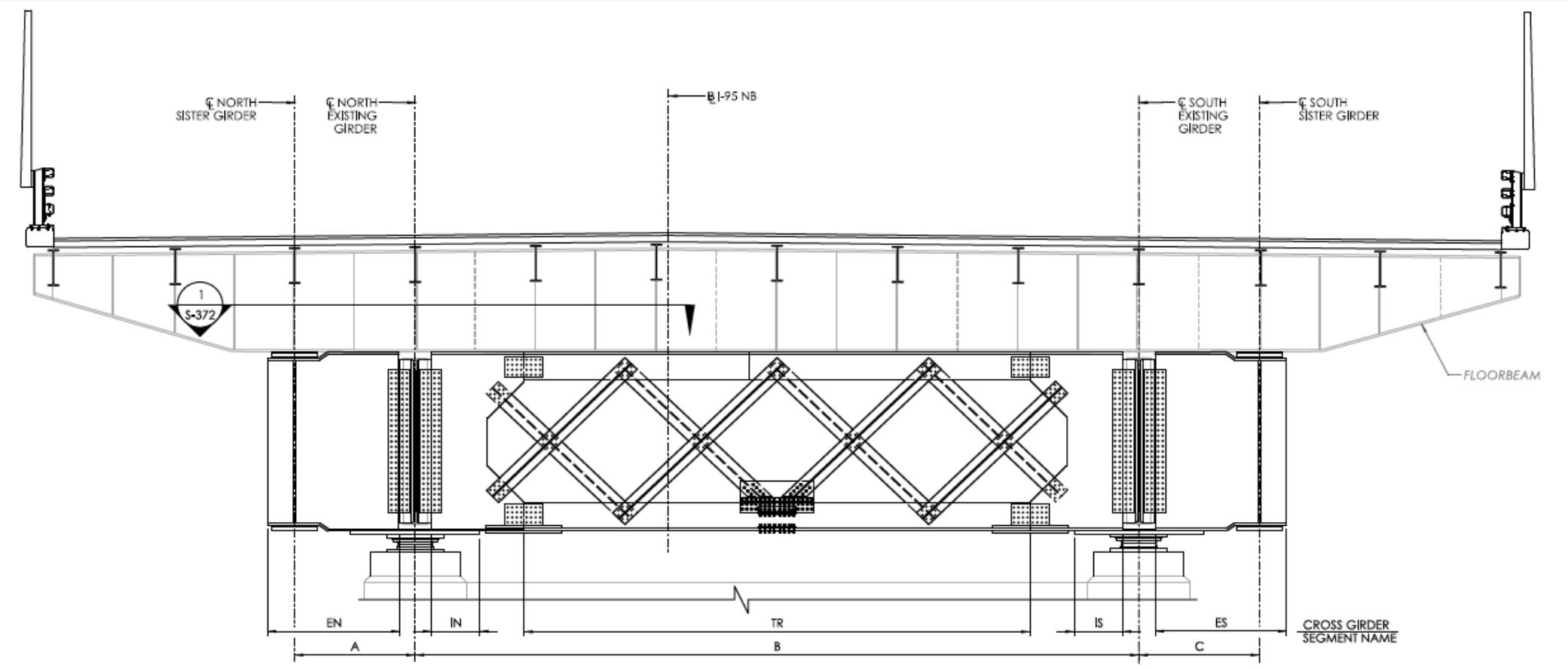
Bearings: Rocker and fixed will be replaced with High-Load Multi-Rotational (HLMR) bearings and steel laminated elastomeric bearings



Structural Solutions – Girder Sistering

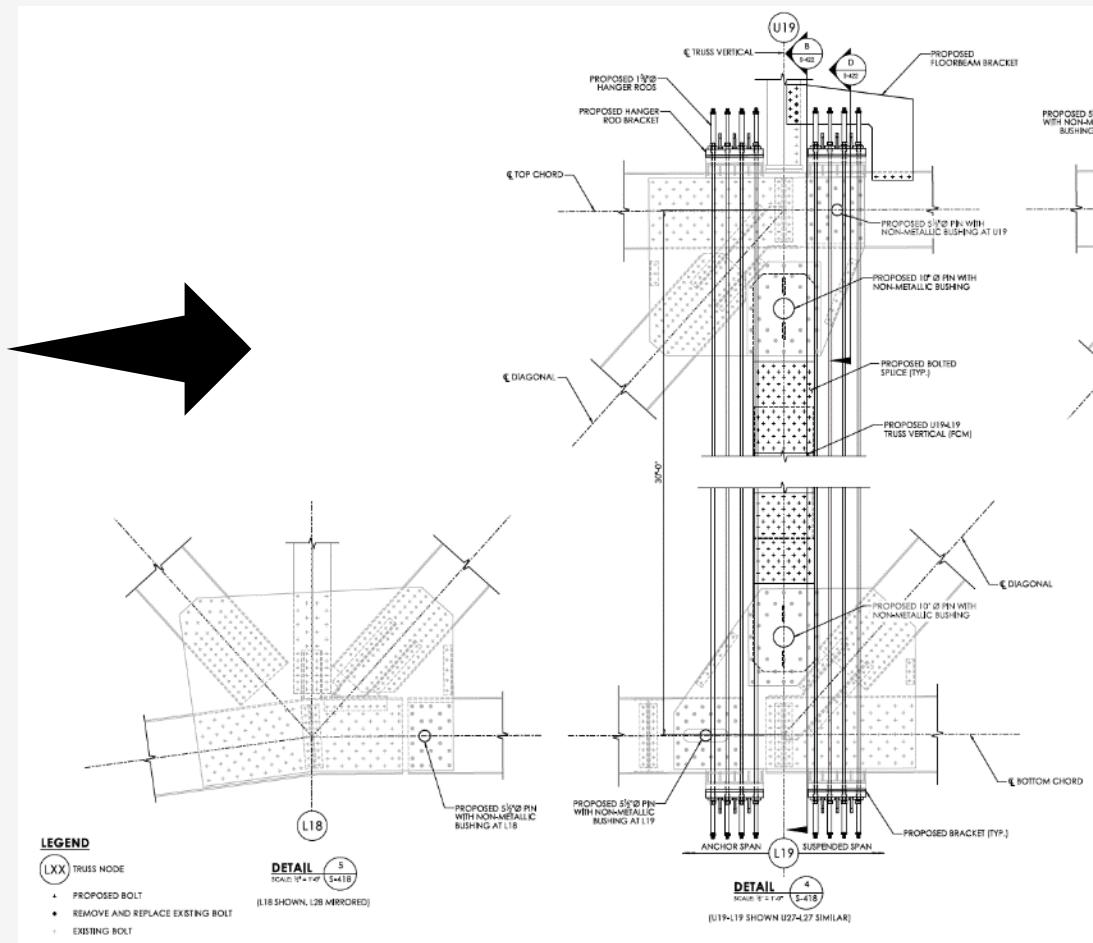
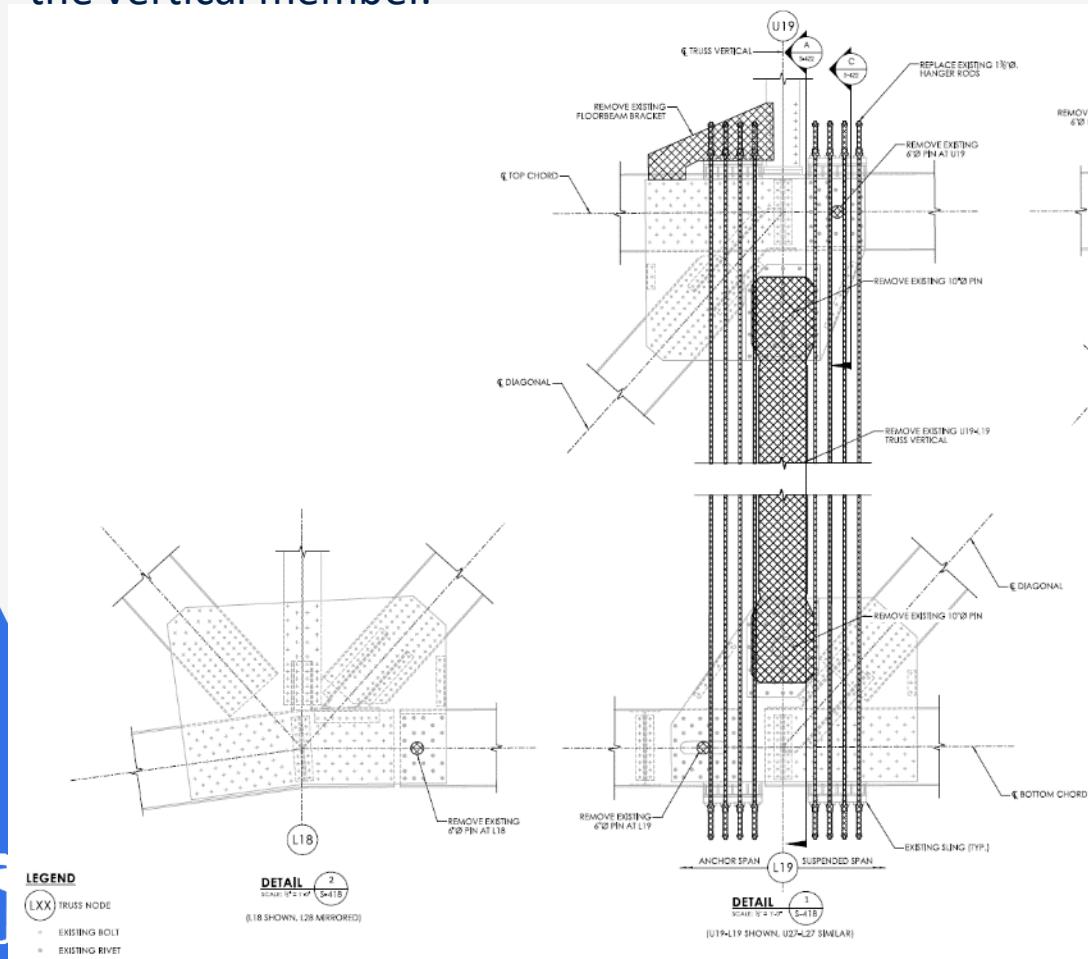


