

DESIGN DATA				
Traffic	Average Daily			Max.Hr.
Current 1999	Pass: 3,070	Trucks 670	Total 3,740	375
Forecast 2019	Pass: 4,605	Trucks 1,005	Total 5,610	565
Minimum Sight Dist. for:		Design Speed 70 mph		
Stopping 625'		Bridges		
Full Control of Access				
No Point of Access Other Than at Interchange Ramps				

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

PROJECT NO. IM-2-094(049)248
IN STUTSMAN COUNTY
PCC PAVEMENT & INCIDENTALS
(WESTBOUND)

STATE	PROJECT NO.	SHEET NO.
ND	IM-2-094(049)248	1

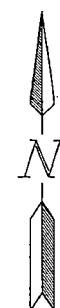
JOB# 20

GOVERNING SPECIFICATIONS:

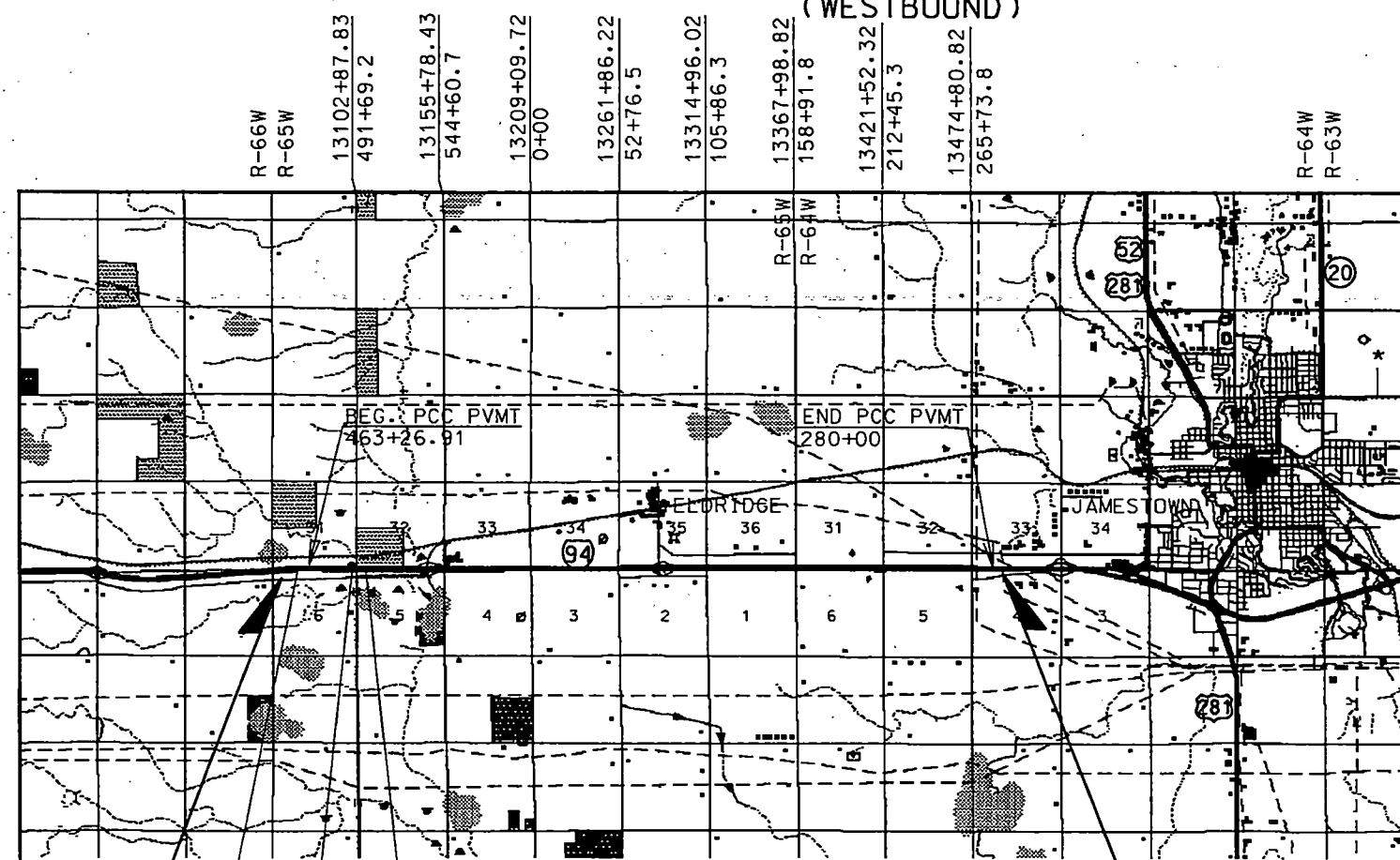
Standard Specifications adopted by the North Dakota Department of Transportation October 1997; Standard Drawings currently in effect; and other Contract Provisions submitted herein.

LENGTH OF PROJECT

8.196 Miles
From beginning of west median crossover at Lippert to end of east median crossover at Woodbury.



T-140N
T-139N



Beg. Proj. IM-2-094(049)248
 RP 247.500
 New Sta. 13068+02.24
 Old Sta. 456+78.45

End Proj. IM-2-094(049)248
 RP 255.696
 New Sta. 13500+72.29
 Old Sta. 291+65.27

DESIGNER *William S. Ekmann*
 DESIGNER _____
 DESIGNER _____
 RECOMMEND APPROVAL *9-7* .20 00
 DESIGN ENGINEER *K. H. E. C. B. J.*

EQUATION 462+15.7 BK =
462+19.1 AHD

EQUATION 490+93.7 BK =
490+95.46 AHD

EQUATION 492+41.8 BK =
492+42.70 AHD

EQUATION 597+91.99 BK =
0+00 AHD

EQUATION 158+89.10 BK =
158+91.80 AHD

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

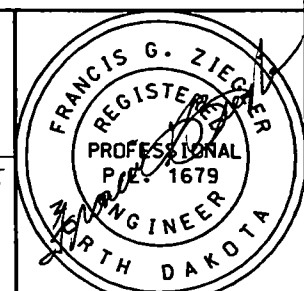
APPROVED

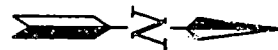
DIVISION ADMINISTRATOR DATE

APPROVED DATE *9/7/2000*

OFFICE OF INFRASTRUCTURE SUPPORT

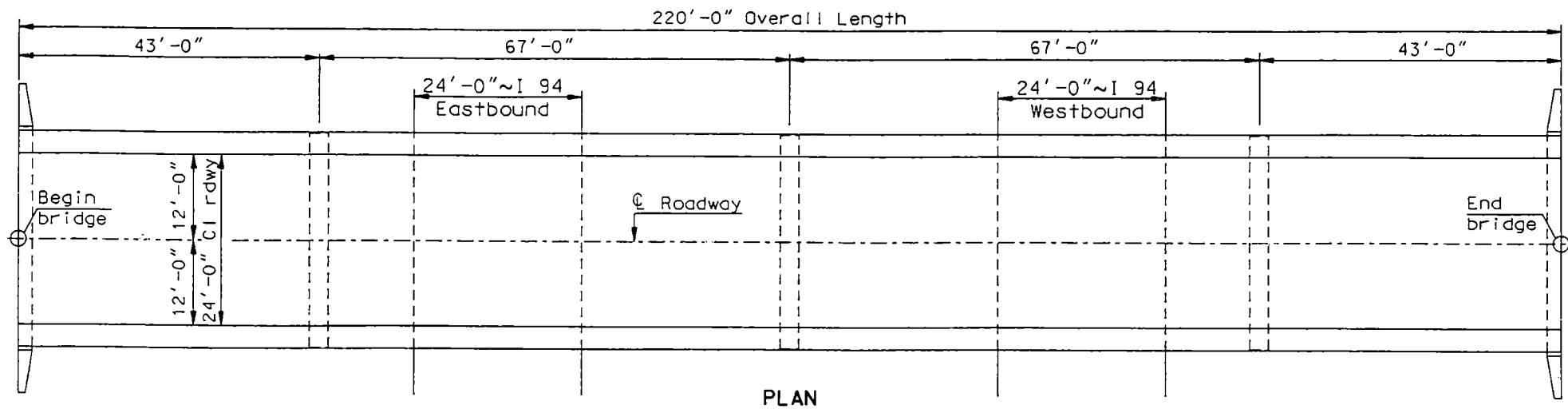
NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION





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

BRIDGE CODE	FHWA REGION	STATE	FEDERAL AID PROJECT NUMBER	SHEET NO.
X-781	8	ND	IM-2-094(049)248	72



NOTES:

- 100 SCOPE OF WORK: The work at this site consists of removing existing bridge railing, concrete end post and end block and installing a bridge rail retrofit.
- 624 RAIL RETROFIT: The old railing and posts shall be removed and shall become the property of the contractor. The concrete end block and end post shall be removed and disposed of off the right of way by the contractor. All equipment, labor and materials necessary to remove the old rail, end block and end posts, and install the new rail shall be included in the bid item "Double Box Beam Rail Retrofit - Free Standing."

