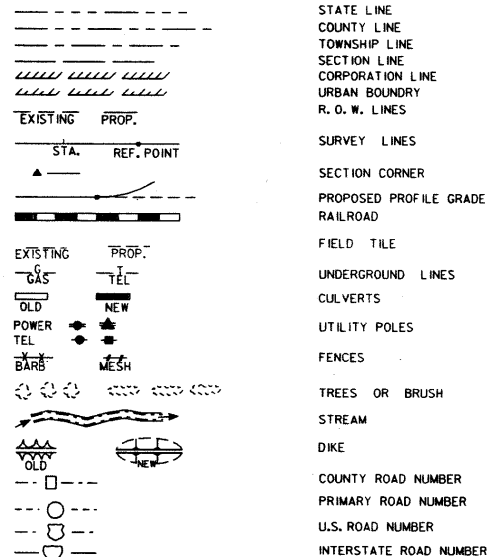


BRIDGE DECK REPAIR
FN-21-1(23)--21-54

KEOKUK COUNTY

CONVENTIONAL SIGNS



RECEIVED
DIST. 100
92 DEC 15 1988

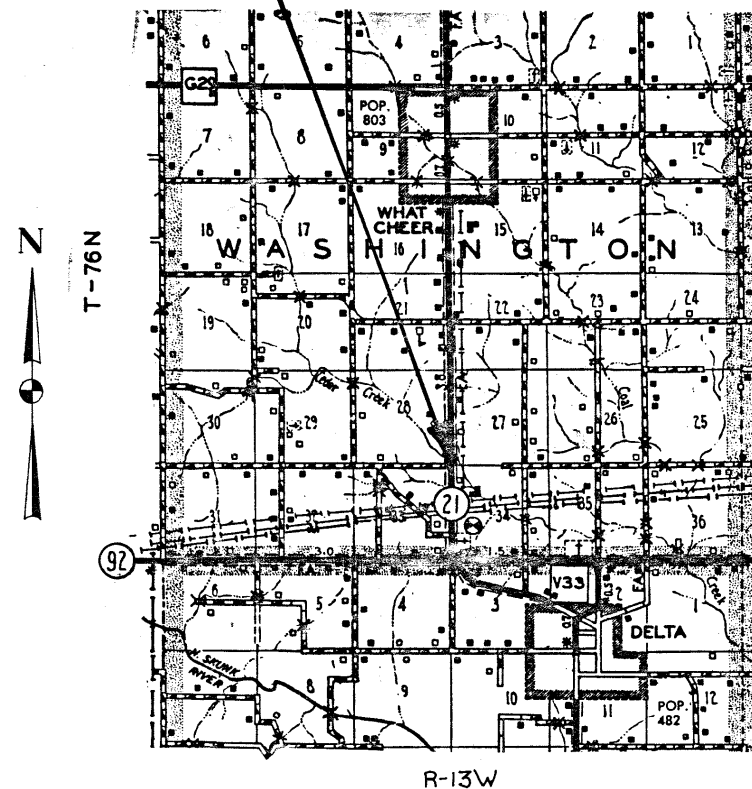
IOWA
DEPARTMENT OF TRANSPORTATION
Highway Division
PLANS OF PROPOSED IMPROVEMENTS ON THE
PRIMARY ROAD SYSTEM
KEOKUK COUNTY
BRIDGE DECK REPAIR
ON IOWA 21 - OVER CEDAR CREEK - 1.2 MILES NORTH
OF IOWA 92

SCALES: As Noted

The standard specifications, series of 1984 of the Iowa Department of Transportation, shall apply to construction work on this project.

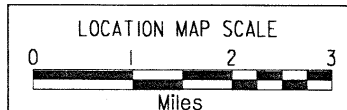
(PLUS CURRENT SUPPLEMENTAL SPECIFICATIONS AND SPECIAL PROVISIONS)

DESIGN NO. 188



5414.53021

880798
002631 113/228



CONSTRUCTION PLANS SHOWING PROJECT AS BUILT

Plan Preparation Supervised By: JOHN A. CARNS
Resident Construction Engineer
Date 3/29/91 Iowa Reg. No. 11228

REVIEWED AND FORWARDED TO AMES

District Construction Engineer Date _____
One 50% Reduced and Two Full-Size Prints To Be Made and Returned To _____
District Engineer

AFTER MICROFILMING RETURN ORIGINAL
TO DISTRICT NO. 5

* 150*

STANDARD ROAD
PLANS

IDENT	DATE	IDENT	DATE
RE-2A	2-17-87		
RE-7	5-13-86		
RE-12A	5-13-86		
RE-47	1-10-87		
RE-48A	8-20-85		
RE-52	7-21-87		
RE-57	9-23-86		
RF-19E	2-17-87		
RH-2A	1-19-88		
RH-2B	7-21-87		
RH-41A	2-17-87		
RK-16	2-17-87		
RS-2	8-20-85		
RS-3	1-19-88		

STANDARD BRIDGE
PLANS

STANDARD	ISSUED	REVISED

REVISIONS



AUTHORIZED FOR LETTING
R. C. Anderson 3-11-88
DEPUTY CHIEF ENGINEER DATE

I hereby certify that this plan was prepared under my supervision and that engineering decisions with regard to the design were made by me or by other duly Registered Professional Engineers under the laws of the State of Iowa.

Name Wm. A. Anderson
Iowa Registration No. 4449 Date 3/10/88

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
APPROVED

FOR THE DIVISION ADMINISTRATOR DATE

I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED BY ME OR UNDER MY DIRECT PERSONAL SUPERVISION AND THAT I AM A DULY REGISTERED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF IOWA

3-9-88
DATE

L. Ray Phillips
LEROY PHILLIPS

REG. NO. 4136

DESIGN NO. 188	OVER CEDAR CREEK	STATION: 57+50	
KEOKUK COUNTY	MAINT. NO. 5414.55021		
SECTIONS 27/28	T-76N R-13W	WASHINGTON TOWNSHIP	
DESIGN FOR REPAIRS TO A 80' X 30' STEEL DECK GIRDER BRIDGE W/ 19'-10 1/2" CONC. SLAB APPR. SPANS			
FINAL QUANTITIES			
NO.	ITEM	UNIT	TOTAL
1	CLASS A BRIDGE FLOOR REPAIR	SQ. YD.	101.94
2	BRIDGE FLOOR OVERLAY	SQ. YD.	398
3	TEMPORARY FLOODLIGHTING	L.S.	\$ 3000.00
4	PAVEMENT MARKINGS	STA.	79.74
5	TRAFFIC CONTROL	L.S.	\$ 4125.00
6	TEMPORARY BARRIER RAIL - FURNISH ONLY	L.F.	380
7	TEMPORARY BARRIER RAIL - PLACE ONLY	L.F.	760
8	CONCRETE SEALER AS PER PLAN	SQ. FT.	409
9	CONCRETE BARRIER RAIL - CAST IN PLACE	L.F.	235.5
10	STRUCTURAL STEEL	LBS.	5784
11	STRUCTURAL CONCRETE - CLASS D	CU. YDS.	2.5
12	REINFORCING STEEL - EPOXY COATED	LBS.	234.0
13	STEEL EXTRUSION JOINT WITH NEOPRENE	L.F.	31
14	2 1/2" PREFORMED ELASTIC NEOPRENE JOINT	L.F.	33.0
15	TEMPORARY TRAFFIC SIGNALS	L.S.	\$ 3500.00
16	BRIDGE REPAIR	L.S.	\$ 10,000.00
17	REMOVALS AS PER PLAN	L.S.	\$ 8,000.00
18	CLEANING AND PAINTING STRUCTURAL STEEL	L.S.	\$ 3,000.00
19	REGULAR CONTAINMENT	L.S.	\$ 500.00
20	BACKFILL, SPECIAL	TONS	44
21	BRIDGE APPROACH SECTION, REINFORCED	SQ. YDS.	69.6
22	GUARDRAIL, END ANCHORAGE, BEAM, RE-52	NO.	5
23	GUARDRAIL, FORMED STEEL BEAM	LIN. FT.	287.5
24	GUARDRAIL, POSTS, BEAM	NO.	51
25	PAV'T., STD P.C. CONC. CLASS C, 10 IN.	SQ. YDS.	46.4
26	PAVED SHLDRS., CLASS 1 P.C. CONC.	SQ. YDS.	0
27	REMOVAL OF OBJECT MARKERS	NO.	12
28	REMOVAL OF PAVEMENT	SQ. YDS.	122
29	DELINEATOR, SINGLE WHITE	NO.	14
30	OBJECT MARKER, TYPE 3	NO.	4
31	OBJECT MARKER, TRIPLE YELLOW	NO.	9
32	MOBILIZATION	L.S.	\$ 7000.00
33	FLAGGERS	DAYS	13
8001	SHOULDERS GRANULAR TYPE "B"	TON	16.85
8002	GUARDRAIL REPAIR	L.S.	\$ 175.25
8003	PRICE ADJUSTMENT	L.S.	\$ 291.86

REFERENCE INFORMATION	
Data listed below is for informational purposes only and shall not constitute a basis for any extra work orders	
ITEM NO.	DESCRIPTION
4	INCLUDES 46.3 STA. REMOVAL OF PAVEMENT MARKINGS, 31.4 STA. OF YELLOW TEMPORARY AND PERMANENT PAVEMENT MARKINGS, AND 16.9 STA. OF WHITE TEMPORARY AND PERMANENT PAVEMENT MARKINGS.
6 & 7	ALL TEMPORARY BARRIER RAIL SHALL BE NOMINAL 10' LONG CONCRETE UNITS.
9	INCLUDES 1248 L.F. OF NO. 5 BAR AND 115 L.F. OF NO. 6 BAR OF EPOXY COATED REINFORCING STEEL, AND 9.9 CU. YD. OF CLASS D STRUCTURAL CONCRETE.
12	INCLUDES 66 L.F. OF NO. 5 BAR AND 115 L.F. OF NO. 6 BAR OF EPOXY COATED REINFORCING STEEL.
13	INCLUDES ALL NECESSARY HARDWARE AND ACCESSORIES INCLUDING THE SHIM PLATES, TEMPORARY ERECTION MATERIAL AND THE 3/8" CURB PLATES AND THEIR ANCHORAGE SYSTEMS.
15	TRAFFIC SIGNALS ARE TO BE REMOVED AND ARE TO REMAIN THE PROPERTY OF THE CONTRACTOR.
20, 21, 25, 26 & 28 REFER TO STD. RD. PLAN RK-16 FOR DETAILS.	
27	TO BE HAULED TO MAINTENANCE YARD AS DIRECTED BY THE ENGINEER.
28	TO BE DISPOSED OF AS PER STD. NOTATION 213-1.

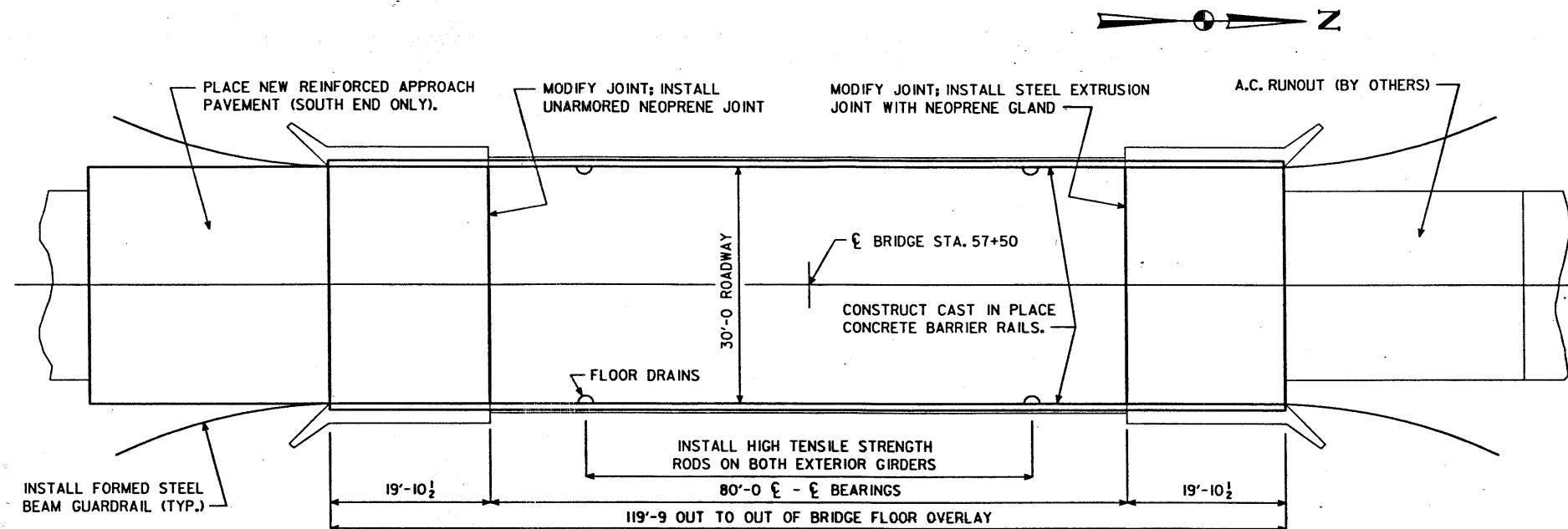
ESTIMATE SHEET

FILE NO. 26969

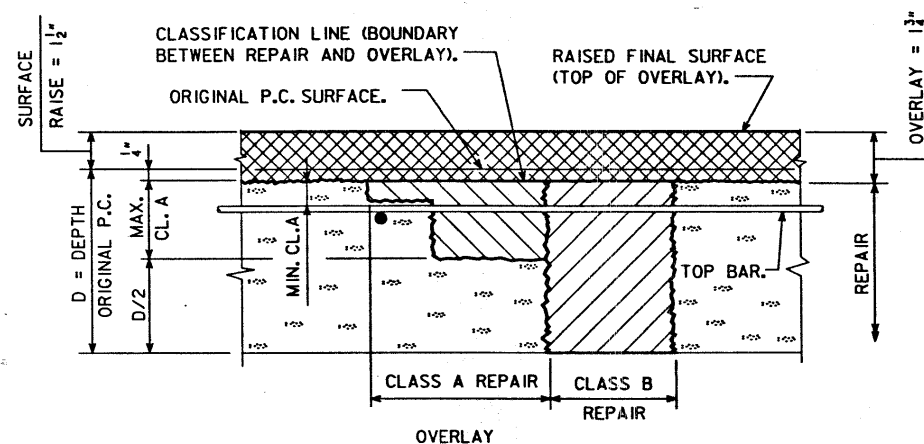
KEOKUK COUNTY

PROJECT NO. FN-21-1(23)--21-54

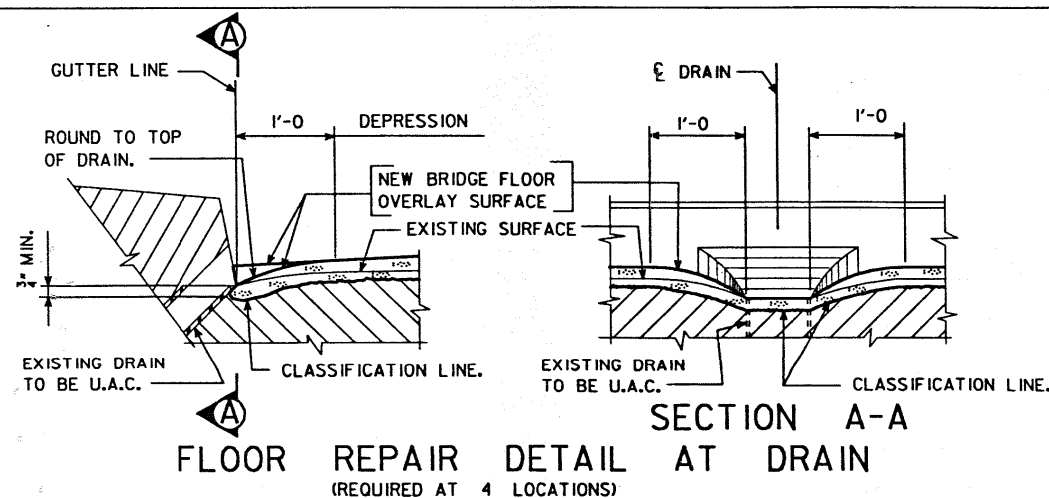
STATE	FHWA REGION	F.Y.	SHEET	TOTAL
IOWA	7		2	15



SITUATION PLAN



REPAIR AND OVERLAY DEFINITION



FLOOR REPAIR DETAIL AT DRAIN
(REQUIRED AT 4 LOCATIONS)

NOTE:
ROADWAY QUANTITIES SHOWN
ELSEWHERE IN THESE PLANS.

SPECIFICATIONS:
CONSTRUCTION: IOWA DEPARTMENT OF TRANSPORTATION SPECIFICATION,
SERIES OF 1984, PLUS CURRENT SUPPLEMENTAL SPECIFICATIONS
AND SPECIAL PROVISIONS.

DESIGN STRESSES:
DESIGN STRESSES FOR THE FOLLOWING MATERIALS ARE IN ACCORDANCE WITH
THE AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES, SERIES OF 1983.
REINFORCING STEEL IN ACCORDANCE WITH SECTION 8, GRADE 60.
CONCRETE IN ACCORDANCE WITH SECTION 8, $f'_c = 3,500$ PSI.
STRUCTURAL STEEL IN ACCORDANCE WITH SECTION 10, ASTM A-36, EXCEPT
AS NOTED.

LOCATION:

MAINTENANCE NO. 5414.5S021
1A. #21 OVER CEDAR CREEK
T-76N, R-13W
SECTION 27 & 28
WASHINGTON TWP.
KEOKUK COUNTY

DESIGN HISTORY AT THIS SITE

DES. NO.	TYPE OF WORK
1448	ORIGINAL DESIGN
188	DECK REPAIR AND STRENGTHENING

DESIGN FOR REPAIRS TO A
80'x30' STEEL DECK GIRDER BRIDGE
W/19'-10 1/2 CONC. SLAB APPR. SPANS
SITUATION PLAN & QUANTITIES
STA. 57+50
JANUARY, 1988
KEOKUK COUNTY
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 1 OF 13 FILE NO. 26969 DESIGN NO. 188

TOTAL BRIDGE QUANTITIES			
ITEM NO.	ITEM	UNIT	QUANTITY
1	CLASS A BRIDGE FLOOR REPAIR	SQ. YD.	101.94
2	BRIDGE FLOOR OVERLAY	SQ. YD.	398
3	TEMPORARY FLOODLIGHTING	L. S.	1,200.00
4	PAVEMENT MARKINGS	STA.	79.74
5	TRAFFIC CONTROL	L. S.	1,125.00
6	TEMPORARY BARRIER RAIL - FURNISH ONLY	L. F.	380
7	TEMPORARY BARRIER RAIL - PLACE ONLY	L. F.	760
8	CONCRETE SEALER AS PER PLAN	SQ. FT.	409
9	CONCRETE BARRIER RAIL - CAST IN PLACE	L. F.	235.5
10	STRUCTURAL STEEL	LBS.	5784
11	STRUCTURAL CONCRETE - CLASS D	CU. YD.	2.5
12	REINFORCING STEEL - EPOXY COATED	LBS.	234.0
13	STEEL EXTRUSION JOINT WITH NEOPRENE	L. F.	31
14	2 1/2" PREFORMED ELASTIC NEOPRENE JOINT	L. F.	33
15	TEMPORARY TRAFFIC SIGNALS	L. S.	1,350.00
16	BRIDGE REPAIR	L. S.	1,000.00
17	REMOVALS AS PER PLAN	L. S.	1,800.00
18	CLEANING AND PAINTING STRUCTURAL STEEL	L. S.	1,300.00
19	REGULAR CONTAINMENT	L. S.	1,500.00

REFERENCE INFORMATION

- 4 INCLUDES 46.3 STA. REMOVAL OF PAVEMENT MARKINGS, 31.4 STA. OF YELLOW TEMPORARY AND PERMANENT PAVEMENT MARKINGS, AND 16.9 STA. OF WHITE TEMPORARY AND PERMANENT PAVEMENT MARKINGS.
- 6 & 7 ALL TEMPORARY BARRIER RAIL SHALL BE NOMINAL 10' LONG CONCRETE UNITS.
- 9 INCLUDES 1248 L.F. OF NO. 5 BAR AND 605 L.F. OF NO. 6 BAR OF EPOXY COATED REINFORCING STEEL, AND 9.9 CU. YD. OF CLASS D STRUCTURAL CONCRETE.
- 12 INCLUDES 66 L.F. OF NO. 5 BAR AND 115 L.F. OF NO. 6 BAR OF EPOXY COATED REINFORCING STEEL.
- 13 INCLUDES ALL NECESSARY HARDWARE AND ACCESSORIES INCLUDING THE SHIM PLATES, TEMPORARY ERECTION MATERIAL AND THE 3/8" CURB PLATES AND THEIR ANCHORAGE SYSTEMS.
- 15 TRAFFIC SIGNALS ARE TO BE REMOVED AND ARE TO REMAIN THE PROPERTY OF THE CONTRACTOR.

DESIGNED BY THAYNE SORENSON TRACED BY THAYNE SORENSON
DETAILED BY THAYNE SORENSON CHECKED BY THAYNE SORENSON

SECTION LEADER: L. Phillips

DECK REPAIR - QUANTITIES

STANDARD SHEET 1038

KEOKUK COUNTY

PROJECT NUMBER

FN-21-1 (23) --21-54

STATE
IOWA

FEDERAL
7

FISCAL
YEAR

SHEET
NO.

