

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	SHEET NO.
5	N D	MG-1-010(05)917	1

GOVERNING SPECIFICATIONS:
 Standard Specifications adopted by the North Dakota State Highway Department July 1971 and approved as standard by the Bureau of Public Roads Sept 29, 1971. Required Contract Provision (Form PR-1273) dated Sept. 1975 and others submitted herewith.

NORTH DAKOTA STATE HIGHWAY DEPARTMENT

PLANS

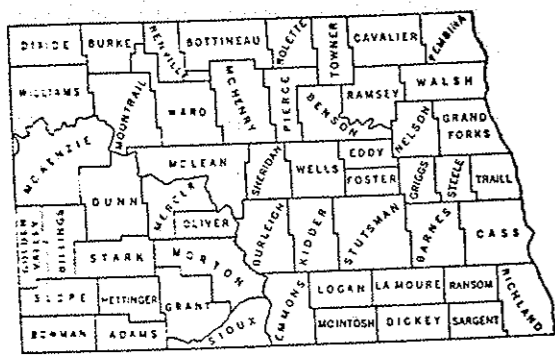
FOR THE PROPOSED IMPROVEMENT OF A

STATE HIGHWAY

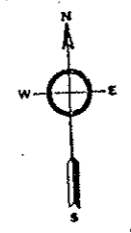
IN MORTON COUNTY

FEDERAL AID PROJECT NO. MG-1-010(05)917
 GRADING, STORM SEWER, SURFACING,
 STRUCTURAL, LIGHTING & INCIDENTALS

LENGTH OF PROJECT		
PROJECT	MILES-GROSS	MILES-NET
MG-1-010(05)	0.177	0.177
TOTALS	0.177	0.177



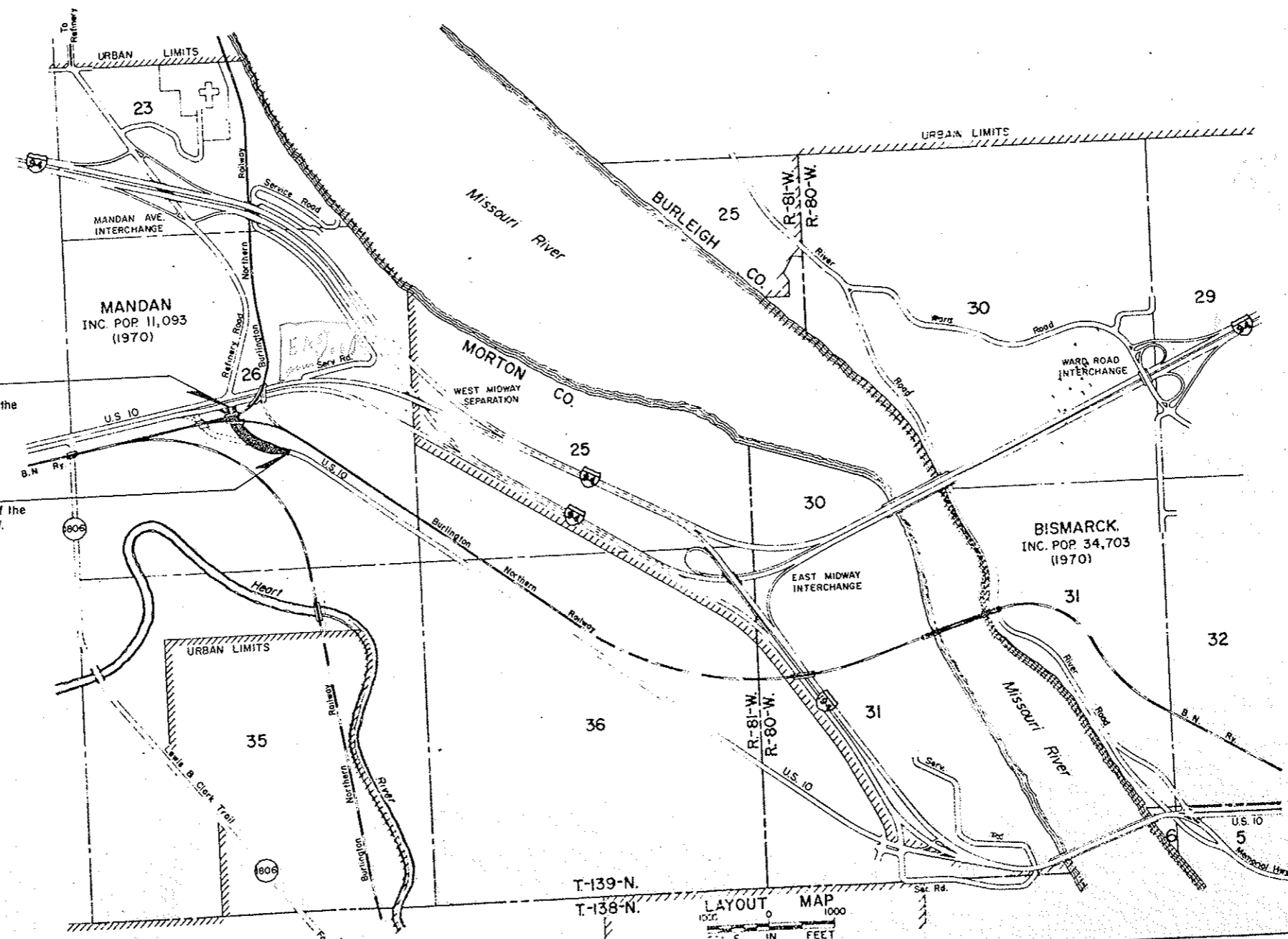
SKETCH-MAP OF NORTH DAKOTA
SHOWING COUNTIES



SCALES
 LAYOUT SHEET: 1 IN = 1000 FT
 PLAN AND PROFILE DRAWINGS (VERT.): 1 IN = 100 FT
 STRUCTURAL DRAWINGS: AS SHOWN
 CROSS SECTION SHEETS: 1 IN = 10 FT

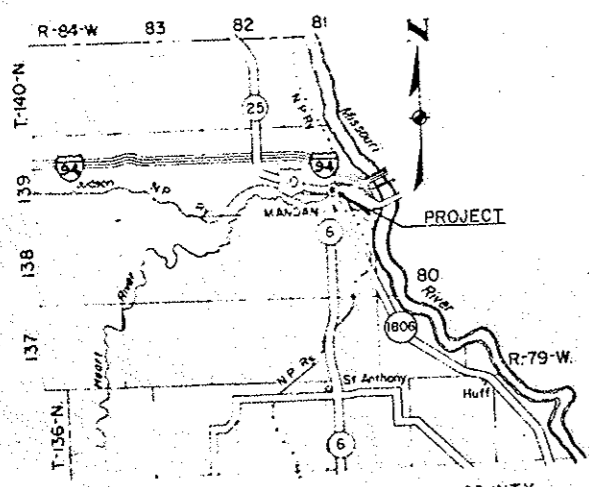
DESIGN DATA

TRAFFIC	AVERAGE DAILY	EST. 30TH MAX. HR.
CURRENT TRAFFIC 1976	13770 PASS. 330 TRUCKS 400 TOTAL	450
TRAFFIC FORECAST 1996	15550 PASS. 450 TRUCKS 6000 TOTAL	650
DESIGN SPEED	40 MPH	
TRAFFIC CLASSIFICATION	"M"	
M.N.M.M. SIGHT DISTANCE (STOPPING)	300'	



BEG. MG-1-010(05) STA. 0+56.5=
 Sta. 39+97.9 - 56.5' Rt. on UG-100(07)
 A point 2445.9' North & 2928.3' West of the
 S.E. Cor. of Sec. 28, Twp. 139N., Rge. 80W.

END MG-1-010(05) STA. 9+93.2
 A point 1960.7' North & 2372.32' West of the
 S.E. Cor. of Sec. 28, Twp. 139N., Rge. 80W.

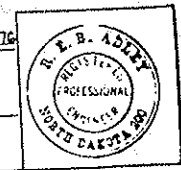


SKETCH MAP OF PART OF MORTON COUNTY

LAYOUT MAP
 SCALE 1 IN = 1000 FEET

APPROVED DATE Sept. 1, 1976

R. E. B. ADLEY
 CHIEF ENGINEER
 NORTH DAKOTA STATE
 HIGHWAY DEPARTMENT



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

131

MG-1-010(05)917

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
All.	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.O.	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. Bk.	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.	Continuously Reinforced Concrete	Rd.	Road
Pvm't	Pavement	Rdbd.	Roadbed
Contn.	Continuation	Rdwy.	Roadway
Cra.	Crown	Ref.	Reflectorized
CRS	Cationic Rapid Setting	R.R.	Railroad
Crae.	Course	Rt.	Right
C.S.	Curve to Spiral	R/W	Right of Way
C.to C.	Center to Center	Salv.	Salvage
C.Y.	Cubic Yard	San.	Sanitary
D	Degree of Curvature	S.C.	Spiral to Curve
D-Load	Dead Load	SC	Slow Curing
D.B.	Ditch Block	Sc	Spiral Deflection Angle
Def.	Deformed	S.D.	Sight Distance
Del.	Deliver	S.E.	Superelevation
D.G.	Ditch Grade	Sec.	Section
El. or Elev.	Elevation	Sec. Line Appr.	Section Line Approach
Ellipt.	Elliptical	Sep.	Separation
Emb.	Embankment	Serv.	Service
Emul.	Emulsified	Sgr Prep.	Subgrade Preparation
Engr.	Engineer	Shldr.	Shoulder
Eq.	Equation	SP	Special Provision
E.R.	East Roadway	S.P.P.	Structural Plate Pipe
E.S.	End Section	S.P.P.A.	Structural Plate Pipe Arch
Esmt.	Easement	S.R.	South Roadway
Exc.	Excavation	SS	Slow Setting or Supplement Specification
Exp.	Expansion	S.S.D.	Stopping Sight Distance
F.D.	Field Drive	S.T.	Spiral to Tangent
Found.	Foundation	Sta.	Station
F.P.	Fence Post	Std.	Standard
Furn.	Furnish	Std. Specs.	Standard Specifications
Go.	Gage or Gauge	Struct.	Structure
Gr.	Gravel	Surf.	Surface or Surfacing
Grd.	Graded	Surv.	Survey
G.V.	Gate Valve	S.W.	Sidewalk
Hel.	Helical	S.Y.	Square Yard
Hyd.	Hydrant	T	Tangent Length (circular curve)
Ident.	Identification	T or Twp.	Township
Inchg.	Interchange	Tel.	Telephone
I.M.	Iron Monument	Temp.	Temporary
Inst.	Install	T.P.	Telephone Pole
Inter.	Intersection	Tr.	Traffic
Inv.	Invert	Trans.	Transverse or Transition
Jt.	Joint	Trtd.	Treated
L	Length of Curve	Ts	Tangent Length (curve with spirals)
Lc	Length of Spiral	T.S.	Tangent to Spiral
Levg	Leveling	U.S.C. & G.S.	United States Coast and Geodetic Survey
L.F.	Linear or Linear Foot	V.C.	Vertical Curve
Liq.	Liquid	V.C.P.	Vitrified Clay Pipe
Long	Longitudinal	W.M.	Water Main
L.P.	Light Pole	W.M.V.	Water Main Valve
Li	Left	W.R.	West Roadway
"M"	One Thousand	Wrng	Wearing
Mall.	Material	W.S.V.	Water Service Valve
Max.	Maximum	X-Sec.	Cross Section
MC	Medium Curing	Xc	Spiral Coordinate
M.H.	Manhole	Yc	Spiral Coordinate
Min.	Minimum		

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FHWA REGION	STATE	FED AID PROJ. NO.	SHEET NO.
8	ND	MG-1-010(05)	3

NOTE SHEET

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 owners.
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:** 35% 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 shall be Class AE. The Contractor shall have the option of using aggregate Size No. 3, 4 or 5 as defined in Section 806-2 of the Standard Specifications.
5. **QUANTITIES:** Quantity totals have been rounded off to the nearest whole unit for bidding purposes.
6. Diesel fuel shall not be used to lubricate the dump body of any truck hauling bituminous mixed material.
7. **COMPACTION & DENSITY CONTROL:** The Aggregate Base Course and subgrade shall be compacted in accordance with Section 203.2.3.3 of the Std. Spec's.
8. **EXCESS EXCAVATION:** Excavation in excess of that used for embankment shall be placed within right-of-way as directed by the Engineer for use in filling existing structure and future use on Project F-1-010()917 (Mandan Strip) Approximately 25779 C.Y. to be stockpiled.
9. **AVERAGE HAUL:** No average haul is computed for this project.
10. **REMOVAL OF CONCRETE PAVEMENT:** The existing concrete pavement shall be removed at the locations shown on the Plans, or as directed by the Engineer. The Contractor shall use extreme care to avoid damaging the abutting concrete that is to remain in place. Any damage done thereto shall be repaired by the Contractor at his own expense. The concrete removed shall be disposed of by the Contractor at a location obtained by him (and approved by the Engineer) off the highway right-of-way. Cost of this disposal and obtaining of the disposal area, shall be included in the price bid for "Removal of Concrete Pavement".
11. **CONCRETE PAVEMENT:** Price bid for 9" Reinforced Concrete shall include cement and welded wire fabric reinforcement.
12. **CURING:** The Concrete Pavement shall be cured in accordance with sub-section 550-4.13.2.1, Water Soluble Liquid Membrane Cure, of the Standard Specifications. Materials shall meet the requirements of sub-section 880-5 of the Standard Specifications. In lieu of the Water Soluble Liquid Membrane Cure, paper or plastic blanket cure may be used as described in Section 550-4.13.3 of the Standard Specifications, followed by a linseed oil treatment as specified in Section 750 of the Standard Specifications. There shall be no extra compensation allowed for this alternate cure method.
13. **MISCELLANEOUS STEEL:** The cost for all steel used for tie bars shall be included in the price bid for P.C.C. Pavement.
14. Dowel bars installed at expansion joints in the curb and gutter will not be paid for separately, but shall be included in the price bid for "Curb and Gutter - Type I".
15. **JOINTS FOR SEWER PIPE:** When bell and spigot type is used, the joints shall be sealed with oakum and mortar or by rubber gaskets of a type approved by the Engineer. When tongue and groove type is used, the joints shall be sealed with rubber gaskets. Not a separate pay item, cost to be included in the price bid for RCP sewer.
16. **STORM SEWER:** At Sta. 0+72 Lt. the new storm sewer is to be installed into an existing manhole. The cost of cutting into this manhole and the necessary grouting shall be included in price bid for other items. The manhole at Sta. 36+26+ Rt. (I-94) and the inlet at Sta. 0+58.4 Rt. are to be installed over existing storm sewer. The cost of cutting or removing and replacing the sewer to facilitate the installation of the manhole shall be included in price bid for "48" Manhole". The cost of cutting or removing and replacing the sewer to facilitate the installation of the inlet shall be included in price bid for "Inlet". Adjust location of inlet and manhole to fit existing sewer.
17. **UNDERDRAIN SYSTEM:** 7 Ft. of P. V. C. pipe for each cleanout has been included in "6 Inch Perforated PVC Pipe" quantities for nonperforated riser sections. All materials, labor and equipment necessary for construction of cleanouts shall be included in price bid for "6 Inch Perforated PVC Pipe".
18. **PUMP STATION & EQUIPMENT:** Notes pertaining to construction and design of Pump Station shall be found on detail sheets.
19. **TEMP. BYPASS:** Approximately 122 ton of Hot Bituminous Pavement and 9 ton of 120-150 Asphalt Cement are required for temp. bypass. These items are not separate pay items, but shall be included in price bid for "Temporary Bypass".
20. Any tack required on project is to be included in price bid for 120-150 Asphalt Cement.
21. **PIPE INLET 37+00 (U.S. 10):** Shape surrounding area to drain into pipe.

SUMMARY OF QUANTITIES

SPEC. NO.	CODE NO.	GRADING																				726	728	4009	8505	746	754	756	762	776	724								
		202		203		216	630						706	708		714				726	728													746	754	756	762	776	724
		0114	0130	0230	0101	0180	0100	0165	2638	2216	2256	2296	2341	2386	3275	0110	0395	0397	0300	0424	0110											0122	0130	0134	0208	0216	0110	0100	
REMOVAL OF CONCRETE PAVEMENT	REMOVAL OF CURB & GUTTER	REMOVAL OF INLETS	COMMON EXCAVATION TYPE A	ROADWAY OBLITERATION	WATER	AGGREGATE BASE COURSE CLASS 20	REINFORCED CONCRETE PIPE SEWER						REINFORCED CONCRETE END SECTIONS	UNDERDRAIN GRANULAR FILL MATERIAL	PERFORATED P.V.C. PIPE FOR UNDERDRAINS		CURB & GUTTER TYPE I	CURB & GUTTER TYPE I	MANHOLE RISER		INLETS	DOUBLE INLETS	MANHOLE		SEEDING TYPE A CLASS III	SODDING	PUMP STATION & EQUIPMENT	TRAINEE	FLAGGING	FLAT SHEET FOR SIGNS	FIELD LABORATORY TYPE A	MAINTENANCE & PROTECTION OF TRAFFIC	TEMPORARY STRIPING	TEMPORARY BYPASS					
SQ. YD.	L. FT.	EA.	CU. YD.	L. FT.	M. GAL.	TON	48"	12"	15"	18"	21"	24"	24"	EA.	CU. YD.	6"	8"	L. FT.	L. FT.	L. FT.	L. FT.	EA.	EA.	EA.	EA.	ACRE	SQ. YD.	L. SUM	MAN. HR.	MAN. HR.	SQ. FT.	EA.	L. SUM	MILE	EA.				
TOTAL		1442	1170	3	35021	500	92	12304	29	218	64	21	236	132	1	280	228	154	2375	1812	25	13	10	2	5	1	2	2150	1	2000			1000	114	1	1	1	1	1

NOTE: The Signs & Supports are to be furnished & installed by State Forces.

SURFACING

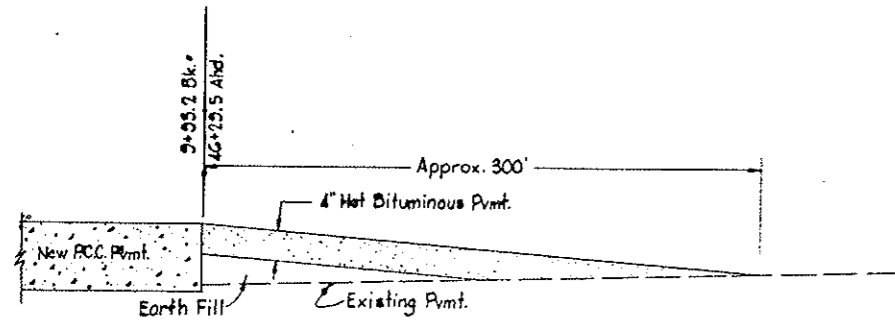
SPEC. NO.	CODE NO.	406		550				
		0165	0320	0180	0230	0809	0830	
		HOT BITUMINOUS PAVEMENT CLASS 20	120 - 150 ASPHALT CEMENT	9" REINFORCED CONC. PAVEMENT CLASS 20	CEM. & STEEL INCL.	DOWELLED EXPANSION JOINT ASSEMBLY	PREFORMED COMPRESSION JOINT SEAL - 1/2"	PREFORMED COMPRESSION JOINT SEAL - 1/4"
		TON	TON	SQ. YD.	L. FT.	L. FT.	L. FT.	L. FT.
		383	30	6753	65	3605	250	
TOTAL		383	30	6753	65	3605	250	

STRUCTURAL

LIGHTING

SPEC. NO.	CODE NO.	STRUCTURAL														LIGHTING														
		202	203		208	228	610		612	616		620	622		705	736	740	750	777											
		0105	0190	0100	0100	1130	9110	0110	0360	0361	5880	0100	0110	0040	1340	0100		0119	0106	0100	9535	9585								
		REMOVAL OF STRUCTURE	MOISTURE CONTROL	CLASS I EXCAVATION	SELECT BACKFILL	CLASS AE-3 CONCRETE	CLASS AE-1 MODIFIED CONCRETE	REINFORCING STEEL GRADE 40	STRUCTURAL STEEL A36	STRUCTURAL STEEL A36 ROLLED BEAM	STRUCTURAL STEEL A-588 MISC.	UNTREATED TIMBER	TREATED TIMBER	STEEL PILING HP12 x 53	STEEL TEST PILES HP12 x 53 - 75 FT.	MOBILIZATION	ONE-PLY MEMBRANE WATERPROOFING	RESET EXISTING CHAIN LINK FENCE	LINSEED OIL TREATMENT	DECK DRAINAGE SYSTEM	CONCRETE SURFACE PROTECTION	CONCRETE FOUNDATIONS HIGHWAY LIGHTING	2" DIA RIGID CONDUIT	UNDERGROUND CONDUCTOR NO. 4 TYPE RHW	UNDERGROUND CONDUCTOR NO. 6 TYPE THW	MERCURY VAPOR LUMINAIRE 700 WATT	REVISE CONCRETE FOUNDATIONS	RELOCATE LIGHT STANDARDS	RELOCATE LUMINAIRE	REMOVE STREET LIGHT LUMINAIRE
		L. SUM	L. SUM	CU. YD.	CU. YD.	CU. YD.	CU. YD.	LB.	LB.	LB.	LB.	M.B.M.	M.B.M.	L. FT.	EA.	L. SUM	SQ. FT.	L. SUM	GAL.	L. SUM	SQ. FT.	EA.	L. F.	L. F.	L. F.	EA.	EA.	EA.	EA.	EA.
						234.9	1849.7	205295	7881	749123	84409	2.6	6.0	18720	8		5911		5		8810	5	331	802	401	5	1	5	2	5
TOTAL						235	1850	205295	7881	749123	84409	3	6.0	18720	8		5911		5		8810	5	331	802	401	5	1	5	2	5

BASIS OF ESTIMATE				
QUANTITY FOR ROAD APPR STA. CORR.	QUANTITY PER SQ. YD.		UNIT	DESCRIPTION
	DEPTH			
	2 1/2"	1 1/2"		
20	0.13888	0.08333	Ton	Hot Bituminous Pavement @ 2.0 Ton/C.Y. (Class 20 Aggregate)
2	0.01055	0.00633	Ton	120-150 Asphalt Cement for Hot Bituminous Pavement @ 7.0% of Hot Bituminous Pavement



TEMPORARY CONNECTION AT END OF PROJECT

ESTIMATED QUANTITIES: Hot Bit. Pmnt. = 170 Ton
Asph. Cement = 13 Ton

BASIS OF ESTIMATE

WATER FOR COMPACTION:
10 Gal. per C.Y. of Embankment Quantity.

SEEDING:
Entire Right-of-Way and construction areas in easements except roadbed and sodded areas.

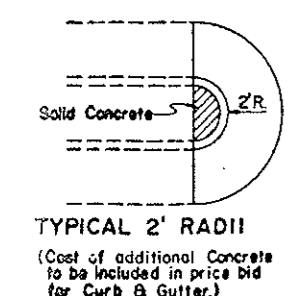
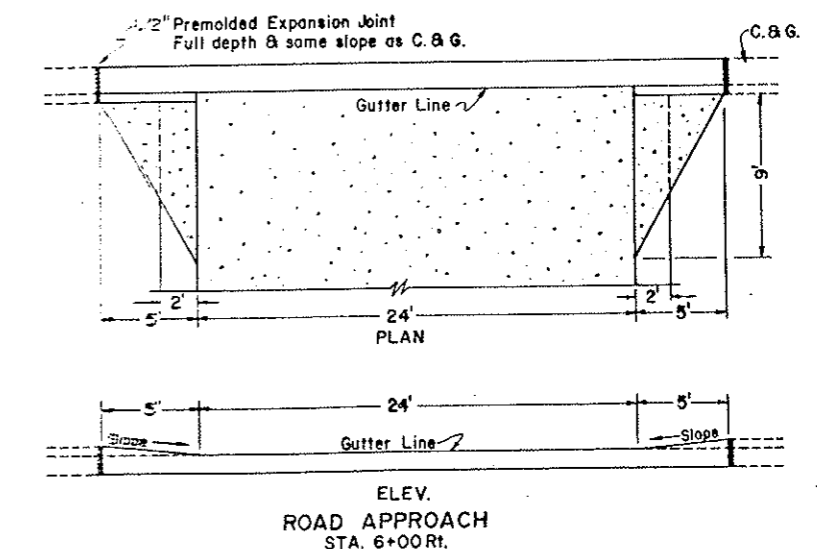
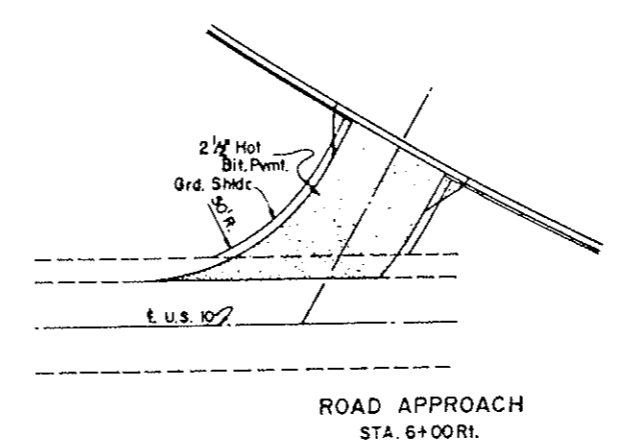
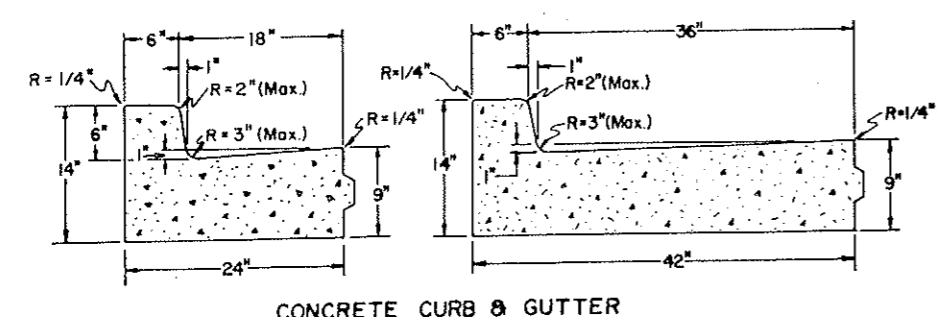
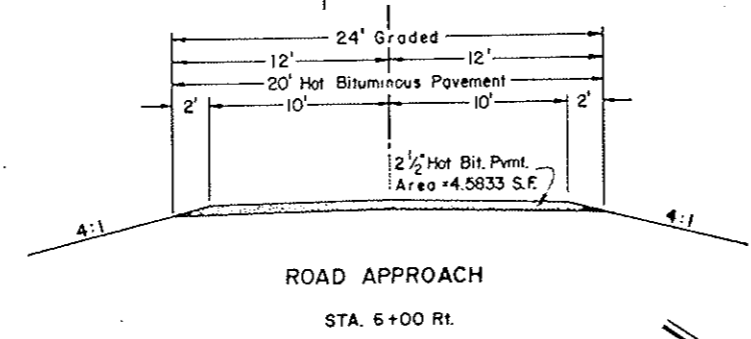
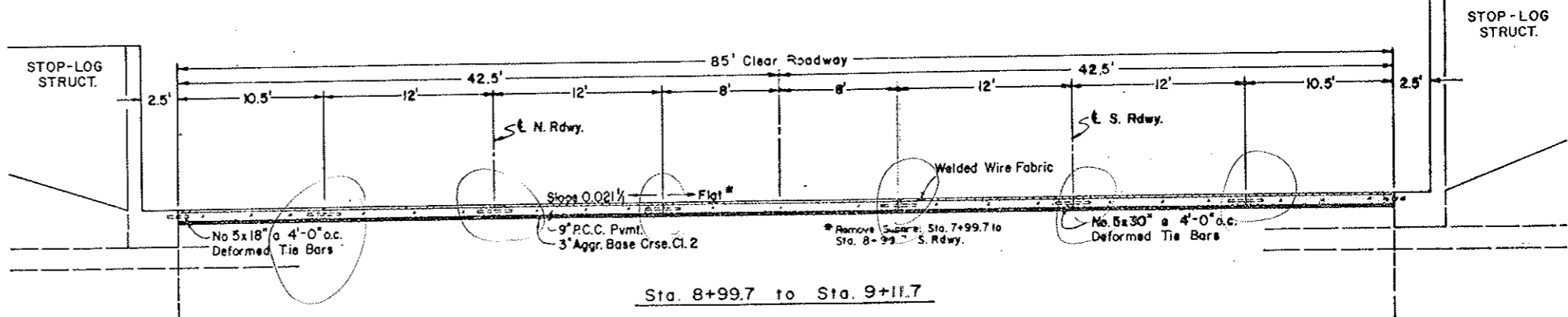
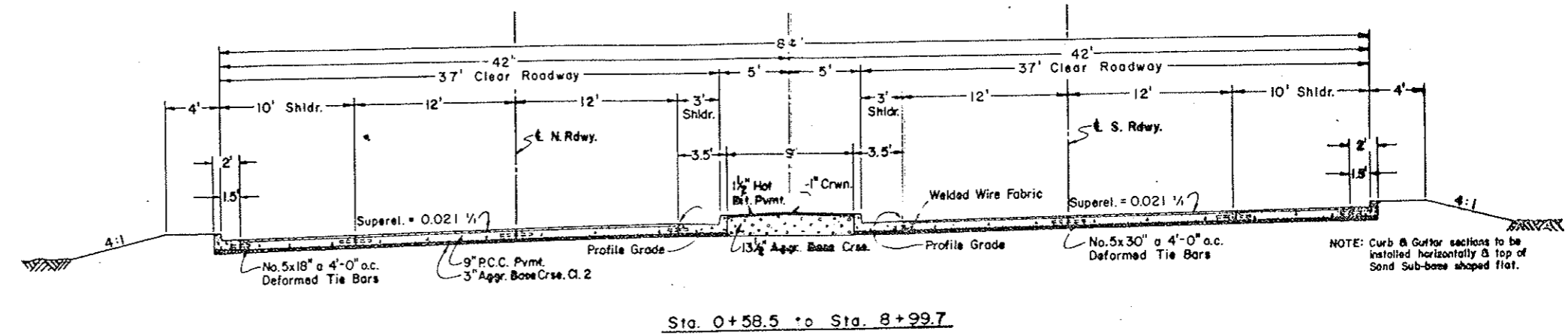
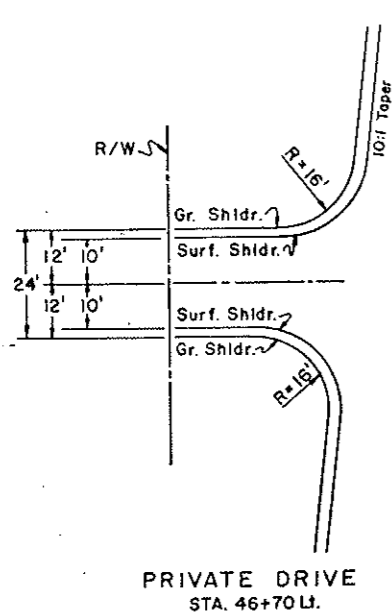
AGGREGATE BASE COURSE:
Class 20 - .5 Ton/C.Y. + 25%
Class 2 - .5 Ton/C.Y.

SODDING:
See Cross-Sections for areas to be sodded.

LIST OF SUPPLEMENTAL SPECIFICATIONS AND SPECIAL PROVISIONS #	
NAME	NO.
UNDERDRAIN	SP
EROSION AND WATER POLLUTION CONTROL	106 A
HOT BIT PVMT (COLD FEED CONTROL (DRUM DRYER MIX)	109 E
REPAIR AND RESTORATION OF HAUL ROADS	111 C
LEGAL RELATIONS (RESPONSIBILITY TO THE PUBLIC (SPECIALS)	113
SODDING	122 A
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HIGHWAY LIGHTING	SP
PUMP STATION (EQUIPMENT	SP
CONCRETE SURFACE PROTECTION	SP

NOTE: See Sheet No. 24 for Supp. Specs. & Spec. Provs. for Structures.

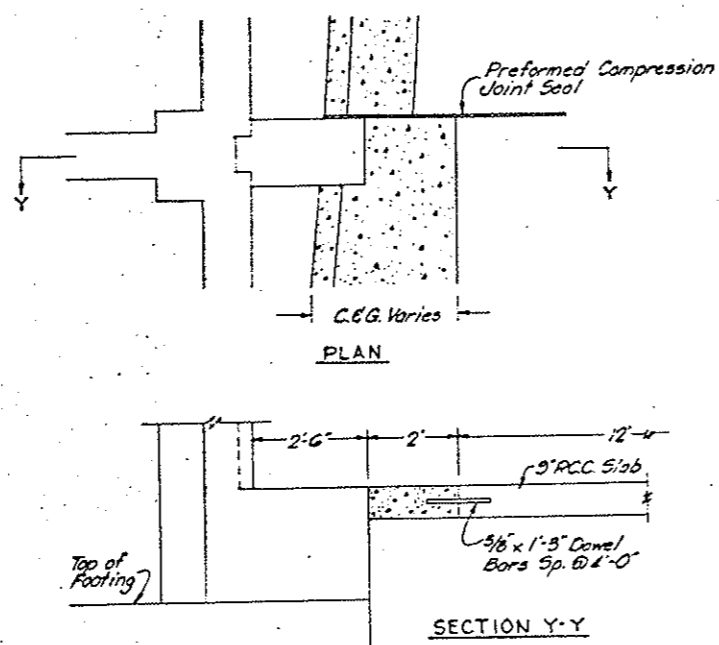
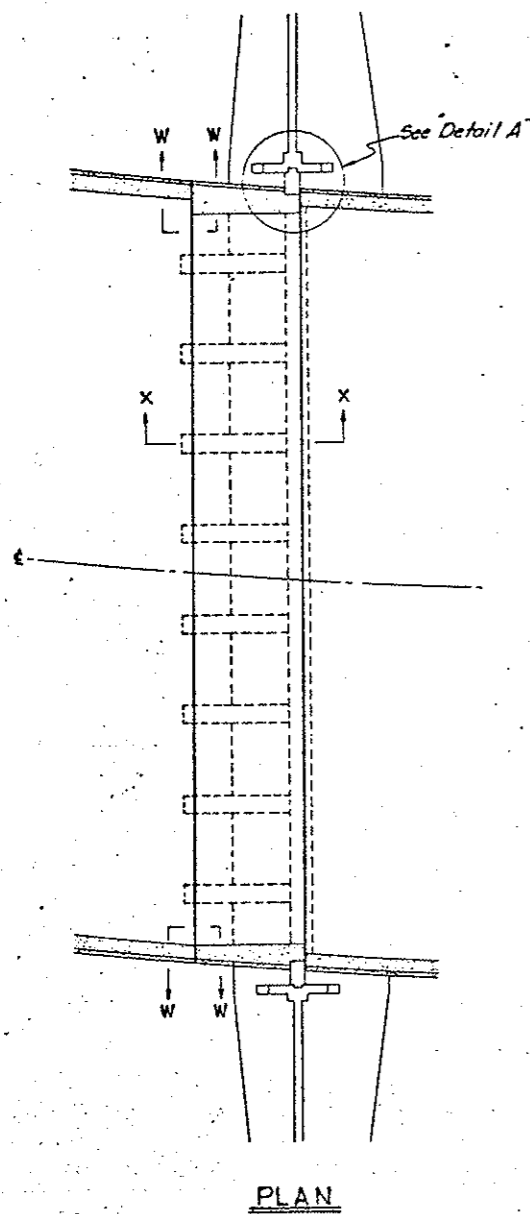
TYPICAL SECTIONS & DETAILS



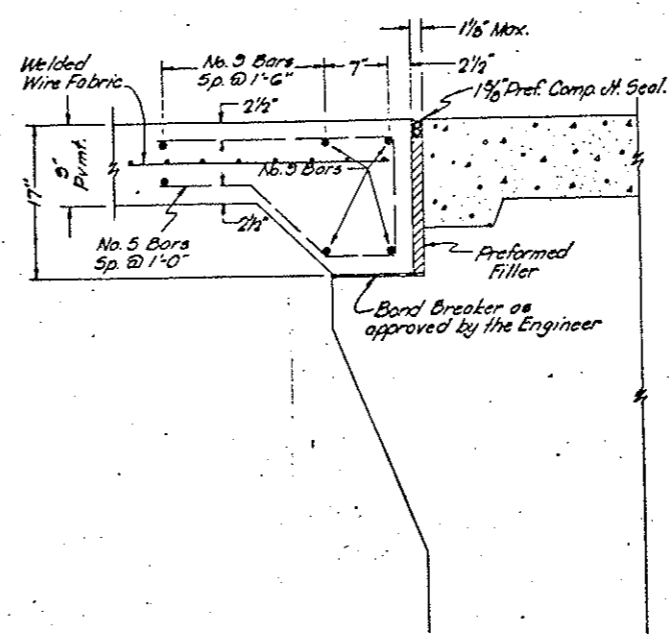
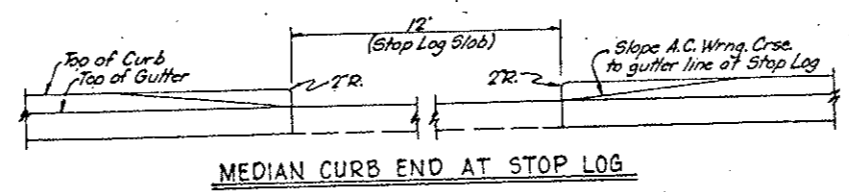
NOTE: Curb & Gutter sections to be installed horizontally & top of Sand Sub-base shaped flat.

DETAILS

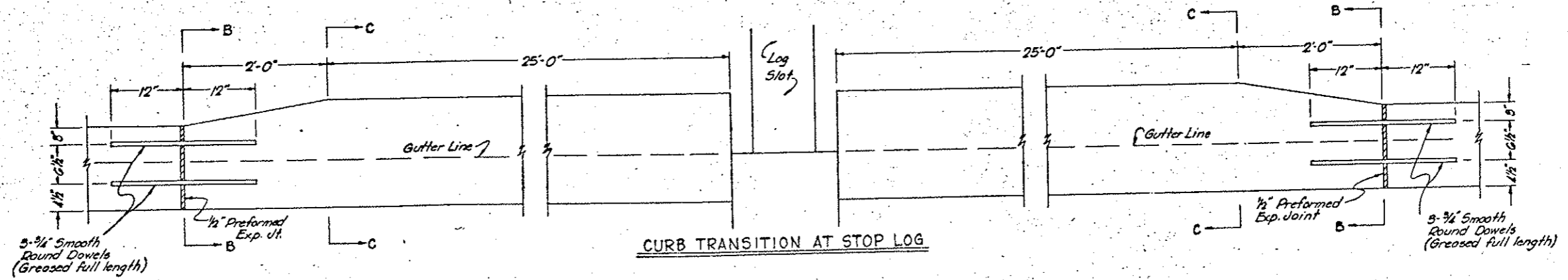
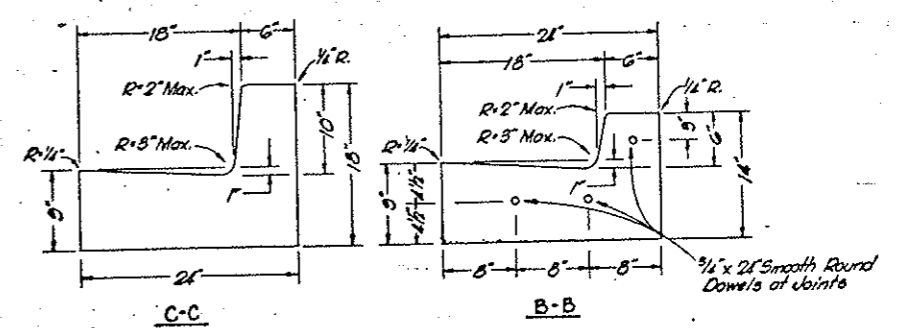
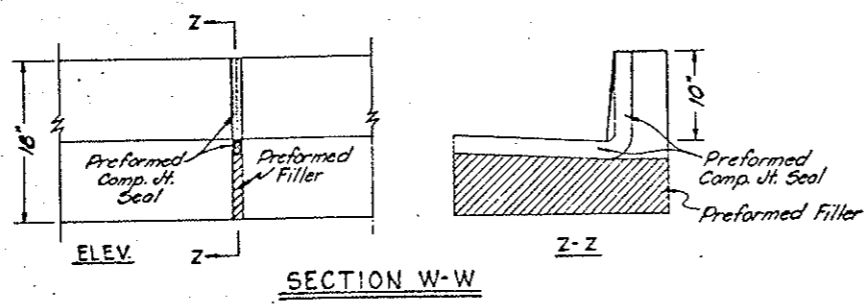
FYWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	MG-1-010(05)	7



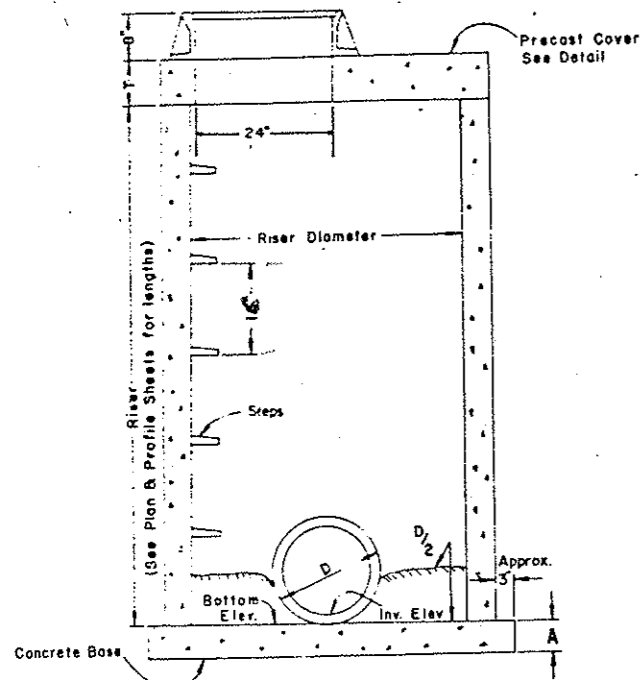
DETAIL A



SECTION X-X



MANHOLE DETAILS

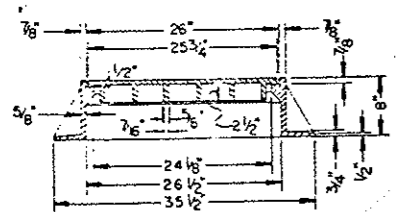
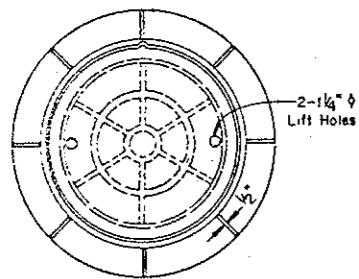


MANHOLE

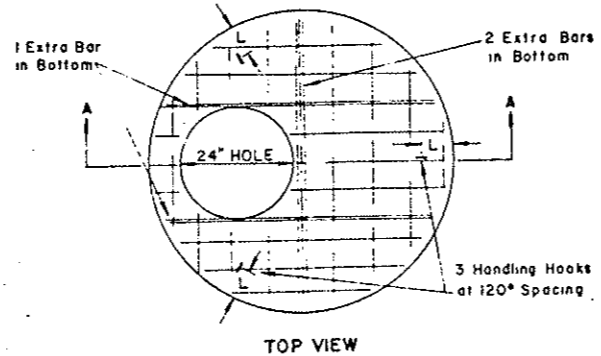
NOTE: METHOD OF MEASUREMENT FOR MANHOLES SHALL BE AS FOLLOWS: THE CONTRACT UNIT PRICE BID FOR MANHOLES SHALL INCLUDE THE FURNISHING AND INSTALLING THE FOLLOWING:

1. CAST IRON RING AND COVER.
2. PRECAST COVER.
3. CONCRETE BASE.

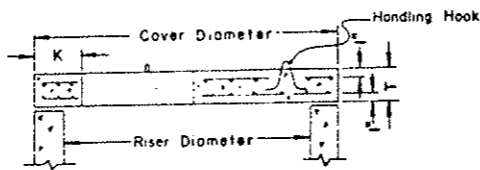
THE ITEM "MANHOLE RISER" SHALL INCLUDE THE FURNISHING & INSTALLING OF THE REQUIRED LENGTH OF RISER & CAST IRON STEPS.



MANHOLE CAST IRON RING & COVER



TOP VIEW



**SECTION A-A
PRECAST COVER**

PRECAST MANHOLE COVERS

PIPE DIAMETER	COVER DIAMETER	WEIGHT OF SECTION	T	K	L	BOTTOM BARS	TOP BARS
42"	51"	800#	6"	8"	7"	#4 AT 6"	
48"	58"	1110#	6"	8"	8"	#4 AT 6"	
54"	65"	1950#	8"	6"	8"	#4 AT 6"	
60"	72"	2470#	8"	7"	9"	#4 AT 6" #3 AT 6"	
66"	79"	3050#	8"	7"	9"	#4 AT 6" #3 AT 6"	
72"	86"	3630#	8"	8"	10"	#4 AT 6" #3 AT 6"	
78"	93"	4350#	8"	8"	10"	#4 AT 4" #3 AT 4"	
84"	100"	5100#	8"	9"	11"	#4 AT 4" #3 AT 4"	
90"	107"	5850#	8"	9"	11"	#4 AT 4" #3 AT 4"	
96"	114"	6730#	8"	9"	11"	#4 AT 4" #3 AT 4"	
102"	121"	7630#	8"	9"	12"	#4 AT 4" #3 AT 4"	
108"	128"	12450#	12"	10"	12"	#4 AT 4" #3 AT 4"	
120"	140"	15500#	12"	11"	13"	#4 AT 4" #3 AT 4"	

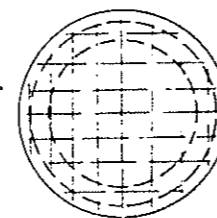
Top and Bottom Bars run in both directions.

PRECAST MANHOLE BASES

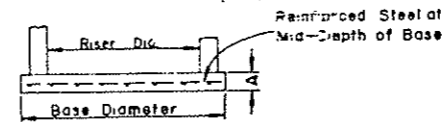
PIPE DIAMETER	BASE DIAMETER	WEIGHT OF SECTION	A	BARS
42"	58"	1380#	6"	#3 AT 6"
48"	66"	1780#	6"	#3 AT 6"
54"	72"	2120#	6"	#3 AT 6"
60"	79"	3410#	8"	#3 AT 8"
66"	87"	4130#	8"	#3 AT 8"
72"	94"	4820#	8"	#3 AT 8"
78"	101"	5570#	8"	#3 AT 8"
84"	108"	6370#	8"	#3 AT 8"
90"	115"	7220#	8"	#3 AT 8"
96"	122"	8130#	8"	#3 AT 8"
102"	129"	9080#	8"	#3 AT 8"
108"	136"	15130#	12"	#3 AT 8"
120"	149"	18170#	12"	#3 AT 8"

Notes:

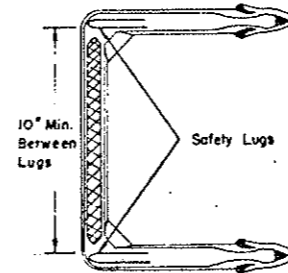
- Bottoms of manholes shall be cut or precast square to fit the base. Grout joint between base and wall with cement mortar.
- The Contractor may, if he so desires, construct the manholes lower than plan grade and bring the casting to grade using precast adjusting rings in a manner satisfactory to the Engineer in the field.
- The Contractor shall have the option of using precast or poured in place bases.
- Precast bases shall be reinforced as shown in listing for each size base. The class of concrete used in poured bases shall be class AE.
- The aggregate size shall be approved by the engineer.
- Precast barrels shall be constructed in accordance with ASTM 478.
- Other castings, similar in dimension, may be used if accepted by the engineer in writing. Manhole steps shall be made of non-corrosive materials. The steps shall be certified capable of withstanding a minimum static load of 1500 pounds.
- Configuration of the steps shall be approved by the engineer.
- Manhole riser shall be produced in accordance with ASTM 478.



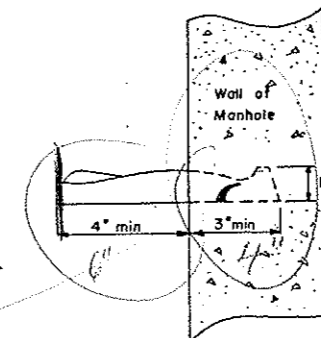
TOP VIEW



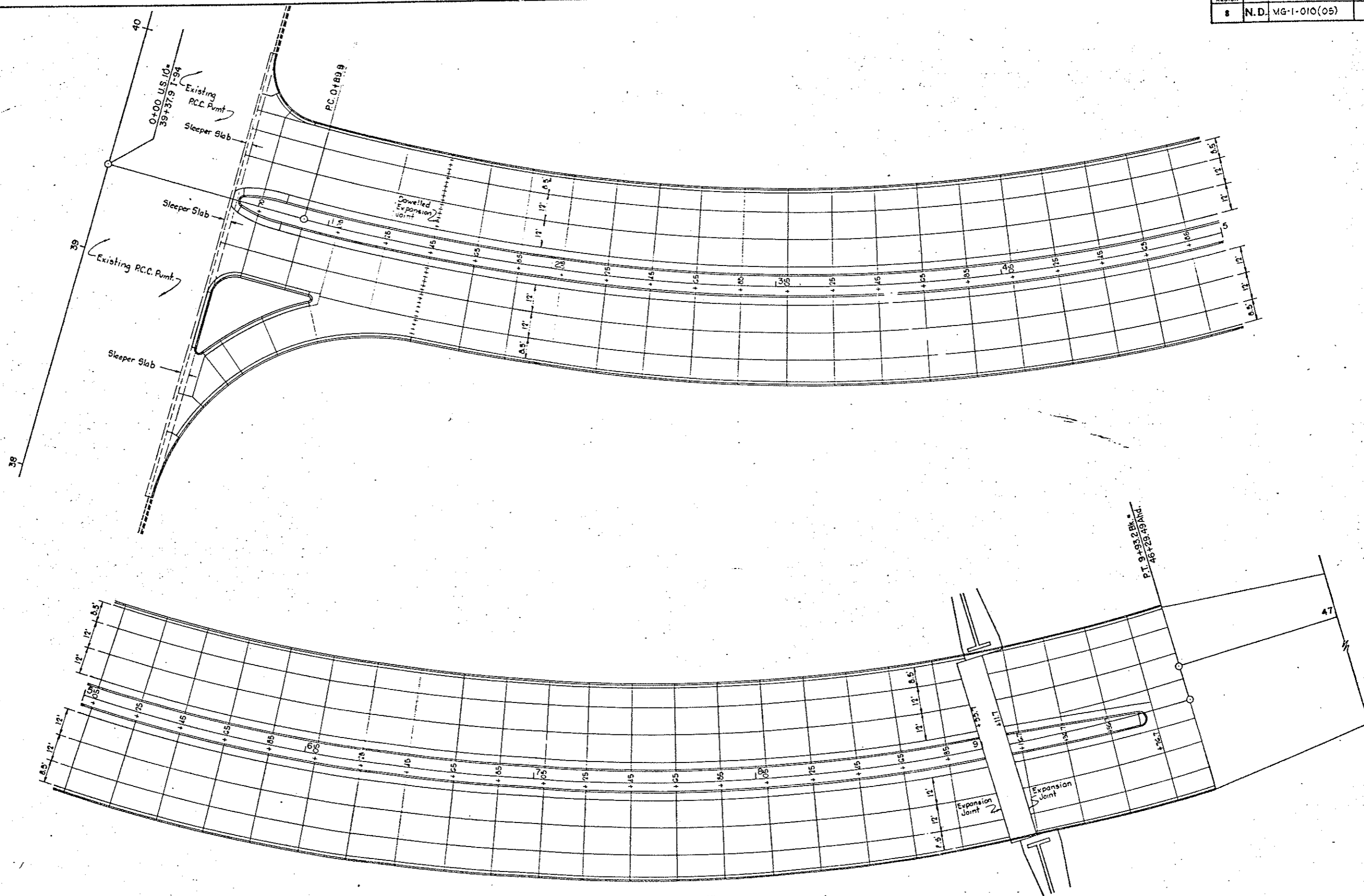
PRECAST MANHOLE BASE



STEP DETAIL

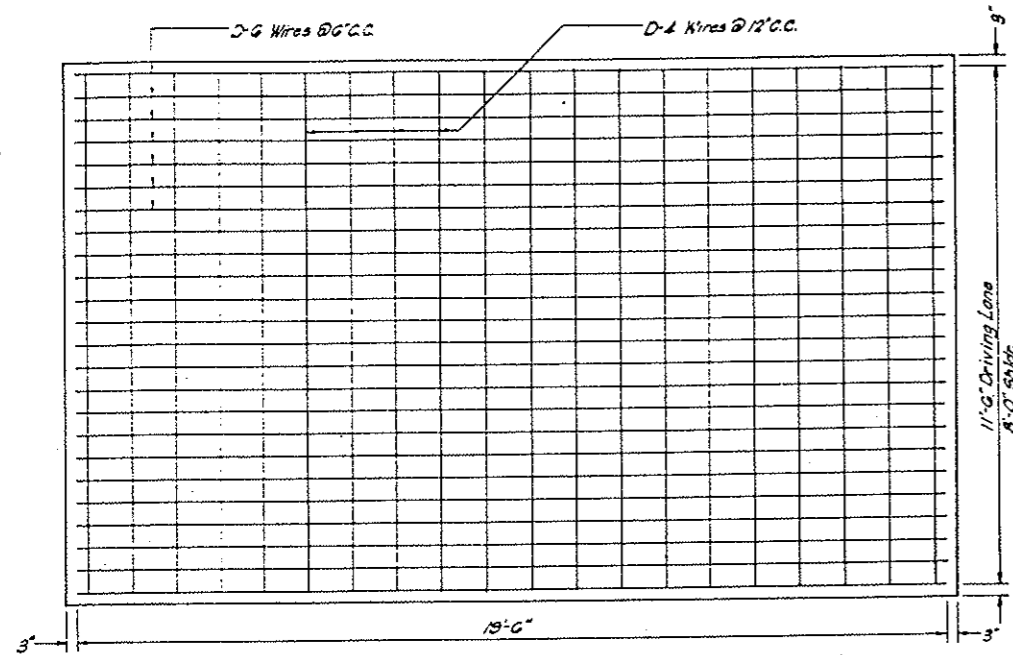


12-22-75		NORTH DAKOTA STATE HIGHWAY DEPARTMENT
REVISIONS		
DATE	CHANGE	Submitted: <i>Richard J. Kelly</i> Design Engineer
2-24-76	Step Dimensions	
		Recommended: _____ Asst. Chief Engineer Pre-Construction
		Approved: <i>Richard J. Kelly</i> Chief Engineer



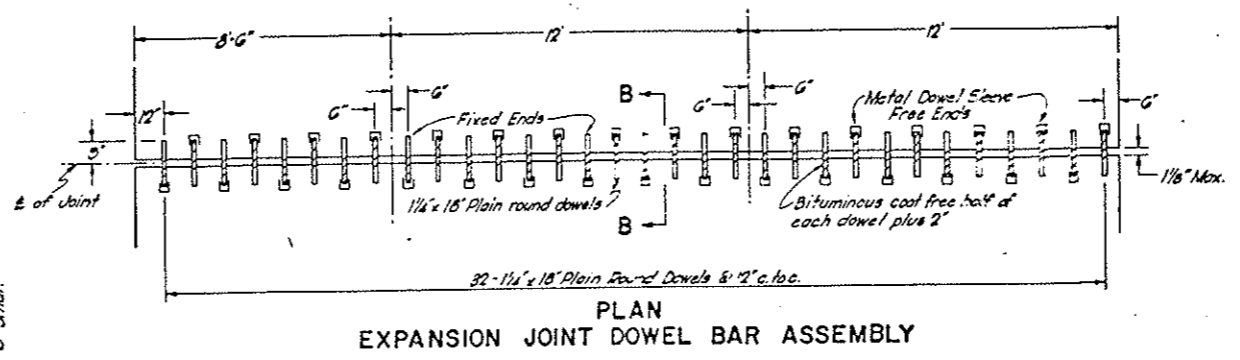
PAVEMENT JOINT LAYOUT

JOINT DETAILS

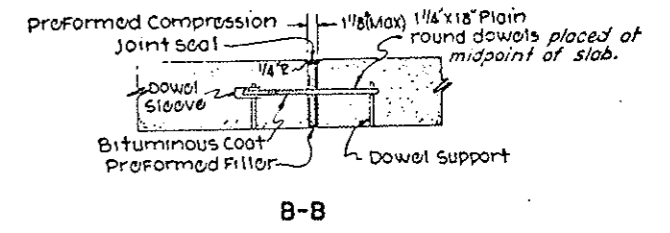


NOTE:
Place Mesh at mid-depth of slab.
An equivalent area of steel may be used if approved by the Engr.

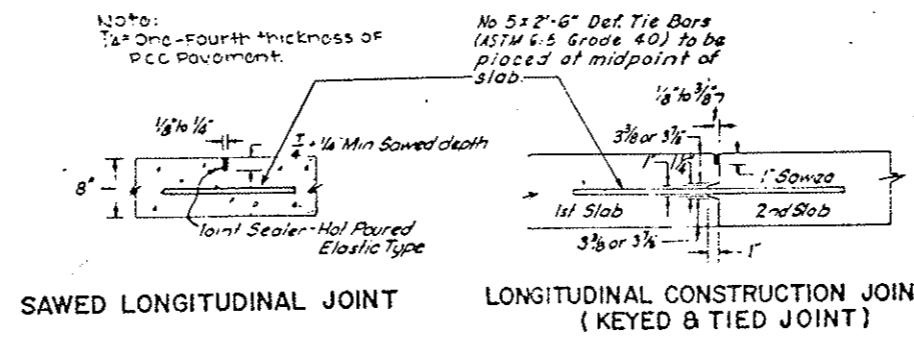
TYPICAL REINFORCED CONCRETE RDWY. PANEL WITH WELDED WIRE FABRIC



EXPANSION JOINT DOWEL BAR ASSEMBLY



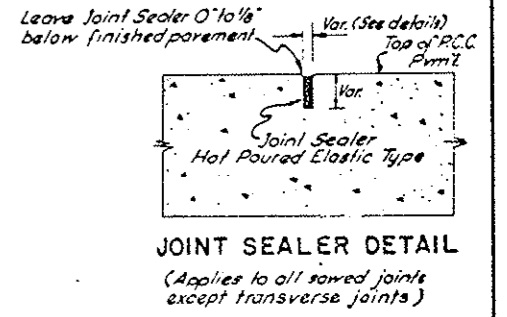
B-B



SAWED LONGITUDINAL JOINT

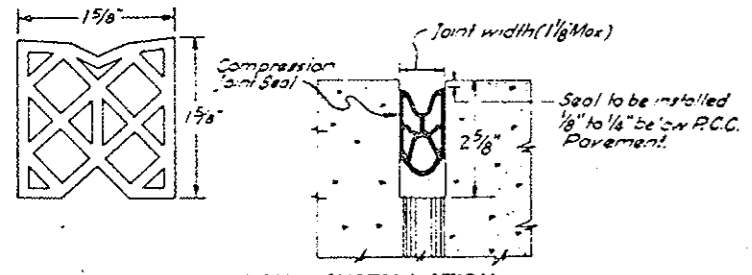
LONGITUDINAL CONSTRUCTION JOINT (KEYED & TIED JOINT)

Note: Bars to be spaced at approx 4'-0" C to C



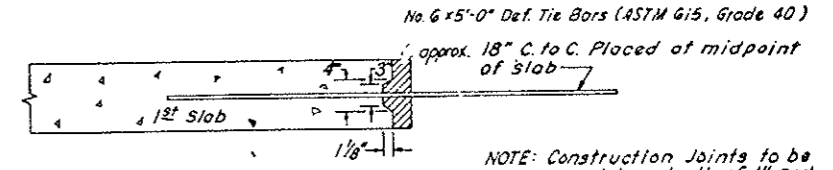
JOINT SEALER DETAIL

(Applies to all sawed joints except transverse joints)



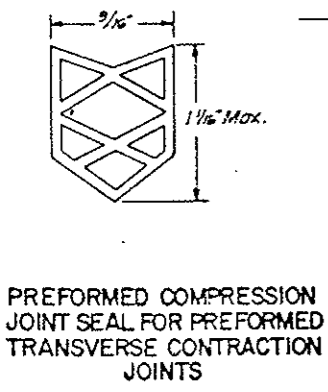
PREFORMED COMPRESSION JOINT SEAL FOR PRE-FORMED EXPANSION JOINT

INSTALLATION (Expansion Joint Seal)

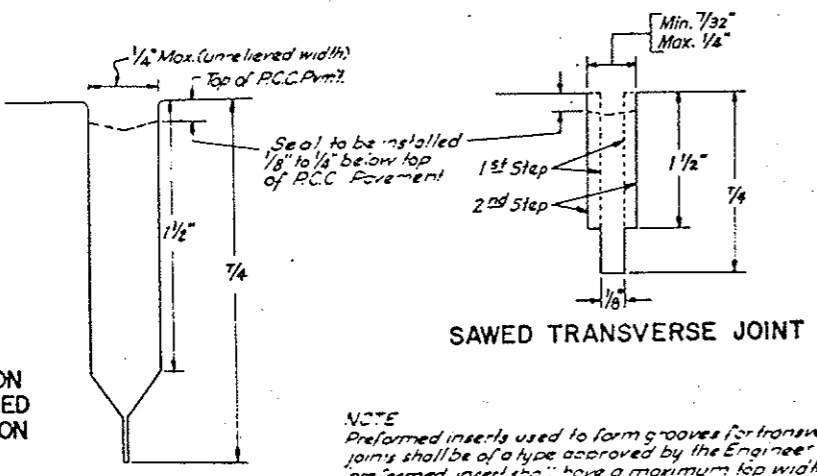


TRANSVERSE CONSTRUCTION JOINT (Keyed & Tied Joint)

NOTE: Construction Joints to be sawed to a depth of 1" and a width of 1/4" to 3/8" and sealed.

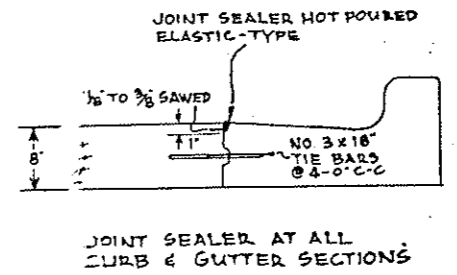


PREFORMED COMPRESSION JOINT SEAL FOR PREFORMED TRANSVERSE CONTRACTION JOINTS

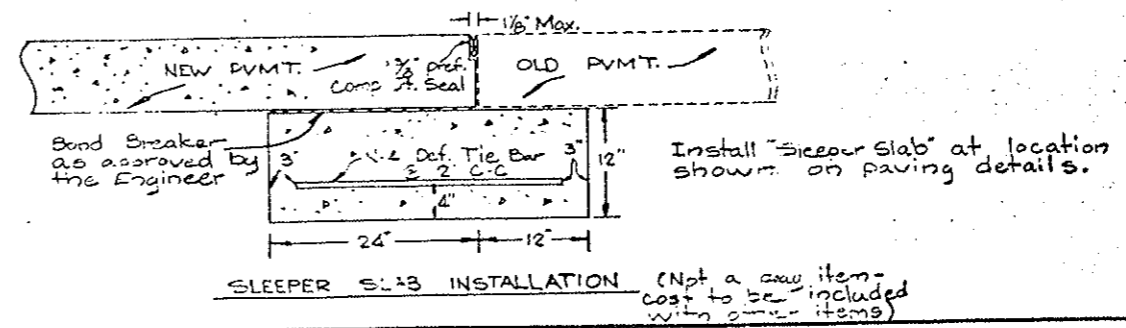


SAWED TRANSVERSE JOINT

NOTE
Preformed inserts used to form grooves for transverse joints shall be of a type approved by the Engineer. The preformed inserts shall have a maximum top width of 1/4" and a min depth of 2". The preformed insert shall form a groove so shaped that the top edge of the installed sealer will be 1/8" to 1/4" below the top edge of the PCC Pavmt. Transverse Joint may be sawed to dimensions shown in lieu of forming. Preformed compression joint seals of other shapes may be used. The shape and dimensions must be approved by the Engineer.



JOINT SEALER AT ALL CURB & GUTTER SECTIONS



SLEEPER SLAB INSTALLATION

(Not a new item - cost to be included with other items)

- INSTALL PERE PVC PIPE**
- 1+00-37' Lt. to 2+25-37' Lt. 3" x 150'
 - 1+20-37' Rt. to 3+05-37' Rt. 3" x 152'
 - 2+25-37' Lt. to 3+05-37' Rt. 3" x 154'
 - 2+25-37' Lt. to 4+20-37' Lt. 3" x 192'
 - 3+05-37' Rt. to 4+20-37' Lt. 3" x 217'
 - 4+20-37' Lt. to 7+50-37' Lt. 3" x 357'
- INSTALL MANHOLES**
- 3+05-37' Rt. 1-48"
 - 4+20-37' Lt. 1-48"

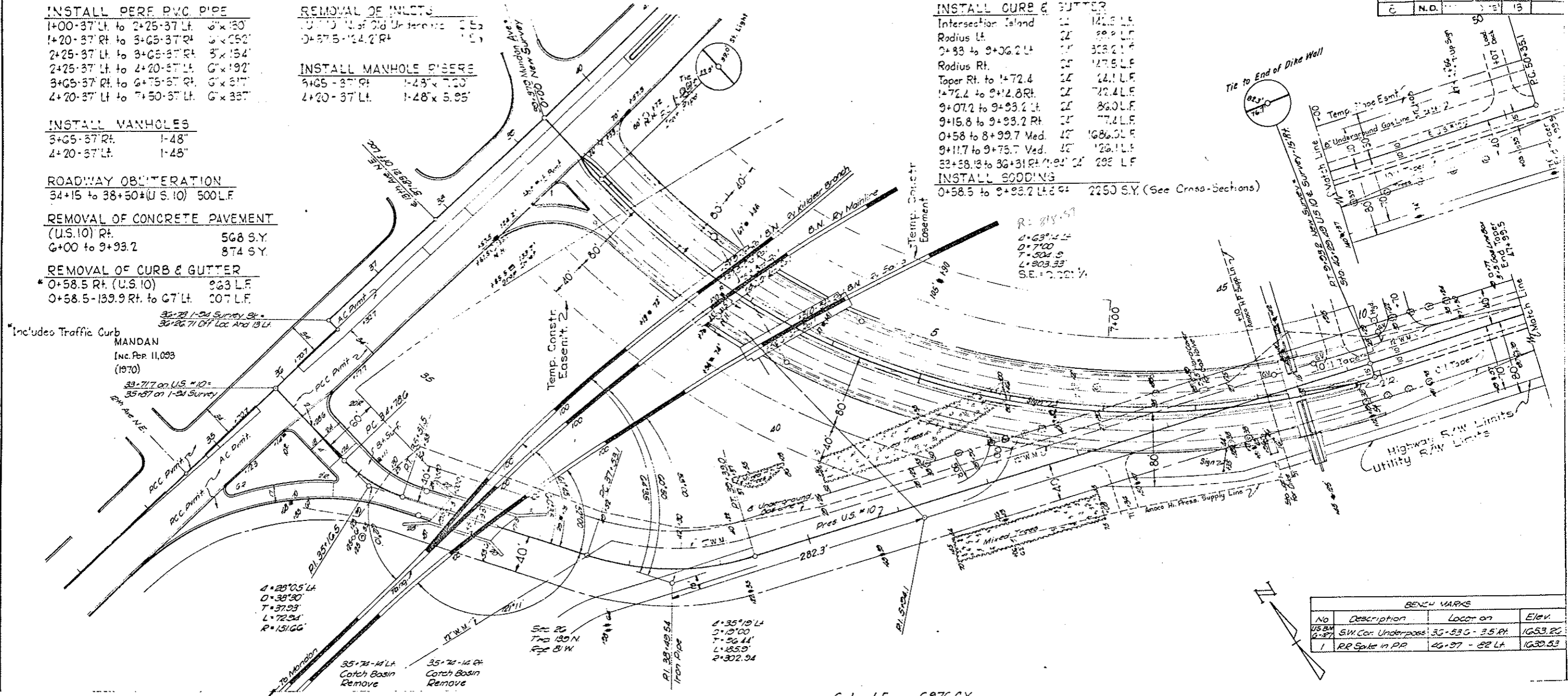
- REMOVAL OF INLETS**
- 0+57.5-124.2' Rt. 1-52"
 - 0+57.5-124.2' Rt. 1-52"
- INSTALL MANHOLE PIPERS**
- 3+05-37' Rt. 1-28" x 7.30'
 - 4+20-37' Lt. 1-28" x 5.95'

- ROADWAY OBSTRUCTION**
- 34+15 to 38+50 (U.S. 10) 500 L.F.
- REMOVAL OF CONCRETE PAVEMENT (U.S. 10) Rt.**
- G+00 to 9+93.2 568 S.Y.
 - G+00 to 9+93.2 874 S.Y.
- REMOVAL OF CURB & GUTTER**
- * 0+58.5 Rt. (U.S. 10) 963 L.F.
 - 0+58.5-139.9 Rt. to G7 Lt. 307 L.F.

- INSTALL CURB & GUTTER**
- Intersection Island 12 142.5 L.F.
 - Radius Lt. 22 39.2 L.F.
 - 0+83 to 9+06.2 Lt. 24 308.2 L.F.
 - Radius Rt. 25 127.8 L.F.
 - Taper Rt. to 1+72.4 24 24.1 L.F.
 - 1+72.4 to 9+12.8 Rt. 22 72.4 L.F.
 - 9+07.2 to 9+93.2 Lt. 22 86.0 L.F.
 - 9+15.8 to 9+93.2 Rt. 22 77.4 L.F.
 - 0+58 to 8+99.7 Med. 12 1686.0 L.F.
 - 9+11.7 to 9+75.7 Med. 12 126.1 L.F.
 - 33+58.13 to 36+31.1 Rt. (194') 24 282 L.F.
- INSTALL SODDING**
- 0+58.5 to 9+93.2 Lt. 2250 S.Y. (See Cross-Sections)

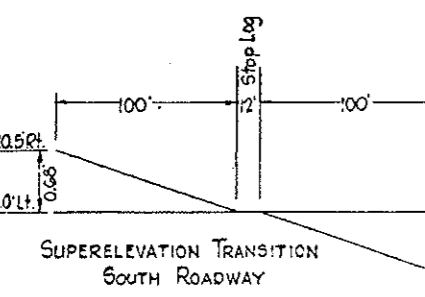
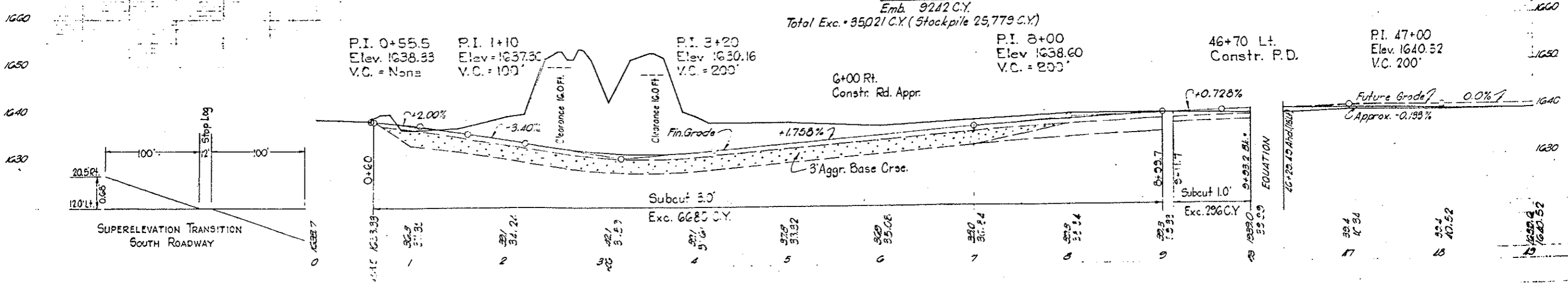
*Includes Traffic Curb

MANDAN
Inc. Per. 11,093
(1970)



No.	Description	Location	Elev.
US 84	S.W. Cor. Underpass	35+53.6 - 35.5 Rt.	1653.22
1	R.R. Spike in PP	46+97 - 98 Lt.	1639.53

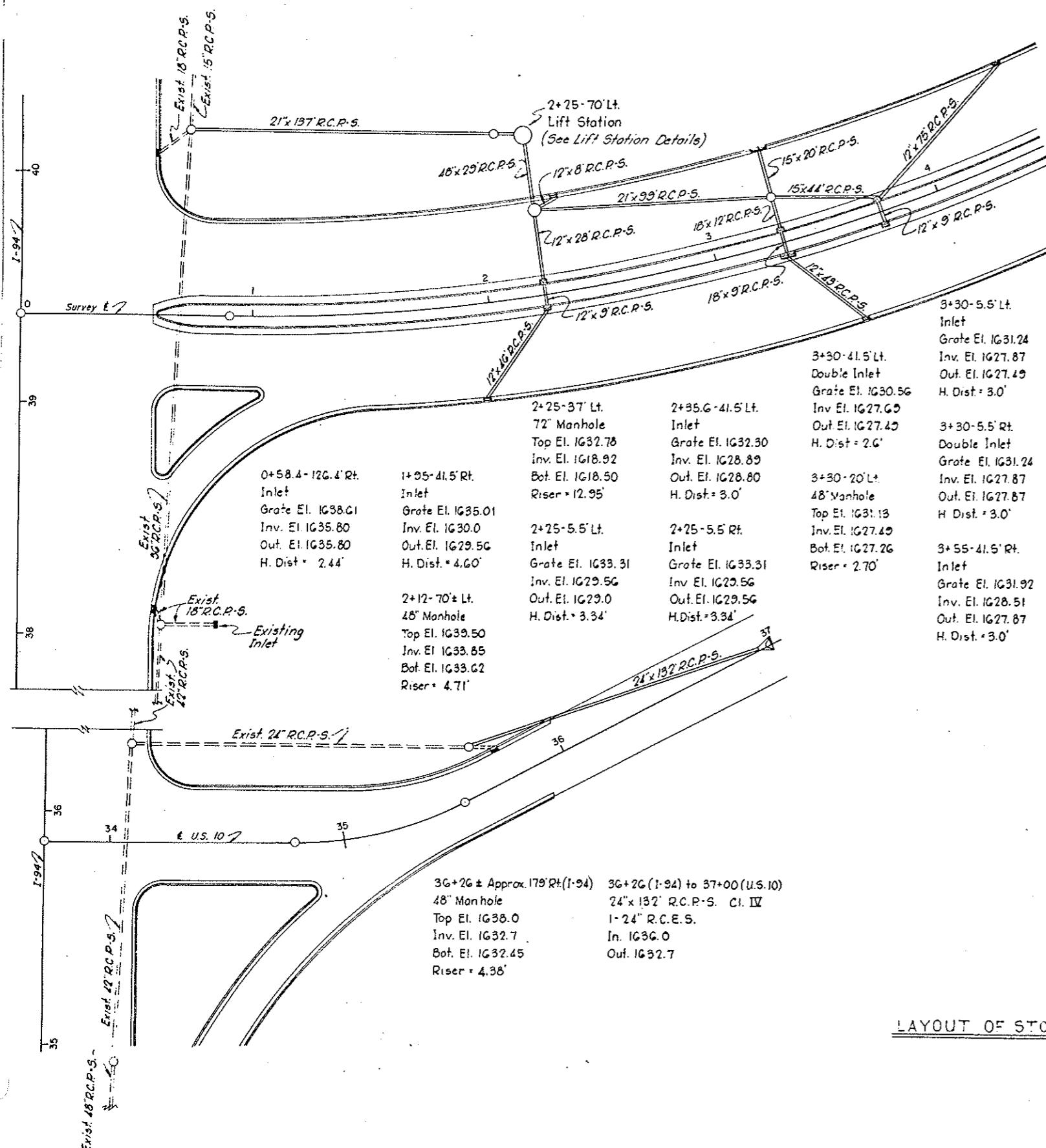
Subcut Exc. 6976 C.Y.
Exc. 28045 C.Y.
Emb. 9212 C.Y.
Total Exc. = 35021 C.Y. (Stockpile 25,779 C.Y.)



Subcut 3.0
Exc. 6680 C.Y.

Subcut 1.0
Exc. 296 C.Y.

Future Grade 0.0%
Approx. -0.199%



INSTALL MANHOLES

3G+26 ± Approx. 179 Rt. (I-94)	1-48"
2+12 - 70 ± Lt.	1-48"
2+25 - 37 Lt.	1-72"
3+30 - 20 Lt.	1-48"

INSTALL MANHOLE RISERS

3G+26 ± Approx. 179 Rt. (I-94)	1-48" x 4.38'
2+12 - 70 ± Lt.	1-48" x 4.71'
2+25 - 37 Lt.	1-72" x 12.95'
3+30 - 20 Lt.	1-48" x 2.70'

INSTALL INLETS

0+58.4 - 126.4 Rt.	1-Ea.
1+95 - 41.5 Lt.	1-Ea.
2+25 - 5.5 Lt.	1-Ea.
2+25 - 5.5 Rt.	1-Ea.
2+35.6 - 41.5 Lt.	1-Ea.
3+30 - 5.5 Lt.	1-Ea.
3+55 - 41.5 Rt.	1-Ea.
3+75 - 5.5 Lt.	1-Ea.
3+75 - 5.5 Rt.	1-Ea.
4+45 - 41.5 Lt.	1-Ea.

INSTALL DOUBLE INLETS

3+30 - 41.5 Lt.	1-Ea.
3+30 - 5.5 Rt.	1-Ea.

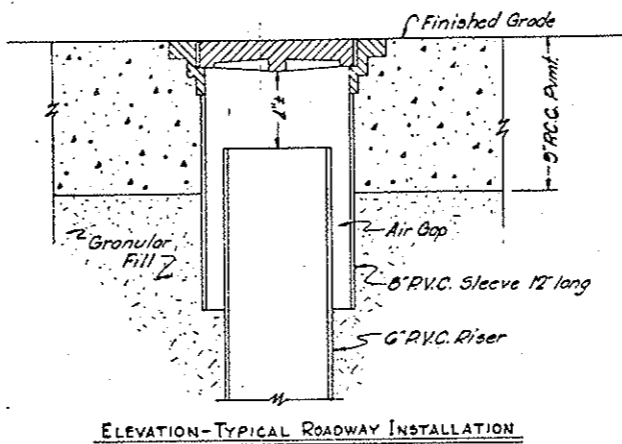
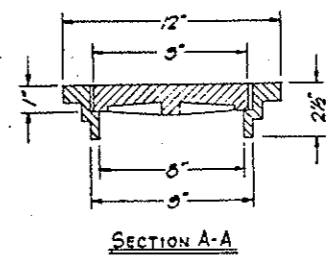
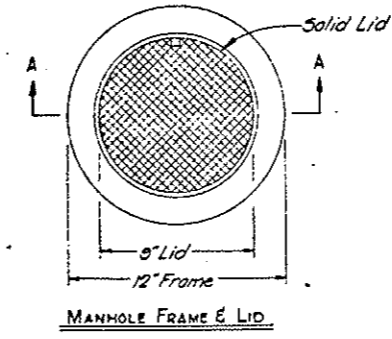
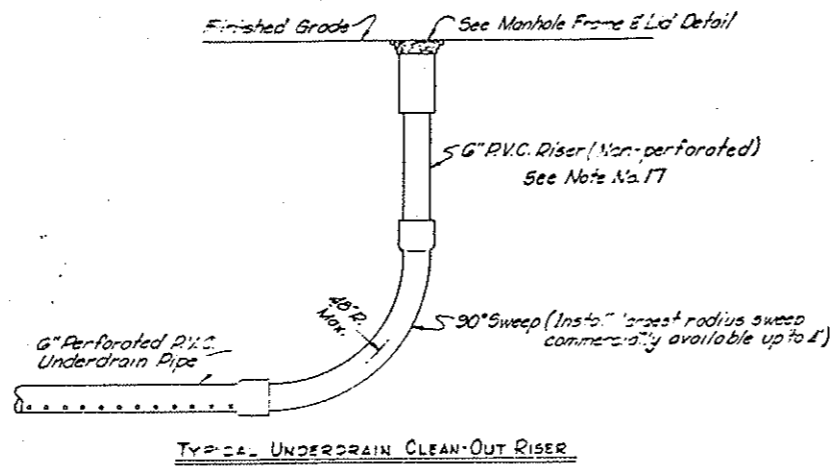
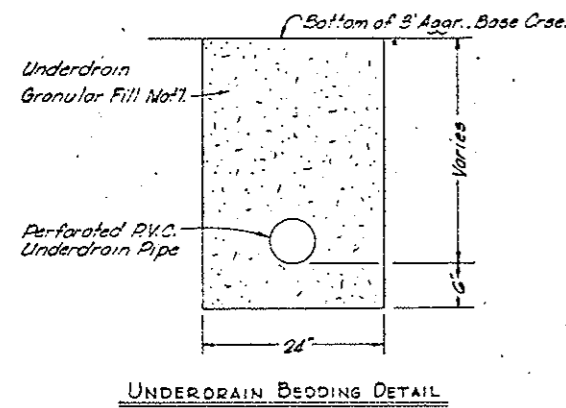
INSTALL R.C.P.-SEWER

0+72 to 2+12 Lt.	21" x 137' Cl. III
1+95 to 2+25 Rt.	12" x 46' Cl. III
2+25 - 5.5 Rt. to 5.5 Lt.	12" x 9' Cl. III
2+25 - 5.5 Lt. to 37 Lt.	12" x 28' Cl. III
2+25 - 37 Lt. to 70 Lt.	48" x 29' Cl. II
2+25 to 2+35.6 Lt.	12" x 8' Cl. III
2+25 to 3+30 Lt.	21" x 99' Cl. III
3+30 to 3+55 Rt.	12" x 43' Cl. III
3+30 - 5.5 Rt. to 5.5 Lt.	18" x 9' Cl. III
3+30 - 5.5 Lt. to 20 Lt.	18" x 12' Cl. III
3+30 - 20 Lt. to 41.5 Lt.	15" x 20' Cl. III
3+30 to 3+75 Lt.	15" x 44' Cl. III
3+75 - 5.5 Rt. to 5.5 Lt.	12" x 9' Cl. III
3+75 to 4+45 Lt.	12" x 75' Cl. III
3G+26 (I-94) to 37+00 (U.S. 10)	24" x 132' Cl. IV 1-R.C.E.S.

