FRACTURE CRITICAL PIER CAP INSPECTION REPORT

SFN3101215 (HAM-42-0257R)

I-71 NB RAMP OVER US-42 NB (READING RD)

HAMILTON COUNTY, OH

DISTRICT 8

June 2023

Prepared for:

STATE OF OHIO DEPARTMENT OF TRANSPORTATION

STATE OF OHIO
MICHAEL A.
SEAL
E-70350
10/30/2023
REGISTERED
PROFESSIONAL ENGINEER

Prepared by:

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EXECUTIVE SUMMARY

Project: VAR-District 8 Bridge Inspections No. 2023-4. (PID No. 105476)

Purpose of Project: To perform NBI fracture critical (NSTM) inspections of steel pier caps on bridges for the Ohio Department of Transportation, District 8.

Inspection Team: Team Leader – Michael Seal, P.E. – Collins Engineers, Inc.
Team Member – Trent Graham – Collins Engineers, Inc.
Team Member – Rob Parker – Gannett Fleming, Inc.

Inspection Date(s): June 20-21, 2023

Summary of Findings:

- Water and moisture continue to accumulate inside the pier cap, particularly on the east end. This is due to humidity from the ambient air that enters the cap between the hatch door and end plate. Water has ponded up to the perforations at the eastern bearing stiffeners and was spilling into the portion between the bearing stiffener and Diaphragm F. The humid environment inside the cap is causing active surface and freckling corrosion with no section loss at the time of inspection.
- Triaxial welds were previously noted at five locations inside the cap and have not changed. These occur between the fillet welds connecting the cap web stiffeners to the web plates and the fillet welds connecting the cap flange plates to the cap web plates.
- Active surface corrosion was present inside the cap at diaphragm clip angles, along fillet welds, on cap plate surfaces, and on the cap exterior along the corners and on web plates behind girders. Overall, there was no appreciable change from the previous inspection.
- The east downspout was clogged and full of water. This has not changed from the previous inspection.
- The cap exterior exhibited some previously observed minor defects (tack welds, active surface corrosion, gouges on bottom flange plate edges, etc). No changes were observed at these locations.

Summary of Recommendations:

- Weep holes should be drilled in the underside of the east end of the bottom cap plate to allow water accumulating in these areas to drain.
- Clear out the clogged east end downspout so water can drain effectively.
- Monitor triaxial weld locations for cracks related to excessive restraint.
- Monitor the corrosion on the cap interior for section loss or additional deterioration. Compare future inspections to current conditions to determine any changes.
- Monitor the noted minor defects on the cap exterior for changes. See the bullets in 2.1.1.2 below for specifics and locations.
- Consider replacing the current hatch bolts with new replacements to ease hatch removal.

NBI Ratings:

Item ID	Description	Condition Rating	Summary
B.C.14	NSTM	7-Good	Active surface corrosion, water ponding.

AASHTO National Bridge Element (NBE) Ratings:

Element #	Description	Units	Total	Condition State			
				1	2	3	4
231	Steel Pier Cap	LF	69	0	69	0	0

Note: Ratings were developed using the Ohio Department of Transportation Manual of Bridge Inspection (2014) and AASHTO Manual for Bridge Element Inspection, 2nd Edition.

1.0 INTRODUCTION

1.1 Purpose and Scope

This report consists of the results of a detailed inspection of fracture critical steel pier caps performed on the I-71 NB ramp Bridge (HAM-42-0257R) over US-42 NB (Reading Rd) in Hamilton County, OH. Collins Engineers, Inc. (Collins) conducted the fracture critical pier cap investigation for the Ohio Department of Transportation (ODOT), District 8 on June 20-21, 2023.

1.2 General Description of the Structure

The HAM-42-0257R Bridge is a 3-span welded steel plate girder structure with a reinforced concrete deck that carries one lane of ramp traffic from Eden Park Drive to southbound Interstate I-71. The bridge passes over two lanes of northbound US Route 42 (Reading Road) and a single lane ramp that runs from northbound Interstate I-71 to northbound US Route 42 (see Figure 1).

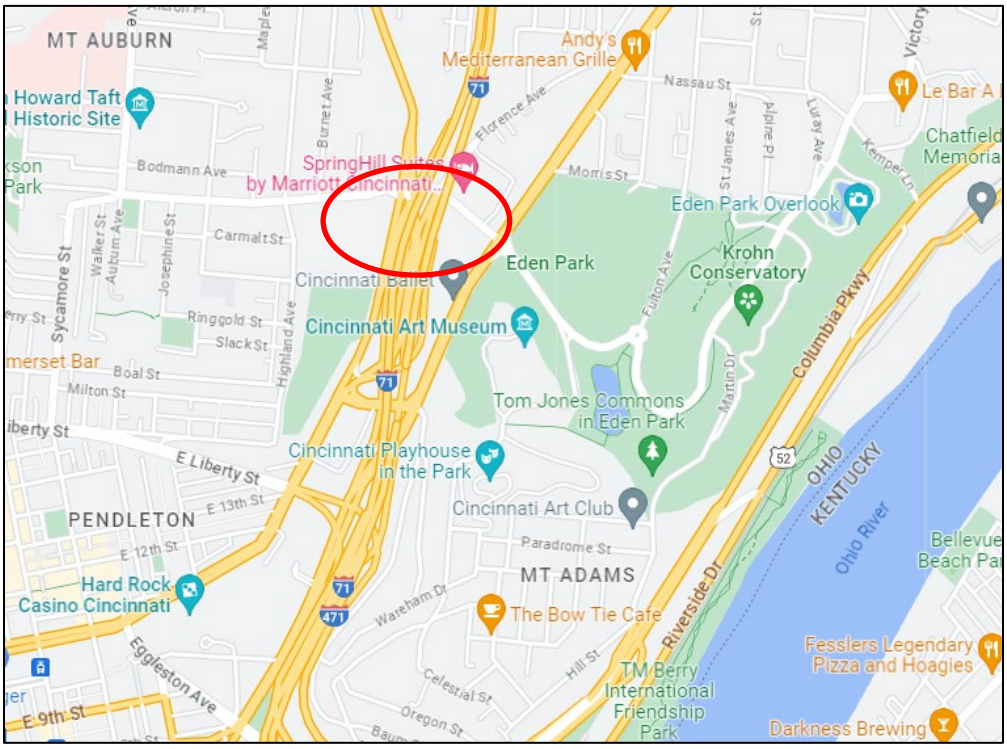


Figure 1: General Bridge Location

The structure has one fracture critical integral steel pier cap which is located at Pier 1 (see Figure 2). The pier cap is a welded steel plate box girder that straddles northbound US Route 42 and the ramp from northbound Interstate I-71 to northbound US Route 42. It is simply supported on two square reinforced concrete columns spaced at 64 ft-6 in. center-to-center. Four continuous I-girders are connected directly to the pier cap. The connection is made continuous via tie plates that are bolted to both girder flanges both pier cap flange plates. The girder webs are connected to the pier cap webs by bolted clip angles.