TOTAL
SHEETS

H54018800.S01

GENERAL NOTES:

THIS DESIGN IS FOR REPAIR TO THE EXISTING 80' x 30' STEEL DECK GIRDER BRIDGE WITH 19'-10½ CONCRETE SLAB APPROACH SPANS ON IOWA 21 OVER CEDAR CREEK, ORIGINAL DESIGN NO. 1448 KEOKUK COUNTY. PLANS OF THE EXISTING STRUCTURE MAY BE OBTAINED AT THE AMES OFFICE OF THE IOWA D.O.T.-HIGHWAY DIVISION. REPAIRS SHALL CONSIST OF BRIDGE FLOOR REPAIR, BRIDGE FLOOR OVERLAY, ADDING CAST IN PLACE BARRIER RAILS TO THE CURBS, STRENGTHENING OF THE EXISTING EXTERIOR STEEL GIRDERS BY THE ADDITION OF POST-TENSIONING RODS, THE MODIFICATION OF THE JOINTS AT BOTH ENDS OF THE STEEL GIRDER BRIDGE, THE ADDITION OF SHEAR CONNECTORS TO THE EXISTING GIRDERS, THE REPLACEMENT OF APPROACH PAVEMENT AT THE SOUTH END OF THE BRIDGE, THE INSTALLATION OF NEW GUARDRAIL AND SOME CLEANING AND PAINTING OF STRUCTURAL STEEL.

EACH OF THE EXTERIOR GIRDERS SHALL REQUIRE FOUR POST-TENSIONING RODS, TWO PLACED ON EACH SIDE OF THE WEB. EACH ROD SHALL HAVE A MINIMUM CROSS SECTIONAL AREA OF 1.25 SQUARE INCHES AND CONFORM TO ASTM SPECIFICATIONS A722 (GRADE 150). ONE COUPLING PER ROD WILL BE PERMITTED, PROVIDED THE COUPLING HAS BEEN TESTED AND DOCUMENTATION IS PROVIDED TO THE ENGINEER TO CONFIRM THE COUPLING CAN TRANSMIT THE ULTIMATE CAPACITY OF THE ROD (187.5 KIPS). THE ANCHOR NUT ON THE POST-TENSIONING RODS SHALL HAVE A CURVED SURFACE AND A MATCHING ANCHOR PLATE TO ACCOMMODATE SMALL UNALIGNMENT OF THE POST-TENSIONING ROD. THE ANCHOR PLATE SHALL BE OF SUCH SIZE AS TO FIT ON THE END OF THE ANCHORAGE ASSEMBLY AS DETAILED.

THE JACKING OPERATION WILL TAKE PLACE IN STAGES AS SPECIFIED IN THE "JACKING SEQUENCE" TABLE. FOUR JACKS WILL BE REQUIRED IN ORDER TO JACK ONE ROD ON EACH SIDE OF BOTH EXTERIOR GIRDERS SIMULTANEOUSLY. THE MINIMUM CAPACITY OF EACH JACK SHALL BE 75 TONS. EACH JACK SHALL BE CALIBRATED TO INSURE ACCURATE STRESSING OF THE POST-TENSIONING RODS. ELONGATION MEASUREMENTS OF THE POST-TENSIONING ROD SHALL BE TAKEN DURING THE JACKING SEQUENCE AND COMPARED WITH THE VALUES GIVEN IN THE "JACKING SEQUENCE" TABLE. IN THE EVENT THE ELONGATION VALUES DIFFER SIGNIFICANTLY FROM THOSE LISTED IN THE TABLE THE BRIDGE ENGINEER SHALL BE INFORMED AFTER THE POST-TENSIONING OPERATION IS COMPLETED. THE CONTRACTOR SHALL MONITOR THE CONCRETE DECK FOR ANY CRACKING DURING THE STRESSING OF THE POST-TENSIONING RODS. IF SIGNIFICANT CRACKING IS DETECTED, THE POST-TENSIONING FORCE SHALL BE RELEASED AND THE JACKING OPERATION HALTED UNTIL THE BRIDGE ENGINEER IS NOTIFIED AND HAS AUTHORIZED CONTINUATION OF THE PROCESS. THE JACKING OPERATION SHALL TAKE PLACE PREFERABLY BEFORE 12 NOON SO THAT THE TEMPERATURE EFFECT ON THE POST-TENSIONING PROCESS IS KEPT TO A MINIMUM. THE CONTRACTOR SHALL SUBMIT HIS PROPOSED JACKING APPARATUS, JACKING PROCEDURE AND JACK CALIBRATION DATA FOR REVIEW BY THE BRIDGE ENGINEER.

THE ANCHORAGE ASSEMBLIES SHALL BE BOLTED TO THE EXISTING EXTERIOR STEEL GIRDER USING 1" DIAMETER A325 HIGH STRENGTH BOLTS. HOLES IN THE ANCHORAGE ASSEMBLY SHALL BE DRILLED IN THE SHOP. THE ANCHORAGE ASSEMBLY SHALL BE USED TO MARK THE LOCATION OF HOLES TO BE FIELD DRILLED IN THE EXISTING EXTERIOR STEEL GIRDERS. HOLES ARE TO BE 1¼ IN. DIAMETER EXCEPT AS NOTED. THE ANCHORAGE ASSEMBLIES SHALL BE GIVEN THE FULL PAINT SYSTEM IN THE SHOP. SHOP PAINTING IS TO BE IN ACCORDANCE WITH SECTION 2508 OF THE STANDARD SPECIFICATIONS. SURFACES OF THE ANCHORAGE ASSEMBLY WHICH WILL BE IN CONTACT WITH THE EXISTING GIRDER WILL RECEIVE ONLY THE PRIME COAT OF PAINT.

IN THE AREA OF THE STEEL GIRDERS WHERE THE ANCHORAGE ASSEMBLIES WILL BE ATTACHED, THE SURFACE SHALL BE BLAST CLEANED TO A NEAR WHITE CONDITION IN ACCORDANCE WITH ARTICLE 2508.03 OF THE STANDARD SPECIFICATIONS. AS SOON AS POSSIBLE AFTER CLEANING, BOLT THE ANCHORAGE ASSEMBLIES TO THE GIRDER WEB AND FLANGE (APPLY NO PRIME COAT TO THE CONTACT SURFACE OF THE EXISTING GIRDER). AFTER ATTACHMENT OF ANCHORAGE ASSEMBLIES, PRIME THE REMAINING BARE METAL WITH EPOXY ALUMINUM PAINT AND APPLY THE INTERMEDIATE COAT AND FINISH COAT OF PAINT IN ACCORDANCE WITH SUPPLEMENTAL SPECIFICATION 994 EXCEPT THE SURFACE PREPARATION SHALL BE AS DESCRIBED ABOVE. THE JOINT BETWEEN THE ANCHORAGE ASSEMBLY AND THE STEEL GIRDER SHALL BE SEALED WITH A SMALL BEAD OF COMPATIBLE, ELASTOMERIC CAULKING COMPOUND AFTER THE PRIMER HAS BEEN APPLIED AND BEFORE THE APPLICATION OF VINYL PAINT.

THE POST-TENSIONING RODS USED IN THIS STRENGTHENING PROCEDURE AND A PORTION OF THE INTERMEDIATE SUPPORT BRACKETS SHALL BE EPOXY COATED IN ACCORDANCE WITH THE CURRENT STANDARD SPECIFICATIONS OF THE IOWA D.O.T. THE EPOXY COATING ON THE RODS SHALL BE EXCLUDED FROM THE ENDS OF THE RODS TO INSURE THE ANCHOR NUT AND COUPLER CAN BE TURNED AND SECURED AS NECESSARY. AFTER THE JACKING OPERATION IS COMPLETE AND THE ANCHOR NUTS AND COUPLERS ARE IN THEIR FINAL POSITION, THE NON EPOXY COATED PORTIONS OF THE RODS SHALL RECEIVE THE FOLLOWING PROTECTION. THE ENDS AT THE COUPLER SHALL BE COATED WITH EPOXY PATCHING MATERIAL IN ACCORDANCE WITH ARTICLE 415.03B OF THE STANDARD SPECIFICATIONS. THE END OF THE ROD AT THE ANCHORAGE ASSEMBLIES SHALL BE CLEANED AND PAINTED IN ACCORDANCE WITH SUPPLEMENTAL SPECIFICATION 994. THE EXCESS BAR LENGTH AT THE ROD END WHERE THE JACKS WERE POSITIONED MAY BE CUT OFF PROVIDED THERE IS ENOUGH BAR REMAINING TO REATTACH THE JACKS FOR FUTURE MAINTENANCE.

INTERMEDIATE SUPPORT BRACKETS SHALL BE PAINTED IN ACCORDANCE WITH ARTICLE 2508 OF THE STANDARD SPECIFICATIONS. THEY SHALL BE GIVEN THE FULL PAINT SYSTEM IN THE SHOP. BRACKETS SHALL BE BOLTED TO THE EXISTING GIRDER USING ¾" DIAMETER A325 HIGH

TENSILE STRENGTH BOLTS. NO PAINT SHALL BE REMOVED FROM THE EXISTING GIRDER AT THE LOCATION OF THE INTERMEDIATE BRACKET ATTACHMENT. THE CONTRACTOR SHALL TAKE NOTE OF THE BRACKETS DURING THE JACKING OPERATION TO INSURE THEY DO NOT RESTRICT MOVEMENT OF THE POST-TENSIONING RODS, AND THAT THEIR SOLE PURPOSE IS FOR INTERMEDIATE SUPPORT BEFORE AND AFTER THE JACKING OPERATION.

THE CONTRACTOR SHALL INSTALL ADDITIONAL SHEAR CONNECTORS DURING THE OVERLAY REPAIR OPERATION AS NOTED IN THESE PLANS. THE CONTRATOR SHALL TAKE CARE WHEN DRILLING THE CORES OUT OF THE DECK SO AS NOT TO DAMAGE THE STEEL GIRDERS.

THE BID ITEM "BRIDGE REPAIR" SHALL INCLUDE ALL COSTS ASSOCIATED WITH THE INSTALLATION OF THE ANCHORAGE ASSEMBLIES POST-TENSIONING RODS, INTERMEDIATE SUPPORT BRACKETS AND ADDITIONAL SHEAR CONNECTORS, THE JACKING OPERATION, AND THE MODIFICATIONS TO THE INTERMEDIATE DIAPHRAGMS NECESSARY IN ORDER TO PLACE THE POST-TENSIONING RODS.

THE BID ITEM "STRUCTURAL STEEL" SHALL INCLUDE THE COST OF FURNISHING THE EPOXY COATED POST-TENSIONING RODS, ALONG WITH THE ANCHOR NUTS, COUPLERS AND ANCHOR PLATES. ALSO INCLUDED SHALL BE THE COST OF FURNISHING THE ADDITIONAL SHEAR CONNECTORS REQUIRED, THE INTERMEDIATE SUPPORT BRACKETS, THE ANCHORAGE ASSEMBLIES AND THE HIGH STRENGTH BOLTS, NUT AND WASHERS. NOTE: THE POST-TENSIONING ROD SHALL BE OF SUFFICIENT LENGTH TO ACCOMMODATE THE JACKING PROCEDURE PROPOSED BY THE CONTRACTOR.

PLAN QUANTITY OF FLOOR REPAIR IS BASED ON THE "SURVEY PLOT" AS SHOWN IN THESE PLANS. HATCHED PORTIONS REPRESENT CLASS A BRIDGE FLOOR REPAIR. CROSS HATCHED PORTIONS, IF SHOWN, REPRESENT CLASS B BRIDGE FLOOR REPAIR. ACTUAL SPALLED AND HOLLOW AREAS, AS DETERMINED BY THE ENGINEER AT THE TIME OF CONSTRUCTION, SHALL BE REPAIRED. THE ENTIRE CONCRETE SURFACE OF THE BRIDGE FLOOR, INCLUDING AREAS OVER BRIDGE FLOOR REPAIR, SHALL HAVE BRIDGE FLOOR OVERLAY.

PRESENT FLOOR THICKNESS IS ABOUT 8" ON THE MAIN SPAN AND 11" ON THE APPROACH SPANS. THE CONTRACTOR SHALL EXERCISE CARE IN REMOVING CONCRETE IN ORDER TO PREVENT UNNECESSARY UNBONDING OF REINFORCING STEEL.

SURFACE RAISE, AS SHOWN ON THE PLANS, SHALL BE CONSIDERED A MINIMUM. IN ORDER TO LIMIT THE ADDITIONAL DEAD LOAD, SURFACE RAISE SHALL BE RESTRICTED TO A MAXIMUM OF ½" MORE THAN SHOWN ON THE PLANS. PROFILE MAY BE ADJUSTED TO THE EXTENT POSSIBLE WITHIN THESE LIMITS.

ALL DIMENSIONS AND DETAILS SHOWN ON THESE PLANS PERTINENT TO NEW CONSTRUCTION SHALL BE VERIFIED IN THE FIELD BY THE CONTRACTOR BEFORE STARTING CONSTRUCTION.

FAINT LINES ON PRINTS AND ON TRACINGS INDICATE EXISTING PORTION OF THE BRIDGE.

MINIMUM CLEAR DISTANCE FROM FACE OF CONCRETE TO NEAR REINFORCING BAR IS TO BE 2" UNLESS OTHERWISE NOTED OR SHOWN.

THE REINFORCEMENT SUPPLIED FOR THIS STRUCTURE IS TO BE GRADE 60 IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

THE CONTRACTORS ATTENTION IS DIRECTED TO THE FACT THAT ALL OF THE REINFORCING BARS ARE TO BE EPOXY COATED. SEE THE EPOXY COATED REINFORCING BAR LISTS IN THESE PLANS.

REMOVALS AND DISPOSALS OF ITEMS SCHEDULED FOR REMOVAL SHALL BE IN ACCORDANCE WITH SECTION 2401 OF THE SPECIFICATIONS. ANY DAMAGE TO ANY STEEL OR CONCRETE NOT TO BE REMOVED SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR AND REPAIRED BY HIM AT NO EXTRA COST TO THE STATE.

THE BID ITEM "REMOVALS AS PER PLAN" SHALL INCLUDE THE COST OF REMOVAL OF CONCRETE AT THE SOUTH ABUTMENT DIAPHRAGM, THE REMOVAL OF CONCRETE AT THE CURB TO ACCOMMODATE THE NEW JOINT MATERIAL AT BOTH ABUTMENTS AND THE REMOVAL OF THE CONCRETE DECK AS DETAILED IN ORDER TO PLACE ADDITIONAL SHEAR CONNECTORS. ALSO INCLUDED SHALL BE THE COST OF CUTTING THE EXISTING EXPANSION PLATE AS INDICATED IN ORDER TO ACCOMMODATE PLACEMENT OF THE NEW STEEL EXTRUSION.

THE A.C. RUNOUT TAPER AT THE NORTH END OF THE BRIDGE AS SHOWN WILL BE PLACED BY LOCAL HIGHWAY DIVISION MAINTENANCE FORCES BEFORE TRAFFIC IS SHIFTED TO NEW CONSTRUCTION. THE CONTRACTOR SHALL GIVE ADEQUATE PRIOR NOTICE SO THAT THE A.C. MAY BE PLACED DURING NORMAL WORKING HOURS AND WORKING DAYS OF MAINTENANCE.

THE CONTRACTOR SHALL CONSTRUCT NEW BRIDGE APPROACH PAVEMENT AT THE SOUTH END OF THE BRIDGE AS SHOWN AND NOTED. COST OF THIS WORK SHALL BE AS INDICATED IN THE "ESTIMATED ROADWAY QUANTITIES" SHOWN ELSEWHERE IN THESE PLANS.

THE MINIMUM DEPTH FOR CLASS A REPAIR IS TO BE 1½ INCHES IN AREAS WHERE TOP REINFORCING IS NOT PRESENT.

THE BID ITEM "STEEL EXTRUSION JOINT WITH NEOPRENE" IS TO INCLUDE ALL COSTS FOR FURNISHING AND INSTALLING THE STEEL EXTRUSION AND GLAND, AND ALL MATERIAL NECESSARY FOR THE FABRICATION AND INSTALLATION (INCLUDING CURB PLATES, 3x½ SHIM ½ AND TEMPORARY ERECTION MATERIAL) OF THE STRIP SEAL EXPANSION DEVICE AS DETAILED FOR THE NORTH ABUTMENT.

THE BID ITEM "2½" PREFORMED ELASTIC NEOPRENE JOINT" SHALL INCLUDE ALL COST OF FURNISHING AND PLACING THE NEOPRENE JOINT AT THE SOUTH ABUTMENT.

QUANTITY OF "CONCRETE SEALER, AS PER PLAN" IN SQUARE FEET, TO BE PAID FOR WILL BE COMPUTED FROM MEASUREMENTS OF AREAS ACTUALLY COVERED AND ARTICLE 1109.03 SHALL NOT APPLY. PLAN QUANTITY IS BASED ON P.C. CONCRETE FLOOR OVERLAY.

THE EXISTING STEEL HANDRAIL SHALL BE CLEANED AND PAINTED PRIOR TO PLACEMENT OF THE CAST IN PLACE CONCRETE BARRIER RAIL. CLEANING AND PAINTING SHALL BE IN ACCORDADNCE WITH SUPPLEMENTAL SPECIFICATION 994. LIMITS OF CLEANING AND PAINTING OF THE HANDRAIL SHALL BE AS INDICATED ON THE "CLEAN AND PAINT" DETAIL ON DESIGN SHEET 9. THE FINAL COAT OF PAINT SHALL BE WHITE IN COLOR.

THE BID ITEM "CLEANING AND PAINTING STRUCTURAL STEEL" SHALL INCLUDE THE COST OF CLEANING AND PAINTING THE EXISTING BRIDGE HANDRAIL, THE NORTH ABUTMENT EXPANSION DEVICE AS INDICATED, THE EXISTING GIRDERS AT THE ANCHORAGE ASSEMBLY LOCATIONS AND A PORTION OF THE SOUTH ABUTMENT DIAPHRAGM AS INDICATED IN THESE PLANS.

ENVIRONMENTAL PROTECTION SHALL BE PROVIDED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS. REGULAR CONTAINMENT WILL BE REQUIRED. THE COST OF FURNISHING ALL EQUIPMENT AND MATERIALS NECESSARY TO CONTAIN, COLLECT AND DISPOSE OF WASTE MATERIAL GENERATED DURING CLEANING AND PAINTING SHALL BE INCLUDED IN THE PRICE BID FOR "REGULAR CONTAINMENT".

TRAFFIC ON THE BRIDGE SHALL BE RESTRICTED TO A SINGLE LANE DURING THE REPAIR WORK EXCEPT DURING THE TIME THE POST-TENSIONING RODS ARE BEING STRESSED BY THE JACKING OPERATION. DURING THAT TIME, THE BRIDGE WILL BE CLOSED TO ALL TRAFFIC AND THE BRIDGE DECK CLEARED OF ALL CONSTRUCTION EQUIPMENT. THE TRAFFIC CONTROL PLAN IS SHOWN ELSEWHERE IN THESE PLANS.

PROPOSED CONSTRUCTION SEQUENCE:

1. CLOSE NORTHBOUND LANE TO TRAFFIC USING RS-3 ROAD STANDARD PLAN AND PLACE POST-TENSIONING APPARATUS ON EAST EXTERIOR GIRDER.

- A. MODIFY INTERIOR DIAPHRAGMS AS SHOWN ON PLANS.
- B. CLEAN SURFACE OF THE EXISTING GIRDER WHERE ANCHORAGE ASSEMBLIES ARE TO BE PLACED. GRIND LONGITUDINAL WEB WELD SMOOTH IN THIS AREA.
- C. INSTALL ANCHORAGE ASSEMBLIES AND INTERMEDIATE SUPPORT BRACKETS.

2. CLOSE SOUTHBOUND LANE TO TRAFFIC USING TEMPORARY BARRIER RAIL AND PERFORM STAGE I CONSTRUCTION.

- A. REPEAT STEPS 1 - A,B,C FOR THE WEST EXTERIOR GIRDER.
- B. SCARIFY BRIDGE DECK.
- C. PERFORM CLASS A & B DECK REPAIR. IF MORE THAN 25% OF THE BRIDGE DECK REQUIRES CLASS A REPAIR OR A LARGE AREA OF CLASS B OR CURB REPAIR IS ENCOUNTERED, CONTACT THE BRIDGE ENGINEER PRIOR TO PROCEEDING. SOUTH ABUTMENT DIAPHRAGM CONCRETE CAN BE REMOVED BUT NOT REPLACED AT THIS TIME. INSTALL ADDITIONAL SHEAR CONNECTORS.
- D. PLACE POST-TENSIONING RODS IN POSITION BETWEEN ANCHORAGE ASSEMBLIES ON BOTH EXTERIOR GIRDERS WITH THE INTERMEDIATE SUPPORT BRACKETS SUPPORTING THE RODS.
- E. STOP ALL TRAFFIC ON THE BRIDGE AND PERFORM THE POST-TENSIONING OPERATION ON BOTH EXTERIOR GIRDERS SIMULTANEOUSLY. SEE THE JACKING SEQUENCE TABLE ON DESIGN SHEET 8.
- F. COMPLETE WORK FOR STAGE I CONSTRUCTION INCLUDING PLACEMENT OF SOUTH ABUTMENT DIAPHRAGM CONCRETE, MODIFICATION OF NORTH ABUTMENT EXPANSION DEVICE, PAINTING OF THE EXISTING HANDRAIL, PLACEMENT OF OVERLAY AND CAST IN PLACE CONCRETE RAIL, REPLACEMENT OF APPROACH PAVEMENT, AND INSTALLATION OF APPROACH GUARDRAIL.