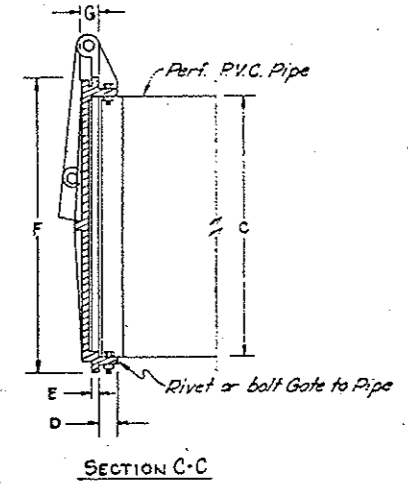
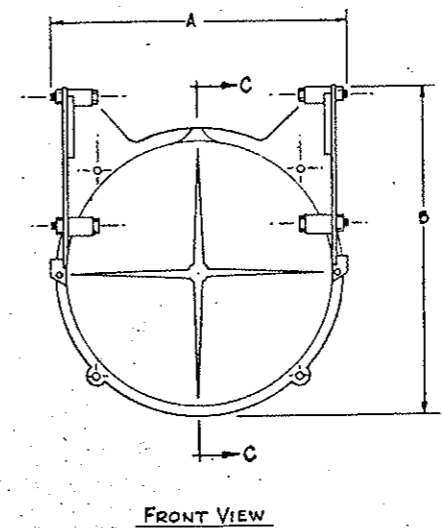
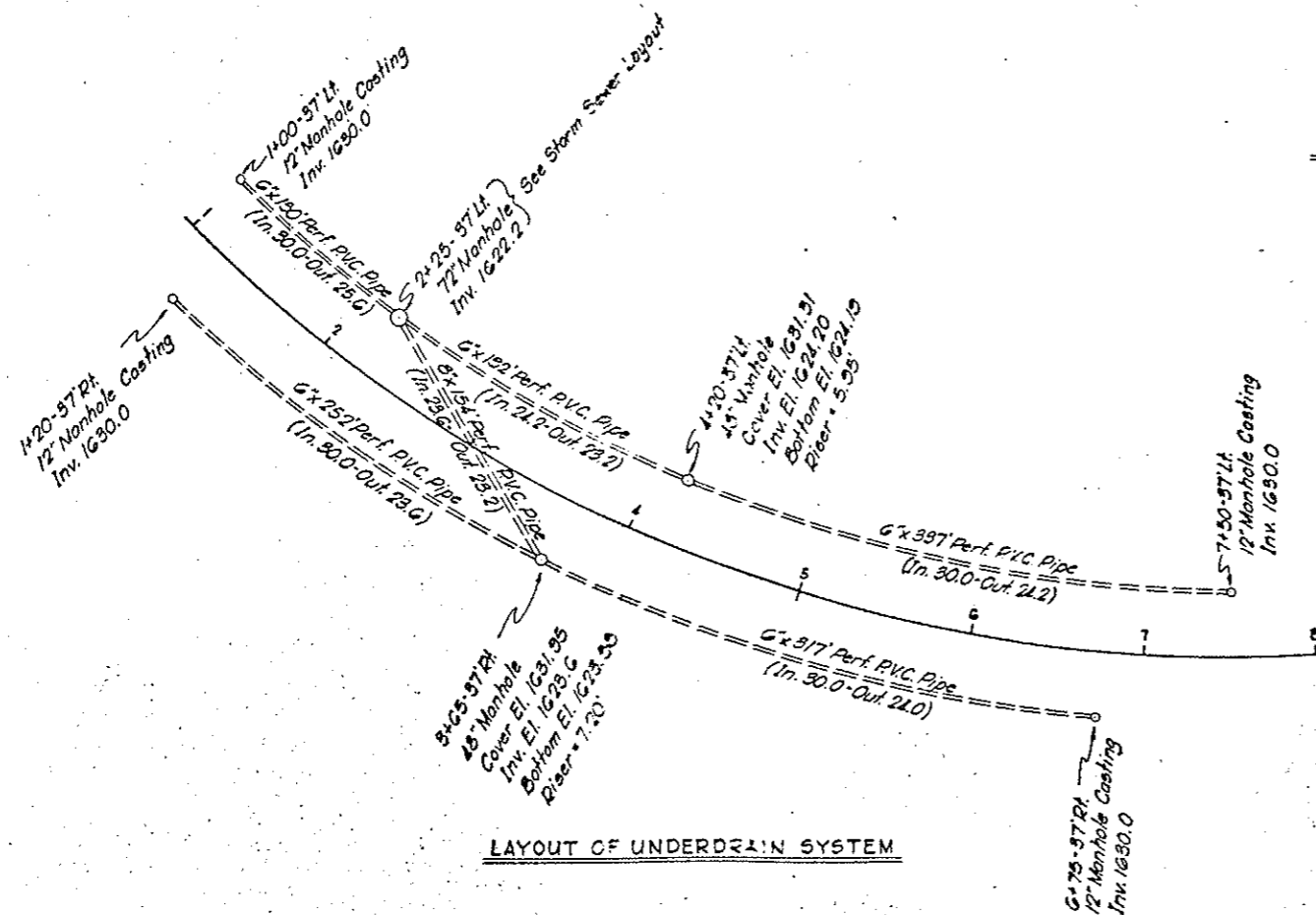
3G+26 ± Approx. 179 Rt. (I-94)
48" Manhole
Top El. 1G38.0
Inv. El. 1G32.7
Bot. El. 1G32.45
Riser = 4.38'

3G+26 (I-94) to 37+00 (U.S. 10)
24" x 132' R.C.P.-S. Cl. IV
1-24" R.C.E.S.
In. 1G36.0
Out. 1G32.7

LAYOUT OF STORM SEWER SYSTEM



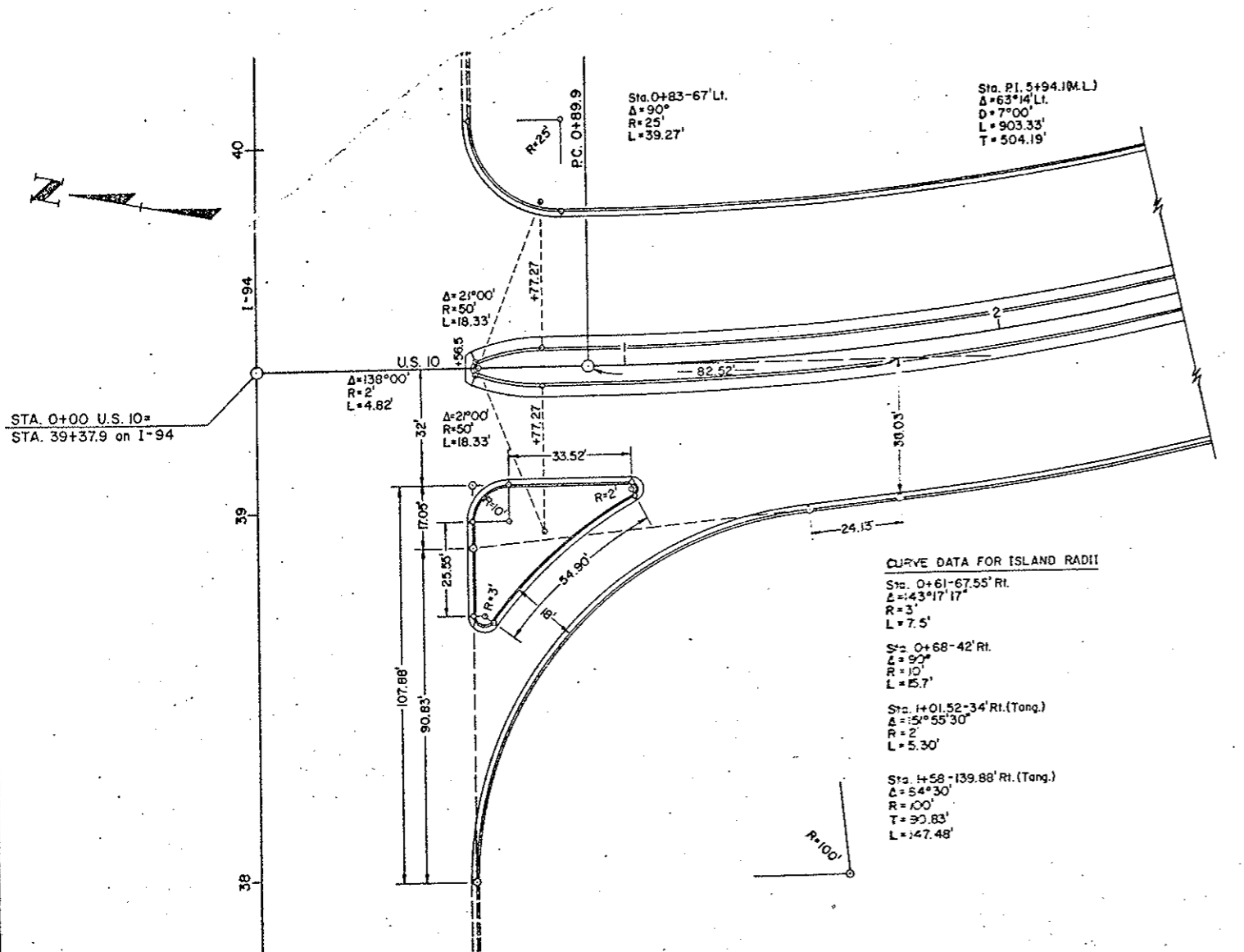
NOTE:
Cost of Sweep, Manhole Frame & Lid and Flap Gates to be included in price bid for "Perf. P.V.C. Pipe."



GATE SIZE	A	B	C	D	E	F	G
6" Dia.	8 5/8	8 5/8	6 3/8	7/8	1/4	7 1/4	7/8
8" Dia.	11 1/4	11 1/8	8 1/4	1 1/8	3/8	10	1 1/8

All dimensions in inches.

DETAIL OF FLAP GATE
Flap Gates to be installed on ends of Perf. P.V.C. Pipes in Manhole Sta. 2125-97' Lt.



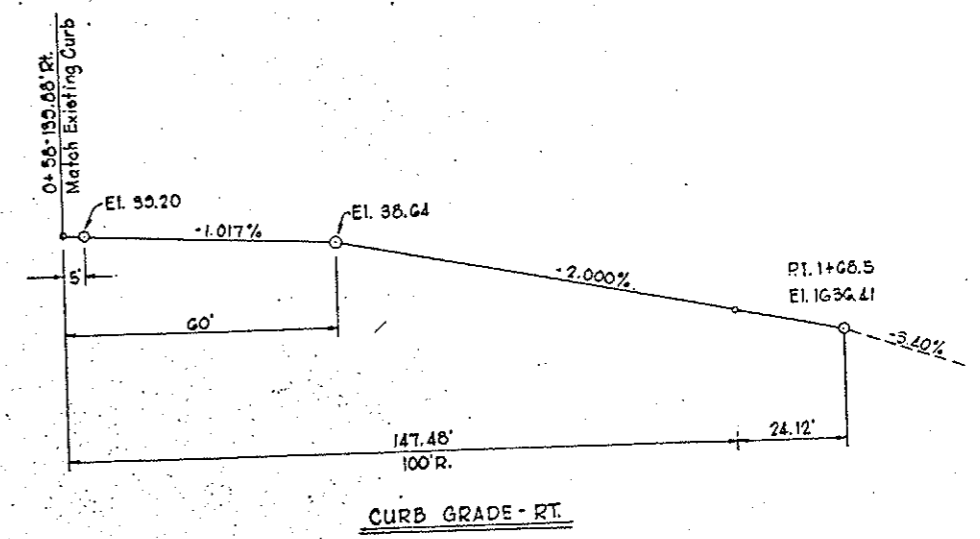
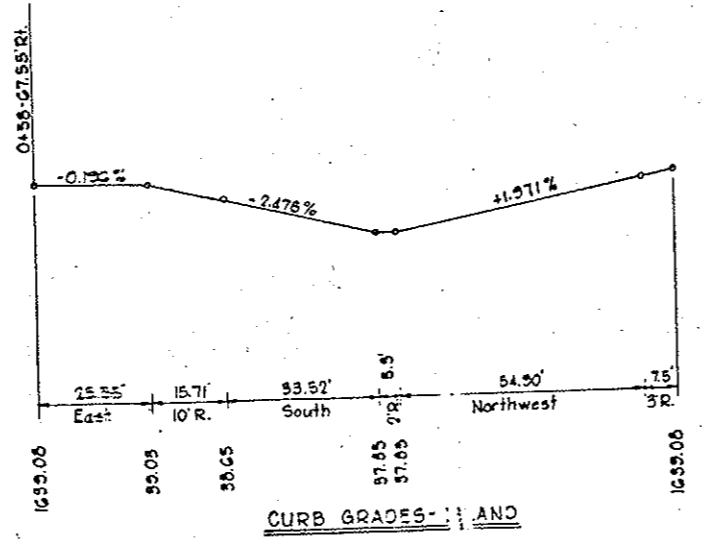
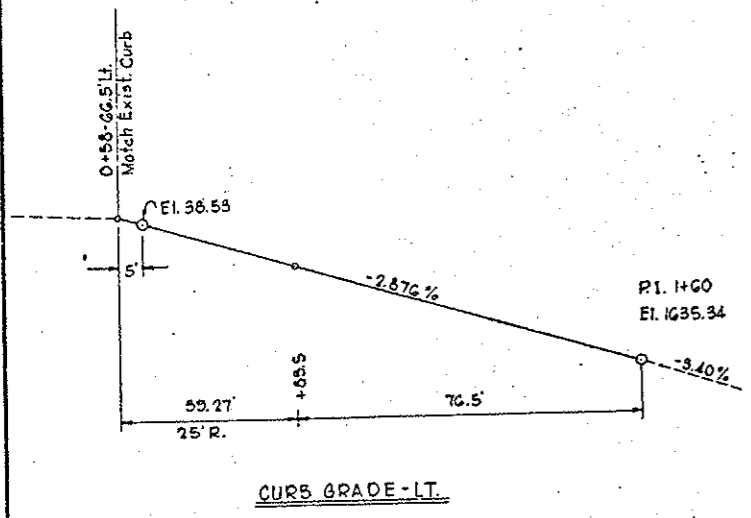
CURVE DATA FOR ISLAND RADII

Sta. 0+61-67.55' Rt.
 $\Delta = 43^\circ 17' 17''$
 $R = 3'$
 $L = 7.5'$

Sta. 0+68-42' Rt.
 $\Delta = 90^\circ$
 $R = 10'$
 $L = 5.7'$

Sta. 1+01.52-34' Rt. (Tang.)
 $\Delta = 54^\circ 55' 30''$
 $R = 2'$
 $L = 5.30'$

Sta. 1+58-139.88' Rt. (Tang.)
 $\Delta = 54^\circ 30''$
 $R = \infty$
 $T = 30.83'$
 $L = 147.48'$

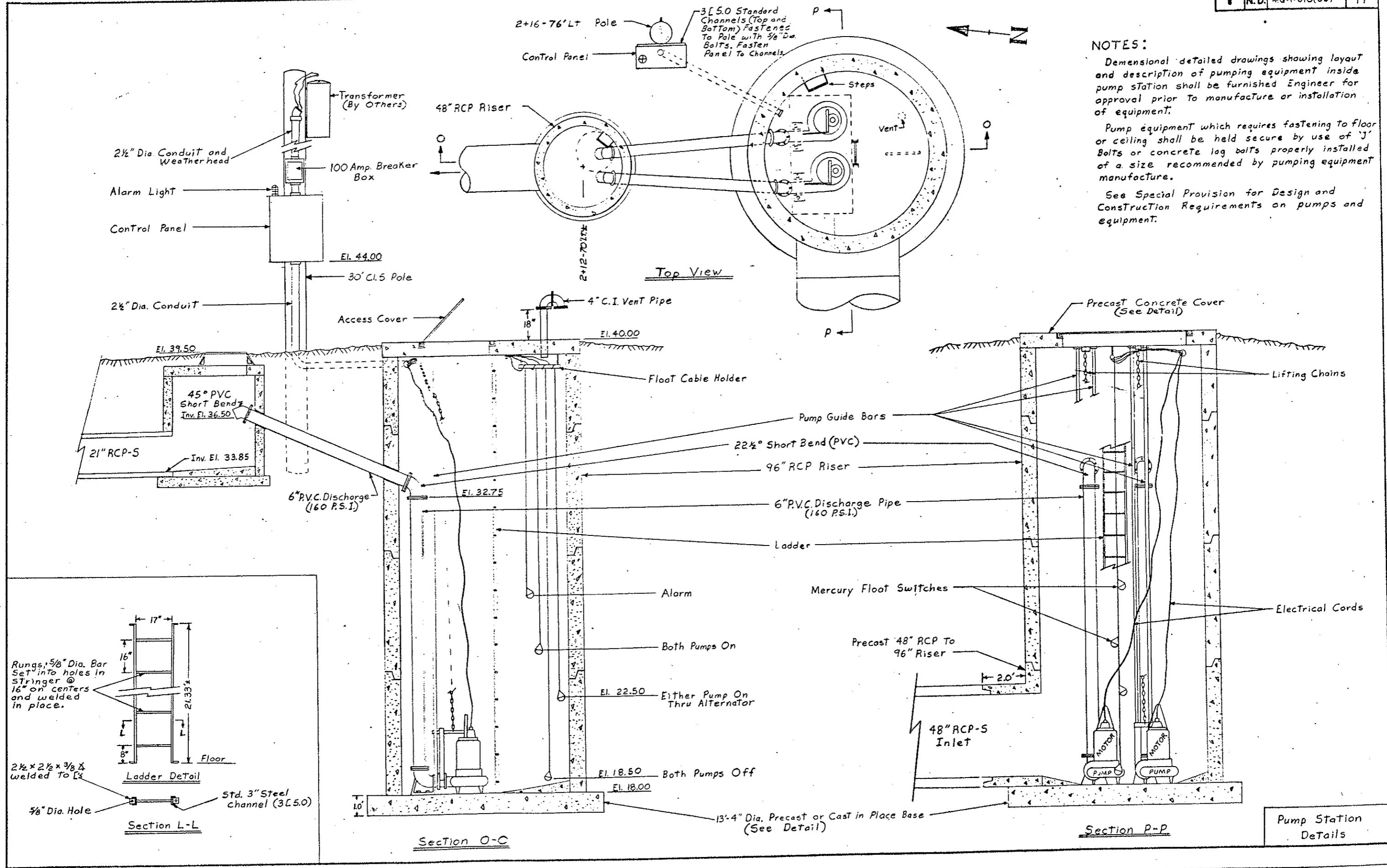


NOTES:

Dimensional detailed drawings showing layout and description of pumping equipment inside pump station shall be furnished Engineer for approval prior to manufacture or installation of equipment.

Pump equipment which requires fastening to floor or ceiling shall be held secure by use of 'J' Bolts or concrete lag bolts properly installed of a size recommended by pumping equipment manufacture.

See Special Provision for Design and Construction Requirements on pumps and equipment.

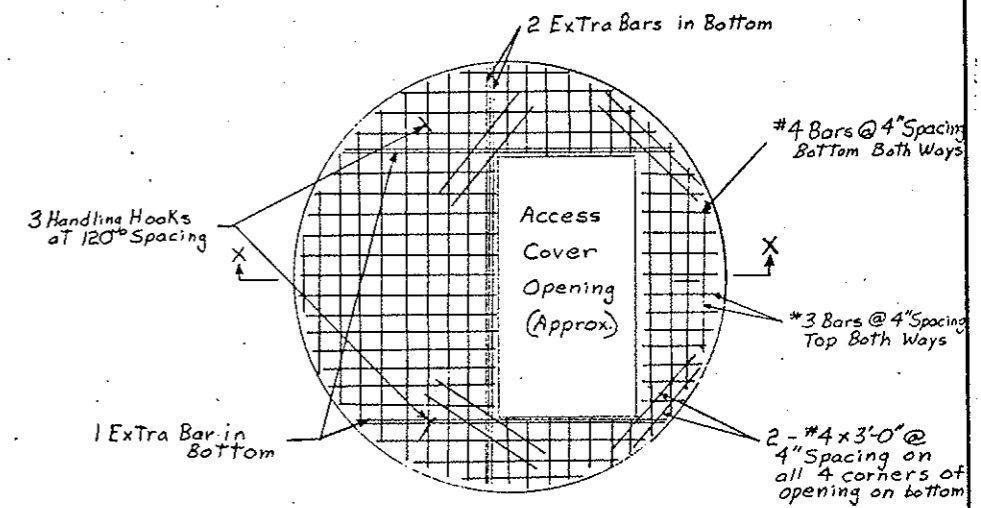


Notes:

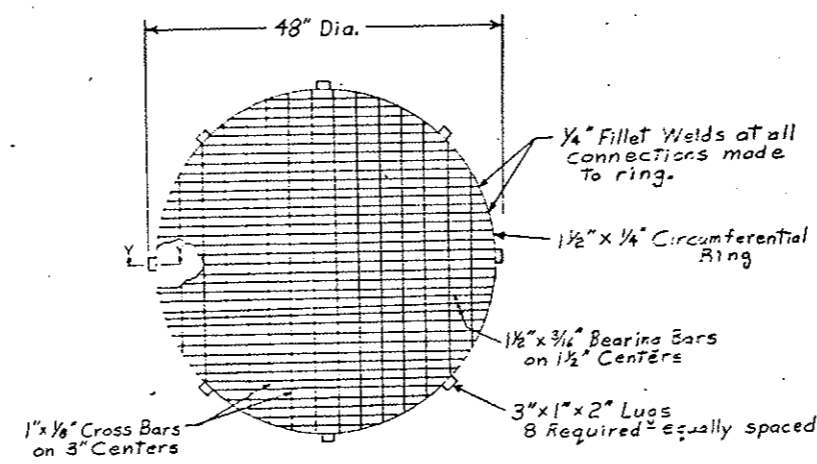
The dimensions and location of access cover opening in pump station concrete cover will have to be determined by pumping equipment supplier so as to assure easy removal of slide-out type pumps through opening.

Trash grate shall be constructed of aluminum alloy members joined together by the "pressure-lock" type construction. Grate bar spacing may vary from dimensions shown, in order to obtain a ready-made commercially available grate size, with area of opening between 4 to 5 square inches. All material, labor, equipment, and hardware necessary for installation of trash grate shall be included as incidental to price. bid for "48 in. Rein. Conc. Pipe-Sewer Cl. III."

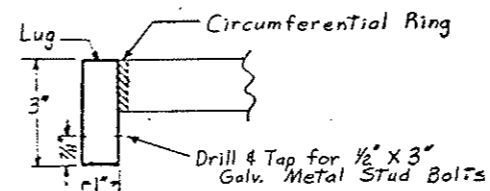
The limits of the concrete level at the bottom of pump station shall be determined by Engineer in the field.



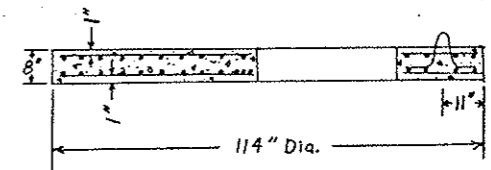
Pump Station Cover
Top View



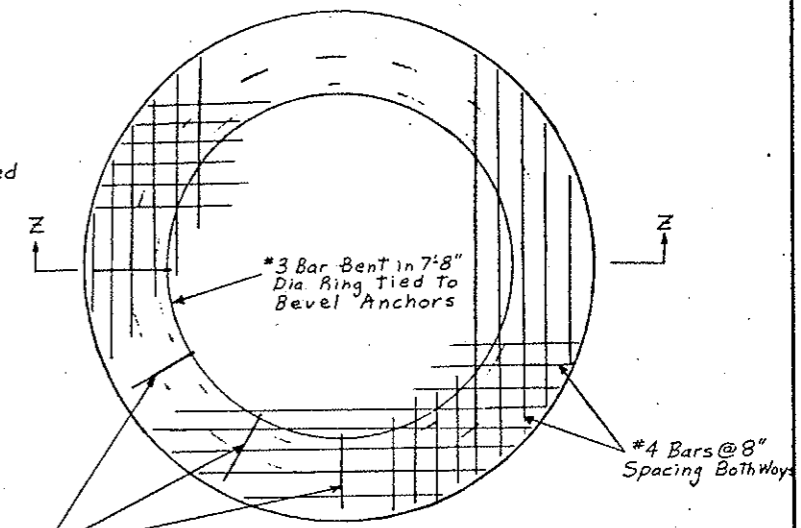
Aluminum Trash Grate Detail
(See Notes)



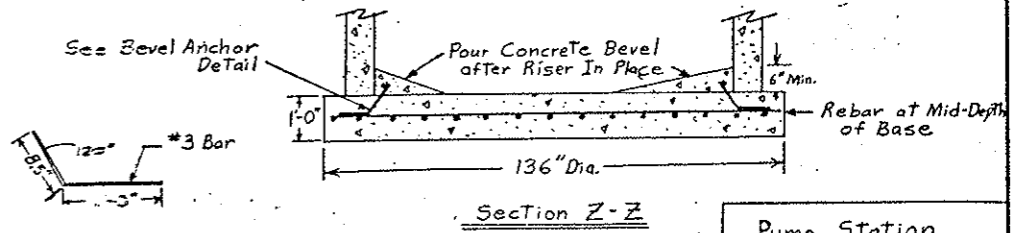
Section Y-Y



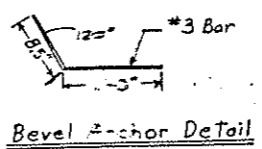
Section X-X



Pump Station Base
Top View



Section Z-Z

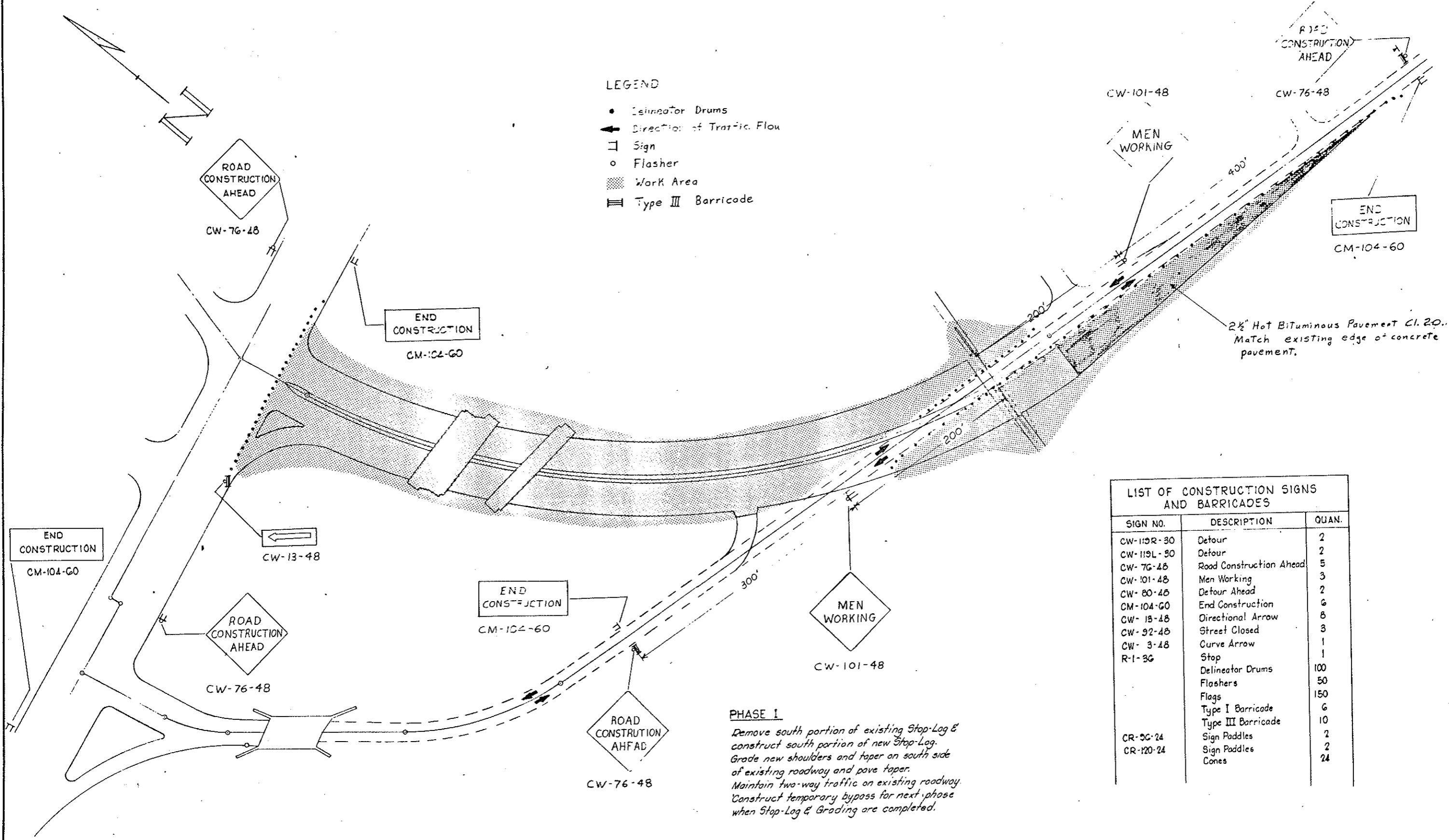


Bevel Anchor Detail

Pump Station Base & Cover Details

CONSTRUCTION SIGNING

- LEGEND**
- Delineator Drums
 - ← Direction of Traffic Flow
 - Sign
 - Flasher
 - ▨ Work Area
 - ≡ Type III Barricade



LIST OF CONSTRUCTION SIGNS AND BARRICADES

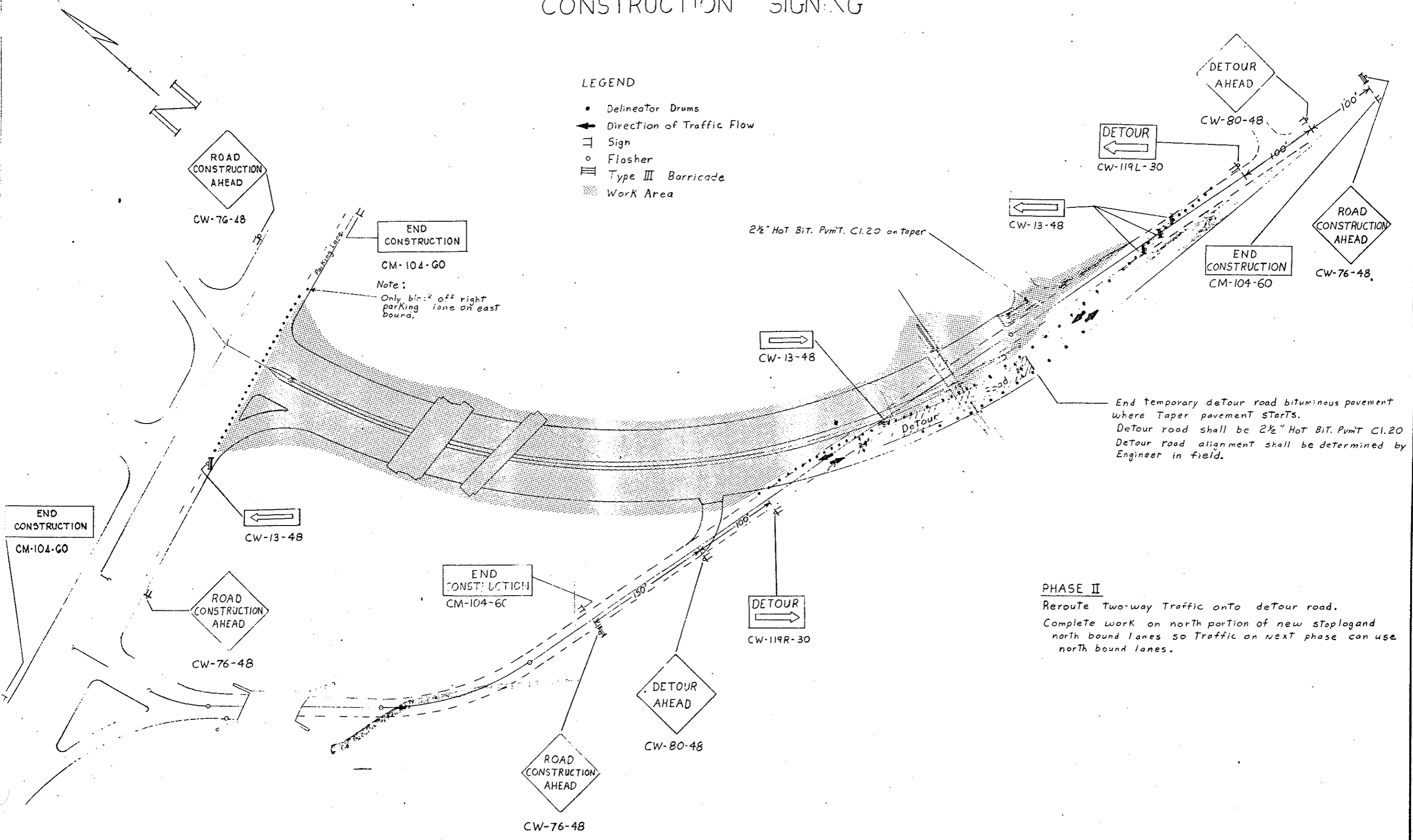
SIGN NO.	DESCRIPTION	QUAN.
CW-119R-30	Detour	2
CW-119L-30	Detour	2
CW-76-48	Road Construction Ahead	5
CW-101-48	Men Working	3
CW-80-48	Detour Ahead	2
CM-104-60	End Construction	6
CW-15-48	Directional Arrow	8
CW-92-48	Street Closed	3
CW-3-48	Curve Arrow	1
R-1-36	Stop	1
	Delineator Drums	100
	Flashers	50
	Flags	150
	Type I Barricade	6
	Type III Barricade	10
CR-5C-24	Sign Paddles	2
CR-120-24	Sign Paddles	2
	Cones	24

PHASE I
 Remove south portion of existing Stop-Lag & construct south portion of new Stop-Lag. Grade new shoulders and taper on south side of existing roadway and pave taper. Maintain two-way traffic on existing roadway. Construct temporary bypass for next phase when Stop-Lag & Grading are completed.

CONSTRUCTION SIGNING

LEGEND

- Delineator Drums
- ← Direction of Traffic Flow
- Sign
- Flasher
- ≡ Type III Barricade
- ▨ Work Area



END CONSTRUCTION
CM-104-60
Note:
Only block off right parking lane on east bound.

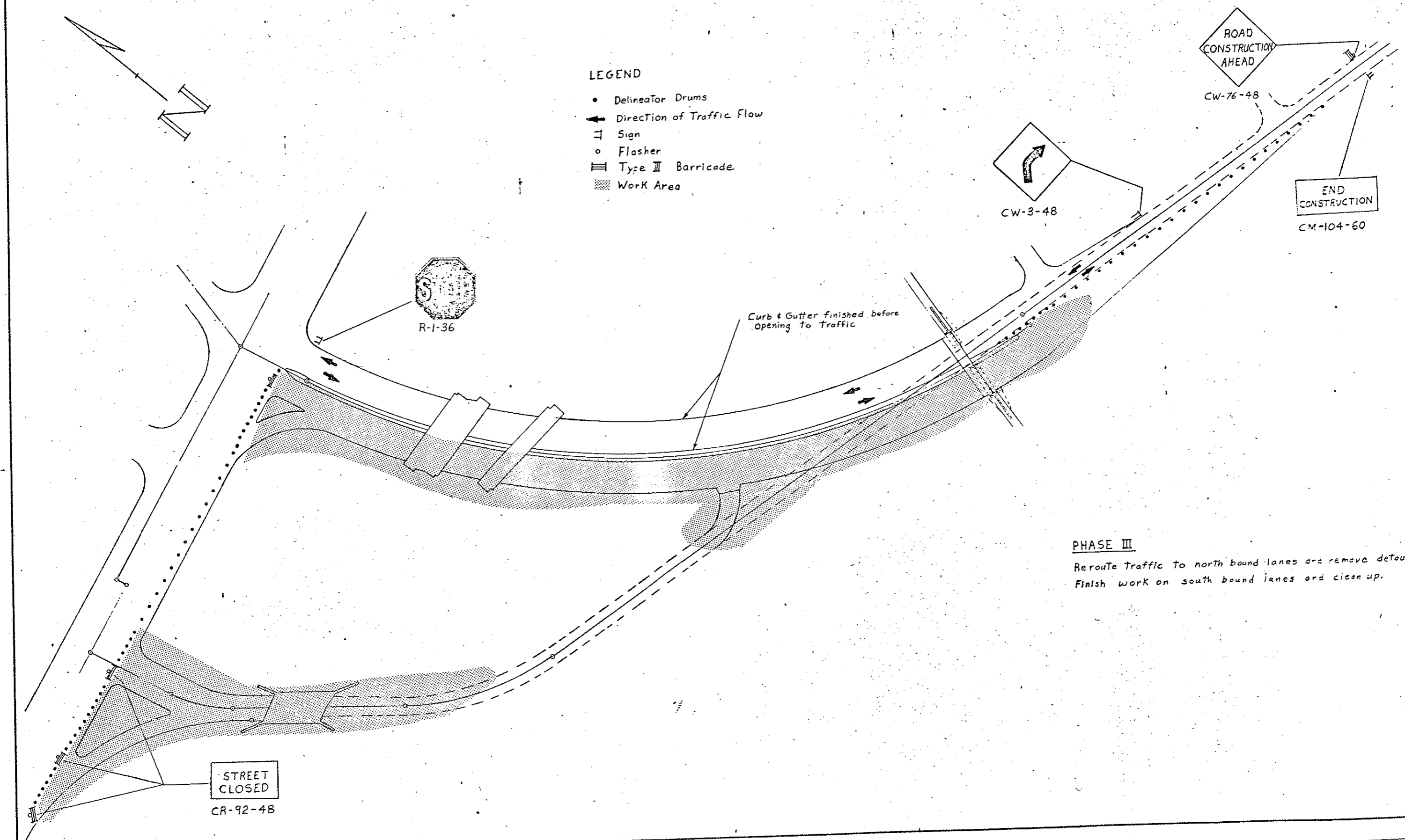
End temporary detour road bituminous pavement where Taper pavement starts.
Detour road shall be 2 1/2" Hot Bit. PvmT. C1.20
Detour road alignment shall be determined by Engineer in field.

PHASE II
Reroute two-way traffic onto detour road.
Complete work on north portion of new stoplog and north bound lanes so traffic on next phase can use north bound lanes.

CONSTRUCTION SIGNING

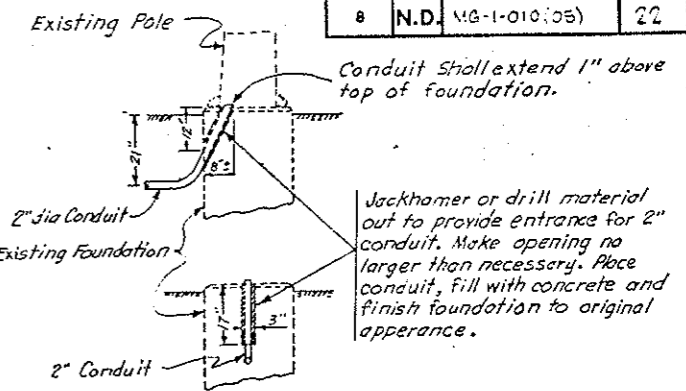
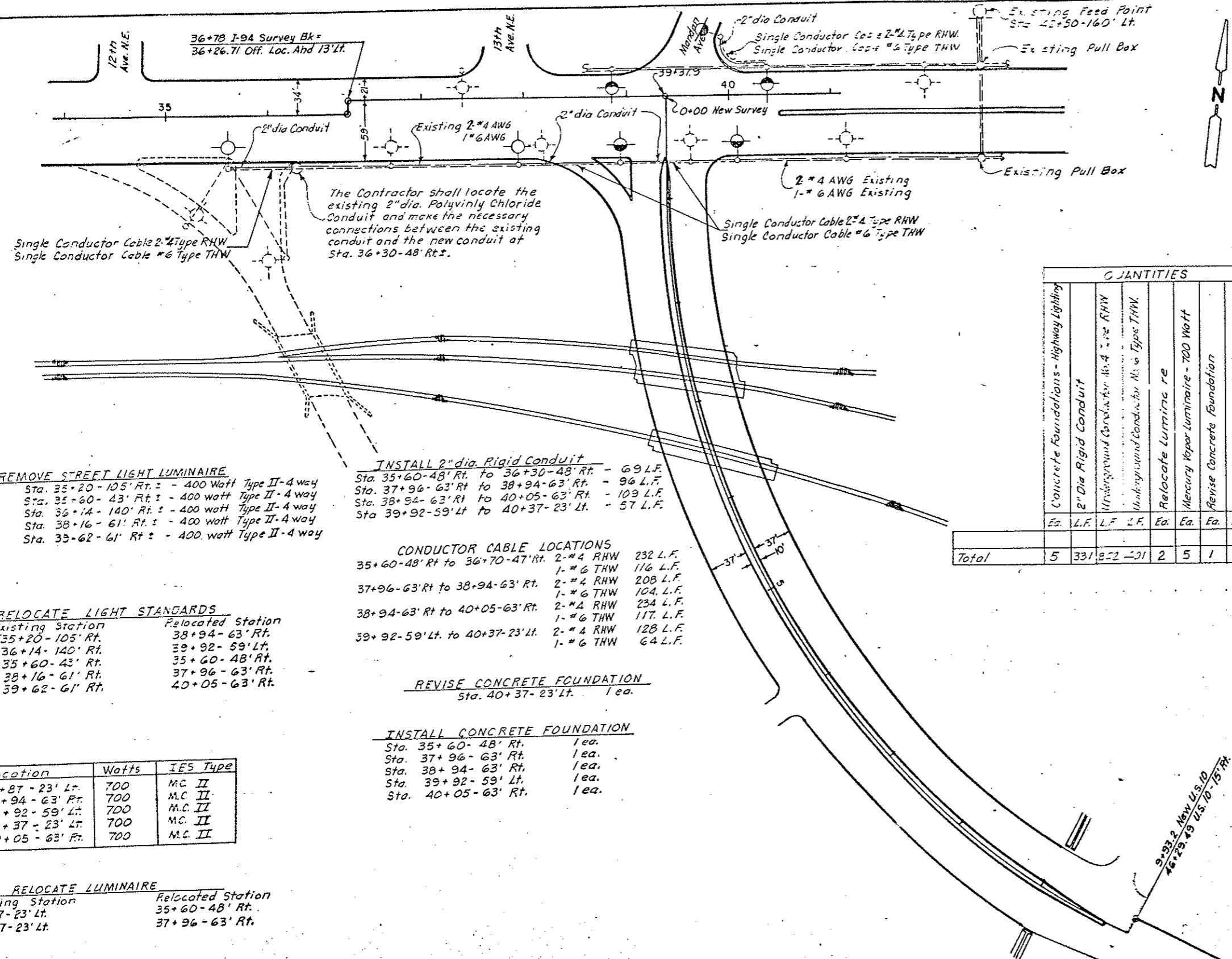
LEGEND

- Delineator Drums
- ➔ Direction of Traffic Flow
- Sign
- Flasher
- ≡ Type III Barricade
- ▨ Work Area



PHASE III

Reroute traffic to north bound lanes and remove detour.
 Finish work on south bound lanes and clean up.



QUANTITIES

	Concrete Foundations - Highway Lighting	2" Dia Rigid Conduit	Underground Conductor No. 4 Type RHW	Underground Conductor No. 6 Type THW	Relocate Luminaire	Mercury Vapor Luminaire - 700 Watt	Revise Concrete Foundation	Relocate Light Standards	Relocate Street Light Luminaire
	Ea.	L.F.	L.F.	L.F.	Ea.	Ea.	Ea.	Ea.	Ea.
Total	5	331	952	21	2	5	1	5	5

REMOVE STREET LIGHT LUMINAIRE
 Sta. 35+20-105' Rt. - 400 watt Type II-4 way
 Sta. 35+60-43' Rt. - 400 watt Type II-4 way
 Sta. 36+14-140' Rt. - 400 watt Type II-4 way
 Sta. 38+16-61' Rt. - 400 watt Type II-4 way
 Sta. 39+62-61' Rt. - 400 watt Type II-4 way

INSTALL 2" dia. Rigid Conduit
 Sta. 35+60-48' Rt. to 36+30-48' Rt. - 69 L.F.
 Sta. 37+96-63' Rt. to 38+94-63' Rt. - 96 L.F.
 Sta. 38+94-63' Rt. to 40+05-63' Rt. - 109 L.F.
 Sta. 39+92-59' Lt. to 40+37-23' Lt. - 57 L.F.

CONDUCTOR CABLE LOCATIONS
 35+60-48' Rt. to 36+70-47' Rt. 2#4 RHW 232 L.F.
 1#6 THW 116 L.F.
 37+96-63' Rt. to 38+94-63' Rt. 2#4 RHW 208 L.F.
 1#6 THW 104 L.F.
 38+94-63' Rt. to 40+05-63' Rt. 2#4 RHW 234 L.F.
 1#6 THW 117 L.F.
 39+92-59' Lt. to 40+37-23' Lt. 2#4 RHW 128 L.F.
 1#6 THW 64 L.F.

REVISE CONCRETE FOUNDATION
 Sta. 40+37-23' Lt. 1 ea.

INSTALL CONCRETE FOUNDATION
 Sta. 35+60-48' Rt. 1 ea.
 Sta. 37+96-63' Rt. 1 ea.
 Sta. 38+94-63' Rt. 1 ea.
 Sta. 39+92-59' Lt. 1 ea.
 Sta. 40+05-63' Rt. 1 ea.

RELOCATE LIGHT STANDARDS

Existing Station	Relocated Station
35+20-105' Rt.	38+94-63' Rt.
36+14-140' Rt.	39+92-59' Lt.
35+60-43' Rt.	35+60-48' Rt.
38+16-61' Rt.	37+96-63' Rt.
39+62-61' Rt.	40+05-63' Rt.

Location	Watts	IES Type
38+87-23' Lt.	700	M.C. II
38+94-63' Rt.	700	M.C. II
39+92-59' Lt.	700	M.C. II
40+37-23' Lt.	700	M.C. II
40+05-63' Rt.	700	M.C. II

RELOCATE LUMINAIRE

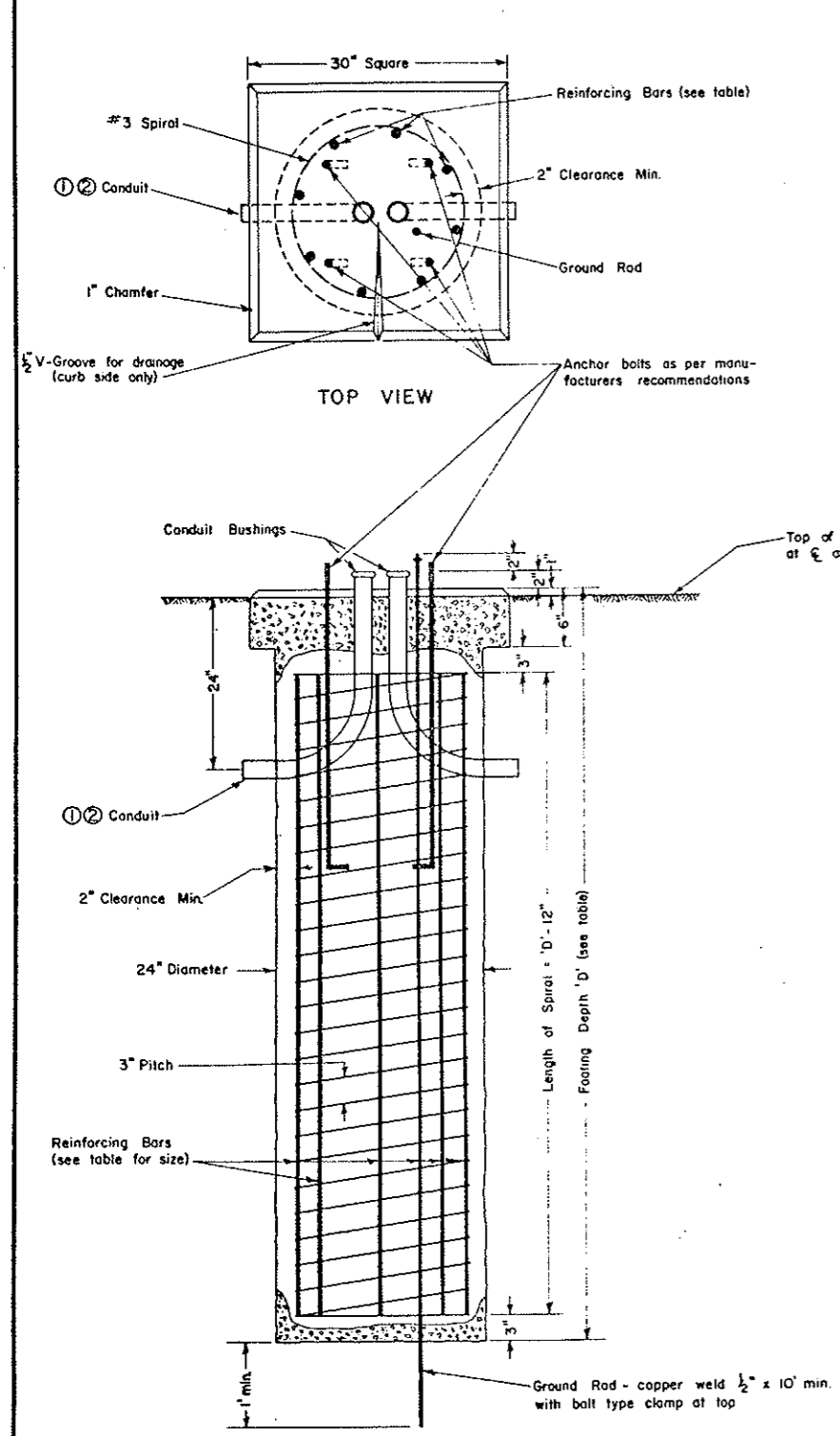
Existing Station	Relocated Station
38+87-23' Lt.	35+60-48' Rt.
40+37-23' Lt.	37+96-63' Rt.

Note: As built plans of existing lighting system (Project No. UG-100(7)) are available for inspection at the North Dakota State Highway Department, Bismarck District Office.

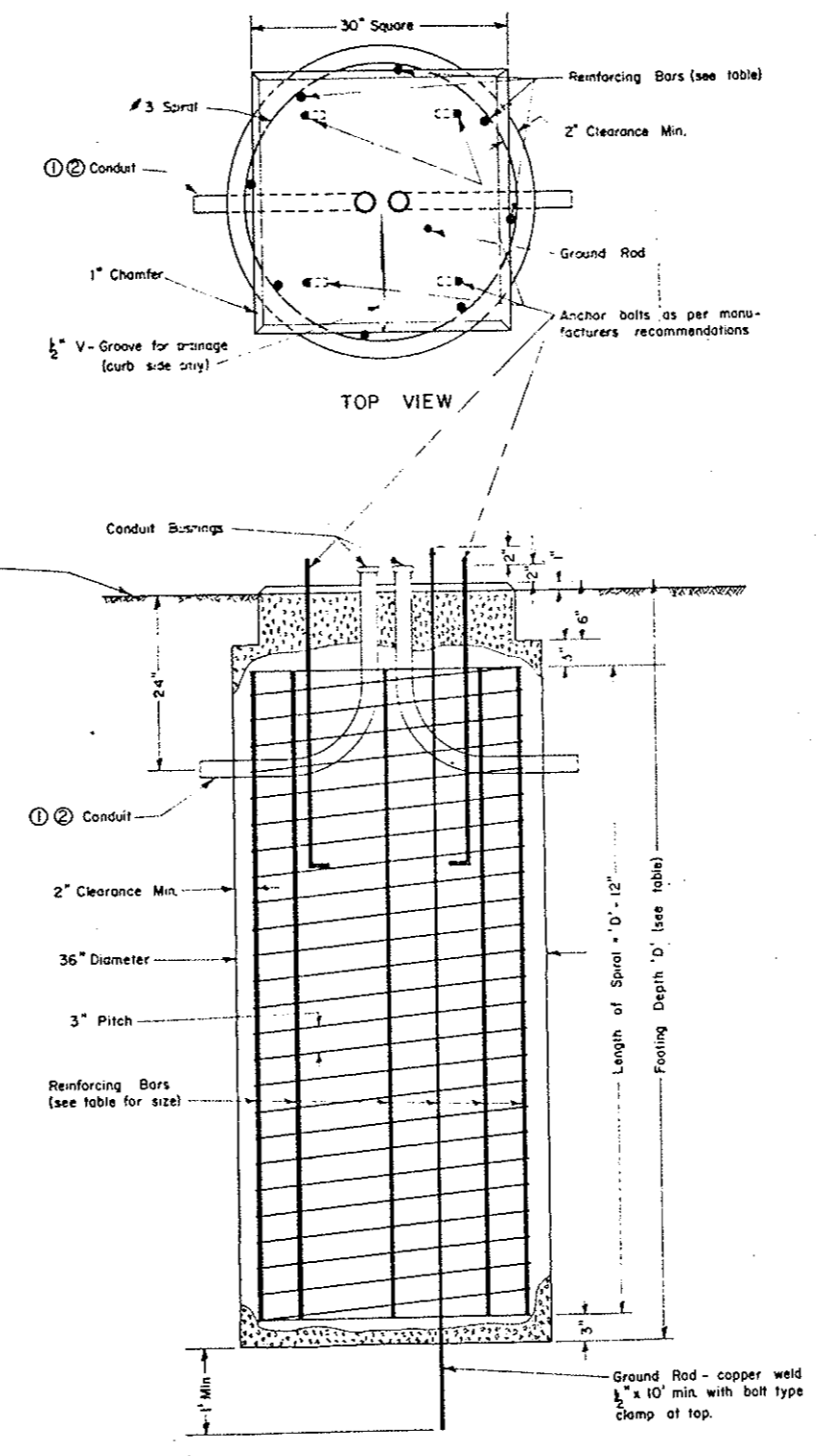
Existing Luminaires operate on 120 volts.

New conduit shall be connected to existing conduit with water tight fittings.

LIGHTING REVISIONS
 Main Street.
 MANDAN, NORTH DAKOTA



24" DIAMETER FOUNDATION



36" DIAMETER FOUNDATION

Description	Reinforcing Bars Required	Footing Depth 'D' 24" Diameter	Reinforcing Bars Required	Footing Depth 'D' 36" Diameter
Combination 50' Mounting Height, 26'-4' signal Mast Arm	8-#8	12'	8-#7	10'
Combination 50' Mounting Height, 0-25' signal Mast Arm	8-#6	10'	8-#5	9'
Light Standard 50' Mounting Height	8-#5	8'	8-#4	7'
Combination 40' Mounting Height, 26'-4' signal Mast Arm	8-#7	11'	8-#6	9'
Combination 40' Mounting Height, 0-25' signal Mast Arm	8-#6	10'	8-#5	8'
Light Standard 40' Mounting Height	8-#5	6'	8-#4	5'
Combination 30' Mounting Height, 26'-4' signal Mast Arm	8-#6	10'	8-#5	8'
Combination 30' Mounting Height, 0-25' signal Mast Arm	8-#6	10'	8-#5	8'
Light Standard 30' Mounting Height	8-#5	6'	8-#4	5'
Type IV signal Standard	8-#5	8'	8-#4	7'
Control Box Pedestal	*	4'	*	3'
Type I, II & III signal standard	*	4'	*	3'

*No reinforcement is required if the anchor bolts extend to within 3" to 6" above the bottom of the foundation.
 The loads described in the above table are maximum for each foundation shown.
 All reinforcing steel to be Grade 40 or 60. Concrete shall be Class AE.
 If the Contractor elects to use a 24" square foundation, the next size smaller reinforcement bars may be substituted for those shown in the table. No substitutions may be made for a 36" square foundation. #3 tie bars on 12" c-c may be substituted for the spiral when a 24" square foundation is used.

NOTES:
 ① See plans for conduit size, number of bends and correct positioning for each foundation.
 ② When conduit does not continue beyond the foundation, conduit with a 105° bend and bushings on both ends may be substituted for the 90° bends shown.

See plans for correct location of foundations. Grade of foundations to be established by the Engineer in the field.

Ground rods are not required in foundations for the type I, II or III signal standards.
 Maximum anchor bolt circle for the 24" foundation shall not exceed 18". Maximum anchor bolt circle for the 36" foundation shall not exceed 30".

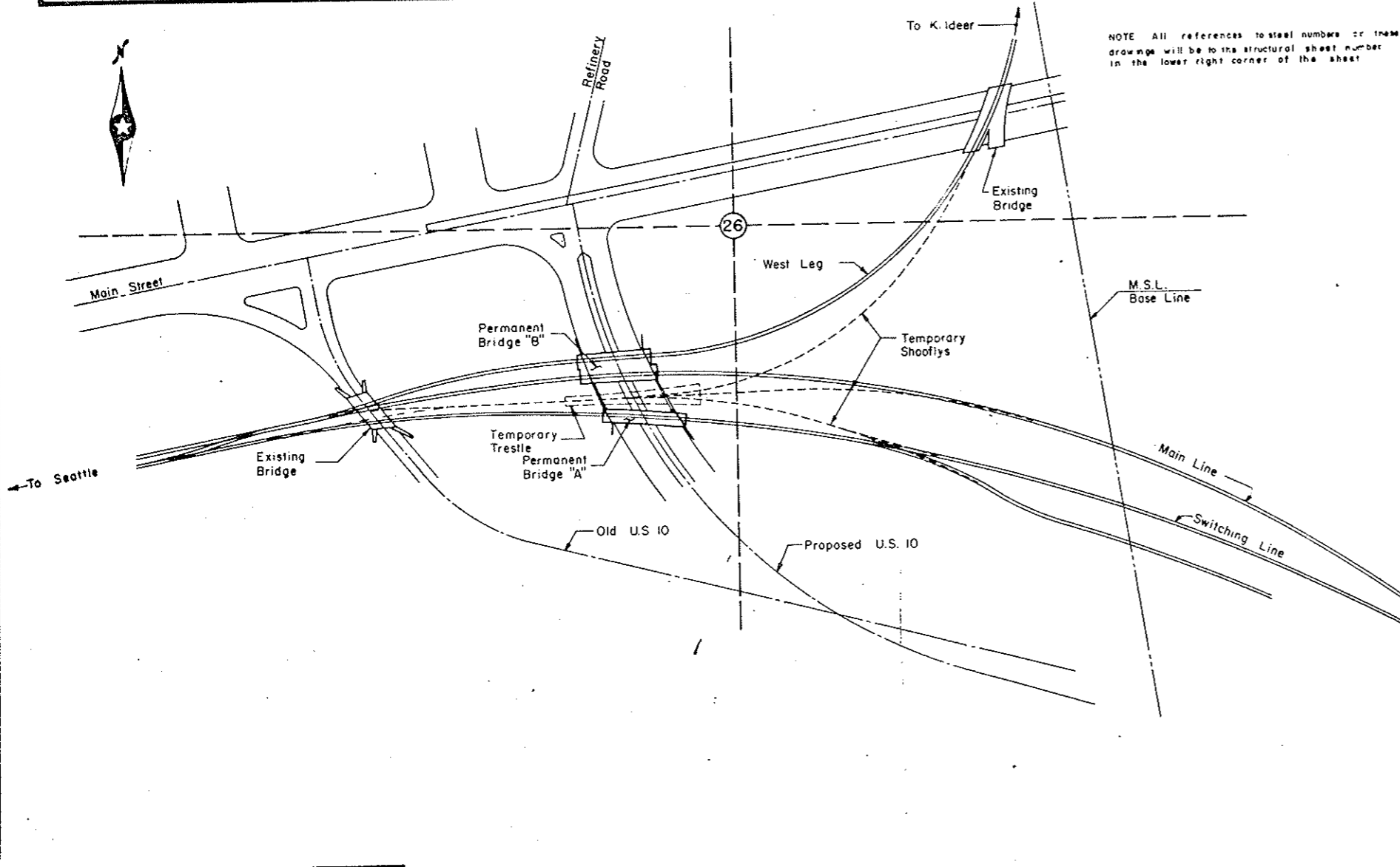
BRIDGE CODE	R.R. BRIDGE NO.	FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
	199	8	N.D.	MG-1-010 (05) 917		28	

STRUCTURAL SHEET		STRUCTURAL SHEET		STRUCTURAL SHEET		STRUCTURAL SHEET	
NO.	NO.	NO.	NO.	NO.	NO.	NO.	NO.
Cover Sheet and Index	10-91695-1	Deck Slab Reinforcement - Bridge A	" 14	Ballast Plate Details - Bridge B	" 27	Stringer Plan - Trestle	" 40
General Notes	" 2	Walkplate and Railing Details - Bridge A	" 15	Walkplate and Railing Details - Bridge B	" 28	Bent Details (Sheet 1 of 2) - Trestle	" 41
Geometric Layout	" 3	Walkplate and Bracket Details - Bridge A	" 16	Walkplate and Bracket Details - Bridge B	" 29	Bent Details (Sheet 2 of 2) - Trestle	" 42
Boring Logs	" 4	Waterproofing and Drainage Details - Bridge A	" 17	Waterproofing and Drainage Details - Bridge B	" 30	Bill of Materials - Trestle	" 43
Piling Layout	" 5	Bridge Layout - Bridge B	" 18	Bearing Assembly Details - Bridge A and B	" 31	Cross Sections	" 44
Bridge Layout - Bridge A	" 6	Abutment 1B Details (Sheet 1 of 2) - Bridge B	" 19	Miscellaneous Details	" 32	Cross Sections	" 45
Abutment 1A Details - Bridge A	" 7	Abutment 1B Details (Sheet 2 of 2) - Bridge B	" 20	Proposed Profile - B.N. Main Line	" 33	Cross Sections	" 46
Abutment 3A Details - Bridge A	" 8	Abutment 3B Details (Sheet 1 of 2) - Bridge B	" 21	Proposed Profile - B.N. West Leg and Switching Lead	" 34	Cross Sections	" 47
Wingwall Details - Bridge A	" 9	Abutment 3B Details (Sheet 2 of 2) - Bridge B	" 22	Proposed Profile - U.S. Highway No. 10	" 35	Cross Sections	" 48
Phase I Retaining Wall Details - Bridge A	" 10	Wingwall Details - Bridge B	" 23	Phase I Sequence of Construction	" 36	Cross Sections	" 49
Pier 2A Details - Bridge A	" 11	Phase II Retaining Wall Details - Bridge B	" 24	Phase II Sequence of Construction (Sheet 1 of 2)	" 37		
Framing Plan and Beam Details - Bridge A	" 12	Pier 2B Details - Bridge B	" 25	Phase II Sequence of Construction (Sheet 2 of 2)	" 38		
Diaphragms, Joints and Screed Elev. - Bridge A	" 13	Framing Plan and Beam Details - Bridge B	" 26	Temporary Trestle Layout	" 39		

ESTIMATE OF QUANTITIES			
CODE	SPEC. NO.	BID ITEM	
0101	203	COMMON EXCAVATION - TYPE A	18,276 CU. YD.
0190	203	MOISTURE CONTROL	LUMP SUM
0100	208	CLASS I EXCAVATION	1,212 CU. YD.
0100	228	SELECT BACKFILL	2,695 CU. YD.
9110	610	CLASS AE-1 MODIFIED CONCRETE *	1849.7 CU. YD.
0110	612	REINFORCING STEEL (GRADE 40)	186,468 LB.
0361	616	STRUCTURAL STEEL (A36 ROLLED BEAM)	749,123 LB.
5880	616	HIGH STRENGTH LOW ALLOY	
		STRUCTURAL STEEL (A588, MISC.)	94,409 LB.
0100	620	UNTREATED TIMBER	2.6 MBM
0040	622	STEEL PILING (HP 12 x 53)	18,720 LIN. FT.
1340	622	STEEL TEST PILE (HP 12 x 53) @ 75 FEET	8 EACH
9535	900	DECK DRAINAGE SYSTEM	LUMP SUM
0119	736	ONE-PLY MEMBRANE WATERPROOFING	5911 SQ. FT.
9558	900	CONCRETE SURFACE PROTECTION	8810 SQ. FT.

LIST OF SUPPLEMENTAL SPECIFICATIONS AND SPECIAL PROVISIONS	
Class AE-1 Mod. Concrete	SP1
Non-Skid Epoxy	SPK
One-Ply Membrane Waterproofing	SPA
Gray Rubber Joints Filler	SPE
Structural Steel	SP-116 C
Railway Protection and Liability Insurance	SP-14C
Underpass Backfill	SP
Concrete Surface Protection	SP

APPROVED
B.H. Anderson
 ASS'T. V.P. ENGINEERING - BURLINGTON NORTHERN INC.



BENCH MARKS			
NO.	DESCRIPTION	LOCATION	ELEV.
1	S.W. Cor. Underpass	36+53.6 - 13.5' Rt.	1653.26
1	R.R. Spike in P.P.	46+97 - 182' Lt.	1639.53

Note: Permanent Bridge "A" and Permanent Bridge "B" designations are for use in plan preparation only. See Bridge Number Sign and Federal Aid Name Plate details for B.N. Inc. and N.D.H.D. bridge numbers respectively.



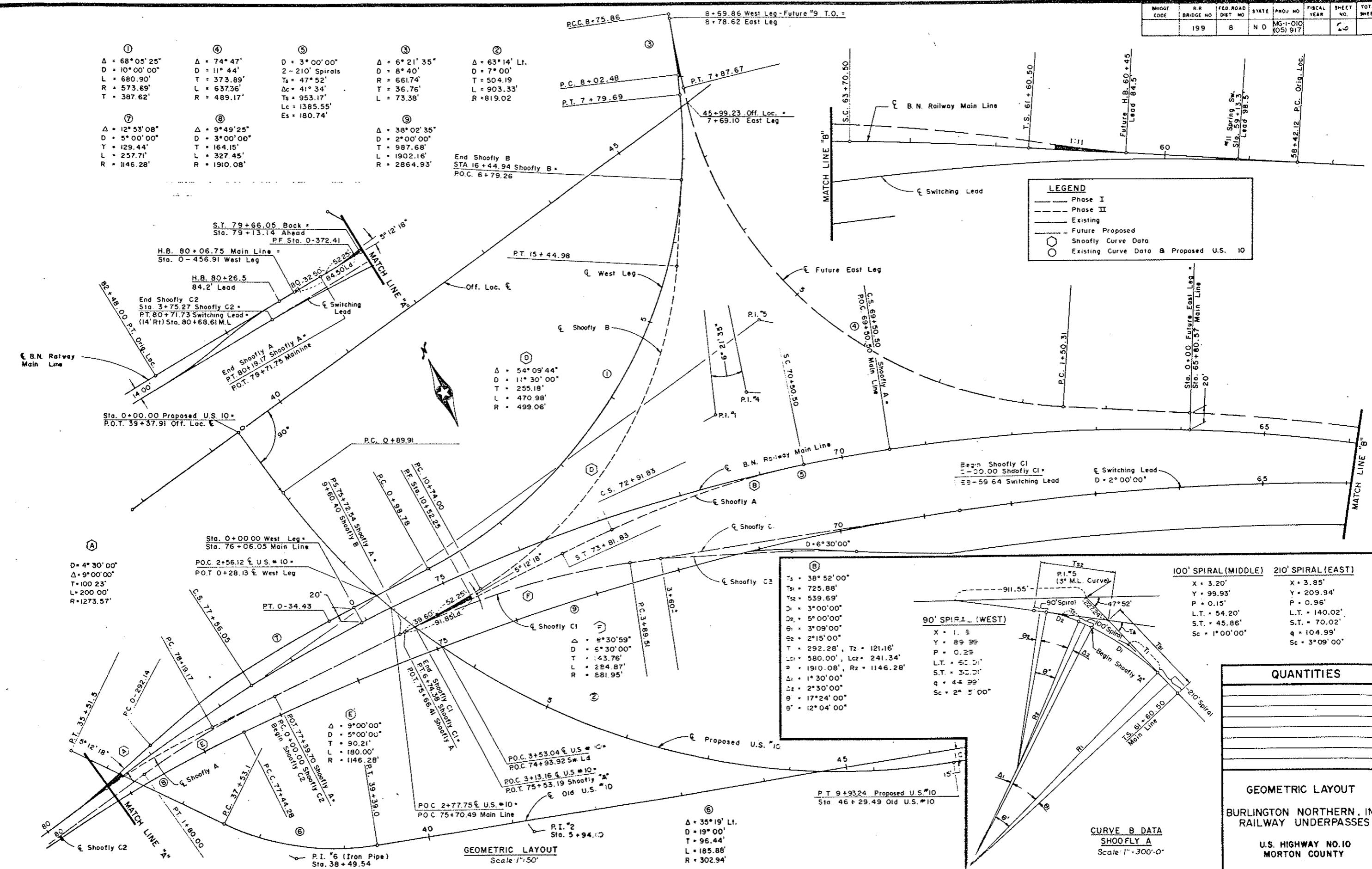
HOWARD NEEDLES TAMMEN & BERGENDOFF
 CONSULTING ENGINEERS
HNTB

STRUCTURAL DRAWINGS	
GENERAL DRAWING	10-91695-1 THRU 10-91695-6, 10-91695-18, 10-91695-32
SUBSTRUCTURE	10-91695-7 THRU 10-91695-11, 10-91695-19 THRU 10-91695-25
SUPERSTRUCTURE	10-91695-12 THRU 10-91695-17, 10-91695-26 THRU 10-91695-31
DESIGN LOADING	Coopers E-80 B Diesel Impact
SCALE	1 inch = 100 Feet

NORTH DAKOTA
 STATE HIGHWAY DEPARTMENT
BURLINGTON NORTHERN, INC.
 RAILWAY UNDERPASSES
 PROJECT MG-1-010 (05) 917 STA 2+66.9
 MORTON COUNTY
 APPROVED
[Signature]
 DATE _____
 BRIDGE ENGINEER

BRIDGE CODE	R.R. BRIDGE NO.	FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
	199	8	N D	MG-1-010 (KOS) 917		2	

- ① Δ = 68°05'25"
D = 10°00'00"
L = 680.90'
R = 573.69'
T = 387.62'
- ④ Δ = 74°47'
D = 11°44'
L = 637.36'
R = 489.17'
- ⑤ D = 3°00'00"
2 - 210' Spirals
T_s = 47°52'
Δc = 41°34'
T_s = 953.17'
Lc = 1385.55'
Es = 180.74'
- ③ Δ = 6°21'35"
D = 8°40'
T_s = 661.74'
R = 36.76'
L = 73.38'
- ② Δ = 63°14' Lt.
D = 7°00'
L = 903.33'
R = 819.02'
- ⑦ Δ = 12°53'08"
D = 5°00'00"
T = 129.44'
L = 257.71'
R = 1146.28'
- ⑧ Δ = 9°49'25"
D = 3°00'00"
T = 164.15'
L = 327.45'
R = 1910.08'
- ⑨ Δ = 38°02'35"
D = 2°00'00"
T = 987.68'
L = 1902.16'
R = 2864.93'



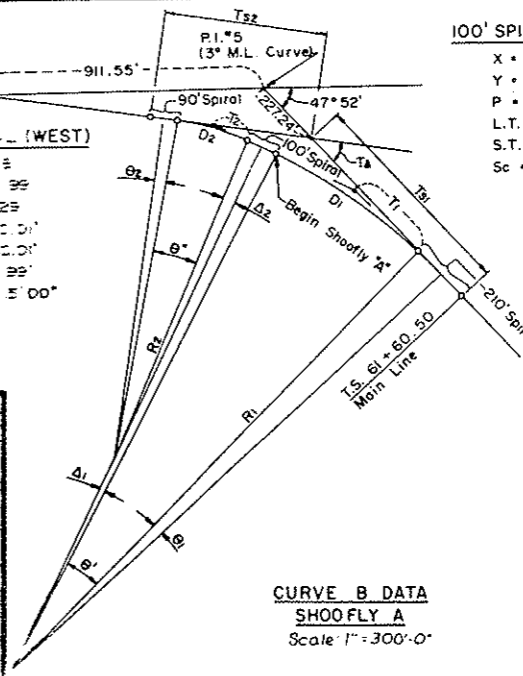
—	Phase I
---	Phase II
—	Existing
- - -	Future Proposed
○	Shoo-fly Curve Data
⊙	Existing Curve Data & Proposed U.S. 10

GEOMETRIC LAYOUT
Scale 1"=50'

X = 1.1
Y = 89.29
P = 0.25
L.T. = 50.00'
S.T. = 30.00'
q = 44.29'
Sc = 2° 5' 00"

100' SPIRAL (MIDDLE)	210' SPIRAL (EAST)
X = 3.20'	X = 3.85'
Y = 99.93'	Y = 209.94'
P = 0.15'	P = 0.96'
L.T. = 54.20'	L.T. = 140.02'
S.T. = 45.86'	S.T. = 70.02'
Sc = 1°00'00"	Sc = 3°09'00"

T _s = 38° 52' 00"
T _{s1} = 725.88'
T _{s2} = 539.69'
Δ = 3°00'00"
Δc = 5°00'00"
Δ ₁ = 3°09'00"
Δ ₂ = 2°15'00"
T = 292.28', T ₂ = 121.16'
L ₁ = 580.00', L ₂ = 241.34'
P = 1910.08', R ₂ = 1146.28'
Δ ₁ = 1°30'00"
Δ ₂ = 2°30'00"
θ = 17°24'00"
θ' = 12°04'00"



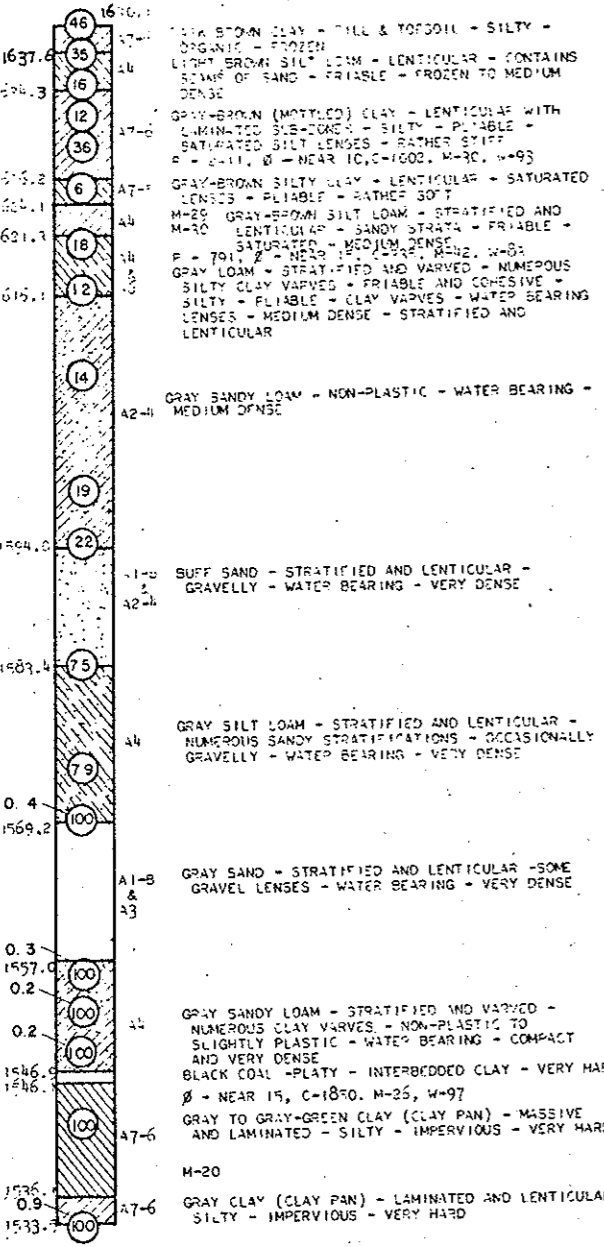
CURVE B DATA
SHOOFLY A
Scale 1"=300'-0"

QUANTITIES

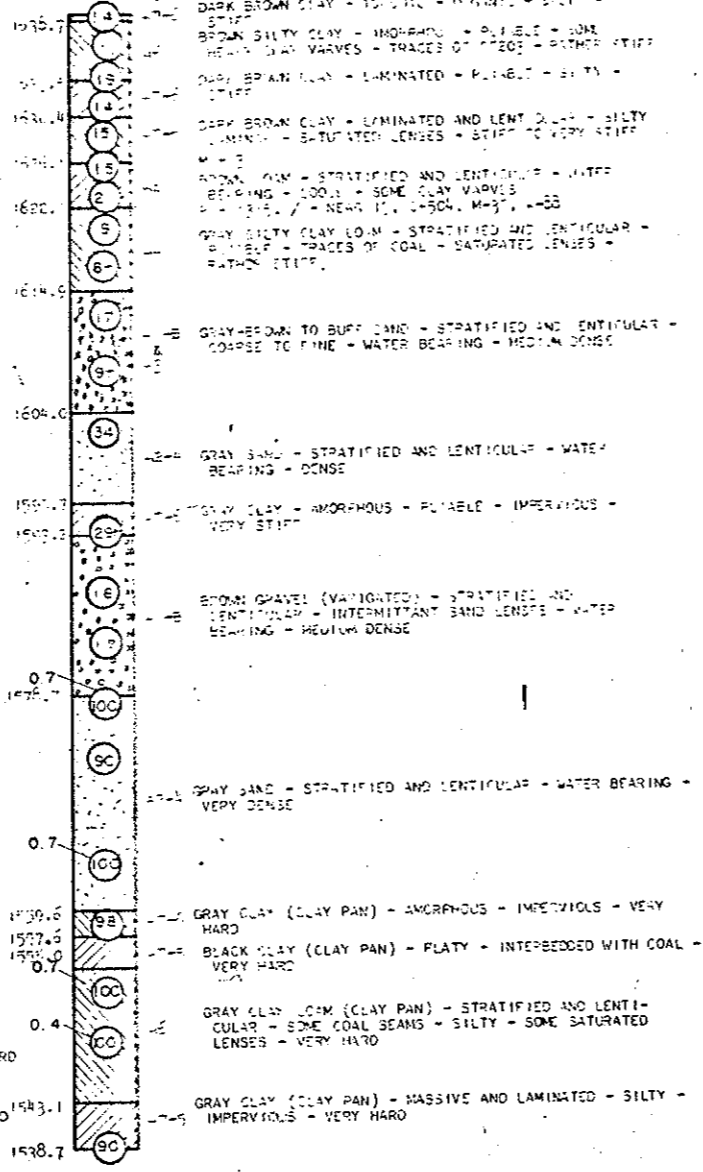
GEOMETRIC LAYOUT
BURLINGTON NORTHERN, INC.
RAILWAY UNDERPASSES
U.S. HIGHWAY NO. 10
MORTON COUNTY

1655
1650
1645
1640
1635
1630
1625
1620
1615
1610
1605
1600
1595
1590
1585
1580
1575
1570
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1545
1540
1535
1530
1525
1520
1515
1510
1505

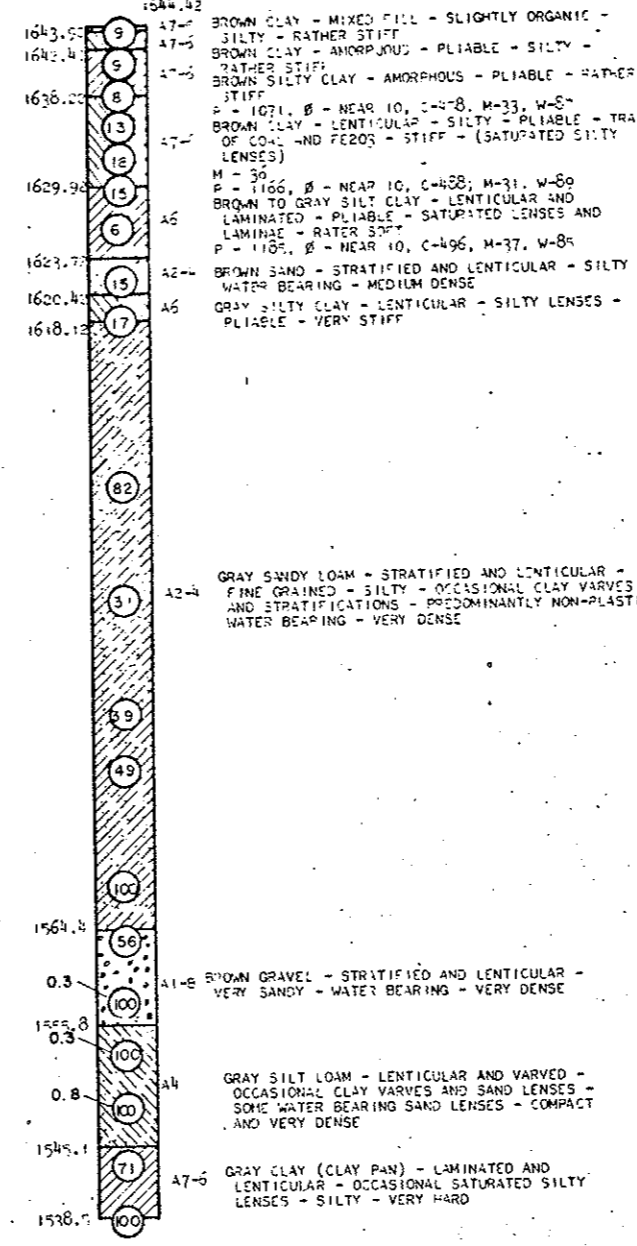
FINAL WATER LEVEL = 10.4'



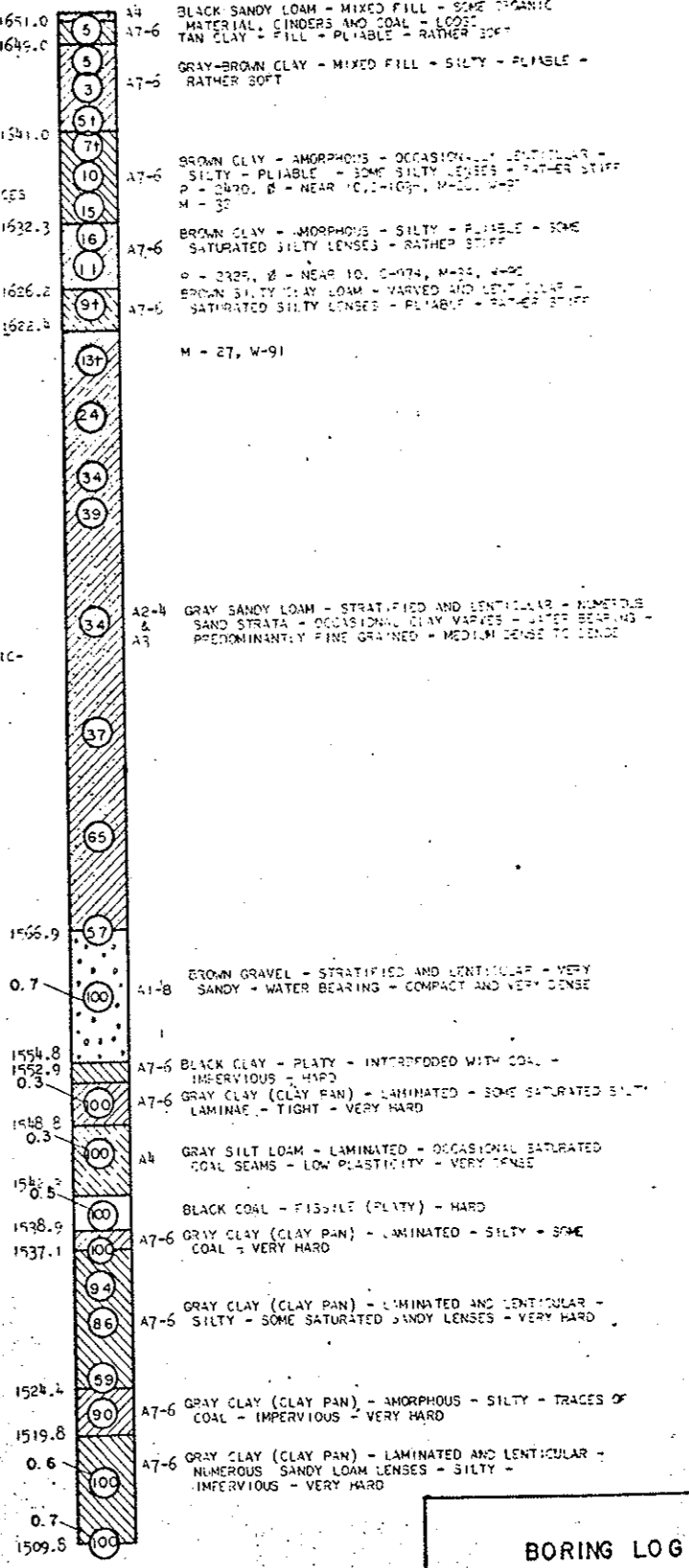
FINAL WATER LEVEL = 9.1'



FINAL WATER LEVEL = 15.1'



FINAL WATER LEVEL - EST. 19.0'

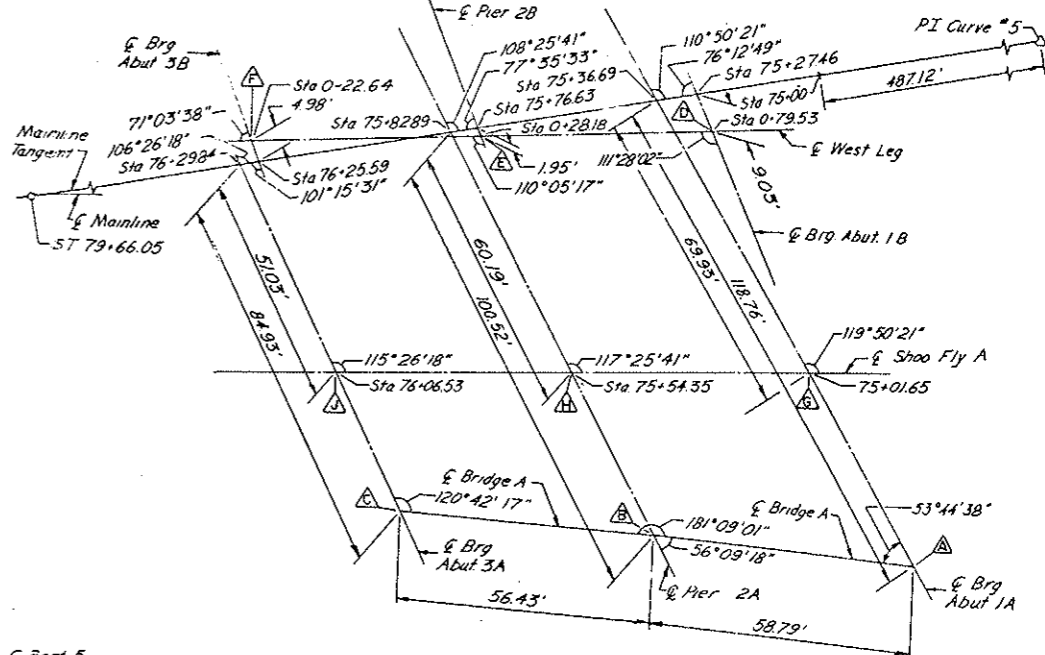
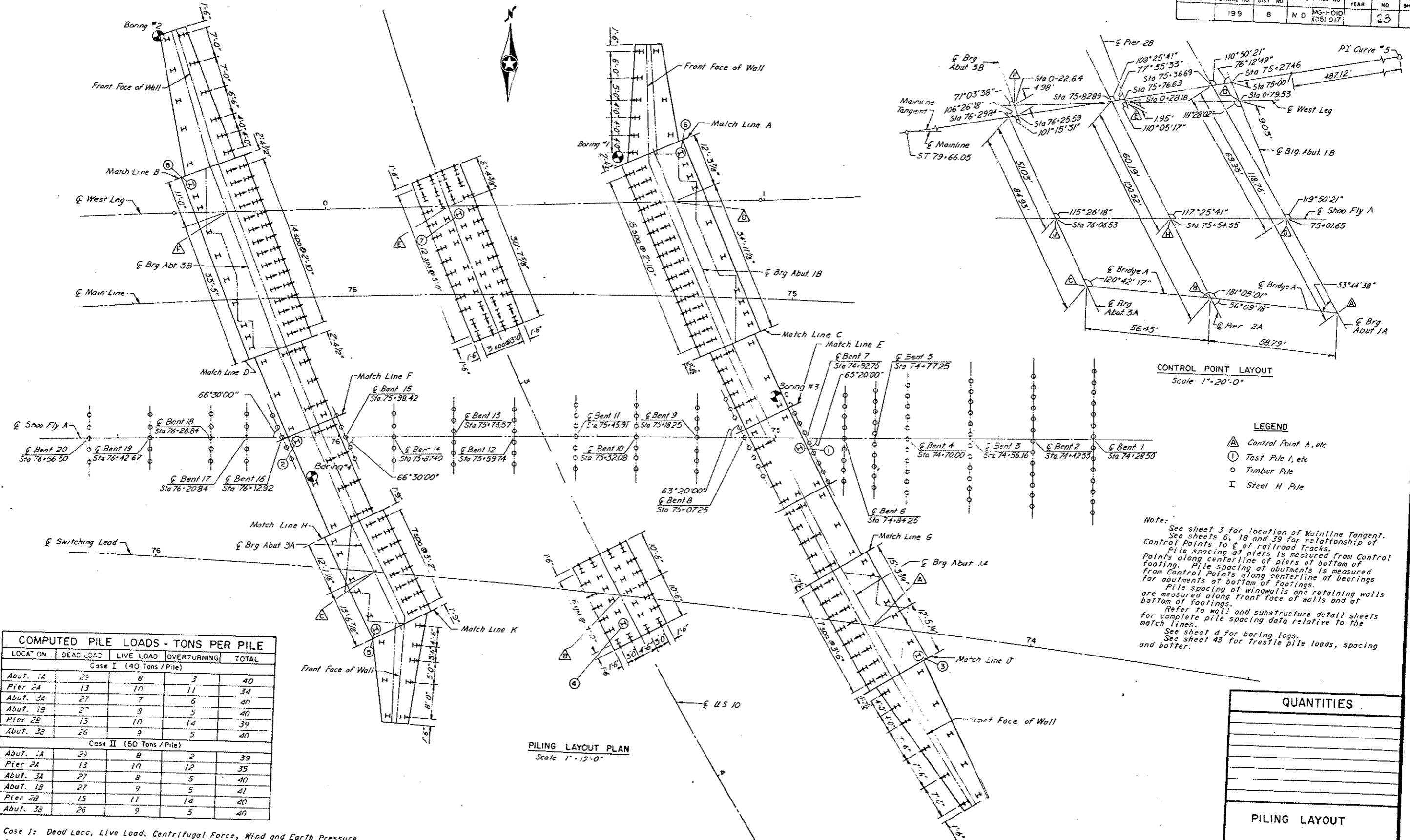


SYMBOLS:
P - MAXIMUM LOAD (LBS./SQ. FT.)
β - SHEAR ANGLE (DEGREES)
C - COHESION (LBS./SQ. FT.)
M - MOISTURE (PER CENT)
W - DRY WEIGHT (LBS./CU. FT.)
*** TRIAXIAL

NOTES:
ENCIRCLED NUMBERS INDICATE THE NUMBER OF BLOWS DELIVERED BY A 140 LB. HAMMER FROM A HEIGHT OF 30" TO DRIVE CORE TUBE 1.0'.
THE BORING LOG DATA SHOW IS FOR DESIGN PURPOSE ONLY. THE STATE ASSUMES NO RESPONSIBILITY IF SOIL CONDITIONS ENCOUNTERED DURING CONSTRUCTION DIFFER FROM THOSE SHOWN.

