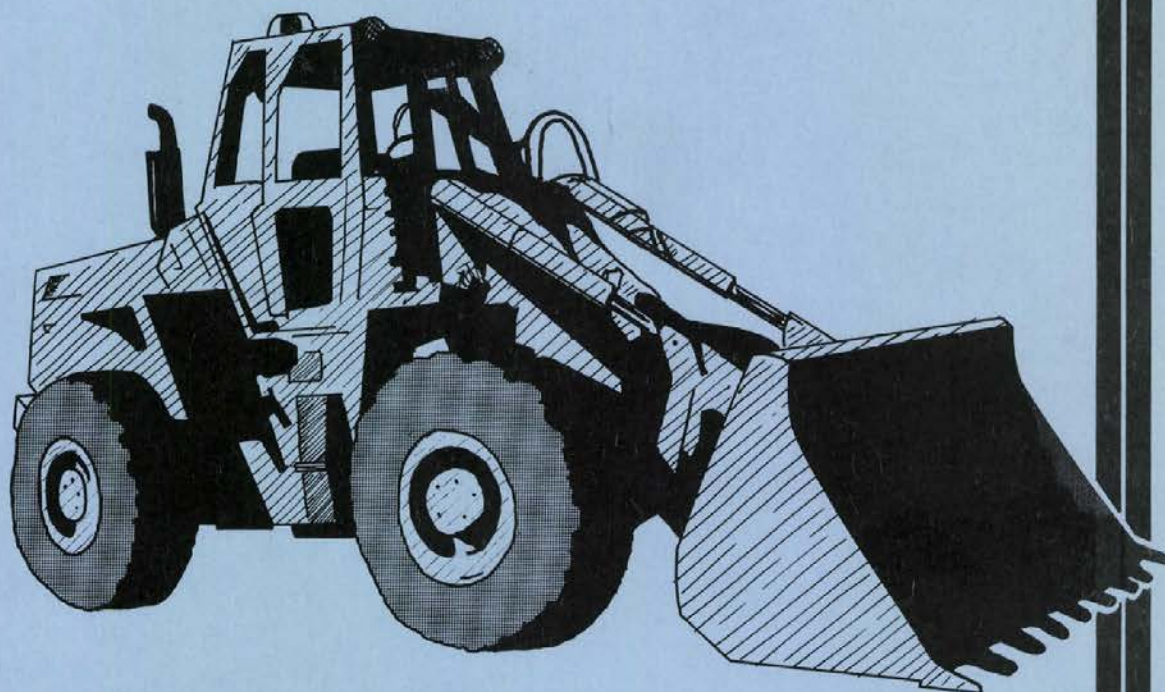


STATE OF NEVADA
STANDARD PLANS
FOR
ROAD AND BRIDGE
CONSTRUCTION



1987

NEVADA

**DEPARTMENT OF
TRANSPORTATION**



DEPARTMENT OF TRANSPORTATION
CARSON CITY, NEVADA 89712

STANDARD PLANS

FOR ROAD AND BRIDGE CONSTRUCTION



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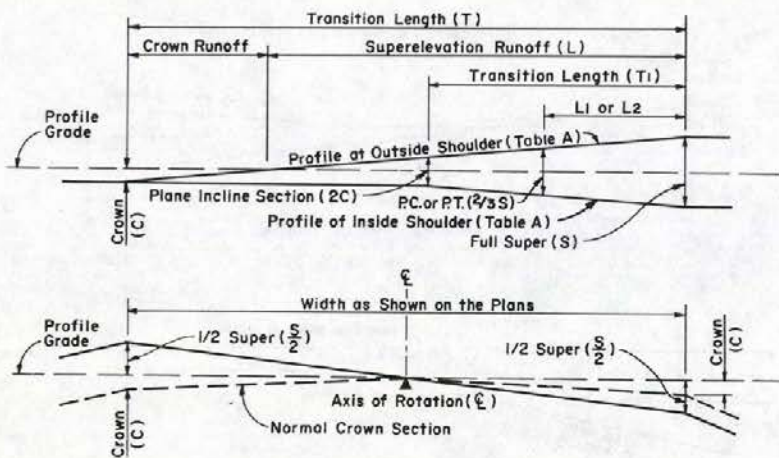
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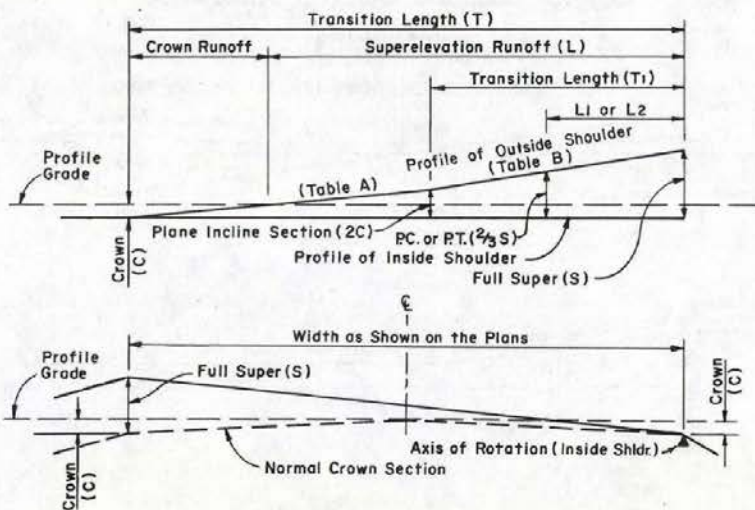
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CASE NO. 1 — ROTATION ABOUT CENTER LINE



CASE NO. 2 — ROTATION ABOUT INSIDE SHOULDER

SUPERELEVATION TRANSITION

FORMULAE

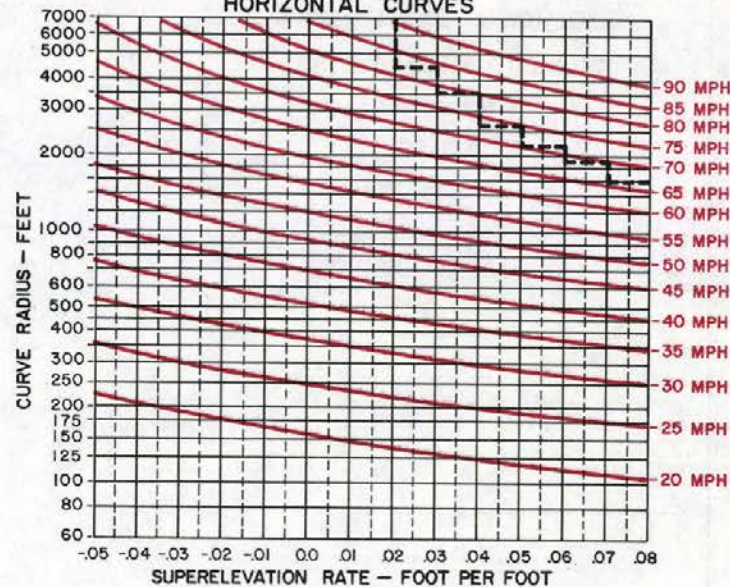
TABLE A Rate of Easement Ft. per Ft.	TABLE B Rate of Easement Ft. per Ft.	Length in Feet
.004	.008	$T = 250 \left(\frac{S}{2} + C \right)$
.004	.008	$T = 250 \left(\frac{S}{2} - C \right)$
.004	.008	$L = 125 S$
.004	.008	$L = \frac{S}{.024}$
.004	—	$L_2 = T - 250 \left(\frac{2}{3} S \right)$

WHERE:
 S—FULL SUPERELEVATION (FT.)
 C—CROWN (FT.)
 T—TOTAL LENGTH OF TRANSITION
 T₁—TRANSITION LENGTH—PLANE INCLINE SECTION TO FULL SUPER.
 L—TOTAL LENGTH OF SUPERELEVATION RUNOFF.
 L₁—LENGTH FROM P.C. TO P.T. TO FULL SUPERELEVATION WHERE SUPER RATE IS .03 FT. PER FT. OR GREATER.
 L₂—LENGTH FROM P.C. OR P.T. TO FULL SUPERELEVATION WHERE SUPER RATE IS LESS THAN .03 FT. PER FT.

SPEED	FRICTION FACTOR
30	0.16
40	0.15
50	0.14
55	0.13 (INTERPOLATED)
60	0.12
70	0.10
80	0.08
90	0.06

- ALL CURVES SHALL BE SUPERELEVATED AS SHOWN UNLESS OTHERWISE NOTED ON PLANS.
- THE AXIS OF ROTATION SHALL BE THE CENTER LINE OF THE ROADBED ON GRADES OF ONE PERCENT OR GREATER AND SHALL BE THE INSIDE SHOULDER ON GRADES FLATTER THAN ONE PERCENT.
- SUPERELEVATION MAY CAUSE DRAINAGE POCKETS WHERE EASEMENT OCCURS. DRAINAGE SHALL BE CHECKED AND POCKETS ELIMINATED BY CONSTRUCTING ROADWAY DITCHES TO GRADE, CHANGING THE AXIS OF ROTATION, OR, IN EXTREME CASES, BY INSTALLING PIPE GULLVERTS.
- SHORT VERTICAL CURVES SHALL BE INSERTED BY EYE ADJUSTMENT OF STAKES AT BEGINNING AND END OF EASEMENT.
- WHEN THE TANGENT BETWEEN CURVES IS TOO SHORT TO PERMIT EASEMENT LENGTHS SHOWN, THE TRANSITION MAY BE EXTENDED ONTO THE CURVE OR THE EASEMENT LENGTH MAY BE DECREASED.

LIMITING SPEED ON HORIZONTAL CURVES



NOTE: BROKEN LINE INDICATES STANDARD SUPERELEVATION RATE. HIGHER VALUE AT STEPS IS THE PROPER SUPERELEVATION FOR INDICATED CURVE RADIUS.

DESIGN SPEED (MPH)	MINIMUM RADIUS USING MAXIMUM SUPER. (.08) (FEET)	*MINIMUM RADIUS USING NORMAL CROWN (-2%) (FEET)
30	250	430
40	470	825
50	760	1400
55	965	1850
60	1200	2450
70	1825	4100
80	2700	7200

*NORMAL CROWN MAY BE USED ON CITY STREETS WHERE SPEED IS CONTROLLED

$$E + F = \frac{0.067V^2}{R}$$

E=SUPERELEVATION
 F=FRICTION FACTOR
 V=SPEED IN MILES PER HOUR
 R=RADIUS IN FEET

STATE OF NEVADA
 DEPARTMENT OF TRANSPORTATION

**SUPERELEVATION
 2-LANE**

Chief Road Design Engr. *[Signature]* R-SI.1-(000)
 ADOPTED 1/79 REVISION 1/86

FORMULAE

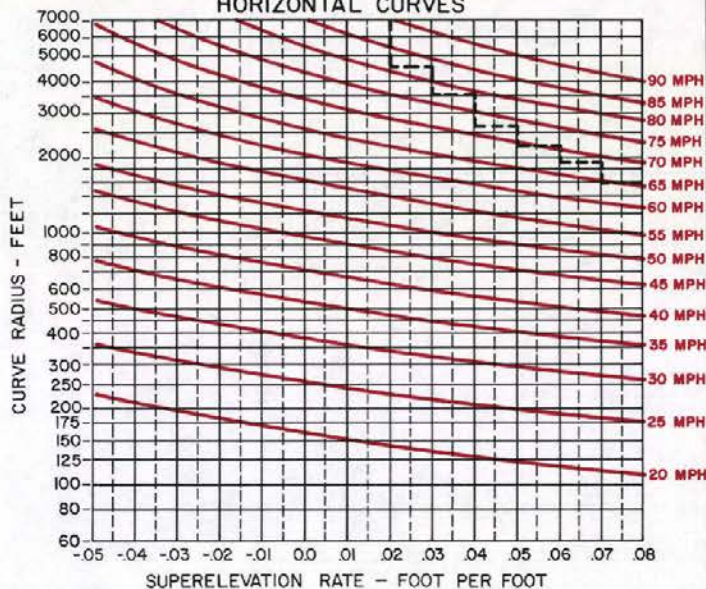
Rate of Easement TABLE A ft per ft.	TABLE B ft. per ft.	Length in Feet
.005	.01	$T = 200 (\frac{S}{2} + C)$
.005	.01	$T_1 = 200 (\frac{S}{2} - C)$
.005	.01	$L = 100 S$
.005	.01	$L_1 = \frac{S}{.03}$
.005	-	$L_2 = T - 200 (\frac{S}{3})$

WHERE:
 S=FULL SUPERELEVATION (FT.)
 C=CROWN (FT.)
 T=TOTAL LENGTH OF TRANSITION
 T₁=TRANSITION LENGTH-PLANE INCLINE SECTION TO FULL SUPER.
 L=TOTAL LENGTH OF SUPERELEVATION RUNOFF.
 L₁=LENGTH FROM P.C. OR P.T. TO FULL SUPERELEVATION WHERE SUPER RATE IS .03 FT. PER FT. OR GREATER.
 L₂=LENGTH FROM P.C. OR P.T. TO FULL SUPERELEVATION WHERE SUPER RATE IS LESS THAN .03 FT. PER FT.

SPEED	FRICITION FACTOR
30	0.16
40	0.15
50	0.14
55	0.13 (INTERPOLATED)
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- SUPERELEVATION MAY CAUSE DRAINAGE POCKETS WHERE EASEMENT OCCURS. DRAINAGE SHALL BE CHECKED AND POCKETS ELIMINATED BY CONSTRUCTING ROADWAY DITCHES TO GRADE. CHANGING THE AXIS OF ROTATION, OR, IN EXTREME CASES, BY INSTALLING PIPE CULVERTS.
- SHORT VERTICAL CURVES SHALL BE INSERTED BY EYE ADJUSTMENT OF STAKES AT BEGINNING AND END OF EASEMENT.
- WHEN THE TANGENT BETWEEN CURVES IS TOO SHORT TO PERMIT EASEMENT LENGTHS SHOWN, THE TRANSITION MAY BE EXTENDED ONTO THE CURVE OR THE EASEMENT LENGTH MAY BE DECREASED.

LIMITING SPEED ON HORIZONTAL CURVES



NOTE: BROKEN LINE INDICATES STANDARD SUPERELEVATION RATE. HIGHER VALUE AT STEPS IS THE PROPER SUPERELEVATION FOR INDICATED CURVE RADIUS.

DESIGN SPEED (MPH)	MINIMUM RADIUS USING MAXIMUM SUPER. (.08) (FEET)	*MINIMUM RADIUS USING NORMAL CROWN (-2%) (FEET)
30	250	430
40	470	825
50	750	1400
55	965	1850
60	1200	2450
70	1825	4100
80	2700	7200

*NORMAL CROWN MAY BE USED ON CITY STREETS WHERE SPEED IS CONTROLLED

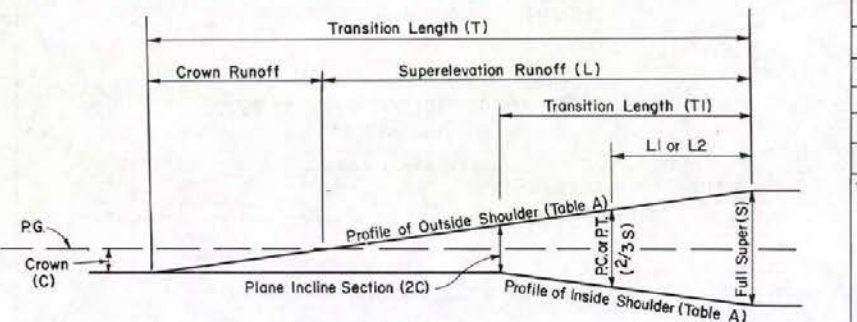
$$E = \frac{0.067V^2}{R}$$

E=SUPERELEVATION
 F=FRICITION FACTOR
 V=SPED IN MILES PER HOUR
 R=RADIUS IN FEET

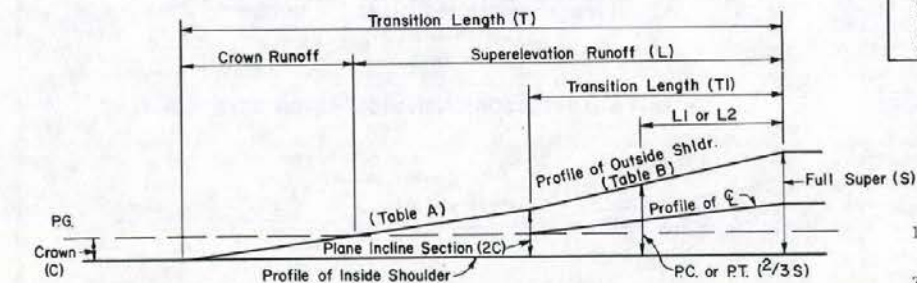
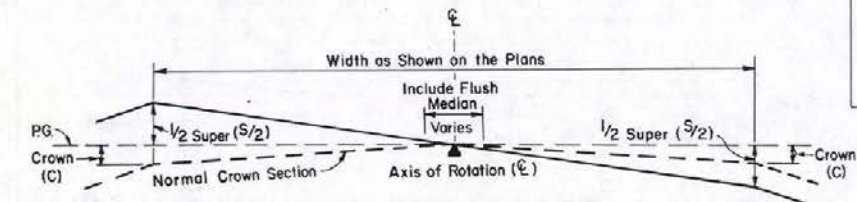
STATE OF NEVADA
 DEPARTMENT OF TRANSPORTATION

**SUPERELEVATION
 MULTI-LANE, UNDIVIDED**

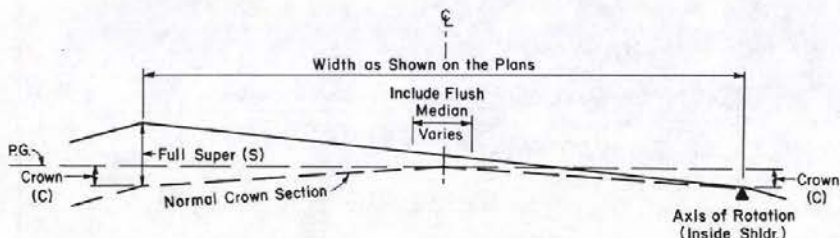
ADOPTED 1/79
 REVISION 4-11/86
 R-S-1.2-(000)



CASE NO.1 - ROTATION ABOUT CENTER LINE



CASE NO.2 - ROTATION ABOUT INSIDE SHOULDER



SUPERELEVATION TRANSITION

R2

DESIGN SPEED (MPH)	MINIMUM RADIUS USING MAXIMUM SUPER. (.08) (FEET)	*MINIMUM RADIUS USING NORMAL CROWN (-2%) (FEET)
30	250	430
40	470	825
50	760	1400
55	965	1850
60	1200	2450
70	1825	4100
80	2700	7200

*NORMAL CROWN MAY BE USED ON CITY STREETS WHERE SPEED IS CONTROLLED

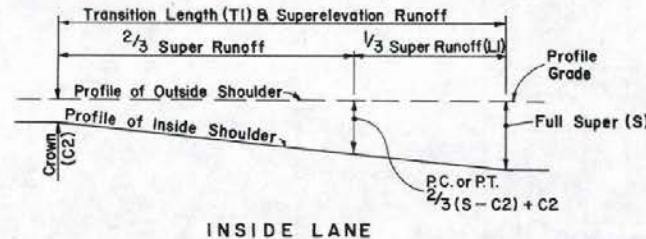
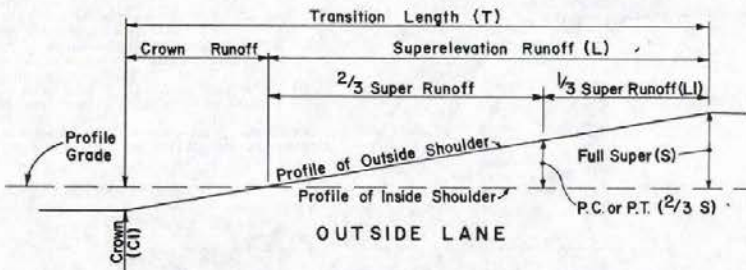
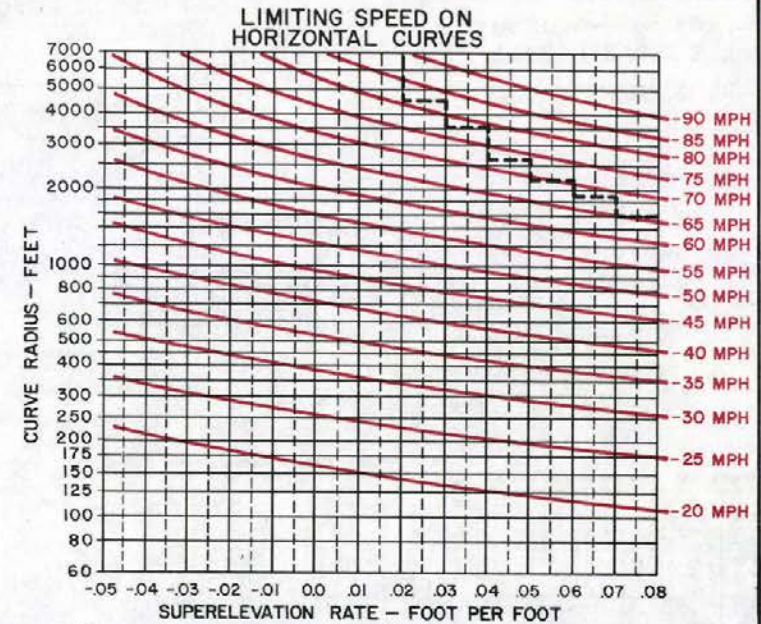
FORMULAE

WHERE:			
S	- FULL SUPERELEVATION (FT.)		
C ₁ & C ₂	- CROWN (FT.)		
T	- TOTAL LENGTH OF TRANSITION		
T ₁	- TOTAL LENGTH OF TRANSITION AND SUPERELEVATION RUNOFF		
L	- TOTAL LENGTH OF SUPERELEVATION RUNOFF		
L ₁	- LENGTH FROM P.C. OR P.T. TO FULL SUPERELEVATION		

OUTSIDE LANE		INSIDE LANE	
Rate of Easement	Length in Feet	Rate of Easement	Length in Feet
.005	T = 200 (S + C ₁)	.005	T ₁ = 200 (S - C ₂)
.005	L = 200 S	.005	L ₁ = $\frac{S - C_2}{.015}$
.005	L ₁ = $\frac{S}{.015}$		

GENERAL NOTES

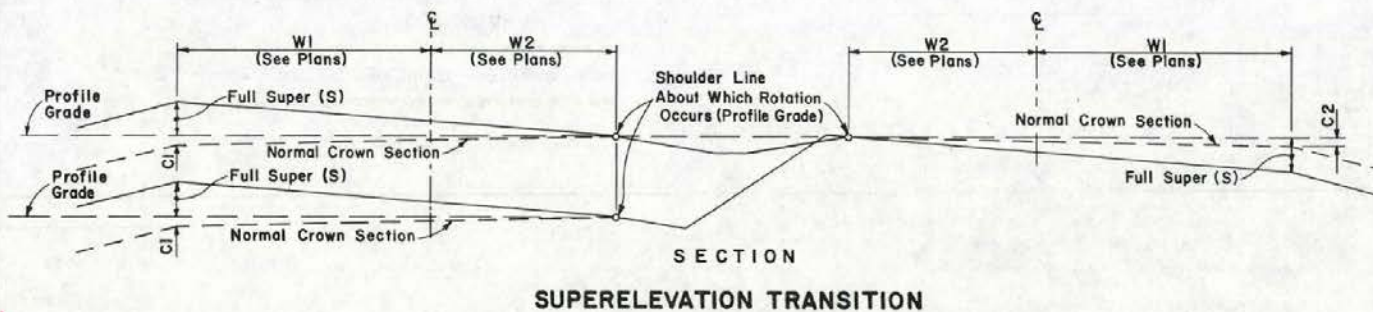
- ALL CURVES SHALL BE SUPERELEVATED AS SHOWN UNLESS OTHERWISE NOTED ON PLANS.
- SUPERELEVATION MAY CAUSE DRAINAGE POCKETS WHERE EASEMENT OCCURS. DRAINAGE SHALL BE CHECKED AND POCKETS ELIMINATED BY CONSTRUCTING ROADWAY DITCHES TO GRADE, CHANGING THE AXIS OF ROTATION, OR, IN EXTREME CASES, BY INSTALLING PIPE CULVERTS.
- SHORT VERTICAL CURVES SHALL BE INSERTED BY EYE ADJUSTMENT OF STAKES AT BEGINNING AND END OF EASEMENT.
- WHEN THE TANGENT BETWEEN CURVES IS TOO SHORT TO PERMIT EASEMENT LENGTHS SHOWN, THE TRANSITION MAY BE EXTENDED ONTO THE CURVE OR THE EASEMENT LENGTH MAY BE DECREASED.



$$E + F = \frac{0.067V^2}{R}$$

E = SUPERELEVATION
F = FRICTION FACTOR
V = SPEED IN MILES PER HOUR
R = RADIUS IN FEET

SPEED	FRICTION FACTOR
30	0.16
40	0.15
50	0.14
55	0.13 (INTERPOLATED)
60	0.12
70	0.10
80	0.08
90	0.06



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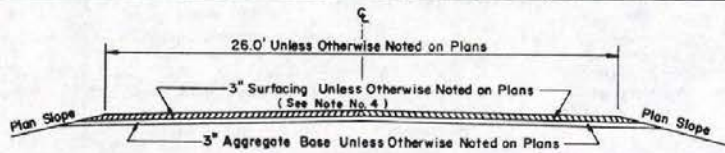
SUPERELEVATION MULTI-LANE, DIVIDED

ADOPTED 1/79 REVISION 2-11/84

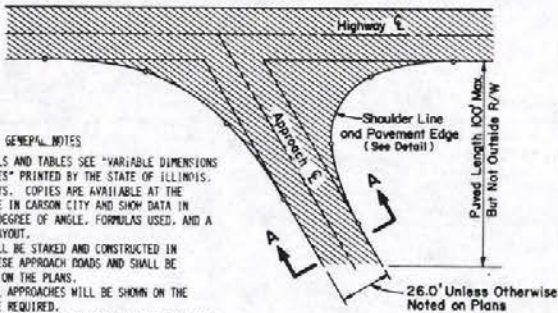
R-SI.3-(000)

CHIEF ROAD DESIGN ENGR.

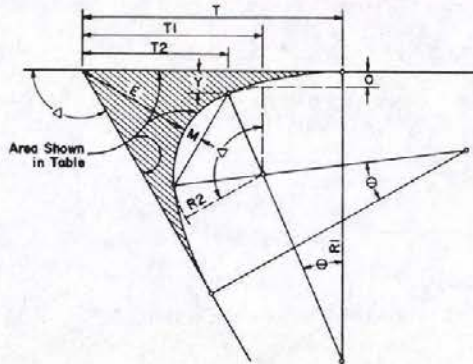
R 3



SECTION A-A



PLAN



DETAIL OF PAVEMENT EDGE

TYPE I APPROACH

DIMENSIONS FOR 3-CENTERED CURVES

TYPE 1-P APPROACH (PASSENGER)

Δ	Θ	R1	R2	O	Y	T2	T1	T	E	M	AREA*	AREA*
DEGREE	DEGREE										SQ FT	SQ YD
60	13°15.66'	100	25	2.0	2.67	9.86	15.59	52.79	6.48	1.06	106.9	12.1
70	13°15.66'	100	25	2.0	2.67	13.17	18.91	36.11	7.96	1.78	145.8	16.0
80	13°15.66'	100	25	2.0	2.67	16.92	22.66	39.86	10.25	2.67	190.5	21.2
90	14°21.72'	100	20	2.5	3.13	17.54	22.50	42.34	11.82	2.79	216.6	24.1
100	14°21.72'	100	20	2.5	3.13	21.85	26.81	46.66	15.00	3.75	270.3	31.0
110	14°21.72'	100	20	2.5	3.13	27.17	32.13	51.98	19.23	4.62	365.5	40.4
120	12°50.34'	100	20	2.0	2.50	33.66	38.11	55.88	24.00	6.40	437.0	48.6

TYPE 1-SU APPROACH (SINGLE UNIT)

Δ	Θ	R1	R2	O	Y	T2	T1	T	E	M	AREA*	AREA*
DEGREE	DEGREE										SQ FT	SQ YD
60	13°15.66'	120	45	2.0	3.20	16.82	27.14	44.34	9.27	1.91	224.0	24.9
70	13°15.66'	120	45	2.0	3.20	22.59	32.91	50.11	12.38	3.20	318.7	35.4
80	13°15.66'	120	45	2.0	3.20	29.12	35.44	56.64	16.35	4.81	448.8	49.9
90	12°50.34'	120	40	2.0	3.00	35.11	42.00	59.78	19.40	6.14	515.0	57.7
100	12°50.34'	100	35	3.0	4.62	30.78	45.29	64.81	24.12	5.49	669.2	74.3
110	12°50.34'	100	35	3.0	4.62	43.76	54.27	73.79	31.25	7.24	903.6	100.4
120	21°07.22'	100	30	5.0	7.14	49.49	60.62	86.60	40.00	6.43	1226.4	136.3

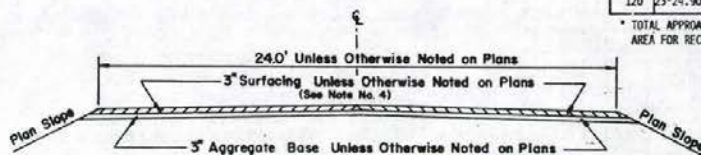
TYPE 1-C43 APPROACH (SEMI-TRAILER COMBINATION INTERMEDIATE)

Δ	Θ	R1	R2	O	Y	T2	T1	T	E	M	AREA*	AREA*
DEGREE	DEGREE										SQ FT	SQ YD
60	18°47.82'	120	45	4.0	6.40	13.79	28.29	52.46	11.58	0.86	350.0	38.9
70	18°47.82'	120	45	4.0	6.40	19.81	34.31	58.48	14.02	1.79	468.5	52.1
80	18°47.82'	120	45	4.0	6.40	26.62	41.12	65.28	18.97	3.05	625.2	69.5
90	20°11.84'	120	40	5.0	7.50	31.08	45.00	72.84	23.64	3.64	812.4	90.3
100	22°37.20'	100	35	5.0	7.69	34.21	47.67	72.67	27.23	3.92	873.5	97.1
110	22°37.20'	100	35	5.0	7.69	43.66	57.13	82.13	34.74	5.44	1144.8	127.2
120	22°51.84'	100	30	5.5	7.86	49.83	61.49	88.69	41.00	6.08	1294.3	143.8

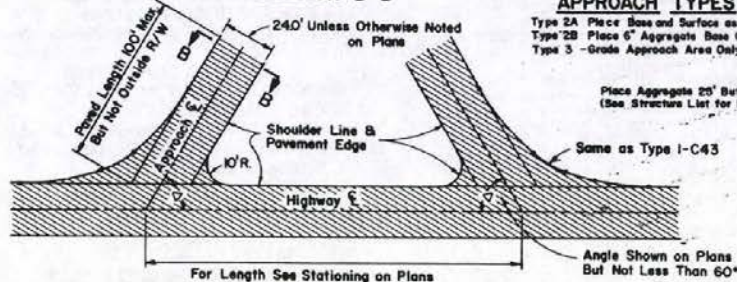
TYPE 1-C50 APPROACH (SEMI-TRAILER COMBINATION LARGE)

Δ	Θ	R1	R2	O	Y	T2	T1	T	E	M	AREA*	AREA*
DEGREE	DEGREE										SQ FT	SQ YD
60	13°35.40'	200	75	3.5	5.69	27.70	45.32	74.70	15.64	3.05	639.1	71.0
70	19°05.46'	150	50	5.5	8.25	22.51	38.86	71.57	17.75	4.32	686.9	76.3
80	19°05.46'	150	50	5.5	8.25	30.22	46.57	79.28	22.45	5.29	806.6	99.6
90	18°11.70'	150	50	5.0	7.50	39.30	55.00	86.23	27.78	5.37	1111.4	123.5
100	19°47.70'	150	40	6.5	8.86	41.87	55.42	92.67	32.34	5.43	1280.0	142.2
110	19°47.70'	150	40	6.5	8.86	52.86	66.41	103.66	41.07	7.32	1651.5	183.5
120	23°24.90'	120	35	7.0	9.88	58.84	72.75	106.53	49.00	6.90	1860.4	206.7

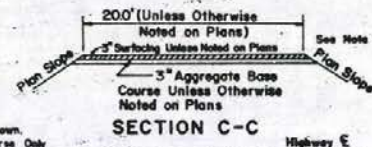
* TOTAL APPROACH AREA EQUALS AREA SHOWN IN TABLE FOR 180° MINUS PLUS PAVEMENT AREA FOR RECTANGULAR PORTION OF APPROACH.



SECTION B-B



SERVICE TYPE APPROACH



SECTION C-C

APPROACH TYPES

- Type 2A Place Base and Surface as Shown
- Type 2B Place 6" Aggregate Base Course Only
- Type 3 - Grade Approach Area Only

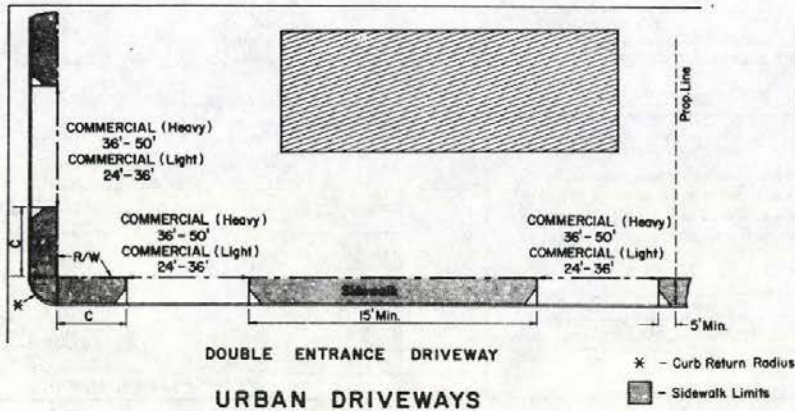
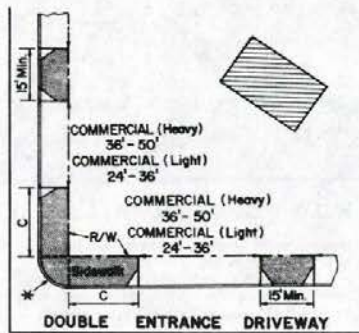
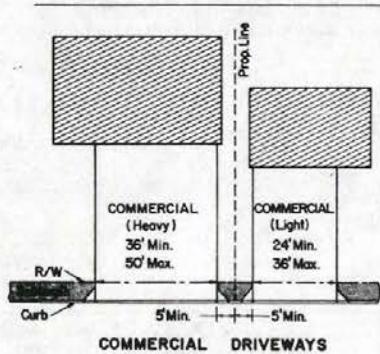
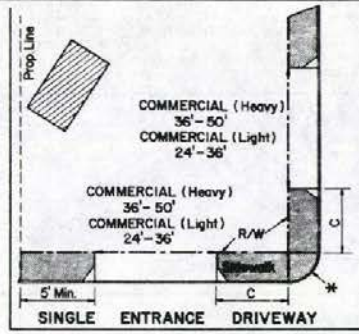
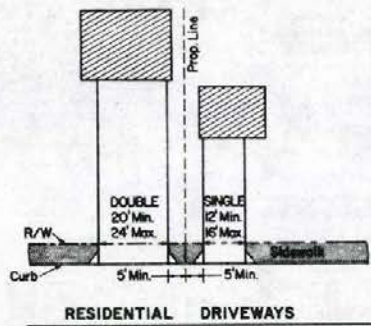
Place Aggregate 20" But Not Outside R/W (See Structure List for Length)

TYPE 2 & 3 APPROACHES

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

**TYPES 1, 2 AND 3
APPROACH ROADS**

REVISED 1-5-82
ADOPTED 8-88
R-52.1-(000)

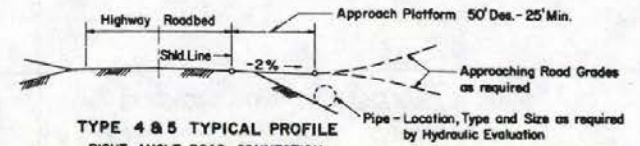
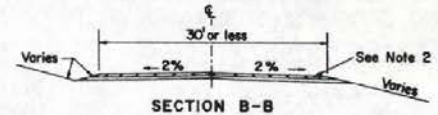
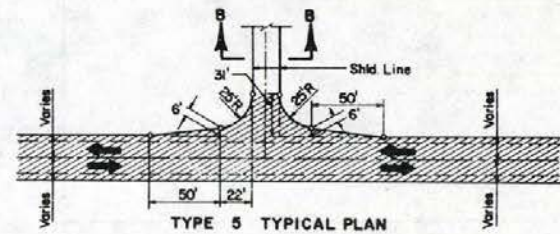
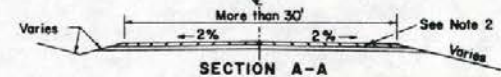
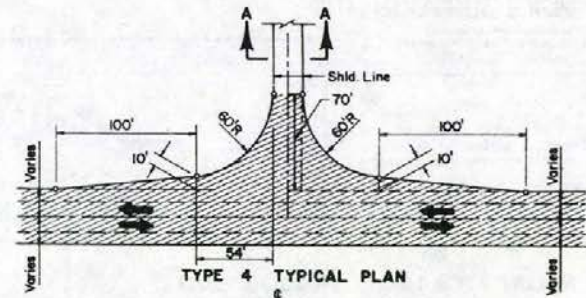


MINIMUM CORNER CLEARANCE (C)

CURB RADIUS	CLEARANCE (C)
UNDER 25'	10'
25' TO 60'	5'
OVER 60'	0'

1. REFER TO STANDARD SHEET R-5.1.1 FOR DESIGN AND TYPES OF CURB AND GUTTER AND DRIVEWAYS.

* FOR DESIRABLE CORNER CLEARANCE, CURB RADIUS SHALL BE CHECKED WITH TURNING TEMPLATE FOR THE DESIGN VEHICLE.



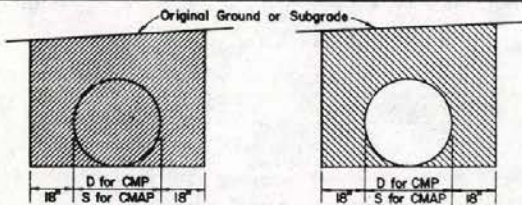
TYPE 4 AND 5 APPROACHES

- REFER TO STANDARD SHEET R-5.2.1 FOR TYPE 1, 2 AND 3 APPROACH DESIGN.
- MINIMUM DEPTH OR BASE AND SURFACE SHALL BE 4 INCHES AND 5 INCHES RESPECTIVELY. THICKER LIFTS SHALL BE SHOWN IN THE PLANS.
- APPROACHES TO BE PAVED TO THE THROAT OR RIGHT-OF-WAY, WHICHEVER OCCURS FIRST, UNLESS OTHERWISE NOTED ON THE PLANS.
- APPROACHES MAY REQUIRE THE STANDARD STOP SIGNS AND STOP BARS AS DIRECTED BY ENGINEER.

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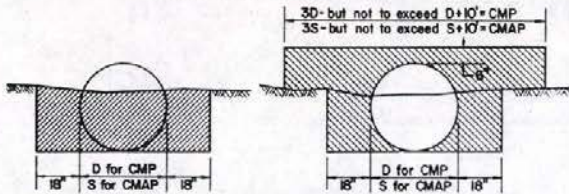
**TYPE 4 AND TYPE 5
APPROACH ROAD-URBAN
DRIVEWAY LOCATION DETAILS**

R-92.2 (000)
ADOPTED: 6/75 REVISION: 3-1/78

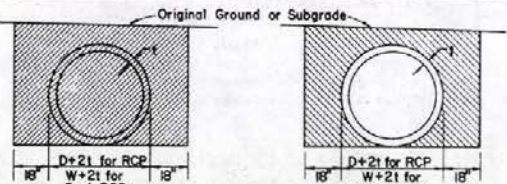


CULVERT IN EXCAVATION

Excavation Depth is Less than 5 feet

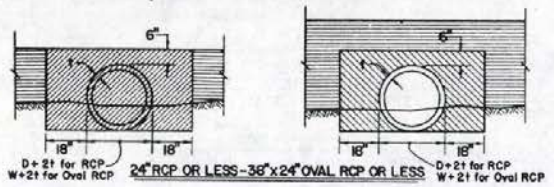


**CULVERT IN EMBANKMENT
CMP OR CMAP CULVERTS**

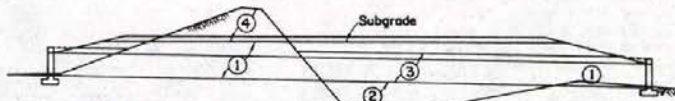


CONCRETE PIPE CULVERT IN EXCAVATION

All RCP and Oval RCP sizes
Excavation Depth is Less than 5 feet

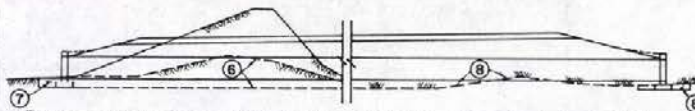


**CONCRETE PIPE CULVERT IN EMBANKMENT
(METHOD A)**



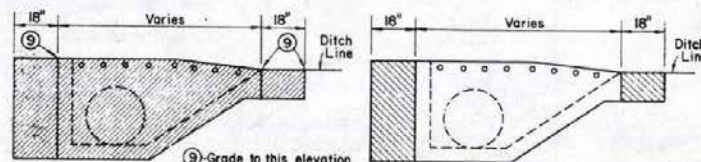
- ① Structure Excavation and Backfill in excavation to be paid below subgrade and within designated limits.
- ② Embankment to be constructed to flowline prior to installation.
- ③ Backfill in embankment to be paid from flowline to the designated maximum limits.
- ④ Roadway Excavation to be paid to subgrade.

CULVERT INSTALLATION IN ROUGH TERRAIN



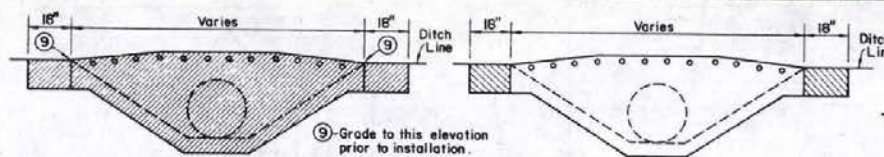
- ⑥ CMP or RCP - When the pipe is laid in a trench in rock, hard clay, shale or other hard material, the unsuitable material shall be removed to a depth of not less than 6" for RCP & 12" for CMP below the bottom of the pipe grade and the trench backfilled with suitable material. In no place shall the pipe be laid directly on unsuitable material.
- ⑦ No additional excavation is necessary under headwalls when rock or other hard material is encountered.
- ⑧ When a firm foundation is not encountered, all soft, spongy or other unsuitable material under the culvert shall be removed, and the space filled with Foundation Fill. (Depth of Foundation Fill as indicated on the plans or ordered by the Engineer, but not less than 1'-6").

CULVERT INSTALLATION WITH UNSUITABLE FOUNDATIONS



⑨ Grade to this elevation prior to installation.

