# Fracture Critical Bridge Inspection Report

## NBI Bridge No.: 17611

### Route S.H. 100 over ARKANSAS RIVER
### Muskogee County

Prepared for:

**Oklahoma Department of Transportation**

**Field District 01**

Inspection Date:

**7/14/2023**


Report Prepared By:

**BURGESS & NIPLE, INC.**

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Mr. Wes Kellogg, P.E.
Field Service Engineer
Oklahoma Department of
Transportation
200 Northeast 21st Street
Oklahoma City, OK 73102-3204

Re: Fracture Critical Bridge Inspection Report
Structure No.: 5159 0300X
NBI No.: 17611
S.H. 100 over Arkansas River
Muskogee County
ODOT Field Division 1

August 11, 2023

Dear Mr. Kellogg:

Burgess & Niple (B&N) performed a fracture critical and routine inspection of the above referenced bridge on July 13 and 14, 2023. The bridge is a fifteen-span structure **(photos 1 and 2)** with spans numbered from west to east and consisting of:

| | |
|---|---|
| Spans 1 - 4: | Four 100-foot-long continuous steel multi girders spans |
| Spans 5 - 7: | Three span continuous steel twin girders (207 feet - 334 feet - 207 feet) |
| Spans 8 - 10: | Three 100-foot-long continuous steel multi girders spans |
| Spans 11 - 14: | Four 100-foot-long continuous steel multi girders spans |
| Span 15: | One 100-foot-long simple steel multi girder span |

The limits of the inspection were from the west abutment to the east abutment. Inspection team members included Shaun Fillmore, PE (Team Leader), Dale Poorman, PE, Jarrett Shafer, EI, Drew Urban, EI, and Patrick Kalush.

As per the latest load rating report date November 24, 2003, the bridge does not require a load posting. *This bridge was recently rehabilitated in 2014; see the 17611(2014-05-29)FC report for further details regarding the rehabilitation.*

This report includes appendices containing:

- Significant Findings
- Truss/FC Bridge Rating Form
- Condition Photographs
- Oklahoma DOT Bridge Inspection Form/BrM element report

The current and previous NBI ratings for the bridge are:

| NBI Item | Current Rating (2021) | Previous Rating (2019) |
|---|---|---|
| NBI Item 58 (Deck) | 6 = Satisfactory | 6 = Satisfactory |
| NBI Item 59 (Superstructure) | 5 = Fair | 5 = Fair |
| NBI Item 60 (Substructure) | 6 = Satisfactory | 6 = Satisfactory |
| NBI Item 61 (Channel) | 6 = Bank Slumping | 6 = Bank Slumping |
| NBI Item 113 (Scour) | (8 = Calculated Scour Above Foundation) | (8 = Calculated Scour Above Foundation) |
| Sufficiency Rating | 66.7 (ND) | 66.7 (ND) |

The bridge is neither structurally deficient nor functionally obsolete.

**RECOMMENDED ACTIONS**, in order of decreasing priority, are as follows:
Priority Code **CX** – *Bridge condition is bad enough that there is a possibility of failure of a major structural component if repairs are not completed within the next few days.*

- No CX repair items are required at this time.

Priority Code **PX** – *Bridge condition is such that immediate repair is not necessary but should be completed within the next several weeks or months.*

- Replace north railing post anchor bolts missing from the eastern most railing post.
- Unclog the deck scuppers.
- Reseal the fixed poured joint seal at both abutments.
- Arrest girder web cracks at the horizontal splice termination at:
    - Span 5, girder 1 at the field splice near floor beam 5 – 5/8-inch-long crack with no arrestor hole.
    - Span 6, girder 2 near floor beam 11 – 3/16-inch-long vertical crack in the lower web plate.
- Replace missing bolts and tighten loose bolts at
    - Girder splice locations
    - Floor beam connection to the girders in spans 5, 6 and 7.
    - Stringer connection to floor beams in spans 5, 6 and 7.
- Repair cracked web connection plate weld for floor beam 6 in span 5 at girder 1.
- Reattach floor beam 0 lower connection to girder 2 in span 6. Consider bolting the previously welded connection.
- Repair cracks in the lower lateral bracing in span 5, floor beam 7, girder 2 and span 6, floor beam 12, girder 2.
- Tighten loose anchor bolts and replace missing or bent anchor bolts.

Priority Code **FX** – *Bridge condition is such that repair should not be necessary any time soon, monitor during future inspections.*

- Monitor the deck soffit along the girders, floor beams and stringers for further spalls falling into the channel.
- Monitor the vertical offset of the finger joints for changes in height at piers 4 and 7.
- Monitor locations of girder web cracks having drilled hole retrofits or paint cracks at the horizontal splice termination at:
    - Span 5, girder 2 at the field splice near floor beam 5 – paint crack.
    - Span 6, girder 1 at the field splice near floor beam 3 – arrested crack.
    - Span 7, girder 1 at the field splice near floor beam 4 – paint crack.
    - Span 7, girder 2 at the field splice near floor beam 4 – arrested crack.
- Monitor the 1 1/4-inch long paint crack in the span 5, girder 1 web at the longitudinal stiffener cored hole between floor beams 4 and 5 (perform Magnetic Particle Testing during 2022 Other/Special inspection).
- Monitor cored hole locations in the longitudinal stiffeners for crack development in the girder web.
- Monitor bow in the web of girder 1, span 7 at the field splice between floor beams 3 and 4.
- Monitor cracked welds at cross frame connection to girders due to pack rust.
- Monitor cracks at the stringer connection angles at:
    - Span 5, stringer 3 connection to floor beam 3
    - Span 7, stringer 1 connection to floor beam 0
    - Span 7, stringer 3 connection to floor beam 0
- Monitor welded connections at recently replaced floor beams due to irregular weld contour.

It is recommended that this structure remain on a 24-month Routine/Fracture Critical inspection frequency and a 24-month Other/Special inspection frequency.

Other/Special Inspection items include:

- Girder web cracks at:
    - Span 5, girder 1 (south face) between floor beams 4 and 5 – 1 1/4-inch-long paint crack in web at the longitudinal stiffener cored hole (perform Magnetic Particle Testing during 2022 Other/Special inspection)
    - Span 5, girder 1 at the field splice near floor beam 5 – 5/8-inch-long crack with no arrestor hole.
    - Span 5, girder 2 at the field splice near floor beam 5 – paint crack.
    - Span 6, girder 1 at the field splice near floor beam 3 – arrested crack.
    - Span 6, girder 2 near floor beam 11 – 3/16-inch-long crack.
    - Span 7, girder 1 at the field splice near floor beam 4 – paint crack.
    - Span 7, girder 2 at the field splice near floor beam 4 – arrested crack.
- Cracks in the stringer connection angles welds to replaced floor beams at:
    - Span 5, stringer 3 connection to floor beam 3
    - Span 7, stringer 1 connection to floor beam 0
    - Span 7, stringer 3 connection to floor beam 0
- Crack on exterior face of span 15, beam 1 in near pier 14.

- Cracked floor beam to girder connection welds:
  - Span 5, floor beam 6 upper connection to girder 1 – 5 1/8-inch-long crack in connection plate weld.
  - Span 6, floor beam 0 lower connection to girder 2 – horizontal weld cracked full length.
  - Span 7, floor beam 0 lower connection to girder 2 – 1 1/8-inch-long and 1/2-inch-long cracks in welded repair.

We thank you for the opportunity to provide our engineering services. Please contact me if you have any questions or comments.

Sincerely,

**BURGESS & NIPLE, INC.**

Shaun Fillmore, PE
Team Leader

Attachments

**SIGNIFICANT FINDINGS** are as follows:

## NBI Item 36 – Traffic Safety (5 = Fair condition)

- **PX** – The easternmost rail post along the north barrier at the end of the east approach slab is missing all four anchor bolts **(photo 3)**.
- Span 5 sidewalk near piers 4 and 5 exhibits spalling. These are not significant and have not changed since the prior inspection.
- East sidewalk in span 3 exhibits a 15-square-foot delamination.
- Corrosion holes through the steel tube were observed through the south bridge rail near floor beam 7, span 7, and in the north bridge railing in span 6, near pier 6 **(photo 4)**.
- The west termination of the north bridge railing is missing one rail post.
- The northeast approach railing exhibits multiple twisted/damaged blockouts **(photo 5)**. The southeast approach railing near the east end of the bridge exhibits collision damage to the approach rail and post for 60 feet from the end of the bridge.
- The south metal rail near floor beam 3, span 10 exhibits minor impact damage.
- Isolated areas of the steel railing painted coating exhibit peeling paint due to adhesion failure between the top and intermediate coats **(photo 6)**. Areas of corrosion are beginning to blead through. Isolated areas of the concrete rail skim coat exhibit minor cracking.
- Minor debris exists along the toe of both the north and south barriers.
- The curbs exhibit active vertical cracks and small spalls with exposed reinforcing due to insufficient cover **(photo 7)**. These are not currently problematic.
- Tapered concrete curbs have been installed at both approaches to address blunt impact potential apart from the northeast corner. The northeast approach safety curb extends 14 inches from the face of the railing and is unprotected, creating a blunt end at the transition **(photo 8)**.
- All traffic safety items meet current standards for non-National Highway system roadways except for the bridge railing.

## NBI Item 58 – Deck ( 6 = Satisfactory condition)

**Driving Surface** – ( 6 = Satisfactory condition) *The following conditions are considered minor deterioration.*

- **PX** – Minor to moderate debris accumulation exists along the curbs. Several scuppers are clogged or partially clogged with vegetation **(photo 9)**.
- The 2014 epoxy grit overlay is failing in patches throughout the deck, mostly along the wheel lines.
- Isolated shallow spalls exist in the deck**,** a few of which exhibit exposed and corroded reinforcing steel **(photo 10)**.
- Transverse cracks spaced at 1 to 3 feet exist on the surface randomly along the full length of the bridge. Cracks are widest and most prominent in the twin girder spans **(photo 11)**.
- Concrete deck patches exist throughout the driving surface from a prior rehabilitation **(photo 12)**. Isolated spalls have been patched with asphalt **(photo 13)**. The concrete patches are functioning as intended and the asphalt patches exhibit some deterioration.

**Soffit** – ( 6 = Satisfactory condition) *The following conditions are considered minor deterioration.*

- **FX** – Isolated spalls typically 4 to 6 square feet and up to 3/4 inch deep with exposed reinforcing steel exist on the soffit **(photo 14)**. These spalls are not currently problematic.
- **FX** – Shallow spalls are common along the top flange of girders, floor beams, and stringers. Isolated locations have larger spalls up to 1-foot-wide with exposed corroding reinforcing steel **(photo 15)**. This spalling is most likely due to pack rust between the superstructure and the deck.
- Isolated areas of the deck have lifted from the top flange of the girders or floor beams due to pack rust.
- Multiple 1/4-inch-wide cracks exist along the stringer deck haunch at locations in span 6 where stringers are not continuous over floor beam members.
- The deck soffit exhibits random transverse cracking with efflorescence throughout. The cracking is heaviest within 3 floor beams/diaphragms of the piers and is typically spaced at 5 feet. The cracks are due to flexure in the negative moment region over the piers. Shrinkage and hairline map cracking is common throughout.
- Bird nesting along soffit adjacent to the top flange of the girders is typical; this is heaviest in the main spans.
- Many scuppers in the main spans are sealed off with closed cell spray foam. It appears this foam was temporarily installed during the recent deck overlay installation and was not removed at all locations.

**Joints** – ( 6 = Satisfactory condition) *The following conditions are considered minor deterioration.*

- **PX** – The poured fixed joint at the abutments exhibits minor to moderate debris impaction, debonded seals, and a few shallow spalls and patches in the headers **(photo 16)**.
- **FX** – The poured fixed joint armor at the west abutment exhibits a 1-inch vertical offset with the deck armor lower than the approach armor.
- The finger joints at piers 4 and 7 have an elastomeric trough under the joints. Debris has filled the trough causing debris impaction with most severe conditions observed at the shoulders **(photo 17)**. The seal is torn at pier 7 **(photo 18)**.
- Two 5-foot-long sections of the pier 4 finger joint have been replaced with a welded steel plate **(photo 17)**. Both finger joints have a slight vertical offset of 1/8 to 3/8 inch.
- Poured seal deck control joints are typically spaced at 18 feet in the approach spans and at 50 to 75 feet in the main spans. Joint seals exhibit areas of failure and the joint headers exhibit cracking and/or spalling up to 2 feet long and 2 inches wide, some with exposed reinforcement. Isolated areas have been patched with asphalt since the previous inspection **(photo 19)**.
- The sealed expansion joints at the west abutment, and over piers 10 and 14 have been replaced and have moderate debris impaction. Sealed expansion joints are all nearly closed.

## NBI Item 59 – Superstructure ( 5 = Fair condition)

| Fracture Critical Member Rating Summary | |
|---|---|
| Girders | 5 = Fair condition |
| Floor Beams | 5 = Fair condition |

**[FCM] Girders** – ( 5 = Fair condition)

Fracture Critical twin girder spans exist in spans 5 through 7 and have the following comments:

- **PX/FX** – Cracks were observed at the ends of the horizontal splice at the following locations. No changes were noted to the cracks unless noted otherwise.
  - **PX** – Span 5, girder 1 at the field splice near floor beam 5 – 5/8-inch-long crack with no arrestor hole on interior face **(photo 20)**.
  - **FX** – Span 5, girder 2 at the field splice near floor beam 5 – 3/8-inch-long likely paint crack in the girder web at the toe of the longitudinal stiffener to web weld and has no arrestor hole **(photo 21)**.
  - **FX** – Span 6, girder 1 at the field splice near floor beam 3 – 3/4-inch-long crack arrested with two drilled hole retrofits **(photo 22)**. The crack has not propagated past the arrestor holes; however, two paint cracks exist in the underside of the top drilled hole.
  - **PX** – Span 6, girder 2 near floor beam 11 – 3/16-inch-long vertical crack in the lower web plate without arrestor holes **(photo 23)**. This crack was discovered during the 2020 OS inspection.
  - **FX** – Span 7, girder 1 near floor beam 4 – 1-inch-long paint crack in the upper web arrested with a arrestor hole, and 1 1/8-inch-long paint crack in the lower web that is not arrested **(photo 24)**.
  - **FX** – Span 7, girder 2 near floor beam 4 – Two vertical cracks arrested with drilled hole retrofits **(photo 25)**.
- **PX** – Missing or loose bolts were observed at the following locations:
  - Span 5, girder 2, near floor beam 5.
  - Span 6, girder 1, exterior face top flange.
  - Span 6, girder 1, interior face horizontal splice over pier 6 **(photo 26)**.
  - Span 6, girder 2, exterior face top and bottom flanges near floor beam 3.
  - Span 6, girder 2, exterior face horizontal splice near floor beam 12 **(photo 27)**.
  - Span 7, girder 1, exterior face horizontal splice near floor beam 3.
- **FX** – Longitudinal stiffeners on the exterior face of the girders have been retrofitted with a cored hole made through the stiffener and tangent with the girder web at the butt weld locations noted below. The stiffeners exist within the compression zones of the girder and the deck is not noted as composite with the girders.
  - Span 5, girder 1 between floor beams 4 and 5 at the lower longitudinal stiffener – A 1 1/4-inch-long vertical paint crack exists in the girder web at the cored hole location in the lower longitudinal stiffener **(photo 28)**. The paint crack was

observed during the 2021 fracture critical inspection is now defined with corrosion along the crack. Magnetic particle testing was not performed on the crack during either inspection.
    - Span 6, girder 1 near floor beam 6 at the upper longitudinal stiffener – A paint crack exists in the free edge of the stiffener.
    - Span 6, girder 1 near floor beam 7 at the upper longitudinal stiffener – Crack in the free edge of the stiffener **(photo 29)**.
    - Span 6, girder 1 near floor beam 9 at the upper longitudinal stiffener.
    - Span 6, girder 2 near floor beam 9 at the upper longitudinal stiffener.
    - Span 7, girder 2 between floor beams 7 and 8 at the lower longitudinal stiffener.
- **FX** – Span 7, girder 1 web between floor beams 3 and 4 exhibits a global bow up to 1/2-inch at the field splice. No signs of distress were noted to the splice plates or bolts.
- Girders top flange exhibit surface corrosion and 1/8-inch-thick pack rust between the flange and soffit in various locations.
- Painted over pitting was observed in the web of the girders adjacent to the top of lower lateral bracing gusset plates. This deterioration is most likely due to debris build up capturing moisture. No active pitting was noted.
- Pack rust up to 1/2 inch thick has developed between the horizontal web splice of the girders causing distortion at several locations **(photo 30)**. This condition does not affect the load carrying capacity of the girders.
- Pack rust up to 5/16 inch thick exists at isolated locations at the bottom flange splice plates.
- Heavy laminating corrosion was noted at the girder horizontal splices at the bearing stiffeners over piers 5 and 6. Girder 2 over pier 6 exhibits additional section loss greater than 50% to 4 of 6 bolts.
- Pack rust and section loss up to 3/16 inch deep exists in the girders top flange at several of the deck joints.

