NSTM Member Inspection Report

Submitted to:

Ohio Department of Transportation, District 8
505 S. State Route 741
Lebanon, Ohio 45036

HAM-71-0197W
2025 NSTM Member Inspection Report
(VAR-District 8 Bridge Inspections for Steel Pier Caps)
SFN: 3106659, PID: 109781

September 11, 2025

Submitted by:

GANNETT FLEMING

September 2025

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INTRODUCTION

Bridge Description

The HAM-71-0197W Bridge is a three-span welded steel plate girder structure with a reinforced concrete deck that carries two single lanes of ramp traffic to southbound Interstate I-471. The west lane carries traffic from the intersection of Liberty Street and Reading Road, and the east lane carries traffic from southbound Interstate I-71. A ramp from Gilbert Avenue to northbound Interstate I-71 passes beneath the structure.

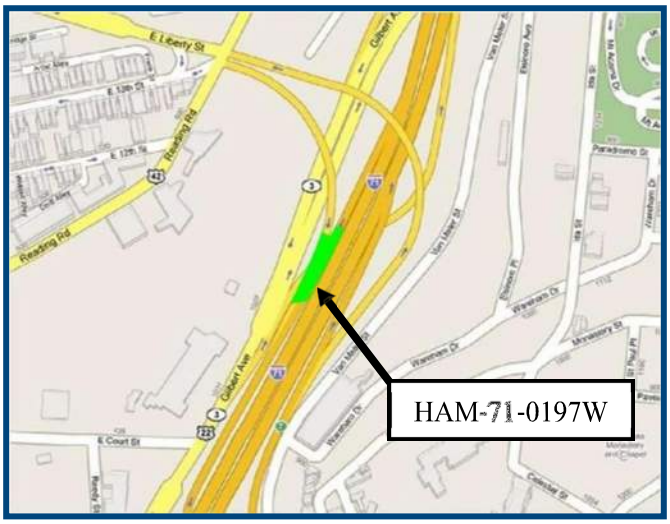


Figure 1: Bridge Location Map

The structure has one NSTM integral pier cap which is located at Pier 1. The pier cap is a welded steel plate box girder that is simply supported on two circular reinforced concrete columns. Seven I-girders frame into the pier cap and are made continuous by bottom flange tie plates that pass through slots and are welded to the pier cap webs, and by top flange tie plates that bear on and are bolted to the top flange of the pier cap. The girder webs are connected to the pier cap webs by bolted connection plates. Knee braces are welded to the bottom tie plates and pier cap webs for additional rigidity.

The nomenclature and girder designations shown on the design plans were used in the NSTM member inspection of the pier cap. In 2009 the bridge pier cap was rehabilitated to improve areas of corrosion of problematic weld details.

Figure 2: NSTM Pier Cap Location

Inspection and Access Methods

On July 13, 2025 Gannett Fleming performed an NSTM inspection of the pier cap. A 46' bucket truck and ladders were used to access the pier cap interior and perform the "arm's length" exterior inspection. The south pier cap hatch cover was opened for entry and the bolts replaced with an impact wrench and resealed with exterior grade silicone caulk after the inspection.

Figure 3: Interior Photo of North Hatch. Note No Interior Latch

Traffic control provided by A&A Safety was used to gain access to the box cap exterior and consisted of single lane closures as follows:

- Gilbert Ave Ramp to I-71 Northbound – Single lane closures between the hours of 8:00 AM to 4:00 PM were necessary to inspect Pier Cap 1.

OSHA confined space entry procedures were followed while inspectors were working inside the pier cap. Entry was performed in accordance with complete permit-required confined space entry procedures per GF SOP #10 and 29 CFR 1910.146. This included the use of an entry permit system, pre-entry air monitoring, continuous air monitoring, the designation of qualified entrants, attendants, and supervisor(s), and available emergency response. OSHA compliant safety harnesses and lanyards were worn by inspectors when working in the lift bucket and when implementing bridge climbing techniques.

Field measurements were taken using tape measures, calipers, and an ultrasonic thickness gauge to verify structural component dimensions. Observed deficiencies were recorded on member-specific field inspection forms. Digital photographs were taken of the fatigue prone details and other areas of interest or concern to further document the physical condition of the pier cap.

Inspection Team

The following individuals were part of the inspection team:

- Daniel Kent, Jr., PE, CBI — Team Leader
- Rob Parker, CBI — Inspector
- Matthew McFadden, EI, CBI — Inspector

Condition Rating

State and Federal guidelines for evaluating the condition of bridges have been developed to promote uniformity in the inspections performed by different teams at different times. Condition ratings are used to describe the existing, in-place bridge as compared to the as-built condition. The following table was used as a guide in evaluating the condition of the various members of the pier cap.

Summary Items (NBIS)	Condition	Defects
9	Excellent	Excellent Condition.
8	Very Good	No problems noted.
7	Good	Some minor problems.
6	Satisfactory	Structural elements show some minor deterioration.
5	Fair	All primary structural elements are sound but may have minor section loss, cracking, spalling, or scour.
4	Poor	Advanced section loss, deterioration, spalling, or scour.
3	Serious	Loss of section, deterioration, spalling, or scour have seriously affected primary structural components. Local failures are possible. Fatigue cracks in steel or shear cracks in concrete may be present.
2	Critical	Advanced deterioration of primary structural elements. Fatigue cracks in steel or shear cracks in concrete may be present or scour may have removed substructure support. Unless closely monitored it may be necessary to close the bridge until corrective action is taken.
1	"Imminent" Failure	Major deterioration or section loss present in critical structural components or obvious vertical or horizontal movement affecting structure stability. Bridge is closed to traffic, but corrective action may put it back in light service.
0	Failed	Out of service-beyond corrective action

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

1. *Manual of Bridge Inspection*, Ohio Department of Transportation (ODOT), 2025.
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. *National Bridge Inspection Standards*, U.S. Department of Transportation, 2004.