3. OPEN SOUTHBOUND LANE TO TRAFFIC AND CLOSE NORTHBOUND LANE USING TEMPORARY BARRIER RAIL. PERFORM STAGE II CONSTRUCTION

- A. SCARIFY BRIDGE DECK.
- B. PERFORM CLASS A & B DECK REPAIR. IF MORE THAN 25% OF THE DECK REQUIRES CLASS A REPAIR OR A LARGE AREA OF CLASS B OR CURB REPAIR IS ENCOUNTERED, CONTACT THE BRIDGE ENGINEER PRIOR TO REMOVAL OF CONCRETE.
- C. COMPLETE WORK FOR STAGE II CONSTRUCTION INCLUDING REMOVAL AND REPLACEMENT OF SOUTH ABUTMENT DIAPHRAGM CONCRETE, MODIFICATION TO NORTH ABUTMENT EXPANSION DEVICE, INSTALLATION OF ADDITIONAL SHEAR CONNECTORS, PAINTING OF EXISTING HANDRAIL, PLACEMENT OF OVERLAY AND CAST IN PLACE CONCRETE RAIL, REPLACEMENT OF APPROACH PAVEMENT, AND INSTALLATION OF APPROACH GUARDRAIL. INSTALLATION OF NEOPRENE GLAND AT NORTH ABUT. AND 2½" PREFORMED ELASTIC NEOPRENE JOINT MATERIAL AT SOUTH ABUT., PERFORM MISCELLENOUS PAINTING AS INDICATED ON THESE PLANS AND ADJUST INTERMEDIATE SUPPORT BRACKETS AS NECESSARY.

4. REMOVE TEMPORARY BARRIER RAIL AND PERFORM ALL SUCH OPERATONS AS NECESSARY TO REOPEN THE BRIDGE TO TWO WAY TRAFFIC.

THIS STRENGTHENED BRIDGE IS DESIGNED TO CARRY IOWA LEGAL LOADS BASED ON A YIELD STRENGTH OF 33,000 PSI FOR THE EXISTING STEEL GIRDERS.

DESIGN FOR REPAIRS TO A				
80'x30' STEEL DECK GIRDER BRIDGE				
w/19'-10½ CONC. SLAB APPR. SPANS				
REPAIR DETAILS				
STA. 57+50			JANUARY, 1988	
KEOKUK COUNTY				
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION				
DESIGN SHEET NO. 2 OF 13		FILE NO. 26969		DESIGN NO. 188

DESIGNED BY David G. Brown TRACED BY THAYNE SORENSON
DETAILED BY THAYNE SORENSON CHECKED BY Wesley T. Lee

KEOKUK COUNTY

PROJECT NUMBER

STATE

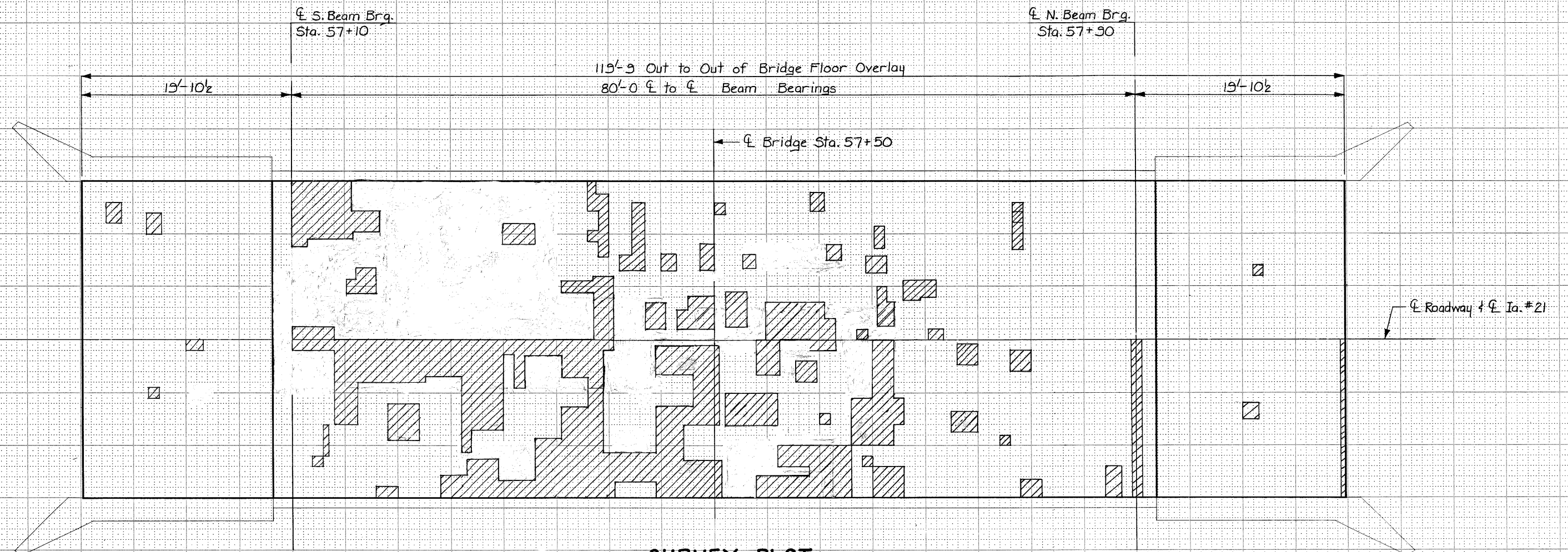
FHWA REGION

FISCAL YEAR

SHEET NO.

TOTAL SHEETS

H54018800.S02



SURVEY PLOT
Dated: 7-2-87

Design for Repairs to a
80'-30' STEEL DECK GIRDER BRIDGE
w/19'-10 1/2' CONC. SLAB APPR. SPANS
SURVEY PLOT
Sta. 57+50 January, 1988
KEOKUK COUNTY
IOWA DEPARTMENT OF TRANSPORTATION-HIGHWAY DIVISION
Design Sheet No.: 3 Of 13 File No.: 26969 Design No.: 188

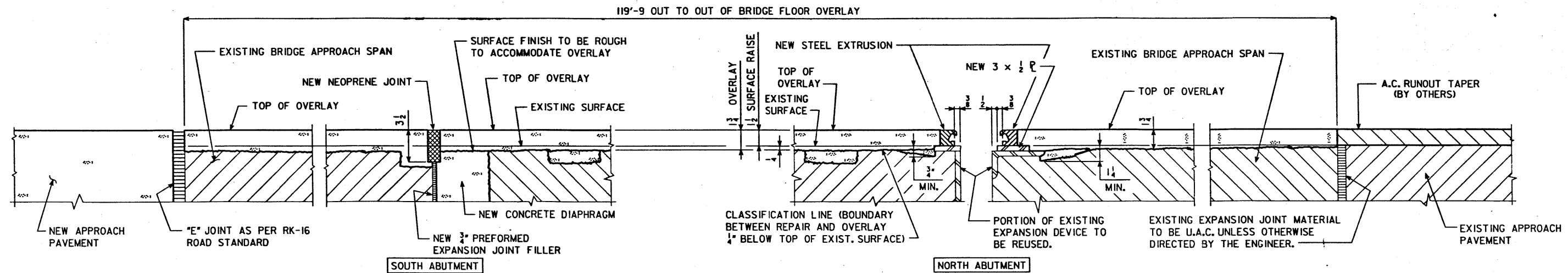
DESIGNED BY: Steve A. Nason
DETAILED BY: Thayne Sorenson

TRACED BY: _____
CHECKED BY: Mike Train

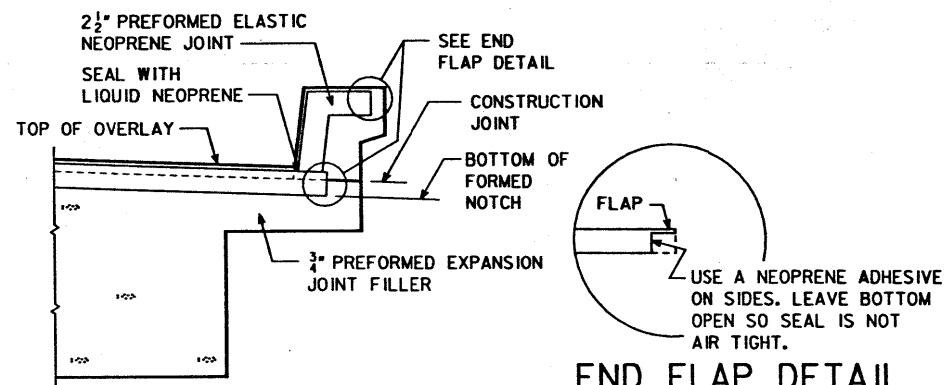
Keokuk COUNTY

PROJECT NUMBER

STATE	FHWA Region	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
IOWA	7		5	21

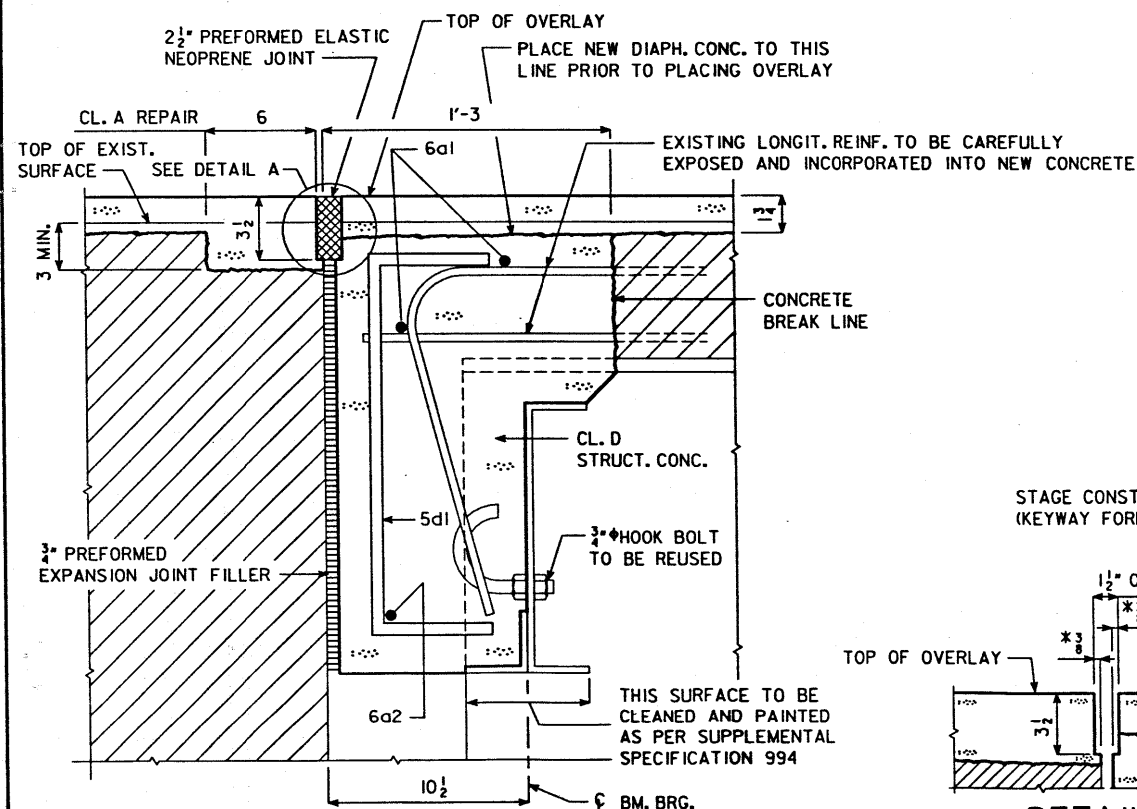


PART LONGITUDINAL SECTION ALONG ROADWAY

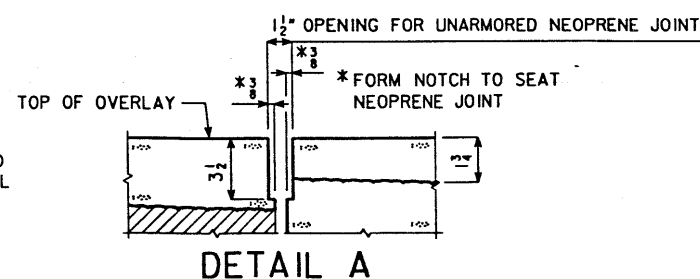


SECTION B-B

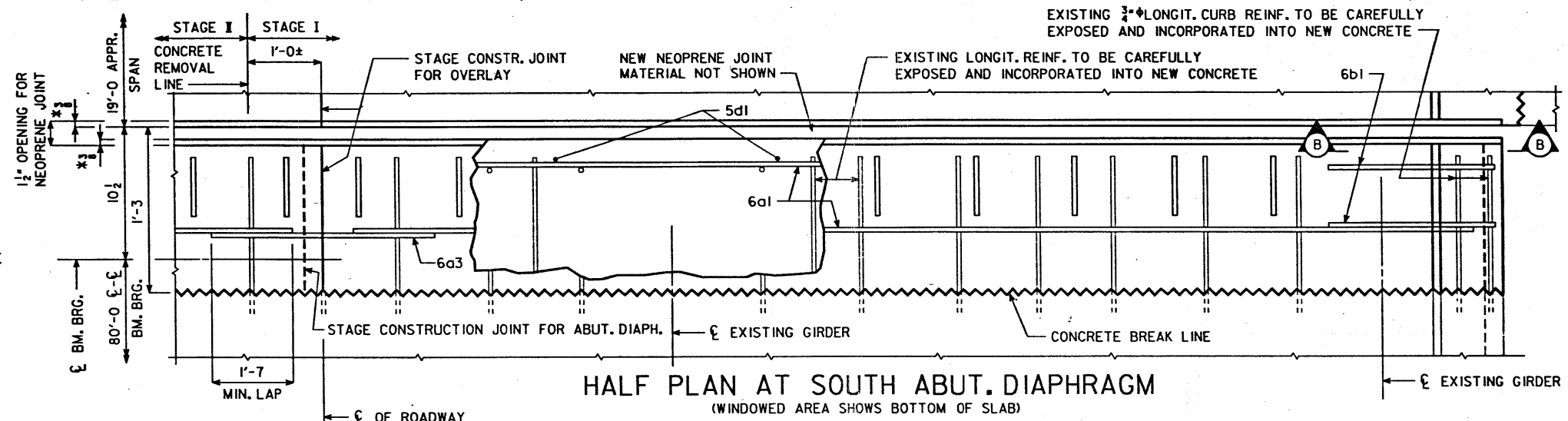
(SHOWING NEOPRENE JOINT CONFIGURATION AT CURB)



SECTION A-A

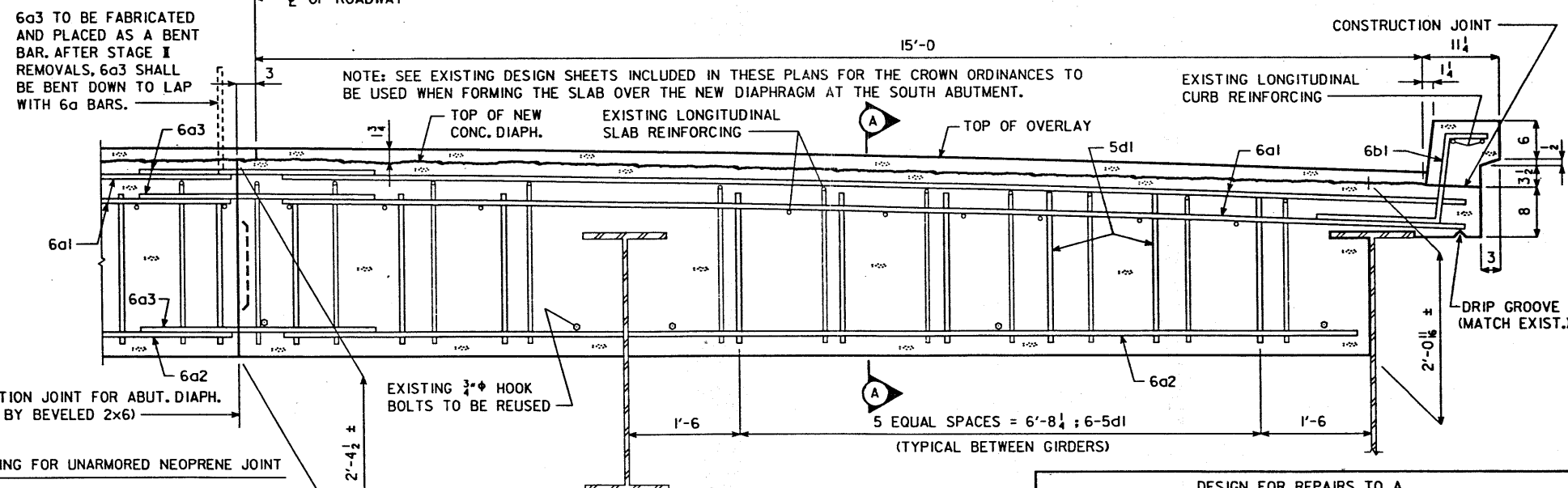


DETAIL A



HALF PLAN AT SOUTH ABUT. DIAPHRAGM

(WINDOWED AREA SHOWS BOTTOM OF SLAB)



HALF END SECTION THRU ROADWAY
AT SOUTH ABUT. DIAPHRAGM

DESIGN FOR REPAIRS TO A
80'x30' STEEL DECK GIRDER BRIDGE
w/19'-10 1/2' CONC. SLAB APPR. SPANS
REPAIR DETAILS

STA. 57+50

JANUARY, 1988

KEOKUK COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 4 OF 13 FILE NO. 26969 DESIGN NO. 188

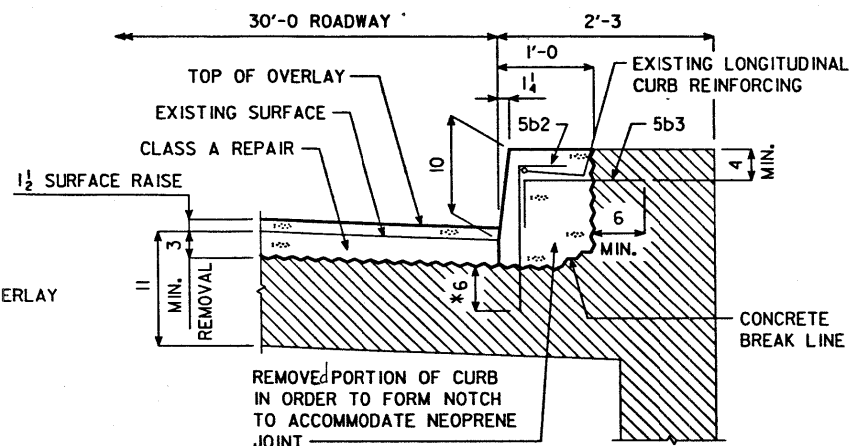
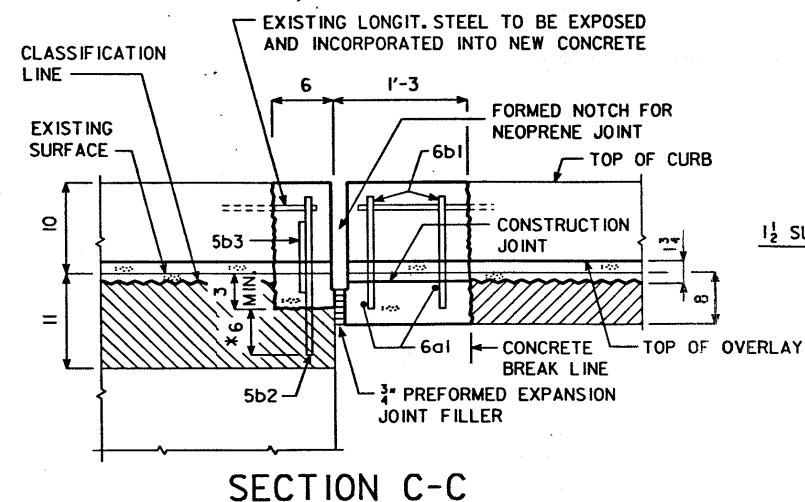
DESIGNED BY David A. Noyes TRACED BY THAYNE SORENSON
DETAILED BY THAYNE SORENSON CHECKED BY Neil Tsai

