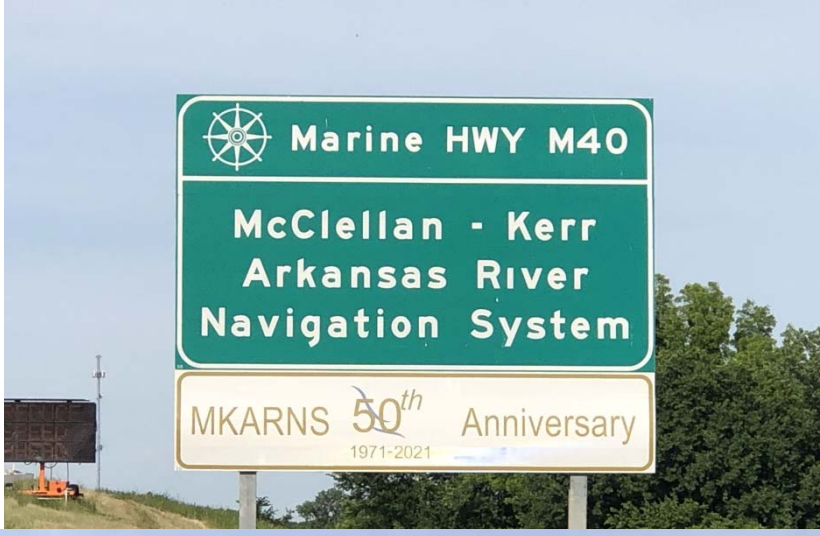
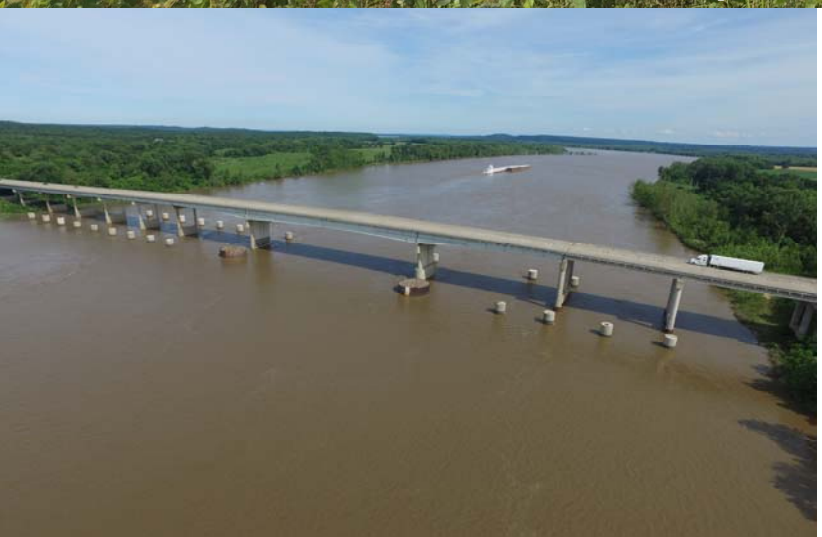
OKLAHOMA Transportation



Bridge Assessment Report

Interstate 40 over Arkansas River
NBI No. 17051, Location No. 6822 0000X
Muskogee and Sequoyah Counties
(Rehabilitation of Span Nos. 1, 2 and 3 and West Approach Slab)

April 29, 2022



EST
Comprehensive Engineering Services

Bridge Assessment Report

Interstate 40 over Arkansas River
NBI No. 17051, Location No. 6822 0000X
Muskogee and Sequoyah Counties
(Rehabilitation of Span Nos. 1, 2 and 3 and West Approach Slab)

Prepared For:

OKLAHOMA Transportation

Prepared By:

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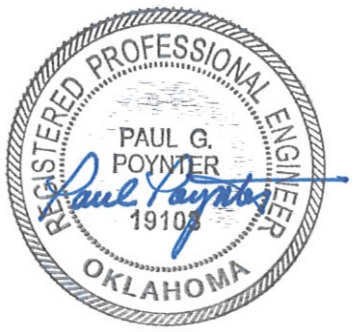


Paul Poynter, P.E. 19103

BRIDGE ASSESSMENT REPORT
(Rehabilitation of Span Nos. 1, 2 and 3 and West Approach Slab)

GENERAL BRIDGE INFORMATION

BRIDGE LOCATION

Division: 1
County: Muskogee and Sequoyah
Highway No.: Interstate 40
Crossing Feature: Arkansas River
NBI No.: 17051

PRELIMINARY ESTIMATE

Alternate No. 1: $**3,211,000 -** Superstructure and Substructure Rehabilitation

Alternate No. 2: $**4,475,000 -** Superstructure Replacement and Substructure Rehabilitation

Alternate No. 3: **$15,851,000 -** Cost for complete replacement calculated as the product of the total length of Span Nos. 1, 2 and 3 equal to 391'-4½", a total bridge width equal to 81'-0" and a unit price equal to $500/SF of bridge. The unit price was calculated by adjusting for inflation the unit price from a recently bid bridge and approaches project on US-62 over the Arkansas River with State Job No. 30416(04). The average unit bid price for the twin bridges on the US-62 project was approximately $482/SF of bridge.

SUMMARY OF IMPROVEMENTS

Alternate No. 1 6 6 6 i do not like the idea of a concrete overlay

- ✓ **Widen Superstructure:** Widen the existing superstructure width (out-to-out) from the existing 68'-6" to 81'-0" to accommodate 38'-0" clear roadways on each side of a median barrier at the centerline bridge. On each side of the bridge, add a single beam line and extend the deck slab 6'-3".
- ✓ **Conduct Hydrodemolition:** Scarify (cold mill) in conjunction with hydrodemolition the full extents of existing deck and approach slab.
- ✓ **Repair Deck and Approach Slab:** Make Class B and C deck slab repairs as needed to the full extents of existing deck and approach slab.
- ✓ **Bridge Deck Concrete Overlay:** Apply a bridge deck concrete overlay to the deck slab and approach slab
- ✓ **Replace Existing Parapets:** Replace the existing parapets and curbs on the deck and approach slab with new 42" F-shaped concrete parapets.

- ✓ **Replace Existing Median Barrier:** Replace the existing median barrier and curbs on the deck and approach slab with new 42" concrete median barrier.

- ✓ **P.C. Beams:** Add six (6) new 72" Bulb Tee beams along two (2) new exterior beam lines to accommodate widening of the bridge superstructure. Repair the beam ends on the existing p.c. beams at two locations.

- ✓ **Diaphragms:** Install new diaphragms between the existing p.c. beams and the new p.c. beams. Use structural steel diaphragms of a design matching the structural steel diaphragms currently existing on the bridge.

- ✓ **Bearing Assemblies:** Add new stainless steel bearing assemblies at the ends of the p.c. beams in the two (2) new exterior beam lines. Clean and paint all existing bearing assemblies. recommend replacing all bearing assemblies ?

- ✓ **Abutment Repair:** Make concrete crack and surface repairs to the abutment as needed. Apply an elastomeric coating (CIM 1000) to the top of the bridge seat and bottom of backwall.

- ✓ **Pier Repair:** Make concrete crack and surface repairs to Pier No. 1, 2 and 3 as needed. Apply an elastomeric coating (CIM 1000) to the top of the pier caps.

Alternate No. 2

- ✓ **Widen Superstructure:** Widen the existing superstructure width (out-to-out) from the existing 68'-6" to 81'-0" to accommodate 38'-0" clear roadways on each side of a median barrier at the centerline bridge.

- ✓ **Superstructure Replacement:** Includes removal of the superstructure and installation of new p.c. beams, concrete diaphragms, deck slab and expansion joints. The number of beam lines will increase from twelve (12) to fourteen (14) to accommodate widening of the bridge superstructure. steel beams

- ✓ **Approach Slab Replacement:** Replace the existing approach slab with a new approach slab matching the extents of the existing approach slab.

- ✓ **New Parapets:** Install new 42" F-shaped concrete parapets on the deck and approach slab

- ✓ **New Median Barrier:** Install new 42" concrete median barrier on the deck and approach slab.

- ✓ **Bearing Assemblies:** Add new stainless steel bearing assemblies at the ends of the p.c. beams in the two (2) new exterior beam lines. Clean and paint all existing bearing assemblies.

- ✓ **Abutment Repair:** Make concrete crack and surface repairs to the abutment as needed. Apply an elastomeric coating (CIM 1000) to the top of the bridge seat and bottom of backwall.

- ✓ **Pier Repair:** Make concrete crack and surface repairs to Pier No. 1, 2 and 3 as needed. Apply an elastomeric coating (CIM 1000) to the top of the pier caps.

DESCRIPTION OF TRAFFIC CONTROL

Rehabilitation of Span Nos. 1, 2 and 3 and the west approach slab will be completed as part of a greater project that includes replacement of all remaining parts of the bridge. Consequently, the traffic control will be designed to accommodate the greater project as well as the rehabilitation. The bridge currently contains four lanes of traffic with two lanes in each direction. Median barrier divides the two directions of traffic. During construction, only a single lane will be provided for each direction of traffic. Crossovers will be installed in the median of I-40 at locations before and after the bridge to allow the shifting of one lane of traffic to the inside lane on the opposite side of the existing median barrier. This will place opposing directions traffic on one side of the bridge and remove all traffic from the opposite side of the bridge. Portable longitudinal barrier will be installed to separate these opposing directions of traffic. At the completion of the project, the crossovers will be removed. No cost for this traffic control in included in the cost estimate for the rehabilitation of Span Nos. 1, 2 and 3 and the west approach slab because the traffic control will already be required for construction of the greater project.

DESCRIPTION OF UTILITIES

The bridge supports a pvc conduit below the deck slab overhang on the south side of the bridge. Presumably, the conduit contains the electric supply for the bridge navigation lighting over the channel.

PHOTO DOCUMENTATION

Bridge Element: Deck slab, Expansion and Construction Joints, Parapets and Median Barrier

Existing Condition: The existing deck slab has a total width of 68’-6” and a thickness of 8”. The soffit of the deck slab between the beams was constructed with stay-in-place steel deck forms and is not visible; however, the soffits of the deck slab overhangs are in good condition with no significant deterioration or efflorescence. The top surface of the deck slab contains abrasion and some small patches, potholes and impending potholes. The most significant problem with the deck slab is the presence of extensive map cracking. The cracks are small but numerous and prevalent throughout the deck slab in Span Nos. 1, 2 and 3.

A sealed expansion joint exists in the deck slab at Pier No. 1. A modular expansion joint exists in the deck slab at Pier No. 3. Construction joints exist in the deck slab between the approach slab and deck slab and at Pier No. 2. The joint between the approach slab and deck slab is a sawed and sealed joint. The sealed and modular expansion joints are in fair condition with some corrosion and loss of coating on the steel parts. The neoprene diaphragms at the joints appear

to be functioning with some tearing and seepage; however, the joints contain significant debris. The fascia concrete in the deck slab at the ends of the modular expansion joint is in poor condition with cracking and impending spalls.

The parapets on the deck slab consists of vertical face parapets with metal hand railing supported on approximately 8" tall curbs. The median barrier at the centerline of the bridge consists of an 11" wide vertical wall supported on a 4' wide by 8" tall curb. The parapets and median barrier are of an obsolete design and are in fair condition but do contain numerous vertical cracks. Additionally, the concrete surface finish has worn off in most areas resulting in significant discoloration of the concrete. The metal handrailing on the parapets are in good condition with little to no corrosion.

Proposed Improvements: The greater project will require the bridge superstructure to be widened sufficiently to accommodate a 4' wide inside shoulder, two 12' wide driving lanes and a 10' wide outside shoulder on each side of a median barrier located at the centerline of the bridge. The widening will increase the total width of the deck slab from 68'-6" to 81'-0". This widening will require the deck slab to be extended approximately 6'-3" on each side of the bridge. Two (2) alternates are considered here for rehabilitation and widening of the deck slab in Span Nos. 1 2 and 3.

<u>Alternate No. 1</u>
Remove the existing parapets, median barrier and curbs supporting those elements at the edges and centerline of the bridge. Additionally, remove a portion of the deck slab at the edges of the bridge to accommodate widening of the deck slab.

On each side of the bridge, add a single line of p.c. beams and extend the deck slab to accommodate widening of the bridge. Make a connection between the transverse reinforcing steel in the deck slab extensions to the existing transverse reinforcing steel in the deck slab. Scarify (cold mill) and conduct hydrodemolition of the existing deck slab to remove approximately 1" of the surface concrete. Apply a concrete overlay of no less than 2" above the original deck slab surface elevation across the full width of the bridge including the new deck slab extensions. Complete the work in two phases maintaining two-way traffic on one side of the bridge at a time for the duration of the project. Place the longitudinal phased construction joint at or near the centerline of the bridge.

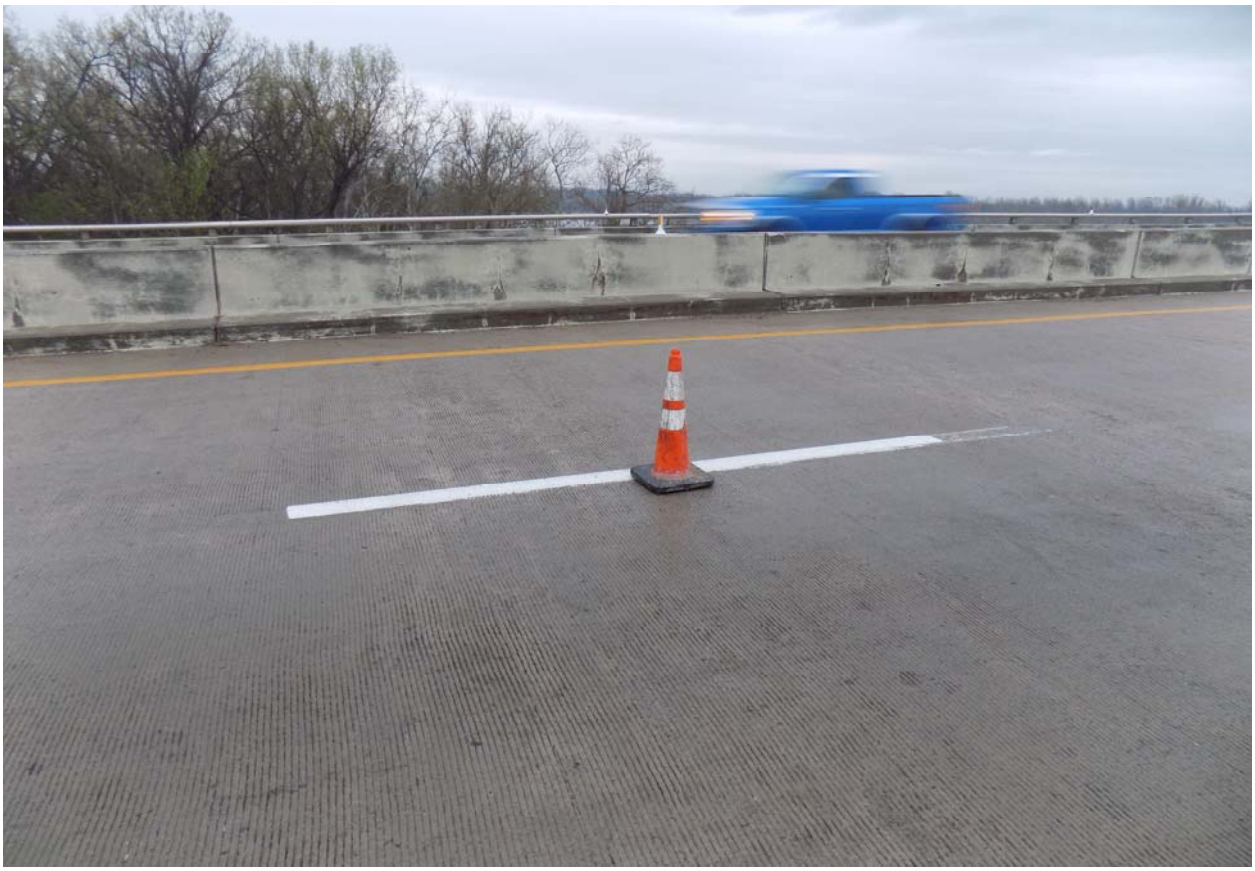
Construct new 42" F-Shaped parapets at the edges of the deck slab on the new deck slab extensions. Construct new

42” median barrier at the centerline of the bridge. Preserve the existing reinforcing steel projecting from the existing deck slab into the existing median barrier. Anchor the new median barrier to the existing deck slab my mechanically splicing the new median barrier reinforcing steel to the existing reinforcing steel projecting from the deck slab.

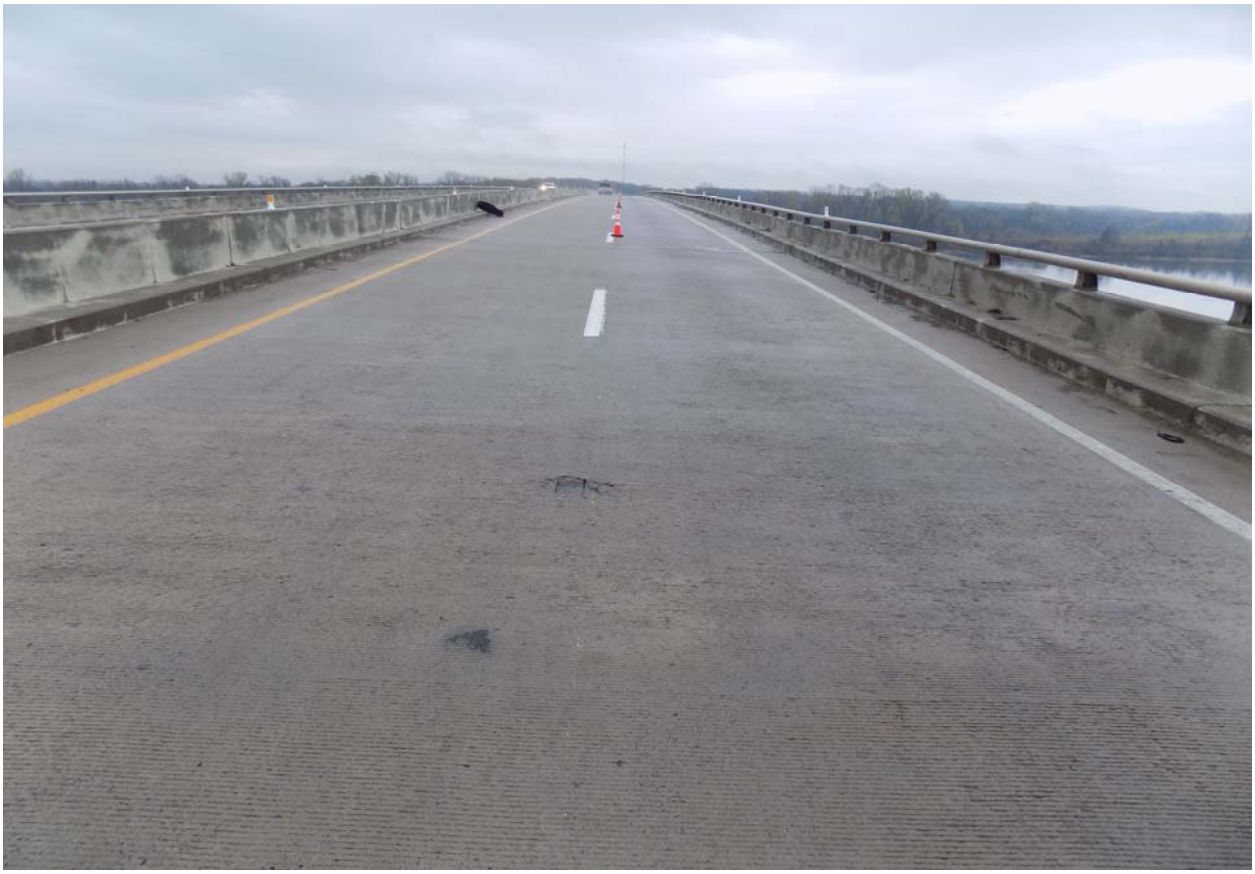
At the expansion joints, remove up to 4’ of the deck slab on each side of the joints; subsequently, remove and replace the sealed and modular expansion joints to the level of the overlay. Maintain the construction joints between the approach slab and the deck slab and in the deck slab at Pier No 2. by placing the overlay concrete in two separate pours on each side of the construction joints. Seal the construction joint at Pier No. 2 with sealer resin.