Structural Solutions – Girder Sistering



Structural Solutions

Pin and Hangers: The pins in the pin and hanger assemblies in main truss span 27 at panel points U19, L19, U27 and L27 will be replaced with similar diameter pins, 5½" for the top and bottom chords and 10" diameter pins for the vertical member.



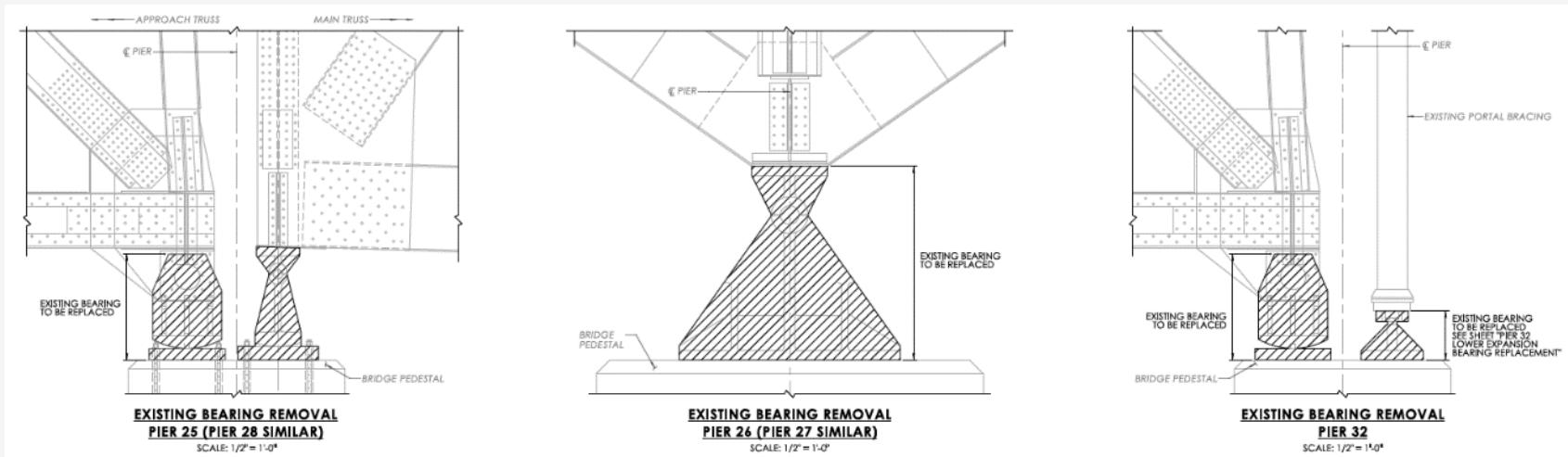
Structural Solutions

Bearing Replacements:

The existing rocker bearings and fixed bearings at the concrete piers on the **west approach** girder spans 7 to 21 will be replaced with low-profile high-load multi-rotational (HLMR) bearings.

All twenty-four (24) existing **approach truss** span high-profile steel rocker bearings and eight (8) existing main truss span high-profile steel rocker bearings will be replaced with new low-profile high-load multi-rotational (HLMR) disc bearings.

The existing expansion rocker and fixed steel bearings at the east approach spans will be replaced with steel laminated elastomeric bearings.

