

3/9/18

0008-090.657

DESIGN DATA			
Traffic	Average Daily (RP 81,820 to 82,391)		
Current 2015	Pass: 1,440	Trucks: 270	Total: 1,710
Forecast 2035	Pass: 1,945	Trucks: 405	Total: 2,350
Traffic	Average Daily (RP 82,391 to 93,745)		
Current 2015	Pass: 505	Trucks: 185	Total: 690
Forecast 2035	Pass: 755	Trucks: 280	Total: 1,035
Traffic	Average Daily (RP 93,745 to 112,215)		
Current 2016	Pass: 470	Trucks: 180	Total: 650
Forecast 2036	Pass: 635	Trucks: 220	Total: 855
Clear Zone Distance: 20 Feet	Design Speed: 65 mph		
Minimum Sight Dist. for Stopping: Existing	Bridges: N/A		
Sight Dist. for No Passing Zone: Existing			
RP 81.749 to 93.745 Pavement Design Life: 20 years			
Design Accumulated One-way Flexible ESALs: 783,601			
RP 93.745 to 112.215 Pavement Design Life 20 years			
Design Accumulated One-way Flexible ESALs: 803,694			

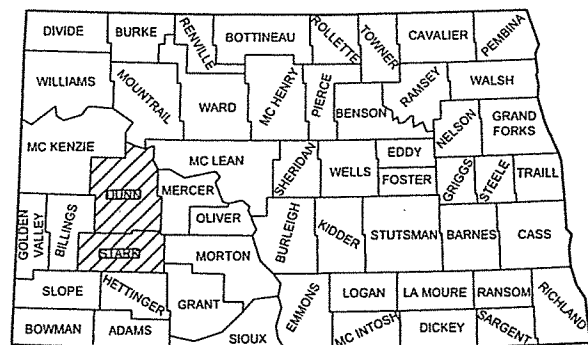
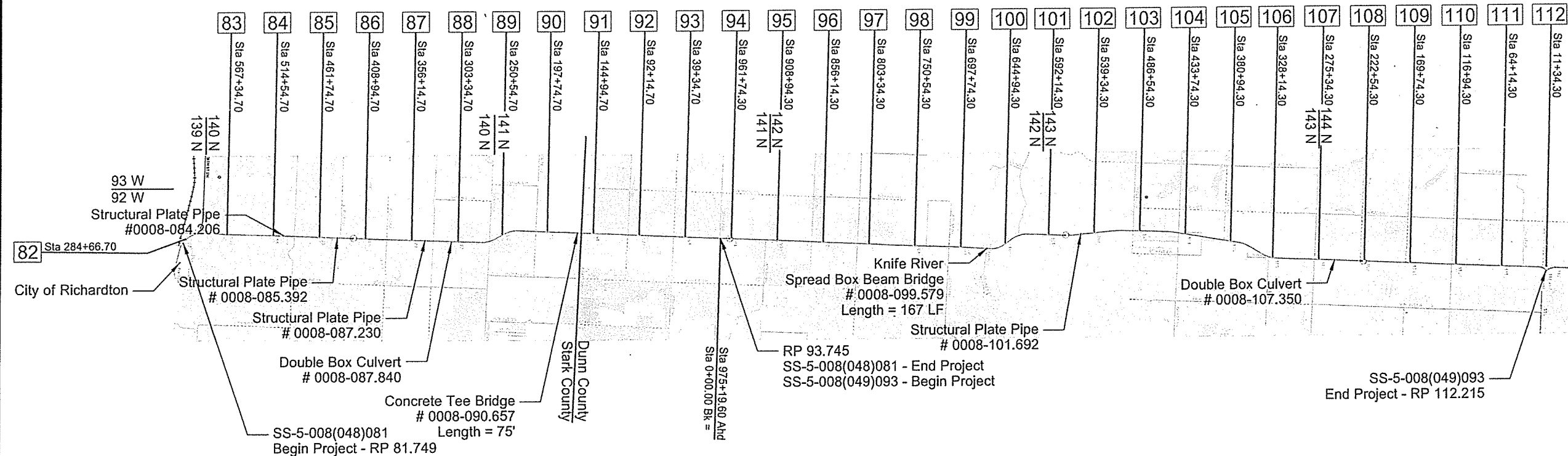
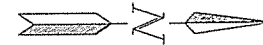
**JOB # 23
NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION**

SS-5-008(048)081
SS-5-008(049)093
Dunn and Stark Counties
Richardton to 12 Miles North of Richardton
12 Miles North of Richardton to JCT ND 200
Mill and Overlay, RCB Extension,
Line SPP, Approach Flattening,
Construct Turn Lanes

STATE	PROJECT NO.	PCN	SECTION NO.	SHEET NO.
ND	SS-5-008(048)081	21513	1	1

GOVERNING SPECIFICATIONS:
2014 Standard Specifications adopted by the North Dakota Department of Transportation and the Supplemental Specifications effective on the date the project is advertised.

PROJECT NUMBER \ DESCRIPTION	NET MILES	GROSS MILES
SS-5-008(048)081 Bridge Exception = 0.014 mi	11.911	11.925
SS-5-008(049)093 Bridge Exception = 0.031 mi	18.439	18.470

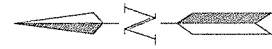


DESIGNERS
Wayne A. Zacher /s/
Douglas A. Schumaker /s/

APPROVED DATE 8-30-17
Roger Weigel /s/ for
OFFICE OF PROJECT DEVELOPMENT
ND DEPARTMENT OF TRANSPORTATION

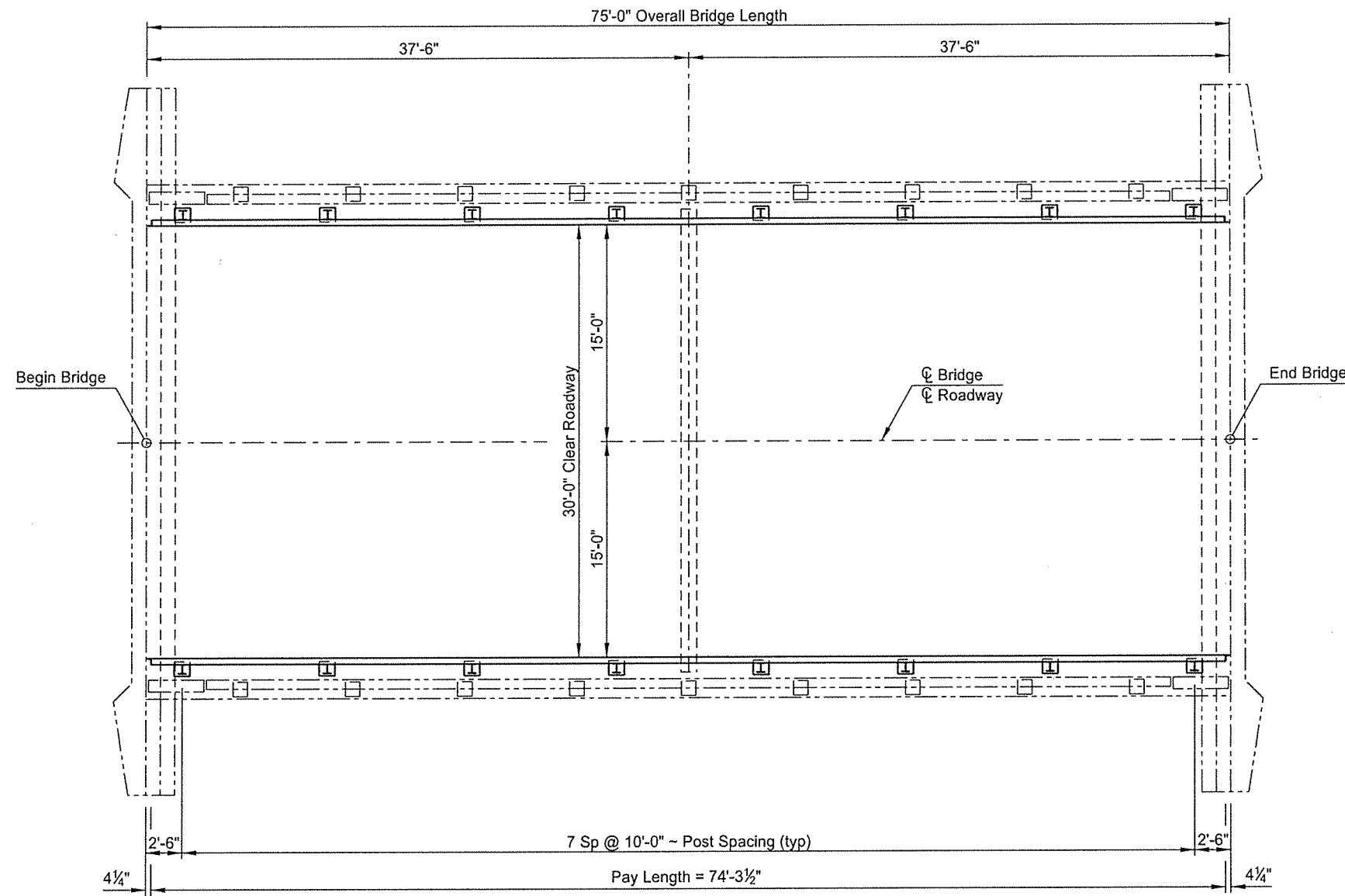
I hereby certify that the attached plans were prepared by me or under my direct supervision and that I am a duly registered professional engineer under the laws of the state of ND.
APPROVED DATE 8-30-17
James Douglas Rath /s/
DESIGN DIVISION

This document was originally issued and sealed by James Douglas Rath Registration Number PE- 4288, on 8-30-17 and the original document is stored at the North Dakota Department of Transportation



23 U.S.C. 409
NDDOT Reserves All Objections

STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
ND	SS-5-008(048)081	170	9



PLAN

This document was originally issued and sealed by Dustin Wing, Registration Number PE 7128, on 8/24/17 and the original document is stored at the North Dakota Department of Transportation

NOTE:

100 SCOPE OF WORK: Work at this site consists of installing a double box beam rail retrofit.

BRIDGE BID ITEMS

SPEC	CODE	ITEM DESCRIPTION	UNIT	QUANTITY
624	3001	DOUBLE BOX BEAM RAIL RETROFIT-FREE STANDING	LF	148.6

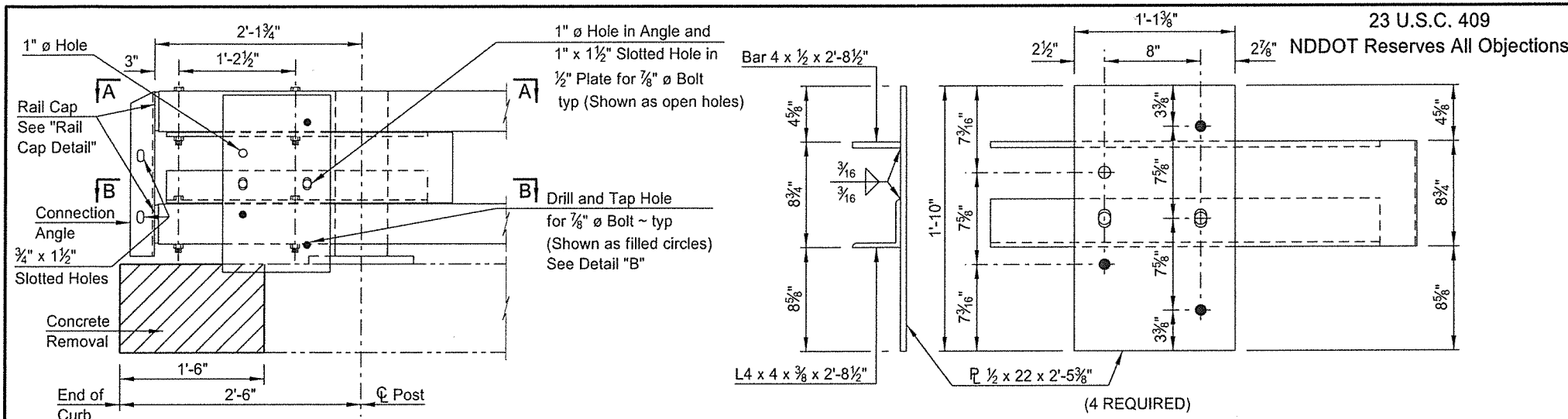
NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION
KNIFE RIVER
10 NORTH JCT I-94

BRIDGE LAYOUT

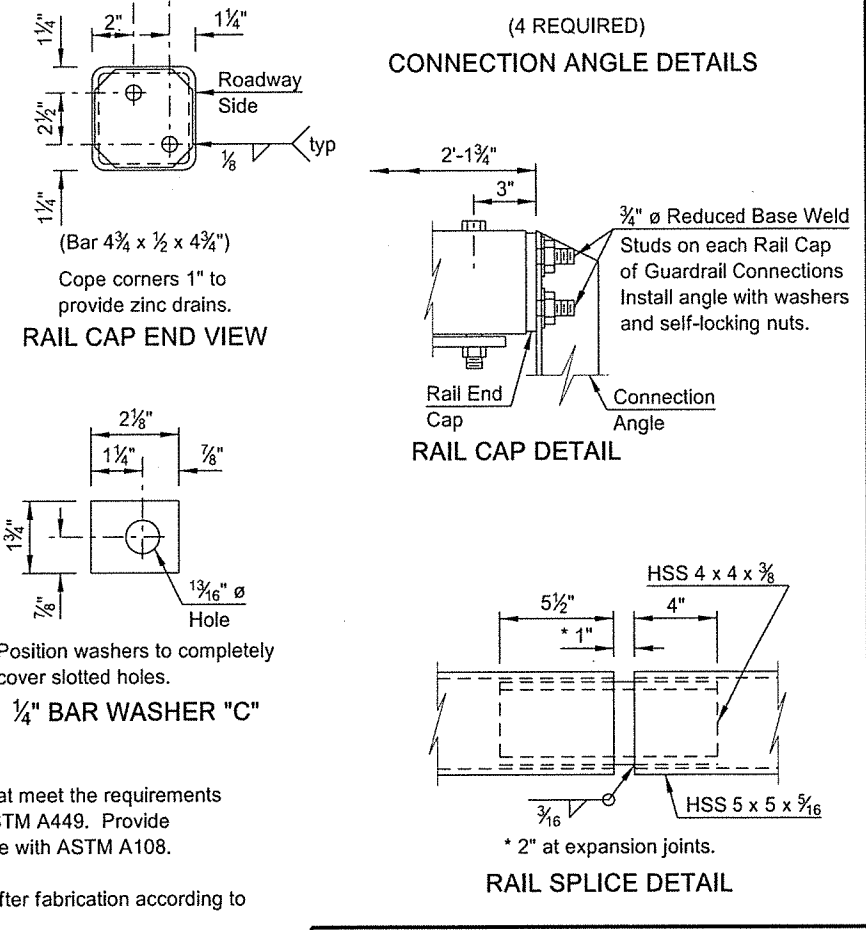
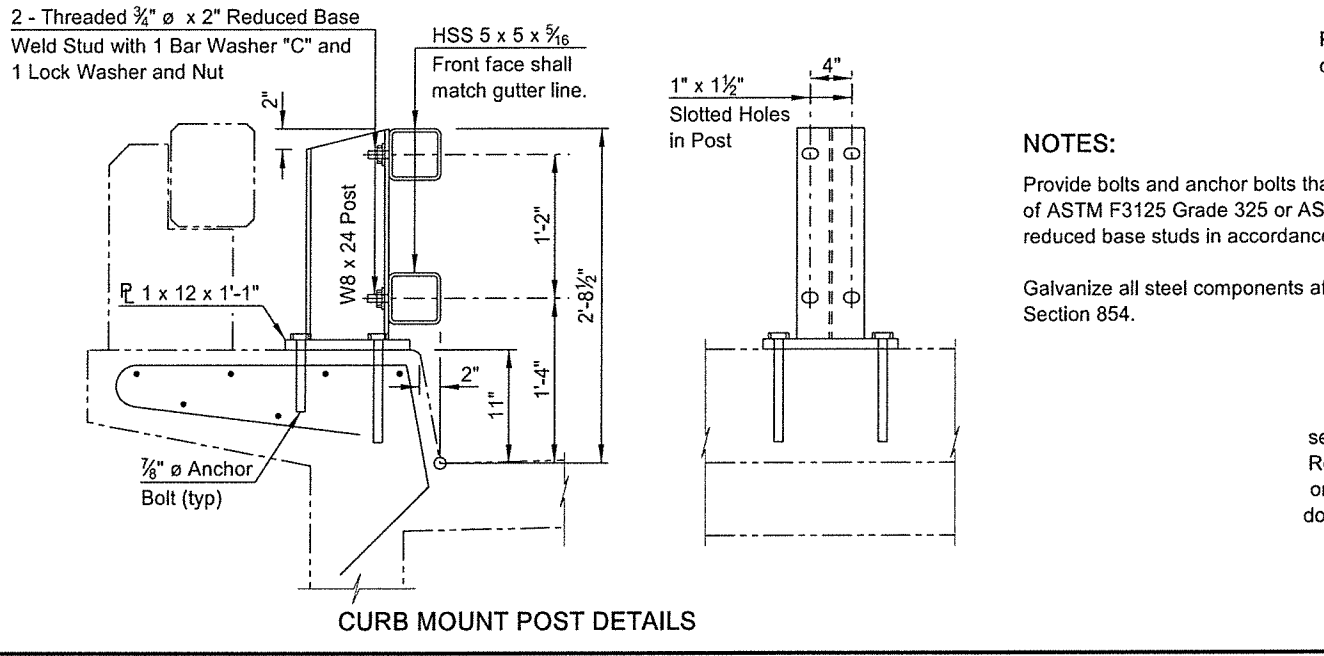
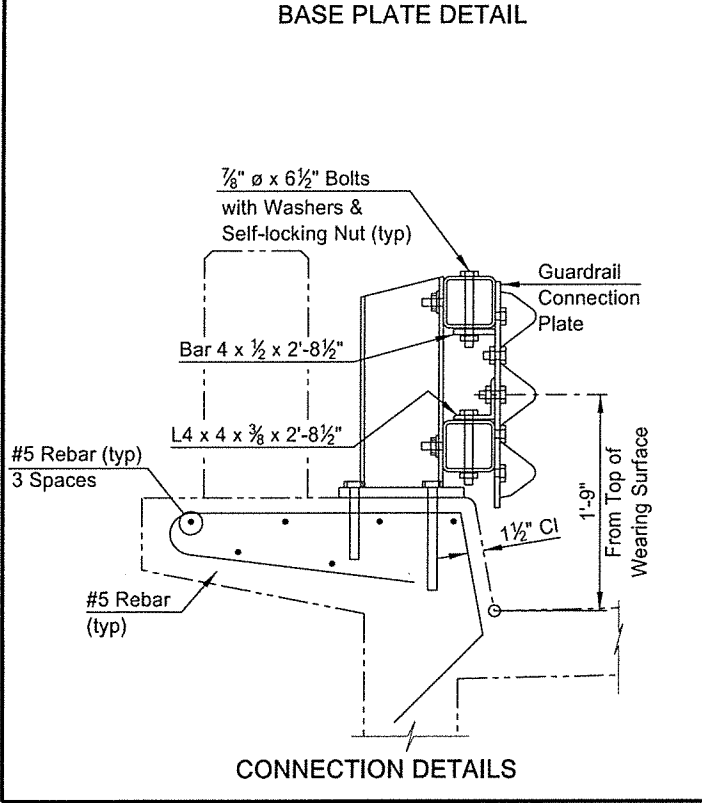
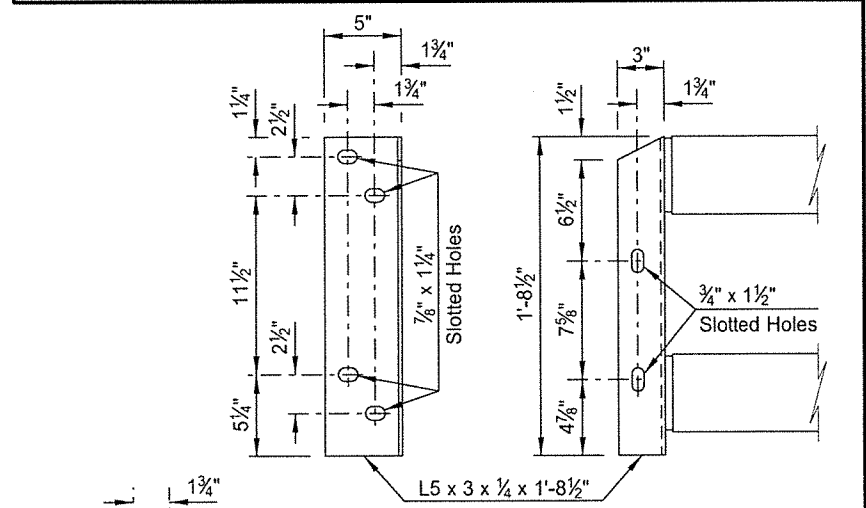
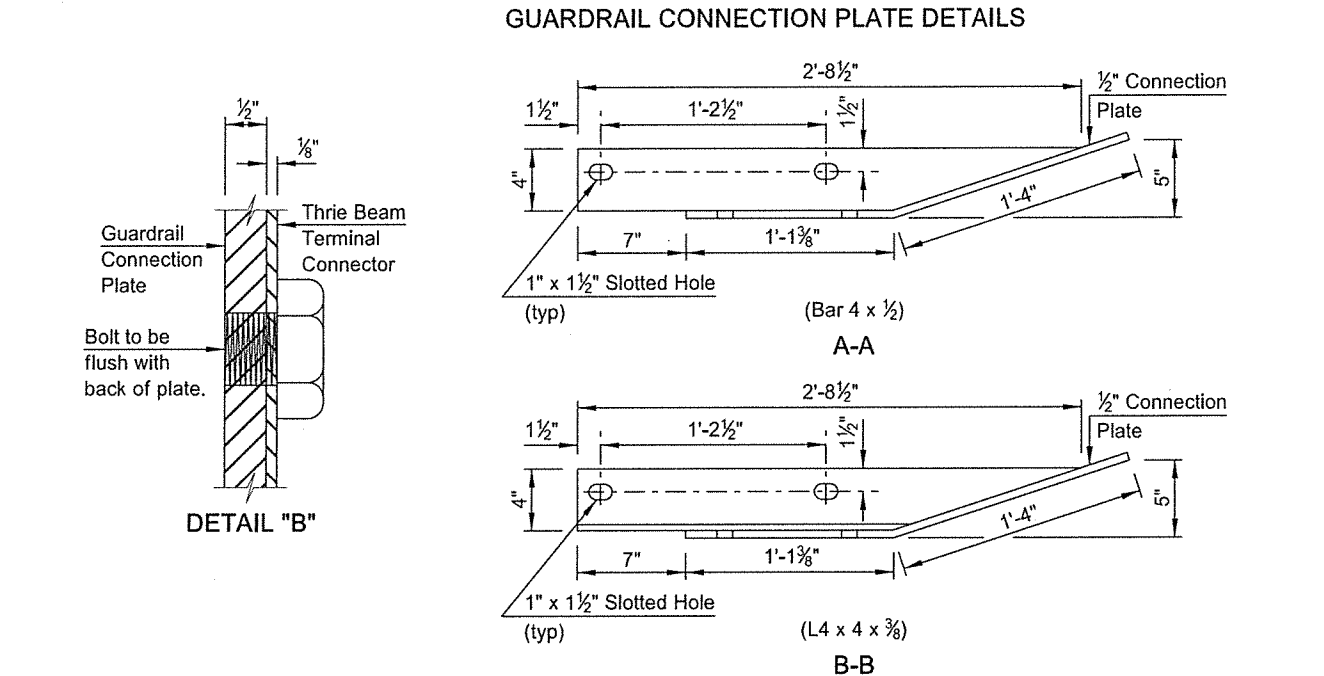
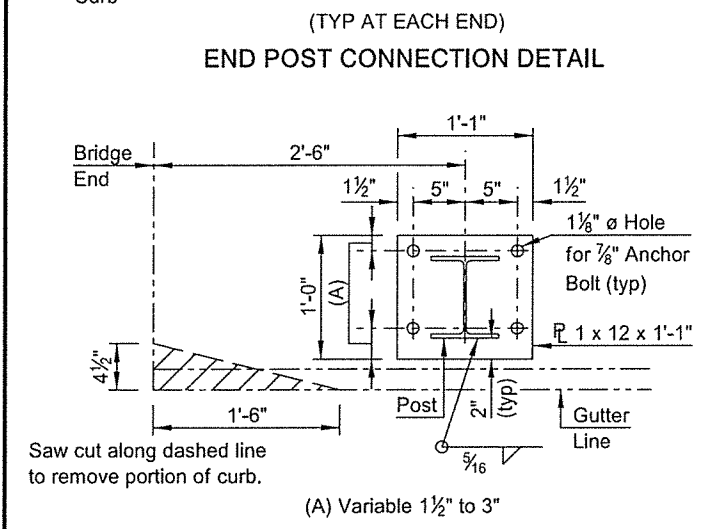
PROJECT: SS-5-008(048)081

