DESIGN DATA				
Traffic	Average Daily			Max.Hr.
Current 2008	Pass: 2110	Trucks: 740	Total: 2850	285
Forecast 2028	Pass: 3145	Trucks: 1105	Total: 4250	425
Clear Zone Dist. 32		Design Speed: 75		
Minimum Sight Dist. for Stopping: 820'		Bridges:		
Full Control of Access				
No Point of Access Other Than at Interchange Ramps				
Pavement Design Life 30 (years)				

JOB# 42

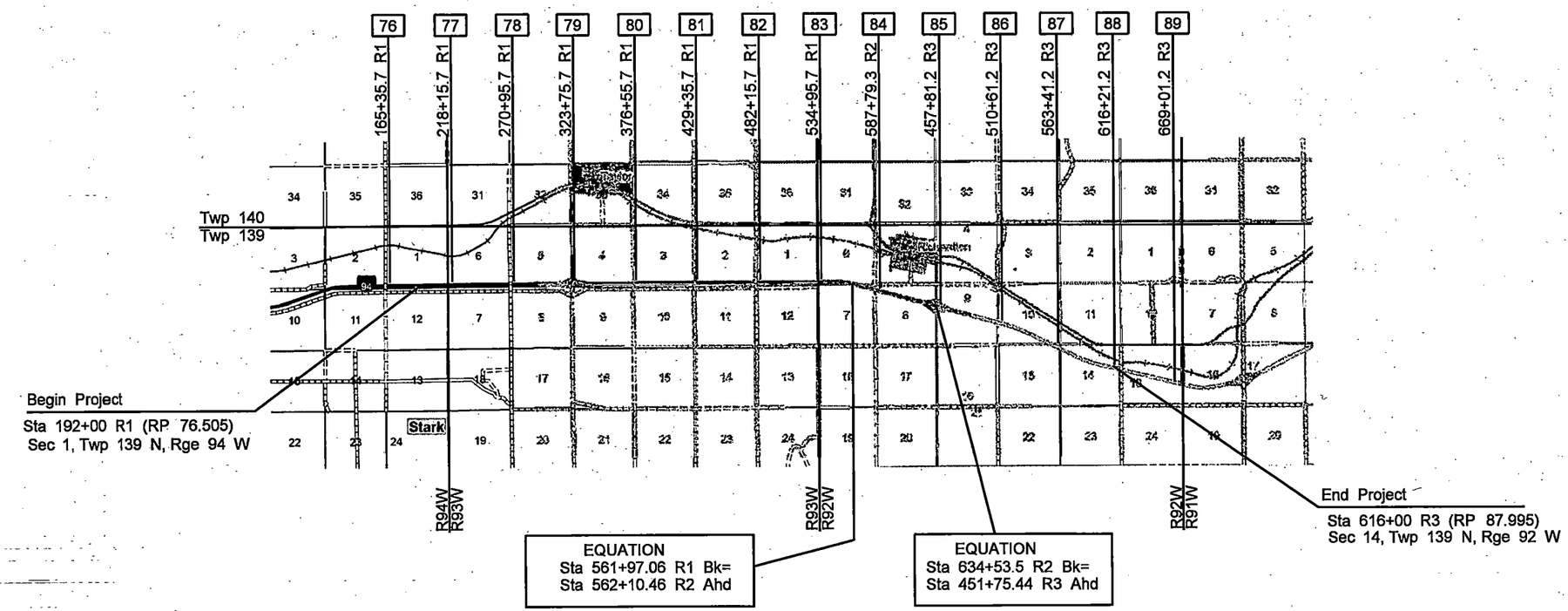
STATE	PROJECT NO.	PCN	SECTION NO.	SHEET NO.
ND	IM-5-094(060)076	17125	1	1

NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

IM-5-094(060)076
Stark County
I-94 Westbound Roadway
RP 76.5 to Youngman's Butte
PCC Reconstruction
West Median Crossover and Ramp Connections
Reconstruct and/or Mill and Overlay Interchanges

GOVERNING SPECIFICATIONS:
Standard Specifications adopted by the North Dakota Department of Transportation October 2008; Standard Drawings currently in effect; and other Contract Provisions submitted herein.

PROJECT NUMBER \ DESCRIPTION	NET MILES	GROSS MILES
IM-5-094(060)076	11.490	11.490



DESIGNERS

Travis Spaeth /s/

Jacob Braunagel

APPROVED DATE 07/23/10

Roger Weigel /s/
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.

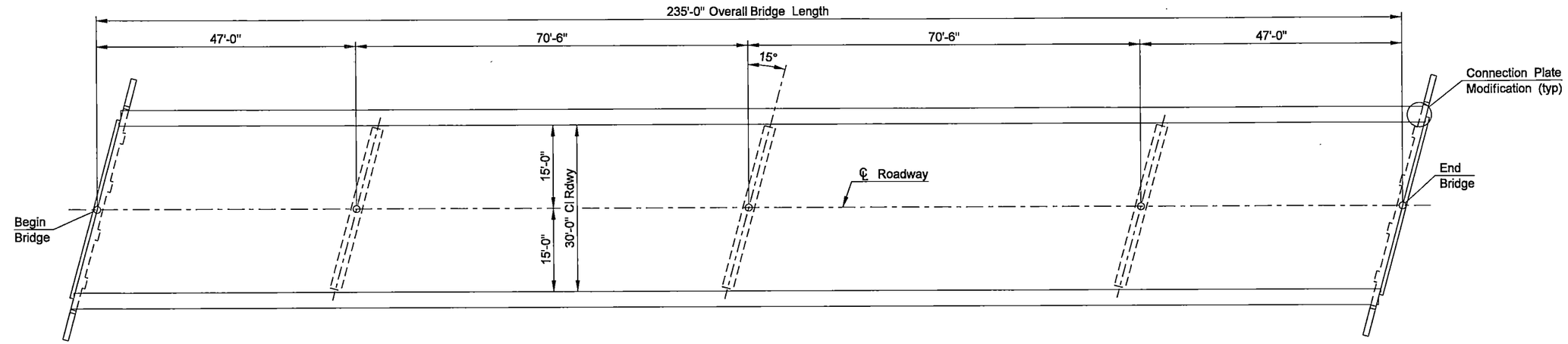
APPROVED DATE 07/22/10

James Douglas Rath /s/
DESIGN DIVISION

This document was originally issued and sealed by James Douglas Rath Registration Number PE- 4288, on 07/22/10 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	IM-5-094(060)076	170	10



PLAN

NOTE:

100 SCOPE OF WORK: Work at this site consists of placing a deck overlay and replacing the existing connection plates with new plates at the four corners of the bridge.

650 OVERLAY CONCRETE: Bridge deck overlays shall not be placed after September 15 unless authorized by the Bridge Engineer.

This document was originally issued and sealed by Brian W. Raschke, Registration Number PE 4361, on 07/01/10 and the original document is stored at the North Dakota Department of Transportation

SPEC	CODE	ITEM DESCRIPTION	UNIT	QUANTITY
624	3005	CONNECTION PLATE MODIFICATION	EA	4
650	0704	OVERLAY CONCRETE	CY	43
650	0720	CLASS 1 REMOVAL	SY	783
650	0721	CLASS 2 REMOVAL	SY	157
650	0722	CLASS 2-A REMOVAL	LF	282
650	0723	CLASS 3 REMOVAL	SY	39

NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

RICHARDTON-MOTT INTERCHANGE

BRIDGE LAYOUT

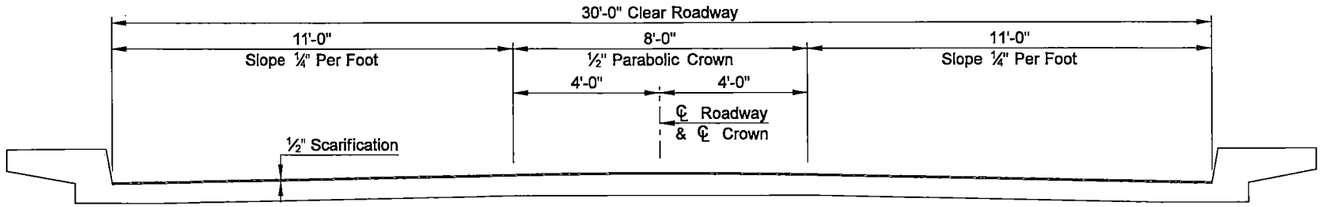
PROJECT: IM-5-094(060)076

STARK COUNTY

07/01/10 — Terrence R. Udland
DATE — BRIDGE ENGINEER

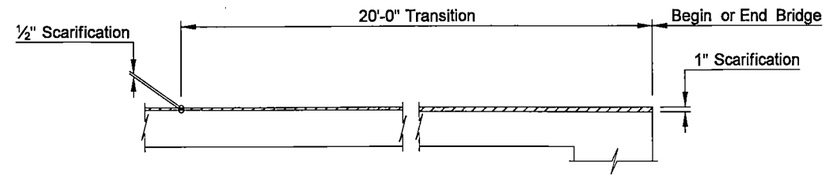
23 U.S.C. 409
NDDOT Reserves All Objections

STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
ND	IM-5-094(060)076	170	11



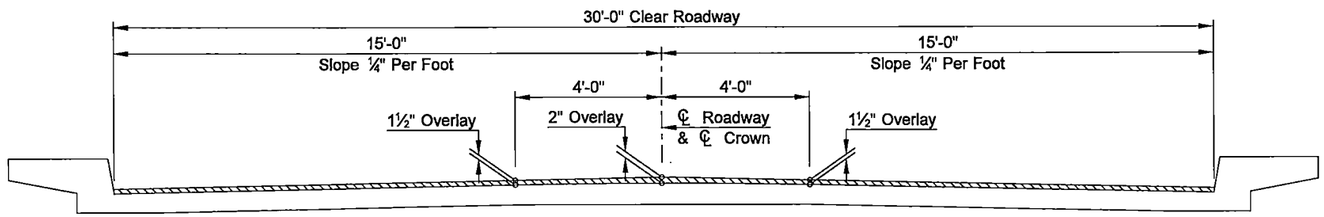
(SHOWING REMOVAL)

TYPICAL DECK SECTION



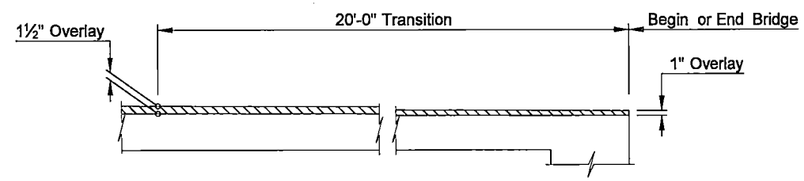
(SHOWING REMOVAL AT BRIDGE ENDS)

DECK ELEVATION



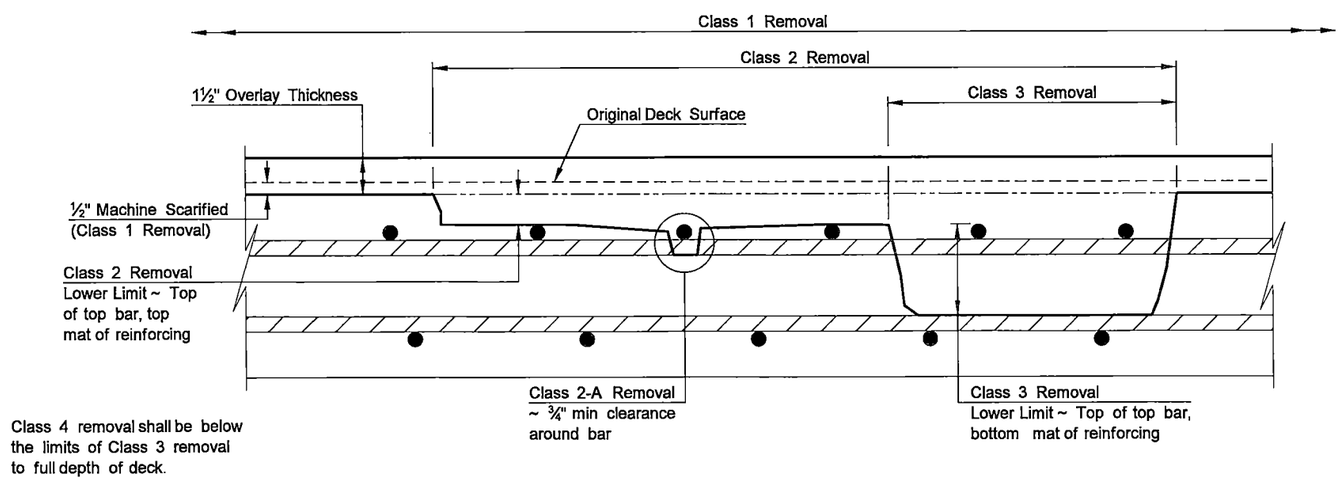
(SHOWING OVERLAY)

TYPICAL DECK SECTION



(SHOWING OVERLAY AT BRIDGE ENDS)

DECK ELEVATION



(OVERLAY CLASSIFICATIONS)

BRIDGE DECK SECTION

NOTE:

650 CLASS 2-A REMOVAL: Class 2-A removal is paid for the top bar in the top mat of reinforcing only. If a bar that is identified for 2-A is in an area that becomes Class 3 or Class 4, it shall not be paid for as 2-A removal.

QUANTITIES	
OVERLAY CONCRETE	43 CY
CLASS 1 REMOVAL	783 SY
CLASS 2 REMOVAL	157 SY
CLASS 2-A REMOVAL	282 LF
CLASS 3 REMOVAL	39 SY

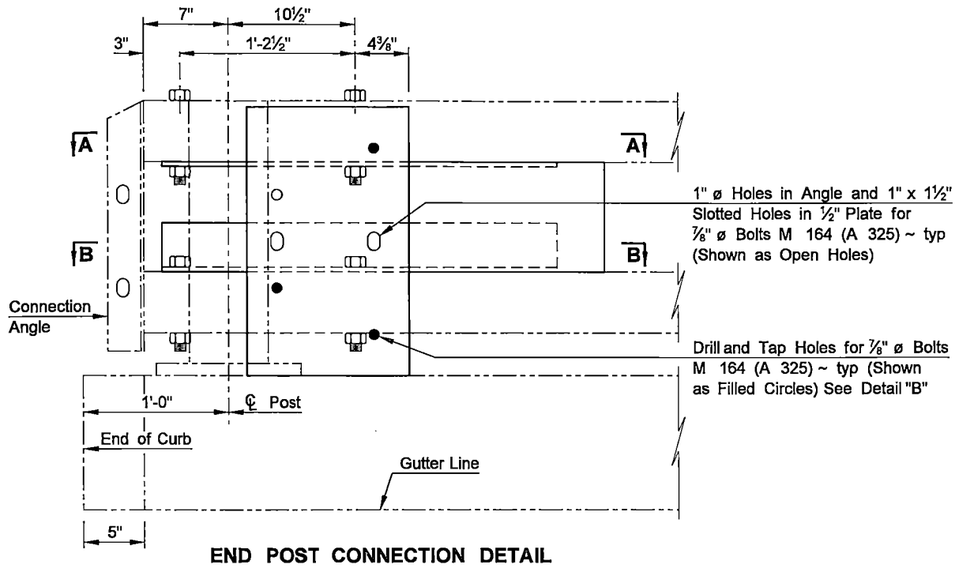
This document was originally issued and sealed by Brian W. Raschke, Registration Number PE 4361, on 07/01/10 and the original document is stored at the North Dakota Department of Transportation

RICHARDTON-MOTT INTERCHANGE

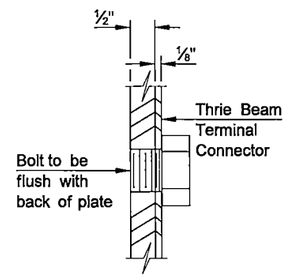
DECK OVERLAY DETAILS

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

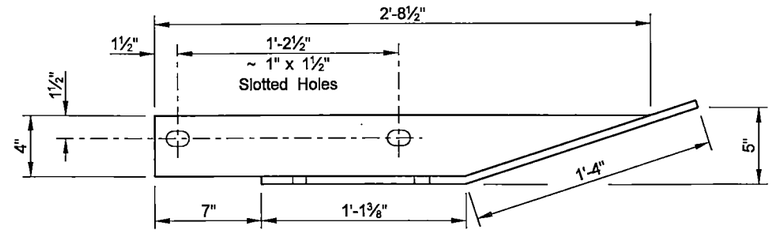
STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
ND	IM-5-094(060)076	170	12



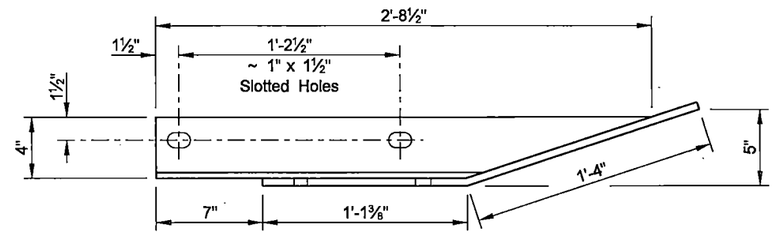
END POST CONNECTION DETAIL



DETAIL "B"

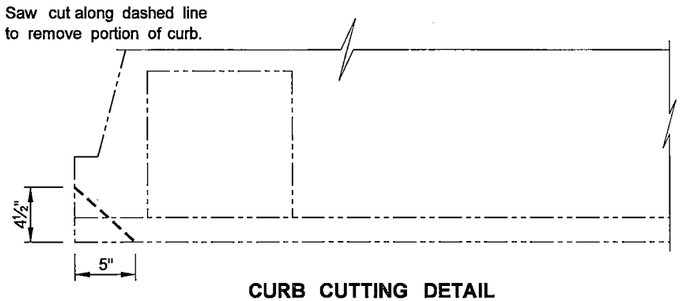


(BAR 4 x ⅜)
A-A

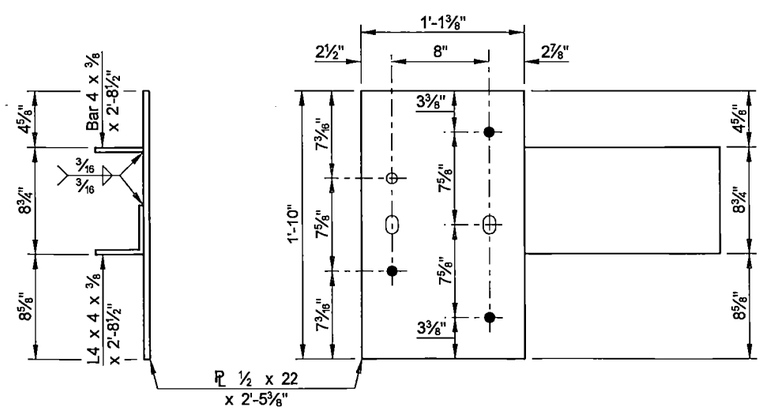


(L4 x 4 x ⅜)
B-B

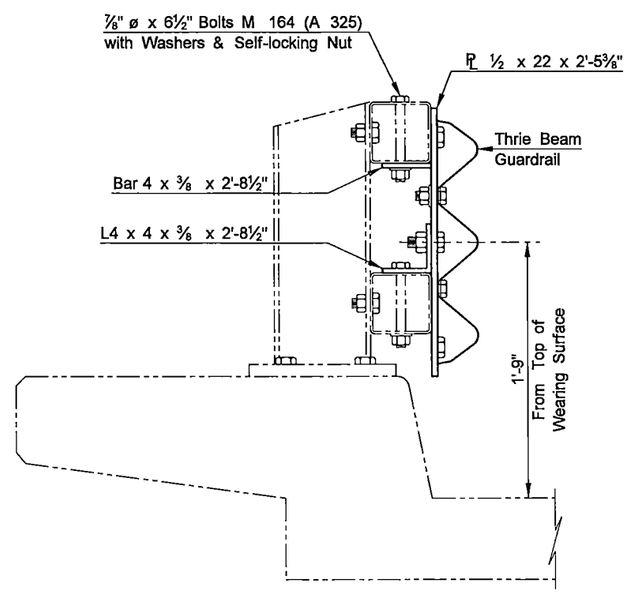
Saw cut along dashed line to remove portion of curb.



CURB CUTTING DETAIL



GUARDRAIL CONNECTION PLATE DETAILS



THRIE BEAM CONNECTION DETAIL

NOTE:

The bid item "Connection Plate Modification" includes saw cutting the curb, removing the existing connection plate, and supplying and installing the new plate.

This document was originally issued and sealed by Brian W. Raschke, Registration Number PE 4361, on 07/01/10 and the original document is stored at the North Dakota Department of Transportation

QUANTITIES	
CONNECTION PLATE MODIFICATION	4 EA

RICHARDTON-MOTT INTERCHANGE

CONNECTION PLATE MODIFICATION DETAILS

DESIGN DATA

(See Design Data)

JOB# 32

FHWA REGION	STATE	PROJECT NO.	SHEET NO.
8	ND	NH-5-008(018)064	1

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

IN STARK COUNTY

FEDERAL AID PROJECT NO NH-5-008(018)064

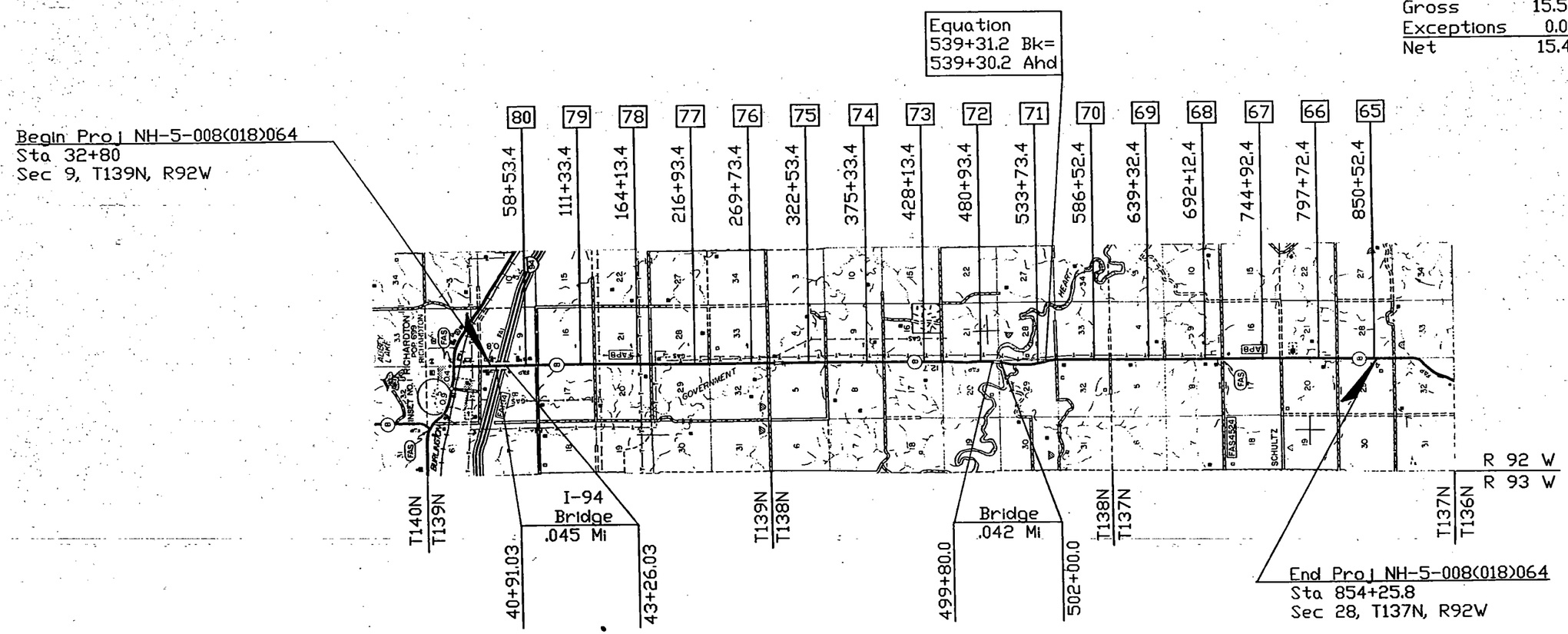
Milling, Hot Bituminous Pavement, and Incidentals

GOVERNING SPECIFICATIONS:

Standard Specifications adopted by the North Dakota Department of Transportation September 1992; Standard Drawings currently in effect; and other Contract Provisions submitted herein.