BORING LOG
BURLINGTON NORTHERN, INC.
U.S. 10 OVERHEAD
MORTON COUNTY

BRIDGE CODE	R.R. BRIDGE NO.	FED ROAD DIST NO.	STATE PROJ NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
	199	8	N. D. MG-1-010 (OST 917)		23	



LEGEND

- △ Control Point A, etc
- ① Test Pile 1, etc
- Timber Pile
- I Steel H Pile

Note:
 See sheet 3 for location of Mainline Tangent.
 See sheets 6, 18 and 39 for relationship of Control Points to ϵ of railroad tracks.
 Pile spacing at piers is measured from Control Points along centerline of piers at bottom of footing. Pile spacing of abutments is measured from Control Points along centerline of bearings for abutments at bottom of footings.
 Pile spacing of wingwalls and retaining walls are measured along front face of walls and at bottom of footings.
 Refer to wall and substructure detail sheets for complete pile spacing data relative to the match lines.
 See sheet 4 for boring logs.
 See sheet 43 for trestle pile loads, spacing and batter.

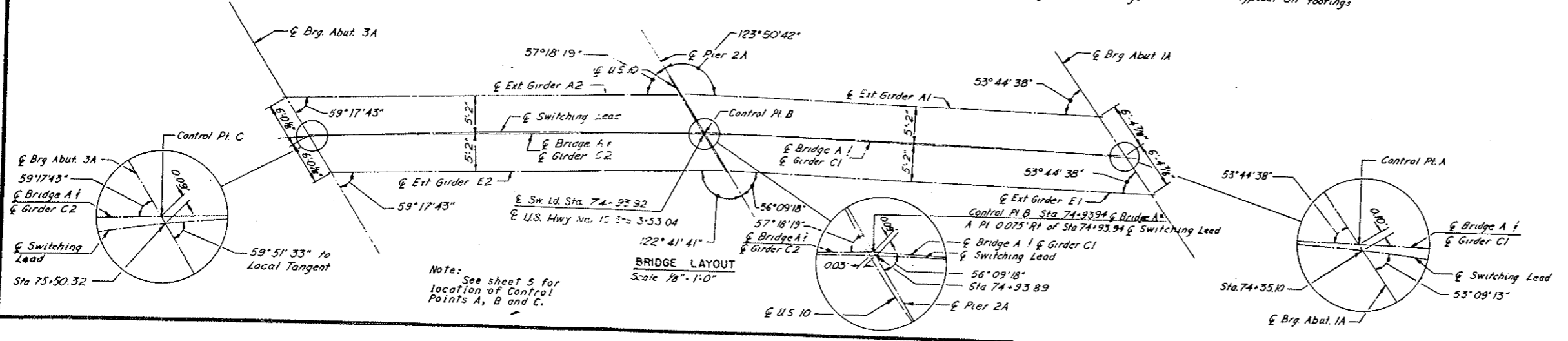
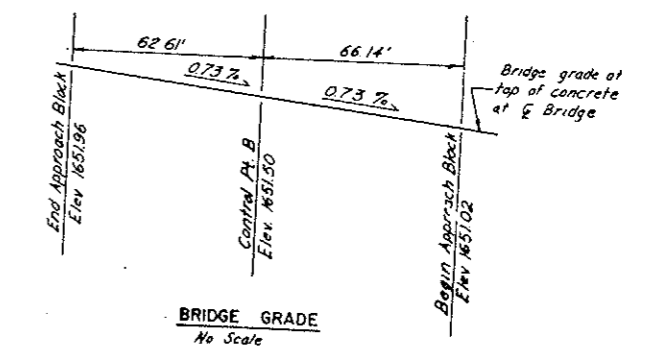
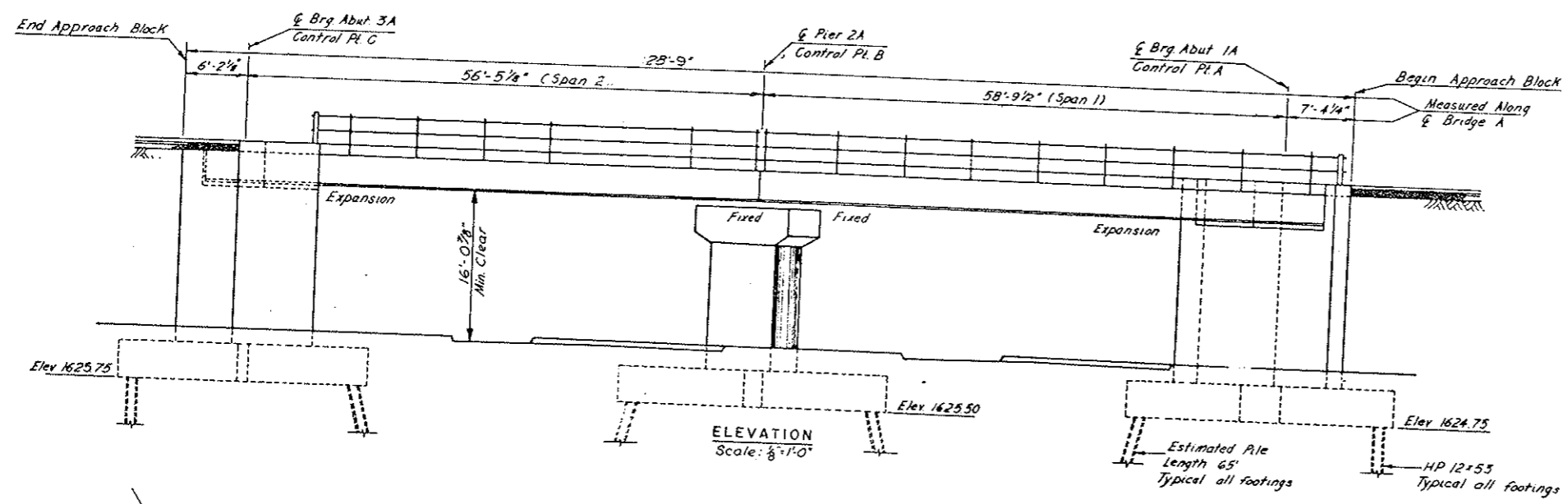
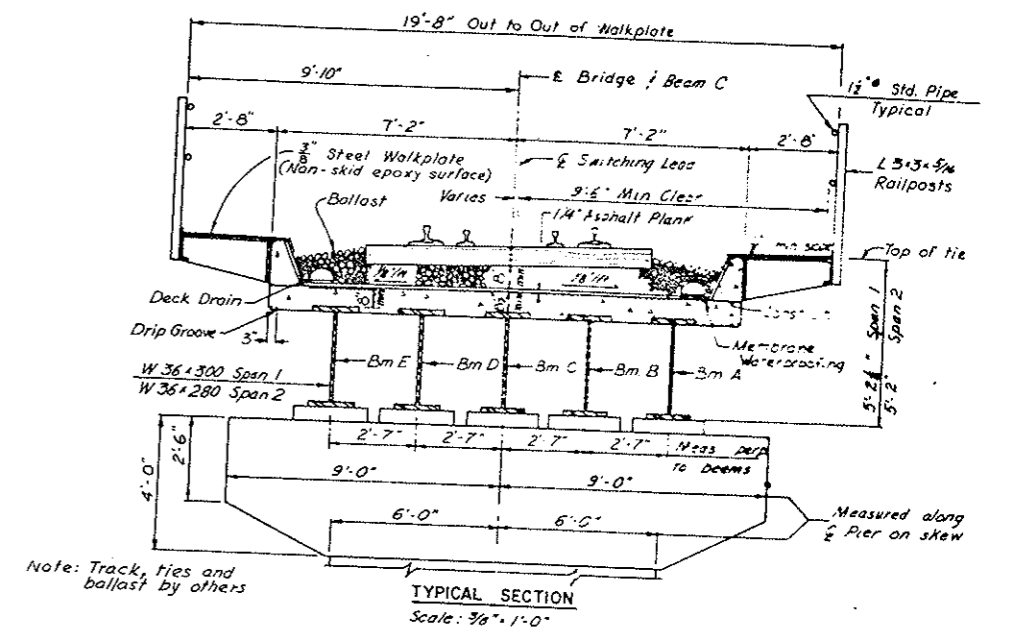
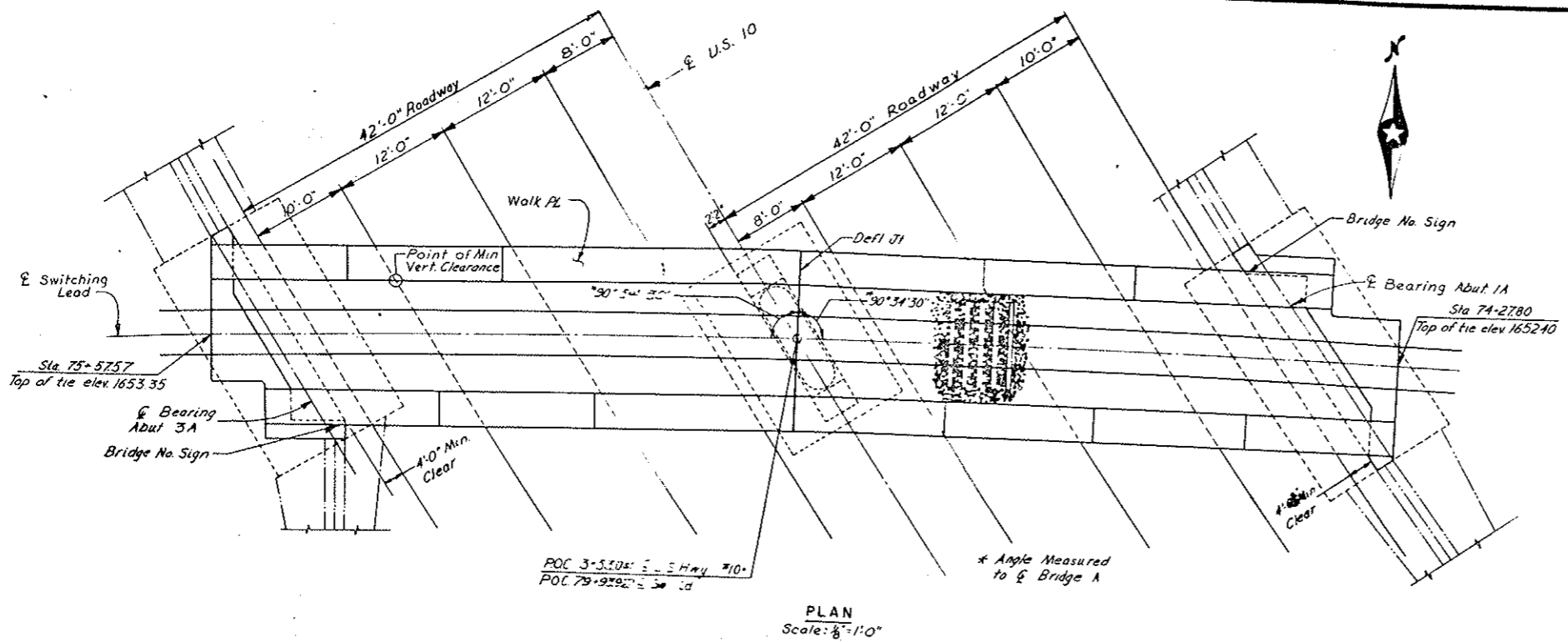
COMPUTED PILE LOADS - TONS PER PILE				
LOCATION	DEAD LOAD	LIVE LOAD	OVERTURNING	TOTAL
Case I (40 Tons / Pile)				
Abut. 1A	23	8	3	40
Pier 2A	13	10	11	34
Abut. 3A	27	7	6	40
Abut. 1B	27	9	5	40
Pier 2B	15	10	14	39
Abut. 3B	26	9	5	40
Case II (50 Tons / Pile)				
Abut. 1A	23	8	2	39
Pier 2A	13	10	12	35
Abut. 3A	27	8	5	40
Abut. 1B	27	9	5	41
Pier 2B	15	11	14	40
Abut. 3B	26	9	5	40

Case I: Dead Load, Live Load, Centrifugal Force, Wind and Earth Pressure.
 Case II: Dead Load, Live Load, Centrifugal Force, Wind, Earth and Live Load Thrust.

QUANTITIES

PILING LAYOUT	
BURLINGTON NORTHERN, INC. RAILWAY UNDERPASSES	
U.S. HIGHWAY NO.10 MORTON COUNTY	

BRIDGE CODE	R.R. BRIDGE NO.	FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
X671	199	B	N.D.	MG-1-010 (OS) 917		29	

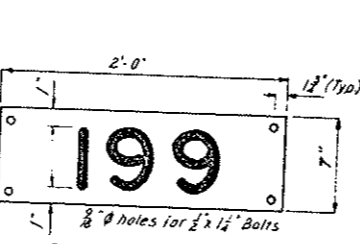
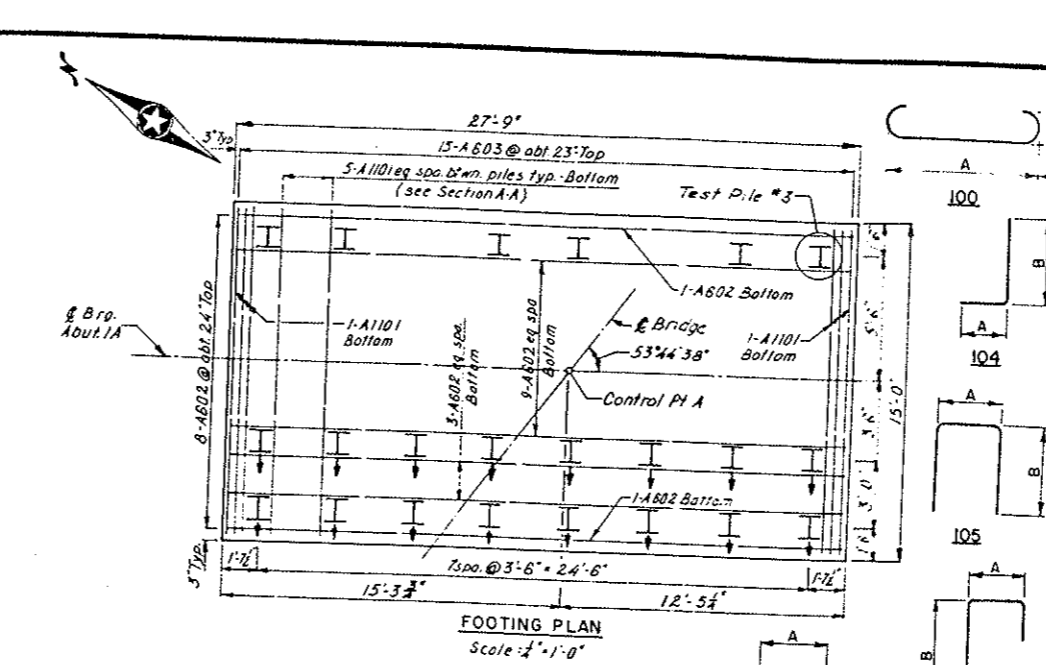
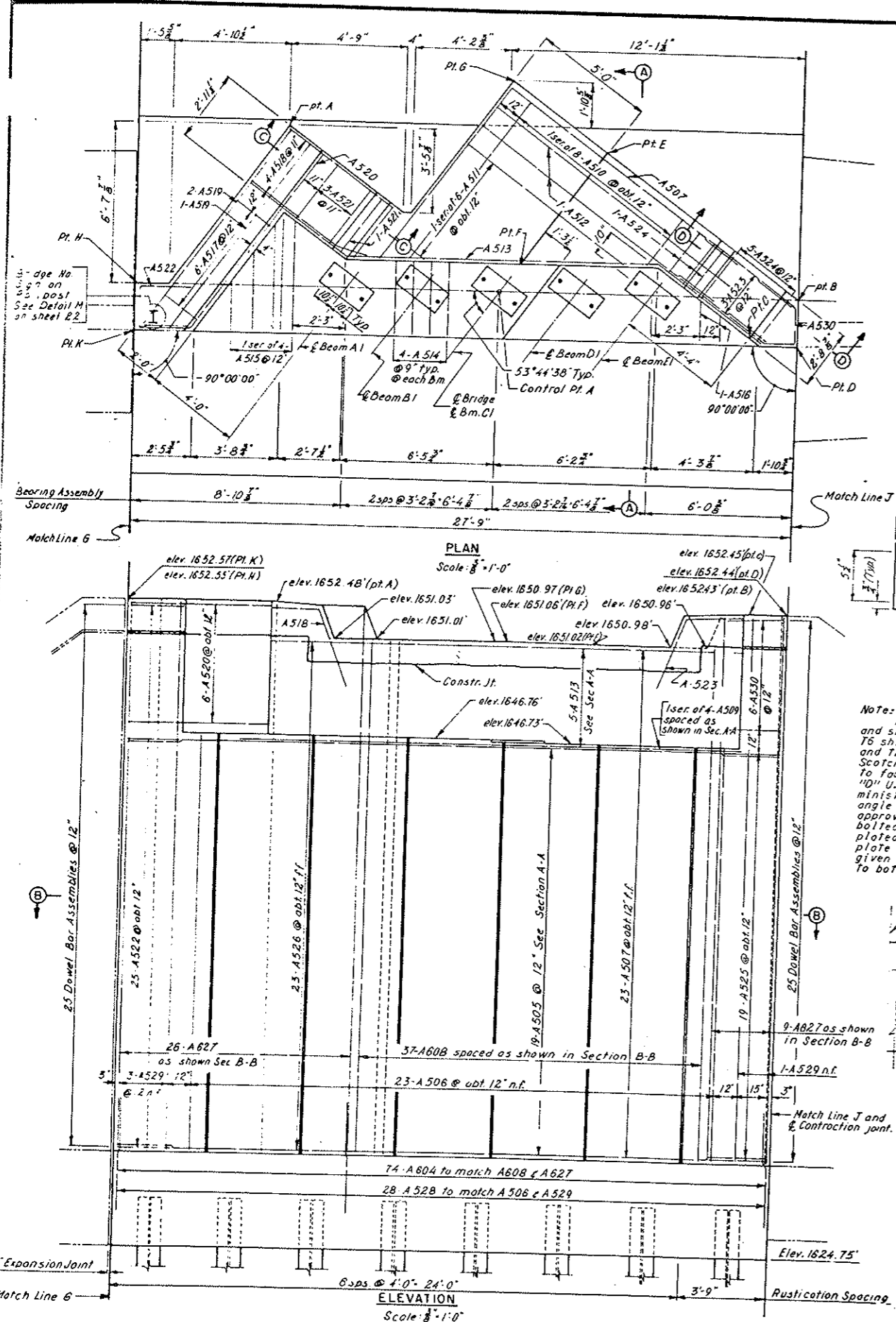


QUANTITIES	

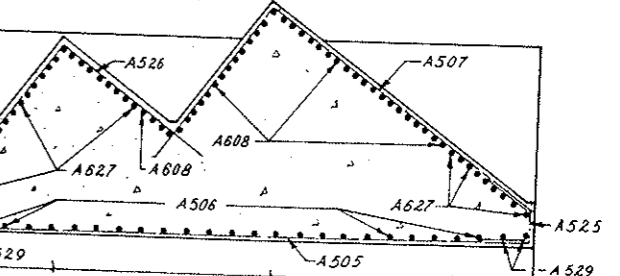
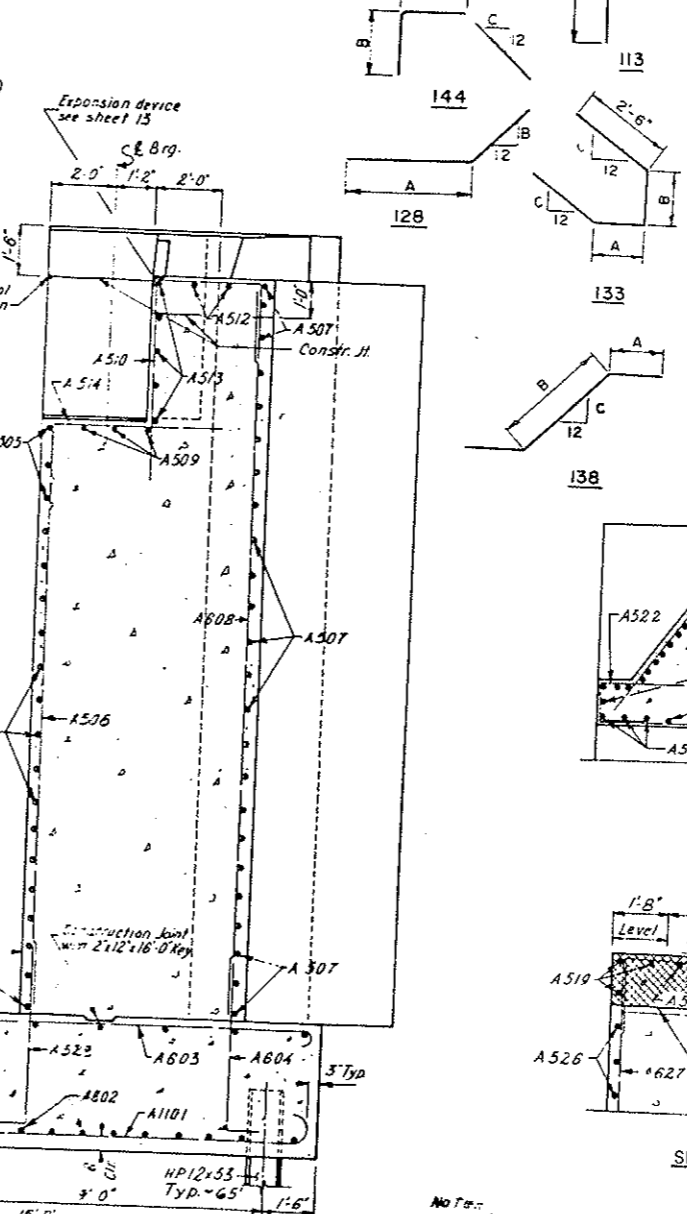
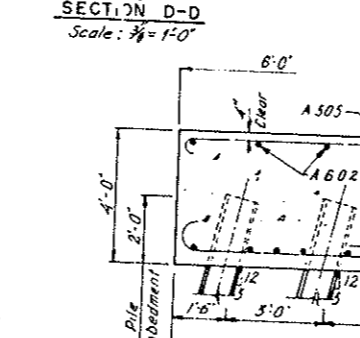
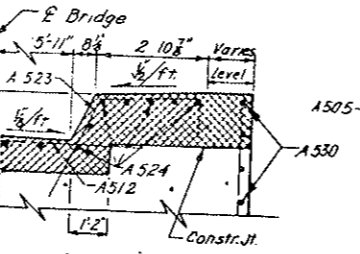
BRIDGE LAYOUT
BRIDGE A
BURLINGTON NORTHERN, INC.
RAILWAY UNDERPASSES
U.S. HIGHWAY NO. 10
MORTON COUNTY

BRIDGE CODE	K.P. BRIDGE NO.	IFED ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
X671	199	B	N D	MS-1-010 (OS) 917		83	

BILL OF REINFORCEMENT - ABUTMENT IA									
BAR NO.	NO.	SIZE	LENGTH	TYPE	DIMENSION			LOCATION	
					A	B	C		
A1101	41	11	17-8	100	14-6	1-7		Footing	
A602	22	6	27-3	Str.				Footing	
A603	15	6	15-10	100	14-6	8		Footing	
A604	74	6	7-0	104	1-0	6-0		Footing	
A505	19	5	27-3	Str.				Footing	
A506	23	5	17-6	Str.				Horizontal	
A507	23	5	23-6	104	9-0	14-6		Vertical	
A608	37	6	22-0	Str.				Horizontal	
A509	1 Ser. of 3	5	20-3	Str.				Vertical	
A510	1 Ser. of 8	5	25-6	Str.				Horizontal	
A511	1 Ser. of 6	5	11-0	113	2-6	6-3		Backwall	
A512	1 Ser. of 8	5	17-0	Str.	8-3	6-3		Backwall	
A513	7	5	12-3	Str.				Backwall	
A514	5	5	23-3	138	5-6	12-8	9	Backwall	
A515	20	3	7-3	104	2-3	5-0		Pad	
A516	1 Ser. of 4	5	6-3	104	2-3	4-0		Pad	
A517	2	5	10-0		2-3	7-9		Pad	
A518	2	5	4-9	104	2-3	2-6		Pad	
A519	6	5	11-6	113	1-7	7-9		Maskwall	
A520	4	5	10-0	144	4-2	2-3	6	Backwall	
A521	3	5	9-9	Str.				Maskwall	
A522	6	5	11-9	128	4-9	16		Maskwall	
A523	5	5	12-6	113	2-6	7-9		Backwall	
A524	25	5	5-8	105	1-8	2-0		Horizontal	
A525	3	5	9-3	144	2-1	2-3	6	Backwall	
A526	8	5	12-3	113	2-4	7-3		Backwall	
A527	19	5	7-0	144	1-10	2-6	9	Backwall	
A528	23	5	18-6	104	8-0	10-6		Horizontal	
A627	37	6	23-6	Str.				Vertical	
A529	28	5	6-9	104	1-0	5-9		Footing	
A530	5	5	23-6	Str.				Vertical	
A531	6	5	8-6	133	1-6	1-10	9	Horizontal	



Note: Bridge Number Signs are overlays and shall be made of 0.025" thick 61S-T6 sheet aluminum. After degreasing and treatment of aluminum, apply black Scotchcal No. 655, or approved equal, to face of sign. Then apply 5" Series 10" U.S. Bureau of Public Roads Administration standard numerals of wide angle silver No. 2270 Scotchlite, or approved equal. Sign overlay to be bolted with galvanized or cadmium plated bolts to a No. 7 wrought iron plate of same size. The plate to be given two coats of jet black enamel to both sides.

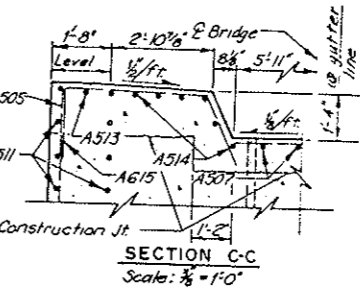
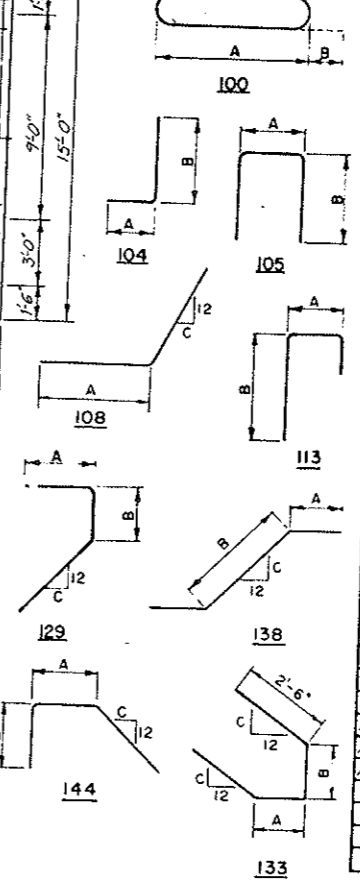
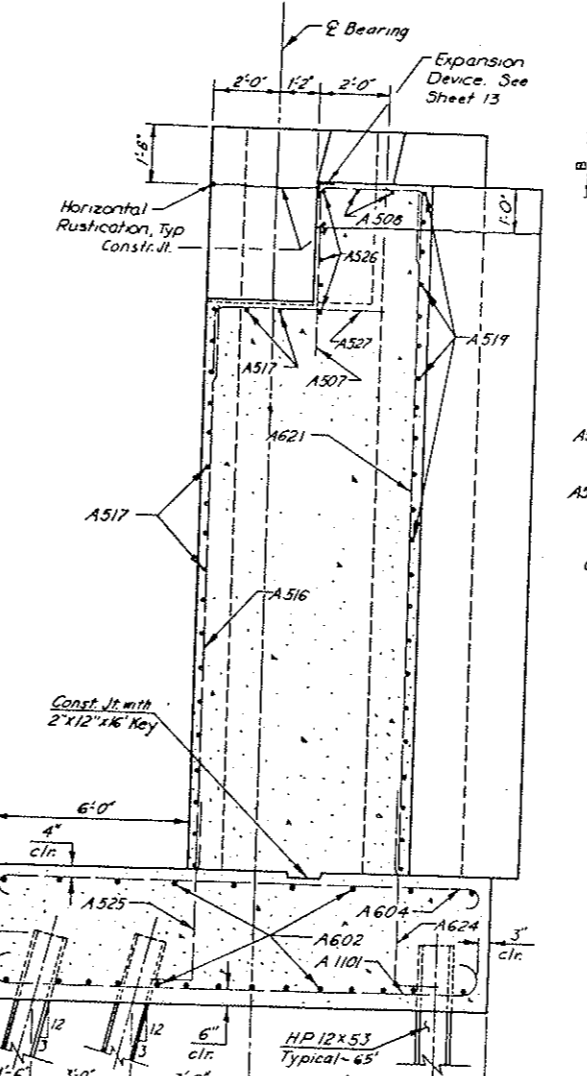
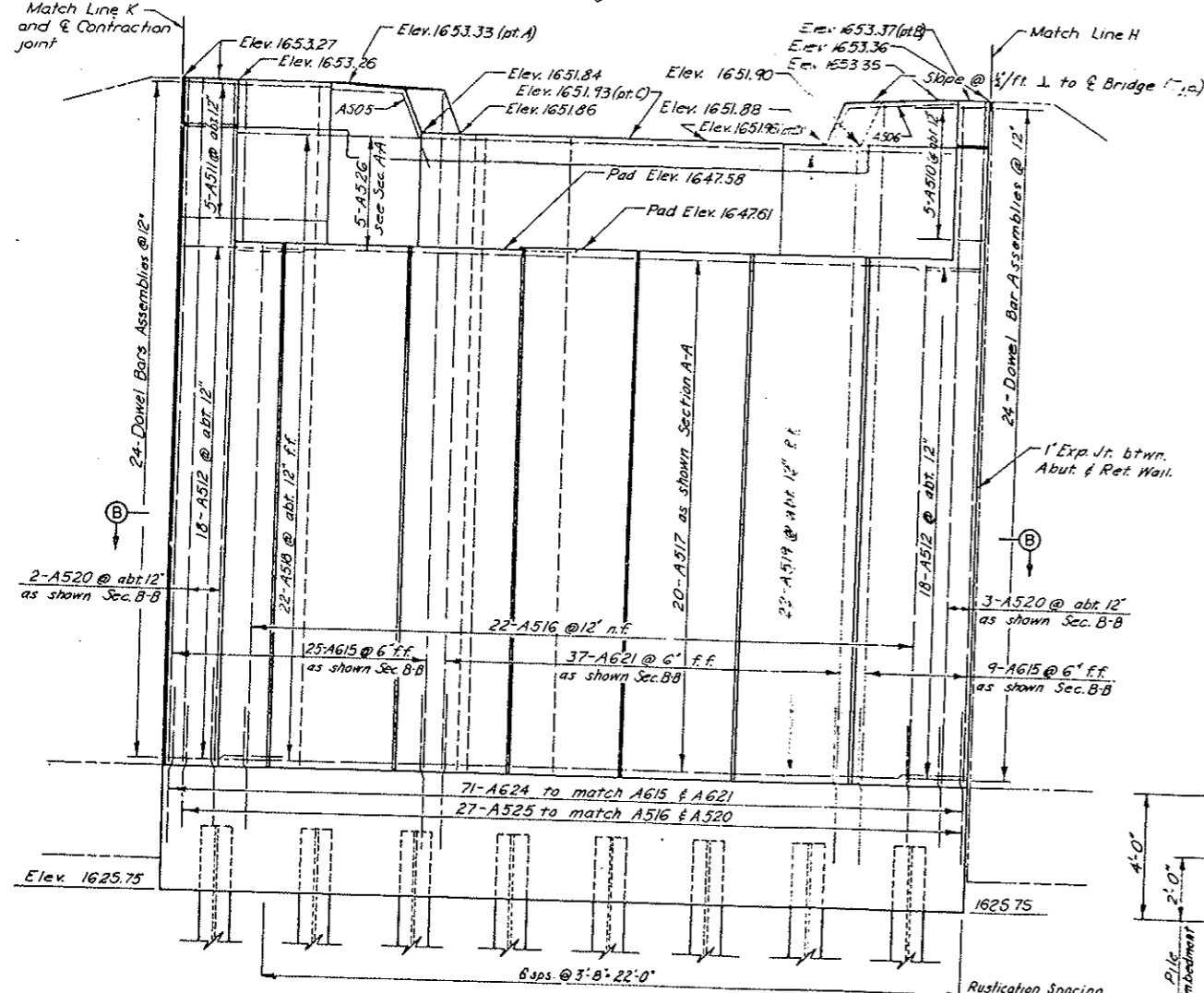
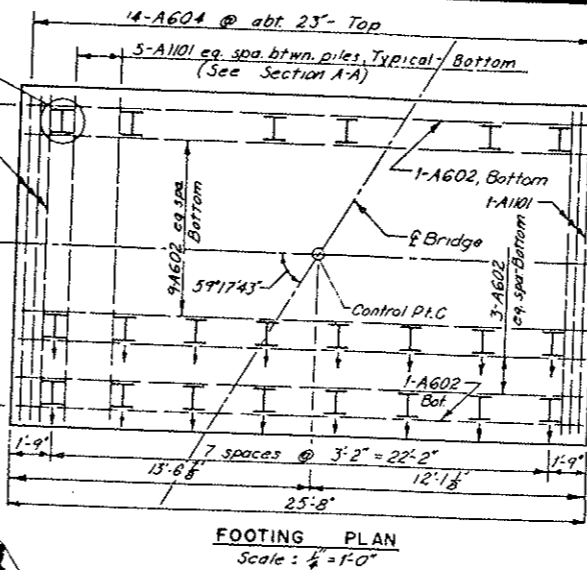
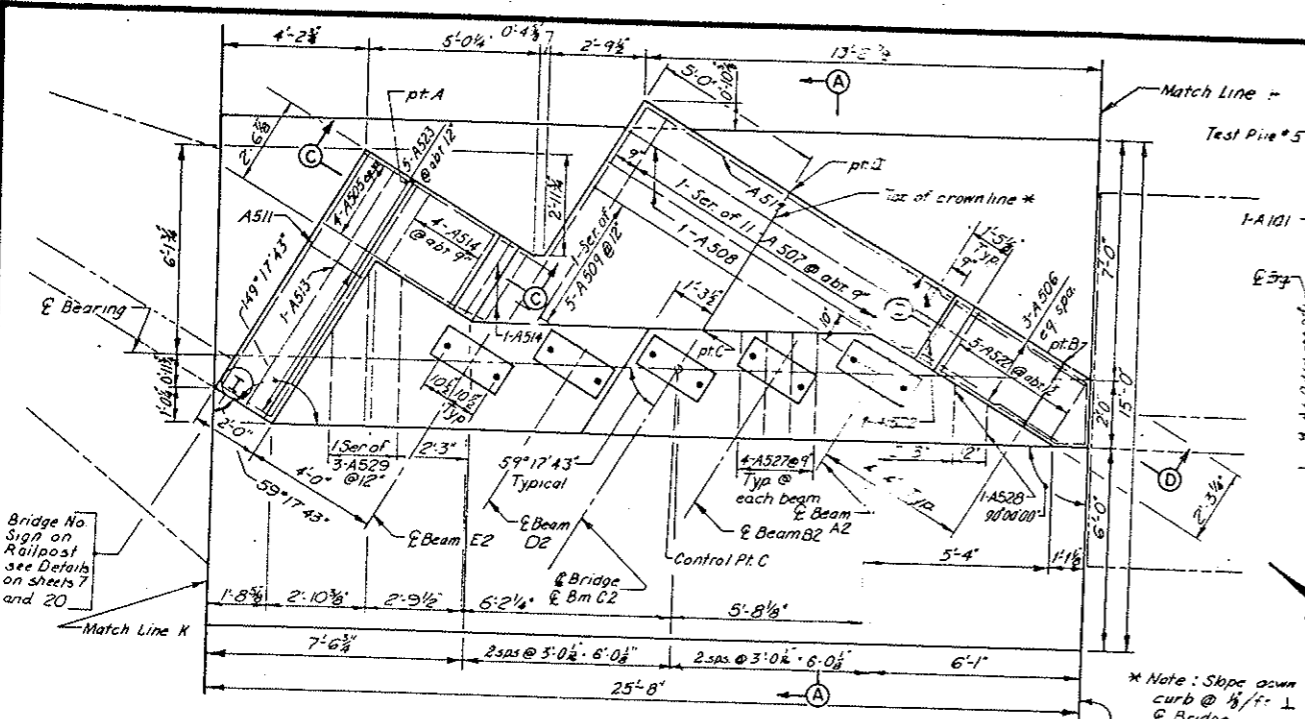


Note: A627 and A608 bars are to be equally spaced at about 6" along the back faces of the abutment.

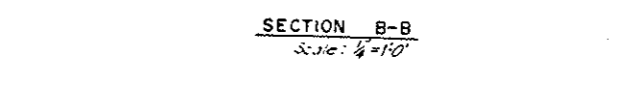
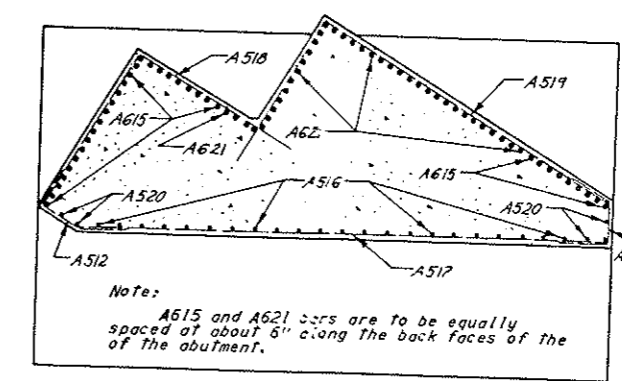
QUANTITIES	
Reinforcing Steel	13,245 Lbs
Steel Piling (HP12x53)	1,365 Lin Ft
Class RE-1 Mod Concrete	198 Cu Yd
Class I Excavation	112 Cu Yd
Steel Test Piles (HP12x53) @ 75' Each	

ABUTMENT IA DETAILS
BRIDGE A
BURLINGTON NORTHERN, INC.
RAILWAY UNDERPASSES
U.S. HIGHWAY NO. 10
MORTON COUNTY

Note: See sheet 13 for expansion joint details between abutment and superstructure.



BAR NO.	SIZE	LENGTH	TYPE	DIMENSIONS			LOCATION
				A	B	C	
A1101	41	11	17-8	100	14-6	1-7	Footing
A502	23	6	25-4	STR.			Footing
A604	14	6	15-10	100	14-6	0-3	Footing
A505	4	5	10-0	144	4-2	2-3	Backwall
A506	3	5	7-10	108	3-5	5	Backwall
A507	1 Ser.	5	9-9	113	2-0	3-5	Backwall
	of 11		14-9				Backwall
A508	2	5	12-6	STR.			Backwall
A509	1 Ser.	5	1-3	STR.			Backwall
	of 5		7-9				Backwall
A510	5	5	7-6	133	0-9	1-9	Maskwall
A511	5	5	17-4	105	1-8	7-10	Maskwall
A512	36	5	6-9	129	2-6	1-2	Horizontal
A513	1	5	11-10	105	7-10	2-0	Maskwall
A514	6	5	12-3	113	2-2	7-5	Backwall
A615	34	6	23-2	STR.			Vertical
A516	22	5	17-6	STR.			Vertical
A517	21	5	23-6	STR.			Vertical
A518	22	5	16-0	104	7-10	8-2	Horizontal and Pad
A519	22	5	22-5	104	7-6	13-0	Horizontal
A520	5	5	23-2	STR.			Vertical
A621	37	6	21-9	STR.			Vertical
A522	7	5	11-9	113	1-10	7-3	Backwall
A523	5	5	11-6	113	1-6	7-3	Maskwall
A624	71	6	7-0	104	1-0	6-0	Footing Dowel
A525	27	5	6-9	104	1-0	5-3	Footing Dowel
A526	5	5	22-9	138	5-0	11-10	Backwall
A527	20	5	7-3	104	2-3	5-0	Pad
A528	2	5	5-0	104	2-3	2-3	Pad
A529	1 Ser.	5	6-3	104	2-3	4-0	Pad
	of 3		9-3				Pad



Note: See sheet 13 for expansion joint details between superstructure and abutment.
See sheet 32 for railing corner post detail and dowel bar assembly details and expansion and contraction joints in wall.

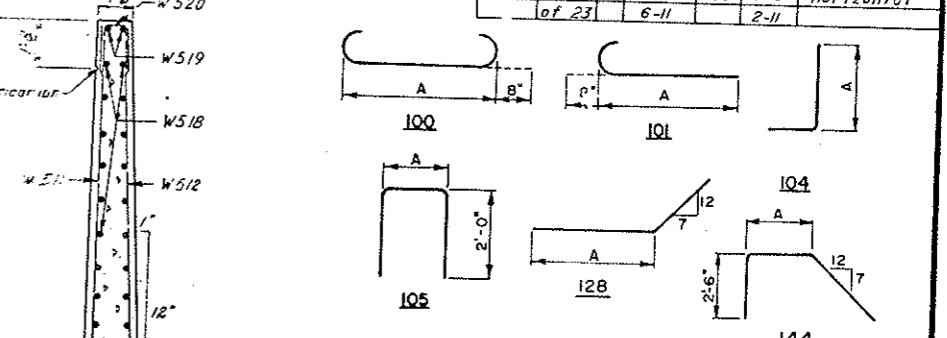
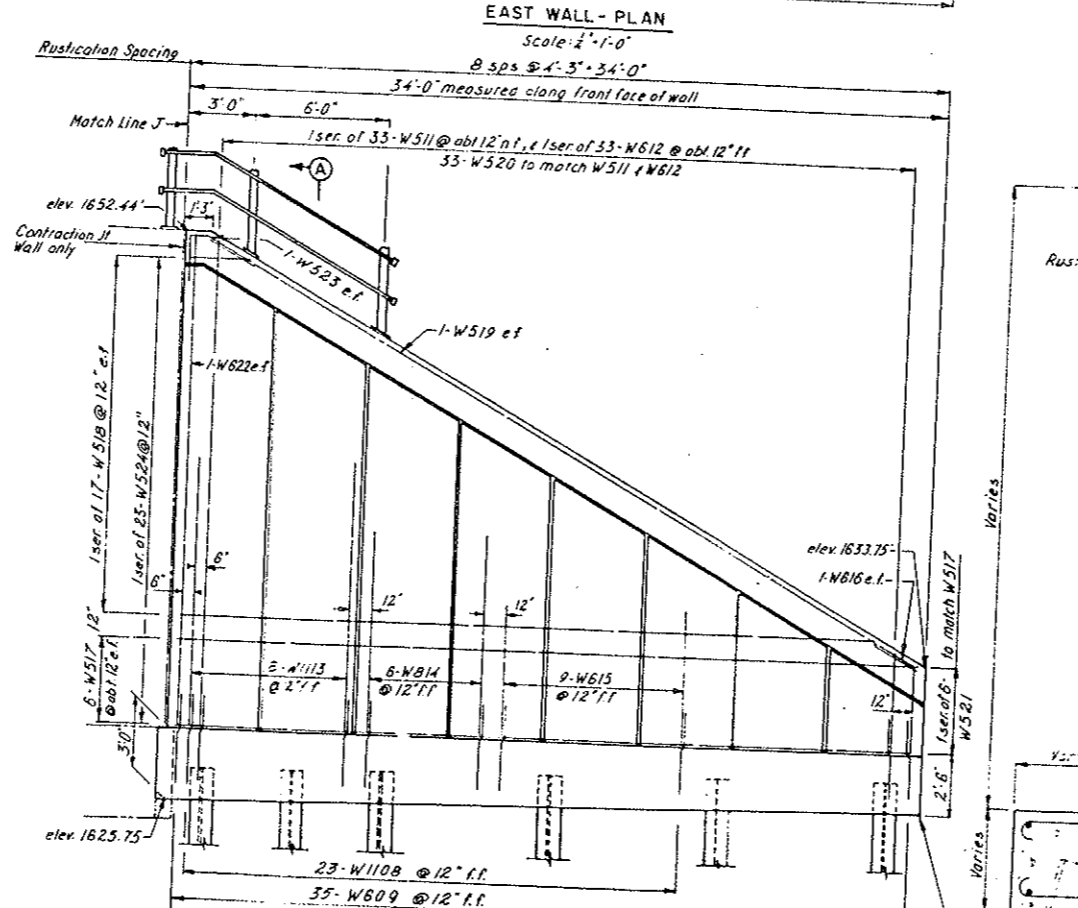
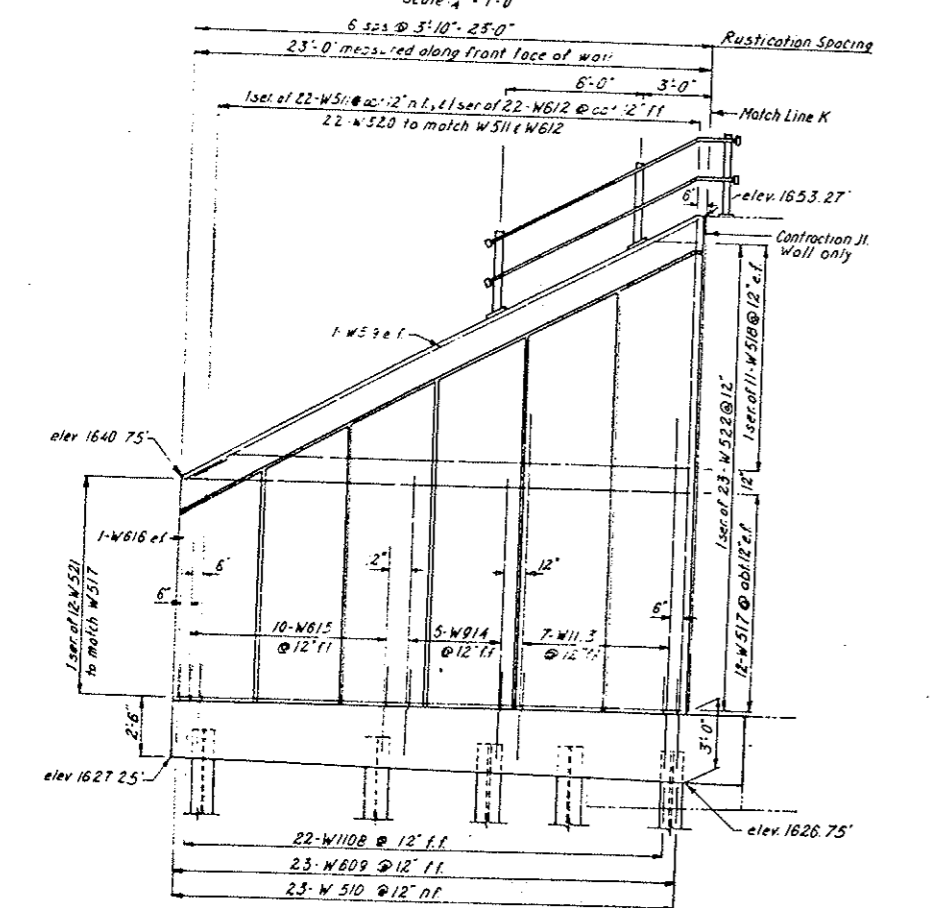
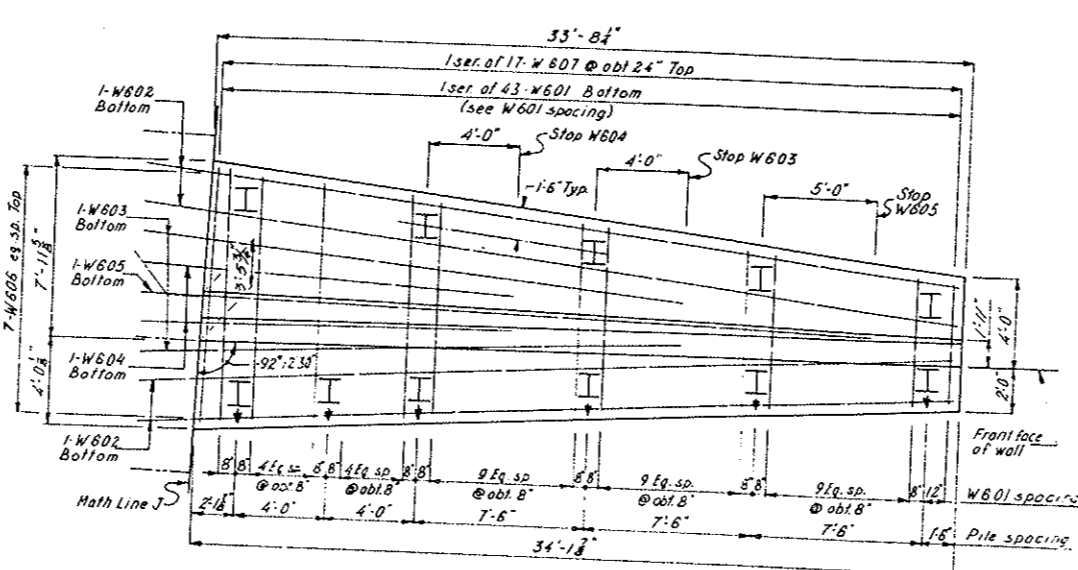
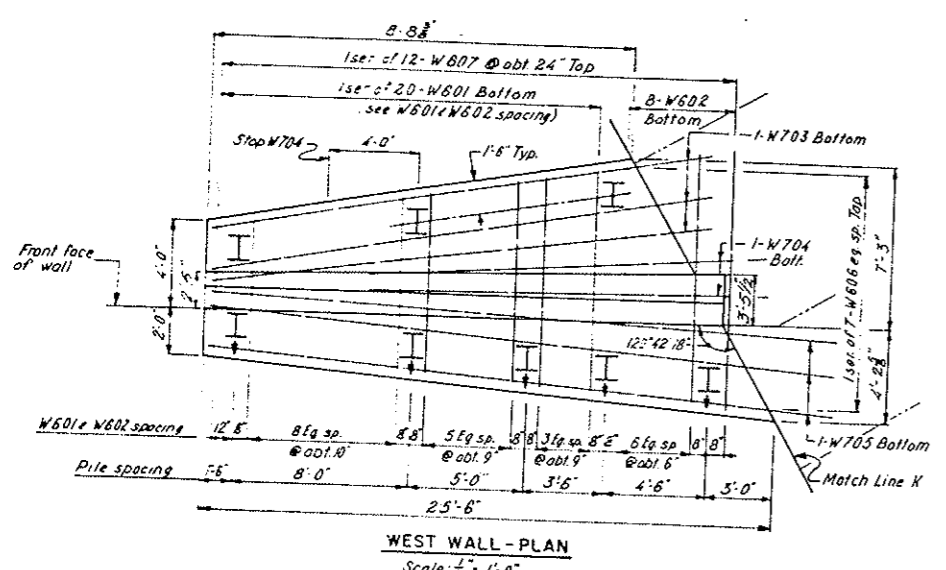
Reinforcing Steel	11,483 Lbs
Steel Piling (HP 12x53)	1,365 Lin Ft
Class AC- Mod Concrete	174.5 Cu Yd
Class I Excavation	104 Cu Yd
Steel Test Piles (HP 12x53)	75 1 Each

ABUTMENT 3A DETAILS
BRIDGE A
BURLINGTON NORTHERN, INC.
RAILWAY UNDERPASSES

U.S. HIGHWAY NO. 10
MORTON COUNTY

BILL OF REINFORCEMENT

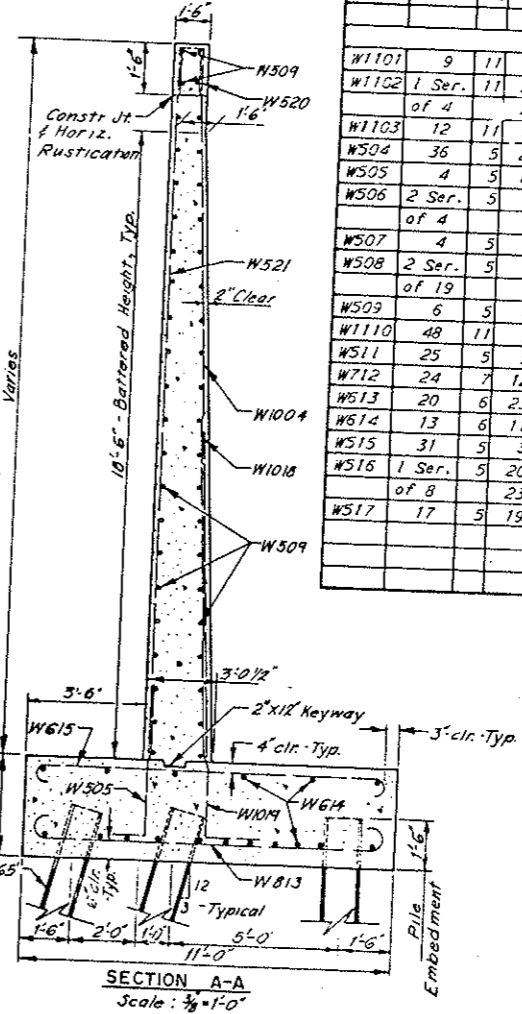
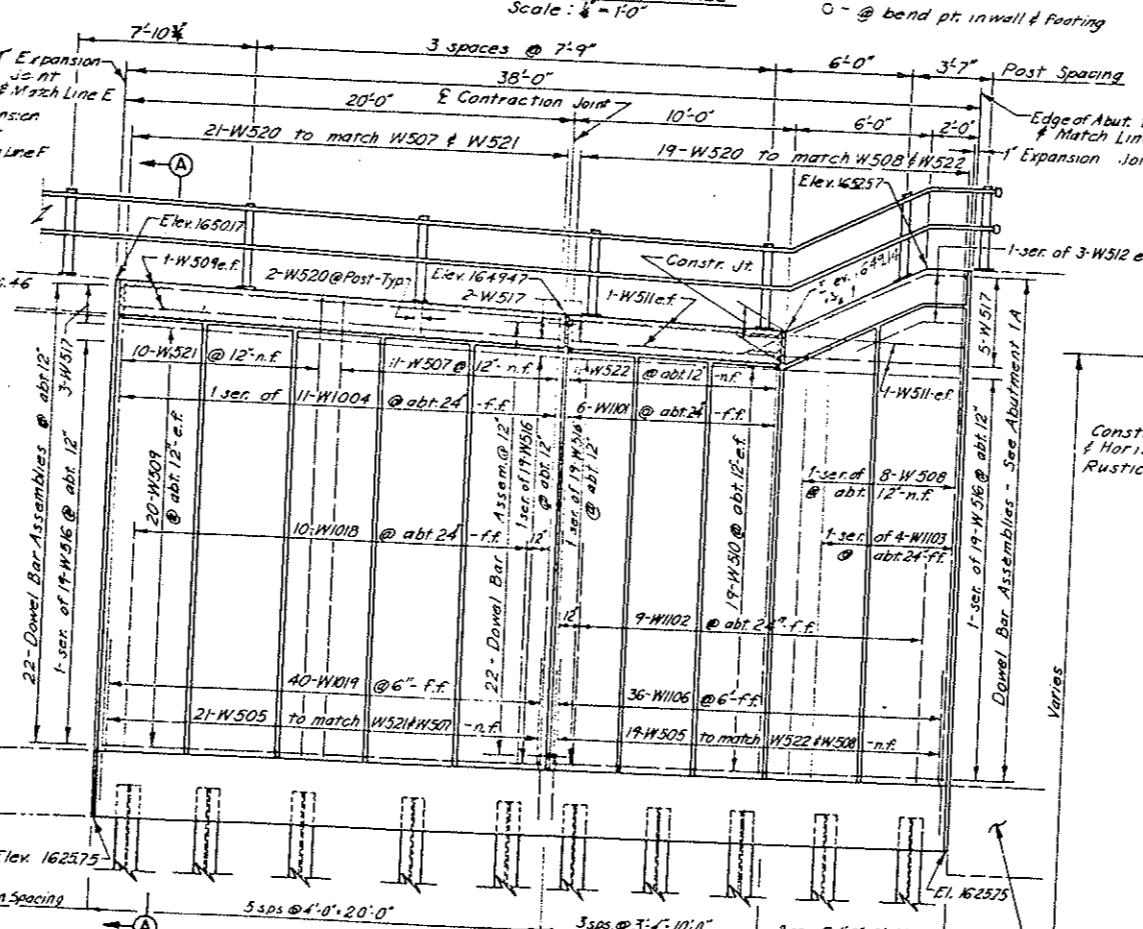
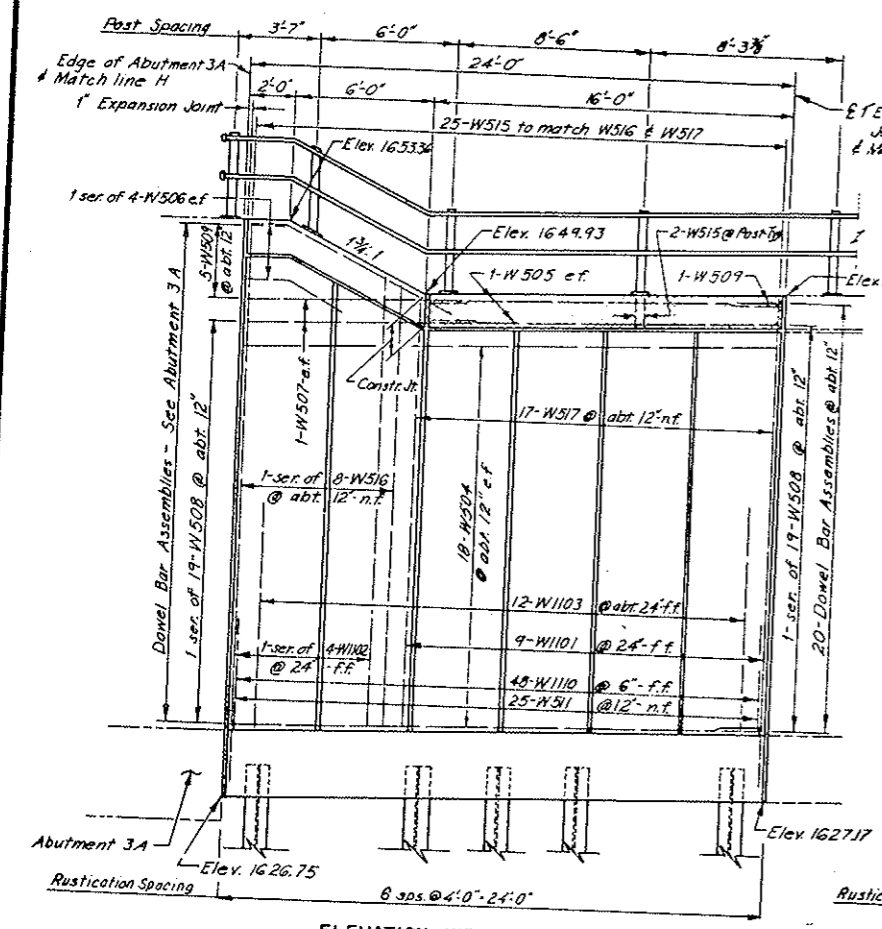
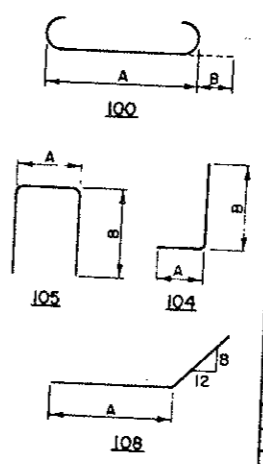
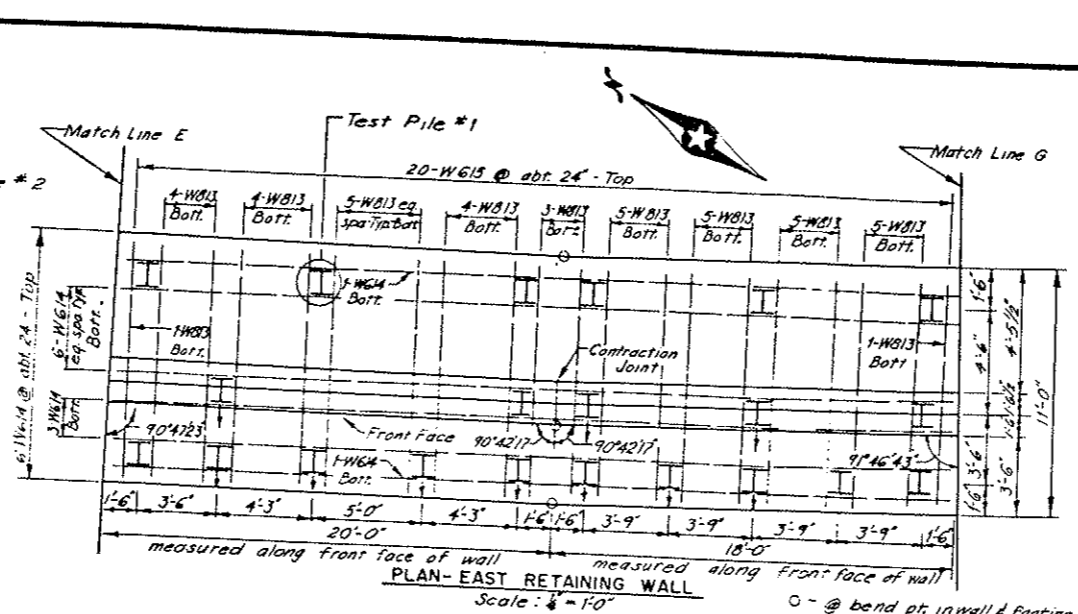
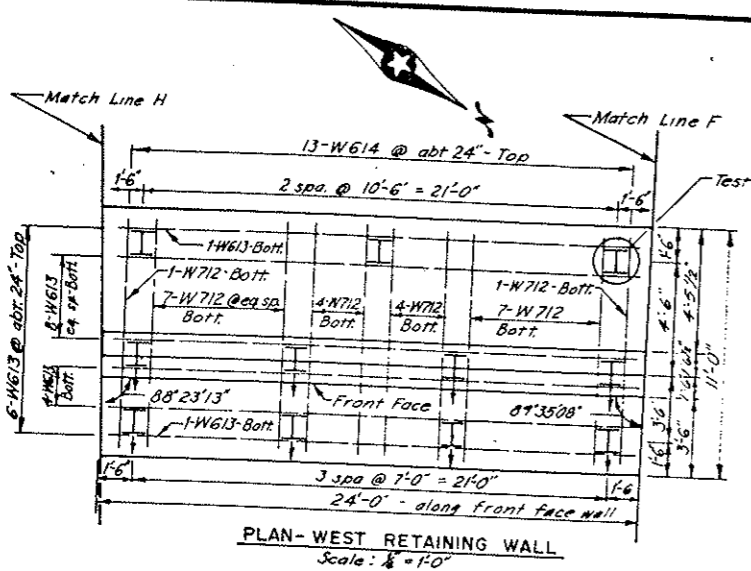
BAR NO.	NO.	SIZE	LENGTH	TYPE	DIM. A	LOCATION	BAR NO.	NO.	SIZE	LENGTH	TYPE	DIM. A	LOCATION
WEST WINGWALL							EAST WINGWALL						
W501	1 Ser.	6	6-10	100	5-6	Footing	W601	1 Ser.	6	6-10	100	5-6	Footing
	of 20		11-4		10-0			of 43		12-10		11-6	Footing
W502	8	6	10-11	101	10-3	Footing	W602	4	6	36-6	Str.		Footing
W503	3	7	22-5	Str.		Footing	W603	2	6	24-6	Str.		Footing
W504	2	7	17-6	Str.		Footing	W604	2	6	16-6	Str.		Footing
W505	3	7	28-0	Str.		Footing	W605	1	6	32-9	Str.		Footing
W506	1 Ser.	6	20-9	Str.		Footing	W606	7	6	37-0	Str.		Footing
	of 7		28-0				W607	1 Ser.	6	6-10	100	5-6	Footing
W507	1 Ser.	6	6-10	100	5-6	Footing		of 17		12-10		11-6	
	of 12		11-8		10-4		W1108	23	11	8-0	104	7-0	Footing
W508	22	11	8-0	104	7-0	Footing	W609	35	6	5-10	104	4-10	Footing
W509	23	6	5-10	104	4-10	Footing	W510	35	5	5-6	104	4-5	Footing
W510	23	5	5-6	104	4-6	Footing	W511	1 Ser.	5	5-6	Str.		Vertical
W511	1 Ser.	5	11-4	Str.		Vertical		of 33		23-3			Vertical
	of 22		23-3				W512	1 Ser.	6	5-6	Str.		Vertical
W512	1 Ser.	6	11-4	Str.		Vertical		of 33		23-3			Vertical
	of 22		23-3				W1113	8	11	13-0	Str.		Vertical
W513	7	11	14-0	Str.		Vertical	W614	6	8	10-0	Str.		Vertical
W514	5	9	11-0	Str.		Vertical	W615	9	6	7-0	Str.		Vertical
W515	10	6	8-0	Str.		Vertical	W516	2	6	7-6	Str.	4-10	Vertical
W516	6	13-6	128	10-10	Vertical	Horizontal	W517	12	5	33-8	Str.		Horizontal
W517	24	5	22-8	Str.		Horizontal	W518	2 Ser.	3-0				Horizontal
	of 11		21-0					of 17		31-9			Horizontal
W518	2	5	25-5	Str.		Horizontal	W519	2	5	37-3	Str.		Horizontal
W519	2	5	25-5	Str.		Horizontal	W520	33	5	5-2	105	1-2	Vertical
W520	22	5	5-2	105	1-2	Vertical	W521	1 Ser.	5	5-0	105	1-0	Horizontal
W521	1 Ser.	5	5-0	105	1-0	Horizontal		of 6		5-5		1-5	
	of 12		5-11		1-11		W622	2	6	23-4	Str.		Vertical
W522	1 Ser.	5	5-0	105	1-0	Horizontal	W523	2	5	5-6	144	0-11	Vertical
	of 23		6-10		2-10		W524	1 Ser.	5	5-0	105	1-0	Horizontal
								of 23		6-11		2-11	



Note: See sheet 32 for details of railing on wingwalls and corner railpost on abutments. Railing to extend 1'-0" beyond centerline of last railpost on wingwall and capped.
See Dowel Bar Assembly detail on sheet 32 for contraction joint details.

QUANTITIES	
Reinforcing Steel	12,274 Lbs
Steel Piling (HP 12x53)	1,235 Lin Ft
Class A-1 Mod Concrete	130.6 Cu Yd
Class 1 Excavation	104 Cu Yd
Structural Carbon Steel (A36)	555 Lbs

WINGWALL DETAILS
BRIDGE A
BURLINGTON NORTHERN, INC.
RAILWAY UNDERPASSES
U.S. HIGHWAY NO. 10
MORTON COUNTY



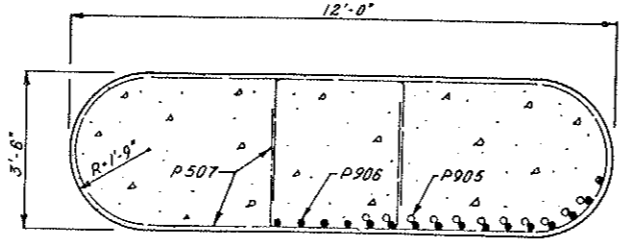
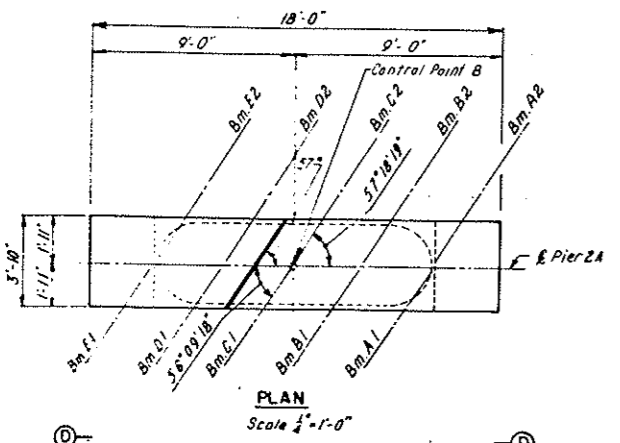
BILL OF REINFORCEMENT										
LAR NO.	NO.	LENGTH	TYPE	DIMENSIONS			LOCATION			
							A B C			
EAST RETAINING WALL										
W1101	6	11	20-0				Vertical			
W1102	9	11	10-0				Vertical			
W1103	1 Ser.	11	21-0				Vertical			
	of 4		23-4				Vertical			
W1004	1 Ser.	10	20-3				Vertical			
	of 11		21-0				Vertical			
A505	40	3	5-6	1-0	4-5		Dowel			
W1106	36	9	9-0	1-04	7-4		Dowel			
W507	11	5	20-3				Vertical			
W508	1 Ser.	9	20-6				Vertical			
	of 8		23-4				Vertical			
W509	44	9	19-6				Horizontal			
W510	38	9	17-6				Horizontal			
W511	8	3	9-6				Horizontal			
W512	2 Ser.	5	5-8	1-8	0-5		Horizontal			
	of 3		9-8				Horizontal			
W513	42	8	12-8	10-6	1-1		Footing			
W514	17	6	37-4				Footing			
W515	20	6	11-10	10-6	0-8		Footing			
W516	4 Ser.	5	5-0	1-0	2-0		Stem Tie - Side			
	of 19		6-7				Stem Tie - Side			
W517	12	3	5-0	1-0	2-0		Stem Tie - Side			
W1018	10	10	10-0				Vertical			
W1019	40	10	9-0	1-8	7-4		Dowel			
W520	50	3	3-6	1-2			Stem Tie - Top			
W521	10	5	20-9				Vertical			
W522	11	5	20-0				Vertical			
WEST RETAINING WALL										
W1101	9	11	19-9				Vertical			
W1102	1 Ser.	11	20-10				Vertical			
	of 4		23-3				Vertical			
W1103	12	11	10-0				Vertical			
W504	36	5	23-6				Horizontal			
W505	4	5	15-8				Horizontal			
W506	2 Ser.	5	4-2	1-8	0-6		Horizontal			
	of 4		9-8				Horizontal			
W507	4	5	9-6				Horizontal			
W508	2 Ser.	5	5-0	1-0	2-0		Horizontal			
	of 19		6-7				Stem Tie - Side			
W509	6	5	5-0	1-0	2-0		Stem Tie - Side			
W1110	48	11	9-0	1-8	7-4		Dowel			
W511	25	5	5-6	1-0	4-6		Dowel			
W712	24	7	12-2	10-6	0-10		Footing			
W513	20	6	23-4				Footing			
W514	13	6	11-10	10-6	0-8		Footing			
W515	31	5	3-6	1-2	1-2		Stem Tie - Top			
W516	1 Ser.	5	20-0				Vertical			
	of 8		23-3				Vertical			
W517	17	5	19-9				Vertical			

QUANTITIES	
Reinforcing Steel	20,472 Lbs
Steel Piling (HP12x53)	1,950 Lin Ft
Class RE-1 Mod Concrete	181.2 Cu Yd
Class I Excavation	134 Cu Yd
Structural Carbon Steel (A36)	1041 Lbs
Steel Test Piles (HP12x53) @ 75	2 Each

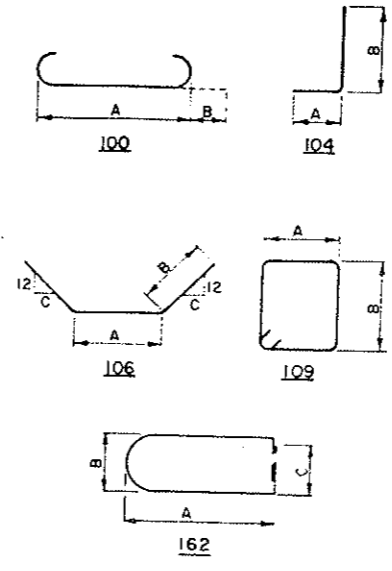
PHASE I
RETAINING WALL DETAILS
BRIDGE A
BURLINGTON NORTHERN, INC.
RAILWAY UNDERPASSES

U.S. HIGHWAY NO. 10
MORTON COUNTY

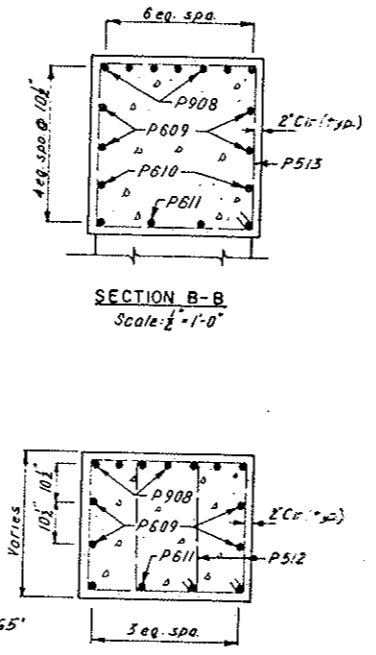
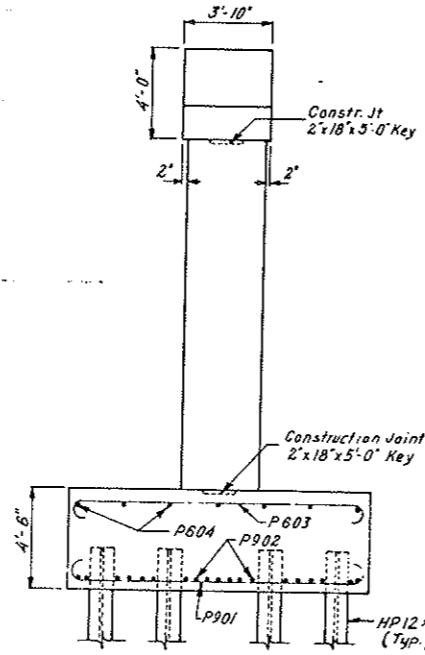
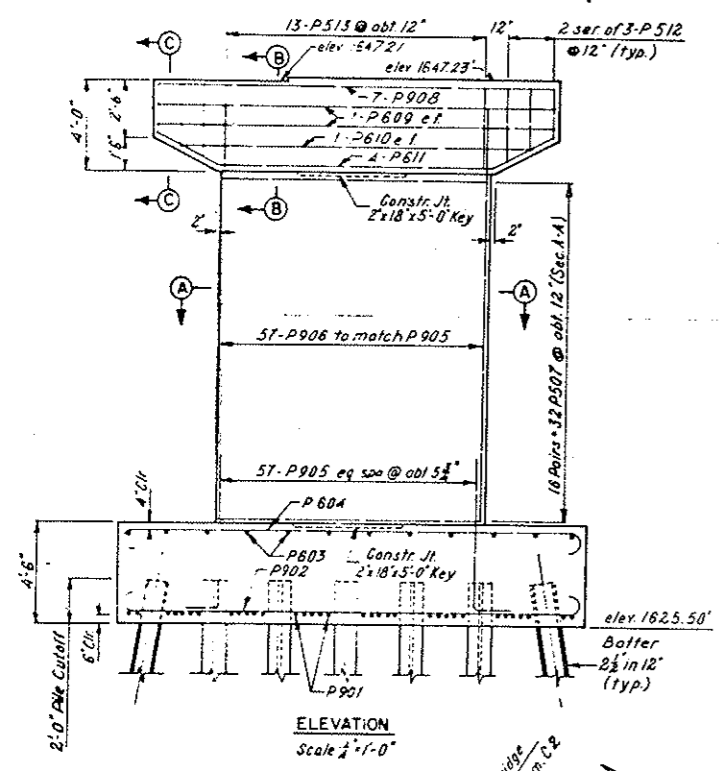
BRIDGE CODE	F.R. BRIDGE NO.	FED ROAD DIST NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
X671	199	8	N D	MG-1-010 (OS) 917		24	



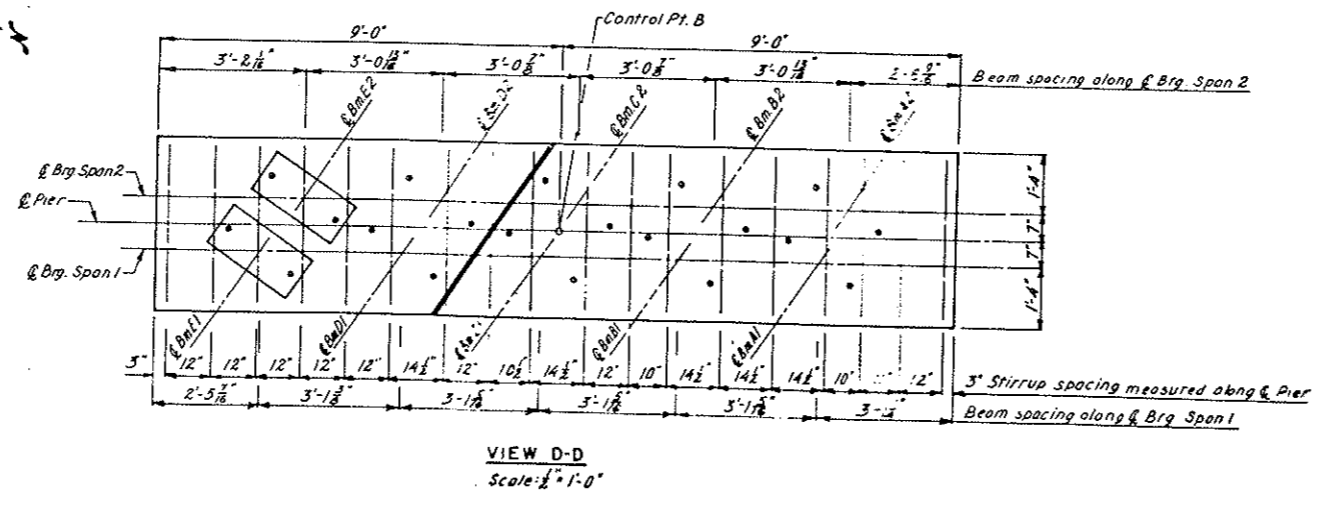
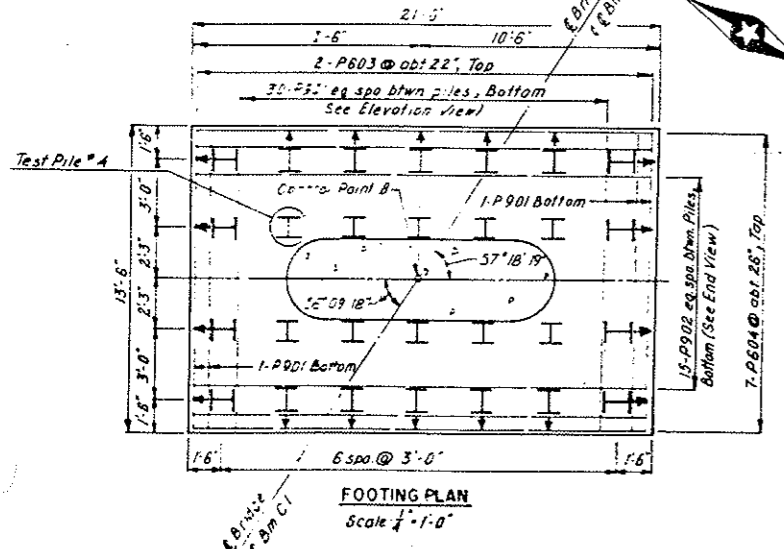
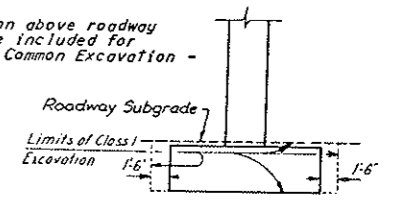
Note: Place dowel bars 1/4" inside of tie bars. Bars to be equally spaced along the perimeter of the column shaft.