SPEC	CODE	ITEM DESCRIPTION	UNIT	QUANTITY
624	3001	DBL BOX BM RAIL RETROFIT (F. STDG)	LF	439

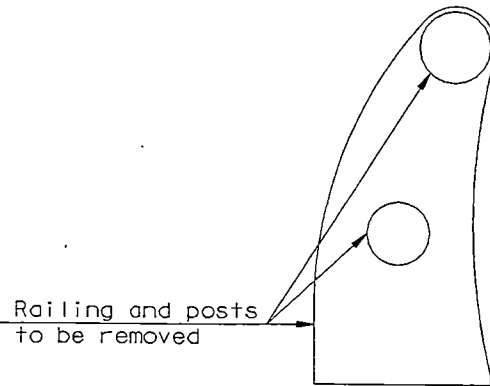
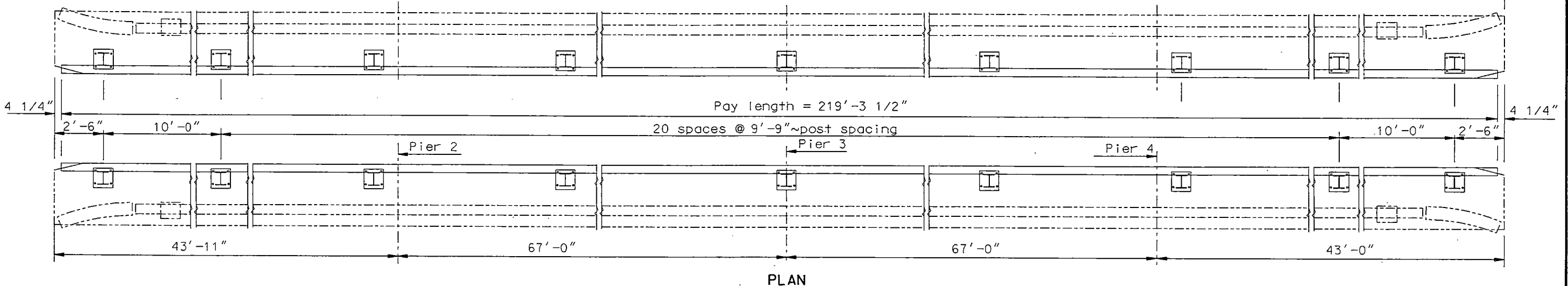
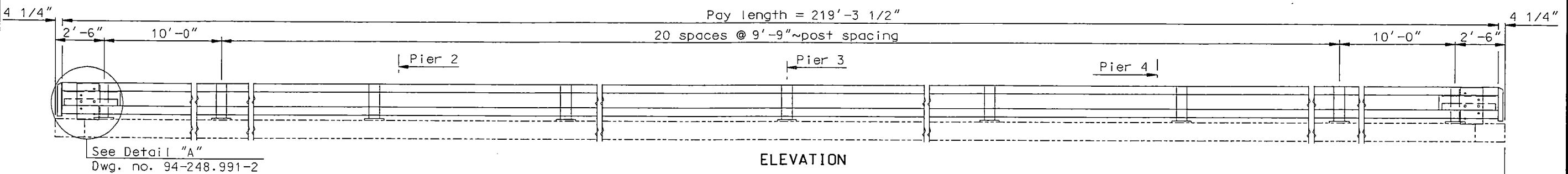
NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION
LIPPERT TOWNSHIP INTERCHANGE

BRIDGE LAYOUT

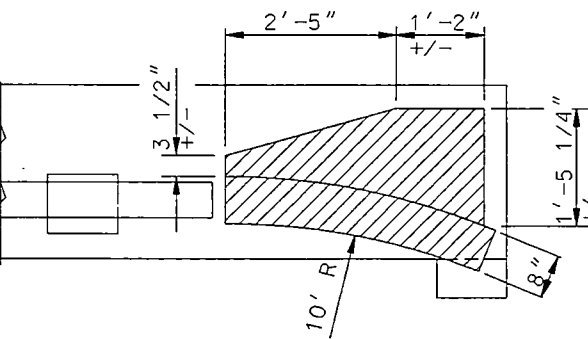
PROJECT: IM-2-094(049)248

STATION 535 + 00

STUTSMAN COUNTY

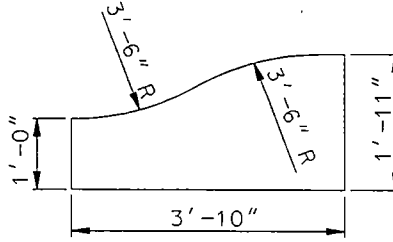


ALUMINUM RAILING & POST



END POST & END BLOCK

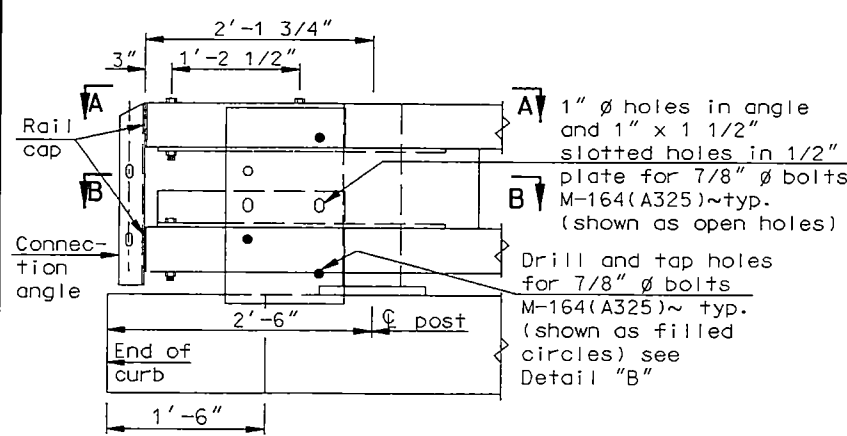
End post and end block on all four corners of bridge need to be removed. The end block is 1'-6" high. Cost of removal to be included in the bid item "Double Box Beam Rail Retrofit-Free Standing."



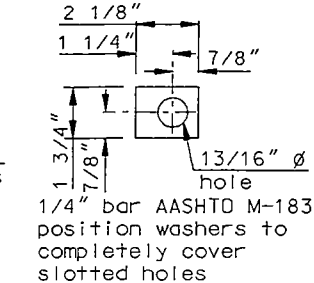
END POST

LIPPERT TWP INTERCHANGE

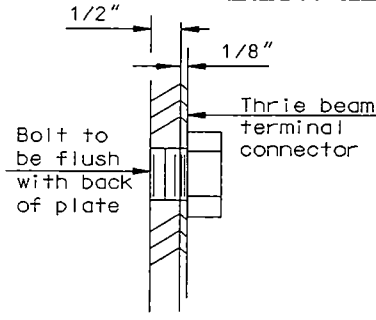
RAIL RETROFIT LAYOUT



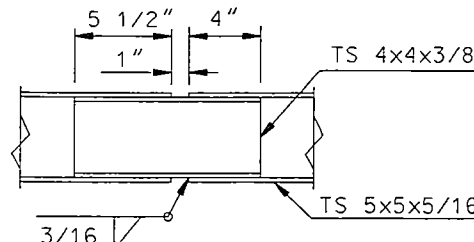
END POST CONNECTION DETAIL
(Typ. @ each end)



BAR WASHER "C"

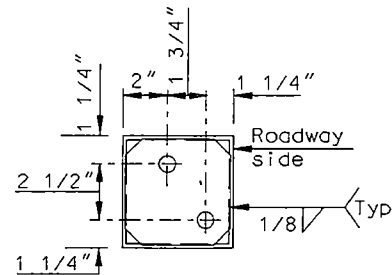


DETAIL "B"



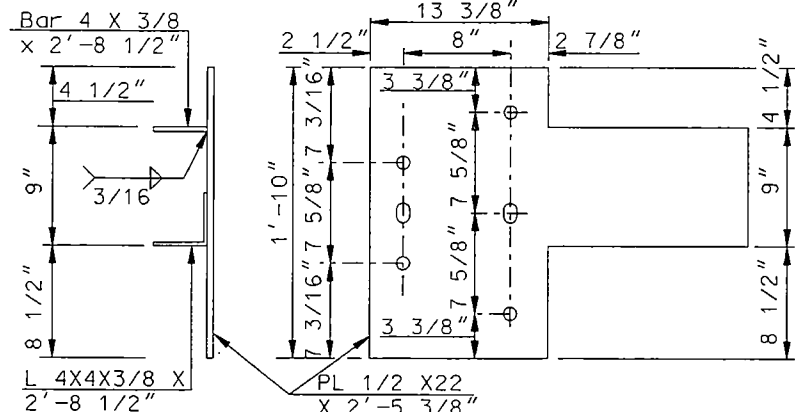
RAIL SPLICE DETAIL

* 2" @ Expansion Splice

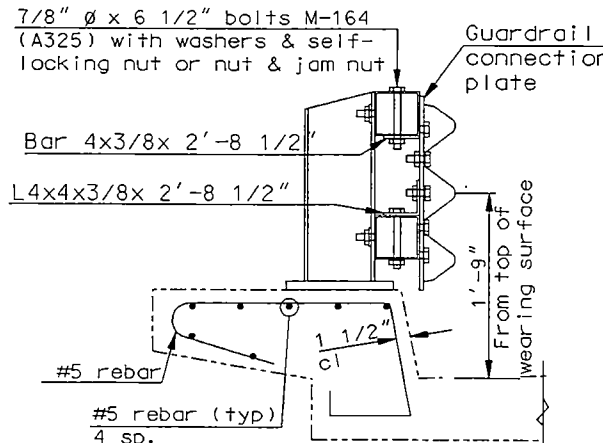


RAIL CAP DETAILS

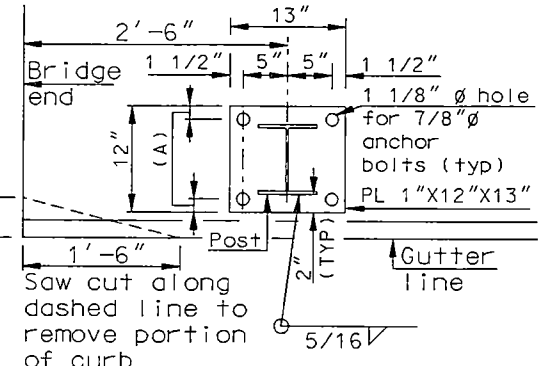
Bar 4 3/4 x 3/16 x 4 3/4 cope corners 3/4" to provide zinc drains



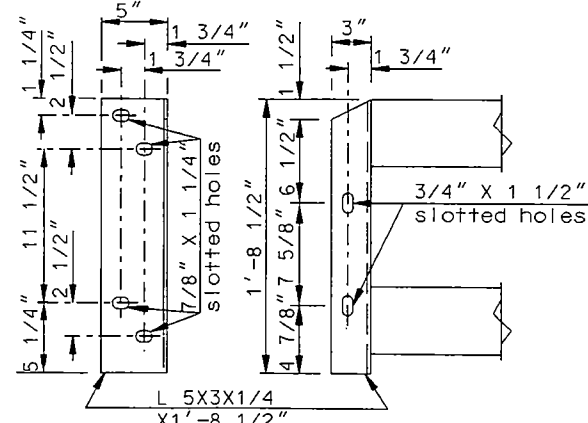
GUARDRAIL CONNECTION PLATE DETAILS
(4 required)



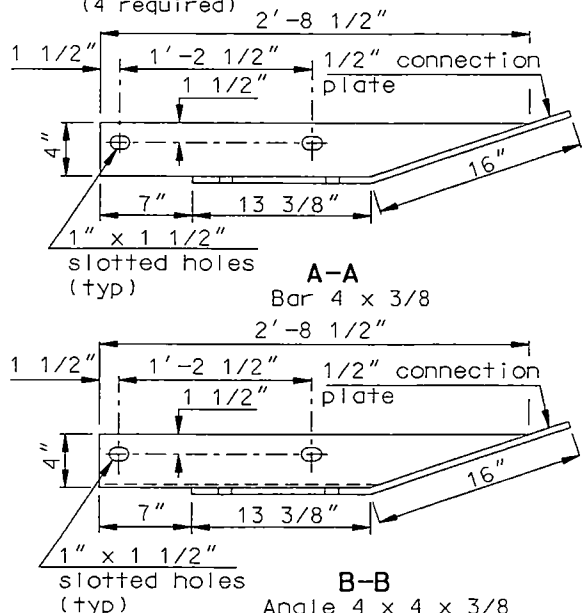
CONNECTION DETAILS



BASE PLATE DETAIL
(A) Variable 1 1/2" to 3"



CONNECTION ANGLE DETAILS



CURB MOUNT POST DETAILS

NOTES:

The bid item shall be "Double Box Beam Rail Retrofit". The pay length shall be end to end and in linear feet.