STARK COUNTY

DATE: 8/24/17 BRIDGE ENGINEER: Jon Ketterling



STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
ND	SS-5-008(048)081	170	10



NOTES:
 Provide bolts and anchor bolts that meet the requirements of ASTM F3125 Grade 325 or ASTM A449. Provide reduced base studs in accordance with ASTM A108.
 Galvanize all steel components after fabrication according to Section 854.

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QUANTITIES	
RAIL RETROFIT - FREE STANDING	148.6 LF
KNIFE RIVER 10 NORTH JCT I-94	
DOUBLE BOX BEAM RAIL RETROFIT DETAILS (FREE STANDING)	

KNIFE RIVER BRIDGE

DOUBLE BOX BEAM

RAIL RETROFIT

PAGE INDEX

COVER PAGE

BRIDGE LAYOUT - PAGE 1

RAIL LAYOUTS - PAGE 2

DETAILS/NOTES- PAGE 3-6

ND PROJECT # SS-5-008(048)081

BRIDGE # 0008-090.657

PCN# 21513

STARK COUNTY, ND

DAKOTA FENCE CO. - SUBCONTRACTOR

BORDER STATES PAVING- PRIME CONTRACTOR

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION ENGINEER

Shop Drawings Have
Been Reviewed and
Checked As Submitted
and Are in Conformance
with Contract Documents
Dakota Fence Co.



NO EXCEPTIONS NOTED

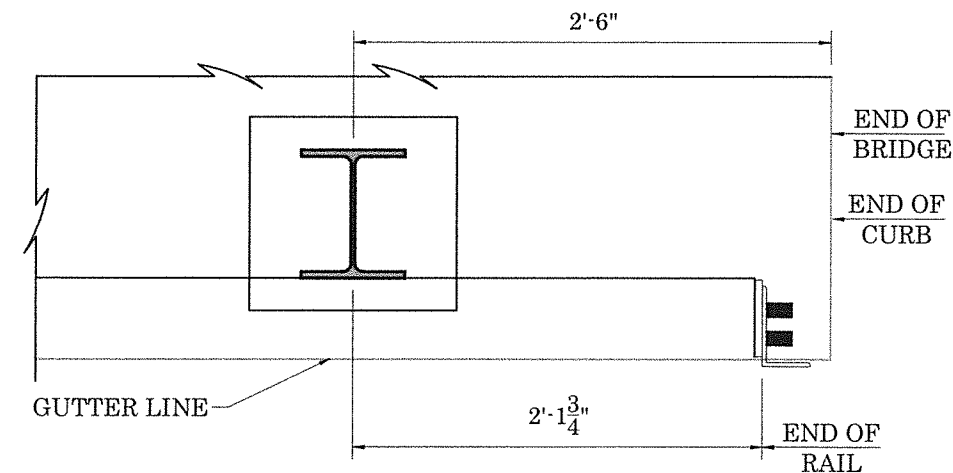
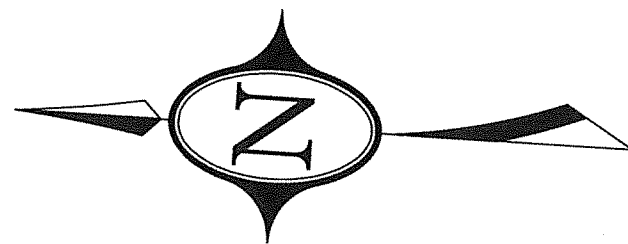
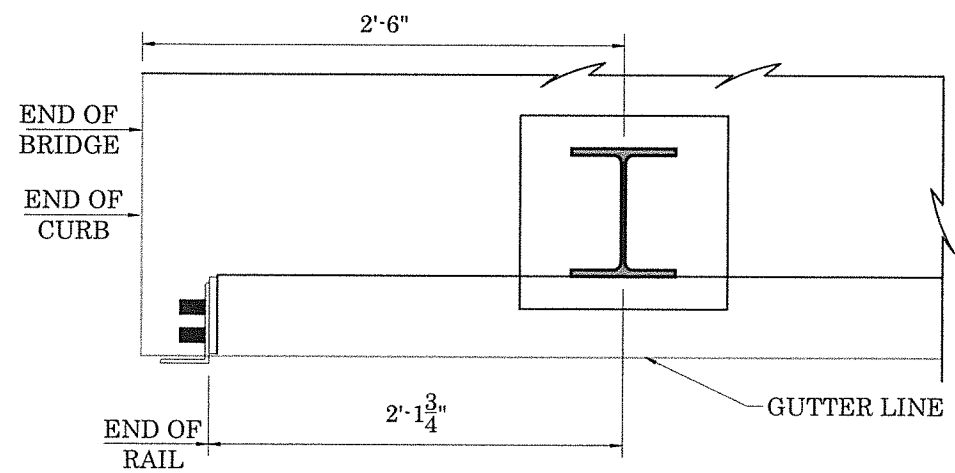
Dean Stolz

Digitally signed by Dean Stolz
DN: cn=Dean Stolz, o=Bridge,
ou=NDDOT, email=dstolz@nd.gov,
c=US
Date: 2018.04.24 13:14:51 -0500

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NDDOT

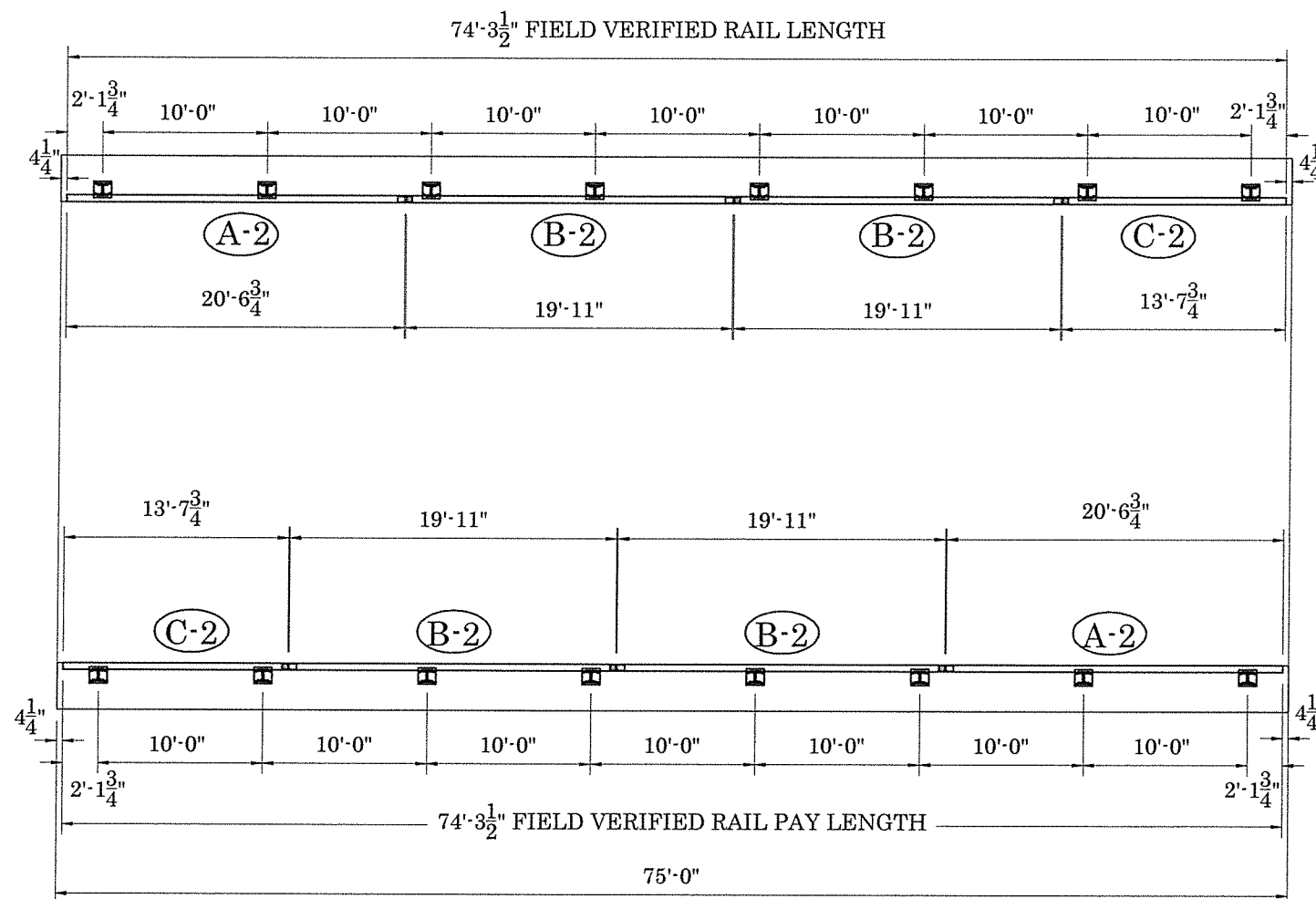
4/16/2018



**TYP. BRIDGE END
DETAIL**

NOTES:
FIELD VERIFIED LAYOUT TO CLEAR EXISTING ANCHOR BOLT LOCATIONS

**TYP. BRIDGE END
DETAIL**



BRIDGE RAIL LAYOUT

Shop Drawings Have
Been Reviewed and
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Dakota Fence Co.

No Exceptions Noted
BY: D Stolz
DATE: April 24, 2018
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NDDOT

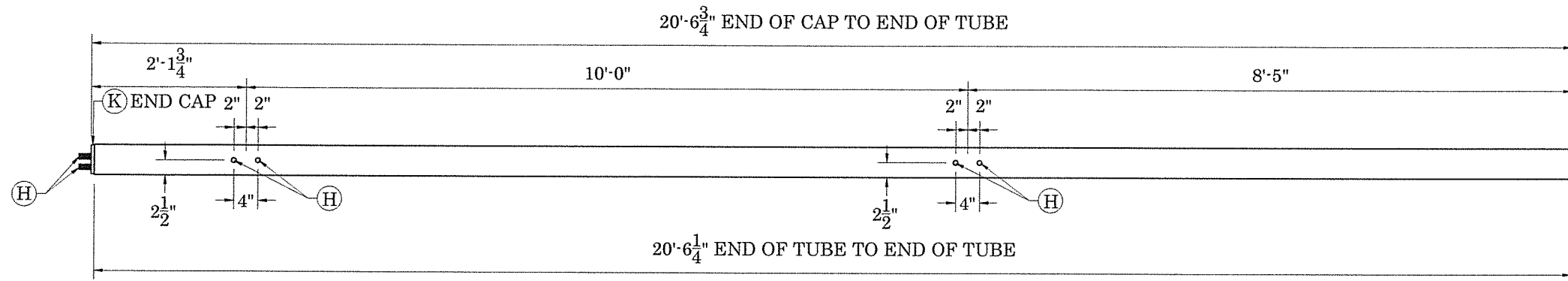
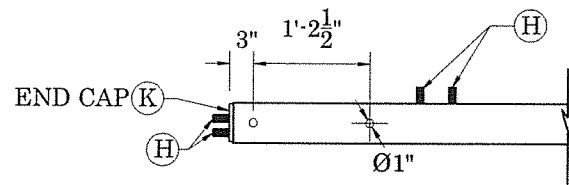
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DATE: 4/5/18	DRAWN BY: CJB	PCN: 21513		KNIFE RIVER BRIDGE DOUBLE BOX BEAM RAIL RETROFIT STARK COUNTY, ND
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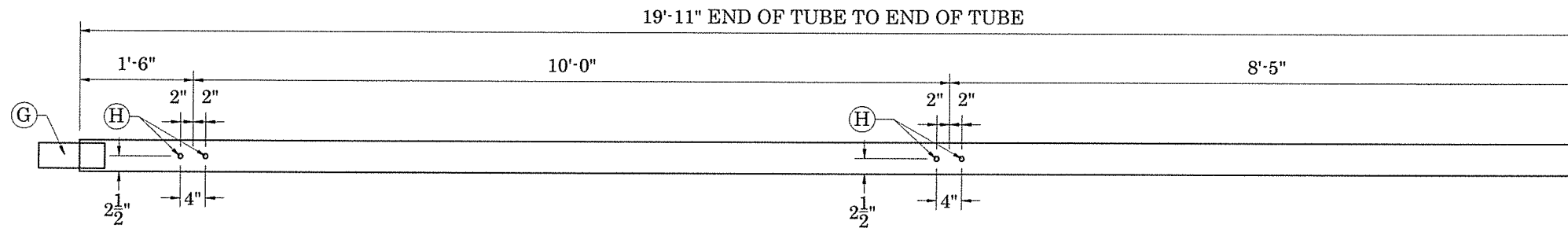
3D Specialties inc.
Division of Dakota Fence

**FARGO, BISMARCK,
MINOT, WILLISTON**

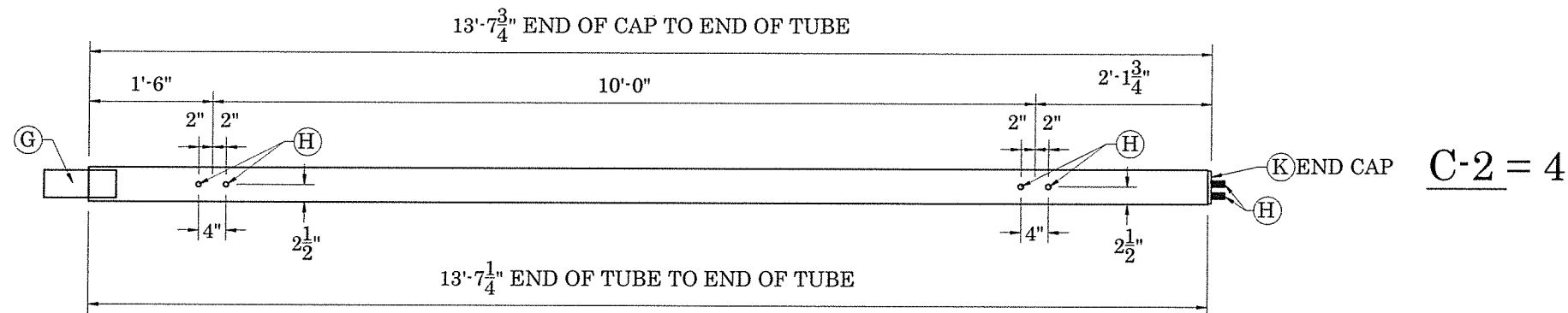
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1730 12th St. S. BOX 62 Bismarck, ND 58502	Phone:(701) 258-9095 Fax: (701) 223-3140
1915 20th Ave. SE. BOX 3066 Minot, ND 58702	Phone:(701) 852-6263 Fax: (701) 852-0931
6407 138th Ave. NW. Williston, ND 58802	Phone:(701) 826-6264



A-2 = 4

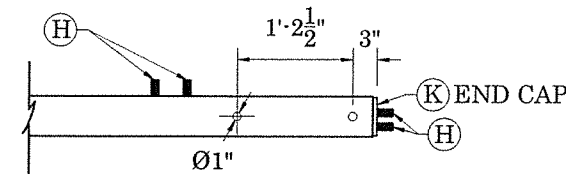


B-2 = 8



C-2 = 4

RAIL SECTION DETAILS



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 BY: D Stolz
 DATE: April 24, 2018
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 Dakota Fence Co.