AASHTO National Bridge Element Quantities:

NATIONAL BRIDGE ELEMENTS RECORDING SHEET[1]									
Element	Defect	Env	Element/Defect Description	Total Qty	Units	Condition State Quantity			
						CS1	CS2	CS3	CS4
Superstructure									
PIER 1									
231		3	Steel Pier Cap	60	FT	5	54	1	
515		3	Steel Protective Coating	2,080	SQ FT	2,018	0	62	
Substructure									
PIER 1									
205		3	Reinforced Concrete Column	2	EA	2			

[1] Includes only the defects for the portions of the elements that were inspected during the NSTM inspection.

PIER CAP 1

Pier Cap 1 is in Good Condition [7] (Photo 1). No moisture was found inside of the cap during the 2025 inspection. Surface rust was found on the bottom of one interior pier diaphragm, on the underside of several flange tie plates, and on the interior bottom flange at one location.

Pier Cap 1 Interior

The interior paint is in Good Condition [7] with isolated areas of surface rust, including at the bottom of the Girder T diaphragm (Photo 2) and on the bottom flange tie plates of Girders T, U, V, and Z. The underside of the flange tie plates were not consistently re-painted during a previous rehabilitation. The south face diaphragm at Girder Z appears to have been previously primed but not painted. Intermittent tack welds were removed from the bottom flange backer bars and web plates. Miscellaneous tack welds were also removed from the web plates. Previously observed ponding water on the bottom flange plate near Girder T (Photo 3) was not present. No significant changes observed during the 2025 inspection.

Moderate surface rust was found on the bottom flange and bottom of south end plate between the south bearing stiffener and the end plate. The previously observed 6-8" of standing water (Photo 4) between south bearing stiffener and end plate was not present. Area was dry during 2025 inspection. There were numerous areas of paint cracking from excess paint that is peeling.

Photo 1: Pier Cap 1 Elevation

Photo 2: Active Corrosion Under Stiffener at Girder T, South Face

Photo 3: Previously Reported Area of Ponding Water on the Bottom Flange Tie Plate of Girder T Not Present. Dry During 2025 Inspection

Photo 4: Surface Corrosion on the Bottom Flange Between the South Bearing Stiffener and End Plate.

Pier Cap 1 Exterior

The exterior paint is in Good Condition [7] with small, isolated spots of minor corrosion. During a previous rehabilitation, the bolted connections of the drainpipe support brackets remain, but the drainpipes appear to be rerouted (Photo 5). The web plates were retrofit with stress relief drilled holes connected by vertical saw cuts adjacent to the welded connections of the bottom flange tie plates of the interior girders at both webs, Girder T at the east web, and Girder Z at the west web. Porosity was noticed in the fillet welds around the bottom flange tie plates, but they appear to be sound. Fillet welds between the west web and knee braces below Girders X, Y, and Z intersect the groove weld of the web and bottom flange (Photo 6). There was a small crack indication previously noted above the weld on one bottom flange knee brace on the east face of Girder U connection, but it was verified that the weld was not cracked. Corrosion exists where paint was previously removed.

The cover plate on both access hatches have been replaced. The south access hatch has 1-1/2" x 1/2" area of 100% section loss, and up to 50% section loss for the rest of the width (Photo 7). Both access hatches have been retrofitted with bolts to secure closure and rain shields. The north and south pot bearings both have minor surface rust but appear to function appropriately (Photo 8).

Photo 5: Bolted Downspout Brackets.

Photo 6: Typical Fillet Weld of the Girder Knee Brace and West Web Intersecting the Groove Weld Between the Web and Bottom Flange. Dog Bone Retrofit in Cap Web.

Photo 7: 1" of 100% Section Loss at South End Hatch Opening.

Photo 8: Typical Condition of North Bearing.

Pier Cap 1 Fatigue Prone Details

Fatigue Prone Detail 1
Fillet welds between diaphragms or stiffeners and web or flange plates.
Category: C'
Location: All girder diaphragms and we 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 weld between the west web and knee brace below girder Z intersecting the groove weld of the web and bottom flange.

Fatigue Prone Detail 9
Drilled hole stress relief retrofit in web plates.
Category: B.
Location: Both web plates on each side of all interior girders, east web plate on each side of girder T, and west web plate on each side of girder Z.