BILL OF REINFORCEMENT									
BAR NO.	NO.	WT. LB	LENGTH	TYPE	DIMENSIONS			LOCATION	
					A	B	C		
P901	34	9	15-6	100	13-0	1-3		Footing	
P902	19	9	23-0	100	20-6	1-3		Footing	
P603	12	6	14-4	100	13-0	8		Footing	
P604	7	6	21-10	100	20-6	8		Footing	
P905	57	9	9-3	104	1-6	7-9		Footing	
P906	57	9	16-10	STR.				Shaft	
P507	32	5	19-8	162	7-6	3-2	3-0	Shaft	
P908	7	9	17-8	STR.				Cap Beam	
P609	4	6	17-8	STR.				Cap Beam	
P610	2	6	15-8	STR.				Cap Beam	
P611	4	6	18-8	106	12-2	3-3	2-3	Cap Beam	
P512	4 Ser. of 3	5	12-0	109	3-4	2-3		Cap Beam	
P513	13	5	15-2	109	3-6	3-8		Cap Beam	



Note: Excavation above roadway subgrade to be included for payment under Common Excavation - Type A.

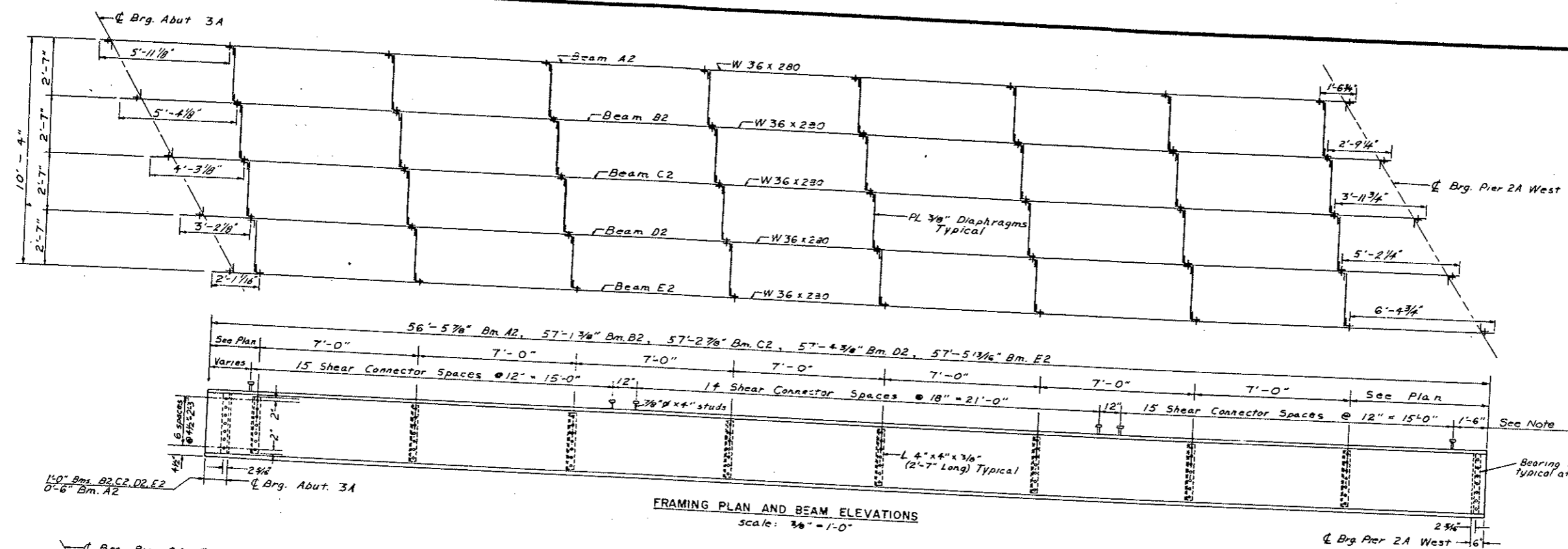


QUANTITIES	
Reinforcing Steel	10,531 Lbs
Steel Piling (HP12 x 53)	1,755 Lin Ft
Class RE-1 Mod. Concrete	761 Cu Yd
Class I Excavation	68 Cu Yd
Steel Test Piles (HP 12 x 53) @ 75'	1 Each

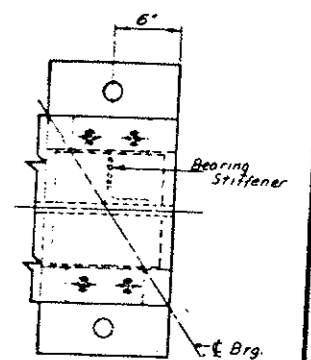
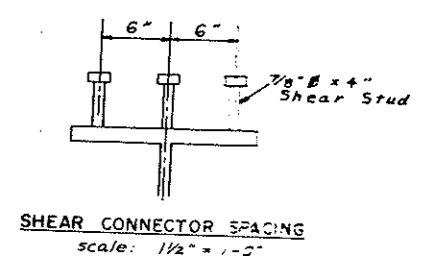
PIER 2A DETAILS
BRIDGE A
BURLINGTON NORTHERN, INC.
RAILWAY UNDERPASSES

U.S. HIGHWAY NO. 10
MORTON COUNTY

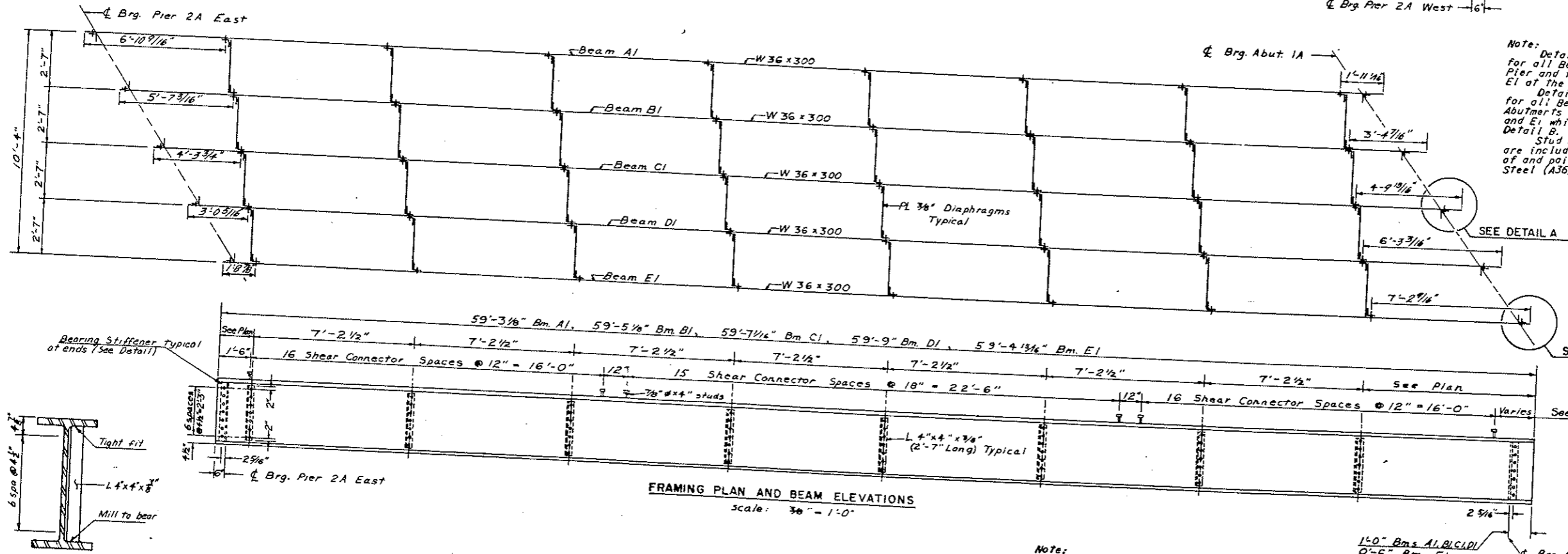
BRIDGE CODE	R.R. BRIDGE NO.	FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
K671	199	8	MO.	11-00 (C.S. 9-7)		35	



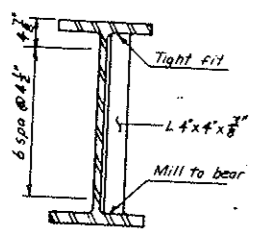
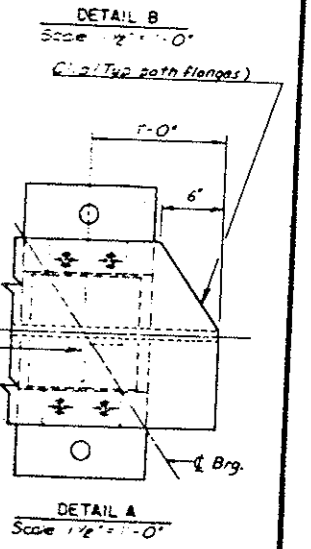
FRAMING PLAN AND BEAM ELEVATIONS
Scale: 3/8" = 1'-0"



Note:
Detail B is typical for all beam ends at the Pier and for Beams A2 and E1 at the Abutments.
Detail A is typical for all beam ends at the Abutments except Beams A2 and E1 which are like Detail B.
Stud Shear Connectors are included in the weight of and paid for as Structural Steel (A36).



FRAMING PLAN AND BEAM ELEVATIONS
Scale: 3/8" = 1'-0"

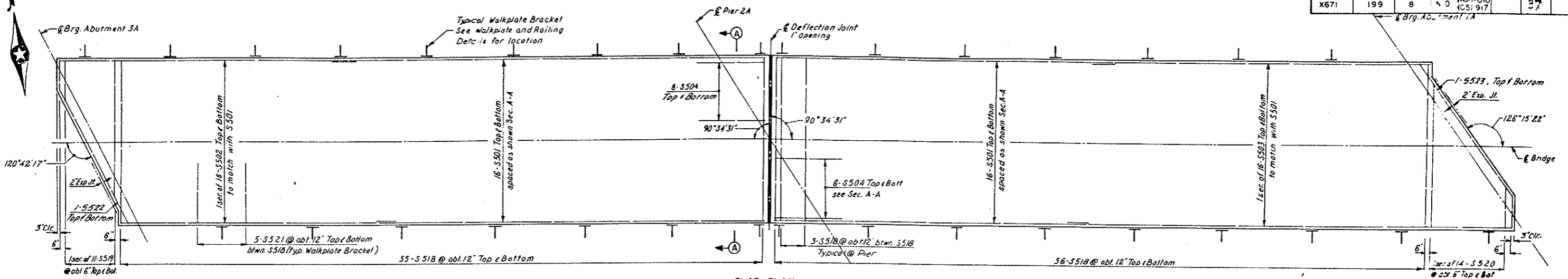


Note:
At Beams E2 and A1 at Pier 2A eliminate shear studs within 4'-0" from end of beam. At Beams D2 and B1 eliminate shear studs within 2'-0" from end of beam.
See sheet 13 for diaphragm details.

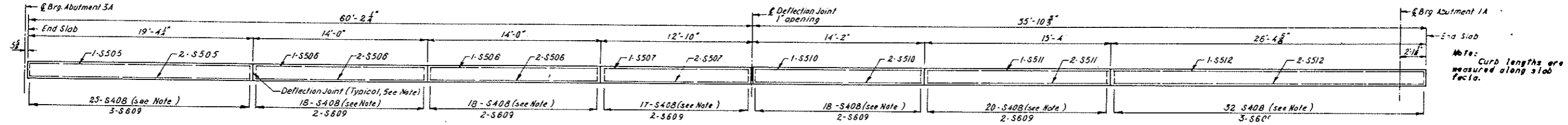
QUANTITIES	
Struct. Steel	182,960 lbs.
Steel	182,960 lbs.

FRAMING PLAN AND BEAM DETAILS
BRIDGE A
BURLINGTON NORTHERN, INC.
RAILWAY UNDERPASSES
U.S. HIGHWAY NO. 10
MORTON COUNTY

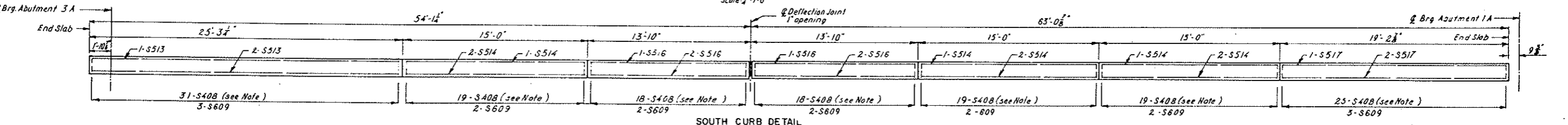
BRIDGE CODE	R.R. BRIDGE NO.	FED. ROAD DIST. NO.	STATE PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
X671	199	B	MD MG-1-010 (S) 917		27	7



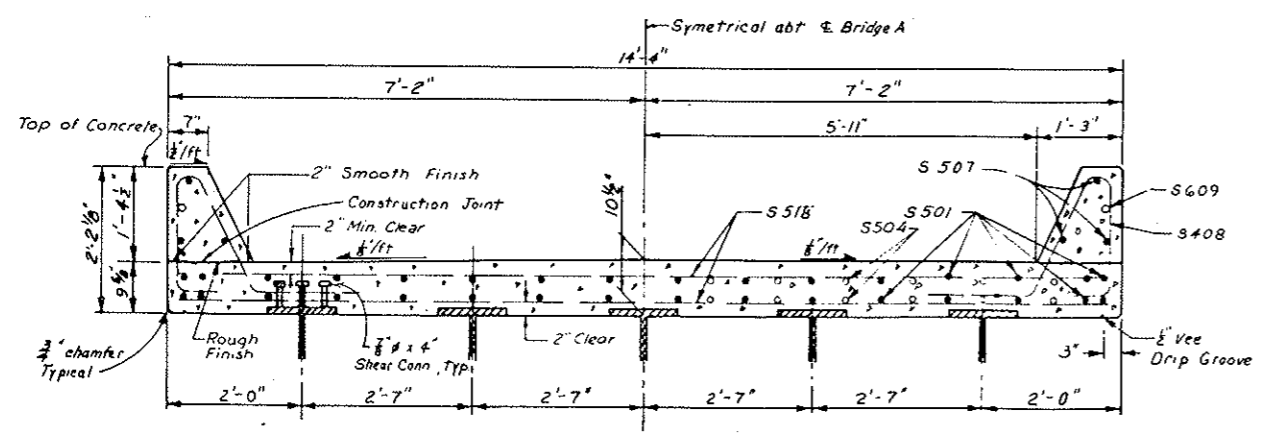
SLAB PLAN
Scale: 1/4" = 1'-0"



NORTH CURB DETAIL
Scale: 1/4" = 1'-0"



SOUTH CURB DETAIL
Scale: 1/4" = 1'-0"



SECTION A-A
Scale: 1/4" = 1'-0"

Note: Intermediate deflection joints in curb to be formed with 3/8" pre-molded bituminous joint filler conforming to AASHTO Designation M33.

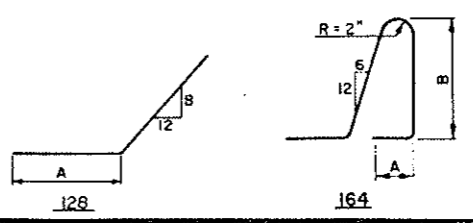
BILL OF REINFORCEMENT															
BAR NO.	NO.	SIZE	LENGTH	TYPE	DIMENSIONS		LOCATION	BAR NO.	NO.	SIZE	LENGTH	TYPE	DIMENSIONS		LOCATION
					A	B							A	B	
S501	64	5	30-0	Str.			Longitudinal	S512	3	5	26-0	Str.			Curb
S502	2 Ser.	5	25-9	Str.			Longitudinal	S513	3	5	24-10	Str.			Curb
	of 16		31-9					S514	9	5	14-8	Str.			Curb
S503	2 Ser.	5	27-6	Str.			Longitudinal	S516	6	5	13-5	Str.			Curb
	of 16		35-9					S517	3	5	18-9	Str.			Curb
S504	24	5	6-0	Str.			Longitudinal	S518	234	5	13-10	Str.			Transverse
S505	3	5	19-0	Str.			Curb	S519	2 Ser.	5	3-6	Str.			Transverse
S506	6	5	13-8	Str.			Curb	of 11			11-6				
S507	3	5	12-5	Str.			Curb	S520	2 Ser.	5	3-7	Str.			Transverse
S408	297	4	5-6	164	0-6	1-8	Curb	of 14			11-9				
S609	32	6	3-6	Str.			Curb	S521	260	5	5-0	Str.			Transverse
S610	3	5	13-9	Str.			Curb	S522	2	5	15-3	128	12-9	7 3/4	Transverse
S511	3	5	15-0	Str.			Curb	S523	2	5	16-3	128	13-9	8 3/4	Transverse

Note: Place one bar of about 3" and one bar of about 6" from joints and remaining bars of about 12" ctrs. At bracket anchorage place one extra S408 between normally spaced bars and add one S609 bar as shown on sh. 16.

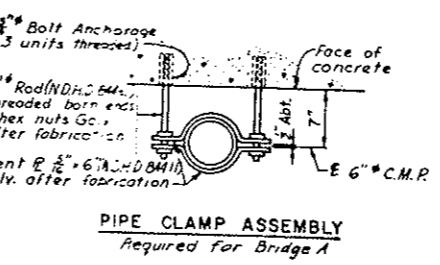
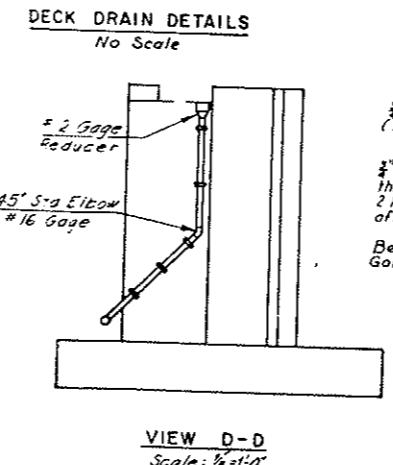
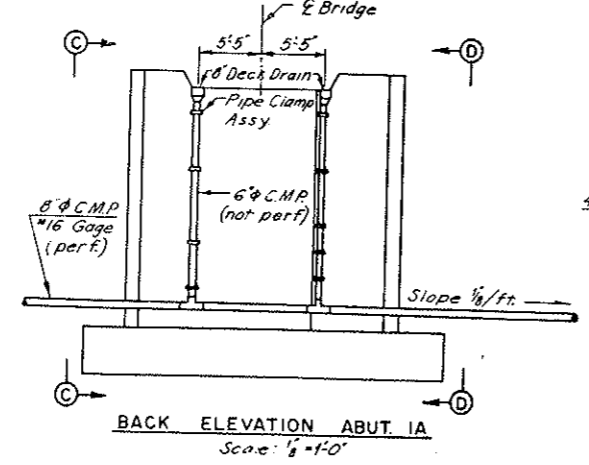
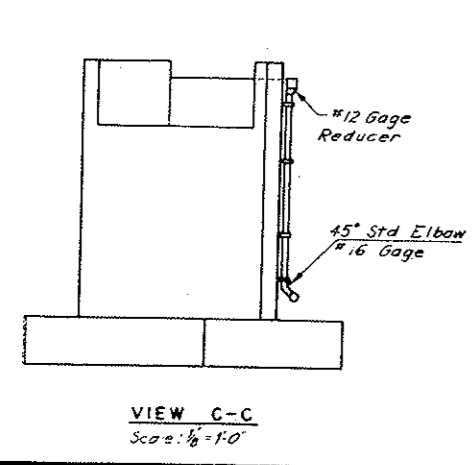
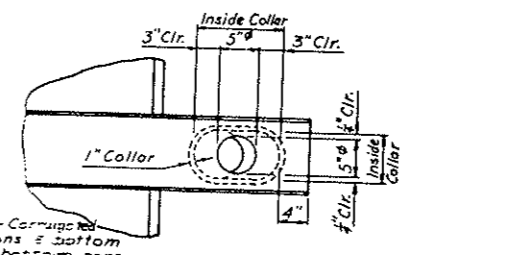
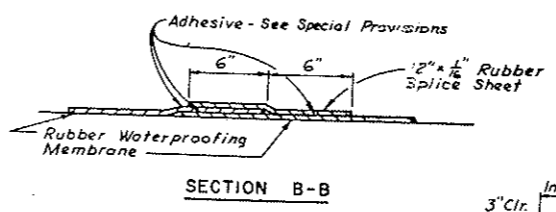
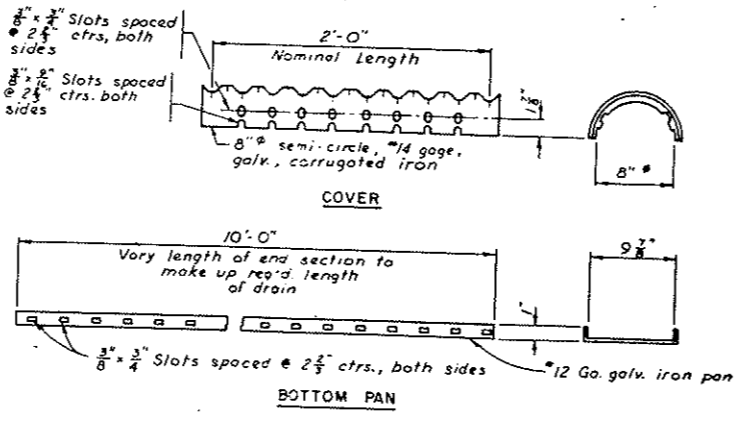
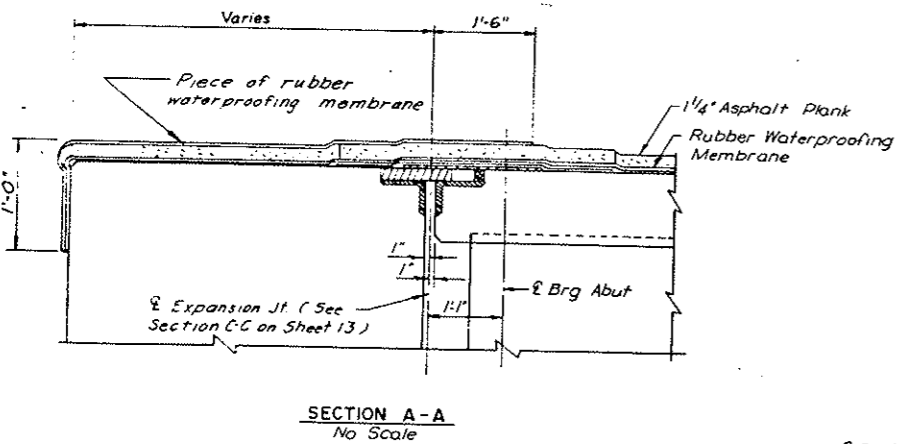
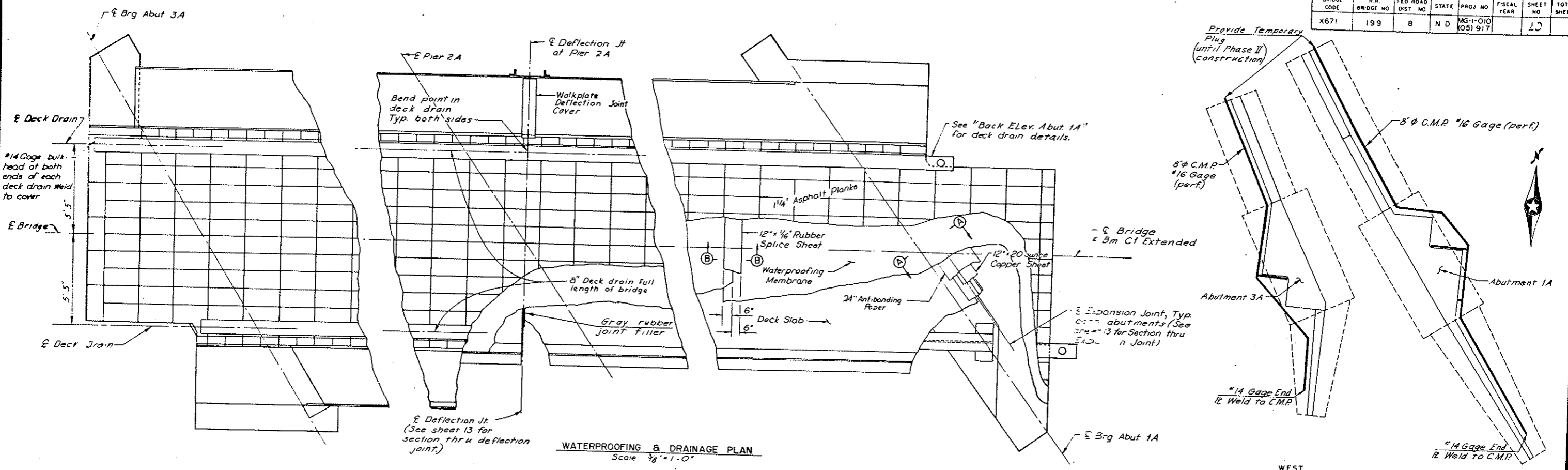
Note: See sh. 13 for details of Expansion Joints and Deflection Joint.

QUANTITIES	
Reinforcing Steel	11,354 Lbs
Class A2 W-8 Concrete	591 Cu Yd
Structural Carbon Steel (A36)	1,308 Lbs

DECK SLAB REINFORCEMENT
BRIDGE A
BURLINGTON NORTHERN, INC
RAILWAY UNDERPASSES
U.S. HIGHWAY NO. 10
MORTON COUNTY

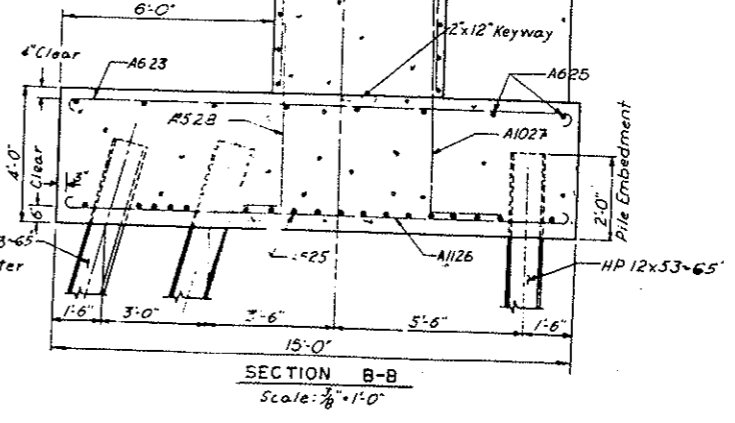
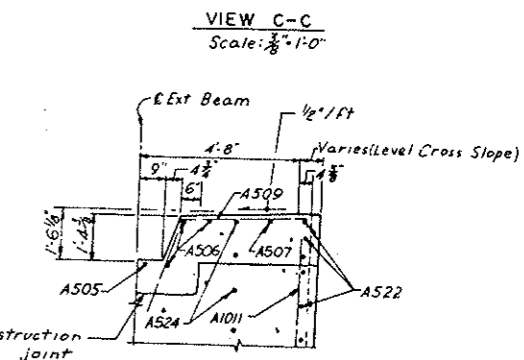
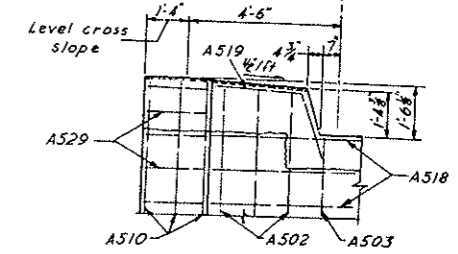
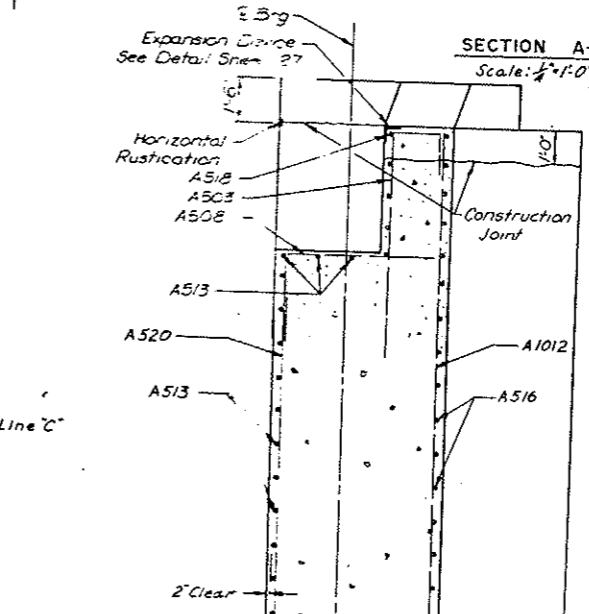
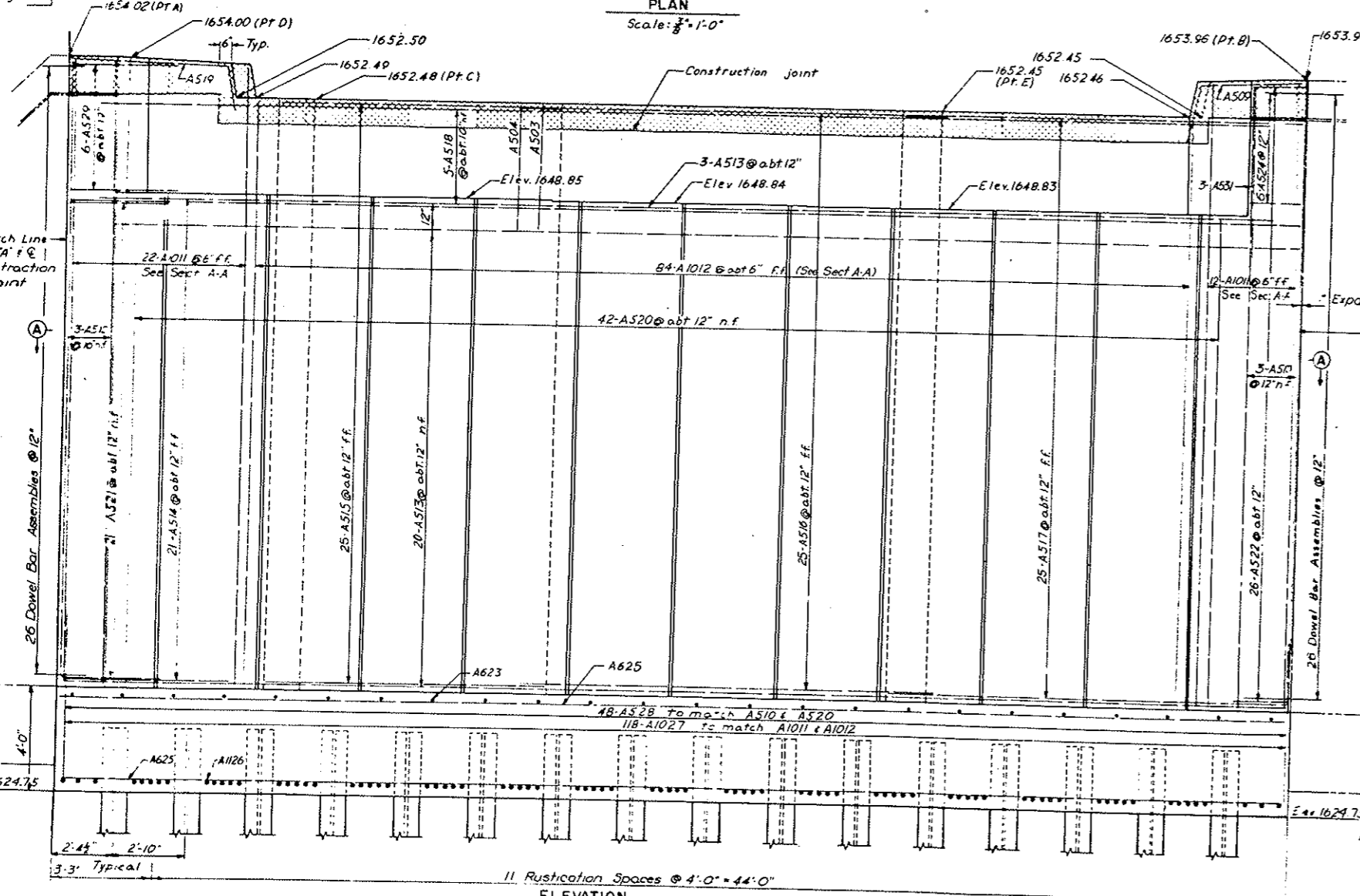
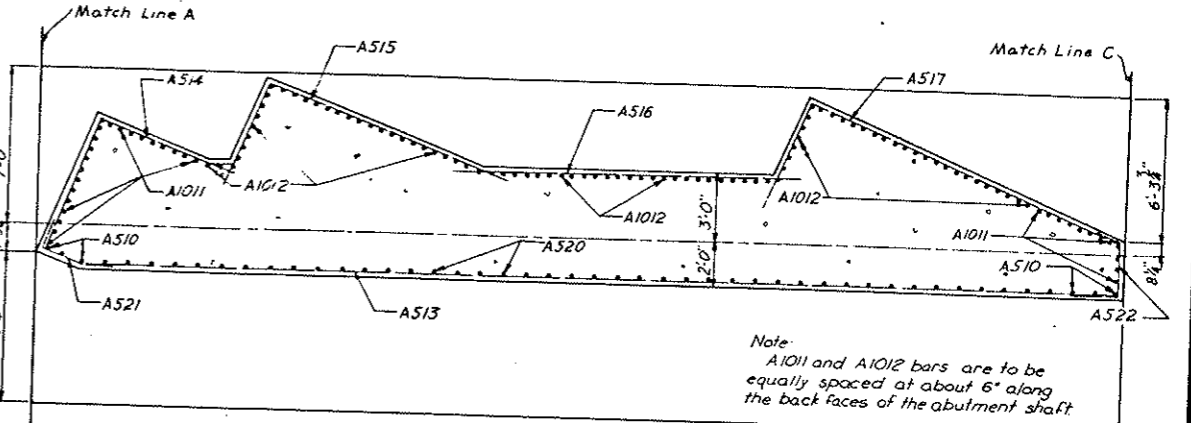
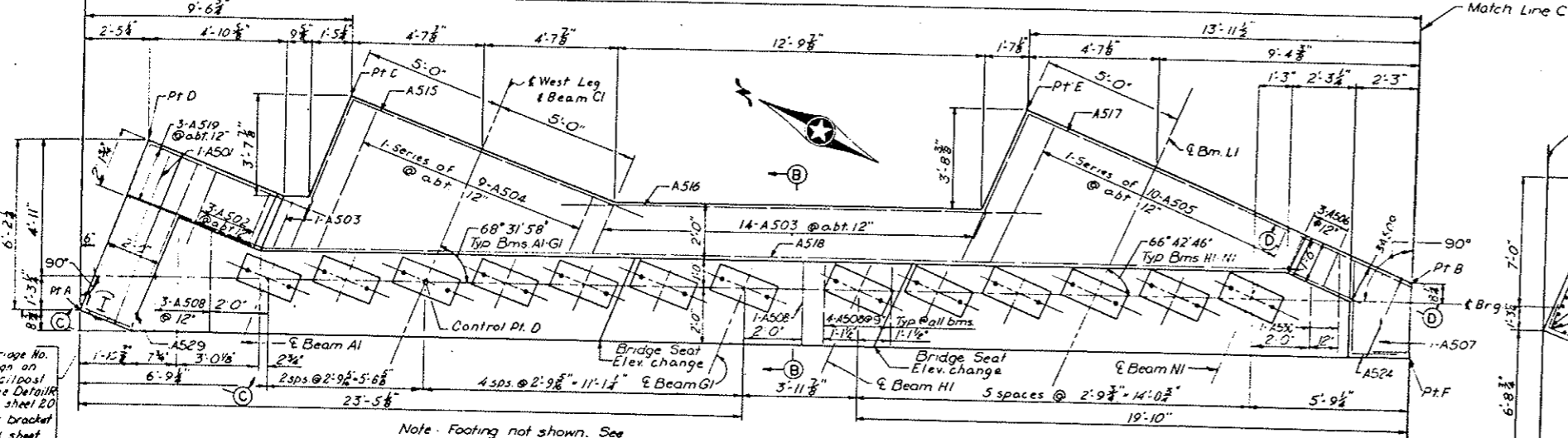


BRIDGE CODE	R.R. BRIDGE NO.	FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
X671	199	8	N D	AG-1-010 (05) 917		20	



QUANTITIES	
One-Ply Membrane Waterproofing	1915.39 ft
WATERPROOFING AND DRAINAGE DETAILS BRIDGE A BURLINGTON NORTHERN, INC. RAILWAY UNDERPASSES U.S. HIGHWAY NO. 10 MORTON COUNTY	

BRIDGE CODE	R.R. BRIDGE NO.	FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
X631	199	8	N.D.	MG-1-010 (05) 917		27	31

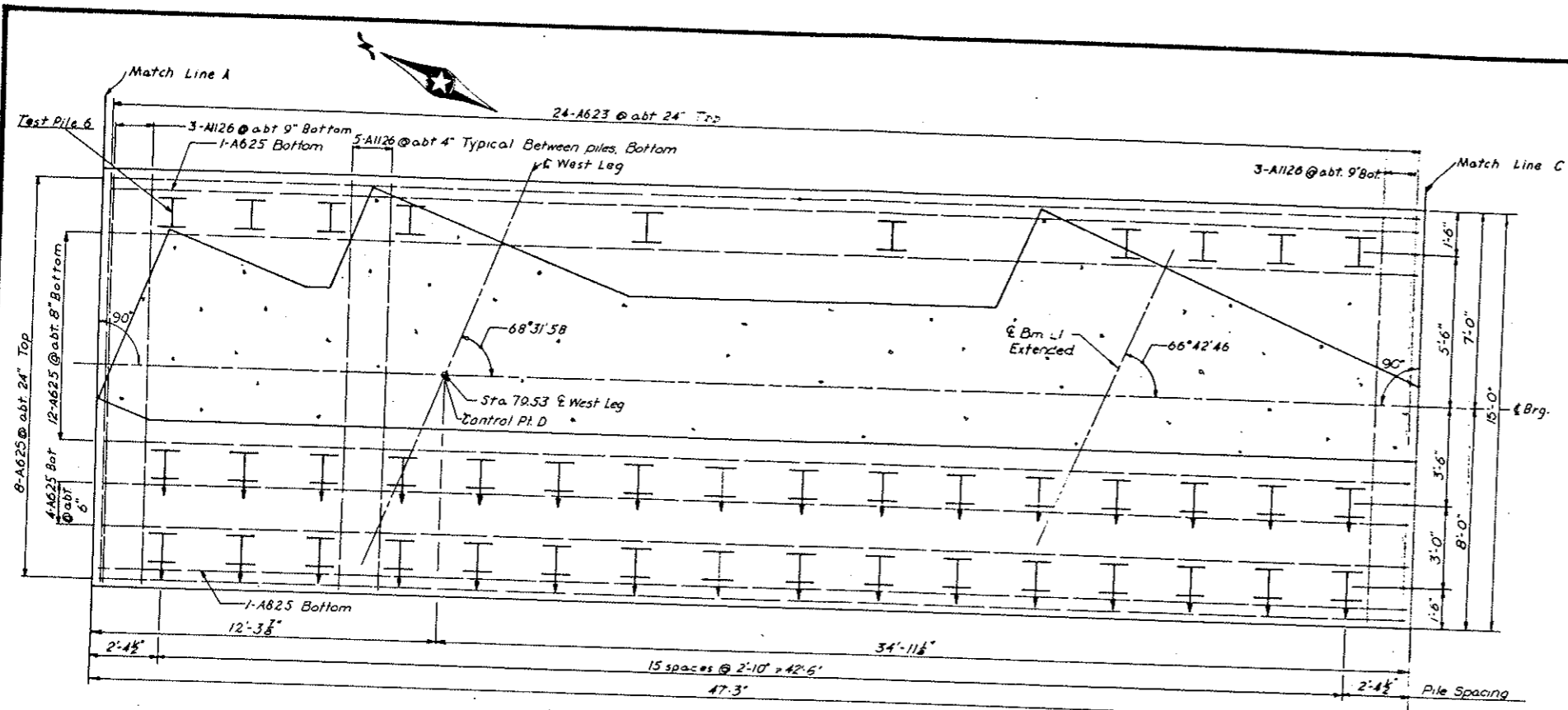


QUANTITIES	

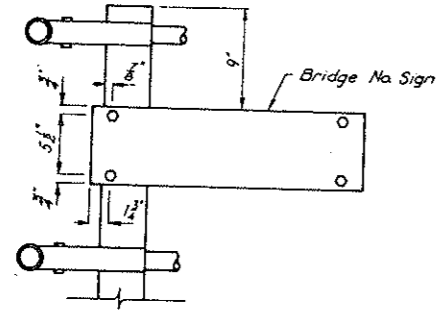
ABUTMENT IB DETAILS
(SHEET 1 OF 2)
BRIDGE B
BURLINGTON NORTHERN, INC.
RAILWAY UNDERPASSES

U.S. HIGHWAY NO. 10
MORTON COUNTY

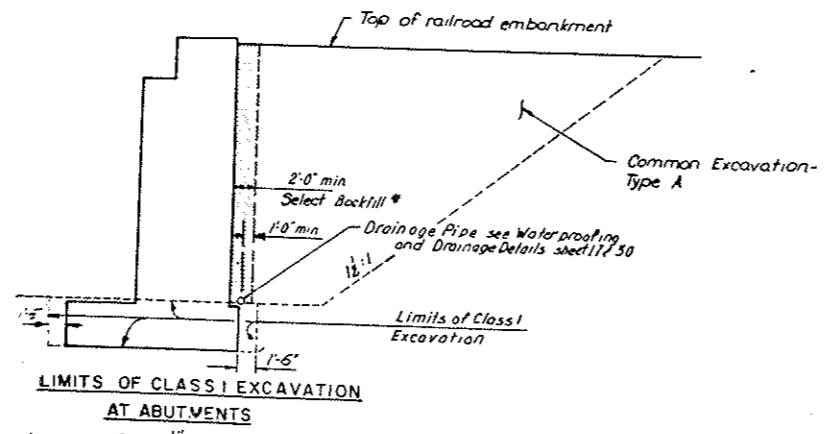
BRIDGE CODE	R.R. BRIDGE NO.	FED ROAD DIST NO	STATE	PROJ NO	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
X631	199	8	N D	MG-1-010 (A5) 917		25	



FOOTING PLAN
Scale: 3/8" = 1'-0"



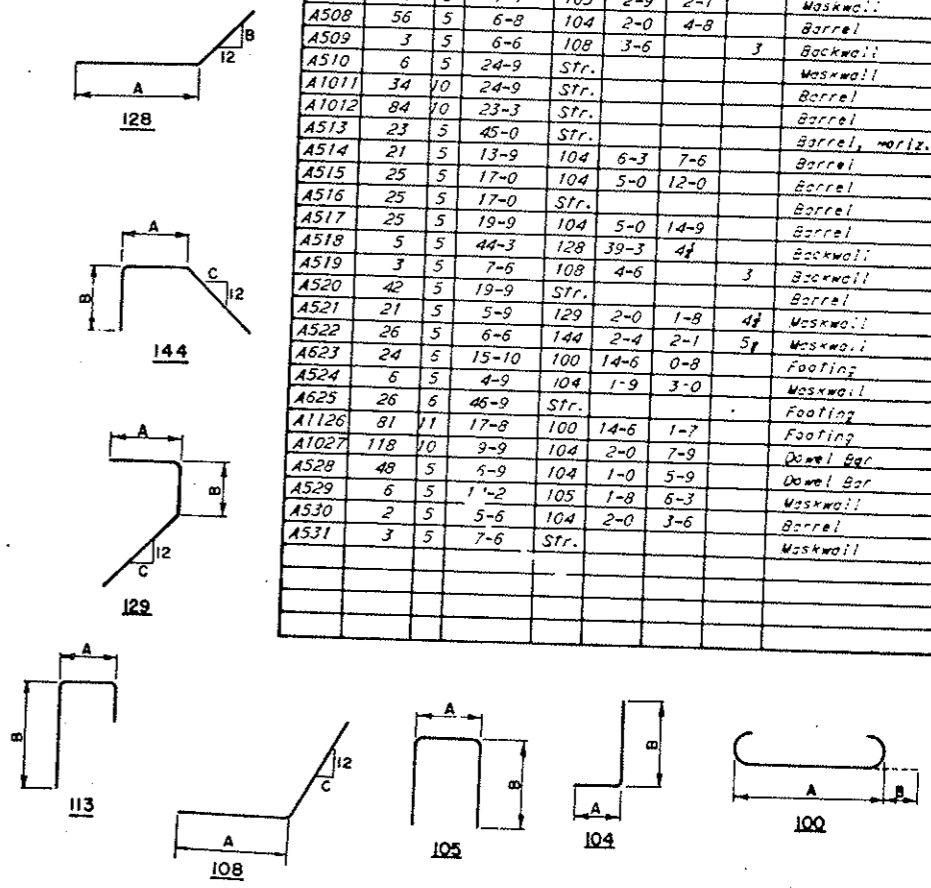
DETAIL R
Scale: 1/2" = 1'-0"



LIMITS OF CLASS I EXCAVATION AT ABUTMENTS
Scale: 3/8" = 1'-0"

*Select Backfill to be included for payment under N.D.H.D. Spec. 228-4.2. Note that width of Select Backfill for payment varies from 2'-0" minimum to width as required to extend 1'-0" beyond drainpipe.

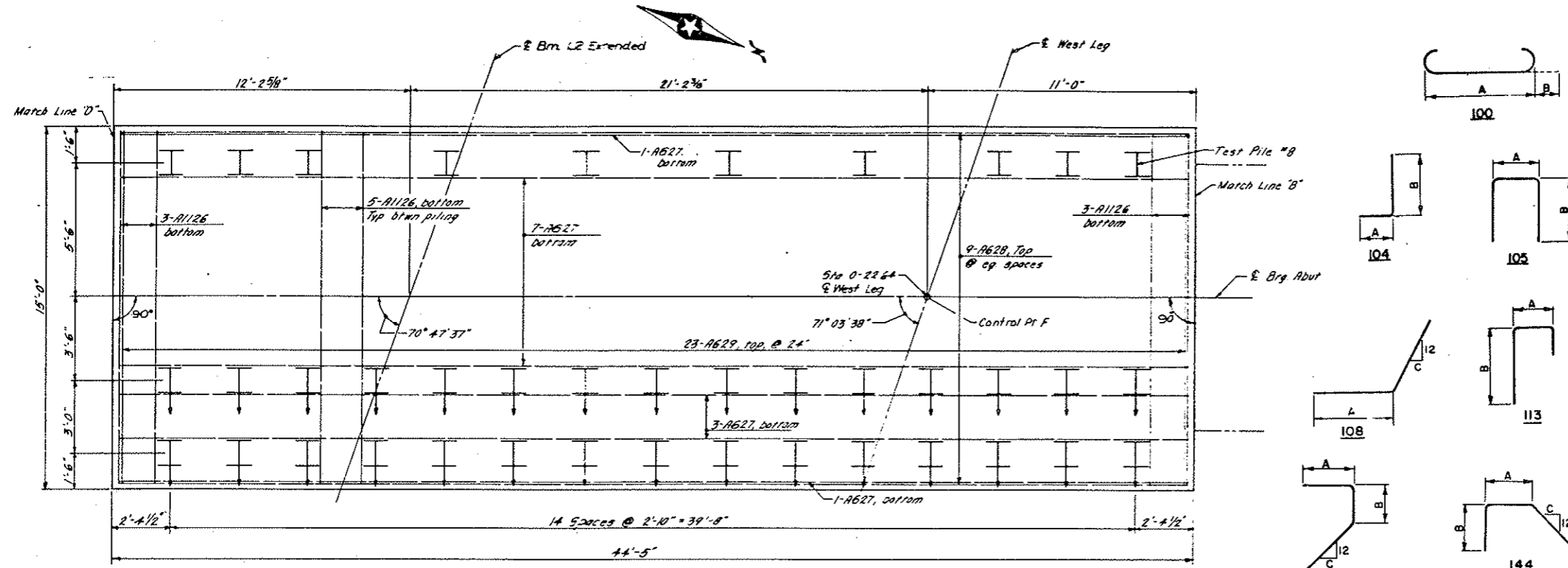
BILL OF REINFORCEMENT- ABUTMENT 1B									
BAR NO.	NO.	SIZE	LENGTH	TYPE	DIMENSIONS			LOCATION	
					A	B	C		
A501	1	5	6-3	Str.				Maskwall	
A502	3	5	11-0	113	1-7	7-0		Backwall	
A503	15	5	9-3	113	1-9	5-6		Backwall	
A504	1 Ser.	5	9-6	113	2-0	5-6		Backwall	
	of 9		12-7		5-1	5-6			
A505	1 Ser.	5	9-0	113	1-5	5-6		Backwall	
	of 10		12-8		5-1	5-6			
A506	4	5	10-2	113	1-0	7-0		Backwall	
A507	1	5	7-1	105	2-9	2-1		Maskwall	
A508	56	5	6-8	104	2-0	4-8		Barrel	
A509	3	5	6-6	108	3-6		3	Backwall	
A510	6	5	24-9	Str.				Maskwall	
A1011	34	10	24-9	Str.				Barrel	
A1012	84	10	23-3	Str.				Barrel	
A513	23	5	45-0	Str.				Barrel, horiz.	
A514	21	5	13-9	104	6-3	7-6		Barrel	
A515	25	5	17-0	104	5-0	12-0		Barrel	
A516	25	5	17-0	Str.				Barrel	
A517	25	5	19-9	104	5-0	14-9		Barrel	
A518	5	5	44-3	128	39-3	4 1/2		Backwall	
A519	3	5	7-6	108	4-6		3	Backwall	
A520	42	5	19-9	Str.			4 1/2	Barrel	
A521	21	5	5-9	129	2-0	1-8		Maskwall	
A522	26	5	6-6	144	2-4	2-1	5 1/2	Maskwall	
A623	24	5	15-10	100	14-6	0-8		Footing	
A524	6	5	4-9	104	1-9	3-0		Maskwall	
A625	26	6	46-9	Str.				Footing	
A1126	81	11	17-8	100	14-6	1-7		Footing	
A1027	118	10	9-9	104	2-0	7-9		Dowel Bar	
A528	48	5	5-9	104	1-0	5-9		Dowel Bar	
A529	6	5	1'-2	105	1-8	6-3		Maskwall	
A530	2	5	5-6	104	2-0	3-6		Barrel	
A531	3	5	7-6	Str.				Maskwall	



QUANTITIES	
Reinforcing Steel	32,687 lbs
Steel Piling (HP12x53)	2,665 Lin. Ft
Class AE-1 Mod Concrete	3264 Cu. Yd
Class I Excavation	188 Cu. Yd
Steel Test Piles (HP 2x53) @ 75' / Each	

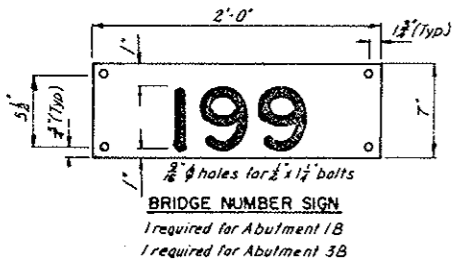
ABUTMENT 1B DETAILS
 (SHEET 2 OF 2)
 BRIDGE B
 BURLINGTON NORTHERN, INC.
 RAILWAY UNDERPASSES
 U.S. HIGHWAY NO. 10.
 MORTON COUNTY

BRIDGE CODE	R.R. BRIDGE NO.	FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
X631	199	8	N D	MG-11-010 CS-9-7		15	



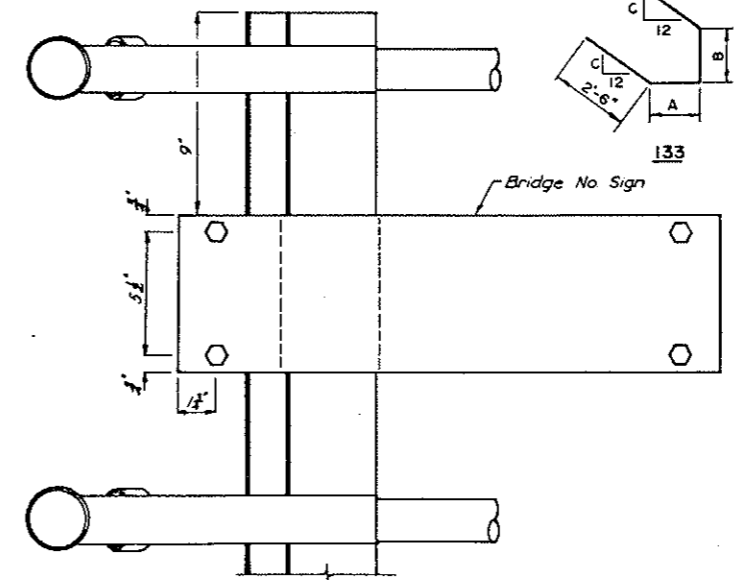
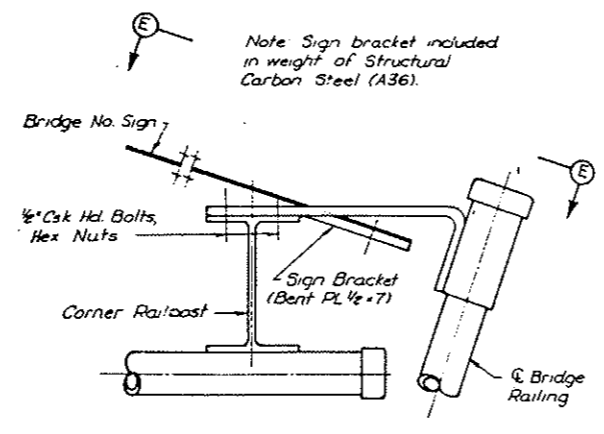
BILL OF REINFORCEMENT - ABUTMENT 3B

BAR NO.	NO.	SIZE	LENGTH	TYPE	DIMENSIONS			LOCATION
					A	B	C	
A501	5	5	10-8	113	1-6	7-0		Wes wall
A502	3	5	7-9	108	4-7		3	Back wall
A503	3	5	11-0	113	1-11	7-0		Back wall
A504	5	5	11-0	133	0-9	1-6	3y	Wes wall
A505	14	5	9-2	113	1-7	5-6		Back wall
A506	1 Ser.	5	9-6	113	1-10	5-6		Back wall
	of 9		12-10		5-2	5-6		
A507	1 Ser.	5	8-10	113	1-4	5-6		Back wall
	of 10		12-0		4-6	5-6		
A508	3	5	10-2	113	1-0	7-0		Back wall
A509	1	5	7-0	105	3-0	2-0		Wes wall
A510	42	5	6-8	104	2-0	4-8		Barrel-Horiz.
A511	20	5	4-8	129	2-0	0-8	3y	Barrel-Horiz.
A512	34	9	23-6	Str.				Barrel-Vert.
A513	79	9	22-0	Str.				Barrel-Vert.
A514	6	5	23-6	Str.				Barrel-Vert.
A515	39	5	18-4	Str.				Barrel-Vert.
A516	23	5	14-4	104	6-3	8-1		Barrel-Horiz.
A517	23	5	17-2	104	5-4	11-10		Barrel-Horiz.
A518	24	5	14-6	Str.				Barrel-Horiz.
A519	23	5	19-6	104	4-9	14-2		Barrel-Horiz.
A520	25	5	6-9	144	2-9	1-11	4	Barrel-Horiz.
A521	4	5	41-9	128	36-9	4		Back wall
A522	20	5	44-1	Str.				Barrel-Horiz.
A523	113	9	8-7	104	1-6	7-1		Footing Dowel
A524	45	5	6-11	104	1-6	5-5		Footing Dowel
A525	3	5	6-9	108	3-7		3	Back wall
A1126	76	11	17-8	100	14-6	1-7		Footing
A627	12	6	43-11	Str.				Footing
A628	9	6	43-11	Str.				Footing
A629	23	6	15-10	100	14-6	0-2		Footing
A530	2	5	42-6	Str.				Barrel-Horiz.
A531	3	5	5-6	104	2-0	3-6		Barrel-Horiz.
A532	2	5	6-	Str.				Wes wall
A533	5	5	5-0	104	1-11	3-1		Wes wall
A534	7	5	7-0	Str.				Wes wall
A535	1 Ser.	5	3-8	Str.				Approach Block
	of 4		13-4					
A536	1 Ser.	5	2-10	Str.				Approach Block
	of 4		12-4					



Note: Bridge Number Signs are overlays and shall be made of 0.025" thick 61S-T6 sheet aluminum. After degreasing and treatment of aluminum, apply black Scotchcal No. 655, or approved equal, to face of sign. Then apply 5" Series 140" U.S. Bureau of Public Roads Administration standard numerals of wide angle silver No. 2270 Scotchlite, or approved equal. Sign overlay to be bolted with galvanized or cadmium plated bolts to a No. 7 wrought iron plate of same size. The plate to be given two coats of jet black enamel to both sides.

FOOTING PLAN
Scale: 3/8"=1'-0"



QUANTITIES	
Reinforcing Steel	26,293 lbs.
Steel Piling (#2 @ 2'-5")	2,535 Lin Ft
Class AE-1 Mod Concrete	2930 Cu Yd
Class I Excavation	174 Cu Yd
Steel Test Piles (#12 @ 53) @ 75'	1 Each

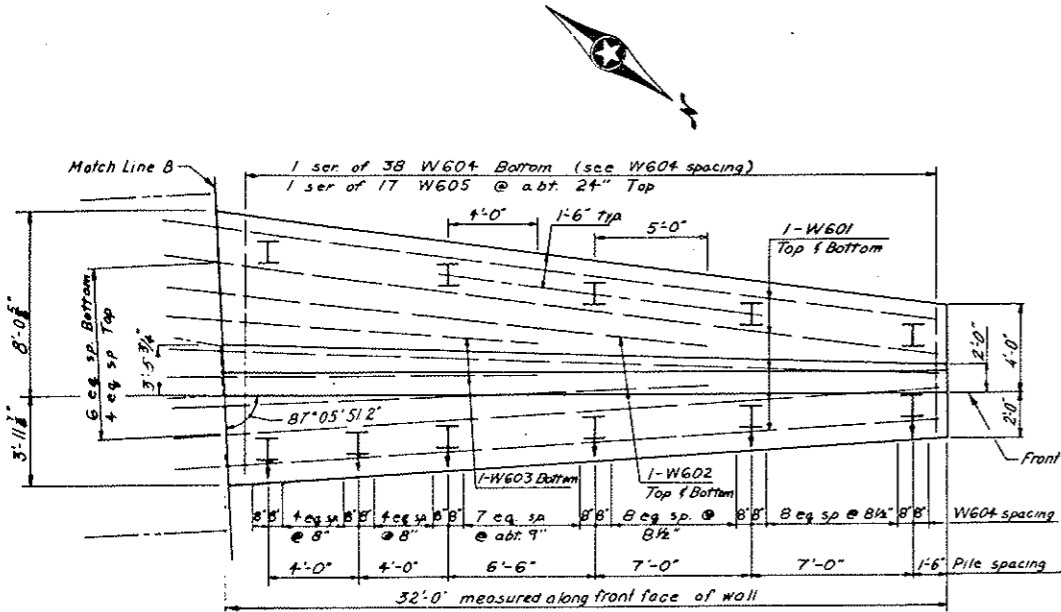
ABUTMENT 3B DETAILS
(SHEET 2 OF 2)
BRIDGE B
BURLINGTON NORTHERN, INC.
RAILWAY UNDERPASSES

U.S. HIGHWAY NO. 10
MORTON COUNTY

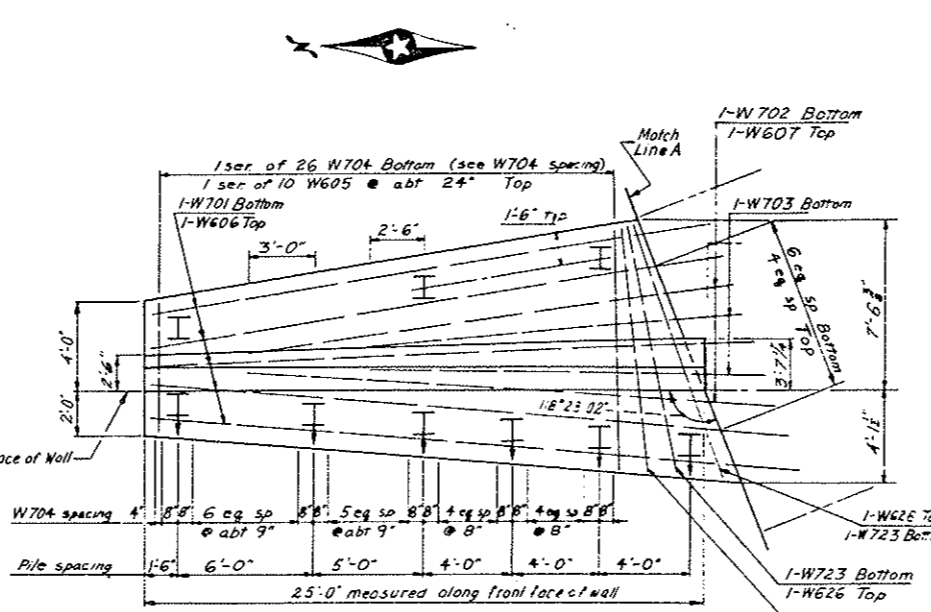
BRIDGE CODE	R.R. BRIDGE NO.	FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
X631	199	8	N.D.	MG-1-010 (05) 917		46	

BILL OF REINFORCEMENT

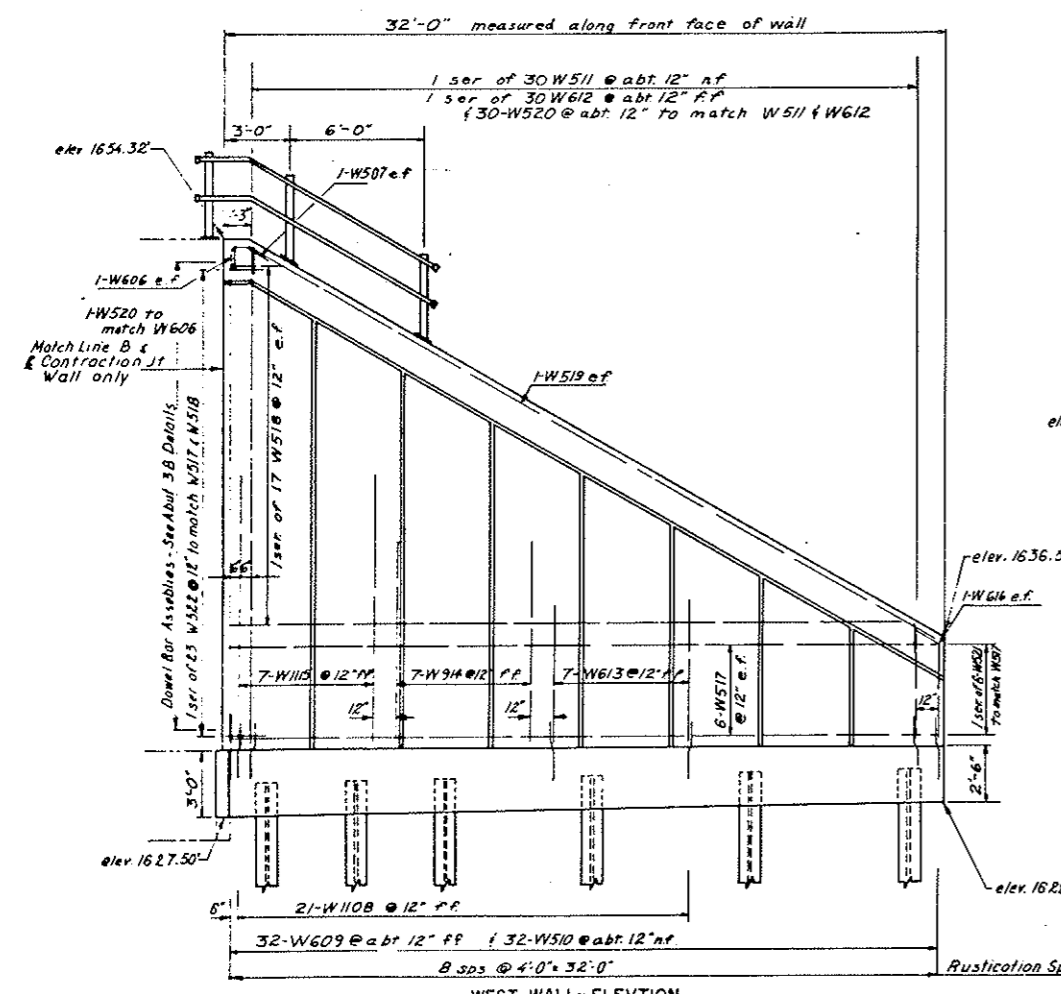
BAR NO.	NO.	SIZE	LENGTH	TYPE	DIM. A	LOCATION	BAR NO.	NO.	SIZE	LENGTH	TYPE	DIM. A	LOCATION
						WEST WINGWALL							
W501	10	6	34-9	Str.		Footing	W701	5	7	29-0	Str.		Footing
W502	4	6	24-6	Str.		Footing	W702	2	7	22-0	Str.		Footing
W503	2	6	17-0	Str.		Footing	W703	2	7	17-0	Str.		Footing
W504	1 Ser.	6	6-10	100	5-6	Footing	W704	1 Ser.	7	7-2	100	5-6	Footing
of 38			12-10		11-5		of 26			12-2		10-6	
W505	1 Ser.	6	6-10	100	5-6	Footing	W605	1 Ser.	6	6-10	100	5-6	Footing
of 17			12-10		11-5		of 10			11-10		10-6	
W506	2	6	23-6	Str.		Vertical	W606	5	6	29-0	Str.		Footing
W507	2	5	5-2	144	1-0	Vertical	W607	2	6	22-0	Str.		Footing
W1103	21	11	8-9	104	1-7	Footing	W1103	24	11	8-9	104	1-7	Footing
W509	32	6	6-0	104	1-0	Footing	W609	25	6	6-0	104	1-0	Footing
W510	32	5	5-7	104	1-0	Footing	W510	25	5	5-7	104	1-0	Footing
W511	1 Ser.	5	6-3	Str.		Vertical	W511	1 Ser.	5	12-3	Str.		Vertical
of 30			23-6				of 24			25-0			
W612	1 Ser.	6	6-3	Str.		Vertical	W612	1 Ser.	5	12-3	Str.		Vertical
of 30			23-6				of 24			25-0			
W512	7	6	7-0	Str.		Vertical	W613	8	6	7-0	Str.		Vertical
W914	7	9	10-0	Str.		Vertical	W914	8	9	11-0	Str.		Vertical
W115	7	11	13-0	Str.		Vertical	W115	8	11	15-0	Str.		Vertical
W616	2	6	8-0	128	5-6	Vertical	W616	2	5	14-0	128	11-6	Vertical
W517	5	5	31-8	Str.		Horizontal	W517	24	5	24-8	Str.		Horizontal
W518	2 Ser.	5	2-9	Str.		Horizontal	W518	2 Ser.	5	2-3	Str.		Horizontal
of 11			30-9				of 12			23-3			
W519	2	5	35-6	Str.		Horizontal	W519	2	5	27-6	Str.		Horizontal
W520	31	5	5-4	105	1-2	Vertical	W520	24	5	5-4	105	1-2	Vertical
W521	1 Ser.	5	5-2	105	1-0	Horizontal	W521	1 Ser.	5	5-2	105	1-0	Horizontal
of 6			5-8		1-6		of 12			6-2		2-0	
W522	1 Ser.	5	5-3	105	1-1	Horizontal	W522	1 Ser.	5	5-3	105	1-1	Horizontal
of 23			7-1		2-11		of 24			7-2		3-0	
W723	3	7	11-4	101	0-10	Footing							
W625	2	6	11-2	101	0-8	Footing							



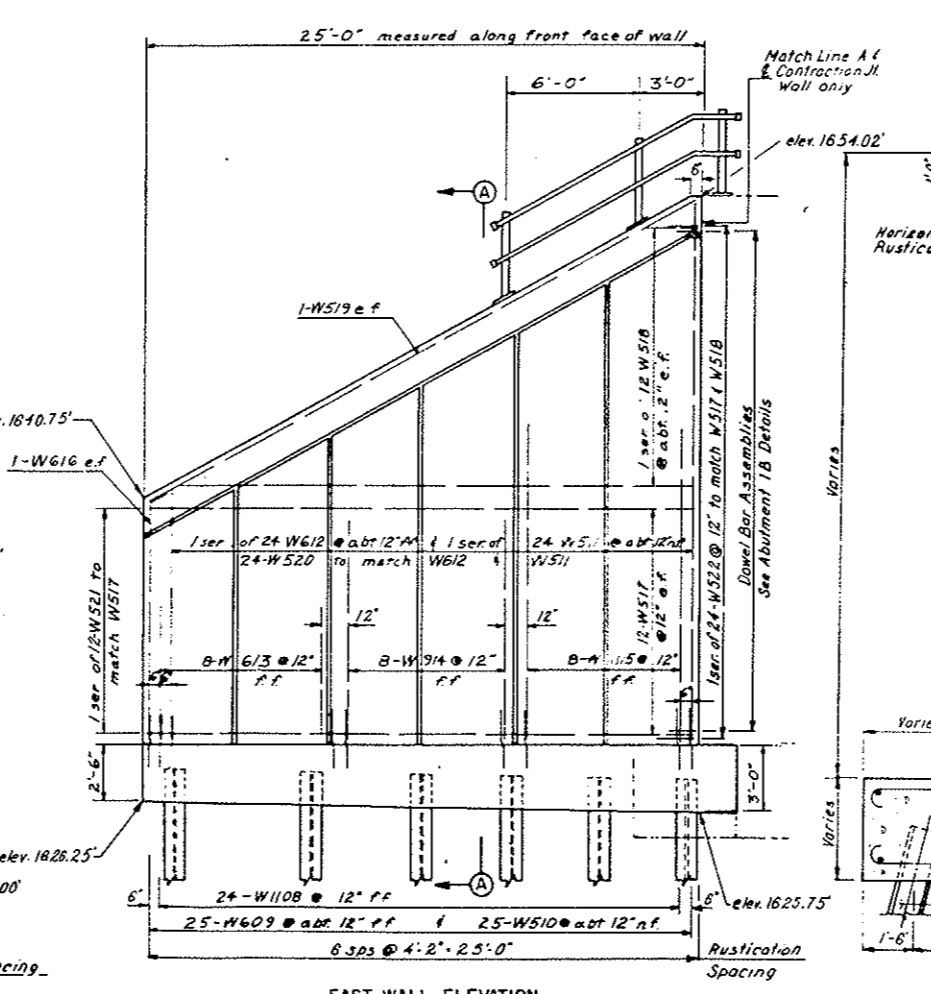
WEST WALL-PLAN
Scale: 1/4" = 1'-0"



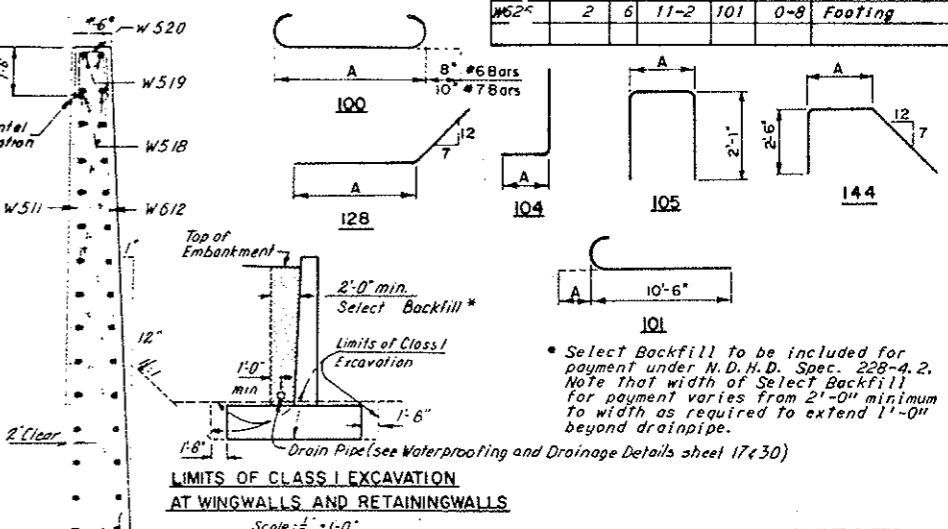
EAST WALL-PLAN
Scale: 1/4" = 1'-0"



WEST WALL-ELEVATION
Scale: 1/4" = 1'-0"



EAST WALL-ELEVATION
Scale: 1/4" = 1'-0"

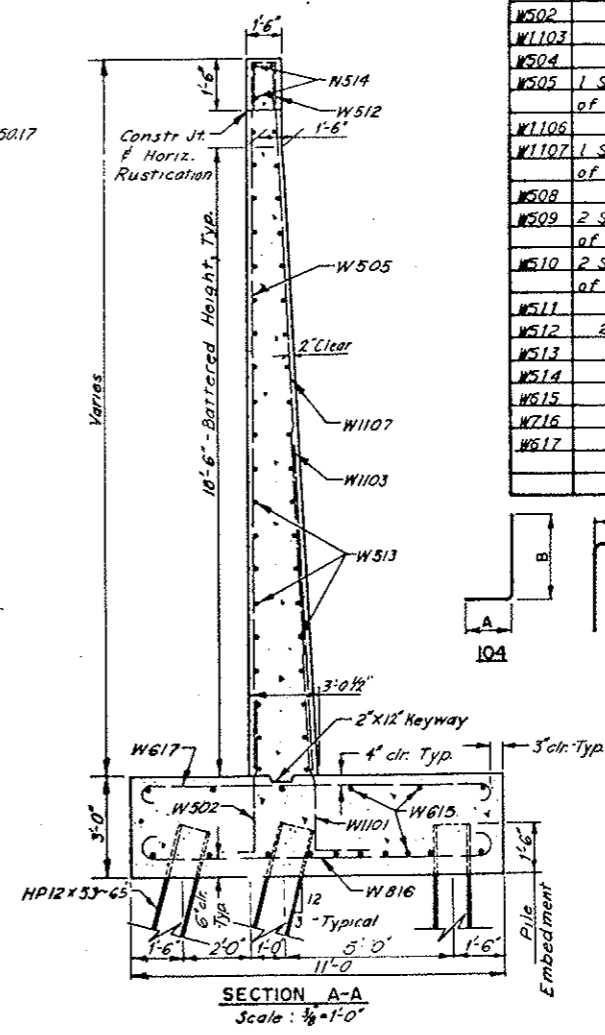
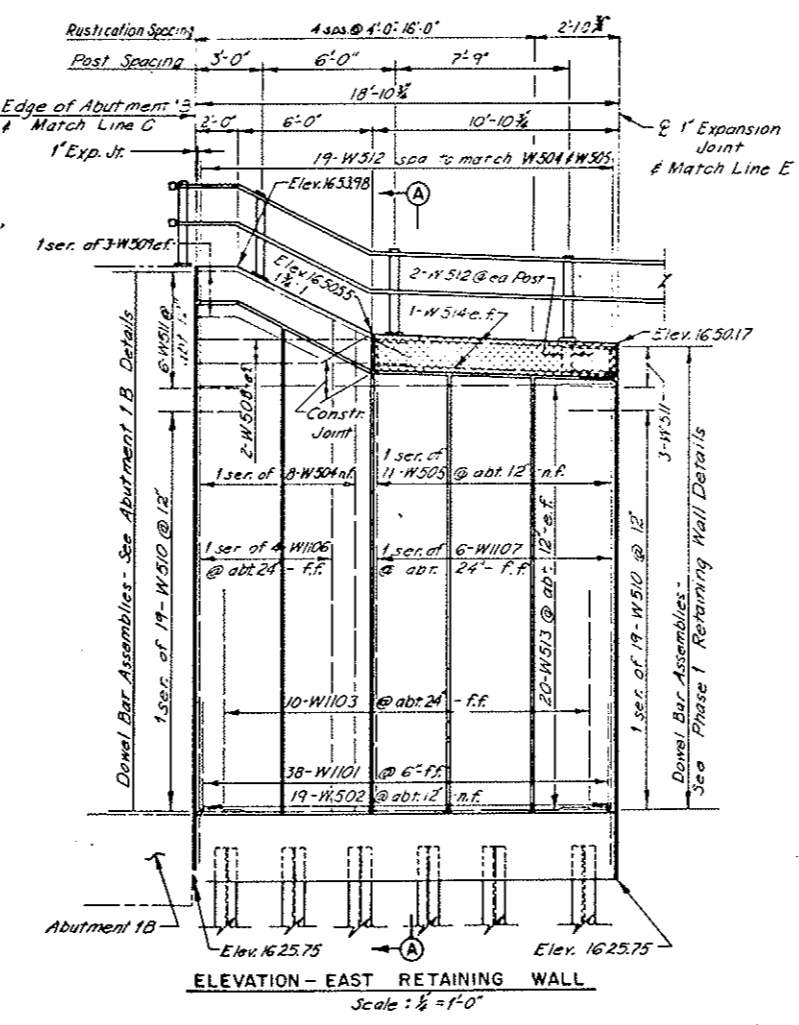
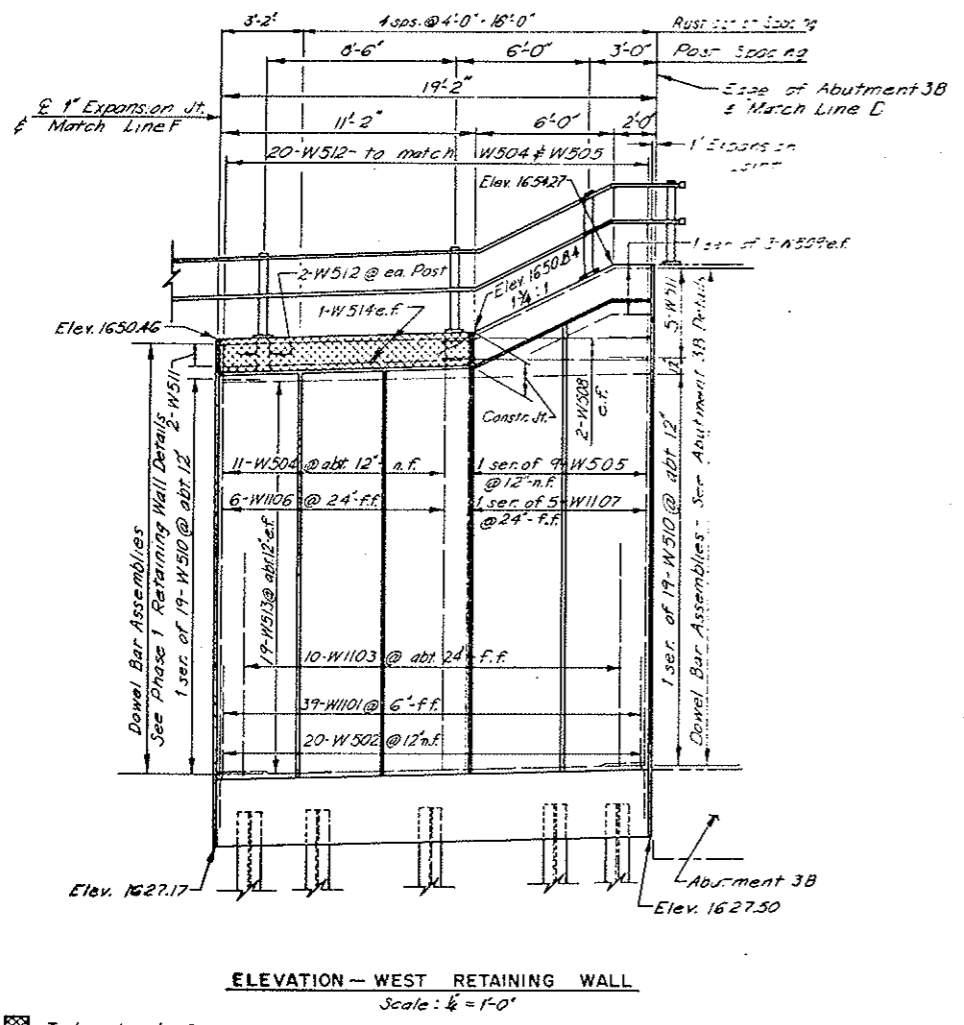
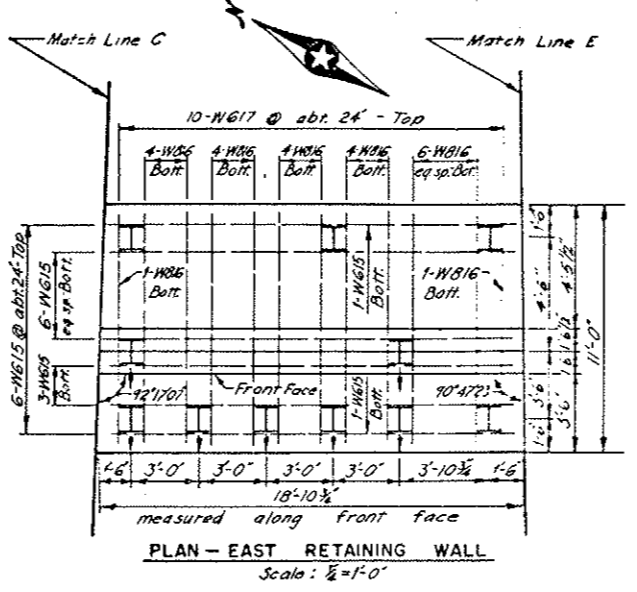
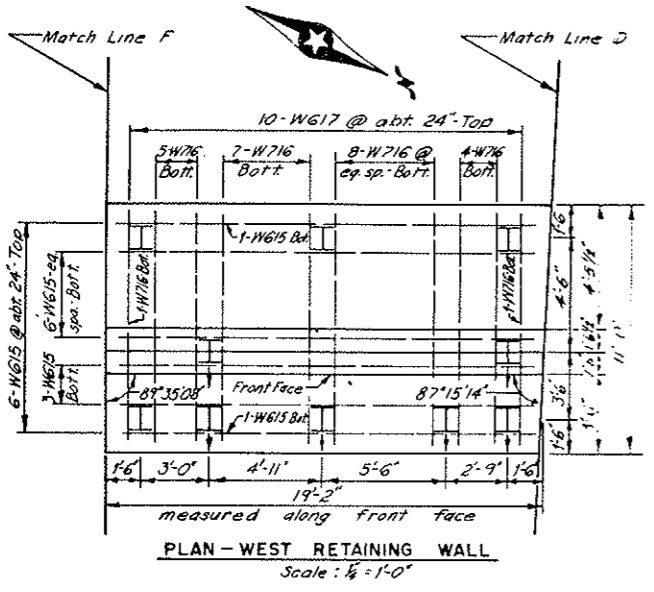


SECTION A-A
Scale: 1/8" = 1'-0"

QUANTITIES	
Reinforcing Steel	12,975 lbs.
Steel Piling (HP12x53)	1,300 Lin Ft
Class AE-1 Mod Concrete	1364 Cu Yd
Class I Excavation	110 Cu Yd
Structural Carbon Steel (A36)	556 lbs.

