



2023 ROUTINE AND FRACTURE CRITICAL INSPECTION REPORT

Bridge CUY-02-1441

SFN 1800035

Main Avenue Bridge over Cuyahoga River

Dates of Inspection: July 10-15, 2023

**ODOT DISTRICT 12
5500 TRANSPORTATION BOULEVARD
GARFIELD HEIGHTS, OHIO 44125
NOVEMBER 30, 2023**

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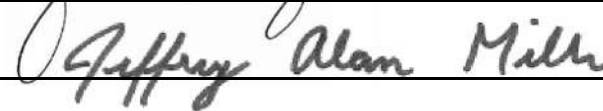
ODOT BRIDGE NO. CUY-02-1441 Main Avenue Bridge over Cuyahoga River SFN 1800035

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EXECUTIVE SUMMARY

The Main Avenue bridge (CUY-2-1441, SFN 1800035) carries State Route 2 over the Cuyahoga River Valley, several city streets, parking lots, the GCRTA Waterfront Line tracks, and a Norfolk Southern Railroad/CSX railroad tracks and is located in the city of Cleveland. The bridge is situated immediately southwest of the Cleveland Browns Stadium and is owned and maintained by the Ohio Department of Transportation (ODOT). The annual bridge inspection is performed by ODOT or consultants to confirm the condition state of the bridge. DLZ Ohio, Inc. (DLZ) was contracted by ODOT to perform fracture critical and routine element level inspection services on this bridge for year 2023.

The overall condition of the Main Avenue bridge is rated a **5**, meaning that it is in **Fair** condition. **Items highlighted in red in this inspection report are new findings that were not noted during previous inspections.** Significant findings justifying the general appraisal rating include the following results:

1. The edge of the deck has areas of delamination and cracking scattered throughout, with areas of spalling. Some of the delaminated and cracking deck edges and areas at bridge joints have the potential to spall off onto roadways, parking lots, or trails underneath the bridge.
2. The exterior railings have widespread cracking with rust staining and some areas of delamination and spalls with exposed reinforcing.
3. Many of the scupper catch basins are fully clogged with dirt, debris, and water. There are locations where downspouts are broken off, misaligned, or not functioning as intended and draining onto the structure.
4. The south fascia beam in Unit III over W. 9th Street is slightly misaligned due to vehicular impact.
5. The truss, particularly the lower chords, has varying degrees of section loss, including 100% loss, with painted over and reactivating pack rust, and pack rust causing significant distortion of the web plates and flange angles.
6. The lower chord gusset plates have areas of heavy corrosion below the deck expansion joints, section loss and pitting around the pins, and advanced section loss just above the lower chord and along the edges and at the ends of the diagonal connections.
7. The steel floor beams in Unit II and III have unarrested cracks in the top of the web at the flange copes at truss connections.
8. Many of the lateral and sway bracing members and gusset plates have section loss, pack rust, corrosion holes, and distortion due to pack rust.
9. The joints have various degrees of debris impaction and areas of broken and depressed seals.

Inspection findings were documented with field notes, photos, sketches, and measurements. Detailed discussion of all related issues can be found in the pertinent sections of this inspection report.

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INNOVATIVE IDEAS
EXCEPTIONAL DESIGN
UNMATCHED CLIENT SERVICE

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1.0 Bridge Description

The Main Avenue Bridge (CUY-2-1441, SFN 1800035) carries between four to six lanes of vehicular traffic over the Cuyahoga River, several city streets, the GCRTA Waterfront Line tracks, and Norfolk Southern/CSX railroad tracks. The bridge was constructed between 1938 and 1940 and is approximately 6,580 feet long. On October 6, 1939, the West Approach, Main Truss Spans, and East Approach-Forward Sections were opened to traffic. The Lakefront Trestle and Lakefront Ramp were opened to traffic in 1940. The bridge was closed to traffic for a major rehabilitation project between April 13, 1991 and October 6, 1992. Rehabilitation work included replacing and widening the deck, updating safety features, improving the drainage system, installing new floor system members, and strengthening or replacing deteriorated portions of the bridge. The Main Avenue Bridge is now designated as a National Historic Civil Engineering Landmark by the American Society of Civil Engineers.

The Main Avenue Bridge is comprised of five distinct units of varying structure types within each section.

- Unit I – West Approach
- Unit II – Main Truss Spans
- Unit III – East Approach – Forward Section
- Unit IV – East Approach – Lakefront Trestle Section
- Unit V – East Approach – Lakefront Ramp Section

For plan views of the bridge with the units and sections identified refer to Figures 1 to 5 in Appendix B.

The alignment of the bridge varies throughout the length of the structure. The nomenclature of the bridge will follow the 1990 rehabilitation plans and previous inspection reports. All compass directions will be based upon this relative assignment.

UNIT I – WEST APPROACH

The West Approach section consists of east and west bound structures separated by the ramps at W. 28th Street. Each portion of the structure carries three lanes of traffic from near West 29th Street to 250 feet east of West 25th Street. These separate structures then merge into one structure near West 25th Street.

The West Approach section consists of four main structure types: Transverse rigid concrete frames supporting a concrete deck slab (Sections B', D, J' and M), concrete stringers and diaphragms (Section P), longitudinal rigid steel frames supporting floorbeams and stringers (Sections C, K and L'), and a steel floorbeam/stringer system (Section N). The steel floorbeam/stringer system consists of continuous stringers bearing on top of floorbeams that are supported by steel columns. The various steel sections consist of rolled beams, welded plate girders, and riveted built-up plate girders.

UNIT II – MAIN TRUSS SPANS

Beginning at the termination of Section I (West Approach) east of W. 25th Street, the Main Truss Spans carry six lanes of traffic over several city streets and the Cuyahoga River ending near West 10th Street.

The Main Truss Spans section consists of ten (10) cantilevered Pratt deck trusses. The upper and lower truss chord members are composed of riveted built-up box sections. The truss diagonals and verticals are a combination of rolled wide flange sections and riveted box sections. The floor system is comprised of rolled steel beam stringers supported on riveted and welded floorbeams. The floorbeams frame into the truss at the upper chord panel point connections.

UNIT III – EAST APPROACH – FORWARD SECTION

Beginning at the end of Unit II (Main Truss Spans), the Forward Section starts just west of West 10th Street at the base of the Flats and carries the six lanes of traffic from the Cuyahoga River Valley over the western portion of the GCRTA Waterfront Line tracks and up to West 9th Street. The Forward Section consists of steel truss bents that support rolled steel floorbeams with rolled steel stringers bearing on top. The steel truss bent members consist of rolled steel sections connected by riveted gusset plates. Below the eastbound lanes, a lower utility/parking deck was removed, however, portions of the steel support structure remain in place. The Pratt deck truss members consist of rolled wide flange sections with a similar deck framing system to the main truss spans of Unit II.

UNIT IV – EAST APPROACH – LAKEFRONT TRESTLE

Beginning at the end of Unit III (Forward Section), the Lakefront Trestle starts just west of West 9th Street and continues to West 3rd Street carrying four lanes of traffic over parking lots and city streets. Two ramp structures tie into the main structure in this area as well. The Lakefront Trestle superstructure is supported by two lines of steel longitudinal rigid frames comprised of riveted built-up beams and columns. Transverse floorbeams frame into the steel longitudinal rigid frames and support rolled stringers.

UNIT V – EAST APPROACH – LAKEFRONT RAMP

Beginning at the end of Unit IV (Lakefront Trestle), the Lakefront Ramp starts just east of West 3rd Street and carries four lanes of traffic continuing over the eastern end of the GCRTA Waterfront Line and the Norfolk Southern/CSX railroad tracks and terminating near First Energy Stadium. The superstructure consists of three riveted, built-up plate girders with rolled floorbeams and stringers.

2.0 Bridge History

The following is a summary of significant events in the history of the Main Avenue Bridge:

- 1930-37: Planning and design for the Main Avenue Bridge was performed following the Cuyahoga County Engineer's Office decision to build the Lorain-Carnegie Bridge first as a means to relieve congestion on the Detroit-Superior Bridge. The structure was designed by Fred L. Plummer, Chief Design Engineer of the Cuyahoga County Engineer's Office. Consulting engineer was Wilbur Watson & Associates.
 - 1937-40: The West Approach, Main Truss Spans, East Approach-Forward Section, and East Approach-Lakefront Trestle were constructed in 17 months. The bridge project was one of the initial projects funded by the Federal Emergency for Public Works.
 - October 6, 1939: Main Avenue Bridge was dedicated and opened to traffic the following morning.
 - 1954-55: Bridge superstructure was repainted.
 - April 1984-November 1985: Complete removal of the existing paint and application of a Zinc-Vinyl-Vinyl (ZVV) paint system on the steel superstructure was performed.
 - 1986: Bridge was rededicated as the Harold Burton Memorial Bridge.
 - April 13, 1991 to October 6, 1992: The Main Avenue Bridge was closed to traffic for an 18-month major rehabilitation. Repair work consists of the following activities:
 - Removal of the existing concrete filled steel grid deck, sidewalks, and stringers.
 - Placement of new stringers on top of existing floor beams.
 - Replacement of approximately 40% of the main truss spans floor beam cantilevers with welded floor beam brackets.
 - Removal of the existing drainage system, including drain troughs along interior portions of the lower chord.
 - Local painting of new steel elements with an OZEU protective coating system.
 - Application of pack rust caulk sealant along open structural steel seams.
 - 2007: Main Truss Spans – Complete painting of the steel superstructure.
 - 2007: Emergency retrofits were performed on L24L25, North and South Trusses, Span 8.
 - 2014 to 2016: A series of minor rehabilitation projects have been conducted: Construction tasks include:
 - Gusset plate retrofits.
 - Truss member repairs and strengthening.
 - Replacement of select lower lateral bracing members.
 - Drainage replacement, Main Truss Spans.
 - Removal of sheared rivets due to vehicular impact and installation of high-strength bolts, Lakefront Ramp.
 - Concrete railing and median repairs (2016).
 - Combination of expansion joint membrane replacement and expansion joint membrane replacement (2016).
-

- 2017-2019: A major paint project was completed on the east and west approaches. In addition, patching concrete substructure units, patching both median and exterior parapets, superstructure steel repairs, replacement of deck joint armor and joint glands, drainage replacement, and drainage repairs were completed as part of the rehabilitation project.
-

3.0 General

The data for this Physical Condition Routine Element Level Inspection Report was obtained on **July 10-15, 2023**. The bridge inspection was performed by inspectors from **DLZ and AECOM**.

The Scope of Services directed **DLZ and AECOM** to perform a routine physical condition and fracture critical inspection and report the findings in a formal report. The inspectors used several different access methods for the superstructure, including walking the deck, using snoopers, and accessing the bridge from the catwalks. Sofis Company, Inc. provided a snoopier truck and traffic control on **July 10-15, 2023**. The substructure was visually inspected from the ground and from the 40-ft aerial work platform. **DLZ** collected field notes, photos, sketches, and measurements while performing the bridge inspection. No destructive testing was performed.

Items highlighted in red in this inspection report are new findings that were not noted during previous inspections.

The bridge inspection was performed in accordance with the following documents:

- Manual of Bridge Inspection, Ohio Department of Transportation (ODOT), 2014 (with 2017 & 2021 Addendums)
 - National Bridge Inspection Standards, U.S. Department of Transportation, 2022
 - Manual for Bridge Element Inspection, 2nd Edition, American Association of State Highway and Transportation Officials (AASHTO), 2019
 - Bridge Inspector's Reference Manual, Federal Highway Administration (FHWA), 2012
 - Inspection of Fracture Critical Bridge Members, U.S. Department of Transportation and Federal Highway Administration (FHWA), 1986
-

The Condition Ratings used in this report are based on the 2014 ODOT Manual of Bridge Inspection Condition Rating Guidelines.

Condition Rating Guide			
1-4 Individual Component	9-0 NBIS Summary		Inspector Guidelines (Quantitative comments include the Location, Extent & Severity of the deficiency)
1-GOOD	9 - Excellent	No problems noted: no section loss, general deterioration.	Make brief comments as necessary. Communicate the predominant deficiency.
	8 - Very Good		
2-FAIR	7 - Good	Some minor problems (ex. extent of concrete deterioration is up to 1% spalling or up to 5% saturation)	
	6 - Satisfactory	Structural elements show some minor deterioration (ex. extent of concrete deterioration is up to 5% spalling or up to 10% saturation)	
3-POOR	5 - Fair	Structural elements show deterioration but are sound (ex. extent of concrete deterioration is up to 10% spalling or up to 20% saturation)	Document deficiencies quantitatively. Consider taking photos or making sketches.
	4 - Poor	Advanced* (ex. extent of concrete deterioration is more than 10% spalling or more than 20% saturation). Usually the load path appears to be affected for primary members or there are obvious structural changes since the as-built condition that are advanced.	Candidate to establish monitoring benchmarks to track the rate-of-change. Take photos, make sketches and document quantitatively in order to determine if a re-load rating is possible. Include in-service conditions to verify capacity
4-CRITICAL	3 - Serious	4-Poor. . . <u>And local failures possible.</u>	<u>Above. . . And discuss the deficiency immediately with Control Authority.</u>
	2 - Critical	3-Serious. . . <u>And Unless closely monitored it may be necessary to close the bridge</u> until corrective action is taken.	<u>Above. . . And the bridge is a candidate to dispatch road closure and/or immediate repairs and/or increased monitoring (Interim Inspections). Confirm in writing, critical finding.</u>
	1 - Imminent Failure	2-Critical. . . <u>And Major deterioration is affecting stability. Bridge or lane(s) shall be closed to traffic</u> but corrective action may put bridge back into light service.	<u>Above. . . And Dispatch immediate lane or bridge closure.</u> Contact the Control Authority. Stay at the bridge until the safety of the traveling public is achieved. Confirm in writing.
	0 - Failed	1-Imm Failure. . . <u>And Out of service - beyond corrective action.</u>	

Poor
Structurally Deficient**

* **Advanced** –widespread deficiencies or a likely reduction to capacity (**more examples on following page**).

** **Structurally Deficient (SD)** –Bridge Deck, Superstructure, or Substructure Summary rated 4-Poor or below.

A bridge can also be classified as structurally deficient if its load carrying capacity is significantly below current design standards or if a waterway below frequently overtops the bridge during floods.

4.0 Location Map



Structure: CUY-2-1441
Main Avenue Bridge over the Cuyahoga River Valley
Cleveland, OH

5.0 Inspection Findings

Inspection findings from the field inspection performed on **July 10-15, 2023** are presented below.

5.1 NBI Item 58 – Deck

The overall deck rating is a **7**, indicating that it is in **Good** condition. Condition findings of individual deck items are as follows:

5.1.1 ELEMENT 12 – REINFORCED CONCRETE DECK

Total Quantity	Units	CS1	CS2	CS3	CS4
502,787	sq. ft.	487,593	15,094	100	0

The reinforced concrete deck is in **Good** condition. The replacement deck, opened to traffic in 1992, consists of epoxy coated reinforcement with stay-in-place metal galvanized steel forms. In Unit 1, there are several sections that do not have stay-in-place forms, and the underside of the deck is visible. In these sections the deck has areas of light cracking and the haunches in the deck above the stringers have areas of minor spalling. In Unit 1, Section P, the underside of the deck has cracking with efflorescence throughout. Isolated edge delamination and spalls were noted, often adjacent to the expansion joint armor. At some locations these edge spalls have been sealed. Areas of isolated spalling were noted along the gutter line on the eastbound roadway in Unit II, Main Truss spans. The underside of deck exhibits spalling at several joint locations in Unit II.

For specific deck deficiencies, refer to Tables 1 through 5 in Appendix C.



Photo 1: Deck Edge Spalling

5.1.2 NBI ITEM 58.02 & ELEMENT 300 – STRIP SEAL EXPANSION JOINT

Total Quantity	Units	CS1	CS2	CS3	CS4
1,750	ft.	522	988	236	4

The strip seal expansion joints are in **Satisfactory** condition. Throughout the structure, joints have significant debris impaction, **deteriorated joint material**, and corrosion with section loss typically 3/16” deep on the joint plates. Isolated joints exhibit evidence of leakage. At Joint O on the westbound side of the bridge, the west joint armor in the left lane near the W. 28th Street exit ramp is loose and banging under vehicular impact. The west joint header exhibits spalls on the top of deck at the area of loose joint armor. **Daylight is visible with debris on the floorbeam through Joint I1 (Photo 3).**



Photo 2: Typical Debris Impaction of Strip Seal Expansion Joints



Photo 3: Visible Daylight and Debris Collection on Floorbeam Below Joint I1

For specific joint deficiencies, refer to Tables 1 through 5 in Appendix C. **For joint measurements, refer to Table 6 in Appendix C.**

5.1.3 ELEMENT 302 – COMPRESSION JOINT SEAL

Total Quantity	Units	CS1	CS2	CS3	CS4
1,055	ft.	356	546	143	10

The compression joints are in **Satisfactory** condition. Throughout the structure, joints have significant debris impaction (**Photo 4**), **deteriorated joint material**, impact damage, and corrosion with section loss typically 3/16" deep on the joint plates. Some joint seals are depressed, up to 1" deep. Isolated joints exhibit evidence of leakage. **At eastbound Joint 8Q, there is a 4-foot section of missing joint armor in the middle lane (Photo 5)**. At Joint X, there is a 10-foot section of broken compression seal retainer in westbound lane 3, allowing drainage directly through the joint.

For specific joint deficiencies, refer to Tables 1 through 5 in Appendix C. **For joint measurements, refer to Table 6 in Appendix C.**



Photo 4: Typical Compression Seal Joint Debris Impaction



Photo 5: Missing Joint Armor on Eastbound Joint 8Q

5.1.4 ELEMENT 303 – ASSEMBLY JOINT WITH SEAL

Total Quantity	Units	CS1	CS2	CS3	CS4
595	ft.	224	270	101	0

The modular joints are in **Satisfactory** condition. There are scattered areas of minor tearing and leaking in the seals (Photo 6). At Joint L and Joint J, the joint header on the east side of the joint is delaminated and spalling with loose concrete falling onto the catwalk below. Joint L is located over Elm Street, and this spalling is a safety concern.

For specific joint deficiencies, refer to Table 2 in Appendix C. **For joint measurements, refer to Table 6 in Appendix C.**



Photo 6: Assembly Joint with Seal with Splitting Seal

5.1.5 ELEMENT 331 – REINFORCED CONCRETE BRIDGE RAILING

Total Quantity	Units	CS1	CS2	CS3	CS4
20,150	ft.	17,616	2,394	140	0

The concrete railings are in **Fair** condition. The median and railing constructed during the 1991-1992 rehabilitation were poured using slip form construction. Both the median and the parapets were repaired in the last rehabilitation project between 2017 and 2018. Vertical, horizontal, and map cracking are common throughout the bridge railings. Many of the large spalls facing traffic were patched, however, isolated patches are spalled again. Several spalls exhibit exposed reinforcing steel. Many of the spalls previously noted on the exterior faces of the parapets have been sealed; however, surface corrosion is reactivating on the exposed reinforcing bars that were sealed, and some of the sealed concrete is delaminating. There are scattered areas with new spalls and delamination of the exterior of the parapets (Photo 7). On the north fascia in Spans 8 and 9, there are spalls forming over the parking lot at 1189 Main Ave. Areas of spalling and delamination exist in the bridge railing at or near the deck joints (Photo 8). There are isolated spalls up to 3” deep in the median.

For specific railing deficiencies, refer to Tables 1 through 5 in Appendix C.



Photo 7: Railing spalls on South Railing, West of W. 25th Street



Photo 8: Typical Railing Spalls Adjacent to Joint Armor

5.1.6 NBI ITEM 58.01 & ELEMENT 510 – WEARING SURFACES

Total Quantity	Units	CS1	CS2	CS3	CS4
464,586	sq. ft.	430,383	33,973	230	0

The microsilica concrete wearing surface rating is a **7**, indicating that it is in **Good** condition. The wearing surface consists of a 1.2” layer of latex modified concrete on top of the reinforced concrete deck. Typical deterioration includes minor wear in the wheel path and isolated minor hairline cracking. There are isolated areas of surface scaling or spalling up to 1” deep. Some of the scaled/spalled areas are patched with bituminous material (Photo 9). There is spalling up to ½” deep along the joints and areas of vegetation are growing along the curb line. In Unit II, Span 6, there is an area of spalling in the wearing surface in Lane 3 Westbound that appears to be due to a vehicle fire (Photo 10).

For specific wearing surface deficiencies, refer to Tables 1 through 5 in Appendix C.



Photo 9: Wearing Surface Spall Patched with Asphalt



Photo 10: Wearing Surface Damage Due to Vehicle Fire in Right Westbound Lane In Unit II

5.1.7 ELEMENT 815 – DRAINAGE

Total Quantity	Units	CS1	CS2	CS3	CS4
268	each	25	200	27	16

The deck drainage is in **Satisfactory** condition. **Most** of the scuppers and catch basins along the edge of roadway are partially or fully clogged with debris that is visible from the top of deck (Photo 11). Many of the scupper catch basins, including those inside vaulted areas are fully clogged with dirt, debris, and water. In Unit IV, near Bent 15, the scupper catch basin is heavily spalled and the grate has fallen out of place. In Unit II, Span 2, the downspout at the South Truss panel point L6U6 is broken which is allowing water to drain directly onto the superstructure (Photo 12). At the Pier 5 South Column, the bottom angle scupper piece is broken. In Unit II Span 9, the north scupper downspout is disconnected and a portion of the downspout could fall into the river below. **In Unit I, Section P at the north fascia, floorbeam nearest to Pier 0, the downspout sections are misaligned vertically by 6" (Photo 13). The downspout in Unit V at Pier 39 was seen to not be functioning as intended during a period of heavy rain as some water was falling from an area above the steel pier cap.**

For specific drainage deficiencies, refer to Table 7 in Appendix C.



Photo 11: Typical Fully Clogged Scuppers



Photo 12: Disconnected Downspout in Unit II, Span 2, South Truss at U6L6



Photo 13: Misaligned Downspout in Unit I, Section P at North Fascia Near Joint O

5.2 NBI Item 59 – Superstructure

The overall superstructure rating is a **5**, indicating that it is in **Fair** condition. Condition findings of individual superstructure items are as follows:

5.2.1 ELEMENT 107 – STEEL OPEN GIRDER/BEAM

Total Quantity	Units	CS1	CS2	CS3	CS4
8,898	ft.	7,346	1,510	42	0

The steel beams and girders are in overall **Fair** condition. The West Approach, Unit I, Section K / C and N superstructure consists of rolled beams, welded plate girders, and riveted built-up plate girders. Typical conditions found include areas of minor corrosion and broken rivets. The north and south girders in Section K over W. 28th Street has areas of scraped paint on the bottom flange due to impact damage.

In Unit III over West 9th Street, the south fascia beam is misaligned slightly to the north due to vehicular impact. There are also impact scrapes visible on the recently painted bottom flange. This beam was previously heat straightened and nearly returned to its original alignment. Measured minimum clearance at this beam is 13'-6" (posting) feet along the right curb.

The East Approach, Unit IV Lakefront Trestle consists of riveted built-up girders with isolated areas of painted over pitting up to 1/8" deep and pack rust along the bottom flange up to 1" thick. There are cutouts in the girder webs up to 11.5" L x 10" H in various locations throughout Unit IV. These cutouts are present for drainage troughs that were removed in 1991.

The East Approach, Unit V Lakefront Ramp superstructure consists of three riveted built-up plate girders with painted over pitting up to 1/16" deep typical on the girder webs and bottom flanges with isolated locations of up to ¼" deep. At several locations the bottom flange plates are distorted due to sealed pack rust (Photo 14).

For specific steel beam deficiencies, refer to Tables 8 through 11 in Appendix C.



Photo 14: Pitting and Distorted Plates of Center Girder in Unit V, Span 39 at Pier 38, North Face

5.2.2 ELEMENT 113 – STEEL STRINGER

Total Quantity	Units	CS1	CS2	CS3	CS4
62,103	ft.	61,643	460	0	0

The stringers are in **Good** condition. The steel stringers across the structure were replaced in the 1991-1992 deck replacement project. The stringers on the approaches were all repainted in the recent rehabilitation project. Typical conditions found are isolated freckled corrosion across the structure **with isolated pitting**.

For specific steel stringer deficiencies, refer to Tables 8 and 10 and Figures 1 through 18 in Appendix C.

5.2.3 ELEMENT 116 – REINFORCED CONCRETE STRINGER

Total Quantity	Units	CS1	CS2	CS3	CS4
3,611	ft.	3,503	72	36	0

The reinforced concrete stringers are in **Satisfactory** condition. The reinforced concrete stringers in West Approach Sections D, M, J', P, and B' are in overall Satisfactory condition. There are hairline cracks with and without efflorescence throughout the concrete stringers. There are isolated patches throughout the stringers with some areas of unconsolidated concrete and delaminations. The stringers in Section P are in fair to poor condition. There are spalls and delaminated areas up to 12' long x 4' high and isolated spalls up to 3" deep in stringers in Section P, with moderate section loss on the shear reinforcing. **The bottom of the cantilevered Floorbeam 1 has cracking with rust staining at Pier 0 (Photo 16).**

For specific concrete stringer deficiencies, refer to Table 8 in Appendix C.



Photo 15: Reinforced Concrete Stringers, Unit I, Section P



Photo 16: Reinforced Concrete Stringer with Cracking with Rust Staining Near North Fascia at End of Unit I at Joint O, Section P

5.2.4 ELEMENT 120 – STEEL TRUSS

Total Quantity	Units	CS1	CS2	CS3	CS4
5,360	ft.	1,978	2,150	1,178	54

The truss is in **Poor** condition. Overall, the truss members are in Poor condition with typical areas of painted over minor section loss, pitting, reactivated pack rust, distortion due to pack rust, and surface corrosion throughout all truss members (Photo 17). A summary of defects on each truss member type is listed below. Refer to the Deficiency Figures for further details.



Photo 17: North Truss Elevation, Spans 1 Thru 3

The truss verticals exhibit varying section loss due to pack rust between the gusset plates, fill plates, cover plates, and vertical flanges.

The truss diagonals exhibit section loss with pitting typical in the top face of the web plates of the rolled sections and pack rust induced distortion along the flanges and connection fill plates. There are locations where section loss in the web was repaired with bolted repair plates.

The truss upper chord exhibits areas of painted over section loss, pitting, and pack rust induced distortion (Photo 18). There are isolated areas of reactivating corrosion near the joints. **There are locations of the top flange near the gusset plates bowing downward (Photo 19).**

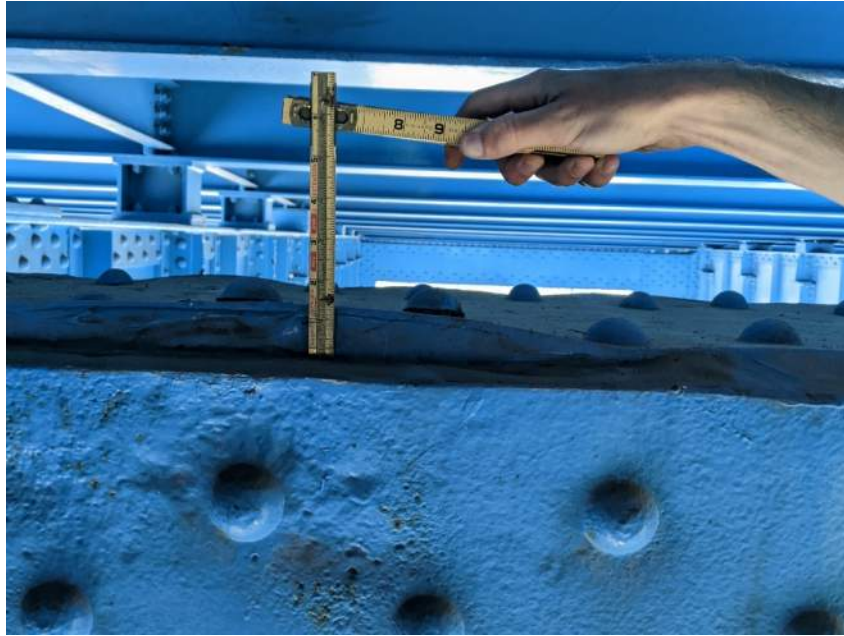


Photo 18: Distortion of Top Flange of Top Chord Due to Pack Rust



Photo 19: Bowing of Top Chord, Top Flange

The lower chord exhibits more numerous deficiencies across the structure. Section loss is affecting up to approximate 25% of the total calculated length of the lower chord members. These areas include section loss due to previously noted and reactivated areas of pack rust and pitting. There are previously caulked areas of pack rust at the lower chord to gusset plate interfaces that are cracked and no longer effective. There are numerous locations noted of pack rust, both sealed and reactivated, located between the flange angles and the web plates that are distorting the web plates up to 2" high (Photo 20). Isolated perforations are also noted along the top and bottom flange plates. The Unit II lower chord (Span 8, L2425) at the South Truss, has a full length retrofit around the original steel member. There is minor surface corrosion on the retrofit bolt heads at this location.



Photo 20: Painted Over and Reactivating Pack Rust Typical Between Web and Flange Plates



Photo 21: Painted Over Pitting, Pack Rust at Fill Plates of L15L16

The lower lateral bracing and sway exhibits areas of pack rust and pitting, with areas of painted over corrosion holes (Photo 22). Isolated locations exhibit missing **or distorted** rivets and broken and painted over section loss on the rivet heads. The connection plates have areas of significant section loss with isolated corrosion holes typical.

Refer to Figures 1 through 18 in Appendix C for specific truss member deficiencies.



Photo 22: Painted Over Pitting and Corrosion Holes in Sway Bracing

5.2.5 ELEMENT 152 – STEEL FLOOR BEAM

Total Quantity	Units	CS1	CS2	CS3	CS4
23,487	ft.	18,024	5,111	352	0

The floorbeams are in overall **Good** condition. The floorbeams were recently repainted in Unit I, Unit III, Unit IV, and Unit V. Typical conditions found in those areas include areas of painted over pitting up to 1/4" deep and reactivated areas of pack rust and freckled surface corrosion. Behind some of the removed stringer connections, there is painted over section loss with some corrosion holes in the webs (Photo 23). Weld remnants and random attachments remain on the floorbeams from previous drainage assemblies. In the Unit II main truss spans, areas of painted over pitting were found along the bottom of top flange tension tie plates connecting the center floor beam section and the floor beam cantilever brackets. In Unit II and III, there are cracks present in the floorbeam webs at the top flange cope, adjacent to the truss lines. There are several new crack locations that were not previously noted, and several of the previously noted cracks have grown since the **2022** inspection (Photo 24). **Several of the new crack locations may just be paint cracks, some with rust staining, but should nonetheless be monitored.** For specific Unit II floorbeam crack locations and descriptions, Refer to Table 13 in Appendix C.

For specific floorbeam deficiencies, refer to Tables 8 through 11 and 13, and Figures 1 through 18 in Appendix C.



Photo 23: Painted Over Pitting and Corrosion Holes in Floorbeam



Photo 24: Propagating Crack in North Truss Floorbeam

5.2.6 ELEMENT 155 – REINFORCED CONCRETE FLOOR BEAM

Total Quantity	Units	CS1	CS2	CS3	CS4
5,407	ft.	5,353	54	0	0

The floorbeams are in overall **Good** condition. There are reinforced concrete floorbeams in the West Approach, Unit I, Section J', B', M, D and P. In Section P, there are isolated hairline cracks and areas of delamination throughout the floorbeams, and several locations of spalling with exposed reinforcing.

For specific deficiencies, refer to Table 8 in Appendix C.

5.2.7 ELEMENT 161 – STEEL PIN AND PIN & HANGER ASSEMBLY

Total Quantity	Units	CS1	CS2	CS3	CS4
14	each	11	2	1	0

The pins, hangers, and hinges are in **Good** condition. In Unit II, the pins exhibit painted over pitting with some active corrosion due to deck joint leakage. In several locations, the inboard and outboard oval pin plates have rotated. In Span 9, South Truss at LOL1 the pin plates are rotated to the point where they are in contact with gusset stiffening channels on both the inboard and outboard gusset. The channel flange/rivets are beginning to push the edge of the pin plate outward.

In the Unit IV, there are pin and hanger locations where rivet heads on the girders interfere with hangers. Evidence of movement of the pin and hanger was noted due to cracked paint between the hangers and the beam webs. Isolated pins exhibit painted over pitting less than 1/8" deep.

For specific deficiencies, refer to Table 10 and Figures 1 through 15 in Appendix C.



Photo 25: Pin and Hanger Assembly

5.2.8 ELEMENT 162 – STEEL GUSSET PLATE

Total Quantity	Units	CS1	CS2	CS3	CS4
548	each	238	140	170	0

The truss gusset plates are in **Fair** condition. The truss gusset plates typically exhibit painted over pitting up to ¼” deep (Photo 26). There are several locations of reactivating pitting throughout the Main Truss spans. There is pack rust between various truss members and gusset plates at both the upper and lower chords. **Corrosion hole is seen at outboard and inboard gusset plate at Unit II- North Main Truss Span at member U6 (Photo 27)**. Fill plates across the structure typically exhibit painted over section loss with up to 100% section loss in isolated locations outside of the gusset plates.

Refer to Figures 1 through 18 in Appendix C for specific gusset plate deficiencies.



Photo 26: Painted over pitting at Span 6, U0, Outboard Gusset Plate



Photo 27: Upper Chord Outboard Gusset Plate at Span 7 North Truss, U6



Photo 28: Rust Staining at Lower Chord Gusset Plate in Span 3 North Truss, L0

5.2.9 ELEMENT 311 – MOVABLE BEARING

Total Quantity	Units	CS1	CS2	CS3	CS4
103	each	83	14	6	0

The moveable bearings are in **Good** condition. The moveable bearings in Unit II exhibit moderate surface corrosion throughout the bearing components. Several bearings in Unit II have standing water and debris accumulation in the bearing assembly. For specific locations of standing water and debris accumulation, refer to Table 12 in Appendix C. The moveable bearings in Unit III were cleaned and in the latest rehabilitation project. **However, the bearing below L8 in Span 11 has active corrosion between bearing device and masonry plate with section loss up to ¼” (Photo 29).** Typical conditions found are painted over section loss up to 3/16” deep throughout the lower portion of the columns and cleaned and caulked areas of pack rust. The anchor bolts at the base of Bents 1 through 10 exhibit moderate painted over section loss. Masonry plates typically exhibit painted over pitting up to 3/16” deep. In Unit V the moveable bearings have widespread painted over pitting (Photo 30).

For specific moveable bearing deficiencies, refer to Tables 8 through 12 and Figures 1 through 18 in Appendix C.



Photo 29: Active Corrosion with Section Loss Up To ¼" at Bearing Below L8 In Span 11



Photo 30: Painted Over Pitting of Movable Bearings at Abutment A

5.2.10 ELEMENT 313 – FIXED BEARING

Total Quantity	Units	CS1	CS2	CS3	CS4
100	each	80	14	6	0

The fixed bearings are in **Good** condition. The fixed bearings in Unit II exhibit moderate corrosion and section loss throughout the bearing components (Photo 31). Several bearings in Unit II have standing water and debris accumulation in the bearing assembly (Photo 31). For specific locations of standing water and debris accumulation, refer to Table 12 in Appendix C.

For specific fixed bearing deficiencies, refer to Tables 8 through 12 and Figures 1 through 18 in Appendix C.



Photo 31: Typical Fixed Bearing with Moderate Corrosion



Photo 32: Standing Water in A Bearing Assembly in Unit II

5.2.11 NBI ITEM 59.01 & ELEMENT 515 – STEEL PROTECTIVE COATING

Total Quantity	Units	CS1	CS2	CS3	CS4
889,000	sq. ft.	862,360	26,340	300	0

The protective coating system (PCS) rating is a **7**, indicating that it is in **Good** condition. The PCS in the Main Truss Spans was applied in 2007. The PCS in the West Approach, Forward Section, Lakefront Trestle, and Lakefront Ramp was applied in 2017 and 2018 and in is very good condition (Photo 33). The paint system in Unit II typically exhibits fading and reactivating corrosion throughout with isolated locations of moderate active corrosion, mainly near joints and leaking scupper downspouts (Photo 34).



Photo 33: Protective Coating System in Unit I



Photo 34: Protective Coating System with Reactivating Corrosion Near a Joint

5.2.12 ALIGNMENT

In Unit II, there are several pin locations along the upper chord and lower chord where the trusses are not aligned along a linear plane. This is due to an intentional change in alignment of the structure. These locations should continue to be monitored.

In Unit III, between Bent 8 and 9, the south diagonal is bent upward and to the South due to vehicular impact. The member has not been braced or straightened.

In Unit IV, Section E at Bent 26, the north girder bottom flange on the north side is bent at Joint B4 and the pin nuts show evidence of movement. Continue to monitor this location.

5.2.13 FATIGUE PRONE DETAILS

The fatigue prone details are in **Good** condition. In the Lakefront Trestle, Unit IV, Bents 14 and 15, Section A, there is an obsolete utility bracket welded to the south twin girder. The top flange weld on the field splice of Girder GF2 exhibits a deep crevice between adjacent weld passes. These types of welded connections represent stress risers and potential fatigue prone details that should be monitored in future inspections.

5.3 NBI Item 60 – Substructure

The overall substructure rating is a **6**, indicating that it is in **Satisfactory** condition. Condition findings of individual substructure items are as follows:

5.3.1 ELEMENT 202 – STEEL COLUMN

Total Quantity	Units	CS1	CS2	CS3	CS4
151	each	120	31	0	0

The steel pier columns in the West Approach Spans are in **Fair** condition.

The steel bents in Unit I (Photo 31), Unit III, and Unit IV exhibit areas of painted over pitting up to 3/16" deep and isolated painted over corrosion holes. There are areas of painted over pack rust up to 1/4" thick between plates. The anchor bolts nuts exhibit up to 40% painted over section loss. Anchor bolts have painted over section loss up to 75%. The reinforced concrete bases exhibit delamination, cracking, and isolated spalls up to 4" deep.

For specific steel column deficiencies, refer to Tables 8 through 11 and Figures 16 through 18 in Appendix C.



Photo 35: Steel Columns in Unit 1

5.3.2 ELEMENT 205 – REINFORCED CONCRETE COLUMN

Total Quantity	Units	CS1	CS2	CS3	CS4
268	each	213	53	2	0

The reinforced concrete pier columns are in **Fair** condition. In Unit I, Section M and D, the reinforced concrete columns are generally in good condition with one isolated column with significant spalling. In Unit I, Section P, several of the columns have areas of delamination. The columns in Unit II typically have areas of cracking with rust staining and some areas of delamination.

For specific deficiencies, refer to Tables 14 through 18 in Appendix C.

