

June 28, 2023

Mr. Henry Henning, PE
Bridge Inspection Engineer
Montana Department of Transportation
2701 Prospect Avenue
Helena, MT 59620

RE: Asset 03719, L32101000+01001 Fracture Critical Inspection

Dear Mr. Henning,

Fickett Structural Solutions, Inc. (Fickett) performed a Fracture Critical Inspection of Asset 03719 on June 28, 2023. The following personnel performed the inspection:

- Team Leader
 - Ryan Sievers, PE, CWI
- Team Members:
 - Michael Feilbach, EIT, CWI
 - Aric Jensen, EIT
 - Noah Boehnen, EIT

Our inspection team has filled out all applicable fields and uploaded the updated Fracture Critical Inspection Procedure in the Inspection Documents on Montana DOT's (MDT) Structure Management System (BrM). The following NBI ratings were noted during the inspection:

Item Number	Description	Previous Rating	Current Rating	Comment
MDT034	Request Review of Load Rating	No	Yes	Fickett notified Henry Henning at MDT via email on June 30 th on widespread corrosion with section loss to floor beams that was not previously documented in addition to section loss and through holes on stringers that was previously found. Mr. Henning set MDT034 – Request Review of Load Rating to “Yes – Change in Condition” with accompanying notes.
MDT061	Type 1 UW Required	Yes	Yes	Cross sections performed at 48 month interval even though doesn't meet MDT Criteria per MDT recommendation.
41	Structure Open, Posted, or Closed to Traffic	P	P	Bridge posted for 11 tons.
58	Deck	5	5	No change to deck NBI rating.
59	Superstructure	5	4	NBI 59 - Superstructure reduced from 5 to 4 due to widespread section loss in floor beams and stringers.
60	Substructure	5	5	No change to substructure NBI rating.
61	Channel	7	7	No change to channel NBI rating.

The condition of the bridge was based on the above ground condition only. The following conclusions and recommendations are suggested to maintain the long-term serviceability of the bridge:

Repair and Maintenance Recommendations				
Priority	BrM Date	BrM Number	Action	Description
High	10/17/2017	2017-0272	Change from "Medium" to "High" priority	Both movable bearings on Abutment 1 need to be replaced/reset.
Low	11/9/2017	2017-0318	Delete - duplicate	Patch potholes in asphalt wearing surface.
Low	11/9/2017	2017-0319	Change to add "on approach spans."	Repair spalls with exposed steel reinforcement on curbs and bents on approach spans.
Low	11/9/2017	2017-0320	No Change	Replace joint seal above Bent 3
High	11/9/2017	2017-0321	Change from "Medium" to "High" priority	Shim stringer ends at Abutment 1 and Bent 3 to prevent vertical movement.
Medium	6/27/2019	2019-0181	Delete - Completed	Repair the areas of 100% section loss in the asphalt above FB3' and FB2' in the main truss span.
Low	6/27/2019	2019-0182	Delete - Completed	Repair the delaminated and cracking asphalt patches concentrated above the floor beams.
Medium	6/27/2019	2019-0185	No Change	Replace the broken stringer bearing tube anchor rod at the south end of Bent 3.
High	9/27/2019	2019-0355	Delete - Completed	The intact deck around one of the two holes in the bridge deck is in danger of failing and needs to be repaired immediately.
Medium	6/28/2023	2023_03719_1	Added this inspection	Replace the deck and wearing surface.

The Fracture Critical (FC) Elements associated with this bridge are in varying conditions as described below. Please see MDT's Structure Management System (BrM) for additional detail, photos, and condition of non-FC Members:

Element 120 – Steel Truss (bottom chords, verticals, and tension diagonals)

Overall the steel truss was in fair condition. No recommendations are currently listed for the truss.

The following defects were noted on the FC Truss Members:

Span 1:

- Through Truss had minor surface corrosion and negligible section loss in areas of failed paint.
- South Truss, Panel Point U2, one bolt was loose at upper horizontal strut to top chord connection plate.
- North Truss, Panel Point U3, outboard pin nut had a 3/8 in. gap between nut and chord web.
- North Truss, Panel Point U2', two loose bolts at upper horizontal strut to top chord connection plate.
- South Truss, Panel Point U4, one bolt was sheared off at upper horizontal strut to top chord connection plate.
- South Truss, End Diagonal U1'-L0', one bolt was missing at top flange plate to rail post angle connection.
- South Truss, Diagonal U1-L2 inboard eyebar was bent 3 in. upwards over a 3 ft. length.
- South Truss, Diagonal U3-L4 inboard eyebar was bent 1 in. to the north over a 2 ft. length.
- South and North Trusses, minor abrasion at the intersection between L4-U4' and U4-L4' with negligible section loss.
- North Truss, Vertical U1-L1, east interior and exterior flanges of vertical were bent 1 in. to the north due to impact damage approximately 5 ft. above the deck.