LENGTH OF PROJECT

Gross	15.558 Mi
Exceptions	0.087 Mi
Net	15.471 Mi



PAVING SECTION Brian Rosin

URBAN SECTION

TRAFFIC SECTION George H. Jonelle

RURAL SECTION

RECOMMEND APPROVAL 11-23 1994

DESIGN ENGINEER David K. D. Leer

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

APPROVED

DIVISION ADMINISTRATOR DATE

APPROVED DATE 11/23/94

Francis G. Ziegler

DIRECTOR OF HIGHWAYS AND ENGINEERING

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

FRANCIS G. ZIEGLER
REGISTERED
PROFESSIONAL
P.E. 1679
ENGINEER
NORTH DAKOTA

SYMBOLS

STATE & NATIONAL LINES
COUNTY LINE
TOWNSHIP & RANGE LINES
SECTION LINE
QUARTER SECTION LINE
SECTION CORNER
QUARTER SECTION CORNER
OLD RIGHT OF WAY LINE
NEW RIGHT OF WAY LINE
GRADE LINE
CENTERLINE OF CONSTRUCTION — 500
RAILROAD RIGHT OF WAY LINE
CITY OR VILLAGE CORPORATE LIMITS
PROPERTY LINE
EASEMENT LINE
FENCES
SNOW FENCE
DRAINAGE
WATERS EDGE
MARSH OR SWAMP
RIPRAP
DRAINAGE DITCH
APPROACH — 502 + 00
TRAVELED WAY
RAILROADS — PAUSE
GUARD RAIL
GUIDE POSTS
DELINEATORS
HEDGES AND TREES
INTERCHANGE
HIGHWAY GRADE SEPARATION - NO CONNECTION
OTHER BRIDGE
SERVICE ROAD
TERMINATED CROSS-ROAD

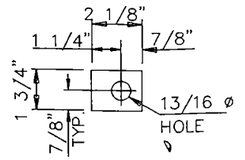
BUILDINGS
TELEGRAPH LINES
TELEPHONE LINES
POWER LINES
CULVERTS (In Place)
CULVERTS (Install)
CONCRETE BOX CULVERTS (Install)
BRIDGES (Install)
CONCRETE CURB
CONCRETE CURB AND GUTTER
CONCRETE WALK
CATCH BASIN (Existing)
CATCH BASIN (New)
MANHOLE (Existing)
MANHOLE (New)
CURB INLET (Existing)
CURB INLET (New)
GROUND MOUNTED SIGNS
OVERHEAD SIGNS
HYDRANT
LIGHT STANDARDS
TRAFFIC SIGNALS (Plan & Profile Sheets)
HIGH MAST LIGHTING ASSEMBLY
GROUND ELEVATION / GRADE — 1643.0 / 1641.0 / 245
CENTERLINE
SECTION LINE
DEFLECTION ANGLE (Delta)
SOD OR JUTE MESH
POLES TO BE MOVED
POLES TO BE LOWERED
CONCRETE FOUNDATION
CONDUIT
CONDUCTOR
CONCRETE PULL BOX
FEED POINT
250 WATT LIGHT STANDARDS
400 WATT LIGHT STANDARDS
700 WATT LIGHT STANDARDS
1000 WATT LIGHT STANDARDS
FLASHING BEACON
TRAFFIC SIGNAL - MAST ARM MOUNTED
TRAFFIC SIGNAL - POST MOUNTED
SIGNAL HEAD
PEDESTRIAN PUSHBUTTON POST
TRAFFIC SIGNAL CONTROLLER
FEED POINT - PAD MOUNTED

ABBREVIATIONS

Aggr	Aggregate
Ahd	Ahead
Alt	Alternate
Approx	Approximate or Approximately
Appr	Approach
Asph Cem or A C	Asphalt Cement
Asph Conc.	Asphaltic Concrete
Bit	Bituminous or Bitumen
Bk	Back
B M	Bench Mark
Bldg	Building
Br	Bridge
C A E.S.	Corrugated Aluminum End Section
C A P	Corrugated Aluminum Pipe
C B	Catch Basin
C & G	Curb and Gutter
Ch Blk	Channel Block
Ch Ch	Channel Change
C.I	Curb Inlet
C I P	Cast Iron Pipe
Cl	Class
C.S.E S	Corrugated Steel End Section
C.S.P.	Corrugated Steel Pipe
CMS	Cationic Medium Setting
Comp	Compression
Const	Construction
Conc	Concrete
Cont Reinf Conc Pvm't	Continuously Reinforced Concrete Pavement
Contn	Contraction
Crn	Crown
CRS	Cationic Rapid Setting
Crse	Course
C S	Curve to Spiral
C to C	Center to Center
C.Y	Cubic Yard
D	Degree of Curvature
D-Load	Dead Load
D.B	Ditch Block
Def	Deformed
Del	Deliver
D G	Ditch Grade
El or Elev	Elevation
Ellipt	Elliptical
Emb	Embankment
Equal.	Equalized
Engr	Engineer
Eq	Equation
E R	East Roadway
E S	End Section
Esmt	Easement
Exc	Excavation
Exp.	Expansion
F D	Field Drive
Found	Foundation
F P	Fence Post
Furn	Furnish
Ga	Gage or Gauge
Gr	Gravel
Grd	Graded
G V	Gate Valve
Hel	Helical
Hyd	Hydrant
Ident	Identification
Inchg	Interchange
I M	Iron Monument
Inst	Install
Inter	Intersection
Inv	Invert
Jt	Joint
L	Length of Curve
Lc	Length of Spiral
Levg	Leveling
L F	Linear or Lineal Foot
Liq	Liquid
Long	Longitudinal
L P	Light Pole
Lt	Left
"M"	One Thousand
Matl	Material
Max	Maximum
MC	Medium Curing
M H	Manhole
Min	Minimum

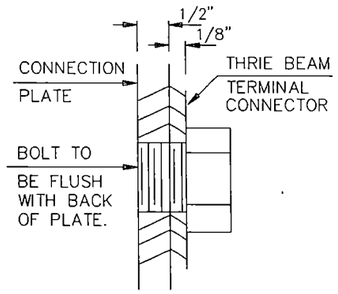
M L	Main Line
N R	North Roadway
Off Loc	Office Location
O to O	Out to Out
P & P	Plan and Profile
P C	Point of Curvature
P C C	Point of Compound Curve
P C C Pvm't	Portland Cement Concrete Pavement
P D	Private Drive
Pen	Penetration
Perf	Perforated
P I	Point of Intersection
P O C	Point on Curve
P O T	Point on Tangent
P P	Power Pole
P R C	Point of Reverse Curvature
Pref	Preformed
P S D	Passing Sight Distance
P T	Point of Tangency
P V C	Polyvinyl Chloride Sewer Pipe
Quant	Quantity or Quantities
R	Radius
R or Rge	Range
RC	Rapid Curing
R C E S	Reinforced Concrete End Section
R C P	Reinforced Concrete Pipe
R C P S	Reinforced Concrete Pipe Sewer
Rd	Road
Rdbd	Roadbed
Rdwy	Roadway
Refl	Reflectorized
R R	Railroad
Rt	Right
R/W	Right of Way
Salv	Salvage
San	Sanitary
S C	Spiral to Curve
SC	Slow Curing
Sc	Spiral Deflection Angle
S D	Sight Distance
S E	Superelevation
Sec	Section
Sec Line Appr	Section Line Approach
Sep	Separation
Serv	Service
Sgr Prep	Subgrade Preparation
Shldr	Shoulder
SP	Special Provision
S P P	Structural Plate Pipe
S P P A	Structural Plate Pipe Arch
S R	South Roadway
SS	Slow Setting or Supplement Specification
S S D	Stopping Sight Distance
S T	Spiral to Tangent
Sta.	Station
Std	Standard
Std. Specs	Standard Specifications
Struct	Structure
Surf	Surface or Surfacing
Surv	Survey
S W	Sidewalk
S Y	Square Yard
T	Tangent Length (circular curve)
T or Twp	Township
Tel	Telephone
Temp	Temporary
T P	Telephone Pole
Tr	Traffic
Trans	Transverse or Transition
Trtd	Treated
Ts	Tangent Length (curve with spirals)
T S	Tangent to Spiral
U S C & G S	United States Coast and Geodetic Survey
V C	Vertical Curve
V C P	Vitrified Clay Pipe
W M	Water Main
W M V	Water Main Valve
W R	West Roadway
Wrng	Wearing
W S V	Water Service Valve
X-Sec	Cross Section
Xc	Spiral Coordinate
Yc	Spiral Coordinate

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NH-5-008(018)064	36

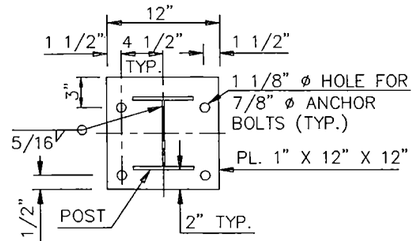


1/4" BAR AASHTO M-183 POSITION WASHERS TO COMPLETELY COVER SLOTTED HOLES

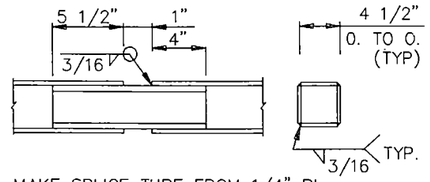
BAR WASHER "C"



DETAIL "B"

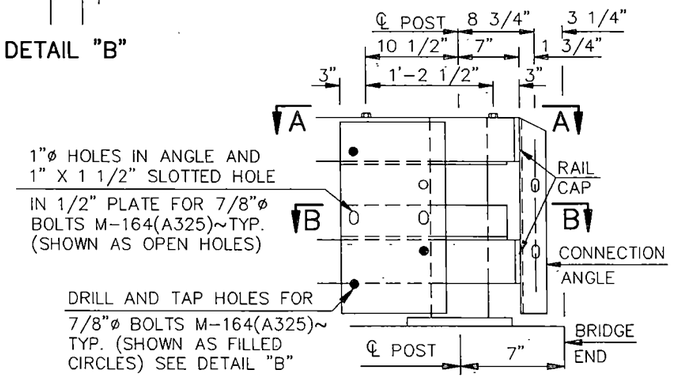


BASE PLATE DETAIL

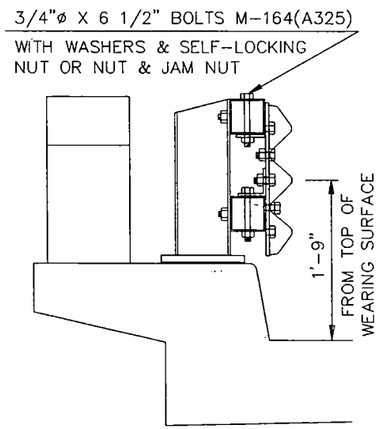


MAKE SPLICE TUBE FROM 1/4" PL. GRIND ALL EDGES PRIOR TO GAVANIZING TO ASSURE PROPER FIT.

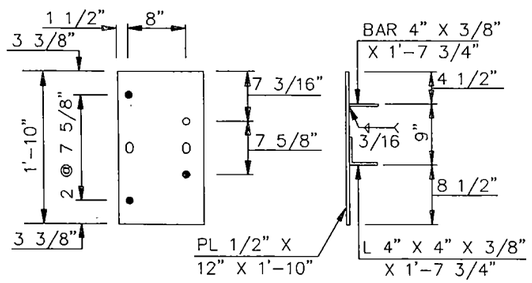
RAIL SPLICE DETAIL



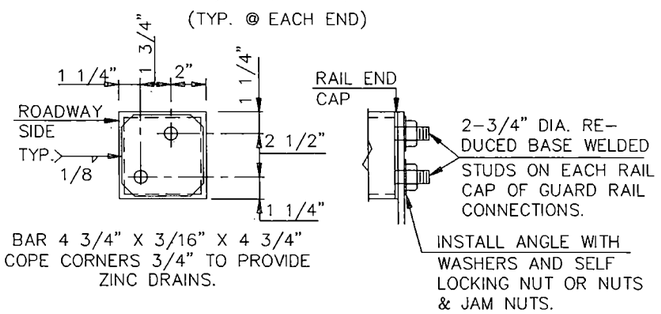
DETAIL "A"
(TYP. @ EACH END)



GUARDRAIL CONNECTION DETAILS



GUARDRAIL CONNECTION PLATES
(4 REQUIRED)



RAIL CAP DETAIL

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 A 500 GRADE B.

STEEL POSTS, PLATES, BARS & 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 TO BE NORMAL TO GRADE.

PAYMENT FOR THE RAILING SHALL INCLUDE COMPENSATION FOR FURNISHING AND INSTALLING THE GUARDRAIL CONNECTION PLATES.

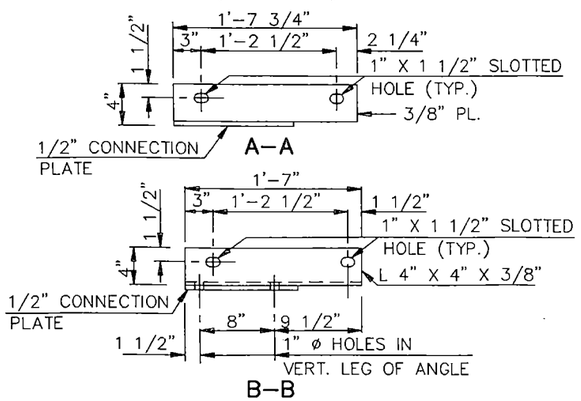
ALL STRUCTURAL STEEL INCLUDING FASTENERS SHALL BE HOT-DIP GALVANIZED AFTER FABRICATION ACCORDING TO AASHTO M111.

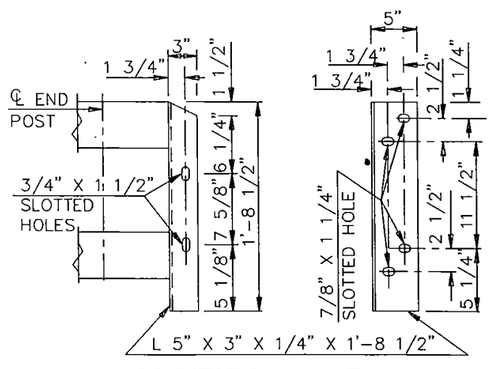
THE ANCHOR BOLTS MUST BE ABLE TO DEVELOP IN TENSION THE EQUIVALENT OF A AASHTO M-164 (A325) 7/8"ø BOLT (18,250 LBS). THE ANCHOR BOLTS MAY BE MECHANICAL TYPE, GROUT-IN TYPE OR OTHER TYPE THAT CAN DEVELOP THE REQUIRED TENSION IN THE CONCRETE.

ALL ANCHOR AND SPLICE BOLTS SHALL BE GALVANIZED AND WILL BE AASHTO M-164 (A325).

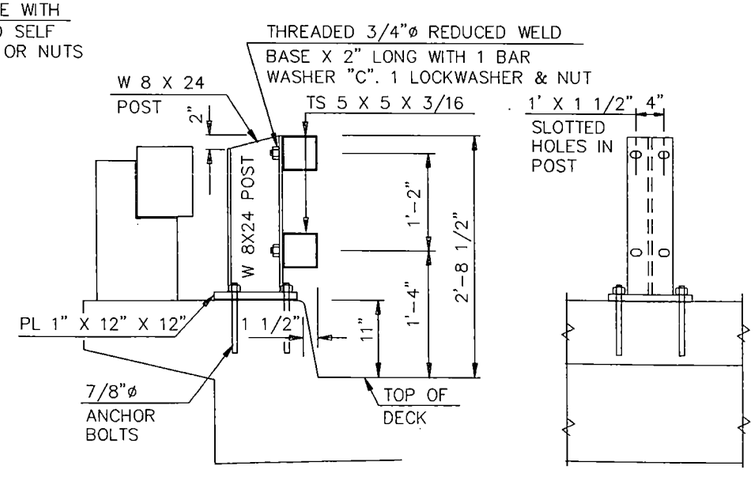
THE CONTRACTOR SHALL SUBMIT THE SHOP DRAWINGS FOR DOUBLE BOX BEAM RAIL FOR APPROVAL BY THE BRIDGE ENGINEER BEFORE FABRICATION.

RAILS SHALL BE FABRICATED SO THAT EACH RAIL SEGMENT BETWEEN SPLICES IS ATTACHED TO A MINIMUM OF TWO POSTS.





CONNECTION ANGLE



CURB MOUNT POST DETAILS

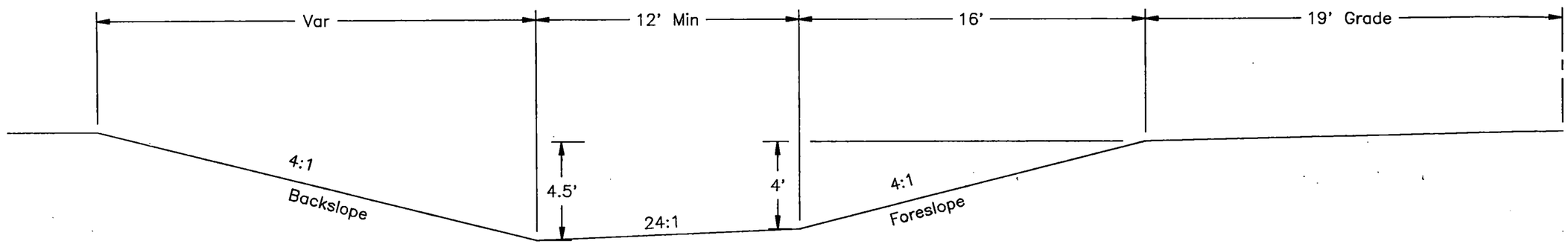
QUANTITIES
SEE DRWG. NO. 94-084.885-2

RICHARDTON INTERCHANGE

RAIL RETROFIT DETAILS

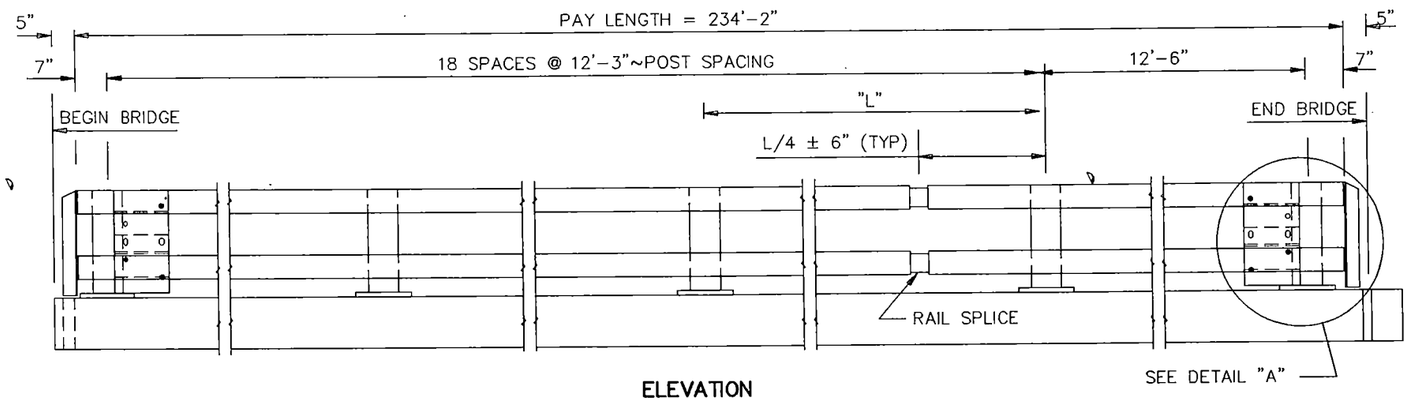
FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NH-5-008(018)064	35

TYPICAL DITCH SECTION

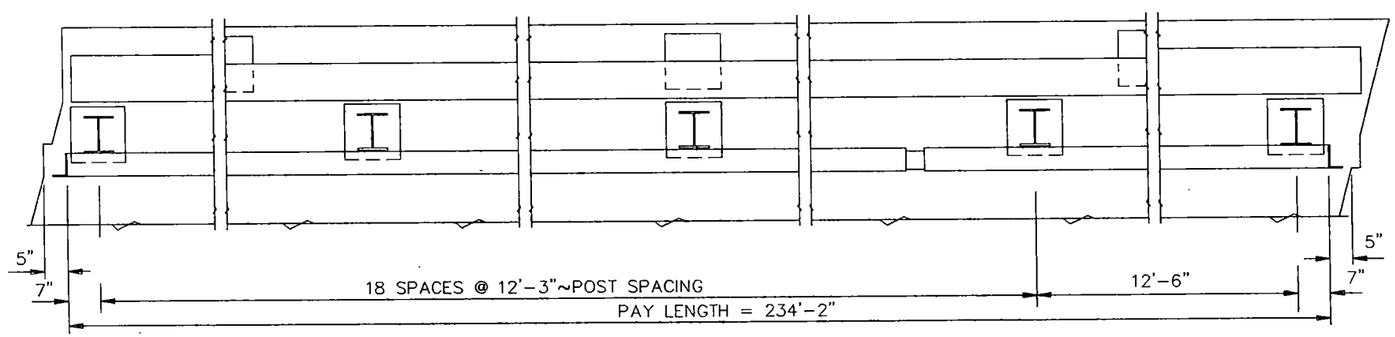


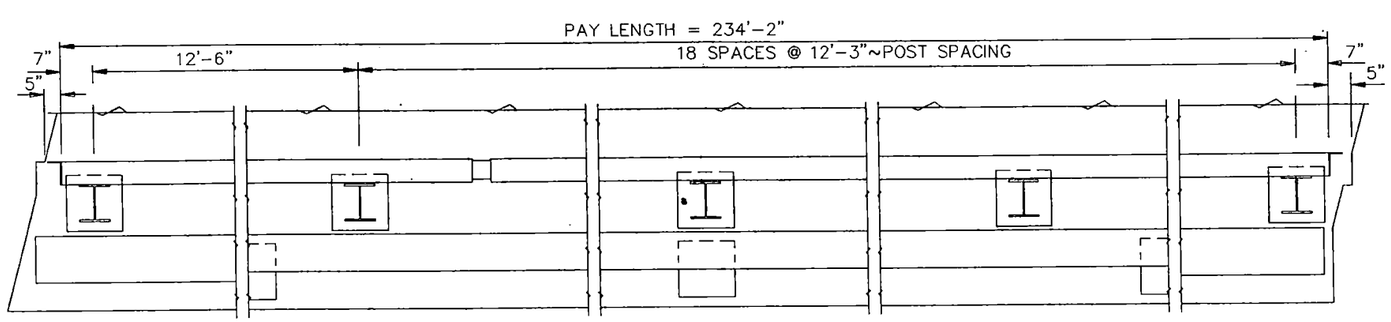
94BR138 P5'

