

# VAR-D12-BI-2019-1

## 2021 Physical Condition Element Level Routine Inspection Report

### CUY-480-0647

SFN 1812831 - PID 108056

Bridge No. CUY-480-0647 carrying I-480 over the Rocky River Valley



Submitted to ODOT - District 12  
December 2021

Prepared By



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## I. EXECUTIVE SUMMARY

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The Interstate 480 bridge over the Rocky River Valley is one of the major crossings over the river valley, located between the cities of Fairview Park and Cleveland. The bridge is situated north of the Cleveland International Airport 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. ODOT or contracted consultants have inspected the structure annually in the past. E.L. Robinson Engineering (ELR) was contracted by ODOT to perform **routine** element level inspection services on this bridge **for year 2021**.

The overall condition of the I-480 Bridge (SFN 1812831) is rated a **6**, meaning that it is in **satisfactory** condition. **Items highlighted in red in this inspection report are new items that were not noted during previous inspections.** Significant findings justifying the general appraisal rating include the following results:

1. The strip seal expansion joints continue to leak. This leaking has caused corrosion on the steel elements below, and in turn has caused spalling and deterioration to the substructure concrete.
2. The underside of the deck is generally in good condition away from the deck joints. The wearing surface is in good condition in the center two lanes in each direction. The shoulders and outer lanes are generally in fair condition.
3. The concrete parapets have significant areas of deterioration with over 33% of the length of the outside parapets having deep horizontal cracks or spalls with exposed reinforcing steel. The median parapets show rust staining delaminations throughout.
4. The transverse neoprene drainage troughs under the hinge expansion joints are plugged and continue to leak water onto the steelwork and piers below. All of the 24 deck scuppers are partially full of debris and growing vegetation.
5. **The steel superstructure members had been repainted since the last inspection.**
6. Currently, there are no active cracks in the girders, floorbeams, or stringers.
7. **The erosion at the embankment slopes at both abutments was in the process of being repaired during the time of the inspection.**

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



*Michael J. Malloy*

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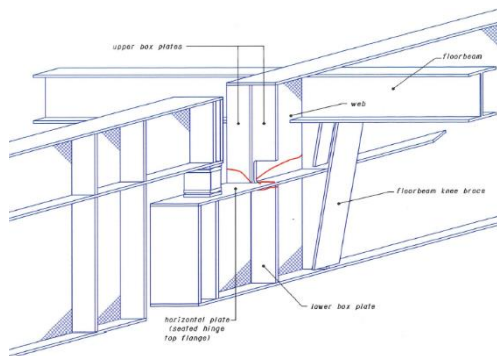


## II. BRIDGE DESCRIPTION

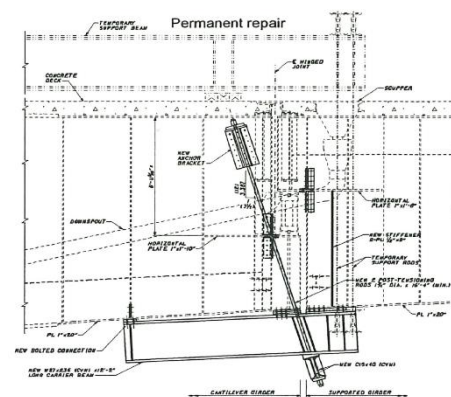
ODOT Bridge No. CUY-480-0647 over the Rocky River Valley is located between the cities of Fairview Park and Cleveland in Cuyahoga County, Ohio. The bridge was originally built in 1970 and had emergency rehabilitation in 2000. The existing Eastbound structure is 1,571'( $\pm$ ) long and the existing Westbound structure is 1,535'( $\pm$ ) long, each with a nine (9) span superstructure divided into three (3) units by two (2) seated hinges in Span 4 and Span 6. Eastbound Span 1 is 139.7'( $\pm$ ) long and Westbound Span 1 is 103.7'( $\pm$ ), the other spans are the same for both Eastbound and Westbound: Span 2 and 3 are 177.3'( $\pm$ ) long each; Spans 4, 5 and 6 are 199.5'( $\pm$ ) long each; Span 7 is 177.3'( $\pm$ ) long; Span 8 is 155.2'( $\pm$ ) long; Span 9 is 86.7'( $\pm$ ) long. Eastbound Unit 1 is 570'( $\pm$ ) long and Westbound Unit 1 is 534'( $\pm$ ) long; Unit 2 is 510'( $\pm$ ) long and Unit 3 is 491'( $\pm$ ) long for both Eastbound and Westbound. The deck consists of two 72'( $\pm$ ) out-to-out black steel reinforced concrete decks with reinforced concrete New jersey shaped barriers and a micro silica modified concrete overlay in the middle two lanes in each the westbound and eastbound directions and a latex modified concrete overlay wearing surface everywhere else. The roadway width is 69'( $\pm$ ) face-to-face of barriers for both Eastbound and Westbound roadways. Steel sliding plate expansion joints are present between the superstructure units and at the abutments. The structure carries four (4) Eastbound lanes and four (4) Westbound lanes over the Rocky River, Cleveland Metroparks Rocky River Reservation, Valley Parkway Trail, and Valley Parkway.

The concrete deck is supported by continuous rolled steel stringers supported by floorbeams and three (3) main plate girders. The main plate girders are spaced at 25'-6"( $\pm$ ) for each superstructure. The steel superstructure members are ASTM A36 steel. The plate girders are supported by reinforced concrete cap and 40'( $\pm$ ) to 100'( $\pm$ ) tall column piers and cellular reinforced concrete abutments. The piers and abutments are founded on spread footings in shale.

The westbound bridge was closed in 2000 due to a crack found at the support side of the seated hinge in span 4 at girder 3. The bridge was repaired, retrofitted, and carrier beams were added under each seated hinge for redundancy.



LOCATION OF THE CRACKS  
(CRACKS SHOWN IN RED)



Carrier Beam Retrofit

The existing longitudinal bridge grade is approximately 0.28% (west to East) and the transverse roadway crown is approximately -1.56%. The approach slabs are 13"( $\pm$ ) thick and 25'( $\pm$ ) long, located on either side of the bridge. The 2017 traffic on the bridge is estimated at 120,850 vehicles per day with 5.1% trucks.

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### III. BRIDGE HISTORY

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The bridge was designed by Alden E. Stilson & Associates for the Ohio Department of Highways and built in 1970. The adjacent roadways were completed and subsequently the bridges were opened in 1978. The following table defines the projects and repairs which took place on the bridge since the start of construction in 1978:

Date	Project
1990	<b>Minor Rehabilitation:</b> retrofitted the lower lateral bracing connection at the girder webs; sealed concrete on the superstructure and substructure; drainage system improvements; safety cable and hand rail installed to aid in inspections; and an IZEU paint system applied.
2001	<b>Emergency Repair:</b> installed carrier beams and jacked all twelve seated hinges after cracks were found during the 2000 inspection.
2002	<b>Overlay:</b> latex modified concrete overlay constructed
2015	<b>Overlay:</b> two middle lanes received a microsilica overlay
Current	<b>Bridge Inspection:</b> The structure is inspected annually by ODOT or consultants. The 2021 inspection was a routine element level inspection with quantities performed by ELR.

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### III. GENERAL

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**The data for this Physical Condition Inspection Report was obtained September 21 through 24, 2021.**

The bridge inspection was performed by inspectors from E.L. Robinson Engineering. The bridge inspection was performed in accordance with the following documents:

Version	Document
2014	Manual of Bridge Inspection, Ohio Department of Transportation (ODOT)
2010	Manual for Bridge Evaluation, American Association of State Highway and Transportation Officials (AASHTO)
2012	Bridge Inspector's Reference Manual, Federal Highway Association
1986	Inspection of Fracture Critical Bridge Members, U.S. Department of Transportation
1988	National Bridge Inspection Standards, U.S. Department of Transportation

The Scope of Services directed ELR to perform a routine inspection and report the findings in a formal report. The inspectors used several different access methods for the superstructure, including walking the deck **within lane closures and accessing the superstructure and deck via snooper truck. Sofis Company, Inc. provided a snooper truck and traffic control September 21 through 24, 2021.** The substructure was visually inspected from the ground **and from the snooper.** ELR collected photographs, field notes, measurements, and sketches while carrying out the bridge inspection. No destructive testing was performed.

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

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	<b>9-0 NBIS Summary</b>	
	<b>Inspector Guidelines</b> (Quantitative comments include the Location, Extent & Severity of the deficiency)	
1-GOOD	9 - Excellent	No problems noted: no section loss, general deterioration.
	8 - Very Good	Some minor problems (ex. extent of concrete deterioration is up to 1% spalling or up to 5% saturation)
	7 - Good	
2-FAIR	6 - Satisfactory	<b>Structural elements show some minor deterioration</b> ( ex. extent of concrete deterioration is up to 5% spalling or up to 10% saturation)
	5 -Fair	<b>Structural elements show deterioration but are sound</b> (ex. extent of concrete deterioration is up to 10% spalling or up to 20% saturation )
3-POOR	4 - Poor	<b>Advanced*</b> (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.
	3 - Serious	4-Poor. . . <b>And local failures possible.</b>
4-CRITICAL	2 - Critical	3-Serious. . . <b>And Unless closely monitored it may be necessary to close the bridge</b> until corrective action is taken.
	1 -Imminent Failure	2-Critical. . . <b>And Major deterioration is affecting stability. Bridge or lane(s) shall be closed</b> to traffic but corrective action may put bridge back into light service.
	0 - Failed	1-Imm Failure. . . <b>And Out of service - beyond corrective action.</b>
		<p>Candidate to establish monitoring benchmarks to track the rate-of -change. <b>Take photos, make sketches and document quantitatively</b> in order to determine if a re-load rating is possible. Include in-service conditions to verify capacity</p> <p><i>Above. . . And discuss the deficiency immediately with Control Authority.</i></p> <p><i>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.</i></p> <p><i>Above. . . And Dispatch immediate lane or bridge closure.</i> Contact the Control Authority. Stay at the bridge until the safety of the traveling public is achieved. Confirm in writing.</p>
		<b>Poor</b> <b>Structurally Deficient**</b>

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

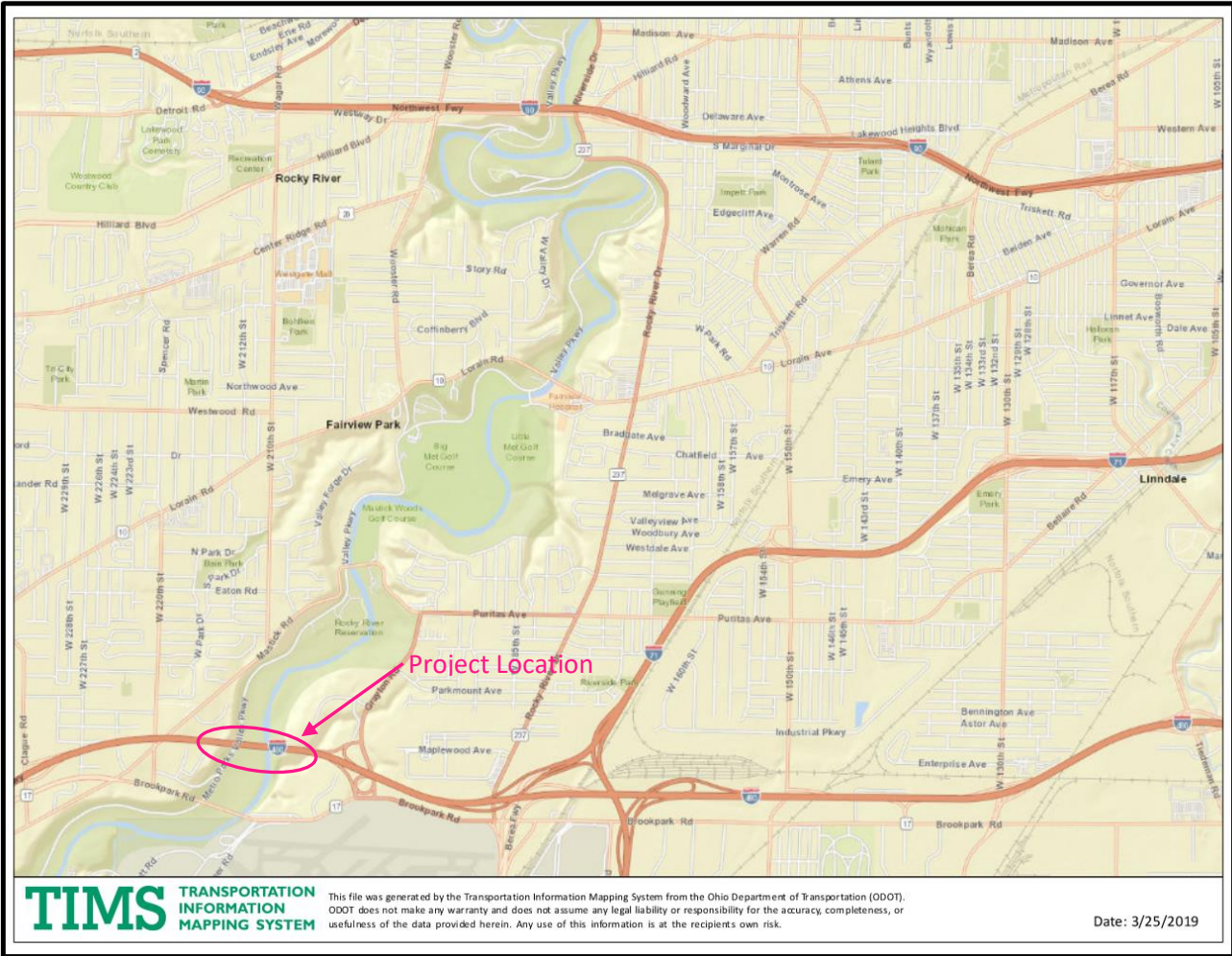
\*\* **Structurally Deficient (SD)** –Bridge Deck, Superstructure, or Substructure Summary rated 4-Poor or below.

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.

Table 34 - Condition



# IV. LOCATION MAP



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## V. GENERAL APPRAISAL AND OPERATING STATUS

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The overall condition rating of the bridge is **6A [A]**, indicating that it is in **satisfactory** condition and is **open with no restrictions**.

The following is a summary of the field inspection performed on **September 21 through 24, 2021**:

Item	Rating
Deck Summary	6
Superstructure Summary	6
Substructure Summary	6

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### V.1 DECK

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

#### V.1.1 FLOOR/SLAB

Item Name	Total Quantity	Units	CS1	CS2	CS3	CS4
12 - Reinforced Concrete Deck	216,432	sq. ft.	212,352	3,411	669	0

The floor is in **good** condition. There is typical hairline transverse cracking and isolated areas of efflorescence throughout the deck underside. Deteriorated locations of concrete are focused around the deck joints and the corrugated deck forms that were left in place. In some locations, the deck forms have deteriorated and the concrete beneath the original forms is visible and has spalled with exposed reinforcing steel.

The West side of expansion joint 2 on the Eastbound deck between Stringers 10 and 11 has a deep 3.5' x 1' spall that is near full depth at the end of the deck at the joint armor (Photos 1 and 2). The corrugated deck form has deteriorated and fallen off and the remaining exposed reinforcing steel exhibits moderate section loss. A few other locations were noted with deep spalls exposing the bottom mat of reinforcing steel (Photo 3).



Photo 1 – Deep spall between Stringers 10 and 11 from 2020 report



Photo 2 – Deep spall between Stringers 10 and 11 as seen in 2021



Photo 3 – Deep spall under Westbound deck at Stringer 2

### V.1.2 EDGE OF FLOOR/SLAB

The edge of floor is in **fair** condition. There are sporadic transverse cracks with spalls and heavier deterioration typically concentrated around the deck joints. There is exposed rebar along the hinge joint in span 4 at the South edge of the Eastbound bridge (Photo 4).





### V.1.3 BRIDGE WEARING SURFACE

Item Name	Total Quantity	Units	CS1	CS2	CS3	CS4
510 - Wearing Surfaces	206,663	sq. ft.	194,153	12,002	508	0

The bridge wearing surface is in **good** condition. The center two lanes in each direction received a new MSM concrete overlay in 2015, and the entire wearing surfaces received non epoxy sealing treatment in 2017. The wearing surface has potholes and hairline transverse and longitudinal cracks throughout, specifically in the shoulders and outside lanes where the older (2002) wearing surface is located. These visible cracks allow water to seep into the concrete deck and promoting deterioration of the floor slab.. There is halo spalling in the wearing surface typical around all scuppers (Photo 5). The Westbound outside shoulder has multiple areas where the wearing surface has spalled full depth for typically half the width of the shoulder at the base of the parapet (Photo 6). There is a section of the Westbound bridge between Pier 5 and the Unit 2/3 Expansion Joint that has six deteriorating wearing surface patches within a 30 foot length of the two south lanes (Photo 7).



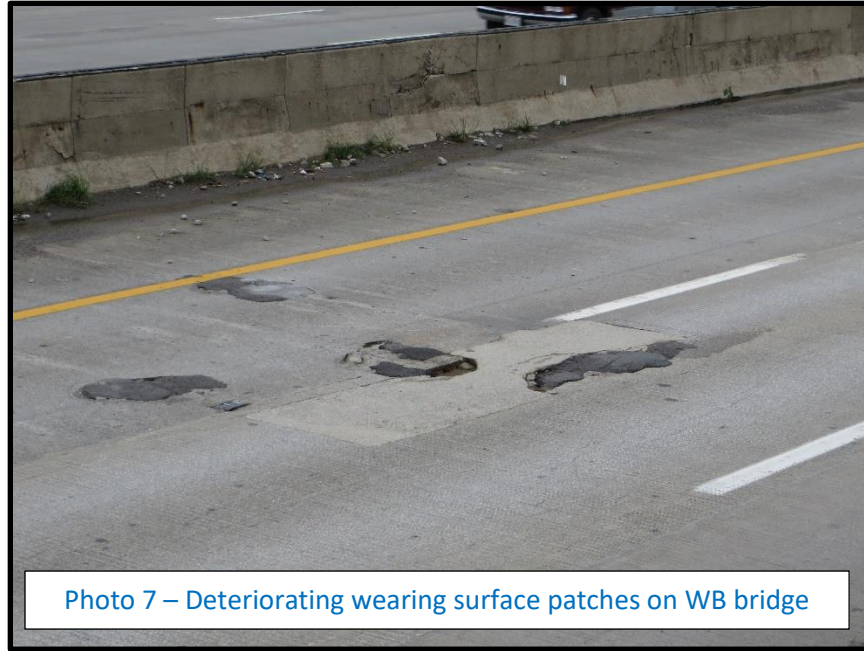


Photo 7 – Deteriorating wearing surface patches on WB bridge

#### V.1.4 EXPANSION JOINTS

Item Name	Total Quantity	Units	CS1	CS2	CS3	CS4
305 - Assembly Joint without Seal	552	ft.	384	125	43	0

The expansion joints are in **fair** condition. Each expansion joint is rusting and impacted with debris in the shoulders (Photo 8).