TYPE 7 DROP INLET

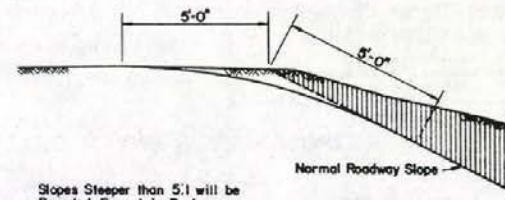


⑨ Grade to this elevation prior to installation.

TYPE 8 DROP INLET

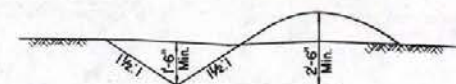
LEGEND

- | | | | | | |
|--|----------------------|--|--------------------|--|---------------------|
| | STRUCTURE EXCAVATION | | ROADWAY EXCAVATION | | DRAINAGE EXCAVATION |
| | GRANULAR BACKFILL | | CHANNEL EXCAVATION | | ROADWAY EMBANKMENT |



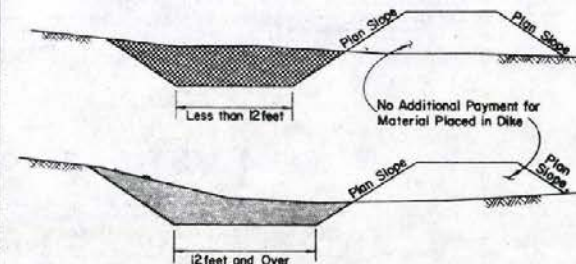
Slopes Steeper than 5:1 will be Rounded Except in Rock.

ROUNDED OR TRANSITION SLOPES



Dike Material Placed on the Downhill side is Included in the Price for Ditching.

V-TYPE DITCH AND DIKE



FLAT BOTTOM DITCH EXCAVATION

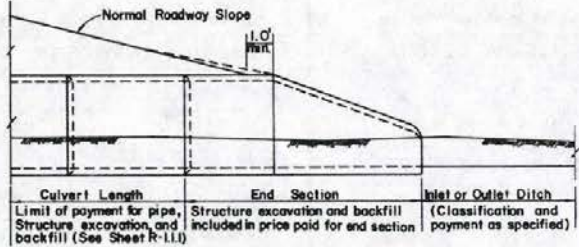
GENERAL NOTES

1. Excavation for Multiple Pipes, or RCB Installations Exceeding 12 feet in Width Will Be Paid as Channel or Roadway Excavation.

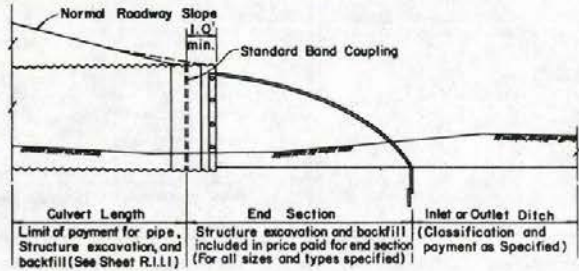
STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

**STRUCTURE EXCAVATION
& BACKFILL
(METHOD OF MEASUREMENT)**

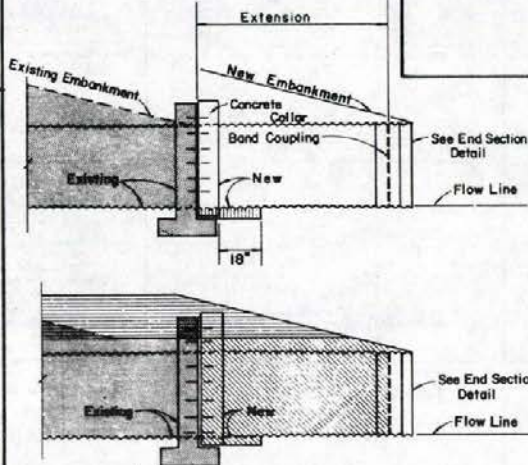
R-LLI-(206,207)
ADOPTED: 8/69 REVISION: 4-8/82
R. L. L. I. (206,207)
CHIEF ROAD DESIGN ENGINEER



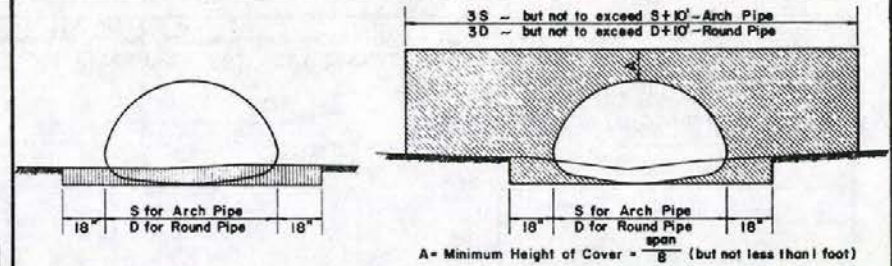
PRECAST CONCRETE END SECTIONS



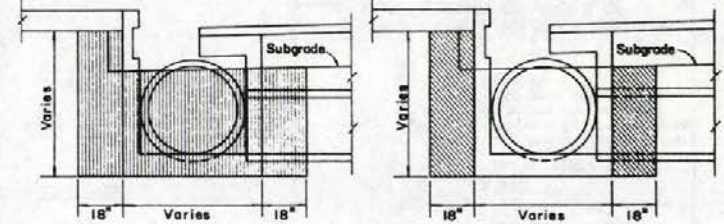
PREFABRICATED METAL END SECTION
(Type 3 Connection)



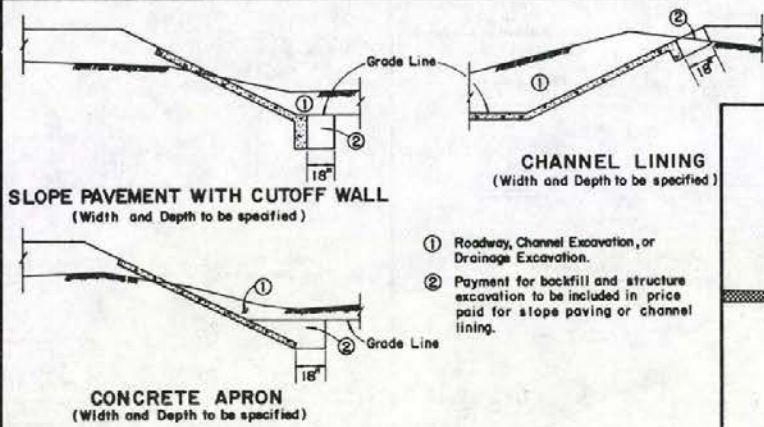
CULVERT EXTENSION OF EXISTING HEADWALL
(SEE SHEET R-2.1.1)



STRUCTURAL PLATE PIPE

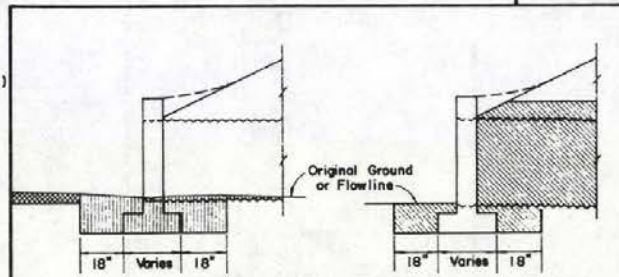


DROP INLETS IN EXCAVATION
(Type 3 Drop Inlet Illustrated)

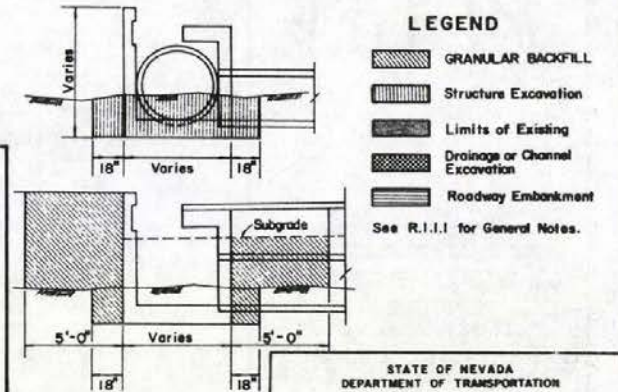


CHANNEL LINING AND SLOPE PAVEMENT

- ① Roadway, Channel Excavation, or Drainage Excavation.
- ② Payment for backfill and structure excavation to be included in price paid for slope paving or channel lining.



CULVERT HEADWALLS

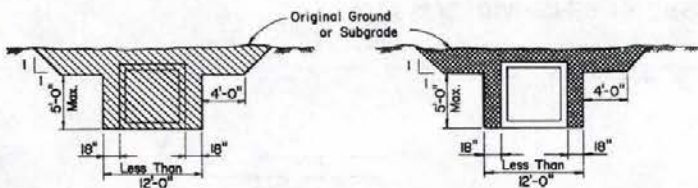


DROP INLETS IN EMBANKMENT
(Type 3 Drop Inlet Illustrated)

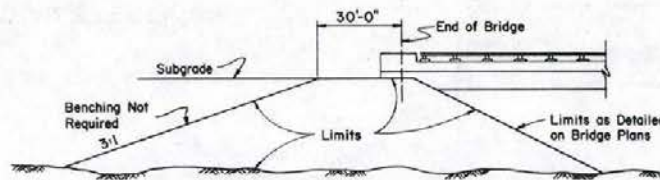
- LEGEND**
- GRANULAR BACKFILL
 - Structure Excavation
 - Limits of Existing
 - Drainage or Channel Excavation
 - Roadway Embankment
- See R.1.1.1 for General Notes.

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION
**STRUCTURE EXCAVATION
AND BACKFILL
(METHOD OF MEASUREMENT)**

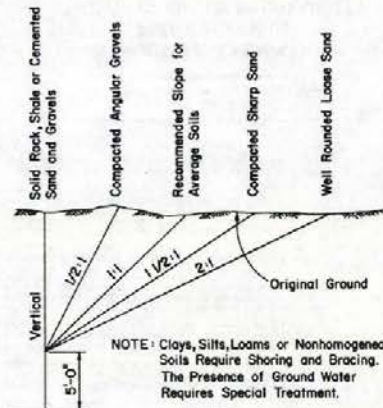
R-1.1.2-(206,207)
REVISION
ADOPTED: 8/98 12-11/82
CHIEF ROAD DESIGN ENGR.



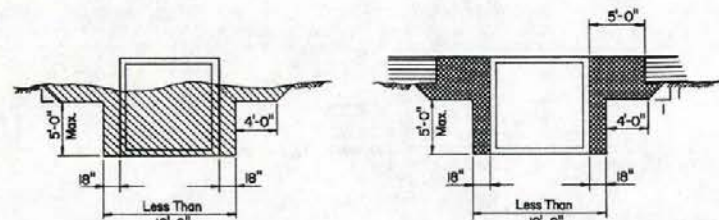
CULVERT IN EXCAVATION



LIMITS OF SELECTED BORROW AT BRIDGE ABUTMENTS



APPROXIMATE ANGLE OF REPOSE FOR SLOPING OF SIDES OF EXCAVATIONS



CULVERT IN EMBANKMENT

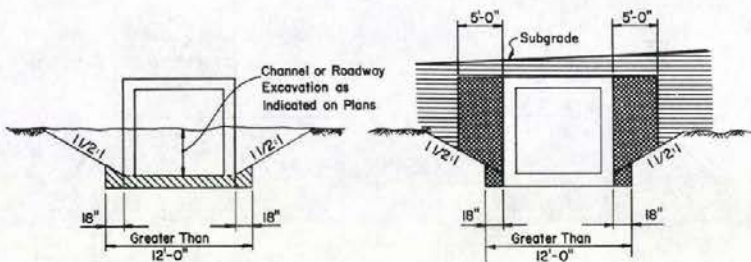
TRENCH SHORING - MINIMUM REQUIREMENTS

Depth of Trench	Kind or condition of earth	Size and spacing of members										
		Uprights		Stringers		Cross Braces				Maximum Spacing		
		Min. Dim.	Max. Spac.	Min. Dim.	Max. Spac.	width of Trench		Maximum Spacing				
Feet		Inches	Feet	Inches	Feet	Inches	Inches	Inches	Feet	Feet		
5 to 10	Hard, compact	3x4 or 2x6	6	-----	-----	2x6	4x4	4x6	6x6	6x8	4	6
	Likely to crack	3x4 or 2x6	3	4x4	4	2x6	4x4	4x6	6x6	6x8	4	6
	Soft, sandy, or filled	3x4 or 2x6	Close Sheeting	4x4	4	4x4	4x6	6x6	6x8	8x8	4	6
10 to 15	Hydrostatic pressure	3x4 or 2x6	Close Sheeting	6x8	4	4x4	4x6	6x6	6x8	8x8	4	6
	Hard	3x4 or 2x6	4	4x4	4	4x4	4x6	6x6	6x8	8x8	4	6
	Likely to crack	3x4 or 2x6	2	4x4	4	4x4	4x6	6x6	6x8	8x8	4	6
15 to 20	Soft, sandy, or filled	3x4 or 2x6	Close Sheeting	4x4	4	4x4	4x6	6x6	6x8	8x10	4	6
	Hydrostatic pressure	3x4	Close Sheeting	8x10	4	4x4	4x6	6x6	6x8	8x10	4	6
	All kinds or conditions	3x4	Close Sheeting	4x12	4	4x12	6x8	8x8	8x10	10x10	4	6
Over 20	All kinds or conditions	3x4	Close Sheeting	6x8	4	4x12	8x8	8x10	10x10	10x12	4	6

Trench Jacks may be used in lieu of, or in combination with, cross braces. Shoring is not required in solid rock, hard shale, or hard slag. Where desirable, steel sheet piling and bracing of equal strength may be substituted for wood.

GENERAL NOTES

- 1) TRENCHES MORE THAN 5 FEET DEEP SHALL BE SHORED, LAID BACK TO AT LEAST THE ANGLE OF REPOSE FOR EXISTING FIELD CONDITIONS, OR SOME OTHER MEANS OF PROTECTION SHALL BE PROVIDED.
- 2) IF UNUSUAL FIELD CONDITIONS INDICATE GROUND MOVEMENT MAY BE EXPECTED, TRENCHES LESS THAN 5 FEET DEEP SHALL ALSO BE PROTECTED AS INDICATED IN NOTE 1.
- 3) FOR THE PURPOSE OF PAYMENT, STRUCTURE EXCAVATION AND BACKFILL QUANTITIES ARE BASED ON THESE STANDARD DRAWINGS AND NO ADDITIONAL PAYMENT WILL BE MADE.
- 4) IF SHORING IS USED, PAYMENT WILL BE MADE FOR STRUCTURE EXCAVATION AND BACKFILL BASED ON THESE STANDARD DRAWINGS AND NO ADDITIONAL PAYMENT WILL BE MADE FOR SHORING.
- 5) MINIMUM REQUIREMENTS FOR SHORING ARE AS SHOWN IN THE TABLE ON THIS SHEET.
- 6) THE QUANTITY OF STRUCTURE EXCAVATION AND BACKFILL MEASURED FOR PAYMENT SHALL BE THE NUMBER OF CUBIC YARDS CALCULATED HEREON AND DUPLICATION OF LIMITS WHICH OVERLAP.



CULVERT IN EXCAVATION OR EMBANKMENT

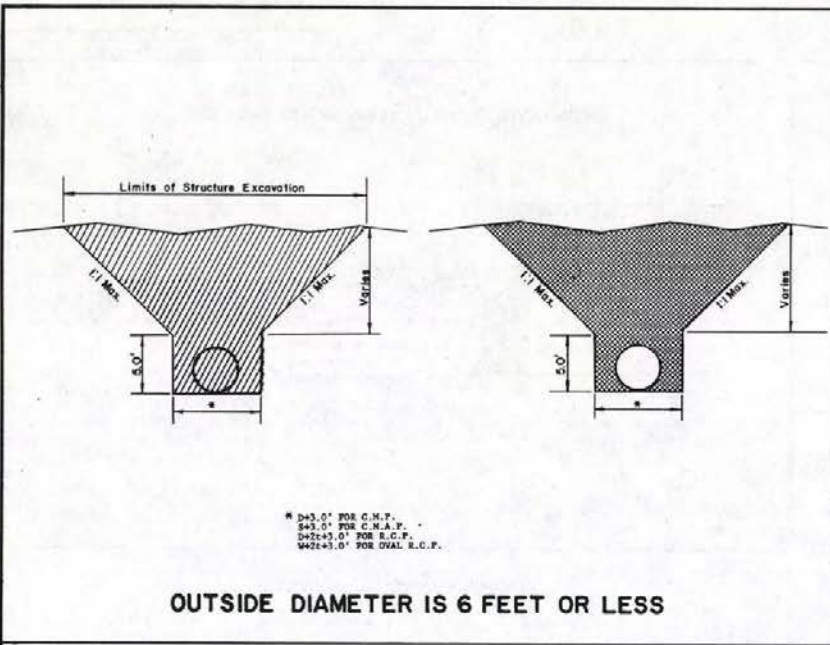
- Structure Excavation
- Granular Backfill
- Roadway Embankment

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

**STRUCTURE EXCAVATION
AND BACKFILL
(METHOD OF MEASUREMENT)**

R-1.1.4 - (206, 207)
ADOPTED 11/73 REVISION 2-4/88

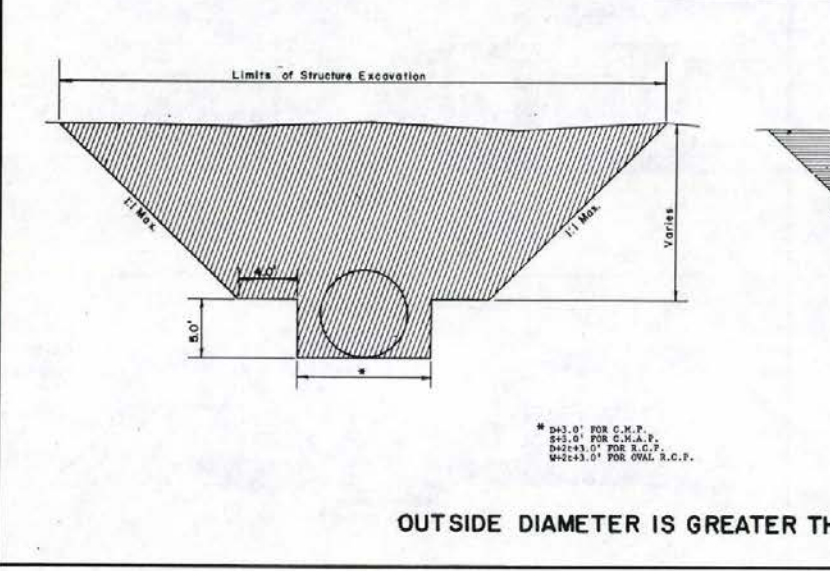
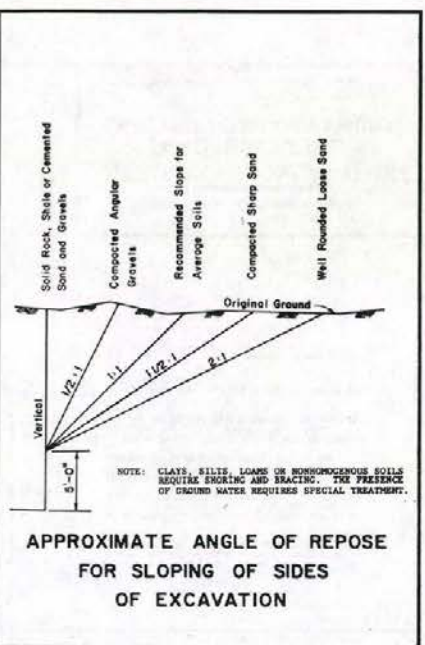
Amos W. Hill
CHIEF ROAD DESIGN ENGINEER



TRENCH SHORING - MINIMUM REQUIREMENTS

Depth of Trench	Kind or Condition of Earth	Size and Spacing of Members											
		Uprights		Stringers		Cross Braces							
		Min. Dia.	Max. Spac.	Min. Dia.	Max. Spac.	Width of Trench				Maximum Spacing			
				Up to 3 Ft.	3 to 4 Ft.	4 to 5 Ft.	5 to 12 Ft.	12 to 15 Ft.	Vars.	Varia.			
5 to 10 Feet	Hard, compact	2x4 or 2x6	6	---	---	2x6	4x4	4x4	4x4	4x4	4x4	4	6
	Likely to crack	2x4 or 2x6	3	4x4	4	2x6	4x4	4x4	4x4	4x4	4x4	4	6
	Soft, sandy, or filled	2x4 or 2x6	Close Sheathing	4x4	4	4x4	4x4	4x4	4x4	4x4	4x4	4	6
10 to 15 Feet	Hydrostatic pressure	2x4 or 2x6	Close Sheathing	4x4	4	4x4	4x4	4x4	4x4	4x4	4x4	4	6
	Hard	2x4 or 2x6	6	4x4	4	4x4	4x4	4x4	4x4	4x4	4x4	4	6
	Likely to crack	2x4 or 2x6	2	4x4	4	4x4	4x4	4x4	4x4	4x4	4x4	4	6
15 to 20 Feet	Soft, sandy, or filled	2x4 or 2x6	Close Sheathing	4x4	4	4x4	4x4	4x4	4x4	4x4	4x10	4	6
	Hydrostatic pressure	2x4	Close Sheathing	4x10	4	4x4	4x4	4x4	4x4	4x10	4	6	
	All kinds or conditions	2x4	Close Sheathing	4x12	4	4x4	4x4	4x4	4x4	4x10	10x10	4	6
Over 20 Feet	All kinds or conditions	2x4	Close Sheathing	4x4	4	4x12	4x4	4x4	4x4	4x10	10x10	4	6

Trench jacks may be used in lieu of, or in combination with, cross braces. Shoring is not required in solid rock, hard shale, or hard silt. Where desirable, steel sheet piling and bracing of equal strength may be substituted for wood.



LEGEND

- Structure Excavation
- Granular Backfill
- Roadway Embankment or Borrow

- GENERAL NOTES**
- 1) TRENCHES MORE THAN 5 FEET DEEP SHALL BE SHORED, LAID BACK TO AT LEAST THE ANGLE OF REPOSE FOR EXISTING FIELD CONDITIONS, OR SOME OTHER MEANS OF PROTECTION SHALL BE PROVIDED.
 - 2) IF HAZARDOUS FIELD CONDITIONS INDICATE GROUND MOVEMENT MAY BE EXPECTED, TRENCHES LESS THAN 5 FEET DEEP SHALL ALSO BE PROTECTED AS INDICATED IN NOTE 1.
 - 3) FOR THE PURPOSE OF PAYMENT, STRUCTURE EXCAVATION AND BACKFILL QUANTITIES ARE BASED ON THESE STANDARD DRAWINGS AND NO ADDITIONAL PAYMENT WILL BE MADE.
 - 4) IF SHORING IS USED, PAYMENT WILL BE MADE FOR STRUCTURE EXCAVATION AND BACKFILL BASED ON THESE STANDARD DRAWINGS AND NO ADDITIONAL PAYMENT WILL BE MADE FOR SHORING.
 - 5) MINIMUM REQUIREMENTS FOR SHORING ARE AS SHOWN IN THE TABLE ON THIS SHEET.
 - 6) THE QUANTITY OF STRUCTURE EXCAVATION AND BACKFILL MEASURED FOR PAYMENT SHALL BE THE NUMBER OF CUBIC YARDS CALCULATED MINUS ANY DUPLICATION OF LIMITS WHICH OVERLAP.
 - 7) GRANULAR BACKFILL TO BE PLACED FOR A DEPTH OF 6" ABOVE THE TOP OF THE PIPE FOR THE WIDTH OF THE TRENCH.

STATE OF NEVADA
 DEPARTMENT OF TRANSPORTATION

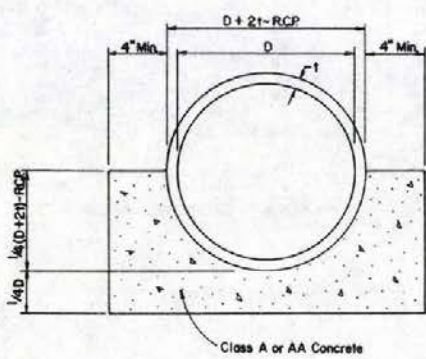
**STRUCTURE EXCAVATION
 AND BACKFILL
 (METHOD OF MEASUREMENT)**

R-1.15 (206, 207)
 ADOPTED 10/72 REVISION 3-777

CHIEF ROAD DESIGN ENGR.

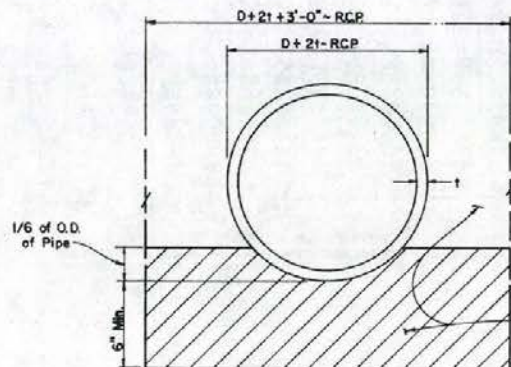
R-10

R-11



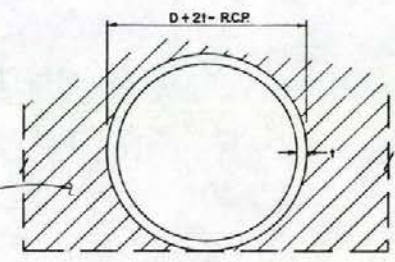
CLASS A BEDDING

Payment for Excavated Area Below the Bottom of the Pipe Grade to be Included in the Unit Bid Price Per Cubic Yard of Concrete.



CLASS B BEDDING

Bedding Shall be Carefully Shaped to Fit Pipe Prior to Installation. No Direct Payment for Shaping the Trench.

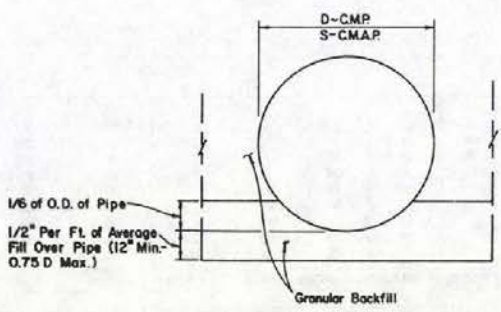


CLASS C BEDDING

BEDDING FOR CONCRETE CULVERT

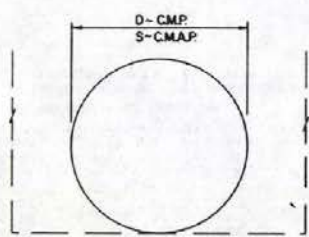
GENERAL NOTES

1. Minimum Depths as Specified in "Culvert Installation With Unsuitable Foundations" on Sheet R-1.1.1, Notes No. 6 & 8 Will Prevail When These Conditions are Encountered.
2. Excavation For Multiple Pipe or RCB Installations Exceeding 12 Feet in Width Shall Be Paid For as Channel Excavation or Roadway Excavation.



CLASS B BEDDING

Bedding Shall be Carefully Shaped to Fit Pipe Prior to Installation. No Direct Payment for Shaping the Trench.



CLASS C BEDDING

BEDDING FOR C.M.P. OR C.M.A.P.

Allowable Fill Height Table For Reinforced Concrete Pipe 24" to 84"

Pipe Class	CLASS II			CLASS III			CLASS IV			CLASS V		
	A	B	C	A	B	C	A	B	C	A	B	C
24"	---	---	---	22	14	11	30	18	15	46	39	23
30"	---	---	---	22	14	11	32	20	16	47	30	23
36"	---	---	---	22	14	11	32	20	16	47	31	24
42"	---	---	---	22	14	11	32	21	16	47	31	24
48"	17	11	9	22	14	11	32	21	16	48	31	24
54"	17	11	10	22	14	12	32	21	17	49	31	24
60"	17	11	10	22	14	12	33	21	17	49	31	25
66"	17	12	11	22	14	13	33	22	17	49	31	25
72"	17	12	11	22	15	13	33	22	17	49	32	25
84"	17	12	11	22	15	14	33	22	17	50	32	25

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

CULVERT BEDDING & ALLOWABLE FILL HEIGHT FOR R.C.P.

R-1.1.6 (803, 804)
ADOPTED: 8/88
6-10-88

2 2/3" x 1/2" ROUND CORRUGATED ALUMINUM PIPE

PIPE DIAMETER	MINIMUM COVER	PLATE THICKNESS				
		IN .060 GA 16	.075 14	.105 12	.135 10	.164 8
INCHES	INCHES	MAX FILL HEIGHTS ABOVE TOP OF PIPE IN FEET				
18	12	30	30	52		
24	12	22	18	31	41	
30	12		15	26	27	
36	12			45	43	
42	12			40	41	43
48	18			35	37	38
54	18				33	34
60	18					31
66	24					28
72	24					

* CORRUGATED ALUMINUM ALLOY PIPE ARCH
2 2/3" x 1/2" CORRUGATIONS

PIPE DIMENSIONS SPAN-RISE	** MIN COVER	CORNER RADIUS	MIN THICKNESS	MAX COVER FOR CORNER PRESSURES 2 TONS PER SQ. FT.
INCHES	INCHES	INCHES	INCHES	FEET
18 x 11	18	4	0.060	15
22 x 13	18	4	0.060	14
25 x 16	18	4	0.060	12
29 x 18	18	4 1/2	0.060	10
36 x 22	18	5	0.060	9
43 x 27	18	5 1/2	0.075	9
50 x 31	18	6	0.105	8
58 x 36	18	7	0.135	8
65 x 40	18	8	0.135	8
72 x 44	18	9	0.164	8

EQUIVALENT GAGE NUMBER	THICKNESS IN INCHES		
	STEEL		AL
	ZN COAT	UNCOATED	
16	0.064	0.0598	0.060
14	0.079	0.0747	0.075
12	0.109	0.1046	0.105
10	0.138	0.1345	0.135
8	0.168	0.1644	0.164
7	0.188	0.1835	
5	0.218	0.2145	
3	0.249	0.2451	
1	0.280	0.2758	

* Riveted Or Helical Fabrication
** Top Of Pipe To Top Of Finished Grade At Shoulder Line For 2 Tons Per Sq. Ft.

3" x 1" ROUND CORRUGATED ALUMINUM PIPE

PIPE DIAMETER	MIN COVER	PLATE THICKNESS				
		IN .060 GA 16	.075 14	.105 12	.135 10	.164 8
INCHES	INCHES	MAX FILL HEIGHTS ABOVE TOP OF PIPE IN FT.				
30	12	33	41	56	70	
36	12	28	34	47	58	
42	18	24	24	40	52	
48	18	21	27	35	48	50
54	18	18	23	31	46	47
60	24	17	21	28	28	45
66	24		19	25	38	44
72	24		17	23	35	44
78	24			22	32	42
84	24			20	30	39
90	24			19	28	36
96	24			18	26	34
102	30				25	32
108	30				23	30
114	30					29
120	30					27

MAXIMUM HEIGHT COVER FOR STRUCTURAL ALUMINUM PLATE PIPE
9"x2 1/2" Corrugation

Diam Inches	Min Cover	Min Ga.	Metal Thickness -- (Inches)								
			.100	.125	.150	.175	200	225	250	275	300
60	1.0'	100	26	35	44	53	60	66	72	79	86
66	1.0'	100	24	32	40	48	55	60	66	72	79
72	1.0'	100	22	29	37	44	50	63	64	67	69
78	1.0'	100	20	27	34	41	46	51	55	61	67
84	1.5'	100	19	25	32	38	43	47	51	57	59
90	1.5'	100	18	23	30	35	40	44	48	53	58
96	1.5'	100	17	22	28	33	38	41	45	50	53
102	2.0'	100	16	21	26	31	35	39	42	47	51
108	2.0'	100	15	19	25	29	33	37	40	44	48
114	2.0'	100	14	18	23	28	32	35	38	42	46
120	2.0'	100	13	17	22	26	30	33	36	40	43
126	2.0'	100	13	17	21	25	29	31	34	38	41
132	2.0'	100	12	16	20	24	27	30	33	36	39
138	2.0'	100	11	15	19	23	26	29	31	34	38
144	2.0'	125	11	14	18	22	25	28	30	33	36
150	2.0'	125		14	18	21	24	26	29	32	35
156	2.0'	150			17	20	23	25	28	30	33
162	2.0'	150			16	20	22	25	27	29	32
168	2.0'	150			16	19	21	24	26	28	31
174	2.0'	175			18	21	23	25	27	30	33
180	3.0'	175			18	20	22	24	26	28	29

MAXIMUM HEIGHT OF COVER FOR ALUMINUM STRUCTURAL PLATE PIPE ARCH
31.8" CORNER RADIUS

Span Ft.	Min Cover	Height Of Cover (Feet)																										
		1.5	2.0	2.5	3.0	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
6-0	1.5'	100	100	100	100	100	100	100	100	100	100	100	100	125	125	125	150	150	150	175	175	200	225	250	275	275	300	300
7-0	1.5'	100	100	100	100	100	100	100	100	100	100	100	100	125	125	150	150	150	175	175	200	225	250	275	275	300	300	300
8-0	2.0'	125	100	100	100	100	100	100	100	100	100	100	125	125	150	150	175	175	200	225	250	275	275	300	300	300	300	300
9-0	2.0'	125	100	100	100	100	100	100	100	100	100	125	125	150	150	175	175	200	225	250	275	275	300	300	300	300	300	300
10-0	2.0'	125	100	100	100	100	100	100	100	100	100	125	125	150	150	175	175	200	225	250	275	275	300	300	300	300	300	300
11-0	2.0'	150	125	100	100	100	100	100	100	100	100	125	125	150	150	175	175	200	225	250	275	275	300	300	300	300	300	300
12-0	2.0'	175	150	125	100	100	100	100	100	100	100	125	125	150	175	175	200	225	250	275	275	300	300	300	300	300	300	300
13-0	2.0'	175	150	125	125	125	125	125	125	125	125	150	150	175	175	200	225	250	275	275	300	300	300	300	300	300	300	300
14-0	2.0'	175	150	125	125	125	125	125	125	125	150	175	175	200	225	250	275	275	300	300	300	300	300	300	300	300	300	300
15-0	2.0'	175	150	150	150	150	150	150	150	150	175	200	225	250	275	275	300	300	300	300	300	300	300	300	300	300	300	300
16-0	3.0'		175	175	175	175	175	175	175	175	200	225	250	275	275	300	300	300	300	300	300	300	300	300	300	300	300	300
17-0	3.0'		175	175	175	175	175	175	175	175	200	225	250	275	275	300	300	300	300	300	300	300	300	300	300	300	300	300
18-0	3.0'		200	200	200	200	200	200	200	200	225	250	275	275	300	300	300	300	300	300	300	300	300	300	300	300	300	300
19-0	3.0'		250	250	250	250	250	250	250	250	275	275	275	275	275	275	275	275	275	275	275	275	275	275	275	275	275	275
20-0	3.0'		275	275	275	275	275	275	275	275	275	275	275	275	275	275	275	275	275	275	275	275	275	275	275	275	275	275

Note: To determine proper metal thickness select the span in left hand column that is next larger to size structure required. EXAMPLE - If you need a 10'-8" span x 7'-5" rise structure, use the line for span 11'-0"

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

**ALLOWABLE FILL HEIGHTS
FOR ALUMINUM CULVERTS**

R-1.3.1(601, 605)
ADOPTED 12/17/12 REVISION

CHIEF ROAD DESIGN ENGR

* ROUND CORRUGATED STEEL PIPE 2 2/3" x 1/2" CORRUGATIONS											
PIPE DIAMETER	**MIN. COVER	PLATE THICKNESS IN INCHES									
		0.064		0.079		0.109		0.138		0.168	
INCHES	INCHES	R	E	R	E	R	E	R	E	R	E
MAX. FILL HTS. ABOVE TOP OF PIPE IN FEET											
12	12	63	83								
15	12	50	66								
18	12	42	55								
24	12	32	42		84						
30	12	25	33		49		75				74
36	12	21	28		41		60				62
42	12	41	44		46	72	48	76	50		80
48	12		35		38	45	63	46	67	47	70
54	12				34	43	56	44	59	45	63
60	12				42	50	43	53	44	56	
66	12				41	46	42	49	43	51	
72	12						41	45	42	47	
78	12							43	36	44	
84	12							40	31	42	

R Round Installation
E Vertical Elongation (See Standard Specification Sec. 604.03.02) ****

* ROUND CORRUGATED STEEL PIPE 5' x 1' & 3' x 1' CORRUGATIONS											
PIPE DIAMETER	**MIN. COVER	PLATE THICKNESS IN INCHES									
		0.064		0.079		0.109		0.138		0.168	
INCHES	INCHES	R	E	R	E	R	E	R	E	R	E
MAX. FILL HTS. ABOVE TOP OF PIPE IN FEET											
54	12	27	29	36	38	56	59	57	64	65	71
60	12	25	26	32	34	50	53	51	56	58	64
66	12	22	23	29	31	45	48	46	52	53	58
72	12	21	22	28	29	42	44	43	48	49	53
78	12	19	20	25	26	38	41	42	44	44	49
84	18			23	25	36	38	40	42	42	46
90	18			21	23	33	35	38	40	41	43
96	18					30	33	37	38	40	42
102	24					26	28	34	35	38	41
108	24					22	24	32	34	35	37
114	24					21	23	31	32	34	36
120	24					20	22	30	32	32	33
126	24							26	27	31	33
132	24							25	26	30	31
138	24							23	24	28	29
144									25	25	26

* CORRUGATED STEEL PIPE ARCH 2 2/3" x 1/2" CORRUGATIONS					
PIPE DIMENSIONS SPAN-RISE	**MIN. COVER	EQUIV. DIA.	MIN. THICKNESS	MAX. COVER FOR CORNER PRESSURES IN TONS PER SQ. FT.	
				2 TONS	*** 3 TONS
INCHES	INCHES	INCHES	INCHES		
17 x 13	18	15	0.064	13	19
21 x 15	18	18	0.064	12	18
24 x 18	18	21	0.064	10	16
28 x 20	18	24	0.064	10	15
35 x 24	18	30	0.064	9	14
42 x 29	18	36	0.064	9	12
49 x 33	18	42	0.079	8	12
57 x 38	18	48	0.109	8	12
64 x 43	18	54	0.109	8	12
71 x 47	18	60	0.138	8	12
77 x 52	18	66	0.168	8	12
83 x 57	18	72	0.168	9	13

* CORRUGATED STEEL PIPE ARCH 3' x 1' CORRUGATIONS					
PIPE DIMENSIONS SPAN-RISE	**MIN. COVER	EQUIV. DIA.	MIN. THICKNESS	MAX. COVER FOR CORNER PRESSURES IN TONS PER SQ. FT.	
				2 TONS	*** 3 TONS
INCHES	INCHES	INCHES	INCHES		
60 x 46	18	54	0.064	12	18
66 x 51	18	60	0.064	12	18
73 x 55	18	66	0.064	12	18
81 x 59	18	72	0.064	12	18
87 x 63	18	78	0.064	16	22
95 x 67	18	84	0.079	15	21
103 x 71	18	90	0.079	14	20
112 x 75	18	96	0.109	13	18
117 x 79	24	102	0.109	12	17
128 x 83	24	108	0.109	11	16
137 x 87	24	114	0.109	10	15
142 x 91	24	120	0.138	9	14

* Riveted or Helical Fabrication
** Top of Pipe to Top of Finished Grade at Shoulder
Line for 2 Tons Per Sq. Ft.
*** Shall be Used Only After Foundation Investigation
**** For Field Strutting C M P Detail See Standard Sheet R-2.1.1

MAXIMUM HEIGHT OF COVER
FOR STRUCTURAL STEEL PLATE PIPE (5% ELONGATION)
6" x 2" CORRUGATIONS

DIAMETER IN INCHES	MIN. COVER INCHES	ALLOWABLE FILL HEIGHTS IN FEET						
		12 GAGE 0.109	10 GAGE 0.138	8 GAGE 0.168	7 GAGE 0.188	5 GAGE 0.218	3 GAGE 0.249	1 GAGE 0.280
60	12	42	62	80	93			
66	12	39	57	73	85			
72	12	35	52	67	78	94		
78	12	33	48	62	72	87		
84	18	30	45	57	67	80	95	
90	18	28	42	54	62	75	88	96
96	18	27	39	50	58	70	83	90
102	24	25	37	47	55	66	78	85
108	24	24	35	45	51	63	74	80
114	24	22	33	42	49	59	70	76
120	24	21	31	40	47	56	66	72
126	24	20	30	38	45	54	63	69
132	24	19	28	37	43	51	60	66
138	24	18	27	35	41	49	58	63
144	24	10	26	34	39	47	55	60
150	24	17	25	32	38	45	53	58
156	24	16	24	31	36	44	51	56
162	24	16	23	30	35	42	49	54
168	24	15	22	29	34	40	47	52
174	24	15	22	28	32	39	46	50
180	36	14	21	27	31	38	44	48
186	36	14	20	26	30	36	43	47
192	36		20	25	29	35	42	45
198	36		19	25	29	34	40	44

NOTE: ① Round Corrugated Steel Pipe
Fill Heights shown are for 3' x 1" Corrugation
Fill Heights for 5' x 1" Corrugation are 87% of those shown.
② Corrugated Steel Pipe Arch
Fill Heights for 5' x 1" and 3' x 1" Corrugations are identical.

