

SR-822/Sheridan Street over ICWW Bascule Bridge Rehabilitation Project

Alan Klevens, P.E.

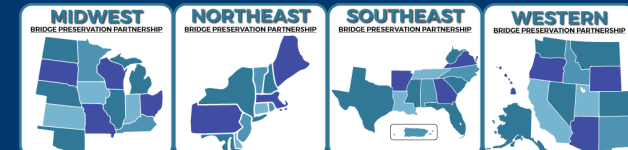
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SR-822/Sheridan Street over ICWW Bascule Bridge Rehabilitation Project



- Project Background
- Major Project Challenges
- Lessons Learned

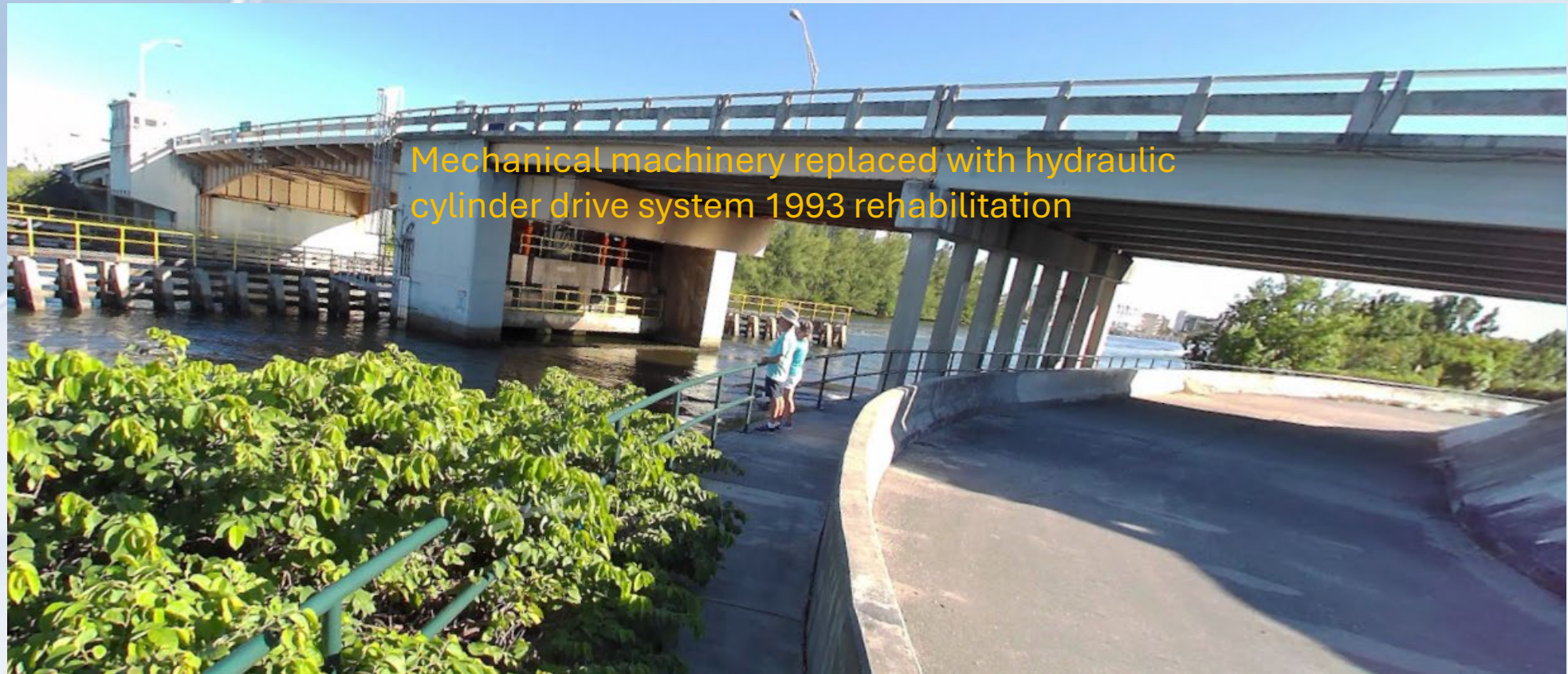
Project Background

- Double-leaf bascule bridge carrying SR-822/Sheridan Street EB & WB(4 lanes) over the Intracoastal Waterway in Hollywood, FL