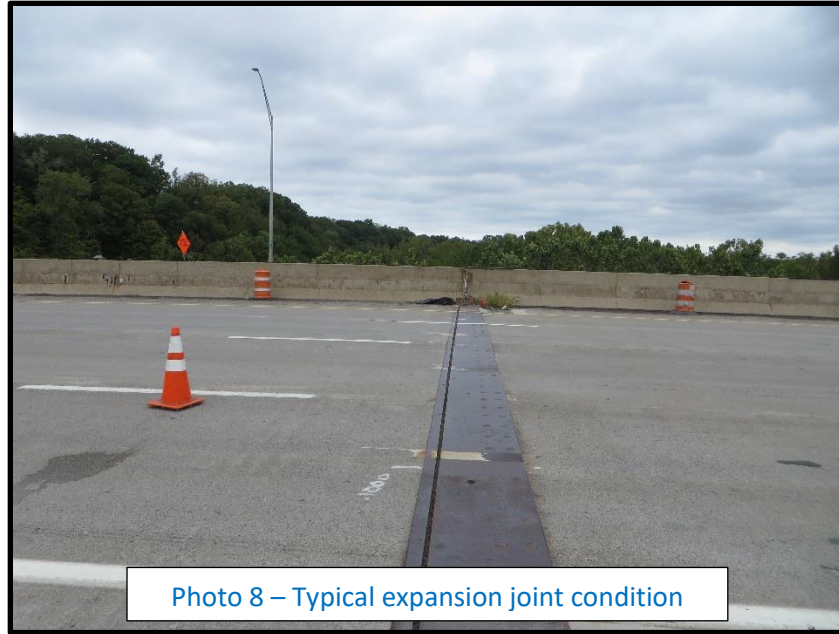


Photo 8 – Typical expansion joint condition

The top plate of the Eastbound Rear Abutment backwall joint header is sunken in Lanes 2 and 3. At the Eastbound Rear Abutment, there is a loud banging noise, near the second girder from the south side, when traffic drives over the expansion joint (Photos 9 and 10). In the 2020 report it was noted that at the Westbound Rear Abutment part of the metal backwall header in the south lane was sticking up ½" above the wearing surface, not seen in 2021 (Photos 11 and 12).



Photo 9 – EB Rear Abutment expansion joint top plate sunken, shown before approach was paved



Photo 10 – EB Rear Abutment expansion joint after approach paving



Photo 11 – 2020 Report Photo of WB Rear Abutment expansion joint metal sticking up



Photo 12 – WB Rear Abutment expansion joint in 2021

At the Eastbound forward abutment, 19 feet of the backwall joint armor has asphalt partially over the sunken backwall joint armor and the steel is showing minor section loss (Photo 13). The Westbound Forward Abutment joint had some minor patched potholes at the backwall, but the asphalt patches are sinking.

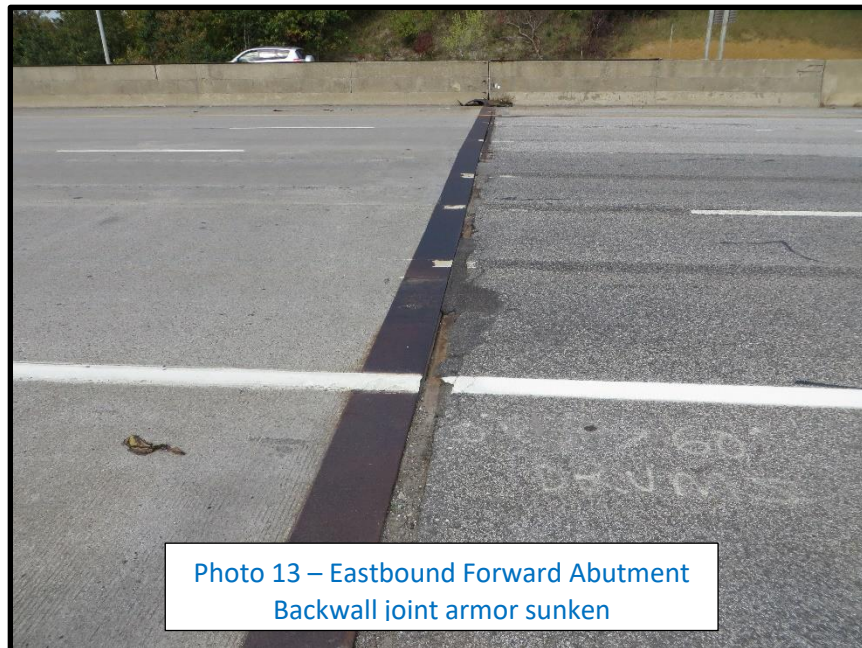


Photo 13 – Eastbound Forward Abutment Backwall joint armor sunken



## V.1.5 BRIDGE RAILING

Item Name	Total Quantity	Units	CS1	CS2	CS3	CS4
331 - Reinforced Concrete Bridge Railing	6,210	ft.	1,956	1,955	2,309	0

The bridge railing is in **poor** condition. Spalling with exposed, corroded, and debonded reinforcing steel, delaminations, vertical and horizontal cracks, and map cracks are typical along the parapets (Photo 14). Spalls were typical along the top edge of the interior face of the parapet at the deck joints. Where a spall does not exist, a deep horizontal crack runs near full length on the Westbound North parapet and **Eastbound South parapet** (Photo 15). There is an 18" hole in the South parapet of the Eastbound bridge at the deck joint in Span 4. There is a 16" hole in the South parapet of the Eastbound bridge at the deck joint in Span 6 (Photo 16). The up-turned parapet joint armor is missing at both locations.

The rubber seal covering the open joint between the median barriers is missing for more than half of the bridge. Delaminations, rust stains, and shallow spalls with exposed rusted rebar were noted throughout the median parapet wall.



Photo 14 – Typical parapet spall and debonded





Photo 15 – Typical parapet deep horizontal cracking



Photo 16 – Span 6 Eastbound exterior parapet hole

## V.1.6 DECK DRAINAGE

Item Name	Total Quantity	Units	CS1	CS2	CS3	CS4
815 - Drainage	24	each	0	23	1	0

The drainage system is in **fair** condition. All scuppers on the bridge deck are partially full of debris with vegetation growing out of them. The gutters of the deck are full of debris which is limiting flow to the scuppers. The deck is still clearing drainage with only minor ponding noted in past reports, although no evidence of ponding was present during the 2020 inspection. **Minor ponding was noted in 2021 seen during a rain event.** The north and median scupper grates near Pier 4 of the Westbound bridge **and the south scupper grate near the expansion joint in span 6 of the Eastbound bridge** have missing metal bars that have broken off **(Photo17)**.

The downspouts show minor surface rust throughout, and minor section loss at the neoprene couplers. **The 2020 report noted that the downspout at the Westbound expansion joint 2 in Span 6 had a corrosion hole on both sides of the neoprene coupler. In 2021 at that location the pipe had been repainted and signs of leaking at the coupler were seen, but no holes were found (Photos 18 and 19).** The concrete paved gutters below Pier 6 at the West bank of the river that were noted as undermined and washed out in the 2020 report have been replaced by rock protection **(Photo 20)**. The downspout at Pier 7 on the Eastbound Bridge is clogged and water is overflowing during rain events **(Photo 21)**.



**Photo 17 – Metal bars broken off scupper grates**





Photo 18 – Westbound Span 6 downspout 2020



Photo 19 – Westbound Span 6 downspout 2021



Photo 20 – New rock protection below Pier 6



### V.1.7 SIGNS

The signs are in **good** condition. No deficiencies were noted during this inspection.

### V.1.8 SIGN SUPPORTS

The sign supports are in **fair** condition. Bolts for the brackets holding the “corporation limit” signs to the parapet are broken on both bridges, but they are still attached to the floorbeams at the base.

### V.1.9 UTILITIES

The utilities are in fair condition. Missing or loose covers were noted for the utility access panels with exposed wiring inside. Vegetation growth inside the utility access panels were observed at most light posts. There is impact damage to the South barrier at the light pole at Pier 7 and the pole appears to lean to the East. Most light post bases are missing bolt caps at their bases.

**Most of the grounding cables are broken at the pier caps, most likely broken during the repainting of the superstructure (Photo 22)**



**Photo 22 – Broken grounding wire at pier cap**

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## V.2 SUPERSTRUCTURE

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

### V.2.1 SUPERSTRUCTURE ALIGNMENT

The alignment is in **good** condition. There were no instances of misaligned girders or sagging noticed during the inspection.

### V.2.2 BEAMS/GIRDERS

Item Name	Total Quantity	Units	CS1	CS2	CS3	CS4
107 - Steel Open Girder/Beam	8,944	ft.	8,536	408	0	0

The girders are in **fair** condition. No significant section loss in the base metal was noted on the beams and girders. The carrier beam retrofit to the previous cracking in the girder webs at the seated hinges are operating as intended with no deficiencies noted.

Many of the dogbone retrofits are in good condition, but several of them were subjected to an overcut (Photos 23) or have not been cut through during the initial installation. **The overcuts could not be seen in 2021 due to the new paint (Photo 24).** Additional detail on the dogbone retrofits can be found in the table in Appendix VII.



Photo 23 – Typical overcut dogbone retrofit 2020



Photo 24 – Location of previous dogbone overcut in 2021 after painting

### V.2.3 PROTECTIVE COATING SYSTEM

Item Name	Total Quantity	Units	CS1	CS2	CS3	CS4
515 - Steel Protective Coating	36,738	sq. ft.	36,738	0	0	0

The protective coating system is in **good** condition. **The steel superstructure members had just been painted since the previous inspection (Photo 25). There are a couple of isolated areas of paint missing (Photo 26).**



Photo 25 – Superstructure members newly painted





**Photo 26 – Area of missing paint**

### V.2.4 STRINGERS

Item Name	Total Quantity	Units	CS1	CS2	CS3	CS4
113 - Steel Stringer	17,880	ft.	17,880	0	0	0

The stringers are in **good** condition. No deterioration or other significant deficiencies were noted on the stringers.

### V.2.5 FLOORBEAMS

Item Name	Total Quantity	Units	CS1	CS2	CS3	CS4
152 - Steel Floor Beam	9,918	ft.	9,918	0	0	0

The floorbeams are in **good** condition. No deterioration or other significant deficiencies were noted on the floorbeams.

### V.2.6 FATIGUE

The fatigue details are in **fair** condition. The stringer bottom flange to floorbeam top flange weld connections are a Category E detail. No cracks were found in these connections. The stringer partial length welded moment plates are Category E' details. No cracks were found in these connections. The roller seat flange connection tri-axial welds to the girder webs at the expansion hinges are a Category E' detail. No signs of distress were noted at these locations. The longitudinal web stiffener to girder web welds, where the ends of the stiffeners do not have a radius with the weld ends ground out, are Category E details. No signs of fatigue cracking were noted in these details.

The dogbone retrofits have isolated locations of overcut but appear to be working as intended. No stress has transferred beyond the retrofit.

Photos of the fatigue prone details can be found in Appendix VI.

**There are multiple locations where some of the knee brace connection retrofit bolts are missing at the bottom flange of the girder (Photo 27).**



## V.2.7 DIAPHRAGMS/X-FRAMES

The diaphragms are in **good** condition. The diaphragms are present between the stringers. No significant deficiencies were noted except minor section loss under the end and intermediate deck joints.

## V.2.8 LATERAL BRACING

The lateral bracing is in good condition. A localized kink due to erection damage was previously noted on the strut bottom flange at floorbeams 29 and 30 between Girders B and C and remains unchanged. There are a few locations where the bolts are loose **or missing** at the connection plates (Photo 28), **but these are just erection bolts and the connection was backed up with field welds.**

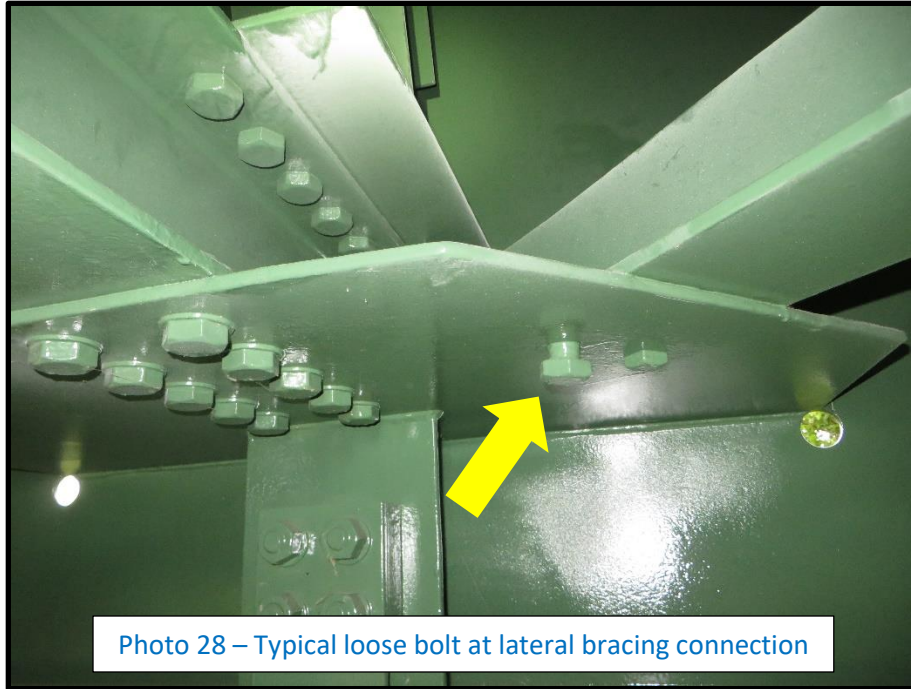


Photo 28 – Typical loose bolt at lateral bracing connection

### V.2.9 BEARING DEVICES

Item Name	Total Quantity	Units	CS1	CS2	CS3	CS4
311 - Movable Bearing	60	each	60	0	0	0

The bearings are in **good** condition. The Girder E bearing at the Forward Abutment was noted in previous inspections to deflect up to ½” under live load, but not noted to deflect during the 2019, 2020, **or 2021** inspection. The Girder F bearing at the Forward Abutment is undermined by a spall up to ½” deep under the full width of the West edge of the bearing plate.

### V.2.10 PINS/HANGERS/HINGES

Item Name	Total Quantity	Units	CS1	CS2	CS3	CS4
820 - Steel Seated-Hinge Assembly	12	each	11	1	0	0

The hinges are in good condition. No deterioration or other significant deficiencies were noted on the hinge components. **As noted under the bridge description, the seated hinge in span 4 at girder 3 had previously cracked and the bridge was closed until the seated hinge could get retrofitted. The repair appears to be in good condition with no changes since installed – this location is rated CS2. The other 11 hinges were also retrofitted and carrier beams installed below the structure to add redundancy.**



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## V.3 SUBSTRUCTURE

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

### V.3.1 PIER COLUMNS/BENTS

Item Name	Total Quantity	Units	CS1	CS2	CS3	CS4
205 - Reinforced Concrete Column	32	each	17	7	8	0

The pier columns are in **fair** condition. Several pier columns exhibit delaminations and spalls, some with deteriorated rebar (Photo 29), over their full height and localized around the relief detail at the column corners (Photo 30). Vertical cracks were also noted on several pier columns.





Photo 30 – Typical column corner spall

### V.3.2 ABUTMENT WALLS

Item Name	Total Quantity	Units	CS1	CS2	CS3	CS4
215 - Reinforced Concrete Abutment	92	ft.	68	24	0	0

The abutment walls are in **fair** condition. The girder seat pedestals at both abutments exhibit cracked corners and some delaminations and/or spalls. The Forward Abutment has a spalled area at the West vertical face below the Girder F bearing that is full height x 2' wide x up to 1" deep (Photo 31). The spall undermines the masonry plate up to ½" deep.



Photo 31 – Spall undermining Girder F masonry plate

### V.3.3 PIER CAPS

Item Name	Total Quantity	Units	CS1	CS2	CS3	CS4
234 - Reinforced Concrete Pier Cap	963	ft.	943	7	13	0

The pier caps are in **good** condition. The pier caps had some locations of minor cracks and spalls.

### V.3.4 BACKWALLS

Item Name	Total Quantity	Units	CS1	CS2	CS3	CS4
830 - Abutment Backwall	288	ft.	241	36	11	0

The backwalls are in **fair** condition. A 4'x5' delamination was noted by sounding behind Girder 1 on the Rear Abutment Backwall. A 10' wide V-shaped delamination was noted by sounding behind Girder 5 stemming from the expansion joint anchor concrete to 2' from the bottom of the backwall of the Forward Abutment. Minor spalls were noted at the bottom corners where fill has pulled away (Photos 32 and 33). Minor vertical cracks were noted throughout.



Photo 32 – Typical backwall bottom corner spall from 2020 report



Photo 33 – Location of backwall corner spall in 2021, covered by stone

### V.3.5 WINGWALLS

The wingwalls are in **good** condition. The wingwalls have isolated areas of minor spalls, cracks, patches, and efflorescence. The interior wingwall at the Rear Abutment has multiple full height vertical and diagonal cracks with efflorescence (Photo 34), but the wingwall is not counted in the bridge inventory.



Photo 34 – Rear Abutment interior wingwall showing cracking with efflorescence



### V.3.6 SCOUR

The scour is in **good** condition. No exposed footings were noted during the **2021** inspection.

### V.3.7 SLOPE PROTECTION

The slope protection is in **good** condition. **The slope protection was in the process of being replaced during the time of the 2021 inspection.**

**The erosion channels on both the east and west sides had been filled with large stones and the faces of slope protection on both sides had been covered in aggregate stone (Photos 35 and 36). The new slope protection extends from the rear abutment to the road on the west side and from the forward abutment to the river on the east side.**



**Photo 35 – New slope protection at forward abutment**



**Photo 36 – New slope protection at rear abutment**

## V.4 APPROACH ROADWAY

Condition findings of individual approach roadway items are as follows:

### V.4.1 APPROACH WEARING SURFACE

The approach wearing surface is in **fair** condition. The approach roadway wearing surface is asphalt with full width transverse cracks that have generally been sealed and some locations of map cracks. Raveling and rutting are evident in the outside and middle lane at all approaches. **At the time of the 2021 inspection, the asphalt approach wearing surface on the west side of both bridges was in the process of being repaved and was milled off.**

### V.4.2 APPROACH SLABS

Item Name	Total Quantity	Units	CS1	CS2	CS3	CS4
321 - Reinforced Concrete Approach Slab	4,842	sq. ft.	4,472	76	294	0

The approach slabs are in **good** condition. The approach slabs are covered with an asphalt wearing surface and have a few transverse cracks that have been sealed and map cracks at multiple locations including

along the expansion joints. **The asphalt wearing surface on the west approach slab for each bridge had been milled off and was in the process of being repaved at the time of the 2021 inspection.**

### V.4.3 APPROACH EMBANKMENT

The approach embankments are in **good** condition. There is minor bare soil and rutting around the wingwalls for the Forward Abutment. The fill behind the forward backwalls, underneath the abutment spans, is spilling out between the median joint (Photos 37 and 38).



### V.4.4 APPROACH GUARDRAIL

The approach guardrail is in **fair** condition. There are two posts missing sections with damaged blockouts at the Southeast corner (Photo 39). The approach guardrail is leaning towards the road at the Northwest corner. The median and exterior concrete railings on both approach slabs have vertical cracks, map cracks, and spalls with deteriorated rebar. Guardrail at all other locations is in good condition.



Photo 39 - Guardrail blockouts with section loss and damage

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## V.5 CHANNEL

---

Condition findings of individual channel items are as follows:

### V.5.1 ALIGNMENT

The channel alignment is in **good** condition. The river has a straight alignment for more than 100 feet upstream. No significant deficiencies were noted.

### V.5.2 PROTECTION

The channel protection is in **good** condition. The foundations in the flood plain are all covered.

### V.5.3 HYDRAULIC OPENING

The hydraulic opening is in **good** condition. The structure is approximately 100 feet above the river.

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## V.6 SUMMARY & RECOMMENDATIONS

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The Interstate 480 bridge over the Rocky River Valley is in **satisfactory** condition, or **6** on the 2014 ODOT Manual of Bridge Inspection Condition Rating Guidelines (page 7).



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

### **V.6.1 PRIORITY**

There are no concerns requiring immediate action for this bridge.