Multi girder spans exist in spans 1 through 4 and 8 through 15 and have the following comments:

- **FX** – Isolated cross frame top struts exhibit cracked welds between the cross frame and gusset plate due to pack rust. The following locations exhibited cracks:
    - Cross frame at pier 1, connection to girder 3 – 5 3/8-inch-long crack in the bottom weld.
    - Cross frame at pier 3, connection to girder 4 – 1/4-inch-long crack in the top weld.
    - Cross frame at pier 4, span 4 connection to girder 1 – 1/4-inch-long crack in the top weld and a broken weld at the bottom weld connection for the top strut **(photo 31)**.
    - Cross frame at pier 12, connections to girders 2 and 3 – crack full length of the gusset plates due to pack rust **(photos 32 and 33)**.
- Pack rust up to 1 1/4 inches thick is typical between the girder cross frame members and vertical web and bearing stiffeners. Minor to moderate pitting and distortion to the gusset plate is also present at these locations **(photo 34)**.

- Girder cross frames between girders 1, 2, and 3 at pier 9 and pier 10 exhibits a 3-inch bow, most likely due to the bearing rehabilitation project.
- Span 15, girder 1 at pier 14 exhibits a 1 3/4-inch-long crack in the vertical fillet weld to the exterior face of the girder web at the bottom flange. A 19-inch-long paint crack extends from this crack in the vertical fillet weld. These cracks appear to be contained within the fillet weld and do not extend into the base metal of the girder web.

**Stringers** – (5 = Fair condition)

- **PX** – Loose stringer connection bolts were observed between the connection angle and the floor beam web at the following locations:
    - Span 5, stringer 2 at floor beam 4 – 1 loose bolt **(photo 35)**
    - Span 5, stringer 3 at floor beam 4 – 1 loose bolt
    - Span 5, stringer 3 at floor beam 8 – 1 loose bolt
    - Span 6, stringer 1 at floor beam 3 – 4 loose bolts
    - Span 6, stringer 2 at floor beam 3 – 1 loose bolt
    - Span 6, stringer 3 at floor beam 4 – 1 loose bolt **(photo 36)**
    - Span 6, stringer 1 at floor beam 5 – 2 loose bolts
    - Span 6, stringer 1 at floor beam 6 – 2 loose bolts
    - Span 6, stringer 2 at floor beam 6 – 1 loose bolt
    - Span 6, stringer 3 at floor beam 6 – 3 loose bolts
    - Span 6, stringer 3 at floor beam 8 – 3 loose bolts
    - Span 6, stringer 1 at floor beam 11 – 5 loose bolts
    - Span 6, stringer 1 at floor beam 12 – 1 loose bolt
    - Span 7, stringer 3 at floor beam 4 – 1 loose bolt **(photo 37)**

  The bolts appear to have not been properly tightened during construction with most locations being the result of improper fit or alignment. These loose bolts do not provide the clamping strength intended for the connection and rely on bearing against the bolt shank for strength.
- **FX** – Stringer connection angles welded to the replaced floor beams exhibit cracks in the bottom weld at the following locations:
    - Span 5, stringer 3 connection to the east face of floor beam 3 – 3 1/2-inch-long crack (1/2 inch increase since the previous inspection) **(photo 38)**.
    - Span 7, stringer 1 connection to the east face of floor beam 0 – 1 3/4-inch-long crack.
    - Span 7, stringer 3 connection to the east face of floor beam 0 – 1-inch-long crack **(photo 39)**.
- Span 7, stringer 3 at floor beam 0 has been repaired by removing the deteriorated end and welding in a new steel section.
- Multiple stringers exhibit mis-drilled holes in the bottom flange at the floor beam connections.

**[FCM] Floor Beams** – ( 5 = Fair condition)
The floor beams in the twin girder spans (spans 5 through 7) act effectively as trusses. The diagonal and vertical floor beam members carry the stringer loads to the girders. The floor beam at each deck joint acts as an end diaphragm with the stringers framing into the face of the floor beam. These members exist at floor beams 0, 3, and 6 in span 5, floor beams 0, 3, 6, 8, and 11 in span 6, and floor beams 0, 3, 6, and 9 in span 7. The floor beam truss gusset plates are welded to the bottom flange of the floor beam upper chord beneath each stringer. The upper chord of the floor beams not under deck joints are significantly shallower with the stringers bearing on the top of the member. For the purpose of this report, the floor beams are considered to act as a truss and the components contain typical truss element descriptions.

- **PX** – Span 5, west face of floor beam 6 at girder 1 exhibits a 5 1/8-inch-long crack in the weld for the web connection plate due to pack rust **(photo 40)**. This represents an increase of 5/8 inch since the previous inspection. The weld is 15-inches-long and occurs along both faces of the floor beam web. Deck drainage leaking though the deck control joint is the source of the pack rust.
- **PX** – **Member Alignment** – Span 6, floor beam 0 over pier 5 at girder 2 is cracked for the full width of the horizontal weld along the bottom edge of the truss floor beam gusset plate **(photo 41)**. The vertical weld at this location is cracked full height (3 1/2 inches). The gusset plate has been reinforced with a welded 3-inch by 1/2-inch diagonal bar which is bowed out-of-plane 1/16 inch **(photo 42)**. This bow may be indicative of a recent overload especially with the multitude of previously undocumented bows in adjacent gusset plates.
- **PX** – Loose and misaligned bolts and blind holes exist in the floor beam to girder connections at the following locations:
    - Span 5, floor beam 0 upper connection to girder 1 – 2 bolts not fully seated.
    - Span 6, floor beam 1 lower connection to girder 1 – 11 loose bolts **(photo 43)**.
    - Span 6, floor beam 4 lower connection to girder 1 – 2 blind holes at the top of the gusset plate with adjacent pack rust up to 11/16-inch-thick **(photo 44)**.
    - Span 6, floor beam 5 lower connection to girder 2 – 2 blind holes **(photo 45)**.
    - Span 6, floor beam 12 lower connection to girder 1 – 1 unseated bolt due to misaligned holes.
    - Span 6, floor beam 13 lower connection to girder 1 – 4 loose bolts and one bolt without a nut allowing active pack rust up to 1/4 inch thick at the loose bolts.
    - Span 7, floor beam 2 lower connection to girder 1 – 1 missing bolt.
    - Span 7, floor beam 3 upper connection to girder 2 – 3 loose bolts and one bolt without a washer **(photo 46).**
    - Span 7, floor beam 9 upper connection to girder 1 – 2 missing bolts.
- **FX** – The following floor beams have been replaced as of the 2014 OS:
    - Span 5, floor beam 3.
    - Span 6, floor beam 0.
    - Span 7, floor beam 0.

  The stringer to floor beam connections and the girder to floor beam connections at these locations are welded which differ from the details in Sheet 16 of the repair plans which call for bolted connections **(photo 47)**. Many of the welds in these locations have irregular weld contour. Floor beam 0, span 6 over pier 5 – east face of floor beam, south face of

stringer 1 toe weld between the connection angle and the floor beam web exhibits a 3/4-inch possible crack. It is possible this is a fold in an uneven weld due to poor weld contour and not a crack.

- Span 7, floor beam 0 exhibits a previous repair at girder 2 with the floor beam reattached to the girder via welded plate prior to the 2014 OS inspection. The weld has 1 1/8-inch-long and 1/2-inch-long cracks at the lower end of the weld **(photo 48)**. This retrofit plate is positioned to resist the vertical dead load reaction of the lower strut and is not well suited to resist the axial load the bottom strut was intended to carry.
- **Member Alignment** – Several kinks and bends were noted in the floor beam members and gusset plates. It was unable to be determined at the time of the inspection if this is an as-built condition or if this is the result of recent damage due to overload; however, the lack of fatigue or crack indications suggests that the kinks are an as-built condition. Details and locations are as follows:
    - Span 5, floor beam 2 at girder 2 – L4 gusset plate exhibits a slight bow.
    - Span 5, floor beam 5 at girder 2 – L4 gusset plate exhibits a slight bow.
    - Span 5, floor beam 7 adjacent to girder 2 – U3 gusset plate exhibits an approximately 3/8-inch kink under stringer 3 and L4 gusset plate exhibits an approximately 1/8-inch bow.
    - Span 6, floor beam 4 – Center gusset plate kinked.
    - Span 6, floor beam 13 – L0L1 exhibits 2 minor kinks.
    - Span 7, floor beam 1 at stringer 3 – upper chord bottom flange is twisted/rolled 7° to the east. The upper gusset plate under stringer 3 is kinked 1/2 inch on the vertical edges and 1/2 inch on the bottom horizontal edge. The vertical stiffeners are out of alignment due to the roll in the bottom flange of the floor beam. The center gusset plate is kinked 1/4 inch to the west **(photo 49)**.
    - Span 7, floor beam 5 – upper chord is rotated 4.5° to the east **(photo 50)**.
    - Span 7, floor beams 2, 5, and 8 at stringer 3 – bottom horizontal face of gusset plate kinked 1/4-inch and rotated up to 1/2-inch to the west. Floor beam 2 exhibits a poor-quality weld between the north vertical stiffener under stringer 3 and the floor beam bottom flange that appears to have never properly been attached at this location.
- Span 6, floor beam 2 – U3L2 (tension member) exhibits several shallow gouges up to 3/8-inch-deep in the bottom flange.
- Span 6, floor beam 4 exhibits two mis-drilled holes in the bottom flange under stringer 3.
- Span 6, floor beam 6 top flange exhibits a 14-inch by 1-inch corrosion hole with adjacent knife edging.
- Oversized holes exist randomly throughout the floor beam connections. The holes appear to have been re-drilled during the erection of the bridge. The bolt holes are close to the top edge of the connection plate, reducing the capacity of the connection. No signs of distress were observed and the connection most likely is adequate.
- Several floor beams exhibit surface corrosion along the top flange with evidence of deck pumping due to splash marks on the underside of the deck.

- The floor beams typically exhibit corrosion on both flanges and up to 1/8-inch-deep pitting on the bottom face of the top flange.

**Floor Bracing System** – ( 5 = Fair condition)

- **PX** – Span 5, lower lateral bracing diagonal east of floor beam 7 and at girder 2 exhibits a 5-inch-long crack in the weld between the bottom angle and the bracing gusset plate caused by active pack rust between the diagonal and the lower lateral bracing gusset plate **(photo 51)**.
- **PX** – Span 6, lower lateral bracing diagonal east face of floor beam 12 and at girder 2 exhibits a 5 3/4-inch-long crack in the weld between the bottom angle and the bracing gusset plate caused by active pack rust between the diagonal and the lower lateral bracing gusset plate **(photo 52)**.
- Span 5, lower lateral bracing diagonal east of floor beam 1 at girder 2, exhibits a crack along the end of the bracing due to pack rust **(photo 53)**. The bracing is welded along the west edge and end of the bracing.
- Many lower lateral bracing hanger rod connections were replaced prior to the 2014 OS inspection although the hanger rod to stringer connections do not include lock washers as detailed in the repair plans. In many locations the bolted assembly is not tight allowing the connection clamp to slide along the stringer bottom flange. Several other hanger rods remain severed. In other locations the lower lateral bracing connection brackets to the stringers are missing **(photo 54)**. These rods prevent oscillation of the lower lateral bracing under live loads. Oscillation of the lower lateral bracing can cause fatigue cracks in the gusset plate weld to the web of the girders.
- Previous recommended repairs for lower lateral bracing welded angles were performed prior to the 2014 OS inspection. Pack rust has been removed and angles have been welded on two of three legs at most locations, as well as all three legs at random locations.
- The lower lateral bracing crossbuck connections between floor beams exhibit broken welds at the following locations due to pack rust forming between the flange of the diagonal member and the gusset plates:
    - Span 5, between floor beams 0 and 1 southwest diagonal member at the gusset plate connection.
    - Span 6, between floor beams 10 and 11 northeast diagonal member at the gusset plate connection **(photo 55)**.
    - Span 7, between floor beams 3 and 4 southeast diagonal member at the gusset plate connection, exhibits a cracked weld full flange width **(photo 56)**.
- Span 6 lower lateral bracing between floor beams 3 and 4 exhibit up to 1-inch-thick pack rust between the gusset plate and the floor beam causing the bracing to rotate.
- Span 7 lower lateral bracing gusset plate at floor beam 6 exhibits a 5-inch by 2-inch corrosion hole through the gusset plate at the edge of the floor beam connection stiffener to girder 1.

**Paint/Coating System** – ( 6 = Satisfactory condition)

- The bridge was repainted in 2010. Areas of previous corrosion and pack rust are reactivating in many locations especially at gusset plates near the expansion joints. Pack rust is active in many girder horizontal web splices. Previous PX of laminating corrosion and pack rust at lower lateral bracing gusset plates were repaired prior to the 2014 OS although corrosion is reactivating in isolated locations.

