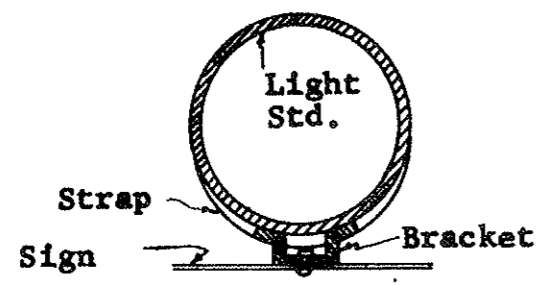


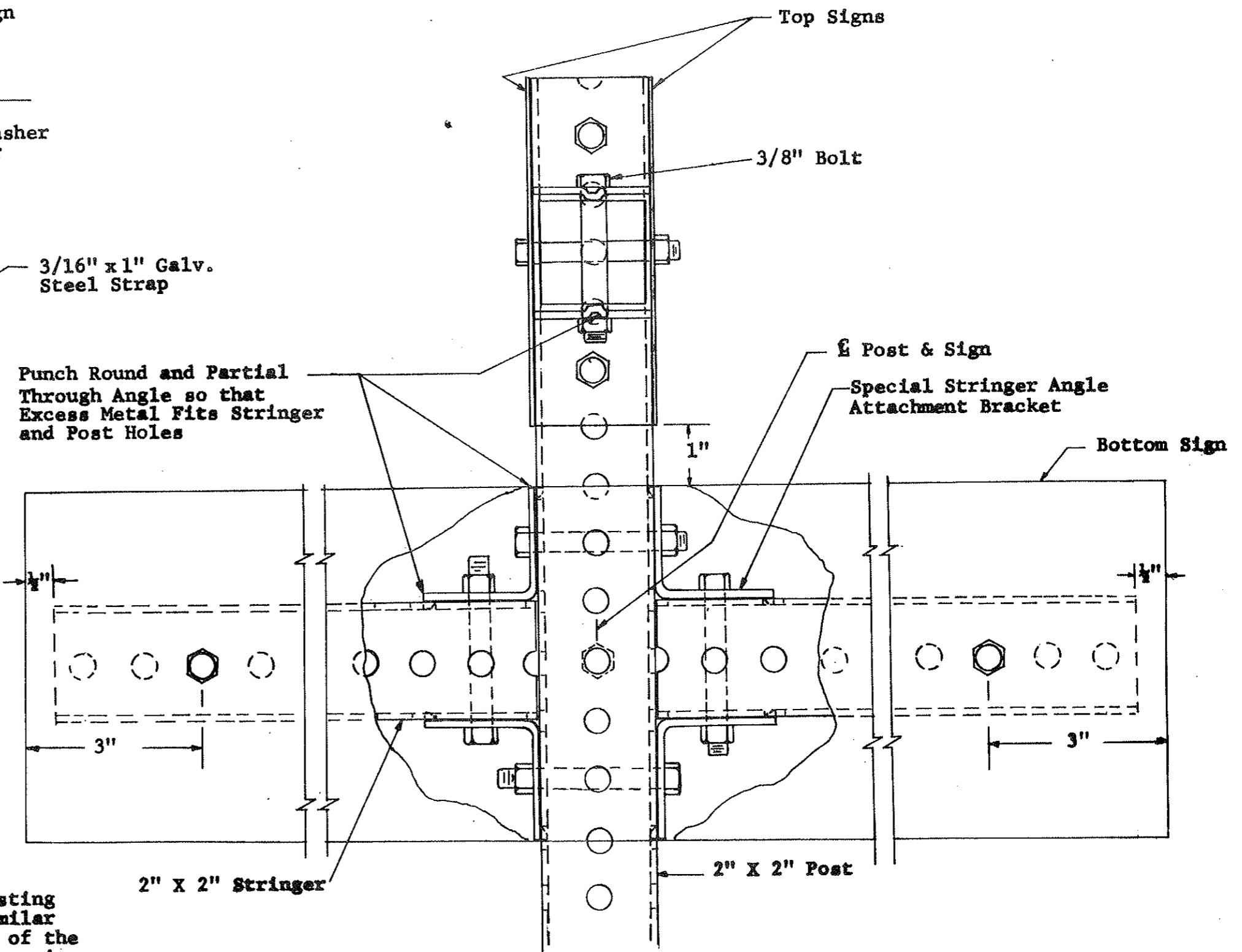
STRAP DETAIL

For mounting signs at an angle of 30° to 45° toward traffic. Material used for the attachment straps shall be included in the price bid for flat sheet signs.