H54018800.S03

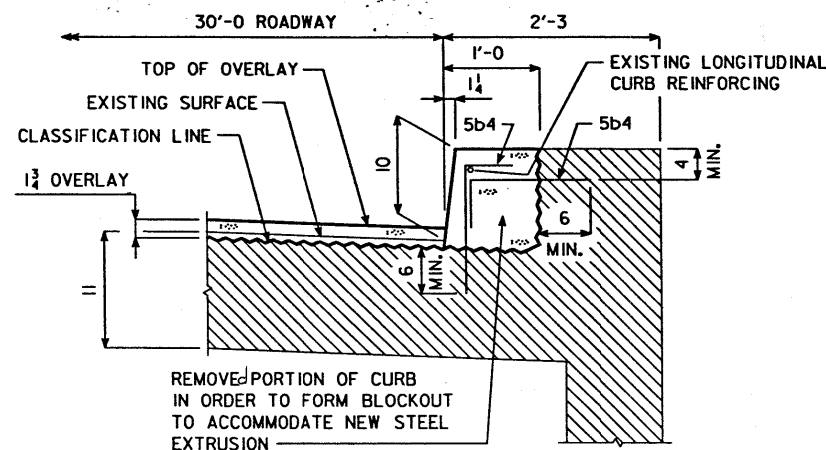
KEOKUK COUNTY

PROJECT NUMBER

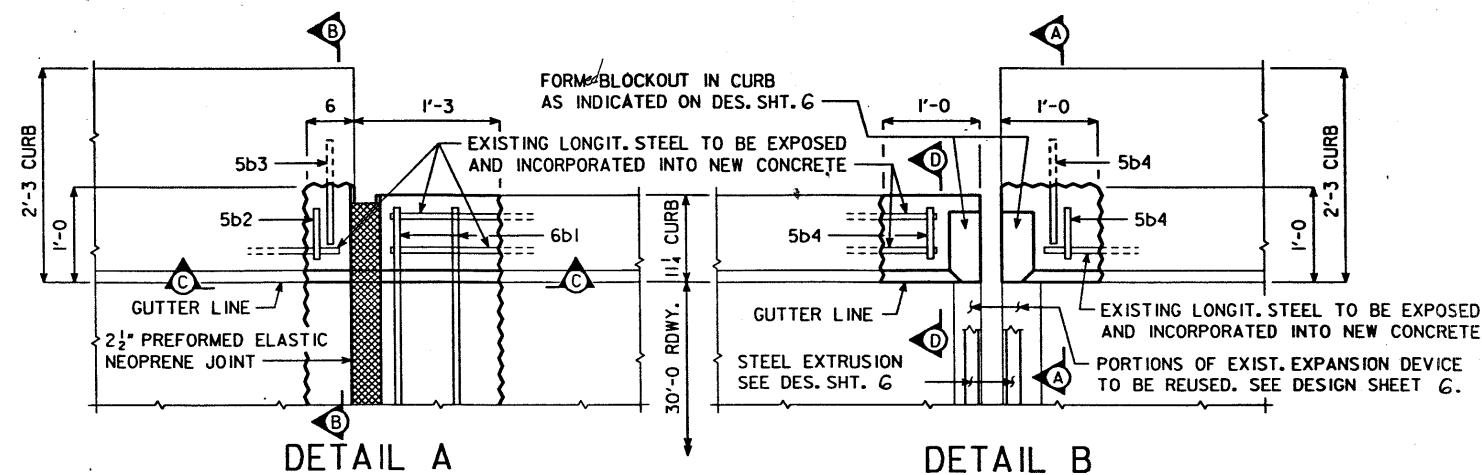
STATE	FHWA REGION	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
IOWA	7		6	21



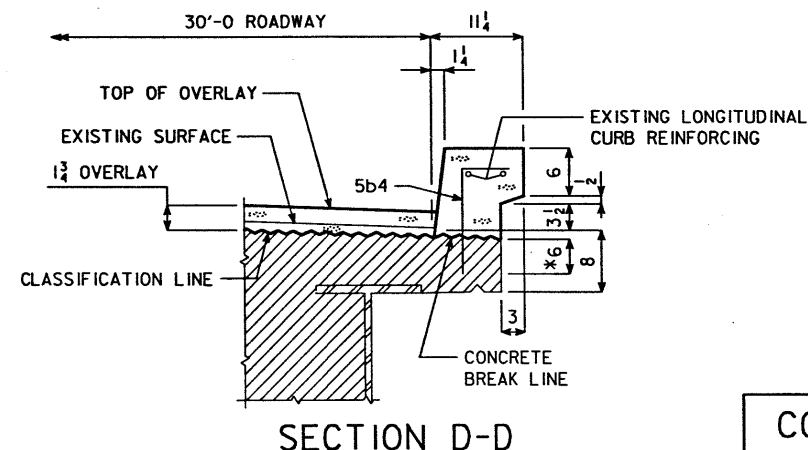
NOTE: 5b2 & 5b3 BARS SHALL BE SET AS DOWELS IN DRILLED HOLES. SEE DOWEL SETTING PROCEDURE NOTE.



NOTE: 5b4 BARS SHALL BE SET AS DOWELS IN DRILLED HOLES. SEE DOWEL SETTING PROCEDURE NOTE.



NOTE: DURING REMOVAL OF CONCRETE IN THE CURBS AS INDICATED, THE EXISTING CURB PLATES FOR THE EXPANSION DEVICE SHALL BE REMOVED AND DISCARDED.



* DOWEL SHALL HAVE AT LEAST 6 IN. EMBEDMENT AND A MINIMUM OF 1 1/4 IN. END CLEARANCE.

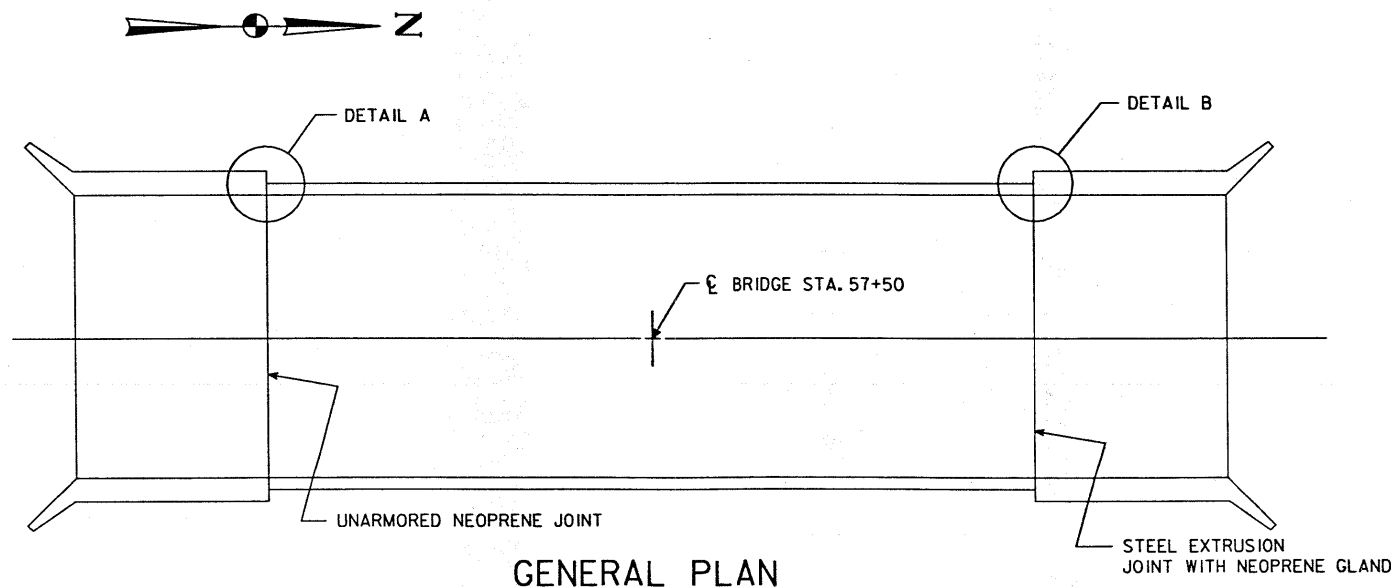
CONCRETE PLACEMENT QUANTITIES			
LOCATION	STAGE I	STAGE II	TOTAL
SOUTH ABUT. DIAPH.	1.2	1.1	2.3
SOUTH ABUT. CURBS	0.05	0.05	0.1
NORTH ABUT. CURBS	0.05	0.05	0.1
TOTAL (CU. YD.)	1.3	1.2	2.5

DOWEL SETTING NOTE:
DOWELS SHALL BE SET WITH EPOXY GROUT IN ACCORDANCE WITH STANDARD SPECIFICATIONS ARTICLE 2301.15 AND CURRENT SUPPLEMENTAL SPECIFICATIONS OF THE IOWA D. O. T. HIGHWAY DIVISION.

DESIGN FOR REPAIRS TO A
80'x30' STEEL DECK GIRDER BRIDGE
w/19'-10 1/2' CONC. SLAB APPR. SPANS

REPAIR DETAILS
STA. 57+50
KEOKUK COUNTY
JANUARY, 1988

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 5 OF 13 FILE NO. 26969 DESIGN NO. 188

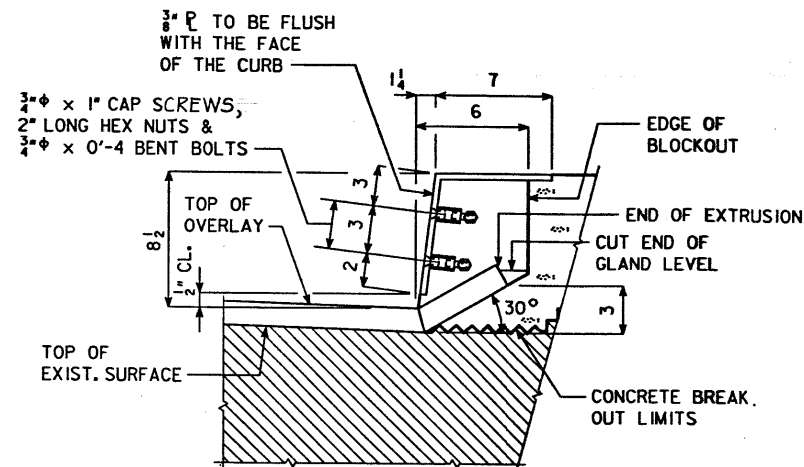


DESIGNED BY THAYNE SORENSON TRACED BY _____
DETAILED BY THAYNE SORENSON CHECKED BY _____
H54018800.S06

KEOKUK COUNTY

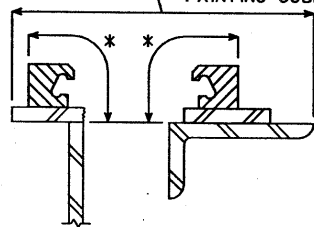
PROJECT NUMBER

STATE	FHWA REGION	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
IOWA	7		7	21



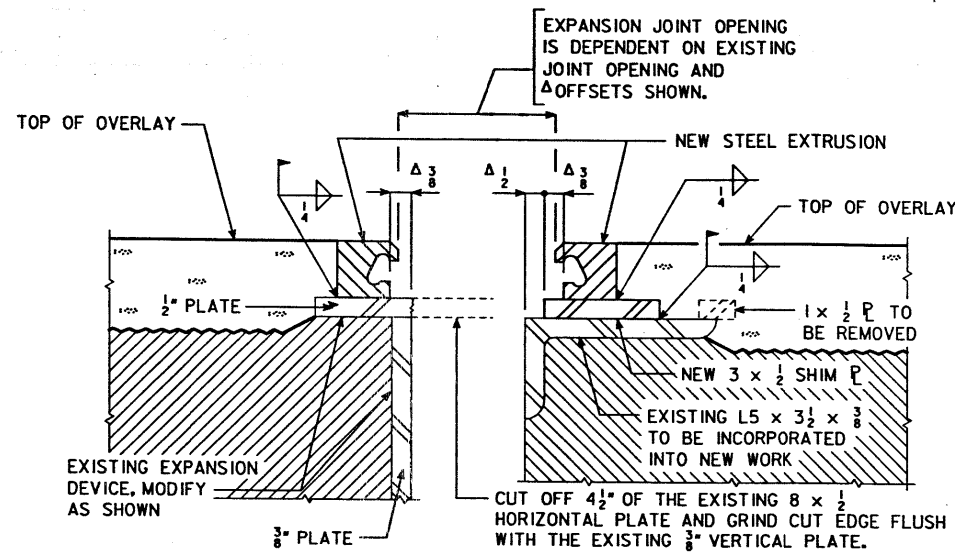
PART SECTION THRU CURB
(SHOWING BLOCK OUT DETAILS)

BLAST CLEAN THESE SURFACES AFTER WELDING EXTRUSION TO EXISTING EXPANSION DEVICE AND BEFORE PLACING OVERLAY. BLAST CLEANING PREPARATION IS TO COMPLY WITH STEEL STRUCTURES PAINTING COUNCIL SPECIFICATION SSPC-SP7, BSAL.



*PAINT THIS SURFACE WITH ONE COAT OF RUST-OLEUM PRIMER AND ONE COAT OF RUST-OLEUM FINAL COAT OR AN APPROVED EQUAL PRIMER AND FINAL COAT. THE COLOR OF DRY PAINT SHOULD APPROXIMATE THE COLOR OF CONCRETE. NO PAINT WILL BE ALLOWED IN THE INTERNAL SECTION OF THE EXTRUSION WHERE THE NEOPRENE GLAND IS TO BE LOCATED.

CLEAN AND PAINT DETAIL



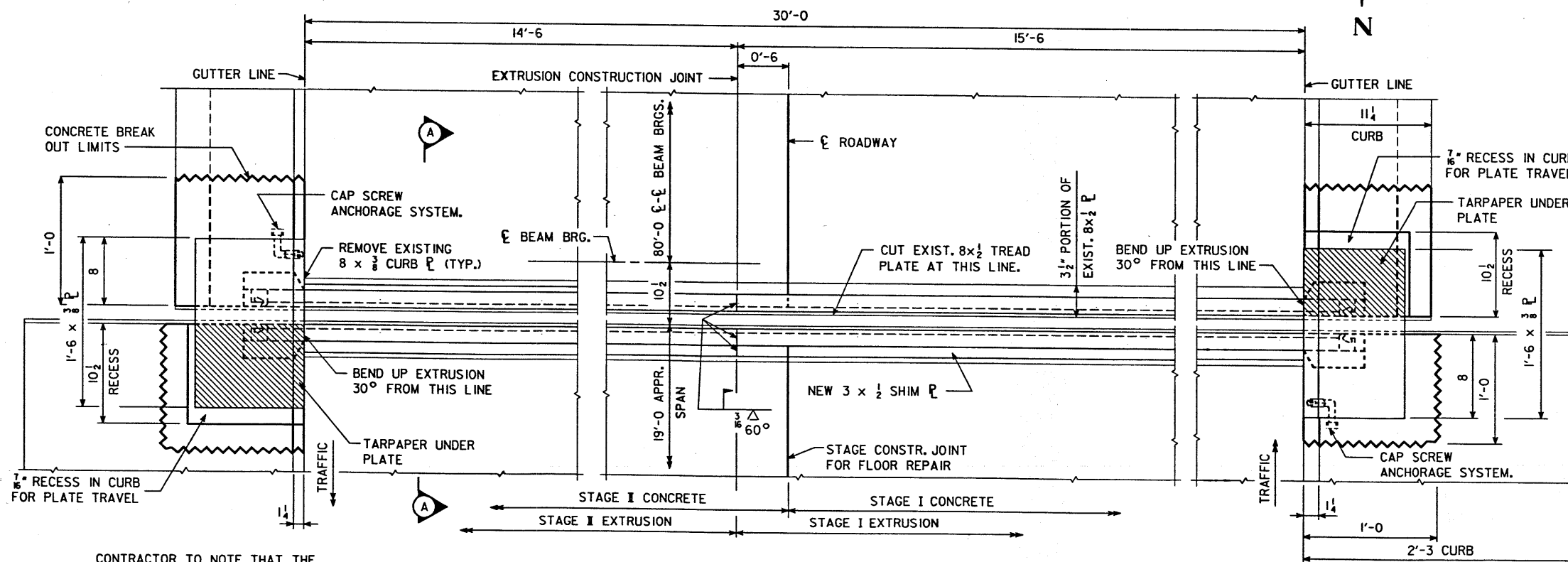
SECTION A-A

EXPANSION DEVICE NOTES:

THE CONTRACTOR SHALL SUBMIT FOR APPROVAL SHOP DRAWINGS OF THE EXPANSION DEVICE SHOWING LAYOUT AND MATERIAL TO BE USED. THE EXPANSION DEVICE SHALL BE PAINTED AS NOTED. THE EXPANSION DEVICE IS TO BE PARALLEL TO GRADE. CAP SCREWS SHALL BE COUNTERSUNK $\frac{1}{8}$ " BELOW TOP OF THE PLATE. THE NEOPRENE GLAND IS TO BE PLACED AS ONE CONTINUOUS PIECE FROM END TO END OF THE STEEL EXTRUSIONS. THE MINIMUM GRADE OF STRUCTURAL STEEL FOR THE EXPANSION DEVICE SHALL BE ASTM A-36. THE NEOPRENE GLAND SHALL CONFORM TO ASTM D-2628 MODIFIED TO EXCLUDE RECOVERY TESTS AND COMPRESSION SET. BLOCKOUT DETAILS MAY BE ALTERED FROM THOSE SHOWN PROVIDED THE GLAND MAY BE INSTALLED AND REMOVED IF NECESSARY. THE CONTRACT UNIT PRICE BID FOR "STEEL EXTRUSION JOINT WITH NEOPRENE" SHALL BE FULL COMPENSATION FOR FURNISHING AND INSTALLING THE EXPANSION JOINT. THIS WORK WILL CONSIST OF FURNISHING ALL REQUIRED MATERIALS, (INCLUDING THE $\frac{3}{8}$ " PLATES AT THE CURBS, THEIR ANCHORAGE SYSTEMS AND THE SHIM PLATES), AND THE INSTALLATION AND ADJUSTMENT OF THE EXPANSION JOINT IN ACCORDANCE WITH THE DETAILS SHOWN ON THE PLANS AND AS DIRECTED BY THE ENGINEER. THE FURNISHING AND INSTALLATION OF ALL NECESSARY HARDWARE AND ACCESSORIES AS SUPPLIED BY THE EXPANSION JOINT MANUFACTURER ARE TO BE INCLUDED IN THIS WORK. ALL WORK AND MATERIALS FOR THE INSTALLATION OF THE EXPANSION JOINT ARE TO COMPLY WITH THE WRITTEN RECOMMENDATIONS OF THE EXPANSION JOINT MANUFACTURER. SHOP AND OR FIELD SPLICES OF THE STEEL EXTRUSION WILL BE REQUIRED AT THE GUTTER LINES AND THE STAGE CONSTRUCTION JOINT. ALL PIECES SHALL BE JOINED WITH A PREQUALIFIED SINGLE-V-GROOVE WELD, AND ALL SURFACES NOT IN CONTACT WITH CONCRETE ARE GROUND FLUSH. NO WELD SHALL BE PERMITTED IN THE INTERNAL SECTION OF THE EXTRUSION WHERE THE NEOPRENE GLAND IS TO BE LOCATED.

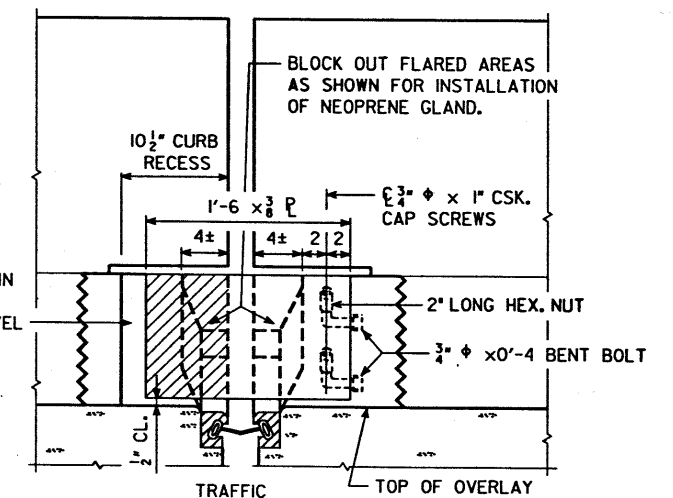
ALLOWABLE NEOPRENE GLANDS	
MANUFACTURER	GLAND
WATSON-BOWMAN & ACME CORP.	SE-400
D.S. BROWN CO.	SS-400

FOLLOWING DEVICES ARE APPROVED FOR USE.
1. WATSON-BOWMAN & ACME CORP., TYPE E EXTRUSION.
2. D.S. BROWN CO., TYPE "SSE" EXTRUSION.
3. APPROVED EQUAL.



PLAN VIEW OF EXPANSION DEVICE
(CAST IN PLACE BARRIER RAIL NOT SHOWN)

NOTE: SEE DESIGN SHEET 5 FOR REMOVAL LIMITS AND REINFORCING DETAILS AT CURBS.



PART ELEVATION VIEW AT CURB

CONTRACTOR TO NOTE THAT THE CAP SCREW ANCHORAGE SYSTEM FOR THE $\frac{3}{8}$ " CURB PLATES ARE ALWAYS TO BE PLACED ON THE ONCOMING TRAFFIC SIDE.