**Load Deflection** – ( 4 = Poor condition)

- The approach spans were observed to oscillate and have noticeable deflection during the passage of multiple loaded trucks. Additionally, the approach span piers exhibited longitudinal oscillations during these passages. These conditions may be caused by the deck lifting at the control joints over intermediate floor beams, creating a ramping effect and magnified impact loading on the superstructure.

## NBI Item 60 – Substructure ( 6 = Satisfactory condition)

**Abutments** – ( 6 = Satisfactory condition)

- The bottom of both abutment breastwalls are exposed up to 2 inches high by 4 feet wide at both ends with up to 30 inches of penetration **(photo 57)**. The steel piles are not exposed.
- The backwalls appear to be leaning towards the channel. A level was used to confirm that the girder ends remain near vertical, and the backwalls are leaning towards the channel. Abutments are supported on vertical piles. Measurements between the backwall and the girder top and bottom flanges were taken at the following locations:
    - The west abutment transverse measurement between the abutment backwall and the girder flanges at span 1, girder 4 are 4 7/8 inches at the top flange (previously 1 inch) and 7 inches at the bottom flange (previously 3 1/4 inches) **(photo 58)**.
    - The east abutment transverse measurement between the abutment backwall and the girder flanges at span 15, girder 4 are 1 1/8 inches at the top flange and 3 1/4 inches at the bottom flange **(photo 59)**.
- The west abutment exhibits varmint holes under the breastwall between girders 3 and 4.
- West abutment bearing seats exhibit light accumulation of spalled concrete and debris **(photo 60)**.
- The east abutment exhibits a 7-foot-wide patched area between girders 2 and 3 and a horizontal crack with rust staining near the girder 3 pedestal. Moist sand from the epoxy overlay exists on the abutment seat.

**Piers** – ( 6 = Satisfactory condition)

- Pier 1 cap exhibits an incipient corner spall/delamination along the east edge near girder 3 **(photo 61)**.
- Pier 2 cap exhibits a 3/16-inch-wide crack along the east and west edges near girder 2 and the top face of the cap in this area is delaminated. Cracking and delaminations are due to corrosion of the reinforcing steel.

- Pier 3 cap exhibits 1/16-inch-wide cracks in the top face with large, delaminated areas. The web wall has multiple shallow spalls with exposed reinforcing in the west face.
- Pier 4 cap exhibits spalling and scaling concrete with exposed corroded reinforcing steel in the bearing seat areas and to the west face over the north column. Scaling concrete 1/8-inch-deep exists around the bearing for girder 1, span 5 **(photo 62)**.
- The south column of pier 4 exhibits cracking with efflorescence on the east face **(photo 63)**.
- The west face of the pier 5 cap at the interface with the column exhibits multiple exposed and corroding reinforcing steel ends **(photo 64)**. Pier 5 also exhibits random hairline shrinkage cracks and isolated areas of small delaminations.
- The column of pier 6 exhibits random full height vertical cracks with light efflorescence and full width spalling with exposed reinforcement at the cross-section change near the waterline.
- Pier 7 cap exhibits map cracks in the patched areas and spalling with exposed reinforcement around the base of the north column.
- Pier 8 cap exhibits 1/16-inch-wide by 5-foot-long longitudinal cracks along the west and east top edges at girders 1 and 2 and delaminated concrete. Cracking and delaminations are due to corrosion of the reinforcing steel.
- The north column of pier 8 exhibits multiple spalls with exposed reinforcement.
- Pier 11 web wall exhibits multiple spalls with exposed reinforcement.
- Pier 13 cap exhibits longitudinal cracks along the edges under girders 1 and 2.
- Pier 14 cap exhibits 1/16-inch-wide cracks on the top face with large delaminated areas. Spalling and scaling concrete with exposed corroded reinforcing steel exists in the bearing seat areas and on the south face **(photo 65)**.

**Bearings** – ( 5 = Fair condition)

- **PX** – Bearing anchor bolts and fasteners exhibit the following conditions:
    - Pier 2, girder 4 bearing – One loose anchor bolt.
    - Pier 3, girder 1 bearing – Fixed bearing anchor bolts are bent and exhibit corrosion **(photo 66).**
    - Pier 5, girder 1 bearing – Fixed bearing exhibits several different length anchor bolts, and the bolts are typically not fastened tightly. This possibly is the result of the anchor bolts working up out of the bearing seat due to rocking of the fixed bearings **(photo 67)**.
    - Pier 8, girder 2 bearing – Fixed bearing exhibits one missing anchor bolt at the southwest corner of the bearing.
    - Pier 9, girder 1 bearing – Fixed bearing is missing one anchor bolt at the southwest corner of the bearing with the remaining 3 bolts exhibiting nuts not completely threaded onto the bolt. The southwest anchor bolt for the sole plate connection to the bottom flange is loose **(photo 68)**.
    - Pier 11, girder 4 bearing – One loose anchor bolt at the southwest corner with no signs of movement.

  - Pier 12, girder 4 bearing – East anchor bolts are not fully seated and are slightly bent to the east.
  - East abutment, girder 4 bearing – Anchor bolts exhibit up to approximately 20% loss to bolt heads due to corrosion.
- The keeper plates used to contain the rocker bearing within the limits of the sole plate have broken welds or is missing at the west abutment bearings for girders 3 and 4 **(photo 69)**. The girder 4 bearing has moved south 1/2 inch with no significant lateral movement since the last painting.
- Fixed bearings typically exhibit surface corrosion forming at stiffeners and masonry plates and minor pack rust developing between the masonry plate and concrete bearing seat.
- Pier 10, girder 1 bearing has rotated clockwise (looking down), and the southwest (span 9 side) corner of the rocker overhangs the masonry plate 1/4 inch **(photo 70)**.
- The rocker bearings typically exhibit rust staining and active laminating corrosion between the rocker and the masonry plate.
- Previous rocker bearings for span 4 at pier 4, span 8 at pier 7, and span 11 at pier 10 have been replaced with elastomeric bearings prior to the 2014 OS inspection.
- Bearing measurements are listed in the table below **(photos 71 and 72)**.

| Pier | Average Rotation/ Translation | Max Rotation or Translation | Direction | Expansion/ Contraction | Temperature |
|---|---|---|---|---|---|
| Spans 1 through 4 - four span continuous 4-girder approach spans | | | | | |
| West abutment | 4° | 7° | West | Expansion | 90°F |
| Pier 1 | 0° | 0° | - | - | 86°F |
| Pier 2 | Fixed | - | - | - | |
| Pier 3 | Fixed | - | - | - | |
| Pier 4 | 0” | 3/4” | West | Contraction | 85°F |
| Spans 5 through 7 - three span continuous 2-girder main spans | | | | | |
| Pier 4 | 8° | 8° | East | Contraction | 85°F |
| Pier 5 | Fixed | - | - | - | |
| Pier 6 | 5° | 7° | East | Expansion | 85°F |
| Pier 7 | 3° | 3° | - | Expansion | 96°F |
| Spans 8 through 10 - three span continuous 4-girder approach spans | | | | | |
| Pier 7 | 0” | 0” | - | - | 80°F |
| Pier 8 | Fixed | - | - | - | |
| Pier 9 | Fixed | - | - | - | |
| Pier 10 | 6° | 9° | West | Contraction | 77°F |
| Spans 11 through 14 - four span continuous 4-girder approach spans | | | | | |
| Pier 10 | 1/2” | 1” | West | Contraction | 77°F |
| Pier 11 | fixed | - | - | - | |

| Pier | Average Rotation/ Translation | Max Rotation or Translation | Direction | Expansion/ Contraction | Temperature |
|---|---|---|---|---|---|
| Pier 12 | fixed | - | - | - | |
| Pier 13. G2,3,4<br>Pier 13, G1 | 2°<br>4° | 3°<br>4° | East<br>West | Expansion<br>Contraction | 95°F<br>95°F |
| Pier 14. G 2,4<br>Pier 14. G 1,3 | 2°<br>4° | 2°<br>8° | East<br>West | Expansion<br>Contraction | 80°F<br>80°F |
| Span 15 - simple span 4-girder approach span | | | | | |
| Pier 14 | 12° | 14° | West | Expansion | 95°F |
| East abutment | Fixed | - | - | - | |

**NBI Item 61 – Channel and Channel Protection** (6 = Bank Slumping condition) *NBI Item 61 was rated 6=Bank Slumping condition during the October 14, 2022 underwater inspection. The following conditions are based on observations during the 2023 fracture critical inspection.*

**Flowline Stability** – (7 = Good condition)

- No significant deficiencies noted.

**Channel Bank Damage** – (7 = Good condition)

- No significant deficiencies noted.

**Debris** – (6 = Satisfactory condition)

- As per the 2022 underwater inspection, light timber debris exists on the riverbed at piers 3, 4 and 7 through 10.

**Vegetation** – ( 7 = Good condition)

- The banks are sandy and well vegetated with grass and tree growth on both banks.

**NBI Item 72 – Approach** ( 7 = Good condition)

**Approach Roadway Condition** – ( 7 = Good condition)

- Both approach slabs have been recently replaced. The east and west approach slabs exhibit up to 0.020-inch-wide longitudinal cracking in the wheel lines with intersecting transverse cracks **(photo 73)**.
- The west approach slab approximately 40 feet from the west abutment exhibits a 7 1/2-inch diameter infilled core hole in the west travel lane **(photo 74)**.
- A spall measuring 2 feet by 6 inches exists along the east abutment joint.
- Pavement relief joints at the ends of both approach slabs exhibit adhesion failures and minor debris impaction.

**Approach Roadway Settlement** – ( 7 = Good condition)

- No settlement issues were noted at the time of the inspection.

**NBI Item 113 – Scour Rating** ( 8 = Calculated Scour Above Foundation) No change to scour rating is recommended.

- Per the 2022 Underwater Inspection report: There has been general scour ranging from 5-ft to 15-ft, west of Pier 7 since construction. The top of the footing at Pier 5 and Pier 6 is exposed; however, the footings are keyed into hard shale, according to the design plans.

# Truss/FC Bridge Rating Form

| | |
|---|---|
| NBI | 17611 |
| Structure | 5159 0300X |
| County | Muskogee |
| Division | 1 |

| Facility Carried |
|---|
| S.H. 100 |
| Feature Intersected |
| Arkansas River |

| NBI Item # | 2023 | 2021 |
|---|---|---|
| 36 - Traffic Safety | 5, PX | 5, PX |
| 58 - Deck | 6, PX | 6, PX |
| a. Driving Surface | 6, PX | 6, PX |
| b. Soffit | 6, FX | 6, FX |
| c. Joints | 6, PX | 6, PX |
| 59 - Superstructure* | 5, PX | 5, PX |
| a. Beams/Girders | 5, PX | 5, PX |
| b. Stringers** | 5, PX | 5, PX |
| c. Floor Beams | 5, PX | 5, PX |
| d. Pier Beams | N/A | N/A |
| e. Floor Bracing System | 5, PX | 5, PX |
| f. Truss Upper Chord*** | N/A | N/A |
| g. Truss Lower Chord*** | N/A | N/A |
| h. Truss Web Members | N/A | N/A |
| i. Truss End Posts | N/A | N/A |
| j. Truss Bracing | N/A | N/A |
| k. Paint/Coating | 6 | 6 |
| l. Load Deflection | 4 | 4 |
| 60 - Substructure**** | 6, PX | 6, PX |
| a. Abutments | 6 | 6, FX |
| b. Piers | 6 | 6 |
| c. Bearings | 5, PX | 5, PX |
| 61 - Channel & Channel Protection | 6 | 6 |
| a. Flowline Stability | 7 | 7 |
| b. Channel Bank Damage | 7 | 6 |
| c. Debris | 6 | 7 |
| d. Vegetation | 7 | 7 |
| Approach Roadway | 7 | 7 |
| a. Approach Roadway Condition | 7 | 7 |
| b. Approach Roadway Settlement | 7 | 7 |
| 113 - Scour | 8 | 8 |
| Flowline/Notes | N/A | N/A |

| Rating | Description (For 36, 58, 59, 60, 72) |
|---|---|
| N/A | NOT APPLICABLE |
| 9 | EXCELLENT CONDITION |
| 8 | VERY GOOD CONDITION - no problems noted. |
| 7 | GOOD CONDITION - some minor problems. |
| 6 | SATISFACTORY CONDITION - structural elements show some minor deterioration |
| 5 (FX,PX) | FAIR CONDITION - all primary structural elements are sound but may have minor section loss, cracking, spalling or scour. |
| 4 (PX) | POOR CONDITION - advanced section loss, deterioration, spalling or scour. |
| 3 (PX,CX) | SERIOUS CONDITION - loss of section, deterioration, spalling or scour have seriously affected primary structural components. Local failures are possible. Fatigue cracks in steel or shear cracks in concrete may be present. |
| 2 (CX) | CRITICAL CONDITION - advanced deterioration of primary structural elements. Fatigue cracks in steel or shear cracks in concrete may be present or scour may have removed substructure support. Unless closely monitored it may be necessary to close the bridge until corrective action is taken. |
| 1 (CX) | IMMINENT FAILURE CONDITION - major deterioration or section loss present in critical structural components or obvious vertical or horizontal movement affecting structure stability. Bridge is closed to traffic but corrective action may put back in light service. |
| 0 | FAILED CONDITION - out of service - beyond corrective action. |

* - Members with fatigue cracks in compression zones ( top flange stringer copes, clip angles, etc.) are to be coded as a 5 unless the crack turns toward a tension zone, then code 3.

* - Members with fatigue cracks in tension zones (cover plate ends, etc. ) are to be coded as a 3.

** - Includes connection angles.

*** - Includes gusset plates. Missing rivets in connections are coded as a 3.

**** - Elements with superficial cracking are coded as 6, spalls with exposed rebar 5, spalls with exposed rebar with section loss 4.

| Rating | Description (For 61) |
|---|---|
| N/A | NOT APPLICABLE |
| 9 | There are no noticeable or noteworthy deficiencies which affect thecondition of the channel. |
| 8 | Banks are protected or well vegetated. River control devices such as spur dikes and embankment protection are not required or are in a stable condition. |
| 7 | Bank protection is in need of minor repairs. River control devices and embankment protection have a little minor damage. Banks and/or channel have minor amounts of drift. |
| 6 | Bank is beginning to slump. River control devices and embankment protection have widespread minor damage. There is minor stream bed movement evident. Debris is restricting the channel slightly. |
| 5 | Bank protection is being eroded. River control devices and/or embankment have major damage. Trees and brush restrict the channel. |
| 4 | Bank and embankment protection is severely undermined. River control devices have severe damage. Large deposits of debris are in the channel. |
| 3 | Bank protection has failed. River control devices have been destroyed. Stream bed aggradation, degradation or lateral movement has changed the channel to now threaten the bridge and/or approach roadway. |
| 2 | The channel has changed to the extent the bridge is near a state ofcollapse. |
| 1 | Bridge closed because of channel failure. Corrective action may putback in light service. |
| 0 | Bridge closed because of channel failure. Replacement necessary. |

| NBI # | Structure # | County | Fac. Carried | Fac. Intersected | Insp. Date |
|---|---|---|---|---|---|
| 17611 | 5159 0300 X | Muskogee | S.H. 100 | ARKANSAS RIVER | 7/14/2023 |

Photograph 1 - Looking east at the bridge end view.