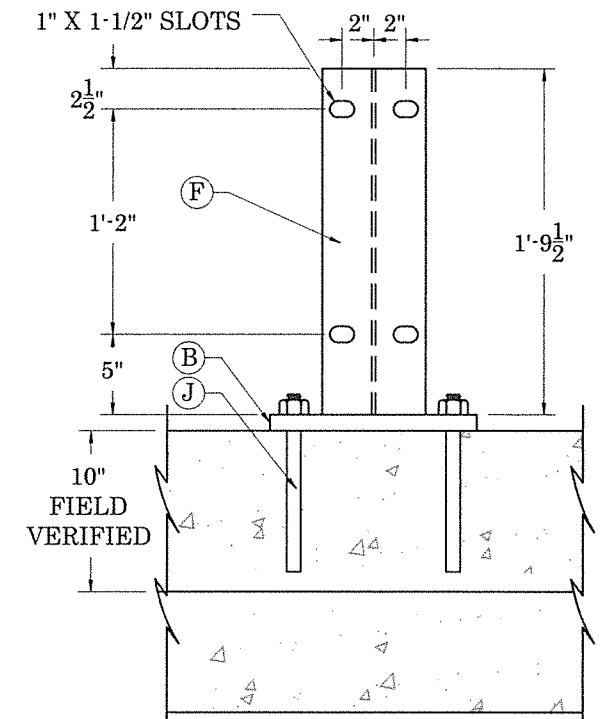
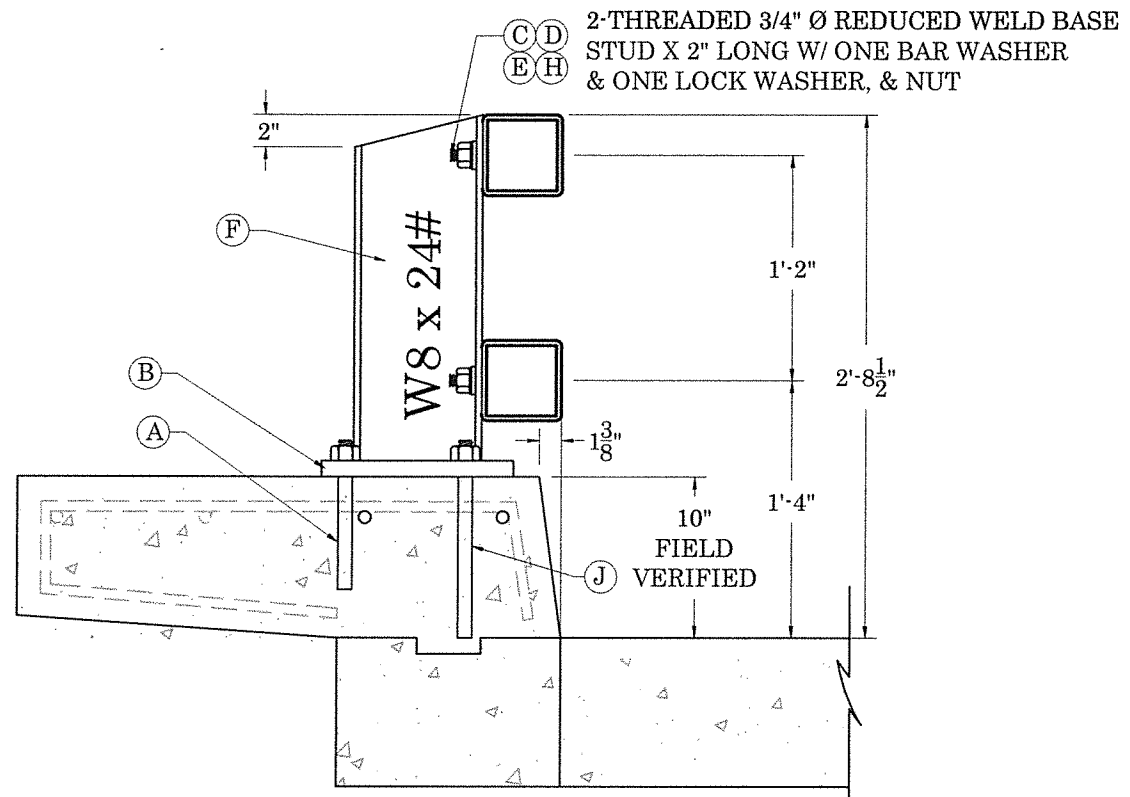
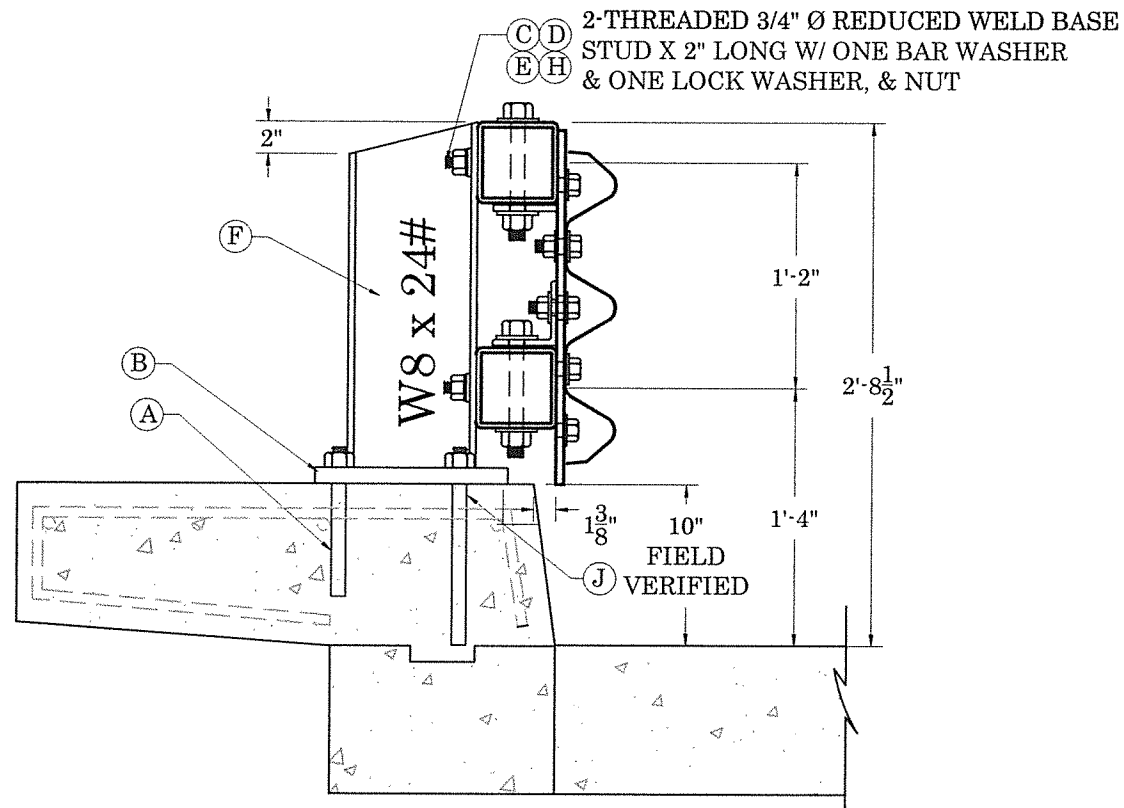
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ND PROJECT # SS-5-008(048)081 BRIDGE # 0008-090.657
 KNIFE RIVER BRIDGE DOUBLE BOX BEAM RAIL
 RETROFIT
 STARK COUNTY, ND
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 DAKOTA FENCE CO. >> SUB-CONTRACTOR
 NDDOT >> ENGINEER

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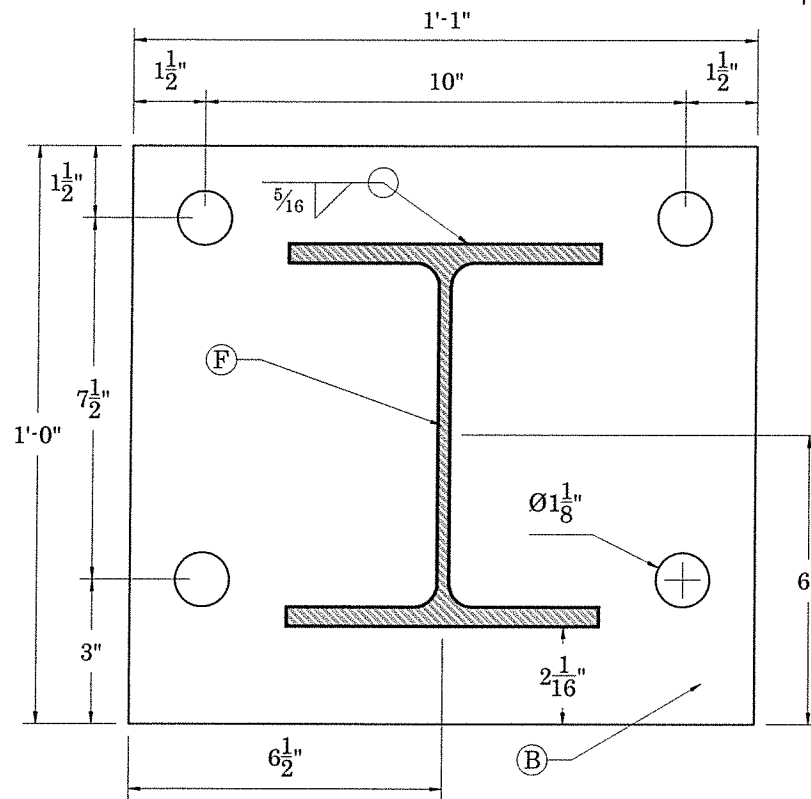
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 Division of Dakota Fence
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6407 138th Ave. NW Williston, ND 58802	Phone: (701) 826-6264



CURB MOUNT POST & CONNECTION DETAILS

CURB MOUNT DETAILS



**ROADWAY
BASE PLATE DETAILS**

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 BY: D Stolz
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 Dakota Fence Co.

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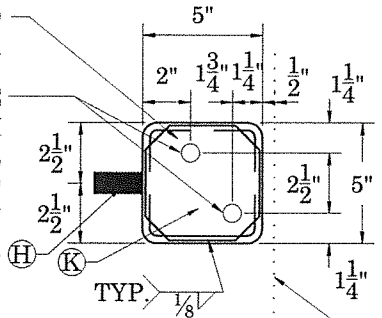
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 6407 138th Ave. NW. Phone:(701) 826-6264
 Williston, ND 58802

4-3/4" X 4-3/4" X 1/2" BAR
COPE CORNERS 1" TO
PROVIDE ZINC DRAINS.

2 @ 3/4" Ø REDUCED BASE
WELDED STUDS ON EACH
RAILCAP OF GUARD RAIL
CONNECTION. STUDS 2"
LONG. INSTALL CONNECTION
ANGLE W/ NUTS & LOCK WASHERS.

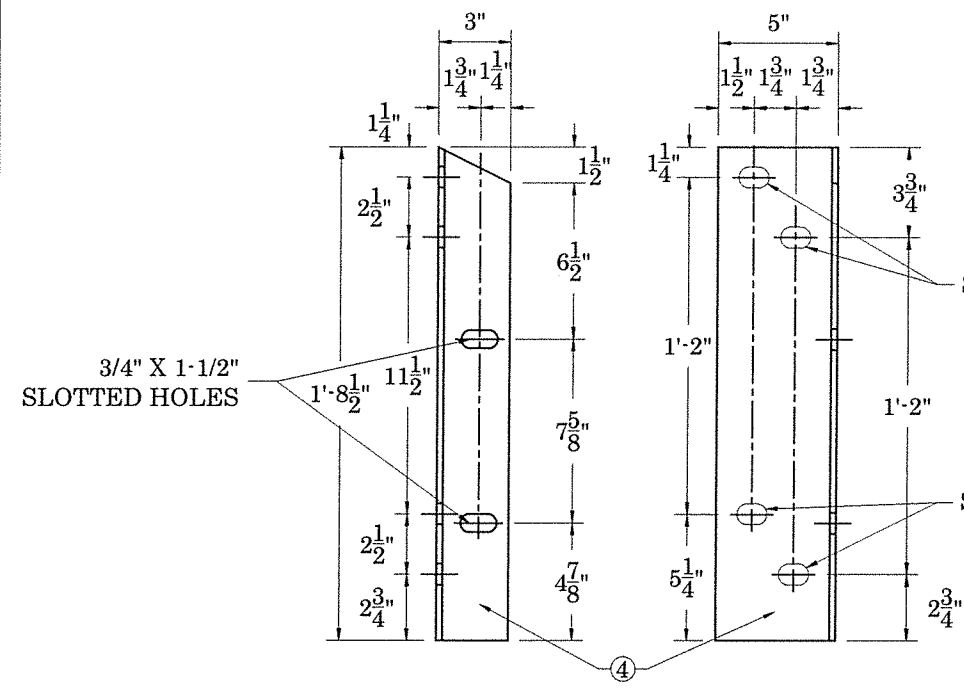
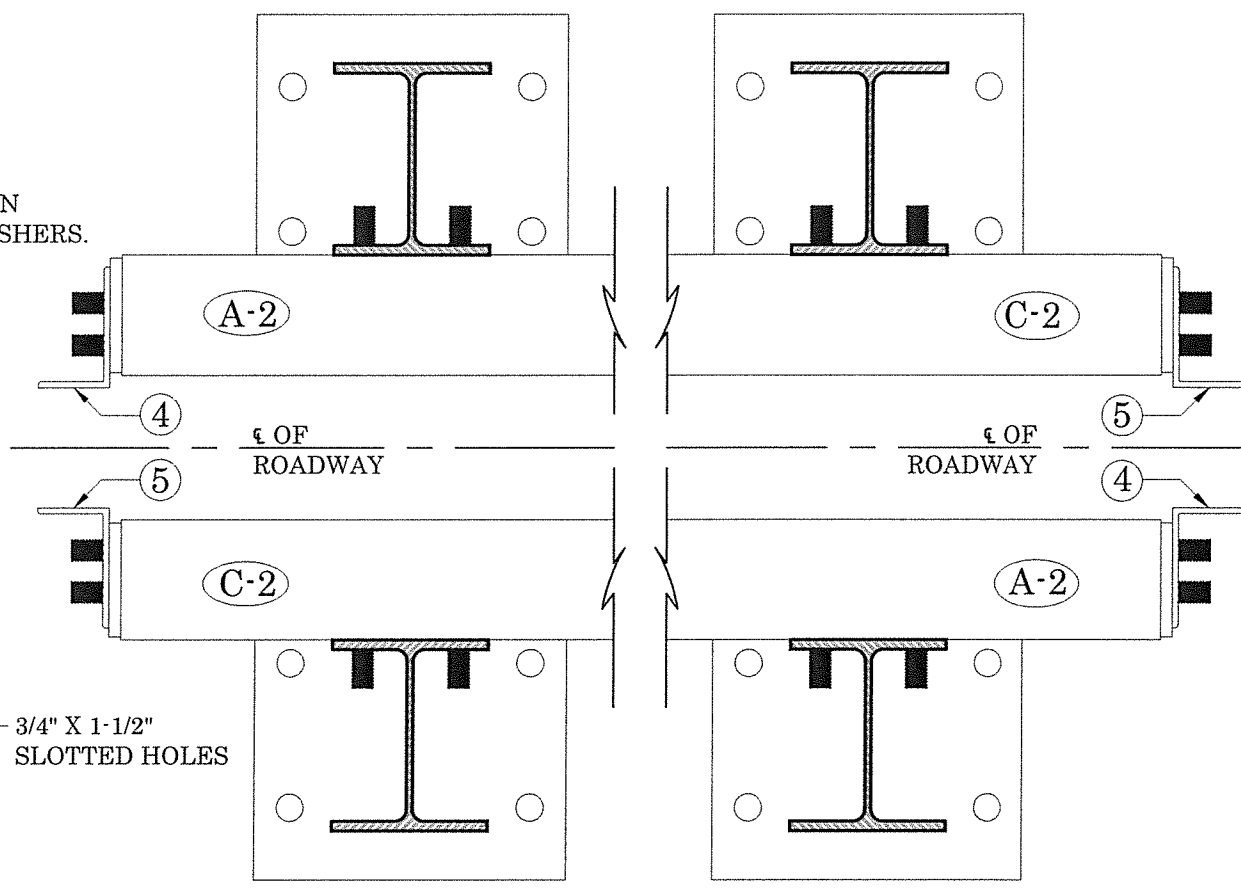
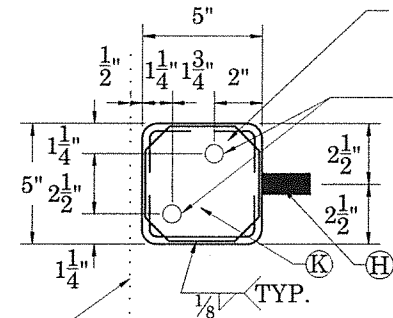


CENTER OF
ROADWAY

LINE OF
CONNECTION ANGLE

4-3/4" X 4-3/4" X 1/2" BAR
COPE CORNERS 1" TO
PROVIDE ZINC DRAINS.

2 @ 3/4" Ø REDUCED BASE
WELDED STUDS ON EACH
RAILCAP OF GUARD RAIL
CONNECTION. STUDS 2"
LONG. INSTALL CONNECTION
ANGLE W/ NUTS & LOCK WASHERS.



7/8" X 1-1/4"
SLOTTED HOLES

7/8" X 1-1/4"
SLOTTED HOLES

3/4" X 1-1/2"
SLOTTED HOLES

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CONNECTION ANGLE DETAILS

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BY: D Stolz

DATE: April 24, 2018

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PROJECT# 18203D0067	DRAWING# 18.002	SCALE: VARIES	REVISED: 4/16/2018	ND PROJECT # SS-5-008(048)081 BRIDGE # 0008-090.657 KNIFE RIVER BRIDGE DOUBLE BOX BEAM RAIL RETROFIT STARK COUNTY, ND
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3D Specialties Inc.

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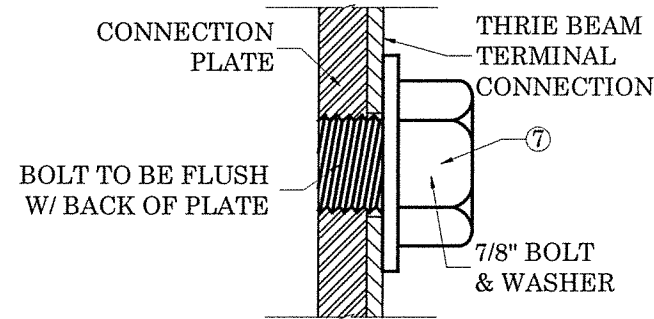
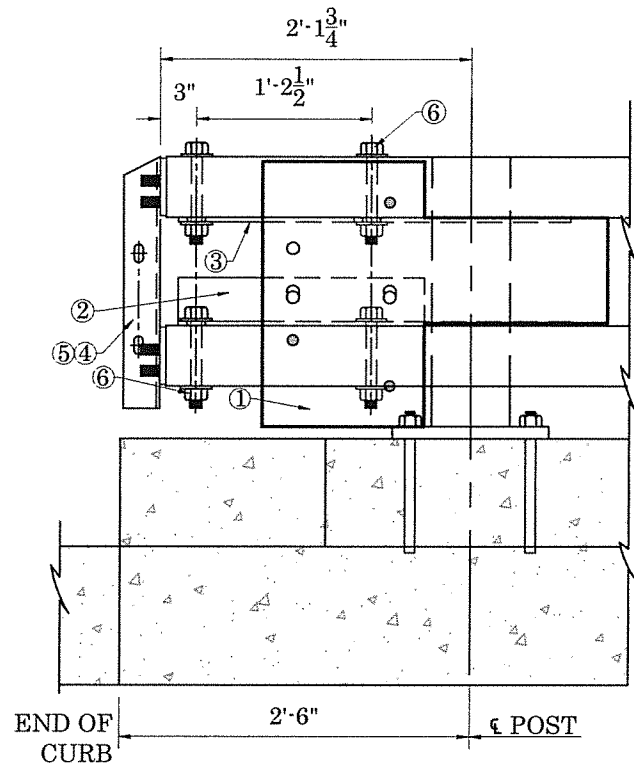
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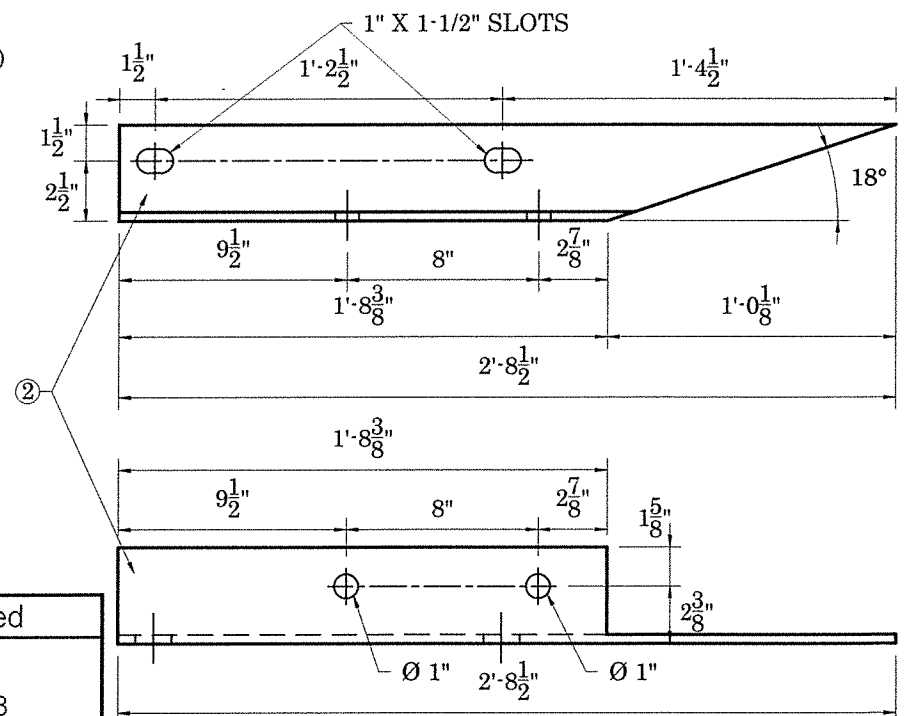
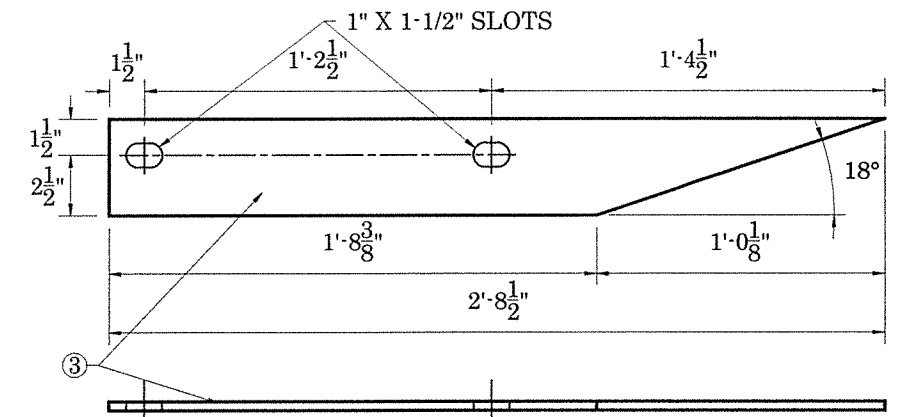
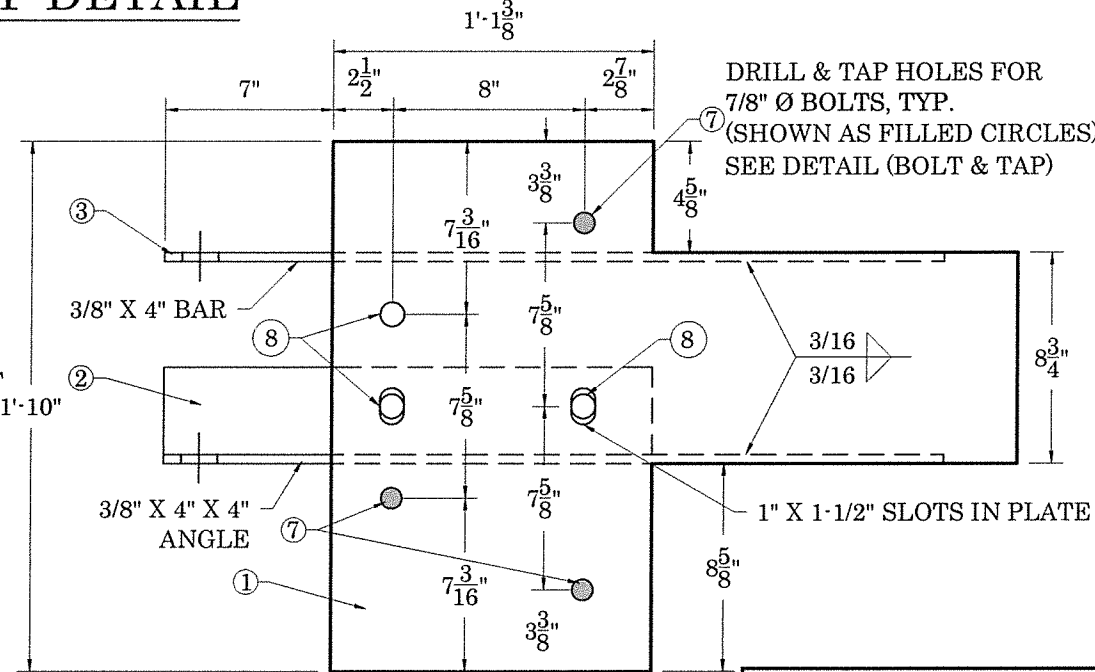
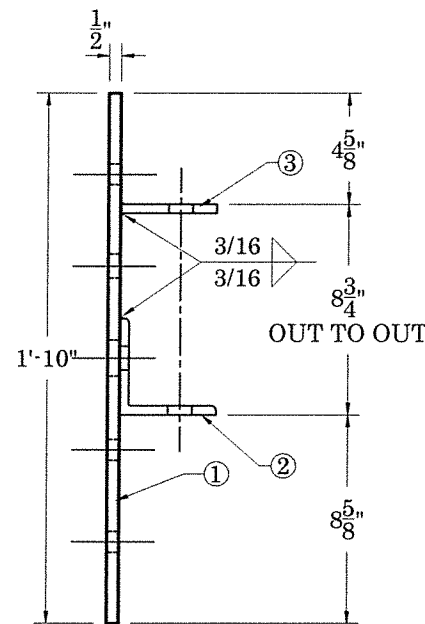
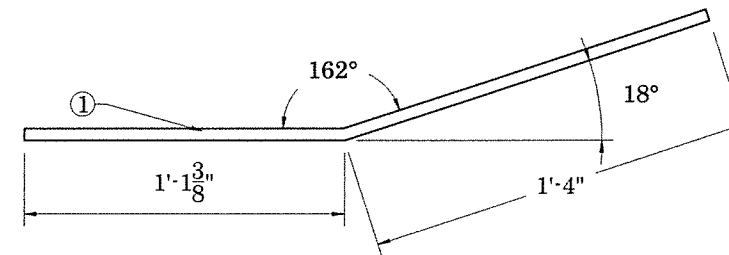
GUARDRAIL CONNECTION PARTS LIST

