The Winona Bridge Rehabilitation
A Tale of History, Collaboration, and Internal Redundancy

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OUTLINE (Joint MNDOT/Baker Presentation)

• Project Overview/Project Background (MnDOT)
  • Bridge 5900 – Historic Bridge Review and Previous Repair Projects
  • Chapter 152 Bridge Replacement Program vs. Section 106 Process
  • Scoping, Preliminary Design, and Environmental Assessment, Preliminary Design
  • Construction Manager/General Contractor (CMGC) Delivery Method
  • Project Elements, Work Packages, & Accelerated Project Delivery
• CIP Segmental River Crossing / CMGC Lessons learned
  • Bridge 5900 Rehabilitation & Reconstruction (MnDOT/Baker)
  • Design Challenges (MnDOT)
  • Scour Monitoring & Scour Countermeasures (MnDOT)
  • Vessel Impact Considerations and Vessel Impact Event (MnDOT)
  • Timber Pile Investigation (Baker)
  • Consideration of Internal Redundancy (Baker)
  • Design of Bridge 5900 (Baker)
  • Full Build vs. Modernized Approach Spans (Baker)
  • Construction Support/RID Document
  • Pre-construction CMGC input, lessons learned, and EOR Construction Support
• Project Participants – Collaboration of Project Design Team

Project Overview / Project Background

Project background:
• Winona, Minnesota
• T.H. 43 over Mississippi River
• 125 Miles South of St. Paul
• Connects Winona to Lake City, then to Wisconsin
• Bridge 5900 replaced the Wagon Bridge and opened in 1942
• Previous Repair Projects

Project Needs:
• MN Chapter 152 – Tier 1 bridge
• Legislation and Funding was provided for Fracture Critical Bridge Projects (2007-2018)
• Rehabilitation Study initiated in 2009 resulting in Preferred Alternative in 2013

Central Files – Historic Bridge information
• 1865: Furryboat Turtle
• 1892: High Wagon Bridge
• 1942: Bridge 5900 (opened)
• 2016: Bridge 85851 (opened)
• 2019/2020: Bridge 5900 (soon to be opened)
Project Background

Previous Repair Projects

- 1942 – Bridge 5900 opened to traffic...(functioned for 43 years...)
- 1985 – Bridge Deck Replacement, cantilevered Sidewalk, painted...(12 years...)
- 1997 – Hanger Span Pin Replacement...(1 pin replaced – inspected original)
- 1998 – River Piers 19 & 20 – Concrete Collars Installed at Waterline...(20 years...)
- 2005 – Rocker Bearing(s) Replaced under Deck Trusses
- 2008 – Gusset Plate Repairs (Emergency Contract)
  Sidewalk Grid replaced with used Glu-lam panels
  Scour Analysis Updated – Scour Critical Determination
- 2010 – Additional Gusset Plate Repairs Made, Bridge Posted to 40 ton (legal)
Previous Re-deck and Paint Project, 1985

Previous Gusset Plate Repair Project (2008)

• Bridge closed for emergency repair to gusset plates (2008)
• Bridge Posted 40 ton legal loads, (2008)

Project Overview / Project Background

Project background:
- Winona, Minnesota
- T.H. 43 over Mississippi River
- 125 Miles South of St. Paul
- Connects Winona to Latch Island, then to Wisconsin
- Bridge 5900 replaced the Wagon Bridge and opened in 1942
- Previous Repair Projects

• Project Scoping Phase (2009 – 2013)
• MN Chapter 152 – Tier 1 bridge
• Bridge 5900 is a fracture critical bridge
• Historically Significant: Eligible for listing on National Registry of Historic Places (NRHP)

Chapter 152 Program

• Following the collapse of the 35W Bridge (Aug 1, 2007)
• Legislation and Funding was provided for development of Bridge Replacement Program
• Emphasis on Fracture Critical Bridge Projects (2007-2018)
• $2 Billion Statewide
Chapter 152 Program

Subd. 4. Prioritization of bridge projects.

- Laws passed by the Minnesota legislature (2008 Chapter 152) required MnDOT to develop a Bridge replacement program, and classify all bridges in the program into tier 1, 2, or 3, where tier 1 is the highest priority tier.

- “By June 30, 2018, all tier 1 and tier 2 bridges originally included in the program must be under contract for repair or replacement with a new bridge that includes a load-path redundant design, except that a specific bridge may remain in continued service if the reasons are documented in the report documented under subdivision 5.”