Alternate No. 2

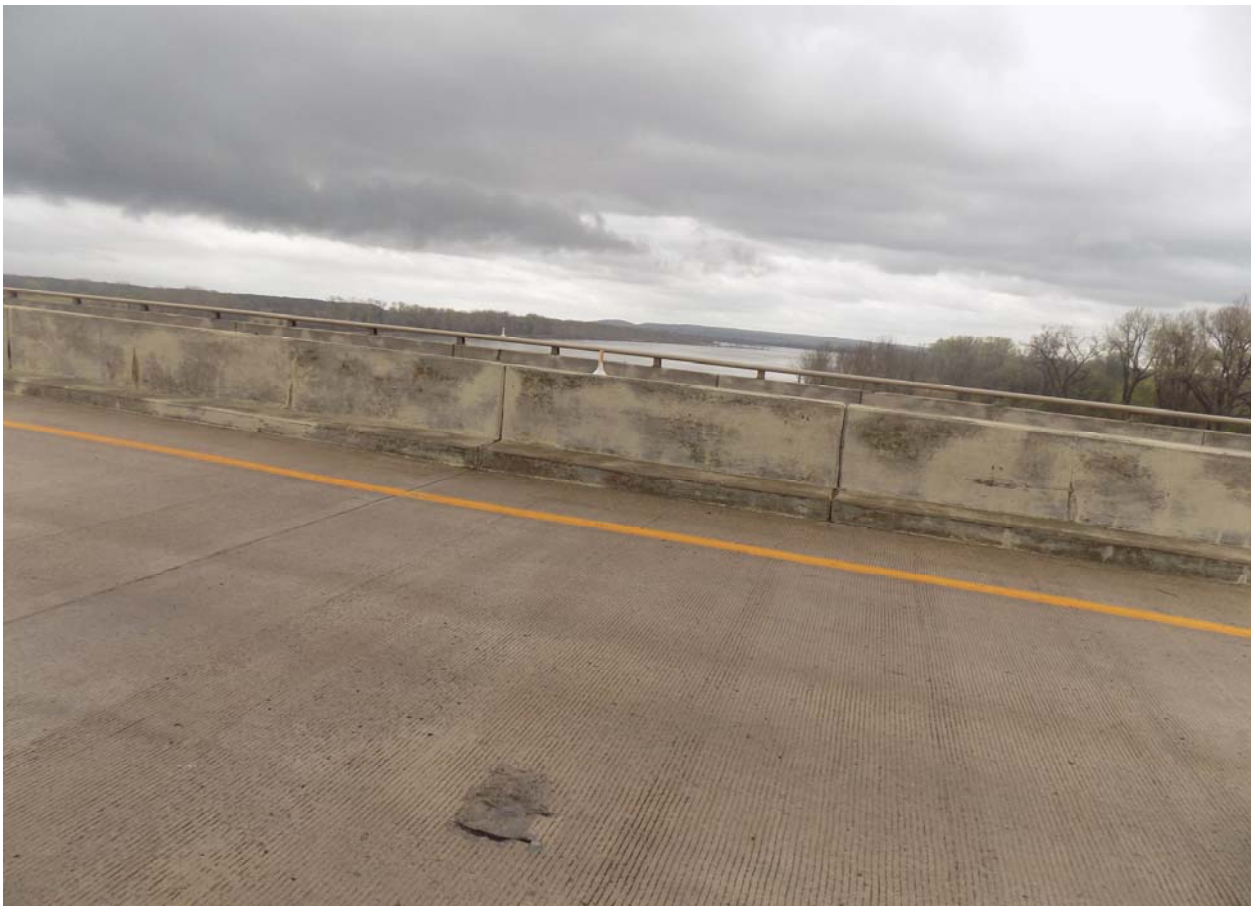
Remove the complete superstructure in Span No. 1, 2 and 3 including the deck slab, expansion joints, parapets, median barrier, curbs, p.c. beams and diaphragms. Reconstruct the superstructure with new 8” thick deck slab, expansion joints, 42” F-Shaped parapets at the edges of the deck slab and 42” median barrier at the centerline of the bridge. The new deck slab will be made wide enough to accommodate the proposed superstructure width of 81’-0”.



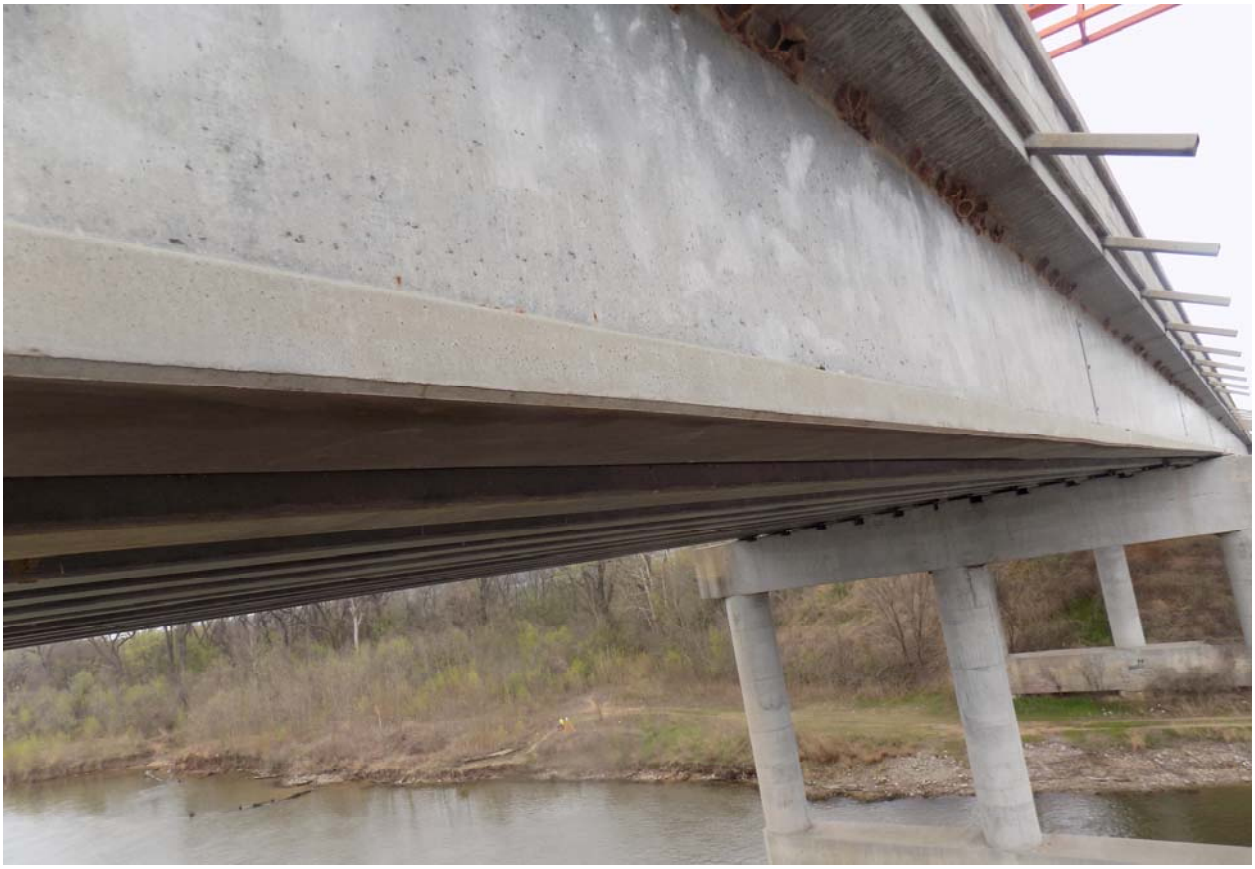
Eastbound Deck Slab and Median Barrier



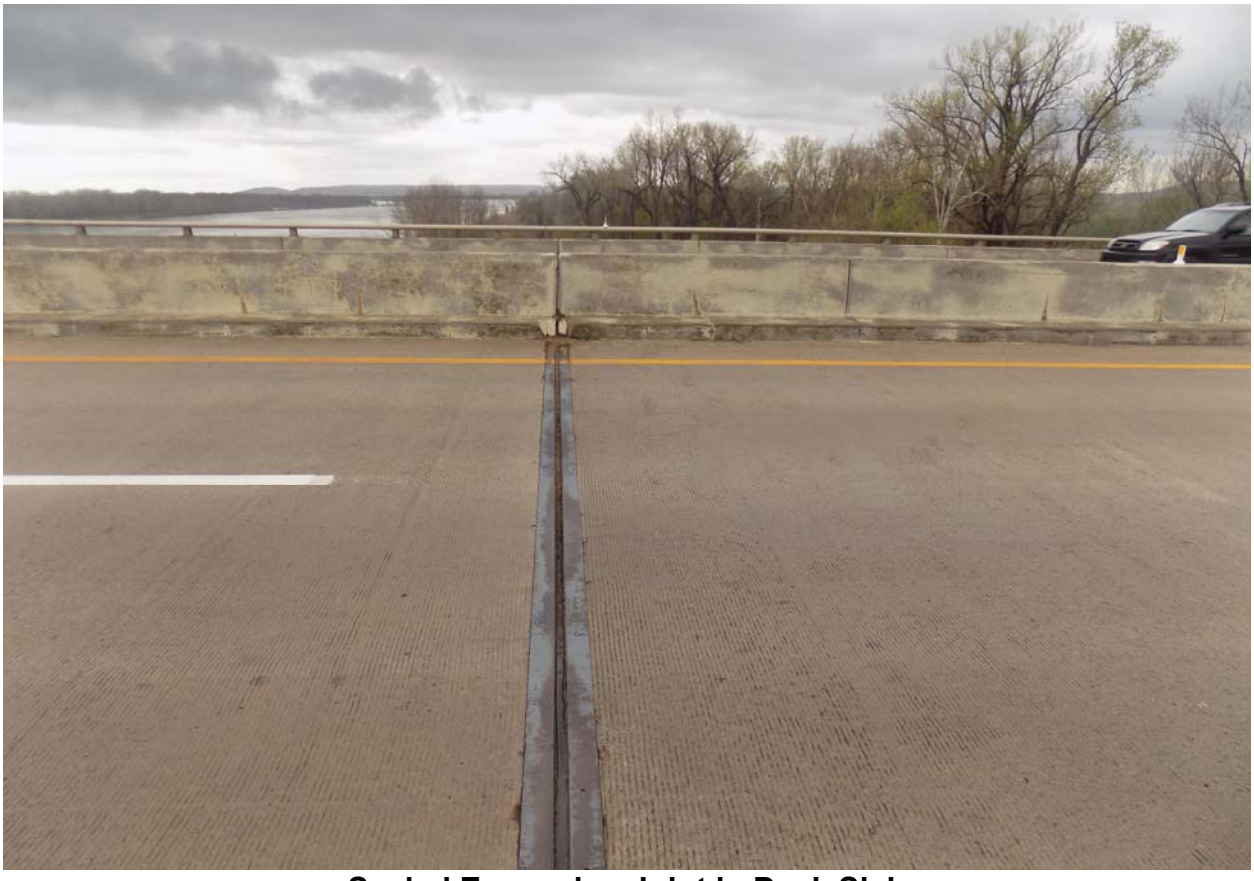
Eastbound Deck Slab, Median Barrier and Parapet



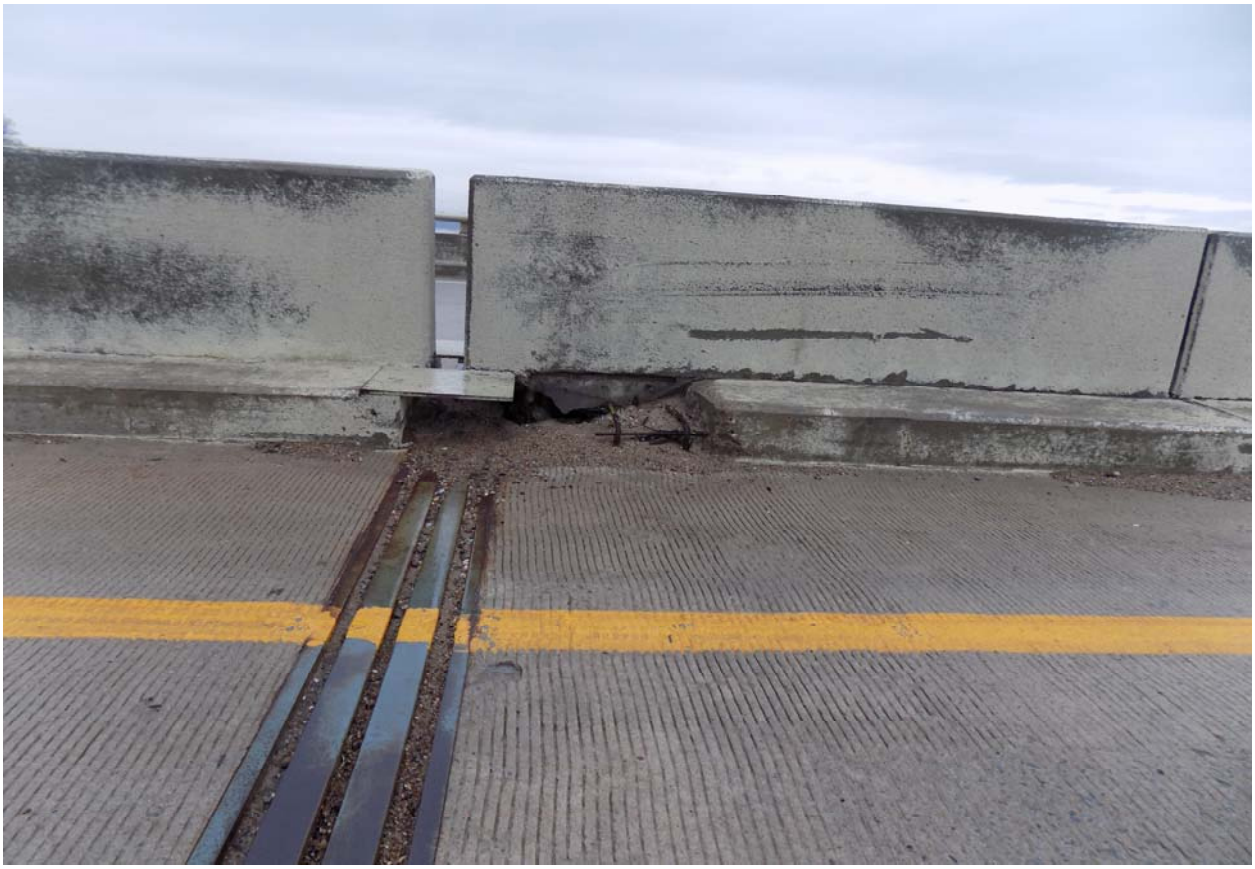
Westbound Deck Slab and Median Barrier



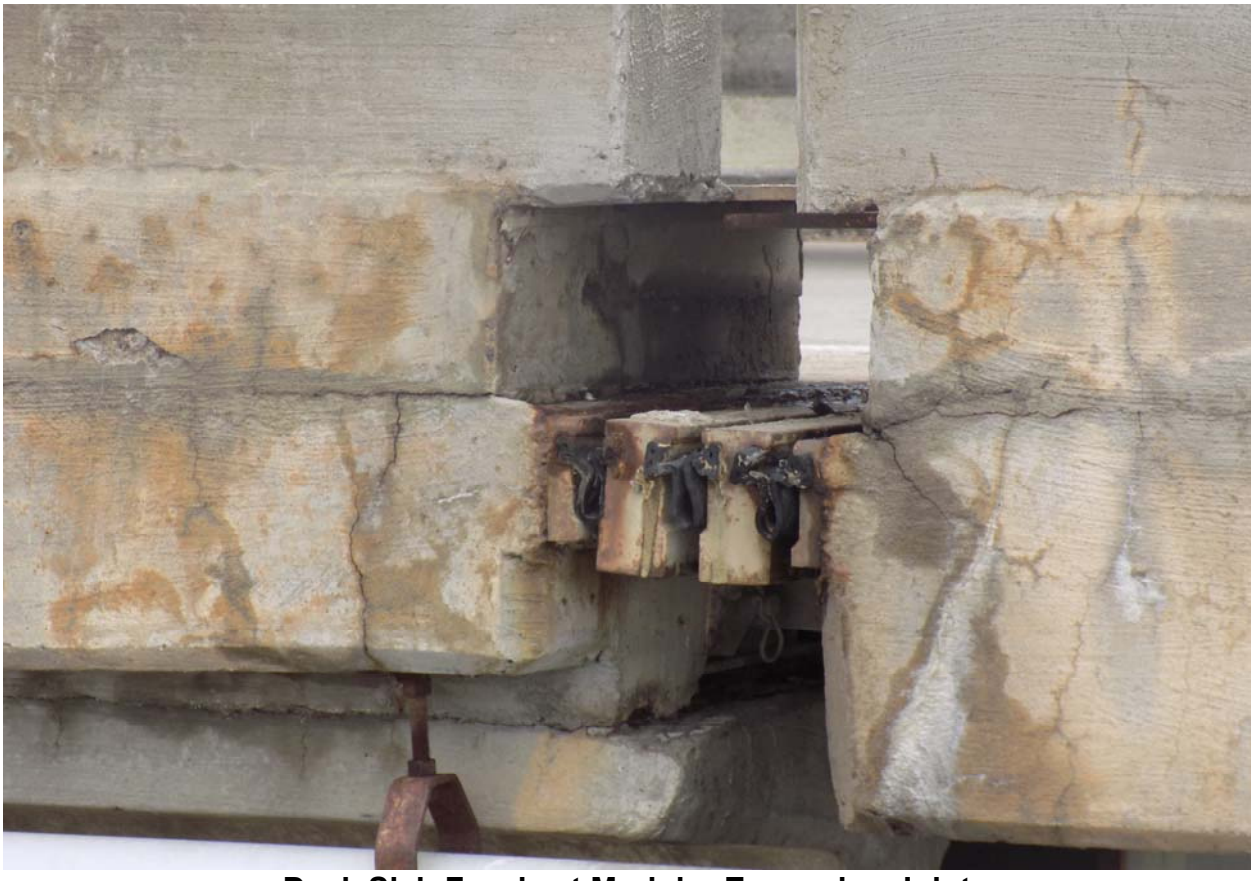
Soffit of Eastbound Deck Slab



Sealed Expansion Joint in Deck Slab



Modular Expansion Joint in Deck Slab



Deck Slab Fascia at Modular Expansion Joint

Bridge Element: P.C. Beams and Diaphragms

Existing Condition: The existing p.c. beams consist of 72” Bulb Tee beams extending along twelve (12) beam lines. The end and intermediate diaphragms consist of double steel channels bolted to the p.c. beams with angle gussets. The diaphragms are spaced at third points along the beams. The p.c. beams and diaphragms are mostly in good condition. Two (2) of the p.c. beams in the north exterior beam line contain some spalling with exposed prestressing strands on the end face of the p.c. beams. These occur over Pier Nos. 2 and 3. The diaphragms are in good condition; however, several of the bolted connections between the angle gussets and the p.c. beams have loose or missing bolts.