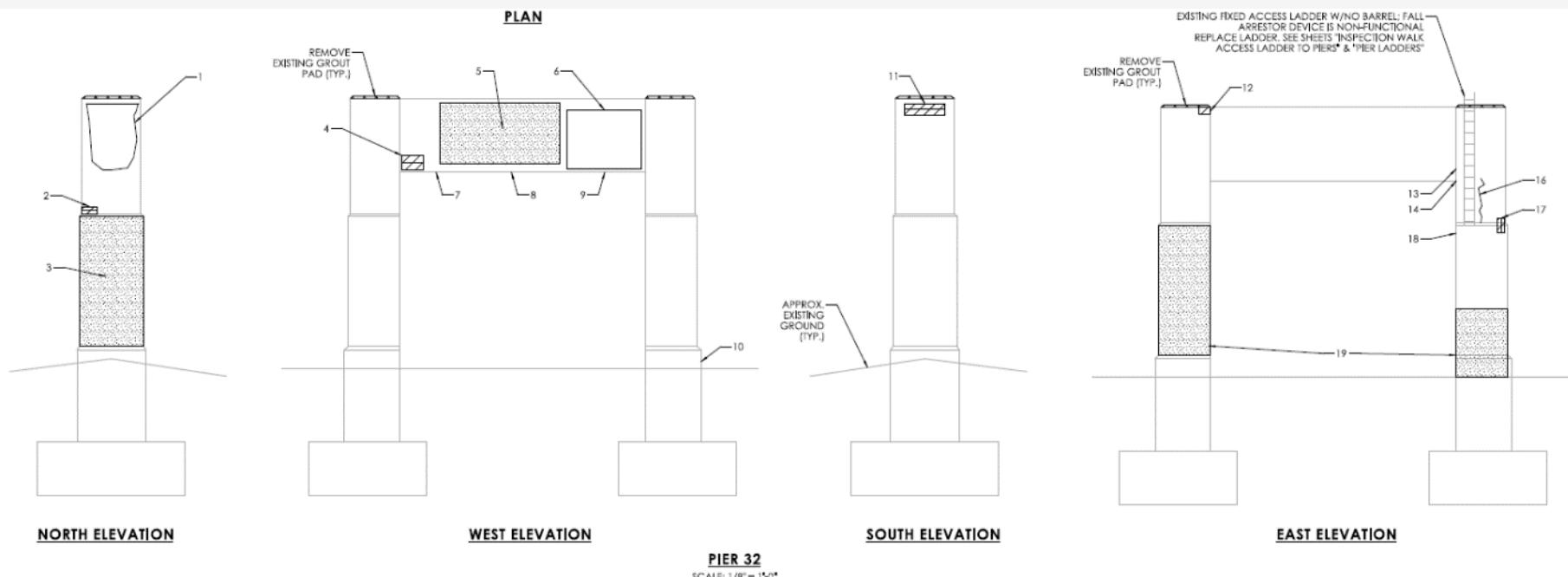
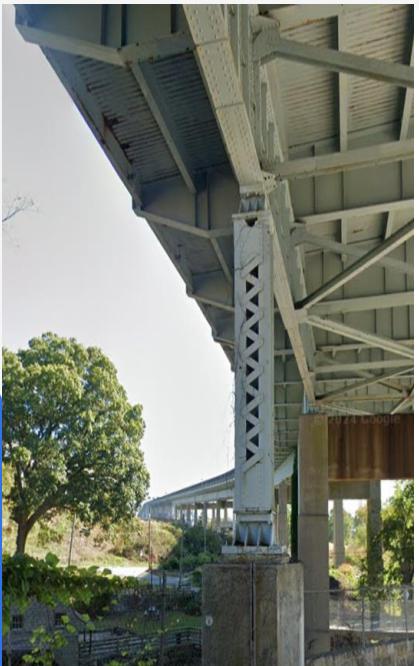


Structural Solutions

Substructure Repairs:

To accommodate the addition of the sister girders in spans 7, 9, 13, 15 and 21, the existing steel rocker columns supporting these spans will be replaced.

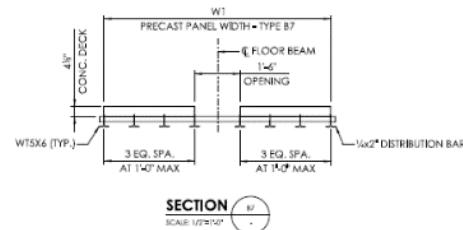
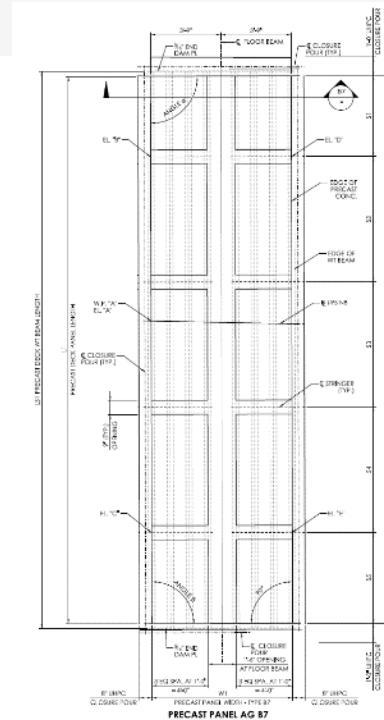
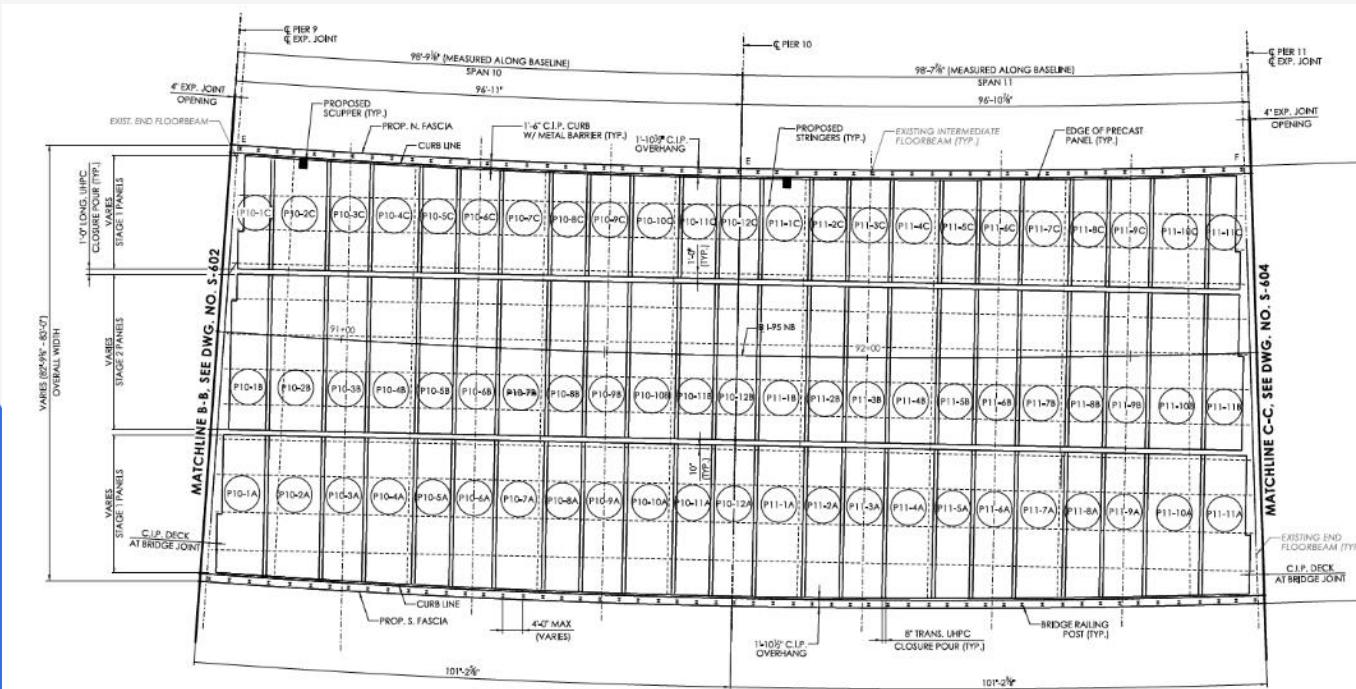
The concrete substructure elements consist of epoxy injection crack repair, structural repair concrete and surface repair concrete with galvanic anodes, and granite repointing.



Deck Replacement

Exodermic Deck:

The deck replacement design for all spans between abutment 4 and abutment 5 will be a precast Exodermic Deck System with ultra-high performance concrete (UHPC) closure pours and a 1" Polyester Polymer Concrete (PPC) overlay.