PART #	QUANTITY	LENGTH	DESCRIPTION	MATERIAL
*1	4	1'-10"	PLATE 1/2" X 2'-5 3/8"	ASTM A-36
*2	4	2'-8 1/2"	ANGLE 3/8" X 4" X 4"	ASTM A-36
*3	4	2'-8 1/2"	BAR 3/8" X 4"	ASTM A-36
4	2	1'-8 1/2"	CONNECTION ANGLE 5" X 3" X 1/4"	ASTM A-36
5	2	1'-8 1/2"	CONNECTION ANGLE 5" X 3" X 1/4"	ASTM A-36
6	16	7"	BOLT 7/8" X 7" (2) WASHERS, LOCK WASHER, & NUT	ASTM A325, F436, A563
7	12	5/8"	BOLT 7/8" X 5/8" (1) FLAT WASHER	ASTM A325, F436
8	12	2-1/2"	BOLT 7/8" X 2 1/2" (2) WASHERS, LOCK WASHER, & NUT	ASTM A325, F436, A563

** WILL HAVE TWO LEFT AND TWO RIGHT



BOLT & TAP DETAIL



No Exceptions Noted
 BY: D Stolz
 DATE: April 24, 2018
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NDDOT

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ND PROJECT # SS-5-008(048)081 BRIDGE # 0008-090.657
 KNIFE RIVER BRIDGE DOUBLE BOX BEAM RAIL
 RETROFIT
 STARK COUNTY, ND
 BORDER STATES PAVING >> PRIME CONTRACTOR
 DAKOTA FENCE CO. >> SUB-CONTRACTOR
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PAGE:
5 of 6

DUE TO SHOP PROCESS, SPLICES MAY OCCUR OTHER THAN SHOWN

3D Specialties
 inc.
**FARGO, BISMARCK,
 MINOT, WILLISTON**

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 Fax: (701) 852-0931
 6407 138th Ave. NW
 Williston, ND 58802
 Phone: (701) 826-6264

PARTS LIST

PART	QUANTITY	LENGTH	DESCRIPTION	MATERIAL
A	32	9"	7/8" ANCHOR STUD/NUT	ASTM A-449, A563
B	16	13"	1" X 12" PLATE	ASTM A-36
C	64	2 1/8"	1/4" X 1 3/4" BAR WASHER	ASTM A-36
D	80	3/4"	LOCKWASHER	ASTM F436
E	80	3/4"	NUT	ASTM A563
F	16	1'-9 1/2"	W8" X 24# BEAM	ASTM A-36
G	12	10 1/2"	HSS 4" X 4" X 3/8"	ASTM A500 GRADE B
H	80	2"	3/4" X 2" STUD	ASTM A108
J	32	12"	7/8" ANCHOR STUD/NUT	ASTM A-449, A563
K	8	4 3/4"	4 3/4" X 1/2" BAR	ASTM A-36
A-2	4	20'-6 1/4"	HSS 5" X 5" X 3/16"	ASTM A500 GRADE B
B-2	8	19'-11"	HSS 5" X 5" X 3/16"	ASTM A500 GRADE B
C-2	4	13'-7 1/4"	HSS 5" X 5" X 3/16"	ASTM A500 GRADE B

NOTES:

RAIL ELEMENTS SHALL BE SQUARE STRUCTURAL TUBING IN ACCORDANCE WITH ASTM SPECIFICATION A-500 GRADE B. STEEL POSTS, PLATES, BARS, AND ANGLES SHALL CONFORM TO AASHTO, GRADE 36, UNLESS OTHERWISE NOTED. RAILING SHALL BE FABRICATED TO THE HORIZONTAL AND VERTICAL ALIGNMENT OF THE STRUCTURE. ALL STRUCTURAL STEEL SHALL BE HOT-DIP GALVANIZED AFTER FABRICATION ACCORDING TO THE AASHTO M111. ALL BOLTS AND ANCHOR BOLTS SHALL BE ASTM A325 OR A449. REDUCED BASE STUDS SHALL BE ASTM A108. NUTS SHALL BE ASTM A563 AND WASHERS SHALL BE ASTM F436. ALL BOLTS, STUDS, NUTS, AND WASHERS SHALL BE GALVANIZED ACCORDING TO AASHTO M232.

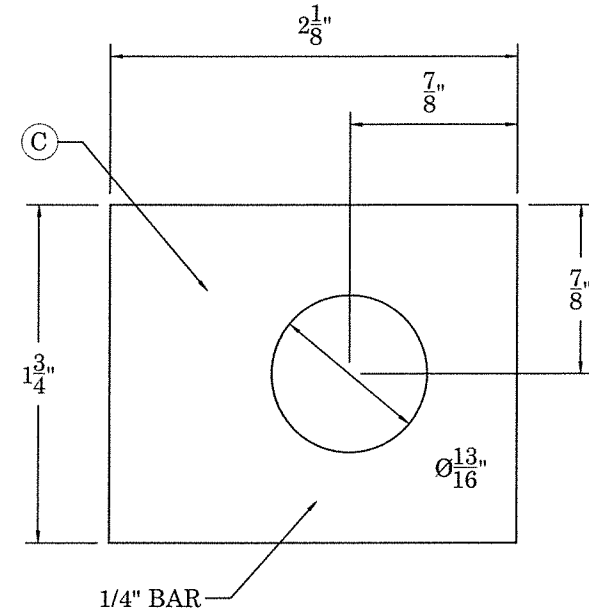
THE MAXIMUM POST SPACING SHALL BE 10'-0". POST SHALL BE NORMAL TO GRADE.

ANCHOR BOLTS SHALL BE EMBEDDED INTO THE CONCRETE WITH A CHEMICAL ADHESIVE SYSTEM THAT CAN DEVELOP A TENSILE STRENGTH OF AT LEAST 17,500 POUNDS.

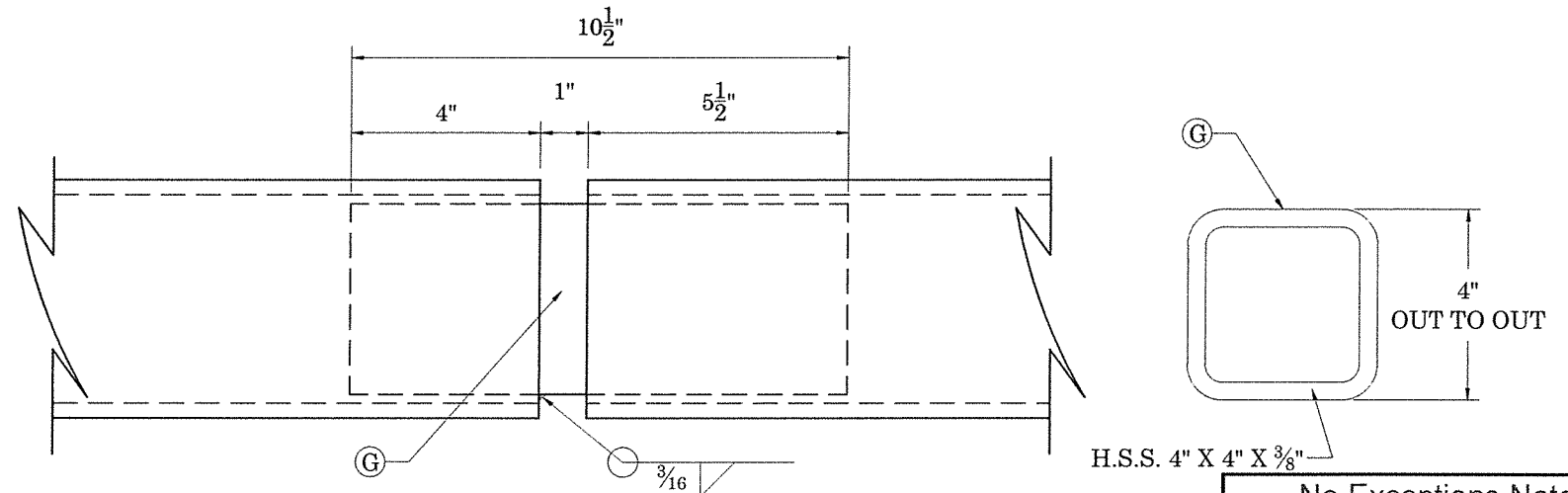
ANCHOR SYSTEM DATA - 7/8" A-449 THREADED STUD
CHEMICAL ADHESIVE - EPOXY AS MANUFACTURED BY SIMPSON STRONG-TIE COMPANY.

WELD STUD PROCEDURE:

APPLY WELD STUDS TO BOX BEAM AFTER BOX BEAM IS HOT DIPPED GALVANIZED. PREP AREA ON PRE-GALVANIZED TUBE. APPLY WELD STUDS AS PER A.W.S. SPECIFICATION. FINISH TREATMENT ON WELD STUDS & STUD WELDMENTS SHALL MEET ASTM A 780.



BAR WASHER DETAIL



RAIL SPLICE DETAIL

No Exceptions Noted
BY: D Stolz
DATE: April 24, 2018
REVIEW DOES NOT RELIEVE CONTRACTOR FROM RESPONSIBILITY FOR ERRORS, OMISSIONS, OR DEVIATIONS FROM CONTRACT REQUIREMENTS
NDDOT

Shop Drawings Have
Been Reviewed and
Checked As Submitted
and Are in Conformance
with Contract Documents
Dakota Fence Co.

PROJECT# 18203D0067	DRAWING# 18.002	SCALE: VARIES	REVISED: 4/16/2018
DATE: 4/5/18	DRAWN BY: CJB	PCN: 21513	
ALL VERIFIES WILL BE ASSUMED CORRECT AS SHOWN UNLESS NOTED OTHERWISE BY APPROVER			
This print is the exclusive property of Dakota Fence Co. and is not to be modified, photographed, scanned, or used by anyone without written consent from Dakota Fence Co. Failure to obtain permission may result in legal action.			

ND PROJECT # SS-5-008(048)081 BRIDGE # 0008-090.657
KNIFE RIVER BRIDGE DOUBLE BOX BEAM RAIL
RETROFIT
STARK COUNTY, ND
BORDER STATES PAVING >> PRIME CONTRACTOR
DAKOTA FENCE CO. >> SUB-CONTRACTOR
NDDOT >> ENGINEER

DUE TO SHOP PROCESS, SPLICES MAY OCCUR OTHER THAN SHOWN

3D Specialties
FARGO, BISMARCK,
MINOT, WILLISTON

1110 25th Ave N. Phone:(701) 237-6181
BOX 1408 Fax: (701) 293-7811
Fargo, ND 58107

1720 12th St. S. Phone:(701) 258-9095
BOX 62 Fax: (701) 223-3140
Bismarck, ND 58502

1915 20th Ave. SE. Phone:(701) 852-6263
BOX 3066 Fax: (701) 852-0931
Minot, ND 58702

6407 138th Ave. NW. Phone:(701) 826-6264
Williston, ND 58802

8-090.657 / 8-087.84

Both

FED. ROAD DIST. NO.	STATE	F.A.S. NO.	PROJECT NO.	SHEET NO.	TOTAL SHEETS
5	N. D.	S 362(10)		1	102

NORTH DAKOTA STATE HIGHWAY DEPARTMENT

PLANS

FOR THE PROPOSED IMPROVEMENT OF A
STATE HIGHWAY
IN **Dunn and Stark** COUNTIES
FEDERAL AID SECONDARY PROJECT NO. S-362(10)
GRADE, GRAVEL AND STRUCTURES

INDEX OF DRAWINGS

SHEET NO.	TITLE PAGE
1	TYPICAL SECTIONS & SUMMARY OF QUANTITIES
2	CULVERT AND BRIDGE LIST
3	TO 24 INCL. PLAN AND PROFILE DRAWINGS
4	TO 34 INCL. STRUCTURAL DRAWINGS
25	TO INCL. SOIL PROFILE
35	TO 102 INCL. CROSS SECTIONS

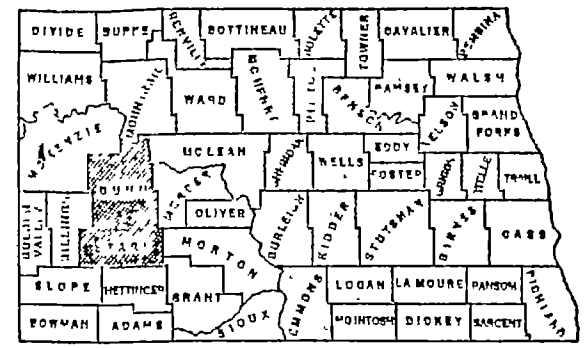
LENGTH OF PROJECT	
PROJECT MILES - GROSS	MILES NET
11.253	11.353
TOTALS	11.353

GOVERNING SPECIFICATIONS

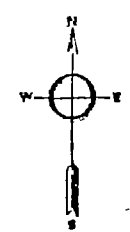
Standard Specifications adopted by the North Dakota State Highway Department on 5/6 and approved as standard by the Bureau of Public Roads Nov 7, 1956. Required Special Provisions dated June 15, 1959 and approved by the Bureau of Public Roads July 8, 1959 and others submitted herewith.

KEY TO CONVENTIONAL SIGNS

STATE & NATIONAL LINES	
COUNTY LINE	
TOWNSHIP & RANGE LINES	
GRADE LINE	
CENTERLINE OF CONSTRUCTION	
OLD RIGHT OF WAY LINE	
NEW RIGHT OF WAY LINE	
ABANDONED RIGHT OF WAY LINE	
PROPERTY LINE	
STONE WALL	
OTHER FENCES	
POLE LINES	
POWER LINES	
BRIDGE	
GROUND ELEVATION	
TRAVELED WAY	
RAILROADS	
HEDGES AND TREES	
TRAILS	
CITY OR VILLAGE CORPORATE LIMITS	
SECTION CORNER	
QUARTER SECTION CORNER	
BUILDINGS	
OLD CULVERTS	
NEW CULVERTS	
DRAINAGE	
BENCH MARKS	
WATERS EDGE	
MARSH	
WIRE ROPE GUARD RAIL	
SNOW FENCE	
RIPRAP	
GUARD POSTS	
COBBLE GUTTERS	
CONCRETE GUTTERS	



SKETCH MAP OF NORTH DAKOTA SHOWING COUNTIES



SCALES
 LAYOUT SHEET 1 IN = 4000'
 PLAN AND PROFILE DRAWINGS 1 IN = 100 FT
 STRUCTURAL DRAWINGS - AS SHOWN
 CROSS SECTION SHEETS 1 IN = 10 @ 20 FT

DESIGN DATA

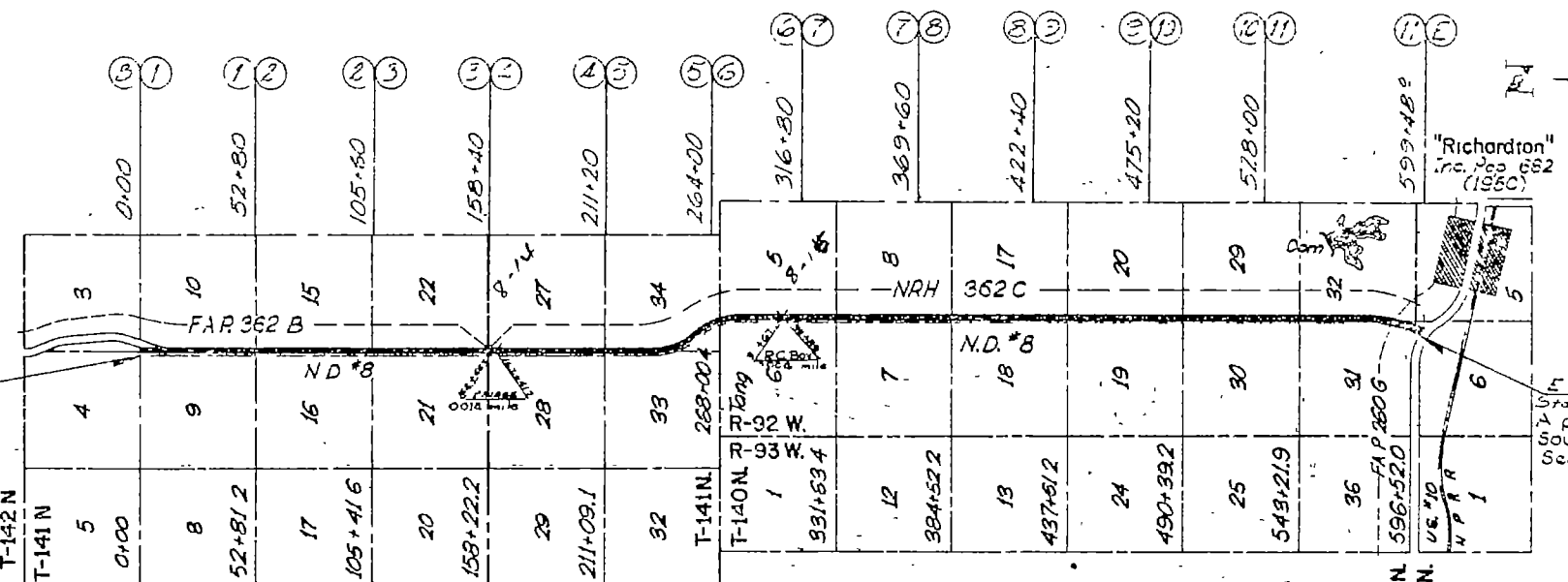
TRAFFIC AVERAGE DAILY EST. 30TH MAX HP

PRESENT TRAFFIC (1960) 163 PASS 55 TRUCKS 220 TOTAL 338
 TRAFFIC FORECAST (1970) 320 PASS 110 TRUCKS 440 TOTAL 530

DESIGN SPEED 80 MPH

TRAFFIC CLASSIFICATION "M"

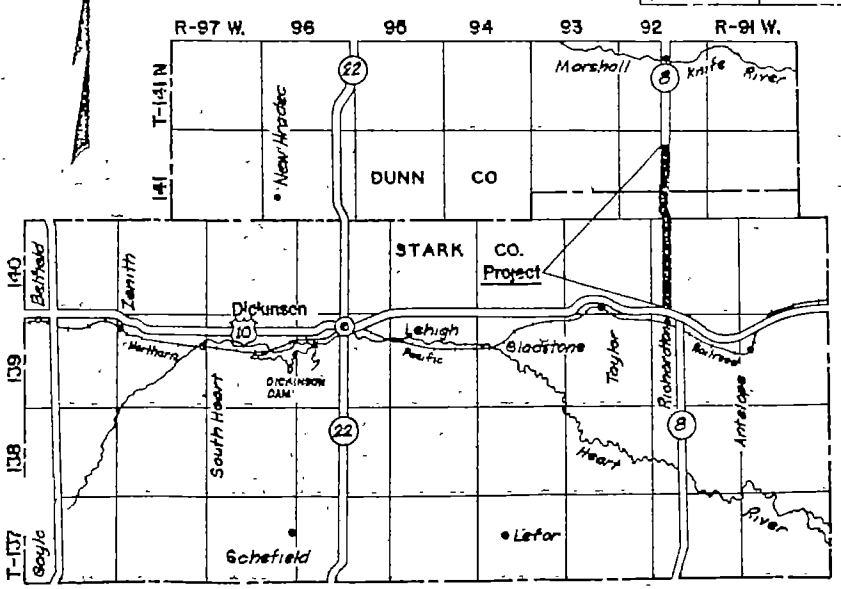
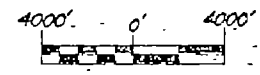
MINIMUM SIGHT DISTANCE (NON PASSING) 475 FT
 MINIMUM SIGHT DISTANCE (SAFE PASSING) 2300 FT
 MINIMUM PASSING SIGHT DISTANCE FOR MARKING 1000 FT
 BRIDGES Min width 30 FT
 Design Load H 20 S 16 (1957)



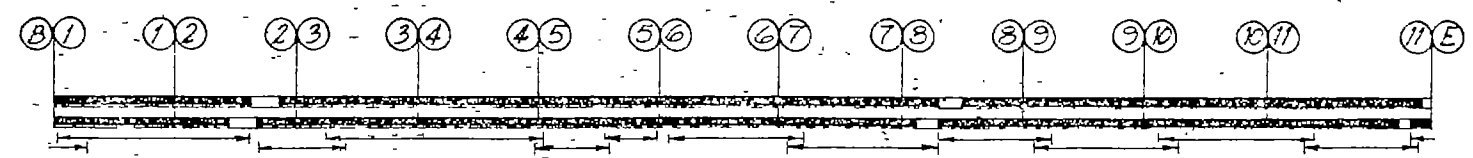
Req. S-362(10) Sta. 0+00
 A point at the NE Corner of Sec 9, Twp 141 N, Rge 91 W.

