Bridge Office
3485 Hadley Avenue north
Oakdale, MN 55128-3307

MEETING AGENDA

3rd Ave Bridge 2440 CMGC Kick-off Meeting Agenda – January 23, 2018

Location: Bridge Office, Conference Room 5

Part 1: Project Manager Meeting (9:00-11:00 AM)

1. Welcome
2. Team Member Roles
    a. PDT Team
    b. CMGC Team
3. CMGC Input SOW Overview

4. Project Background
    a. Include summary from Powerpoint
    b. Include Historic Process Overview

Part 2: Project Background/Working Lunch (11:00 AM- 1:00 PM)

5. Project Hand-Off Information
6. Current Engineer of Record SOW
7. Project Documentation
    i. Historic Features Report
    ii. Bridge Inspection Report (WJE)
    iii. Bridge Alternatives Evaluation Report
    iv. Bridge Cost Evaluation Report
    v. EA
    vi. Permits
    vii. Stakeholders/Contacts
8. Access Considerations – overview

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Part 3: Project Design Team (PDT) Meeting (1:00 PM- 4:00 PM)

9. Introductions/Roles
10. HNTB/WJE Project Design Team Agenda (inserted here)
11. Next Steps
    a. Staging Considerations
    b. Baseline Alternative
    c. Cost Estimate(s)
12. Schedule/Next Steps

S.P. 2710-47 TH 65 (3rd Avenue Bridge)
CMGC Kick-Off Meeting
January 23, 2018

DEPARTMENT OF TRANSPORTATION

Outline

- Introductions
- Project Overview
- Project Goals
- CMGC SOW

- Historic Process
- Questions

Introductions

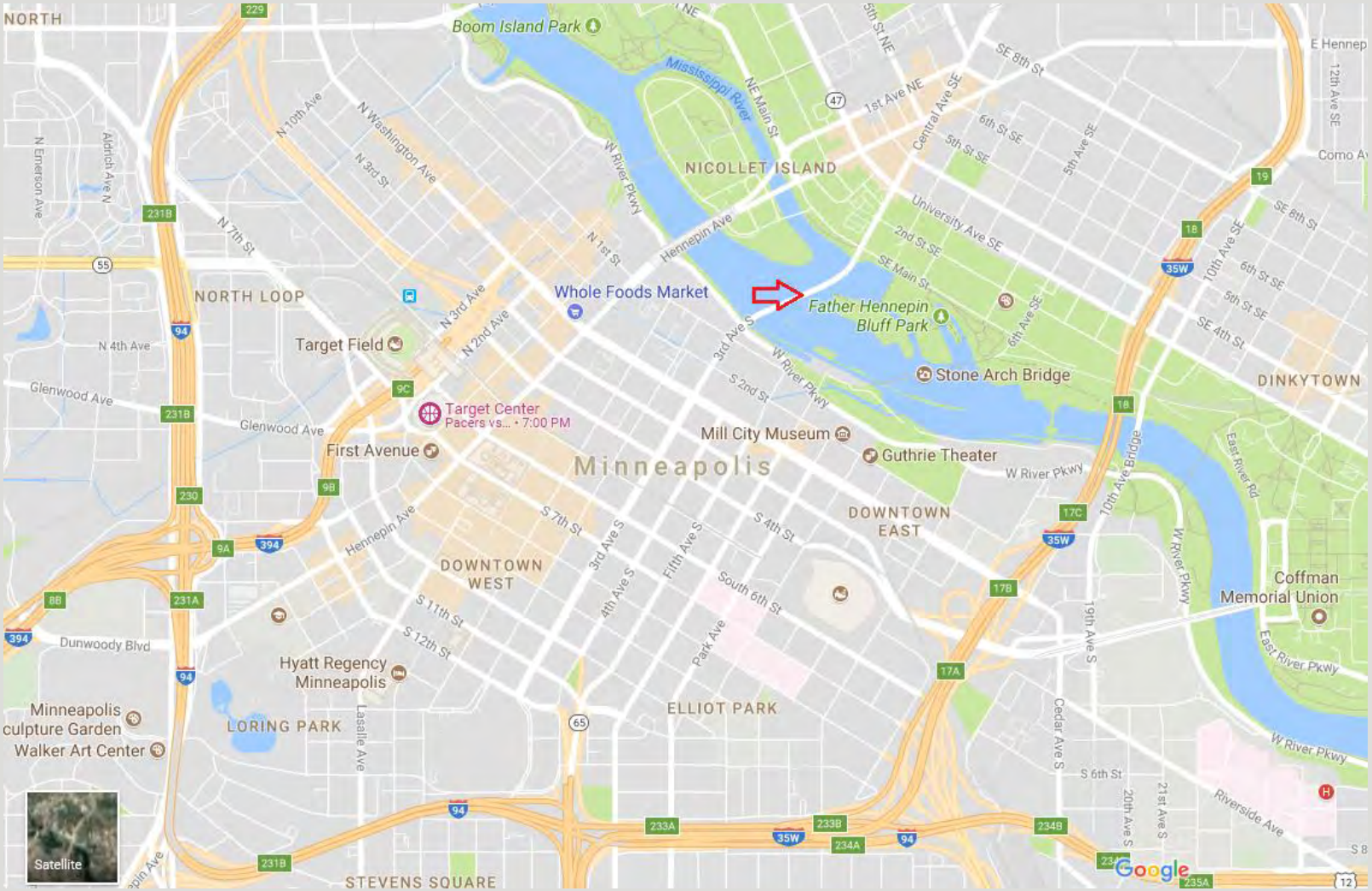
- MnDOT Project Manager: Christian Hoberg (Single point of Contact prior to letting)
- MnDOT Construction Project Manager: Timothy Nelson
- MnDOT
  - CMGC Program Manager: Kevin Hagness
  - Bridge Office Project Manager: Keith Molnau
  - Cultural Resources Unit: Katherine Jaun Schuring
  - Project Design Team (PDT) Introductions to follow during Project Design Team Meeting

Introductions

CMGC Introductions: Ames Construction

Project Manager: Jerry Voltz
Construction Engineer: David Duke
Lead Cost Estimator: Jason Luhman
Project Specialist: Justin Gabrielson,
Proposal lead: Nick Ruba: (now handing off PM to Jerry)
Project Specialist: Craig Finley, *Construction Engineering*

Project Overview - Location



Project Goals

1. Redeck and rehabilitate the bridge to achieve a 50-year design life.

2. Complete the project within budget.

3. Minimize bridge closure to less than 24 months.

Project Goals

4. Develop a design that meets Secretary of Interior Standards for Treatment of Historic Properties, in order to *avoid an adverse effect* per Section 106 of National Historic Preservation Act, and Section 4(f) use.

5. Maintain pedestrian and vehicular traffic adjacent to the project and under the bridge during construction.

6. Minimize impacts to stakeholders (local community, historic district, parks, businesses) and the environment, (protected and endangered species, the river, park land, and properties to the project)

Project Goals

7. Build a professional and collaborative project team among the owner, designer, and contractor using the CMGC delivery method.

8. Maintain public trust and confidence in the Project and the CMGC process.

CMGC Scope of Work Development

- Review TASKS as per the RFP
- Establish Deliverables for each task
- Review Timing/Schedule for each deliverable
- Establish Hours Estimate for Tasks
- Establish Target date for SOW including cost estimate for CMGC Participation on bi-weekly meetings, PDT meetings, Workshops, and Task Deliverables

CMGC Scope of Work Development

1. Provide a Project Manager and associated staff to consult with, advise, assist, and provide recommendations to MnDOT and the design team on all aspects of the planning, design, and proposed construction, as requested by MnDOT.

2. Attend an initial Project Kickoff Mtg that includes the following:

   a) Introduction to the Project Team

   b) Introduction of the Project Stakeholders

   c) Project status, goals, objectives, schedule, funding, etc.

   d) Presentation of Project elements.

   e) Identify Project risks and provide input that will be used to develop a risk management plan.

   f) Question and answer session.

CMGC Scope of Work Development

3. Participate in a Partnering Workshop.

4. Provide technical assistance during the scoping/preliminary design phase (prior to 30% design) as alternatives are evaluated in the development of a historic bridge alternatives analysis rehabilitation report and the NEPA process. The technical assistance may include providing risk assessments, constructability input, cost estimates, and schedules for alternatives (including various staging/access alternatives) being evaluated

5. Participate in design coordination meetings with MnDOT and MnDOT's Design Engineer. It is anticipated that design coordination meetings will be held every 2 weeks at MnDOT's Bridge Office in Oakdale, MN. (SEE SCHEDULE, add intermittent meetings every 2 wks)

CMGC Scope of Work Development

6. Participate in the interim pricing milestone process, anticipated to occur at the 30%, 60%, and 90% design submissions. This includes the following at each milestone:

- participating in formal workshops (e.g., estimate coordination, design review, risk);
- preparing a cost estimate and schedule;
- reconciling price differences.

See MnDOT's Interim Pricing Milestone process for more information regarding the process and the services provided by the CMGC Contractor.

CMGC Scope of Work Development

7. Review the 30%, 60%, and 90% plan submissions and provide comments regarding constructability, cost, schedule, and staging.

8. Continually review and provide input to the Project Team on various elements of the Project such as staging, sequencing, access, equipment storage, detour routes, traffic control, storm water management, accelerated bridge construction techniques, and materials.

9. Assist with evaluating the potential use of pre-cast deck panels early in the design development (i.e., prior to completion of the 30% design)

CMGC Scope of Work Development

10. Recommend any early work packages, such as procurement of long-lead time materials, which optimize the Project schedule and/or reduce cost.

11. Develop, with input from MnDOT, a Subcontracting Plan to integrate subcontractors as needed to accomplish all construction work. Identify the proposed plan to meet contract goals (e.g., DBE) established by MnDOT's Office of Civil Rights for the Project.

CMGC Scope of Work Development

12. Develop plans that detail equipment placement and associated loads during staged deck removal and placement of the arch spans and approach spans. This plan will be developed through a collaborative and likely iterative process with the Designer (Engineer of Record) and MnDOT during the design development. Plans must be developed for all four scenarios under consideration per section 4.4.4.3 and include sufficient detail to assess and compare the costs, risks, and schedules for each of the different scenarios.

SOW Deliverables should be further refined – DISCUSS

- Detailed equipment plan (loads to be provided by Contractor)
- Detailed Stage removal Plan (Work to be investigated by HNTB EOR, and reviewed by Contractor – provide comments)
- Preliminary Structural Analysis of Arch and Pier Columns that will need to be braced with external temporary bracing system and support bracket system (Temporary Works) to be Designed by Contractor (Finley) and reviewed by our EOR and PEER Review Team. All are engaged in the Structural analysis of the Construction Loads, but Contractor takes lead on development of Temporary Works Plans including Structural Analysis of staged removal and reconstruction.
- BRIM: We need to better understand intentions of use of BRIM, and value this adds to our project, thus we need to have further discussion with AMES on this and assess if this should be included in the SOW

CMGC Scope of Work Development

13. Develop a plan that details river access location(s), land access locations, equipment placement (within the river, on the bridge deck, and on land) and the associated loads during staged deck removal and placement of the approach spans that accounts for proximity of equipment to overhead utilities. This plan will be reviewed by the Designer (Engineer of Record) and MnDOT during the design development and included in the development of cost estimates used for comparison of the different scenarios.

14. Develop a plan for providing temporary de-watering to permit concrete surface repairs to the pier columns. This plan will be reviewed by the Designer (Engineer of Record) and MnDOT during the design development.

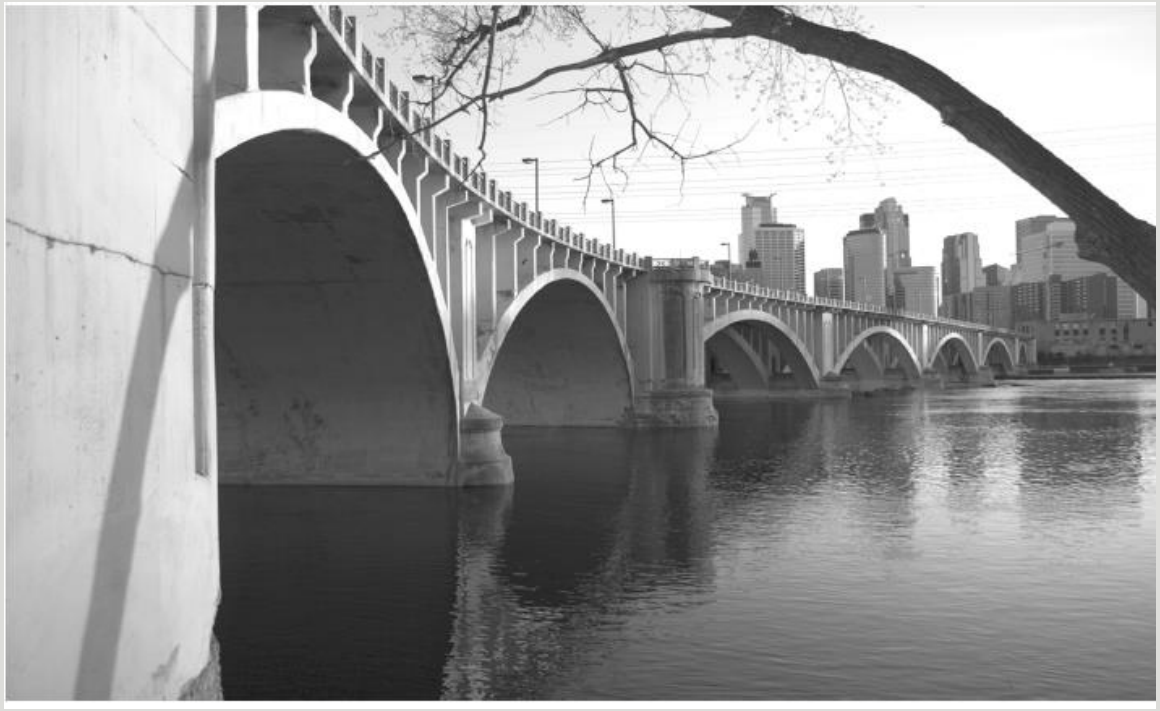
CMGC Scope of Work Development

15. Develop conceptual plans for the CMGC Contractor's proposed means and methods and temporary works such as site access, debris containment, potential de-watering, arch span concrete placement, complex forming systems, protecting environmentally sensitive areas, deck placement and maintaining/supporting utilities.

16. Assist MnDOT with certain project development tasks such as permits and agreements. Example tasks include assisting with the development of the Storm Water Pollution Prevention Plan (SWPPP) as applicable to meet local jurisdictional requirements; providing MnDOT and the applicable regulatory agencies with relevant construction details, such as staging or means and methods (including the river); and prioritizing right-of-way acquisitions, utility agreements, or permits to optimize the overall Project schedule.

Historic Bridge Background/Process

Bridge 2440 – Historic Bridge Management Plan



One of MnDOT's 24 bridges selected for long term preservation

Must comply with Section 106 of the National Historic Preservation Act of 1966, and Section 4(f) of U.S. Dept. of Transp. Act of 1966

Listed on the National Register of Historic Places

Historic Bridge Background/Process

Bridge 2440 – Historic Bridge Management Plan

Minnesota Department of Transportation (Mn/DOT)

Historic Bridge Management Plan

I - Project Introduction **Bridge Number: 2440**

The Minnesota Department of Transportation (Mn/DOT), in cooperation with the Minnesota State Historic Preservation Office (SHPO) and Federal Highway Administration (FHWA), has committed to preserve selected historic bridges in Minnesota that are owned by the state and managed by Mn/DOT. In consultation with SHPO and FHWA, Mn/DOT selected 24 bridges as candidates for long-term preservation. Mn/DOT's objective was to preserve the structural and historic integrity and serviceability of these bridges following the Secretary of the Interior's Standards for the Treatment of Historic Properties (Standards) [36 CFR Part 68], and their adaptation for historic bridges by the Virginia Transportation Research Council as Guidelines for Bridge Maintenance and Rehabilitation Based on the Secretary of the Interior's Standards (Guidelines). The character-defining features of each bridge received special attention. Mn/DOT also hopes to encourage other owners of historic bridges to follow its model for preservation.

Historic Bridge Background/Process

Bridge 2440 – Historic Bridge Management Plan

Character-Defining Features

Character-defining features are prominent or distinctive aspects, qualities, or characteristics of a historic property that contribute significantly to its physical character. Features may include materials, engineering design, and structural and decorative details.

Feature 1. Melan-system reinforced-concrete arches. The Melan system, patented in 1894, uses steel I-beams bent approximately to the shape of the arch axis and laid in a parallel series near the undersurface of the arch. The Third Avenue Bridge has seven large Melan arches, including two barrel arches and five three-rib arches, including the example in this photograph. It is considered to be the last major reinforced-concrete bridge constructed in the Twin Cities using the Melan system.

Historic Bridge Background/Process

Bridge 2440 – Historic Bridge Management Plan

Feature 2. Reverse S-curve alignment. The bridge location lies in an area of the Mississippi River between Nicollet Island and St. Anthony Falls that has an irregular limestone base. The placement of piers and engineering of the spans required considerable engineering analysis to avoid unstable areas. The final plan resulted in a reverse S-curve alignment, which spanned the poor foundation sections and produced an aesthetic form that added to the bridge's overall image as a gateway to downtown Minneapolis.

Feature 3. Classical Revival aesthetic treatment. A gateway structure, the Third Avenue Bridge received a Classical Revival aesthetic treatment. Classical elements include piers and the projecting pedestrian bays, which were restored or reconstructed in the 1979-80 deck-replacement project, and the 1939 ornamental railing.

Historic Bridge Background/Process

Bridge 2440 – Historic Bridge Management Plan

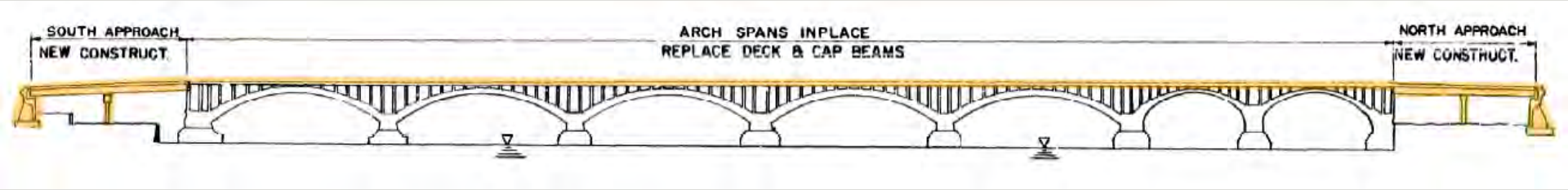
Feature 4. St. Anthony Falls setting. The Third Avenue Bridge is located just above the falls, as visible in this photograph. It spans elements of the V-shaped, upper-dam system that channeled water into east and west mill ponds on the east and west sides of the falls. The ponds provided water to the waterpower canals for the flour-milling district. The bridge is within the St. Anthony Falls Historic District (National Register of Historic Places).

Bridge 2440 – Background

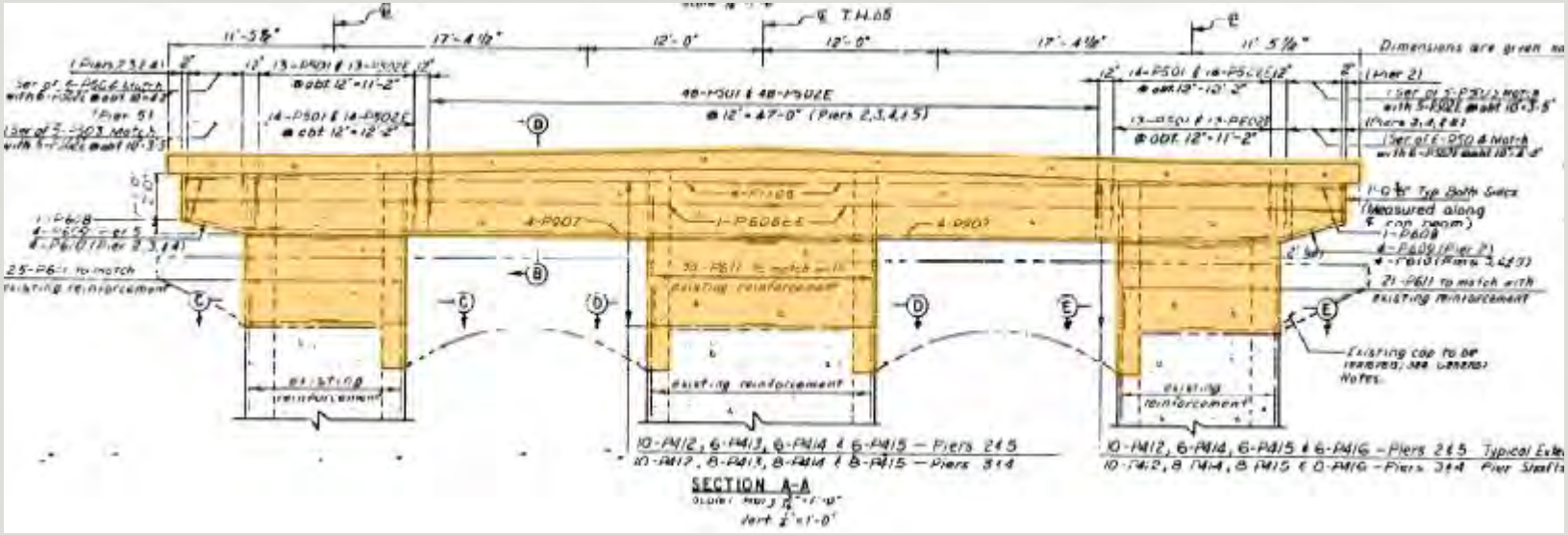
- Originally constructed 1917
- 1939 rehabilitation
  - Replaced sidewalks
  - Replaced balustrade railing with art-deco metal railing
  - Replaced original ornamental lights with highway style fixtures
- 1979 rehabilitation
  - Replaced spandrel cap beams, pier caps, portions of spandrel columns, approach spans, abutments, approach piers, beam spans, raised grade with new bridge deck, added traffic barrier
  - Original/remaining concrete repaired
  - Ornamental railing rehabilitated

Bridge 2440 – Background

1979 Rehabilitation



Arch Pier Cap Replacement



Bridge 2440 – Background

- Spandrel Cap Replacement

Bridge 2440 - Background

Additional Past Projects:

- 2003 Expansion Joint Reconstruction, shotcrete piers
- 2014 Foundation Repair Project
  - *Bridge 2440 Third Ave Bridge – Summary Engineering Report, March 5, 2015 (with Appendices)*
    - *Includes Geological Summary & Background Information*
    - *Pier 5 Investigation for Foundation Repairs*
    - *1968 Bridge Inspection Report*
    - *Other historic information*

Project Background Information on ftp site http://www.mndot.gov/bridge/temp/

1 Br 2440 Summary Engineering Report (HDR)

1b-1f Series: 2014 Foundation Repair (Plans Specs Reports)

2.0-2.2b Series: Inspection Reports

3.0-3.3 Series: Structure Inventory Reports

4a-4e Series: Underwater Inspection Reports

5 Bridge Management Plan

Project Background Information on ftp site

- 6a-6c Series: 2003 Expansion Joint Reconst. and Shotcrete
- 7 Bridge Utility Files (1998)
- 8a, 8b: 1979 Rehabilitation Plans, Shop Drawings *(155,127)*
- 9 Br 2440 Original Plans (MnDOT Bridge Office Files) *(298)*
- 10 Foundation Memo (For current project)
- 11 Br. 2440 Orig. Plans City of MPLS Files *(81 sheets)*
- 12 Br. 2440 Information Mtg 8-24-16 with updates 8-31-17
- 13 Historic Features Report 7-26-17

Consultant Contracts for Current Project

Phase 1: (Scoping/Inspections/Reports)

HNTB Corporation (Lead Design Engineer of Record)

Wiss Janney, Elstner, Inc. (WJE): Bridge Inspections

Olson & Nesvold Engineers, P.S.C

Dan Brown Associates

Multi Vista, and Survey Solutions

Hess Roise Historical Consultants – Managed by MnDOT CRU

PEER REVIEW Contract (Scope of Work: Dec 1, 2017)

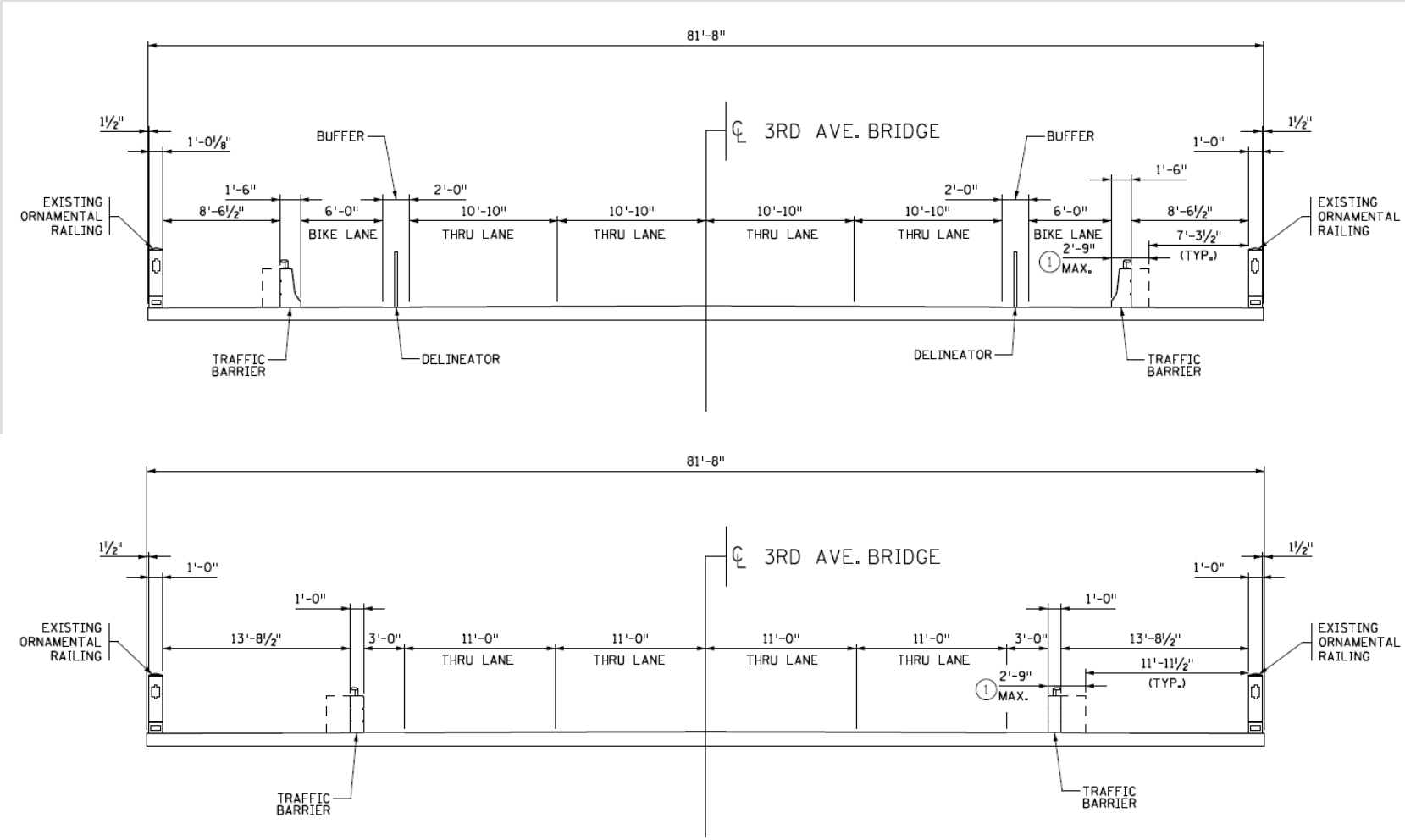
Phase 2 (Begin Preliminary Plans) – June 2018

Phase 3 (Final Design) – August 2018 – August 2019

Phase 1: (Scoping/Inspections/Reports)

- EOR Deliverables
  - Bridge 2440 Historic Features Report *(complete)*
  - Bridge Inspection and Condition Evaluation Report *(complete)*
  - Draft Bridge Rating Report *(work-in-progress)*
  - Bridge Alternatives Feasibility / Rehabilitation Report (in progress)
  - Final Bridge Rating Report *(work in progress)*
  - Bridge Construction, Cost Estimates, Maintenance Projections, and Annualized Repair Cost Report *(work in progress)*
  - LiDAR Report

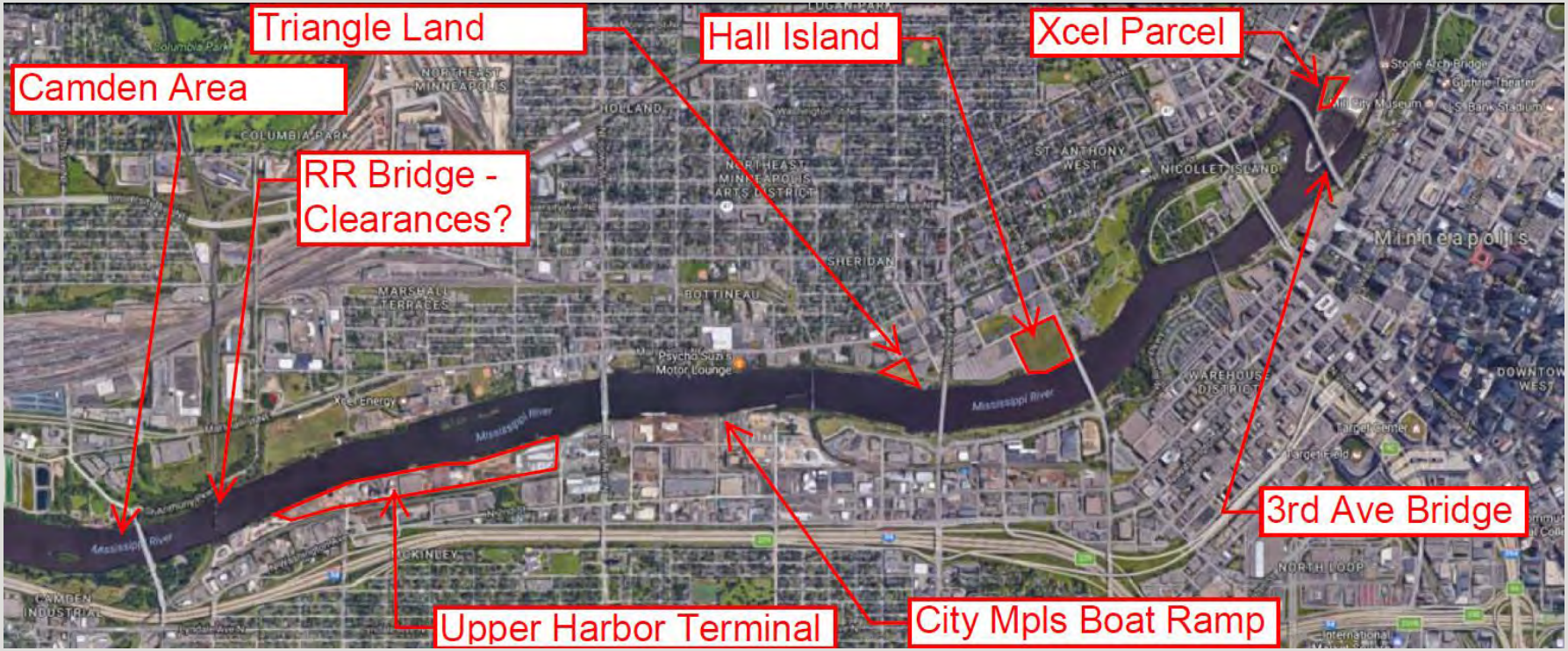
Cross Section Alternatives
Bridge Closure/Staged Construction /ABC Alt.