MAXIMUM HEIGHT OF COVER
FOR STRUCTURAL STEEL PLATE PIPE ARCH WITH 31" CORNER RADIUS
6" x 2" CORRUGATIONS

SPAN	RISE	MIN. COVER INCHES	ALLOWABLE FILL HEIGHTS IN FEET								
			2 TONS/SQ. FT. BEARING PRESSURE 12 GAGE 0.109	10 GAGE 0.138	8 GAGE 0.168	7 GAGE 0.188	13 TONS/SQ. FT. BEARING PRESSURE 12 GAGE 0.109	10 GAGE 0.138	8 GAGE 0.168	7 GAGE 0.188	
13'-3"	9'-4"	36	11					17			
14'-2"	9'-10"	36	11					17			
15'-4"	10'-4"	36		10					16		
16'-3"	10'-10"	36		9					16		
17'-2"	11'-4"	36		9					15		
18'-1"	11'-10"	36			8					14	
19'-3"	12'-4"	36			8					13	
19'-11"	12'-10"	36			7					13	
20'-7"	13'-2"	36			7						12

▲ May be Used Only When Supported by Foundation Study

MAXIMUM HEIGHT OF COVER
FOR STRUCTURAL STEEL PLATE PIPE ARCH WITH 18" CORNER RADIUS
6" x 2" CORRUGATIONS

SPAN	RISE	MIN. COVER INCHES	ALLOWABLE FILL HEIGHTS IN FEET								
			2 TONS/SQ. FT. BEARING PRESSURE 12 GAGE 0.109	10 GAGE 0.138	8 GAGE 0.168	7 GAGE 0.188	13 TONS/SQ. FT. BEARING PRESSURE 12 GAGE 0.109	10 GAGE 0.138	8 GAGE 0.168	7 GAGE 0.188	
6'-1"	4'-7"	18	15								
7'-0"	5'-1"	18	13								
7'-11"	5'-7"	18	12					16			
8'-10"	6'-1"	24	10					16			
9'-9"	6'-7"	24	9					15			
10'-11"	7'-1"	24	8					13			
12'-10"	8'-4"	24	8					11			
14'-1"	8'-9"	24	7					11			
15'-4"	9'-3"	24							10		
16'-10"	9'-10"	24							9		
16'-7"	10'-1"	36							8		

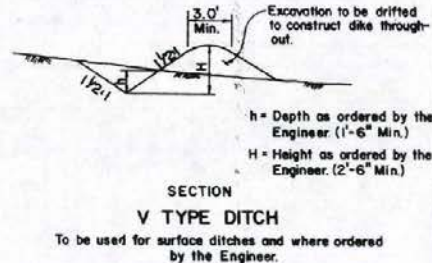
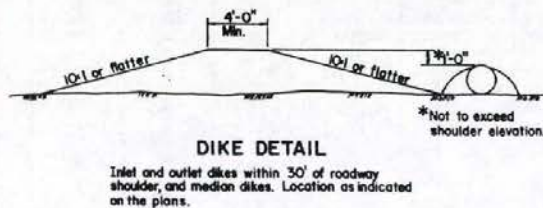
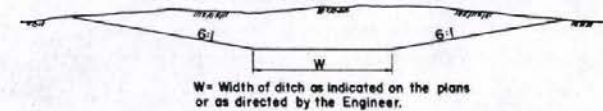
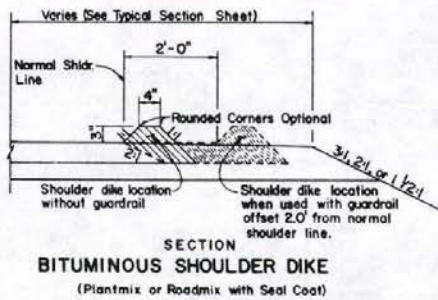
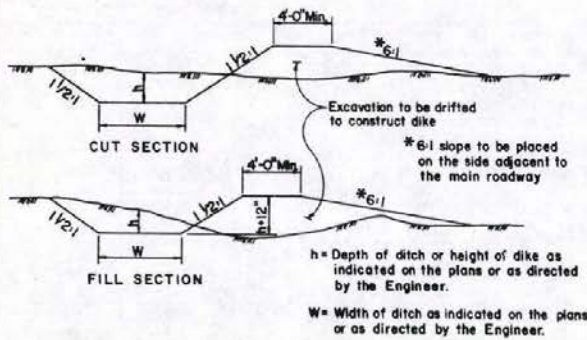
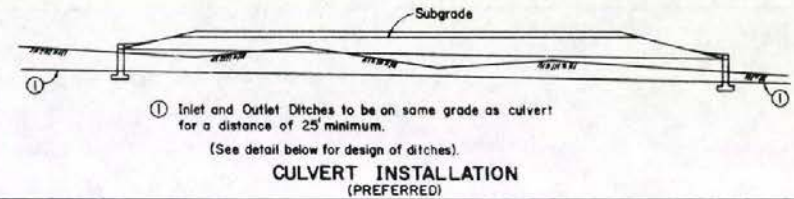
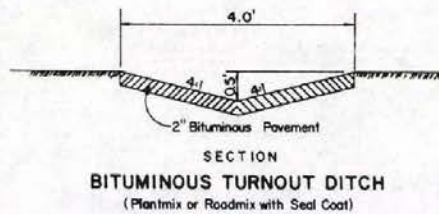
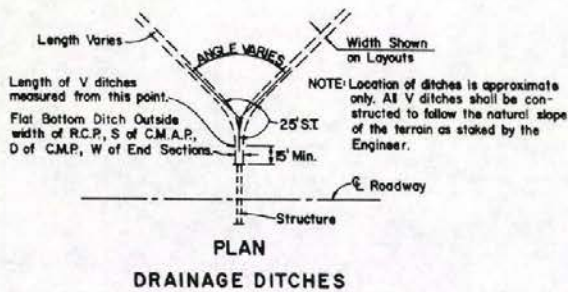
▲ May be Used Only When Supported by Foundation Study.

GAGE NUMBER	EQUIVALENT GAGE NUMBERS		
	THICKNESS IN INCHES		
	STEEL		AL.
ZN. COAT	UNCOATED		
16	0.064	0.0598	0.060
14	0.079	0.0747	0.075
12	0.109	0.1046	0.105
10	0.138	0.1345	0.135
8	0.168	0.1644	0.164
7	0.188	0.1838	
5	0.218	0.2145	
3	0.249	0.2451	
1	0.280	0.2756	

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

**ALLOWABLE FILL HEIGHTS
FOR STEEL CULVERTS**

Revised 2-10/85
ADOPTED: 7/73



NOTE: DIMENSIONS RELATING TO EXCAVATION (DITCHES) OR EMBANKMENT (DIKES) SHALL BE DESIGNATED AS W (WIDTH), X H (HEIGHT OR DEPTH), X L (LENGTH).

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

**DRAINAGE DITCHES
AND DIKES**

R-14.1-(203)
ADOPTED: 8/69 REVISION: 6-1/73
CHIEF ROAD DESIGN ENGR.

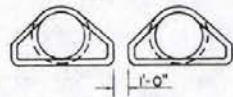
R-14

Diameter	Minimum Space Between Pipes
12" to 24"	1'-0"
30" to 66"	One Half Diameter of Pipe
72" to 84"	3'-0"

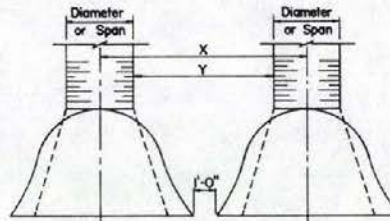
* When headwalls are used or anticipated for future use, space as per headwalls standard.

Span	Min. Space Between Pipe Arches
17' to 35'	1'-0"
42' to 83'	One Third Span of Pipe Arch

MULTIPLE INSTALLATIONS WITHOUT HEADWALLS



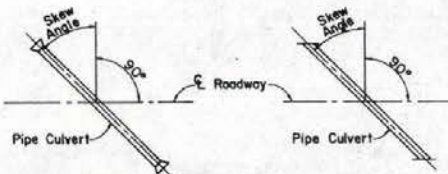
MULTIPLE INSTALLATIONS WITH END SECTIONS



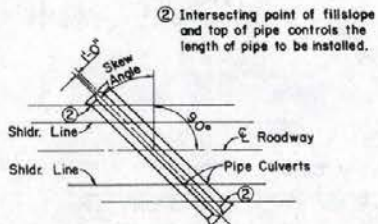
Note: When Y distance exceeds 3'-0", Structure Excavation and Backfill quantities shall be calculated for each culvert.

TABLE OF SEPARATION FOR MULTIPLE INSTALLATIONS

CMP			CMAP			RCP		
DIA.	X	Y	SPAN	X	Y	DIA.	X	Y
			21'x15'	5'-2"	3'-5"	18"	4'-4"	2'-6"
			24'x18'	5'-10"	3'-10"	24"	5'-5"	3'-0"
			28'x20'	6'-6"	4'-2"	30"	6'-6"	3'-6"
24"	6'-8"	4'-8"	35'x24'	7'-8"	4'-9"	36"	7'-7"	4'-0"
30"	8'-0"	5'-6"	42'x29'	9'-3"	5'-9"	42"	8'-2"	4'-0"
36"	9'-4"	6'-4"	49'x33'	10'-3"	6'-2"	48"	8'-9"	4'-0"
42"	10'-8"	7'-2"	57'x38'	11'-6"	6'-9"	54"	8'-7"	3'-4"
48"	11'-6"	7'-6"	64'x43'	12'-6"	7'-2"			
54"	12'-6"	8'-0"	71'x47'	13'-6"	7'-7"			
60"	13'-6"	8'-6"	77'x52'	14'-6"	8'-1"			
66"	14'-0"	8'-6"	83'x57'	15'-6"	8'-7"			
72"	14'-6"	8'-6"						
78"	15'-0"	8'-6"						
84"	15'-6"	8'-6"						



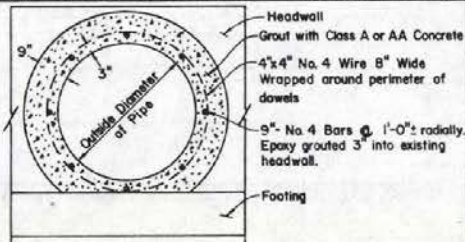
SINGLE CULVERT WITH END SECTIONS



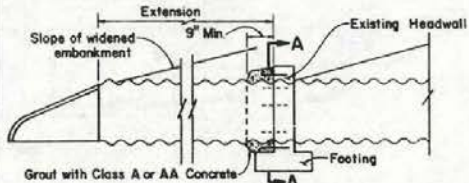
SINGLE CULVERT WITH HEADWALLS

MULTIPLE CULVERT WITH END SECTIONS

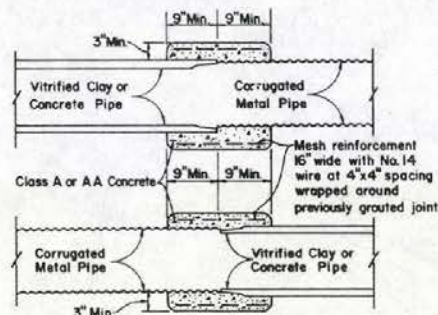
② Intersecting point of fill slope and top of pipe controls the length of pipe to be installed.



SECTION A-A



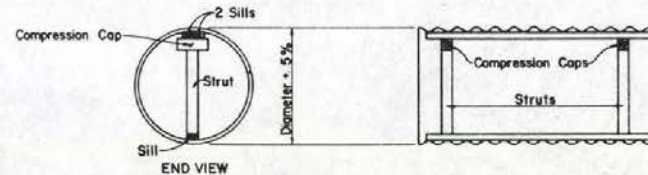
PIPE CULVERT EXTENSION
(FOR ADDITIONAL INFORMATION SEE R-1.1.2)



CONCRETE COLLAR

(CMP to RCP or Vitrified Pipe Extensions)

Struts shall be left in place until fill has been completed and compacted, unless otherwise directed by the Engineer.



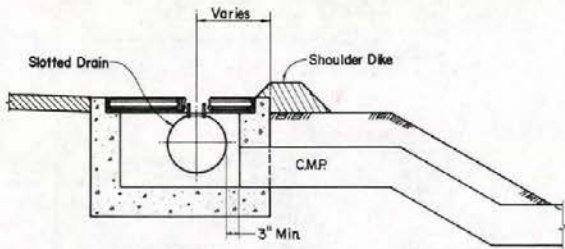
FIELD STRUTTING CMP

Note: For strut, cap, sill size and spacing use manufacturers recommendations. Struts, caps and sills to be the same dimension. For maximum fill heights, see standard sheet R-1.3.1.2 under columns designated "E".

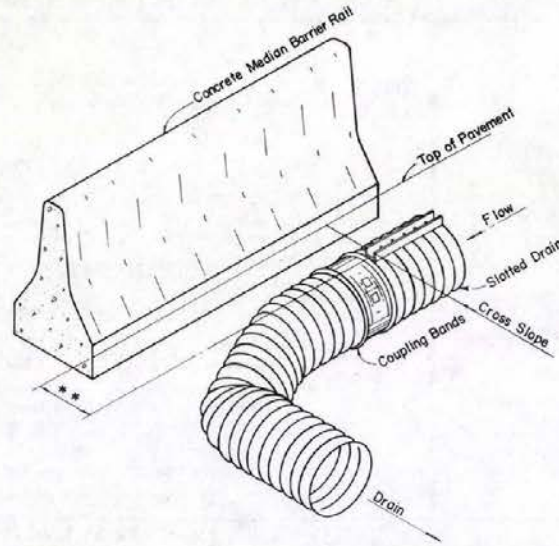
STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

CULVERT INSTALLATION

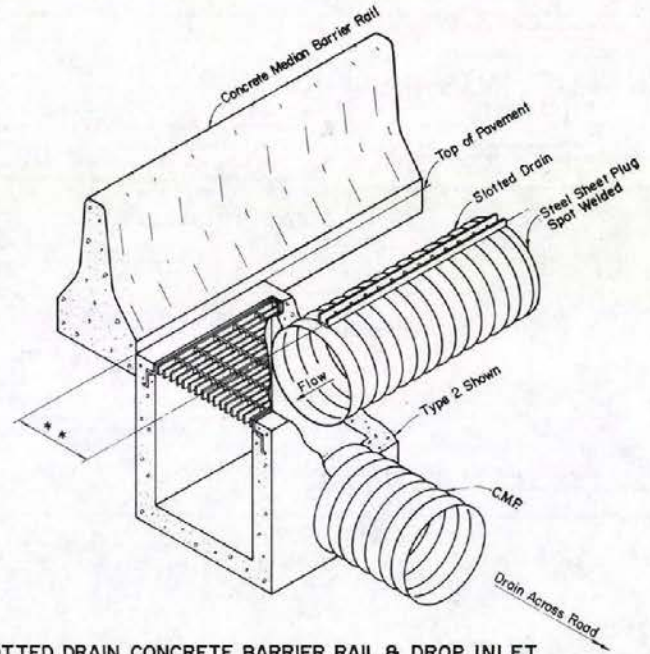
R-2.1.1 (601 THRU 606)
ADOPTED 8/65
REVISION 8 4/93



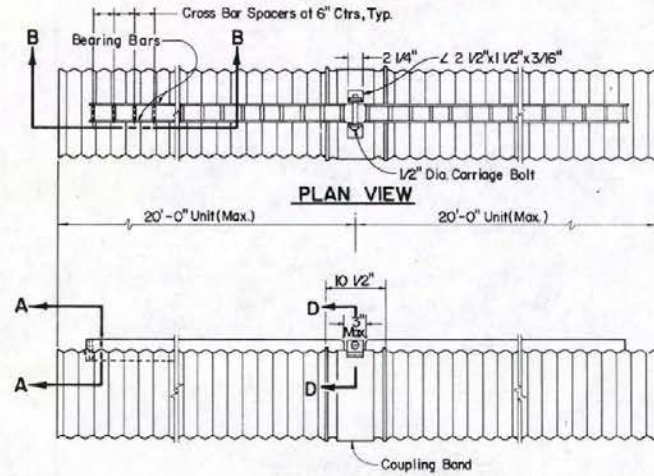
EMBANKMENT PROTECTOR & SLOTTED DRAIN



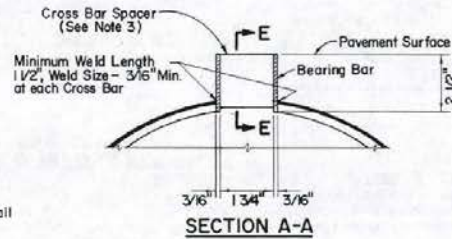
45° ANGLE SLOTTED DRAIN & CONCRETE BARRIER RAIL
(CAN BE USED WITH SHOULDER DIKE)



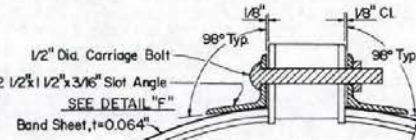
SLOTTED DRAIN, CONCRETE BARRIER RAIL & DROP INLET



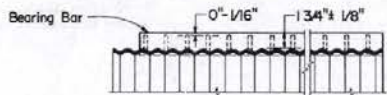
SLOTTED DRAIN DETAIL



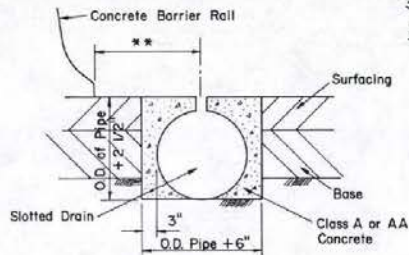
SECTION A-A



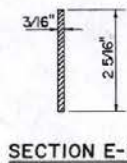
SECTION D-D



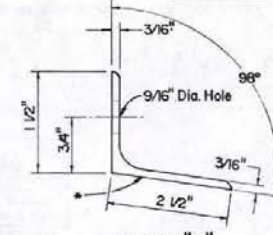
SECTION B-B



BEDDING DETAIL



SECTION E-E



DETAIL "F"

* Attach to Coupling Band With Tack or Fillet Welds or Rivets

GENERAL NOTES

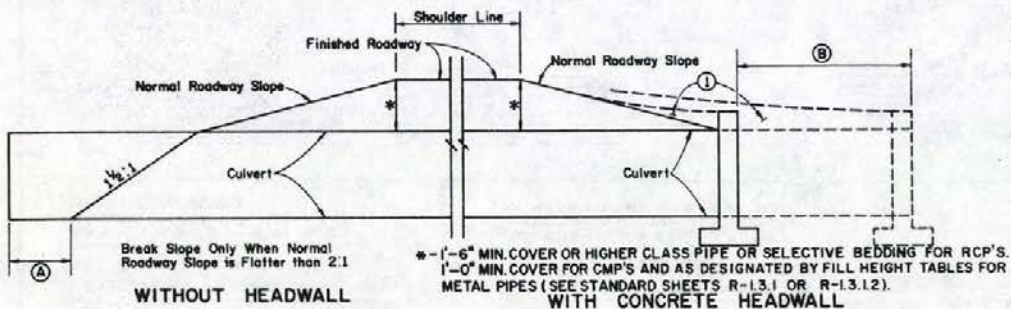
1. DRAIN PIPE SEAMS MAY BE CONTINUOUS HELICAL LOCK SEAM OR HELICAL WELD SEAM.
2. DRAIN SECTIONS SHALL BE ASSEMBLED WITH THE COUPLING BAND SHOWN.
3. THE CROSS BAR SPACER SHALL BE WELDED TO THE BEARING BARS IN SUCH A MANNER AS TO DEVELOP A MINIMUM TENSILE STRENGTH OF 12,000 LBS. NORMAL TO THE LONGITUDINAL AXIS OF THE BEARING BARS. THE MAXIMUM VARIANCE FROM A STRAIGHT LINE BETWEEN THE EXTREME TOP CORNERS OF THE BEARING BARS SHALL BE 1/2" IN 20 FEET.
4. FOR CONTINUOUS RUNS OF S.C.M.P. IN EXCESS OF 200 FEET, CLEANOUT D.I. OR STANDARD FLUSHING INLETS SHALL BE INSTALLED AS SHOWN ON THE PLANS.
5. SPOT WELD SHALL DEVELOP MINIMUM REQUIRED STRENGTH OF STRAP.
6. DIMENSIONS SHOWN ARE MINIMUMS.
7. CONTRACTOR TO PROVIDE AN ADEQUATE METHOD OF KEEPING THE A.C. OUT OF PIPE. DURING PAVING OPERATIONS.

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

SLOTTED C.M.P. DRAIN DETAILS

CHIEF ROAD DESIGN ENGR.	R-2.1.3(604) ADOPTED 6-71	REVISION 3-7/24
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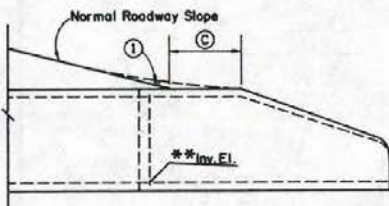
** See Plan Structure List



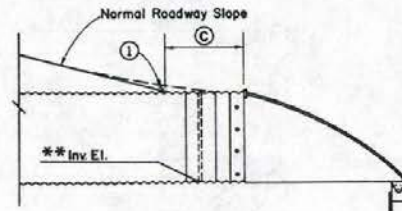
A - LENGTH OF CULVERT SHALL BE INCREASED AS FOLLOWS: CONSIDER EACH SIDE SEPARATELY. MEASURE PIPE FROM ROADWAY CENTERLINE TO THE INTERSECTION OF PIPE FLOW LINE AND FILL SLOPE. TO THIS DIMENSION ADD 2.0' WHEN COVER AT SHOULDER IS 1.0' TO 10.0'. ADD AN ADDITIONAL 0.5' FOR EACH SUCCEEDING 5.0' OF COVER OR PORTION THEREOF.

B - LENGTH OF CULVERTS SHALL BE INCREASED AS FOLLOWS: CONSIDER EACH SIDE SEPARATELY. MEASURE PIPE FROM ROADWAY CENTERLINE TO THE INTERSECTION OF THE TOP OF PIPE AND FILL SLOPE PLUS HEADWALL THICKNESS. TO THIS DIMENSION ADD 1.0' WHEN COVER AT SHOULDER IS 5.0' TO 10.0'. ADD AN ADDITIONAL 0.5' FOR EACH SUCCEEDING 5.0' OF COVER OR PORTION THEREOF.

1 - CONTOUR THIS AREA TO PROVIDE THE MINIMUM AMOUNT OF OBSTRUCTION EXPOSURE.



PRECAST CONCRETE END SECTION



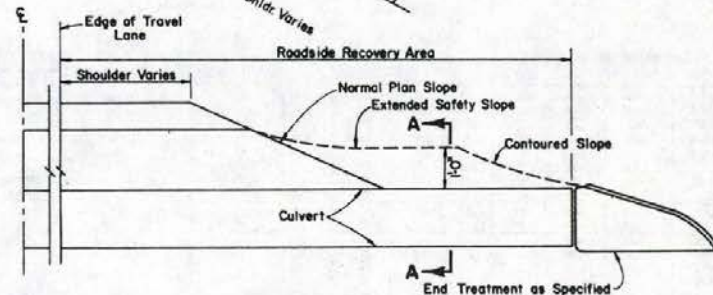
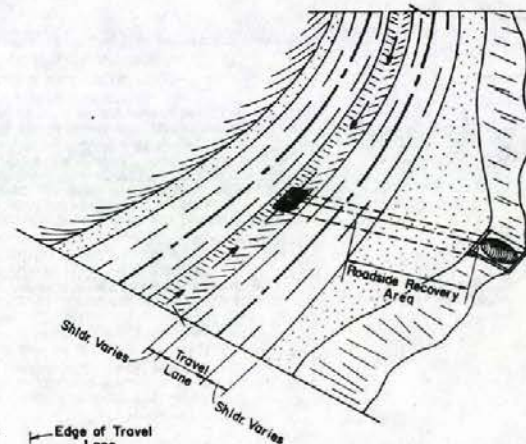
METAL END SECTION

C - LENGTH OF CULVERT SHALL BE INCREASED AS FOLLOWS: CONSIDER EACH SIDE SEPARATELY. MEASURE PIPE FROM ROADWAY CENTERLINE TO THE INTERSECTION OF THE TOP OF PIPE AND FILL SLOPE. TO THIS DIMENSION ADD 1.0' WHEN COVER AT SHOULDER IS 1.0' TO 10.0'. ADD AN ADDITIONAL 0.5' FOR EACH SUCCEEDING 5.0' OR PORTION THEREOF.

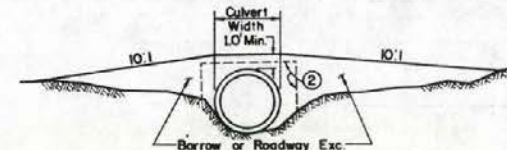
MINIMUM CULVERT INSTALLATION

*RCP: USE 1'6" WHERE POSSIBLE. IF MINIMUM COVER IS RESTRICTIVE, COMPENSATE BY UTILIZING HIGHER CLASS PIPE OR SELECTIVE BEDDING AS RECOMMENDED BY THE HYDRAULICS SECTION.
ALUMINUM CULVERTS: SEE STANDARD SHEET R-1.3.1.
STEEL CULVERTS: SEE STANDARD SHEET R-1.3.1.2

** FOR INFORMATIONAL PURPOSES ONLY



METHOD OF CONTOURING OVER CULVERTS



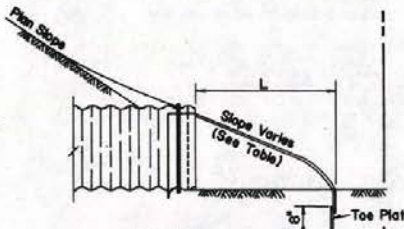
SECTION A-A
SAFETY CULVERT INSTALLATION
(TO PROVIDE OBSTRUCTION CLEARANCE)

NOTE: **1** - IF, AFTER EXTENDING THE CULVERT AND/OR WARPING THE FILL SLOPE FOR SAFETY AND/OR AESTHETICS, THE EXTENSION DOES NOT FULFILL THE REQUIREMENTS FOR A CLEAR ROADSIDE RECOVERY AREA; THEN VEHICULAR TRAFFIC MAY BE PROTECTED BY SOME OTHER MEANS, SUCH AS GUARDRAIL, BARRIER RAIL OR ANOTHER ACCEPTABLE SAFETY FEATURE.
2 - NORMAL STRUCTURE EXCAVATION AND BACKFILL LIMITS.

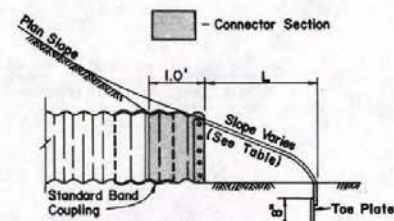
STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

CULVERT INSTALLATION

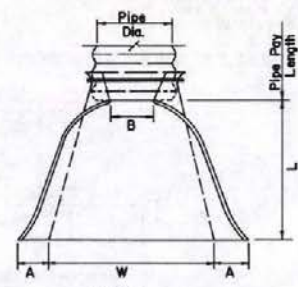
ADOPTED: 6/72
R-2.1.4 (601 THRU 606)



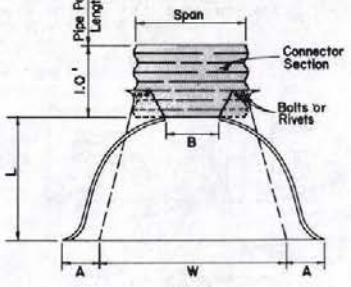
SECTION
TYPE 1 OR 2 CONNECTION



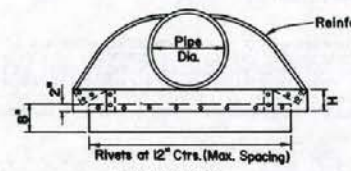
SECTION
TYPE 3 CONNECTION



PLAN

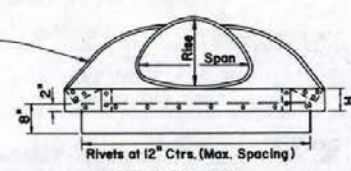


PLAN



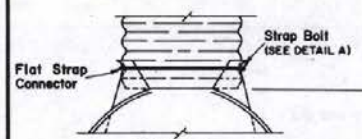
ELEVATION

LENGTH OF TOE PLATE TO BE $W + 10"$ MIN. FOR 12" TO 30" DIAMETER PIPE INCLUSIVE AND $W + 22"$ MIN. FOR 36" DIAMETER PIPES AND LARGER.



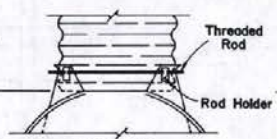
ELEVATION

LENGTH OF TOE PLATE TO BE $W + 10"$ MIN. FOR PIPE ARCHES WITH RISE OF 13" TO 29" INCLUSIVE AND $W + 18"$ MIN. FOR PIPE ARCHES WITH RISE OF 33" AND LARGER.



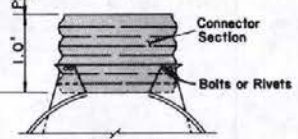
TYPE 1

FOR 12" CMP THROUGH 24" CMP ONLY



TYPE 2

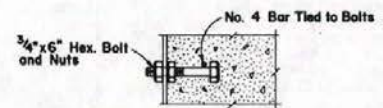
FOR 30" CMP THROUGH 84" CMP,
AND
FOR 17" X 13" CMP THRU 57" X 38" CMP.



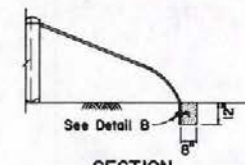
TYPE 3

FOR 64" X 43" CMP THROUGH 83" X 57" CMP
OR
FOR 42" CMP THROUGH 84" CMP (OPTIONAL)

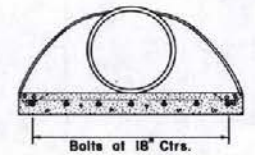
STANDARD CONNECTIONS



DETAIL B



SECTION



ELEVATION
ANCHOR BLOCK DETAIL

(See Notes 6 Thru 9)

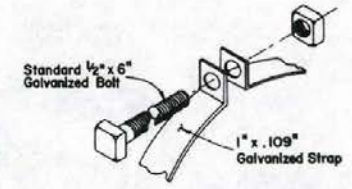
TYPE CONNECTION	PIPE ARCH DIMENSIONS		GAGE	DIMENSIONS					APPROX. SLOPE	* CONCRETE CU. YD.	
	SPAN	RISE		A 1" TOL.	B MAX.	H 1" TOL.	L 1 1/2" TOL.	W 2" TOL.			
TYPE 2	17"	13"	16	7"	9"	6"	19"	30"	2 1/2:1		
	21"	15"	16	7"	10"	6"	23"	36"	2 1/2:1		
	28"	18"	16	8"	12"	6"	28"	42"	2 1/2:1		
	28"	20"	16	9"	14"	6"	32"	48"	2 1/2:1		
	35"	24"	14	10"	16"	6"	39"	60"	2 1/2:1		
	42"	29"	14	12"	18"	8"	46"	75"	2 1/2:1		
TYPE 3	49"	33"	12	13"	21"	9"	53"	85"	2 1/2:1	0.26	
	57"	38"	12	18"	26"	12"	63"	90"	2 1/2:1		
	64"	43"	12	18"	30"	12"	70"	102"	2 1/2:1		0.29
	71"	47"	12	18"	33"	12"	77"	114"	2 1/2:1		
	77"	52"	12	18"	36"	12"	77"	126"	2 1/2:1		
83"	57"	12	18"	39"	12"	77"	138"	2 1/2:1			

TYPE CONNECTION	PIPE DIAM.	GAGE	DIMENSIONS					APPROX. SLOPE	* CONCRETE CU. YD.	
			A 1" TOL.	B MAX.	H 1" TOL.	L 1 1/2" TOL.	W 2" TOL.			
TYPE 1	12"	16	6"	8"	6"	21"	24"	2 1/2:1		
	15"	16	7"	8"	6"	26"	30"	2 1/2:1		
	18"	16	8"	10"	6"	31"	36"	2 1/2:1		
	21"	16	9"	12"	6"	35"	42"	2 1/2:1		
TYPE 2	30"	14	10"	13"	6"	41"	48"	2 1/2:1		
	36"	14	14"	19"	9"	60"	72"	2 1/2:1		
TYPE 2 OR TYPE 3	42"	12	16"	22"	11"	69"	84"	2 1/2:1	0.26	
	48"	12	18"	27"	12"	78"	90"	2 1/2:1		
	54"	12	18"	30"	12"	84"	102"	2 1/2:1		0.29
	60"	12	18"	33"	12"	87"	114"	1 3/4:1		
	66"	12	18"	36"	12"	87"	120"	1 1/2:1		0.32
	72"	12	18"	39"	12"	87"	126"	1 1/5:1		
	78"	12	18"	42"	12"	87"	132"	1 1/2:1		0.35
	84"	12	18"	45"	12"	87"	138"	1 1/6:1		

*FOR INFORMATION ONLY

GENERAL NOTES

1. THE CULVERT LENGTHS SHOWN ON THE PLANS AND STRUCTURE LIST SHALL BE THE PAY LENGTH AS INDICATED ON THE STANDARD SHEET INCLUDING CONNECTOR SECTION LENGTHS WHEN USED.
2. PIPE ON SKEW SHALL NOT BE MITERED. SUFFICIENT ADDITIONAL LENGTH OF PIPE SHALL BE ALLOWED TO PROVIDE CLEARANCE FOR END SECTIONS.
3. TOE PLATES REQUIRED ON ROUND PIPE 24" AND OVER IN DIAMETER AND ON ARCH PIPE 28" X 20" AND OVER UNLESS OTHERWISE SPECIFIED ON THE PLANS OR IN THE SPECIAL PROVISIONS.
4. TOE PLATES SHALL BE PUNCHED WITH 7/16" HOLES TO MATCH HOLES IN LIP OF END SECTION AND BOLTED WITH 3/8" GALVANIZED BOLTS.
5. REINFORCED EDGES TO BE SUPPLEMENTED WITH GALVANIZED STIFFENER ANGLES FOR THE 60" THRU 84" ROUND, 77" X 52" AND 83" X 57" PIPE-ARCH SIZES. THE ANGLES WILL BE 2" X 2" X 1/2" FOR THE 60" THRU 72" ROUND, 77" X 52" AND 83" X 57" PIPE ARCH SIZES AND 2 1/2" X 2 1/2" X 1/2" FOR 78" AND 84" ROUND. THE ANGLES TO BE ATTACHED BY 3/8" GALVANIZED NUTS AND BOLTS.
6. ANCHOR BLOCK SHALL BE USED ON INLET END ONLY FOR 48" CMP AND OVER AND FOR 57" X 38" CMP AND OVER UNLESS OTHERWISE SPECIFIED (SEE ANCHOR BLOCK DETAILS).
7. CONCRETE SHALL BE CLASS A OR AA.
8. TOE PLATE TO BE ELIMINATED WHEN ANCHOR BLOCK IS USED.
9. REINFORCING STEEL BAR TO CLEAR 2" ON ENDS OF CONCRETE ANCHOR BLOCK.



DETAIL A

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

METAL END SECTIONS
12" CMP TO 84" CMP AND
17" X 13" CMP TO 83" X 57" CMP

R-2.21 - (604)

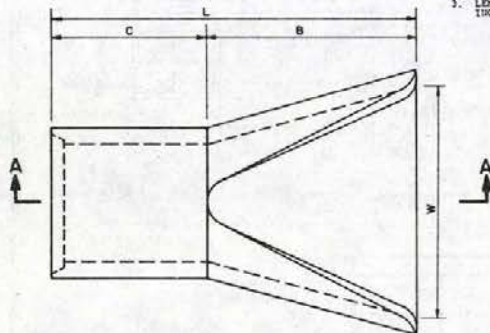
ADOPTED 8/73 REVISION 2 8/81

DIAMETER	WEIGHT	A	B	C*	L	W
18"	670	9"	2'-11"	2'-11"	4'-2"	1'-0"
24"	1300	9"	3'-5"	2'-5"	6'-2"	2'-0"
30"	1850	1'-2"	4'-3"	3'-2"	8'-2"	3'-0"
36"	2500	1'-2"	5'-2"	4'-1"	11'-2"	4'-0"
42"	3200	1'-2"	6'-2"	5'-0"	14'-2"	5'-0"
48"	4000	1'-2"	7'-2"	6'-0"	17'-2"	6'-0"
54"	5150	2'-5"	8'-2"	7'-3"	21'-2"	7'-10"

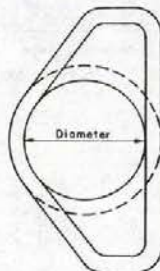
* For Reference Only

GENERAL NOTES

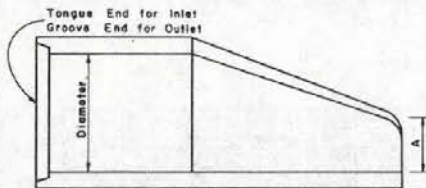
1. CLASS AND TYPE OF CONCRETE SHALL BE AS SPECIFIED FOR REINFORCED CONCRETE PIPE.
2. STRUCTURAL DESIGN OF END SECTION SHALL CONFORM TO THAT OF STANDARD REINFORCED CONCRETE CULVERT PIPE.
3. LENGTH OF PIPE SHOWN ON THE PLANS DOES NOT INCLUDE CONNECTOR SECTION (LENGTH C).



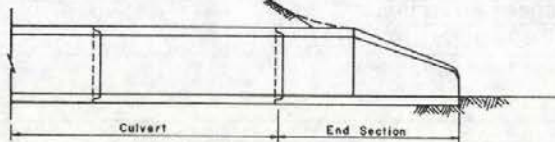
PLAN



END VIEW



SECTION A-A



CROSS SECTION VIEW
18" RCP TO 54" RCP

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

RCP END SECTION
12" RCP TO 54" RCP

R-2.3.1-(603)
CHIEF ROAD DESIGN ENGR. ADOPTED 1/78 REVISION 1-12/82

CMP SIZE Dia.	CORR CMP SXR	CMP AREA SQ. FT.	L	SINGLE CMP								DOUBLE CMP											
				0° SKEW		15° SKEW		30° SKEW		45° SKEW		0° SKEW		15° SKEW		30° SKEW		45° SKEW					
				CONC CUYD	STEEL LB	CONC CUYD	STEEL LB	CONC CUYD	STEEL LB	CONC CUYD	STEEL LB	CONC CUYD	STEEL LB	CONC CUYD	STEEL LB	CONC CUYD	STEEL LB	CONC CUYD	STEEL LB				
12"		0.79	3'-6"	0.85	35	0.93	37	1.09	48	1.19	50	1.21	51	1.27	52	1.51	61	1.62	64	1.68	65	1.85	69
15"	18" X 11"	1.23	4'-3"	1.09	48	1.19	50	1.21	51	1.27	52	1.51	61	1.62	64	1.68	65	1.85	69	2.05	75	2.24	80
18"	22" X 13"	1.77	5'-0"	1.36	55	1.48	59	1.51	59	1.57	61	1.83	70	1.96	73	2.05	75	2.24	80	2.53	95	2.73	100
24"	29" X 18"	3.14	6'-6"	1.95	78	2.12	83	2.16	84	2.25	86	2.53	95	2.73	100	2.84	103	3.08	108	3.39	126	3.65	132
30"	36" X 22"	4.91	8'-0"	2.61	105	2.85	111	2.90	112	3.01	115	3.39	126	3.65	132	3.79	135	4.11	142	4.34	147	4.68	155
36"	43" X 27"	7.07	9'-6"	3.36	122	3.66	129	3.72	131	3.86	134	4.34	147	4.68	155	4.85	158	5.25	167	5.59	196	5.81	206
42"	50" X 31"	9.62	11'-0"	4.18	167	4.56	177	4.64	179	4.81	182	5.39	196	5.81	206	6.03	210	6.52	220	6.81	219	7.31	230

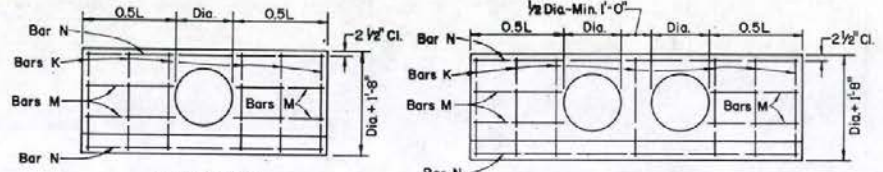
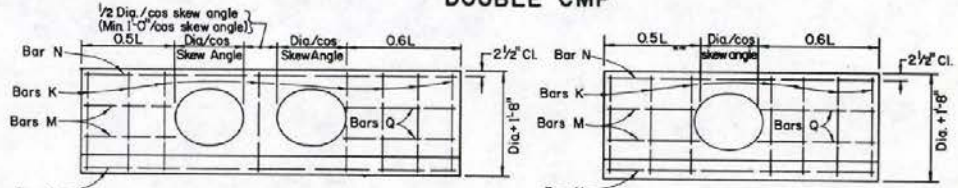
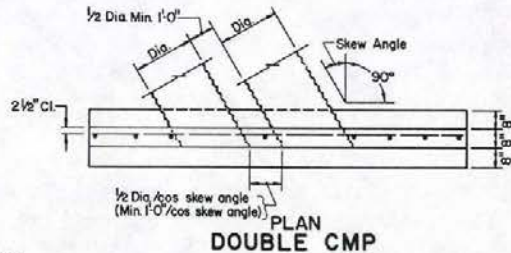
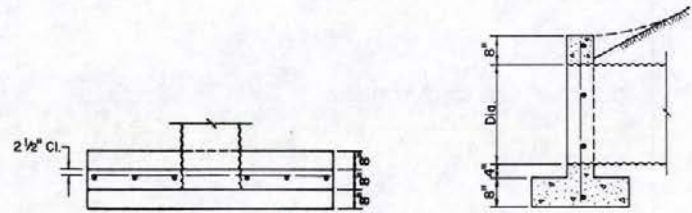
Quantities shown above are for two headwalls.

Quantities shown below are for one headwall.

CMP SIZE Dia.	LENGTH OF REINFORCING BARS																			
	SINGLE CMP					SINGLE OR DOUBLE CMP										DOUBLE CMP				
	0°-45° NO. 4	0° NO. 5	15° NO. 5	30° NO. 5	45° NO. 5	0° NO. 4	15° NO. 4	30° NO. 4	45° NO. 4	0°-45° NO. 4	0° NO. 5	15° NO. 5	30° NO. 5	45° NO. 5						
12"	4#2'-5"	2#4'-3"	2#4'-8"	2#4'-9"	2#5'-0"	2#1'-6"	1#1'-4"	1#2'-0"	1#2'-1"	1#2'-4"	1#2'-4"	1#2'-4"	1#2'-4"	1#2'-4"	5#2'-5"	2#6'-3"	2#6'-9"	2#7'-1"	2#7'-10"	2#7'-10"
15"	6#2'-8"	2#5'-3"	2#5'-9"	2#5'-11"	2#6'-2"	2#1'-8"	1#1'-6"	1#2'-2"	1#2'-3"	1#2'-6"	1#2'-6"	1#2'-6"	1#2'-6"	1#2'-6"	7#2'-8"	2#7'-6"	2#8'-1"	2#8'-6"	2#9'-5"	2#9'-5"
18"	6#2'-11"	2#6'-3"	2#6'-10"	2#7'-0"	2#7'-4"	2#2'-3"	1#2'-1"	1#2'-11"	1#2'-10"	1#3'-0"	1#3'-0"	1#3'-0"	1#3'-0"	1#3'-0"	7#2'-11"	2#8'-9"	2#9'-5"	2#9'-10"	2#10'-11"	2#10'-11"
24"	6#3'-5"	2#6'-3"	2#6'-9"	2#6'-9"	2#6'-9"	4#3'-0"	2#2'-10"	2#3'-5"	2#2'-9"	2#3'-10"	2#2'-6"	2#4'-1"	7#3'-5"	2#1'-3"	2#1'-3"	2#1'-3"	2#1'-3"	2#1'-3"	2#1'-3"	2#1'-3"
30"	8#3'-11"	2#10'-3"	2#11'-2"	2#11'-5"	2#12'-1"	4#3'-9"	2#3'-7"	2#4'-8"	2#3'-6"	2#4'-9"	2#3'-3"	2#4'-9"	9#3'-11"	2#1'-3"	2#1'-3"	2#1'-3"	2#1'-3"	2#1'-3"	2#1'-3"	2#1'-3"
36"	8#4'-5"	2#12'-3"	2#13'-4"	2#13'-8"	2#14'-5"	4#4'-6"	2#4'-4"	2#5'-7"	2#4'-3"	2#5'-8"	2#4'-0"	2#5'-11"	9#4'-5"	2#1'-3"	2#1'-3"	2#1'-3"	2#1'-3"	2#1'-3"	2#1'-3"	2#1'-3"
42"	10#4'-11"	2#14'-3"	2#15'-6"	2#15'-11"	2#16'-10"	6#5'-3"	3#5'-1"	3#6'-6"	3#5'-0"	3#6'-7"	3#4'-9"	3#6'-10"	11#4'-11"	2#1'-3"	2#1'-3"	2#1'-3"	2#1'-3"	2#1'-3"	2#1'-3"	2#1'-3"

GENERAL NOTES

- 1- CONCRETE SHALL BE CLASS A OR AA.
- 2- REINFORCING STEEL SHALL BE DEFORMED BARS WITH MAXIMUM SPACING OF 18" SET 2 1/2" CLEAR OF SURFACE OF CONCRETE EXCEPT AS NOTED. BAR ENDS SHALL BE KEPT 1 1/2" CLEAR OF SURFACE OF CONCRETE. REINFORCING BARS MAY BE CUT AND BENT IN FIELD.
- 3- FOOTINGS SHOWN ARE OF MINIMUM DEPTH AND SHALL BE EXTENDED IF SOIL IS UNSUITABLE OR LIABLE TO SCOUR.
- 4- CULVERT PIPES TO BE SET ON A SKEW SHALL BE MITERED WHEN HEADWALLS ARE CONSTRUCTED. WHEN HEADWALLS ARE NOT CONSTRUCTED THE PIPES SHALL NOT BE MITERED EXCEPT IN OVERFLOW SECTION.
- 5- FOR ESTIMATING HEADWALL QUANTITIES ON SKEWED CULVERTS:
 - 0° to 10°-USE QUANTITIES FOR 0° SKEW.
 - 11° to 25°-USE QUANTITIES FOR 15° SKEW.
 - 26° to 40°-USE QUANTITIES FOR 30° SKEW.
 - 41° to 55°-USE QUANTITIES FOR 45° SKEW.
 - OVER 55°-CALCULATE QUANTITIES REQUIRED. CULVERTS SHOULD BE INSTALLED ON 5° INCREMENTS WHERE IT IS FEASIBLE.