BRACKET DETAIL

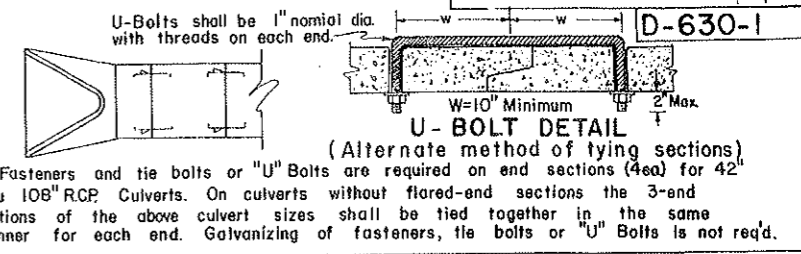
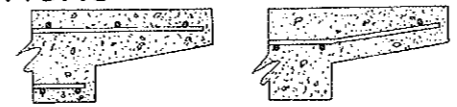
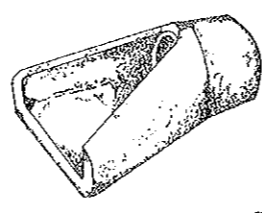
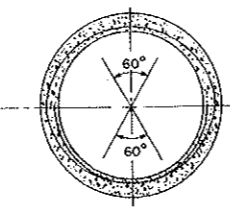
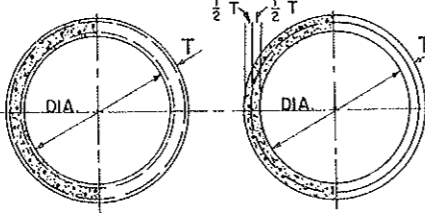
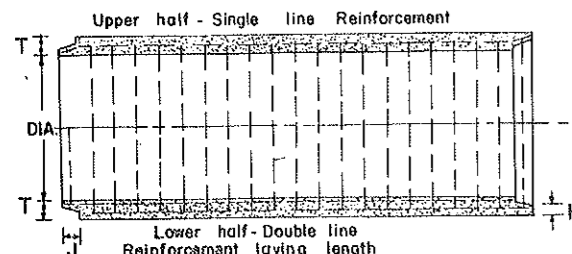
Bracket shall be of galv. steel consisting of strap & sign attachment bracket similar to the one shown in the detail. Cost of the bracket assembly to be included in the price bid for flat sheet signs. Punching shall be as shown on the Standard Drawings. The Engineer in the field shall determine the exact location of the light standard for sign attachment. There shall be a 7' vertical clearance to the bottom of all signs mounted on light standards.



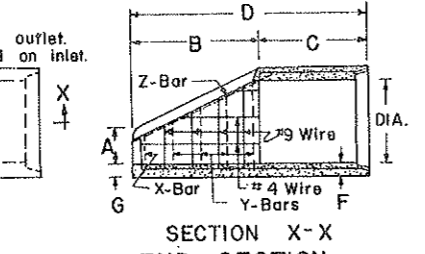
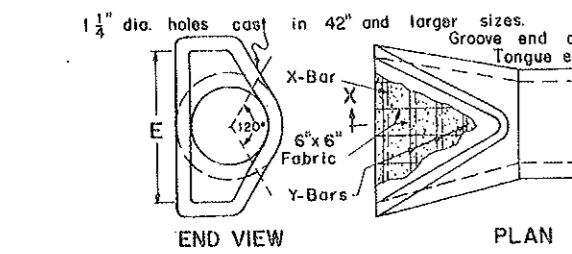
STREET NAME SIGN ASSEMBLY DETAIL

Material used in this assembly shall be included in the price bid for flat sheet for signs.