Project Background

- Built in 1960, rehabilitations in 1993 & 2003
- 354'-3" long including 109'-0" double leaf bascule span



Project Background

- Typical section consists of:



Project Background

- Beach Traffic all Year
- Tourist Season Thanksgiving to Easter
- Summer is Hurricane Season



Project Background

- Pedestrian & Bicycle Traffic



Project Background

- Boat Traffic

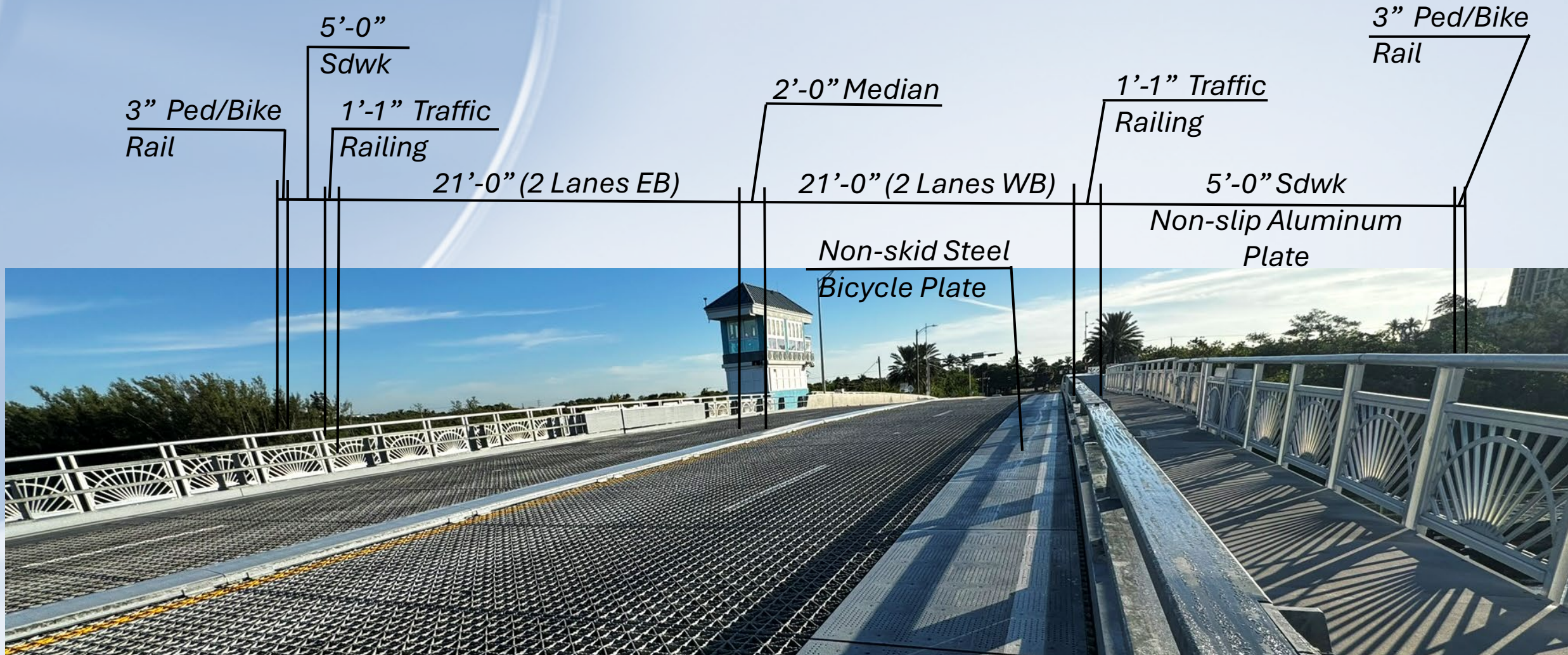


Project Purpose

- ENHANCE SAFETY
 - Pedestrians, bicyclists, vehicles, and vessels
- IMPROVE OPERATIONAL RELIABILITY & RESILIENCY
 - Replace obsolete equipment
 - Improve maintenance access
 - Harden house, electrical services & backup generator systems
- EXTEND USEFUL LIFE OF 60-YEAR-OLD BRIDGE
 - Address structural deterioration
 - Refurbish mechanical equipment
 - Replace obsolete equipment