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|---|---|---|---|---|---|
| 17611 | 5159 0300 X | Muskogee | S.H. 100 | ARKANSAS RIVER | 7/14/2023 |

Photograph 2 - Looking north at the bridge elevation.

| NBI # | Structure # | County | Fac. Carried | Fac. Intersected | Insp. Date |
|---|---|---|---|---|---|
| 17611 | 5159 0300 X | Muskogee | S.H. 100 | ARKANSAS RIVER | 7/14/2023 |

Photograph 3 - Looking northwest at the north rail east end post. Note: rail post is missing all four anchor bolts.

| NBI # | Structure # | County | Fac. Carried | Fac. Intersected | Insp. Date |
|---|---|---|---|---|---|
| 17611 | 5159 0300 X | Muskogee | S.H. 100 | ARKANSAS RIVER | 7/14/2023 |

Photograph 4 - Looking northeast at the north bridge railing in span 6 neat pier 6. Note: corrosion hole through rail.

| NBI # | Structure # | County | Fac. Carried | Fac. Intersected | Insp. Date |
|---|---|---|---|---|---|
| 17611 | 5159 0300 X | Muskogee | S.H. 100 | ARKANSAS RIVER | 7/14/2023 |

Photograph 5 - Looking west along the northeast approach railing. Note: the blockouts have been damaged for 60 feet near the transition.

| NBI # | Structure # | County | Fac. Carried | Fac. Intersected | Insp. Date |
|---|---|---|---|---|---|
| 17611 | 5159 0300 X | Muskogee | S.H. 100 | ARKANSAS RIVER | 7/14/2023 |

Photograph 6 - Looking southwest at the south bridge railing in span 14. Note: top coat of paint is peeling due to adhesion failure.

| NBI # | Structure # | County | Fac. Carried | Fac. Intersected | Insp. Date |
|---|---|---|---|---|---|
| 17611 | 5159 0300 X | Muskogee | S.H. 100 | ARKANSAS RIVER | 7/14/2023 |

Photograph 7 - Looking northwest at the north concrete curb at mid span of span 3. Note: 7-foot-long by full curb height spall with exposed and corroded reinforcing steel.

| NBI # | Structure # | County | Fac. Carried | Fac. Intersected | Insp. Date |
|---|---|---|---|---|---|
| 17611 | 5159 0300 X | Muskogee | S.H. 100 | ARKANSAS RIVER | 7/14/2023 |

Photograph 8 - Looking west at the northeast approach railing transition. Note: transition meets current standards; however, safety curb extends 14 inches from face of railing and is unprotected.

| NBI # | Structure # | County | Fac. Carried | Fac. Intersected | Insp. Date |
|---|---|---|---|---|---|
| 17611 | 5159 0300 X | Muskogee | S.H. 100 | ARKANSAS RIVER | 7/14/2023 |

Photograph 9 - Looking east along the south curb in span 10. Note: isolated scuppers clogged with debris. Moderate debris exists along edge of deck full length.

| NBI # | Structure # | County | Fac. Carried | Fac. Intersected | Insp. Date |
|---|---|---|---|---|---|
| 17611 | 5159 0300 X | Muskogee | S.H. 100 | ARKANSAS RIVER | 7/14/2023 |

Photograph 10 - Looking northwest at span 7 deck top eastbound lane. Note: 2-foot-long by 1-foot-wide by up to 3-inch deep pothole with 5 exposed and corroded transverse reinforcement.

| NBI # | Structure # | County | Fac. Carried | Fac. Intersected | Insp. Date |
|---|---|---|---|---|---|
| 17611 | 5159 0300 X | Muskogee | S.H. 100 | ARKANSAS RIVER | 7/14/2023 |

Photograph 11 - Looking north at span 5 top of deck. Note: transverse cracking spaced 1 to 3 feet apart.

| NBI # | Structure # | County | Fac. Carried | Fac. Intersected | Insp. Date |
|---|---|---|---|---|---|
| 17611 | 5159 0300 X | Muskogee | S.H. 100 | ARKANSAS RIVER | 7/14/2023 |

Photograph 12 - Looking northwest at span 7 deck top. Note: typical patching in good condition throughout the bridge.

| NBI # | Structure # | County | Fac. Carried | Fac. Intersected | Insp. Date |
|---|---|---|---|---|---|
| 17611 | 5159 0300 X | Muskogee | S.H. 100 | ARKANSAS RIVER | 7/14/2023 |

Photograph 13 - Looking northwest at the deck near mid span of span 14. Note: concrete patches throughout with isolated asphalt patches and spalling.

| NBI # | Structure # | County | Fac. Carried | Fac. Intersected | Insp. Date |
|---|---|---|---|---|---|
| 17611 | 5159 0300 X | Muskogee | S.H. 100 | ARKANSAS RIVER | 7/14/2023 |

Photograph 14 - Looking west at span 12 north soffit overhang near pier 12. Note: typical spalling with exposed and corroded reinforcement.

| NBI # | Structure # | County | Fac. Carried | Fac. Intersected | Insp. Date |
|---|---|---|---|---|---|
| 17611 | 5159 0300 X | Muskogee | S.H. 100 | ARKANSAS RIVER | 7/14/2023 |

Photograph 15 - Looking east at floor beam 3, span 7. Note: pack rust and section loss exists along the top flange of the floor beam. Spalls are typical in the deck soffit adjacent to the floor beam.

| NBI # | Structure # | County | Fac. Carried | Fac. Intersected | Insp. Date |
|---|---|---|---|---|---|
| 17611 | 5159 0300 X | Muskogee | S.H. 100 | ARKANSAS RIVER | 7/14/2023 |

Photograph 16 - Looking north along the sealed expansion joint at the west abutment. Note: moderate debris impaction throughout.

| NBI # | Structure # | County | Fac. Carried | Fac. Intersected | Insp. Date |
|---|---|---|---|---|---|
| 17611 | 5159 0300 X | Muskogee | S.H. 100 | ARKANSAS RIVER | 7/14/2023 |

Photograph 17 - Looking north along the finger joint over pier 4. Note: 5 feet of missing fingers on span 4 side in east travel lane, 4 feet missing in span 4 side near the north shoulder. Heavy debris compaction for the full length inhibits expansion of joint.

| NBI # | Structure # | County | Fac. Carried | Fac. Intersected | Insp. Date |
|---|---|---|---|---|---|
| 17611 | 5159 0300 X | Muskogee | S.H. 100 | ARKANSAS RIVER | 7/14/2023 |

Photograph 18 - Looking north along the underside of the finger joint over pier 7. Note: trough torn and falling through along the underside.

| NBI # | Structure # | County | Fac. Carried | Fac. Intersected | Insp. Date |
|---|---|---|---|---|---|
| 17611 | 5159 0300 X | Muskogee | S.H. 100 | ARKANSAS RIVER | 7/14/2023 |

Photograph 19 - Looking north along the construction joint over floor beam 2 in span 3. Note: typical condition, isolated spalls/delaminations with concrete and AC patches.

| NBI # | Structure # | County | Fac. Carried | Fac. Intersected | Insp. Date |
|---|---|---|---|---|---|
| 17611 | 5159 0300 X | Muskogee | S.H. 100 | ARKANSAS RIVER | 7/14/2023 |

Photograph 20 - Looking southeast at girder 1, span 5 at the field splice near floor beam 5. Note: 5/8-inch-long crack in the inboard face at the horizontal web splice termination.

| NBI # | Structure # | County | Fac. Carried | Fac. Intersected | Insp. Date |
|---|---|---|---|---|---|
| 17611 | 5159 0300 X | Muskogee | S.H. 100 | ARKANSAS RIVER | 7/14/2023 |

Photograph 21 - Looking northeast at girder 2, span 5 at the field splice near floor beam 5. Note: 3/8-inch-long paint crack in the inboard face at the horizontal web splice termination.

| NBI # | Structure # | County | Fac. Carried | Fac. Intersected | Insp. Date |
|---|---|---|---|---|---|
| 17611 | 5159 0300 X | Muskogee | S.H. 100 | ARKANSAS RIVER | 7/14/2023 |

Photograph 22 - Looking north at girder 1, span 6 at the field splice near floor beam 3. Note: 3/4-inch-long crack in the inboard face at the horizontal web splice termination has not propagated past the arrestor holes.

| NBI # | Structure # | County | Fac. Carried | Fac. Intersected | Insp. Date |
|---|---|---|---|---|---|
| 17611 | 5159 0300 X | Muskogee | S.H. 100 | ARKANSAS RIVER | 7/14/2023 |

Photograph 23 - Looking north at girder 2, span 6 at the field splice near floor beam 11. Note: 3/16-inch-long crack in the inboard face at the horizontal web splice termination.

| NBI # | Structure # | County | Fac. Carried | Fac. Intersected | Insp. Date |
|---|---|---|---|---|---|
| 17611 | 5159 0300 X | Muskogee | S.H. 100 | ARKANSAS RIVER | 7/14/2023 |

Photograph 24 - Looking southwest at girder 1, span 7 at the field splice near floor beam 4. Note: 1-inch-long paint crack in the upper web with an arrestor hole, and a 1 1/8-inch-long paint crack in the lower web without an arrestor hole in the inboard face at the horizontal web splice termination.

| NBI # | Structure # | County | Fac. Carried | Fac. Intersected | Insp. Date |
|---|---|---|---|---|---|
| 17611 | 5159 0300 X | Muskogee | S.H. 100 | ARKANSAS RIVER | 7/14/2023 |

Photograph 25 - Looking south at girder 2, span 7 at the field splice near floor beam 4. Note: no cracks in outboard face of girder web

| NBI # | Structure # | County | Fac. Carried | Fac. Intersected | Insp. Date |
|---|---|---|---|---|---|
| 17611 | 5159 0300 X | Muskogee | S.H. 100 | ARKANSAS RIVER | 7/14/2023 |

Photograph 26 - Looking up along the outboard face of the bearing stiffener for girder 1 at pier 6. Note: 1 missing bolt in horizontal splice. Corrosion and pitting exist at the splice interface.

| NBI # | Structure # | County | Fac. Carried | Fac. Intersected | Insp. Date |
|---|---|---|---|---|---|
| 17611 | 5159 0300 X | Muskogee | S.H. 100 | ARKANSAS RIVER | 7/14/2023 |

Photograph 27 - Looking north at the span 6, girder 2 field splice near floor beam 12. Note: 1 missing bolt in the horizontal splice.

| NBI # | Structure # | County | Fac. Carried | Fac. Intersected | Insp. Date |
|---|---|---|---|---|---|
| 17611 | 5159 0300 X | Muskogee | S.H. 100 | ARKANSAS RIVER | 7/14/2023 |

Photograph 28 - Looking north at girder 1, span 5 at the lower longitudinal stiffener splice between floor beams 4 and 5. Note: 1 1/4-inch long vertical paint crack in the girder web.

| NBI # | Structure # | County | Fac. Carried | Fac. Intersected | Insp. Date |
|---|---|---|---|---|---|
| 17611 | 5159 0300 X | Muskogee | S.H. 100 | ARKANSAS RIVER | 7/14/2023 |

Photograph 29 - Looking north at girder 1, span 6 at the upper longitudinal stiffener splice near floor beam 7. Note: crack in splice on free edge side of cored hole.

| NBI # | Structure # | County | Fac. Carried | Fac. Intersected | Insp. Date |
|---|---|---|---|---|---|
| 17611 | 5159 0300 X | Muskogee | S.H. 100 | ARKANSAS RIVER | 7/14/2023 |

Photograph 30 - Looking south along the girder 1, span 7 horizontal splice. Note: 1/4-inch-thick pack rust exists between the splice plates.

| NBI # | Structure # | County | Fac. Carried | Fac. Intersected | Insp. Date |
|---|---|---|---|---|---|
| 17611 | 5159 0300 X | Muskogee | S.H. 100 | ARKANSAS RIVER | 7/14/2023 |

Photograph 31 - Looking southeast at the end diaphragm connection to girder 1, span 4 at pier 4. Note: pack rust has broken the bottom and vertical welds.

| NBI # | Structure # | County | Fac. Carried | Fac. Intersected | Insp. Date |
|---|---|---|---|---|---|
| 17611 | 5159 0300 X | Muskogee | S.H. 100 | ARKANSAS RIVER | 7/14/2023 |

Photograph 32 - Looking north at cross frame connection to girder 2 over pier 12. Note: full-length crack in gusset plate to cross frame connection due to pack rust.

| NBI # | Structure # | County | Fac. Carried | Fac. Intersected | Insp. Date |
|---|---|---|---|---|---|
| 17611 | 5159 0300 X | Muskogee | S.H. 100 | ARKANSAS RIVER | 7/14/2023 |

Photograph 33 - Looking south at cross frame connection to girder 3 over pier 12. Note: crack in gusset plate to cross frame connection due to pack rust.

| NBI # | Structure # | County | Fac. Carried | Fac. Intersected | Insp. Date |
|---|---|---|---|---|---|
| 17611 | 5159 0300 X | Muskogee | S.H. 100 | ARKANSAS RIVER | 7/14/2023 |

Photograph 34 - Looking southwest at the diaphragm connection to girder 1 over pier 9. Note: typical pack rust between bearing stiffener and diaphragm interface up to 3/4 inch thick.

| NBI # | Structure # | County | Fac. Carried | Fac. Intersected | Insp. Date |
|---|---|---|---|---|---|
| 17611 | 5159 0300 X | Muskogee | S.H. 100 | ARKANSAS RIVER | 7/14/2023 |

Photograph 35 - Looking north at the stringer 2 connection to floor beam 4, span 5. Note: bolt on east face is loose and bolt holes punched in wrong location.

| NBI # | Structure # | County | Fac. Carried | Fac. Intersected | Insp. Date |
|---|---|---|---|---|---|
| 17611 | 5159 0300 X | Muskogee | S.H. 100 | ARKANSAS RIVER | 7/14/2023 |

Photograph 36 - Looking southeast at the stringer 3 connection to floor beam 4, span 6. Note: loose bolt stringer connection bolt.