REINFORCED CONCRETE PIPE CULVERT AND END SECTIONS



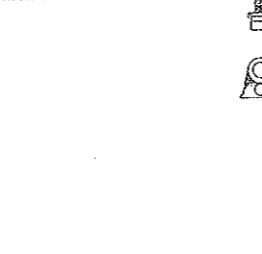
REINFORCED CONCRETE PIPE TYPICAL LONGITUDINAL SECTION



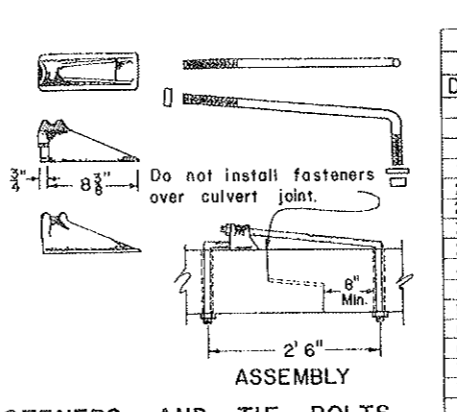
END VIEW



PERSPECTIVE



ARRANGEMENT FOR REINFORCEMENT



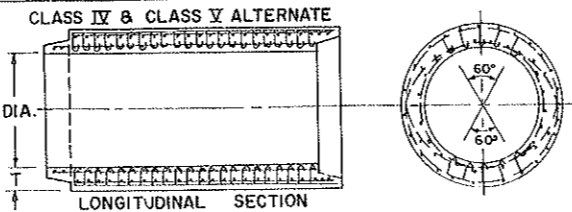
DIA.	TERMINAL DIMENSIONS							REINFORCING STEEL				
	A	B	C	D	E	F	G	X	Y	Z		
12	0'-4"	2'-0"	4'-0 1/2"	6'-0 1/2"	2'-0"	2"	2 1/4"	2 1/4" x 2'	6-3/4" x 2 1/2" @ 6" c.c.	2-1/4" x 4'		
15	0'-6"	2'-3"	3'-10"	6'-1"	2'-6"	2 1/4"	2 1/4"	2 1/4" x 2 1/2"	6-3/4" x 2 1/2" @ 6" c.c.	2-3/8" x 4'		
18	0'-9"	2'-3"	3'-10"	6'-1"	2'-6"	2 1/2"	2 1/2"	2 1/2" x 3"	6-3/4" x 3" @ 6" c.c.	2-3/8" x 4'		
21	0'-9"	3'-0"	3'-1 1/2"	6'-1 1/2"	3'-6"	2 3/4"	2 3/4"	2 3/4" x 3 1/2"	8-1/2" x 3 1/2" @ 6" c.c.	2-3/8" x 5'		
24	0'-9 1/2"	3'-7 1/2"	2'-6"	6'-1 1/2"	4'-0"	3"	3"	2 1/2" x 4'	8-3/8" x 4' @ 8" c.c.	2-3/8" x 6'		
27	0'-10 1/2"	4'-1 1/2"	2'-0"	6'-1 1/2"	4'-6"	3 1/2"	3 1/2"	2 1/2" x 5'	8-3/8" x 5' @ 9" c.c.	2-3/8" x 6'		
30	1'-0"	4'-6"	3'-7 1/2"	8'-1 1/2"	5'-0"	3 1/2"	3 1/2"	2 1/2" x 5'	12-3/8" x 5' @ 8" c.c.	2-1/2" x 6'		
36	1'-3"	5'-3"	2'-10 1/2"	8'-1 1/2"	6'-0"	4"	4"	2 1/2" x 6'	12-3/8" x 6' @ 6" c.c.	2-1/2" x 8'		
42	1'-9"	5'-3"	2'-11"	8'-2"	6'-6"	4 1/2"	4 1/2"	2 1/2" x 7'	12-1/2" x 7' @ 9" c.c.	2-1/2" x 8'		
48	2'-0"	6'-0"	2'-2"	8'-2"	7'-0"	5"	5"	2 1/2" x 8'	16-1/2" x 8' @ 8" c.c.	2-1/2" x 8'		
54	2'-3"	5'-5 1/2"	2'-9 1/2"	8'-2 1/2"	7'-6"	5 1/2"	5 1/2"	2 1/2" x 8'	16-1/2" x 9' @ 7" c.c.	2-1/2" x 8'		
60	2'-11"	5'-0"	3'-3"	8'-3"	8'-0"	6"	6"	2 1/2" x 9'	16-1/2" x 9' @ 6" c.c.	2-1/2" x 9'		
66	2'-6"	6'-0"	2'-3"	8'-3"	8'-6"	6 1/2"	6 1/2"	2 1/2" x 9'	22-1/2" x 9' @ 6" c.c.	2-1/2" x 9'		
72	3'-0"	6'-6"	1'-9"	8'-3"	9'-0"	7"	7"	2 1/2" x 10'	24-1/2" x 10' @ 6" c.c.	2-1/2" x 9'		
78	3'-0"	7'-6"	1'-9"	9'-3"	9'-6"	7 1/2"	7 1/2"	2 1/2" x 10'	28-1/2" x 10' @ 6" c.c.	2-1/2" x 10'		
84	3'-0"	7'-6"	1'-9"	9'-3 1/2"	10'-0"	8"	8"	4 1/2" x 10'	28-1/2" x 10' @ 6" c.c.	4-1/2" x 10'		
90	3'-5"	7'-3 1/2"	2'-0"	9'-3 1/2"	11'-0"	8 1/2"	8 1/2"	4 1/2" x 11'	28-1/2" x 11' @ 6" c.c.	4-1/2" x 10'		

