

Appendix A – Rehabilitation Costs

Table A-1: Bridge Rehabilitation Cost Summary¹

Items of Work	Units	Quantity	Unit Price	Cost
Structural	LS	1	\$5,206,800	\$5,206,800
⁴ Track and Treads	LS	1	\$6,226,000	\$6,226,000
Mechanical	LS	1	\$562,600	\$562,600
Electrical	LS	1	\$1,425,700	\$1,425,700
			Sub Total	\$13,421,100
Mobilization			5%	\$671,100
² Allowance for Un-quantified Costs			15%	\$2,013,200
³ Contingencies			20%	\$2,684,300
Construction Total				\$18,790,000

¹ All costs based on 2018 dollars.

² Percentage to account for items not able to be quantified prior to design

³ Percentage to allow for unforeseen or unknown issues.

⁴ Unit Price of this item includes a 30% contingency for complexity

Table A-2: Structural Rehabilitation Cost Summary

Items of Work	Units	Quantity	Unit Price	Cost
Bridge Scour Remediation	LS	1	\$234,500	\$234,500
Operator House Refurbish (Windows, Roof, Doors)	LS	1	\$96,800	\$96,800
Bascule Pier (Counterweight Pit Drain Lines)	LS	1	\$13,020	\$13,000
Removal of Epoxy Overlay, Special	Sft	9,405	\$1.30	\$12,200
Epoxy Overlay	Syd	1,735	\$43	\$74,600
Joint Repairs	Ft	85.5	\$574	\$49,100
Structures, Rehabilitation, Rem Portions	Cyd	96.6	\$310	\$29,900
Superstructure Conc	Cyd	96.6	\$345	\$33,300
Superstructure Conc, Form, Finish, and Cure	Cyd	96.6	\$480	\$46,400
Reinforcement, Steel, Epoxy Coated	Lb	4,321	\$2.10	\$9,100
Bridge Railing, 4 Tube	Ft	757	\$213	\$161,300
Steel Structure, Cleaning and Coating, Partial, Type 4	Sft	10,618	\$23	\$244,200
Replace Center Breaks (Roadway and Sidewalk)	Lb	4,670	\$6.50	\$30,400
Rear Break Neoprene Blocks	Ft	86	\$257	\$22,100
Skewed Longitudinal Joint	Ft	99.3	\$1,149	\$114,100
Structural Steel, Retrofit, Furn, Fab and Erect	Lb	1,900	\$40	\$76,000
Shim Center Locks and Uplift Points	LS	1	\$22,500	\$22,500
Balancing Bascule Leaves	LS	1	\$271,600	\$271,600
Cleaning Counterweight Pit Interiors	LS	1	\$24,600	\$24,600
Hand Chipping, Other Than Deck	Cft	323	\$61	\$19,700
Patch, Forming	Sft	449	\$35	\$15,700
Flushing Cracks, Water	Ft	621	\$3.70	\$2,300
Structural Crack, Repr	Ft	621	\$80	\$49,700
Patching Conc, C-L	Cyd	25	\$880	\$22,000
Fender System Replacement	LS	1	\$3,502,000	\$3,502,000
Remove Slopewall and Install Heavy Riprap	Cyd	309.2	\$96	\$29,700
			Sub Total	\$5,206,800

Table A-3: Track and Tread Rehabilitation Cost Summary

Items of Work	Units	Quantity	Unit Price	Cost
Track & Tread Work				
Track	EA	4	\$201,700	\$806,800
Treads	EA	4	\$201,700	\$806,800
Flange & Web Weldments	EA	8	\$136,200	\$1,089,600
Connection Weldments	EA	16	\$11,000	\$176,000
Splice Plates	EA	4	\$39,300	\$157,200
Track Girders	EA	4	\$147,300	\$589,200
Turned Bolts	EA	480	\$250	\$120,000
Shop Assembly & Testing				
Tread / Weldment Assembly	EA	4	\$22,300	\$89,200
Track / Track Girder Assembly	EA	4	\$24,700	\$98,800
Numeric Roll Test	EA	4	\$5,000	\$20,000
Temp Works				
Pipe Piles	LF	720	\$420	\$302,400
Forward Jacking Beam	EA	2	\$79,800	\$159,600
Rear Jacking Frames	EA	2	\$119,800	\$239,600
Jacking Equipment	LS	1	\$33,200	\$33,200
Barge & Crane	Month	5	\$149,400	\$747,000
Field Survey	LS	1	\$49,800	\$49,800
Jacking Operation	EA	2	\$25,200	\$50,400
Track & Tread Demo	EA	4	\$50,200	\$200,800
Roll Test	EA	2	\$50,400	\$100,800
Misc. Machinery Remove/Reinstall	EA	4	\$30,000	\$120,000
Temp Works Demo	EA	2	\$50,400	\$100,800
Concrete Reconstruction	EA	4	\$41,900	\$167,600
			Sub Total	\$6,226,000

Table A-4: Mechanical Rehabilitation Cost Summary

Items of Work	Units	Quantity	Unit Price	Cost
Drive Machinery				
Reducer Seals and Gaskets	EA	6	\$11,900	\$71,400
Motor Brake, 13"	EA	2	\$29,650	\$59,300
Machinery Brake, 13"	EA	2	\$29,650	\$59,300
Remove and Replace Rack	EA	4	\$10,650	\$42,600
Coupling Seals and Gaskets	EA	16	\$1,575	\$25,200
Rack Shim Pack	EA	4	\$11,750	\$47,000
Rack Turned Bolts	EA	176	\$293	\$51,500
Misc. Items	LS	1	\$7,700	\$7,700
Rear Locks				
Limit Switch Brackets	EA	8	\$863	\$6,900
Shim Pack	EA	4	\$4,175	\$16,700
Connecting Pin	EA	8	\$163	\$1,300
Cylinder Support	EA	4	\$1,725	\$6,900
HPU (includes Cylinder)	EA	4	\$18,750	\$75,000
HPU Support	EA	4	\$3,975	\$15,900
Field Piping	EA	4	\$5,625	\$22,500
Turned Bolts	LS	1	\$17,400	\$17,400
Clean and Paint	LS	4	\$7,850	\$31,400
Misc. Items	LS	1	\$4,600	\$4,600
			Sub Total	\$562,600

Table A-5: Electrical Rehabilitation Cost Summary

Items of Work	Units	Quantity	Unit Price	Cost
Replace PLC Cabinet with Programming	LS	1	\$256,600	\$256,600
Replace Drives	EACH	4	\$68,400	\$273,600
Replace Traffic Gates	EACH	4	\$30,800	\$123,200
Motor Control Center	LS	1	\$72,000	\$72,000
Console Repairs and Modifications	LS	1	\$27,700	\$27,700
Replace Droop Cables	LS	1	\$38,100	\$38,100
Electrical Installation	LS	1	\$310,500	\$310,500
Electrical Testing, Manuals and Training	LS	1	\$90,900	\$90,900
Generator Replacement	LS	1	\$233,100	\$233,100
			Sub Total	\$1,425,700

Appendix B – Replacement Costs

Table B-1: Bridge Replacement Cost Summary¹

Items of Work	Units	Quantity	Unit Price	Cost
Structural	LS	1	\$25,070,900	\$25,070,900
Mechanical	LS	1	\$5,072,000	\$5,072,000
Electrical	LS	1	\$2,279,600	\$2,279,600
			Sub Total	\$32,422,500
Mobilization			5%	\$1,621,200
² Allowance for Un-quantified Costs			15%	\$4,863,400
³ Contingencies			20%	\$6,484,500
Construction Total				\$45,392,000

¹ All costs based on 2018 dollars.

² Percentage to account for items not able to be quantified prior to design

³ Percentage to allow for unforeseen or unknown issues.