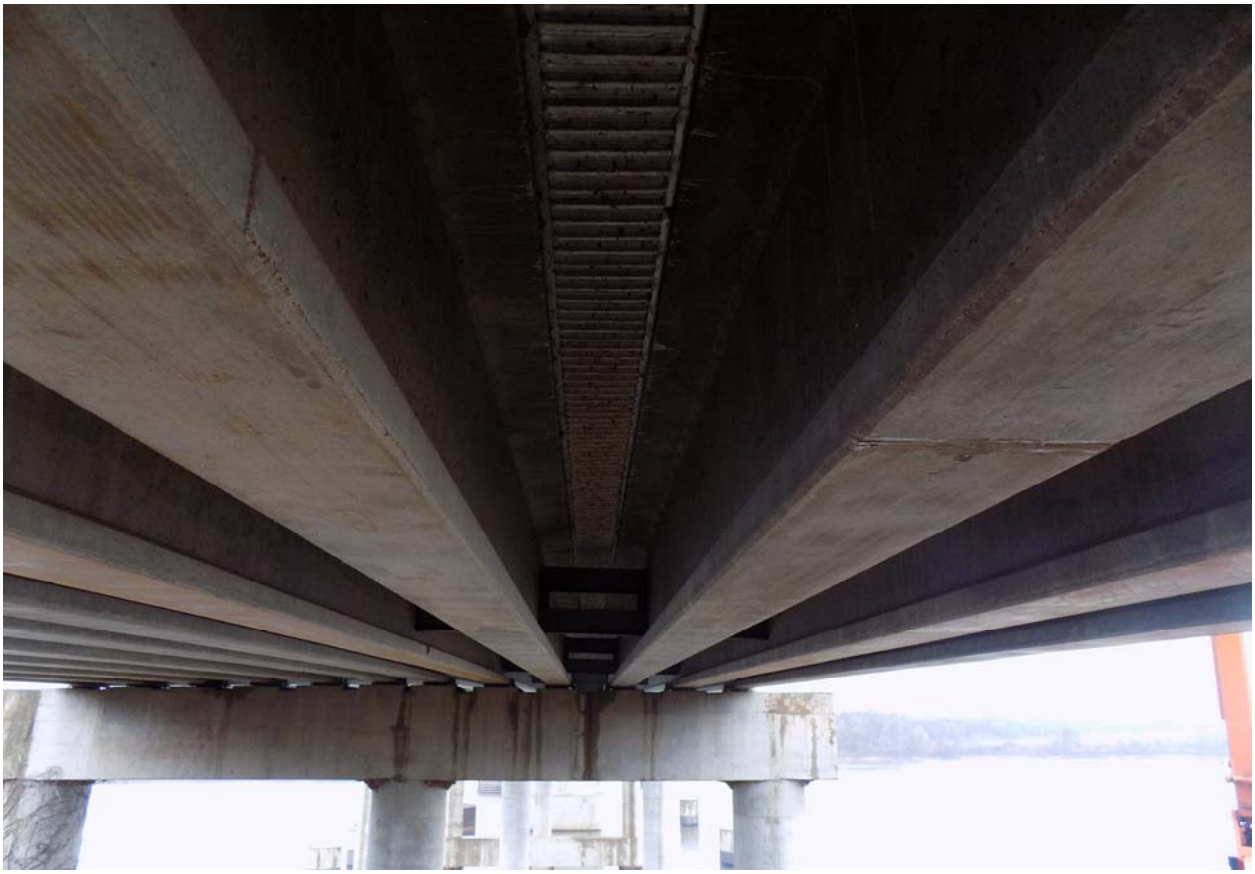
Proposed Improvements: The greater project will require the total width of the bridge deck slab to be widened from 68’-6” to 81’-0”. This widening will require the deck slab to be extended approximately 6’-3” on each side of the bridge and will require one additional beam line to be added on each side of the bridge. Two (2) alternates are considered here for rehabilitation of the p.c. beams and diaphragms in Span Nos. 1 2 and 3.

Alternate No. 1

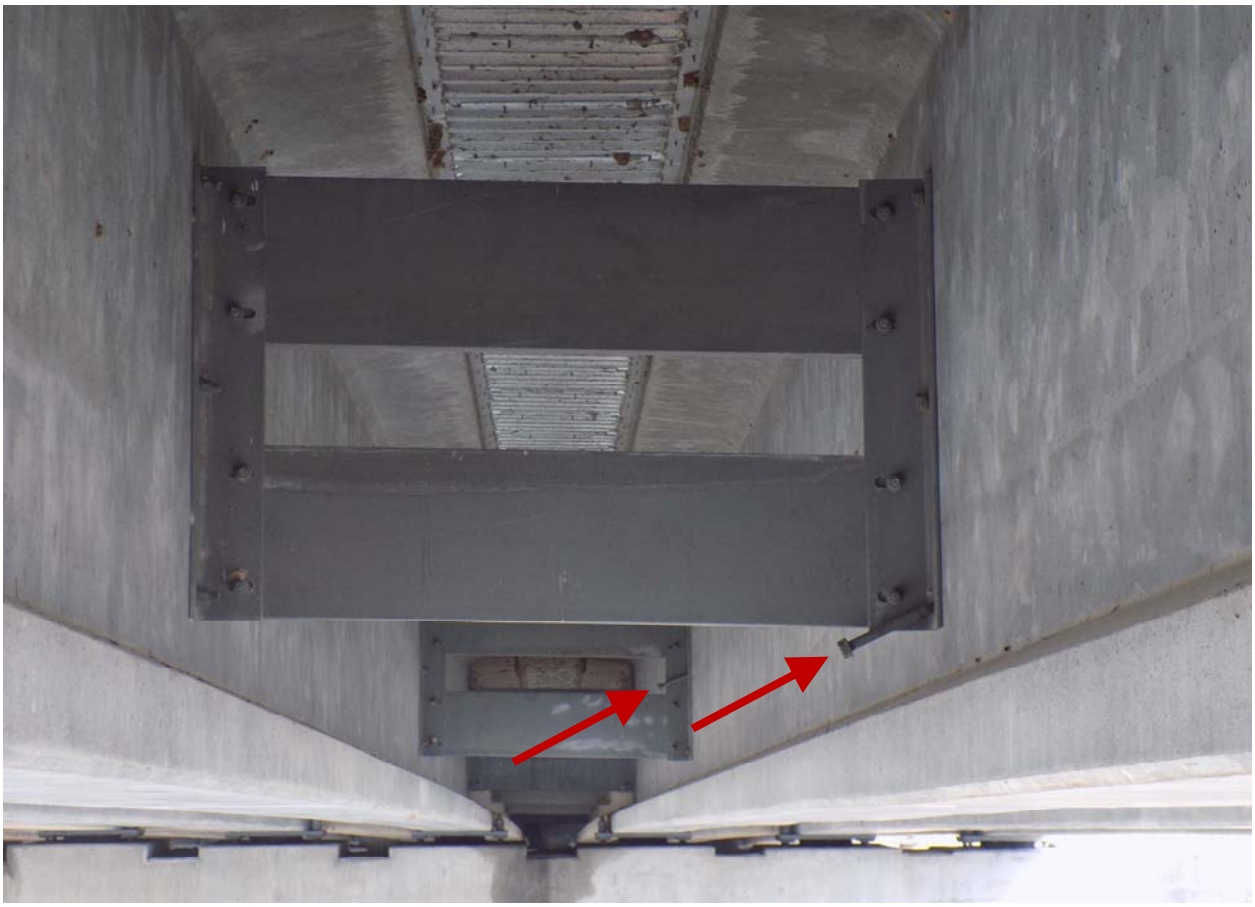
Repair the two (2) p.c. beam ends that currently contain spalling and exposed prestressing strands. Remove all loose and unsound concrete from beam ends and patch with pneumatically placed mortar. Subsequently, apply an elastomeric coating to the repaired beam ends. Add two additional beam lines of 72” Bulb Tee p.c. beams to accommodate widening of the bridge superstructure. Add missing bolts, retighten loose bolts with thread lock compound on the steel diaphragm angle gusset connections to the p.c. beams. Add additional steel double channel diaphragms with angle gussets between the new and existing p.c. beams.

Alternate No. 2

Remove the complete superstructure in Span No. 1, 2 and 3 including the existing p.c. beams and structural steel diaphragms. Install new 72” Bulb Tee p.c. beams at all existing beam lines and the two (2) new exterior beam lines to accommodate widening of the bridge superstructure. Install new reinforced concrete diaphragms between all p.c. beams at third points along p.c. beams. Include double steel diaphragm rods extending through all diaphragms across the width of the bridge

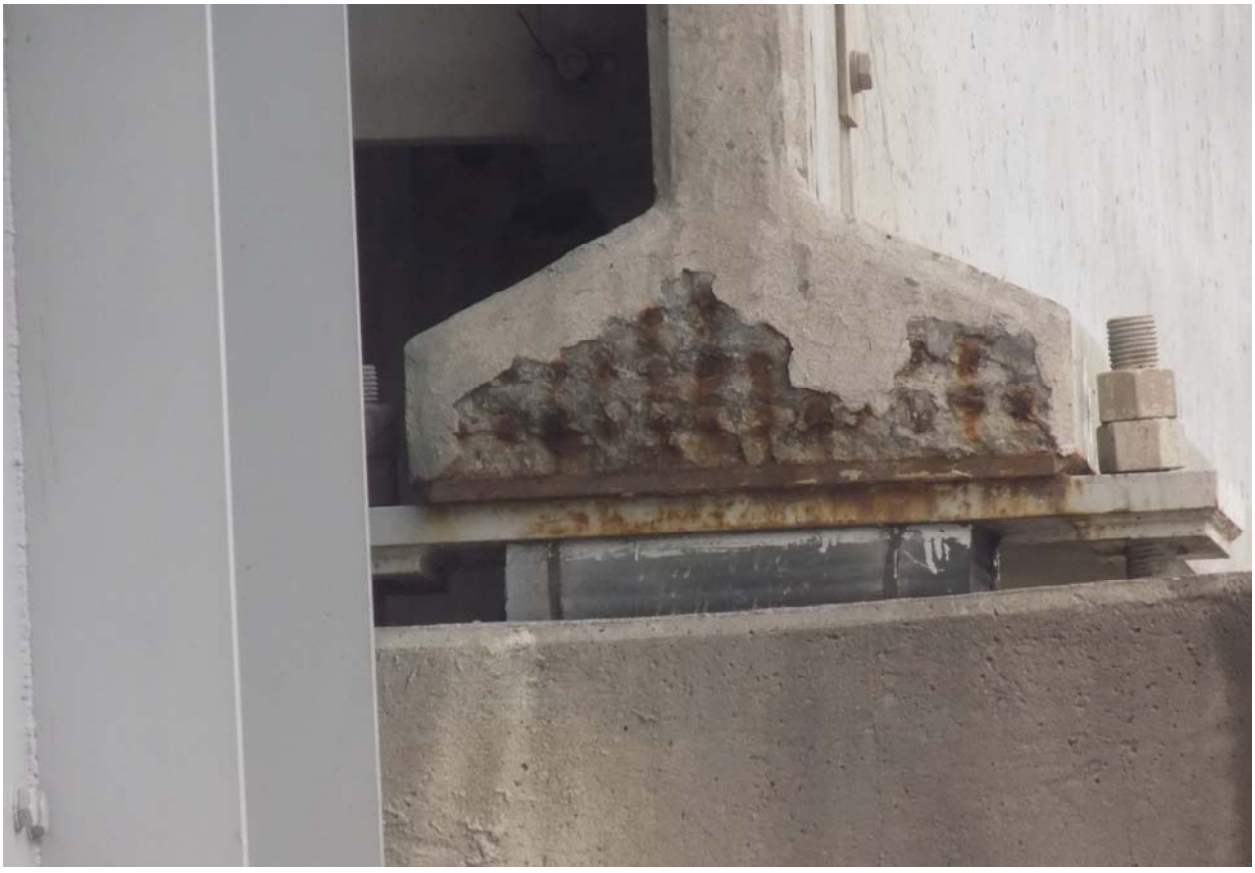


P.C Beams (Typical)



Structural Steel Diaphragms and Angle Gussets (Typical)

North Exterior P.C. Beam End at Pier No. 2



North Exterior P.C. Beam End at Pier No. 3

Bridge Element: Bearing Assemblies

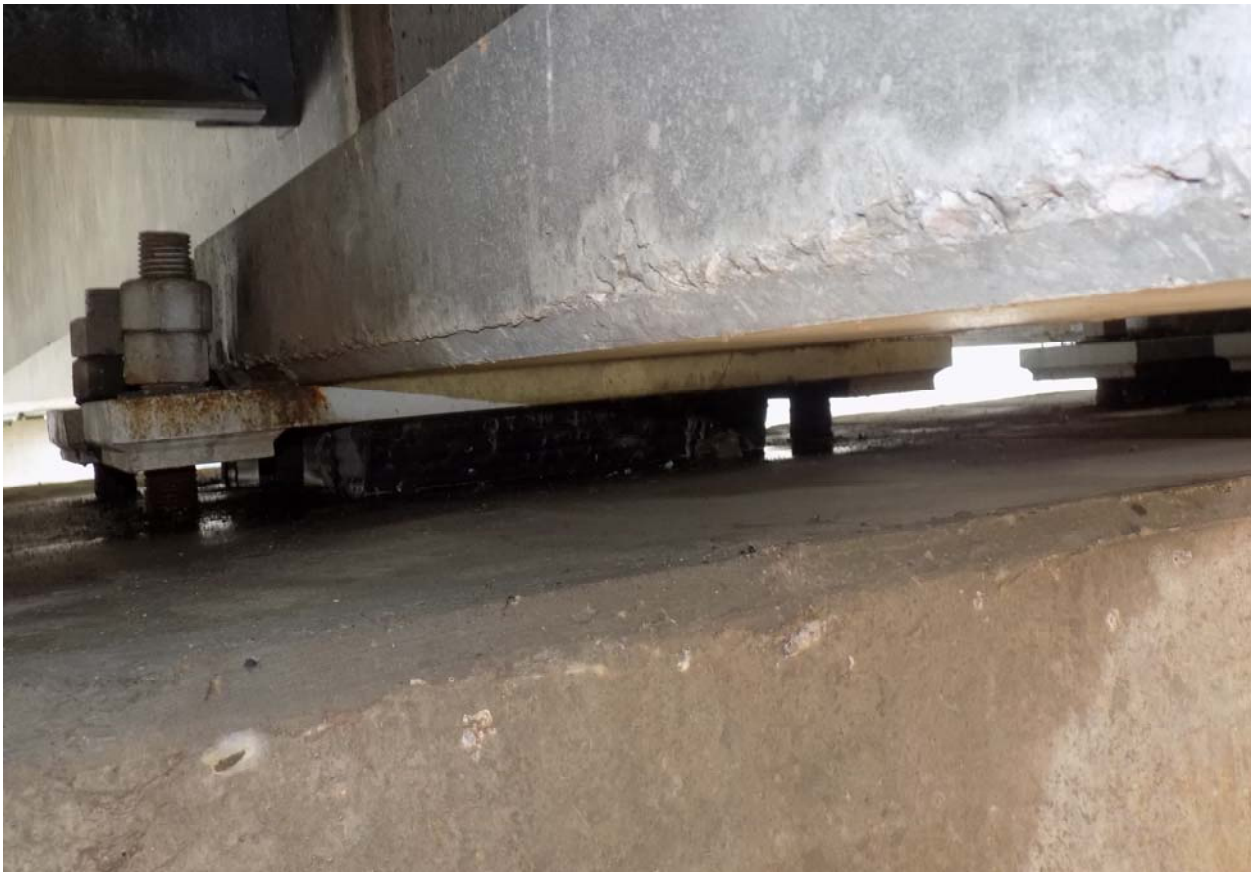
Existing Condition: The existing bearings assemblies consist of steel reinforced elastomeric pads with painted weathering steel beveled anchor plates, contact plates and anchor bolt assemblies. The bearing pads are in good condition with little deterioration or bulging. The steel parts of the bearing assemblies are in good condition but have some moderate paint coating failure and rust staining. Most of the staining is at the joint between the anchor plates and p.c. beam sole plates.

Proposed Improvements: The greater project will require one additional line of beams to be added to each side of the bridge to accommodate widening of the bridge superstructure. For each added p.c. beam, additional bearing assemblies will be required at the beam ends. The two (2) alternates for rehabilitation of Span Nos. 1 2 and 3 are the same for the bearing assemblies with one minor exception noted below.

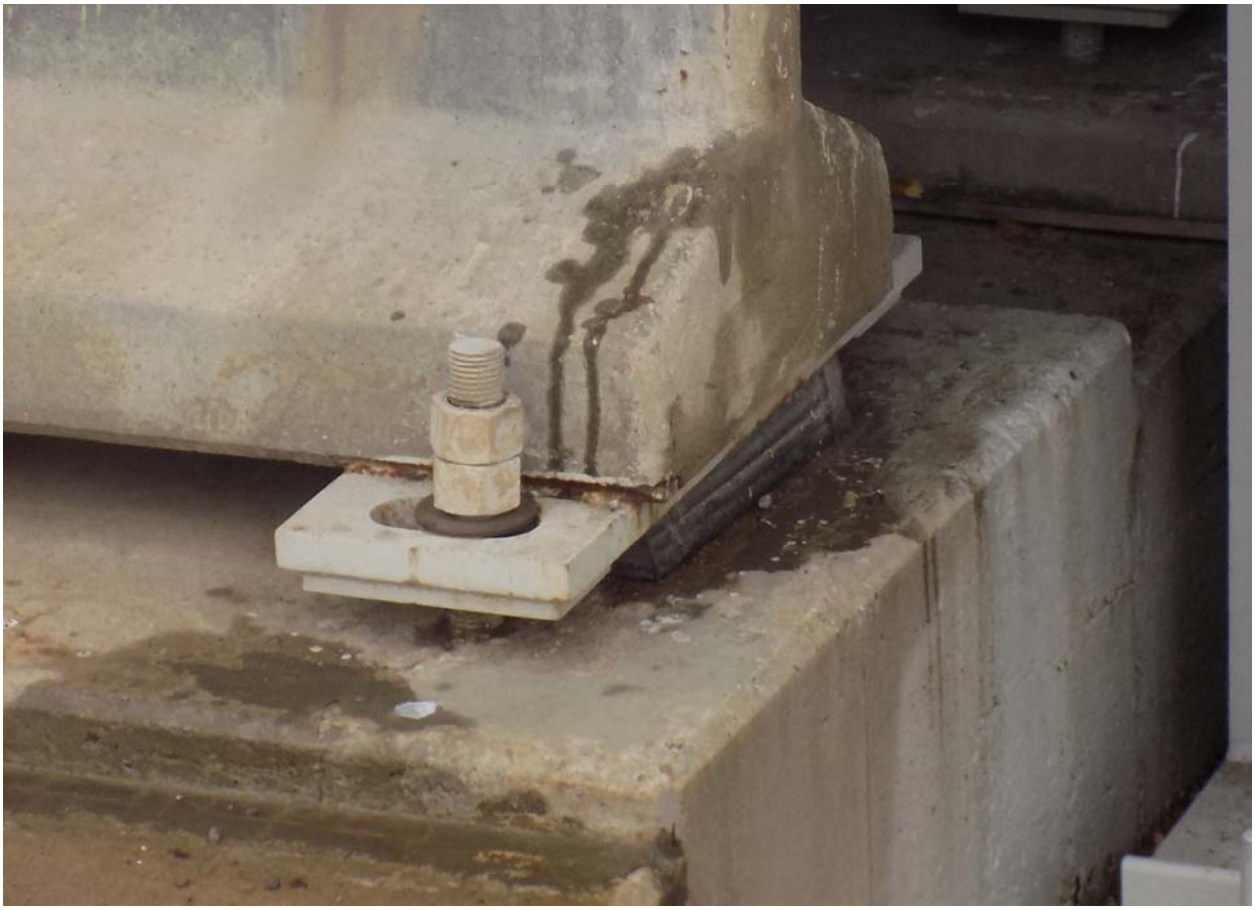
<u>Alternate Nos. 1 and 2</u>

At the new exterior beam lines, install new bearing assemblies consisting of steel reinforced elastomeric pads and stainless-steel beveled anchor plates, contact plates and anchor bolt assemblies. The new anchor bolt assemblies will need to be drilled and epoxy anchored into the existing pedestal concrete at the abutment and piers.

Leave all existing bearing assemblies in-place. Clean and paint all steel parts of the existing bearing assemblies. Since the existing p.c. beams will be removed in Alternate No. 2, the existing beveled anchor plates will need to be separated from the sole plates in the existing p.c. beams for Alternate No. 2. Any weld material remaining on the anchor plates after removal of the p.c. beams should be ground flush prior to painting the anchor plates.



Painted Weathering Steel Bearing Assembly



Painted Weathering Steel Bearing Assembly at Exterior P.C. Beam

Bridge Element: West Approach Slab

Existing Condition: The west approach slab has a length of 30'-0" a width of 81'-0" and a thickness of 13". The existing parapets on the approach slab are not located at the edges of the approach slab. They located approximately 6' from the edges of the approach slab thereby confining the current bridge clear roadway to 30'-0" on each side of the median barrier. The top surface of the approach slab contains abrasion and some minor potholes and impending potholes. The most significant problem with the approach slab is the presence of extensive map cracking. The cracks are small but numerous and prevalent throughout the approach slab. A sawed and sealed construction joint exists between the approach slab and deck slab.

The parapets on the approach slab consist of vertical wall parapets supported on approximately 8" tall curbs. The median barrier on the approach slab consists of an 11" wide vertical wall supported on a 4' wide by 8" tall curb at the begin bridge. This section transitions to the ODOT standard 42" median barrier at the begin approach slab. The parapets and median barrier are of an obsolete design and are in fair condition but do contain numerous vertical cracks. Additionally, the concrete surface finish has worn off in most areas resulting in significant discoloration of the concrete. The south parapet on the approach slab contains impact damage as well.