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NH-5-008(018)064	37



ELEVATION





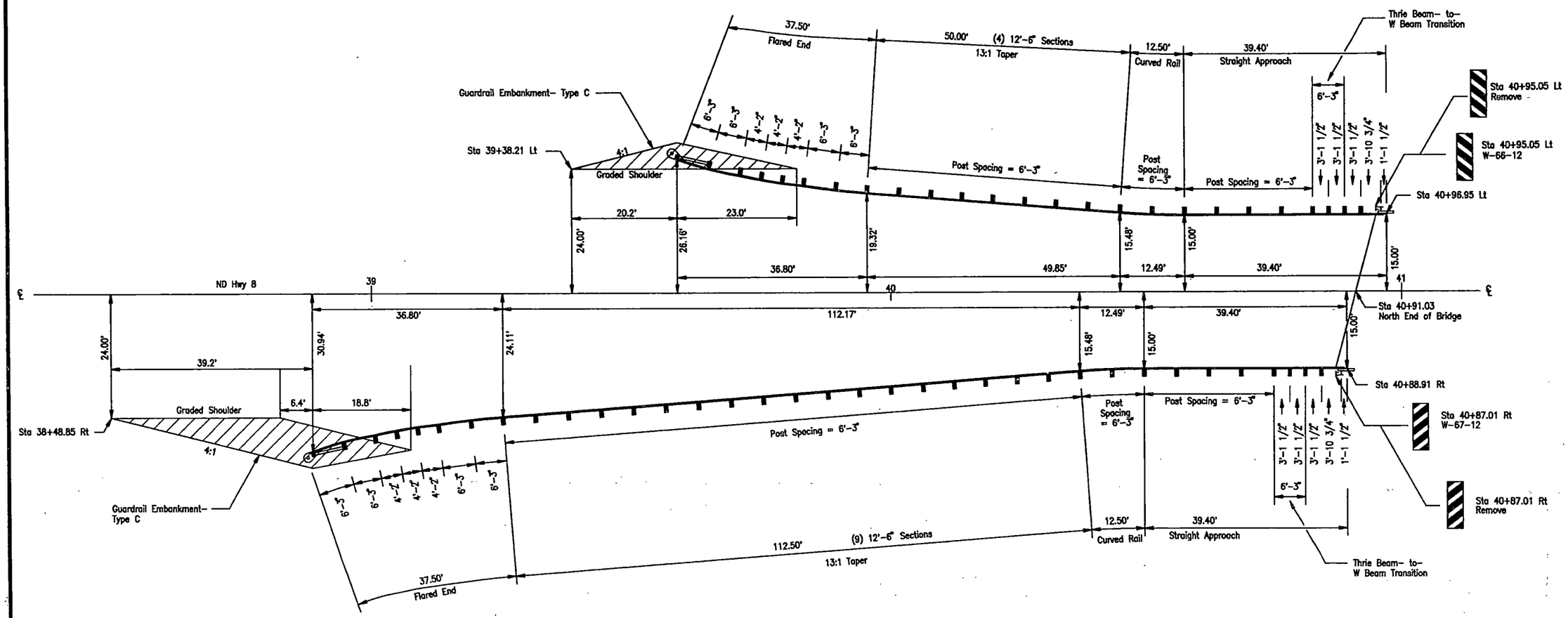
PLAN

QUANTITIES		
DOUBLE BOX BEAM RAIL RETROFIT (FREE STANDING)	468.3	L.FT.

RICHARDTON INTERCHANGE

RAIL RETROFIT DETAILS

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NH-5-008(018)064	38



HAZARD MARKERS- TYPE III

Sta 40+95.05 Lt	1 EA
Sta 40+87.01 Rt	1 EA
Total	2 EA

W-BEAM GUARDRAIL

Guardrail Layout
Bridge 094-084.885 (North End)
ND Hwy 8
Stark Co. ND

N80 1"=20' Disk T

FED. ROAD DIV. NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
8	N. D.	I-94-3(6) 84	1	107

NORTH DAKOTA
STATE HIGHWAY DEPARTMENT

PLANS

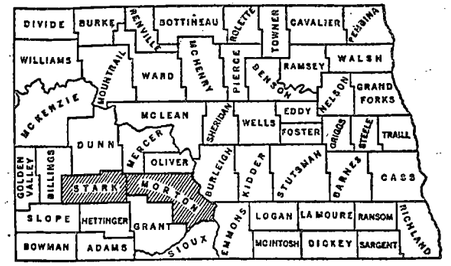
FOR THE PROPOSED IMPROVEMENT OF A

STATE HIGHWAY

IN STARK COUNTY

FEDERAL AID PROJECT NO. I-94-3(6)84

STRUCTURAL



SKETCH-MAP OF NORTH DAKOTA
SHOWING COUNTIES

SCALES
- LAYOUT SHEET: 1 IN. = 5280'
- PLAN AND PROFILE DRAWINGS: HOR. 1 IN. = 100 FT. VERT. 1 IN. = 10 FT.
- STRUCTURAL DRAWINGS:- AS SHOWN
- CROSS SECTION SHEETS:- 1 IN. = 10 FT.

INDEX OF DRAWINGS

SHEET NO. 1	TITLE PAGE	
SHEET NO. 1	SUMMARY OF QUANTITIES	
SHEET NO. 2&3	TYPICAL SECTIONS	
SHEETS NO. 4	TO 17 INCL.	PLAN AND PROFILE DRAWINGS & INTER. LAYOUTS
SHEETS NO. 18	TO 51 INCL.	STRUCTURAL DRAWINGS
SHEETS NO. 52	TO 58 INCL.	SOIL PROFILE
SHEETS NO. 59	TO 107 INCL.	CROSS SECTIONS

SHEET NO. 2A-2B-36-37-38-46-50-56-57-58-64 to 79-95-96-99-100-101-102-114 to 122-125 to 132-165-166-167-168-169-171 172-173-176 from I-94-3(2)
7-8 from S-363(18)

LENGTH OF PROJECT		
PROJECT	MILES-GROSS	MILES-NET
I-94-3(6)	7.356	0.0
TOTALS	7.356	0.0

LIST OF STRUCTURAL DRAWINGS

94-37	H-5117	H-5109	H-1356
94-37-1	H-5118	H-5110	H-5112
H-0311	H-5119	H-5111	94-39
H-1284	H-0501	H-5113	94-39-1
H-1358	94-37.5	H-5114	H-1283
H-0401	94-37.5-1	94-38	H-5105
H-5115	H-1286	94-38-1	H-5106
H-5116	H-1357	H-1285	H-5107
		H-1355	H-5108

LIST OF STANDARDS

Bridge Bench Marks Std. 7.6
Standard Signs Std. 14.1A
Federal Aid Name Plate Std. 14.9

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 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
GRADE
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

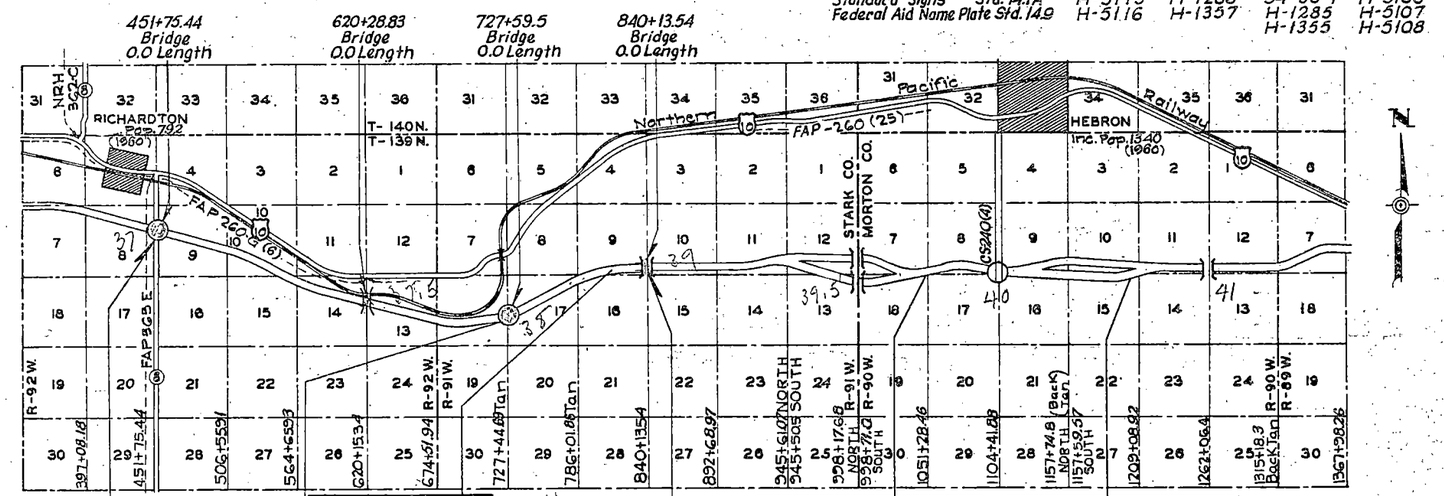
LEGEND

INTERCHANGE
HIGHWAY GRADE SEPARATION-NO CONNECTION
SERVICE ROAD
TERMINATED CROSS ROAD

DESIGN DATA

TRAFFIC	AVERAGE DAILY	EST. 30TH MAX. HR.
CURRENT TRAFFIC (1961)	1870 PASS. 330 TRUCKS	2200 TOTAL 330
TRAFFIC FORECAST (1981)	4500 PASS. 800 TRUCKS	5300 TOTAL 800

DESIGN SPEED 70 MPH
TRAFFIC CLASSIFICATION "M"
MINIMUM SIGHT DISTANCE (NON PASSING) 600'
FULL CONTROL OF ACCESS
No point of access, other than by ramps at interchanges.
DESIGN LOADING H20-S16 (1957)
CLEAR ROADWAY WIDTH 451+75.44 30'-0"
DESIGN LOADING H15 (1957)
CLEAR ROADWAY WIDTH 620+28.83 24'-0"
727+59.50 24'-0"
840+13.54 24'-0"

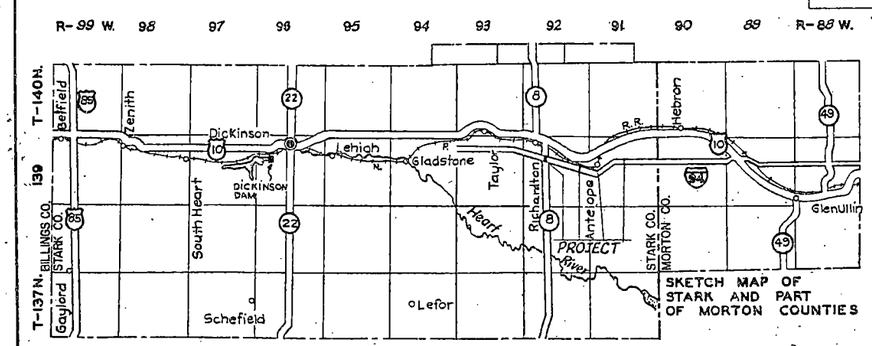


Change Order No. 1
April 28, 1961
Revised Sheets No. 1-8-9-10-11-13-16-17-39-82-83-84-85-86-87-88-89-90-97-98

① See Special Provisions

APPROVED DATE 2-17-61

CHIEF ENGINEER
NORTH DAKOTA STATE HIGHWAY DEPARTMENT



SKETCH MAP OF STARK AND PART OF MORTON COUNTIES

QUANTITIES

LOCATION	13X ROADWAY EXCAVATION CLASS "A"	WATER	15B EXCAVATION CLASS-2	22B SELECT BACKFILL	60AA CLASS AA-1 CONCRETE	60A CLASS AE-1½ CONCRETE	62A REINFORC'G. STEEL INTERMEDIATE GRADE	63A STRUCTURAL STEEL	65B TREATED TIMBER PILING 25'	30'	35'	50'	65C STEEL PILING 12BP53 40'	12BP53 50'	65L TREATED TIMBER TEST PILES 40'		BRIDGE BENCH MARKS	84 TEMPORARY CROSSING AND DETOUR LUMPSUM
	CU. YD.	"M" GAL.	C.Y.	C.Y.	C.Y.	C.Y.	LB.	LB.	L.F.	L.F.	L.F.	L.F.	L.F.	L.F.	NO.		SET	STA.
451 + 75.44	36.600	366	510	73	11.92	35.89	77.686	125.436						500			1	451+75.44
620 + 28.83	40.500	405	340	64	11.92	29.96	65.873	88.415					320				1	620+28.83
727 + 59.50	28.200	282	290	60	11.92	28.30	62.431	88.415	759		462				3		1	727+59.50
840 + 13.54	20.700	207	310	66	11.39	27.19	59.992	85.000	506	504		336			3		1	840+13.54
GRAND TOTAL	126.000	1.260	1.450	263	47.15	121.34	265.982	387.266	1265	504	462	336	320	500	6		4	4 Lump Sum
	① SP 33A SP 49B	① SP 42				① SP 50			① SP 151									① SP 32A

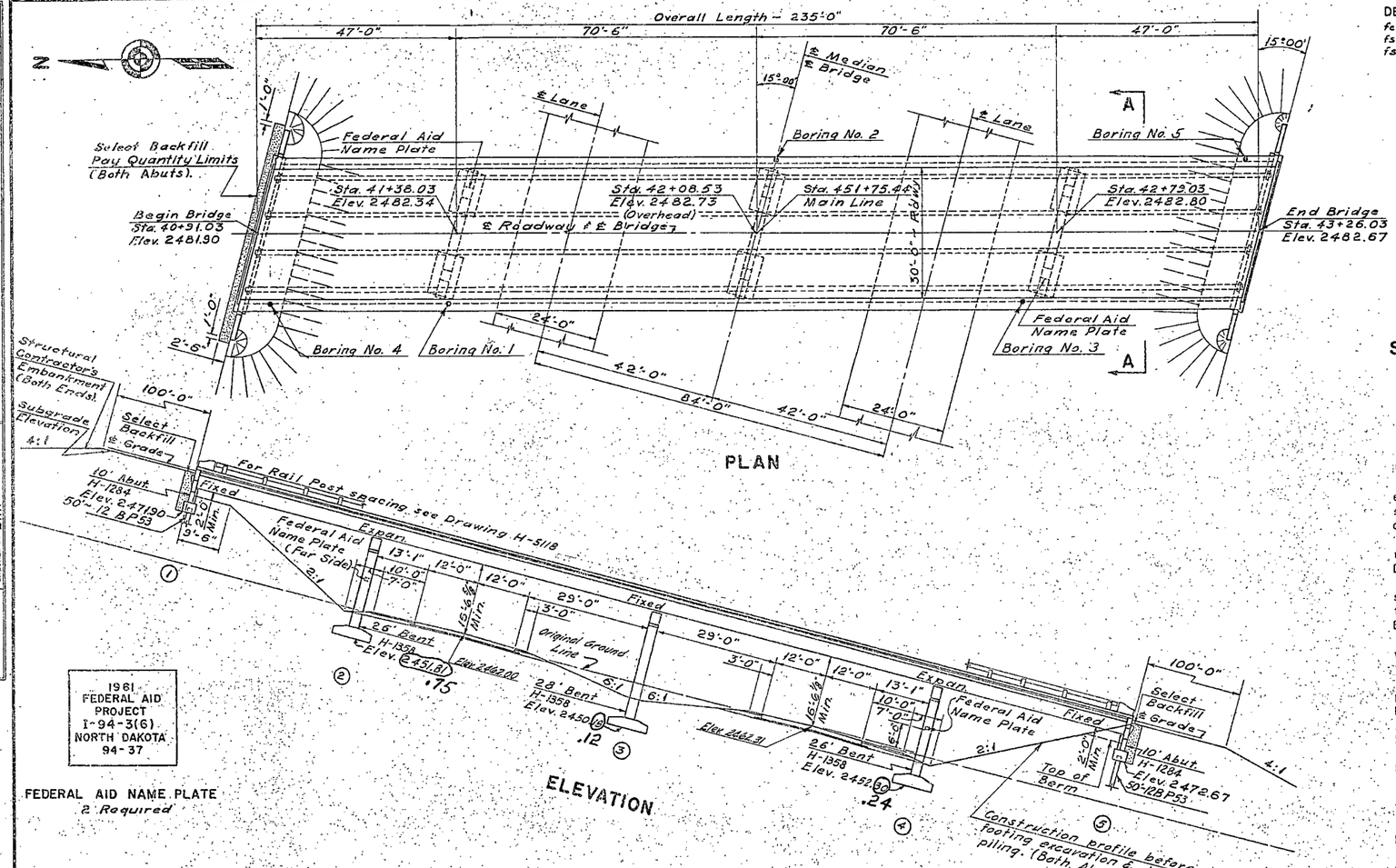
DEPARTMENT OF COMMERCE
BUREAU OF PUBLIC ROADS

APPROVED:

DIVISION ENGINEER DATE

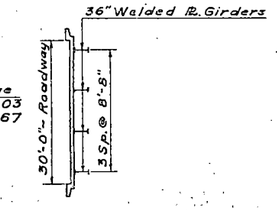
I-94-3(6)84

BRIDGE CODE	FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR.	SHEET NO.	TOTAL SHEETS
X-731	5	N. D.	I-94-3(6)		18	107

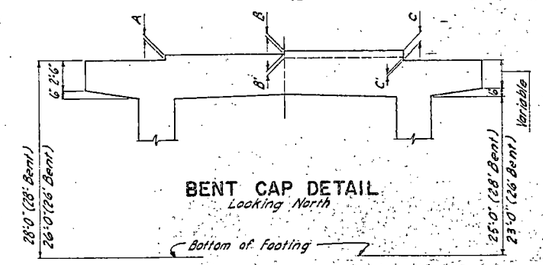


PLAN

DESIGN STRESSES:
fc = 1200 psi.
fs = 20,000 psi. (Reinforcing Steel).
fs = 18,000 psi. (Structural Steel).



SEC. A-A



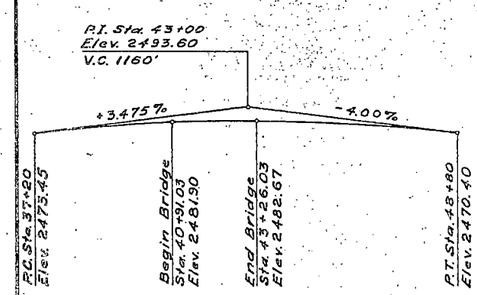
BENT CAP DETAIL
Looking North

	A	B	C	B'	C'
Bent No. 2	2 5/16"	1/4"	1 15/16"	—	—
Bent No. 3	2 5/16"	1/8"	2 1/16"	—	—
Bent No. 4	2 3/16"	—	—	1/8"	2 3/16"

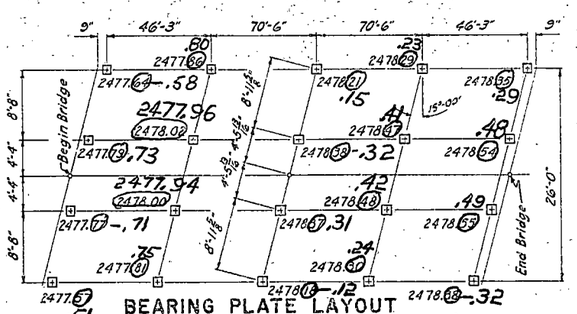
ELEVATION

1961
FEDERAL AID
PROJECT
I-94-3(6)
NORTH DAKOTA
94-37

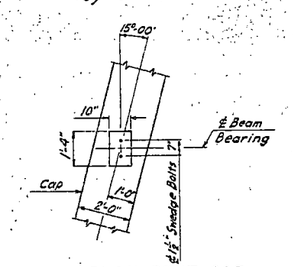
FEDERAL AID NAME PLATE
2 Required



VERTICAL CURVE DATA
Elevations are to top of Finished Roadway



BEARING PLATE LAYOUT
Elevations are to top of Concrete



PART PLAN-BENT CAP
Showing Masonry Plate Location

NOTES:
GENERAL:
The cost of furnishing and placing joint filler, asphalt curb seal, name plates, end post pipe sleeves and other miscellaneous items shall be included in the price bid for Class AE-1½ Concrete.
Dead load deflections and vertical curve corrections have been accounted for in the Shop Camber Diagram on Sheet H-5119.
Welding will not be paid for directly but shall be included in the unit price bid for Structural Steel.
EMBANKMENT:
Earth consolidations shall be in accordance with Section 17.3(a)4 of the Standard Specifications using "Extra Compaction".
The abutment select backfill shall not be placed above the berm until the superstructure deck has been placed.
Embankment material shall be obtained from the Highway Right-of-Way as staked by the Engineer between Sta. 451 + CO and Sta. 465 + CO.
EXCAVATION:
Excavation Class 2 shall extend from the bottom of the abutment footing to subgrade elevation and from the bottom of the bent footing to the finished roadway section.
REINFORCING STEEL: (Intermediate Grade)
Dimensions for bent bars 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 concrete shall be beveled with 3/4" triangular molding, unless otherwise noted.
The "Rubbed Surface Finish" will be required for the roadway and outside faces of curbs, edges of slab, all faces of rails, intermediate and end posts, the exposed faces of the abutment wing wall, and all exposed surfaces of bents. All other surfaces shall be given the "Ordinary Surface Finish".
All concrete shall be Class AE-1½, except railings which are Class AAE-1, and shall be compacted by vibration.
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

ESTIMATE OF QUANTITIES (ONE BRIDGE)

SP'L. PROV.	SPEC. NO.	BID ITEM		
	12	REMOVING EXISTING STRUCTURE AT STA.	—	
	15A	EXCAVATION CLASS 1	—	CU. YD.
	15B	" CLASS 2	510	CU. YD.
	15C	" CLASS 3	—	CU. YD.
49B 33A	13X	ROADWAY EXCAVATION "CLASS A"	36,600	CU. YD.
	60AA	CONCRETE CLASS AAE-1	11.92	CU. YD.
50	60A	" CLASS AE-1½	358.9	CU. YD.
	22B	SELECT BACKFILL	73	CU. YD.
	62A	REINFORCING STEEL (INTERMEDIATE GRADE)	77,686	LB.
	63A	STRUCTURAL STEEL	125,436	LB.
	64A	UNTREATED TIMBER	—	M.B.M.
	64B	TREATED TIMBER	—	M.B.M.
	65A	UNTREATED TIMBER PILING	—	LIN. FT.
	65B	TREATED TIMBER PILING	—	LIN. FT.
15T	65C	STEEL PILING (12 BP53) 10 @ 50'	500	LIN. FT.
	65K	UNTREATED TIMBER TEST PILES	—	EACH
	65L	TREATED TIMBER TEST PILES	—	EACH
42		WATER FOR COMPACTION (10 GAL./CU. YD.)	366	M. GAL.
32A	84	TEMPORARY CROSSING AND DETOUR (STA. 451+75.44)		LUMP SUM
		BRIDGE BENCH MARKS		1 SET

BENCH MARKS

NO.	DESCRIPTION	LOCATION	ELEV.
1	I.P. & F.P. Grd.	Sta. 453+00 – 300' Rt.	2464.44
2	" " " "	Sta. 463+00 – 300' Rt.	2470.97
3	" " " "	Sta. 473+00 – 300' Rt.	2495.86

PILE LOADING

LOCATION	DEAD LOAD	LIVE LOAD	EARTH	WIND 50 LB.	WIND 15 LB.	WIND 100 LB. L.L.	LONG. FORCE	DESIGN LOAD	MAXIMUM REQUIRED BEARING	MINIMUM * PENETRATION
Abutment	23.5 T	8.3 T	3.4 T					35.2 T	46 T	25'
Pier	2.6 K/L.F.	1.0 K/L.F.	0.6 K/L.F.					4.2 K/L.F.		