5.3.3 ELEMENT 210 – REINFORCED CONCRETE PIER WALL

Total Quantity	Units	CS1	CS2	CS3	CS4
55	ft.	20	25	10	0

The pier walls are in **Good** condition. Pier 37 between Units IV and V has several areas of delamination, spalling and cracking, especially on the bearing pedestals (Photos 36 & 37).



Photo 36: Pier 37 Wall Spalls



Photo 37: Pier 37 Bearing Pedestals Spalling

For specific pier wall deficiencies, refer to Table 18 in Appendix C.

5.3.4 ELEMENT 215 – REINFORCED CONCRETE ABUTMENT

Total Quantity	Units	CS1	CS2	CS3	CS4
110	ft.	59	51	0	0

The abutment walls are in **Good** condition. There are isolated areas of hairline vertical cracking with isolated areas of efflorescence and water staining on the Unit I abutments. In Unit V, the East Abutment exhibits areas of patched concrete.

For specific abutment wall deficiencies, refer to Table 14 and 18 in Appendix C.



Photo 38: East Abutment

5.3.5 ELEMENT 231 – STEEL PIER CAP

Total Quantity	Units	CS1	CS2	CS3	CS4
5,426	ft.	5,197	209	20	0

The pier caps are in **Good** condition. The steel pier caps at Pier 38, 39, & 40 in Unit V exhibit painted over pitting and pack rust up to 1” thick (Photo 39).

For specific steel pier cap deficiencies, refer to Table 14 and 18 in Appendix C.



Photo 39: Unit V Steel Pier Cap Plate Distortion Due to Pack Rust

5.3.6 ELEMENT 234 – REINFORCED CONCRETE PIER CAP

Total Quantity	Units	CS1	CS2	CS3	CS4
212	ft.	201	9	2	0

The pier caps are in **Good** condition. In Unit I, there are areas of delaminations in the underside of Pier O in Section P near the middle of the cap (Photo 40). The Pier 12 cap in Section M exhibits a spall with exposed reinforcing steel. In Unit II, Pier 10 Cap exhibits a patched and fiber wrapped area on the underside of the cap.

For specific concrete pier cap deficiencies, refer to Table 14 in Appendix C.



Photo 40: Underside of Pier O in Section P Delaminations

5.3.7 ELEMENT 830 – ABUTMENT BACKWALL

Total Quantity	Units	CS1	CS2	CS3	CS4
110	ft.	50	60	0	0

The backwalls are in **Good** condition. Minor vertical cracking and staining are present on the East Abutment backwall. The **east abutment has an area of spalling with exposed reinforcement (Photo 41)**.

For specific backwall deficiencies, refer to Table 18 in Appendix C.



Photo 41: East Abutment Backwall Spall with Exposed Rebar

5.3.8 WINGWALLS

The wingwalls are in **Good** condition.

5.3.9 MASK WALLS

In Unit I, there are mask walls in each section except for B and J where the roadway is built on fill. The mask walls have widespread areas of spalling, delamination, and cracking on the inside and outside faces of the walls. Several spalls exhibit exposed reinforcing steel with significant section loss. In Section C & K, some of the delaminations are above pedestrian walkways. **In Section N, there is a very large 20'x10' delamination with deteriorated rebar on the back face of the south side wall under Joint Q (Photo 42).**



Photo 42: Section N Wall with Very Large Delamination

In Unit III, there are mask walls at the north and south chambers east of West 9th Street. The inside faces of the walls have significant areas of spalling, delaminations and cracking. Several spalls have exposed rebar with up to 100% section loss.

For specific mask wall deficiencies, refer to Tables 14 and 16 in Appendix C.

5.4 NBI Item 61 – Channel & Channel Protection

The overall channel rating is an **8**, indicating that it is in **Very Good** condition. Condition findings of individual channel items are as follows:

5.4.1 ALIGNMENT

The alignment is in **Good** condition (Photos 43 and 44).



Photo 43: Channel at Bridge, Looking Upstream



Photo 44: Channel at Bridge, Looking Downstream

5.4.2 PROTECTION

The channel protection is in **Good** condition (Photos 45 and 46).



Photo 45: Channel Protection, East Bank



Photo 46: Channel Protection, West Bank

5.4.3 HYDRAULIC OPENING

The hydraulic opening is in **Good** condition. The hydraulic opening is sufficient.

5.4.4 NAVIGATION LIGHTS

The navigation lights are in **Good** condition.

5.4.5 NBI ITEM 58.01 – SCOUR

The scour rating is a **7**, indicating that it is in **Good** condition. The piers are outside of the normal channel flow area.

5.5 Approaches

The approaches are in **Satisfactory** condition. Condition findings of individual approach items are as follows:

5.5.1 ELEMENT 321 – REINFORCED CONCRETE APPROACH SLAB

Total Quantity	Units	CS1	CS2	CS3	CS4
6,788	sq. ft.	6,584	136	68	0

The approach slabs are in **Good** condition. There is some cracking and spalls with asphalt patching at the ends (Photo 47). The asphalt joints at the ends of the west approach slabs have areas of cracking, patching, and heaving (Photo 47).



Photo 47: Approach Slab with Asphalt Patching At End Of Eastbound, West Approach

5.5.2 APPROACH WEARING SURFACE

The approach wearing surfaces are in **Fair** condition (Photo 48). The east and west approach wearing surface exhibits numerous potholes and asphalt patches. The asphalt joints at the ends of the west approach slabs have areas of **2" deep potholes**, cracking, patching, and heaving (Photo 49).



Photo 48: Typical Approach Wearing Surface



Photo 49: Asphalt Patching at End Of Eastbound, West Approach Slab

5.5.3 EMBANKMENT

The approach embankments are in **Good** condition. **There was a previously noted 14' long x 4' wide x 2' deep sinkhole near the North column of Bent 30 in Unit IV. The sink hole has been patched since the 2022 inspection (Photo 50).**

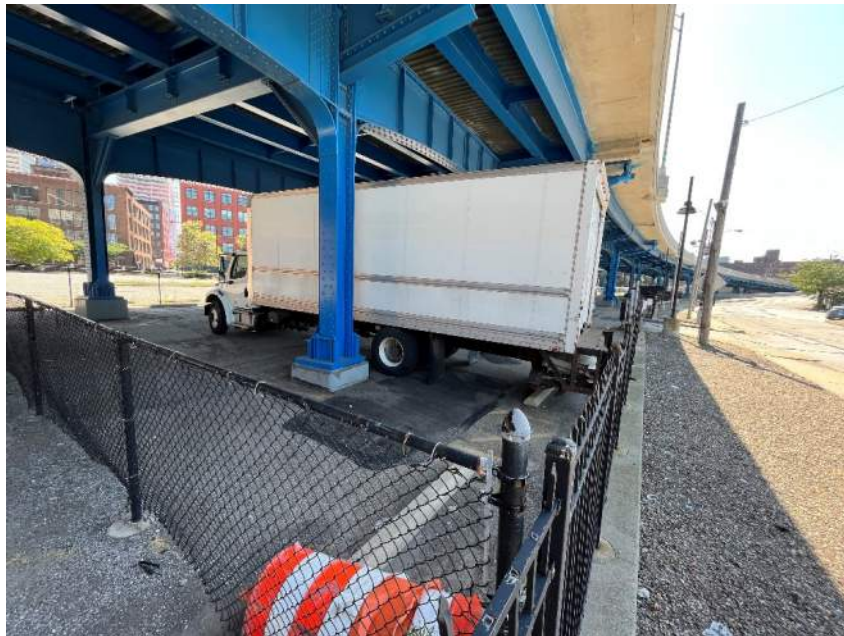


Photo 50: Sink Hole Patch

5.5.4 GUARDRAIL

The approach guardrails are in **Satisfactory** condition. There are areas of cracking and spalling in the approach concrete barrier. At the westbound exit to W. 28th Street, eastbound exit to W. 25th Street, **and eastbound to W. 6th Street**, the impact attenuators are damaged (Photo 51).



Photo 51: Damage to Impact Attenuator at Eastbound Exit to W. 6th Street

5.5.5 SECURITY ITEMS

The fenced in area under Unit V is accessible due to an open gate on the southeast end of Pier 37. Due to this opening, there is evidence of a homeless encampments within the fenced in area.

5.6 Signs & Utilities

Condition findings of individual sign and utility items are as follows:

5.6.1 SIGNS

The signs on the structure are in **Good** condition. In Unit V, there is a missing sign curve warning sign in the Eastbound lanes.

5.6.2 UTILITIES

The deck lighting is in **Fair** condition. The deck lighting consists of metal poles with cobra head fixtures. Several pull boxes at the base of the light poles across the structure have either missing or loose covers with exposed wiring (Photo 52).



Photo 52: Missing Cover with Exposed Wiring At The Base Of A Light Pole

5.7 Summary & Recommendations

The General Appraisal and Operating Status for the Main Avenue Bridge over the Cuyahoga River is 5 (Fair Condition). The Superstructure components, particularly the Unit II - Main Truss lower chord members, are the governing element for this condition rating.

The following is a summary of the field inspection performed on **July 10-15, 2023**:

NBI Item	Component	Rating
58	Deck	7
58.01	Wearing Surface	7
58.02	Expansion Joint	6
59	Superstructure	5
59.01	Protective Coating System (PCS)	7
60	Substructure	6
61	Channel & Channel Protection	8
61.01	Scour	7

DLZ has determined the following recommendations for the bridge. Based on the level of urgency, recommendations have been divided into three categories: Priority, Maintenance, and Monitor.

5.7.1 PRIORITY

The following recommendations are priority repairs which should be completed as soon as possible to address an immediate safety concern:

- Remove areas of loose and deteriorating concrete on the north deck fascia in Spans 8 and 9 over the parking at 1189 Main Ave **and at 2316 Mulberry Ave.**
- Remove delaminated concrete from Joint L concrete header above Elm Street in Span 5/6.
- Drill crack arrest holes in the areas of fatigue cracking in the Unit II and III Floorbeam Top Flange Copcs.
- Repair the Joint X broken compression seal retainer over Westbound Lane 3 in Unit 1.
- Secure loose joint armor at Joint O in Westbound Lane 1 in Unit II.
- **Realign the downspout in Unit I, Section P, Pier 5 at the North Column.**
- Repair the disconnected downspout over the Cuyahoga River in Unit II, Span 9.
- **Repair the disconnected downspout over the Cuyahoga River in Unit II, Span 2.**
- **Clean, paint, and repair the Pin on Unit II, Span 9 north truss.**
- **Clean out the catch basins at Pier 2 in Unit II that are overflowing and causing flooding issues at Mulberry's Bar.**
- **Repair the malfunctioning downspout in Unit V at Pier 39**

- Repair the damaged impact attenuators at the westbound exit to W. 28th Street, eastbound exit to W. 25th Street, and **eastbound exit to W. 6th Street.**
- **Replace deteriorated and torn joint material in deck expansion joints.**
- **Repair very large delamination with deteriorated rebar on the back face of the south side wall under Joint Q in West Approach Abutment Section N.**

5.7.2 MAINTENANCE

The following recommendations are on-going repairs which are intended to maintain the current level of service for the bridge:

- Clean out debris from all joints.
- Spot paint areas of corrosion in Unit II.
- Install minimum overhead clearance signs as required by ODOT & City of Cleveland policy.
- Clean out all scuppers at deck level and under structure.
- Replace the broken downspout bottom angle piece at Unit II, Span 2, South Truss, L6U6.
- Install utility access covers on bridge light poles as needed.
- Remove obsolete and random welded attachments.
- Clean out drain holes to drain water from bearings. Drill drain holes in bearings where needed to avoid water collecting in casting.
- Reset expansion bearings at Pier 3 and Pier 11.
- Clean out debris and secure gate at Unit V, Pier 37.
- Main Truss Spans: Remove expansion bearing guide plates, remove debris and paint roller nest.

5.7.3 MONITOR

The following items should be investigated and recorded with each annual bridge inspection:

1. Monitor areas of fatigue cracking and fatigue crack repairs during future inspections.
 2. Monitor areas of deteriorating substructure and deck concrete to ensure potential spalls are not a public safety concern.
 3. Monitor the areas of reactivating pack rust and corrosion throughout the structural members.
-



INNOVATIVE IDEAS
EXCEPTIONAL DESIGN
UNMATCHED CLIENT SERVICE

Routine and Fracture Critical Inspection Report
CUY-2-1441, SFN 1800035

APPENDIX A – AssetWise Bridge Inspection Field Report

Inspector: Agler,Justin

Inspection Date: 07/10/2023

Structure Number: 1800035

Facility Carried: SR 2

Ohio Bridge Inspection Summary Report

CUY-00002-1441 (1800035)

2: District 16000 - CLEVELAND (CUY county)
ict
12

5A: Inventory Route 1 00002

21: Major Maint A/B 01 - State Highway Agency /

7: Facility On SR 2

225 Routine Main A/B 04 - City or Municipal Highway Agency /

6: Feature Ints CUY RIVER,RTA,FLATS

221 Inspection A/B 01 - State Highway Agency /

9: Location MAIN AVE. BRIDGE

220: Inv. Location DISTRICT 12

Lat, Lon 41.490256 ,-81.711967

Condition Structure Type

58: Deck 7 - Good Condition
 58.01 Wearing Surface 7 - Good (1% distress)
 58.02 Joint 6- Satisfactory (isolated leaking)
59: Superstructure 5 - Fair Condition
 59.01 Paint & PCS 7 - Good (1-5% corr.)
60: Substructure 6 - Satisfactory Condition
61: Channel 8
61.01 Scour 7 - Good
62: Culverts N - Not Applicable
67.01 GA 5

43: Bridge Type 3 - Steel
 09 - Truss - Deck
 N- Not Applicable
 45: Spans Main / Approach 10 / 30
 107: Deck Type 1 - Concrete Cast-in-Place
 408: Composite Deck N - Non-composite Construction
 414A Joint Type 1 8 - Elastomeric Strip Seal
 414B: Joint Type 2 N - None
 108A: Wearing Surface 3 - Latex Concrete or similar additive
 N- Not Applicable

Appraisal

Sufficiency Rating 40.2 SD/FO 2 - FO
 36: Rail, Tr, Gd, Term Std 1 1 1 1
 72: Approach Alignment 6 - Equal to present minimum criteria
 113: Scour Critical 8 - Stable for scour conditions
 71: Waterway Adequacy 9 - Bridge Above Flood Water Elevations

422: WS Date 01/01/1992
 423: WS Thick (in) 1.2
 482: Protective Coating 8 - Paint System A with intermediate tie coat
 483: PCS Date 01/01/1984
 453: Bearing Type 1 0 - Other
 455: Bearing Type 2 N - None
 528: Foundn: Abut Fwd 4 - Spread Footing (on soil)
 533: Foundn: Abut Rear 4 - Spread Footing (on Soil)
 536: Foundn: Pier 1 2 - Cast-in-Place Reinforced Concrete Piles (Other diameter)
 539: Foundn: Pier 2 N - None (Such as most Culverts)

Geometric

48: Max Span Length (ft) 400.0
 49: Structure Length (ft) 6580.0
 52: Deck Width, Out-To-Out (ft) 85.5
 424: Deck Area (sf) 562590
 32: Appr Roadway Width (ft) 70.0
 51: Road Width, Curb-Curb (ft) 82.0
 50A: Curb/SW Width: Left (ft) 0
 50A: Curb/SW Width: Right (ft) 0
 34: Skew (deg) 99
 33: Bridge Median 3 - Closed median with non-mountable barriers
 54B: Min Vert Underclearance (ft) 14.08
 336A: Min Vert Clrnce IR Cardinal (ft) 99
 336B: Min V Clr IR Non-Cardinal (ft) 0
 578: Culvert Length (ft) 0

Age and Service

27: Year Built/ 106 Rehab 1939 / 1992
 42A: Service On 5 - Highway-pedestrian
 42B: Service Under 8 - Highway - waterway - railroad
 28A: Lanes on 06
 28B: Lanes Under 04
 19: Bypass Length 2
 29: ADT 37139
 109: % Trucks (%) 3

Load Posting

41: Op/Post/Closed A - Open
 70: Posting 5 - Equal to or above legal loads
 70.01: Date
 70.02: Sign Type
 734: Percent Legal (%) 110
 704: Analysis Date 12/19/2012
 63: Analysis Method 6 - Load Factor (LF) rating reported by rating factor (RF) method using MS18

Inspections

		Months	
90: Routine Insp.		12	07/10/2023
92A: FCM Insp.	Y	24	07/10/2023
92B: Dive Insp.	N	0	
92C: Special Insp.	N	0	
92D: UBIT Insp.	Y	12	07/10/2023
92E: Drone Insp.	N	0	

Inspector Agler,Justin

Inspector: Agler,Justin
Inspection Date: 07/10/2023
loading.

Structure Number: 1800035
Facility Carried: SR 2

Inspector: Agler,Justin
 Inspection Date: 07/10/2023

Structure Number: 1800035
 Facility Carried: SR 2

	Environment	Total Quantity	Units	Condition State 1	Condition State 2	Condition State 3	Condition State 4
12-Reinforced Concrete Deck	3 - Mod.	502787	sq. ft.	487593	15094	100	0
<p>CS2: In Unit 1 the haunches in the deck above the stringers in these sections have areas of minor spalling. In Unit 1, Section P, the underside of the deck has cracking with efflorescence throughout. Isolated edge delaminations throughout.</p> <p>CS3: The underside of deck exhibits spalling at several joint locations in Unit II. Isolated edge spalls throughout.</p>							
510-Wearing Surfaces		464586	sq. ft.	430383	33973	230	0
<p>CS2: Minor abrasion in the wheel path and isolated hairline map cracking. Areas of bituminous patching</p> <p>CS3: Isolated areas of surface abrasion and spalling up to 1" deep. In Unit II, Span 6, there is an area of spalling in the wearing surface in Lane 3 Westbound that appears to be due to a vehicle fire</p>							
107-Steel Open Girder/Beam	3 - Mod.	8898	ft.	7346	1510	42	0
<p>CS2: Surface corrosion & minor painted over pitting.</p> <p>CS3: In Unit III over West 9th Street, the south fascia beam is misaligned slightly to the north due to vehicular impact. The East Approach, Unit IV Lakefront Trestle consists of riveted built-up girders with isolated areas of painted over pitting up to 1/8" deep and pack rust along the bottom flange up to 1" thick. The East Approach, Unit V Lakefront Ramp superstructure consists of three riveted built-up plate girders with painted over pitting up to 1/16" deep typical on the girder webs with isolated locations of up to 1/4" deep.</p>							
515-Steel Protective Coating		58000	sq. ft.	57420	580	0	0
<p>CS2: Areas of surface dulling</p>							
113-Steel Stringer	3 - Mod.	62103	ft.	61643	460	0	0
<p>CS2: Surface corrosion.</p>							
515-Steel Protective Coating		350000	sq. ft.	349300	700	0	0
<p>CS2: Areas of surface dulling</p>							
116-Reinforced Concrete Stringer	3 - Mod.	3611	ft.	3503	72	36	0
<p>CS2: Hairline cracks with and without efflorescence. Isolated patches and delaminations.</p> <p>CS3: Heavy spalls with exposed reinforcing in Unit I, Section P.</p>							
120-Steel Truss	3 - Mod.	5360	ft.	1978	2150	1178	54
<p>CS2: Surface corrosion & painted over minor pitting.</p> <p>CS3: Minor to moderate section loss, isolated small perforations, pack rust between plates with up to 2" of distortion.</p> <p>CS4: Advanced section loss & corrosion holes at several locations on lower chord.</p>							
515-Steel Protective Coating		225000	sq. ft.	202250	22500	250	0
<p>CS2: Areas of surface dulling and surface corrosion (substantially effective).</p> <p>CS2: Areas with limited effectiveness.</p>							

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	Environment	Total Quantity	Units	Condition State 1	Condition State 2	Condition State 3	Condition State 4
152-Steel Floor Beam	3 - Mod.	23487	ft.	18024	5111	352	0
CS2: Surface Corrosion CS3: Areas of minor to moderate section loss, painted over pitting up to 1/4" deep, reactivated pack rust. Unarrested cracks in top flange copes at truss connections.							
515-Steel Protective Coating		230000	sq. ft.	227650	2300	50	0
CS2: Areas of surface dulling and surface corrosion (substantially effective). CS2: Areas with limited effectiveness.							
155-Reinforced Concrete Floor Beam	3 - Mod.	5407	ft.	5353	54	0	0
CS2: Isolated hairline cracks and areas of delamination							
161-Steel Pin and Pin & Hanger Assembly or both	3 - Mod.	14	each	11	2	1	0
CS2: Minor painted over pitting on pins and adjacent plates. Minor misalignments of plates.							
162-Steel Gusset Plate	3 - Mod.	548	each	238	140	170	0
CS2: Areas of surface corrosion CS3: Painted over & reactivated pitting up to 1/4" deep. Pack rust along lower chord members.							
202-Steel Column	3 - Mod.	151	each	120	31	0	0
CS2: Areas of minor section loss							
515-Steel Protective Coating		26000	sq. ft.	25740	260	0	0
CS2: Areas of surface dulling and surface corrosion (substantially effective).							
205-Reinforced Concrete Column	3 - Mod.	268	each	213	53	2	0
CS2: Areas of map cracking, patching and delamination CS3: Few locations of spalling and rust staining							
210-Reinforced Concrete Pier Wall	3 - Mod.	55	ft.	20	25	10	0
CS2: Areas of moderate cracking and delamination CS3: Areas of spalling							
215-Reinforced Concrete Abutment	3 - Mod.	110	ft.	59	51	0	0
CS2: Minor vertical cracks with efflorescence and staining.							
231-Steel Pier Cap	3 - Mod.	5426	ft.	5197	209	20	0
CS2: Minor painted over pitting in Unit V CS3: Moderate painted over pitting and pack rust up to 1" thick in Unit V							
234-Reinforced Concrete Pier Cap	3 - Mod.	212	ft.	201	9	2	0
CS2: Areas of delamination CS3: Spall with exposed reinforcing							
300-Strip Seal Expansion Joint	3 - Mod.	1750	ft.	522	988	236	4

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	Environment	Total Quantity	Units	Condition State 1	Condition State 2	Condition State 3	Condition State 4
	CS2: Isolated areas of leakage. Minor Debris Impaction. Minor section loss to plates. CS3: Areas of significant debris impaction. Seals depressed up to 1". At Joint O on the westbound side of the bridge, the west joint armor in the left lane near the W. 28th Street exit ramp is loose and banging under vehicular impact						
302-Compression Joint Seal	3 - Mod.	1055	ft.	356	546	143	10
	CS2: Isolated areas of leakage. Minor Debris Impaction. Minor section loss to plates. CS3: Areas of significant debris impaction. Seals depressed up to 1". CS4: At Joint X, there is a 10 foot section of broken compression seal retainer in westbound lane 3, allowing drainage directly through the joint						
303-Assembly Joint with Seal	3 - Mod.	595	ft.	224	270	101	0
	CS2: Isolated areas of leakage CS3: Areas of tearing seals.						
311-Movable Bearing	3 - Mod.	103	each	83	14	6	0
	CS2: Surface Corrosion CS3: Painted over pitting up to 3/16" deep and moderate anchor bolt section loss.						
313-Fixed Bearing	3 - Mod.	100	each	80	14	6	0
	CS2: Surface Corrosion CS3: Minor to moderate section loss.						
321-Reinforced Concrete Approach Slab	3 - Mod.	6788	sq. ft.	6584	136	68	0
331-Reinforced Concrete Bridge Railing	3 - Mod.	20150	ft.	17616	2394	140	0
	CS2: Moderate vertical and horizontal cracking, map cracking, poor & failing patches. CS3: Areas of spalling, some with exposed reinforcing.						
815-Drainage	3 - Mod.	268	each	25	200	27	16
	CS2: Numerous partially clogged scuppers CS3: Numerous mostly clogged scuppers. Some disconnected or clogged downspouts. CS4: Several fully clogged scuppers						
830-Abutment Backwall	3 - Mod.	110	ft.	50	60	0	0
	CS2: Minor vertical cracking with staining.						

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Facility Carried: SR 2

ODOT District: District 12

CUY-00002-1441 _(1800035)

Date Built: 07/01/1939

Major Maint: 01 - State Highway Agency

Facility Carried: SR 2

Traffic On: 5 - Highway-pedestrian

Rehab Date: 07/15/1992

Routine Maint: 04 - City or Municipal Highway Agency

Feature Inters: CUY RIVER,RTA,FLATS

Traffic Under: 8 - Highway - waterway - railroad

Insp. Resp A: 01 - State Highway Agency

FIPS Code: 16000 - CLEVELAND (CUY county)

Location: DISTRICT 12

MAIN AVE. BRIDGE

Insp Resp B:

Inspector

Agler,Justin

Inspection Date 07/10/2023

Reviewer Not Approved

Inspector Comments - Deck and Approach

Deck

Element 12 - Reinforced Concrete Deck (SF)

The replacement deck, opened to traffic in 1992, consists of epoxy coated reinforcement with stay-in-place metal galvanized steel forms. In Unit 1, there are several sections that do not have stay-in-place forms, and the underside of the deck is visible. In these sections the deck has areas of light cracking and the haunches in the deck above the stringers have areas of minor spalling. In Unit 1, Section P, the underside of the deck has cracking with efflorescence throughout. Isolated edge delamination and spalls were noted, often adjacent to the expansion joint armor. At some locations these edge spalls have been sealed. Areas of isolated spalling were noted along the gutter line on the eastbound roadway in Unit II, Main Truss spans. The underside of deck exhibits spalling at several joint locations in Unit II. See the inspection report for additional details.

Element 300 - Strip Seal Expansion Joint (LF)

Throughout the structure, joints have significant debris impaction, **deteriorated joint material**, and corrosion with section loss typically 3/16" deep on the joint plates. Isolated joints exhibit evidence of leakage. At Joint O on the westbound side of the bridge, the west joint armor in the left lane near the W. 28th Street exit ramp is loose and banging under vehicular impact. The west joint header exhibits spalls on the top of deck at the area of loose joint armor. **Daylight is visible with debris on the floorbeam through Joint I1.** See the inspection report for additional details.

Element 302 - Compression Joint Seal (LF)

Throughout the structure, joints have significant debris impaction (Photo 4), **deteriorated joint material**, impact damage, and corrosion with section loss typically 3/16" deep on the joint plates. Some joint seals are depressed, up to 1" deep. Isolated joints exhibit evidence of leakage. **At eastbound Joint 8Q, there is a 4-foot section of missing joint armor in the middle lane (Photo 5).** At Joint X, there is a 10-foot section of broken compression seal retainer in westbound lane 3, allowing drainage directly through the joint.

Element 303 - Assembly Joint with Seal (LF)

There are scattered areas of minor tearing and leaking in the seals (Photo 6). At Joint L and Joint J, the joint header on the east side of the joint is delaminated and spalling with loose concrete falling onto the catwalk below. Joint L is located over Elm Street, and this spalling is a safety concern.

Element 331 - Reinforced Concrete Bridge Railing (LF)

The median and railing constructed during the 1991-1992 rehabilitation were poured using slip form construction. Both the median and the parapets were repaired in the last rehabilitation project between 2017 and 2018. Vertical, horizontal, and map cracking are common throughout the bridge railings. Many of the large spalls facing traffic were patched, however, isolated patches are spalled again. Several spalls

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exhibit exposed reinforcing steel. Many of the spalls previously noted on the exterior faces of the parapets have been sealed; however, surface corrosion is reactivating on the exposed reinforcing bars that were sealed, and some of the sealed concrete is delaminating. There are scattered areas with new spalls and delamination of the exterior of the parapets (Photo 7). On the north fascia in Spans 8 and 9, there are spalls forming over the parking lot at 1189 Main Ave. Areas of spalling and delamination exist in the bridge railing at or near the deck joints (Photo 8). There are isolated spalls up to 3" deep in the median.

Element 510 - Wearing Surface (SF)

The wearing surface consists of a 1.2" layer of latex modified concrete on top of the reinforced concrete deck. Typical deterioration includes minor wear in the wheel path and isolated minor hairline cracking. There are isolated areas of surface scaling or spalling up to 1" deep. Some of the scaled/spalled areas are patched with bituminous material (Photo 9). There is spalling up to ½" deep along the joints and areas of vegetation are growing along the curb line. In Unit II, Span 6, there is an area of spalling in the wearing surface in Lane 3 Westbound that appears to be due to a vehicle fire.

Element 815 - Drainage (EA)

Most of the scuppers and catch basins along the edge of roadway are partially or fully clogged with debris that is visible from the top of deck (Photo 11). Many of the scupper catch basins, including those inside vaulted areas are fully clogged with dirt, debris, and water. In Unit IV, near Bent 15, the scupper catch basin is heavily spalled and the grate has fallen out of place. In Unit II, Span 2, the downspout at the South Truss panel point L6U6 is broken which is allowing water to drain directly onto the superstructure (Photo 12). At the Pier 5 South Column, the bottom angle scupper piece is broken. In Unit II Span 9, the north scupper downspout is disconnected and a portion of the downspout could fall into the river below. In Unit I, Section P at the north fascia, floorbeam nearest to Pier 0, the downspout sections are misaligned vertically by 6" (Photo 13). The downspout in Unit V at Pier 39 was seen to not be functioning as intended during a period of heavy rain as some water was falling from an area above the steel pier cap.

Lighting

The deck lighting consists of metal poles with cobra head fixtures. Several pull boxes at the base of the light poles across the structure have either missing or loose covers with exposed wiring

Approach

Element 321 - Approach Slab (SF)

The approach slabs are in Good condition. There is some cracking and spalls with asphalt patching at the ends (Photo 47). The asphalt joints at the ends of the west approach slabs have areas of cracking,

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patching, and heaving (Photo 47).

Approach Wearing Surface

The approach wearing surfaces are in **Fair** condition (Photo 48). The east and west approach wearing surface exhibits numerous potholes and asphalt patches. The asphalt joints at the ends of the west approach slabs have areas of 2" deep potholes, cracking, patching, and heaving (Photo 49). See report for detailed locations and descriptions of deficiencies.

Embankment

The approach embankments are in Good condition. There was a previously noted 14' long x 4' wide x 2' deep sinkhole near the North column of Bent 30 in Unit IV. The sink hole has been patched since the 2022 inspection (Photo 50).

Guardrail

The approach guardrails are in Satisfactory condition. There are areas of cracking and spalling in the approach concrete barrier. At the westbound exit to W. 28th Street, eastbound exit to W. 25th Street, and eastbound to W. 6th Street, the impact attenuators are damaged (Photo 51).

Security Items

The fenced in area under Unit V is accessible due to an open gate on the southeast end of Pier 37. Due to this opening, there is evidence of a homeless encampments within the fenced in area.

Signs

The signs on the structure are in Good condition. In Unit V, there is a missing sign curve warning sign in the Eastbound lanes

Inspector Comments - General Appraisal

Superstructure

Element 107 - Steel Open Girder/Beam (LF)

The West Approach, Unit I, Section K / C and N superstructure consists of rolled beams, welded plate girders, and riveted built-up plate girders. Typical conditions found include areas of minor corrosion and broken rivets. The north and south girders in Section K over W. 28th Street has areas of scraped paint on the bottom flange due to impact damage.

In Unit III over West 9th Street, the south fascia beam is misaligned slightly to the north due to vehicular impact. There are also impact scrapes visible on the recently painted bottom flange. This beam was previously heat straightened and nearly returned to its original alignment. Measured minimum clearance at this beam is 13'-6" (posting) feet along the right curb.

The East Approach, Unit IV Lakefront Trestle consists of riveted built-up girders with isolated areas of painted over pitting up to 1/8" deep and pack rust along the bottom flange up to 1" thick. There are cutouts in the girder webs up to 11.5" L x 10" H in various locations throughout Unit IV. These cutouts

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are present for drainage troughs that were removed in 1991.

The East Approach, Unit V Lakefront Ramp superstructure consists of three riveted built-up plate girders with painted over pitting up to 1/16" deep typical on the girder webs and bottom flanges with isolated locations of up to 1/4" deep. At several locations the bottom flange plates are distorted due to sealed pack rust (Photo 14).

See the inspection report for additional details.

Element 113 - Steel Stringers (LF)

The steel stringers across the structure were replaced in the 1991-1992 deck replacement project. The stringers on the approaches were all repainted in the recent rehabilitation project. Typical conditions found are isolated freckled corrosion across the structure with isolated pitting. See the inspection report for additional details.

Element 116 - Reinforced Concrete Stringers (LF)

The reinforced concrete stringers in West Approach Sections D, M, J', P, and B' are in overall Satisfactory condition. There are hairline cracks with and without efflorescence throughout the concrete stringers. There are isolated patches throughout the stringers with some areas of unconsolidated concrete and delaminations. The stringers in Section P are in fair to poor condition. There are spalls and delaminated areas up to 12' long x 4' high and isolated spalls up to 3" deep in stringers in Section P, with moderate section loss on the shear reinforcing. The bottom of the cantilevered Floorbeam 1 has cracking with rust staining at Pier 0 (Photo 16).

Element 120 - Steel Truss (LF)

Overall, the truss members are in Poor condition with typical areas of painted over minor section loss, pitting, reactivated pack rust, distortion due to pack rust, and surface corrosion throughout all truss members. A summary of defects on each truss member type is listed below. Refer to the Deficiency Figures for further details.

The truss verticals exhibit varying section loss due to pack rust between the gusset plates, fill plates, cover plates, and vertical flanges.

The truss diagonals exhibit section loss with pitting typical in the top face of the web plates of the rolled sections and pack rust induced distortion along the flanges and connection fill plates. There are locations where section loss in the web was repaired with bolted repair plates.

The truss upper chord exhibits areas of painted over section loss, pitting, and pack rust induced distortion (Photo 18). There are isolated areas of reactivating corrosion near the joints. There are locations of the top flange near the gusset plates bowing downward (Photo 19).

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The lower chord exhibits more numerous deficiencies across the structure. Section loss is affecting up to approximate 25% of the total calculated length of the lower chord members. These areas include section loss due to previously noted and reactivated areas of pack rust and pitting. There are previously caulked areas of pack rust at the lower chord to gusset plate interfaces that are cracked and no longer effective. There are numerous locations noted of pack rust, both sealed and reactivated, located between the flange angles and the web plates that are distorting the web plates up to 2" high (Photo 20). Isolated perforations are also noted along the top and bottom flange plates. The Unit II lower chord (Span 8, L2425) at the South Truss, has a full length retrofit around the original steel member. There is minor surface corrosion on the retrofit bolt heads at this location.

The lower lateral bracing and sway exhibits areas of pack rust and pitting, with areas of painted over corrosion holes (Photo 22). Isolated locations exhibit missing or distorted rivets and broken and painted over section loss on the rivet heads. The connection plates have areas of significant section loss with isolated corrosion holes typical.

Element 152 - Steel Floorbeam (LF)

The floorbeams were recently repainted in Unit I, Unit III, Unit IV, and Unit V. Typical conditions found in those areas include areas of painted over pitting up to 1/4" deep and reactivated areas of pack rust and freckled surface corrosion. Behind some of the removed stringer connections, there is painted over section loss with some corrosion holes in the webs (Photo 23). Weld remnants and random attachments remain on the floorbeams from previous drainage assemblies. In the Unit II main truss spans, areas of painted over pitting were found along the bottom of top flange tension tie plates connecting the center floor beam section and the floor beam cantilever brackets. In Unit II and III, there are cracks present in the floorbeam webs at the top flange cope, adjacent to the truss lines. There are several new crack locations that were not previously noted, and several of the previously noted cracks have grown since the 2022 inspection (Photo 24). Several of the new crack locations may just be paint cracks, some with rust staining, but should nonetheless be monitored. For specific Unit II floorbeam crack locations and descriptions, Refer to Table 13 in Appendix C. See the inspection report for additional details.

Element 155 - Reinforced Concrete Floorbeam (LF)

There are reinforced concrete floorbeams in the West Approach, Unit I, Section J', B', M, D and P. In Section P, there are isolated hairline cracks and areas of delamination throughout the floorbeams, and several locations of spalling with exposed reinforcing. See the inspection report for additional details.

Element 161 - Steel Pin and Pin & Hanger Assembly (EA)

In Unit II, the pins exhibit painted over pitting with some active corrosion due to deck joint leakage. In several locations, the inboard and outboard oval pin plates have rotated. In Span 9, South Truss at LOL1 the pin plates are rotated to the point where they are in contact with gusset stiffening channels on both the inboard and outboard gusset. The channel flange/rivets are beginning to push the edge of the pin plate outward.

In the Unit IV, there are pin and hanger locations where rivet heads on the girders interfere with hangers. Evidence of movement of the pin and hanger was noted due to cracked paint between the hangers and the beam webs. Isolated pins exhibit painted over pitting less than 1/8" deep.

See the inspection report for additional details.

Element 162 - Steel Gusset Plate

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(EA)

The truss gusset plates typically exhibit painted over pitting up to ¼” deep (Photo 26). There are several locations of reactivating pitting throughout the Main Truss spans. There is pack rust between various truss members and gusset plates at both the upper and lower chords. Corrosion hole is seen at outboard and inboard gusset plate at Unit II- North Main Truss Span at member U6 (Photo 27). Fill plates across the structure typically exhibit painted over section loss with up to 100% section loss in isolated locations outside of the gusset plates. See report for detailed locations and descriptions of deficiencies.

Element 311 - Moveable Bearings (EA)

The moveable bearings in Unit II exhibit moderate surface corrosion throughout the bearing components. Several bearings in Unit II have standing water and debris accumulation in the bearing assembly. For specific locations of standing water and debris accumulation, refer to Table 12 in Appendix C. The moveable bearings in Unit III were cleaned and in the latest rehabilitation project. However, the bearing below L8 in Span 11 has active corrosion between bearing device and masonry plate with section loss up to ¼” (Photo 29). Typical conditions found are painted over section loss up to 3/16” deep throughout the lower portion of the columns and cleaned and caulked areas of pack rust. The anchor bolts at the base of Bents 1 through 10 exhibit moderate painted over section loss. Masonry plates typically exhibit painted over pitting up to 3/16” deep. In Unit V the moveable bearings have widespread painted over pitting (Photo 30).

Element 313 - Fixed Bearings (EA)

The fixed bearings in Unit II exhibit moderate corrosion and section loss throughout the bearing components (Photo 31). Several bearings in Unit II have standing water and debris accumulation in the bearing assembly (Photo 31).

Element 515 - Steel Protective Coating System (SF)

The PCS in the Main Truss Spans was applied in 2007. The PCS in the West Approach, Forward Section, Lakefront Trestle, and Lakefront Ramp was applied in 2017 and 2018 and in is very good condition (Photo 33). The paint system in Unit II typically exhibits fading and reactivating corrosion throughout with isolated locations of moderate active corrosion, mainly near joints and leaking scupper downspouts (Photo 34).

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Superstructure Alignment

In Unit II, there are several pin locations along the upper chord and lower chord where the trusses are not aligned along a linear plane. This is due to an intentional change in alignment of the structure. These locations should continue to be monitored.