ELEVATION DOUBLE CMP
ELEVATION SINGLE CMP
15° TO 45° SKEW

0° SKEW

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION
CULVERT HEADWALLS
12" CMP TO 42" CMP

Richard J. Hill
CHIEF ROAD DESIGN ENGINEER

R-2.4.1-(502)
ADOPTED: 8/69 REVISION

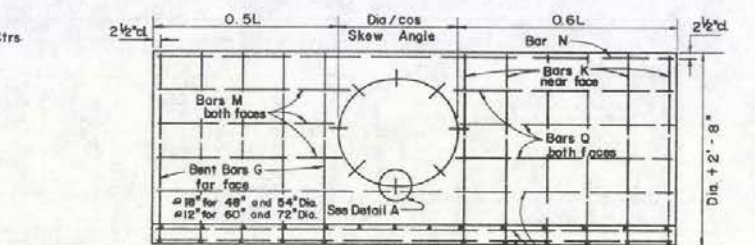
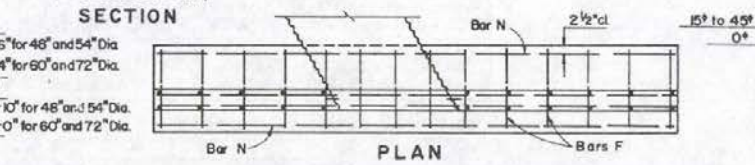
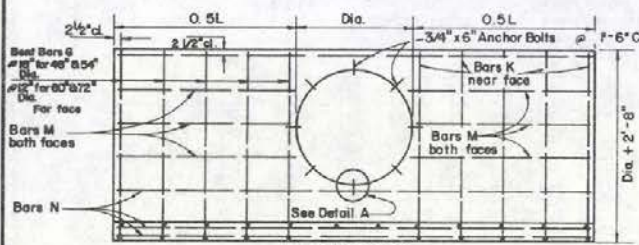
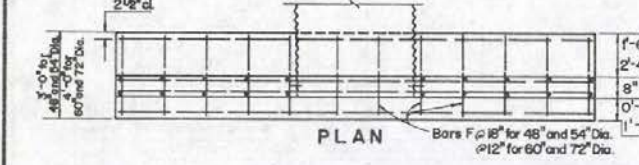
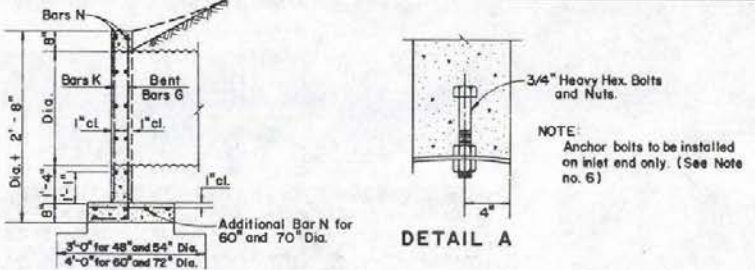
R20

CMP SIZE DIA.	CORR MAP S X R	CMP AREA SQFT	SINGLE CMP								DOUBLE CMP								
			0° SKEW		15° SKEW		30° SKEW		45° SKEW		0° SKEW		15° SKEW		30° SKEW		45° SKEW		
			CONC CU YD	STEEL LB	CONC CU YD	STEEL LB	CONC CU YD	STEEL LB	CONC CU YD	STEEL LB	CONC CU YD	STEEL LB	CONC CU YD	STEEL LB	CONC CU YD	STEEL LB	CONC CU YD	STEEL LB	
48"	58" x 36"	12.87	12'-6"	6.72	597	7.31	651	7.45	656	7.75	696	8.76	715	9.43	772	9.82	815	10.65	874
54"	65" x 40"	15.90	14'-0"	7.90	706	8.60	766	8.76	802	9.10	814	10.28	841	11.07	904	11.51	950	12.47	1045
60"	72" x 44"	19.64	15'-6"	10.17	993	11.07	1089	11.28	1095	11.74	1147	13.26	1229	14.30	1328	14.87	1381	16.13	1547
72"		28.27	18'-6"	13.13	1265	14.30	1377	14.56	1424	15.12	1481	17.07	1538	18.38	1654	19.11	1753	20.70	1937

QUANTITIES SHOWN ABOVE ARE FOR TWO HEADWALLS

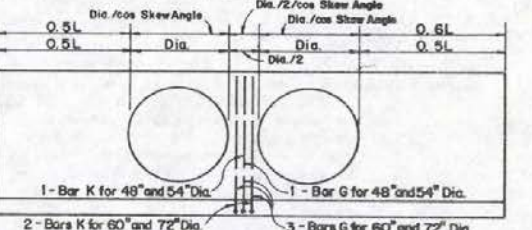
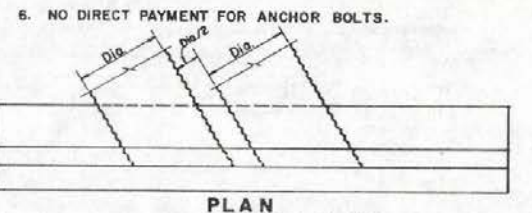
QUANTITIES SHOWN BELOW ARE FOR ONE HEADWALL.

CMP SIZE DIA.	LENGTH OF REINFORCING BARS																						
	0° SKEW				15° SKEW				30° SKEW				45° SKEW										
	NO. 5	NO. 5	NO. 4	NO. 4	NO. 5	NO. 5	NO. 4	NO. 4	NO. 5	NO. 5	NO. 4	NO. 4	NO. 5	NO. 5	NO. 4	NO. 4							
48"	12'-2"-9"	10'-7"-7"	12'-6"-0"	9'-16"-3"	10'-5"-10"	13'-2"-9"	11'-7"-7"	6'-5"-10"	6'-7"-3"	9'-25"-10"	12'-5"-10"	18'-2"-9"	13'-7"-7"	6'-5"-8"	6'-7"-3"	9'-25"-10"	13'-5"-10"	14'-2"-9"	12'-7"-7"	6'-5"-6"	6'-7"-3"	9'-25"-10"	12'-5"-10"
54"	13'-2"-9"	12'-8"-1"	12'-6"-9"	9'-25"-0"	13'-6"-4"	19'-2"-9"	14'-8"-1"	6'-6"-7"	6'-8"-1"	9'-28"-10"	14'-6"-4"	20'-2"-9"	15'-8"-1"	6'-6"-5"	6'-8"-1"	9'-28"-10"	15'-6"-4"	22'-2"-9"	17'-8"-1"	6'-6"-3"	6'-8"-1"	9'-28"-10"	17'-8"-1"
60"	21'-3"-9"	18'-8"-9"	12'-7"-6"	10'-27"-9"	14'-6"-10"	23'-3"-9"	23'-8"-9"	6'-7"-4"	6'-9"-0"	10'-22"-0"	13'-6"-10"	23'-3"-9"	23'-8"-9"	6'-7"-2"	6'-9"-0"	10'-22"-0"	13'-6"-10"	24'-3"-9"	21'-8"-9"	6'-7"-0"	6'-9"-0"	10'-22"-0"	14'-6"-10"
72"	25'-3"-9"	20'-9"-9"	16'-9"-0"	10'-23"-3"	16'-7"-10"	26'-3"-9"	25'-9"-9"	8'-8"-10"	8'-10"-10"	10'-26"-4"	15'-7"-10"	28'-3"-9"	27'-9"-9"	8'-8"-8"	8'-10"-10"	10'-27"-0"	16'-7"-10"	29'-3"-9"	24'-9"-9"	8'-8"-6"	8'-10"-10"	10'-26"-7"	17'-7"-10"



GENERAL NOTES

- CONCRETE SHALL BE CLASS A OR AA.
- REINFORCING STEEL SHALL BE DEFORMED BARS WITH MAXIMUM SPACING OF 18" SET 2 1/2" CLEAR OF SURFACE OF CONCRETE EXCEPT AS NOTED. BAR ENDS SHALL BE KEPT 1 1/2" CLEAR OF SURFACE OF CONCRETE. REINFORCING BARS MAY BE CUT AND BENT IN FIELD.
- FOOTINGS SHOWN ARE OF MINIMUM DEPTH AND SHALL BE EXTENDED IF SOIL IS UNSUITABLE OR LIABLE TO SCOUR.
- CULVERT PIPES TO BE SET ON A SKEW SHALL BE MITERED WHEN HEADWALLS ARE CONSTRUCTED. WHEN HEADWALLS ARE NOT CONSTRUCTED THE PIPES SHALL NOT BE MITERED EXCEPT IN OVERFLOW SECTION.
- FOR ESTIMATING HEADWALL QUANTITIES ON SKEWED CULVERTS:
 - 0° TO 10° - USE QUANTITIES FOR 0° SKEW.
 - 11° TO 25° - USE QUANTITIES FOR 15° SKEW.
 - 26° TO 40° - USE QUANTITIES FOR 30° SKEW.
 - 41° TO 55° - USE QUANTITIES FOR 45° SKEW.
 - OVER 55° - CALCULATE QUANTITIES REQUIRED.



NOTE: For details of other reinforcing bars see single culvert headwalls.

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

CULVERT HEADWALLS
48" CMP TO 72" CMP

Approved: *[Signature]*
CHIEF ROAD DESIGN ENGINEER

R-2.4.2-(502)
ADOPTED: 8/88 REVISION

QUANTITIES SHOWN BELOW ARE FOR TWO HEADWALLS

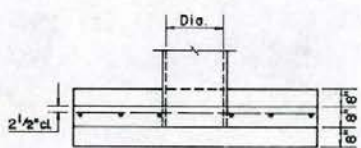
RCP SIZE DIA.	RCP AREA SQ.FT.	SINGLE RCP										DOUBLE RCP										X	Y	L	h
		0° SKEW		15° SKEW		30° SKEW		45° SKEW		0° SKEW		15° SKEW		30° SKEW		45° SKEW									
		CONC CU YD	STEEL LB	CONC CU YD	STEEL LB	CONC CU YD	STEEL LB	CONC CU YD	STEEL LB	CONC CU YD	STEEL LB	CONC CU YD	STEEL LB	CONC CU YD	STEEL LB	CONC CU YD	STEEL LB								
12"	0.79	1.00	46	1.09	49	1.10	49	1.14	50	1.41	59	1.52	62	1.58	64	1.73	67	0'-10"	1'-2"	4'-0"	3'-0"				
15"	1.23	1.32	55	1.45	58	1.47	59	1.52	60	1.30	70	1.33	73	2.01	75	2.18	79	0'-10 1/2"	1'-2 1/2"	5'-0"	3'-3 1/2"				
18"	1.77	1.62	69	1.77	73	1.80	74	1.85	75	2.15	85	2.31	89	2.40	91	2.50	96	0'-10 3/4"	1'-2 3/4"	5'-9"	3'-7"				
21"	2.41	1.95	77	2.13	82	2.16	83	2.23	85	2.59	95	2.79	101	2.90	103	3.13	108	0'-11"	1'-3"	7'-3"	3'-10 1/2"				
24"	3.14	2.27	96	2.48	102	2.52	103	2.60	105	3.01	116	3.24	122	3.27	125	3.64	131	0'-11 1/2"	1'-3 1/2"	7'-3"	4'-2"				
27"	3.98	2.62	105	2.86	111	2.90	112	2.99	114	3.48	128	3.75	134	3.89	137	4.21	144	0'-11 3/4"	1'-3 3/4"	8'-0"	4'-5"				
30"	4.91	3.08	117	3.37	123	3.41	124	3.44	127	4.07	141	4.38	148	4.55	152	4.90	159	0'-11 3/4"	1'-3 3/4"	9'-0"	4'-9"				
33"	5.94	3.50	125	3.82	132	3.87	134	3.98	137	4.62	153	4.98	160	5.17	164	5.56	172	0'-11 3/4"	1'-3 3/4"	9'-9"	5'-1 1/2"				
36"	7.07	3.93	161	4.29	169	4.34	171	4.47	174	5.19	190	5.59	200	5.80	204	6.24	213	1'-0"	1'-4"	10'-6"	5'-4"				

QUANTITIES SHOWN BELOW ARE FOR ONE HEADWALL

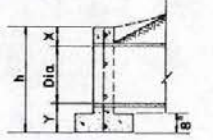
RCP SIZE DIA.	LENGTH OF REINFORCING BARS																	
	SINGLE				SINGLE OR DOUBLE								DOUBLE					
	0° TO 45°	0°	15°	30°	0°	15°	30°	45°	0° TO 45°	0°	15°	30°	45°	0° TO 45°	0°	15°	30°	45°
12"	NO. 4	NO. 5	NO. 5	NO. 5	NO. 4	NO. 4	NO. 4	NO. 4	NO. 4	NO. 4	NO. 4	NO. 4	NO. 4	NO. 4	NO. 5	NO. 5	NO. 5	NO. 5
12"	K	N	N	N	M	M	O	M	O	M	O	M	O	K	N	N	N	N
12"	6x2-9"	2x4-9"	2x5-2"	2x5-4"	2x5-7"	1x1-5"	1x2-1"	1x1-4"	1x2-2"	1x1-1"	1x2-5"	7x2-9"	2x7-0"	2x7-6"	2x7-11"	2x8-9"		
15"	6x3-1"	2x6-0"	2x6-6"	2x6-9"	2x7-0"	2x2-1"	1x1-11"	1x2-8"	1x1-10"	1x2-9"	1x1-7"	1x3-0"	7x3-1"	2x8-6"	2x9-2"	2x9-7"	2x10-7"	
18"	6x3-4"	2x7-0"	2x7-8"	2x7-10"	2x8-2"	4x2-5"	2x2-3"	2x3-1"	2x2-2"	2x3-2"	2x1-11"	2x3-5"	7x3-4"	2x9-9"	2x10-6"	2x11-0"	2x12-1"	
21"	6x3-8"	2x8-0"	2x8-9"	2x8-11"	2x9-5"	4x2-9"	2x2-7"	2x3-6"	2x2-6"	2x3-7"	2x2-3"	2x3-10"	7x3-8"	2x11-2"	2x12-0"	2x12-7"	2x13-10"	
24"	6x3-11"	2x9-0"	2x9-10"	2x10-1"	2x10-7"	4x3-2"	2x3-0"	2x4-0"	2x2-11"	2x4-1"	2x2-8"	2x4-4"	9x3-11"	2x12-7"	2x13-7"	2x14-2"	2x15-8"	
27"	8x4-2"	2x10-0"	2x10-11"	2x11-2"	2x11-9"	4x3-6"	2x3-4"	2x4-4"	2x3-3"	2x4-5"	2x3-0"	2x4-8"	9x4-2"	2x14-1"	2x15-1"	2x15-10"	2x17-6"	
30"	8x4-6"	2x11-3"	2x12-3"	2x12-7"	2x13-2"	4x4-0"	2x3-10"	2x5-0"	2x3-9"	2x5-1"	2x3-6"	2x5-4"	9x4-6"	2x15-9"	2x16-11"	2x17-9"	2x19-7"	
33"	8x4-10"	2x12-3"	2x13-4"	2x13-8"	2x14-4"	4x4-3"	2x4-1"	2x5-3"	2x4-0"	2x5-4"	2x3-9"	2x5-7"	9x4-10"	2x17-3"	2x18-6"	2x19-5"	2x21-5"	
36"	10x5-1"	2x13-3"	2x14-5"	2x14-9"	2x15-7"	6x4-8"	3x4-6"	2x5-9"	3x4-5"	3x5-10"	3x4-2"	3x6-1"	11x5-1"	2x18-8"	2x20-0"	2x21-0"	2x23-2"	

GENERAL NOTES

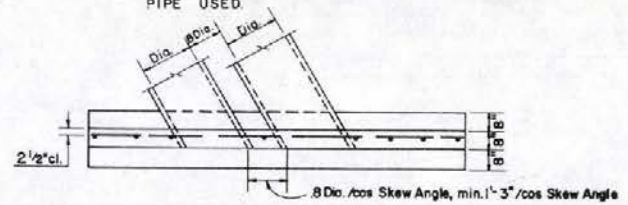
- CONCRETE SHALL BE CLASS A OR AA.
- REINFORCING STEEL SHALL BE DEFORMED BARS WITH MAXIMUM SPACING OF 18" SET 2 1/2" CLEAR OF SURFACE OF CONCRETE EXCEPT AS NOTED. BAR ENDS SHALL BE KEPT 1 1/2" CLEAR OF SURFACE OF CONCRETE. REINFORCING BARS MAY BE CUT AND BENT IN FIELD.
- FOOTINGS SHOWN ARE OF MINIMUM DEPTH AND SHALL BE EXTENDED IF SOIL IS UNSUITABLE OR LIABLE TO SCOUR.
- CULVERT PIPES TO BE SET ON A SKEW SHALL BE MITERED WHEN HEADWALLS ARE CONSTRUCTED. WHEN HEADWALLS ARE NOT CONSTRUCTED THE PIPES SHALL NOT BE MITERED EXCEPT IN OVERFLOW SECTION.
- FOR ESTIMATING HEADWALL QUANTITIES ON SKEWED CULVERTS:
 - 0° TO 10° - USE QUANTITIES FOR 0° SKEW.
 - 11° TO 25° - USE QUANTITIES FOR 15° SKEW.
 - 26° TO 40° - USE QUANTITIES FOR 30° SKEW.
 - 41° TO 55° - USE QUANTITIES FOR 45° SKEW.
 - OVER 55° - CALCULATE QUANTITIES REQUIRED. CULVERTS SHOULD BE INSTALLED ON 5° INCREMENTS WHERE IT IS FEASIBLE.
- DIMENSIONS X, Y, L, AND h TO REMAIN CONSTANT REGARDLESS OF MINOR VARIATIONS IN WALL THICKNESS DUE TO CLASS OF PIPE USED.



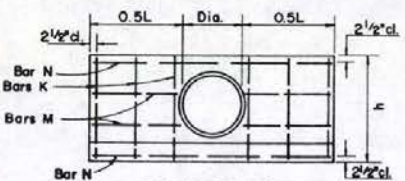
PLAN



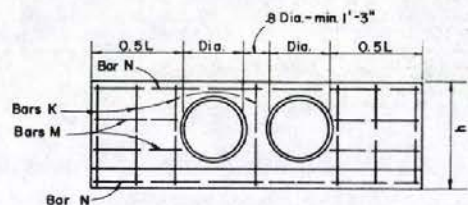
SECTION (FOR ALL HEADWALLS)



PLAN

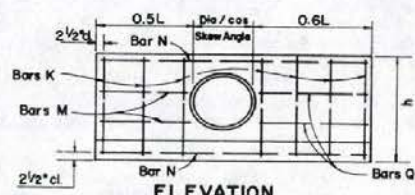


ELEVATION SINGLE RCP

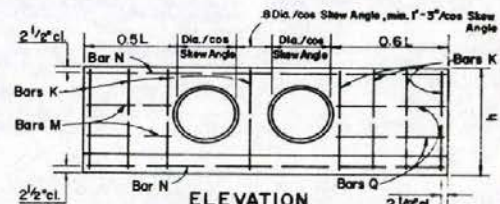


ELEVATION DOUBLE RCP

0° SKEW



ELEVATION SINGLE RCP



ELEVATION DOUBLE RCP

15° TO 45° SKEW

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION
CULVERT HEADWALLS
12" RCP TO 36" RCP

James E. Hill
CHIEF ROAD DESIGN ENGINEER

R-2.5.1-(502)
ADOPTED 8/69 NEVADA

QUANTITIES SHOWN BELOW ARE FOR TWO HEADWALLS

RCP SIZE DIA.	RCP AREA SQ.FT.	SINGLE RCP								DOUBLE RCP								X	Y	L	h
		0° SKEW		15° SKEW		30° SKEW		45° SKEW		0° SKEW		15° SKEW		30° SKEW		45° SKEW					
		CONC CU YD	STEEL LB	CONC CU YD	STEEL LB	CONC CU YD	STEEL LB	CONC CU YD	STEEL LB	CONC CU YD	STEEL LB	CONC CU YD	STEEL LB	CONC CU YD	STEEL LB	CONC CU YD	STEEL LB				
42"	9.62	6.10	571	6.66	624	6.76	627	6.98	666	8.18	692	8.80	748	9.15	790	9.91	877	1'-0 1/4"	2'-0 1/4"	12'-0"	6'-6 1/2"
48"	12.57	7.41	688	8.10	745	8.21	781	8.46	792	9.88	829	10.65	889	11.07	935	11.96	1030	1'-1"	2'-1"	13'-9"	7'-2"
54"	15.90	9.81	990	10.71	1091	10.87	1096	11.21	1146	13.11	1236	14.12	1340	14.68	1395	15.86	1562	1'-1 1/2"	2'-1 1/2"	15'-6"	7'-9"
60"	19.64	11.29	1137	12.32	1244	12.50	1250	12.88	1332	15.06	1407	16.25	1537	16.88	1596	18.25	1774	1'-2"	2'-2"	17'-0"	8'-4"
72"	28.27	15.62	1825	17.05	2002	17.30	2045	17.83	2170	20.87	2247	22.49	2464	23.36	2596	25.26	2881	1'-3"	2'-3"	20'-3"	9'-6"

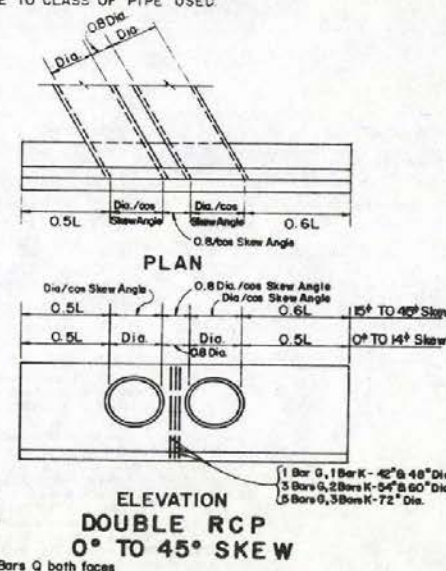
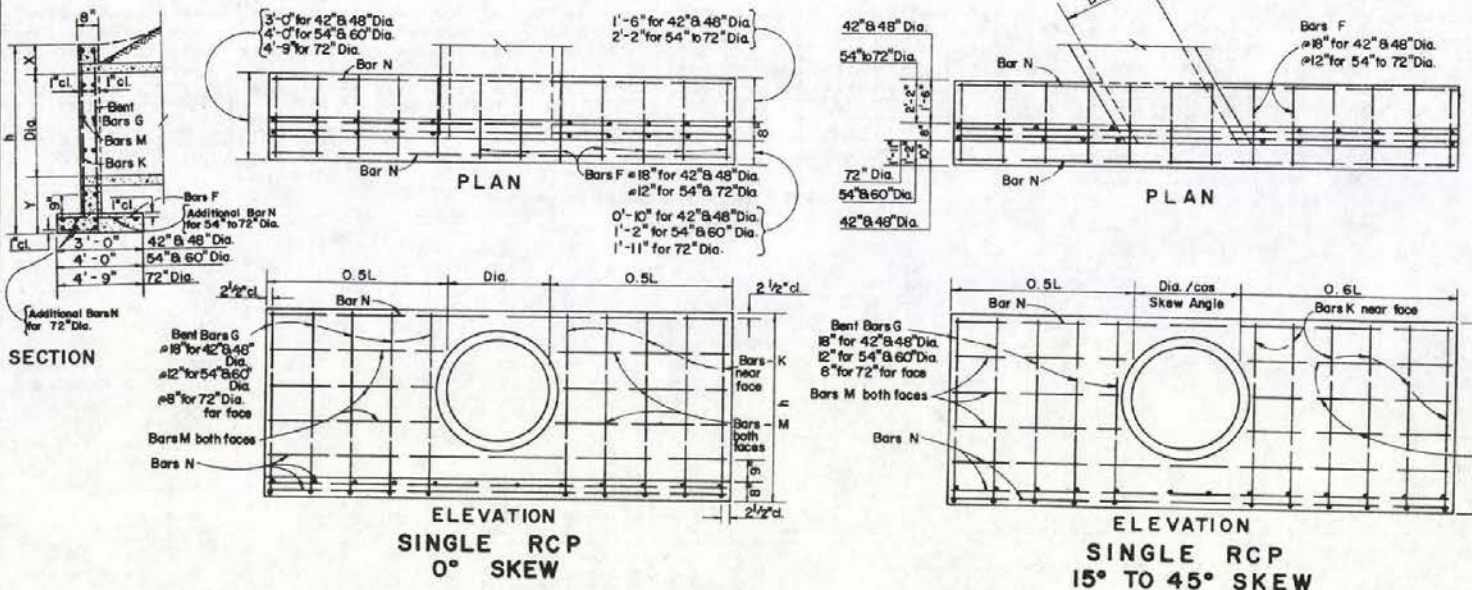
QUANTITIES SHOWN BELOW ARE FOR ONE HEADWALL

RCP SIZE DIA.	LENGTH OF REINFORCING BARS																							
	SINGLE RCP										DOUBLE RCP													
	0° SKEW		15° SKEW		30° SKEW		45° SKEW		0° SKEW		15° SKEW		30° SKEW		45° SKEW		0° SKEW		15° SKEW		30° SKEW		45° SKEW	
	NO. 5	NO. 4	NO. 5	NO. 4	NO. 5	NO. 4	NO. 5	NO. 4	NO. 5	NO. 4	NO. 5	NO. 4	NO. 5	NO. 4	NO. 5	NO. 4	NO. 5	NO. 4	NO. 5	NO. 4	NO. 5	NO. 4	NO. 5	NO. 4
42"	12#2'-9"	10#7'-6"	12#5'-5"	9#15'-3"	10#5'-8"	13#2'-9"	11#7'-6"	6#6'-3"	6#6'-6"	9#16'-7"	11#5'-8"	13#2'-9"	11#7'-6"	6#5'-1"	6#6'-6"	9#17'-0"	11#5'-8"	14#2'-9"	12#7'-6"	6#4'-11"	6#6'-6"	9#17'-1"	12#5'-8"	14#6'-3"
48"	13#2'-9"	12#8'-1"	12#6'-3"	9#17'-6"	12#6'-3"	14#2'-9"	13#8'-1"	6#6'-1"	6#7'-5"	9#19'-0"	13#6'-3"	15#2'-9"	14#8'-1"	6#5'-1"	6#7'-5"	9#19'-6"	14#6'-3"	15#2'-9"	14#8'-1"	6#5'-9"	6#7'-5"	9#20'-6"	14#6'-3"	14#6'-3"
54"	21#3'-9"	16#9'-1"	16#7'-1"	10#19'-9"	12#6'-10"	23#3'-9"	18#9'-1"	8#6'-11"	8#8'-5"	10#21'-6"	13#6'-10"	23#3'-9"	18#9'-1"	8#6'-9"	8#8'-5"	10#22'-0"	13#6'-10"	24#3'-9"	19#9'-1"	8#6'-7"	8#8'-5"	10#23'-2"	14#6'-10"	14#6'-10"
60"	23#3'-9"	18#9'-8"	16#7'-9"	10#21'-9"	14#7'-5"	25#3'-9"	20#9'-8"	8#7'-7"	8#9'-4"	10#23'-8"	15#7'-5"	25#3'-9"	20#9'-8"	8#7'-5"	8#9'-4"	10#24'-3"	15#7'-5"	27#3'-9"	22#9'-8"	8#7'-3"	8#9'-4"	10#25'-6"	16#7'-5"	16#7'-5"
72"	27#4'-6"	20#11'-7"	20#9'-11"	12#26'-0"	16#8'-7"	29#4'-6"	23#11'-7"	10#9'-2"	10#11'-3"	12#28'-3"	18#8'-7"	30#4'-6"	24#11'-7"	10#9'-0"	10#11'-3"	12#29'-0"	18#8'-7"	32#4'-6"	27#11'-7"	10#8'-10"	10#11'-3"	12#30'-6"	19#8'-7"	19#8'-7"
42"	16#2'-9"	11#7'-6"	12#5'-5"	9#21'-6"	11#5'-8"	17#2'-9"	12#7'-6"	6#5'-3"	6#6'-6"	9#23'-1"	12#5'-8"	18#2'-9"	13#7'-6"	6#5'-1"	6#6'-6"	9#24'-3"	13#5'-8"	20#2'-9"	15#7'-6"	6#4'-11"	6#6'-6"	9#26'-10"	15#5'-8"	15#5'-8"
48"	18#2'-9"	13#8'-1"	12#6'-3"	9#24'-9"	13#6'-3"	19#2'-9"	14#8'-1"	6#6'-1"	6#7'-5"	9#26'-6"	14#6'-3"	20#2'-9"	15#8'-1"	6#5'-11"	6#7'-5"	9#27'-10"	15#6'-3"	22#2'-9"	17#8'-1"	6#5'-9"	6#7'-5"	9#30'-9"	17#6'-3"	17#6'-3"
54"	29#3'-9"	19#9'-1"	16#7'-0"	10#27'-10"	14#6'-10"	31#3'-9"	21#9'-1"	8#6'-11"	8#8'-5"	10#29'-10"	15#6'-10"	32#3'-9"	22#9'-1"	8#6'-9"	8#8'-5"	10#31'-4"	16#6'-10"	36#3'-9"	26#9'-1"	8#6'-7"	8#8'-5"	10#34'-8"	18#6'-10"	18#6'-10"
60"	32#3'-9"	21#9'-8"	16#7'-9"	10#30'-9"	14#7'-5"	35#3'-9"	24#9'-8"	8#7'-7"	8#9'-4"	10#33'-0"	16#7'-5"	36#3'-9"	25#9'-8"	8#7'-5"	8#9'-4"	10#34'-8"	17#7'-5"	40#3'-9"	29#9'-8"	8#7'-3"	8#9'-4"	10#38'-3"	19#7'-5"	19#7'-5"
72"	37#4'-6"	25#11'-7"	20#9'-11"	12#36'-10"	19#8'-7"	40#4'-6"	33#11'-7"	10#9'-2"	10#11'-3"	12#39'-5"	21#8'-7"	42#4'-6"	34#11'-7"	10#9'-0"	10#11'-3"	12#41'-5"	22#8'-7"	46#4'-6"	48#11'-7"	10#8'-10"	10#11'-3"	12#45'-10"	25#8'-7"	25#8'-7"

GENERAL NOTES

1. CONCRETE SHALL BE CLASS A OR AA.
2. REINFORCING STEEL SHALL BE DEFORMED BARS WITH MAXIMUM SPACING OF 18" SET 2 1/2" CLEAR OF SURFACE OF CONCRETE EXCEPT AS NOTED. BAR ENDS SHALL BE KEPT 1 1/2" CLEAR OF SURFACE OF CONCRETE. REINFORCING BARS MAY BE CUT AND BENT IN FIELD.
3. FOOTINGS SHOWN ARE OF MINIMUM DEPTH AND SHALL BE EXTENDED IF SOIL IS UNSUITABLE OR LIABLE TO SCOUR.
4. CULVERT PIPES TO BE SET ON A SKEW SHALL BE MITERED WHEN HEADWALLS ARE CONSTRUCTED WHEN HEADWALLS ARE NOT CONSTRUCTED, THE PIPES SHALL NOT BE MITERED EXCEPT IN OVERFLOW SECTION.
5. FOR ESTIMATING HEADWALL QUANTITIES ON SKEWED CULVERTS:
 - 0° TO 10° - USE QUANTITIES FOR 0° SKEW.
 - 11° TO 25° - USE QUANTITIES FOR 15° SKEW.
 - 26° TO 40° - USE QUANTITIES FOR 30° SKEW.
 - 41° TO 55° - USE QUANTITIES FOR 45° SKEW.
 - OVER 55° - CALCULATE QUANTITIES REQUIRED. CULVERTS SHOULD BE INSTALLED ON 5° INCREMENTS WHERE IT IS FEASIBLE.
6. DIMENSIONS X, Y, L, AND h TO REMAIN CONSTANT REGARDLESS OF MINOR VARIATIONS IN WALL THICKNESS DUE TO CLASS OF PIPE USED.

R-23



STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

CULVERT HEADWALLS
42" RCP TO 72" RCP

Small & Sea
CHIEF ROAD DESIGN ENGINEER

R-2.5.2-(502)
ADOPTED: 8/99 REVISOR

QUANTITIES SHOWN BELOW ARE FOR TWO HEADWALLS

CWP SIZE S X R	CWP DIA.	CWP AREA SQ. FT.	L	SINGLE CWP								DOUBLE CWP							
				0° SKEW		15° SKEW		30° SKEW		45° SKEW		0° SKEW		15° SKEW		30° SKEW		45° SKEW	
				CONC. CU. YD.	STEEL LB.	CONC. CU. YD.	STEEL LB.	CONC. CU. YD.	STEEL LB.	CONC. CU. YD.	STEEL LB.	CONC. CU. YD.	STEEL LB.	CONC. CU. YD.	STEEL LB.	CONC. CU. YD.	STEEL LB.	CONC. CU. YD.	STEEL LB.
17" x 13"	15"	1.1	3'3"	0.87	35	0.94	37	0.97	38	1.05	39	1.30	48	1.38	51	1.46	53	1.64	57
21" x 15"	18"	1.6	3'9"	1.05	40	1.13	42	1.17	43	1.24	45	1.54	55	1.64	58	1.74	60	1.94	65
24" x 18"	21"	2.3	4'9"	1.45	50	1.53	54	1.58	54	1.67	55	1.99	66	2.13	69	2.24	72	2.47	78
28" x 20"	24"	2.9	5'0"	1.51	59	1.64	63	1.68	64	1.79	66	2.13	77	2.29	81	2.40	84	2.67	90
35" x 24"	30"	4.4	6'0"	1.95	70	2.09	74	2.15	75	2.28	79	2.67	91	2.86	95	3.00	99	3.32	106
40" x 29"	36"	6.4	7'3"	2.19	101	2.70	107	2.78	103	2.94	112	3.41	126	3.66	132	3.84	136	4.24	145
49" x 33"	42"	8.5	8'3"	2.99	114	3.25	120	3.34	122	3.52	127	4.10	143	4.39	150	4.61	155	5.08	165
57" x 38"	48"	11.4	9'6"	3.69	130	4.00	137	4.10	140	4.33	145	5.03	163	5.39	171	5.66	177	6.24	189
64" x 43"	54"	14.5	10'6"	4.27	156	4.63	164	4.75	166	5.01	172	5.82	199	6.24	208	6.55	214	7.21	228
71" x 47"	60"	17.5	11'6"	4.90	184	5.32	194	5.45	197	5.74	204	6.66	231	7.14	242	7.49	249	8.24	265
77" x 52"	66"	21.2	12'6"	5.83	214	6.33	225	6.48	228	6.82	235	8.35	263	8.46	275	8.88	284	9.74	302
83" x 57"	72"	25.0	13'6"	6.61	246	7.18	254	7.35	260	7.72	267	9.44	294	9.57	308	10.00	319	10.98	339

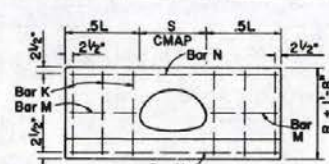
GENERAL NOTES

1. CONCRETE SHALL BE CLASS A OR AA.
2. REINFORCING STEEL SHALL BE DEFORMED BARS WITH MAXIMUM SPACING OF 18" SET 25" CLEAR OF SURFACE OF CONCRETE EXCEPT AS NOTED. BAR ENDS SHALL BE KEPT 14" CLEAR OF SURFACE OF CONCRETE. REINFORCING BARS MAY BE CUT AND BENT IN FIELD.
3. FOOTINGS SHOWN ARE OF MINIMUM DEPTH AND SHALL BE EXTENDED IF SOIL IS UNSUITABLE OR LIABLE TO SCOUR.
4. CULVERT PIPES TO BE SET ON A SKEW SHALL BE MITERED WHEN HEADWALLS ARE CONSTRUCTED. WHEN HEADWALLS ARE NOT CONSTRUCTED THE PIPES SHALL NOT BE MITERED EXCEPT IN OVERFLOW SECTION.
5. FOR ESTIMATING HEADWALL QUANTITIES ON SKEWED CULVERTS:
0° TO 10° - USE QUANTITIES FOR 0° SKEW.
10° TO 25° - USE QUANTITIES FOR 15° SKEW.
26° TO 40° - USE QUANTITIES FOR 30° SKEW.
41° TO 55° - USE QUANTITIES FOR 45° SKEW.
OVER 55° - CALCULATE QUANTITIES REQUIRED.
CULVERTS SHOULD BE INSTALLED ON 5° INCREMENTS WHERE IT IS FEASIBLE.

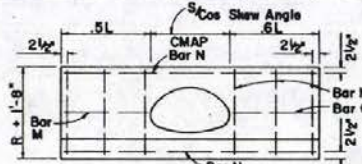
QUANTITIES SHOWN BELOW ARE FOR ONE HEADWALL

LENGTH OF REINFORCING BARS

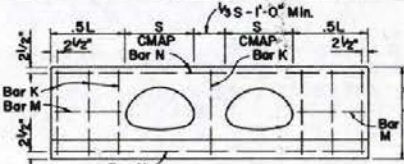
CWP SIZE S X R	SINGLE CWP					SINGLE OR DOUBLE CWP					DOUBLE CWP													
	0° - 45°		15°		30°		45°		0°		15°		30°		45°		0° - 45°		15°		30°		45°	
	NO. 4	NO. 5	NO. 5	NO. 5	NO. 5	NO. 4	NO. 4	NO. 4	NO. 4	NO. 4	NO. 4	NO. 4	NO. 4	NO. 4	NO. 4	NO. 4	NO. 4	NO. 5	NO. 5	NO. 5	NO. 5	NO. 5	NO. 5	
17" x 13"	4 @ 2'4"	2 @ 4'6"	2 @ 4'11"	2 @ 5'1"	2 @ 5'6"	2 @ 1'4"	1 @ 1'2"	1 @ 1'9"	1 @ 1'9"	1 @ 1'10"	1 @ 0'10"	1 @ 2'1"	5 @ 2'4"	2 @ 7'0"	2 @ 7'6"	2 @ 7'11"	2 @ 9'0"							
21" x 15"	4 @ 2'6"	2 @ 5'4"	2 @ 6'0"	2 @ 6'6"	2 @ 6'0"	2 @ 1'7"	1 @ 1'5"	1 @ 2'1"	1 @ 2'1"	1 @ 2'2"	1 @ 1'1"	1 @ 2'5"	5 @ 2'6"	2 @ 8'2"	2 @ 8'8"	2 @ 9'3"	2 @ 10'6"							
24" x 18"	6 @ 2'9"	2 @ 6'5"	2 @ 7'1"	2 @ 7'2"	2 @ 7'9"	2 @ 2'1"	1 @ 2'1"	1 @ 2'7"	1 @ 2'7"	1 @ 2'3"	1 @ 2'1"	1 @ 2'7"	7 @ 2'9"	2 @ 9'6"	2 @ 10'1"	2 @ 10'6"	2 @ 11'6"							
28" x 20"	6 @ 2'11"	2 @ 7'2"	2 @ 7'9"	2 @ 8'0"	2 @ 8'8"	2 @ 2'3"	1 @ 2'4"	1 @ 2'10"	1 @ 2'3"	1 @ 2'11"	1 @ 2'3"	1 @ 3'2"	7 @ 2'11"	2 @ 10'7"	2 @ 11'4"	2 @ 12'0"	2 @ 13'6"							
35" x 24"	6 @ 3'3"	2 @ 8'9"	2 @ 9'6"	2 @ 9'10"	2 @ 10'7"	2 @ 2'9"	1 @ 2'7"	1 @ 3'6"	1 @ 2'7"	1 @ 3'7"	1 @ 2'6"	1 @ 3'10"	7 @ 3'3"	2 @ 12'9"	2 @ 13'7"	2 @ 14'5"	2 @ 16'3"							
40" x 29"	8 @ 3'8"	2 @ 10'7"	2 @ 11'5"	2 @ 11'10"	2 @ 12'9"	4 @ 3'4"	2 @ 3'2"	2 @ 4'2"	2 @ 3'1"	2 @ 4'3"	2 @ 2'10"	2 @ 4'6"	9 @ 3'8"	2 @ 15'4"	2 @ 16'5"	2 @ 17'4"	2 @ 19'6"							
49" x 33"	8 @ 4'0"	2 @ 12'2"	2 @ 13'2"	2 @ 13'8"	2 @ 14'9"	4 @ 3'10"	2 @ 3'6"	2 @ 4'9"	2 @ 3'7"	2 @ 4'10"	2 @ 3'4"	2 @ 5'1"	9 @ 4'0"	2 @ 17'8"	2 @ 18'11"	2 @ 20'1"	2 @ 22'7"							
57" x 38"	8 @ 4'5"	2 @ 14'1"	2 @ 15'2"	2 @ 15'9"	2 @ 17'0"	4 @ 4'6"	2 @ 4'4"	2 @ 5'7"	2 @ 4'3"	2 @ 5'8"	2 @ 4'0"	2 @ 5'11"	9 @ 4'5"	2 @ 20'6"	2 @ 21'11"	2 @ 23'3"	2 @ 26'2"							
64" x 43"	10 @ 4'9"	2 @ 15'8"	2 @ 16'11"	2 @ 17'7"	2 @ 19'0"	4 @ 5'0"	2 @ 4'10"	2 @ 6'2"	2 @ 4'9"	2 @ 6'3"	2 @ 4'6"	2 @ 6'6"	12 @ 4'9"	2 @ 22'10"	2 @ 24'5"	2 @ 25'11"	2 @ 29'2"							
71" x 47"	10 @ 5'1"	2 @ 17'3"	2 @ 18'7"	2 @ 19'4"	2 @ 20'11"	6 @ 5'6"	3 @ 5'4"	3 @ 6'9"	3 @ 5'3"	3 @ 6'10"	3 @ 5'0"	3 @ 7'1"	12 @ 5'3"	2 @ 25'3"	2 @ 26'11"	2 @ 28'7"	2 @ 32'3"							
77" x 52"	10 @ 5'9"	2 @ 19'3"	2 @ 20'8"	2 @ 21'6"	2 @ 23'1"	6 @ 6'3"	3 @ 6'3"	3 @ 7'7"	3 @ 6'3"	3 @ 7'7"	3 @ 6'3"	3 @ 7'7"	12 @ 5'9"	2 @ 27'9"	2 @ 27'9"	2 @ 31'4"	2 @ 35'2"							
83" x 57"	10 @ 6'2"	2 @ 20'8"	2 @ 22'3"	2 @ 23'2"	2 @ 24'11"	6 @ 6'9"	3 @ 6'8"	3 @ 8'2"	3 @ 6'9"	3 @ 8'2"	3 @ 6'9"	3 @ 8'2"	12 @ 6'2"	2 @ 29'11"	2 @ 33'9"	2 @ 38'0"								



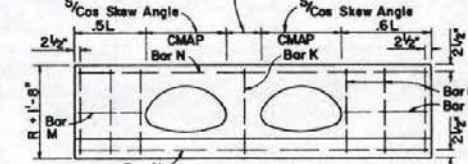
0° SKEW



15° to 45° SKEW

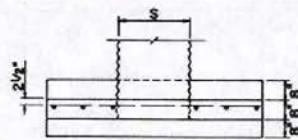


0° SKEW

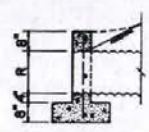


15° to 45° SKEW

ELEVATIONS

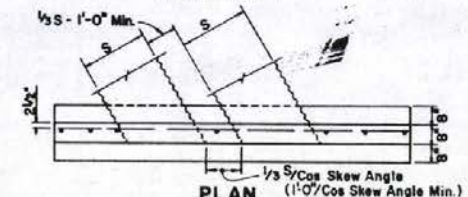


PLAN SINGLE CWP



SECTION For all Headwalls

ELEVATIONS



PLAN DOUBLE CWP

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

CULVERT HEADWALLS
17" x 13" CWP to 83" x 57" CWP

Robert W. Hill
CHIEF ROAD DESIGN ENGR.