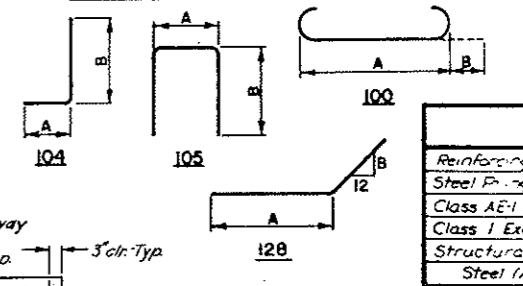
WINGWALL DETAILS
BRIDGE B
BURLINGTON NORTHERN, INC.
RAILWAY UNDERPASSES

U.S. HIGHWAY NO. 10
MORTON COUNTY



BILL OF REINFORCEMENT								
BAR NO.	NO.	SIZE	LENGTH	TYPE	DIMENSIONS			LOCATION
					A	B	C	
EAST RETAINING WALL								
W1101	38	11	9-0	104	1-8	7-4		Dowel
W502	19	5	5-6	104	1-0	4-6		Dowel
W1103	10	11	10-0	STR.				Vertical
W504	1 Ser.	5	21-10	STR.				Vertical
	of 8		24-10					
W505	1 Ser.	5	21-0	STR.				Vertical
	of 11		21-6					
W1106	1 Ser.	11	22-6	STR.				Vertical
	of 4		24-10					
W1107	1 Ser.	11	21-0	STR.				Vertical
	of 6		21-6					
W508	4	5	9-6	STR.				Horizontal
W509	2 Ser.	5	5-8	128	1-8	0-6		Horizontal
	of 3		9-8					
W510	2 Ser.	5	5-0	105	1-0	2-0		Stem Tie - Side
	of 19		6-5			2-5		
W511	9	5	5-0	105	1-0	2-0		Stem Tie - Side
W512	25	5	3-6	105	1-2	1-2		Stem Tie - Top
W513	40	5	18-4	STR.				Horizontal
W514	4	5	10-6	STR.				Horizontal
W815	17	6	18-4	STR.				Footings
W816	24	8	12-8	100	10-5	1-1		Footings
W817	10	6	11-10	100	10-5	0-8		Footings
WEST RETAINING WALL								
W1101	39	11	9-0	104	1-8	7-4		Dowel
W502	19	5	5-6	104	1-0	4-6		Dowel
W1103	10	11	10-0	STR.				Vertical
W504	1 Ser.	5	19-10	STR.				Vertical
	of 9		23-4					
W1106	6	11	19-10	STR.				Vertical
W1107	1 Ser.	11	19-10	STR.				Vertical
	of 5		23--					
W508	4	5	9-6	STR.				Horizontal
W509	2 Ser.	5	5-8	128	1-8	0-6		Horizontal
	of 3		9-8					
W510	2 Ser.	5	5-0	105	1-0	2-0		Stem Tie - Side
	of 19		6-5			2-5		
W511	7	5	5-0	105	1-0	2-0		Stem Tie - Side
W512	26	5	3-6	105	1-2	1-2		Stem Tie - Top
W513	38	5	18-8	STR.				Horizontal
W514	4	5	10-10	STR.				Horizontal
W815	17	6	18-8	STR.				Footings
W816	26	7	12-2	100	10-5	0-10		Footings
W817	10	6	11-10	100	10-5	0-8		Footings

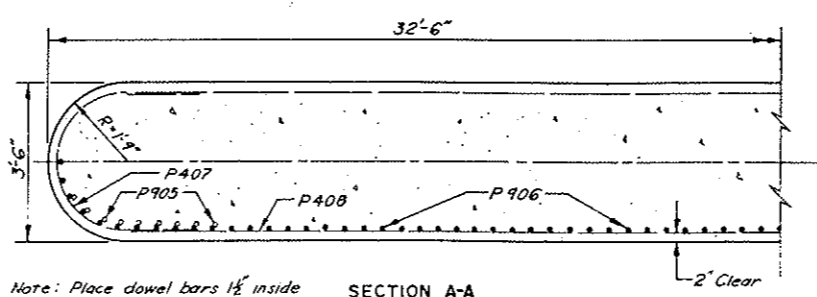
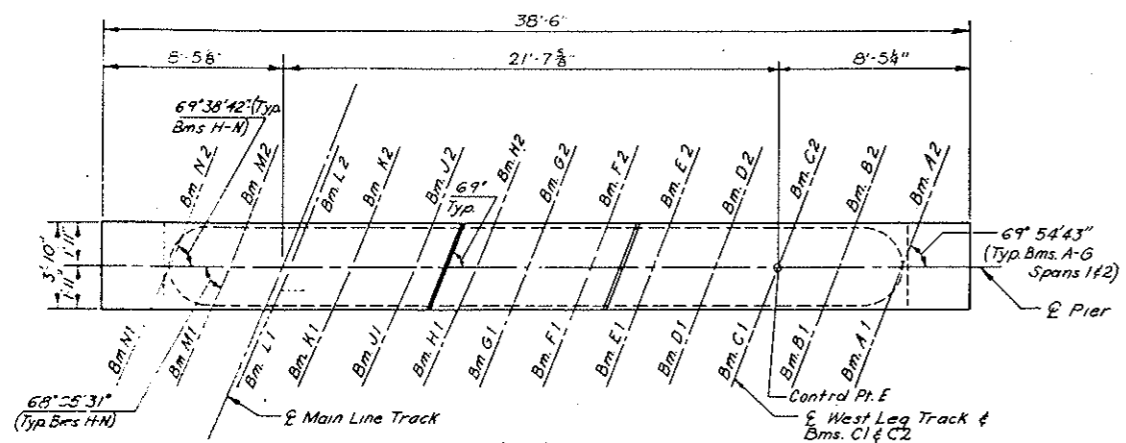
To be placed after temporary trestle has been removed.



QUANTITIES	
Reinforcing Steel	13,456 lbs
Steel Piling (HP 2x53)	1,365' Lin.
Class AE-1 Max Concrete	1130 Cu. Yd.
Class I Excavation	85 Cu. Yd.
Structural Carbon Steel (A36)	778 lbs

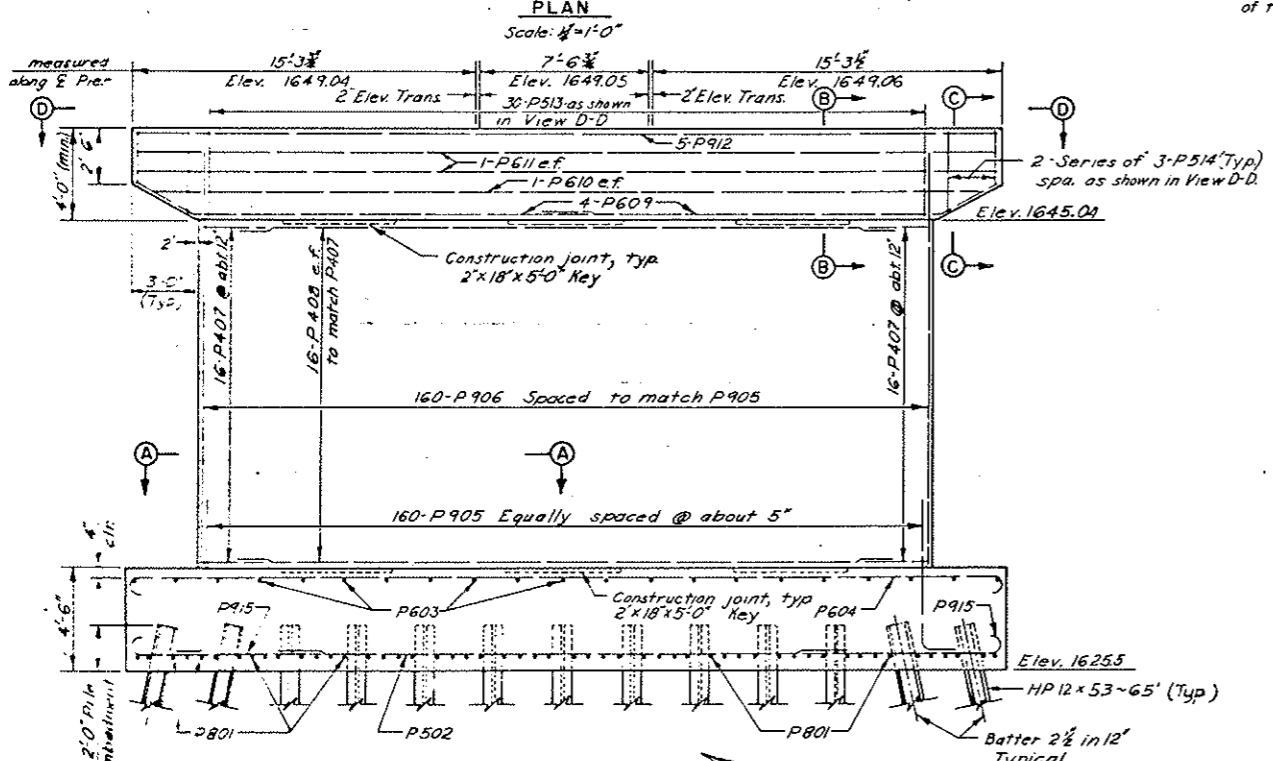
PHASE II
RETAINING WALL DETAILS
BRIDGE B
BURLINGTON NORTHERN, INC
RAILWAY UNDERPASSES

U.S. HIGHWAY NO. 10
MORTON COUNTY

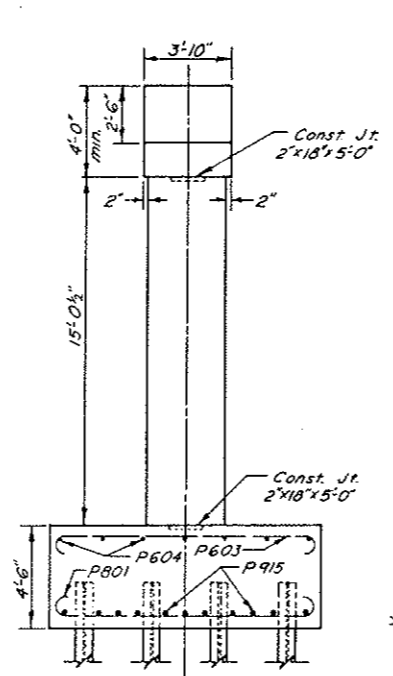


SECTION A-A
Scale: 1/2" = 1'-0"

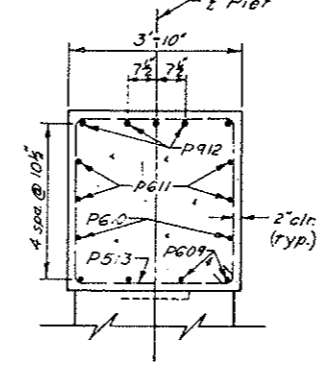
BAR NO.	SIZE	LENGTH	TYPE	DIMENSIONS			LOCATION
				A	B	C	
P801	52	8	13-8	100	11-6	1-1	Footing
P502	11	5	25-0	Str.			Footing
P603	21	6	12-10	100	11-6	0-8	Footing
P604	7	6	39-10	100	38-6	0-8	Footing
P905	160	9	9-3	104	1-6	7-9	Footing Dowel
P906	160	9	18-10	Str.			Shaft Vert.
P407	32	4	9-0	102	3-2	3-7	Shaft
P408	32	4	29-0	Str.			Shaft
P609	8	6	20-10	128	17-6	0-6	Cap Beam
P610	2	6	37-0	Str.			Cap Beam
P611	4	6	38-0	Str.			Cap Beam
P912	5	9	38-0	Str.			Cap Beam
P513	30	5	15-2	109	3-6	3-8	Cap Beam
P514	4 Ser. of 3	5	10-4	109	2-6	2-3	Cap Beam
P915	22	9	10-0	101	1-3	8-9	Footing



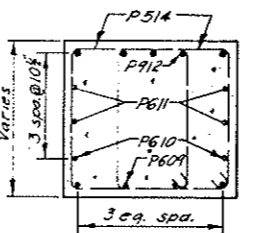
ELEVATION
Scale: 1/4" = 1'-0"



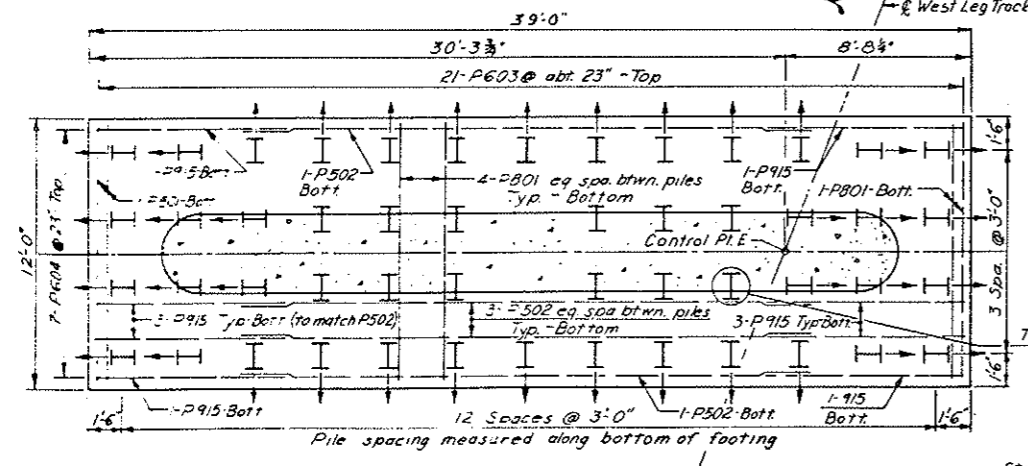
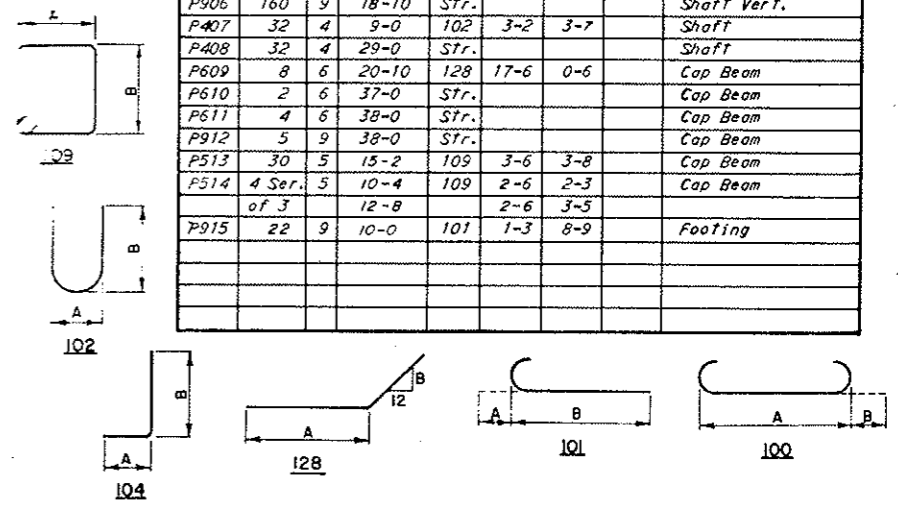
END VIEW
Scale: 1/4" = 1'-0"



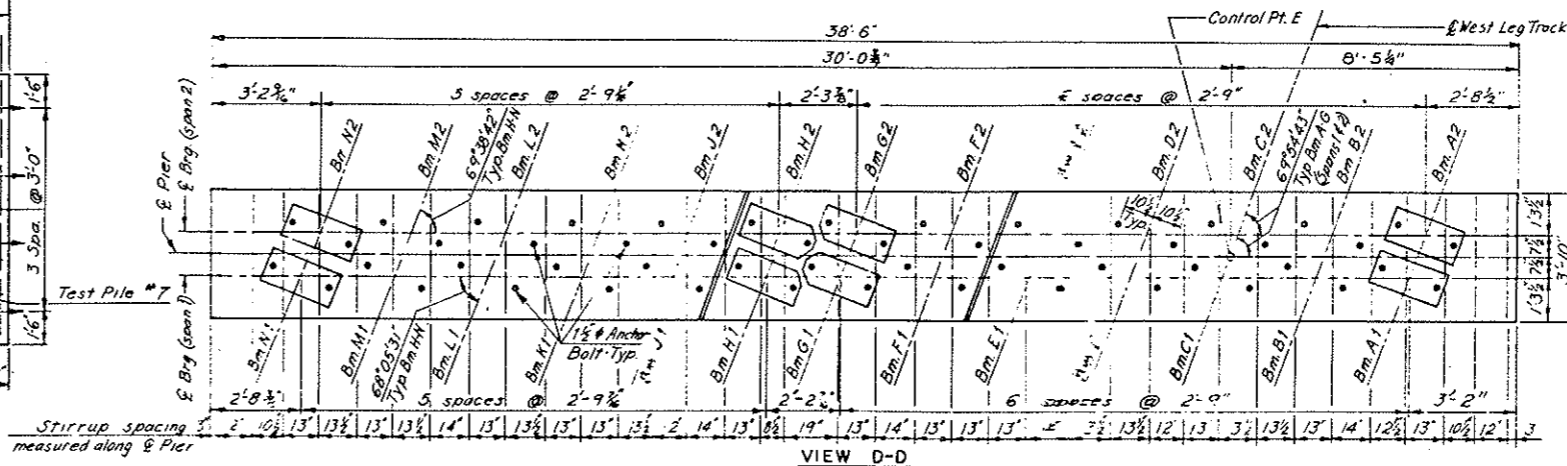
SECTION B-B
Scale: 1/2" = 1'-0"



SECTION C-C
Scale: 1/2" = 1'-0"



FOOTING PLAN
Scale: 1/4" = 1'-0"

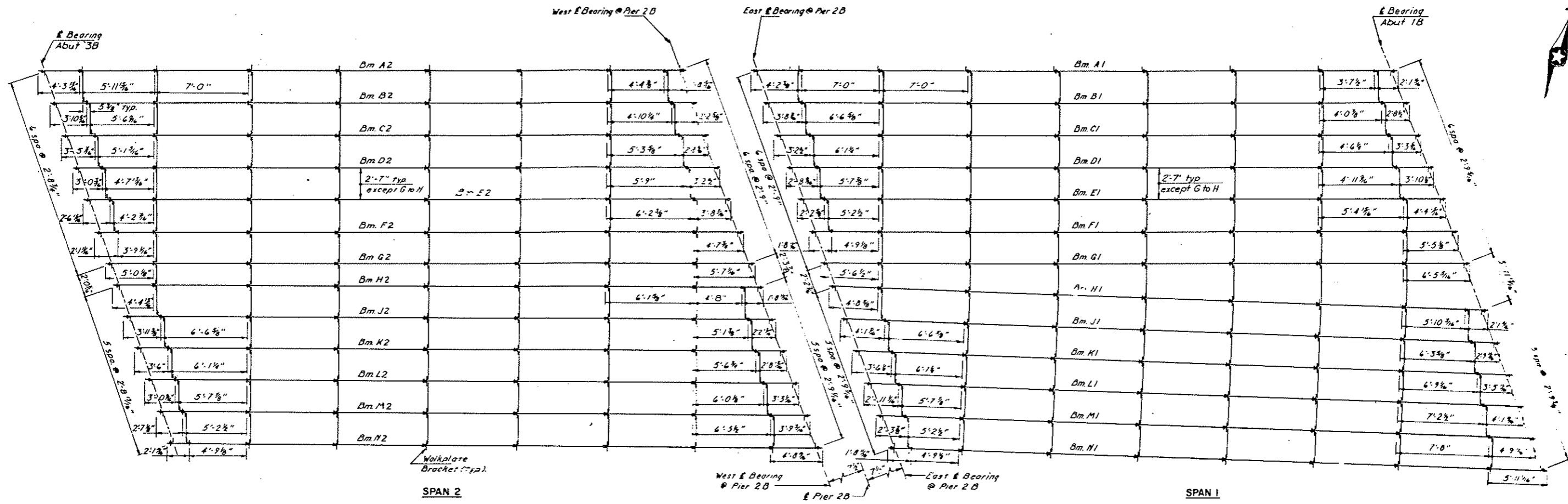


VIEW D-D
Scale: 1/8" = 1'-0"

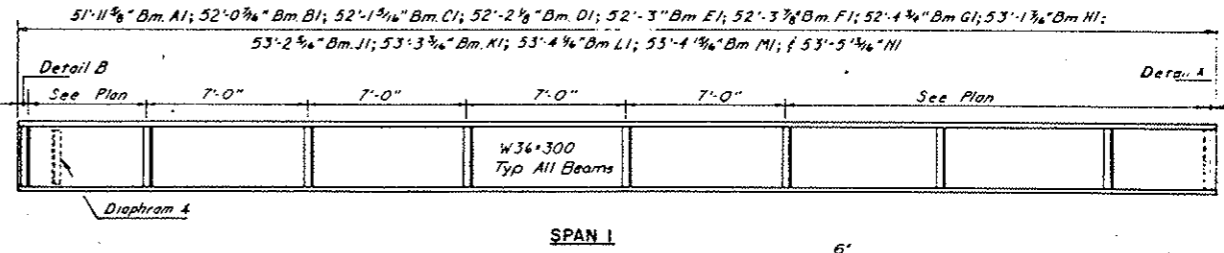
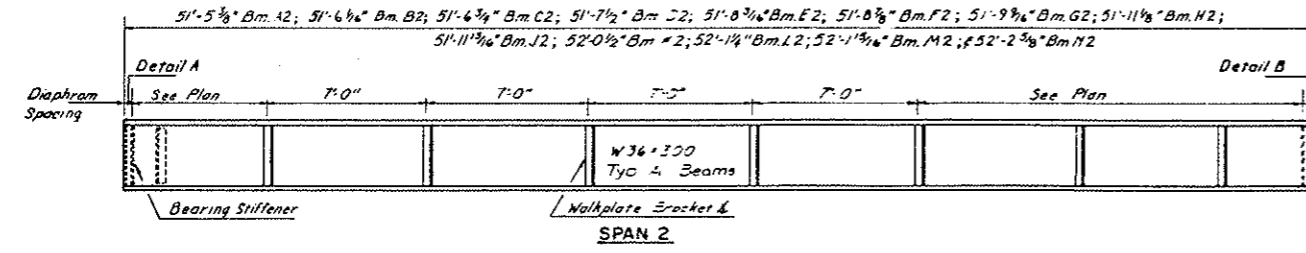
QUANTITIES	
Reinforcing Steel	21,698 lbs
Steel Piling (HP12x53)	3,145 Ln Ft
Class AE-1 Mod Concrete	161.3 Cu Yd
Class I Excavation	133 Cu Yd
Steel Test Piles (HP12x53) @ 7' - 1 Each	

PIER 28 DETAILS
BRIDGE B
BURLINGTON NORTHERN, INC.
RAILWAY UNDERPASSES
U.S. HIGHWAY NO. 10
MORTON COUNTY

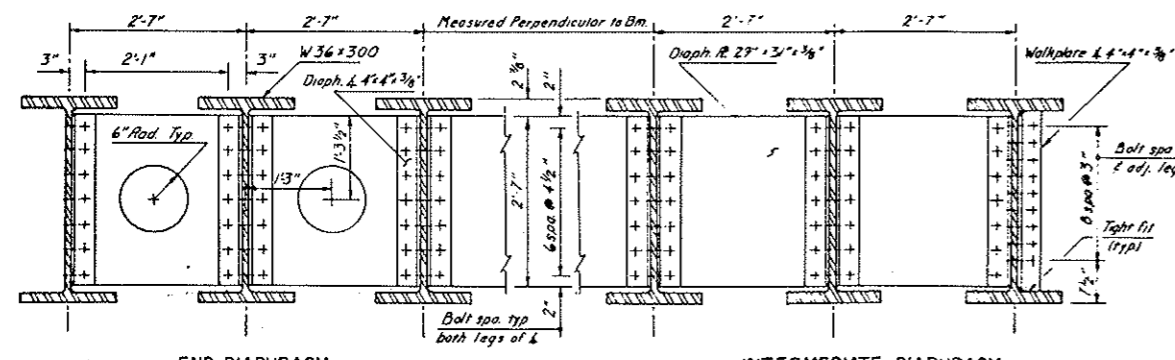
BRIDGE CODE	A.R. BRIDGE NO	FED. ROAD DIST NO	STATE	PROJ. NO	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
X631	199	B	N D	MO-1010 COS 917		49	



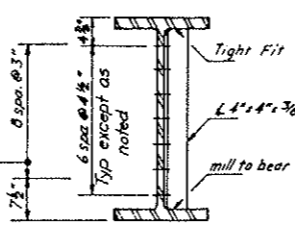
FRAMING PLAN
Scale: 1/4" = 1'-0"



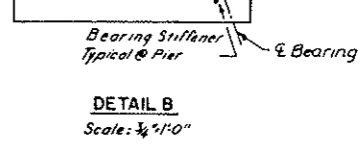
BEAM ELEVATION
Scale: 1/4" = 1'-0"



TYPICAL DIAPHRAGM DETAIL
Scale: 3/4" = 1'-0"



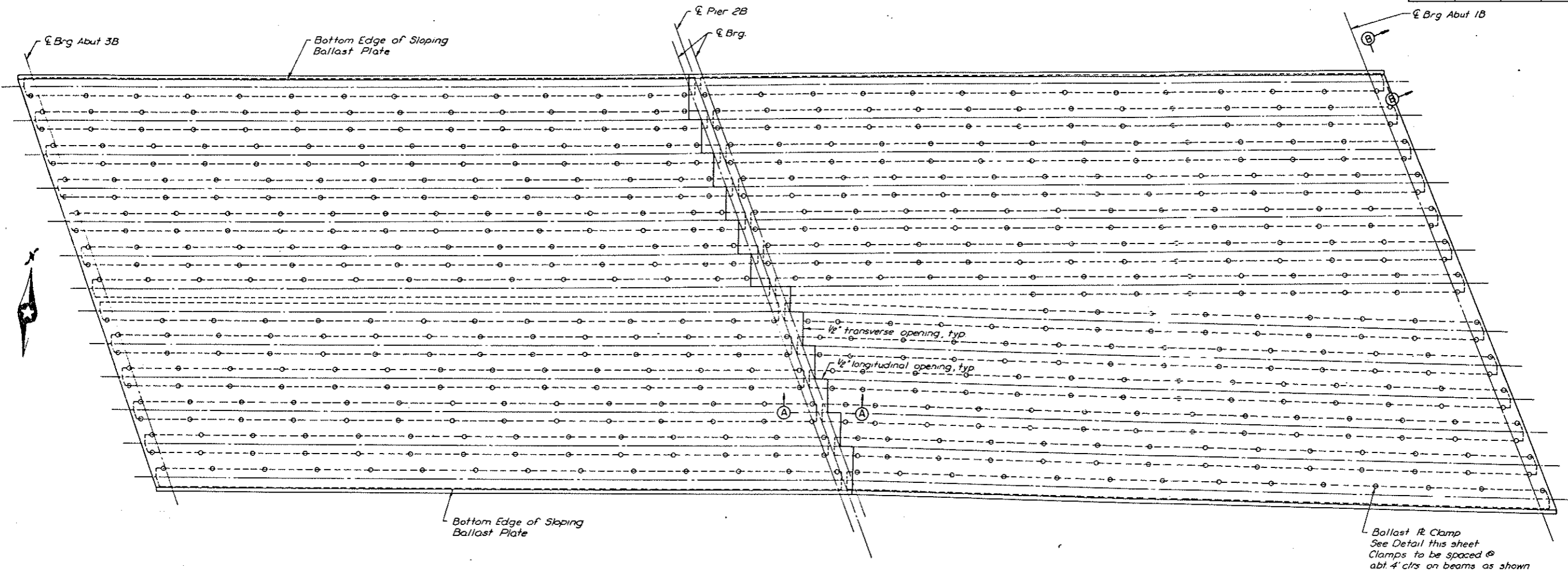
DETAIL A
Scale: 3/4" = 1'-0"



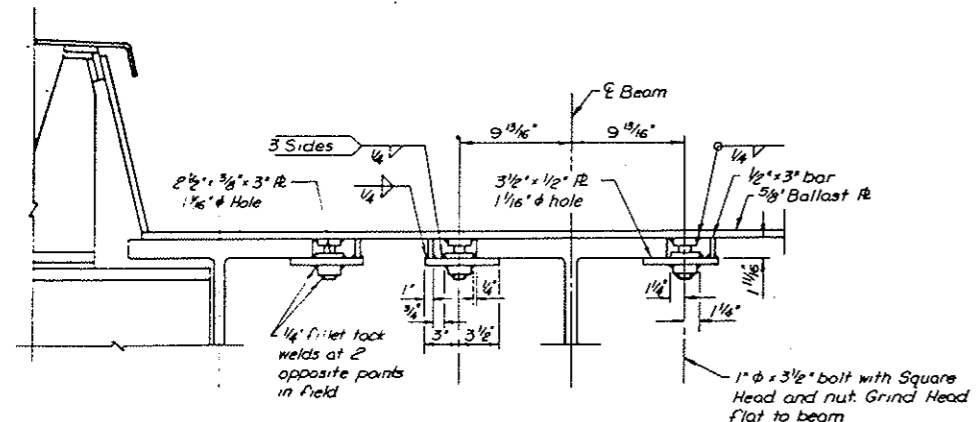
DETAIL B
Scale: 3/4" = 1'-0"

QUANTITIES	
Structural Carbon Steel (A36)	436,415 lbs
FRAMING PLAN AND BEAM DETAILS	
BRIDGE B	
BURLINGTON NORTHERN, INC.	
RAILWAY UNDERPASSES	
U.S. HIGHWAY NO. 10	
MORTON COUNTY	

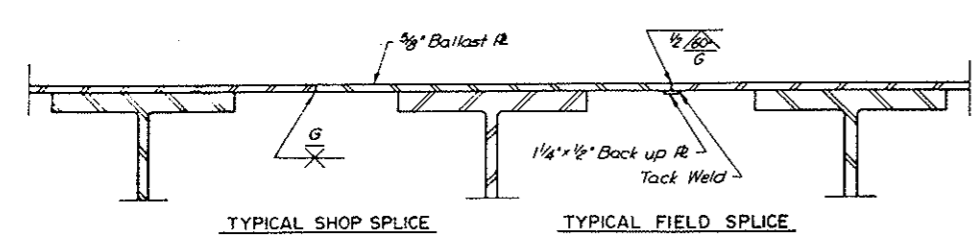
BRIDGE CODE	R.R. BRIDGE NO.	FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
X631	199	8	N.D.	MS-1-010 (OS) 9:17		5	



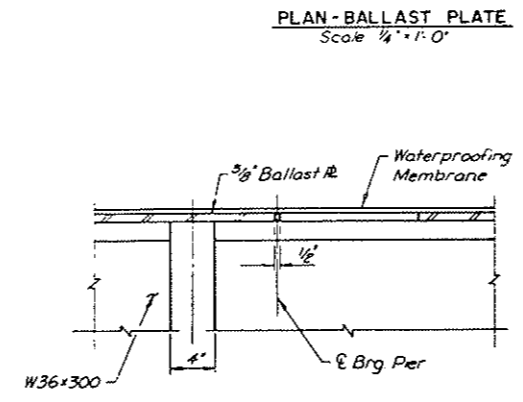
PLAN-BALLAST PLATE
Scale 1/4"=1'-0"



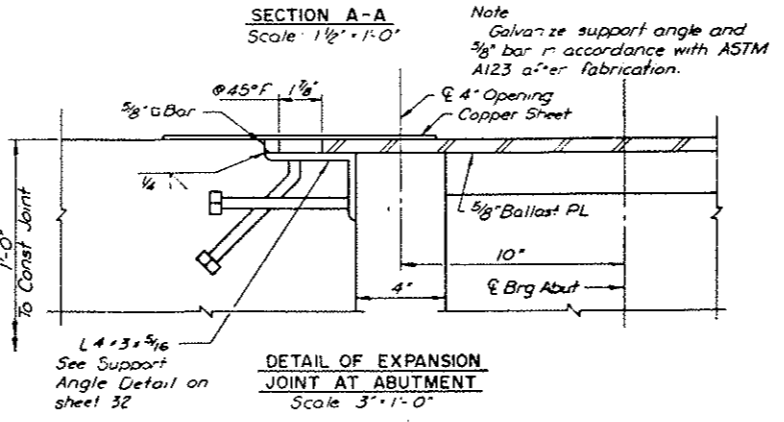
BALLAST PLATE CLAMPS AT BEAMS
No Scale



BALLAST PLATE SPLICES
No Scale

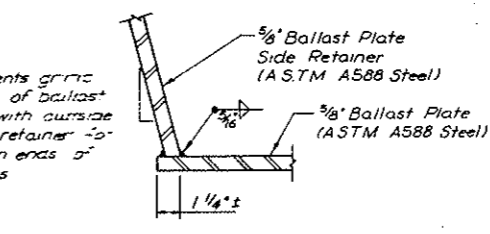


SECTION A-A
Scale 1 1/2"=1'-0"

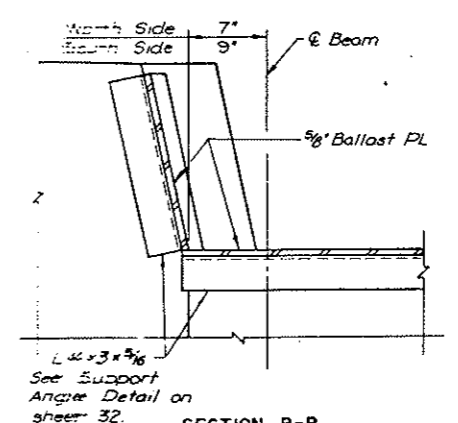


DETAIL OF EXPANSION JOINT AT ABUTMENT
Scale 3"=1'-0"

Note: At abutments grout outside edge of ballast plate flush with outside face of side retainer - 2" - 4" inches from ends of ballast plates



SIDE RETAINER WELD DETAIL
Scale 3"=1'-0"



SECTION B-B
No Scale

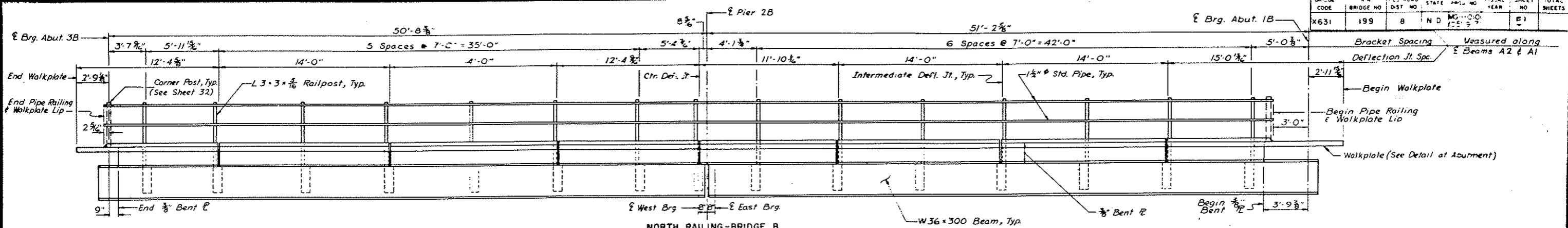
Note: After final assembly of the ballast plate, the support angles of abutment expansion joints shall be positioned for a snug fit against the ballast plate and ballast plate side retainers before placing of abutment backwall concrete. Expansion joint material including support angle and copper sheet and ballast plate clamps are included in weight and paid for as Structural Carbon Steel (A36). The vertical sections of the expansion device are separate pieces. The expansion joint device shall be positioned snug against the ballast plate and ballast plate side retainers before pouring concrete in the cross-hatched portion of the abutments as shown on sheets 19 and 21.

QUANTITIES	
High Strength Low Alloy Structural Steel (A588)	94,409 lbs
Structural Carbon Steel (A36)	4,570 lbs

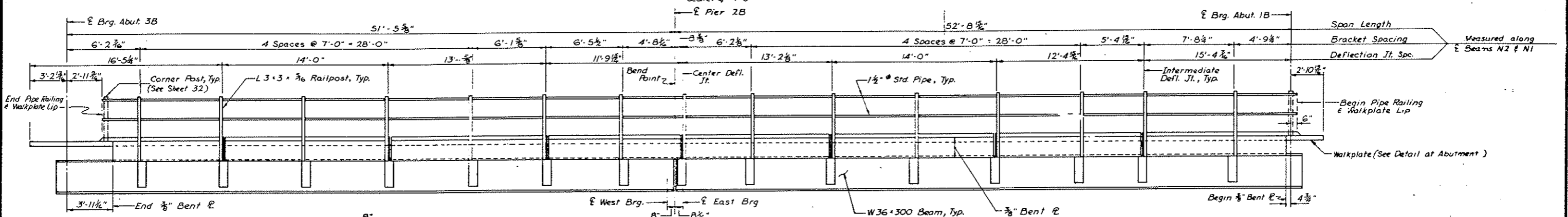
BALLAST PLATE DETAILS
BRIDGE B
BURLINGTON NORTHERN, INC.
RAILWAY UNDERPASSES

U.S. HIGHWAY NO.10
MORTON COUNTY

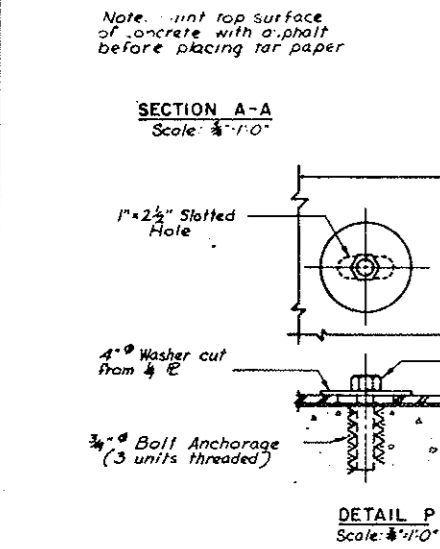
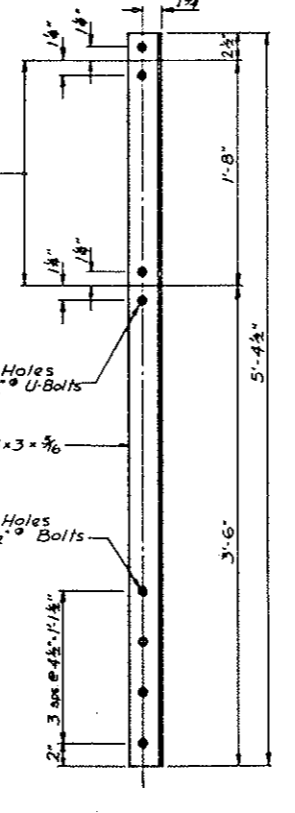
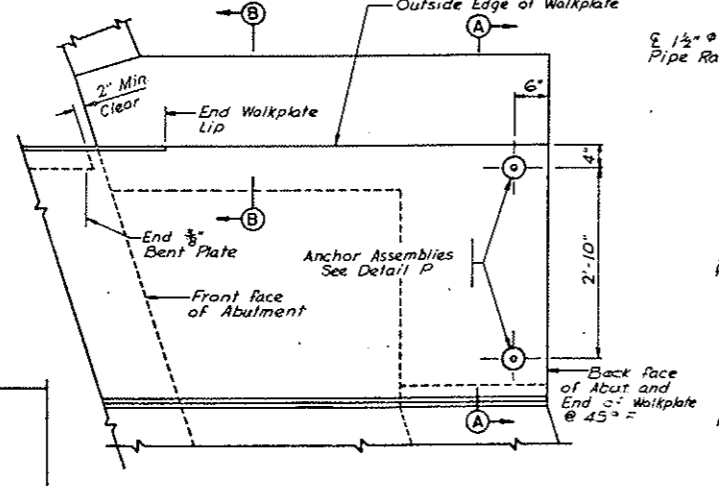
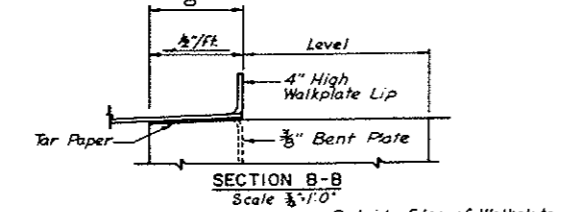
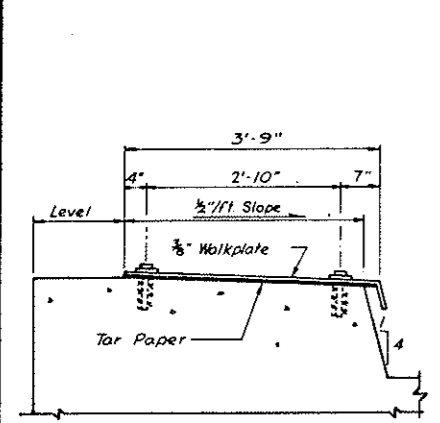
BRIDGE CODE	BRIDGE NO.	FED. ROAD DIST. NO.	STATE	ROUTE NO.	SECTIONAL YEAR	SHEET NO.	TOTAL SHEETS
X631	199	8	N.D.	MO. 000	1957	1	1



NORTH RAILING - BRIDGE B
Scale: 1/4" = 1'-0"



SOUTH RAILING - BRIDGE B
Scale: 1/4" = 1'-0"



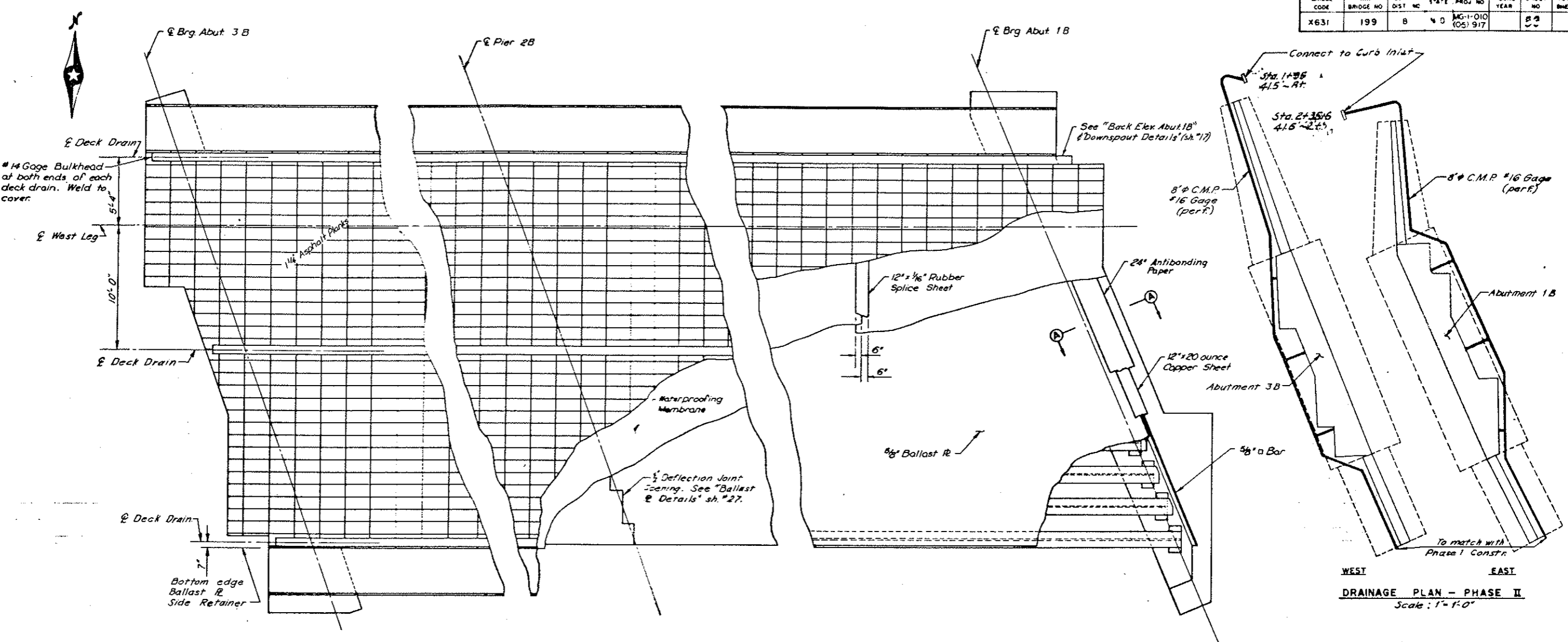
WALKPLATE DETAIL AT ABUTMENTS
Scale: 3/8" = 1'-0"

RAILPOST DETAIL
Scale: 1/2" = 1'-0"

Note:
The Contractor shall verify the dimensions to the ends of pipe railing and walkplate at abutments prior to fabrication of walkplate and railing.
See sheet 29 for bracket details.
Bolts and nuts shall meet the requirements of A.S.T.M. A307.
All structural steel items shown on this sheet and on sheet 29 shall be galvanized in accordance with A.S.T.M. A53.
The top surface of the walkplate shall be painted with a non-skid epoxy coating after final assembly.
Except for ballast plate and ballast plate retainer all steel for structural items shown on this sheet and on sheet 29 including standard pipe railing to be included in weight and said for as Structural Carbon Steel (Meltable A36).
Railing pipe shall be continuous between ends of bridge and pipe connections shall be made with ASA standard couplings.
See sheet 32 for railing corner post details at abutments.

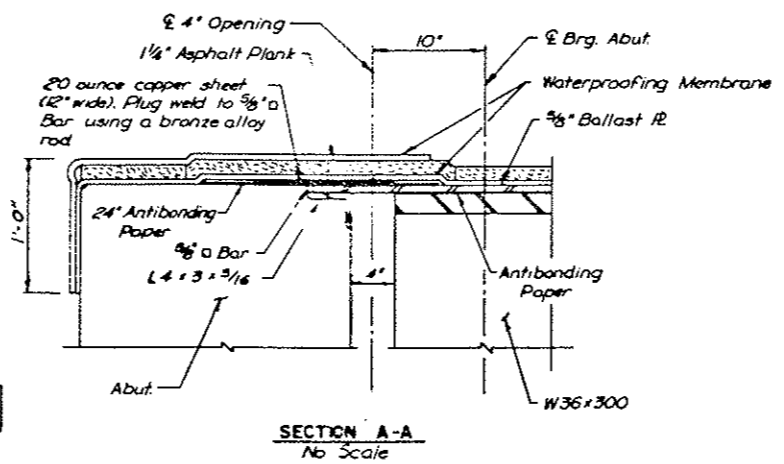
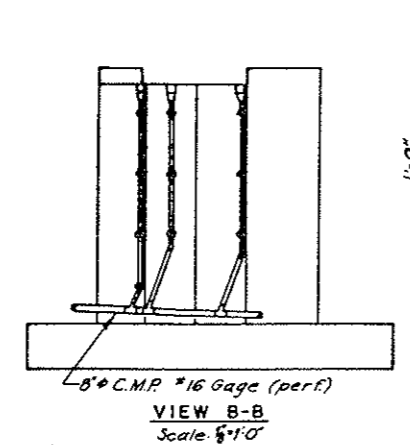
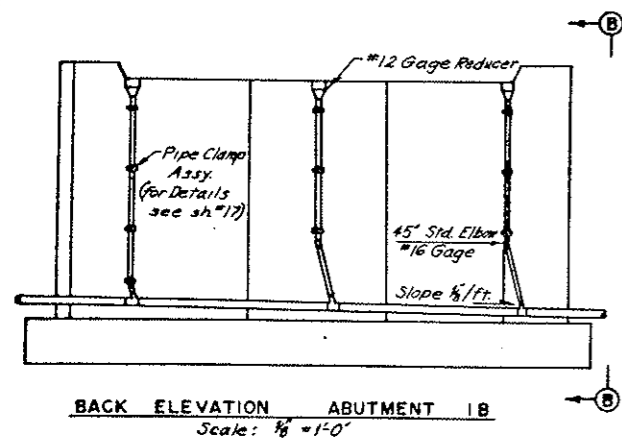
QUANTITIES	
Structural Carbon	
Steel (A36)	56,341 lbs.
WALKPLATE AND RAILING DETAILS	
BRIDGE B	
BURLINGTON NORTHERN, INC.	
RAILWAY UNDERPASSES	
U.S. HIGHWAY NO. 10	
MORTON COUNTY	

BRIDGE CODE	R.R. BRIDGE NO.	FED. DIST. NO.	STATE PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
X631	199	B	0	MG-1-010 (OS) 917	83	



WEST EAST
DRAINAGE PLAN - PHASE II
Scale: 1" = 1'-0"

WATERPROOFING & DRAINAGE PLAN
Scale: 1/4" = 1'-0"



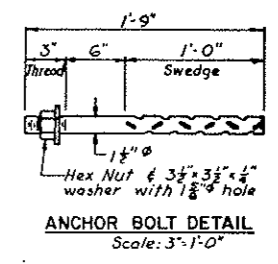
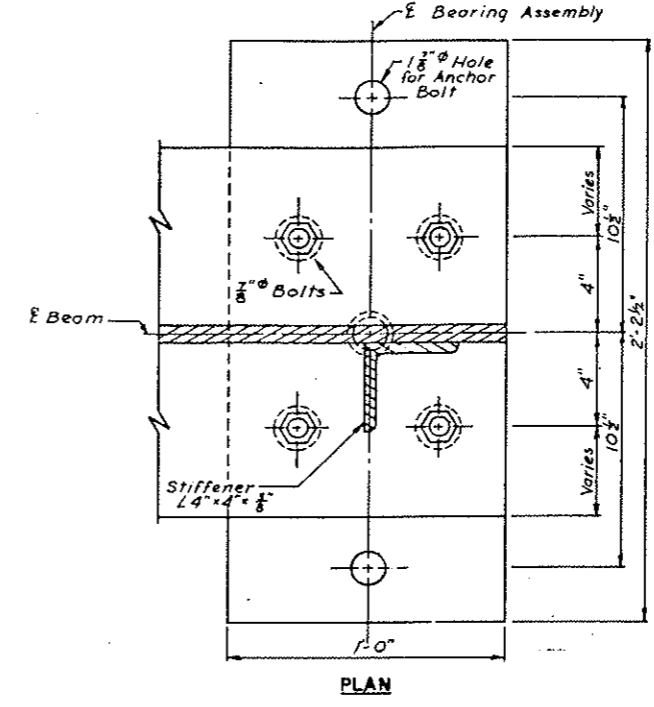
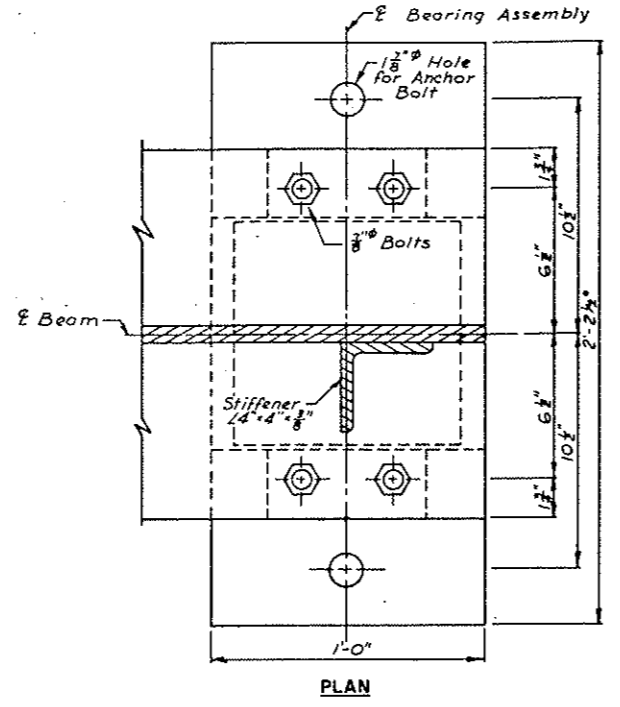
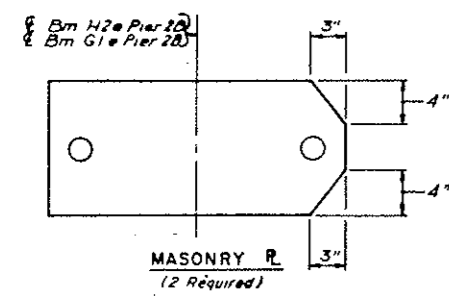
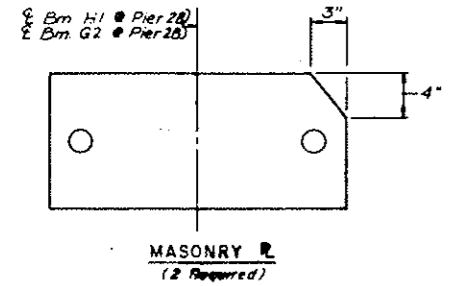
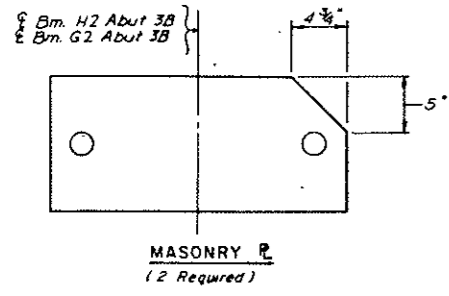
Note: A crown surface shall be built up between drain troughs at the rate of 1/4 inch per ft. with a minimum thickness of asphalt plank of 1/4 inch. See sheet 17 for additional waterproofing and drainage details.

In lieu of using Rubber Waterproofing Membrane the Contractor shall have the option of using Three-Ply-Fabric Waterproofing as specified under Standard Spec. No. 736-3.5 except when noted.

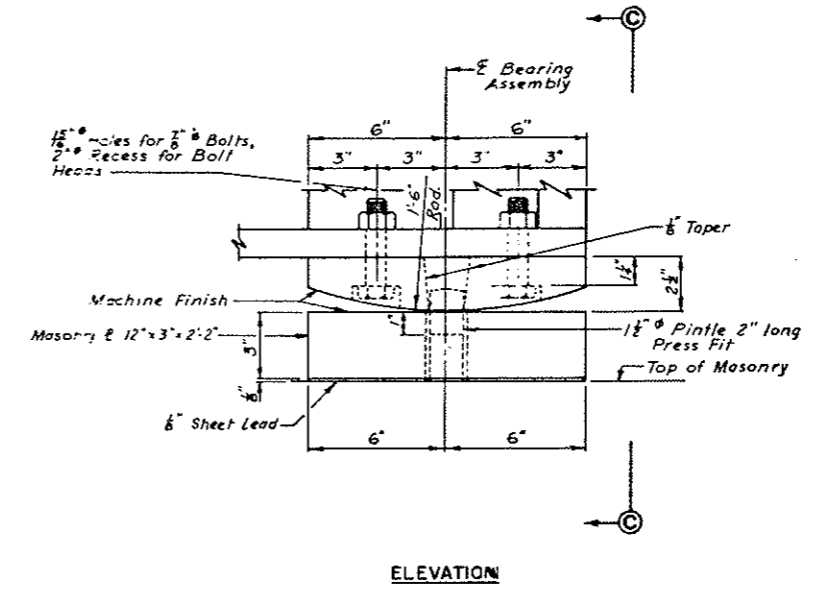
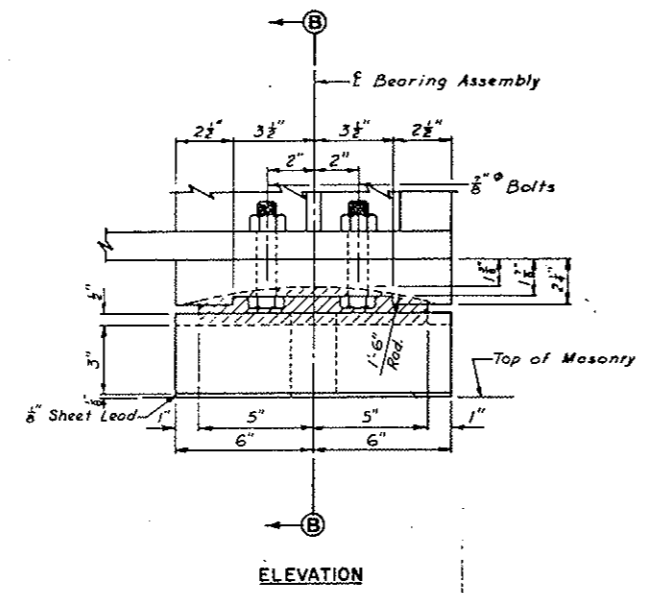
Antibonding paper shall be #15 rag felt building paper. Cost of antibonding paper to be considered incidental and included in the price bid for One Ply Membrane Waterproofing.

QUANTITIES	
One-Ply Membrane	
Waterproofing	3,497 sq. ft.
WATERPROOFING AND DRAINAGE DETAILS BRIDGE B BURLINGTON NORTHERN, INC. RAILWAY UNDERPASSES	
U.S. HIGHWAY NO. 10 MORTON COUNTY	

BRIDGE CODE	R.R.	FED. ROAD	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
	199	8	N D	KG-1-010 (OS) 917		54	

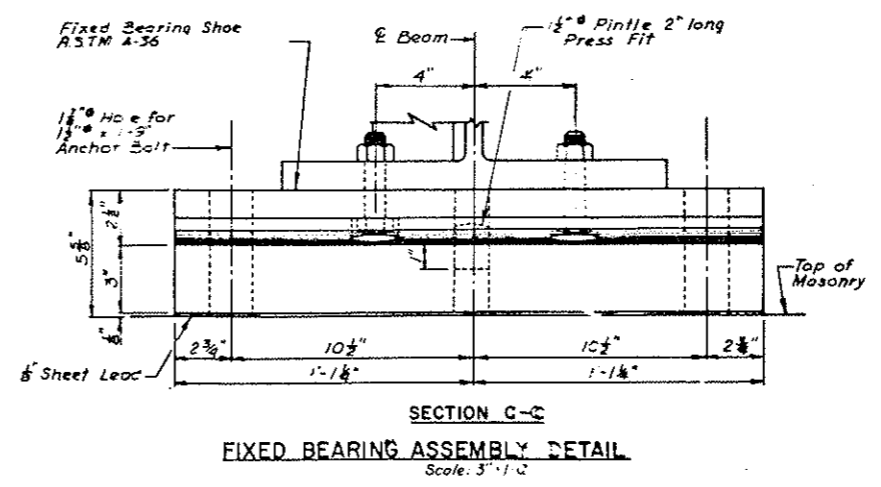
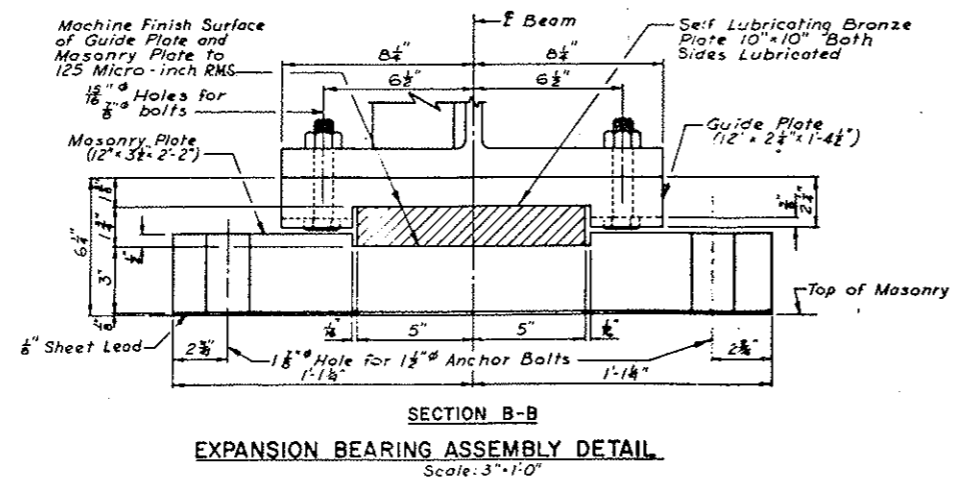


Note: All masonry plates and guide plates shall be structural steel, A.S.T.M. Designation A-36. Pintles are to be cold finished alloy bar steel A.S.T.M. Designation A331. (Grade AISI A 4140 or 4142) Masonry Plates to be bolted to fixed bearing shoes with 1/2" bolts for shipment. All bearing assemblies including bronze plates and anchor bolts will be included in the weight and paid for as Structural Carbon Steel (Weldable) (A36). All bearing assembly steel including bolts and anchor bolts to be galvanized in accordance with A.S.T.M. A123. Bearing Assemblies to be adjusted as required so as to be in their normal vertical position at 45° F. Drilling and grouting of anchor bolts shall be considered incidental and included in price bid for other items.



BEARING ASSEMBLIES			
Substructure Unit	Span	Shoe Type	Number
Abut 1A	1	Exp.	5
Pier 2A	1	Fixed	5
	2	Fixed	5
Abut 3A	2	Exp.	5
Abut 1B	1	Exp.	13
	2	Exp.	13
Pier 2B	1	Fixed	13
	2	Fixed	13
Abut 3B	2	Exp.	13

(36 Fixed Required)
(36 Exp. Required)
*See masonry plate details on this sheet for number, location and dimensions of clipped masonry plates.

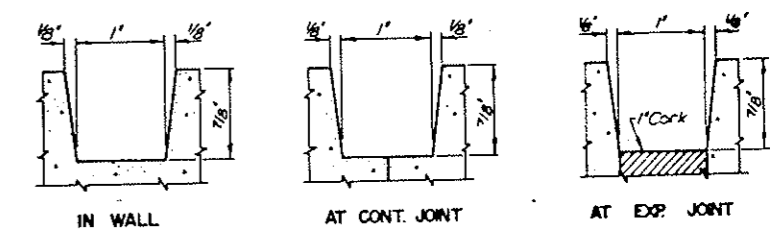


QUANTITIES	
Structural Carbon Steel (A36)	37,155 lbs.
BEARING ASSEMBLY DETAILS	
BRIDGE A & B	
BURLINGTON NORTHERN, INC.	
RAILWAY UNDERPASSES	
U.S. HIGHWAY NO.10	
MORTON COUNTY	

BRIDGE CODE	R.R. BRIDGE NO.	FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
	199	8	ND	MG-1-010 (05) 917		55	

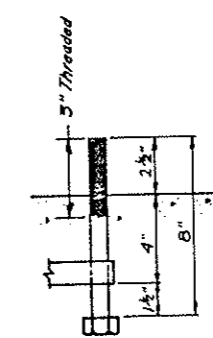
TOP OF BEAM ELEVATIONS AT BEARINGS								
BRIDGE A - SPAN 1			BRIDGE B - SPAN 1			BRIDGE B - SPAN 2		
Beam	Abut. 1A	Pier 2A	Beam	Abut. 1B	Pier 2B	Beam	Pier 2B	Abut. 3B
A1	1650.358	1650.789	A1	1652.450	1652.602	A2	1652.606	1652.756
B1	1650.354	1650.777	B1	1652.447	1652.599	B2	1652.603	1652.754
C1	1650.340	1650.764	C1	1652.444	1652.596	C2	1652.600	1652.751
D1	1650.326	1650.751	D1	1652.441	1652.593	D2	1652.597	1652.748
E1	1650.312	1650.739	E1	1652.438	1652.590	E2	1652.594	1652.746
BRIDGE A - SPAN 2			BRIDGE B - SPAN 2					
Beam	Pier 2A	Abut. 3A	Beam	Pier 2A	Abut. 3A	Beam	Pier 2A	Abut. 3A
A2	1650.787	1651.192	G1	1652.432	1652.585	G2	1652.589	1652.740
B2	1650.775	1651.181	H1	1652.428	1652.582	H2	1652.586	1652.738
C2	1650.763	1651.170	I1	1652.425	1652.579	I2	1652.583	1652.736
D2	1650.751	1651.159	J1	1652.422	1652.577	J2	1652.581	1652.733
E2	1650.739	1651.148	K1	1652.419	1652.574	K2	1652.578	1652.730
			L1	1652.415	1652.571	L2	1652.575	1652.728
			M1	1652.412	1652.568	M2	1652.572	1652.725
			N1	1652.412	1652.568	N2	1652.572	1652.725

Note: The contractor shall provide shims as required to bring top of beams up to the elevations tabulated above. The cost of furnishing and placing shims shall be considered incidental and included in the price bid for Structural Carbon Steel.

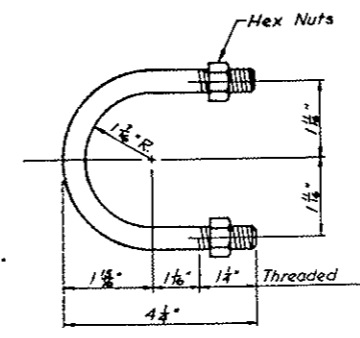


RUSTICATION DETAILS
No Scale

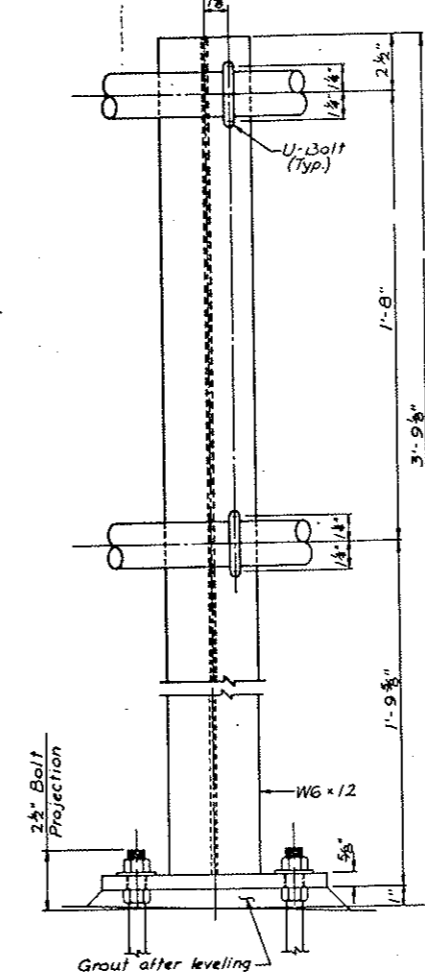
Note: Railposts, railpost anchorage, pipe sleeves, U-bolts and pipe railing on retaining walls and wingwalls shall be included in weight and paid for as Structural Carbon Steel (A36). Galvanize after fabrication in accordance with ASTM A153. 3-Ply joint waterproofing on back face of wall joints shall be considered incidental and included in price bid for Class AE-1 Modified Concrete.



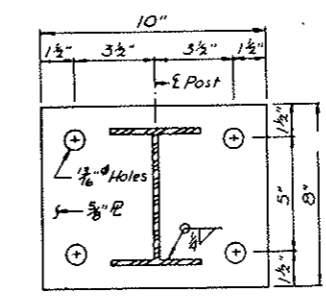
SECTION A-A
Scale: 3" = 1'-0"



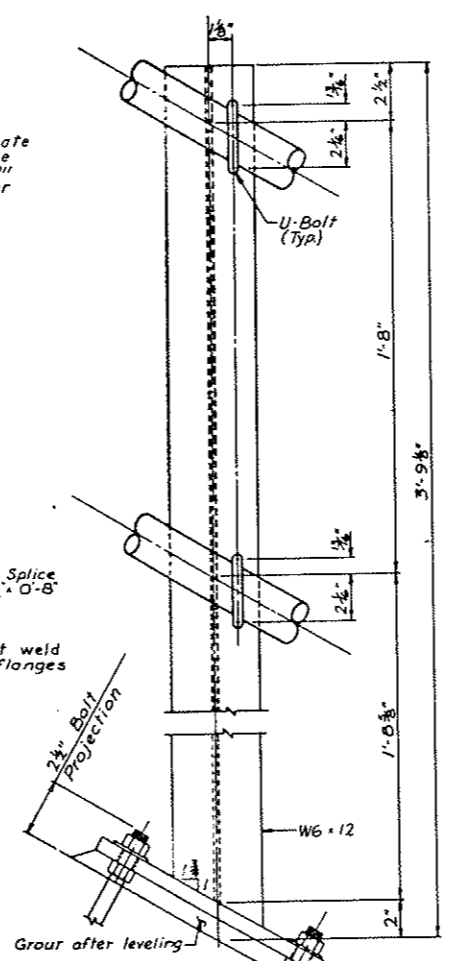
U-BOLT DETAIL
FOR SLOPED RAILING
Scale: half scale



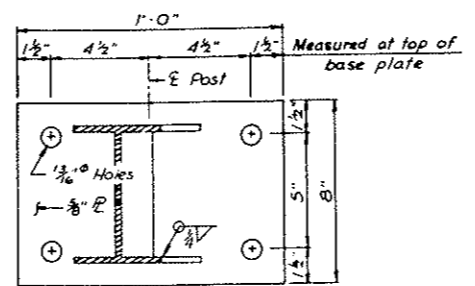
RAILPOST - HORIZONTAL BASE
Scale: 3" = 1'-0"



PLAN - HORIZONTAL BASE
Scale: 3" = 1'-0"



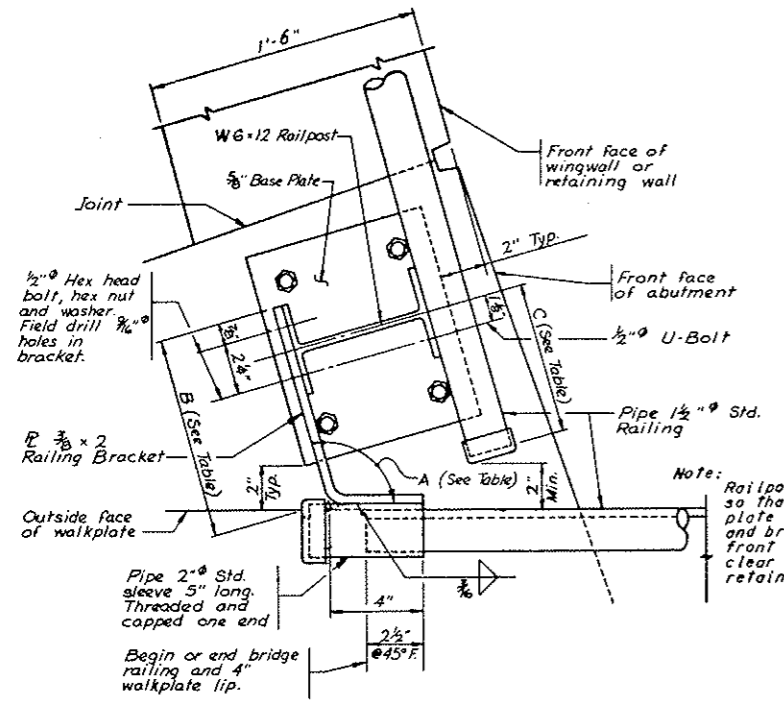
RAILPOST - SLOPED BASE
Scale: 3" = 1'-0"



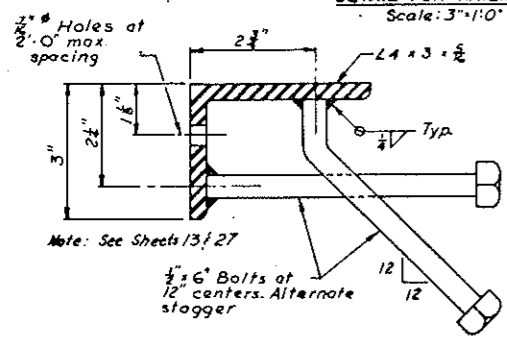
PLAN - SLOPED BASE
Scale: 3" = 1'-0"

DIMENSIONS AT CORNER POST				
ABUT.	CORNER	ANGLE A	DIM. B	DIM. C
1A	North	55°31'22"	1'-2 1/2"	3"
1A	South	128°27'52"	9 1/2"	10"
3A	North	119°05'32"	9 1/2"	8"
3A	South	90°01'00"	9 1/2"	4"
1B	North	90°00'00"	9 1/2"	4"
1B	South	115°34'22"	9 1/2"	8"
3B	North	106°02'13"	9"	6"
3B	South	69°03'21"	1'-1"	3"

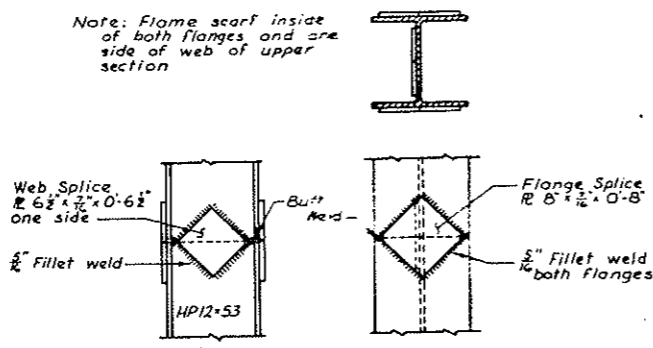
Note: Railpost anchorage shall be positioned so that the nearest corner of the base plate clears the outside face of walkplate and bridge railing by 2" exactly and the front railpost flange is parallel and 2" clear from the front face of wingwall or retaining wall extended.



TYPICAL CORNER POST
DETAIL FOR RAILING
Scale: 3" = 1'-0"

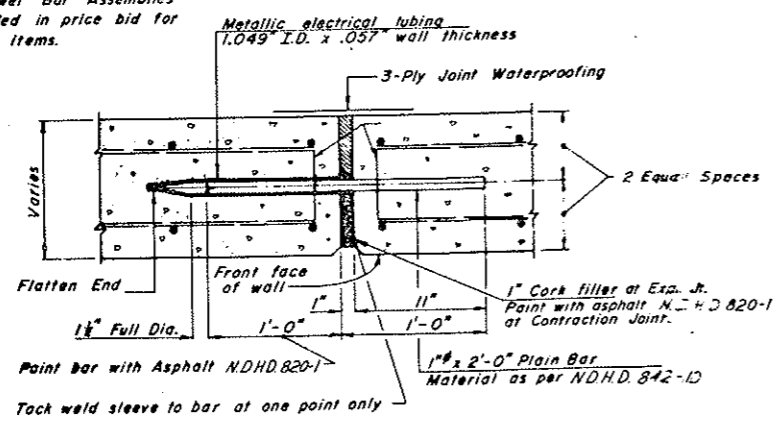


SUPPORT ANGLE DETAIL
FOR EXPANSION JOINTS
Scale: half scale



PILE SPLICE DETAIL
Scale: 1" = 1'-0"

Note: Dowel Bar Assemblies included in price bid for other items.



DOWEL BAR ASSEMBLY
1 1/2" x 1'-0"

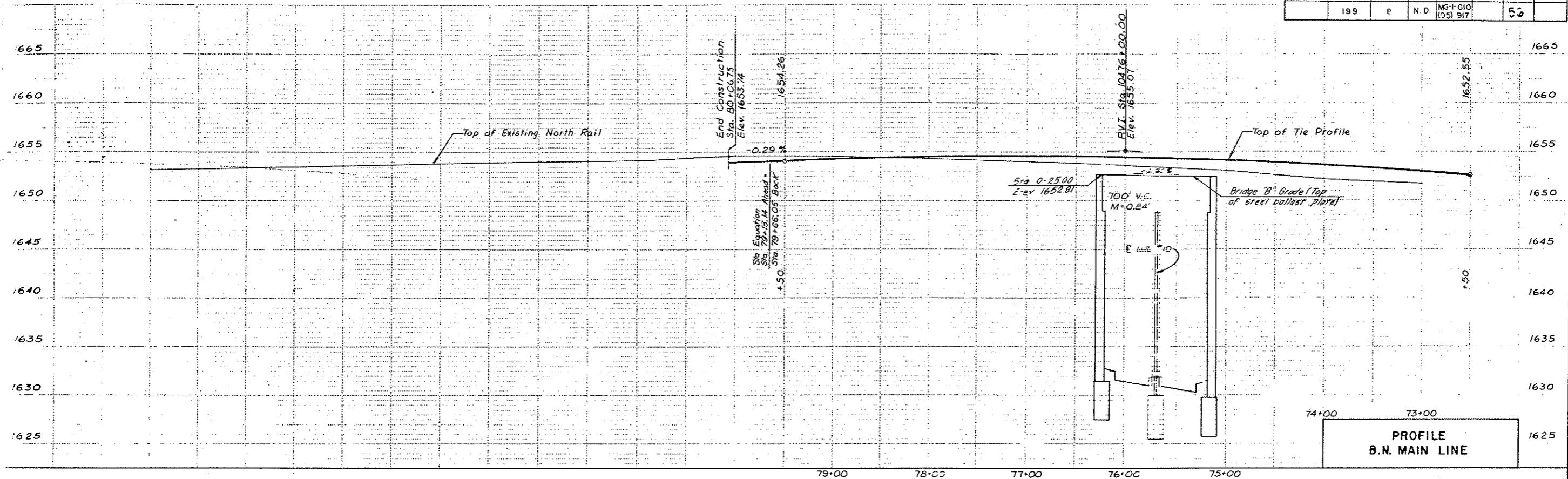
QUANTITIES

MISCELLANEOUS DETAILS

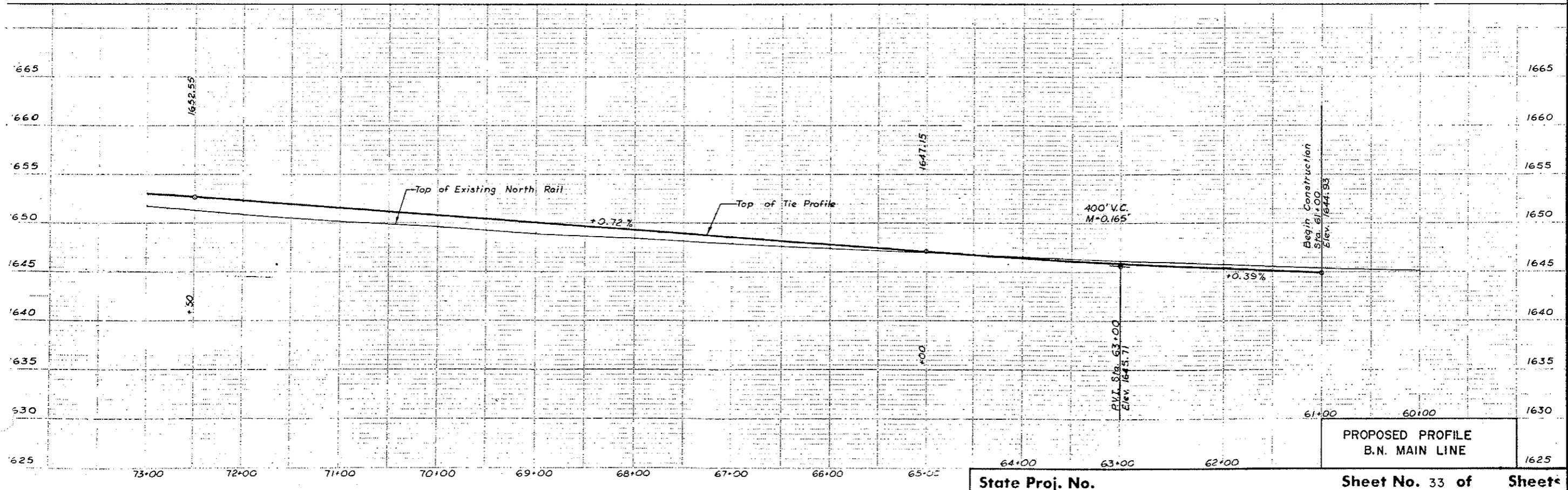
BURLINGTON NORTHERN, INC.
RAILWAY UNDERPASSES

U.S. HIGHWAY NO. 10
MORTON COUNTY

BRIDGE CODE	R.R. BRIDGE NO.	FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
	199	E	N D	MG-1-G10 (05) 917		50	

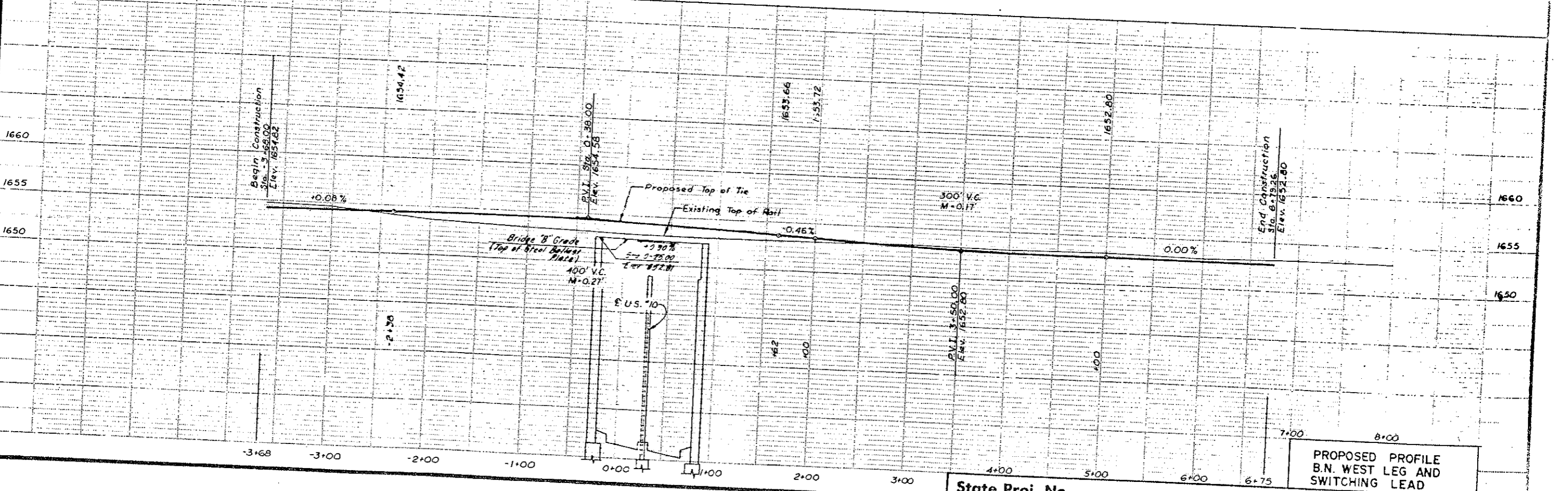
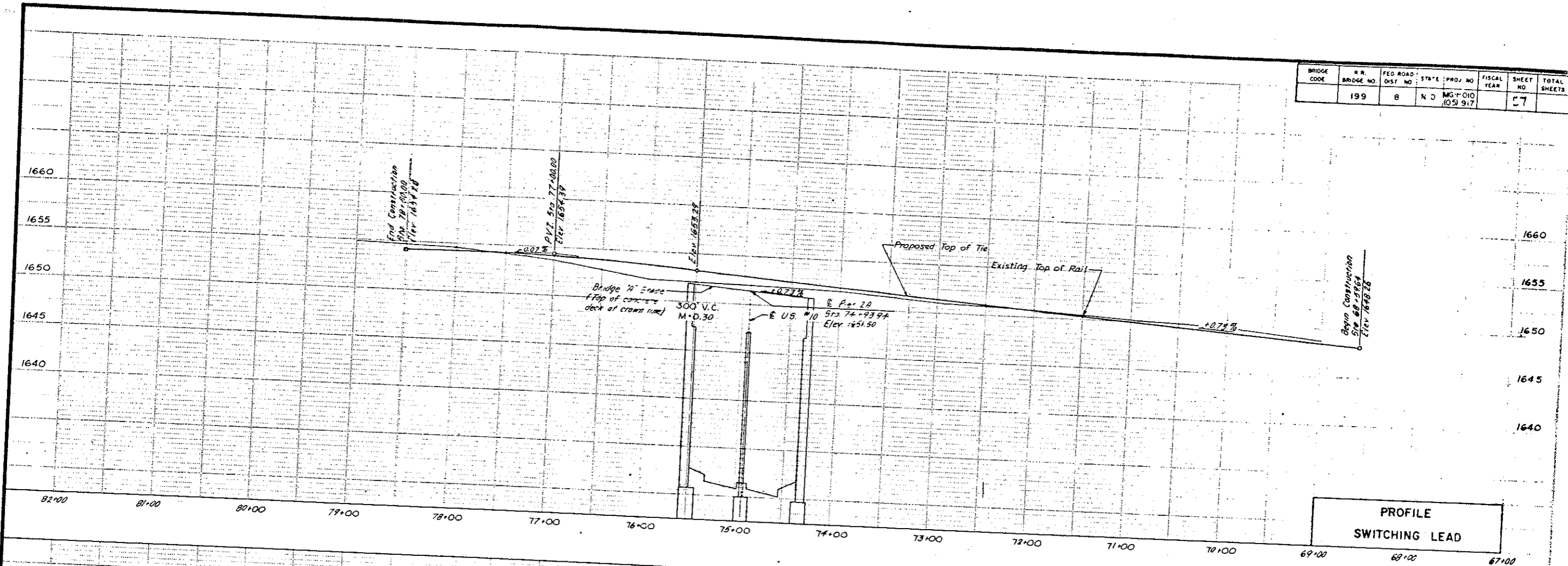


PROFILE
B.N. MAIN LINE



PROPOSED PROFILE
B.N. MAIN LINE

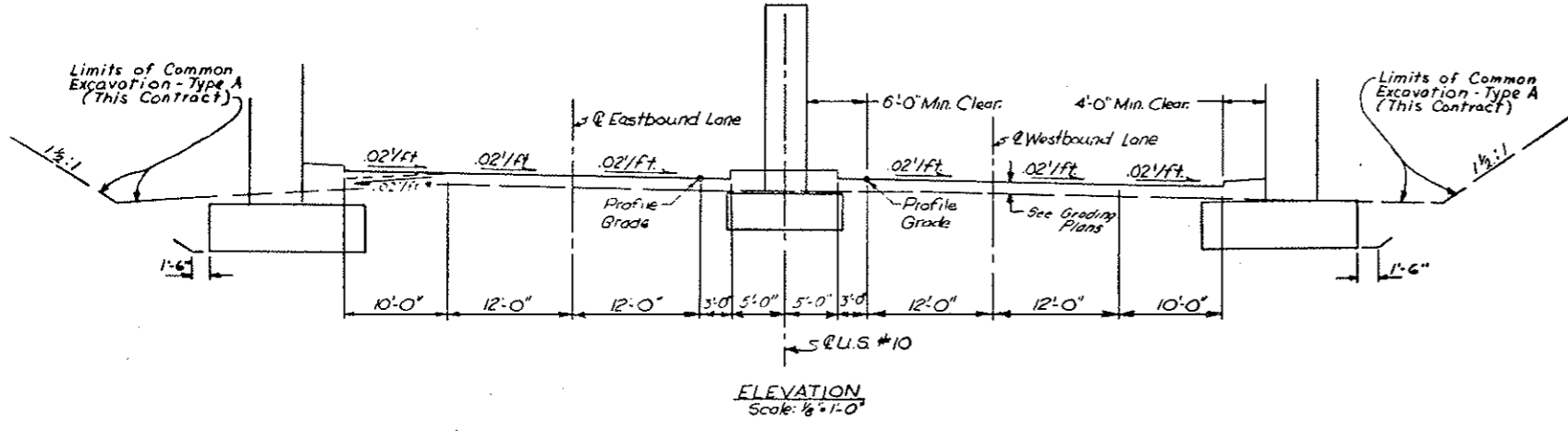
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	199	8	N.D.	MG-010 (05) 917		27	



State Proj. No.