Rail elements shall be square structural tubing in accordance with ASTM Specification A500 Grade B.

Steel posts, plates and angles shall conform to AASHTO Specification M-183, unless otherwise noted.

Railing shall be fabricated to the horizontal and vertical alignment of the structure. Posts shall be normal to grade.

Payment for railing shall include compensation for furnishing and installing the guardrail connection plates and for sawing and removing portion of the curb.

All structural steel, including fasteners, shall be hot dip galvanized after fabrication according to AASHTO M111.

The 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.

All anchor and splice bolts shall be galvanized and will be AASHTO M-164 (A325).

Rails shall be fabricated so that each rail segment between splices is attached to a minimum of two posts.

The contractor shall field verify the curb height.

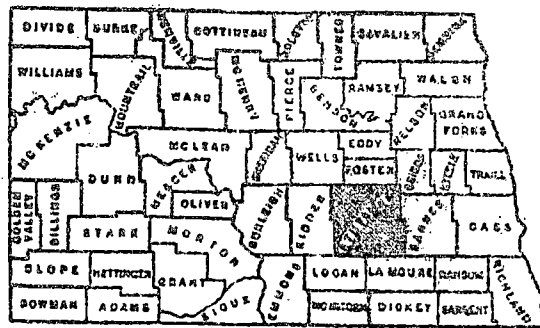
The contractor shall submit the shop drawings for double box beam rail retrofit for approval to the Construction Office before fabrication.

QUANTITIES

DOUBLE BOX BEAM RAIL RETROFIT
(FREE STANDING) 439 LF

LIPPERT TWP INTERCHANGE

DOUBLE BOX BEAM RAIL
RETROFIT DETAILS
(FREE STANDING)



SKETCH-MAP OF NORTH DAKOTA
SHOWING COUNTIES



SCALES
LAYOUT SHEET: 1 IN. = 5000'
PLAN AND PROFILE DRAWINGS (VERT.): 1 IN. = 10 FT.
STRUCTURAL DRAWINGS: AS SHOWN
CROSS SECTION SHEETS: 1 IN. = 10 FT.

NORTH DAKOTA STATE HIGHWAY DEPARTMENT

PLANS FOR THE PROPOSED IMPROVEMENT OF A STATE HIGHWAY IN STUTSMAN COUNTY FEDERAL AID PROJECT NO. 1-94-6(18)243

INDEX OF DRAWINGS

SHEET NO. 1 TITLE PAGE & SUMMARY OF QUANTITIES
SHEETS NO. 2 TO 10 INCL. PLAN AND PROFILE DRAWINGS
SHEETS NO. 11 TO 23 INCL. STRUCTURAL DRAWINGS
SHEETS NO. 24 TO 37 INCL. CROSS SECTIONS
SHEETS NO. 120, 121, 123, 124, 126, 170, 171, 172, 179, 175, 258, 266, 267, 270 FROM 1-94-6(20)

LENGTH OF PROJECT	
PROJECT MILES - GROSS	5.000
PROJECT MILES - NET	4.318
TOTAL MILES - NET	4.318

GOVERNING SPECIFICATIONS:
Standard Specifications adopted by the North Dakota State Highway Department Jan. 1956 and approved as standard by the Bureau of Public Roads May 7, 1956. Required Special Provisions dated Oct. 2, 1957 and approved by the Bureau of Public Roads Nov. 20, 1957 and others submitted herewith.

KEY TO CONVENTIONAL SIGNS

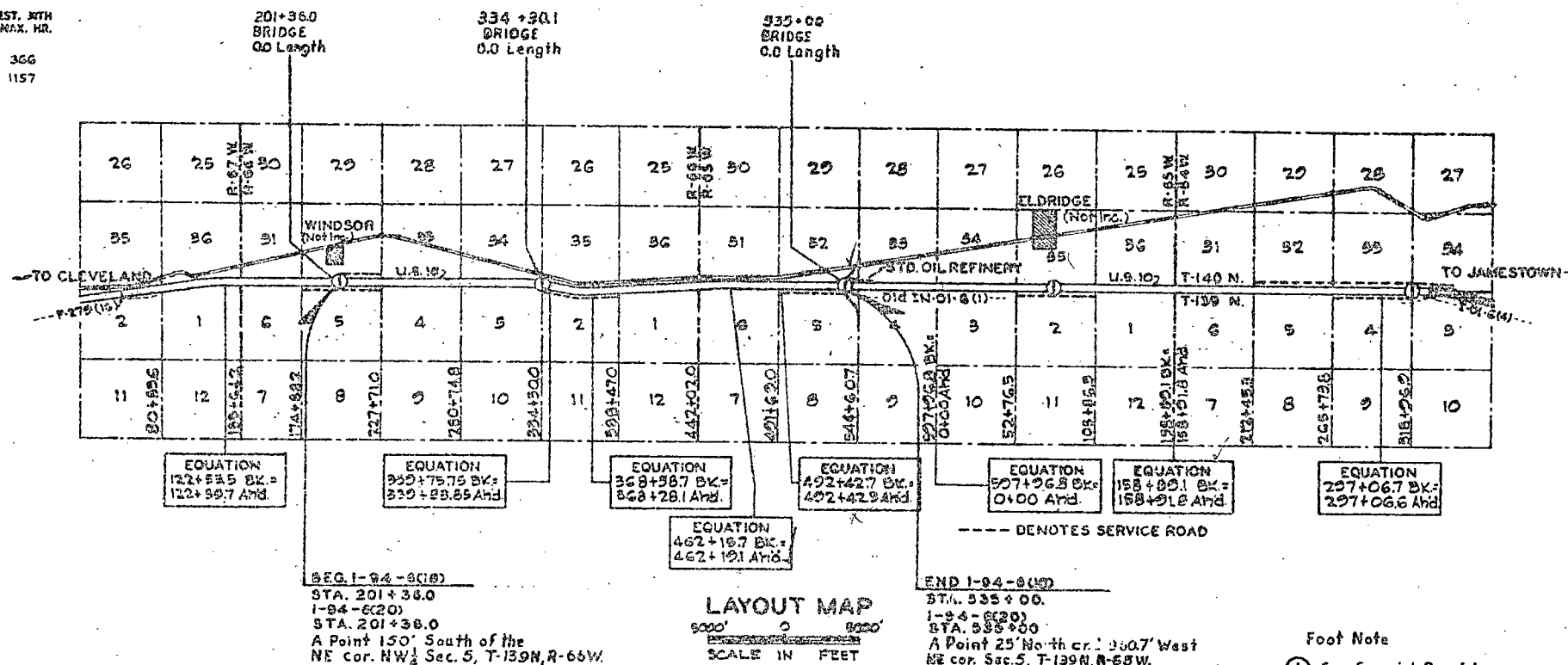
STATE & NATIONAL LINES	=====
COUNTY LINE	-----
TOWNSHIP & RANGE LINES	-----
GRADE LINE	-----
CENTERLINE OF CONSTRUCTION	-----
OLD RIGHT OF WAY LINE	-----
NEW RIGHT OF WAY LINE	-----
ABANDONED RIGHT OF WAY LINE	-----
PROPERTY LINE	-----
STONE WALL	-----
OTHER FENCES	-----
POLE LINES	-----
POWER LINES	-----
BRIDGE	-----
GROUND ELEVATION	-----
TRAVERSED 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	-----
MARCH	-----
WIRE ROPE GUARD RAIL	-----
SHOW FENCE	-----
REPAIR	-----
GUARD POSTS	-----
COBBLE SUTTERS	-----
CONCRETE SUTTERS	-----

DESIGN DATA
TRAFFIC
CURRENT TRAFFIC (1950) 1953 PASS. 654 TRUCKS 261 TOTAL 366
TRAFFIC FORECAST (1978) 7025 PASS. 1240 TRUCKS 8165 TOTAL 1157
DESIGN SPEED 70 MPH
TRAFFIC CLASSIFICATION "M"
MINIMUM SIGHT DISTANCE (NON PASSING) 600'

LIST OF STRUCTURAL DRAWINGS

94-91 H-3312
94-92 H-3313
94-93 H-3115-1
94-94 H-3115-2
H-0104 H-3116-1
H-0309 H-3116-2
H-3311

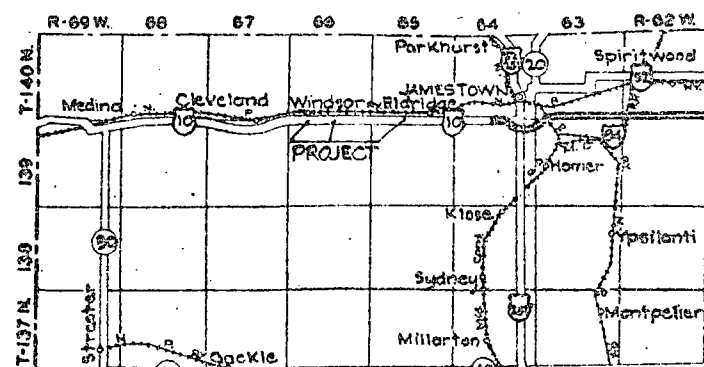
STANDARD DRAWINGS
9'x12' 14.9 & 5'x12' 7.6



LAYOUT MAP
SCALE IN FEET

END 1-94-6(18)
STA. 535+00.0
1-94-6(20)
STA. 535+00.0
A Point 25' North of cr. 260.7' West
NE cor. Sec. 5, T-139N, R-65W.