The nomenclature and girder designation shown on the design plans were used in the inspection of the pier cap. In 2009, this pier cap was rehabilitated to address active corrosion and problematic weld details. The exterior of the cap was painted at that time, and zone painting was also completed on the interior.

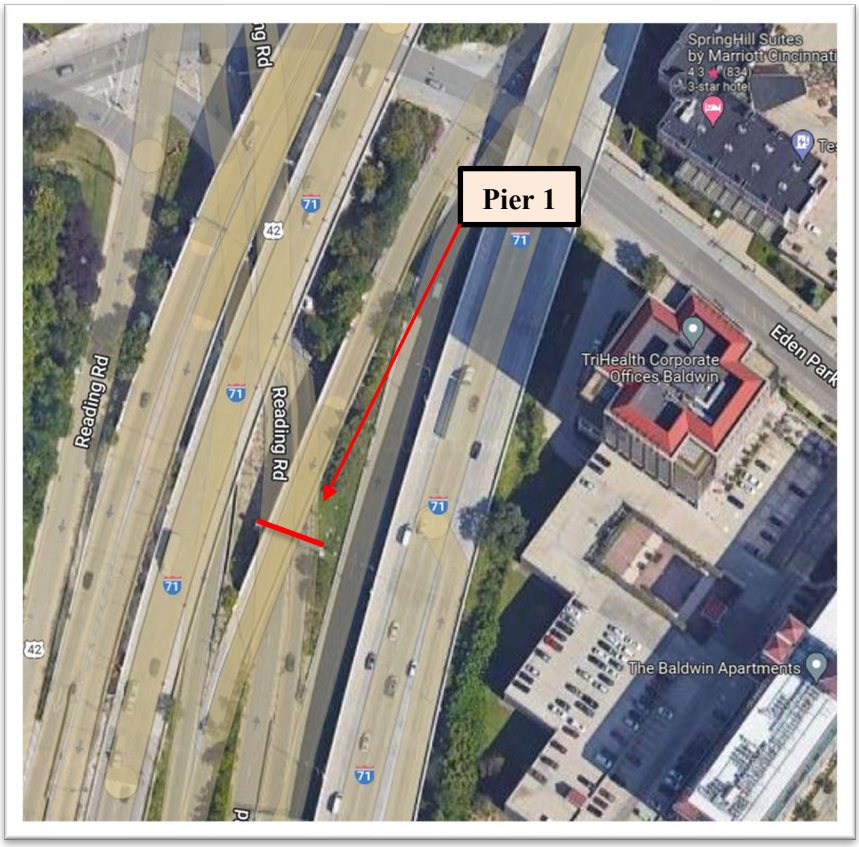


Figure 2: Fracture Critical Pier Cap Location

This bridge is inventoried in a south to north direction, and superstructure units are labeled from left to right looking north (Girder A to Girder F). Substructure units are labeled as Rear and Forward Abutments and Piers 1 to 2. Refer to Photographs 1 and 2 below for overall views of the bridge.

Photograph 1: Overall View, Looking South.

Photograph 2: Overall View, Looking West.

1.3 Method of Investigation

Collins Engineers, Inc. performed a fracture critical inspection of the fracture critical pier cap of Bridge SFN3101215 (HAM-42-0257R) on June 20 and 21, 2023. A three-person team consisting of a professional engineer and NBI team leader (Michael A. Seal, P.E.) and technicians Trent Graham (Collins) and Rob Parker (Gannett Fleming) conducted this inspection. A 46 ft bucket truck was used to inspect the exterior and to access the pier cap interior and perform this "arm's-length" inspection. The west pier cap hatch cover was removed for entry and reinstalled after completing the work. The hatch cover was sealed with exterior grade silicone caulking. Traffic control was provided by A&A Safety to gain access to the cap exterior and consisted of single lane closures as follows:

- I-71 northbound to US-42 northbound (exterior access) – Single lane closures were performed on this ramp between the hours of 11:00 PM to 5:00 AM to inspect the east portion of the pier cap exterior.
- US-42 northbound (interior and exterior access) – Single lane closures were performed a single lane of this 2-lane ramp between the hours of 10:00 AM and 3:00 PM to access the west hatch of the pier cap and inspect the exterior portions over these lanes.

The pier cap interior was accessed with confined space entry procedures, in accordance with 29 CFR 1910.146. This included an entry permit system, continuous air monitoring, plus use of qualified entrants,

attendants, and supervisor(s). The remaining bolts securing the pier cap hatches were removed and reinstalled with an impact wrench and the hatches were sealed with exterior-grade caulking once the interior inspection was complete. Various socket sizes from 1/2 in. to 15/16 in. were required to remove the hatch bolts.

Field measurements were taken using tape measures, scales, calipers, pit gauges, and ultrasonic thickness gauges as needed to verify dimensions. Observed deficiencies were recorded on bridge-specific field inspection forms. Digital Photographs were taken of the weld cracks, steel section loss, fatigue prone details, among other items, to document the physical condition of the pier cap.

1.4 Condition Ratings

State and federal guidelines for evaluating bridge conditions have been developed at both the state and federal level to promote uniformity in the inspections performed by different teams for different cycles. Condition ratings used for this inspection describe the existing, in-place bridge, and the criteria for this is listed below. The following table was used as a guide in evaluating the condition of the various members of the pier cap.

NBI Rating	CONDITION	DESCRIPTION
N	NOT APPLICABLE	Component does not exist.
9	EXCELLENT	Isolated inherent defects.
8	VERY GOOD	Some inherent defects.
7	GOOD	Some minor defects.
6	SATISFACTORY	Widespread minor or isolated moderate defects.
5	FAIR	Some moderate defects; strength and performance of the component are not affected.
4	POOR	Widespread moderate or isolated major defects; strength and/or performance of the component is affected.
3	SERIOUS	Major defects; strength and/or performance of the component is seriously affected. Condition typically necessitates more frequent monitoring, load restrictions, and/or corrective actions.
2	CRITICAL	Major defects; component is severely compromised. Condition typically necessitates frequent monitoring, significant load restrictions, and/or corrective actions in order to keep the bridge open.
1	IMMINENT FAILURE	Bridge is closed to traffic due to component condition. Repair or rehabilitation may return the bridge to service.
0	FAILED	Bridge is closed due to component condition, and is beyond corrective action. Replacement is required to restore service.