ADDITIONAL X-SECTION

(1) MAXIMUM LIGHT BLISTER DIMENSION, TO BE FINALIZED IN DESIGN

Access Considerations



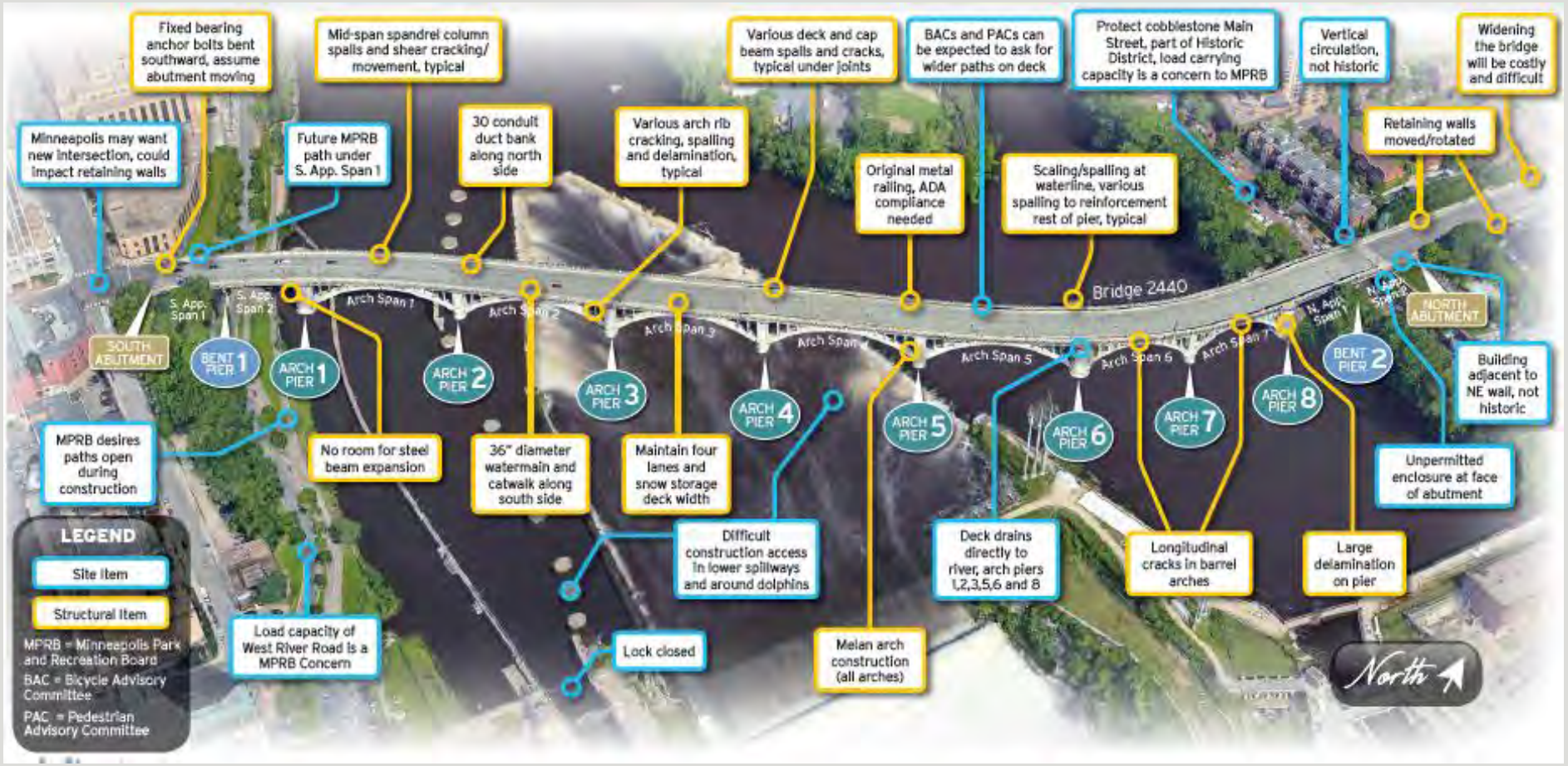
Access Considerations

Stakeholder Considerations

This project has a large and complex group of stakeholders with whom the project will require coordination, including:

- Minnesota State Historic Preservation Office
- Minnesota Department of Natural Resources
- Minneapolis Public Works
- Minneapolis Traffic
- Minneapolis Park Board
- Minneapolis Bicycle and Pedestrian Advisory Boards
- Federal Highway Administration
- US Army Corp of Engineers
- XCEL Energy
- Federal Energy Regulatory Commission
- University of Minnesota
- Private Utilities carried by the structure
- Businesses
- Residents
- Roadway Users

Project Challenges



DEPARTMENT OF TRANSPORTATION

Questions & Discussion

Christian Hoberg, Project Manager

christian.hoberg@state.mn.us

3rd Ave Meeting Summary

1/23/2018 =Date Summary Updated

Meeting Type / Name	Date	Ames Comments to Column B	Ames proposed dates to the every other week CMGC Meeting	Start Time	End Time	Potential Topics	Location	Done?		
Coordination Meeting 21	~~Tuesday, January 23, 2018~~	NA	NA	1:30	2:30	TBD - To be re-schedlued to accommodate PDT 10 above				
Coordination Meeting 22	Tuesday, February 06, 2018	Ames available before 9am only		1:30	2:30	TBD				
Coordination Meeting 23	Tuesday, February 20, 2018	Not available 2/20, Propose 2/22		1:30	2:30	TBD				
PDT Monthly Meeting 11	Wednesday, February 14, 2018	Only available in the AM		1:00	3:30	TBD	**Oakdale Conf Rm 5**			
CMGC Team Meeting 1			Tuesday, February 27, 2018							
PDT Monthly Meeting 12	Wednesday, March 14, 2018	Works		1:00	3:30	TBD	**Oakdale Conf Rm 5**			
CMGC Team Meeting 2			Tuesday, March 27, 2018							
PDT Monthly Meeting 13	Wednesday, April 18, 2018	Works		1:00	3:30	TBD	**Oakdale Conf Rm 5**			
CMGC Team Meeting 3			Tuesday, May 01, 2018							
PDT Monthly Meeting 14	Tuesday, May 15, 2018	Works		1:00	3:30	TBD	**Oakdale Conf Rm 5**			
CMGC Team Meeting 4			Wednesday, May 30, 2018							
PDT Monthly Meeting 15	Wednesday, June 13, 2018	Works		1:00	3:30	TBD	**Oakdale Conf Rm 5**			
CMGC Team Meeting 5			Tuesday, June 26, 2018							
PDT Monthly Meeting 16	Thursday, July 12, 2018	Works		1:00	3:30	TBD	**Oakdale Conf Rm 5**			
CMGC Team Meeting 6			Tuesday, July 31, 2018							
PDT Monthly Meeting 17	Wednesday, August 15, 2018	Works		1:00	3:30	TBD	**Oakdale Conf Rm 5**			
	Wednesday, September 19, 2018	Works		1:00	3:30	HOLD CONF RM 5 - 30% PLANS	**Oakdale Conf Rm 5**			
	Wednesday, October 17, 2018	Works		1:00	3:30	HOLD CONF RM 5	**Oakdale Conf Rm 5**			
	Wednesday, November 14, 2018	Works		1:00	3:30	HOLD CONF RM 5	**Oakdale Conf Rm 5**			
	Wednesday, December 12, 2018	Works		1:00	3:30	HOLD CONF RM 5	**Oakdale Conf Rm 5**			
	Wednesday, January 16, 2019	Works		1:00	3:30	HOLD CONF RM 5 - 60% Plans	**Oakdale Conf Rm 5**			
	Wednesday, February 13, 2019	Works		1:00	3:30	HOLD CONF RM 5	**Oakdale Conf Rm 5**			
	Wednesday, March 13, 2019	Works		1:00	3:30	HOLD CONF RM 5	**Oakdale Conf Rm 5**			
	Wednesday, April 17, 2019	Works		1:00	3:30	HOLD CONF RM 5	**Oakdale Conf Rm 5**			
	Wednesday, May 15, 2019	Works		9:00	4:00	HOLD CONF RM 5 90% Plans	**Oakdale Conf Rm 5**			
	Wednesday, June 19, 2019	Works		9:00	4:00	HOLD CONF RM 5 90% Plans	**Oakdale Conf Rm 5**			

Bridge 2440

Historic Features

DEPARTMENT OF TRANSPORTATION

Hess Roise
Historical Consultants

OLSON & NESVOLD ENGINEERS, P.S.C.

HNTB

July 2017

Purpose of the Historic Features Report

- Providing an overview of the bridge's construction and evolution
- Outlining the historic characteristics of the bridge
- Guiding the Design Team as rehabilitation alternatives are evaluated and a preferred alternative is selected

The goal: Complying with the Secretary of the Interior's Standards for Rehabilitation to avoid adverse effects to:

- The historic bridge
- The Saint Anthony Falls Historic District
- Any other historic properties in the Area of Potential Effects

Topics

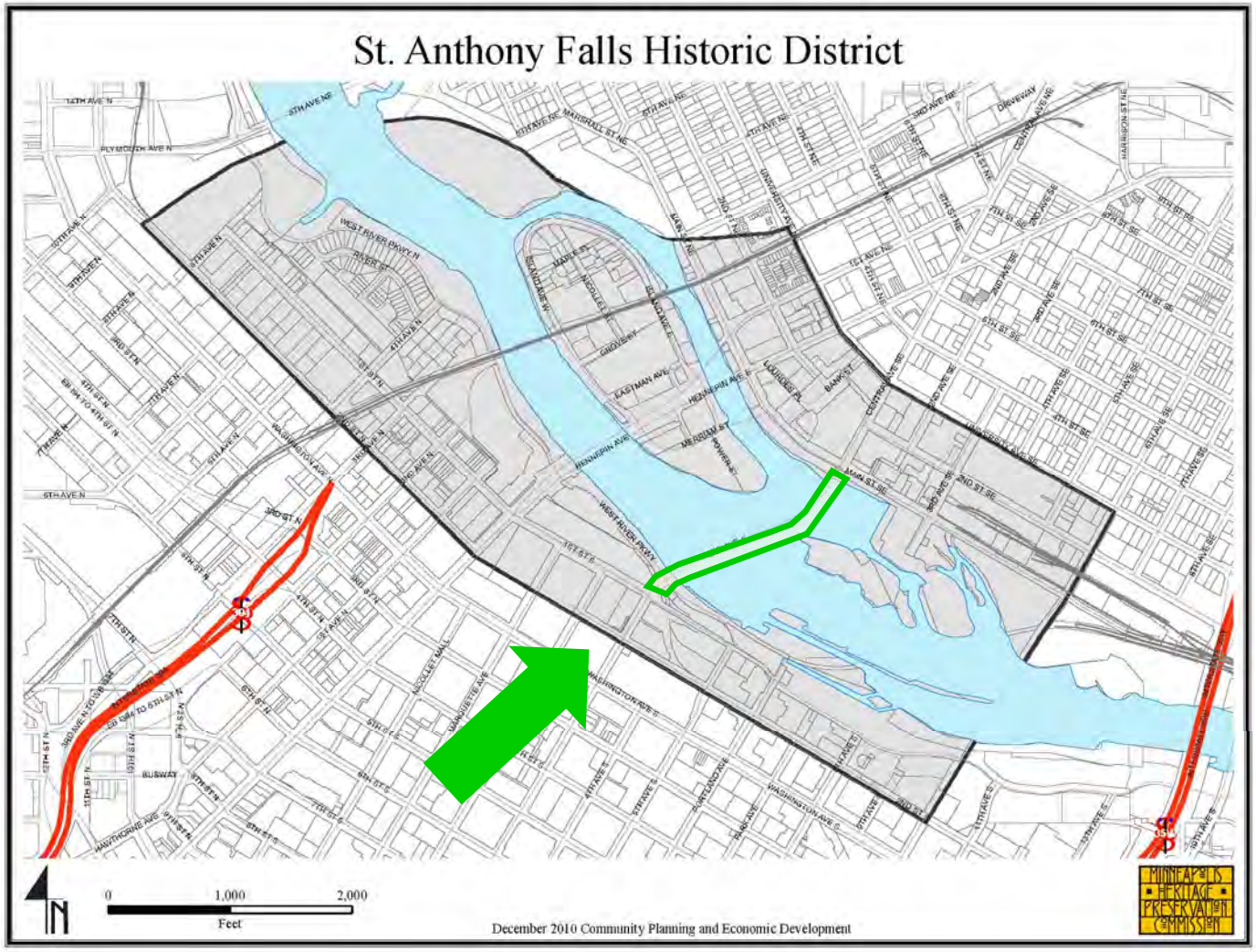
- Historical Significance of the Bridge
- Period of Significance (1918-1941)
- Bridge Location
- Bridge History
  - Original Construction (1914-1918)
  - Major Rehabilitation 1 (1938-1939)
  - Major Rehabilitation 2 (1978-1980)
- Character-defining-features
- Next Steps

Historical Significance of the Bridge

- Criterion C: Engineering
- Criterion A: Transportation
- Contributes to the Saint Anthony Falls Historic District (NRHP and locally listed)

Period of Significance

- Begins in 1918 (when bridge was placed in service)
- Ends in 1941 (same as Saint Anthony Falls Historic District)


St. Anthony Falls Historic District
0
1,000
2,000
Feet
December 2010 Community Planning and Economic Development
MINNEAPOLIS HERITAGE PRESERVATION COMMISSION


Third Avenue South
Third Avenue Bridge
Central Avenue SE
Google Maps (2017)
Waterfront
Nicollet Island
Mill Ruins Park
Museum
W River Pkwy
Central Ave SE
Google
Stone Arch Bridge
Imagery ©2017 Google, Map data ©2017 Google

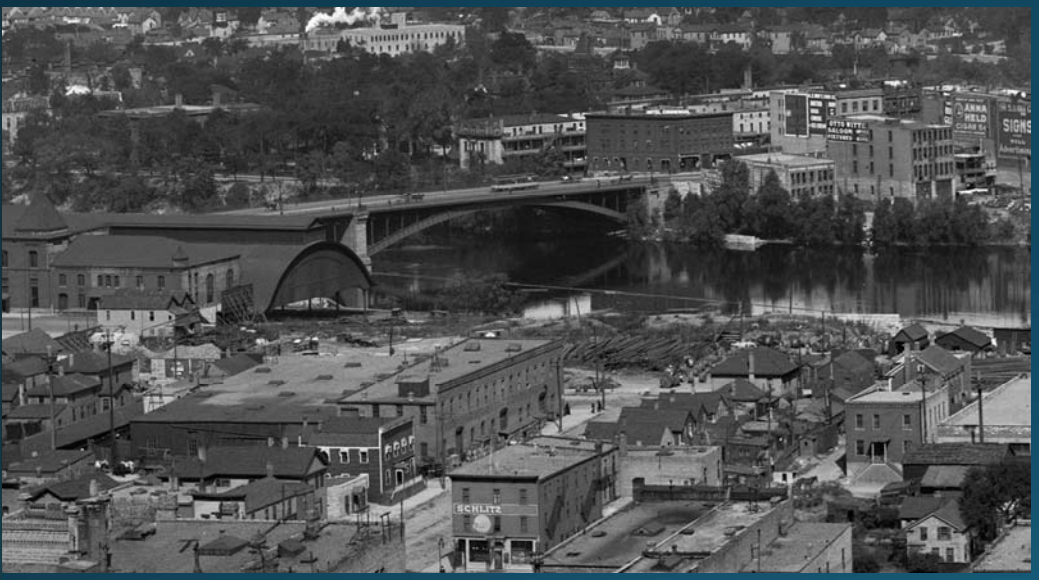
Minneapolis – Circa 1900

Minnesota Historical Society Photo (1899)

Minneapolis – Circa 1900

City of Minneapolis (c. 1900)

Minneapolis – Circa 1900



City of Minneapolis (c. 1900)

City of Minneapolis (c. 1900)

City of Minneapolis (c. 1900)

Featured in *Engineering News*, 1915

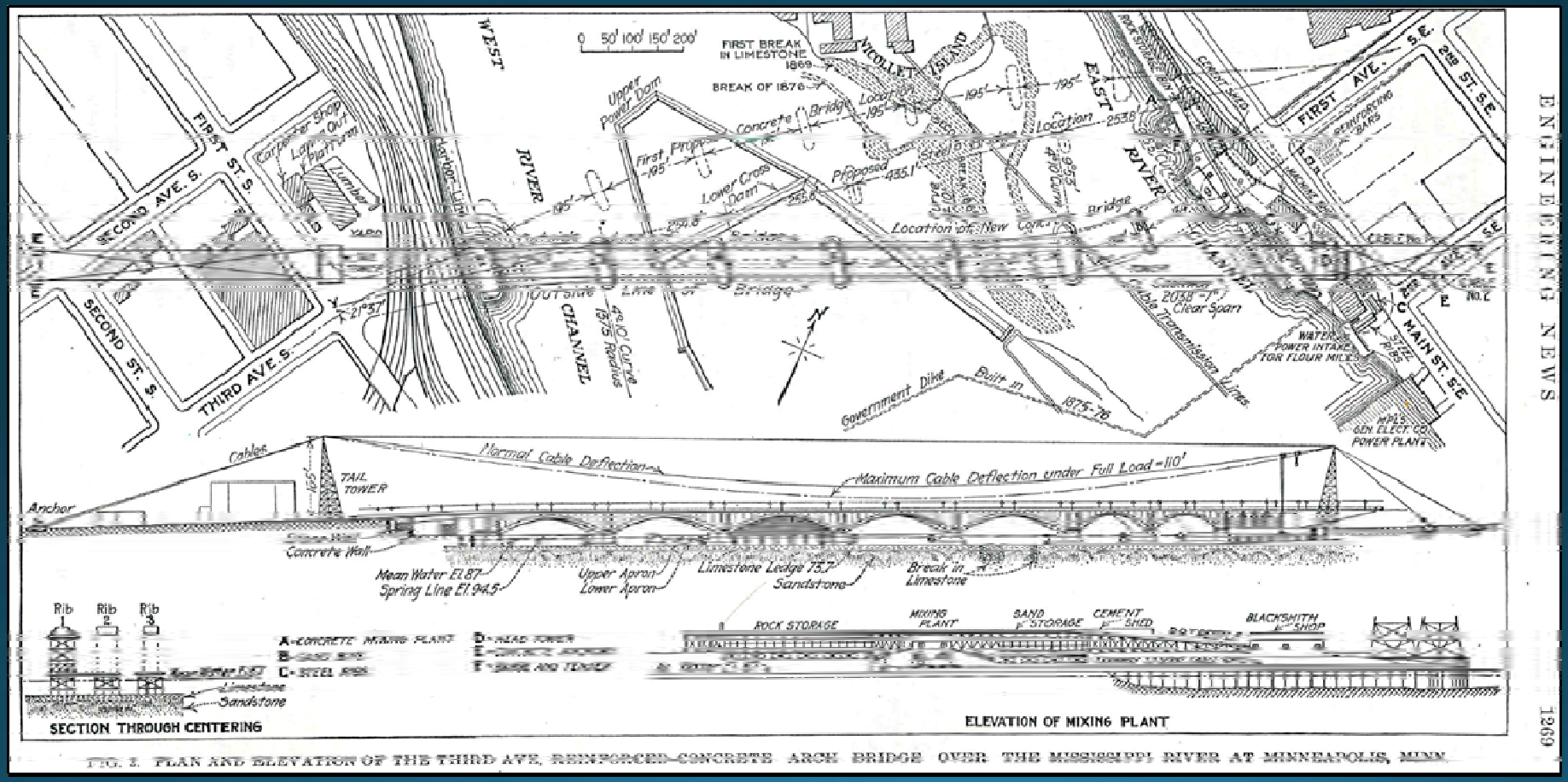
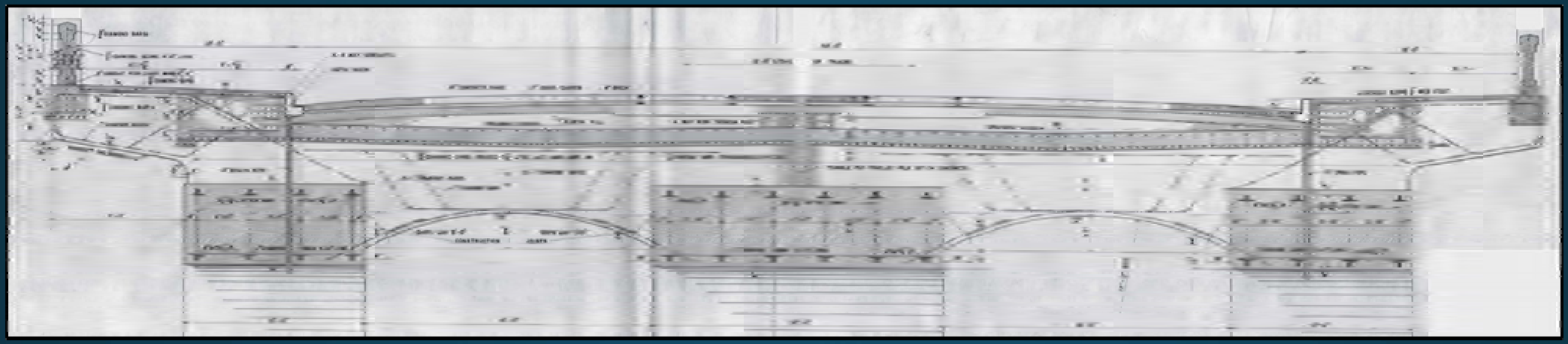
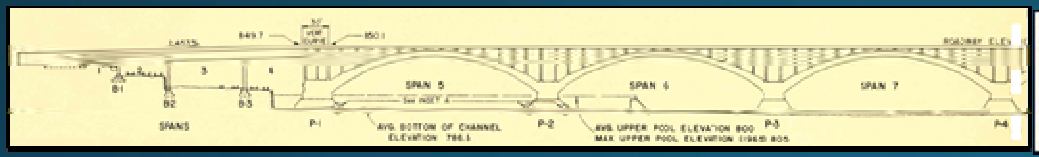


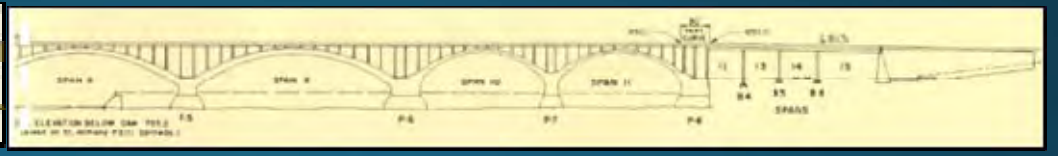
FIG. 1. PLAN AND ELEVATION OF THE THIRD AVE. REINFORCED-CONCRETE ARCH BRIDGE OVER THE MISSISSIPPI RIVER AT MINNEAPOLIS, MINN.

ENGINEERING NEWS 1269

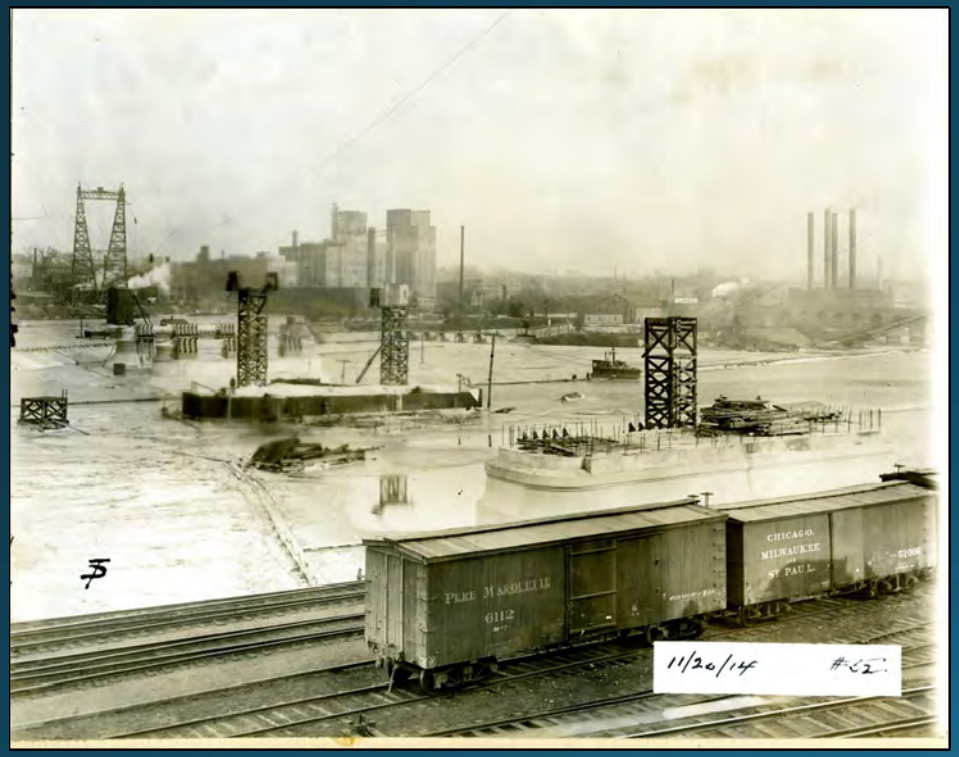
Original Construction (1914-1918)







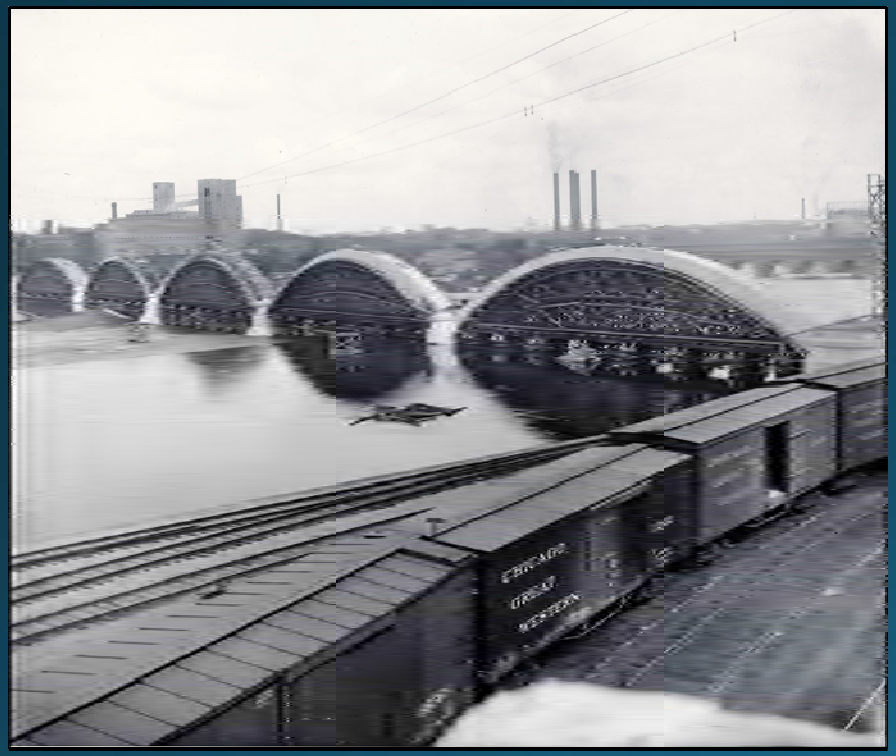
Original Construction (1914-1918)



City of Minneapolis (1914)

City of Minneapolis (c. 1915)

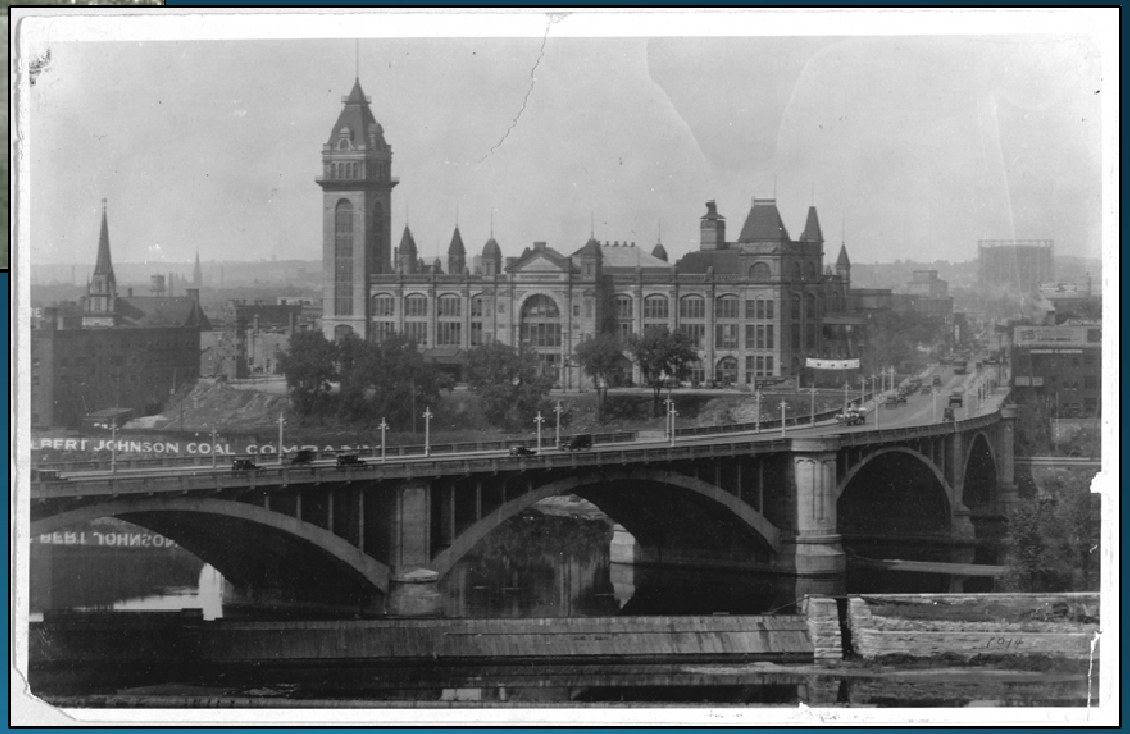
Original Construction (1914-1918)



City of Minneapolis (1915)

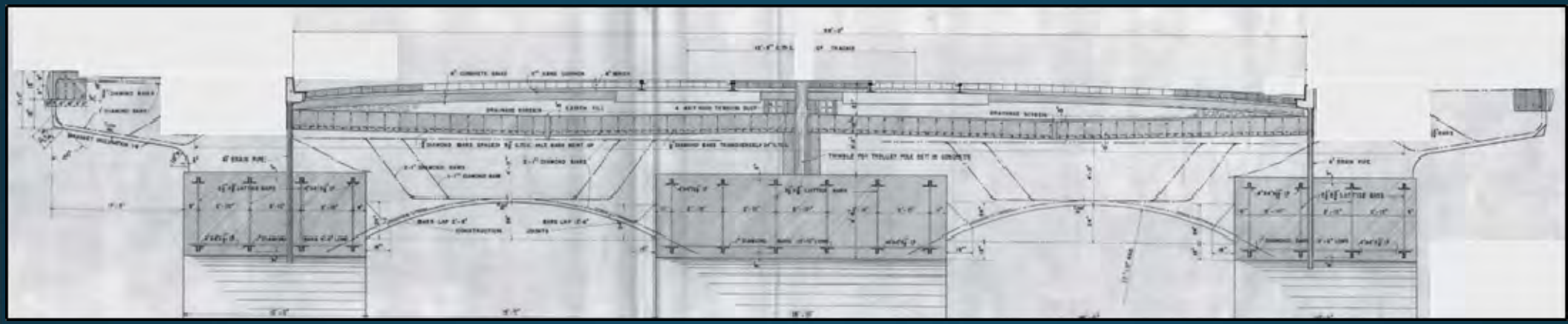
City of Minneapolis (c. 1916)

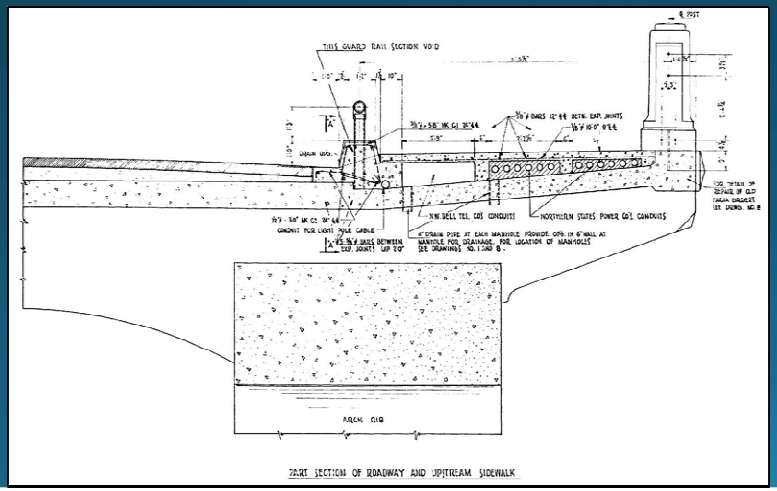
Minnesota Historical Society (c. 1918)



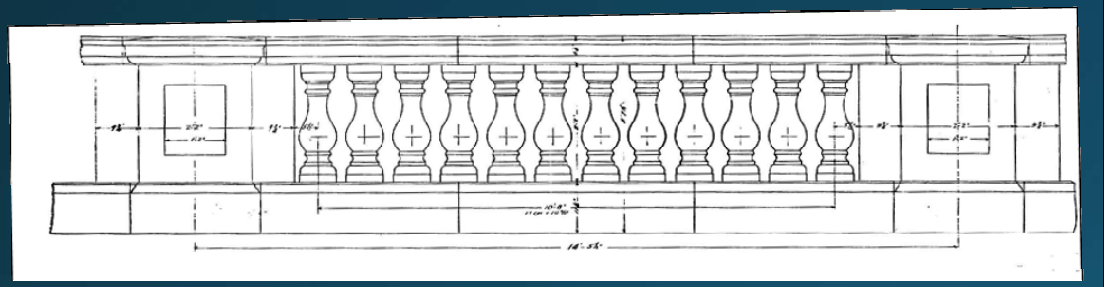
Special Collections – Hennepin County Library (1920s)

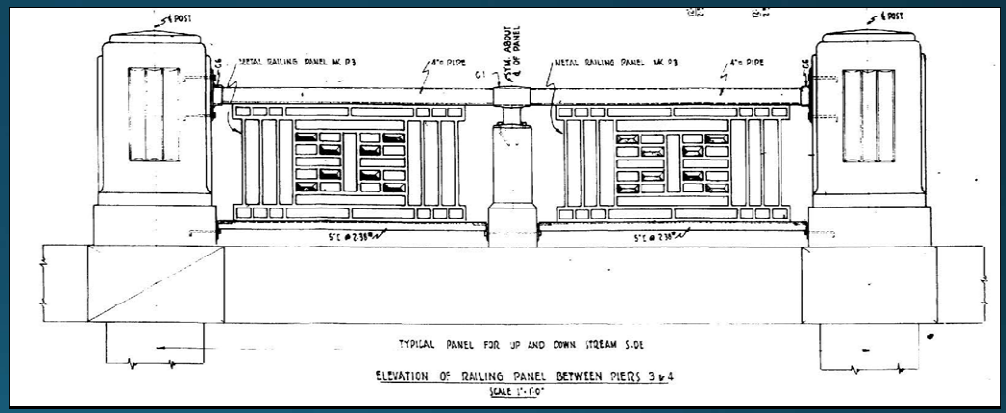
Major Rehabilitation 1 (1938-1939)





Major Rehabilitation 1 (1938-1939)





Major Rehabilitation 1 (1938-1939)

City of Minneapolis (1939)

Minnesota Historical Society (1948)

Minnesota Historical Society (1951)

1968 Evaluation Report

II-21. Bared column reinforcement of Bent 3.