Table B-2: Structural Replacement Cost Summary

Items of Work	Units	Quantity	Unit Price	Cost
Operator House (Amenities & Misc.)	LS	1	\$351,775	\$351,800
HVAC	LS	1	\$33,436	\$33,400
Plumbing	LS	1	\$52,080	\$52,100
Structural Steel	Lb	1,291,528	\$6.50	\$8,394,900
Track and Tread Castings	Lb	125,972	\$12.20	\$1,536,900
PPC Beams 45" Wide Flanged	Ft	1,470	\$243	\$357,200
Bearing, Elastomeric, 3 inch	Sin	5,087	\$2.80	\$14,200
Bridge Railing, 4 Tube	Ft	967	\$213	\$206,000
Expansion Joint Device	Ft	107	\$205	\$21,800
Steel Diaphragms	Ea	20	\$729	\$14,600
Fender System	LS	1	\$3,502,000	\$3,502,000
Superstructure Conc	Cyd	746	\$315	\$234,800
Superstructure Conc, Form, Finish, and Cure	Cyd	746	\$480	\$357,900
Substructure Conc	Cyd	5,160	\$638	\$3,291,900
Conc, Grade S2, Subfooting	Cyd	3,718	\$188	\$699,000
Reinforcement, Steel, Epoxy Coated	Lb	461,254	\$1.20	\$553,500
Reinforcement, Steel	Lb	194,214	\$1.20	\$233,100
Steel Grid Deck (Half Filled, 2" Overfill)	LS	6,927	\$163	\$1,129,100
Cofferdam Excavation	Cyd	3,997	\$45	\$179,900
Cofferdams	LS	1	\$877,100	\$877,100
Counterweight Concrete	Cyd	576	\$1,085	\$625,300
Removal of Existing Structure	LS	1	\$950,000	\$950,000
Pile, Steel, Furnish and Driven, 14 inch	Ft	23,396	\$51	\$1,193,200
Painting Epoxy System	LS	1	\$143,500	\$143,500
Slip Resistant Sidewalk Plates	Sft	2,353	\$50	\$117,700
			Sub Total	\$25,070,900

Table B-3: Mechanical Replacement Cost Summary

Items of Work	Units	Quantity	Unit Price	Cost
Drive Machinery				
Primary Speed Reducer	EA	2	\$69,350	\$138,700
Secondary Speed Reducer	EA	4	\$427,675	\$1,710,700
Primary Reducer Sppt	EA	2	\$82,650	\$165,300
Secondary Reducer Sppt	EA	4	\$107,975	\$431,900
Motor Brake, 13"	EA	4	\$25,350	\$101,400
Machinery Brake, 19"	EA	4	\$36,075	\$144,300
Bearing "B" Assy	EA	4	\$27,425	\$109,700
Bearing "B" Sppt	EA	4	\$33,400	\$133,600
Floating Shaft/Couplings	EA	4	\$51,925	\$207,700
Pinion Shaft/Coupling	EA	4	\$95,150	\$380,600
Bearing "A" Assy	EA	4	\$56,850	\$227,400
Rack & Pinion	EA	4	\$160,050	\$640,200
Turned Bolts	LS	1	\$59,000	\$59,000
Misc. Items	LS	1	\$15,300	\$15,300
Speed Reducer Testing	LS	1	\$183,800	\$183,800
Rear Locks				
Strut	EA	4	\$20,975	\$83,900
Rocker Arm	EA	4	\$4,150	\$16,600
Clevis Pin	EA	8	\$1,038	\$8,300
Bushing	EA	16	\$388	\$6,200
Lower Bracket	EA	4	\$7,000	\$28,000
Strike Plate	EA	4	\$8,475	\$33,900
Beveled Fill	EA	4	\$575	\$2,300
Shim Pack	EA	4	\$850	\$3,400
Connecting Pin	EA	8	\$163	\$1,300
Cylinder Ver. Sppt	EA	4	\$4,125	\$16,500
Cylinder Hor. Sppt	EA	4	\$4,475	\$17,900
HPU (includes Cylinder)	EA	4	\$26,425	\$105,700
HPU Support	EA	4	\$5,875	\$23,500
Field Piping	EA	4	\$7,825	\$31,300
Turned Bolts and Anchors	LS	1	\$35,000	\$35,000
Misc. Items	LS	1	\$7,700	\$7,700
Sub Total				\$5,072,000

Table B-4: Electrical Replacement Cost Summary

Items of Work	Units	Quantity	Unit Price	Cost
PLC cabinet and Programming	LS	1	\$256,600	\$256,600
Motors and Drives	EACH	4	\$79,900	\$319,600
Traffic Gates	EACH	4	\$30,800	\$123,200
Console	LS	1	\$67,400	\$67,400
Motor Control Center	LS	1	\$72,000	\$72,000
Limits and Sensors	LS	1	\$31,800	\$31,800
Submarine Cables	LS	1	\$482,400	\$482,400
Lightning and Surge Suppression	LS	1	\$49,600	\$49,600
Electrical Installation	LS	1	\$411,000	\$411,000
Electrical Testing, Manuals and Training	LS	1	\$90,900	\$90,900
Aux. Electrical Equipment	LS	1	\$142,100	\$142,100
Generator	LS	1	\$233,100	\$233,100
			Sub Total	\$2,279,700

Appendix C – Life Cycle Cost Analysis

Table C-1: Rehabilitation Life Cycle Costs

Assumptions

- Year Zero corresponds to 2018
- The life cycle cost analysis considers a 90 year period.
- A 5% escalation rate was used to determine costs in "2018 Dollars"

Discount Rate = 4.00%

REHABILITATION - LIFE CYCLE COSTS			
Items of Work	Year	Cost	Present Value
1 Rehabilitation	0	\$ 18,790,000	\$ 18,790,000
2 Thin Epoxy Deck Overlay (Bascule Span)	15	\$ 40,400	\$ 22,433
3 Shallow Concrete Overlay (Approach Spans)	15	\$ 199,100	\$ 110,553
4 Replace Approach Slabs	15	\$ 24,900	\$ 13,826
5 Joint Repairs	15	\$ 49,200	\$ 27,319
6 Mechanical & Electrical	25	\$ 2,518,400	\$ 944,694
7 Steel Structure, Cleaning and Coating, Full, Type 4	25	\$ 662,400	\$ 248,477
8 Operator House (Roof, Doors, Windows)	25	\$ 96,800	\$ 36,311
9 Thin Epoxy Deck Overlay (Bascule Span and Approach Spans)	35	\$ 81,800	\$ 20,729
10 Joint Repairs	35	\$ 49,200	\$ 12,468
11 Bridge Replacement	50	\$ 45,392,000	\$ 6,387,227
12 Thin Epoxy Deck Overlay (App. Spans and Bascule Span)	75	\$ 88,800	\$ 4,687
13 Joint Repairs	75	\$ 61,200	\$ 3,230
14 Steel Structure, Cleaning and Coating, Partial, Type 4	75	\$ 233,100	\$ 12,304
15 Mechanical & Electrical	75	\$ 1,260,700	\$ 66,544
16 Thin Epoxy Deck Overlay (Bascule Span)	90	\$ 61,000	\$ 1,788
17 Shallow Concrete Overlay (Approach Spans)	90	\$ 246,600	\$ 7,228
18 Replace Approach Slabs	90	\$ 24,900	\$ 730
19 Joint Repairs	90	\$ 61,200	\$ 1,794
20 Replace Coating for Steel Sidewalks (Bascule Span)	90	\$ 58,900	\$ 1,726
21 Remaining Service Life Value	90	\$ (16,018,000)	\$ (469,470)
Annual Maintenance and Inspection (Year 0 to 90)	90	\$ 42,117	\$ 1,022,072
Net Present Value (NPV)			\$27,266,671
Equivalent Uniform Annual Costs (EUAC)			\$1,123,598

LCC Description of Repairs/Replacements

1. The bridge will undergo a complete rehab at year zero. Refer to the report and rehabilitation cost summary.
2. At year 15, the bascule span deck will be approx. 43 years old and will require that the thin epoxy overlay be removed and re-applied with a new epoxy overlay.
3. At year 15, the approach spans' deck will be approximately 43 years old and the epoxy overlay applied for the rehab will need to be removed to allow for a more extensive rehab. At this time, the deck should be milled and a shallow concrete overlay should be performed.
4. At year 15, the approach slabs will be approx. 43 years old and should be replaced at the same time that the shallow concrete overlay is performed on the approach spans.
5. At year 15, joint repairs should be performed at the same time that the shallow overlay is performed on the approach spans.
6. At year 25, the bridge will require an electrical rehabilitation and repairs to mechanical equipment.
This work will serve to extend the service of the mechanical and electrical elements to the end of the bridge life (Year 50).
7. At year 25, the paint system will have reached the end of its useful life. At this point, a full cleaning and coating will be req'd.
8. At year 25, the operator house will be 53 yrs old and need some renovations including a new roof, windows and doors.
9. At year 35, the epoxy overlay on the bascule span deck will be 15 years old and the deck itself will be approximately 63 years old. The bridge is recommended to be replaced 15 years later (year 50) and it is not economical to perform a full deck replacement. Therefore, another epoxy overlay should be applied to get another 15 years of life out of the bridge deck.