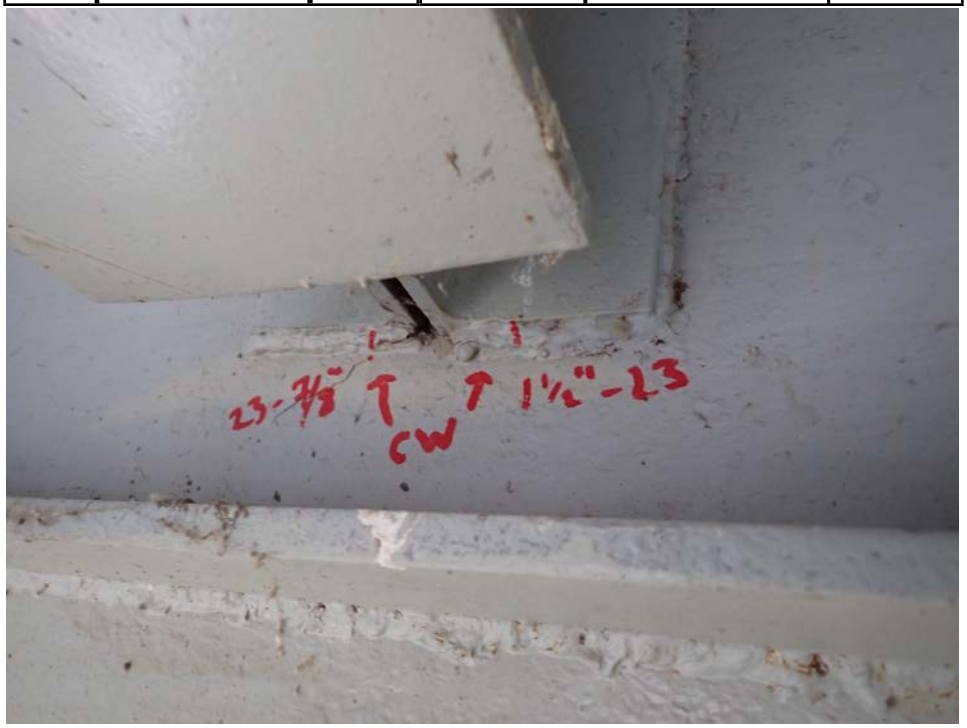
| NBI # | Structure # | County | Fac. Carried | Fac. Intersected | Insp. Date |
|---|---|---|---|---|---|
| 17611 | 5159 0300 X | Muskogee | S.H. 100 | ARKANSAS RIVER | 7/14/2023 |

Photograph 37 - Looking east at the stringer 3 connection to floor beam 4, span 7. Note: one missing stringer connection bolt.

| NBI # | Structure # | County | Fac. Carried | Fac. Intersected | Insp. Date |
|---|---|---|---|---|---|
| 17611 | 5159 0300 X | Muskogee | S.H. 100 | ARKANSAS RIVER | 7/14/2023 |

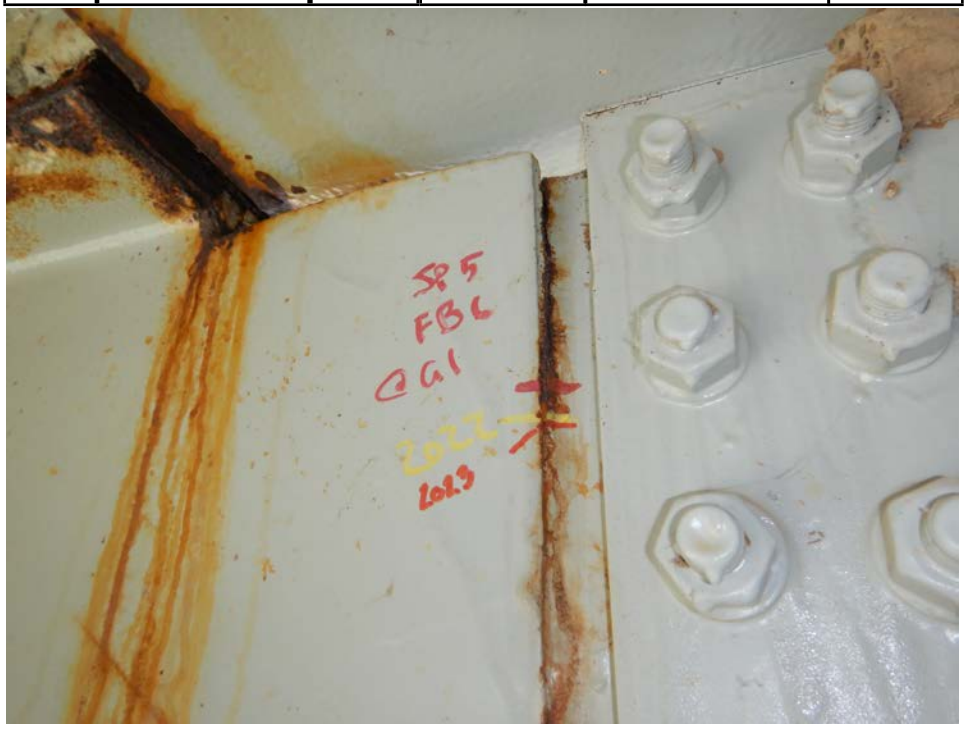
Photograph 38 - Looking west at the stringer 3 connection to floor beam 3, span 5. Note: 3 1/2-inch-long crack along weld on the underside of the stringer connection angles.

| NBI # | Structure # | County | Fac. Carried | Fac. Intersected | Insp. Date |
|---|---|---|---|---|---|
| 17611 | 5159 0300 X | Muskogee | S.H. 100 | ARKANSAS RIVER | 7/14/2023 |




Photograph 39 - Looking west at the stringer 3 connection to floor beam 3, span 7. Note: 1 1/2-inch and 7/8-inch-long cracks in weld on the underside of the stringer connection angles.

| NBI # | Structure # | County | Fac. Carried | Fac. Intersected | Insp. Date |
|---|---|---|---|---|---|
| 17611 | 5159 0300 X | Muskogee | S.H. 100 | ARKANSAS RIVER | 7/14/2023 |




Photograph 40 - Looking east at floor beam 6 connection to girder 1, span 5. Note: 5 1/8-inch vertical crack in connection weld.

| NBI # | Structure # | County | Fac. Carried | Fac. Intersected | Insp. Date |
|---|---|---|---|---|---|
| 17611 | 5159 0300 X | Muskogee | S.H. 100 | ARKANSAS RIVER | 7/14/2023 |

Photograph 41 - Looking east at floor beam 0 lower connection to girder 2 over pier 5. Note: full width crack along the floor beam to gusset plate weld on both faces.

| NBI # | Structure # | County | Fac. Carried | Fac. Intersected | Insp. Date |
|---|---|---|---|---|---|
| 17611 | 5159 0300 X | Muskogee | S.H. 100 | ARKANSAS RIVER | 7/14/2023 |

Photograph 42 - Looking north at floor beam 0 lower connection to girder 2 over pier 5. Note: gusset plate has been reinforced with a diagonal bar, which is now bowing out of plane 1/16 inch.

| NBI # | Structure # | County | Fac. Carried | Fac. Intersected | Insp. Date |
|---|---|---|---|---|---|
| 17611 | 5159 0300 X | Muskogee | S.H. 100 | ARKANSAS RIVER | 7/14/2023 |

Photograph 43 - Looking east at floor beam 1, span 6 connection to girder 1. Note: loose bolts exist in the bottom strut connection to the girder. Several misdrilled holes exist in the connection.

| NBI # | Structure # | County | Fac. Carried | Fac. Intersected | Insp. Date |
|---|---|---|---|---|---|
| 17611 | 5159 0300 X | Muskogee | S.H. 100 | ARKANSAS RIVER | 7/14/2023 |

Photograph 44 - Looking east at floor beam 4 span 6, connection to girder 1. Note: 2 blind holes exist in top of the connection plate of the bottom strut. Pack rust is forming between the vertical stiffener and the connection plate.

| NBI # | Structure # | County | Fac. Carried | Fac. Intersected | Insp. Date |
|---|---|---|---|---|---|
| 17611 | 5159 0300 X | Muskogee | S.H. 100 | ARKANSAS RIVER | 7/14/2023 |

Photograph 45 - Looking east at floor beam 5, span 6 conneciton to girder 2. Note: 2 blind holes at the top of the connection.

| NBI # | Structure # | County | Fac. Carried | Fac. Intersected | Insp. Date |
|---|---|---|---|---|---|
| 17611 | 5159 0300 X | Muskogee | S.H. 100 | ARKANSAS RIVER | 7/14/2023 |

Photograph 46 - Looking east at floor beam 3, span 7 connection to girder 2. Note: 3 loose bolts and 1 missing washer.

| NBI # | Structure # | County | Fac. Carried | Fac. Intersected | Insp. Date |
|---|---|---|---|---|---|
| 17611 | 5159 0300 X | Muskogee | S.H. 100 | ARKANSAS RIVER | 7/14/2023 |

Photograph 47 - Looking northwest at stringer 1 connection to the east face of floor beam 0, span 6.
Note: stringer connection angle has been rewelded along the bottom edge.

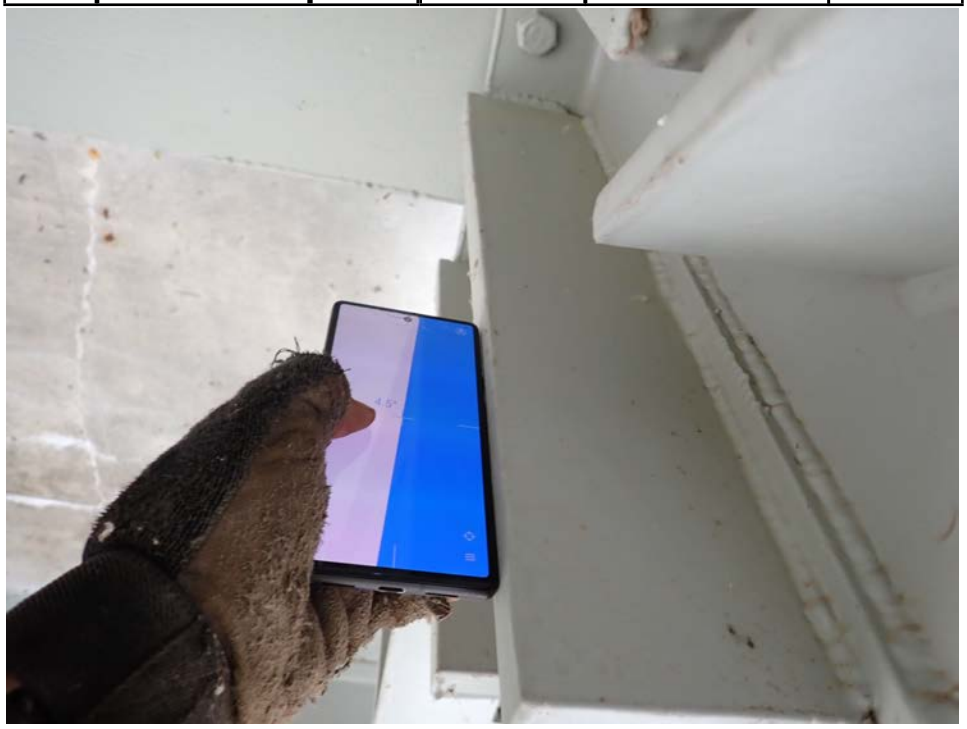
| NBI # | Structure # | County | Fac. Carried | Fac. Intersected | Insp. Date |
|---|---|---|---|---|---|
| 17611 | 5159 0300 X | Muskogee | S.H. 100 | ARKANSAS RIVER | 7/14/2023 |

Photograph 48 - Looking northeast at the floor beam 0 lower strut connection to girder 2, span 7.
Note: 1 1/8-inch-long crack in repair plate weld on the west face, 1/2-inch-long crack on the east face.

| NBI # | Structure # | County | Fac. Carried | Fac. Intersected | Insp. Date |
|---|---|---|---|---|---|
| 17611 | 5159 0300 X | Muskogee | S.H. 100 | ARKANSAS RIVER | 7/14/2023 |

Photograph 49 - Looking south along the top chord of floor beam 1 in span 7 between the stringers. Note: top chord is rotated to the east, kink in upper gusset plate under stringer 3.

| NBI # | Structure # | County | Fac. Carried | Fac. Intersected | Insp. Date |
|---|---|---|---|---|---|
| 17611 | 5159 0300 X | Muskogee | S.H. 100 | ARKANSAS RIVER | 7/14/2023 |



Photograph 50 - Looking northwest at floor beam 5, span 7 under stringer 3. Note: top chord/strut is rotated 4.5 degrees east.

| NBI # | Structure # | County | Fac. Carried | Fac. Intersected | Insp. Date |
|---|---|---|---|---|---|
| 17611 | 5159 0300 X | Muskogee | S.H. 100 | ARKANSAS RIVER | 7/14/2023 |

Photograph 51 - Looking west at the lower lateral bracing connection at the east face of floor beam 7 and girder 2, span 5. Note: 5-inch-long crack in the weld between the bottom angle and the bracing gusset plate.

| NBI # | Structure # | County | Fac. Carried | Fac. Intersected | Insp. Date |
|---|---|---|---|---|---|
| 17611 | 5159 0300 X | Muskogee | S.H. 100 | ARKANSAS RIVER | 7/14/2023 |

Photograph 52 - Looking west at the lower lateral bracing connection to floor beam 12 and girder 2, span 6. Note: 5 3/4-inch-long crack in weld between lower lateral bracing and gusset plate.

| NBI # | Structure # | County | Fac. Carried | Fac. Intersected | Insp. Date |
|---|---|---|---|---|---|
| 17611 | 5159 0300 X | Muskogee | S.H. 100 | ARKANSAS RIVER | 7/14/2023 |

Photograph 53 - Looking southwest at the lower lateral bracing connection to floor beam 1 and girder 2, span 5. Note: bracing is welded along the west edge and end allowing pack rust to form and crack weld at end of bracing.

| NBI # | Structure # | County | Fac. Carried | Fac. Intersected | Insp. Date |
|---|---|---|---|---|---|
| 17611 | 5159 0300 X | Muskogee | S.H. 100 | ARKANSAS RIVER | 7/14/2023 |

Photograph 54 - Looking southeast at the lower lateral bracing hanger rod in span 6, between floor beams 5 and 6. Note: missing clamp to stringer bottom flange.

| NBI # | Structure # | County | Fac. Carried | Fac. Intersected | Insp. Date |
|---|---|---|---|---|---|
| 17611 | 5159 0300 X | Muskogee | S.H. 100 | ARKANSAS RIVER | 7/14/2023 |

Photograph 55 - Looking southeast at span 6, lower lateral bracing crossbuck connection between floor beams 10 and 11. Note: 2 cracked welds on northeast member due to pack rust.

| NBI # | Structure # | County | Fac. Carried | Fac. Intersected | Insp. Date |
|---|---|---|---|---|---|
| 17611 | 5159 0300 X | Muskogee | S.H. 100 | ARKANSAS RIVER | 7/14/2023 |

Photograph 56 - Looking southeast at span 7, lower lateral bracing crossbuck connection between floor beams 3 and 4. Note: cracked weld on southeast member due to pack rust.

| NBI # | Structure # | County | Fac. Carried | Fac. Intersected | Insp. Date |
|---|---|---|---|---|---|
| 17611 | 5159 0300 X | Muskogee | S.H. 100 | ARKANSAS RIVER | 7/14/2023 |