II-29. Deterioration to the south wall of Pier 4.

1968 Evaluation Report

II-14. Areas of spall at the bridge railing posts, sidewalk deck, and spandrel cantilevers.

II-19. Crushed concrete at a beam haunch above Bent 5.

STATE OF MINNESOTA
DEPARTMENT OF HIGHWAYS
DISTRICT NO. 5
2055 NO. LILAC DRIVE
MINNEAPOLIS, MINN. 55422

July 10, 1975

Mr. Clayton Sorenson
Director of Public Works
City of Minneapolis
203 City Hall
Minneapolis, Minnesota 55415

RE: Posting 3rd Avenue Bridge
(Bridge No. 2440)

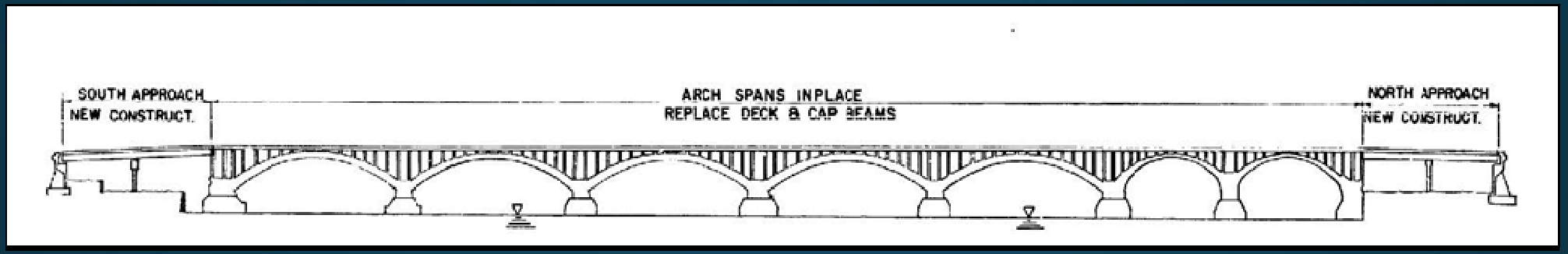
Dear Mr. Sorenson:

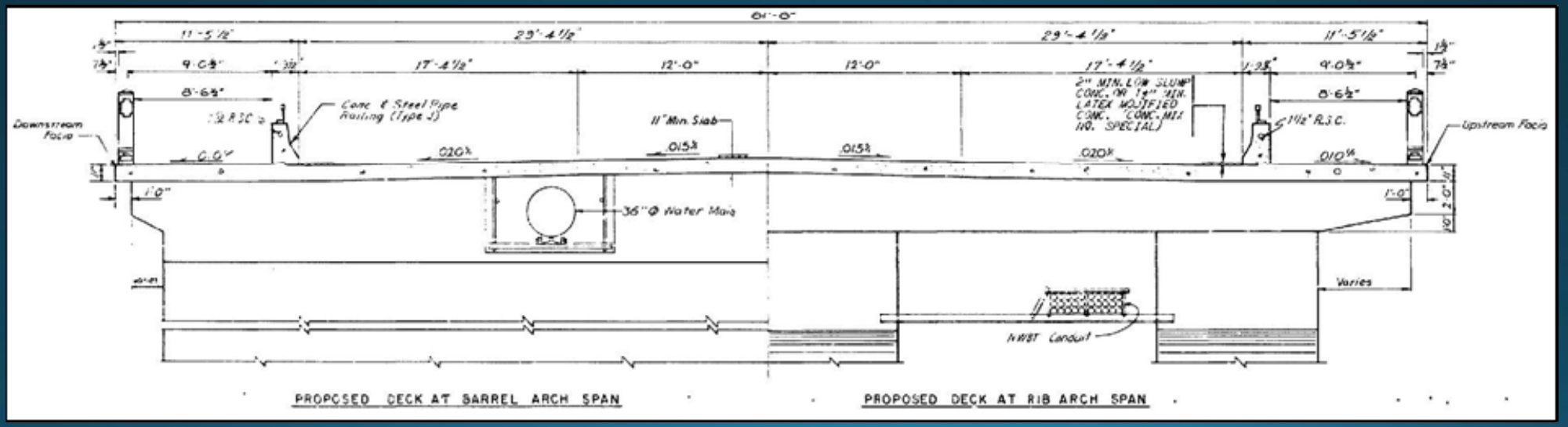
We have been informed by W. C. Merritt, Deputy Commissioner and Chief Engineer, that the 3rd Avenue Bridge over the Mississippi River is no longer safe to carry legal loads and that a posting for 18-ton trucks and 30-ton combination vehicles is required. Since this bridge is maintained by your City under agreement, we would appreciate your placing the appropriate signing.

Major Rehabilitation 2 (1978-1980)

Riverfront News (1980)

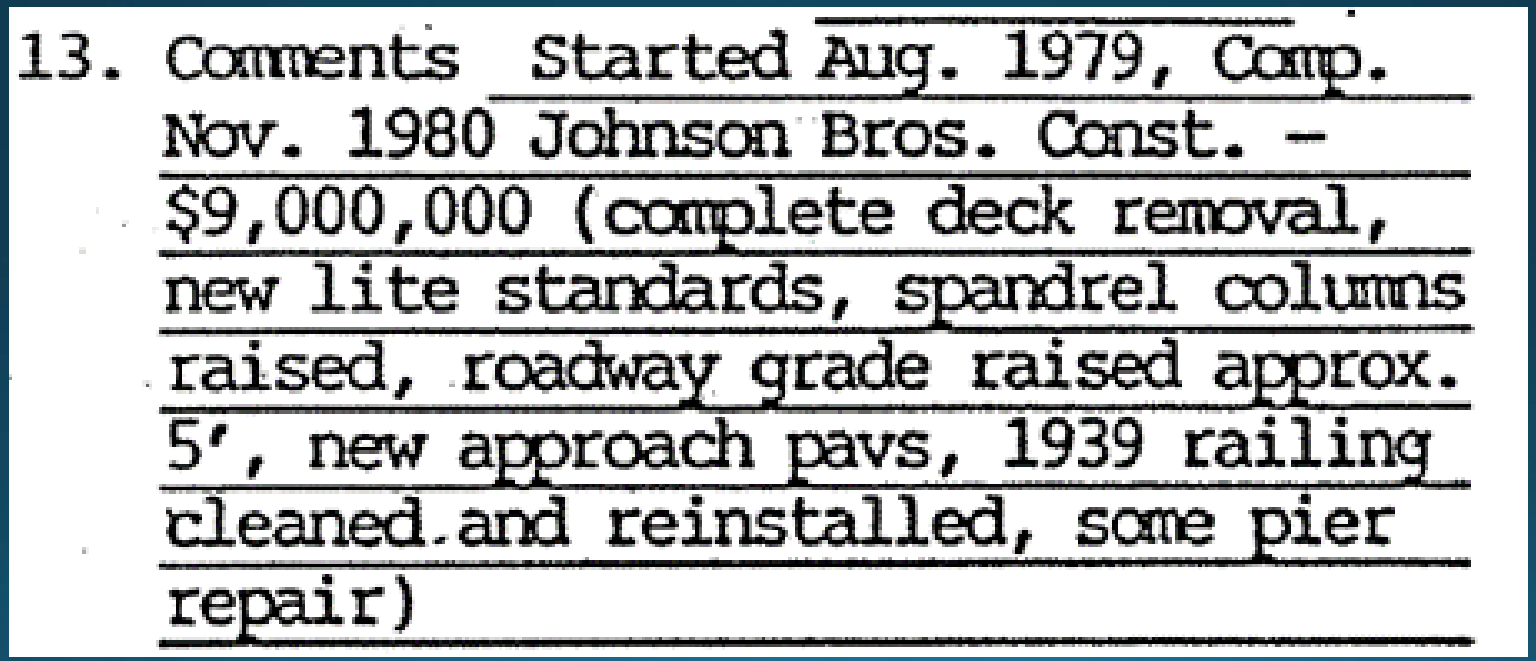
Major Rehabilitation 2 (1978-1980)





Major Rehabiltiation 2 (1978-1980)

- 1988 Bridge Inspection Notes



13. Comments Started Aug. 1979, Comp. Nov. 1980 Johnson Bros. Const. - $9,000,000 (complete deck removal, new lite standards, spandrel columns raised, roadway grade raised approx. 5', new approach pavs, 1939 railing cleaned and reinstalled, some pier repair)


MnDOT (2005)


MnDOT (2005)

Character-Defining Features

Large-Scale Features

- The **overall configuration and material** of the seven main spans and related piers and columns (reinforced concrete, three arch ribs, barrel arches).
- **S-curve** alignment of the bridge.
- The **incised linear detailing** on the pier and the **projecting bands** at the bases of the piers.
- The **observation platforms and cantilevered sidewalks**, which extend outward and highlight the edge of the deck.

Character-Defining Features

Detailed Features

- **Railings**: The aluminum panels are historic, and the newer concrete posts are complimentary. The railings contribute to the historic integrity of the bridge.

- **Sidewalks**: The sidewalks have always flanked the roadway and maintaining the symmetry of sidewalks on both sides of the bridge is important to the historic integrity. The relationship between the sidewalks and the historic railing panels should be maintained.

- **Light fixtures**: The modern light fixtures do not complement the bridge's historic character. The original light fixtures, as modified in 1938-1939, represent the period of significance.

Next Steps

- Conduct Fieldwork
- Test Materials
- Complete Structural Analysis (Load Rating)
- Define Purpose and Need
- Assemble Rehabilitation Alternatives
- Select Rehabilitation Alternative
- Prepare Plans and Specifications

	Wednesday, July 24, 2019	Works		9:00	4:00	HOLD CONF RM 5 90% Plans	**Oakdale Conf Rm 5**			
	Wednesday, August 14, 2019	Works		9:00	4:00	HOLD CONF RM 5 90% Plans	**Oakdale Conf Rm 5**			
	Wednesday, October 02, 2019	Works				Start Construction				
						CONSTRUCTION ACTIVITIES				
						CONSTRUCTION ACTIVITIES				
						CONSTRUCTION ACTIVITIES				
						CONSTRUCTION ACTIVITIES				
	Wednesday, April 17, 2019					Substantial Completion				

HNTB

WJE

3rd Avenue Bridge

DEPARTMENT OF TRANSPORTATION

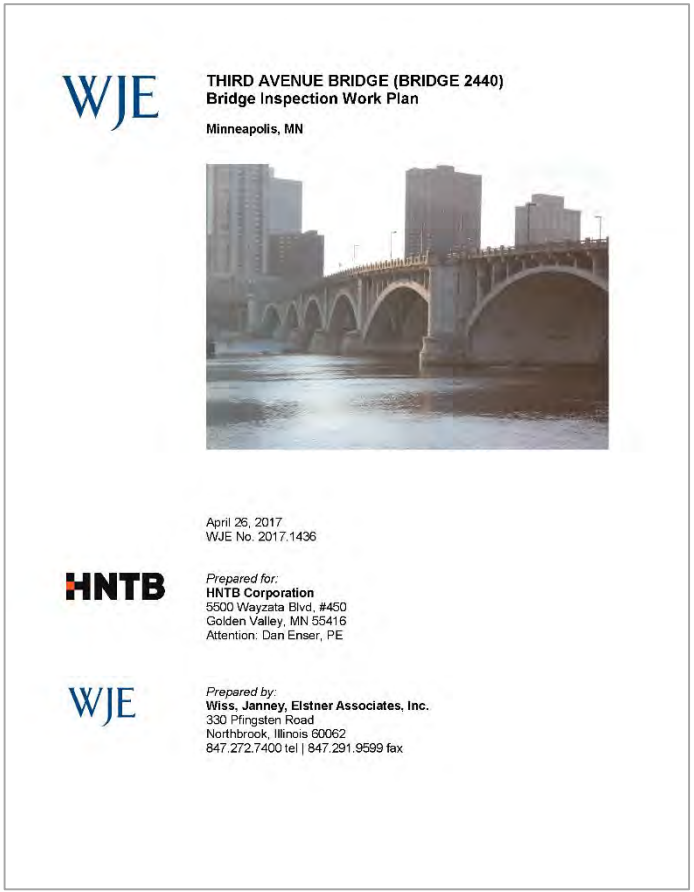
SUMMARY OF WJE'S BRIDGE INSPECTION REPORT

PDT #10, January 23, 2018

www.wje.com

WJE ENGINEERS ARCHITECTS MATERIALS SCIENTISTS

Wiss, Janney, Elstner Associates, Inc.



WJE

THIRD AVENUE BRIDGE (BRIDGE 2440)
Bridge Inspection Work Plan

Minneapolis, MN

April 26, 2017
WJE No. 2017.1436

HNTB

Prepared for:
HNTB Corporation
5500 Wayzata Blvd, #450
Golden Valley, MN 55416
Attention: Dan Enser, PE

WJE

Prepared by:
Wiss, Janney, Elstner Associates, Inc.
330 Pfingsten Road
Northbrook, Illinois 60062
847.272.7400 tel | 847.291.9599 fax

FIELD INSPECTION AND TESTING

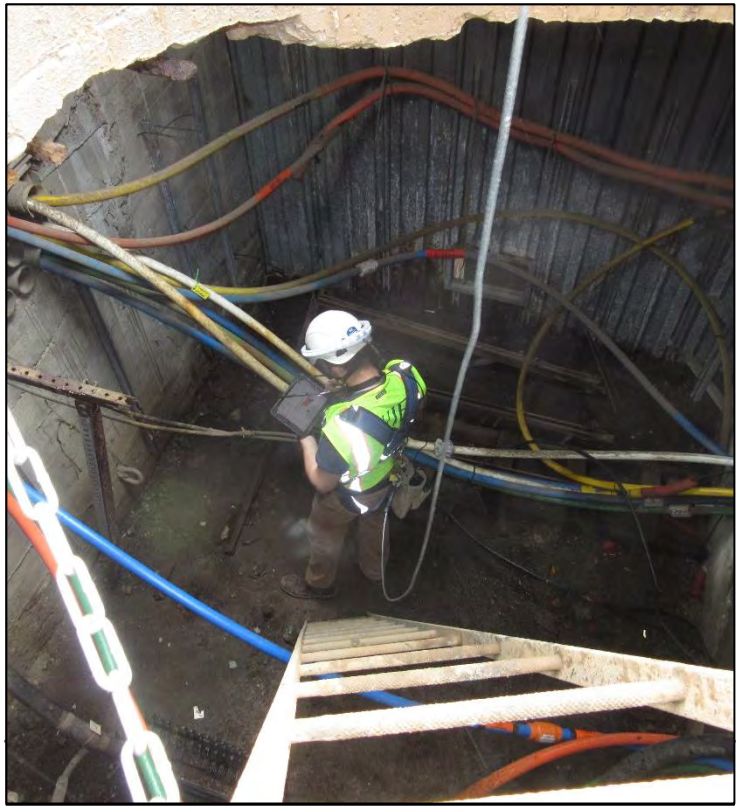
- In-Depth Element Level Bridge Inspection
  - May 1-19, 2017 (three 2-engineer teams for three weeks, plus various additional days)
- Follow-Up Testing and Material Sampling
  - Week of May 22-29
  - Weekends of July 8, July 15-16 and August 5-6

In-Depth Element Level Bridge Inspection

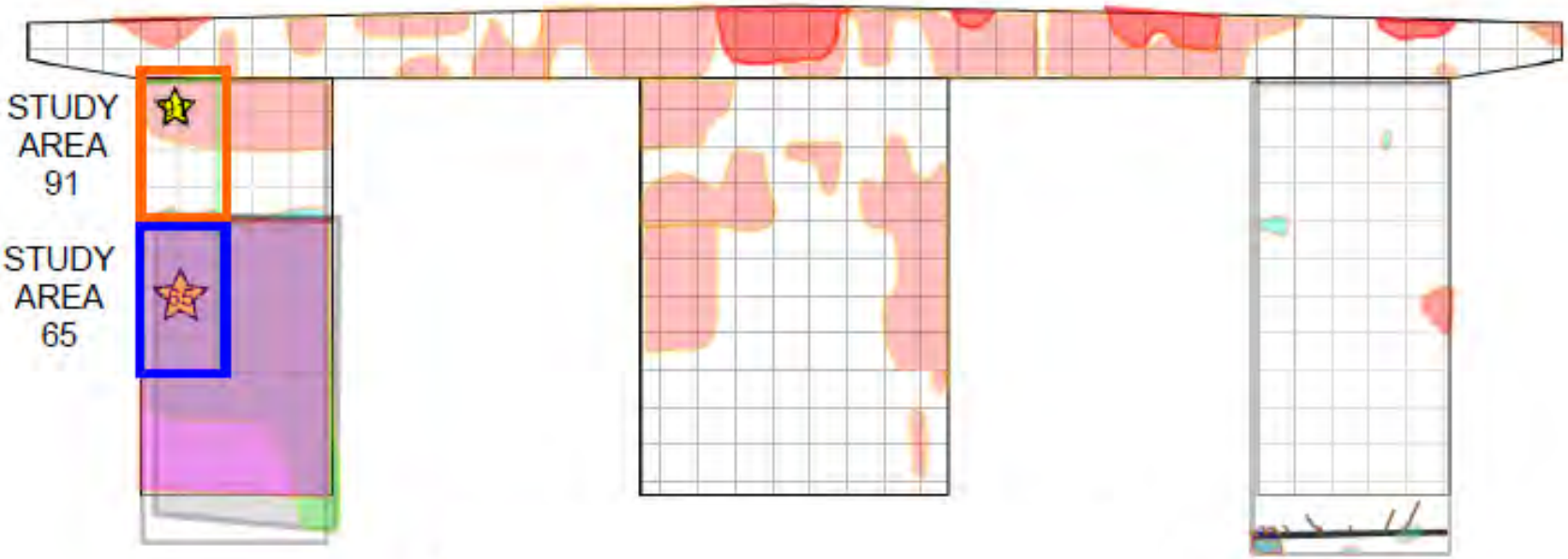
- Close-up visual inspection and mechanical sounding of all exposed bridge surfaces
- Mapped all distress conditions on scaled drawings
- Documented condition state information according to MnDOT Bridge Inspection Field Manual

In-Depth Element Level Bridge Inspection

- Three 2-engineer teams working for 3+ weeks
- Notes taken digitally on Plannotate
  - WJE's iOS-based inspection software application
- Plannotate customized to MnDOT's element level inspection parameters
  - CS1, CS2, CS3, CS4
  - Delam/spall, crack, patch, freeze-thaw, efflorescence, etc.



ARCH SPAN 3 - SPANDREL COLUMN N - NORTH FACE
Expansion Joint Since 1918



	Coating	Crack	Delamination, spall, or exposed rebar	Efflorescence	Freeze-thaw distress	Moisture/rust staining	Patch	Scale, wear, or abrasion
CS1								
CS2								
CS3								
CS4								

Follow-up Testing and Material Sampling

- Three 2-engineer teams for 3+ weeks
- Goals
  - Identify mechanisms of deterioration
  - Determine mechanical properties
  - Develop basis for projecting future life
- Deterioration Mechanisms
  - Chloride-induced corrosion
  - Carbonation-induced corrosion
  - Freezing/thawing distress
  - Mechanical action

Follow-up Testing and Material Sampling

Field Testing

Item	Method / Description	Purpose
Reinforcement Cover Survey	Ground-penetrating radar (GPR)	Confirm as-built construction (cover and spacing) for structural analysis; support service life modeling
Corrosion Survey: Half-cell Survey	Point measurements and rolling wheel per ASTM C876	Identify "hot spots" of corrosion activity and areas where future concrete distress is anticipated.
Corrosion Survey: Corrosion Rate	ASTM G59 and/or CEPRA technique	Assess instantaneous rate of corrosion to support projections of future distress
Corrosion Survey: Resistivity	4-pin Wenner probe	Quan corro
In situ Steel Corrosion Assessment	Visual assessment & ultrasonic thickness gage at exposed steel	Deter relate
Melan Truss Sampling & Stress Measurement	Strain-relief measurement and removal of min. 2-in. dia. Samples	Meas labor
Reinforcing Bar Sampling	Removal of 3-ft. long samples	Provi
Concrete Sampling	Water-cooled core drill	Provi

Lab Testing

Item	Method / Description	Purpose
Carbonation Depth	Phenolphthalein pH indicator on all cores	Assess potential for carbonation-related corrosion of reinforcement and support service life modeling
Compressive Strength	ASTM C42	Determine concrete strength to support structural analysis; particularly important for arches and deck
Chloride Profile	Per ASTM C1152 on slices cut from cores [1]	Assess potential for chloride-related corrosion of reinforcement and support service life modeling
Petrographic Examination	ASTM C856	Assess concrete quality and identify nature and extent of distress mechanisms, including depth of freeze-thaw
Steel testing	Tensile and chemistry testing	Asses mechanical properties and chemistry of steel reinforcing bar and Melan Truss to support structural modeling
Reinforcing Section Loss Quantification	Measurement of corrosion-related section loss using extraction method	Provide basis for estimation of corrosion rate to be used for service life modeling

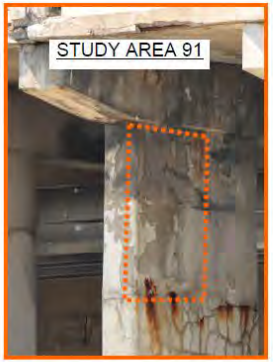
Follow-up Testing and Material Sampling

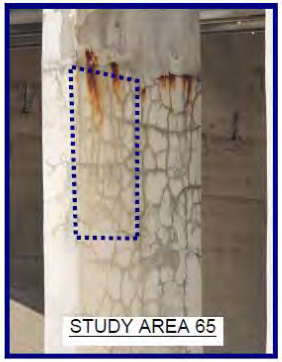
Preliminary Bridge Inspection Testing Plan - Anticipated Number of Study Areas and Test Quantities

	Element	Year built	Delamination Survey[1]	Reinforcement Cover Survey[2]	Corrosion Survey[2, 3]	In Situ Steel Corrosion Assessment	Steel Sampling	Concrete Sampling	Carbonation Depth	Compressive Strength	Chloride Profile	Petrographic Analysis	Section Loss Quantification	Service Life by Numerical Modeling
Main spans	Arch Piers	1917	19	8	8		3 bars	17	17	7	8	2	10	Y
	Arch Ribs - Spans 1-5	1917	20	10	10	5	3 truss	9	9	3	5	1	5	-
	Arch Ribs - Spans 6-7	1917	8	4	4	2	1 truss	4	4	1	2	1	2	-
	Cap Beams	1980	30	15	15	-		6	6	0	5	1	-	-
	Spandrel Cols./Walls	1917	42	21	21	-	3 bars	11	11	3	7	1	7	-
North approach	Abutment	1980	4	2	2	-	-	1	1	0	1	0	-	-
	Bent Pier	1980	3	2	2	-	-	2	2	0	1	1	-	-
	PS Conc Girders	1980	2	1	1	-	-	2	2	0	1	1	-	-
	Retaining Wall	1917	4	2	2	-	-	3	3	1	1	1	1	-
South approach	Abutment	1980	4	2	2	-	-	1	1	0	1	0	-	-
	Bent Pier	1980	3	2	2	-	-	2	2	0	1	1	-	-
	Steel Girders	1980	0	0	0	2	-	0	0	0	0	0	-	-
	Retaining Wall	1917	4	2	2	-	-	3	3	1	1	1	1	Y
All	Deck Topside	1980	100%* of area	25% of area	25% of area	-	-	16	16	7	8	1	-	Y
	Deck Underside	1980	9	4	4	-	-	3	3	0	3	0	-	-
	Concrete Rail	1980	4	2	2	-	-	2	2	0	2	0	-	-
	Steel Rail	1939/1980	0	0	0	2	-	0	0	0	0	0	-	-
Totals			156	77	77	11	10	82	82	23	47	12	26	7

By the Numbers:

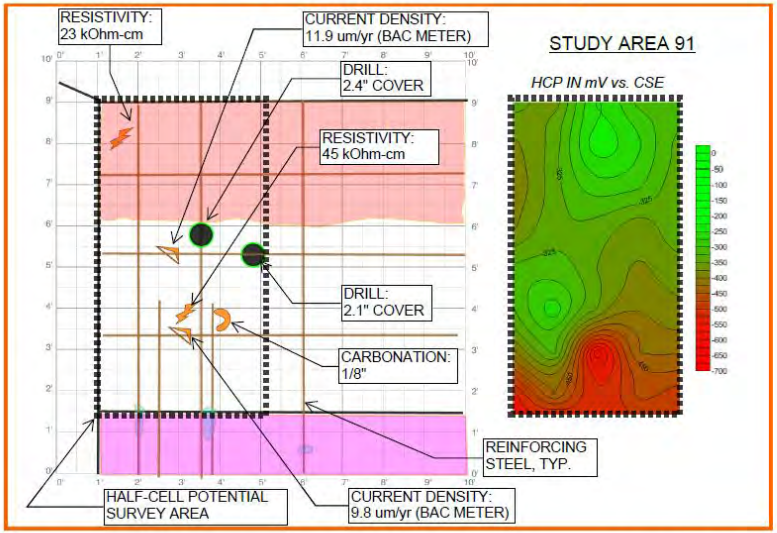
- Total test locations: 137
- NDE areas: 73
- Concrete samples: 81
- Steel samples: 10

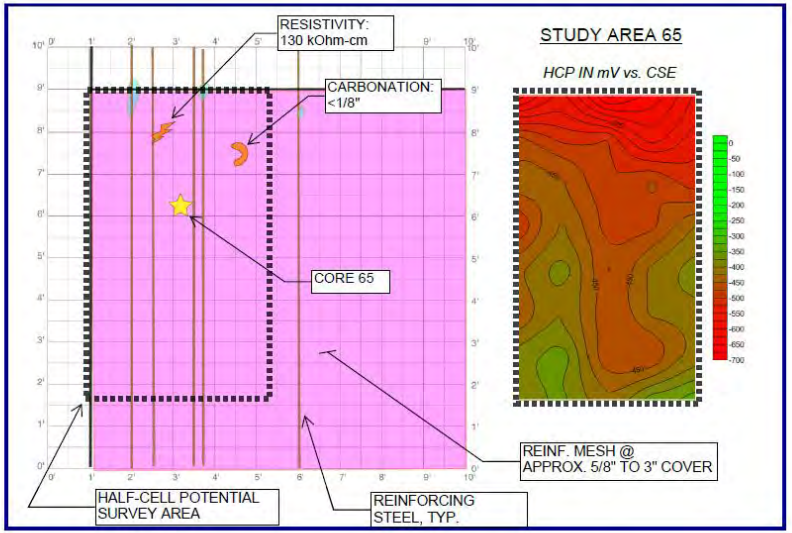




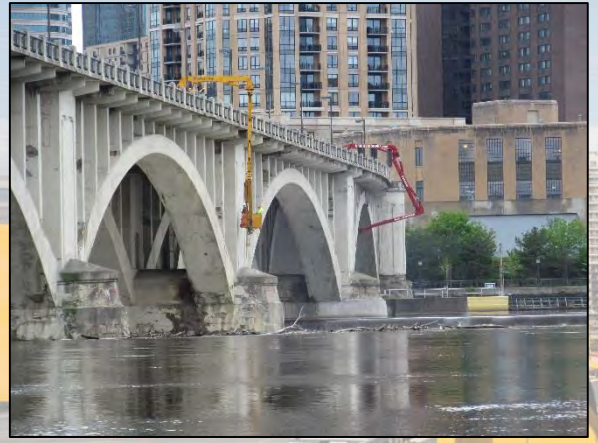
ARCH SPAN 3 - SPANDREL COLUMN N - NORTH FACE
Expansion Joint Since 1918

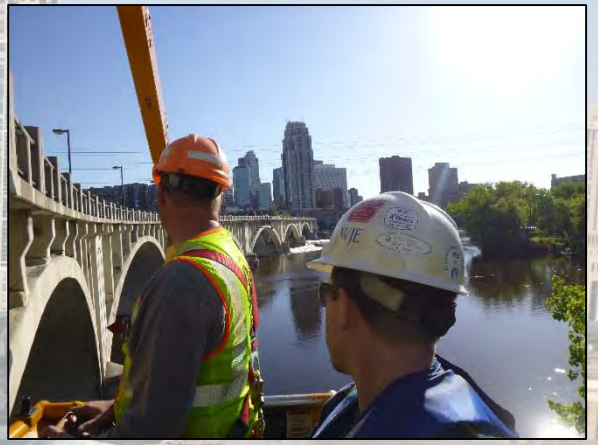
(SEE CONDITION LEGEND IN APPENDIX X)



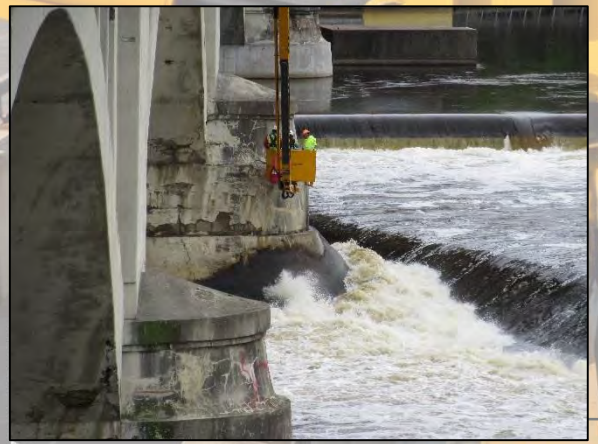


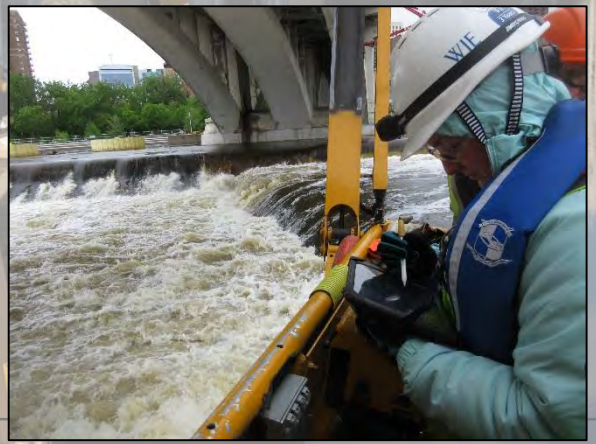
Study Area	Inspection Date	Type	Physical Condition	Core Sample(s)	HCP - Avg. (mV vs. CSE)	HCP - Min. (mV vs. CSE)	Resistivity - Avg. (kOhm-cm)	Current Density - Avg. (um/yr)	Cover Vertical Bars - Avg. (in.)	Cover Horizontal Bars - Avg. (in.)	Representative Minimum Cover (in.)	Carbonation (in.)	Mechanisms of Distress	Notes/Interpretation
91	7/15/2017	NDE Only	Poor	N/A	-368	-595	34	10.85	3.7	2.6	2.1	1/8	Chloride Exposure	--
65	7/15/2017	NDE and Core	Poor	65	-466	-683	130	N/A	N/A	N/A	0.6 (Mesh)	<1/8	Other - Moisture Ingress and Cracking	Mesh Reinforcement Present in Patched Area