In Unit III, between Bent 8 and 9, the south diagonal is bent upward and to the South due to vehicular impact. The member has not been braced or straightened.

In Unit IV, Section E at Bent 26, the north girder bottom flange on the north side is bent at Joint B4 and the pin nuts show evidence of movement. Continue to monitor this location.

Historic remarks: Isolated stringer sliding bearings exhibit minor vertical misalignment at the bearing interface in the East Approach Trestle Section.

Fatigue Prone Details

In the Lakefront Trestle, Unit IV, Bents 14 and 15, Section A, there is an obsolete utility bracket welded to the south twin girder. The top flange weld on the field splice of Girder GF2 exhibits a deep crevice between adjacent weld passes. These types of welded connections represent stress risers and potential fatigue prone details that should be monitored in future inspections.

Substructure

Element 202 - Steel Column (EA)

The steel bents in Unit I (Photo 31), Unit III, and Unit IV exhibit areas of painted over pitting up to 3/16" deep and isolated painted over corrosion holes. There are areas of painted over pack rust up to 1/4" thick between plates. The anchor bolts nuts exhibit up to 40% painted over section loss. Anchor bolts have painted over section loss up to 75%. The reinforced concrete bases exhibit delamination, cracking, and isolated spalls up to 4" deep.

Element 205 - Reinforced Concrete Columns (EA)

In Unit I, Section M and D, the reinforced concrete columns are generally in good condition with one isolated column with significant spalling. In Unit I, Section P, several of the columns have areas of delamination. The columns in Unit II typically have areas of cracking with rust staining and some areas of delamination.

Element 510 - Reinforced Concrete Pier Wall (LF)

Pier 37 between Units IV and V has several areas of delamination, spalling and cracking, especially on the bearing pedestals (Photos 36 & 37). See report for detailed locations and descriptions of deficiencies.

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Element 215 - Reinforced Concrete Abutment (LF)

There are isolated areas of hairline vertical cracking with isolated areas of efflorescence and water staining on the Unit I abutments. In Unit V, the East Abutment exhibits areas of patched concrete.

Element 231 - Steel Pier Caps (LF)

The steel pier caps at Pier 38, 39, & 40 in Unit V exhibit painted over pitting and pack rust up to 1" thick (Photo 39). See report for detailed locations and descriptions of deficiencies.

Element 234 - Reinforced Concrete Pier Caps (LF)

In Unit I, there are areas of delaminations in the underside of Pier O in Section P near the middle of the cap (Photo 40). The Pier 12 cap in Section M exhibits a spall with exposed reinforcing steel. In Unit II, Pier 10 Cap exhibits a patched and fiber wrapped area on the underside of the cap. See report for detailed locations and descriptions of deficiencies.

Element 830 - Abutment Backwalls (LF)

Minor vertical cracking and staining are present on the East Abutment backwall. The east abutment has an area of spalling with exposed reinforcement (Photo 41). See report for detailed locations and descriptions of deficiencies.

Wingwalls

The wingwalls are in Good condition.

Mask Walls

In Unit I, there are mask walls in each section except for B and J where the roadway is built on fill. The mask walls have widespread areas of spalling, delamination, and cracking on the inside and outside faces of the walls. Several spalls exhibit exposed reinforcing steel with significant section loss. In Section C & K, some of the delaminations are above pedestrian walkways. In

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Section N, there is a very large 20'x10' delamination with deteriorated rebar on the back face of the south side wall under Joint Q (Photo 42).

In Unit III, there are mask walls at the north and south chambers east of West 9th Street. The inside faces of the walls have significant areas of spalling, delaminations and cracking. Several spalls have exposed rebar with up to 100% section loss.

See report for detailed locations and descriptions of deficiencies.

Substructure Scour

Sea walls are present along both riverbanks, providing protection for Pier 8 and 9.

Culvert

Inspector Comments - Waterway

Waterway Adequacy

Channel

Channel Alignment

The alignment is in Good condition.

Channel Protection

The channel protection is in Good condition. Historic Remark: Isolated erosion holes exist in the area between Pier 9 and the river wall.

Channel Hydraulic Opening

The hydraulic opening is in Good condition. The hydraulic opening is sufficient.

Channel Navigation Lights

The navigation lights are in Good condition.

Scour Critical

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Bridge Inspection Report

Pictures

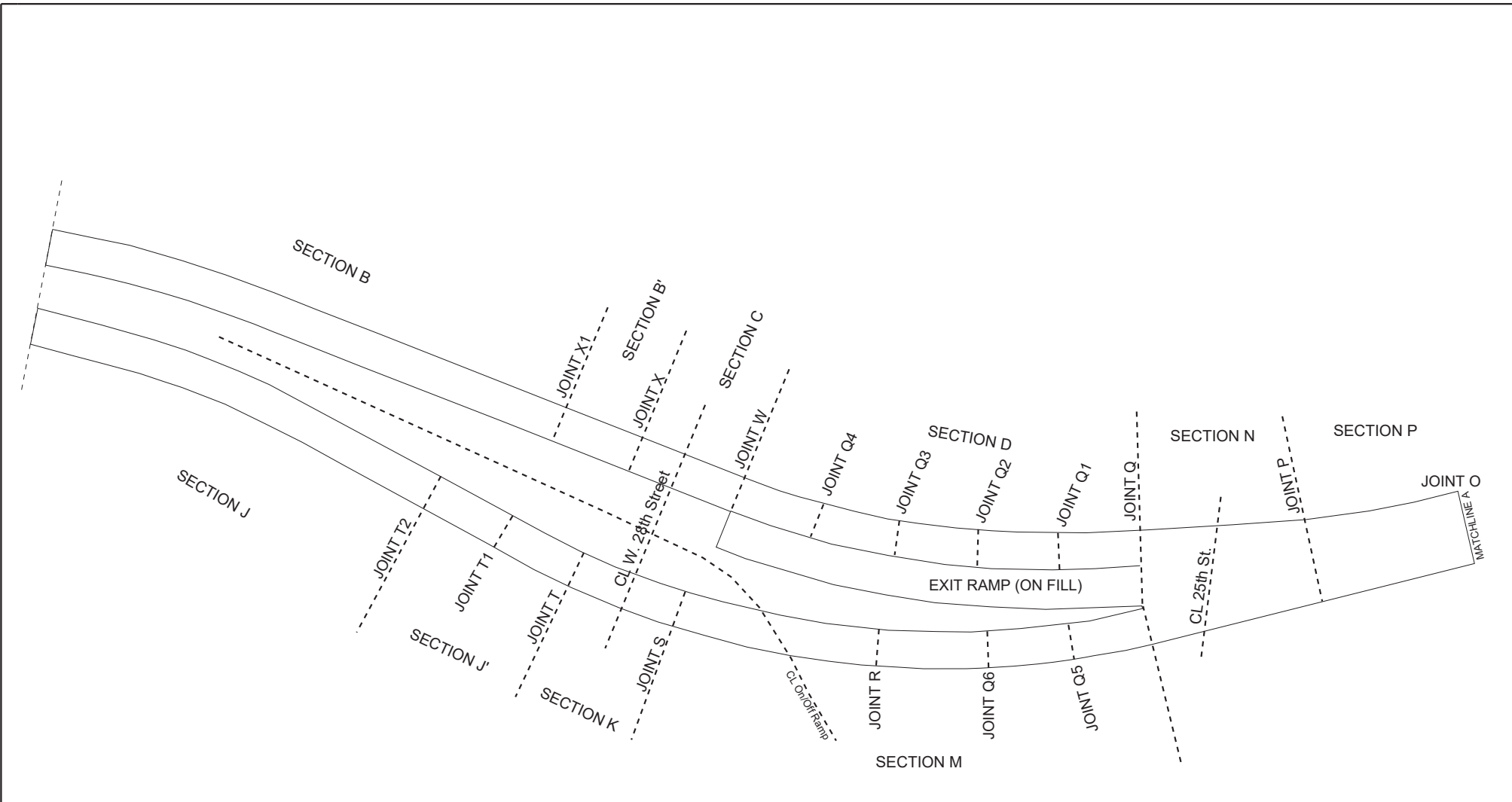


INNOVATIVE IDEAS
EXCEPTIONAL DESIGN
UNMATCHED CLIENT SERVICE

Routine and Fracture Critical Inspection Report
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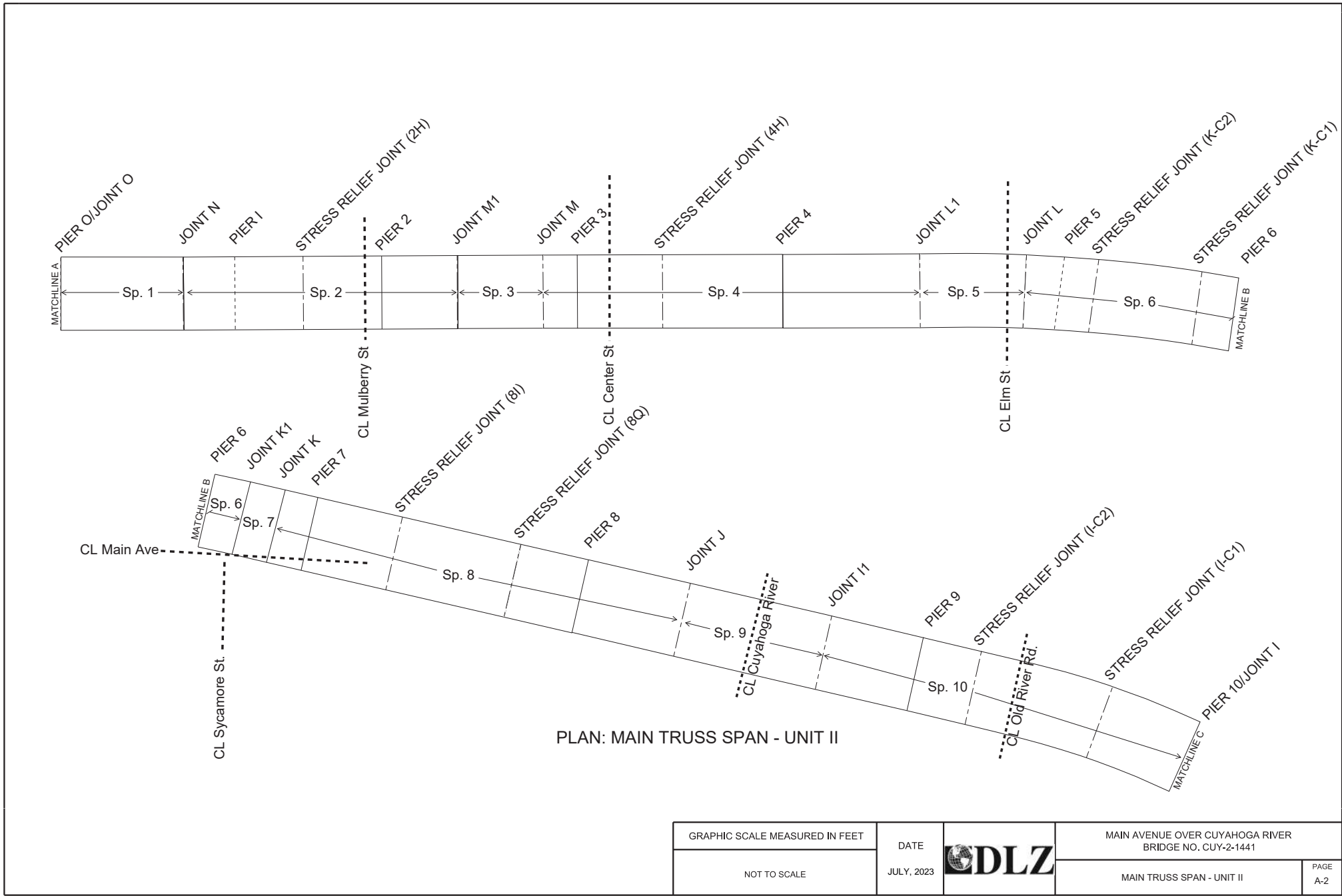
APPENDIX B – Existing General Plan



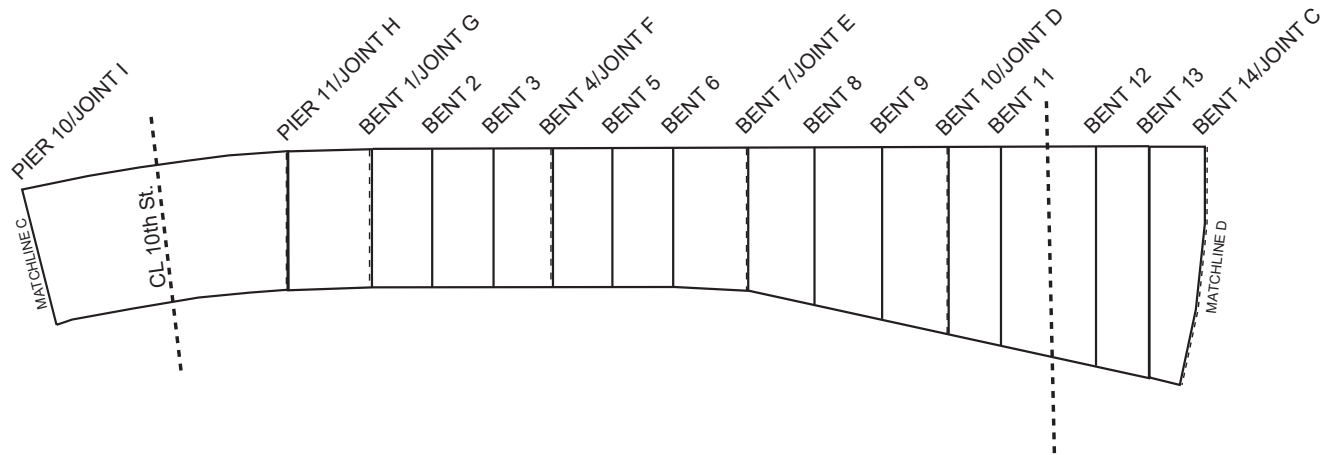


PLAN: WEST APPROACH - UNIT I

GRAPHIC SCALE MEASURED IN FEET	DATE		MAIN AVENUE OVER CUYAHOGA RIVER BRIDGE NO. CUY-2-1441	
NOT TO SCALE	JULY, 2023		WEST APPROACH - UNIT I	PAGE A-1

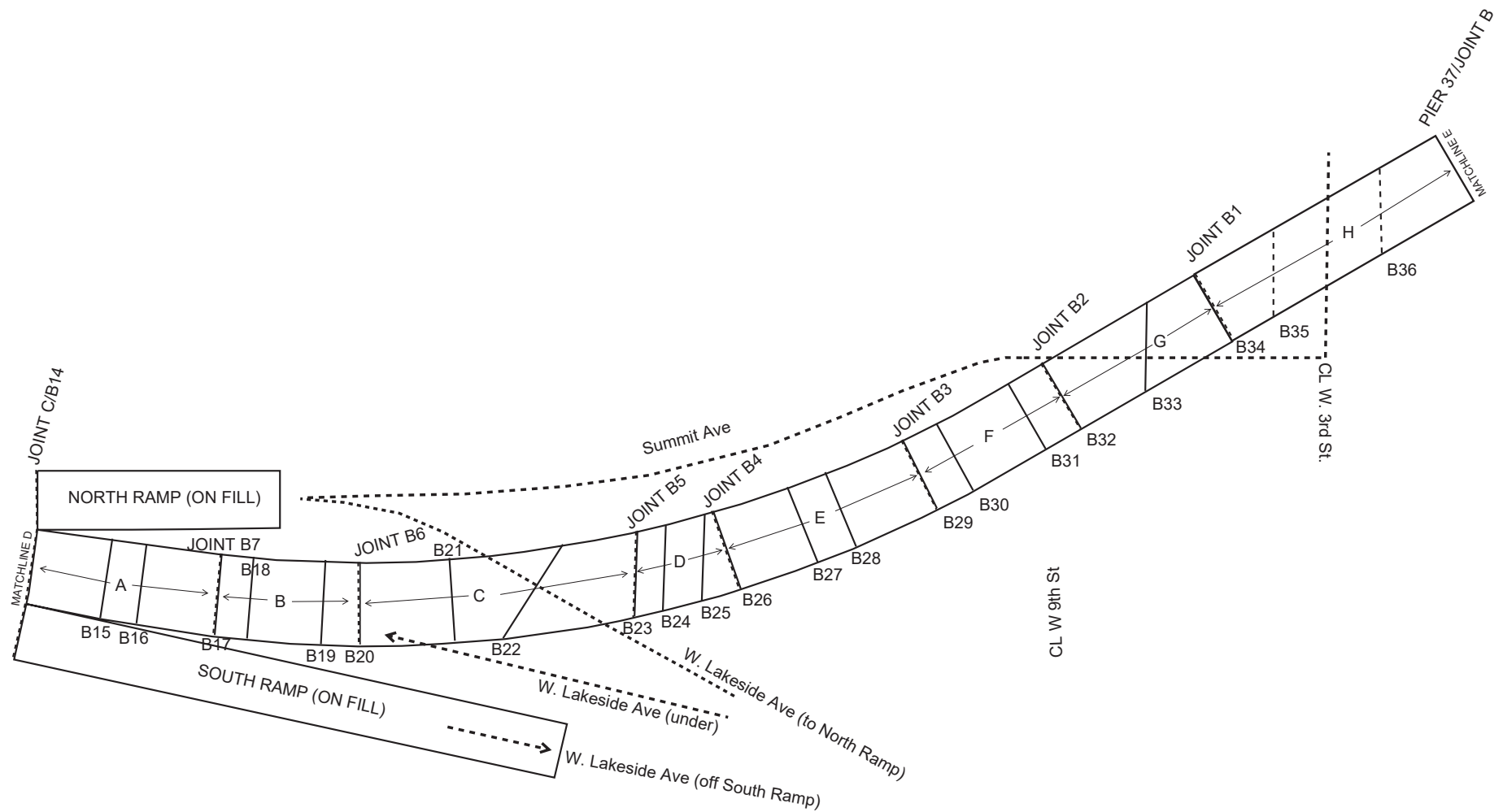


GRAPHIC SCALE MEASURED IN FEET	DATE		MAIN AVENUE OVER CUYAHOGA RIVER BRIDGE NO. CUY-2-1441	
NOT TO SCALE	JULY, 2023		MAIN TRUSS SPAN - UNIT II	PAGE A-2



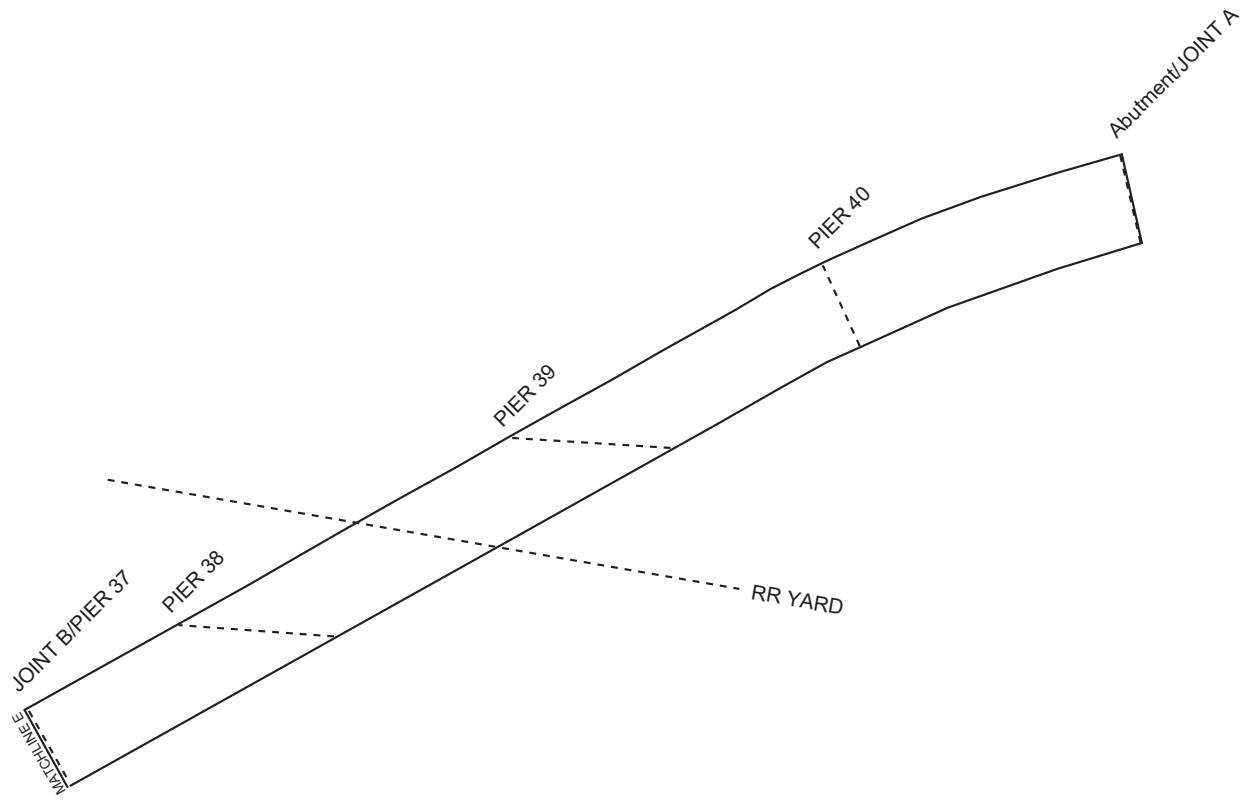
PLAN: FRAMED & BRACED COLUMN - UNIT III

GRAPHIC SCALE MEASURED IN FEET	DATE		MAIN AVENUE OVER CUYAHOGA RIVER BRIDGE NO. CUY-2-1441
NOT TO SCALE	JULY, 2023		FRAMED AND BRACED COLUMN - UNIT III



PLAN: EAST APPROACH - UNIT IV

GRAPHIC SCALE MEASURED IN FEET	DATE		MAIN AVENUE OVER CUYAHOGA RIVER BRIDGE NO. CUY-2-1441	
NOT TO SCALE	JULY, 2023		EAST APPROACH - UNIT IV	PAGE A-4



PLAN: LAKEFRONT RAMP - UNIT V

GRAPHIC SCALE MEASURED IN FEET	DATE		MAIN AVENUE OVER CUYAHOGA RIVER BRIDGE NO. CUY-2-1441
NOT TO SCALE	JULY, 2023		LAKE FRONT RAMP - UNIT V



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APPENDIX C – Inspection Findings Tables & Figures

Table 1: Unit 1 Deck Deficiencies				
Travel Direction	Span	Joint	Component	Note
Typical	All		Railing	Throughout all parapets all units all spans have sound patching (5-10%).
West	All		Railing	Along length of parapet, horizontal, map cracks and vertical cracks up to FH x 1/32" W (15%).
West	All	All	Joints	Throughout all joints, debris impaction (40%).
West	APP		Wearing Surface	Throughout west approach westbound lanes have multiple spalls/potholes and patches up to FW x 3' with vegetation growth at both shoulders.
East	J'		Wearing Surface	Throughout west approach, asphalt patches.
East	J'	T2	Joints	Joint filled with water, debris impaction (12LF), deteriorated joint material (5LF).
East	J'		Lighting	Between Joint T and T1, light pole on south railing is missing 3 anchor bolt covers and light pole on north railing is missing an anchor bolt cover.
East	J'	T1	Joints	Debris impaction (8LF), deteriorated joint material (5LF).
East	J'	T	Joint	Debris impaction (15LF), spot/freckled rust (5LF).
East	J'		Wearing Surface	Along length of deck adjacent to joints, edge spalling up to 3' L x 4" W x 1/2" D (30 SF).
East	J'		Railing	Throughout parapets, multiple vertical cracks up to FH x up to 1/32" W (15%).
West	B		Deck	On the south fascia, located two sections west of Joint X1, the underside edge of deck at bridge rail joint has a 1' H x 1'-6" W x 5" D spall.
West	APP		Railing	Two sections west of Joint X1, Bridge rail has 1' H x 6" W delamination.
West	B'	X	Joints	8 LF of compression seal retainer has broken away from deck, allowing drainage directly through the joint. Corrosion with section loss up to 3/16" D (4LF), joint is depressed up to 1" H x FL, edge spalling adjacent wearing surface FL x up to 2" W x 1/4" D. 8 LF of joint armor has been broken off on the east side in north lane, leaving the jagged edge of the armor exposed to traffic.
West	B'	X1	Joints	Debris impaction (20LF).
East	K		Deck	1' L haunch spall above Stringer 1 by Floorbeam 3.
East	K		Railing	Throughout parapets, multiple vertical cracks up to FH x up to 1/32" W (15%).
East	K	S	Joints	Debris impaction (18LF), deteriorated joint material (7LF).
West	D		Wearing Surface	10' west from Joint Q2 at north parapet, wearing surface has a spall 5' L x up to 7" W x up to 1" D.

Table 1: Unit 1 Deck Deficiencies				
Travel Direction	Span	Joint	Component	Note
West	D	W	Joints	Debris impaction (FL).
West	D	Q4	Joints	Debris impaction (12 LF), Corrosion with section loss up to 3/16" D (6LF), joint is depressed up to 1" H x FL, edge spalling adjacent wearing surface FL x up to 2" W x 1/4" D.
West	D	Q3	Wearing Surface	24" diameter x 1-1/4" D spall patched in center lane westbound.
West	D	Q3	Joints	Debris impaction (10LF) , corrosion with section loss up to 3/16" D (9LF), joint is depressed up to 1" H x FL, edge spalling adjacent wearing surface FL x up to 2" W x 1/4" D.
West	D	Q2	Wearing Surface	6.5' W x 3' L x 1/2" D spall in north lane 20' east of Joint Q2 (20 SF).
West	D	Q2	Joints	Debris impaction (12 LF at south end, 2 LF at north end), Corrosion with section loss up to 3/16" D (8LF), joint is depressed up to 1" H x FL.
West	D	Q1	Joints	Debris impaction (4 LF at north end, 8 LF at south end).
West	D	Q	Joints	Debris impaction (20 LF), corrosion with section loss up to 3/16" D (15LF).
West	D		Railing	At Joint Q, 42" H x 12" W x 1" D spall to N face of the median parapet. The south face of the north parapet has spall on each side of the joint. West side: 12" H x 12" W x 1/4" D. East side: 12" H x 1" W x 2" D.
West	N		Lighting	Between Joint P and Q, light pole is missing an anchor bolt cover.
East	M	Q5	Deck	Along length of adjacent deck, edge spalling up to 10' L x 2" W x 1/2" D (35 SF).
East	M		Wearing Surface	Entrance/exit ramp approximately 23' from Joint Q, asphalt patch FW x 3' raised higher than roadway up to 5".
East	M	Q5	Railing	On the south railing, the outside face has a 5' W x 6" H spall with exposed reinforcing.
East	M	Q6	Railing	Spall with exposed reinforcing 4' L x 6" H x 3" D, one exposed bar.
East	M	R	Joint	Debris impaction (18LF).
East	M		Railing	Parapets at Joint S, spalls up to 11" H x 3-1/2" W x 2-3/4" D (1LF per rail).
East	M		Railing	Left parapet along top edge between Joint R and Q6, spalling up to 5' L x 1" H x 1/2" D (20 LF), at Joint Q6, spall 18" H x FW x 5" D with 5 exposed rebar which has been painted.
East	M		Railing	Throughout entrance/exit ramp, multiple asphalt patches with adjacent broken up concrete.
Typical	M		Railing	Through parapets at entrance/exit ramp multiple vertical cracks up to FH x 1/32" W (50%).
East	M	Q	Median	At concrete median sound patch 15' L x 5' H.

Table 1: Unit 1 Deck Deficiencies				
Travel Direction	Span	Joint	Component	Note
East	M	Q6	Joints	Debris impactation (15LF), spot/freckled rust (3LF).
East	M	Q5	Joints	Debris impactation (5LF), deteriorated joint material (3LF) , near center line of roadway joint is depressed up to 1" (8LF).
East	M	Q	Joints	Debris impactation (26LF), deteriorated joint material (5LF) . East side of joint is 1/4" lower than W side of joint.
East	M		Railing	Throughout parapets Section M, vertical and horizontal cracks up to FH x up to 1/32" W (15%).
East	N	P	Joints	Debris impactation (FL), corrosion with section loss up to 1/16"D (6 LF).
West	N	P	Joints	Debris impactation (20 LF), corrosion with section loss up to 3/16" D (11 LF), joint is depressed up to 1" H x FL.
East	N		Median	Median near Joint Q, spalls 12" L x 12" H x 3" D with one with exposed rebar.
East	N	P	Railing	Both parapets at Joint P, spalling up to 12" L x 36" H x up to 6" D (1LF each rail).
East	N		Railing	Multiple vertical cracks around the utility pole on South railing.
East	N		Railing	Right parapet near Joint Q, multiple spalls up to 12" L x 8" W x 4" D with one with exposed rebar.
West	N		Railing	The guardrail impact attenuator for the W 28th St exit ramp has sustained vehicular impact damage.
West	N	P	Railing	3' H x 16" W x 1" D spall to the north face of the median parapet. The south face of the north parapet has spalls on each side of Joint P. West side of P: 18" W x 12" H x 1/4" D. East side of P: 6" W x 12" H x 1/4" D.
East	P		Lighting	Light pole west of Joint O is missing an anchor bolt cover.
East	P	O	Joint	Debris impactation (FL).

Table 2: Unit 2 Deck Deficiencies				
Travel Direction	Span	Joint	Component	Note
East	6			Spalls are forming on the south deck edge over a parking lot.
West	8			At Pier 9 over a parking lot, there are spalls forming on the north deck edge.
Center	5	L	Deck	Underside of deck at Joint L, corrosion of stay in place form up to 100% with multiple spalls up to 5' L x 2' W x up to 3" D with exposed rebar and section loss up to 15%.
Center	8		Deck	Underside of deck at Floorbeam 0, corrosion of stay in place form up to 100% with multiple spalls up to 2' L x 1' W x 11" D with exposed rebar and section loss up to 15%.
Center	9		Deck	Underside of deck at Floorbeam 0, corrosion of stay in place form up to 100% with multiple spalls up to 2' L x 2' D x up to 1" D with exposed rebar and section loss up to 15%.
West	7		Deck	1SF corrosion close to section loss in SIP between FB71-FB70
West	8		Deck	Spalls with exposed rebar in parapet and deck edge. Span 07
West	9		Deck	2 corrosion holes SIP between FB98-FB99
West	9		Deck	1 SF corrosion hole in SIP between FB 103-FB102
West	10		Deck	2 - 1" diameter corrosion holes in the SIP top chord between F118-F117
West	10		Deck	1 location of corrosion hole in SIP between FB118-FB119
West	10		Deck	2 location of corrosion hole in SIP between FB121-FB120.
West	10		Deck	Corrosion holes in SIP between FB125 and FB124
West	10		Deck	4 corrosion holes in SIP between FB113 and FB114
West	10		Deck	2 corrosion holes SIP between FB108-FB107.
West	10		Deck	1 corrosion hole in SIP between FB110-FB109
East	4		Wearing Surface	30' east of Joint 4H , spall in the South lanes near parapet up to 16" W x 15' L x up to 1" D on outside shoulder.
East	6		Wearing Surface	Just east of Relief Joint K-C1, there is a 25' L x up to 6" W x up to 1/2" D area of spalling to the south outside shoulder against the parapet.
East	10		Wearing Surface	20' west of Joint IC-2, 5' L x 2' W x 1/2" D spall on south shoulder (10 SF).
West	4		Wearing Surface	Between Joints M and 4H, 28" L x 14" W x 3/4" D spall to north outside shoulder.

Table 2: Unit 2 Deck Deficiencies				
Travel Direction	Span	Joint	Component	Note
West	4		Wearing Surface	2' west of Joint 4H, 6" L x 8' W x 1/2" D pothole/depression (4 SF).
West	6		Wearing Surface	18' L x 10' W x 1/4" D area of spalling to the WB lane 3 wearing surface due to vehicle damage (180 SF).
West	8		Wearing Surface	Between Joints J and 8Q, 2'W x 2" L spall/poor consolidation in the middle lane (4 SF).
West	10	I-C1	Wearing Surface	In the north lane, wearing is starting to spall at the mid-point between joints. Multiple small divits present.
West	10	I-C2	Wearing Surface	In the south lane, 8' W x 5' L spall (40 SF).
East	1		Railing	Parapets have horizontal and vertical cracks up to full height x up to 1/32" W (10%).
East	1		Railing	50' east of Joint N, 1' L x 1' H cracked patch on south railing.
East	2		Railing	Parapets have vertical cracks up to full height x up to 1/32" W (10%).
East	2		Railing	Spall in the South railing with map cracking 9" W x 6" L x 1-1/2" D, located 25' west of Joint M1.
East	2		Railing	Median and right parapet at Joint M1, spalls/delaminations up to 12" x 12" x up to 1" D (1LF each rail).
East	2		Railing	Spall with exposed reinforcing in the south fascia rail between Joints 2H and M1, east of the sign post, measuring 6' L x 1' H x 2" D.
East	3		Railing	Parapets have vertical and horizontal cracks up to full height x up to 1/32" W with adjacent map cracking (10%).
East	3		Railing	Between Joints M1 and M, there is a 14" L x 2" W x up to 1" D spall on the north face of the south parapet.
East	3		Railing	South fascia has a spall with exposed reinforcing just west of Joint M measuring 9' L x 2' H x 2-1/2" D with one exposed bar.
East	4		Railing	Parapets have vertical and horizontal cracks up to 1/16" W x up to full height (10%).
East	4		Railing	South fascia spall 5' W x 1-1/2' H x 3" D with one exposed rebar. Spall is just west of Center Street.
East	4		Railing	South fascia spall 6' W x 2' H x 4" D located 30' east of Joint 4H.
East	4		Railing	South fascia spall 3' W x 1' H x 2" D exposed corroded rebar at FB10 between Joints 4H and L1.
East	5		Railing	Parapets have vertical and horizontal cracking with adjacent map cracking up to full height x up to 1/32" W (10%).
East	6		Railing	South fascia between Joints KC1 and KC2, spall with exposed corroding rebar 15' L x 2' H x up to 3" D.
East	6		Railing	South fascia east of Joint KC1, spall 15' W x 1-1/2' H with 3 longitudinal and 7 vertical rebar exposed. One of the longitudinal rebar is broken. There is a delaminated area 6' L x 1-1/2' H.

Table 2: Unit 2 Deck Deficiencies				
Travel Direction	Span	Joint	Component	Note
East	6		Railing	Parapets have vertical and horizontal cracking with adjacent map cracking up to full height x up to 1/32" W (10%), (8LF) efflorescence.
East	6		Railing	Cracking and spalling on top of the South rail 2' L x 1" W x 3/8" D located 30' east of Joint L.
East	7		Railing	Two south fascia spalls: 15" W x 7" H x 2" D and 1' W x 6" H x 2" D at FB 6.
East	7		Railing	South parapet top face at end of first rail segment spall / delamination 18" x FW x up to 1-1/2" D.
East	7		Railing	Parapets have vertical and horizontal cracking with adjacent map cracking up to full height x hairline (10%), (8LF efflorescence).
East	7		Railing	Right parapet at Joint K, spall 2' L x 9" H x 1" D on outside face.
East	8		Railing	Parapets have vertical and horizontal cracking with adjacent map cracking up to full height x up to 1/32" (10%).
East	8		Railing	Median rail at Joint J, spall 12" diameter x 3/4" D.
East	8	J	Railing	1' diameter delamination located at Joint J.
East	9		Railing	Median rail at Joint J, spall 14" x up to 5" x 3/4" D.
East	9		Railing	Parapets have vertical and horizontal cracking with adjacent map cracking up to full height x up to 1/32" (10%).
East	9/10		Railing	6" H x 1' L x 1" D spall on south railing on each side of Joint I1.
East	10		Railing	Parapets have vertical and horizontal cracking with adjacent map cracking up to full height x up to 1/32" (10%).
West	All		Railing	Along length of parapet, multiple vertical cracks up to FH x 1/32" W (10%).
West	1		Railing	9' west of Joint N at top outside edge of north parapet spall/delamination 8" L x 4" H x up to 1" D with one exposed rebar on outside face.
West	2	Btw. FB 13-14	Railing	50' west of Joint M1, 12' L x 2' H x 3" D spall with exposed and corroded rebar on outside of north railing.
West	2		Railing	4' west of Joint 2H on north face of median parapet spall 8" L x 5" H x 1" D.
West	2/3		Railing	At Joint M1, there is a 2' H x 5" W x up to 5" D spall on the north face of the median parapet, with adjacent map cracking.
West	4		Railing	16" H x 9" W x 1-1/2" D spall to the exterior face of the north parapet, over Center St.
West	4		Railing	20' west of Joint 4H on north parapet spall 8" L x 12" H x 2" D.
West	5		Railing	25' West of Joint L, 2 spalls on north parapet, 11" L x 8" H x 1" D.

Table 2: Unit 2 Deck Deficiencies				
Travel Direction	Span	Joint	Component	Note
West	6		Railing	10' west of Joint K-C2, 6" W x 6" H x 1" D spall near the top of the north exterior face of north parapet.
West	6		Railing	4' west of Joint KC1 on north parapet, interior face, spall 17" L x 10" H x 1" D.
West	6		Railing	12' west of Joint K1 on the north parapet, interior face, several areas of shallow spalling (10 LF) due to vehicle damage.
West	6/7		Railing	2 small spalls at Joint K1, one on each side of the header. West side: 5" W x 5" H. East side: 6" W x 6" H.
West	7	FB 1	Railing	12' L x 1' H x 3" D spall/delamination with exposed and corroded rebar.
West	8	FB 4	Railing	15' L x 2' H x 4" D spall with two longitudinal and 14 vertical exposed and corroded rebar.
West	10	IC-2	Railing	10' west of IC-2, full height crack with rust staining.
West	10	IC-1/ IC-2	Railing	2' L x 1' H x 2" D spall at bottom of median near midspan.
All			Joints	Shallow spalling of joint header typical.
East	1	O	Joints	Debris impaction (FL).
East	1	N	Joints	Debris impaction (36 LF), corrosion with section loss up to 3/16" D (6 LF), joint material split in south lane (3 LF).
East	2	2H	Joints	Debris impaction (20 LF), corrosion with section loss up to 1/8" D (8 LF).
East	3	M1	Joints	Debris impaction full length, corrosion with section loss up to 3/16" D (12 LF).
East	4	M	Joints	Debris impaction (FL), corrosion with section loss up to 3/16" D (10 LF).
East	4	4H	Joints	Debris impaction (FL), corrosion with section loss up to 1/4" (13 LF).
East	5	L1	Joints	Debris impaction (FL), corrosion with section loss up to 3/16" (20 LF), depressed up to 1" (18 LF).
East	5	L	Joints	Debris impaction x FL.
East	6	KC-2	Joints	Debris impaction x 36', corrosion with section loss up to 1/8" (13 LF).
East	6	KC-1	Joints	Debris impaction x FL, corrosion with section loss up to 3/16" (6 LF).
East	7	K1	Joints	Debris impaction (20 LF), corrosion with section loss up to 3/16" (17 LF).
East	8	K	Joints	Debris impaction x FL, corrosion with section loss up to 3/16" (9 LF). Seal beginning to detach (10 LF).
East	8	8I	Joints	Debris impaction x FL, corrosion with section loss up to 3/16" (6 LF).