R-2.6.1 (502)
ADOPTED 8/69 REVISION

Quantities Shown Below Are For Two Headwalls.

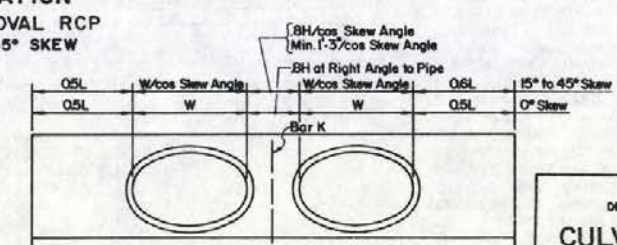
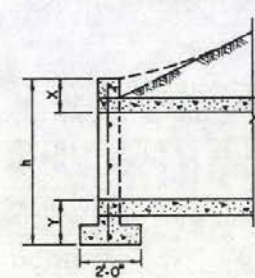
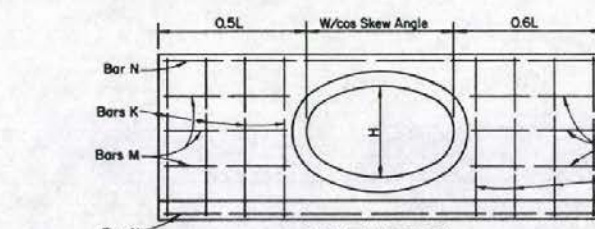
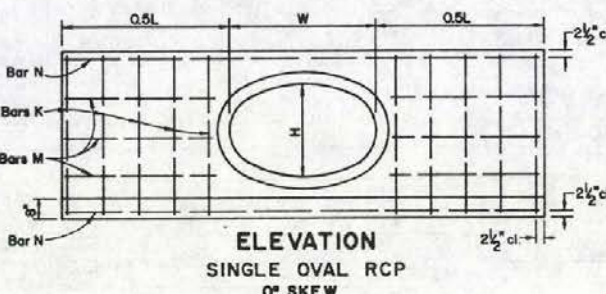
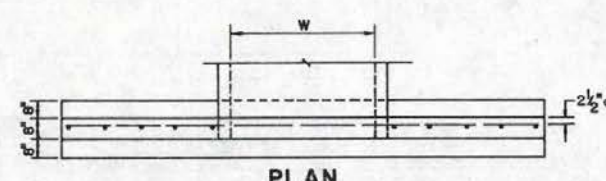
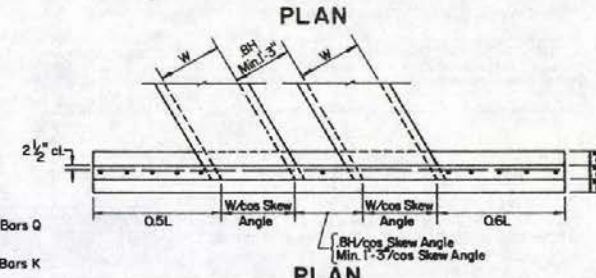
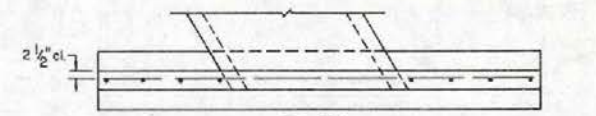
OVAL RCP SIZE W & H	RCP SIZE	OVAL RCP AREA SQFT	SINGLE OVAL RCP								DOUBLE OVAL RCP								X	Y	L	h
			0° SKEW		15° SKEW		30° SKEW		45° SKEW		0° SKEW		15° SKEW		30° SKEW		45° SKEW					
			CONC CU YD	STEEL LB	CONC CU YD	STEEL LB	CONC CU YD	STEEL LB	CONC CU YD	STEEL LB	CONC CU YD	STEEL LB	CONC CU YD	STEEL LB	CONC CU YD	STEEL LB	CONC CU YD	STEEL LB				
23"x14"	18"	1.82	1.37	57	1.49	60	1.52	61	1.60	63	1.94	74	2.08	77	2.18	80	2.40	86	10.4	1.24	4.9	3.3
30"x18"	24"	3.21	1.95	79	2.13	92	2.17	83	2.27	86	2.64	98	2.85	103	2.97	106	3.25	113	11.4	1.34	5.3	3.9
34"x22"	27"	4.20	2.30	87	2.50	92	2.55	93	2.66	96	3.11	110	3.34	116	3.49	119	3.81	127	11.9	1.34	7.0	4.1
38"x24"	30"	5.15	2.57	93	2.79	99	2.85	100	2.98	104	3.49	119	3.75	125	4.07	129	4.28	137	11.4	1.34	7.6	4.3
42"x27"	33"	6.39	2.94	113	3.20	120	3.26	121	3.40	125	4.00	141	4.30	148	4.49	153	4.91	162	11.4	1.34	8.3	4.6
45"x29"	36"	7.37	3.31	122	3.53	128	3.68	130	3.82	134	4.48	152	4.81	159	5.04	164	5.47	174	10.2	1.42	9.0	4.1
53"x34"	42"	10.15	4.06	164	4.42	173	4.50	175	4.68	180	5.48	199	5.90	209	6.14	214	6.69	226	11.1	1.5	10.3	5.4
60"x38"	48"	12.86	4.81	182	5.24	192	5.33	194	5.54	199	6.49	221	6.98	231	7.26	238	7.90	251	11.2	1.52	11.6	5.9

Quantities Shown Below Are For One Headwall.

OVAL RCP SIZE W & H	LENGTH OF REINFORCING BARS																			
	SINGLE OVAL RCP										DOUBLE OVAL RCP									
	SINGLE OR DOUBLE OVAL RCP					SINGLE OR DOUBLE OVAL RCP					SINGLE OR DOUBLE OVAL RCP					SINGLE OR DOUBLE OVAL RCP				
	0°-45°	0°	15°	30°	45°	0°	15°	30°	45°	0°-45°	0°	15°	30°	45°	0°-45°	0°	15°	30°	45°	
N# 4	N# 5	N# 5	N# 5	N# 5	N# 4	N# 4	N# 4	N# 4	N# 4	N# 4	N# 5	N# 5	N# 5	N# 4	N# 4	N# 5	N# 5	N# 5	N# 5	
K	N	N	N	N	M	M	Q	M	Q	M	Q	N	N	K	N	N	N	N	N	
23"x14"	6 # 3"	2 # 6.5"	2 # 7.0"	2 # 7.2"	2 # 7.8"	2 # 11.1"	1 # 1.9"	1 # 2.6"	1 # 1.8"	1 # 2.7"	1 # 1.5"	1 # 2.10"	7 # 3.1"	2 # 9.7"	2 # 10.3"	2 # 10.10"	2 # 12.2"			
30"x18"	6 # 3.6"	2 # 8.6"	2 # 9.3"	2 # 9.6"	2 # 10.2"	4 # 2.7"	2 # 2.5"	2 # 3.3"	2 # 2.4"	2 # 3.4"	2 # 2.1"	2 # 3.7"	7 # 3.6"	2 # 12.3"	2 # 13.1"	2 # 13.1"	2 # 15.6"			
34"x22"	6 # 3.10"	2 # 9.7"	2 # 10.4"	2 # 10.9"	2 # 11.5"	4 # 3.0"	2 # 2.10"	2 # 3.9"	2 # 2.9"	2 # 3.10"	2 # 2.6"	2 # 4.1"	7 # 3.10"	2 # 13.1"	2 # 14.10"	2 # 15.8"	2 # 17.6"			
38"x24"	6 # 4.1"	2 # 10.5"	2 # 11.3"	2 # 11.6"	2 # 12.6"	4 # 3.2"	2 # 3.0"	2 # 4.0"	2 # 2.1"	2 # 4.1"	2 # 2.8"	2 # 4.4"	7 # 4.1"	2 # 15.2"	2 # 16.3"	2 # 17.2"	2 # 19.3"			
42"x27"	8 # 4.4"	2 # 11.6"	2 # 12.5"	2 # 12.1"	2 # 13.9"	4 # 3.7"	2 # 3.5"	2 # 4.6"	2 # 3.5"	2 # 4.9"	2 # 3.3"	2 # 5.0"	9 # 4.4"	2 # 16.10"	2 # 17.1"	2 # 19.0"	2 # 21.3"			
45"x29"	8 # 4.7"	2 # 12.6"	2 # 13.6"	2 # 14.0"	2 # 14.1"	4 # 3.10"	2 # 3.8"	2 # 4.9"	2 # 3.7"	2 # 4.10"	2 # 3.4"	2 # 5.1"	9 # 4.7"	2 # 16.2"	2 # 19.5"	2 # 20.7"	2 # 23.0"			
53"x34"	10 # 5.1"	2 # 14.5"	2 # 15.7"	2 # 16.2"	2 # 17.3"	6 # 4.6"	3 # 4.4"	3 # 5.7"	3 # 4.3"	3 # 5.8"	3 # 4.0"	3 # 5.1"	11 # 5.1"	2 # 21.1"	2 # 22.6"	2 # 23.10"	2 # 26.9"			
60"x38"	10 # 5.6"	2 # 16.3"	2 # 17.7"	2 # 18.2"	2 # 19.6"	6 # 5.1"	3 # 4.1"	3 # 6.3"	3 # 4.10"	3 # 6.4"	3 # 4.7"	3 # 6.7"	11 # 5.6"	2 # 23.9"	2 # 25.8"	2 # 26.10"	2 # 30.2"			

GENERAL NOTES

- 1 - CONCRETE SHALL BE CLASS A OR AA.
- 2 - REINFORCING STEEL SHALL BE DEFORMED BARS WITH MAXIMUM SPACING OF 18" SET 2 1/2" CLEAR OF SURFACE OF CONCRETE EXCEPT AS NOTED. BAR ENDS SHALL BE KEPT 1/2" CLEAR OF SURFACE OF CONCRETE. REINFORCING BARS MAY BE CUT AND BENT IN FIELD.
- 3 - FOOTINGS SHOWN ARE OF MINIMUM DEPTH AND SHALL BE EXTENDED IF SOIL IS UNSUITABLE OR LIABLE TO SCOUR.
- 4 - CULVERT PIPES TO BE SET ON A SKEW SHALL BE MITERED WHEN HEADWALLS ARE CONSTRUCTED. WHEN HEADWALLS ARE NOT CONSTRUCTED THE PIPES SHALL NOT BE MITERED EXCEPT IN OVERFLOW SECTION.
- 5 - DIMENSIONS X, Y, L AND h TO REMAIN CONSTANT REGARDLESS OF MINOR VARIATIONS IN WALL THICKNESS DUE TO CLASS OF PIPE USED.
- 6 - FOR ESTIMATING HEADWALL QUANTITIES ON SKEWED CULVERTS:
 - 0° TO 10° - USE QUANTITIES FOR 0° SKEW.
 - 11° TO 25° - USE QUANTITIES FOR 15° SKEW.
 - 26° TO 40° - USE QUANTITIES FOR 30° SKEW.
 - 41° TO 55° - USE QUANTITIES FOR 45° SKEW.
 - OVER 55° - CALCULATE QUANTITIES REQUIRED.



STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

CULVERT HEADWALLS
23" x 14" OVAL RCP TO
60" x 38" OVAL RCP

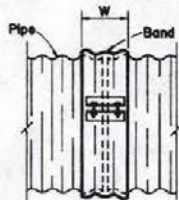
R-2.7.1-(502)

ADOPTED: 8/69

REVISION

NOTE: For Details of other Reinforcing Bars, See Single Culvert Headwalls.

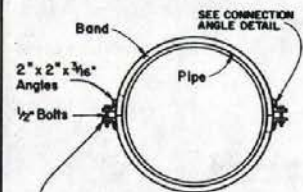
R-23



SIDE VIEW



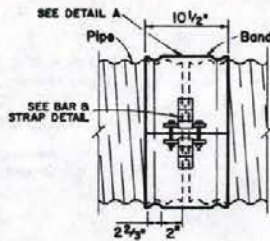
CONNECTION ANGLE DETAIL



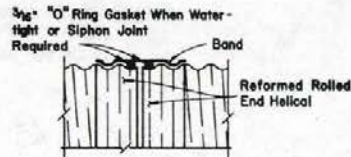
END VIEW

ANNULAR COUPLING BAND

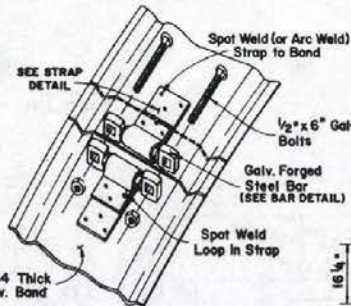
ANNULAR COUPLING BAND			
CORRUGATION	PIPE SIZE	W (IN MIN.)	1/2" BOLTS (NO. EACH CONNECTION)
2 2/3" X 1/2"	THRU 30"	7	2
2 2/3" X 1/2"	THRU 60"	12	3
2 2/3" X 1/2"	THRU 84"	24	5
3" X 1"	54" THRU 60"	14	3
3" X 1"	THRU 96"	26	5



SIDE VIEW



DETAIL A



BAR & STRAP DETAIL

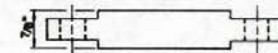
ALTERNATIVE ANNULAR COUPLING BAND FOR HCMP THRU 84"

COUPLING BAND FOR HELICAL WELD SEAM ONLY

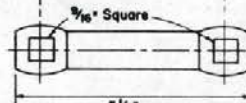


STRAP DETAIL

* SPOT WELDS SHALL DEVELOP FULL STRENGTH OF STRAP



TOP VIEW

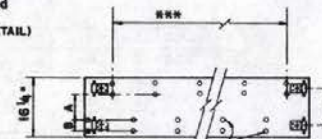


FRONT VIEW



END VIEW BAR DETAIL

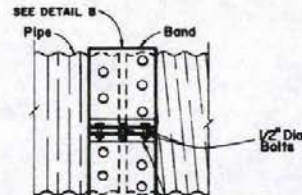
*** 8 SPACES AS REQUIRED TO FIT HELIX ANGLE



UNIVERSAL COUPLING BAND FOR USE ON 42" THRU 60" CMP INCLUSIVE

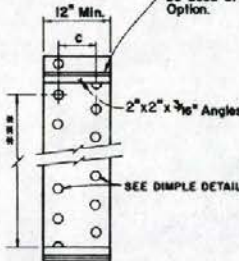
DIMENSION A: AS REQUIRED TO FIT HELIX ANGLE, 7" MIN.
DIMENSION B: AS REQUIRED TO FIT HELIX ANGLE, 2 2/3" MIN.

ONE PIECE BAND OPTIONAL ON 42" DIAMETER, TWO PIECE BAND REQUIRED ABOVE 42" DIAMETER.



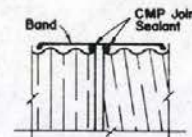
SIDE VIEW

Angle Connection Shown, Bar & Strap Type May be Used at Contractors Option.



BAND DETAIL

DIMENSION C: 7" MIN. BETWEEN DIMPLES, AS REQUIRED TO FIT THE HELIX ANGLE



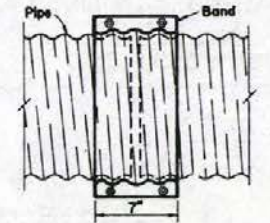
DETAIL B

NOTE: FOR HCMP DOWN DRAINS AND SLOTTED DRAINS.

UNIVERSAL COUPLING BAND FOR USE ON CMP THRU 36" INCLUSIVE

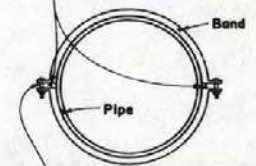
GENERAL NOTES

1. ALL COUPLING BAND CONNECTING HARDWARE SHALL BE GALVANIZED.
2. FOR PIPE ARCHES USE SAME WIDTH BAND AS FOR ROUND PIPE OF EQUAL PERIPHERY.
3. FOR WATERTIGHT AND SIPHON JOINTS ON ALTERNATIVE ANNULAR COUPLING BAND PLACE PASTIC SEALANT STRIP 1/8" THICK X 1 1/2" WIDE X 5" LONG IN LAP BETWEEN BANDS.
4. FOR ALTERNATIVE ANNULAR COUPLING BAND, 2 BAR AND STRAP ASSEMBLIES REQUIRED FOR PIPE GREATER THAN 42" DIAMETER, OPTIONAL FOR SIZES LESS THAN 42"



TOP VIEW

For Down Drains, Install Synthetic Rubber Strips



END VIEW

**TWO PIECE INTEGRAL FLANGE DIE FORMED FOR USE ON 6", 8" & 10" HCMP

** TO BE USED ONLY FOR JOINING EXISTING HELICALLY CORRUGATED PIPES



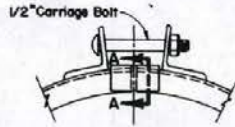
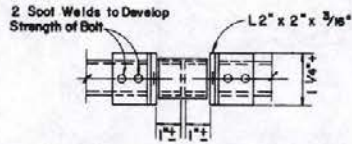
DIMPLE DETAIL

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION
**COUPLING BAND DETAILS
CMP AND PIPE ARCHES**

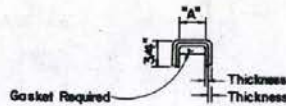
R-2.8.1- (804)
ADOPTED: 6/71 REVISION 7-780

COUPLING TYPE	CORRUGATION	PIPE SIZE	W or A	THICKNESS PIPE WALL	THICKNESS BAND	BAR & STRAP				ANGLE				WEDGE & STRAP	
						THICKNESS STRAP	BOLTS	BAR DIA.	BAR YIELD STRENGTH P.S.I.	DIMENSIONS	BOLTS	RIVETS ANGLE TO BAND	SPOT WELDS ANGLE TO BAND	THICKNESS STRAP	THICKNESS WEDGE
TWO PIECE INTEGRAL FLANGE	1 1/2" x 1/4"	6" Thru 10"	7"	0.064-0.079	0.064						2 - 3/8"				
UNIVERSAL	2 3/8" x 1/2"	Thru 36"	12"	0.064-0.138	0.064									0.079	0.138
		42" Thru 60"	16 1/4"	0.064-0.168	0.064	Double 0.079	1/2"	7/8"	32,000	2 x 2 x 3/16"	3 - 1/2"	3 - 5/8"	5 - 1/2"		
ANNULAR	2 3/8" x 1/2"	Thru 36"	12"	0.064-0.138	0.064					2 x 2 x 3/16"	3 - 1/2"	3 - 3/8"	5 - 1/2"		
		42" Thru 60"	12"	0.064-0.079	0.064					2 x 2 x 3/16"	3 - 1/2"	3 - 3/8"	5 - 1/2"		
		42" Thru 60"	12"	0.064-0.168	0.064					2 x 2 x 3/16"	3 - 1/2"	5 - 3/8"			
	3" x 1"	66" Thru 84"	24"	0.109-0.168	0.064					2 x 2 x 3/16"	5 - 1/2"	7 - 3/8"			
		48" Thru 60"	14"	0.064-0.079	0.064					2 x 2 x 3/16"	3 - 1/2"	3 - 3/8"	5 - 1/2"		
		48" Thru 60"	14"	0.109	0.064					2 x 2 x 3/16"	3 - 1/2"	5 - 3/8"			
CHANNEL	2 3/8" x 1/2"	66" Thru 120"	25"	0.064-0.109	0.064					2 x 2 x 3/16"	5 - 1/2"	9 - 3/8"			
		Thru 24"	3/4"	0.064-0.079	0.079	0.079	1/2"	7/8"	32,000	2 x 2 x 3/16"	1 - 1/2"	See Note B			
		30" Thru 42"	3/4"	0.064-0.079	0.079	0.079	1/2"	7/8"	32,000						
		30" Thru 42"	1"	0.109	0.109	0.079	1/2"	7/8"	32,000						
		48" Thru 54"	1"	0.064-0.079	0.109	0.079	1/2"	7/8"	32,000						

* SEE SHEET R-2.8.1 FOR 'W' DIMENSION.



CHANNEL COUPLING BAND FOR USE ON FLANGED END C.M.P. (CHANNEL COUPLING BAND SHALL BE TWO PIECE)



NOMINAL DIMENSIONS THICKNESS 'A' FOR USE WITH C.M.P.
 0.079" 3/4" 0.109" THICK or LIGHTER
 0.109" 1" 0.138" THICK or HEAVIER

SECTION A-A

GENERAL NOTES

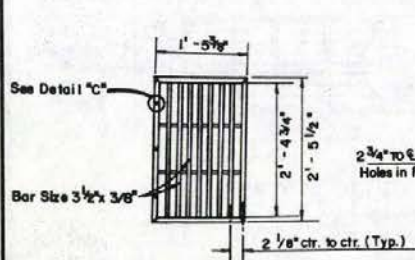
- ALL COUPLING BAND CONNECTION HARDWARE SHALL BE GALVANIZED OR ELECTROPLATED IN ACCORDANCE WITH STANDARD SPECIFICATIONS.
- FOR PIPE ARCHES USE SAME WIDTH BAND AS FOR ROUND PIPE OF EQUAL PERIPHERY.
- TWO PIECE BAND REQUIRED FOR PIPE GREATER THAN 42" DIAMETER.
- TENSION STRAP MAY BE CONNECTED TO BAND OR SHEET WITH EITHER SPOT WELDS OR FILLET WELDS THAT DEVELOP MINIMUM REQUIRED STRENGTH OF STRAP.
- USE 1 1/4" GAGE LINE DIMENSION ON ATTACHED ANGLE LEG FOR RIVETS AND SPOT WELDS.
- BAND THICKNESS SHALL NOT BE LESS THAN 3 STANDARD THICKNESSES LIGHTER THAN THE THICKNESS OF THE PIPE.
- DIMENSIONS AND THICKNESS SHOWN ARE MINIMUM.
- ANGLE 2" LONG WITH 0.064" x 2" STRAP.
- FILLET WELDS OF EQUIVALENT STRENGTH MAY BE SUBSTITUTED FOR SPOT WELDS OR RIVETS.



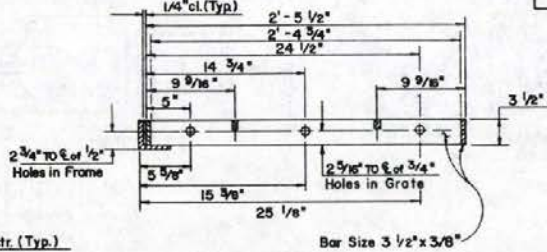
SPIRAL C.M.P. REFERRED TO ACCEPT UNIVERSAL, ANNULAR, CHANNEL COUPLERS

STATE OF NEVADA
 DEPARTMENT OF TRANSPORTATION
**CMP
 COUPLING BAND
 DETAILS**

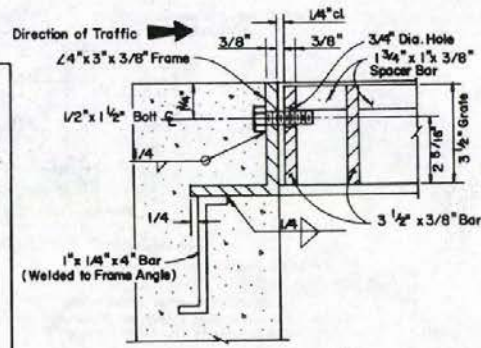
R-2.8.2 (604)
 ADOPTED 1/78
 REVISION 1-10/85



GRATE DETAIL



**DETAIL "C"
GRATE HOLE DETAIL**



**DETAIL "D"
GRATE HOLD-DOWN BOLT
(INSTALL ONLY ON APPROACH SIDE OF GRATE & FRAME)**

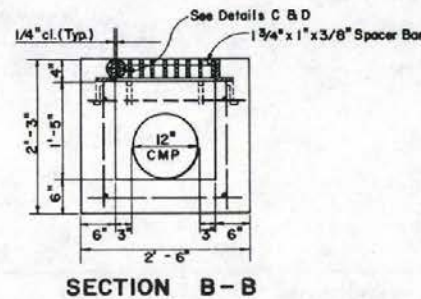
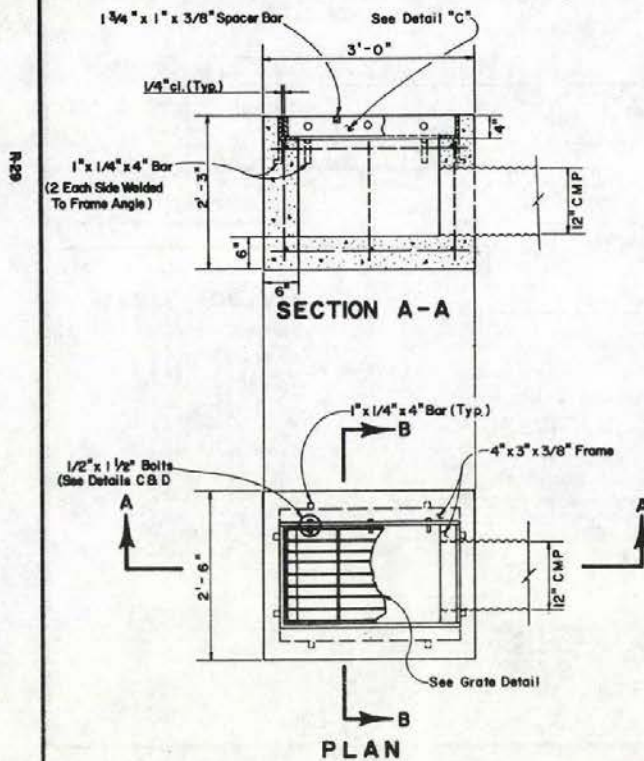
GENERAL NOTES

1. ALL CONCRETE SHALL BE CLASS A OR AA.
2. REINFORCING BARS SHALL BE NO. 4 BARS WITH MAXIMUM SPACING AT 18" CENTERS. BARS TO BE EMBEDDED A MINIMUM OF TWO INCHES AND BAR ENDS MUST CLEAR SURFACE BY ONE AND ONE-HALF INCHES.
3. ALL EXPOSED CONCRETE EDGES SHALL BE CHAMFERED ONE INCH.
4. GRATE AND FRAME ANGLE TO BE WELDED AT ALL CONTACT POINTS.

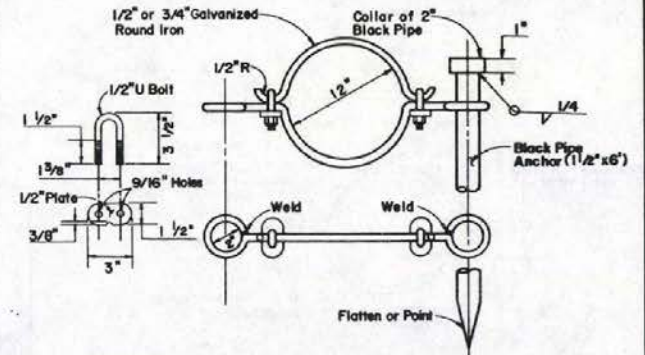
QUANTITIES *

CONCRETE	REINFORCING STEEL	STRUCTURAL STEEL
0.37 CU. YD.	25 LBS.	185 LBS.

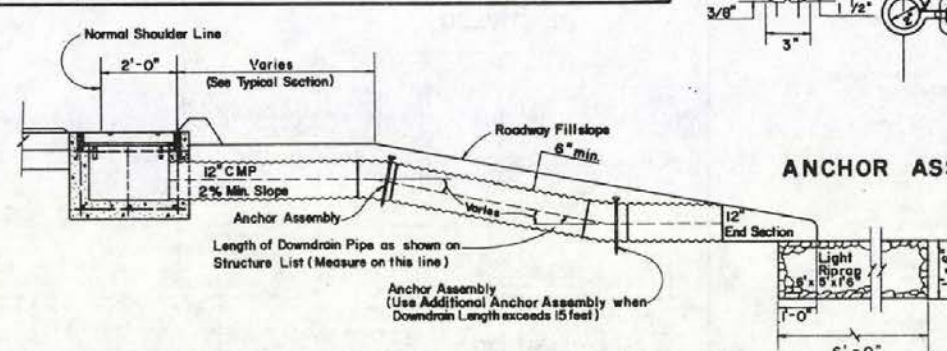
* FOR INFORMATION ONLY



SECTION B-B



ANCHOR ASSEMBLY DETAIL



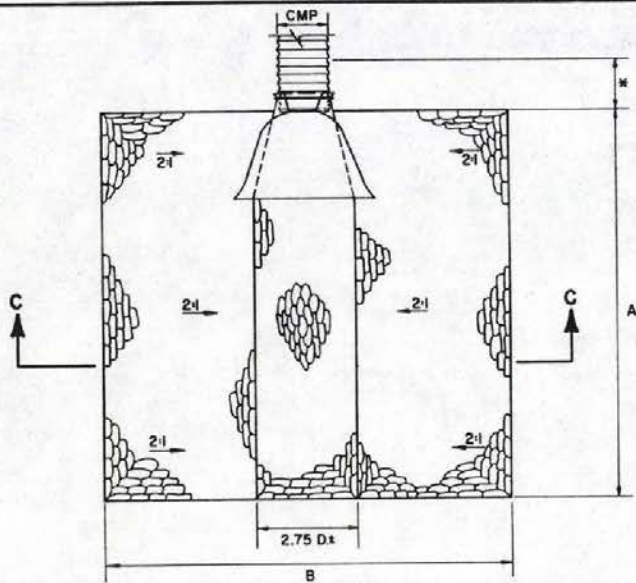
TYPICAL INSTALLATION - ELEVATION

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

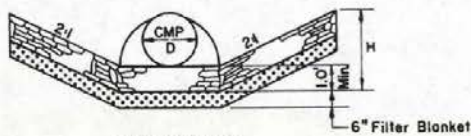
**EMBANKMENT PROTECTOR
(TYPE 5)**

David W. Lee
CHIEF ROAD DESIGN ENGR.

R-3.1.2 (608)
ADOPTED: 3/79 REVISION: 2-8/83



PLAN



SECTION C-C

H= SEE STRUCTURE LIST.

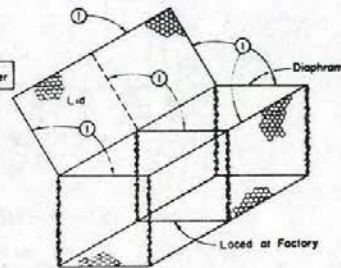
CULVERT SIZE	A	B
18" to 36"	3D	3.5D
42" to 84"	4D	3.75D

HYDRAULIC SECTION APPROVAL MUST BE OBTAINED PRIOR TO INCORPORATION INTO PLANS.

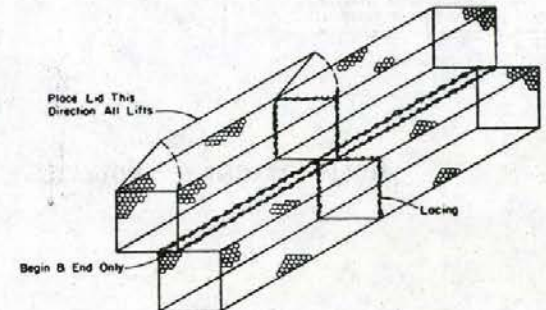
STANDARD RIPRAP BASIN

* When No End Section Is Used, Additional Rip Rap Shall Be As Required by Hydraulics Engineer.

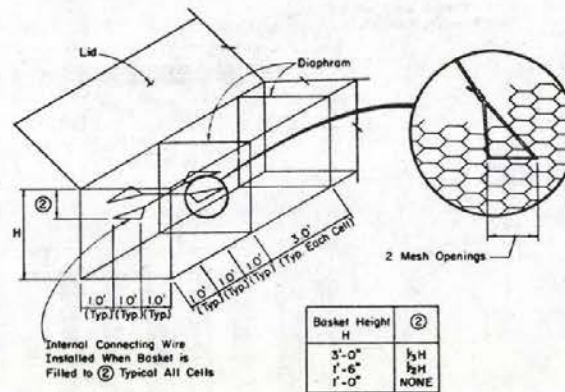
NOTE
① When Full, Laced Together



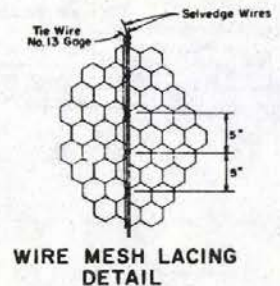
LACING SINGLE BASKET



LACING BASKET TO BASKET



INTERNAL CONNECTING WIRE DETAIL FOR WIRE MESH GABIONS



WIRE MESH LACING DETAIL

GABIONS LACING DETAIL

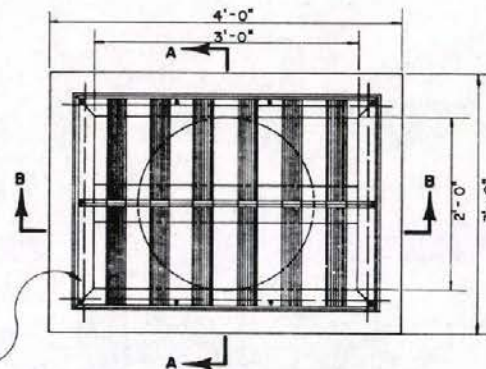
STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

STANDARD RIPRAP BASIN & GABIONS LACING DETAIL

R-31.4 (610)

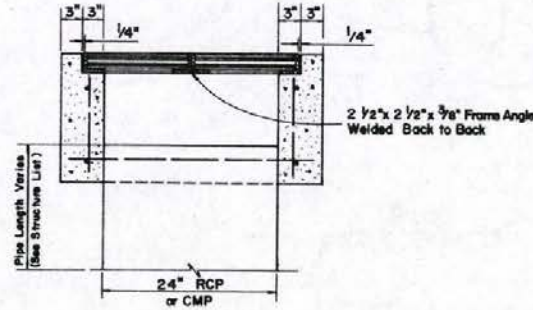
ADOPTED: 10/85 REVISION: 7-2/86

Chief Road Design Engr.

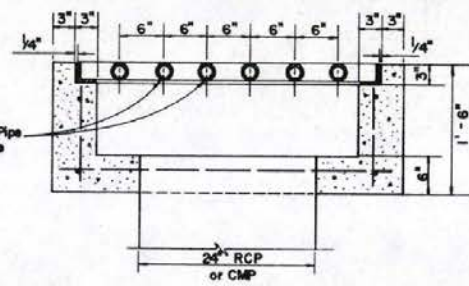


2 1/2" x 2 1/2" x 3/8"
Frame Angle around
Perimeter of Inlet

PLAN



SECTION A - A



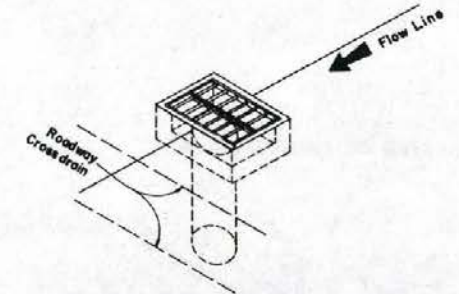
SECTION B - B

GENERAL NOTES

1. ALL CONCRETE SHALL BE CLASS A OR AA.
2. REINFORCING BARS SHALL BE NO. 4 BARS WITH MAXIMUM SPACING AT 18" CENTERS. BARS TO BE EMBEDDED A MINIMUM OF TWO INCHES AND BAR ENDS MUST CLEAR CONCRETE SURFACES BY ONE AND ONE-HALF INCH.
3. ALL EXPOSED CONCRETE EDGES SHALL BE CHAMFERED ONE INCH.
4. STRUCTURAL STEEL WEIGHT INCLUDES THE 2" PIPE AND THE 2 1/2" x 2 1/2" x 3/8" FRAME ANGLES.

QUANTITIES *		
CONCRETE	REINF. STEEL	STRUCT. STEEL
0.36 Cu. Yd.	23 lbs.	170 lbs.

* FOR INFORMATION ONLY



TYPICAL INSTALLATION

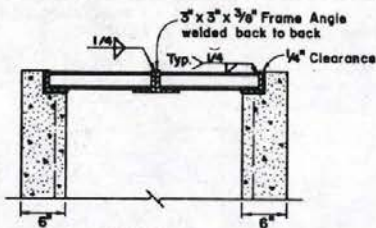
STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

PIPE RISER INLET
(TYPE 3)

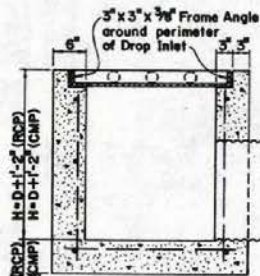
R-4.1.2 (609)

Ames J. Lee
CHIEF ROAD DESIGN ENGR

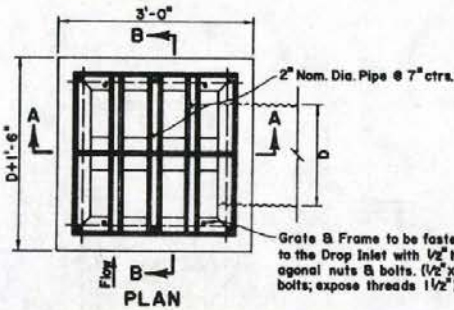
ADOPTED 8/69 REVISION



SECTION B-B



SECTION A-A



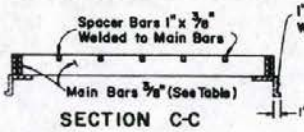
PLAN

— GENERAL NOTES —

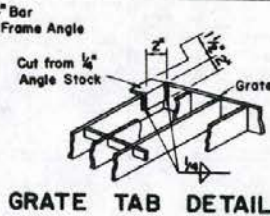
1. ALL CONCRETE SHALL BE CLASS A OR AA.
2. REINFORCING STEEL SHALL BE NO. 4 BARS WITH MAXIMUM SPACING AT 18" CENTERS, WIRED TIGHTLY AT ALL INTERSECTIONS AND EMBEDDED 2" CLEAR OF ALL CONCRETE SURFACES.
3. ALL EXPOSED CONCRETE EDGES SHALL BE CHAMFERED ONE INCH.
4. STRUCTURAL STEEL WEIGHT INCLUDES THE 2" PIPE AND THE 3"x3"x3/8" FRAME ANGLES.

CMP SIZE	CONCRETE CU. YD.	REINF. LB.	STRUCT. STEEL LB.	RCP SIZE	CONCRETE CU. YD.	REINF. LB.	STRUCT. STEEL LB.
18"	0.62	39	120	18"	0.66	40	120
24"	0.77	44	132	24"	0.84	45	132
30"	0.93	59	145	30"	0.99	60	145
36"	1.11	64	158	36"	1.17	65	158
42"	1.29	69	170	42"	1.35	70	170

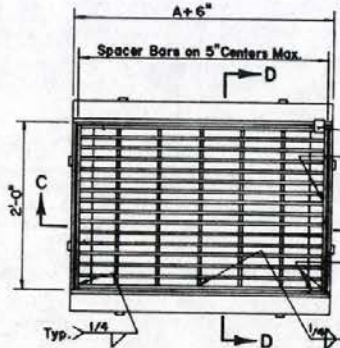
TYPE 2A DROP INLET



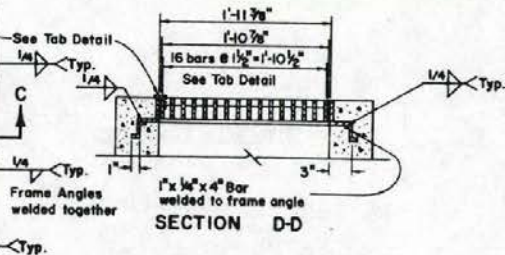
SECTION C-C



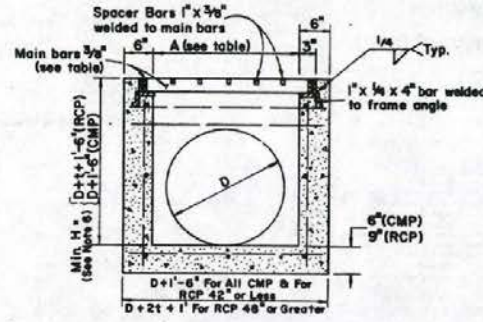
GRATE TAB DETAIL



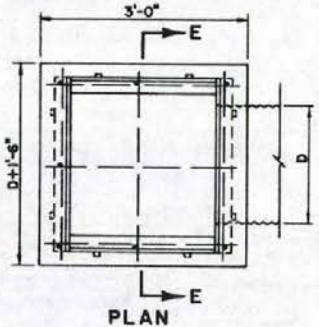
GRATE AND FRAME DETAIL



SECTION D-D



SECTION E-E



PLAN

BILL OF MATERIALS

PIPE SIZE	A	RCP (Standard Wall Pipe)			CMP			MAIN BARS INCHES	FRAME ANGLES INCHES	GRATE LB	FRAME LB	TOTAL LB
		H (ft.)	CONCRETE CU. YD.	REINF. LB.	H (ft.)	CONCRETE CU. YD.	REINF. LB.					
18"	2'-0"	3.19	0.77	43	3.00	0.68	41	2 1/2 x 3/8	3 x 3 x 3/8	138	67	205
24"	2'-6"	3.68	0.94	48	3.50	0.83	46	3 x 3/8	3 1/2 x 3 x 3/8	199	82	281
30"	3'-0"	4.25	1.11	54	4.00	1.00	51	3 1/2 x 3/8	4 x 3 x 3/8	266	96	362
36"	3'-6"	4.76	1.30	59	4.50	1.18	56	4 1/2 x 3/8	5 x 3 x 3/8	387	120	507
42"	4'-0"	5.32	1.51	74	5.00	1.37	71	4 1/2 x 3/8	5 x 3 x 3/8	434	129	563

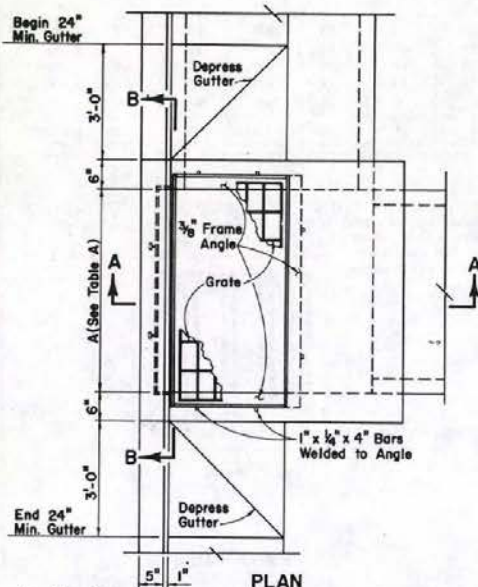
TYPE 2 DROP INLET

GENERAL NOTES

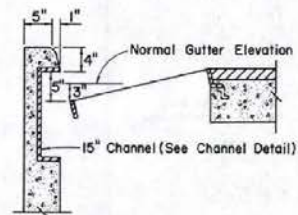
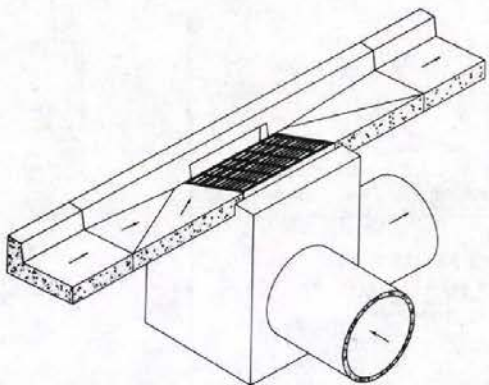
1. ALL CONCRETE SHALL BE CLASS A OR AA.
2. REINFORCING STEEL SHALL BE NO. 4 BARS WITH MAXIMUM SPACING AT 18" CENTERS, WIRED TIGHTLY AT ALL INTERSECTIONS AND EMBEDDED 2" CLEAR OF ALL CONCRETE SURFACES.
3. EXPOSED EDGES OF CONCRETE SHALL BE CHAMFERED 1".
4. DIMENSIONS MAY BE VARIED TO FIT LOCAL CONDITIONS IF ORDERED BY THE ENGINEER.
5. COMMERCIAL PREFABRICATED GRATINGS APPROVED BY THE BRIDGE DIVISION MAY BE USED IN LIEU OF THE FIELD-WELDED GRATING SHOWN ABOVE.
6. 1'-6" IS MINIMUM COVER FOR PIPE - ASSUMING CLASS III RCP OR 16 GAUGE COP WITH CLASS C BEDDING.