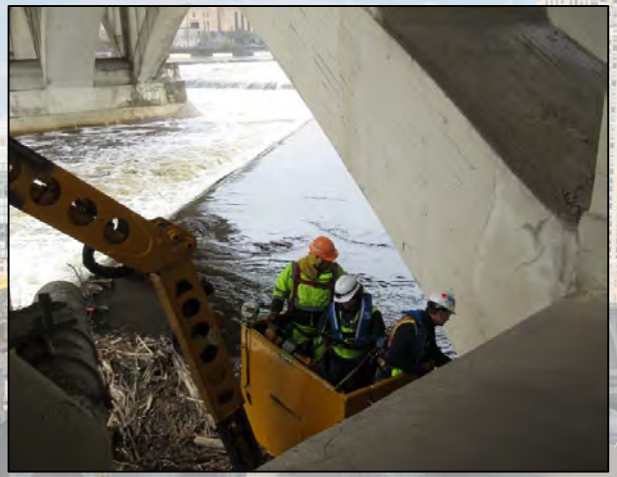


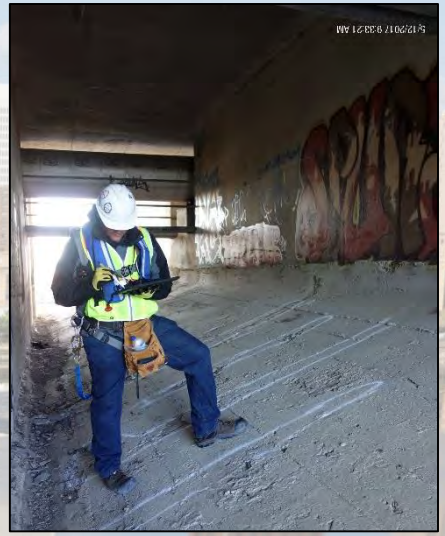


In Action…



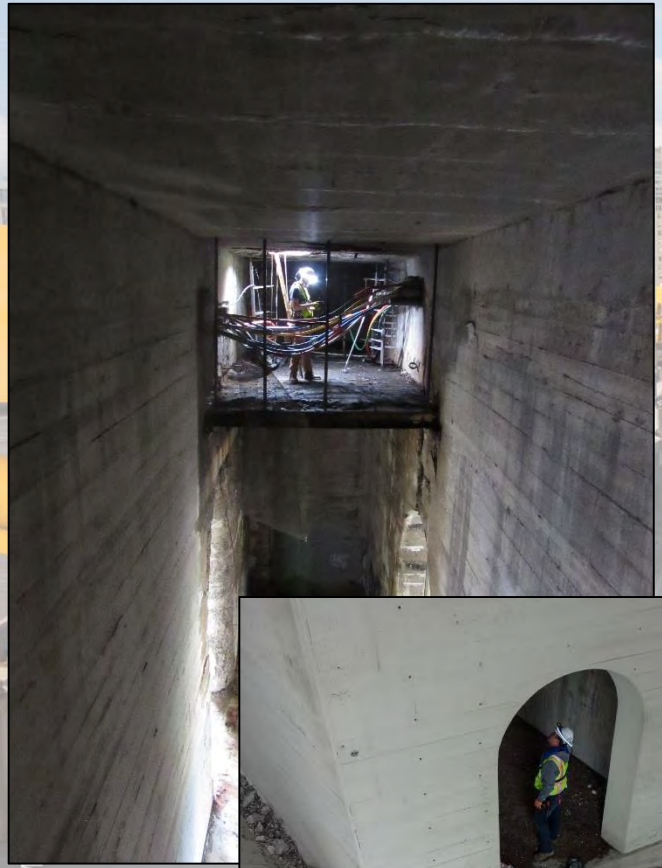


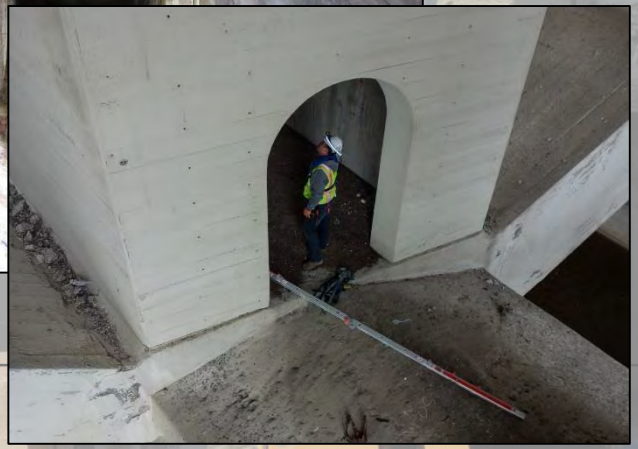


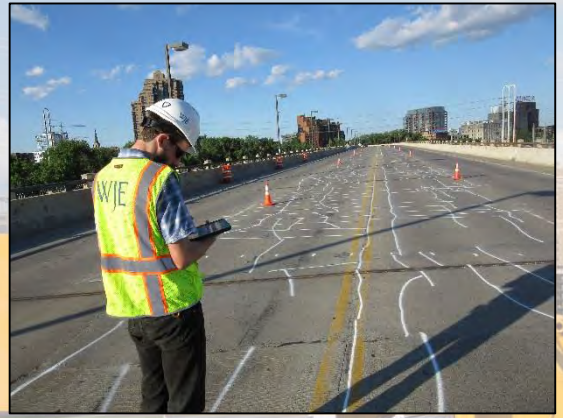


In Action…

In Action…



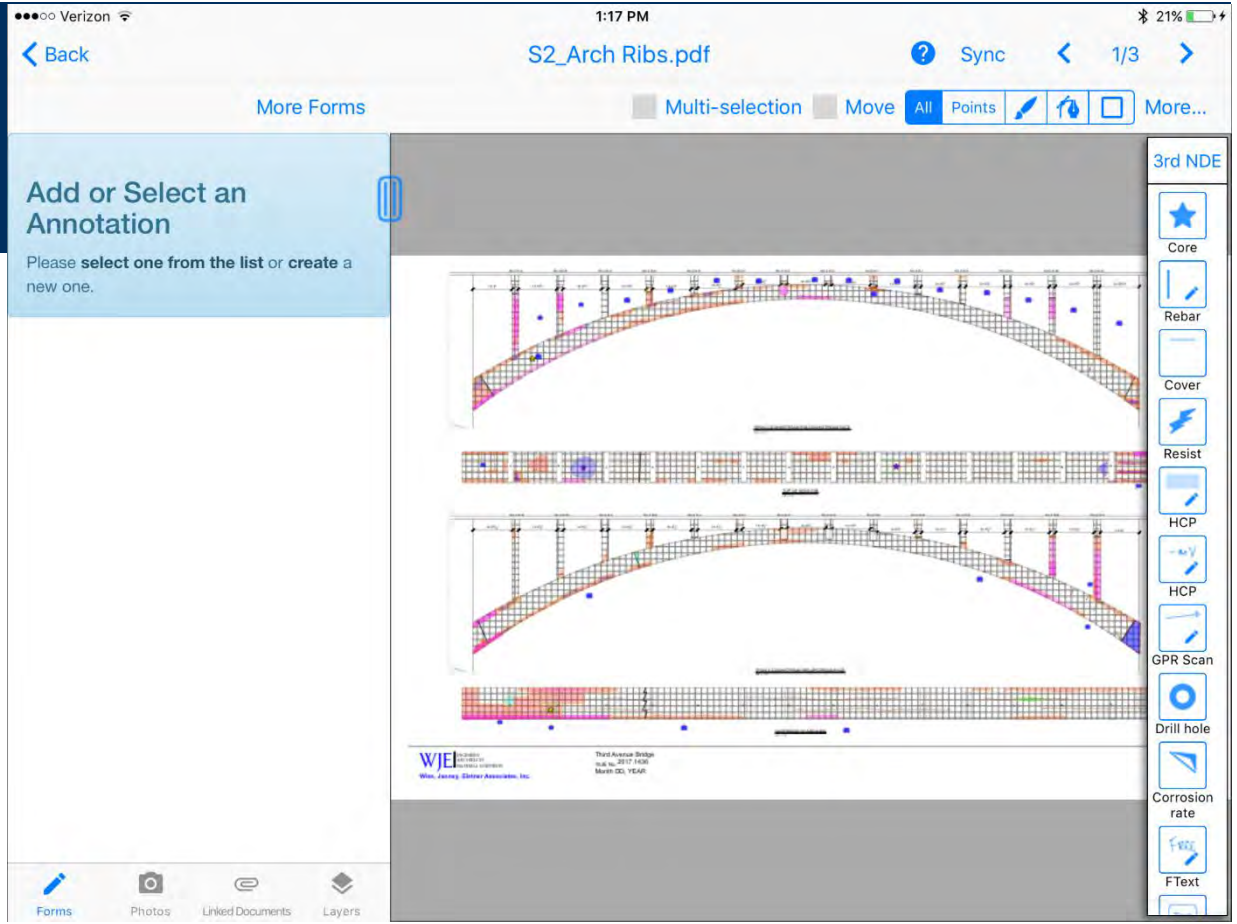



WJE

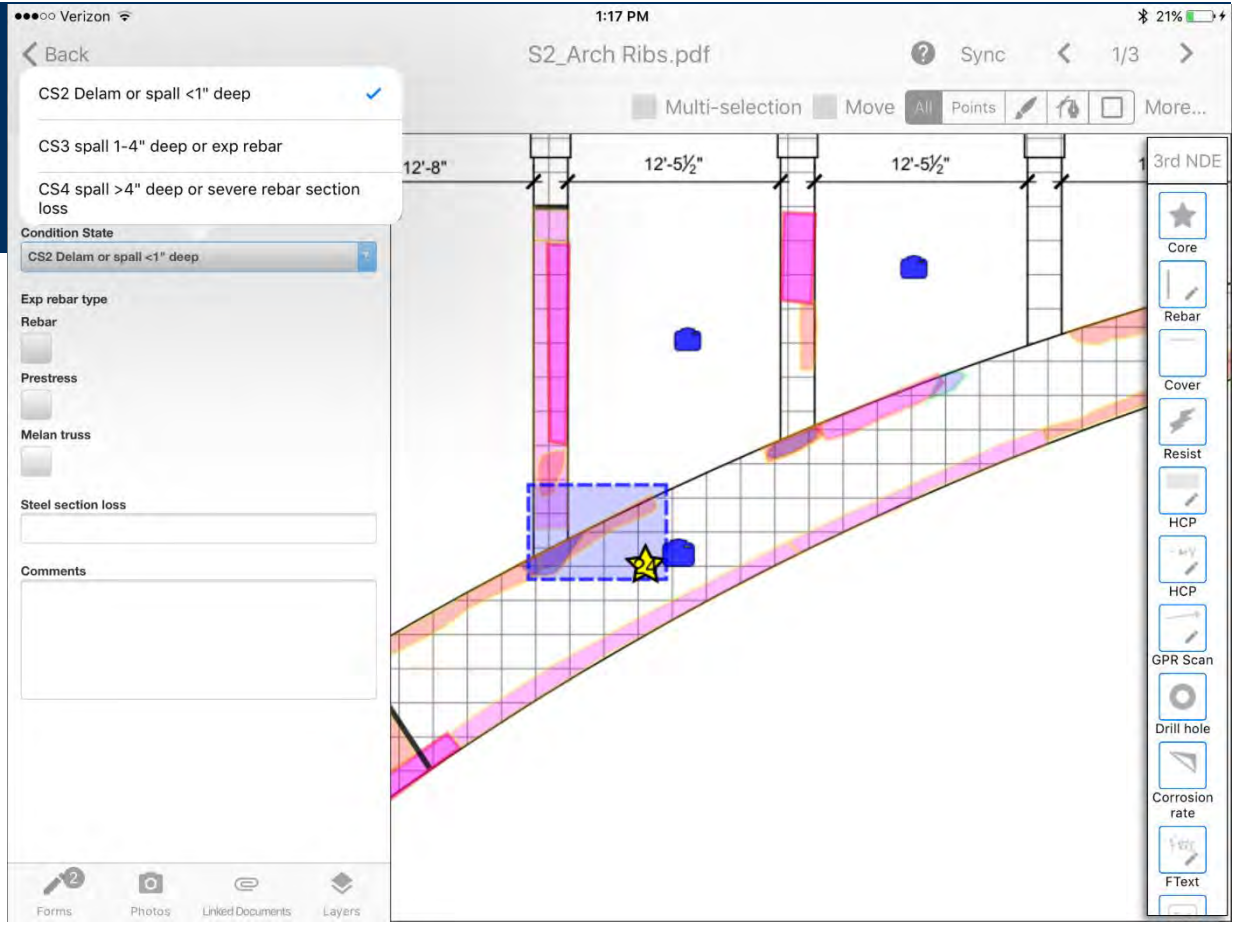

WJE
FRACTAL
BAC

Intro to Plannotate

- iOS and web interfaces
- Designed for data entry and best functionality on Apple iPad



Intro to Plannotate

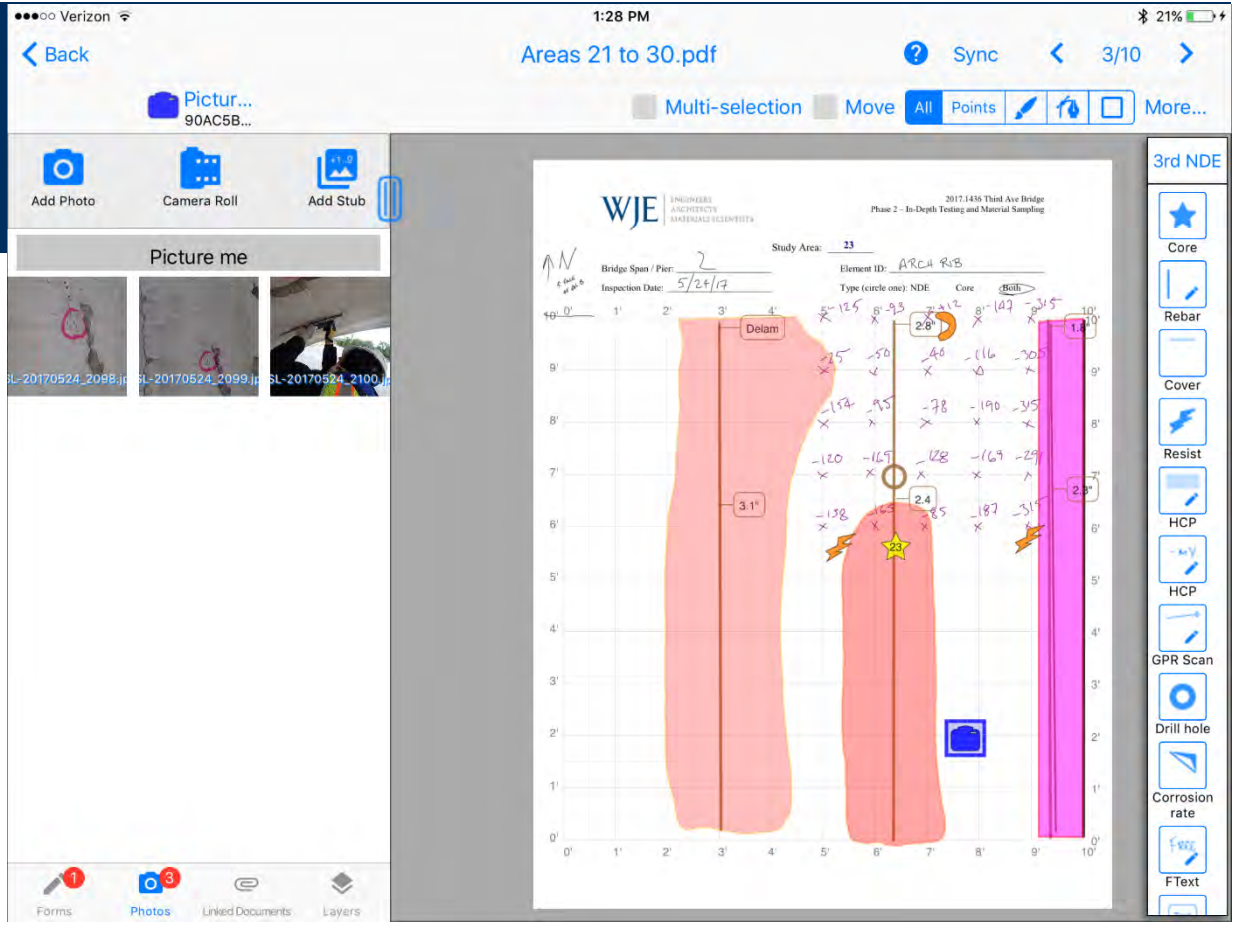


Intro to Plannotate

Intro to Plannotate

Intro to Plannotate

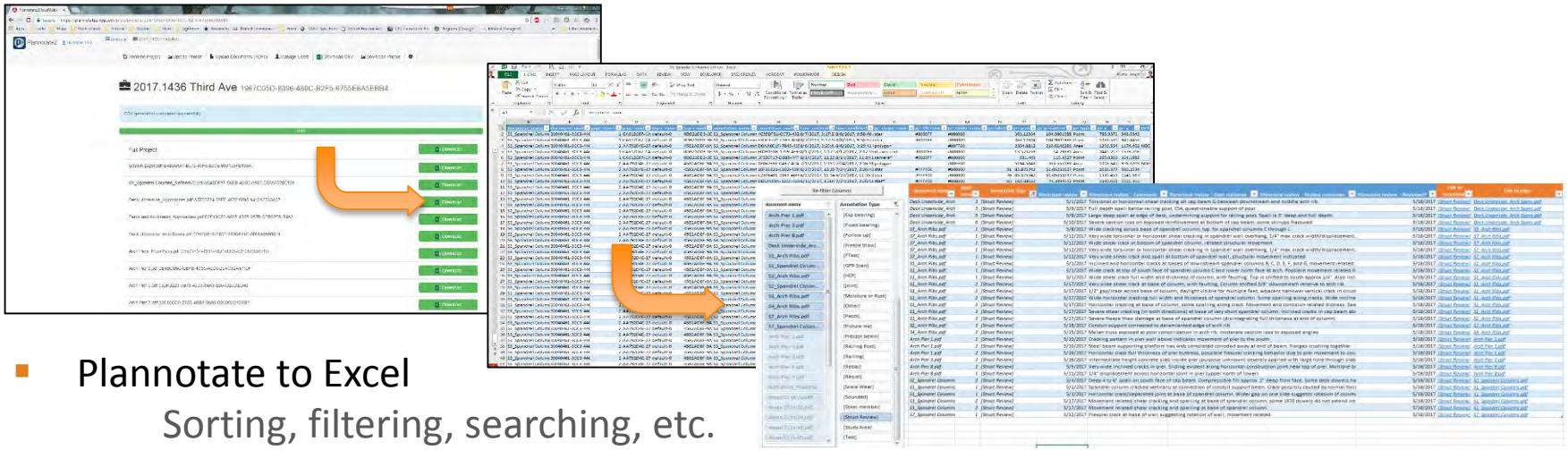
Intro to Plannotate



Value of the Plannotate Data

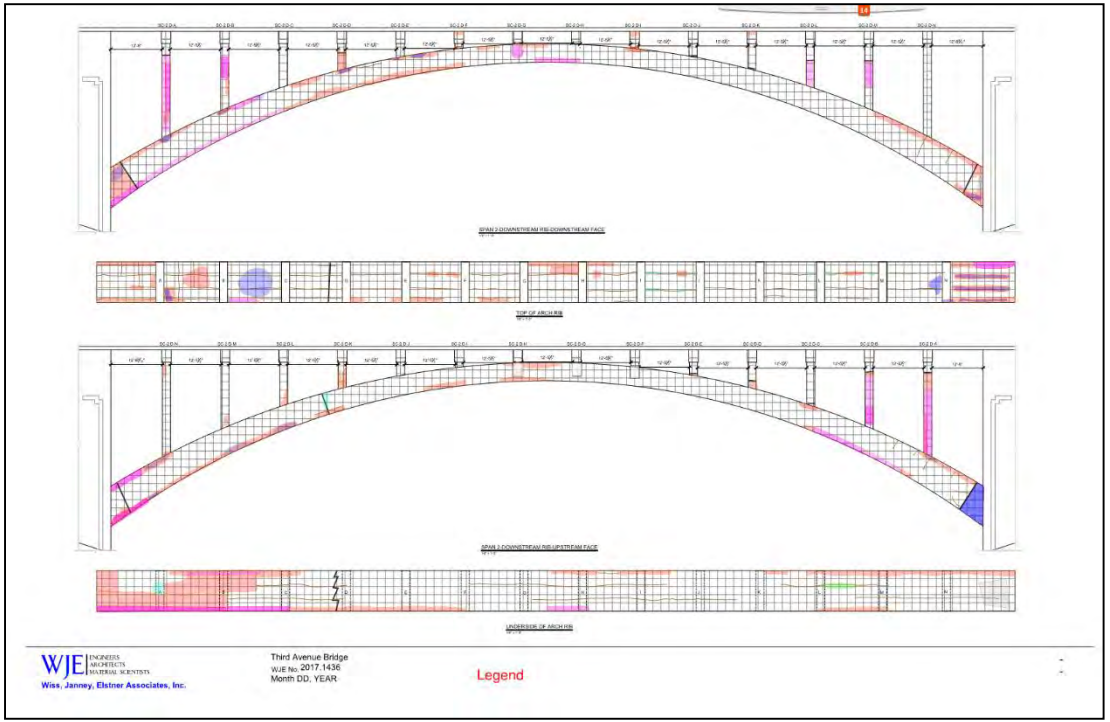
Digital record of all inspection notes taken, accessible now and future

Lots of database power



- Plannotate to Excel
  - Sorting, filtering, searching, etc.
- Plannotate to CAD
  - Aid for Phase 2 repair plans
- Quantity calculations within Plannotate
  - As-mapped quantities, not repair qts.

In Inspection Report (Appendix 2)



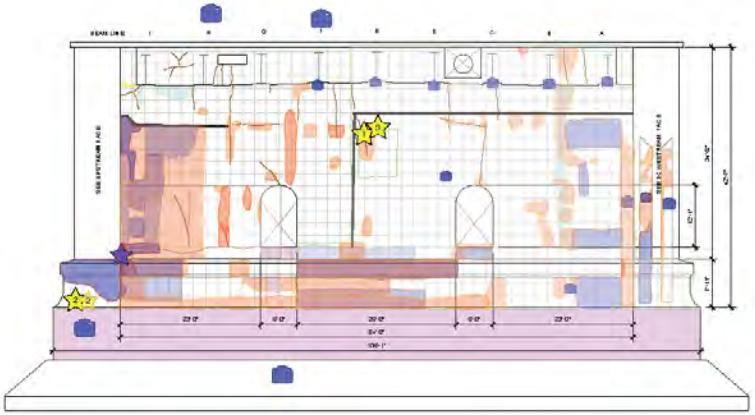
WJE

Third Avenue Bridge
Example Data Tabulation for Element
August 17, 2017
Page 1

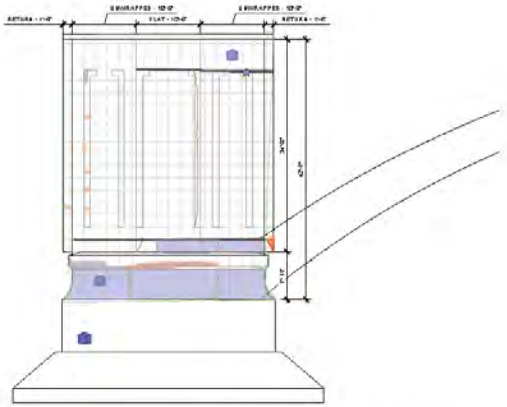
Span: 1-Middle **Element: Spandrel Column A**

Face	Condition State	Units	CS1	CS2	CS3	CS4
North	Coating	LF				
	Crack	SF				
	Delamination, spall, or exposed rebar	SF				
	Efflorescence	SF				
	Freeze-thaw	SF				
	Moisture staining / rust staining	SF				
	Patch	SF				
	Scale, wear or abrasion	SF				
	Subtotal Area Affected	**SF**				
	Subtotal Surface Area	**SF**				
South	Coating	LF				
	Crack	SF				
	Delamination, spall, or exposed rebar	SF				
	Efflorescence	SF				
	Freeze-thaw	SF				
	Moisture staining / rust staining	SF				
	Patch	SF				
	Scale, wear or abrasion	SF				
	Subtotal Area Affected	**SF**				
	Subtotal Surface Area	**SF**				
Upstream	Coating	LF				
	Crack	SF				
	Delamination, spall, or exposed rebar	SF				
	Efflorescence	SF				
	Freeze-thaw	SF				
	Moisture staining / rust staining	SF				
	Patch	SF				
	Scale, wear or abrasion	SF				
	Subtotal Area Affected	**SF**				
	Subtotal Surface Area	**SF**				
Downstream	Coating	LF				
	Crack	SF				
	Delamination, spall, or exposed rebar	SF				
	Efflorescence	SF				
	Freeze-thaw	SF				
	Moisture staining / rust staining	SF				
	Patch	SF				
	Scale, wear or abrasion	SF				
	Subtotal Area Affected	**SF**				
	Subtotal Surface Area	**SF**				
Total:	Area Affected	SF				
	Area Affected	%				
	Surface Area	SF				

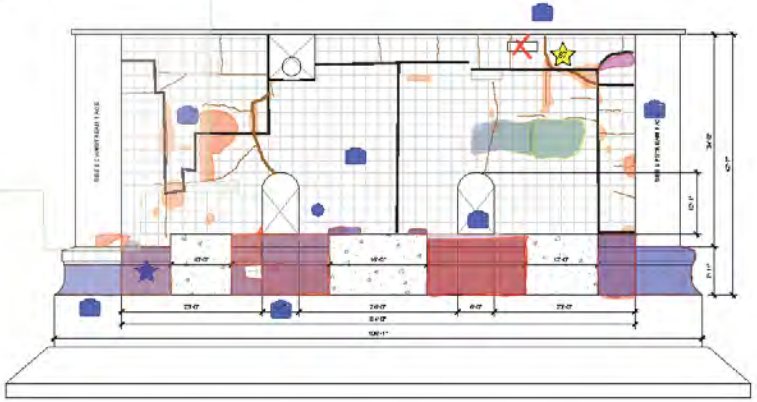
For this calculation, cracks are counted as 0.5 SF per LF in accordance with MNDOT Bridge Inspection Manual.



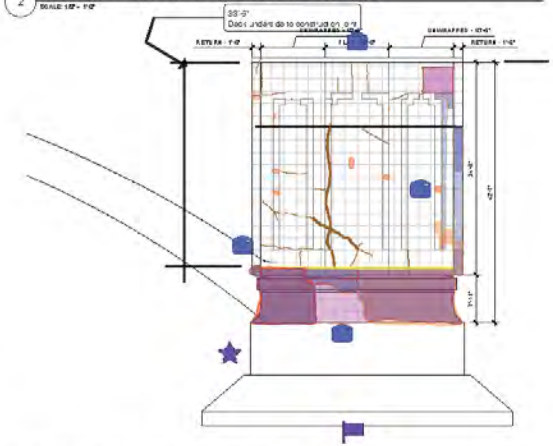
1 ARCH PIER 1 - SOUTH WALL - EXTERIOR FACE

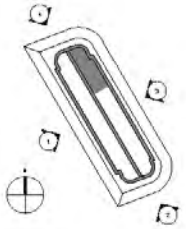


2 ARCH PIER 1 - DOWNSTREAM WALL - EXTERIOR FACE



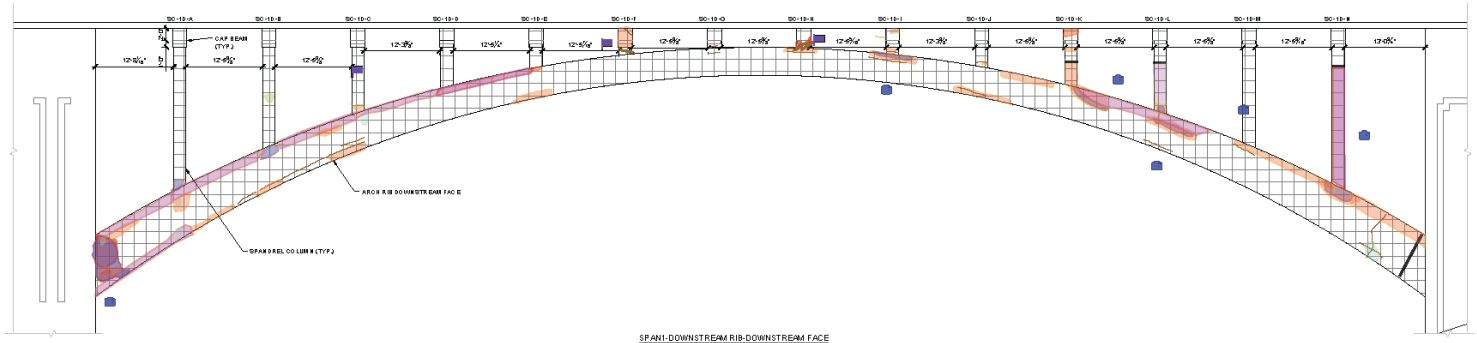
3 ARCH PIER 1 - NORTH WALL - EXTERIOR FACE



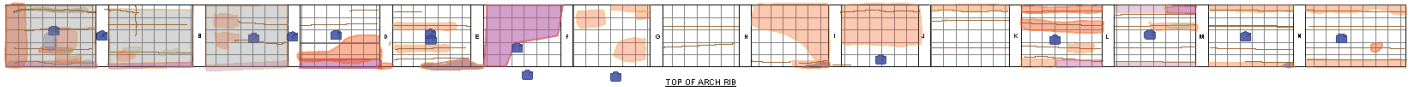


	Coating	Crack	Delamination, spall, or exposed rebar	Efflorescence	Freeze-thaw distress	Moisture/rust staining	Patch	Scale, wear, or abrasion
CS1								
CS2								
CS3								
CS4								

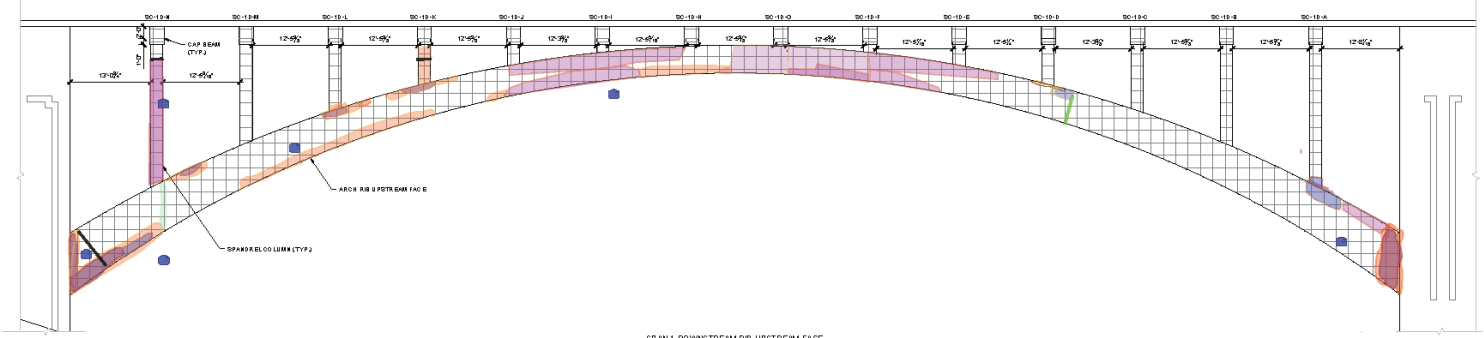
WJE ENGINEERS ARCHITECTS MATERIAL SCIENTISTS
Wiss, Janney, Elstner Associates, Inc.