This inspection of this bridge was performed in accordance with the following documents:

1. Manual of Bridge Inspection, Ohio Department of Transportation (ODOT), 2014.
2. Manual for Bridge Element Inspection, AASHTO, 2019.
3. Bridge Inspector's Reference Manual, U.S. Department of Transportation, 2002 (rev 2012).
4. Inspection of Fracture Critical Bridge Members, U.S. Department of Transportation, 1986.
5. Specifications for the National Bridge Inventory, U.S. Department of Transportation, 2022.

2.0 EXISTING CONDITIONS

2.1 Pier Cap Conditions

2.1.1 Pier Cap 1 Overall

Pier Cap 1 was in Good Condition (7) overall (Photograph 3). Moisture/dew/water droplets are still present along most of the cap. Condensation was present on the top flange inside the cap at all bays (Photograph 4), and water has ponded to the brim of the perforation for the easternmost portion between east column bearing stiffeners (Photograph 5). The ponding water has noticeably increased since the prior inspection. Some has spilled over to the western portion between the east column bearing stiffeners. The paint system under the water appears intact, currently. The condensation on the interior face of the cap was causing freckling corrosion with no section loss along the top and bottom corners of the pier cap web plate. This was noted previously and does not appear to have significantly increased from the prior inspection. The pier cap interior exhibited potential tri-axial welds at locations where the cap web stiffener welds intersection with the pier cap flange plate to web plate welds (both at the top and bottom of the cap). At most locations the requisite 1/4 in. distance between weld intersections was observed (Photograph 6), though prior inspections have identified five locations where tri-axial welds do exist. Several retrofits were performed prior to the 2010 inspection to address fatigue issues relating to this type of connection.

Photograph 3: General Underview of Pier Cap 1. Note Tie Plates, Bolted Clip Angles, and Overall Steel Configuration, Looking Northeast.

Photograph 4: View of North Web Plate Near West End Between Bearing Stiffeners and Diaphragm A. Note General Example of Condensation Present on Top Plate Due to Humidity, Looking Northwest.

Photograph 5: View of Water Ponding Between the Bearing Stiffeners at the East End. Note The Easternmost Portion Was Completely Filled, Spilling Over to the Portion West of This, Looking East.

Photograph 6: View of the North Web Plate Between the West Hatch and Diaphragm A at the Base of the Stiffener. Note the Typical Example of Triaxial Weld at Base of Stiffener, Looking Northeast.

2.1.1.1 Pier Cap 1 Interior

The pier cap interior was in Good Condition (7) overall, with only minor surface corrosion and no weld cracks observed. Specific items to note include:

- As stated above, the east end of the pier cap exhibited water ponding near the cap door (Photograph 4). At this location the water leaks in from the hatch. For this inspection the two end sections between the end plate and the bearing stiffeners were full, which is a noticeable increase from the prior inspection. Water was spilling into the portion between the bearing stiffener and Diaphragm F.

- The connection angle between the bottom of the west face of Diaphragm F and the cap bottom plate exhibits active surface corrosion along the full length (Photograph 7). Steel surface pits are present around this corrosion, but this overall has not noticeably changed since the prior inspection. No pack rust or swelling between the steel plates was observed. This corrosion is atypical compared to other similar locations inside the cap.
- Previous inspections noted five (5) locations of tri-axial welds, where the cap web stiffener welds intersect the cap flange plate to cap web plate weld. At these locations, no weld cracks nor observable changes have occurred since the prior inspection (Photograph 6).
- A few bolts for the angles that connect the diaphragms to the cap plates exhibit underengaged/negative threads. This is not currently a significant issue and can be monitored in future inspections.
- The cap web plate stiffeners are welded to the web plates only, with no welds present on the flange plates. These stiffeners utilize a tight fit between flange plates. At two locations near the west end and at one location at the east end there are stiffeners with small but visible gaps between the top of the stiffener and the top plate of the cap. This is not currently significant and can be monitored in future inspections.

The protective coating system exhibited a consistent amount of light surface corrosion along the top flange and the web plate welds throughout the entire cap; this indicates coating failure along these locations. The lower portion of both ends of the cap were painted during a prior rehabilitation and this white protective layer is protecting the steel as intended, though there is evidence of corrosion reactivating below the protective layer at isolated locations (Photograph 8). Overall, there were no noticeable changes to the paint system on the cap interior.

	
Photograph 7 – View of the Connection Angle Between the Bottom of the West Face of Diaphragm F and the Cap Bottom Plate. Note Active Corrosion Developing But No Pack Rust Present, Looking East.	Photograph 8 – Typical Example of Lower Cap Interior With Recent Painting. Note Blistering Corrosion Developing at Isolated Areas on the Bottom Plate. The East Face of Diaphragm F Shown, Looking West.

2.1.1.2 Pier Cap 1 Exterior

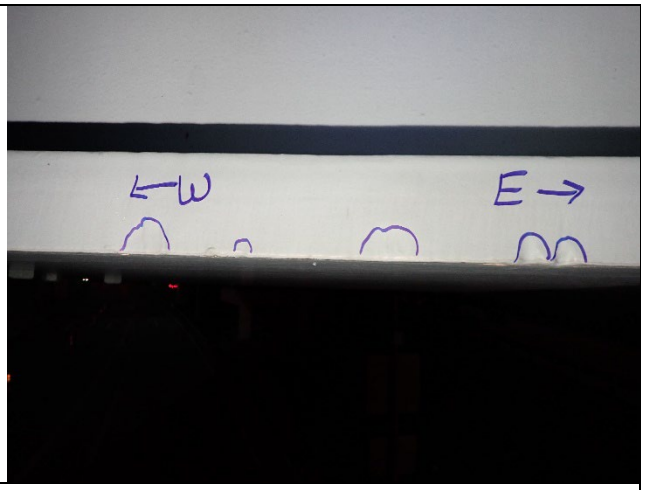
The pier cap exterior overall was in Good Condition (7), with no significant deficiencies to the girder to pier cap connections observed. Specific items to note include:

- No change was observed to the 6 in. L x by 1 in. H area of 1/16 in. deep pitting and surface corrosion on the south web plate at the west face of the top flange of Girder A. Near this location, a 1/4 in. deep undercut was present from a previously removed tack weld on the west side of Girder A. This is an old comment and has not changed.
- Tack welds were present between the bottom flange and fill plate for the west face of Girder B on the south face of the pier cap (Photograph 9). This is an old comment and has not changed.
- The south edge of the bottom flange exhibits numerous small impact gouges up to a 1/8 in. deep (Photograph 10). These are likely from fabrication or construction and are not evidence of vehicular impacts. No change from prior inspections.
- Pack rust up to 1/8 in. thick continues between the cap flange plates and the flange connection plates of Girder A. This is currently not significant and has not changed.
- There was no change to the minor corrosion of the cap bottom flange plate behind Girder D.
- The downspout for the drainage pipe at the east end of the pier cap remains clogged, as noted in prior inspections (Photograph 11). The downspout overflows and has caused active corrosion near the top with rust staining down the downspout. Moss was present, indicating a consistently wet area, but no

section loss was noted on the downspout or the connections. Welded connections were previously replaced with bolted connections and these function as designed.