### **V.6.2 MAINTENANCE**

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

1. Clean all gutters, scuppers, and downspouts to prevent water from leaking onto the steel and pier below the expansion joints
2. Repair or replace scupper sections with corrosion holes near the neoprene couplers
3. Repair or replace the pull box hatches at the light posts
4. Repair the deteriorated parapets
5. Patch the wearing surface to protect the underlying floor
6. Patch the spalls with exposed and deteriorated rebar on the underside of the deck
7. Patch the substructure spalls and delaminations

### **V.6.3 MONITOR**

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

1. Monitor the deterioration of structural steel under the expansion joints
2. Monitor the dogbone overcuts on the girders for any possible propagation beyond the relief holes
3. Monitor the carrier beam retrofits and threaded bar assemblies

APPENDIX I – Bridge Inspection Field Report

# Ohio Bridge Inspection Summary Report

**CUY-00480-0647 (1812831)**

2: District 12 26446 - FAIRVIEW PARK (CUY county)  
 21: Major Maint A/B 01 - State Highway Agency /  
 225 Routine Main A/B 01 - State Highway Agency /  
 221 Inspection A/B 01 - State Highway Agency /  
 220: Inv. Location DISTRICT 12

5A: Inventory Route 1 00480  
 7: Facility On IR 480  
 6: Feature Ints ROCKY RIVER  
 9: Location 2.07 MI. W. OF JCT. I-71  
 Lat, Lon 41.424461018037384 , -81.8577877386747

## Condition

**58: Deck** **6 - Satisfactory Condition**  
 58.01 Wearing Surface 7 - Good (1% distress)  
 58.02 Joint 6- Satisfactory (isolated leaking)  
**59: Superstructure** **6 - Satisfactory Condition**  
 59.01 Paint & PCS 9 - Excellent  
**60: Substructure** **6 - Satisfactory Condition**  
**61: Channel** **7**  
**61.01 Scour** **7 - Good**  
**62: Culverts** **N - Not Applicable**  
**67.01 GA** **6**

## Structure Type

43: Bridge Type 3 - Steel  
 03 - Girder and Floorbeam System  
 N- Not Applicable  
 45: Spans Main / Approach 9 / 0  
 107: Deck Type 1 - Concrete Cast-in-Place  
 408: Composite Deck N - Non-composite Construction  
 414A Joint Type 1 2 - Sliding Metal Plate Angle  
 414B: Joint Type 2 N - None  
 108A: Wearing Surface 3 - Latex Concrete or similar additive  
 N- Not Applicable

## Appraisal

Sufficiency Rating 61.8 SD/FO 0 - ND  
 36: Rail, Tr, Gd, Term Std 1 1 1 1  
 72: Approach Alignment 8 - Equal to present desirable criteria  
 113: Scour Critical 8 - Stable for scour conditions  
 71: Waterway Adequacy 8 - Bridge Above Approaches

422: WS Date 09/30/2005  
 423: WS Thick (in) 1.2  
 482: Protective Coating 5 - Paint System OZEU  
 483: PCS Date 01/01/1991  
 453: Bearing Type 1 2 - Rockers & Bolsters  
 455: Bearing Type 2 N - None  
 528: Foundn: Abut Fwd 6 - Rock  
 533: Foundn: Abut Rear 6 - Rock  
 536: Foundn: Pier 1 6 - Rock  
 539: Foundn: Pier 2 0 - Other

## Geometric

48: Max Span Length (ft) 200.0  
 49: Structure Length (ft) 1571.0  
 52: Deck Width, Out-To-Out (ft) 144.0  
 424: Deck Area (sf) 226224  
 32: Appr Roadway Width (ft) 103.0  
 51: Road Width, Curb-Curb (ft) 142.0  
 50A: Curb/SW Width: Left (ft) 0  
 50A: Curb/SW Width: Right (ft) 0  
 34: Skew (deg) 0  
 33: Bridge Median 0 - No median  
 54B: Min Vert Underclearance (ft) 99  
 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 1970 / 0000  
 42A: Service On 1 - Highway  
 42B: Service Under 6 - Highway - waterway  
 28A: Lanes on 08  
 28B: Lanes Under 02  
 19: Bypass Length 1  
 29: ADT 109150  
 109: % Trucks (%) 5

## 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 (%) 130  
 704: Analysis Date 06/12/2019  
 63: Analysis Method 6 - Load Factor (LF) rating reported by rating factor (RF) method using MS18 loading.

## Inspections

		Months	
90: Routine Insp.		12	09/24/2021
92A: FCM Insp.	Y	24	09/21/2020
92B: Dive Insp.	N	0	
92C: Special Insp.	N	0	
92D: UBIT Insp.	Y	12	09/24/2018
92E: Drone Insp.			

Inspector Malloy, Michael

Inspector: Michael Malloy  
 Inspection Date: 09/24/2021

Structure Number: 1812831  
 Facility Carried: IR 480

Bridge Inspection Report

Element Inspection

	Environment	Total Quantity	Units	Condition State 1	Condition State 2	Condition State 3	Condition State 4
<b>12 - Reinforced Concrete Deck</b>	3 - Mod.	216432	sq. ft.	212352	3411	669	0
	<p>CS2- is considered areas where the deck is cracked at various locations throughout the deck. For It's age the deck is in good condition with isolated leaching cracks            CS3 - is the areas were the cracks are leaching or there are spalled areas. Spall are generally located around the expansion joints or where there is minimal concrete cover.</p>						
510 - Wearing Surfaces		206663	sq. ft.	194153	12002	508	0
	<p>CS1 - Is generally where in the middle two lanes in each directions where the 2015 MSMC concrete overlay was placed.            CS2- are in the outside lanes in each direction and in the shoulders where the 2002 LMC concrete overlay was placed.            CS3 - are areas with pot holes or potholes filled with asphalt. Generally located in the shoulders, near the expansion joints, and the the interface between the new and old overlays</p>						
<b>107 - Steel Open Girder/Beam</b>	3 - Mod.	8944	ft.	8536	408	0	0
	<p>CS2- are the locations were the seated hinge retrofits are and at the lower lateral bracing retrofit location where there are missing the treaded welded shear connector or overcuts in the dog bone retrofits.            - Of not due to the paint project in 2020, Overcuts are difficult to see as the cuts are filled with paint.</p>						
515 - Steel Protective Coating		36738	sq. ft.	36738	0	0	0
<b>113 - Steel Stringer</b>	3 - Mod.	17880	ft.	17880	0	0	0
<b>152 - Steel Floor Beam</b>	3 - Mod.	9918	ft.	9918	0	0	0
<b>205 - Reinforced Concrete Column</b>	3 - Mod.	32	each	17	7	8	0
	<p>CS-2 are piers with minor cracking and minor surface spall            CS3 are piers with extensive spalling with exposed reinforcing steel, normally on piers with drainage system that had leaked in the past</p>						
<b>215 - Reinforced Concrete Abutment</b>	3 - Mod.	92	ft.	68	24	0	0
	<p>CS2 - The girder seat pedestals at both abutments exhibit cracked corners and some delaminations and/or spalls. The Forward Abutment has a spalled area at the West vertical face below the Girder F bearing that is full height x 2' wide x up to 1" deep (Photo 31). The spall undermines the masonry plate up to ½" deep.</p>						
<b>234 - Reinforced Concrete Pier Cap</b>	3 - Mod.	963	ft.	943	7	13	0
	<p>CS2 are areas where there is shallow spall and minor cracking            CS3 area areas with spall with exposed reinforcing steel. Normally on pier with drainage system</p>						



Inspector: Michael Malloy  
 Inspection Date: 09/24/2021

Structure Number: 1812831  
 Facility Carried: IR 480

Bridge Inspection Report

Element Inspection

305 - Assembly Joint without Seal	3 - Mod.	552	ft.	384	125	43	0
<p>CS2- are expansion joints with rusting armor and minor deterioration            CS3 - is primarily at the rear abutment eastbound expansion joint,.            The top plate of the Eastbound Rear Abutment backwall joint header is sunken in Lanes 2 and 3. At the Eastbound Rear Abutment, there is a loud banging noise, near the second girder from the south side, when traffic drives over the expansion joint. The rear approach was under construction at the time of inspections. Later we went out and visited the sited after asphalt was added to the approach and the banging noise was no longer apparent. In the 2020 report it was noted that at the Westbound Rear Abutment part of the metal backwall header in the south lane was sticking up 1/2" above the wearing surface, not seen in 2021 -</p>							
311 - Movable Bearing	3 - Mod.	60	each	60	0	0	0
321 - Reinforced Concrete Approach Slab	3 - Mod.	4842	sq. ft.	4472	76	294	0
<p>CS2- The approach wearing surface is in fair condition. The approach roadway wearing surface is asphalt with full width transverse cracks that have generally been sealed and some locations of map cracks. Raveling and rutting are evident in the outside and middle lane at all approaches.            CS3 - At the time of the 2021 inspection, the asphalt approach wearing surface on the west side of both bridges was in the process of being repaved and was milled off.</p>							
331 - Reinforced Concrete Bridge Railing	3 - Mod.	6210	ft.	1946	1955	2309	0
<p>The bridge railing is in poor condition. Spalling with exposed, corroded, and debonded reinforcing steel, delaminations, vertical and horizontal cracks, and map cracks are typical along the parapets . Spalls were typical along the top edge of the interior face of the parapet at the deck joints. Where a spall does not exist, a deep horizontal crack runs near full length on the Westbound North parapet and Eastbound South parapet . There is an 18" hole in the South parapet of the Eastbound bridge at the deck joint in Span 4. There is a 16" hole in the South parapet of the Eastbound bridge at the deck joint in Span 6 . The up-turned parapet joint armor is missing at both locations.             CS2 are areas with cracking and efflorescence but generally sound            CS3 are areas where there are spalls with missing or loose concrete, generally the top of the parapet</p>							
815 - Drainage	3 - Mod.	24	each	0	23	1	0
<p>CS-2 - All drainage structure generally convey water off the deck but have minor clogs and standing water with minor sections loss            CS3 - includes Pier 7 near the Right Fascia girder which is clogged and water is overflowing onto the pier cap</p>							

Inspector: Michael Malloy  
 Inspection Date: 09/24/2021

Structure Number: 1812831  
 Facility Carried: IR 480

**Bridge Inspection Report**

**Element Inspection**

<b>820 - Steel Seated-Hinge Assembly</b>	3 - Mod.	12	each	11	1	0	0
<p>The hinges are in good condition. No deterioration or other significant deficiencies were noted on the hinge components. As noted under the bridge description, the seated hinge in span 4 at girder 3 had previously cracked and the bridge was closed until the seated hinge could get retrofitted. The repair appears to be in good condition with no changes since installed – this location is rated a CS2. The other 11 hinges were also retrofitted and carrier beams installed below the structure to add redundancy.</p>							
<b>830 - Abutment Backwall</b>	3 - Mod.	288	ft.	241	36	11	0
<p>CS2- Minor vertical cracks were noted throughout.          CS3- A 4'x5' delamination was noted by sounding behind Girder 1 on the Rear Abutment Backwall. A 10' wide V-shaped delamination was noted by sounding behind Girder 5 stemming from the expansion joint anchor concrete to 2' from the bottom of the backwall of the Forward Abutment. Minor spalls were noted at the bottom corners where fill has pulled away.</p>							

ODOT District: 12

**CUY-00480-0647\_(1812831)**

Date Built: 07/01/1970

Major Maint: 01 - State Highway Agency

Facility Carried: IR 480

Traffic On: 1 - Highway

Rehab Date:

Routine Maint: 01 - State Highway Agency

Feature Inters: ROCKY RIVER

Traffic Under: 6 - Highway - waterway

Insp. Resp A: 01 - State Highway Agency

FIPS Code: 26446 - FAIRVIEW PARK (CUY county)

Location: DISTRICT 12

2.07 MI. W. OF JCT. I-71

Insp

Inspector

Malloy,Michael

Inspection Date

09/24/2021

Reviewer

Malloy,Michael

Resp B:

## **Inspector Comments - Deck and Approach**

### **Deck**

#### **Floor/Slab (SF)**

The deck underside is in good condition with hairline transverse cracks and isolated locations of efflorescence. Isolated spalls were noted in the deck haunch along the edges of the top flange for the girders and stringers and more significant deterioration was noted under the deck joints. Stay-in-place deck forms were observed adjacent to deck joints at the girder hinges in Spans 4 and 6. Several stay-in-place forms have laminating corrosion and corrosion holes with the forms coming loose at a few locations. Several other stay-in-place forms have sections missing, and in some cases the concrete underneath is spalled with exposed rebar. The previously noted full-depth hole (27"L x 7"W x FD) with exposed corroded reinforcing steel along the east face of the cantilevered floorbeam 27 near Girder F grew to a full depth hole extending 7 feet from the toe of the north parapet. There is debris accumulating in the rebar between the expansion joint armor and the deck scupper. There is a 3' diameter x 3" deep spall with exposed rebar exhibiting section loss up to 50% next to floorbeam 42 on the south side of stringer 11. There is a full depth hole in the deck along stringer 2 on the west side of floorbeam 50 with additional deterioration to the exposed rebar and stay-in-place deck forms.

#### **Edge of Floor/Slab (LF)**

The deck edges are generally in fair condition with minor cracks and a few spalled areas (most spalls were at the joints). There is exposed rebar at joint in span 4 on south edge of right bridge.

#### **Bridge Wearing Surface (SF)**

The wearing surface is in good condition overall with the new overlay recently placed in lanes 2 and 3 of the eastbound and westbound bridges. Lanes 1 and 4 and the shoulders still exhibit shallow potholes and up to 1/16inch wide transverse cracks. The majority of the potholes in the travel lanes have been patched (some with asphalt), but there are still several potholes around the deck scuppers, next to the deck joints, and along the parapets. The Westbound outside shoulder has multiple areas where the wearing surface has spalled full depth for typically half the width of the shoulder at the base of the parapet. There is a section of the Westbound bridge between Pier 5 and the Unit 2/3 Expansion Joint that has six deteriorating wearing surface patches within a 30 foot length of the two south lanes.

#### **Bridge Railing (LF)**

Spalling with exposed, corroded, and debonded reinforcing steel, delaminations, vertical and horizontal cracks, and map cracks are typical along the parapets. Tops of exterior parapets are spalled off on approx. 25% of the length. Spalls were typical along the bottom edge of the interior face of the parapet at the deck joints. There is an 18" hole in the south parapet of the eastbound bridge at the deck joint in span 4. There is a 16" hole in the south parapet of the eastbound bridge at the deck joint in span 6. There is a 5' section of median wall broken between floorbeams 39 and 40 of the eastbound bridge. The top of the wall is pushed back 1.75" at this location. The rubber seal covering the open joint between the median barriers is missing for more than half of the bridge.

#### **Deck Drainage (EA)**

All scuppers are partially full of debris and vegetation growth and is inhibiting proper drain function.

Cracked and/or missing sections of the steel grate for the scupper drains were noted at the north and median scupper grates near Pier 4. The deck is still clearing drainage with only minor ponding noted (2018) along the parapets after a storm.

Leakage and surface corrosion was noted at or below several neoprene couplers due to loose steel bands attaching the coupler to the downspout. The downspout at the Westbound expansion joint 2 in Span 6 has a corrosion hole on both sides of the neoprene coupler.

The concrete paved gutters below Pier 6 at the West bank of the river are all undermined and washed out.

### **Expansion Joint (LF)**

The expansion joints allow moisture and debris to reach the superstructure in a few locations. The top plate of the eastbound rear abutment backwall joint header is missing in lanes 2 and 3. At the eastbound rear abutment, there is a loud banging noise, near the second girder from the south side, when traffic drives over the expansion joint. At the westbound rear abutment, part of the metal backwall header in the south lane is sticking up ½” above the wearing surface.

At the eastbound forward abutment, 19 feet of the backwall joint armor is missing from lanes 1 and 2. There was a small pothole in the lane 2 joint header but appear to be filled in with asphalt. The backwall joint armor has asphalt partially over the sunken

backwall joint armor and the steel is showing minor section loss.

The Westbound Forward Abutment joint had some minor patched potholes at the backwall, but the asphalt patches are sinking.

The westbound forward abutment joint has spalls and potholes on the joint header. The deck has deteriorated around the west side of the joint armor along the north curb at floorbeam 26/27 and no longer provides support to about 7 feet of the armor. The approach pavement at this locations was paved at the during our inspection. Prior to paving the joint armor made a loud banging sound and after paving, the banging sound subsided.

Areas where the parapet spalls noted above has heavy section loss to the joint armor turned up for the parapet.

## **Approach**

### **Approach Wearing Surface (EA)**

The approach roadway wearing surface is asphalt with regularly spaced full width transverse cracks that have generally been sealed and some locations of map cracks. There are small patched potholes

The rear approach wearing surface was in the process of being repaved during our inspection.

### **Approach Slab (SF)**

Sealed transverse cracks in the asphalt pavement wearing surface at the ends of the approach slabs. Minor patched pot holes in asphalt. Minor longitudinal sealed cracks on the Westbound Rear Approach Slab. Map cracks at multiple locations including along the expansion joints. 2018 -There is a low spot in westbound lane 1 that holds water next to the east abutment joint. 2019, 2020, 2021 - no evidence. The rear approach slab was in the process of being repaved at the time of inspections.

### **Approach Embankment (EA)**

Erosion channel along the WB Forward Abutment, This was in the process of being repaired at the time of inspection.

### **Approach Guardrail (EA)**

There is an area of minor impact damage on the Eastbound Forward trailing guardrail, two posts need replaces and 3 blocks. The approach guardrail is leaning towards the road at the Northwest corner. The



median and exterior concrete railings on both approach slabs have vertical cracks, map cracks, and spalls with deteriorated rebar.

### **Signs (EA)**

Signs are in good condition.

### **Sign Supports (EA)**

The southwest Object Marker is set back 2' from the face of the rail. Bolts for the brackets holding the "corporation limit" signs on both bridges to the parapet are broken, but they are still attached to floorbeams at the base.

## **Inspector Comments - General Appraisal**

### **Superstructure**

#### **Superstructure Alignment (EA)**

The alignment of the structure is in good condition with no significant deficiencies noted.

#### **Beams/Girders (LF)**

Isolated locations of overcuts and incomplete saw cuts were noted at the "dog-bone" retrofits (see formal report for specific locations). No deterioration or other significant deficiencies were noted on the girders.

#### **Diaphragm/X-Frames (EA)**

No significant deficiencies were noted except minor section loss under the end and intermediate deck joints.

#### **Stringers (LF)**

No deterioration or other significant deficiencies were noted on the stringers.

#### **Floorbeams (LF)**

No deterioration or other significant deficiencies were noted on the floorbeams.

#### **Lateral Bracing (EA)**

A localized kink due to erection damage was previously noted on the strut bottom flange at floorbeams 29 and 30 between Girders B and C and remains unchanged. Some bolts are loose at the connection plates.

#### **Bearing Devices (EA)**

The Girder E bearing at the east abutment bottom plate does not fully sit on the bearing and deflects up to ½" under live load with heavy fretting corrosion (noted 2018, not noted 2019, 2020 and 2021). The Girder F bearing at the east abutment is undermined by a spall at the west edge of the bearing plate full width by

up to ½" deep.

#### **Protective Coating System (LF)**

The steel superstructure members were repainted in 2020 a dark green which makes it difficult to inspect. Need supplemental lighting to inspect bridge.

#### **Pins/Hangers/Hinges (EA)**

No deterioration or other significant deficiencies were noted on the hinge components. The seated hinge in span 4 at girder 3 had previously cracked and the bridge was closed until the seated hinge could get retrofitted. The repair appears to be in good condition with no changes since installed - this location is rated CS2. The other 11 hinges were also retrofitted and carrier beams installed below the structure to add redundancy.

### **Fatigue (LF)**

Isolated locations of overcuts and incomplete saw cuts were noted at the “dog-bone” retrofits. Several triaxial welds were noted at the girder seated hinges, but no cracks were noted at these locations. Floorbeam 66's west weld to south face of Girder F has a couple of voids (look to be from original construction), but no cracks.