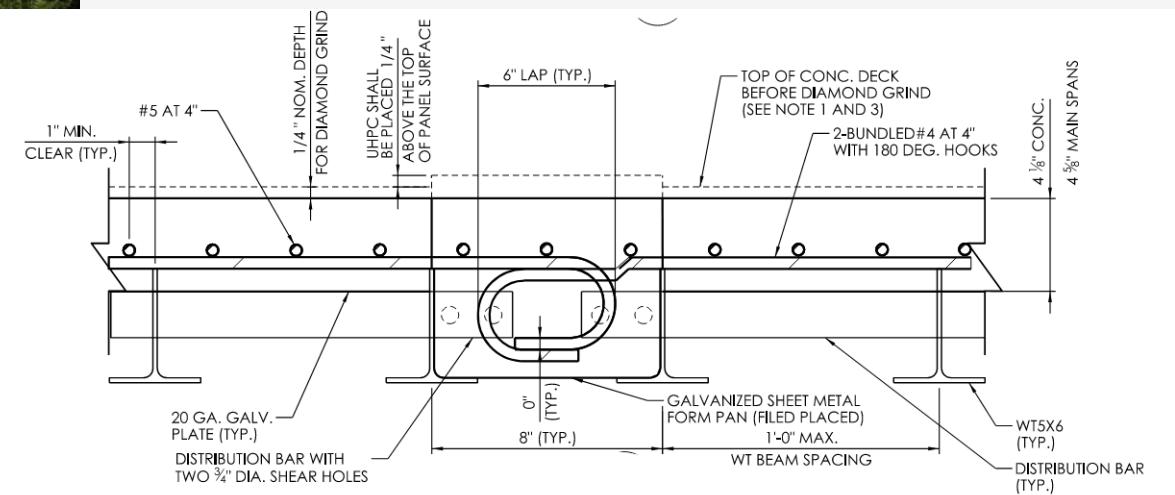
Deck Replacement

UHPC (Ultra-High Performance Concrete)

Transverse and longitudinal closure pours and concrete joint headers.

Superior durability and tensile strength – minimizes reflective cracking on concrete cover.

Self-consolidation is important for tight spaces around the modular expansion joint support boxes.



Deck Replacement

Polyester Polymer Concrete (PPC) Overlay System

Bridge deck overlay (1") single lift

Low permeability - Protection of concrete beyond original bond line.

Rapid cure in cold/humid conditions and successful in New England climates



High Molecular Weight Methacrylate Primer Placement



PPC Placement

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Deck Replacement

Construction Equipment Ingenuity

Exodermic deck systems will weight 25,000 – 30,000 lbs

Mantis-type cranes are compact, versatile, controlled, track-mounted:

Higher lifting capacities at larger radii for force distribution, faster.

Limited headroom instances - launching sister girders

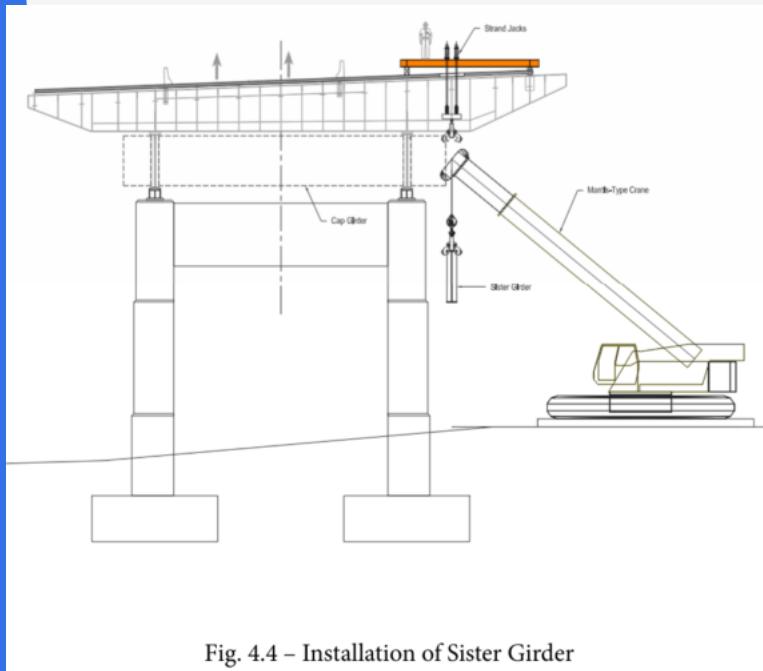
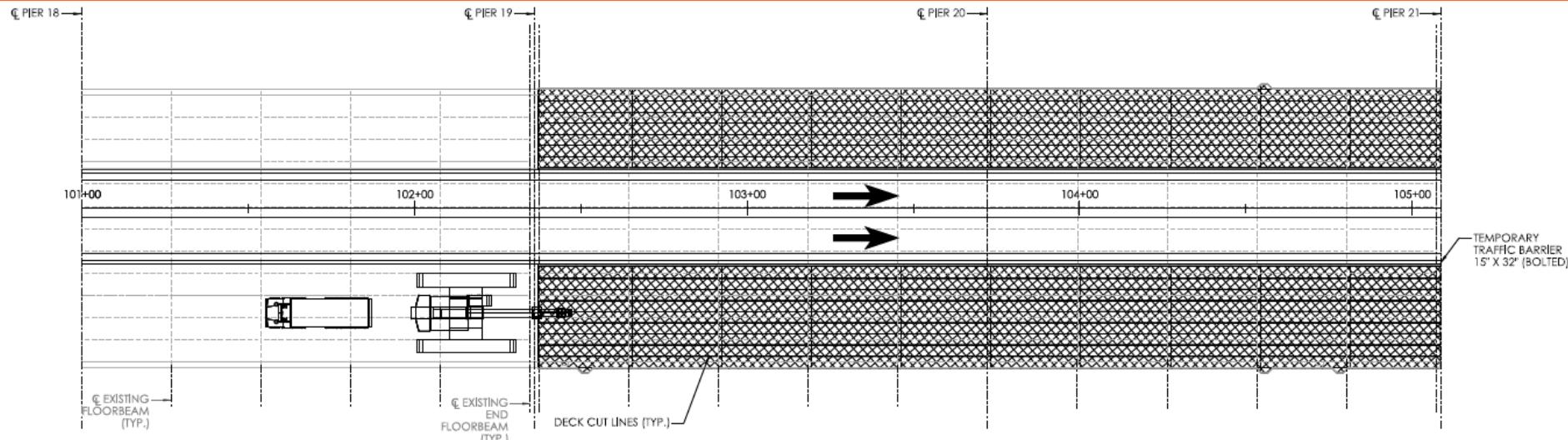