DESIGNED BY Sam A. Noren TRACED BY Thayne Sorenson
 DETAILED BY Thayne Sorenson CHECKED BY Hein Train
 H54018800.S04

KEOKUK COUNTY

PROJECT NUMBER

DESIGN FOR REPAIRS TO A

80'x30' STEEL DECK GIRDER BRIDGE

w/19'-10 $\frac{1}{2}$ ' CONC. SLAB APPR. SPANS

REPAIR DETAILS

STA. 57+50

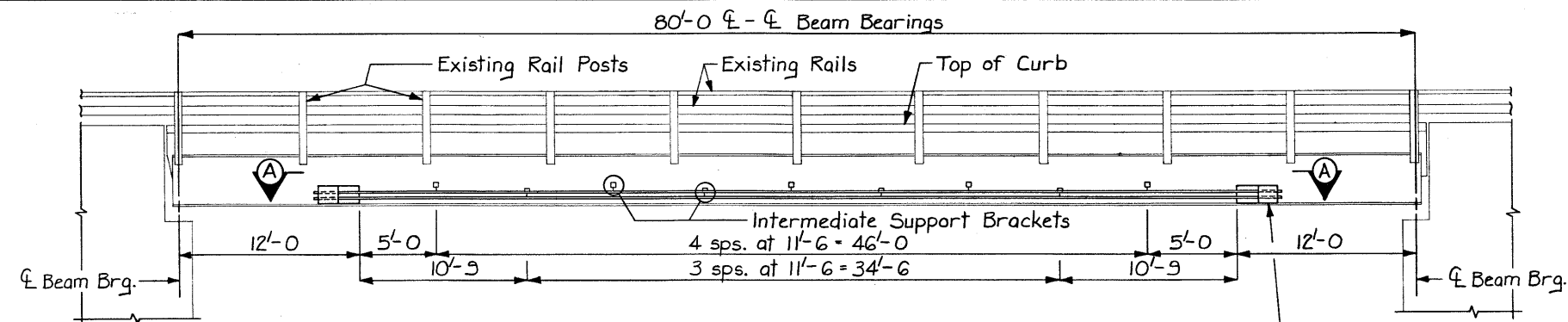
JANUARY, 1988

KEOKUK COUNTY

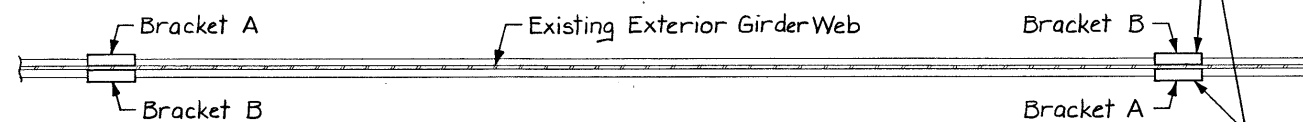
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 6 OF 13 FILE NO. 26969 SHEET NO. 188

STATE	FHWA REGION	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
IOWA	7		8	21

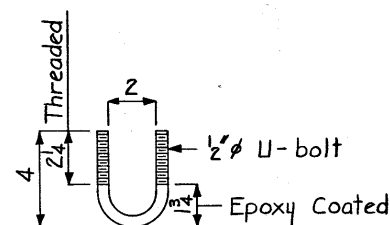


ELEVATION VIEW

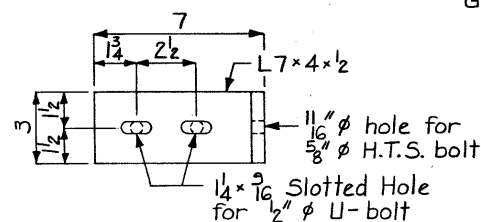


SECTION A-A

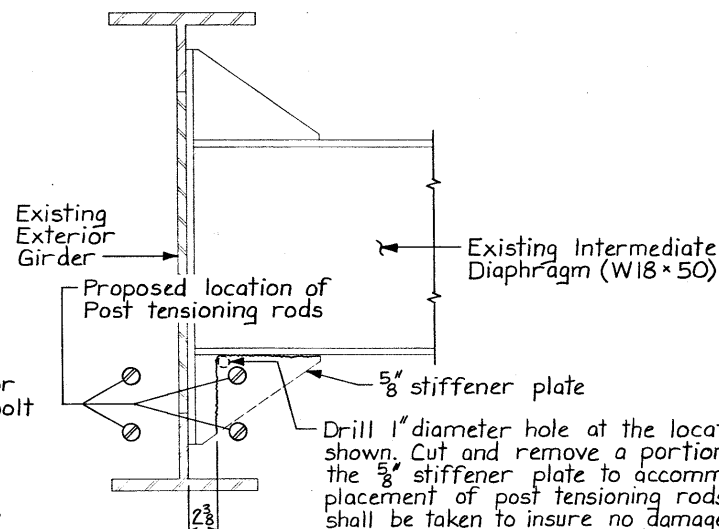
(Intermediate Support Brackets not shown)



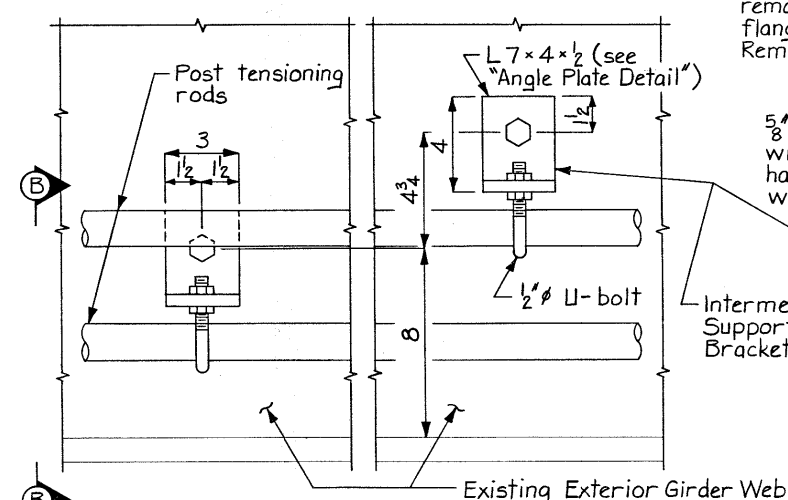
U-BOLT DETAIL



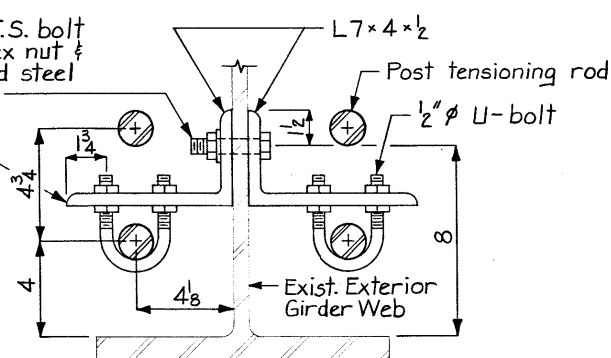
ANGLE PLATE DETAIL



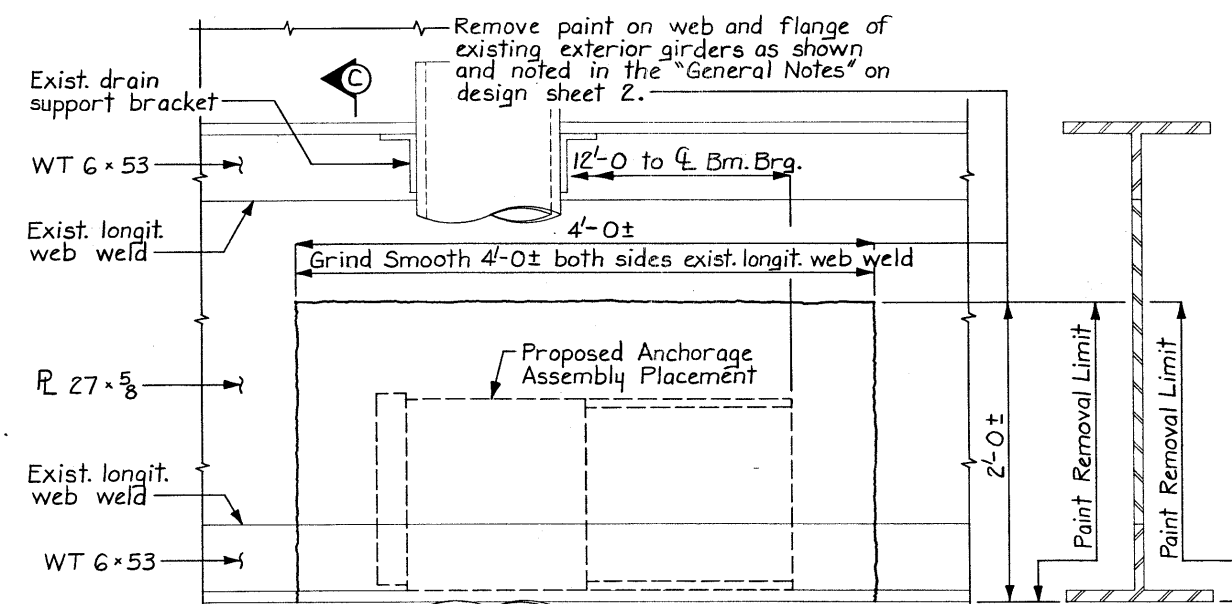
REMOVAL DETAIL



PART ELEVATION VIEW



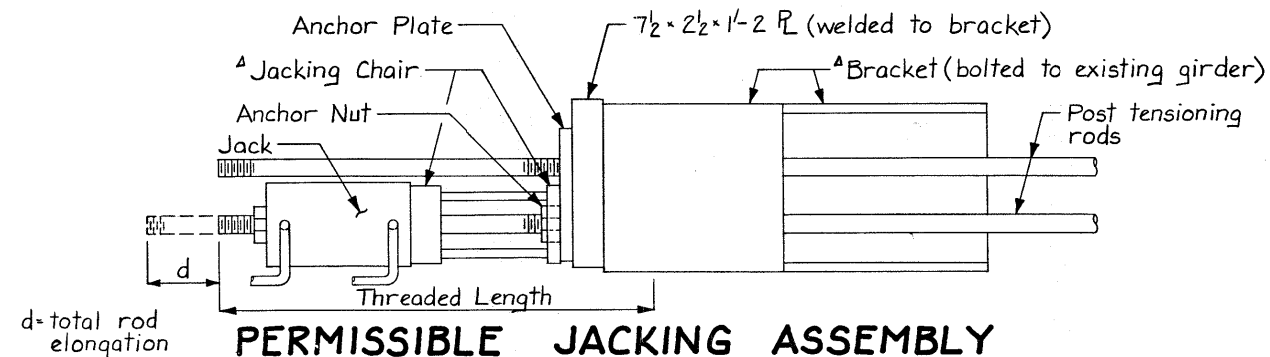
PART SECTION B-B



PART ELEV. VIEW

(Showing preparations necessary to accommodate anchorage assembly placement)

See design sheet 8 for details of Jacking Chair and Brackets.



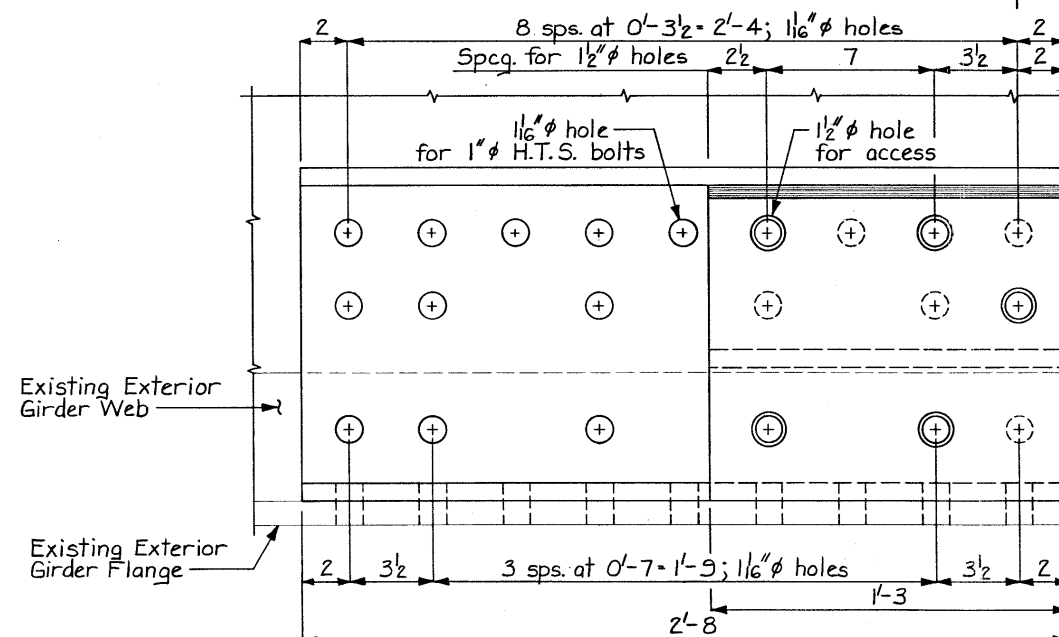
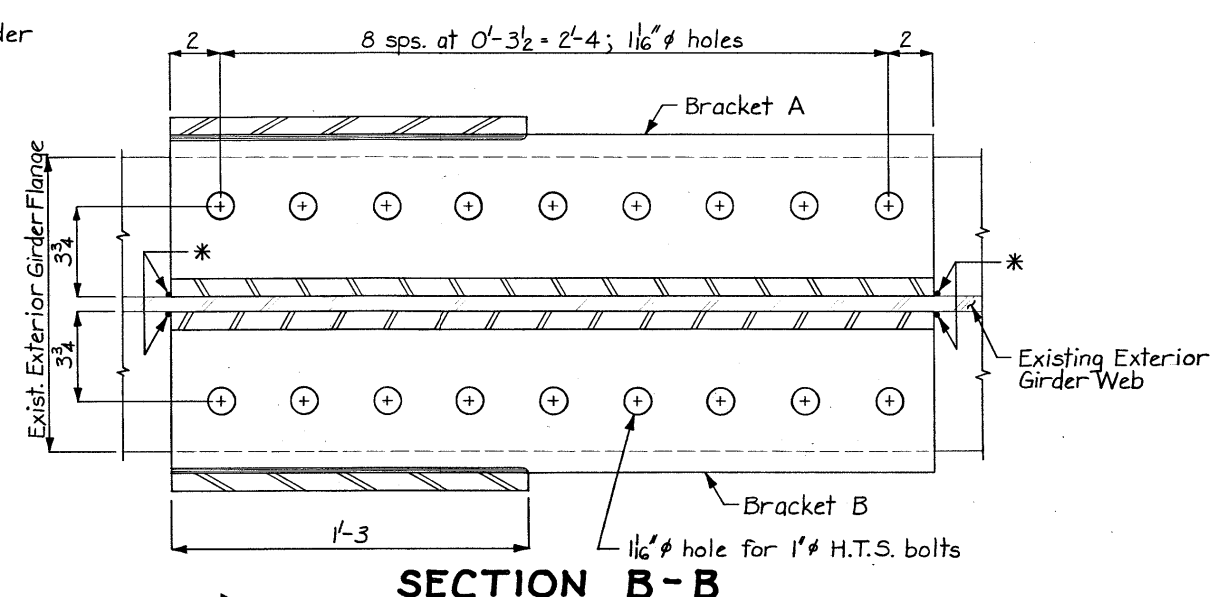
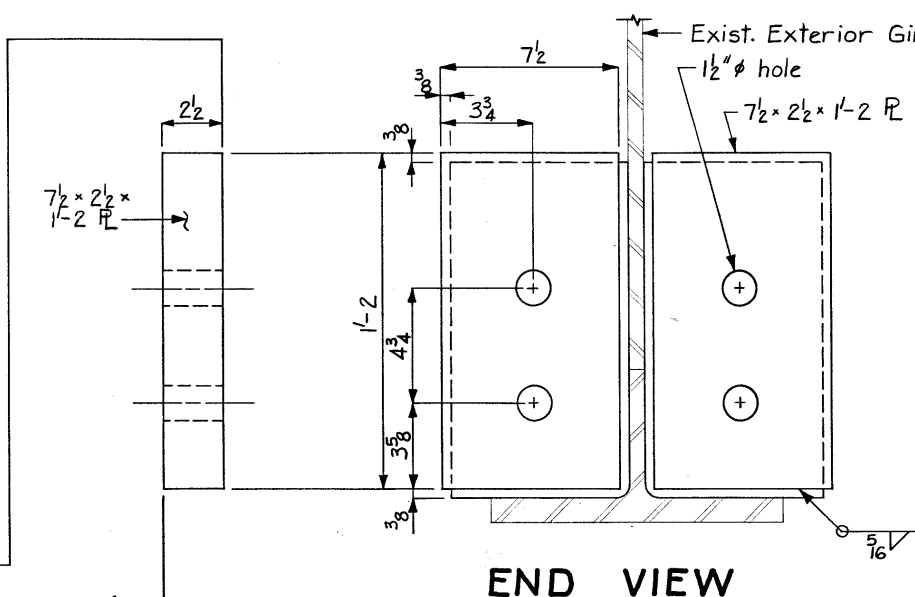
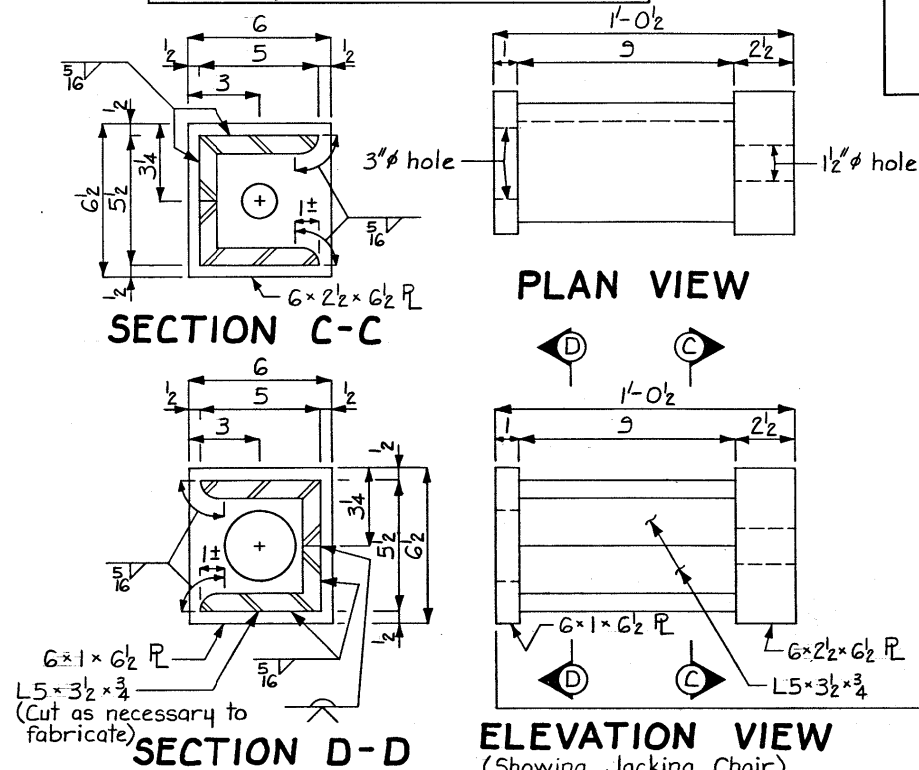
PERMISSIBLE JACKING ASSEMBLY
(Showing Optional Jacking Chair)

Design for Repairs to a
80'x30' STEEL DECK GIRDER BRIDGE
w/19'-10 1/2" CONC. SLAB APPR. SPANS
POST TENSIONING ROD DETAILS
Sta. 57+50 January, 1988
KEOKUK COUNTY
IOWA DEPARTMENT OF TRANSPORTATION-HIGHWAY DIVISION
Design Sheet No.: 7 Of 13 File No.: 26363 Design No.: 188

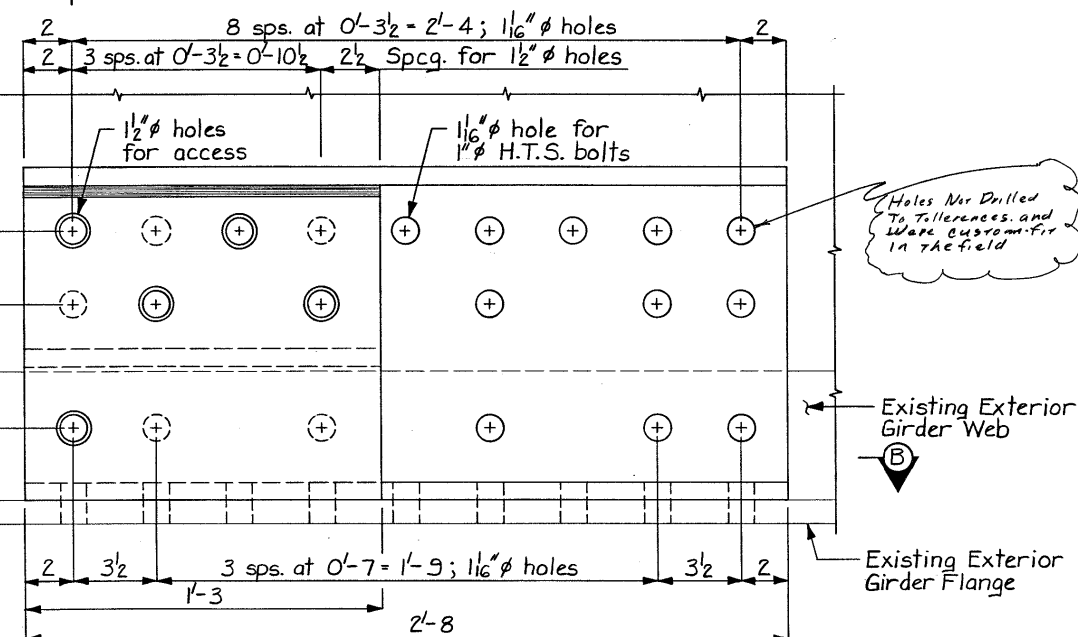
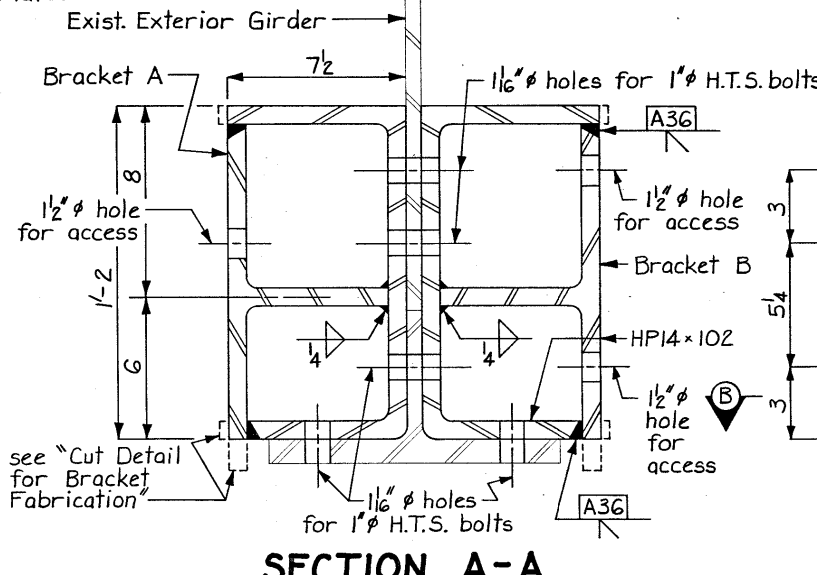
4 Jacking Chairs required (if used)

Note:
Jacking Chair Weight - 63 lbs. each. This weight is not included in the structural steel bid item. Cost of the Jacking Chairs, if used, shall be included in the bid item "Bridge Repair".