At year 35, the shallow concrete overlay on the approach decks will be 25 years old and the deck itself will be approximately 63 years old. The bridge is recommended to be replaced 15 years later and it is not economical to perform a full deck replacement. Therefore, the approach spans' deck should be scarified another epoxy overlay should be applied to get another 15 years of life out of the bridge deck.
10. At year 35, joint repairs should be performed at the same time that work is done on the bridge deck.
11. At year 50, the bridge superstructure will be approximately 75 years old, and the substructure will be approximately 125 years old. At this time it is recommended that the existing structure be demolished and a new bridge be constructed.
12. At year 75, the bridge decks on all spans will be 25 years old and should be applied with a thin epoxy overlay.
13. At year 75, joint repairs should be performed at the same time that work is done on the bridge deck.
14. At year 75, the paint system will be 25 years old. New paint systems last 50 years and it is recommended that a partial cleaning and coating should be performed to ensure the 50 year life of the paint is achieved.
15. At year 75, the mechanical and electrical equipment will be 25 years old. Some electrical systems will require replacement, and some mechanical systems will require rehabilitation and/or replacement.
16. At year 90, the epoxy overlay on the bascule span deck will be 15 years old. The overlay should be removed and a new thin epoxy overlay should be applied.
17. At year 90, the deck of the approach spans will be 40 years old and the epoxy overlay on them will be 15 years old.
At this point, the approach span bridge deck should be milled and a shallow concrete overlay should be performed.
18. At year 90, the approach slabs will be approx. 40 years old and should be replaced at the same time that the shallow overlay is being performed on the approach spans.
19. At year 90, joint repairs should be performed at the same time that work is being performed on the bridge deck.
20. At year 90, the steel plate sidewalks on the bascule span will likely begin to show wear. Therefore, the plates should be reapplied with a slip resistant coating.
21. Year 90 is the end of the LCC analysis period and the bridge will be 40 years old. All spans will have remaining service life value. Remaining Service Life Value is calculated based on a percentage of the Structural cost of the replacement bridge. $(50\text{yrs}/90\text{yrs})(\$23,905,800)(1.15 \text{ contingency}) = \$15,913,000$.

Table C-2: Replacement Life Cycle Costs

Assumptions

- Year Zero corresponds to 2018
- The life cycle cost analysis considers a 90 year period.
- A 5% escalation rate was used to determine costs in "2018 Dollars"

Discount Rate = 4.00%

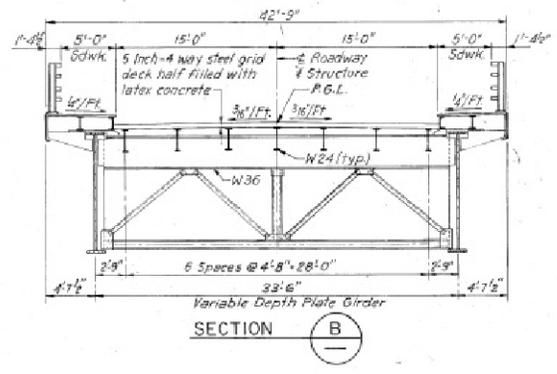
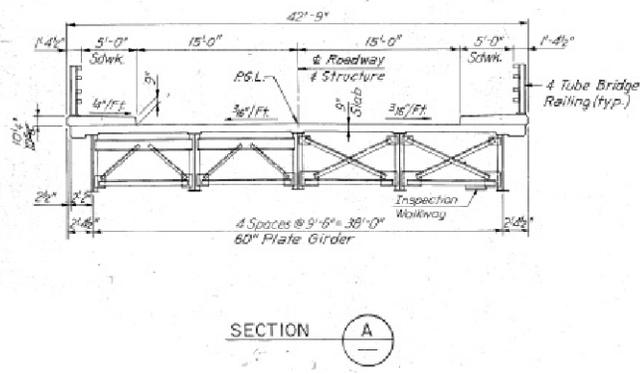
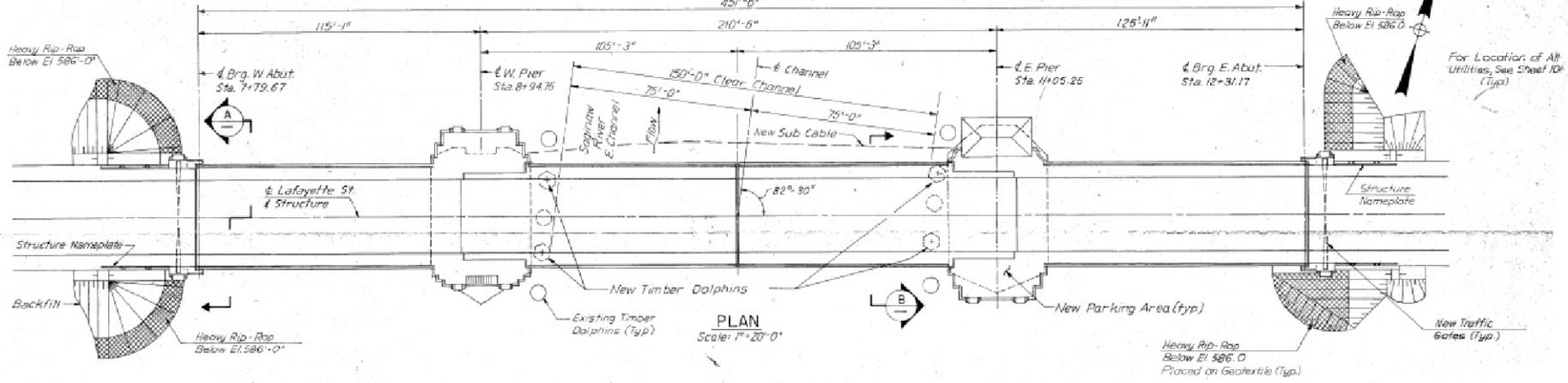
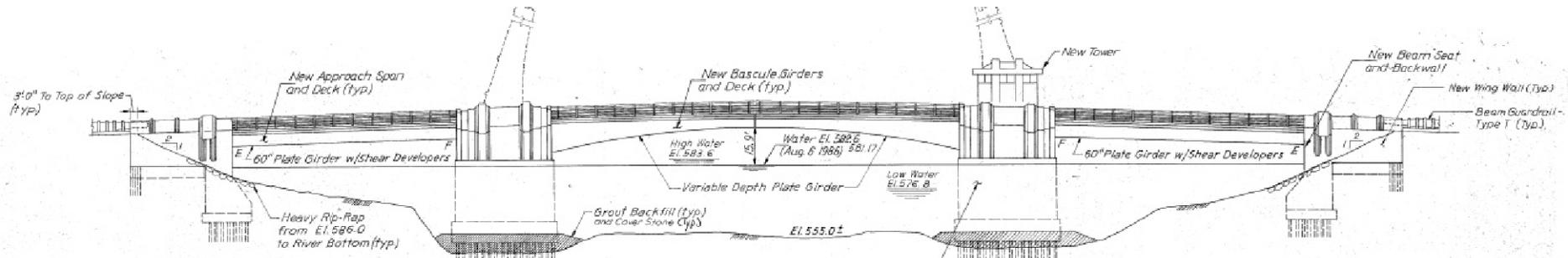
REPLACEMENT - LIFE CYCLE COSTS			
	Year	Cost	Present Value
Items of Work			
1 Replacement	0	\$ 45,392,000	\$ 45,392,000
2 Steel Structure, Cleaning and Coating, Partial, Type 4	25	\$ 233,100	\$ 87,440
3 Thin Epoxy Deck Overlay (Bascule Span and Approach Spans)	25	\$ 88,800	\$ 33,310
4 Joint Repairs	25	\$ 61,200	\$ 22,957
5 Operator House (Misc. Work)	25	\$ 15,000	\$ 5,627
6 Mechanical & Electrical	25	\$ 1,292,400	\$ 484,801
7 Thin Epoxy Deck Overlay (Bascule Span)	40	\$ 61,000	\$ 12,706
8 Shallow Concrete Overlay (Approach Spans)	40	\$ 246,600	\$ 51,364
9 Joint Repairs	40	\$ 61,200	\$ 12,747
10 Replace Approach Slabs	40	\$ 24,900	\$ 5,186
11 Replace Coating for Steel Sidewalks (Bascule Span)	40	\$ 58,900	\$ 12,268
12 Steel Structure, Cleaning and Coating, Full, Type 4	50	\$ 558,318	\$ 78,562
13 Mechanical & Electrical	50	\$ 2,762,300	\$ 388,690
14 Operator House (Roof, Doors, Windows)	50	\$ 96,800	\$ 13,621
15 Vessel Collision System Repairs	50	\$ 175,100	\$ 24,639
16 Thin Epoxy Deck Overlay (Bascule Span)	60	\$ 61,000	\$ 5,799
17 Reinforced Conc. Deck Replacement (Approach Spans)	60	\$ 696,900	\$ 66,248
18 Replace Concrete Deck (Movable Span over Machinery)	60	\$ 252,200	\$ 23,974
19 Replace Approach Slabs	60	\$ 24,900	\$ 2,367
20 Remove and Replace Steel Sidewalks (Bascule)	60	\$ 117,700	\$ 11,189
21 Steel Structure, Cleaning and Coating, Partial, Type 4	75	\$ 233,100	\$ 12,304
22 Mechanical & Electrical	75	\$ 1,292,400	\$ 68,218
23 Remaining Service Life Value	90	\$ -	\$ -
Annual Maintenance (Year 0 to 90)	90	\$ 33,000	\$ 800,820
Net Present Value (NPV)			\$ 47,616,837
Equivalent Uniform Annual Costs (EUAC)			\$ 1,962,183