Span 2:

- Pony Truss had minor surface corrosion with negligible section loss in areas of failed paint.
- Pony Truss had random areas of lamellar corrosion up to 1/8 in. deep along the inboard channel of the bottom chord.
- South Truss, Panel Point L2, bottom chord inboard web had pitting up to 1/8 in. deep around gusset plate.
- South Truss, Panel Points L2 and L2' had pack rust up to 1/4 in. thick between bottom chord and both interior and exterior gusset plates. Pack rust up to 3/4 in. thick between lower strut angles of exterior sway brace frames.
- South Truss, Bottom Chord at L0' had pack rust up to 3/16 in. thick between outboard channel and gusset plate. Channel members were deflected up to 1-1/2 in. out-of-plane over the moveable bearing.
- North Truss, Panel Points L2 and L2' had pack rust up to 3/8 in. thick between bottom chord and both interior and exterior gusset plates. Pack rust up to 3/4 in. thick between lower strut angles of exterior sway brace frames.
- North Truss, U1' exterior gusset plate had two misdrilled 3/4 in. diameter holes.
- South Truss, Diagonal L2'-U1' was bent 3/4 in. out-of-plane over a 12 in. length.
- North Truss, Vertical L2'-U2' interior flange was bent 1 in. out-of-plane over a 6 in. height due to impact damage.
- North Truss, Diagonal L2'-U1' interior flange was bent 1-3/8 in. out-of-plane over a 24 in. length due to impact damage.
- North Truss, End Diagonal U1'-L0' had seven areas of impact damage up to 3/4 in. long with up to 1/4 in. of deflection spaced over a 15 in. length.

Element 152 – Steel Floor Beams

Overall the steel floor beams were in good condition. No recommendations are currently listed for the floor beams.

The following defects were noted on the FC Floor Beams:

- Seepage through deck at seams and weld burn through locations was accelerating corrosion to floor beams.
- Floor Beams 1, 3', 2', and 1' had lamellar corrosion with pitting up to 1/64 in. deep underneath for approximately 25% of length. Remaining length had moderate corrosion with negligible section loss.

- Floor Beam 2, north 8 ft. of east web face had lamellar corrosion up to 1/4 in. thick with section loss when removed. Heaviest corrosion under Stringer 3 with 0.430 in. remaining (approximately 14% section loss). Floor beam had lamellar corrosion along top and bottom flanges but section loss could not be accurately measured due to tapered member.
- Floor Beams 3, 4, and 4' had lamellar corrosion with pitting up to 1/64 in. deep for approximately 75% of length. End 2 ft. on both ends had areas with 0.470 in. remaining (approximately 7% section loss).
- Floor Beam 1' bottom west flange was bent upwards 1/2 in. over a 6 in. length approximately 16 in. from the north end.
- Pony Truss floor beams had minor surface corrosion with negligible section loss in areas of failed paint.

The above summarizes our inspection findings from the 2023 Maclay Bridge Fracture Critical Inspection. Per FHWA requirements, the Maclay Bridge should be inspected at intervals not to exceed 24 months. If you have any questions regarding the report or our fracture critical inspection, please do not hesitate to contact me at 608.831.3238.

Sincerely,



Ryan Sievers, PE, CWI
Fickett Structural Solutions, Inc.

Notes:

- See BrM for Inspection Photos
- See BrM for Fracture Critical Procedure (No changes needed. Last updated on June 21, 2021)

Attachments:

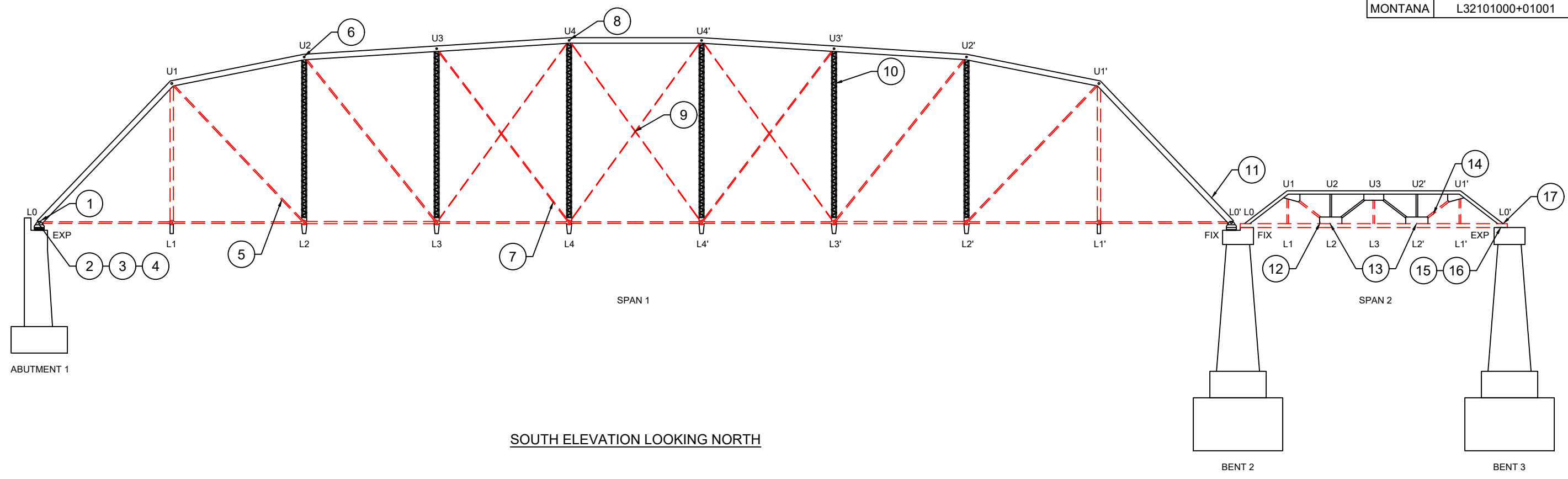
Appendix A: Defect Drawing Sheets

- Maclay South Elevation
- Maclay North Elevation
- Maclay Floor Plan
- MDT Fracture Critical Floor Beam Inspection Plan and Reporting Form

Appendix B: Overview Photos

- **Photo 1:** North Elevation looking south

STATE	BRIDGE NUMBER	ASSET
MONTANA	L32101000+01001	03719



SOUTH ELEVATION LOOKING NORTH

GENERAL NOTES:

- APPROXIMATELY 20% OF THE PAINTED COATING ON THE THROUGH TRUSS AND PONY TRUSS HAD FAILED WITH CORROSION UNDERNEATH, 15% HAD EXPOSED PRIMER, 50% WAS CHALKING, AND THE REMAINING PAINTED COATING WAS IN GOOD CONDITION.
- APPROXIMATELY 40% OF THE PAINTED COATING ON THE THROUGH TRUSS CROSS BRACING HAD FAILED WITH CORROSION UNDERNEATH, 40% HAD EXPOSED PRIMER, AND 20% WAS BUBBLING AND PEELING.
- APPROXIMATELY 25% OF THE PAINTED COATING ON THE ABUTMENT 1 MOVEABLE BEARINGS HAD FAILED WITH CORROSION UNDERNEATH, 10% HAD EXPOSED PRIMER, AND 65% WAS CHALKING.
- APPROXIMATELY 10% OF THE PAINTED COATING ON THE BENT 2 FIXED BEARINGS HAD FAILED WITH CORROSION UNDERNEATH, 10% HAD EXPOSED PRIMER, AND 80% WAS CHALKING.
- THE THROUGH TRUSS, THRU TRUSS CROSS BRACING, AND PONY TRUSS HAD MINOR SURFACE CORROSION AND NEGLIGIBLE SECTION LOSS IN AREAS OF FAILED PAINT.
- THE PONY TRUSS HAD RANDOM AREAS OF LAMELLAR CORROSION UP TO 1/8 IN. DEEP ALONG THE INBOARD CHANNEL OF THE BOTTOM CHORD.
- THE BENT 2 FIXED BEARINGS HAD MINOR SURFACE CORROSION AND NEGLIGIBLE SECTION LOSS IN AREAS OF FAILED PAINT.

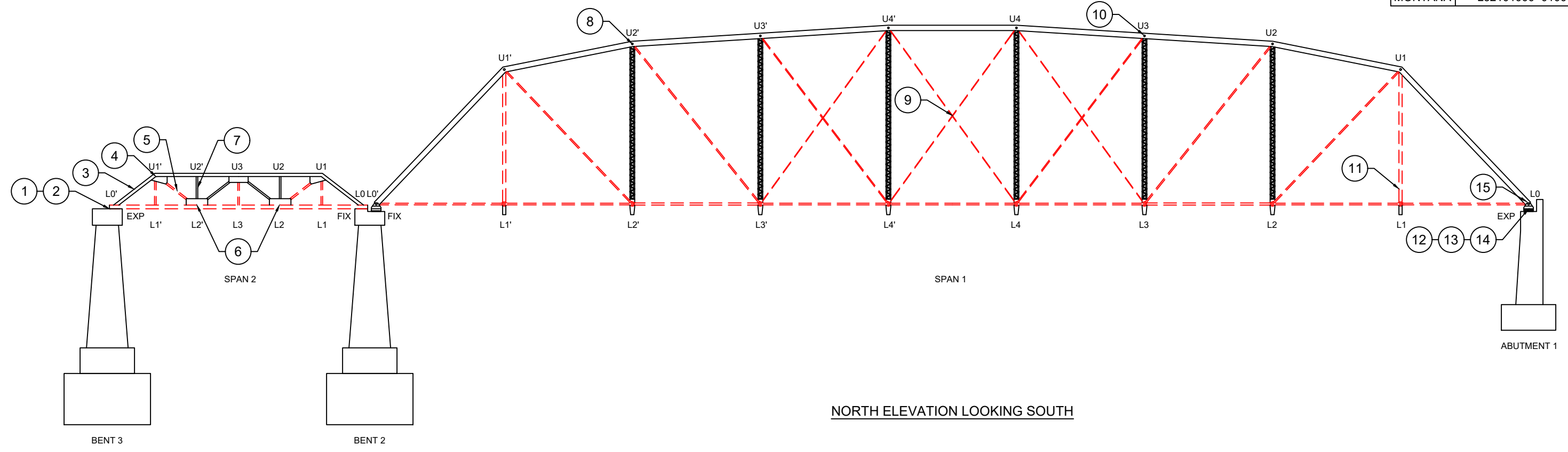
SPECIFIC NOTES:

- THE PIN AT L0 HAD PACK RUST UP TO 1 IN. THICK.
- MOVEABLE BEARING HAD HEAVY CORROSION WITH UP TO 50% SECTION LOSS TO THE ANCHOR RODS.
- MOVEABLE BEARING SOLE PLATE WAS DISPLACED 1-7/8 IN. TO THE WEST, IN EXPANSION, IN RELATION TO THE MASONRY PLATE ON A 65°F DAY.
- THE ROLLERS HAD WORKED OUT FROM UNDERNEATH THE BEARING AND WERE PUSHING AGAINST THE ABUTMENT BACKWALL. TWO ROLLERS WERE NO LONGER UNDER THE SOLE PLATE.
- INBOARD DIAGONAL EYEBAR WAS BENT 3 IN. UPWARDS OVER A 3 FT. LENGTH.
- ONE BOLT WAS LOOSE AT UPPER HORIZONTAL STRUT TO TOP CHORD CONNECTION PLATE.
- INBOARD DIAGONAL EYEBAR WAS BENT 1 IN. TO THE NORTH OVER A 2 FT. LENGTH.
- ONE BOLT WAS SHEARED OFF AT UPPER HORIZONTAL STRUT TO TOP CHORD CONNECTION PLATE.
- MINOR ABRASION AT THE INTERSECTION BETWEEN L4-U4' AND U4-L4' WITH NEGLIGIBLE SECTION LOSS.
- LOWER HORIZONTAL SWAY BRACING AT U3' WAS BENT 2 IN. TO THE EAST, AND UPWARD AND DOWNWARD 1 IN. DUE TO IMPACT DAMAGE.
- ONE BOLT WAS MISSING AT TOP FLANGE PLATE TO RAIL POST ANGLE CONNECTION.
- BOTTOM CHORD INBOARD WEB HAD PITTING UP TO 1/8 IN. DEEP AROUND GUSSET PLATE.
- PACK RUST UP TO 1/4 IN. THICK BETWEEN BOTTOM CHORD AND BOTH INTERIOR AND EXTERIOR GUSSET PLATES. PACK RUST UP TO 3/4 IN. THICK BETWEEN LOWER STRUT ANGLES OF EXTERIOR SWAY BRACE FRAMES.
- DIAGONAL WAS BENT 3/4 IN. OUT-OF-PLANE OVER A 12 IN. LENGTH.
- MOVEABLE BEARING WAS LEFT UNPAINTED AND HAD MODERATE CORROSION WITH PITTING UP TO 1/16 IN. DEEP.
- MOVEABLE BEARING SOLE PLATE WAS DISPLACED 1-7/8 IN. TO THE EAST, IN EXPANSION, IN RELATION TO THE UPPER FLANGE OF THE BEARING ON A 65°F DAY. THE ELASTOMERIC BEARING PAD WAS CRACKED.
- LOWER CHORD CHANNEL MEMBERS WERE DEFLECTED UP TO 1-1/2 IN. OUT-OF-PLANE OVER THE MOVEABLE BEARING. PACK RUST UP TO 3/16 IN. THICK BETWEEN OUTBOARD CHANNEL AND GUSSET PLATE.

