



SKETCH-MAP OF NORTH DAKOTA SHOWING COUNTIES



SCALES
 LAYOUT SHEET: 1 IN. = 2000 FT.
 PLAN AND PROFILE DRAWINGS: 1 IN. = 30 FT.
 STRUCTURAL DRAWINGS: AS SHOWN
 CROSS SECTION SHEETS: 1 IN. = 5 FT.

NORTH DAKOTA STATE HIGHWAY DEPARTMENT

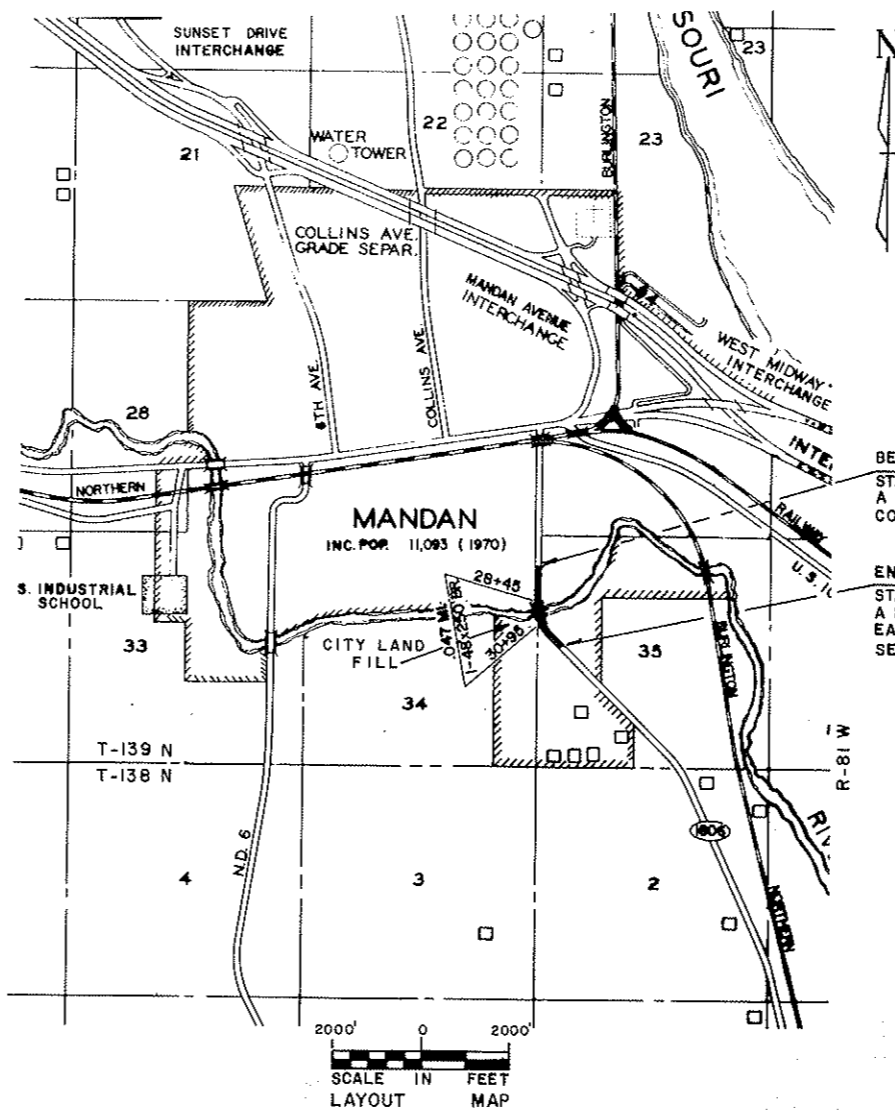
PLANS FOR THE PROPOSED IMPROVEMENT OF A STATE HIGHWAY IN MORTON COUNTY FEDERAL AID PROJECT NO. BRS-I-806(05)069 GRADING, SURFACING, & STRUCTURE

LENGTH OF PROJECT		
PROJECT	MILES-GROSS	MILES-NET
BRS-I-806(05)	.322	.322
TOTALS	.322	.322

GOVERNING SPECIFICATIONS:
 Standard Specifications adopted by the North Dakota State Highway Department July 1971 and approved as standard by the Federal Highway Administration Sept. 29, 1971. Required Contract Provisions (Form PR-1273) dated April 1974 and others submitted herewith.

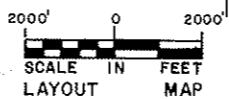
DESIGN DATA

TRAFFIC	AVERAGE DAILY	EST. WITH MAX. HR.
CURRENT TRAFFIC (1975)	3102 PASS. 198 TRUCKS 3300	TOTAL 625
TRAFFIC FORECAST (1995)	4200 PASS. 300 TRUCKS 4500	TOTAL 900
DESIGN SPEED	40 MPH	
TRAFFIC CLASSIFICATION	M	
MINIMUM SIGHT DISTANCE (STOPPING)	275'	
MINIMUM SIGHT DISTANCE (SAFE PASSING)	3200'	
MINIMUM PASSING SIGHT DISTANCE FOR MARKING	1200'	
BRIDGE		
STA. 29+70	CLEAR RDWY. WIDTH 40' + 8' SIDEWALK	DESIGN LOADING HS 20



BEG. BRS-I-806 (05)069 STA. 20+67.9 = STA. 20+67.9 ON S-1-1806 A POINT 561.9' SOUTH OF THE N.E. COR. OF SEC. 35 T-139 N. R-81 W.

END BRS-I-806 (05)069 STA. 37+70.9 OFF LOC. * 37+74.4 SURV. = STA. 37+92.6 ON S-1-1806 A POINT 2101.7' SOUTH & 674.6' EAST OF THE N.E. COR. OF SEC. 35 T-139 N. R-81 W.



Copy A

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APPROVED DATE 6-27-75
R. Bradley
 REGISTERED PROFESSIONAL ENGINEER
 NORTH DAKOTA
 STATE HIGHWAY DEPARTMENT

U.S. DEPARTMENT OF TRANSPORTATION
 FEDERAL HIGHWAY ADMINISTRATION
 APPROVED
 DIVISION ENGINEER DATE

SYMBOLS

STATE & NATIONAL LINES		BUILDINGS	
COUNTY LINE		TELEGRAPH LINES	
TOWNSHIP & RANGE LINES		TELEPHONE LINES	
SECTION LINE		POWER LINES	
QUARTER SECTION LINE		CULVERTS (In Place)	
SECTION CORNER		CULVERTS (Install)	
QUARTER SECTION CORNER		CONCRETE BOX CULVERTS (Install)	
OLD RIGHT OF WAY LINE		BRIDGES (Install)	
NEW RIGHT OF WAY LINE		CONCRETE CURB	
GRADE LINE		CONCRETE CURB AND GUTTER	
CENTERLINE OF CONSTRUCTION		CONCRETE WALK	
RAILROAD RIGHT OF WAY LINE		CATCH BASIN (Existing)	
CITY OR VILLAGE CORPORATE LIMITS		CATCH BASIN (New)	
PROPERTY LINE		MANHOLE (Existing)	
EASEMENT LINE		MANHOLE (New)	
FENCES		CURB INLET (Existing)	
SNOW FENCE		CURB INLET (New)	
DRAINAGE		GROUND MOUNTED SIGNS	
WATERS EDGE		OVERHEAD SIGNS	
MARSH OR SWAMP		HYDRANT	
RIPRAP		LIGHT STANDARDS	
DRAINAGE DITCH		TRAFFIC SIGNALS (Plan & Profile Sheets)	
APPROACH		HIGH MAST LIGHTING ASSEMBLY	
TRAVELED WAY		GROUND ELEVATION	
RAILROADS		GRADE	
GUARD RAIL		CENTERLINE	
GUIDE POSTS		SECTION LINE	
DELINEATORS		DEFLECTION ANGLE (Delta)	
HEDGES AND TREES		SOD OR JUTE MESH	
INTERCHANGE		POLES TO BE MOVED	
HIGHWAY GRADE SEPARATION-NO CONNECTION		POLES TO BE LOWERED	
OTHER BRIDGE		CONCRETE FOUNDATION	
SERVICE ROAD		CONDUIT	
TERMINATED CROSS-ROAD		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	M L	Main Line
Ahd	Ahead	N. R.	North Roadway
Alt	Alternate	Off. Loc.	Office Location
Approx	Approximate or Approximately	O to O	Out to Out
Appr	Approach	P. B. P.	Plan and Profile
Asph. Cem. or A. C.	Asphalt Cement	P. C.	Point of Curvature
Asph. Conc.	Asphaltic Concrete	P. C. C.	Point of Compound Curve
Bit	Bituminous or Bitumen	P. C. C. Pvm't	Portland Cement Concrete Pavement
Bk.	Back	P. D.	Private Drive
B.M.	Bench Mark	Pen.	Penetration
Bldg.	Building	Perf.	Perforated
Br.	Bridge	P. I.	Point of Intersection
C. A. E. S.	Corrugated Aluminum End Section	P. O. C.	Point on Curve
C. A. P.	Corrugated Aluminum Pipe	P. O. T.	Point on Tangent
C. B.	Catch Basin	P. P.	Power Pole
C. B. G.	Curb and Gutter	P. R. C.	Point of Reverse Curvature
Ch. Blk.	Channel Block	Pref.	Preformed
Ch. Ch.	Channel Change	P. S. D.	Passing Sight Distance
C. I.	Curb Inlet	P. T.	Point of Tangency
C. I. P.	Cast Iron Pipe	P. V. C.	Polyvinyl Chloride Sewer Pipe
Cl.	Class	Quant.	Quantity or Quantities
C. S. E. S.	Corrugated Steel End Section	R	Radius
C. S. P.	Corrugated Steel Pipe	R or Rge.	Range
CMS	Cationic Medium Setting	RC	Rapid Curing
Comp.	Compression	R. C. E. S.	Reinforced Concrete End Section
Const.	Construction	R. C. P.	Reinforced Concrete Pipe
Conc.	Concrete	R. C. P. S.	Reinforced Concrete Pipe Sewer
Cont. Reinf. Conc. Pvm't	Continuously Reinforced Concrete Pavement	Rd.	Road
Contn.	Continuation	Rd. bd.	Roadbed
Cra.	Course	Rdwy.	Roadway
CRS	Cationic Rapid Setting	Ref.	Reflectorized
Crae.	Course	R. R.	Railroad
C. S.	Curve to Spiral	Rt.	Right
C. to C.	Center to Center	R/W	Right of Way
C. Y.	Cubic Yard	Salv.	Salvage
D	Degree of Curvature	San.	Sanitary
D-Load	Dead Load	S. C.	Spiral to Curve
D. B.	Ditch Block	SC	Slow Curing
Def.	Deformed	Sc	Spiral Deflection Angle
Del.	Deliver	S. D.	Sight Distance
D. G.	Ditch Grade	S. E.	Superelevation
El. or Elev.	Elevation	Sec.	Section
Ellipl.	Elliptical	Sec. Line Appr.	Section Line Approach
Emb.	Embankment	Sep.	Separation
Emul.	Emulsified	Serv.	Service
Engr.	Engineer	Sgr. Prep.	Subgrade Preparation
Eq.	Equation	Shldr.	Shoulder
E. R.	East Roadway	SP	Special Provision
E. S.	End Section	S. P. P.	Structural Plate Pipe
Esmt.	Easement	S. P. P. A.	Structural Plate Pipe Arch
Exc.	Excavation	S. R.	South Roadway
Exp.	Expansion	SS	Slow Setting or Supplement Specification
F. D.	Field Drive	S. S. D.	Stopping Sight Distance
Found.	Foundation	S. T.	Spiral to Tangent
F. P.	Fence Post	Sta.	Station
Furn.	Furnish	Std.	Standard
Ga.	Gage or Gauge	Std. Specs.	Standard Specifications
Gr.	Gravel	Struct.	Structure
Grd.	Graded	Surf.	Surface or Surfacing
G. V.	Gate Valve	Surv.	Survey
Hel.	Helical	S. W.	Sidewalk
Hyd.	Hydrant	S. Y.	Square Yard
Ident.	Identification	T	Tangent Length (circular curve)
Inchg.	Interchange	T or Twp.	Township
I. M.	Iron Monument	Tel.	Telephone
Inst.	Install	Temp.	Temporary
Inter.	Intersection	T. P.	Telephone Pole
Invt.	Invert	Tr.	Traffic
Jt.	Joint	Trans.	Transverse or Transition
L	Length of Curve	Trid.	Treated
Lc	Length of Spiral	Ts	Tangent Length (curve with spirals)
Levg.	Leveling	T. S.	Tangent to Spiral
L. F.	Linear or Lineal Foot	U. S. C. & G. S.	United States Coast and Geodetic Survey
Liq.	Liquid	V. C.	Vertical Curve
Long.	Longitudinal	V. C. P.	Vitrified Clay Pipe
L. P.	Light Pole	W. M.	Water Main
Ll.	Left	W. M. V.	Water Main Valve
"M"	One Thousand	W. R.	West Roadway
Matl.	Material	Wrgg.	Wearing
Max.	Maximum	W. S. V.	Water Service Valve
MC	Medium Curing	X-Sec.	Cross Section
M. H.	Manhole	Xc	Spiral Coordinate
Min.	Minimum	Yc	Spiral Coordinate

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59	Sanitary Sewer Force Main Details		

BASIS OF ESTIMATE

SEEDING - Entire Right-Of-Way Except Roadbed, Sidewalk, and Sodded Areas.

WATER FOR COMPACTION- 10 Gal. Per. C.Y. Of Embankment Quantity.

AGGREGATE SURFACE COURSE CLASS 6 - 1.5 Tons Per C.Y. + 25 % = 29 Ton Per Sta. (2" Depth, 24' Width - Temp. Surf. Prior to Hot Bit. Pvm't.)

4 Ton Per P.D. 22 + 37 Lt. (4" Depth, 12' Width)

6 Ton Per P.D. 25 + 65 Lt. (4" Depth, 12' Width)

FED. ROAD DIST. NO.	STATE	PROJ. NO.	SHEET NO.
8	N. D.	RR-1-500 (195)	3

LIST OF SUPPLEMENTAL SPECIFICATIONS AND SPECIAL PROVISIONS

NAME	NO.
Hot Bituminous Pavement	SP-109 E
Hot Bituminous Pavement (Temp. Recording)	SS-1
Legal Relations & Responsibility to the Public	SP-123
Measurement and Payment	SP-145
Maintenance & Protection of Traffic	SP-124
Erosion and Water Pollution Control	SP-106 A
Legal Relations & Responsibility to the Public	
Underground Utilities	SP-113
Field Laboratory	SS-3
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Legal Relations & Responsibility to the Public	
Utilities (Century Code)	SP
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Biddings Requirements and Conditions	SP-138 A
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Repair and Restoration of Haul Roads	SP-111 C
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Hot Bituminous Pavement	SP-128
Measurement and Payment	SP-133
Measurement and Payment (Bit. Materials)	SP
Bituminous Materials (Acceptance & Sampling)	SP
Bituminous Materials (Viscosity Grades)	SP
Measurement & Payment (Contract Adjustment)	SP
Portland Cement Concrete	SP-126
Measurement & Payment	SP-143
Underground Utilities (Century Code)	SP
PVC Force Sanitary Sewer	SP
Excavation and Embankment (Borrow Area)	SP-105 D
Structural Steel	SP-116 C
Quick Setting Anchor Grout	SP-135
Chemical Admixture for Concrete	SP

STRUCTURAL

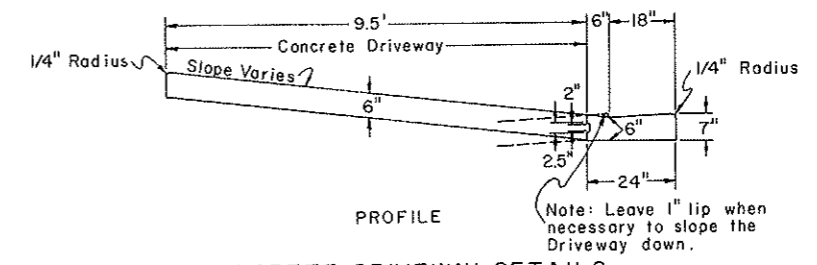
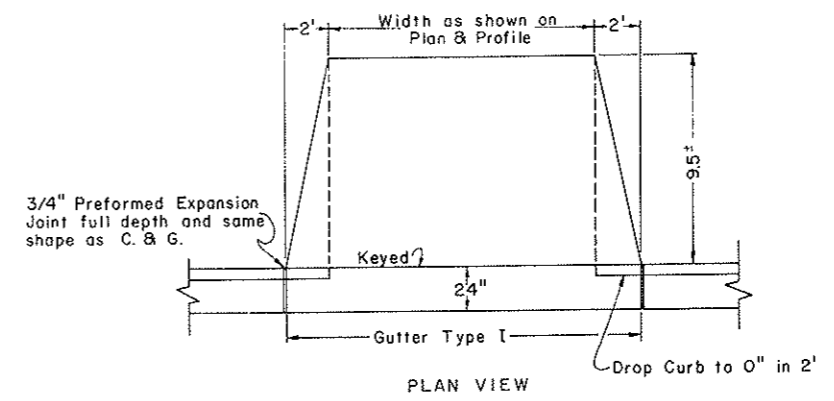
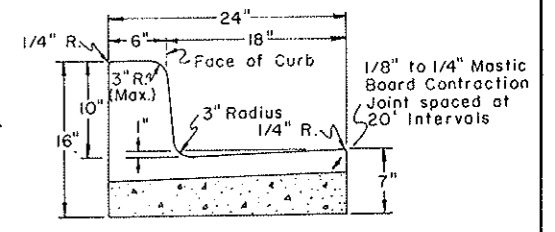
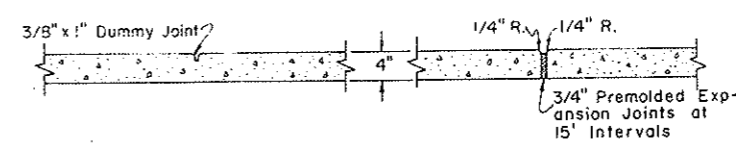
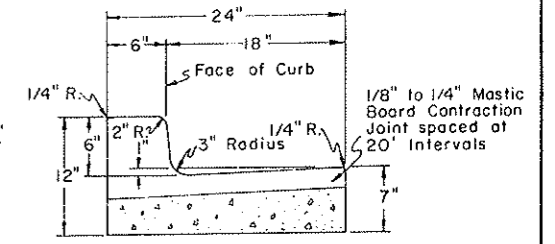
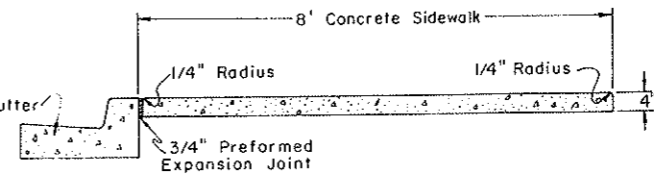
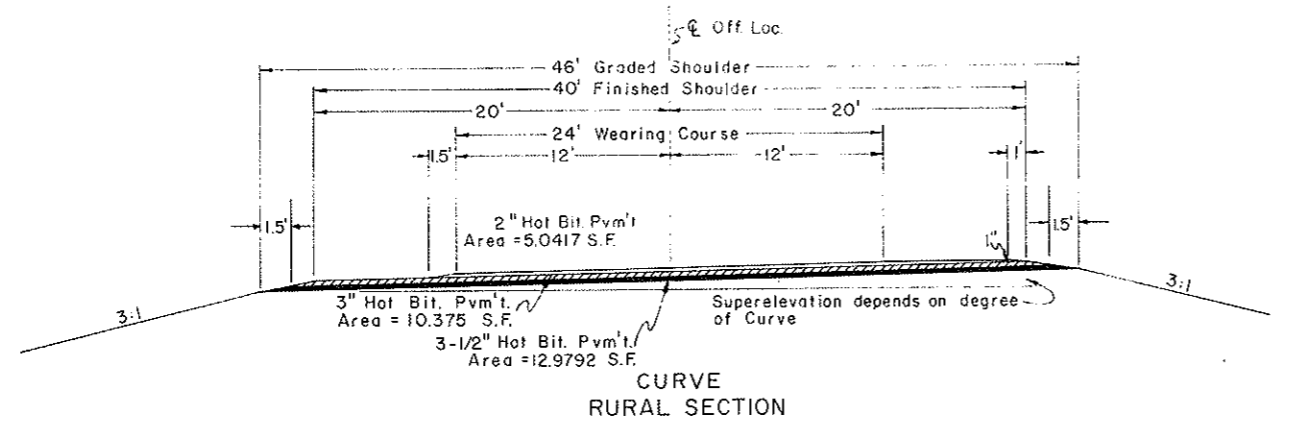
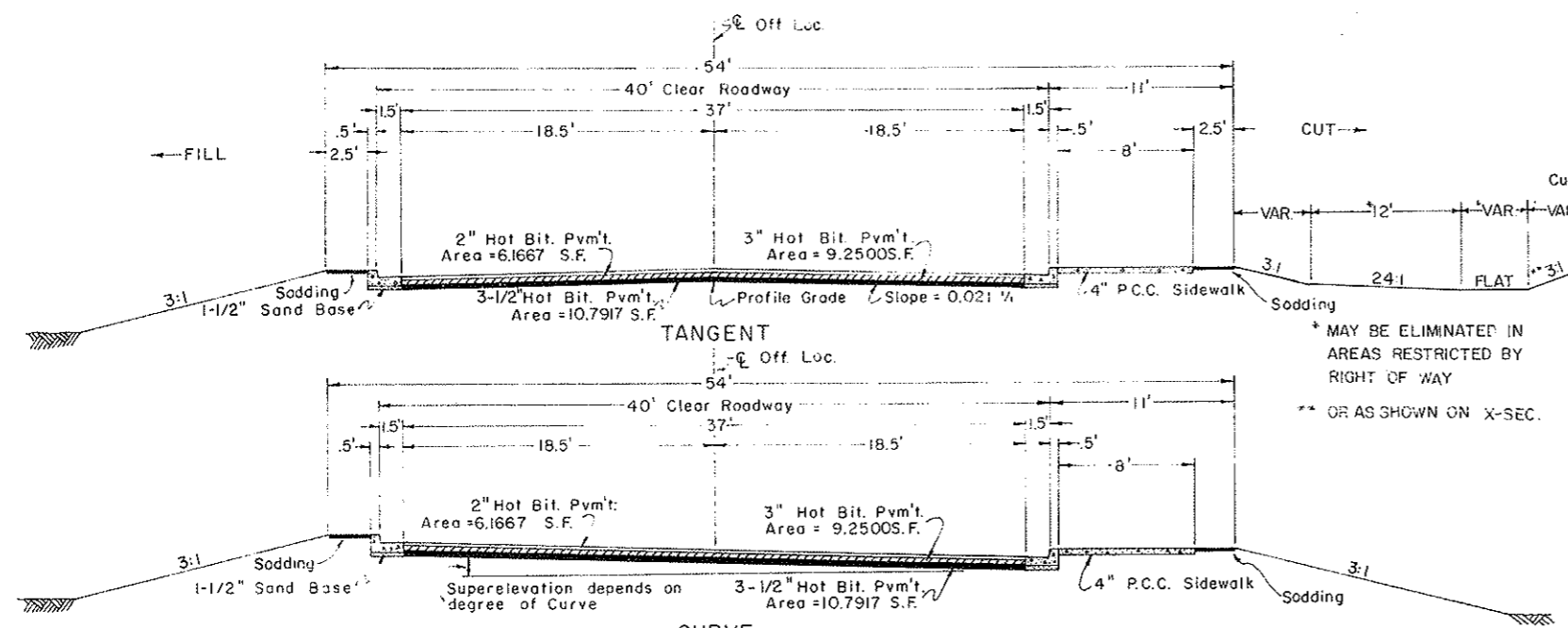
SPEC. NO.	208		228	610			612	616		622		624	750	202		
CODE NO.	0100	0110	0100	1112	0134	0138	0115	0362	5722	0020	0440	0460	0125	0100	3000	0105
LOCATION	CLASS 1 EXCAVATION	CLASS 2 EXCAVATION	SELECT BACKFILL	CLASS AE-1 CONCRETE SUB-STRUCTURES	CLASS AAE-3 CONCRETE I-BEAM SUPERSTRUCTURES	CLASS AAE-3 CONCRETE RAILING & POSTS	REINFORCING STEEL GRADE - 60	STRUCTURAL STEEL A36 WELDED GIRDER	STRUCTURAL STEEL A 572 WELDED GIRDER GRADE -50	STEEL PILING HP 10x42	STEEL TEST PILES HP 10x42 60FT.	STEEL TEST PILES HP 10x42 70FT.	PEDESTRAIN RAILING	LINSEED OIL TREATMENT	BRIDGE BENCH MARKS	REMOVAL OF STRUCTURE
	C.Y.	C.Y.	C.Y.	C.Y.	C.Y.	C.Y.	L.B.	L.B.	L.B.	L.F.	EACH	EACH	L.F.	GAL.	SET	LUMP SUM
	170	385	300	260	423	16	124,319	205,300	180,694	2670	2	2	249	23	1	1
GRAND TOTAL	170	385	300	260	423	16	124,319	205,300	180,694	2670	2	2	249	23	1	1

SUMMARY OF QUANTITIES

SPEC. NO.	203	201	216	204		420			401	406	708	712	716	726	728	203	630		302	630	630	630	630	714	714	705	746	756	762				
CODE NO.	0101	0330	0100			0100	0145	0160	0152	0185	0320	0300	0104	0116	0110	0140	0190	0100	0140	0055	0455	0325	5206	5210	5212	5215	0102	0110	0100	0100	3301		
LOCATION	COMMON EXCAVATION TYPE A	CLEARING AND GRUBBING	WATER	AVERAGE HAUL (NOT A PAY ITEM)		RC 250,800 LIQ. ASPH. OR CRS - 2 EMULS. ASPH. FOR SEAL COAT	COVER COAT MATERIAL CL. 43	BLOTTER MATERIAL CL. 44	SS1H OR CSS1H EMULS. ASPHALT FOR TACK COAT	HOT BITUMINOUS PAVEMENT CL. 24	120-150 ASPHALT CEMENT	CURB & GUTTER TYPE I	4" CONCRETE SIDEWALK	6" CONCRETE DRIVEWAY	ADJUST MANHOLE	ADJUST UTILITY APPURTENANCE	SEEDING TYPE B CLASS I OR II	SODDING	BORROW	6" CORRUGATED STEEL PIPE	8" CORRUGATED STEEL PIPE	END SECTIONS	AGGREGATE SURFACE COURSE CLASS 6	6" PRESSURE PVC SEWER PIPE	8" PVC SEWER PIPE	10" PVC SEWER PIPE	15" PVC SEWER PIPE	MANHOLES TYPE A	MANHOLE RISER 48"	MOBILIZATION	FLAGGING	FIELD LABORATORY TYPE A	MTC & PROTECTION OF TRAFFIC 2 LANE GRAD. & SURE
	C.Y.	L.SUM	M.GAL	C.Y.	STA.	GAL.	TON	TON	GAL.	TON	TON	L.F.	S.Y.	S.Y.	EACH	EACH	ACRE	S.Y.	C.Y.	L.F.	EA.	TON	L.F.	L.F.	L.F.	L.F.	EA.	L.F.	L.SUM	M.HR.	EACH	L.SUM	
	12,122	1	126	14456	3.3	2278	78	19	657	3192	230	1701	679	49	1	1	3	455	12569	26	2	400								1	400	1	1
CITY OF MANDAN FUNDS ONLY																							404	76	303	8	2	17					
GRAND TOTAL	12,122	1	126	14456	3.3	2278	78	19	657	3192	230	1701	679	49	1	1	3	455	12569	26	2	400	404	76	303	8	2	17	1	400	1	1	

1. GENERAL: THE ENGINEER WILL ATTEND TO THE REMOVAL OF EXISTING FENCES TO THE HIGHWAY RIGHT-OF-WAY LINE AND TO THE RELOCATION OR ADJUSTMENT OF UTILITY FACILITIES AS SHOWN ON THE PLANS. ALL PRIVATELY OWNED LIGHT POLES, GUARD POSTS, SIGNS, ETC. WITHIN THE RIGHT-OF-WAY LIMITS SHALL BE REMOVED BY THE OWNER.
2. UTILITIES: SEPARATE PLANS, IF ANY, SHOWING THE UTILITY RELOCATION OR ADJUSTMENT WORK TO BE PERFORMED BY THE UTILITY COMPANIES TO ACCOMMODATE HIGHWAY CONSTRUCTION WILL BE MADE AVAILABLE TO THE CONTRACTOR UPON REQUEST TO THE ENGINEER.
3. SHRINKAGE: 25% ADDITIONAL VOLUME IN YARDAGE COMPUTED BY THE END AREA METHOD IS ALLOWED FOR SHRINKAGE IN EARTH EMBANKMENT.
4. CLASS OF CONCRETE: THE CLASS OF CONCRETE USED IN THE CURB AND GUTTER, SIDEWALKS, AND DRIVEWAYS SHALL BE CLASS A. THE CONTRACTOR SHALL HAVE THE OPTION OF USING AGGREGATE SIZE NO. 1,3,4 OR 5 DEFINED IN SECTION 806-2 OF THE STANDARD SPECIFICATIONS.
5. COMPACTION AND DENSITY CONTROLS: THE EMBANKMENT SHALL BE COMPACTED IN ACCORDANCE WITH SECTION 203-2.3.2 OF THE STANDARD SPECIFICATIONS.
6. UNDERGROUND CABLES: THE CONTRACTOR SHALL NOTIFY THE ENGINEER SUFFICIENTLY IN ADVANCE OF BEGINNING EXCAVATION IN AREAS OF UNDERGROUND UTILITIES SO THAT ARRANGEMENTS MAY BE MADE TO HAVE THE UTILITY OWNERS DETERMINE LOCATIONS AND DEPTHS.
7. ADJUST MANHOLES: AT THE LOCATION DESIGNATED ON THE PLAN FOR ADJUST MANHOLE, THE CONTRACTOR SHALL FURNISH A NEW MANHOLE CASTING. THE EXISTING CASTING SHALL BE CAREFULLY REMOVED AND DELIVERED TO A SITE DESIGNATED BY THE ENGINEER. COST OF THE NEW CASTING AND REMOVAL AND DELIVERY OF THE EXISTING CASTING SHALL BE INCLUDED IN THE PRICE BID FOR "ADJUST MANHOLES."
8. DRAINAGE: THE CONTRACTOR SHALL PROVIDE SUFFICIENT TEMPORARY DRAINAGE FACILITIES TO KEEP THE ROADWAY AND CONSTRUCTION AREA DRAINED TO THE SATISFACTION OF THE ENGINEER.
9. SIDEWALK: AT LOCATIONS WHERE THE NEW SIDEWALK ABUTTS THE EXISTING SIDEWALK (OR OTHER CONCRETE SURFACING) AND THE GRADES DO NOT MATCH THE CONTRACTOR SHALL REMOVE AND REPLACE AS MUCH OF THE EXISTING SIDEWALK AS DEEMED NECESSARY BY THE ENGINEER TO OBTAIN A REASONABLY SMOOTH PROFILE. REMOVAL OF EXISTING SIDEWALK SHALL NOT BE A SEPARATE PAY ITEM BUT SHALL BE INCLUDED IN THE PRICE BID FOR OTHER ITEMS.
10. REMOVAL OF TREES: REMOVAL OF BRUSH AND TREES NECESSARY TO FACILITATE CONSTRUCTION OF THIS PROJECT SHALL NOT BE PAID FOR SEPARATELY BUT SHALL BE INCLUDED IN THE PRICE BID FOR CLEARING & GRUBBING. NO TREES OUTSIDE THE CONSTRUCTION AREAS SHALL BE DESTROYED WITHOUT APPROVAL OF THE ENGINEER.
11. CONSTRUCTION SEQUENCE: THE CONTRACTOR SHALL FOLLOW THE CONSTRUCTION SEQUENCE LISTED BELOW.
 1. CONSTRUCT THE STRUCTURE AND PLACE THE FILL NECESSARY TO CONSTRUCT THE STRUCTURE. IT IS SUGGESTED THIS FILL MATERIAL BE OBTAINED FROM BORROW AREAS.
 2. COORDINATE THE FIRST STAGE CONSTR. WORK WITH THE COMPLETION OF BRIDGE CONSTR. THEREBY RETAINING THE EXISTING RDWY. FOR TRAFFIC FOR THE MAXIMUM LENGTH OF TIME. DURING CONSTRUCTION OF THE FIRST STAGE ONE WAY TRAFFIC MAY BE MAINTAINED ON THE WEST HALF OF THE OLD RDWY.
 3. ROUTE TRAFFIC AFTER INSTALLING 2" AGGR. SURF. CRSE. ON THE COMPLETED FIRST STAGE. CONSTRUCT THE REMAINING PORTION OF THE ROADBED WITH A 24' WIDTH OF AGGR. SURF. CRSE.
12. ACCESS POINTS: FINAL DETAILS ON LOCATION OF ACCESS POINTS AND CONSTRUCTION PROCEDURES SHALL BE WORKED OUT WITH THE ENGINEER IN THE FIELD PRIOR TO THE START OF THE PROJECT.
13. DIMENSIONS: DIMENSIONS SHOWN ON THE TYPICAL SECTION FOR SURFACING COURSES ARE APPROXIMATE ONLY. PLAN QUANTITIES WILL BE PLACED UNIFORMLY EXCEPT WHERE OTHERWISE AUTHORIZED BY THE ENGINEER.
14. QUANTITIES: TOTAL QUANTITIES HAVE BEEN ROUNDED OFF TO THE NEAREST WHOLE UNIT FOR BIDDING PURPOSES.
15. BENCHING: THE INSLOPES ON THE RIGHT SIDE OF THE FIRST STAGE EMBANKMENT SHALL BE BENCHED UNLESS OTHERWISE DIRECTED BY THE ENGINEER. BENCHES SHALL BE DEEP ENOUGH TO PROVIDE SUFFICIENT WIDTH TO PERMIT PLACING, SPREADING, AND COMPACTING EQUIPMENT TO OPERATE AND EACH BENCH SHALL BE THOROUGHLY COMPACTED BEFORE ADDITIONAL EMBANKMENT IS PLACED. COST OF BENCHING SHALL BE INCLUDED IN THE PRICE BID FOR COMMON EXCAVATION.
16. TOPSOIL: REMOVAL OF TOPSOIL FROM EXCAVATION AREAS WILL BE PAID FOR AS COMMON EXCAVATION. REMOVAL OF TOPSOIL FROM EMBANKMENT AREAS WILL BE INCLUDED IN THE PRICE BID FOR CLEARING AND GRUBBING. TOPSOIL FROM CLEARING AND GRUBBING AREAS IS APPROXIMATELY 1308 C.Y.
17. HOT BIT PAVEMENT: THE 6 1/2" HOT BIT PAVEMENT SHALL BE LAID IN TWO COURSES AS SHOWN ON THE TYPICAL SECTIONS.
18. TACK COAT: WHEN DIRECTED BY THE ENGINEER, THE EMULSIFIED ASPHALT FOR TACK COAT SHALL BE DILUTED WITH WATER PRIOR TO APPLICATION IN A 50:50 RATIO OR OTHER APPROVED PROPORTIONS. COST OF WATER SHALL BE INCLUDED IN THE PRICE BID FOR EMULSIFIED ASPHALT FOR TACK COAT.
19. LOOSE AND EXCESS CHIPS: ALL LOOSE AND EXCESS CHIPS SHALL BE REMOVED FROM THE ROADWAY BY SWEEPING AS SOON AS PRACTICABLE AFTER SEALING AND NO LATER THAN FIVE DAYS AFTER THE SEAL HAS BEEN APPLIED. THE SWEEPING OF LOOSE CHIPS FROM THE SHOULDER ONTO THE NEW SEALED SURFACE WILL NOT BE PERMITTED.
20. CURB & GUTTER: THE 6" LIP CURB AND GUTTER TYPE 1, 10" LIP CURB AND GUTTER TYPE 1, AND THE GUTTER TYPE 1 SHALL ALL BE PAID FOR AS CURB AND GUTTER TYPE 1.
 6" LIP CURB AND GUTTER EQUALS: 885' (21+47.9 TO 26+00)
 10" LIP CURB AND GUTTER EQUALS: 780' (26+00 TO 28+45 & 30+95 TO 32+40)
 GUTTER EQUALS: 36' (AT CONC. DRIVEWAY OPENINGS)
21. CURB & GUTTER AT BRIDGE ENDS: THE REINFORCED CURB & GUTTER AT THE BRIDGE ENDS (SEE SHEET # 7) SHALL NOT BE A SEPARATE PAY ITEM BUT SHALL BE INCLUDED IN THE PRICE BID FOR CURB & GUTTER TYPE 1.
22. REMOVE & RESET GATES: ALL EQUIPMENT & MATERIAL NEEDED TO REMOVE & RESET THE GATES AT 20+00 LT. & RT. SHALL BE INCLUDED IN THE PRICE BID FOR OTHER ITEMS.
23. TREES: THE TREES REMOVED ON THIS PROJECT SHALL BE CUT IN 10' LENGTHS MAX. OR AS DIRECTED BY THE ENGINEER & STOCKPILED ON THE CITY LANDFILL AREA FOR USE BY THE STATE PARK SERVICE.
24. PRIVATE PROPERTY WITHIN RIGHT OF WAY - ALL PRIVATELY OWNED LIGHT POLES, GUARD POSTS, SIGNS, ETC. WITHIN THE R/W LIMITS SHALL BE REMOVED BY THE OWNER.
25. BORROW: BORROW MAY BE OBTAINED FROM THE CITY LAND FILL AREA. BORROW MAY BE HAULED ACROSS THE EXISTING BRIDGE, BUT LIMITED TO THE LOADING (LIVE & DEAD) OF 22 TONS UNLESS OTHERWISE APPROVED BY THE ENGINEER.

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	501-1-101-101	5



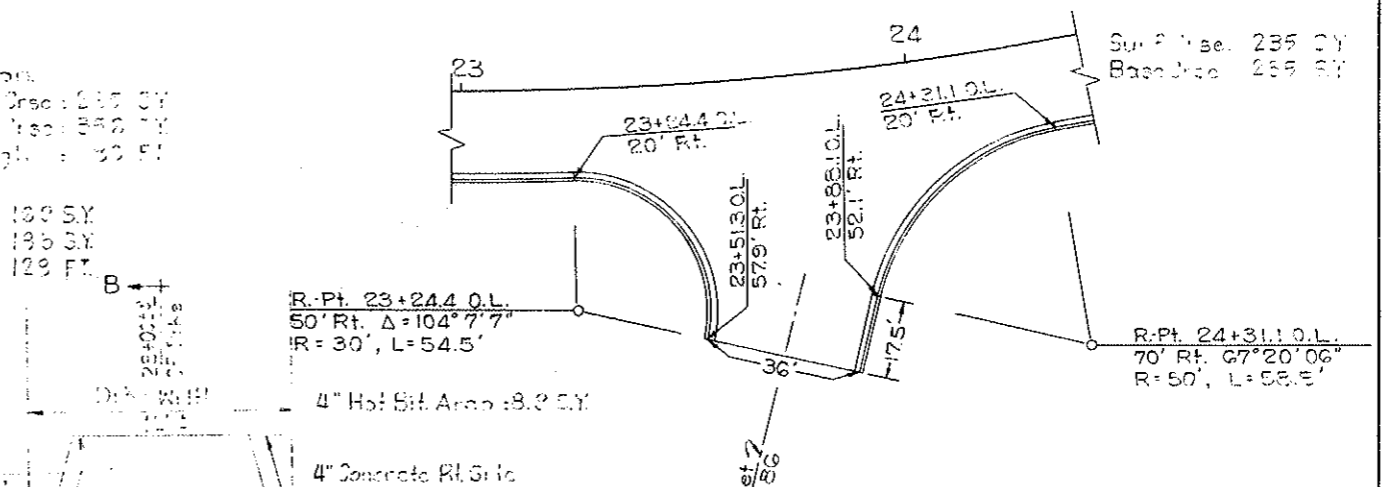
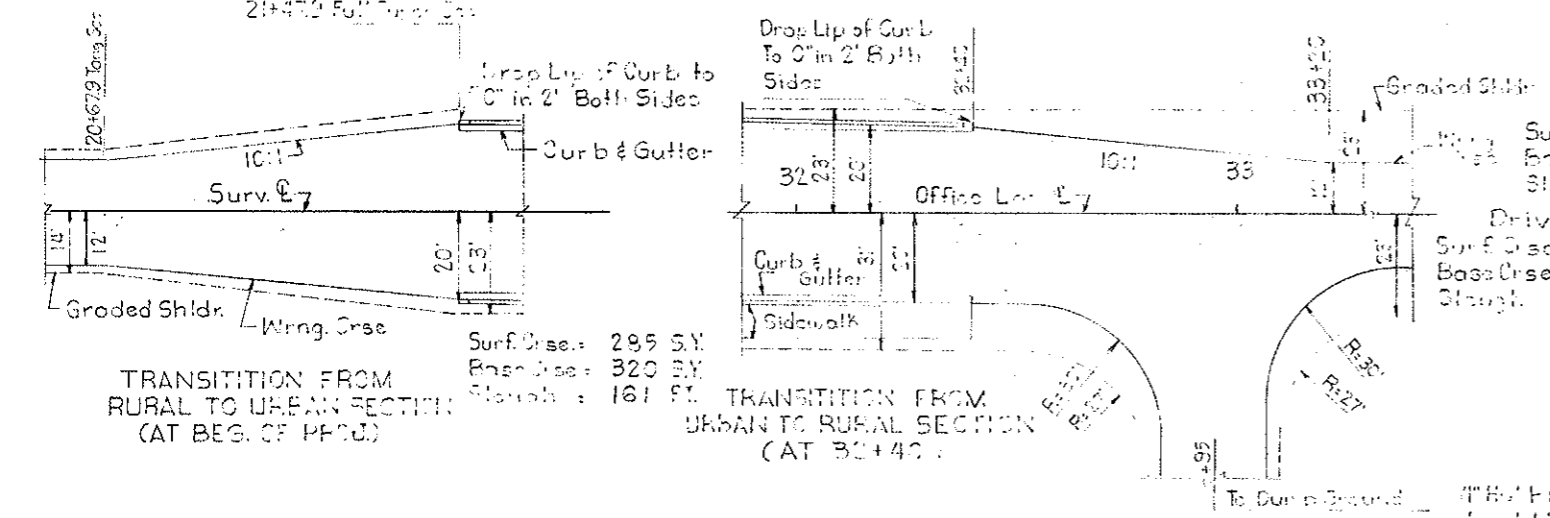
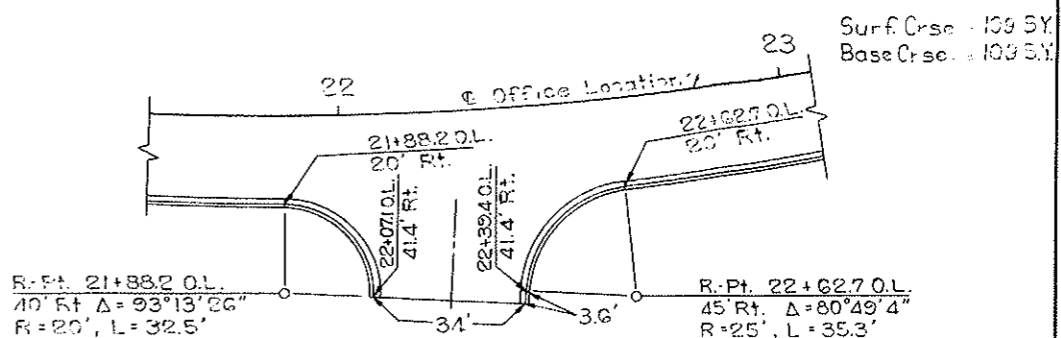
CONCRETE DRIVEWAY DETAILS

NOTE: The Contractor may use a 5" top of curb in place of a 6" top. The face of curb will be measured 6" from the back side of the curb in all cases.