Foot Note
① See Special Provisions



SKETCH MAP OF SOUTH HALF OF STUTSMAN COUNTY

LOCATION	QUANTITIES									
	158	60A	62A	83B	65L	65G	65S	ORNAMENTAL	BRIDGE	
	EXCAVATION	CONCRETE	REINFORCING STEEL	TREATED TIMBER PILING	TREATED TIMBER TEST PILES @ 60"	STEEL ENCASED PILING	STEEL ENCASED TEST PILES @ 60"	METAL RAILING	BRIDGE BENCH MARK	
STA 201+36.0 &	191	438.4	112403	2964	2			424	1	
STA 334+30.0 &	183	449.4	123585	2964	2			442	1	
STA 535+00 &	69	424.4	111232			716	2	424	1	
GRAND TOTAL	437	1912.2	347620	5228	4	716	2	1290	3	

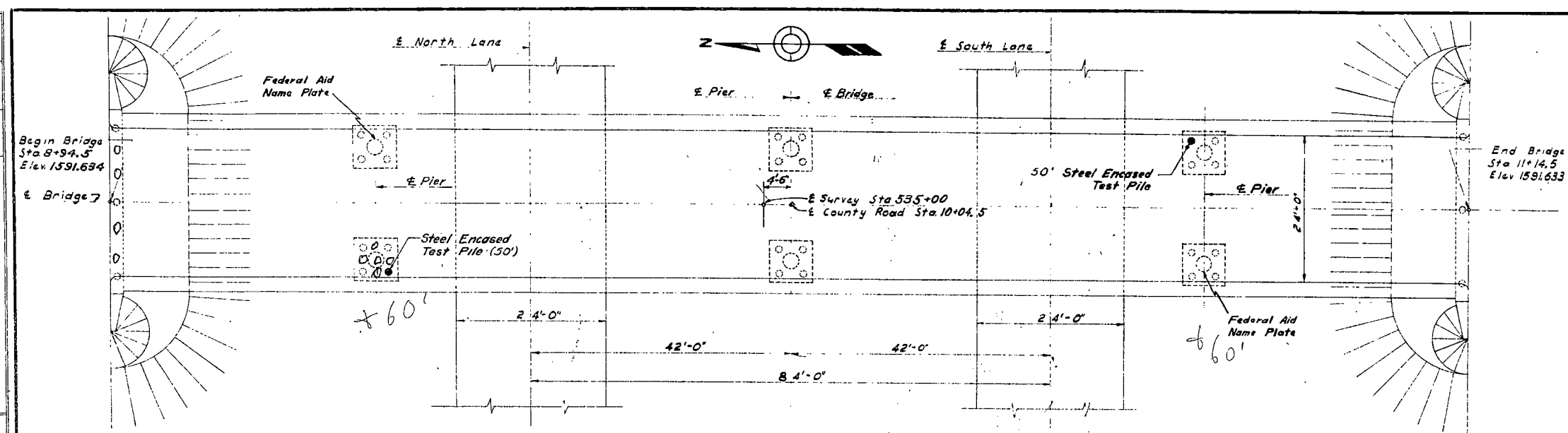
① ①

APPROVED DATE 4-26-58
CHIEF ENGINEER
NORTH DAKOTA STATE
HIGHWAY DEPARTMENT

DEPARTMENT OF COMMERCE
BUREAU OF PUBLIC ROADS
APPROVED
DIVISION ENGINEER DATE

1-94-6(18)243

MADE BY
CHECKED BY
QUANTITIES
TRACING



NOTES:

Reinforcing steel bent bar dimensions are center to center unless otherwise noted. The bar fabricator shall add a prefix to each bar mark to designate the structure.

Rail end posts, roadway and outside face of curbs and slab and outside vertical face of outside beams shall be "Rubbed Surface Finish". All other concrete shall be "Ordinary Surface Finish". All exposed edges shall be beveled with 3/4" triangular molding unless otherwise noted.

The Structure and Grading Contractors shall be responsible for maintaining traffic during structure and grading operations at structure location. Any detour provided shall allow four-way traffic and be gravel surfaced for all weather use. Payment for maintaining this traffic shall be included in the unit price bid for the several pay items.

The embankment at ends of the bridge shall be placed and compacted by the Grading Contractor in two stages, timed to agree with the Structure Contractors' work. The first stage, consisting of the embankment up to term elevation, shall be completed (using "Extra Compaction") before any abutment piles are driven, according to Section 17 of the Standard Specifications. The final embankment stage shall be completed after the superstructure is in place.

All piling shall be driven a minimum of fifteen (15) feet into the original ground. If necessary the Structural Contractor will be required to drill pilot holes to permit driving of piling to the required depth.

Payment for incidental items shown on plans, but not listed in the estimate of quantities shall be included in the unit price bid for the various pay items.

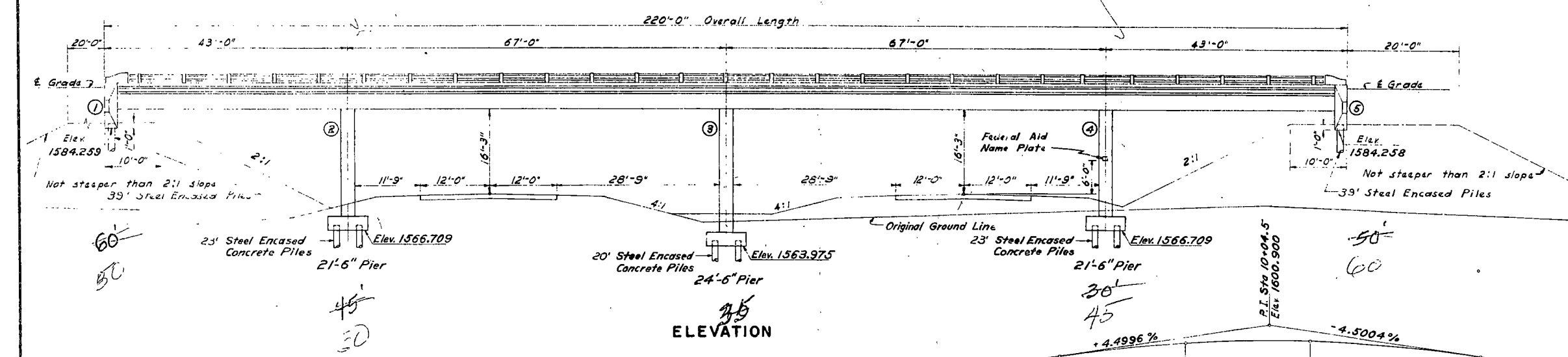
BRIDGE CODE NO.	FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
X721	5	N.D.	1-94-600		13	37

1591.634	1591.728	1591.816	1591.897	1591.966	1592.028	1592.084	1592.155	1592.216	1592.270	1592.315	1592.336	1592.369	1592.354	1592.350	1592.354	1592.349	1592.336	1592.315	1592.269	1592.216	1592.154	1592.084	1592.028	1591.965	1591.896	1591.815	1591.727	1591.633
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FEDERAL AID PROJECT
1-94-6(18)
NORTH DAKOTA
1998
FEDERAL AID NAME PLATE
2 Req'd

NOTE:
The pipe shell for the Steel Encased Concrete Piling shall have the following dimensions and properties:
Outside Diameter - 12-3/4 inches minimum
Wall Thickness - 0.230 inches minimum (AISI)
End Closure - 3/4" flat steel plate welded directly to the pipe.

**CONSTRUCTION ELEVATIONS - E ROADWAY
ADJUSTED FOR DEAD LOAD DEFLECTIONS**



BENCH MARKS				PILE LOADING							
NO.	DESCRIPTION	LOCATION	ELEV.	LOCATION	DEAD LOAD	LIVE LOAD	EARTH	WIND	LONG. FORCE	ICE	DESIGN LOAD
41	2x2 Hub ~ I.F.P. Gd.	Sta. 525+03 ~ 131' Lt.	1567.19					50 LB.	15 LB.	100 LB. L.L.	
42	2x2 Hub ~ I.F.P. Gd.	Sta. 533+17 ~ 144' Lt.	1570.18	Pier	33.6 T	12.3 T	1.8 T				47.7 T
43	Top Culvert ~ N. End	Sta. 545+60 ~ 135' Lt.	1577.85	Abut.	25.3 T	18.4 T					43.7 T

VERTICAL CURVE DATA
Elevations are to top of Finished Roadway E

ESTIMATE OF QUANTITIES (ONE BRIDGE)		
SPEC. NO.	BID ITEM	
12	REMOVING EXISTING STRUCTURE AT STA.	
18	EXCAVATION CLASS 1	CU. YD.
198	" CLASS 2	63 CU. YD.
	" CLASS 3	CU. YD.
604	CONCRETE CLASS A-1	CU. YD.
	" CLASS A-1 1/4	431.85 424.4 CU. YD.
62A	REINFORCING STEEL	112440 111232 LB.
63A	STRUCTURAL STEEL	LB.
64A	UNTREATED TIMBER	M.B.M.
64B	TREATED TIMBER	M.B.M.
Δ	STEEL ENCASED PILING	716' LIN. FT.
Δ	STEEL ENCASED TEST PILES @ 50'	12 EACH
	60'	2 Ea
81	TEMPORARY CROSSING AND DETOUR	
	ORNAMENTAL METAL RAILING	424' LIN. FT.
	BRIDGE BENCH MARKS	1 SET
Δ	SEE SPECIAL PROVISIONS	

STRUCTURAL DRAWINGS

GENERAL DRAWING This Sheet

SUBSTRUCTURE H-3313, Std. 14.9, 94-6(18)-1 & H-0309

SUPERSTRUCTURE H-3116-1, H-3116-2, H-0104 & Std. 7.6

DESIGN LOADING H-20 + S-16 (1993)

SCALE 1 INCH = 10 FEET

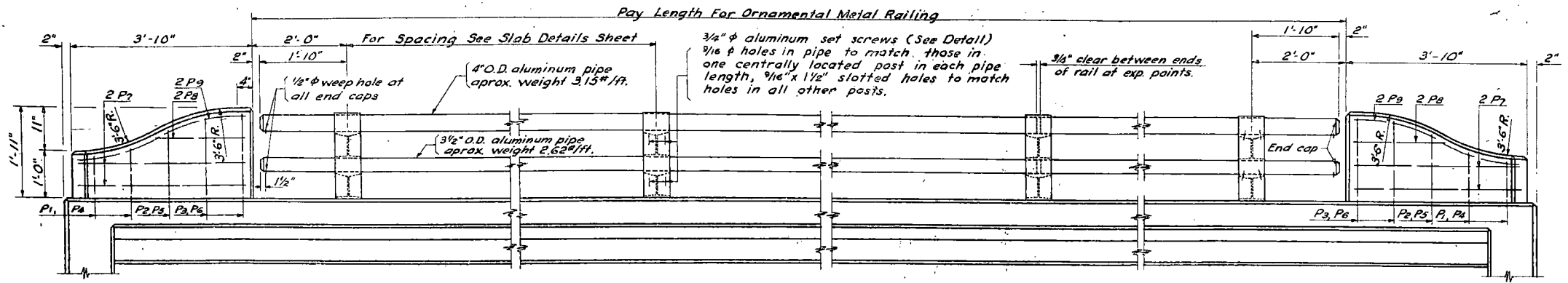
NORTH DAKOTA
STATE HIGHWAY DEPARTMENT
LIPPETT TOWNSHIP INTERCHANGE BRIDGE LAYOUT

PROJECT 1-94-6(18) STA. 535+00

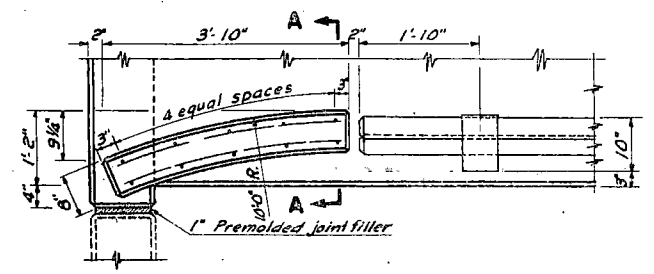
STUTSMAN COUNTY

APPROVED
DATE 1/21/98
Joseph R. K...
BRIDGE ENGINEER

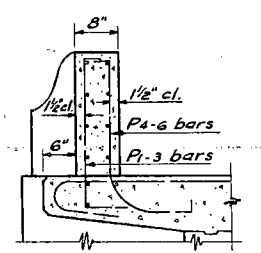
FED. ROAD DIV. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	N. D.				