BRIDGE NUMBER	L32101000+01001
FICKEIT Structural Solutions	2148 DEMING WAY SUITE 160 MIDDLETON, WISCONSIN 53562 608.831.3238
FICKEIT PROJECT NUMBER	22011.03
MONTANA DEPARTMENT OF TRANSPORTATION	
MDT Montana Department of Transportation	
BY _____ BY _____	DATE _____
CONSULTANT DESIGN ENGINEER	
DATE OF INSPECTION	JUNE 2023
SHEET DESCRIPTION SOUTH ELEVATION	

DRAWN BY	KIRSTEN B MAXWELL			
REVIEWED BY	RYAN A SIEVERS			

STATE	BRIDGE NUMBER	ASSET
MONTANA	L32101000+01001	03719





NORTH ELEVATION LOOKING SOUTH

GENERAL NOTES:

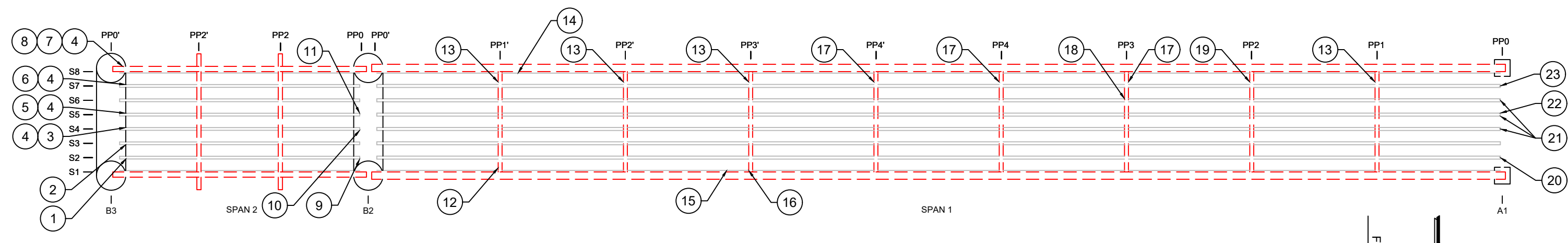
- APPROXIMATELY 20% OF THE PAINTED COATING ON THE THROUGH TRUSS AND PONY TRUSS HAD FAILED WITH CORROSION UNDERNEATH. 15% HAD EXPOSED PRIMER, 50% WAS CHALKING, AND THE REMAINING PAINTED COATING WAS IN GOOD CONDITION.
- APPROXIMATELY 40% OF THE PAINTED COATING ON THE THROUGH TRUSS CROSS BRACING HAD FAILED WITH CORROSION UNDERNEATH. 40% HAD EXPOSED PRIMER, AND 20% WAS BUBBLING AND PEELING.
- APPROXIMATELY 25% OF THE PAINTED COATING ON THE ABUTMENT 1 MOVEABLE BEARINGS HAD FAILED WITH CORROSION UNDERNEATH, 10% HAD EXPOSED PRIMER, AND 65% WAS CHALKING.
- APPROXIMATELY 10% OF THE PAINTED COATING ON THE BENT 2 FIXED BEARINGS HAD FAILED WITH CORROSION UNDERNEATH, 10% HAD EXPOSED PRIMER, AND 80% WAS CHALKING.
- THE THROUGH TRUSS, THRU TRUSS CROSS BRACING, AND PONY TRUSS HAD MINOR SURFACE CORROSION AND NEGLIGIBLE SECTION LOSS IN AREAS OF FAILED PAINT.
- THE PONY TRUSS HAD RANDOM AREAS OF LAMELLAR CORROSION UP TO 1/8 IN. DEEP ALONG THE INBOARD CHANNEL OF THE BOTTOM CHORD.
- THE BENT 2 FIXED BEARINGS HAD MINOR SURFACE CORROSION AND NEGLIGIBLE SECTION LOSS IN AREAS OF FAILED PAINT.

SPECIFIC NOTES:

- MOVEABLE BEARING WAS LEFT UNPAINTED AND HAD MODERATE CORROSION WITH PITTING UP TO 1/16 IN. DEEP.
- MOVEABLE BEARING TOP PLATE WAS DISPLACED 1-1/2 IN. TO THE EAST, IN EXPANSION, IN RELATION TO THE UPPER FLANGE OF THE BEARING ON A 65°F DAY. THE ELASTOMERIC BEARING PAD WAS CRACKED/TORN.
- END POST HAD SEVEN AREAS OF IMPACT DAMAGE UP TO 3/4 IN. LONG WITH UP TO 1/4 IN. OF DEFLECTION SPACED OVER A 15 IN. LENGTH.
- EXTERIOR GUSSET PLATE HAD TWO MISDRILLED 3/4 IN. DIAMETER HOLES.
- DIAGONAL INTERIOR FLANGE WAS BENT 1-3/8 IN. OUT-OF-PLANE OVER A 24 IN. LENGTH DUE TO IMPACT DAMAGE.
- PACK RUST UP TO 3/8 IN. THICK BETWEEN LOWER CHORD AND BOTH INTERIOR AND EXTERIOR GUSSET PLATES. PACK RUST UP TO 3/4 IN. THICK BETWEEN LOWER STRUT ANGLES OF EXTERIOR SWAY BRACE FRAMES.
- VERTICAL INTERIOR FLANGE WAS BENT 1 IN. OUT-OF-PLANE OVER A 6 IN. HEIGHT DUE TO IMPACT DAMAGE.
- TWO LOOSE BOLTS AT UPPER HORIZONTAL STRUT TO TOP CHORD CONNECTION PLATE.
- MINOR ABRASION AT THE INTERSECTION BETWEEN L4-U4' AND U4-L4' WITH NEGLIGIBLE SECTION LOSS.
- OUTBOARD PIN NUT HAD A 3/8 IN. GAP BETWEEN NUT AND CHORD WEB.
- EAST INTERIOR AND EXTERIOR FLANGES OF VERTICAL WERE BENT 1 IN. TO THE NORTH DUE TO IMPACT DAMAGE APPROXIMATELY 5 FT. ABOVE THE BRIDGE DECK.
- MOVEABLE BEARING HAD HEAVY CORROSION WITH UP TO 50% SECTION LOSS TO THE ANCHOR RODS.
- MOVEABLE BEARING SOLE PLATE WAS DISPLACED 2 IN. TO THE WEST, IN EXPANSION, IN RELATION TO THE MASONRY PLATE ON A 65°F DAY.
- THE NESTED ROLLER KEEPER HAD FAILED. TWO ROLLERS HAD WORKED OUT FROM UNDERNEATH THE BEARING AND WERE PUSHED AGAINST THE ABUTMENT BACKWALL. ONE ROLLER WAS STICKING OUT ON THE EAST SIDE OF THE BEARING.
- THE PIN AT L0 HAD PACK RUST UP TO 2.25 IN. THICK.

BRIDGE NUMBER	L32101000+01001
	
2148 DEMING WAY SUITE 160 MIDDLETON, WISCONSIN 53562 608.831.3238	
FICKETT PROJECT NUMBER	22011.03
MONTANA DEPARTMENT OF TRANSPORTATION	
	
BY _____	DATE _____
CONSULTANT DESIGN ENGINEER	
DATE OF INSPECTION	JUNE 2023
SHEET DESCRIPTION NORTH ELEVATION	

DRAWN BY	KIRSTEN B MAXWELL			
REVIEWED BY	RYAN A SIEVERS			



FLOOR BEAM PLAN VIEW

GENERAL NOTES:

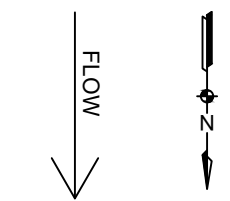
- APPROXIMATELY 40% OF THE PAINTED COATING ON THE FLOOR BEAMS HAD FAILED WITH CORROSION UNDERNEATH, 40% HAD EXPOSED PRIMER, AND 20% WAS BUBBLING AND PEELING.
- APPROXIMATELY 30% OF THE PAINTED COATING ON THE STEEL STRINGERS HAD FAILED WITH CORROSION UNDERNEATH, 15% HAD EXPOSED PRIMER, AND 55% WAS BUBBLING AND PEELING.
- SEEPAGE THROUGH DECK AT SEAMS AND WELD BURN THROUGH LOCATIONS WAS ACCELERATING CORROSION TO FLOOR BEAMS AND STRINGERS.
- SPAN 1 STRINGERS HAD ACTIVE CORROSION FOR THE FULL LENGTH. APPROXIMATELY 25% HAD LAMELLAR CORROSION WITH PITTING UP TO 1/64 IN. DEEP, HEAVIER NEAR FLOOR BEAM LOCATIONS.
- SPAN 1 EXTERIOR STRINGERS TYPICALLY HAD HEAVY CORROSION WITH PITTING UP TO 1/16 IN. DEEP.
- PONY TRUSS FLOOR BEAMS HAD MINOR SURFACE CORROSION WITH NEGLIGIBLE SECTION LOSS IN AREAS OF FAILED PAINT.
- PONY TRUSS STRINGERS HAD MINOR TO MODERATE CORROSION AND NEGLIGIBLE SECTION LOSS IN AREAS OF FAILED PAINT.

SPECIFIC NOTES (SPAN 2):