LCC Description of Repairs/Replacements

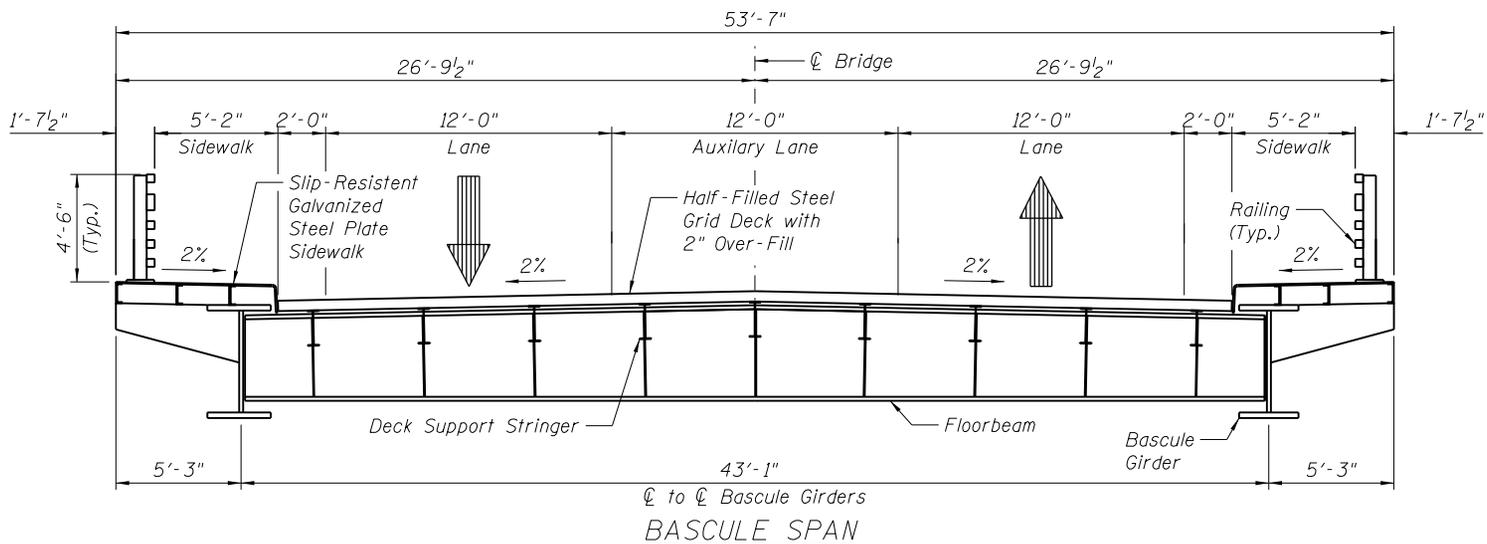
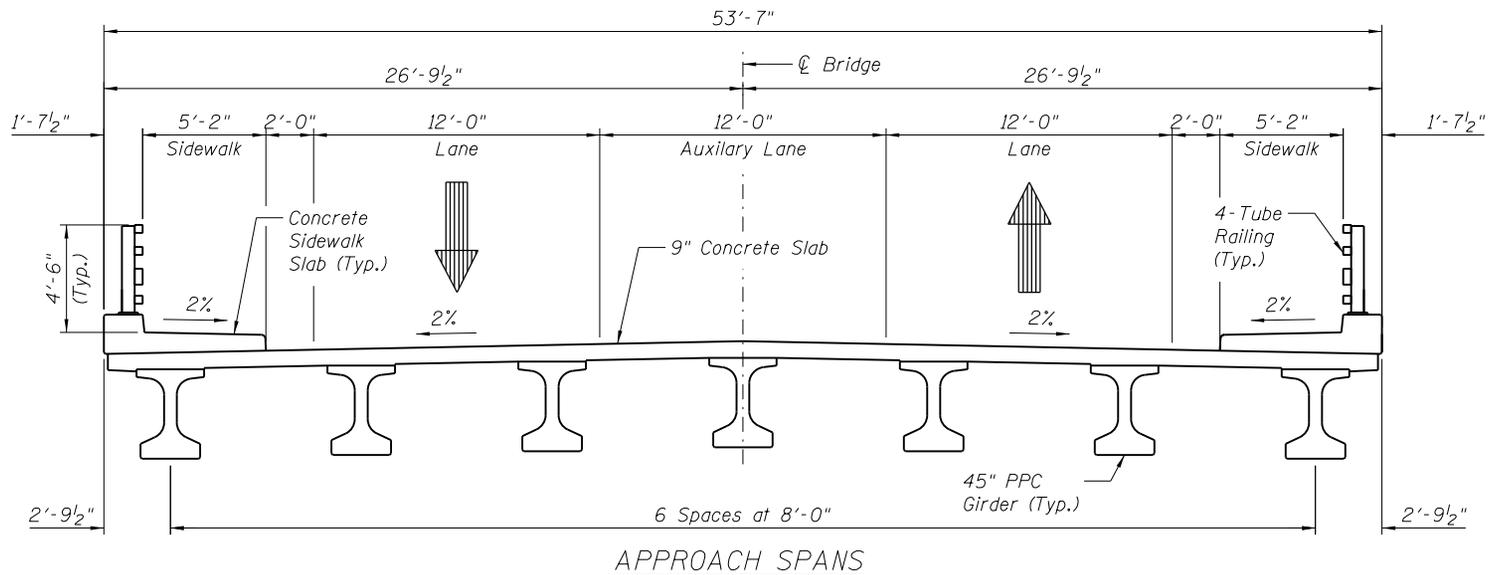
- 1 The bridge will be replaced at year zero. Refer to the report and replacement cost summary.
- 2 At year 25, the paint system will be 25 years old. New paint systems last 50 years and it is recommended that a partial cleaning and coating should be performed to ensure the 50 year life of the paint is achieved.
- 3 At year 25, the bridge decks on all spans will be 25 years old and should be applied with a thin epoxy overlay.
- 4 At year 25, joint repairs should be performed at the same time that work is done on the bridge deck.
- 5 At year 25, the operator house will likely need some minor repairs.
- 6 At year 25, the bridge will undergo minor electrical and mechanical repairs. This work will serve to extend the life of Mechanical and Electrical systems until a more extensive repair is performed at year 50.
- 7 At year 40, the epoxy overlay on the bascule span deck will be 15 years old. The overlay should be removed and a new thin epoxy overlay should be applied.
- 8 At year 40, the deck of the approach spans will be 40 years old and the epoxy overlay on them will be 15 years old. At this point, the approach span bridge deck should be milled and a shallow concrete overlay should be performed.
- 9 At year 40, joint repairs should be performed at the same time that work is being performed on the bridge deck.
- 10 At year 40, the approach slabs will be approx. 40 years old and should be replaced at the same time that the shallow overlay is being performed on the approach spans.
- 11 At year 40, the steel plate sidewalks on the bascule span will likely begin to show wear. Therefore, the plates should be reapplied with a slip resistant coating.
- 12 At year 50, the paint system will have reached its useful life and a full bridge cleaning and coating will be required.
- 13 At year 50, The mechanical and electrical systems should be rehabilitated with a more extensive scope of work than was performed at year 25.
- 14 At year 50, the operator house will need a new roof, windows and doors.
- 15 At year 50, the vessel collision system will likely need repairs. The rub rail fender system should be rehabilitated.
- 16 At year 60, the epoxy overlay on the bascule span deck will be 20 years old. The overlay should be removed and a new thin epoxy overlay should be applied.
- 17 At year 60, it is assumed that the approach span bridge decks will have reached their useful life and a full reinforced conc. deck replacement should be performed.
- 18 At year 60, the reinforced concrete deck over the heel section of the movable leaf should be replaced at the same time the bridge deck on the approach spans are replaced.
- 19 At year 60, the approach slabs will be approx. 20 years old and should be replaced so that work will coincide with the shallow overlay is being performed on the approach spans.
- 20 At year 60, the slip-resistant steel plate sidewalk system will be 60 years old and should be removed and replaced.
- 21 New paint systems last 50 years and the paint system will be 25 years old. A partial cleaning and coating should be performed.
- 22 At year 75, the paint system will be 25 years old. New paint systems last 50 years and it is recommended that a partial cleaning and coating should be performed to ensure the 50 year life of the paint is achieved.
- 23 Year 90 is the end of the LCC analysis period and the bridge will have reached the end of its useful life. Therefore, there will be no remaining service life value for the bridge