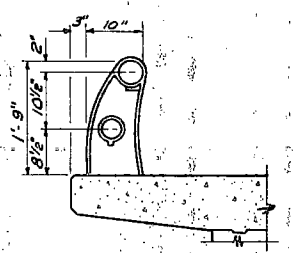
PART ELEVATION



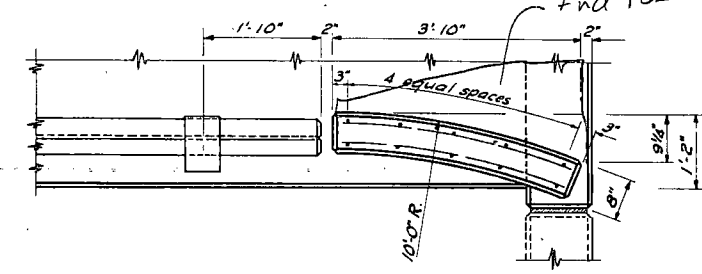
PART PLAN



SECTION A-A



TYPICAL SECTION

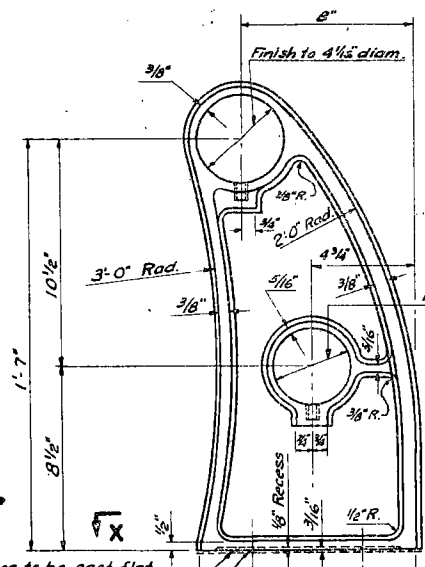


PART PLAN

NOTES:
 Rail posts shall be aluminum alloy sand or permanent mold castings 356-T6, alloy 5670A condition T6. Sand castings shall conform to A.S.T.M. Spec. B26.
 Rail pipe to be aluminum drawn tube 6061-T6 conforming to A.S.T.M. Spec. B210-55T, alloy 6311A condition T6, or extruded tube 6061-T6 conforming to A.S.T.M. Spec. B235-55T, alloy 6311A condition T6. Mill Finish.
 Bolts and screws to be aluminum alloy 2024-T3 with No 205 alumilite finish conforming to A.S.T.M. Spec. B211-55T alloy 6042 A condition T4.
 Pins shall conform to A.S.T.M. Spec. B211-55T, alloy 6311A condition T6.
 All aluminum castings shall be finished by grinding off the gates and parting line followed by sand blasting and one coat of lacquer.

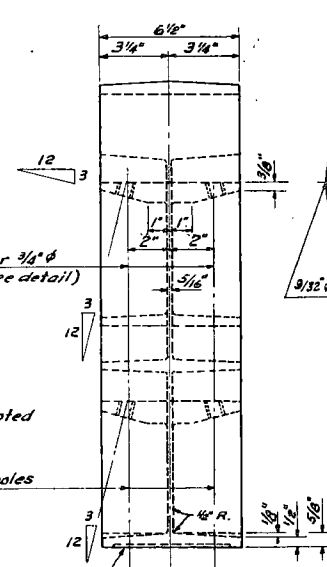
Modified
 All concrete in the end posts shall be Class A-1½. End posts shall be given the "Rubbed Surface Finish". Railing and end post quantities are included in slab quantities on slab sheet.
 All posts shall be set normal to grade.
 All pipe, rail posts, anchor bolt assemblies, bolts, screws, shims, pins, end caps and compound shall be included in the price bid for Ornamental Metal Railing.
 Each section of pipe rail shall project through, or into, at least three and preferably four posts.
 The bottom of rail posts in contact with concrete shall be coated with caulking compound; grade I-Far gun application; white, natural or grey in color and furnished in cartridges; conforming to the latest Federal Specifications TT-C-598. Application shall be made to clean and dry surfaces above 40°F. Joints may be freed from dust by swabbing with waste moistened with turpentine or universal spirits. Compound shall be placed with care to prevent smearing the area outside and around the base of the post.

QUANTITIES FOR 4 END POSTS
 Concrete Class A-1½ = 0.5 Cu Yd.
 Reinforcing Steel = 221 lbs.

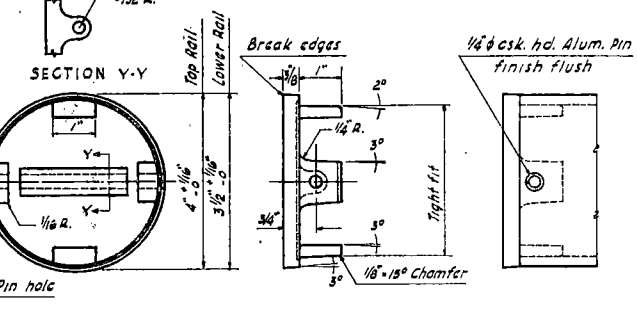


This surface to be cast flat
 Caulking compound completely filling recess plus 1/8" thick additional over entire base of post.

DETAIL OF ALUMINUM SET SCREWS

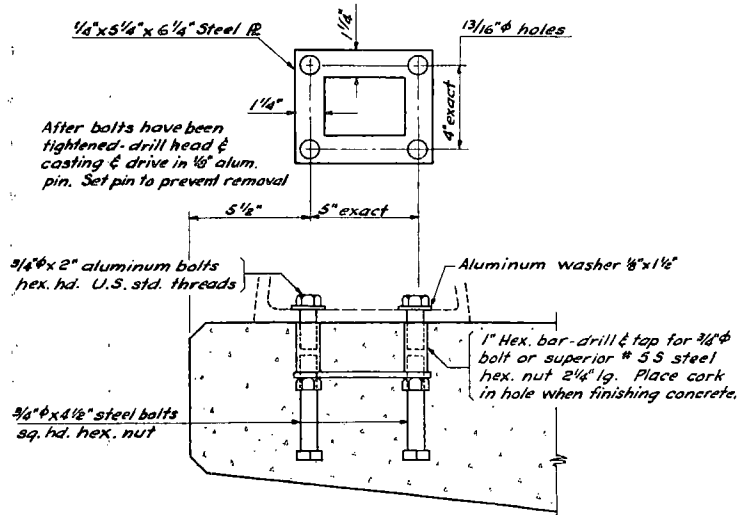


DETAIL OF ALUMINUM SHIMS

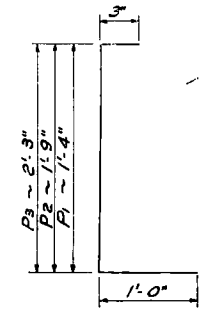


CAST ALUMINUM END CAP FOR RAIL

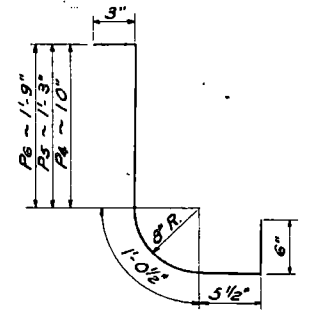
BAR LIST (4 END POSTS)				
MARK	NO.	SIZE	LENGTH	SHAPE
P1	8	5	2' 7"	Bent
P2	4	5	3' 0"	Bent
P3	8	5	3' 6"	Bent
P4	8	5	3' 1"	Bent
P5	4	5	3' 6"	Bent
P6	8	5	4' 0"	Bent
P7	16	4	3' 9"	Field Bent
P8	8	4	2' 0"	Field Bent
P9	8	5	4' 0"	Field Bent



ANCHOR BOLT ASSEMBLY



P1, P2 & P3 BARS



P4, P5 & P6 BARS

BENT BAR DETAILS

STANDARD RAILING
 DETAILS

H-0104

H-0104

PER. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	N.D.				

NOTE:

Slab and beam reinforcing steel shall be placed after column concrete has been placed.

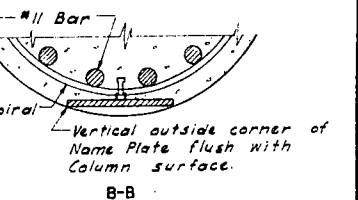
Column concrete shall be placed to the elevation of the bottom of the beam, then allowed to set a min. of 2 hours before deck concrete is placed. The concrete surface & reinforcement shall be cleaned by removal of all laitance & foreign matter before deck concrete is placed.

BAR LIST - THREE PIERS & TWO ABUTMENTS

MARK	NO.	SIZE	LENGTH	SHAPE
A1	8	6	12'-0"	Bent
A2	8	8	23'-3"	"
A3	4	8	33'-0"	Str.
A4	4	5	37'-0"	"
A5	24	5	22'-0"	"
A6	32	6	17'-6"	Bent
A7	8	6	19'-3"	"
A8	4	4	17'-3"	"
A9	4	4	13'-6"	"
A10	4	4	10'-0"	"
A11	4	4	5'-9"	"
A12	6	6	34'-0"	Str.
A13	24	6	13'-0"	Bent

P1	36	8	17'-0"	Bent
P2	36	8	16'-9"	"
P3	42	11	8'-9"	"
P4	48	11	9'-3"	"
P5	4	4	44'-9"	"
P6	2	4	517'-6"	"
P7	60	11	22'-4"	Str.
P8	30	11	25'-4"	"
P9	34	11	10'-6"	Bent
P10	36	11	5'-9"	"
P11	66	5	11'-2"	"
P12	36	11	21'-0"	Str.