The protective coating system overall was in Good Condition (7). The pier cap bearings were in Good Condition (7), with minor surface corrosion on both bearings and anchor bolts (Photograph 12). This has not changed since the prior inspection.

Photograph 9 – View of the West Face of the Bottom Flange of Girder B, South Side of the Pier Cap. Note No Change to the Tack Welds on the Bottom Tie Plate, Looking East.



Photograph 10 – View of the Bottom of the South Plate Over the Right Travel Lane Below the Bridge. Note No Change to Gouges in the Corner of the Bridge, Looking North.

Photograph 11 – View of the Downspout on the North Side of the East Column. Note Downspout Was Still Clogged. No Change, Looking Southeast.

Photograph 12 – View of the Southeast Corner of the West Bearing. Note Typical Corrosion on the Masonry Plate and Anchor Bolts/Nuts, Looking North.

2.1.1.3 Pier Cap 1 Retrofit Details

Pier Cap 1 – Retrofit Details

There are 4 types of Pier Cap 1 retrofits, which are:

Retrofit Detail 1

- Removal of all tack welds at the pier cap exterior bottom flange to girder flange fill plate connection.

Retrofit Detail 2

- Removal of miscellaneous tack welds on the interior of the north pier cap web.

Retrofit Detail 3

- Removal by grinding of intersecting welds between the transverse web stiffener weld and the longitudinal web plate to flange plate weld.

Retrofit Detail 4

- The original welded drainage pipe support brackets were removed, ground smooth, and replaced with bolted drainage pipe support brackets.

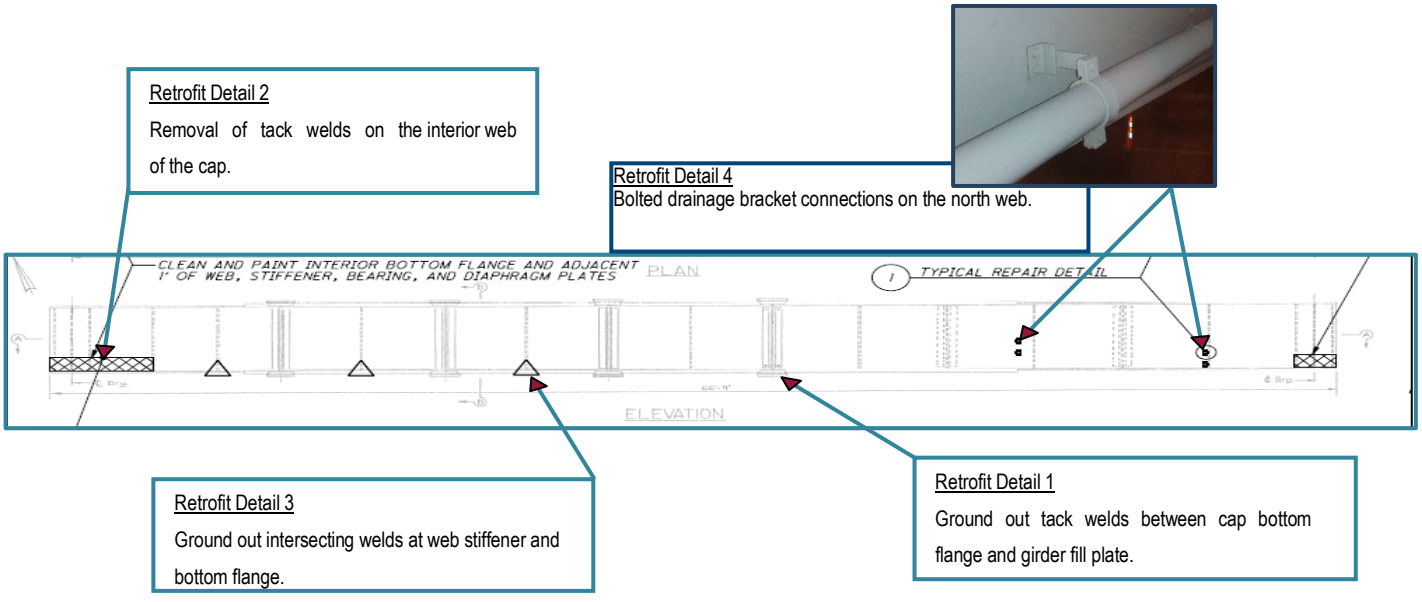


Figure 3: Pier Cap 1 Retrofit Details

2.1.1.4 Fatigue Prone Details

Fatigue Prone Detail 1

Fillet welds between diaphragms or stiffeners and web plates.

Category: C'

Location: All pier cap web stiffeners.

Fatigue Prone Detail 2

Full penetration groove weld of flange splice. Category: B

Location: Two bottom flange splices.

Fatigue Prone Detail 8

Intersection of fillet welds.

Category: E

Location: Fillet welds of bottom flange and north web plate intersecting fillet weld of north web plate and stiffener between Girders A and B.