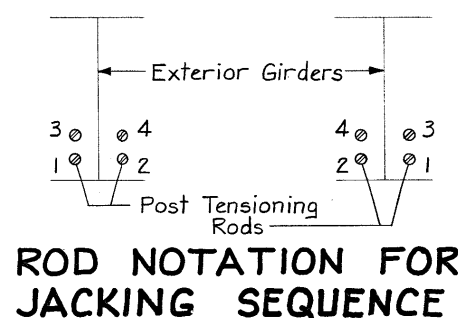
* Seal with caulking compound, see General Notes on design sheet 2 for application procedure.



Note: End of bracket to be milled flat before welding on the 7 1/2 x 2 1/2 x 1'-2 End Plate.

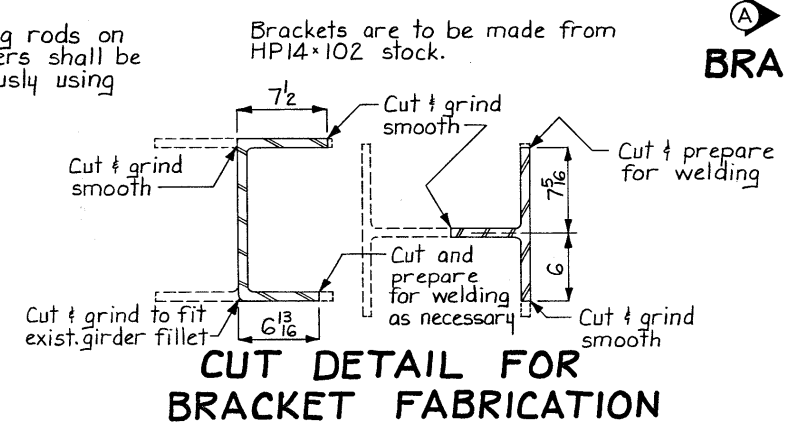


Holes Mr. Drilled to Tolerances and Were Custom-Fit in the Field

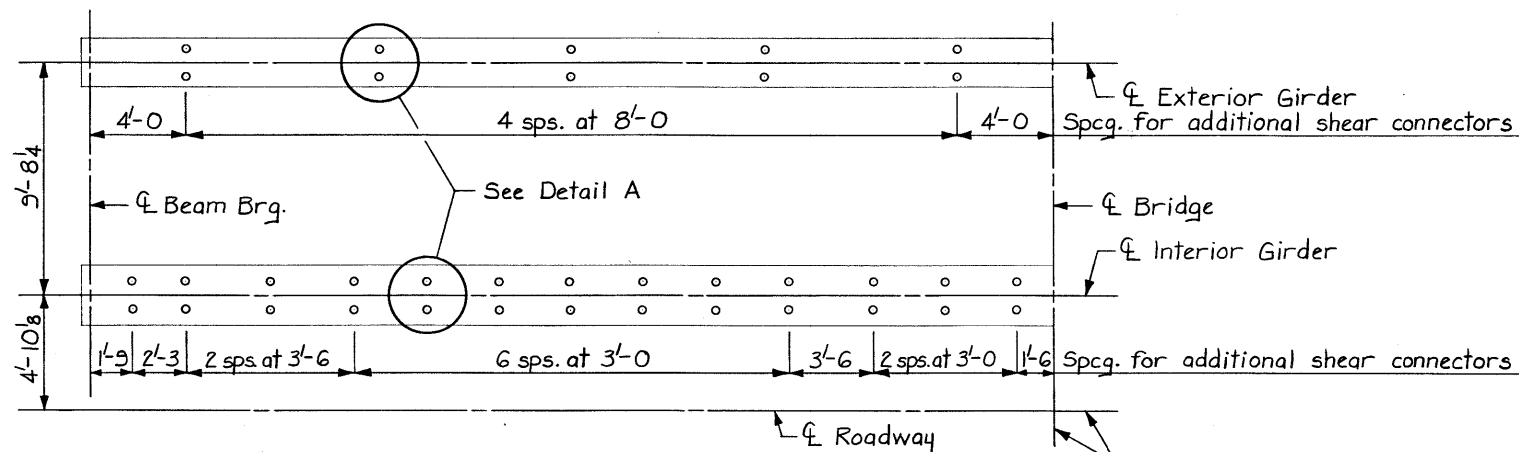


Steps	Force in Kips				Elongation Total
	Rod 1	Rod 2	Rod 3	Rod 4	
1			50	50	1"
2	50	50			1"
3	100	100			2"
4			100	100	2"
5			128	128	2 1/2"
6	128	128			2 1/2"

Note: The post tensioning rods on both exterior girders shall be jacked simultaneously using this sequence.

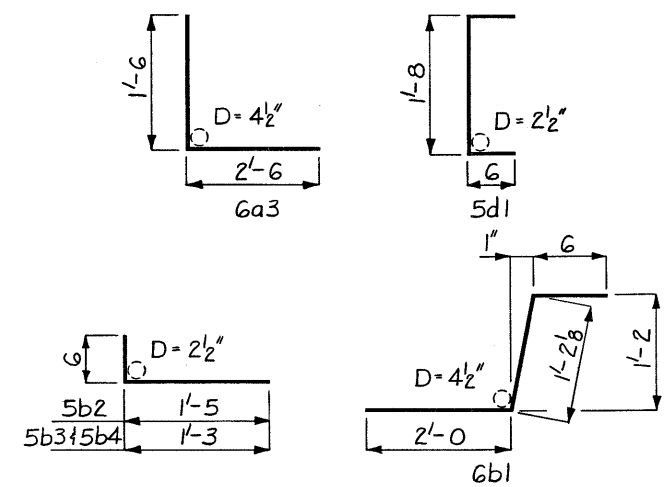


Design for Repairs to a
80'x30' STEEL DECK GIRDER BRIDGE
w/19'-10 1/2" CONC. SLAB APPR. SPANS
POST TENSIONING ROD DETAILS
Sta. 57+50 January, 1988
KEOKUK COUNTY
IOWA DEPARTMENT OF TRANSPORTATION-HIGHWAY DIVISION
Design Sheet No.: 8 Of 13 File No.: 26969 Design No.: 188



HALF PLAN VIEW SHOWING LOCATIONS FOR NEW SHEAR CONNECTORS

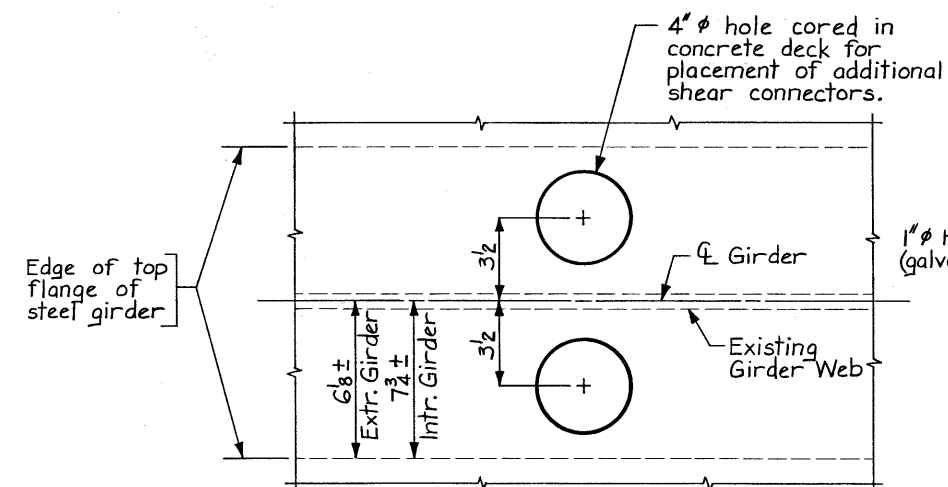
Shear Connector layout is symmetrical about ϕ Bridge and ϕ Roadway.



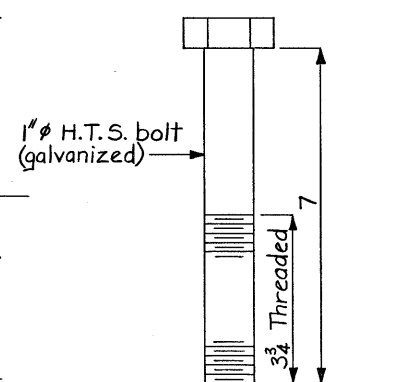
BENT BAR DETAILS
All bar dimensions are out to out
D = Pin Diameter

EPOXY REINF. BAR LIST ~ SUPERSTR.

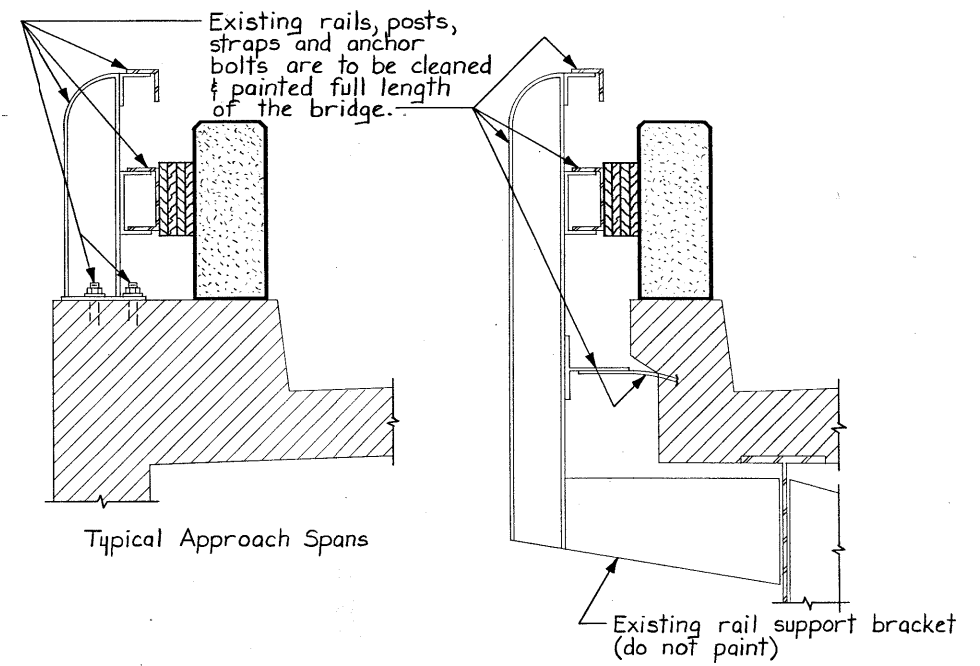
Bar	Location	Shape	No.	Length	Lin. Ft.	Weight
6a1	Slab transv. - S. Abut.	—	4	15'-1	60	91
6a2	Diaph. transv. - S. Abut.	—	2	13'-9	28	41
6a3	Dowels at Constr. Jt. - S.A.	L	3	4'-0	12	18
6b1	Slab to Curb - S. Abut.	└	4	3'-9	15	23
5b2	Curb Dowels - S. Abut.	└	2	1'-11	4	4
5b3	Curb Dowels - S. Abut.	└	2	1'-9	4	4
5b4	Curb Dowels - N. Abut.	└	6	1'-9	10	11
5d1	Diaph. vert. - S. Abut.	└	18	2'-8	48	50
Total Weight (Lbs.)						242



DETAIL A

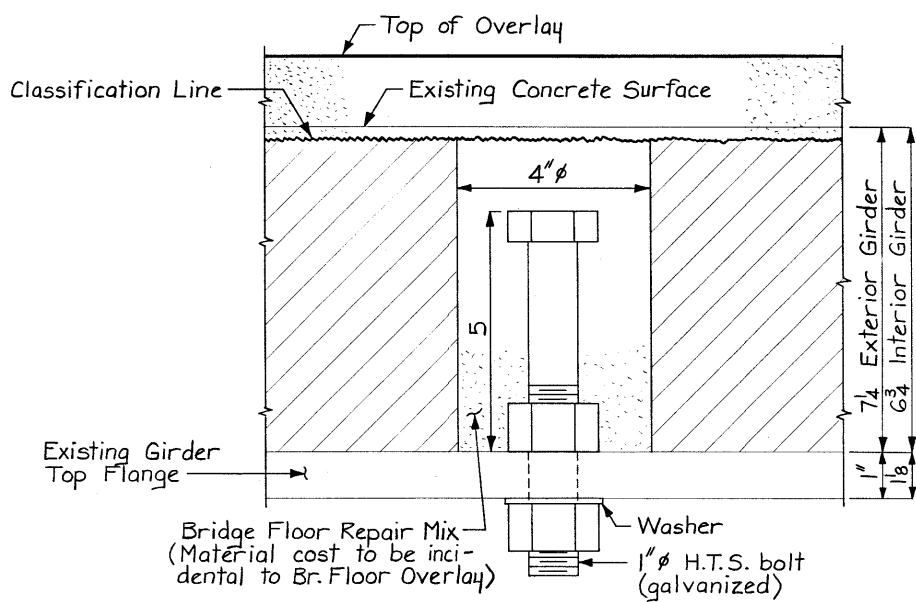


BOLT DETAIL



CLEAN AND PAINT DETAIL
(Showing Limits on Existing Rail)

Note: Cleaning and painting to be in accordance with Supplemental Spec. 994 "Repainting Existing Zinc-Silicate Paint Systems on Bridges". See General Notes on Design Sheet 2.

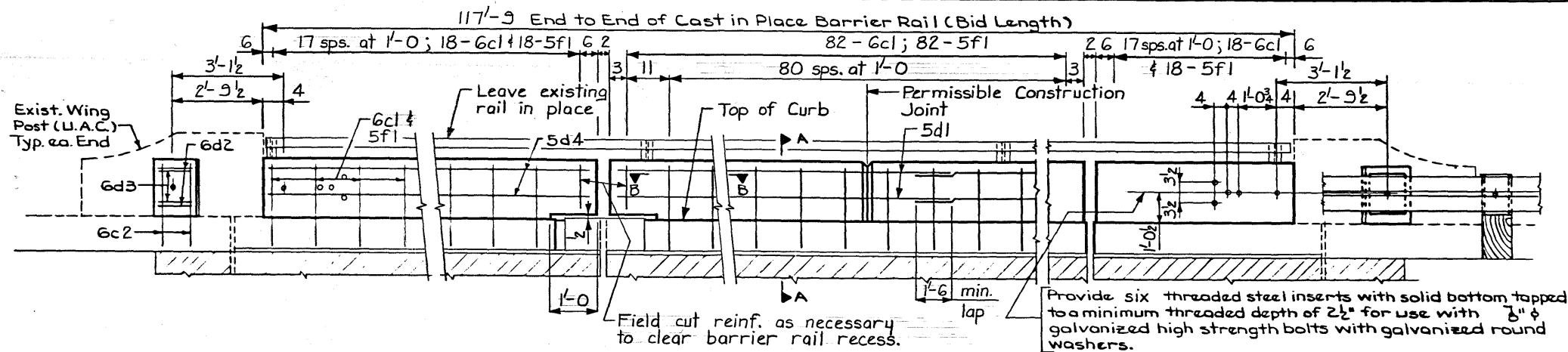


PART SECTION THRU SLAB

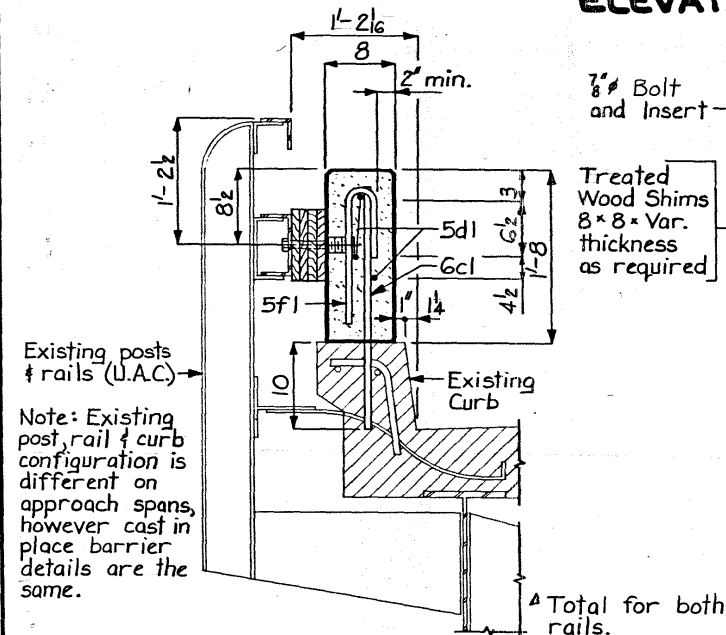
- SHEAR CONNECTORS**
CONTRACTOR SHALL INSTALL 1" H.T.S. BOLTS TO ACT AS SHEAR CONNECTORS. INSTALLATION SHALL BE AS FOLLOWS:
- 1) CORE 4" DIAMETER HOLE IN THE DECK AT LOCATIONS SHOWN (LOCATION MAY BE VARIED SLIGHTLY TO MISS EXISTING REINFORCING & ANGLE SHEAR CONNECTORS).
 - 2) DRILL 1 1/16" HOLE IN TOP FLANGE OF BEAM IN THE CENTER OF THE CORED AREAS.
 - 3) INSTALL 1" H.T.S. BOLTS AS DETAILED. THE BOLT, NUT AND WASHER SHALL BE GALVANIZED.
 - 4) BEFORE OVERLAY IS PLACED, PLACE BRIDGE FLOOR REPAIR MIX IN CORED AREA UP TO THE CLASSIFICATION LINE. CARE SHALL BE TAKEN TO INSURE ADEQUATE CONSOLIDATION OF THE CONCRETE AROUND THE 1" H.T.S. BOLT. SLUMP OF THE BRIDGE FLOOR REPAIR MIX MAY BE RELAXED TO 2 1/2" TO ACCOMMODATE PLACEMENT OF REPAIR MIX AROUND THE H.T.S. BOLT.

Design for Repairs to a
80'x30' STEEL DECK GIRDER BRIDGE
w/19'-10 1/2' CONC. SLAB APPR. SPANS

REPAIR DETAILS
 Sta. 57+50 January, 1988
KEOKUK COUNTY
 IOWA DEPARTMENT OF TRANSPORTATION-HIGHWAY DIVISION
 Design Sheet No.: 9 Of 13 File No.: 26969 Design No.: 188

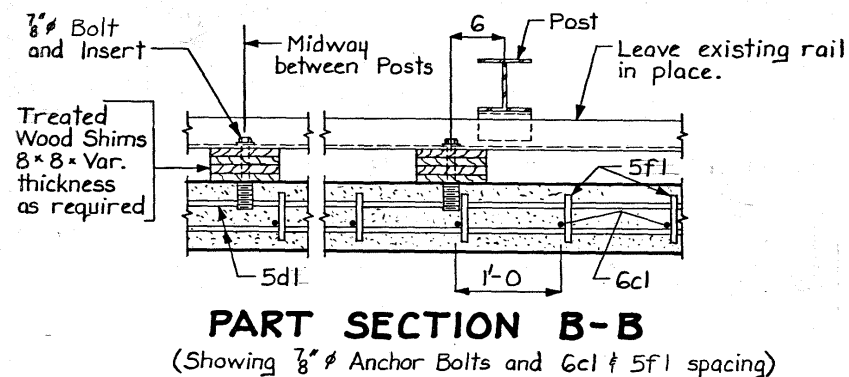


ELEVATION OF CAST IN PLACE BARRIER RAIL
(Looking East)



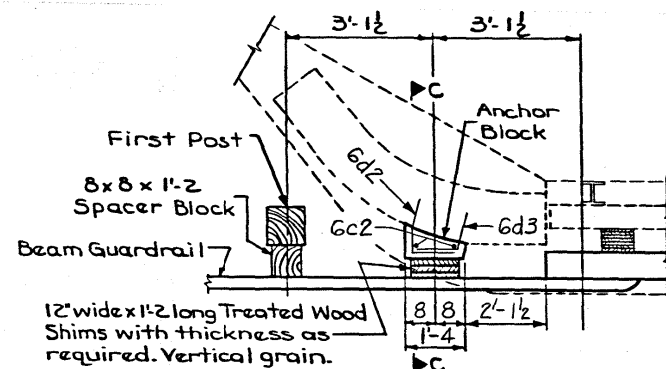
SECTION A-A

On backface of concrete rails provide 6G threaded steel inserts with solid bottom tapped to a minimum threaded depth of 2 1/2" for use with 3/8" galvanizd bolts with galvanizd lock washer. Cost of inserts, bolts, lock washers, and treated wood shims to be included in the price bid for Cast in Place Barrier Rail.