Appendix D – Exhibits

- Exhibit D-1 Existing Bridge Plan, Elevation and Cross Sections
- Exhibit D-2 Proposed Replacement Bridge Plan and Elevation
- Exhibit D-3 Proposed Replacement Bridge Typical Sections



EXHIBITS FOR EXISTING BRIDGE INFORMATION ARE TAKEN FROM THE 1987 REHABILITATION PLANS



Appendix E – Photographs

E-2 to E-24 Structural Photographs

E-25 to E-31 Mechanical Photographs

E-32 to E-45 Electrical Photographs



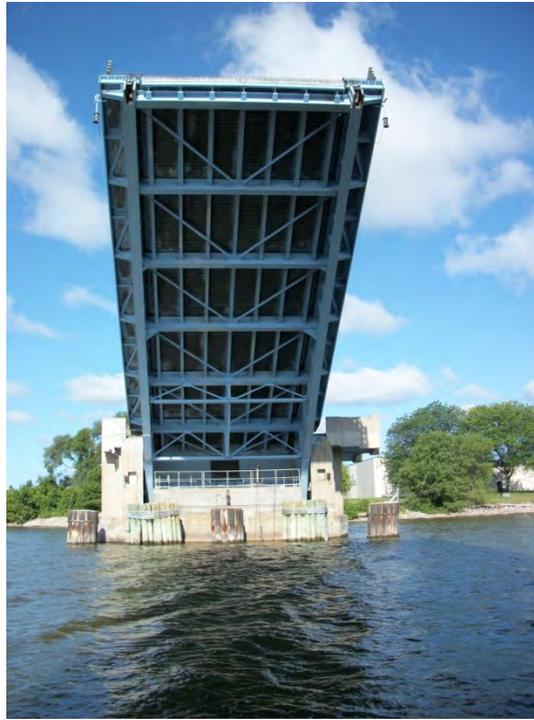
STRUCTURAL PHOTOGRAPHS



S-1. North Elevation (07-18-2013)



S-2. North Elevation with Bridge Open (07-18-2013)



S-3. West Pier With Bridge Open – Structural Framing System and Fender System
(08-13-2013)



S-4. Looking South at Control Tower (08-13-2013)



S-5. North Sidewalk of Bascule Span – Steel Grid Exposed (07-17-2013)



S-6. North Sidewalk on East Approach Span – Map Cracking (07-17-2013)



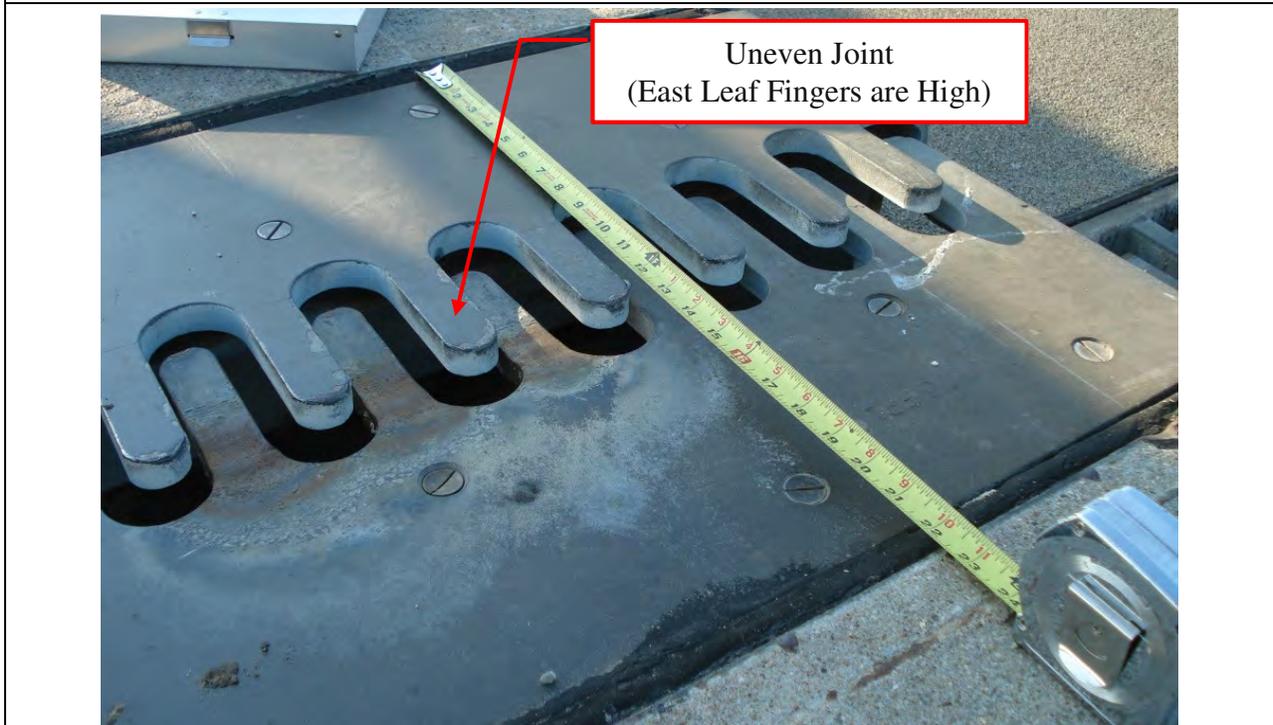
S-7. Rear Break at North Sidewalk on West Leaf – Cracking and Spalling of Concrete (07-17-2013)



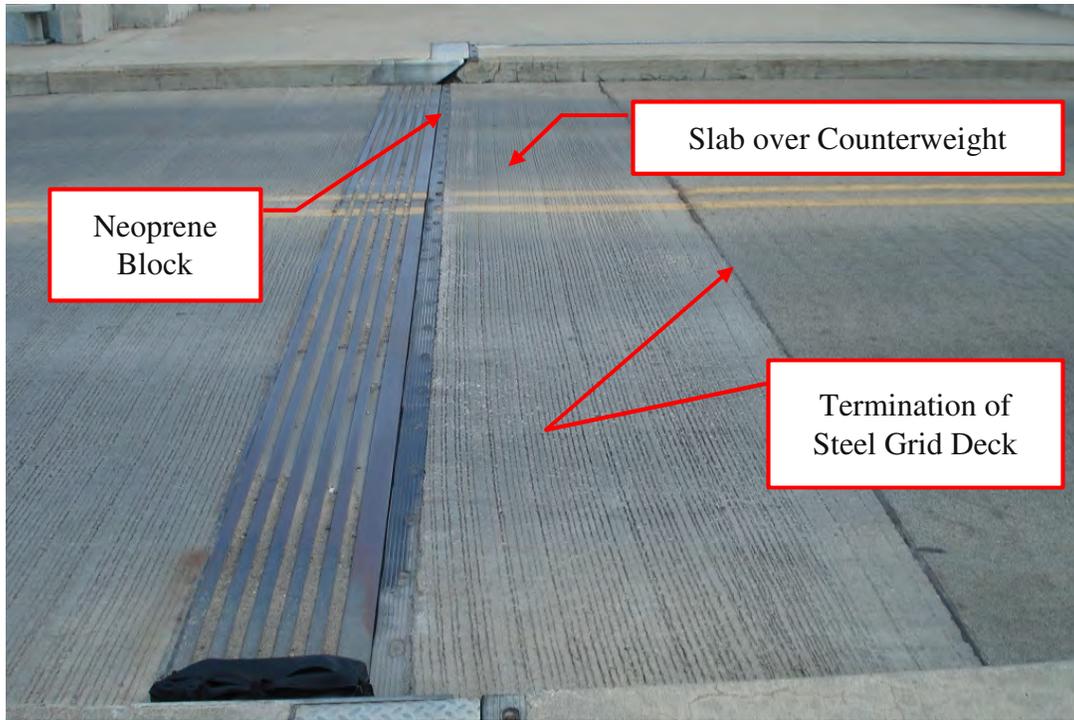
S-8. Joint at Longitudinal Break – Deterioration and Map Cracking at Joint (07-17-2013)