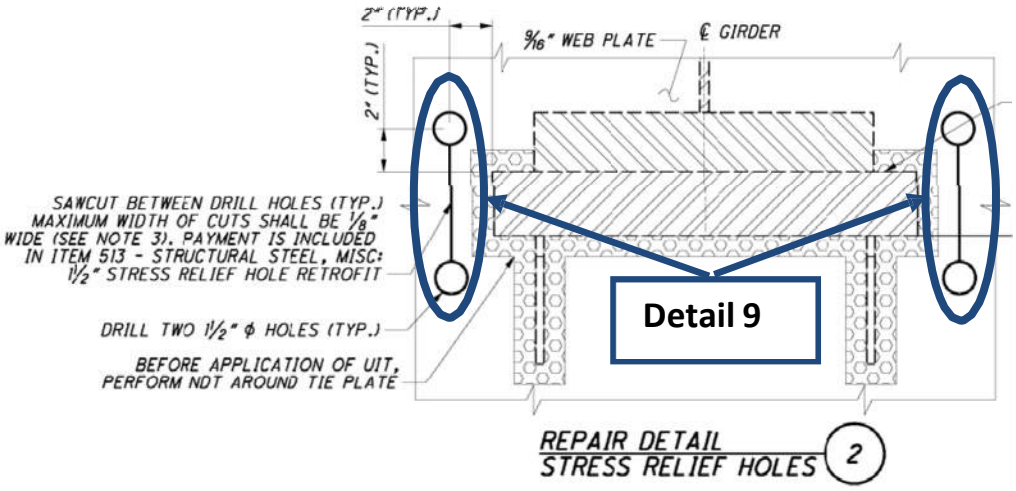


Figure 5: Drilled hole stress relief retrofit in web plates.

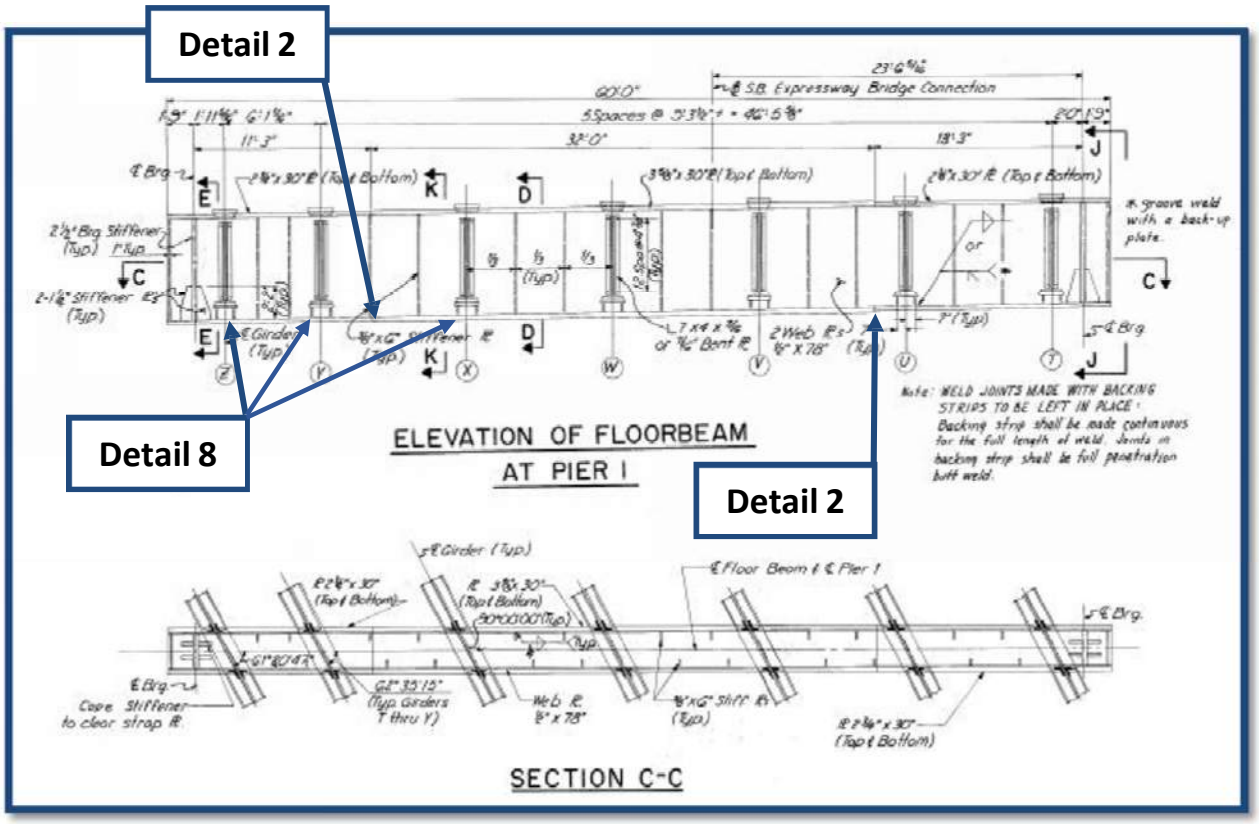


Figure 6: Plan and Elevation of Pier Cap 1 with Fatigue Prone Details.

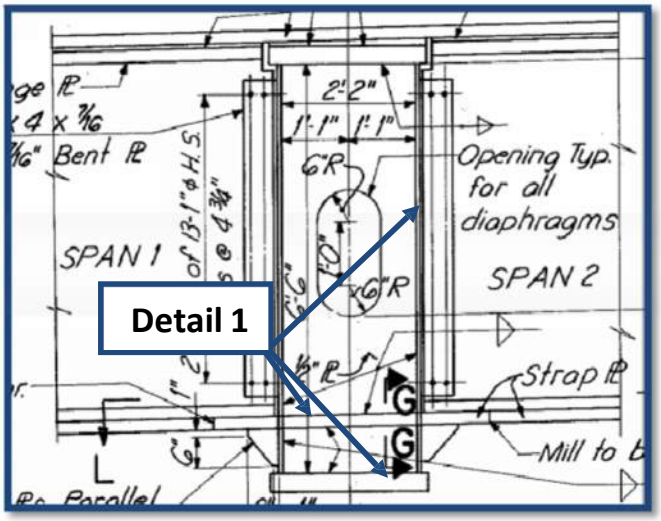


Figure 7: Section through girder diaphragm.