### **Utilities (LF)**

Missing or loose covers for the utility access panels with exposed wiring inside and some with vegetation growth were observed at most light posts. There is impact damage to the south barrier at the light pole at Pier 7 and pole appears to lean to the east. Most light post bases are missing bolt caps at their bases.

Most of the grounding cables are broken at the pier caps, most likely broken during the repainting of the superstructure. These may have been damaged from the recent painting operation. Need to look at old photo to determine.

## **Substructure**

### **Abutment Walls (LF)**

The girder seat pedestals at both abutments exhibit minor cracking (typically at the corners) and some minor delaminations and/or spalls. The east abutment has a spalled area at the west vertical face below the Girder F bearing that is full height x 2' wide x up to 1" deep. The spall undermines the masonry plate up to ½" deep.

### **Pier Caps (LF)**

No significant deficiencies. Minor cracks, spalls, and delaminations on a few of the caps (behind drainage pipes mainly). Pier 2 for left bridge has biggest concentration of spalls with exposed rebar on the west face behind drain pipe at Girder F for the whole cantilever.

### **Pier Columns/Bents (EA)**

Several pier columns exhibit delaminations and spalls, some with deteriorated rebar, over their full height on the relief detail on the corner of the column. Several of the piers exhibit cracking – usually, in the corners (Pier 8 of right bridge has full height crack on SE corner of south leg) – and some delaminations or spalls. The distressed areas typically add up to less than 5% of the pier surface area.

### **Backwalls (LF)**

There were several delaminations and a few spalls noted on the abutment backwalls. A large, deep delamination 10' wide behind Girder E was noted at the forward abutment backwall.

### **Wingwalls (EA)**

The wingwalls have small delaminated areas, patches, and graffiti. Interior wingwall at the rear abutment has multiple full height vertical and diagonal cracks, but is not quantified in the inventory.

### **Substructure Scour (EA)**

The footings at all piers and abutments are covered and stable.

### **Slope Protection (EA)**

The previously noted embankment erosion continues to progress at both abutments. The erosion channel cut in the east abutment slope extends from the abutment all the way to Pier 7, up to 10' wide and 15' deep. There is minor undermining and backfill behind the Forward Abutment backwall, losing fill in the median gap underneath the approach span. There is also an 8'-10' deep erosion channel cut through the slope protection on the north side of span 1. The erosion channel goes from the rear abutment to the east side of Pier 1 and then along Pier 1.

At the time of inspection - A contractor was finishing up installing new slope protection and new channel protection.

### **Culvert**

### **Inspector Comments - Waterway**

#### **Waterway Adequacy**

#### **Channel Hydraulic Opening (EA)**

More than adequate

### **Channel**

#### **Channel Alignment (LF)**

The channel is perpendicular to the bridge and the waterway opening is adequate.

#### **Channel Protection (LF)**

The pier footings near the river are founded in rock and unexposed. - New channel protection added near pier 6

### **Scour Critical**

Inspector: Michael Malloy  
Inspection Date: 09/24/2021

Structure Number: 1812831  
Facility Carried: IR 480

### Bridge Inspection Report

## Pictures



PHOTO 1

Description Photo 39 - Guardrail blockouts with section loss and damage



PHOTO 1

Description Photo 1 - Deep spall between Stringers 10 and 11 from 2020 report



Inspector: Michael Malloy  
Inspection Date: 09/24/2021

Structure Number: 1812831  
Facility Carried: IR 480

Bridge Inspection Report

Pictures



PHOTO 1

Description Photo 22 – Broken grounding wire at pier cap



PHOTO 1

Description Photo 36 – New slope protection at rear abutment

Inspector: Michael Malloy  
Inspection Date: 09/24/2021

Structure Number: 1812831  
Facility Carried: IR 480

### Bridge Inspection Report

## Pictures



PHOTO 1

Description Photo 25 – Superstructure members newly painted



PHOTO 1

Description Photo 20 – New rock protection below Pier 6



Inspector: Michael Malloy  
Inspection Date: 09/24/2021

Structure Number: 1812831  
Facility Carried: IR 480

### Bridge Inspection Report

#### Pictures



PHOTO 2

Description Channel near pier 6 - left



PHOTO 2

Description Photo 38 – Embankment spilling out from behind Forward Abutment as seen in 2021

Inspector: Michael Malloy  
Inspection Date: 09/24/2021

Structure Number: 1812831  
Facility Carried: IR 480

### Bridge Inspection Report

### Pictures



PHOTO 2

Description Photo 24 – Location of previous dogbone      overcut in 2021 after painting



PHOTO 2

Description Photo 2 – Deep spall between Stringers 10 and 11 as seen in 2021



Inspector: Michael Malloy  
Inspection Date: 09/24/2021

Structure Number: 1812831  
Facility Carried: IR 480

Bridge Inspection Report

Pictures



PHOTO 3

Description Photo 3 – Deep spall under Westbound deck at Stringer 2



PHOTO 3

Description Photo 23 – Typical overcut dogbone retrofit 2020

Inspector: Michael Malloy  
Inspection Date: 09/24/2021

Structure Number: 1812831  
Facility Carried: IR 480

### Bridge Inspection Report

#### Pictures



PHOTO 3

Description Photo 37 – Embankment spilling out from behind Forward Abutment from 2020 report



PHOTO 3

Description Downstream channel

Inspector: Michael Malloy  
Inspection Date: 09/24/2021

Structure Number: 1812831  
Facility Carried: IR 480

### Bridge Inspection Report

#### Pictures



PHOTO 4

Description Channel Under Bridge



PHOTO 4

Description Photo 34 – Rear Abutment interior wingwall showing cracking with efflorescence



Inspector: Michael Malloy  
Inspection Date: 09/24/2021

Structure Number: 1812831  
Facility Carried: IR 480

### Bridge Inspection Report

## Pictures



PHOTO 4

Description Photo 35 – New slope protection at forward abutment



PHOTO 4

Description Photo 4 – Deep spalling at South edge of Joint 1 in Span 4



Inspector: Michael Malloy  
Inspection Date: 09/24/2021

Structure Number: 1812831  
Facility Carried: IR 480

### Bridge Inspection Report

## Pictures



PHOTO 5

Description Photo 5 – Typical scupper halo spalling



PHOTO 5

Description Photo 31 – Spall undermining Girder F masonry plate

Inspector: Michael Malloy  
Inspection Date: 09/24/2021

Structure Number: 1812831  
Facility Carried: IR 480

### Bridge Inspection Report

#### Pictures



PHOTO 5

Description Photo 33 – Location of backwall corner spall in 2021, covered by stone



PHOTO 5

Description Upstream Channel



Inspector: Michael Malloy  
Inspection Date: 09/24/2021

Structure Number: 1812831  
Facility Carried: IR 480

### Bridge Inspection Report

### Pictures



PHOTO 6

Description Photo 32 – Typical backwall bottom corner spall from 2020 report



PHOTO 6

Description Photo 28 – Typical loose bolt at lateral bracing connection

Inspector: Michael Malloy  
Inspection Date: 09/24/2021

Structure Number: 1812831  
Facility Carried: IR 480

### Bridge Inspection Report

#### Pictures



PHOTO 6

Description Photo 6 – Typical Westbound shoulder spall



PHOTO 7

Description Photo 7 – Deteriorating wearing surface patches on WB bridge



Inspector: Michael Malloy  
Inspection Date: 09/24/2021

Structure Number: 1812831  
Facility Carried: IR 480

### Bridge Inspection Report

### Pictures



PHOTO 7

Description Photo 27 – Missing knee brace connection retrofit bolts



PHOTO 7

Description Photo 30 – Typical column corner spall

Inspector: Michael Malloy  
Inspection Date: 09/24/2021

Structure Number: 1812831  
Facility Carried: IR 480

Bridge Inspection Report

Pictures



PHOTO 8

Description Photo 29 – North Pier 5, South face spalls



PHOTO 8

Description Photo 26 – Area of missing paint

Inspector: Michael Malloy  
Inspection Date: 09/24/2021

Structure Number: 1812831  
Facility Carried: IR 480

### Bridge Inspection Report

### Pictures



PHOTO 8

Description Photo 8 – Typical expansion joint condition



PHOTO 9

Description Photo 9 – EB Rear Abutment expansion joint top plate sunken, shown before approach was paved



Inspector: Michael Malloy  
Inspection Date: 09/24/2021

Structure Number: 1812831  
Facility Carried: IR 480

### Bridge Inspection Report

#### Pictures



PHOTO 10

Description Photo 10 – EB Rear Abutment expansion joint after approach paving



PHOTO 11

Description Photo 11 – 2020 Report Photo of WB Rear Abutment expansion joint metal sticking up



Inspector: Michael Malloy  
Inspection Date: 09/24/2021

Structure Number: 1812831  
Facility Carried: IR 480

### Bridge Inspection Report

### Pictures



PHOTO 12

Description Photo 12 – WB Rear Abutment expansion joint in 2021



PHOTO 13

Description Photo 13 – Eastbound Forward Abutment Backwall joint armor sunken

Inspector: Michael Malloy  
Inspection Date: 09/24/2021

Structure Number: 1812831  
Facility Carried: IR 480

### Bridge Inspection Report

### Pictures



PHOTO 14

Description Photo 14 – Typical parapet spall and debonded

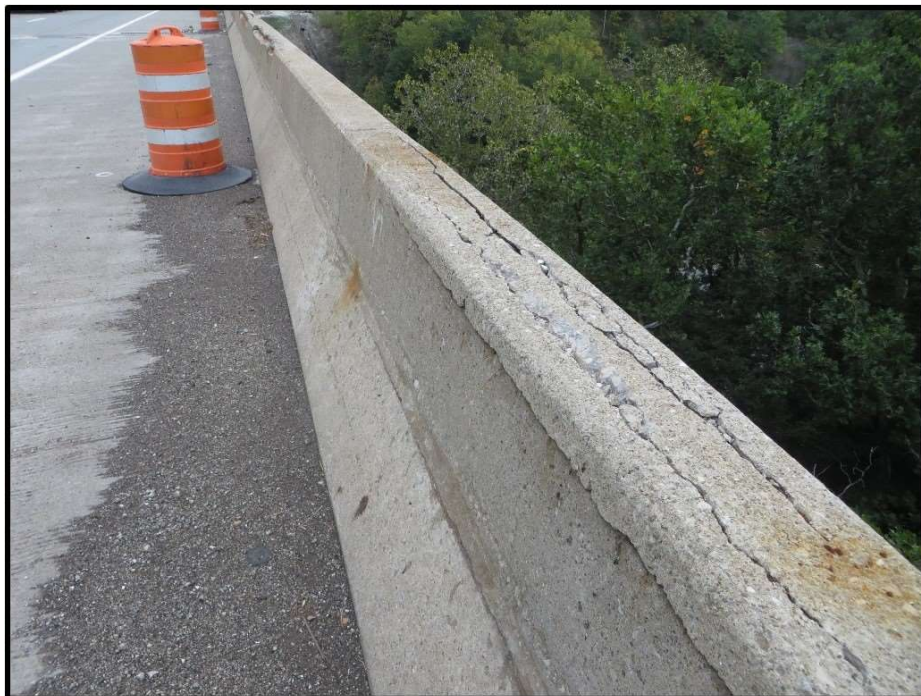


PHOTO 15

Description Photo 15 – Typical parapet deep horizontal cracking



Inspector: Michael Malloy  
Inspection Date: 09/24/2021

Structure Number: 1812831  
Facility Carried: IR 480

### Bridge Inspection Report

### Pictures



PHOTO 16

Description Photo 16 – Span 6 Eastbound exterior parapet hole



PHOTO 17

Description Photo 17 – Metal bars broken off scupper grates

Inspector: Michael Malloy  
Inspection Date: 09/24/2021

Structure Number: 1812831  
Facility Carried: IR 480

Bridge Inspection Report

Pictures



PHOTO 18

Description Photo 18 – Westbound Span 6 downspout 2020



PHOTO 19

Description Photo 19 – Westbound Span 6 downspout 2021



Inspector: Michael Malloy  
Inspection Date: 09/24/2021

Structure Number: 1812831  
Facility Carried: IR 480

Bridge Inspection Report

Pictures



PHOTO 20

Description Photo 21 – Clogged downspout at pier 7

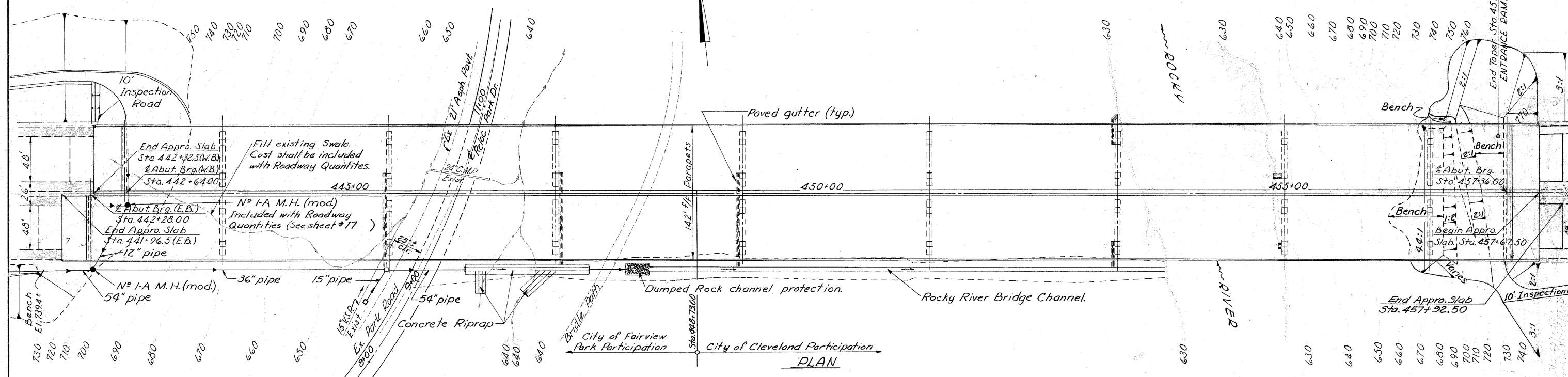
APPENDIX II – Existing General Plan

T-2

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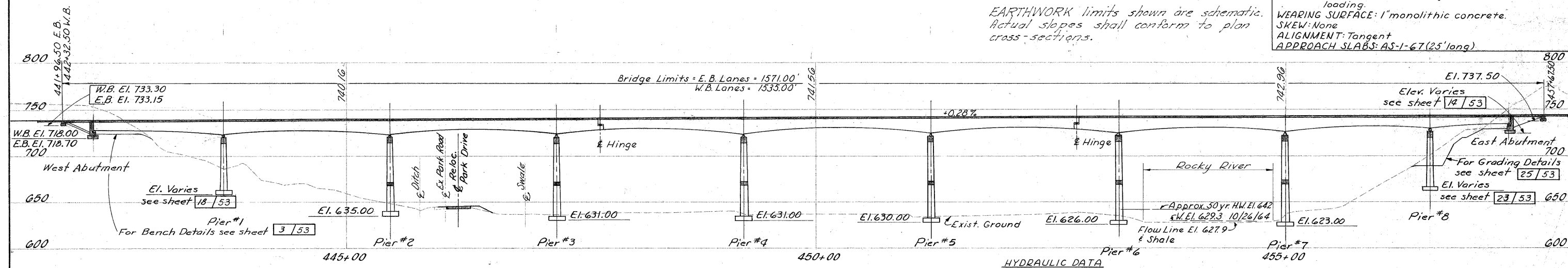
FED. RD. DIVISION	STATE	PROJECT	TYPE FUNDS
2	OHIO	F-480-4(16)161	60 120

CUYAHOGA COUNTY  
CUY480-6.48



**PROPOSED STRUCTURE**  
 TYPE: Continuous haunched steel girder with transverse floorbeams, longitudinal stringers, concrete deck and concrete substructure.  
 SPANS: E.B. Lanes 139'-8", 2@177'-4", 3@199'-6", 177'-4", 155'-2", 82'-8" 96 Brqs.  
 W.B. Lanes 103'-8", 2@177'-4", 3@199'-6", 177'-4", 155'-2", 82'-8" 96 Brqs.  
 ROADWAY: 142' f/f parapets, with Type 2' Railing, including 26'-0" median and 10'-0" shoulders.  
 LOADING: CF-2000 (1957) - Adequate for AASHTO alternate loading.  
 WEARING SURFACE: 1" monolithic concrete.  
 SKEW: None  
 ALIGNMENT: Tangent  
 APPROACH SLABS: AS-1-67 (25' long)

EARTHWORK limits shown are schematic. Actual slopes shall conform to plan cross-sections.



**HYDRAULIC DATA**  
 Drainage Area = 283 sq. mi.  
 $Q_{20} = 24,600$  c.f.s.  
 $V_{50} = 5.1$  ft/sec. (includes overbank)  
 $V_{50} = 10.4$  ft/sec. (Main channel)

**TRAFFIC DATA**  
 DHV (1975) = 4600 (1150 per lane)  
 DDHV (1987) = 6520 (1630 per lane)

Note: For Drainage Quantities, see sheets No 17 & 18

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 CONSULTING ENGINEERS  
 COLUMBUS, OHIO

**SITE PLAN**  
 BRIDGE No. CUY480-0648  
 OUTERBELT SOUTH over ROCKY RIVER  
 CUYAHOGA COUNTY STA. 441+96.50 E.B.  
 STA. 457+67.50

DESIGNED	DRAWN	TRACED	CHECKED	REVIEWED	DATE	REVISION
J.E.V.	J.E.V.		GEA RWB	JEV	2/23/68	

Rev. 10-22-70

APPENDIX III – Existing Transverse Sections

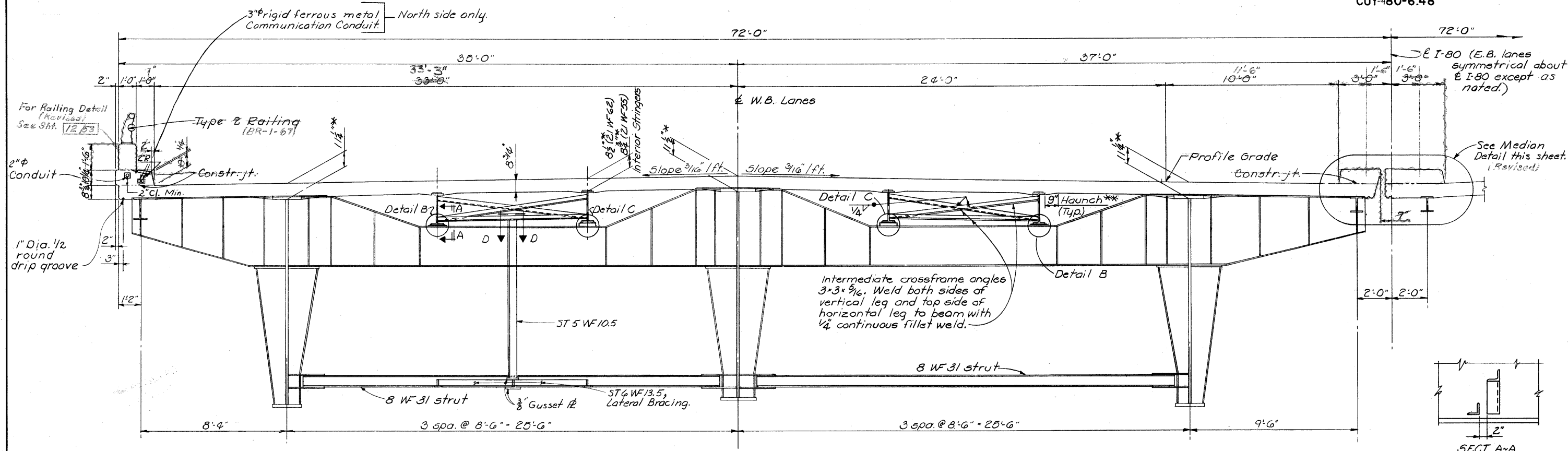


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JUN 18 1984

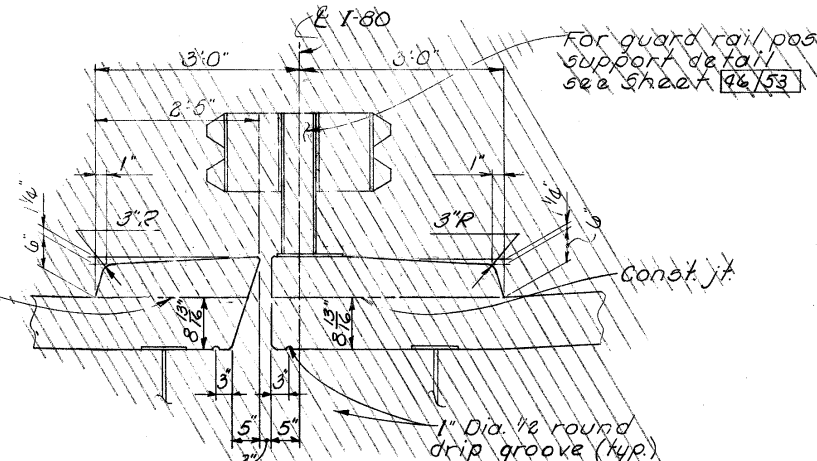
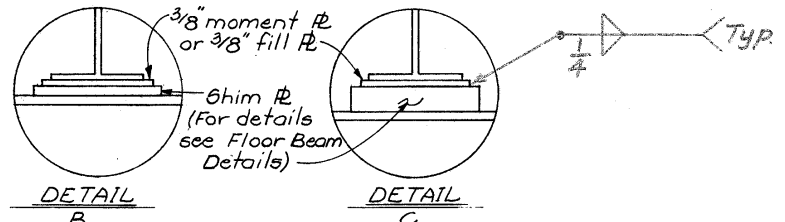
FED. RD. DIVISION	STATE	PROJECT	TYPE FUNDS
2	OHIO		