BASIS OF ESTIMATE, ST. INTERSECTION DETAIL.
 & SUMMARY OF QUANTITIES

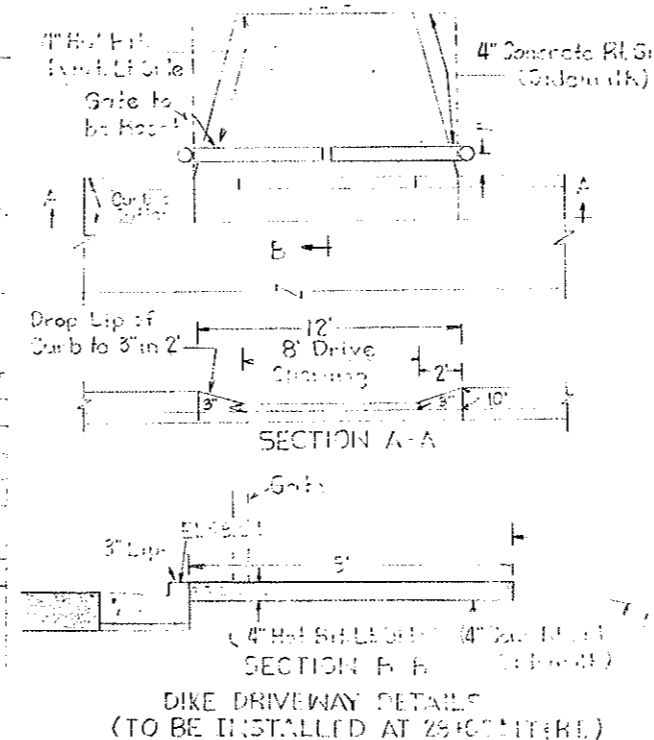
FED. ROAD DIST. NO.	STATE	PROJ. NO.	SHEET NO.
8	N.D.	BRS-1806(05)	6

DESCRIPTION	ESTIMATED QUANTITIES						
	216 0120	406 0189	406 0320	401 0152	420 0100	420 0145	420 0160
21+47.9 to 28+45 Urban	WATER	HOT BIT. PAVEMENT CLASS 24	120-150 ASPHALT CEMENT	55-14 or 035-14 Emul. Asph. for Tack Coat	RC 250-300 Lb. for Tack Coat	RC 250-300 Lb. for Seal Coat	COVER COAT MATERIAL CLASS 43
30+95 to 32+40 Urban	"MGAL	TON	TON	GAL	GAL	TON	TON
33+20 to 37+70.9 Rural	.3	1553.3	97.5	282.6	1003.1	35.8	8.6
20+67.9 to 21+47.9 Rural to Urban Transition	.1	281.5	20.3	59.6	208.6	7.5	1.8
32+40 to 33+20 Urban to Rural Transition	.2	948.4	38.3	101.8	641.3	20.0	4.8
Street Int. 6 th & 7 th		130.1	11.9	50.3	106.8	3.6	.9
Dike Drive Lt Side		173.8	12.6	32.1	114.0	3.6	.9
Rural Drives 32+35 RL & 34+02 LL		162.5	11.7	34.4	120.5	4.3	1.0
GRAND TOTAL	1	3192	230	657	2073	78	19



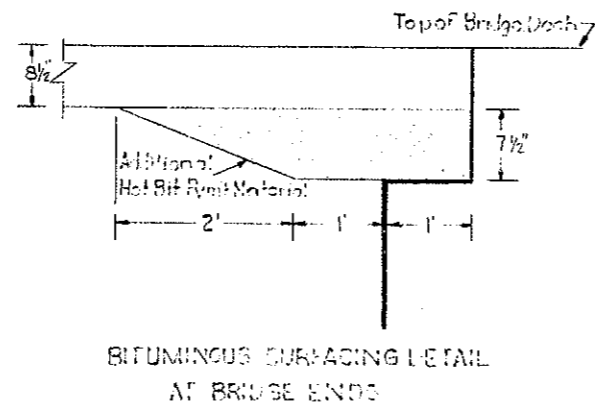
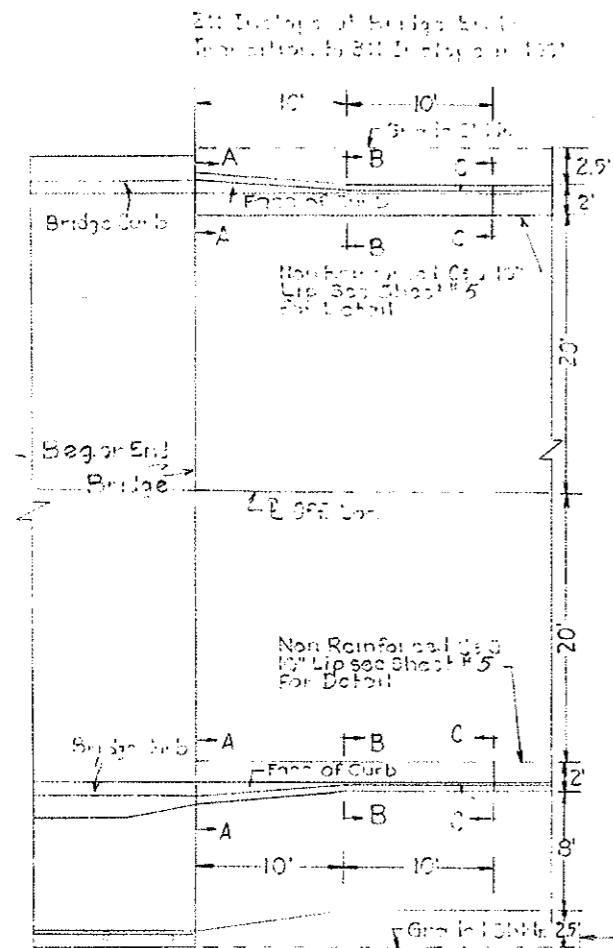
URBAN	RURAL	QUANTITY PER STA	DESCRIPTION	QUANTITY PER STA
0.47	0.47	MGAL	Water for Dust Pollution - 25 MGAL/MI	
79.94	95.14	3 1/2" T	Hot Bit Pavement (Base Course) @ 2.0 Ton/3 Y	19444
5.76	6.92	TON	120-150 Asphalt Cement for Hot Bit Pavement @ 7.2% of Hot Bit Pavement	21400
20.55	23.89	3" G	55-14 or 035-14 Emul. Asph for Tack Coat @ 0.9 Gal/3 Y	109
68.51	76.85	3" T	Hot Bit Base Course @ 2.0 Ton/3 Y	16667
4.33	5.52	TON	120-150 Asphalt Cement for Hot Bit Pavement @ 7.2% of Hot Bit Pavement	21200
20.55	18.61	3" G	55-14 or 035-14 Emul. Asph for Tack Coat @ 0.9 Gal/3 Y	109
45.88	37.35	2" T	Hot Bit Pavement (Surf Course) @ 2.0 Ton/3 Y	11111
3.29	2.60	TON	120-150 Asphalt Cement for Hot Bit Pavement @ 7.2% of Hot Bit Pavement	20800
143.95	124.44	3" G	RC 250-300 Lb. for Tack Coat @ 0.37 Gal/3 Y	35
	17.78	8" U	RC 250-300 Lb. Asph. for Seal Coat @ 0.25 Gal/3 Y	20
5.14	4.44	TON	Cover Coat Material Class 43 @ 25 Lb/3 Y	125
1.23	1.07	TON	Blotter Material Class 44 @ 25 Lb/3 Y	1003

MAXIMUM SIZE OF AGGREGATE		
DESCRIPTION	TYPE OF PAVEMENT	SIZE
Hot Bit Pavement Class 23	Crushed	3/4"
Blotter Material Class 44	Screened	3/8"
Cover Coat Material Class 43		1/2"



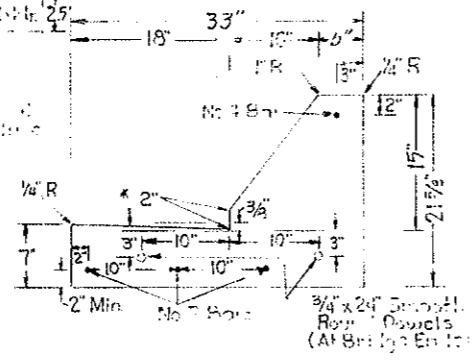
* Check to be credited by the Engineer
 ** Quantity shown does not include water

DIKE DRIVEWAY DETAILS
 (TO BE INSTALLED AT 25% CONTRACT)

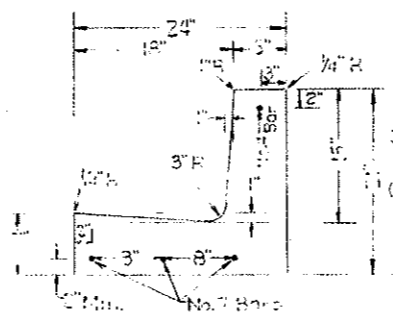


PLAN

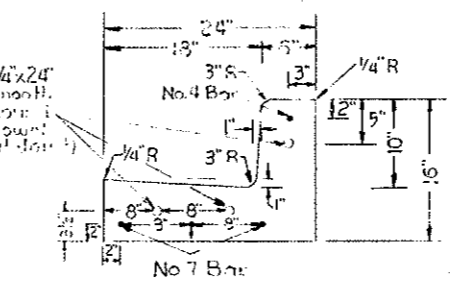
Note
 Reinforce 2" Vertical
 Face of Curb for
 5' From End



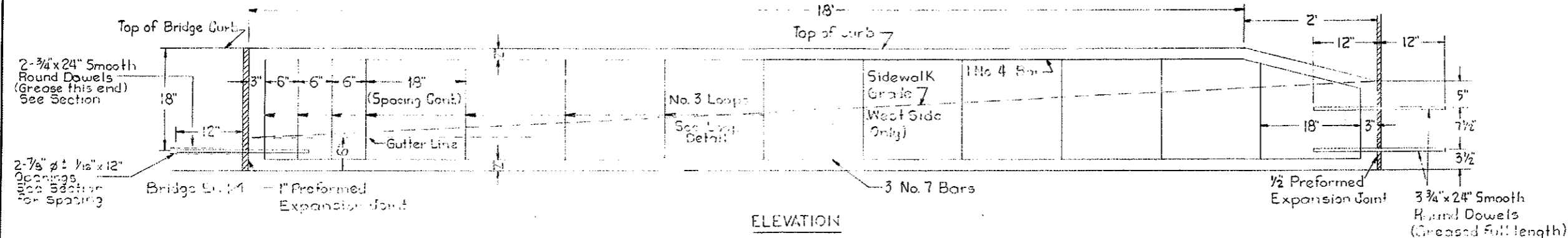
SECTION A-A



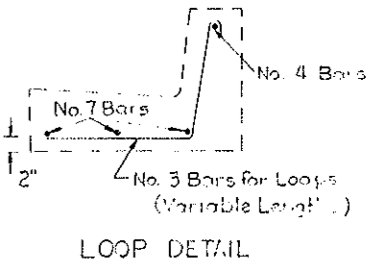
SECTION B-B



SECTION C-C



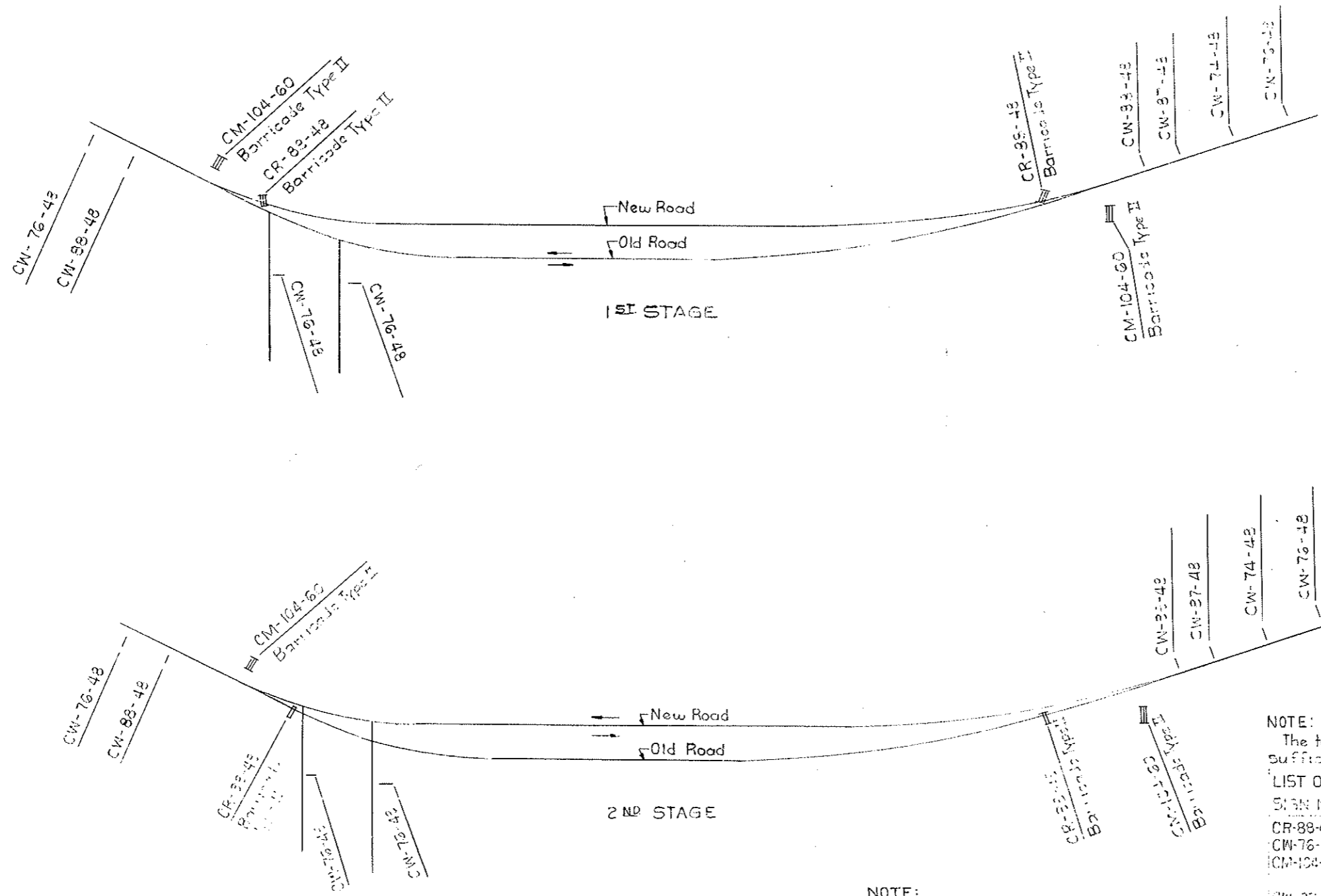
ELEVATION



LOOP DETAIL

CONSTRUCTION PLAN

FED. ROAD DIST. NO.	STATE	PROJ. NO.	SHEET NO.
8	N.D.	BRS-1-8716(05)	8



NOTE:
 Delineators shall be installed as directed by the Engineer during Roadbed Construction Operations. The Sign Inventory includes Delineators for this Installation. The Delineators shall have Reflectorized Plates on both sides.

NOTE:
 The total Quantities of Signs shown are sufficient for one stage.

LIST OF CONSTRUCTION SIGNS & BARRICADES

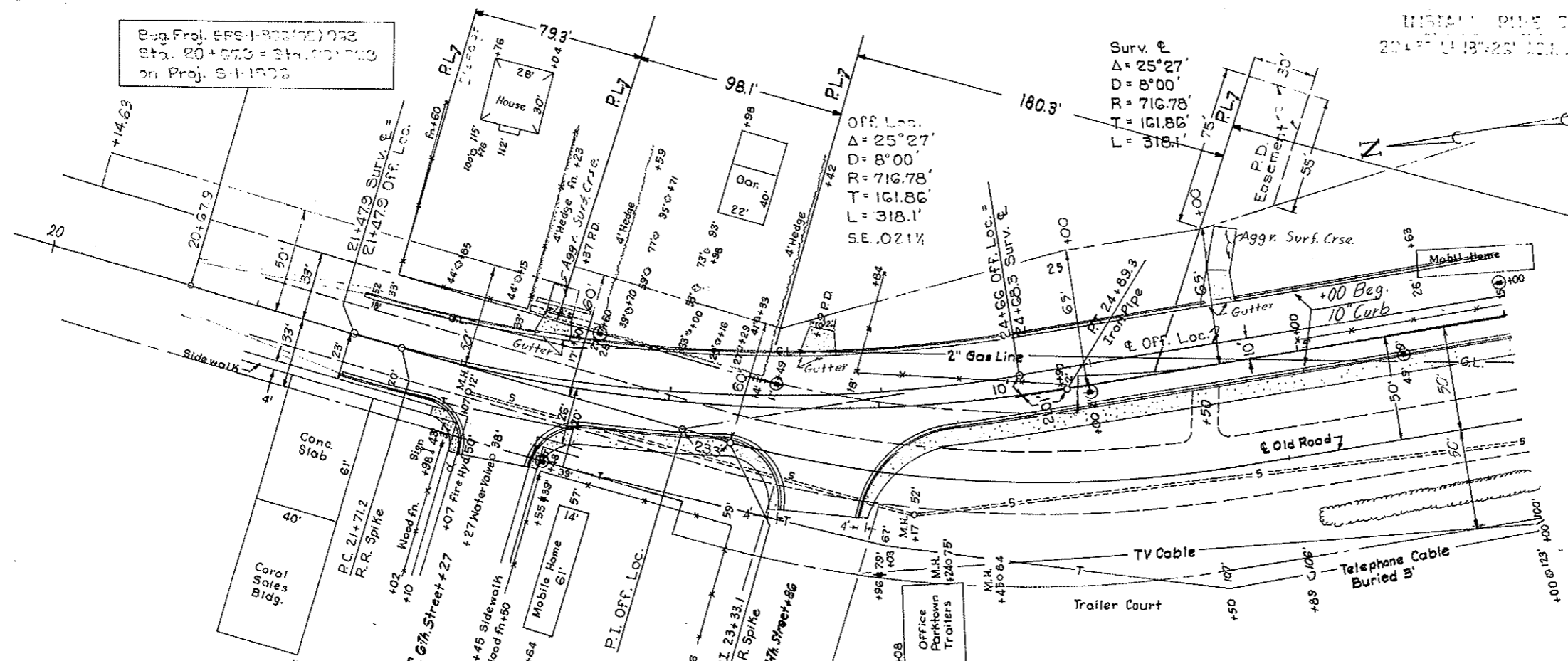
SIGN NO.	SIGN NAME	NO.
CR-88-48	Road Closed	3
CW-76-48	Road Construction Ahead	5
CM-104-60	End Construction	3
CW-97-48	One Lane Road 500 Ft.	2
CW-93-48	One Lane Road Ahead	3
CW-74-48	Road Construction 1000 Ft.	2
	Flare	30
	Orange Flag	20
	Barricade Type II	7
	Delineators	140

Eng. Proj. EFC-1-802 (05) 032
 Sta. 20+00.00 = Sta. 20+00.00
 on Proj. S-1-1922

INSTALL PIPE CULVERT
 20+47.9 (18'x23') to 21+65.5 (18'x23')

8 N.D. EFC-1-802 (05) 9

BENCH MARK		ELEV.
NO.	DESCRIPTION	LOCATION
	Curb Inlet	Cor. Main & 6th Ave. NE
	Fire Hydrant	22+07.50 Rt. E
	Man Hole	24+17 Rt.
		1643.47
		1647.40
		1648.88



INSTALL CONCRETE DRIVEWAYS

22+37 Off. Loc. Lt.	15 S.Y.
23+59 Off. Loc. Lt.	17 S.Y.
25+65 Off. Loc. Lt.	17 S.Y.

INSTALL CONCRETE SIDEWALK

21+94 to 22+07.1 Rt. Off. Loc.	16.0 S.Y.
22+39.4 to 23+51.3 Rt. Off. Loc.	113.8 S.Y.
23+84 to 27+00 Rt. Off. Loc.	290.0 S.Y.

ADJUST UTILITY APPURTENANCES

22+27 - 38' Rt. Water Valve 1

ADJUST MANHOLE

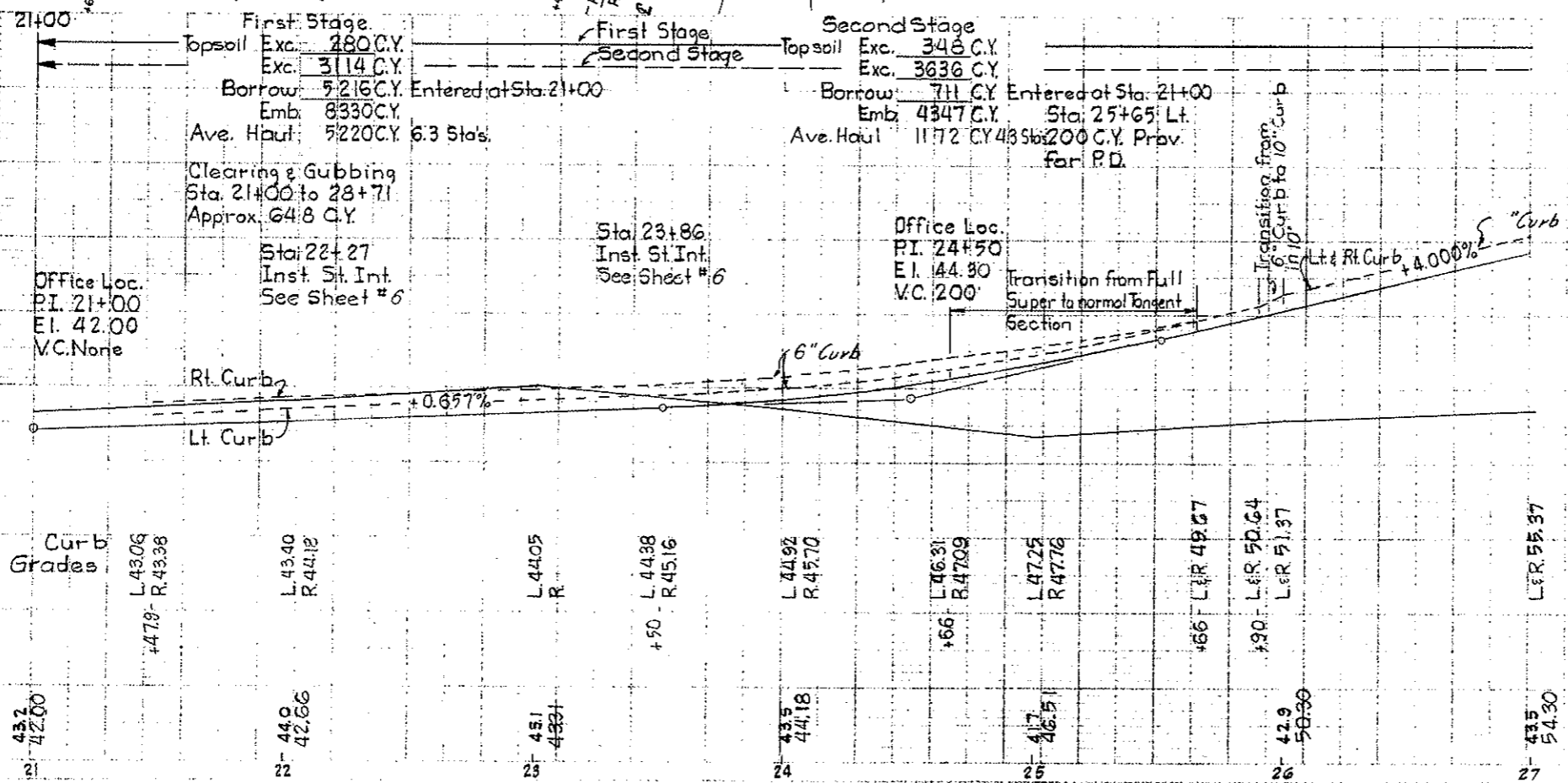
22+07 - 12' Rt. 1

INSTALL SODDING

21+47.9 Lt. to 22+31 Lt. Off. Loc.	23 S.Y.
22+43 Lt. to 23+63 Lt. Off. Loc.	33 S.Y.
23+75 Lt. to 25+59 Lt. Off. Loc.	51 S.Y.
25+71 Lt. to 27+00 Lt. Off. Loc.	36 S.Y.
21+47.9 Rt. to 22+03 Rt. Off. Loc.	20 S.Y.
22+43 Rt. to 23+46 Rt. Off. Loc.	42 S.Y.
23+88 Rt. to 27+00 Rt. Off. Loc.	96 S.Y.

INSTALL CURB & GUTTER TYPE I

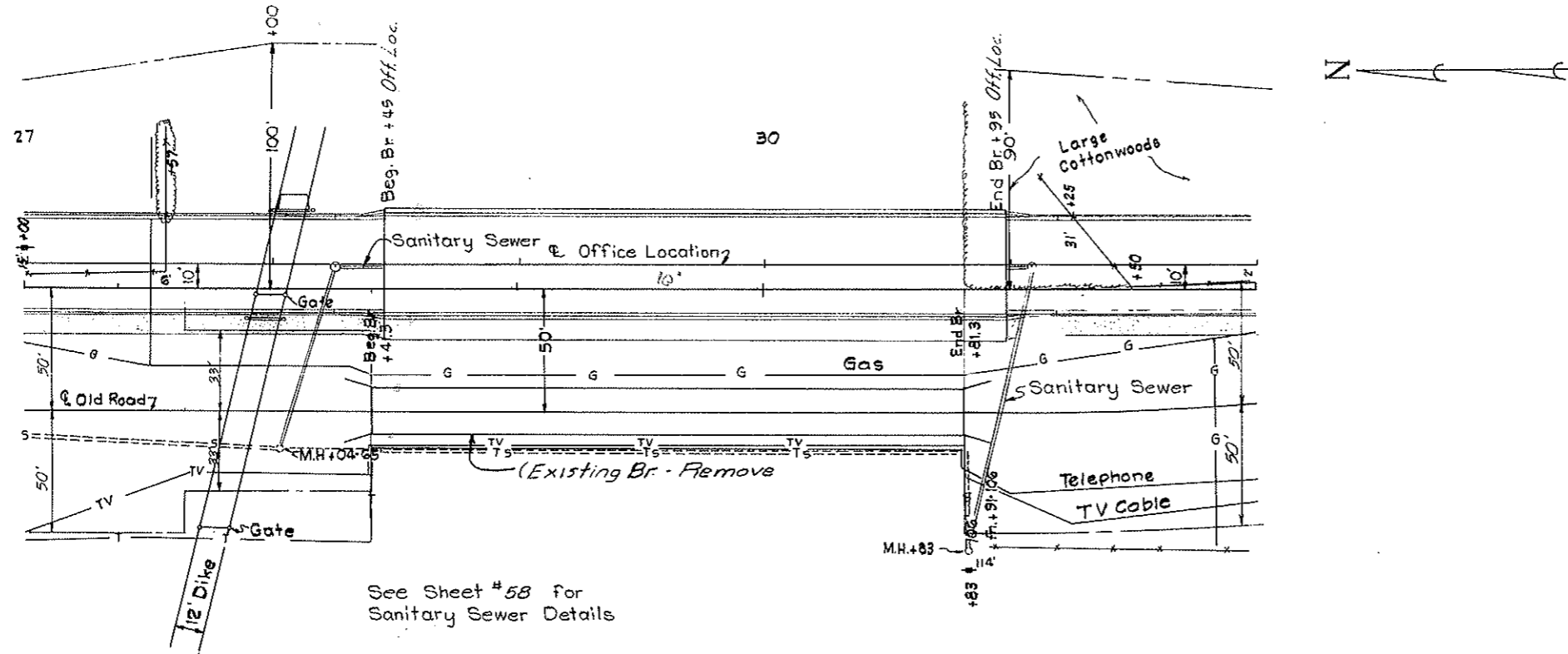
21+47.9 Lt. to 27+00 Lt. Off. Loc.	552.1 L.F.
21+47.9 Rt. to 22+07.1-41.4 Rt. Off. Loc.	728 L.F. 1645
22+39.4-45.0 Rt. to 23+51.3-57.9 Rt. Off. Loc.	151.5 L.F.
23+84-88 Rt. to 27+00 Rt. Off. Loc.	345.2 L.F.



Station	Topsoil Exc.	Borrow	Emb.	Ave. Haul	Notes
21+00 <td>280 C.Y. <td>5216 C.Y. <td>8330 C.Y. <td>5220 C.Y. <td>Entered at Sta. 21+00</td> </td></td></td></td>	280 C.Y. <td>5216 C.Y. <td>8330 C.Y. <td>5220 C.Y. <td>Entered at Sta. 21+00</td> </td></td></td>	5216 C.Y. <td>8330 C.Y. <td>5220 C.Y. <td>Entered at Sta. 21+00</td> </td></td>	8330 C.Y. <td>5220 C.Y. <td>Entered at Sta. 21+00</td> </td>	5220 C.Y. <td>Entered at Sta. 21+00</td>	Entered at Sta. 21+00
21+00 to 28+71 <td>3114 C.Y. <td>5216 C.Y. <td>8330 C.Y. <td>5220 C.Y. <td>Approx. 648 C.Y. Clearing & Gubbing</td> </td></td></td></td>	3114 C.Y. <td>5216 C.Y. <td>8330 C.Y. <td>5220 C.Y. <td>Approx. 648 C.Y. Clearing & Gubbing</td> </td></td></td>	5216 C.Y. <td>8330 C.Y. <td>5220 C.Y. <td>Approx. 648 C.Y. Clearing & Gubbing</td> </td></td>	8330 C.Y. <td>5220 C.Y. <td>Approx. 648 C.Y. Clearing & Gubbing</td> </td>	5220 C.Y. <td>Approx. 648 C.Y. Clearing & Gubbing</td>	Approx. 648 C.Y. Clearing & Gubbing
21+00 to 28+71 <td>348 C.Y. <td>711 C.Y. <td>4347 C.Y. <td>1172 C.Y. <td>Entered at Sta. 21+00</td> </td></td></td></td>	348 C.Y. <td>711 C.Y. <td>4347 C.Y. <td>1172 C.Y. <td>Entered at Sta. 21+00</td> </td></td></td>	711 C.Y. <td>4347 C.Y. <td>1172 C.Y. <td>Entered at Sta. 21+00</td> </td></td>	4347 C.Y. <td>1172 C.Y. <td>Entered at Sta. 21+00</td> </td>	1172 C.Y. <td>Entered at Sta. 21+00</td>	Entered at Sta. 21+00
25+65 <td>3636 C.Y. <td>711 C.Y. <td>4347 C.Y. <td>1172 C.Y. <td>Entered at Sta. 25+65 Lt. far P.D.</td> </td></td></td></td>	3636 C.Y. <td>711 C.Y. <td>4347 C.Y. <td>1172 C.Y. <td>Entered at Sta. 25+65 Lt. far P.D.</td> </td></td></td>	711 C.Y. <td>4347 C.Y. <td>1172 C.Y. <td>Entered at Sta. 25+65 Lt. far P.D.</td> </td></td>	4347 C.Y. <td>1172 C.Y. <td>Entered at Sta. 25+65 Lt. far P.D.</td> </td>	1172 C.Y. <td>Entered at Sta. 25+65 Lt. far P.D.</td>	Entered at Sta. 25+65 Lt. far P.D.

Station	Left Curb Grade	Right Curb Grade
21+00	43.2	42.00
22+00	43.06	43.38
22+40	43.40	44.12
23+00	44.05	44.31
23+50	44.38	45.16
24+00	44.92	45.70
24+50	46.31	47.09
25+00	47.25	47.76
25+65	49.57	49.57
26+00	50.64	51.37
27+00	55.37	54.30

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	BRS-1-B06(05)	10

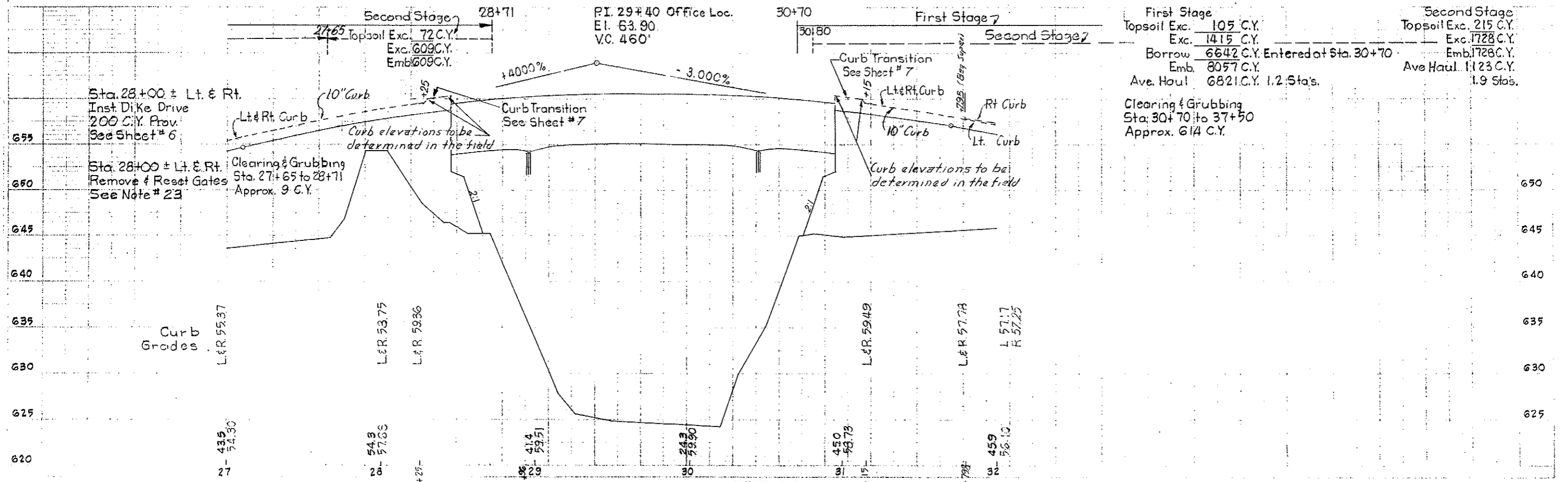


INSTALL CURB & GUTTER TYPE - I
 27+00 Lt. to 28+45 Lt. Off. Loc. 145 L.F.
 30+95 Lt. to 32+00 Lt. Off. Loc. 105 L.F.
 27+00 Rt. to 28+45 Rt. Off. Loc. 145 L.F.
 30+95 Rt. to 32+00 Rt. Off. Loc. 105 L.F.

INSTALL CONCRETE SIDEWALK
 27+00 Rt. to 28+45 Rt. Off. Loc. 128.9 S.Y.
 30+95 Rt. to 32+00 Rt. Off. Loc. 93.3 S.Y.

INSTALL SODDING
 27+00 Lt. to 27+94 Lt. Off. Loc. 265 Y.
 28+06 Lt. to 28+45 Lt. Off. Loc. 11 S.Y.
 30+95 Lt. to 32+00 Lt. Off. Loc. 295 Y.
 27+00 Rt. to 27+94 Rt. Off. Loc. 265 Y.
 28+06 Rt. to 28+45 Rt. Off. Loc. 11 S.Y.
 30+95 Rt. to 32+00 Rt. Off. Loc. 295 Y.

See Sheet #58 for Sanitary Sewer Details



Off Loc. $\Delta = 13^{\circ}14'$ Lt.
 $D = 3^{\circ}00'$
 $R = 1910.08'$
 $T = 221.57'$
 $L = 441.1'$

Surv. E
 $\Delta = 13^{\circ}14'$ Lt.
 $D = 3^{\circ}00'$
 $R = 1910.08'$
 $T = 221.57'$
 $L = 441.1'$

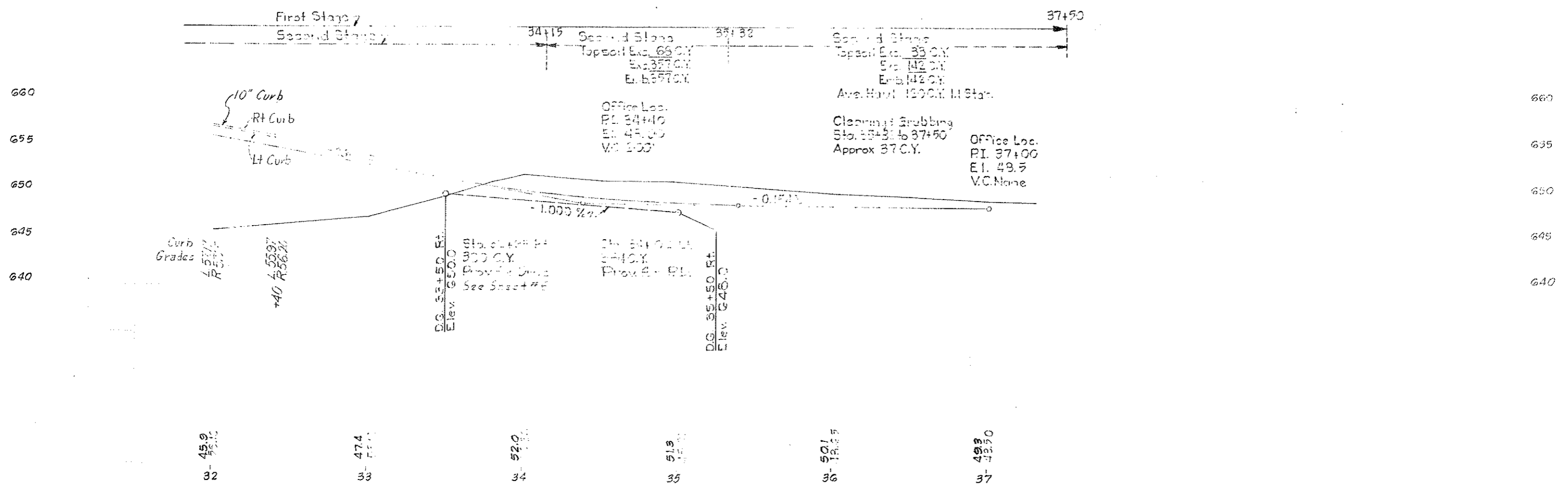
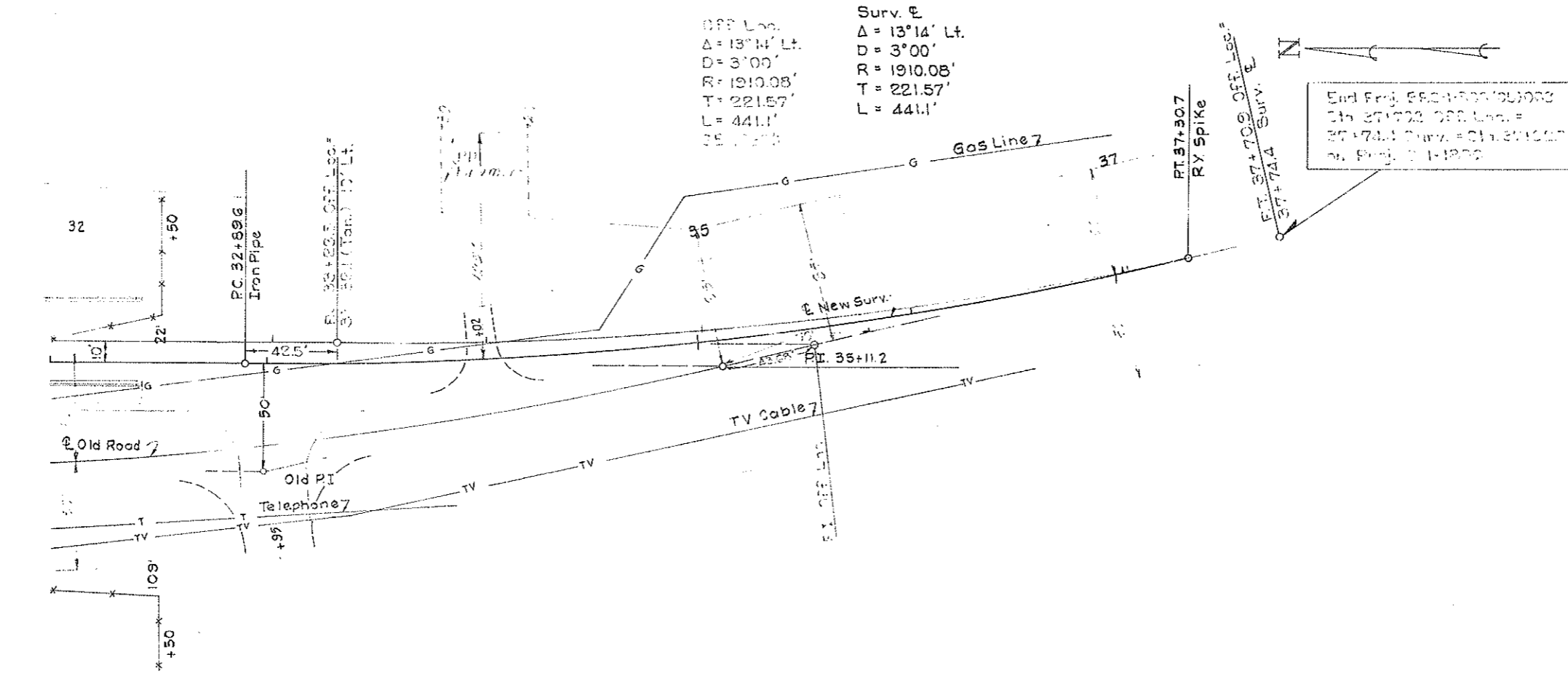
NO.	REV.	DATE	BY
2	NO	REVISIONS	11

End Proj. 82+00 to 82+50
 Sta. 37+00 to 37+50
 37+00 to 37+50
 37+00 to 37+50

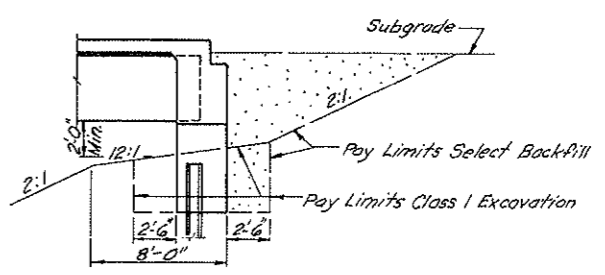
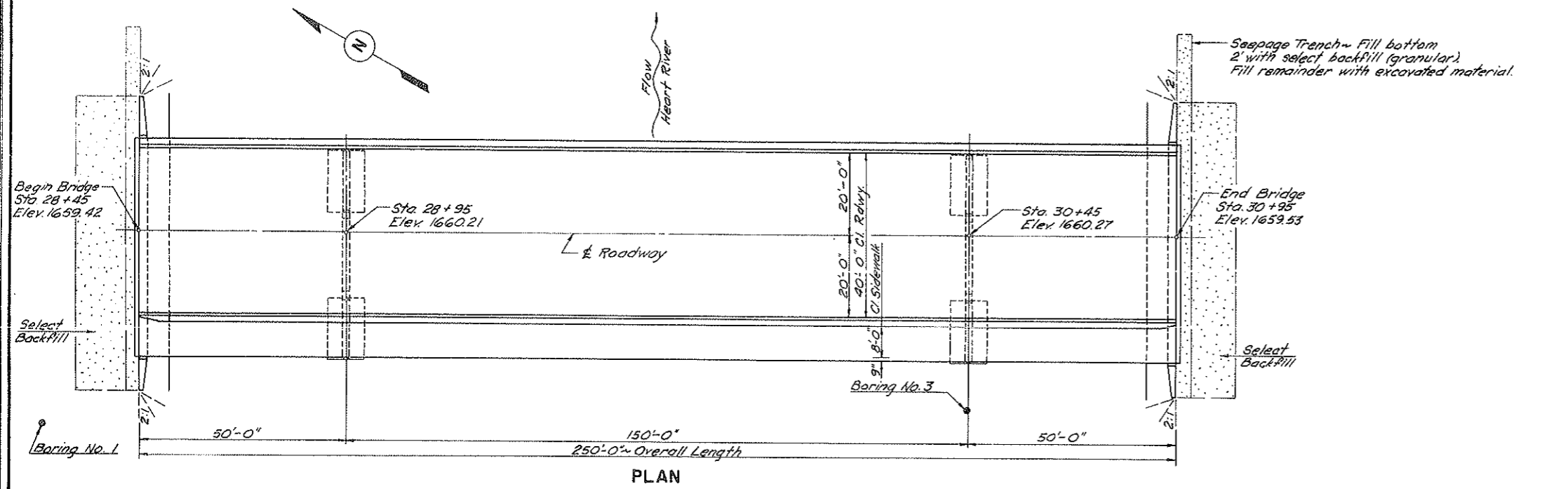
INSTALL CURB & GUTTER TYPE - I
 32+00 LT to 32+40 LT OFF Loc. 40' LT
 32+00 RT to 32+40 RT OFF Loc. 40' RT

INSTALL CONCRETE SIDEWALK
 32+00 RT to 32+40 RT OFF Loc. 37' RT

INSTALL SODDING
 32+00 LT to 32+40 LT OFF Loc. 110' LT
 32+00 RT to 32+40 RT OFF Loc. 110' RT



BRIDGE CODE	FED. ROAD DIST. NO.	STATE	PROJ. NO.	SHEET NO.	TOTAL SHEETS
X-071	8	N. D.	BRS-1-806(05)069	12	

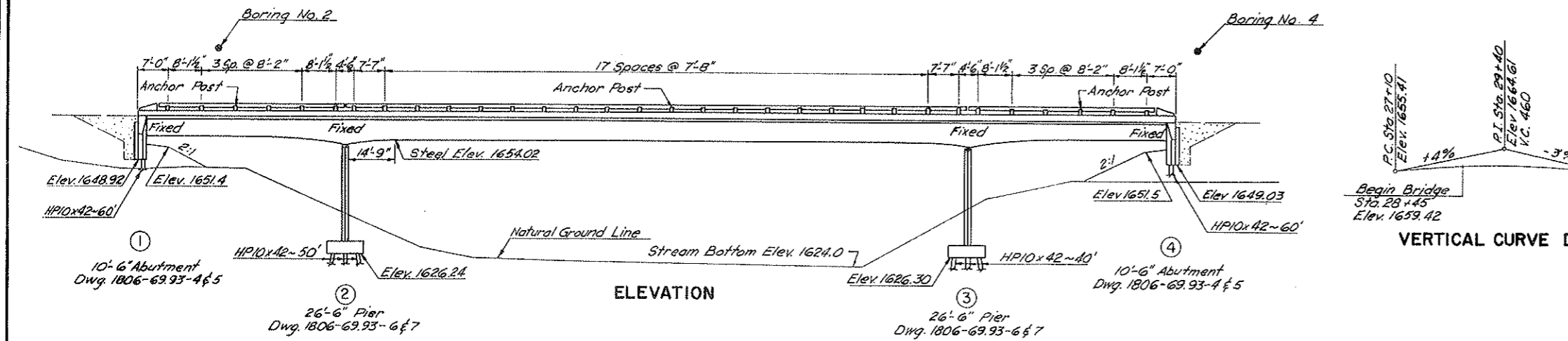


DETAIL AT ABUTMENTS

See Drawing 1806-69.93-3 for General Notes.

SPECIAL PROVISIONS	
NO.	NAME
SP116C	STRUCTURAL STEEL
SP135	QUICK SETTING ANCHOR GROUT
	CHEMICAL ADMIXTURES FOR CONCRETE

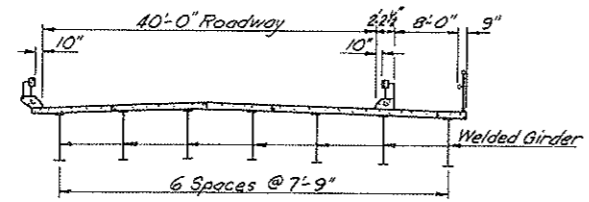
ESTIMATE OF QUANTITIES			
SPEC. NO.	CODE NO.	BID ITEM	L. SUM
202	0105	REMOVAL OF STRUCTURE	
208	0100	CLASS 1 EXCAVATION	170 CU. YD.
208	0110	CLASS 2 EXCAVATION	385 CU. YD.
228	0900	SELECT BACKFILL	300 CU. YD.
610	1112	CLASS AE-1 CONCRETE - SUB-STRUCTURES	260.2 CU. YD.
610	0134	CLASS AAE-3 CONCRETE - I-BEAM SUPERSTRUCTURE	423.4 CU. YD.
610	0138	CLASS AAE-3 CONCRETE - RAILING & POSTS	16.08 CU. YD.
612	0115	REINFORCING STEEL - GRADE 60	124,319 LB.
616	0362	STRUCTURAL STEEL A36 WELDED GIRDER	205,300 LB.
616	5722	STRUCTURAL STEEL A572 WELDED GIRDER - GRADE 50	180,694 LB.
622	0020	STEEL PILING HP10x42	2670 LIN. FT.
622	0440	STEEL TEST PILE HP10x42 @ 60 FT.	2 EA.
622	0460	STEEL TEST PILE HP10x42 @ 70 FT.	2 EA.
624	0125	PEDESTRIAN RAILING	249.25 LIN. FT.
750	0100	LINSEED OIL TREATMENT	23 GAL.
3000		BRIDGE BENCH MARKS	1 SET



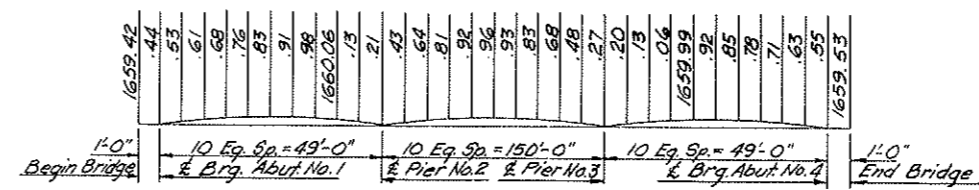
VERTICAL CURVE DATA

DESIGN STRENGTHS:
 $f'_c = 3,000$ psi ~ Class AE-1 Concrete
 $f'_c = 4,000$ psi ~ Class AAE-3 Concrete
 $f_y = 50,000$ psi ~ Structural Steel A572
 $f_y = 36,000$ psi ~ Structural Steel A36
 $f_y = 60,000$ psi ~ Reinforcing Steel

Design by Load Factor



DECK SECTION



SCREEN ELEVATION

Elevations shown are to top of finished concrete.