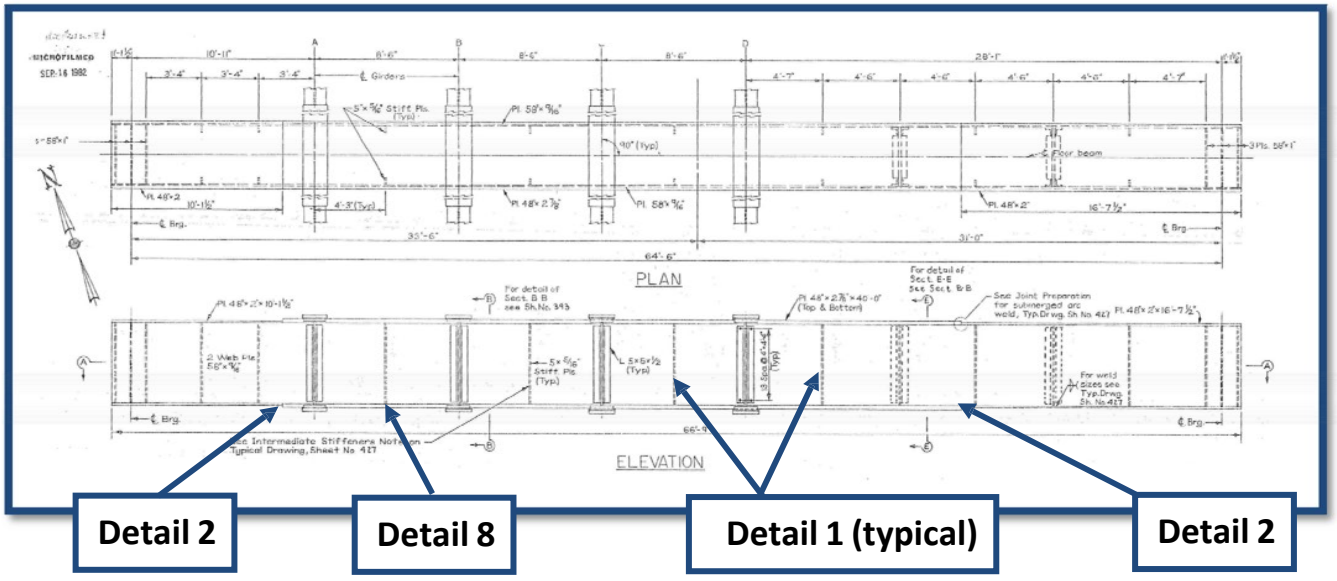


Figure 4: Pier Cap 1 Fatigue Prone Details

3.0 EVALUATION AND RECOMMENDATIONS

Based on the in-depth inspection, the fracture critical Pier 1 Cap of Bridge No. HAM-42-0257R and its associated fatigue prone details were in Good Condition (7) overall. There were no major changes overall, though the ponded water on the east end of the cap had noticeably increased since the prior inspection and there was evidence of corrosion reactivating under the lower cap interior portions painted white during a previous rehabilitation.

Collins appreciates the opportunity to work with ODOT District 8 on this project and looks forward to working together in the future. We would be happy to discuss any aspect of the report with you in person or via phone or email.

Respectfully Submitted,
COLLINS ENGINEERS, INC.

Michael Seal, P.E.
Project Manager

Originated by:
Kevin Mitchell, E.I.T.

EXHIBIT 1 –EXISTING PIER CAP PLANS

FED. RD. DIV.	STATE	PROJECT	FISCAL YEAR
2	OHIO		

383
460

HAMILTON COUNTY
HAM-71-2.08

DETAIL A

PLAN

PROFILE

CURVE DATA

Curve No.3RB
PI = 188+11.00 RB
Δ = 11°-07'-12"
D = 8°-30'
R = 674.07
L = 130.82
T = 65.62

PROPOSED STRUCTURE

TYPE: Continuous Steel Plate girder with reinforced concrete deck and substructure.
Span: 111'-4½, 127'-0", 100'-0" c. to c. bearings.
Roadway: 26'-0" f/f curbs with 1'-0" curbs (28'-0" f/f parapets)
Skew: 0° (Piers 1 & 2 & N. Abut.), 55° S. Abut. (Measured from forward tangent.)
Load frequency: CF = 2000 (57) Adequate for AASHO alternate loading.
Wearing Surface: 1" Monolithic Concrete
Approach Slabs: AS-1-54 (25'-0" long)
Alignment: Varies, see Plan
Superelevation: Varies, see Plan

GENERAL NOTES

Span lengths are measured along Base Line
⊕ Symbol denotes drill hole
For test boring data, see Sheet 15 of 23
For Bench Marks, see Sheet 39

Traffic Count: 1986 A.D.T. 6500
D.H.V. 780

HAZELET & ERDAL
CONSULTING ENGINEERS
CINCINNATI, OHIO

SITE PLAN

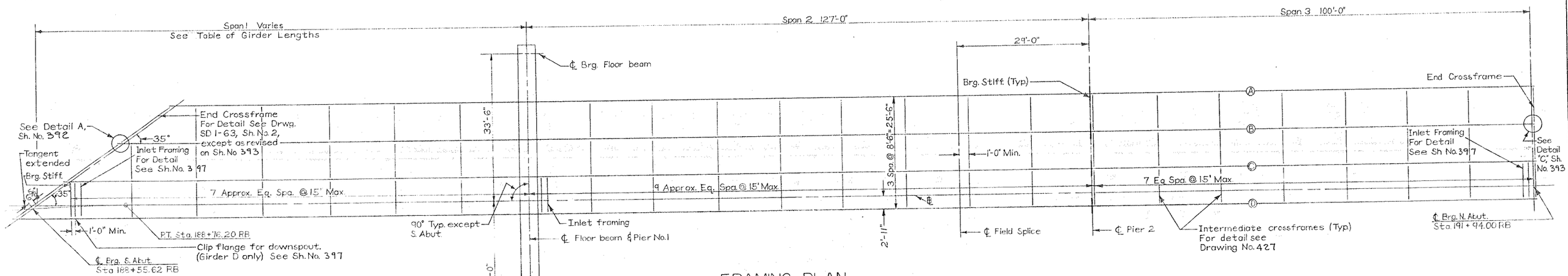
BRIDGE No. HAM-71-0228
RAMP RB OVER NORTHBOUND READING ROAD
H&E BRIDGE No. 16

DESIGNED	DRAWN	TRACED	CHECKED	REVIEWED DATE	REVISED
	M.K.K.	J.D.C.	A.R.Z.	11/6 8/14/85	

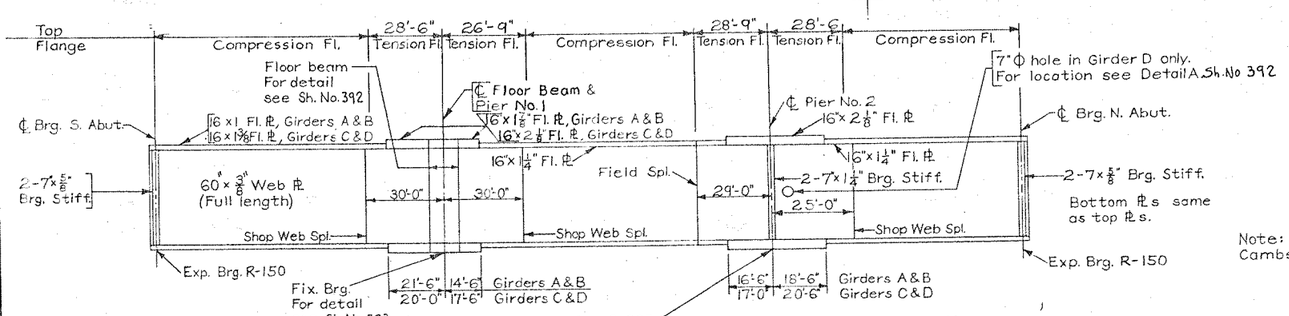
FED. RD. DIV.	STATE	PROJECT	FISCAL YEAR
2	OHIO		

391
460

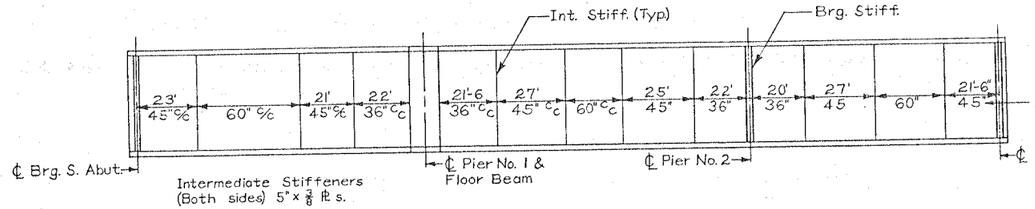
HAMILTON COUNTY
HAM-71- 2.08



FRAMING PLAN



GIRDER ELEVATION



INTERMEDIATE STIFFENER SPACING

Note:
Camber girders by cutting webs to a smooth curve.