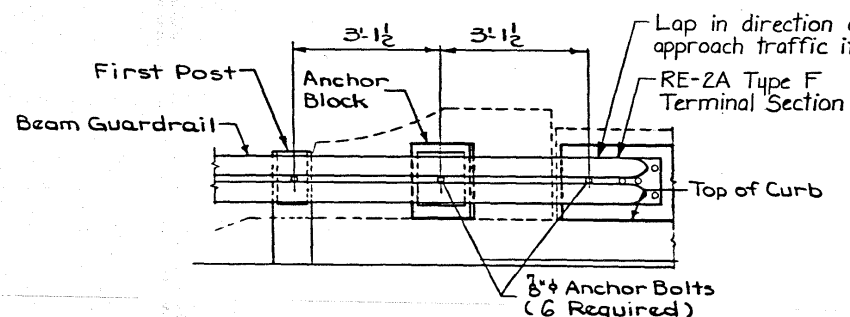


PART SECTION B-B

(Showing 3/8" Anchor Bolts and Gc1 & 5f1 spacing)

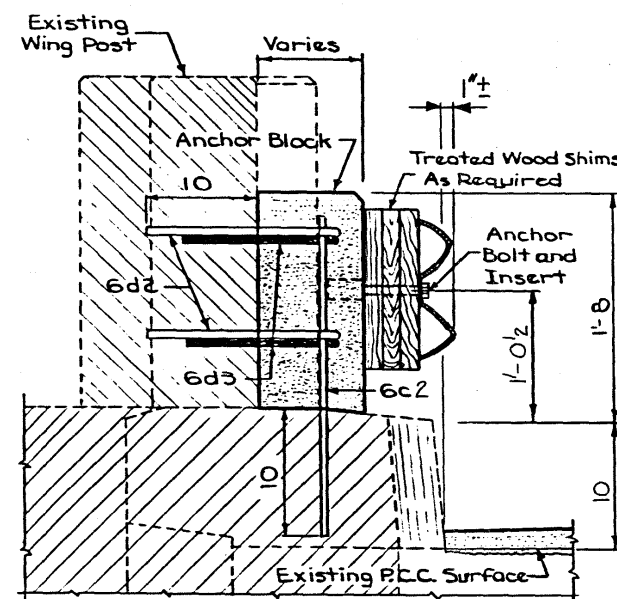


PART PLAN VIEW

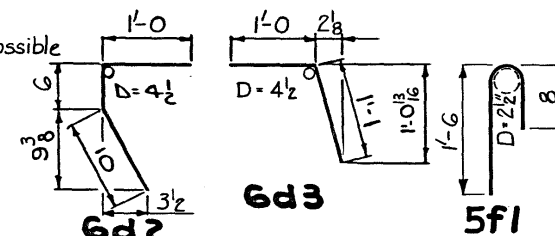


PART ELEVATION VIEW

(Showing Beam Guardrail attachment to Cast in Place Concrete Barrier Rail)



SECTION C-C



BENT BAR DETAILS

Note: All Dimensions are Out to Out. D = Pin Diameter.

EPOXY REINF. STEEL ~ TWO RAILS

Bar	Location	Shape	No	Length	Weight
Gc1	Rail, Vert. Front Face	—	236	2'-4"	827
Gc2	Anchor Block, Vert.	—	8	2'-4"	28
5d1	Rail, Longit.	—	18	28'-1"	527
Gd2	Anchor Block, Horiz.	—	8	2'-4"	28
Gd3	Anchor Block, Horiz.	—	8	2'-1"	25
5f1	Rail, Vert. Back Face	—	236	2'-3"	554
5d4	Rail, Longit. Approach	—	12	17'-8"	221
Total Weight (Lbs.)					2210

CONCRETE PLACEMENT SUMMARY

Concrete	Total
234.8 @ 0.04 Cu Yds. per Lin. Ft.	9.6
4 Anchor Blocks @ 0.06 Cu Yds. per Block	0.3
Total (Cu Yds.)	9.9

ESTIMATED QUANTITIES

Item	Unit	Quantity
Rail, Concrete Barrier (Cast in Place)	Lin. Ft.	235.5

CAST IN PLACE BARRIER RAIL NOTES:

MINIMUM CLEAR DISTANCE FROM FACE OF CONCRETE TO NEAR REINFORCING BAR IS TO BE 2" UNLESS OTHERWISE NOTED OR SHOWN.

THE CAST IN PLACE BARRIER RAIL IS TO BE BID ON A LINEAL FOOT BASIS MEASURED FROM END TO END OF RAIL. THE NUMBER OF LINEAL FEET OF CAST IN PLACE BARRIER RAIL INSTALLED WILL BE PAID FOR AT THE CONTRACT PRICE PER LINEAL FOOT BASED ON PLAN QUANTITIES. PRICE BID FOR CAST IN PLACE BARRIER RAIL SHALL BE FULL COMPENSATION FOR FURNISHING ALL MATERIAL, INCLUDING REINFORCING STEEL, AND ALL OF THE EQUIPMENT AND LABOR REQUIRED TO ERECT THE RAIL & ANCHOR BLOCKS IN ACCORDANCE WITH THESE PLANS AND CURRENT SPECIFICATIONS.

ALL CAST IN PLACE BARRIER RAIL CONCRETE IS TO BE CLASS D. ALL REINFORCING IS TO BE EPOXY COATED. THE EPOXY COATING SHALL BE IN ACCORDANCE WITH CURRENT STANDARD AND SUPPLEMENTAL SPECIFICATIONS OF THE IOWA D.O.T. HIGHWAY DIVISION.

ANCHOR BOLTS SHALL CONFORM TO REQUIREMENTS OF ASTM A325 OR A449 AND SHALL BE GALVANIZED IN COMPLIANCE WITH ASTM A-153. ANCHOR BOLTS SHALL BE INSTALLED IN THREADED STEEL INSERTS WELD IN PROPER POSITION BY USE OF AN ASSEMBLY SET IN THE CONCRETE AND ALLOWING A MINIMUM EMBEDMENT OF 2 1/2" FOR THE ANCHOR BOLTS. THE COMPONENTS AND PROCEDURE SHALL BE SUBJECT TO THE APPROVAL OF THE ENGINEER.

THE COST OF THE RE-2A TYPE F TERMINAL SECTION, THREADED STEEL INSERTS AND ANCHOR BOLTS SHALL BE INCLUDED IN PRICE BID FOR CAST IN PLACE BARRIER RAIL.

DOVEL SETTING NOTE

THE * BARS SHALL BE SET AS DOVELS IN DRILLED HOLES. HOLES ARE TO BE 10" DEEP. THE DOVELS SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS. THE FOLLOWING SYSTEM SHALL BE USED AS A BONDING AGENT FOR THE DOVELS.

A. EPOXY GROUT SYSTEM IN ACCORDANCE WITH STANDARD SPECIFICATIONS ARTICLE 2301.15 AND CURRENT SUPPLEMENTAL SPECIFICATIONS OF THE IOWA D.O.T. HIGHWAY DIVISION.

THE PERMISSIBLE CONSTRUCTION JTS. CAN BE PLACED BETWEEN VERTICAL BARS AT A MINIMUM SPACING OF 20 FEET. CONSTRUCTION JOINT CONTACT SURFACES ARE TO BE COATED WITH AN APPROVED BOND BREAKER.

COST OF JOINT SEALER AND BOND BREAKER SHALL BE CONSIDERED INCIDENTAL TO OTHER CONSTRUCTION.

THE JOINT SEALER SHALL CONFORM TO FED. SPEC. TT-S00230 OR TT-S00227 FOR TYPE II, CLASS A OR B.

THE WOOD SHIMS ARE TO BE TREATED IN ACCORDANCE WITH CURRENT STANDARD AND SUPPLEMENTAL SPECIFICATIONS.

Design for Repairs to a
80'x30' STEEL DECK GIRDER BRIDGE
w/19'-10 1/2" CONC. SLAB APPR. SPANS

CAST IN PLACE BARRIER RAIL DETAILS
Sta. 57+50 January, 1988

KEOKUK COUNTY

IOWA DEPARTMENT OF TRANSPORTATION-HIGHWAY DIVISION

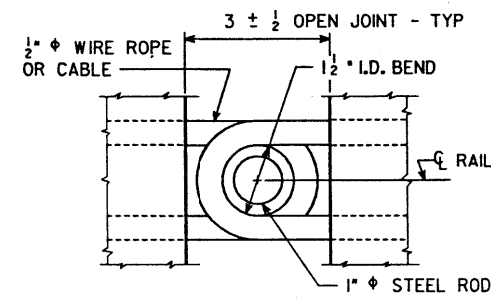
Design Sheet No.: 10 Of 13 File No.: 26969 Design No.: 188

DESIGNED BY: *Thayne Sorenson* TRACED BY: *Hain Trai*
CHECKED BY: *Hain Trai*

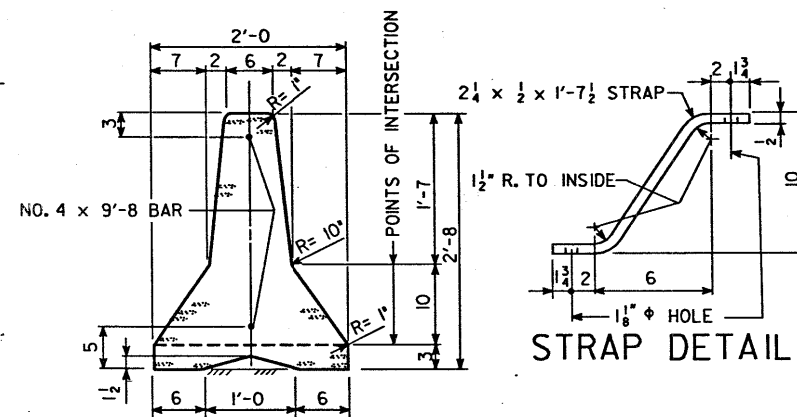
Keokuk COUNTY

PROJECT NUMBER

STATE	FWHA Region	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
IOWA	7		12	21



WIRE ROPE OR CABLE TO BE $\frac{1}{2}$ " ϕ , WITH A MINIMUM BREAKING STRENGTH OF 20,000 POUNDS.

[illegible]

STRAP DETAIL

Technical drawing of a bridge railing cross-section. The drawing includes a side elevation and a detailed view of the railing post connection. The side elevation shows a railing with a total height of 10 units. The railing post is labeled "OPEN JOINT - TYP 3 ± 1/2". The railing is composed of a "2" WIRE ROPE OR CABLE" and a "1" STEEL ROD". The railing is supported by a "STEEL STRAP" and a "STANDARD WASHER". The railing is anchored into an "APPROVED CONCRETE ANCHOR". The detailed view shows the railing post with dimensions: 10 units total height, 7 units for the upper section, 6 units for the lower section, 9 units for the upper section, and 8 units for the lower section. The railing post is labeled "TRAFFIC FACE". The railing post is anchored into the concrete with a "4 1/2 MIN. EMBEDMENT".

BRIDGE END A

TEMPORARY CONCRETE BARRIER RAIL LAYOUT FOR TWO WAY TRAFFIC

NOTE: THE LAYOUT SHOWN IS FOR STAGE I CONSTRUCTION AND WOULD BE SIMILAR FOR STAGE II BY ROTATING 180°.

SHOULDER WIDTH (S)	NO. OF BARRIER RAIL SECT. (N)	D
8 FT.	11	7 FT.

ESTIMATED QUANTITIES

ITEM	AMOUNT
TEMPORARY BARRIER RAIL, FURNISH ONLY	380 L.F.
TEMPORARY BARRIER RAIL, PLACE ONLY	760 L.F.

ITEM REFERENCE:
ALL TEMPORARY BARRIER RAIL SHALL BE NOMINAL 10' LONG CONCRETE UNITS.

DESIGN FOR REPAIRS TO A
80'x30' STEEL DECK GIRDER BRIDGE
w/19'-10 $\frac{1}{2}$ CONC. SLAB APPR. SPANS
TEMPORARY BARRIER RAIL-CONCRETE
STA. 57+50
JANUARY, 1988

KEOKUK COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 11 OF 13 FILE NO. 26969 DESIGN NO. 188

DESIGNED BY Darryl A. Rovey TRACED BY _____
DETAILED BY THAYNE SORENSON CHECKED BY Wesley Tsai

TEMPORARY BARRIER RAIL-CONCRETE

STANDARD 1033

KEOKUK COUNTY

PROJECT NUMBER

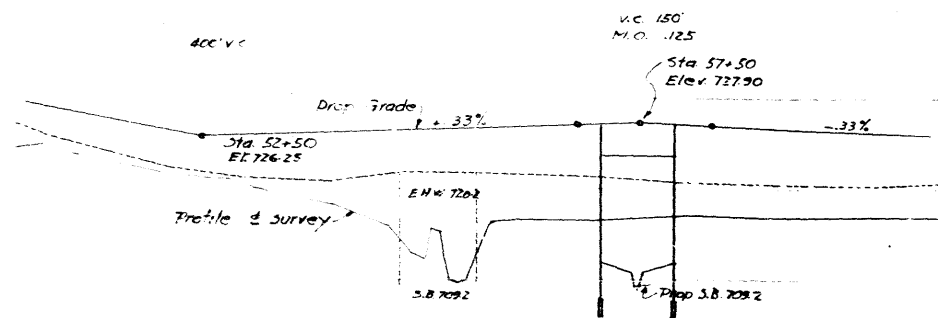
STATE

FHWA
REGION

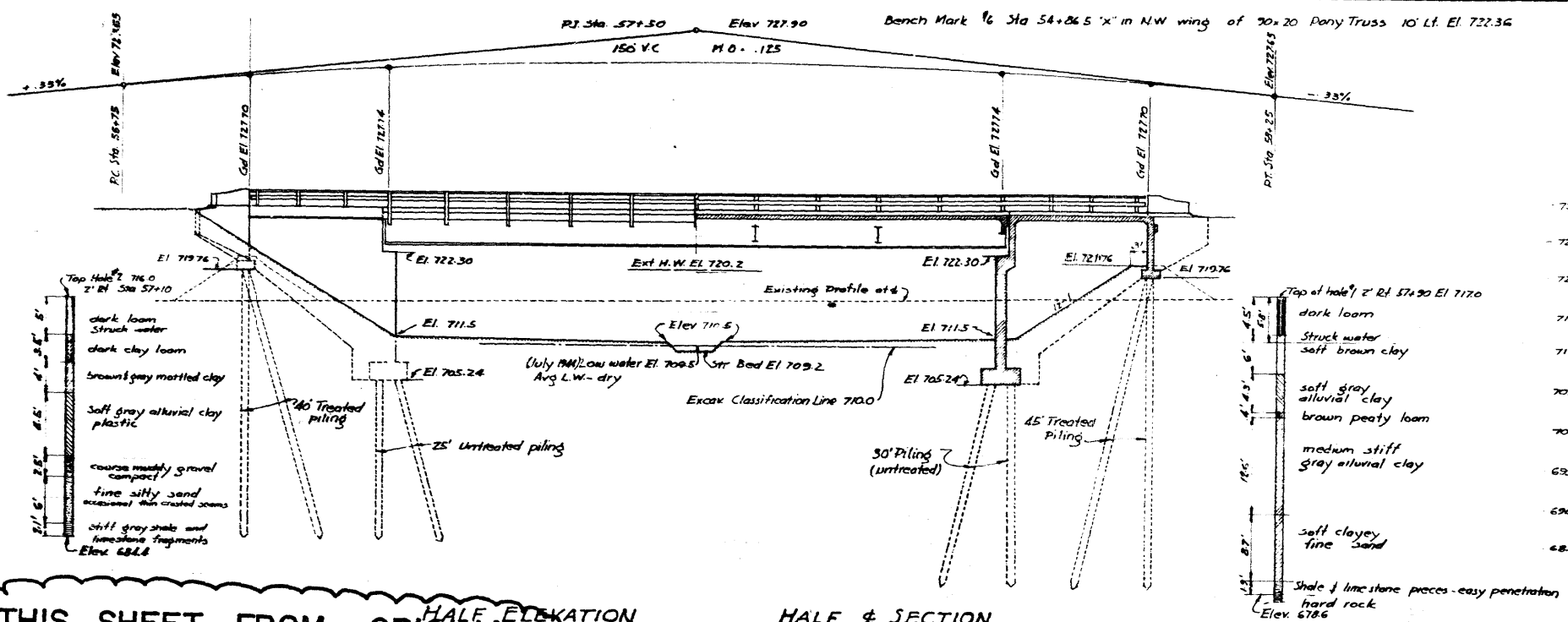
FISCAL YEAR	
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SHEET NO.	TOTAL SHEETS
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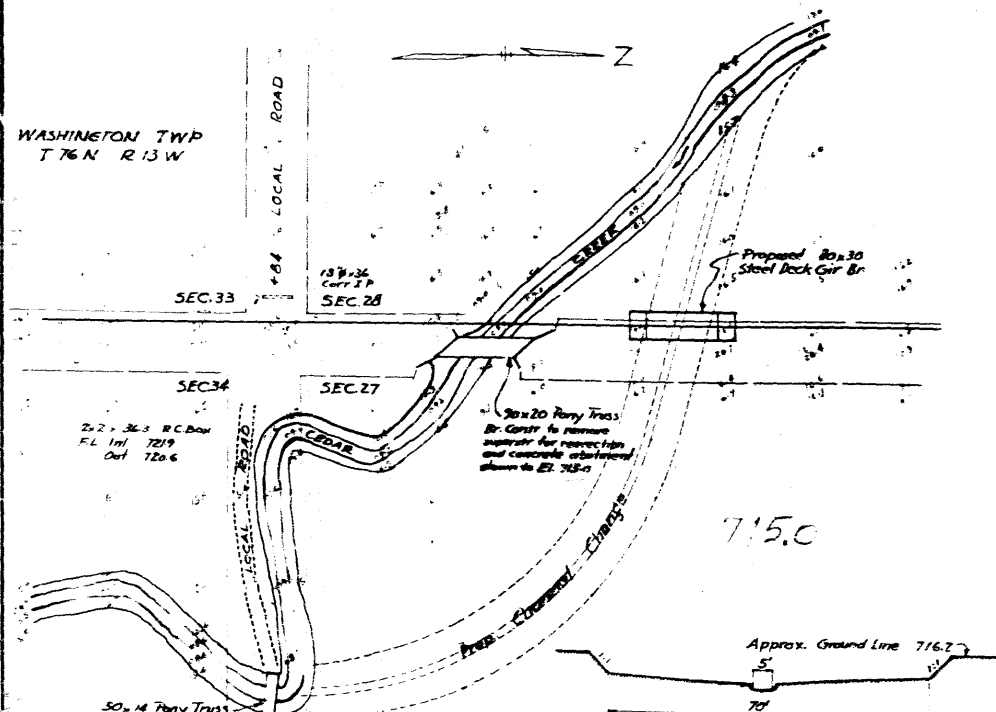
H54018800.S05



PROFILE
Scale 1" = 100'

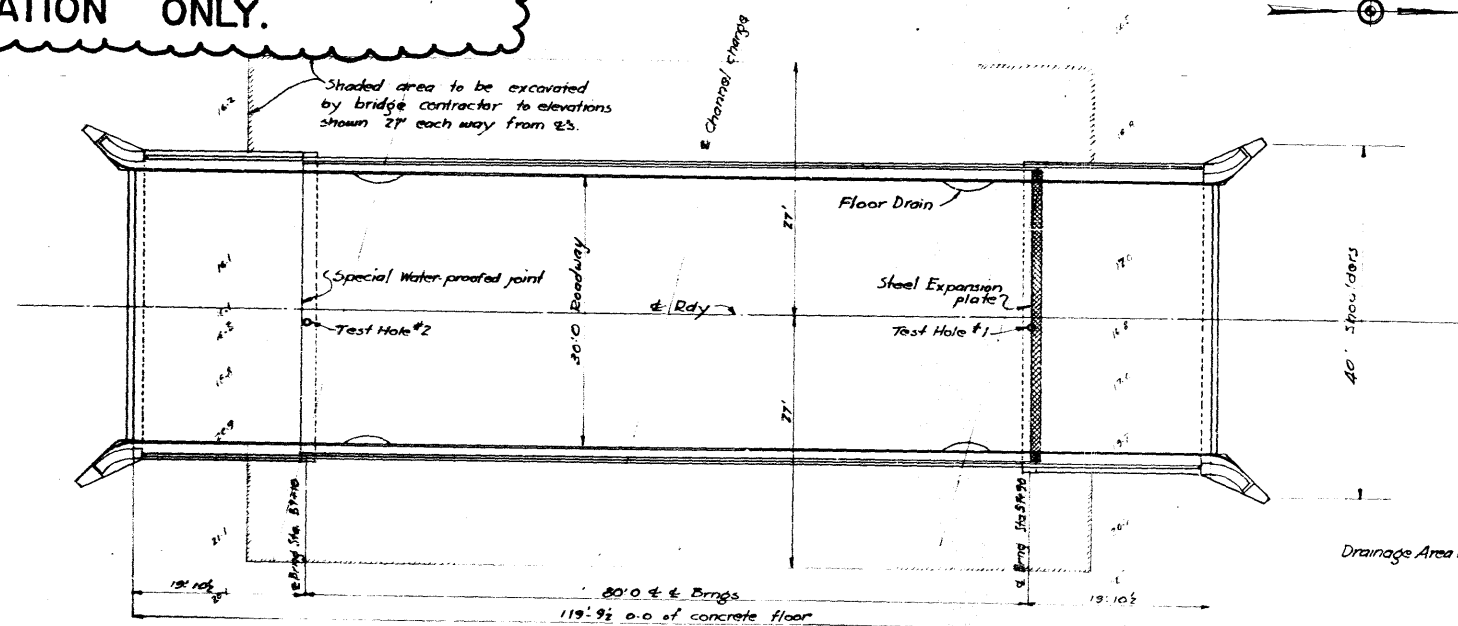


THIS SHEET FROM ORIGINAL
DESIGN IS INCLUDED FOR
INFORMATION ONLY.