BENCH MARKS			PILE LOADING				EMBANKMENT SETTLEMENT	TEMP.	DESIGN LOAD	MAXIMUM REQUIRED BEARING
NO.	DESCRIPTION	LOCATION	DEAD LOAD	LIVE LOAD	EARTH LOAD					
	Fire Hydrant	22+07 ~ 50' Rt.	18.0T	22.0T			15.0T	55.0T	55.0T	
	Manhole	24+17 ~ 52' Rt.	28.0T	8.0T	35.7		15.5T	55.0T	55.0T	

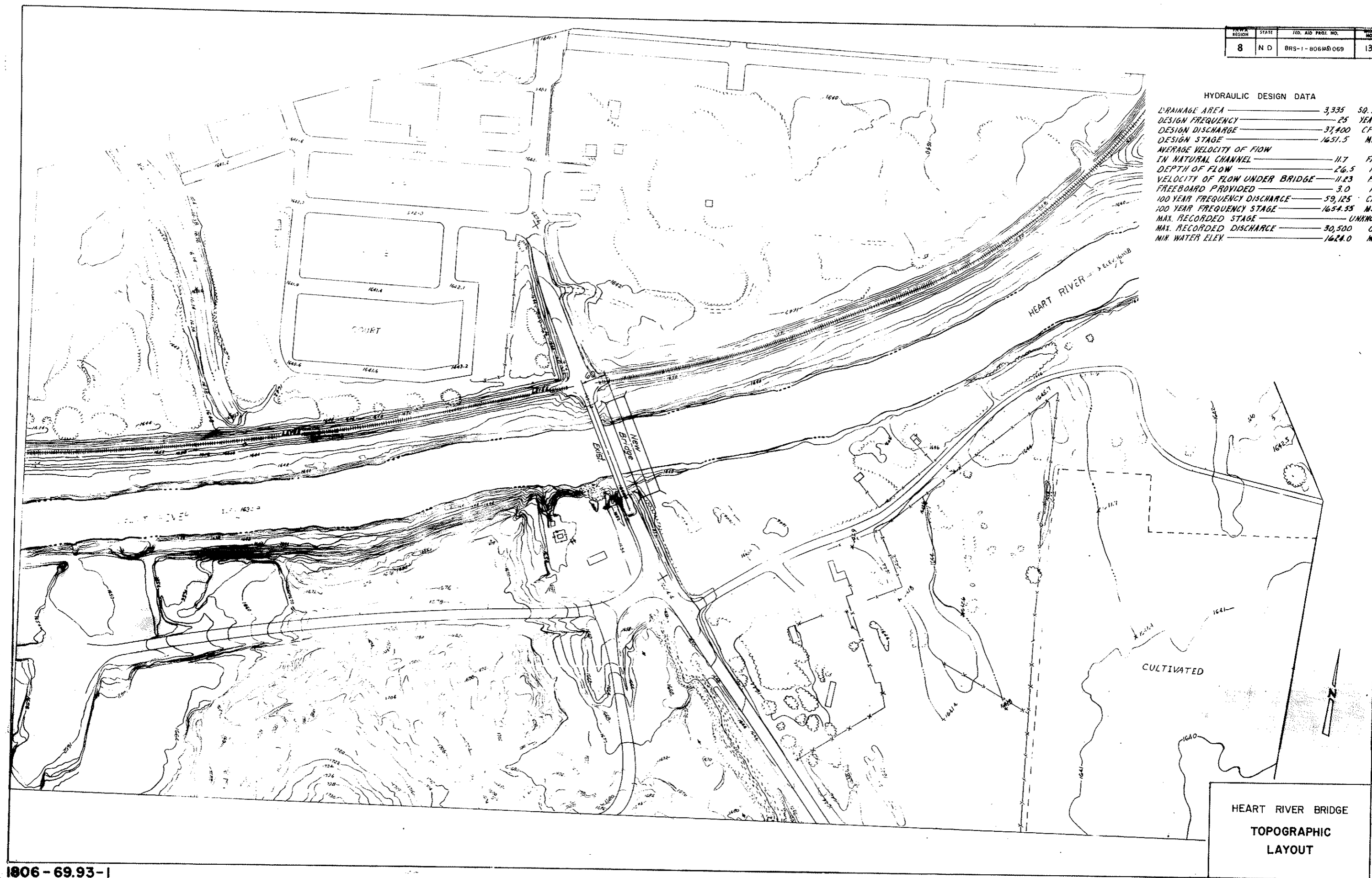
NORTH DAKOTA
STATE HIGHWAY DEPARTMENT
HEART RIVER BRIDGE
BRIDGE LAYOUT
PROJECT BRS-1-806(05)069 STA. 29 + 70.0
MORTON COUNTY

APPROVED _____
DATE _____
BRIDGE ENGINEER

FED. AID PROJ. NO.	STATE	REGION	MAP NO.
BRS-1-80640069	N D	8	13

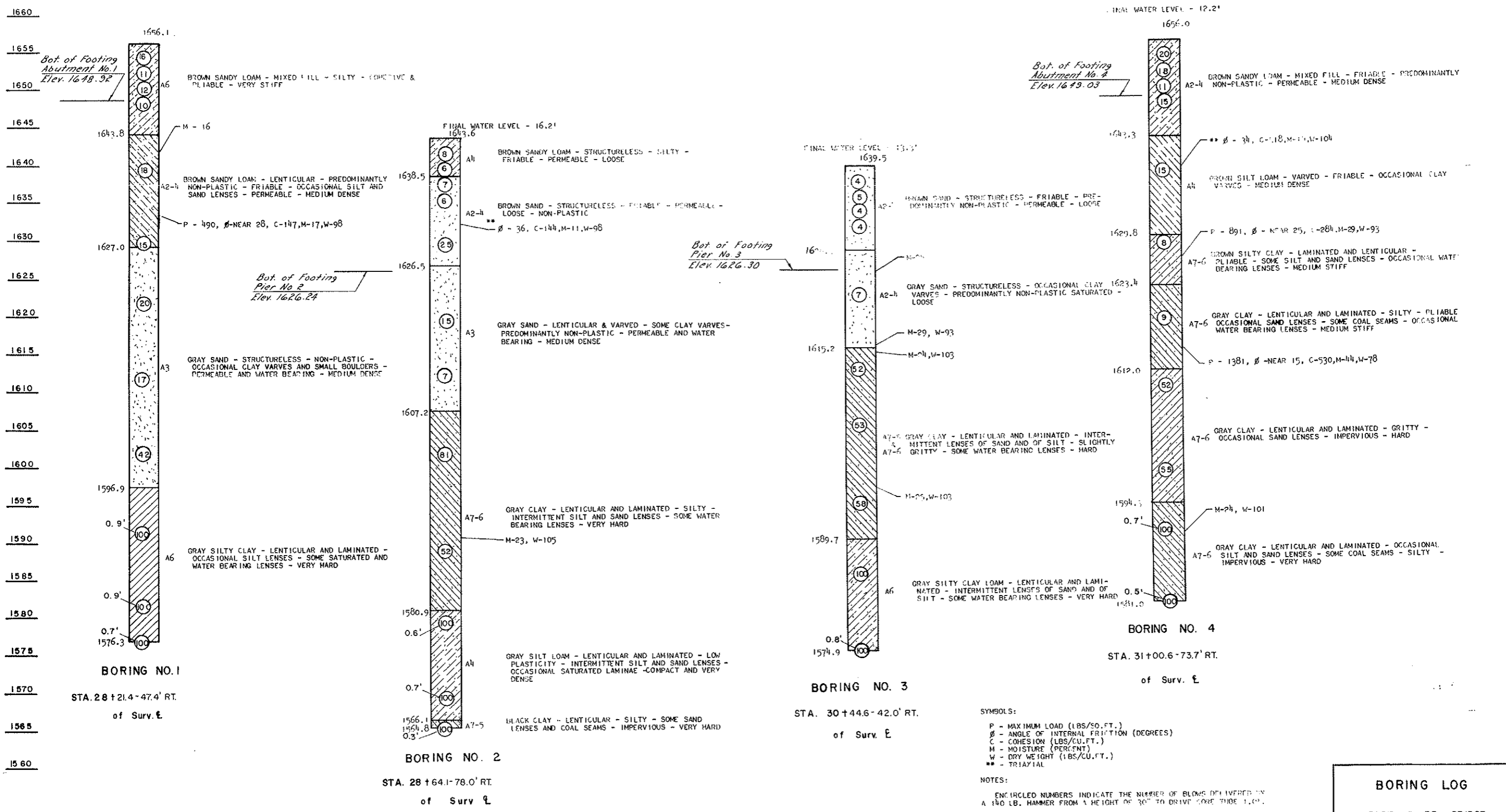
HYDRAULIC DESIGN DATA

DRAINAGE AREA	3,335	SQ. MI.
DESIGN FREQUENCY	25	YEAR
DESIGN DISCHARGE	37,400	CFS
DESIGN STAGE	1651.5	MSL
AVERAGE VELOCITY OF FLOW IN NATURAL CHANNEL	11.7	FPS
DEPTH OF FLOW	26.5	FT
VELOCITY OF FLOW UNDER BRIDGE	11.23	FPS
FREEBOARD PROVIDED	3.0	FT
100 YEAR FREQUENCY DISCHARGE	59,125	CFS
100 YEAR FREQUENCY STAGE	1654.55	MSL
MAX. RECORDED STAGE	UNKNOWN	
MAX. RECORDED DISCHARGE	30,500	CFS
MIN. WATER ELEV.	1624.0	MSL



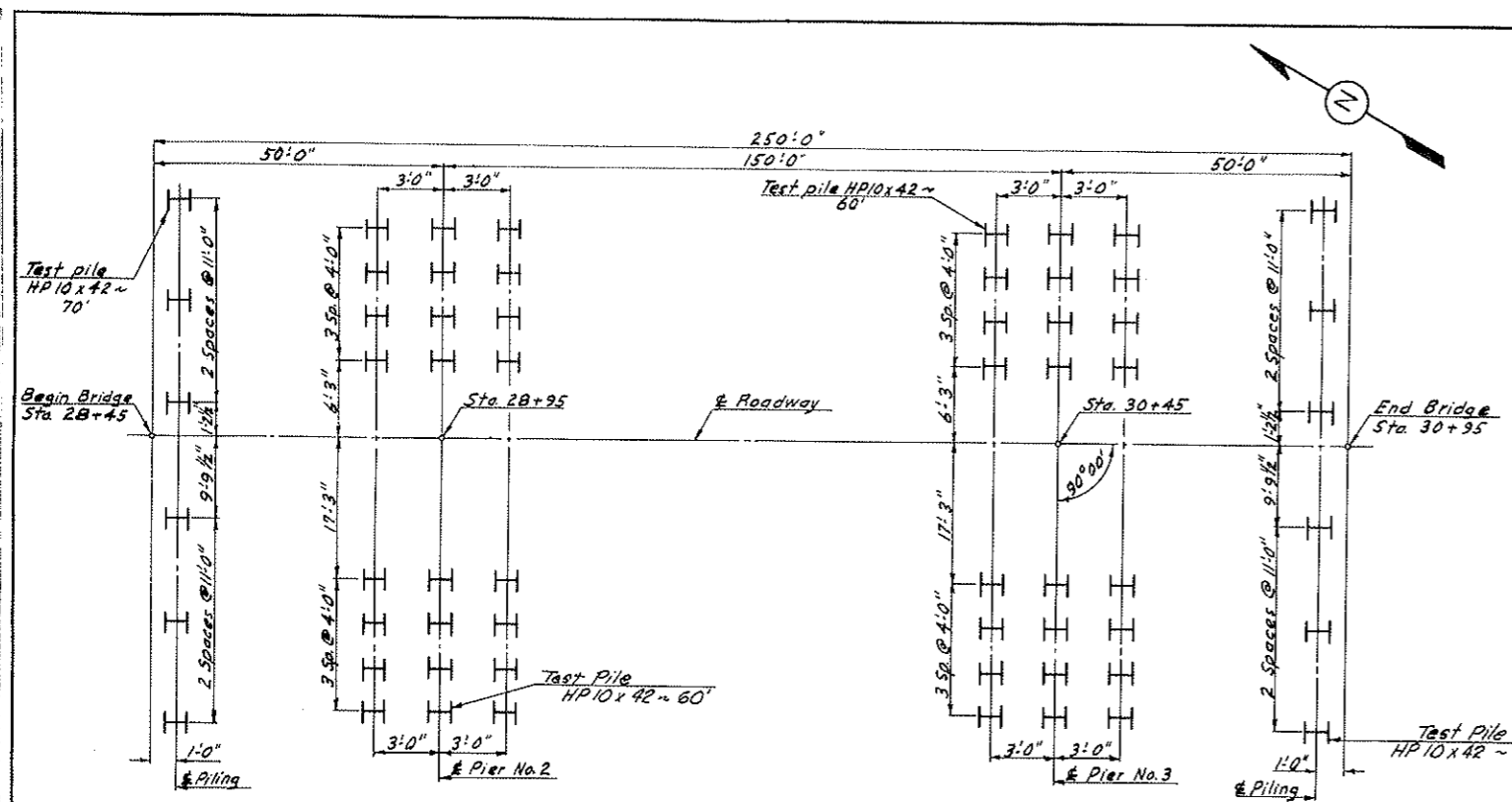
HEART RIVER BRIDGE
TOPOGRAPHIC
LAYOUT

FED. ROAD DIST. NO.	STATE	PROJ. A.C.	SHEET NO.	TOTAL SHEETS
8	N. D.	BRS-1-80693-2	14	

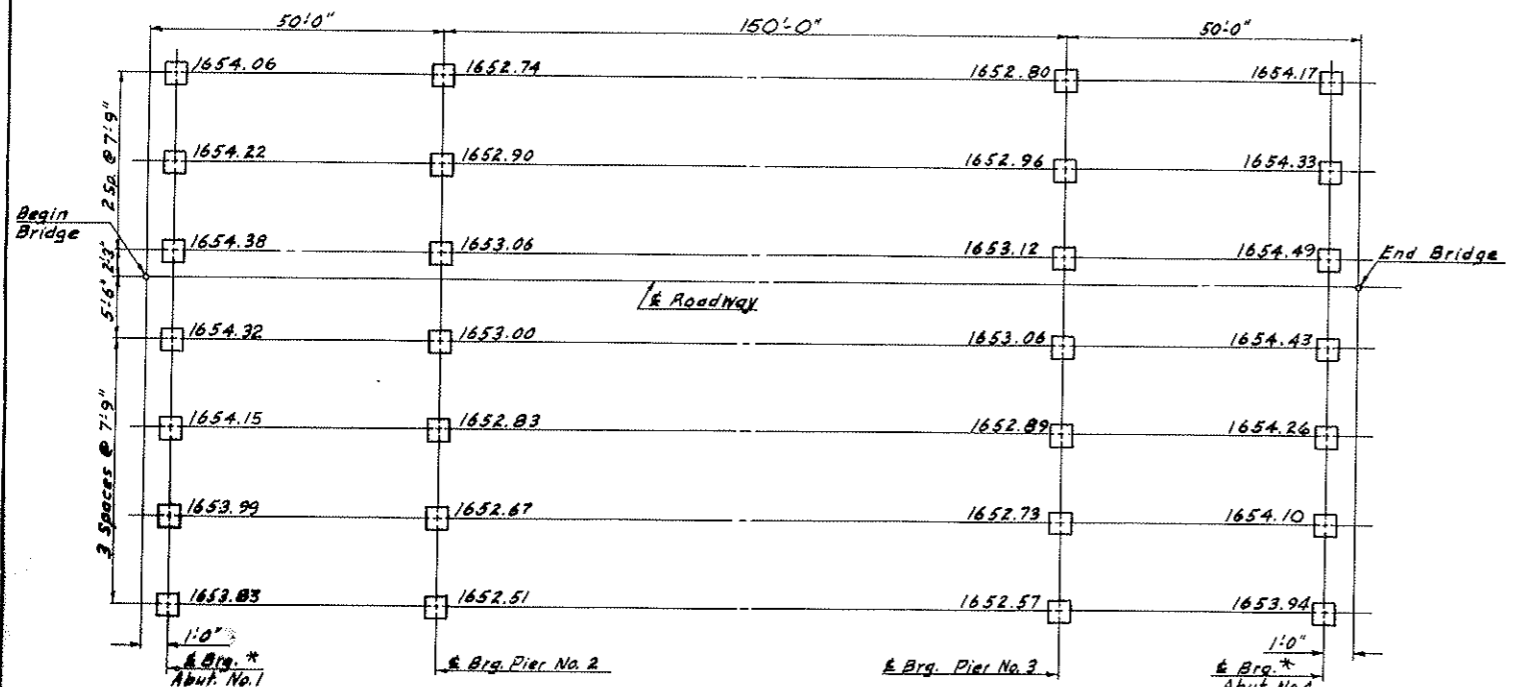


BORING LOG
 HEART RIVER BRIDGE
 MORTON COUNTY

FED. ROAD DIST. NO.	STATE	PROJ. NO.	SHEET NO.	TOTAL SHEETS
8	N. D.	(BRS-1-8068060)	15	



PILING LAYOUT
(Not to Scale)
Stations are on Office Location



BEARING PLATE LAYOUT
Elevations shown are to top of finished concrete
(Not to Scale)
Stations are on Office Location
* Abut. brg. surface shall be on 2% grade.

GENERAL NOTES:

GENERAL:
WORK SHALL CONFORM TO ALL APPLICABLE PARAGRAPHS OF THE NORTH DAKOTA STATE HIGHWAY DEPARTMENT SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION.

THE COST OF FURNISHING AND PLACING JOINT FILLER, ASPHALT CURB SEAL, AND OTHER MISCELLANEOUS ITEMS SHALL BE INCLUDED IN THE PRICE BID FOR CONCRETE.

BEARING AREAS SHALL BE FINISHED TRUE TO PLAN AND ELEVATION BY GRINDING, IF NECESSARY, BEFORE BEARING PLATES ARE SET.

ALL HIGH STRENGTH BOLTS ARE TO BE 7/8 INCH DIAMETER. FIELD CONNECTIONS SHALL BE MADE WITH HIGH TENSILE STRENGTH BOLTS.

EXCAVATION:
EXCAVATION FOR ABUTMENTS SHALL BE CLASS 1 AND SHALL EXTEND FROM THE BOTTOM OF THE FOOTING TO THE LIMITS SHOWN ON THE BRIDGE LAYOUT DRAWING. EXCAVATION AT PIERS SHALL BE CLASSIFIED AS CLASS 2.

EMBANKMENT:
THE EMBANKMENT AT THE ABUTMENTS SHALL BE IN PLACE BEFORE PILING ARE DRIVEN. THE CONTRACTOR WILL BE REQUIRED TO PREDRILL THROUGH THE FILL AT THE ABUTMENTS BEFORE DRIVING PILING. ALL PILOT HOLES, NOT COMPLETELY FILLED BY THE PILES, SHALL BE BACKFILLED WITH SAND OR FINE GRAVEL BEFORE THE SUBSTRUCTURE IS PLACED.

BACKFILL:
ALL BACKFILLING SHALL BE DONE ACCORDING TO SECTIONS 228 AND 203-2.3.2 OF THE STANDARD SPECIFICATIONS. SELECTED BACKFILL SHALL NOT BE PLACED ABOVE THE ELEVATION OF THE BERM UNTIL THE SUPERSTRUCTURE HAS CURED.

CONCRETE PILING:
CONCRETE PILING IN ACCORDANCE WITH STANDARD H-0402 MAY BE USED IN PLACE OF THE STEEL PILING INDICATED ON THE PLANS.

THE TEST PILES SHALL BE DRIVEN TO A BEARING OF NOT LESS THAN 125% OF THE DESIGN LOAD AS DETERMINED BY THE DYNAMIC FORMULA.

THE PILES FOR THIS STRUCTURE SHALL BE DRIVEN BY A STEAM (OR AIR) OR DIESEL HAMMER HAVING A RATED ENERGY AND RAM WEIGHT NOT LESS THAN 23,562 FOOT-POUND-TONS AS COMPUTED BY THE FORMULA $W(E-8662) + 54WE$ WHERE W IS THE WEIGHT OF THE RAM IN TONS AND E IS THE RATED HAMMER ENERGY AS ALLOWED IN THE STANDARD SPECIFICATION. IN NO CASE SHALL THE RAM WEIGHT BE LESS THAN 4,800 POUNDS.

REINFORCING STEEL:
BENT BARS SHALL BE BENT AROUND A.C.I. STANDARD SIZE PINS FOR GRADE 60 REINFORCING.

THE TOP LAYER OF TRANSVERSE DECK SLAB REINFORCEMENT SHALL BE TIED DOWN WITH WIRE TIES TO THE SHEAR CONNECTORS OF THE BEAMS. IF CHANNELS ARE USED, SMALL HOLES MAY BE BURNED THROUGH THE TOP PORTION OF THE SHEAR CONNECTOR WEB TO FACILITATE MAKING THE TIE. THE TIES SHALL BE AT INTERVALS OF 5 TO 6 FEET ALONG THE FULL LENGTH OF ALL BEAMS TO PREVENT THE SLAB REINFORCEMENT FROM RISING WHEN THE CONCRETE IS PLACED.

REINFORCING STEEL IS TO BE GRADE 60.

CONCRETE:
THE DECK SLAB CONCRETE SHALL BE STRUCK OFF AND COMPACTED BY AN APPROVED DECK FINISHING MACHINE.

CONCRETE FOR SLAB, CURB AND RAIL, POSTS, AND END WALLS SHALL BE CLASS AA-3. CONCRETE FOR PIERS AND ABUTMENTS SHALL BE AE-1 CONCRETE.

THE "RUBBED SURFACE FINISH" (SECTION 602-3.10.3) OR THE "SPECIAL SURFACE FINISH" (SECTION 602-3.10.5) WILL BE REQUIRED FOR EXPOSED FACES OF THE ABUTMENTS AND PIERS. IT WILL ALSO BE REQUIRED ON BOTH FACES OF CURBS, EDGES OF SLABS, ALL FACES OF THE RAILS, RAIL POSTS, AND END POSTS. ALL OTHER SURFACES SHALL BE GIVEN THE "ORDINARY SURFACE FINISH".

THE CONTRACTOR MAY SUBSTITUTE AE-3 CONCRETE FOR AE-1 CONCRETE. ANY SUBSTITUTION; HOWEVER, WILL BE AT THE CONTRACTOR'S EXPENSE AND THE CLASS OF CONCRETE PAID FOR WILL BE THAT CLASS SHOWN ON THE PLANS.

CURING CONCRETE:
LIQUID MEMBRANE CURING COMPOUND SHALL NOT BE USED ON ANY CONCRETE WHICH IS TO RECEIVE FURTHER TREATMENT EXCEPT AS PROVIDED IN THE FOLLOWING PARAGRAPHS.

THE WATER SOLUBLE LIQUID MEMBRANE CURB (SECTION 550-4.13.2.1 AND 880-5 OF THE STANDARD SPECIFICATIONS) MAY BE USED FOR CURING THE DECK SLAB CONCRETE. A PROTECTIVE COVER SHALL BE USED SO THAT LINSEED OIL IS NOT APPLIED TO THE AREA WITHIN THREE INCHES OF THE GUTTER LINE UNTIL AFTER THE ASPHALT CURB SEAL IS IN PLACE.

IF THE CONTRACTOR ELECTS TO USE THIS METHOD OF CURING THE DECK CONCRETE, THE QUANTITY FOR LINSEED OIL TREATMENT MAY BE REDUCED WITHOUT ADJUSTMENT TO ITS BID PRICE.

THE COST OF LIQUID MEMBRANE CURING COMPOUND SHALL BE INCLUDED IN THE BID PRICE FOR CONCRETE CLASS AA-3.

LINESEED OIL TREATMENT:
LINESEED OIL TREATMENT SHALL NOT BE DONE UNTIL ALL CONCRETE WORK IS COMPLETED AND THE ASPHALT CURB SEAL HAS BEEN INSTALLED. ONLY ONE UNIFORM APPLICATION OF .015 GALLONS PER SQUARE YARD SHALL BE APPLIED TO THE DECK, CURB AND SIDEWALK.

PAINT:
PAINT AND PAINTING SHALL CONFORM TO THE STANDARD SPECIFICATIONS, SECTIONS 718 AND 870-1.2. ALL EXPOSED STEEL SURFACES SHALL BE GIVEN ONE SHOP COAT OF RED LEAD PAINT (INCLUDING TOP OF UPPER FLANGES BUT NOT SHEAR CONNECTORS), ONE SPOT COAT OF RED LEAD PAINT AFTER ERECTION AND CONCRETE WORK IS COMPLETED AND TWO FINISH COATS OF ENAMEL. THE FIRST FINISH COAT SHALL CONFORM TO RED COLOR NO. 31158 AND THE SECOND COAT SHALL CONFORM TO RED COLOR NO. 31302. BOTH FINISH COATS SHALL MEET THE FEDERAL STANDARD NO. 595 FOR COLOR. COLOR CHIPS ARE ON FILE IN THE BRIDGE DIVISION OF THE NORTH DAKOTA STATE HIGHWAY DEPARTMENT, BISMARCK.

STRUCTURAL STEEL:
SEE DRAWING 1806-69.93-10

REMOVAL OF STRUCTURE:
THE EXISTING STRUCTURE IS A THREE SPAN BRIDGE WITH A CLEAR ROADWAY OF 19 FEET. THE TWO END SPANS ARE EACH 45 FEET IN LENGTH AND CONSIST OF A CONCRETE SLAB SUPPORTED BY ROLLED BEAMS. THE CENTER SPAN IS A 150 FOOT STEEL TRUSS WITH A CONCRETE SLAB.

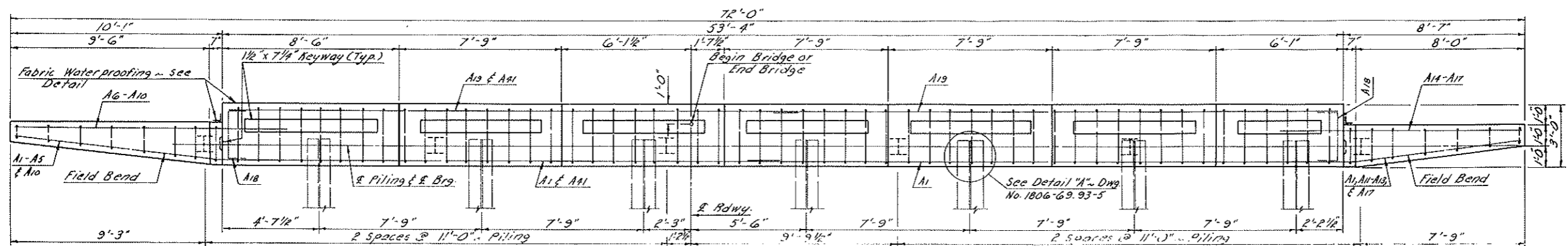
THE STRUCTURAL STEEL IS TO BECOME THE PROPERTY OF THE CONTRACTOR AND SHALL BE REMOVED FROM THE SITE. THE CONCRETE SHALL BE BROKEN UP AND DISPOSED OF WITHIN ONE MILE OF THE SITE AS DIRECTED BY THE ENGINEER.

THE TELEPHONE CONDUIT, GAS LINE, TV CABLE AND SEWER LINE WILL BE REMOVED BY THE OWNERS.

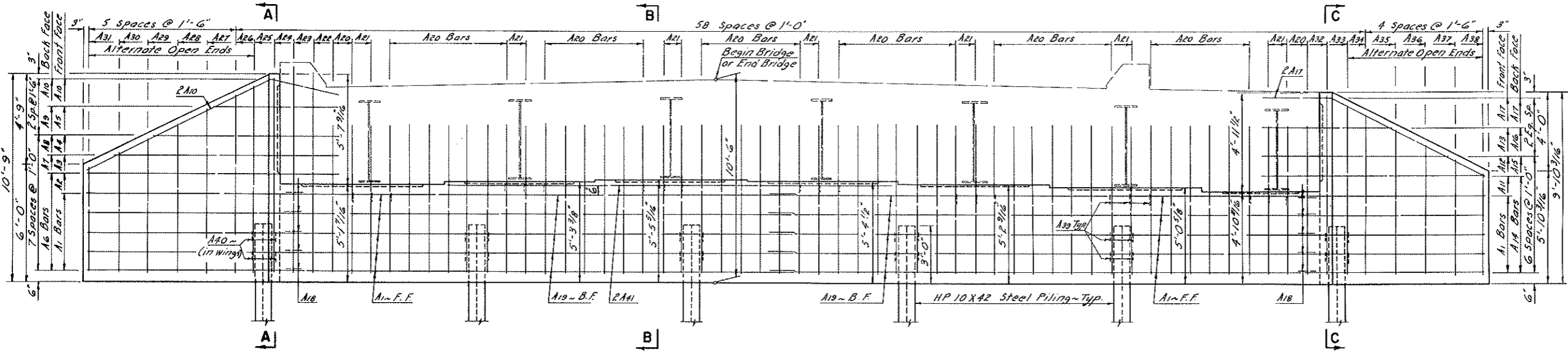
QUANTITIES	

**HEART RIVER BRIDGE
PILING LAYOUT
BEARING PLATE LAYOUT
GENERAL NOTES**

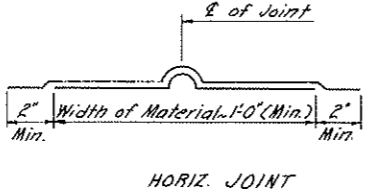
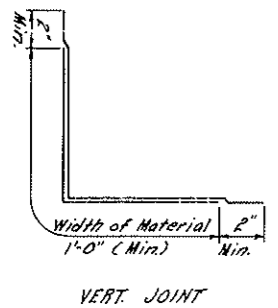
FED. ROAD DIST. NO.	STATE	PROJ. NO.	SHEET NO.	TOTAL SHEETS
8	N. D.	BRS-1-806-69-3	16	



PLAN
Abut. No. 4 Shown - Abut. No. 1 Reversed



ELEVATION
Abut. No. 4 Shown - Abut. No. 1 Reversed



FABRIC WATERPROOFING DETAIL

Nomenclature:
F.F. - Front Face
B.F. - Back Face

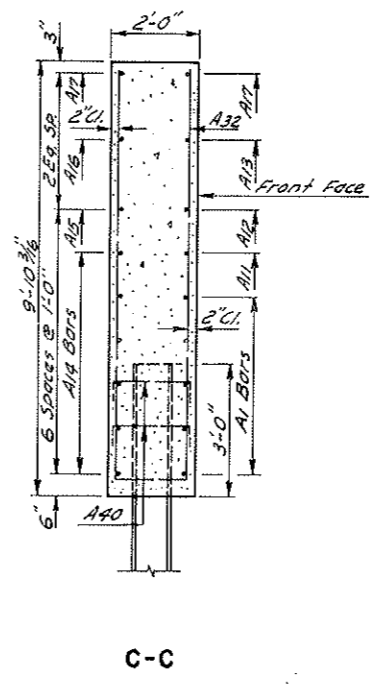
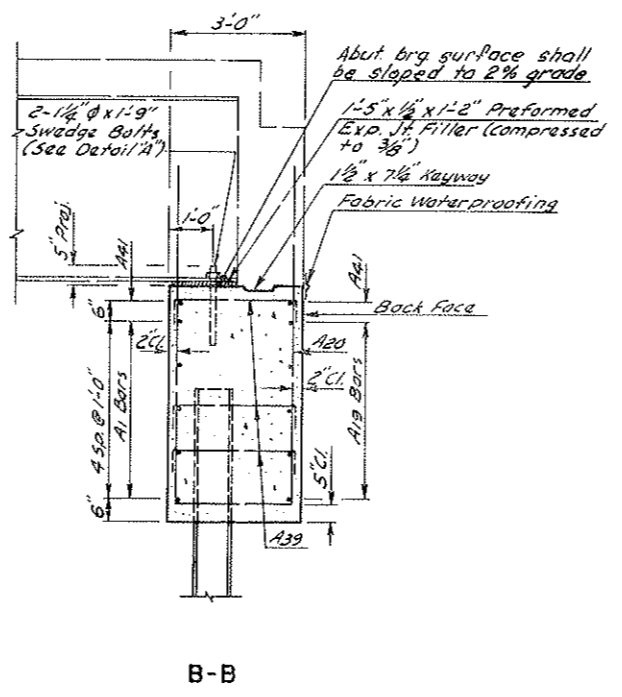
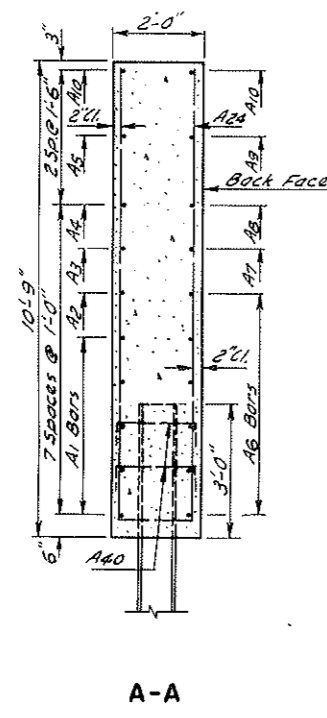
NOTE:

Two Ply Fabric Waterproofing shall consist of furnishing materials and placing damp-proofing and fabric waterproofing at areas designated in this sheet in accordance with Sec. 786 of the "Standard Specifications" for Two Ply Fabric Waterproofing. All materials and work shall be considered incidental to the pay item for Class AE-1 concrete. See Dwg. 1806-69.93-5 for sections A-A, B-B & C-C.

QUANTITIES	
See Dwg. 1806-69.93-5	

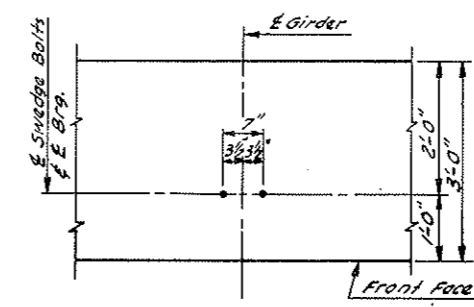
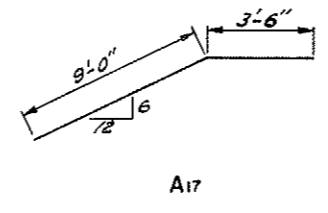
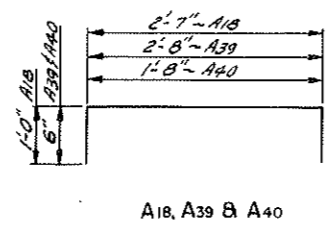
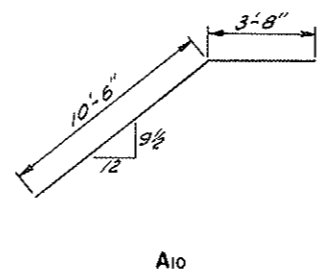
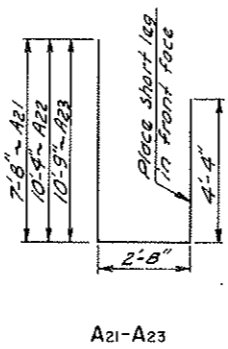
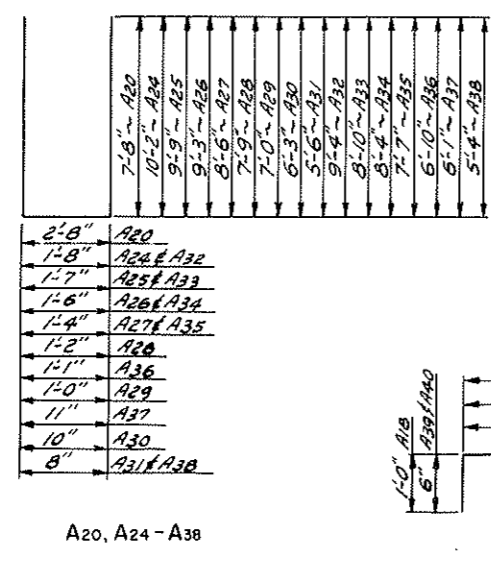
HEART RIVER BRIDGE
ABUTMENT DETAILS

FED. ROAD DIST. NO.	STATE	PROJ. NO.	SHEET NO.	TOTAL SHEETS
8	N. D.	BRS-1-806991069	17	



BAR LIST (ONE ABUT)					
MARK	NUMBER	SIZE	LENGTH	SHAPE	UNIT WT
A1	10	4	36'-6"	Str.	
A2	1	4	12'-7"	"	
A3	1	4	11'-8"	"	
A4	1	4	9'-6"	"	
A5	1	4	6'-6"	"	
A6	6	7	12'-7"	"	
A7	7	7	11'-6"	"	
A8	7	7	9'-6"	"	
A9	7	7	6'-8"	"	
A10	2	6	14'-3"	Bent	
A11	1	4	11'-5"	Str.	
A12	1	4	9'-8"	"	
A13	1	4	6'-8"	"	
A14	6	6	11'-5"	"	
A15	7	6	9'-8"	"	
A16	7	6	6'-8"	"	
A17	2	6	12'-6"	Bent	
A18	10	4	4'-7"	"	
A19	10	4	27'-4"	Str.	
A20	42	5	18'-0"	Bent	
A21	9	5	14'-8"	"	
A22	7	5	17'-4"	"	
A23	1	5	17'-9"	"	
A24	1	5	22'-0"	"	
A25	1	4	21'-7"	"	
A26	1	4	20'-0"	"	
A27	1	4	18'-2"	"	
A28	1	4	16'-8"	"	
A29	1	4	15'-0"	"	
A30	1	4	13'-4"	"	
A31	1	4	11'-8"	"	
A32	1	5	20'-4"	"	
A33	1	4	19'-3"	"	
A34	1	4	18'-2"	"	
A35	1	4	16'-6"	"	
A36	1	4	14'-9"	"	
A37	1	4	13'-1"	"	
A38	1	4	11'-4"	"	
A39	37	4	3'-8"	"	
A40	8	4	2'-8"	"	
A41	2	4	22'-9"	Str.	

CHECKED BY: LEG
 MADE BY: DLR
 CHECKED BY: DLR
 MADE BY: LEG
 QUANTITIES CHECKED BY: DLR



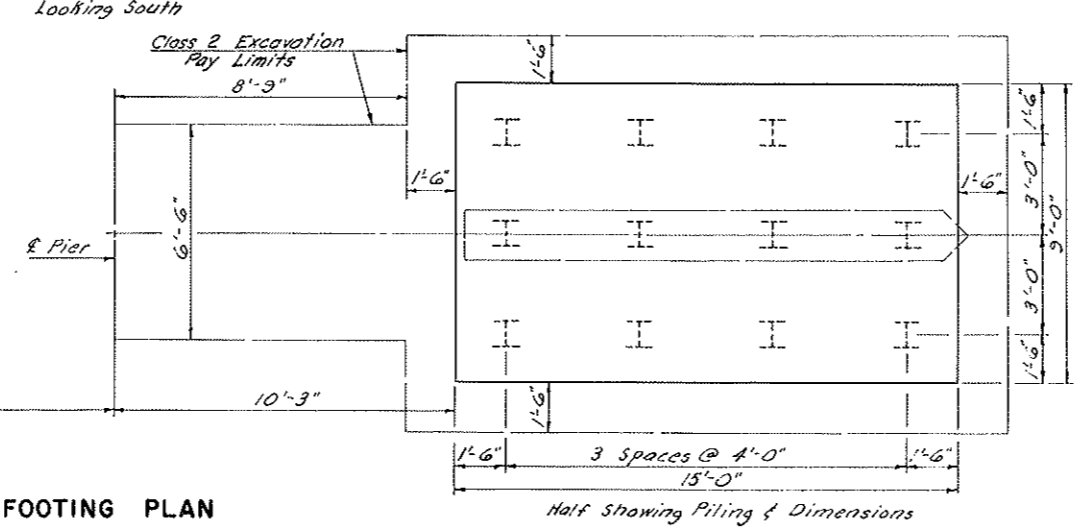
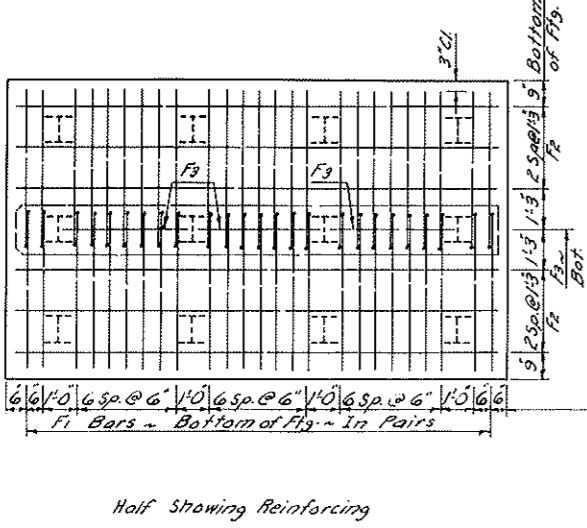
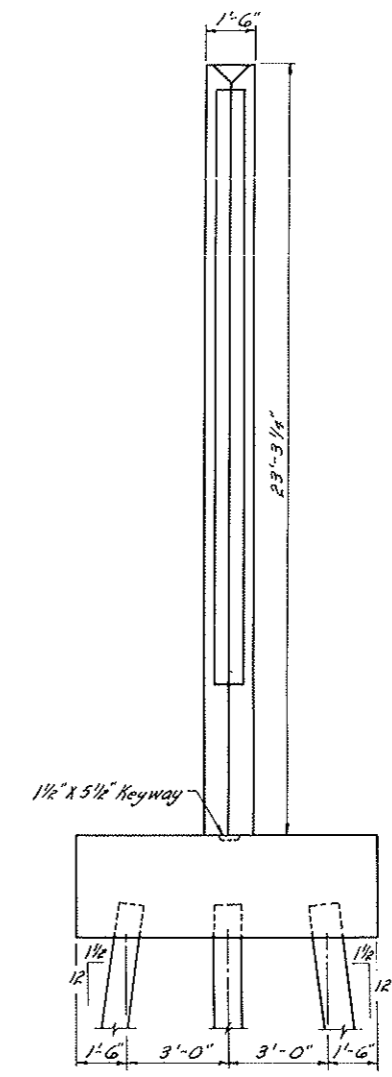
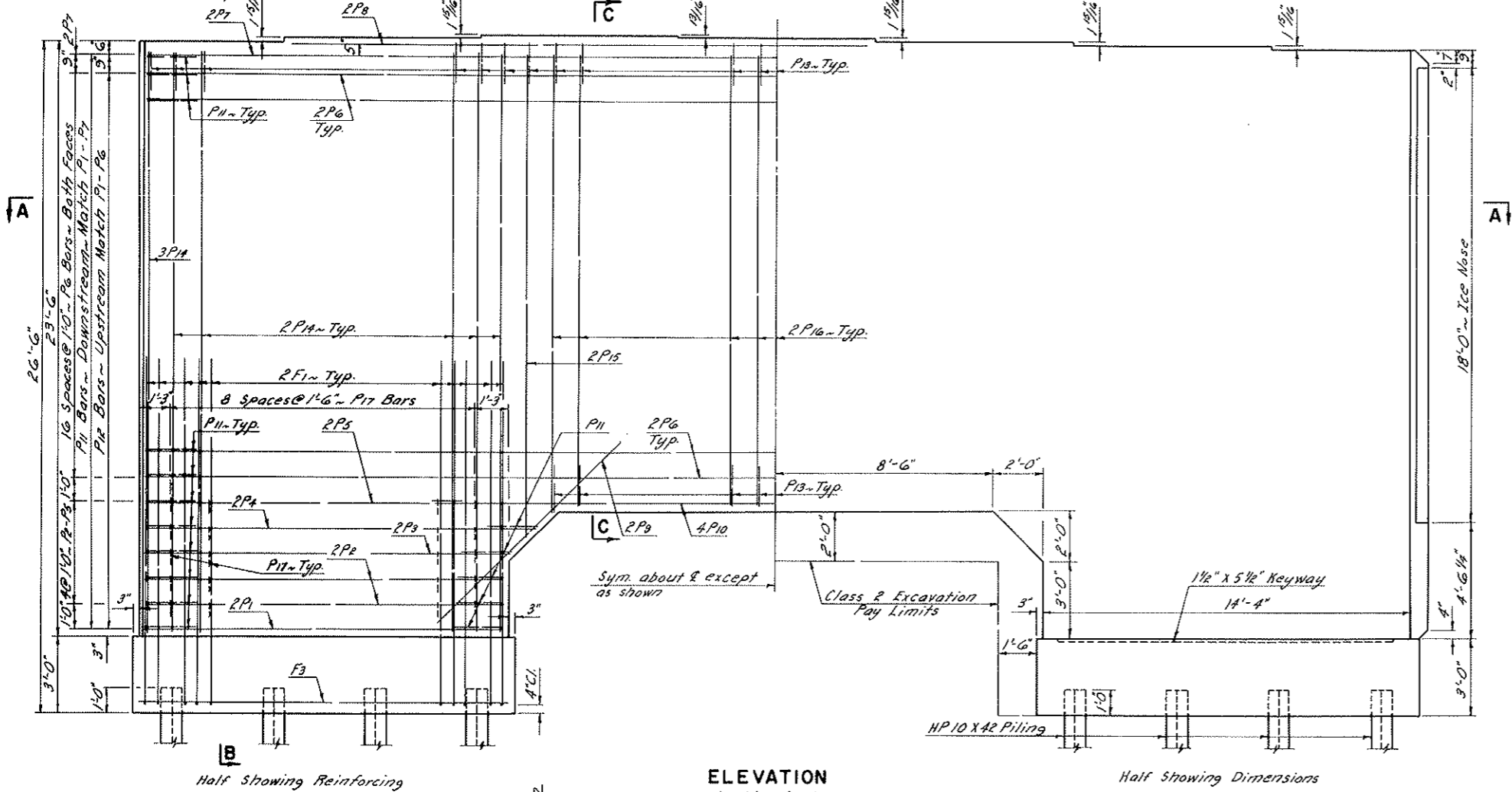
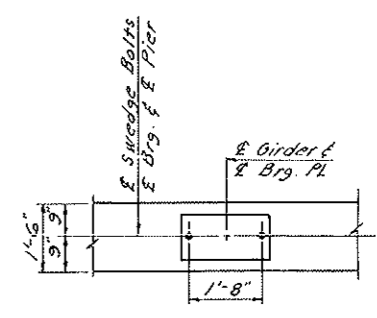
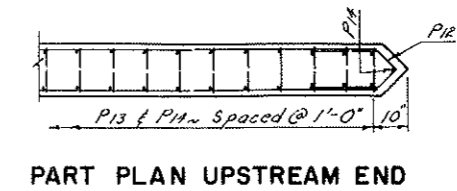
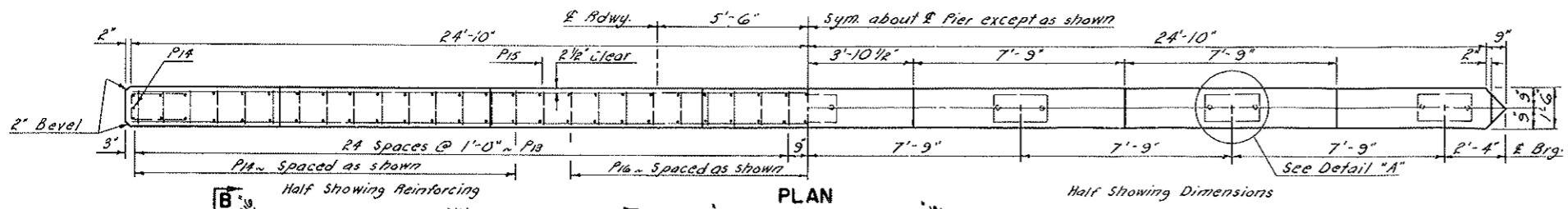
PLAN
 DETAIL "A"

BENT BAR DETAILS
 Dimensions Shown Are Out to Out

QUANTITIES (ONE ABUT.)	
Class II-1 Concrete	339.22
Reinforcing Steel	218.14
Excavation (See Layout)	
Piling (See Layout)	

HEART RIVER BRIDGE
 ABUTMENT DETAILS

FED. ROAD DIST. NO.	STATE	PROJ. NO.	SHEET NO.	TOTAL SHEETS
8	N. D.	BR5-1-806WRO69	1B	



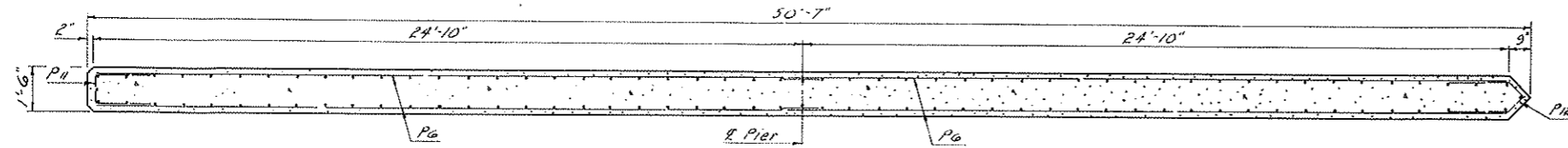
Note: Pile Spacing dimensions are at the bottom of footing.

See Dwg. 1806-69-93-7 for Sections A-A, B-B, & C-C.