S-9. West Approach – South Sidewalk and Approach Pavement Settlement (08-13-2013)



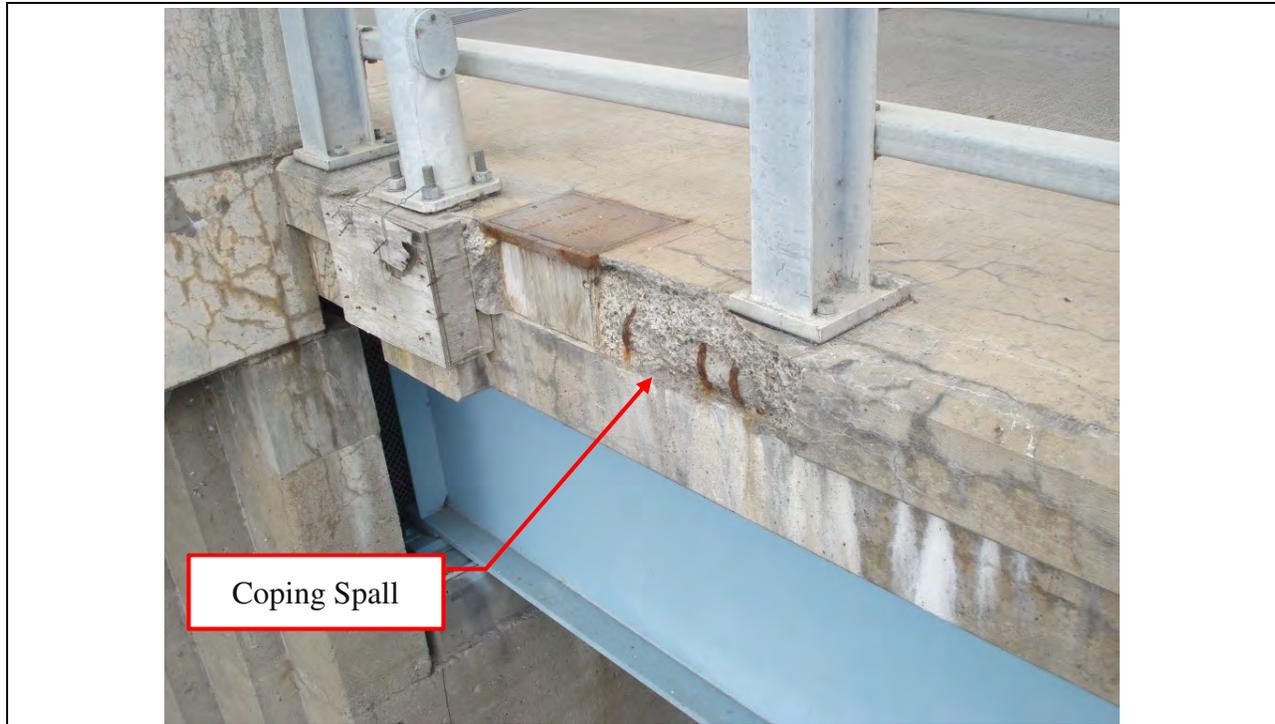
S-10. Center Break at North Sidewalk– Uneven Fingers at Joint (07-17-2013)



S-11. Rear Break of West Leaf – Typical Condition (08-13-2013)



S-12. South Fascia at East Abutment – Cracks and Spalls on Coping (08-13-2013)



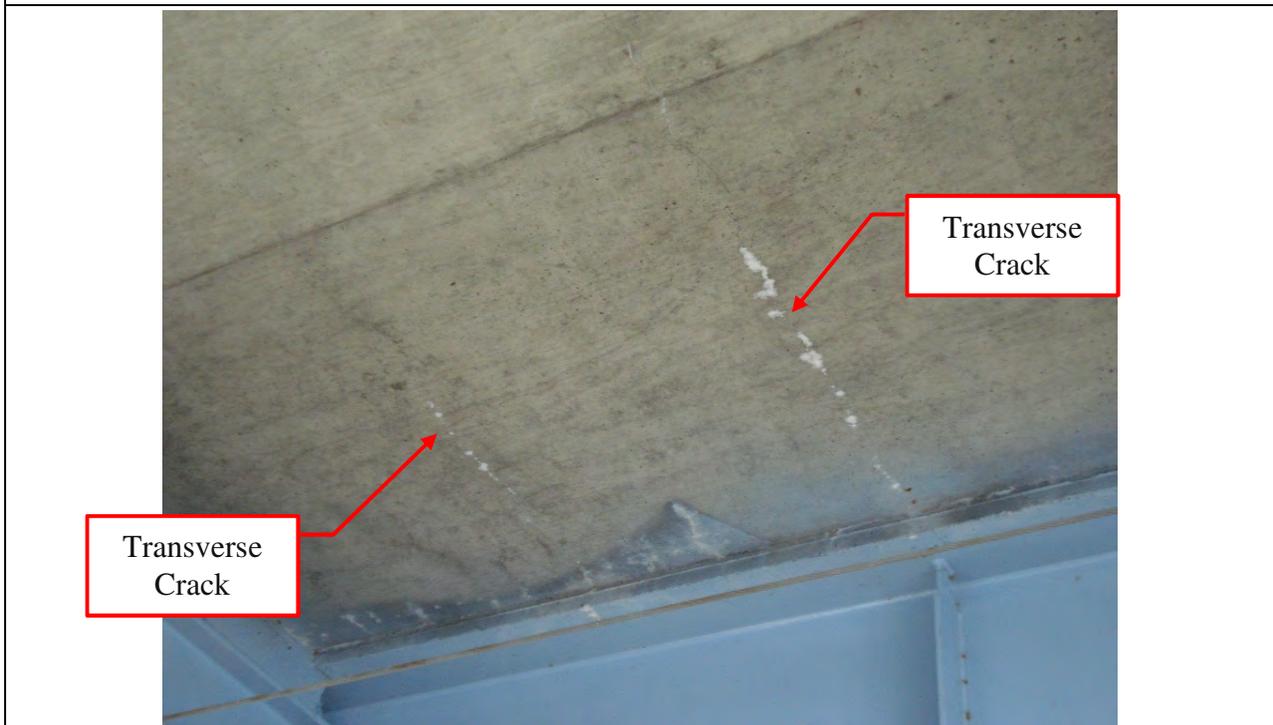
S-13. East Approach Span at South Coping – Spall with Exposed Rebar (08-13-2013)



S-14. East Bascule Pier Looking South – Cracking in Parapet Walls of Lookout (07-17-2013)



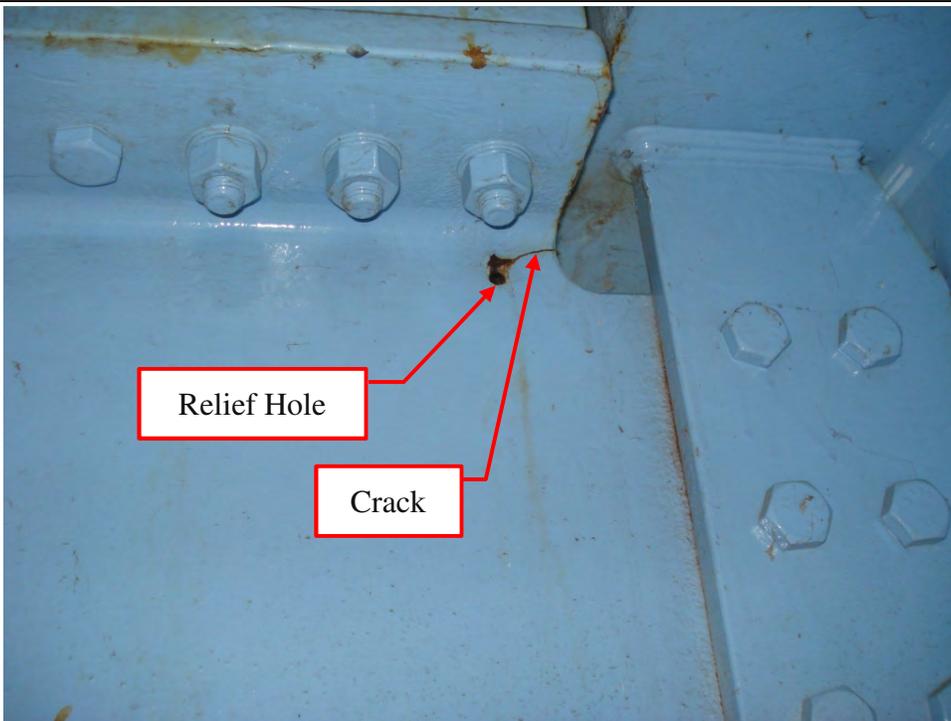
S-15. West Approach – North Sidewalk and Approach Pavement Settlement (08-13-2013)