- “for any tier 1 fracture-critical bridge that is repaired but not replaced, an explanation of the reasons for repair instead of replacement”.

Bridge 5900 – Historic Bridge Overview

- Bridge 5900 eligible for listing- National Registry of Historic Places (NRHP)
- Federal Laws – provide for projection of Historic Properties (Section 106)
- Selection of a recommended alternative is informed by the historic review process, based on many factors:
  - Cost, feasibility, constructability, general visual quality
  - Impacts to environmental, social and economic resources
  - Balances Historic Preservation & Transportation Needs of Traveling Public

Bridge 5900 – Historic Bridge Overview

- Review Alternatives for Rehabilitation in accordance with the SOI Standards and avoid or minimize adverse effects on the Historic Property

  Standard 6
  
  Deteriorated structural members and architectural features shall be retained and repaired, rather than replaced.

  Where the severity of deterioration requires replacement of a distinctive element, the new element should match the old in design, texture, and other visual qualities and where possible, materials.

  From the Virginia Transportation Research Council’s adaptation of the Standards for the Special Requirements of Historic Bridges.

Bridge 5900 – Historic Bridge Overview

- Minnesota’s last example of pre-1946 Cantilever Through Truss – Eligible for NRHP
- Section 106 Process Required evaluation of rehabilitation alternatives to determine if feasible and prudent alternatives exist that have no adverse effect on historic Bridge 5900

Existing Bridge 5900:

- Built 1943
- Rehab 1985
- Gusset Repairs 2008 and 2010
- Load Posting: 40 Ton
- Timber Piles, scour critical
- Legislative Funding (Chapter 152) – emphasis on replacement with “Load Path Redundant Design”
Winona Bridge: Character Defining Features

• Feature 1 – Cantilever through-truss main spans
• Feature 2 – Deck-truss approach spans
• Feature 3 – Architectural style in bridge piers

Winona Bridge: additional notable features

• Latsch Island stonework
• Moderne endpost remnant
• Plate-girder span

Key Milestone: CMGC Project Information Meeting

• June 2013: Nearing completion of Scoping Phase/Prelim Design Phase
• Bridge Type Study, Layout, Preliminary Bridge Plans under development
• EA (DRAFT) work in progress

Project Layout - 2013

• Several Alignments Studied (documented in Environmental Assessment)
• Preferred Alignment: Parallel Upstream alignment selected
• 50 feet between bridges allows for construction and future maintenance
• MOT needs led to need for upstream bridge with pedestrian trail
• Finding of No Significant Impact (FONSI) - Jan. 30, 2014
Project Scoping Phase (2009 – 2013)
Environmental Assessment (EA)

- Primary Need: A structurally sound bridge
- Secondary Needs:
  - MOT (25 mile detour), regional crossing with access to 2 river ports in Winona, emergency response fire, law enforcement, medical vehicles
  - Improve Roadway Capacity (20 yr marginal, 50 yr = 19,700 vpd)
  - Maintain Ped and Bike Accommodations
  - Meet Critical Regulatory Requirements (Historic Resources)
  - Maintain Navigational Channel
- Other Considerations:
  - Improve Bike Ped Accommodations
  - Structural Load Path Redundancy
  - Improve Bridge Geometrics, Minimise impacts to local roadway & Truck Route Impacts

Key Issue – The Parallel Bridge

Visual Quality – Advanced in 2-Stage Process:

1) Preliminary Design Phase (SRF)
   a) Winona Bridge 3D Simulation Drive Thru completed: Oct. 2013 (SRF & TYLIN)
   b) Preliminary Bridge Plans for New Bridge 85851 developed with input from the Visual Quality Advisory Committee
   c) Vision Statement, Design Theme, Preliminary Bridge Aesthetics (Feb 2014)

Visual Quality Review Committee Project Vision Statement

The Winona Bridge should reflect the current era while respecting the past. The existing bridge is a visual icon for the city, and so the new bridge should defer its prominent visual presence. The new bridge should celebrate the river’s natural beauty and the cultural history of Winona that is intertwined with the river. Together, the two bridges should symbolize a welcoming gateway to beauty, culture, and prosperity.
Visual Quality Process

2) Visual Quality Refinements continued with Final Design Phase (FIGG)
   Summary of Preferred Features (2/4/14 – 9/25/14)