CONCLUSIONS AND RECOMMENDATIONS

Based on this inspection, the NSTM pier cap of Bridge No. HAM-71-0197W and its associated fatigue prone details are in Good Condition [7] overall. The recommendations for maintenance of the pier cap are presented in the following four categories:

Priority Repairs (Within 1 Year Period)
Work which should be performed as soon as possible to address deficiencies which affect the capacity of the structure or public safety

Rehabilitation/Evaluation (Within 5 Year Period)
Recommendations for large-scale deficiencies which are extensive in nature and require engineering analysis.

Maintenance (Within 2-4 Month Period)
Recommendations that are minor in nature and can be performed by maintenance personnel or through small maintenance repair contracts.

Monitoring (As Recommended)
Regular field observations of deficiencies which are not currently in need of repair but will require corrective action if deterioration continues.

Pier Cap 1 – Recommendations:

Priority Repairs:	None
Rehabilitation/Evaluation:	Consider retrofits of Category E details of intersecting welds. Simple drilled and ground retrofit at intersection recommended.
Maintenance:	Spot clean and paint the interior, focusing on the underside of the flange tie plates and adjacent areas, and repaint the south end plate.
Monitoring:	Continue to monitor fatigue prone details at a 24-month cycle.

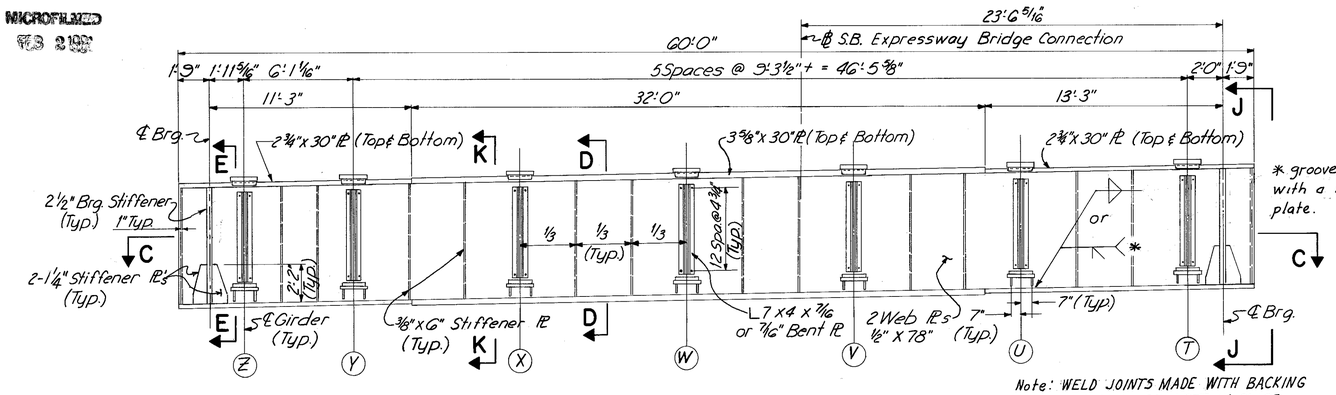
APPENDIX A

EXISTING PIER PLANS

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

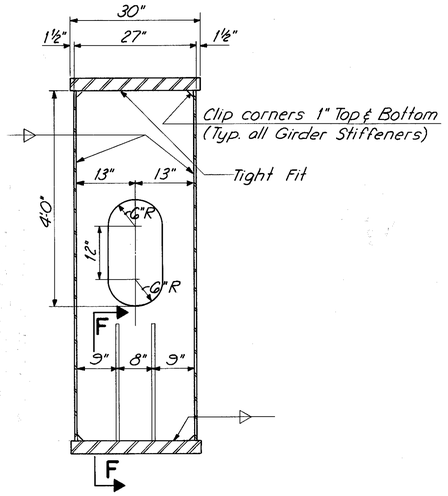
402
494

HAMILTON COUNTY
HAM-471-0.30

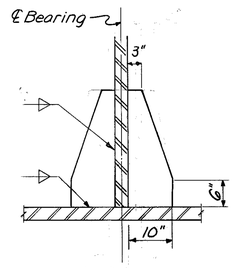


Note: WELD JOINTS MADE WITH BACKING STRIPS TO BE LEFT IN PLACE: Backing strip shall be made continuous for the full length of weld. Joints in backing strip shall be full penetration butt weld.