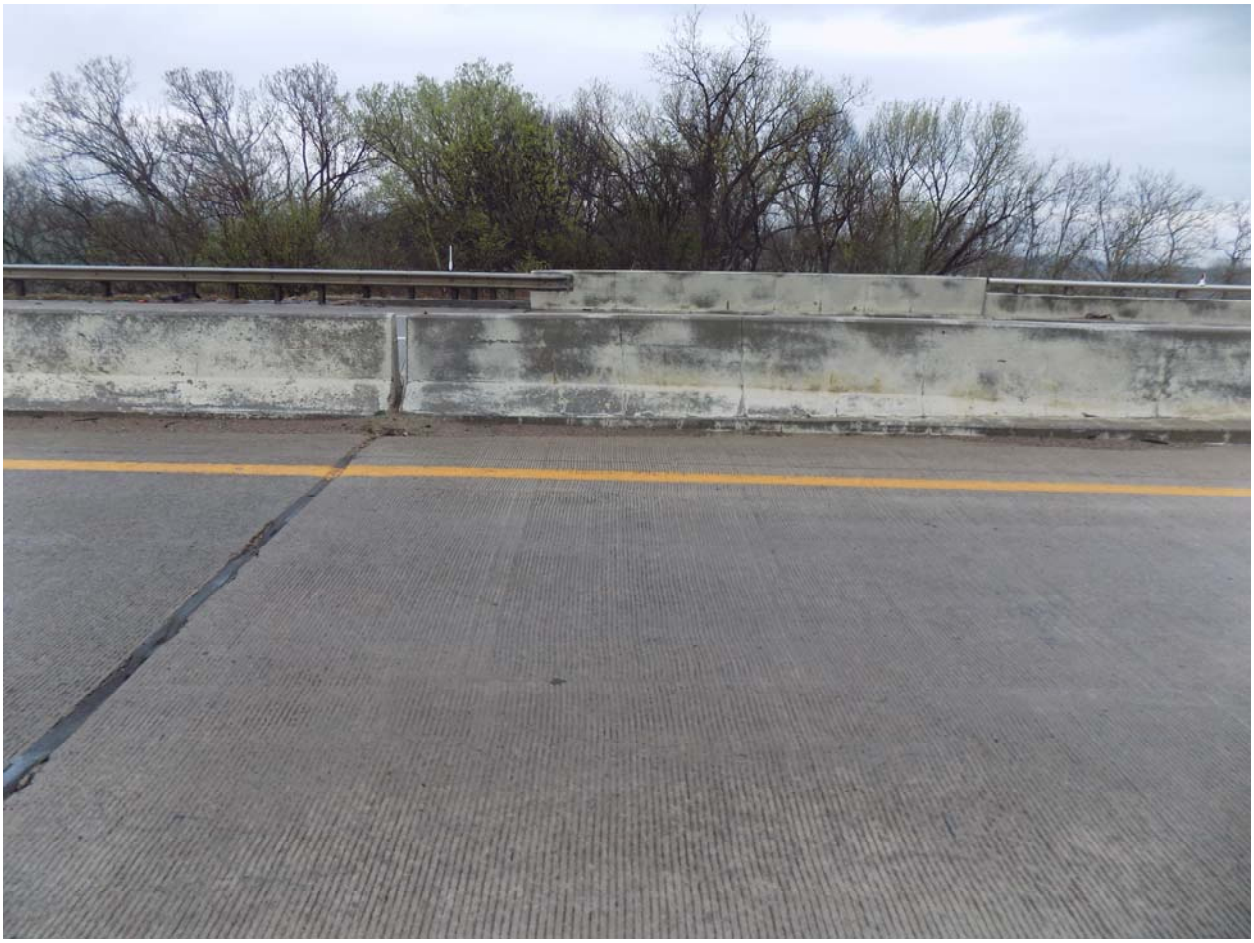
Proposed Improvements: The greater project will require the total width of the bridge superstructure to be widened from 68'-6" to 81'-0". The existing west approach slab currently has sufficient width to accommodate the widening of the bridge superstructure. Two (2) alternates are considered here for rehabilitation of the west approach slab.

<u>Alternate No. 1</u>
Remove the existing parapets, median barrier and curbs supporting those elements on the approach slab at the edges and centerline of the bridge. Scarify (cold mill) and conduct hydrodemolition of the existing approach slab surface to remove approximately 1" of the surface concrete. Apply a concrete overlay of no less than 2" above the original approach slab surface elevation across the full width of the approach slab.

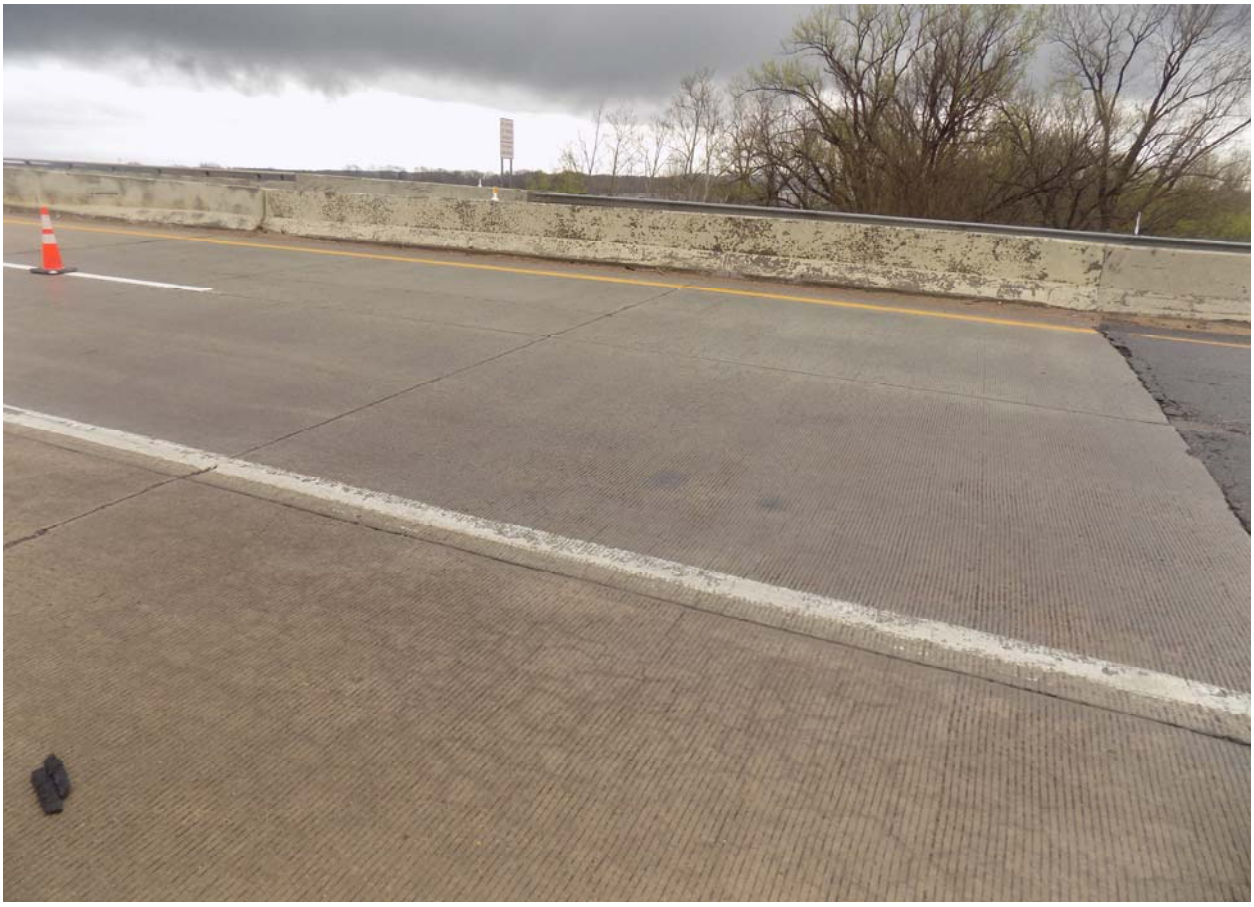
Drill and epoxy anchor new reinforcing steel bars into the approach slab to allow anchorage of new parapets and median barrier to the existing approach slab. Then construct new 42" F-Shaped parapets at edges of the approach slab and new 42" median barrier at the centerline of the bridge.

Alternate No. 2

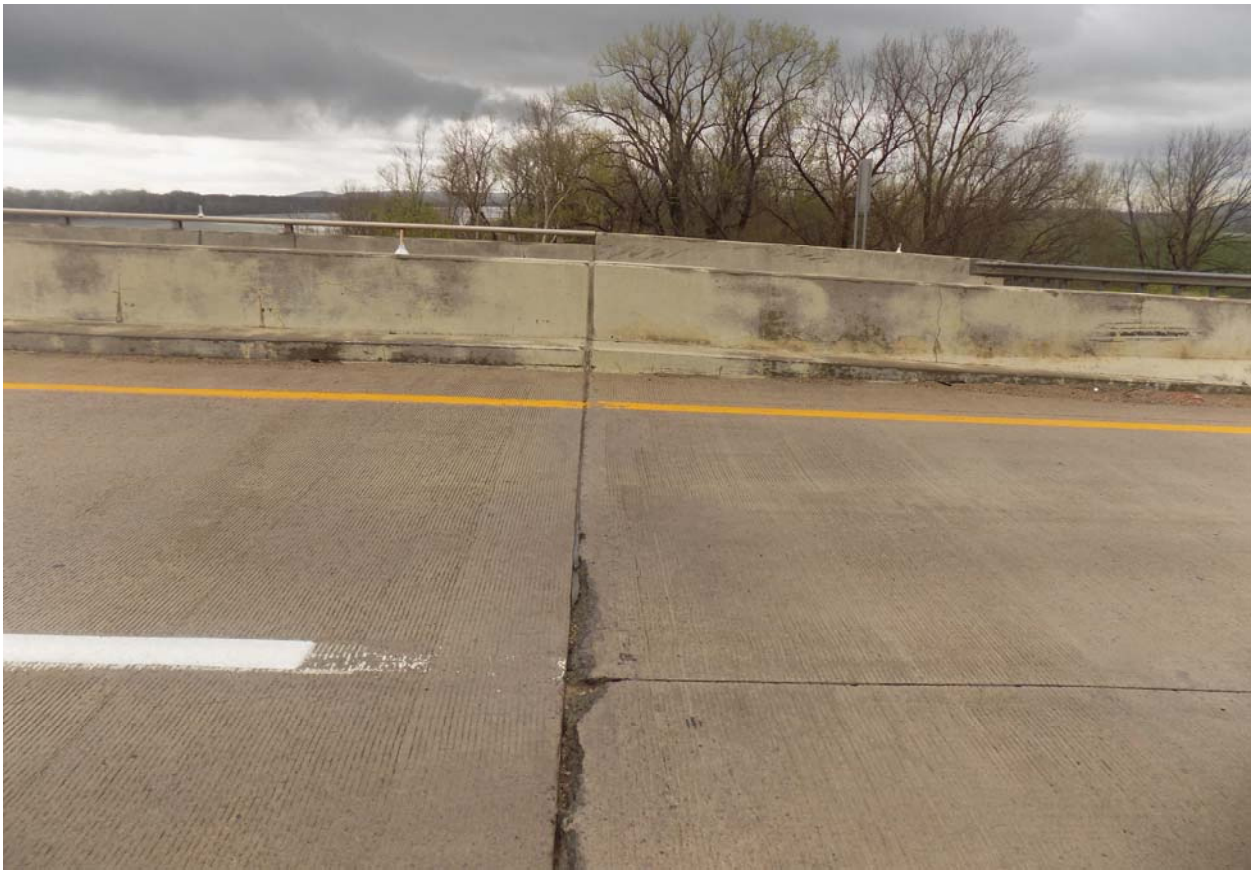
Entirely remove the west approach slab. The removal will include removal of the existing approach slab, parapets, median barrier and curbs. Reconstruct a new approach slab with new 42" F-shaped parapets at the edges of the approach slab and new 42" median barrier at the centerline of the bridge. The width of the new approach slab will match the width of the existing approach slab.



West Approach Slab on Eastbound Side of Bridge



West Approach Slab on Westbound Side of Bridge



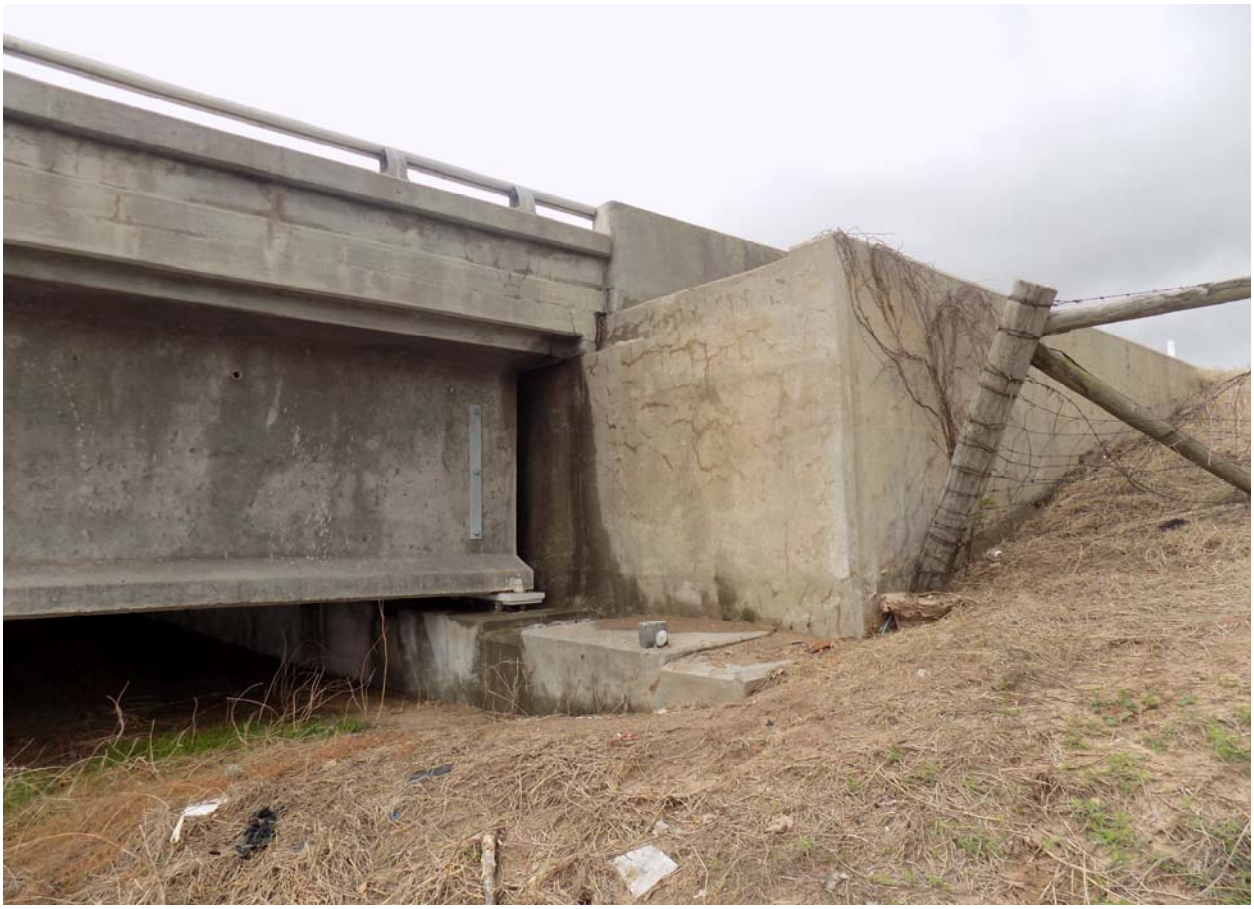
Construction Joint between Deck Slab Approach Slab

Bridge Element: Abutment No. 1 (West Abutment)

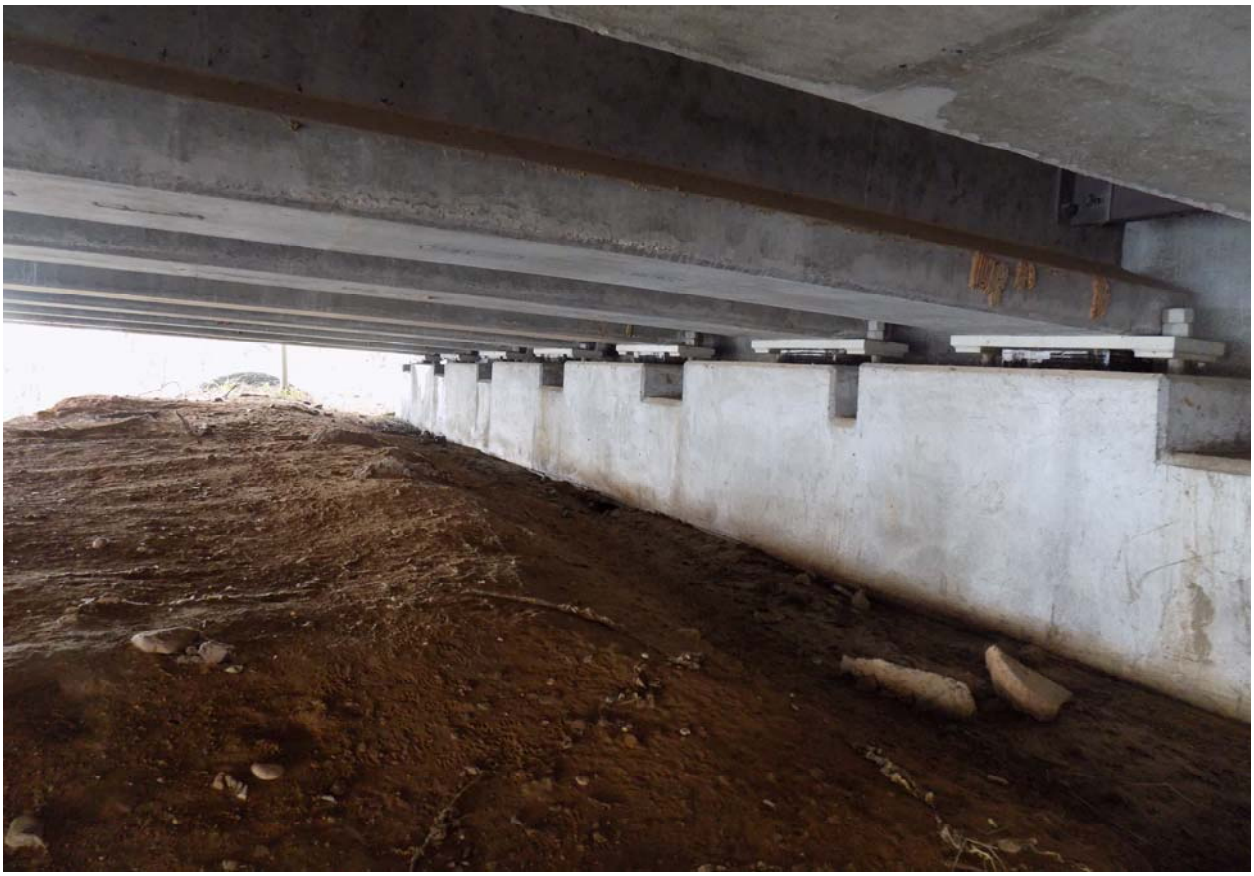
Existing Condition: The bridge seats and back walls of Abutment No. 1 are in fair to good condition but contain some abrasion, cracks and minor spalls throughout. Map cracking exists on the backwall at the exposed ends of the abutment. The pedestals are in good condition. The abutment wings are in fair condition with no significant spalling but some map cracking. A portion of the abutment from the original bridge was not removed with the construction of the existing abutment in 2002 and remains in front of the existing bridge seat.

Proposed Improvements: The greater project will require the total width of the bridge superstructure to be widened from 68'-6" to 81'-0". The existing Abutment No. 1 currently has sufficient width to accommodate widening of the bridge superstructure including the pedestals needed to support one additional beam line on each side of the bridge. No other modification of the abutment will be required to accommodate the bridge widening except installing new bearing assembly anchor bolt assemblies into the existing concrete of the pedestals at the added beam lines. The two (2) alternates considered here for rehabilitation of Abutment No. 1 are the same.