S-16. Underside of West Approach Span Deck – Transverse Cracks with Leaching, Typ. Condition (08-13-2013)



S-17. West Approach Span – Superstructure Underside (08-13-2013)



S-18. South End of FB5 on the West Leaf – Crack in Upper Portion of Web with 3/8" Drilled Relief Hole (08-13-2013)

Excess Gap between
top of Jaw and
Diaphragm Casting

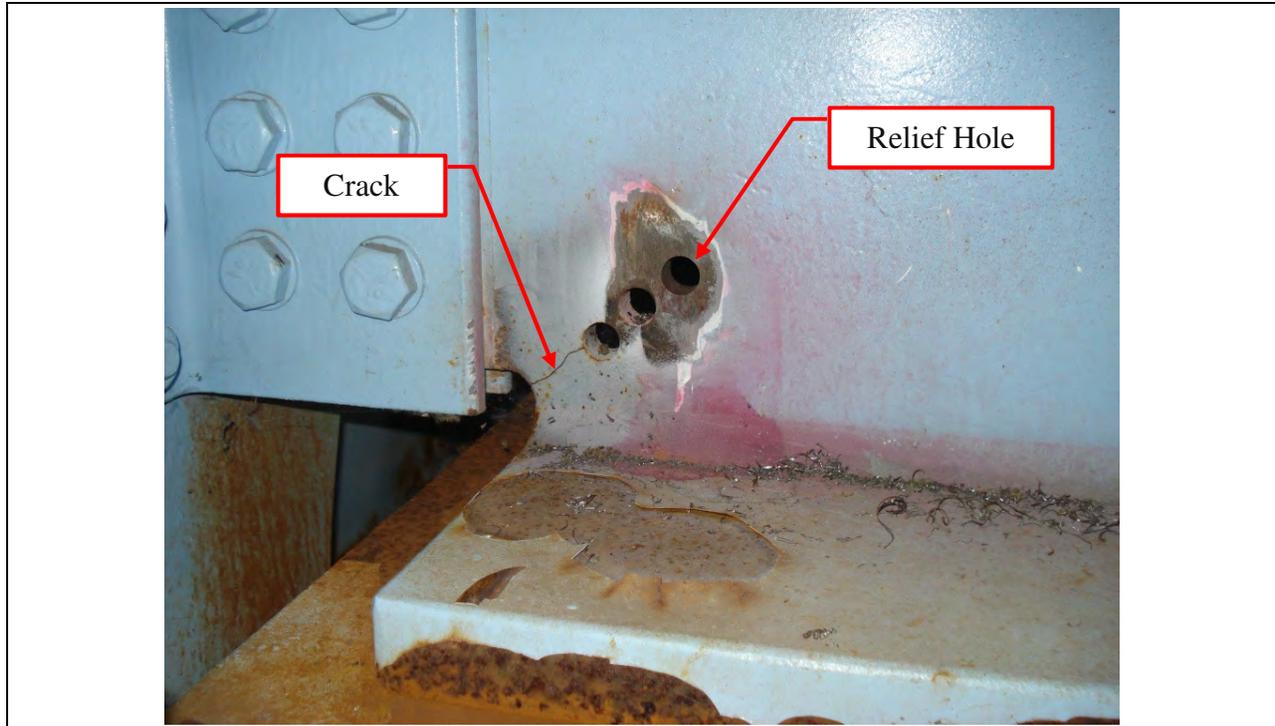


S-19. North Center Lock Looking South – Gap at Top Plate (08-13-2013)