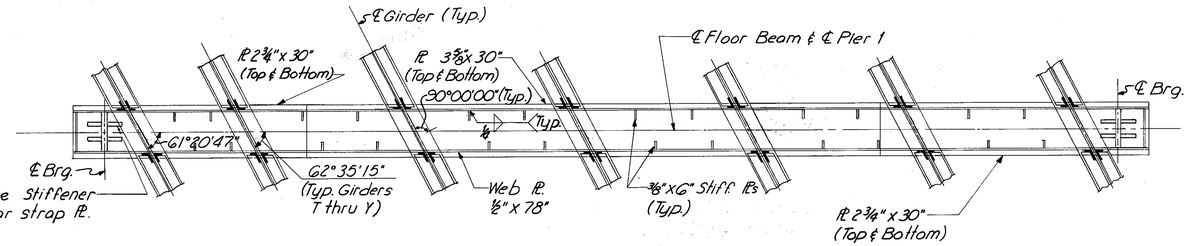
ELEVATION OF FLOORBEAM AT PIER 1



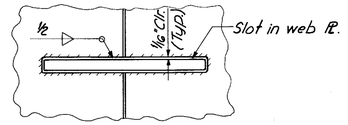
SECTION E-E



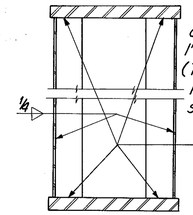
SECTION F-F



SECTION C-C

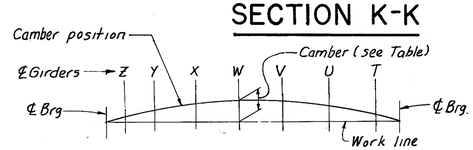


SECTION G-G

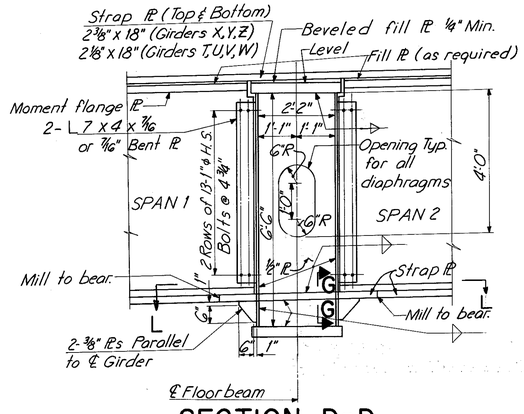


SECTION K-K

Note: Milled ends of Compression Splice on bottom flanges of girders shall be brought to full bearing against milled ends of floor beam brackets before the holes in the compression strap plate are field drilled full size and bolts tightened. Holes may be sub-punched or sub-drilled in the shop.

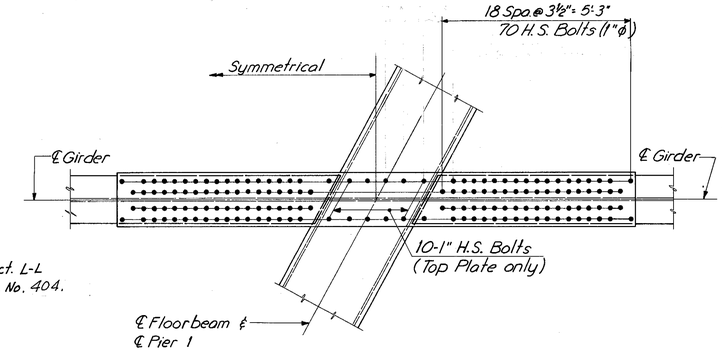


FLOORBEAM CAMBER DIAGRAM

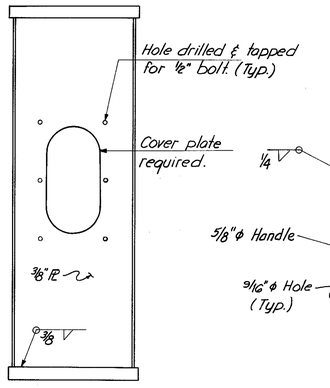


SECTION D-D

For Sect. L-L see Sh. No. 404.

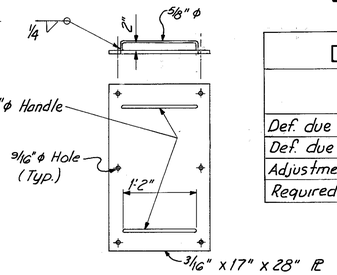


PLAN OF SPLICE PLATE



SECTION J-J

(Typ each end)



COVER PLATE

(For Access Hole)

For fillet weld sizes not shown see "Table of Fillet Weld Sizes" sh. No. 468.

DEFLECTIONS & CAMBER (INCHES)

	Girders						
	Z	Y	X	W	V	U	T
Def. due to weight of steel	0	0	1/16	1/16	1/16	1/16	0
Def. due to remaining D.L.	1/16	1/8	1/4	5/16	5/16	3/16	0
Adjustment req'd for convexity	1/16	3/4	1 3/16	1 7/8	1 3/8	1/8	3/4
Required shop camber	1/8	7/8	2 1/8	2 1/4	1 3/4	1 3/8	3/4