Table 2: Unit 2 Deck Deficiencies				
Travel Direction	Span	Joint	Component	Note
East	8	8Q	Joints	Debris impaction x FL, corrosion with section loss up to 3/16" (10 LF), depressed up to 1" (18 LF).
East	9	J	Joints	Debris impaction (30 LF) corrosion with section loss up to 3/16" (9 LF). Joint plate under FB 25 has corrosion with up to 100% section loss. Joint material deteriorated/torn in south lane (4 LF).
East	10	I1	Joints	Debris impaction full length, corrosion with section loss up to 3/16" D (22 LF), depressed up to 1". Bottom joint plate at FB 8 has up to 100% section loss.
East	10	I-C2	Joints	Debris impaction (12 LF), corrosion with section loss up to 3/16" D (7 LF).
East	10	I-C1	Joints	Debris impaction (12 LF), corrosion with section loss up to 3/16" D (11 LF).
West	1	O	Joints	Debris impaction (25 LF).
West	2	N	Joints	Debris impaction (5 LF), corrosion with section loss up to 3/16" D (13 LF).
West	2	2H	Joints	Debris impaction (5 LF).
West	3	M1	Joints	Debris impaction (FL), corrosion with section loss up to 3/16" D (17 LF).
West	4	M	Joints	Debris impaction (5 LF), corrosion with section loss up to 3/16" D (11 LF).
West	4	4H	Joints	Debris impaction (6 LF).
West	5	L1	Joints	Debris impaction (FL).
West	5	L	Joints	Debris impaction (20 LF)'. '
West	6	K-C2	Joints	Debris impaction (4 LF).
West	6	K-C1	Joints	Debris impaction (4 LF).
West	7	K1	Joints	Debris impaction (15 LF), torn (6 LF). Corrosion with section loss up to 3/16" D (14 LF).
West	8	K	Joints	Debris impaction (20 LF), corrosion with section loss up to 3/16" D (6 LF). Material torn and coming out of joint in north lane (10 LF).
West	8	8I	Joints	Debris impaction (FL), corrosion with section loss up to 3/16" D (6 LF), bottom joint plate at U8 has 100% section loss.
West	8	8Q	Joints	Debris Impaction (FL), corrosion with section loss up to 1/8" D (5 LF). Header is chipping near the armor. Missing armor in middle lane (4 LF).
West	9	J	Joints	Debris impaction (6 LF), corrosion with section loss up to 3/16" D (7 LF). Header starting to show rust and chipping near the armor.

Table 2: Unit 2 Deck Deficiencies				
Travel Direction	Span	Joint	Component	Note
West	10	I1	Joints	Debris impaction (28 LF), corrosion with section loss up to 3/16" D (4 LF). Concrete starting to wear off the north wall at the joint. Rust staining and cracking present on the south wall.
West	10	IC-2	Joints	Debris impaction (20 LF), corrosion with section loss up to 3/16" D (12 LF).
West	10	IC-1	Joints	Debris impaction (30 LF), corrosion with section loss up to 3/16" D (8 LF). Header getting rust staining and wearing.
West	10	I	Joints	Debris Impaction (20 LF), corrosion with section loss up to 3/16" D (8 LF).
East	1		Lighting	10' west of Joint N, a light pole hjas its cover missing and 3 anchor bolt covers missing.
East	2		Lighting	On one light pole in span 2, 40' East of Joint 2H, cover plate is missing. Another light pole in span 2 is missing 3 anchor bolt covers.
East	4		Lighting	35' east of Joint 4H, a pole on the south parapet is missing 2 anchor bolt covers.
East	5		Lighting	Pole on south parapet west of Joint L over Elm St. is missing its cover and its inside is heavily corroded.
East	6		Lighting	West of Joint K-C1, a pole on the south parapet is missing an anchor bolt cover.
East	7		Lighting	A pole on the north parapet is missing 2 anchor bolt covers.
East	8		Lighting	A pole on the north parapet is missing an anchor bolt cover.
East	9	J	Lighting	Missing junction cover at base of light 15' East of Joint J. Junction opening is covered with tape.
East	10		Lighting	East of Joint I1, light pole is missing its cover plate and hole is covered by tape.
West	1		Lighting	Between Joint O and N, light pole is missing its cover plate; inside is heavily corroded and has exposed wires.
West	2		Lighting	A pole on the north parapet is missing its cover.
West	7		Lighting	A pole on the north parapet is missing an anchor bolt cover.
West	8		Lighting	A pole on the north parapet is missing its anchor bolt cover. Another pole on the north parapet is missing a conduit cover.

Table 3: Unit 3 Deck Deficiencies				
Travel Direction	Span	Joint	Component	Note
East		D/E	Railing	Top of south rail has a spall with delamination 18" W x Full Height x 2"D.
East		F/E	Railing	Parapets between Joints F and E have vertical and horizontal cracking with adjacent mc up to full height x up to 1/32" W (10%).
East		F/E	Railing	Median rail with 8 LF of rust staining.
East		H/I	Railing	Spall 5' L x 1' H on south side of south rail over railroad.
East	11		Railing	Parapets have vertical and horizontal cracking with adjacent map cracking up to full height x up to 1/32" W (10%).
West	All		Railing	Throughout parapet, multiple vertical cracks up to full height x 1/32" W (10%). Horizontal cracking at the top of the parapets typical (10% South, 5% North).
West		H	Railing	18" H x 6" W x up to 1" D spall on north parapet.
West		E/F	Railing	Between Joints E and F, there is a 3.5' L x up to FW x up to 1-1/2" D spall on top of the north parapet.
West		E/F	Railing	East of Joint F, median has 4 locations with cracked patches for a total length of 25' (25 LF).
West		F/G	Railing	25' east of Joint G, median rail has cracking and rust staining (8LF). Median railing has 8' total of additional cracks in 3 locations (8 LF).
East	All	All	Joints	Throughout joints: debris impaction (50%), corrosion with section loss (15%).
East	11	I	Joints	Debris impaction (10LF), corrosion with section loss up to 3/16" (7LF), deteriorated joint material (7 LF), torn joint in south lane (10 LF).
East		H	Joints	Debris impaction (24 LF).
East		G	Joints	Debris impaction (24 LF).
East		F	Joints	Debris impaction (28 LF), corrosion with section loss up to 1/8" D (21LF).
East		E	Joints	Debris impaction (13 LF), corrosion with section loss up to 3/16" D (15 LF), depressed up to 1" H x FL.
East		D	Joints	Debris impaction (17 LF).
East		C	Joints	Debris impaction (FL).
West	All	All	Joints	Throughout joints: debris impaction (50%), corrosion with section loss (15%).
West	11	I	Joints	Debris impaction (20 LF), corrosion with section loss up to 3/16" D (8 LF).
West		H	Joints	Debris impaction (20 LF), corrosion with section loss up to 1/8" D (18 LF). 1/4" vertical offset between joint edges, East is higher.

Table 3: Unit 3 Deck Deficiencies				
Travel Direction	Span	Joint	Component	Note
West		G	Joints	Debris impaction (30 LF).
West		F	Joints	Debris impaction (36 LF), corrosion with section loss up to 1/8" D (12 LF). Joint is depressed up to 1" H (24 LF).
West		E	Joints	Debris impaction (18 LF).
West		D	Joints	Debris impaction (FL).
West		E/F	Lighting	Attached lighting between Joints E and F, missing conduit cover.
West		I	Lighting	Pole on north parapet at Joint I has taped on cover.
East		I	Lighting	East of Joint I, a pole on the south parapet is missing an anchor bolt cover.
East		E	Deck	2 small spalls are developing between Bent 7/Joint E and Bent 9, south exterior
East		E	Deck	2" deep hallow area in deck underside, 5 bays from north midspan 1" diameter
East		E	Deck	Corrosion holes in SIP forms above catwalk between FB128-127. Voids above holes

Table 4: Unit 4 Deck Deficiencies				
Travel Direction	Span	Bent / Joint	Component	Note
East	All		Railing	Throughout parapets, multiple horizontal, vertical and map cracking to FH x 1/32" W (10%). Parapets have many sound areas of patching.
West	All	C to B	Joints	Throughout joints from Joint C to Joint B, debris impaction (50%), corrosion with section loss up to 1/8" D (15%).
East	All	C to B	Joints	Throughout joints from Joint C to Joint B, debris impaction (60%), corrosion with section loss up to 1/8" D (20%).
West	North Ramp		Railing	Spalling 1' L x 3' W x up to 3" D, patched with bituminous material.
West	A	14	Joints	West Lakeside Avenue exit ramp: At Joint C, the west wall for filled ramp has a 1/16" W x Full Height vertical crack at centerline.
West	A		Railing	1' L x 6" H x 1" D spall near utility cover.
West	A		Lighting	Light pole is missing an anchor bolt cover.
East	A		Railing	North Parapet of South ramp 40' from Joint C, spall/delamination 4' x FW x up to 5" D.
West	B	18/19	Deck	6" W x 3" L corrosion hole in deck pan above diaphragm above floorbeam cantilever South of North exterior girder.
West	B	B7	Joints	Debris impaction (22 LF), deteriorated joint material (6 LF).
West	C	B6	Joints	Debris impaction (7 LF), corrosion with section loss (5 LF).
West	C	B5	Joints	Debris impaction (20 LF).
West	C		Railing	8" W x 11" H x 3/4" D spall near Joint B6 on north parapet.
West	C		Railing	18' east of Joint B6, 1' L x 3" H x 1" D spall totally cracked through.
East	C		Deck	2' L x 6" H x 2" D spall with adjacent delam, south exterior face.
East	C		Wearing Surface	1' L x 1' W spall (1 SF).
West	D	B4	Joints	Debris impaction (FL), corrosion with section loss (6 LF).
West	D		Deck	8' L x 2' H x 2" D sealed spall with exposed reinforcing, north exterior face.
East	D		Deck	3' L x 1' H x 2" D spall, south exterior face.
West	E		Railing	6' L x 2' H x 5" D spall with exposed rebar and utility chase on the North parapet, exterior face.
East	E/F		Deck	Numerous deck edge spalls removed by ODOT 3-21, south exterior face.
West	E		Wearing Surface	1.5' W x 6" L x 2" D spall at south end of 3' L crack emanating from curb inlet.

Table 4: Unit 4 Deck Deficiencies				
Travel Direction	Span	Bent / Joint	Component	Note
West	E		Lighting	Light pole is missing cover plate.
West	F	B3	Joints	Debris impaction (16 LF).
West	F		Wearing Surface	40' east of Joint B3, 6" L x 6" W x 1/2" D spall (1 SF).
West	G	B2	Joints	Debris impaction (FL), corrosion with section loss (8 LF).
West	G		Lighting	Near Joint B2, north parapet light pole is missing its SE anchor bolt cover.
East	G		Railing	2' L x 1' H spall on south railing.
West	H		Wearing Surface	South lane; 8' L x 8' W area of 1" D spalling with staining.
West	H	B1	Joints	Debris impaction (FL), corrosion with section loss (6 LF).
West	H		Lighting	Light pole is missing its SE anchor bolt cover.
East	H		Deck	1.5' x 1.5' x 6" D spall on the underside of the south overhang.

Table 5: Unit 5 Deck Deficiencies				
Travel Direction	Pier / Section	Joint	Component	Note
East	Approach	East	Wearing Surface	Throughout approach, multiple spalls, potholes and patched areas up to 5' L x 3' W x 1" D.
West	38		Wearing Surface	Above railroad tracks, 10' L x 6' W x 1/2" D spall.
West	40		Wearing Surface	Minor wear in wheel paths.
West	41		Wearing Surface	Minor wear in wheel paths.
West	Approach	East	Wearing Surface	24" W x 4" L bituminous patch in the centerline of the south lane at the asphalt plug joint on the east end of the slab. Throughout approach, multiple spalls, potholes and patched areas.
Both	All		Railing	Throughout parapets, multiple horizontal, vertical and map cracking to full height x 1/32" D (10%).
East	Approach	East	Railing	Along length of the South parapet, multiple spalls up to 8" x FW x 6" D.
East	37/38		Railing	Cracking/delamination in the parapet bump out.
East	39		Railing	4' L x 2' H x 2" D spall/delamination on the south parapet, exterior face.
East	40/41		Railing	8' L x 2' H x 2" D spall/delamination on the south parapet, exterior face.
East	40/41		Railing	8' L x 2' H x 3" D spall with exposed rebar on the south parapet, exterior face.
East	41		Railing	Near east abutment, 2' L x 2' H spall on south railing.
West	39		Railing	Over railroad tracks, scrapes on median railing (10 LF).
West	38/39		Railing	On top of North parapet, FW x 1' L x 2" D spall.
West	40/41		Railing	20' east of Pier 40, 5' L x 16" H area of delaminations with small spalls along south parapet.
West	41		Railing	5' west of Joint A, 2' L x 1' W x 1" D spall on north railing (2 SF).
West	Approach	East	Railing	Map cracking covers full length of interior north face of south parapet with some small delaminations/spalls. North curb height varies 1-2" above the roadway. Minor vegetation sporadically along curb line.
East	All	All	Joints	Joint B and Joint A, debris impaction (65%), corrosion with section loss up to 1/8" D (40%)
East	Abutment	A	Joints	Debris impaction (10 LF), corrosion with section loss (8 LF).
East	37	B	Joints	Debris impaction (FL), corrosion with section loss (14 LF).

Table 5: Unit 5 Deck Deficiencies				
Travel Direction	Pier / Section	Joint	Component	Note
West	Approach	East	Joints	Asphaltic plug joint between east approach roadway and slab. 2" W gaps between the east and west edges of the joint.
West	Abutment	A	Joints	Debris impaction (FL), corrosion with section loss (10 LF).
West	37	B	Joints	South parapet armor, laminating corrosion, but functioning. Joint/deck armor is fair with areas of 1/8" D pitting on the sides. North end of parapet, armor has laminating corrosion. The top plate appears to be bent upward possibly during cold/contracted conditions. Minor roadway debris within joint but appears to move freely (FL). 12 LF of corrosion with section loss up to 1/8" D. North end joints wider and not equally spaced. Deteriorated joint material in north lane (5 LF).
East	38		Lighting	East of Pier 38, light pole has a taped on cover plate.
East	40/A		Lighting	Light pole base is missing NW anchor bolt cover.
West	37		Lighting	Near Joint B, light pole base is missing all anchor bolt covers.

Table 6: Joint Measurements			
Joint	Unit	Westbound	Eastbound
X1	I	3"	
X	I	2-1/2"	
W	I	2-7/8"	
Q4	I	2-5/8"	
Q3	I	2-7/8"	
Q2	I	2-5/8"	
Q1	I	3"	
T2	I		2-3/4"
T1	I		3"
T	I		3-3/8"
S	I		1-1/2"
R	I		3"
Q6	I		2-5/8"
Q5	I		3"
Q	I	2-1/2"	2-3/8"
P	I	1-3/8"	1-3/8"
O	I/II	3"	3-1/4"
N	II	3"	3"
2H	II	1-5/8"	1-5/8"
M1	II	2-7/8"	2-7/8"
M	II	2-5/8"	2-3/4"
4H	II	1-1/2"	1-1/2"
L1	II	3"	3"
L	II	4-1/4"	4-1/4"
K-C2	II	1-1/4"	1-1/4"
K-C1	II	1-1/2"	1-1/2"
K1	II	2-1/2"	2-5/8"
K	II	6-3/8"	6-1/2"
8I	II	1-1/4"	1-1/8"
8Q	II	1-1/2"	1-3/8"
J	II	2-1/4"	2-1/4"
I1	II	2-1/2"	2-1/2"
I-C2	II	1"	7/8"
I-C1	II	1"	1"
I	II/III	3-3/4"	3-3/4"
H	III	2-3/4"	2-3/4"
G	III	3-1/8"	3-1/8"
F	III	2"	2"
E	III	2-7/8"	2-7/8"
D	III	3-1/4"	3-1/4"
C	III/IV	2-3/4"	2-3/4"
B7	IV	2-3/8"	2-3/8"
B6	IV	2-1/4"	2"
B5	IV	3"	2-7/8"
B4	IV	2"	2"

Table 6: Joint Measurements			
Joint	Unit	Westbound	Eastbound
B3	IV	2-1/2"	2-3/4"
B2	IV	2-3/8"	2-3/8"
B1	IV	2-1/2"	2-1/2"
B	IV/V	9"	8-3/4"
A	V	1-1/2"	1-1/2"

Temperature at time of measurement = 75°F

Table 7: Drainage Deficiencies				
Unit	Span	Travel Direction	Component	Note
Entire Bridge - Both Directions			Deck	Throughout all deck drains, partially filled with debris and sediment.
1	B'	West	Catch Basin	All catch basins in this section are fully clogged with debris.
1	J'	East	Catch Basin	All 3 catch basins in this section are fully clogged with debris.
1	M	East	Catch Basin	Basins near column 13, column 26, FB0, and FB11 are fully clogged.
1	D	West	Catch Basin	Basin near column 50 is fully clogged. Basins near columns 10, 20, 30, and 40 are partially clogged.
1	P	West	Deck	Both outside shoulder scuppers are completely clogged with debris.
1	P	West	Downspout	Sections are misaligned vertically by 6" near Joint O
2	1	N/A	Catch Basin	Pier 0, the north catch basin drain is fully clogged and buried. The south drain is fully clogged.
2	2	West	Deck	West of Relief Joint 2H, both scuppers are completely clogged with debris.
2	2	East	Deck	Just west of Relief Joint 2H, East scupper is completely clogged with debris and grass.
2	2	N/A	Downspout	PP6 downspout is clogged/disconnected near U6, allowing drainage directly on to the bottom chord.
2	2	N/A	Catch Basin	Pier 1, the south catch basin drain is fully clogged and buried.
2	6	East	Deck	Near Joint L, both scuppers are completely clogged with debris.
2	6	N/A	Downspout	The bottom angle piece of the scupper is missing.
2	9	N/A	Downspout	Drainage downspout on north overhang is disconnected over the Cuyahoga River.
2	10	N/A	Catch Basin	The Pier 10 south basin drain is fully clogged.
3	11	N/A	Catch Basin	South column, basin clogged and filled with water.
3	Near Jt. C	East	Deck	Deck drains at right parapet near Joint C, 2/3 of the drains are 100% clogged.
3	North Chamber	N/A	Catch Basin	Basin along north wall is blocked, causing drainage and debris to backup and flow through vault.
3	South Chamber	N/A	Catch Basin	Drainage pipe along south wall is exposed. Catch basin is partially blocked and heavily spalled.
4	A	N/A	Catch Basin	Fully clogged with debris, concrete edges of basin are heavily spalling and displaced.
4	A/B	N/A	Catch Basin	Fully clogged with spalling with exposed reinforcing.
4	B/C	N/A	Catch Basin	Clogged with debris.
4	C	N/A	Catch Basin	Clogged with debris.
4	C	West	Deck	East of joint B6, both north shoulder scuppers are fully clogged with dirt and debris.
4	C/D	N/A	Catch Basin	Fully clogged with debris, with spalling.
4	D/E	West	Catch Basin	Catch basin is clogged at the north column at B25.
4	E	N/A	Catch Basin	Partially clogged with debris
4	E/F	N/A	Catch Basin	Partially clogged with debris
4	G	N/A	Catch Basin	Partially clogged with debris
4	H	N/A	Catch Basin	Partially clogged with debris.
4	H	West	Catch Basin	Catch basin is clogged at the north column at B34.

Table 7: Drainage Deficiencies				
Unit	Span	Travel Direction	Component	Note
5	37	N/A	Downspout / Catch Basin	2 of 2 downspouts are clogged and leaking. The catch basins are also clogged.
5	39	N/A	Downspout	Between FB 31-32, typical signs of leakage between sections of pipe at the gaskets. Typical for all downspouts.
5	39/40	West	Deck	Both inlets are fully clogged with debris along North curb near Pier 39.
2	9	N/A	Downspout	Downspout pipe next to FB7 is disconnected.
2	2	N/A	Downspout	Downspout is broken over L13 in 2 locations. Water runs down bottom cord.

Table 8: Unit I Superstructure Deficiencies				
Section	Frame	Floorbeam	Girder	Note
D				Joint Q is leaking for full length.
D				At Joint Q1, there is evidence of leakage for full length and cracking around the header.
D				At Joint Q2, there is evidence of leakage for full length and cracking around the header.
D				At Joint Q3, there is evidence of leakage for full length and cracking around the header.
D				At Joint Q4, there is evidence of leakage for full length and cracking around the header.
J'		8		1' L x 1' W spall with deteriorated rebar on FB 8 in West Approach Abutment Section D.
J'				At Joint T2, there is cracking with efflorescence around the header.
J'		1		2' L x 6" W x 1/2" D spall on FB 1 in West Approach Abutment Section J'.
J'		2		1' L x 6" W x 1" D spall on FB 2 in West Approach Abutment Section J'.
J'		4		1' L x 1' W x 1" D spall on FB 4 in West Approach Abutment Section J'.
J'		17		At Floorbeam 17, North End, there is exposed rebar due to poor consolidation with surface corrosion and no section loss.
K		0		1/4" painted over pitting on the bottom flange and bottom half of the web.
K		at FB0	South	1/8" painted over pitting on the bottom flange and lower 6" of the web extending 2' from the floorbeam. There is a 2" W x 1" H corrosion hole in the SW bearing stiffener.
K			North	Collision scrapes are on the bottom of the girder for full length over the southbound lanes.
K			South	Collision scrapes are on the bottom of the girder for full length over the southbound and center lanes.
K/M				1/8" D pitting on girder ends at Frame 1 below Joint S.
L'		Jt R		There is 1/8" D painted over pitting on the end of the girders and columns.
M				Steel components in Span M have been cleaned and painted. Overall good condition with isolated areas of pitting up to 1/16" D at stringer to floorbeam connections and at the base of the support columns.
M		1	North	Opening in wall for girder pass thru is rough cut with exposed rebar and stirrups along all edges.
M		2		The previously noted 4" L vertical crack in south exterior stringer to floorbeam cantilever west connection angles at top was not found.
M		3		32" L x 12" H area of advanced section loss at the south end of Floorbeam 3, west face. Nominal thickness is 13/16" T, thinnest remaining section is 0.40" T.
M			North	Typical painted over 1/8" T pack rust between girder top flange cover plates at the transverse ends.

Table 8: Unit I Superstructure Deficiencies				
Section	Frame	Floorbeam	Girder	Note
M		2	North	1/8" pack rust between girder top flange and tie plate for floorbeam.
M		3	North	1/2" T painted over pack rust between girder top flange and floorbeam tie plate.
M		4	North	1/8" pack rust between girder top flange and tie plate for floorbeam.
M		7	North	3/16" T pack rust between girder top flange and tie plate for floorbeam.
M		10		3' L x 1' W sapll on FB 10 in West Approach Abutment Section M.
M		10		1' L x 1' W sapll on FB 17 in West Approach Abutment Section M.
N			North	Not fully engaged bolt between girder web and top flange connection angle, also to north face cantilever connection angle.
N	5		Center	Sheared bolt at end of top flange due to pack rust.
N		All	North	Knee braces have a 12" L x 3" W cutouts.
N		1	North and Center	Between the north and center girders, there is up to 1/8" D painted over section loss on the web and flanges in a 9' L section.
N		4	Center	West of the center girder, there are 2 bent areas in the knee brace flange. Up to 1/16" pitting on floorbeam.
N		8	North	1/16" D painted over pitting on east end of girder near bearing.
N		5	South	East bearing all anchor bolt nuts are missing.
N		5	South	Pack rust between girder top flange and floorbeam to cantilever tie plate up to 3/4" thick.
P		West of 1	14	3' x 4' spall with exposed reinforcing, south face. Stirrups bars are broken.
P		West of 1	15	8' L x 4' H Spall with exposed reinforcing.
P		1		North end, west face has a 2' x 2' spall with exposed reinforcing.
P		1 to 2	14	Girder; South face of girder 14 at floorbeam 2 has 3' L x 2' H delamination with cracks (3LF).
P		1 to 2	2	Girder; South face of girder at FB 2 has a 3' diameter delamination (2LF).
P		2		Floorbeam; West face of floorbeam 2 in middle section has numerous hairline cracks and an isolated 2' x 2' delamination between girder 11 and 12 (2LF).
P		2 to 3	4	At Floorbeam 2, there is an area of delamination 2' L x 1.5' W.
P		3	13-14	West face, delamination 12" H x 3" W
P		5	2	Girder; Bottom side of cantilevered girder past FB5 cracking with rust staining

Table 9: Unit III Superstructure Deficiencies

Span	Bent/ Truss	Column/ Member	Note
Frame and Braced Column	Pier 10	Cross Bracing	5 - 1" ø holes in the south, lower to upper cross brace member, near center
Frame and Braced Column	11/12		Chipped paint on the bottom flange of Stringer 1 between Bent 11 and 12 over West 9th Street lane indicates vehicular impact. There are slight bends from impacts and heat straightening.
Frame and Braced Column	14	South Center Column	Up to 1/8" D painted over section loss in webs and flanges, knife edging, and a small perforation on the East side of the transverse stiffeners.
11	FB 8		Tack welds are cracked and pack rust is forming in between top flange and plate. Weld near end is starting to crack into steel.
11	FB 129		3rd stringer from north has 3/8" distortion in bottom flange east of floorbeam 129.

Table 10: Unit IV Superstructure Deficiencies			
Section	Bent	Item	Note
A	14		North girder; Painted over 1/2" Diameter corrosion hole and adjacent pitting in web of column at masonry plate.
B	17	Pin & Hanger	Painted over pack rust between built up flange components. Up to 1/8" D pitting on bottom flange angle.
B	17	Stringer	2nd stringer from south has abrasion dust.
B	Joint B7	Girder	North girder; 11.5" L x 10" H cutout 30" east of Joint B7.
B	18/19	Floorbeam	Typical 1/16" D painted over pitting on bottom of web and bottom flange.
B	19/20		Abandoned welded attachments to south face of North girder between Bents 19 & 20.
B	20	Pin & Hanger	North girder: Painted over pack rust between built up flange components. Up to 1/8" D pitting on bottom flange angle.
C		Girder	North girder over Lakeside Ramp, there is 1" T painted over pack rust between the bottom flange plates.
C	20	North Floorbeam cantilever	Sheared bolt head at North stringer connection angle to East face of floorbeam cantilever.
C	21	Girder	North girder: Cutout in web 14" L x 12" H.
C/D	23	Pin & Hanger	Typical pin-hanger East of bent, North girder. Edges have been caulked, but new movement is evident.
D	23	Stringer	1st interior stringer from the south has abrasion dust.
D/E	26	Girder	North girder; bottom flange angle on north side is bent at the Joint B4. Pin nuts show evidence of movement.
E/F	29	Floorbeam	1/16" painted over pitting on bottom flange and lower 6" of the web.
F/G	32	Floorbeam	1/8" painted over section loss on the bottom flange and lower 6" of the web (most of length).
G	33	South Cantilever	Cantilever west bottom flange is bent 18" L x 1" H.
H	35	North Cantilever	Southeast bottom flange is bent 12" L x 1" H.

Table 11: Unit V Superstructure Deficiencies			
Section	Girder	Face	Note
38	North / Center		Abandoned catwalk at FB20 with up to 100% section loss and holes that are cleaned and painted.
38	South	North	Between FBs 26-33, up to 1/2" T painted over pack rust between bottom flange cover plates.
38	South	North	Previously noted corrosion hole in the web has been repaired with a steel plate retrofit between FBs 28/29.
38	Center	North	Painted over pitting up to 1/4" D x 24" H in web and 1/4" D x FW in top of the bottom flange above bearing at Pier 38, FB30. 4 rivet heads have popped off and been painted over on bottom flange and 4 web rivet heads and 2 bottom flange rivet heads have up to 90% section loss and are painted over. Several rivets have been replaced with high strength bolts. At this location, bottom secondary connection plate has 18" L x 6" W area of 100% section loss.
38	Center		Abrasion rust along the middle bearing.
38	North	Both	Between 1/8" to 3/16" D painted over pitting to the Pier 38 bearing.
38	Center / South		At Pier 38, the lower lateral bracing gusset plate has advanced painted over section loss, up to 3/4", including knife-edging, perforations and 30% rivet head loss. The lateral brace from Center Girder to South Girder has advanced 5/16" D painted over section loss in the web and bottom flange with up to 1/2" perforations.
39	North / Center		Between FB 31-32, typical signs of leakage between sections of pipe at the gaskets. Typical for all downspouts.
39	Center / South	South	Typical cleaned and painted section loss with up to 100% section loss at abandoned catwalk channel at connection to south face of the center girder
39	Center	Both	3/16" D painted over pitting between Floorbeams 40 and 41, and also between Floorbeams 62 and 63. Transverse catwalk extension at these locations removed due to excessive section loss in supports. Longitudinal catwalk is in good condition. Abandoned catwalk supports have widespread 1/8" D pitting with knife edging and isolated sections of 100% section loss to angle legs.
39	North / Center	-	2 - 1" ø holes through the bottom of the web
39	Center	North	Between FB 51-61, up to 1/2" T painted over pack rust between the two bottom flange cover plates.
39	Center	North	At FB 63, typical 1/16" D pitting with isolated areas up to 3/16".
39	Center	North	Painted over pitting up to 1/4" D by 30" W in the bottom of the web and vertical leg of bottom flange from floorbeams and in vertical stiffener to floorbeam.
39	Center	Both	Rocker bearing at Pier 39 has typical 3/16" D, up to 3/8" D painted over pitting.
39	Center		Between FBs 73-80, up to 1/2" T painted over pack rust between bottom flange cover plates.
39	North / Center		One plug weld in FB 76 bottom flange over catwalk.

Table 11: Unit V Superstructure Deficiencies			
Section	Girder	Face	Note
40	North / Center		Typical 1/8" D painted over pitting along bearing.
40	North / Center		Three corrosion holes (up to 1-1/2" L x 1/2" H) in lower strut between girders near north girder support. The lower lateral brace east of Pier 39 has up to 3/16" D section loss in the web and rivet heads near the top flange. Lower strut impact dent (3/4" up over 6" L) in bottom flange near midspan.
40	North	South	At the second portal brace east of Pier 39, there is up to 3/16" D painted over web loss and rivet head loss in the lateral bracing connection angle near the top flange at the lower lateral brace.
40	North	South	25% section loss in 4 rivet heads in south bottom flange at FB 77.
40	North	South	1/8" D undercutting in south face of the web at the plate base weld.
40	North		Three plug welds in stiffener outstanding leg below FB 84.
40	Center		12-1/2" W x 10" H rectangular hole and two open holes in web between FB 83-84 with isolated 1/16" painted over pitting around. (South girder similar).
40	North		Errant weld material in south face web below the Floorbeam 92 connection (similar at FB 87 and 88).
40	Center		12-1/2" W x 10" H rectangular hole and two open holes in web between FB 101-102 with isolated 1/16" painted over pitting around. (South girder similar). Two plug welds in bottom flange of FB101.
40/41	South		Arrested pack rust up to 1-5/8" T at the bottom flange plate (worst on east side of pier 40).
40/41	Center	North	Up to 1/4" T pack rust between bottom flange built up plates near Pier 40. This has been cleaned and sealed. Painted over section loss (1/8" D) at the floorbeam connection to the Center girder.
41	South / Center		Flame cut hole for scupper downspout in South and Center girder web past Pier 40.
41	Center	North	Isolated 1/8" painted over pitting on north face of web around FB 115.
41	South	North	Isolated painted over pitting 1/8" between FB 115-116.
41	Center		12-1/2" W x 10" H rectangular hole and two open holes in web between FB 118-119 with isolated 1/16" painted over pitting around. (South girder similar).
41	South		Replaced rivets with bolts in south girder bottom flange over eastbound on ramp. Minor gouges in edges and underside of bottom flange with no significant distress noted.
41	North	North	Up to 1" Painted over pack rust between the bottom flange plates east of Pier 40.
41	North	South	1' x 4" cut out hole on 19th stiffener from East Abutment
41	All Bearings		All rocker bearings at the East Abutment are at or near full expansion. North 4.0 degrees, Mid 6.0 degrees, South 7.0 degrees. All rotated east. (2023 Measurement conditions: 71°F and cloudy)

Table 12: Unit II Main Truss Bearing Deficiencies			
Span	Pier	Truss	Note
1	0	North	No Significant Deficiencies.
1	0	South	No Significant Deficiencies.
2	1	North	West side of bearing is partially full of water. Active corrosion with section loss up to 1/4" on steel plates surrounding bearing.
2	1	South	Laminating corrosion of steel side plates for bearing.
2	2	North	No Significant Deficiencies.
2	2	South	No Significant Deficiencies.
4	3	North	Water is pooling in the bearing at time of time of inspection. There is heavy laminar corrosion and pack rust between the bearing edge plates separating the edge plates up to 1.5".
4	3	South	West side of bearing area full of water.
4	4	North	L12 fixed bearing exhibits painted over pitting up to 1/4" D on the masonry plate and 1/8" D on other bearing components. Bleeding rust is dripping down below pinned connections. Anchor bolt nuts have laminar corrosion and up to 20% section loss.
4	4	South	The bearing assembly anchor bolts nuts exhibit up to 25% section loss.
6	5	North	No Significant Deficiencies.
6	5	South	The bearing assembly has moderate surface corrosion along the rocker containment plates.
6	6	North	Bearing is full of water. 50% section loss to anchor bolts.
6	6	South	Bearing is full of water.
8	7	North	There is heavy laminar corrosion / pack rust between the bearing edge plates separating the edge plates up to 1.25". North side of the bearing is ponding water between the stiffeners. SW anchor bolt has up to 100% section loss.
8	7	South	East half of bearing is full of water.
8	8	South	Anchor bolts exhibit up to 50% section loss.
8	8	North	Southeast anchor bolt nut has 50% section loss. Southwest anchor bolt nut has 100% section loss.
10	9	North	Anchor bolt nuts exhibit up to 25% painted over section loss with some active corrosion.
10	9	South	Anchor bolt nuts exhibit 50% section loss with some active corrosion.
10	10	North	1/8" painted over section loss on the bearing and pin. Reactivating in some areas.
10	10	South	1/8" painted over section loss on the bearing and pin. Reactivating in some areas.
10			Typical stringer bearings (sliding plate) on east face of Floorbeam 0, evidence of movement. Surface corrosion is present.
11	10	North	2 of 3 bolts are loose on the inboard sliding plate for the north truss at U0. Movement noted.

Table 13: Unit II & III Floorbeam Cracks								
Span	Truss Line	Floorbeam	Location	Comment	Crack Length			
					2020	2021	2022	2023
1	North	FB 0	OB West Face	Horizontal Crack in Web at Top Flange	N/A	3 1/4"	3 3/8"	4"
			OB East Face	Horizontal Crack in Web at Top Flange	N/A	N/A	N/A	2 1/2"
		FB 6	OB East Face	Horizontal Crack in Web at Top Flange	N/A	N/A	N/A	3 1/4"
	South	FB 0	OB East Face	Horizontal Crack in Web at Top Flange	N/A	N/A	1 1/2"	1 1/12"
		FB 6	OB East Face	Horizontal Crack in Web at Top Flange	N/A	3 1/8"	3 1/8"	3 1/8"
		FB 7	OB West Face	Horizontal Crack in Web at Top Flange	2 7/8"	3 3/8"	3 5/8"	4 1/4"
			OB East Face	Horizontal Crack in Web at Top Flange	4 1/2"	4 7/8"	4 7/8"	4 7/8"
2	North	FB 0	OB East Face	Horizontal Crack in Web at Top Flange	N/A	3"	3"	4 1/4"
		FB 1	OB East Face	Horizontal Crack in Web at Top Flange	N/A	N/A	N/A	3 1/2"
		FB 2	OB East Face	Horizontal Crack in Web at Top Flange	N/A	N/A	N/A	1 1/2"
		FB 12	OB East Face	Horizontal Crack in Web at Top Flange	N/A	N/A	N/A	4"
		FB 14	OB East Face	Horizontal Crack in Web at Top Flange	N/A	N/A	N/A	2 1/2"
3	North	FB 4	OB East Face	Horizontal Crack in Web at Top Flange	N/A	N/A	N/A	2 3/4"
4	North	FB 0	OB East Face	Horizontal Crack in Web at Top Flange	N/A	N/A	1 1/2"	2 1/2"
		FB 3	IB West Face	Horizontal Crack in Web at Top Flange	N/A	N/A	N/A	1 3/4"
		FB 4	OB West Face	Horizontal Crack in Web at Top Flange	N/A	N/A	N/A	*
	South	FB 14	OB West Face	Horizontal Crack in Web at Top Flange	N/A	1-1/4"	1 3/4"	1 3/4"
		FB 0	OB East Face	Horizontal Crack in Web at Top Flange	N/A	1 3/4"	1 3/4"	1 3/4"
6	North	FB 0	IB East Face	Horizontal Crack in Web at Top Flange	2"	1 1/2"	1 1/2"	1 1/2"
			OB East Face	Horizontal Crack in Web at Top Flange	2 1/8"	2 3/4"	2 3/4"	2 3/4"
		FB 16	OB West Face	Horizontal Crack in Web at Top Flange	N/A	N/A	N/A	3/8"
			OB East Face	Horizontal Crack in Web at Top Flange	N/A	N/A	N/A	2"
	South	FB 17	OB West Face	Horizontal Crack in Web at Top Flange	N/A	2 3/8"	2 3/8"	2 3/8"
		FB 0	OB West Face	Horizontal Crack in Web at Top Flange	2 5/16"	2 5/16"	2 5/16"	2 5/16"
			OB East Face	Horizontal Crack in Web at Top Flange	4 1/2"	4 1/2"	4 1/2"	4 1/2"
IB West Face	Horizontal Crack in Web at Top Flange		2"	2"	2"	2"		
IB East Face	Horizontal Crack in Web at Top Flange		2 1/4"	2 1/4"	2 1/4"	2 1/4"		
8	North	FB 0	OB East Face	Horizontal Crack in Web at Top Flange	N/A	3 1/4"	3 1/4"	3 1/4"
			IB West Face	Horizontal Crack in Web at Top Flange	N/A	1 5/8"	1 5/8"	1 5/8"
			IB East Face	Horizontal Crack in Web at Top Flange	N/A	2 1/8"	2 1/8"	2 1/8"
	South	FB 25	North Cantilever	6 crack arrest holes and multiple arrested cracks present at the Stringer 6 bracket.	N/A	N/A	N/A	N/A
			FB 0	OB East Face	Horizontal Crack in Web at Top Flange	N/A	3 1/2"	3 1/2"

* Crack noted as unable to be measured

10	North	FB 22	OB East Face	Horizontal Crack in Web at Top Flange	N/A	3 5/8"	3 5/8"	5 1/12"
			IB East Face	Horizontal Crack in Web at Top Flange	N/A	6 1/4"	6 1/4"	6 1/4"
			IB West Face	Horizontal Crack in Web at Top Flange	N/A	3 1/2"	3 5/8"	3 5/8"
	South	FB 22	OB West Face	Horizontal Crack in Web at Top Flange	3 1/4"	3 3/4"	3 3/4"	3 3/4"
			OB East Face	Horizontal Crack in Web at Top Flange	6"	7 1/4"	7 1/4"	7 1/4"
			IB West Face	Horizontal Crack in Web at Top Flange	4"	4"	4"	4"
			IB East Face	Horizontal Crack in Web at Top Flange	6 1/2"	7"	7"	7"
11	North	FB 8	OB West Face	Horizontal Crack in Web at Top Flange	N/A	N/A	4 3/4"	5"
			OB East Face	Horizontal Crack in Web at Top Flange	N/A	N/A	4 3/4"	4 3/4"
	South	FB 8	OB West Face	Horizontal Crack in Web at Top Flange	N/A	N/A	N/A	1 5/8"
			OB West Face	Tack welds are cracked and pack rust is forming in between top flange and plate. Weld near end is starting to crack into steel.	N/A	N/A	N/A	1 5/8"

Table 14: Unit I Substructure Deficiencies				
Section	Inside / Outside	Face	Location	Note
SECTION B AND B'				
B'	Inside			All drains in section are fully clogged.
B'	Inside	North	West of Column 0	6' H x 5' W spall.
B'	Inside	South	West of Column 0	2' H x 3' W spall with deteriorated reinforcing near top of wall.
B'	Inside	Both	Between Columns 7 & 8	Full height x 1/16" W crack on N & S walls.
B'	Inside	East	East of Column 9	20 SF delamination.
B'	Inside	East	East of Column 9	3' H x 3' W delamination.
B'	Inside	South	East of Column 9	10 SF delamination near top of wall.
B'	Outside	North	At Joint X	1' H x 3' W spall with deteriorated reinforcing.
B & B'	Outside	North		Multiple vertical cracks typically full height x 1/16" W but up to 1/8" W (30 LF).
B	Outside	North	4 Sections W of Jt X, west end of section	12" x 6" x 1" D spall.
B	Outside	North	5 Sections W of Joint X	12" x 8" x 1.5" D spall.
B	Outside	South	At Joint X1	2' H x 6" W x 1' D spall with exposed and corroded rebar at the top of the joint.
B	Outside	South	Joint between Sections 5 & 6 W of Jt X	2' H x 4" W incipient spall at top right section of wall. At mid height, 2' H x 3" W spall.
B	Outside	South	Joint between Sections 6 & 7 W of Jt X	2' H x 4" W x 2-1/2" D spall at top of wall. 4' H x 6" W x 5" D spall at mid height.
B	Outside	South	Joint b/w Sections 8 & 9 W of Jt X	2.5' H x 2" W x 4" D spall with exposed reinforcing.
B'	Outside	North	at Joint X1	5' H x 8" W delamination.
B'	Outside	North	W end of Section 2 W of Jt X	6' H x 1.5' W delamination.