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION
TYPE 2 AND 2A
DROP INLET

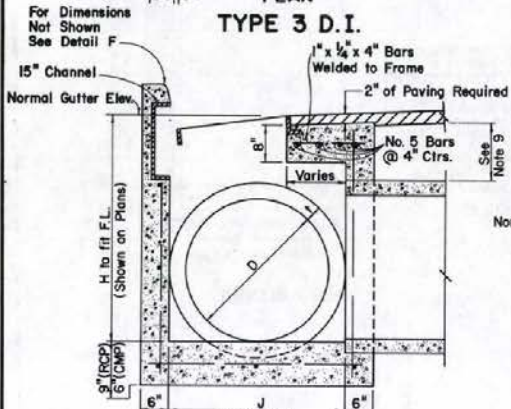
ADAPTED: 11/79
R-4.2.1-(808)



PLAN TYPE 3 D.I.

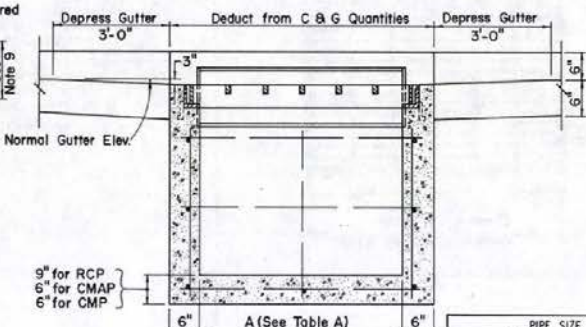


DETAIL F



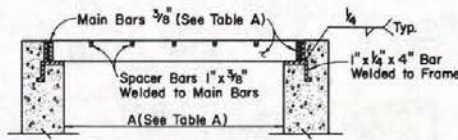
SECTION A-A

(FOR CMAP, CMP, RCP & LO-HED RCP)

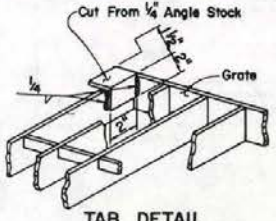


SECTION B-B

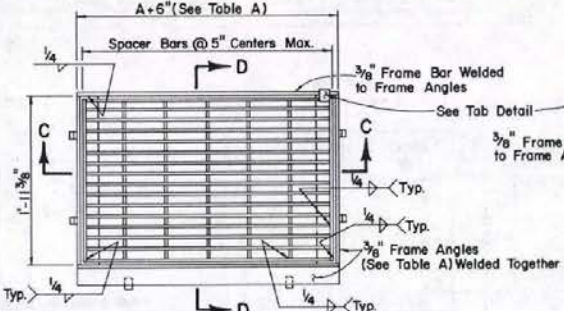
(FOR CMAP, CMP, RCP & LO-HED RCP)



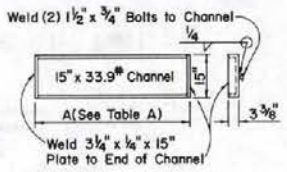
SECTION C-C



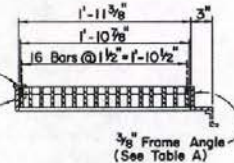
TAB DETAIL



PLAN GRATE AND FRAME DETAIL



CHANNEL DETAIL



SECTION D-D

TABLE B

CMAP	MAXIMUM H	
	J OR A	H
29" x 18" OR LESS	30" OR LESS	21'-0"
36" x 22"		16'-0"
43" x 27"	42"	12'-0"
	48"	9'-0"
	54"	7'-0"
	60"	7'-0"

(WITH #4 BARS @ 12" CENTERS)

GENERAL NOTES

- ALL CONCRETE SHALL BE CLASS A OR AA.
- ALL REINFORCING STEEL SHALL BE TIGHTLY WIRED AND EMBEDDED 1/2" CLEAR OF CONCRETE SURFACE EXCEPT AS NOTED. ALL REINFORCING STEEL SHALL BE NO. 4 BARS WITH MAXIMUM SPACE AT 18" CENTERS, FOR ALL VALUES OF H TO THE MAXIMUM AS SHOWN IN TABLE B. IF H EXCEEDS THESE MAXIMUMS, DROP INLET WILL REQUIRE SPECIAL DESIGN.
- EXPOSED EDGES OF CONCRETE SHALL BE CHAMFERED ONE INCH.
- WHERE PIPE INTERSECTS DROP INLET ON A 12" OR LARGER SKEW INCREASE J TO $\frac{S}{\cos \text{ SKEW } Z}$. REDESIGN FOR SKEWS AT A.
- WHERE PIPE INTERSECTS DROP INLET ON 12" OR LARGER SKEW INCREASE S TO $\frac{S}{\cos \text{ SKEW } Z}$. REDESIGN FOR SKEWS AT A.
- FOR VALUES OF "H" SEE STORM DRAIN SCHEDULE OR STRUCTURE LIST.
- "H" IS THE DIFFERENCE IN ELEVATION BETWEEN THE OUT FLOW PIPE AND THE NORMAL GUTTER GRADE LINE AT THE CURB FACE.
- PIPES(S) CAN BE PLACED IN ANY WALL.
- 1'-6" IS MINIMUM COVER FOR PIPE-ASSUMING CLASS III RCP OR 16 GAUGE CMP WITH CLASS C BEDDING.
- FOR DROP INLET, CONFIGURATIONS WITH 2 PIPES-INFLOW PIPE INVERT ELEVATION SHALL BE \approx 0' ABOVE OUTFLOW PIPE INVERT ELEVATION.

STRUCTURAL STEEL TABLE A

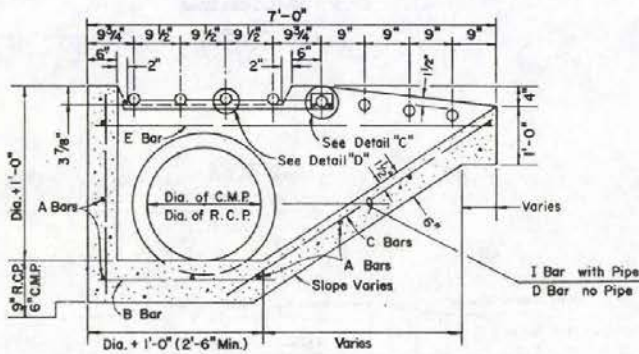
CMAP	PIPE SIZE			A	MAIN BARS	FRAME ANGLES	FRAME BAR	GRATE LBS	FRAME LBS	CHANNEL & PLATES, LBS	TOTAL LBS
	CMAP	RCP	LO-HED								
29" x 18" OR LESS	30" OR LESS	24" OR LESS	14" x 23" OR LESS	2'-6"	3" x 3/8"	3 1/2" x 3" x 3/8"	3 1/2" x 3/8"	199	68	93	360
	36" OR LESS	30" OR LESS	19" x 30" OR LESS	3'-0"	3 1/2" x 3/8"	4" x 3" x 3/8"	4" x 3/8"	266	83	107	456
	43" x 27"	36" OR LESS	22" x 34" OR LESS	3'-6"	5" x 3/8"	5" x 3" x 3/8"	5" x 3/8"	387	105	126	618
		42" OR LESS	27" x 42" OR LESS	4'-0"	5" x 3/8"	5" x 3" x 3/8"	5" x 3/8"	434	113	143	690
		54" OR LESS	29" x 45" OR LESS	4'-6"	4 1/2" x 3/8"	5" x 3" x 3/8"	5" x 3/8"	482	121	160	753

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

TYPE 3 DROP INLET

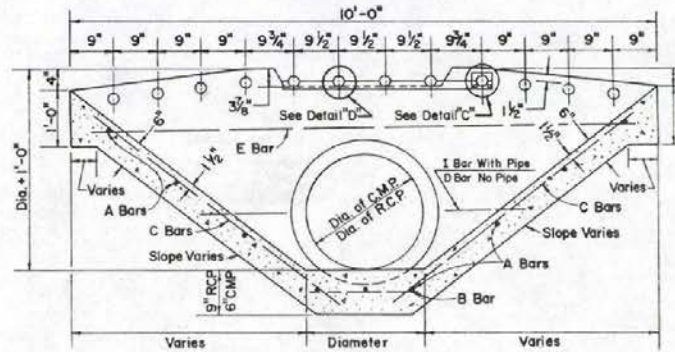
Chief Road Design Engr. R-4.3.1(609)
ADOPTED 10/85 REVISION

TYPE 7 DROP INLET

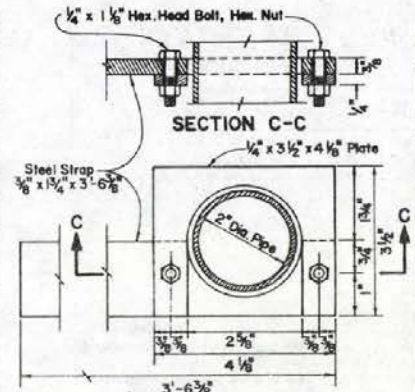


SECTION A-A

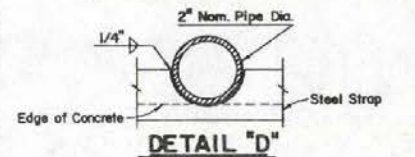
TYPE 8 DROP INLET



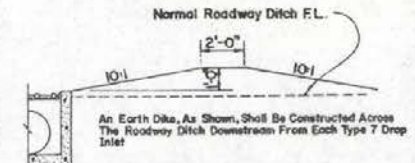
SECTION B-B



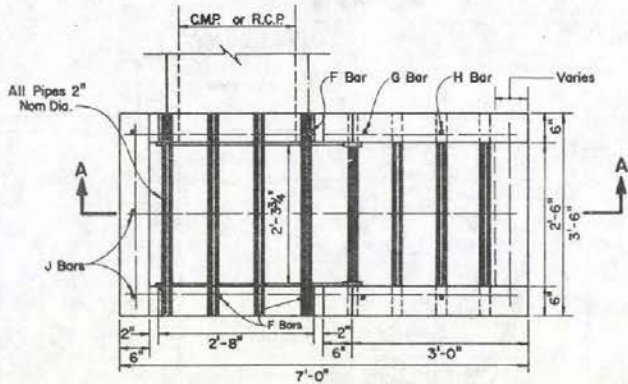
DETAIL "C"



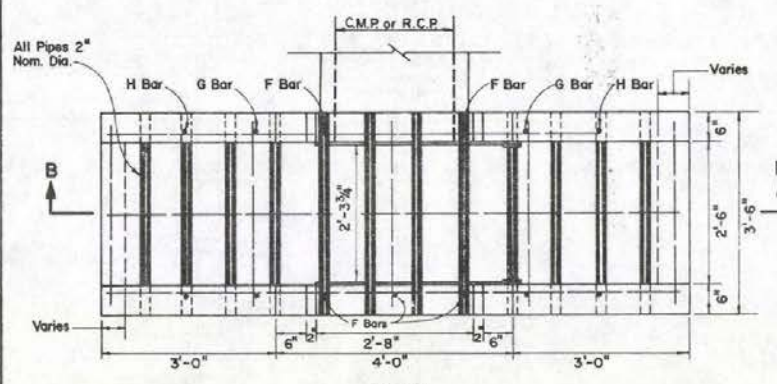
DETAIL "D"



SKETCH OF ROADWAY DITCH DIKE



TYPE 7 DROP INLET



TYPE 8 DROP INLET

SIZE DIA.	TABLE OF QUANTITIES									CONC. CU. YD.	REIN. STEEL LB.	EST. RATE \$	
	A Bars	B Bars	C Bars	D Bars	E Bars	F Bars	G Bars	H Bars	I Bars				J Bars
C.M.P.													
18"	8@3'-2"	3@2'-3"	3@4'-9"	1@3'-0"	2@6'-8"	3@2'-3"	2@1'-10"	2@1'-2"	1@2'-4"	3@2'-9"	1.11	81	117
24"	8@3'-2"	3@2'-9"	3@4'-9"	1@3'-0"	2@6'-8"	3@2'-3"	2@1'-10"	2@1'-4"	1@2'-3"	3@3'-2"	1.28	83	117
30"	8@3'-2"	3@3'-4"	3@4'-9"	1@3'-4"	2@6'-8"	3@3'-3"	2@2'-0"	2@1'-9"	1@1'-10"	3@3'-6"	1.34	87	117
R.C.P.													
18"	8@3'-2"	3@3'-4"	3@5'-0"	1@3'-0"	2@6'-8"	3@2'-4"	2@1'-10"	1@2'-1"	1@2'-11"	2@2'-11"	1.18	82	117
24"	8@3'-2"	3@3'-4"	3@5'-0"	1@3'-0"	2@6'-8"	3@3'-0"	2@2'-0"	2@1'-4"	1@2'-0"	3@3'-5"	1.27	85	117
30"	8@3'-2"	3@3'-4"	3@5'-0"	1@3'-4"	2@6'-8"	3@3'-6"	2@2'-0"	2@1'-9"	1@1'-8"	3@3'-11"	1.41	88	117

SIZE DIA.	TABLE OF QUANTITIES									CONC. CU. YD.	REIN. STEEL LB.	EST. RATE \$
	A Bars	B Bars	C Bars	D Bars	E Bars	F Bars	G Bars	H Bars	I Bars			
C.M.P.												
18"	9@3'-2"	3@2'-0"	6@4'-9"	1@6'-5"	2@9'-8"	3@2'-3"	4@1'-10"	4@1'-2"	2@2'-4"	1.33	78	168
24"	9@3'-2"	3@2'-8"	6@4'-9"	1@6'-10"	2@9'-8"	3@2'-3"	4@1'-10"	4@1'-4"	2@2'-3"	1.45	82	168
30"	9@3'-2"	3@3'-0"	6@4'-9"	1@7'-0"	2@9'-8"	3@2'-3"	4@1'-10"	4@1'-9"	2@1'-10"	1.59	87	168
R.C.P.												
18"	9@3'-2"	3@2'-0"	6@5'-0"	1@6'-6"	2@9'-8"	3@2'-4"	4@1'-10"	4@1'-2"	2@2'-1"	1.35	80	168
24"	9@3'-2"	3@2'-8"	6@5'-0"	1@6'-10"	2@9'-8"	3@2'-3"	4@1'-10"	4@1'-4"	2@2'-0"	1.48	84	168
30"	9@3'-2"	3@3'-0"	6@5'-0"	1@7'-0"	2@9'-8"	3@2'-3"	4@1'-10"	4@1'-9"	2@1'-8"	1.63	89	168

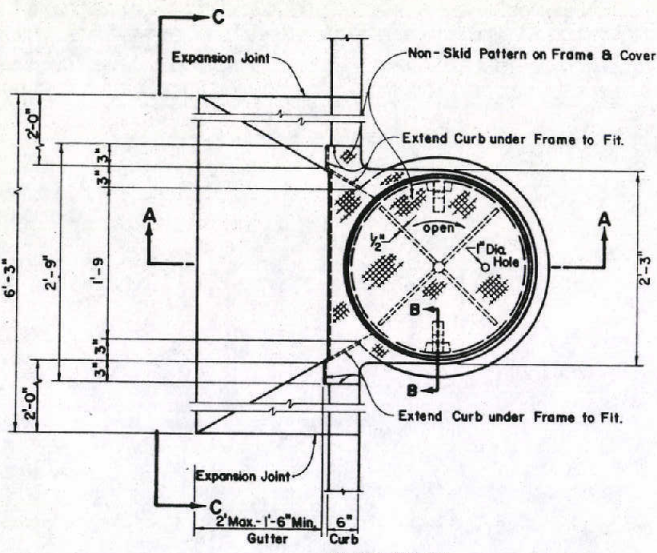
- GENERAL NOTES:**
- All concrete shall be class A or AA.
 - Reinforcing steel shall be No. 4 bars with maximum spacing of 18" centers, wired tightly at all intersections and embedded at least one and one half inch clear of concrete surface.
 - Dimensions may be varied by the Engineer to fit local conditions.
 - No deductions in concrete shall be made for the 2" crossbars.
 - All exposed edges of concrete shall be chamfered one inch.
 - Steel strap and pipe for crossbars are included in the structural steel grate quantities.

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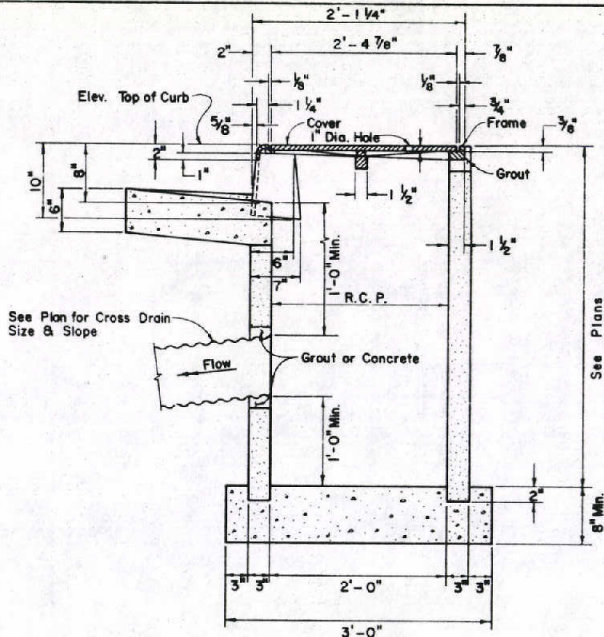
**TYPE 7 & 8
DROP INLETS**

R-4.1- (609)
ADOPTED 8/69

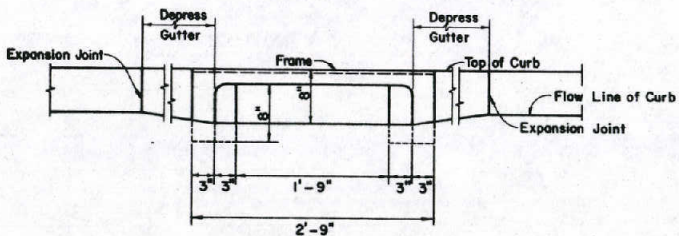
RS5



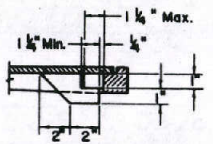
PLAN VIEW



SECTION A-A



VIEW C-C



**SECTION B-B
WEDGE LOCK HOLD DOWN**

CASTINGS *		
	FRAME	COVER
TYPE 10	80 Lbs.	70 Lbs.

* For info. Only

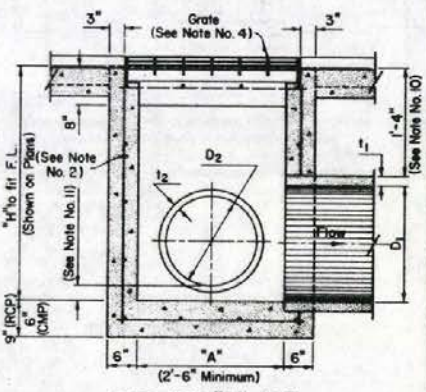
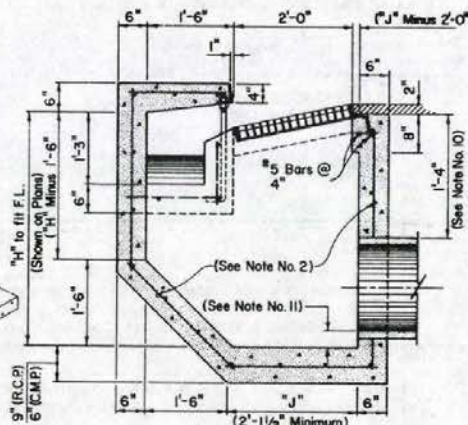
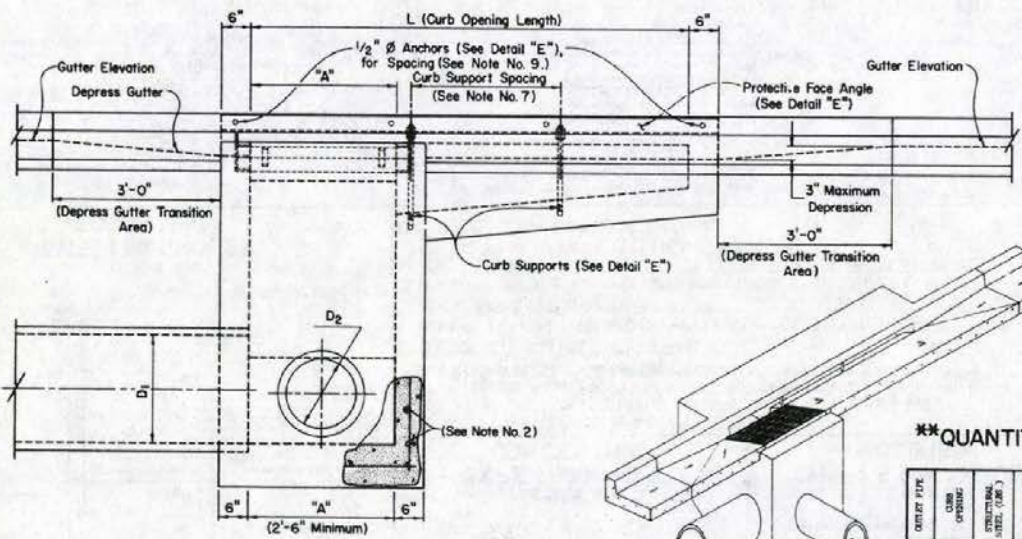
GENERAL NOTES

1. All Concrete shall be A or AA.
2. Forming of the Base Will not be Required.

STATE OF NEVADA
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**DROP INLET
TYPE 10**

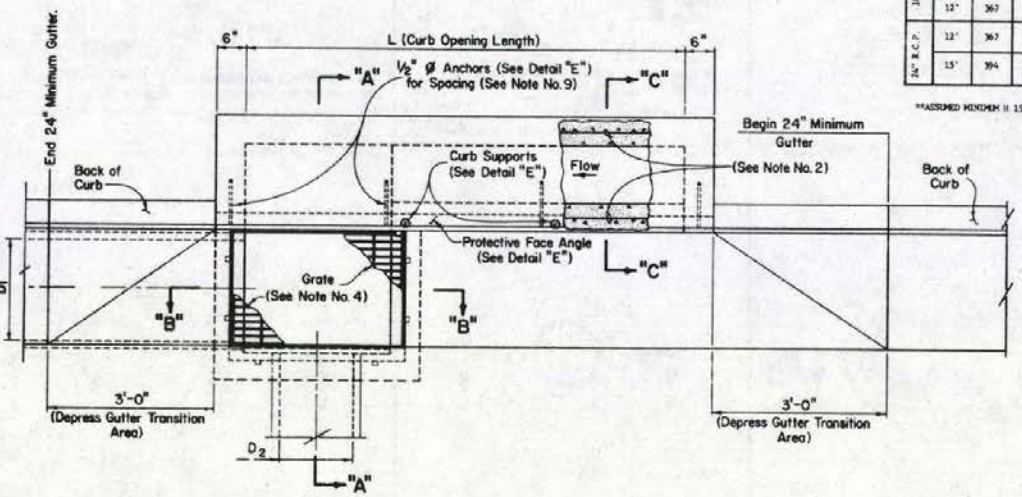
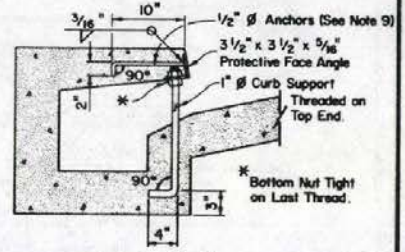
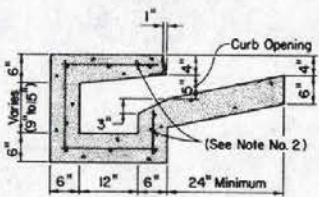
CHIEF ROAD DESIGN ENGR. *[Signature]* R-48.1.2 (809) ADOPTED 1/71



****QUANTITIES**

GUTTER TYPE	CURB OPENING	CONCRETE (CY)	REINFORCING STEEL (LBS.)	CONCRETE (CU. YD.)
18" R.C.P.	7"	325	126	1.64
18" R.C.P.	10"	332	155	2.01
18" R.C.P.	12"	367	176	2.26
18" R.C.P.	12"	367	179	2.34
18" R.C.P.	15"	394	209	2.72

**ASSUMED HEIGHTS IN 15" INLET PIPE



GENERAL NOTES

- ALL CONCRETE SHALL BE CLASS AA OR A.
- REINFORCING STEEL SHALL BE NO. 4 BARS, EXCEPT AS NOTED, WITH MAXIMUM SPACE AT 12" CENTERS, WIRED TIGHTLY AT ALL INTERSECTIONS, AND EMBEDDED AT LEAST 1 1/2" CLEAR OF CONCRETE SURFACE, EXCEPT AS NOTED.
- EXPOSED EDGES OF CONCRETE SHALL BE CHAMFERED ONE INCH.
- FOR GRATE AND FRAME DETAIL, SEE STANDARD PLANS SHEET R-4.3.1 - (609) (TYPE 3 DROP INLET).
- FOR VALUES OF "H" AND "L" SEE STORM DRAIN SCHEDULE.
- "H" IS THE DIFFERENCE IN ELEVATION BETWEEN THE OUT PIPE FLOW LINE AND THE NORMAL GUTTER GRADE LINE AT THE CURB FACE.
- CURB OPENINGS LONGER THAN 7" SHALL HAVE ONE CURB SUPPORT FOR EACH 7" INCREMENT OR FRACTION THEREOF, EVENLY SPACED.
- PIPE(S) CAN BE PLACED IN ANY WALL.
- ANGLE ANCHORS SHALL BE IMBEDDED MIDPOINT IN EACH ENDWALL AND EVENLY SPACED (MAXIMUM SPACING OF 5').
- 1'-6" IS MINIMUM COVER FOR PIPE - ASSUMING CLASS III RCP OR 16 GAGE CMP WITH CLASS C BEDDING.
- FOR DROP INLET CONFIGURATIONS WITH 2 PIPES - INFLOW PIPE INVERT ELEVATION SHALL BE ≥ 0' ABOVE OUTFLOW PIPE INVERT ELEVATIONS.

"A"
D₂ for CMP.
D₂ + 6" for RCP 42" or Less.
D₂ + 2 1/2" for RCP 48" or More.

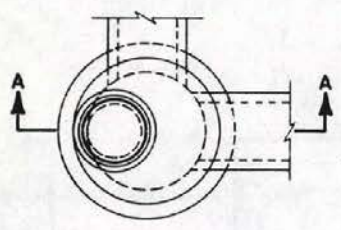
"J"
D₁ for CMP
D₁ + 6" for RCP 24" or Less.
D₁ + 2 1/2" for RCP 30" or More.

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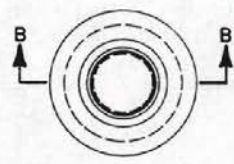
TYPE 11 DROP INLET

ADOPTED AND REVISION

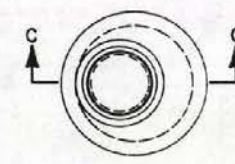
R-38



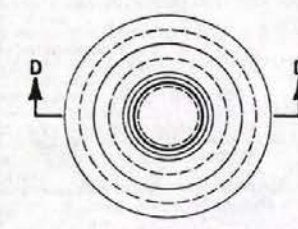
PLAN



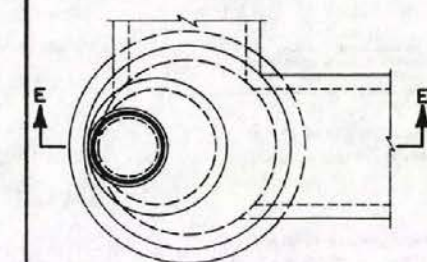
PLAN



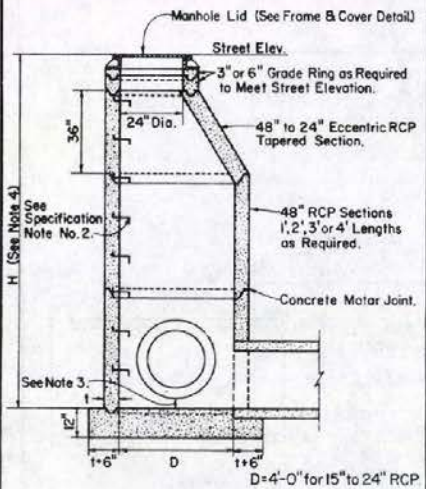
PLAN



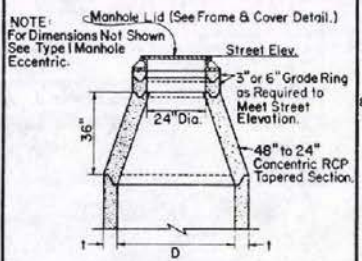
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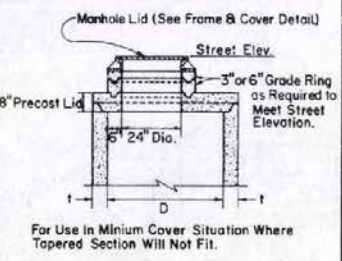
PLAN



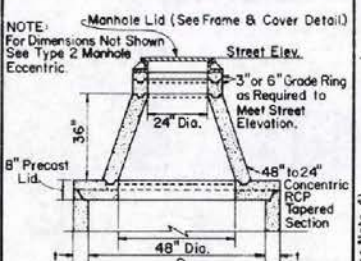
SECTION A-A
TYPE I MANHOLE
ECCENTRIC



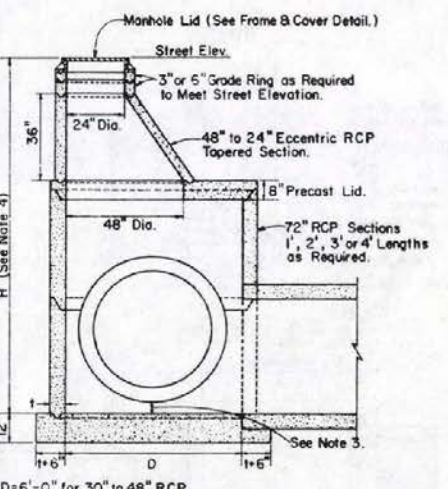
SECTION B-B
TYPE I MANHOLE
CONCENTRIC



SECTION C-C
TYPE I & 2 MANHOLE
MODIFIED

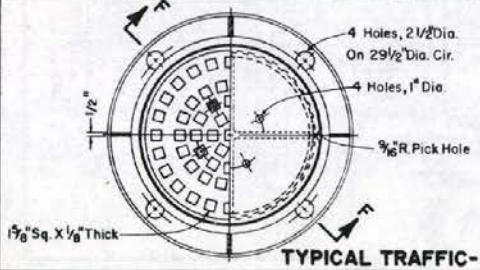


SECTION D-D
TYPE 2 MANHOLE
CONCENTRIC

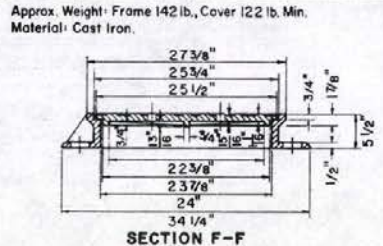


SECTION E-E
TYPE 2 MANHOLE
ECCENTRIC

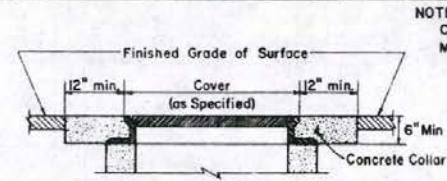
- GENERAL NOTES**
- 1) FOR CAST IN PLACE CONCRETE BASE ALL REINFORCING STEEL TO BE NO. 4 BARS AT 18" CENTERS, TIGHTLY WOUND AT ALL INTERSECTIONS AND IMBEDDED IN CONCRETE AT LEAST 2" AND BAR ENDS MUST CLEAR CONCRETE SURFACES BY 1 1/2".
 - 2) ALL CONCRETE SHALL BE CLASS A OR AA.
 - 3) MANHOLE WITH MORE THAN ONE PIPE - INFLOW PIPE INVERT ELEVATIONS SHALL BE 2-0.1 ABOVE OUTFLOW PIPE ELEVATION.
 - 4) FOR VALUES OF "H" SEE STORM DRAIN SCHEDULE OR STRUCTURE LIST. "H" IS THE DIFFERENCE IN ELEVATION BETWEEN THE OUTFLOW PIPE INVERT ELEVATION AND THE TOP OF MANHOLE ELEVATION AT STREET GRADE.
 - 5) DO NOT PLACE PIPES IN TAPERED SECTION.
 - 6) MANHOLE COVER SHALL BEAR NDOT IDENTIFICATION AND SYSTEM FUNCTION.
 - 7) MANHOLE STEPS SHALL CONFORM TO ASTM STANDARD SPECIFICATION C-478 WITH MAXIMUM SPACING OF 16" AND 4" CLEAR DISTANCE FROM THE WALL OF RISER OR CONE SECTION. THE STEP MUST HAVE A 10" MINIMUM WIDTH.



TYPICAL TRAFFIC-STRENGTH MANHOLE FRAME & COVER



SECTION F-F



TYPICAL METHOD OF ADJUSTING
MANHOLES & WATER VALVES
(ADJUSTED COLLARS MAY BE POURED SQUARE OR ROUND)

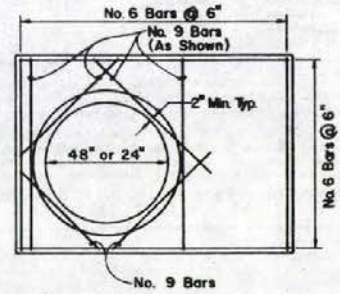
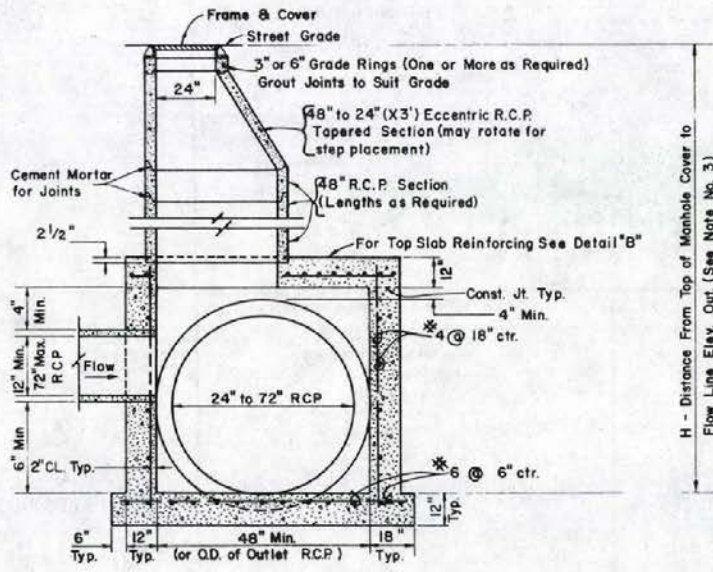
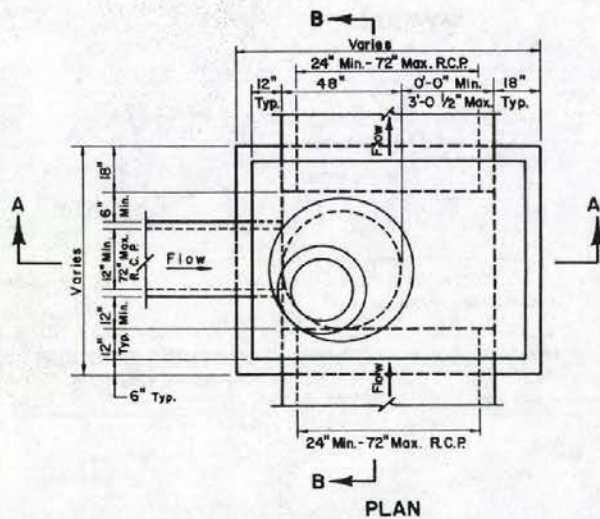
NOTE:
Commercial Prefabricated Adjustment Rings For Manholes May Be Used When Approved By The Engineer.

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**TYPE I & 2
& TYPE I & 2 MODIFIED
MANHOLES**

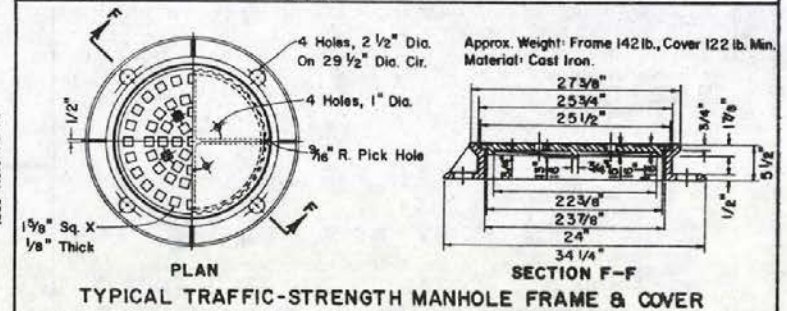
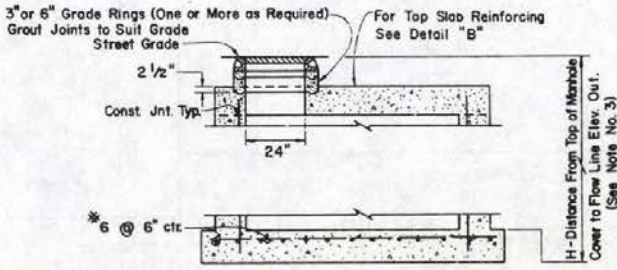
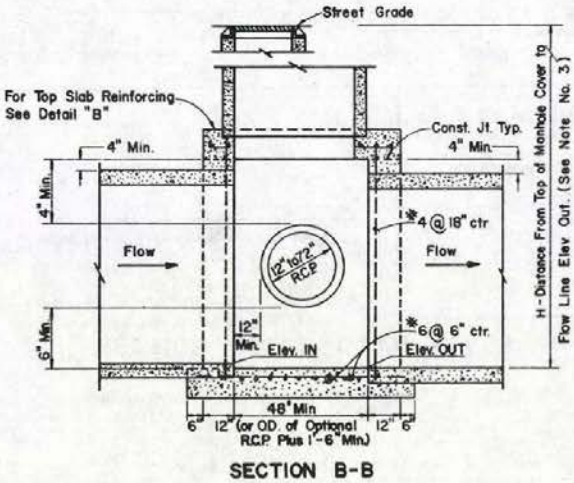
Amel A. Odeh
CHIEF ROAD DESIGN ENGR.

R-4.7.1 (609)
ADOPTED: 10/85 REVISION



GENERAL NOTES

- 1) ALL CONCRETE SHALL BE CLASS A OR AA.
- 2) MANHOLES WITH MORE THAN ONE PIPE - THE INFLOW PIPES INVERT ELEVATIONS SHALL BE GREATER THAN OR EQUAL TO 0.1' ABOVE THE OUTFLOW PIPE INVERT ELEVATION.
- 3) FOR VALUES OF "H" SEE STORM DRAIN SCHEDULE OR STRUCTURE LIST IN CONTRACT PLANS. "H" IS THE DIFFERENCE IN ELEVATION BETWEEN THE OUTFLOW PIPE INVERT ELEVATION AND THE TOP OF MANHOLE ELEVATION AT STREET GRADE.
- 4) MANHOLE STEPS SHALL CONFORM TO ASTM STANDARD SPECIFICATION C-478 WITH MAXIMUM SPACING OF 16" AND 4" CLEAR DISTANCE FROM THE MANHOLE WALL. THE STEP MUST BE A 10" MINIMUM WIDTH.
- 5) MANHOLE COVER SHALL BEAR N.D.O.T. IDENTIFICATION AND SYSTEM FUNCTION.

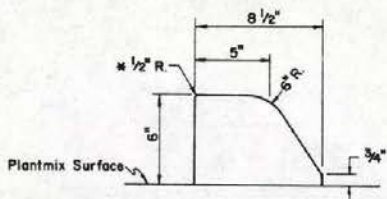


Note, Hydraulic Engineer Will Look at Other Options for Extreme Minimum Cover Situation.