* Below Bottom of Footing in ft.

STRUCTURAL DRAWINGS

GENERAL DRAWING	THIS SHEET (94-37), 94-37-1, H-0311
SUBSTRUCTURE	H-1284, H-1358, H-0401, ST'D. 14.9
SUPERSTRUCTURE	H-5115, H-5116, H-5117, H-5118, H-5119, H-0501, ST'D. 7.6

DESIGN LOADING	SCALE
$H_{20}S_{16}$ (1957)	1 INCH = 15 FEET

NORTH DAKOTA
STATE HIGHWAY DEPARTMENT

RICHARDTON-MOTT INTERCHANGE
BRIDGE LAYOUT

PROJECT I-94-3(6) STA. 451+75.44

STARK COUNTY

APPROVED
2-10-61 DATE
Joseph R. Kirby BRIDGE ENGINEER

JOSEPH R. KIRBY REGISTERED PROFESSIONAL ENGINEER NORTH DAKOTA

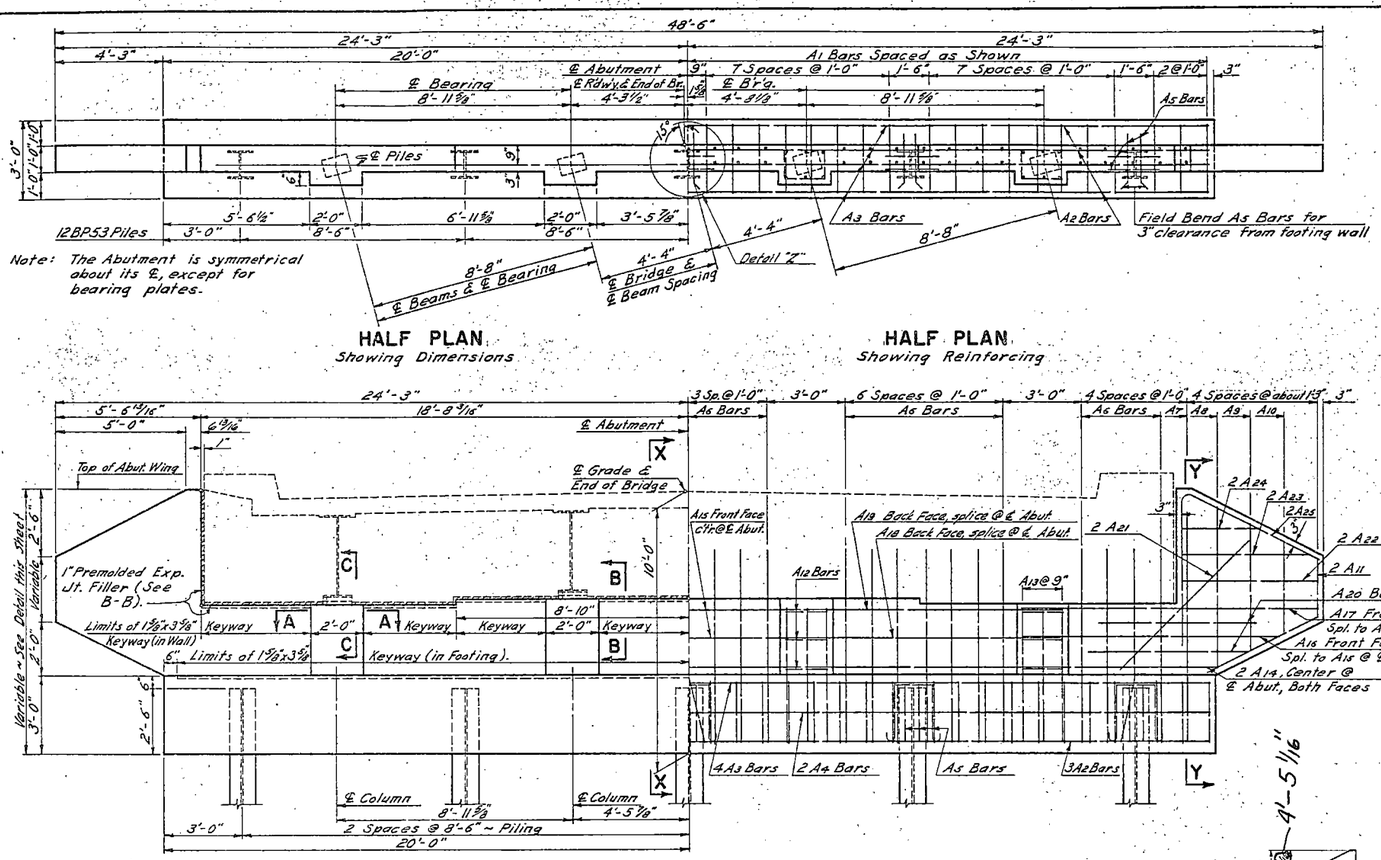
94-37

94-37

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TO SHEETS
5	N.D.	~~(24-3(2))~~		21	10

BAR LIST ~ ONE ABUT.

MARK.	NO.	SIZE	LENGTH	SHAPE
A1	38	4	10'-4"	Bent
A2	3	8	39'-6"	Str.
A3	4	6	39'-6"	"
A4	2	4	39'-6"	"
A5	20	4	7'-0"	Bent
A6	29	5	12'-8"	"
A7	2	6	18'-0"	"
A8	2	4	12'-8"	"
A9	2	4	10'-0"	"
A10	2	4	7'-6"	"
A11	4	4	6'-10"	"
A12	12	4	6'-4"	"
A13	24	6	5'-0"	Str.
A14	2	4	40'-0"	"
A15	2	4	28'-8"	"
A16	2	4	10'-0"	"
A17	2	4	11'-6"	"
A18	2	4	23'-3"	"
A19	2	4	25'-0"	"
A20	4	6	6'-0"	"
A21	4	6	7'-0"	"
A22	4	4	5'-2"	"
A23	4	4	4'-10"	"
A24	4	4	3'-0"	"
A25	4	6	11'-4"	Bent



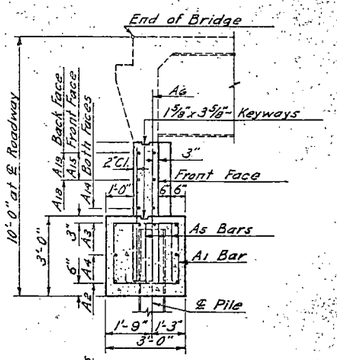
Note: The Abutment is symmetrical about its ℄, except for bearing plates.

HALF PLAN
Showing Dimensions

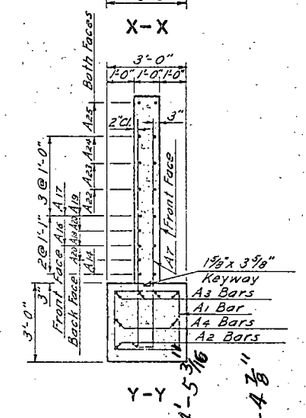
HALF PLAN
Showing Reinforcing

HALF ELEVATION
Showing Dimensions

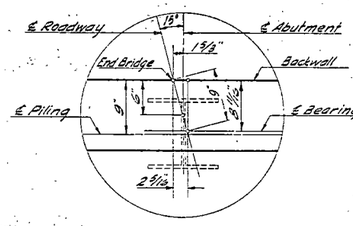
HALF ELEVATION
Showing Reinforcing



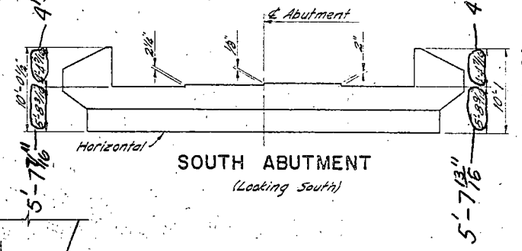
X-X



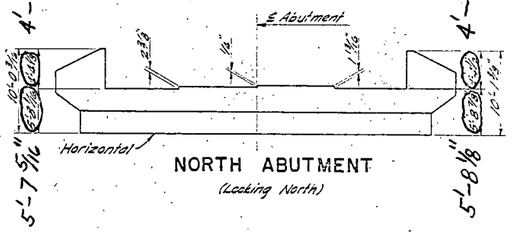
Y-Y



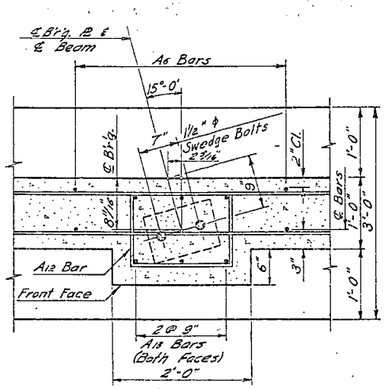
DETAIL "Z"



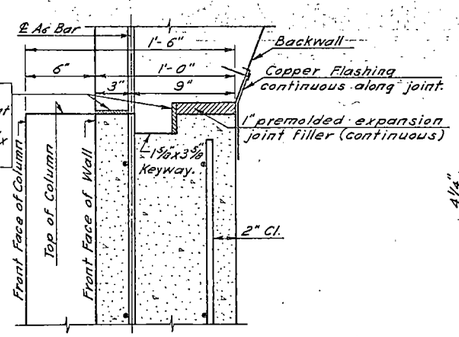
SOUTH ABUTMENT
(Looking South)



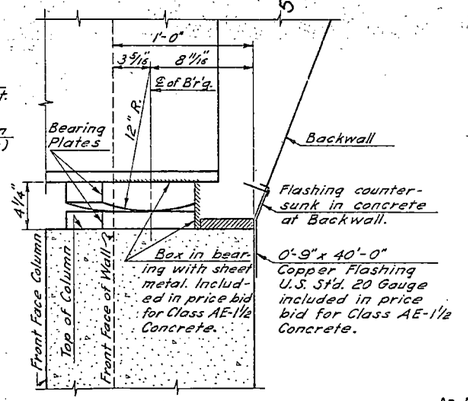
NORTH ABUTMENT
(Looking North)



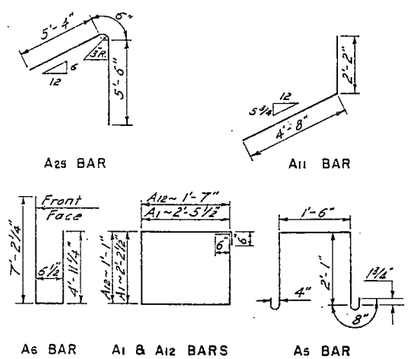
A-A



B-B



C-C
Through Column



BENT BAR DETAILS

QUANTITIES (ONE ABUT.)

Concrete Class AE-1 1/2	19.7 C
Reinforcing Steel	2055
Piling (See Layout)	
Excavation (See Layout)	

10 FT. ABUTMENT
FOR STEEL BEAM SPA.
FIXED END
15°-0' SKEW
30 FT. ROADWAY
H20-S16 LOADING

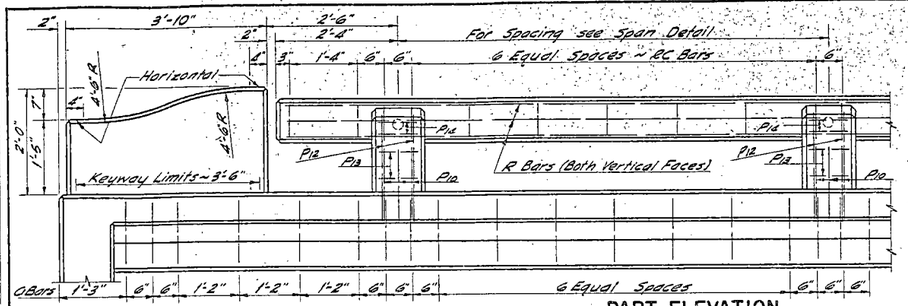
PILING BEARING (H20-S16)	
LOADS / SPANS	44'-3", 70'-6"
DL) LOAD	.5 T.
EARTH	3.4 T.
LIVE LOAD	8.3 T.
DESIGN LOAD	35.2 T.

	MADE BY	CHKD BY	DATE
REVISIONS			

	MADE BY	CHECKED BY
DESIGN	T.H.P.	M.E.W.
DETAILS	M.E.W.	H.P.R.
TRACING	M.E.W.	T.H.P.
QUANTITIES	T.H.P.	R.P.L.

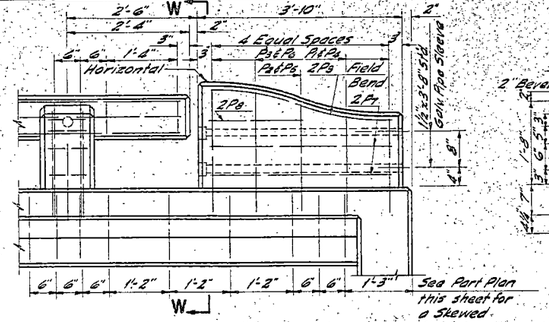
H-1284

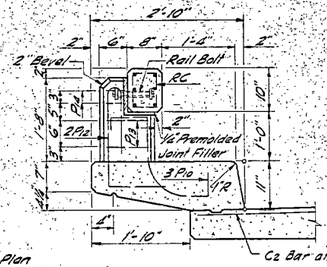
FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	N.D.	BM-3(CO)		26	107



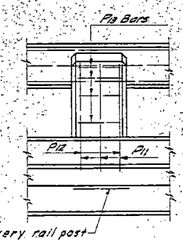
PART ELEVATION

Showing Dimensions & Reinforcing.
This detail is for a right bridge. See Detail "X", "Y" & "Part Plan" for a skewed bridge.



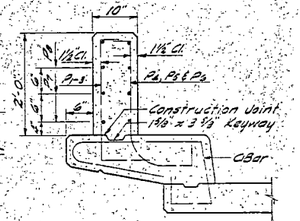


TYPICAL SECTION

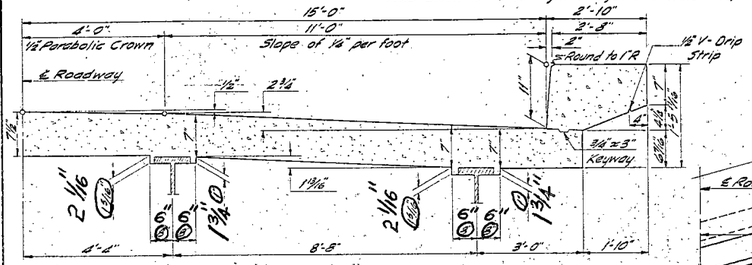


ANCHOR POST DETAIL

See Layout for Placement.



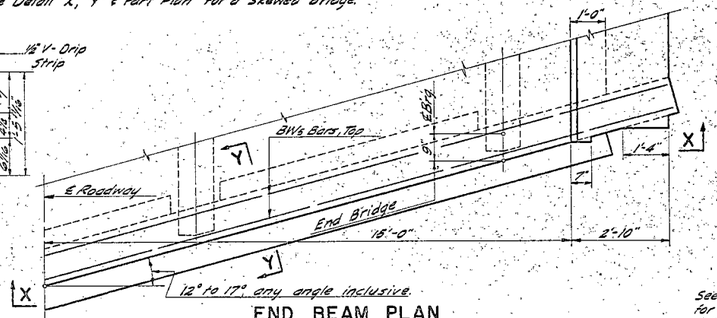
W-W



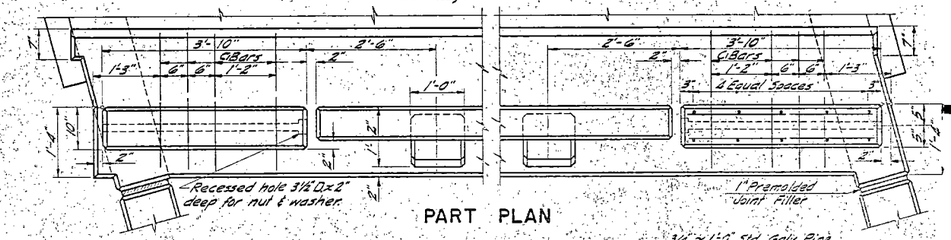
HALF SECTION OF SLAB

Showing Dimensions

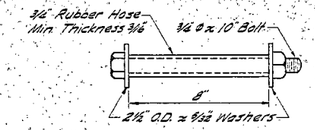
The slab will be so placed that the roadway surface conforms to the crown and elevation shown on these plans. Any extra concrete that might be required in the slab because of irregularities in the beam camber shall be placed by the contractor at his own expense.



END BEAM PLAN

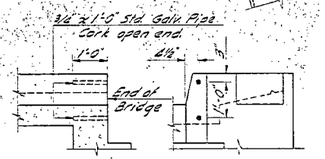


PART PLAN

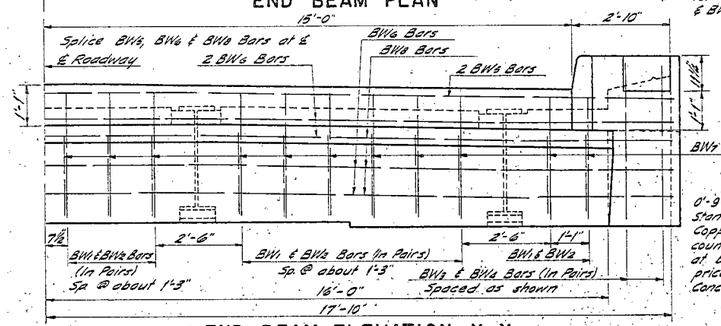


RAIL BOLT

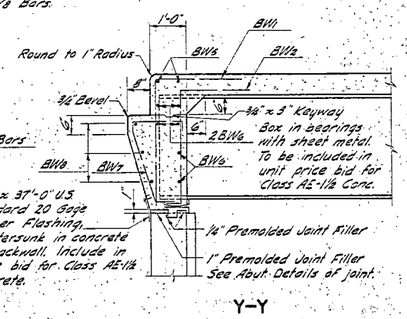
(Galvanized)
To be included in the unit price bid for Class AE-1 1/2 Concrete.



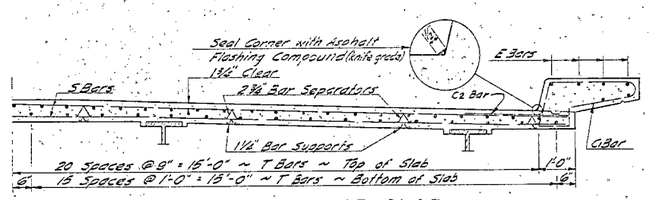
CURB SLEEVE DETAILS



END BEAM ELEVATION X-X

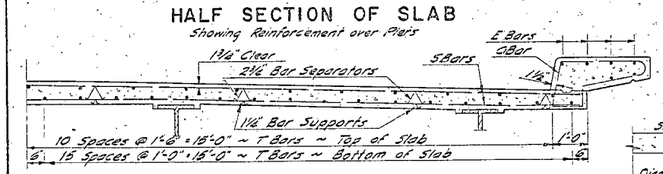


Y-Y



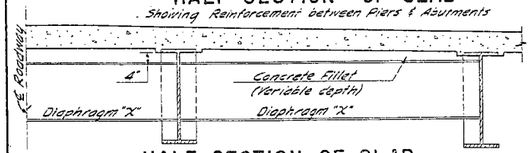
HALF SECTION OF SLAB

Showing Reinforcement over Piers



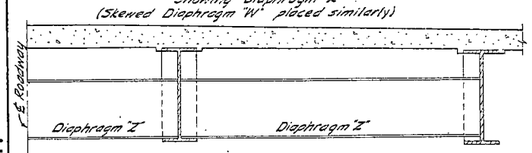
HALF SECTION OF SLAB

Showing Reinforcement between Piers & Abutments



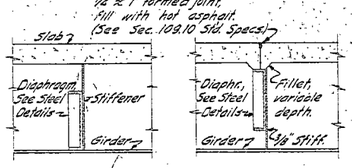
HALF SECTION OF SLAB

Showing Diaphragm "X"
(Skewed Diaphragm "W" placed similarly)



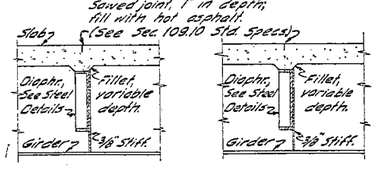
HALF SECTION OF SLAB

Showing Diaphragm "Z"
(Skewed Diaphragms "V" and "Y" placed similarly)



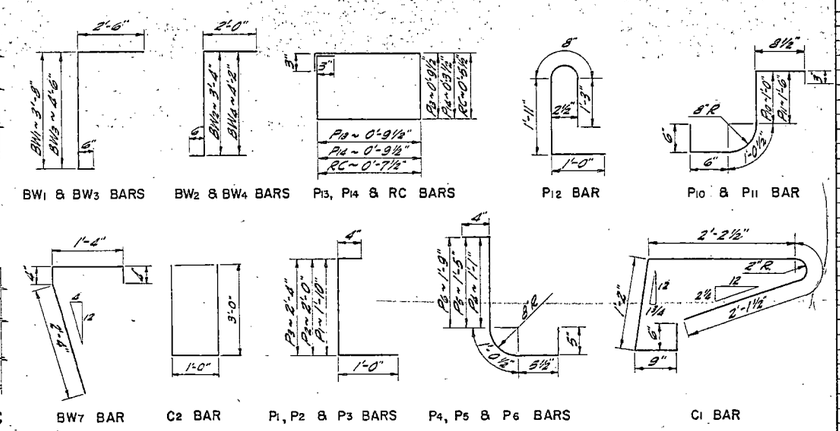
SECTION A-A SECTION C-C

Continuous & Multiple Pours
Diaphragm "Z", Diaphragms "V" and "Y" Similar.
Multiple Pours
Diaphragm "X"



SECTION B-B SECTION C-C

Continuous & Multiple Pours
Diaphragm "W"
at ℄ Roadway only.
Continuous Pours
Diaphragm "X"



BENT BAR DETAILS

BAR LIST

MARK	NO.	SIZE	LENGTH	SHAPE
BW1	44	4	6'-8"	Bent
BW2	44	4	5'-10"	"
BW3	8	4	7'-6"	"
BW4	8	4	6'-8"	"
BW5	8	4	13'-6"	Str.
BW6	24	5	19'-3"	"
BW7	44	4	4'-6"	Bent
BW8	12	5	17'-8"	Str.
C1	496	5	6'-9"	Bent
C2	54	5	7'-0"	"
E	82	5	35'-4"	Str.
P1	8	5	3'-2"	Bent
P2	4	5	3'-4"	"
P3	8	5	3'-8"	"
P4	8	5	3'-4"	"
P5	4	5	3'-8"	"
P6	8	5	4'-0"	"
P7	16	4	3'-6"	Str.
P8	8	4	1'-9"	"
P9	8	5	3'-9"	"
P10	156	5	4'-0"	Bent
P11	6	5	4'-6"	"
P12	108	5	4'-10"	"
P13	112	3	3'-8"	"
P14	104	3	2'-8"	"
R1	8	5	39'-3"	Str.
R2	68	5	38'-3"	"
R3	8	5	32'-3"	"
RC	376	3	2'-8"	Bent
S	942	5	31'-6"	Str.
T1	371	4	35'-0"	Str.
T2	60	4	28'-0"	"

NOTE:

All concrete above top of curb shall be Class AE-1 except concrete end posts.