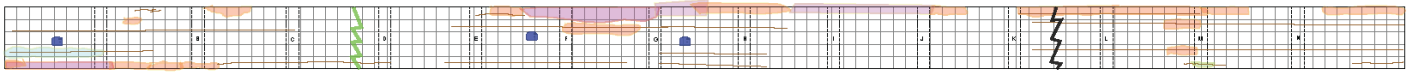
SPAN1-DOWNSTREAM RIB-DOWNSTREAM FACE



TOP OF ARCH RIB

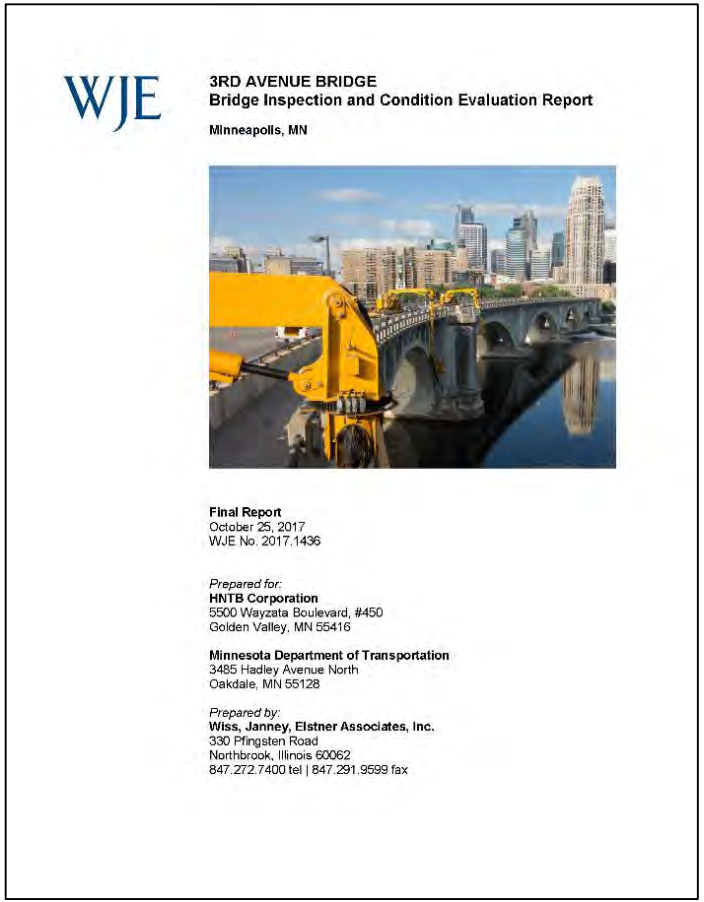


SPAN 1-DOWNSTREAM RIB-UPSTREAM FACE



UNDERSIDE OF ARCH RIB

	Coating	Crack	Delamination, spall, or exposed rebar	Efflorescence	Freeze-thaw distress	Moisture/rust staining	Patch	Scale, wear, or abrasion
CS1								
CS2								
CS3								
CS4								



WJE

3RD AVENUE BRIDGE
Bridge Inspection and Condition Evaluation Report

Minneapolis, MN

Final Report
October 25, 2017
WJE No. 2017.1436

Prepared for:
HNTB Corporation
5500 Wayzata Boulevard, #450
Golden Valley, MN 55416

Minnesota Department of Transportation
3485 Hadley Avenue North
Oakdale, MN 55128

Prepared by:
Wiss, Janney, Elstner Associates, Inc.
330 Pfingsten Road
Northbrook, Illinois 60062
847.272.7400 tel | 847.291.9599 fax

BRIDGE INSPECTION AND CONDITION EVALUATION REPORT

October 25, 2017

- Detailed View:
  - 8 Chapters, 284 pages
  - 15 Appendices, 3 Volumes, 724 pages
- High-level View:
  - Executive Summary, 10 pages
  - Use TOC to find details

Element Category	Sub-Category	Distress Typically Observed	Distress Quantity Ratio
Deck - Arch	Topside	Dense network of usually narrow but occasionally wide transverse and longitudinal cracks; very occasional delaminations and spalls	< 1% to 2%

Element Category	Sub-Category	Distress Typically Observed	Distress Quantity Ratio
Deck - Arch Spans (1980)	Topside	Dense network of usually narrow but occasionally wide transverse and longitudinal cracks; very occasional delaminations and spalls	< 1% to 2%
	Underside	Widespread spalls with corroded reinforcing at downstream fascia, below bridge centerline, along cap beams at deck joints, and around manholes in southbound lane	14%
Deck - Approach Spans (1980)	Topside, underside	Much less cracking than in arch spans and much less underside distress	1%

Element Category	Sub-Categories	No. of Elements	0-10%	10-20%*	>20%*	Quantity for all Elements in Category*
Lower Spandrel Columns and Walls (1918)	Never Expansion Joint	33	25	6	2	7%
	Expansion Joint 1918-1980	16	8	7	1	10%
	Expansion Joint 1980-Present	20	10	3	7	17%
	Always Expansion Joint	17	0	5	12	36%
Upper Spandrel Columns and Walls (1980)	Never Expansion Joint	130	128	2	0	< 1%
	Always Expansion Joint	98	76	17	5	7%
Cap Beams (1980)	Never Expansion Joint	47	47	0	0	6%
	Always Expansion Joint	38	5	9	24	34%

** Compare to MnDOT Preservation Guide thresholds: Major preservation: 10-20%, Rehabilitation: >20% (see below)*

Element Category	Sub-Category	Distress Typically Observed	Distress Quantity Ratio
Deck - Arch Spans (1980)	Topside	Dense network of usually narrow but occasionally wide transverse and longitudinal cracks; very occasional delaminations and spalls	< 1% to 2%
	Underside	Widespread spalls with corroded reinforcing at downstream fascia, below bridge centerline, along cap beams at deck joints, and around manholes in southbound lane	14%
Deck - Approach Spans (1980)	Topside, underside	Much less cracking than in arch spans and much less underside distress	1%

Element Category	Sub-Category	Distress Typically Observed	Distress Quantity Ratio
Arch Ribs and Barrel Arches (1918)	--	Frequent cracking and intermittent delaminations and spalling along arch rib corners; longitudinal cracking along Melan truss angles; deep freeze thaw damage at arch spring line regions and occasionally elsewhere	3 to 19%

Lower Spandrel Columns and Walls (1918)	See next table	Below deck joints: Very widespread delaminations and spalls with corroded reinforcing; paste erosion on most surfaces; occasional freeze-thaw damage; structural distress at bases Away from deck joints: Same distress types as below joints but					7 to 36% (see next table)
(1980)	Always Expansion Joint		38	5	9	24	34%

** Compare to MnDOT Preservation Guide thresholds: Major preservation: 10-20%, Rehabilitation: >20% (see below)*

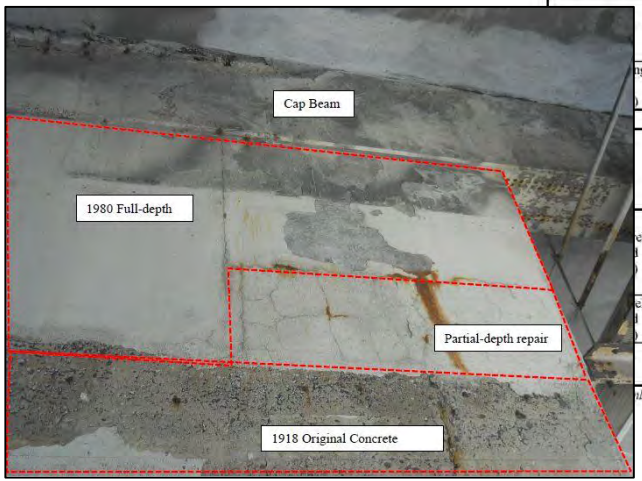
Element Category	Sub-Category	Distress Typically Observed	Distress Quantity Ratio
Arch Piers (1918)	Walls	Isolated delaminations and spalls, more frequent at Piers 1, 6 and 8; occasional freeze-thaw damage	6%
	Bases	Very widespread, deep freeze-thaw damage and failed previous repairs; very deep freeze-thaw damage below drain outfalls	78%

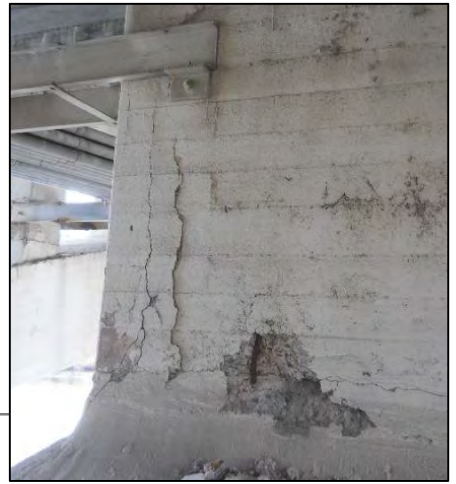
Lower Spandrel Columns and Walls (1918)	See next table	Below deck joints: Very widespread delaminations and spalls with corroded reinforcing; paste erosion on most surfaces; occasional freeze-thaw damage; structural distress at bases				7 to 36% (see next table)
Upper Spandrel Columns and Walls (1980)	Never Expansion Joint	130	128	2	0	≤ 1%
	Always Expansion Joint	98	76	17	5	7%
Cap Beams (1980)	Never Expansion Joint	47	47	0	0	6%
	Always Expansion Joint	38	5	9	24	34%

** Compare to MnDOT Preservation Guide thresholds: Major preservation: 10-20%, Rehabilitation: >20% (see below).*

Element Category	Sub-Category	Distress Typically Observed	Distress Quantity Ratio
North Retaining Walls (1918, 1980)	--	Occasional delaminations and spalls; deep freeze-thaw damage at joints and along top edge; rotation of 1980 cap atop 1918 wall especially at downstream side	8%

Element Category	Sub-Categories	No. of Elements	No. of Elements With Distress Quantity in Range			Average Distress Quantity for all Elements in Category*
			0-10%	10-20%*	>20%*	
Lower Spandrel Columns and Walls (1918)	Never Expansion Joint	33	25	6	2	7%
	Expansion Joint 1918-1980	16	8	7	1	10%
	Expansion Joint 1980-Present	20	10	3	7	17%
	Always Expansion Joint	17	0	5	12	36%





Element Category	Sub-Categories	No. of Elements	No. of Elements With Distress Quantity in Range			Average Distress Quantity for all Elements in Category*
			0-10%	10-20%*	>20%*	
Upper Spandrel Columns and Walls (1980)	Never Expansion Joint	130	128	2	0	< 1%
	Always Expansion Joint	98	76	17	5	7%

* Compare to MnDOT Preservation Guide thresholds: Major preservation: 10-20%, Rehabilitation: >20% (see below)

Element Category	Sub-Categories	No. of Elements	No. of Elements With Distress Quantity in Range			Average Distress Quantity for all Elements in Category*
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Cap Beams (1980)	Never Expansion Joint	47	47	0	0	6%
	Always Expansion Joint	38	5	9	24	34%

Structural Distress Conditions

In addition to the deterioration conditions described above, the inspection identified several conditions of significant structural distress caused by unintended volume change movement of the deck and superstructure when subjected to thermal changes. These conditions included the following:

- Pier 8 - Very wide diagonal shear cracking, sliding along horizontal construction joint, fractured and bent reinforcing steel across joint
- Pier 1 - Wide vertical and diagonal shear cracking
- Spandrel columns and walls, particularly below expansion joints - Structural distress at bases, including wide cracking, diagonal shear cracking, and delamination and spalling, sometimes severe
- Cap beams below expansion joints - Deep spalling along top corners and shear or torsional cracking
- South abutment - Missing and fractured anchor bolts at fixed bearings

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Facsimile (763) 852-2199
www.hntb.com

Project Name
3rd Ave Bridge Rehab – Phase 1
Contract 1000045

Date of Meeting
4/21/17

HNTB Project #
62350-DS-001

Location
MPRB Office

Purpose of Meeting
Potential Laydown/Staging Areas

Time
11:00-12:00 pm

MEETING MINUTES

Participants

Name	Representing		Name	Representing
Keith Molnau	MnDOT Bridge		Chris Hoberg	MnDOT Metro
April Crocket	MnDOT Metro		Tyler Pederson	MPRB
Cliff Swenson	MPRB		Kate Lamers	MPRB
Dan Enser	HNTB		Steve Schantzen	HNTB

1. Introductions were done.
    a. Currently HNTB is contracted with MnDOT to complete Phase 1 activities to inspect the bridge and determine the scope of work for a future project.
    b. Purpose of meeting was to follow up on a meeting held with the City of Minneapolis regarding staging and laydown areas along the river to server a potential 3rd Ave Bridge Project that could occur in 2019 or 2020. HNTB is completing a high-level cost estimate and would like to understand better potential areas for staging and access to the bridge.
2. C. Swenson provided a background on the MPRB.
    a. They fund themselves and do not have specific people to assign to outside projects but usually connect the outside projects with a MPRB project manager familiar with the area. For this project, MPRB will assign Tyler Pederson.
    b. Permit is needed when working on park board property. They have two engineering techs, Julie or Tom, who do permits.
    c. They also have departments for special events, park police and operations (mowing and plowing).
    d. Roads on parkland is MPRB property, not public property.
3. A. Crocket will be working with Jenny (??) who would assign someone from the City of Minneapolis.
4. The following areas were discussed, see attached map:
    a. Hall Island – MPRB just finished an EAW and construction in this area will start this fall.
    b. Triangle Land – CPED owns some land on the land side of this parcel but MPRB owns the river side. MPRB is finishing community engagement and looking to perform some construct in Memorial Park. Xcel Energy has an easement through her also.
    c. City Boat Ramp – MPRB did not know about this property.

d. Upper Harbor Terminal – Owned by the City of Mpls but part is designated park land approximately 150-200 feet along the river. Anything that would happen permanently here would involve the MPRB but if temporary and before 2020 it would go to the City (i.e., MPRB not involved). Looking to develop this area near 2020 but there are no agreements currently in place, they should know more in 9 months.
e. Ramsey Crushing - The area just north of the Upper Harbor Terminal is used by Ramsey as a crushing site and they have a year to year lease now but in 2018 MPRB thought that went down to a 3 to 6-month cycle.
f. Boom Island – There are some changes in the master plan with this area but hard to use because it is very busy and set-up for access from Marshall Street to BF Nelson Park.
g. 1720 Marshall St – There is an old building here but there is about a 20 ft difference in elevation between the river the building.
h. Under I-94 Viaduct – This area was discussed as a potential staging area and believed to be on MnDOT ROW. However, does not have river access.
i. N. Mississippi Regional Park – this area is wild/wooded and has a boat launch.
j. Commercial owned areas MPRB mentioned:
    i. Xcel Ash Pile – MPRB thought this might be an area available
    ii. Agg. Industries – MPRB thought this might have RR access.

5. Now that lock is closed the river is no longer being dredged.
6. MPRB's main concern regarding Main Street and West River Parkway is they know it will need to be closed at times but access for bikes and pedestrians need to remain open. Detouring these modes of traffic is possible or allowed.
7. Main St has cobble stones.
8. West River Parkway is maintained by milling and overlay.
9. During the 3rd Ave Bridge project the Contractor will need to park somewhere and some arrangement with MPRB may be needed.
10. Fill out the permit for the inspection, there should be no charge.
11. MPRB has the Waterworks Project starting in 2019 in the SW quadrant of the bridge, see map. MPRB may request under bridge lighting.
12. ROW was discussed and C. Swenson would like to resolve this. C. Swenson will send the survey information they have to C. Hoberg. MPRB noted the Mpls side of the river is clearer or more understood than the Main St side of the river.

NOTES: Please call or email Dan Enser (763-852-2130, denser@hntb.com) if you have any questions or comments on these meeting minutes. Minutes are assumed to be final after 5 days.

I.D.	From Mtg	Action Item	By, When	Resolution
1	MPRB Mtg 4-21	A.Crocket coordinate a contact at the City of Minneapolis		
2	MPRB Mtg 4-21	C. Swenson send survey to C. Hoberg.		This has been done, closed.
3				
4				
5				


Xcel Ash Pile
Triangle Land
Boom Island
3rd Ave Brid
1720 Marshall
Xcel Riverside Plant
Hall Island
Xcel Parcel
Wtrworks Proj.
MPRB Owns Prkwy
City Owned Prkwy
Agg Industries
Ramsey Crushing
Upper Harbor Terminal
City Mpls Boat Ramp
Minneapolis
Mississippi River
Xcel Energy
Psycho Suzi's Motor Lounge
NORTHEAST MINNEAPOLIS
COLUMBIA PARK
MARSHALL TERRACES
BOTTINEAU
SHERIDAN
NICOLLET ISLAND
WAREHOUSE
DOWNTOWN WEST
KINGFIELD
HAWTHORNE
CAMDEN
NORTH LOOP

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Project Name
3rd Ave Bridge Rehab – Phase 1
Contract 1000045

Date of Meeting
6/16/17

HNTB Project #
62350-DS-001

Location
Xcel Main Street Plant.

Purpose of Meeting
Understand Xcel Energy's role along the river

Time
11:30-1:30 pm

MEETING MINUTES

Participants

Name	Representing		Name	Representing
Keith Molnau	MnDOT Bridge		Aaron Tag	MnDOT Metro
Dan Enser	HNTB		Rob Olson	Xcel Energy

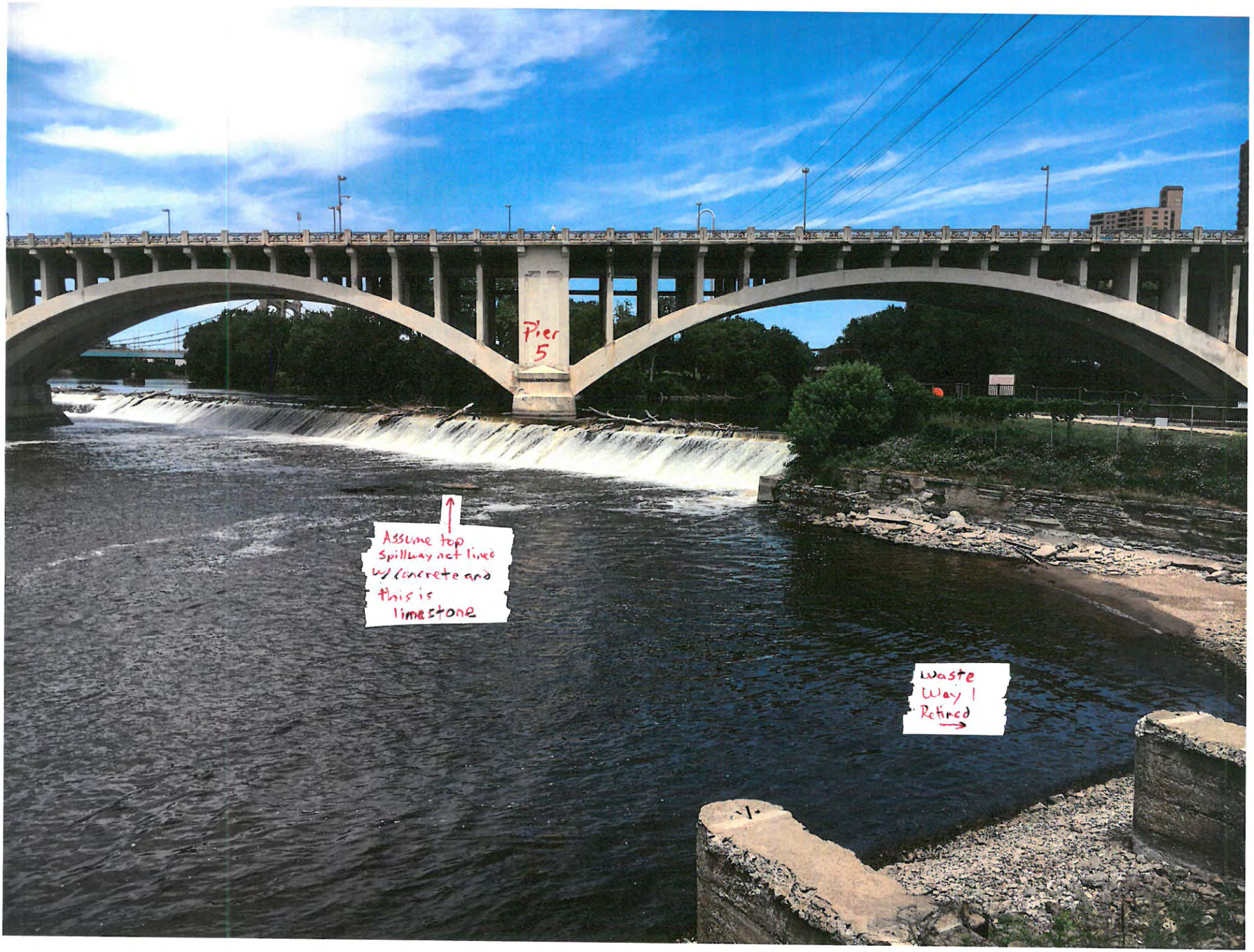
1. Introductions were done.
    a. Rob represents Xcel and is a/the superintendent of Hydro Plants
    b. Aaron Tag is MnDOT Metro's Project Manager on the overall project
    c. Keith Molnau is the MnDOT Bridge Project Manager responsible for the bridge portion of the project.
    d. Dan Enser is the Project Manager for HNTB who is a consultant hired by MnDOT to work on the project.
2. Xcel to keep 100 cfs moving over the spillway. This is equivalent to about 1 inch of water over the flashboards.
3. "Flashboards" – are placed on the top side of the spillway to keep water elevation above intakes upstream for Xcel Riverside Plant and other city water intakes. When the water gets between 18" – 24" above flashboards, they are designer to bend over. Once this happens they do not come back up and need to manually be repaired. The flashboards are approximately 2.5 feet tall. See pictures at end of minutes
4. The maximum the Xcel plant can discharge 4,300 cfs. The COE Lock and Dam pumps can discharge 1,500 cfs. If the gate were operational, 10,000 cfs can be passed through the lock with the gate open. Rob O. the St. Anthony Falls Hydraulic Laboratory could pass 50 cfs but was not sure of their outside stream operation.
5. Flashboards were replaced about 3 years ago in September by drawing down the river but to do this they need help from the COE with an operational gate. The day of the meeting Rob O. estimated the flow at 11,000 cfs.
6. Xcel is evaluating other options to control upstream water elevation that have less maintenance and more control. Rob O. explained an option used at a different plant is inflatable diaphragms that lift steel plates. In high water, the bags are deflated and during low water the bags are inflated. Barr Engineering is looking at options for Xcel Energy.
7. Xcel understands they are in a historic district and they have a historic management plan.

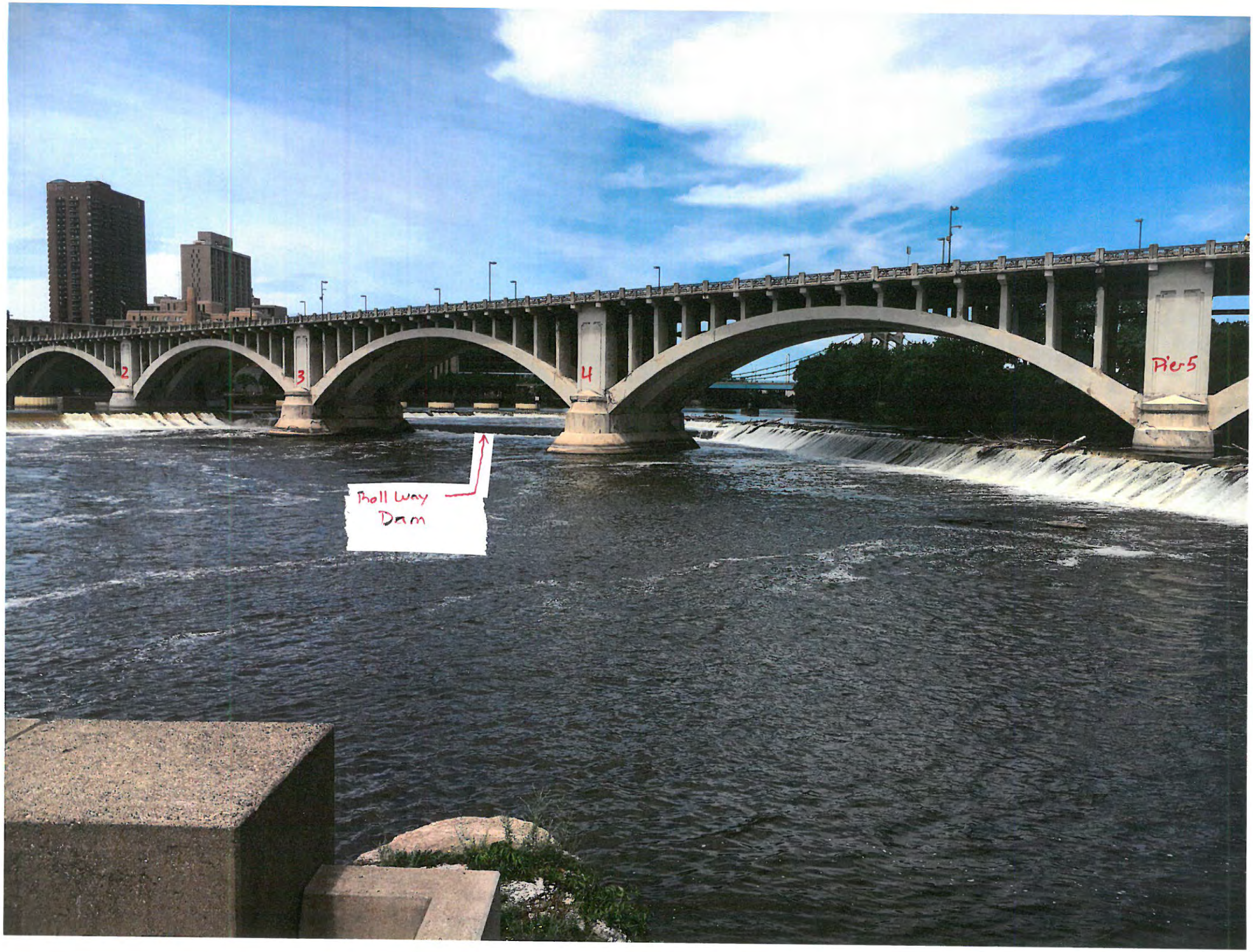
8. The Federal Energy Regulatory Commission (FERC) has pond level management requirements Xcel needs to meet.
9. Xcel also needs certain water elevation, or head, to generate power and move water.
10. For example – assume flow of 11,000 cfs and Xcel and the COE can pump 4,300 cfs and 1,500 cfs, respectively, for a total of 5,800 cfs –> 11,000 – 5,800 = 5,200 cfs needs to go over the spillway.
11. USGS website has real time flow information for site near Brooklyn Center - https://waterdata.usgs.gov/mn/nwis/current/?type=flow
12. Rob O. noted the maximum that has been observed is 60,000 cfs
13. The target water elevation for Xcel to change out the flashboards is when the water is 6 inches below the bottom of the flashboards where they are founded on timbers that make up the spillway.
14. Rob O. noted the COE is doing a disposition study of the lock and dam facility. This is assumed to be to evaluate the facility and determine what next steps are since the lock is not closed to barge traffic.
15. The Xcel Energy Water Power Park that extends from Main Street to the spillway as developed in 2007 by a partnership between Xcel Energy and the City of Minneapolis. Xcel hasa maintenance agreement with Minneapolis Park and Recreation Board where the park board maintains the area. The park is open 6 am to dusk. Rob O. noted there was a 30-year lease with the City of Minneapolis but not sure if that means the City leases the park area from the City or the City leases land from Xcel.
16. The flat area just upstream of river Pier 3 that is mid elevation between the top pool and lower pool is called the "rollway" dam.
17. The pedestrian bridge that connect the park walk area to the spillway area goes over the inlets to Xcel Energy and the hydraulics lab has a 35-ton combined load limit as noted by the placard on the northwest end post.
18. Besides the main spillway, Xcel also owns Waste Way 1 which is now retired and Waste Way 2 which the hydraulics laboratory is using for an experiment. The group walked down Waste Way 1 to understand the area.
19. Between the spillway and the COE lock and dam, there are stop logs that can be removed to let more water through the spillway.
20. There is an inlet along Main Street that feeds smaller energy equipment installed as part of the mill rehabilitation project. Rob O. noted it is large and runs under Main Street and used to feed the mills.

NOTES: Please call or email Dan Enser (763-852-2130, denser@hntb.com) if you have any questions or comments on these meeting minutes. Minutes are assumed to be final after 5 days.

I.D.	From Mtg	Action Item	By, When	Resolution
1	Xcel 6-16	Rob O. provide Aaron Tag more pictures and information of the operation of drawing down the spillway to replace flashboards.		
2				
3				
4				
5				


Pier 5
Flashboards
Steel pins holding flashboards
Open - No flashboards


Pier 5
Assume top Spillway not lined w/ concrete and this is limestone
Waste Way 1 Retired