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

TYPE 4 MANHOLE

Advised by
CHIEF ROAD DESIGN ENGR
R-4.7.2 (609)
ADOPTED 10/85 REVISION 1-1/85

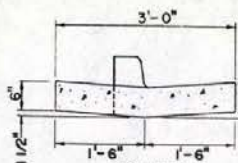


SECTION - GLUE DOWN CURBS

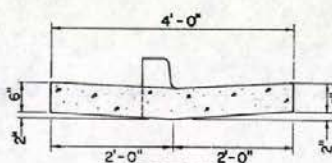
(0.0108 Cu. Yds. Per. Lin. Ft.)

* - Omit Rounding When Curbs Are Back To Back. (EPOXY CURB TO PLANTMIX SURFACE)

NOTE: EPOXY CEMENT MAY BE OMITTED WHEN INSTALLATION IS TEMPORARY.

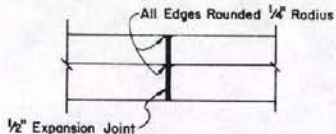


SECTION TYPE 1
(0.0556 cu. yd. per ft.)

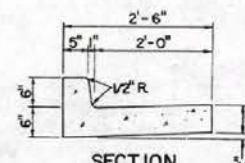


SECTION TYPE 2
(0.07407 cu. yd. per ft.)

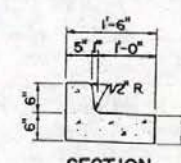
VALLEY GUTTER



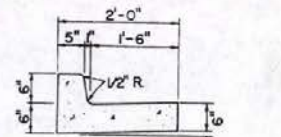
ELEVATION EXPANSION JOINT



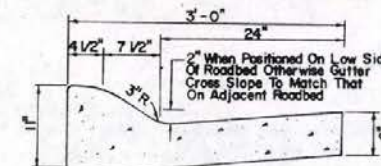
SECTION TYPE 1
(0.05476 cu. yd. per ft.)



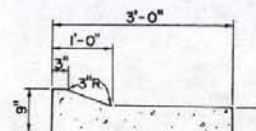
SECTION TYPE 4
(0.03627 cu. yd. per ft.)



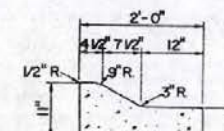
SECTION TYPE 5
(0.04552 cu. yd. per ft.)



SECTION TYPE 6
(0.06599 cu. yd. per ft.)

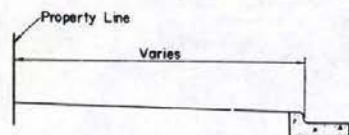


SECTION TYPE 7
(0.0613 cu. yd. per ft.)

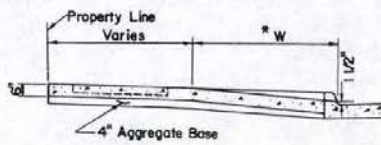


SECTION TYPE 8
(0.04747 cu. yd. per ft.)

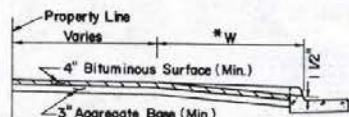
CURB AND GUTTER



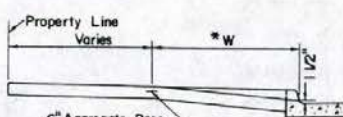
SECTION A-A



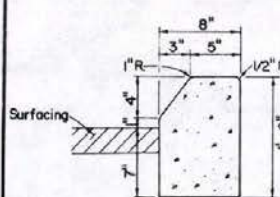
SECTION B-B (CONCRETE)



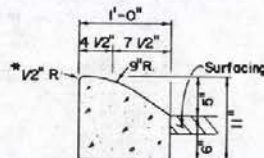
SECTION B-B (BITUMINOUS SURFACE)



SECTION B-B (AGGREGATE)

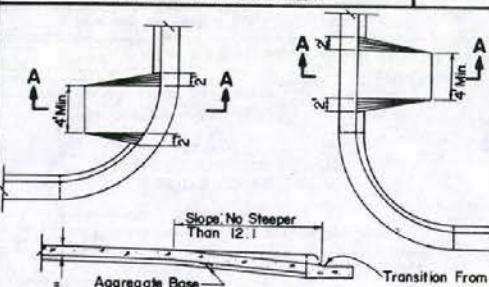


SECTION TYPE 2
(0.02315 cu. yd. per ft.)



SECTION TYPE 3
(0.02894 cu. yd. per ft.)

* Omit Rounding When Curb is Back To Back



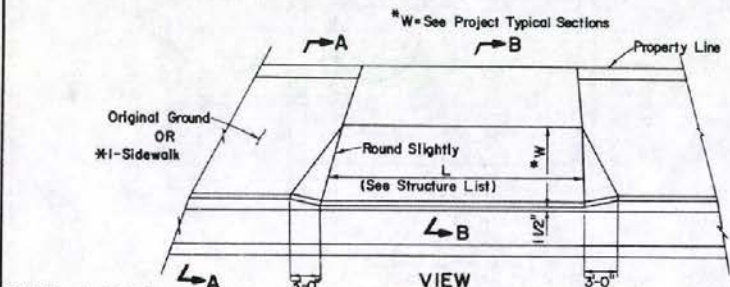
SECTION A-A CURB CUT RAMPS

- GENERAL NOTES**
1. Curb Cuts Can Be Varied To Fit The Needs At A Particular Location
 2. Curb Cut Ramps Should Be Located Closely Adjacent To Or Within Marked Crosswalks To Insure Their Use As Part Of The Established Pedestrian Control At The Intersection. Specific Location Should Be Adapted To Site Conditions.
 3. Sidewalk Widths Must Be Based On Space Requirements Of Power Poles, Traffic Signs And Signal Posts, Wheelchair Requirements And Any Obstructions Placed In Sidewalk Area

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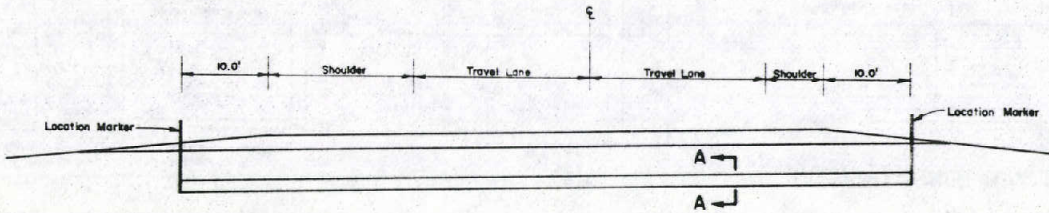
CURB & GUTTERS AND DRIVEWAYS

Smith & Lee
CHIEF ROAD DESIGN ENGR. R-511 (613)
ADOPTED 6/69 REVISION 5-11-74

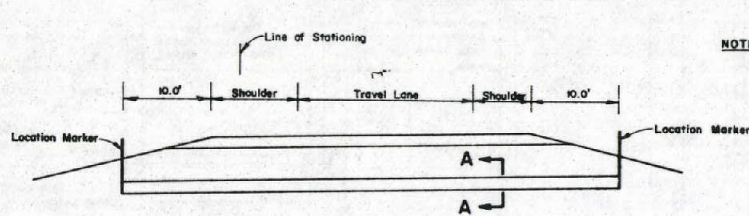


VIEW DRIVEWAYS

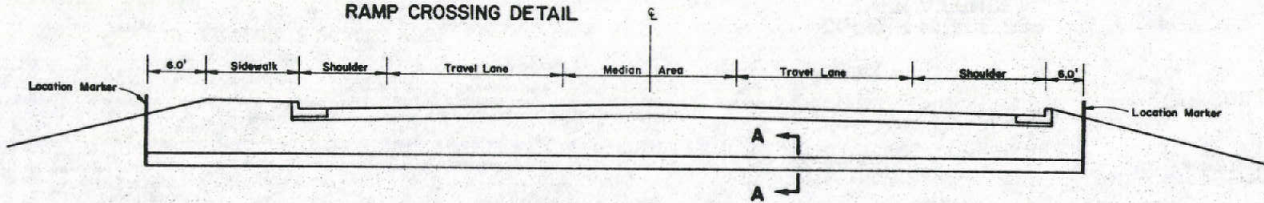
*I- Sidewalk Shall Have 4" min. Thickness and Limits as Indicated on Project Typical Sections.



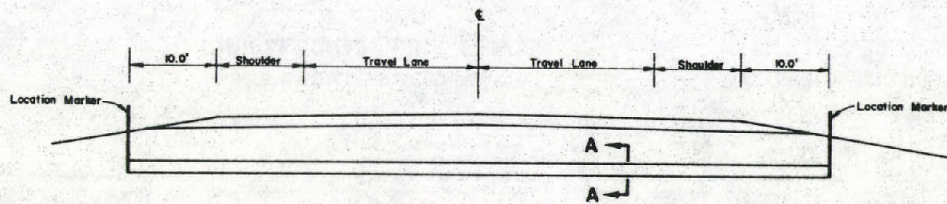
FREEWAY CROSSING DETAIL



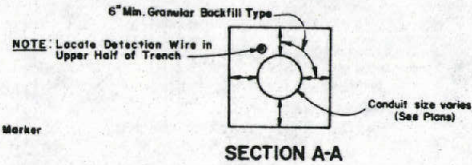
RAMP CROSSING DETAIL



CROSSROAD DETAIL



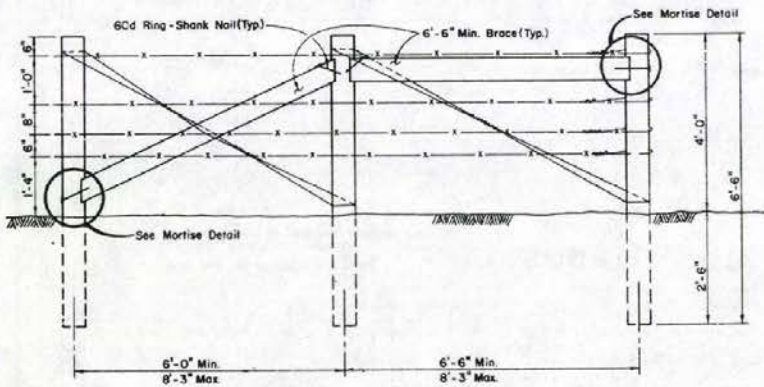
FRONTAGE ROAD DETAIL



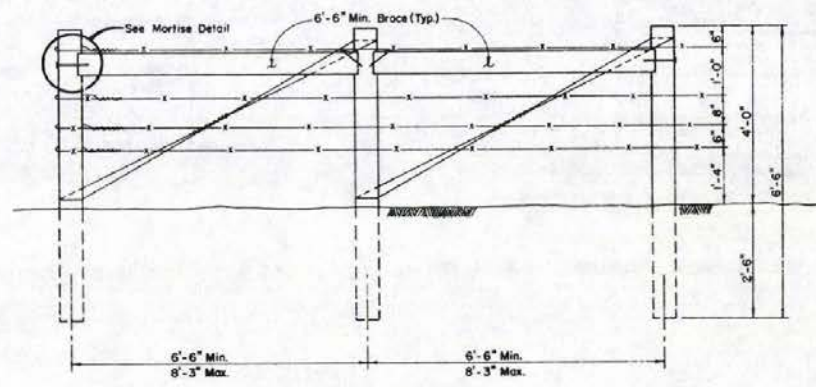
GENERAL NOTES

1. Minimum 3.0' Cover Over Top Of Conduit At Shoulder Line.
2. 12 Gauge Bare Copper Detection Wire To Lay In Trench Adjacent To Conduit And Attach To Location Marker At Each End.
3. Location Marker Shall Be 2" P.V.C. or 5.0' Steel Fence Posts.

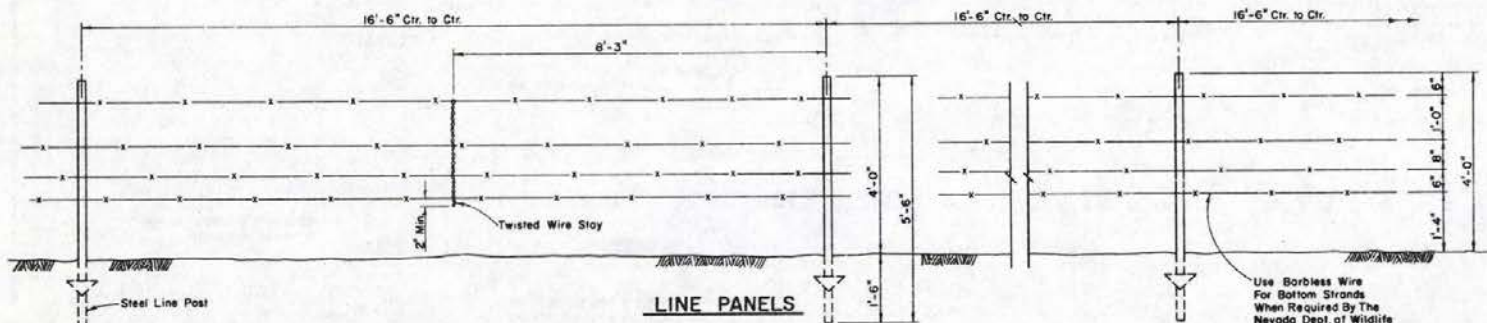
STATE OF NEVADA DEPARTMENT OF TRANSPORTATION	
CONDUIT INSTALLATION FOR FUTURE WATER LINES	
R-5.1.2	REVISION
ADOPTED 5/73	11/82
CHIEF ROAD DESIGN ENGR.	REVISION



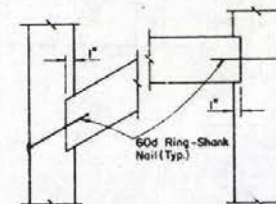
END PANEL - TYPE I
(SEE SPECIFICATIONS FOR TYPE TO BE USED)



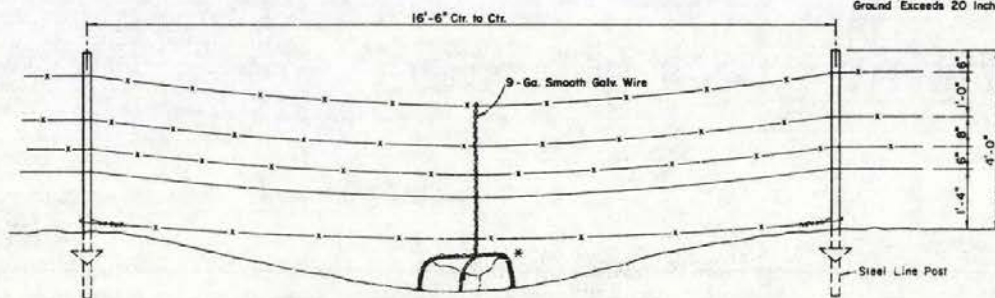
END PANEL - TYPE II
(SEE SPECIFICATIONS FOR TYPE TO BE USED)



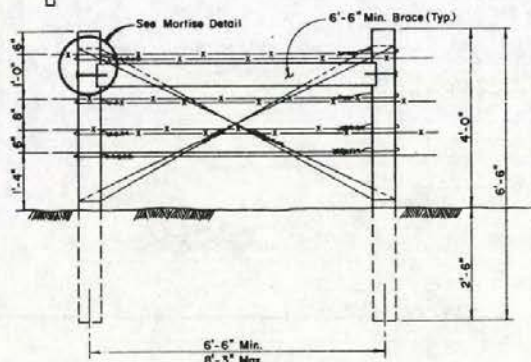
LINE PANELS



MORTISE DETAIL



PANEL AT MINOR DEPRESSION



STRESS PANEL

* Add Additional Strands of Barbed Wire And/or A Rock Deadman (Min. Weight 50 Lb.) When Space Between Bottom Wire And Ground Exceeds 20 Inches.

GENERAL NOTES

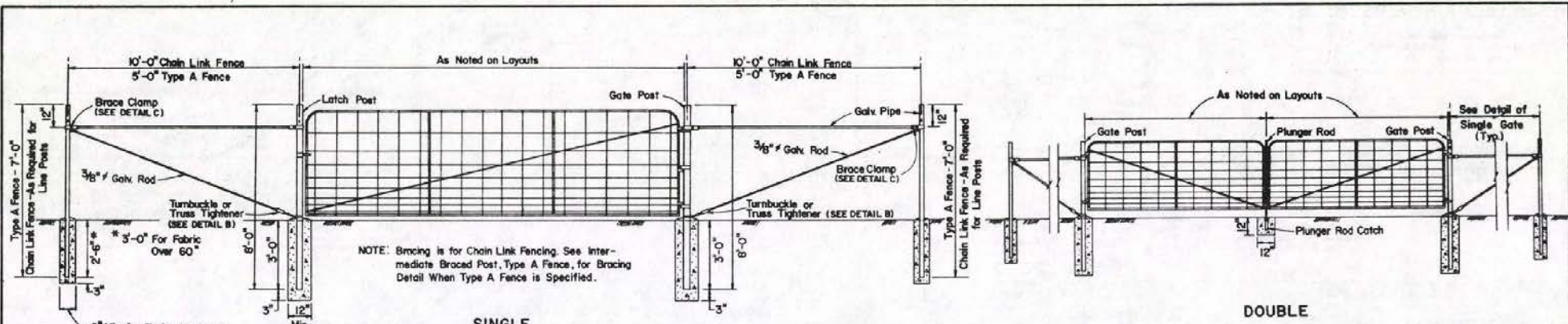
1. SEE SPECIFICATIONS FOR THE FOLLOWING:
 1. TYPE OF END PANEL TO BE USED.
 2. TYPE OF GATE(S) TO BE USED.
 3. TYPE OF CORNER PANEL(S) TO BE USED.
 4. TYPE OF POST(S) TO BE USED.
2. WIRES TO BE TIED OFF AT STRETCH POINTS. WELD AND SPlice TO STEEL WITH AT LEAST 4 TURNS AT OPPOSITE END OF PANEL.

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

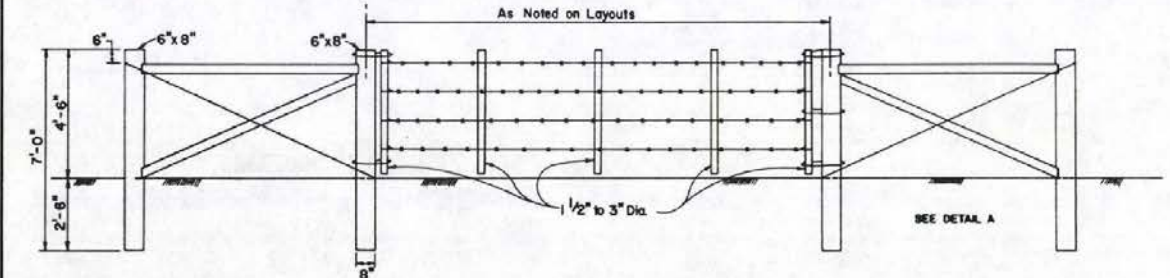
BARBED WIRE FENCE
NV(4-WIRE x 16'-6")

P-612
ADOPTED 10/85

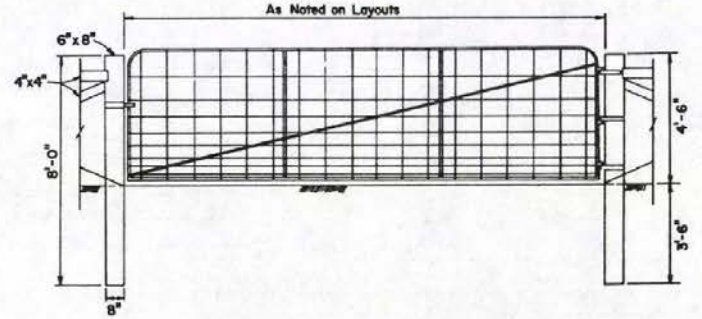
CHIEF ROAD DESIGN ENGR. *[Signature]* REVISION *[Signature]*



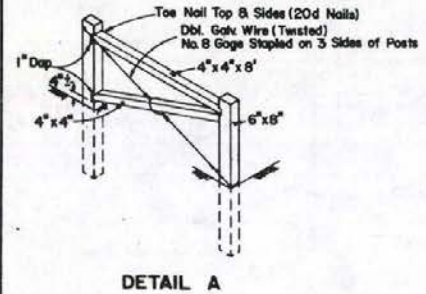
METAL DRIVE GATES



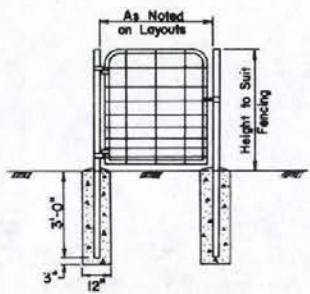
MISSOURI GATE



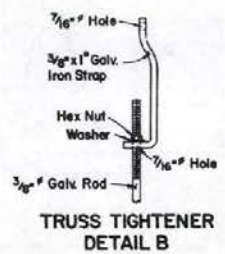
METAL DRIVE GATE IN TIMBER FENCE



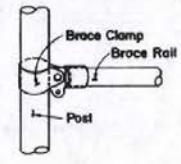
DETAIL A



WALK GATE



TRUSS TIGHTENER DETAIL B



DETAIL C

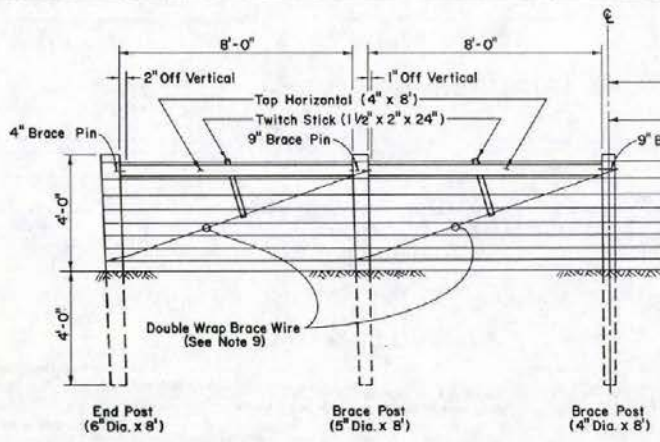
- GENERAL NOTES**
- STANDARD GATES, CHAIN LINK GATES, AND WALK GATES SHALL BE CONSTRUCTED AS SPECIFIED BY THE STANDARD SPECIFICATIONS.
 - GATE POSTS, BRACED POSTS, AND BRACES SHALL CONFORM TO THE REQUIREMENTS OF THE STANDARD SPECIFICATIONS.
 - LIMBS USED IN THE CONSTRUCTION OF TIMBER GATES SHALL CONFORM TO THE REQUIREMENTS OF THE STANDARD SPECIFICATIONS.

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

GATE AND FENCE DETAILS

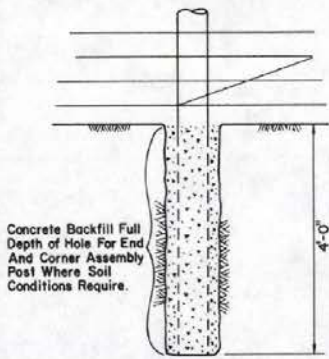
R-6.1.3 - (686)
ADOPTED 8/80

R-44

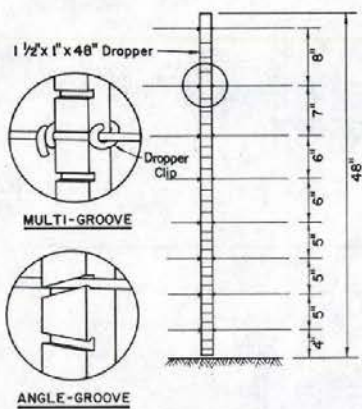


DOUBLE BRACE END ASSEMBLY

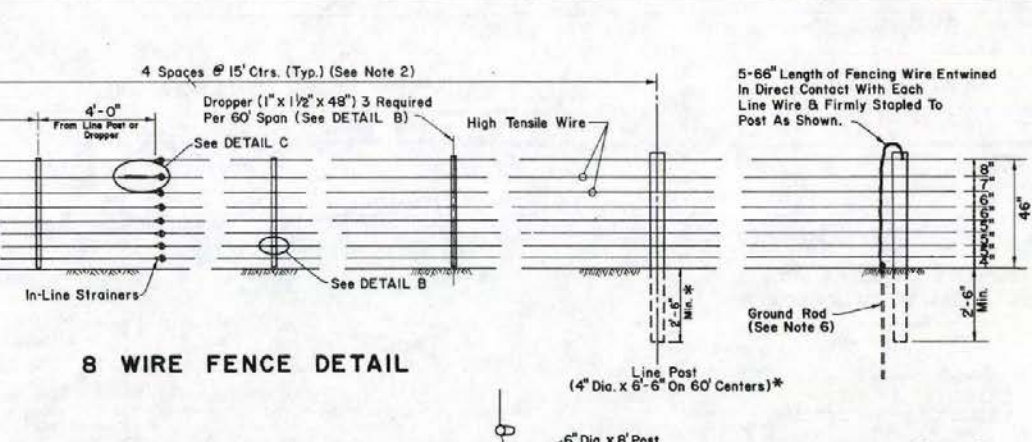
Note: Farm Gate 12' or Less May Be Installed On Post After Final Wire Tensioning.



**DETAIL A
(POST WITH CONCRETE BACKFILL)**



DROPPER DETAIL B



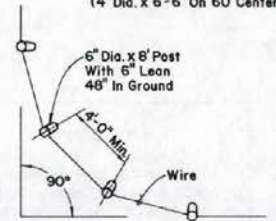
8 WIRE FENCE DETAIL



**DETAIL C
(IN-LINE WIRE STRAINERS AND TENSION INDICATOR SPRING)**

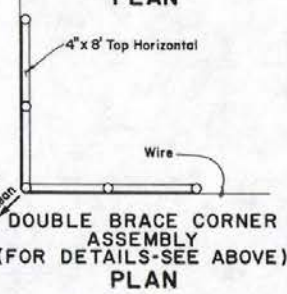
-CONSTRUCTION NOTES-

1. END POSTS AND LINE POSTS ARE RECOMMENDED TO BE MECHANICALLY DRIVEN INTO THE GROUND WHERE SOIL CONDITIONS PERMIT, TO BE DETERMINED BY THE ENGINEER.
2. MAXIMUM POST SPACING IS 60' ON LEVEL TERRAIN WITH DROPPERS OR 15' CENTERS. POST SPACING MAY BE DECREASED DUE TO TERRAIN CONDITIONS. DROPPER SPACING WILL REMAIN ON 15' MAX. CENTERS. MINIMUM LINE POST SPACING WILL BE ON 15' CENTERS WITHOUT DROPPERS. WITH 4" DIAMETER, SMALL END, LINE POSTS WHEN NEEDED.
3. PLACEMENT OF IN-LINE STRAINERS SHALL BE AS CLOSE TO THE CENTER OF THE FENCE RUN AS POSSIBLE. PLACEMENT OF TENSION INDICATOR SPRING SHALL BE ON THE SECOND WIRE FROM THE TOP. COMPRESSION OF THE INDICATOR SPRING BY 1-3/4" WILL INDICATE A TENSION OF APPROXIMATELY 350 LBS. (+ TO LBS.).
4. MAXIMUM LENGTH OF WIRE PER IN-LINE STRAINER ON LEVEL TERRAIN, STRAIGHT-5000', 1-90° CORNER-1000', 2-90° CORNERS-1000', 3-90° CORNERS-1500', 4-90° CORNERS-1600'. FOR UNEVEN TERRAIN REDUCE DISTANCES BY 500' FOR EACH MAJOR RISE AND DIP. DIP OR RISE POSTS SHALL BE A MINIMUM OF 6" DIAMETER SMALL END, 8' LONG, POSITIONED AT HIGH POINTS OF RIDGES AND LOW POINTS OF GULLIES.
5. EXCEPT FOR FASTENING LINE WIRE UNION HAS BEEN STENCILED AROUND THE OUTSIDES OF MOOR POST IN CORNERS AND CURVES. FENCE STAPLES SHOULD NOT BE DRIVEN VERTICALLY INTO WOOD POSTS. ROTATING STAPLES SLIGHTLY AWAY FROM SLASH CUT POINTS WILL PROVIDE IMPROVEMENT IN RESISTANCE TO PULLOUT.
6. GROUND RODS OF GALVANIZED STEEL (3/8" x 8') SHALL BE PLACED EVERY 150' ON DRY SOILS OR EVERY 100' IN MOIST SOILS. SPECIFIC ROD POSITIONING TO BE DETERMINED BY THE ENGINEER. FENCE UNDER POWER LINES SHALL BE GROUNDED AT 3 POINTS, ONE DIRECTLY UNDER POWER LINE AND ONE EACH SIDE 15' TO 50' AWAY.
7. IT IS RECOMMENDED FOR TYING OFF WIRES ON END POSTS TO USE TWO (2) MICROPRESS SLEEVES, CAT. NO. PA-2-3 MANUFACTURED BY THE NATIONAL TELEPHONE SUPPLY COMPANY OR ACCEPTABLE EQUAL.
8. IT IS RECOMMENDED FOR SPLICING WIRES TO USE THREE (3) MICROPRESS SLEEVES OR 1 RELIABLE WIRELINK NUMBER 3057V, MANUFACTURED BY RELIABLE ELECTRIC COMPANY OR ACCEPTABLE EQUAL.
9. PROPER TENSION ON THE BRACE WIRE IN THE END ASSEMBLY IS ACCOMPLISHED BY TWISTING THE BRACE WIRE A MINIMUM OF 6 TURNS TO A MAXIMUM OF 8 TURNS. THE TWITCH STICK SHOULD BE SECURELY FASTENED TO THE TOP HORIZONTAL BRACE POST.
10. LINE WIRES SHOULD BE STAPLED TO THE LINE POST ONLY AFTER TAKING UP PRELIMINARY TENSION (ABOUT 150 LBS.) ON EACH WIRE. STAPLES SHALL NOT BIND WIRE. AFTER STAPLING IS COMPLETED, TENSION EACH WIRE AN ADDITIONAL 100 LBS. FOR A TOTAL OF 250 LBS. INSTALL DROPPERS ONLY AFTER FINAL TENSION IS ON EACH WIRE. SEE CONSTRUCTION NOTE C ABOUT TENSION INDICATOR SPRING.
11. ADDITIONAL CONSTRUCTION NOTES MAY BE FOUND IN UNITED STATES STEEL CATALOG NO. T11375 HOW TO BUILD FENCES WITH UNITED STATES STEEL MAX TEN 200 HIGH-TENSILE FENCE WIRE.



ALTERNATE FOUR POST CORNER ASSEMBLY PLAN

*-Rise or Dip Post 4" Dia. x 8', C-C Spacing As Needed Driven 48" (See Note 4)



DOUBLE BRACE CORNER ASSEMBLY (FOR DETAILS-SEE ABOVE) PLAN

-SPECIFICATION NOTES-

- A. ALL WOOD POSTS AND DROPPERS SHALL BE PRESSURE TREATED IN ACCORDANCE WITH AASHTO DESIGNATION OR EQUIVALENT STATE SPECIFICATION.
- B. ALL FENCE WIRE, END AND CORNER BRACE ASSEMBLY WIRE SHALL CONSIST OF HIGH TENSILE FENCE WIRE 12S GAUGE, WITH A MINIMUM OF 200,000 LBS./IN. TENSILE STRENGTH AND CONFORMS WITH THE REQUIREMENTS FOR CLASS 3 ZINC COATING OF ASTM SPECIFICATION A116.
- C. BRACE PINS, DROPPER CLIPS, TENSION INDICATOR SPRINGS AND IN-LINE STRAINERS SHALL CONFORM WITH THE REQUIREMENTS FOR CLASS 3 ZINC COATING OF ASTM SPECIFICATION A116.
- D. STAPLES ARE 1-3/4", 9 GAUGE WITH SLASH CUT POINTS AND SHALL CONFORM WITH THE REQUIREMENTS FOR CLASS 3 ZINC COATING OF ASTM SPECIFICATION A116.

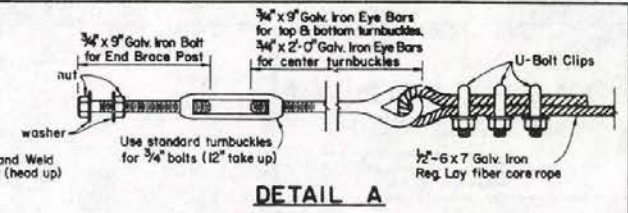
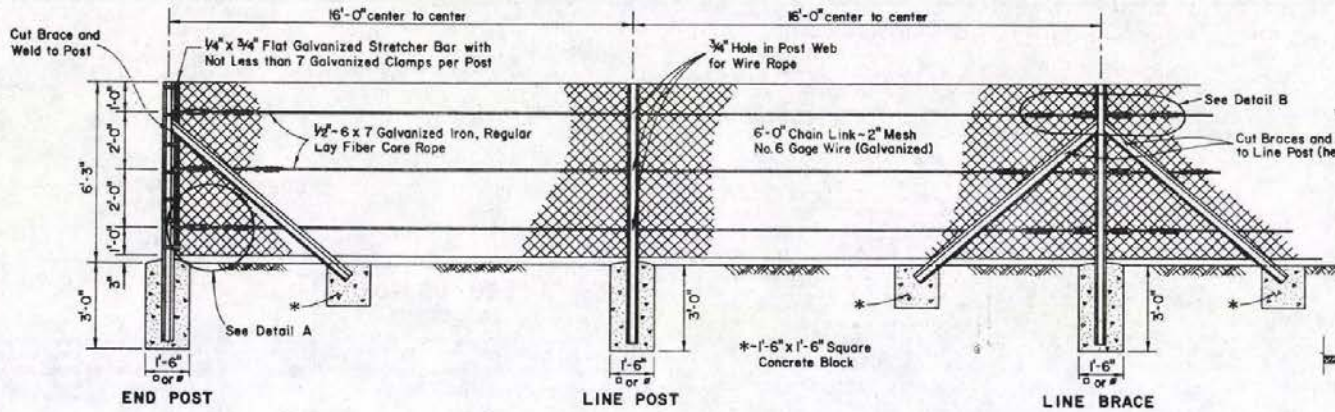
STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

**HIGH TENSILE
8-WIRE RANGE FENCE**

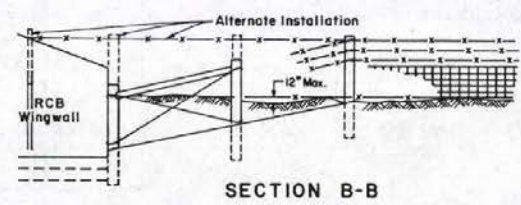
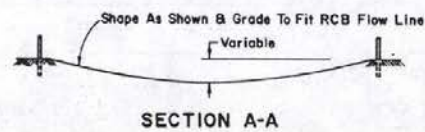
Approved by
CHIEF ROAD DESIGN ENGR

R-6.1.4 (616)
ADOPTED 11/82 REVISION

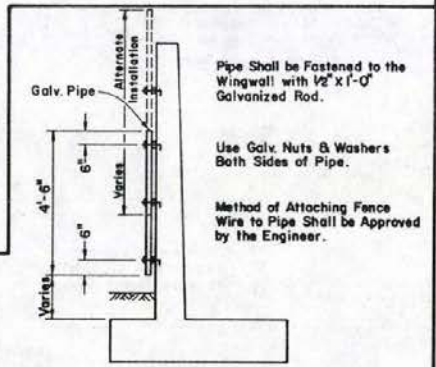
R-45



BENCH FENCE (630)

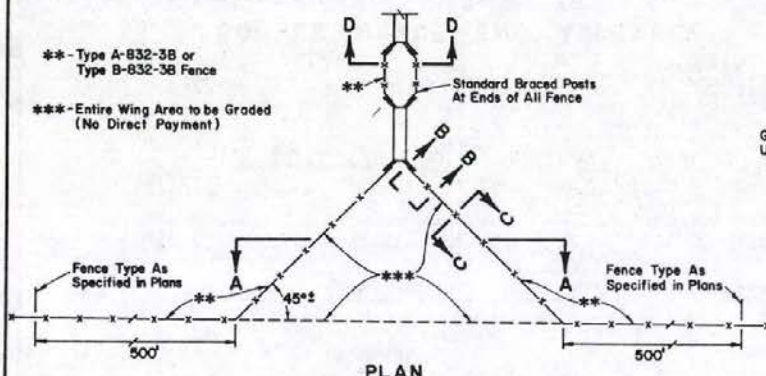


- BENCH FENCE:**
1. ALL POSTS AND BRACES SHALL BE 50 POUND CRANE RAIL OR 4"x13" POUND WIDE FLANGE, 9' LONG.
 2. INSTALL LINE BRACES AT INTERVALS NOT EXCEEDING 275'.
 3. ALL POSTS SHALL BE AT 16' CENTERS.
 4. POSTS AND BRACES TO BE SET IN CONCRETE AS SHOWN, EXCEPT IN ROCK THEY MAY BE GROUTED IN DRILL HOLE.
 5. 3 GALVANIZED CROSBY CLIPS OR EQUAL AND 1 GALVANIZED WIRE ROPE THIMBLE SHALL BE USED TO ATTACH WIRE ROPE TO EYE BARS.
 6. CUT GROOVE IN FLANGE OF BRACES FOR WIRE ROPE AND EYE BAR.
 7. SECURE MESH TO LINE POSTS WITH 7 WIRE TIES PER POST, AND TO EACH WIRE ROPE WITH 1 WIRE TIE PER 3 LIN. FEET.

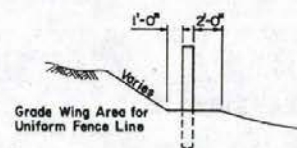


**DETAIL C
METHOD OF ATTACHING FENCE
TO RCB WINGWALL (OPTIONAL)**

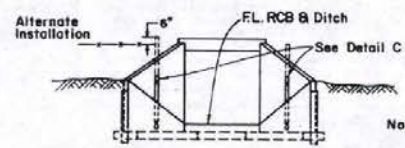
** - Type A-832-3B or Type B-832-3B Fence
*** - Entire Wing Area to be Graded (No Direct Payment)



**PLAN
CATTLE PASS FENCING (616)**



SECTION C-C



SECTION D-D

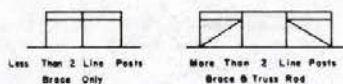
Note: Fence Attachment and/or Alternate Installation to be Placed at the Direction of the Engineer. (1' Min. from Outer End of Wingwall).

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

**BENCH FENCE AND
CATTLE PASS FENCING**

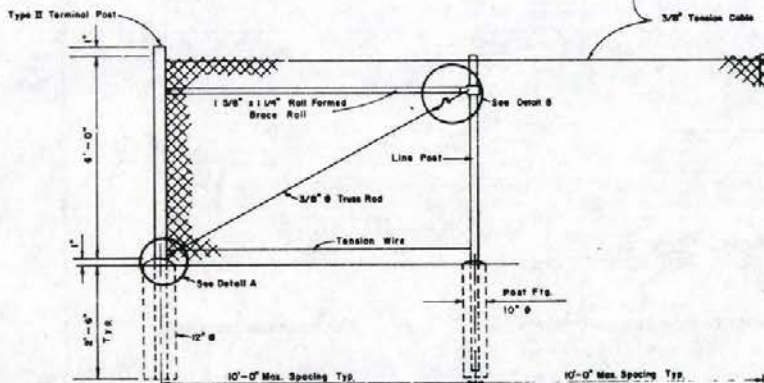
R-6.2.1 (616-630)
ADOPTED: 2-11/82
REVISION

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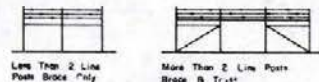
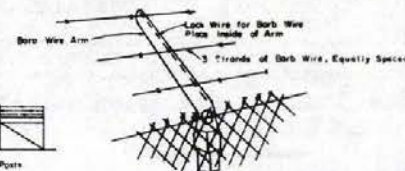


BRACING ARRANGEMENT

LINE POST TOP

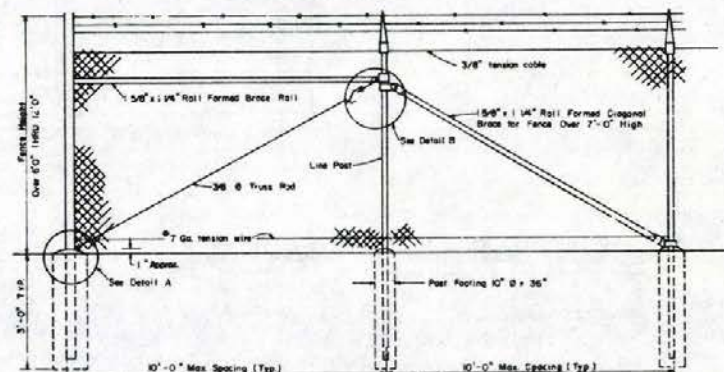


72-INCH CHAIN LINK FENCE



BRACING ARRANGEMENT

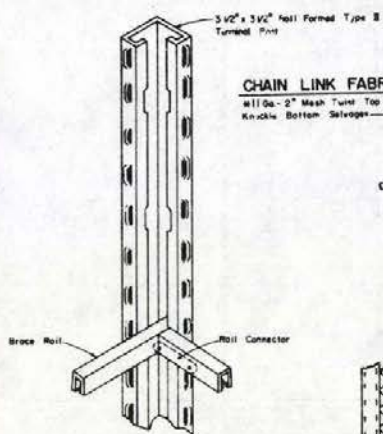
LINE POST TOP



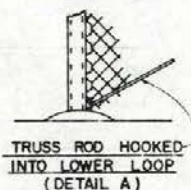
VARIABLE HEIGHT CHAIN LINK 3B FENCE

GENERAL NOTES

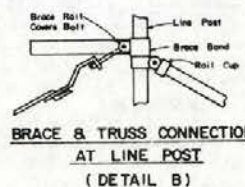
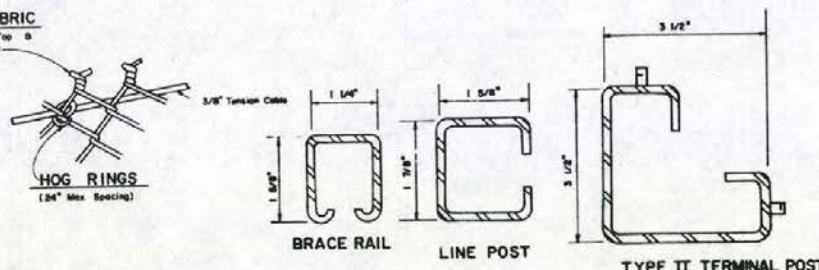
- FENCE POSTS AND MATERIALS SHALL CONFORM TO THE REQUIREMENTS OF STANDARD SPECIFICATIONS AND SUPPLEMENTS.
- CHAIN LINK FENCING SHALL CONSIST OF GALVANIZED CHAIN LINK FABRIC ON STEEL POSTS (TUBULAR OR C-COLUMN).
- (A) ALL POSTS SHALL BE SET IN CLASS A OR AA CONCRETE.
 (B) BRACES SHALL BE SPACED APPROXIMATELY 12" BELOW TOP OF TERMINAL POSTS AND SHALL EXTEND FROM END, GATE OR CORNER POSTS TO FIRST ADJACENT LINE POST.
 (C) ALL FITTINGS SHALL BE HOT DIPPED GALVANIZED MALLEABLE, CAST IRON, OR PRESSED STEEL.
 (D) FABRIC SHALL BE FASTENED TO LINE POSTS WITH FABRIC BANDS SPACED APPROXIMATELY 14" APART, AND TO TOP TENSION CABLE AND BOTTOM TENSION WITH HOG RINGS OR TIE WIRES SPACED APPROXIMATELY 24" APART.
 (E) FOR TUBULAR POST AND BRACERAIL DETAILS. SEE SHEET NO. R-6.1.1.