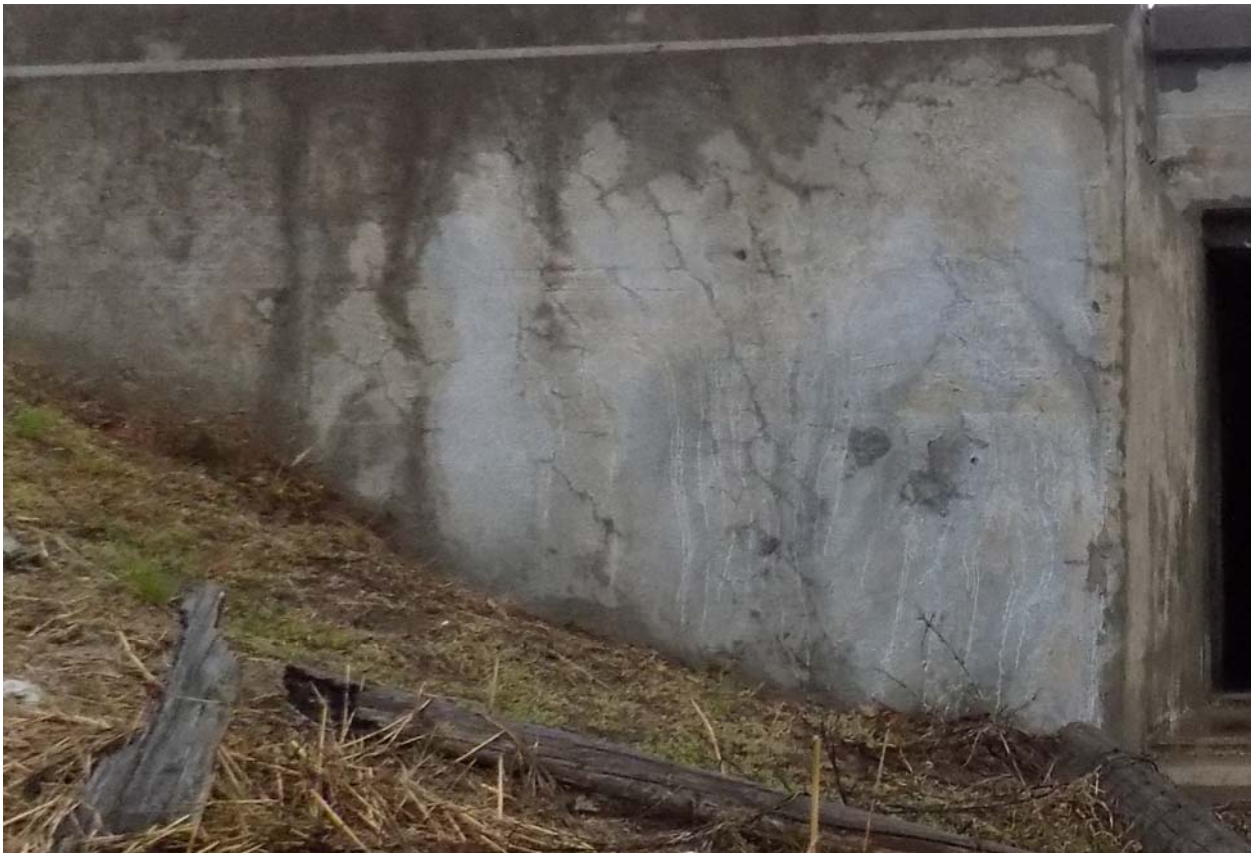
<u>Alternate Nos. 1 and 2</u>
Remove all unsound concrete from the bridge seat, backwall and wings of Abutment No. 1. Pneumatically place mortar to repair the areas of unsound concrete that is removed. Place the mortar back to the original lines and surfaces of the abutment. Apply corrosion inhibitor to the repaired areas. After making the pneumatically placed mortar repairs, make epoxy crack repairs to any cracks remaining in the abutment concrete. Apply an elastomeric coating (Cim 1000) to the top of the abutment bridge seat and pedestals.



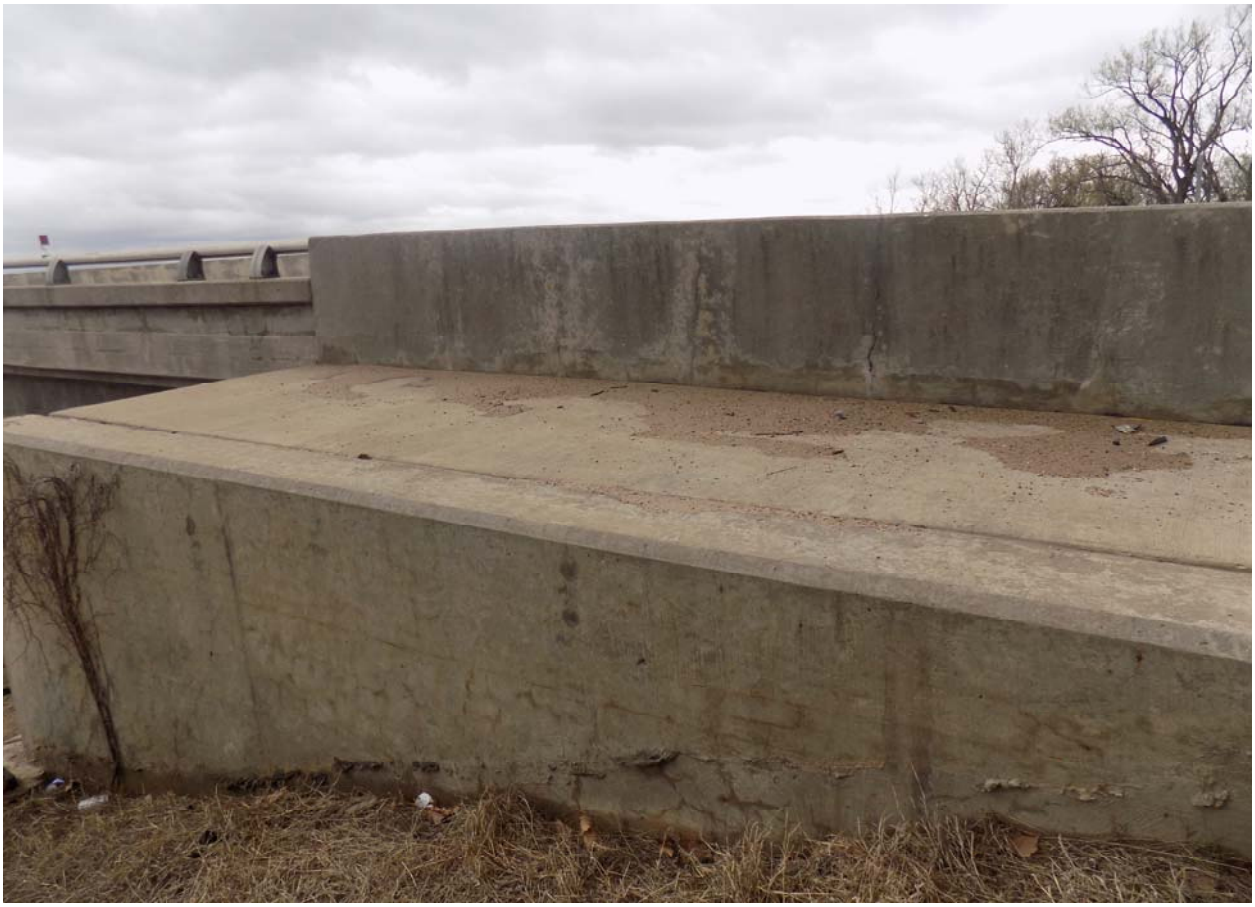
North End of Abutment No. 1



Bridge Seat of Abutment No. 1



South Wing of Abutment No. 1



North Wing of Abutment No. 1

Bridge Element: Pier Nos. 1, 2 and 3

Existing Condition: The existing piers consist of 7’ wide x 8’ deep pier caps supported on three 7’ diameter columns. The pier caps at Pier No. 3 are stepped to allow support p.c. beams on one side of the pier and steel girders on the opposite side of the pier. All piers are founded on 9’ diameter drilled shafts. 7’ wide by 10’ deep web walls extend between the columns at the base of the columns at all piers. The existing pier caps are in fair condition but do contain some large cracks and impending spalls. The ends of pier caps that extend beyond the superstructure contain the most significant deterioration. There is some efflorescence in the cracks on the pier cap overhangs. The pier columns and web walls are in fair condition but do contain some cracks including map cracking and impending spalls.

Proposed Improvements: The greater project will require the total width of the bridge superstructure to be widened from 68’-6” to 81’-0”. The existing Pier Nos. 1, 2 and 3 currently have sufficient width to accommodate widening of the bridge superstructure including the pedestals needed to support one additional beam line on each side of the bridge. No other modification of the piers will be required to accommodate the bridge widening except installing new bearing assembly anchor bolt assemblies into the existing concrete of the pedestals at the added beam lines. The two (2) alternates considered here for rehabilitation of Pier Nos. 1, 2 and 3 are the same.

<u>Alternate Nos. 1 and 2</u>

Remove all unsound concrete from the pier cap, columns and web walls of Pier Nos. 1, 2 and 3. Where the removals of the pier concrete are less than 2 inches deep, pneumatically place mortar to repair the areas of removed unsound concrete. Place the mortar back to the original lines and surfaces of the piers. Where the removals of the pier concrete are deeper than 2”, cast Class AA Concrete to repair the areas of removed unsound concrete. Place the Class AA Concrete back to the original lines and surfaces of the piers. The Class AA Concrete should be specified to have a maximum coarse aggregate size of ¾ inches. Apply corrosion inhibitor to the repaired areas. After making the pneumatically placed mortar and Class AA Concrete repairs, make epoxy crack repairs to any cracks remaining in the pier concrete. Apply an elastomeric coating (Cim 1000) to the top of the pier caps and pedestals.

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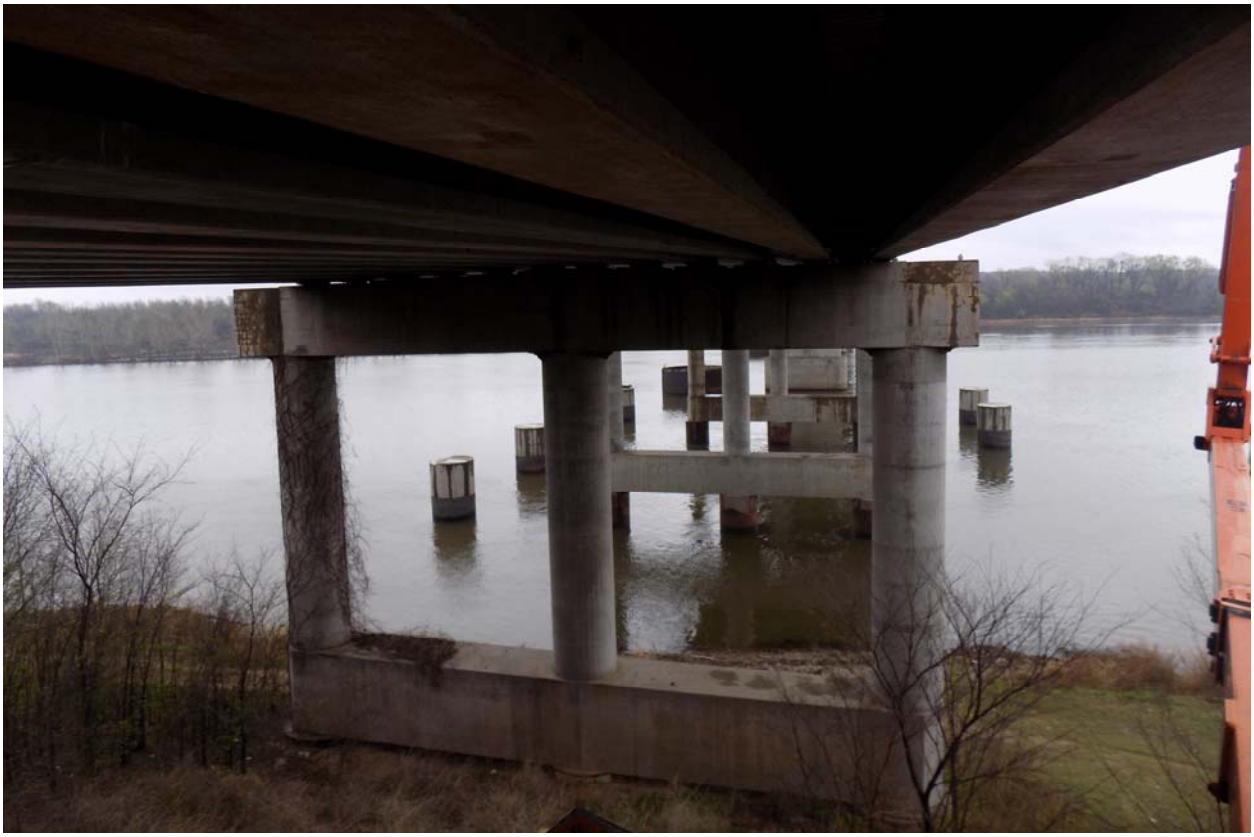
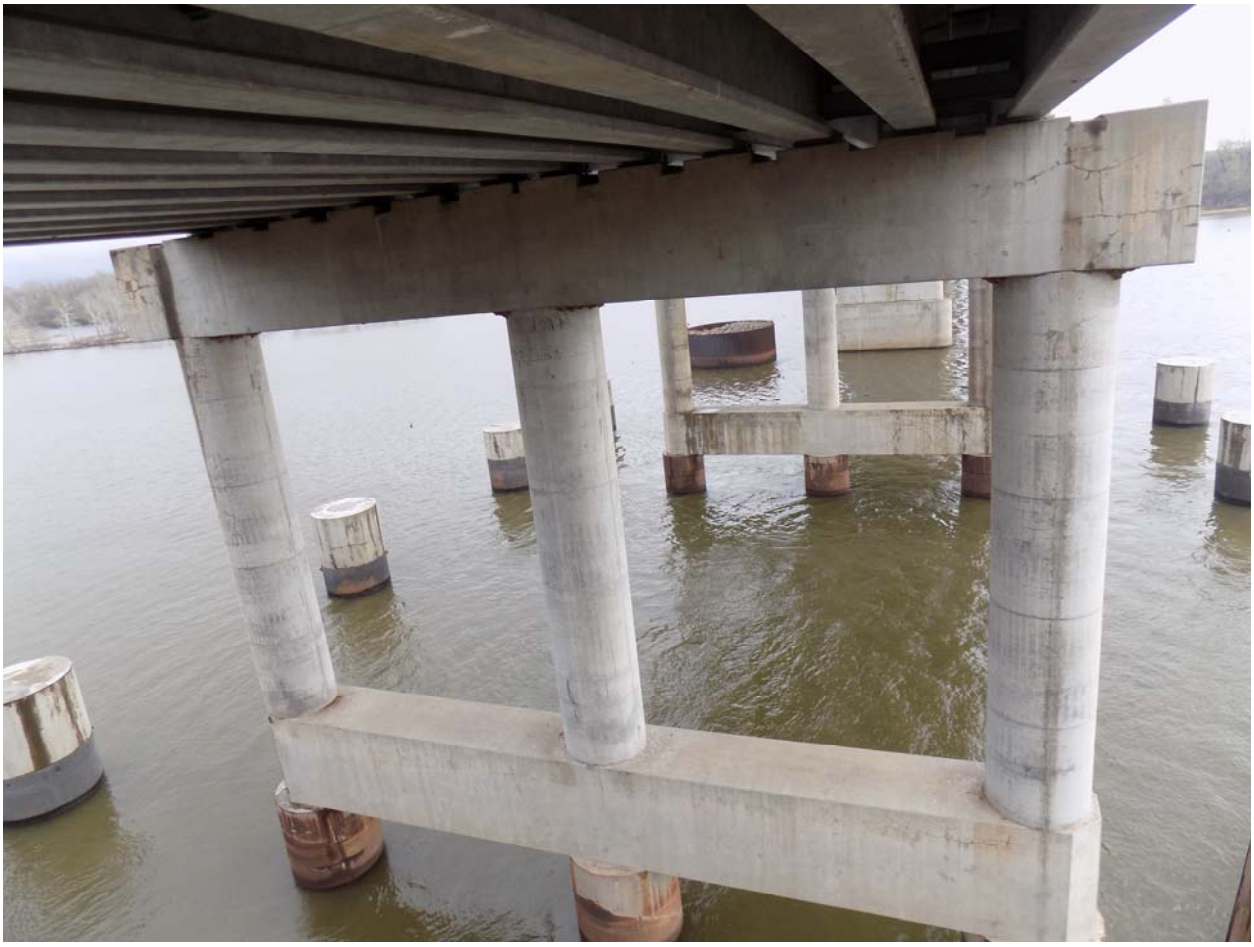
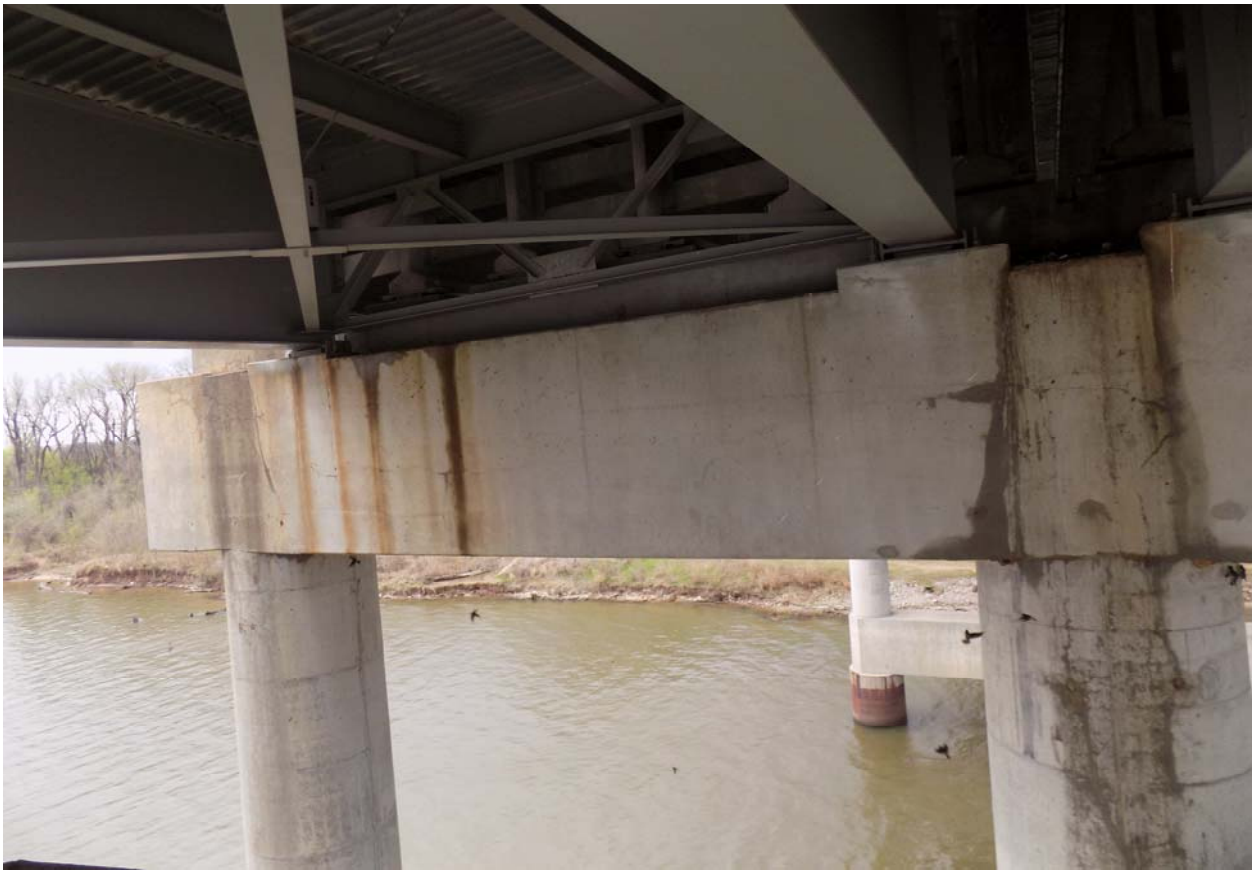