Photograph 57 - Looking northeast at the east abutment. Note: deck drainage leaking on bearing seat. Minor spall along bottom edge of breastwall between girders 2 and 3. 18 inches of penetration noted between girders 2 and 3 with no significant undermining noted vertically.

| NBI # | Structure # | County | Fac. Carried | Fac. Intersected | Insp. Date |
|---|---|---|---|---|---|
| 17611 | 5159 0300 X | Muskogee | S.H. 100 | ARKANSAS RIVER | 7/14/2023 |

Photograph 58 - Looking south at girder 4, span 1 at the west abutment. Note: backwall is leaning towards the channel with 4 7/8 inches clear to the girder end near the top flange and 7 inches clear near the bottom flange.

| NBI # | Structure # | County | Fac. Carried | Fac. Intersected | Insp. Date |
|---|---|---|---|---|---|
| 17611 | 5159 0300 X | Muskogee | S.H. 100 | ARKANSAS RIVER | 7/14/2023 |

Photograph 59 - Looking south at girder 4, span 15 at the east abutment. Note: backwall is leaning towards the channel with 1 1/8 inches clear to the girder end near the top flange and 3 1/4 inches clear near the bottom flange.

| NBI # | Structure # | County | Fac. Carried | Fac. Intersected | Insp. Date |
|---|---|---|---|---|---|
| 17611 | 5159 0300 X | Muskogee | S.H. 100 | ARKANSAS RIVER | 7/14/2023 |

Photograph 60 - Looking southwest at the west abutment. Note: light accumulation of spalled concrete and debris on bearing seat.

| NBI # | Structure # | County | Fac. Carried | Fac. Intersected | Insp. Date |
|---|---|---|---|---|---|
| 17611 | 5159 0300 X | Muskogee | S.H. 100 | ARKANSAS RIVER | 7/14/2023 |

Photograph 61 - Looking north at pier 1 cap east edge near girder 3. Note: 5-foot-long corner spall/delamination.

| NBI # | Structure # | County | Fac. Carried | Fac. Intersected | Insp. Date |
|---|---|---|---|---|---|
| 17611 | 5159 0300 X | Muskogee | S.H. 100 | ARKANSAS RIVER | 7/14/2023 |

Photograph 62 - Looking north at pier 4 pier cap south end span 5. Note: scaling concrete around the girder 1 bearing.

| NBI # | Structure # | County | Fac. Carried | Fac. Intersected | Insp. Date |
|---|---|---|---|---|---|
| 17611 | 5159 0300 X | Muskogee | S.H. 100 | ARKANSAS RIVER | 7/14/2023 |

Photograph 63 - Looking west at pier 4, south column at the web wall interface. Note: cracking/spalling with efflorescence.

| NBI # | Structure # | County | Fac. Carried | Fac. Intersected | Insp. Date |
|---|---|---|---|---|---|
| 17611 | 5159 0300 X | Muskogee | S.H. 100 | ARKANSAS RIVER | 7/14/2023 |

Photograph 64 - Looking east at pier 5. Note: patched area and spall with exposed reinforcing steel in cap due to deck drainage passing through previous deck control joint.

| NBI # | Structure # | County | Fac. Carried | Fac. Intersected | Insp. Date |
|---|---|---|---|---|---|
| 17611 | 5159 0300 X | Muskogee | S.H. 100 | ARKANSAS RIVER | 7/14/2023 |

Photograph 65 - Looking north at the end of the pier 14 cap. Note: spalling and delaminations throughout the top of the cap.

| NBI # | Structure # | County | Fac. Carried | Fac. Intersected | Insp. Date |
|---|---|---|---|---|---|
| 17611 | 5159 0300 X | Muskogee | S.H. 100 | ARKANSAS RIVER | 7/14/2023 |

Photograph 66 - Looking west at girder 1, pier 3 bearing. Note: fixed bearing anchor bolts are bent.

| NBI # | Structure # | County | Fac. Carried | Fac. Intersected | Insp. Date |
|---|---|---|---|---|---|
| 17611 | 5159 0300 X | Muskogee | S.H. 100 | ARKANSAS RIVER | 7/14/2023 |

Photograph 67 - Looking southwest at the girder 1, pier 5 fixed bearing. Note: anchor bolt lifted and nuts not fully seated.

| NBI # | Structure # | County | Fac. Carried | Fac. Intersected | Insp. Date |
|---|---|---|---|---|---|
| 17611 | 5159 0300 X | Muskogee | S.H. 100 | ARKANSAS RIVER | 7/14/2023 |

Photograph 68 - Looking northeast at girder 2 fixed bearing at pier 8. Note: missing anchor bolt.

| NBI # | Structure # | County | Fac. Carried | Fac. Intersected | Insp. Date |
|---|---|---|---|---|---|
| 17611 | 5159 0300 X | Muskogee | S.H. 100 | ARKANSAS RIVER | 7/14/2023 |

Photograph 69 - Looking west at the girder 4, span 1 expansion bearing at the west abutment. Note: south keeper plate attached to the sole plate is missing and the bearing has moved south 1/2 inch with no significant lateral movement since the last painting.

| NBI # | Structure # | County | Fac. Carried | Fac. Intersected | Insp. Date |
|---|---|---|---|---|---|
| 17611 | 5159 0300 X | Muskogee | S.H. 100 | ARKANSAS RIVER | 7/14/2023 |

Photograph 70 - Looking south at the girder 1, span 10 expansion bearing at pier 10. Note: misalignment between the rocker and masonry plate with the rocker overhanging the masonry plate 1/4 inch.

| NBI # | Structure # | County | Fac. Carried | Fac. Intersected | Insp. Date |
|---|---|---|---|---|---|
| 17611 | 5159 0300 X | Muskogee | S.H. 100 | ARKANSAS RIVER | 7/14/2023 |

Photograph 71 - Looking south at the girder 1, span 7 expansion bearing at pier 7. Note: bearing in expansion 3 degrees at 96F.

| NBI # | Structure # | County | Fac. Carried | Fac. Intersected | Insp. Date |
|---|---|---|---|---|---|
| 17611 | 5159 0300 X | Muskogee | S.H. 100 | ARKANSAS RIVER | 7/14/2023 |

Photograph 72 - Looking north at the girder 1, span 10 expansion bearing at pier 10. Note: bearing is rocked 5 degrees in contraction at 77 F.

| NBI # | Structure # | County | Fac. Carried | Fac. Intersected | Insp. Date |
|---|---|---|---|---|---|
| 17611 | 5159 0300 X | Muskogee | S.H. 100 | ARKANSAS RIVER | 7/14/2023 |

Photograph 73 - Looking southeast at the west approach slab in the eastbound lane. Note: longitudinal crack running the full length of the slab with intersecting transverse cracks.

| NBI # | Structure # | County | Fac. Carried | Fac. Intersected | Insp. Date |
|---|---|---|---|---|---|
| 17611 | 5159 0300 X | Muskogee | S.H. 100 | ARKANSAS RIVER | 7/14/2023 |

Photograph 74 - Looking southeast at the west approach roadway. Note: 7 1/2-inch diameter filled core hole exists in the westbound lane approximately 40 feet from the west abutment.

# Oklahoma Dept. of Transportation - Bridge Inspection Report

| NBI No.: | Structure No.: | Local ID: | Suff. Rating: | |
|---|---|---|---|---|
| 17611 | 5159 0300 X | -1 | 66.70 | ND |

## IDENTIFICATION

**Bridge Description:**

4(100ft.CONT.)
(207ft.-334ft.-207ft.CONT.)3(100ft.CONT.)4(100ft.CONT.)75ft. PLATE

1. State: Oklahoma
2. Division: Division 1
3. County: MUSKOGEE
4. City: Unknown
Admin Area: Unknown
5a. On/Under: Route On Structure
5b. Kind of Hwy: State Hwy
5c. Lvl of Srvc: Mainline
5d. Route No.: 00100
5e. Dir. Sufx: N/A (NBI)
7. Facility Carried S.H. 100
6. Feat. ARKANSAS RIVER
9. SEQUOYAH C/L
11. Mile Post: 2.999 mi
13. LRS / Sub Rte: -1 / -1
16. Latitude: 35° 31' 14.59"
17. Longitude: 095° 07' 24.89"
98. Border Unknown (P)
% Responsible: 0.00
99. Border Brdg #: Unknown

## INSPECTION

| Type | Insp. Req. | Insp. Done | Freq. | Insp. Date | Next Insp. |
|---|---|---|---|---|---|
| NBI: | | 1 | 24 months | 7/14/2023 | 07/14/2025 |
| FC: | Y | 1 | 24 months | 7/14/2023 | 7/14/2025 |
| UW: | Y | 0 | 60 months | 10/14/2022 | 10/14/2027 |
| OS: | Y | 0 | 24 months | 7/12/2022 | 7/14/2024 |

## CLASSIFICATION

12.Base Hwy Net.: Not on Base Network
20. Toll Facility: On free road
21. Custodian: State
22. Owner: State
26. Function Class: 07 Rural Mjr Collecto
37. Historical Sig.: Not eligible for NRHP
100. Def. Hwy: Not a STRAHNET hwy
101. Parallel Str.: No || bridge exists
102. Traffic Dir.: 2-way traffic
103. Temp. Str.: Not Applicable (P)
104. Hwy System: Not on NHS
105. Fed Land Hwy: IRR-Indian Res Rd
110. Defense Hwy: Not a STRAHNET hwy
112. NBIS Length: Long Enough

## STRUCTURE TYPE AND MATERIALS

43a/b. Main Span: Steel Cont. / Girder-Floorbeam
44a/b. Appr. Span: Steel / Stringer/Girder
45. # of Main Spans: 3
46. # of Appr. Spans: 11
107. Deck Type: Concrete-Cast-in-Place
108a. Wearing Surface: Epoxy Overlay
108b. Membrane: None
108c. Deck protection: Unknown

## CONDITION

58.Deck: 6 Satisfactory
59.Sup.: 5 Fair
60.Sub: 6 Satisfactory
62.Culvert: N/A (NBI)
61.Chan./Chan. Prot.: 6 Bank Slumping

**Flowline Notes:**

There has been general scour ranging from 5-ft to15-ft, west of Pier 8 since construction. The top of the footing at Piers 4, 5, 6, 8 and 9 are exposed;

## AGE AND SERVICE

19. Detour Length: 9.9 mi
27. Year Built: 1969
28a/b. Lanes on/und: 2 / 0
29. ADT: 3,300
30. Year of ADT: 2020
106. Year Reconst,:
109. Truck ADT: 15%
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 11/24/2003
63.Op / 65.Inv. Rating Meth.: 1 LF Load Factor / 1 LF Load Factor

| | H | HS | 3-3 | EV3 | SHV |
|---|---|---|---|---|---|
| 64. Operating Rating (tons): | 33.29 | 54.45 | 75.84 | 0.00 | 0.00 |
| 66. Inventory Rating (tons): | 19.95 | 32.63 | 45.53 | -1.00 | |

## GEOMETRIC DATA

10. Vert. Clearance: 99.99 ft
32. Appr Rwy Width: 44.00 ft
33. Median: No median
34. Skew: 0.00°
35. Struct. Flared: No flare
47Horizontal Clr: 28.00 ft
48. Length Max Span: 333.99 ft
49. Struct. Length: 1,928.15 ft
50a. Curb/Sdwlk Width L: 1.50 ft
50b. Curb/Sdwlk Width R: 4.00 ft
51. Width Curb to Curb: 28.00 ft
52. Width Out to Out: 35.30 ft
Deck Area: 68,060.89 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: 0.00 ft
56. Min.Lat.Underclr. L: 0.00 ft

## APPRAISAL

36a. Brdg Rail: 0 Substandard
36b. Transition: 1 Meets Standards
36c. Appr. Rail: 1 Meets Standards
36d. Appr.Rail Ends: 1 Meets Standarc
67. Str Evaluation: 5 Above Min Tolera
68. Deck Geom.: 4 Tolerable
69. Vert./Horiz. Undclr: Not applicable (NB
71. Waterway Adeq: 8 Equal Desirable
72. Appr. Alignment: 6 Equal Min Criteria
113. Scour Critical: 8 Stable Above Footin

## PROPOSED IMPROVEMENT

94. Bridge Cost: $11,530,195
95. Roadway Cost: $4,500,000
96. Total Cost: $16,937,565
97. Yr.of Cost Est.: 2015
75. Type of Work: 31 Repl-Load Capacity
76. Lngth of Improvement: 1,928.1 ft
114. Future ADT: 5,280
115. Yr.of Future ADT: 2040

## 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: 99
200d. Weather: Clear
201. Struc.Stl. ASTM Desig.: A-36 / -1
202. Waterprf.Membrane: -1
Date Installed: 01/01/1901
203. Type Exp. Device: Finger
204. Type of Railing: PTR-1 (square hand rail)
205. Material Quantity: -3.00
208a. Type of Abutment: Skeleton
b. Type of Found.: Steel Piling
209. Type of Pier/Found.: 2 / No
Spread Footing
210. Foundation Elev.: 4,402.00 | 4,352.00 | -1.00 | 4,400.00 | -1.00
211. Wear.Surf.Prot.Sys: None
Date Installed: 01/01/1901
211c. Silane Reapplied
211d. Date :
213. Utilities Attached: Communication | Natural Gas | Power

214a. Posted Weight Limit: NR
b. Posted Speed Limit:
c. Narrow/1way Brdg Sign: NA
d. Vertical Clr. Sign: NA
Adv. Warning Sign: NA
e. Navigation Lights?: Yes
Working/Not Working: Yes
215. Overpass: STATE HIGHWAY
218. Functionally Obsolete : -
220. Bridge Redecked
221. Substr.Cond.(U/W): Satisfactory Condition
222. Fill Over RCB: 0
223. Appr.Slab/Rwy Cond.: 2
225. Paint Type/Ovrct: Organic Zinc(OZ-E-U) Gra
N/A
226. Date Painted: 2010
227. Paint Color: Gray
233. Deck Forming:
238. School Bus Rte.: Current & Desired route
240. Appr. Rwy Type.: Concrete
243. Grdr Spacing/No.: /

244. Span Lengths: 100 | 100 | 100 | 100 | 207 | 334 | 207 | 100
245. Girder Depth:
246a. Type of Ovelay: Chipseal
b. Overlay Thickness: 0.10
c. Overlay Date: 05/01/2014
d. Ovly Depth Changed >1": N
247. Protective Systems:
248. # Field Splices w/ Corrosion: 3
249. Scour Crit. POA Exists?:
250. Headwall:
258. Plans w/Found.in ODOT File
259. Scour Eval. in ODOT File:
263. Interchange at Intersection: No
264. Interstate Milepoint:

# Oklahoma Dept. of Transportation - Bridge Inspection Report

| NBI No.: | Structure No.: | Local ID: | Suff. Rating: | |
|---|---|---|---|---|
| 17611 | 5159 0300 X | -1 | 66.70 | ND |

Inspection Date: 7/14/23 Shaun Fillmore

Invoice No.: 1098920 Inspected With: Colton Powell

Shaun Fillmore Digitally signed by Shaun Fillmore
Date: 2023.10.09 07:40:36 -05'00'

**BRIDGE NOTES:**

15 span structure consisting of: Spans 1-4 100-foot long continuous steel multi girders spans; Spans 5-7 three span continuous steel twin girders (207 feet, 334 feet, 207 feet); Spans 8-10 three 100-foot long continuous steel multi girders spans; Spans 11-14 four 100-foot long continuous steel multi girders spans; Span 15 100-foot long simple steel multi girder span.