2
3
4
Pier 5
Bell Way
Dam

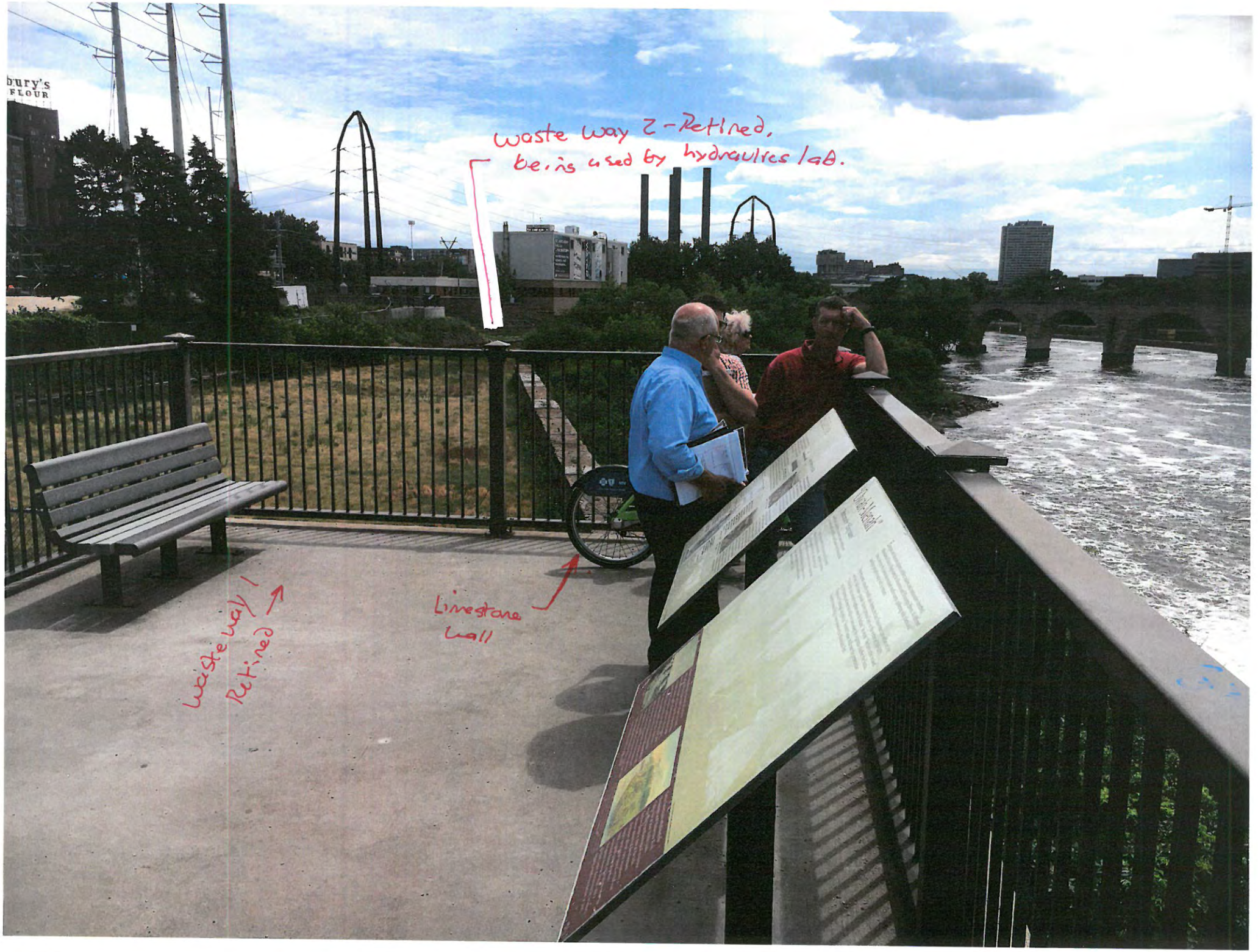

Xcel owns limestone wall
1
2
3

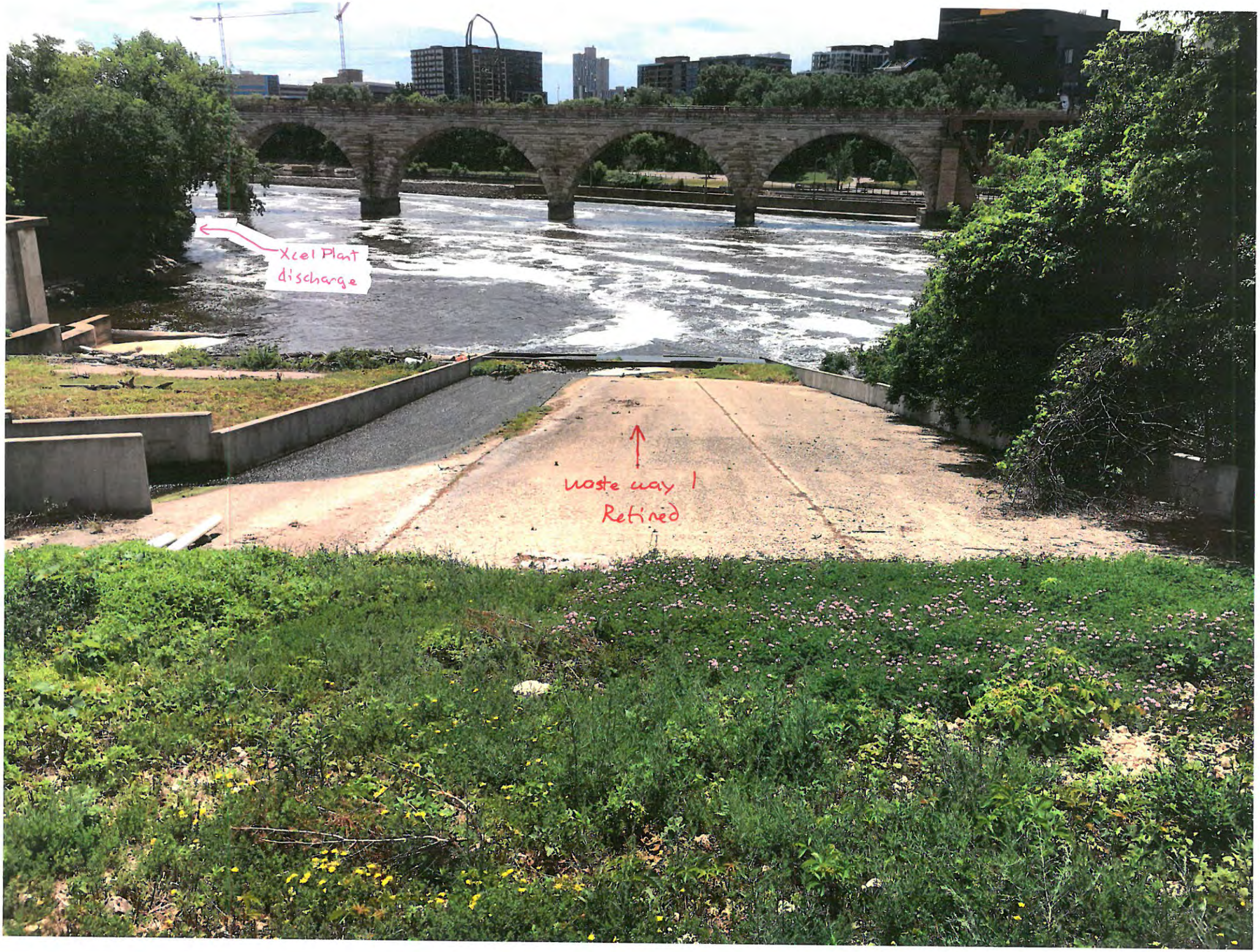

GOLD MEDAL FLOUR
COE lock + Dam

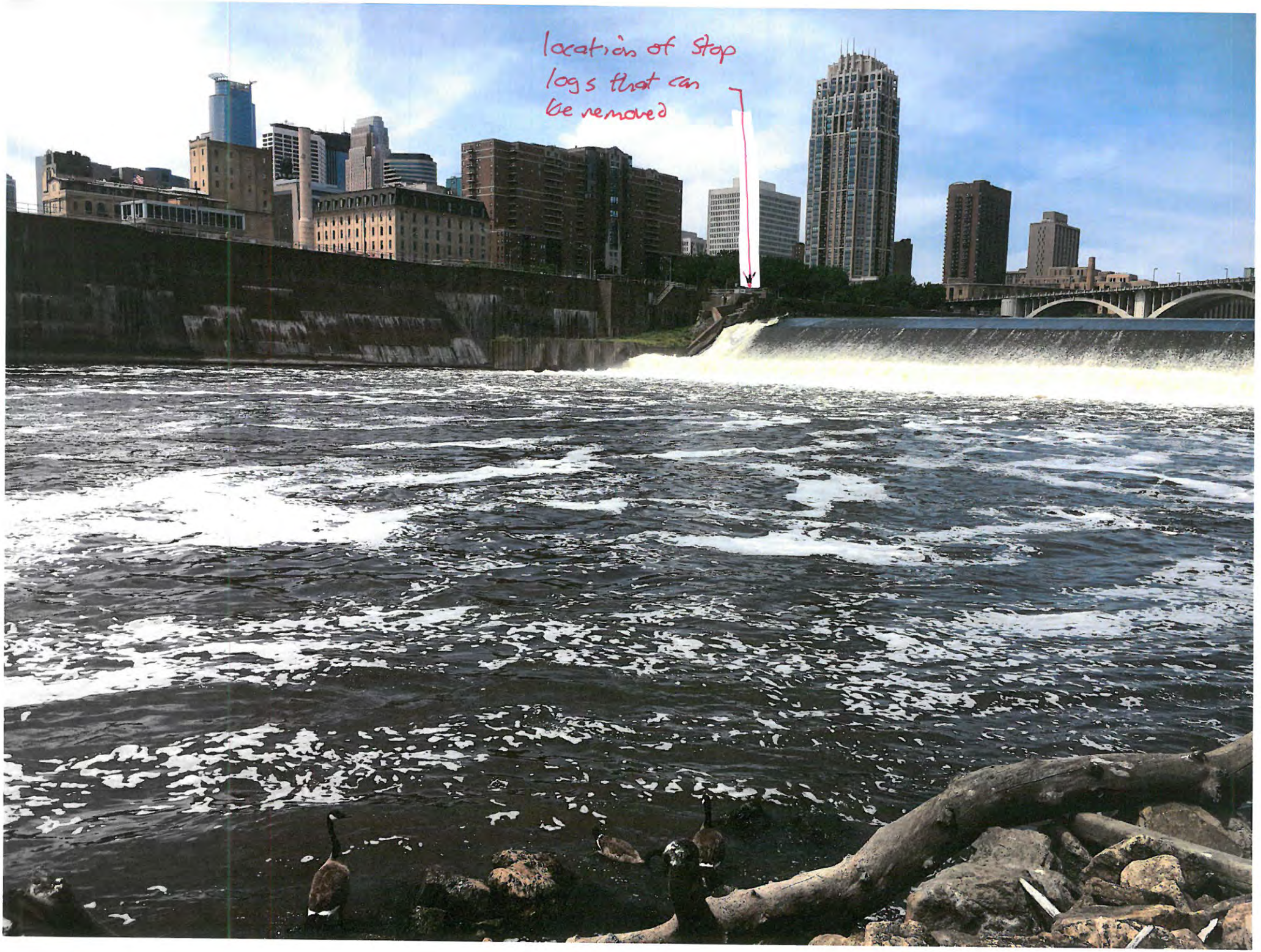

Pier 6
Wast way 1
Retired →

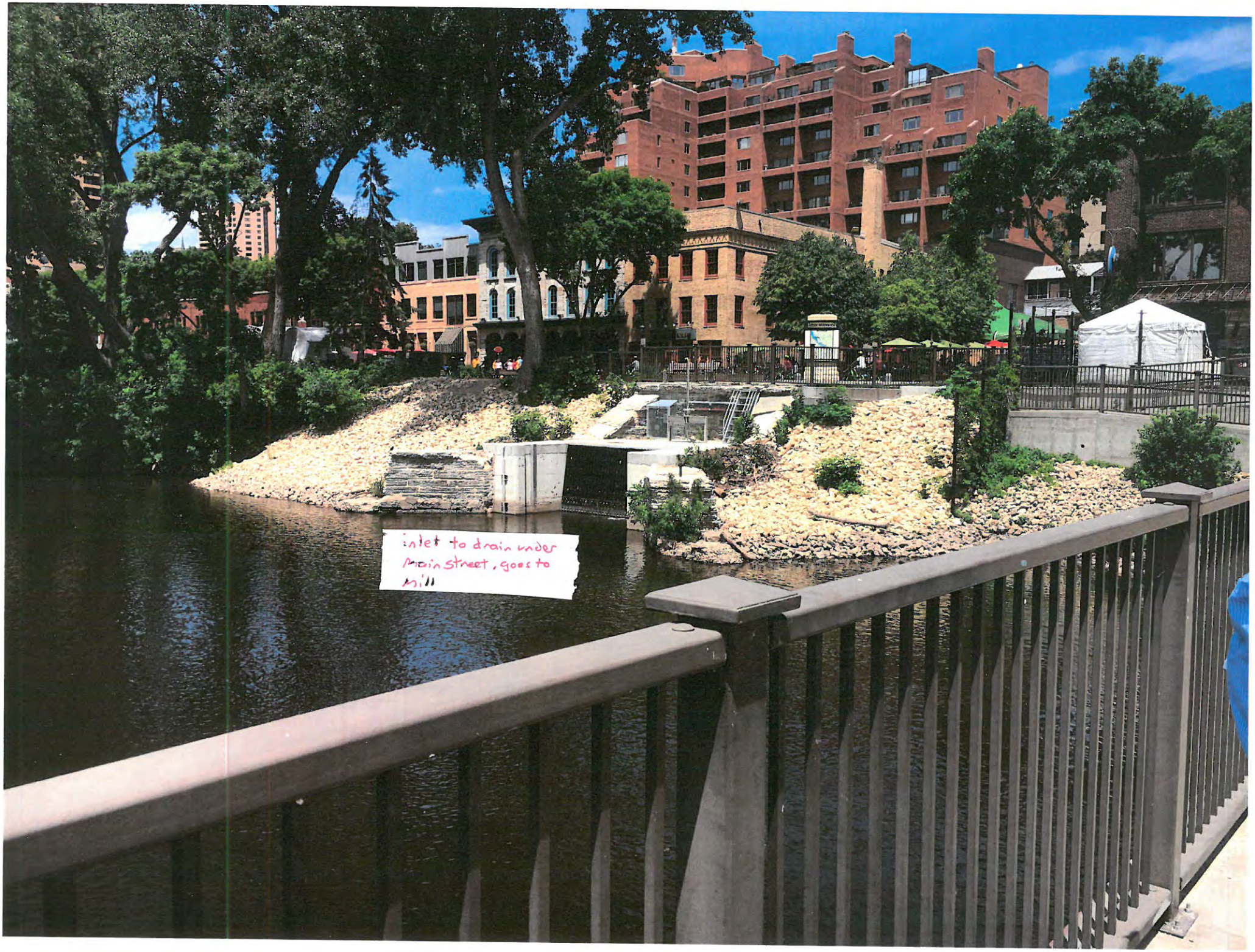

TVG
EVENTS
Trash
Waste way !
Retired, now
filled in for
Park

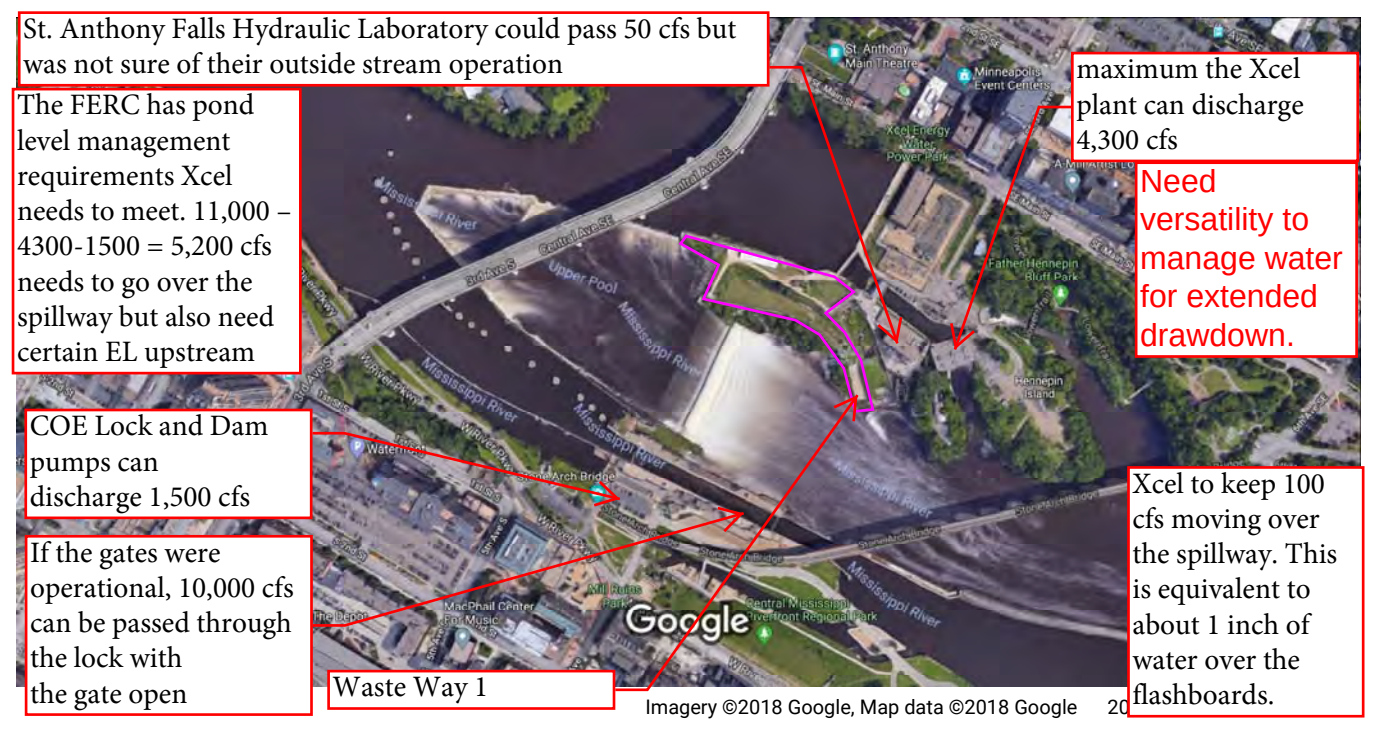

Pillsbury's
BEST FLOUR
TVG
EVENTS
Trash
waste way /
Retired


Waste Way 2 - Retined,
be. is used by hydraulics lab.
Waste Way 1
Retined
Limestone
wall


Xcel Plant
discharge
waste way 1
Retired


location of Stop
logs that can
be removed


inlet to drain under
Main Street, goes to
Mill


St. Anthony Falls Hydraulic Laboratory could pass 50 cfs but was not sure of their outside stream operation
The FERC has pond level management requirements Xcel needs to meet. 11,000 – 4300-1500 = 5,200 cfs needs to go over the spillway but also need certain EL upstream
maximum the Xcel plant can discharge 4,300 cfs
Need versatility to manage water for extended drawdown.
COE Lock and Dam pumps can discharge 1,500 cfs
If the gates were operational, 10,000 cfs can be passed through the lock with the gate open
Waste Way 1
Xcel to keep 100 cfs moving over the spillway. This is equivalent to about 1 inch of water over the flashboards.
Upper Pool
Mississippi River
Central Ave SE
3rd Ave S
Stone Arch Bridge
Hennepin Island
Father Hennepin Bluff Park
Xcel Energy Water Power Park
St. Anthony Main Theatre
Minneapolis Event Centers
Google
Imagery ©2018 Google, Map data ©2018 Google


Pillsbury's
BEST FLOUR


ST. ANTHONY MAIN


300


400
50

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Project Name
3rd Ave Bridge Rehab – Phase 1
Contract 1000045

Date of Meeting
1/23/18

HNTB

MEETING MINUTES

HNTB Project #
62350-DS-001

Location
MnDOT Bridge Office
Conf Rm Oakdale Ground 5

Purpose of Meeting
PDT #10

Time
1:00 – 3:30 pm

Participants

	Name	Representing		Name	Representing
X	Keith Molnau	MnDOT Bridge		Mark Pribula	MnDOT Bridge
	Aaron Tag	MnDOT Metro	X	Paul Pilarski	MnDOT Bridge
	Dave Dahlberg	MnDOT Bridge	X	Matt Harold	MnDOT Bridge
	Yihong Gao	MnDOT Bridge		Amber Blanchard	MnDOT Bridge
	Kristen Zschomler	MnDOT CRU	X	Chris Hoberg	MNDOT Metro
X	Kevin Hagness	MnDOT		Jennifer Wells	MnDOT Bridge
	Nicole Bartelt	MnDOT	X	Tim Nelson	MnDOT Metro Const'n
	Ed Lutgen	MnDOT Bridge	X	Katherine Haun Schuring	MnDOT CRU
	Sara Sondag	Metro Bridge		Brigid Gombold	Metro Environ. Doc.
X	Kevin Western	MnDOT Bridge	X	Elizabeth Gales	Hess Roise
	Charlene Roise	Hess Roise	X	Meseret Walona	City of Mpls
X	Jack Yuzna	City of Mpls	X	Dan Enser	HNTB
	Bala Sivakumar	HNTB	X	Arne Johnson	WJE
	Angela Kingsley	HNTB		Steve Schantzen	HNTB
X	Steve Olson	ONE		Tony Shkurti	HNTB
X	Jerry Volz	Ames		David Duke	Ames
X	Jason Luhman	Ames	X	Justin Gabrielson	Ames
X	Nick Ruba	Ames	X	Craig Finley	Finley Engineering Group

1. Introductions / Overview Project Status / CMGC Integration (1:00 - 1:15) (MnDOT / HNTB)
    a. Introduction of CMGC team
2. Environmental Document Status (1:15 – 1:30) (MnDOT)
    a. This project will be a Categorical Exclusion (Cat Ex). We will not replace the bridge and we will do something so the bridge will be rehabilitated. Alternatives are being evaluated and will be documented in an Alternatives Analysis Report which may or may not become part of the Cat Ex documentation. The Cat Ex is needed before preliminary plans are due in August 2018.
    b. The Alternatives Analysis Report is to define and communicate each alternative and is used to also communicate the decision-making process to SHPO and FHWA. A draft is needed soon to start informing stakeholders.
3. Review Cross Section Status (1:30 – 1:45) (MnDOT / HNTB / Hess Roise)
    a. C. Hoberg and J Yuzna are working together for a meeting with the City if Minneapolis in the coming weeks but the commotion due to the Super Bowl is making it difficult to schedule.

b. Communication to stakeholders needs to be planned and have boundaries or constraints that need to be communicated. A best practice is to listen to the stakeholders first.
c. D. Enser communicated that each vertical opening between concrete pilasters and the ornamental rail panels was measured and some are as large as 9 inches. Thus, we will need a solution to decrease this to meet standards.

4. Rehabilitation Alternatives Definition (1:45 – 3:30) (HNTB/WJE)
    a. Project goals
        i. The project goals were reviewed briefly in this setting because they were reviewed in detail in the earlier session with the CMGC.
    b. 25-year Project
        i. Condition / Loading evaluation
            1. End of life for an element in 25 years was determined to be when 20% of total surface area of an element is damaged or deteriorated.
            2. The inspection report and load ratings were reviewed and any item that would have greater than 20% deterioration after 25 years was marked for repair or replacement.
            3. Low end of current deterioration state or limit for repair considers extent of chlorides and carbonation noting as elements with chlorides age a point is reached where deterioration increases rapidly, see graph in slides.
            4. An element that currently had more than 30% damage now was recommended for replacement.
            5. The graphics provided had 3 essential color schemes.
                a. Light blue = Replacement
                b. Dark Blue = Major rehabilitation (Could result in replacement depending on extent of actual repairs)
                c. All others = minor rehabilitation
            6. Above is the general process. See the meeting slides for each % per element.
        ii. Keep deck, minimum work to achieve 25-years
            1. HNTB recommends adding blocking or some restrainer type element to the bottom of several columns that have cracks to keep them from shifting in the future. E. Gales and K. Haun Schuring will want to review these details.
            2. How much historic fabric is needed to avoid an adverse impact was discussed and K. Haun Schuring noted removal of 1918 column material will likely not impact this because of the mass of the original 1918 arches and piers.
            3. The cost of the 2003/2004 joint project was asked for. MnDOT to provide this cost to the team.
            4. The history of jointing on the bridge was reviewed. Cracking of elements of a thermal nature began to show up in inspection reports 1986. This option would follow jointing details similar to the 1918 approach where

the deck is connected to only one side of the spandrel cap beam. C. Finley felt modular compression seals would be a good choice here.

5. The deck repairs were reviewed noting the graphics are from the structural model so not dimensionally correct. HNTB to determine the percent of full depth removals. This assumed when a cap beam was replaced that the deck would also be replaced above it. It needs to also be assumed and accounted for - if a column is replaced, the cap and deck above that column will also be replaced.
6. The percent of current 1918 columns removed for the 25-year project was provided. HNTB to determine the original percent of columns removed in 1980 compared to now and ultimately how much of the original fabric has already been removed.
7. This option does not replace the deck and thus the shared use paths will not be changed/widened.

iii. Keep deck, 50-year repair below deck

1. The 25-year project with a 50-year repair below the deck (i.e. trying to keep the deck) was discussed. The 50-year repair below the deck is discussed and defined later. This option is an effort to focus costs on repairing and protecting the historic elements but results in a lot of deck removal to access the removed items below deck.

c. 50-year Project

i. condition / loading evaluation

1. Similar approach as described for 25-year except any element with no deterioration would still need rehabilitation and elements with deterioration (DQ > 0%) would need to be replaced. See power point slides for this information.

ii. Minimum to achieve 50-year

1. Condition and ratings were reviewed and a minimum amount of work was determined for the spandrel cap beams and columns to achieve a 50-year life. This resulted in 79% of columns needing to be replaced and 54% of cap beams needing to be replaced. However, when these are combined on a drawing there are several areas where cap beams that are noted for rehabilitation are over columns that need to be replaced to meet the service life goal. Assuming cap beams would be replaced above all columns that need to be replaced, 91% of the current cap beams would be replaced.
2. Due to the minimum amount of removal required to achieve a 50-year service life and to realize the benefits of reducing joints on the bridge by rearticulating the bridge for thermal movements, consideration of replacing essentially all elements except the piers and arch ribs was discussed and is referred to in these minutes and the power point as the “50-year project”.
3. The 50-year project with removal of the deck, cap beams and columns allows for re-articulation of the bridge which includes adding hinges to columns bases and sliding the deck over short, stiff cap beams. This

could reduce the number of joints from 38 to approximately 14 or even 7. The slide shows the joint at the center of the span. It can be moved to an adjacent column of the deck could be fixed at the piers and the center, short columns and have joints at the 3rd points. The actual details and location of joints will be determined in final design.

4. Historical fabric considerations and items for inclusion in the alternatives report include:
    a. The evaluation of the condition and how replacement and rehabilitation of elements was determined is very technical and will need to be explained appropriately to SHPO and stakeholders
    b. Step through original number of cap beams and columns, what was removed in 1980 and proposed to be removed in this project.
    c. Evaluate risks to remaining historic fabric with the 25-year project vs. the 50-year project (i.e. – removing joints will protect more historic fabric now, resulting in more fabric remaining in the future)
5. The cost of staging and access was discussed. This is expected to be costly and doing the larger project now makes sense to not come back again in 25 years and have another large cost for access. This needs to be evaluated further and CMGC will be working on access costs.
6. K. Molnau offered everyone start understanding the 50-year project and what is involved in it as this is the option right now that meets the project goals.

d. 50+ -year project
    i. Consideration of achieving a service life longer than 50 years was evaluated and discussed. Based on corroding reinforcement being the basis for concrete deterioration, WJE feels using SS bars in the railing, barrier, deck, and caps/columns under joints would extend the service life of the repairs beyond 50 years. D. Enser has searched within HNTB and while approaches on special materials are being used, none of these have been proven on a project for 100 years. Other considerations such as special concrete mix designs have not been evaluated.
    ii. C. Finley mentioned grease wrapped post-tensioning to put compression in the deck is one option.
e. Work items for all alternatives
    i. The items noted in the slides are proposed on each project, regardless if 25-years or 50-years.
    ii. Arches and piers will receive a 50-year repair. Pier repairs will be around the full perimeter of the pier and will not be limited to only at the connection of arches to piers.
    iii. See slides for additional work
f. Staging considerations discussed included:

i. Safety is an issue whenever public traffic is staged with the contractor's operations.
ii. City of Minneapolis has no plans at this time to replace the watermain and thus it would need to be temporarily supported or otherwise addressed. Existing water line hangs from current cap beams
iii. Replacing the center column will be difficult in a part width scenario. If replaced along the centerline of bridge in stages (i.e. – split the center column vertically), this would place eccentric loading on the center rib and cause torsion in the rib. There is not torsion reinforcement in the rib and thus should not be eccentrically loaded. At this time, HNTB recommends no eccentric loading be placed on the arch ribs.
iv. Spans 1 and 5 have curved deck on straight ribs resulting in the centerline of the bridge being offset from centerline of center rib
v. Depending on the project type taken forward, final inside barrier location will impact where traffic can be staged and could result in geometry not conducive to part-width construction. Basically – if the 50-year project moves forward, the inner barrier is moved toward centerline which takes away from available room for traffic.
vi. C. Finley recommends the bridge be closed to public traffic during construction.
vii. Risks associated with staging and part-width construction need to be documents. HNTB take the lead on documenting risks but eventually have a document that includes MnDOT and CMGC input. For now, engineering judgement backed up by information will suffice.
viii. CMGC has evaluated the following:
    1. Complete closure with 200 T crane on crane mats over center rib working from center span toward piers for precast.
    2. If part width, CMGC is looking at 100 T cranes on outside rib starting at the center and working back to piers with cast-in-place.
    3. Planning on top down construction over lower pool
    4. The CMGC is working with 30K hook capacity.
ix. HNTB would like to understand with CMGC structural analysis items such as construction loading, is CMGC applying temperature loading, what allowable is being used. C. Finley is running SOFiSTiK software, HNTB us using CSi Bridge.
x. P. Pilarski would like the CMGC's help in understanding the cost of replacing items without taking the deck off vs. removal of the deck.

g. Next Steps
i. HNTB focus on staging and pricing the 50+ project, CIP with full closure.
ii. WJE focus on providing HNTB repair quantities
iii. CMGC focus on access and staging of the 50-year and 25-year projects
iv. Priorities:
    1. CMGC get scope of work and fee submitted
    2. C. Hoberg get meetings planned with City of Minneapolis.
    3. Costs are needed for STIP by March 1
v. J. Volz suggested starting next week we have 1-hour conference calls.

NOTES: Please call or email Dan Enser (763-852-2130, denser@hntb.com) if you have any questions or comments on these meeting minutes. Minutes are assumed to be final after 5 days.

I.D.	From Mtg	Action Item	By, When	Resolution
1	PDT #10: 1-23	The cost of the 2003/2004 joint project was asked. MnDOT to provide this cost to the team.	Next PDT	
2	PDT #10: 1-23	If the 25-year project moves forward, HNTB will coordinate what the blocking at spandrel column bases looks like with CRU	If 25 Yr project moves forward	
3	PDT #10: 1-23	The deck repairs were reviewed noting the graphics are from the structural model so not dimensionally correct. HNTB determine the percent of full depth removals.	Next week	
4	PDT #10: 1-23	The percent of current 1918 columns removed was provided. HNTB to determine the original percent of columns removed in 1980 compared to now and ultimately how much of the original fabric has already been removed.	Next week	
5	PDT #10: 1-23	HNTB take the lead on documenting risks but eventually have a document that includes MnDOT and CMGC input	ASAP	
6	PDT #10: 1-23	HNTB focus on staging- part width	ASAP	
7	PDT #10: 1-23	CMGC cost access and staging	ASAP	
8	PDT #10: 1-23	HNTB focus on cost of 50-year project physical scope of work	ASAP	
9	PDT #10: 1-23	C. Hoberg get meetings planned with City of Minneapolis.	Two weeks	
10	PDT #10: 1-23	CMGC get scope of work and fee submitted		
11	PDT #10: 1-23	WJE focus on providing HNTB repair quantities		

3rd Ave Bridge Rehabilitation–Phase 1, PDT # 10 (1-23-18)

- Agenda:
  - Introductions/Overview (1:00 - 1:15)
  - NEPA Document Status (1:15 – 1:30)
  - Review Cross Section Status (1:30 – 1:45)
  - Rehabilitation Alternatives Definition (1:45 – 3:30)

3rd Ave Bridge Rehabilitation–Phase 1, PDT # 10 (1-23-18)

- Review Cross Section Status
  - Added Existing section and Option 7 with 4 ft shoulder
  - Added recreation of original cruciform lights to matrix
  - Added placing lights on ornamental railing to matrix
  - Reorganized ornamental railing matrix
  - Added views to address vertical openings

Next steps??

3rd Ave Bridge Rehabilitation–Phase 1, PDT # 10 (1-23-18)

- Rehabilitation Alternatives Definition
  - Project Goals:
    - Repair/replace deck and rehabilitate the bridge to achieve at least a 50-year design life.
    - Complete the project within budget.
    - Minimize bridge closure to less than 24 months.
    - Develop a design that meets the Secretary of the Interior's Standards for the Treatment of Historic Properties.
      - Maintaining character-defining features and historic fabric (to the extent possible) to avoid an adverse effect under the Section 106 review of the National Historic Preservation Act for the project, and a Section 4(f) use.
    - Maintain pedestrian and vehicular traffic adjacent to the project and under the bridge during construction.
    - Minimize impacts to stakeholders (local community, historic district, parks, businesses).

3rd Ave Bridge Rehabilitation–Phase 1, PDT # 10 (1-23-18)

- Rehabilitation Alternatives Definition
  - Project Goals (continued):
    - Minimize impacts to the environment (including protected or endangered species, the river, park land, and other properties adjacent to the project).
    - Build a professional and collaborative project team among the owner, designer, and contractor using the CMGC delivery method.
    - Maintain public trust and confidence in the Project and the CMGC process.
    - Safety of workers and public
    - Quality
    - Public engagement
    - Minimizing project risk.

3rd Ave Bridge Rehabilitation–Phase 1, PDT # 10 (1-23-18)

Rehabilitation Alternatives Definition - 25 year condition evaluation - Spandrels / Walls - Away from a current joint:

Never joint (low chlorides) & 1918-1980 joint (moderate chlorides):

a) For 1980 concrete: (primary mechanism is chlorides, though low)

- DQ <10%: No action (surface repairs at MnDOT's discretion)
- DQ of 10-30%: Rehab* entire column/wall to last 25 years, then replace element
- DQ >30%: Replace element

b) For 1918 concrete: (primary mechanism is carbonation & chlorides)

- DQ <5%: No action (surface repairs at MnDOT's discretion)
- DQ of 5-30%: Rehab* entire column/wall to last 25 years, then replace element
- DQ >30%: Replace

3rd Ave Bridge Rehabilitation–Phase 1, PDT # 10 (1-23-18)

Rehabilitation Alternatives Definition - 25 year condition evaluation - Spandrels / Walls – At current joint:

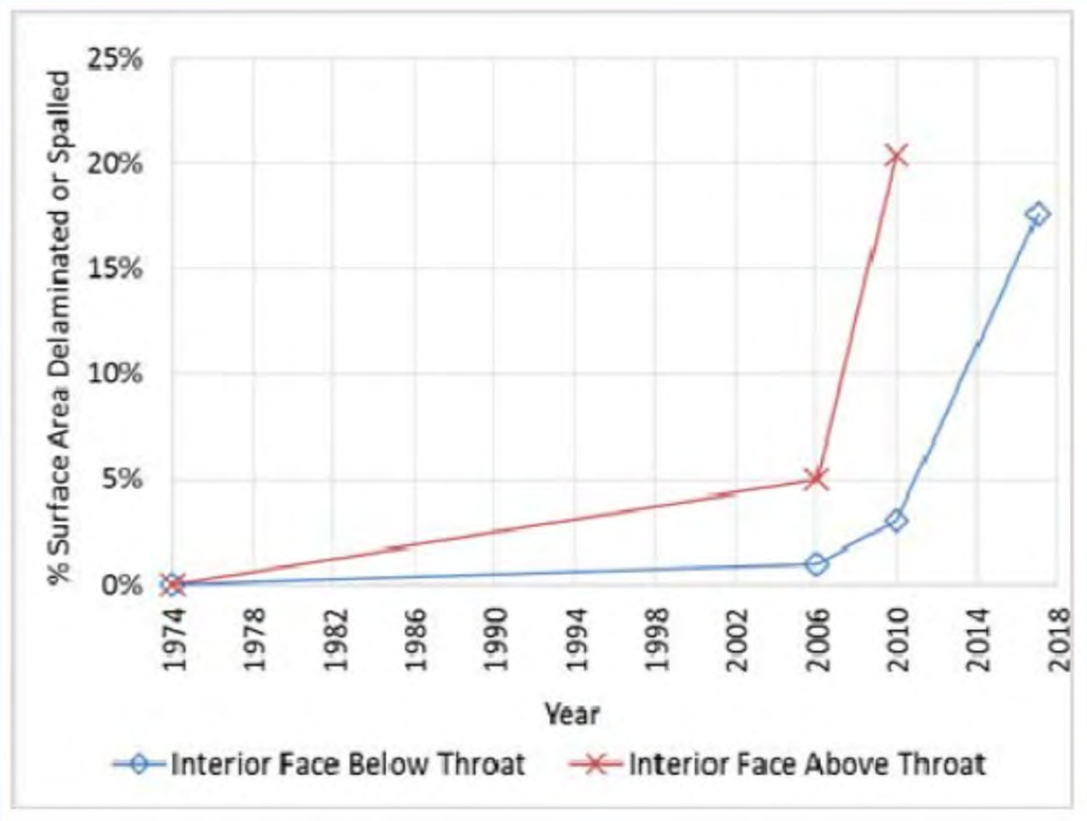
1980-present joint (high chlorides) & Always joint (highest chlorides):

- For 1918 & 1980 concrete: (primary mechanism is chlorides)
  - DQ <2%: No action (surface repairs at MnDOT's discretion)
  - DQ of 2-30%: Rehab* entire column/wall to last 25 years, then replace element; or replace element now since access will be easy with deck gone above
  - DQ >30%: Replace element

3rd Ave Bridge Rehabilitation–Phase 1, PDT # 10 (1-23-18)

Rehabilitation Alternatives Definition - 25 year condition evaluation - Spandrels / Walls – At current joint:

- Sample curve of damage progression from chlorides



3rd Ave Bridge Rehabilitation–Phase 1, PDT # 10 (1-23-18)

Rehabilitation Alternatives Definition - 25 year condition evaluation - Spandrels / Walls

* Rehab definitions:

- Columns/walls never at joint: Surface repairs, rough surface leveling (render), and water-resistant coating
- Columns/walls located below joint sometime in past: Surface repairs, corrosion mitigation (distributed system such as arc sprayed zinc), and water-resistant coating

3rd Ave Bridge Rehabilitation–Phase 1, PDT # 10 (1-23-18)

Rehabilitation Alternatives Definition - 25 year condition evaluation – 1980 Cap Beams

- Away from current joint - Never joint (low chlorides):
  - For 1980 concrete: (primary mechanism is chlorides, though low)
    - DQ <10%: No action (surface repairs at MnDOT's discretion)
    - DQ 15-30%: Rehab** to last 25 years, then replace
    - DQ >30%: Replace
- At a current joint - 1980-present joint (high chlorides):
  - For 1980 concrete: (primary mechanism is chlorides)
    - DQ <2%: No action (surface repairs at MnDOT's discretion)
    - DQ 2-30%: Rehab** to last 25 years, then replace; or replace element now since access will be easy with deck gone above
    - DQ >30%: Replace

3rd Ave Bridge Rehabilitation–Phase 1, PDT # 10 (1-23-18)

Rehabilitation Alternatives Definition - 25 year condition evaluation – 1980 Cap Beams

** Rehab definition:

- Cap beams never at joint: Surface repairs and water-resistant coating
- Cap beams at joints: Surface repairs, corrosion mitigation (distributed system such as arc sprayed zinc), and water-resistant coating

3rd Ave Bridge Rehabilitation–Phase 1, PDT # 10 (1-23-18)

Rehabilitation Alternatives Definition:

- 25 year - Minimum work to achieve 25 years – See graphic
  - Remove “good” deck and cap beam to replace column?
  - Replace span 1, cap/column at G and H – torsion cracks
  - Add “blocking” at base of cracked columns/walls
  - Full depth deck repairs:
    - 2 ft downstream edge (results in ornamental railing removal)
    - Piers 1, 6 and 8 – upstream 1/3 of deck for manholes
    - 3 ft longitudinal center joint
    - Each expansion joint
    - Mill & overlay

3rd Ave Bridge Rehabilitation–Phase 1, PDT # 10 (1-23-18)

Rehabilitation Alternatives Definition:

- 25 year - Minimum work to achieve 25 years
  - Full depth deck repairs photos:

.14. Slab underside delamination at

Figure 4.17. Slab underside spalls and rebar section loss at manholes in southbound lane.