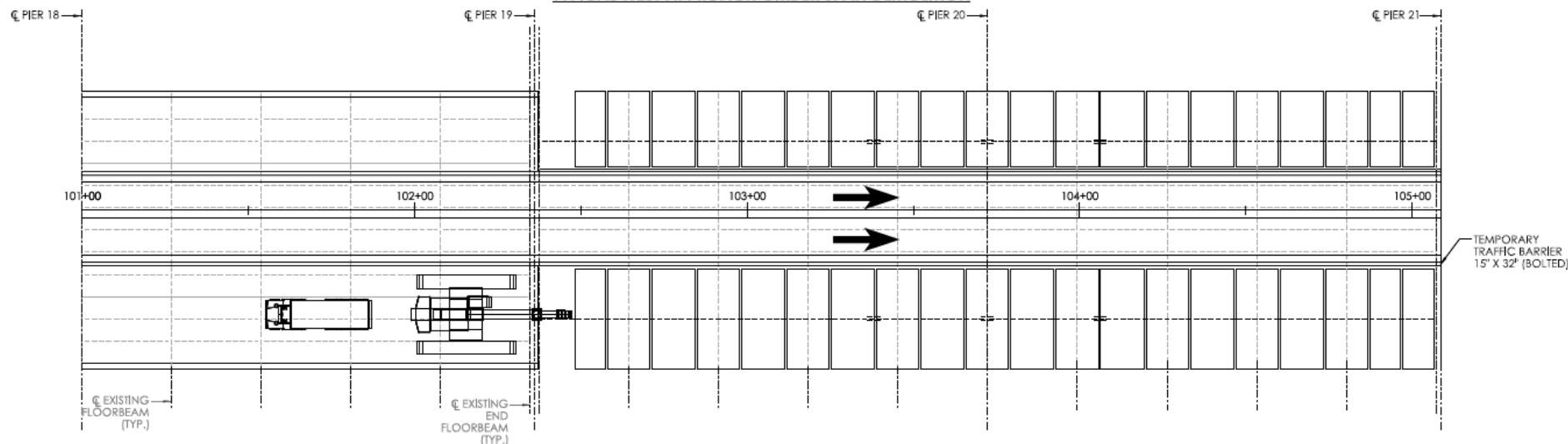
Fig. 4.4 – Installation of Sister Girder



Deck Replacement



TYPICAL WEST APPROACH GIRDER SPAN DEMOLITION



TYPICAL WEST APPROACH GIRDER SPAN EXODERMIC DECK PANEL INSTALLATION

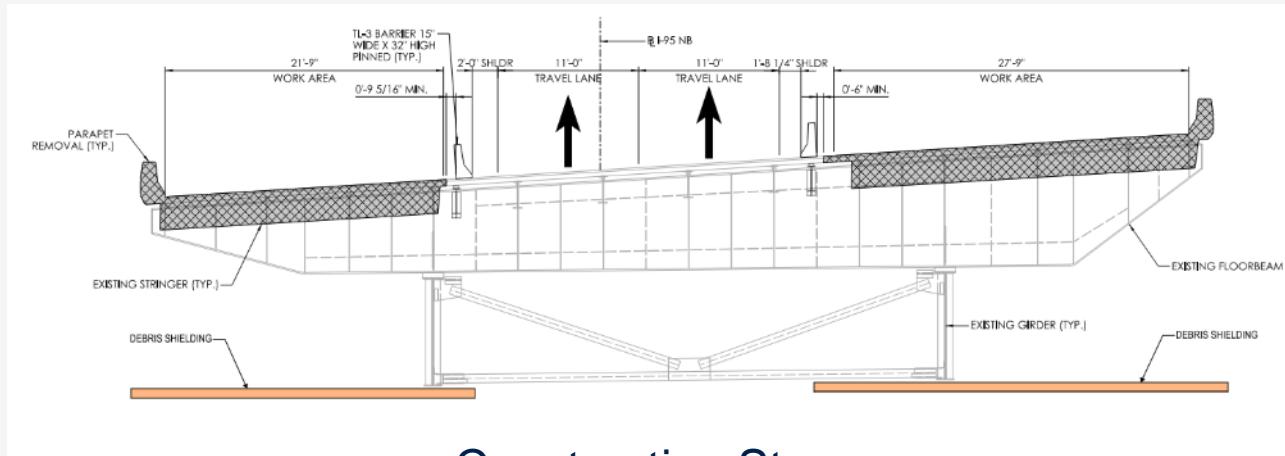
SCALE: 1=20'