88  
120

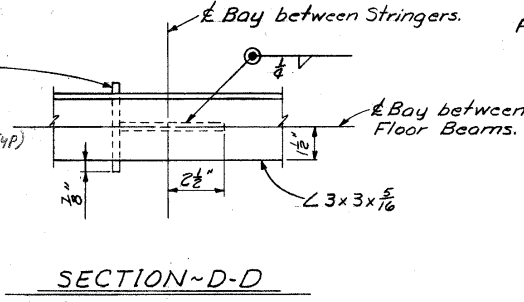
CUYAHOGA COUNTY  
CUY-480-6.48



TRANSVERSE SECTION ~ (Near Mid-Span)



MEDIAN DETAIL



SECTION ~ D-D

NOTES

- \* This is the nominal dimension. The quantity of deck concrete to be paid for shall be based upon this dimension, even though deviation from it may be necessary because the top flange of the girder or beam may not have the exact camber or conformation required to place it parallel to the finished grade. Deduction shall be made for volume of encased steel plates as per Sec. 511.19 of the Construction and Material Specifications.
- Field Welded Attachments: No attachments shall be made by welding to the top flanges of the beams or girders, within a distance of 0.10 of the span length on either side of the interior supports. Welding for attachments to the top flanges at other parts of the spans shall be kept at least 2" from edge of flange.
- \*\* A typical haunch width of 9" shall be used for computing quantity of concrete. However, the haunch width may vary between 6" and 12" provided that the slope shall be not more than 1:4 for a haunch less than 9" wide.
- Concrete parapet shall be included with Item 519 for payment.
- Slab thickness includes 1" monolithic wearing surface.
- For superstructure reinforcing see sheet 43/53

INDEX OF DETAILS			
For Details of	See Sheet No	For Details of	See Sheet No
Transverse Section	29/53	Floor Beam Details	39/53
Framing Plan	30/53	Knee Brace Details	35/53
Girder Details	32/53	Stringer Framing Plan and Details	40/53
Girder Details, Intermediate Stiffeners	33/53	Bearing Details	41/53
Girder Details, Longitudinal Stiffeners and Splices	34/53	Bearing, Roller, and Alignment Plate Details	42/53
Girder Details, Expansion Hinge and End Dam	36/53	Superstructure Reinforcing Details	43/53
Girder Details, Abutment End Dam and Lateral Bracing	37/53	Camber Diagram and Screenshot Elevations	38/53
		Superstructure Drainage Details	44/53

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COLUMBUS, OHIO 29/53

**SUPERSTRUCTURE DETAILS**

BRIDGE No. CUY-480-0648  
OUTERBELT SOUTH over ROCKY RIVER  
CUYAHOGA COUNTY STA. 441+96.50 E.B.  
STA. 457+67.50

DESIGNED	DRAWN	TRACED	CHECKED	REVIEWED	DATE	REVISED
GEA	E.K.		RWE	J.E.V.	2/23/68	55-77

Rev. 10-22-70

Rev. 1-11-72

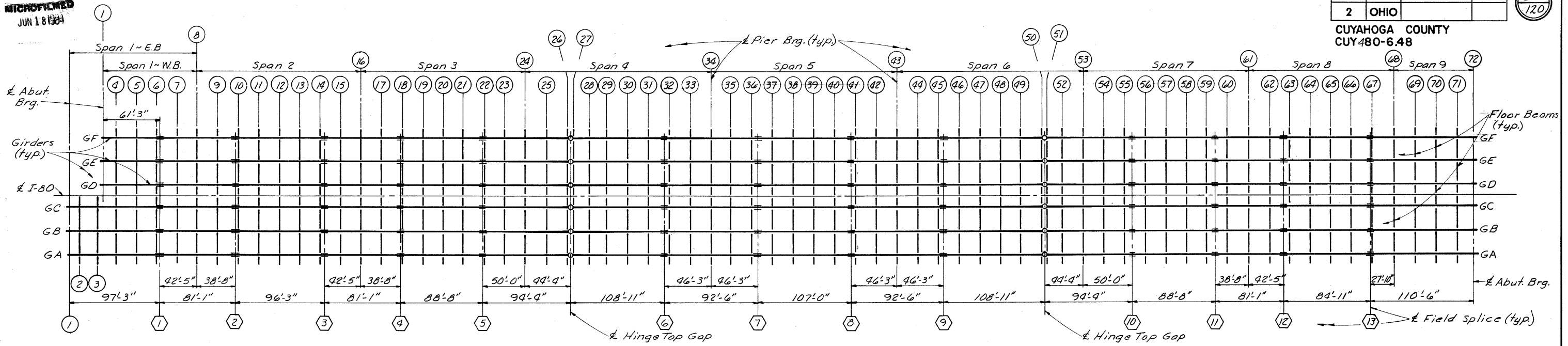
APPENDIX IV – Existing Framing Plans

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JUN 18 1984

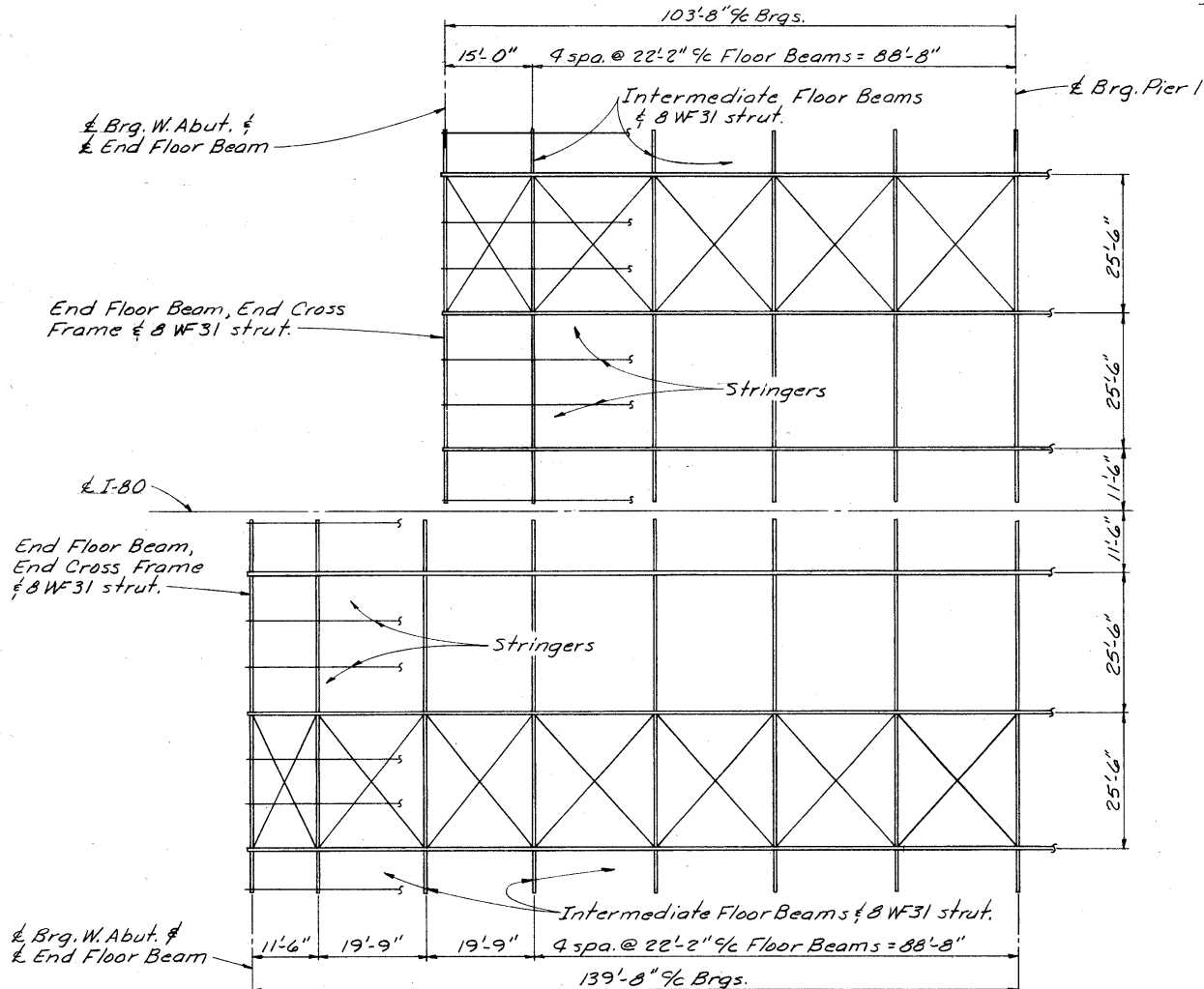
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2	OHIO		

89  
120

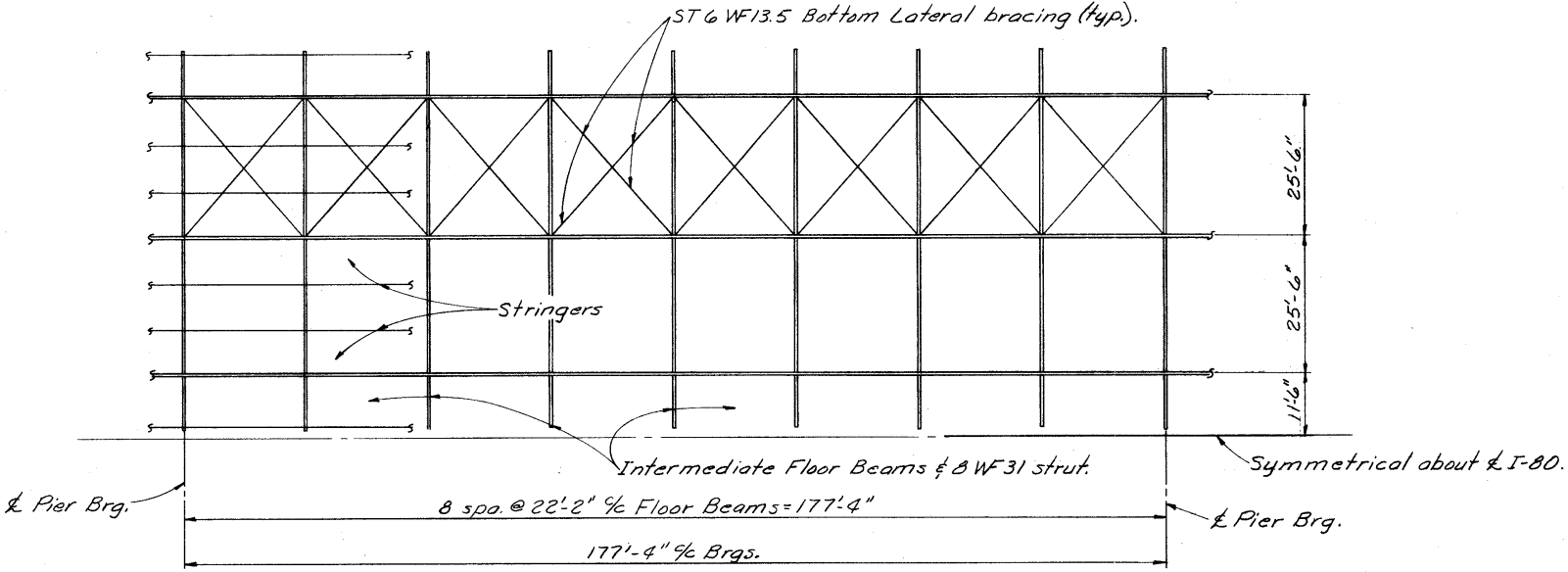
CUYAHOGA COUNTY  
CUY480-648



GENERAL FRAMING PLAN  
(Stringers & Lateral system not shown.)



SPAN I FRAMING PLAN  
(Stringer intermediate crossframes not shown.)



SPANS 2,3 & 7 FRAMING PLAN  
(Stringer intermediate crossframes not shown.)

BEARING UNITS	
Location ( $\perp$ Bearing)	Unit
W. Abutment ~ All Girders	R-425
Pier 1 ~ " "	R-1125
Piers 2 & 7 ~ " "	B-1125
Piers 3 thru 6 ~ " "	B-1250
Pier 8 ~ " "	R-850
E. Abutment ~ " "	R-300

For details of Bearing Units, see sheets 40491/53

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FRAMING PLAN  
BRIDGE No. CUY480-0648  
OUTERBELT SOUTH over ROCKY RIVER  
CUYAHOGA COUNTY STA. 441+96.50 E.B.  
STA. 457+67.50

DESIGNED	DRAWN	TRACED	CHECKED	REVIEWED	DATE	REVISED
GEA	JER	DW	RWE	JEN.	2/23/68	

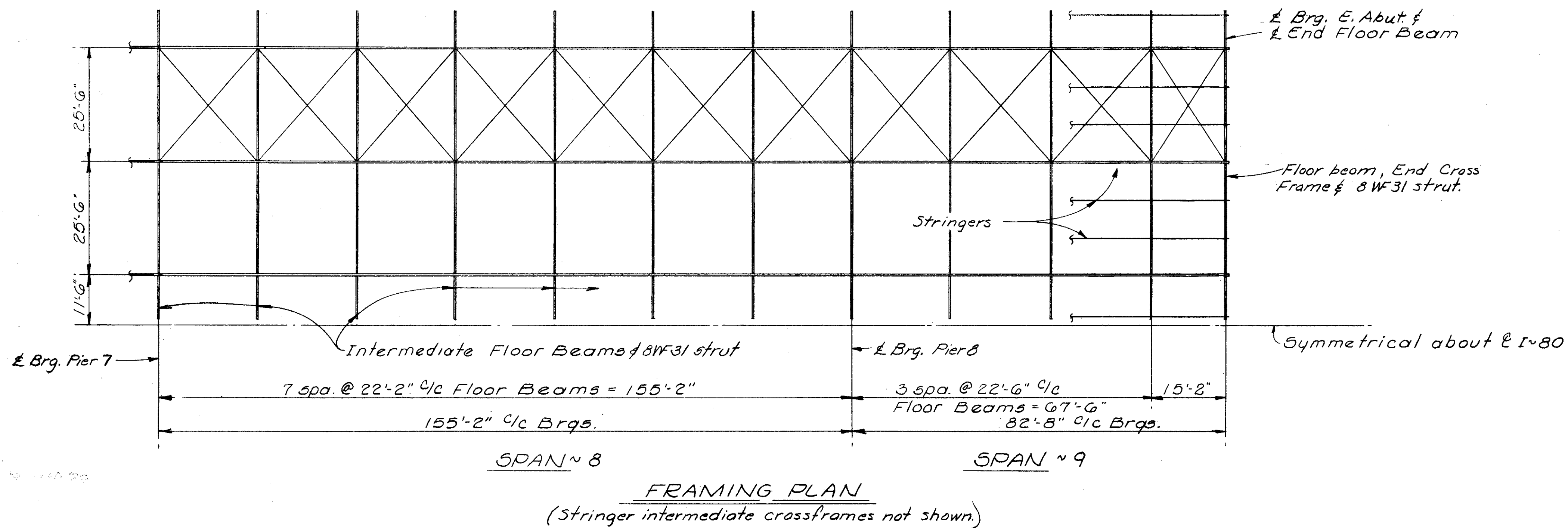
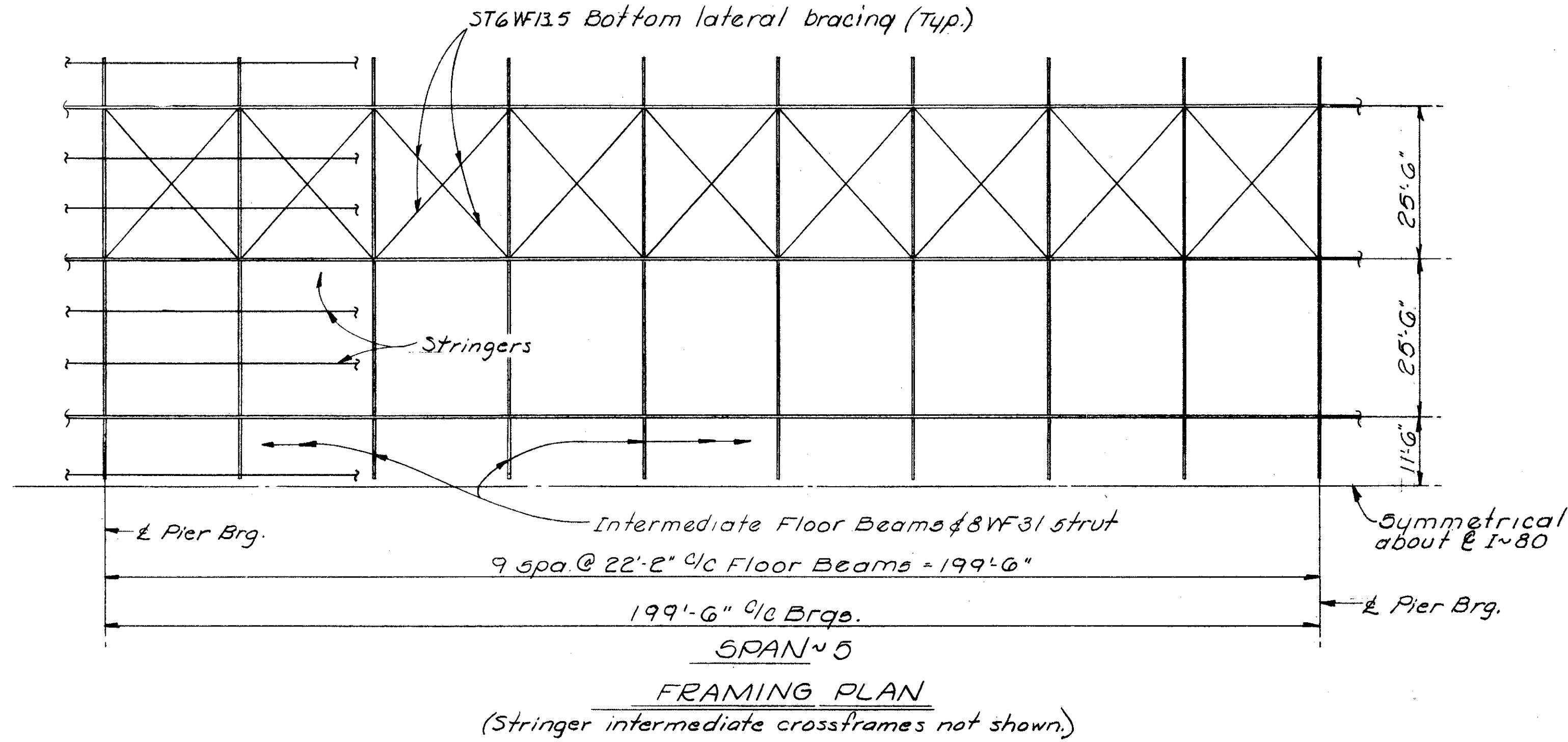
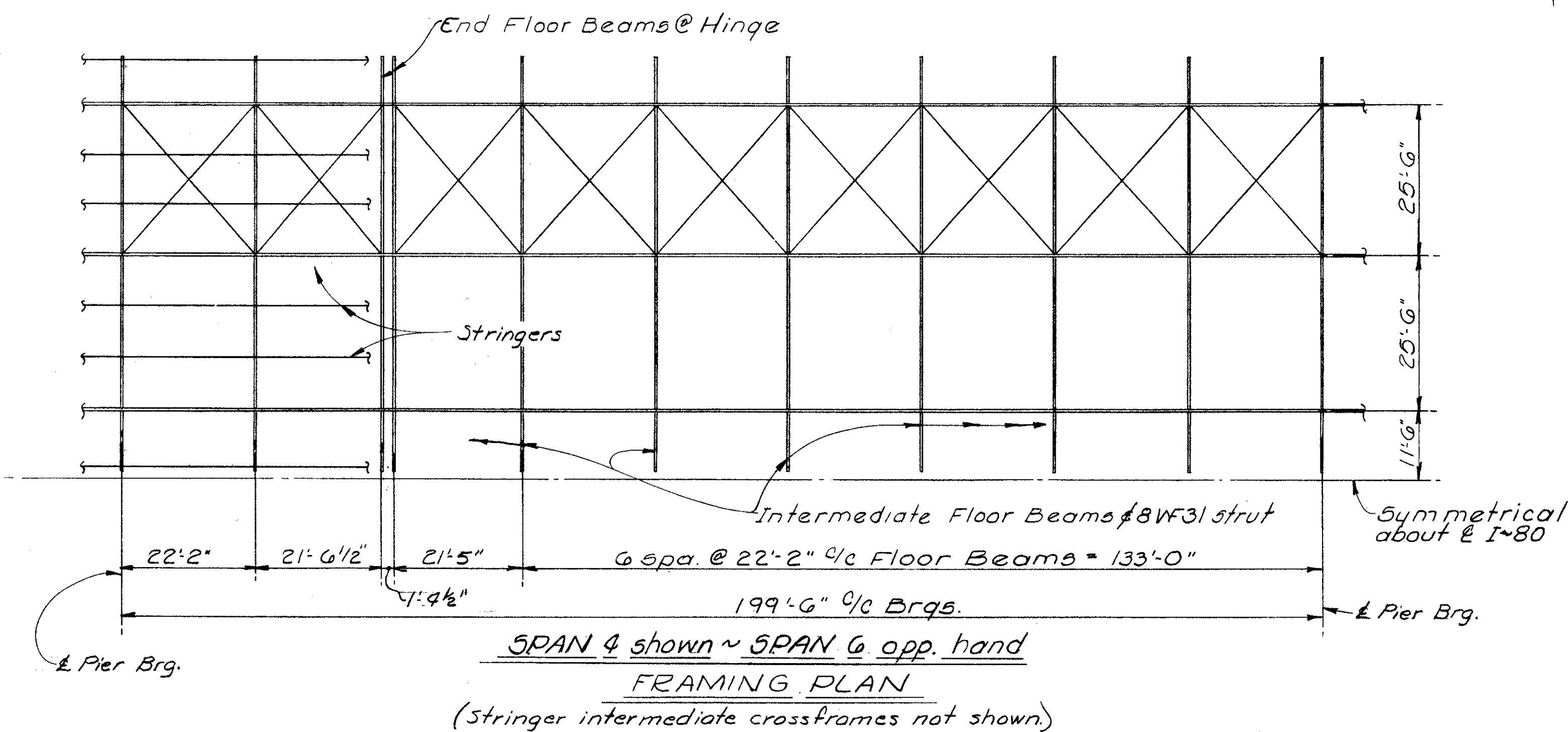
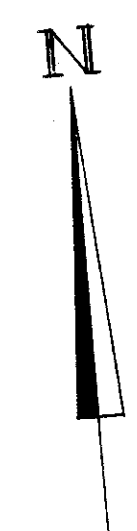
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FED. RD. DIVISION	STATE	PROJECT	TYPE FUNDS
2	OHIO		