Table 14: Unit I Substructure Deficiencies				
Section	Inside / Outside	Face	Location	Note
SECTION J AND J'				
J	Outside	North		Full height vertical cracks up to 1/16" W with efflorescence and some rust staining spaced 10' apart on average, with isolated diagonal cracks as well.
J	Outside	North	Mask Wall	Concrete around second joint west from Joint T2 is spalling out 1' W x 12' H.
J	Outside	North	Mask Wall	At Joint T2 the west wall panel is leaning to the north approximately 2.5" more than the east panel (approximated at the top).
J	Outside	South	Between Section 2 and 4	Full Height vertical cracks.
J'	Inside	South	At Joint T2	8' H x 1' W x 3" D and 4' H x 1.5' W x 4" D spalls.
J'	Inside	North	At Joint T2	At north wall, edge spalling and delaminations (8 LF).
J'	Inside	Both	Near Joint T1	On south wall, 2' W x 11' H delamination centered at joint. On north wall, 2' W x 12' H delam. Spall with exposed reinforcing for 6 SF. Signs of leakage and rusting through joint.
J'	Inside	East	At Joint T	Delamination (40 SF).
J'	Inside	South	At Joint T	11' H x 3' W map cracks.
J'	Outside	North	Panel 7	At the first panel east of Joint T2, delamination at top of Wall 15 SF.
J'	Outside	North	Panel 8	First panel west of Joint T1 has 15 SF of delaminations.
J'	Outside	North	Panel 9	At the first panel east of Joint T1, 20 SF delamination near top.
J'	Outside	North	At Joint T	2' H x 2' W x 2" D spall with deteriorated rebar.
J'	Outside	East	At Joint T	2' H x 6" W x 1" D spall.
J'	Outside	East	At Joint T	2' H x 1' W x 2" D spall with deteriorated rebar.
J'	Outside	South	Section 5	10 SF of spalls, some with exposed rebar with 30% section loss. 20 SF of delaminations. Full height hairline cracks.
J'	Outside	South	Section 6	6 SF of spalls, some with exposed rebar. 25 SF delamination. Full height hairline cracks.
J'	Outside	South	Section 7	5 SF of spalls, some with exposed rebar with 30% section loss. 20 SF of delaminations. Full height hairline cracks.
J'	Outside	South	Section 8	10 SF of delaminations. Full height hairline cracks.

Table 14: Unit I Substructure Deficiencies				
Section	Inside / Outside	Face	Location	Note
SECTION C				
C	Inside	East	West Wall	North end of east wall has a 6' H x 3' W x 1.5" D spall with exposed reinforcing with 10' W x 2' H delamination.
C	Inside	East	East Wall, At Joint W	Scaling with secure aggregate over 25% of surface area.
C	Outside	North	Joint X	5' H x 16" W x up to 2" D spall / delamination with one vertical and four horizontal exposed rebar with up to 80% section loss.
C	Outside	North	West Wall, Near Joint X	3' H x 16" W spall with exposed reinforcing.
C			Columns 2 and 3 north and south	The anchor bolts have been cleaned and painted with 20% section loss with minor necking of the bolt between the column sleeve and base plate. This is typical of all 4 anchor bolts. The bottom base plate has up to 1/8" D painted over pitting throughout
C	Outside	South	East Wall	2' H x 1" W delamination.
C	Outside	South		2' x 6" W delamination.
C	Inside	East	East Wall, N Corner	6' H x up to 3' W x up to 2" D spall with exposed rebar with minor section loss. Scattered delaminations (10 SF).
C	Inside	West	West Wall	5' H x 2' W delamination. South end of west wall has a 2' x 2' delamination.
C	Inside	West	West Wall	North end of west wall has 5' H x 2' W delamination. South end of west wall has a 2' x 2' delamination.
SECTION K				
K	Inside	North	Joint S	Spalling with exposed reinforcing (4 SF).
K	Inside		South Wall, FB 0	1/8" D Painted over pitting for full height with 2 small corrosion holes in the web. In the column base, there is spalling with exposed reinforcing (1.5 SF) and delamination (1 SF).
K	Inside	West	West Wall	Delamination (15 SF).
K	Inside	South	At Joint T	Full height x 3' W delamination.
K	Outside	East	West Wall	Delamination (15 SF) and a spall (1 SF).
K	Outside	South	East Wall	Edge delamination (1 SF).
K	Outside	North	Top of West Wall under steel	2' diameter x 3" D spall with exposed rebar.
K	Outside	West	East Concrete Wall along W 28th St.	Below Girder 2, there is a delamination (25 SF). There are several hairline vertical cracks.

Table 14: Unit I Substructure Deficiencies				
Section	Inside / Outside	Face	Location	Note
SECTION M				
M	Inside	North	Wall West of FB 0	Delamination (40 SF). Three cracks 10' H.
M	Inside	North	West of Joint Q6	5' H x 6" W spall. Delamination (2 SF).
M	Inside	North	Between Columns 19 & 20	13' H crack.
M	Inside	North	Between Columns 20 & 21	13' H crack.
M	Inside	North	Between Columns 24 & 25	13' H crack.
M	Inside	North	Between Columns 29 & 30	Full height crack.
M	Inside	South	Wall West of Joint R	2' H x 3' W spall with deteriorated rebar. Delamination (6 SF).
M	Inside	South	Between Columns 12 & 13	Two 4' H x 3' W spalls with deteriorated rebar at Joint Q6.
M	Inside	South	Between Columns 14 & 15	13' H crack.
M	Inside	South	Between Columns 15 & 16	13' H crack.
M	Inside	South	Between Columns 27 & 38	2' H x 2' W spall with deteriorated rebar.
M	Outside	North	North Column by FB5 (Ramp Median)	The bottom base plate and stiffening angles have up to 3/16" D painted over pitting. The west flange just above the vertical gusset plate has up to 3/16" D painted over pitting for 2" H. 25% section loss to the anchor bolts.
M	Outside	South	Wall West of Joint R	3' H x 3' W and 2' H x 1.5' W spalls with deteriorated rebar. Delaminations (12 SF and 24 SF).
M	Outside	South	1st Panel East of Joint R	Delamination near east side (30 SF).
M	Outside	South	1st Panel East of Joint Q6	3' H x 2' W spall with deteriorated rebar near west side.

Table 14: Unit I Substructure Deficiencies				
Section	Inside / Outside	Face	Location	Note
M	Outside	South	1st Panel West of Joint Q5	Delamination near east side (9 SF).
M	Outside	South	1st Panel East of Joint Q5	Delamination on west side (15 SF).
M	Outside	South	1st Panel West of Joint Q	Delamination near west side (6 SF). Map cracks near east side (12 SF).

Table 14: Unit I Substructure Deficiencies				
Section	Inside / Outside	Face	Location	Note
SECTION D				
D	Inside		Typical	There are isolated instances of hairline cracking in the walls up to 1/32" W, some with minor moisture/rust staining.
D	Inside		Typical	Some of the columns have spalling in the corners up to 1' diameter from machine impact.
D	Inside		Typical	Concrete beams have isolated instances of scaling and minor spalls less than 6" diameter.
M	Inside	North	Wall West of FB 0	2' L x 1' W spall with deteriorated rebar on overhead concrete at joint.
M	Inside	West	Wall West of FB 0	6' H x 3' W spall with deteriorated rebar. Delaminations (18 SF, 15 SF, & 10 SF).
M	Inside	South	Wall West of FB 0	Delamination (20 SF).
D	Inside	South	Between Columns 1 & 2	13' H crack.
D	Inside	North	Between Columns 2 & 3	13' H crack.
D	Inside	North	Between Columns 4 & 5	10' H x 3" W and 4' H x 1' W spalls with deteriorated rebar.
D	Inside	South	Between Columns 4 & 5	4' H x 1' W spall with deteriorated rebar.
D	Inside	North	Between Columns 6 & 7	13' H crack.
D	Inside	North	Joint Q4	23' H x 3' W spall with deteriorated rebar.
D	Inside	South	Joint Q4	Delamination (10 SF). 13' H crack.
D	Inside	North	Between Columns 11 & 12	13' H crack.
D	Inside	South	Between Columns 12 & 13	13' H crack.
D	Inside	North	Between Columns 14 & 15	2' H x 1' W spall with deteriorated rebar.
D	Inside	South	Between Columns 14 & 15	2' H x 2' W spall with deteriorated rebar.
D	Inside	South	Between Columns 16 & 17	4' H crack.
D	Inside	North	Between Columns 17 & 18	6' H x 1' W spall with deteriorated rebar. 10' H crack.

Table 14: Unit I Substructure Deficiencies				
Section	Inside / Outside	Face	Location	Note
D	Inside	North	Joint Q3	5' H x 2' W spall.
D	Inside	South	Joint Q3	4' H x 2' W spall with deteriorated rebar. 6' H x 6" W spall.
D	Inside	South	Between Columns 21 & 22	13' H crack.
D	Inside	South	Between Columns 22 & 23	13' H crack.
D	Inside	North	Between Columns 24 & 25	6' H x 5' W spall with deteriorated rebar.
D	Inside	North	Between Columns 28 & 29	13' H crack.
D	Inside	South	Between Columns 28 & 29	13' H crack.
D	Inside	South	Between Columns 29 & 30	13' H crack.
D	Inside	North	Joint Q2	Delamination (6 SF).
D	Inside	South	Between Columns 33 & 34	13' H crack.
D	Inside	South	Between Columns 34 & 35	13' H crack.
D	Inside	North	Between Columns 36 & 37	Delaminations (20 SF & 10 SF).
D	Inside	South	Between Columns 36 & 37	2' H x 1' W spall.
D	Inside	North	Between Columns 38 & 39	23' H crack.
D	Inside		Joint Q1	20' L crack on overhead concrete at joint.
D	Inside	South	Joint Q1	3' H x 6" W spall with deteriorated rebar.

Table 14: Unit I Substructure Deficiencies				
Section	Inside / Outside	Face	Location	Note
D	Inside	South	Between Columns 43 & 44	13' H crack.
D	Inside	North	Between Columns 46 & 47	3' H x 1' W spall with deteriorated rebar. Delamination (6 SF).
D	Inside	South	Between Columns 46 & 47	3' H x 6" W spall with deteriorated rebar.
D	Inside	North	Column 50	1' H x 1' W x 3" D spall.
D	Outside	North	Between Joints Q to Q4	Numerous full height vertical cracks up to 1/16" W. Numerous areas of delam measuring 6' x 4'. Several spalls with exposed reinforcing.
D	Outside	South	Section 1 (Starting from West 28th St.)	10 SF of delaminations.
D	Outside	South	Section 2	10 SF of delaminations.
D	Outside	South	Section 3	30 SF of delaminations. 2 SF spall 2" D.
D	Outside	South	Section 4	10 SF of delaminations. 1 SF shallow spall.
D	Outside	South	Section 5	15 SF of delaminations.
SECTION N				
N	Inside	West	Near Column N21	2' H x 1' W spall.
N	Inside	West	Near Column N8	5' H x 8' W spall with deteriorated rebar at top of wall. Delamination (4 SF).
N	Inside	North	Near Column N27	3' H x 1' W spall with deteriorated rebar.
N	Inside	North	Near Column N29	5' H x 3' W and 3' H x 2' W spalls with deteriorated rebar. Delamination (24 SF & 8 SF). 23' L crack.
N	Inside	North	Near Column N30	23' H crack. Delaminations (9 SF & 16 SF).
N	Inside	North	Near Column N25	4' H x 2' W spall.
N	Inside	South	Near Column N1	20' H x 10' W delamination (200 SF) with deteriorated rebar under joint Q. Additional delamination (2 SF).
N	Inside	South	Near Column N2	Delamination (10 SF). 10' H crack.
N	Inside	East	Near Column N25	Delamination (3 SF).

Table 14: Unit I Substructure Deficiencies				
Section	Inside / Outside	Face	Location	Note
N	Inside	East	Wall West of 25th St	2' W x 2" deep spalls around garage door.
N	Outside	North	West Side	2' L x 1' H x 6" D spall.
N	Outside	North	East Side	FH crack. 4' H x 1' W spall with deteriorated rebar.
N	Outside	South	West Corner	4' H x 5' W spall with deteriorated rebar. Crack in masonry. Joint material coming out of joint between masonry and concrete.
N	Outside	South	East Corner	2' L crack under floorbeam. 13' H crack.
N	Outside		Panel adjacent to Joint P	Multiple delaminations - 4' H x 4' W, 2'W x 1' H, and 1/8" W x Full Height crack with 2' W delaminations.
N	Outside		2nd Panel West of Joint P	Multiple delaminations - 3' W x 6' H, 4' W x 1.5' H, 4' W x 2' H, 6' W x 2' H, 4' W x 6' H, 3' W x 2' H, 2' W x 2' H.

Table 14: Unit I Substructure Deficiencies				
Section	Inside / Outside	Face	Location	Note
SECTION P				
P		Under side	East End Pier Cap	Bottom face of cap has two delaminations, 5' x 3' and 4' x 2', near the middle of the cap with surrounding vertical cracks.
P	Inside	North	S Wall, W end	Curtain walls at both north and south ends, multiple spalls and delaminations up to 6' L x up to 4' H x 5" D with exposed rebar with 10% section loss; several areas on curtain walls marked for repair.
P	Inside		East Pier, South End	4' L delamination with rust staining.
P	Inside		East Pier, North Column	8' H x 1' W delamination, 20 SF, 3" D spall with exposed reinforcing.
P	Inside	Both	East Curtain Walls	North wall, 40 SF delaminations and 5 SF spall with exposed reinforcing. South wall, 60 SF delaminations.
P		East	3rd col. from S, 2nd row of col's from W	The base of the column is delaminated around the north and east faces below the original ground level and is marked for repair.
P	Outside	East	East Pier, South End	20 SF delamination.

Table 15: Unit II Substructure Deficiencies			
Span / Pier	Column	Face	Note
Typical Note			All columns have typical concrete patching with some map cracking and minor rust staining.
Pier 0	North	SE	2' L x 4" H delamination/spall.
Pier 0	South	North	2.5' L x 6" H delamination.
Pier 2	South	West	2' x 2' delamination
Pier 6	North	North	1' H x 1' W spall.
Pier 6	South	South	Multiple 6" H x 6" W spalls.
Pier 8	North	North	4" H x 4" W x 1.25" D spall.

Table 16: Unit III Substructure Deficiencies			
Span / Pier	Bent	Column	Note
Typical			Typical areas of painted over section loss up to 3/16" D were noted throughout the lower portions of the columns and along the lower bracing members. Areas of pack rust have been cleaned and caulked throughout.
11		South	22" W x 6" H x 4" D spall on West face of concrete base above drain pipe catch basin connection. 4" W x 3" H x 1" D spall with vertical hairline cracks extending downward on East face of concrete base. Anchor bolt nuts with 20-40% section loss, and head loss on a few rivets and bolts. Corrosion holes in the 2nd and 3rd north web plates up to 2" diameter. 1/2" T pack rust on base plate members.
11		North	The interior faces of the column plates exhibit up to 1/8" D section loss along the lower 2.5'. The anchor bolts exhibit up to 25% section loss at the base. The exterior surface of the column has painted over section loss up to 1/8" D x full height.
Frame & Braced Connection	1	South	Up to 20% section loss of anchor bolts and nuts.
Frame & Braced Connection	1	North	The column has been cleaned and painted with typical painted over pitting up to 1/8" D. The anchor bolts exhibit up to 10% section loss with minor necking of the bolt between the column sleeve and base plate. This is typical of all 4 anchor bolts.
Frame & Braced Connection	1	Center	Typical painted over pitting up to 1/8" D on all faces from Level 2 to the base. Isolated areas up to 3/16" D section loss noted at the bracing connections. The web stiffening angles located at the Level 1 bolted connection for the transverse strut truss exhibit up to 100% section loss with the upper angle having FL x FW section loss up to 100%. The bearing pedestal typically exhibits 2-3 full height 1/16" W cracks and one full width horizontal crack. The anchor bolts have up to 10% section loss between the vertical and the base plate with up to 25% section loss of the anchor bolt nuts.
Frame & Braced Connection	2	North	The bottom 3" H of the column and the base plate have typical painted over pitting up to 1/8" D. The anchor bolts have been cleaned and painted with 50% section loss with minor necking of the bolt between the column sleeve and base plate. This is typical of all 4 anchor bolts. The anchor bolt nuts on the north side have up to 20% painted over section loss. There is a Full Height x 1/16" W vertical crack at the southwest and southeast corners of the concrete pedestal. The east bottom batten plate of the column has a 1/2" diameter hole. The northeast corner of the pedestal has a 1'-9" H x 5" W x 1" D spall/delamination. The southeast corner at the bottom has a 6" H x 10" W x 2" D spall. The southwest corner has a 3" H x 5" W x 1" D spall at the top edge and a 3" H x 2" W x 1/2" D spall at the bottom.
Frame & Braced Connection	2	Center	The base of the column exhibits painted over pitting of the base plate up to 1/8" D. There is a 2" H x 1" W corrosion hole in the west batten plate. The lower 4" of the web exhibits painted over pitting 1/8" with a corrosion hole 3" x 1"

Table 16: Unit III Substructure Deficiencies			
Span / Pier	Bent	Column	Note
Frame & Braced Connection	3	North	The bottom 3" H of the column and the base plate have typical painted over pitting up to 1/8" D. The anchor bolts have been cleaned and painted with 35% section loss with minor necking of the bolt between the column sleeve and base plate. This is typical of all 4 anchor bolts. The anchor bolt nuts have up to 20% painted over section loss. The west bottom batten plate of the column has a 1/2" diameter hole.
Frame & Braced Connection	3	Center	The base of the column has painted pitting of the base plate up to 1/8" D and painted over pitting on lower web at base full width x up to 3" H x up to 3/16" D pitting. The anchor bolts exhibit 10% section loss.
Frame & Braced Connection	3	South	1/8" pitting on the masonry plate and lower column. The anchor bolts exhibit 10% section loss.
Frame & Braced Connection	4	North	The base of the vertical has pitting up to 1/16" D. The anchor bolts also exhibit up to 10% section loss between the vertical collar and the base plate. The lower web has a 3" x 3" corrosion hole. Column from Level 0 to Level 2 have painted over pitting up to 1/8" D on the inboard flange C-channel flanges. At Level 2 on the east inboard flange C-channel there is a 1 1/2" H x 1/2" L corrosion hole. Level 2 to Level 3 are in similar conditions. At Level 3 the inboard C-channel flange has a 6" H x 3/4" L corrosion hole.
Frame & Braced Connection	4	Center	The base of the vertical has painted pitting up to 1/16" D. The anchor bolts also exhibit up to 10% section loss between the vertical collar and the base plate. There is a 1/4" crack for full height of the pedestal south face. The west edge of the concrete pedestal is spalled Full Length x 3" H x up to 1" D with up to 1/2" D void underneath the base plate. Column Level 0 to Level 3 has painted over pitting up to 1/16" to 1/8" D in isolated locations on the exterior webs. Exterior web channels on the north end of the member just above Level 2 has two corrosion holes 3/4" H x 3/8" L.
Frame & Braced Connection	4	South	Painted over pitting from 1/16" D to 1/8" D on anchor bolt assemblies, and bottom of column. Up to 10% section loss to anchor bolts. Masonry plates with up to 1/4" D painted over pitting. South flanges exhibit knife edging with up to 1" diameter areas of 100% section loss above the masonry plate.
Frame & Braced Connection	5	North	The base of the column exhibits pitting up to 1/16" D. The anchor bolts also exhibit up to 10% section loss between the vertical collar and the base plate.
Frame & Braced Connection	5	Center	The base of the column exhibits pitting up to 1/16" D. The anchor bolts also exhibit up to 10% section loss between the vertical collar and the base plate. The east batten plate has a 3" x 1.5" perforation.
Frame & Braced Connection	6	North	7/16" D pitting in outboard flange at horizontal connection for longitudinal bracing to Bent 5 at Level 2. Original thickness 7/8". Up to 50% section loss. Numerous perforations on the horizontal bracing Bents 5-6.
Frame & Braced Connection	6 to 7		Diagonal cross bracing between Bent 5 and 6. Utility pipe at cross bracing from Level 2, Bent 6 to Level 1 cross bracing is completely corroded with 100% section loss exposing electrical wires.

Table 16: Unit III Substructure Deficiencies			
Span / Pier	Bent	Column	Note
Frame & Braced Connection	6 to 9	All	The base of the vertical exhibits pitting up to 1/16" D. The anchor bolts also exhibit up to 10% section loss between the vertical collar and the base plate.
Frame & Braced Connection	7	North / Center	The anchor bolts exhibit section loss, 25% on the two northernmost columns.
Frame & Braced Connection	8 to 10	South	The base of the southernmost columns for towers 8 - 10 in the parking lot have a rocker bearing at the base that sits in a metal pan/base plate. Minor debris accumulation typical in pan with typical painted over pitting up to 1/16".
Frame & Braced Connection	10	North	4" H x 1" W corrosion hole in the west batten plate. 1" H perforation along the bottom of the web.
Frame & Braced Connection	10	South	2' x 4" x 4" delamination on north face with efflorescence.
Frame & Braced Connection	10	North	The base of the column exhibits painted over pitting up to 1/8" D. The anchor bolts also exhibit painted over up to 10% section loss between the vertical collar and the base plate.
Frame & Braced Connection	11	North	The anchor bolts exhibit painted over up to 10% section loss between the vertical collar and the base plate.
Frame & Braced Connection	12	North / Center	The anchor bolts exhibit painted over up to 10% section loss between the vertical collar and the base plate.
Frame & Braced Connection	13	North	Spall with exposed reinforcing in NE corner of concrete column base 18" L x 7" W x 1" D.
Frame & Braced Connection	South Chamber		South wall, north face has a full height x 3' W spall with exposed rebar. South wall, north face west side has a 6' H x 8' W spall with exposed rebar and a 30" H x 8" W x 5" D spall with exposed rebar. West wall, east face has a 10' H x 4' W spall with exposed rebar and a 5' W x 2' H delamination at the top.
Frame & Braced Connection	South Chamber		North wall, south face is spalled over 10' W x full height area with exposed rebar with section loss.
Frame & Braced Connection	North Chamber		South wall, north face, in the southeast corner of the North Ramp vault under Joint C has a Full Height x 44" W spall with exposed rebar and adjacent delaminations. Does not impact load bearing members.
Frame & Braced Connection	14	Middle 2 Columns	The base of the column exhibits painted over pitting up to 1/8" D. The anchor bolts also exhibit painted over up to 10% section loss between the vertical collar and the base plate.

Table 16: Unit III Substructure Deficiencies			
Span / Pier	Bent	Column	Note
Frame & Braced Connection	North Chamber		North wall, inside face has a 2' diameter spall with exposed reinforcement, minor section loss. Adjacent delamination 2' x 8'.
Frame & Braced Connection	North Chamber		Large area of spalling and delaminations 8' x 10' x up to 3" D.
Frame & Braced Connection	13		Two 6' H x 2' W delaminations on north wall inside face.
Frame & Braced Connection	North Chamber		18" x 18" spall with exposed reinforcing on south wall interior.

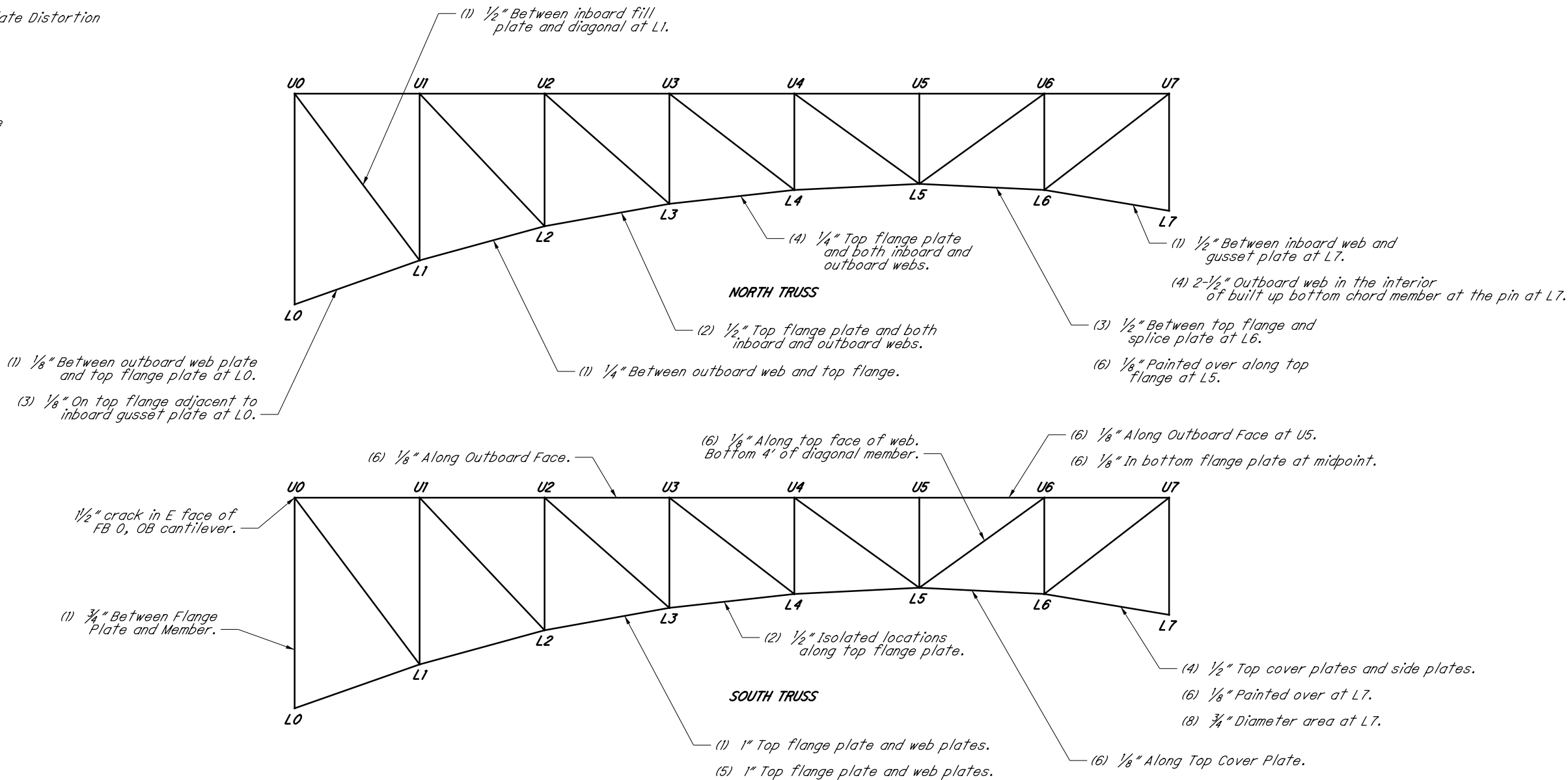
Table 17: Unit IV Substructure Deficiencies	
Bent	Note
14	West Lakeside Ave. entrance ramp (North ramp): North wall has spall and delamination along joint.
15	West Lakeside Ave entrance ramp, north face: Panel 1 at east end has a 2' H x 6" W x 6" D spall.
15	West Lakeside Ave. exit ramp: North face of Panel 1/2 has a 1.5" H x 6" W spall.
15	West Lakeside Ave. entrance ramp, bottom of overhang at the chamfer, south face: Panel 2 has a 1.5" L x 6" H spall with exposed reinforcements.
16	West Lakeside Avenue entrance ramp: The east end at the top has two 1' diameter delaminations. The north face of the entrance ramp at panel 2/3 has a minor spall, delamination and rust staining.
16	West Lakeside Ave. exit ramp, north face: Panel 3 has a 1' H x 6" W spall with exposed reinforcing.
17	North column at base of web, painted over pitting up to 1/8" D with 2 pin hole perforations.
17	West Lakeside Avenue entrance ramp: South wall, south face of Panel 3; the east end at the top has 8" L x 6' H x 1" D spall/delamination with one exposed corroded rebar.
18	North column at base of web, painted over pitting up to 1/8" D with corrosion hole 2" x 1" with adjacent pin holes.
	Lakefront entrance ramp South wingwall; delaminations and spalls with exposed reinforcement. Some patched areas, multiple areas of covered graffiti.
	East Abutment/entrance ramp North wingwall; vertical cracking isolated to joint areas.
	East Abutment/entrance ramp South wingwall. Vertical full height cracking with moisture leakage and efflorescence, spaced 10'-15' apart.
24	3 of the 4 north column anchor bolts are short 3/8".
25	All 6 south column anchor bolts are short 3/8". All 6 north column bolts short 1/2".
26	South concrete has Full Height hairline cracking with rust stains extending from SE and SW anchor bolt.
27	The north column has 1/8" pitting on the webs, with a 7" L x 1" H corrosion hole. The south column anchor bolts are short. There is a hole in the column web.
28	Both column's anchor bolts are short 1/4".
30	There is a 14' L x 6' W x 2' D sink hole near North column. This sink hole is undermining the pavement by 3' to the north and 1' to the west. The north column south face anchor bolts are 5/8" short. The south column north face anchor bolts are short 1/2."
31	The north column south face anchor bolts are short 3/4".
32	The north column has a 3" L x 1" H corrosion hole, and 1/4" pitting on the north web. Pitting on the lower portion of the south column's web, up to 1/8" D.
32	South column north face has bent anchor bolt stiffeners and the north face anchor bolts are short 3/8".

Table 17: Unit IV Substructure Deficiencies	
Bent	Note
34	North column anchor bolts have section loss up to 25% at the NW bolt. The south web of the north column has a Full W x 2" H corrosion hole, and the north web has two pinhole perforations.
36	The grounding strap is missing on the north column.

Table 18: Unit V Substructure Deficiencies		
Pier	Face	Note
37	E	Spalling and delamination with exposed rebar 32" W x 5' H x up to 5" D (typ. 1-3/4" D) along east face of bearing pedestal, South Girder.
37	E	East face of the east backwall, south end, has 6' H x 18" W x 3" D spall with exposed reinforcing.
37	E	East face of the pier wall has a 9' W x 8' H x 2-1/2" D spall/delamination with exposed corroded rebar between North and Middle Girders.
37		Center girder pedestal, south face, has 54" L x 30" H x 3-1/2" D spall with exposed corroded rebar; north face has a 30" H x 24" W x 2-1/2" D delamination/spall with exposed rebar. Vertical cracks in the east face.
37	W	3' L x 1/4" W crack along South edge of West Face of Pier wall (Non-structural)
37	W	West face north end, cracking in patched and non-patched areas.
38	Btm.	Pitting and up to 1" diameter corrosion holes in the underside of the strut between the north and center columns at the center column.
38	Top	Top of pier strut exhibits painted pitting up to 3/16" D. Up to 1/4" T pack rust between top plate and web plates.
38		Center bearing and surrounding area has 1/4" D painted over pitting on the bearing with areas of 3/16" remaining.
38	Btm.	Inside face of bottom flange plate has a 9" L x 4" W corrosion hole inside the member at the connection to the north column.
39	Top	Top of pier strut between the north and center girders has painted over pitting up to 3/16" D near the old downspout connection and typical up to 1/4" T pack rust between top plate and web plates. Up to 1" T x 12" L painted over pack rust is present between the top plate and web plate at the north column. The top of the strut between the north and center girders has up to 1/4" T painted over pack rust between the web plate and channel.
40	Top	Pier strut face plates and top face plates have up to 1-1/8" T pack rust with scalloping. Isolated active corrosion along connections to the pier strut.
40		North pedestal has several 3/8" W vertical cracks and isolated spalls/delaminations throughout (up to 8" H x 6" W x 3" D). Two vertical cracks on the east face extend into the sidewalk, and a portion of the sidewalk has settled approx. 3/8" at this location. Spalling with exposed reinforcing also in south pedestal.
41	Back wall	31 LF of patches on the East Abutment stem (all patches are sound). Minor vertical cracking and staining. 30" H x 20" W x 2" D spall with exposed and corroded reinforcing.

LEGEND

- 1 - Pack Rust
- 2 - Pack Rust With Plate Distortion
- 3 - Painted Over Pack Rust
- 4 - Painted Over Pack Rust With Plate Distortion
- 5 - Reactivating Pack Rust
- 6 - Pitting
- 7 - 100% Section Loss
- 8 - Perforations In The Steel Plate
- 9 - Painted Over Section Loss



South Truss Gusset Plate Deficiencies:

- L0, The inboard and outboard gusset plate, exterior face has up to 1/16" pitting throughout and up to 1/8" around the pin.
- L2, Pack rust, 1/2" T at connection with L1/L2 south web plate.
The north plate has 1/2" D painted over (6).
- L7, Lower lateral bracing horizontal gusset plate connection is heavily distorted along the edges due to pack rust and small areas of up to 100% painted over section loss.
Two broken bolts at angle connection to vertical gusset plate.
Up to 3/8" wide gap due to pack rust between outboard gusset plate and lower chord at L7.
Inboard and outboard gusset plate at L7 has up to 3/16" painted over pitting on the interior faces.
The inboard and outboard gusset plate, exterior face has up to 1/16" pitting throughout and up to 1/8" around the pin.
Pack rust, 1/2" between vertical gusset plates and web plates of L6L7.
Section Loss, 1/8" pitting on north face of north vertical plate, more noticeable at pin for vertical.

Inboard and outboard gusset plate bowing outward up to 1" at tops

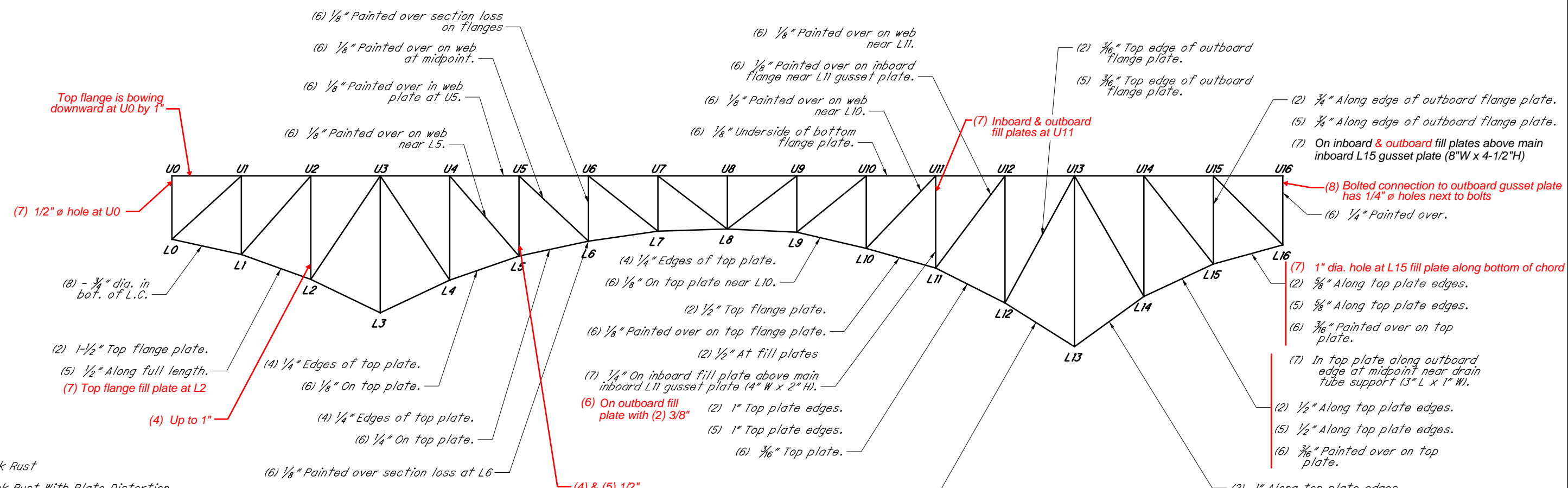
Floorbeam Deficiencies:

- FB0, Crack in top of web of cantilever Floorbeam; West Face 3 1/4" at north truss.
- FB6, Crack in top of web of cantilever Floorbeam; East Face 3 1/8" at south truss.
- FB7, Crack in top of web of cantilever Floorbeam; West Face 3 3/8" & East face 4 1/8" at south truss.