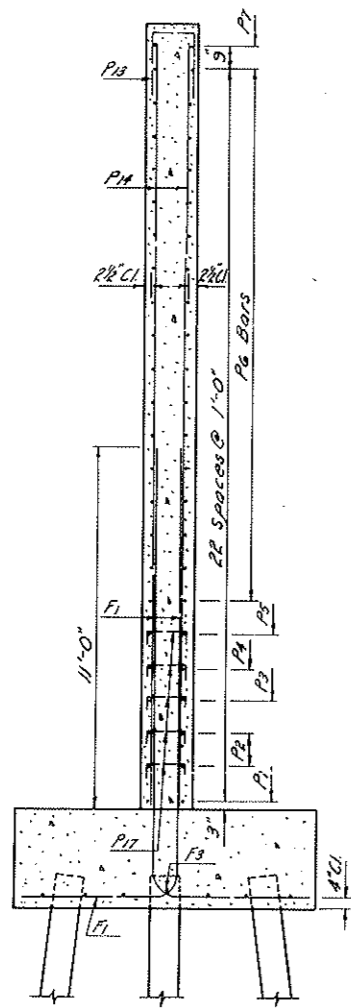
QUANTITIES	
See Dwg. 1806-69-93-7	

HEART RIVER BRIDGE
PIER DETAILS

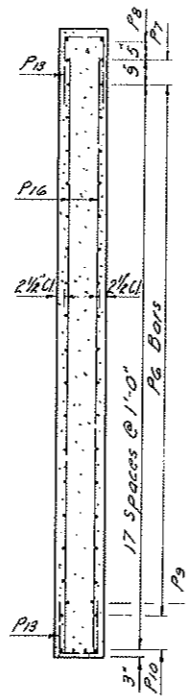
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8	N. D.	BRS-11-806W1069	19	



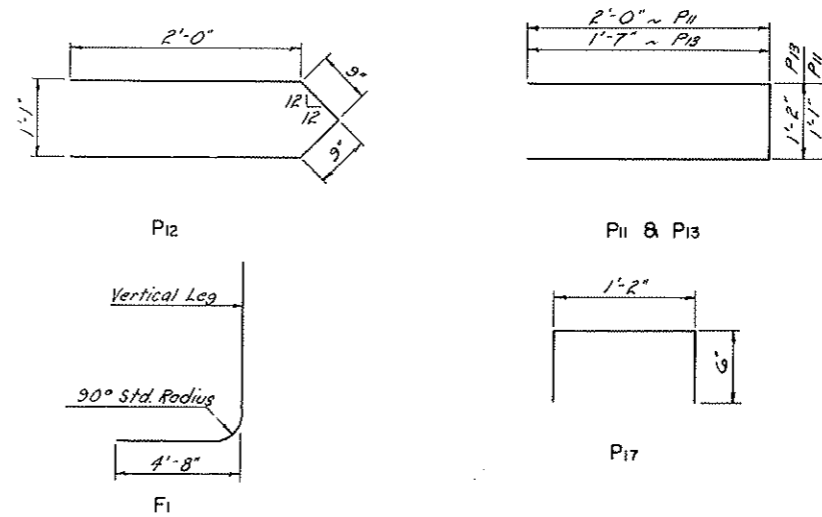
A-A



B-B

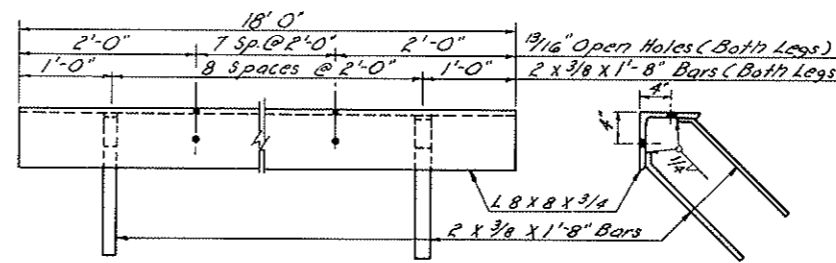


C-C



BENT BAR DETAILS

Dimensions shown are out to out



ICE NOSE ANGLE

BAR LIST (ONE PIER)						
MARK	NUMBER	SIZE	LENGTH	SHAPE	UNIT WT.	
						Footings
						Wall
F1	100	9	18'-2"	Bent		
F2	12	6	14'-6"	Str.		
F3	6	6	3'-8"	"		
P1	4	6	14'-2"	Str.		
P2	8	4	14'-2"	"		
P3	4	4	14'-6"	"		
P4	4	4	15'-6"	"		
P5	4	4	12'-6"	"		
P6	68	4	25'-6"	"		
P7	4	6	22'-9"	"		
P8	2	6	22'-9"	"		
P9	4	11	10'-0"	"		
P10	4	9	26'-8"	"		
P11	34	5	5'-1"	Bent		
P12	23	5	3'-6"	"		
P13	70	5	4'-8"	"		
P14	62	5	23'-0"	Str.		
P15	4	5	19'-3"	"		
P16	38	5	18'-0"	"		
P17	90	4	2'-2"	Bent		
SB1	1	4	3'-8"	Str.		
SB2	1	5	4'-0"	"		
SB3	1	6	4'-6"	"		
SB4	1	7	5'-0"	"		
SB5	1	8	5'-4"	"		

* Sample replacement bar to be spliced to bar from which 2'-0" sample has been cut. Furnish only one set for the entire bridge. This is not a pay item and shall be included in the unit price bid for reinforcing steel.

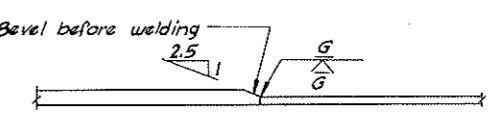
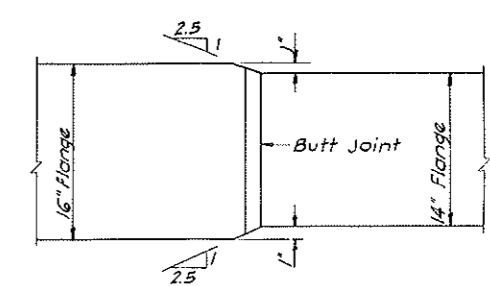
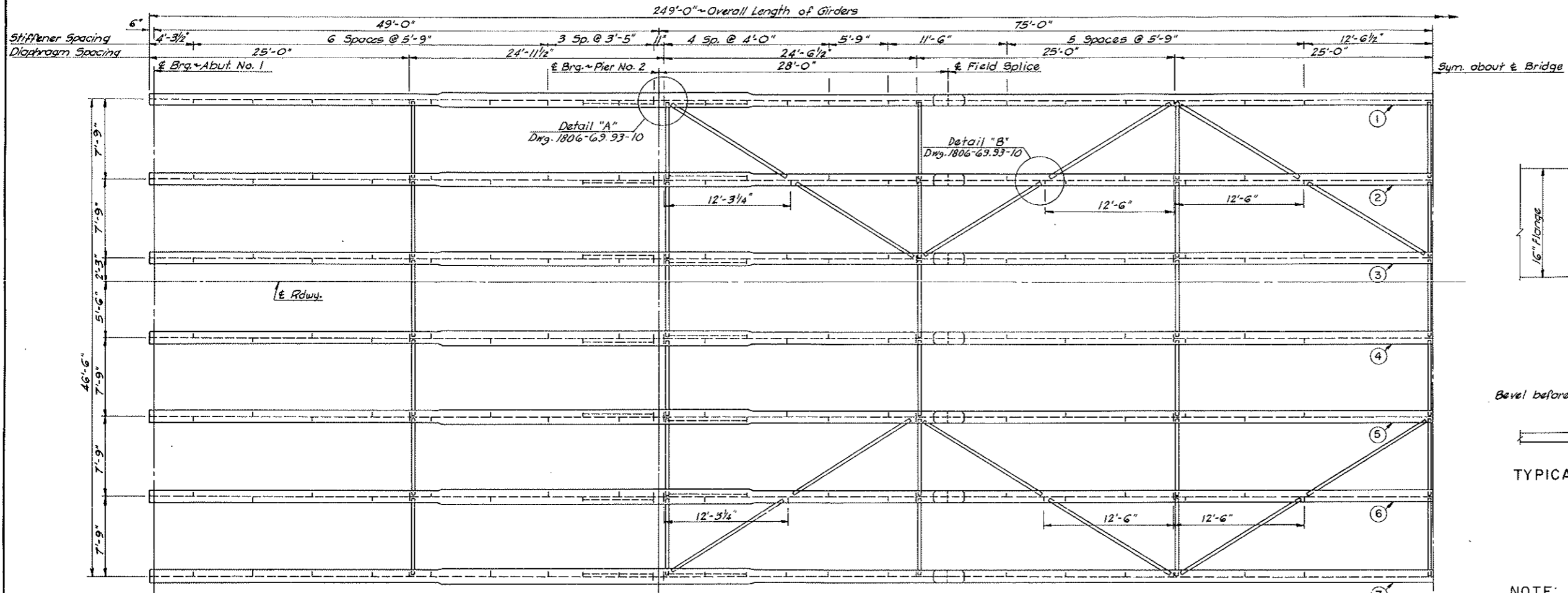
QUANTITIES (ONE PIER)	
Class A1-Concrete	902 C.Y.
Reinforcing Steel	11,741 LB.
Structural Steel (A36)	777 LB.
Piling (See Layout)	
Excavation (See Layout)	

HEART RIVER BRIDGE

PIER DETAILS

CHECKED BY L.L.G.
MADE BY L.L.G.
CHECKED BY D.L.A.
QUANTITIES MADE BY L.L.G.
CHECKED BY D.L.A.

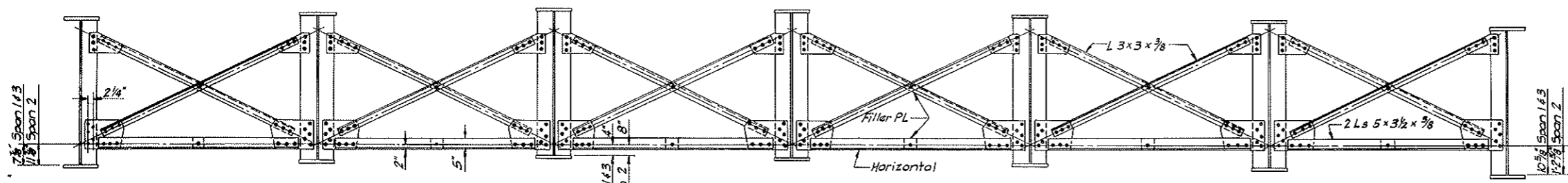
FED. ROAD DIST. NO.	STATE	PROJ. NO.	SHEET NO.	TOTAL SHEETS
8	N. D.	BRG-1-806(5)069	20	



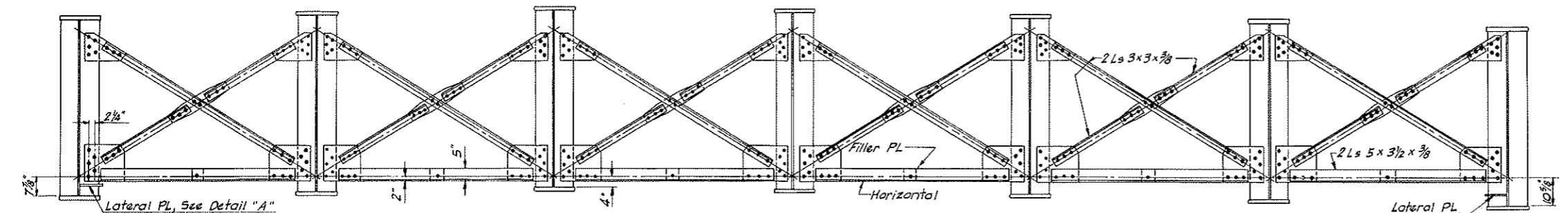
TYPICAL SHOP FLANGE SPLICE
Top Flange Shown

NOTE:
All gusset PL's to be 3/8" thick.
For location of lateral PL's, see steel layout and Details "A" & "B" on Dwg. 1806-69.93-10.

STEEL LAYOUT



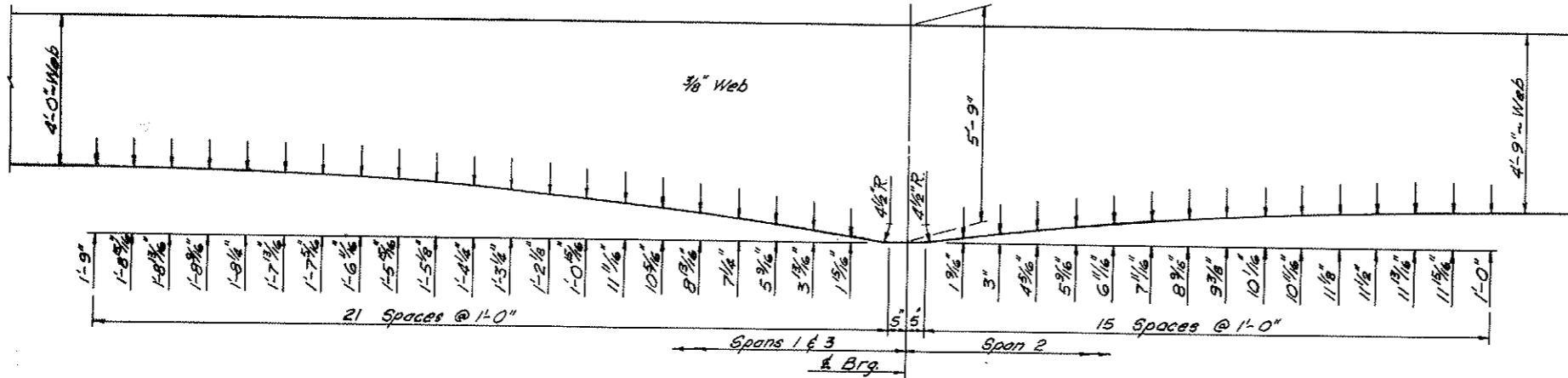
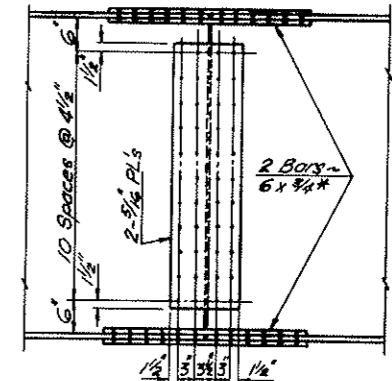
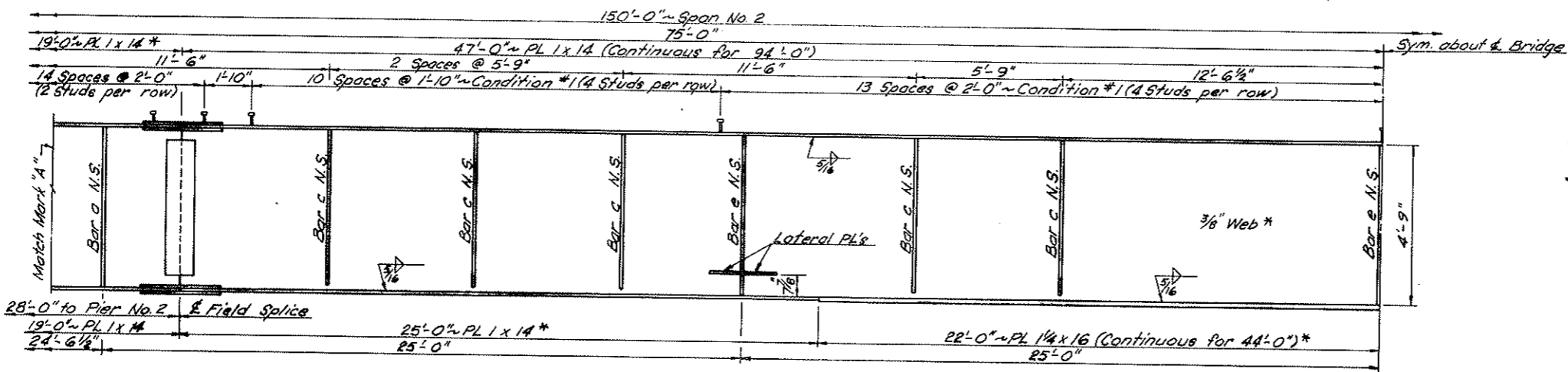
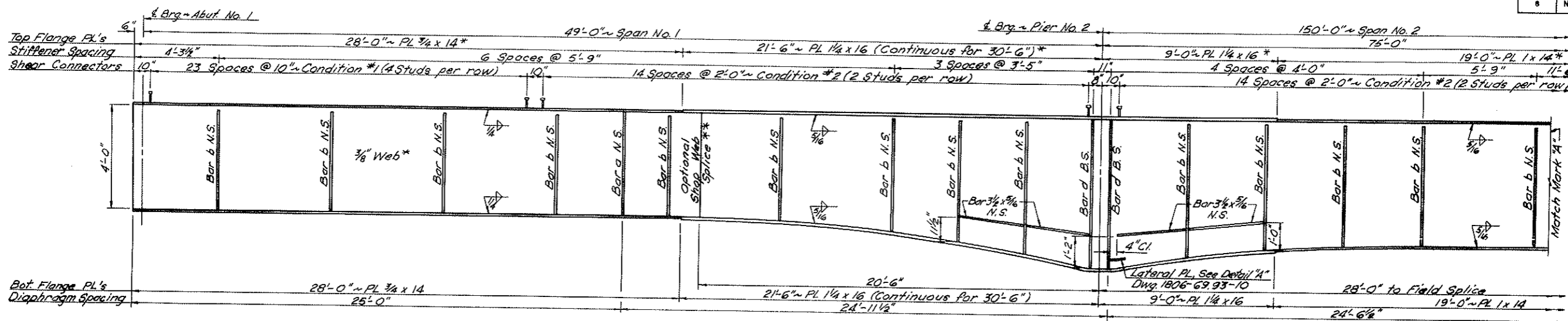
END & CENTER SPANS DIAPHRAGMS



PIER DIAPHRAGM

QUANTITIES	
See Dwg. 1806-69.93-10	
HEART RIVER BRIDGE	
WELDED GIRDER	
DETAILS	

FED. ROAD DIST. NO.	STATE	PROJ. NO.	SHEET NO.	TOTAL SHEETS
6	N. D.	BRS-1-806(93)069	21	



Nomenclature:
 N.S. = Near Side
 B.S. = Both Sides

** Structural steel pay quantities are based on the use of the optional shop web splice.

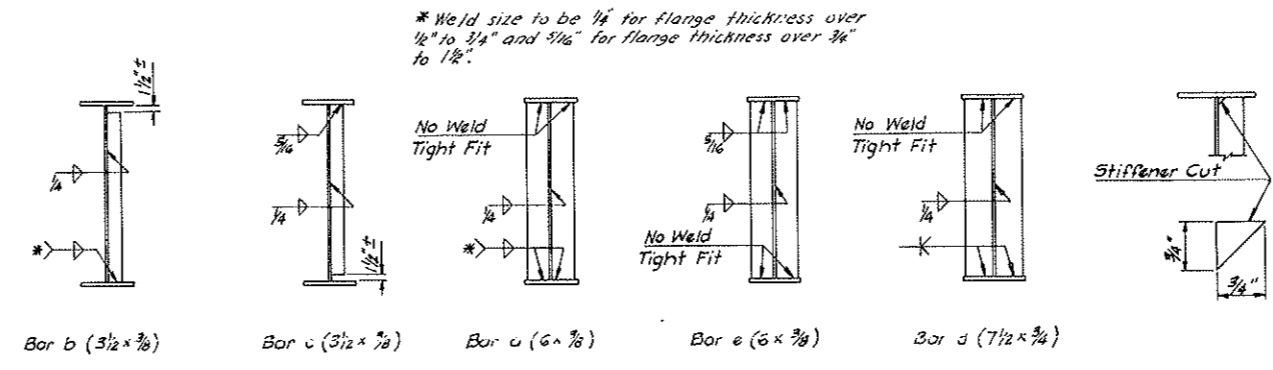
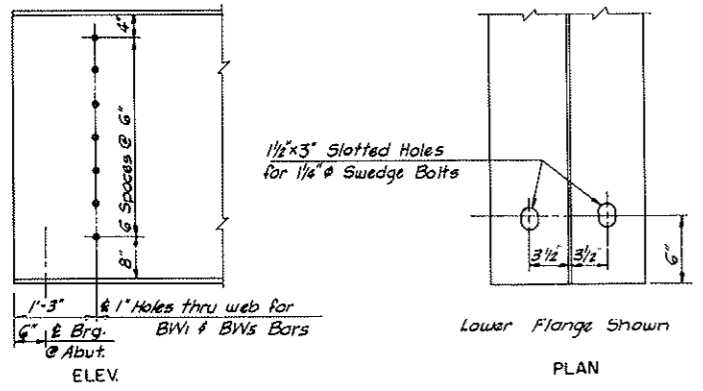
*All plates designated by * shall meet the longitudinal Charpy V-notch test for 15 ft.-lb. at 40°F. Sampling and testing procedures shall be in accordance with ASTM A673-73. The (H) frequency of heat testing shall be used.

QUANTITIES	
See Dwg. 1806-6993-10	

HEART RIVER BRIDGE
 WELDED GIRDER
 DETAILS

MADE BY	DLP
CHECKED BY	LEG
MADE BY	DLP
CHECKED BY	LEG
MADE BY	DLP
CHECKED BY	LEG
QUANTITIES	LEG

FED. ROAD DIST. NO.	STATE	PROJ. NO.	SHEET NO.	TOTAL SHEETS
8	N. D.	RFS-1806-69.93	22	



STRUCTURAL STEEL:

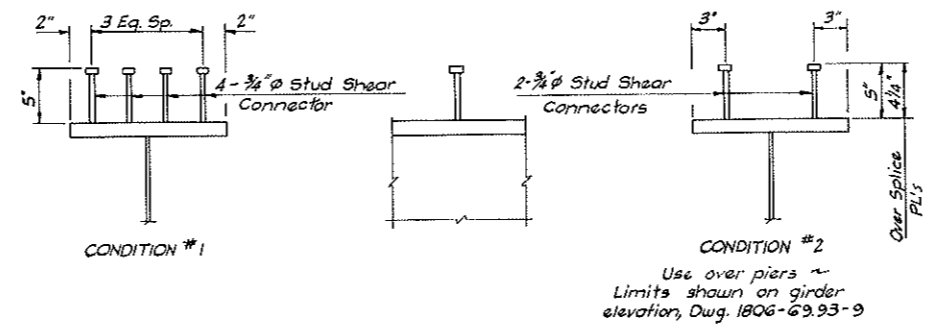
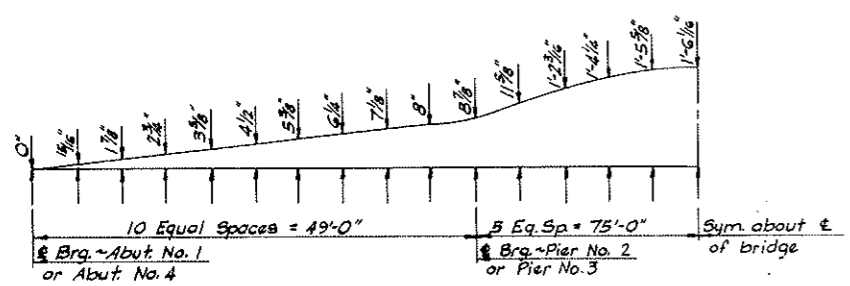
THE GIRDER SHALL BE CAMBERED IN THE SHOP AS DETAILED ON DRAWING 1806-69.93-10. THE SHOP CAMBER DIAGRAM REPRESENTS THE TOTAL RISE, IN INCHES, ABOVE A CHORD BETWEEN THE CENTERLINES OF BEARINGS THAT IS TO BE CUT INTO THE WEB PLATES OF THE GIRDERS TO COMPENSATE FOR THE DEAD LOAD DEFLECTION OF THE SUPERSTRUCTURE AND VERTICAL CURVE.

A MINIMUM OF TWO (2) CONTIGUOUS BEAM SECTIONS SHALL BE PLACED IN THEIR CORRECT RELATIVE POSITIONS BEFORE DRILLING THE HOLES FOR THE BEAM FIELD SPLICE BETWEEN THESE SECTIONS. THE PROPER ALIGNMENT SHALL BE MAINTAINED BETWEEN SECTIONS WHILE REAMING THE HOLES. TEMPLATES SHALL NOT BE USED IN LIEU OF THE ABOVE SHOP ASSEMBLY.

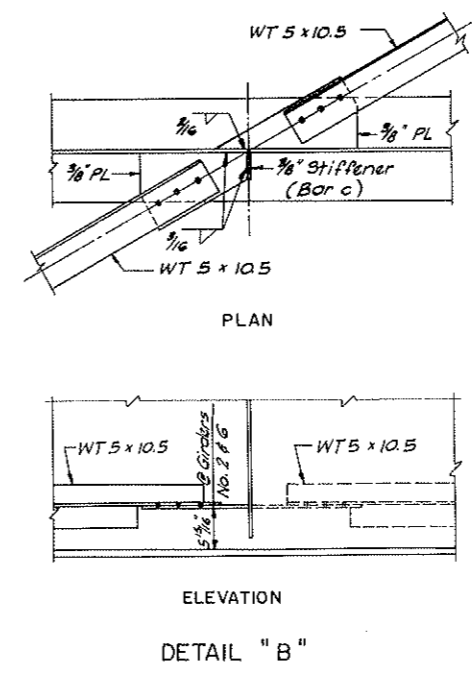
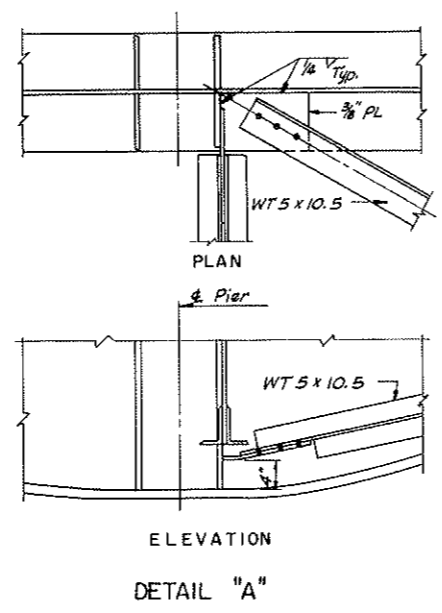
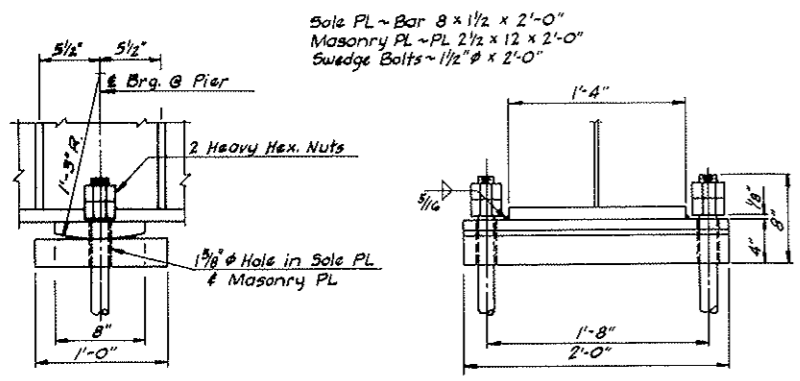
WIRE ROPE SLINGS SHALL NOT BE USED TO HANDLE THE BEAMS. THEY SHALL BE HANDLED WITH BEAM CLAMPS DESIGNED FOR THAT PURPOSE OR OTHER DEVICES APPROVED BY THE ENGINEER.

GIRDER FLANGES ARE TO BE A572 GRADE 50, ALL OTHER STRUCTURAL STEEL SHALL BE A36.

WELDED CONNECTIONS OF DIAPHRAGM ANGLES TO GUSSET PLATES MAY BE USED IN PLACE OF THE BOLTED CONNECTIONS SHOWN. DETAILS SHOULD BE SHOWN ON SHOP DRAWINGS.



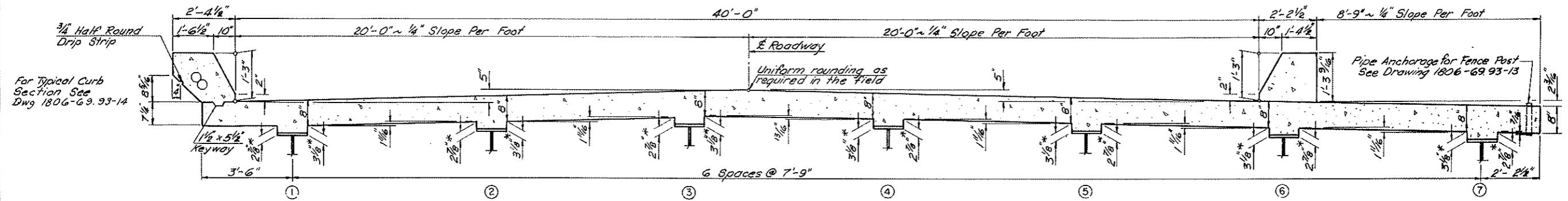
For each row of studs, one C5x6.7 may be substituted if contractor submits plans showing details.



QUANTITIES	
Structural Steel (A372)	100,624 Lb.
Structural Steel (A36)	181,031 Lb.

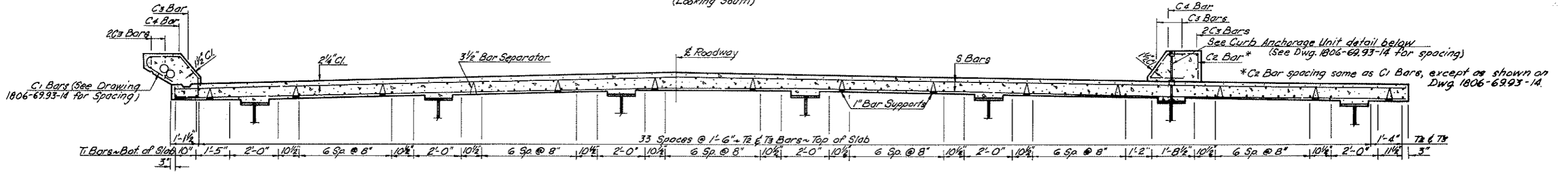
HEART RIVER BRIDGE
WELDED GIRDER
DETAILS

FED. ROAD DIST. NO.	STATE	PROJ. NO.	SHEET NO.	TOTAL SHEETS
8	N. D.	BRS-1-80693069	23	

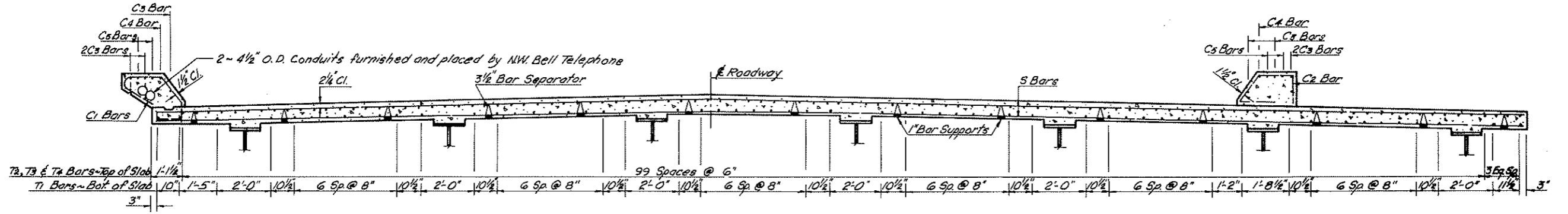


*Allow for variation in girder elevation by adjusting the riser dimension to maintain required slab thickness.

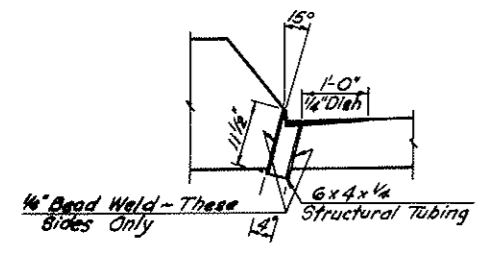
SECTION OF SLAB
Showing Dimensions
(Looking South)



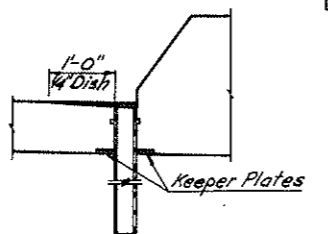
SECTION OF SLAB
Showing Reinforcing Between Supports
(Looking South)



SECTION OF SLAB
Showing Reinforcing Over Piers
(Looking South)

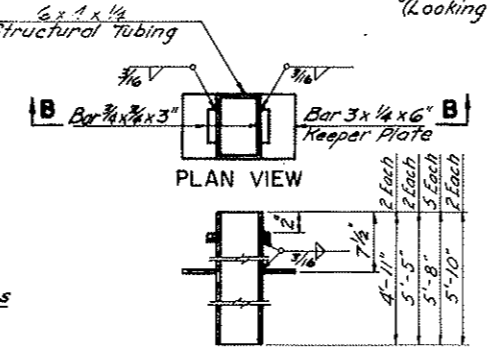


EAST DRAIN DETAIL
If Required

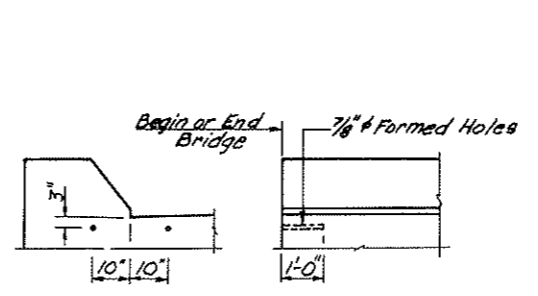


WEST DRAIN DETAIL
If Required

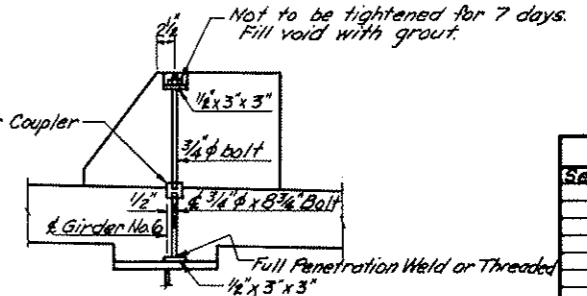
Shall be considered incidental to the pay item of Class AA-3 Concrete



B-B
DRAIN PIPE DETAIL
(West Drains)



CURB SLEEVE DETAIL



CURB ANCHORAGE UNIT

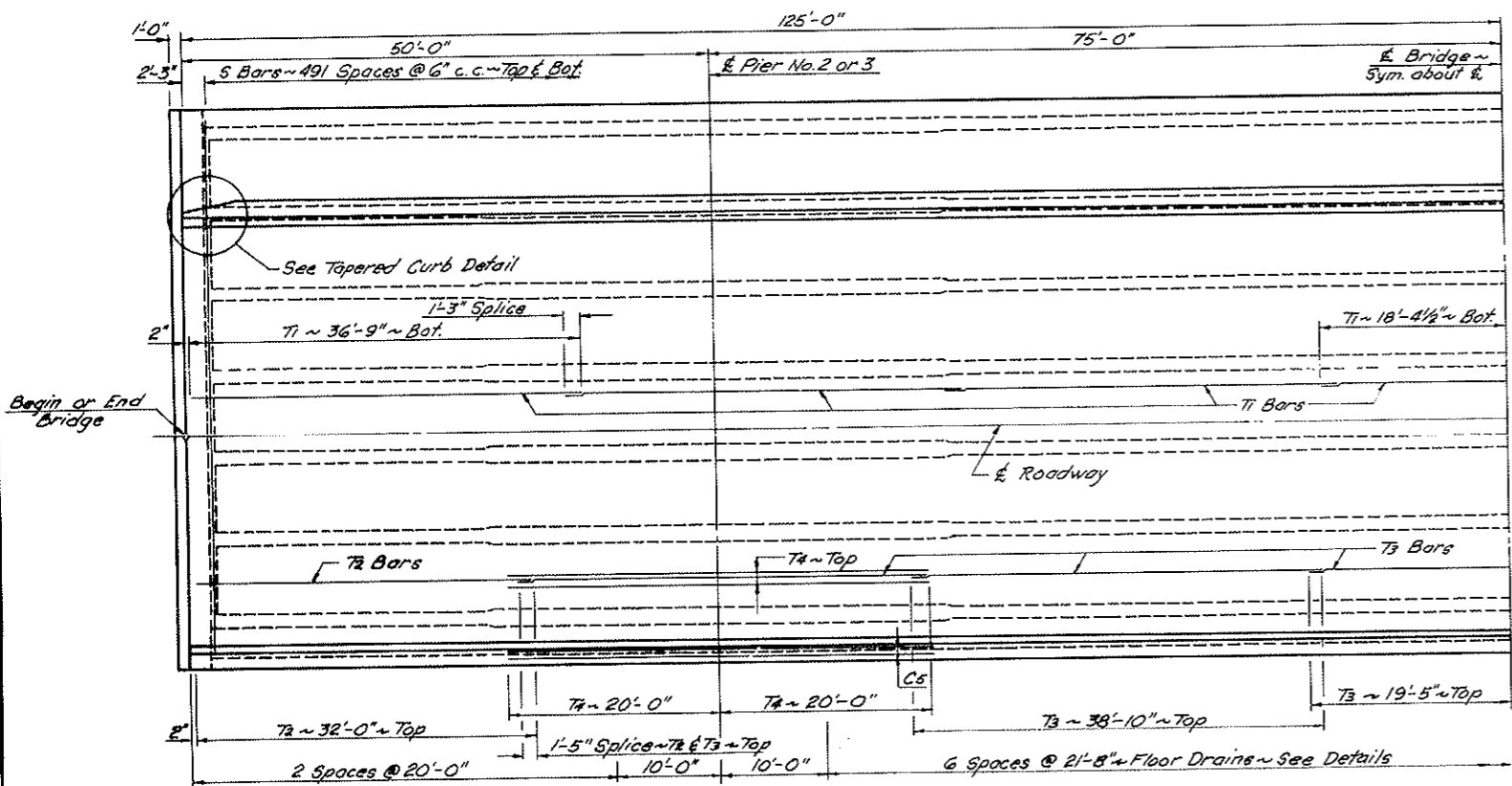
A 3/4" x 8 3/4" bolt attached to a 1/2" x 3" x 3" plate shall be set on the top of the steel girder under the curb adjacent to the sidewalk. The top portion shall be threaded and greased. This will allow the slab to be poured and finished as a full width. After the concrete has been finished, the threads shall be exposed to receive the coupler and additional bolt. The material shall meet A36 strength requirements. Payment will be made under "Structural Steel A36 Welded Girder" and includes the cost of material and placement.

QUANTITIES	
See Drawing 1806-69.93-12	

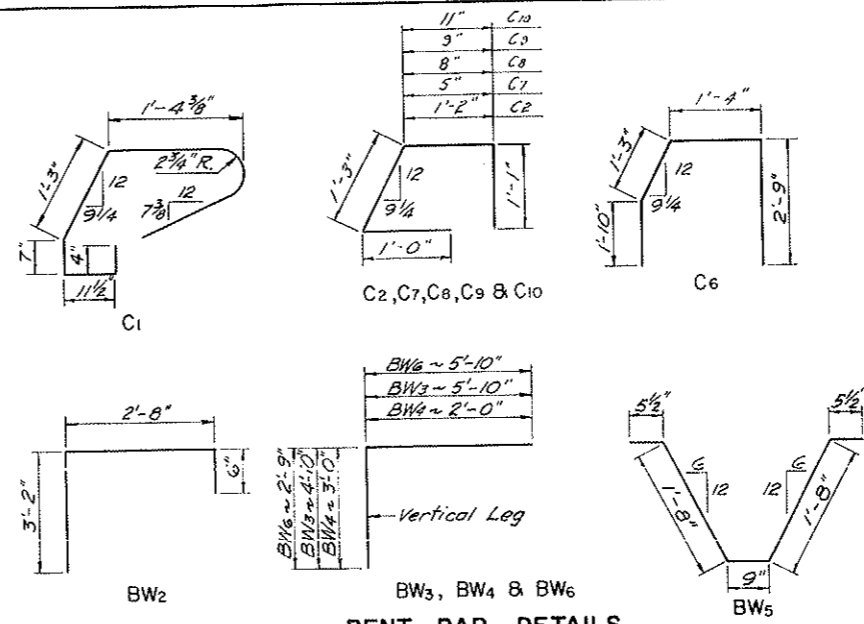
HEART RIVER BRIDGE

SLAB DETAILS

FED. ROAD DIST. NO.	STATE	PROJ. NO.	SHEET NO.	TOTAL SHEETS
8	N. D.	BRS-1-80693-1069	24	

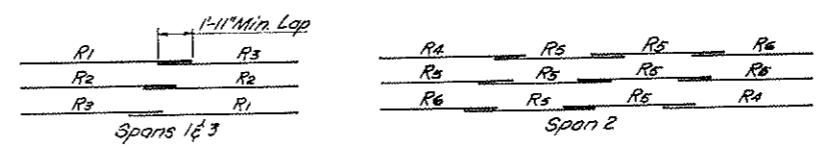


HALF PLAN



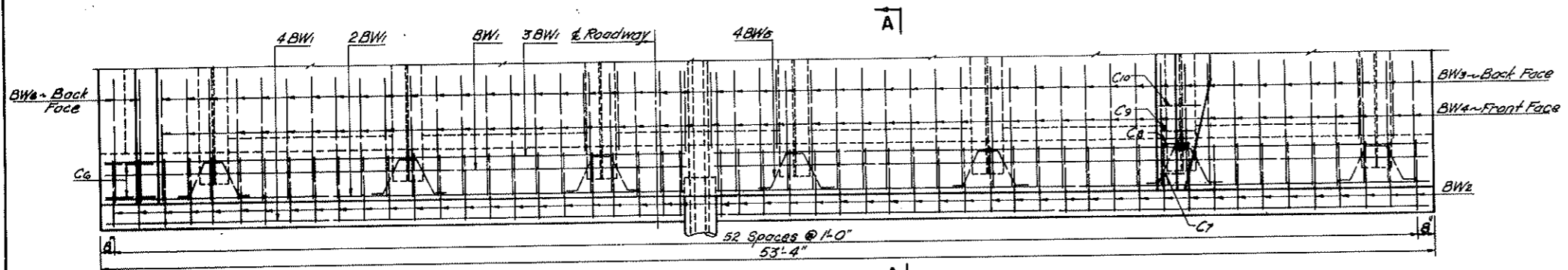
BENT BAR DETAILS

Dimensions shown are out to out

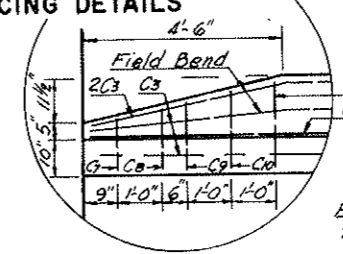


R BAR SPLICING DETAILS

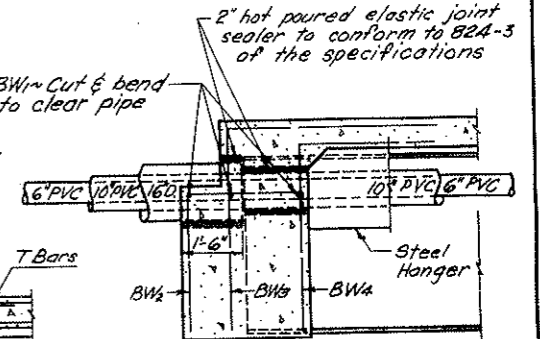
SUPERSTRUCTURE						
MARK	NUMBER	SIZE	LENGTH	SHAPE	UNIT	WT.
BW1	36	4	27'-2"	Str.		
BW2	106	5	6'-4"	Bent		
BW3	102	5	10'-2"	"		
BW4	94	5	5'-0"	"		
BW5	36	5	5'-0"	"		
BW6	4	5	8'-7"	"		
BW7	4	6	27'-6"	Str.		
C1	285	5	5'-9"	Bent		
C2	281	5	4'-6"	"		
C3	63	5	37'-1"	Str.		
C4	14	6	37'-4"	"		
C5	8	6	40'-0"	"		
C6	4	5	7'-2"	Bent		
C7	2	5	3'-9"	"		
P7	174	6	4'-4"	Bent		
P8	18	6	5'-1"	"		
P9	128	5	4'-9"	"		
P10	128	3	4'-2"	"		
P11	116	3	3'-2"	"		
P12	12	3	4'-8"	"		
RC	442	3	3'-3"	Bent		
R1	16	6	26'-2"	Str.		
R2	16	6	23'-4"	"		
R3	16	6	20'-4"	"		
R4	8	6	41'-0"	"		
R5	32	6	38'-0"	"		
R6	8	6	35'-0"	"		
S	994	5	51'-10"	Str.		
T1	413	5	36'-9"	Str.		
T2	70	4	32'-0"	"		
T3	175	4	38'-0"	"		
T4	136	4	40'-0"	"		
C8	2	5	4'-0"	Bent		
C9	2	5	4'-1"	"		
C10	2	5	4'-3"	"		



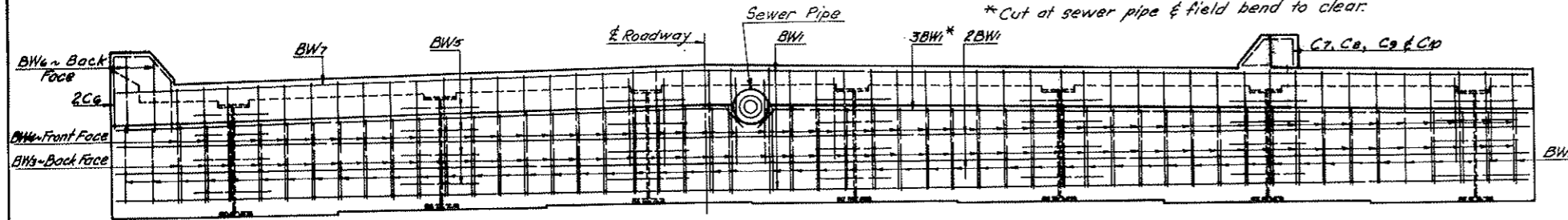
PLAN



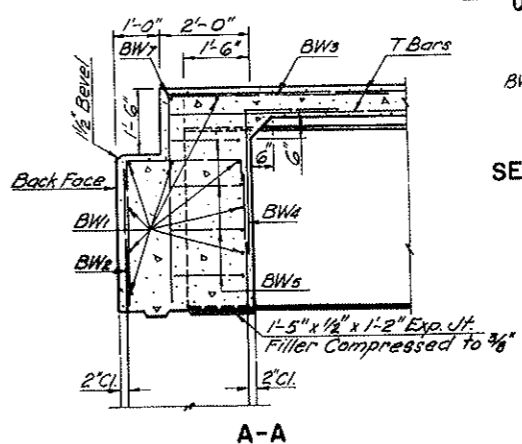
TAPERED CURB DETAIL (sidewalk side only)



SEWER DETAILS @ ENDWALL



ENDWALL ELEVATION (Abutment No. 1 shown)



A-A

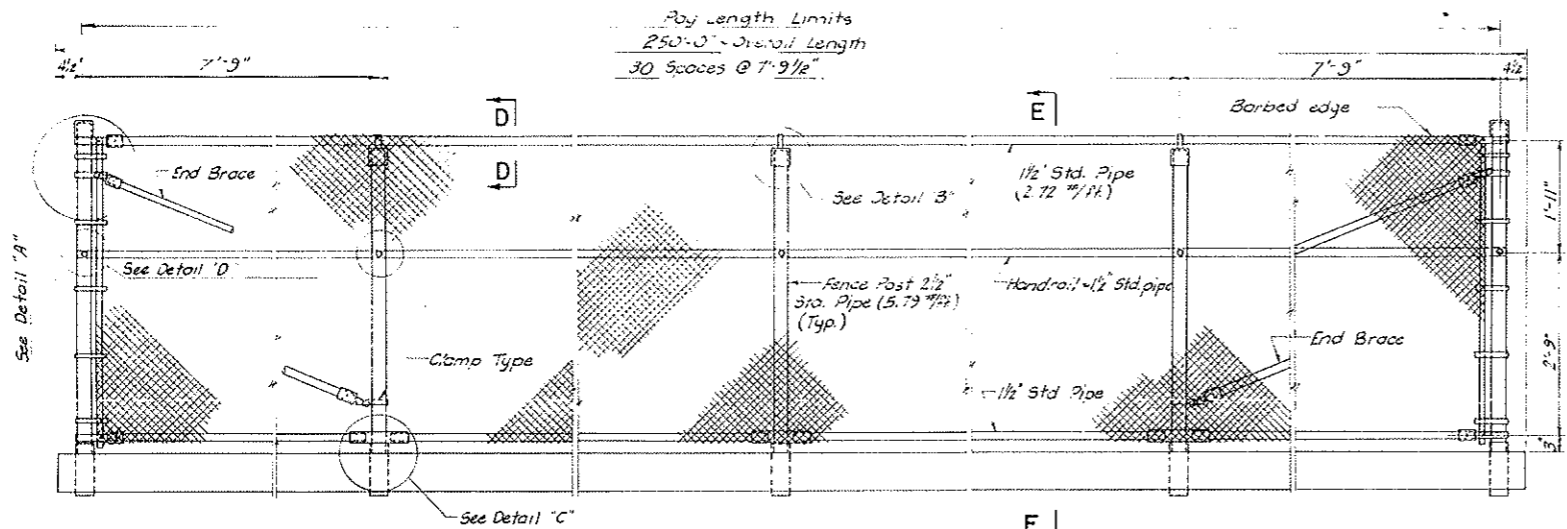
QUANTITIES	
Class A-A-3 Concrete (Slab)	463.4 C.Y.
Class A-A-3 Concrete (Rail & Posts)	16.03 C.Y.
Main Reinforcing Steel	56,425 Lbs.
Structural Steel A&B	855 Lbs.

Rolling and end post quantities included.