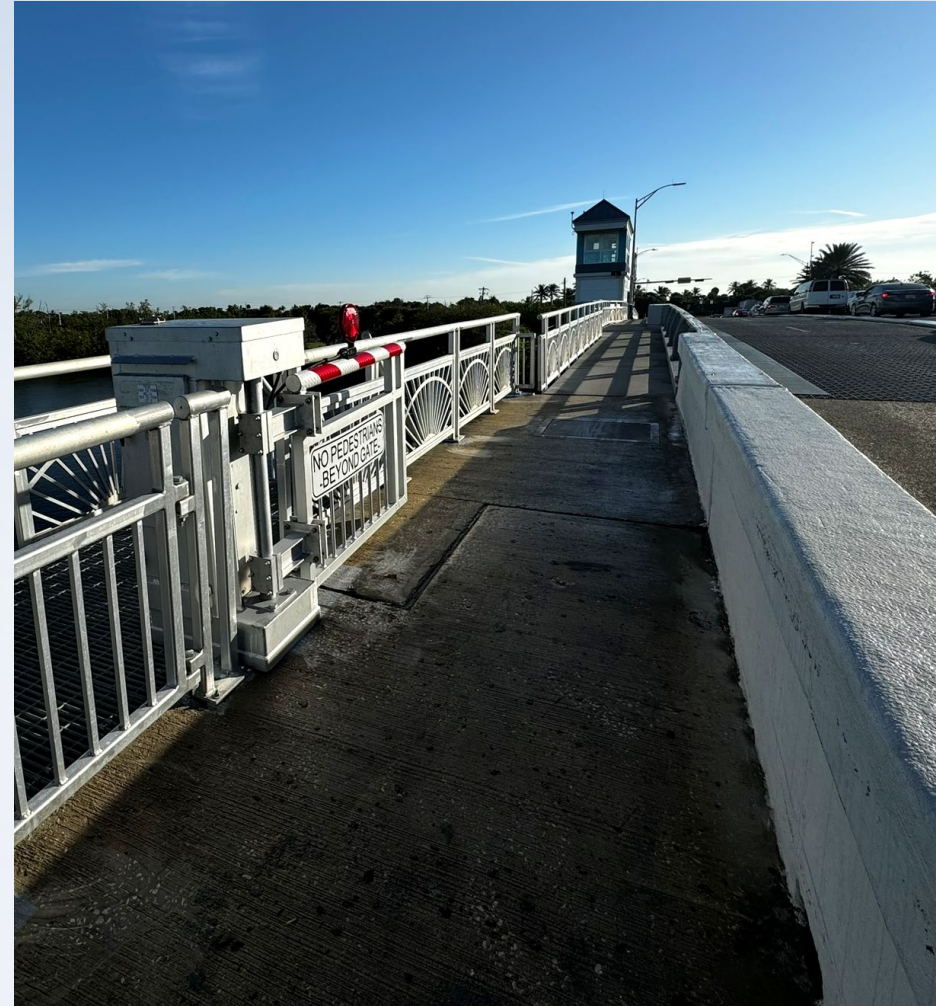


Major Scope Items - Enhance Vehicular, Pedestrian & Bicyclist Safety



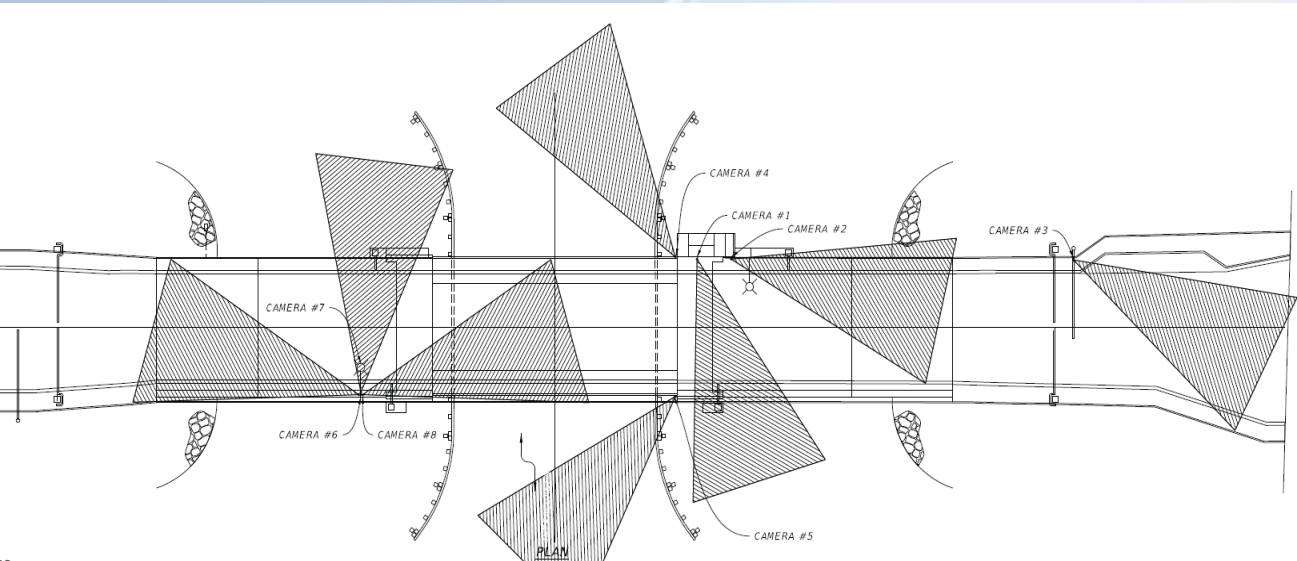
Major Scope Items - Enhance Vehicular, Pedestrian & Bicyclist Safety

- New swing arm style sidewalk pedestrian gates



Major Scope Items

- ENHANCE SAFETY
 - CCTV, Communications, and Fire Alarms
 - Move Bridge Tender to new upper level



Major Scope Items - Improve Operational Reliability & Resiliency

- Replace Electrical Service and Main Feeder
- Replace Existing Backup Generator w/ 2 New Generators
- Replace Motor Control Center and Power Distribution Panel
- Install New Surge Suppression and Lightning Protection
- Replace Bridge Control System with relay controls and PLC monitoring
- Replace Submarine Cables w/ Submarine Conduits



Major Scope Items - Improve Operational Reliability & Resiliency

- Improve Maintenance Access



Major Scope Items - Improve Operational Reliability & Resiliency

- Harden Bridge Tender House
 - Strengthen Cantilever Supports
 - Impact Windows & Doors
 - Roadway Level for MCC
 - New HVAC System
 - New Restroom
 - New Roof
 - Improved Tender Views
 - Removed Backup Generator from Lower Level