End S-362(10) Sta. 599+48.9
 Sta. 266+00 on Hwy 250 S 76°
 A point 536.5 Ft West and 267.2 Ft South of the NE Corner of Sec 6 Twp 139 N, Rge 92 W

LAYOUT MAP



SKETCH MAP OF STARK CO. & PART OF DUNN CO.



SIGHT DISTANCE DIAGRAM

LEGEND
 Passing Zones (1000 Min S.D.)
 Non-Passing Zones
 Safe Passing Sections (2300 Min S.D.)

APPROVED DATE 2-4-60

 CHIEF ENGINEER
 NORTH DAKOTA STATE HIGHWAY DEPARTMENT

DEPARTMENT OF COMMERCE
 BUREAU OF PUBLIC ROADS

APPROVED _____
 DIVISION ENGINEER DATE _____

NO.	DATE	BY	REV.	TOTAL
5	NO	S-262-05	9	102

BENCH MARKS			
NO	DESCRIPTION	LOCATION	ELEV.
22	R.R Spk in PP	150+99-48' LT.	2074.47
23	Conc Hon brass cap	157+29-35' RT	2061.07
24	1 Mon 2x2qd by XFn	158+58-18' RT	2057.05
25	1 Mon 2x2qd by XFn	162+77-12' RT	2057.96
26	1 Mon 2x2qd by XFn	166+12-19' LT.	2051.29
26	"	176+72-163' LT.	2052.5

INSTALL PIPE CULVERTS
157+50 ± 36"x12" RCP 2-36" FES

INSTALL CURB AND GUTTER
162+26 to 162+66 Lt & Rt. 80 LF
163+41 to 163+81 Lt & Rt 80 LF

INSTALL BRIDGE APPR. DRAINS
163+77 Lt. 1 Ea.
163+77 Rt. 1 Ea.

REMOVE EXISTING BRIDGE
Sta 163+03.8 (Lump Sum)

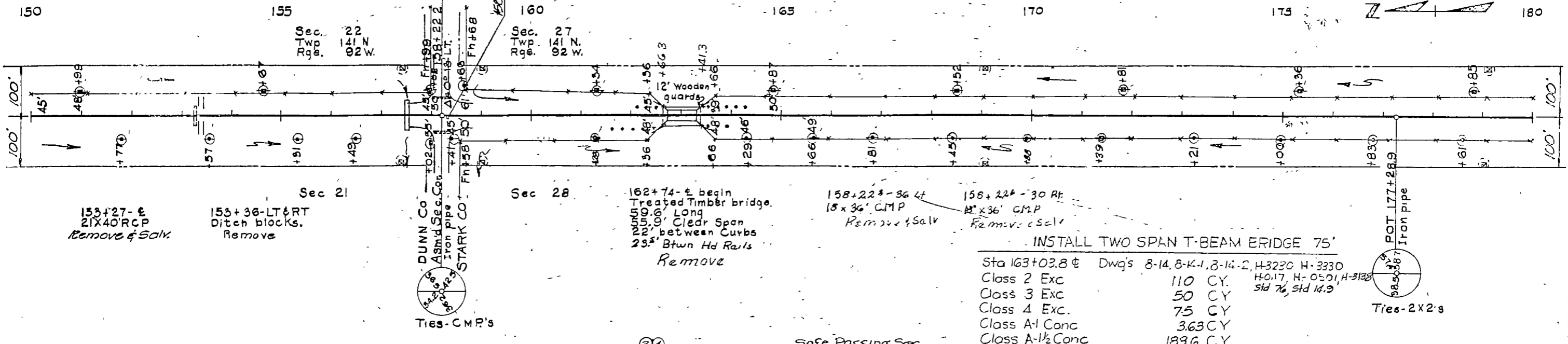
INSTALL STD R/W MARKERS
157+72 Rt & Lt 2 Ea.
158+97.2 Lt & Rt 2 Ea.
169+00 Lt & Rt 2 Ea.
179+00 Lt & Rt 2 Ea.

INSTALL TEMP X-ING & DETOUR
Sta 163+03.8 (Lump Sum)

INSTALL SODDING
163+77 Lt. 21 S.Y.
163+77 Rt. 21 S.Y.

INSTALL GALV. METAL FLUME
163+77 Lt. 13 LF
163+77 Rt. 16 LF

INSTALL FOUR CABLE GUARD RAIL
Sta 161+66.3 to Sta. 162+66.3 Rt 100 LF
Sta 162+26.3 to Sta 162-66.3 Lt 40 LF
Sta 163+41.3 to Sta. 164+41.3 Lt 100 LF
Sta 163+41.3 to Sta. 163+81.3 Rt 40 LF



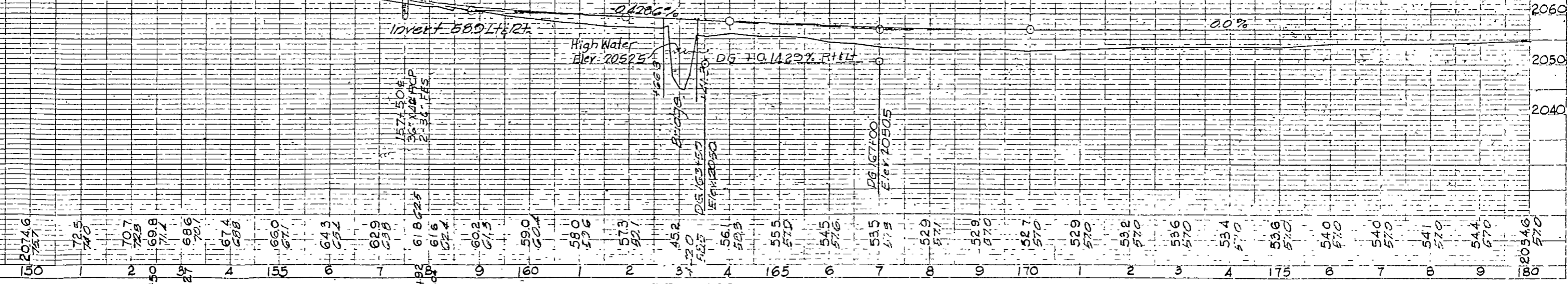
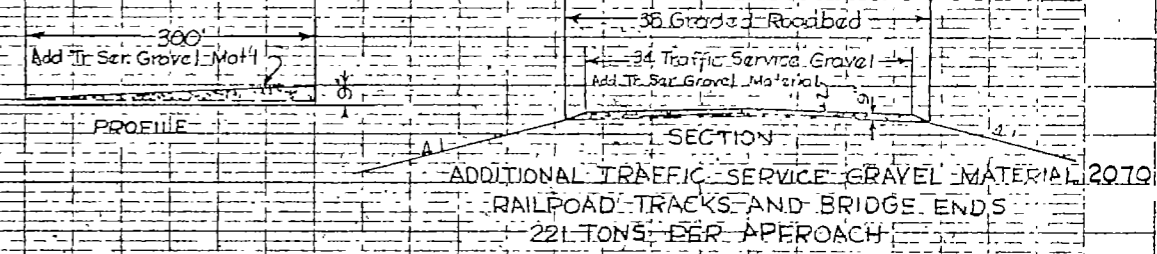
INSTALL TWO SPAN T-BEAM BRIDGE 75'

Sta 163+03.8 ±	Dwg's 8-14, 8-K-1, 8-14-2, H-3320 H-3330
Class 2 Exc	110 CY
Class 3 Exc	50 CY
Class 4 Exc.	75 CY
Class A-1 Conc	3.63 CY
Class A-1 1/2 Conc	1896 CY
Rainf Steel (inter. grade)	4143 LB
Treated Tbr. Piling 40'	588 LF
Treated Tbr. Piling 60'	228 LF
Treated Tbr. Test Piles (40')	2 Ea.
Treated Tbr. Test Piles (60')	1 Ea.
Bridge Bench Marks	1 Set

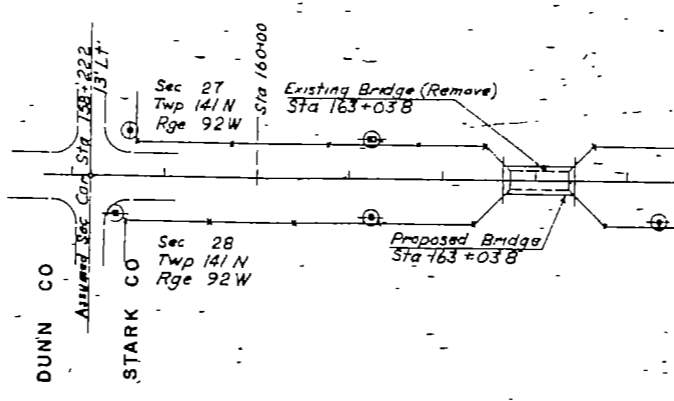
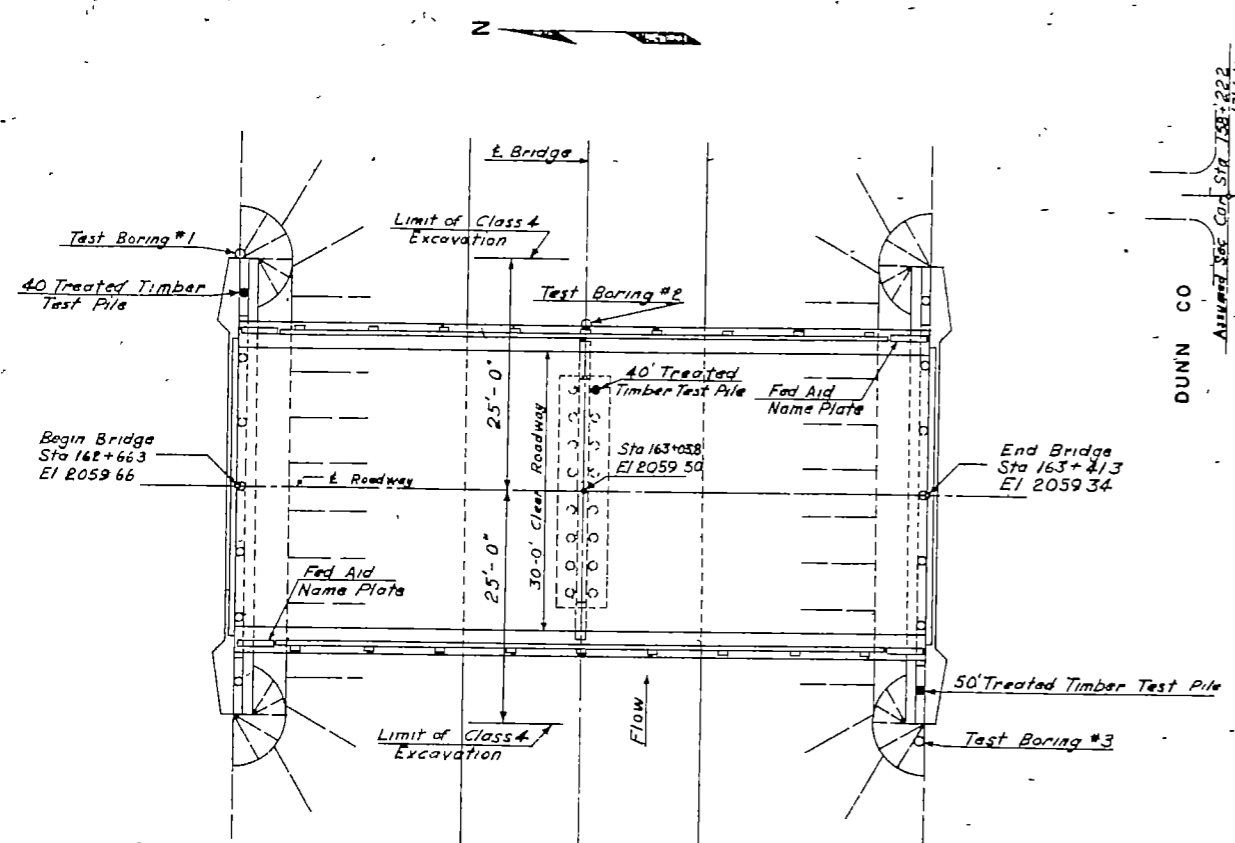
SUBROUT EXC. 256 Cu Yds.
SUBSTRUKG. EXC. 59 Cu Yds.
EXC. 7522 Cu Yds.
EMB. 7964 Cu Yds.
OVERHAUL 57800 Cu Yds. Sta's

158+222 Lt & Rt
500 Cu Yds. Prov. for
Approaches
Pt. 158+033
Elev. 2060.5
V.C. 600'

Pt. 167+00
Elev. 2057.0
V.C. 600'



PROJECT CODE NO.	FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
X021	5	N D	S-362(10)		25	102



NOTES

GENERAL

A vibrating strike-off template shall be used when finishing the deck slab concrete. Care shall be taken that the vibrator is shut off when the forward movement of the template is stopped. The final strike-off shall be made on a fairly long surface without continual starting and stopping. The cost of furnishing and placing joint filler, asphalt curb seal, name plates, drain pipes, pipe sleeves, and other miscellaneous items shall be included in the price bid for Class A-1 1/2 concrete.

For rail post spacing and deflection note see drawing no H-3138

For railing notes see drawing no H-9117

For Hydraulic Design Data see drawing no 8-14-1

For Boring Log see drawing no 8-14-2

REINFORCING

Bent bar details are given center to center unless noted.

The Bar Fabricator shall add a prefix to all bar designations to differentiate between the several parts of the structure or structures.

CONCRETE

All exposed edges of the concrete shall be beveled with 3/4" triangular molding except as shown on the plans.

The "Rubbed Surface Finish" shall be given to the railing end posts, railing, to the outside and roadway vertical faces of curbs, and to the exposed faces of the abutment wing walls. All other surfaces shall be given the "Ordinary Surface Finish".

The entire curb shall be placed in one continuous operation.

All concrete below the tops of curbs shall be Class A-1 1/2. End posts are to be Class A-1 1/2 and railing Class A-1. In each instance the concrete shall be compacted by vibration.

REMOVING EXISTING STRUCTURE

The bridge to be removed is located at Station 163+03.8. It is a two-span timber structure, 59.6 feet overall in length with 22 feet of clear roadway.

The superstructure shall be carefully and completely removed in two sections (the separation to be over the center bent) and stored on suitable blocking approved by the Engineer, within the highway right-of-way within 500 feet of the present bridge site. The timber pile caps shall be removed with the superstructure. A sufficient number of 2x4 laminated flooring shall be removed from above the center bent to permit the separation of the two spans. Drift bolts thru the timber stringers into the bent pile cap shall be cut flush with the bottom of those stringers that are to be separated from the pile cap. All hardware to be removed shall be done by removing the nuts and pulling the bolts. All salvageable hardware shall be stored in a wooden box along with the two superstructure sections.

This bridge superstructure is to be moved, under another contract, to a new bridge site and reused. It is important that the contractor uses particular care in removing the superstructure from its present supports and placing on temporary supports as mentioned above.

All salvageable backing plank and other salvageable material from the substructure units shall be neatly piled on the right-of-way near the bridge site and shall remain the property of the State. All other material shall be removed and disposed of in accordance with Section 12 of the Standard Specifications.

Removing Existing Structure at Station 163+03.8 shall be paid for at the contract Lump Sum bid price in accordance with Section 12 of the Standard Specifications.

The Contractor will be required to drill pilot holes for all piles if conditions are such that piling cannot be driven a minimum of 15 feet below the bottom of each footing.

EXCAVATION

All structural excavation below elevation 2047.0 except excavation Class 4, the limits of which are shown on this sheet shall be excavation Class 3.

The embankment above the original ground required between the abutments and pier as shown on this sheet or as stated by the Engineer shall be placed and compacted according to the Standard Specifications Sec 17 3(a)4 & SP 49A. Embankment required will not be paid for directly but will be incidental to Excavation Class 4.

The Structural Contractor shall finish the 2:1 slopes between the abutments and pier for the full length of the Class 4 excavation.

TEMPORARY CROSSING AND DETOUR

Traffic shall be maintained at the site with a minimum inconvenience to the public, insuring their safety at all times.

The provisions in Section 7 7a(1) of the general specifications and the special provision this project shall apply as defined and directed by the Engineer.

EXCAVATION (CONT)

The embankment for the Channel and the shaping of the Channel shall be done before the superstructure is placed.

ESTIMATE OF QUANTITIES (BY ITEM)

SP. L. PROV.	SPEC. NO.	BID ITEM	QUANTITY	UNIT
	12	REMOVING EXISTING STRUCTURE AT STA. 163+03.8		LUMP SUM
	18A	EXCAVATION CLASS 1		CU YD
	18B	CLASS 4	110	CU YD
	19C	CLASS 3	50	CU YD
	18D	CLASS 4	75	CU YD
	60A	CONCRETE CLASS A-1	363	CU YD
	60A	CLASS A-1 1/2	1886	CU YD
	62A	REINFORCING STEEL (INTERMEDIATE GRADE)	41,434	LB
	63A	STRUCTURAL STEEL		LB
	64A	UNTREATED TIMBER		M B M
	64B	TREATED TIMBER		M B M
	65A	UNTREATED TIMBER PILING		LN FT
	65B	TREATED TIMBER PILING	21 @ 30 FT	588 LN FT
	65C	TREATED TIMBER PILING	8 @ 40 FT	228 LN FT
	65K	UNTREATED TIMBER TEST PILES		EACH
	65L	TREATED TIMBER TEST PILES	40 FT	2 EACH
	65M	TREATED TIMBER TEST PILES	50 FT	1 EACH
	84	TEMPORARY CROSSING AND DETOUR (STA. 163+03.8)		LUMP SUM

STRUCTURAL DRAWINGS

GENERAL DRAWING THIS SHEET 8-14-1	
SUBSTRUCTURE 8-14-2, H-3230, H-3330	
SUPERSTRUCTURE ST'D 7, 6, ST'D 14, H-0117, H-3138, H-0501	
DESIGN LOADING H20-S16 (1957)	SCALE 1 INCH = 10 FEET

NORTH DAKOTA
STATE HIGHWAY DEPARTMENT

**KNIFE RIVER
BRIDGE LAYOUT**

PROJECT S-362(10) STA. 163+03.8

STARK COUNTY

APPROVED
DATE 2-3-60
Joseph R. Kirby
REGISTERED PROFESSIONAL ENGINEER
NORTH DAKOTA

BENCH MARKS

NO.	DESCRIPTION	LOCATION	ELEV.
23	I Man 2x2 gd by X Fr	158+58 - 18' Rt	2057.05
24	N Bolt on W side of bridge	162+77 - 12' Rt	2057.96
25	I Man 2x2 gd P & Nd	166+18 - 19' Lt	2051.29

PILE LOADING

LOCATION	DEAD LOAD	LIVE LOAD	EARTH	WIND		LONG FORCE	DESIGN LOAD	MIN REQ'D BEARING	MINIMUM PENETRATION *
				50 LB	100 LB LL				
Pier	13.3T	10.6T	1.4T				28.0T	33.0T	15'
Abut	13.6T	7.2T	4.2T						

* Below Bottom of Footing in ft.