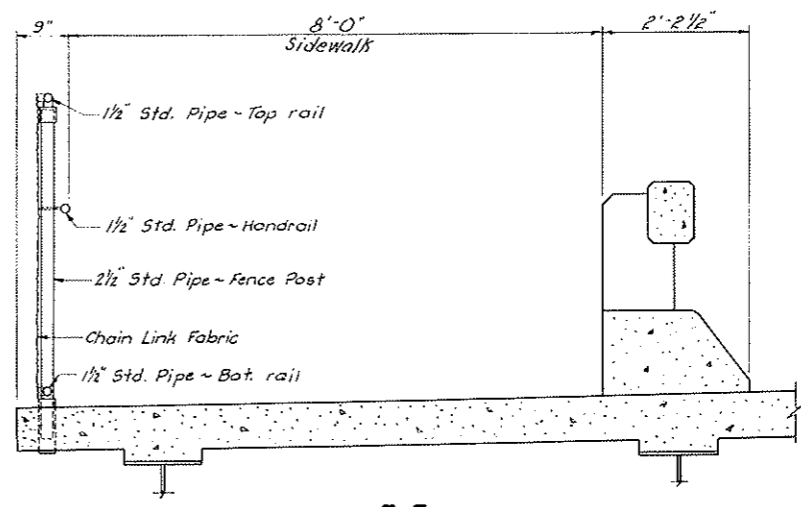
HEART RIVER BRIDGE

SLAB & ENDWALL DETAILS

FED. ROAD DIST. NO.	STATE	PROJ. NO.	SHEET NO.	TOTAL SHEETS
8	N D	BRS-1-B05001069	25	



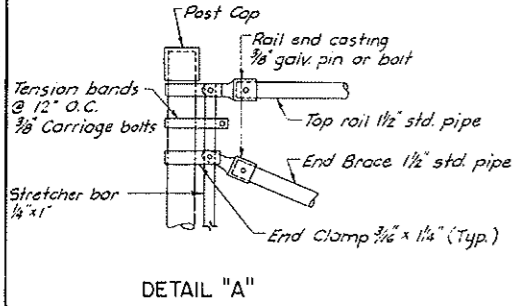
WIRE FENCE ELEVATION
(Looking East)



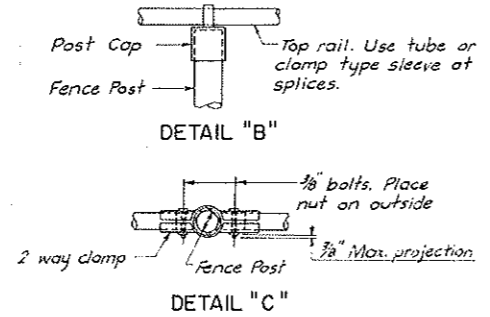
E-E

NOTE:
All posts, fittings and chain link fence shall conform to Section 886 of the Standard Specifications.
Chain Link fabric shall be zinc coated steel, 9-gage wire, 2' mesh, 60" high, bottom edge knuckled and top edge barbed. All posts, fittings and hardware shall be galvanized steel in conformance with AASHTO M 181.

MADE BY LEO
 CHECKED BY OLP
 MADE BY LEO
 CHECKED BY OLP
 MADE BY LEO
 CHECKED BY OLP
 QUANTITIES CHECKED I OLP

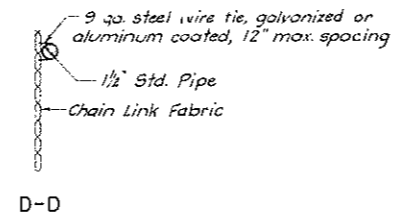


DETAIL "A"

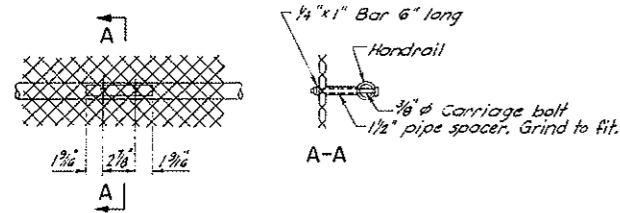


DETAIL "B"

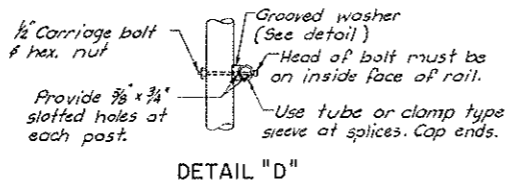
DETAIL "C"



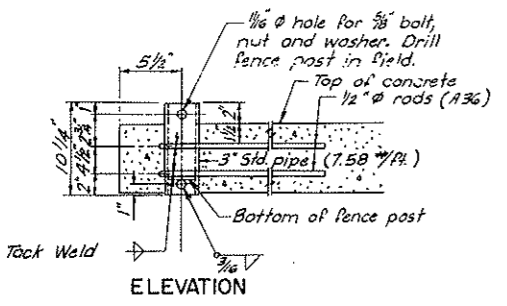
D-D



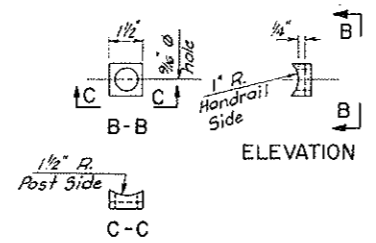
PART ELEVATION
@ 1/2 BAY



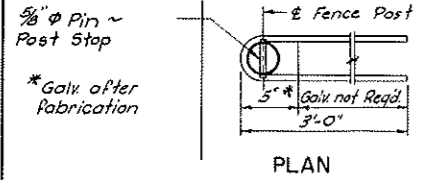
DETAIL "D"



ELEVATION



GROOVED WASHER DETAIL



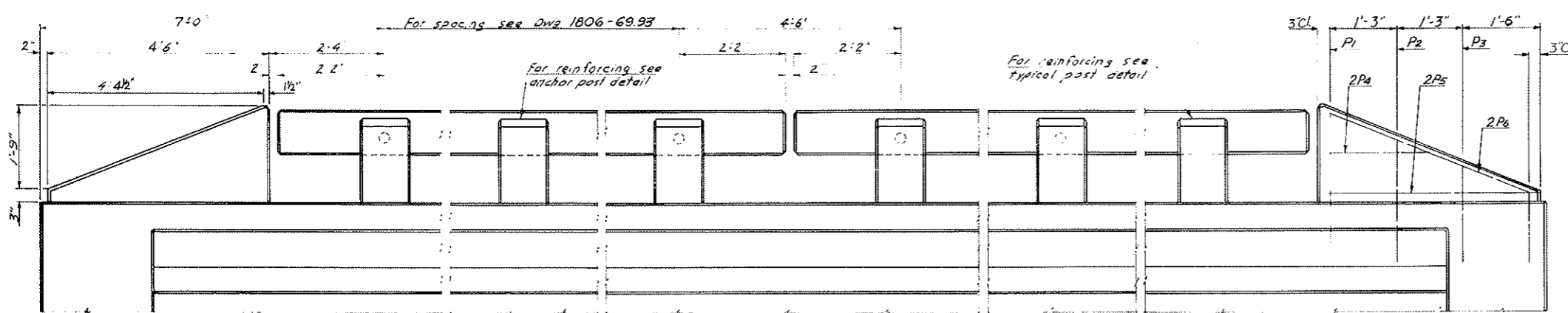
PLAN

PIPE ANCHORAGE FOR FENCE POSTS

QUANTITIES	
Pedestrian Railing	24925 L.F.

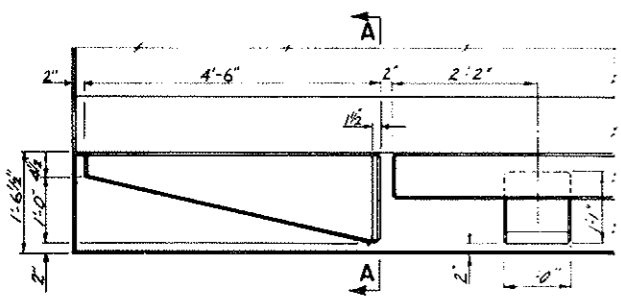
HEART RIVER BRIDGE
PEDESTRIAN RAIL
& MISCELLANEOUS

FED. ROAD DIST. NO.	STATE	PROJ. NO.	SHEET NO.
8	N D	BRS-1-80693-14	2 G

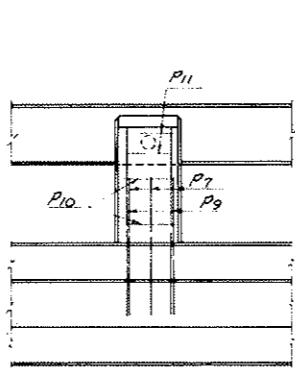


PART ELEVATION

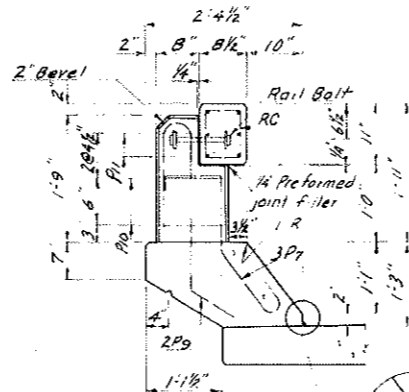
NOTES:
 All concrete above top of curb shall be class AAE-3.
 "Rubbed Surface Finish" will be required for the roadway face of curbs, the outside vertical faces of curb and slab, and all faces of rails, intermediate posts and end posts.
 * Number of bars shown on superstructure sheet.
 ** Number, Length & Splicing information of 'R' Bars shown on superstructure sheet.
 † Railing and end post quantities are included in slab quantities on superstructure sheet.



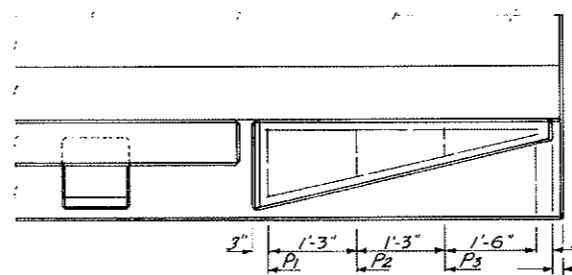
PART PLAN



TYPICAL POST DETAILS

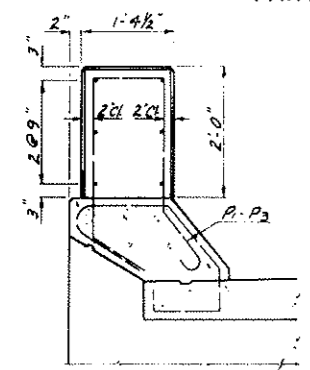


ANCHOR POST DETAILS

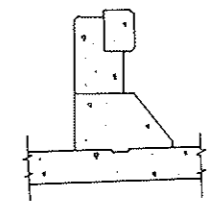


PART PLAN

See Dwg. 1806-69.93-12 for end of curb on sidewalk side of bridge.



A-A

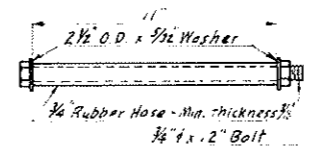


CURB SECTION

Showing post flush with face of curb on sidewalk side.

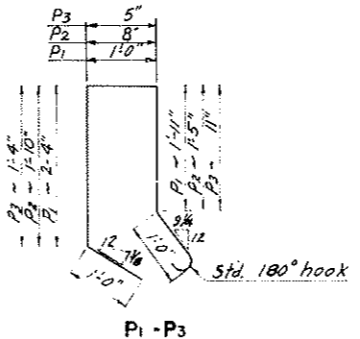
BAR LIST				
(Bars for four end posts)				
MARK	NUMBER	SIZE	LENGTH	SHAPE
P1	4	5	7'-10"	Bent
P2	4	5	6'-6"	"
P3	4	5	4'-3"	"
P4	8	5	2'-1"	Str.
P5	8	5	4'-0"	"
P6	8	5	5'-10"	Bent

BAR LIST				
(Bars for railing & posts)				
MARK	NUMBER	SIZE	LENGTH	SHAPE
P7	*	6	4'-4"	Bent
P8	*	6	5'-1"	"
P9	*	5	4'-9"	"
P10	*	3	4'-2"	"
P11	*	3	3'-2"	"
P12	*	3	4'-8"	"
RC	*	3	3'-3"	Bent
R	**	6	**	Str.

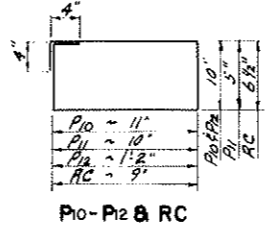


RAIL BOLT

(Galvanized)
 To be included in the unit price bid for class AAE-3 concrete



P1-P3

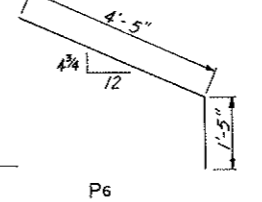


P10-P12 & RC



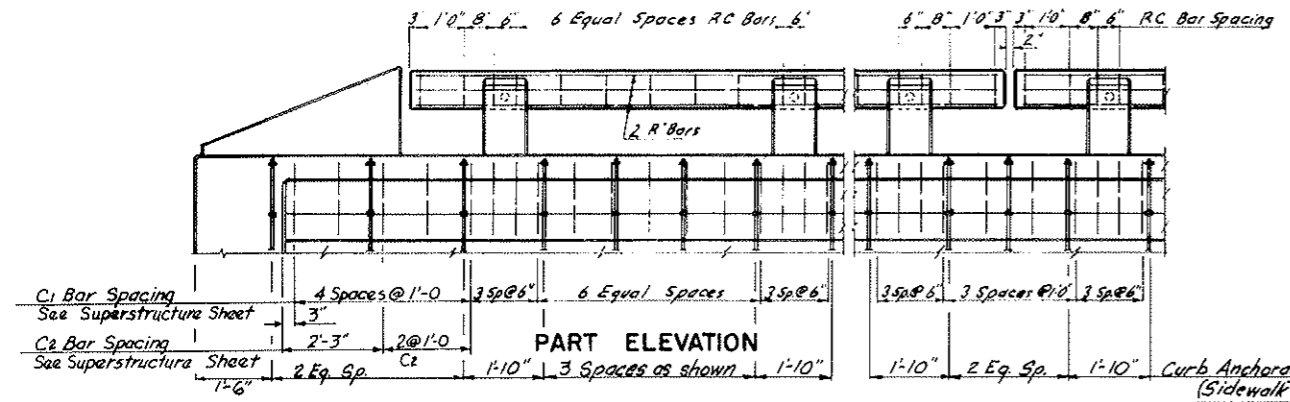
P9

P7 & P8



P6

BENT BAR DETAILS
 Dimensions shown are out to out

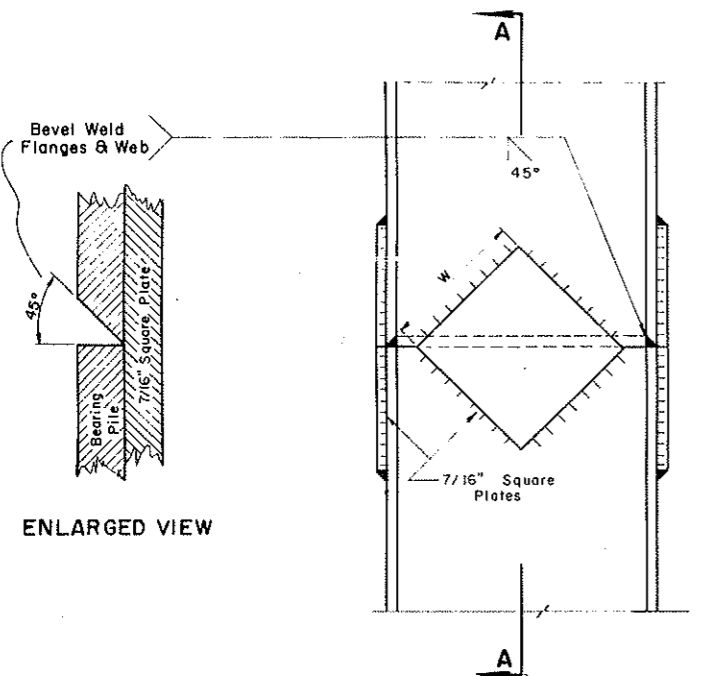


PART ELEVATION

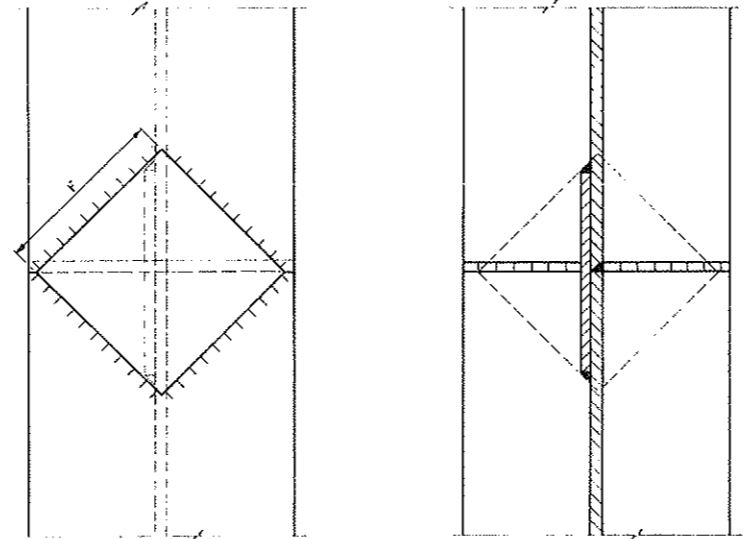
QUANTITIES 4 END POSTS +
 Class AAE-3 Concrete 0.78 cu yd.
 Reinforcing Steel (Grade 60) 177 Lbs.

RAILING DETAILS

MADE BY
CHECKED BY
TRACING
QUANTITIES

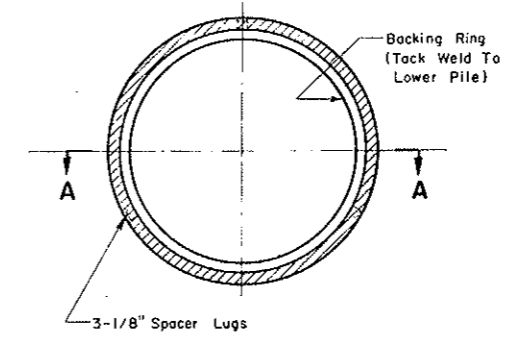


ENLARGED VIEW

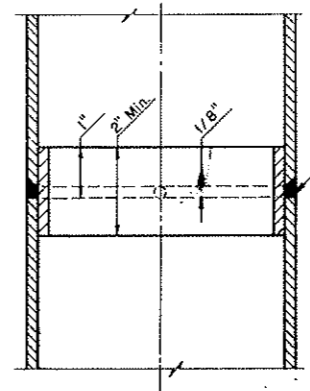


Flame Scarf Inside Of Both Flanges And One Side Of Web Of Upper Section

A - A

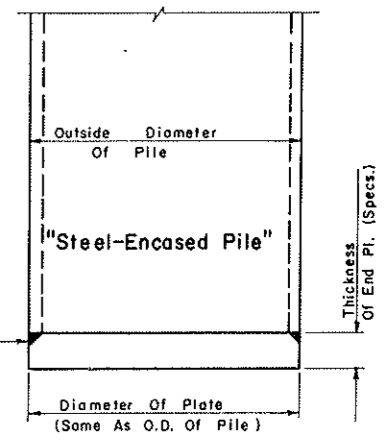


Backing Ring may be made from pile cut-offs or other material of a like quality.

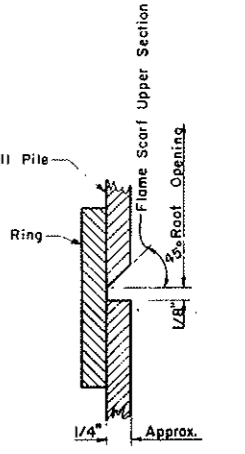


A-A

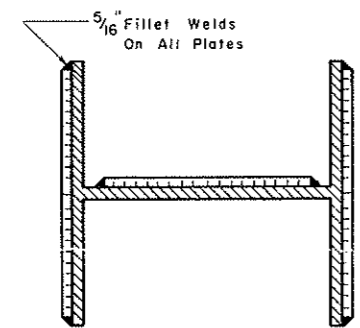
SHELL PILE SPLICE DETAIL



END PLATE DETAIL



ENLARGED VIEW



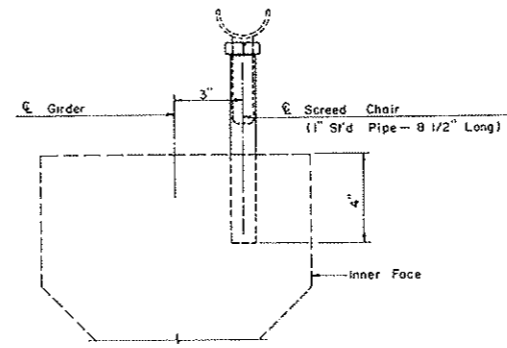
H-PILE SPLICE DETAIL

PILE	8"	10"	12"	14"
F FLANGE	5"	6 1/2"	8"	10"
W WEB	4"	5 1/2"	6 1/2"	8"

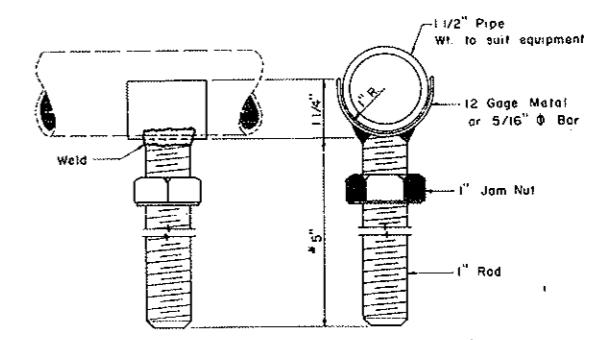
All welding shall conform to the current specification for "Welded Highway and Railway Bridges of the American Welding Society."

PILE SPLICE DETAILS

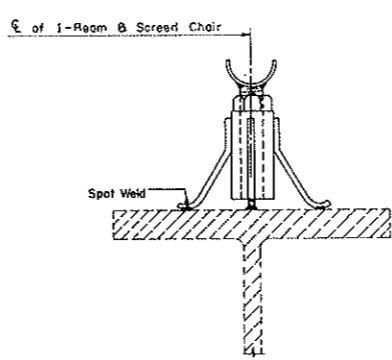
DESIGN	MADE BY	REVISIONS	MADE BY	CHK'D BY	DATE
DETAILS	CHECKED BY				
TRACING	MADE BY				
QUANTITIES	CHECKED BY				



SCREED CHAIR IN PRESTRESSED GIRDER
(Outside Girders Only)



ADJUSTABLE SCREED HOLDER
* Useable with slab thickness of 7" or less. For greater slab thickness adjust length accordingly.



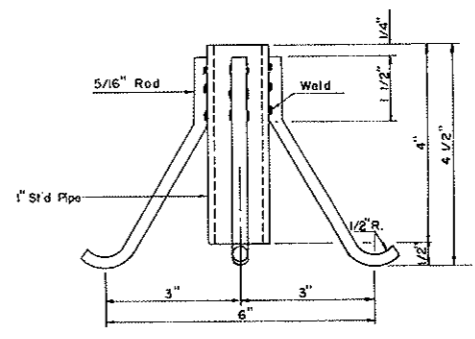
I-BEAM WITH SCREED CHAIR

NOTE:

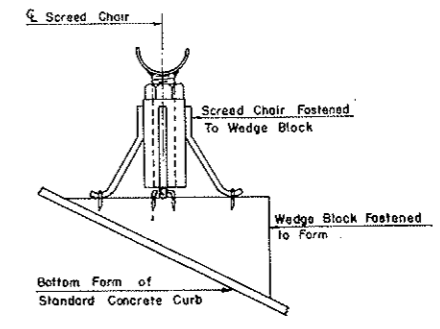
THE SPACING OF SCREED CHAIRS SHALL BE SUCH THAT NO NOTICEABLE DEFLECTION OCCURS IN THE SCREED WHEN THE VIBRATION STRIKE-OFF IS IN OPERATION. CHAIRS SHALL BE SIMILARLY PLACED FOR ALL SCREEDS ON THE SAME BRIDGE SPAN WITH A MAXIMUM SPACING OF THREE FEET WHEN USING 1 1/2" EXTRA STRONG PIPE FOR A SCREED. SCREEDS SHALL BE SET ON OUTER BEAMS AND ALSO ON INTERMEDIATE BEAMS IF NECESSARY TO MAINTAIN THE REQUIRED TEMPLATE.

THE COST OF THE SCREED CHAIRS AND HOLDERS SHALL BE INCLUDED IN THE UNIT PRICE BID FOR THE VARIOUS PAY ITEMS. UPON COMPLETION OF THE PROJECT THE SCREED AND SCREED HOLDERS SHALL REMAIN THE PROPERTY OF THE CONTRACTOR.

THE DESIGN SHOWN FOR THE SCREED CHAIRS AND SEAT MAY BE VARIED SLIGHTLY TO SUIT MANUFACTURERS PRODUCTS IF APPROVED BY THE ENGINEER.



SCREED CHAIR



BOTTOM CURB FORM WITH SCREED CHAIR

NORTH DAKOTA
STATE HIGHWAY DEPARTMENT

**SCREED CHAIR
&
ADJUSTABLE SCREED
HOLDER**

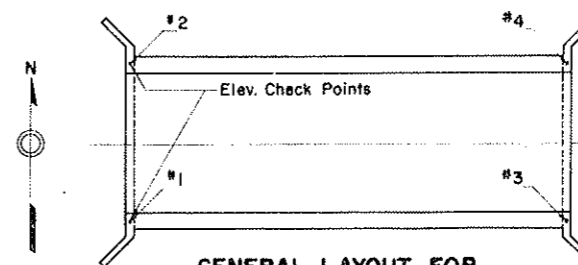
APPROVED
3-20-78
DATE

Alvin Anderson
BRIDGE ENGINEER

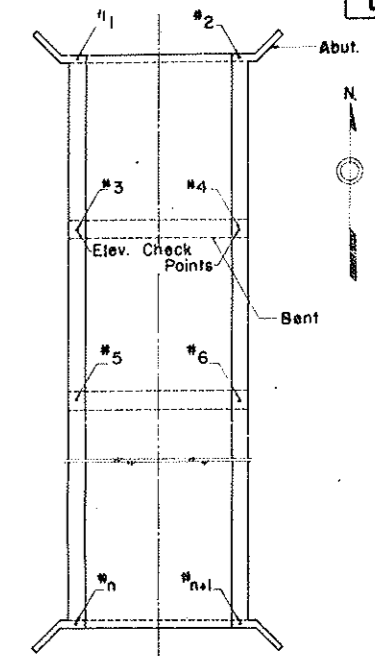
BRIDGE BENCH MARKS

8 N.D.

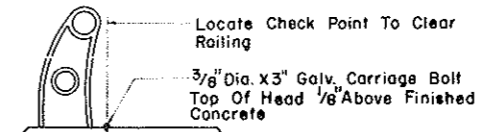
D-900-1



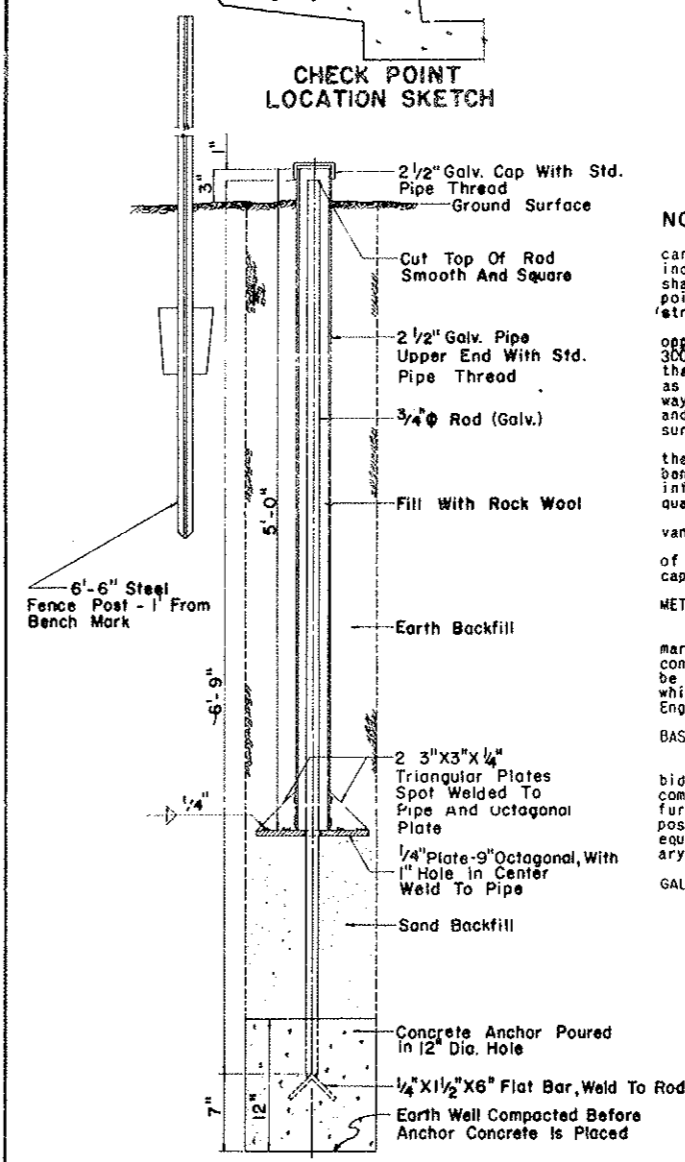
GENERAL LAYOUT FOR SINGLE SPAN



GENERAL LAYOUT FOR MULTIPLE SPAN



CHECK POINT LOCATION SKETCH



BENCH MARK DETAIL

NOTES:

Elevation check points shall consist of 3/8"x 3" galvanized carriage bolts (or equal) set in the concrete curb at the points indicated on the General Layout Sketches. The top of bolt head shall project above the finished concrete 1/8". Elevation check points shall be placed on each curb over each unit of the sub-structure for each bridge at a structural location. Two bench marks as detailed hereon shall be set at diagonal opposite positions away from the structure location and at least 300 feet from the nearest point on the bridge or bridges (if more than one at a location). These bench marks shall be constructed as detailed on this sheet and located near the Highway Right-of-way lines. The steel fence post shall extend 4'-0" above ground and be painted with two coats of white paint suitable for steel surfaces. The Project Engineer shall run a set of levels determining the elevation of each check point on the structure and the two bench marks immediately after the completion of the bridge. This information shall be submitted to the Bridge Engineer with adequate information locating each check point and bench mark. Except for fence posts, all metal parts to be hot dip galvanized after punching, shearing, welding, and fabrication. Threads of cap and pipe are not to be galvanized. At time of installation these threads are to be coated with grease and cap screwed to snug fit.

METHOD OF MEASUREMENT:

Each set of Bridge Bench Marks consisting of two bench marks and the required number of elevation check points shall be considered as one unit for bidding purposes and the quantity to be paid for shall be the number of sets of bridge bench marks which have been installed complete in place and accepted by the Engineer.

BASIS OF PAYMENT:

Bridge Bench Marks shall be paid for at the contract price bid for each set of Bridge Bench Marks, which price shall be full compensation for all excavation, backfill and clean-up and for furnishing, hauling and placing all elevation check points, fence posts, galvanized pipe, caps, rods, sand backfill, concrete, rock equipment, tools and incidentals, including galvanizing, necessary to complete this item.

GALVANIZING:

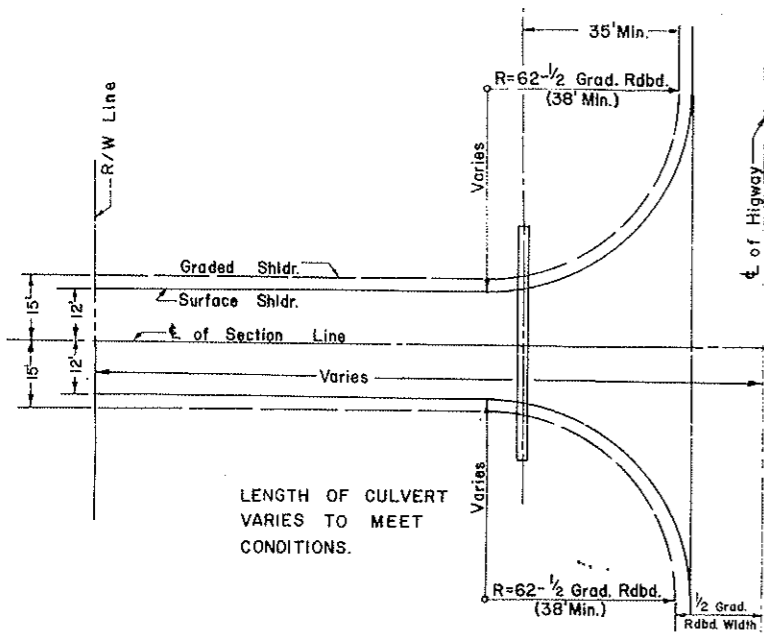
After fabrication the complete assembly shall be Hot Dip Galvanized.

7.6

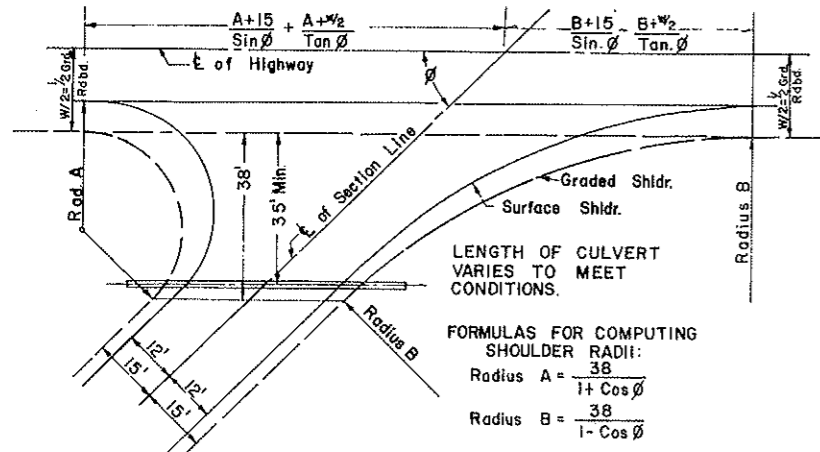
NORTH DAKOTA
STATE HIGHWAY DEPARTMENT
Submitted: *Joseph R. Kirby*
Bridge Engineer
Recommended: *[Signature]*
Director State Division
Approved: *[Signature]*
Chief Engineer
Date: 3-3-58

Revised 10-20-59
Revised 6-9-59

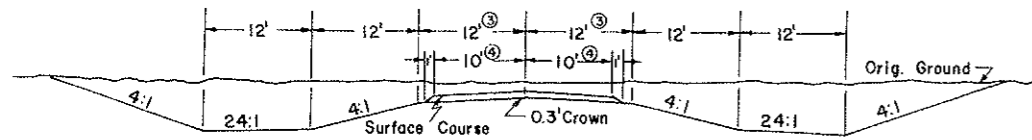
SECTION LINE & PRIVATE DRIVE APPROACHES (RURAL)



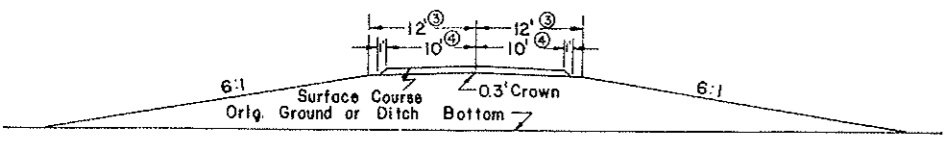
PLAN VIEW SECTION LINE APPROACH (WITHOUT SKEW)



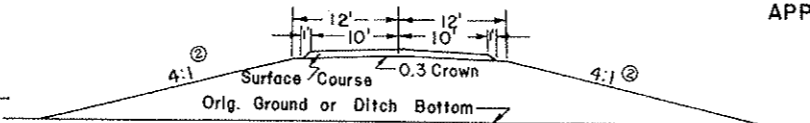
PLAN VIEW SECTION LINE APPROACH (SKEWED)



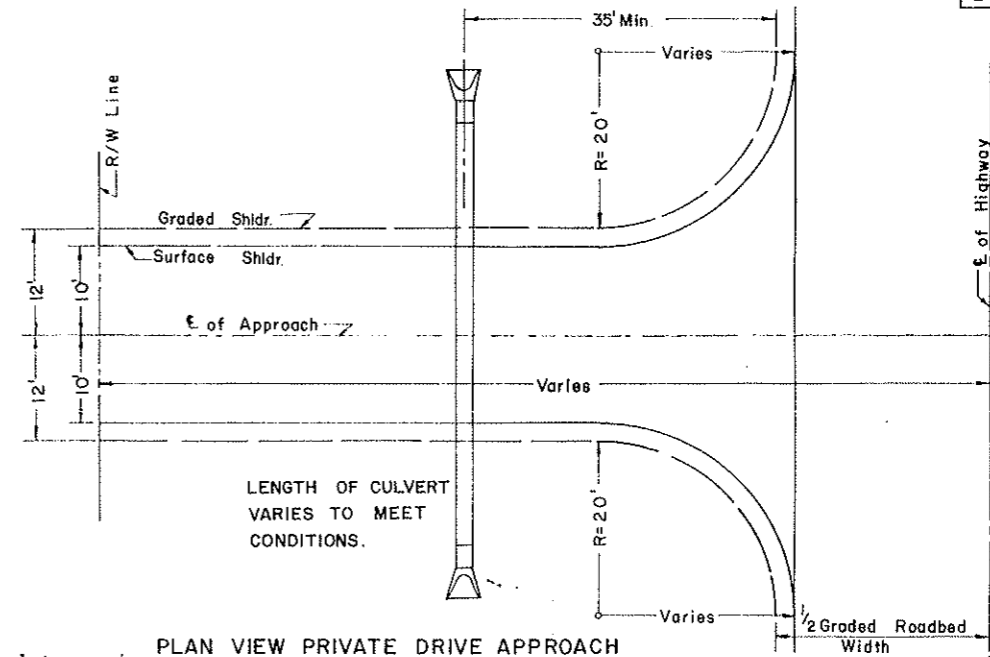
SECTION A-A



SECTION B-B

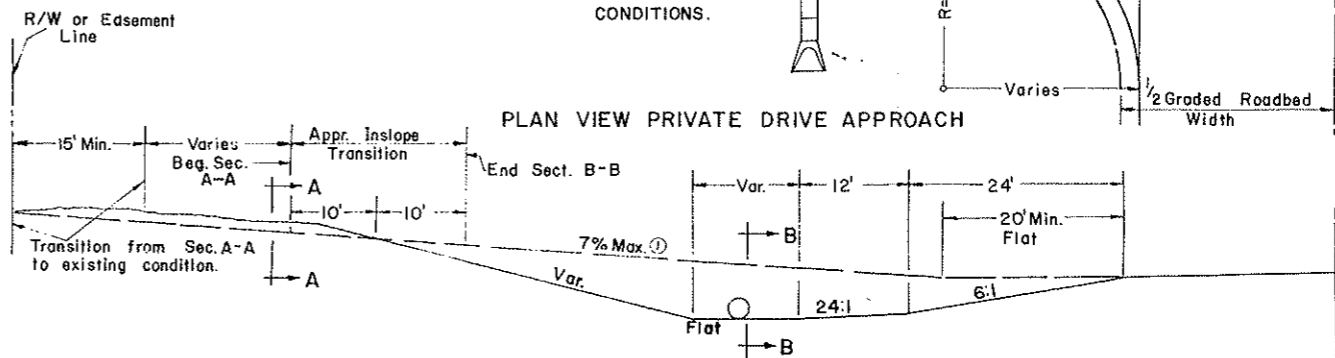


SECTION C-C

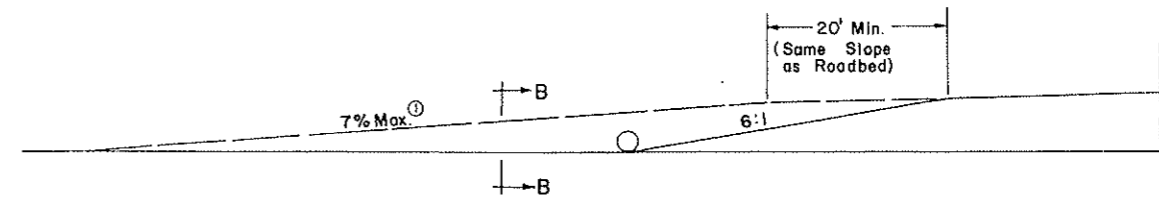


LENGTH OF CULVERT VARIES TO MEET CONDITIONS.

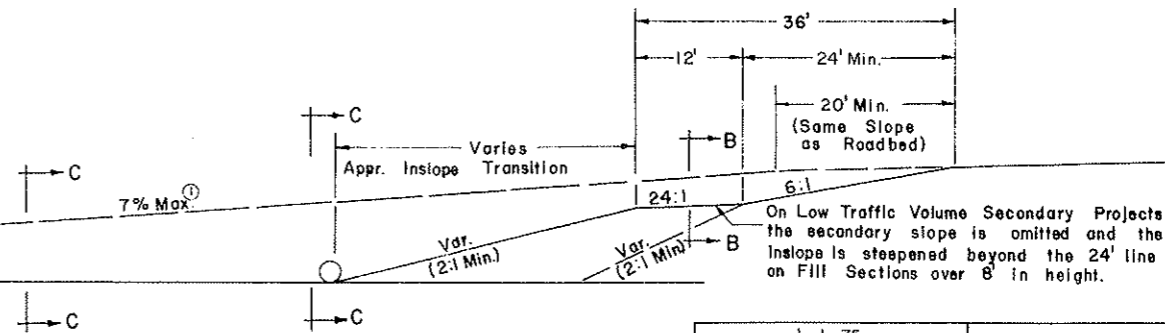
PLAN VIEW PRIVATE DRIVE APPROACH



APPROACH GRADE ON CUT SECTION



APPROACH GRADE ON FILL SECTION 12 FEET OR LESS



APPROACH GRADE ON FILL SECTION OVER 12 FEET

NOTE:
DIMENSIONS SHOWN FOR SURFACING ARE FOR AGGREGATE SURFACE COURSE OR BITUMINOUS SURFACE CONSTRUCTED WITH GRADING CONTRACT. APPR. GRADES AND TYPICAL SECTIONS APPLY TO BOTH PRIVATE DRIVES AND SECTION LINE APPROACHES.

FOOT NOTES

- ① 10% Max. on Field Drives.
- ② 3:1 Slope - 20' to 30' Fill
2:1 Slope on Fills over 30'
- ③ 15' on Sec. Line Appr's.
- ④ 12' on Sec. Line Appr's

1-1-75		REVISIONS	NORTH DAKOTA STATE HIGHWAY DEPARTMENT
DATE	CHANGE		
Submitted:			Design Engineer
Recommended:			Asst. Chief Engineer Pre-Construction
Approved:			Chief Engineer

CORRUGATED STEEL PIPE CULVERTS AND END SECTIONS (ROUND PIPE)

D-630-4

This connection for 42" thru 84" diameter pipe to be bolted or riveted to the end section with $\frac{3}{8}$ " Galv. bolts or rivets.

NOTES:

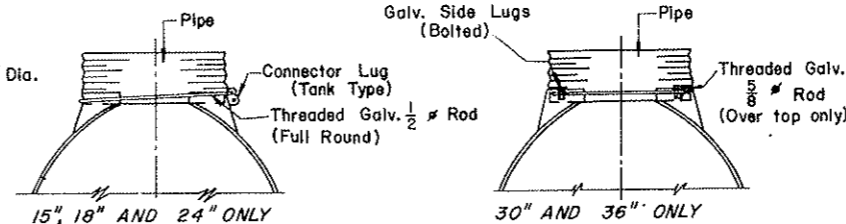
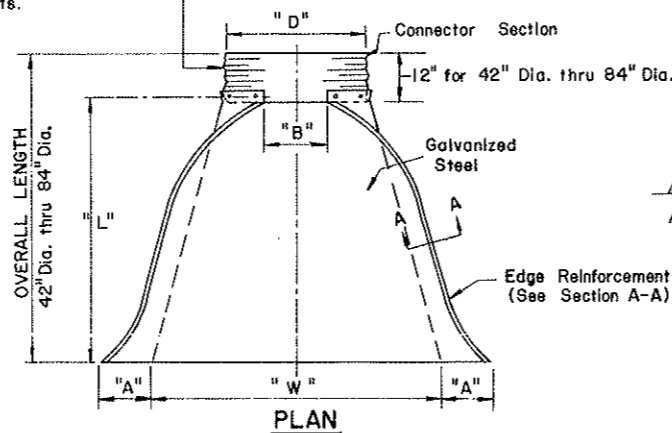
Pipe and Connecting Bands shall conform to applicable sections of MDSHD Standard Specifications and to AASHTO M-36.

Top edge of all End Sections to have tubing reinforcement or rolled tubing reinforcement (See Section A-A). The tubing is to be supplemented with $2 \times 2 \times \frac{1}{4}$ " Galv. Angle for 60" thru 72" Dia. and $2 \frac{1}{2} \times 2 \frac{1}{2} \times \frac{1}{4}$ " Galv. Angle for 78" and 84" Dia. Angles to be attached by Gal. $\frac{3}{8}$ " bolts and nuts. Angles are to extend from Pipe to the corner wing bend.

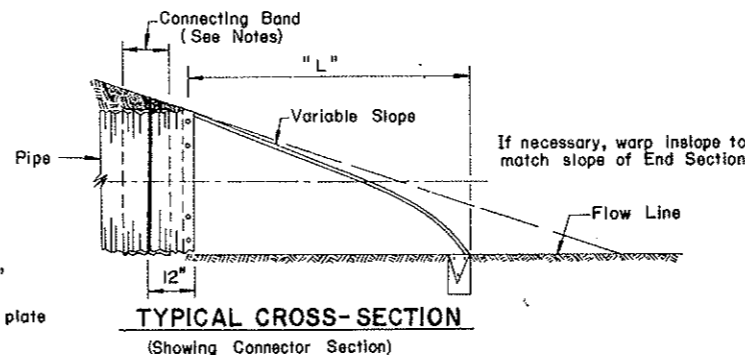
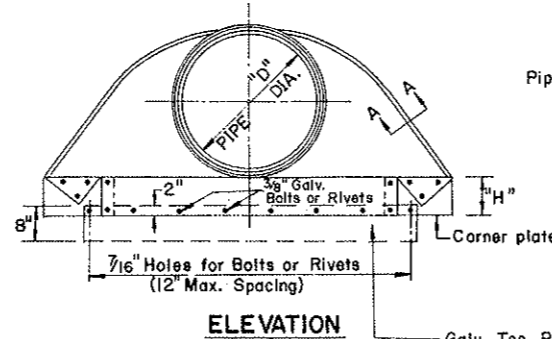
Elongated pipe shall be factory preformed so that the vertical diameter shall be 5% greater and the horizontal diameter 5% less than a circular pipe.