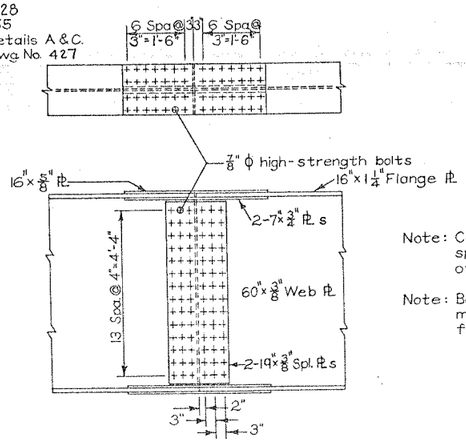
For bearing detail (R-325) see Drwg. No. 428
For bearing detail (R-150) see Drwg. No. RB-1-55 except masonry plates modified as shown on details A & C.
For typical plate girder elevation see Typ. Drwg. No. 427
For detail of roadway end dam see Sh. No. 395

For treatment of ends of bridge see Drawing No. SD-1-63, Sh. No. 2, "Longitudinal Section."

Note: Girder Length measured from ℄ Brg S. Abut to ℄ Pier No. 1.

Girder	Span 1
A	78'-8 1/8"
B	90'-9 13/16"
C	102'-11 7/16"
D	115'-1 1/8"

TABLE OF GIRDER LENGTHS



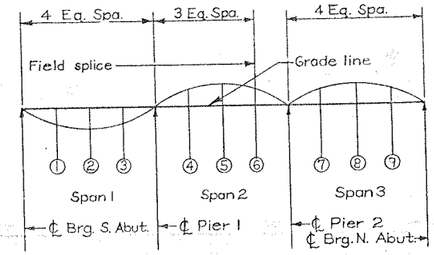
FIELD SPLICE

Note: Contact surface of splice shall be free of all oil or paint

Note: Bottom flange splice material same as top flange splice material.

Girder		LOCATION ①	②	③	④	⑤	⑥	⑦	⑧	⑨
A	Deflection due to weight of steel.	1/8	3/16	1/8	7/16	9/16	5/16	0	1/16	1/16
	Deflection due to remaining dead load	1/8	1/8	0	11/16	1 1/8	5/8	3/16	1/2	1/2
	Convexity required for vertical curve and superelevation	-1	-1¼	-1	2½	3¾	3	2½	3⅜	2½
	Sum of deflection and convexity	-7/8	-1⅛	-1	3 3/16	4 7/8	3 5/8	2 11/16	3 7/8	2 7/8
	Required camber	-3/4	-15/16	-7/8	3 5/8	5 7/16	3 15/16	2 11/16	3 15/16	3 1/16
B	Deflection due to weight of steel	1/4	5/16	1/4	7/16	9/16	5/16	0	1/16	1/16
	Deflection due to remaining dead load	5/16	3/8	1/8	3/8	11/16	3/8	3/16	1/2	3/8
	Convexity required for vertical curve and superelevation	-1¼	-¾	-1¼	3	4¼	3⅜	2½	3⅜	2½
	Sum of deflection and convexity	-15/16	-1⅜	-1⅛	3⅜	4 15/16	3¾	2 11/16	3 7/8	2 7/8
	Required camber	-11/16	-1 1/16	-7/8	3 13/16	5½	4 1/16	2 11/16	3 15/16	2 15/16

Girder		LOCATION ①	②	③	④	⑤	⑥	⑦	⑧	⑨
C	Deflection due to weight of steel.	5/16	1/2	5/16	7/16	9/16	5/16	0	1/16	1/16
	Deflection due to remaining dead load	1/2	9/16	1¼	3/8	11/16	3/8	1¼	9/16	1/2
	Convexity required for vertical curve and superelevation	-1 5/8	-2¼	-1 5/8	3½	4¾	3½	2½	3⅜	2½
	Sum of deflection and convexity	-1 1/8	-1 1/16	-1⅜	3⅞	5 7/16	3⅞	2¾	3 15/16	3
	Required camber	-13/16	-1 3/16	-1 1/16	4 5/16	6	4 3/16	2¾	4	3 1/16
D	Deflection due to weight of steel	1/2	¾	1/2	7/16	9/16	5/16	0	1/16	1/16
	Deflection due to remaining dead load	15/16	1 1/8	9/16	1¼	9/16	5/16	1¼	5/8	1/2
	Convexity required for vertical curve and superelevation.	-2	-2 3/4	-2 1/8	4	5¼	3¾	2½	3⅜	2½
	Sum of deflection and convexity	1 1/16	1 5/8	1 9/16	4¼	5 13/16	4 1/16	2¾	4	3
	Required camber	-9/16	-7/8	-1 1/16	4 11/16	6 3/8	4 3/8	2¾	4 1/16	3 1/16



CAMBER DIAGRAM

Note: Minus sign in table indicates camber ordinates measured below chord. No sign indicates camber ordinates measured above chord.