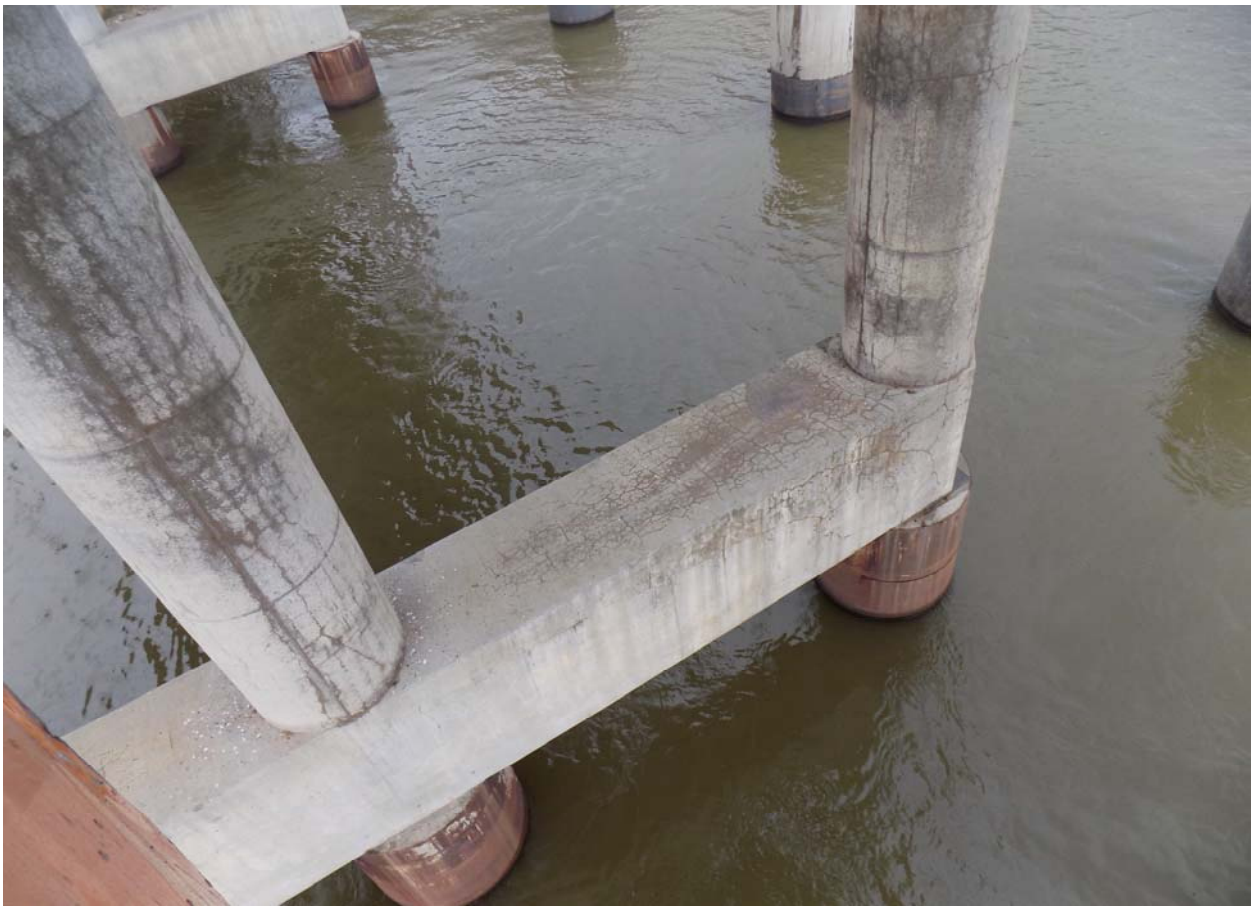
West Side of Pier No. 1



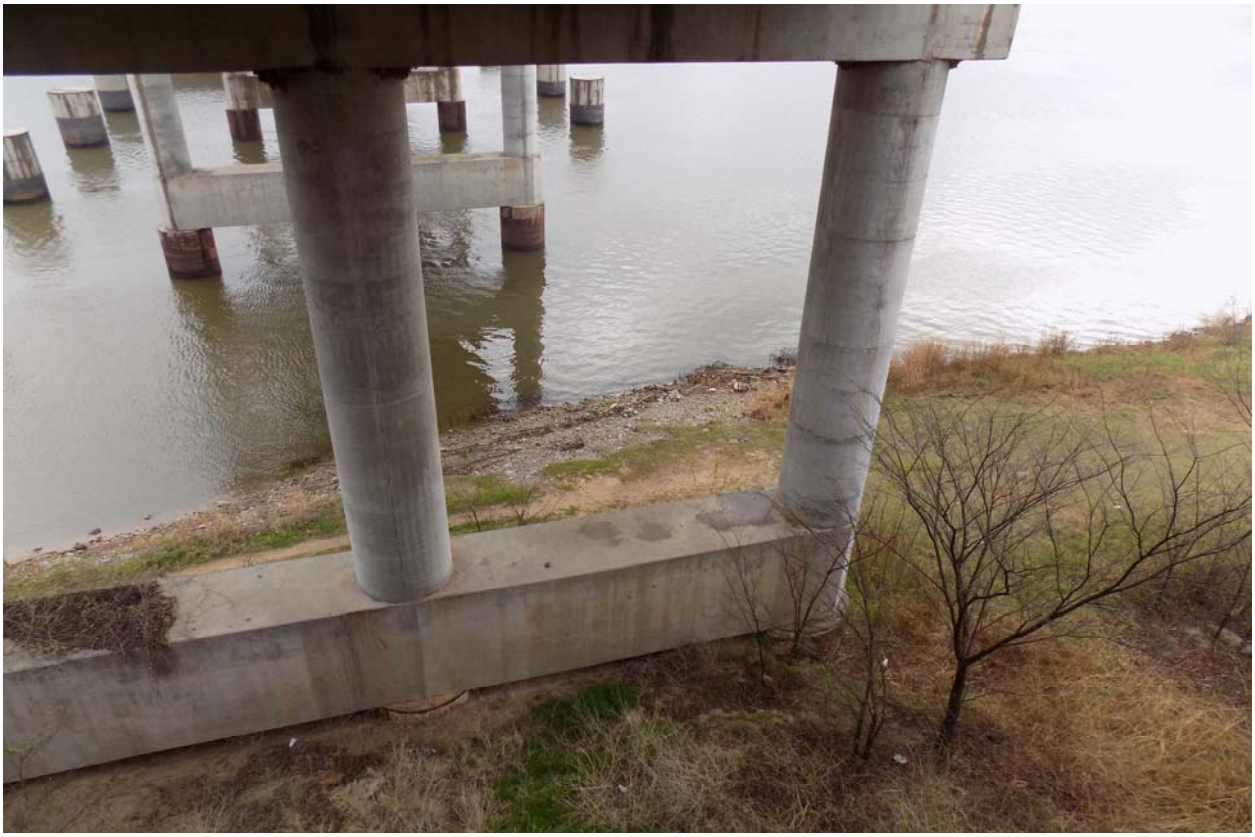
West Side of Pier No. 2



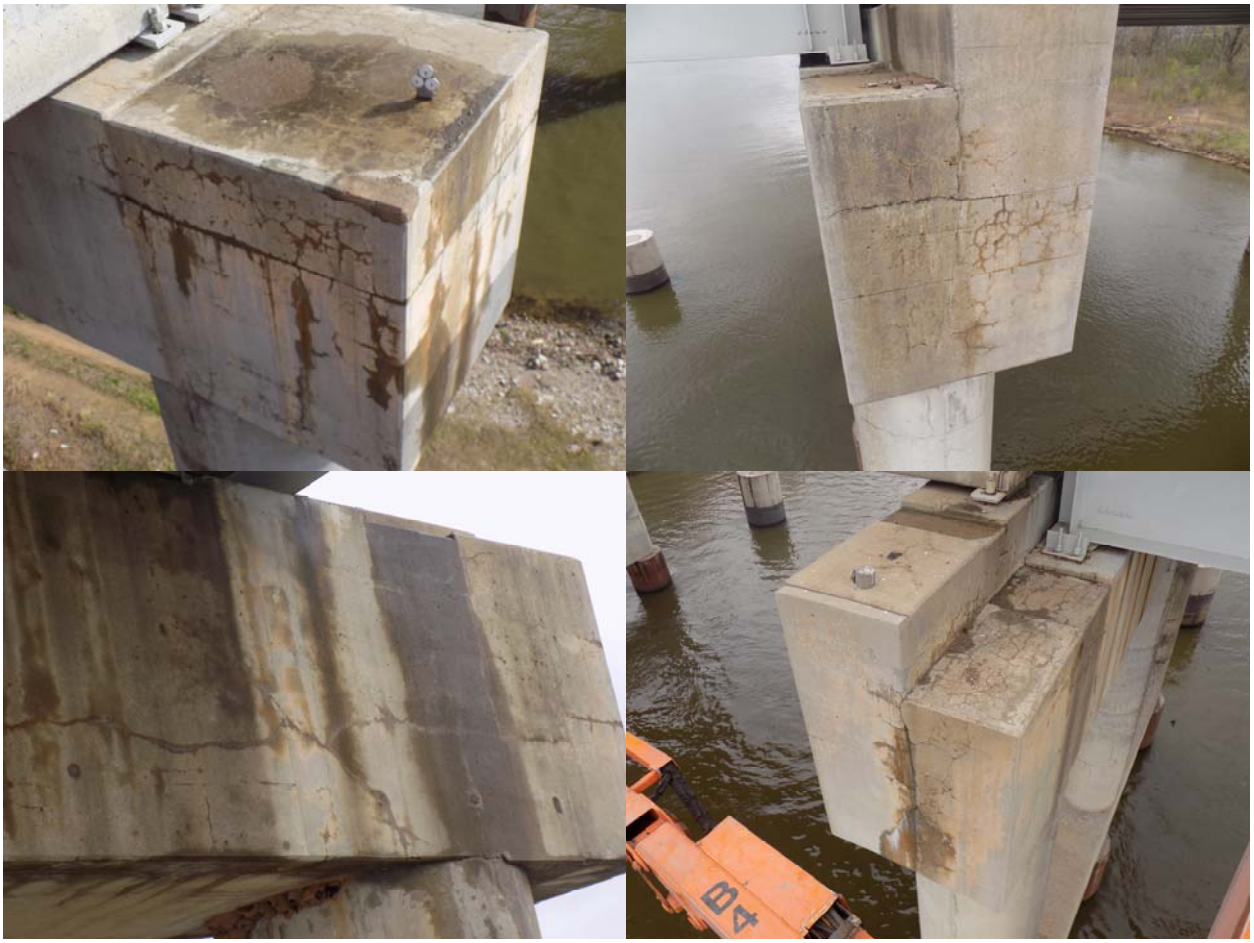
East Side of Pier No. 3



Web Wall at Pier No. 3



Web Wall at Pier No. 1



Pier Cap Overhangs

ITEMIZED COST ESTIMATES

Bridge Rehabilitation Alternate No. 1						
ITEM		DESCRIPTION	UNIT	QUANTITY	UNIT COST	COST
503(A)	4260	PRESTRESSED CONCRETE BEAMS (72 BT)	LF	778.00	$320.00	$248,960.00
504(B)	5300	SAW-CUT GROOVING	SY	3,559.00	$6.00	$21,354.00
504(E)	5520	42" F-SHAPED PARAPET	LF	842.80	$90.00	$75,852.00
505(A)	6200	BRIDGE DECK CONCRETE OVERLAY	SY	3,793.00	$160.00	$606,880.00
505(E)	6600	HYDRODEMOLITION	SY	3,249.00	$160.00	$519,840.00
506(A)	7200	STRUCTURAL STEEL	LB	14,030.00	$3.50	$49,105.00
507(A)	8200	STAINLESS STEEL FIXED BEARING ASSEMBLY	EA	6.00	$2,500.00	$15,000.00
507(B)	8300	STAINLESS STEEL EXP. BEARING ASSEMBLY.	EA	6.00	$2,500.00	$15,000.00
509	0120	ELASTOMERIC COATING	SF	3,275.00	$20.00	$65,500.00
509(A)	0210	CLASS AA CONCRETE	CY	299.00	$800.00	$239,200.00
511	2100	MECHANICAL SPLICES	EA	3,134.00	$50.00	$156,700.00
511(A)	2210	REINFORCING STEEL	LB	1,034.00	$2.50	$2,585.00
511(B)	2310	EPOXY COATED REINFORCING STEEL	LB	52,130.00	$1.60	$83,408.00
512(A)	3200	PAINTING EXISTING STRUCTURES	LSUM	1.00	$20,000.00	$20,000.00
512(B)	3300	COLLECTION AND HANDLING OF WASTE	LSUM	1.00	$2,000.00	$2,000.00
513(B)	4300	CLASS B BRIDGE DECK REPAIR	SY	163.00	$400.00	$65,200.00
513(C)	4400	CLASS C BRIDGE DECK REPAIR	SY	163.00	$600.00	$97,800.00
515(A)	7200	WATER REPELLENT (VISUALLY INSPECTED)	SY	1,921.20	$5.00	$9,606.00
518(B)	0300	SEALED EXPANSION JOINTS	LF	82.00	$360.00	$29,520.00
518(I)	0700	MODULAR EXPANSION JOINT	LF	82.00	$6,000.00	$492,000.00
520(A)	1200	PREPARATION OF CRACKS, ABOVE WATER	LF	400.00	$50.00	$20,000.00
520(C)	1400	EPOXY RESIN, ABOVE WATER	GAL	40.00	$120.00	$4,800.00
521(A)	2200	PNEUMATICALLY PLACED MORTAR	SY	200.00	$1,000.00	$200,000.00
523(A)	3200	SEALER CRACK PREPARATION	LF	81.00	$5.00	$405.00
523(B)	3300	SEALER RESIN	GAL	1.00	$200.00	$200.00
535	7100	(SP) CORROSION INHIBITOR (SURFACE APPLIED)	SY	400.00	$50.00	$20,000.00
619(B)	6304	REMOVAL OF BRIDGE ITEMS	LSUM	1.00	$150,000.00	$150,000.00
					Total =	**$3,210,915.00**

Bridge Rehabilitation Alternate No. 2						
ITEM		DESCRIPTION	UNIT	QUANTITY	UNIT COST	COST
503(A)	4260	PRESTRESSED CONCRETE BEAMS (72 BT)	LF	5,446.00	$320.00	$1,742,720.00
504(A)	5200	APPROACH SLAB	SY	271.70	$280.00	$76,076.00
504(B)	5300	SAW-CUT GROOVING	SY	3,559.00	$6.00	$21,354.00
504(E)	5520	42" F-SHAPED PARAPET	LF	842.80	$90.00	$75,852.00
506(A)	7200	STRUCTURAL STEEL	LB	7,780.00	$5.00	$38,900.00
507(A)	8200	STAINLESS STEEL FIXED BEARING ASSEMBLY	EA	6.00	$2,500.00	$15,000.00
507(B)	8300	STAINLESS STEEL EXP. BEARING ASSEMBLY.	EA	6.00	$2,500.00	$15,000.00
509	0120	ELASTOMERIC COATING	SF	3,194.00	$20.00	$63,880.00
509(A)	0210	CLASS AA CONCRETE	CY	1,100.70	$800.00	$880,560.00
511(B)	2310	EPOXY COATED REINFORCING STEEL	LB	179,250.00	$1.60	$286,800.00
512(A)	3200	PAINTING EXISTING STRUCTURES	LSUM	1.00	$20,000.00	$20,000.00
512(B)	3300	COLLECTION AND HANDLING OF WASTE	LSUM	1.00	$2,000.00	$2,000.00
515(A)	7200	WATER REPELLENT (VISUALLY INSPECTED)	SY	1,921.20	$5.00	$9,606.00
518(B)	0300	SEALED EXPANSION JOINTS	LF	82.00	$360.00	$29,520.00
518(I)	0700	MODULAR EXPANSION JOINT	LF	82.00	$6,000.00	$492,000.00
520(A)	1200	PREPARATION OF CRACKS, ABOVE WATER	LF	400.00	$50.00	$20,000.00
520(C)	1400	EPOXY RESIN, ABOVE WATER	GAL	40.00	$120.00	$4,800.00
521(A)	2200	PNEUMATICALLY PLACED MORTAR	SY	200.00	$1,000.00	$200,000.00
523(A)	3200	SEALER CRACK PREPARATION	LF	81.00	$5.00	$405.00
523(B)	3300	SEALER RESIN	GAL	1.00	$200.00	$200.00
535	7100	(SP) CORROSION INHIBITOR (SURFACE APPLIED)	SY	400.00	$50.00	$20,000.00
619(B)	6304	REMOVAL OF BRIDGE ITEMS	LSUM	1.00	$460,000.00	$460,000.00
					Total =	**$4,474,673.00**

NBI STRUCTURE INSPECTION AND APPRAISAL (SI & A)

SCHEMMER

Oklahoma Dept. of Transportation - Bridge Inspection Report

NBI No.:	Structure No.:	Local ID:	Suff. Rating:	
17051	6822 0000 X	-1	83.00	ND

IDENTIFICATION

Bridge Description:

3-125ft. P/S CONCRETE GIRDERS, 3-CONT. PLATE GIRDER SPANS (200ft. -330ft.-200), 4-125ft., 3-125ft. CONT. PLATE GIRDER SPANS

1. State: Oklahoma
2. Division: Division 1
3. County: SEQUOYAH
4. City: Unknown
Admin Area: Unknown
5a. On/Under: Route On Structure
5b. Kind of Hwy: Interstate Hwy
5c. Lvl of Srvc: Mainline
5d. Route No.: 00040
5e. Dir. Sufx: N/A (NBI)
7. Facility Carried : I-40
6. Feat. Intersect: ARKANSAS RIVER
9. Location: SEQUOYAH-MUSKOGEE CC
11. Mile Post: NA
13. LRS Inv. / Sub Rte: 6822 0000 / 01
16. Latitude: 35° 29' 16.49"
17. Longitude: 095° 05' 38.05"
98. Border Brdg: Unknown (P)
% Responsible: 0.00
99. Border Brdg #: Unknown

INSPECTION

Type	Insp. Req.	Insp. Done	Freq.	Insp. Date	Next Insp.
NBI:		1	24 months	8/9/2019	08/09/2021
FC:	Y	1	24 months	8/9/2019	8/9/2021
UW:	Y	0	60 months	8/5/2015	8/5/2020
OS:	Y	0	24 months	8/9/2018	8/9/2020

CLASSIFICATION

12.Base Hwy Net.: On Base Network
20. Toll Facility: On free road
21. Custodian: State
22. Owner: State
26. Function Class: 01 Rural Interstate
37. Historical Sig.: Not eligible for NRHP
100. Def. Hwy: On Interstate STRAHNE
101. Parallel Str.: No || bridge exists
102. Traffic Dir.: 2-way traffic
103. Temp. Str.: Not Applicable (P)
104. Hwy System: On the NHS
105. Fed Land Hwy: IRR-Indian Res Rd
110. Defense Hwy: On Interstate STRAHNE
112. NBIS Length: Long Enough

STRUCTURE TYPE AND MATERIALS

43a/b. Main Span: Steel Cont. / Girder-Floorbeam
44a/b. Appr. Span: P/S Conc. / Stringer/Girder
45. # of Main Spans: 10
46. # of Appr. Spans: 3
107. Deck Type: Concrete-Cast-in-Place
108a. Wearing Surface: Low Slump Concrete
108b. Membrane: Unknown
108c. Deck protection: Unknown

CONDITION

58.Deck: 6 Satisfactory
59.Sup.: 6 Satisfactory
60.Sub: 6 Satisfactory
62.Culvert: N/A (NBI)
61.Chan./Chan. Prot.: 6 Bank Slumping

Flowline Notes

Refer to 2010 UW inspection report.