1960
FEDERAL AID
PROJECT
S-362(10)
NORTH DAKOTA
8-14

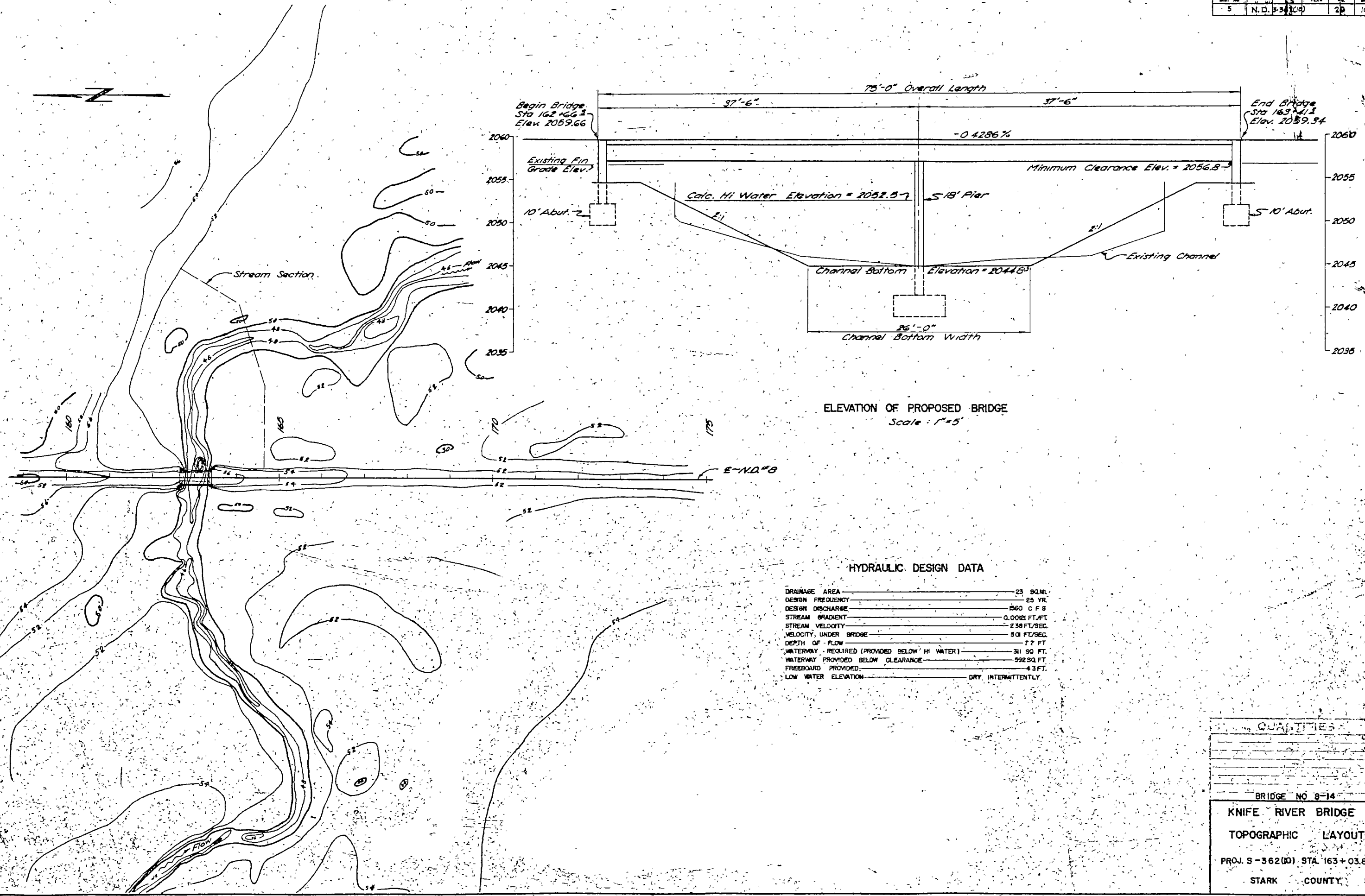
DESIGN STRESSES:

$f_c = 1200 \text{ * } S_q \text{ in}$
 $f_s = 20,000 \text{ * } S_q \text{ in (reinforcing steel)}$
 $f_s = 18,000 \text{ * } S_q \text{ in (structural steel)}$

FEDERAL AID NAME PLATE
2 REQUIRED
(See drawing No H-0117
for location on end posts)

8-90.657

FED. ROAD DIST. NO.	STATE	PROJECT NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	N.D.	3-34-20		20	192



ELEVATION OF PROPOSED BRIDGE
Scale: 1"=5'

HYDRAULIC DESIGN DATA

DRAINAGE AREA	23 SQ.MI.
DESIGN FREQUENCY	25 YR.
DESIGN DISCHARGE	1560 C.F.S.
STREAM GRADIENT	0.0023 FT./FT.
STREAM VELOCITY	2.38 FT./SEC.
VELOCITY UNDER BRIDGE	5.0 FT./SEC.
DEPTH OF FLOW	7.7 FT.
WATERWAY REQUIRED (PROVIDED BELOW HI WATER)	311 SQ. FT.
WATERWAY PROVIDED BELOW CLEARANCE	592 SQ. FT.
FREEBOARD PROVIDED	4.3 FT.
LOW WATER ELEVATION	DRY INTERMITTENTLY.

QUANTITIES

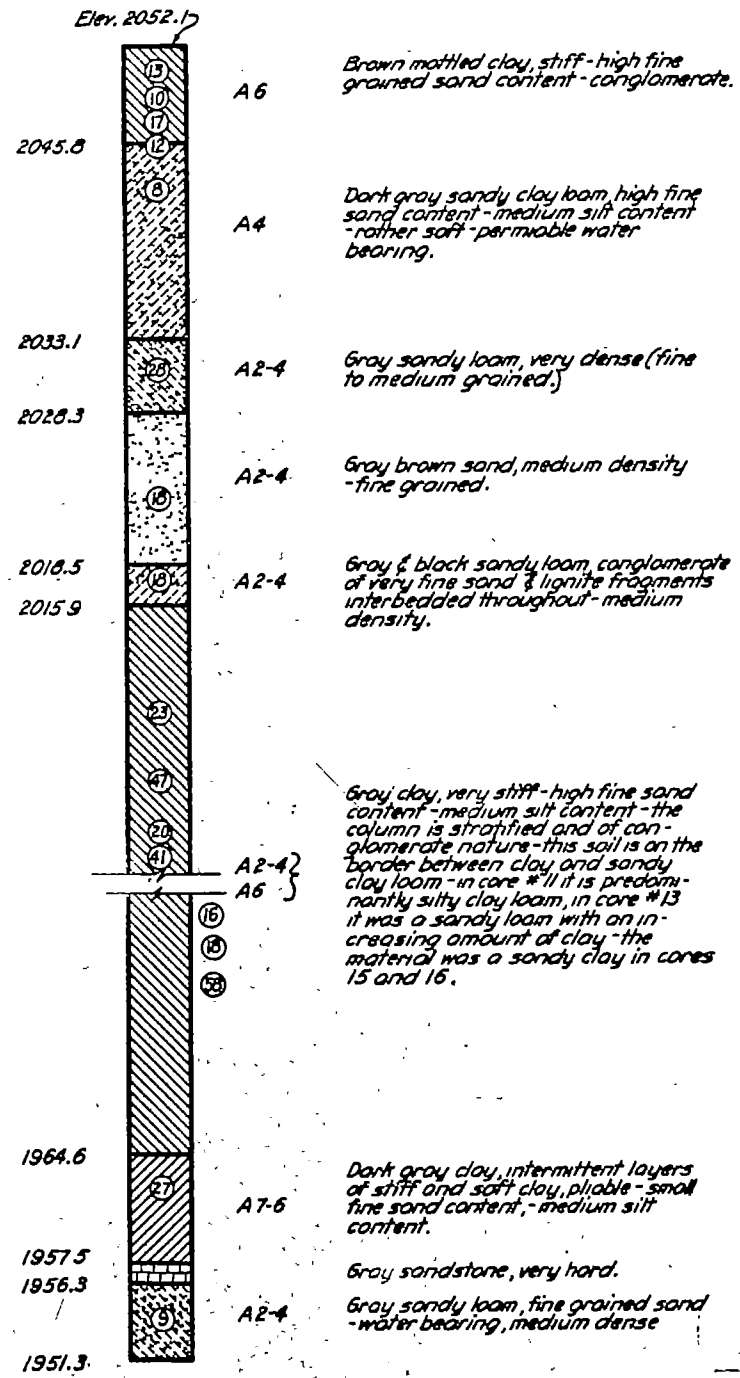
BRIDGE NO 8-14
KNIFE RIVER BRIDGE
TOPOGRAPHIC LAYOUT
PROJ. S-362(10) STA. 163+03.8
STARK COUNTY

8-14-1

8-14-1

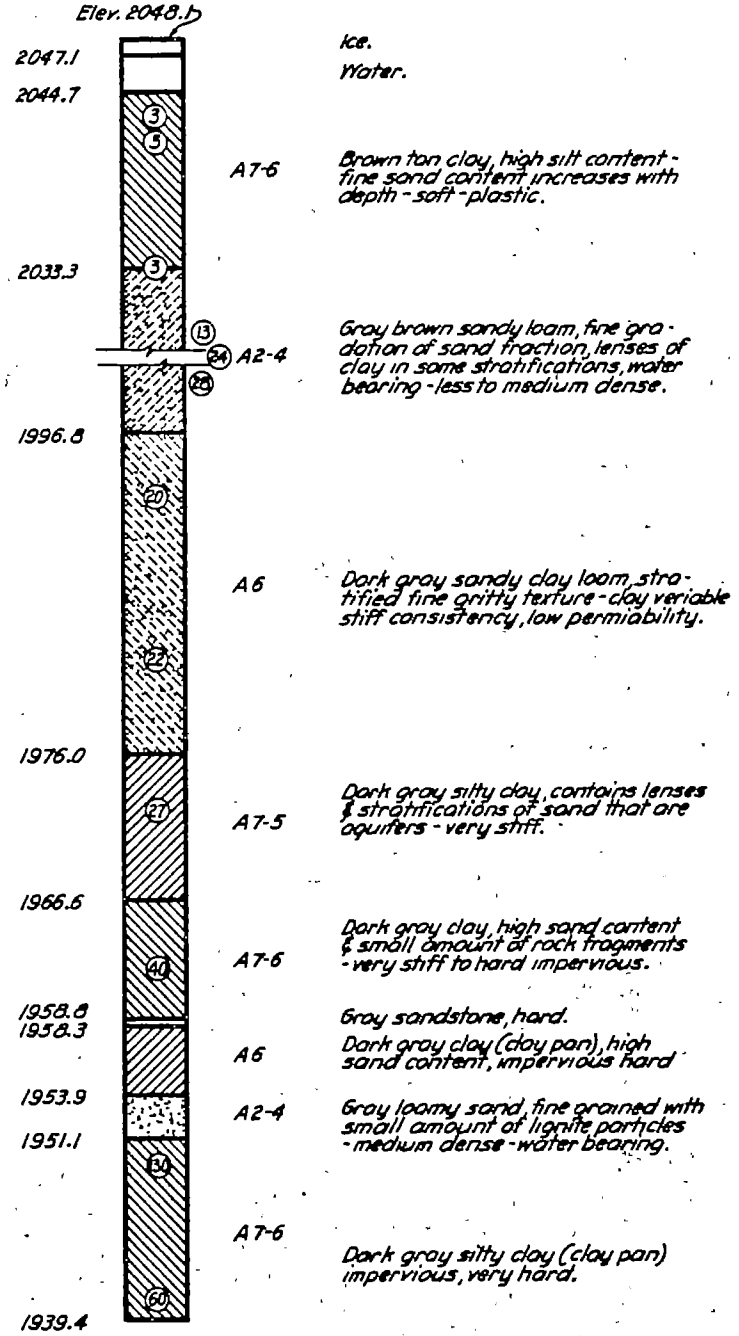
FED. ROAD DEV. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	N D	5362(10)		27	102

Final water level at 2.4' below surface.



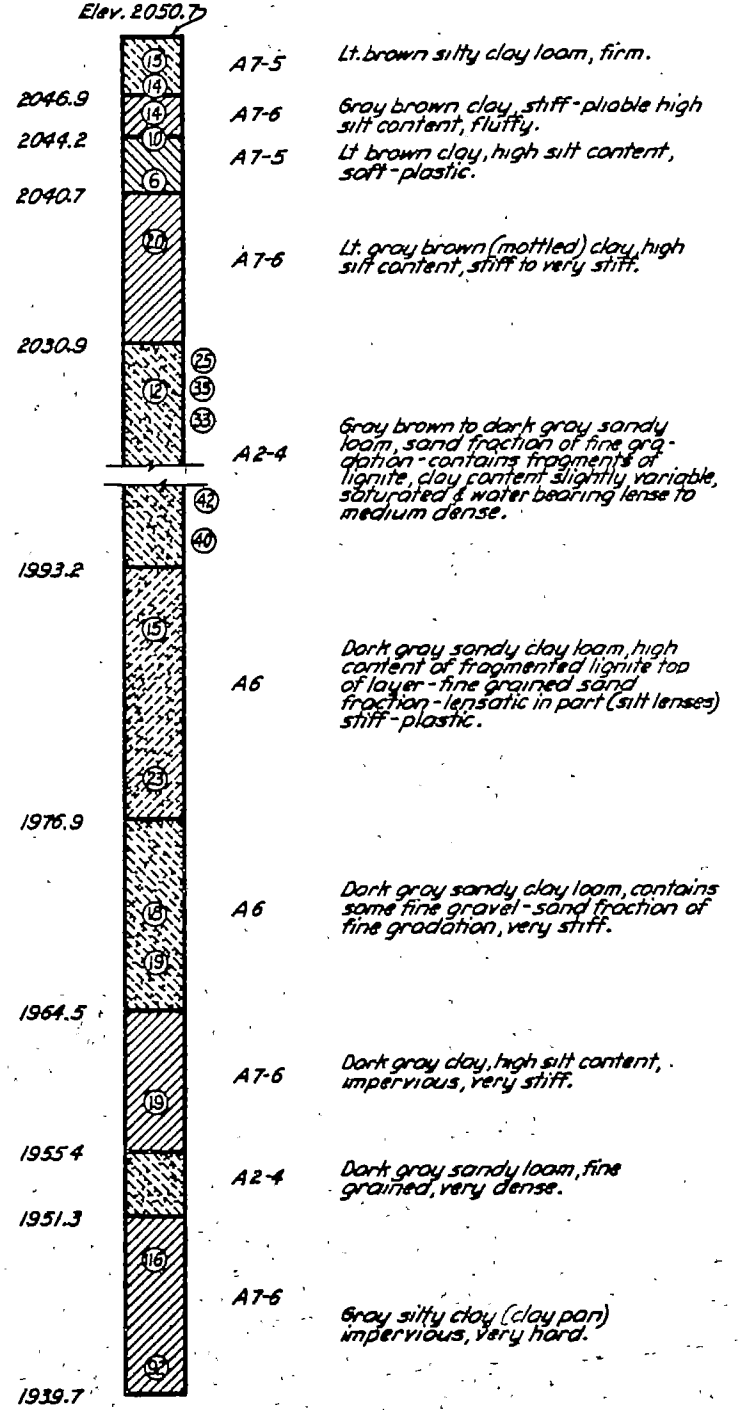
BORING NO. 1
Sta. 162+66 ~ 25' Lt. of S.

Final water level at 0.0'



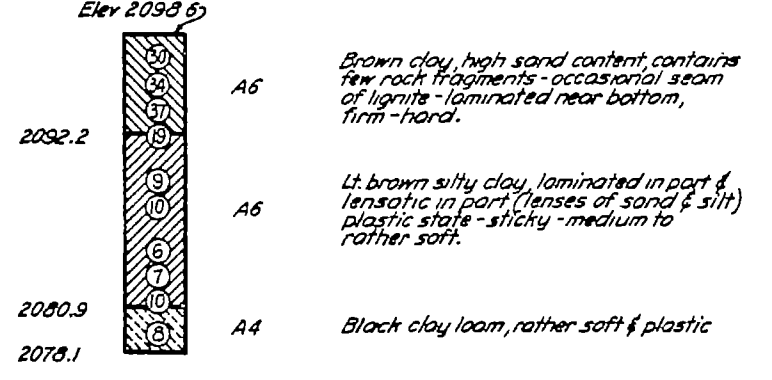
BORING NO. 2
Sta. 163+04 ~ 18' Lt. of S.

Final water level at 1.2' below surface.



BORING NO. 3
Sta. 163+41 ~ 27' Lt. of S.

No water level measurement taken.



BORING NO. 1
Sta. 311+78 ~ 15' Lt. of E.

BRIDGE NO. 8 - 15

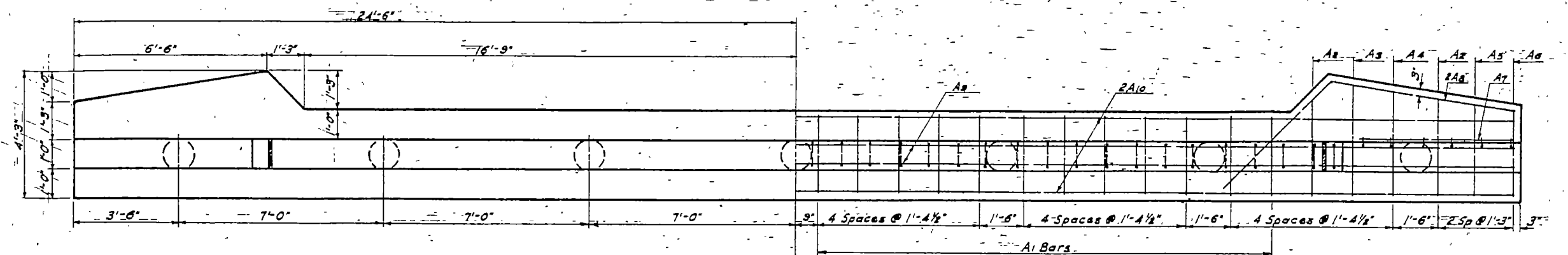
NOTE:
Encircled numbers indicate the number of blows delivered by a 140 lb hammer from a height of 30" to drive core tube 10". The boring log data shown is for design purposes only. The State assumes no responsibility if soil conditions encountered during construction differ from those shown.