90  
120

CUYAHOGA COUNTY  
CUY 480-6.48



NOTE  
For Bearing Units, see sheets 41742/53

ALDEN E. STILSON & ASSOCIATES, LIMITED CONSULTING ENGINEERS COLUMBUS, OHIO							31/53
<b>FRAMING PLAN</b>							
BRIDGE No. CUY480-0648 OUTERBELT SOUTH over ROCKY RIVER CUYAHOGA COUNTY							
STA. 441+96.50 E.B. STA. 457+67.50							
DESIGNED	DRAWN	TRACED	CHECKED	REVIEWED	DATE	REVISED	
GEA	JEK		RUE	J.E.V.	2/23/60		

Rev. 10-22-70



APPENDIX V – Fracture Critical Plan



## **Fracture Critical Member and Fatigue Prone Connection Identification Plan**

---

**District:** 12  
**County-Route-SLM:** CUY-480-0647  
**Structural File Number:** 1812831  
**Access:** Snooper and climbing

---

**Fatigue Life Study:** **Year of Study:** not calculated  
**Remaining Fatigue Life:** not calculated

---

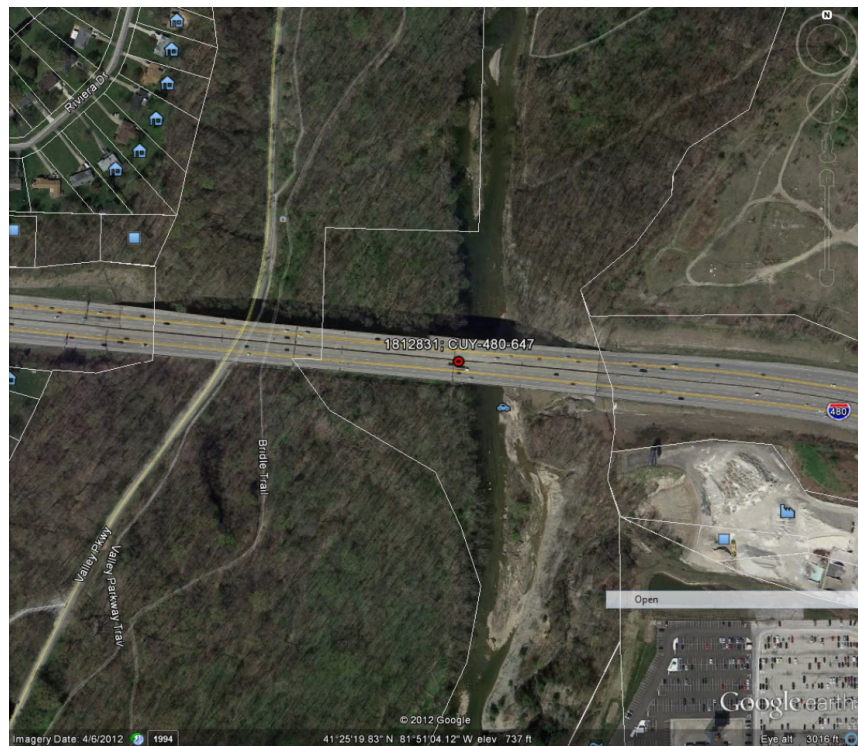
**Load Path Redundant:** No, structure is fracture critical; inspect FCM's every 24 months.

---

**Structurally Redundant:** No, Continuous Spans

---

**Location:** The CUY-480-0647 bridge spans the Rocky River Valley north of Cleveland Hopkins International Airport (Figure 1). The bridge carries traffic on Interstate 480 between the cities of Fairview Park and Cleveland, Ohio.



**Figure 1: CUY-480-0647 – between the cities of Fairview Park and Cleveland in ODOT District 12 over the Rocky River Valley**

---



Figure 2: CUY-480-0647 – Profile view

---

---

**Structure Description:**

This structure is 9 spans, 1571 feet long (a maximum span of 200 feet) three girder bridge with floor beams and stringers (Figure 2). It carries eight lanes of traffic with a 84 foot roadway width and a 142 foot overall width. The average daily traffic for the bridge is 109,150 vehicles with average truck traffic of 5,460 vehicles (2015).

---

---

**Additional Instructions:**

Fracture Critical Members (FCM) must be inspected at an arm's length distance, 18"-35", on each face of the FCM tension zones. A combination of snooper and climbing techniques were used in previous inspections.

When using a snooper, traffic control is needed on the outside lane of Interstate 480, since the superstructure is unable to be accessed from the median.

When using climbing techniques, the girders have handrail bars and safety cables for use by the inspector.

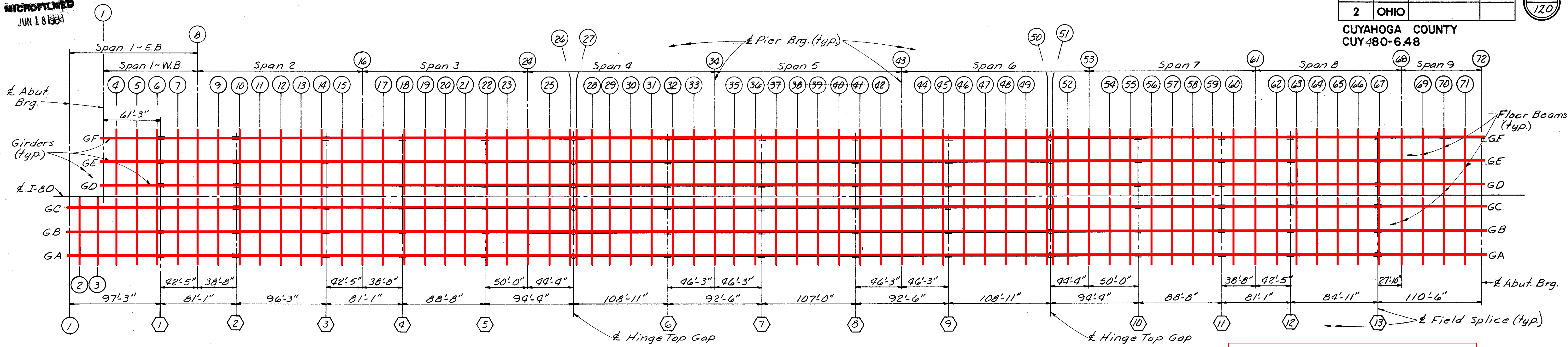


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JUN 18 1984

FED. RD. DIVISION	STATE	PROJECT	TYPE FUNDS
2	OHIO		

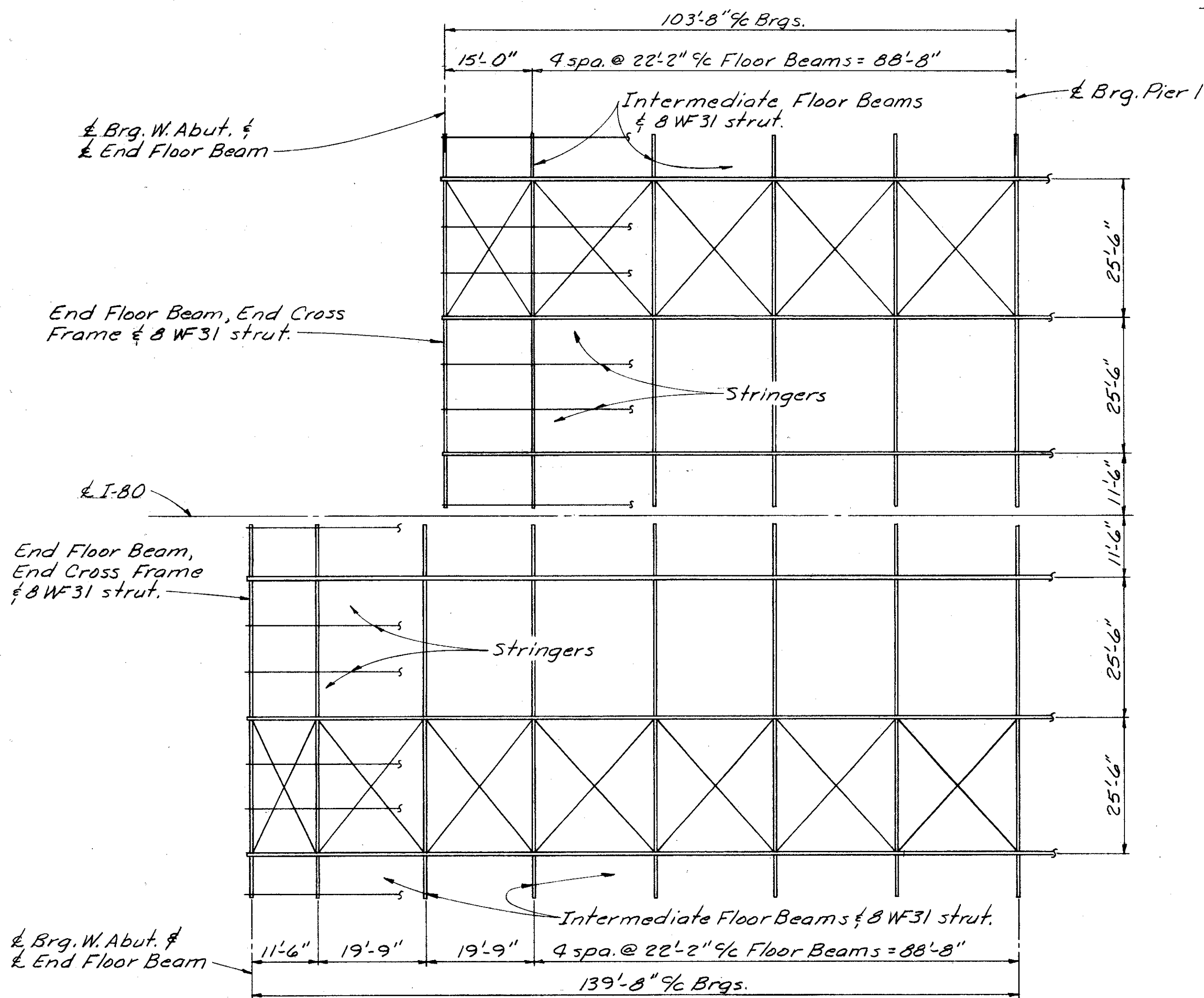
89  
120

CUYAHOGA COUNTY  
CUY480-648

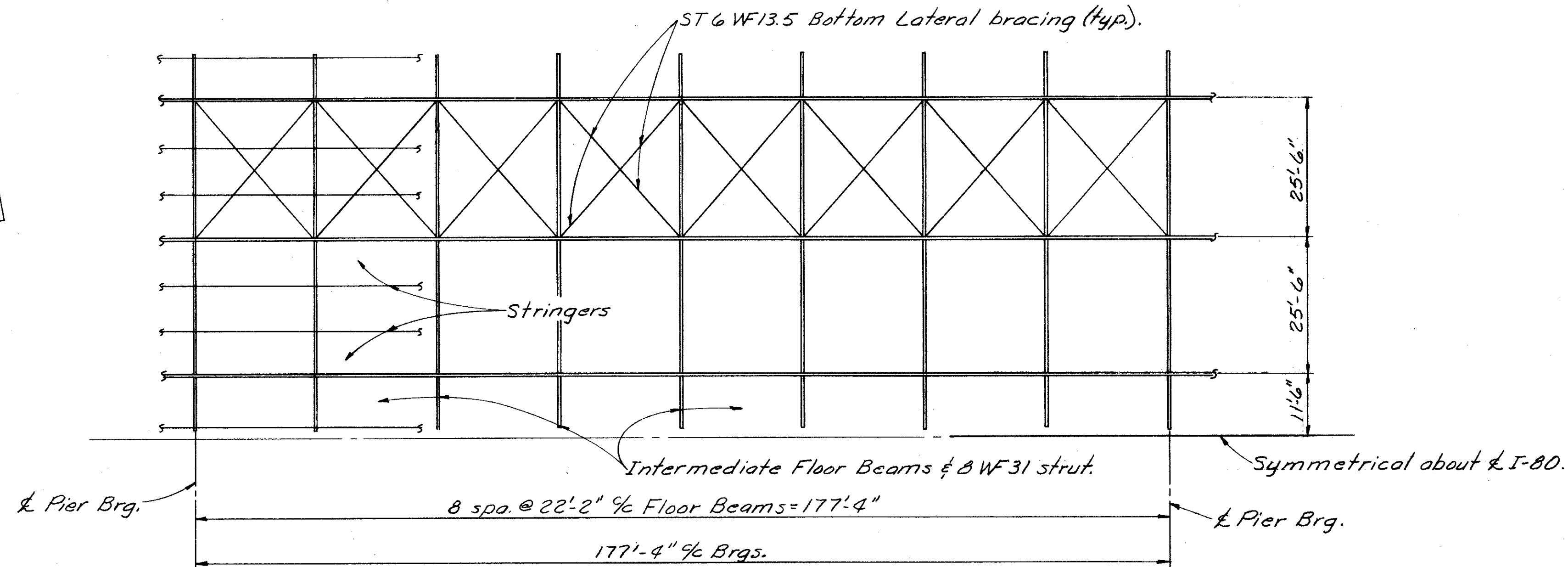


GENERAL FRAMING PLAN  
(Stringers & Lateral system not shown.)

Girders and floor beams are fracture critical members



SPAN 1 FRAMING PLAN  
(Stringer intermediate crossframes not shown.)



SPANS 2,3 & 7 FRAMING PLAN  
(Stringer intermediate crossframes not shown.)