NOTE: SPAN 20 TO 21 SHOWN, OTHER SPANS SIMILAR

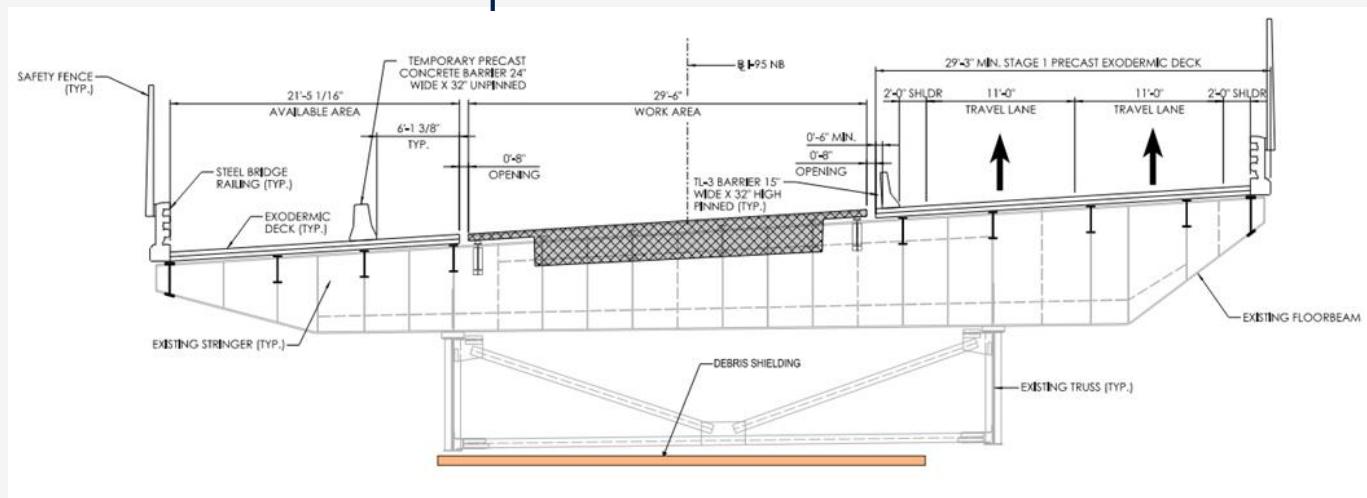


Project No.
0094-0261

Construction Staging & Proposed Access

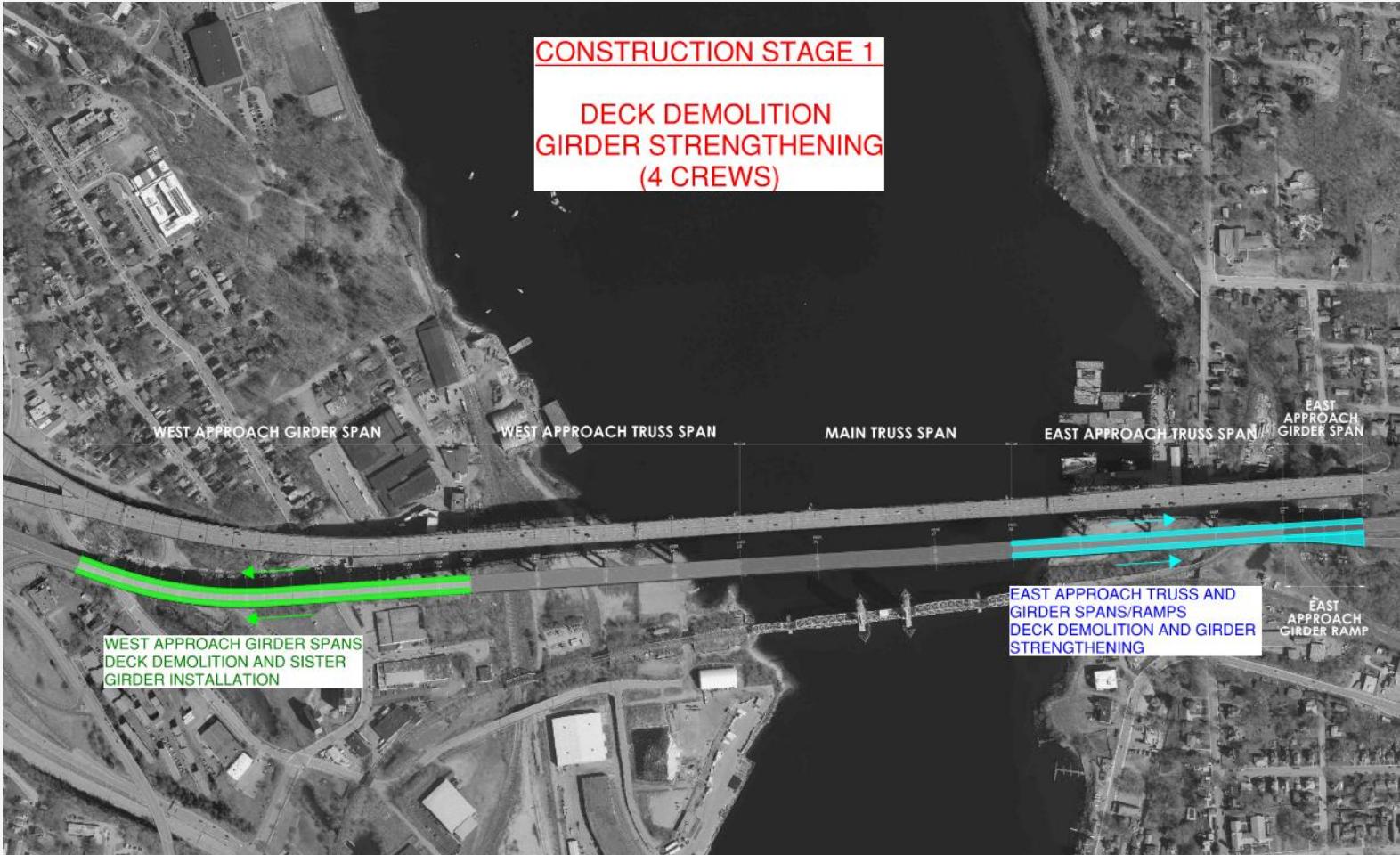


Construction Stage
1

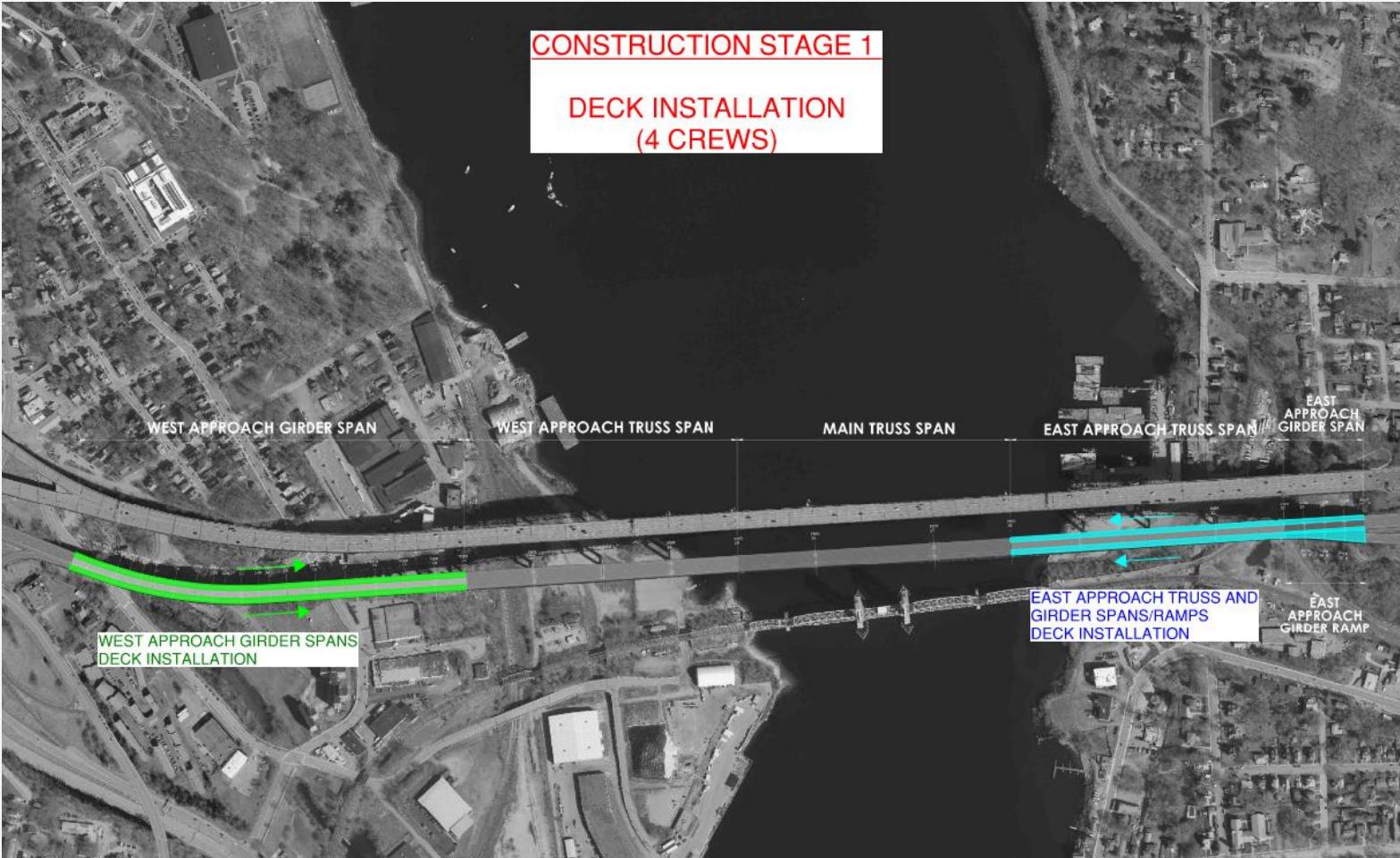


Construction Stage
2

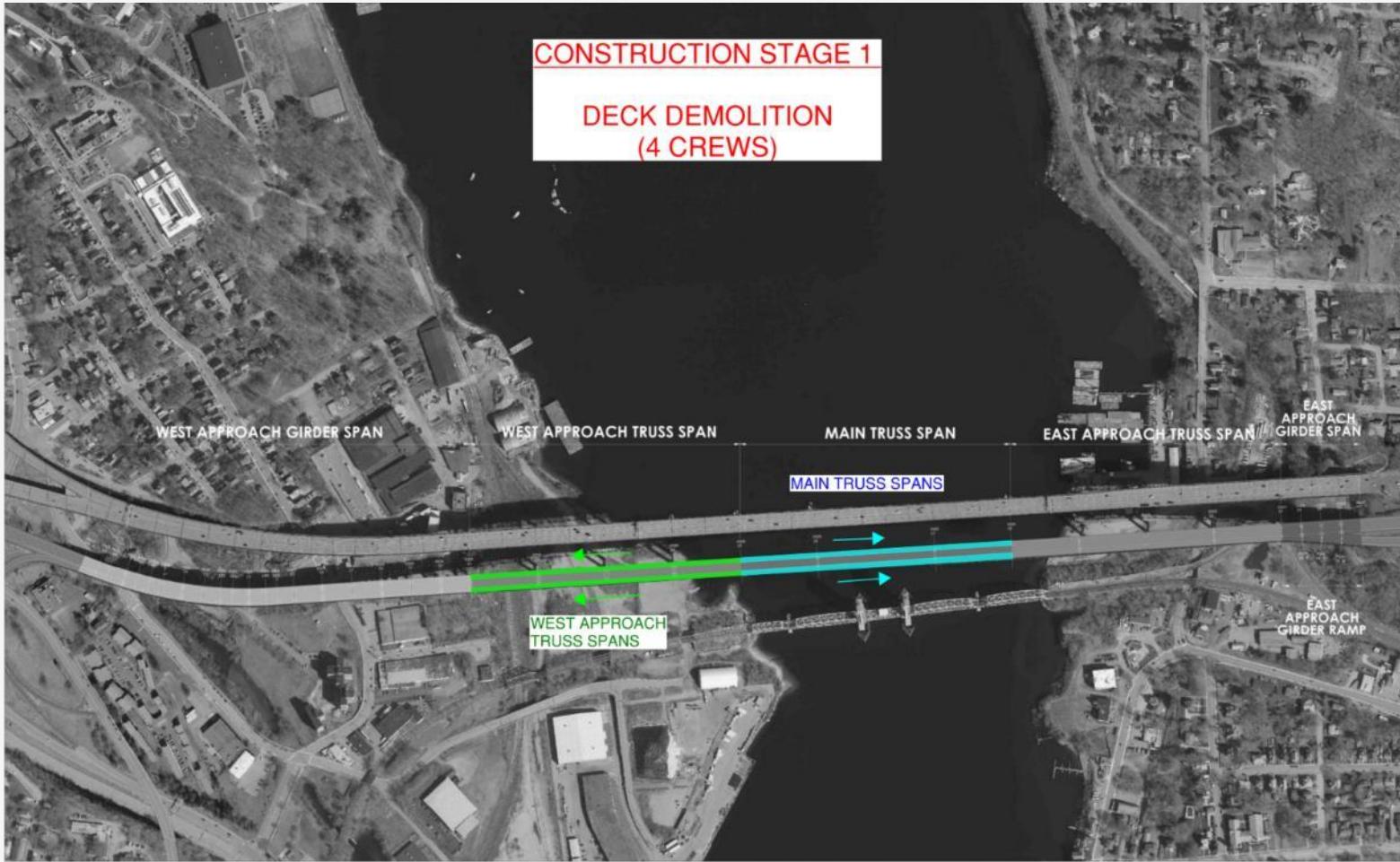
Construction Staging & Proposed Access



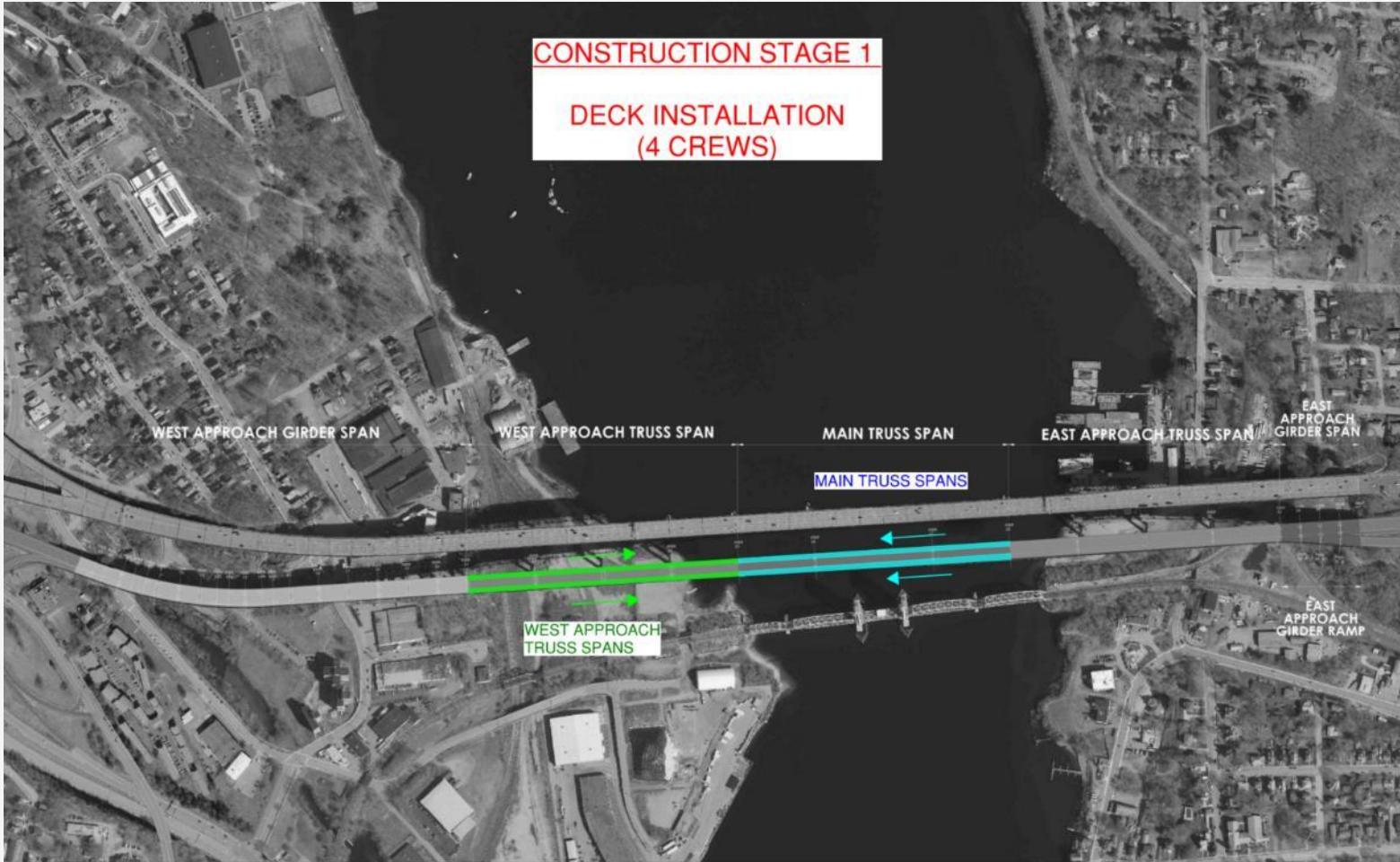
Construction Staging & Proposed Access



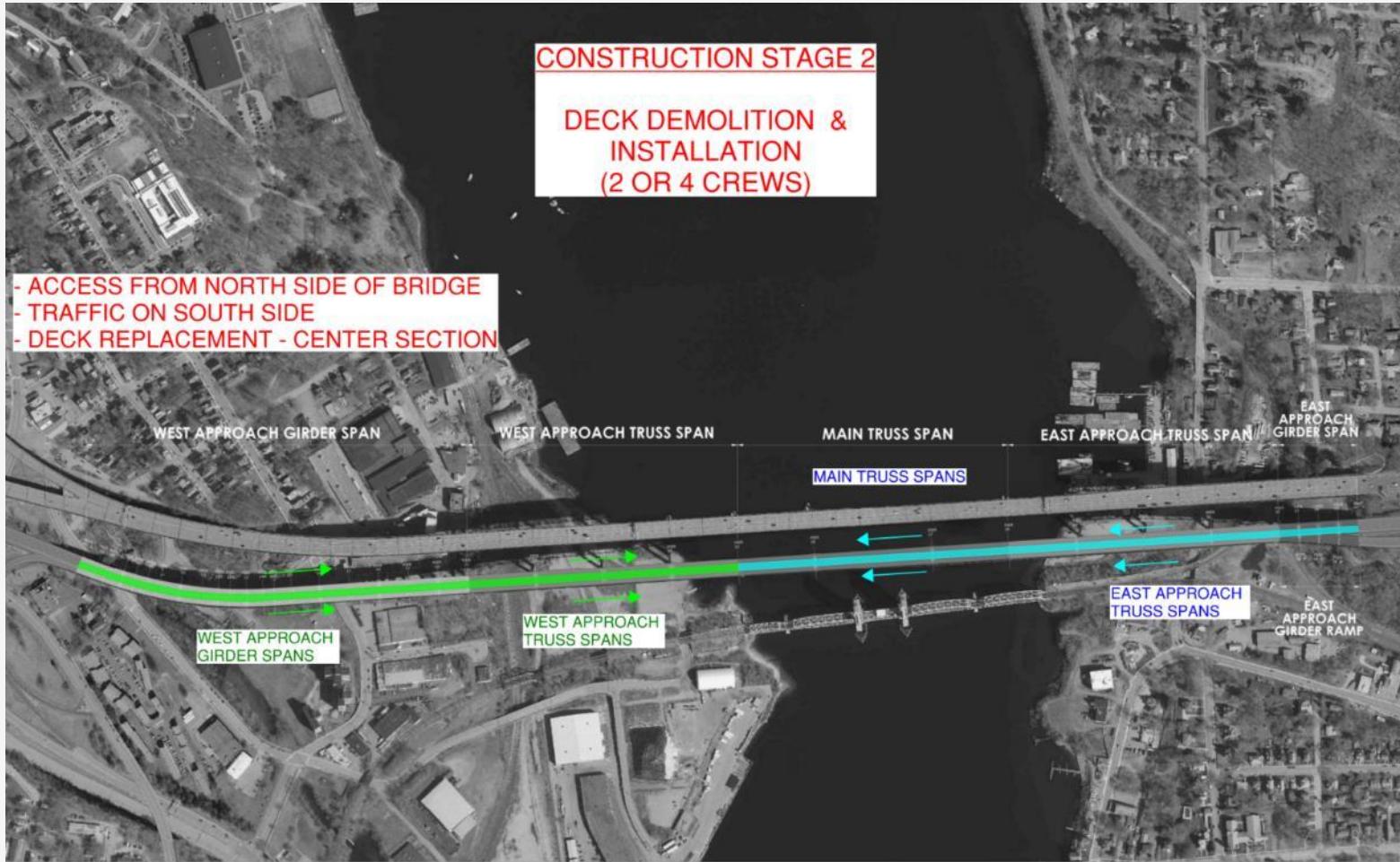
Construction Staging & Proposed Access



Construction Staging & Proposed Access