Fill Height Tables are based on the following criteria:

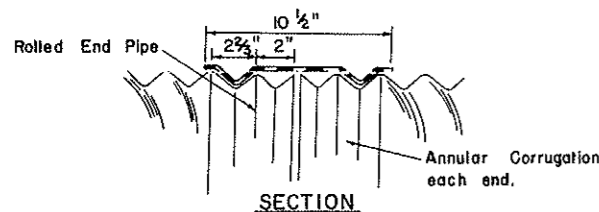
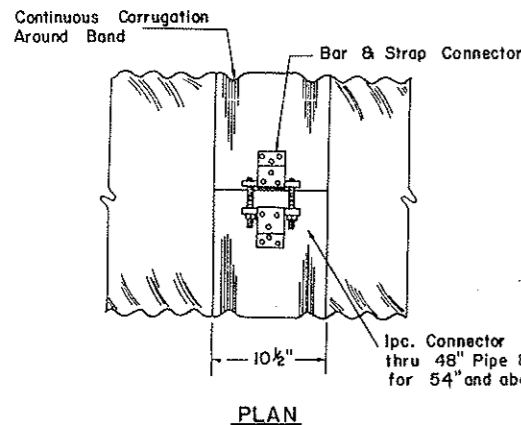
1. Embankment weight = 120 lb/ft³
2. Max. pipe deflection = 5%
3. Bedding - Class C
4. Compaction = 95% Proctor Density
5. Modulus of passive soil resistance (E') = 1400 psi
6. H-20 Live Load



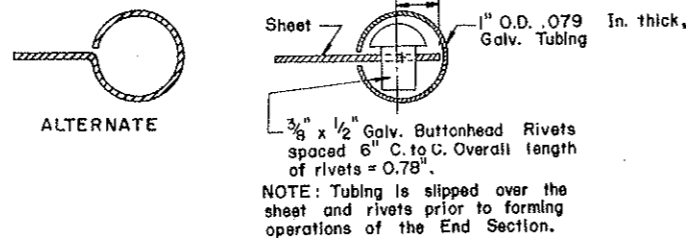
ROD CONNECTION DETAILS



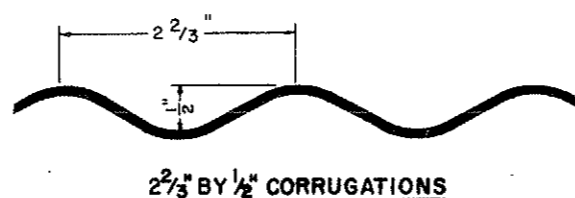
**TYPICAL CROSS-SECTION
(Showing Connector Section)**



**CONNECTING BAND DETAILS FOR
HELICAL, WELDED-SEAM CULVERT**



SECTION A-A



2 2/3" BY 1/2" CORRUGATIONS



3" BY 1" CORRUGATIONS

END SECTIONS

* * PIPE DIA. (In.)	GALV. THICK.	DIMENSIONS					Approx. Slope	Body Pieces
		A	B	H	L	W		
15	.064	7	8	6	26	30	2-1/2:1	1
18	.064	8	10	6	31	36	2-1/2:1	1
24	.064	10	13	6	41	48	2-1/2:1	1
30	.079	12	16	8	51	60	2-1/2:1	1
36	.079	14	19	9	60	72	2-1/2:1	2
42	.109	16	22	11	69	84	2-1/2:1	2
48	.109	18	27	12	78	90	2-1/4:1	2
54	.109	18	30	12	84	102	2:1	2
* 60	.109	18	33	12	87	114	1-3/4:1	3
* 66	.109	18	36	12	87	120	1-1/2:1	3
* 72	.109	18	39	12	87	126	1-1/3:1	3
* 78	.109	18	42	12	87	132	1-1/4:1	3
* 84	.109	18	45	12	87	138	1-1/6:1	3

* These sizes have 0.138 in. center panels.
 * * Pipe diameter is equal to dimension "D" of end section. Manufacturers tolerances of above dimensions will be allowed. Splices to be the lap riveted type. Multiple panel bodies shall have lap seams which are to be tightly joined with $\frac{3}{8}$ " galv. bolts or rivets. Nuts to be torqued to 25 lbs. ft.

FILL HEIGHT TABLES RIVETED, WELDED OR HELICAL FABRICATION

WATERWAY AREA SQ. FT.	PIPE DIA. (IN.)	MIN. COVER (IN.)	MAX. FILL HEIGHTS OVER TOP OF PIPE					WATERWAY AREA SQ. FT.	PIPE DIA. (IN.)	MIN. COVER (IN.)	MAX. FILL HEIGHTS OVER TOP OF PIPE				
			GALV. METAL THICKNESS (IN.)								GALV. METAL THICKNESS (IN.)				
			.064	.079	.109	.138	.168				.064	.079	.109	.138	.168
7.1	36	12	48	60	78 (88)	89 (106)	101 (118)	1.2	15	12	67	73			
9.6	42	12	41	51	64 (76)	71 (91)	79 (104)	1.8	18	12	56	61			
12.6	48	12	36	45	57 (66)	61 (80)	66 (88)	3.1	24	12	42	46	59		
15.9	54	12	32	40	52 (59)	55 (71)	59 (79)	4.9	30	12	34	36	47		
19.6	60	12	29	36	49 (53)	51 (64)	54 (71)	7.1	36	12	28	30	39	41	
23.8	66	12	26	33	47 (58)	49 (64)	51 (64)	9.6	42	12	31	43	46 (67)	48 (70)	50 (73)
28.3	72	12	24	30	44 (53)	47 (59)	49 (59)	12.6	48	12	27	37	45 (58)	46 (61)	47 (64)
33.2	78	12	22	28	41 (46)	46 (49)	47 (54)	15.9	54	12		33	43 (52)	44 (54)	45 (57)
38.5	84	12	21	26	38 (45)	45 (51)	46 (51)	19.6	60	12			43 (47)	43 (49)	44 (51)
44.2	90	12	19	24	35 (43)	43 (45)	45 (45)	23.8	66	12			42	43	43 (47)
50.3	96	12	18	22	33 (40)	40 (44)	44 (44)	28.3	72	12				41	43
56.7	102	24	17	21	31 (38)	38 (42)	42 (42)	33.2	78	12					39
63.6	108	24		20	30 (35)	35 (39)	39 (39)	38.5	84	12					35
70.9	114	24		19	28 (34)	34 (37)	37 (37)								
78.5	120	24			27 (32)	32 (35)	35 (35)								

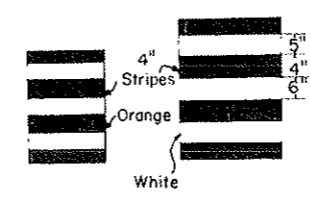
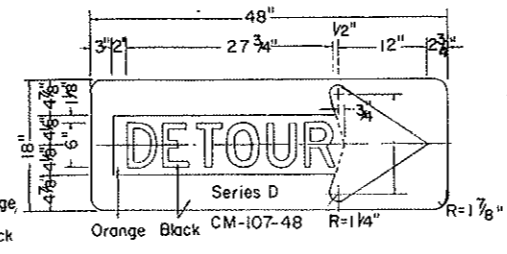
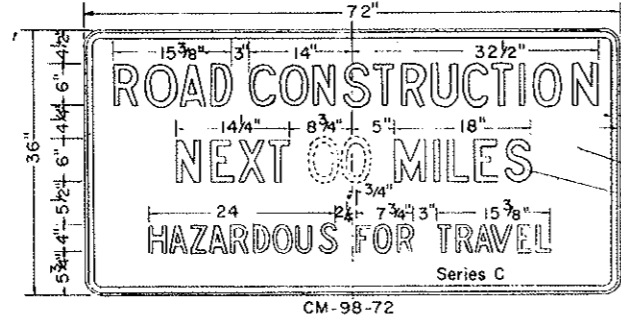
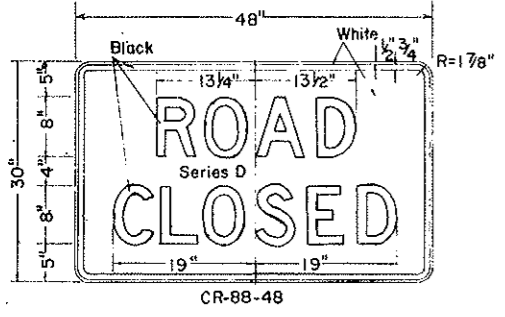
VALUES FOR ELONGATED PIPE ARE SHOWN IN PARENTHESES

6-1-74		NORTH DAKOTA STATE HIGHWAY DEPARTMENT
DATE	REVISIONS	
1-1-75	CHANGE	Submitted: <i>E. Johnson</i> Design Engineer
	Connecting Band	Recommended: _____ Asst. Chief Engineer Pre-Construction
		Approved: <i>W. Handley</i> Chief Engineer

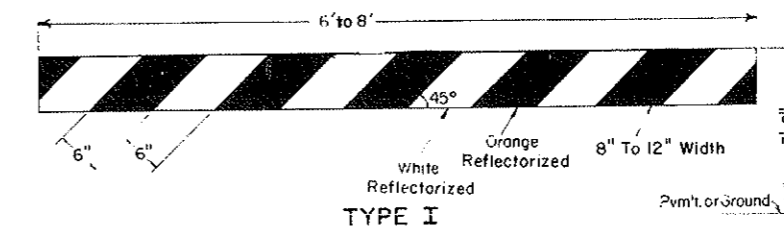
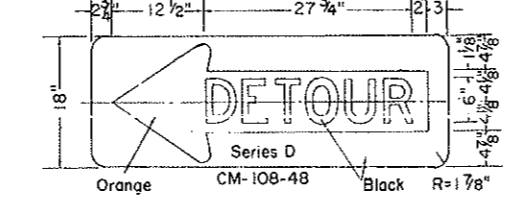
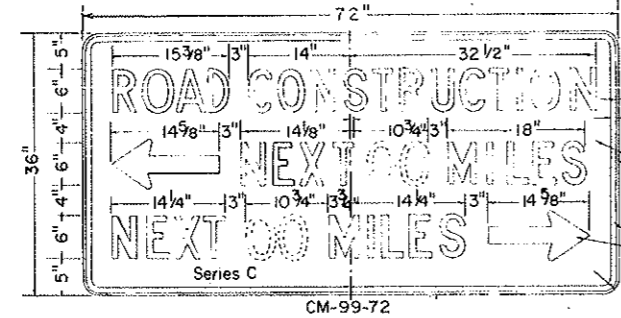
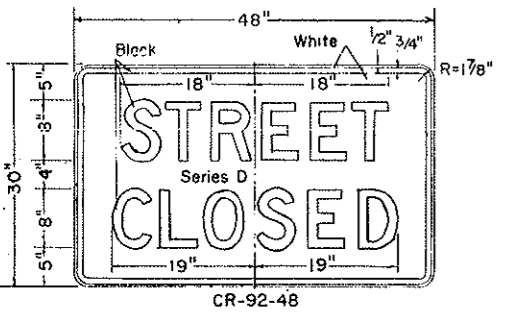
CONSTRUCTION SIGNS AND BARRICADE DETAILS

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8	N.D.			32	32

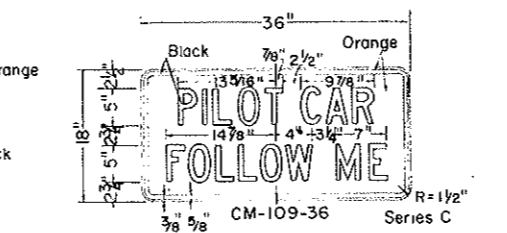
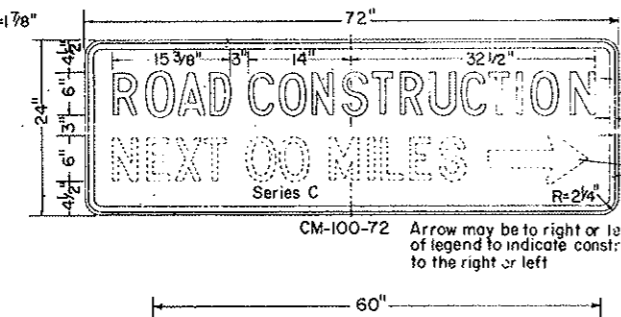
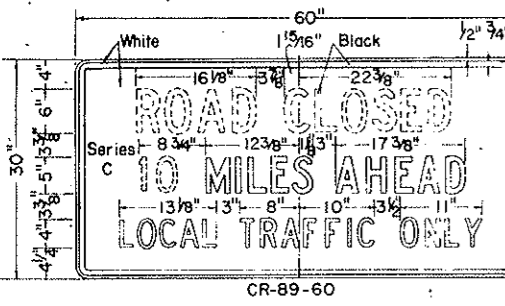
D-754-71-1



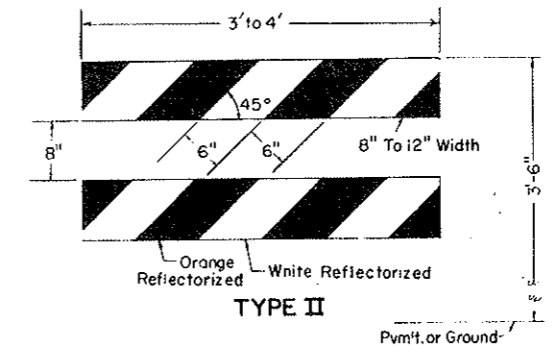
Adjustment due to odd size drums should be divided between the upper and lower stripes.
 Reflectorized delineator drum shall be an oil drum striped as shown. The entire drum shall be given 2 coats of orange paint in accordance with Section 870 of the Std. Specs. Reflective sheeting shall be applied after painting.



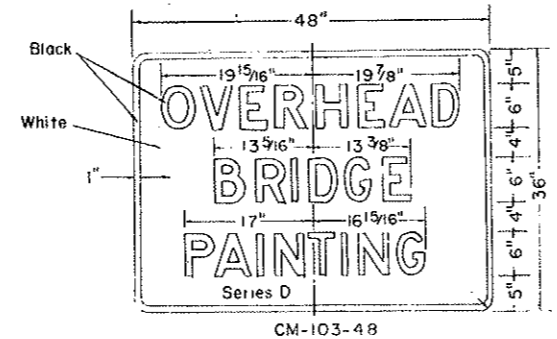
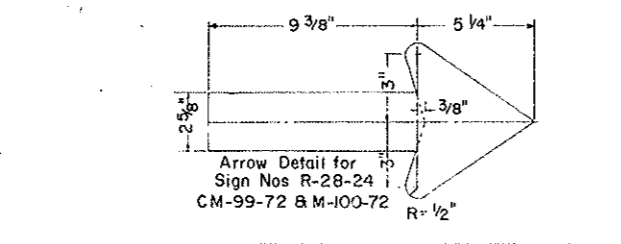
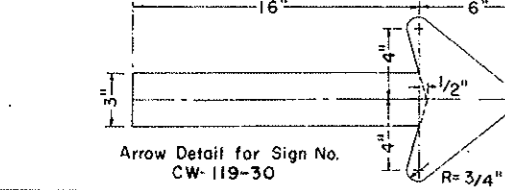
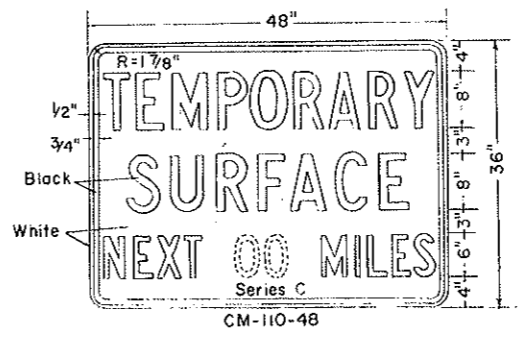
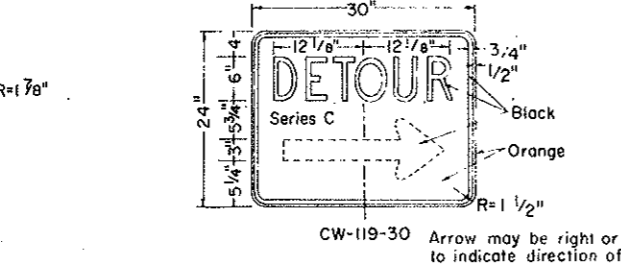
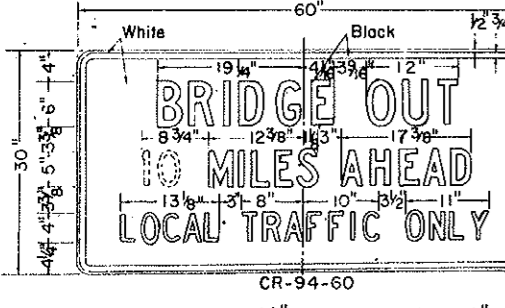
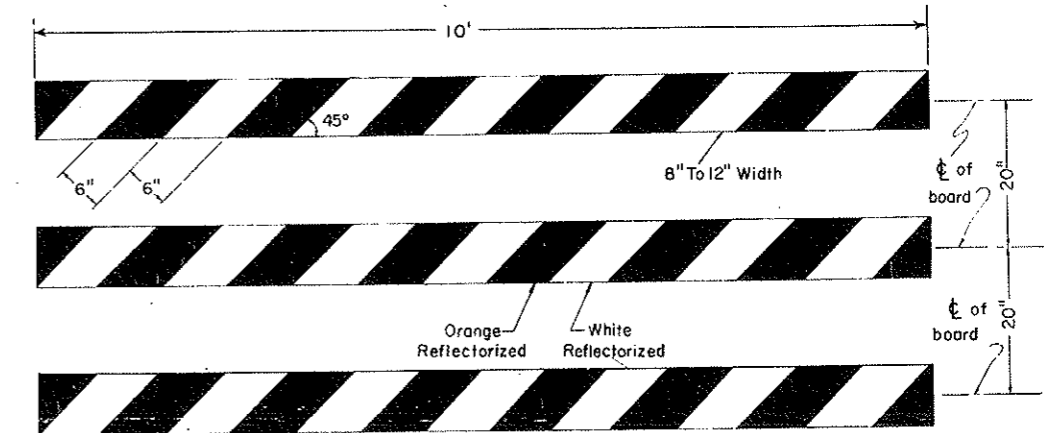
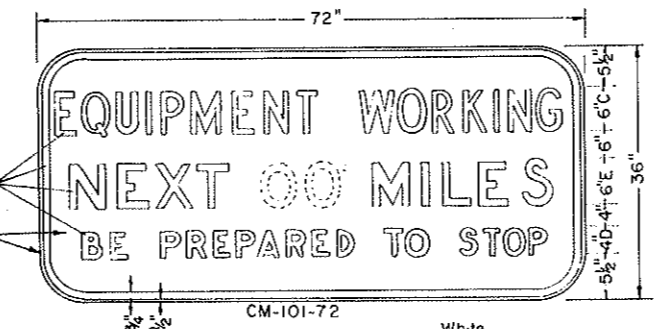
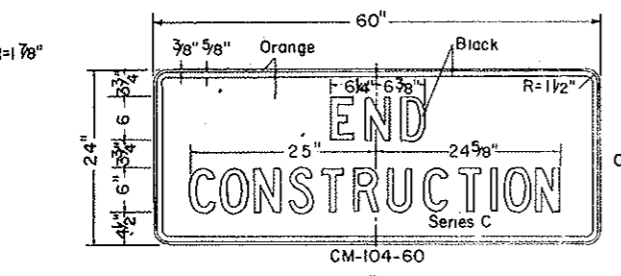
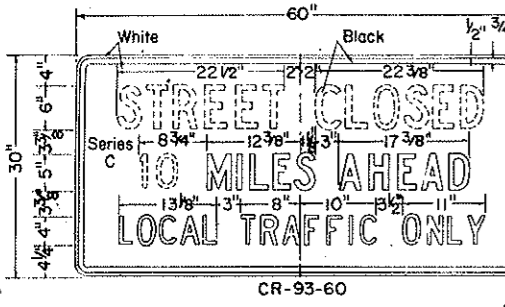
Approx. Wt./Ft. in Lbs. = 1,277
 Extruded Aluminum Barricade Bar Detail



Pilot Car sign shall be mounted on rear of a vehicle used for guiding controlled one-way traffic through a construction area.



Each movable barricade shall be weighted down by a sufficient number of sand bags or other suitable weight so that it will not be blown over by the wind unless the movable supporting structure is constructed in such a manner that the wind cannot blow it over. Weight used shall be approved by the Engineer in the field. Generally the stripes shall slant downward toward the side which traffic is to pass. Barricades used at the beginning of a project shall face traffic entering that project.

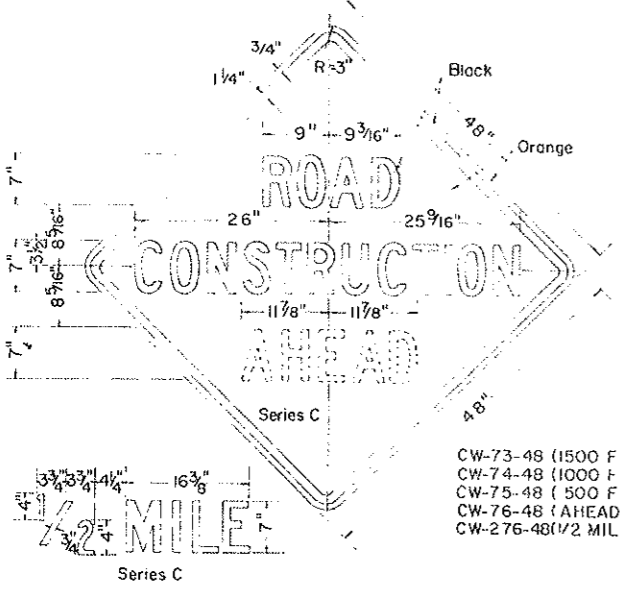


3-13-72		NORTH DAKOTA STATE HIGHWAY DEPARTMENT
REVISIONS		
DATE	CHANGE	Submitted: <i>K. P. Branson</i> Design Engineer
6-5-72	Barricade Details	
9-19-73	Sign Size	
Recommended		Asst. Chief Engineer, Pre-Const.
Approved:		
		Chief Engineer

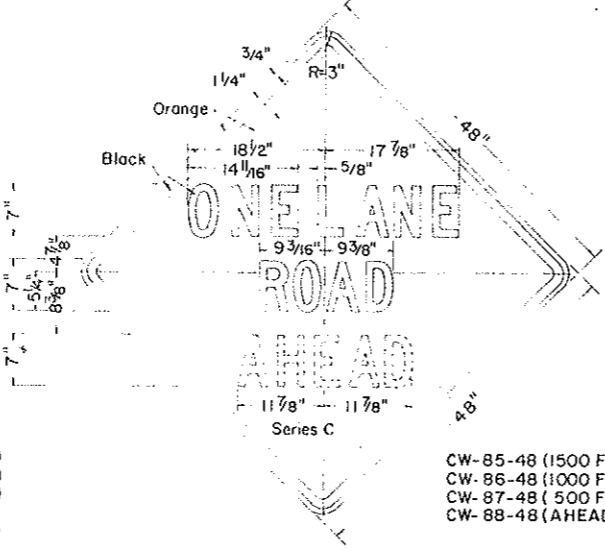
CONSTRUCTION SIGN DETAILS

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
8	N.D.				

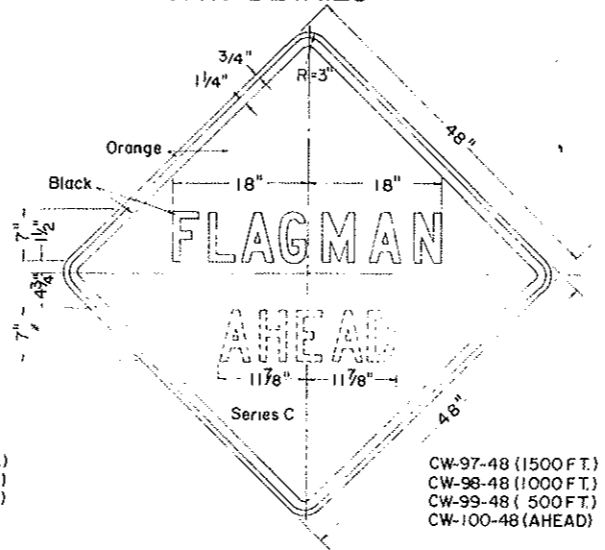
D-754-71-2



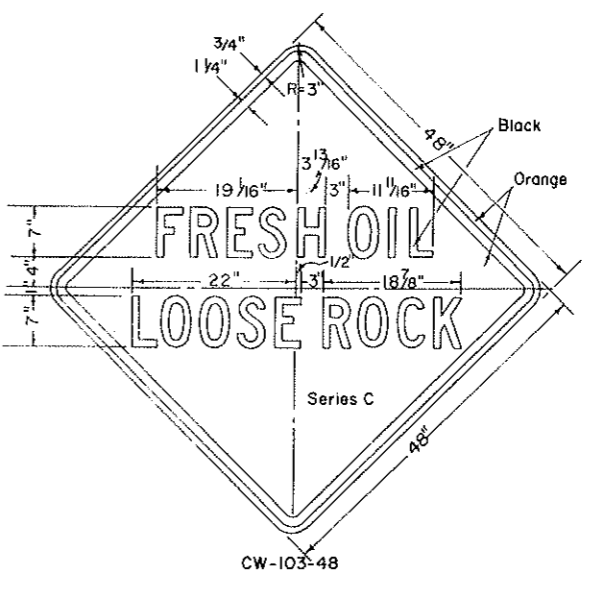
CW-73-48 (1500 FT.)
 CW-74-48 (1000 FT.)
 CW-75-48 (500 FT.)
 CW-76-48 (AHEAD)
 CW-276-48 (1/2 MILE)



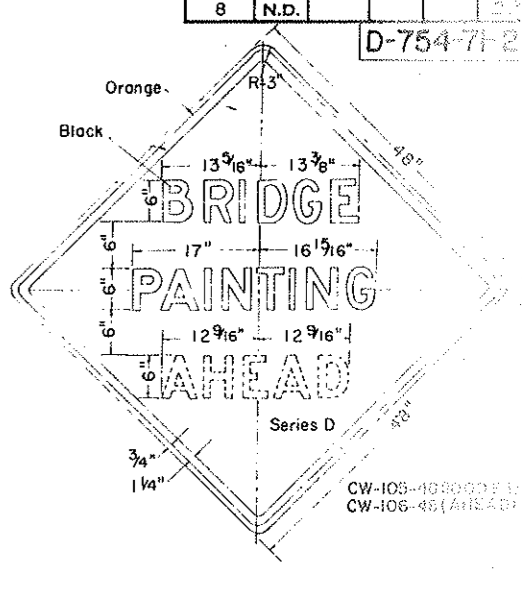
CW-85-48 (1500 FT.)
 CW-86-48 (1000 FT.)
 CW-87-48 (500 FT.)
 CW-88-48 (AHEAD)



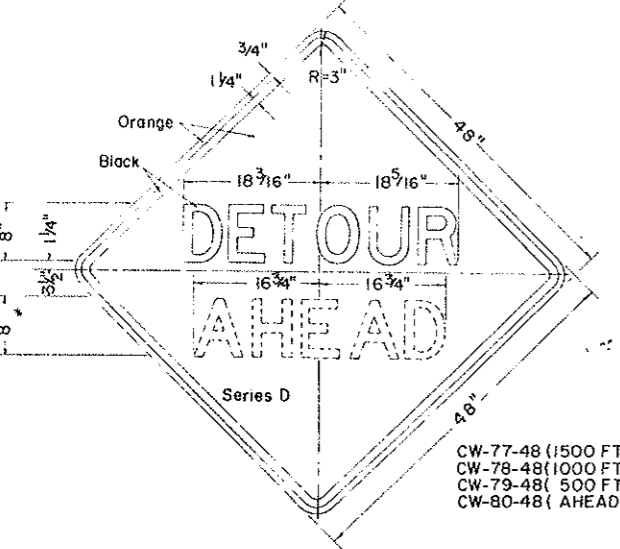
CW-97-48 (1500 FT.)
 CW-98-48 (1000 FT.)
 CW-99-48 (500 FT.)
 CW-100-48 (AHEAD)



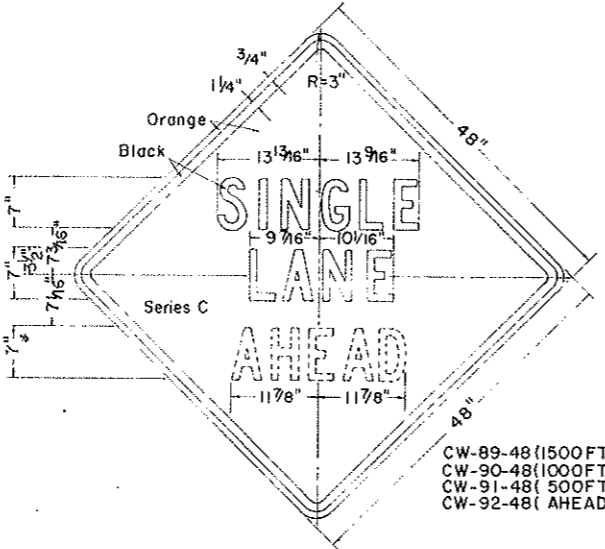
CW-103-48



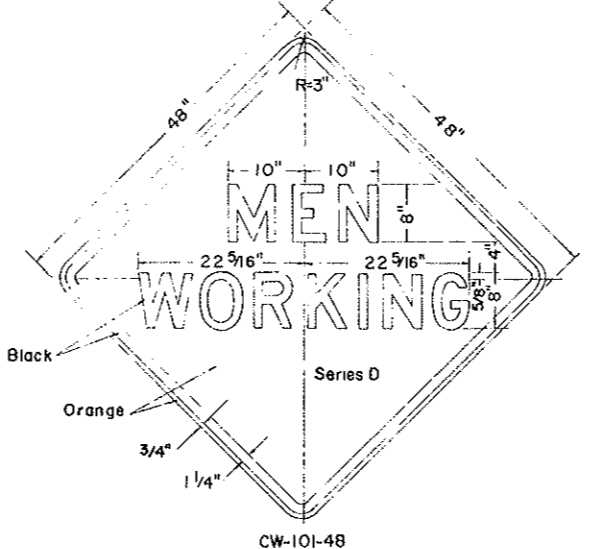
CW-105-48 (1000 FT.)
 CW-106-48 (AHEAD)



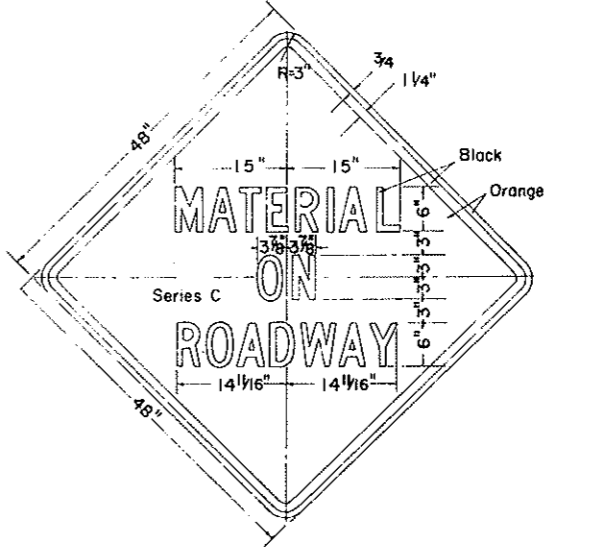
CW-77-48 (1500 FT.)
 CW-78-48 (1000 FT.)
 CW-79-48 (500 FT.)
 CW-80-48 (AHEAD)



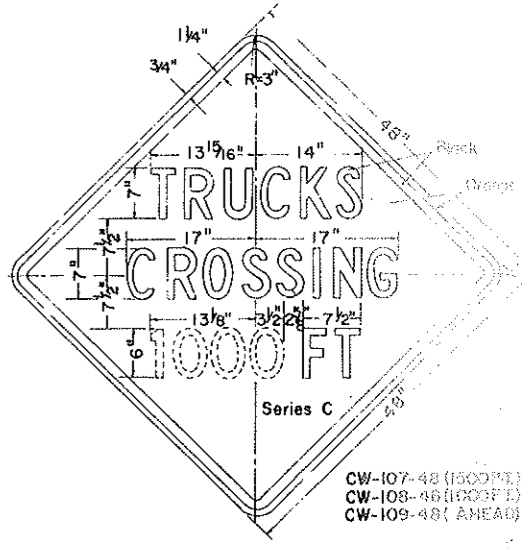
CW-89-48 (1500 FT.)
 CW-90-48 (1000 FT.)
 CW-91-48 (500 FT.)
 CW-92-48 (AHEAD)



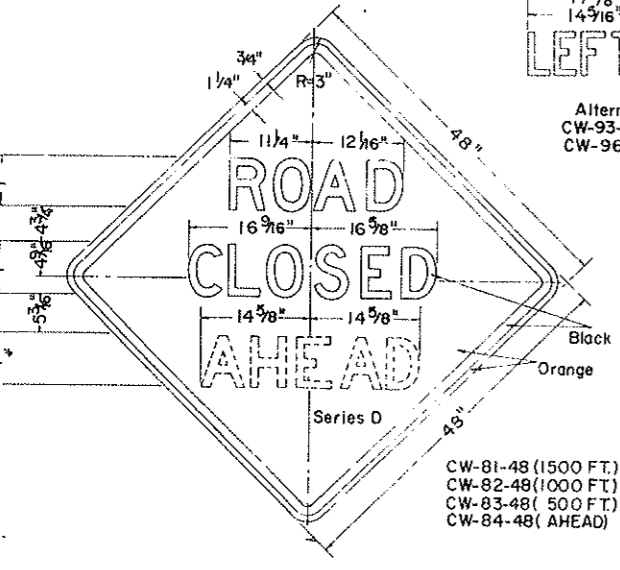
CW-101-48



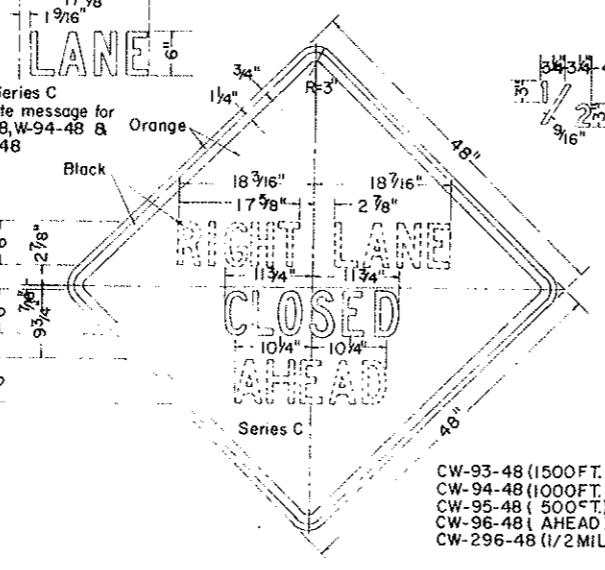
CW-104-48



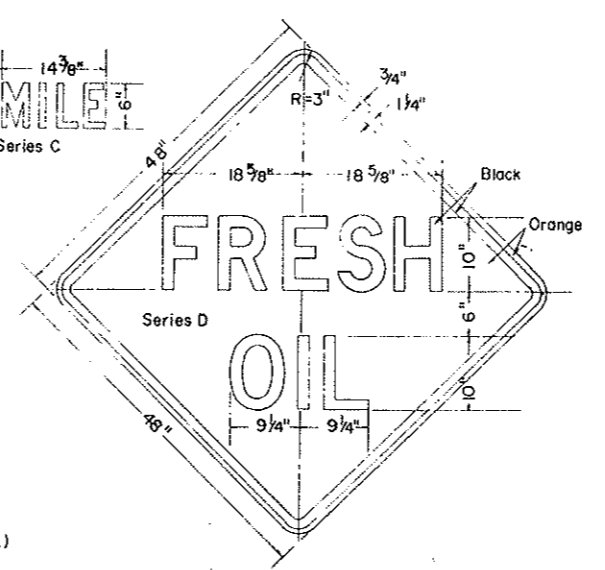
CW-107-48 (1500 FT.)
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 CW-109-48 (AHEAD)



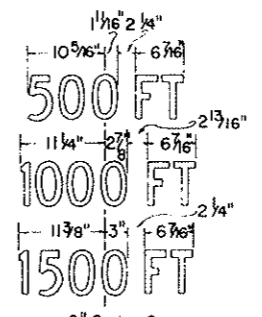
CW-81-48 (1500 FT.)
 CW-82-48 (1000 FT.)
 CW-83-48 (500 FT.)
 CW-84-48 (AHEAD)



CW-93-48 (1500 FT.)
 CW-94-48 (1000 FT.)
 CW-95-48 (500 FT.)
 CW-96-48 (AHEAD)
 CW-296-48 (1/2 MILE)



CW-102-48



6" Series C
 Alternate message for all signs as indicated
 *Alternate message only shall be 6" Series C

NOTE: All signs shall have reflectorized message, border and background, unless shown otherwise on the plans. In no case is the color black reflectorized.

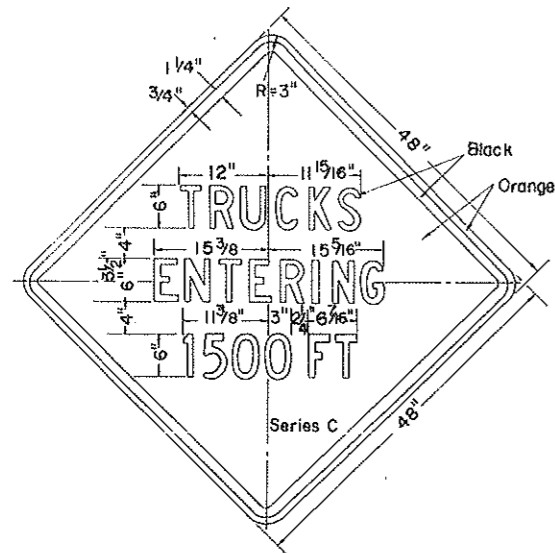
Material: See Std. D-754-71-5 for assembly details.

3-13-72		NORTH DAKOTA STATE HIGHWAY DEPARTMENT
REVISIONS		
DATE	CHANGE	Submitted by: <i>R. Blum</i> Design Engineer
3-7-75	Message on Construction Sign	Recommended by: <i>R. Blum</i> Asst. Chief Engineer, Pre-Const.
		Approved: <i>R. Blum</i> Chief Engineer

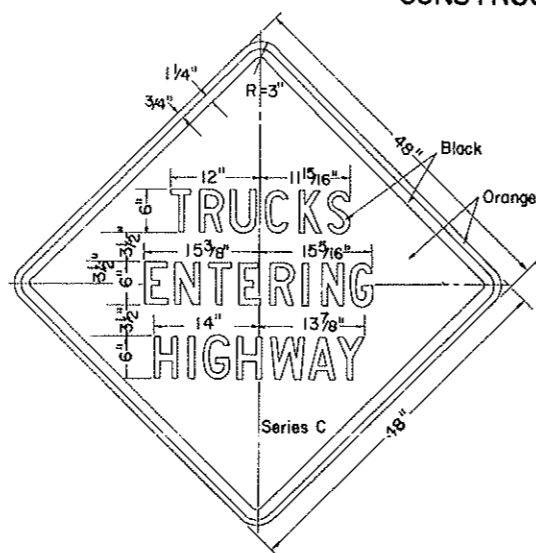
CONSTRUCTION SIGN DETAILS

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	CHG. NO.	DATE
8	N.D.				35

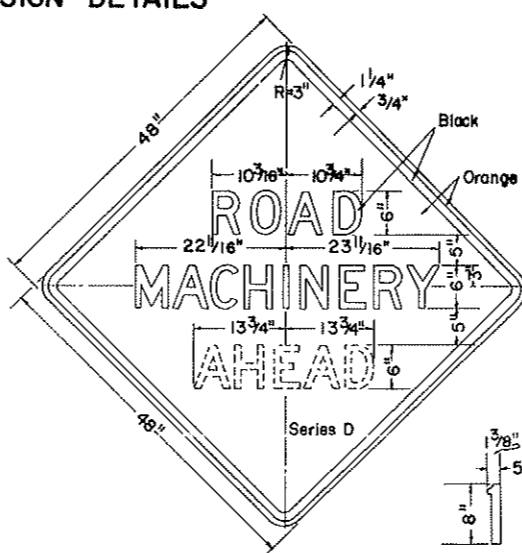
D-754-71-3



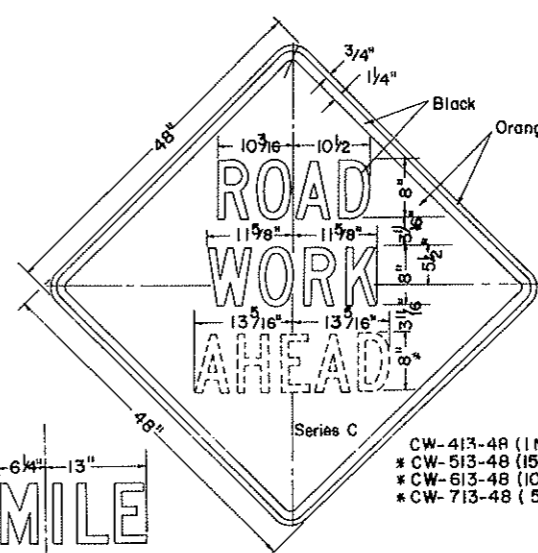
CW-110-48



CW-111-48

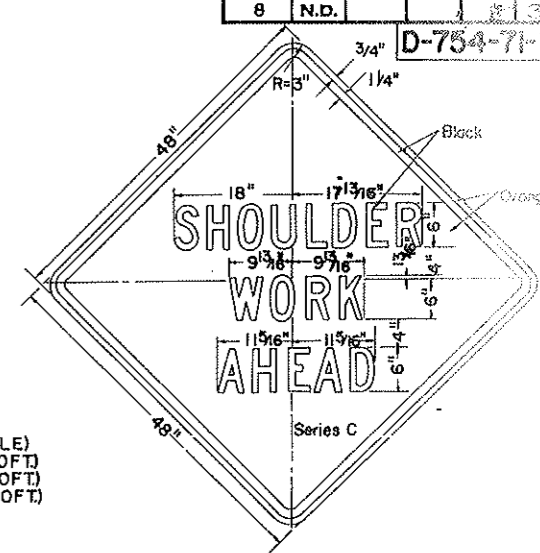


CW-112-48
* CW-512-48 (1500FT)
* CW-612-48 (1000FT)
* CW-712-48 (500FT)

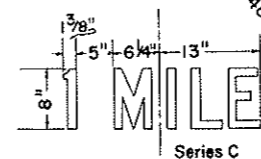


CW-113-48

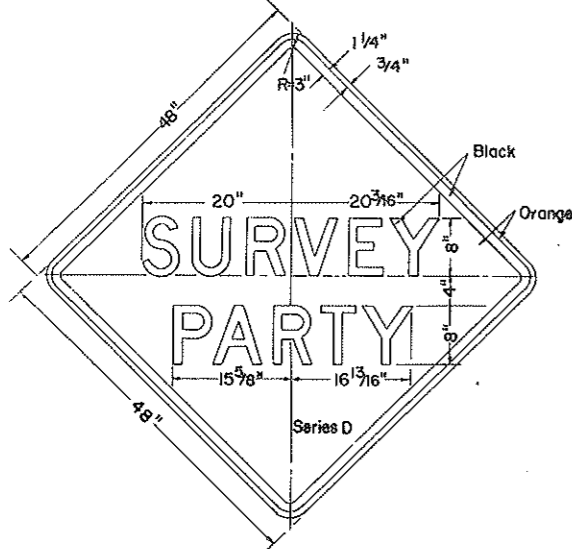
- * CW-413-48 (1 MILE)
- * CW-513-48 (1500FT)
- * CW-613-48 (1000FT)
- * CW-713-48 (500FT)



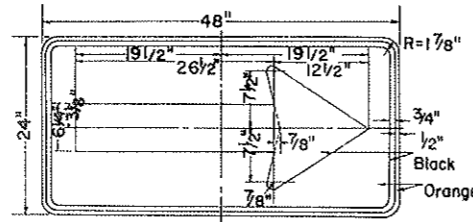
CW-114-48



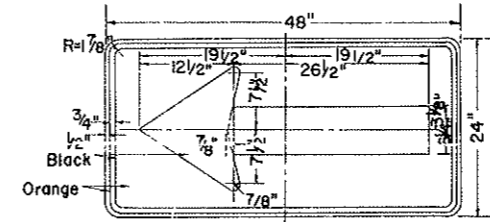
Series C



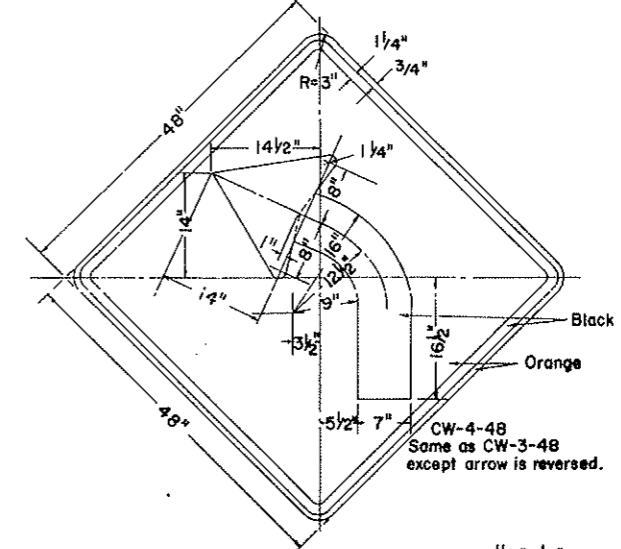
CW-115-48



CW-13-48

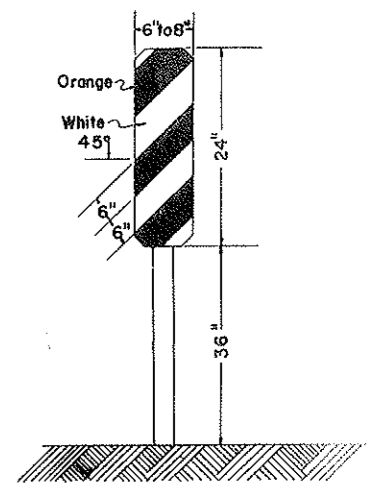


CW-13-48

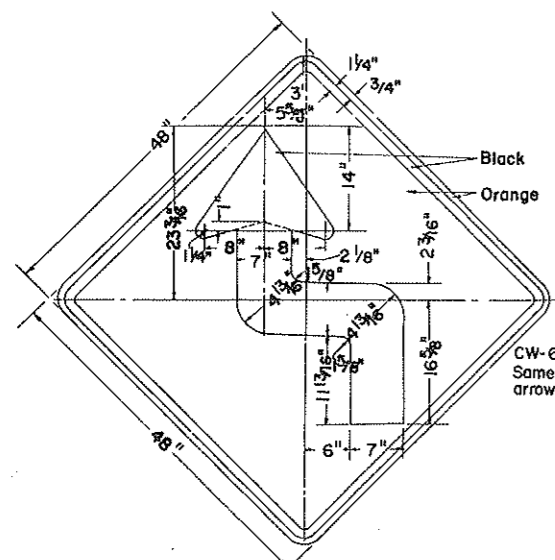


CW-4-48

Same as CW-3-48 except arrow is reversed.

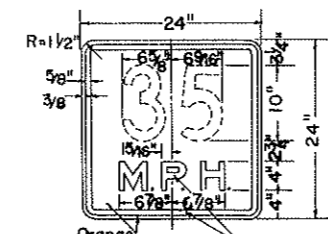


VERTICAL PANELS

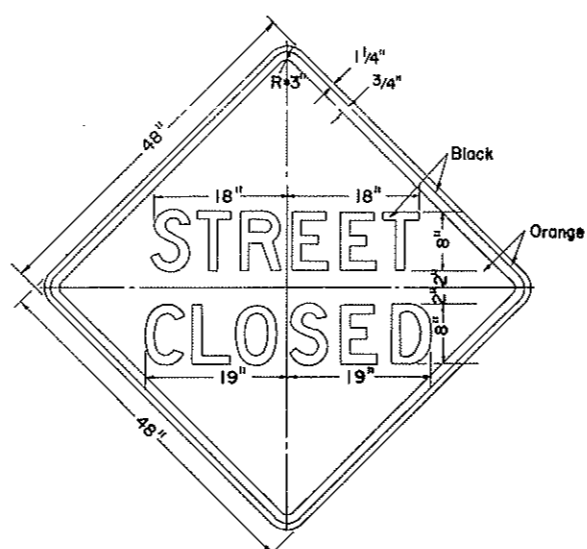


CW-6-48

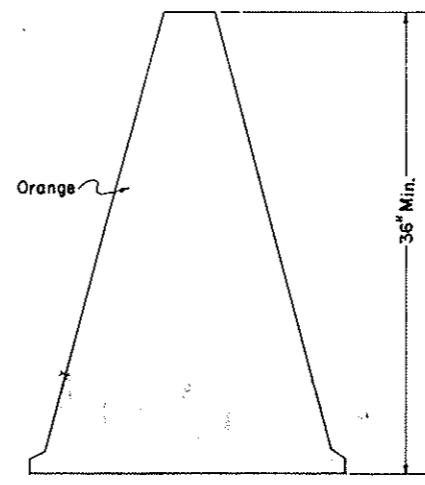
Same as CW-5-48 except arrow is reversed.