HAZELET & ERDAL
CONSULTING ENGINEERS
CINCINNATI, OHIO

12/23

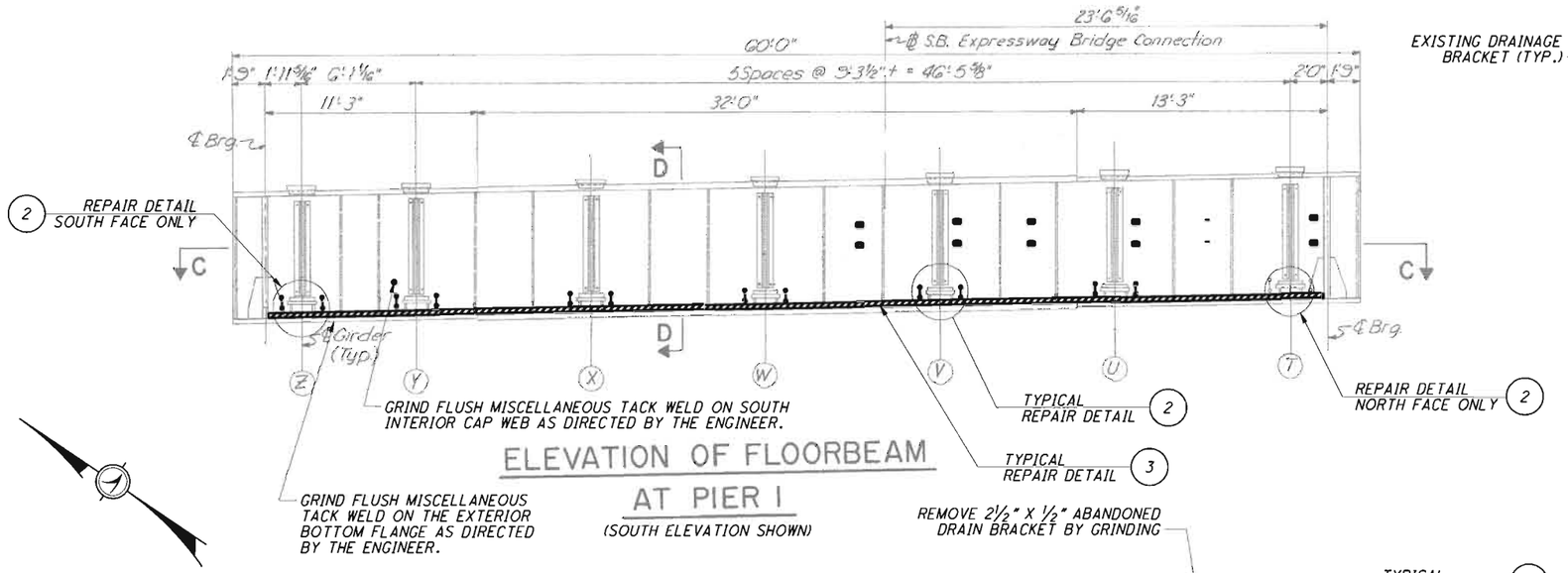
STRUCTURAL STEEL DETAILS
BRIDGE NO. HAM-471-0076

SOUTHBOUND EXPRESSWAY BRIDGE CONNECTION AND RAMP GF OVER RAMP GD H&E BRIDGE NO. 12

DESIGNED	DRAWN	TRACED	CHECKED	REVIEWED DATE	REVISED
WL	JHD		YYL 3-1-71	JHD 11-9-72	

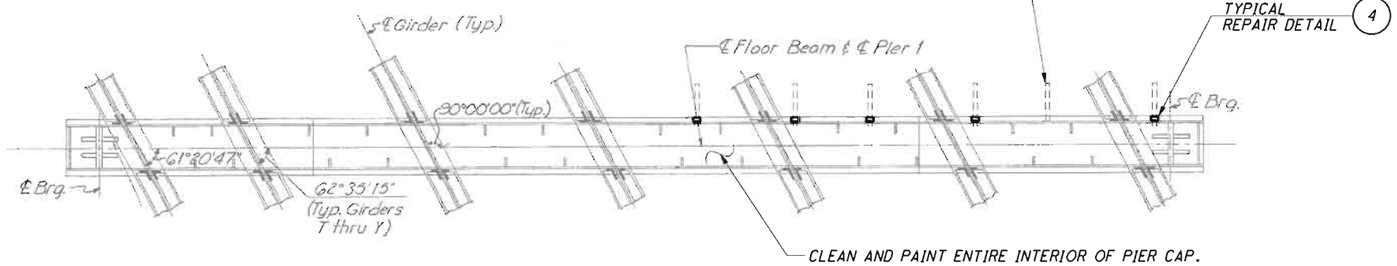
APPENDIX B

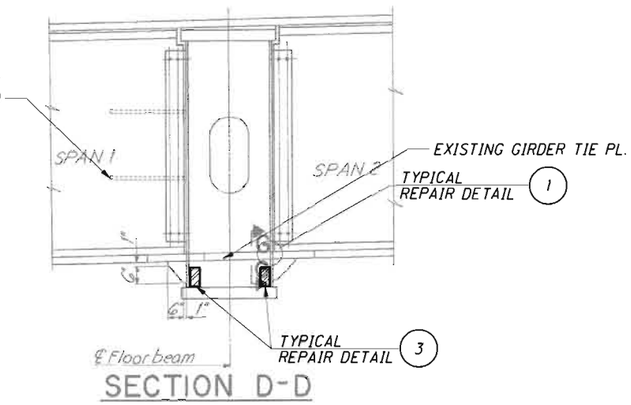
REHABILITATION PLANS



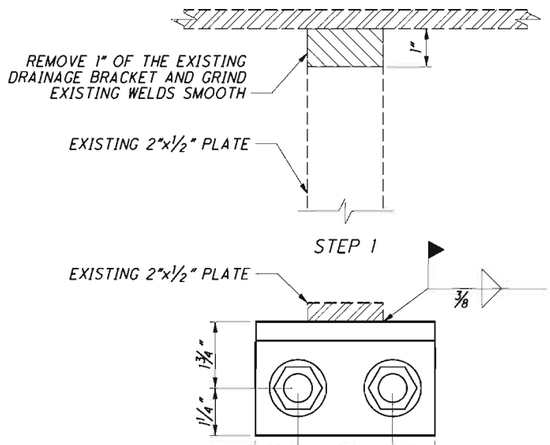
ELEVATION OF FLOORBEAM AT PIER 1

(SOUTH ELEVATION SHOWN)