O/S Inspection items include:

- Girder web cracks at:
  - Span 5, G 1 (south face) between FBs 4 and 5 – 1 1/4-inch paint crack in web at the longitudinal stiffener cored hole (perform Magnetic Particle Testing during 2022 O/S inspection)
  - Span 5, G 1 at the field splice near FB 5 – 5/8-inch crack with no arrestor hole.
  - Span 5, G 2 at the field splice near FB 5 – paint crack.
  - Span 6, G 1 at the field splice near FB 3 – arrested crack.
  - Span 6, G 2 near FB 11 – 3/16-inch crack.
  - Span 7, G 1 at the field splice near FB 4 – paint crack.
  - Span 7, G 2 at the field splice near FB 4 – arrested crack.
- Cracks in the stringer connection angles welds to replaced FBs at:
  - Span 5, stringer 3 connection to FB 3
  - Span 7, stringer 1 connection to FB 0
  - Span 7, stringer 3 connection to FB 0
- Crack on exterior face of span 15, beam 1 in near pier 14.
- Cracked FB to girder connection welds:
  - Span 5, FB 6 upper connection to G 1 – 5 1/8-inch crack in connection plate weld.
  - Span 6, FB 0 lower connection to G 2 – horizontal weld cracked full length.
  - Span 7, FB 0 lower connection to G 2 – 1 1/8-inch and 1/2-inch cracks in welded repair.

**INSPECTION NOTES:** **7/14/23**

Channel Notes: The channel in the vicinity of the bridge has a slight bend and is well aligned with the piers. There are spur dikes on the east bank (outside of the bend), approximately 450-ft, 1400-ft, and 2700-ft upstream of the bridge.. Both embankments are protected with dense vegetation. The embankments appear stable. There is light to moderate timber debris on the channel bottom at Piers 3, 4, 7, 8, 9, and 10; however, there are no significant restrictions to flow at the bridge. The channel bottom material at the piers consists of sand, gravel, and rock.

UW Inspection General Notes: The submerged portions of the substructure are in satisfactory condition. There is light abrasion on the columns and webwalls ranging from 1/16-in deep to 1/8-in deep and algae growth.

PX.

- Replace N railing post anchor bolts missing at eastern most railing post.
- Unclog deck scuppers.
- Reseal fixed poured joint seal at both abutments.
- Arrest girder web cracks at horizontal splice termination at:
  - Span 5, G 1 at field splice near FB 5 – 5/8 inch.
  - Span 6, G 2 near FB 11 – 3/16-inch-long vertical crack in lower web plate.
- Replace missing bolts and tighten loose bolts at
  - Girder splice locations
  - FB connection to girders in spans 5, 6 and 7.
  - Stringer connection to FBs in spans 5, 6 and 7.
- Repair cracked web connection plate weld for FB 6 in span 5 at G 1.
- Reattach FB 0 lower connection to G 2 in span 6.
- Repair cracks in lower lateral bracing in span 5, FB 7, G 2 and span 6, FB 12, G 2.
- Tighten loose anchor bolts and replace missing or bent anchor bolts.

FX – Monitor.

- Monitor deck soffit along girders, FBs and stringers for further spalling.
- Monitor vertical offset of finger joints for changes in height at piers 4 and 7.
- Monitor locations of girder web cracks having drilled hole retrofits or paint cracks at horizontal splice termination at:
  - Span 5, G 2 at field splice near FB 5 – paint crack.
  - Span 6, G 1 at field splice near FB 3 – arrested crack.
  - Span 7, G 1 at field splice near FB 4 – paint crack.
  - Span 7, G 2 at field splice near FB 4 – arrested crack.
- Monitor 1 1/4-inch long paint crack in span 5, G 1 web at longitudinal stiffener cored hole between FBs 4 and 5 (Magnetic Particle Testing to be performed during 2022 O/S inspection).
- Monitor cored hole locations in longitudinal stiffeners for crack development in girder web.
- Monitor bow in web of G 1, span 7 at field splice between FBs 3 and 4.
- Monitor cracked welds at cross frame connection to girders due to pack rust.
- Monitor cracks at stringer connection angles at:
  - Span 5, stringer 3 connection to FB 3
  - Span 7, stringer 1 connection to FB 0
  - Span 7, stringer 3 connection to FB 0
- Monitor welded connections at recently replaced FBs.

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**ELEMENT CONDITION STATE DATA**

| Elem. / Env | Description | Unit | Total Qty | % 1 | Qty. 1 | % 2 | Qty. 2 | % 3 | Qty. 3 | % 4 | Qty. 4 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 12 / 1 | Re Concrete Deck | sq.ft | 53,984.00 | 0% | 0.00 | 100% | 53,984.00 | 0% | 0.00 | 0% | 0.00 |

PX – Minor to moderate debris along curbs. The deck scupper in span 10 near pier 10 is clogged. Several additional scuppers are partially clogged with vegetation.
Isolated shallow spalls exist in the deck.
Longitudinal cracks exist along the deck surface, mostly in the wheel lines.
Transverse cracks spaced at 1 to 3 feet exist on the surface randomly along the full length of the bridge. Cracks are widest and most prominent in the twin girder spans.
Deck patches exist from a prior rehabilitation. The deck patches are functioning as intended.

Note: The deck is being coded CS2 (Soffit CS3) due to areas of the deck being visible due to the deterioration of the wearing surface.

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|---|---|---|---|---|---|---|---|---|---|---|---|
| *510 / 1* | Wearing Surfaces | sq.ft | 53,984.00 | 60% | 32,391.00 | 35% | 18,894.00 | 5% | 2,699.00 | 0% | 0.00 |

Epoxy grit overlay (installed 2014) failing in patches throughout the deck, mostly along the wheel lines.

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|---|---|---|---|---|---|---|---|---|---|---|---|
| 107 / 1 | Steel Opn Girder/Beam | ft | 4,780.00 | 82% | 3,900.00 | 10% | 478.00 | 8% | 402.00 | 0% | 0.00 |

Fracture Critical twin girder spans exist in spans 5 through 7 and have the following comments:
Cracks at horizontal web splice terminations at:
PX – Span 5, G 1 near FB 5 – 5/8 inch, not arrested.
FX – Span 5, G 2 near FB 5 – 3/8 inch (likely paint crack).
FX – Span 6, G 1 near FB 3 – 3/4 inch, arrested with two holes.
PX - Span 6, G 2 near FB 11 – 3/16 inch, not arrested.
FX – Span 7; G 1 near FB 4 – 1 inch and 1 1/8 inch (likely paint cracks) in girder web at toe of longitudinal stiffener.
FX – Span 7; G 2 near FB 4 – Two vertical cracks arrested with drilled hole retrofits.
PX – Missing or loose bolts at:
Span 5, G 2 near FB 5.
Span 6, G 1 top interior top flange.
Span 6, G 1 interior face horizontal splice at pier 6
Span 6, G 2 exterior face top and bottom flanges near FB 3.
Span 6, G 2 exterior face horizontal splice near FB 12.
Span 7, G 1 exterior face horizontal splice near FB 3.
FX – A global bow up to 1/2 inch exists in the web of G 1; span 7 between FB 3 and 4 at the field splice.
1/8-inch pack rust between top flanges and deck is common.
FX – Cracks (retrofitted) at longitudinal stiffener butt welds at:
Span 5; G 1 between FB 4 and 5. A paint crack has formed along the girder web.
Span 6; G 1 near FB 6
Span 6; G 1 near FB 7
Span 6; G 1 near FB 9
Span 6; G 2 near FB 9
Span 7; G 2 between FB 7 and 8
Painted over pitting was observed in the web of the girders adjacent to the top of lower lateral bracing gusset plates.
Pack rust (1/2 inch) between horizontal web splice causing distortion at several locations.
Pack rust (5/16 inch) at bottom flange splice plates.
Heavy laminating corrosion was noted at the girder horizontal web splices at the bearing stiffeners over piers 5 and 6. G 2 over pier 6 also has up to 50% section loss to 4 of 6 bolts.
Pack rust (3/16 inch) in girder top flange at deck joints.
One missing bolt was noted at the FB 2 connection to G 1; span 7.

Multi girder spans exist in spans 1 through 4 and 8 through 15 and have the following comments:
FX – Isolated CF top struts exhibit cracked welds between the CF and gusset plate due to pack rust. The following locations exhibited cracks:
CF at pier 1 to G 3 – 5 3/8 inch.
CF at pier 3 to G 4 – 1/4 inch.
CF at pier 4 to G 1, span 4 – 1/4 inch.
CF at pier 12; connection to G 2 – full length of gusset plate.
Pack rust (1 1/4 inches) typical between CF members and vertical web stiffeners. Minor to moderate pitting and distortion to the gusset plate also present at these locations.
Girder cross frames between G 1; 2 and 3 at pier 9 and pier 10 exhibits a 3-inch bow, most likely due to the bearing rehabilitation project.
Vertical crack (1 3/4 inch) in bearing stiffener fillet weld at exterior face of G 1, span 15 at pier 14.

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|---|---|---|---|---|---|---|---|---|---|---|---|
| *515 / 1* | Steel Protective Coating | sq.ft | 140,000.00 | 0% | 0.00 | 100% | 140,000.00 | 0% | 0.00 | 0% | 0.00 |

Painted in 2010. Areas of previous corrosion and pack rust are reactivating in many locations especially at gusset plates near the expansion joints. Pack rust is active in many girder horizontal web splices. Previous PX of laminating corrosion and pack rust at lower lateral bracing gusset plates were repaired prior to the 2014 OS although corrosion is reactivating in isolated locations.

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|---|---|---|---|---|---|---|---|---|---|---|---|
| 113 / 1 | Steel Stringer | ft | 1,914.00 | 97% | 1,850.00 | 3% | 50.00 | 1% | 14.00 | 0% | 0.00 |

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PX – Loose stringer connection bolts between connection angle and FB web at:
Span 5, stringer 2 at FB 4 – 1 loose bolt
Span 5, stringer 3 at FB 4 – 1 loose bolt
Span 5, stringer 3 at FB 8 – 1 loose bolt
Span 6, stringer 1 at FB 3 – 4 loose bolts
Span 6, stringer 2 at FB 3 – 1 loose bolt
Span 6, stringer 3 at FB 4 – 1 loose bolt
Span 6, stringer 1 at FB 5 – 2 loose bolts
Span 6, stringer 1 at FB 6 – 2 loose bolts
Span 6, stringer 2 at FB 6 – 1 loose bolt
Span 6, stringer 3 at FB 6 – 3 loose bolts
Span 6, stringer 3 at FB 8 – 3 loose bolts
Span 6, stringer 1 at FB 11 – 5 loose bolts
Span 6, stringer 1 at FB 12 – 1 loose bolt
Span 7, stringer 3 at FB 4 – 1 loose bolt
Multiple stringers have mis-drilled holes in bottom flange at FB connections.

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|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 152 / 1 | Steel Floor Beam | ft | 891.00 | 57% | 508.00 | 22% | 200.00 | 21% | 183.00 | 0% | 0.00 |

The FBs in spans 5 through 7 act as trusses.
PX – FB 6; span 5 at G 1 has 5 1/8-inch crack in weld for upper connection plate.
PX – FB 0; span 6 at G 2 cracked full length of bottom weld and full height of vertical weld.
PX – Span 5; west face of FB 6 at G 1, weld for the web connection plate cracked 4 1/2 inches.
PX – Loose and misaligned bolts exist in the FB to G connections at several locations.
FX – FBs replaced at FB 3 span 5; FB 0 span 6; and FB 0 span 7 with welds having irregular contour.
Previous repair to FB 0 at G 2 span 7 was reattached via welded plate and has 1 1/8-inch and 1/2-inch cracks in welds.
Several kinks and bends in FB members and gusset plates.
Span 6, U3L2 of FB 2 has several shallow gouges 3/8 inch deep in the bottom flange.
FB 4; span 6 exhibits two mis-drilled holes in the bottom flange under stringer 3.
Oversized holes exist randomly throughout the FBs.
Span 6, FB 6 top flange has 14-inch by 1-inch corrosion hole with adjacent knife edging.
Several FBs exhibit surface corrosion along top flange and deck pumping.
Corrosion of flanges and 1/8 inch pitting on bottom face of top flange.

FLOOR BRACING SYSTEM
PX – Span 5 LLB at G 2; east face of FB 7 has 5-inch crack in weld to gusset plate.
PX – Span 6 LLB at G 2; east face of FB 12 has 5 3/4-inch crack in weld to gusset plate.
LLB hanger rods are severed or missing backet to stringer in several locations.
Span 6 LLB between FBs 3 and 4 has 1 inch pack rust causing the bracing to rotate.
A 5-inch by 2-inch corrosion hole exists through LLB gusset plate at the edge of the FB 6 stiffener to G 1; span 7.

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|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 205 / 1 | Re Conc Column | each | 26.00 | 88% | 23.00 | 0% | 0.00 | 12% | 3.00 | 0% | 0.00 |

North column of pier 4 exhibits cracking with efflorescence on east face .
Column of pier 6 exhibits random full height vertical cracks with light efflorescence and full width spalling with exposed reinforcement at the cross-section change near the waterline.
North column of pier 8 exhibits multiple spalls with exposed reinforcement.

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| 215 / 1 | Re Conc Abutment | ft | 80.00 | 0% | 0.00 | 98% | 78.00 | 3% | 2.00 | 0% | 0.00 |

E abutment slope protection covered in vines and vegetation. The bottom of the abutment breastwall is exposed due to prior erosion, no piles observed.
Bottom of breastwalls at both abutments are exposed up to 2 inches high and 4 feet wide at ends with up to 30 inches of penetration.
Both abutments appear to be moving towards the channel. Both abutments are supported on vertical piles which are susceptible to movement from soil pressure acting behind the abutments.
The east abutment exhibits a 7-foot wide patched area between girders 2 and 3 and a horizontal crack with rust staining near the girder 3 pedestal.