- STRINGER 2, AT BENT 3, HAD HEAVY CORROSION WITH A 4 IN. LONG BY 1 IN. HIGH THROUGH HOLE AT THE WEB TO BOTTOM FLANGE INTERFACE.
- STRINGER 3, AT BENT 3, HAD HEAVY CORROSION AND UP TO 1/8 IN. THICK RUST SCALE ON BOTH SIDES OF WEB AT WEB TO BOTTOM FLANGE INTERFACE ADJACENT TO STRINGER END.
- THE EAST ANCHOR ROD OF THE BEARING PIPE AT STRINGER 4 WAS SHEARED OFF. THE WEST ANCHOR ROD AT STRINGER 4 HAD UP TO 50% SECTION LOSS AND WAS LOOSE ON CONCRETE. THE BEARING PIPE MOVED UP TO 1/2 IN. VERTICALLY UNDER LIVE LOAD.
- STRINGERS 4, 5, 7, AND 8 HAD A GAP BETWEEN THE BOTTOM FLANGE AND THE HOLLOW BEARING PIPE AT BENT 3. MOVEMENT OF THE STRINGERS WAS OBSERVED UNDER LIVE LOAD.
- STRINGER 5, AT BENT 3, HAD HEAVY CORROSION AND SECTION LOSS IN THE WEB WITH AN 8 IN. LONG BY 1 IN. HIGH THROUGH HOLE NEAR STRINGER END. BOTTOM FLANGE WAS KNIFE-EDGED IN THIS AREA.
- STRINGER 7, AT BENT 3, HAD HEAVY CORROSION WITH UP TO 50% SECTION LOSS OVER A 10 IN. LONG BY 2 IN. HIGH AREA ADJACENT TO THE STRINGER END THAT HAD A 5 IN. LONG BY 1 IN. HIGH THROUGH HOLE AT THE WEB TO LOWER FLANGE INTERFACE.
- STRINGER 8, AT BENT 3, HAD HEAVY CORROSION AND SECTION LOSS IN THE WEB FOR THE END 14 IN. WITH A 7 IN. LONG BY 1 IN. HIGH THROUGH HOLE AT WEB TO BOTTOM FLANGE INTERFACE AT THE STRINGER END.
- BOTH ANCHOR RODS OF THE BEARING PIPE AT STRINGER 8 WERE SHEARED OFF. THE BEARING PIPE MOVED UP TO 1/2 IN. VERTICALLY UNDER LIVE LOAD. IMPRINTS IN DEBRIS ON TOP OF BENT SHOWED UP TO 2 IN. OF LATERAL MOVEMENT.
- STRINGER 2, AT BENT 2, HAD HEAVY CORROSION AND SECTION LOSS IN THE WEB WITH A 22 IN. LONG BY 2 IN. HIGH THROUGH HOLE AND KNIFE EDGING TO THE BOTTOM, NORTH FLANGE.
- STRINGER 4, AT BENT 2, HAD AN 18 IN. LONG BY 2 IN. HIGH AREA OF LAMELLAR CORROSION UP TO 1/4 IN. THICK ON THE BOTTOM OF THE NORTH FACE AT THE WEST END OF THE STRINGER.
- STRINGER 5, AT BENT 2, HAD A 16 IN. LONG BY 2 IN. HIGH AREA OF LAMELLAR CORROSION UP TO 1/4 IN. THICK ON THE BOTTOM OF THE WEB LOCATED 12 IN. FROM THE END OF THE STRINGER ON THE SOUTH FACE.

SPECIFIC NOTES (SPAN 1):

- FLOOR BEAM 1' BOTTOM WEST FLANGE WAS BENT UPWARDS 1/2 IN. OVER A 6 IN. LENGTH APPROXIMATELY 16 IN. FROM THE NORTH END.
- FLOOR BEAM HAD LAMELLAR CORROSION WITH PITTING UP TO 1/64 IN. DEEP UNDERNEATH FOR APPROXIMATELY 25% OF LENGTH. REMAINING LENGTH HAD MODERATE CORROSION WITH NEGLIGIBLE SECTION LOSS.
- STRINGER 8 TOP FLANGE WAS ROTATED 2 IN. TOWARDS THE NORTH FOR END 3 FT. AT FLOOR BEAM 1'.
- STRINGER 1, BETWEEN FLOOR BEAMS 3' AND 2', HAD LAMELLAR CORROSION UP TO 1/4 IN. THICK WITH 1/8 IN. SECTION LOSS UNDERNEATH.
- TWO OF TWO BOLTS LOOSE AT STRINGER 1 TO FLOOR BEAM 3' CONNECTION.
- FLOOR BEAM HAD LAMELLAR CORROSION WITH PITTING UP TO 1/64 IN. DEEP FOR APPROXIMATELY 75% OF LENGTH. END 2 FT. ON BOTH ENDS HAD AREAS WITH LESS THAN 0.470 IN. REMAINING (APPROXIMATELY 7% SECTION LOSS).
- TWO OF TWO BOLTS LOOSE AT STRINGER 6 TO FLOOR BEAM 3 CONNECTION.
- FLOOR BEAM 2, NORTH 8 FT. OF EAST WEB FACE HAD LAMELLAR CORROSION UP TO 1/4 IN. THICK WITH SECTION LOSS WHEN REMOVED. HEAVIEST CORROSION UNDER STRINGER 3 WITH 0.430 IN. REMAINING (APPROXIMATELY 14% SECTION LOSS). FLOOR BEAM HAD LAMELLAR CORROSION ALONG TOP AND BOTTOM FLANGES BUT SECTION LOSS COULD NOT BE ACCURATELY MEASURED DUE TO TAPERED MEMBER.
- STRINGER 2, AT ABUTMENT 1, HAD HEAVY CORROSION AND SECTION LOSS OVER A 14 IN. LONG BY 2 IN. HIGH AREA WITH A 2-1/2 IN. LONG BY 3/4 IN. HIGH HOLE CENTERED 2 IN. FROM THE STRINGER END.
- STRINGERS 4, 5, AND 6, AT ABUTMENT 1, HAD HEAVY CORROSION AND DELAMINATION ON WEB AND FLANGES UP TO 1/8 IN. THICK FROM THE WEST END FOR UP TO HALF OF THE SPAN LENGTH.
- STRINGER 5, AT ABUTMENT 1, HAD A 1/4 IN. GAP BETWEEN THE BOTTOM FLANGE AND THE ABUTMENT 1 BEAM SEAT AND DEFLECTED UNDER LIVE LOAD.
- STRINGER 7, AT ABUTMENT 1, HAD HEAVY CORROSION AND SECTION LOSS IN THE WEB OVER A 17 IN. LONG BY 2 IN. HIGH AREA WITH A 10 IN. LONG BY 1 IN. HIGH HOLE CENTERED 10 IN. FROM THE STRINGER END. ELASTOMERIC PAD WAS WORKING ITSELF OUT TO THE SOUTH AND WAS UNSUPPORTED FOR 1/2 IN. ALONG NORTH EDGE OF STRINGER.