Organic Theme Selected
• Bridge piers and overlooks
• Abutments & retaining walls
• Pedestrian Railing and curb
• Bridge and railing color
• Bridge Lighting
• Latch Island trail railing
• Winona Sign at North Abutment

Visual Assessment of Bridge 5900 -

Assessment of Visual Impacts on Historic Properties:
Separate ongoing process concurrent with Development of Bridge 5900
Rehabilitation Plans - Review by CRU, Project Historian, SHPO (Baker/XH)

Construction Manager/General Contractor (CMGC)

• 2012 - MnDOT received Legislative Authority for CMGC Contracting Process on 10 projects
• Integrated approach to planning, design and construction
• Owners, designer(s), and contractors collaborate to develop project scope, optimize design, improve quality, and manage cost.

Construction Manager/General Contractor (CMGC) Benefits

• Allows for collaboration with the contractor, but the owner retains control of the design
• Innovation
• Minimize/Manage Risk
• Improved Constructability
• Schedule Optimization
• Cost Management – Cost Certainty earlier in the project
Winona Bridge Project Goals

- Start Construction on the New Bridge ASAP (July 2014)
- Place Traffic on New Bridge 85851 ASAP to minimize likelihood for detours due to bridge maintenance work
- Keep river crossing open during construction.
- Meet the overall project funding cap of $162 million.
- Stay within construction funding of $125 million
- Stay within Engineering and ROW funding of $37 million additional.

Winona CMGC Project

- WHY CMGC?
  1. To meet the goal of opening the new bridge by the end of 2016, it was the only procurement method.
     a. Break Project into Work Packages (get ROW off critical path)
     b. Overall Master Construction Schedule (fluid)
     c. Steam-line Plan Reviews and Advertisements
     d. Coordinate Early with Construction Team (minimize risks)
  2. For the Rehabilitation of Bridge 5900
     a. Recent Significant bid Overruns on Similar Work
     b. Contractor Means and Methods
     c. Early input from Constructor’s subs (Complex steel rehab)
     d. More time for Section 106 review process (lag schedule)

Winona CMGC Project – Work Packages

Accomplishments:
- Work Package #1 let on May 1, 2014
- Work Package #2 let on May 15, 2014
- Work Package #3 let on July 30, 2014
- Work Package #4 let on Jan 23, 2015
- Work Package #5 let on Aug 10, 2016
- Work Package #6 let on May 24, 2017

Bridge 85851 Layout / Units
Segmental River Crossing - Main Span Layout

CIP Segmental Bridge Segment Variable Depth Cross Section

Bridge 85851 - Construction

Work Package 1 – Procurement of Materials
Work Package 2 – Early Contractor Access

North Dock Wall and Contractor’s Material Lay-Down Area
Barge delivery of dredged sands used for back fill after testing for contaminants

WP 3: Bridge 85851- Early Foundations Contract

Segmental Shop Drawings – by EOR (Figg) with Review by PEER REVIEWER (PTG)
Likely accelerated schedule by 1 year...
Work Package 4: CIP Segmental Bridge 85851

Construction Proceeded (Spring of 2015 thru 2016)

Bridge 85851 – Awards and Recognition

- Road and Bridge – Top 10
- ASBI – Honorable Mention
- ASPIRE – Winter 2017

Bridge 85851 – Opened to Traffic Aug. 27, 2016

The result is almost a mirror image; ... turns the two bridges into an ensemble, in spite of the fact that they are completely different materials, technologies, and colors. The most powerful visual aspect of any bridge is its overall shape, and here the designers have made that shape work for them very well.

Frederik Guttermoeller, ASPIRE Winter 2017
Bridge 85851 – Lessons Learned

• CMGC Coordination During Final Design Phase
  • Early Procurement of Materials (6 – 9 month lead time delivery 42” piles)
  • Early Access: Construction Access (sheet pile walls on river banks early)
• Early Foundations Contract (decoupled ROW acquisition)
• EOR Development of Segmental Shop Drawings (Collaboration)
  • CMGC Contractor’s Post-tensioning suppliers /Collaboration with EOR/PEER REVIEW
  • Incorporated PT Systems, form-traveler details, accelerated shop drawings
  • Process enabled seamless transition to Segmental Construction/
    Saving est. 1 year!
• Construction Engineer: All Falsework + Independent Construction Model
  (Contract requirement)
• EOR Geometry Control & Construction Support (full time on site)
• Earlier Project Cost Assessments (30%, 60%, 90%, IFB Design Phases)