BRIDGE NO. 8 - 14

BRIDGE NO. 8-14, 15

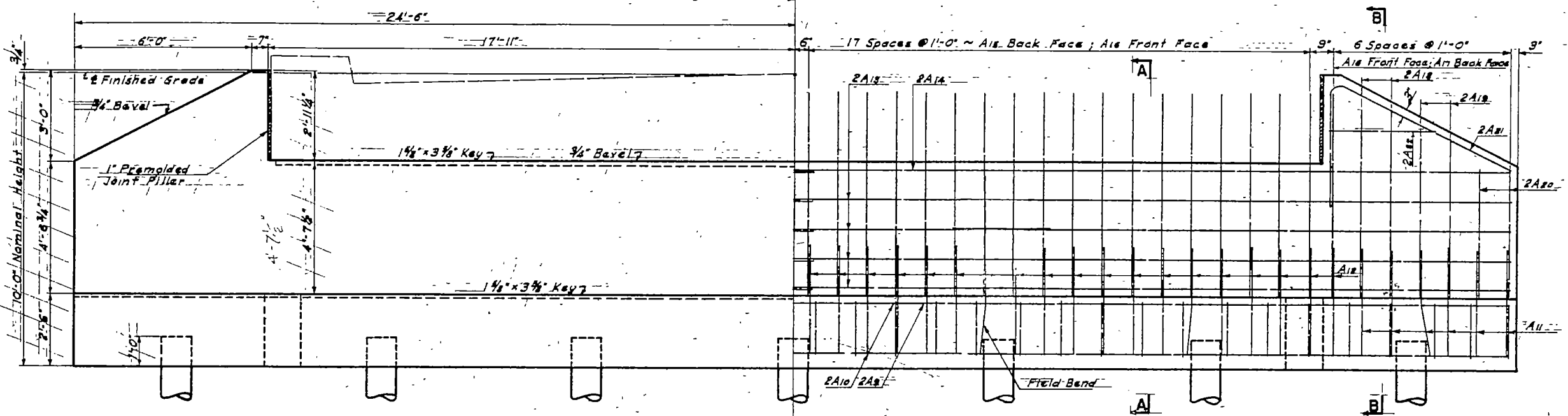
BORING LOG
S - 362 (10)
STARK COUNTY

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	N.D.	53620	1970	28	102



HALF PLAN Showing Dimensions

HALF PLAN Showing Footing Reinforcement

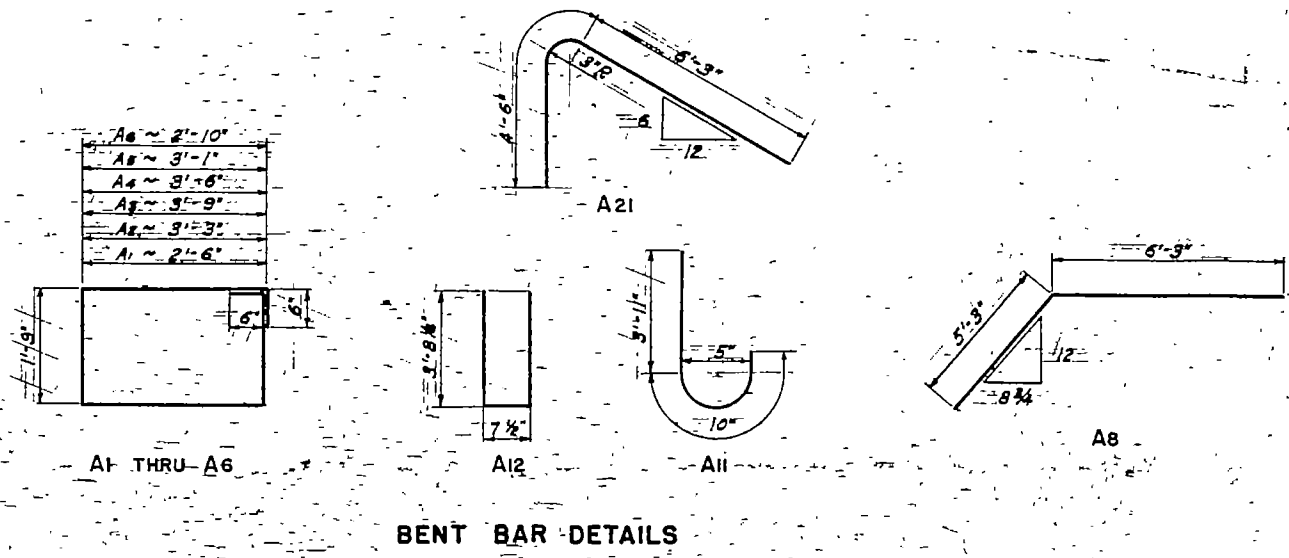
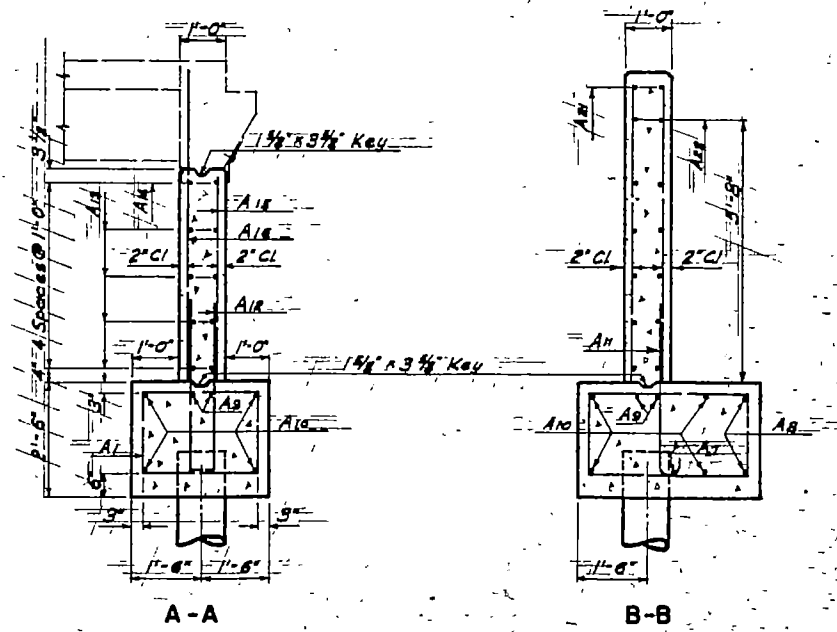


HALF ELEVATION Showing Dimensions

HALF ELEVATION Showing Reinforcement

BAR LIST (ONE ABUT.)

MARK	NO	SIZE	LENGTH	SHAPE
A1	24	4	9'-6"	Bent
A2	4	4	11'-0"	"
A3	2	4	12'-0"	"
A4	2	4	11'-6"	"
A5	2	4	10'-8"	"
A6	2	4	10'-2"	"
A7	2	4	5'-3"	Str
A8	4	6	11'-6"	Bent
A9	4	5	25'-6"	Str
A10	8	8	26'-0"	Str
A11	12	5	4'-9"	Bent
A12	38	4	8'-0"	Bent
A13	16	4	25'-3"	Str
A14	4	6	25'-9"	"
A15	36	4	4'-9"	"
A16	38	4	7'-0"	"
A17	2	5	7'-0"	"
A18	8	4	6'-6"	"
A19	8	4	5'-6"	"
A20	8	4	4'-6"	"
A21	4	6	10'-9"	Bent
A22	4	4	3'-6"	Str



QUANTITIES (ONE ABUT.)

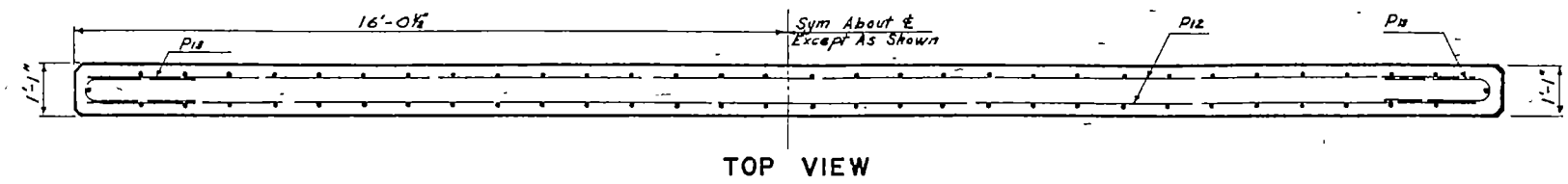
Concrete Class A-1 23.6 CY
 Reinforcing Steel 2122 lb
 Piling (See layout)
 Excavation (See layout)

10' ABUTMENT FOR T-BEAM SPANS

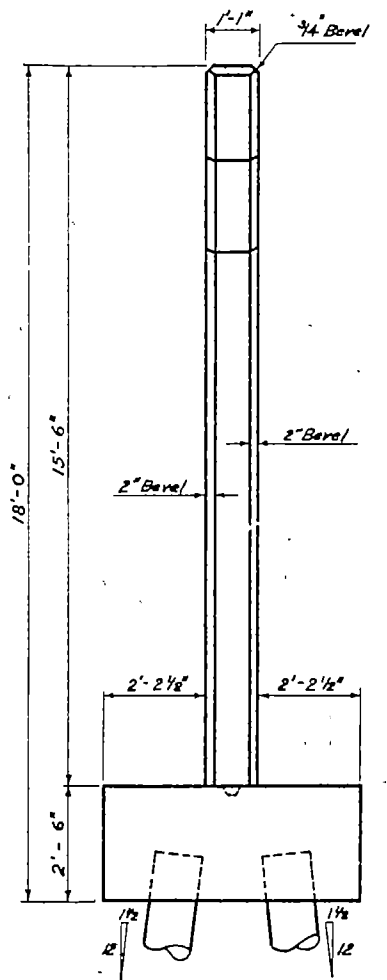
30' ROADWAY

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	N.D.	2-552(10)		23	102

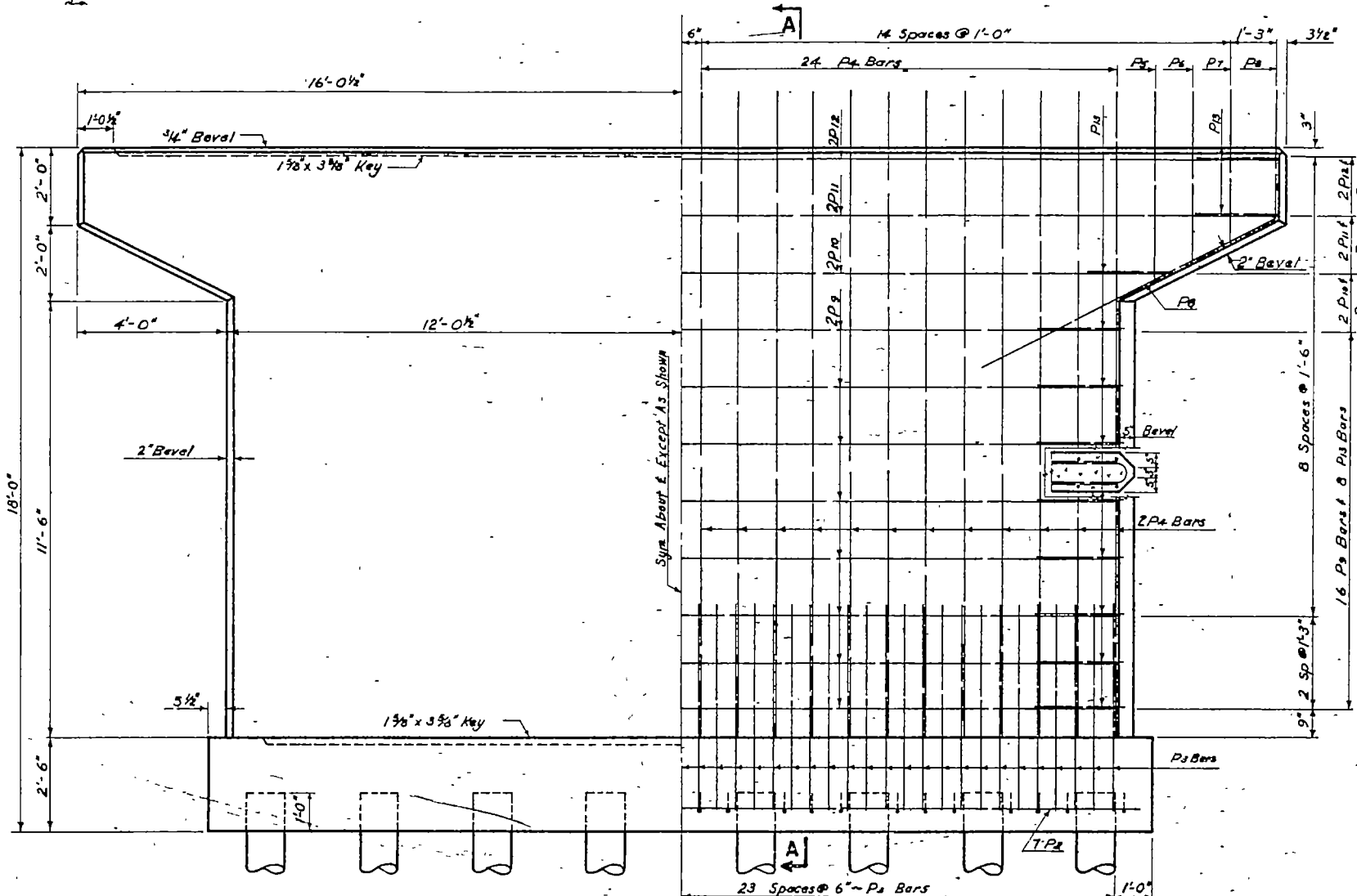
BAR LIST (ONE PIER)					
MARK	NO	SIZE	LENGTH	SHAPE	
P ₁	24	5	6'-3"	Bent	
P ₂	7	8	24'-6"	Str.	
P ₃	47	8	11'-3"	Bent	
P ₄	48	7	17'-6"	Str.	
P ₅	2	7	11'-6"	Bent	
P ₆	2	7	10'-6"	"	
P ₇	2	7	9'-6"	"	
P ₈	2	8	12'-6"	"	
P ₉	16	4	23'-6"	Str.	
P ₁₀	2	4	25'-6"	"	
P ₁₁	2	4	31'-6"	"	
P ₁₂	2	6	31'-6"	"	
P ₁₃	22	4	5'-0"	Bent	



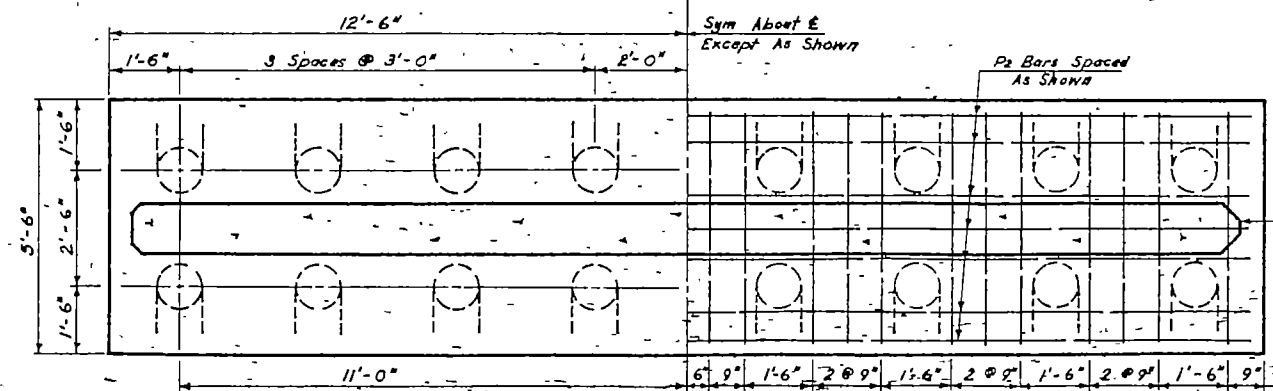
TOP VIEW



HALF ELEVATION
Showing Dimensions

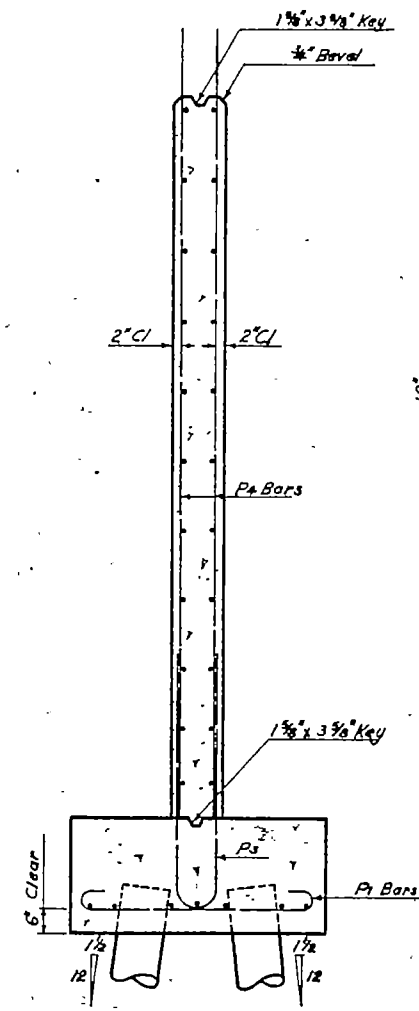


HALF ELEVATION
Showing Reinforcing

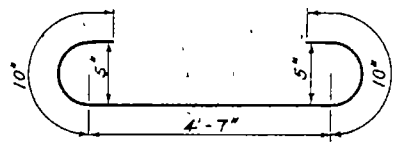


HALF FOOTING PLAN
Showing Dimensions

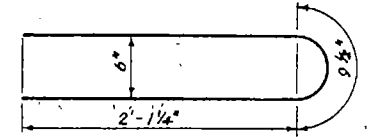
HALF FOOTING PLAN
Showing Reinforcing



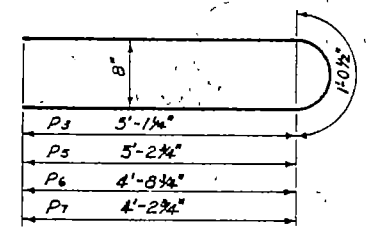
A - A



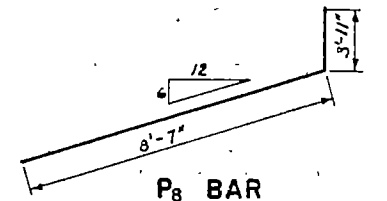
P₁ BAR



P₁₃ BAR



P₃, P₅, P₆ & P₇ BARS



P₈ BAR

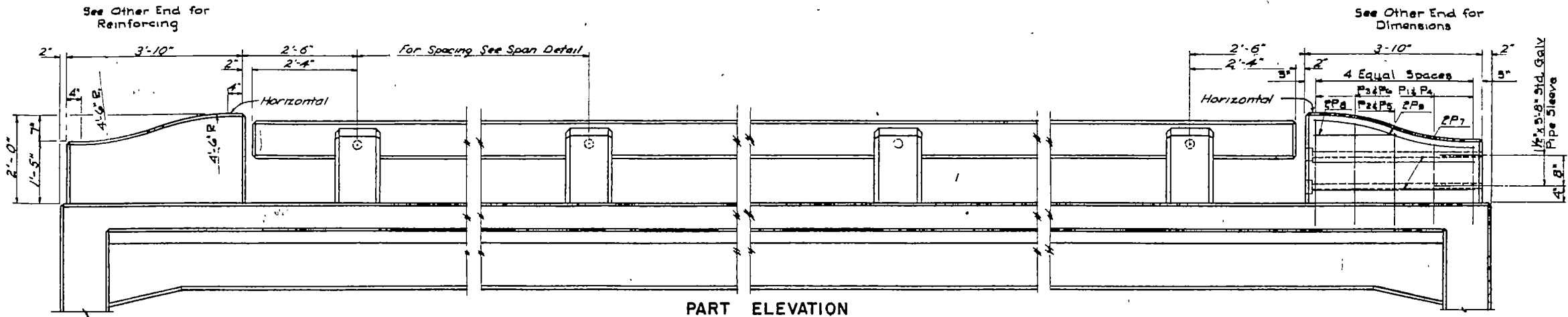
QUANTITIES (ONE PIER)	
Concrete Class A-1 1/2	281 CY
Reinforcing Steel	44,351 lb
Piling (See Layout)	
Excavation (See Layout)	

**18'-0" PIER
FOR T-BEAM SPANS
30' ROADWAY**

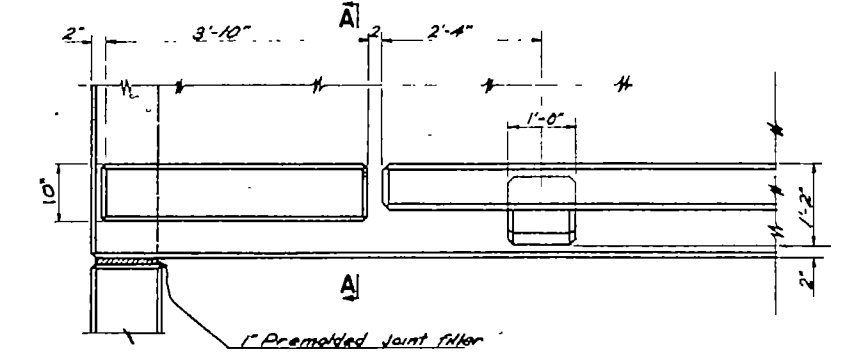
CHECKED BY G.F.F.
 QUANTITIES CHECKED BY D.H.C.