"Rough Surface Finish" will be required for the roadway faces of curb, the outside vertical faces of curb and slab, and all faces of rails, intermediate and end p. All other surfaces shall be given "Ordinary Surface Finish".

End Beams shall be poured and allowed to set at least 48 hours before the slab is poured.

Legs of bar supports shall be galvanized.

See Drawings:
Steel Layout Sheet.
H-5118 for Slab Details.
H-5116 for Steel Details.
H-5115 for Girder Details.

QUANTITIES

See Drawing H-5118 and Steel Layout Drawing.

SUPERSTRUCTURE
FOUR SPAN COMPOSI
CONTINUOUS WELDED GIR
ANGLE OF SKEW (12° TO 17° INCLUS
OVERALL LENGTH 235'-
H20 S16 LOADING
30' ROADWAY

DESIGN	MADE BY		CHECKED BY	
DETAILS	MADE BY		CHECKED BY	
TRACING	MADE BY		CHECKED BY	
QUANTITIES	MADE BY		CHECKED BY	

REVISIONS

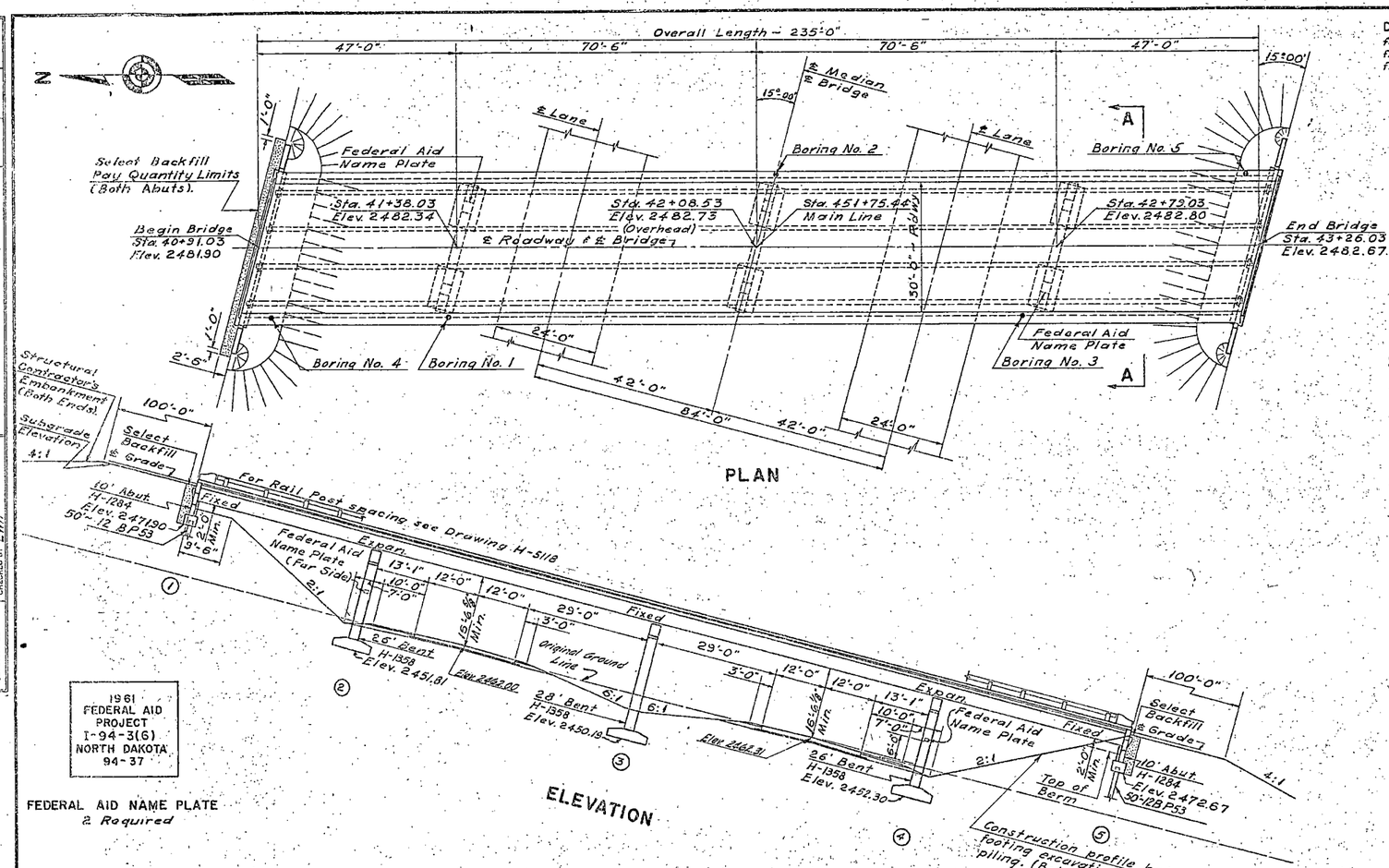
DATE	CHK'D BY	MADE BY

H-5117

H-5117

94-37

BRIDGE CODE	FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
X-731	5	N. D.	I-94-3(6)		18	107



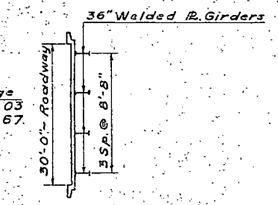
PLAN

ELEVATION

1961
FEDERAL AID
PROJECT
I-94-3(6)
NORTH DAKOTA
94-37

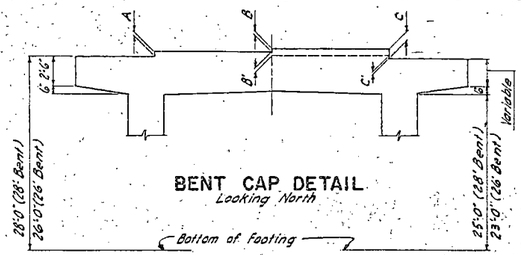
FEDERAL AID NAME PLATE
2 Required

DESIGN STRESSES:
f_c = 1200 psi.
f_s = 20,000 psi. (Reinforcing Steel).
f_s = 18,000 psi. (Structural Steel).



SEC. A-A

	A	B	C	B'	C'
Bent No. 2	2 5/16"	1/4"	1 15/16"	—	—
Bent No. 3	2 5/16"	1/8"	2 1/16"	—	—
Bent No. 4	2 3/16"	—	—	1/8"	2 3/16"



BENT CAP DETAIL
Looking North

NOTES:
GENERAL:

The cost of furnishing and placing joint filler, asphalt curb seal, name plates, end post pipe sleeves and other miscellaneous items shall be included in the price bid for Class AE-1½ Concrete.

Dead load deflections and vertical curve corrections have been accounted for in the Shop Camber Diagram on Sheet H-5119.

Welding will not be paid for directly but shall be included in the unit price bid for Structural Steel.

EMBANKMENT:

Earth consolidations shall be in accordance with Section 17.3(a)4 of the Standard Specifications using "Extra Compaction".

The abutment select backfill shall not be placed above the berm until the superstructure deck has been placed.

Embankment material shall be obtained from the Highway Right-of-Way as staked by the Engineer between Sta. 451 + 00 and Sta. 465 + 00.

EXCAVATION:

Excavation Class 2 shall extend from the bottom of the abutment footing to subgrade elevation and from the bottom of the bent footing to the finished roadway section.

REINFORCING STEEL: (Intermediate Grade)

Dimensions for bent bars 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 concrete shall be beveled with 3/4" triangular molding, unless otherwise noted.

The "Rubbed Surface Finish" will be required for the roadway and outside faces of curbs, edges of slab, all faces of rails, intermediate and end posts, the exposed faces of the abutment wing wall, and all exposed surfaces of bents. All other surfaces shall be given the "Ordinary Surface Finish".

All concrete shall be Class AE-1½, except railings which are Class AAE-1, and shall be compacted by vibration.

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

ESTIMATE OF QUANTITIES (ONE BRIDGE)

SP'L. PROV.	SPEC. NO.	BID ITEM			
	12	REMOVING EXISTING STRUCTURE AT STA.			
	16A	EXCAVATION CLASS 1			CU. YD.
	15B	" CLASS 2	464.6	510	CU. YD.
	15C	" CLASS 3			CU. YD.
49B 33A	13X	ROADWAY EXCAVATION "CLASS A"	~~36,880~~		CU. YD.
	60AA	CONCRETE CLASS AAE-1		11.92	CU. YD.
50	60A	" CLASS AE-1½		358.9	CU. YD.
	22B	SELECT BACKFILL	123.6	73	CU. YD.
	62A	REINFORCING STEEL (INTERMEDIATE GRADE)		77,686	LB.
	63A	STRUCTURAL STEEL	124,977	125,436	LB.
	64A	UNTREATED TIMBER			M.B.M.
	64B	TREATED TIMBER			M.B.M.
	65A	UNTREATED TIMBER PILING			LIN. FT.
	65B	TREATED TIMBER PILING			LIN. FT.
151	65C	STEEL PILING (12BP53) 10@50'		500	LIN. FT.
	65K	UNTREATED TIMBER TEST PILES			EACH
	65L	TREATED TIMBER TEST PILES			EACH
42		WATER FOR COMPACTION (10 GAL./CU. YD.)	~~366~~		M. GAL.
32A	84	TEMPORARY CROSSING AND DETOUR (STA. 451+75.44)	~~LUMP SUM~~		
		BRIDGE BENCH MARKS			1 SET

STRUCTURAL DRAWINGS

GENERAL DRAWING THIS SHEET (94-37), 94-37-1, H-0311
SUBSTRUCTURE H-1284, H-1358, H-0401, ST'D. 14.9
SUPERSTRUCTURE K-5115, H-5116, H-5117, H-5118, H-5119, H-0501, ST'D. 7.6

DESIGN LOADING	SCALE
$H_{20}S_{16}$ (1957)	1 INCH = 15 FEET

NORTH DAKOTA
STATE HIGHWAY DEPARTMENT

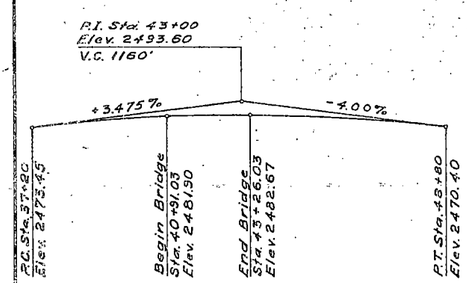
RICHARDTON-MOTT INTERCHANGE
BRIDGE LAYOUT

PROJECT I-94-3(6) STA. 451+75.44

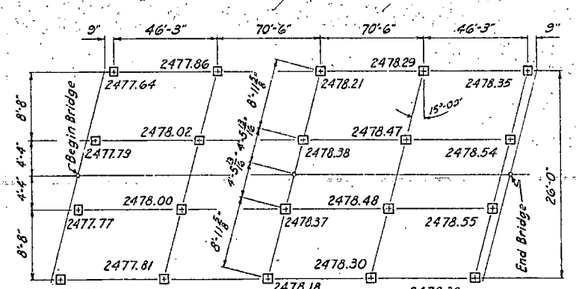
STARK COUNTY

APPROVED
2-10-61 DATE
Joseph R. Kirby
BRIDGE ENGINEER

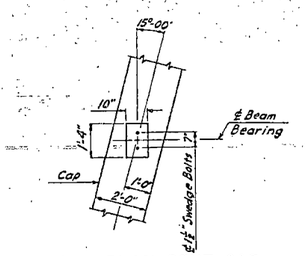
JOSEPH R. KIRBY REGISTERED PROFESSIONAL ENGINEER NORTH DAKOTA NO.



VERTICAL CURVE DATA
Elevations are to top of Finished Roadway



BEARING PLATE LAYOUT
Elevations are to top of Concrete



PART PLAN-BENT CAP
Showing Masonry Plate Location

BENCH MARKS

NO.	DESCRIPTION	LOCATION	ELEV.
1	I.P. & F.P. Grd.	Sta. 453+00 – 300' Rt.	2464.44
2	" " " "	Sta. 463+00 – 300' Rt.	2470.97
3	" " " "	Sta. 473+00 – 300' Rt.	2495.86

PILE LOADING

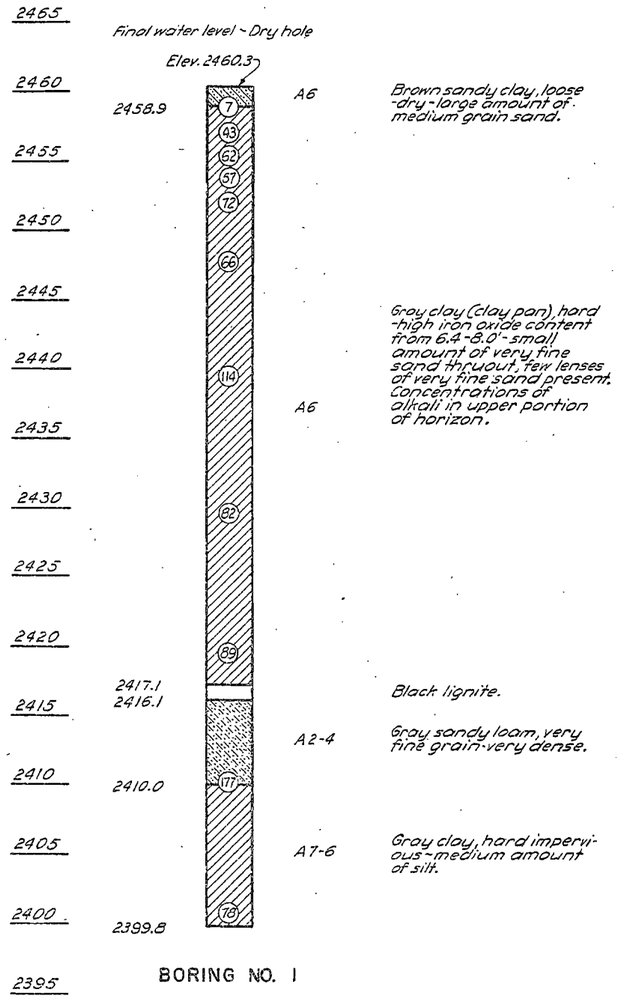
LOCATION	DEAD LOAD	LIVE LOAD	EARTH	WIND 50 LB.	WIND 15 LB.	WIND 100 LB. L.L.	LONG. FORCE	DESIGN LOAD	MAXIMUM REQUIRED BEARING	MINIMUM * PENETRATION
Abutment	23.5 T	8.3 T	3.4 T					35.2 T	46 T	25'
Pier	2.6 K/s.f.	1.0 K/s.f.	0.6 K/s.f.					4.2 K/s.f.		

* Below Bottom of Footing in ft.

94-37

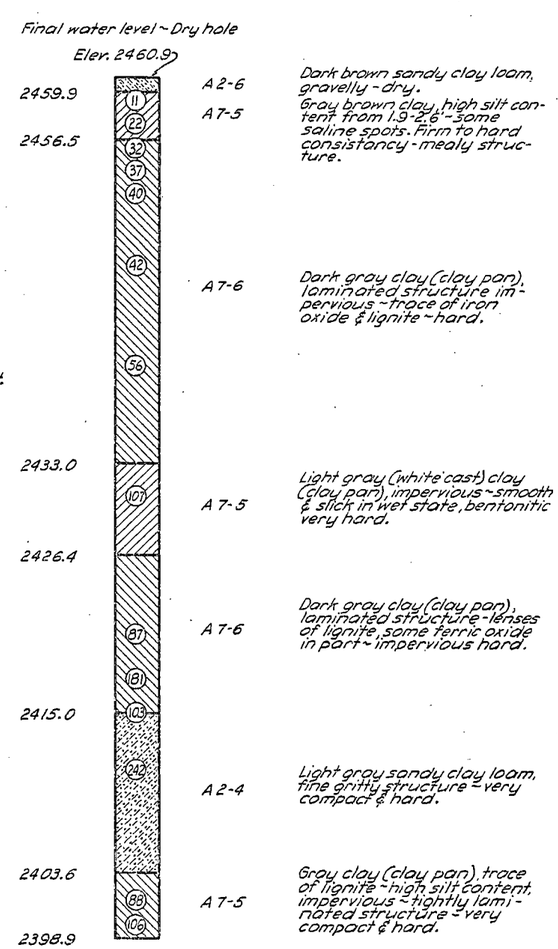
94-37

Made By: R.M.S.



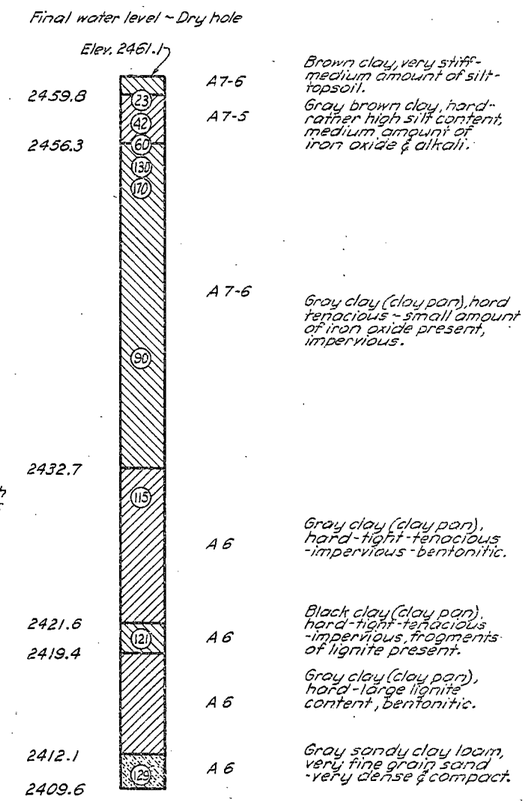
BORING NO. 1

Sta. 41+36 ~ 16' Rt. ℄.



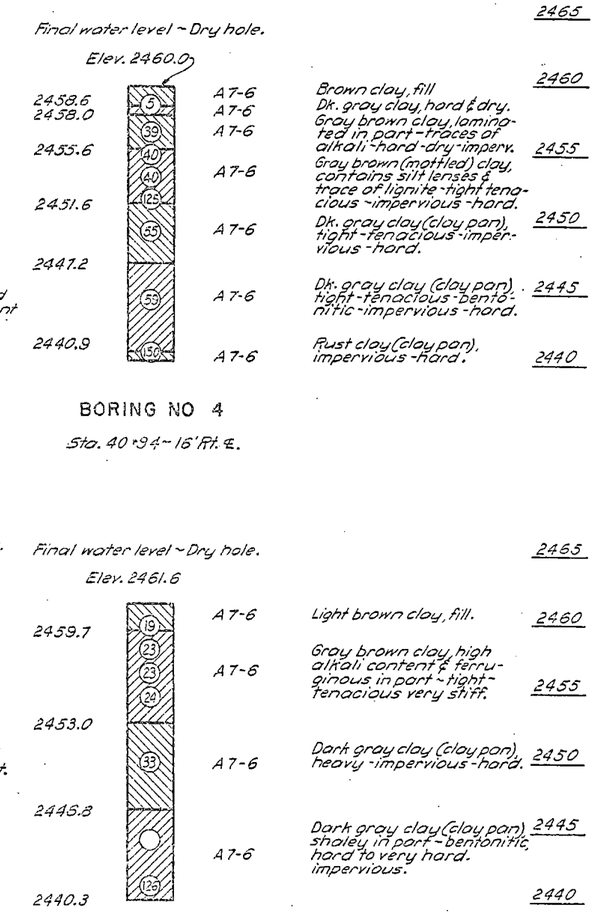
BORING NO. 2

Sta. 451+93 ~ On ℄. Median



BORING NO. 3

Sta. 42+71 ~ 16' Rt. ℄.



BORING NO. 4

Sta. 40+94 ~ 16' Rt. ℄.

BORING NO. 5

Sta. 43+23 ~ 17' Lt. ℄.

NOTES:

Encircled numbers indicate the number of blows delivered by a 140 lb. hammer from a height of 30" to drive core tube 1'-0".

The boring log data shown is for design purposes only. The State assumes no responsibility if soil conditions encountered during construction differ from these shown.