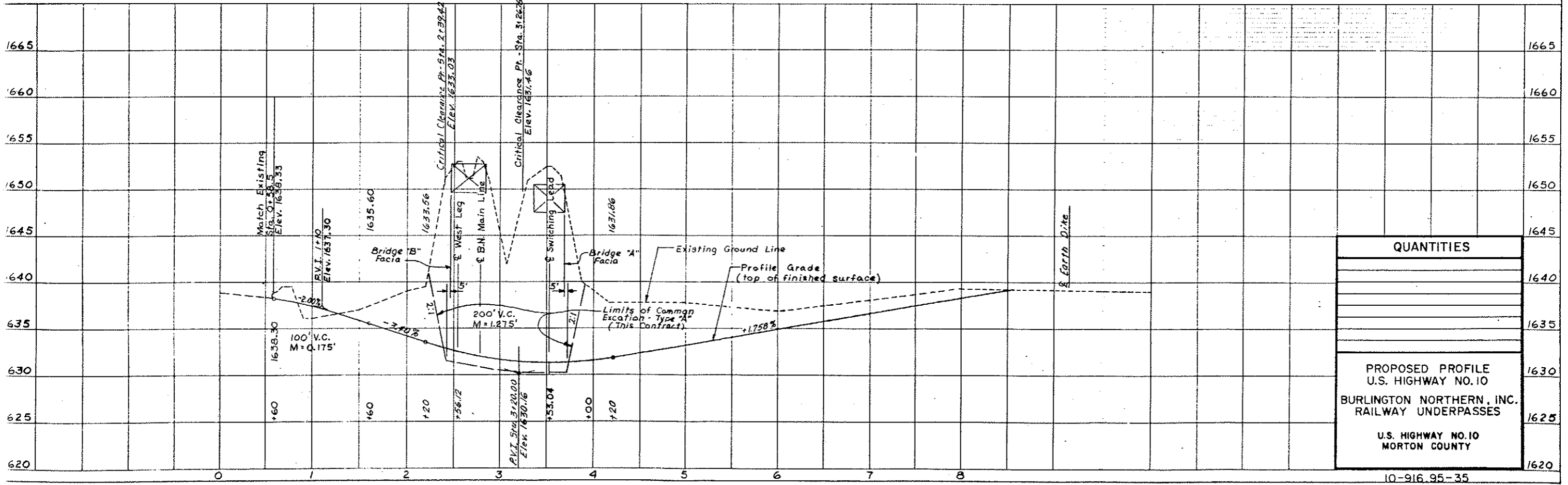
PROPOSED PROFILE
B.N. WEST LEG AND
SWITCHING LEAD

Sheet No. 30 of 30



* Slope toward gutter from Main Street to low point & then transition to full super section.

ELEVATION
Scale: 1/8" = 1'-0"

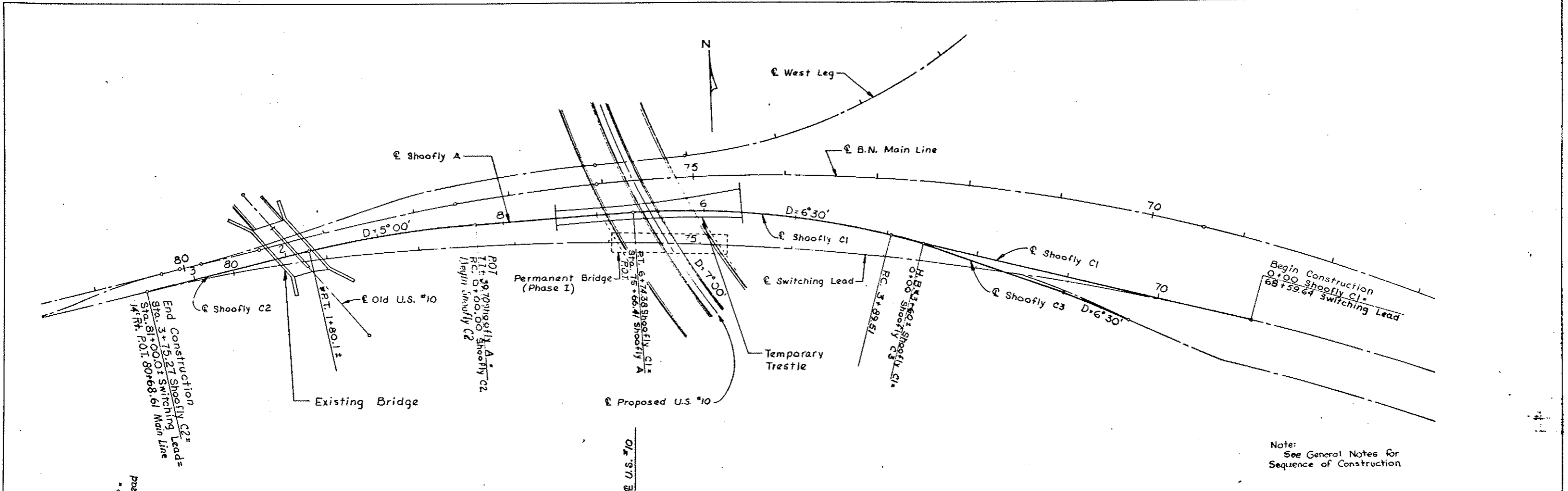


QUANTITIES	
PROPOSED PROFILE U.S. HIGHWAY NO. 10 BURLINGTON NORTHERN, INC. RAILWAY UNDERPASSES U.S. HIGHWAY NO. 10 MORTON COUNTY	

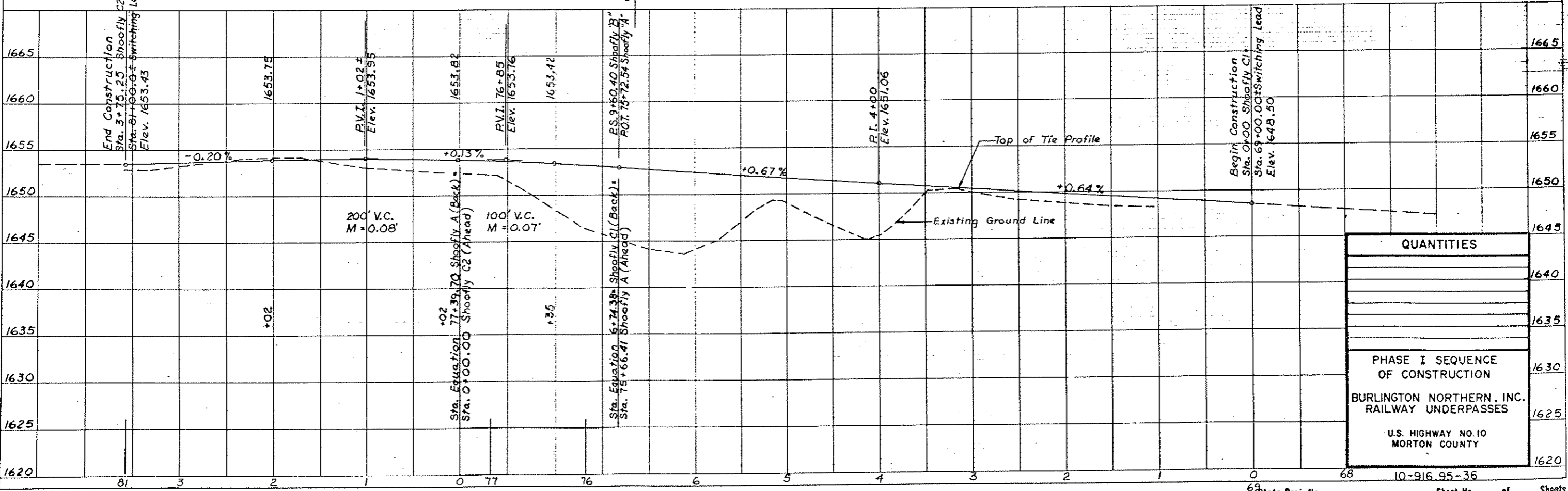
10-916-95-35

PRINTED
ALIGNED
CHECKED
BY
DATE

PLANNED
DESIGNED
CHECKED
BY
DATE



Note:
See General Notes for
Sequence of Construction

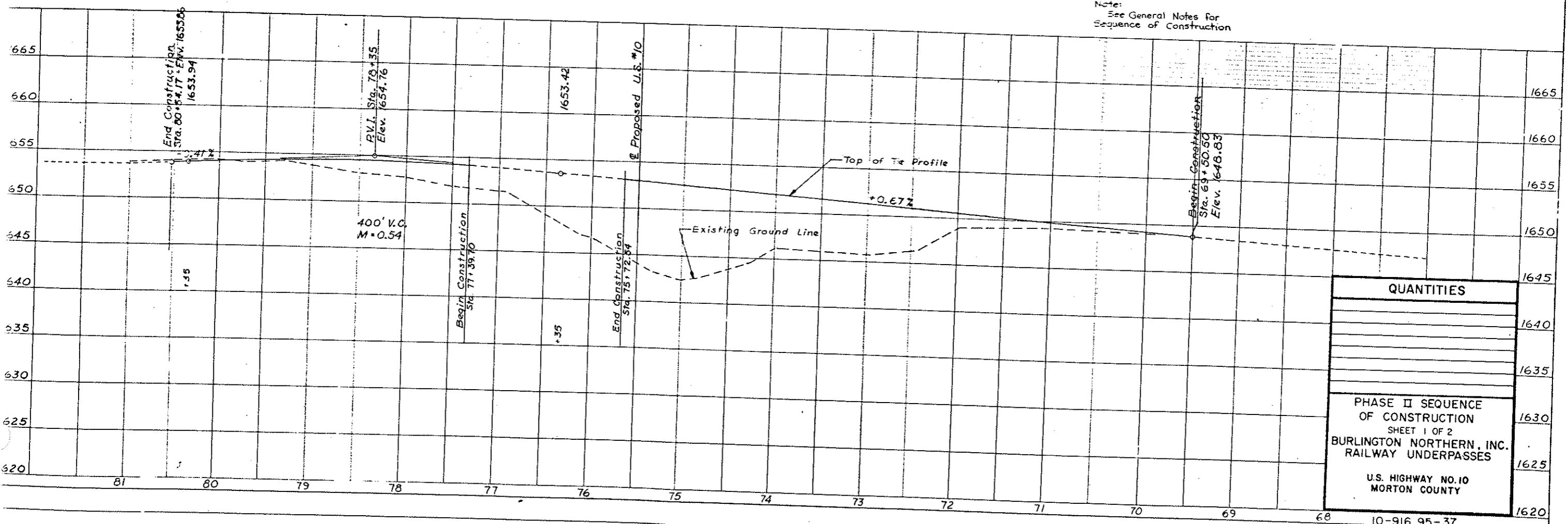
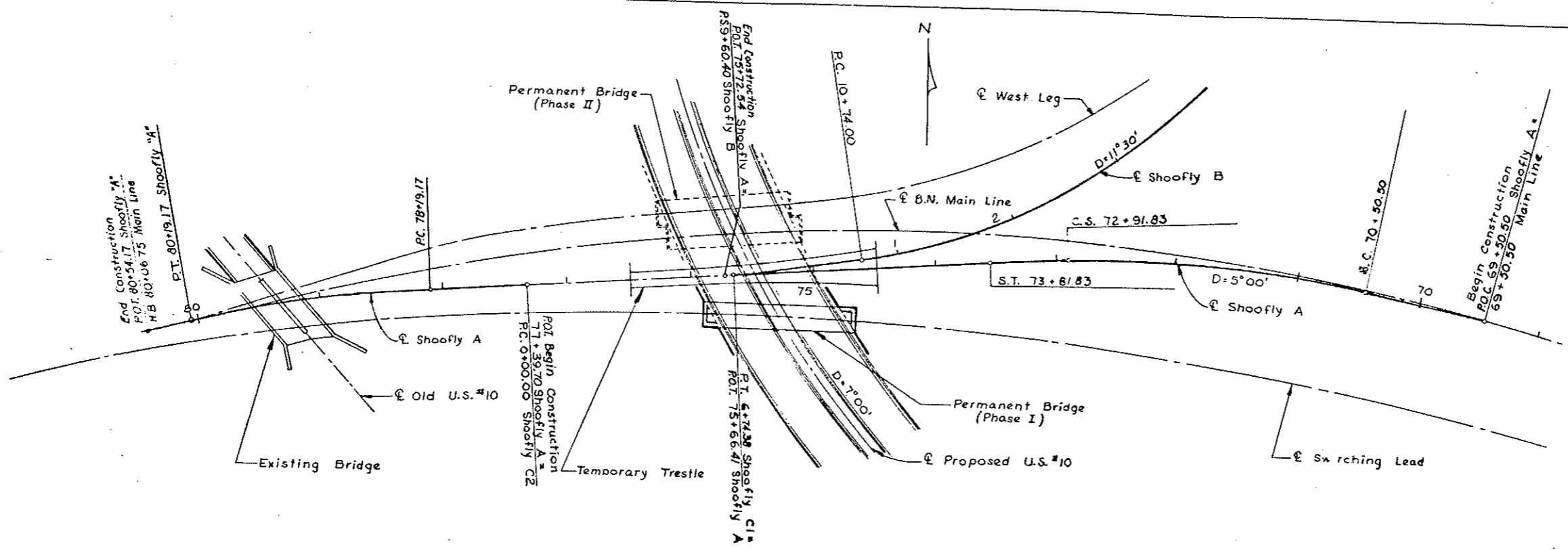


QUANTITIES	
	1640
	1635
	1630
	1625
	1620

PHASE I SEQUENCE
OF CONSTRUCTION

BURLINGTON NORTHERN, INC.
RAILWAY UNDERPASSES

U.S. HIGHWAY NO. 10
MORTON COUNTY

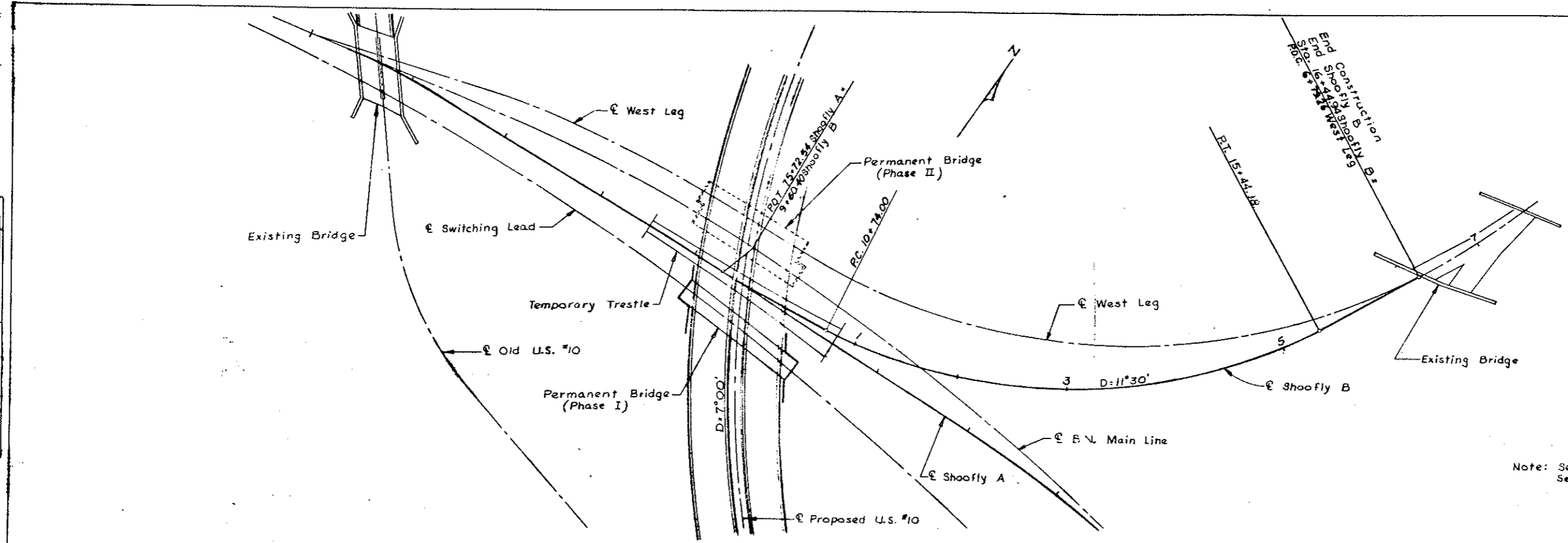


Note:
See General Notes for
Sequence of Construction

QUANTITIES	
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	1660
	1655
	1650
	1645
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	1630
	1625
	1620

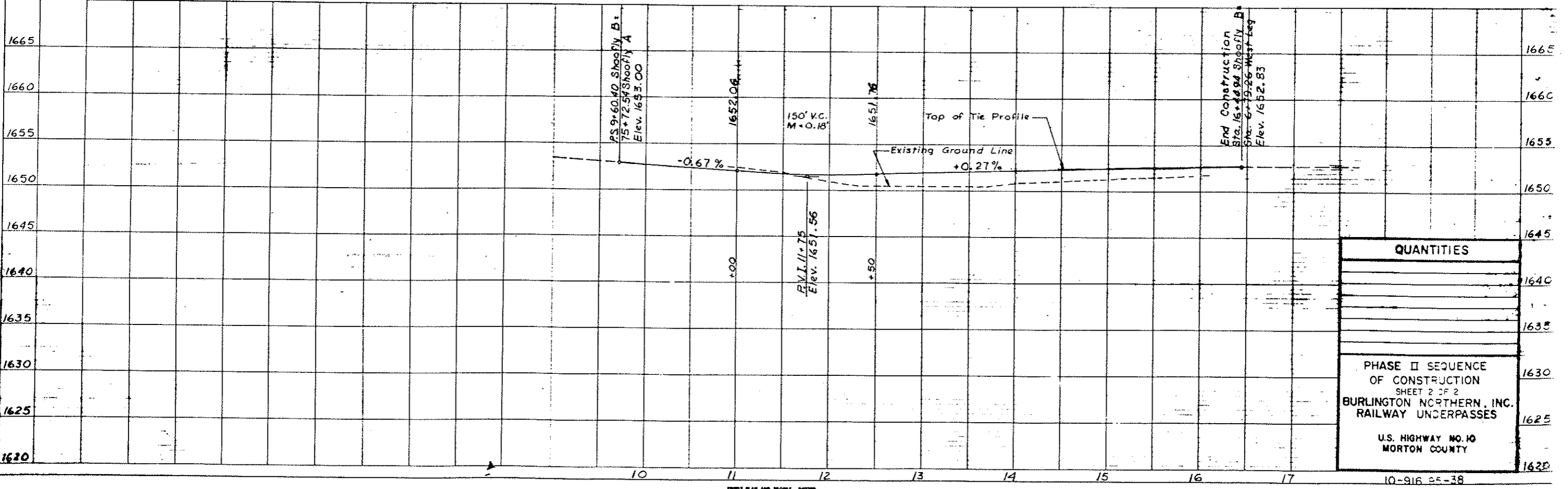
PHASE II SEQUENCE
OF CONSTRUCTION
SHEET 1 OF 2
BURLINGTON NORTHERN, INC.
RAILWAY UNDERPASSES
U.S. HIGHWAY NO. 10
MORTON COUNTY

PLANS
 CHECKED BY
 DATE
 REVISIONS



Note: See Sheet 1 of 2 for Sequence of Construction

IMPRINTS, ENGRAVING, PHOTO-COPYING, ETC., ARE PROHIBITED. REPRODUCE BY ANY MEANS WITHOUT PERMISSION OF THE DISTRICT ENGINEER.

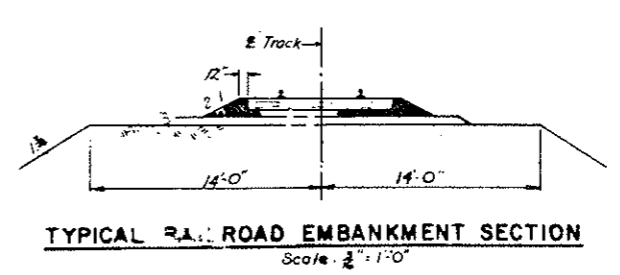
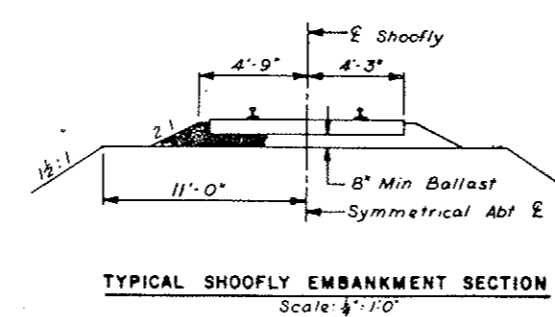
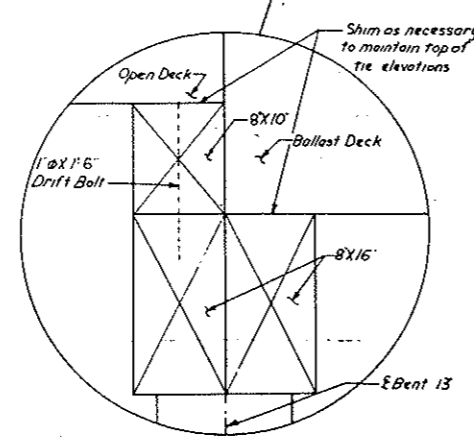
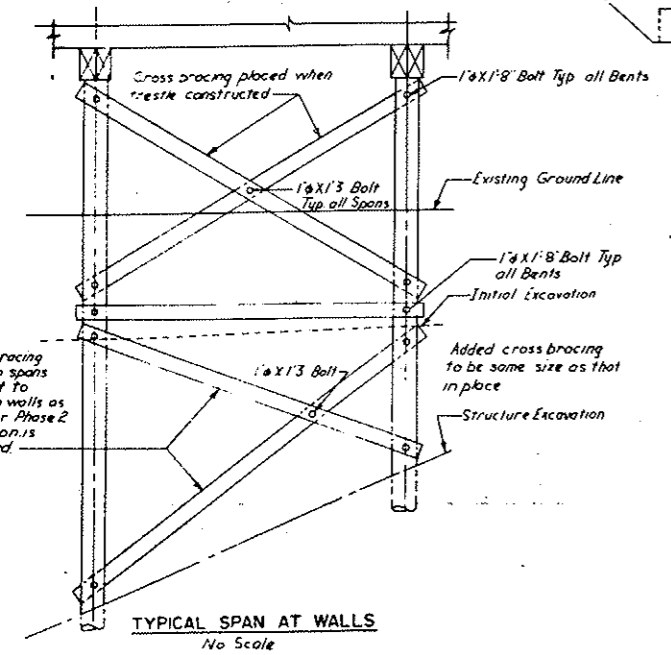
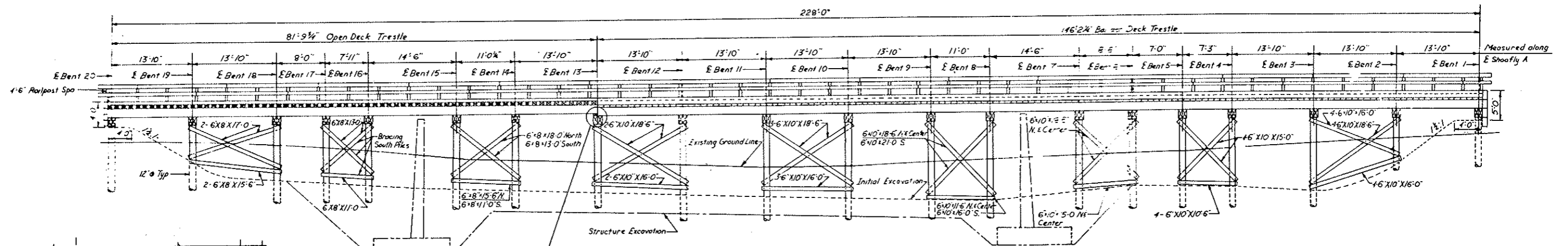
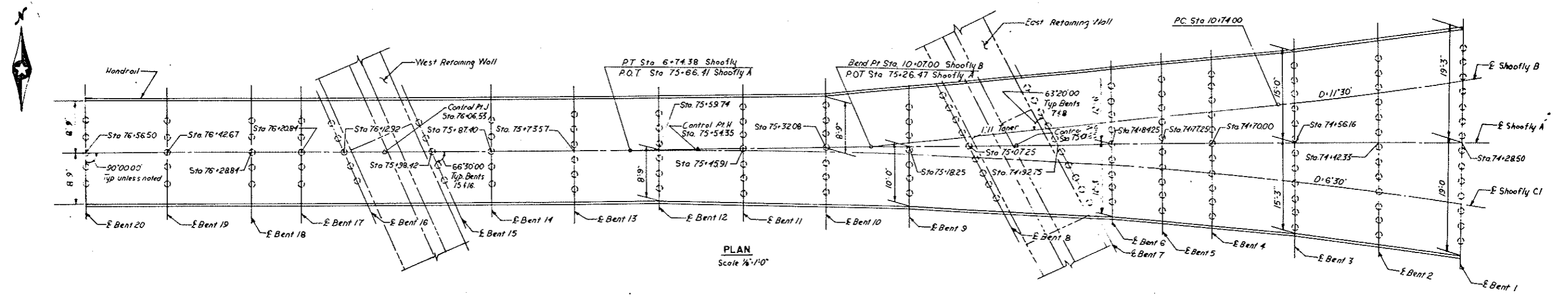


QUANTITIES	

PHASE II SEQUENCE OF CONSTRUCTION
 SHEET 2 OF 2
 BURLINGTON NORTHERN, INC.
 RAILWAY UNDERPASSES
 U.S. HIGHWAY NO. 10
 MORTON COUNTY

DOUBLE PLAN AND PROFILE - 50'-11"

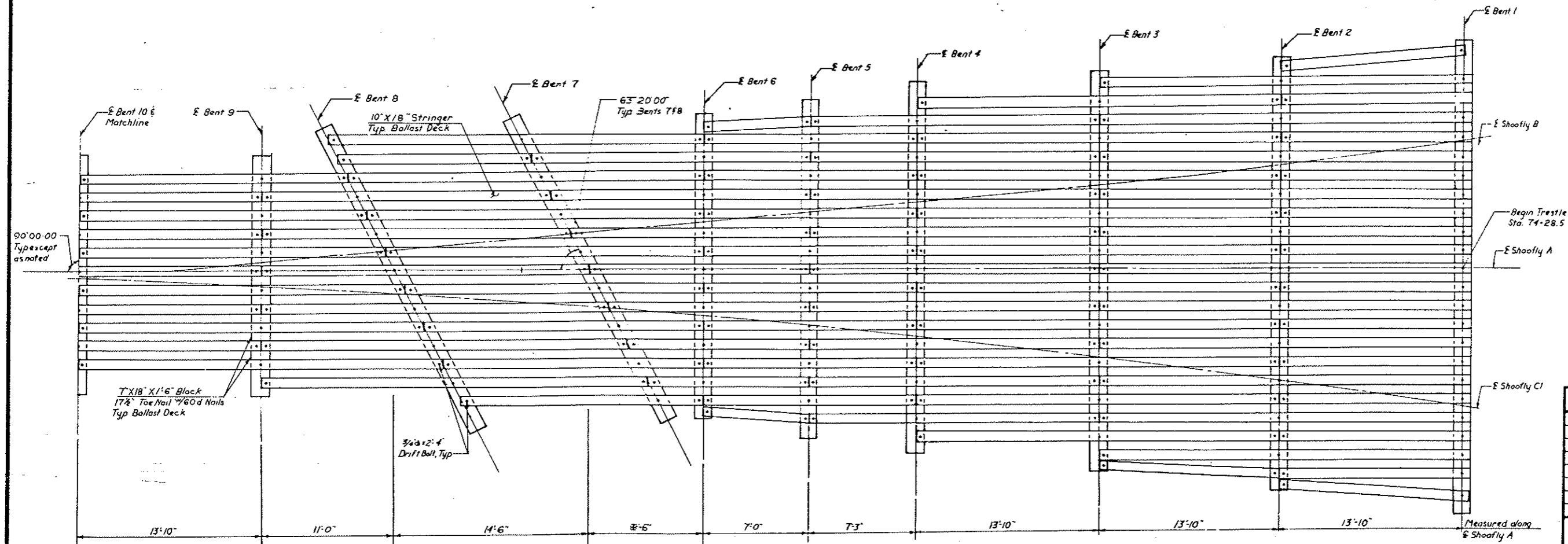
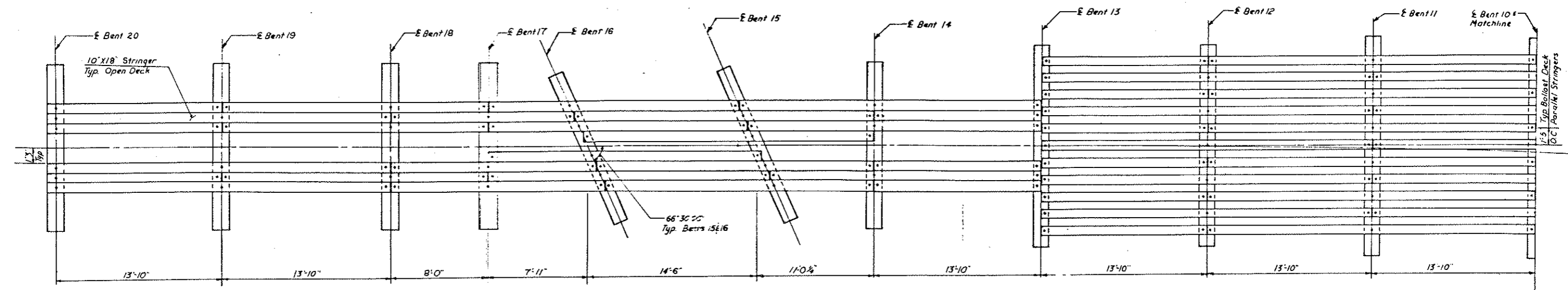
BRIDGE CODE	R.R. BRIDGE NO.	FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
	199	8	N. D.	MS-1-010 (OS) 917		52	



Note: Ground Line and Excavation Lines are at Trestle. See Cross Sections for excavation along Bents.
For location of longitudinal bracing see "Bent Details-Trestle". Longitudinal bracing may be trimmed in the field if necessary.

QUANTITIES	
TEMPORARY TRESTLE LAYOUT BURLINGTON NORTHERN, INC. RAILWAY UNDERPASSES	
U.S. HIGHWAY NO. 10 MORTON COUNTY	

BRIDGE CODE	R R BRIDGE NO	FED ROAD DIST NO	STATE	PROJ NO	SCAL YEAR	SHEET NO	TOTAL SHEETS
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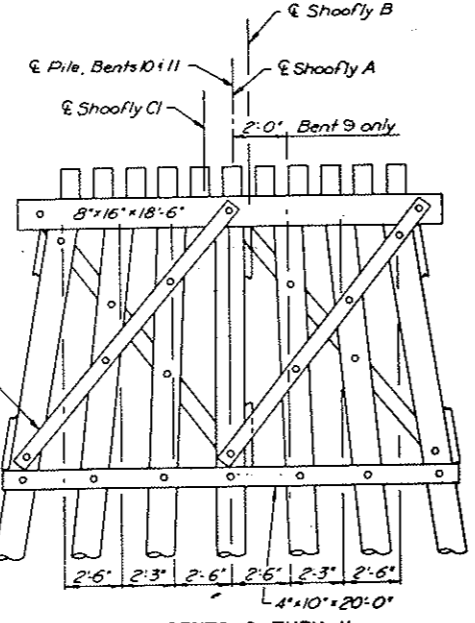
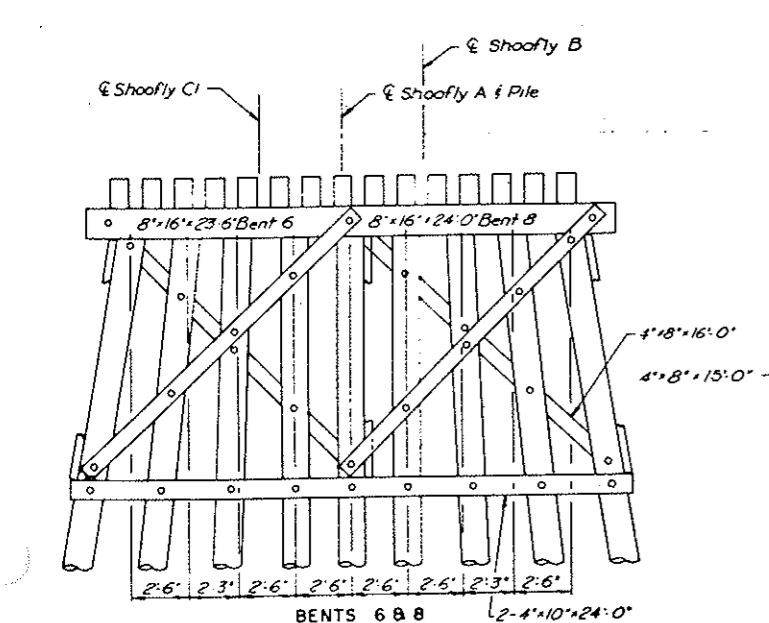
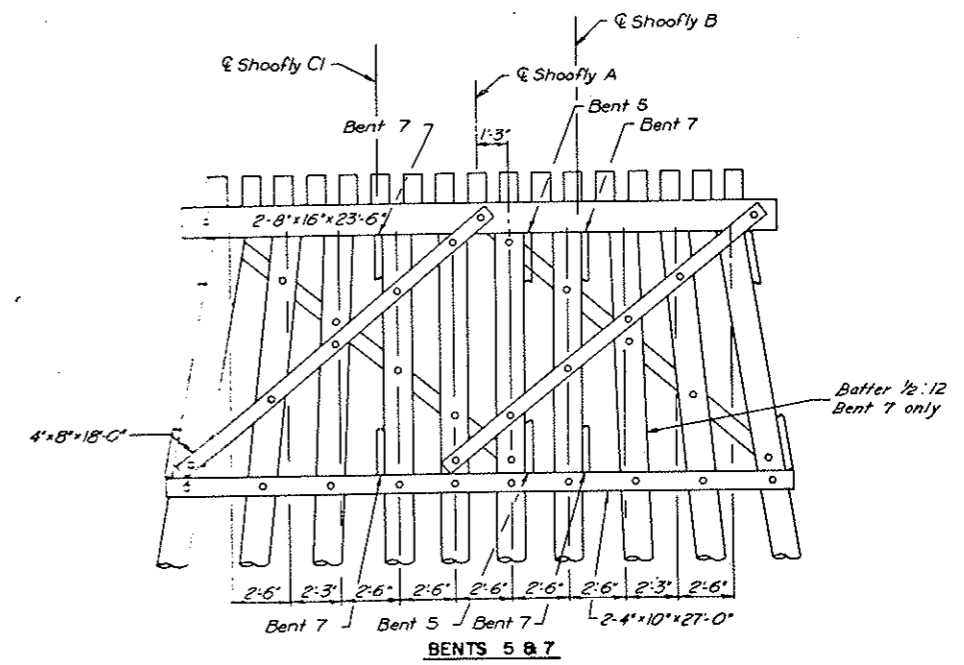
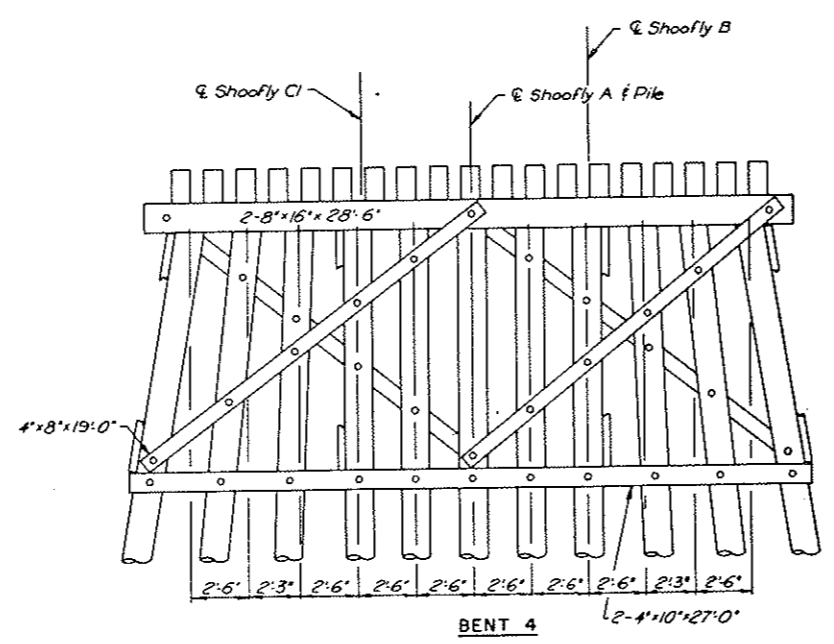
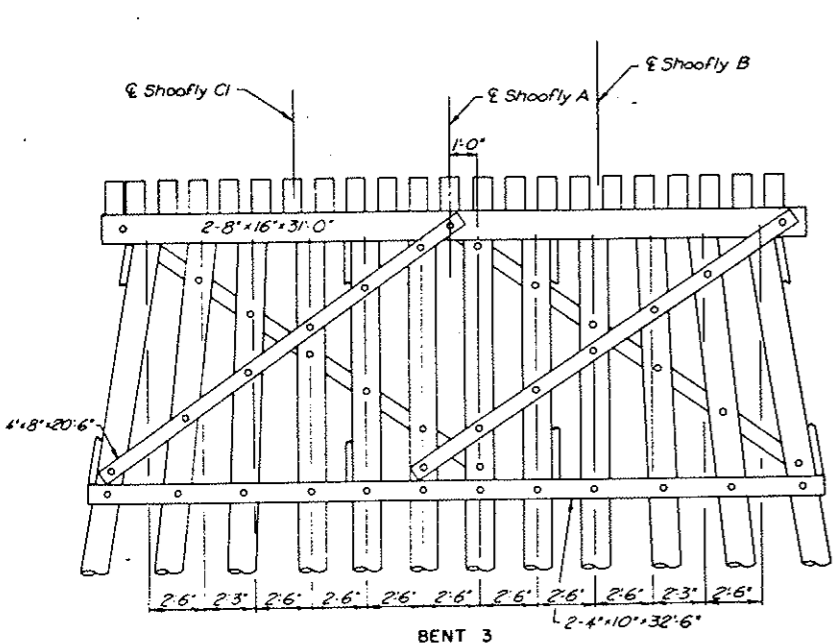
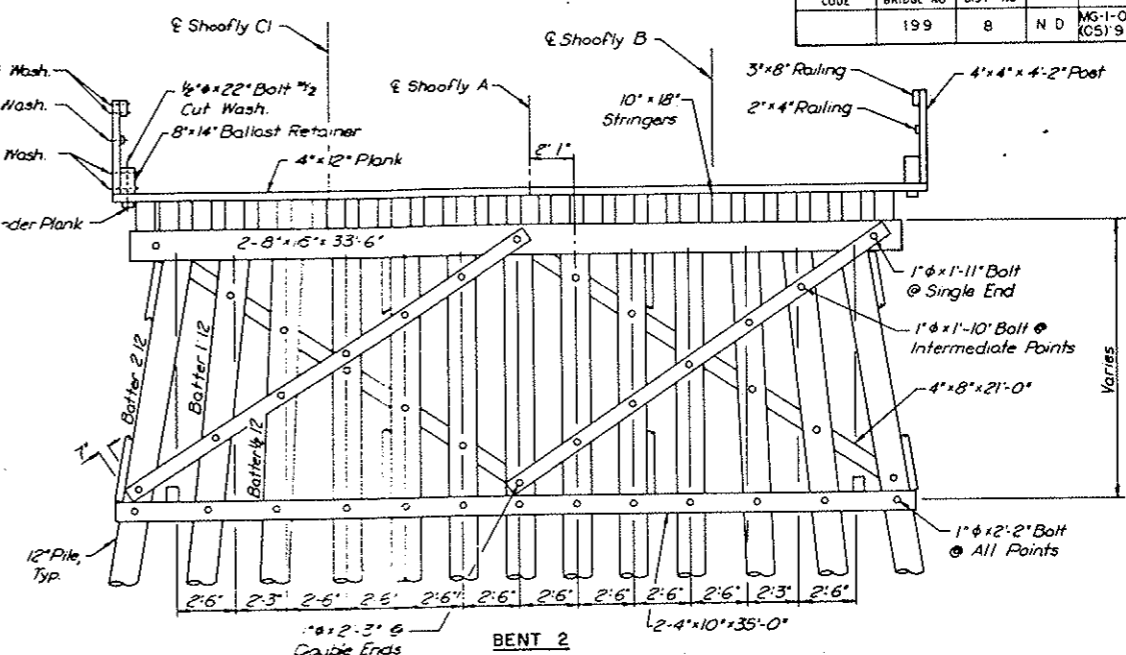
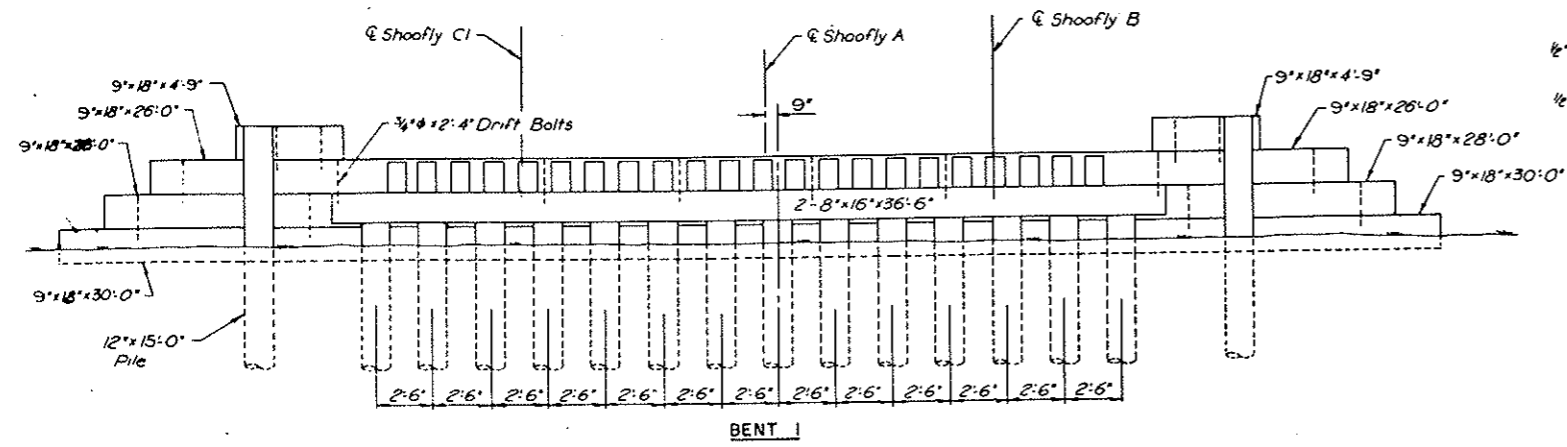


STRINGER PLAN
Scale 1/4" = 1'-0"

Notes:
Ballast Planking to be attached to stringers with 2" x 7" D.C. Spikes.
Stringer Splices to be alternated at bents.

QUANTITIES	
STRINGER PLAN TRETTLE BURLINGTON NORTHERN, INC. RAILWAY UNDERPASSES	
U.S. HIGHWAY NO. 10 MORTON COUNTY	

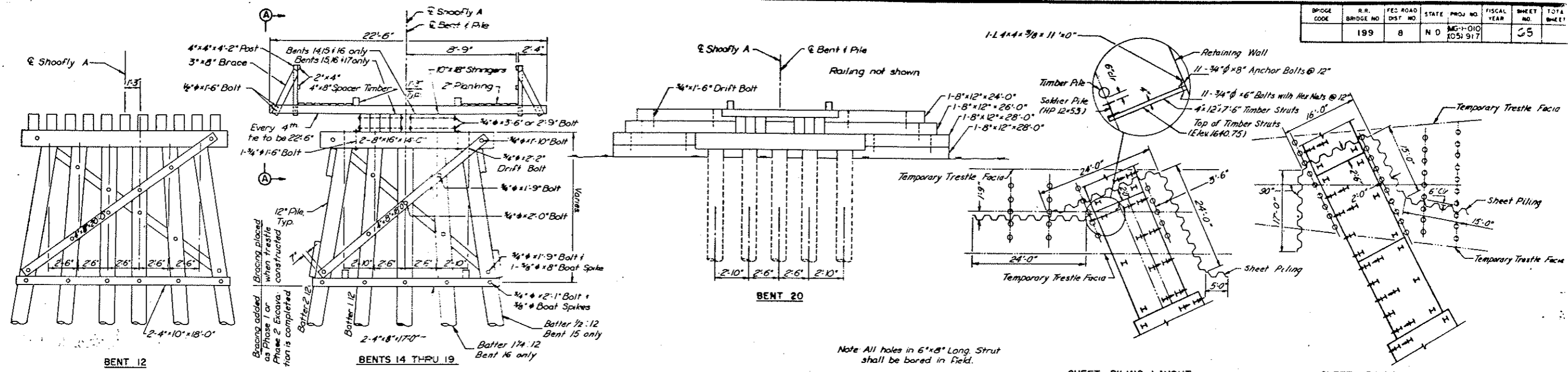
BRIDGE CODE	R.R. BRIDGE NO.	FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
	199	8	N D	MG-1-010 (CS) 917		62	



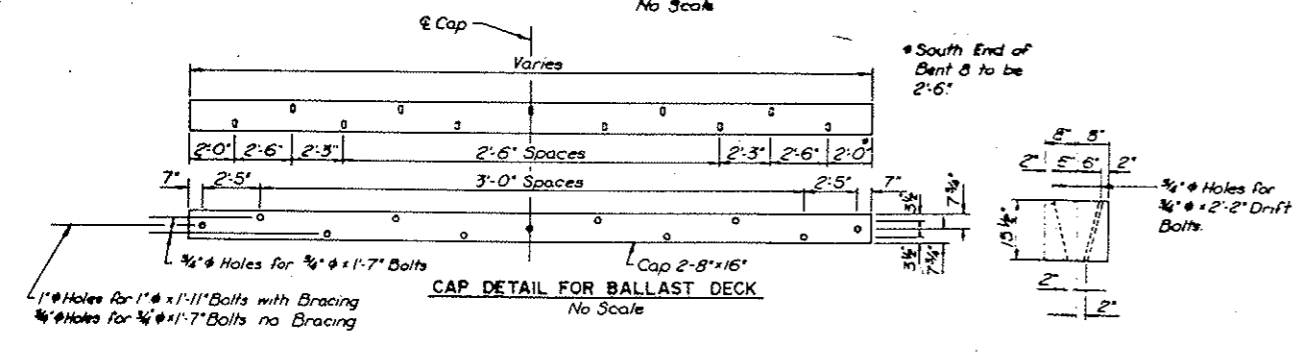
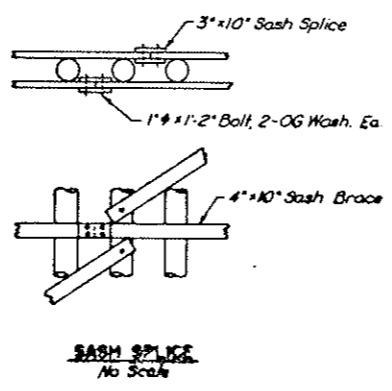
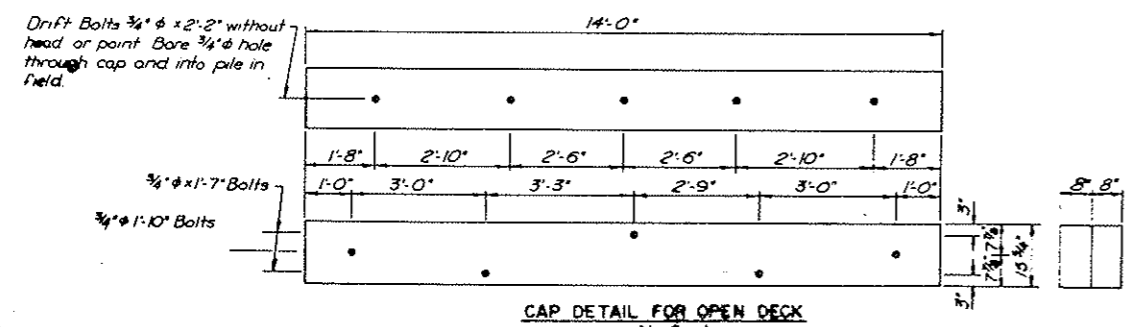
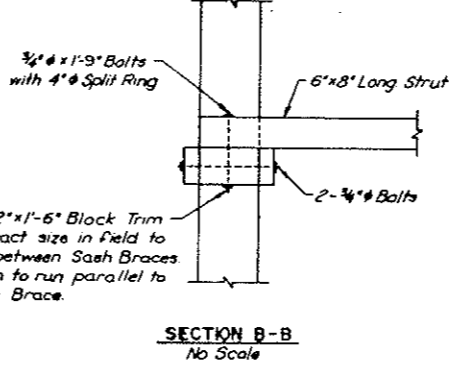
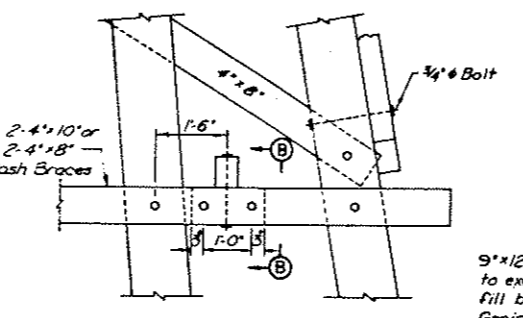
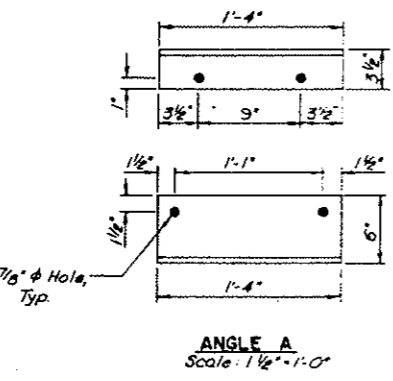
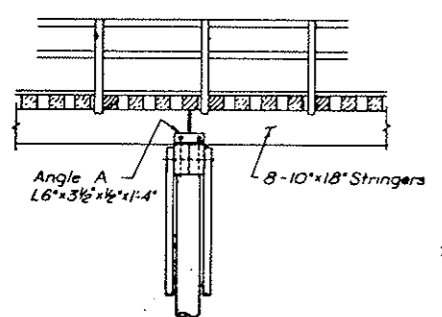
QUANTITIES
<p>BENT DETAILS (SHEET 1 OF 2) TRESTLE BURLINGTON NORTHERN, INC. RAILWAY UNDERPASSES</p>
<p>U.S. HIGHWAY NO. 10 MORTON COUNTY</p>

NOTE: For Ground Line see "Temporary Trestle Layout" and Cross Sections.

BRIDGE CODE	R.R. BRIDGE NO	FED ROAD DIST NO	STATE PROJ NO	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
	199	8	N O	MG-1010 105/917	25	



Note: All holes in 6" x 8" Long. Strut shall be bored in field.



BENT	TOP OF TIE ELEV.	BOTTOM OF PREBORING ELEV.
1	1652.04	1645.50
2	1652.13	1644.00
3	1652.22	1641.00
4	1652.31	1632.50
5	1652.36	1627.50
6	1652.41	1626.50
7	1652.47*	1626.50
8	1652.56*	1626.50
9	1652.64	1630.50
10	1652.73	1636.50
11	1652.82	1636.50
12	1652.92	1636.50
13	1653.01	1636.50
14	1653.10	1633.50
15	1653.17*	1627.50
16	1653.27*	1627.50
17	1653.33	1632.50
18	1653.38	1638.00
19	1653.47	1643.50
20	1653.55	1643.50

* Elevation at Shoofly A only

Notes:

- Each 4 x 12 timber shall be bolted to the L4 x 4 x 1/2 with one 3/4" x 6" Bolt with hex. nut and washer.
- Sheet Piling shall be Regular Carbon Grade Steel, Type MZ 32. Sheet piling shall be driven to a minimum elevation of 1611.75 for the East Retaining Wall and 1512.75 for the West Retaining Wall. Minimum top elevation for the sheet piling shall be 1641.50 for the East Retaining Wall and 1642.5 for the West Retaining Wall.
- The Soldier Pile shall be an HP 12 x 53 and shall be driven to an elevation of 1600.
- Sheet piling within the area of the footing may at Contractors option be left in place and cut off 6" below bottom of footing. All other sheet piling and soldier piles shall be removed.

QUANTITIES	

BENT DETAILS (SHEET 2 OF 2)
TRESTLE
 BURLINGTON NORTHERN, INC.
 RAILWAY UNDERPASSES
 U.S. HIGHWAY NO. 10
 MORTON COUNTY

BILL OF MATERIALS

TO BE INSTALLED BY CONTRACTOR

HARDWARE				TIMBER			
ITEM	DESCRIPTION	NUMBER	REMARKS	ITEM	DESCRIPTION	NUMBER	REMARKS
Drift Bolt	3/4" # x 2'-4"	322		Bent 1 Backwall	9"x18"x4'-9"	2	
Drift Bolt	3/4" # x 2'-2"	152		Bent 1 Backwall	9"x18"x28'-0"	2	
Drift Bolt	3/4" # x 1'-5"	15		Bent 1 Backwall	9"x18"x20'-0"	3	
Bolt w. 4" #				Bent 1 Backwall	9"x18"x22'-0"	3	
Split Ring	3/4" # x 1'-3"	12		Bent 1 Cap	8"x16"x36'-6"	2	
Bolt	3/4" # x 1'-5" or	13		Bent 1 Pile	12" # x 15'-0"	2	
Log Screw	3/4" # x 10"	32		Pile-All Bents	12" # x 35'-0"	151	
Bolt	3/4" # x 1'-7"	127		5 Pile Bent Cap	8"x16"x14'-0"	12	
Bolt	3/4" # x 1'-9"	57		5 Pile Bent Bracing	4"x8"x17'-0"	12	
Bolt w. 4" #				5 and 10 Pile Bent			
Split Ring	3/4" # x 1'-9"	24		Bracing	4"x8"x18'-0"	20	
Bolt	3/4" # x 1'-10"	152		Bracing Block	9"x12"x11'-6"	54	
Bolt w. 20.G				6 Pile Bent Cap	8"x16"x16'-0"	4	
Washer	3/4" # x 2'-0"	353		6 Pile Bent Brace	4"x8"x20'-0"	4	
Bolt	3/4" # x 2'-0"	35		6 Pile Bent Brace	4"x10"x18'-0"	4	
Bolt	3/4" # x 2'-1"	35		6 Pile Bent Brace	8"x10"x16'-0"	1	
Bolt	3/4" # x 2'-3"	12		7 Pile Bent Cap	8"x16"x18'-6"	6	
Bolt	3/4" # x 2'-5"	43		7 Pile Bent Brace	4"x8"x15'-0"	12	
Bolt	3/4" # x 3'-5"	3		7 Pile Bent Brace	4"x10"x20'-0"	6	
Bolt	1" # x 1'-3"	115		9 Pile Bent Cap	8"x16"x23'-6"	2	
Bolt	1" # x 2'-2"	231		9 Pile Bent Cap	8"x16"x24'-0"	2	
Bolt	1" # x 2'-3"	52		9 Pile Bent Brace	4"x10"x24'-0"	4	
Bolt	1" # x 1'-11"	156		9 Pile Bent Brace	4"x8"x16'-0"	8	
Bolt	1/2" # x 6"	175		10 Pile Bent Cap	8"x16"x26'-0"	4	
Bolt	1/2" # x 7"	352		10 Pile Bent Brace	4"x10"x27'-0"	4	
Bolt	1/2" # x 13"	352		11 Pile Bent Cap	8"x16"x28'-6"	2	
D.G. Spikes	3/4" # x 7"	205		11 Pile Bent Brace	4"x8"x19'-0"	4	
Boat Spike	3/4" # x 8"	42		11 Pile Bent Brace	4"x10"x30'-0"	2	
				12 Pile Bent Cap	8"x16"x31'-0"	2	
				12 Pile Bent Brace	4"x8"x20'-6"	4	
				12 Pile Bent Brace	4"x10"x32'-6"	2	
				13 Pile Bent Cap	8"x16"x33'-6"	2	
				13 Pile Bent Brace	4"x8"x21'-0"	4	
				13 Pile Bent Brace	4"x10"x35'-0"	2	
				Stringer	10"x18"x28'-0"	41	
				Stringer	10"x18"x28'-0"	42	To be field cut to 1 usable piece
				Stringer	10"x18"x28'-0"	3	To be field cut to 2 usable pieces
				Stringer	10"x18"x14'-0"	26	
				Stringer	10"x18"x29'-0"	1	
				Stringer	10"x18"x30'-0"	1	
				Stringer Spacer	7"x18"x11'-6"	87	2 to be cut into 7"x18"x8"
				Long Ties-Open Deck	8"x8"x22'-6"	19	
				Long Bracing	6"x8"x13'-0"	4	
				Long Bracing	6"x8"x11'-0"	2	
				Long Bracing	6"x8"x18'-0"	2	
				Long Bracing	6"x8"x15'-6"	3	
				Long Bracing	6"x8"x17'-0"	4	
				Long Bracing	6"x10"x18'-6"	22	
				Long Bracing	6"x10"x16'-0"	14	
				Long Bracing	6"x10"x21'-0"	2	
				Long Bracing	6"x10"x15'-0"	9	
				Long Bracing	6"x10"x10'-6"	4	
				Long Bracing	6"x10"x11'-6"	2	
				Ballast Retainer	8"x14"x300'	1	
				Binder Plate	3"x16"x300'	1	
				Rail Post	4"x4"x4'-2"	176	
				Railing	3"x8"x465'-0"	1	
				Railing	2"x4"x465'-0"	1	
				Ballast Plate	4"x12"	16,500 Bq. Ft.	

ITEM	DESCRIPTION	NUMBER	REMARKS
Long Bracing	6"x8"x20'-0"	2	
Long Bracing	6"x10"x20'-0"	10	
Trans. Bracing	4"x8"x17'-0"	12	
Trans. Bracing	4"x8"x18'-0"	12	
Trans. Bracing	4"x10"x24'-0"	2	
Trans. Bracing	4"x10"x27'-0"	2	
Bolt	1" # x 1'-3"	18	
Bolt	1" # x 1'-8"	104	

Notes:

Rail posts shall be placed every fourth tie in open deck area and continue every 4'-6" in ballast deck area. Splices in railing shall be alternated.

All timbers and piling shall be untreated. Bore grooves for split rings with Teco split ring cutter head 14-M. Do not cut out material inside of grooves.

All bolts through timber shall have a 3/8" x 3" # cut washer under both nut and head. Use approved lock nuts on all bolts.

Holes for 3/4" # Bolts shall be 1/2" #.

Holes for 1" # Bolts shall be 3/4" #.

Holes for 1" # Drift Bolts shall be 1" #.

All stringers except 28'-0" and 14'-0" lengths to be field cut.

All bracing may be trimmed in field if necessary.

All holes for bracing to be field drilled. Ties shall be placed 14" O.C. Ties shall be bored in field. Walks, Railings, and Refuge Platforms shall be placed as directed. See Standard Plan B115-6545-2.

All Piles are 12" #.

All piling to be driven to obtain not less than 30 tons bearing.

For depth of preboring for piles see "Bent Details-Trestle sheet 2 of 2".

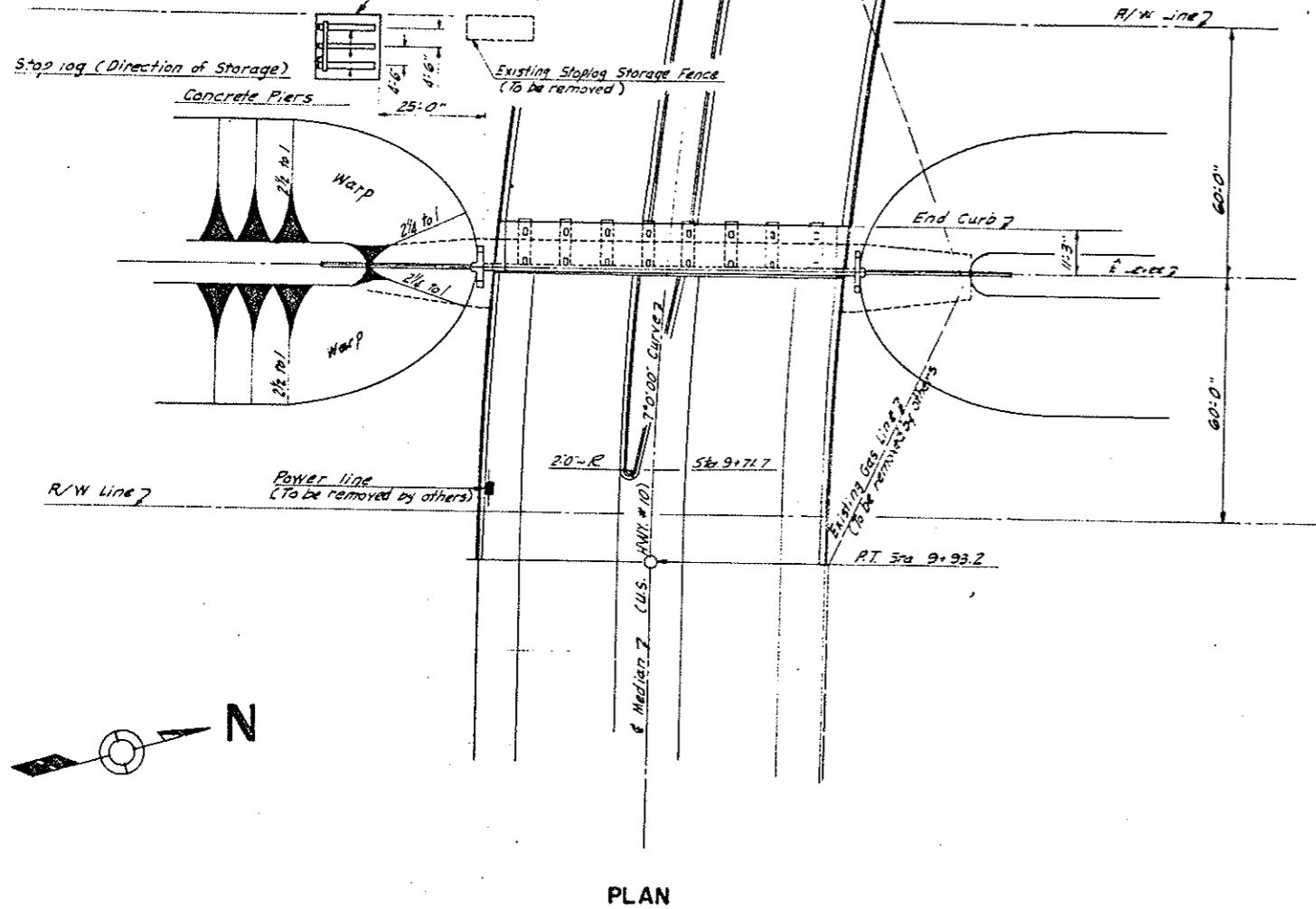
STRINGER STRESSES (DL+LL):

Loading	Bending	Hor. Shear
E 72	1550 P.S.I.	108 P.S.I.

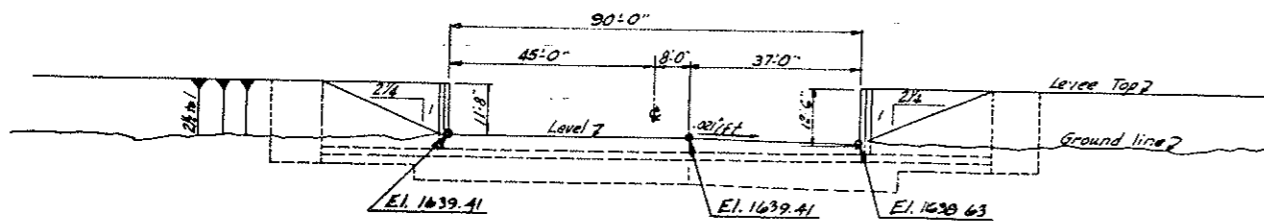
QUANTITIES	
Untreated Timber	26 MBM
BILL OF MATERIALS TRESTLE BURLINGTON NORTHERN, INC. RAILWAY UNDERPASSES	
U.S. HIGHWAY NO. 10 MORTON COUNTY	

BRIDGE NO.	FED. ROAD DIST. NO.	STATE	PROJ. NO.	SHEET NO.	TOTAL SHEETS
8	8	N. D.	MG-1-0005917	67	

Provide 16'x16'x7'-0" high Chain link fence with a 6'-0" swing gate with padlock. Existing fence and 6'-0" swing gate shall be salvaged. Additional chain link fence shall be provided to complete the enclosure. New fence posts to be set in concrete piers 12"x3'-0". Provide 3 concrete piers 12'-0" long x 1'-0" wide x 3'-0" deep projecting 1'-0" above ground and reinforced with #4 bars on 12" centers each face and both ways.



PLAN



ELEVATION

REMOVAL OF STRUCTURE:

THE STRUCTURE TO BE REMOVED IS A 12' HIGH STOP-LOG DAM LOCATED AT APPROXIMATE STA. 9+20 ALONG THE NEW ALIGNMENT. THE FOUNDATION AND ANCHORAGES WILL BE COMPLETELY OBLITERATED AND THE RUBBLE DISPOSED OF AS DIRECTED BY THE ENGINEER.

REINFORCEMENT:

THE CONTRACTOR SHALL VERIFY THE QUANTITY, SIZE AND SHAPE OF THE BAR REINFORCEMENT AGAINST THE DRAWINGS AND INFORM THE ENGINEER OF DISCREPANCIES BEFORE SHIPPING REINFORCING BARS.

DIMENSIONS FOR BENT BARS ARE GIVEN OUT TO OUT WITH ALL BENDS MEETING A.C.I. STANDARDS UNLESS OTHERWISE NOTED. THE CLEAR DISTANCE FROM THE NEAREST BAR TO THE SURFACE OF THE CONCRETE SHALL BE 3" MINIMUM EXCEPT FOR REINFORCED CONCRETE PAVING AS DETAILED ON THESE DRAWINGS, WHICH SHALL HAVE 2" CLEARANCE.

CAST IRON FRAMES AND COVERS:

FRAMES AND COVERS SHALL CONFORM TO SECTION 848-3 OF THE STANDARD SPECIFICATIONS. WEIGHT OF ASSEMBLY APPROX. 175 LBS.

TIE DOWN INSERTS:

INSERTS SHALL BE CAST MALLEABLE IRON, TAPPED TO TAKE A STANDARD THREADED 1" Ø ROD. THE MINIMUM VERTICAL ADJUSTMENT SHALL BE 4". THE INSERT SHALL BE EQUIPPED WITH A BRONZE, ALLEN HEAD PLUG. THE COST OF THE INSERTS SHALL BE INCIDENTAL TO THE CLASS AE-3 CONCRETE.

CONCRETE:

ALL CONCRETE SHALL BE CLASS AE-3 AND SHALL BE COMPACTED BY VIBRATION. ALL EXPOSED EDGES OF CONCRETE SHALL BE BEVELED WITH 3/4" TRIANGULAR MOLDING. AT THE CONTRACTOR'S OPTION, FORMS MAY BE OMITTED FOR THE LOWER 5" OF THE FOOTINGS. PLACING CONCRETE SHALL CONFORM TO SECTION 602-3.1.2 OF THE STANDARD SPECIFICATIONS.

STRUCTURAL STEEL:

STRUCTURAL STEEL SHALL CONFORM TO SECTION 616 OF THE STANDARD SPECIFICATIONS.

STOP-LOGS:

STOP LOGS SHALL BE 6"x8"x9'-10 3/4" TREATED FIR POSTS STRUCTURAL GRADE. PRESERVATIVE TREATMENT SHALL BE CREOSOTE, CONFORMING TO SECTION 866 OF THE STANDARD SPECIFICATIONS.

SALVAGE ITEMS:

EXISTING STEEL POSTS, STRUTS, BRACING, HOIST FRAME, STOP-LOGS ETC. FOR THE MAIN STRUCTURE AND THE CHAIN LINK FENCE WITH SWING GATE FROM THE EXISTING STORAGE ENCLOSURE SHALL BE SALVAGED AND INCORPORATED INTO THE NEW STRUCTURE.

FIELD ASSEMBLY:

THE STOP-LOG STRUCTURE WILL BE ASSEMBLED AT THE SITE INSPECTED, DISMANTLED, PAINTED AND STORED AS DIRECTED BY THE ENGINEER.

PAINTING:

ALL PAINTING SHALL CONFORM TO SECTION 718, 870-1.2 AND 870-1.4. SALVAGED STEEL SHALL RECEIVE ONE SPOT COAT AND A FINISH COAT. NEW STEEL SHALL RECEIVE ONE SHOP COAT AND TWO FIELD COATS. THE SECOND FIELD COAT SHALL BE THE FINISH COAT. FINISH COAT FOR ALL STEEL SHALL BE BLACK IN COLOR.

ESTIMATE OF QUANTITIES				
SPEC. NO.	CODE NO.	BID ITEM	QUANTITY	UNIT
202	0105	REMOVING EXISTING STRUCTURE AT APPROX. STA. 9+20	LUMP SUM	
208	0100	CLASS 1 EXCAVATION	315	CU. YD.
705	0100	MOBILIZATION	LUMP SUM	
740	0106	RESET EXISTING CHAIN LINK FENCE ENCLOSURE	LUMP SUM	
228	0100	SELECT BACKFILL	73	CU. YD.
810	1131	CLASS AE-3 CONCRETE	234.9	CU. YD.
812	0110	REINFORCING STEEL (GRADE 40)	16,887	LB.
816	0360	STRUCTURAL STEEL (A36)	2,881	LB.
820	0110	TREATED TIMBER	6,086	LB.
730	0100	LINSEED OIL TREATMENT	5.0	GAL.

STRUCTURAL DRAWINGS

GENERAL DRAWING 17-5 SHEET 5.
 SUBSTRUCTURE SL-2, SL-3 & 4
 SUPERSTRUCTURE
 DESIGN LOADING
 SCALE
 1" = 20 FEET

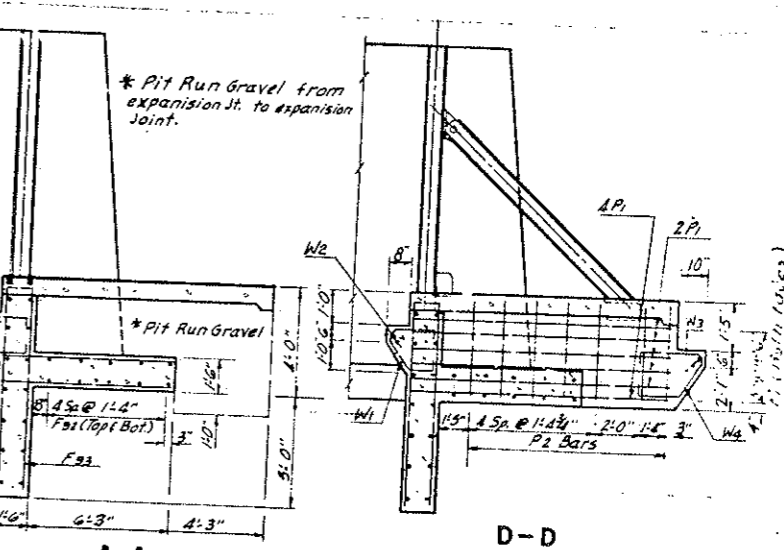
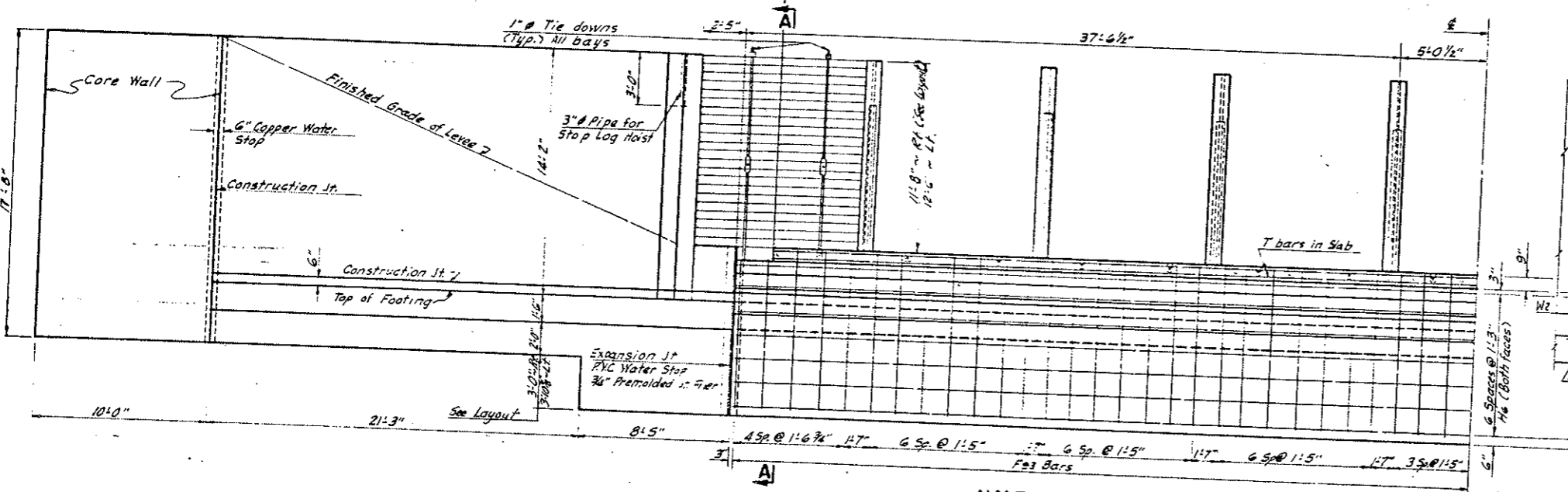
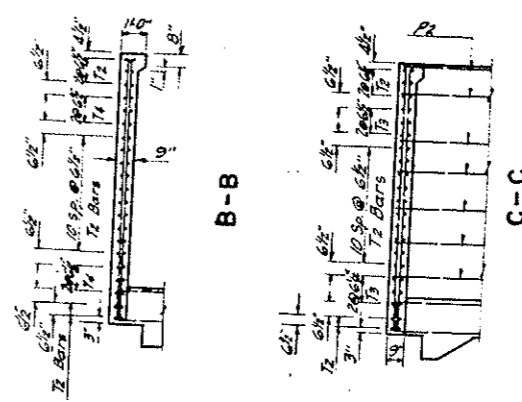
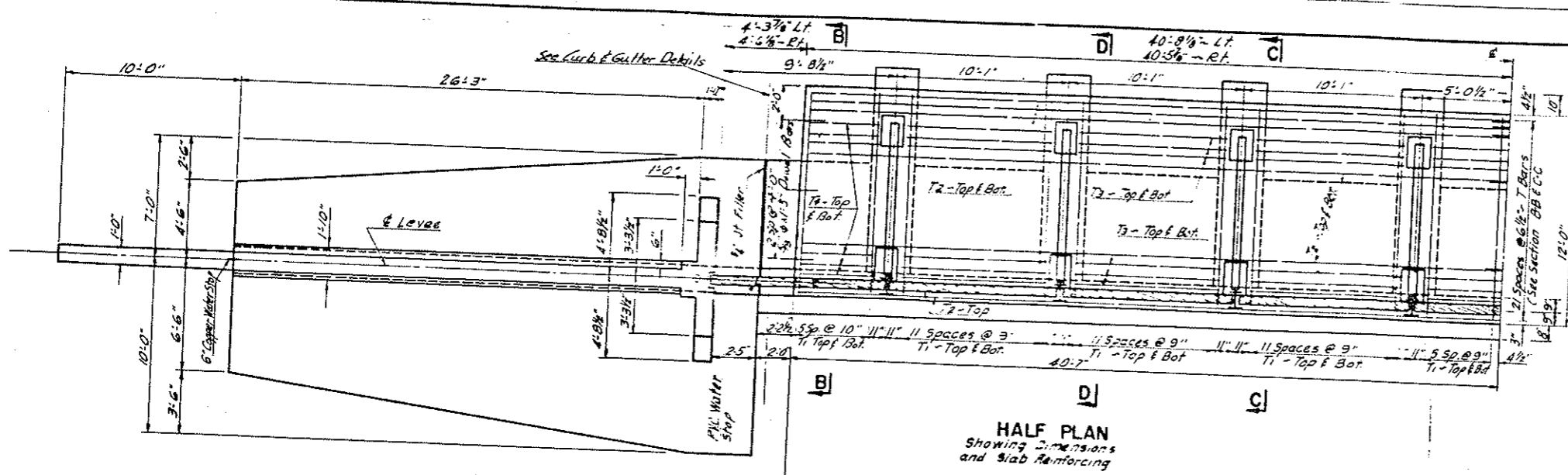
NORTH DAKOTA
 STATE HIGHWAY DEPARTMENT
MANDAN STOP-LOG STRUCTURE
 LAYOUT
 PROJECT MG-1-00 (05)917 STA. 9+11

MORTON COUNTY

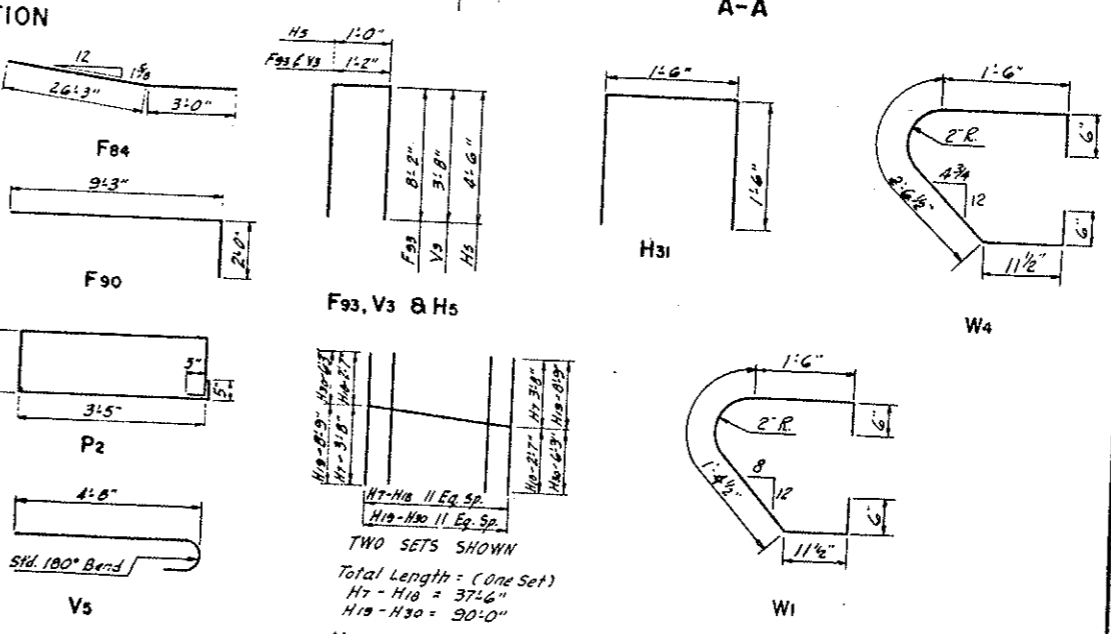
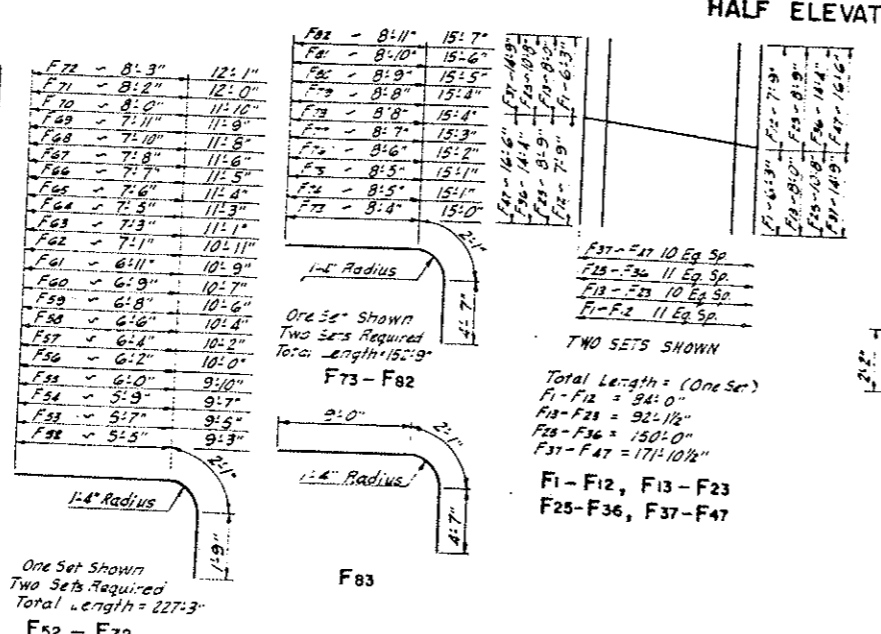
APPROVED
 8-19-76 Stanley Hayes
 DATE
 STANLEY HAYES
 REGISTERED PROFESSIONAL ENGINEER
 494
 NORTH DAKOTA

BENCH MARKS				PILE LOADING							
NO.	DESCRIPTION	LOCATION	ELEV.	LOCATION	DEAD LOAD + EARTH	LIVE LOAD	EARTH O. T. M.	WIND	LONG. FORCE	ICE	DESIGN LOAD
								50 LB.	15 LB.	100 LB. LL	
USGS											
G-127	S.W. COR. OF HWY. UNDERPASS	STA. 36+53.6 (OPG) 13.5' RT.	1653.26								
1	R.R. SPIKE IN POWER POLE	STA. 10+56.71 (NEW) 167' LT.	1639.53								