Permissible Fill Heights RCP Sewer-Trench Conditions Other than Class I

PIPE SIZE	CLASS I				CLASS II				CLASS III				CLASS IV				CLASS IV ALTERNATE				CLASS V				CLASS V ALTERNATE			
	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.
24 thru 54	3-9	9-13	13-23	23+																								
60 thru 108	1-9	9-13	13-23	23+																								

Dia	Sq. ft.	Lbs.	In.	In.	1200												1500												2000												3000												3750											
					4000 PSI.				4000 PSI.				4000 PSI.				4000 PSI.				4000 PSI.				5000 PSI.				6000 PSI.				6000 PSI.				5000 PSI.																											
					Inner cage	Outer cage	Ellip. pipe	Height of Fill	Inner cage	Outer cage	Ellip. pipe	Height of Fill	Inner cage	Outer cage	Ellip. pipe	Height of Fill	Inner cage	Outer cage	Ellip. pipe	Height of Fill	Inner cage	Outer cage	Ellip. pipe	Height of Fill	Inner cage	Outer cage	Ellip. pipe	Height of Fill	Inner cage	Outer cage	Ellip. pipe	Height of Fill	Inner cage	Outer cage	Ellip. pipe	Height of Fill	Inner cage	Outer cage	Ellip. pipe	Height of Fill																								
12	0.79	92	18-23	18-23	TO BE USED FOR R.C.P. SEWER ONLY																																																											
15	1.23	127	18-23	18-23	TO BE USED FOR R.C.P. SEWER ONLY																																																											
18	1.77	168	18-23	18-23	TO BE USED FOR R.C.P. SEWER ONLY																																																											
21	2.40	214	18-23	18-23	TO BE USED FOR R.C.P. SEWER ONLY																																																											
24	3.14	265	23-34	23-34	Special conditions only																																																											
27	3.98	322	23-34	23-34	Special conditions only																																																											
30	4.91	384	34-44	34-44	Special conditions only																																																											
33	5.94	452	34-44	34-44	Special conditions only																																																											
36	7.07	524	34-44	34-44	Special conditions only																																																											
42	9.62	685	34-44	34-44	Special conditions only																																																											
48	12.57	867	34-44	34-44	Special conditions only																																																											
54	15.90	1070	48-54	48-54	Special conditions only																																																											
60	19.63	1296	48-54	48-54	Special conditions only																																																											
66	23.76	1542	54-66	54-66	Special conditions only																																																											
72	28.27	1810	54-66	54-66	Special conditions only																																																											
78	33.18	2098	66-78	66-78	Special conditions only																																																											
84	38.48	2410	66-78	66-78	Special conditions only																																																											
90	44.18	2565	66-78	66-78	Special conditions only																																																											
96	50.27	2910	78-96	78-96	Special conditions only																																																											
102	56.75	3075	78-96	78-96	Special conditions only																																																											
108	63.62	3690	78-96	78-96	Special conditions only																																																											

NOTES: All reinforcement shall be electrically welded cold drawn steel wire fabric. Circular reinforcement shall lap in accordance to A.A.S.H.O. M170. All circular, longitudinal and elliptical reinforcement shall be assembled and securely fastened in cage fashion so as to maintain reinforcement in exact shape and correct positions within the forms. Laying length of pipe: 12" to 66" (incl.) = Not less than 4 feet. 66" to 108" (incl.) = Not less than 6 feet. Furnishing and installing fasteners and tie bolts shall be included in price bid for R.C.P. Culverts.



A_i, A_e, A_o = Minimum circumferential reinforcement required in square inches per lineal foot of pipe.
 A_r = Minimum radial reinforcement required in square inches per square foot of pipe.
 N = Minimum number of rows of radial reinforcing at top and bottom of pipe.
 S = Maximum circumferential spacing of rows of radial reinforcing.

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