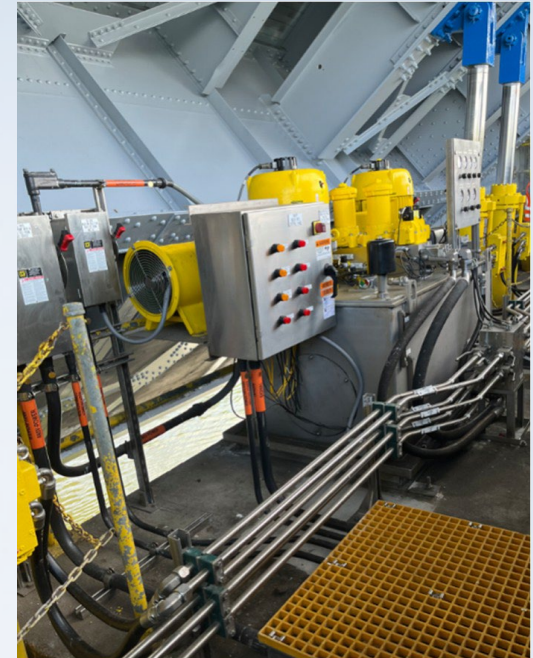
Major Scope Items - Improve Operational Reliability & Resiliency

- Replace Backup Generator w/2 New Generators



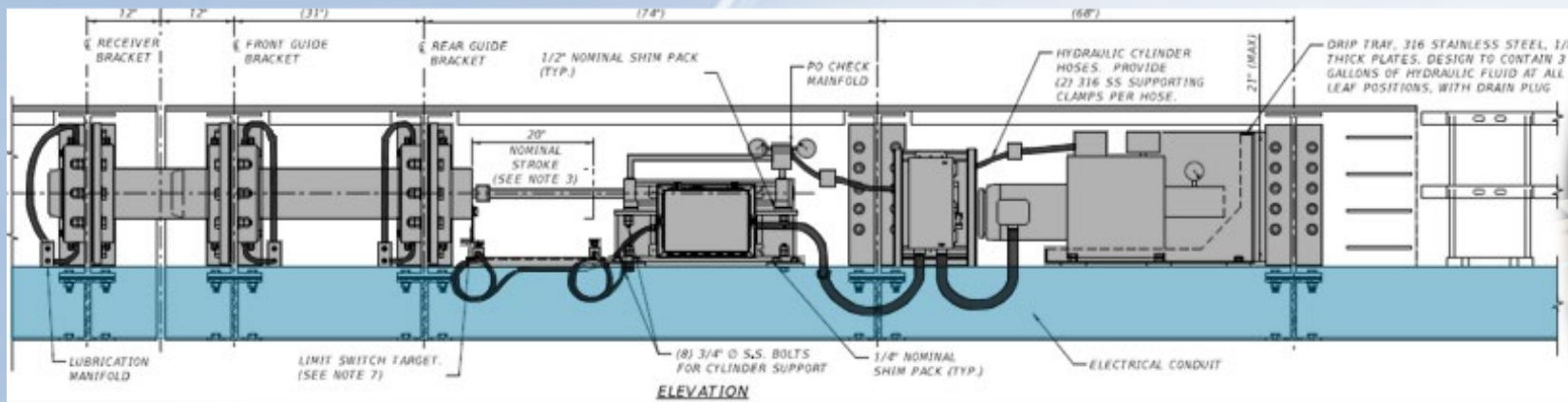
Major Scope Items – Extend Useful Life of 60-Year-Old Bridge

- Replace Hydraulic Pump Motors with variable speed induction motors with flux vector drives
- Hydraulic Power Unit Replacement
- Refurbish All 8 Span Drive Hydraulic Cylinders
- Replace Span Lock Machinery
- Replace Live Load Shoes