BRIDGE NO. 94-37

BORING LOG

I-94-3(6)

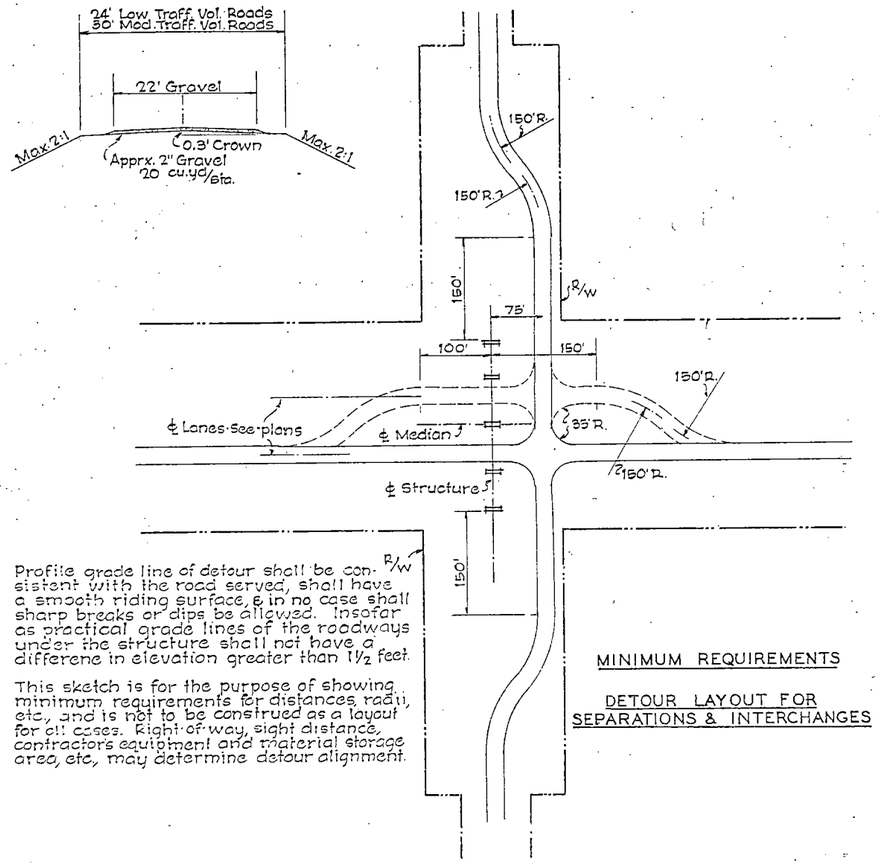
STARK COUNTY

94-37-1

94-37-1

FED. ROAD DIV. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	N. D.	I-94-3 (6)		20	107

I-94-3(7) 21 86



Profile grade line of detour shall be consistent with the road served, shall have a smooth riding surface, & in no case shall sharp breaks or dips be allowed. Insofar as practical grade lines of the roadways under the structure shall not have a differene in elevation greater than 1½ feet.

This sketch is for the purpose of showing minimum requirements for distances, radii, etc., and is not to be construed as a layout for all cases. Right-of-way, sight distance, contractor's equipment and material storage area, etc., may determine detour alignment.

MINIMUM REQUIREMENTS

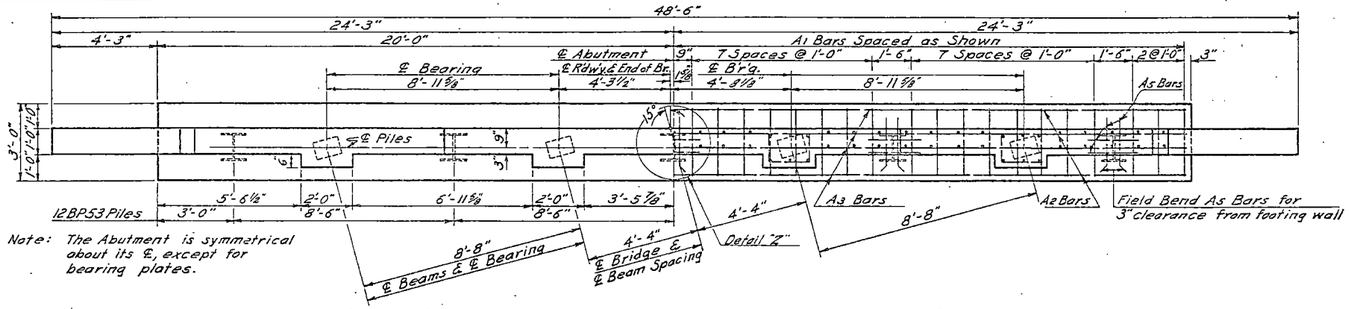
DETOUR LAYOUT FOR SEPARATIONS & INTERCHANGES

DETOUR LAYOUT

H-0311

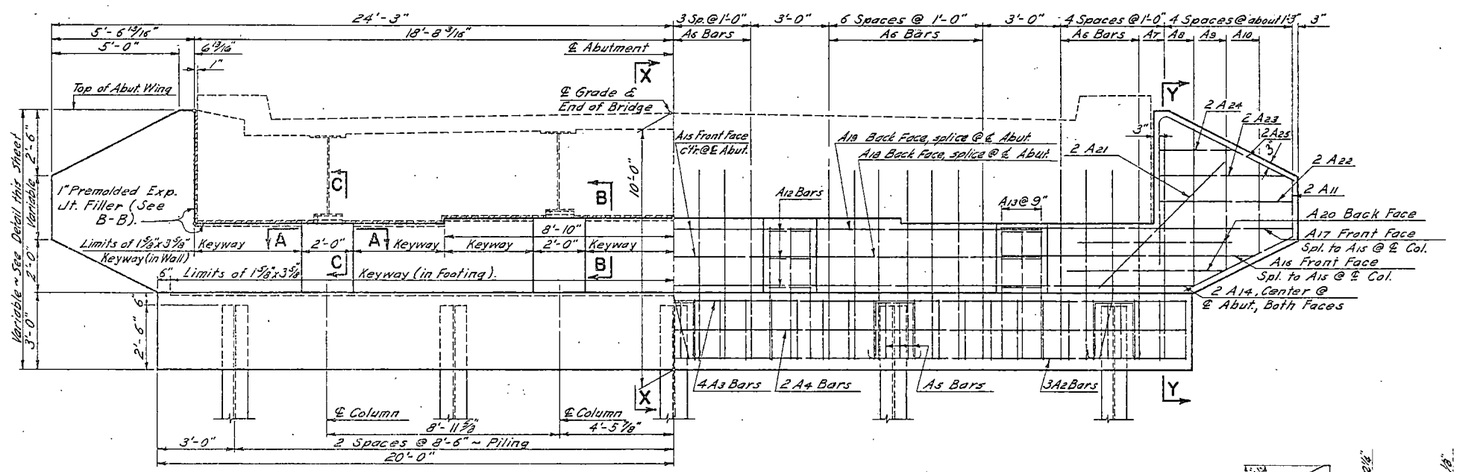
H-0311

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	N.D.	[illegible]		21	107



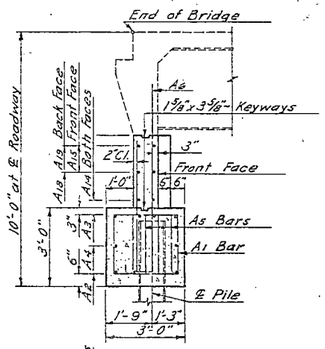
Note: The Abutment is symmetrical about its ℄, except for bearing plates.

HALF PLAN
Showing Dimensions

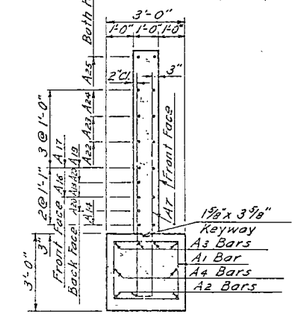


HALF ELEVATION
Showing Dimensions

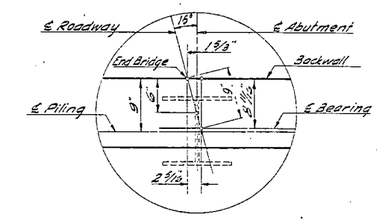
HALF ELEVATION
Showing Reinforcing



X-X

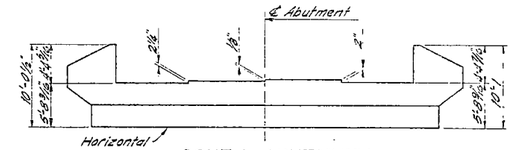


Y-Y

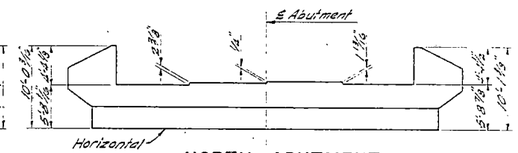


DETAIL "Z"

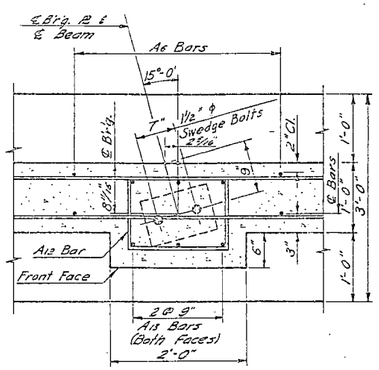
BAR LIST ~ ONE ABUT.				
MARK	NO.	SIZE	LENGTH	SHAPE
A1	38	4	10'-4"	Bent
A2	3	8	39'-5"	Str.
A3	4	6	39'-6"	"
A4	2	4	39'-6"	"
A5	20	4	7'-0"	Bent
A6	29	5	12'-8"	"
A7	2	6	19'-0"	"
A8	2	4	12'-8"	"
A9	2	4	10'-0"	"
A10	2	4	7'-6"	"
A11	4	4	6'-10"	"
A12	12	4	6'-4"	"
A13	24	6	5'-0"	Str.
A14	2	4	40'-0"	"
A15	2	4	28'-8"	"
A16	2	4	10'-0"	"
A17	2	4	11'-6"	"
A18	2	4	23'-3"	"
A19	2	4	25'-0"	"
A20	4	6	6'-0"	"
A21	4	6	7'-0"	"
A22	4	4	5'-2"	"
A23	4	4	4'-10"	"
A24	4	4	3'-0"	"
A25	4	6	11'-4"	Bent



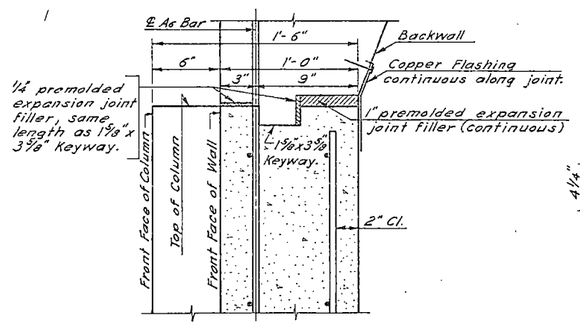
SOUTH ABUTMENT
(Looking South)



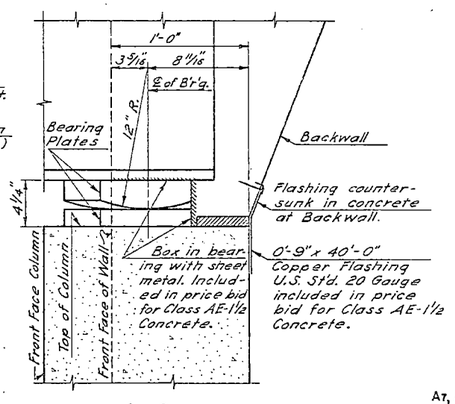
NORTH ABUTMENT
(Looking North)



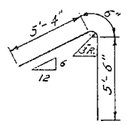
A-A



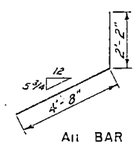
B-B



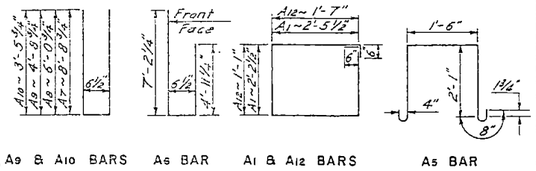
C-C
Through Column



A25 BAR



A11 BAR



A7, A8, A9 & A10 BARS A6 BAR A1 & A12 BARS A5 BAR

BENT BAR DETAILS

QUANTITIES (ONE ABUT.)		
Concrete Class AE-1 1/2	19.7	C.Y.
Reinforcing Steel	2055	Lbs.
Piling (See Layout)		
Excavation (See Layout)		

10 FT. ABUTMENT
FOR STEEL BEAM SPANS
FIXED END
15°-0' SKEW
30 FT. ROADWAY
H20-S16 LOADING

REVISIONS	MADE BY	CHKD BY	DATE

DESIGN	MADE BY	T.H.R.
	CHECKED BY	M.E.W.
DETAILS	MADE BY	T.H.R.
	CHECKED BY	M.E.W.
TRACING	MADE BY	T.H.R.
	CHECKED BY	R.P.L.
QUANTITIES	MADE BY	T.H.R.
	CHECKED BY	R.P.L.

PILING BEARING (H20-S16)

LOADS / SPANS	46'-3" 70'-6"
DL & LL LOAD	5.7 T.
EARTH	3.4 T.
LIVE LOAD	8.3 T.
DESIGN LOAD	35.2 T.

H-1284

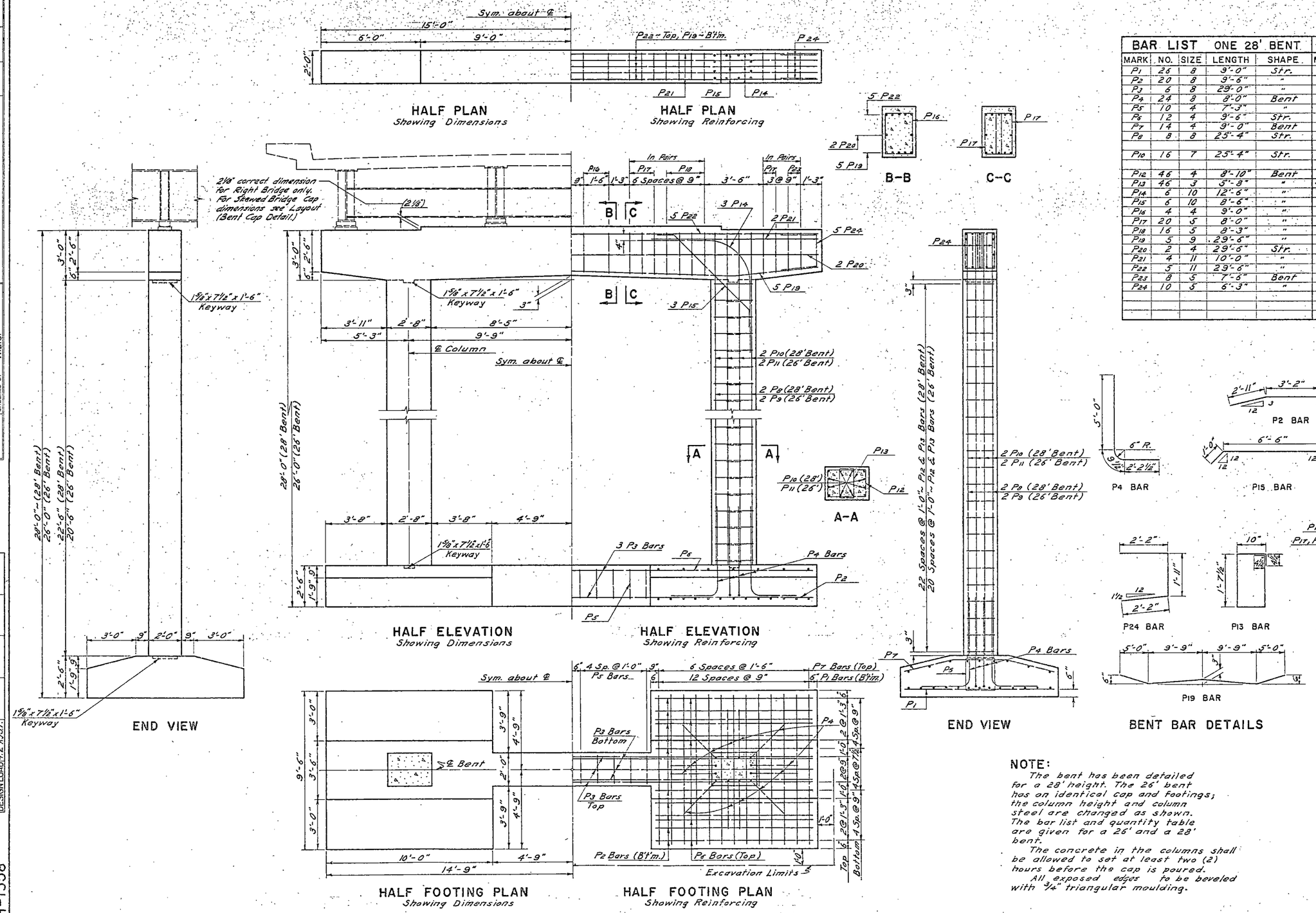
H-1284

FED ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	N.D.	1243(6)		22	107

DESIGN	MADE BY	B.L.S.
	CHECKED BY	M.E.W.
DETAILS	MADE BY	B.L.S.
	CHECKED BY	M.E.W.
TRACING	MADE BY	M.E.W.
	CHECKED BY	M.E.W.
QUANTITIES	MADE BY	M.E.W.
	CHECKED BY	M.E.W.

REVISIONS — MADE BY | CHK'D BY | DATE

PILING BEARING (H20-S16)	
LOAD-% / SPANS	144"-%-94"
DEAD LOAD	2.0 K/S.F.
EARTH	0.6 K/S.F.
LIVE LOAD	1.0 K/S.F.
DESIGN LOAD	4.2 K/S.F.



BAR LIST ONE 28' BENT				
MARK	NO.	SIZE	LENGTH	SHAPE
P1	26	8	9'-0"	Str.
P2	20	8	9'-6"	"
P3	6	8	29'-0"	"
P4	24	8	8'-0"	Bent
P5	10	4	7'-3"	"
P6	12	4	9'-6"	Str.
P7	14	4	9'-0"	Bent
P8	8	8	25'-4"	Str.
P10	16	7	25'-4"	Str.
P12	46	4	8'-10"	Bent
P13	46	3	5'-8"	"
P14	6	10	12'-6"	"
P15	6	10	8'-6"	"
P16	4	4	9'-0"	"
P17	20	5	8'-0"	"
P18	16	5	8'-3"	"
P19	5	9	29'-6"	"
P20	2	4	29'-6"	Str.
P21	4	11	10'-0"	"
P22	5	11	29'-6"	"
P23	8	5	7'-6"	Bent
P24	10	5	6'-3"	"

BAR LIST ONE 26' BENT				
MARK	NO.	SIZE	LENGTH	SHAPE
P1	26	8	9'-0"	Str.
P2	20	8	9'-6"	"
P3	6	8	29'-0"	"
P4	24	8	8'-0"	Bent
P5	10	4	7'-3"	"
P6	12	4	9'-6"	Str.
P7	14	4	9'-0"	Bent
P9	8	8	23'-4"	Str.
P11	16	7	23'-4"	Str.
P12	42	4	8'-10"	Bent
P13	42	3	5'-8"	"
P14	6	10	12'-6"	"
P15	6	10	8'-6"	"
P16	4	4	9'-0"	"
P17	20	5	8'-0"	"
P18	16	5	8'-3"	"
P19	5	9	29'-6"	"
P20	2	4	29'-6"	Str.
P21	4	11	10'-0"	"
P22	5	11	29'-6"	"
P23	8	5	7'-6"	Bent
P24	10	5	6'-3"	"

QUANTITIES (ONE 28' BENT)	
Concrete Class AE-1 1/2	33.2 C.Y.
Reinforcing Steel	6,593 Lbs.
Excavation (See Layout)	

QUANTITIES (ONE 26' BENT)	
Concrete Class AE-1 1/2	32.4 C.Y.
Reinforcing Steel	6,452 Lbs.
Excavation (See Layout)	

NOTE:

The bent has been detailed for a 28' height. The 26' bent has an identical cap and footings; the column height and column steel are changed as shown. The bar list and quantity table are given for a 26' and a 28' bent.

The concrete in the columns shall be allowed to set at least two (2) hours before the cap is poured.

All exposed edges to be beveled with 3/4" triangular moulding.

26' & 28' BENT DETAILS
STEEL GIRDER SPANS
30' ROADWAY
H20 S16 LOADING

H-1358

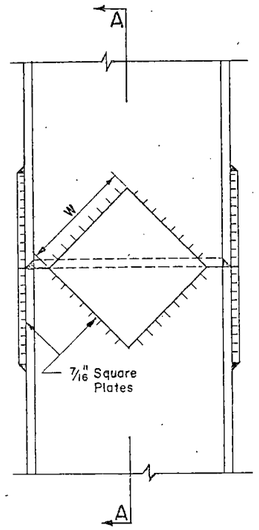
H-1358

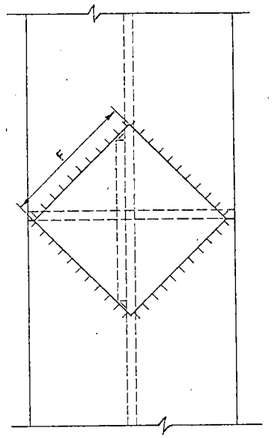
FED. ROAD DIV. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	N. D.	[illegible]		23	[illegible]

S-34-3(7) 25 86

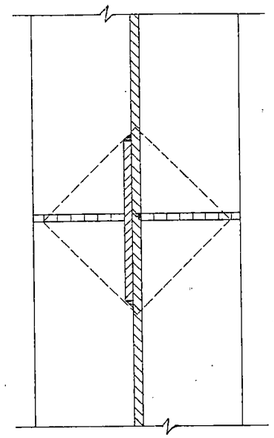
REVISIONS	MADE BY	DATE
Added End Plate Detail	HLS	6-19-59

MADE BY	
CHECKED BY	
DETAILS MADE BY	JGS
DETAILS CHECKED BY	KJH
TRACING MADE BY	
TRACING CHECKED BY	
QUANTITIES MADE BY	
QUANTITIES CHECKED BY	

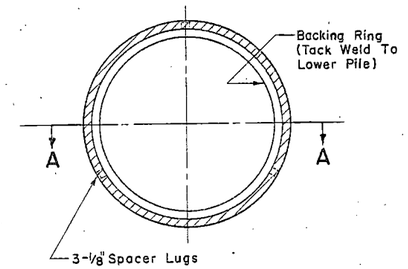




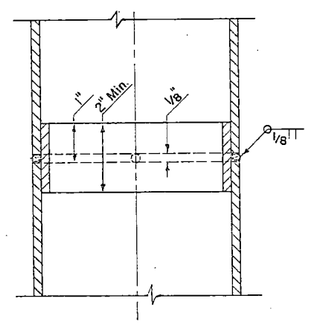
Flame Scarf Inside Of Both Flanges And One Side Of Web Of Upper Section



A-A

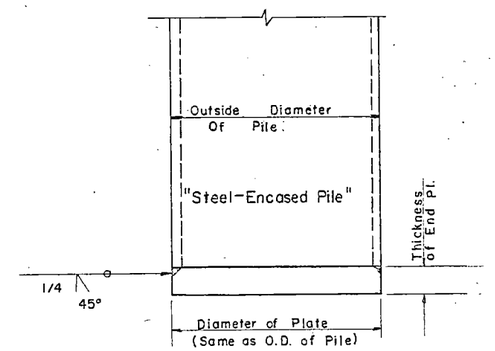


Backing Ring may be made from pile cut-offs or other material of a like quality.

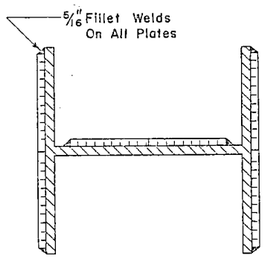


A-A

SHELL PILE SPLICE DETAIL



END PLATE DETAIL



PILE	8"	10"	12"	14"
F FLANGE	5"	6½"	8"	10"
W WEB	4"	5½"	6½"	8"

H-PILE SPLICE DETAIL

All welding shall conform to the current specification for "Welded Highway and Railway Bridges of the American Welding Society".
Backing rings and welding will not be paid for directly, but shall be included in the unit price bid for steel piles.