FED. ROAD DIST. NO.	STATE	PROJ. NO.	SHEET NO.	TOTAL SHEETS
8	N. D.	MG-1-01060597	68	



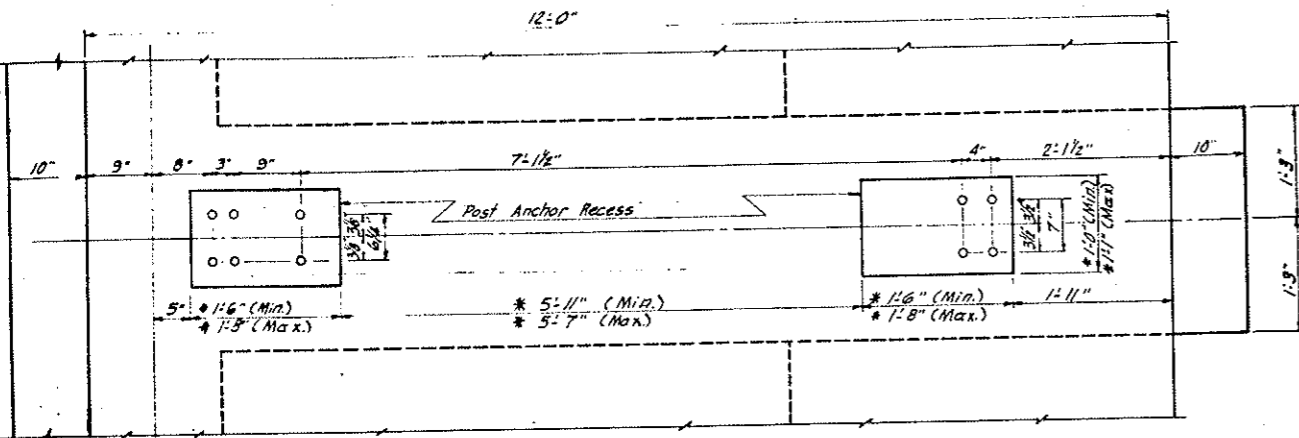
BAR LIST				
MARK NO.	SIZE	LENGTH	SHAPE	UNIT WT.
CW2	28	16.9	A	28
CW3	40	4.0	A	40
F1	20	84.0	Str.	20
F2	20	92.1/2	Str.	20
F3	20	92.1/2	Str.	20
F4	20	92.1/2	Str.	20
F5	20	92.1/2	Str.	20
F6	20	92.1/2	Str.	20
F7	20	92.1/2	Str.	20
F8	20	92.1/2	Str.	20
F9	20	92.1/2	Str.	20
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F89	20	92.1/2	Str.	20
F90	20	92.1/2	Str.	20
F91	20	92.1/2	Str.	20
F92	20	92.1/2	Str.	20
F93	20	92.1/2	Str.	20
F94	20	92.1/2	Str.	20
F95	20	92.1/2	Str.	20
F96	20	92.1/2	Str.	20
F97	20	92.1/2	Str.	20
F98	20	92.1/2	Str.	20
F99	20	92.1/2	Str.	20
F100	20	92.1/2	Str.	20



QUANTITIES	

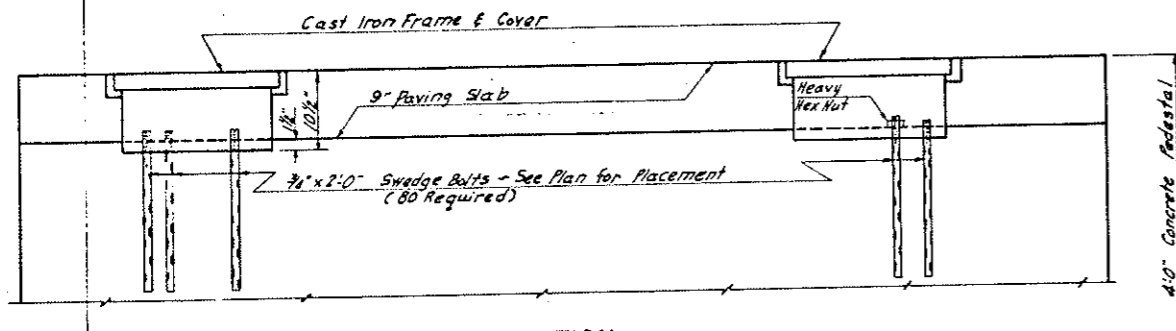
MANDAN STOP-LOG STRUCTURE

FED. ROAD DIST. NO.	STATE	PROJ. NO.	SHEET NO.	TOTAL SHEETS
8	N. D.	MG-1-00106917	70	

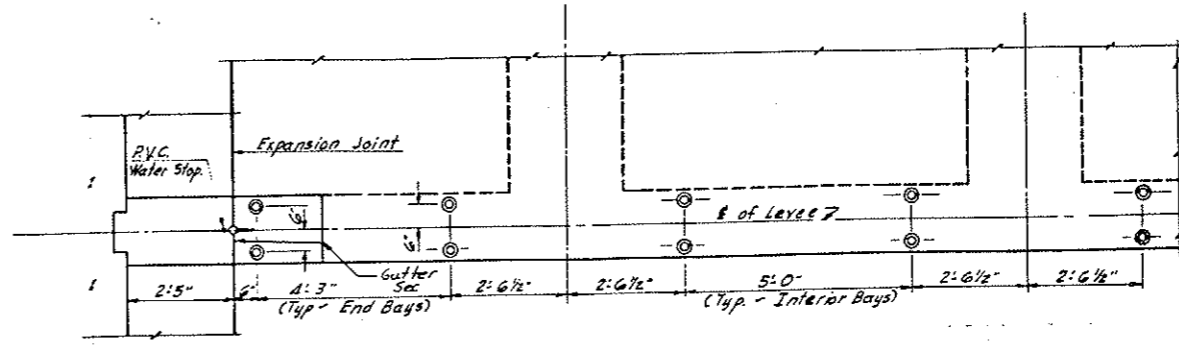


PLAN

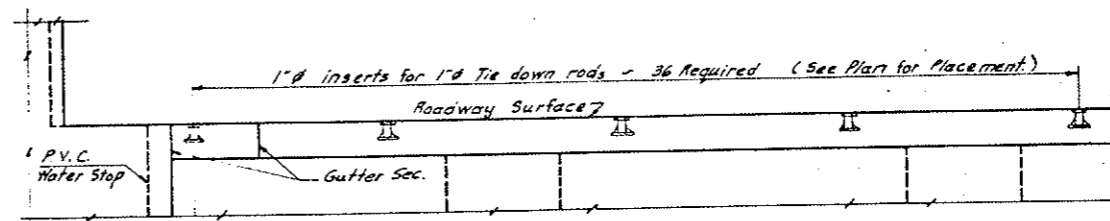
of Levee * Dimensions to fit Cast Frame & Cover



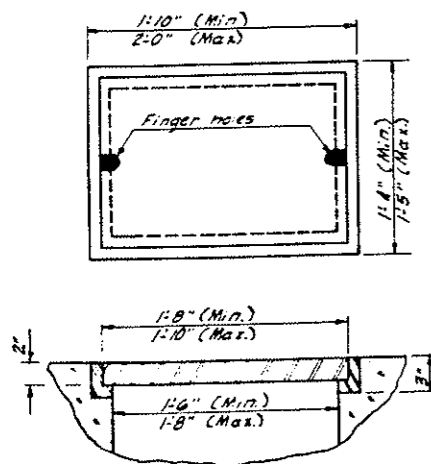
ELEVATION
ANCHOR BOLT PLACEMENT



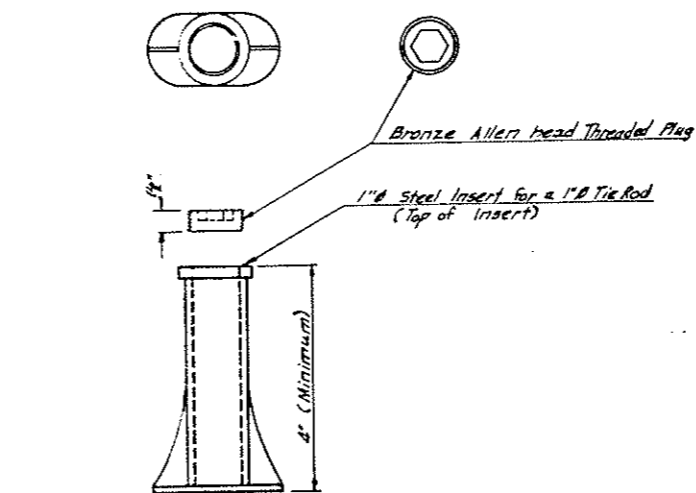
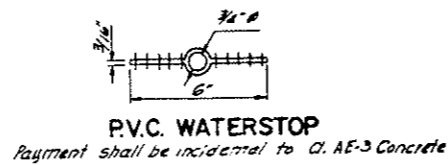
PLAN



ELEVATION



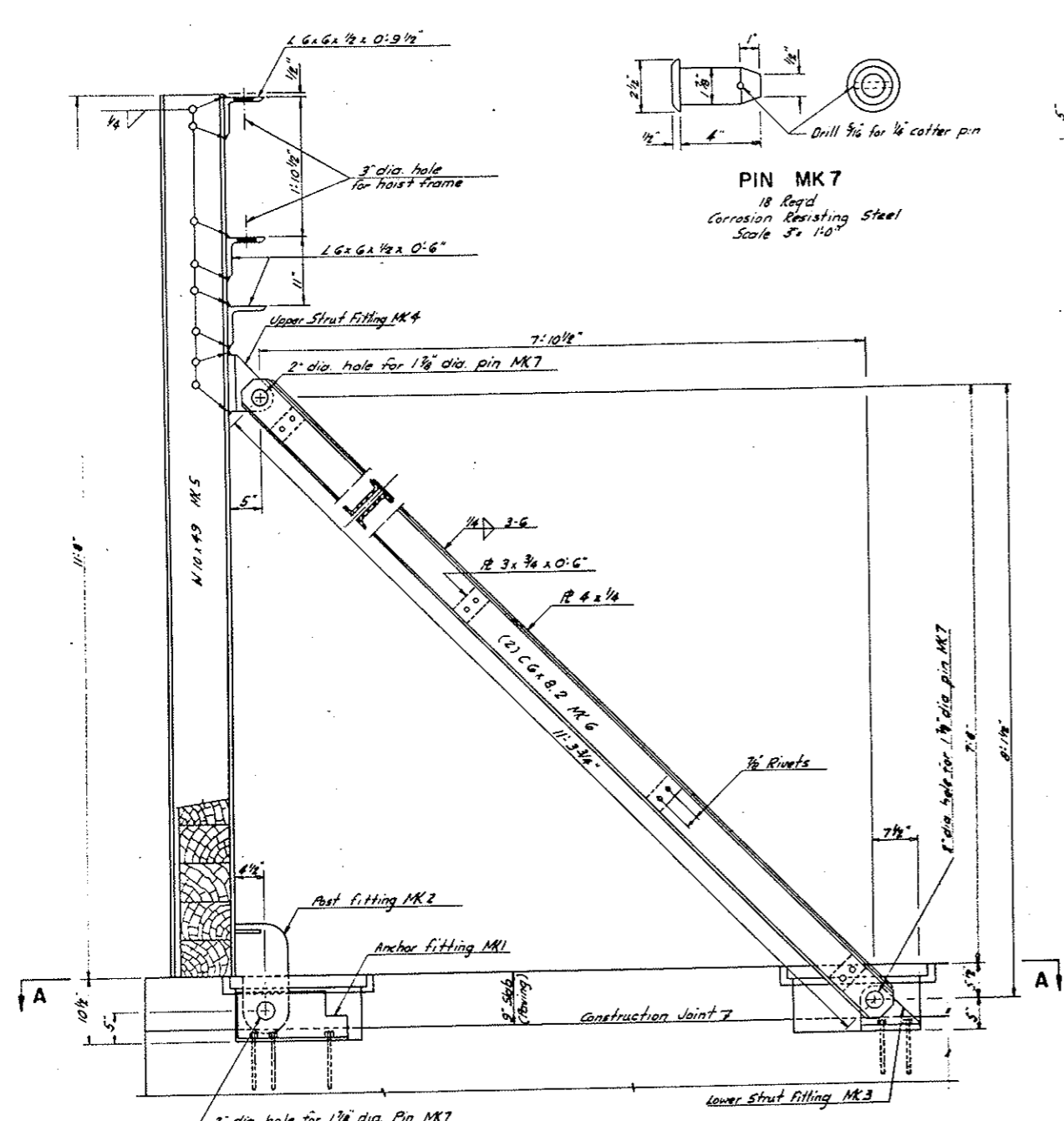
CAST IRON FRAME AND COVER
Approx. Weight 175 lbs. - 16 Required
Payment shall be incidental to Cl. AE-3 Concrete



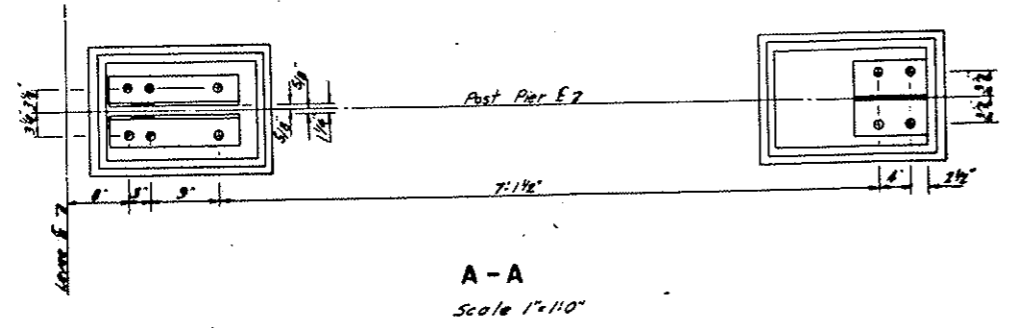
TIE ROD INSERT
36 Required
Payment shall be incidental to Cl. AE-3 Concrete

QUANTITIES	
MANDAN	
STOP-LOG	
STRUCTURE	

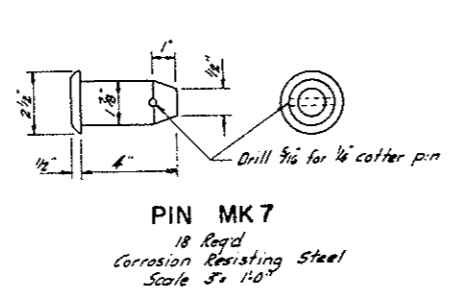
TRACING MADE BY W.A.B.
 CHECKED BY D.E.
 MADE BY
 QUANTITIES CHECKED BY



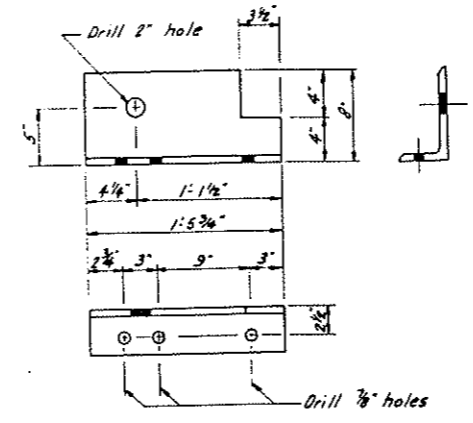
ELEVATION
Scale 1" = 1'-0"



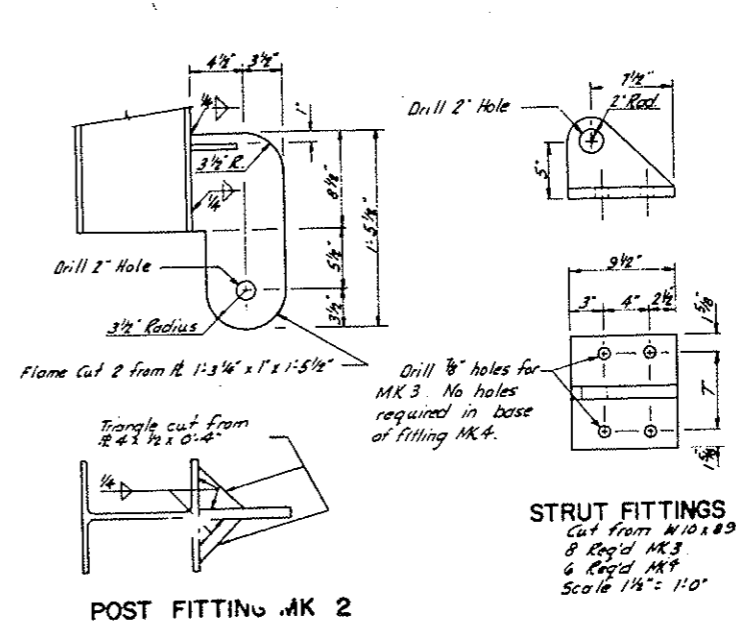
A-A
Scale 1" = 1'-0"



PIN MK7
18 Req'd
Corrosion Resisting Steel
Scale 3/8" = 1'-0"

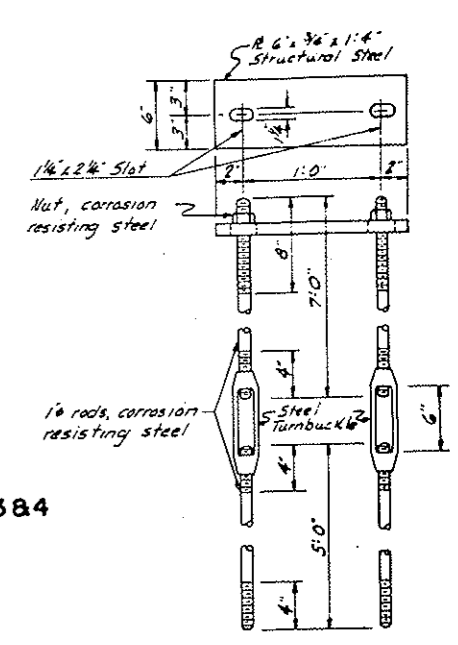


ANCHOR FITTING-MK1
Cut from L8x4x1/8
8 Req'd as shown
8 Req'd opposite hand
Scale 1 1/2" = 1'-0"

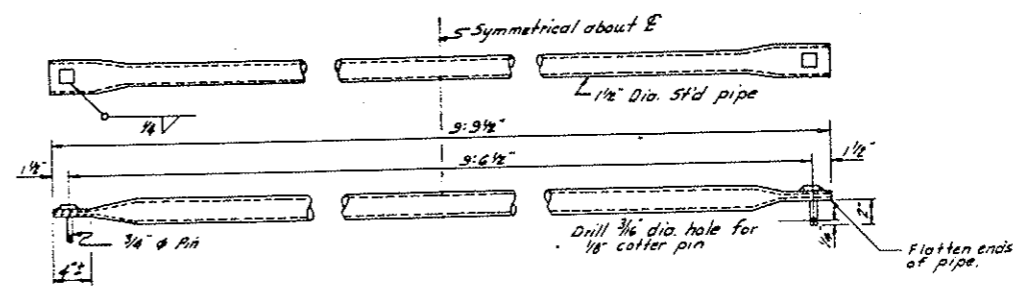


POST FITTING MK2

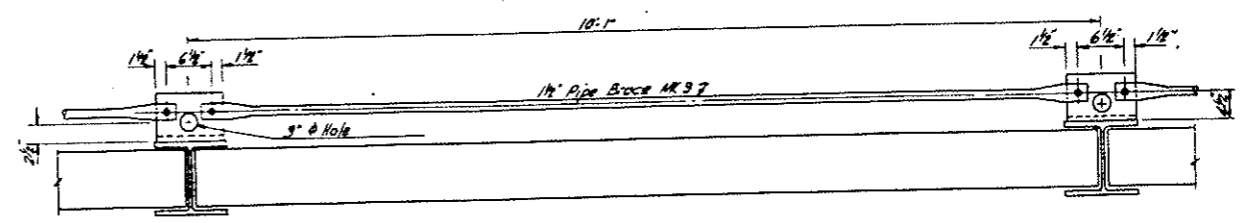
STRUT FITTINGS MK3 & 4
Cut from W10x13.9
8 Req'd MK3
6 Req'd MK4
Scale 1 1/2" = 1'-0"



TIE DOWN MK10
12 Req'd
Scale 1 1/2" = 1'-0"



BRACE FOR INTERIOR BAYS MK9
7 Req'd
Scale 1 1/2" = 1'-0"



PLAN
(Interior Bay Shown)
Scale 1" = 1'-0"

6"x8" S4S x 9'-10 3/4" timbers 25 Req'd per bay.
 15 timbers shall be salvaged from existing structure.
 Total timbers Req'd. 275

NOTES:

Timber bulkheads shall be douglas fir. Existing timber bulkheads shall be cut back to the dimensions shown on this sheet, and cut ends shall be treated as directed by the Engineer.

Pipe braces for the end bays shall be salvaged from the existing structure.

Pins, MK7, shall be attached to members MK5 and MK6 by welded brass chains made from No. 8 gage stock. Chains shall be braced to the member and pin. Provide MK7 for all posts. Chains shall be incidental to structural steel.

Cotter pins shall be furnished for all cotter pin holes.

The cost of revising the existing timber bulkheads shall be included in item Treated Timber.

The bottom fitting of the existing steel posts shall be stripped and replaced with post fitting MK2, the cost shall be included in the item Structural Steel.

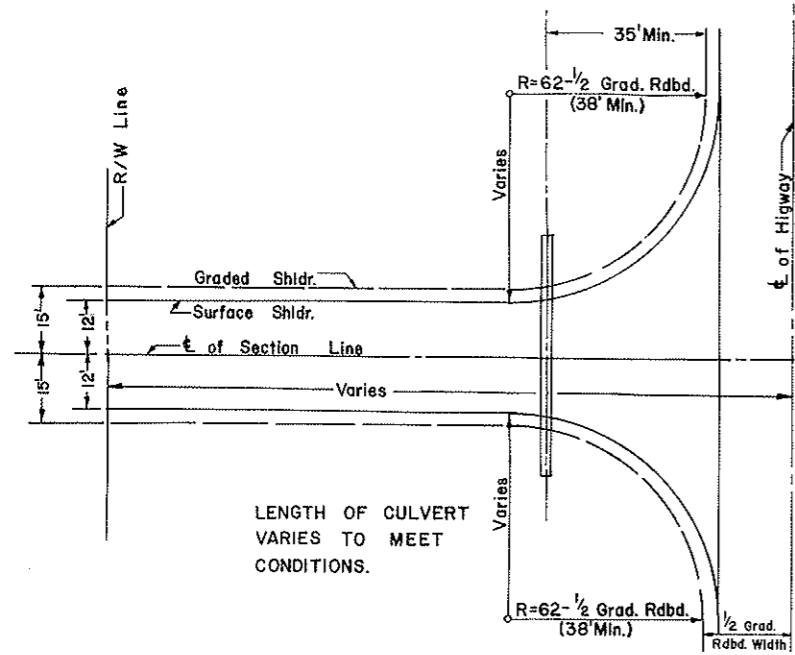
Six MK10 and two hoist frames shall be salvaged from existing structure.

All Structural Steel shall be A36 except as noted.

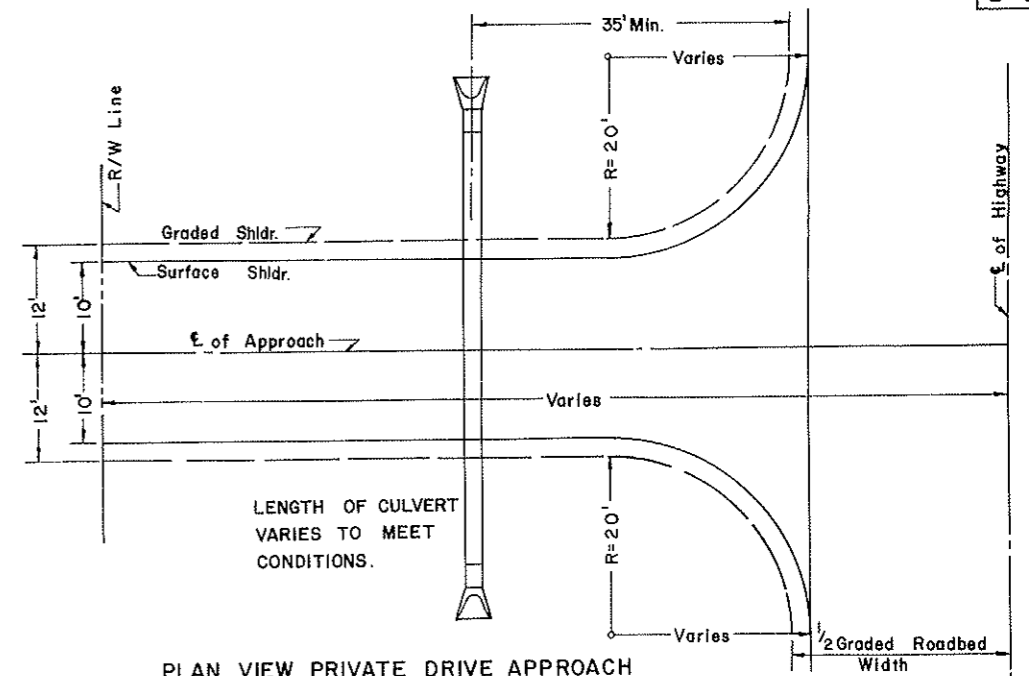
QUANTITIES	

MANDAN
STOP-LOG STRUCTURE

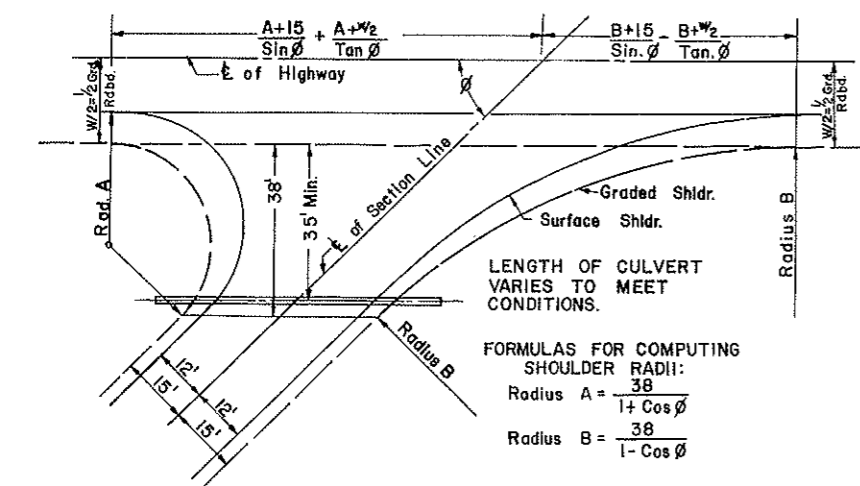
SECTION LINE & PRIVATE DRIVE APPROACHES (RURAL)



PLAN VIEW SECTION LINE APPROACH (WITHOUT SKEW)



PLAN VIEW PRIVATE DRIVE APPROACH

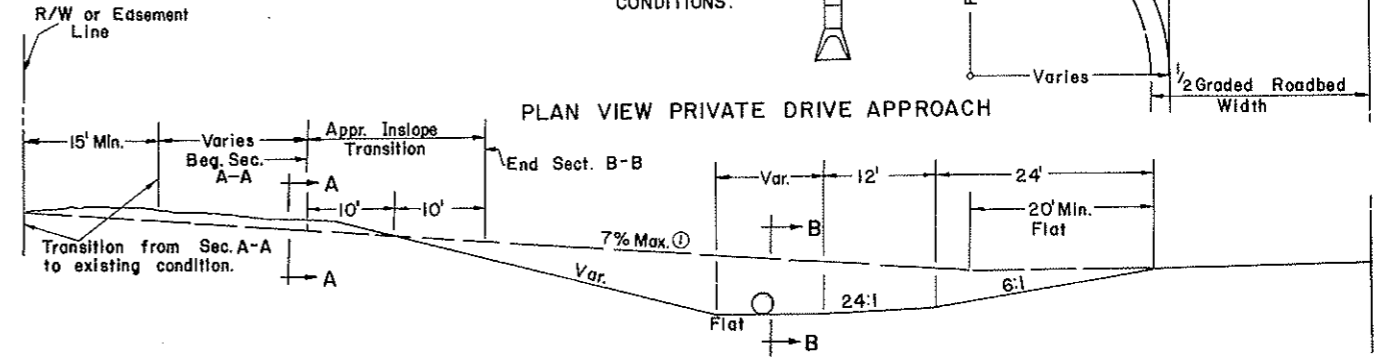


PLAN VIEW SECTION LINE APPROACH (SKEWED)

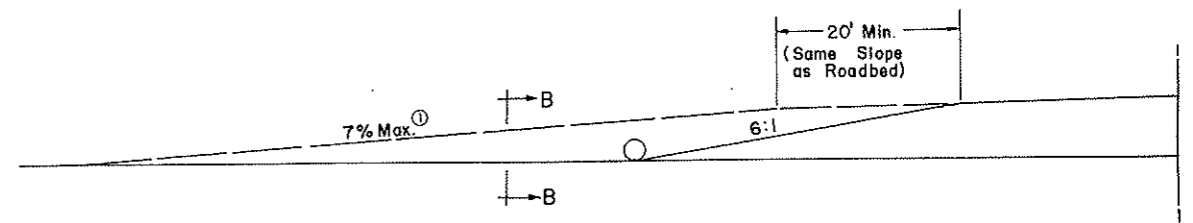
FORMULAS FOR COMPUTING SHOULDER RADII:
 Radius A = $\frac{38}{1 + \cos \phi}$
 Radius B = $\frac{38}{1 - \cos \phi}$

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.

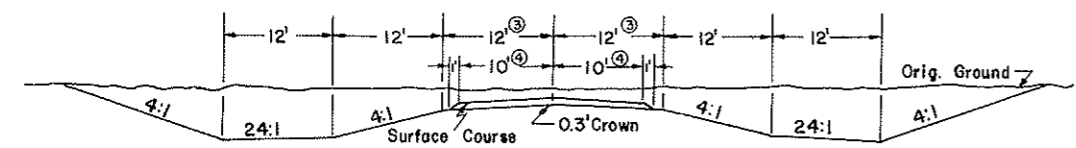
- FOOT NOTES**
- ① 10% Max. on Field Drives.
 - ② 3:1 Slope - 20' to 30' Fill
2:1 Slope on Fills over 30'
 - ③ 15' on Sec. Line Appr's.
 - ④ 12' on Sec. Line Appr's.



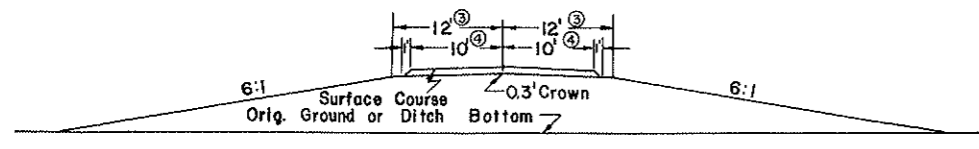
APPROACH GRADE ON CUT SECTION



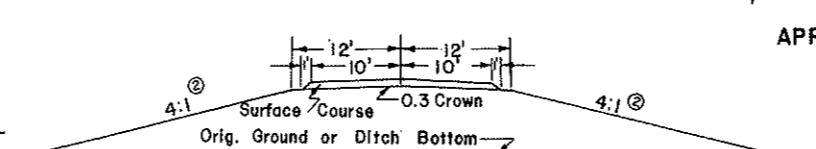
APPROACH GRADE ON FILL SECTION 12 FEET OR LESS



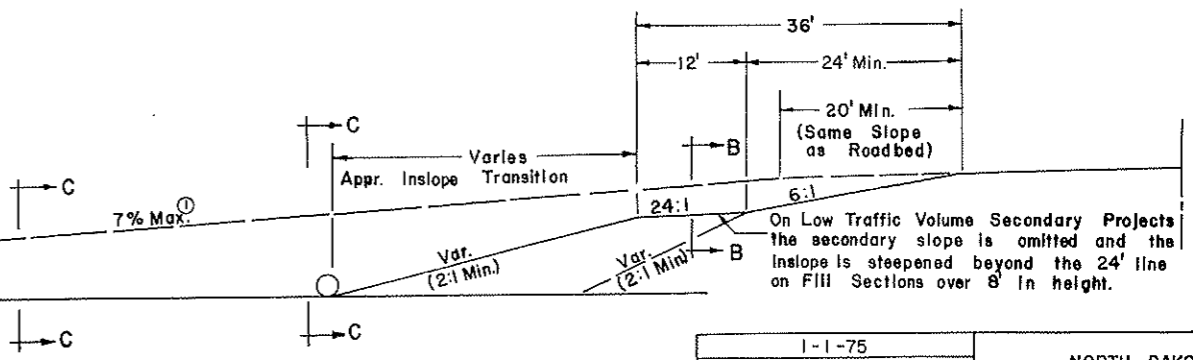
SECTION A-A



SECTION B-B



SECTION C-C



APPROACH GRADE ON FILL SECTION OVER 12 FEET

1-1-75	
REVISIONS	
DATE	CHANGE

NORTH DAKOTA
 STATE HIGHWAY DEPARTMENT

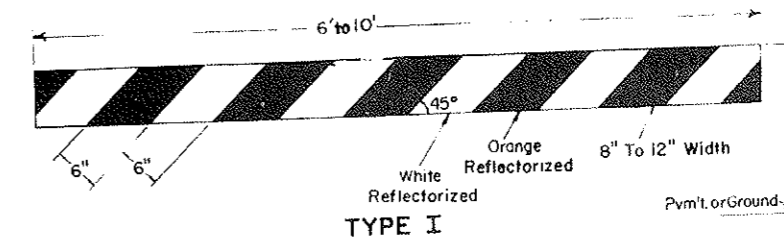
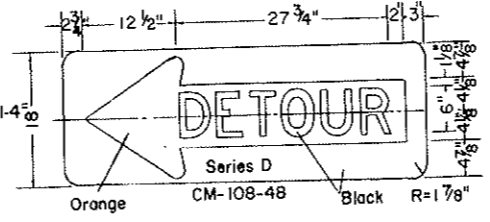
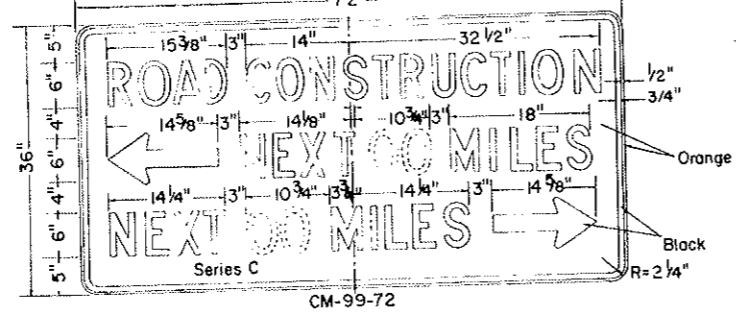
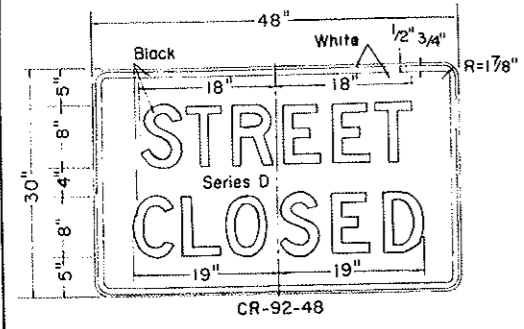
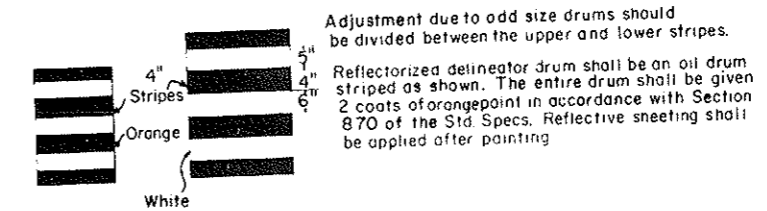
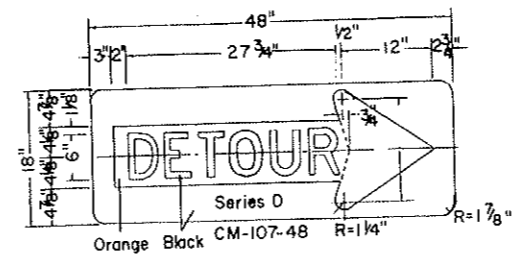
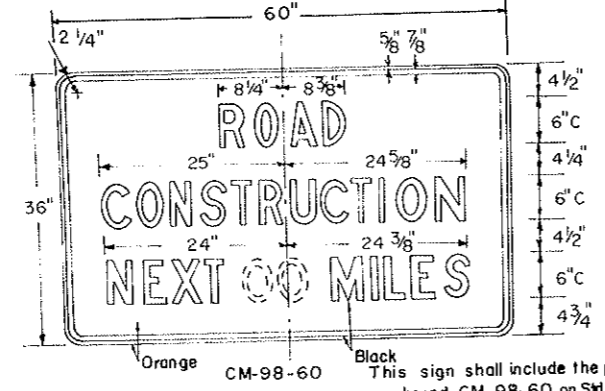
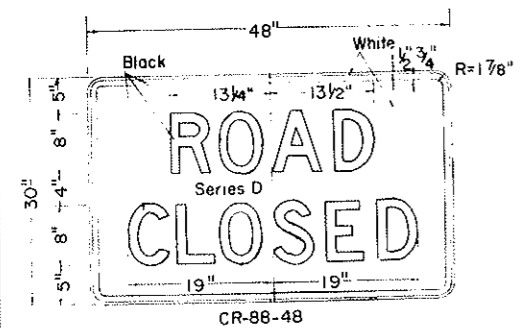
Submitted: *[Signature]*
 Design Engineer

Recommended: *[Signature]*
 Asst. Chief Engineer
 Pre-Construction

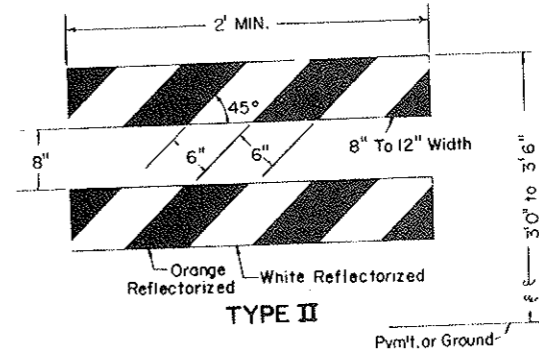
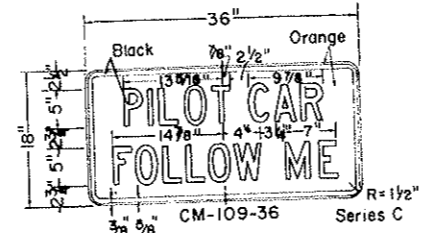
Approved: *[Signature]*
 Chief Engineer

CONSTRUCTION SIGNS AND BARRICADE DETAILS

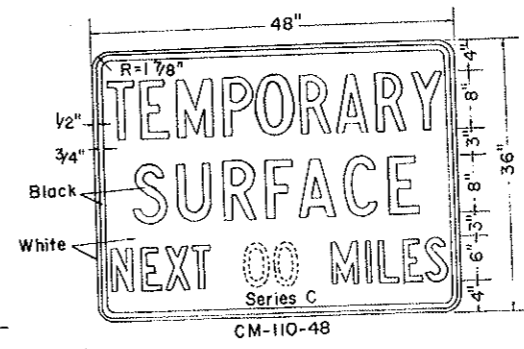
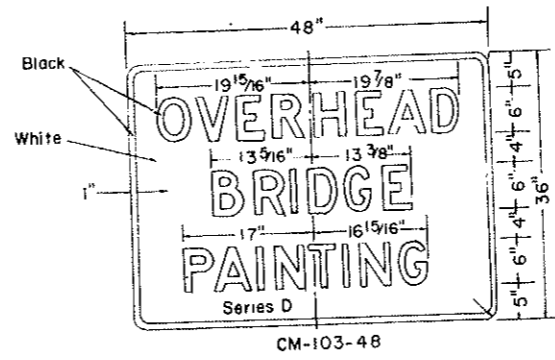
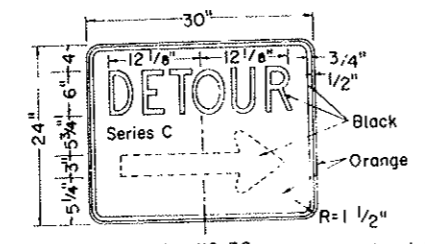
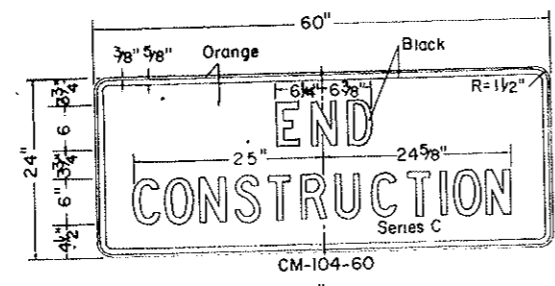
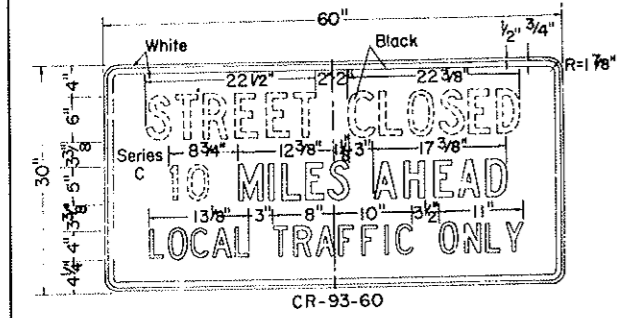
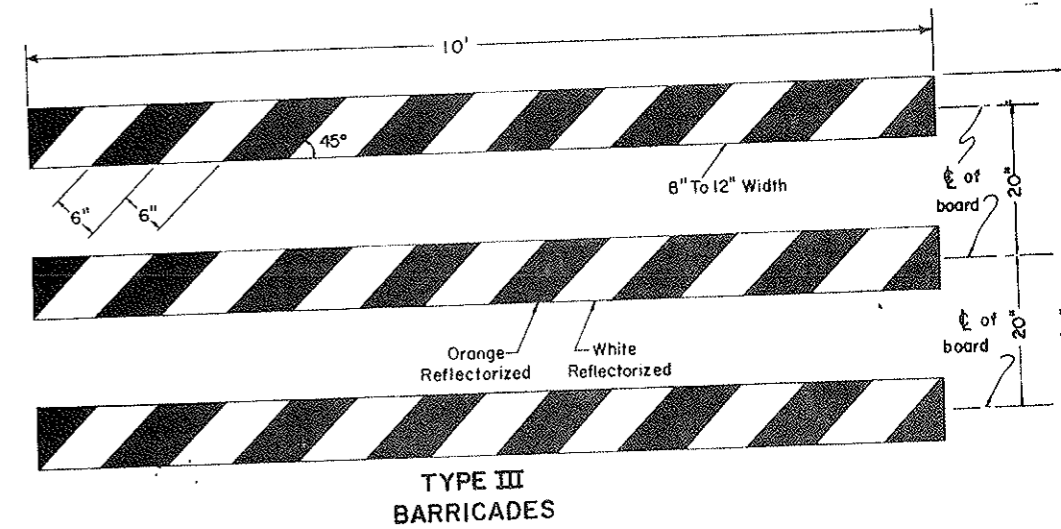
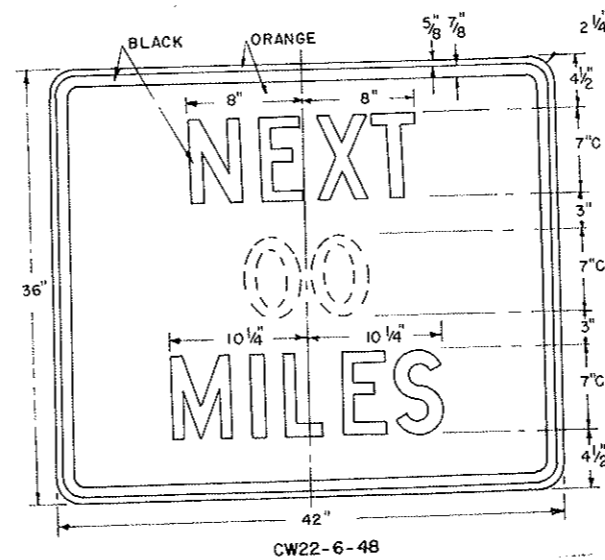
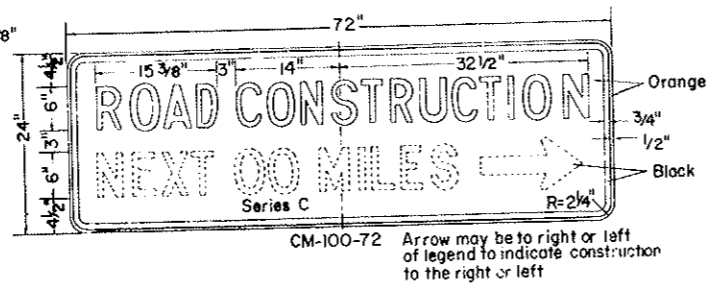
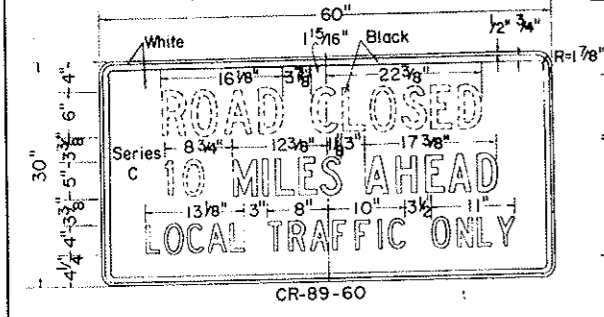
D-754-71-1



Approx. Wt./Ft. in Lbs. x 1.277
 Extruded Aluminum Barricade Bar Detail



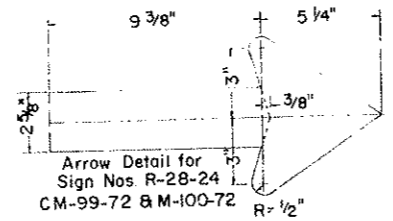
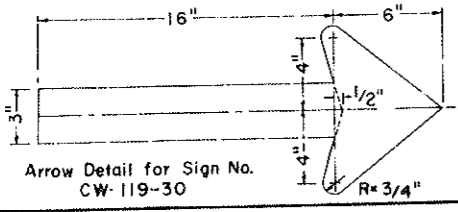
Each movable barricade shall be weighted down by a sufficient number of sand bags or other suitable weight so that it will not be blown over by the wind, unless the movable supporting structure is constructed in such a manner that the wind cannot blow it over. Weight used shall be approved by the Engineer in the field. 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.



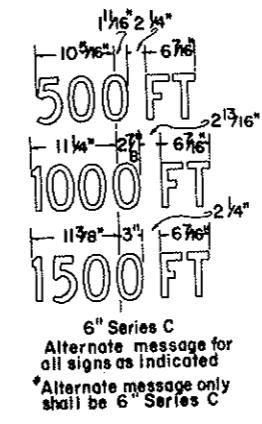
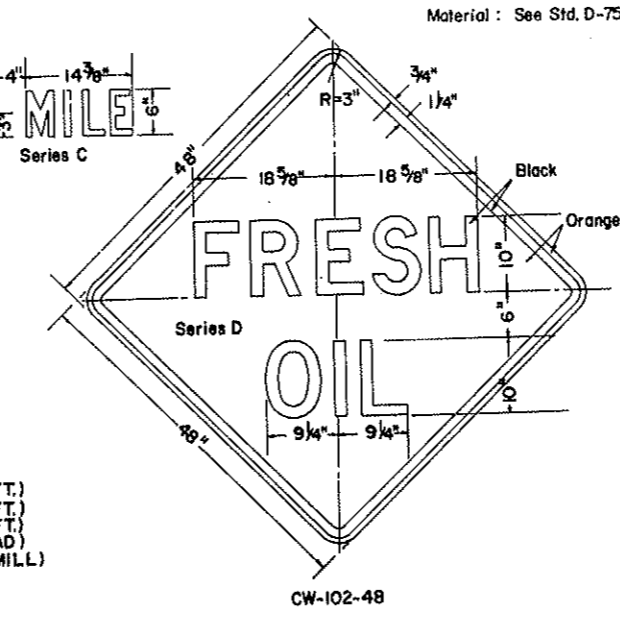
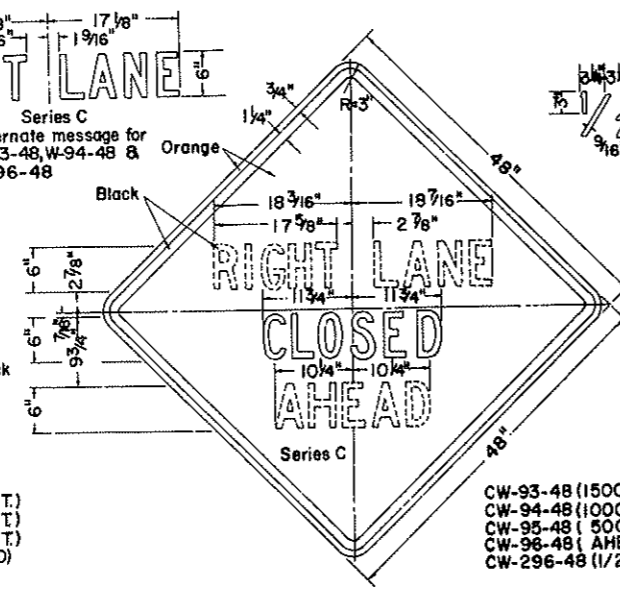
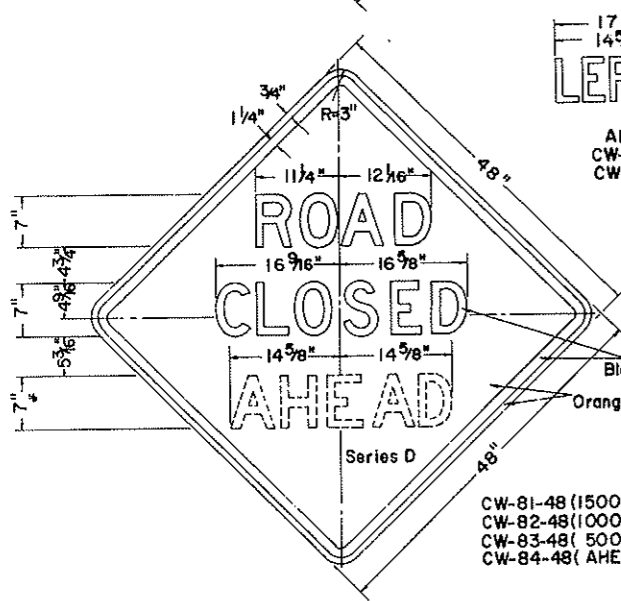
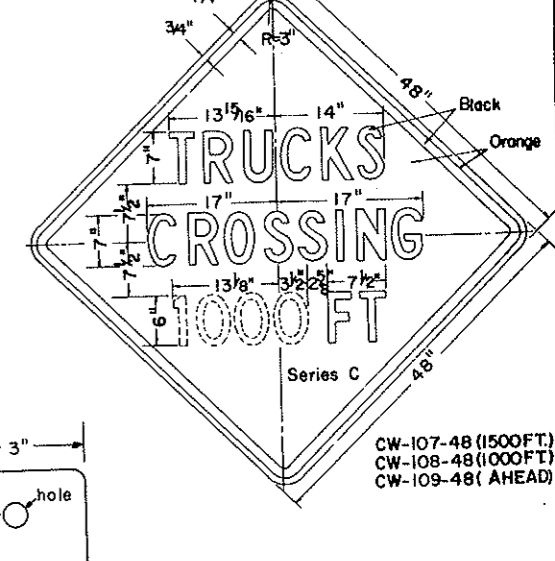
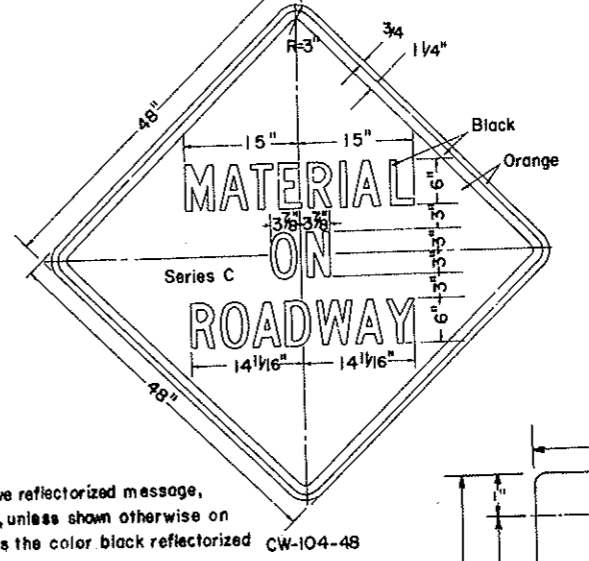
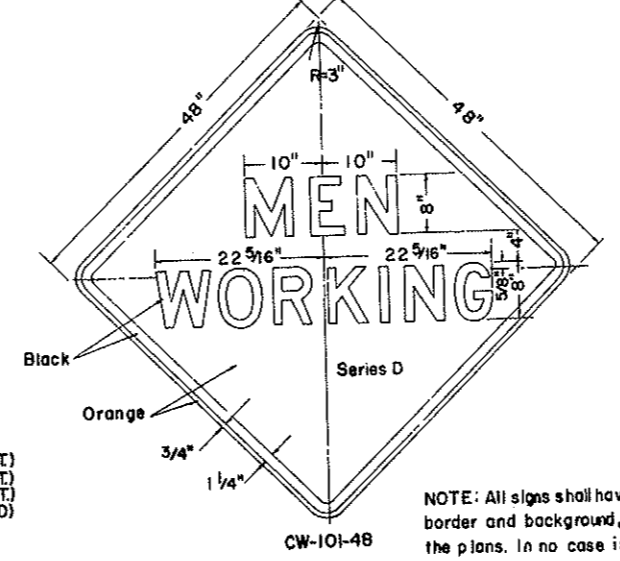
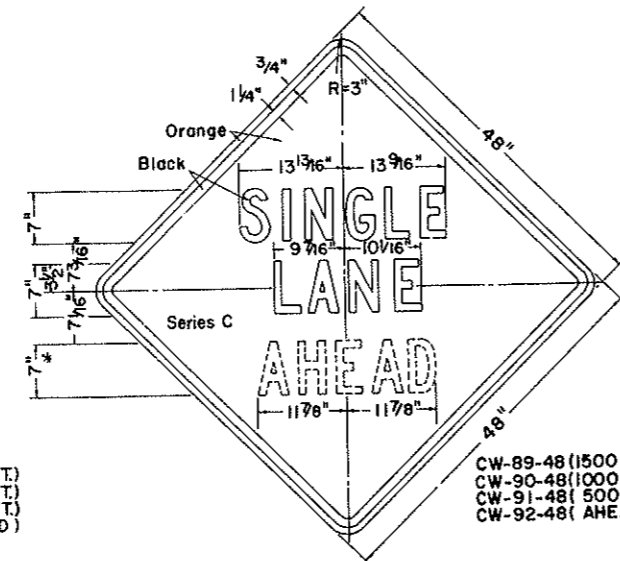
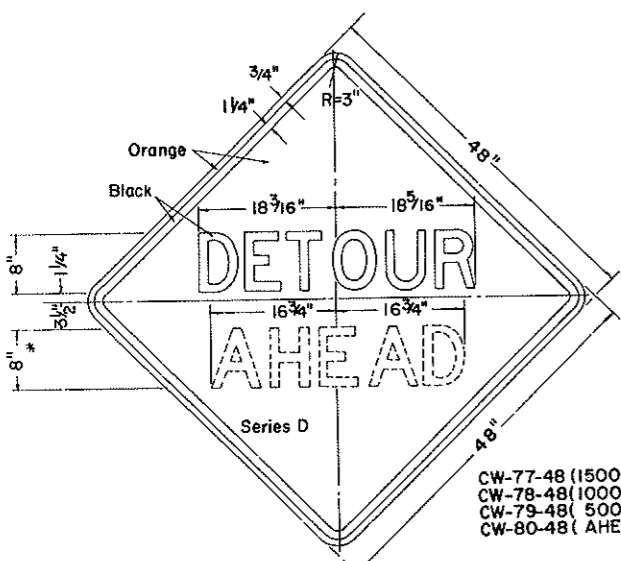
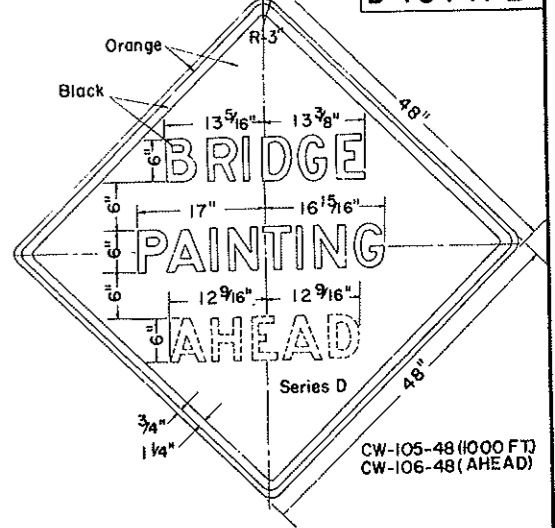
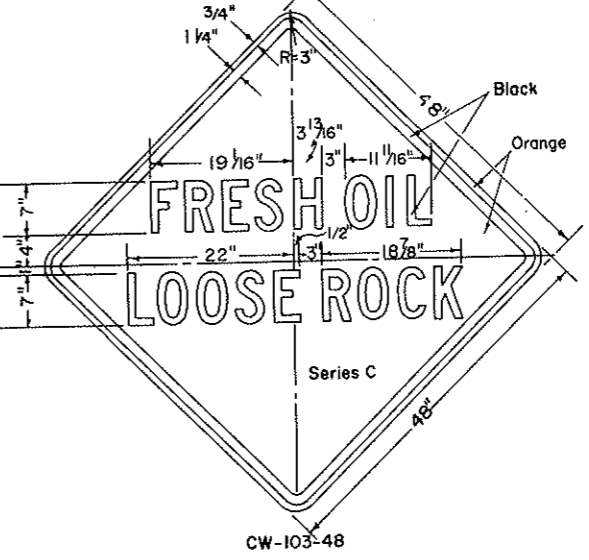
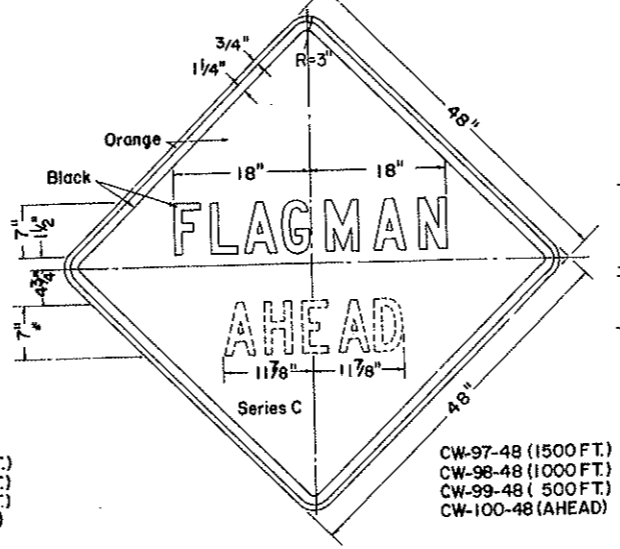
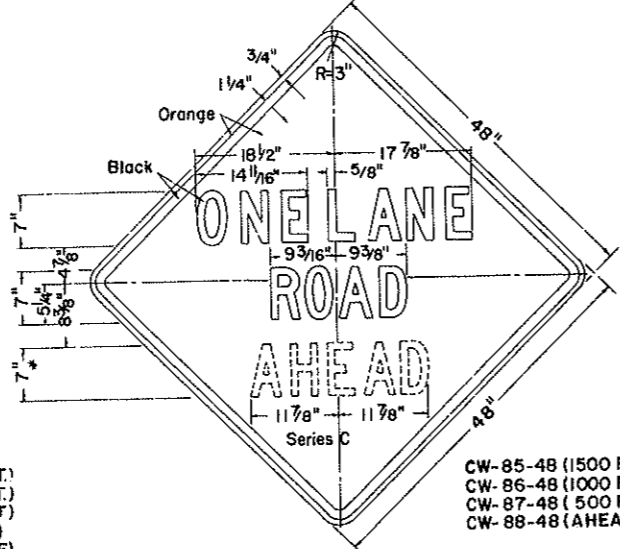
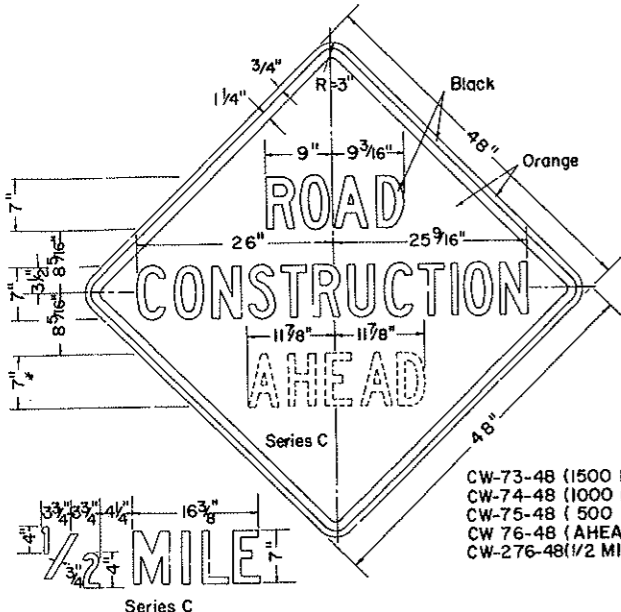
NOTE: All signs shall have reflectorized message, border and background, unless shown otherwise on the plans. In no case is the color black reflectorized.

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

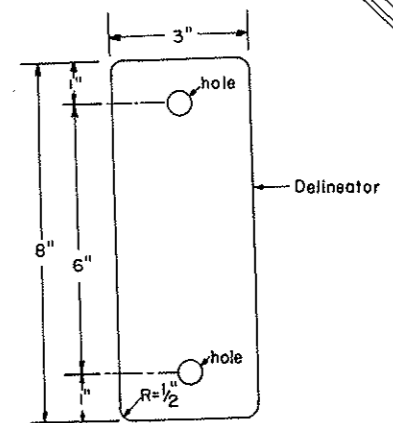
3-13-72		NORTH DAKOTA STATE HIGHWAY DEPARTMENT
DATE	REVISIONS	
6-5-72	Barricade Details	Submitted: <i>R. Thomas</i> Design Engineer
9-19-73	Sign Size	
9-27-76	Sign Size	
10-12-76	Sign Change	
		Recommended: Asst. Chief Engineer, Pre-Const.
		Approved: <i>[Signature]</i> Chief Engineer



CONSTRUCTION SIGN DETAILS



NOTE: All signs shall have reflectorized message, border and background, unless shown otherwise on the plans. In no case is the color black reflectorized CW-104-48 Material: See Std. D-754-71-5 for assembly details.

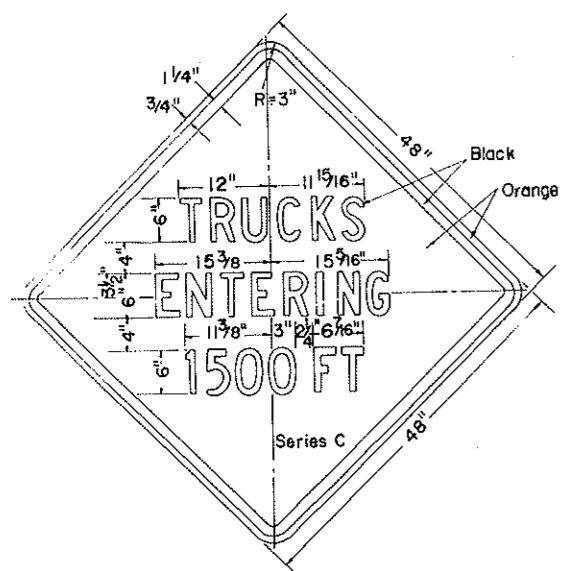


3"x8"-18 gauge sheet iron or steel, or .080" aluminum plate with Reflective Sheeting (enclosed lens) as specified in Section 894 of the Standard Spec.

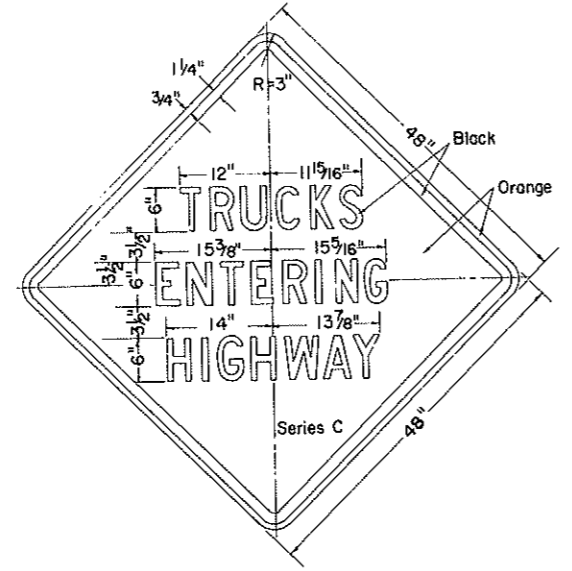
3-13-72 REVISIONS		DATE	CHANGE	Submitted:
3-7-75	Message on Construction Sign			
10-11-76	Delineator Detail Added			Recommended: Asst. Chief Engineer, Pre-Const. Approved: Chief Engineer

CONSTRUCTION SIGN DETAILS

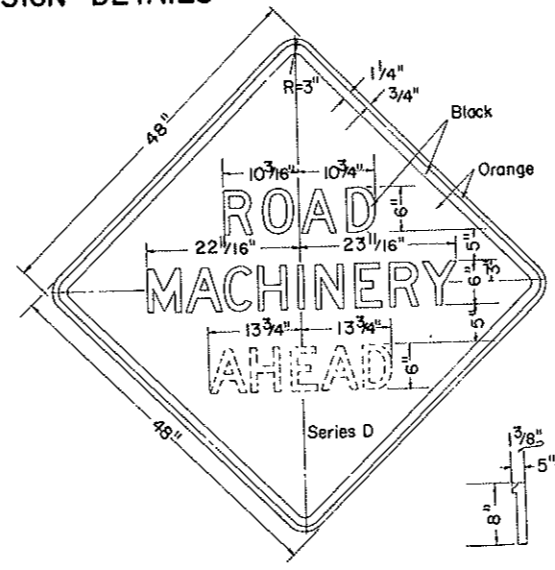
D-754-71-3



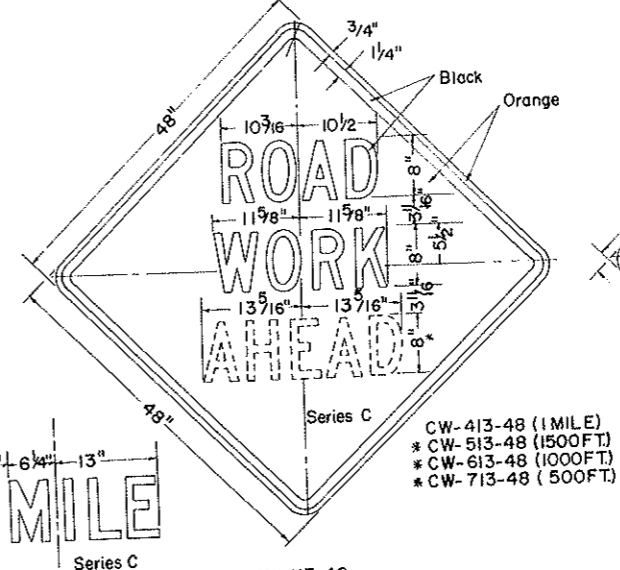
CW-110-48



CW-111-48

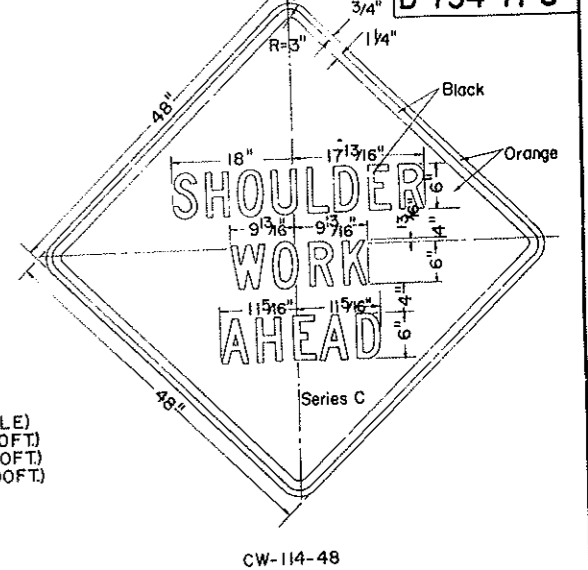


CW-112-48
* CW-512-48 (1500FT)
* CW-612-48 (1000FT)
* CW-712-48 (500FT)

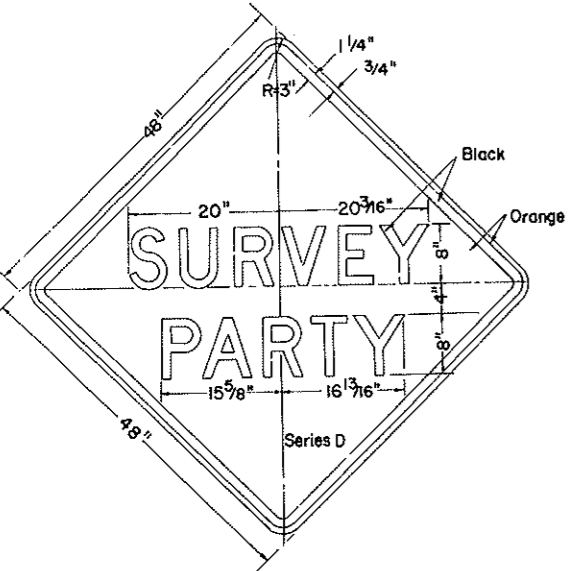


CW-113-48

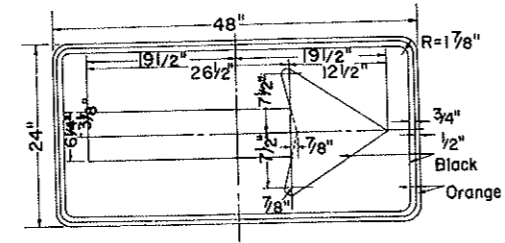
CW-413-48 (1 MILE)
* CW-513-48 (1500FT)
* CW-613-48 (1000FT)
* CW-713-48 (500FT)



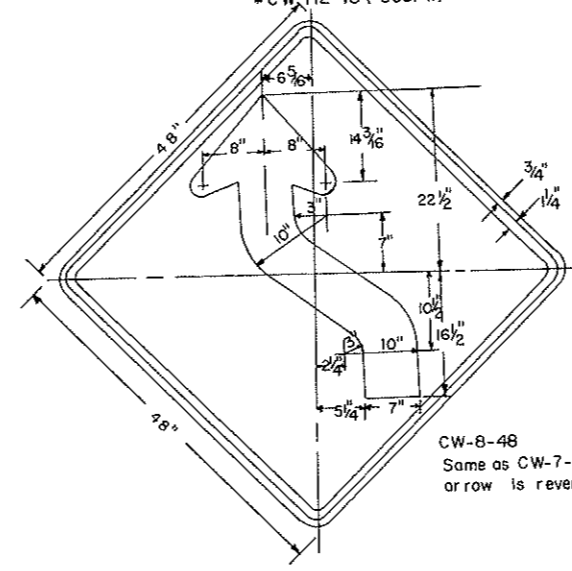
CW-114-48



CW-115-48

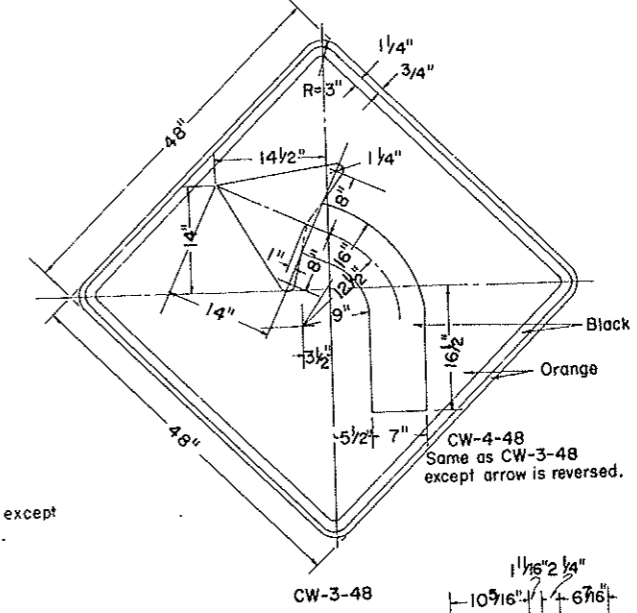


CW-13-48



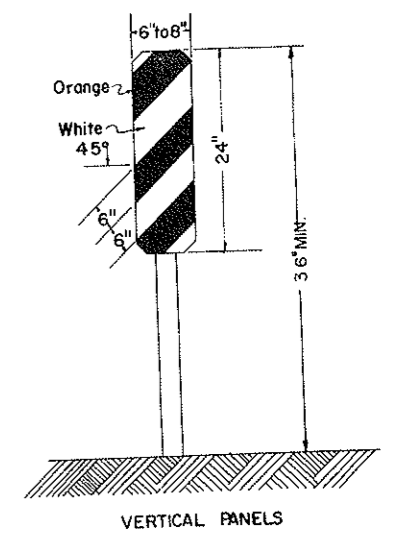
CW-7-48

CW-8-48
Same as CW-7-48 except
arrow is reversed.

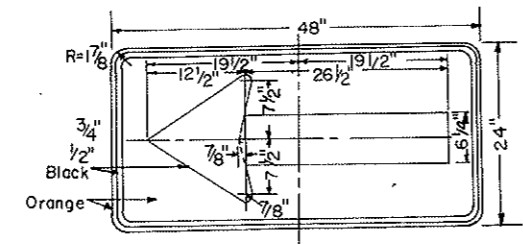


CW-3-48

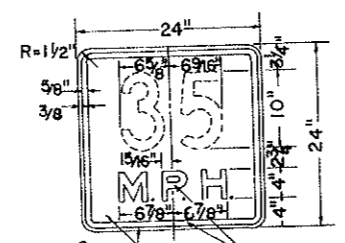
CW-4-48
Same as CW-3-48
except arrow is reversed.



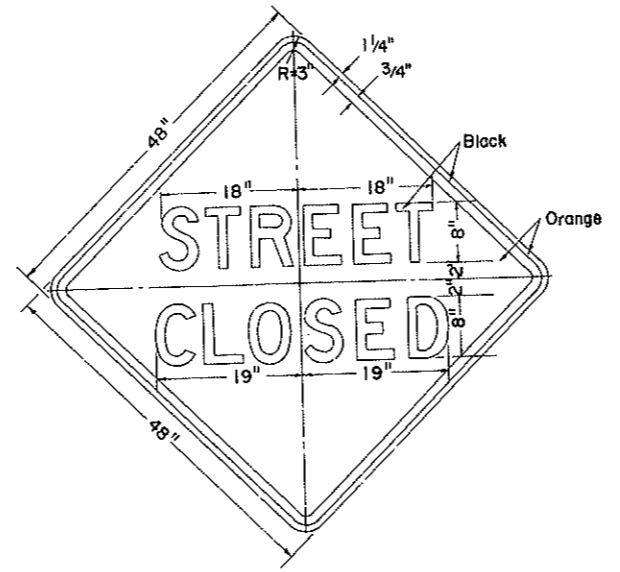
VERTICAL PANELS



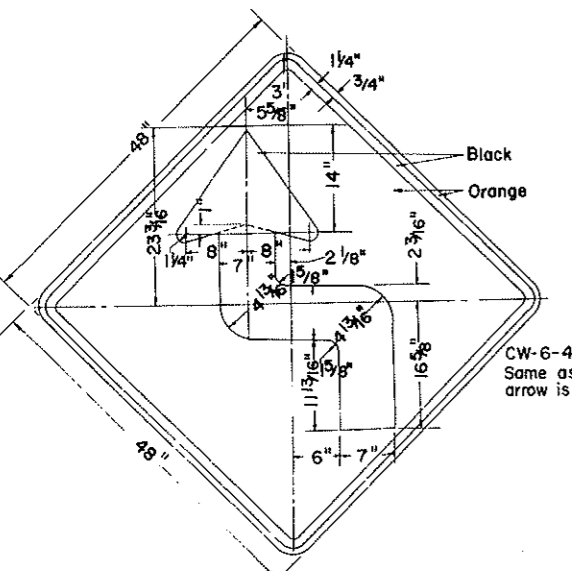
CW-13-48



CW-45-24

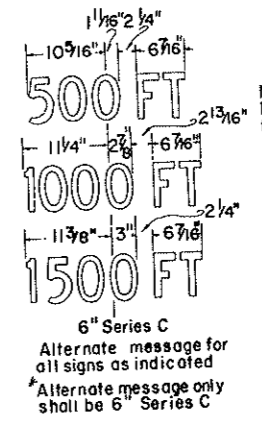


CW-116-48



CW-5-48

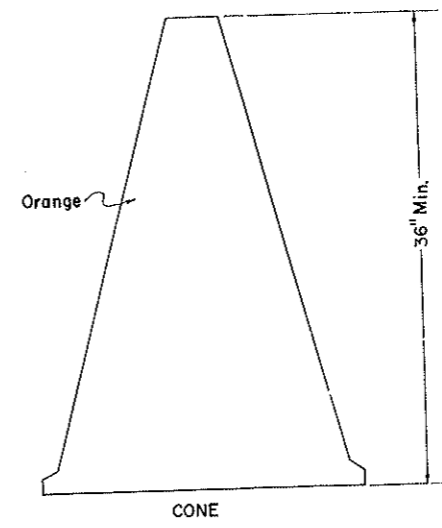
CW-6-48
Same as CW-5-48 except
arrow is reversed.



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.