Figure 4.10. Downstream deck edge condition.

DEPARTMENT OF TRANSPORTATION

HNTB

3rd Ave Bridge Rehabilitation–Phase 1, PDT # 10 (1-23-18)

Rehabilitation Alternatives Definition 25 year

- Minimum work to achieve 25 years

– Joints = similar to 1918 joints

- Pier 8 crack first noted in 1992
- Span 1 & 7 column cracks – 1994
- Cap beam spalls – 1986
- Cap beam shear cracks - 1991

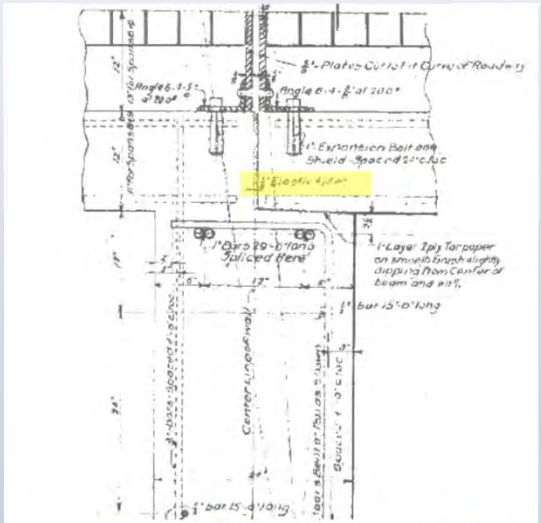


Figure 5.2. Detail from 1916 blue line plans with deck joint callout (highlighted).

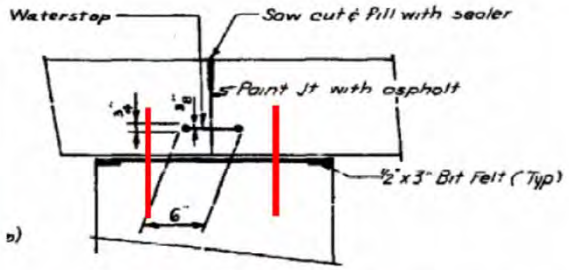


Figure 5.4. Typical joint detail from 1980 plans.

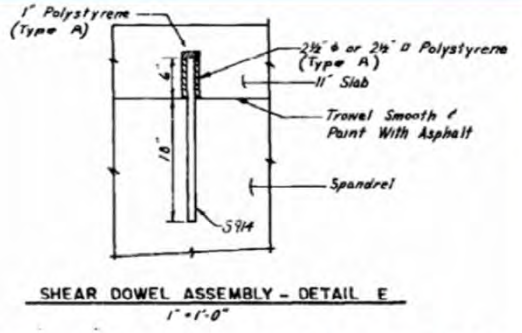


Figure 5.5. Detail of vertical dowels with foam surrounds, from 1980 plans.

3rd Ave Bridge Rehabilitation–Phase 1, PDT # 10 (1-23-18)

Rehabilitation Alternatives Definition 25 year - Minimum work to achieve 25 years

- Joints (cont.)

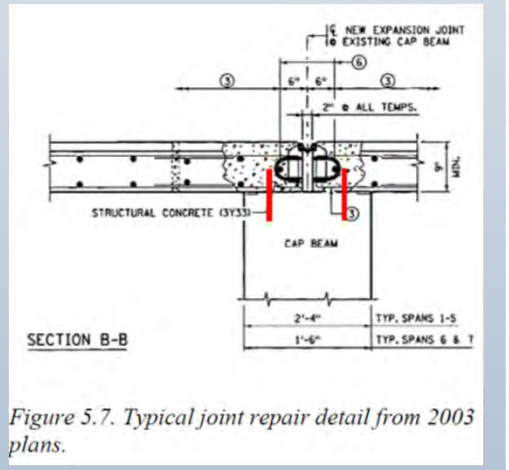


Figure 5.7. Typical joint repair detail from 2003 plans.

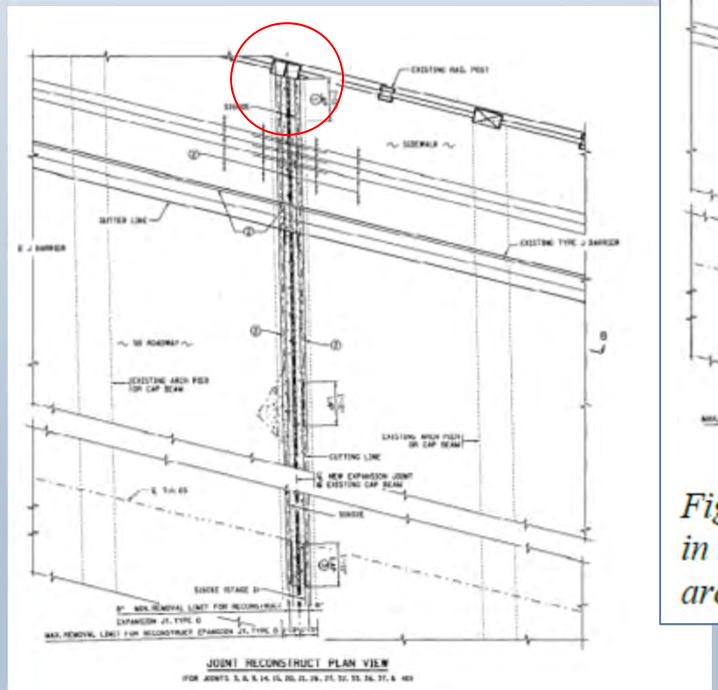


Figure 5.8. Half-deck plan showing strip seal joint in roadway and sidewalk for joints located adjacent to arch piers.

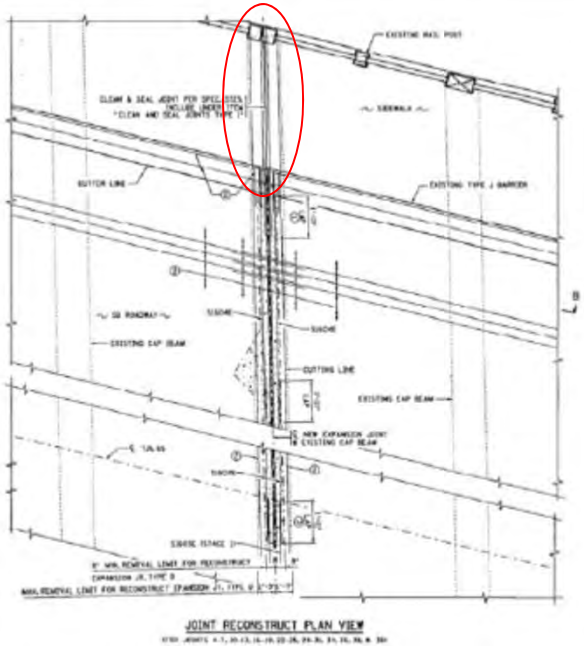


Figure 5.10. Half-deck plan showing strip seal in roadway only for joints located away from arch piers.

DEPARTMENT OF TRANSPORTATION

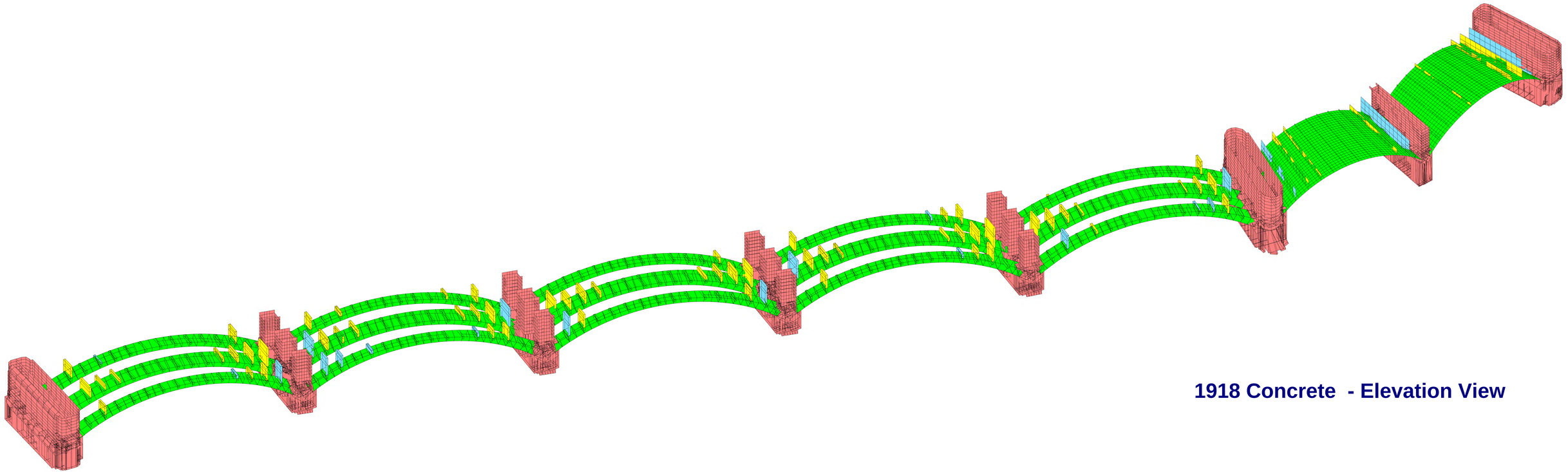
HNTB

3rd Ave Bridge Rehabilitation–Phase 1, PDT # 10 (1-23-18)

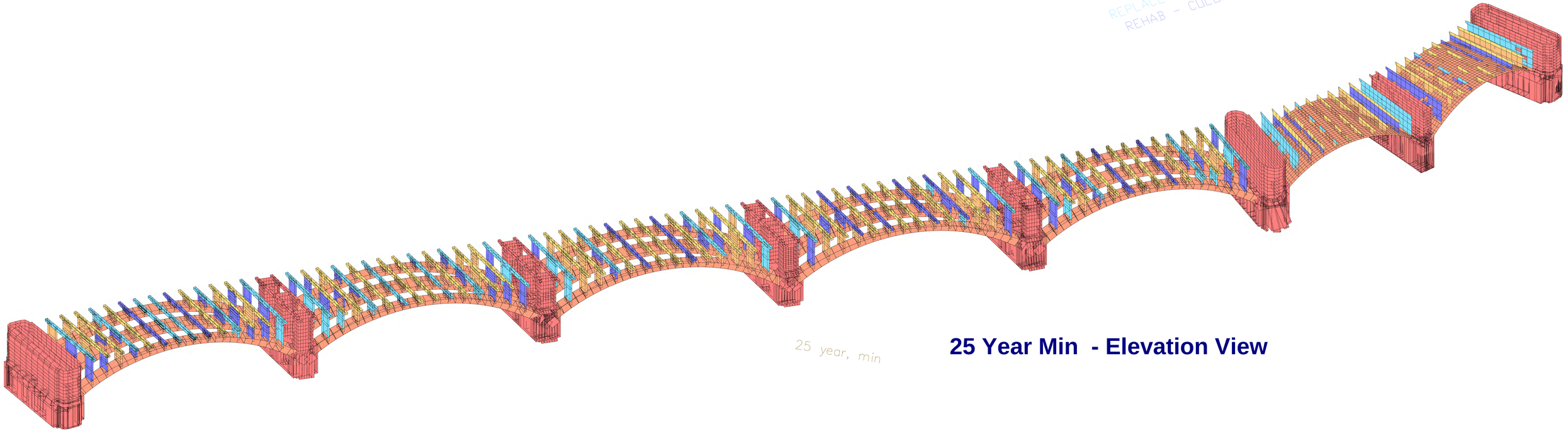
Rehabilitation Alternatives Definition 25 year - Minimum work to achieve 25 years - By the numbers

- 1918 Columns only – 21 out of 86 replaced (24% replaced by each or 27% of total length)

- 1918 & 1980 Columns/Walls:
  - 28 out of 230 columns/walls replaced (12% replaced)
  - 70 out of 230 columns/walls repaired (30% repaired)
- 1980 Cap Beams
  - 27 out of 90 cap beams replaced (30% replaced)
  - 12 out of 90 cap beams repaired (13% replaced)

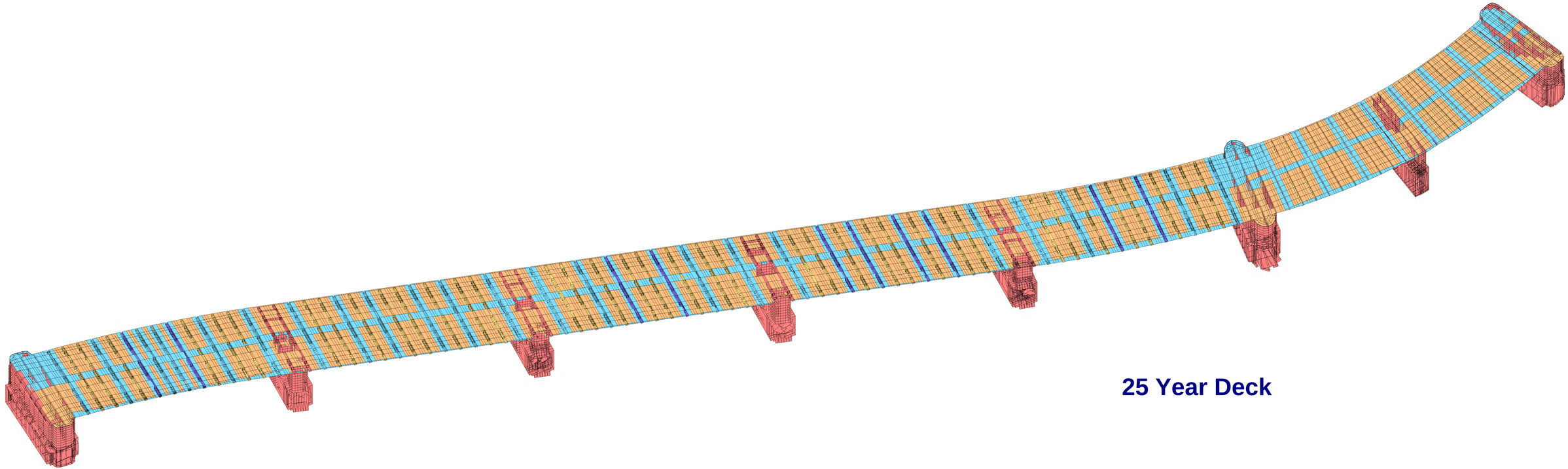


1918 Concrete - Elevation View



25 Year Min - Elevation View

Extruded View_Material_As-Inspected Rev 2.0 Maner BR 2440 Exist 20170526 25 yr.DXF



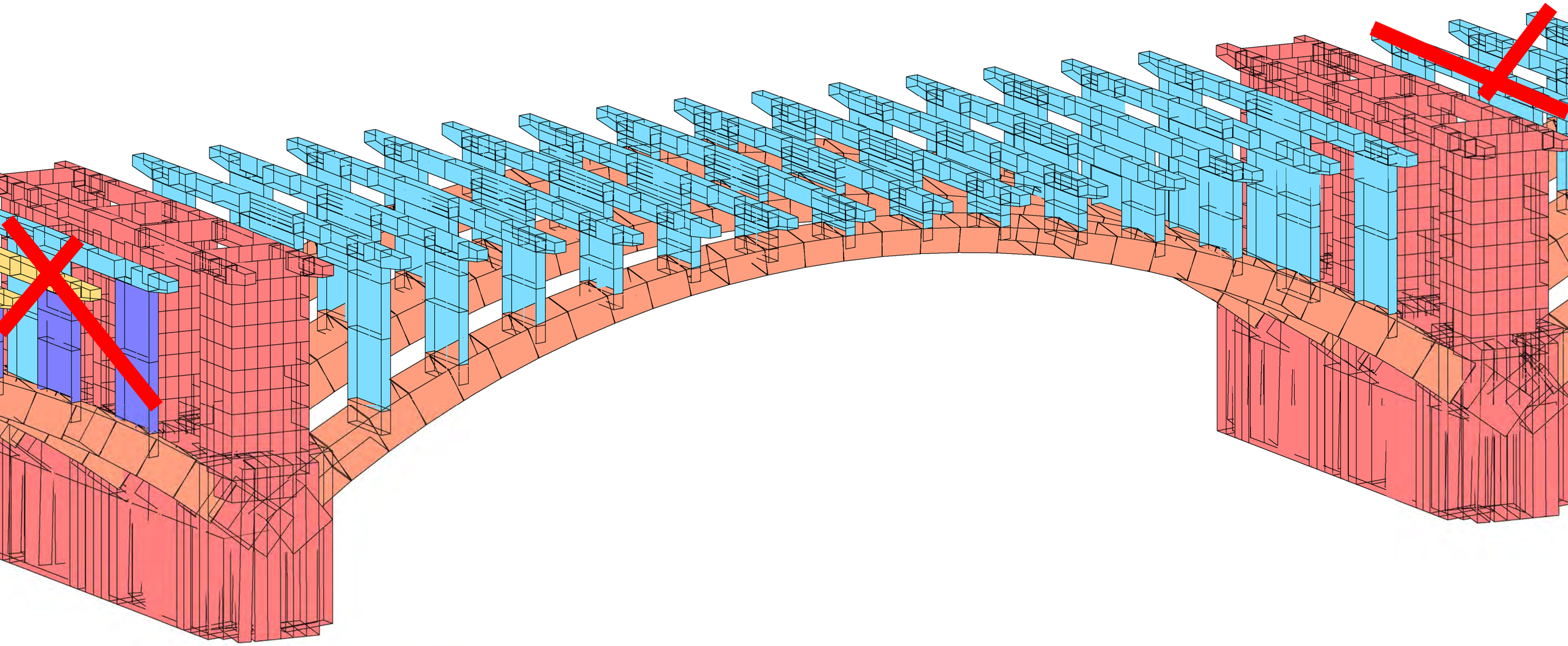
25 Year Deck

Extruded View, Material, As-Inspected Rev 2.0 Master BR 2440 Exist 20170526 25 vs DXF

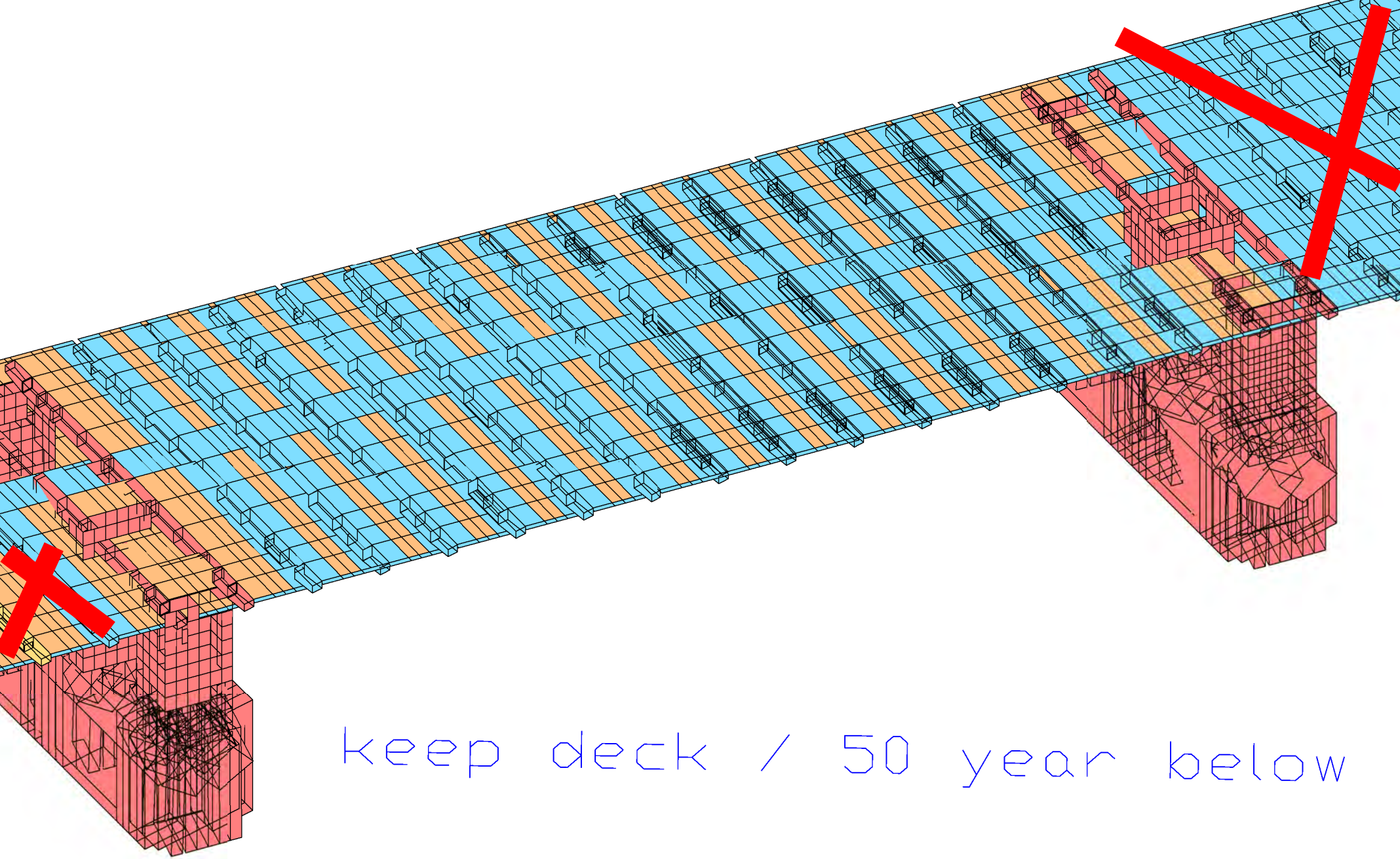
3rd Ave Bridge Rehabilitation–Phase 1, PDT # 10 (1-23-18)

Rehabilitation Alternatives Definition:

- 25 year - keep deck / 50 year repair below deck – See 50 year minimum graphic
  - Full depth deck repairs:
    - 2 ft downstream edge (results in ornamental railing removal)
    - Piers 1, 6 and 8 – upstream 1/3 of deck for manholes
    - 3 ft longitudinal center joint
    - At each cap beam to replace caps/columns for 50-yr fix
    - Mill & overlay



keep deck / 50 year below


keep deck / 50 year below

3rd Ave Bridge Rehabilitation–Phase 1, PDT # 10 (1-23-18)

Rehabilitation Alternatives Definition - 50 year condition evaluation – Columns & Walls – Away from current joint:

- Never joint (low chlorides -rehabilitated 38 of 100 columns/walls) & 1918-1980 joint (moderate chlorides – rehabilitate 10 of 32 columns/walls)
  - For 1980 concrete: (primary mechanism is low chlorides)
    - DQ = 0% and no wide cracking at base: Rehab (Rehab = surface repairs plus water-resistant coating)
    - DQ > 0% or wide cracking at base: Replace (all potential, practical rehabilitation schemes have significant risks and/or insufficient performance history such that we cannot confidently project a 50-year service life for rehabilitation -- see explanations below*)
  - For 1918 concrete: (primary mechanism is carbonation)
    - SAME ACTION CRITERIA AS ABOVE (Rehab = surface repairs, surface leveling material, plus water-resistant coating)
-

3rd Ave Bridge Rehabilitation–Phase 1, PDT # 10 (1-23-18)

Rehabilitation Alternatives Definition - 50 year condition evaluation – Columns & Walls – Currently a joint:

- 1980-present joint and always a joint (high chlorides):
  - For 1980 concrete: (primary mechanism is chlorides)
    - Replace all columns/walls in this category regardless of DQ due to presence or likelihood of high chlorides, and significant risks and/or in sufficient data to confidently project a 50-year service life for available rehabilitation schemes -- see explanation below*
  - For 1918 concrete: (primary mechanism is chlorides)
    - SAME ACTION CRITERIA AS ABOVE

3rd Ave Bridge Rehabilitation–Phase 1, PDT # 10 (1-23-18)

Rehabilitation Alternatives Definition - 50 year condition evaluation – Cap beams

- Never joint (low chlorides – rehabilitate 41 of 90 total cap beams)
  - DQ = 0%: Rehab (surface repairs plus water-resistant coating)
  - DQ > 0%: Replace (all potential, practical rehabilitation schemes have significant risks and/or insufficient performance history such that we cannot confidently project a 50-year service life for rehabilitation -- see explanations below*)
- 1980-present joint (high chlorides):
  - Replace all cap beams in this category regardless of DQ due to presence or likelihood of high chlorides, and significant risks and/or insufficient data to confidently project a 50-year service life for available rehabilitation schemes -- see explanation below*

3rd Ave Bridge Rehabilitation–Phase 1, PDT # 10 (1-23-18)

Rehabilitation Alternatives Definition - 50 year Repair

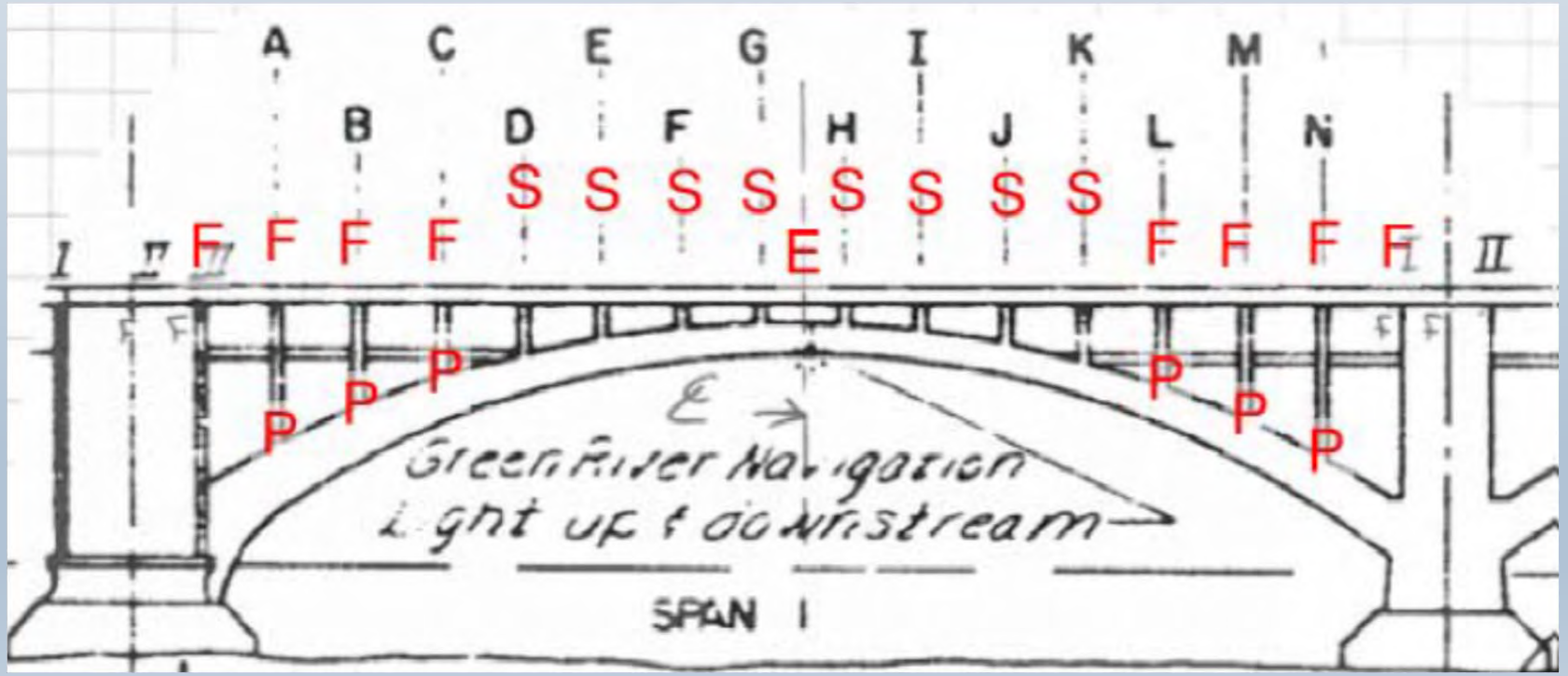
- Rehabilitation Possibilities Considered But Not Recommended For Spandrel Columns/Walls And Cap Beams:
  - **Arc sprayed zinc metallizing:** The zinc in this system will be largely consumed or ineffective after 15-20 years, well short of the 50-year service life.
  - **Electrochemical chloride extraction (ECE):** In our opinion, there is insufficient information and performance history for us to recommend with confidence that this treatment can be relied upon as a component of a 50-year rehabilitation scheme.
  - **FRP wrapping/encapsulation:** In our opinion, this approach has significant risks and disadvantages as it relates to possible inclusion as part of a 50-year rehabilitation scheme for this case, as follows: (debonding allowing moisture intrusion, trapped moisture, impedes inspection, potentially not in line with historic direction, insufficient data and performance history exists for WJE to confidently project a 50-year service life)

3rd Ave Bridge Rehabilitation–Phase 1, PDT # 10 (1-23-18)

- Rehab. Alt. Definition - 50 year repair - By the numbers
  - 1918 Columns only – 84 out of 86 replaced (98% replaced by each or 96% replaced by length)
  - 1918 & 1980 Columns/Walls (100% need work):
    - 181 out of 230 columns/walls replaced (79% replaced)
    - 49 out of 230 columns/walls repaired (21% repaired)
  - 1980 Cap Beams (100% need work)
    - 49 out of 90 cap beams replaced (54% replaced)
    - 41 out of 90 cap beams repaired (46% replaced)
  - Remove caps to remove columns results in 91% of the cap beams being replaced.
- Consider replacement of all columns and cap beams since deck off and can rearticulate the deck to greatly reduce joints

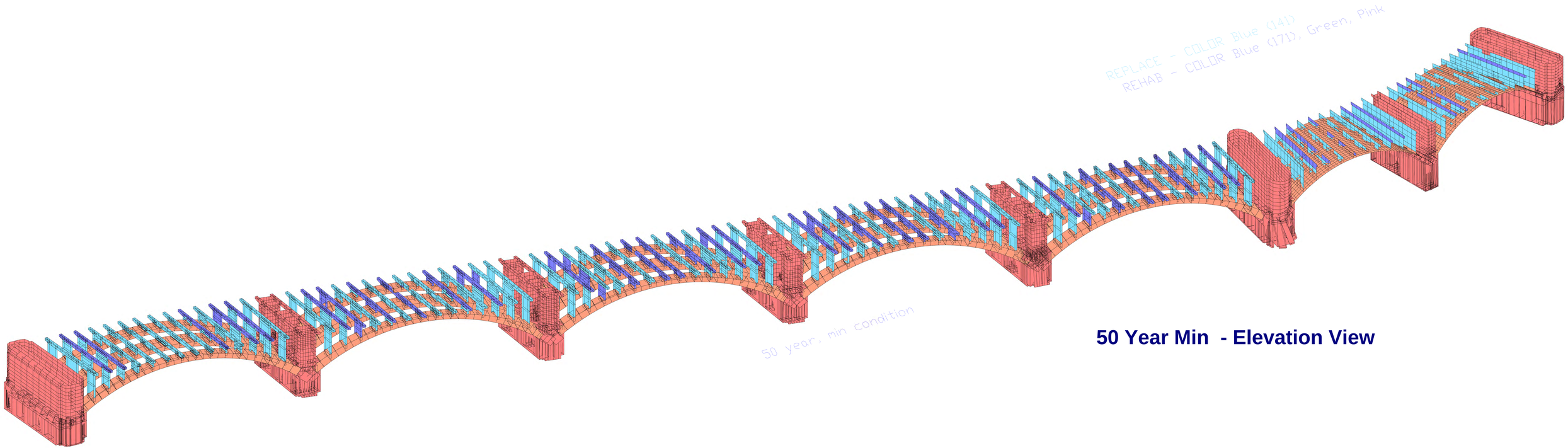
3rd Ave Bridge Rehabilitation–Phase 1, PDT # 10 (1-23-18)

- Rehabilitation Alternatives Definition - 50 year repair
  - Joints / Jointing
    - F = deck fixed to cap, P = column pin/hinge to arch, S = deck sliding over cap, E = Expansion joint in deck