NOT TO SCALE		MAIN AVENUE OVER CUYAHOGA RIVER BRIDGE NO. CUY-2-14.41	
DATE JULY 2023		TRUSS ELEVATION - SPAN 1	PAGE 1/18

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LEGEND

- 1 - Pack Rust
- 2 - Pack Rust With Plate Distortion
- 3 - Painted Over Pack Rust
- 4 - Painted Over Pack Rust With Plate Distortion
- 5 - Reactivating Pack Rust
- 6 - Pitting
- 7 - 100% Section Loss
- 8 - Perforations In The Steel Plate
- 9 - Painted Over Section Loss

Floorbeam Deficiencies:

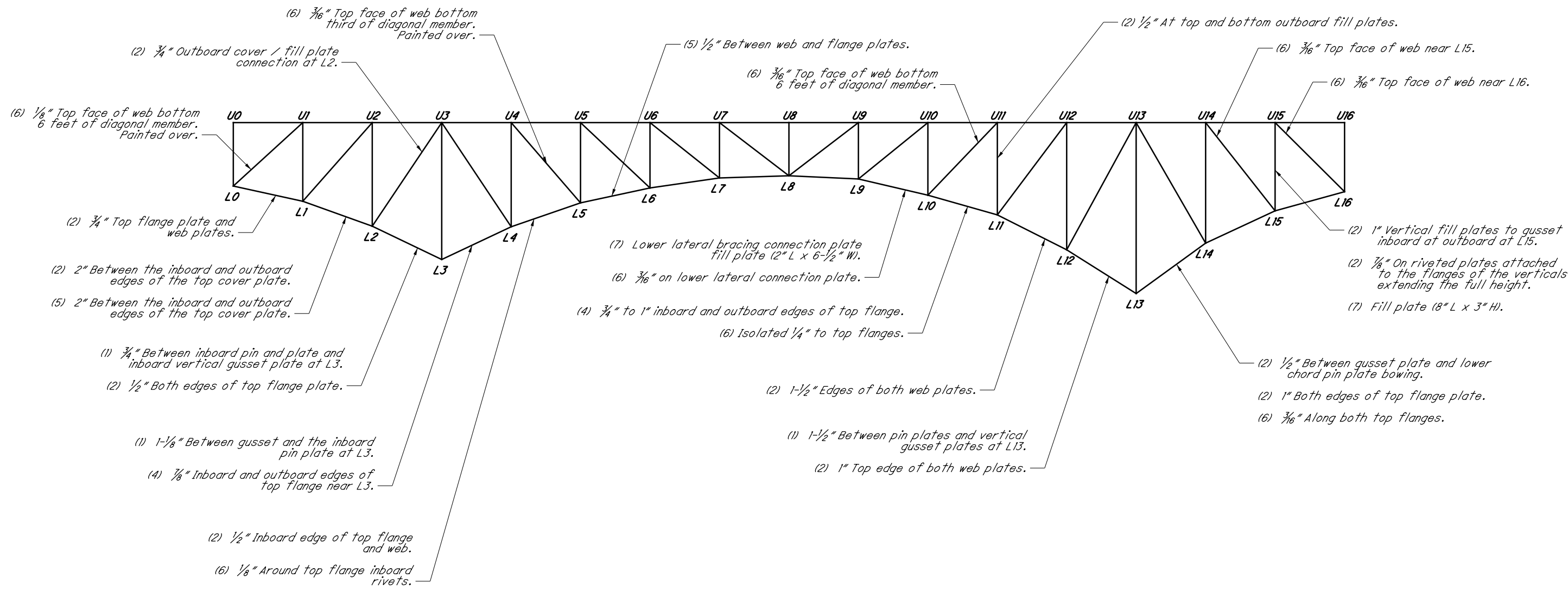
FB0, Crack in top of web of cantilever Floorbeam; East Face 3" at north truss.
 FB6, 1/4" section loss to top and bottom flanges at midspan (6 LF).

North Truss Gusset Plate Deficiencies:

L0, Section loss, up to 3/16" pitting on both faces of both outboard and inboard gusset plates primarily around pins.
 L1, (6) - 1/8" both GPs, N face.
 L5, Up to 1/8" pitting painted over in south face of north gusset at L5.
 L6, Outboard gusset plate, 1/8" thick reactivated pack rust between gusset plate and fill plate on east side of L6 connection. 1/8" painted over section loss along lower chord both plates.
 L14, 1/8" painted over pitting on interior faces of both gusset plates just above the lower chord. North face, south plate has active area of active corrosion 18" L x 4" H x up to 3/16" D.
 U11, 1/4" painted over pitting on exterior face of exterior plate. Interior gusset has 3/16" painted over pitting.
 U13, 1/4" pitting north face north gusset inactive.

NOT TO SCALE		MAIN AVENUE OVER CUYAHOGA RIVER BRIDGE NO. CUY-2-14.41	
DATE JULY 2023		TRUSS ELEVATION - SPAN 2 NORTH	PAGE 2/18

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DRAINAGE DEFICIENCIES:

Panel Point 6, Downspout is clogged/disconnected, allowing drainage directly onto bottom chord.

FLOORBEAM DEFICIENCIES:

FB6, 1/4" section loss to top and bottom flanges at midspan.

SOUTH TRUSS GUSSET PLATE DEFICIENCIES:

- L0, Up to 3/8" gap due to pack rust between outboard gusset plate and lower chord at L7.
Inboard and outboard gusset plate at L7 has up to 3/16" painted over pitting on the interior faces.
The inboard and outboard gusset plate, exterior face has up to 1/16" pitting throughout and up to 1/8" around the pin.
3/8" pack rust between the outboard gusset plate and lower chord at L0 Span 2 and 1/8" pitting on both plates.
- L1, (6) 1/8" D painted over on both plates, inside faces.
- L2, Section Loss, 1/8" pitting on both plates.
- L3, Section Loss, 1/8" pitting on both plates.
- L5, North gusset plate, south face 1/8" pitting throughout on east side of L5 connection.
2 Rivets are missing in the lateral bracing plate.
- L14, North gusset, south face, up to 1/8" pitting typical at lower chord of south gusset, north face of north gusset.

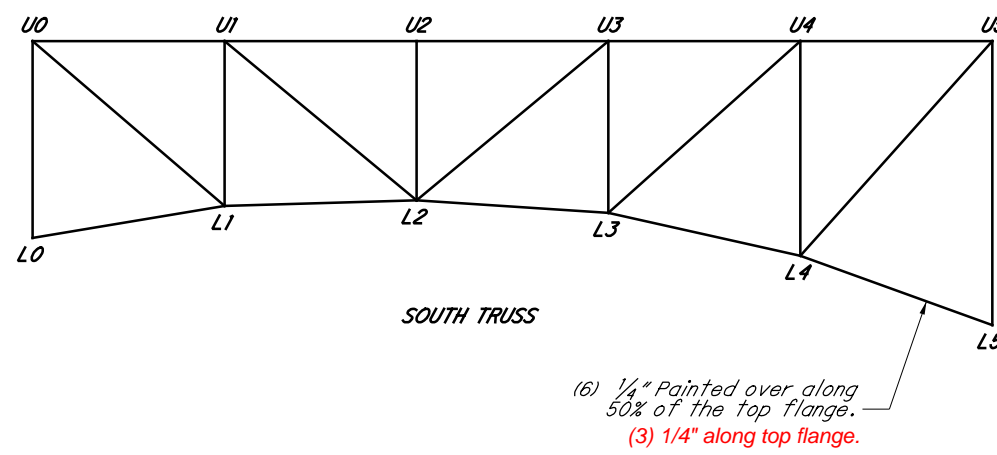
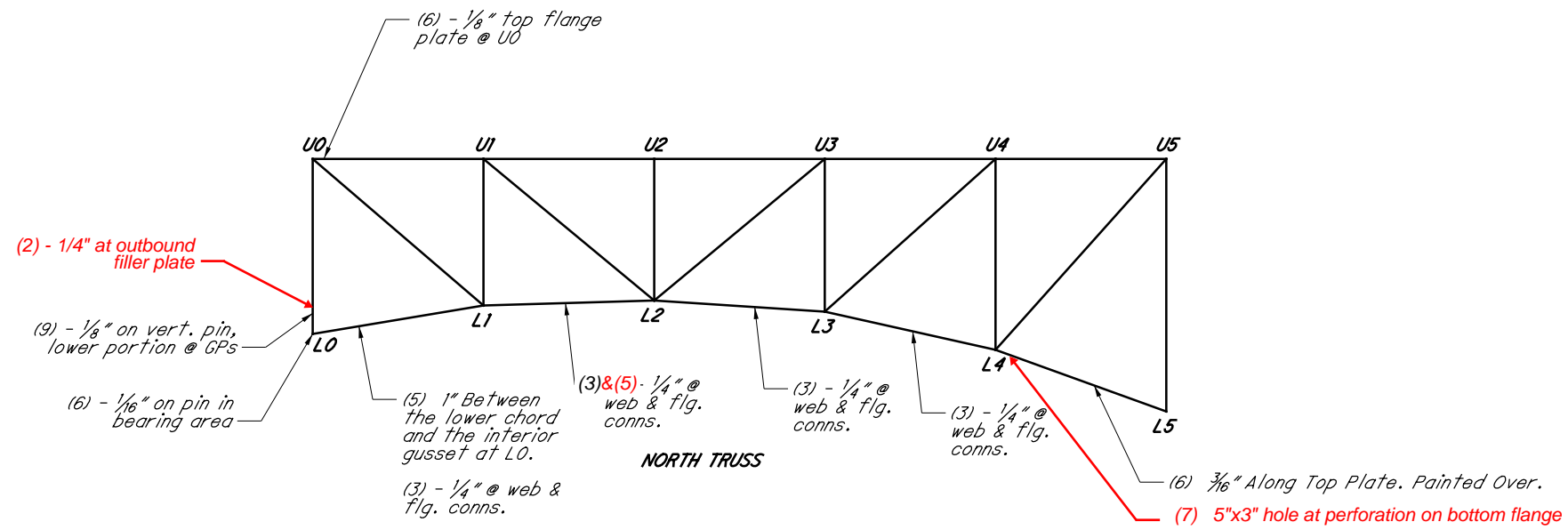
LEGEND

- 1 - Pack Rust
- 2 - Pack Rust With Plate Distortion
- 3 - Painted Over Pack Rust
- 4 - Painted Over Pack Rust With Plate Distortion
- 5 - Reactivating Pack Rust
- 6 - Pitting
- 7 - 100% Section Loss
- 8 - Perforations In The Steel Plate
- 9 - Painted Over Section Loss

NOT TO SCALE		MAIN AVENUE OVER CUYAHOGA RIVER BRIDGE NO. CUY-2-14.41	
DATE JULY 2023		TRUSS ELEVATION - SPAN 2 SOUTH	PAGE 3/18

LEGEND

- 1 - Pack Rust
- 2 - Pack Rust With Plate Distortion
- 3 - Painted Over Pack Rust
- 4 - Painted Over Pack Rust With Plate Distortion
- 5 - Reactivating Pack Rust
- 6 - Pitting
- 7 - 100% Section Loss
- 8 - Perforations In The Steel Plate
- 9 - Painted Over Section Loss



SOUTH TRUSS GUSSET PLATE DEFICIENCIES:

- L0, Caulked over pack rust between gusset plates, lower chord, and vertical.
- 1/8" D pitting around pin nut with 1/2" reactivated pack rust between the bottom of the pin plate and inboard and outboard gusset plates.
- Inboard gusset plate has active corrosion and 1/2" pack rust between vertical member connection plate and gusset plate.

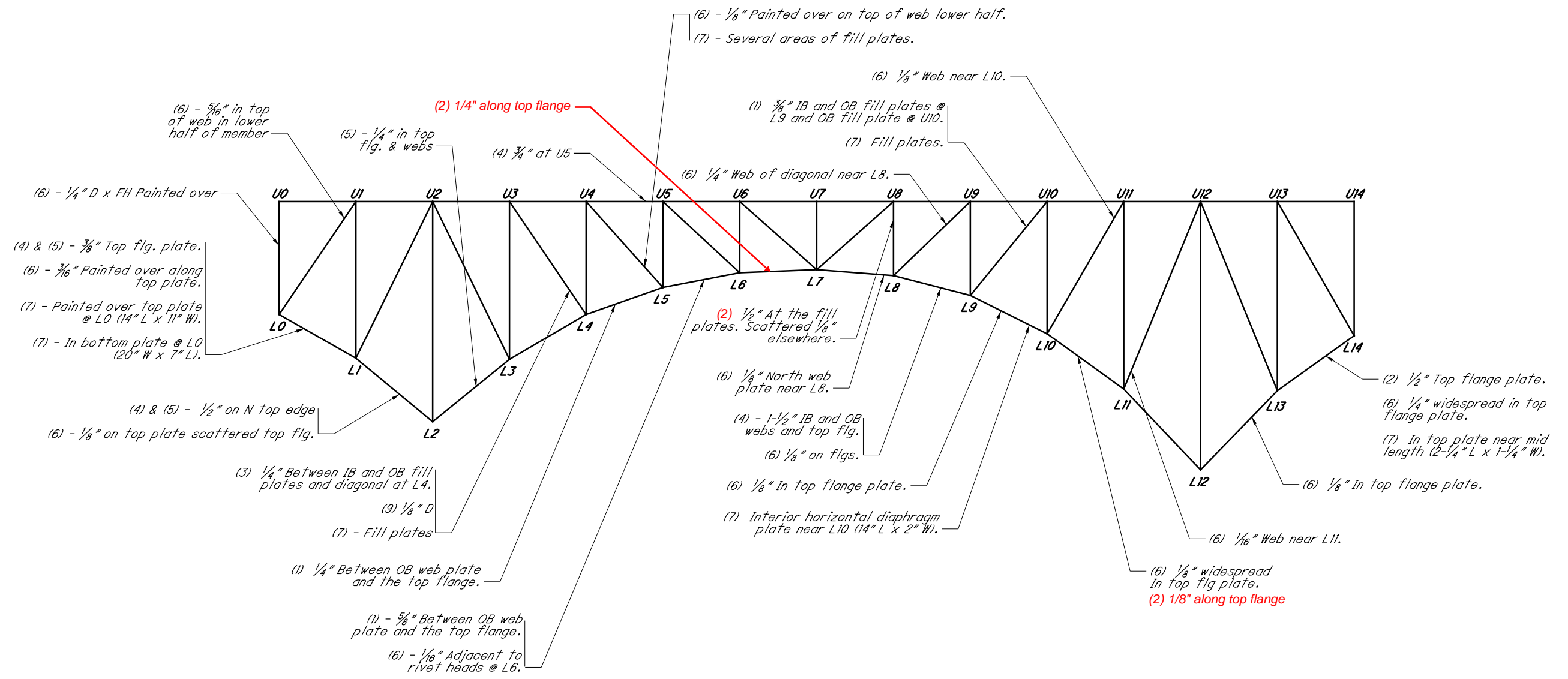
NORTH TRUSS GUSSET PLATE DEFICIENCIES:

- L0, Section loss, 1/4" pitting on exterior face of exterior plate and both faces of interior gusset plate.
- Up to 1/8" active pack rust between the pin strengthening plate and both the interior and exterior gusset plates.
- L2, BOTH - (9) - 1/8" int. faces above L.C.

NOT TO SCALE		MAIN AVENUE OVER CUYAHOGA RIVER BRIDGE NO. CUY-2-14.41	
DATE JULY 2023		TRUSS ELEVATION - SPAN 3	PAGE 4/18

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FLOORBEAM DEFICIENCIES:

- FB0, 2 of 3 bolts are loose on the inboard sliding plate for the north truss at U0. Potential crack 1-1/2" L @ N cantilever, E face
- FB2, N Cantilever, detached utility conduit
- FB14, 1/8" Painted over section loss on the web and flanges at midspan (12 LF). Crack in top of web of cantilever Floorbeam; West Face 1/4" at north truss.

NORTH TRUSS GUSSET PLATE DEFICIENCIES:

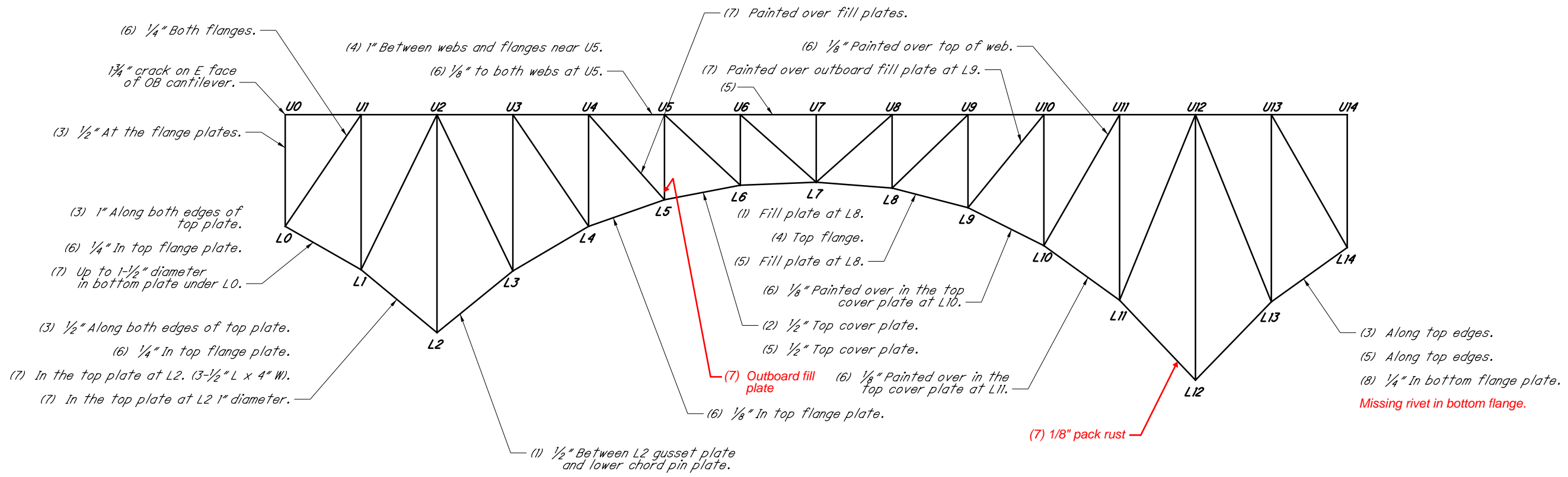
- L0, Inboard gusset, inside face has painted over pitting up to 1/8" D.
- L2, 2" x 3/16" deep painted over pitting on inboard and outboard gusset plates around L2L3 pin plates.
- L8, 1/8" Section Loss, 2" Diameter corrosion hole in outboard gusset plate under L8U8. 1-1/4" fill plate retrofit at inboard gusset plate.
- L14, 1/2" pack rust between L14U14 and both gusset plates with failed caulk and active corrosion, gusset is bowed 1/4". Both GPs have (9) - 3/16" T on interior faces @ vertical.
- U0, Up to 1/8" painted over pitting to both interior and exterior plates.
- U8, Up to 1/8" painted over pitting and rivet head loss to both plates.

LEGEND

- 1 - Pack Rust
- 2 - Pack Rust With Plate Distortion
- 3 - Painted Over Pack Rust
- 4 - Painted Over Pack Rust With Plate Distortion
- 5 - Reactivating Pack Rust
- 6 - Pitting
- 7 - 100% Section Loss
- 8 - Perforations In The Steel Plate
- 9 - Painted Over Section Loss

NOT TO SCALE		MAIN AVENUE OVER CUYAHOGA RIVER BRIDGE NO. CUY-2-14.41	
DATE JULY 2023		TRUSS ELEVATION - SPAN 4 NORTH	PAGE 5/18

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FLOORBEAM DEFICIENCIES:

FB14, Painted over section loss up to 1/8" on the web and flanges at midspan (21 LF).

SOUTH TRUSS GUSSET PLATE DEFICIENCIES:

- L0, Inboard gusset, inside face has painted over pitting up to 1/8" deep x 8" diameter.
- L2, 2" x 3/16" deep painted over pitting on inboard and outboard gusset plates around L2L3 pin plates.
- L10, 1/16" Painted over section loss, inboard face of inboard plate along lower chord.

- LEGEND**
- 1 - Pack Rust
 - 2 - Pack Rust With Plate Distortion
 - 3 - Painted Over Pack Rust
 - 4 - Painted Over Pack Rust With Plate Distortion
 - 5 - Reactivating Pack Rust
 - 6 - Pitting
 - 7 - 100% Section Loss
 - 8 - Perforations In The Steel Plate
 - 9 - Painted Over Section Loss

NOT TO SCALE		MAIN AVENUE OVER CUYAHOGA RIVER BRIDGE NO. CUY-2-14.41	
DATE JULY 2023		TRUSS ELEVATION - SPAN 4 SOUTH	PAGE 6/18

NORTH TRUSS FLOORBEAM DEFICIENCIES:

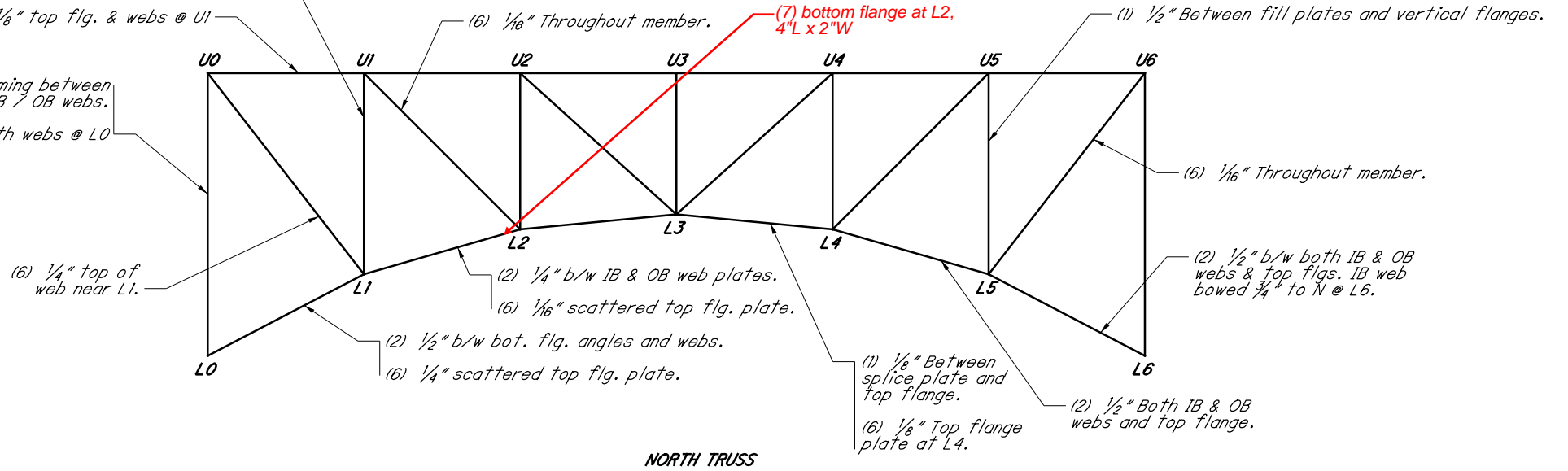
FBI, N cantilever - (6) - $\frac{1}{8}$ " in web @ 1st int. stringer (2 LF)
 FB 3, N cantilever - (6) - $\frac{1}{8}$ " in web @ 1st int. stringer (1 LF)

NORTH TRUSS GUSSET PLATE DEFICIENCIES:

L0, $\frac{1}{8}$ " pack rust beginning to form along connection with L0L1.
 L3, Up to $\frac{1}{8}$ " painted over section loss along the lower chord, both plates.
 U6, $\frac{1}{8}$ " to $\frac{1}{4}$ " painted over section loss of both plates and $\frac{3}{4}$ " pack rust at the verticals.

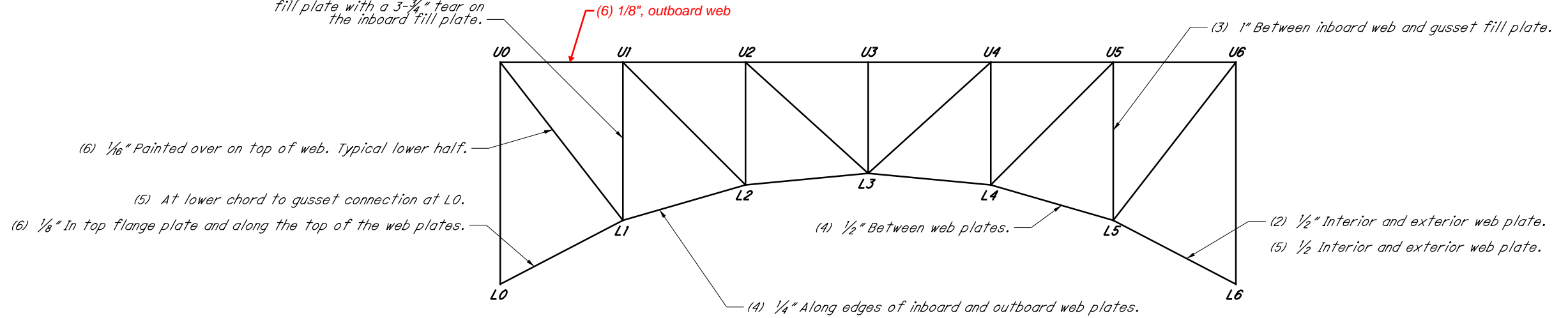
(4) & (5) $\frac{1}{2}$ " Between fill plates and vertical.
 (6) - $\frac{1}{4}$ " Painted over W face of web @ S flg. near L1.

(6) - $\frac{1}{8}$ " top flg. & webs @ U1
 (1) $\frac{1}{4}$ " Forming between angles and IB / OB webs.
 (6) - $\frac{1}{8}$ " both webs @ L0



NORTH TRUSS

(3) 1- $\frac{5}{8}$ " On inboard and outboard fill plate with a 3- $\frac{3}{4}$ " tear on the inboard fill plate.



SOUTH TRUSS

SOUTH TRUSS GUSSET PLATE DEFICIENCIES:

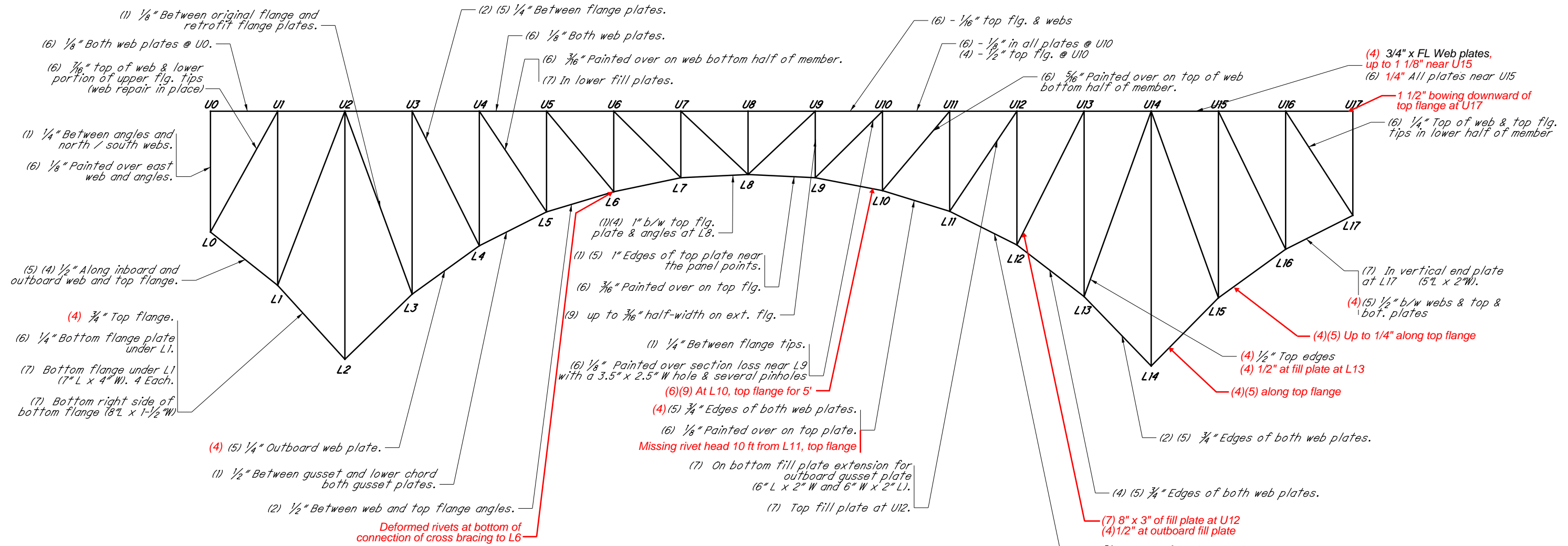
L0, Inboard gusset has typical painted over section loss up to $\frac{1}{8}$ " along the lower chord L1L14 bolted connection.
 L1, Up to $\frac{3}{4}$ " painted over pack rust between outboard gusset plate and L0L1 at L1.
 L2, Up to $\frac{3}{4}$ " painted over pack rust between outboard gusset plate and L1L2 at L2.
 L6, Inboard faces of both gusset plates have up to $\frac{1}{4}$ " painted over pitting typical with corrosion staining noted along the edges of the truss members.
 Inboard gusset plate is bowed to the north, this is due to the truss alignment. The truss alignment changes in a slight SE direction at this pin location.
 Outboard gusset plate is bowed to the north $\frac{1}{2}$ ", this is due to the truss alignment. The truss alignment changes in a slight SE direction at this pin location

- LEGEND**
 1 - Pack Rust
 2 - Pack Rust With Plate Distortion
 3 - Painted Over Pack Rust
 4 - Painted Over Pack Rust With Plate Distortion
 5 - Reactivating Pack Rust
 6 - Pitting
 7 - 100% Section Loss
 8 - Perforations In The Steel Plate
 9 - Painted Over Section Loss

NOT TO SCALE		MAIN AVENUE OVER CUYAHOGA RIVER BRIDGE NO. CUY-2-14.41	
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Floorbeam Deficiencies:

- FB0, Two cracks found in east face of the floorbeam. Inboard 1 1/2" long crack at top cope, outboard 2 1/4" long crack at top cope.
- FB3, N. cantilever, (6) - 1/8" D on web (5 LF)
- FB6, 1/16" painted over pitting on the web and flanges at midspan (6 LF). 7" L x 1/2" H corrosion hole behind old stringer bearings at midspan.
- FB7, (6) - 1/16" painted over on webs & flgs. @ midspan, extending N (10 LF)
- FB9, 1/8" painted over pitting on the web and flanges at midspan extending 12' N and for 4' of the web at the north truss
- FB16, (6) - 1/16" painted over on webs & flgs. @ midspan (8 LF)
- FB17, Crack in top of web of cantilever Floorbeam; West Face 2 3/8" at north truss.

North Truss Gusset Plate Deficiencies:

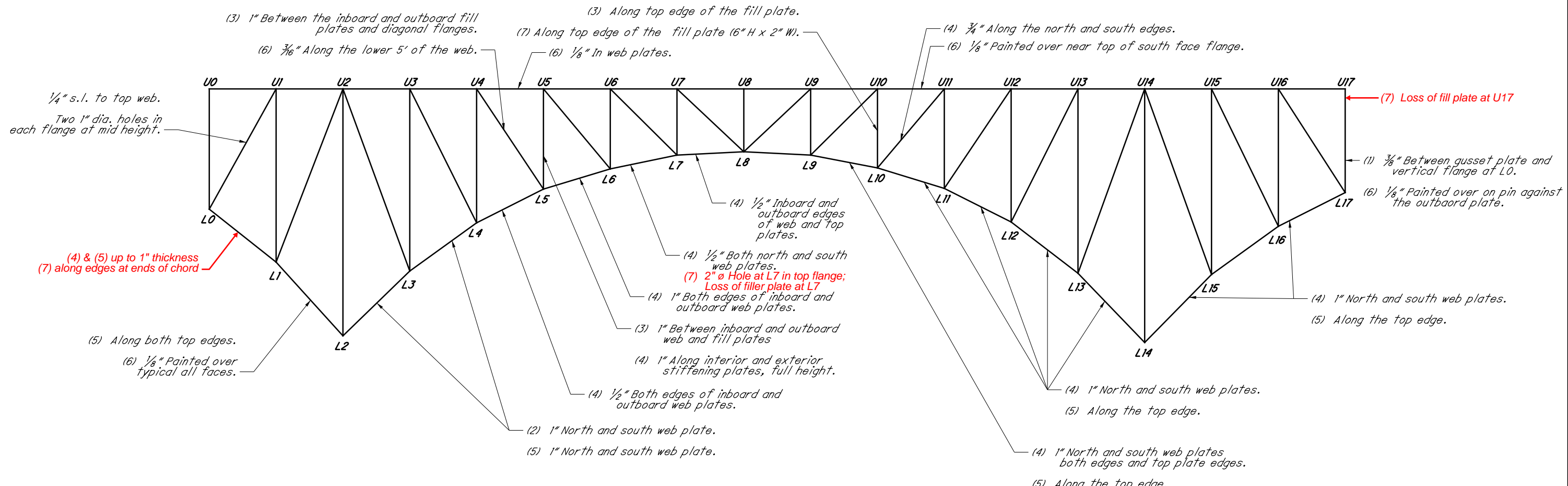
- L0, Bowing OB (north) at both IB and OB gussets (Appears to be as-built to accommodate bend in truss). Both GPs, (9) - 3/16" @ vert. pin
- U0, Both gussets have up to 1/4" D painted over pitting.
- L2, (7) and (8) over FW x 18" H.
- L4, Section Loss, 1/8" pack rust in top joint on exterior plate.
- L7, 1/8" painted over pitting on interior face of outboard gusset plate. Drift pin in rivet hole on inboard gusset plate for member L6L7
- L8, 3/16" painted over pitting on interior faces of both gusset plates just above the lower chord.
- L9, Section Loss, 1/8" pitting on both plates.
- L10, 3/16" painted over pitting on interior faces both gusset plates along L.C.
- U0, Section Loss, 1/4" pitting on both plates. Section loss and bowing approximately 1-1/2" at outboard gusset and 3/4" at inboard (Appears to be as-built to accommodate bend in truss).
- U2, Broken rivet in exterior plate on U2L3 connection.
- U10, (6) - 1/16" OB plate OB face @ U9U10

LEGEND

- 1 - Pack Rust
- 2 - Pack Rust With Plate Distortion
- 3 - Painted Over Pack Rust
- 4 - Painted Over Pack Rust With Plate Distortion
- 5 - Reactivating Pack Rust
- 6 - Pitting
- 7 - 100% Section Loss
- 8 - Perforations In The Steel Plate
- 9 - Painted Over Section Loss

NOT TO SCALE		MAIN AVENUE OVER CUYAHOGA RIVER BRIDGE NO. CUY-2-14.41	
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South Truss Gusset Plate Deficiencies:

- L0, Inboard faces of both gusset plates have up to 1/4" painted over pitting typical
Inboard gusset plate has various areas of section loss up to 3/16" along the exterior face above the lower chord and scupper connections.
- L1, Up to 1/8" painted over pitting on both gusset plates.
- L2, Up to 1/8" painted over pitting on both gusset plates, especially around the lower chord pin connection plates.
Painted over pitting 1/8" on east pin of L2 bearing connection
- L4, U to 1/8" pack rust along the top edge of the outboard gusset plate between the vertical.
1/16" pitting along the inboard faces of both gussets above the lower chord.
- L5, 3'L x 1'H area of section loss with up to 1-1/8" bowing of exterior vertical filler plate due to pack rust.
A 2-3/16" long crack was noted in the fill plate in the paint/caulk.
The interior plate exhibits up to 1" distortion due to pack rust along top of fill plate.
The pack rust is beginning to reactivate along the top edge and has caused pin holes and corrosion cracks in caulk.
There is up to 1/8" painted over section loss on inboard gusset plate above lower chord and strut connection.
- L6, Caulked and painted over pack rust along top edge of outboard fill plate.
The vertical edges of the fill plate to vertical connection exhibit up to 1/8" pack rust.
- L10, Up to 3/16" painted over pitting typical along the interior gusset plate
The interior and exterior fill plates exhibit painted and caulked pack rust up to 3/4"
6'L x 3'H corrosion hole along the top edge of the interior plate
4'L x 2"W and 2'L x 1"W corrosion hole along the fill plate on the outboard face of the diagonal.
- L11, 1/4" painted over pitting on both plates.
Typical painted over pack rust up to 1/2" between all gusset fill plates and the vertical and diagonal.
- L13, Isolated 1/8" painted over pitting on both plates.
- L15, 1/8" painted over pitting on inside of both plates.
- L17, Up to 1/2" pack rust between the inboard and outboard gusset plates and the vertical.
1/8" pack rust in/out between gusset and lower chord
- U17, 3/16" bowing of inboard and outboard plate due to pack rust.

Floorbeam Deficiencies:

FB0, Four cracks found in top of web in floorbeam at south truss; OB West Face 2 3/16", OB East Face 4 1/2", IB West Face 2", IB East Face 2 1/4"

LEGEND

- 1 - Pack Rust
- 2 - Pack Rust With Plate Distortion
- 3 - Painted Over Pack Rust
- 4 - Painted Over Pack Rust With Plate Distortion
- 5 - Reactivating Pack Rust
- 6 - Pitting
- 7 - 100% Section Loss
- 8 - Perforations In The Steel Plate
- 9 - Painted Over Section Loss

NOT TO SCALE		MAIN AVENUE OVER CUYAHOGA RIVER BRIDGE NO. CUY-2-14.41	
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LEGEND

- 1 - Pack Rust
- 2 - Pack Rust With Plate Distortion
- 3 - Painted Over Pack Rust
- 4 - Painted Over Pack Rust With Plate Distortion
- 5 - Reactivating Pack Rust
- 6 - Pitting
- 7 - 100% Section Loss
- 8 - Perforations In The Steel Plate
- 9 - Painted Over Section Loss

Floorbeam Deficiencies:

FB0, 1/8" Painted over section loss on the web and flanges extending from the north truss to 8' S of midspan.