Major Scope Items – Extend Useful Life of 60-Year-Old Bridge

- Replace Span Lock Machinery above deck, within the traffic barrier



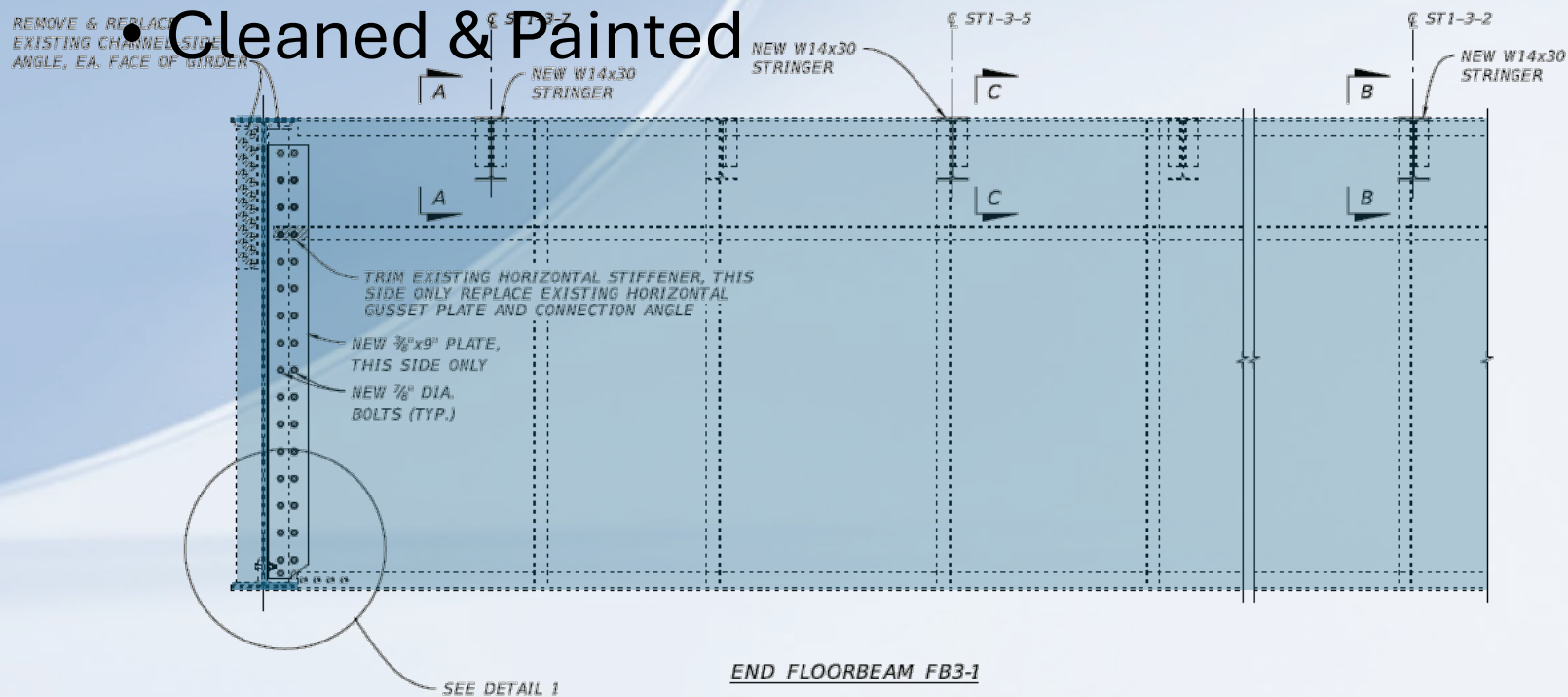
SPAN LOCKS IN TRAFFIC BARRIER



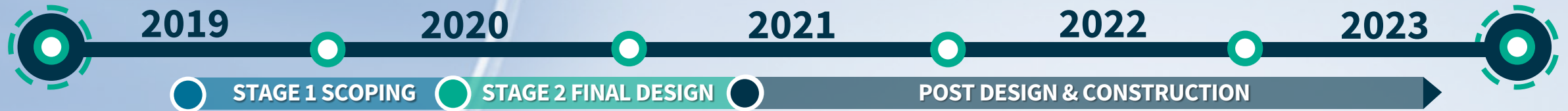
Major Scope Items – Extend Useful Life of 60-Year-Old Bridge

- Replace Sidewalk Brackets
- Replaced Stringers (Fatigue)
- Repaired Section Loss