HAZELET & ERDAL
CONSULTING ENGINEERS
CINCINNATI, OHIO

STRUCTURAL STEEL DETAILS

BRIDGE No. HAM-71-0228

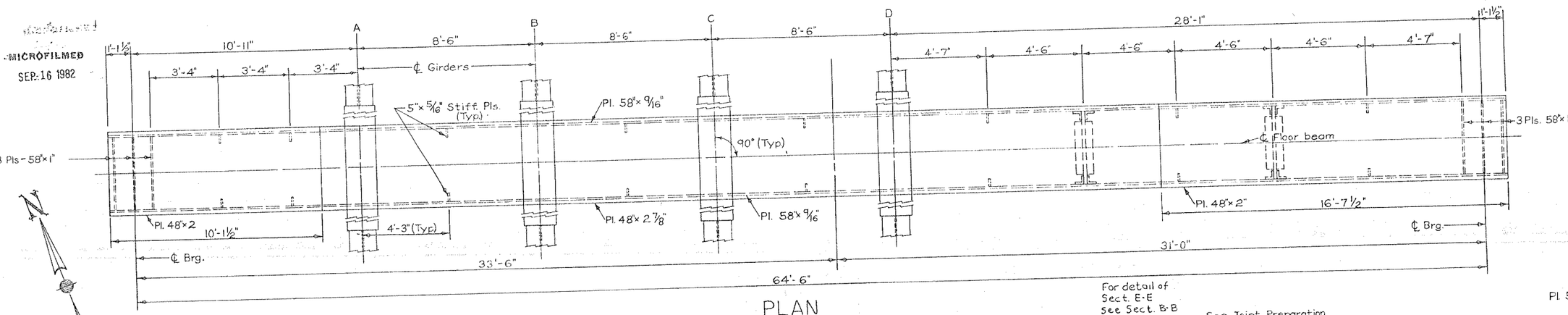
H&E BRIDGE No. 16

DESIGNED	DRAWN	TRACED	CHECKED	REVISED DATE	REVISED
W.L	CIB		JHD 11-8-65	11-23- 8-30-65	

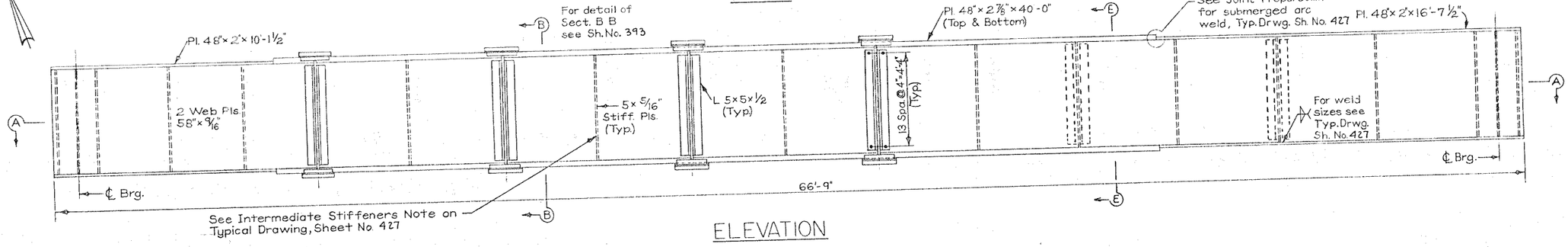
FED. RD. DIV.	STATE	PROJECT	FISCAL YEAR
2	OHIO		

392
460

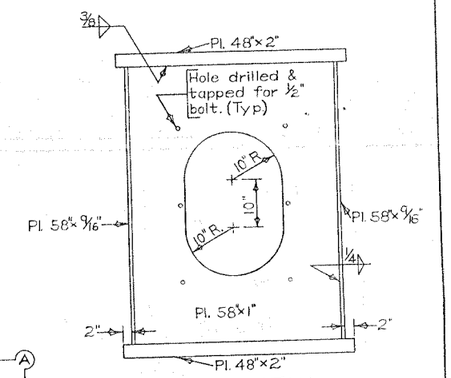
HAMILTON COUNTY
HAM-71- 2.09



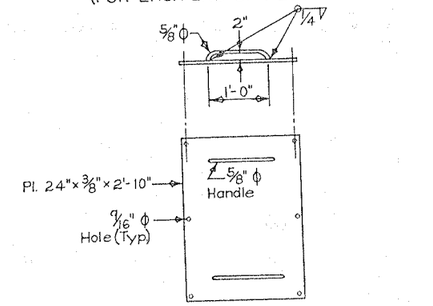
PLAN



ELEVATION

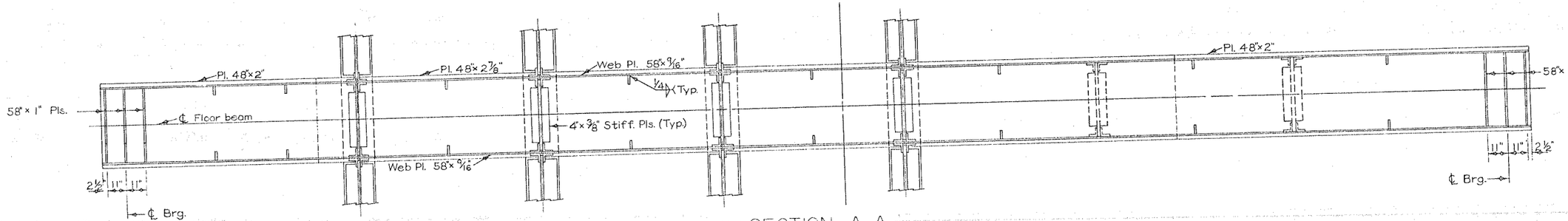


END VIEW
(FOR EACH END OF FLOOR BEAM)

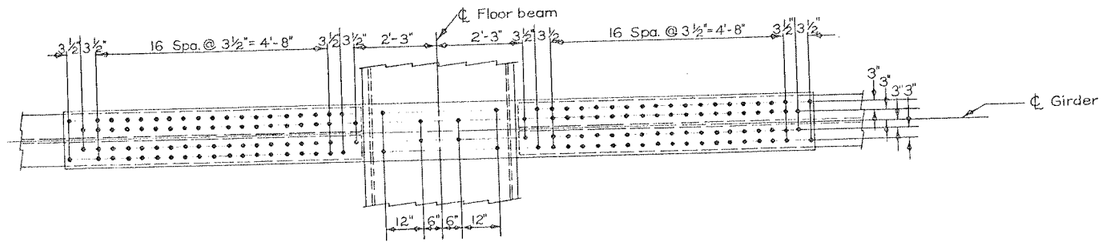


COVER PLATE
(FOR ACCESS HOLE)

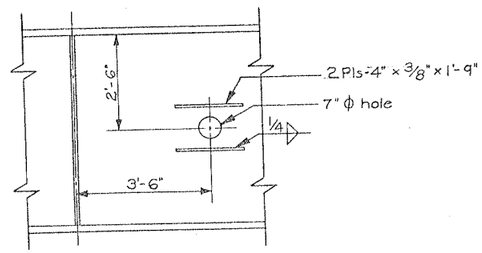
Note: Stiffeners to be grooved and fully butt-welded to the bottom flange plate. Weld to top flange plate as shown in End View above.



SECTION A-A



PLAN OF TIE PLATE
(Typ. top & bottom Pls.)



DETAIL A

For notes see Typ. Drwg. No. 427
Bolts shall be 7/8" ϕ high-strength bolts unless noted otherwise.