FB3, N. Cantilever - (6) - 1#8" in web (3 LF)

North Truss Gusset Plate Deficiencies:

L0, Section Loss, 3/8" ^{up to 1/4" deep} reactivated pack rust is distorting the inboard and outboard plates.

L3, Section Loss, 1/8" pitting on exterior plate.

U0, (9) - 1/8" both GPs, widespread.

U1, Section Loss, distorting the exterior plate from previous pack rust.

U3, OB GP 1/8" CCP below cantilever

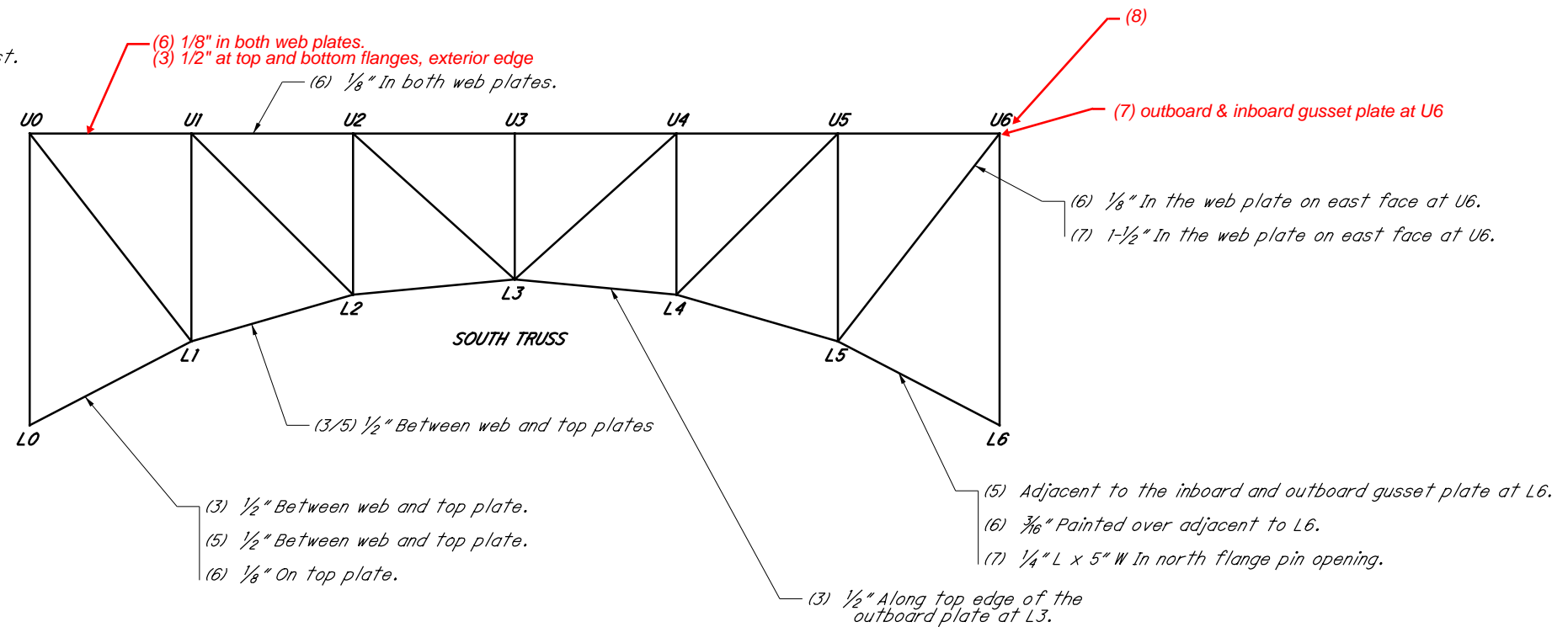
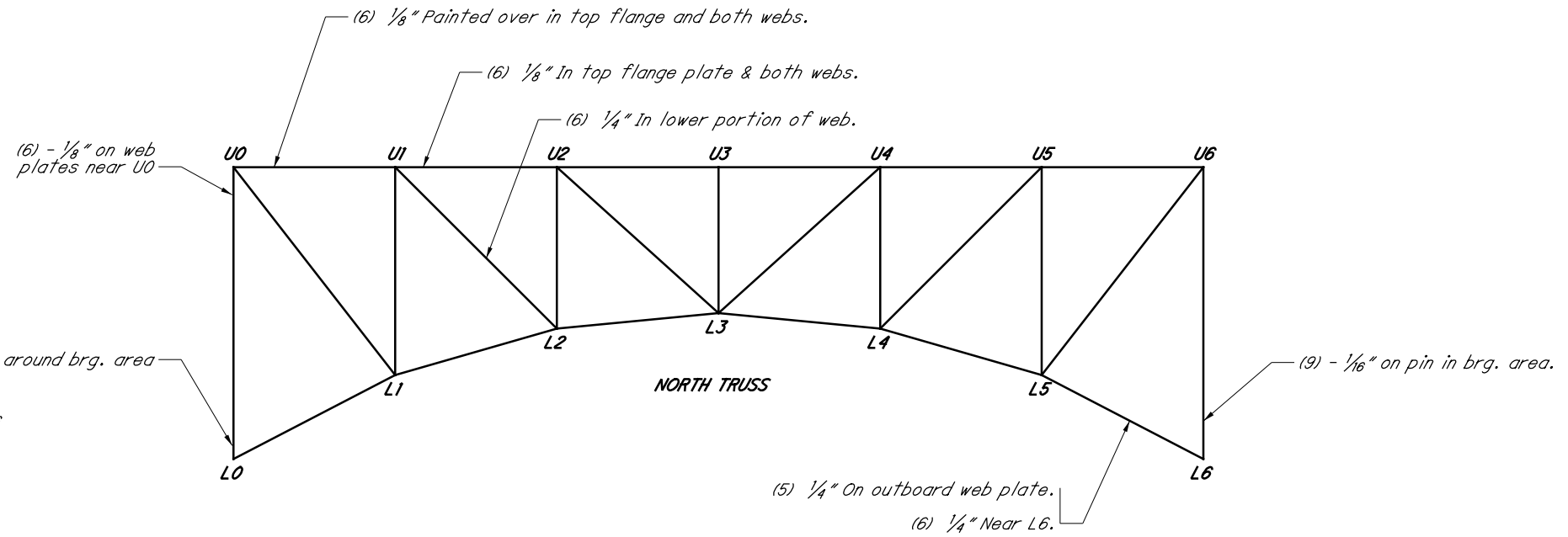
U5, interior of both GP have section loss up to 5/32"

L2, CCP up to 3/16" deep on interior faces of GPs above BC

L5, CCP up to 1/4" deep on interior faces of GPs above BC

L4, CCP up to 1/16" deep on interior faces of GPs above BC

L2, CCP up to 1/8" deep on interior faces of GPs above BC



South Truss Gusset Plate Deficiencies:

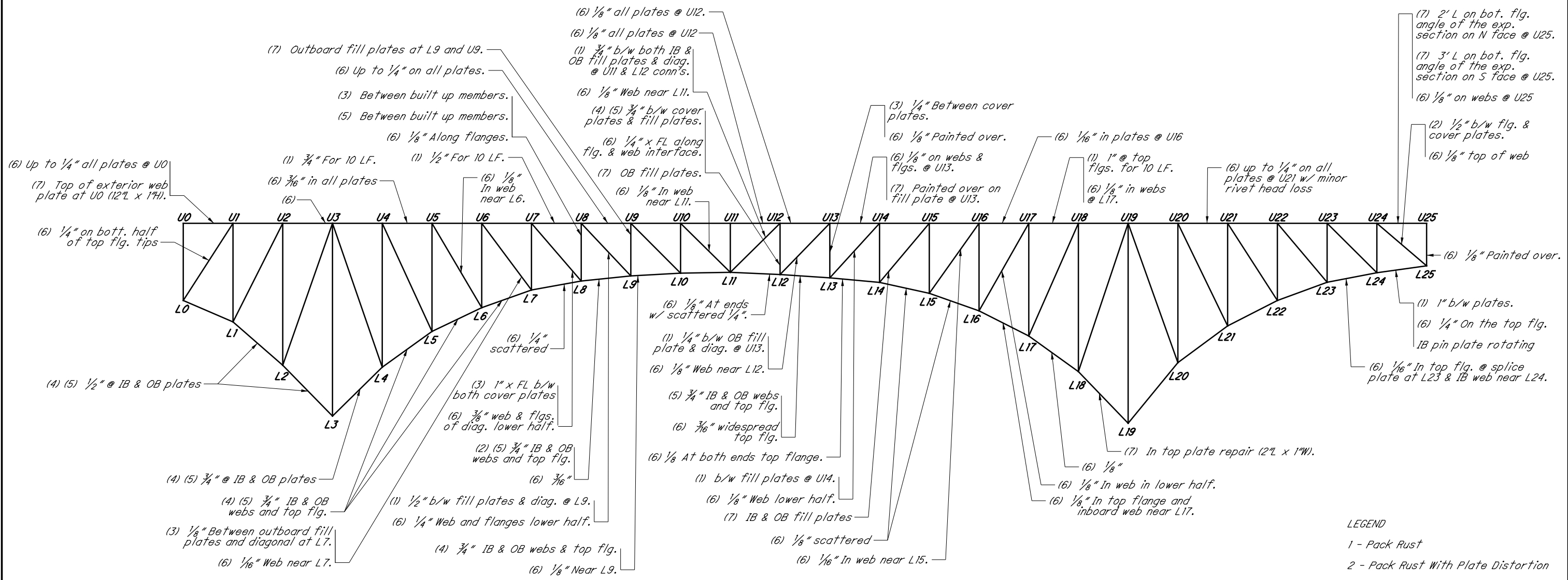
L1, 1/8" deep painted over pitting along top of lower chord with isolated location on inboard gusset plate 3" diameter x 3/16" deep.

L2, Painted over pitting along top of lower chord on inside of both gusset plates typ. 2" x up to 3/16" deep

L3, 1/8" depth pitting, inboard and outboard plates

U1, 3/4" pack rust at outboard fill plate top & bottom; 1/4" pack rust inboard fill plate at top

NOT TO SCALE		MAIN AVENUE OVER CUYAHOGA RIVER BRIDGE NO. CUY-2-14.41	
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North Truss Gusset Plate Deficiencies:

- U0, Corrosion hole with pitting up to 9/32" deep on OB GP
- L1, CCP up to 1/8" deep on interior faces of GPs above BC
- L2, CCP up to 1/8" deep on interior faces of GPs above BC
- L4, CCP up to 1/16" deep on interior faces of GPs above BC
- L5, CCP up to 1/8" deep on interior faces of GPs above BC
- L6, CCP up to 1/8" deep on interior faces of GPs above BC
- L7, Section loss throughout up to 1/4" deep
- L8, CCP up to 1/4" deep on interior faces of GPs above BC
- L10, CCP up to 3/16" deep on interior faces of GPs above BC
- L11, CCP up to 1/8" deep on interior faces of GPs above BC
- U11, section loss up to 1/4" throughout

North Truss Gusset Plate Deficiencies:

- L12, Section loss up to 5/16" throughout exterior plate
- L13, CCP up to 3/32" deep on interior faces of GPs above BC
- L15, CCP up to 1/16" deep on interior faces of GPs above BC
- L16, Section loss throughout up to 7/32" deep
- L18, CCP up to 1/8" deep on interior faces of GPs above BC
- L20, CCP up to 1/4" deep on interior faces of GPs above BC
- L22, CCP up to 1/2" deep on interior faces of GPs above BC

North Truss Gusset Plate Deficiencies:

- L0, Pack rust up to 1/2" thick on both gusset plates inside connection. 1/8" pitting on both gusset plates around the diagonal.
- U0, 1/2" diameter hole in outboard gusset plate. Both plates have up to 1/4" widespread pitting.
- L1, L3, Pitting and section loss in south gusset north face.
- L8, Section Loss, 1/8" pack rust in top joint on both plates.
- U8, Exterior and interior gusset plate has up to 1/4" painted over pitting throughout.
- L9, 1/8" widespread painted over section loss, interior faces of both plates.
- L10, 1/8" scattered painted over section loss, inside face of inboard plate.
- U10, Manufacturing defect in outboard gusset near L11U10 connection.
- L11, 1/8" painted over section loss, inside face of both plates above lower chord.
- L12, 1/8" painted over section loss, inside face of both plates above lower chord.
- U12, Pitting up to 1/4" on outboard face of outboard and inboard gusset plate with rivet head loss.
- L13, Both interior and exterior gusset plates have painted over section loss up to 1/4" on the east half.
- U13, Reactivating 1/4" pack rust between gusset plate and member. Up to 1/8" painted over section loss.

North Truss Gusset Plate Deficiencies:

- L16, L16, Exterior gusset plate has up to 1/4" painted over pitting throughout.
- L17, Up to 1/8" painted over section loss along lower chord, both plates.
- U17, up to 1/16" at east edge.
- L21, 1/8" - 1/4" painted over section loss on both plates above lower chord.
- U21, Both interior and exterior gusset plates have painted over section loss up to 1/4" on the west half.
- L23, South gusset, north face 3/16" pitting Interior gusset, section loss up to 1/4" on interiors above bottom chord.
- L24, 3/4" x up to 1/8" painted over pitting along the interior face of both gussets above the lower chord. Isolated 1/2" diameter areas of 1/4" pitting
- L25, Up to 1/8" painted over section loss on the gusset plates, mainly around pins and along lower chord. Pack rust around the vertical pin. Up to 1" pack rust between the gusset plates and the vertical.

Floorbeam Deficiencies:

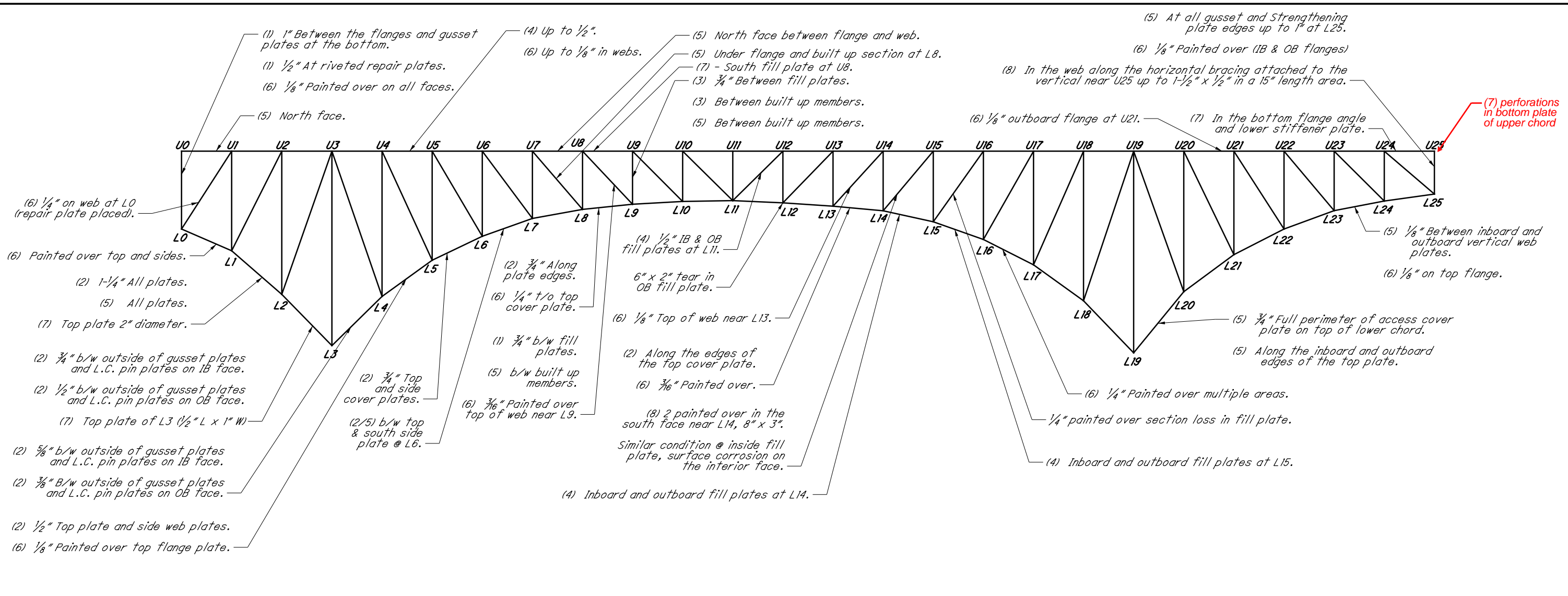
- FB0, Longitudinal cracks in web just under top flanges adjacent of upper chord, coincident with lateral buckling in top flanges. Arrest cracks near Stringer 2, no propagation.
- FB1, 1/8" painted over pitting (6 LF) on the webs and flanges at midspan. 1/8" pitting (2 LF) in webs of north cantilever
- FB5, North truss, top flange has a 1" bend in west flange tip.
- FB8, 1/8" painted over section loss to bottom flange and lower 1' of web.
- FB16, At North Truss, 2 1/2" pinholes inboard of truss with 1/8" localized painted over section loss. 1/8" Painted over pitting on bottom flange, extending south from the north truss (30 LF).
- FB25, 6 crack arrest holes and multiple cracks present in the North cantilever at the Stringer 6 bracket. Active layered corrosion on the top flange of the north cantilever.

LEGEND

- 1 - Pack Rust
- 2 - Pack Rust With Plate Distortion
- 3 - Painted Over Pack Rust
- 4 - Painted Over Pack Rust With Plate Distortion
- 5 - Reactivating Pack Rust
- 6 - Pitting
- 7 - 100% Section Loss
- 8 - Perforations In The Steel Plate
- 9 - Painted Over Section Loss

NOT TO SCALE		MAIN AVENUE OVER CUYAHOGA RIVER BRIDGE NO. CUY-2-14.41	
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South Truss Gusset Plate Deficiencies:

L0, Inside of both gusset plates with areas of painted over pitting up to 1/4" deep.
 Outside of the inboard gusset plate has painted over pitting up to 3/16" deep, typically 1/8" deep.
 The inboard vertical member pin head has 1/8" deep painted over pitting.

L1, 1/16" painted over section loss to both plates along the lower chord.

L4, Outboard gusset plate has up to 1/2" painted over pack rust between it and the lower chord.

L5, Outboard gusset plate has up to 1/2" painted over pack rust between it and the lower chord.
 CCP up to 3/16" deep on interior faces of GPs above BC

L6, Outboard gusset plate has up to 1/2" painted over pack rust between it and the lower chord.
 CCP up to 9/32" deep on interior faces of GPs above BC

L8, CCP up to 1/4" deep on interior faces of GPs above BC

L9, Both gusset plates have up to 5/32" painted over section loss.

L13, Added 1/2" gusset plate to inboard plate. 3/16" section loss elsewhere

L16, Inboard gusset plate has up to 1/8" painted over pitting along the inside face at the lower chord interface.
 Outboard gusset plate has 1/4" section loss 4" L x 4" W.

South Truss Gusset Plate Deficiencies Con't'd:

L7, CCP up to 1/8" deep on interior faces of GPs above BC
 L10, CCP up to 3/16" deep on interior faces of GPs above BC
 L11, CCP up to 1/8" deep on interior faces of GPs above BC
 L12, CCP up to 3/32" deep on interior faces of OB GP above BC
 L15, CCP up to 3/32" deep on interior faces of GPs above BC
 L17, CCP up to 1/8" deep on interior faces of GPs above BC
 L20, CCP up to 1/16" deep on interior faces of IB GP above BC
 L21, CCP up to 5/32" deep on interior faces of GPs above BC
 L22, CCP up to 1/8" deep on interior faces of GPs above BC
 L23, CCP up to 7/32" deep on interior faces of GPs above BC
 L24, CCP up to 1/8" deep on interior faces of GPs above BC

South Truss Gusset Plate Deficiencies Con't'd:

U0, Both gusset plates have up to 1/8" painted over section loss.

U7, Both gusset plates have up to 1/8" painted over section loss.

U16, Outboard gusset plate exterior face has up to 3/16" painted over pitting.

U25, There is reactivating pack rust between the vertical and the inboard and outboard gusset plate up to 1/4"

Typical painted section loss up to 1/4" around the vertical pin and adjacent the strut and bracing connections, inboard plate.

L25, there is reactivating pack rust between the vertical and the inboard and outboard gusset plate up to 1-1/4".
 Heavy debris accumulation within the panel point.

Floorbeam Deficiencies:

F80, 3-1/2" crack, outboard side, east face at top cope.

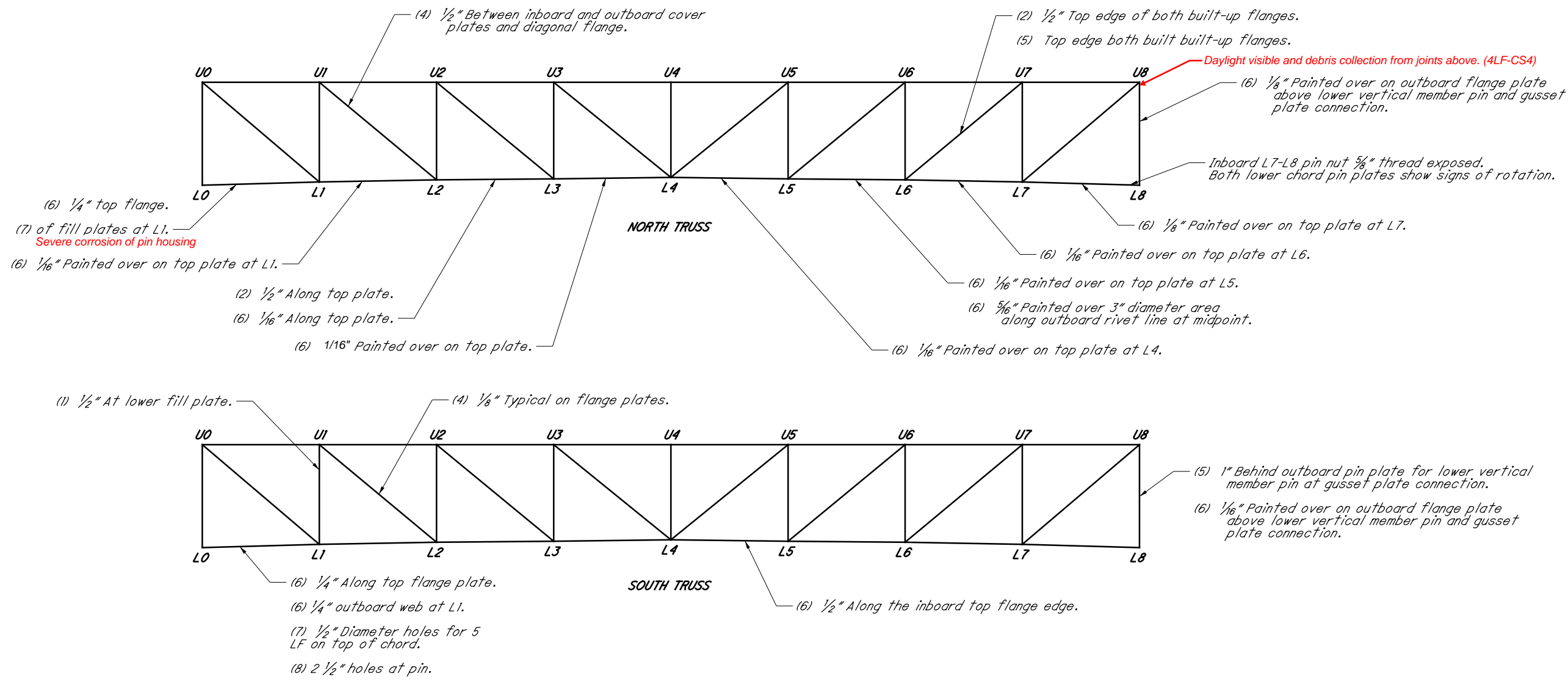
F88, 1/8" painted over section loss to bottom flange and lower 1' of web.

F819, West tip of bottom flange is bent upwards 1/4" at midspan.

- LEGEND**
- 1 - Pack Rust
 - 2 - Pack Rust With Plate Distortion
 - 3 - Painted Over Pack Rust
 - 4 - Painted Over Pack Rust With Plate Distortion
 - 5 - Reactivating Pack Rust
 - 6 - Pitting
 - 7 - 100% Section Loss
 - 8 - Perforations In The Steel Plate
 - 9 - Painted Over Section Loss

NOT TO SCALE		MAIN AVENUE OVER CUYAHOGA RIVER BRIDGE NO. CUY-2-14.41	
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North Truss Gusset Plate Deficiencies:

- L1, Up to 1/8" painted over section loss on both plates.
- U0, Up to 1/8" painted over pitting on interior, both plates.
- L2, 5/16" painted over pitting on interior faces of both gusset plates just above the lower chord.
- L3, 1/8" painted over pitting on interior faces of both gusset plates just above the lower chord.
- L4, 1/8" painted over pitting on interior faces of both gusset plates just above the lower chord.
- L5, Up to 1/8" painted over pitting on interior faces of both gusset plates just above the lower chord.
- L6, 3/16" painted over pitting on interior face of both gusset plate just above the lower chord.
- L7, 7/32" painted over pitting on interior faces of both gusset plate just above the lower chord.
- U8, 11/32" painted over section loss to outside faces reactivating.

South Truss Gusset Plate Deficiencies:

- L1, 1/8" painted over section loss along the lower chord.
- U1, 1/8" pitting in OB GP below cantilever
- L2, CCP up to 1/4" deep on interior faces of GPs above BC
- L3, CCP up to 3/8" deep on interior faces of GPs above BC
- L4, CCP up to 3/16" deep on interior faces of GPs above BC
- L5, CCP up to 1/8" deep on interior faces of GPs above BC
- L6, CCP up to 1/16" deep on interior faces of GPs above BC
- L7, Typical areas of painted over section loss up to 1/4" around diagonal connection and lower chord rivet heads. CCP up to 1/16" deep on interior faces of GPs above BC
- U2, Outboard, Missing rivet due to mispunched member.

Floorbeam and Drainage Deficiencies:

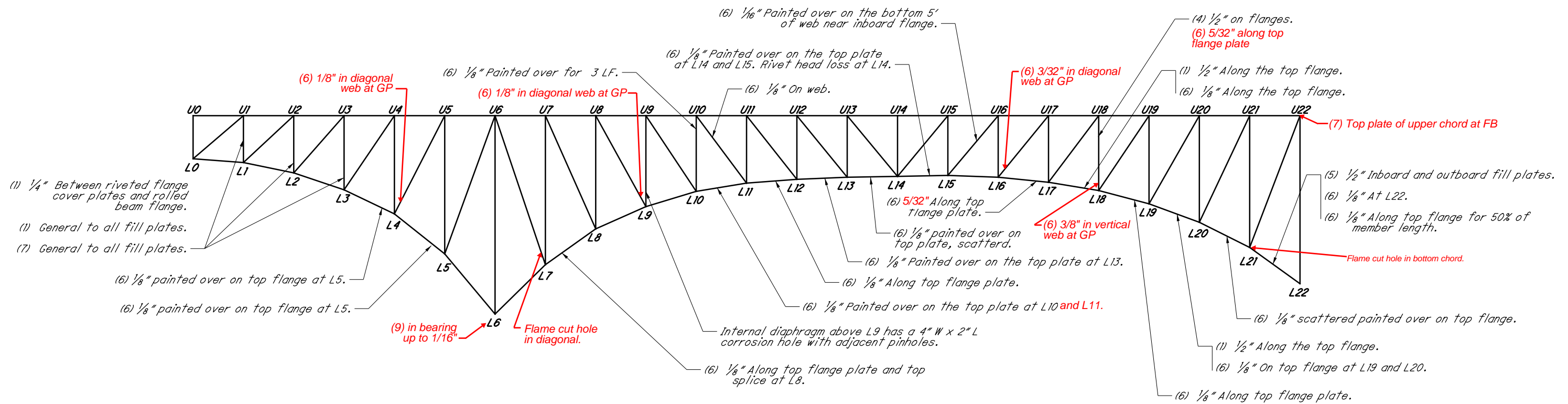
- Drainage downspout on north overhang is disconnected at Panel 7.
- FB8, 1/8" - 1/4" Painted over section loss on webs and flanges beginning to reactivate due to joint leakage (15 LF).
- 10% rivet head loss.

LEGEND

- 1 - Pack Rust
- 2 - Pack Rust With Plate Distortion
- 3 - Painted Over Pack Rust
- 4 - Painted Over Pack Rust With Plate Distortion
- 5 - Reactivating Pack Rust
- 6 - Pitting
- 7 - 100% Section Loss
- 8 - Perforations In The Steel Plate
- 9 - Painted Over Section Loss

NOT TO SCALE		MAIN AVENUE OVER CUYAHOGA RIVER BRIDGE NO. CUY-2-14.41	
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North Truss Gusset Plate Deficiencies:

- L0, 9/32" pitting and pack rust on both interior and exterior plates around vertical pin. and up to 1/8" on interiors of both gussets above bottom chord. 1" Reactivating pack rust around vertical pin. Restraint pin angle is cracked on interior.
- L1, 5/16" pitting and pack rust on both interior and exterior plates along lower chord.
- L8, 1/8" - 1/4" pitting and pack rust on both interior and exterior plates along lower chord.
- L9, 1/8" pitting and pack rust on both interior and exterior plates along lower chord.
- L10, 1/8" - 1/4" pitting and pack rust on both interior and exterior plates along lower chord.
- L11, 1/8" - 1/4" pitting and pack rust on both interior and exterior plates along lower chord.
- L12, 5/16" pitting and pack rust on both interior and exterior plates along lower chord.
- L13, 1/4" pitting and pack rust on both interior and exterior plates along lower chord.
- L14, 1/8" - 1/4" pitting and pack rust on both interior and exterior plates along lower chord.
- L15, 1/8" - 1/4" pitting and pack rust on both interior and exterior plates along lower chord.
- L16, 1/4" pitting and pack rust on both interior and exterior plates along lower chord.
- L17, 1/4" pitting and pack rust on both interior and exterior plates along lower chord.
- L18, 1/4" pitting and pack rust on both interior and exterior plates along lower chord.
- L19, 1/8" - 1/4" pitting and pack rust on both interior and exterior plates along lower chord.
- L20, 1/8" pitting and pack rust on both interior and exterior plates along lower chord.
- L21, 1/8" pitting and pack rust on both interior and exterior plates along lower chord.
- U0, 1/8" - 1/4" pitting and pack rust on both interior and exterior plates.
- U1, 1/8" painted over pitting on both interior and exterior plates.
- U7, 1/8" painted over pitting on both interior and exterior plates.
- U15, 1/16" - 1/8" pitting and pack rust on both interior and exterior plates.
- U17, 1/8" - 1/4" pitting and pack rust on both interior and exterior plates.
- U22, 1/8" painted over pitting and rivet head loss on both interior and exterior plates.
- L2, 1/16" pitting and pack rust on both interior and exterior plates along lower chord.
- L4, 3/16" pitting and pack rust on both interior and exterior plates along lower chord.

Floorbeam Deficiencies:

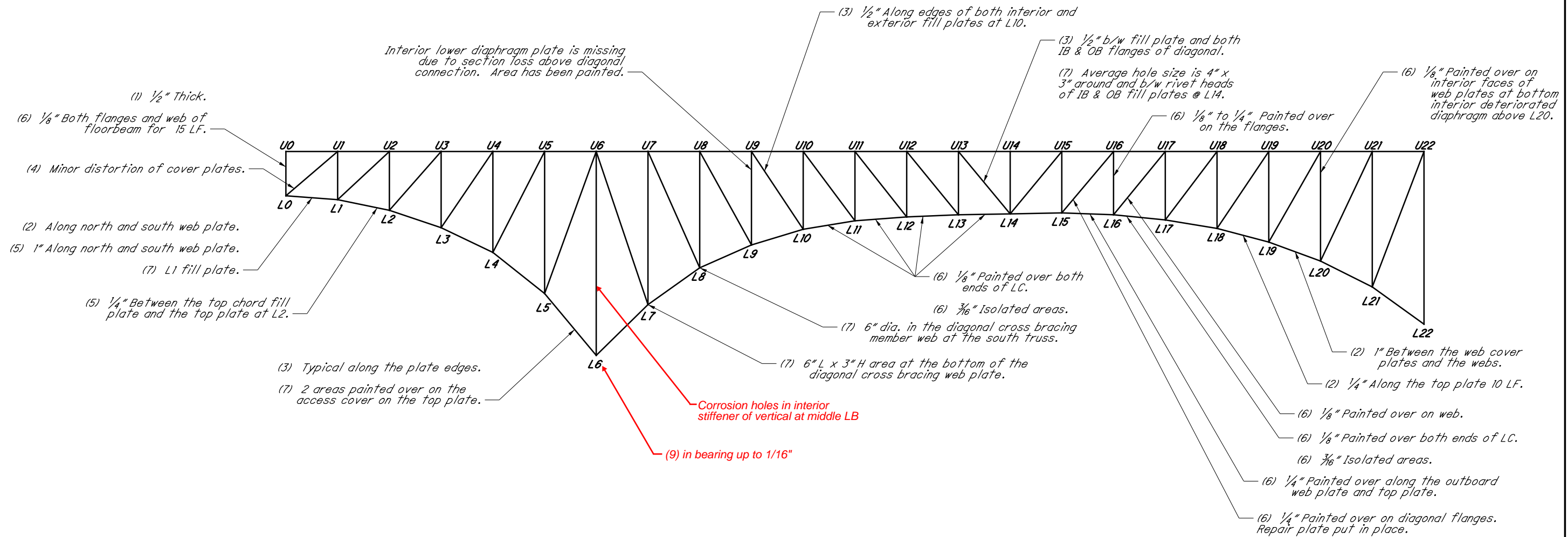
- FB8, 1/8" painted over pitting in webs in north cantilever (5 LF).
- FB9, Section Loss 1/8" painted over on web and flanges at midspan.
- FB10, Pitting 1/8" both flanges and web.
- FB12, Bent stiffener on east face in north cantilever.
- FB13, 1/8" painted over pitting in web behind the 1st interior stringer, 12" diameter.
- FB15, Painted over section loss 1/8" between S truss and catwalk.
- FB 17, 1/4" Painted over pitting in web behind 1st interior stringer, 12" diameter with 1/2" diameter perforations in the steel plate.
- FB17, Painted over section loss 1/8" on web and flanges at midspan.
- FB18, Painted over section loss 1/8" on web and flanges at midspan. 7/32" painted over pitting in web near catwalk, 1/8" diameter perforation
- FB22, The end bracing has painted over pitting and a few small corrosion holes. Top flange has lateral buckling at connection to top chord and suspected cracks.

LEGEND

- 1 - Pack Rust
- 2 - Pack Rust With Plate Distortion
- 3 - Painted Over Pack Rust
- 4 - Painted Over Pack Rust With Plate Distortion
- 5 - Reactivating Pack Rust
- 6 - Pitting
- 7 - 100% Section Loss
- 8 - Perforations In The Steel Plate
- 9 - Painted Over Section Loss

NOT TO SCALE		MAIN AVENUE OVER CUYAHOGA RIVER BRIDGE NO. CUY-2-14.41	
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Floorbeam Deficiencies:

- FB7, Pitting 1/8" Both flanges and web at midspan extending south (15 LF).
- FB10, Pitting 1/8" both flanges and web near midspan (10 LF).
- FB15, Painted over section loss 1/8" on bottom flange and lower 10" of web between S truss and catwalk.
- FB21, 1/16" Painted over pitting on both web faces and both flanges extending 10' south from catwalk
- FB22, Four cracks found at south truss at the top flange cope; IB east face 7", IB West Face 4", OB East 7 1/4", OB West 3 3/4"

South Truss Gusset Plate Deficiencies:

- L0, The exterior pin nut spacer plate exhibits 1" painted and caulked pack rust at the corners. Reactivated pack rust is noted at all corners.
Up to 1/4" pack rust between gusset plates and vertical connections.
Painted over 1/8" pitting to the inboard faces of the inboard gusset.
- L1, Up to 1/8" T painted and caulked pack rust between outboard gusset and lower chord L1L2.
Up to 1/8" painted over section loss along the lower chord.
- L3, CCP up to 5/32" deep on interior faces of GPs above BC
- L12, CCP up to 1/16" deep on interior faces of GPs above BC
- L16, Painted over pitting up to 1/8" on both gusset plates.
- L22, Both gusset plates have up to 1/4" painted over pitting.
Painted over pitting up to 1/8" on interior face of outboard gusset plate.
- U15,

South Truss Gusset Plate Deficiencies (cont.):

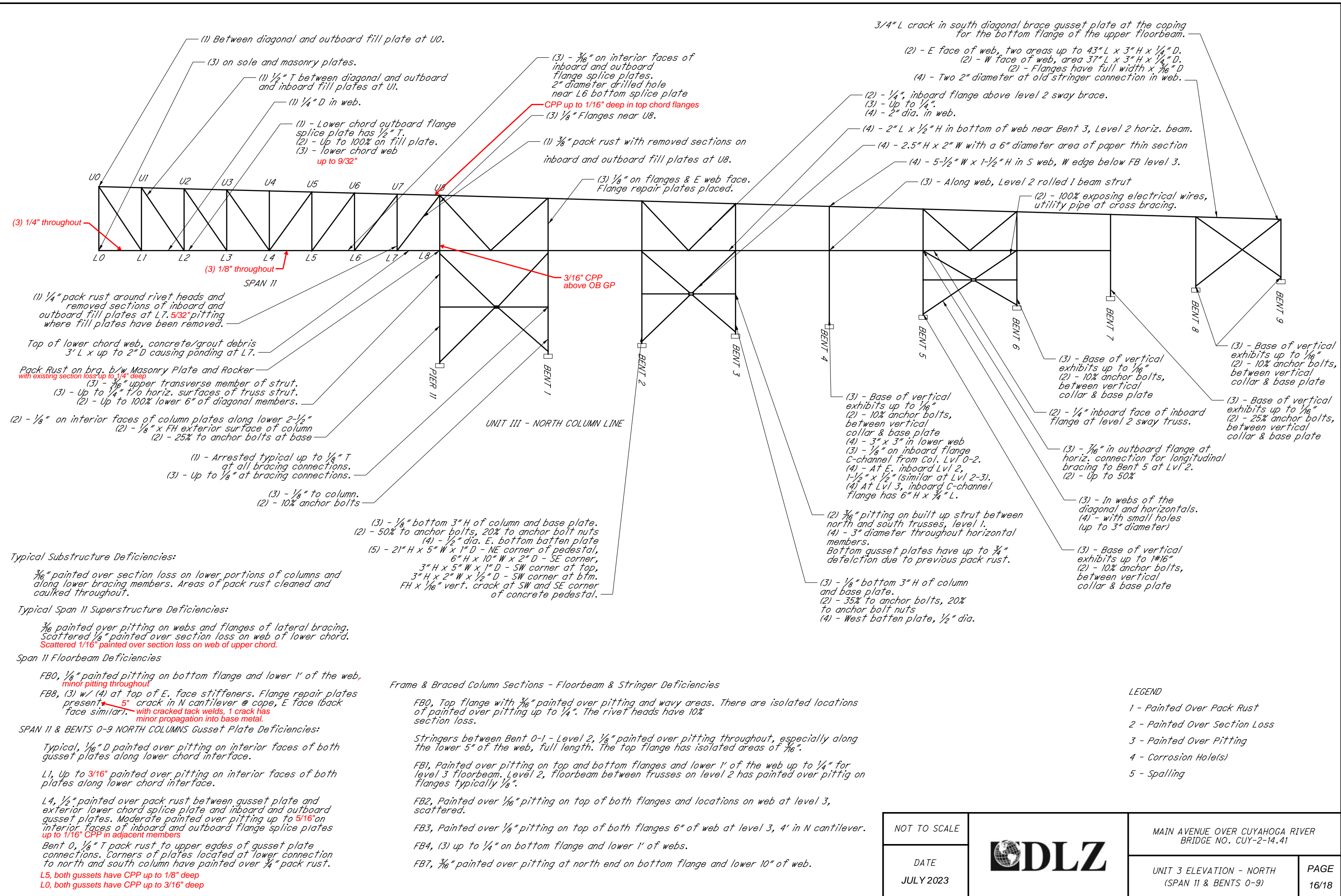
- L2, CCP up to 1/4" deep on interior faces of GPs above BC
- L4, CCP up to 1/8" deep on interior faces of GPs above BC
- L5, CCP up to 1/16" deep on interior faces of GPs above BC
- L7, CCP up to 1/16" deep on interior faces of GPs above BC
- L8, CCP up to 1/8" deep on interior faces of GPs above BC
- L9, CCP up to 1/8" deep on interior faces of GPs above BC
- L10, CCP up to 1/8" deep on interior faces of GPs above BC
- L13, CCP up to 1/8" deep on interior faces of GPs above BC
- L14, CCP up to 1/8" deep on interior faces of GPs above BC
- L15, CCP up to 9/32" deep on interior faces of GPs above BC
- L17, CCP up to 3/16" deep on interior faces of GPs above BC
- L18, CCP up to 5/32" deep on interior faces of GPs above BC
- L19, CCP up to 5/32" deep on interior faces of GPs above BC
- L20, CCP up to 1/8" deep on interior faces of GPs above BC
- L21, CCP up to 5/32" deep on interior faces of GPs above BC

LEGEND

- 1 - Pack Rust
- 2 - Pack Rust With Plate Distortion
- 3 - Painted Over Pack Rust
- 4 - Painted Over Pack Rust With Plate Distortion
- 5 - Reactivating Pack Rust
- 6 - Pitting
- 7 - 100% Section Loss
- 8 - Perforations In The Steel Plate
- 9 - Painted Over Section Loss

NOT TO SCALE		MAIN AVENUE OVER CUYAHOGA RIVER BRIDGE NO. CUY-2-14.41	
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J:\ODOT\109534_VAR-D12_Inspection\109534_VAR-D12_Inspection\CAD\CUY-2-14-41_Truss_Span_Configurations.dgn Unit 3 North Columns 11/28/2022 10:41:21 AM adam-1



Typical Substructure Deficiencies:

$\frac{3}{16}$ " painted over section loss on lower portions of columns and along lower bracing members. Areas of pack rust cleaned and caulked throughout.