BEARING UNITS	
Location (& Bearing)	Unit
W. Abutment ~ All Girders	R-425
Pier 1 ~ " "	R-1125
Piers 2 & 7 ~ " "	B-1125
Piers 3 thru 6 ~ " "	B-1250
Pier 8 ~ " "	R-850
E. Abutment ~ " "	R-300

For details of Bearing Units, see sheets 40 & 41/53

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COLUMBUS, OHIO 30/53

FRAMING PLAN

BRIDGE No. CUY480-0648  
OUTERBELT SOUTH over ROCKY RIVER  
CUYAHOGA COUNTY STA. 441+96.50 E.B.  
STA. 457+67.50

DESIGNED	DRAWN	TRACED	CHECKED	REVIEWED	DATE	REVISED
GEA	JER	DW	RWE	JEN.	2/23/68	

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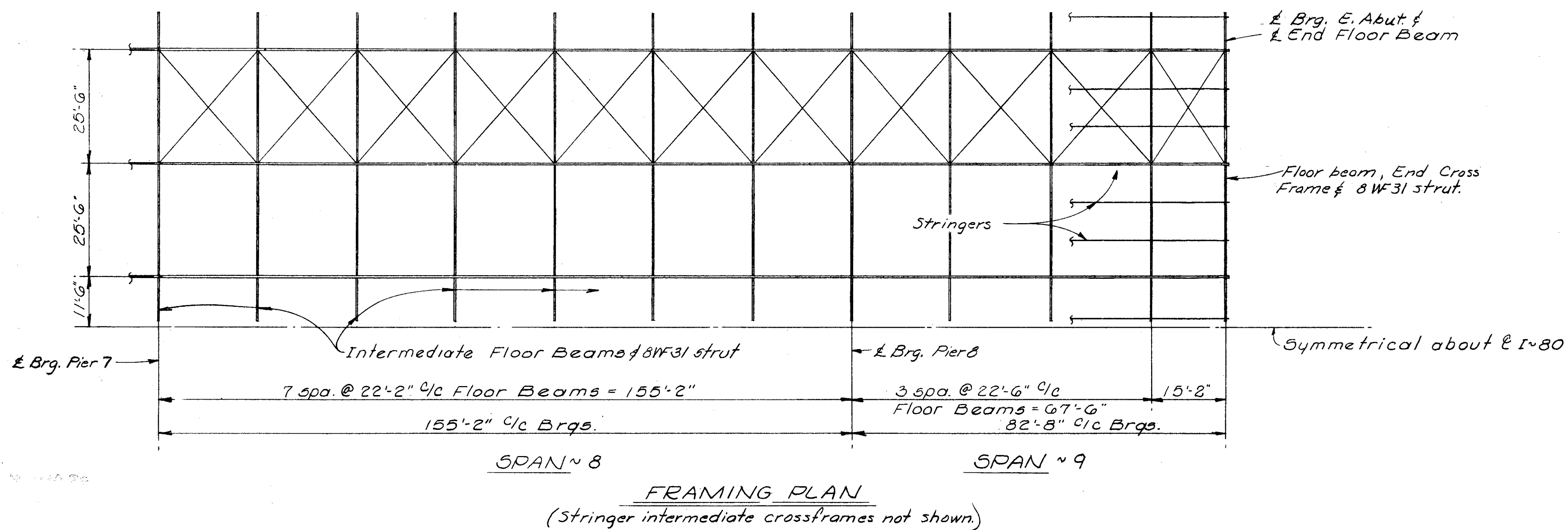
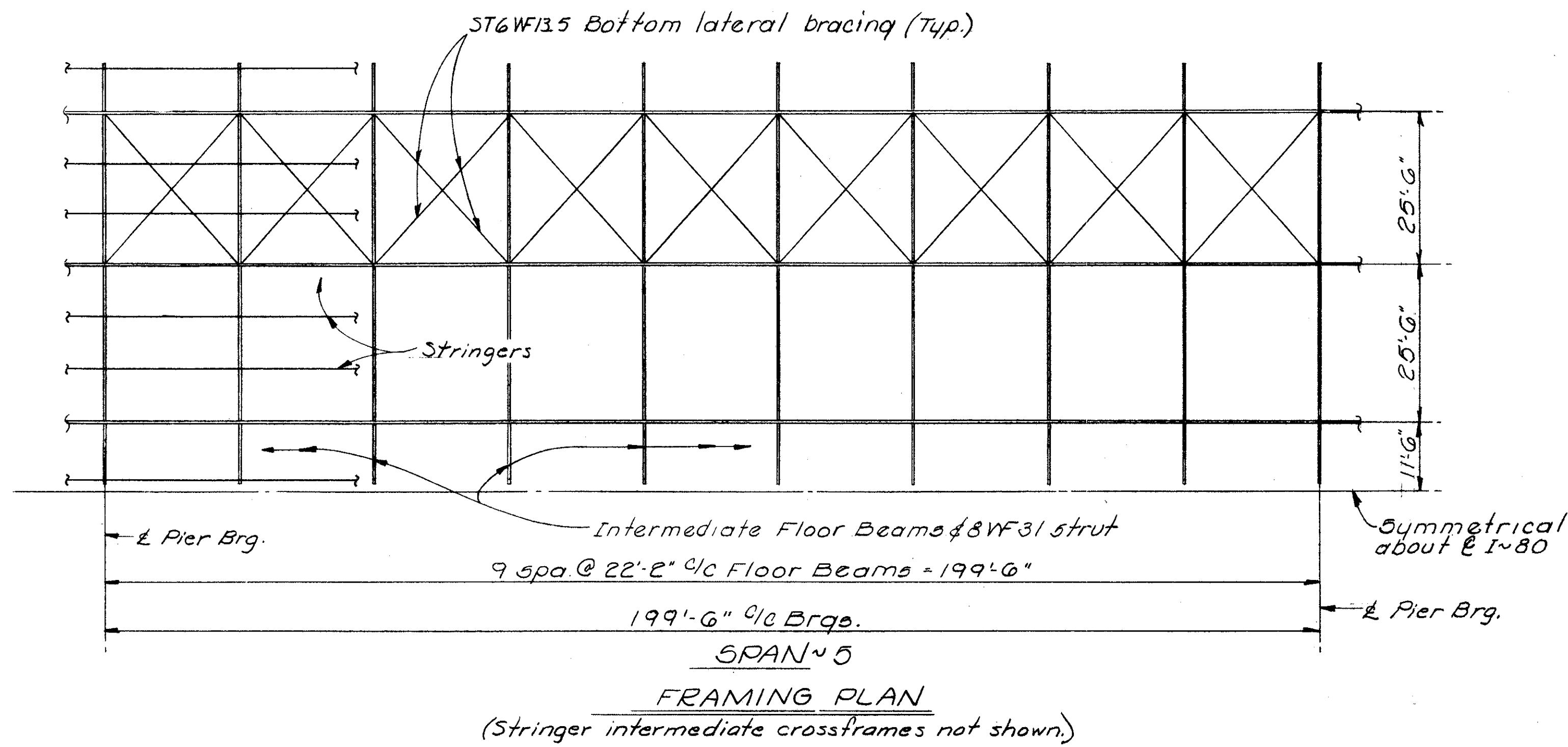
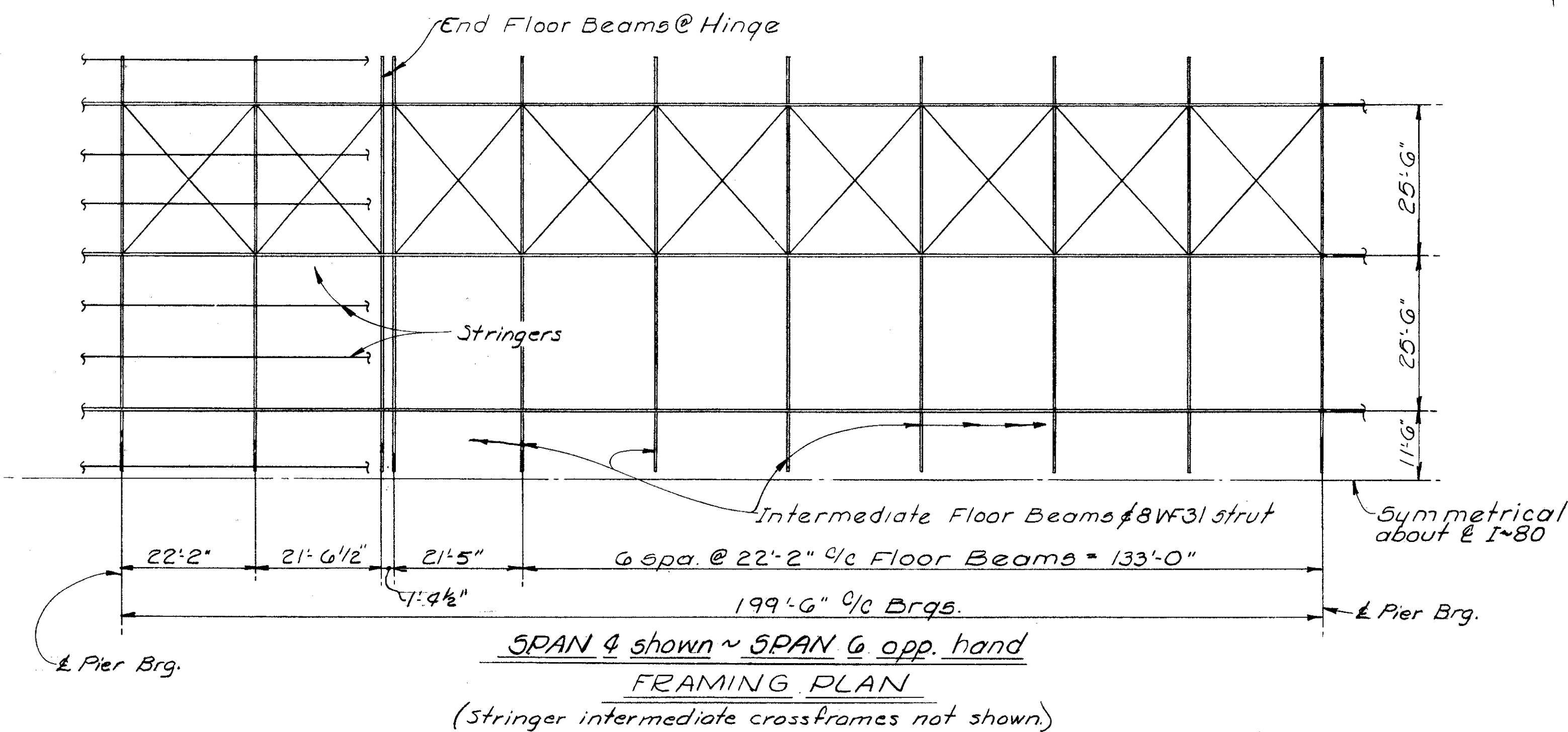
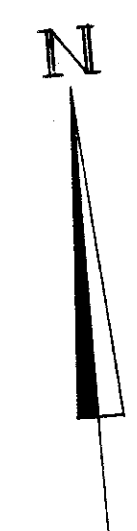


MICROFILMED  
JUN 18 1984

FED. RD. DIVISION	STATE	PROJECT	TYPE FUNDS
2	OHIO		

90  
120

CUYAHOGA COUNTY  
CUY 480-6.48



NOTE  
For Bearing Units, see sheets 41742/53

ALDEN E. STILSON & ASSOCIATES, LIMITED CONSULTING ENGINEERS COLUMBUS, OHIO							31/53
<b>FRAMING PLAN</b>							
BRIDGE No. CUY480-0648 OUTERBELT SOUTH over ROCKY RIVER CUYAHOGA COUNTY							
				STA. 441+96.50 E.B.			
				STA. 457+67.50			
DESIGNED	DRAWN	TRACED	CHECKED	REVIEWED	DATE	REVISED	
GEA	JEK		RUE	J.E.V.	2/23/60		

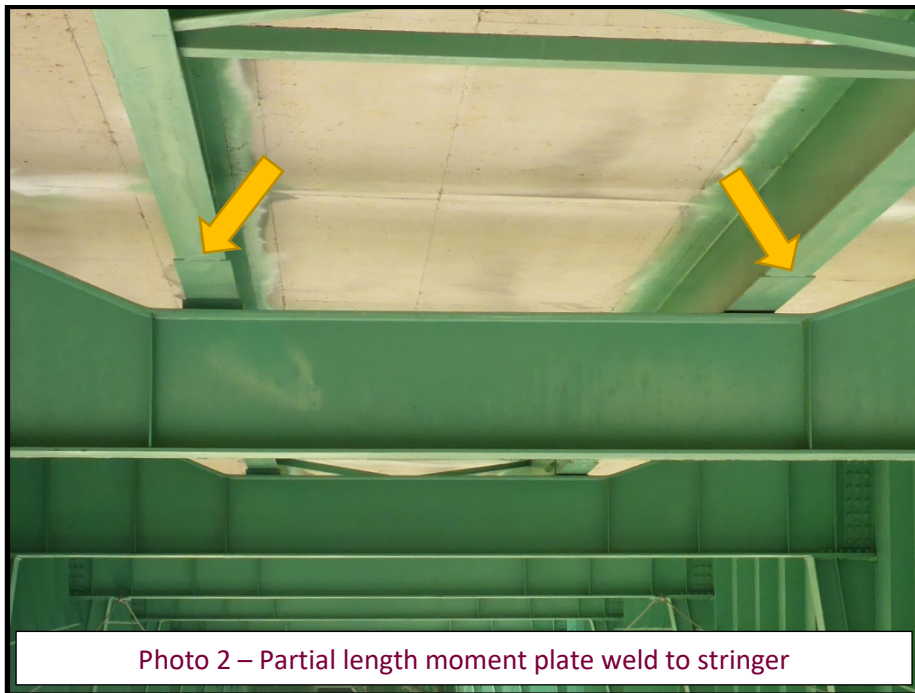
Rev. 10-22-70

APPENDIX VI – Fatigue Prone Details

## Fatigue Prone Details

Category Reference: AASHTO LRFD Bridge Design Specs Table 6.6.1.2.3-1

Photo Reference (photos on following pages)	Category (E, E', or R for Retrofit)	Distribution	Description
Photo 1	E		The stringer bottom flange to floorbeam top flange weld, flange thickness $\leq 0.8$ in.
Photo 2	E'		Partial length moment plate weld to stringer
Photo 3	E'		Tri-axial weld of the roller seat flange to the girder web at the expansion hinge
Photo 4	E		The end termination of the longitudinal stiffener weld to the web of the girder without a radius termination
Photo 5	R		Overcut of dogbone retrofit





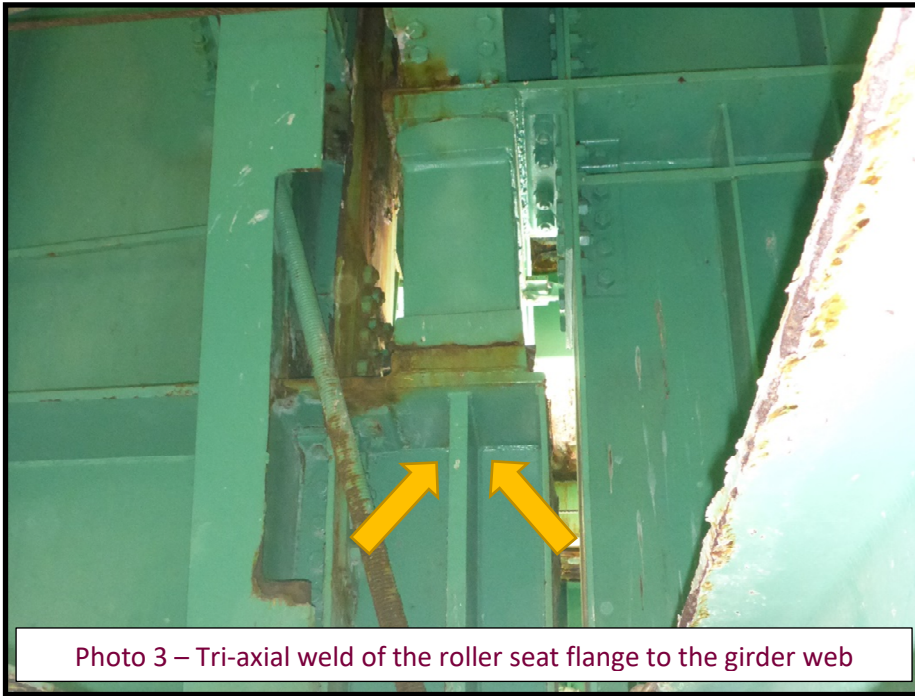


Photo 3 – Tri-axial weld of the roller seat flange to the girder web



Photo 4 – End termination of longitudinal stiffener weld without radius



Photo 5 – Overcut of dogbone retrofit

APPENDIX VII – Dogbone Retrofit Table

# Location of Dogbone Overcuts

CUY-480-0647

2020 Inspection

Bridge	Span	Girder	Floorbeam	Side of FB	Location
Right	1E	B (south face)	2	West	Bottom
Right	1E	A (north face)	3	East	Bottom
Right	1E	B (south face)	4	West	Top
Right	1E	B (south face)	5	West	Bottom
Right	1E	C (south face)	5	West	Bottom
Right	1E	B (south face)	6	West	Top
Right	1E	C	6	East	
Right	1E	C	6	West	
Right	2E	A (north face)	13	West	Top
Right	2E	C (south face)	14	East	Top
Right	2E	B (south face)	15	West	
Right	4E	A (north face)	25	West	Bottom
Right	4E	A (north face)	29	East	Bottom
Right	4E	B (south face)	29	East	Top
Right	4E	B (north face)	30	East	Bottom
Right	5E	C	35	West	
Right	5E	C (south face)	38	East	Bottom
Right	5E	A	40	West	
Right	5E	C (north face)	40	West	Top
Right	6E	B (south face)	46	West	Top
Right	6E	C (south face)	48	West	Bottom
Right	6E	C (south face)	53	East	Bottom
Right	6E	C (south face)	53	West	Bottom
Right	7E	B (south face)	56	East	Top
Right	7E	C (south face)	56	East	Bottom
Right	7E	C (south face)	59	East	Bottom
Right	7E	C (south face)	59	West	Bottom
Right	8E	B (south face)	66	East	Bottom
Right	8E	B (south face)	66	East	Top
Left	1W	F (north face)	5	West	Top
Left	1W	F (south face)	8	West	Bottom
Left	2W	E (north face)	12	West	Bottom
Left	2W	E (north face)	13	East	Bottom
Left	3W	F (north face)	17	West	Top
Left	3W	F (north face)	17	West	Bottom
Left	3W	F (south face)	19	West	Top
Left	3W	F (south face)	21	East	Bottom
Left	3W	F (south face)	23	West	Bottom
Left	4W	E (north face)	30	West	Bottom
Left	4W	F (south face)	31	East	Top
Left	4W	F (north face)	33	West	Top
Left	5W	D (north face)	37	East	Bottom
Left	7W	E (north face)	55	West	Top
Left	7W	F (south face)	56	East	Bottom
Left	7W	D (north face)	60	West	Top
Left	7W	F (south face)	60	West	Top
Left	8W	F (south face)	66	West	Bottom

\*\* NO sawcut between holes

\*\* NO sawcut between holes

\*\* Incomplete sawcut between holes

\*\* NO sawcut between holes

\*\* Incomplete sawcut between holes



Left	8W	D (north face)	67	East	Bottom
Left	9W	F (north face)	71	West	Bottom

Documented in 2020 inspection

Total Overcuts:                      Top Locations:    17  
   Bottom Locations:    28

APPENDIX VIII – Element Level Inspection Data

Deck Items:		condition state			
		QTY.	1	2	3
12 - Reinforced Concrete Deck (sq. ft.)	216,432	212,352	3,411	669	0
510 - Wearing Surfaces (sq. ft.)	206,663	194,153	12,002	508	0
305 - Assembly Joint without Seal (ft.)	552	384	125	43	0
331 - Reinforced Concrete Bridge Railing (ft.)	6,210	1,946	1,955	2,309	0
815 - Drainage (each)	24	0	23	1	0

Superstructure Items:		condition state			
		QTY.	1	2	3
107 - Steel Open Girder/Beam (ft.)	8,944	8,536	408	0	0
113 - Steel Stringer (ft.)	17,880	17,880	0	0	0
152 - Steel Floor Beam (ft.)	9,918	9,918	0	0	0
311 - Movable Bearing (each)	60	60	0	0	0
515 - Steel Protective Coating (sq. ft.)	36,738	36,738	0	0	0
820 - Steel Seated-Hinge Assembly (each)	12	12	0	0	0

Substructure Items:		condition state			
		QTY.	1	2	3
205 - Reinforced Concrete Column (each)	32	17	7	8	0
215 - Reinforced Concrete Abutment (ft.)	92	68	24	0	0
234 - Reinforced Concrete Pier Cap (ft.)	963	943	7	13	0
830 - Abutment Backwall (ft.)	288	241	36	11	0

Approach Roadway Items:		condition state			
		QTY.	1	2	3
321 - Reinforced Concrete Approach Slab (sq. ft.)	4,842	4,472	76	294	0