Bridge 5900 Rehabilitation and Reconstruction

New South Approach Spans  Rehab Main Truss Spans  New North Approach Spans

Bridge 5900 – Design Challenges

• Scour Mitigation Measures
• Vessel Collision Design and potential foundation retrofit
• Foundations: Timber Pile investigation
• Strengthen Bridge to accommodate all Permit Vehicles
• Include Internal Redundancy / Special Design Loads
• Compliance with Section 106 Requirements – no adverse effect
• Construction Challenges and Construction Support
• Lessons Learned/Discussion/Questions

Winona Update: Scour Mitigation
Mississippi River bathymetry at TH43 crossing, Winona

- Mississippi River – Splits into main channel and back channel – separated by Latch Island
- 100yr Q ~ 240,000 cfs (~160,000 cfs under bridge 5900), Average velocity ~ 5.5 ft/s
- Two main channel piers subject to scour
- Pool elevation of 645 ft
- River bed dunes of up to 5 ft high at pool elevation

River bed before and after installation of new cofferdam

May 2014

November 2014

Temporary scour countermeasure during construction

- Geotextile bags were selected:
  - Depth of water
  - Strong current (>3 ft/s)
  - Can be used as stand alone counter measure

...Installation

- Size: 4’ x 4’ x 1’
- Gravel filled and stitched on site
- Weight: 1 ton
Scour Protection

Vessel Impact Study – Br. 85851 & Br. 5900

- 24 – 42” Diam. Pipe Piles ¾” wall
  - Concrete filled
  - 120’ long

- Vessel impact load: 3000 kip (P18), and 3664 kip (P19)

- Strut between existing bridge and new bridge for vessel impact

- 264 timber piles Br. 5900 (P18 & P19)

Winona: Vessel Impact – Collision Strut
Bridge 85851: Vessel Impact 7.31.18

Barge Impact to Pier 11
Upstream nose of Pier Wall
Spall Area = 31 sq. ft.
No cracking in or propagating from impacted areas
Field inspection performed same afternoon by MNDOT (D6) with subsequent close-up inspection of pier blades
Scour Monitoring Equipment (bracket & sensors) damaged

Bridge 5900 – Design Challenges

• Scour Mitigation Measures
• Vessel Collision Design and potential foundation retrofit
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Vessel Impact 7.31.2018

River Pier Foundation Evaluation
Work Package 2 – Pile Investigation

Contractor’s sub (BRENNAN) obtained Timber Pile Samples from Bridge S5000

Samples tested by Forest Products Lab for decay and structural integrity

Part 1 (per WP2)
Sample pencil cores taken from 2 river piers and 2 land based piers

Part 1 (WP2)
Sample pencil cores taken from 2 river piers and 2 land based piers

Part 2 (Change Order)
Additional pencil cores and full pile sections from P19 and P20

Timber Pile Investigation – Part 1 Core Sample

Pencil core samples from Pier 19 and Pier 20 - obtained 9-5-2014

Bubbles encountered during extraction process (with video provided for assessment)

Integrity of sample as viewed in sample tubes was questionable and was discussed at PDT Mtg.

Review by Project Design Team resulted in Recommendation for Change Order to provide further investigation per Change Order

Timber Pile Investigation – Part 2 Change Order

Part 1: Per original Contract (WP2): Extract pile cores from 4 piers
Pier 16 (Treated) Pier 19, Pier 20, Pier 23 (Creasote Treated)

Part 2: Per Supplemental Agreement/Change Order:
Additional Pencil Cores: Pier 17, Pier 18, Pier 19, Pier 20, Pier 22
Extract Full 3’ long full pile section from Pier 19, and
Extract Full 3’ long full pile section from Pier 20
Part 2: Full Pile Section Samples

- Specimen ID: 19.5
  - 16 in. dia.
  - 35 in. long

- Specimen ID: 29.5
  - 14.5 in. dia.
  - 20 in. long

Timber Pile Investigation Results

3.0 Existing Pile Conditions

3.1 - Confirm Pile Records, Type, Size, Species

3.2 – Evaluation of small core samples
  3.2.1 Specific Gravity
  3.2.2 Deterioration