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|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 234 / 1 | Re Conc Pier Cap | ft | 594.00 | 71% | 424.00 | 20% | 120.00 | 8% | 50.00 | 0% | 0.00 |

Pier 1 - Spall in edge near girder 3 seat.
Pier 2 - 3/16-inch crack along east and west edges near G 2 with adjacent delamination in top face.
Pier 3 - 1/16-inch cracks on the top face with large delaminated areas. The web wall has multiple shallow spalls with exposed reinforcing in the west face.
Pier 4 - spalls and scaling exposing corroded reinforcing steel in the bearing seat areas and in west face over north column; Scaling (1/8 inch deep) around G 1 bearing, span 5.
Pier 5 - West face at interface with the column exhibits multiple exposed and corroding reinforcing steel ends ; random hairline shrinkage cracks and isolated areas of small delaminations.
Pier 7 - map cracks in the patched areas and spalling with exposed reinforcement around the base of north column.
Pier 8 - 1/16-inch x 5-foot longitudinal cracks along the west and east top edges at G 1 and G 2 and delaminated concrete. Cracking and delaminations are due to corrosion of the reinforcing steel.
Pier 13 - longitudinal cracks along the edges under G 1 and G 2.
Pier 14 - 1/16-inch cracks in top face with large delaminated areas. Spalling and scaling concrete with exposed corroded reinforcing steel exists in the bearing seat areas and on the south face.

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|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 310 / 1 | Elastomeric Bearing | each | 12.00 | 100% | 12.00 | 0% | 0.00 | 0% | 0.00 | 0% | 0.00 |

Previous rocker bearings for span 4 at pier 4, span 8 at pier 7; and span 11 at pier 10 have been replaced with elastomeric bearings

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|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 311 / 1 | Moveable Bearing | each | 30.00 | 0% | 0.00 | 87% | 26.00 | 13% | 4.00 | 0% | 0.00 |

Typically exhibit rust staining and active laminating corrosion between the rocker and the masonry plate .
Keeper plates broken free or have cracked welds at sole plate for G 3 and G 4 at west abutment.
Pier 10, G1 rocker has rotated about vertical axis with SW corner overhanging masonry plate 1/4 inch.

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|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 313 / 1 | Fixed Bearing | each | 30.00 | 0% | 0.00 | 93% | 28.00 | 7% | 2.00 | 0% | 0.00 |

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PX - Bearing anchor bolts are loose with some working up out of bearing seat at multiple locations.
Typically exhibit surface corrosion forming with minor pack rust developing .

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|---|---|---|---|---|---|---|---|---|---|---|---|
| **321 / 1** | Re Conc Approach Slab | sq.ft | 2.00 | 50% | 1.00 | 50% | 1.00 | 0% | 0.00 | 0% | 0.00 |

Both approach slabs have been recently replaced. The east approach slab exhibits up to 0.020 inch wide longitudinal cracking in the wheel lines.
A spall measuring 2 feet by 6 inches exists along the east abutment joint.

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|---|---|---|---|---|---|---|---|---|---|---|---|
| **330 / 1** | Metal Bridge Railing | ft | 3,856.00 | 95% | 3,651.00 | 5% | 200.00 | 0% | 5.00 | 0% | 0.00 |

PX – Easternmost rail post along the north barrier at the end of the east approach slab is missing all four anchor bolts.
Spalls exist in the sidewalk of span 5 near piers 4 and 5.
West termination of the north bridge rail is missing one rail post and multiple blockouts of the northeast approach railing are twisted / damaged.
South bridge rail in span 7 near FB 7 exhibits corrosion holes through the steel tube.
In span 10; the south metal rail near FB 3 has minor impact damage.

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|---|---|---|---|---|---|---|---|---|---|---|---|
| *919 / 1* | St.(Rail) Prot. Coat | sq.ft | 9,260.00 | 0% | 0.00 | 100% | 9,260.00 | 0% | 0.00 | 0% | 0.00 |

Isolated areas of the painted coating to the steel railing exhibit peeling paint due to adhesion failure between the top and intermediate coats. Areas of corrosion are beginning to bleed through.

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|---|---|---|---|---|---|---|---|---|---|---|---|
| **331 / 1** | Re Conc Bridge Railing | ft | 3,856.00 | 100% | 3,856.00 | 0% | 0.00 | 0% | 0.00 | 0% | 0.00 |

The steel bridge railing has recently been painted and the concrete bridge railing has recently been skim coated. Isolated areas of the concrete rail exhibit minor cracking.
Minor debris exists along the toe of both the north and south barriers.
The curbs exhibit active vertical cracks and small spalls with exposed reinforcing due to insufficient cover .
Tapered concrete curbs have been installed at both approaches to address blunt impact potential .

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|---|---|---|---|---|---|---|---|---|---|---|---|
| **859 / 1** | Soffit | each | 1.00 | 0% | 0.00 | 0% | 0.00 | 100% | 1.00 | 0% | 0.00 |

FX – Isolated spalls, 4 to 6SF and up to 3/4 inch deep with exposed reinforcing steel.
FX – Shallow spalls common along top flange of girders, floor beams, and stringers. Isolated locations have spalls up to 1 foot wide with exposed corroding reinforcing steel.
Deck lifting from girders and floor beams at isolated locations due to pack rust.
Multiple 1/4-inch-wide cracks exist along the stringer deck haunch at locations in span 6 where stringers are not continuous over FBs.
Transverse cracks with efflorescence throughout , heaviest within 3 floor beams/diaphragms of the piers and spaced at 5 feet.
Shrinkage and hairline map cracking is common throughout.
Many scuppers in the main spans are filled with foam installed during the recent deck overlay installation.

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| **865 / 1** | St.Open Gird End(5Ft | ft | 180.00 | 78% | 140.00 | 22% | 40.00 | 0% | 0.00 | 0% | 0.00 |

Active corrosion was noted at the girder horizontal web splices at the bearing stiffeners over piers 5 and 6.
Pack rust and section loss up to 3/16-inch deep exists in the girder top flanges at several of the deck joints.

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|---|---|---|---|---|---|---|---|---|---|---|---|
| **870 / 1** | Concrete Wingwall | each | 4.00 | 100% | 4.00 | 0% | 0.00 | 0% | 0.00 | 0% | 0.00 |

No significant deficiencies.

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|---|---|---|---|---|---|---|---|---|---|---|---|
| **872 / 1** | St.Gird Und Const.Jt | ft | 1,236.00 | 74% | 920.00 | 8% | 100.00 | 18% | 216.00 | 0% | 0.00 |

Pack rust and laminating corrosion has reactivated beneath joints.

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|---|---|---|---|---|---|---|---|---|---|---|---|
| **877 / 1** | St. Stringer End(5Ft) | ft | 30.00 | 100% | 30.00 | 0% | 0.00 | 0% | 0.00 | 0% | 0.00 |

No significant deficiencies.

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|---|---|---|---|---|---|---|---|---|---|---|---|
| **879 / 1** | St.Strng.Un Const.Jt | ft | 300.00 | 100% | 300.00 | 0% | 0.00 | 0% | 0.00 | 0% | 0.00 |

FX – Stringer connetion angle weld cracks at:
Span 5, stringer 3 at FB 3 – 3 1/2 inches.
Span 7; stringer 1 at FB 0 – 1 3/4 inches
Span 7; stringer 3 at FB 0 – 1 inch.
A portion of stringer 3; at FB 0; span 7 has been re-sectioned.

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|---|---|---|---|---|---|---|---|---|---|---|---|
| **906 / 1** | Sealed Exp.Jt.(SEJ-3 | ft | 105.00 | 0% | 0.00 | 100% | 105.00 | 0% | 0.00 | 0% | 0.00 |

Sealed expansion joints at the west abutment, and over piers 10 and 14 have been replaced and have moderate debris impaction. Sealed expansion joints are all nearly closed.

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|---|---|---|---|---|---|---|---|---|---|---|---|
| **907 / 1** | St.Finger Jt. (SED-2 | ft | 70.00 | 0% | 0.00 | 50% | 35.00 | 50% | 35.00 | 0% | 0.00 |

Pier 4 finger joint exhibits moderate debris impaction along with a slight vertical offset of 1/8 to 3/8 inch higher from the west assembly to the east assembly. Two 5-foot sections of the pier 4 finger joint have been replaced with a welded steel plate.
Pier 7 finger joint exhibits moderate debris impaction along with a slight vertical offset of 1/8 inch.

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|---|---|---|---|---|---|---|---|---|---|---|---|
| **909 / 1** | Pourable Fix Jt.Seal | ft | 1,890.00 | 8% | 150.00 | 55% | 1,040.00 | 37% | 700.00 | 0% | 0.00 |

FX – Joint seals at the abutments have moderate debris impaction, debonded seals, and a few shallow spalls and patches in headers.
Poured seal deck control joints are spaced at 18 feet in approach spans and 50 to 75 feet in the main spans. Joint seals exhibit areas of failure and the joint headers exhibit cracking and spalls patched with concrete and asphalt.

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|---|---|---|---|---|---|---|---|---|---|---|---|
| **916 / 1** | St.Bearing Assembly | each | 12.00 | 100% | 12.00 | 0% | 0.00 | 0% | 0.00 | 0% | 0.00 |

Previous rocker bearings for span 4 at pier 4, span 8 at pier 7; and span 11 at pier 10 have been replaced with elastomeric bearings

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|---|---|---|---|---|---|---|---|---|---|---|---|
| **956 / 1** | St. Cracking/Fatigue | each | 1.00 | 0% | 0.00 | 100% | 1.00 | 0% | 0.00 | 0% | 0.00 |

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MAIN SPAN TWIN GIRDERS
Cracks at horizontal web splice terminations at:
PX – Span 5, G 1 near FB 5 – 5/8 inch, not arrested.
FX – Span 5, G 2 near FB 5 – 3/8 inch (likely paint crack).
FX – Span 6, G 1 near FB 3 – 3/4 inch, arrested with two holes.
PX - Span 6, G 2 near FB 11 – 3/16 inch, not arrested.
FX – Span 7; G 1 near FB 4 – 1 inch and 1 1/8 inch (likely paint cracks) in girder web at toe of longitudinal stiffener.
FX – Span 7; G 2 near FB 4 – Two vertical cracks arrested with drilled hole retrofits.
FX – Cracks (retrofitted) at longitudinal stiffener butt welds at:
Span 5; G 1 between FB 4 and 5. A paint crack has formed along the girder web.
Span 6; G 1 near FB 6
Span 6; G 1 near FB 7
Span 6; G 1 near FB 9
Span 6; G 2 near FB 9
Span 7; G 2 between FB 7 and 8web.

APPROACH SPAN MULTI GIRDERS
Vertical crack (1 3/4 inch) in bearing stiffener fillet weld at exterior face of G 1, span 15 at pier 14.

FLOOR BEAMS
PX – FB 6; span 5 at G 1 has 5 1/8-inch crack in weld for upper connection plate.
PX – FB 0; span 6 at G 2 cracked full length of bottom weld and full height of vertical weld.

STRINGERS
FX – Stringer connetion angle weld cracks at:
Span 5, stringer 3 at FB 3 – 3 1/2 inches.
Span 7; stringer 1 at FB 0 – 1 3/4 inches
Span 7; stringer 3 at FB 0 – 1 inch.

CROSS FRAMES
FX – Isolated CF top struts exhibit cracked welds between the CF and gusset plate due to pack rust. The following locations exhibited cracks:
CF at pier 1 to G 3 – 5 3/8 inch.
CF at pier 3 to G 4 – 1/4 inch.
CF at pier 4 to G 1, span 4 – 1/4 inch.
CF at pier 12; connection to G 2 – full length of gusset plate.

FLOOR BRACING SYSTEM
PX – Span 5 LLB at G 2; east face of FB 7 has 5-inch crack in weld to gusset plate.
PX – Span 6 LLB at G 2; east face of FB 12 has 5 3/4-inch crack in weld to gusset plate.

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|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **957 / 1** | Pack Rust Smart Flag | each | 1.00 | 0% | 0.00 | 0% | 0.00 | 100% | 1.00 | 0% | 0.00 |

FX – Pack rust is causing cracking of connection welds for floor beams gusset and connection plates, stringer connections and lower lateral bracing.
Pack rust developing between bolted horizontal web splice in main girders (spans 5-7) and bottom flange splice plates in main and approach girder spans.

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|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **958 / 1** | Concrete Cracking SF | each | 1.00 | 0% | 0.00 | 0% | 0.00 | 100% | 1.00 | 0% | 0.00 |

Longitudinal cracks exist along the deck surface; mostly in the wheel lines.
Transverse cracks exist on the surface randomly along the full length of the bridge. Cracks are widest and most prominent in the twin girder spans.
Multiple 1/4-inch wide cracks exist along the stringer deck haunch at locations in span 6 where stringers are not continuous over FBs.
The deck soffit exhibits random transverse cracking with efflorescence throughout. The cracking is heaviest within 3 FBs/diaphragms of the piers and is typically spaced at 5 feet.
Shrinkage and hairline map cracking is common throughout.

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|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **960 / 1** | Settlement SF | each | 1.00 | 0% | 0.00 | 0% | 0.00 | 100% | 1.00 | 0% | 0.00 |

Both abutments appear to be moving towards the channel based on measurements between backwall and girder flanges. Difference between top and bottom flange clearances is:
W abutment = 2 1/8 inches
E. abutment = 2 1/8 inches

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|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **963 / 1** | Steel Section Loss SF | each | 1.00 | 0% | 0.00 | 100% | 1.00 | 0% | 0.00 | 0% | 0.00 |

Painted over pitting was observed in the web of the girders adjacent to the top of lower lateral bracing gusset plates.
FB 6 top flange in span 6 exhibits a 14-inch by 1-inch corrosion hole with adjacent knife edging.
A 5-inch by 2-inch corrosion hole exists through LLB gusset plate at the edge of the FB 6 stiffener to G 1, span 7.

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|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **969 / 1** | OutOfPlane Dist./Load | each | 1.00 | 0% | 0.00 | 100% | 1.00 | 0% | 0.00 | 0% | 0.00 |

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FX – Global 1/2-inch bow in web of G 1, span 7 between FBs 3 and 4 at the field splice.

FX – Several kinks and bends were noted in floor beam members and gusset plates. Locations:
FB 5; span 5 at G 2; L4 gusset plate – bow.
FB 2; span 5 at G 2; L4 gusset plate – bow.
FB 7; span 5; adjacent to G 2 – 3/8-inch kink in the U3 gusset plate under stringer 3 and approximately 1/8-inch bow in the L4 gusset plate.
FB 4; span 6 center gusset plate kinked.
FB 13; span 6 at L0L1 – exhibits 2 minor kinks.
FB 1; span 7 at stringer 3 – bottom flange of the upper chord is twisted to the east. The upper gusset plate under stringer 3 is kinked 1/2 inch on the vertical edges and 1/2 inch on the bottom horizontal edge. Vertical stiffeners are out of alignment. The center gusset plate is kinked 1/4 inch to the west.
FB 2; 5 and 8 in span 7 at stringer 3 – a 1/4-inch kink in the bottom horizontal face of the gusset plate and rotated up to 1/2 inch to the west. Poor weld quality exist between the north vertical stiffener under stringer 3 and FB 2 bottom flange.
Span 6; LLB has up to 1 inch of pack rust between the gusset plate and the floor beam causing the bracing to rotate.