Revised 6-19-59

PILE SPLICE DETAILS

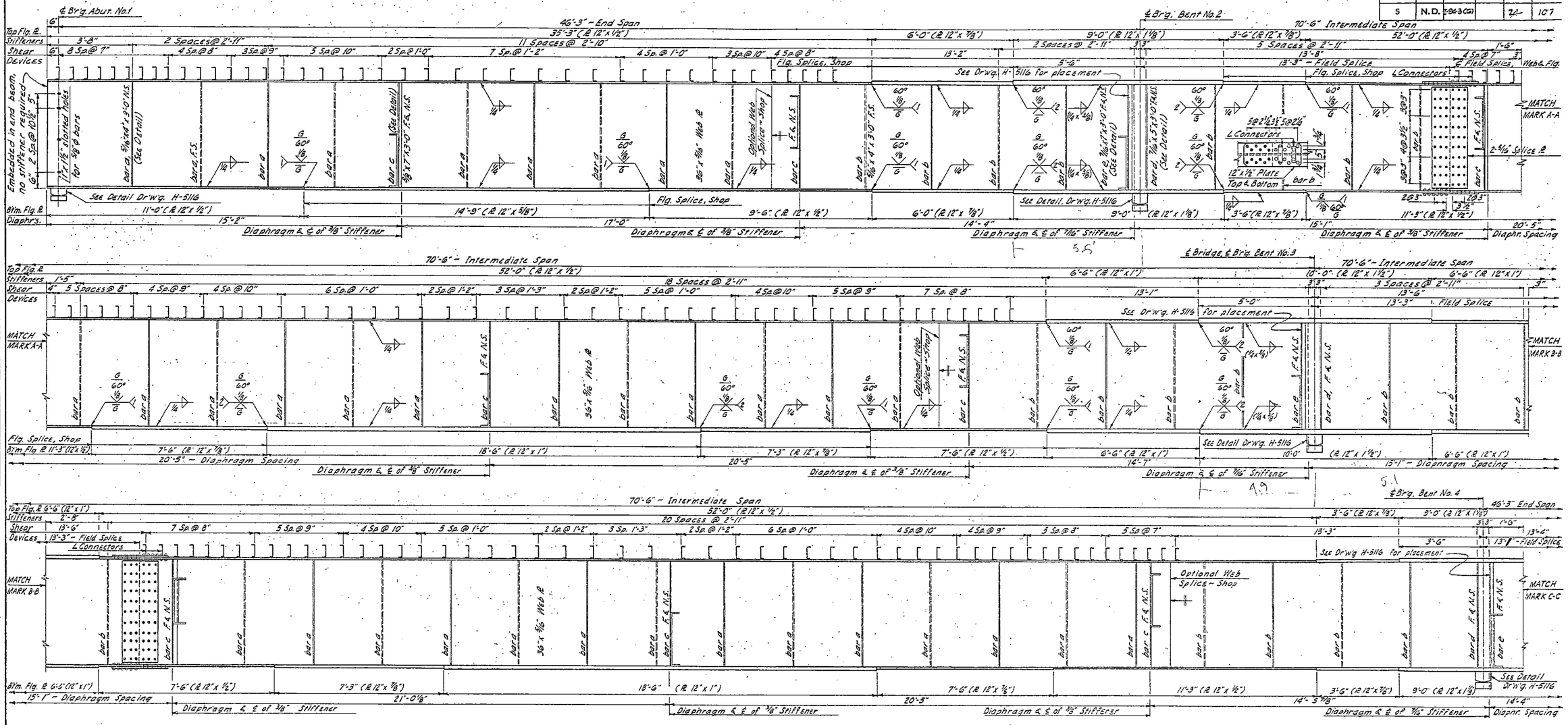
H-0401

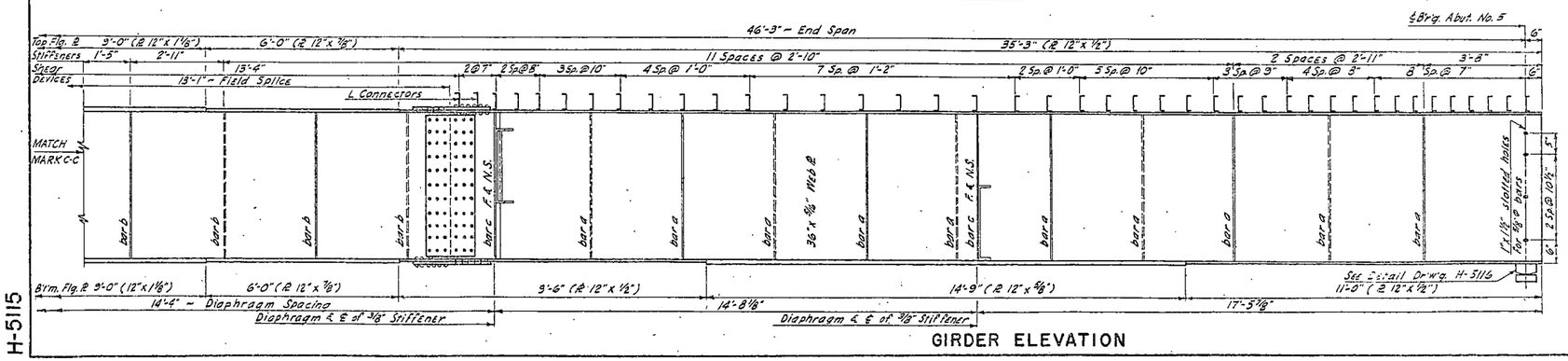
H-0401

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	N.D.	F-94-3(20)		22	107

REVISIONS	MADE BY	CHK'D BY	DATE

DESIGN	MADE BY	T.H.R.
	CHECKED BY	B.L.S.
DETAILS	MADE BY	H.E.W.
	CHECKED BY	H.E.W.
TRACING	MADE BY	H.E.W.
	CHECKED BY	H.E.W.
QUANTITIES	MADE BY	
	CHECKED BY	





GIRDER ELEVATION

NOTE:

The details shown are for a 4 Span Welded Girder, and represent Girder No. 3 in a four girder bridge.

The bridge is 235'-0" overall and covers an angle of skew ranging from 12° to 17° inclusive.

The exact angle of skew and its direction right or left is shown on the Steel Layout Drawing.

The other Girders, No. 1, No. 2 and No. 4, although similar to Girder No. 3, are to be fabricated in accordance with these details and as further amplified on Steel Layout Drawing and Drawing H-5116.

All shop butt welds in flange and web plates shall be made before final fitting and welding into girder.

See Drawings:
- H-5117 for Rail and Slab Sections.
- H-5118 for Slab Details.
- H-5116 for Steel Details.
- Steel Layout Drawing.

SCALE: 3/4" = 1'-0" Vertical.
1/2" = 1'-0" Horizontal.

Designed for 25 #/sq. ft. F.W.S.

QUANTITIES

See Drawing H-5118 and Steel Layout Drawing.

SUPERSTRUCTURE
FOUR SPAN COMPOSITE CONTINUOUS WELDED GIRDER

ANGLE OF SKEW (12° TO 17° INCLUSIVE)

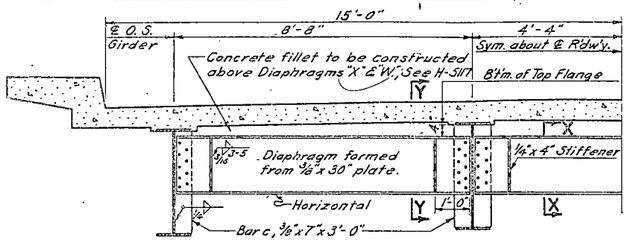
OVERALL LENGTH 235'-0"

H20 S16 LOADING

30'-0" ROADWAY

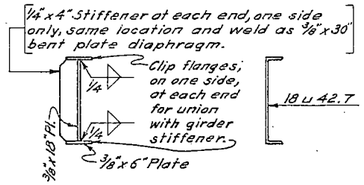
H-5115

FED. ROAD DIV. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	N. D.	[illegible]		25	107



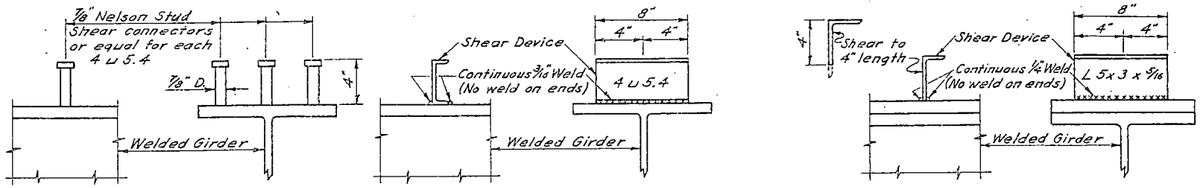
DIAPHRAGM "X" & "W"

See Steel Layout for location and length.



ALTERNATE NO. 1 **ALTERNATE NO. 2**

If the fabricator desires he may substitute Alternate No. 1 or Alternate No. 2 in lieu of the 3/8"x30" bent plate channel diaphragm. The diaphragms however, will be paid for based on the weight of the 3/8"x30" bent plate diaphragm.

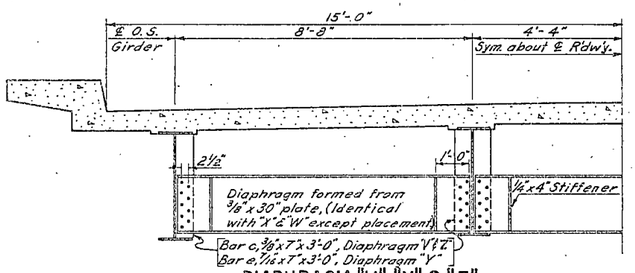


May be used except over splice plates — Used except over splice plates

ALTERNATE SHEAR DEVICE

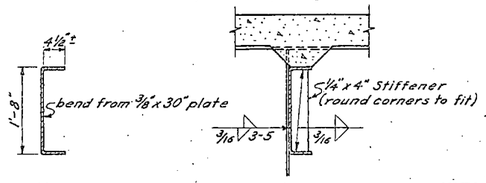
SHEAR DEVICE DETAILS

Used over splice plates



DIAPHRAGM "V", "Y" & "Z"

See Steel Layout for location and length.

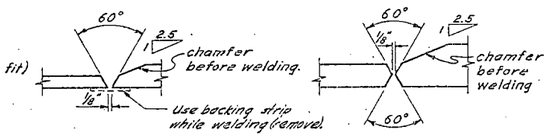


X-X Y-Y

AASHO SPECS.: 2:10:31, 1957;

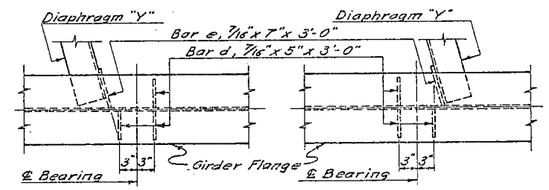
Cold-bent load carrying rolled steel plates shall conform to the following:

1. They shall be so taken from the stock plates that the bend-line will be at right angles to the direction of rolling.
2. The radius of bends, measured to the concave face of the metal, shall not be less and preferably shall be greater than 1.0 T for a 90° bend, in which T is the thickness of the plate. For a shorter radius the plate shall be bent hot.
3. Before bending, the corners of the plate shall be rounded to a radius of 1/16" throughout that portion of the plate at which the bending is to occur.



WELDING DETAIL NO. 1
SHOP FLANGE SPLICE
Top Flange Shown

WELDING DETAIL NO. 2
SHOP FLANGE SPLICE
Top Flange Shown



OUTSIDE GIRDER NO. 1, B'R'G. NO. 2 & NO. 3
GIRDER NO. 4, B'R'G. NO. 4

OUTSIDE GIRDER NO. 4, B'R'G. NO. 2 & NO. 3
GIRDER NO. 1, B'R'G. NO. 4

NOTES:

GENERAL:

All rivets are to be 7/8".
Open holes are to be 13/16" except as noted.
Shop connections shall be made as shown. Field connections shall be made with high tensile strength bolts or shall be riveted.
Paint and painting shall conform to the North Dakota Standard Specifications for Road and Bridge Construction, Sections 80 & 132.17. All exposed steel surfaces shall be given one shop coat of red lead paint, one spot coat of red lead paint after erection and concrete work is completed and two field coats of aluminum paint (first field coat tinted with Prussian Blue). No paint, shop or field, on top of beams.
Bearing areas are to be finished true to plan and elevation by grinding if necessary, before bearing plates are set.
The girders shall be cambered in the shop, as detailed on the Steel Layout Drawing, to compensate for the dead load deflection plus the additional camber required due to the roadway vertical curve. The web plates shall be cut to the indicated camber.
In field erection the concrete slab will be constructed with a constant riser of 1" above the bottom of the top girder flange (gutter side of girder); See Drawing H-5117.

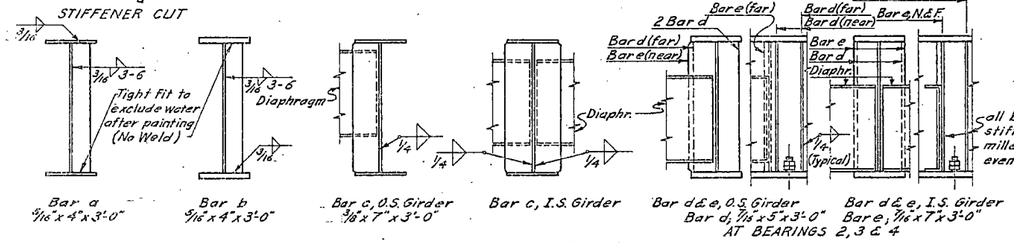
STRUCTURAL STEEL:

Main stress carrying members such as flange, web and stiffener plates shall conform to ASTM A-373-56T Specifications. All other structural carbon steel shall conform to the latest ASTM A-7-56T Specifications.

WELDING:

The metal-arc process shall be used for all Shop and Field fabrication. All welding shall conform to the current "Standard Specifications for Welding Highway and Railway Bridges — Design, Construction and Repair" of the American Welding Society.
Welding will not be paid for directly, but shall be included in the unit price bid for Structural Steel.

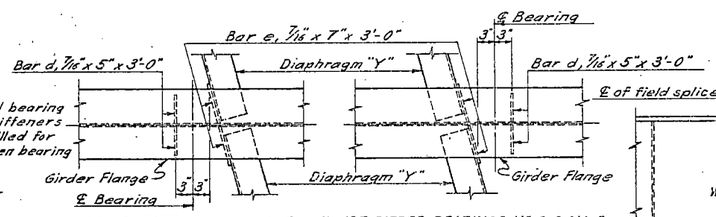
STIFFENER CUT



Bar a 5/16"x4"x3'-0" — Bar b 5/16"x4"x3'-0" — Bar c, O.S. Girder 3/8"x7"x3'-0" — Bar c, I.S. Girder — Bar d & e, O.S. Girder Bar d, 7/16"x5"x3'-0" AT BEARINGS 2, 3 & 4 — Bar d & e, I.S. Girder Bar e, 7/16"x7"x3'-0"

WEB STIFFENER DETAILS

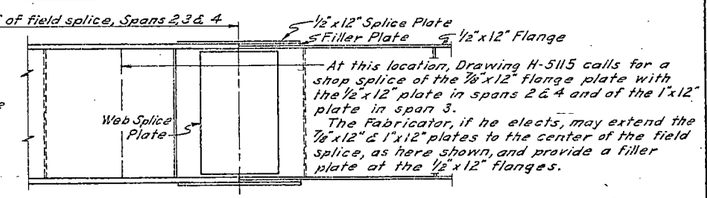
With typical diaphragms



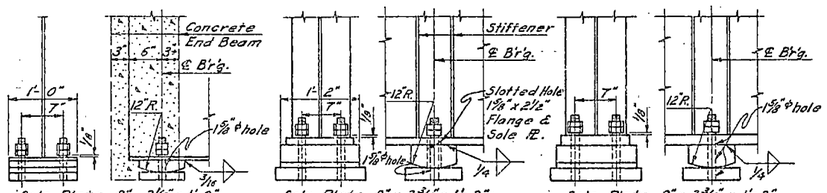
INSIDE GIRDER, BEARING NO. 4 — INSIDE GIRDER, BEARINGS NO. 2 & NO. 3

STIFFENER PLACEMENT DETAIL FOR DIAPHRAGM "Y"

See Steel Layout for location and length.
See Web Stiffener Details on this sheet.
Note: Stiffener Placement Details shown are for a left skew. Placement is similar for a right skew.



ALTERNATE FLANGE SPLICE DETAIL NEAR FIELD SPLICE



Sole Plate 8"x2 1/2"x1'-0"
Masonry Plate 8"x1 3/4"x1'-0"
Swedge Bolts 1 1/2"x1'-3"

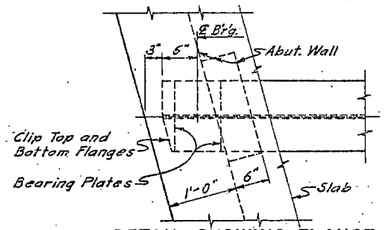
ABUT. B'R'GS. NO. 1 & 5

Sole Plate 8"x3 3/4"x1'-2"
Masonry Plate 10"x2 1/2"x1'-4"
Swedge Bolts 1 1/2"x2'-0"

BENT B'R'GS. NO. 2 & 4

Sole Plate 8"x3 3/4"x1'-2"
Masonry Plate 10"x2 1/2"x1'-4"
Swedge Bolts 1 1/2"x2'-0"

BENT B'R'G. NO. 3



DETAIL SHOWING FLANGE SHAPE AT END OF BEAM

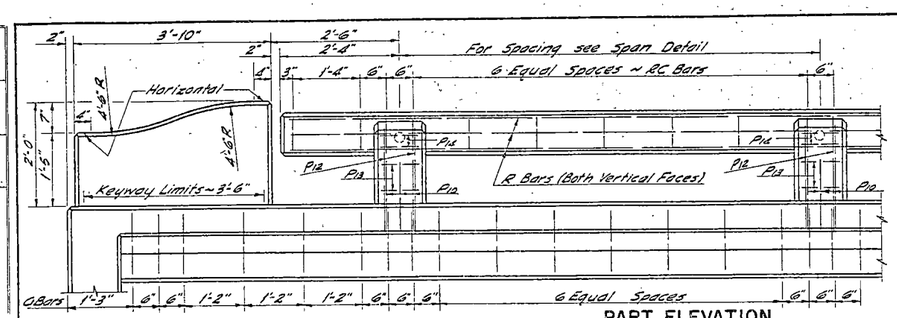
See Drawings:
Steel Layout Sheet.
H-5117 for Rail and Slab Sections.
H-5118 for Slab Details.
H-5115 for Girder Details.

SUPERSTRUCTURE
FOUR SPAN COMPOSITE CONTINUOUS WELDED GIRDER
ANGLE OF SKEW (12° TO 17° INCLUSIVE)
OVERALL LENGTH 235'-0"
H20 S16 LOADING
30' ROADWAY

		DATE
REVISIONS		
MADE BY	T.H.P.	
CHECKED BY	B.L.S.	
DETAILS MADE BY	T.H.P.	
CHECKED BY	N.E.W.	
TRACING MADE BY	N.E.W.	
CHECKED BY	E.W.H.	
QUANTITIES MADE BY		
CHECKED BY		

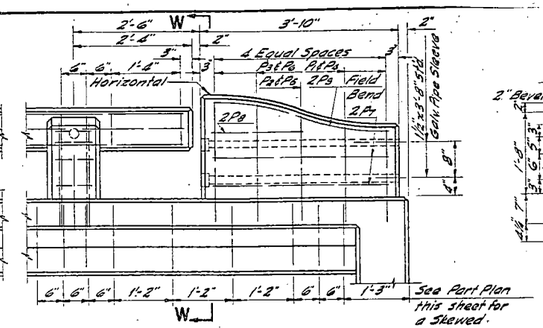
H-5116

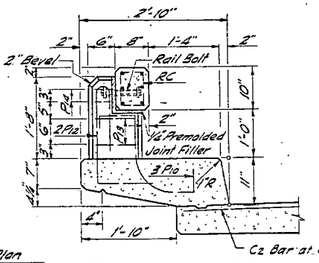
FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	N.D.	1943(03)		26	107



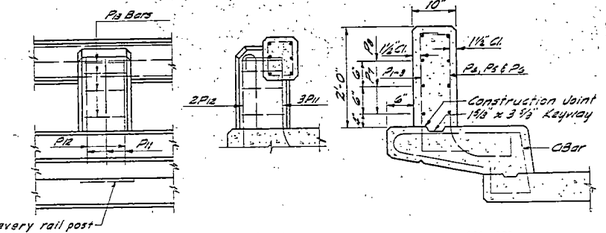
PART ELEVATION

Showing Dimensions & Reinforcing.
This detail is for a right bridge. See Detail "X", "Y" & "Part Plan" for a skewed bridge.





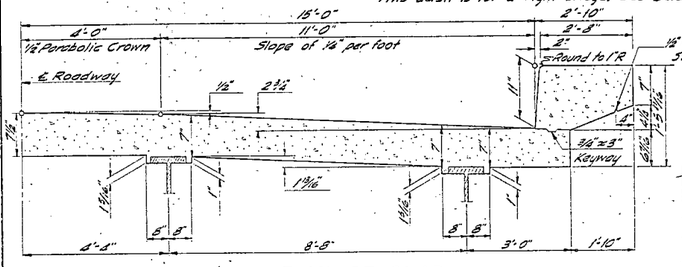
TYPICAL SECTION



ANCHOR POST DETAIL

See Layout for Placement

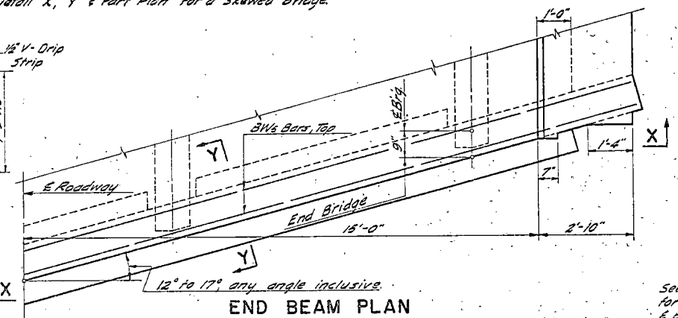
W-W



HALF SECTION OF SLAB

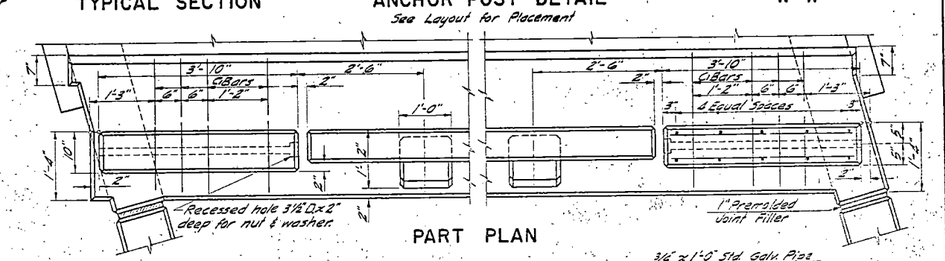
Showing Dimensions

The slab will be so placed that the roadway surface conforms to the crown and elevation shown on these plans. Any extra concrete that might be required in the slab because of irregularities in the beam camber shall be placed by the contractor at his own expense.