Cleaned & Painted



Major Project Challenges - Timeline



Notice to Proceed ○ April 2019

COVID-19

Phase I Scoping & 30% Plans

○ May 2020

Late start for final design

Final Plans & Specifications Development

○ May 2021

Construction

Arrival of backup generators

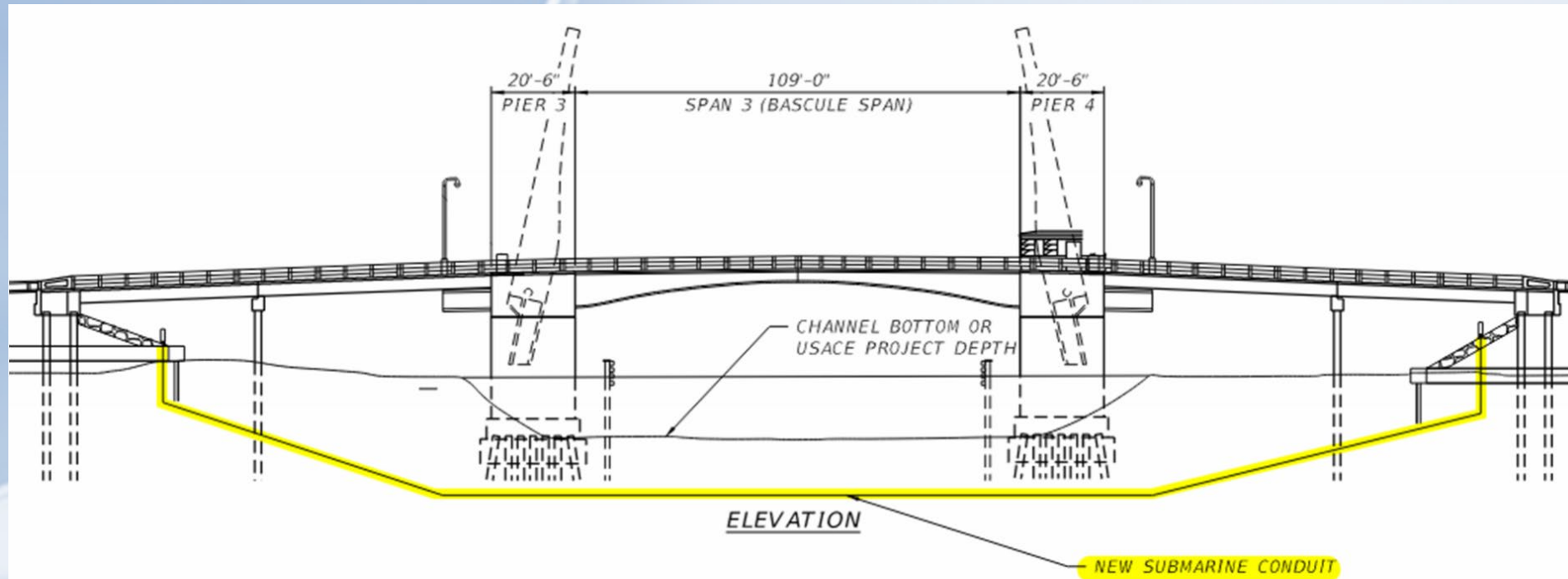
○ June 2023

90-day procurement period

90-day bridge closure

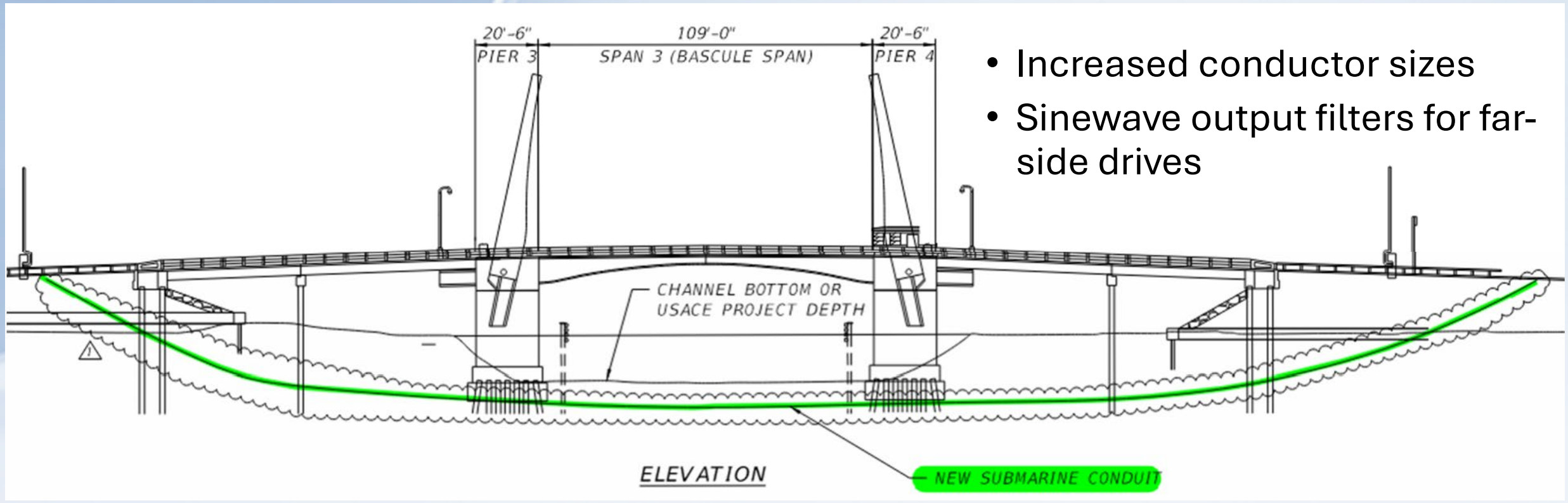
60-day functional testing

Major Project Challenges – Submarine Conduit



Major Project Challenges – Submarine Conduit

- Limitations of the directional bore subcontractor – 400' increase to conductor length



Major Project Challenges – Bascule Leaf “Twist”

- Live-load shoes were replaced & load equalized (at each girder)
- Discovered that bascule leaves were twisted, and tips were misaligned

5 Shim Plates



SW Girder

3 Shim Plates



NW Girder

Major Project Challenges – Bascule Leaf “Twist”

- Live-load shoes were replaced & load equalized (at each girder)
- Discovered that bascule leaves were twisted, and tips were misaligned
 - At the south curblineline, east leaf was ½” higher than the west leaf
 - At the north curblineline, east leaf was ¼” higher
 - There was slight vertical movement at the north live load shoe of the west leaf
 - EB traffic impacting east leaf tip
 - WB traffic impacting the west leaf
- 1000 pounds added to north tip of west leaf only
- West leaf shimmed at live-load shoes to bring it up
- All live-load shoes shimmed and loads equalized

Lessons Learned

- At TranSystems we have back up staff
 - On complex projects we assign a Deputy Project Manager
- Build flexibility into schedules
- Investigate capabilities of specialty contractors
- Verify as-built conditions
- Owner, Construction Inspections, Design Engineer, Contractor, and Subcontractors must work as partners
 - Make decisions that benefit the project



Acknowledgements

- Owner, Construction Engineering & Inspection Consultants
 - Florida Department of Transportation, District 4 - Owner
 - Pinnacle Consulting Enterprises, Inc. - Construction Engineering & Inspection
- Design Engineers
 - TranSystems Corporation, Lead Designer, structural, mechanical, and electrical design and EOR
 - Civil Works, Inc., Roadway and TTCP design, utility coordination
 - Currie Sowards Aguila Architects, Inc., Architectural design
 - KTA-Tator, Inc., Coatings assessment
 - Keith and Associates, Inc., Survey and mapping
 - Tierra South Florida, Inc., Geotechnical engineering
- Contractor
 - PCL Construction Inc. – Prime Contractor

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