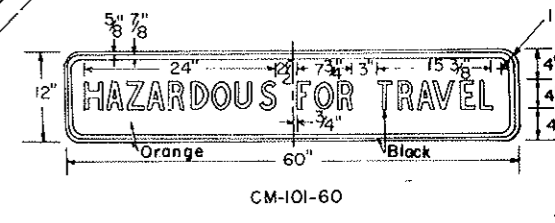
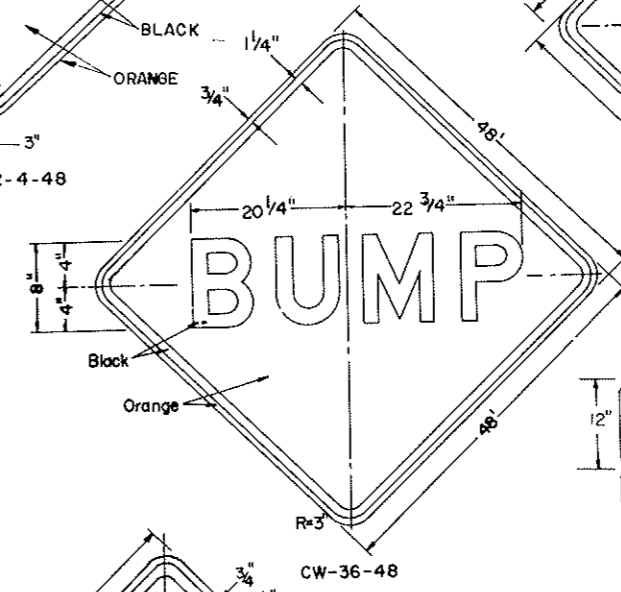
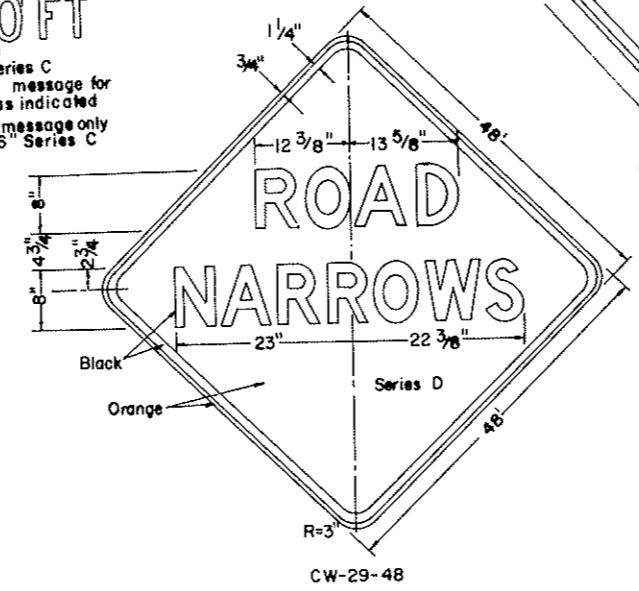
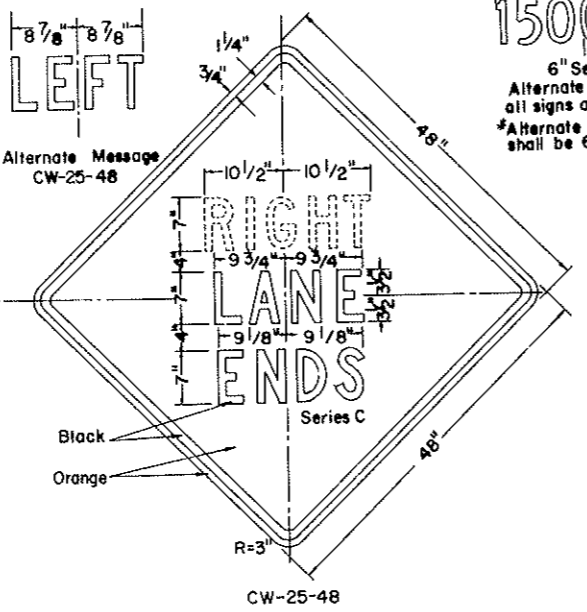
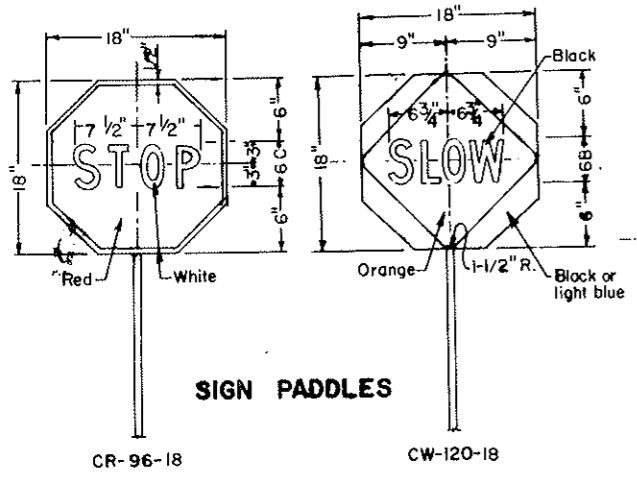
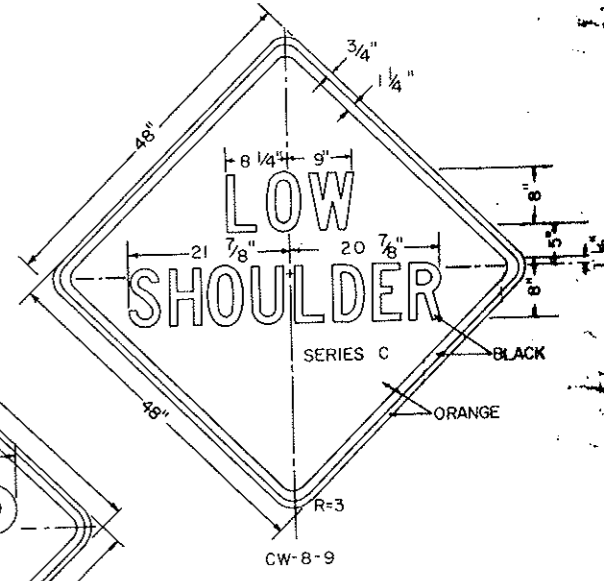
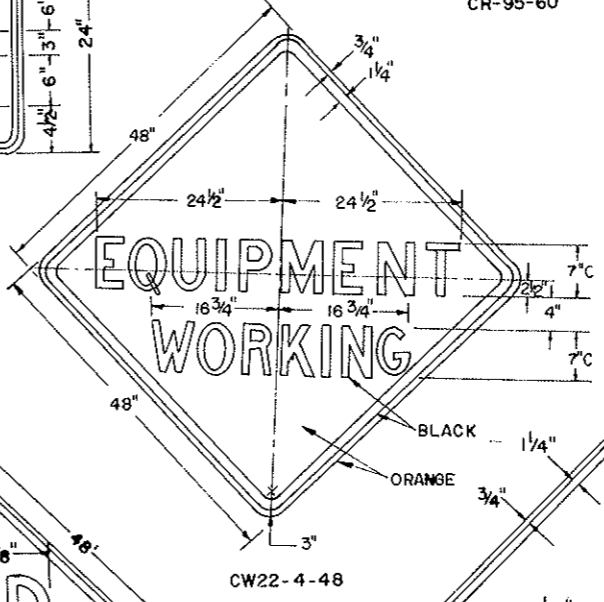
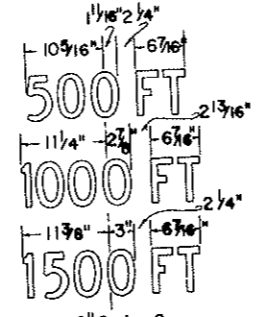
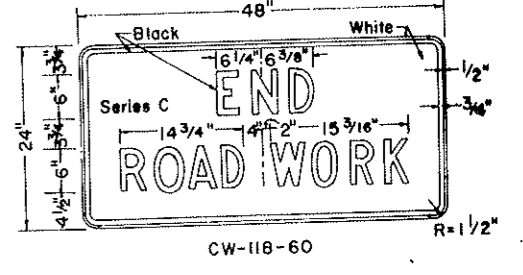
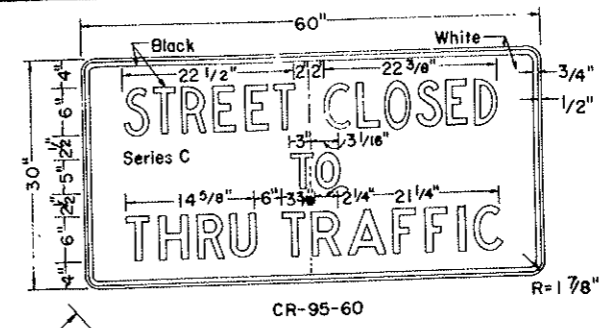
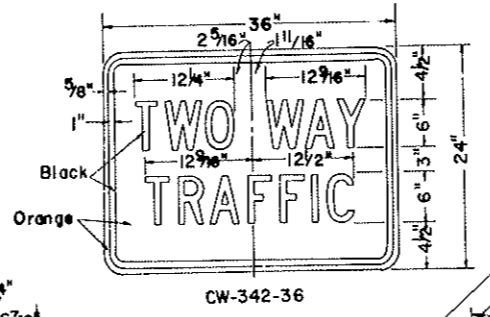
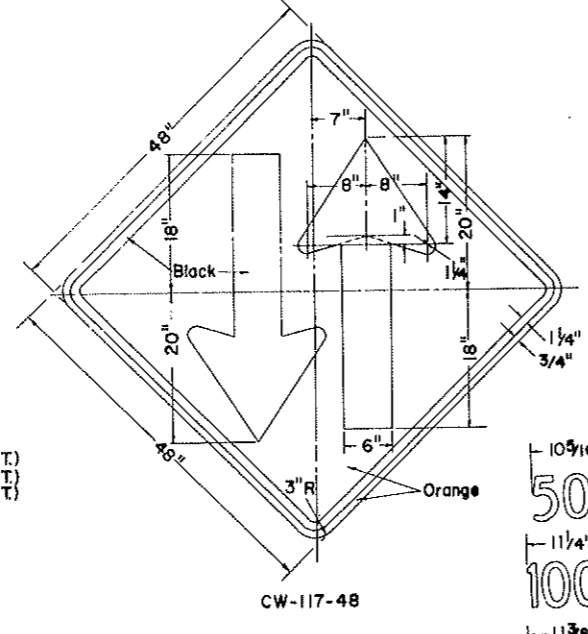
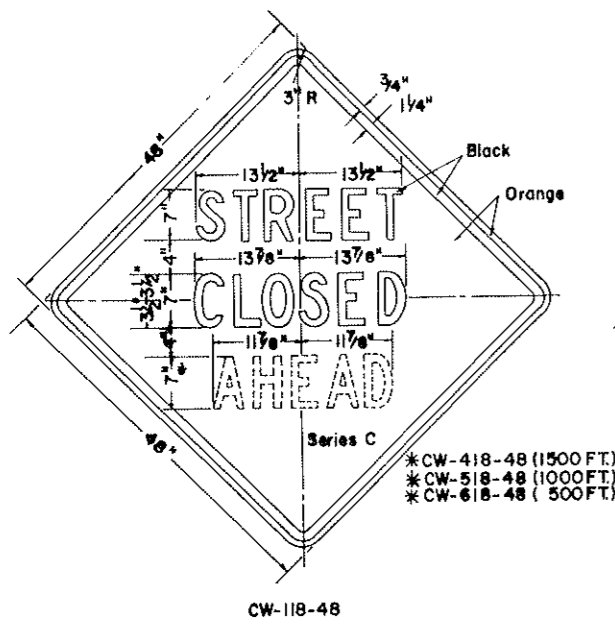


CONE

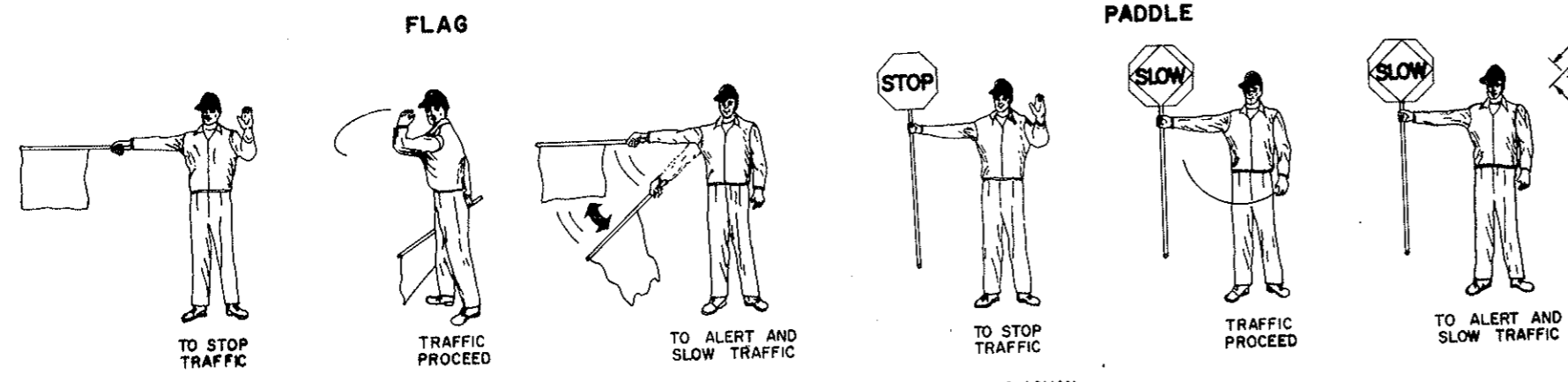
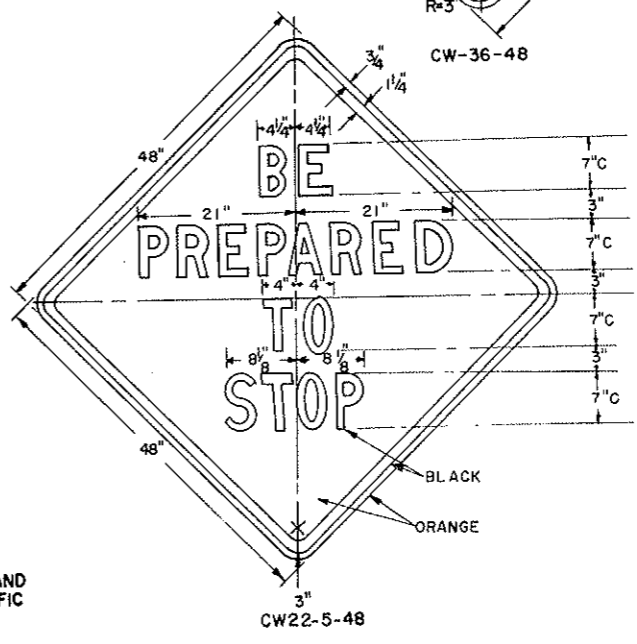
3-13-72	
DATE	REVISIONS
6-5-72	CW-4-48 NOTE
9-5-74	Added Sign No.
4-28-75	Cone Height Change
9-27-76	Vertical Panels Height

NORTH DAKOTA STATE HIGHWAY DEPARTMENT	
Submitted:	<i>R. Johnson</i> Design Engineer
Recommended:	Asst. Chief Engineer, Pre-Const.
Approved:	<i>R. Johnson</i> Chief Engineer

CONSTRUCTION SIGN DETAILS



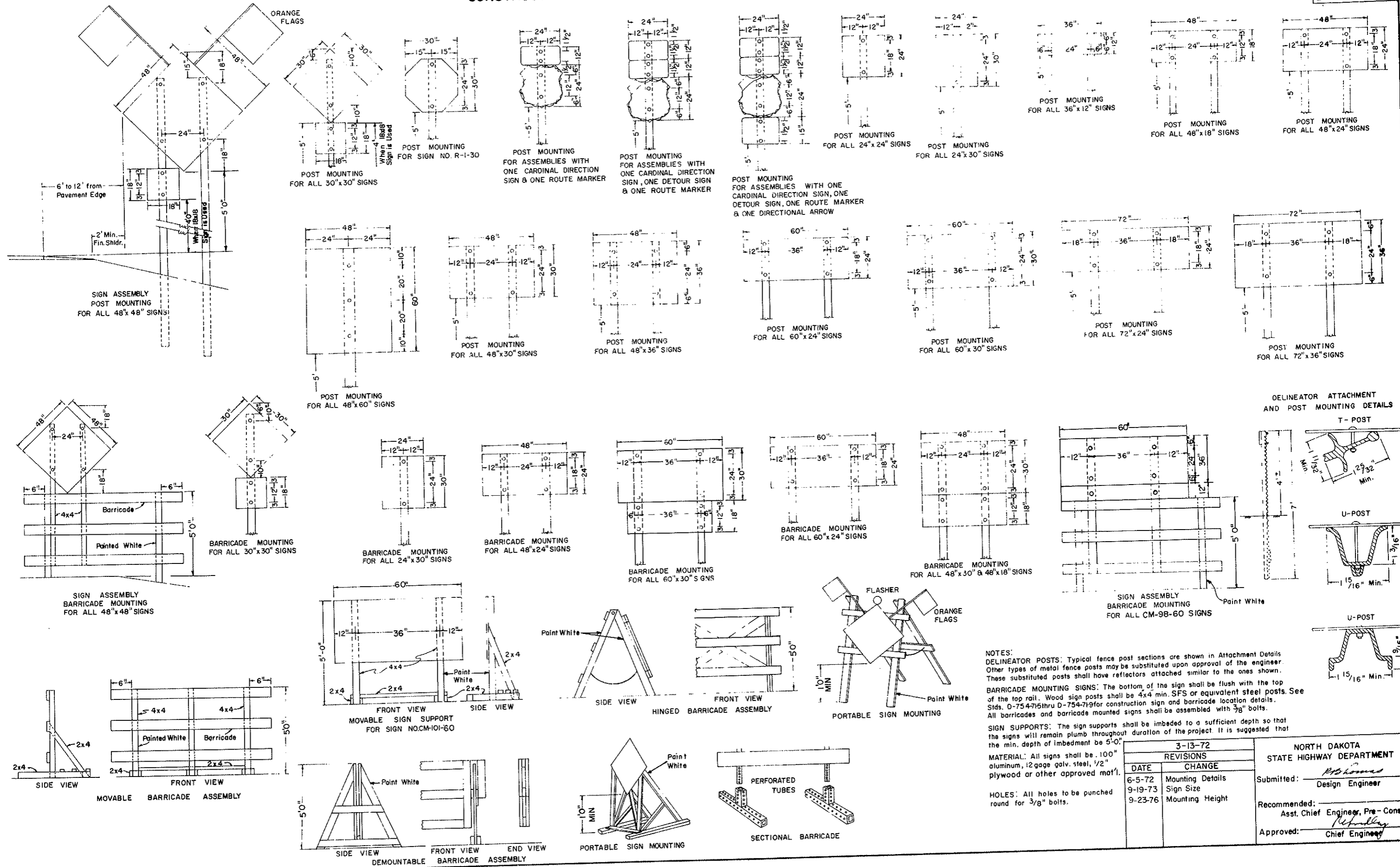
NOTE: All signs shall have reflectorized message, border and background, unless shown otherwise on the plans. In no case is the color black reflectorized.
 Material: See Std. D-754-71-5 for assembly details



USE OF HAND SIGNALING DEVICES BY FLAGMAN

3-13-72		NORTH DAKOTA STATE HIGHWAY DEPARTMENT
REVISIONS		
DATE	CHANGE	Submitted: <i>R. Johnson</i> Design Engineer Recommended: <i>R. Johnson</i> Asst. Chief Engineer, Proj - Constr. Approved: <i>R. Johnson</i> Chief Engineer
6-6-72	C-25-48 Color	
3-27-74	CW-8-9 Added Sign	
5-17-76	Sign Paddle Revised	
9-28-76	Signs Added	
10-12-76	Signs Change	

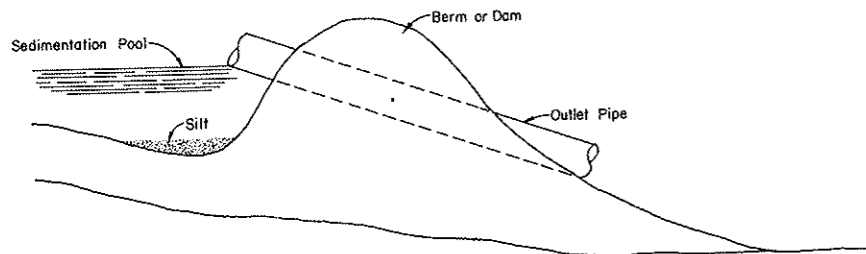
CONSTRUCTION SIGN AND BARRICADE ASSEMBLY DETAILS



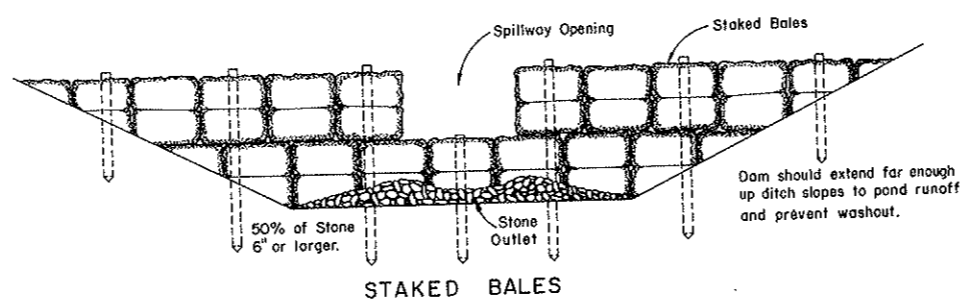
NOTES:
 DELINATOR POSTS: Typical fence post sections are shown in Attachment Details. Other types of metal fence posts may be substituted upon approval of the engineer. These substituted posts shall have reflectors attached similar to the ones shown.
 BARRICADE MOUNTING SIGNS: The bottom of the sign 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-754-71-5 thru D-754-71-9 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		NORTH DAKOTA STATE HIGHWAY DEPARTMENT
DATE	CHANGE	
6-5-72	Mounting Details	Submitted: <i>P. B. Leonard</i> Design Engineer
9-19-73	Sign Size	
9-23-76	Mounting Height	
		Recommended: <i>P. B. Leonard</i> Asst. Chief Engineer, Pre-Const.
		Approved: <i>P. B. Leonard</i> Chief Engineer

TEMPORARY EROSION AND SILTATION CONTROLS

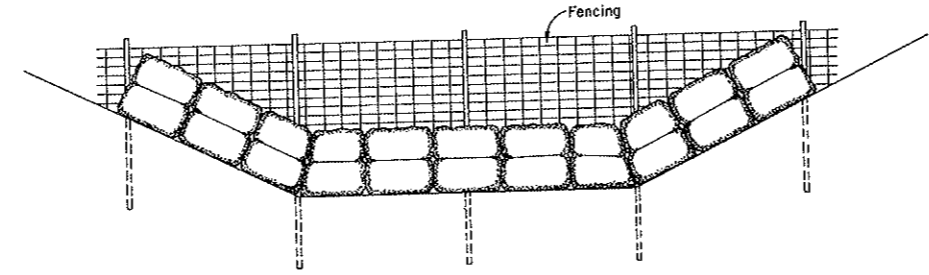


SMALL SEDIMENT DAM OR BERM

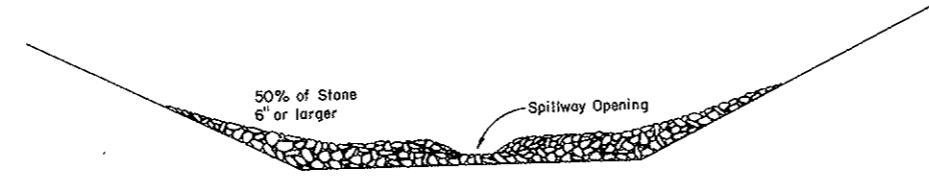


STAKED BALES

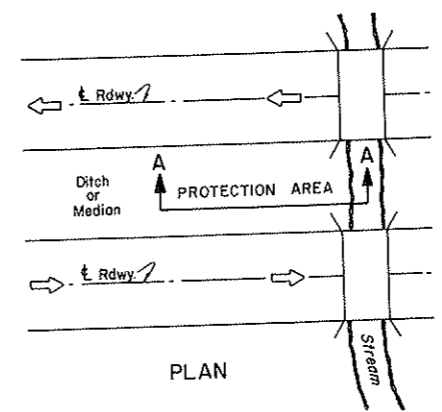
Dam should extend far enough up ditch slopes to pond runoff and prevent washout.



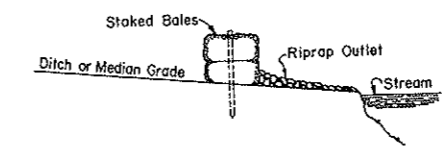
FENCE-BACKED BALES



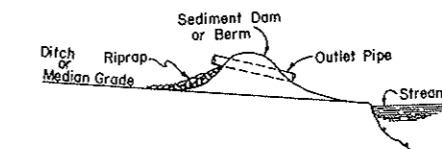
**GRADED STONE
DITCH EROSION DAMS**



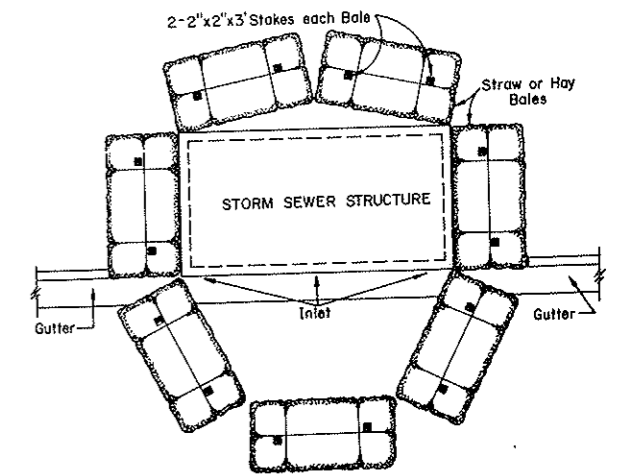
PLAN



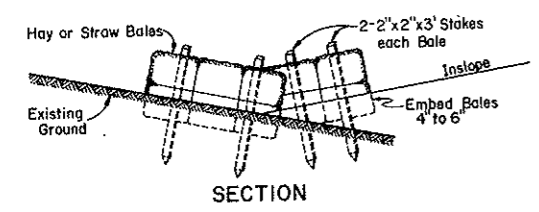
SECTION A-A HAY BALES



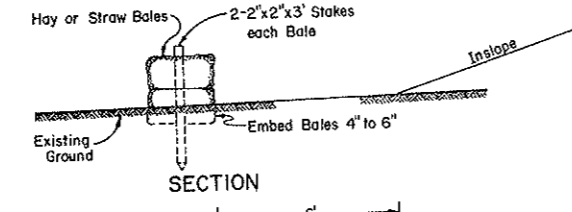
**SECTION A-A SEDIMENT DAM OR BERM
MEDIAN OR DITCH PROTECTION
AT STREAM CROSSINGS**



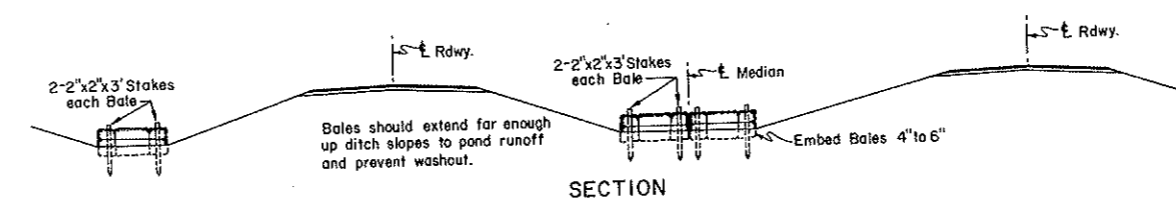
**STORM SEWER INLET
EROSION & SILTATION
BARRIER**



SECTION

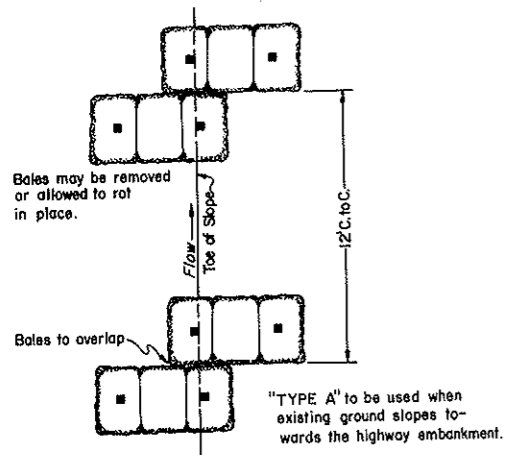


SECTION



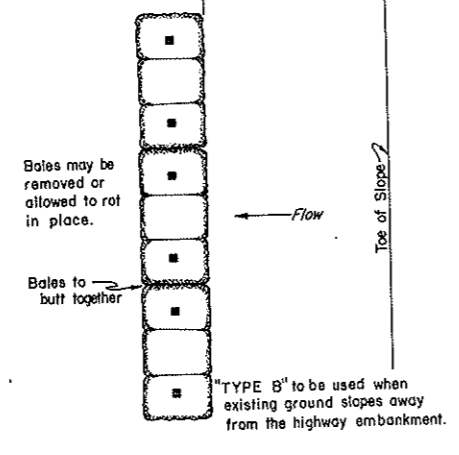
SECTION

Bales should extend far enough up ditch slopes to pond runoff and prevent washout.



**PLAN
"TYPE A"**

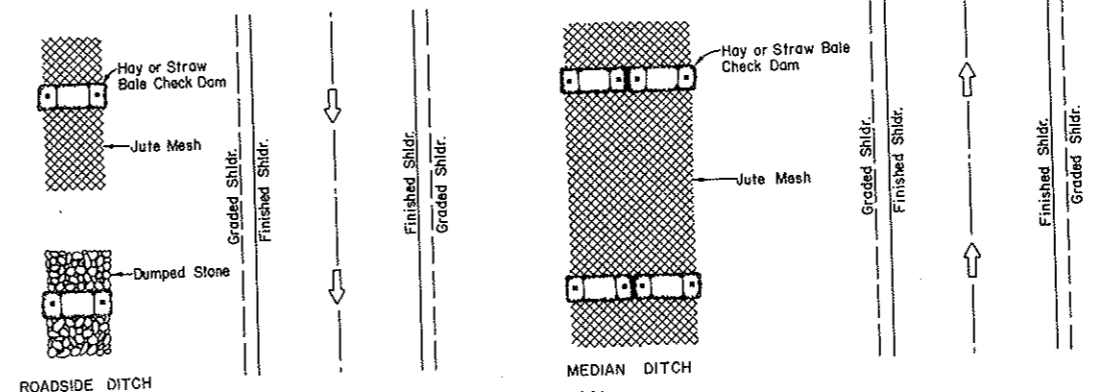
BALED HAY OR STRAW EROSION CHECKS



**PLAN
"TYPE B"**

"TYPE A" to be used when existing ground slopes towards the highway embankment.

"TYPE B" to be used when existing ground slopes away from the highway embankment.



ROADSIDE DITCH

MEDIAN DITCH

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

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."

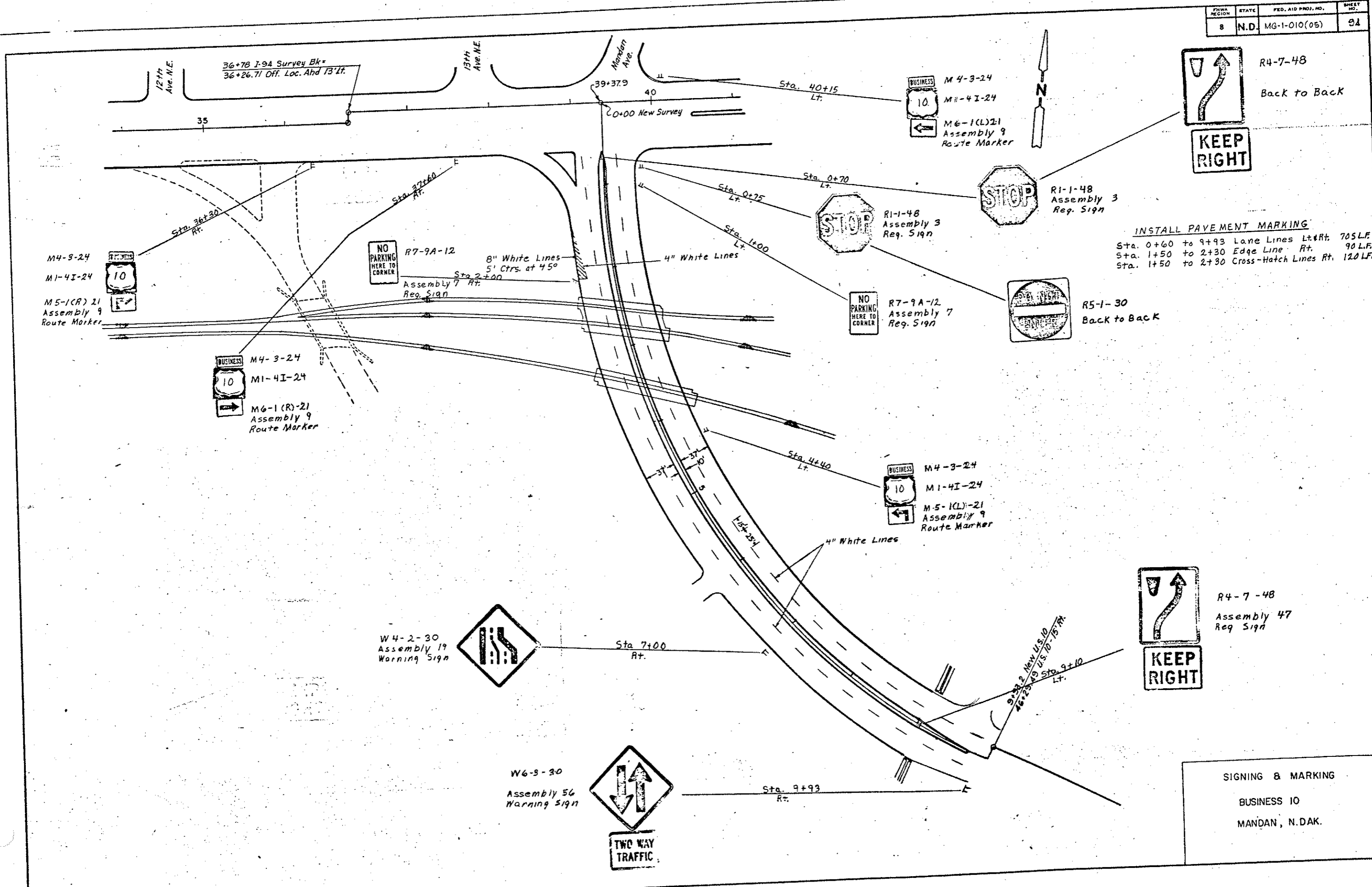
3-25-74		NORTH DAKOTA STATE HIGHWAY DEPARTMENT
REVISIONS		
DATE	CHANGE	Submitted: <i>R. Homan</i> Design Engineer
		Recommended: Asst. Chief Engineer Pre-Construction
		Approved: <i>R. Homan</i> Chief Engineer

SIGN SUMMARY

STATION	LOCATION	SIGN NO. OR ASSEMBLY NO.	SIGN AREA		POST DIMENSIONS				SLEEVE DIMENSIONS				A-FRAME SPACE				ANCHORAGE UNIT						TOTAL SUPPORT WEIGHT LBS.	RESET SIGN PANELS	RESET SIGN SUPPORTS				
			FLAT SHEET	PANEL	LENGTH		SIZE	LENGTH		SIZE	LENGTH		ATTACHMENT SECTION	REINF. SLEEVE		POST		BRACE											
			SQ. FT.	SQ. FT.	1st	2nd	in.	1st	2nd	in.	1st	2nd	SIZE	LENGTH	SIZE	NO.	LENGTH	SIZE	NO.	1st	2nd	SIZE							
36+30	Rt. BUSINESS 10	9 RM	3.19		11.500														4.000	2 1/2 x 2 1/2	0.500	2x3				48.27			
37+60	Rt. BUSINESS 10	9 RM	3.19		11.500														4.000	2 1/2 x 2 1/2	0.500	2x3				48.27			
40+15	Lt. BUSINESS 10	9 RM	3.19		11.500														4.000	2 1/2 x 2 1/2	0.500	2x3				91.93			
0+70	Lt. BUSINESS 10	3 RS	13.25		10.750	10.750													4.000	2 1/2 x 2 1/2	0.500	2x3				91.93			
0+75	Lt. BUSINESS 10	3 RS	13.25		10.750	10.750													4.000	2 1/2 x 2 1/2	0.500	2x3				24.37			
1+00	Lt. BUSINESS 10	7 RS	1.50		8.750														4.000	2 1/2 x 2 1/2	0.500	2x3				24.37			
2+00	Rt. BUSINESS 10	7 RS	1.50		8.750														4.000	2 1/2 x 2 1/2	0.500	2x3				48.27			
4+40	Lt. BUSINESS 10	9 RM	3.19		11.500																								
0+70	Lt. BUSINESS 10	R4-7-30	15.00																										
0+75	Lt. BUSINESS 10	RS-1-3	6.25																4.000	2 1/2 x 2 1/2	0.500	2x3				44.58			
7+00	Rt. BUSINESS 10	19 WS	6.25		10.250														4.000	4.000	2 1/2 x 2 1/2	0.500	2x3				91.93		
9+10	Lt. BUSINESS 10	47 RS	15.00		10.750	10.750													4.000	2 1/2 x 2 1/2	0.500	2x3				44.58			
9+93	Rt. BUSINESS 10	56 WS	9.25		10.250																								
Grand Total			114.01																										

606.77

TUBE SIZE IN.	WALL THICKNESS IN.	U.S. STANDARD GAUGE	WEIGHT PER FOOT LBS.	MOMENT OF INERTIA IN. ⁴	CROSS SECT. AREA IN. ²	SECTION MODULUS IN. ³
1 x 1	.105	12	1.070	.028	.210	.052
1 1/4 x 1 1/4	.105	12	1.427	.070	.315	.112
1 1/2 x 1 1/2	.105	12	1.705	.129	.380	.172
2 x 2	.105	12	2.060	.231	.485	.264
2 x 2	.105	12	2.416	.372	.590	.372
2 1/2 x 2 1/2	.105	12	2.773	.561	.695	.499
2 1/2 x 2 1/2	.105	12	3.141	.804	.803	.643
3 x 3	.1875		7.178	2.791	2.109	1.861



R4-7-48
Back to Back
KEEP RIGHT

INSTALL PAVEMENT MARKING
 Sta. 0+60 to 9+93 Lane Lines Lt. & Rt. 705 L.F.
 Sta. 1+50 to 2+30 Edge Line Rt. 90 L.F.
 Sta. 1+50 to 2+30 Cross-Hatch Lines Rt. 120 L.F.

R5-1-30
Back to Back

R4-7-48
Assembly 47
Req. Sign
KEEP RIGHT

SIGNING & MARKING
 BUSINESS 10
 MANDAN, N. DAK.

M4-3-24
M1-4I-24
M6-1(CL)21
Assembly 9
Route Marker

R1-1-48
Assembly 3
Req. Sign

R7-9A-12
Assembly 7
Req. Sign

M4-3-24
M1-4I-24
M5-1(CL)-21
Assembly 9
Route Marker

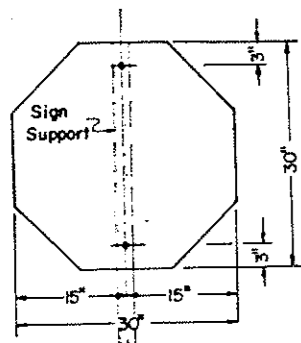
R7-9A-12
Assembly 7
Req. Sign
8" White Lines
5' Ctrs. at 45°

W4-2-30
Assembly 19
Warning Sign

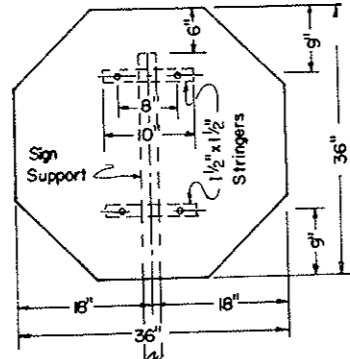
W6-3-30
Assembly 56
Warning Sign

TWO WAY TRAFFIC

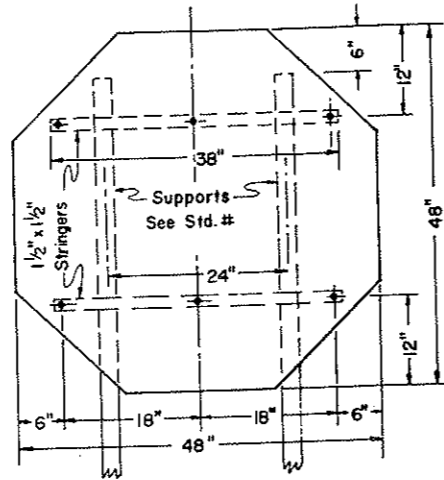
SIGN PUNCHING, STRINGER AND SUPPORT LOCATION DETAILS
REGULATORY AND WARNING SIGNS



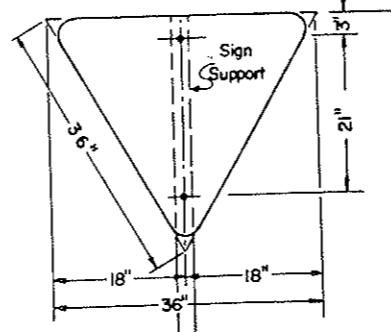
R1-1-30
Assembly 1



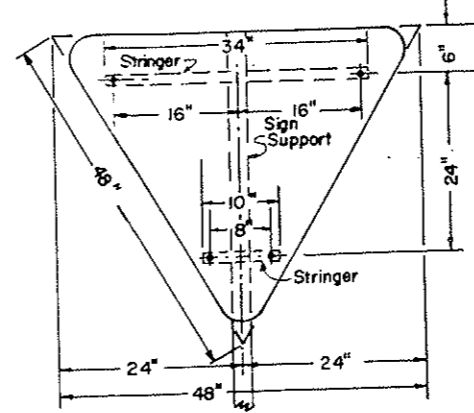
R1-1-36
Assembly 2



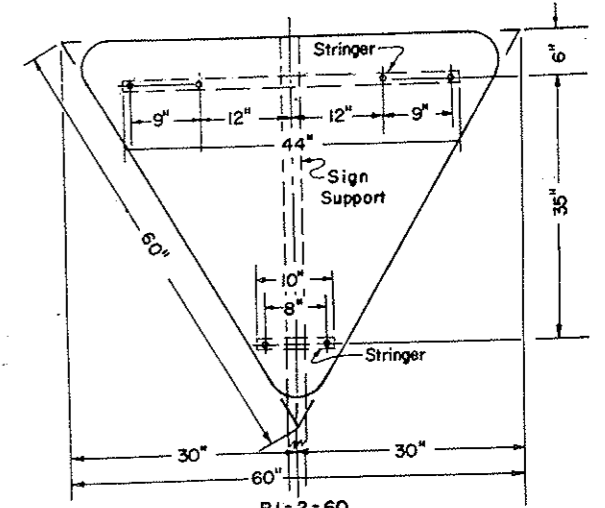
R1-1-48
Assembly 3



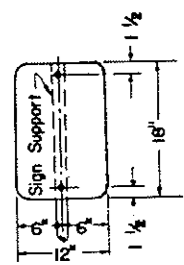
R1-2-36
Assembly 4



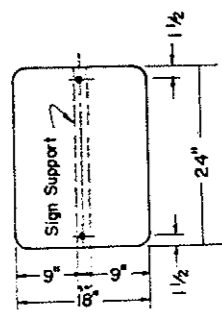
R1-2-48
Assembly 5



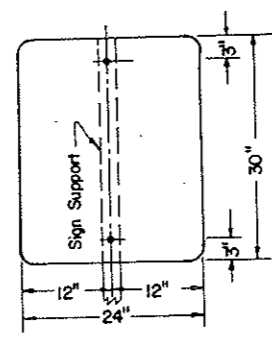
R1-2-60
Assembly 6



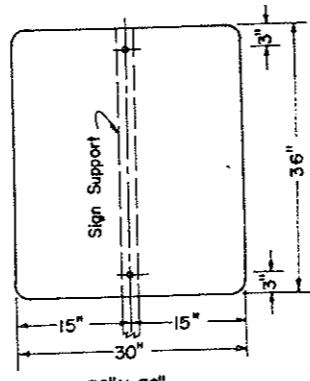
12"X18"
Assembly 7



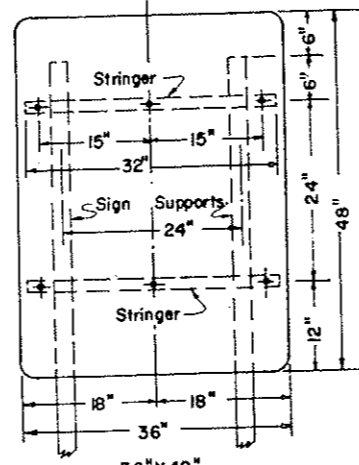
18"X24"
Assembly 8



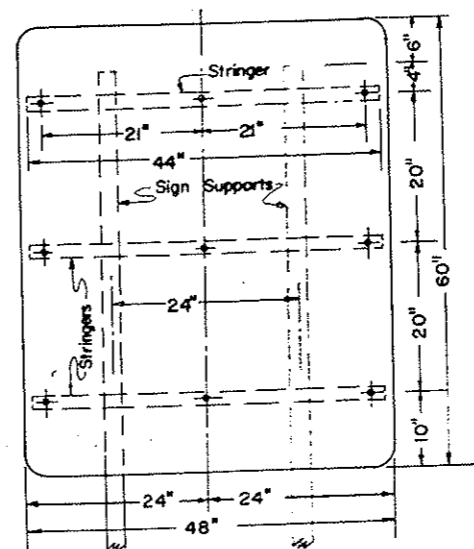
24"X30"
Assembly 9



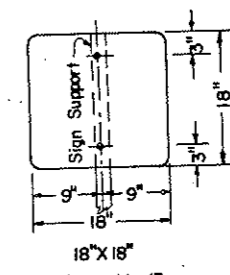
30"X36"
Assembly 10



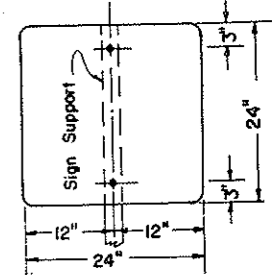
36"X48"
Assembly 11



48"X60"
Assembly 12



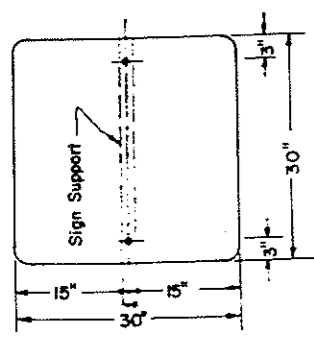
18"X18"
Assembly 13



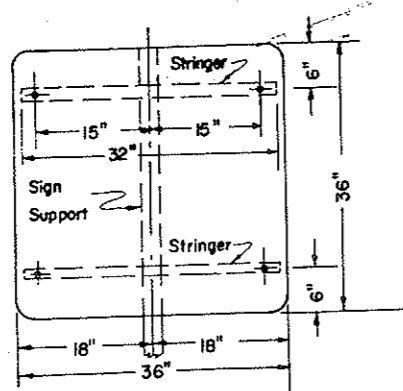
24"X24"
Assembly 14

NOTE:

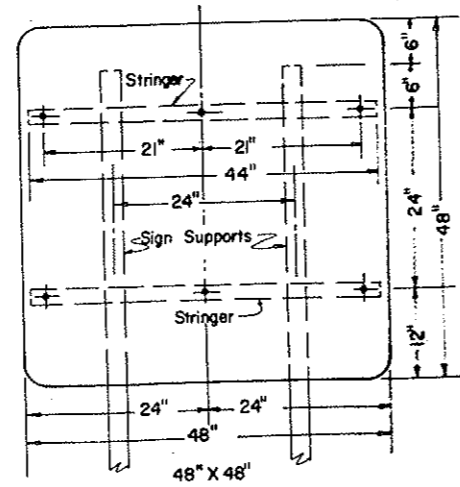
Material:
Sign Backing: The sign backing material thickness shall be as follows.
Steel: Signs having a width of less than 30" shall use 14 gauge material. Signs 30" or more shall use 12 gauge material.
Aluminum: Aluminum alloy 6061-T6 shall have the following minimum thicknesses: Signs 24" or less in width shall be 0.080 inch. Signs 30" or less in width shall be 0.100 inch. Signs over 30" shall be 0.125 inch. Aluminum alloy 5052-H38 shall have the following minimum thicknesses: Signs 24" or less in width shall be 0.100 inch. Signs over 24" in width shall be 0.125 inch.
Stringers: All stringers shall be square tube, perforated 1/2" x 1/2" and of the length shown.
Holes: All holes shall be punched round for 3/8" diameter bolts.
General: See plans for sign numbers to be used at each location.
 See Std. D-754-71-12.12 for mounting details.
 See Std. D-754-75-12.1 & 12.2 for post length and sizes.



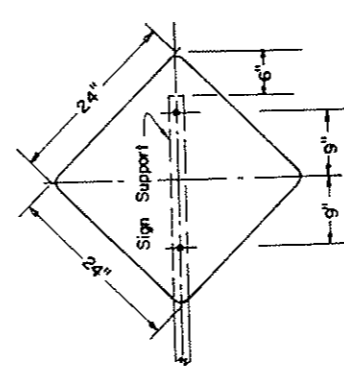
30"X30"
Assembly 15



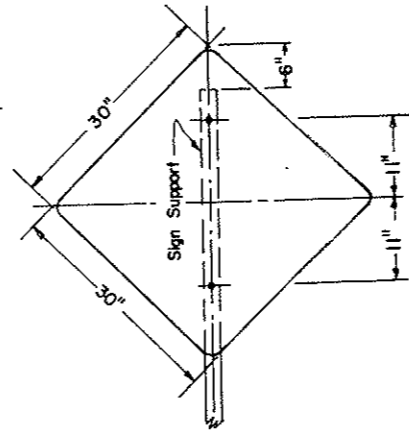
36"X36"
Assembly 16



48"X48"
Assembly 17



24"X24"
Assembly 18

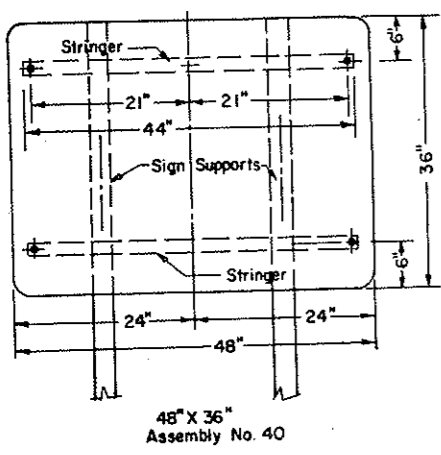


30"X30"
Assembly 19

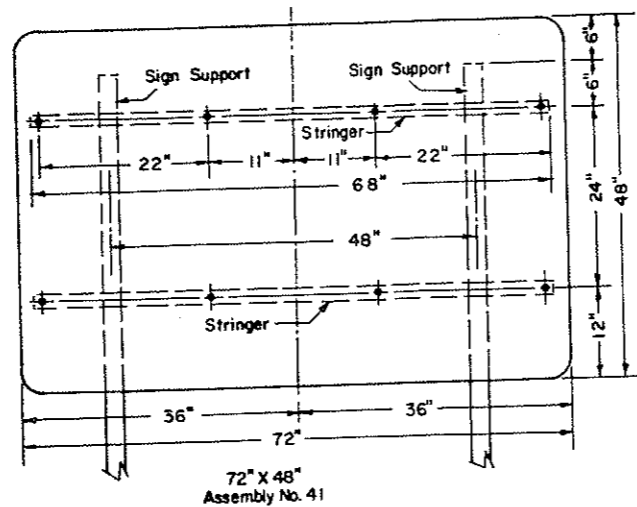
II-10-75	
DATE	CHANGES

NORTH DAKOTA
STATE HIGHWAY DEPARTMENT
 Submitted: *Richard S. Sisk*
Design Engineer
 Recommended: _____
Asst. Chief Engineer, Pre-Const.
 Approved: *Richard S. Sisk*
Chief Engineer

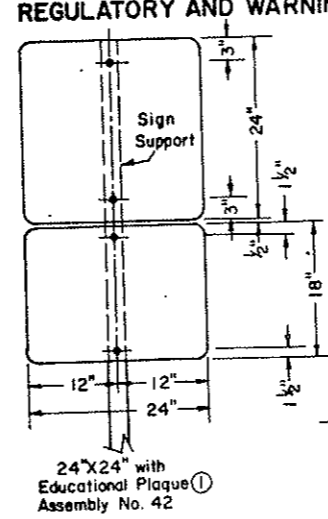
**SIGN PUNCHING, STRINGER AND SUPPORT LOCATION DETAILS
 REGULATORY AND WARNING SIGNS**



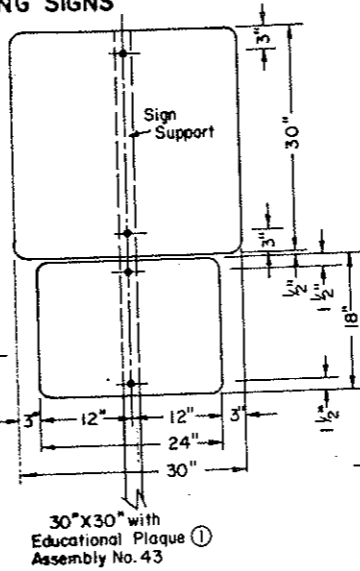
48" X 36" Assembly No. 40



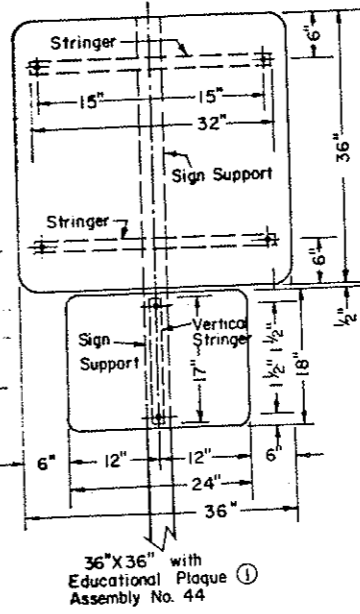
72" X 48" Assembly No. 41



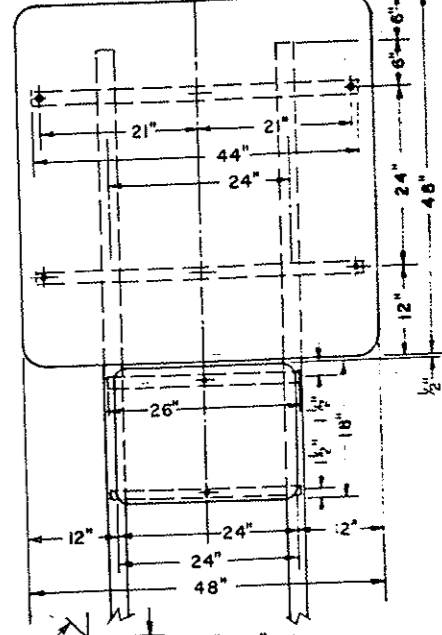
24" X 24" with Educational Plaque ① Assembly No. 42



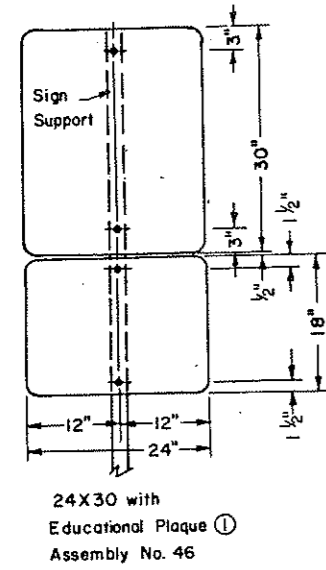
30" X 30" with Educational Plaque ① Assembly No. 43



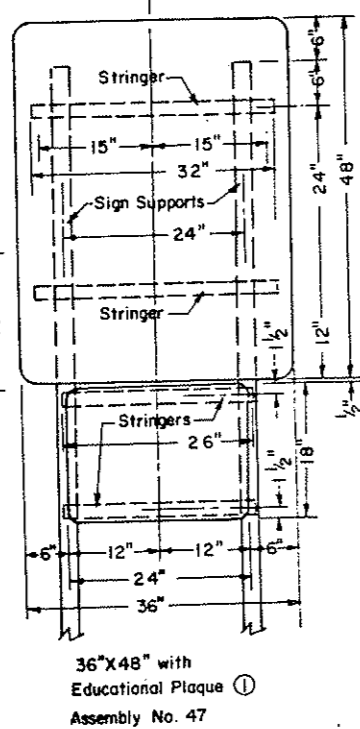
36" X 36" with Educational Plaque ① Assembly No. 44



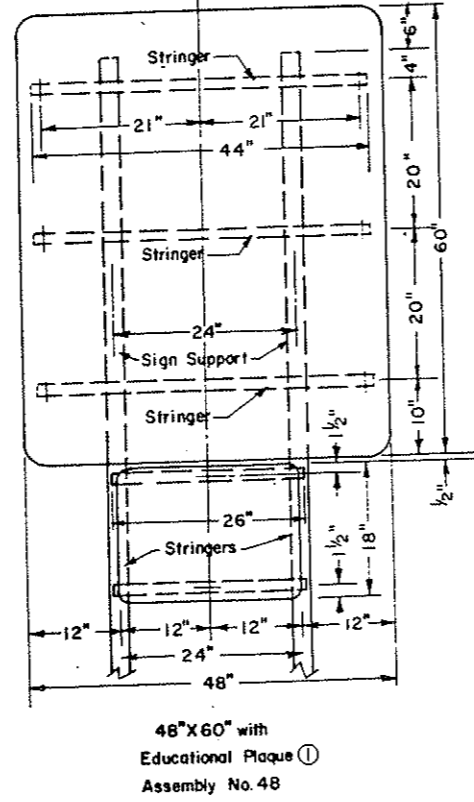
48" X 48" with Educational Plaque ① Assembly No. 45



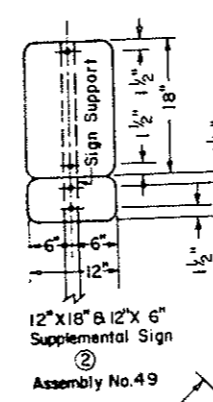
24" X 30" with Educational Plaque ① Assembly No. 46



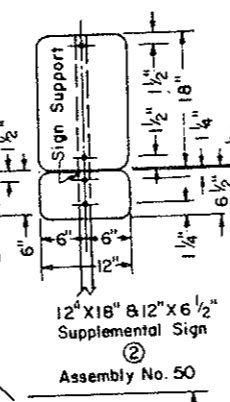
36" X 48" with Educational Plaque ① Assembly No. 47



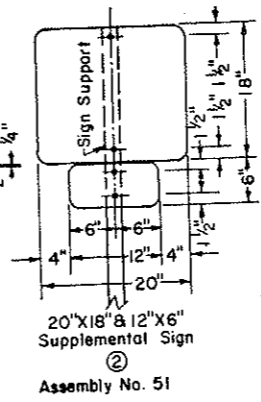
48" X 60" with Educational Plaque ① Assembly No. 48



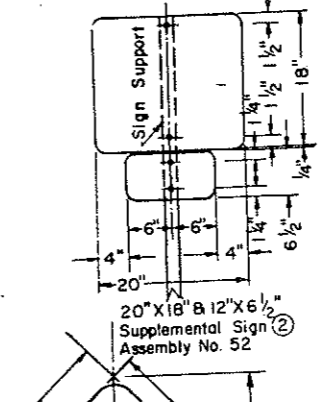
12" X 18" & 12" X 6" Supplemental Sign ② Assembly No. 49



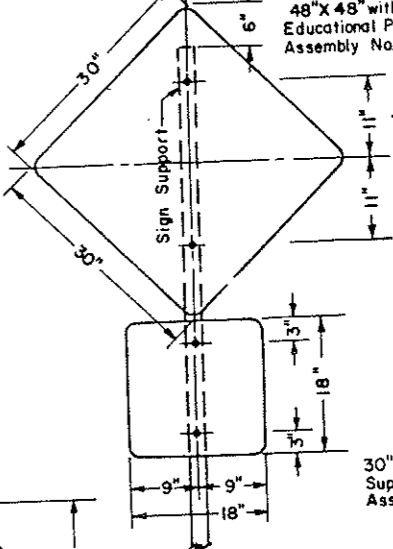
12" X 18" & 12" X 6 1/2" Supplemental Sign ② Assembly No. 50



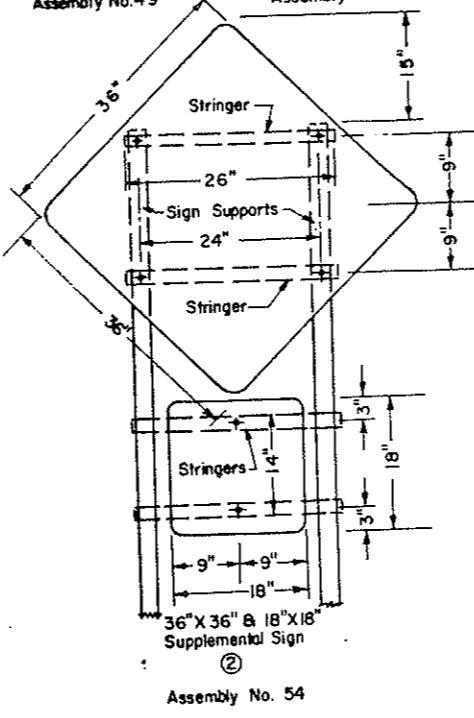
20" X 18" & 12" X 6" Supplemental Sign ② Assembly No. 51



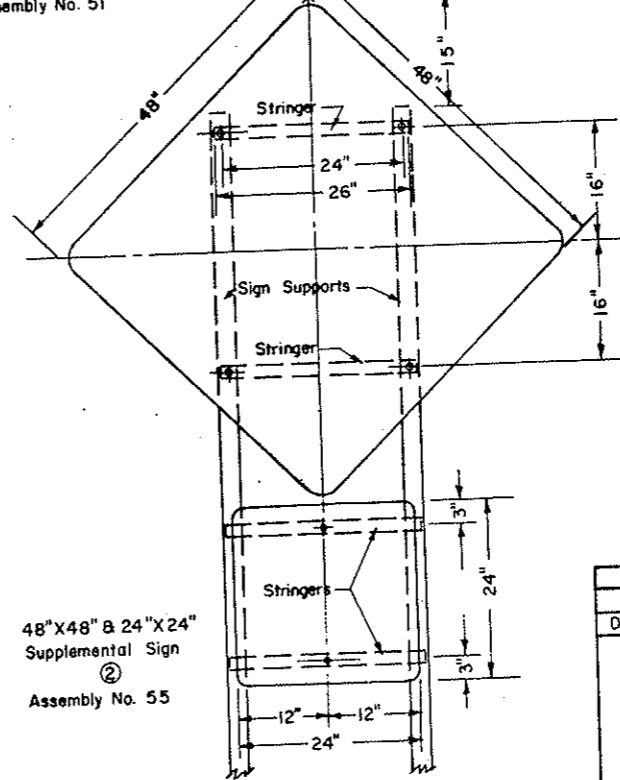
20" X 18" & 12" X 6 1/2" Supplemental Sign ② Assembly No. 52



30" X 30" & 18" X 18" Supplemental Sign ② Assembly No. 53



36" X 36" & 18" X 18" Supplemental Sign ② Assembly No. 54



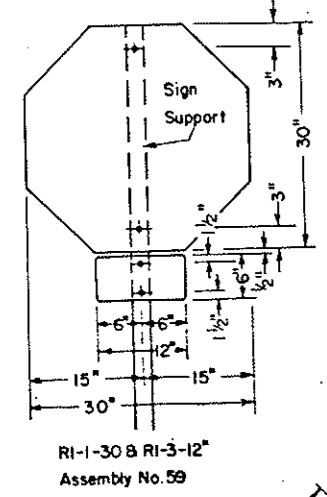
48" X 48" & 24" X 24" Supplemental Sign ② Assembly No. 55

Notes:
 ① Where Educational Plaque is to be placed below main sign the vertical clearance shall be to the main sign & the support length shall be figured as if no plaque is installed. See support tables for max sign size to determine length and size of supports.
 ② Where supplemental signs are placed below the main sign the vertical clearance shall be 1 foot less than that specified on support tables standard.

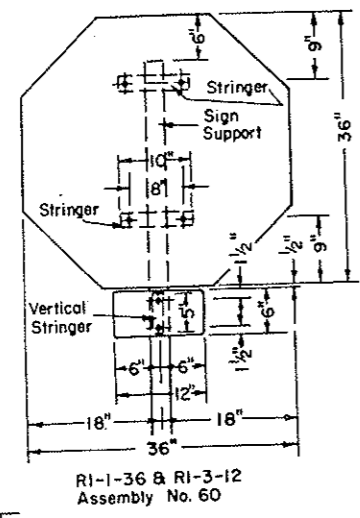
NOTE:
Material:
 Sign Backing: The sign backing material thickness shall be as follows.
 Steel: Signs having a width of less than 30" shall use 14 gauge material. Signs 30" or more shall use 12 gauge material.
 Aluminum: Aluminum alloy 6061-T6 shall have the following minimum thicknesses: Signs 24" or less in width shall be 0.080 inch. Signs 30" or less in width shall be 0.100 inch. Signs over 30" shall be 0.125 inch. Aluminum alloy 5052-H38 shall have the following minimum thicknesses: Signs 24" or less in width shall be 0.100 inch. Signs over 24" in width shall be 0.125 inch.
 Stringers: All stringers shall be square tube, perforated 1 1/2" x 1 1/2" and of the length shown.
 Notes: All holes shall be punched round for 3/8" diameter bolts.
 General: See plans for sign numbers to be used at each location. See Std. D-754-71-12.12 for mounting details. See Std. D-754-75-12.1 & 12.2 for post lengths and sizes.

11-10-75		NORTH DAKOTA STATE HIGHWAY DEPARTMENT
DATE	REVISIONS CHANGE	
		Submitted: <i>[Signature]</i> Design Engineer
		Recommended: <i>[Signature]</i> Asst. Chief Engineer Pre-Construction
		Approved: <i>[Signature]</i> Chief Engineer

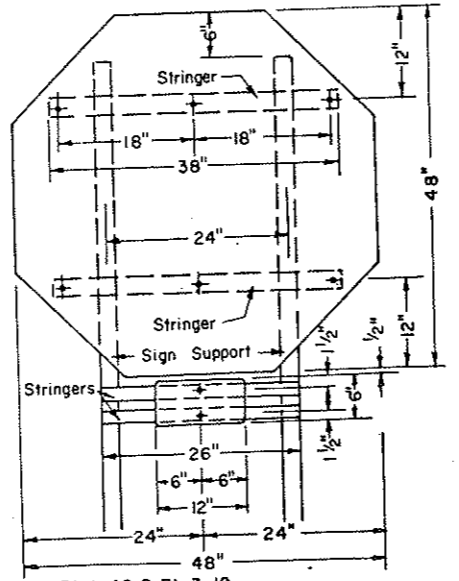
**SIGN PUNCHING, STRINGER AND SUPPORT LOCATION DETAILS
 REGULATORY, WARNING AND GUIDE SIGNS**



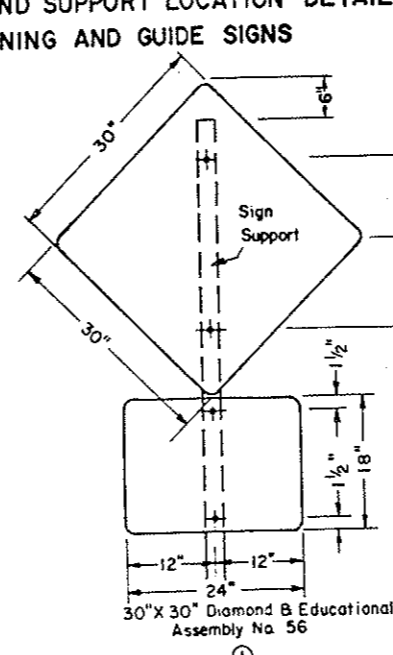
RI-1-30 & RI-3-12
 Assembly No. 59



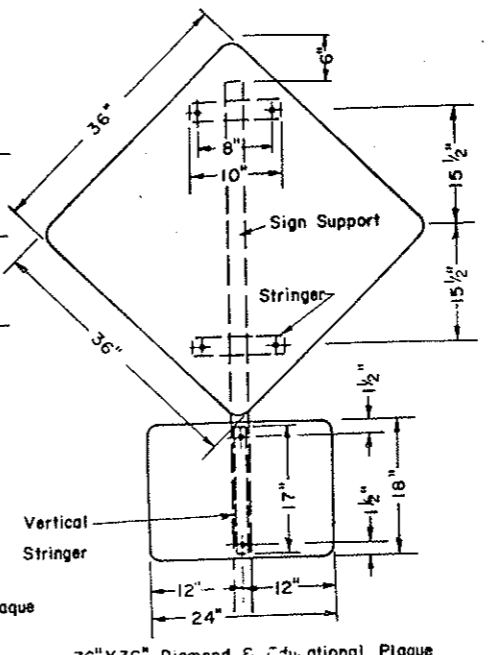
RI-1-36 & RI-3-12
 Assembly No. 60



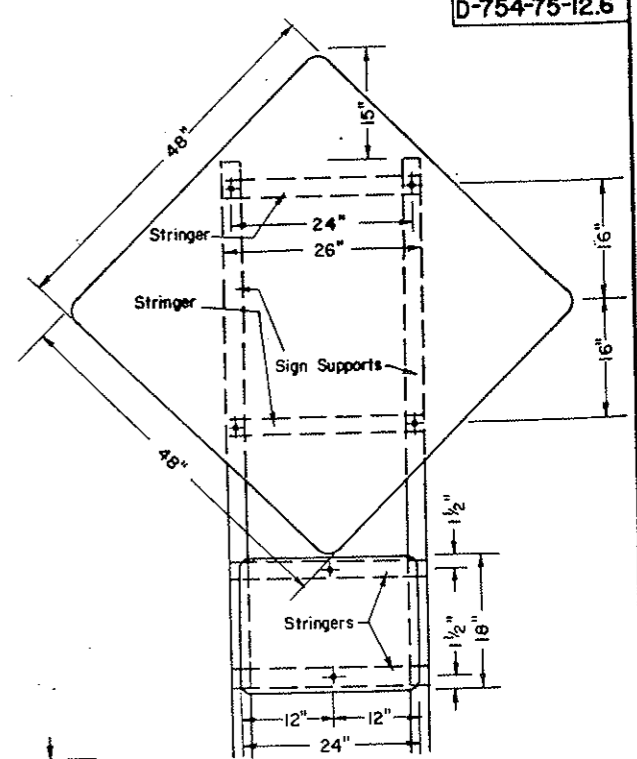
RI-1-48 & RI-3-12
 Assembly No. 61



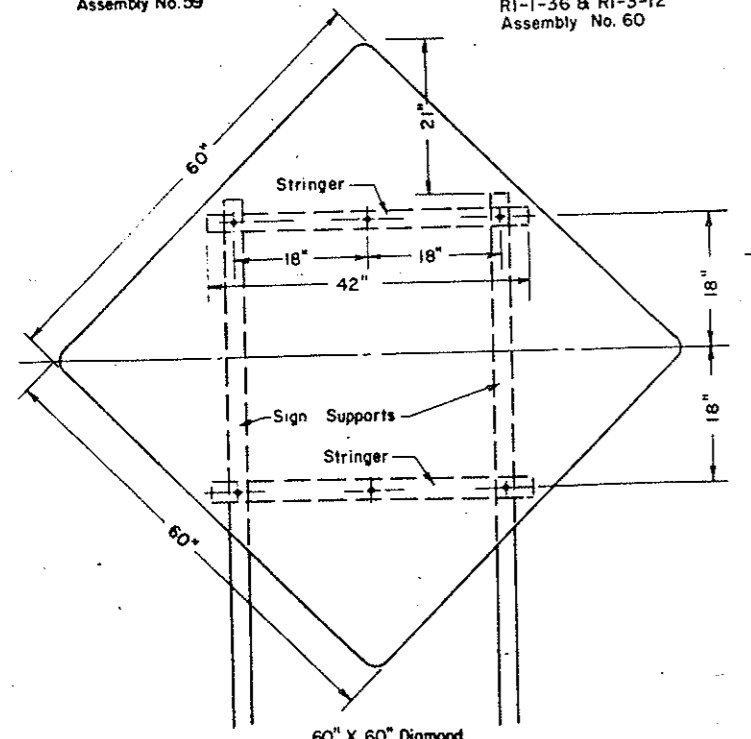
30" X 30" Diamond & Educational Plaque
 Assembly No. 56



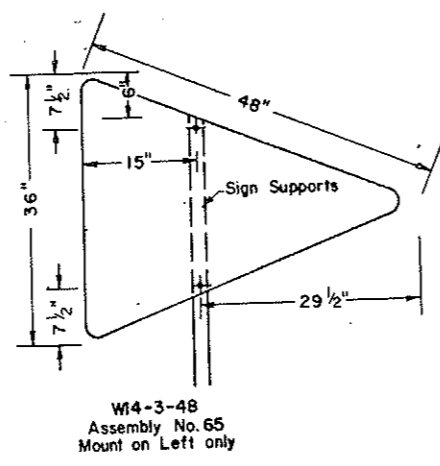
36" X 36" Diamond & Educational Plaque
 Assembly No. 57



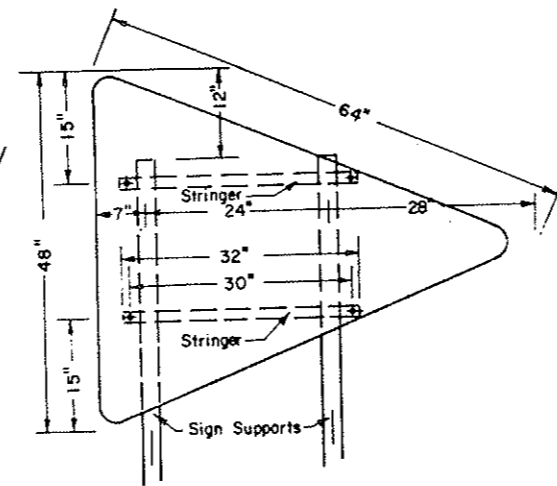
48" X 48" Diamond & Educational Plaque
 Assembly No. 58



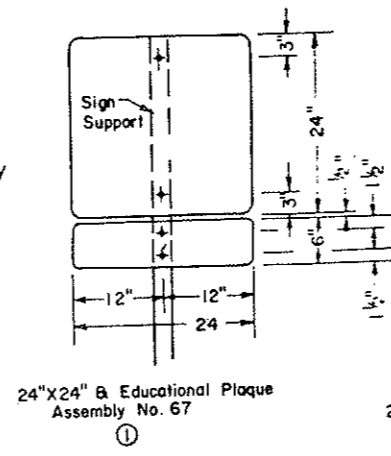
60" X 60" Diamond
 Assembly No. 62



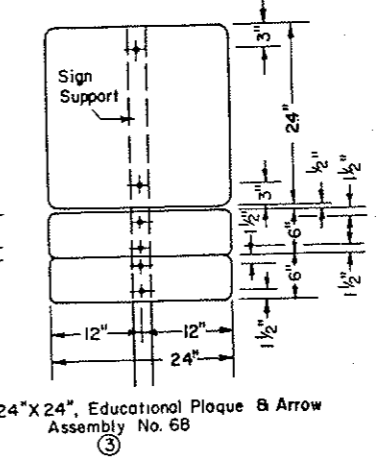
W14-3-48
 Assembly No. 65
 Mount on Left only



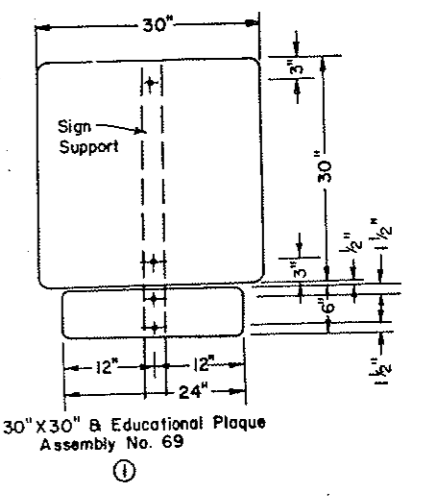
W14-3-64
 Assembly No. 66
 Mount on Left



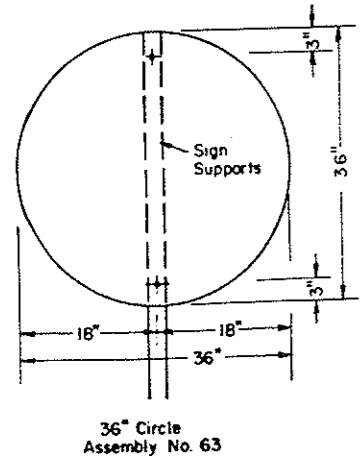
24" X 24" & Educational Plaque
 Assembly No. 67



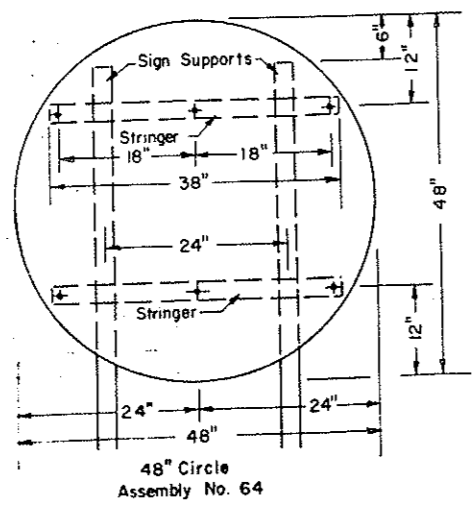
24" X 24", Educational Plaque & Arrow
 Assembly No. 68



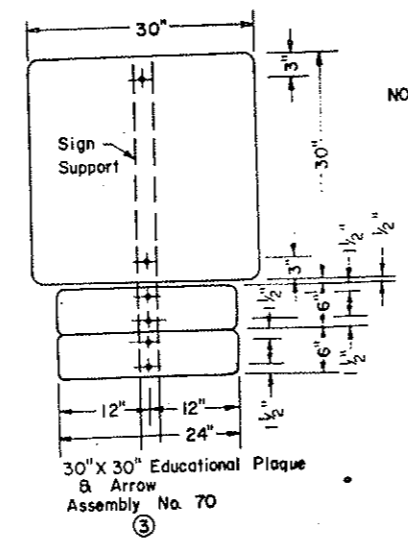
30" X 30" & Educational Plaque
 Assembly No. 69



36" Circle
 Assembly No. 63



48" Circle
 Assembly No. 64



30" X 30" Educational Plaque
 & Arrow
 Assembly No. 70

NOTE:

Material:
 Sign Backing: The sign backing material thickness shall be as follows.
 Steel: Signs having a width of less than 30" shall use 14 gauge material. Signs 30" or more shall use 12 gauge material.
 Aluminum: Aluminum alloy 6061-T6 shall have the following minimum thicknesses. Signs 24" or less in width shall be 0.080 inch. Signs 30" or less in width shall be 0.100 inch. Signs over 30" shall be 0.125 inch. Aluminum alloy 5052-H38 shall have the following minimum thicknesses. Signs 24" or less in width shall be 0.100 inch. Signs over 24" in width shall be 0.125 inch.
 Stringers: All stringers shall be saure tube, perforated 1 1/2" x 1 1/2" and of the length shown.
 Holes: All holes shall be punched round for 3/8" diameter bolts.
 General: See plans for sign numbers to be used at each location.
 See Std. D-754-71-12.12 for mounting details.
 See Std. D-754-75-12.1 & 12.2 for post lengths and sizes.

Notes:

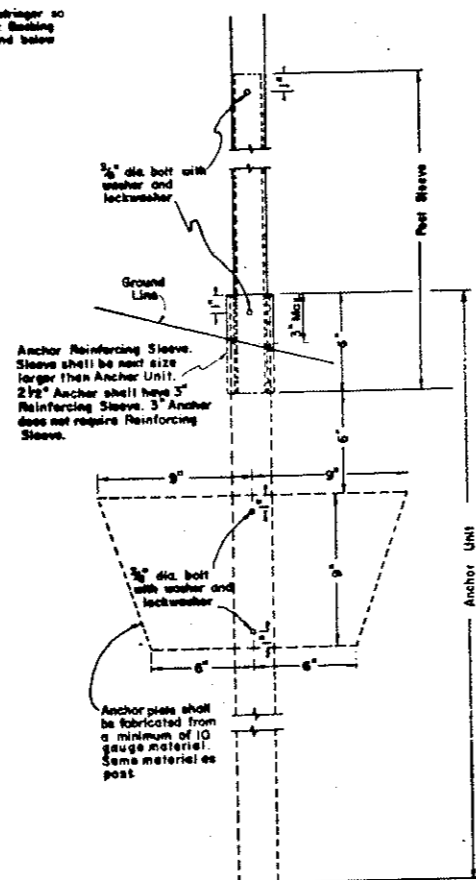
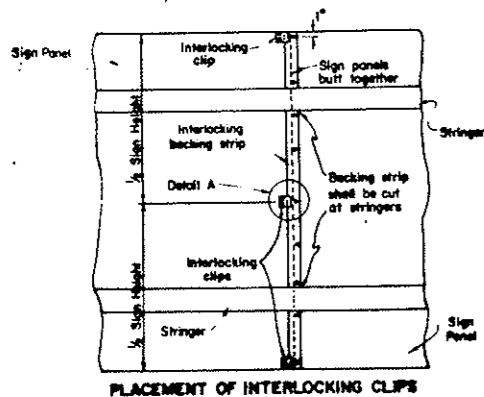
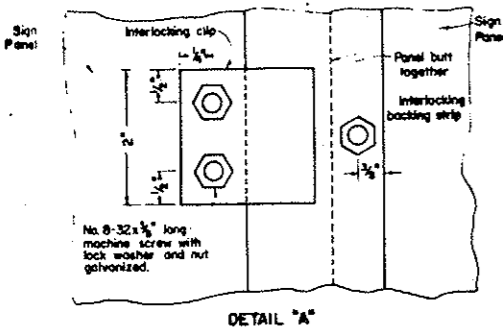
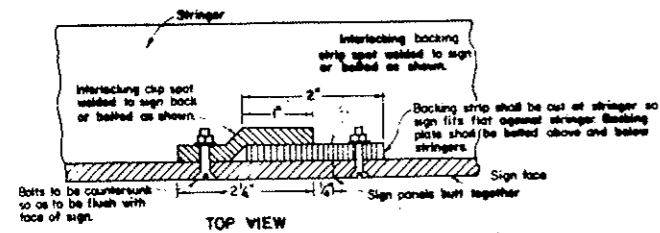
- Where Educational Plaque is to be placed below main sign the vertical clearance shall be to the main sign & the support length shall be figured as if no plaque is installed. See support tables for main sign size to determine length and size of supports.
- Where supplemental signs are placed below the main sign the vertical clearance shall be at least that specified on support tables standard.
- Where Educational Plaque is to be placed below main sign and arrow below it the vertical clearance shall be to the bottom of the arrow as if the educational plaque were removed and the support length shall be figured as if no plaque is installed. See support tables for tables for size of supports.

11-10-75	
REVISIONS	
DATE	CHANGE

NORTH DAKOTA
 STATE HIGHWAY DEPARTMENT
 Submitted: *Hubert J. ...*
 Design Engineer
 Recommended: *...*
 Asst. Chief Engineer
 Pre-Construction
 Approved: *...*
 Chief Engineer

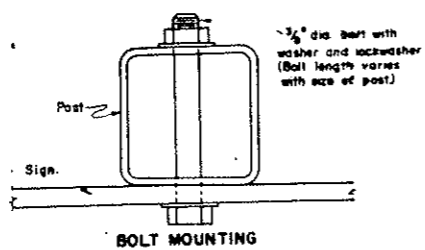
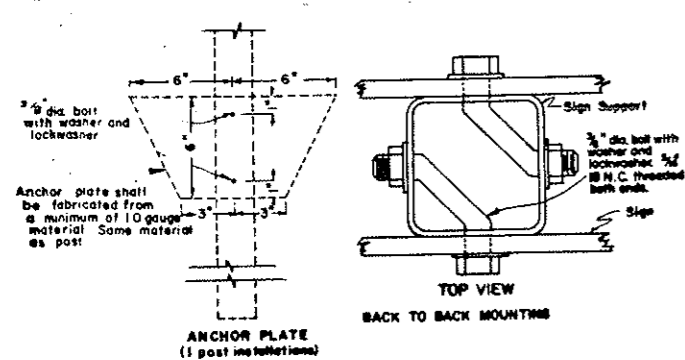
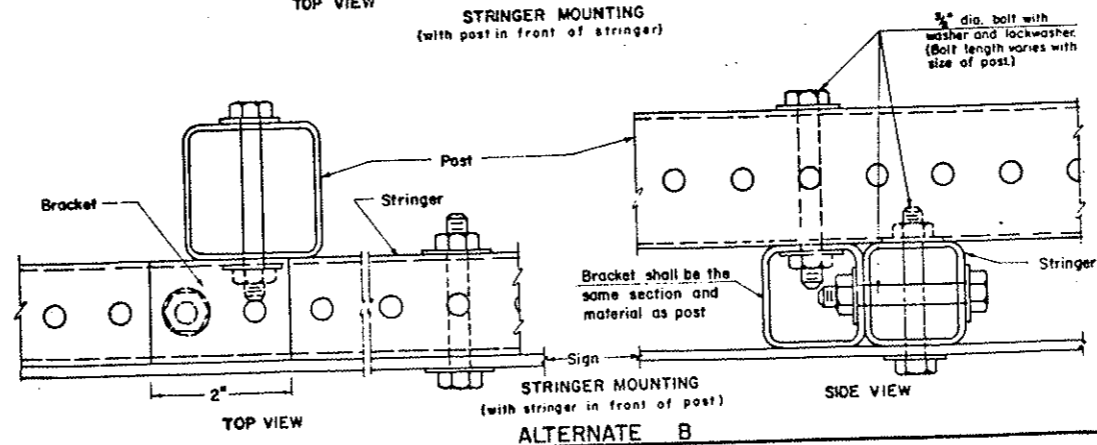
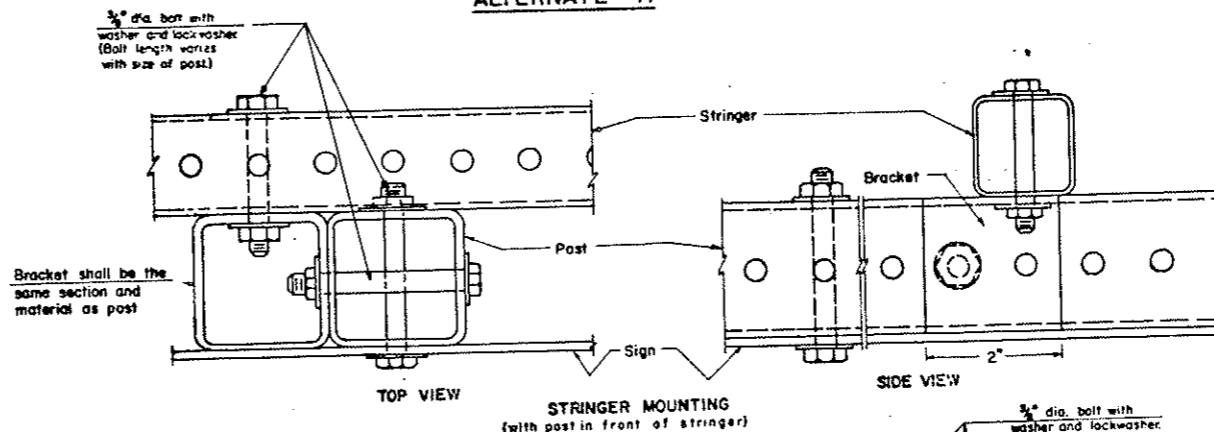
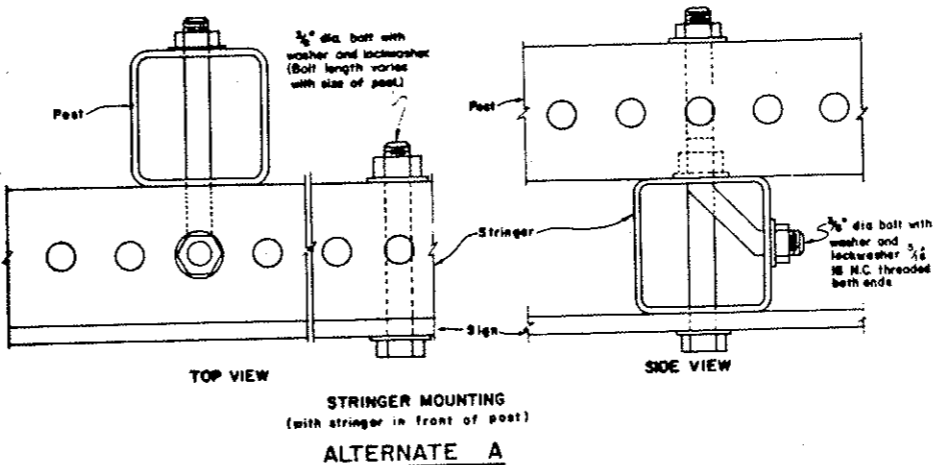
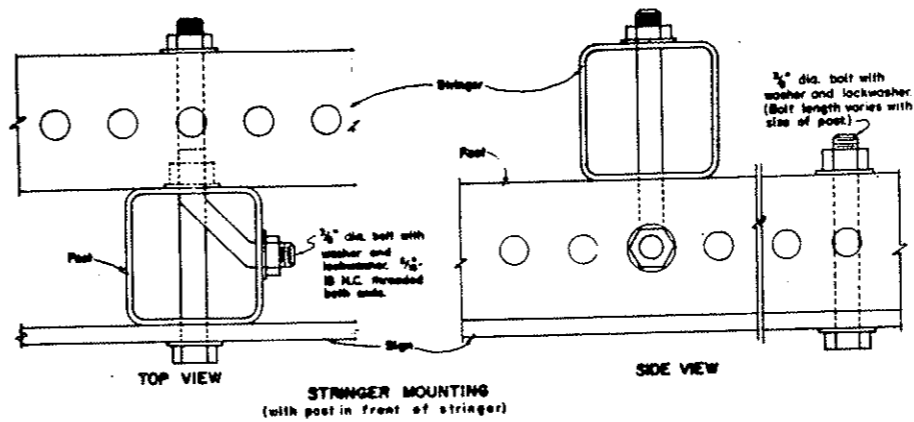
MOUNTING DETAILS

Flat Sheet Signs
Perforated Telescoping Tubes



ANCHOR UNIT AND POST SLEEVE ASSEMBLY
(showing anchor plate to be used for all 2 post installations)

NOTE:
Sign may be made in increments or in one complete unit. If made in increments, the interlocking clip shown shall be used. Anchor Unit shall be driven.



10-19-72 REVISIONS		NORTH DAKOTA STATE HIGHWAY DEPARTMENT
DATE	CHANGE	
		Submitted <i>[Signature]</i> Design Engineer
		Recommended Asst. Chief Engineer, Pre-Const.
		Approved <i>[Signature]</i> Chief Engineer