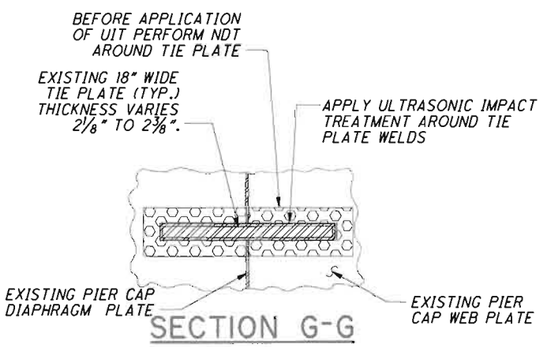




SECTION D-D



REPAIR DETAIL DRAIN BRACKET RETROFIT 4

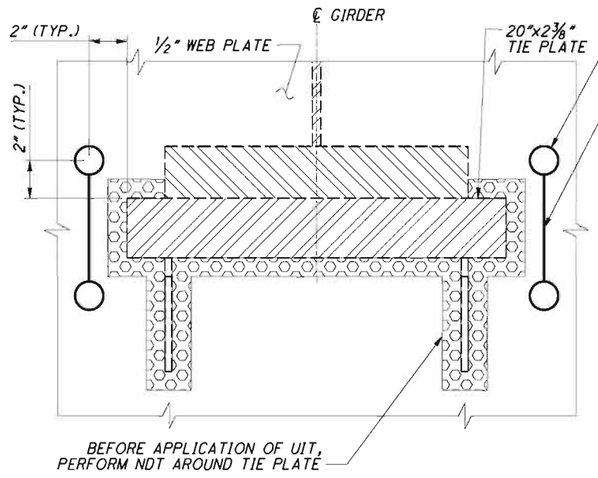


SECTION G-G

REPAIR DETAIL INTERIOR TIE PLATE TREATMENT 1

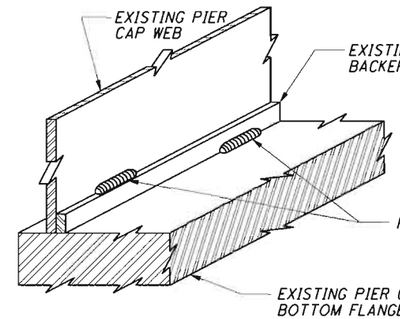
- LIMITS OF ½" WIDE ULTRASONIC IMPACT TREATMENT (UIT)

SECTION C-C



REPAIR DETAIL STRESS RELIEF HOLES 2

(FOR GIRDERS U, V, W, X, Y AT NORTH AND SOUTH WEB PLATES, Z AT SOUTH WEB PLATE, AND T AT NORTH WEB PLATE)



REPAIR DETAIL BACKING BAR WELD REMOVAL DETAIL 3

NOTES:

1. PIER ELEVATION AND SECTIONS C-C, D-D, AND G-G ARE TAKEN FROM THE ORIGINAL PLANS.
2. CLEAN AND PAINT REPAIR AREAS ON THE EXTERIOR OF THE PIER CAP.
3. CARE SHALL BE TAKEN NOT TO OVERCUT SAWCUT BEYOND DRILLED HOLES. FLAME CUTTING IS NOT PERMITTED.