BRIDGE NUMBER	L32101000+01001
FICKETT Structural Solutions	2148 DEMING WAY SUITE 160 MIDDLETON, WISCONSIN 53562 608.831.3238
FICKETT PROJECT NUMBER	22011.03
MONTANA DEPARTMENT OF TRANSPORTATION	
MDT Montana Department of Transportation	
BY _____ BY _____	DATE _____
DATE OF INSPECTION	
JUNE 2023	
SHEET DESCRIPTION	
FLOOR PLAN	

DRAWN BY	KIRSTEN B MAXWELL				
REVIEWED BY	RYAN A SIEVERS				

Fracture Critical Floor Beam Inspection Plan and Reporting Form



Solid Floor Beams:



Consider the fracture critical portion of the floor beam as the lower half of the beam depth, the portion below the neutral axis that is in tension. Note any defects and label the defect accordingly. Make sure and note that a defect is Near Face (NF), Far Face (FF) or Both Faces (BF). All notations will be recorded looking ahead on line. Use this drawing for trusses or two girders system bridges with solid rolled or built up section floor beams.

Typical Floor Beam Comments:

Seepage through deck at seams and weld burn through locations was accelerating corrosion to floor beams. Pony Truss floor beams had minor surface corrosion with negligible section loss in areas of failed paint.

Span	Panel Point	Inspection Comment	Photos
1	1	Floor Beam 1 had lamellar corrosion with pitting up to 1/64 in. deep underneath for approximately 25% of length. Remaining length had moderate corrosion with negligible section loss.	See BrM
1	2	Floor Beam 2, north 8 ft. of east web face had lamellar corrosion up to 1/4 in. thick with section loss when removed. Heaviest corrosion under Stringer 3 with 0.430 in. remaining (approximately 14% section loss). Floor beam had lamellar corrosion along top and bottom flanges but section loss could not be accurately measured due to tapered member.	See BrM
1	3	Floor Beam 3 had lamellar corrosion with pitting up to 1/64 in. deep for approximately 75% of length. End 2 ft. on both ends had areas with 0.470 in. remaining (approximately 7% section loss).	See BrM
1	4	Floor Beam 4 had lamellar corrosion with pitting up to 1/64 in. deep for approximately 75% of length. End 2 ft. on both ends had areas with 0.470 in. remaining (approximately 7% section loss).	See BrM
1	4'	Floor Beam 4' had lamellar corrosion with pitting up to 1/64 in. deep for approximately 75% of length. End 2 ft. on both ends had areas with 0.470 in. remaining (approximately 7% section loss).	See BrM
1	3'	Floor Beam 3' had lamellar corrosion with pitting up to 1/64 in. deep underneath for approximately 25% of length. Remaining length had moderate corrosion with negligible section loss.	See BrM
1	2'	Floor Beam 2' had lamellar corrosion with pitting up to 1/64 in. deep underneath for approximately 25% of length. Remaining length had moderate corrosion with negligible section loss.	See BrM
1	1'	Floor Beam 1' had lamellar corrosion with pitting up to 1/64 in. deep underneath for approximately 25% of length. Remaining length had moderate corrosion with negligible section loss. Bottom west flange was bent upwards 1/2 in. over a 6 in. length approximately 16 in. from the north end.	See BrM
2	2	Typical condition	N/A
2	2'	Typical condition	N/A

Appendix B: Overview Photos



Photo 1: North Elevation looking south