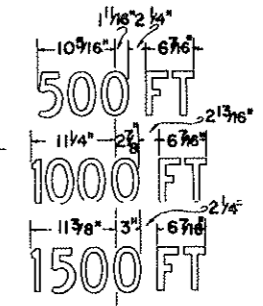
CW-45-24



CW-116-48



CONE



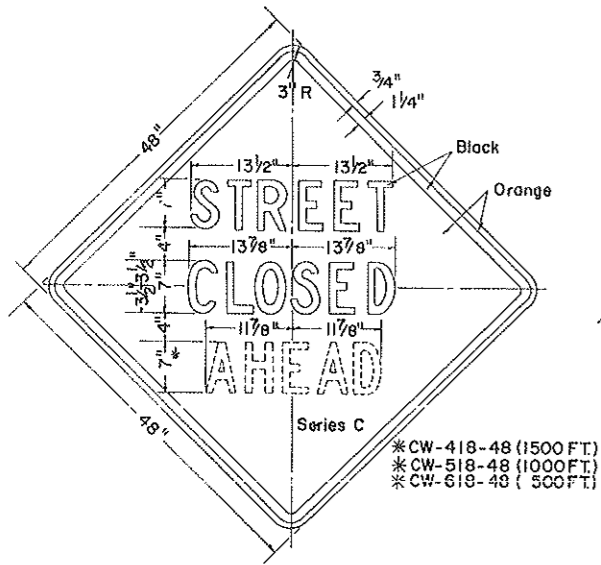
6" Series C
Alternate message for all signs as indicated
* Alternate message only shall be 6" Series C

NOTE: All signs shall have reflectorized message, border and background, unless shown otherwise on the plans. In no case is the color black reflectorized.

Material: See Std. D-754-71-5 for assembly details.

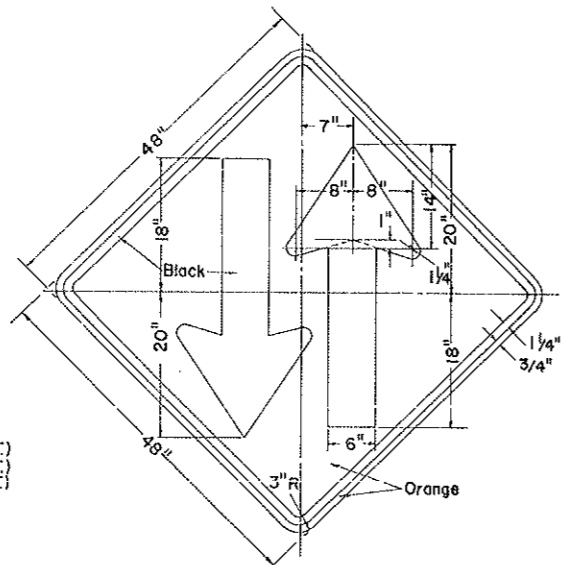
3-13-72		NORTH DAKOTA STATE HIGHWAY DEPARTMENT
DATE	REVISIONS	
6-5-72	CW-4-48 NOTE	Submitted: <i>[Signature]</i> Design Engineer
9-5-74	Added Sign No.	
4-28-75	Cone Height Change	
Recommended:		Approved: <i>[Signature]</i> Chief Engineer
Asst. Chief Engineer, Proj.-Contract		

CONSTRUCTION SIGN DETAILS

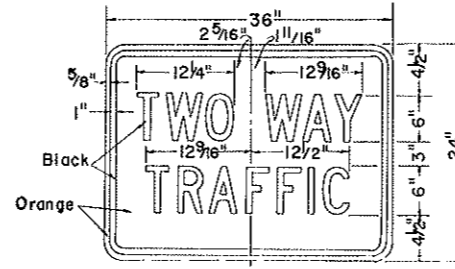


CW-118-48

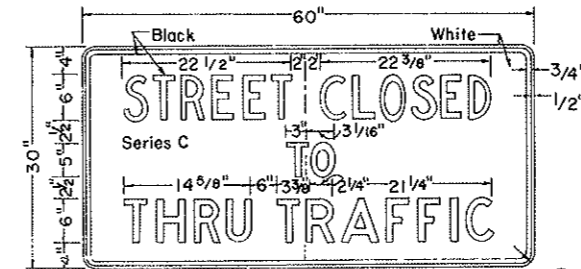
*CW-418-48 (1500 FT)
*CW-518-48 (1000 FT)
*CW-618-48 (500 FT)



CW-117-48

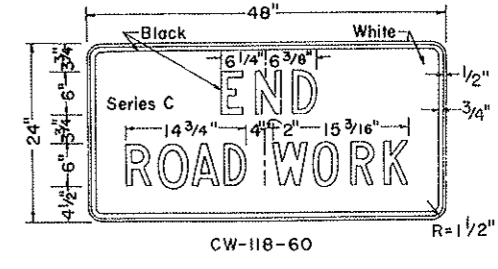


CW-342-36



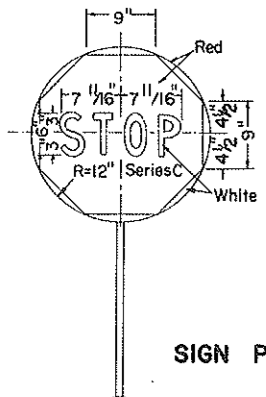
CR-95-60

R=1 7/8"

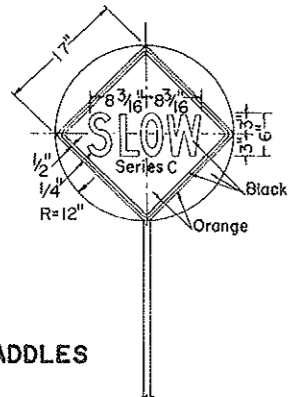


CW-118-60

R=1 1/2"

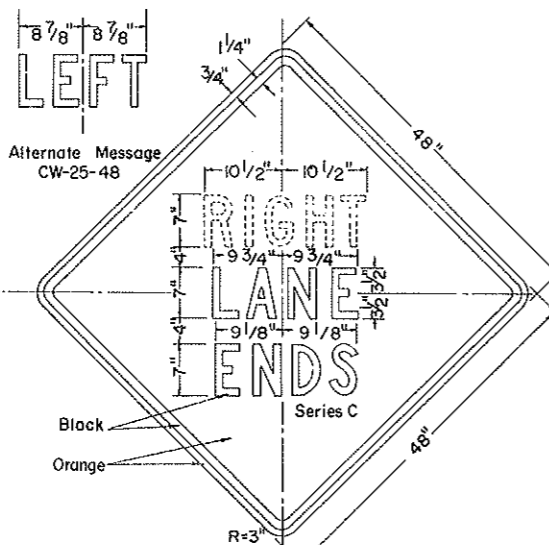


CR-96-24



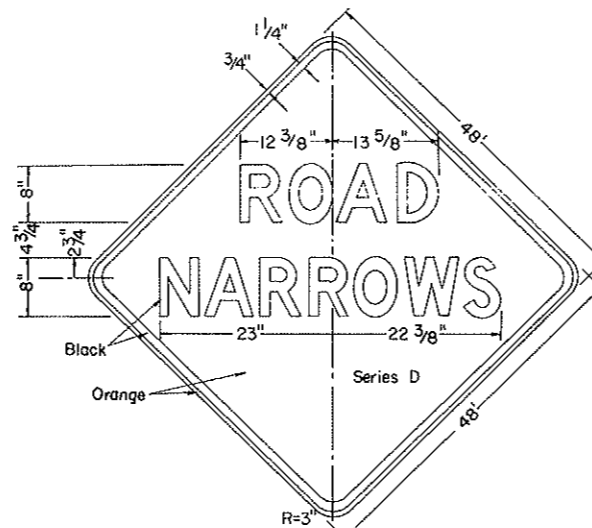
CW-120-24

SIGN PADDLES

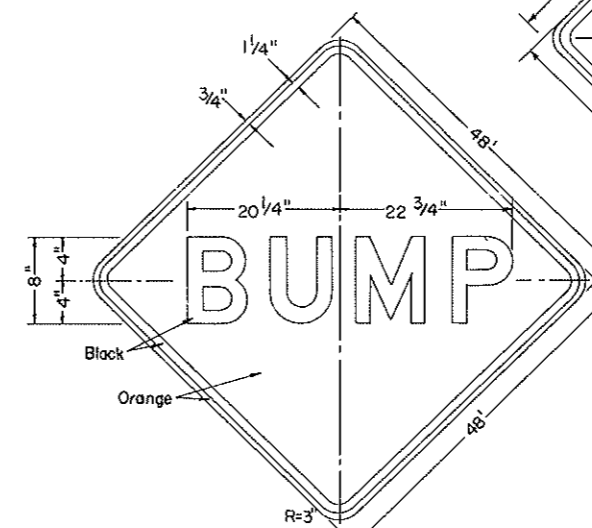


CW-25-48

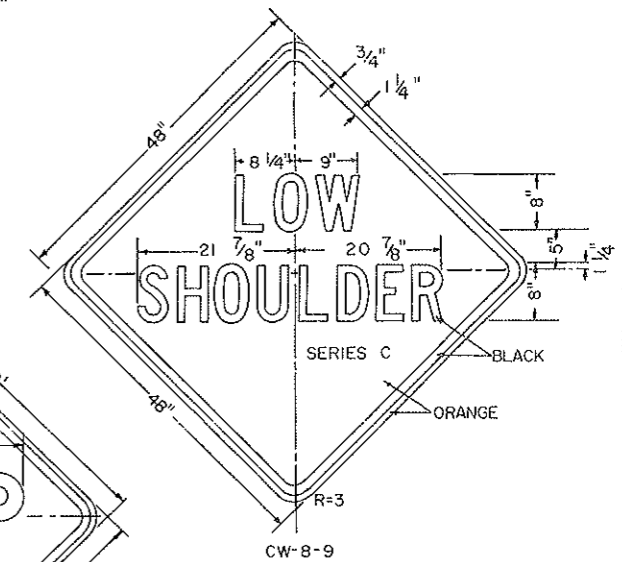
Alternate Message
CW-25-48



CW-29-48



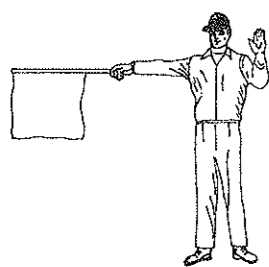
CW-36-48



CW-8-9

NOTE: All signs shall have reflectorized message, border and background, unless shown otherwise on the plans. In no case is the color black reflectorized.

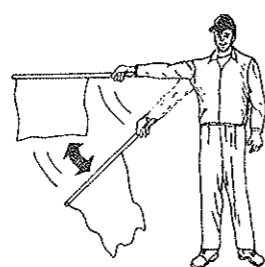
Material: See Std. D-754-71-5 for assembly details



TO STOP TRAFFIC



TRAFFIC PROCEED



TO ALERT AND SLOW TRAFFIC



TO STOP TRAFFIC



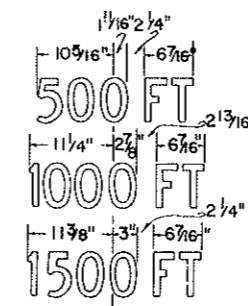
TRAFFIC PROCEED



TO ALERT AND SLOW TRAFFIC

USE OF HAND SIGNALING DEVICES BY FLAGMAN

PADDLE



6" Series C
Alternate message for all signs as indicated
*Alternate message only shall be 6" Series C

3-13-72	
REVISIONS	
DATE	CHANGE
6-6-72	C-25-48 Color
3-27-74	CW-8-9 Added Sign

NORTH DAKOTA
STATE HIGHWAY DEPARTMENT

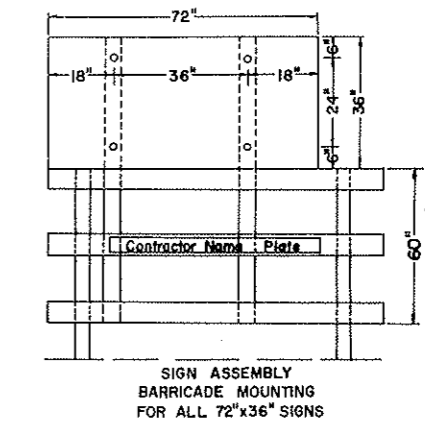
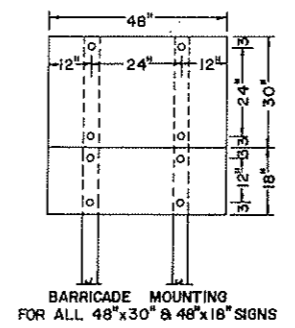
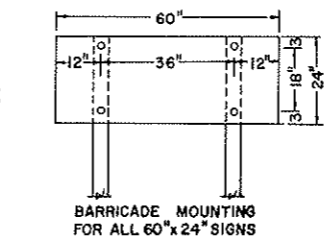
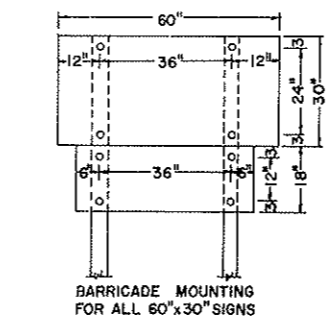
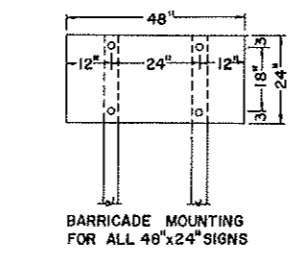
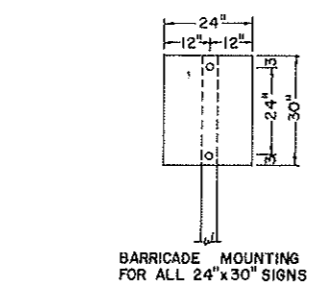
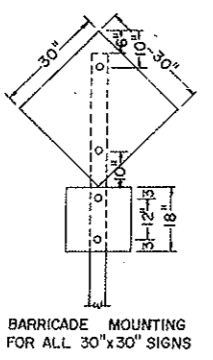
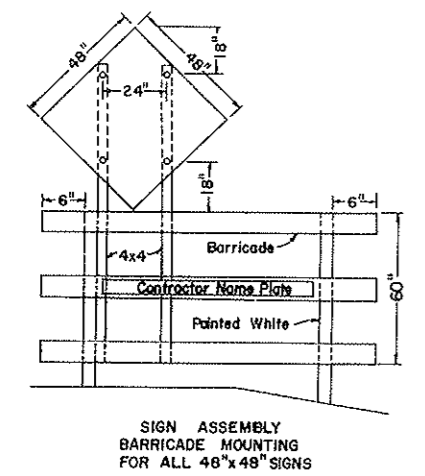
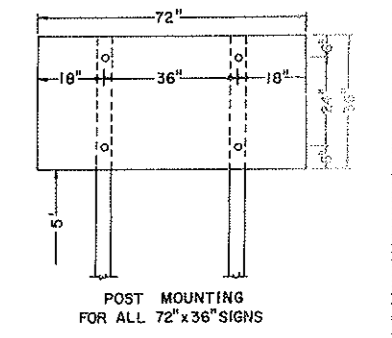
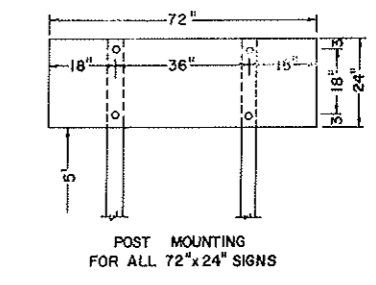
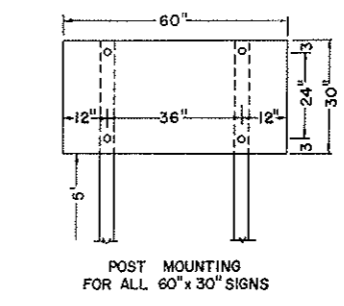
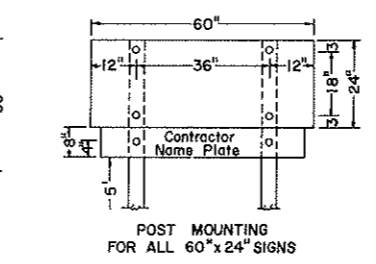
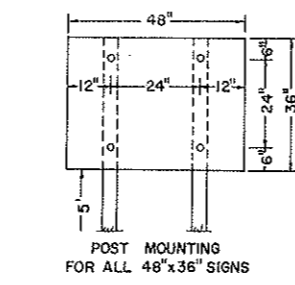
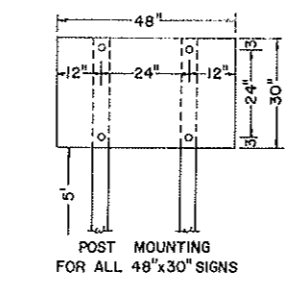
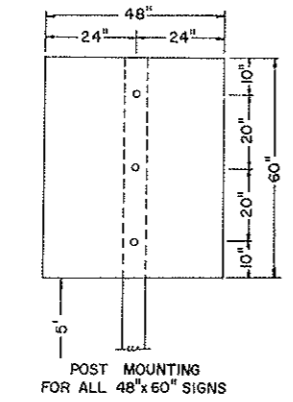
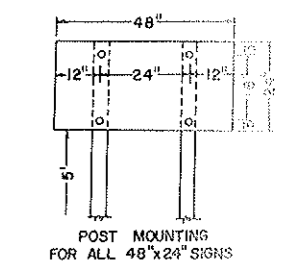
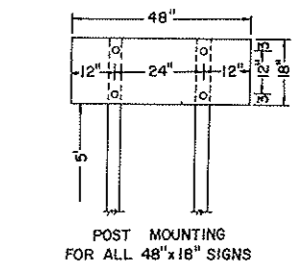
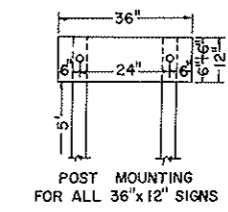
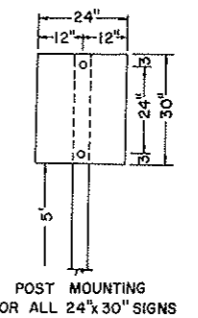
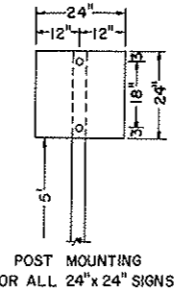
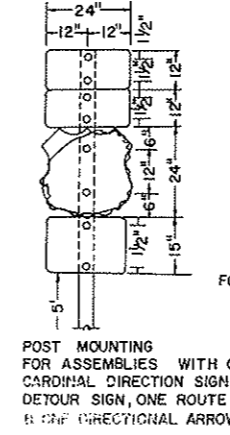
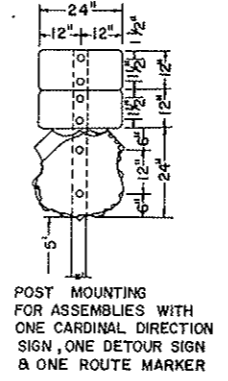
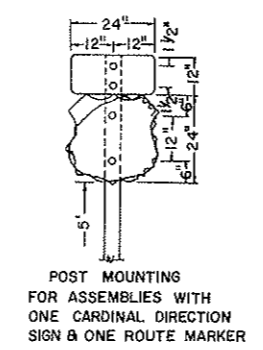
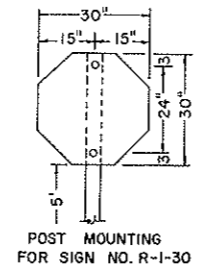
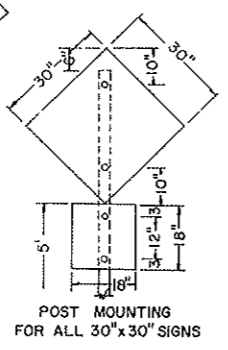
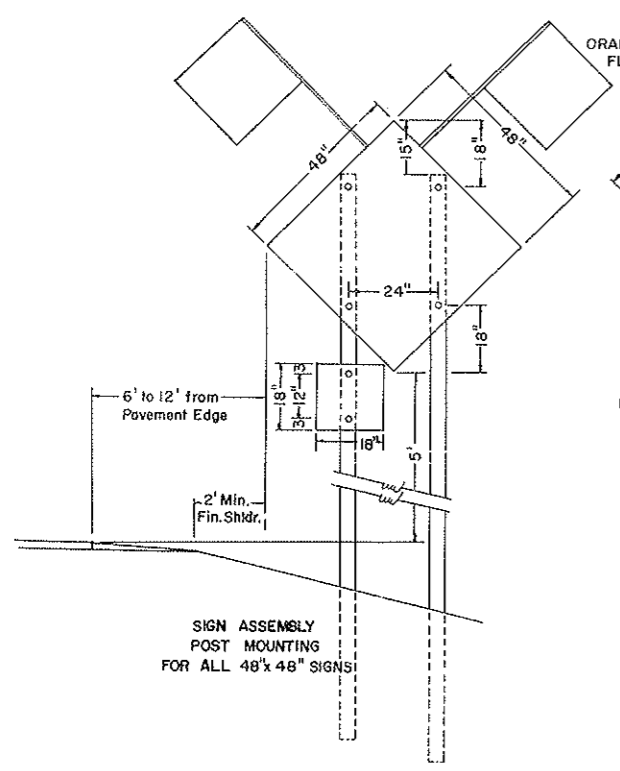
Submitted: *Prohman*
Design Engineer

Recommended: _____
Asst. Chief Engineer, Proj. Constr.

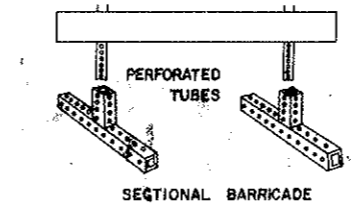
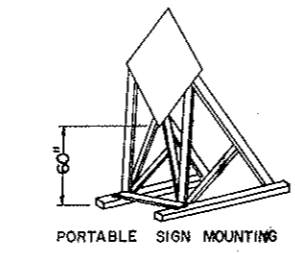
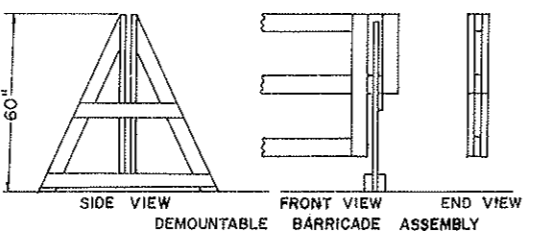
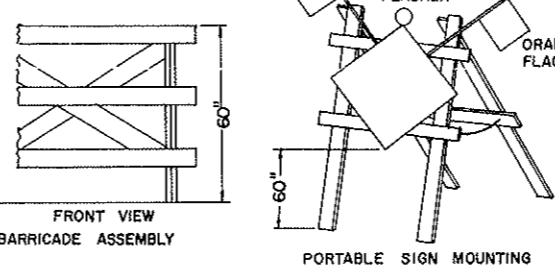
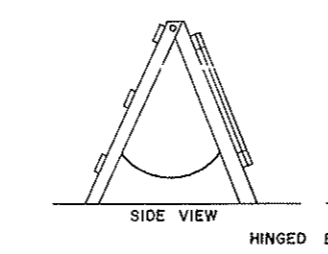
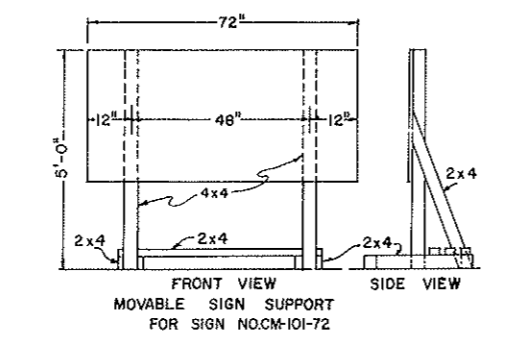
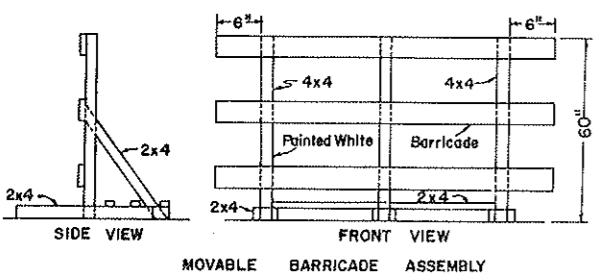
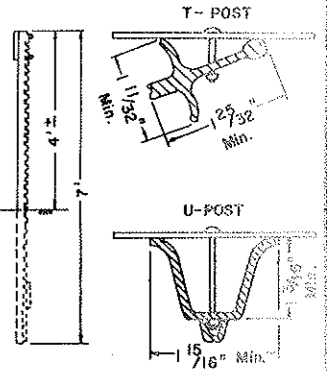
Approved: *Rehberg*
Chief Engineer

CONSTRUCTION SIGN AND BARRICADE ASSEMBLY DETAILS

D-754-71-5



DELINEATOR ATTACHMENT AND POST MOUNTING DETAILS



NOTES:
 DELINEATOR POSTS: Typical fence post sections are shown in Attachment Details. Other types of metal fence posts may be substituted upon approval of the engineer. These substituted posts shall have reflectors attached similar to the ones shown.
 BARRICADE MOUNTING SIGNS: The bottom of the sign shall be flush with the top of the top rail. Wood sign posts shall be 4x4 min. SFS or equivalent steel posts. See Sds. D-754-715 thru D-754-719 for construction sign and barricade location details. All barricades and barricade mounted signs shall be assembled with 3/8" bolts.
 SIGN SUPPORTS: The sign supports shall be imbedded to a sufficient depth so that the signs will remain plumb throughout duration of the project. It is suggested that the min. depth of imbedment be 5'-0".
 MATERIAL: All signs shall be 100" aluminum, 12 gage galv. steel, 1/2" plywood or other approved mat'l.
 HOLES: All holes to be punched round for 3/8" bolts.

3-13-72 REVISIONS	
DATE	CHANGE
6-5-72	Mounting Details
9-19-73	Sign Size

NORTH DAKOTA STATE HIGHWAY DEPARTMENT
 Submitted: *[Signature]* Design Engineer
 Recommended: *[Signature]* Asst. Chief Engineer, Proj. Control
 Approved: *[Signature]* Chief Engineer

CONSTRUCTION SIGN AND BARRICADE LOCATION DETAILS

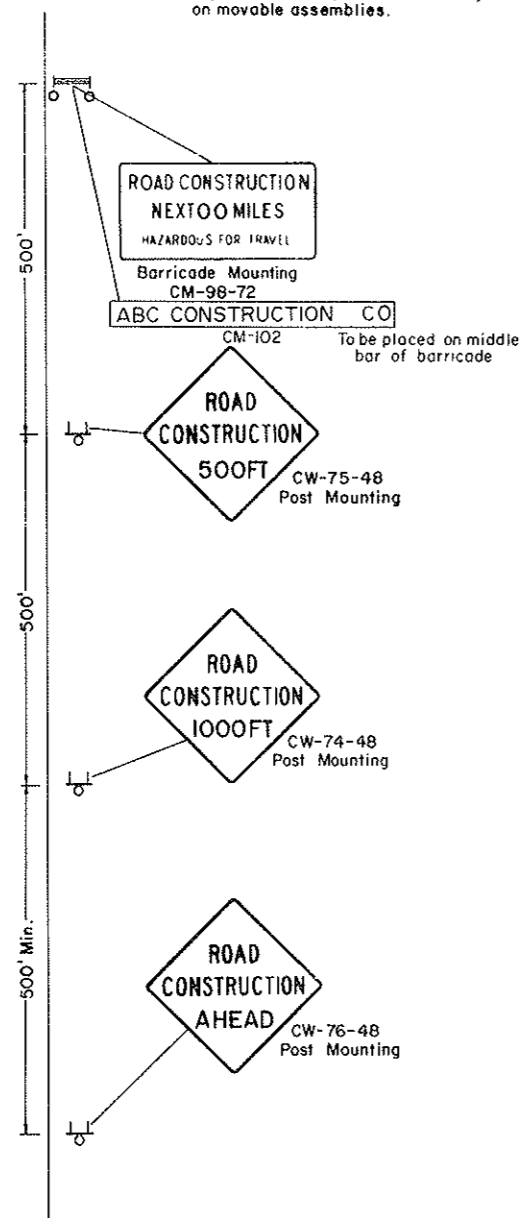
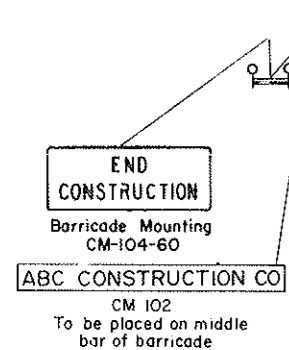
Note:
Sign No. CM-101-72 shall be used on all projects where traffic is maintained. All intermediate signs shall be moved as work progresses and shall be removed when hazard ceases to exist. Two lighted flashers shall be maintained in front of all intermediate signs if hazard remains at night.

Lighting—Flashers shall be maintained as shown. If danger exists at night or work area is closed to the traffic lane, the edge of the traffic lane on the work area side shall be illuminated by flashers or reflectorized delineators spaced at 100 ft. centers. The flashers shall be placed above the barricade bar and above the warning signs.

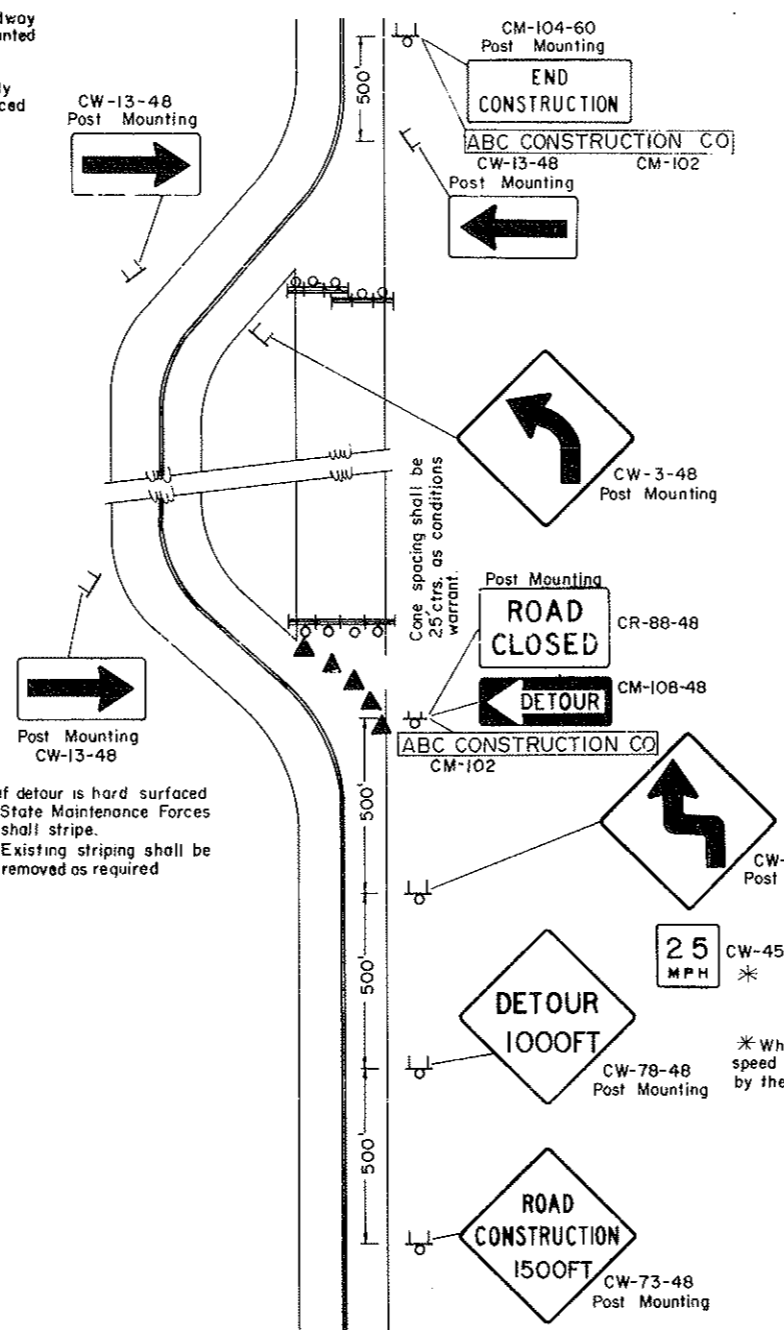
FLAGS: All advance warning signs shall have two orange warning flags 24" square mounted perpendicular to the edges of the diamond sign and at such a distance above the edges so that when flag is hung limp it will not touch the sign.

Where advance warning sign placed as shown interferes with permanent signs, The warning sign location shall be determined by the Engineer for best results. Messages shall be varied as required.

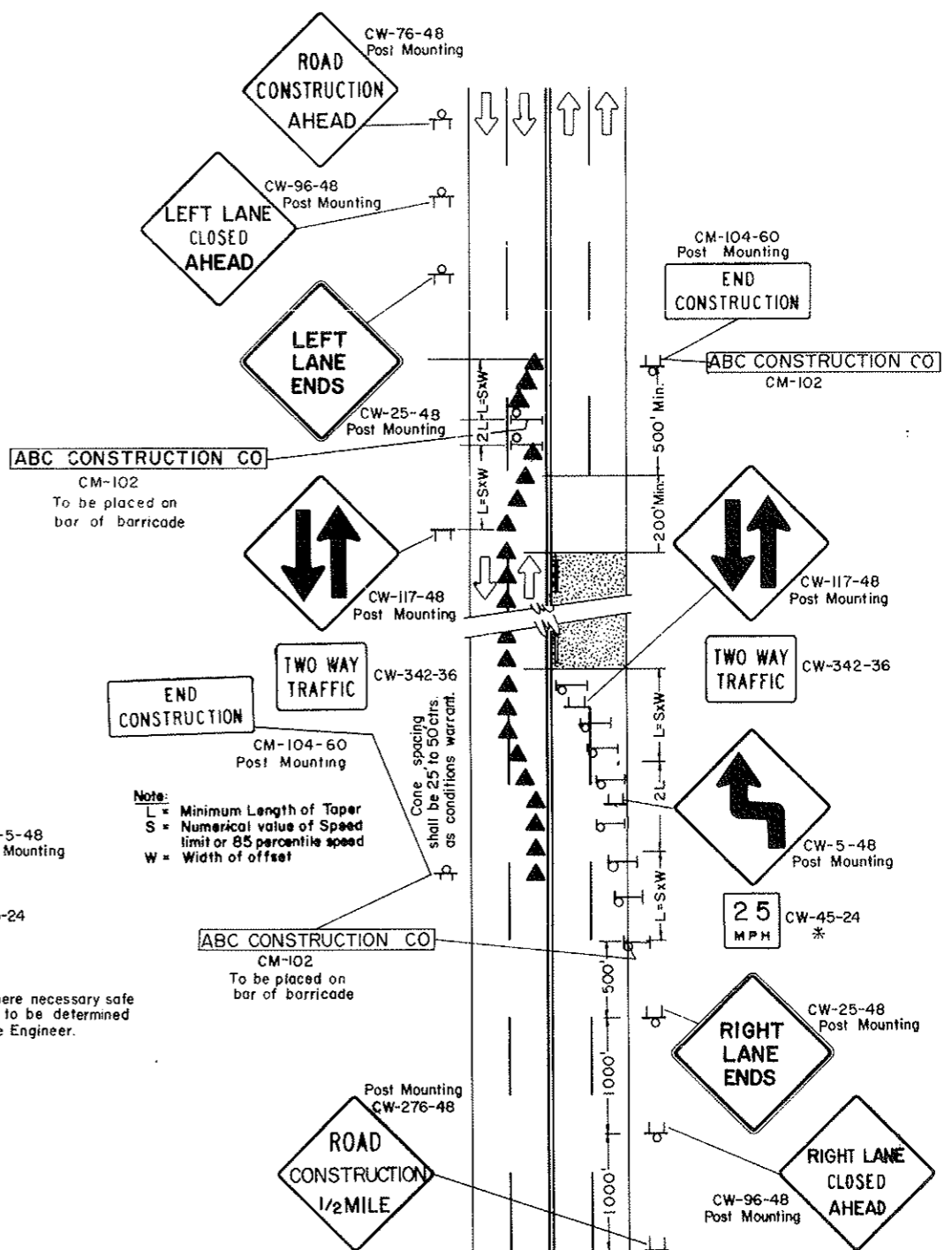
Mounting—Barricade shown to be placed on roadway shall be on a movable Assembly. Sign to be mounted on barricades shall be mounted with the sign bottom on the top of the top barricade bar. Intermediate Sign shall be on a movable assembly. Sign show to be placed on roadway shall be placed on movable assemblies.



TYPE A
CONSTRUCTION SIGN LAYOUT
2 & 4 Lane Highway when traffic is maintained.
(Sign shown for one end only)



TYPE B
CONSTRUCTION SIGN LAYOUT
2 Lane Highway where roadway is closed and detour is provided.
(Sign shown for one direction of travel only)



TYPE C
CONSTRUCTION SIGN LAYOUT
4 Lane undivided Highway with half the roadway closed.

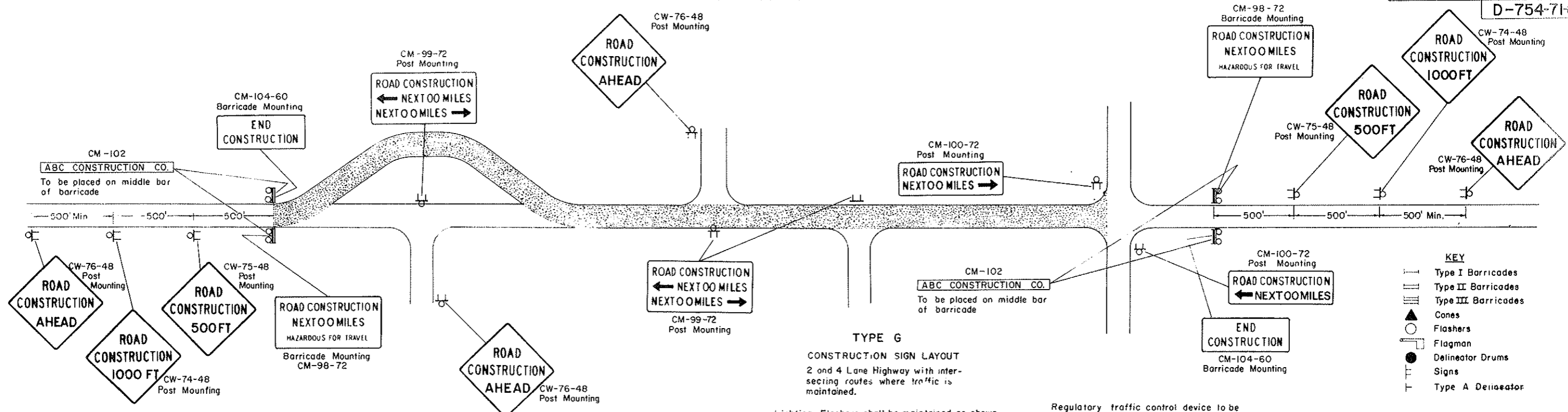
- KEY**
- Type I Barricades
 - Type II Barricades
 - Type III Barricades
 - Cones
 - Flashers
 - Flagman
 - Delineator Drums
 - Signs
 - Type A Delineator

Note:
L = Minimum Length of Taper
S = Numerical value of Speed limit or 85 percentile speed
W = Width of offset
Cone spacing shall be 25' to 50' ctrs. as conditions warrant.

* Where necessary safe speed to be determined by the Engineer.

3-13-72		NORTH DAKOTA STATE HIGHWAY DEPARTMENT
REVISIONS		
DATE	CHANGE	Submitted: <i>W. Thomas</i> Design Engineer
		Recommended: Asst. Chief Engineer, Pre-Const.
		Approved: <i>W. Thomas</i> Chief Engineer

CONSTRUCTION SIGN AND BARRICADE LOCATION DETAILS



TYPE G
CONSTRUCTION SIGN LAYOUT
2 and 4 Lane Highway with intersecting routes where traffic is maintained.

Note: Sign No CM-101-72 shall be used on all projects where traffic is maintained. All intermediate signs shall be moved as work progresses and shall be removed when hazard ceases to exist. Two lighted flashers shall be maintained in front of all intermediate signs if hazard remains at night.

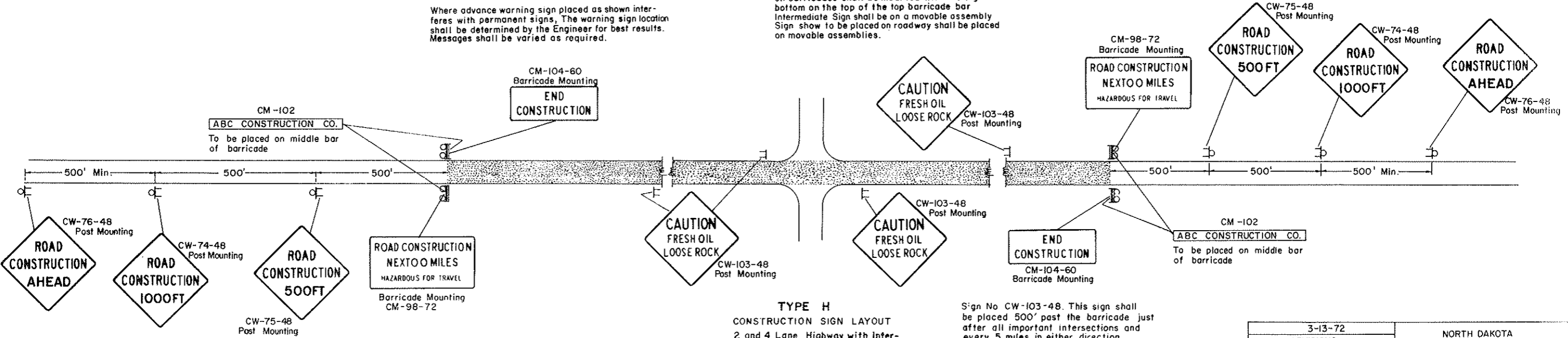
Where advance warning sign placed as shown interferes with permanent signs, The warning sign location shall be determined by the Engineer for best results. Messages shall be varied as required.

Lighting-Flashers shall be maintained as shown. If danger exists at night or work area is closed to the traffic lane, the edge of the traffic lane on the work area side shall be illuminated by flashers or reflectorized delineators spaced at 100 ft centers. The flashers shall be placed above the barricade bar and above the warning signs

Mounting-Barricade shown to be placed on roadway shall be on a movable Assembly. Sign to be mounted on barricades shall be mounted with the sign bottom on the top of the top barricade bar. Intermediate Sign shall be on a movable assembly. Sign show to be placed on roadway shall be placed on movable assemblies.

Regulatory traffic control device to be modified as needed for the duration of construction.

FLAGS: All advance warning signs shall have two orange warning flags 24" square mounted perpendicular to the edges of the diamond sign and at such a distance above the edges so that when flag is hung limp it will not touch the sign.



TYPE H
CONSTRUCTION SIGN LAYOUT
2 and 4 Lane Highway with intersecting routes where traffic is maintained over seal project.

Sign No CW-103-48. This sign shall be placed 500' past the barricade just after all important intersections and every 5 miles in either direction.

3-13-72	
REVISIONS	
DATE	CHANGE

NORTH DAKOTA
STATE HIGHWAY DEPARTMENT

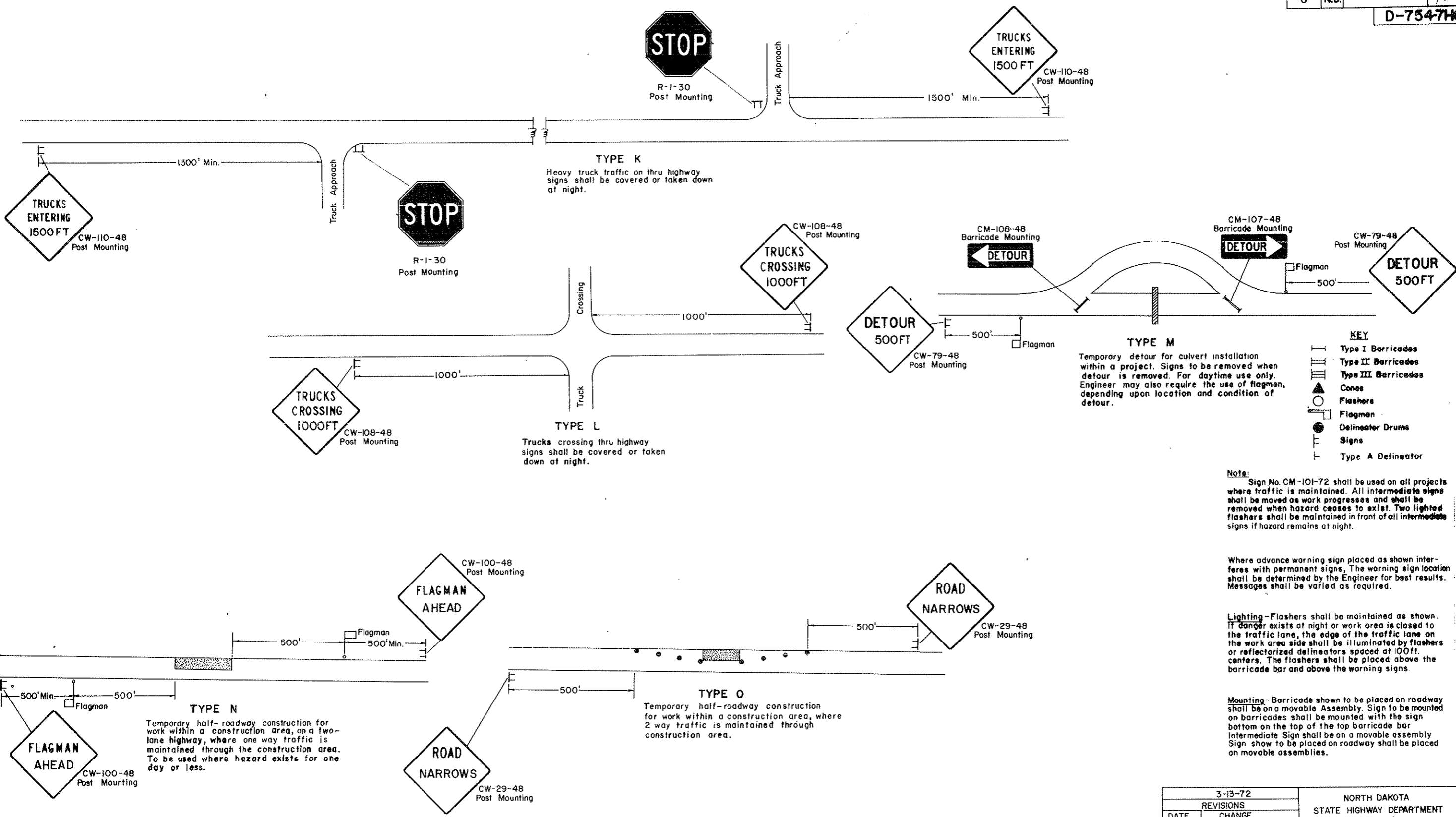
Submitted: *Whitman*
Design Engineer

Recommended: *Asst. Chief Engineer, Pre-Const.*

Approved: *Chief Engineer*

CONSTRUCTION SIGN AND BARRICADE LOCATION DETAILS

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET
8	N.D.		40
			D-754740



- KEY**
- Type I Barricades
 - Type II Barricades
 - Type III Barricades
 - ▲ Cones
 - Flashers
 - Flagman
 - Delineator Drums
 - Signs
 - Type A Delineator

Note:
Sign No. CM-101-72 shall be used on all projects where traffic is maintained. All intermediate signs shall be moved as work progresses and shall be removed when hazard ceases to exist. Two lighted flashers shall be maintained in front of all intermediate signs if hazard remains at night.

Where advance warning sign placed as shown interferes with permanent signs, The warning sign location shall be determined by the Engineer for best results. Messages shall be varied as required.

Lighting-Flashers shall be maintained as shown. If danger exists at night or work area is closed to the traffic lane, the edge of the traffic lane on the work area side shall be illuminated by flashers or reflectorized delineators spaced at 100 ft. centers. The flashers shall be placed above the barricade bar and above the warning signs.

Mounting-Barricade shown to be placed on roadway shall be on a movable Assembly. Sign to be mounted on barricades shall be mounted with the sign bottom on the top of the top barricade bar. Intermediate Sign shall be on a movable assembly. Sign show to be placed on roadway shall be placed on movable assemblies.