3.3 – Evaluation of Full Pile Section Test Results (P19 & P20)
  3.3.1 Specific Gravity
  3.3.2 Bending Stress
  3.3.3 Compression parallel to grain
  3.3.4 Modulus of elasticity:
  3.3.5 Deterioration: no signs of decay in heartwood

Results of Timber Pile Investigation resulted in confirmation that Timber Piles OK

Recommendations:
- Replace South Approach Piers
  - Must replace Pier 16 (new P7)
  - Strong Desire to reuse Pier 21
- Re-use Pier 17 – P23
- Re-use North Abutment

Scope of Work

Reconstruct PT Flat Slab
New PS Girder Spans
Reconstruct Deck Truss
Rehab Through Truss
Scope of Work

- Reconstruct Deck Truss
- Re-use Piers - Through Truss and North Deck Truss Spans

Existing Bridge Condition

- Floorbeam Connections
- Stringers
**Existing Bridge Condition**

- Pack Rust

**Key Issue – Load Path Redundant Design**

- Early Load Path Redundancy concepts

Figure 7. Half-elevation of Suspension Cable Concept

**Rehabilitation Scope**

- Fracture-Critical Members
- Adding Internal Redundancy
- Partner with CRU

**Rehabilitation Scope**

- Evaluate Options

<table>
<thead>
<tr>
<th>Deck Description</th>
<th>Number of Members with Inventory RF &lt; 1</th>
<th>Number of Members with Operating RF &lt; 1</th>
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<tbody>
<tr>
<td>Existing Bridge</td>
<td>52</td>
<td>28</td>
</tr>
<tr>
<td>8&quot; Standard Deck</td>
<td>56</td>
<td>34</td>
</tr>
<tr>
<td>7&quot; Deck</td>
<td>48</td>
<td>24</td>
</tr>
<tr>
<td>8&quot; Lightweight Deck</td>
<td>30</td>
<td>8</td>
</tr>
<tr>
<td>7&quot; Lightweight Deck</td>
<td>26</td>
<td>4</td>
</tr>
<tr>
<td>Exodermic Deck</td>
<td>21</td>
<td>2</td>
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</tbody>
</table>
Rehabilitation Scope

Design Variances Granted
- MnDOT future wearing surface removed
- 8" deck used instead of standard 9" deck
- Refined evaluation for
  - Deterioration
  - System redundancy
  - Utility loads

Through Truss Analysis
- 2D FEM
- 3D FEM

Rehabilitation Scope

• Analysis Defines Scope

Standard MnDOT design criteria

With design variances
- Green = no retrofit required
- Purple = plate retrofit required
- Gray = high strength bar retrofit required

CMGC Delivery

• Internal Redundancy Analysis
  - Compression Members
  - Tension Members
  - Gusset Plates
Internal Redundancy Analysis

During Fracture: \[ 1.10DC + 1.35DW + 0.75(LL + IM) + 1.1 \] (Dynamic Forces)

Post-Fracture: \[ 1.25DC + 1.50DW + 1.30(LL + IM) \]

Design Guidelines for Arch and Cable-Supported Signature Bridges, FHWA, 2012

Check Each Fracture-Critical Member for Extreme Event Limit State

Retrofits Required?

Internal Redundancy

Multilinear elastic link

Element with zero axial stiffness

Multilinear axial stiffness spring
**Internal Redundancy**

**Extreme Event – Post Fracture**

- No Load Path Redundancy = “Fracture Critical” per FHWA
- NEW 2018 AASHTO Guide Specs
  - Internally Redundant Members may not be “Fracture Critical”
  - Check Strength & Fatigue Resistance of FC Members

**Rehabilitation Scope**

- Diagonal retrofit plate
- Bottom chord retrofit plate
- Splice plate
- Bar anchorage

**Future Inspection Requirements**

- No Load Path Redundancy = “Fracture Critical” per FHWA
- NEW 2018 AASHTO Guide Specs
  - Internally Redundant Members may not be “Fracture Critical”
  - Check Strength & Fatigue Resistance of FC Members

**Bridge Rehabilitation**

- High-Strength Bars inside Diagonal Member
- External Plating on Diagonal Member
High-Strength Bar Retrofits

- Stressed to $0.20f_{pu}$
- Goal is to stiffen bar, not to PT the truss
- Wind vibration restraints
- Bars share new deck and live loads
- Modeling verifies internal redundancy
- Detailed anchorage design