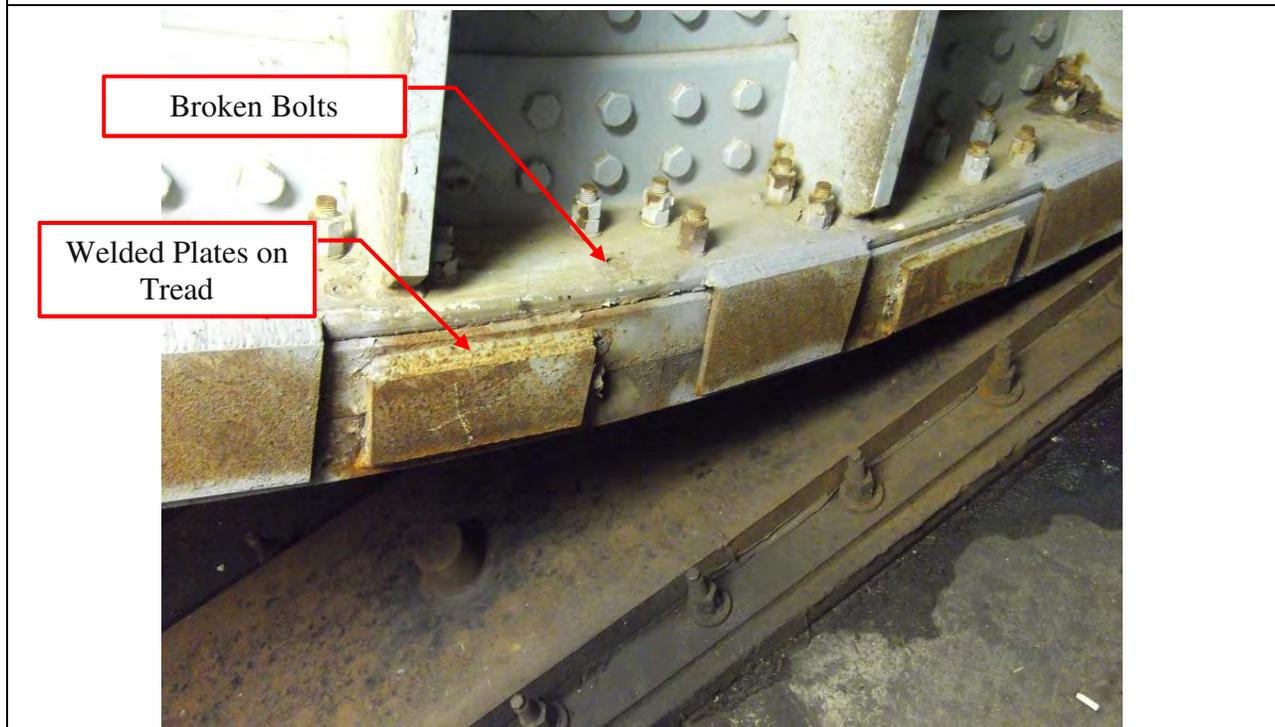
Web Cracks and
Drilled Relief
Holes



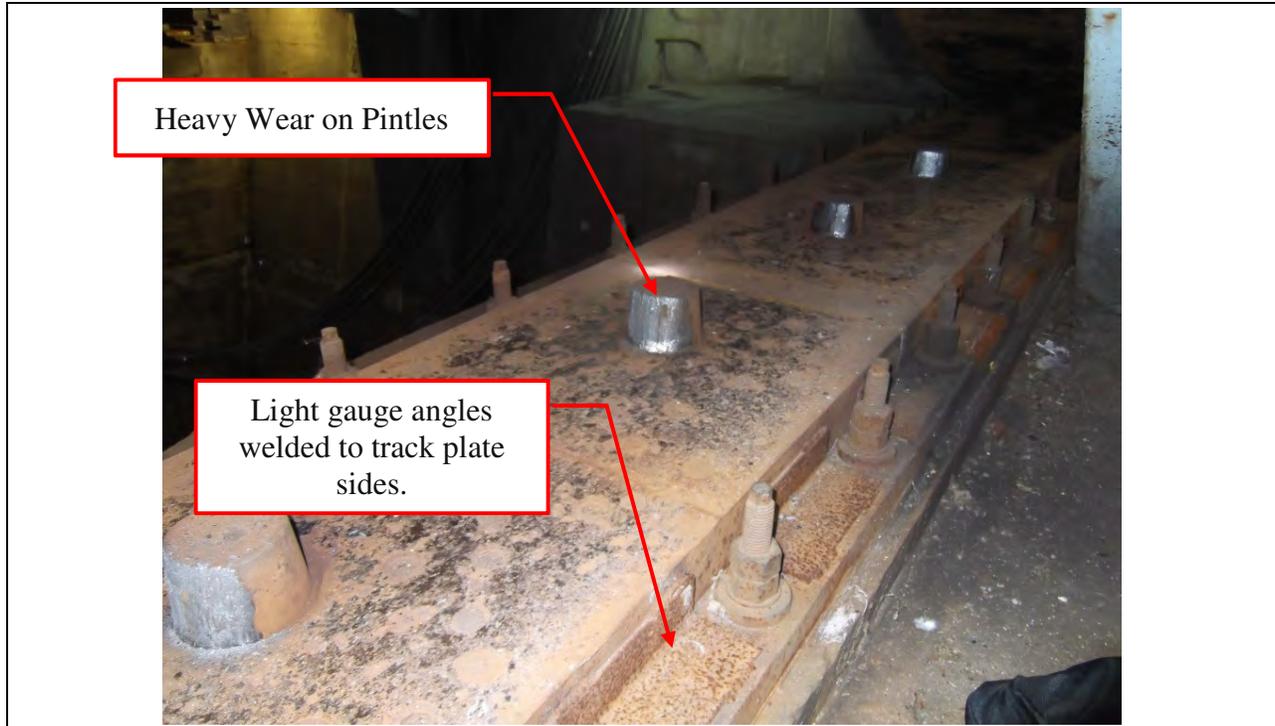
S-20. North Side of the West Uplift Girder – Cracks and Relief Holes in Web (07-17-2013)



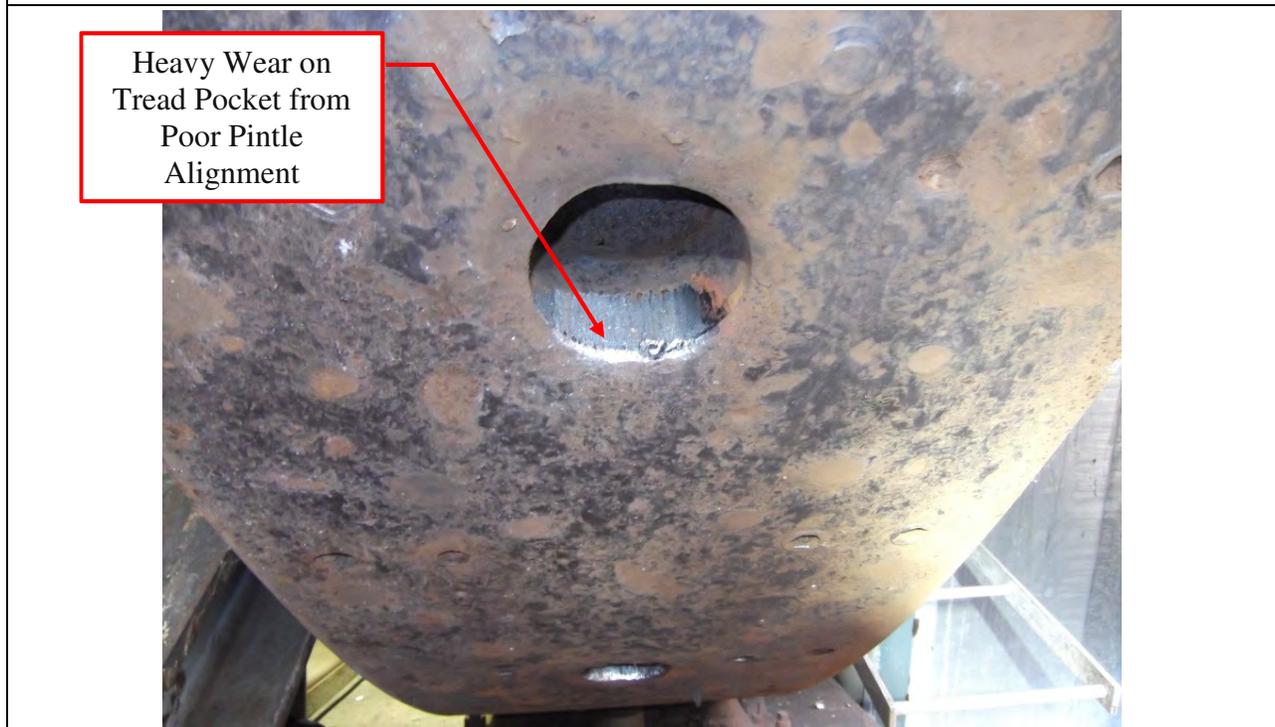
S-21. North Side of the West Uplift Girder – Cracks and Relief Holes in Web (08-13-2013)



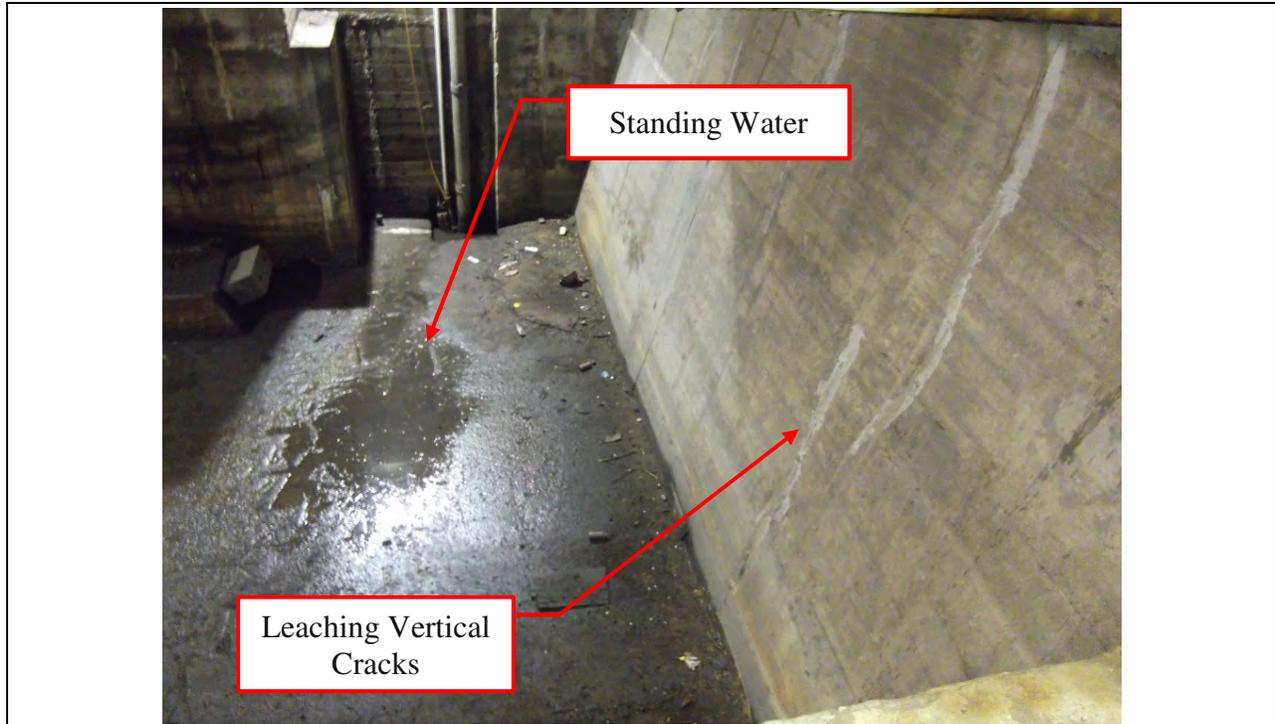
S-22. South Bascule Girder Tread on West Leaf (07-17-2013)



S-23. South Track of West Leaf – Overall Track Configuration with Wear on Back Side of Pintles (07-17-2013)



S-24. South Bascule Girder Tread on West Leaf – Evidence of Wear from Pintles (07-17-2013)



S-25. Counterweight Pit at West Bascule Pier – Standing Water/Mud on Floor and Cracks in Wall with Leaching (07-17-2013)



S-26. Counterweight Pit at West Bascule Pier – Walls Cracking with Leaching and Efflorescence (08-13-2013)