NOTE
FLAGS: All advance warning signs shall have two orange warning flags 24" square mounted perpendicular to the edges of the diamond sign and at such a distance above the edges so that when flag is hung limp it will not touch the sign

3-13-72		NORTH DAKOTA STATE HIGHWAY DEPARTMENT
REVISIONS		
DATE	CHANGE	Submitted: <i>R. Thomas</i> Design Engineer
		Recommended: _____ Asst. Chief Engineer, Pre-Const.
		Approved: <i>R. Thomas</i> Chief Engineer

CITY CONSTRUCTION SIGN LOCATION DETAILS

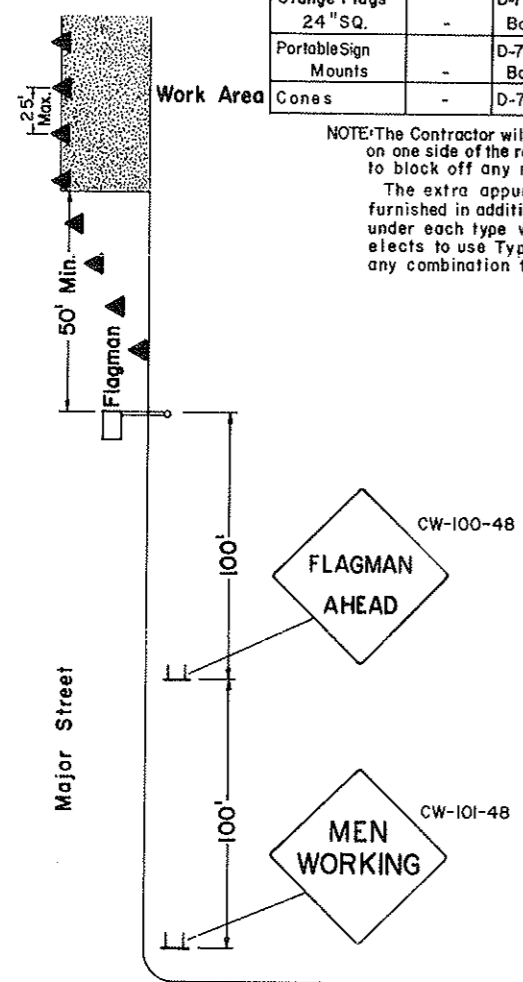
FED. ROAD DIST. NO.	STATE	PROJ. NO.	SHEET NO.
8	N.D.		46

D-754-71-13

CITY CONSTRUCTION SIGN LIST						
APPURTENANCE	SIGN NO.	STANDARD DRWG. NAME & NO.	QUANTITIES			
			TYPE U	TYPE V	TYPE W	EXTRA
Flagman Ahead	CW-100-48	D-754-71-2 Construction Sign Details	1	-	3	1*
Men Working	CW-101-48	D-754-71-2 Construction Sign Details	1	1	1	1
Stop & Slow Sign Paddles	CR-96-24 CW-100-24	D-754-71-4 Construction Sign Details	1	-	3	1*
Orange Flags 24" SQ.	-	D-754-71-5 Construction Sign & Barricade Assembly Details	4	2	8	7
Portable Sign Mounts	-	D-754-71-5 Construction Sign & Barricade Assembly Details	2	1	4	1
Cones	-	D-754-71-3 Construction Sign Details	6	-	5	4*

NOTE: The Contractor will be allowed to work only on one side of the roadway at a time so as not to block off any more than one lane of traffic. The extra appurtenances listed shall be furnished in addition to the number listed under each type whether the Contractor elects to use Type U, Type V or Type W or any combination thereof.

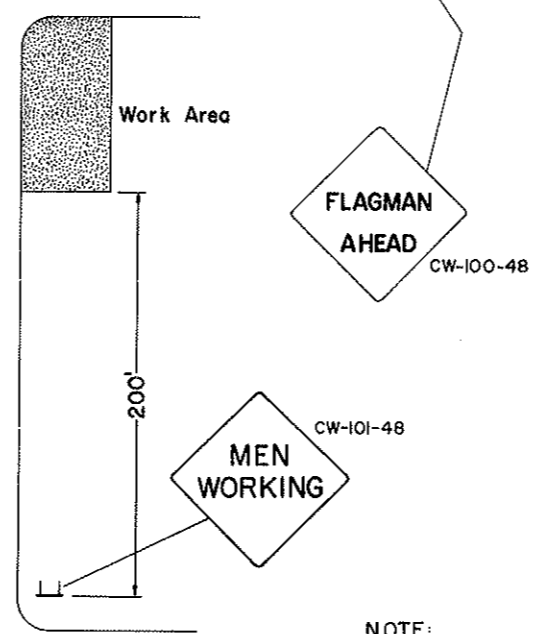
* Does not apply if type V is the only type used.



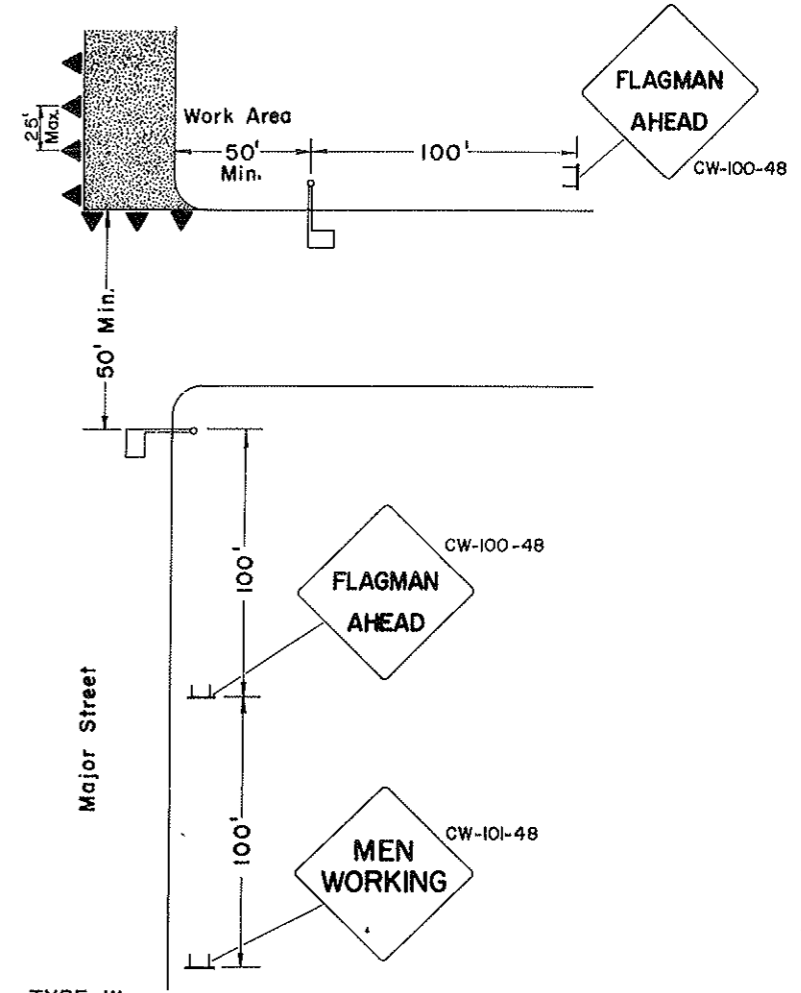
TYPE U
WHEN PORTION OF ROADWAY IS CLOSED TO TRAFFIC ONLY DURING DAYLIGHT HOURS (MID BLOCK LOCATION)



TYPE V
WHEN WORK AREA IS OUTSIDE OF DRIVING LANE AND NO CLOSURE IS NECESSARY



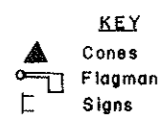
TYPE W
WHEN PORTION OF ROADWAY IS CLOSED TO TRAFFIC ONLY DURING DAYLIGHT HOURS (END BLOCK LOCATION)



NOTE: Where advance warning sign placed as shown interferes with permanent signs, the warning sign location shall be determined by the Engineer for best results. Messages shall be varied as required.

Where parking is present the signs shall be placed so they are entirely visible above the parked vehicles or placed at the edge of the parking area so they are visible to oncoming traffic. The number of locations will determine the number of signs needed and the length of the work area will determine the number of appurtenances needed for each situation. If more than one location is being worked on, the Contractor shall furnish the necessary appurtenances for those additional locations. No additional compensation will be given for additional appurtenances but shall be included in the price bid for maintenance and protection of traffic.

Mounting: Sign shown to be placed on roadway shall be placed on movable assemblies. (All devices shall be removed when hazard ceases to exist).



NOTE: FLAGS: All advance warning signs shall have two orange warning flags 24" square mounted perpendicular to the edges of the diamond sign and at such a distance above the edges so that when the flag is hung limp it will not touch the sign.

3-13-72	
REVISIONS	
DATE	CHANGE
8-27-73	Orange Flag note and Construction Sign List

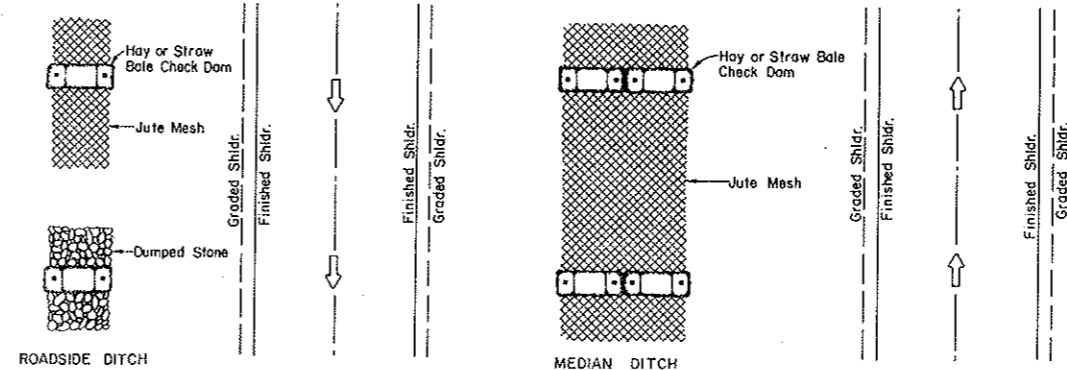
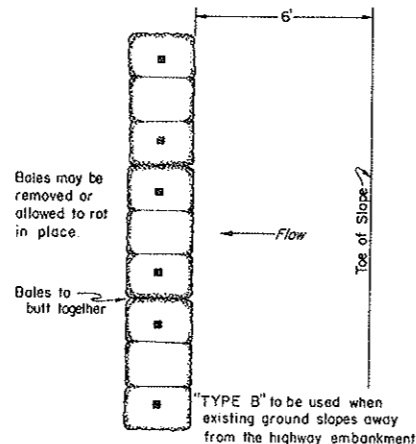
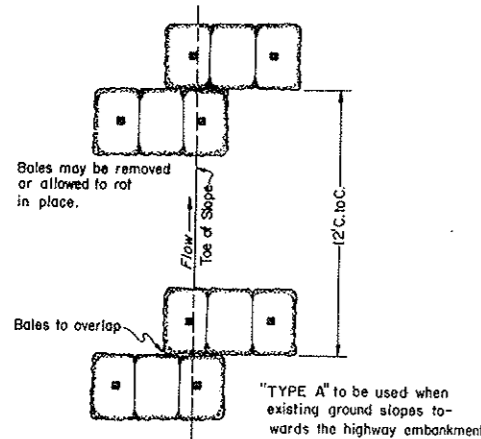
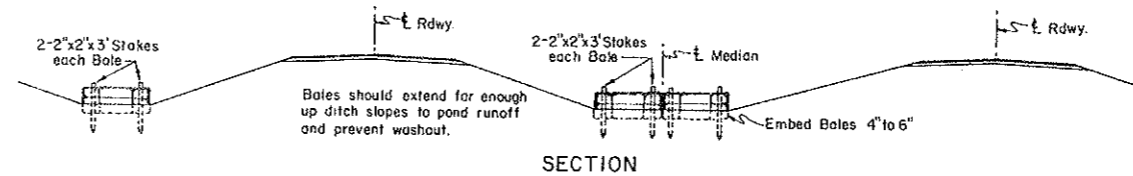
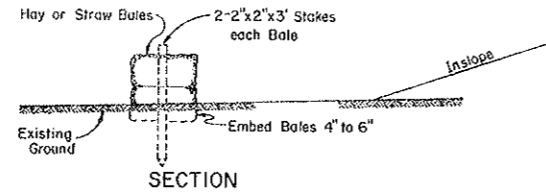
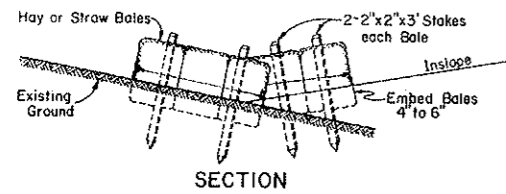
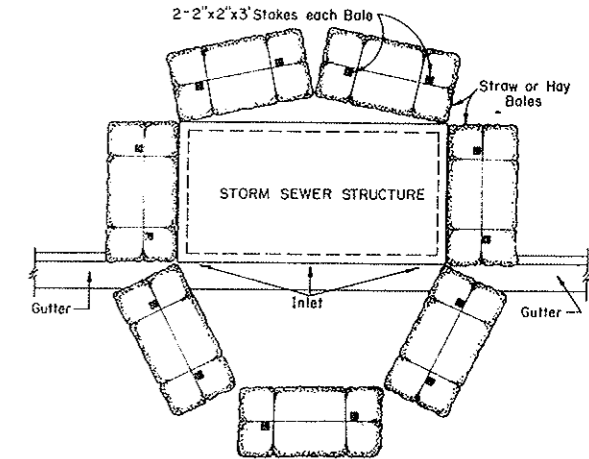
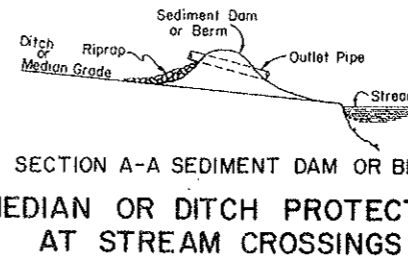
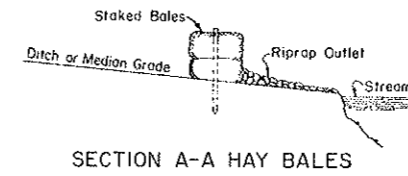
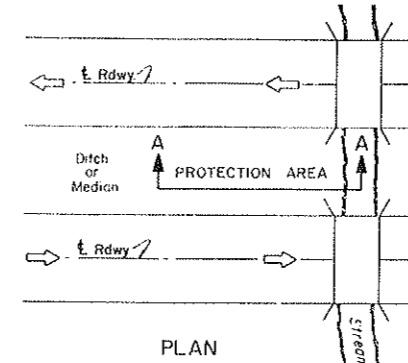
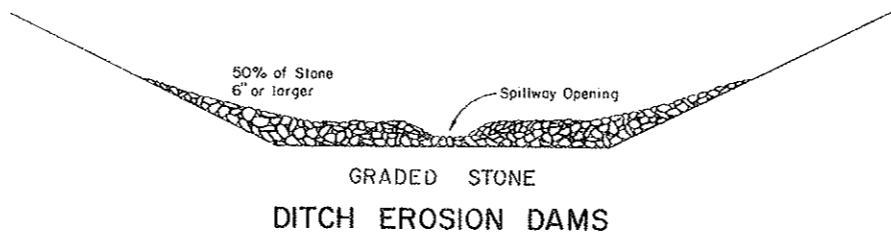
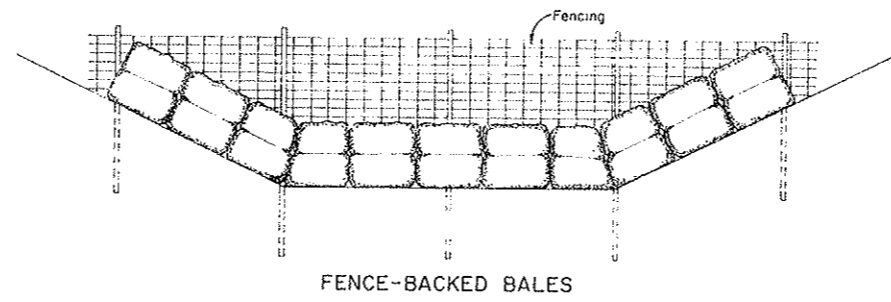
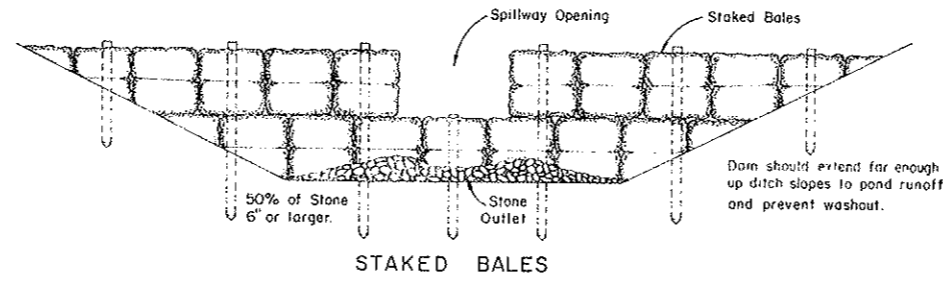
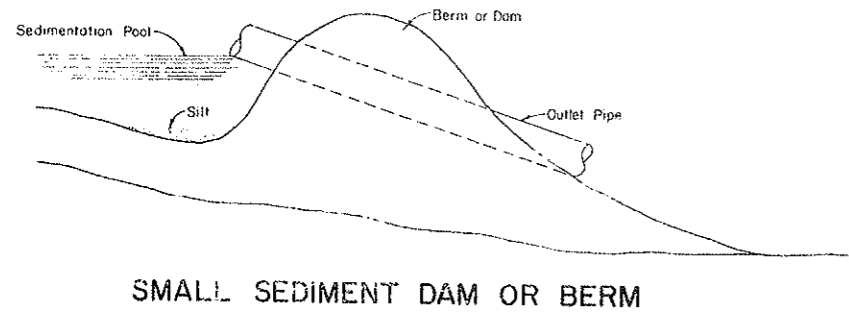
NORTH DAKOTA
STATE HIGHWAY DEPARTMENT

Submitted: *R. Johnson*
Design Engineer

Recommended: _____
Asst. Chief Engineer, Pre-Const.

Approved: *R. Johnson*
Chief Engineer

TEMPORARY EROSION AND SILTATION CONTROLS



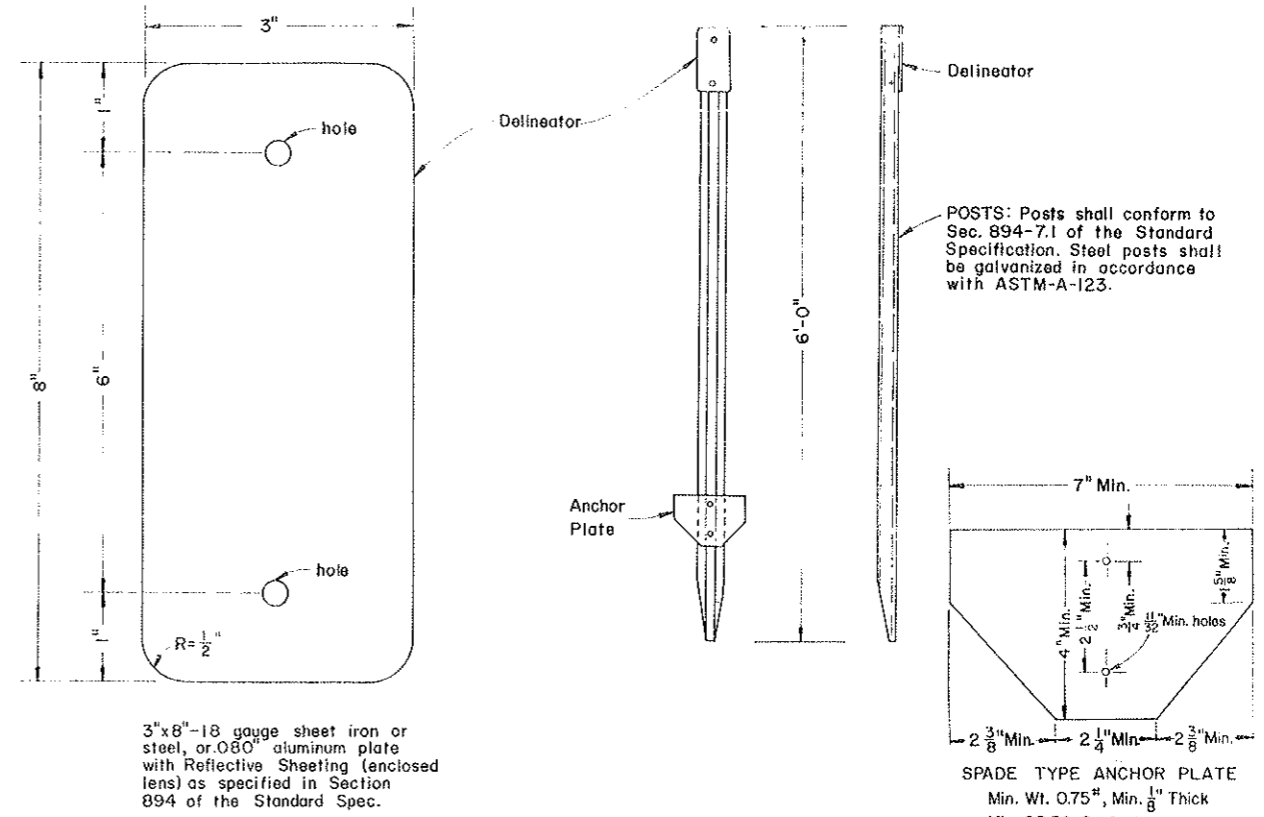
NOTES
 These Temporary Erosion and Siltation Controls or modifications thereof may be used by the Contractor or directed by the Engineer to prevent erosion or siltation during the construction stage.
 Payment for these items will be in accordance with Special Provisions for "Erosion and Water Pollution Control."

BALED HAY OR STRAW EROSION CHECKS

STONE, JUTE MESH, OR SOD DITCH & MEDIAN EROSION CONTROL

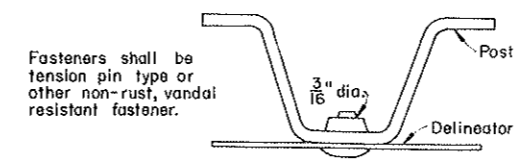
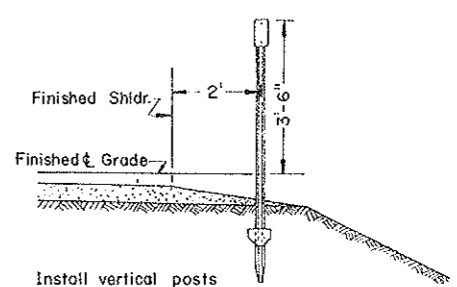
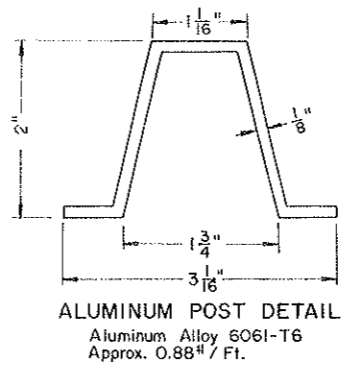
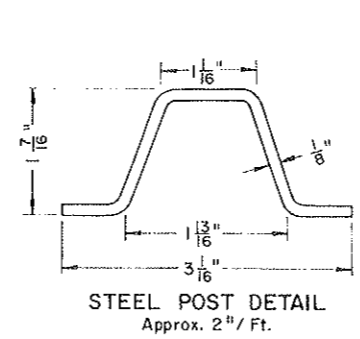
3-25-74		NORTH DAKOTA STATE HIGHWAY DEPARTMENT
REVISIONS		
DATE	CHANGE	Submitted: <i>R. P. Johnson</i> Design Engineer
		Recommended: <i>[Signature]</i> Asst. Chief Engineer Prog. Construction
		Approved: <i>[Signature]</i> Chief Engineer

REFLECTORIZED GUIDE POSTS



3"x8"-18 gauge sheet iron or steel, or .080" aluminum plate with Reflective Sheeting (enclosed lens) as specified in Section 894 of the Standard Spec.

SPADE TYPE ANCHOR PLATE
 Min. Wt. 0.75#, Min. 1/8" Thick
 Min. 22.36 Sq. Inches
 Attached to post with
 Min. 5/16" Rivets



1-1-75		NORTH DAKOTA STATE HIGHWAY DEPARTMENT
REVISIONS		
DATE	CHANGE	Submitted: <i>[Signature]</i> Design Engineer
		Recommended: <i>[Signature]</i> Aest. Chief Engineer Pre-Construction
		Approved: <i>[Signature]</i> Chief Engineer

CHECKED BY: RLA
 DRAWN BY: M.S.
 TRACING: M.S.
 QUANTITIES: M.S.
 MADE BY: M.S.
 CHECKED BY: M.S.

PILE PROPERTIES

PILE SIZE	AREA Ac	APPROX. WEIGHT PER LF (1)	MINIMUM PRESTRESS FORCE (2)	STRANDS PER PILE DIAMETER 7/16" (3) 1/2"	SECTION MODULUS	PERIMETER	DESIGN BEARING CAPACITY CONCRETE STRENGTH 5000 PSI (4)
10"	100sqin	105 #	70 Kips	4 4	167 in ³	40 in.	50 Tons
12"	144"	150 #	101 Kips	6 5	288 in ³	48 in.	72 Tons

FED. ROAD DIST. NO.	STATE	PROJ. NO.	SHEET NO.	TOTAL SHEETS
6	N. D.		4-5	

NOTES:

ALTERNATE PILE HEADS:

REINFORCEMENT MAY BE SPECIFIED TO PROJECT FROM THE PILE INTO THE CAP OR FOOTING. IF SO REQUIRED, ATTACHMENT OF THE PILE TO THE CAP OR FOOTING MAY BE MADE BY ANY ONE OF THE FOLLOWING METHODS UNLESS OTHERWISE SPECIFIED.

1. ALLOW ALL STRANDS TO PROJECT A MINIMUM OF 24" (SPECIAL DRIVING HEAD REQ.)
2. CAST MILD REINFORCING STEEL IN PILE HEAD WITH BARS PROJECTING FOR ANCHORAGE. (SPECIAL DRIVING HEAD REQUIRED)
3. PROVIDE CORED HOLES IN PILE HEAD FOR SUBSEQUENT USE OF GROUTED DOWEL BARS.
4. DRILL HOLES IN PILE HEAD FOR INSTALLATION OF GROUTED DOWEL BARS. SPECIAL CARE SHALL BE TAKEN TO PREVENT DAMAGE TO THE PILE HEAD.

GENERAL:

WHEN PILES ARE ORDERED IN ACCORDANCE WITH THIS STANDARD, THE STANDARD PILE DETAILS SHALL BE USED. ALTERNATE PILE HEADS, PILE TIPS, SPLICES, BUILD-UPS OR OTHER ALTERNATES SHALL BE USED ONLY IF SPECIFIED OR AUTHORIZED BY THE ENGINEER.

WHERE SPECIFIC METHODS ARE INDICATED FOR ACHIEVING A RESULT, OTHER METHODS WHICH WILL INSURE EQUAL RESULTS MAY BE CONSIDERED FOR APPROVAL BY THE ENGINEER.

SMALL AREAS OF HONEYCOMB WHICH ARE PURELY SURFACE IN NATURE EXTENDING TO A DEPTH OF NO MORE THAN ONE INCH MAY BE REPAIRED IN A MANNER SATISFACTORY TO THE ENGINEER. HONEYCOMB EXTENDING TO THE PLANE OF REINFORCING WILL BE CAUSE FOR REJECTION.

IF MILD REINFORCING STEEL IS USED FOR PROJECTION INTO CAP OR FOOTING THE MINIMUM AREA OF STEEL REQUIRED SHALL BE TWICE THE AREA OF THE PRESTRESSING STRANDS WITH NOT LESS THAN FOUR BARS BEING USED. ARRANGEMENT OF BARS SHALL BE IN A SYMMETRICAL PATTERN WITH BARS AS CLOSE AS PRACTICAL TO THE SIDES OF THE PILE. ANCHORAGE OF BARS SHALL BE SUFFICIENT TO DEVELOP STRENGTH OF BAR BUT NOT LESS THAN 20 BAR DIAMETERS.

CONCRETE:

CONCRETE IN THE PRECAST PRESTRESSED PILES SHALL HAVE A MINIMUM COMPRESSIVE CYLINDER STRENGTH (F_c) OF 5000 PSI AT 28 DAYS. COMPRESSIVE CYLINDER STRENGTH AT TRANSFER OF PRESTRESSING FORCE SHALL BE NOT LESS THAN 4000 PSI.

HIGHER CONCRETE STRENGTHS MAY BE USED AND ADVANTAGE MAY BE TAKEN OF SUCH GREATER STRENGTH FOR HANDLING AND DRIVING STRESS AND CROWN LOADING, SUBJECT TO APPROVAL OF ENGINEER.

AIR-ENTRAINED CONCRETE IS REQUIRED FOR PILES WHICH WILL BE SUBJECTED TO CYCLES OF FREEZING AND THAWING AND WETTING AND DRYING.

PRESTRESSING REINFORCEMENT:

SEVEN WIRE STRESS RELIEVED STRAND SHALL CONFORM TO THE GENERAL REQUIREMENTS OF ASTM DESIGNATION A416, AND MAY BE EITHER REGULAR OR HIGH STRENGTH, IN ACCORDANCE WITH STRAND MANUFACTURER'S PUBLISHED TABLES. SUBJECT TO THE APPROVAL OF THE ENGINEER, PRESTRESSING MAY BE INCREASED AS REQUIRED FOR HANDLING OR DRIVING BY INCREASING THE NUMBER OR SIZE OF STRANDS. IN GENERAL THE UNIT PRESTRESS AFTER LOSSES SHOULD NOT EXCEED 0.2 F_c, UNLESS SPECIAL CONDITIONS WARRANT AND APPROPRIATE ADJUSTMENT IS MADE IN ALLOWABLE STRENGTH. BROKEN WIRES WITHIN INDIVIDUAL STRANDS WILL BE PERMITTED UP TO 10% OF THE TOTAL NUMBER OF WIRES IN EACH PILE, PROVIDING THAT THERE IS NOT MORE THAN ONE BROKEN WIRE PER STRAND. TWO OR MORE BROKEN WIRES PER STRAND SHALL BE CAUSE FOR REPLACEMENT OF THE STRAND, EVEN THOUGH THE TWO BROKEN WIRES ARE WITHIN THE 24" LIMITATION.

SPLICES:

TWO PRESTRESSED PILE SECTIONS MAY BE SPLICED BY THE USE OF DOWELS EXTENDING FROM THE TIP OF THE UPPER PRESTRESSED SECTION INTO CORED OR DRILLED HOLES IN THE LOWER PRESTRESSED SECTION. THE DOWELS SHALL HAVE AN AREA EQUAL TO 10% OF THE GROSS CROSS-SECTION OF PILE AND SHALL BE ADEQUATELY BONDED INTO BOTH SECTIONS. THE DOWEL HOLES AND SPACE BETWEEN SPLICED SECTIONS SHALL BE ADEQUATELY BONDED INTO BOTH SECTIONS. THE DOWEL HOLES AND SPACE BETWEEN SPLICED SECTIONS SHALL BE FILLED WITH A MATERIAL HAVING PROPERTIES FULLY EQUAL TO THAT OF THE CONCRETE AND ADHESIVE STRENGTH EQUAL TO THE SHEAR AND TENSILE STRENGTH OF THE CONCRETE. SUCH PROPERTIES SHALL BE OBTAINED WITHIN A TIME LIMIT CONSISTENT WITH THE DRIVING REQUIREMENTS OF THE PILE.

ANY ALTERNATE METHOD OF SPLICING PROVIDING EQUAL RESULTS MAY BE CONSIDERED FOR APPROVAL.

CHAMFERS AND CORNERS:

ALL CORNERS OF SQUARE PILES SHALL BE CHAMFERED TO AT LEAST 3/4" OR ROUNDED TO APPROXIMATELY 1" RADIUS.

FORMS:

FOR FORMING THE EXTERIOR OF PILES, THE USE OF STEEL FORMS ON CONCRETE FOUNDED CASTING BEDS IS REQUIRED, UNLESS OTHERWISE APPROVED BY THE ENGINEER. SIDING FORMS MAY HAVE A MAXIMUM DRAFT ON EACH SIDE NOT EXCEEDING 1/4" PER FOOT.

PICK-UP AND HANDLING:

MAXIMUM LENGTH FOR PICK-UP ARE DETERMINED USING THE FOLLOWING STRESS ASSUMPTIONS.

LOADING: 1-1/2 TIMES FULL DEAD LOAD. ALLOWABLE TENSILE STRESS EQUALS $6.0\sqrt{f'_c}$. THESE STRESS AND LOADING CRITERIA ARE BASED ON NORMAL CARE IN HANDLING THE PILE. IF HANDLING IS SUCH THAT DAMAGE TO THE PILE BECOMES EVIDENT, THE ENGINEER MAY REQUIRE A HIGHER LOAD FACTOR OR LOWER ALLOWABLE STRESS AS NECESSARY TO INSURE NO DAMAGE TO PILES.

DRIVING:

PILE HEADS SHALL BE PROTECTED FROM DIRECT IMPACT OF THE HAMMER BY CUSHION BLOCKS CONSISTING OF SEVERAL PLYS OF SOFT COMPRESSIBLE WOOD OR OTHER APPROVED MATERIAL.

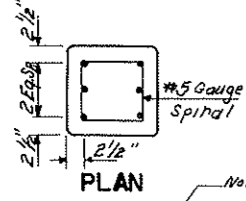
JETTING WILL BE PERMITTED AND/OR REQUIRED WHEN NECESSARY TO OBTAIN THE REQUIRED PENETRATION. INTERNAL JETS MAY BE INSTALLED PROVIDED THEY ARE SECURELY ANCHORED TO THE PILE AND ARE IMBEDDED IN THE CONCRETE.

THE DRIVING HEAD (HELMET) SHALL BE SUFFICIENTLY LARGE AND SHALLOW SO AS NOT TO BIND THE HEAD OF THE PILE IF IT TWISTS SLIGHTLY DURING DRIVING.

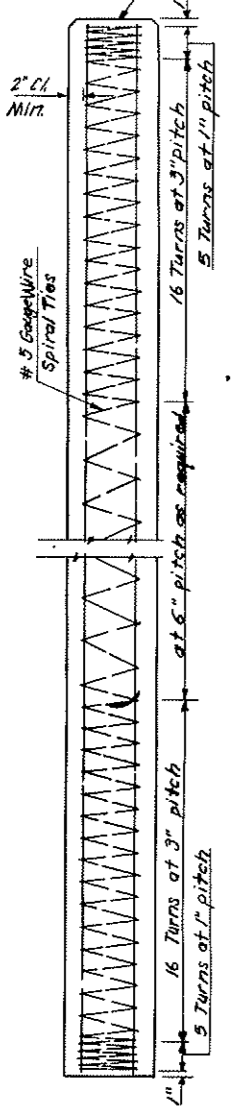
TOLERANCES:

PILE ENDS SHALL BE PLANE SURFACES AND PERPENDICULAR TO AXIS OF PILE WITH A MAXIMUM TOLERANCE OF 1/8" PER FOOT TRANSVERSELY.

THE MAXIMUM SWEEP (DEVIATION FROM STRAIGHTNESS MEASURED ALONG TWO PERPENDICULAR FACES OF THE PILE, WHILE NOT SUBJECT TO BENDING FORCES) SHALL NOT EXCEED 1/8" IN ANY 10' OF ITS LENGTH.

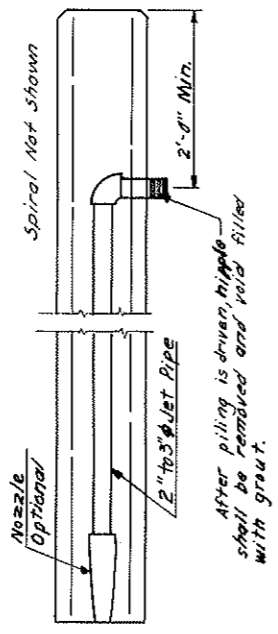


Note: For Method of Attachment of pile head to footing or Cap, See Notes on Alternate pile heads.

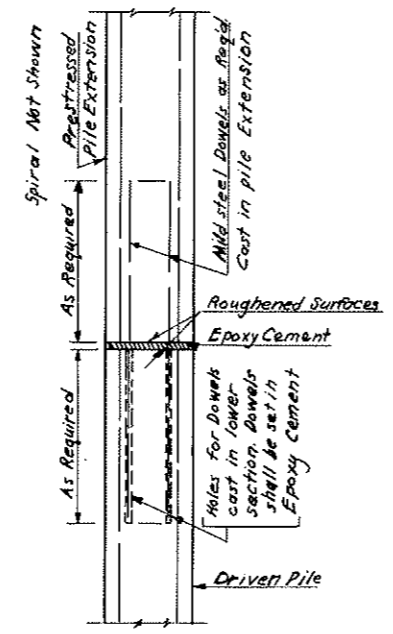


ELEVATION

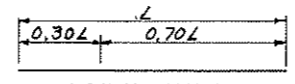
1. WEIGHTS BASED ON 150 LB. PER CUBIC FOOT OF REGULAR CONCRETE.
2. MINIMUM PRESTRESS FORCE BASED ON UNIT PRESTRESS OF 700 PSI AFTER LOSSES.
3. BASED ON 7/16" AND 1/2" HIGH STRENGTH STRAND WITH AN ULTIMATE STRENGTH OF 31,000 LBS. AND 41,300 LBS., RESPECTIVELY. IF REGULAR STRENGTH STRAND IS USED, THE NUMBER OF STRANDS PER PILE SHOULD BE INCREASED ACCORDINGLY IN CONFORMANCE WITH STRAND MANUFACTURER'S TABLES.
4. DESIGN BEARING CAPACITY BASED ON 5000 PSI CONCRETE AND AN ALLOWABLE UNIT STRESS ON THE TIP OF THE PILE OF 0.2 F_c. THESE BEARING CAPACITY VALUES MAY BE INCREASED IF HIGHER STRENGTH CONCRETE IS USED.



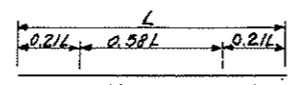
JET PIPE DETAILS



DOWELED SPLICE



1 POINT PICK-UP



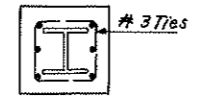
2 POINT PICK-UP

PICKING POINTS: UNLESS SPECIAL LIFTING DEVICES ARE ATTACHED FOR PICK-UP POINTS SHALL BE PLAINLY MARKED ON ALL PILES AFTER REMOVAL OF THE FORMS AND ALL LIFTING SHALL BE DONE AT THESE POINTS.

THE USE OF SPECIAL EMBEDDED OR ATTACHED LIFTING DEVICES, THE EMPLOYMENT OF OTHER PICK-UP POINTS OR ANY OTHER METHOD OF PICK-UP SHALL BE SUBJECT TO APPROVAL BY THE ENGINEER.

ALTERNATE PILE TIPS:

WHEN DRIVING INTO ROCK OR HARD STRATA ALTERNATE TIPS MAY BE USED IN LIEU OF THE STANDARD CHISEL TIP. SIZE AND LENGTH OF STEEL SECTION USED SHALL BE AS DETERMINED BY THE ENGINEER FOR ADEQUATE PENETRATION.



A-A ALTERNATE PILE TIP

QUANTITIES	
STANDARD	
PRESTRESSED CONCRETE	
PILE	

* State & Federal Funds

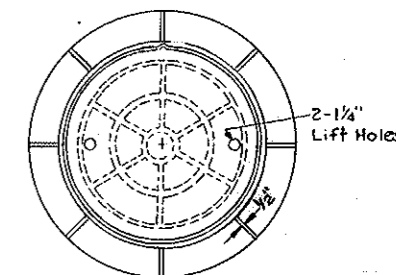
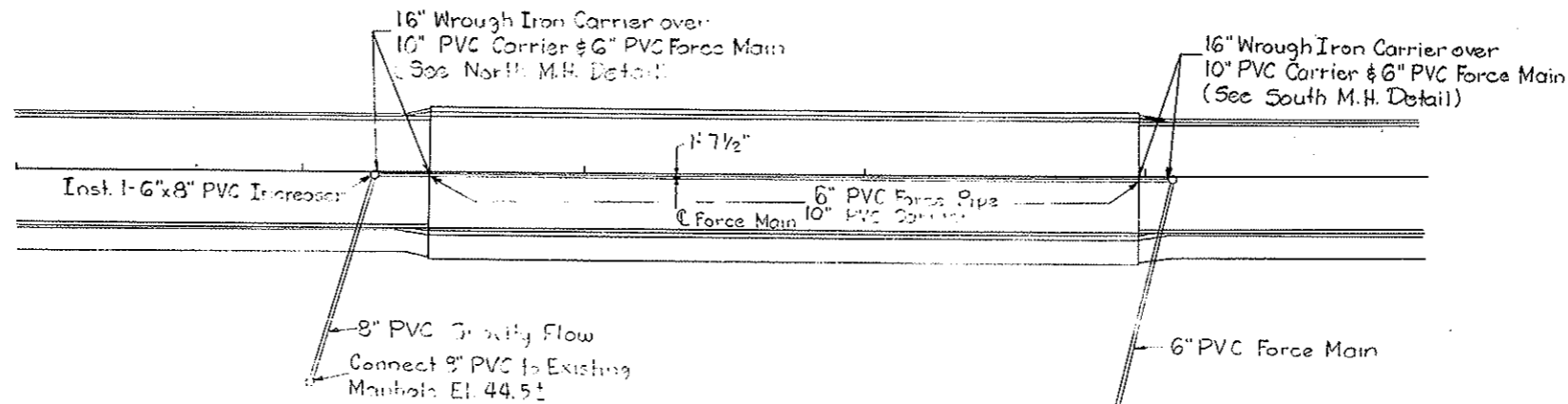
FED. ROAD DIST. NO.	STATE	PROJ. NO.	SHEET NO.
5	N.D.	BR3-1-8725	59

15860 lbs. the weight of the Steel Hangers and Couplers is included in the item "Structural Steel A36 Welded Girder" on the layout sheet drawing number 1806-0993. The Anchor Rods, Styrofoam Seal, Gaskets, and Bulkheads, and the installation of the Steel Hangers shall be considered incidental to the Structural Steel item above.

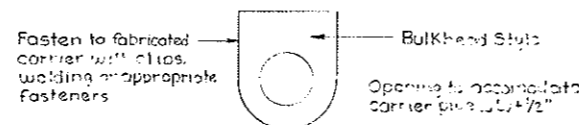
QUANTITIES (City of Mandan Funds)

6" Pressure PVC Sewer Pipe	404 L.F.
8" PVC Sewer Pipe	76 L.F.
10" PVC Sewer Pipe	303 L.F.
15" PVC Sewer Pipe	8 L.F.
Manholes Type A	2 Each
Manhole Riser 48"	17 L.F.

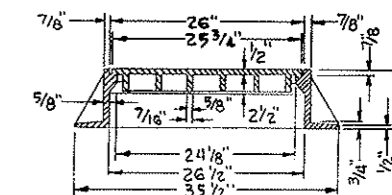
NOTE:
All PVC Bends, Tee's, Increases, and Jointing Material necessary for installation of the Force-Main shall be included in the price bid for non participating items. (City of Mandan Funds)



The manhole cover shall be held in place with 4 each 1/2" Brass Flathead Stud Screws. Sloped & Capable of removal with large blade screwdriver

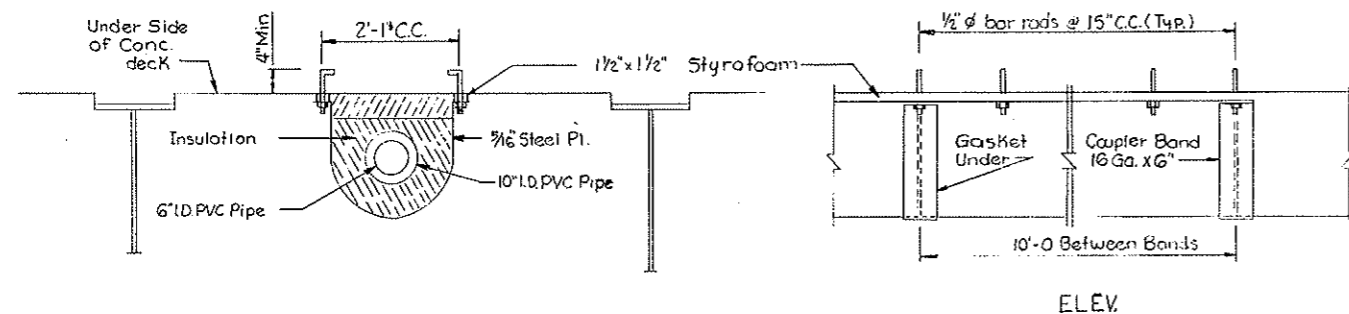


Lift Station
End 6" PVC Force Main 5' East of Lift Sta. Elev. to be determined in the field.

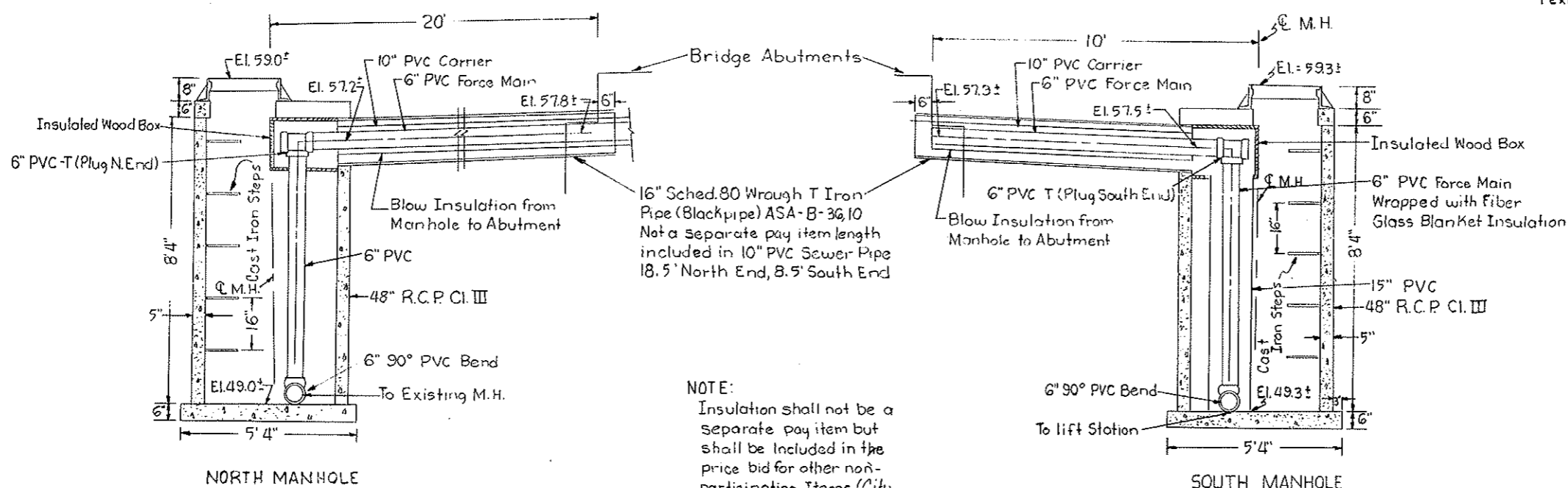


MANHOLE CAST IRON RING & COVER

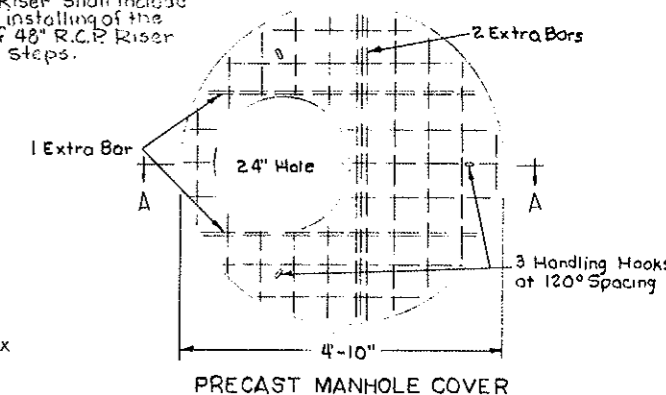
Note: Method of Measurement for Manholes shall be as follows. The Contract unit Price Bid for Manholes shall include the furnishing and installing of the following:
1. Cast Iron Ring and Cover
2. Precast Cover
3. Concrete Base
The item "Manhole Riser" shall include the furnishing and installing of the Required Length of 48" R.C.P. Riser and the Cast Iron Steps.



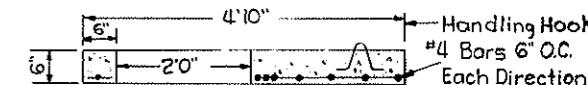
ELEV.



NOTE:
Insulation shall not be a separate pay item but shall be included in the price bid for other non-participating items. (City of Mandan Funds)



PRECAST MANHOLE COVER



SECTION A-A