Deck TOTALS:	condition state				
	QTY.	1	2	3	4
12 - Reinforced Concrete Deck (sq. ft.)	216,432	212,352	3,411	669	0
510 - Wearing Surfaces (sq. ft.)	206,663	194,153	12,002	508	0
305 - Assembly Joint without Seal (ft.)	552	384	125	43	0
331 - Reinforced Concrete Bridge Railing (ft.)	6,210	1,946	1,955	2,309	0
815 - Drainage (each)	24	0	24	0	0

**WESTBOUND Deck Subtotals:**

**Westbound Unit 1:**

	condition state				
	QTY.	1	2	3	4
12 - Reinforced Concrete Deck (sq. ft.)	36,660	35,698	936	26	
510 - Wearing Surfaces (sq. ft.)	35,005	31,607	3,305	93	
305 - Assembly Joint without Seal (ft.)	69	14	33	22	
331 - Reinforced Concrete Bridge Railing (ft.)	1,068	171	172	725	
815 - Drainage (each)	4		4		

**Westbound Unit 2:**

	condition state				
	QTY.	1	2	3	4
12 - Reinforced Concrete Deck (sq. ft.)	36,708	35,517	806	385	
510 - Wearing Surfaces (sq. ft.)	35,051	32,047	2,832	172	
305 - Assembly Joint without Seal (ft.)	69	69			
331 - Reinforced Concrete Bridge Railing (ft.)	1,019	112	656	251	
815 - Drainage (each)	4		4		

**Westbound Unit 3:**

	condition state				
	QTY.	1	2	3	4
12 - Reinforced Concrete Deck (sq. ft.)	33,552	33,371	123	58	
510 - Wearing Surfaces (sq. ft.)	32,038	30,055	1,935	48	
305 - Assembly Joint without Seal (ft.)	138	96	42		
331 - Reinforced Concrete Bridge Railing (ft.)	982	219	362	401	
815 - Drainage (each)	4		4		



**EASTBOUND Deck Subtotals:**

**Eastbound Unit 1:**

12 - Reinforced Concrete Deck (sq. ft.)  
 510 - Wearing Surfaces (sq. ft.)  
 305 - Assembly Joint without Seal (ft.)  
 331 - Reinforced Concrete Bridge Railing (ft.)  
 815 - Drainage (each)

QTY.	condition state			
	1	2	3	4
39,252	38,487	740	25	
37,480	35,634	1,808	38	
69	48		21	
1,140	427	352	361	
4		4		

**Eastbound Unit 2:**

12 - Reinforced Concrete Deck (sq. ft.)  
 510 - Wearing Surfaces (sq. ft.)  
 305 - Assembly Joint without Seal (ft.)  
 331 - Reinforced Concrete Bridge Railing (ft.)  
 815 - Drainage (each)

QTY.	condition state			
	1	2	3	4
36,708	35,997	571	140	
35,051	33,821	1,158	72	
69	69			
1,019	474	145	400	
4		4		

**Eastbound Unit 3:**

12 - Reinforced Concrete Deck (sq. ft.)  
 510 - Wearing Surfaces (sq. ft.)  
 305 - Assembly Joint without Seal (ft.)  
 331 - Reinforced Concrete Bridge Railing (ft.)  
 815 - Drainage (each)

QTY.	condition state			
	1	2	3	4
33,552	33,282	235	35	
32,038	30,989	964	85	
138	88	50		
982	543	268	171	
4		3	1	

Superstructure TOTALS:	condition state				
	QTY.	1	2	3	4
107 - Steel Open Girder/Beam (ft.)	8,944	8,536	408	0	0
113 - Steel Stringer (ft.)	17,880	17,880	0	0	0
152 - Steel Floor Beam (ft.)	9,918	9,918	0	0	0
311 - Movable Bearing (each)	60	60	0	0	0
515 - Steel Protective Coating (sq. ft.)	36,738	36,738	0	0	0
820 - Steel Seated-Hinge Assembly (each)	12	11	1	0	0

**WESTBOUND Superstructure Subtotals:**

**Westbound Span 1:**

	condition state				
	QTY.	1	2	3	4
107 - Steel Open Girder/Beam (ft.)	311	296	15		
113 - Steel Stringer (ft.)	622	622			
152 - Steel Floor Beam (ft.)	349	349			
311 - Movable Bearing (each)	3	3			
515 - Steel Protective Coating (sq. ft.)	1,282	1,282			
820 - Steel Seated-Hinge Assembly (each)					

**Westbound Span 2:**

	condition state				
	QTY.	1	2	3	4
107 - Steel Open Girder/Beam (ft.)	532	508	24		
113 - Steel Stringer (ft.)	1,064	1,064			
152 - Steel Floor Beam (ft.)	559	559			
311 - Movable Bearing (each)	3	3			
515 - Steel Protective Coating (sq. ft.)	2,155	2,155			
820 - Steel Seated-Hinge Assembly (each)					

**Westbound Span 3:**

	condition state				
	QTY.	1	2	3	4
107 - Steel Open Girder/Beam (ft.)	532	508	24		
113 - Steel Stringer (ft.)	1,064	1,064			
152 - Steel Floor Beam (ft.)	559	559			
311 - Movable Bearing (each)	3	3			
515 - Steel Protective Coating (sq. ft.)	2,155	2,155			
820 - Steel Seated-Hinge Assembly (each)					

**Westbound Span 4:**

	condition state				
	QTY.	1	2	3	4
107 - Steel Open Girder/Beam (ft.)	599	572	27		
113 - Steel Stringer (ft.)	1,197	1,197			
152 - Steel Floor Beam (ft.)	698	698			
311 - Movable Bearing (each)	3	3			
515 - Steel Protective Coating (sq. ft.)	2,494	2,494			
820 - Steel Seated-Hinge Assembly (each)	3	2	1		

**Westbound Span 5:**

- 107 - Steel Open Girder/Beam (ft.)
- 113 - Steel Stringer (ft.)
- 152 - Steel Floor Beam (ft.)
- 311 - Movable Bearing (each)
- 515 - Steel Protective Coating (sq. ft.)
- 820 - Steel Seated-Hinge Assembly (each)

QTY.	condition state			
	1	2	3	4
599	572	27		
1,197	1,197			
629	629			
3	3			
2,424	2,424			

**Westbound Span 6:**

- 107 - Steel Open Girder/Beam (ft.)
- 113 - Steel Stringer (ft.)
- 152 - Steel Floor Beam (ft.)
- 311 - Movable Bearing (each)
- 515 - Steel Protective Coating (sq. ft.)
- 820 - Steel Seated-Hinge Assembly (each)

QTY.	condition state			
	1	2	3	4
599	572	27		
1,197	1,197			
698	698			
3	3			
2,494	2,494			
3	3			

**Westbound Span 7:**

- 107 - Steel Open Girder/Beam (ft.)
- 113 - Steel Stringer (ft.)
- 152 - Steel Floor Beam (ft.)
- 311 - Movable Bearing (each)
- 515 - Steel Protective Coating (sq. ft.)
- 820 - Steel Seated-Hinge Assembly (each)

QTY.	condition state			
	1	2	3	4
532	508	24		
1,064	1,064			
559	559			
3	3			
2,155	2,155			

**Westbound Span 8:**

- 107 - Steel Open Girder/Beam (ft.)
- 113 - Steel Stringer (ft.)
- 152 - Steel Floor Beam (ft.)
- 311 - Movable Bearing (each)
- 515 - Steel Protective Coating (sq. ft.)
- 820 - Steel Seated-Hinge Assembly (each)

QTY.	condition state			
	1	2	3	4
466	445	21		
931	931			
489	489			
3	3			
1,885	1,885			

**Westbound Span 9:**

- 107 - Steel Open Girder/Beam (ft.)
- 113 - Steel Stringer (ft.)
- 152 - Steel Floor Beam (ft.)
- 311 - Movable Bearing (each)
- 515 - Steel Protective Coating (sq. ft.)
- 820 - Steel Seated-Hinge Assembly (each)

QTY.	condition state			
	1	2	3	4
248	236	12		
496	496			
349	349			
6	6			
1,093	1,093			

**EASTBOUND Superstructure Subtotals:**

**Eastbound Span 1:**

- 107 - Steel Open Girder/Beam (ft.)
- 113 - Steel Stringer (ft.)
- 152 - Steel Floor Beam (ft.)
- 311 - Movable Bearing (each)
- 515 - Steel Protective Coating (sq. ft.)
- 820 - Steel Seated-Hinge Assembly (each)

QTY.	condition state			
	1	2	3	4
419	398	21		
838	838			
489	489			
3	3			
1,746	1,746			

**Eastbound Span 2:**

- 107 - Steel Open Girder/Beam (ft.)
- 113 - Steel Stringer (ft.)
- 152 - Steel Floor Beam (ft.)
- 311 - Movable Bearing (each)
- 515 - Steel Protective Coating (sq. ft.)
- 820 - Steel Seated-Hinge Assembly (each)

QTY.	condition state			
	1	2	3	4
532	508	24		
1,064	1,064			
559	559			
3	3			
2,155	2,155			

**Eastbound Span 3:**

- 107 - Steel Open Girder/Beam (ft.)
- 113 - Steel Stringer (ft.)
- 152 - Steel Floor Beam (ft.)
- 311 - Movable Bearing (each)
- 515 - Steel Protective Coating (sq. ft.)
- 820 - Steel Seated-Hinge Assembly (each)

QTY.	condition state			
	1	2	3	4
532	508	24		
1,064	1,064			
559	559			
3	3			
2,155	2,155			

**Eastbound Span 4:**

- 107 - Steel Open Girder/Beam (ft.)
- 113 - Steel Stringer (ft.)
- 152 - Steel Floor Beam (ft.)
- 311 - Movable Bearing (each)
- 515 - Steel Protective Coating (sq. ft.)
- 820 - Steel Seated-Hinge Assembly (each)

QTY.	condition state			
	1	2	3	4
599	572	27		
1,197	1,197			
698	698			
3	3			
2,494	2,494			
3	3			

**Eastbound Span 5:**

- 107 - Steel Open Girder/Beam (ft.)
- 113 - Steel Stringer (ft.)
- 152 - Steel Floor Beam (ft.)
- 311 - Movable Bearing (each)
- 515 - Steel Protective Coating (sq. ft.)
- 820 - Steel Seated-Hinge Assembly (each)

QTY.	condition state			
	1	2	3	4
599	572	27		
1,197	1,197			
629	629			
3	3			
2,424	2,424			



**Eastbound Span 6:**

- 107 - Steel Open Girder/Beam (ft.)
- 113 - Steel Stringer (ft.)
- 152 - Steel Floor Beam (ft.)
- 311 - Movable Bearing (each)
- 515 - Steel Protective Coating (sq. ft.)
- 820 - Steel Seated-Hinge Assembly (each)

QTY.	condition state			
	1	2	3	4
599	572	27		
1,197	1,197			
698	698			
3	3			
2,494	2,494			
3	3			

**Eastbound Span 7:**

- 107 - Steel Open Girder/Beam (ft.)
- 113 - Steel Stringer (ft.)
- 152 - Steel Floor Beam (ft.)
- 311 - Movable Bearing (each)
- 515 - Steel Protective Coating (sq. ft.)
- 820 - Steel Seated-Hinge Assembly (each)

QTY.	condition state			
	1	2	3	4
532	508	24		
1,064	1,064			
559	559			
3	3			
2,155	2,155			

**Eastbound Span 8:**

- 107 - Steel Open Girder/Beam (ft.)
- 113 - Steel Stringer (ft.)
- 152 - Steel Floor Beam (ft.)
- 311 - Movable Bearing (each)
- 515 - Steel Protective Coating (sq. ft.)
- 820 - Steel Seated-Hinge Assembly (each)

QTY.	condition state			
	1	2	3	4
466	445	21		
931	931			
489	489			
3	3			
1,885	1,885			

**Eastbound Span 9:**

- 107 - Steel Open Girder/Beam (ft.)
- 113 - Steel Stringer (ft.)
- 152 - Steel Floor Beam (ft.)
- 311 - Movable Bearing (each)
- 515 - Steel Protective Coating (sq. ft.)
- 820 - Steel Seated-Hinge Assembly (each)

QTY.	condition state			
	1	2	3	4
248	236	12		
496	496			
349	349			
6	6			
1,093	1,093			

Substructure Totals:	condition state				
	QTY.	1	2	3	4
205 - Reinforced Concrete Column (each)	32	17	7	8	0
215 - Reinforced Concrete Abutment (ft.)	92	68	24	0	0
234 - Reinforced Concrete Pier Cap (ft.)	963	943	7	13	0
830 - Abutment Backwall (ft.)	288	241	36	11	0

**WESTBOUND Substructure Subtotals:**

**Rear Abutment:**

205 - Reinforced Concrete Column (each)  
 215 - Reinforced Concrete Abutment (ft.)  
 234 - Reinforced Concrete Pier Cap (ft.)  
 830 - Abutment Backwall (ft.)

QTY.	condition state			
	1	2	3	4
22	18	4		
72	69	2	1	

**Pier 1:**

205 - Reinforced Concrete Column (each)  
 215 - Reinforced Concrete Abutment (ft.)  
 234 - Reinforced Concrete Pier Cap (ft.)  
 830 - Abutment Backwall (ft.)

QTY.	condition state			
	1	2	3	4
2	2			
60	60			

**Pier 2:**

205 - Reinforced Concrete Column (each)  
 215 - Reinforced Concrete Abutment (ft.)  
 234 - Reinforced Concrete Pier Cap (ft.)  
 830 - Abutment Backwall (ft.)

QTY.	condition state			
	1	2	3	4
2		1	1	
60	55		5	

**Pier 3:**

205 - Reinforced Concrete Column (each)  
 215 - Reinforced Concrete Abutment (ft.)  
 234 - Reinforced Concrete Pier Cap (ft.)  
 830 - Abutment Backwall (ft.)

QTY.	condition state			
	1	2	3	4
2	2			
60	60			

**Pier 4:**

205 - Reinforced Concrete Column (each)  
 215 - Reinforced Concrete Abutment (ft.)  
 234 - Reinforced Concrete Pier Cap (ft.)  
 830 - Abutment Backwall (ft.)

QTY.	condition state			
	1	2	3	4
2			2	
60	60			

**Pier 5:**

205 - Reinforced Concrete Column (each)  
 215 - Reinforced Concrete Abutment (ft.)  
 234 - Reinforced Concrete Pier Cap (ft.)  
 830 - Abutment Backwall (ft.)

QTY.	condition state			
	1	2	3	4
2	2			
60	59	1		

**Pier 6:**

- 205 - Reinforced Concrete Column (each)
- 215 - Reinforced Concrete Abutment (ft.)
- 234 - Reinforced Concrete Pier Cap (ft.)
- 830 - Abutment Backwall (ft.)

	condition state			
QTY.	1	2	3	4
2		1	1	
60	58	2		

**Pier 7:**

- 205 - Reinforced Concrete Column (each)
- 215 - Reinforced Concrete Abutment (ft.)
- 234 - Reinforced Concrete Pier Cap (ft.)
- 830 - Abutment Backwall (ft.)

	condition state			
QTY.	1	2	3	4
2		2		
60	52		8	

**Pier 8:**

- 205 - Reinforced Concrete Column (each)
- 215 - Reinforced Concrete Abutment (ft.)
- 234 - Reinforced Concrete Pier Cap (ft.)
- 830 - Abutment Backwall (ft.)

	condition state			
QTY.	1	2	3	4
2	2			
60	60			

**Forward Abutment:**

- 205 - Reinforced Concrete Column (each)
- 215 - Reinforced Concrete Abutment (ft.)
- 234 - Reinforced Concrete Pier Cap (ft.)
- 830 - Abutment Backwall (ft.)

	condition state			
QTY.	1	2	3	4
24	14	10		
72	53	14	5	

**EASTBOUND Substructure Subtotals:**

**Rear Abutment:**

- 205 - Reinforced Concrete Column (each)
- 215 - Reinforced Concrete Abutment (ft.)
- 234 - Reinforced Concrete Pier Cap (ft.)
- 830 - Abutment Backwall (ft.)

condition state				
QTY.	1	2	3	4
22	21	1		
72	61	6	5	

**Pier 1:**

- 205 - Reinforced Concrete Column (each)
- 215 - Reinforced Concrete Abutment (ft.)
- 234 - Reinforced Concrete Pier Cap (ft.)
- 830 - Abutment Backwall (ft.)

condition state				
QTY.	1	2	3	4
2	1		1	
60	60			

**Pier 2:**

- 205 - Reinforced Concrete Column (each)
- 215 - Reinforced Concrete Abutment (ft.)
- 234 - Reinforced Concrete Pier Cap (ft.)
- 830 - Abutment Backwall (ft.)

condition state				
QTY.	1	2	3	4
2		1	1	
60	57	3		

**Pier 3:**

- 205 - Reinforced Concrete Column (each)
- 215 - Reinforced Concrete Abutment (ft.)
- 234 - Reinforced Concrete Pier Cap (ft.)
- 830 - Abutment Backwall (ft.)

condition state				
QTY.	1	2	3	4
2	1		1	
60	60			

**Pier 4:**

- 205 - Reinforced Concrete Column (each)
- 215 - Reinforced Concrete Abutment (ft.)
- 234 - Reinforced Concrete Pier Cap (ft.)
- 830 - Abutment Backwall (ft.)

condition state				
QTY.	1	2	3	4
2	1	1		
60	60			

**Pier 5:**

- 205 - Reinforced Concrete Column (each)
- 215 - Reinforced Concrete Abutment (ft.)
- 234 - Reinforced Concrete Pier Cap (ft.)
- 830 - Abutment Backwall (ft.)

condition state				
QTY.	1	2	3	4
2	2			
60	60			

**Pier 6:**

- 205 - Reinforced Concrete Column (each)
- 215 - Reinforced Concrete Abutment (ft.)
- 234 - Reinforced Concrete Pier Cap (ft.)
- 830 - Abutment Backwall (ft.)

condition state				
QTY.	1	2	3	4
2	2			
60	59	1		



**Pier 7:**

- 205 - Reinforced Concrete Column (each)
- 215 - Reinforced Concrete Abutment (ft.)
- 234 - Reinforced Concrete Pier Cap (ft.)
- 830 - Abutment Backwall (ft.)

	condition state			
QTY.	1	2	3	4
2		1	1	
60	60			

**Pier 8:**

- 205 - Reinforced Concrete Column (each)
- 215 - Reinforced Concrete Abutment (ft.)
- 234 - Reinforced Concrete Pier Cap (ft.)
- 830 - Abutment Backwall (ft.)

	condition state			
QTY.	1	2	3	4
2	2			
60	60			

**Forward Abutment:**

- 205 - Reinforced Concrete Column (each)
- 215 - Reinforced Concrete Abutment (ft.)
- 234 - Reinforced Concrete Pier Cap (ft.)
- 830 - Abutment Backwall (ft.)

	condition state			
QTY.	1	2	3	4
24	15	9		
72	58	14		

Approach Roadway TOTALS:	condition state				
	QTY.	1	2	3	4
321 - Reinforced Concrete Approach Slab (sq. ft.)	4,842	4,472	76	294	0

**WESTBOUND Approach Roadway Subtotals:**

**Rear (WEST) Approach**

321 - Reinforced Concrete Approach Slab (sq. ft.)

QTY.	condition state			
	1	2	3	4
1,200	1,153	12	35	

**Forward (EAST) Approach**

321 - Reinforced Concrete Approach Slab (sq. ft.)

QTY.	condition state			
	1	2	3	4
1,242	1,018		224	

**EASTBOUND Approach Roadway Subtotals:**

**Rear (WEST) Approach**

321 - Reinforced Concrete Approach Slab (sq. ft.)

QTY.	condition state			
	1	2	3	4
1,200	1,185		15	

**Forward (EAST) Approach**

321 - Reinforced Concrete Approach Slab (sq. ft.)

QTY.	condition state			
	1	2	3	4
1,200	1,116	64	20	