*AS 6 3 43'-6" Spiral
*AP 42 7 7'-6" Str.
*AS & AP for Abutment Piling Only.
For details see H-0309.



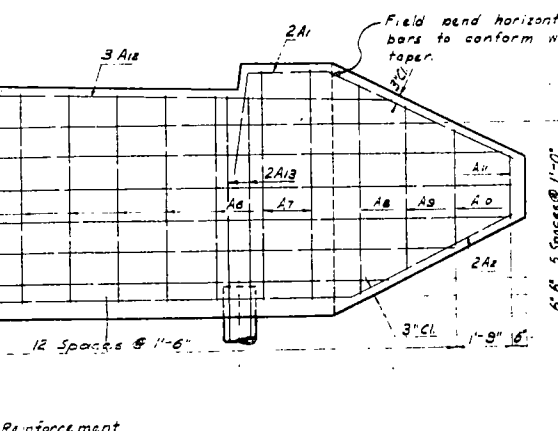
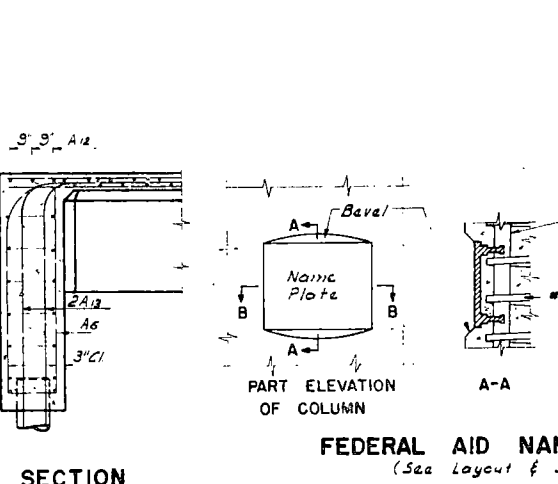
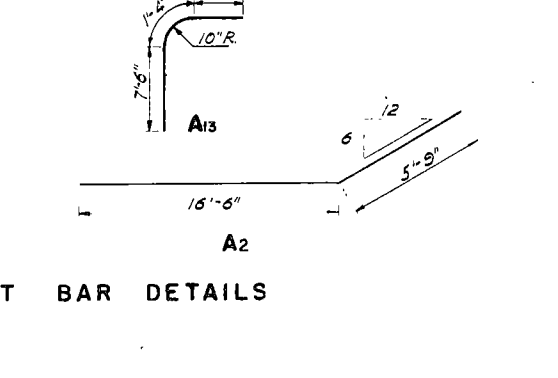
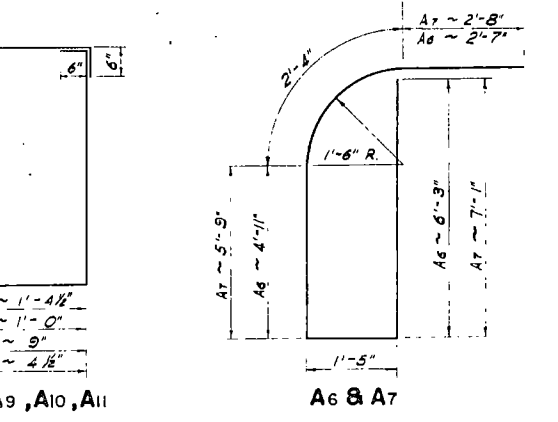
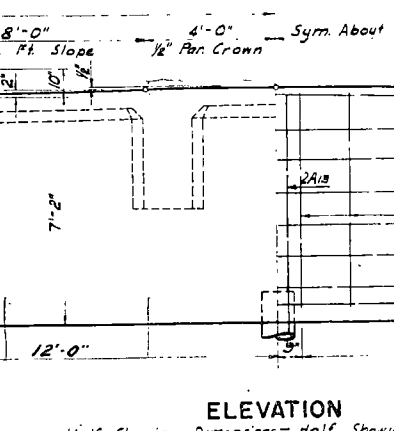
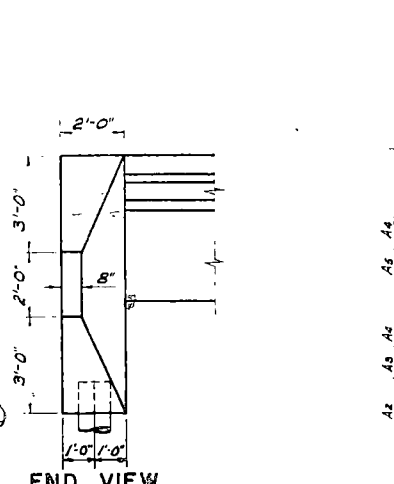
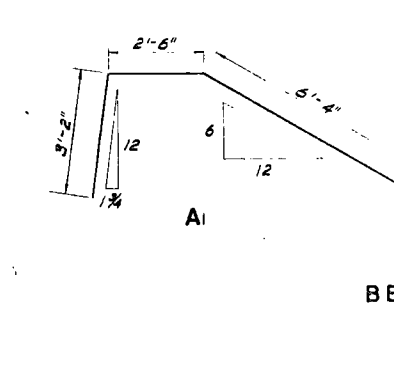
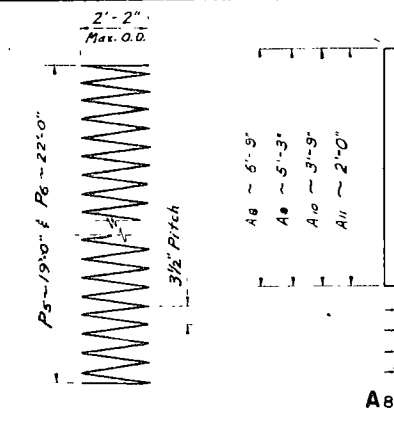
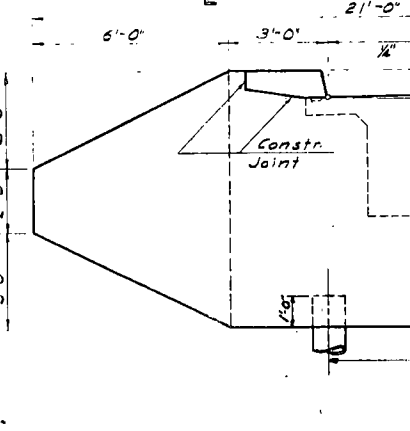
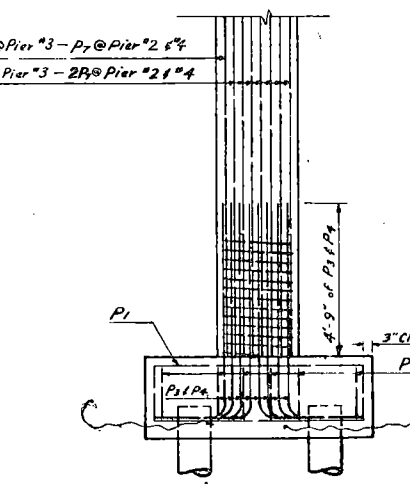
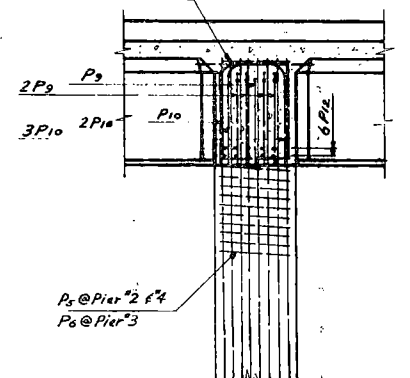
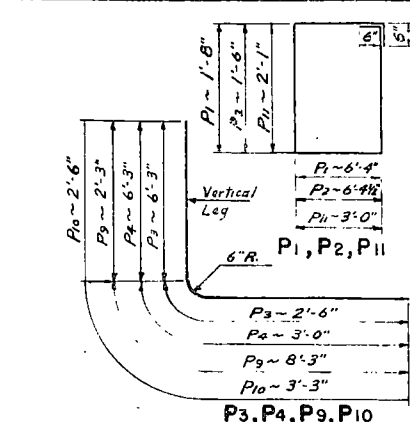
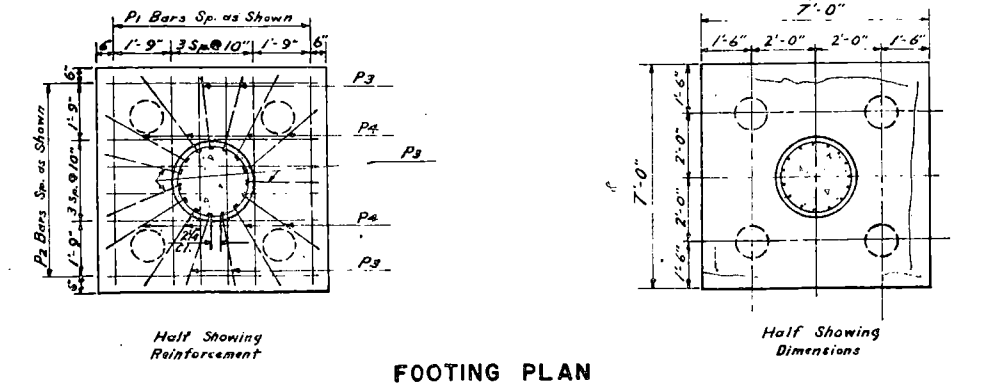
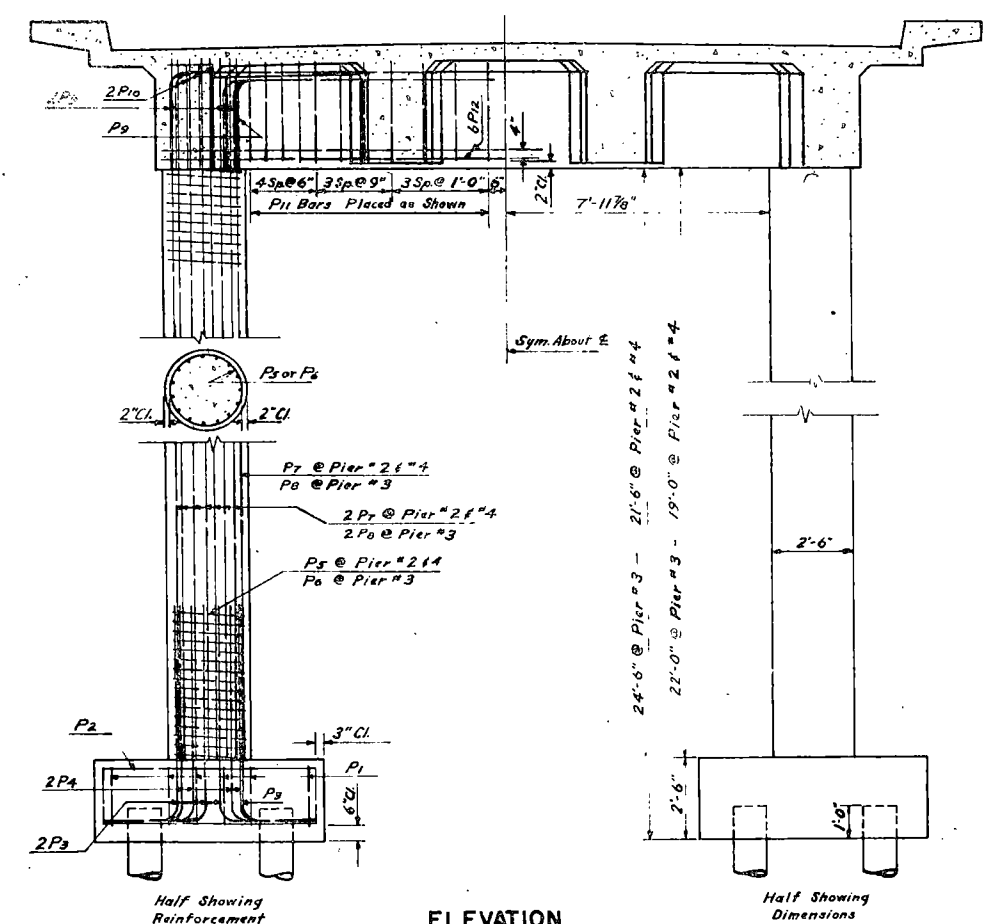
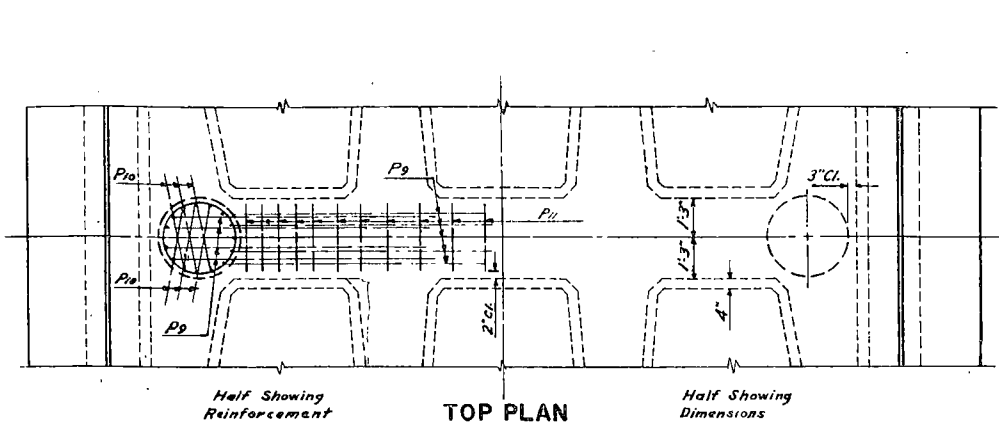
FEDERAL AID NAME PLATE DETAIL (See Layout & Standard 14.3)