Typical Span II Superstructure Deficiencies:

$\frac{3}{16}$ " painted over pitting on webs and flanges of lateral bracing. Scattered $\frac{1}{8}$ " painted over section loss on web of lower chord. Scattered $\frac{1}{16}$ " painted over section loss on web of upper chord.

Span II Floorbeam Deficiencies

FB0, $\frac{1}{8}$ " painted pitting on bottom flange and lower 1' of the web, minor pitting throughout

FB8, (3) w/ (4) at top of E. face stiffeners. Flange repair plates present. 5" crack in N cantilever @ cope, E face (back face similar). with cracked tack welds, 1 crack has minor propagation into base metal.

SPAN II & BENTS 0-9 NORTH COLUMNS Gusset Plate Deficiencies:

Typical, $\frac{1}{16}$ " D painted over pitting on interior faces of both gusset plates along lower chord interface.

L1, Up to $\frac{3}{16}$ " painted over pitting on interior faces of both plates along lower chord interface.

L4, $\frac{1}{2}$ " painted over pack rust between gusset plate and exterior lower chord splice plate and inboard and outboard gusset plates. Moderate painted over pitting up to $\frac{5}{16}$ " on interior faces of inboard and outboard flange splice plates up to $\frac{1}{16}$ " CPP in adjacent members

Bent 0, $\frac{1}{8}$ " T pack rust to upper edges of gusset plate connections. Corners of plates located at lower connection to north and south column have painted over $\frac{3}{4}$ " pack rust.

L5, both gussets have CPP up to $\frac{1}{8}$ " deep

L0, both gussets have CPP up to $\frac{3}{16}$ " deep

Frame & Braced Column Sections - Floorbeam & Stringer Deficiencies

FB0, Top flange with $\frac{3}{16}$ " painted over pitting and wavy areas. There are isolated locations of painted over pitting up to $\frac{1}{4}$ ". The rivet heads have 10% section loss.

Stringers between Bent 0-1 - Level 2, $\frac{1}{8}$ " painted over pitting throughout, especially along the lower 5' of the web, full length. The top flange has isolated areas of $\frac{3}{16}$ ".

FB1, Painted over pitting on top and bottom flanges and lower 1' of the web up to $\frac{1}{4}$ " for level 3 floorbeam. Level 2, floorbeam between trusses on level 2 has painted over pitting on flanges typically $\frac{1}{8}$ ".

FB2, Painted over $\frac{1}{16}$ " pitting on top of both flanges and locations on web at level 3, scattered.

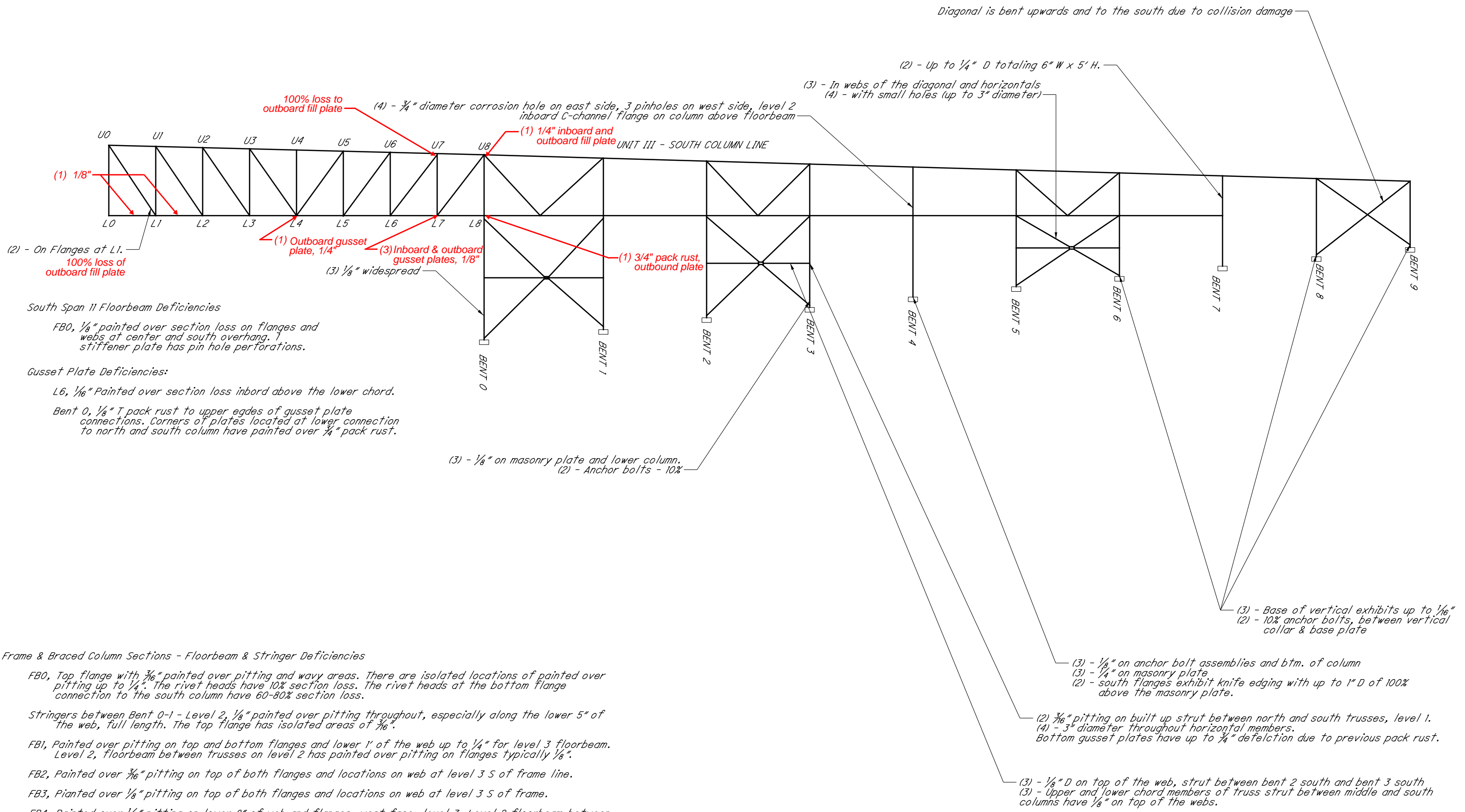
FB3, Painted over $\frac{1}{8}$ " pitting on top of both flanges 6" of web at level 3, 4' in N cantilever.

FB4, (3) up to $\frac{1}{4}$ " on bottom flange and lower 1' of webs.

FB7, $\frac{3}{16}$ " painted over pitting at north end on bottom flange and lower 10" of web.

- LEGEND**
- 1 - Painted Over Pack Rust
 - 2 - Painted Over Section Loss
 - 3 - Painted Over Pitting
 - 4 - Corrosion Hole(s)
 - 5 - Spalling

NOT TO SCALE		MAIN AVENUE OVER CUYAHOGA RIVER BRIDGE NO. CUY-2-14.41	
DATE JULY 2023		UNIT 3 ELEVATION - NORTH (SPAN 11 & BENTS 0-9)	PAGE 16/18



South Span II Floorbeam Deficiencies

FB0, 1/8" painted over section loss on flanges and webs at center and south overhang. 1 stiffener plate has pin hole perforations.

Gusset Plate Deficiencies:

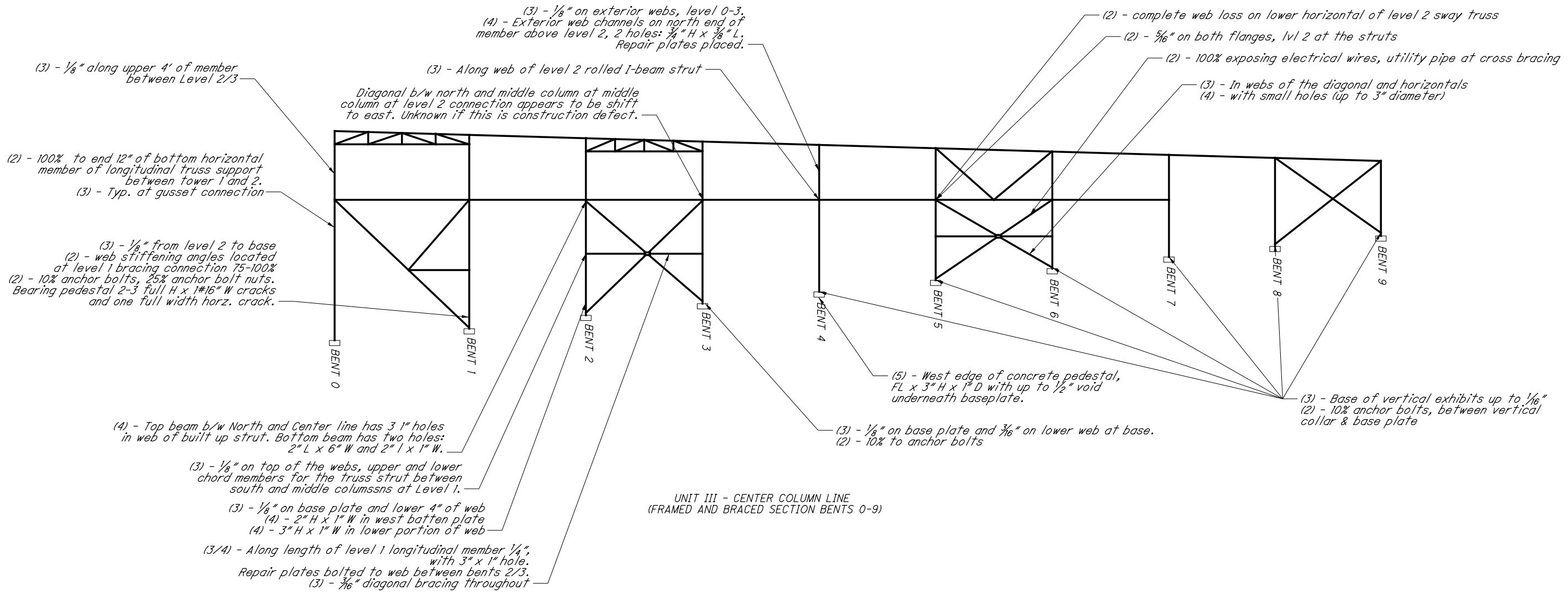
L6, 1/16" Painted over section loss inboard above the lower chord.
 Bent 0, 1/8" T pack rust to upper edges of gusset plate connections. Corners of plates located at lower connection to north and south column have painted over 3/4" pack rust.

Frame & Braced Column Sections - Floorbeam & Stringer Deficiencies

- FB0, Top flange with 3/16" painted over pitting and wavy areas. There are isolated locations of painted over pitting up to 1/4". The rivet heads have 10% section loss. The rivet heads at the bottom flange connection to the south column have 60-80% section loss.
- Stringers between Bent 0-1 - Level 2, 1/8" painted over pitting throughout, especially along the lower 5" of the web, full length. The top flange has isolated areas of 3/16".
- FB1, Painted over pitting on top and bottom flanges and lower 1' of the web up to 1/4" for level 3 floorbeam. Level 2, floorbeam between trusses on level 2 has painted over pitting on flanges typically 1/8".
- FB2, Painted over 3/16" pitting on top of both flanges and locations on web at level 3 S of frame line.
- FB3, Painted over 1/8" pitting on top of both flanges and locations on web at level 3 S of frame.
- FB4, Painted over 1/4" pitting on lower 8" of web and flanges, west face, level 3. Level 2 floorbeam between center and south lines with 3/16" pitting with surface corrosion on the web throughout.
- FB5, 1/16" painted over pitting on bottom flange and lower portion of web, level 3 S of frame.
- FB6, 1/16" painted over pitting on bottom flange and lower portion of web, level 3 S of frame.
- FB7, 1/16" painted over pitting on bottom flange and lower 10" of web, level 3. Steel repair plate on lower portion of web over catwalk measuring 10" H x 16" W. 3/16" painted over pitting at north end.
- FB8, 1/8" pitting on bottom flange and lower 6" of the web along the southern overhang.

- LEGEND**
- 1 - Painted Over Pack Rust
 - 2 - Painted Over Section Loss
 - 3 - Painted Over Pitting
 - 4 - Corrosion Hole(s)

NOT TO SCALE		MAIN AVENUE OVER CUYAHOGA RIVER BRIDGE NO. CUY-2-14.41	
DATE JULY 2023		UNIT 3 ELEVATION (SOUTH COLUMN LINE)	PAGE 17/18



UNIT III - CENTER COLUMN LINE
(FRAMED AND BRACED SECTION BENTS 0-9)

Framed and Braced Column Section - Gusset Plate Deficiencies

- Bent 2 - Level 1, Ends of gussets between N and Mid. columns bowed outward 1-1/4" due to previous pack rust*
- Bent 2, center bracing gusset has 1-3/4" deflection where pack rust was removed and 1/4" pitting.*
- Bent 5, north mid-gusset plate connecting the bracing between bents 5-6 is lightly bowed to the north along the top edge. The south plate is bowed to the south due to pack rust up to 1" T. The south plate has corrosion holes measuring 2" x 1/2".*

Frame & Braced Column Sections - Floorbeam & Stringer Deficiencies

- FBO, Top flange with 3/16" painted over pitting and wavy areas. There are isolated locations of painted over pitting up to 1/4". The rivet heads have 10% section loss. The rivet heads at the bottom flange connection to the south column have 60-80% section loss.*
- Stringers between Bent 0-1 - Level 2, 1/8" painted over pitting throughout, especially along the lower 5" of the web, full length. The top flange has isolated areas of 3/16".*
- FBI, Painted over pitting on top and bottom flanges and lower 1' of the web up to 1/4" for level 3 floorbeam. Level 2, floorbeam between trusses on level 2 has painted over pitting on flanges typically 1/8".*
- FB4, Painted over 1/4" pitting on lower 8" of web and flanges, west face, level 3. Level 2 floorbeam between center and south lines with 3/16" pitting with surface corrosion on the web throughout.*
- FB7, 1/16" painted over pitting on bottom flange and lower 10" of web, level 3. Steel repair plate on lower portion of web over catwalk measuring 10" H x 16" W. 3/16" painted over pitting at north end.*
- FB8, 1/8" pitting on bottom flange and lower 6" of the web along the southern overhang.*

- LEGEND
- 1 - Painted Over Pack Rust
 - 2 - Painted Over Section Loss
 - 3 - Painted Over Pitting
 - 4 - Corrosion Hole(s)
 - 5 - Spalling

NOT TO SCALE		MAIN AVENUE OVER CUYAHOGA RIVER BRIDGE NO. CUY-2-14.41	
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INNOVATIVE IDEAS
EXCEPTIONAL DESIGN
UNMATCHED CLIENT SERVICE

Routine and Fracture Critical Inspection Report
CUY-2-1441, SFN 1800035

APPENDIX D – Fracture Critical Member Plan

Ohio Department of Transportation



Fracture Critical Member and Fatigue Prone Connection Identification Plan

Reference: ODOT Manual of Bridge Inspection Chapter 4 and Appendix E

District: 12
County-Route-SLM: CUY-002-1441
Structural File Number: 1800035

Fatigue Life Study: Year of Study N/A Remaining Fatigue Life N/A

Load Path Redundant: No, structure is fracture critical, inspect FCM's every 24 months
Structurally Redundant: No, acts as simple spans
Internally Redundant: Yes/No, some built up riveted members present
System Redundant: Analysis has not been performed to determine



Figure 1: CUY-10-1613 over the Cuyahoga River

Location: CUY-2-1441 (SFN 1800035), commonly known as the Main Avenue Bridge, carries four to six lanes of vehicular traffic over the Cuyahoga River Valley, local streets, parking lots, GCRTA Waterfront Line tracks and Norfolk Southern Railroad Tracks.

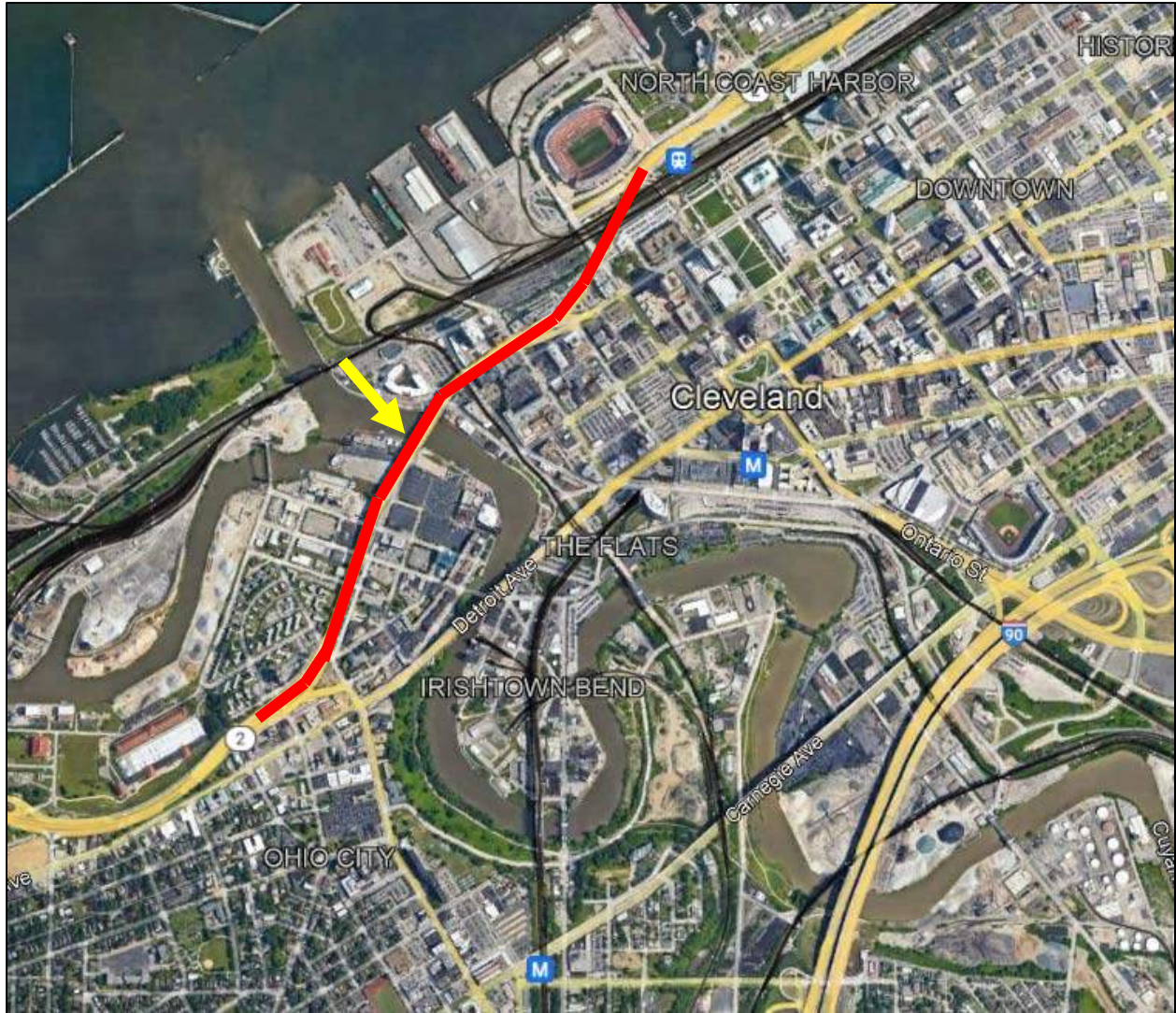


Figure 2: CUY-2-1441 in Cleveland over the Cuyahoga River

Description: The bridge is approximately 6,580 feet long. The bridge is comprised of five sections referred to as the West Approach, Main Truss Spans, East Approach – Forward Section, East Approach - Lakefront Trestle Section, and East Approach - Lakefront Ramp Section:

Unit I - West Approach: The West Approach section consists of east and west bound structures separated by the ramps at W. 28th Street. Each portion of the structure carries three lanes of traffic from near West 29th Street to 250 feet east of West 25th Street. These separate structures then merge into one structure near West 25th Street. There are eight individual units, with varying structure types. The four main structure types are: Transverse rigid concrete frames supporting a concrete deck slab (Sections B', D, J' and M), concrete stringers and diaphragms (Section P), longitudinal rigid steel frames supporting floorbeams and stringers (Sections C, K and L'), and a steel floorbeam/stringer system (Section N).

Fracture critical members: Steel floorbeams and longitudinal frames in Sections C, K and N.

Unit II - Main Truss Spans: Ten (10) spans of two (2) lines of cantilever Pratt deck style trusses. Truss spans vary from 200' to 400'.

Fracture critical members: All floorbeams and select truss chords, diagonals, pins and gusset plates. See *Figure 3* for locations of fracture critical truss chords and diagonals.

Unit III - East Approach – Forward Section: The unit consists of a single span Pratt deck style truss (Span 11), and fourteen (14) spans of steel truss bents that support rolled steel floorbeams with rolled steel stringers bearing on top. Below the eastbound lanes there is lower set of floorbeams which used to support a utility deck.

Fracture critical members: All upper deck floorbeams; Select truss chords, diagonals and gusset plates in Span 11. See *Figure 4* for locations of fracture critical truss chords and diagonals in Span 11.

Unit IV - East Approach – East Approach – Lakefront Trestle Section: The units consists of two lines of steel longitudinal rigid frames comprised of riveted built-up beams and columns. Transverse floorbeams frame into the steel longitudinal rigid frames and support rolled stringers.

Fracture critical members: All longitudinal frames and floorbeams.

Unit V - East Approach – Lakefront Trestle Section: The unit consists of three riveted, built-up plate girders with rolled floorbeams and stringers. The floorbeams are spaced at

Fracture critical members: All girders.

FCM Access: A combination of climbing techniques, underbridge inspection vehicles, aerial work platforms, bucket trucks, and ladders were used in previous inspections to achieve arms' length inspection. Alternate techniques to those described below may be employed at the discretion of the inspection team.

Unit I: The fracture critical girders in this unit are mainly accessed using aerial work platforms or bucket trucks, assisted by ladders.

Unit II: The fracture critical truss members and floorbeams in this unit are mainly accessed using underbridge inspection units and aerial work platforms or bucket trucks.

Unit III: The fracture critical truss members and floorbeams in this unit are mainly accessed using underbridge inspection units, aerial work platforms or bucket trucks, and ladders.

Unit IV: The Fracture Critical girders in this unit are mainly accessed using aerial work platforms or bucket trucks, assisted by ladders.

Unit III: The Fracture Critical truss members and floorbeams in this unit are mainly accessed using underbridge inspection units and climbing techniques.

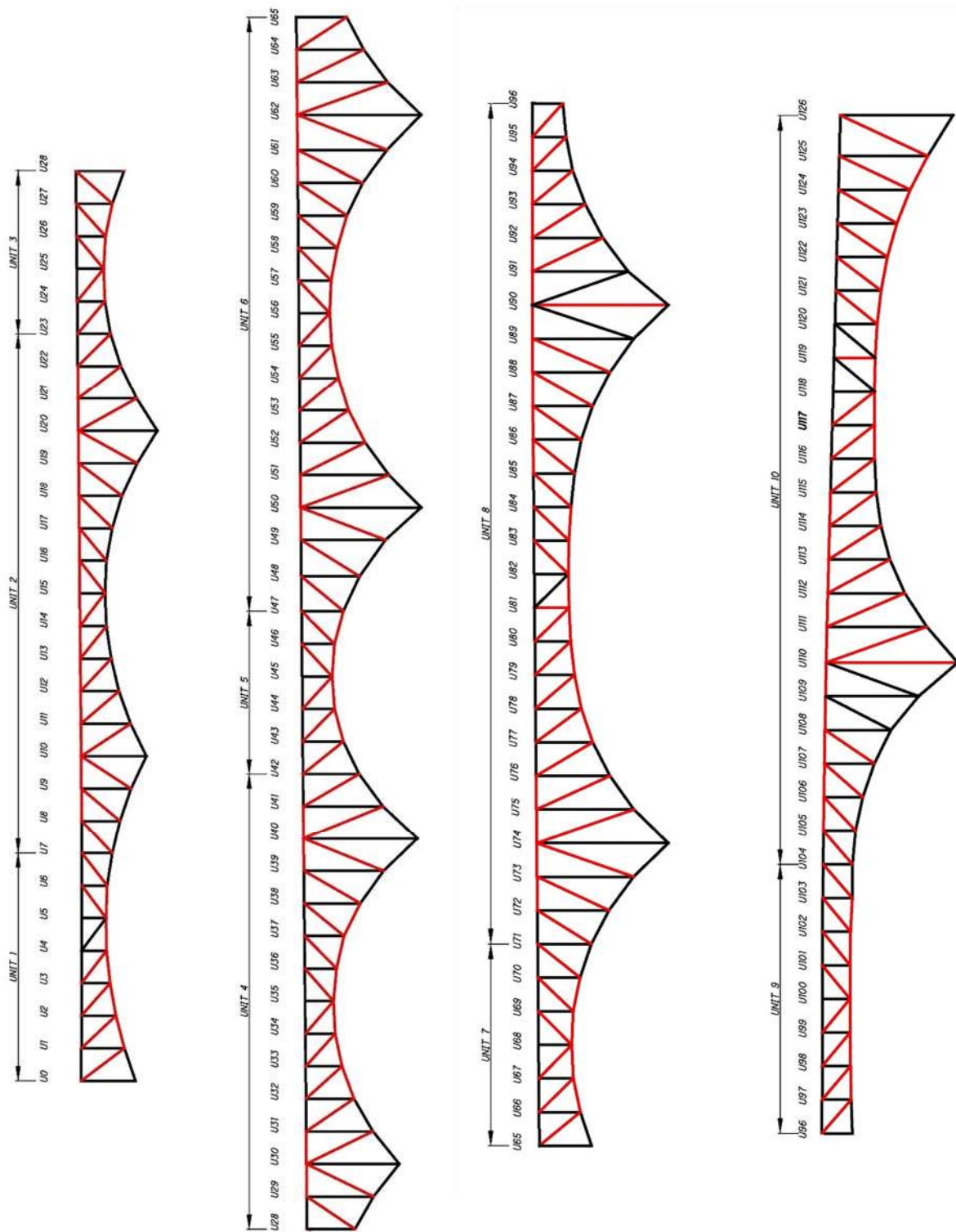


Figure 3: Main Truss Spans Fracture Critical Member Locations (Highlighted Red)

U127 U128 U129 U130 U131 U132 U133 U134 U135

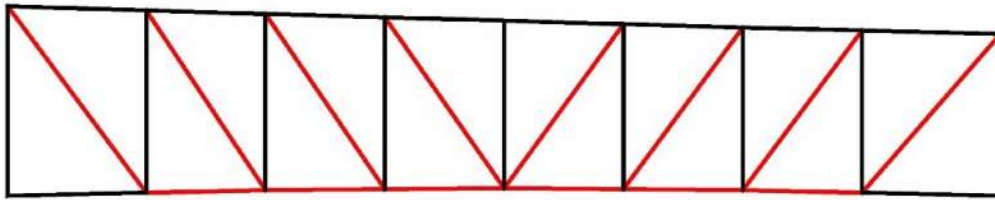


Figure 4: Span 11 Fracture Critical Member Locations (Highlighted Red)

Known Structural Risk Factors & Fatigue Prone Details

Category reference: AASHTO LRFD Bridge Design Specs, 9th Ed. Table 6.6.1.2.3-1

Photo Reference	Label / Fatigue Category	Where?	Description
1	Welded Flange Plates, Fatigue Category E'	Unit I Sections C & K Girders	Ends of field splice plates welded to top and bottom flanges (four girders total with two splice locations on each girder)
2	Abandoned Utility Brackets, Fatigue Category E'	Unit IV Section A Girder Webs	Abandoned utility brackets welded to webs of girders. Some are E/E' depending on length and location.
3	Cracks in Floorbeam Webs	Unit II Floorbeams at truss upper chords	Cracks in coped corners of floorbeam webs adjacent to truss lines in Unit II (Span 1 FBs 0, 6 & 7; Span 2 FB 0; Span
4	Crack in Diagonal Bracing Gusset Plate	Unit III Frame and Braced Column Floorbeam 9	3/4" crack in south diagonal brace gusset plate at the coping for the bottom flange of the upper floorbeam.

*Blank cells are for inspectors to add FPD's, retrofits or fatigue crack locations in future inspections

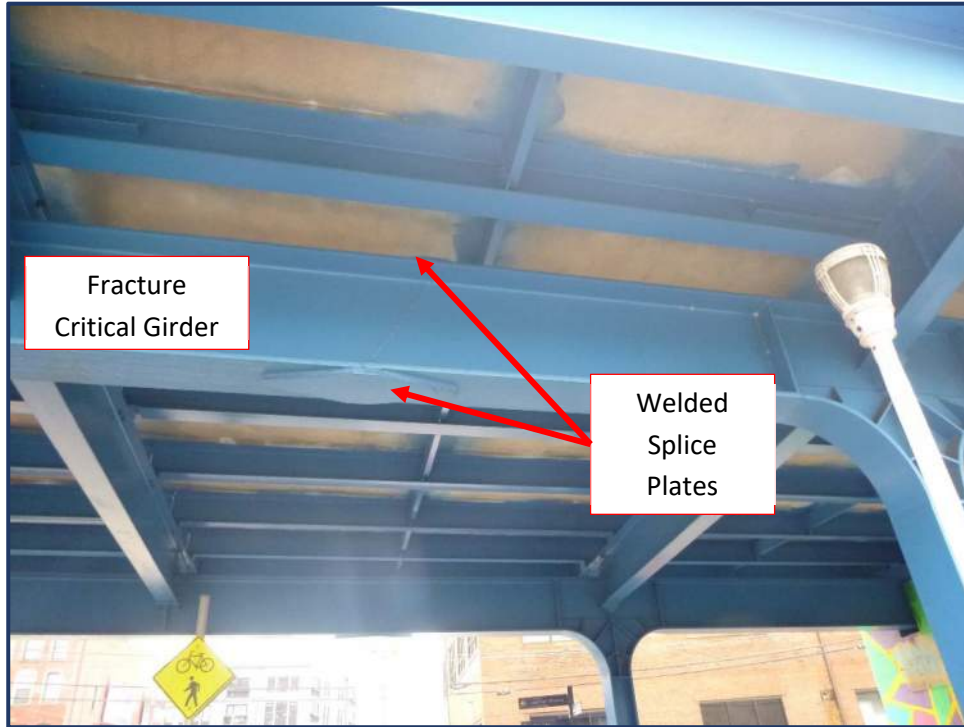


Photo 1 – Welded Cover Plates at Girders in Unit I



Photo 2 – Abandoned Utility Brackets on Unit IV Girder Webs

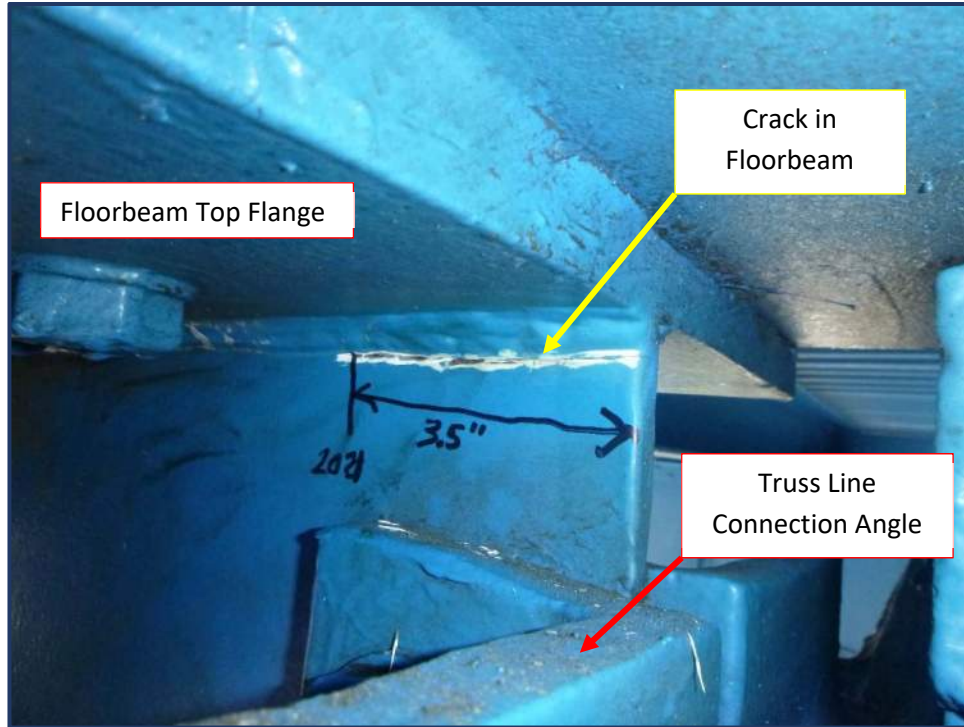


Photo 3 – Cracks in Unit II Floorbeam Web at Top Flange, at Truss Lines

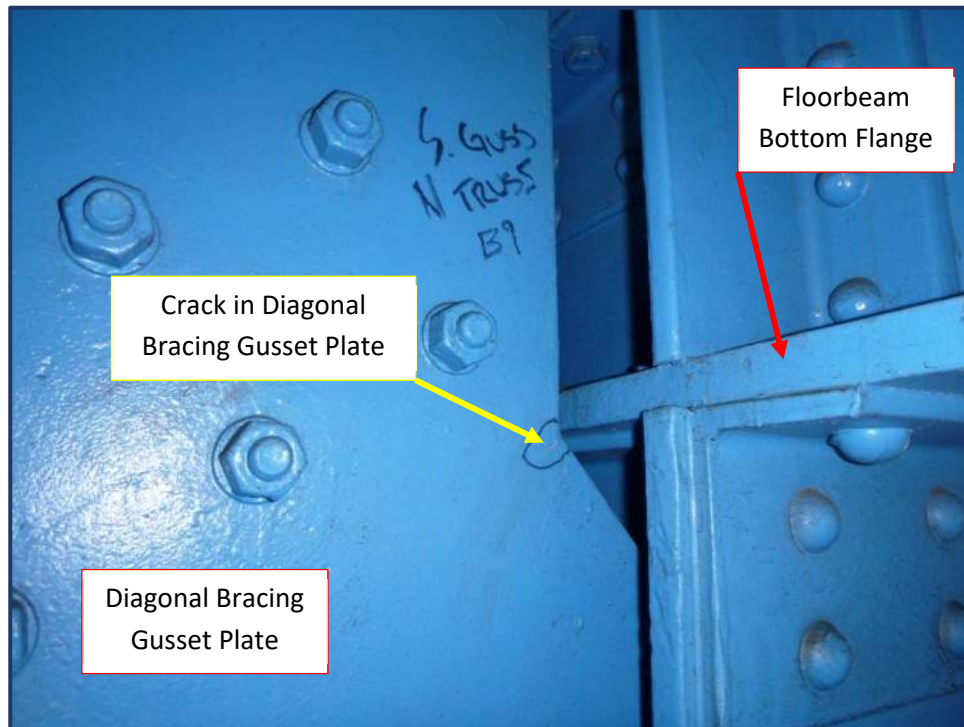


Photo 4 – Crack in Diagonal Bracing Gusset Plate, Unit III, Floorbeam 9, North Column