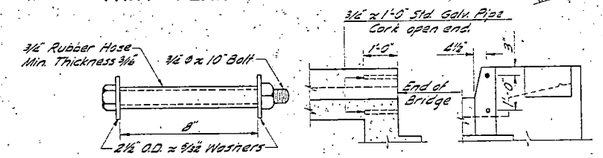


END BEAM PLAN

See girder detail for spacing of BW6 & BW8 Bars.



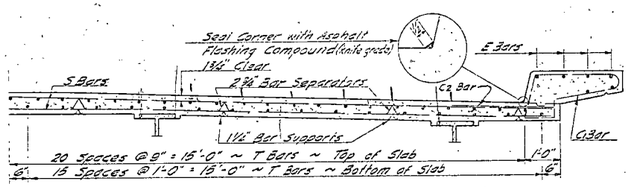
PART PLAN



RAIL BOLT

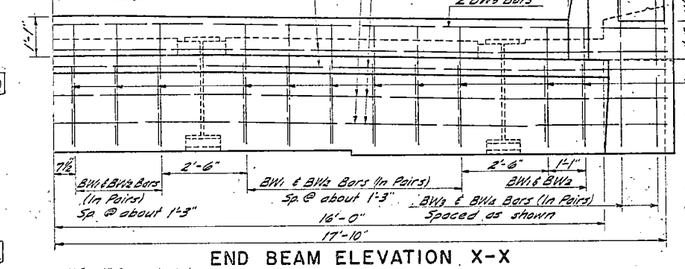
(Galvanized)
To be included in the unit price bid for Class AE-1½ Concrete.

CURB SLEEVE DETAILS

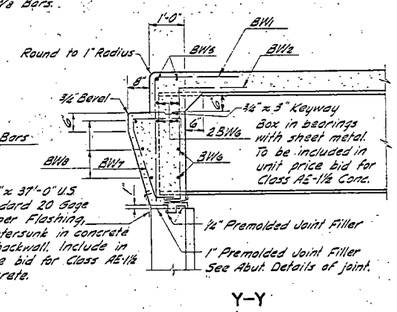


HALF SECTION OF SLAB

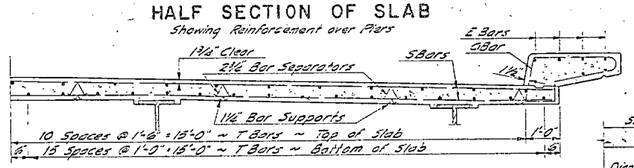
Showing Reinforcement over Piers



END BEAM ELEVATION X-X

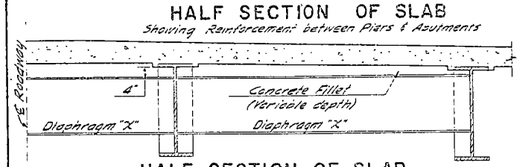


Y-Y



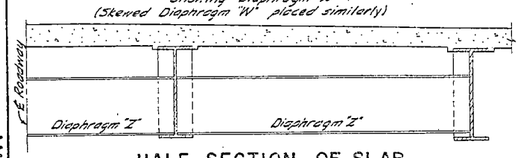
HALF SECTION OF SLAB

Showing Reinforcement between Piers & Abutments



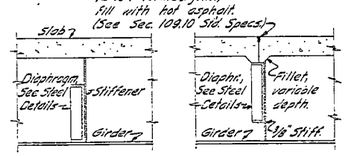
HALF SECTION OF SLAB

Showing Diaphragm "X"
(Skewed Diaphragm "W" placed similarly)



HALF SECTION OF SLAB

Showing Diaphragm "Z"
(Skewed Diaphragms "V" and "Y" placed similarly)

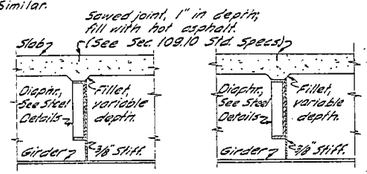


SECTION A-A

Continuous & Multiple Pours
Diaphragm "Z", Diaphragms "V" and "Y" Similar.

SECTION C-C

Multiple Pours
Diaphragm "X"

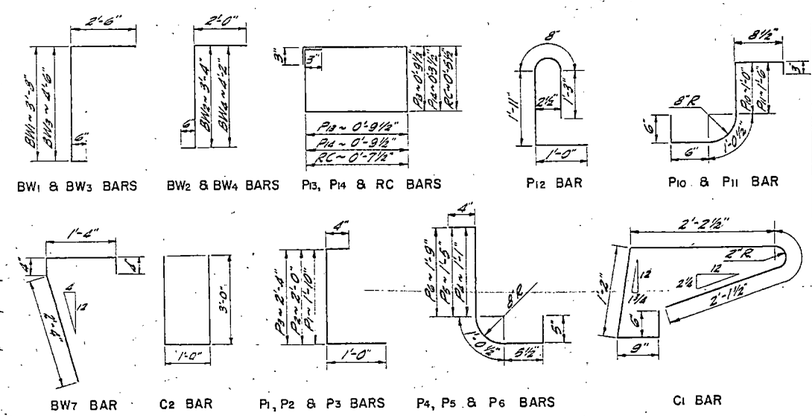


SECTION B-B

Continuous & Multiple Pours
Diaphragm "W"
at ℄ Roadway only.

SECTION C-C

Continuous Pours
Diaphragm "X"



BENT BAR DETAILS

BAR LIST

MARK	NO.	SIZE	LENGTH	SHAPE
BW1	44	4	6'-8"	Bent
BW2	44	4	5'-10"	"
BW3	8	4	7'-6"	"
BW4	8	4	6'-8"	"
BW6	8	4	19'-6"	Str.
BW8	24	5	19'-0"	"
BW7	44	4	2'-4"	Bent
BW9	12	5	17'-8"	Str.
C1	296	5	6'-9"	Bent
C2	34	5	7'-0"	"
E	84	5	35'-4"	Str.
P1	8	5	3'-2"	Bent
P2	4	5	3'-4"	"
P3	8	5	3'-8"	"
P4	8	5	3'-3"	"
P5	4	5	3'-9"	"
P6	8	5	4'-0"	"
P7	16	4	3'-6"	Str.
P8	8	4	1'-9"	"
P9	8	5	3'-9"	"
P10	156	5	4'-0"	Bent
P11	6	5	4'-6"	"
P12	108	5	4'-10"	"
P13	112	3	3'-8"	"
P14	104	3	2'-8"	"
R1	8	5	36'-3"	Str.
R2	68	5	34'-3"	"
R3	8	5	32'-3"	"
RC	376	3	2'-8"	Bent
S	942	5	31'-6"	Str.
T1	371	4	35'-0"	Str.
T2	60	4	25'-0"	"

NOTE:

All concrete above top of curb shall be Class AE-1 except concrete end posts.

"Rubbed Surface Finish" will be required for the roadway faces of curb, the outside vertical faces of curb and slab, and all faces of rails, intermediate and end posts. All other surfaces shall be given the "Ordinary Surface Finish".

End Beams shall be poured and allowed to set at least 48 hours before the slab is poured.

Legs of bar supports shall be galvanized.

See Drawings:
Steel Layout Sheet.
H-5113 for Slab Details.
H-5116 for Steel Details.
H-5118 for Girder Details.

QUANTITIES

See Drawing H-5118 and Steel Layout Drawing.

SUPERSTRUCTURE
FOUR SPAN COMPOSITE
CONTINUOUS WELDED GIRDER

ANGLE OF SKEW (12° TO 17° INCLUSIVE)
OVERALL LENGTH 235'-0"
H20 S16 LOADING
30' ROADWAY

REVISIONS	DATE	MADE BY	CHK'D BY

	MADE BY	CHECKED BY
DESIGN	T.H.B.	B.L.S.
DETAILS	MADE BY	CHECKED BY
	T.H.B.	H.L.W.
TRACING	MADE BY	CHECKED BY
	T.H.B.	S.H.D.
QUANTITIES	MADE BY	CHECKED BY
	T.H.B.	H.L.G.

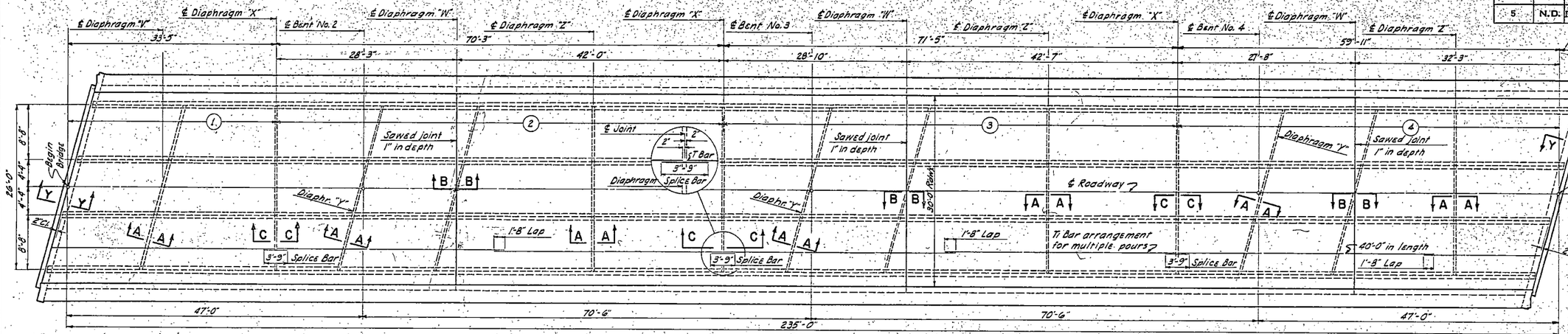
H-5117

H-5117

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	N.D.	F-24-3(23)		17	107

REVISIONS	MADE BY	CHK'D BY	DATE

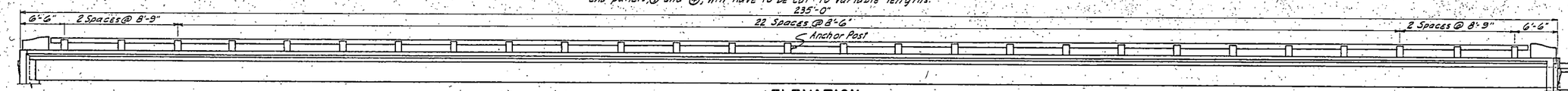
DESIGN	MADE BY	T.H.R.
	CHECKED BY	R.L.S.
DETAILS	MADE BY	M.E.W.
	CHECKED BY	T.H.R.
TRACING	MADE BY	W.E.G.
	CHECKED BY	E.W.H.
QUANTITIES	MADE BY	W.E.G.
	CHECKED BY	E.W.H.



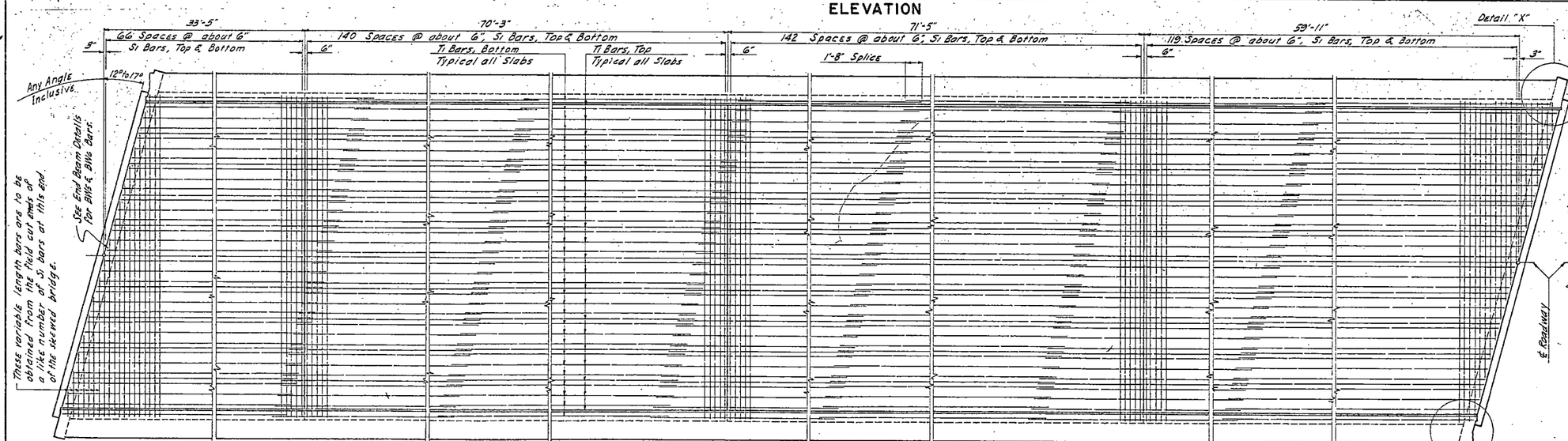
PLAN

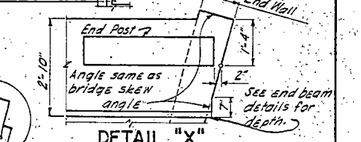
For multiple pours the Ti Bars shall be arranged as shown. The Ti bars in end panels, ① and ④, will have to be cut to variable lengths.

See Drawings:
H-5115 for Girder Details.
H-5116 for Steel Details.
H-5117 for Rail & Slab Details.
Steel Layout Sheet.

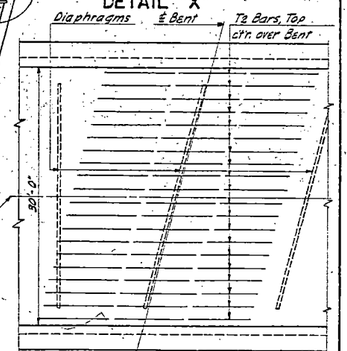


ELEVATION





DETAIL "X"



T2 BARS OVER BENTS

As shown for continuous pour, for multiple pour ctr. between diaphragms.

SLAB NO. 1 SLAB NO. 2 SLAB NO. 3 SLAB NO. 4

PARTIAL PLAN SLAB REINFORCEMENT

See Special Detail this Drawing for T2 Bars over Bents.
Ti Bars shown are for a continuous pour ~ For multiple pours see Plan at Top.

NOTES:

These plans are drawn to fit any angle of skew from 12° to 17° inclusive and are for a right skew. If a left skew is required, reverse the details in accordance with the Steel Layout found elsewhere on these plans:

The slab shall be poured in one of the following sequences:

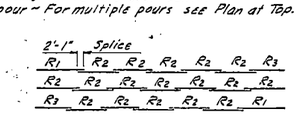
1. In one continuous pour, (See Special Provisions).
2. a. Slab Section ①, left to right.
   b. Slab Section ②, right to left.
   c. Slab Section ③, right to left.
   d. Slab Section ④, right to left.

Ti & T2 Bars in the bar list shown elsewhere and in the plans above are for a continuous pour method of placing concrete.

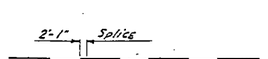
If the Contractor elects the multiple pour method of placing concrete, he shall order reinforcing steel to fit the four panels as shown in the plan view, and shall provide 3'-9" splice bars at the construction joints at his own expense.

Each curb shall be placed in one continuous operation.

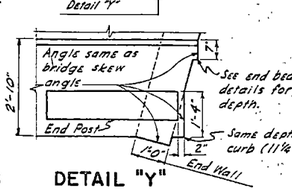
Bevel all exposed edges with 3/4" triangular molding except as shown.



RAIL STEEL ASSEMBLY



SPLICING DETAILS E BARS



DETAIL "Y"

Designed for 25#/sq. ft. F.W.S.

QUANTITIES

Concrete Class AE-1	11.92	C.Y.
Concrete Class AE-1½ (See Steel Layout Sheet)		
* Reinforcing Steel	54,079	Lbs.
Structural Steel	125,436	Lbs.

* End Posts Included.

SUPERSTRUCTURE
FOUR SPAN COMPOSITE
CONTINUOUS WELDED GIRDER
ANGLE OF SKEW (12° TO 17° INCLUSIVE)
OVERALL LENGTH 235'-0"
H20 S16 LOADING
30' ROADWAY

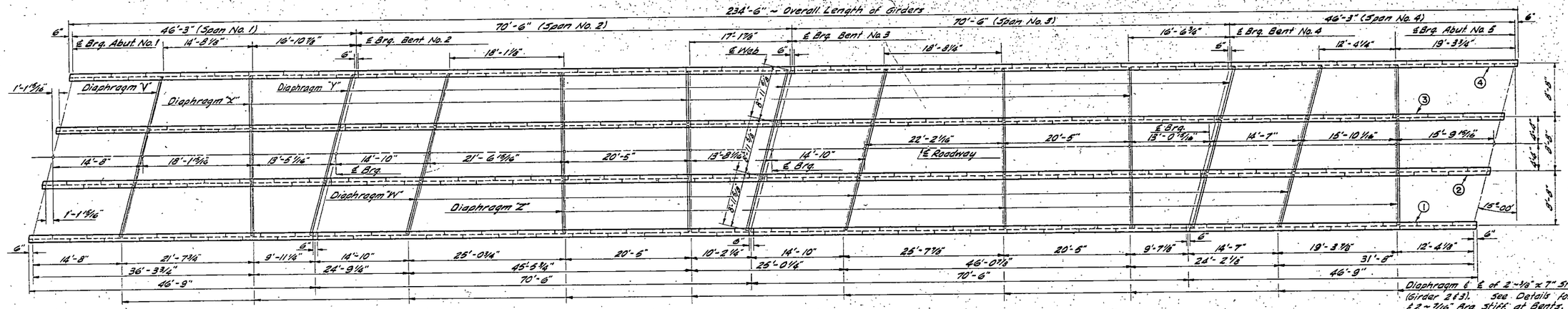
H-5118

H-5118

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5.	N.D.	I-94-3(62)		23	107

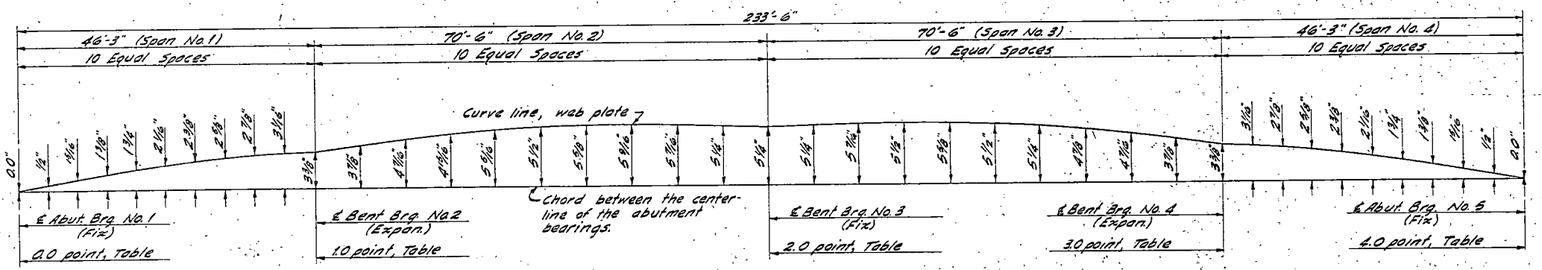
	MADE BY	CHK'D BY	DATE
DESIGN	THR		
DETAILS	THR		
TRACING	WEG		
QUANTITIES	EWH		

REVISIONS



STEEL LAYOUT

Note: The alternating intermediate stiffeners other than noted above are 5/16" x 4".



SHOP CAMBER DIAGRAM

The shop camber diagram above represents the total rise in inches above a chord between the centerline of the abutment bearings that is required in the web plate of the girders in order to compensate for the dead load deflection and the vertical curve of the roadway.

SHOP CAMBER TABLE - FOR WELDED GIRDER

Used in plotting shop camber diagram, this drawing, and giving dead load deflections plus vertical curve rise above a chord between the centerline of abutment bearings.

Span	Location	Dead Load Deflection (inches)	Vert Curve rise above chord (in)	Total in decimals of an inch	Total in fractions of an inch
Span No. 1 ~ 46'-3"	0.0	0.000	0.000	0.000	0
	0.1	0.094	0.408	0.502	1/2
	0.2	0.160	0.804	0.964	15/16
	0.3	0.226	1.176	1.402	1 3/8
	0.4	0.240	1.536	1.776	1 3/4
	0.5	0.220	1.872	2.092	2 1/16
	0.6	0.173	2.196	2.369	2 3/8
	0.7	0.113	2.508	2.621	2 5/8
	0.8	0.059	2.808	2.867	2 7/8
	0.9	0.004	3.084	3.088	3 1/16
	1.0	0.000	3.348	3.348	3 3/8
Span No. 2 ~ 70'-6"	1.1	0.154	3.708	3.862	3 7/8
	1.2	0.333	4.094	4.427	4 7/16
	1.3	0.577	4.332	4.909	4 15/16
	1.4	0.698	4.584	5.282	5 5/16
	1.5	0.720	4.788	5.508	5 1/2
	1.6	0.630	4.968	5.598	5 5/8
	1.7	0.441	5.100	5.541	5 9/16
	1.8	0.226	5.196	5.422	5 7/16
	1.9	0.016	5.256	5.272	5 1/4
	2.0	0.000	5.256	5.256	5 1/4
Span No. 3 ~ 70'-6"	2.0	0.000	5.256	5.256	5 1/4
	2.1	0.016	5.244	5.260	5 1/4
	2.2	0.226	5.184	5.410	5 7/16
	2.3	0.441	5.088	5.529	5 1/2
	2.4	0.630	4.968	5.598	5 5/8
	2.5	0.720	4.788	5.508	5 1/2
	2.6	0.698	4.572	5.270	5 1/4
	2.7	0.577	4.320	4.897	4 7/8
	2.8	0.333	4.082	4.415	4 7/16
	2.9	0.154	3.708	3.862	3 7/8
	3.0	0.000	3.348	3.348	3 3/8
Span No. 4 ~ 46'-3"	3.1	0.004	3.084	3.088	3 1/16
	3.2	0.059	2.808	2.867	2 7/8
	3.3	0.113	2.520	2.633	2 5/8
	3.4	0.173	2.208	2.381	2 3/8
	3.5	0.220	1.872	2.092	2 1/16
	3.6	0.240	1.536	1.776	1 3/4
	3.7	0.226	1.176	1.402	1 3/8
	3.8	0.160	0.804	0.964	15/16
	3.9	0.094	0.408	0.502	1/2
	4.0	0.000	0.000	0.000	0

See Drawings:
H-5117 for Rail & Slab Details.
H-5118 for Slab Details.
H-5116 for Steel Details.
H-5115 for Girder Details.

QUANTITIES

* Concrete Class AE-1½	221.5 C.Y.
For remaining quantities see Sheet H-5118 and Layout.	

* End Posts Included

SUPERSTRUCTURE
FOUR SPAN COMPOSITE
CONTINUOUS WELDED GIRDER
ANGLE OF SKEW 15°-00'
OVERALL LENGTH 235'-0"
H_{20}-S_{16} LOADING

H-5119

H-5119