QUANTITIES		PIERS & ABUT.
Concrete Class A-1 1/2	87.6 CY.	
Reinforcing Steel 3/8"	33,302 Lbs.	
Steel Encased Piling (See Layout)		

PIER & ABUT. DETAILS FOR T-BEAM SPANS

24' ROADWAY
H20-S16 LOADING

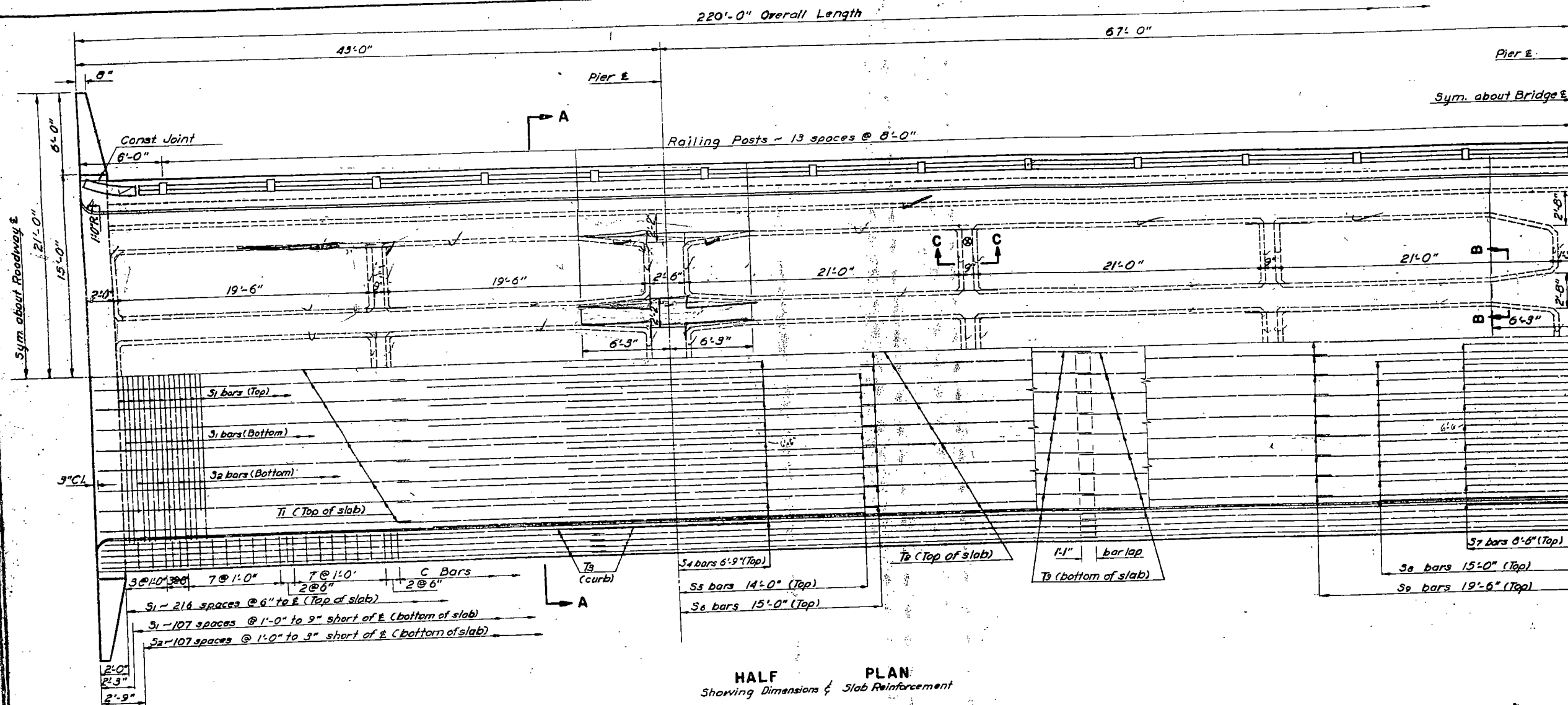
H-3313



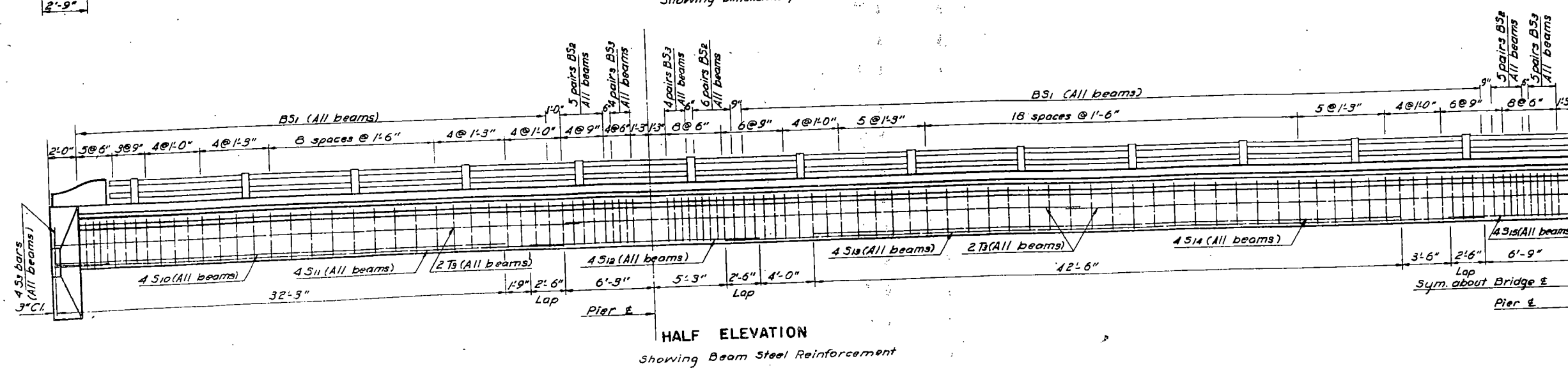
QUANTITIES CHECKED BY
MADE BY

H-3313

FED. ROAD DIV. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	N. D.				