DESIGN AGENCY: TranSystems, 55 PUBLIC SQUARE, SUITE 1900, CLEVELAND, OHIO 44113

DESIGNED	DRAWN	REVIEWED	DATE
NBR	NBR	WRW	12-05-07
CHECKED	REVISED	STRUCTURE FILE NUMBER	
BKC		3106659	

PIER 1 CAP RETROFIT DETAILS

BRIDGE NO. HAM-71-0197W

RAMP TO I-471 OVER GILBERT AVENUE

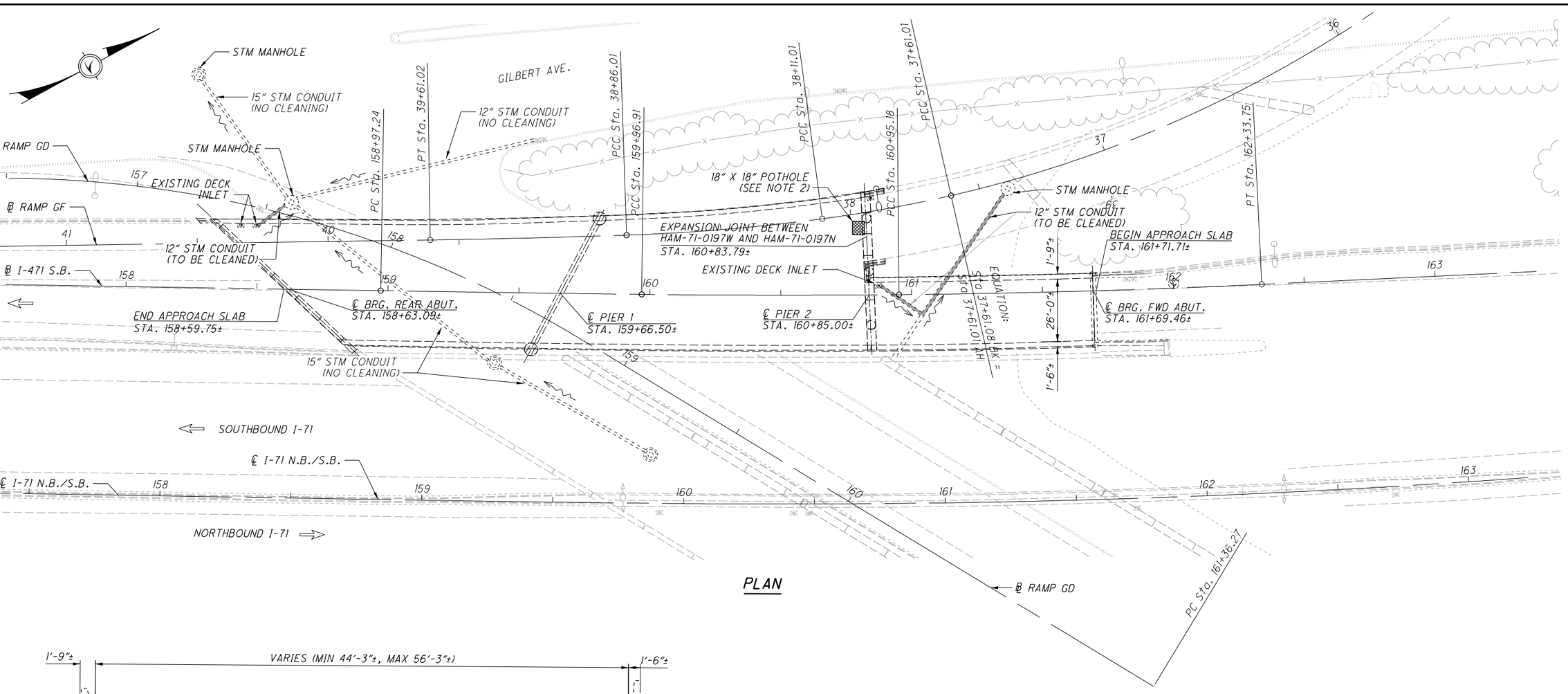
RAMP T AVENUE

HAM-BH-VAR

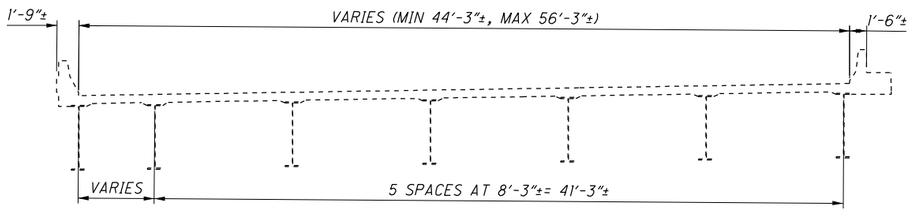
PID No. 25374

29
38

4/17/2008
P:\2426 03-ODOT 8 Pier Cap\2007 PID25374 DRAWINGS\(#) HAM-71-0197W\HAM-71-0197W P1.dgn



PLAN



TYPICAL SECTION (SPANS 1 AND 2)

PROPOSED WORK

1) CLEAN EXISTING DRAINAGE SYSTEM FROM THE DECK INLETS TO THE FIRST MANHOLE.

2) PATCH SMALL POTHOLE (APPROXIMATELY 18"X18") NEAR THE EXPANSION JOINT AT HAM-71-0197N WITH ITEM 519 PATCHING.

3) SEAL WEARING SURFACE WITH GFR.

EXISTING STRUCTURE	
TYPE:	CONTINUOUS STEEL PLATE GIRDERS (SPAN 1 & 2) SIMPLE SPAN STEEL GIRDER (SPAN 3) WITH WITH REINFORCED CONCRETE DECK AND SUBSTRUCTURE
SPANS:	103'-5", 118'-6", & 84'-5½" C/C BRGS
ROADWAY:	VARIES
LIVE LOADING:	HS 20-44 AND THE INTERSTATE ALTERNATE LOADING
SKEW:	VARIES
WEARING SURFACE:	2¼" MICROSILICA MODIFIED CONCRETE OVERLAY
APPROACH SLABS:	AS-1-67 (25'0" LONG)
ALIGNMENT:	VARIES
SUPERELEVATION:	VARIES
STRUCTURAL FILE NUMBER:	3106659
DATE BUILT:	1976
DISPOSITION:	MINOR REPAIRS

PROPOSED STRUCTURE	
TYPE:	CONTINUOUS STEEL PLATE GIRDERS (SPAN 1 & 2) SIMPLE SPAN STEEL GIRDER (SPAN 3) WITH WITH REINFORCED CONCRETE DECK AND SUBSTRUCTURE
SPANS:	103'-5", 118'-6", & 84'-5½" C/C BRGS
ROADWAY:	VARIES
LIVE LOADING:	HS 20-44 AND THE INTERSTATE ALTERNATE LOADING
SKEW:	VARIES
WEARING SURFACE:	2¼" MICROSILICA MODIFIED CONCRETE OVERLAY
APPROACH SLABS:	AS-1-67 (25'0" LONG)
ALIGNMENT:	VARIES
SUPERELEVATION:	VARIES
COORDINATES:	LATITUDE 39° 06' 33" N LONGITUDE 84° 30' 07" W

DESIGN AGENCY
PALMER ENGINEERING
8995 E. KEMPER RD - SUITE B
CINCINNATI, OH 45249
ENGINEERING CINCINNATI, OH 45249

DESIGNED SDW | DRAWN EI | REVIEWED BJF | DATE 5/30/2016
CHECKED CEJ | REVISED XXX | STRUCTURE FILE NUMBER 3106659

HAMILTON COUNTY
STA. 158+59.75
STA. 161+71.71

GENERAL PLAN
BRIDGE NO. HAM-71-0197W
I-471 S.B. OVER RAMP RD

HAM-71-1.97
PID No. 82975

1 / 1

261
292

O:\ODOT\HAM\82975_HAM-71-1.34\Design\Structures\HAM071_0197W\Sheets\071_0197W_SG001.dgn HAM-71-1970W SHEET 9/16/2016 2:59:18 PM dan-f

GANNETT FLEMING

8890 Lyra Road, Suite 110
Columbus, OH 43240