Rehabilitation Rendering

CMGC Benefits: Early Collaboration

- On site field investigations: Assess accuracy of shop drawings/fit-up

CMGG : Ames Construction: Built Mock-Up of Bridge Node - access, space constraints, field splices & fit-up

Section 106 Coordination

- Partner with CRU & MNHPO

<table>
<thead>
<tr>
<th>Procedure for Analysis</th>
<th>Percentage of All Truss Members Retrofit with Plates</th>
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</thead>
<tbody>
<tr>
<td>Standard MnDOT Design Criteria</td>
<td>24%</td>
</tr>
<tr>
<td>With Design Variances</td>
<td>19%</td>
</tr>
<tr>
<td>With Design Variances + Ignore AASHTO Extreme Event Load Case</td>
<td>14%</td>
</tr>
<tr>
<td>Original Preliminary Design – members considered zero deterioration</td>
<td>10%</td>
</tr>
</tbody>
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Bridge Rehabilitation

- Replace Deteriorated Stringers
- Retrofit Floorbeam Connections

Deck Truss Historical Considerations

10" deep members

CMGC Delivery

- Section 106 Coordination
  - Bridge Repairs
  - New Deck Truss
  - Approach Spans
  - Pier Reconstruction
  - Railing
  - Design Variances

Deck Truss Historical Considerations

12" deep members
Deck Truss Historical Considerations

14" deep members

Hex-Head Bolts

10" deep members

Diagonal Deck Truss Members

INTERNAL REDUNDANCY OPTIONS

EXISTING CROSS SECTION

NEW DESIGN OPTIONS

OPTION 1
Addition of web plates

MEMBER U3L2
Current Shape #55460

MEMBER U1L4 & U1L4
Current Shape #03459

OPTION 2
Addition of flange plates
**Deck Truss Bottom Chord Members**

**Railings – Historic vs. Crash Ratings**

- **Historic Railing**
- **Standard Railing with Fence Mount**
- **Final Railing**
CMGC Delivery

- Construction Loading
- Section Loss
- RID

Construction Sequence

- Construction Loading

Reference Information Document
Construction – Deck Truss

Deck Truss Installation
Concrete Girder Approach Spans

Deck Construction

Modular Joints

Deck Pour
Lessons Learned

• CMG – Contractor / PDT Collaboration
• CMG – Owner control; constructability; risk reduction
• CMG – Schedule Acceleration via phased work packages
• Partner with CRU on Historic Bridges
• Feasible to add Internal Redundancy to Historic Bridges
• Construction Sequencing can control schedule and loading

Project Participants

Scoping, Preliminary Design, Environmental Assessment: SRH with TYLIN, Modjeski and Masters
Preconstruction Permit Support and Grading Plans: WSB, CMGC Cost Estimates: Armeni Consulting Services
Bridge 85851 Segmented Bridge: FIGG (EOR), PTG Peer Review

Preconstruction Permit Support: WSB
Bridge 5900 Rehabilitation: Baker (EOR), MnDOT Bridge Office & Hydraulics Section (Sour), HNTB/ONE Peer Review

Construction Manager/General Contractor: (CE: Finley, Danny’s Construction)

Construction Inspection Support (for Bridge 5900)

FHWA/COE/USCG/City of Winona

QUESTIONS / DISCUSSION

Winona Bridge
CMGC Project

Construction Manager/General Contractor (CMGC)

• Work Package 1: 42” Diameter Piles Fab & Delivered
• Work Package 2: Early Contractor Access Plans
  • North and South Dock Walls for Access, Storage
  • Early Pile Investigation Bridge 5900
• Work Package 3: Early Bridge Foundations Br. 85851, Scour Mitigation Bridge 5900:
  • Construct River Pier Cofferdams, Piles, Footings, Pier Ice Breakers
  • Bridge 5900: Scour Mitigation Plan (Monitor scour & Phase 1 installation of Geobags)
• Work Package 4: Construct Remainder of Bridge 85851 & Roadway, walls, Drainage
• Work Package 5: Bridge 5900 Rehabilitation/ Reconstr'n (Full Build)
• Work Package 6: Bridge 5900 Rehabilitation/Reconstruction (Main Through Truss)
“Pause Button” - Review of Approach Spans

Winona – Strengthen Truss Spans

Winona – New Deck Truss

Scheduled Completion: 2019

Replica, with Internal Redundancy

Construction Photos