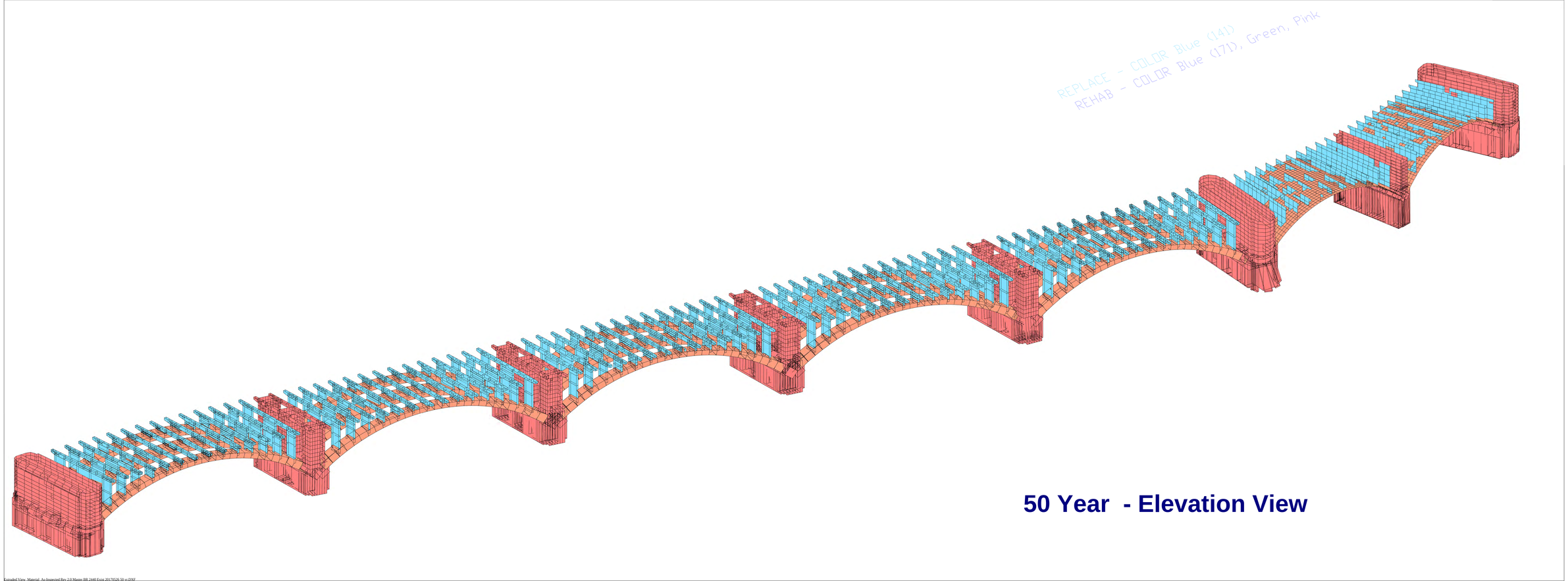


3rd Ave Bridge Rehabilitation–Phase 1, PDT # 10 (1-23-18)

- Rehabilitation Alternatives Definition - 50 year repair
  - Replace deck, barriers, railing posts and lights
  - Address low negative moment rating with deck steel over S bent pier



50 Year Min - Elevation View



50 Year - Elevation View

Extruded View_Material_As-Inspected Rev 2.0 Master BR 2440 Exist 20170526 50 yr.DXF

3rd Ave Bridge Rehabilitation–Phase 1, PDT # 10 (1-23-18)

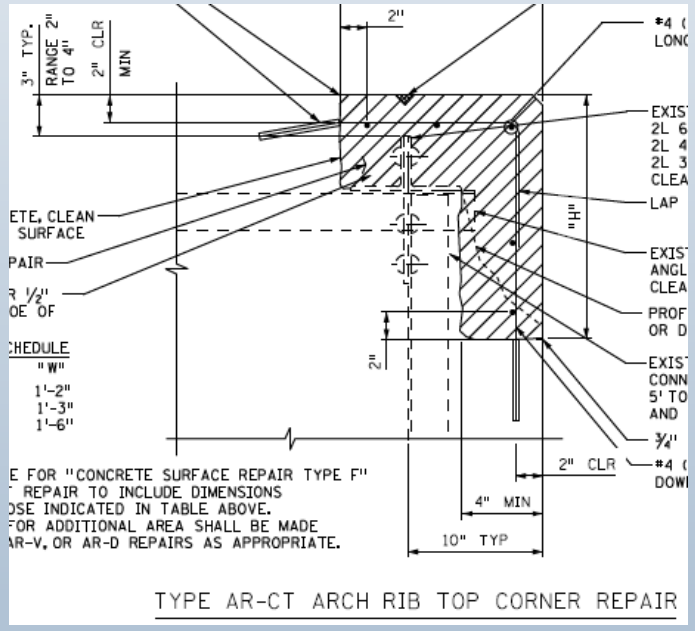
- Rehabilitation Alternatives Definition – Considerations to extend service life beyond 50 years (100 year repair?)
  - Same as 50 year project except place SS bars in the following:
    - Deck
    - Barriers/railing posts
    - Caps and columns under joints

3rd Ave Bridge Rehabilitation–Phase 1, PDT # 10 (1-23-18)

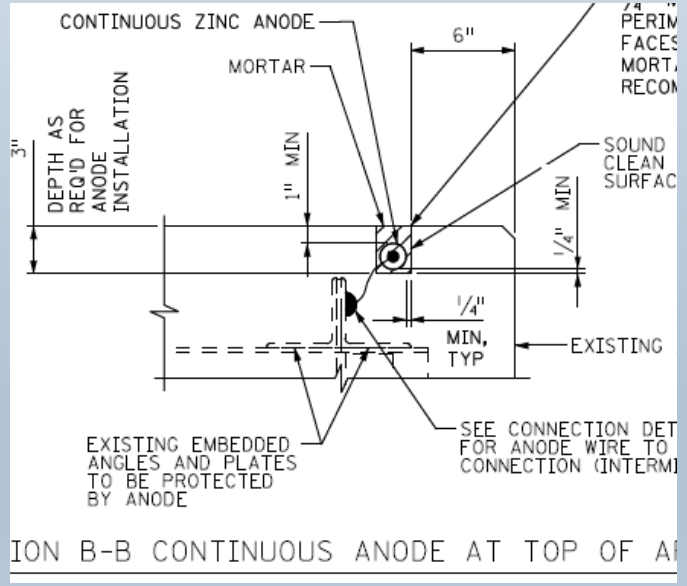
- Rehabilitation Alternatives Definition – Work common to all
  - 50-yr service life repairs on:
    - Piers from deck to water line (and possibly below)
    - Arch ribs and barrel arches
      - Execute surface repairs to all unsound concrete on all arch rib surfaces (details similar to Franklin Avenue).
      - Install zinc strip anodes along all four corners of arch ribs in regions between concrete corner repairs (details similar to Franklin Avenue where ongoing monitoring has verified good performance).
      - Repair longitudinal cracks on top surface (elastomeric sealant).
      - Apply high performance water resistant coating to all surfaces.
    - Piers 1 & 8 (repair cracks)

3rd Ave Bridge Rehabilitation–Phase 1, PDT # 10 (1-23-18)

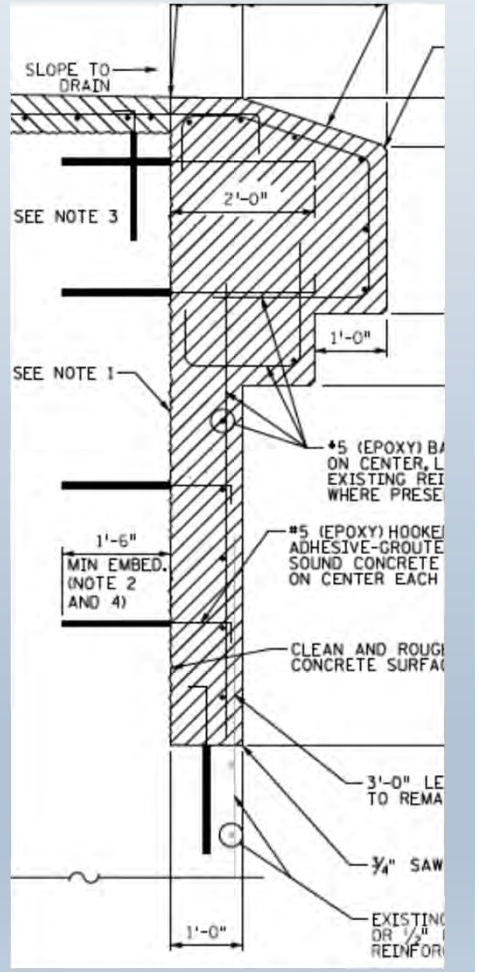
- Rehabilitation Alternatives Definition – Work common to all
  - Sample 50-yr service life repairs:



TYPE AR-CT ARCH RIB TOP CORNER REPAIR

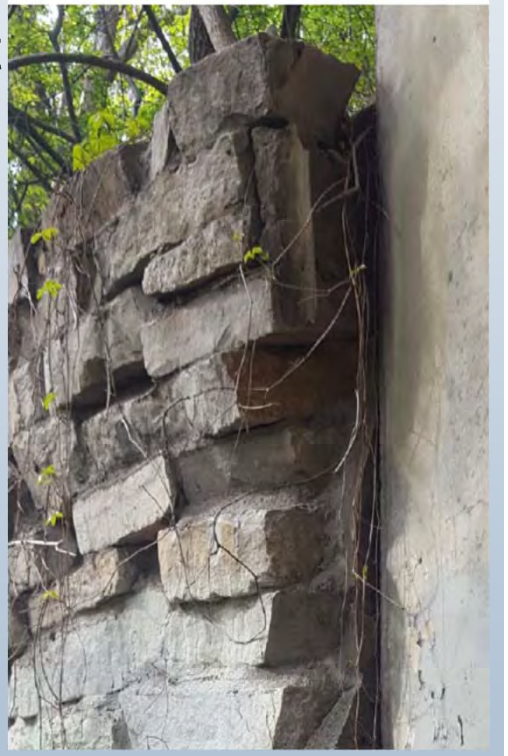


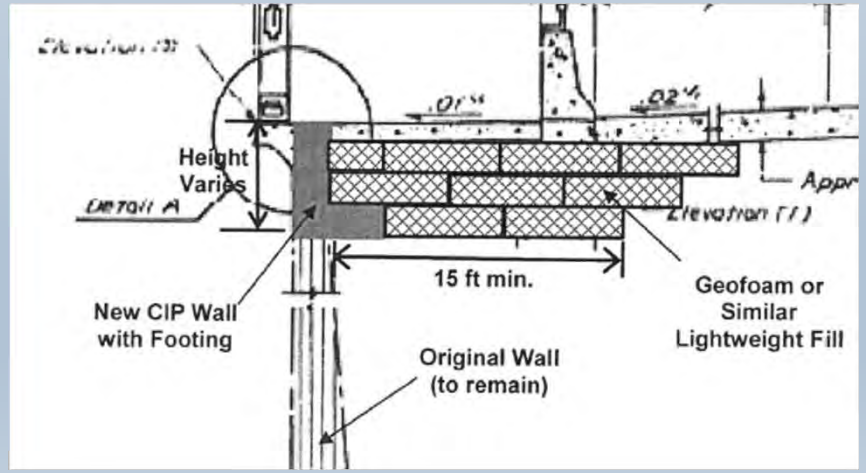
ION B-B CONTINUOUS ANODE AT TOP OF A



3rd Ave Bridge Rehabilitation–Phase 1, PDT # 10 (1-23-18)

- Rehabilitation Alternatives Definition – <u>Work common to all</u>
  - Stabilize downstream masonry wall at S abut
  - Install drains in N 1918 walls
  - Remove N abut enclosure, repair drains
  - Repair S abut drains
  - Replace top N 1918 walls, repair walls



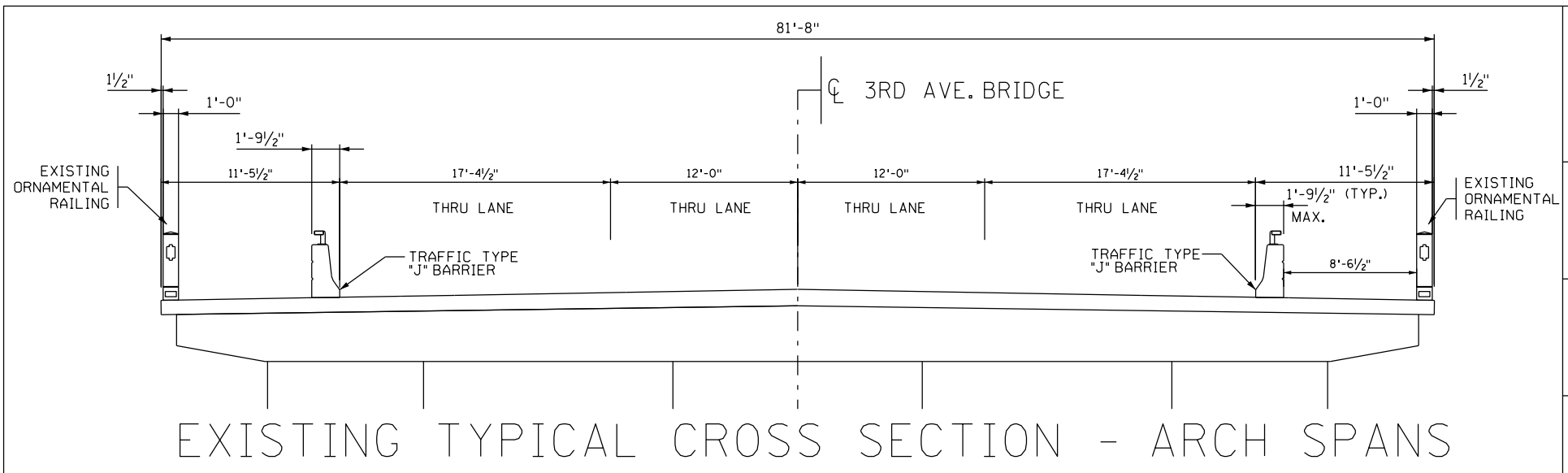


DEPARTMENT OF TRANSPORTATION

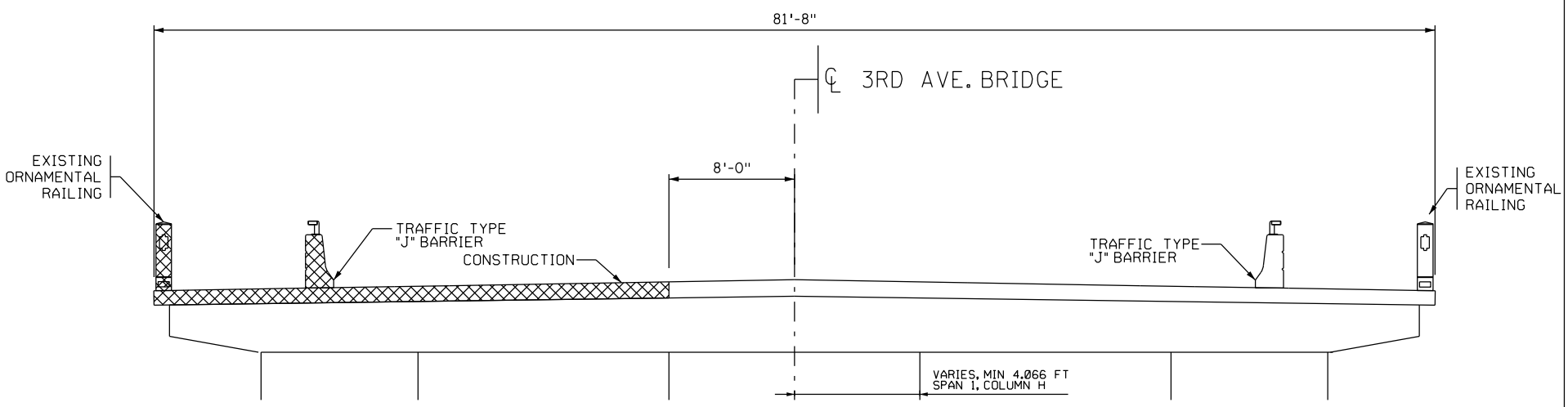
HNTB

3rd Ave Bridge Rehabilitation–Phase 1, PDT # 10 (1-23-18)

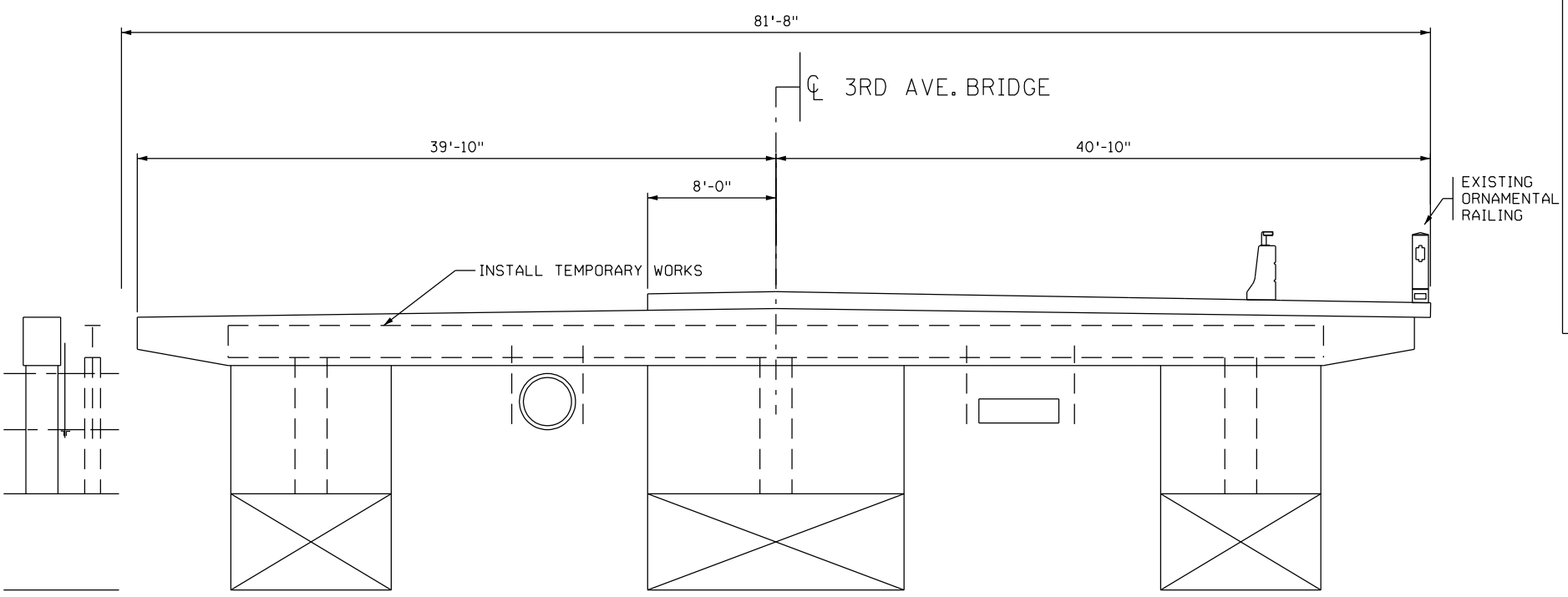
- Rehabilitation Alternatives Definition – Work common to all
  - Approach bridges
    - Repair all unsound concrete
    - Replace bearings / anchor rods
    - Repair ends of concrete beams for shear
  - Coat all bridge



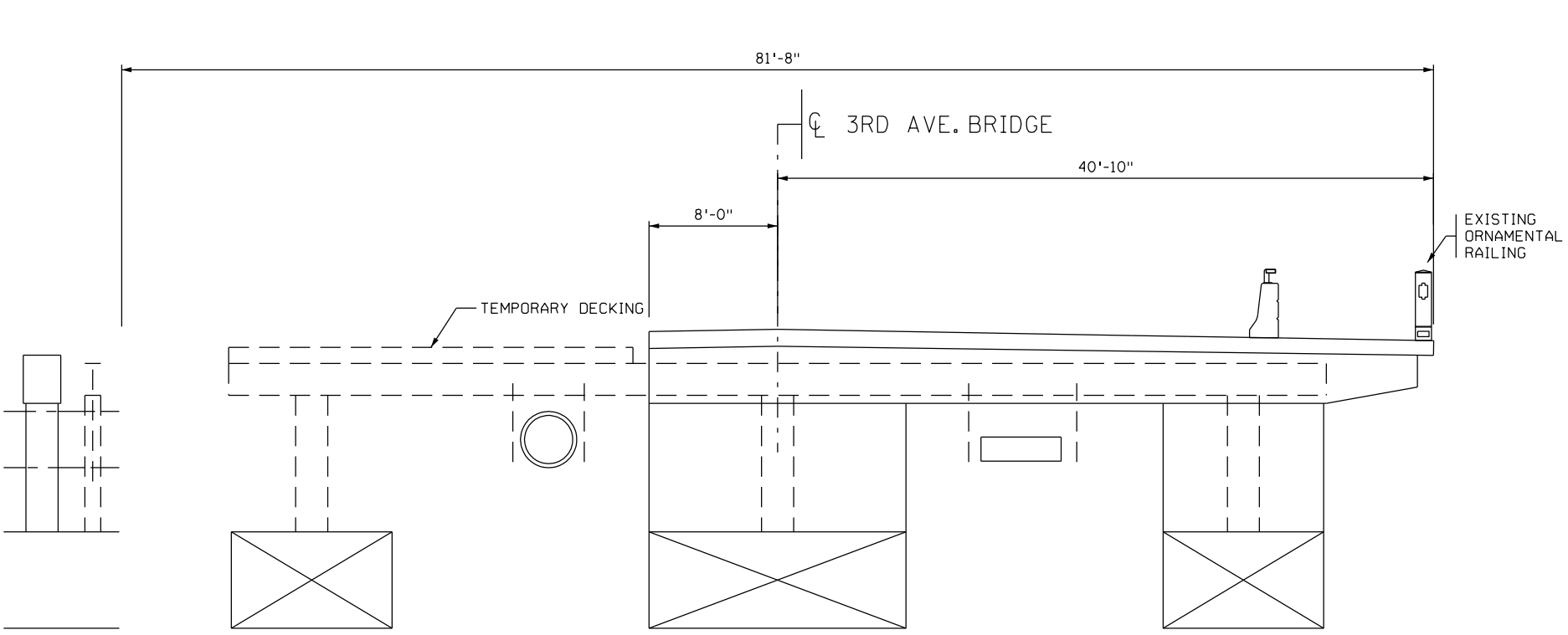
EXISTING TYPICAL CROSS SECTION - ARCH SPANS



STAGE 1: SHIFT TRAFFIC TOWARDS UPSTREAM



STAGE 2: INSTALL TEMP. WORKS TO SUPPORT UTILITIES



STAGE 3: REMOVE DOWNSTREAM CAP & COLUMN, INSTALL TEMP. DECKING

BRIDGE NO.

CHK:

DR:

SHEET NO. OF SHEETS

3RD AVENUE BRIDGE - STAGING (DRAFT)

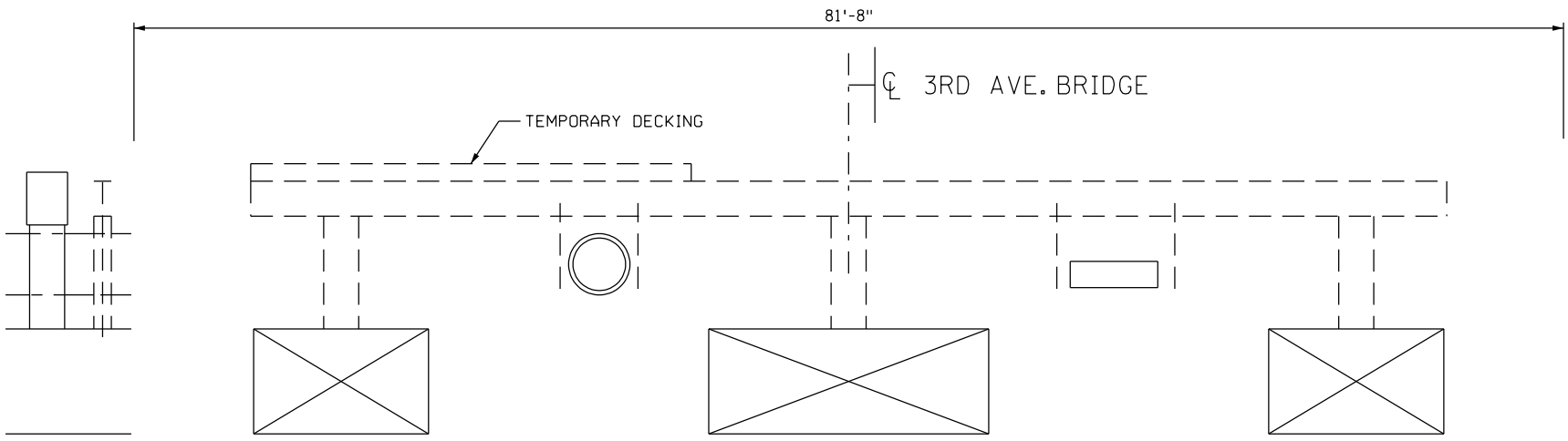
STATE PROJECT NO. -

TIME : $@TIME@$

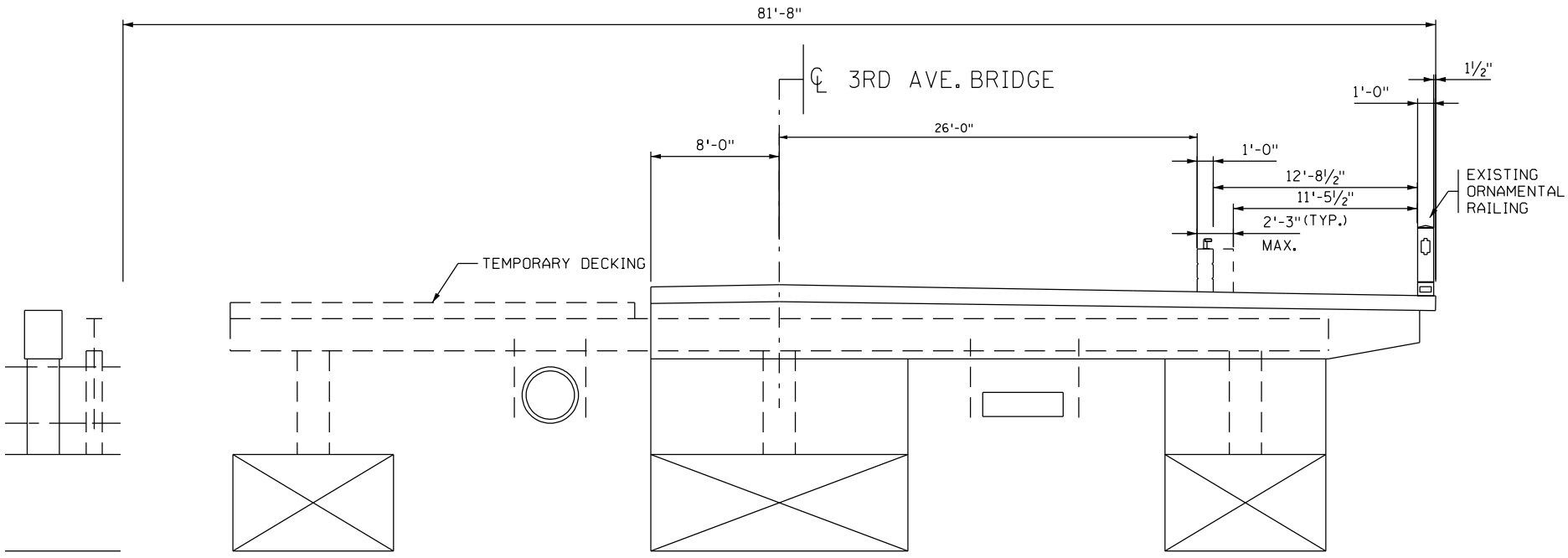
PLOTTED : $@DATE@$

PATH & FILENAME: $filename$

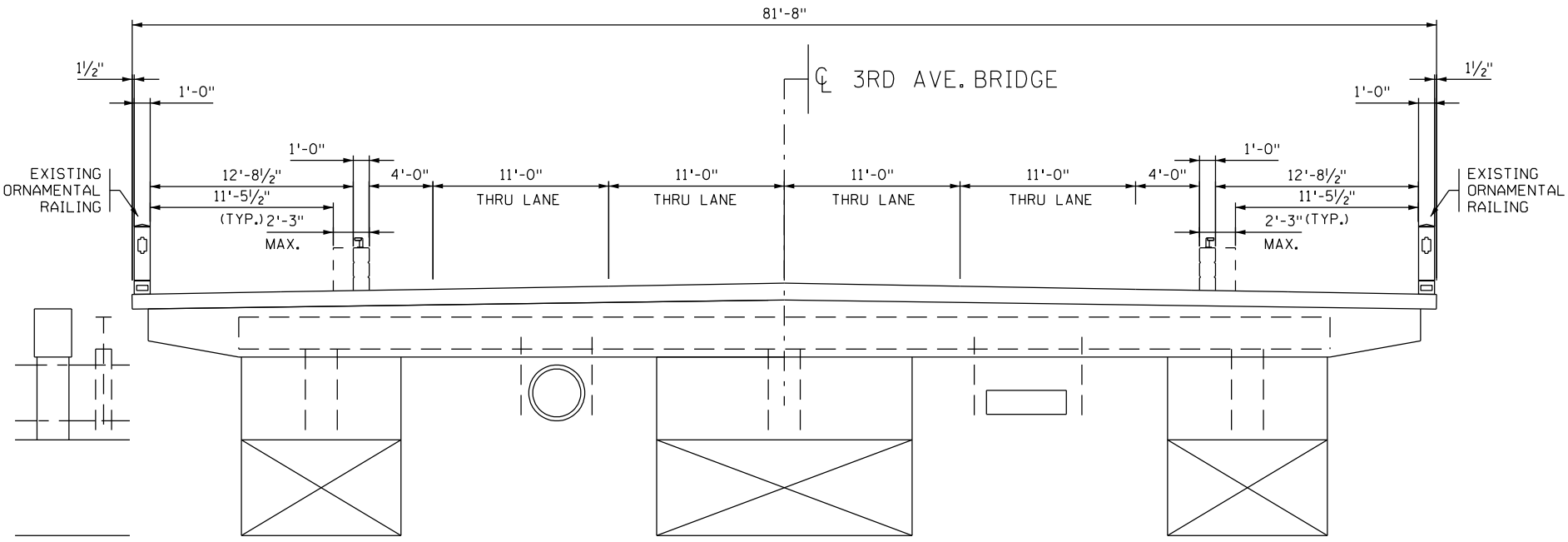
bridgefinaldesignseed.dgn



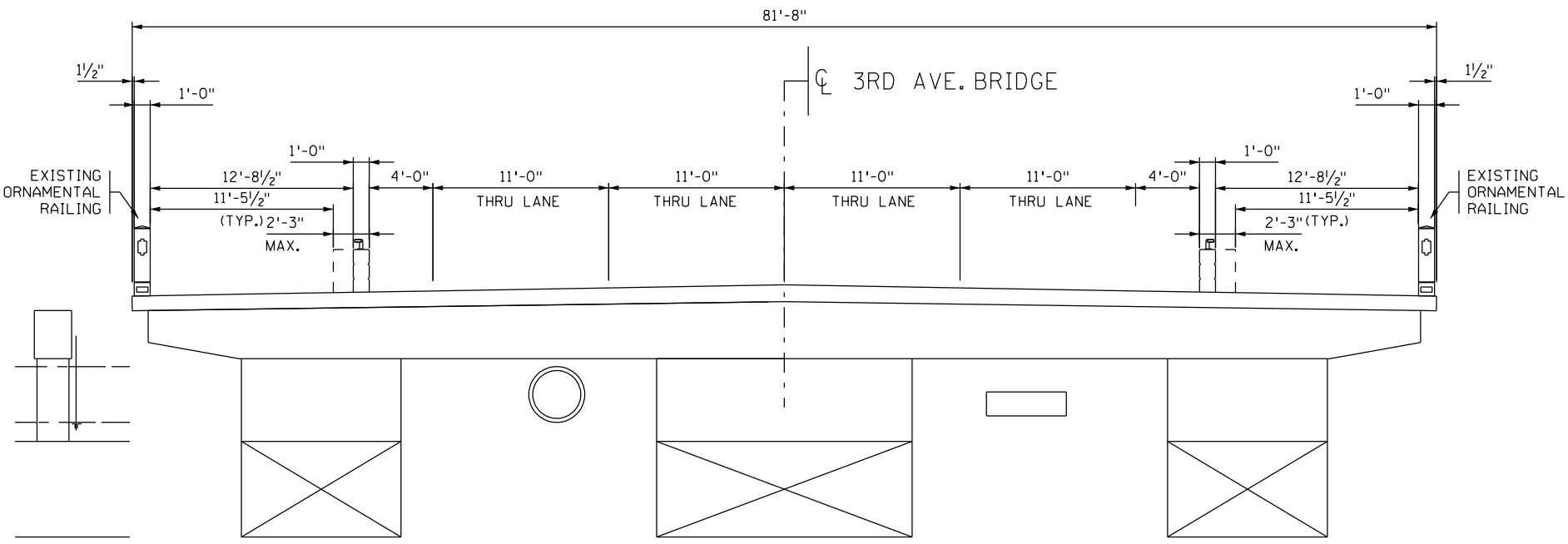
STAGE 4: REMOVE REMAINING CAP & COLUMNS



STAGE 5: INSTALL NEW CAP, COLUMNS, DECK & BARRIERS



STAGE 6: INSTALL NEW CAP, COLUMNS, DECK & BARRIERS



STAGE 7: REMOVE TEMP. WORKS, REATTACH UTILITIES TO NEW CAP BEAMS

BRIDGE NO. -

CHK:

DR:

SHEET NO. OF SHEETS

3RD AVENUE BRIDGE - STAGING (DRAFT)

STATE PROJECT NO. -

TIME : $@TIME@$

PLOTTED : $@DATE@$

PATH & FILENAME: $filenam e$

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3rd Ave Bridge Rehabilitation–Phase 1, PDT # 10 (1-23-18)

- QUESTIONS / COMMENTS / NEXT STEPS