Construction Staging & Proposed Access



Environmental Impacts

- Minimal wetland and watercourse impacts
 - Temporary freshwater wetland impacts at temporary support tower
 - Barge use within river
 - No navigation channel closures anticipated
- Peregrine Falcon nest in the vicinity
- Access needed through the Historical Winthrop Mill property
- Temporary use of Thames River boat launches
- Coordination with CT DEEP, NOAA, USCG, and USACE on going



Railroad and Utility Impacts

Railroad impacts

- New London side - NE Central Railroad.
- Groton side - Providence & Worcester
- Signals operated by Amtrak
- Minimal impacts anticipated.
- 1 location where temporary support tower is close to track

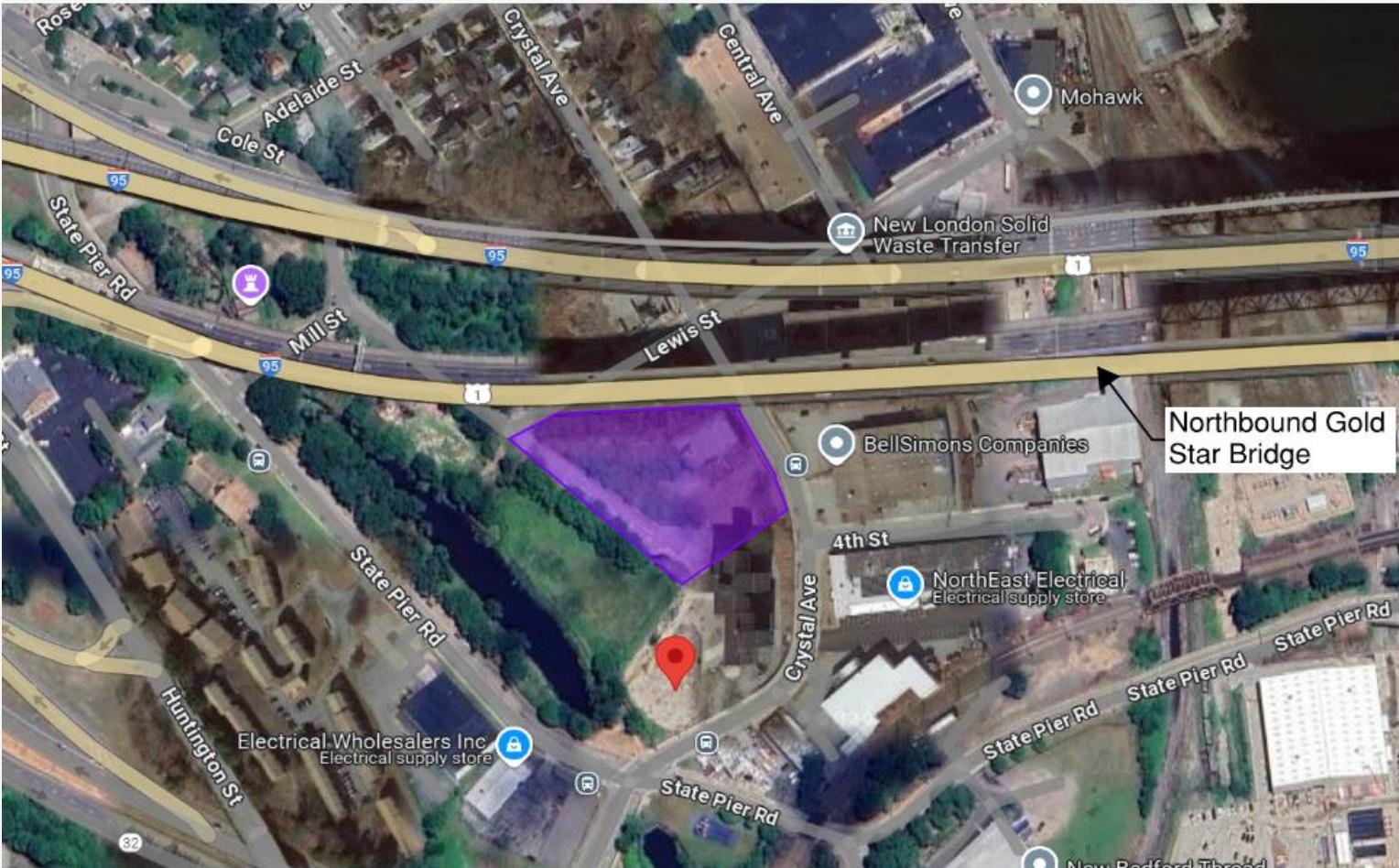


Utility impacts

- Temporary overhead wire relocation:
 - Mill Street
 - Crystal Avenue



Right of Way Impacts



City of New London Property at 40 Crystal Ave
Temporary Easement

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Thank You For Your Time



For Updates, Check Out the Website:

<https://portal.ct.gov/dot/projects/gold-star-memorial-bridge>