H-3330

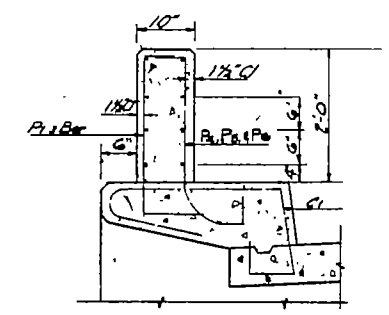
FED ROAD DIV NO	STATE	PROJ NO	SHEET NO	TOTAL SHEETS
6	ND	5562(10)	30	102



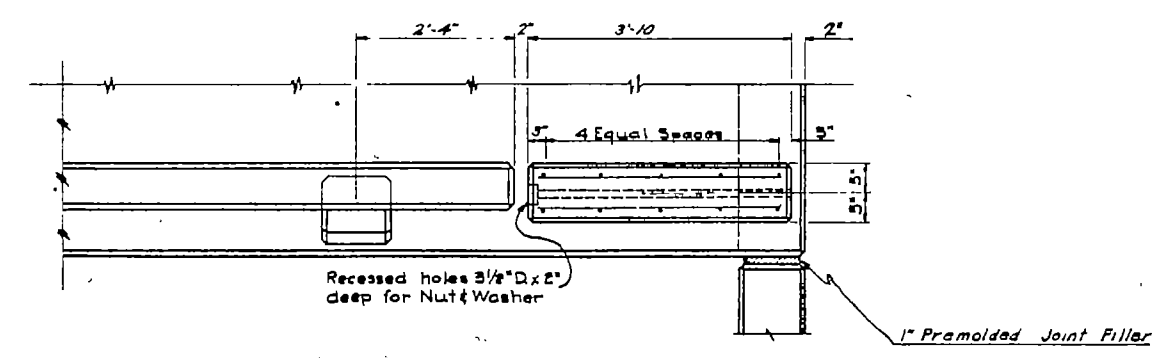
PART ELEVATION



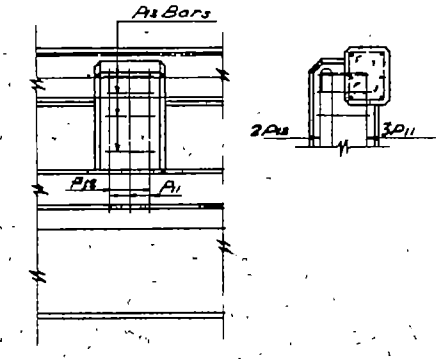
PART PLAN



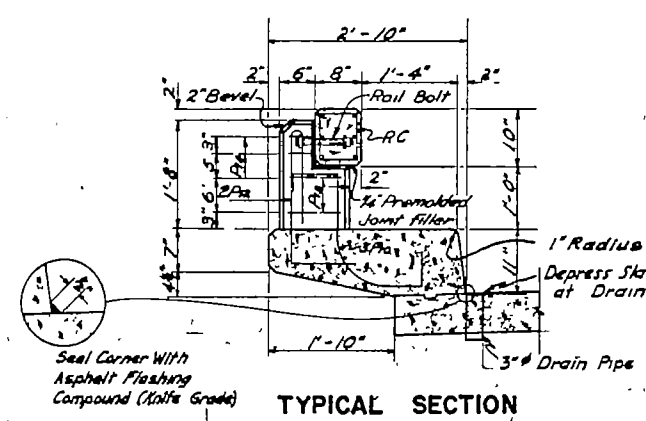
SEC. A-A



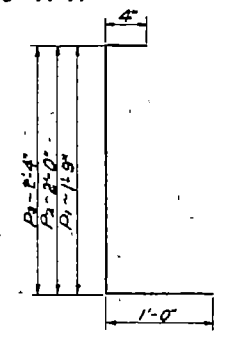
PART PLAN



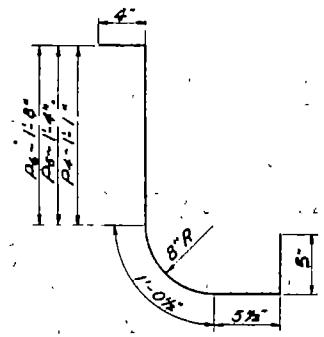
ANCHOR POST DETAIL
See Layout For Placement



TYPICAL SECTION



P1, P2 & P3 BARS



P4, P5 & P6 BARS

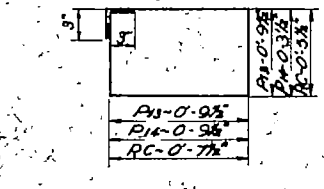
BAR LIST (BARS FOR RAILING AND POSTS)				
MARK NO	SIZE	LENGTH	SHAPE	
P10	* 5	4'-0"	Bent	
P11	* 5	4'-6"	Bent	
P12	* 5	4'-10"	Bent	
P13	* 3	3'-8"	Bent	
P14	* 3	2'-8"	Bent	
RC	* 3	2'-8"	Bent	
*****	5	**	Str	

* Number of bars shown on Superstructure Sheet
 ** Number, Length & Splicing information of R bars shown on Superstructure Sheet

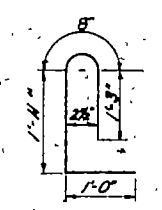
BAR LIST (4 END POSTS)				
MARK NO	SIZE	LENGTH	SHAPE	
P1	8	5	3'-7"	Bent
P2	4	5	3'-4"	-
P3	8	5	3'-8"	-
P4	8	5	3'-4"	-
P5	4	5	3'-7"	-
P6	8	5	3'-4"	-
P7	16	4	3'-6"	Str
P8	8	4	1'-9"	Str
P9	8	5	3'-9"	Field Bend

QUANTITIES ~ 4 END POSTS		
Concrete Class A-1 1/2	0.8	Cu Yd
Reinforcing Steel	224	Lbs

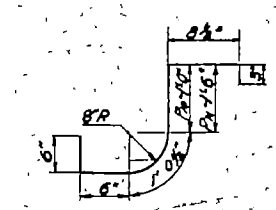
* Railing and end post quantities are included in slab quantities on Superstructure Sheet



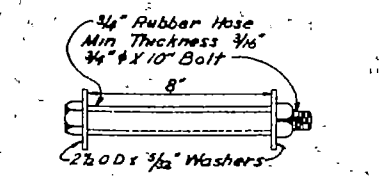
P9, P10 & RC BARS



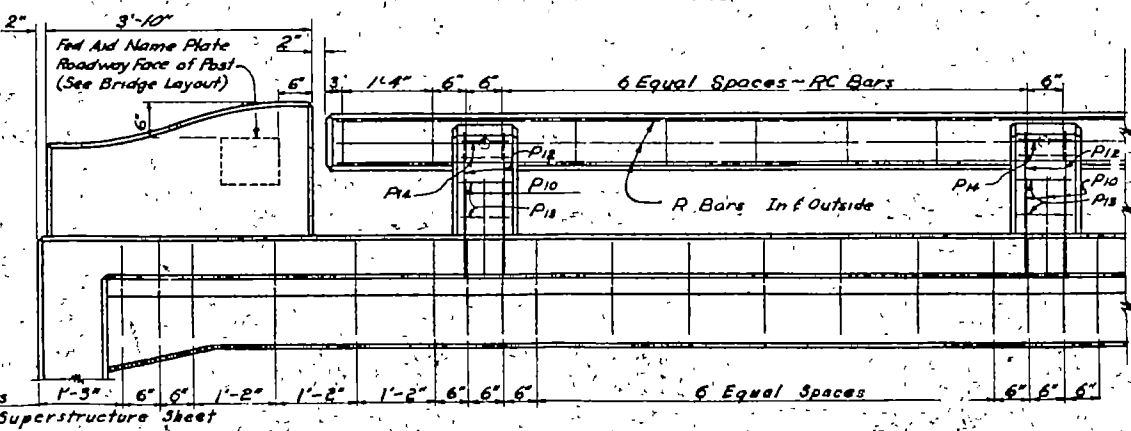
P12 BARS



P10 & P11 BARS



RAIL BOLT
(Galvanized)
(To be included in the unit price bid for Class A 1 1/2 Concrete)

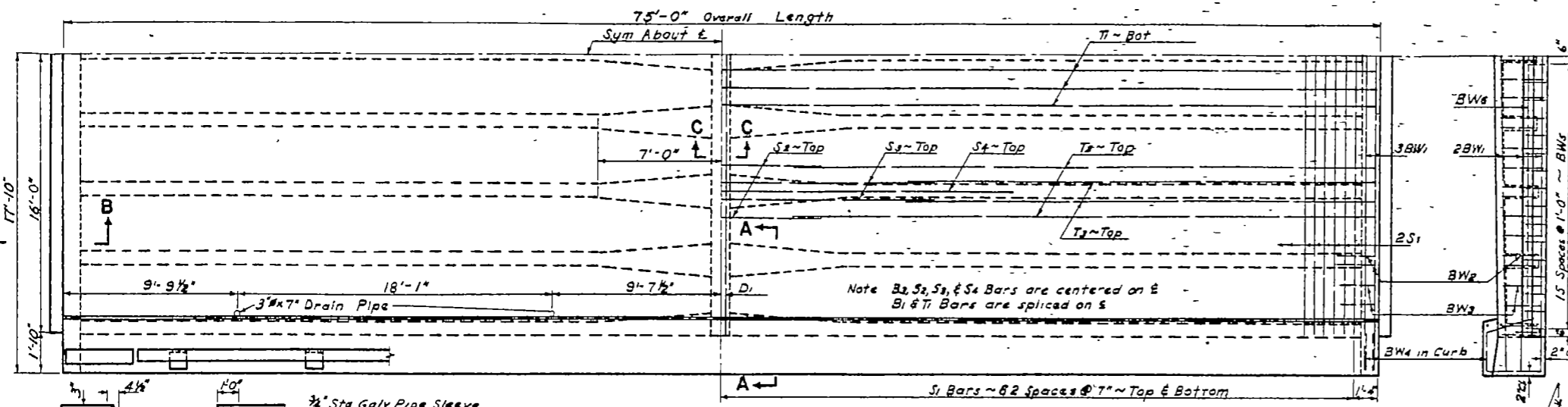


HAND RAIL DETAILS

BENT BAR DETAILS

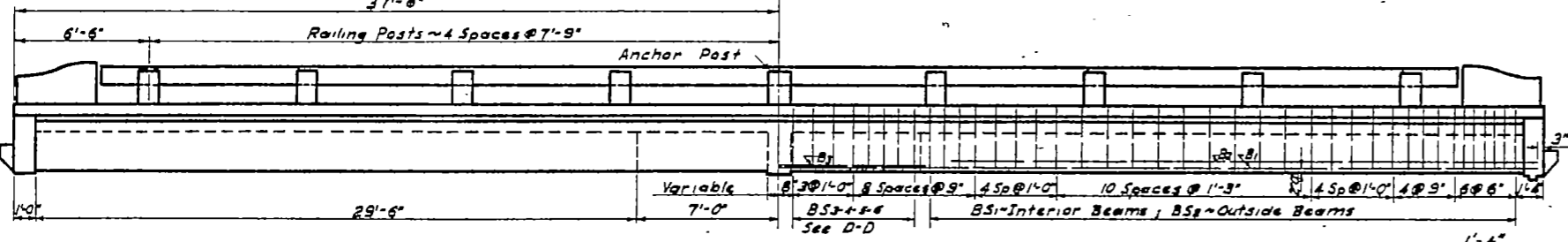
STANDARD RAILING
DETAILS

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	ND	8-90.657		51	102

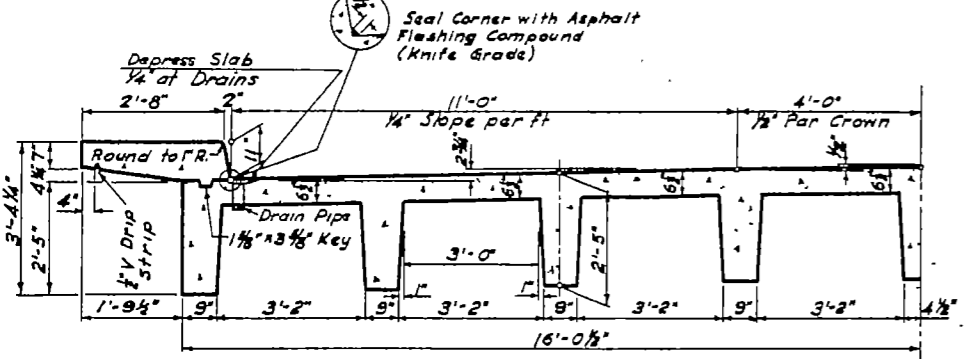


HALF PLAN
Half Showing Dimensions Half Showing Typical Slab Reinforcement

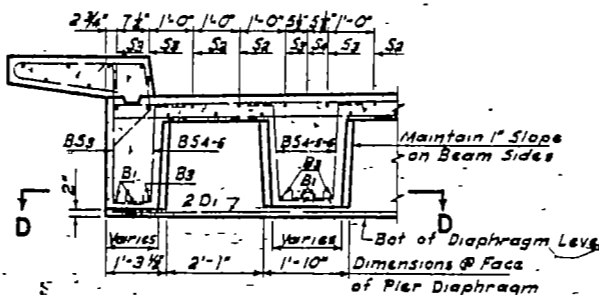
CURB SLEEVE DETAILS
On All Four Corners



ELEVATION
Half Showing Dimensions Half Showing Beam Reinforcement

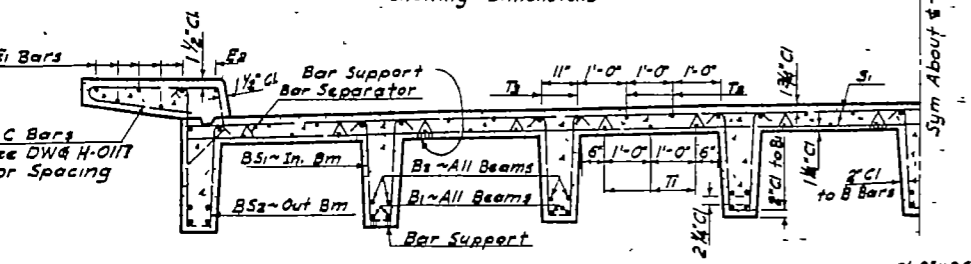


HALF SECTION OF DECK
Showing Dimensions

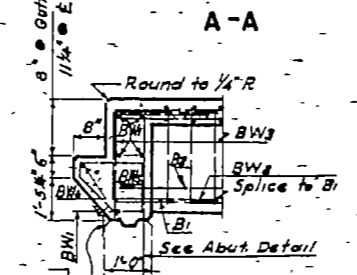


A-A

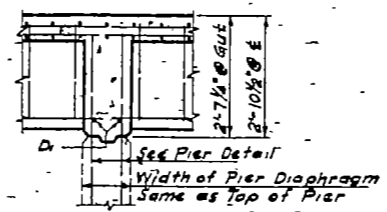
PIER WIDTH	CU YD.
1'-0"	1131 *
1'-1"	1133 *
1'-2"	1134 *
1'-3"	1136 *
1'-4"	1137 *
1'-5"	1139 *
1'-6"	1140 *



HALF SECTION OF DECK
Showing Reinforcement

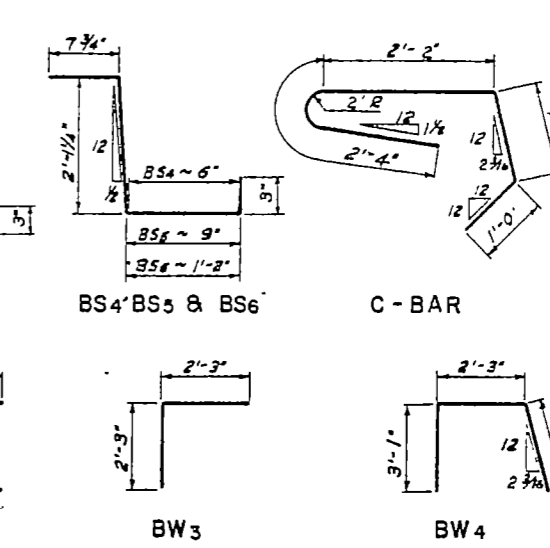
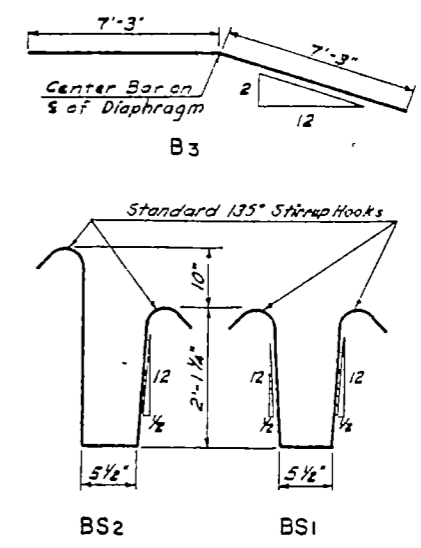


B-B

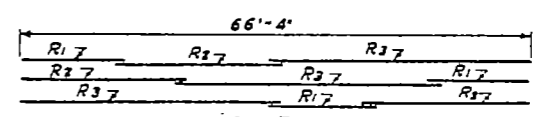


C-C

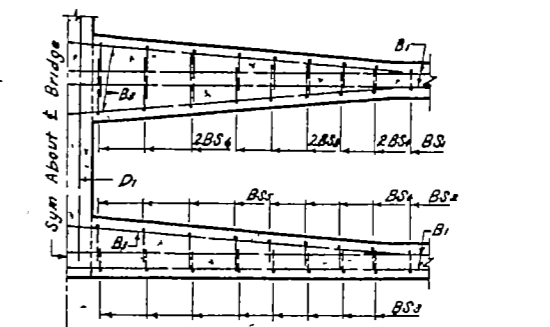
ENDWALL ELEVATION



BENT BAR DETAILS



R-BAR SPLICE DETAIL



D-D

MARK	NO	SIZE	LENGTH	SHAPE
B1	36	11	39'-6"	Str
B2	36	11	30'-0"	
B3	18	6	14'-6"	3-str
BS1	148	4	5'-6"	Bent
BS2	128	4	6'-3"	"
BS3	32	4	4'-0"	"
BS4	72	4	3'-6"	"
BS5	100	4	3'-9"	"
BS6	34	4	4'-2"	"
S1	250	4	31'-9"	Str
S2	16	10	11'-6"	"
S3	18	10	24'-6"	"
S4	7	11	33'-0"	"
T1	48	4	38'-3"	Str
T2	32	4	33'-3"	"
T3	32	4	26'-9"	"
C	172	4	6'-6"	Bent
D1	2	5	31'-9"	Str
E1	30	4	26'-6"	"
E2	6	5	27'-0"	"
BW1	12	4	35'-3"	Str
BW2	36	6	7'-0"	Bent
BW3	32	4	2'-6"	"
BW4	8	4	9'-6"	"
BW5	64	5	4'-0"	"
F	2	6	31'-6"	Str

MARK	NO	SIZE	LENGTH	SHAPE
P10	48	5	4'-0"	Bent
P11	6	5	4'-6"	"
P12	36	5	4'-10"	"
P13	40	5	3'-8"	"
P14	32	5	2'-8"	"
RC	124	3	2'-8"	Bent
R1	12	5	18'-6"	Str
R2	12	5	23'-6"	"
R3	12	5	28'-6"	"

NOTES:
Provide 1/8" Camber at mid-span to compensate for dead load deflection.
This superstructure designed for 30% future wearing surface.
If bridge approach grades are 000%, the transverse bridge elev shall be raised 1" above begin and end bridge elev to provide drainage.

Concrete Class A-1	3,633.4
Concrete Class A-1 1/2 (See Concrete Table)	
Reinforcing Steel #4	32,755 Lb

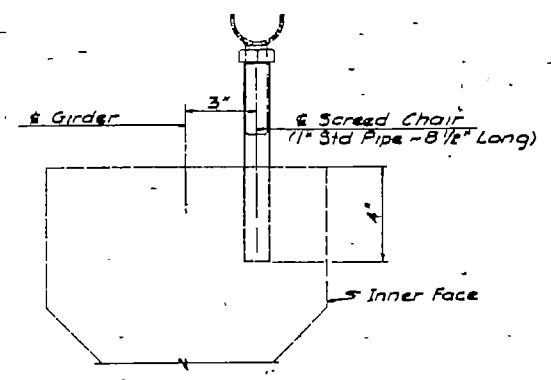
* Includes End Posts
** Includes Railing & End Posts See DWG H-0117

SUPERSTRUCTURE
TWO SPAN CONTINUOUS
CONCRETE T-BEAM
75'-0" OVERALL LENGTH
30' ROADWAY

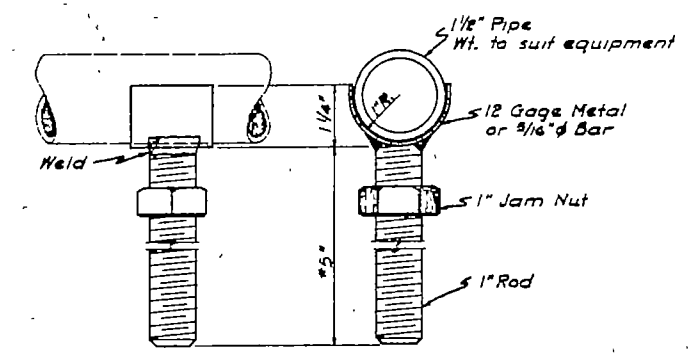
CHECKED BY W.E.G.
MADE BY T.H.D.
QUANTITIES CHECKED BY H.E.G.

H-3138

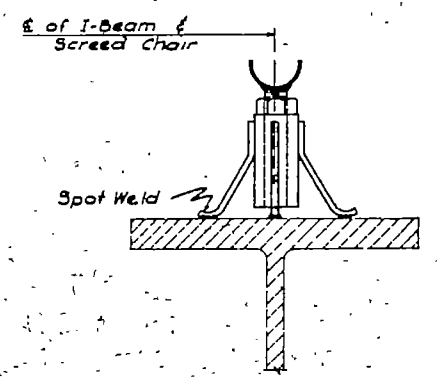
REV. NO.	DATE	BY	APP'D.	TOTAL SHEETS	TOTAL FIGURES
5	11-5-59			32	102



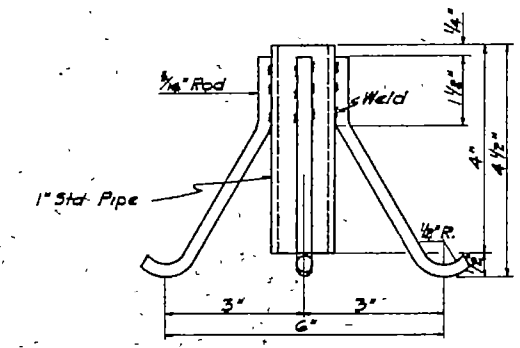
SCREED CHAIR IN PRESTRESSED GIRDER
(Outside Girders Only)



ADJUSTABLE SCREED HOLDER
*Useable with slab thickness of 7\"/>



I-BEAM WITH SCREED CHAIR



SCREED CHAIR*

NOTES:
 The spacing of screed chairs shall be such that no noticeable deflection occurs in the screed when the vibrating strike-off is in operation. Chairs shall be similarly placed for all screeds on the same bridge span with a maximum spacing of three feet when using 1 1/2\"/>

The cost of the screed chairs and holders shall be included in the unit price bid for the various pay items. Upon completion of the project the screed and screed holders shall remain the property of the Contractor.

The design shown for the screed chairs and seat may be varied slightly to suit manufacturers products if approved by the Engineer.

NORTH DAKOTA
STATE HIGHWAY DEPARTMENT

**SCREED CHAIR
AND
ADJUSTABLE SCREED
HOLDER**

APPROVED
1-6-59
DATE

Joseph P. Kirby
BRIDGE ENGINEER