PLAN
Scale 1" = 100'

PROD. CHANNEL CHANGE SECTION
Scale 1" = 20'



PLAN
Scale 1" = 100'

General Notes:
Design Specifications: A.A.S.H.O 1944 for H 20 Loading except that the overload provisions is applied to all lanes.
Construction Specifications: Iowa Highway Commission 1946 except that the two field coats of paint on all rail surfaces visible from the roadway are to be white as per par. 4135.04.
Old 90x20 Pony Truss bridge at Sta 55+16 is to be removed by bridge contractor. Superstructure is to be marked for relocation. Old concrete abutments are to be demolished down to El. 715.0.
Bridge contractor is to excavate channel change under bridge and for a distance of 27' each way from center of roadway.
Berms for rear walls of abutments are to be built and compacted by bridge contractor before driving piling. They are to be built of class 10 channel excavation and cost is to be included in price bid for class 10 channel excavation.

ESTIMATED QUANTITIES			
	Abutments	Superstr	Total
Concrete	2226	72.5	2298.5 cy
Rein. Steel	7958	16292	24250 lb.
Str. Steel	2805	22220	25025 lb.
Untreated Piling	68,816		990 LF
Treated Piling	68,816		510 LF
Excav. Cl. 20			60 cy
Excav. Cl. 21	110		110 cy
Excav. (Ref) Channel			1216 cy
Removal of old bridge			Lump Sum

DESIGN NO. 188
FILE NO. 26969
DES. SH. NO. 12 OF 13

Design For
80x30' STEEL DECK GIRDER BR

Concrete Floor — Steel Rail
GENERAL DRAWINGS

Station 57+50 Federal Aid Project 897(2)

KEOKUK COUNTY

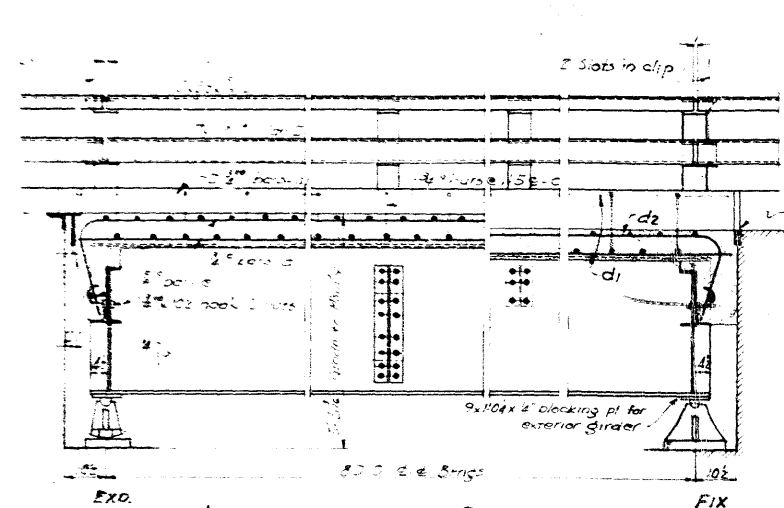
Iowa Highway Commission

July 1948 Sheet 1 of 3 Scales as noted

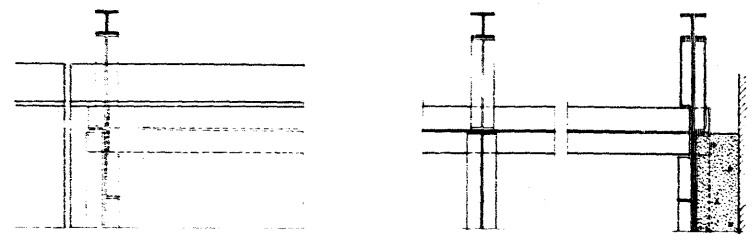
Design 1448 Keokuk File 13197

P.B. BRR

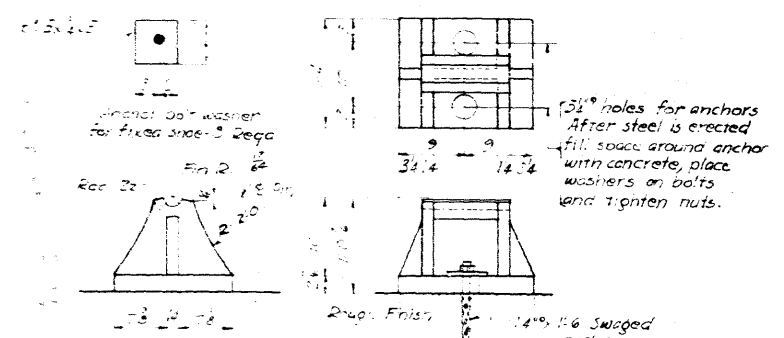
Sheet No. 14 of 21



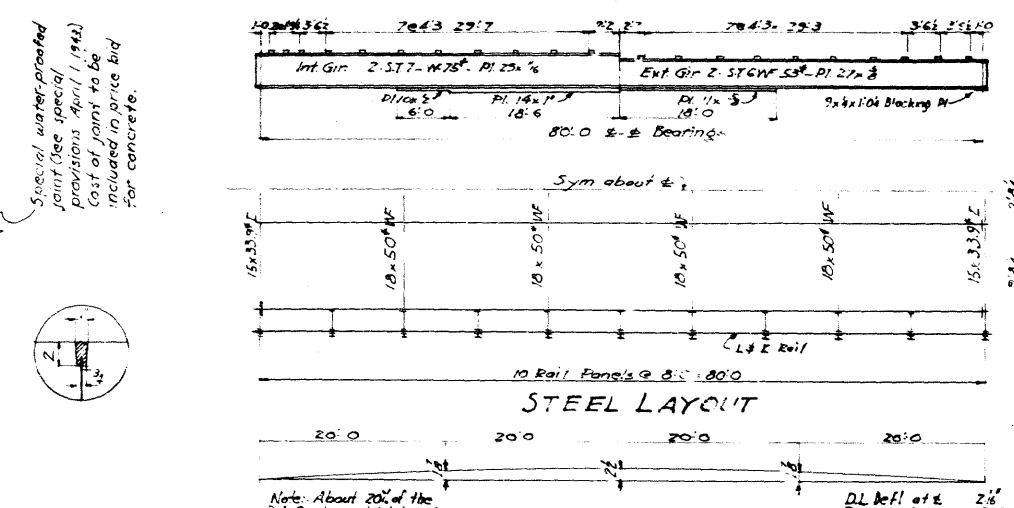
LONGITUDINAL SECTION



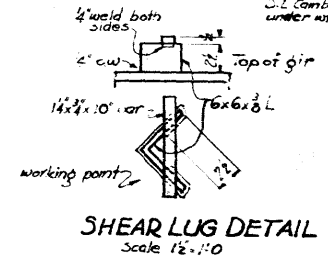
PART PLAN



DETAILS OF C.I. FIXED SHOE
Scale 1" = 1'-0"



STEEL LAYOUT



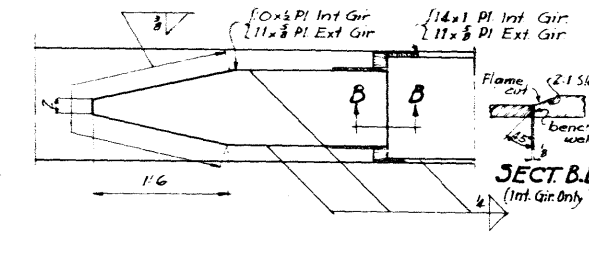
SHEAR LUG DETAIL
Scale 1/2" = 1'-0"

GIRDER MOMENTS & REACTIONS

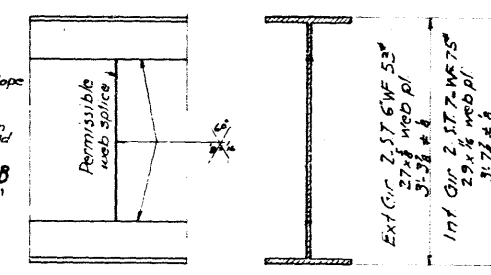
	INTERIOR GIR		EXTERIOR GIR	
	Moments	Reaction	Moments	Reaction
Dead Load #1	1071.2	54.7	712.0	36.4
Dead Load #2	162.0	8.2	66.5	3.4
Live Load	841.0	50.0	461.5	27.9
Impact	205.5	12.2	112.5	6.8
Totals	2279.7	125.1	1352.5	74.5

DL #1: Steel, slab, curb and rail. DL #2: Future wearing surface

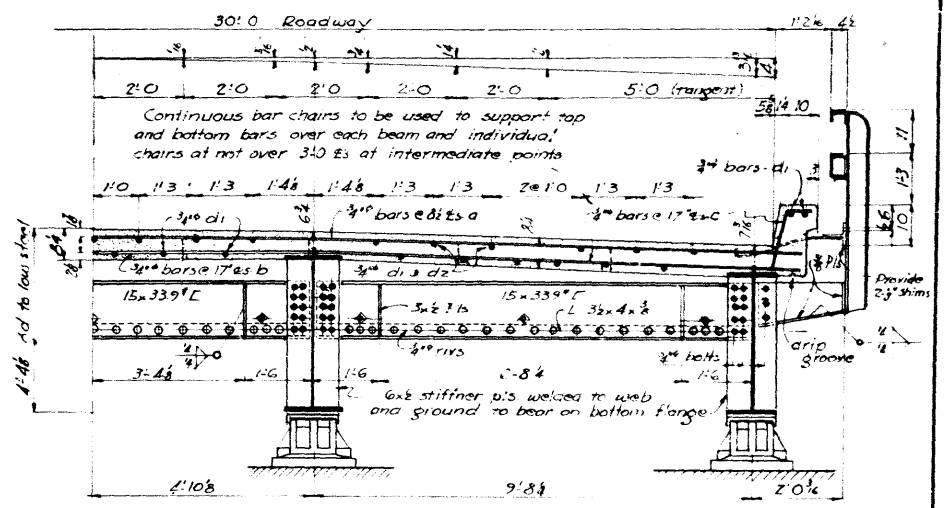
CAMBER DIAGRAM



COVER PLATE DETAILS
Scale 1" = 1'-0"

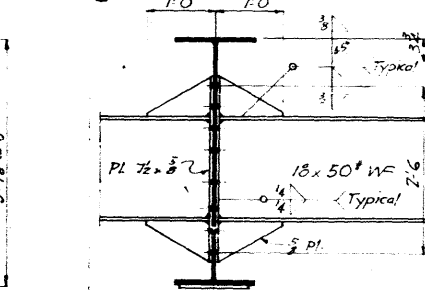
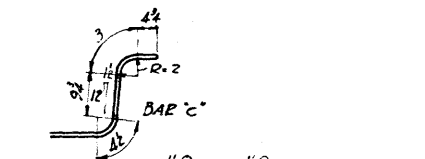


GIRDER DETAILS
Scale 1" = 1'-0"



SECTION NEAR EXPANSION END

Note: Sole P's and pins at both ends and rockers and masonry p's at expansion end are same as for Std. V-7-210' Span.

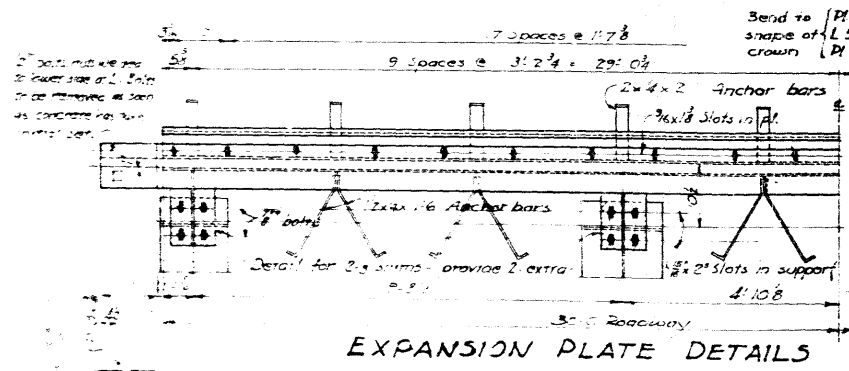


INTERMEDIATE SECTION
Scale 1/2" = 1'-0"

General Notes:
This bridge is designed for H-20 Loading plus 15% per sq ft of roadway for future wearing surface. It is designed under the 1944 Specifications of the A.S.H.O. except that the beams are designed for 100% overload in all lanes with net to exceed 50% increase in the normal unit stresses.
In the design of the beams the beam action is presumed for stresses due to live and impact loads and future wearing surface. It is also presumed that forms for slab and curb will be supported entirely on the beams. The floor as detailed includes 1" of wearing surface.
All field connections are to be bolted. All bolts in rail to be 3/4" all other bolts to be 1/2" except as shown.
Girder bearings are to be truly perpendicular to the webs. All bearings to be set on red lead and canvas.
Shop coat of paint to be omitted on tops of top flanges of girders and other steel surfaces in contact with concrete. All surfaces inaccessible after erection are to be given three coats of paint in shop.
Construction to be in accordance with the 1948 specifications of the Iowa Highway Commission and special provisions listed on sheet 1.

SUPERSTRUCTURE REINFORCING

Mark	Location	Numbr	Size	Length	Shape	Weight
a	Slab trans. top	14	2"	31'1"		532.1
b	" " bottom	56		31'1"		242.1
c	" " " "	57		33'5"		285.8
d	Slab curb length	85		28'10"		367.6
d2	Slab length top ends	30		30'10"		175.8
e	End diaphragm encasement	6	3/4"	9'4"		58
f						1629.2



EXPANSION PLATE DETAILS
Scale 1/2" = 1'-0"

THIS SHEET FROM ORIGINAL DESIGN IS INCLUDED FOR INFORMATION ONLY.

ESTIMATED QUANTITIES

Concrete	725 cu yd
Reinforcing Steel	16,272 lbs
Structural Steel	72,320 lbs

DESIGN NO. 188
FILE NO. 26969
DES. SH. NO. 13 OF 13

Location
Sects 27-28
Washington Twp
Keokuk Co
Over Cedar Creek

Design For
80'x30' STEEL DECK GIRDER BR.
Concrete Floor Steel Rail
SUPERSTRUCTURE DETAILS
Station 57+50 Federal Aid Proj 897(2)
KEOKUK COUNTY
Iowa Highway Commission
Nov. 1948 Sheet 3 of 3 Scales as noted

Design 1448 Keokuk File #13197

204-1
1-20-84

The installation of each continuous piece of guardrail shall be completely functional within five consecutive working days. The following shall apply unless modified by the engineer:

Grading work, if necessary, shall be completed prior to the removal of any existing guardrail or the installation of new guardrail.

Removal of any existing guardrail and installation of new posts and beam rail, except for the approach end section, shall be completed on the same working day. Beam rail shall be fully connected to all posts and protected with a Type E terminal section plus Type II barricade with Type A warning light.

Not later than the next working day, concrete for the end anchorage (RE-52 or RE-53) shall be poured.

204-2
1-20-84

All holes resulting from operations of the contractor, including removal of guardrail posts, fence posts, utility poles, or foundation studies, shall be filled and consolidated to finished grade as directed by the engineer to prevent future settlement. The voids shall be filled as soon as practical--preferably the day created and not later than the following day. Any portion of the right-of-way or project limits (including borrow areas and operation sites) disturbed by any such operations shall be restored to an acceptable condition. This operation shall be considered incidental to other bid items in project.

204-3
8-20-85

All formed steel beam railing and posts that are to be removed and reinstalled on this project shall meet the approval of the engineer before reinstalling. Painted steel beam railing and painted posts shall not be used on this project.

EROSION CONTROL

Seeding, fertilizing, and mulching of all disturbed areas following the work on this project and as directed by the engineer.

Seeding: 3 lbs. per 1,000 sq. ft. of Fescue, Ky. 31

Fertilizer: Rate--15 lbs. of 15-15-15 or equivalent chemically combined commercial fertilizer per 1,000 square feet.

Mulch: Rate--75 lbs. of Dry Cereal Straw per 1000 sq. ft.

The preparation of the seedbed, furnishing and application of seed, fertilizer, and mulch to all disturbed areas on this project shall be considered incidental to work on this project and no extra compensation will be allowed.

213-1
1-20-84

It shall be the contractor's responsibility to provide waste areas or disposal sites for excess material which is not desirable to be incorporated in the work involved on this project (excavation or broken concrete). No payment for overhaul will be allowed for material hauled to these sites.

251-2
6-22-84

The contractor is hereby notified that removal of any existing traffic markers, warning devices or guardrail barriers shall be scheduled subject to the approval of the engineer. The contractor may be required to place temporary warning devices at certain locations where replacement features are not installed the same day during which any such removals take place.

REFERENCE INFORMATION

100-4
1-23-85


Data listed below is for informational purposes only and shall not constitute a basis for any extra work orders.

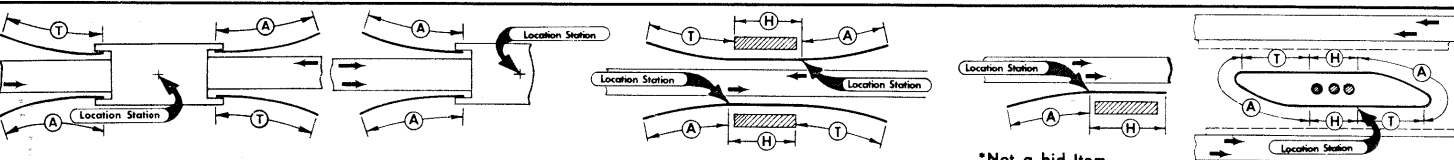
ITEM NO.	DESCRIPTION
20, 21, 25, 26, 28	Refer to Std. Rd. Plan RK-16 for details.
27	To be hauled to maintenance yard as directed by the engineer.
28	To be disposed of as per Std. Notation 213-1.

FINAL ROADWAY QUANTITIES			
100-00 1-20-84			
No.	ITEM	UNIT	TOTAL
20	Backfill, Special	Tons	44
21	Bridge Approach Section, Reinforced	Sq.Yds.	69.6
22	Guardrail, End Anchorage, Beam RE-52	No.	5
23	Guardrail, Formed Steel Beam	Lin.Ft.	287.5 *
24	Guardrail, Posts, Beam	No.	51
25	Pav't., Std. P.C. Conc. Class C, 10 In.	Sq.Yds.	16.1
26	Paved Shldr., Class 1 P.C. Conc.	Sq.Yds.	0
27	Removal of Object Markers	No.	12
28	Removal of Pavement	Sq.Yds.	122
29	Delineator, Single White	No.	14
30	Object Marker, Type 3	No.	4
31	Object Marker, Triple Yellow	No.	9

* - 37.5 LF OF THIS QUANTITY WAS E.W.O. TO REPAIR RAIL CAUSED BY TRAFFIC ACCIDENT

- TRAFFIC CONTROL PLAN
- Through traffic will be maintained on the project at all times except when placing structural members. Maximum closure time shall be 1/2 hour.
 - Traffic control on this project shall be in accordance with layouts contained in the plans and applicable standard road plans. For additional complementary information, refer to current Supplemental Specification for Traffic Controls.
 - All traffic control devices shall be furnished, erected, maintained and removed by the contractor.
 - Where possible, all post mounted signs shall be placed a minimum of two feet clear of the shoulder.
 - The location for storage of equipment by the contractor during non-working hours will be as approved by the engineer in charge of construction.
 - The engineer may require modification of, or additions, to pavement marking details shown. Conflicting permanent edgelines or centerlines shall be removed and replaced with appropriate temporary lines. As applicable, permanent edgelines and centerlines shall be restored before the roadway is returned to normal traffic.
 - Proposed sign spacing may be modified, as approved by the engineer to meet existing field restrictions or to prevent obstruction of the motorist's view of permanent signing.
 - Proposed changes in the Traffic Control Plan (includes layout sheet) shall be reviewed with the Office of Construction before changes are made.
 - The bid item "Traffic Control" shall include the cost of all traffic control measures required of the contractor except those which are separate bid items or are incidental to other bid items.

ROADWAY DESIGN	
	I hereby certify that this plan was prepared under my supervision and that engineering decisions with regard to the design were made by me or by other duly Registered Professional Engineers under the laws of the State of Iowa.
Name <u>John R. Abrams</u>	
Iowa Registration No. <u>7229</u>	Date <u>11-5-87</u>

TABULATION OF "W" BEAM GUARDRAIL INSTALLATIONS													
(Refer to appropriate Standard Road Plans)													
108-8 8-20-85													
													
*Not a bid item													
LOCATION													
STANDARD FORMED STEEL "W" BEAM GUARDRAIL BEAM GUARDRAIL POSTS													
10"x10" 8"x8" 8"x8" 6"x8" 6"x8" 6"x8" 6"x8" 6"x8" 6"x8" 6"x8" 6"x8" 6"x8" 6"x8" 6"x8"													
SINGLE SINGLE NO NO NO NO NO NO NO NO NO NO NO NO NO NO													
SPACER SPACER SPACER SPACER SPACER SPACER SPACER SPACER SPACER SPACER SPACER SPACER SPACER SPACER													
Case (L2) (A) (H) (T) TOTAL													
Lin. Ft. Lin. Ft. Lin. Ft. Lin. Ft. Lin. Ft. Lin. Ft. Lin. Ft. Lin. Ft. Lin. Ft. Lin. Ft. Lin. Ft.													
NO. STATION ROAD PLAN													
57+50 N.B. RE-57 G 62.5 62.5 125 6 16 4													
57+50 S.B. RE-57 G 62.5 62.5 125 6 16 4													
REMARKS													

TABULATION OF DELINEATORS AND OBJECT MARKERS						
Refer to Standard Road Plan RE-48A-B* and RE-29C **Not a bid item						
108-17 11-10-83						
LOCATION		DELINEATOR		OBJECT MARKER		
STATION	TYPE*	SINGLE WHITE D-1W NO.	TRIPLE YELLOW OM2-3YV NO.	TYPE 3		OFFSET BRACKETS ** NO.
				OM-3L NO.	OM-3R NO.	
57+50 N.E.	1		2	1		
57+50 N.W.	1	7	2		1	
57+50 S.E.	1	7	2		1	
57+50 S.W.	1		2	1		

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