HAZELET & ERDAL
CONSULTING ENGINEERS
CINCINNATI, OHIO

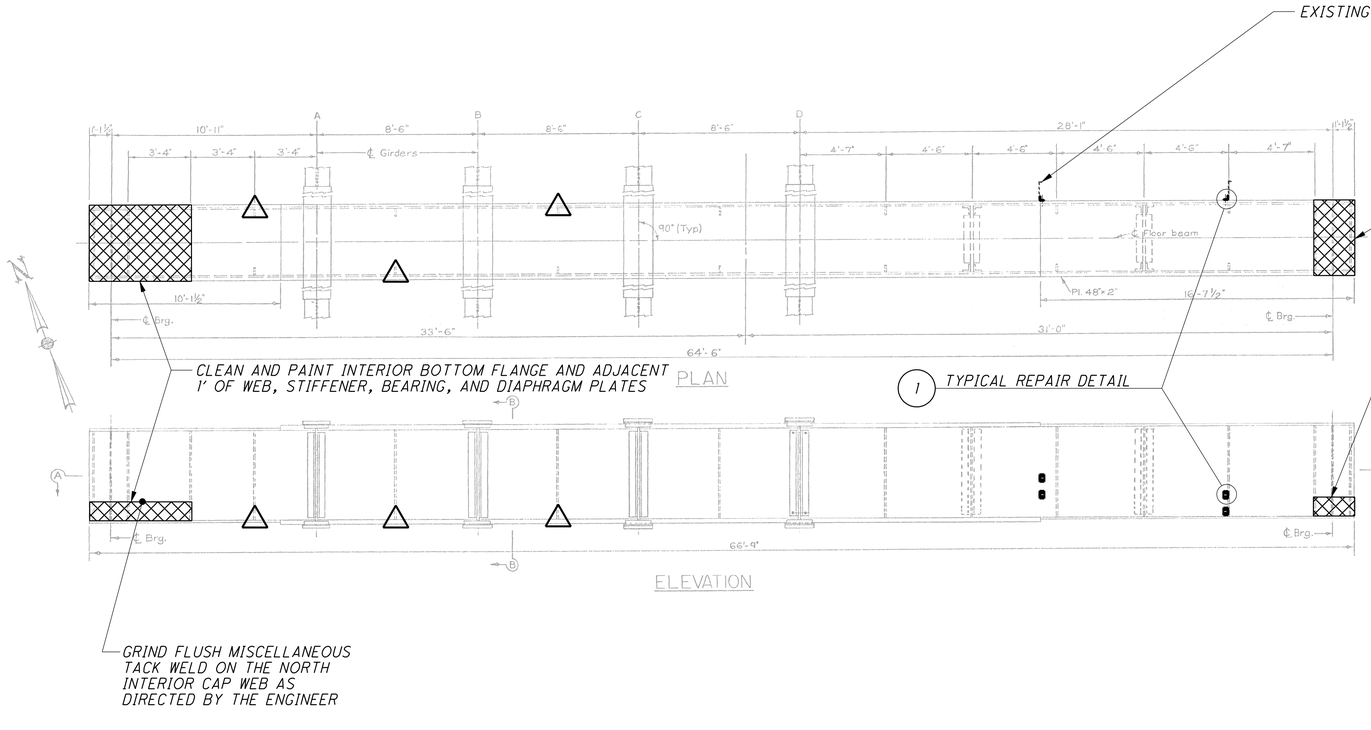
STRUCTURAL STEEL DETAILS

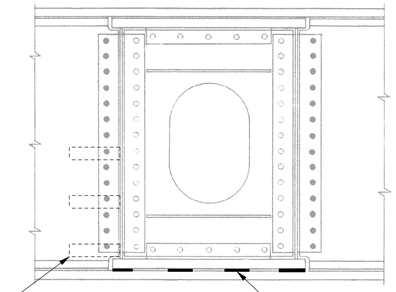
BRIDGE NO. HAM.-71-0228

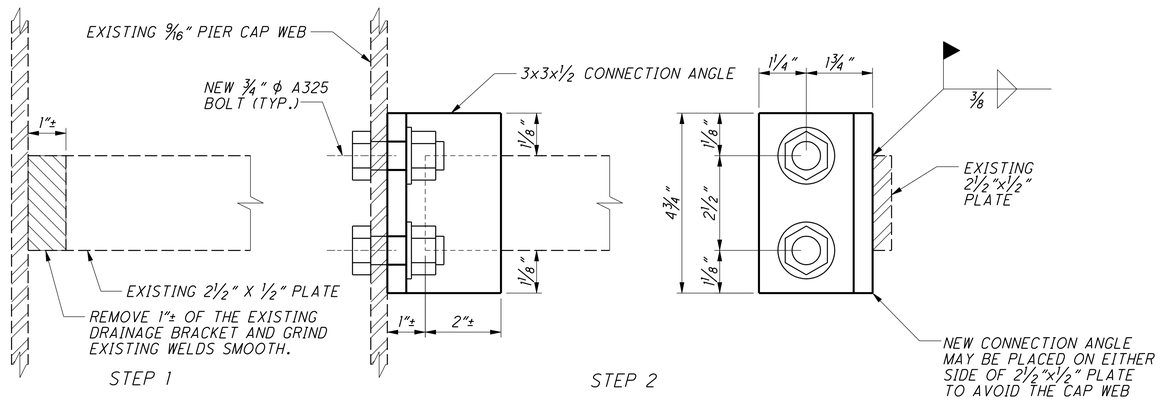
H&E BRIDGE No 16

DESIGNED	DRAWN	TRACED	CHECKED	REVIEWED DATE	REVISED
W.L	CIB		JHO 1/8/65	W.L.Z. 8-30-65	

EXHIBIT 2 –REHABILITATION PLANS







REPAIR DETAIL DRAIN BRACKET RETROFIT (1)

NOTES:

1. PIER PLAN, ELEVATION AND SECTION B-B ARE TAKEN FROM THE ORIGINAL PLANS.
2. CLEAN AND PAINT REPAIR AREAS ON INTERIOR OF PIER CAP.

- LIMITS OF PAINTING OF INTERIOR OF PIER CAP

△ - LOCATION OF INTERSECTING WELD BETWEEN PIER CAP WEB STIFFENER WELD AND PIER CAP FLANGE WELD TO BE REMOVED BY GRINDING

DESIGN AGENCY
Tran Systems
55 PUBLIC SQUARE, SUITE 1900
CLEVELAND, OHIO 44113

DESIGNED	DRAWN	REVIEWED	DATE
NBR	NBR	WRW	12-20-07
CHECKED	REVISED	STRUCTURE FILE NUMBER	
BKC		3101215	

PIER 1 CAP RETROFIT DETAILS
BRIDGE NO. HAM-42-0257R
I-71 RAMP OVER US 42 (READING ROAD)

HAM-BH-VAR
PID No. 25374

33
38

4/17/2008
P:\2426.03-ODOT 8 Pier Cap\2007 PID25374 DRAWINGS\(#9) HAM-42-0257R\HAM-42-0257R P.dgn