HALF PLAN
Showing Dimensions & Slab Reinforcement

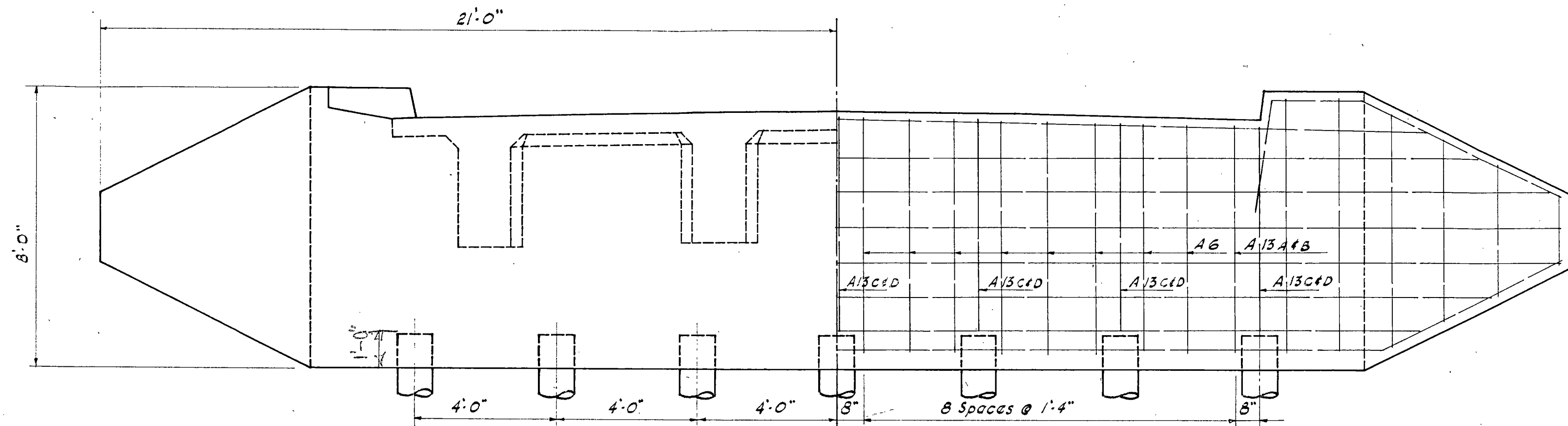


HALF ELEVATION
Showing Beam Steel Reinforcement

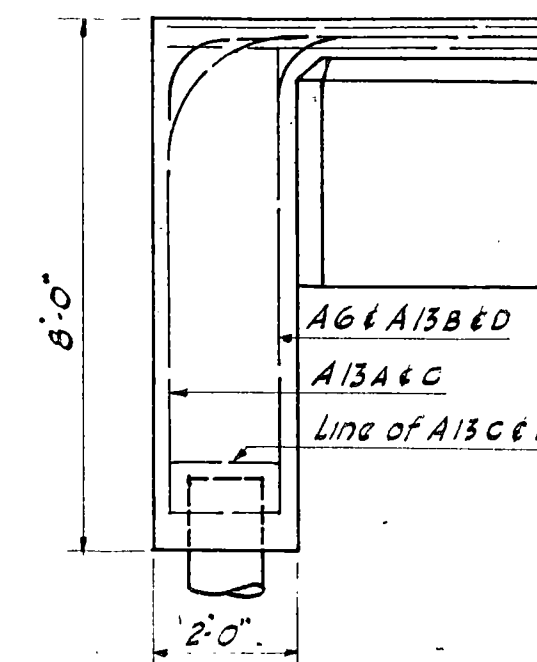
FOUR SPAN CONTINUOUS
CONCRETE T-BEAM
24'-0" CLEAR ROADWAY
220'-0" OVERALL LENGTH

H₂₀ S₁₆ LOADING

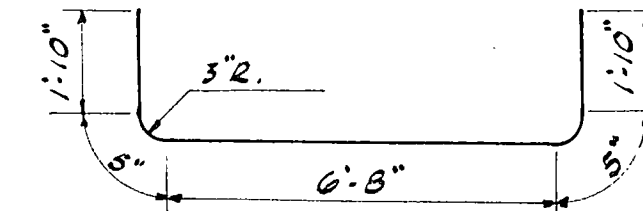
H-3116-1



ABUTMENT ELEVATION

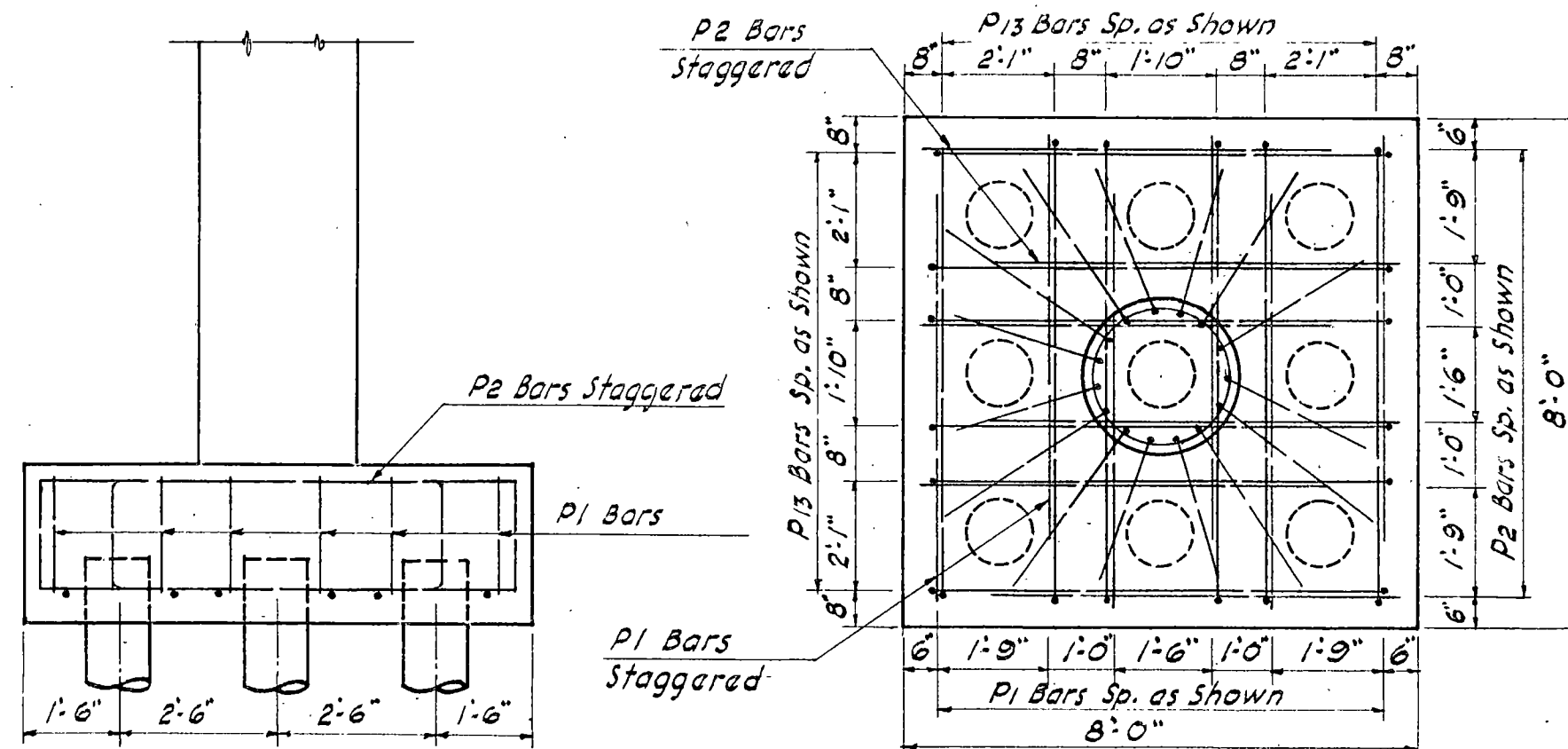


C SECTION



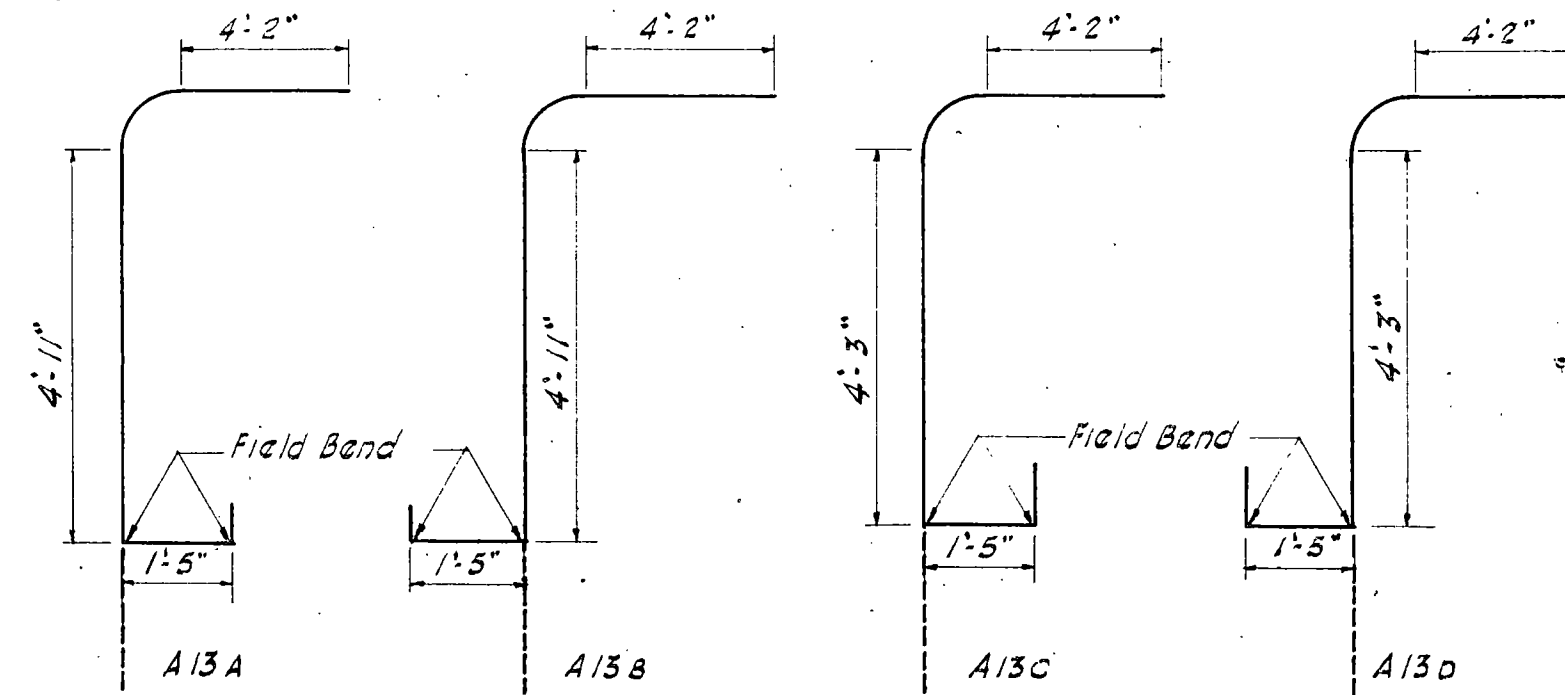
P13 BAR DETAIL
#6 Bar x 11'-2"

NOTE:
Spacing of A6-P1-P2-P4 & P3 Bars changed as indicated.
A13 Bars revised and spaced as indicated.
Steel Encased Piling deleted and Treated Timber Piling Substituted.
P13 Bars added to pads.
Pads enlarged to accomodate Timber Piling.
Design Pile Load for Pier = 21.33 tons
Design Pile Load for Abut. = 18.7 tons



PAD SECTION

PAD PLAN



A13 BAR REVISIONS

QUANTITIES for 3 Piers & 2 Abutments	
Concrete class A-1 1/2	Add 7.14 C.Y.
Reinforcing Steel	Add 1208 Lbs.
Br. # 94-93	
SKETCH TO ACCOMPANY CHANGE ORDER NO PROJECT NO I-94-6 (18) STUTSMAN COUNTY	