AGE AND SERVICE

19. Detour Length: 5.0 mi
27. Year Built: 1967
28a/b. Lanes on/und: 4 / 0
29. ADT: 15,900
30. Year of ADT: 2017
106. Year Reconst.: 1983
109. Truck ADT: 36%
42a/b. Type of Svc on/und: Highway / Waterway

LOAD RATING AND POSTING

31. Design Load: MS 18 (HS 20)
41. Post. Status: A Open, no restriction
70. Posting: 5 At/Above Legal Loads
Date Rated: 10/01/2006
63.Op / 65.Inv. Rating Meth.: 1 LF Load Factor / 1 LF Load Factor

	H	HS	3-3	EV3	SHV
64. Operating Rating (tons):	30.42	54.68	92.82	0.00	0.00
66. Inventory Rating (tons):	18.19	32.85	55.67	-1.00	

GEOMETRIC DATA

10. Vert. Clearance: 99.99 ft
32. Appr Rwy Width: 69.91 ft
33. Median: Closed Med w/o Barri
34. Skew: 0.00°
35. Struct. Flared: No flare
47Horizontal Clr: 30.00 ft
48. Length Max Span: 330.00 ft
49. Struct. Length: 1,989.00 ft
50a. Curb/Sdwlk Width L: 3.00 ft
50b. Curb/Sdwlk Width R: 3.00 ft
51. Width Curb to Curb: 60.00 ft
52. Width Out to Out: 68.50 ft
Deck Area: 136,247.76 sq. ft
53. Min.Vert.Cl.Ovr Brg: 99.99 ft
54a.Min.Vt.Undclr.Ref.: N Feature not hwy c
54b. Min. Vert. Undclr.: 0.00 ft
55a. Min.Lat.Undclr.Ref: N Feature not hwy
55. Min.Lat.Underclr. R: 99.90 ft
56. Min.Lat.Underclr. L: 99.90 ft

APPRAISAL

36a. Brdg Rail: 1 Meets Standards
36b. Transition: 1 Meets Standards
36c. Appr. Rail: 1 Meets Standards
36d. Appr.Rail Ends: 1 Meets Standarc
67. Str Evaluation: 6 Equal Min Criteria
68. Deck Geom.: 4 Tolerable
69. Vert./Horiz. Undclr: Not applicable (NB
71. Waterway Adeq: 8 Equal Desirable
72. Appr. Alignment: 7 Above Min Criteria
113. Scour Critical: 8 Stable Above Footin

PROPOSED IMPROVEMENTS

94. Bridge Cost: $20,219,922
95. Roadway Cost: $4,500,000
96. Total Cost: $26,119,163
97. Yr.of Cost Est.: 2015
75. Type of Work: 31 Repl-Load Capacity
76. Lngth of Improvement: 1,989.0 ft
114. Future ADT: 25,440
115. Yr.of Future ADT: 2037

NAVIGATION DATA

38. Nav. Control: Permit Required
39. Vert. Clearance: 52.0 ft
40. Horiz. Clearance: 300.0 ft
111. Pier Protect.: 2 In-Place, Function
116. Lift Bridge Vert. Clr.: 0.0 ft

OKLAHOMA ITEMS

200c. Temperature: 88
200d. Weather: Ptly Cloudy
201. Struc.Stl. ASTM Desig.: A-36 / -1
202. Waterprf.Membrane: -1
Date Installed: 01/01/1901
203. Type Exp. Device: Modular
204. Type of Railing: PTR-1 (round hand rail)
205. Material Quantity: -3.00
208a. Type of Abutment: Skeleton
b. Type of Found.: Steel Piling
209. Type of Pier/Found.: 2 / Yes
No Piling/Drilled Shaft
210. Foundation Elev.: 4,300.00 / 4,240.00 / -1.00 / 4,290.00 / -1.00
211. Wear.Surf.Prot.Sys: Silane
Date Installed: 01/01/1901
213. Utilities Attached: Communication

214a. Posted Weight Limit: NR
b. Posted Speed Limit: 70
c. Narrow/1way Brdg Sign: NA
d. Vertical Clr. Sign: NA
Adv. Warning Sign: NA
e. Navigation Lights?: Yes
Working/Not Working: No
215. Overpass: INTERSTATE
221. Substr.Cond.(U/W):
222. Fill Over RCB:
223. Appr.Slab/Rwy Cond.: 6
225. Paint Type/Ovrct: Inorganic Zinc 3Coat Sys
N/A
226. Date Painted: 2010
227. Paint Color: Gray
233. Deck Forming:
238. School Bus Rte.: Current & Desired route
240. Appr. Rwy Type.: Asphalt/Bituminous
243. Grdr Spacing/No.: /

244. Span Lengths: 125 / 125 / 125 / 200 / 330 / 200 / 125 / 125
245. Girder Depth:
246a. Type of Ovelay: NA
b. Overlay Thickness: 0.00
c. Overlay Date: 01/01/1901
d. Ovly Depth Changed >1":
247. Protective Systems:

248. # Field Splices w/ Corrosion:
249. Scour Crit. POA Exists?:
250. Headwall:
254. Thru Truss Type:
257a. OkiePROS Truck Routing: Yes
258. Plans w/Found.in ODOT File:
259. Scour Eval. in ODOT File:
263. Interchange at Intersection: No
264. Interstate Milepoint: 290.66

SCHEMMER

Oklahoma Dept. of Transportation - Bridge Inspection Report

NBI No.:	Structure No.:	Local ID:	Suff. Rating:	
17051	6822 0000 X	-1	83.00	ND

Inspection Date: 8/9/19 Brendan Prendeville

Invoice No.: 891921 Inspected With:

BRIDGE NOTES:

3-125' P/S Concrete girders, (200'-330'-200')4-125',3-125' Continuous plate girder spans 2-30' roadways. w/ 18 inch safety curbs & 4' median
OS Inspection Items Include:
Monitor: all locations of cracks in the girders at the ends of stiffeners; Fractured and cracked transverse separation beam in modular joint at pier 6; Cracking of modular joint bearing boxes at pier 3; Misaligned joint support bars and cracked/broken off equidistant control bars at piers 3, 6 and 10; Crack in poor quality weld between the lower lateral bracing gusset plate and the vertical web stiffener for girder 3 at floor beam 5, span 6; Lower lateral bracing gusset plate at floor beam 4, girder 3, in span 8; Elastomeric bearings for span 4 at pier 3; Lateral and longitudinal movement of bearings at east abutment; Undermining/erosion of aprons at both abutments and exposed steel pile under beam 5 where undermining occurs at west abutment.

INSPECTION NOTES: 8/9/19

PX-Reconnect metal bridge railing at two adjacent locations over pier 12 and replace the missing railing posts near midspan of span 13 and patch adjacent spalled concrete.
PX-Patch spalls with exposed reinforcement in the bridge rail.
PX-Patch spalls in driving surface near pourable control joints as listed in the table in the "Driving Surface" section of the report.
PX-Repair cracks in the bearing boxes at the modular joint supports at pier 3. Install shim plates below the bearing blocks to prevent future cracking.
PX-Repair the cracked and broken modular support bars and equidistant control bars at piers 6 and 10. Install countermeasures to keep the joint supports in place to prevent further cracking.
PX-Repair transverse separation beam at support box 2 of pier 6.
PX-Repair/replace the modular joint seals over piers 3 6 and 10 to prevent water from leaking into superstructure.
PX-Replace pourable joint seal at the abutments.
PX-Replace missing bolts at stringer connections.
PX-Drill out end of crack in the stringer diaphragm over floor beam 5 span 6 between stringers 3 and 4.
PX-Consider drilling out the ends of the cracks in the lower lateral bracing gusset plates at locations as listed in the "Floor Bracing System" below.
PX-Reattach the dampener rod bolts/nuts at missing locations and replace dampener rod where fractured.
PX-Consider patching the large spall at pier 6 at the base of the north column.
PX-Repair the broken seismic cable anchorages.
PX-Reset the elastomeric bearings for girder 1 for span 4 at pier 3 and remove paint from the stainless steel sliding surface of the elastomeric bearings at pier 3.
PX-Remove paint from the stainless steel sliding surfaces of the elastomeric bearings at pier 3.
PX-Removing the pack rust from below the rocker bearings to allow proper movement of the bearings.
FX-Monitor full depth transverse cracking in original portion of the deck for growth and change in density.
FX-Monitor sagging middle transverse separation beam of pier 6 joint.
FX-Monitor the locations of cracks which have been retrofitted with drilled holes for signs of crack propagation beyond the drilled holes.
FX-Monitor lateral bracing gusset plate connections to girder webs at undercuts and flame cuts.
FX-Monitor possible crack at the end of the weld for the vertical stiffener under floor beam 7 girder 4 span 6.
FX-Monitor crack in poor quality weld between the lower lateral bracing gusset plate and the vertical web stiffener for girder 3 at floor beam 5 span 6 for propagation into the girder base-metal.
FX-Monitor lamination and/or undercut at the girder web adjacent to the end of the lower lateral bracing gusset plate weld at girder 4 south face of floor beam 2 span 6.
FX-Monitor exposed ends of tendons for corrosion.
FX-Monitor crack in the vertical web stiffener of girder 3 at floor beam 2 span 8.
FX-Monitor pack rust between stringer top flanges floor beam top flanges and diaphragm top flanges and the deck soffit for growth and possible affects to driving surface.
FX-Monitor gouge in floor beam 3 span 6 near girder 2 for cracking.
FX-Monitor pack rust between floor beam webs and gusset plateS especially near piers.
FX-Monitor the corrosion hole in the lower lateral bracing gusset plate at girder 4 span 6 over pier 6 for growth or deterioration.
FX-Monitor the erosion that has developed adjacent to the south end of the east abutment apron.
FX-Monitor corrosion to east abutment bearings.
FX-Monitor cracking in approach slabs for potholes.
FX-Monitor girder webs for signs of distress in locations with gouging.
FX-Monitor pack rust between girder vertical web stiffeners and floor beam truss lower chord gusset plates for growth and distortion.
FX-Monitor girder bottom flange splice plate for pack rust initiation.
FX-Monitor region of painted over pitting that is reactivating on the bottom flange of girder 4 south face at floor beam 6 span 4.

ELEMENT CONDITION STATE DATA

Elem. / Env	Description	Unit	Total Qty	% 1	Qty. 1	% 2	Qty. 2	% 3	Qty. 3	% 4	Qty. 4
12 / 4	Re Concrete Deck	sq.ft	119,340.00	70%	83,538.00	30%	35,802.00	0%	0.00	0%	0.00

SCHEMMER

Oklahoma Dept. of Transportation - Bridge Inspection Report

NBI No.:	Structure No.:	Local ID:	Suff. Rating:	ND
17051	6822 0000 X	-1	83.00	

PX – The original portion of the deck (spans 5-12 and 80 feet of span 4) has control joints at every second or third floor beam. The pourable joint sealant has typically failed; allowing water to drain onto the floor system. Small spalls are typical along control joints. Deck patches are common along these joints; and many patched areas exhibit recent spalling and heavy cracking. Multiple areas previously mentioned as being deteriorated have been patched. Areas specifically listed in the previous report but not repaired include:
Span 4; Pier 4; Westbound; 8-inch wide x 6-inch long patch along centerline with an 8-square-foot spall in westbound lane.
Span 4; Floor beam 7; Westbound; 4 square-foot spall in south lane.
Span 5; Floor beam 0; Westbound; 8 square-foot spall near center line.
Span 5; Floor beam 9; Westbound; 3 square-foot spall in south lane.
Span 7; Floor beam 3; Westbound; 4 square-foot spall in south lane.
Span 8; Floor beam 1; Westbound; 2 square-foot spall at the center line.
Span 9; Floor beam 1; Westbound; 3 square-foot spall in the north lane.
Span 9; Floor beam 4; Westbound; 5 square-foot spall in the north lane.
Span 10; Floor beam 2; Westbound; 20 square-foot spall in north lane.
The newer portion of the deck in spans 1-3 and approximately 125 feet of span 4; exhibits moderate transverse cracking up to 0.020 inches wide; spaced at 3-5 feet in isolated locations. Hairline map cracking is typical. Span 3 exhibits diagonal cracking for westbound lanes also up to 0.030 inches. Some of the wider cracks have been sealed.
Original portion of the deck (spans 5-12 along with approximately 80 feet of span 4) typically exhibits transverse cracking up to 0.030 inches spaced at 5-10 feet. Many of the cracks are full depth and can be seen in the soffit.
Pavement markers near floor beam 7 in span 4 and span 5 mid span are broken.
The north edge of the deck at the west abutment is in contact with the backwall; causing the edge of the deck to spall.
Minor debris exists along deck at the median.

107 / 4	Steel Opn Girder/Beam	ft	5,540.00	91%	5,038.00	9%	500.00	0%	2.00	0%	0.00	

NBI No.:	Structure No.:	Local ID:	Suff. Rating:	ND
17051	6822 0000 X	-1	83.00	

FX – Several cracks and possible cracks exist at the ends of the horizontal stiffeners at the splices. Several of these cracks have been arrested by drilled holes and the locations are as follows:
Sp 4; G2; Near Fb5; 2 cracks; 1-in long and 1 1/2-in long at the top and bottom respectively. Arrested by drilled holes
Sp 4; G4; Near Fb 5; 2 cracks; 1-in long and 1 1/2-in long at the top and bottom respectively. Arrested by drilled holes
Sp 4; G4; Near Fb 5; Lower web contains 7/16-in vertical through crack. Arrested by drilled hole. No crack in upper web but arrestor hole in place.
Sp 5; G1; Near Fb 11; Upper web contains a 3/4-in long crack stopping short of the arrestor hole. Crack in bottom web is 1 1/4-in long arrested by two 1/2-in drilled holes.
Sp 5; G2; Near Fb 0; 2-in long area of lack of fusion on south face at end of LLB gusset plate.
Sp 5; G2; Near Fb 11; 2-in long crack in upper girder web. No growth since the 2014 OS although crack has grown 1 1/2 in since 2013. This crack has been retrofitted with a crack arrest bushing by the DOT.
Sp 5; G3; Near Fb 11; 7/8-in long crack in upper web with arrestor hole. Crack has not reached arrestor hole.
Sp 5; G4; Near Fb 3; 5/8-in long (above longitudinal stiffener) and 1-in long (below longitudinal stiffener) cracks arrested with drilled holes. No changes.
Sp 5; G4; Near Fb 11; 1-in long crack arrested with a drilled hole.
Sp 6; G1; Near Fb 3; 2 cracks arrested by 2-in diameter arrestor holes. No change.
Sp 6; G2; Near Fb 3; 1-in long crack in upper web. Crack has not grown since the 2014 OS. This crack has been retrofitted with a crack arrest bushing by the DOT.
Sp 6; G3; Near Fb 3; No change to paint crack in upper girder web.
Sp 6; G4; Near Fb 3; 1 1/4-in long crack arrested with drilled holes
FX – The lower lateral bracing gusset plates are welded to the girder webs with the use of 1/4-in thick backer bars to weld between the gaps. Many of these welds appear to have undercut the girder web base metal. Holes have been drilled in the girder webs at the ends of the lower lateral bracing gusset plates at following locations:
Sp 10; G1; Near Fb4; no visible crack.
Sp 11; G1; Near Fb1; no visible crack.
Sp 11; G2; Near Fb3; no visible crack.
Sp 12; G2; Near Fb1; no visible crack.
Sp 12; G2; Near Fb2; no visible crack.
Weld material has also spilled behind the backer bars along the girder webs.
FX – At several locations; the lower lateral bracing gusset plates have been flame cut and reattached to the girder webs with bolted angles. Gouges in the girder webs up to 1/4-in deep exist along the original lower lateral bracing weld lines.
FX – A crack was observed at the toe of the top weld for the vertical web stiffener on span 8; girder 3; north face at floor beam 2. The crack currently measures 1 1/2 in (3/8-in growth) in length.
FX – Pack rust up to 1/2-in thick exists between some girder vertical web stiffeners and floor beam truss lower chord gusset plates and between horizontal splice flanges. Minor pack rust up to 1/4-in thick is developing at girder bottom flange splice plates where girder ends butt up against each other. Pack rust is active in many locations and worse at expansion joints.
FX – A paint crack exists at the end of the weld for the vertical stiffener under floor beam 7; girder 4; span 6. This is a paint crack but should be monitored in future inspections.
FX – An approximately 3-in long crack exists through the poor quality weld between the lower lateral bracing gusset plate and the vertical web stiffener for girder 3 at floor beam 5; in span 6.
FX – An undercut exists in the girder web adjacent to the end of the lower lateral bracing gusset plate weld at girder 4; south face of floor beam 2; span 6.
One missing bolt is present in the girder 3 splice near floor beam 3; span 5.
Tri-axial welds exist at intersections between the webs; flanges and stiffeners. No cracked welds are noted at this time.

515 / 4	Steel Protective Coating	sq.ft	330,000.00	0%	0.00	100%	330,000.00	0%	0.00	0%	0.00

The paint system is generally in satisfactory condition with the exception of isolated areas of reactivating painted over pack rust; minor surface corrosion; and flaking or peeling paint most common near the piers.

109 / 4	Pre Opn Conc Girder/Beam	ft	4,140.00	100%	4,140.00	0%	0.00	0%	0.00	0%	0.00

No significant deficiencies were observed to the prestressed concrete girders in spans 1-3.

113 / 4	Steel Stringer	ft	5,540.00	98%	5,438.00	2%	100.00	0%	2.00	0%	0.00

PX – Bolts and/or nuts are missing in the connections to the floor beams at the following locations:
Two missing at span 6; west side of floor beam 1; stringer 1.
Missing nut at span 6; east side of floor beam 1; north face of stringer 3.
Three missing or not fully seated bolts at span 7; floor beam 2; stringer 4.
One missing bolt at span 8; west face of floor beam 0; stringer 3.
PX – There is an 8 1/2-inch long crack in the stringer diaphragm over floor beam 5; in span 6; between stringers 3 and 4. The crack was 6 inches long during the 2016 OS inspection; however; no growth was noted during this inspection.
FX – The deck is lifting off the stringers at several locations. This separation can eventually cause an uneven riding surface increasing impact on the superstructure and further accelerating deck deterioration.
Stringer 2 diaphragm connection on the north face at floor beam 1; span 8 exhibits 5 of 7 connection bolts not fully seated.
The stringers are generally in good condition with negligible surface corrosion in isolated locations; usually near expansion joints.

152 / 4	Steel Floor Beam	ft	3,536.00	0%	0.00	95%	3,359.00	5%	177.00	0%	0.00

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FX – Floor beam 3 in span 6 between girders 1 and 2 has a 1/2-inch long x 3/16-inch deep gouge in the bottom flange approximately 2 feet from girder 2. The floor beam also has an approximate 1/4-inch global lateral sweep in the bottom flange to the east. This sweep appears to be from construction; has not changed from prior inspections; and it is assumed that the cross framing provides additional support to the floor beam.
FX – At floor beam 6 in span 4 between girders 3 and 4; 1/2-thick painted over pack rust exists between the floor beam web and the connection plate at girder 4. Similar condition at floor beam 8 at girder 4 over pier 6; in span 6. Similar conditions occur sporadically but with less severity.
FX – Floor beam 8 between girders 3 and 4 over pier 6; span 6; the floor beam truss lower chord exhibits pack rust up to 1/2 inch between the center gusset plate and the lower chord angle with 1/16-inch deep section loss to the gusset plate. Similar condition in span 7 over pier 6.
FX – Pack rust is typically developing between the diaphragm top flange and the deck soffits; up to 1/16-inch at random locations.
Floor beam 3 in span 7 at girder 2 exhibits one missing and one loose bolt at the top row of connection bolts.
Fretting corrosion is present at the isolated upper floor beam connections to the girders. The movement may be due to a loose connection.

Floor System Bracing
PX – Fatigue cracks are present on welds for the lower lateral bracing gusset plates at multiple locations. These include:
Sp 5; G2; Fb0; 2-inch long area of lack of fusion at the toe of the gusset plate on the south face of the girder.
Sp 5; G2; Fb4; Area of lack of fusion observed along the gusset plate weld on the south face of the girder web at the west end of the plate.
Sp 6; G4; Fb7; 8 1/2-inch long paint crack due to undercut weld.
Sp 8; G3; Fb4; 2 fatigue cracks. One crack is 8 1/2 inches long and runs tangent to the corner of the lower lateral bracing member weld. The second crack is 3 1/2 inches long and runs along the floor beam bottom flange. No change from the previous inspection.
Sp 9; G3; Fb4; 3 3/8-inch crack along the lower lateral bracing connection plate weld on the girder web. No change from previous inspection.
Sp 10; G2; Fb2; 18-inch crack along the weld on the south face of girder on east end of plate. No change from previous inspection.
Sp 11; G2; Fb1; 8-inch along weld on south face of girder on east end of plate. Previously noted as 8 1/2 inches long; however; no change present.
Sp 11; G2; Fb1; 6-inch along the weld on south face of girder on west end of plate. No change from previous inspection.
PX – The lower lateral bracing dampeners have fractured in a couple locations. These include:
Span 4 near floor beam
Span 4; between girders 1 and 2; between floor beams 5 and 6
Span 4 near floor beam 7
Span 4; between girders 1-2 and girders 3-4; between floor beam 7 and pier 5; fractured just above the bolted connection.
FX – A corrosion hole measuring 8 inches long x 1-3/4 inches wide exists on the lateral bracing gusset plate in span 6; girder 4; at pier 6.
Small distortions in the lower lateral bracing angles are common most likely due to erection damage.

205 / 4	Re Conc Column	each	23.00	87%	20.00	9%	2.00	4%	1.00	0%	0.00

PX – The north column of pier 6 exhibits a 5-square foot spall with exposed and corroding reinforcing steel exists at the base of the column.

210 / 4	Re Conc Pier Wall	ft	94.00	100%	94.00	0%	0.00	0%	0.00	0%	0.00

Minor hairline cracking exists in the concrete pier walls.
Pier 4 exhibits some water staining and vertical cracks to the stem wall.

215 / 4	Re Conc Abutment	ft	152.00	97%	147.00	3%	4.00	1%	1.00	0%	0.00

FX – The east abutment slope exhibits a 4-foot deep erosion hole exists adjacent to the south end of the east abutment apron with up to 32 inches of penetration due to active erosion. Undermining up to 20 inches deep exists sporadically along the length of the west abutment breastwall. This erosion has slightly changed since the previous inspection.
The east abutment exhibits random hairline cracking up to 0.020 inches wide.
The east abutment seat exhibits moderate debris accumulation up to 9 inches deep around girders 2 and 3 to the failed joint above. An isolated location of rust staining exists due to shallow rebar.
West abutment exhibits random hairline cracking along the backwall.

234 / 4	Re Conc Pier Cap	ft	837.00	33%	280.00	66%	550.00	1%	7.00	0%	0.00

PX – Seismic restraints; consisting of cable anchorages attached between the girder bottom flanges and the pier caps; exist at piers 6 and 10. Several of the cable anchorages are broken and are no longer functioning. At pier 6; this condition exists at girder 4. At pier 10; this condition exists at girders 1; 2; and 3.
Pier 6 cap exhibits rust staining throughout.
Pier 10 cap exhibits a wide crack and delamination to the bottom west edge between girders 3 and 4.

300 / 4	Strip Seal Exp Joint	ft	69.00	0%	0.00	0%	0.00	0%	0.00	100%	69.00

Jt at east abutment.
PX - Joint at east abutment closed and covered in asphalt in westbound lane.

303 / 4	Assem Jnt With Seal	ft	207.00	0%	0.00	0%	0.00	0%	0.00	100%	207.00

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Modular joints exist above piers 3, 6 and 10.
PX – The support boxes at pier 3 appear to be supported by a thin layer of concrete which does not provide adequate support. Bottom plates of support box fractured at support assembly 3, 4, 7 and 15. West support box is only supported by one edge at support assembly 8, 15, 16, and 17. The modular joint at pier 3 was also observed to be closed and the neoprene joint seals are cracked.
PX – Cantilevered equidistant control bars at piers 6 and 10 and the support bar welds are cracked or broken at the following locations: Jt. 6 - Support Assemblies 1, 2, 3, 4 (Equidistant bars are missing), 10, 11, 12, 13 and 14; Jt 10 - Support Assemblies 4, 12 (Equidistant bars are missing), 13 (Equidistant bars are missing) and 14.
PX – The transverse separation beam at support box 2 at pier 6 has fractured full height and previous plate repair has failed.
PX – The modular joint seals over piers 3, 6, and 10 are bulging and torn along the full length of the joints in the westbound lanes and along the curbs of the eastbound lanes.
FX – The middle transverse separation beam of the modular expansion joint near the north curb at pier 6 is sagging.

310 / 4	Elastomeric Bearing	each	76.00	97%	74.00	0%	0.00	3%	2.00	0%	0.00

PX – The elastomeric bearing for girder 1 of span 4 at pier 3 has rotated between the Teflon pad and the steel bearing assembly. The rotation has caused the southeast corner of the elastomeric bearing to pull away from the sole plate; with up to 2 1/2 inches (1-inch increase since previous inspection) of overhang at the southeast corner of the bearing. The steel bearing assembly is at the limits of expansion with the anchor bolts bent. This condition may be due to the steel bearing assembly not being aligned parallel with the girder before being welded to the bottom flange. The twisted steel bearing assembly is restrained by the anchor bolt slots (also not parallel with the girder) causing binding against the anchor bolts. Similar misalignment between the girder and steel bearing assembly was observed at girder 3 of span 4 at pier 3.
PX – The stainless steel sliding surface for the girder bearings of span 4 at pier 3 have been painted. This condition has compromised the low friction sliding surface of the bearings; causing longitudinal movements to be accommodated by deformation of the elastomeric bearings.

311 / 4	Moveable Bearing	each	24.00	0%	0.00	63%	15.00	38%	9.00	0%	0.00

PX – The rocker bearings at piers 4; 6; 10 and at the east abutment have pack rust between the rockers and the masonry plates. The lead bearing pads below the masonry plates are extruding out from under the masonry plates; suggesting the bearings are being loaded longitudinally as a result of the inability of the rockers to rotate. Several rocker bearing bolts are broken or missing; especially at pier 6.
FX – East abutment bearings typically exhibit surface corrosion on the rocker and the masonry plate with up to 1/16-inch active corrosion and painted over pitting. Anchor bolts are typically bent and/or broken due to expansion. The bearings for girders 1 through 4 at the east abutment have shifted up to 1 inches to the south. Additionally; the bearings for girders 1 and 2 have shifted 1-inch to the north.
The rocker bearings for span 6 at pier 6 are rocked 10° maximum in expansion at 85°F. All anchor bolts for the span 6 rocker bearings at pier 6 are missing.
The rocker bearings at pier 10 are rotated between 6 and 10 degrees in expansion at 80°F.
The bearing for girder 3 at pier 4 is rotated out of alignment relative to the bearings for the other girders. This appears to be due to construction as no correlating signs of distress were noted. The misalignment will tend to transfer higher longitudinal forces to the pier.

313 / 4	Fixed Bearing	each	24.00	0%	0.00	100%	24.00	0%	0.00	0%	0.00

No significant deficiencies.

321 / 4	Re Conc Approach Slab	sq.ft	4.00	0%	0.00	75%	3.00	25%	1.00	0%	0.00

FX – The west approach slab exhibits longitudinal and map cracking throughout up to 1/16-inch max. Minor edge spalls exists along the approach slab adjacent to the joint. Debris exists along the shoulders. East approach slab exhibits wide longitudinal cracking.
Poured joint seals between the approach slab and approach roadway exhibit areas of missing joint material or depressed areas into the slab.
Both approaches exhibit wide longitudinal cracking in the approach wearing surface.
The asphalt concrete approach pavement in the westbound lanes exhibits longitudinal and transverse cracking with minor settlement at both ends.

330 / 4	Metal Bridge Railing	ft	3,978.00	100%	3,976.00	0%	0.00	0%	2.00	0%	0.00

PX – The metal bridge railing is disconnected at two adjacent locations over pier 12. This has not changed since the previous inspection.
PX – The north bridge rail over floor beam 2 in span 12 has 3 missing rail posts along the top of the concrete railing.
A gap in the metal railing exists at the south rail over piers 6 and 7; and in the north rail over floor beam 4 in span 9.
East approach; north railing exhibits impact damage to steel approach rail. Very minor impact damage was noted at other locations.

919 / 4	St.(Rail) Prot. Coat	(SF)	7,500.00	0%	0.00	100%	7,500.00	0%	0.00	0%	0.00

Isolated areas of surface corrosion especially around areas of traffic impact.

331 / 4	Re Conc Bridge Railing	ft	5,967.00	0%	0.00	100%	5,953.00	0%	14.00	0%	0.00

PX – The north bridge rail over floor beam 2 in span 12 has 3 missing rail posts along the top of the concrete railing. Spalls with exposed reinforcing steel exist in the locations of the old rail posts.
PX – Concrete bridge railing and curb typically exhibits 0.020 to 0.030-inch wide cracking spaced at 3-5 feet with leaching and minor rust staining. There are isolated locations of spalling with exposed reinforcing steel. Minor impact damage to the north rail exists in span 3; span 4; at the north face of the median railing over pier 10; and the north face of the median railing at pier 12. Areas of impact damage exhibit heavy cracking.

819 / 4	PS Conc.Gird.End(5Ft	(LF)	360.00	99%	356.00	1%	4.00	0%	0.00	0%	0.00

FX – End faces of the beam exhibit spalling with exposed tendons at the following locations:
Beam 1; span 1 at pier 1 – crack extending 30 inches up the web and spall to bottom flange exposing 9 tendons.
Beam 1; span 3 at pier 2 – crack extending 31 inches down the web and spall exposing 3 tendons.
Beam 12; span 2 at pier 2 – spalling to bottom flange with 23 exposed tendons.
Beam 12; span 3 at pier 3 – spall to the bottom flange exposing 22 tendons.
Some of the girder ends exhibit hairline cracking with rust and efflorescence staining from the deck.

859 / 4	Soffit	(EA)	1.00	0%	0.00	100%	1.00	0%	0.00	0%	0.00

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FX – Original portion of the deck exhibits full depth; full width transverse cracking up to 0.030 inches wide spaced at 2-5 feet with minor efflorescence; heavier over piers.
Shallow spalls exist sporadically adjacent to girder top flanges throughout the main spans.
Soffit between girders 2 and 3 exhibits rust staining and small popouts due to shallow cover of reinforcing steel chairs.
Stay in place forums typically exhibit areas of surface and laminating corrosion near the interface with the original deck surface.
The soffit below the median in span 4 over pier 3 exhibits a 2 –square-foot spall with exposed and corroded reinforcing steel.

865 / 4	St.Open Gird End(5Ft	(LF)	120.00	50%	60.00	50%	60.00	0%	0.00	0%	0.00

FX – Pack rust up to 1/2in thick exists between some girder vertical web stiffeners and floor beam truss lower chord gusset plates and between horizontal splice flanges. Minor pack rust up to 1/4in thick is developing at girder bottom flange splice plates where girder ends butt up against each other. Pack rust is active in many locations and worse at expansion joints.

870 / 4	Concrete Wingwall	(EA)	4.00	100%	4.00	0%	0.00	0%	0.00	0%	0.00

No significant deficiencies.

872 / 4	St.Gird Und Const.Jt	(LF)	760.00	74%	560.00	26%	200.00	0%	0.00	0%	0.00

FX – Several cracks and possible cracks exist at the ends of the horizontal stiffeners at the splices. Several of these cracks have been arrested by drilled holes and the locations are as follows:
Sp 4; G2; Near Fb5; 2 cracks; 1-in long and 1 1/2-in long at the top and bottom respectively. Arrested by drilled holes
Sp 4; G4; Near Fb 5; 2 cracks; 1-in long and 1 1/2-in long at the top and bottom respectively. Arrested by drilled holes
Sp 4; G4; Near Fb 5; Lower web contains 7/16-in vertical through crack. Arrested by drilled hole. No crack in upper web but arrestor hole in place.
Sp 5; G1; Near Fb 11; Upper web contains a 3/4-in long crack stopping short of the arrestor hole. Crack in bottom web is 1 1/4-in long arrested by two 1/2-in drilled holes.
Sp 5; G2; Near Fb 0; 2-in long area of lack of fusion on south face at end of LLB gusset plate.
Sp 5; G2; Near Fb 11; 2-in long crack in upper girder web. No growth since the 2014 OS although crack has grown 1 1/2 in since 2013. This crack has been retrofitted with a crack arrest bushing by the DOT.
Sp 5; G3; Near Fb 11; 7/8-in long crack in upper web with arrestor hole. Crack has not reached arrestor hole.
Sp 5; G4; Near Fb 3; 5/8-in long (above longitudinal stiffener) and 1-in long (below longitudinal stiffener) cracks arrested with drilled holes. No changes.
Sp 5; G4; Near Fb 11; 1-in long crack arrested with a drilled hole.
Sp 6; G1; Near Fb 3; 2 cracks arrested by 2-in diameter arrestor holes. No change.
Sp 6; G2; Near Fb 3; 1-in long crack in upper web. Crack has not grown since the 2014 OS. This crack has been retrofitted with a crack arrest bushing by the DOT.
Sp 6; G3; Near Fb 3; No change to paint crack in upper girder web.
Sp 6; G4; Near Fb 3; 1 1/4-in long crack arrested with drilled holes

877 / 4	St. Stringer End(5Ft)	(LF)	120.00	50%	60.00	33%	40.00	17%	20.00	0%	0.00

The stringers are generally in good condition with negligible surface corrosion in isolated locations; usually near expansion joints.

879 / 4	St.Strng.Un Const.Jt	(LF)	7.60	100%	7.60	0%	0.00	0%	0.00	0%	0.00

FeW locations of minor painted over pitting at stringer ends. Sporadic locations of minor pack rust adjacent to joints.

890 / 4	Steel SIP Form	(LF)	1.00	0%	0.00	100%	1.00	0%	0.00	0%	0.00

Minor surface corrosion and evidence of oxidation at west abutment and adjacent to piers 1 and 2.

906 / 4	Sealed Exp.Jt.(SEJ-3	(LF)	69.00	100%	69.00	0%	0.00	0%	0.00	0%	0.00

At pier 1 - No significant deficiencies.

909 / 4	Pourable Fix Jt.Seal	(LF)	1,311.00	0%	0.00	0%	0.00	0%	0.00	100%	1,311.00

Fixed poured seal joints at west abutment, pier 2, and deck control joints.
PX – The pourable fixed joint seal at the west abutment has missing seal in westbound and eastbound lanes.

916 / 4	St.Bearing Assembly	(LF)	76.00	97%	74.00	0%	0.00	3%	2.00	0%	0.00

Bearings showed some surface corrosion and some pack rust between assemblies.

956 / 4	St. Cracking/Fatigue	(SF)	1.00	0%	0.00	0%	0.00	100%	1.00	0%	0.00

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FX – Several cracks and possible cracks exist at the ends of the horizontal stiffeners at the splices. Several of these cracks have been arrested by drilled holes and the locations are as follows:
Sp 4; G2; Near Fb5; 2 cracks; 1-in long and 1 1/2-in long at the top and bottom respectively. Arrested by drilled holes
Sp 4; G4; Near Fb 5; 2 cracks; 1-in long and 1 1/2-in long at the top and bottom respectively. Arrested by drilled holes
Sp 4; G4; Near Fb 5; Lower web contains 7/16-in vertical through crack. Arrested by drilled hole. No crack in upper web but arrestor hole in place.
Sp 5; G1; Near Fb 11; Upper web contains a 3/4-in long crack stopping short of the arrestor hole. Crack in bottom web is 1 1/4-in long arrested by two 1/2-in drilled holes.
Sp 5; G2; Near Fb 0; 2-in long area of lack of fusion on south face at end of LLB gusset plate.
Sp 5; G2; Near Fb 11; 2-in long crack in upper girder web. No growth since the 2014 OS although crack has grown 1 1/2 in since 2013. This crack has been retrofitted with a crack arrest bushing by the DOT.
Sp 5; G3; Near Fb 11; 7/8-in long crack in upper web with arrestor hole. Crack has not reached arrestor hole.
Sp 5; G4; Near Fb 3; 5/8-in long (above longitudinal stiffener) and 1-in long (below longitudinal stiffener) cracks arrested with drilled holes. No changes.
Sp 5; G4; Near Fb 11; 1-in long crack arrested with a drilled hole.
Sp 6; G1; Near Fb 3; 2 cracks arrested by 2-in diameter arrestor holes. No change.
Sp 6; G2; Near Fb 3; 1-in long crack in upper web. Crack has not grown since the 2014 OS. This crack has been retrofitted with a crack arrest bushing by the DOT.
Sp 6; G3; Near Fb 3; No change to paint crack in upper girder web.
Sp 6; G4; Near Fb 3; 1 1/4-in long crack arrested with drilled holes.
FX – A crack was observed at the toe of the top weld for the vertical web stiffener on span 8; girder 3; north face at floor beam 2. The crack currently measures 1 1/2 in (3/8-in growth) in length.
FX – A paint crack exists at the end of the weld for the vertical stiffener under floor beam 7; girder 4; span 6. This is a paint crack but should be monitored in future inspections.
FX – An approximately 3-in long crack exists through the poor quality weld between the lower lateral bracing gusset plate and the vertical web stiffener for girder 3 at floor beam 5; in span 6.

PX – There is an 8 1/2-inch long crack in the stringer diaphragm over floor beam 5; in span 6; between stringers 3 and 4. The crack was 6 inches long during the 2016 OS inspection; however; no growth was noted during this inspection.

PX – Fatigue cracks are present on welds for the lower lateral bracing gusset plates at multiple locations. These include:
Sp 5; G2; Fb0; 2-inch long area of lack of fusion at the toe of the gusset plate on the south face of the girder.
Sp 5; G2; Fb4; Area of lack of fusion observed along the gusset plate weld on the south face of the girder web at the west end of the plate.
Sp 6; G4; Fb7; 8 1/2-inch long paint crack due to undercut weld.
Sp 8; G3; Fb4; 2 fatigue cracks. One crack is 8 1/2 inches long and runs tangent to the corner of the lower lateral bracing member weld. The second crack is 3 1/2 inches long and runs along the floor beam bottom flange. No change from the previous inspection.
Sp 9; G3; Fb4; 3 3/8-inch crack along the lower lateral bracing connection plate weld on the girder web. No change from previous inspection.
Sp 10; G2; Fb2; 18-inch crack along the weld on the south face of girder on east end of plate. No change from previous inspection.
Sp 11; G2; Fb1; 8-inch along weld on south face of girder on east end of plate. Previously noted as 8 1/2 inches long; however; no change present.
Sp 11; G2; Fb1; 6-inch along the weld on south face of girder on west end of plate. No change from previous inspection.

957 / 4	Pack Rust Smart Flag	(EA)	1.00	0%	0.00	0%	0.00	100%	1.00	0%	0.00

FX – Pack rust up to 1/2-in thick exists between some girder vertical web stiffeners and floor beam truss lower chord gusset plates and between horizontal splice flanges. Minor pack rust up to 1/4-in thick is developing at girder bottom flange splice plates where girder ends butt up against each other. Pack rust is active in many locations and worse at expansion joints.
FX – At floor beam 6 in span 4 between girders 3 and 4; 1/2-thick painted over pack rust exists between the floor beam web and the connection plate at girder 4. Similar condition at floor beam 8 at girder 4 over pier 6; in span 6. Similar conditions occur sporadically but with less severity.
FX – Floor beam 8 between girders 3 and 4 over pier 6; span 6; the floor beam truss lower chord exhibits pack rust up to 1/2 inch between the center gusset plate and the lower chord angle with 1/16-inch deep section loss to the gusset plate. Similar condition in span 7 over pier 6.
FX – Pack rust is typically developing between the diaphragm top flange and the deck soffits; up to 1/16-inch at random locations.

958 / 4	Concrete Cracking SF	(EA)	1.00	0%	0.00	100%	1.00	0%	0.00	0%	0.00

FX – Original portion of the deck exhibits full depth; full width transverse cracking up to 0.030 inches wide spaced at 2-5 feet with minor efflorescence; heavier over piers.
The newer portion of the deck in spans 1-3 and approximately 125 feet of span 4; exhibits moderate transverse cracking up to 0.020 inches wide; spaced at 3-5 feet in isolated locations. Hairline map cracking is typical. Span 3 exhibits diagonal cracking for westbound lanes also up to 0.030 inches. Some of the wider cracks have been sealed.
Original portion of the deck (spans 5-12 along with approximately 80 feet of span 4) typically exhibits transverse cracking up to 0.030 inches spaced at 5-10 feet. Many of the cracks are full depth and can be seen in the soffit.

963 / 4	Steel Section Loss SF	(EA)	1.00	0%	0.00	100%	1.00	0%	0.00	0%	0.00

Areas of painted over pitting are present throughout the bridge primary members. Minor section loss is active at areas of pack rust, generally at deck joints.

968 / 4	Erosion SF	(EA)	1.00	100%	1.00	0%	0.00	0%	0.00	0%	0.00

FX – A 4-foot wide x 12-foot long x 28-inch deep erosion hole exists adjacent to the south end of the east abutment apron with up to 32 inches of penetration. No exposed piles at the time of the inspection.

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17051	6822 0000 X	-1	83.00	

969 / 4	OutOfPlane Dist./Load	(EA)	1.00	100%	1.00	0%	0.00	0%	0.00	0%	0.00

FX – Floor beam 3 in span 6 between girders 1 and 2 has a 1/2-inch long x 3/16-inch deep gouge in the bottom flange approximately 2 feet from girder 2. The floor beam also has an approximate 1/4-inch global lateral sweep in the bottom flange to the east. This sweep appears to be from construction; has not changed from prior inspections; and it is assumed that the cross framing provides additional support to the floor beam.

974 / 4	Straight Gird.Diaphr	(EA)	1.00	0%	0.00	100%	1.00	0%	0.00	0%	0.00

PX – There is an 8 1/2-inch long crack in the stringer diaphragm over floor beam 5; in span 6; between stringers 3 and 4. The crack was 6 inches long during the 2016 OS inspection; however; no growth was noted during this inspection.
FX – Pack rust is typically developing between the diaphragm top flange and the deck soffits; up to 1/16-inch at random locations.