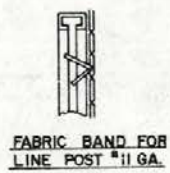
RAIL CONNECTION AT CORNER POSTS



TRUSS ROD HOOKED INTO LOWER LOOP (DETAIL A)



BRACE & TRUSS CONNECTION AT LINE POST (DETAIL B)

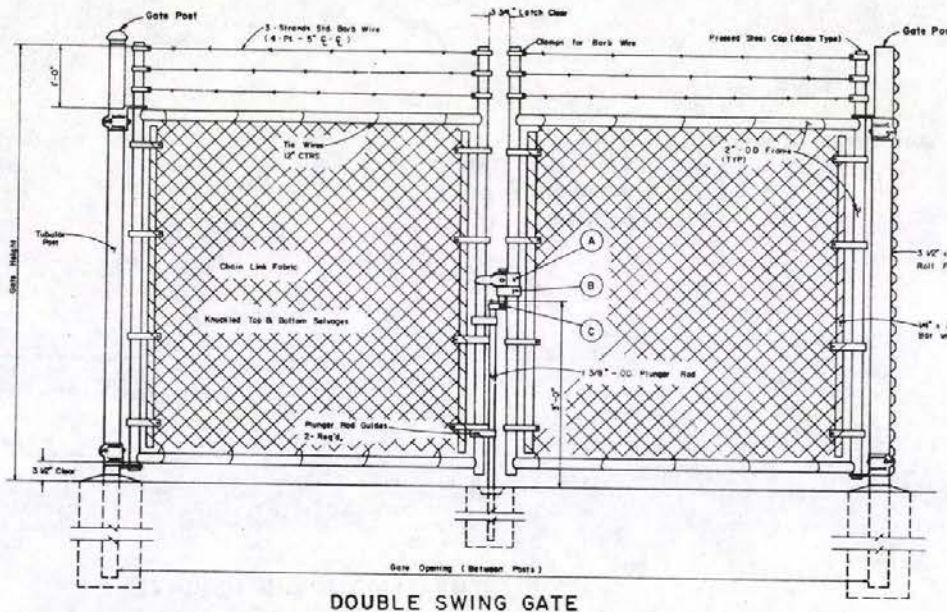


FABRIC BAND FOR LINE POST #11 GA

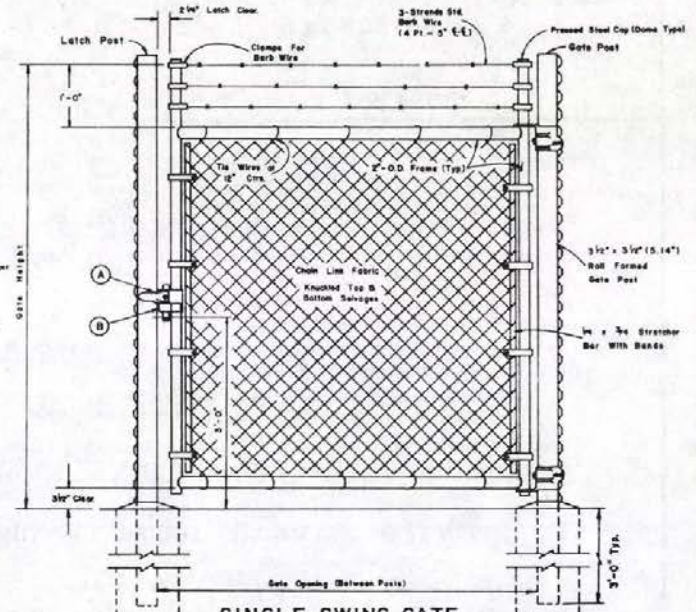
STATE OF NEVADA DEPARTMENT OF TRANSPORTATION		
FENCE DETAILS CHAIN LINK WITH C-TYPE POST		
CHIEF ROAD DESIGN ENGR.	R-6.3.1 ADOPTED 3/79	(616) REVISION 1-5/80

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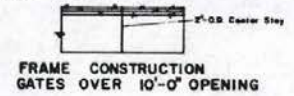
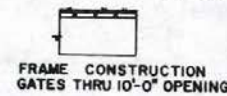
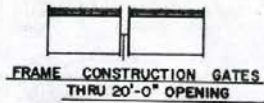
R-48



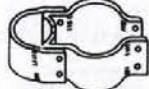
DOUBLE SWING GATE



SINGLE SWING GATE



HINGE FOR ROLL FORM POST & 3"-O.D. POST



HINGE FOR 4"-O.D. & LARGER TUBULAR POSTS



A LOCK KEEPER



B LOCK KEEPER GUIDE



C PLUNGER ROD CAP

GATE POST

FENCE HEIGHT	GATE WIDTH	NOMINAL I. D.	WT/FT
6'-0" OR LESS	UP THRU 6'	2 1/2"	5.79
	OVER 6' THRU 12'	4"	10.79
	OVER 12' THRU 18'	5"	14.62
OVER 6'-0"	OVER 18' THRU 24' MAX	6"	18.97
	UP THRU 6'	3"	7.58
	OVER 6' THRU 12'	5"	14.62
OVER 6'-0"	OVER 12' THRU 18'	6"	18.97
	OVER 18' THRU 24' MAX	8"	28.55

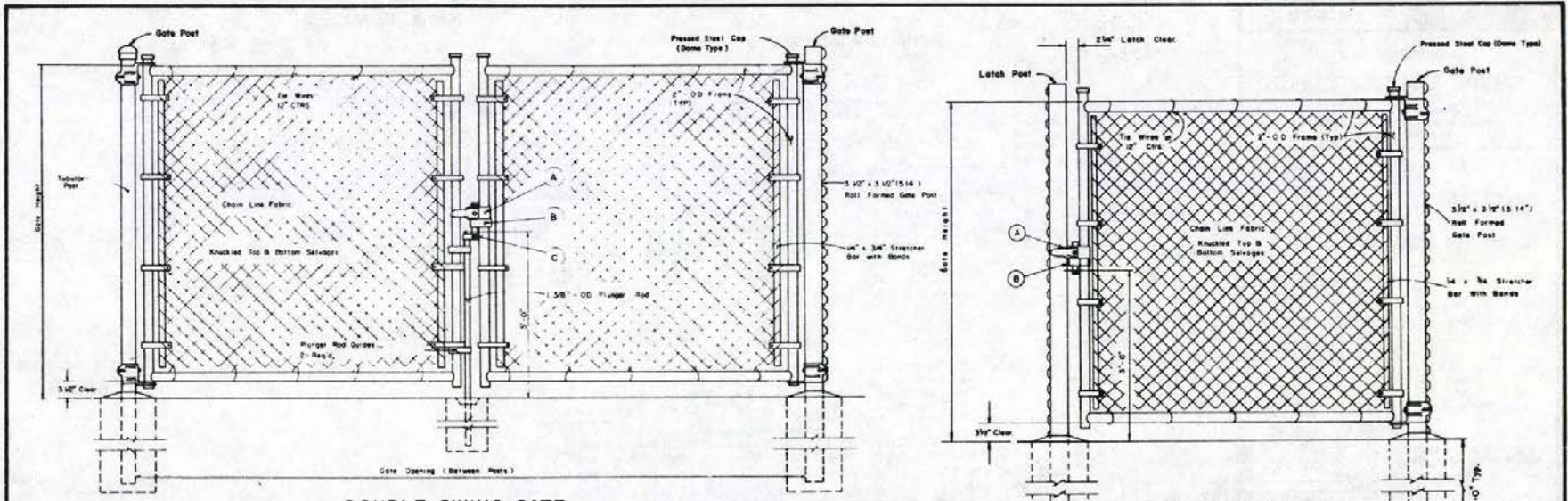
NOTE: DIAMETERS AND WEIGHTS LISTED ABOVE ARE MINIMUMS. LARGER SIZES MAY BE USED ON APPROVAL OF THE ENGINEER.

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

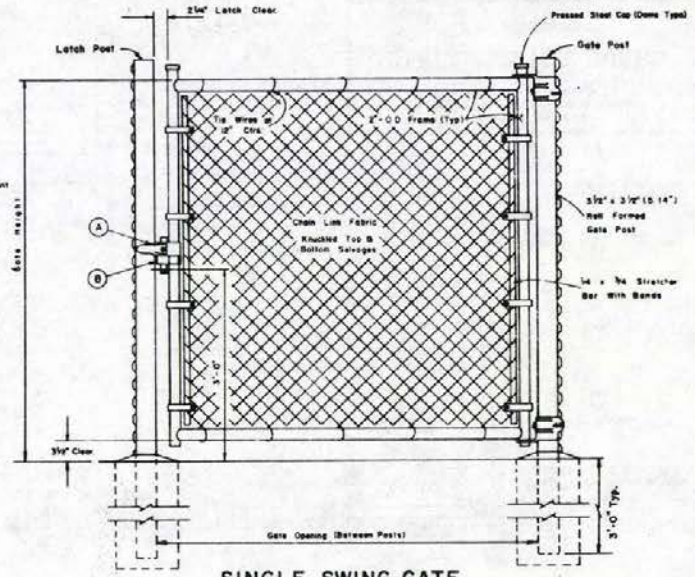
FENCE DETAILS
SWING GATES FOR VARIABLE HEIGHT
CHAIN LINK 3B FENCE

Handwritten Signature
CHIEF ROAD DESIGN ENGR.

R-6.3.2 (616)
ADOPTED 3/79 REVISION 1-11/82

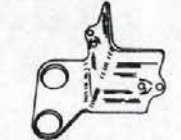
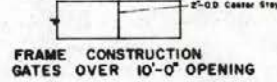
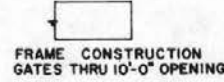
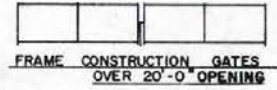
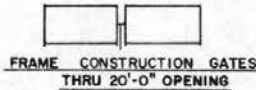


DOUBLE SWING GATE

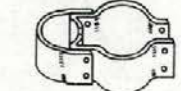


SINGLE SWING GATE

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HINGE FOR ROLL FORM POST & 3"-O.D. POST



HINGE FOR 4"-O.D. & LARGER TUBULAR POSTS



A LOCK KEEPER



B LOCK KEEPER GUIDE



C PLUNGER ROD CAP

GATE POST

FENCE HEIGHT	GATE WIDTH	NOMINAL I.D.	WT/FT
6'-0" OR LESS	UP THRU 6'	2 1/2"	5.79
	OVER 6' THRU 12'	4"	10.79
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OVER 6'-0"	UP THRU 6'	3"	7.58
	OVER 6' THRU 12'	5"	14.62
	OVER 12' THRU 18'	6"	18.97
	OVER 18' THRU 24' MAX	8"	28.55

NOTE: DIAMETERS AND WEIGHTS LISTED ABOVE ARE MINIMUMS. LARGER SIZES MAY BE USED ON APPROVAL OF THE ENGINEER.

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

**FENCE DETAILS
SWING GATES FOR
72-INCH CHAIN LINK FENCE**

R-633 (616)
ADOPTED 3/79 REVISION 1-11/82

CHIEF ROAD DESIGN ENGR.

BILL OF MATERIALS

TIMBER				
ITEM	NO. REQ'D	SIZE	LENGTH	WT. LB.
MISCEL GUARDS	2	6"x6"	7'-3"	43.5
WING SLOPE	4	2"x6"	8'-0"	32.0
WING SLOPE	2	2"x6"	6'-4 1/2"	12.8
WING BRACES	2	2"x6"	3'-4"	5.7
WING BRACES	4	2"x6"	5'-3"	21.0
WING BRACES	2	2"x6"	7'-3"	14.5
WING BRACES	2	2"x6"	7'-3"	14.5
WING BRACES	2	2"x6"	4'-0"	8.0
WING BRACES	2	2"x6"	5'-0"	10.0
WING POST	2	4"x6"	AS REQUIRED	
NAILING STRIP	2	2"x2"	2'-0"	1.3

GALVANIZED HARDWARE				
ITEM	NO. REQ'D	SIZE	LENGTH	WT. LBS.
BOLTS	8	3/4"	12"	15
WASHERS	8	3/4"		1
WASHERS (LOCK)	4	3/4"		1/2
NAILS	50	40d		2-1/4
NAILS	2	20g		1
BOLTS	4	3/4"		1
TOTAL				22-3/4

STRUCTURAL STEEL				
12' ROADBED				
ITEM	NO. REQ'D	SIZE	LENGTH	WT. LBS.
I BEAMS	13	S4x7.7	13'-0"	1,301
I BEAMS	6	S8x18.4	7'-3"	800
SPACERS	72	2"x3/16"	0'-6-13/16"	109
ANCHOR BOLTS	12	7/8"	1'-0"	12
END PLATES	2	8"x18"	1'-0"	177
STEEL STRAPS	3	4"x4"	7'-2"	74
TOTAL				2473

14' ROADBED				
ITEM	NO. REQ'D	SIZE	LENGTH	WT. LBS.
I BEAMS	13	S4x7.7	13'-0"	1,502
I BEAMS	8	S8x18.4	7'-3"	934
SPACERS	84	2"x3/16"	0'-6-13/16"	127
ANCHOR BOLTS	14	7/8"	1'-0"	14
END PLATES	2	8"x18"	1'-0"	99
STEEL STRAPS	4	4"x4"	7'-2"	2880
TOTAL				3240

16' ROADBED				
ITEM	NO. REQ'D	SIZE	LENGTH	WT. LBS.
I BEAMS	13	S4x7.7	13'-0"	1,067
I BEAMS	8	S8x18.4	7'-3"	1067
SPACERS	84	2"x3/16"	0'-6-13/16"	127
ANCHOR BOLTS	14	7/8"	1'-0"	14
END PLATES	2	8"x18"	1'-0"	231
STEEL STRAPS	4	4"x4"	7'-2"	99
TOTAL				3240

20' ROADBED				
ITEM	NO. REQ'D	SIZE	LENGTH	WT. LBS.
I BEAMS	13	S4x7.7	21'-0"	2,102
I BEAMS	9	S8x18.4	7'-3"	1,201
SPACERS	108	2"x3/16"	0'-6-13/16"	163
ANCHOR BOLTS	18	7/8"	1'-0"	18
END PLATES	2	8"x18"	1'-0"	288
STEEL STRAPS	5	4"x4"	7'-2"	123
TOTAL				3993

ALL ROADBED WIDTHS				
ITEM	NO. REQ'D	SIZE	LENGTH	WT. LBS.
CORR. METAL PIPE	1	12"	2'-0"	20

** PIPE LENGTH & DRAINAGE DITCH SHALL BE AS INDICATED ON THE PLANS.
SACKED ROCK AT END OF PIPE WILL NOT BE PERMITTED

REINFORCING

12' ROADBED				
ITEM	NO. REQ'D	SIZE	LENGTH	WT. LBS.
HORIZONTAL BARS	12	NO. 4	12'-6"	100
HORIZONTAL BARS	12	NO. 4	7'-0"	56
HORIZONTAL BARS	18	NO. 4	16'-9"	201
VERTICAL BARS	20	NO. 4	2'-9"	37
U-BARS	26	NO. 6	12'-11"	471
HORIZONTAL BARS	4	NO. 4	13'-2"	35
TOTAL				900

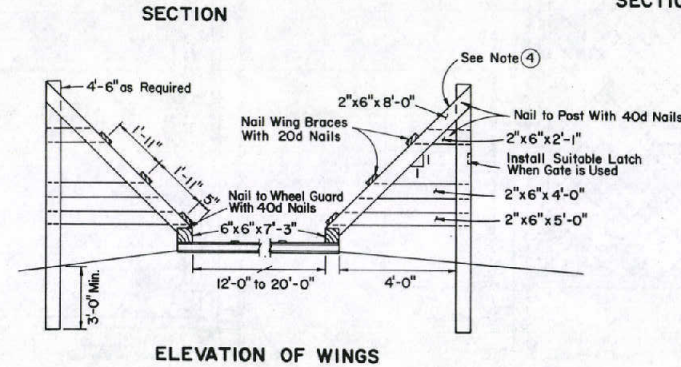
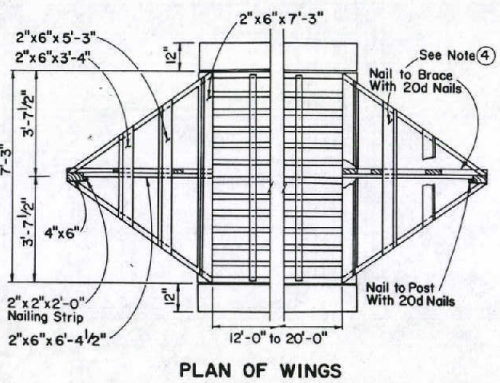
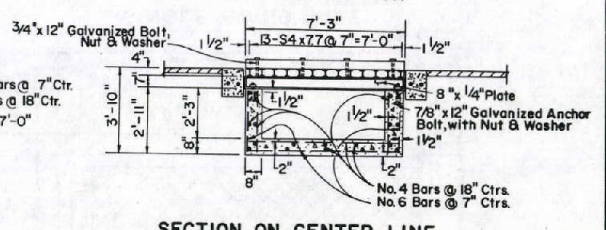
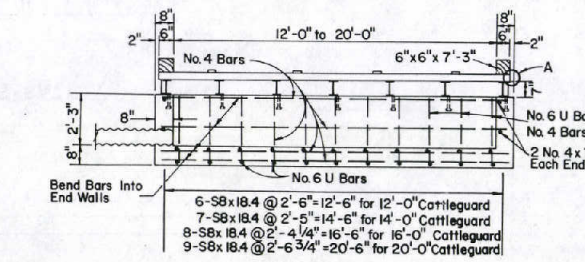
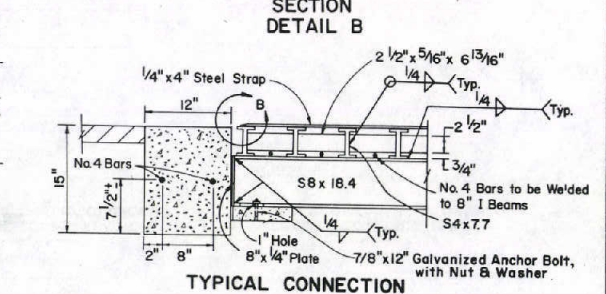
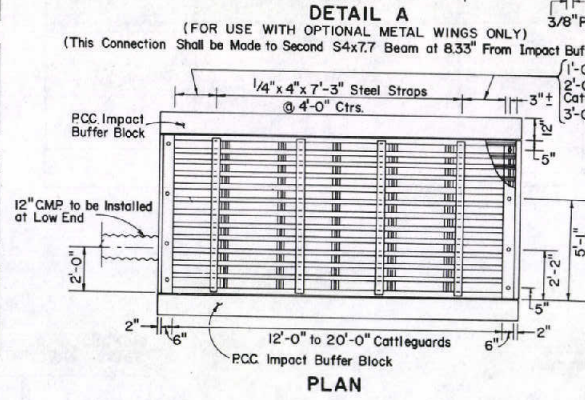
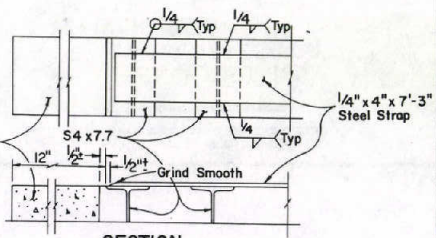
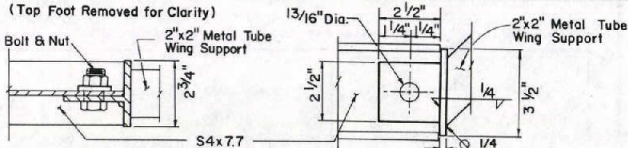
14' ROADBED				
ITEM	NO. REQ'D	SIZE	LENGTH	WT. LBS.
HORIZONTAL BARS	12	NO. 4	14'-6"	116
HORIZONTAL BARS	13	NO. 4	7'-0"	61
HORIZONTAL BARS	18	NO. 4	18'-9"	225
VERTICAL BARS	22	NO. 4	2'-9"	40
U-BARS	29	NO. 6	12'-11"	526
HORIZONTAL BARS	4	NO. 4	15'-2"	41
TOTAL				1,009

16' ROADBED				
ITEM	NO. REQ'D	SIZE	LENGTH	WT. LBS.
HORIZONTAL BARS	12	NO. 4	16'-6"	132
HORIZONTAL BARS	15	NO. 4	7'-0"	70
HORIZONTAL BARS	18	NO. 4	20'-9"	249
HORIZONTAL BARS	26	NO. 4	2'-9"	58
U-BARS	32	NO. 6	12'-11"	580
HORIZONTAL BARS	4	NO. 6	17'-2"	46
TOTAL				1,125

20' ROADBED				
ITEM	NO. REQ'D	SIZE	LENGTH	WT. LBS.
HORIZONTAL BARS	12	NO. 4	20'-6"	164
HORIZONTAL BARS	17	NO. 4	7'-0"	79
HORIZONTAL BARS	18	NO. 4	24'-9"	297
VERTICAL BARS	30	NO. 4	2'-9"	55
U-BARS	39	NO. 6	12'-11"	707
HORIZONTAL BARS	4	NO. 6	21'-2"	57
TOTAL				1,359

CONCRETE				
ITEM	NO. REQ'D	SIZE	LENGTH	WT. LBS.
12' ROADBED			6.25 CU. YD.	
14' ROADBED			7.03 CU. YD.	
16' ROADBED			7.79 CU. YD.	
20' ROADBED			9.34 CU. YD.	

* NO. 4 BARS WELDED TO 8" I BEAMS



- GENERAL NOTES
1. ALL CONCRETE TO BE CLASS A OR AA.
 2. STANDARD METAL OR TIMBER GATES SHALL BE CONSTRUCTED WHEN SHOWN ON PLANS OR ORDERED BY THE ENGINEER.
 3. ALL CONNECTIONS TO BE WELDED.
 4. METAL WINGS ARE OPTIONAL. FOR DETAILS, SEE DETAIL "A". THIS SHEET AND FOR ADDITIONAL DETAILS AND QUANTITIES, SEE R-7.13.

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

STEEL CATTLE GUARD

12' TO 20' ROADBED

James A. [Signature]

TIMBER					
ITEM	NO.	REQ'D.	SIZE	LENGTH	WT.
WHEEL GUARDS	2		6" x 6"	7'-3"	43.5
WING SLOPE	4		2" x 6"	3'-0"	32.0
WING SLOPE	2		2" x 6"	6'-4 1/2"	12.8
WING BRACES	2		2" x 6"	3'-4"	6.7
WING BRACES	4		2" x 6"	5'-3"	21.0
WING BRACES	2		2" x 6"	7'-3"	14.5
WING BRACES	2		2" x 6"	2'-1"	4.2
WING BRACES	2		2" x 6"	4'-0"	8.0
WING BRACES	2		2" x 6"	5'-0"	10.0
WING POST	2		4" x 6"	AS REQUIRED	
NAILING STRIP	2		2" x 2"	2'-0"	1.3

GALVANIZED HARDWARE					
ITEM	NO.	REQ'D.	SIZE	LENGTH	WT.
BOLTS	8		3/4"	12"	15
WASHERS	8		3/4"		6
NAILS	50		40d		3
NAILS	72		20d		2 1/4
TOTAL					26 1/4

STRUCTURAL STEEL					
26' ROADBED					
ITEM	NO.	REQ'D.	SIZE	LENGTH	WT. LBS.
I BEAMS	26		S4 x 7.7	13'-5 3/4"	2699
I BEAMS	12		S8 x 18.4	7'-3"	1331
SPACERS	144		2 1/2" x 5/16"	0'-6 13/16"	217
ANCHOR BOLTS	24		7/8"	1'-0"	25
END PLATES	4		7" x 1/4"	13'-6"	320
TOTAL					4590

32' ROADBED					
ITEM	NO.	REQ'D.	SIZE	LENGTH	WT. LBS.
I BEAMS	26		S4 x 7.7	16'-5 3/4"	3299
I BEAMS	14		S8 x 18.4	7'-3"	1553
SPACERS	160		2 1/2" x 5/16"	0'-6 13/16"	254
ANCHOR BOLTS	28		7/8"	1'-0"	27
END PLATES	4		7" x 1/4"	16'-6"	392
TOTAL					5525

40' ROADBED					
ITEM	NO.	REQ'D.	SIZE	LENGTH	WT. LBS.
I BEAMS	26		S4 x 7.7	20'-5 3/4"	4100
I BEAMS	10		S8 x 18.4	7'-3"	1997
SPACERS	216		2 1/2" x 5/16"	0'-6 13/16"	326
ANCHOR BOLTS	36		7/8"	1'-0"	35
END PLATES	4		7" x 1/4"	20'-6"	487
TOTAL					6945

REINFORCING					
26' ROADBED					
ITEM	NO.	REQ'D.	SIZE	LENGTH	WT. LBS.
HORIZONTAL BARS	24		NO. 4	13'-3"	212
HORIZONTAL BARS	22		NO. 4	7'-0"	103
HORIZONTAL BARS	18		NO. 4	30'-9"	370
VERTICAL BARS	40		NO. 4	2'-9"	74
U-BARS	50		NO. 6	12'-1"	907
TOTAL					1666

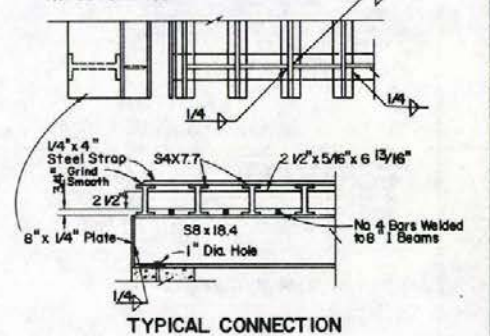
32' ROADBED					
ITEM	NO.	REQ'D.	SIZE	LENGTH	WT. LBS.
HORIZONTAL BARS	24		NO. 4	16'-3"	260
HORIZONTAL BARS	26		NO. 4	7'-0"	122
HORIZONTAL BARS	18		NO. 4	36'-9"	442
VERTICAL BARS	48		NO. 4	2'-9"	88
U-BARS	60		NO. 6	12'-1"	1088
TOTAL					2000

40' ROADBED					
ITEM	NO.	REQ'D.	SIZE	LENGTH	WT. LBS.
HORIZONTAL BARS	24		NO. 4	20'-3"	325
HORIZONTAL BARS	31		NO. 4	7'-0"	145
HORIZONTAL BARS	10		NO. 4	44'-9"	538
VERTICAL BARS	58		NO. 4	2'-9"	107
U-BARS	74		NO. 6	12'-1"	1344
TOTAL					2459

CONCRETE	
26' ROADBED	9.36 CU. YD.
32' ROADBED	11.23 CU. YD.
40' ROADBED	13.74 CU. YD.

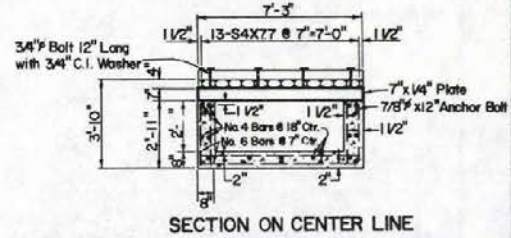
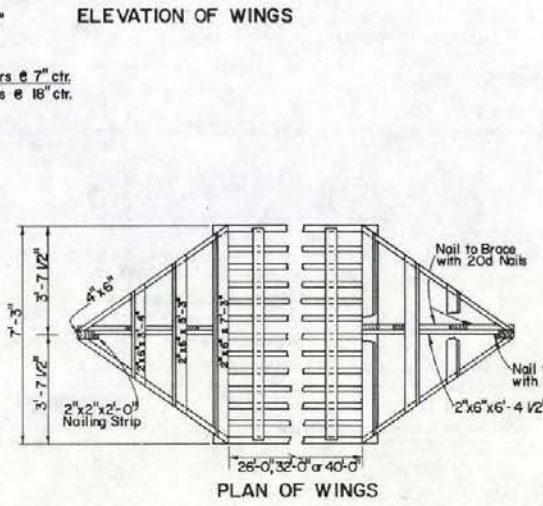
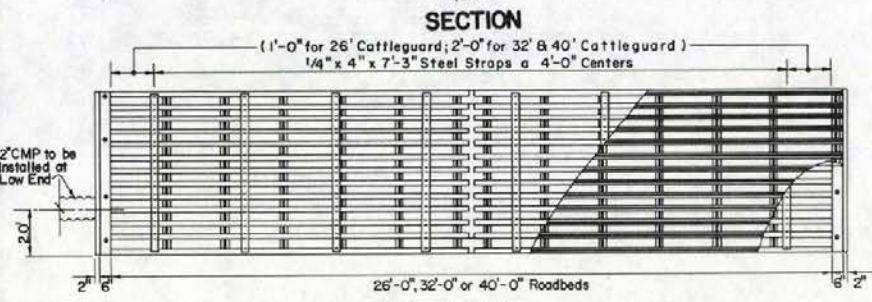
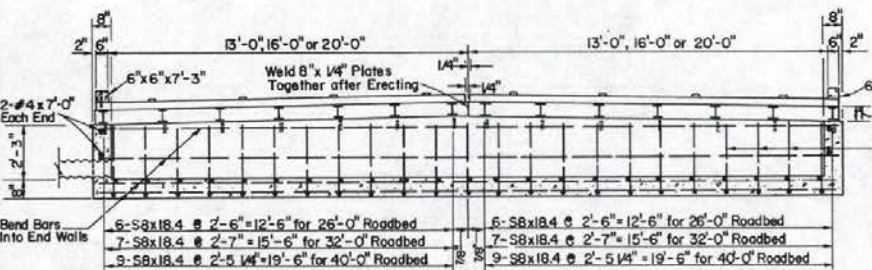
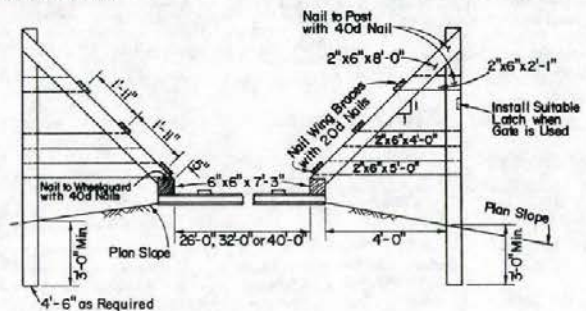
MISCELLANEOUS	
ITEM	LENGTH
12" CMP PIPE	** 2' LENGTH

** Pipe Length & Drainage Ditch Shall Be As Indicated On The Plans. Sacked Rack At End Of Pipe Will Not Be Permitted.



BILL OF MATERIALS

** NO. 4 BARS HELDED TO 7" I BEAMS



- GENERAL NOTES
1. ALL CONCRETE TO BE CLASS A OR AA.
 2. STANDARD METAL OR TIMBER GATES SHALL BE CONSTRUCTED WHEN SHOWN ON PLANS OR ORDERED BY THE ENGINEER.
 3. ALL CONNECTIONS TO BE HELDED.
 4. ALL TIMBER SHALL BE GIVEN TWO COATS OF APPROVED OUTSIDE WHITE PAINT.

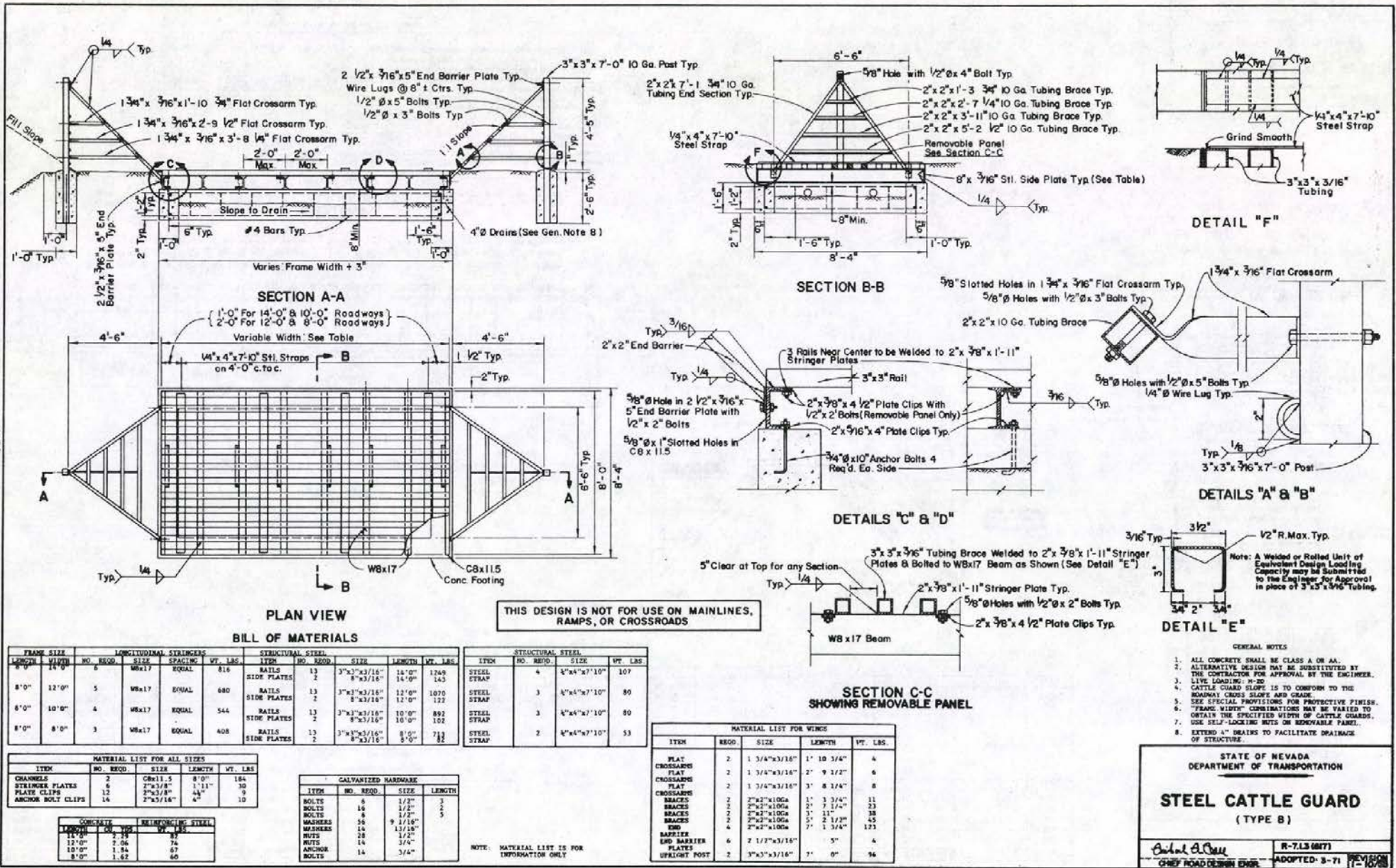
STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

STEEL CATTLE GUARD

(26' TO 40' ROADBED)

Richard A. Bell
CHIEF ROAD DESIGN ENGR

R-7.1.2-(617)
ADOPTED: 8/69 REVISION: 3-1/80



BILL OF MATERIALS				
TIMBER				
ITEM	N ^o REQ'D	SIZE	LENGTH	B.F.T.
WHEEL GUARDS	2	6" x 6"	7'-3"	43.5
WING SLOPE	4	2" x 6"	8'-0"	32.0
WING SLOPE	2	2" x 6"	6'-4 1/2"	12.8
WING BRACES	2	2" x 6"	3'-4"	6.7
WING BRACES	4	2" x 6"	5'-3"	21.0
WING BRACES	2	2" x 6"	7'-3"	14.5
WING BRACES	2	2" x 6"	2'-1"	4.2
WING BRACES	2	2" x 6"	4'-0"	8.0
WING BRACES	2	2" x 6"	5'-0"	10.0
WING POST	2	4" x 6"	AS REQUIRED	
NAILING STRIP	2	2" x 2"	2'-0"	1.3

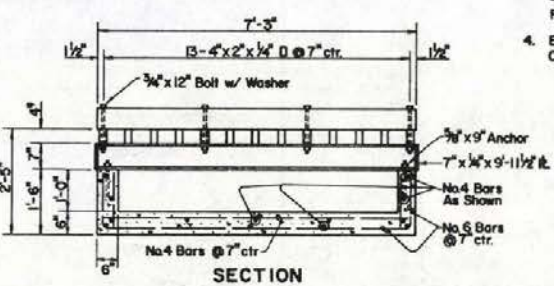
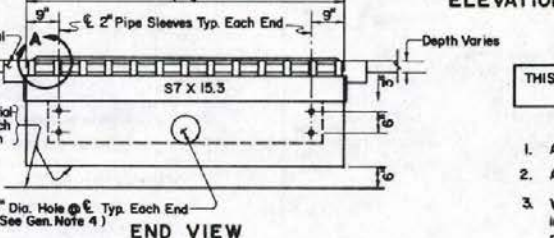
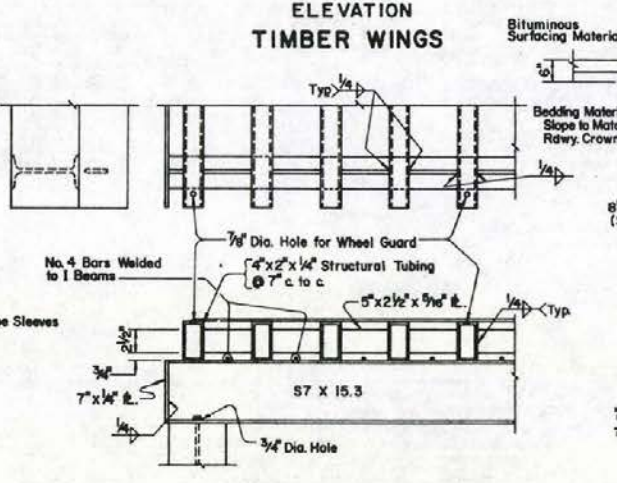
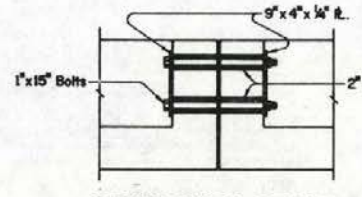
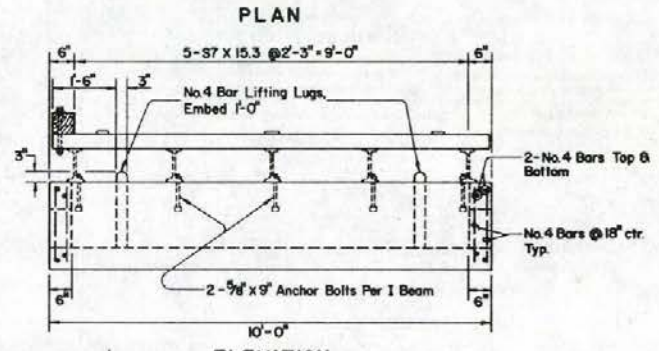
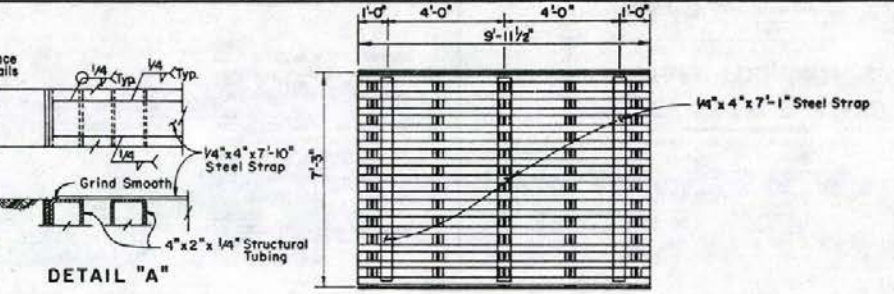
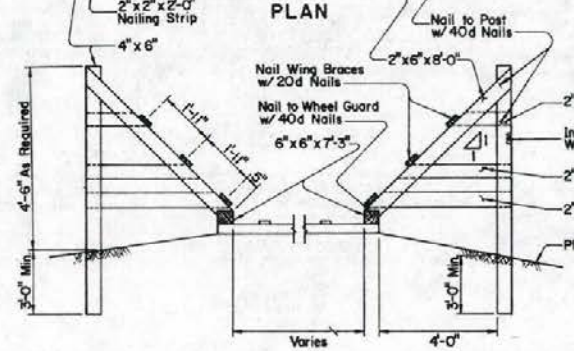
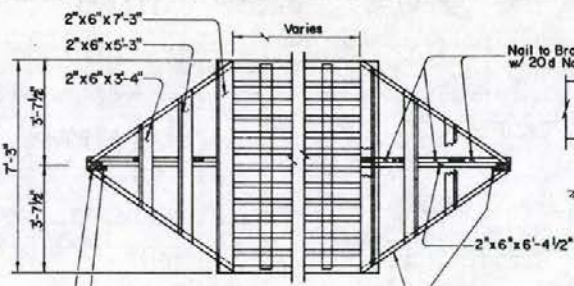
GALVANIZED HARDWARE				
ITEM	N ^o REQ'D	SIZE	LENGTH	WT LBS
BOLTS	8	3/4"	12"	15
WASHERS	8	3/4"		6
NAILS	50	40d		3
NAILS	72	40d		2 1/4
TOTAL				26 1/4

STRUCTURAL STEEL (1-10'-0" COMPONENT)				
ITEM	N ^o REQ'D	SIZE	LENGTH	WT LBS
BEAMS	5	S7 x 15.3	7'-3"	554.6
STRUCTURAL TUBING	13	4" x 2" x 1/4"	9'-11 1/2"	1139.3
SPACER PLATES	60	2 1/2" x 3/4"	0'-5"	67.0
ANCHOR BOLTS	10	3/4"	0'-9"	9.0
STEEL STRAPS	3	4" x 1 1/4"	7'-1"	72.3
END PLATES	2	7" x 3/4"	9'-11 1/2"	118.5
PIPE SLEEVES	8	2"	0'-6"	14.6
CONNECTION PLATES	As Req'd	9" x 4" x 1/4"		
CONNECTION BOLTS	As Req'd	1"	15"	

REINFORCING STEEL (1-10'-0" COMPONENT)				
ITEM	N ^o REQ'D	SIZE	LENGTH	WT LBS
HORIZONTAL BARS	12	N ^o 4	9'-6"	76
HORIZONTAL BARS	18	N ^o 4	9'-9"	117
HORIZONTAL BARS	18	N ^o 4	7'-0"	84
VERTICAL BARS	44	N ^o 4	1'-3"	37
LIFTING LUGS	4	N ^o 4	2'-9"	7
U BARS	18	N ^o 6	9'-6"	259
TOTAL				580

CONCRETE	
1 - 10'-0" COMPONENT	1.94 cu. yd.

* - N^o 4 BARS WELDED TO I BEAMS.



THIS DESIGN IS NOT FOR USE ON MAINLINES, RAMPS, OR CROSSROADS

- GENERAL NOTES
- All Concrete To Be Class DA.
 - All Connections To Be Welded.
 - When Gate is Not Specified: Install The Required Type Of Intermediate Braced Post Adjacent To The Wing Post. Fence Wires To Be Tied To Braced Post Only.
 - Extend Drain Pipes To Facilitate Drainage Of Structure.

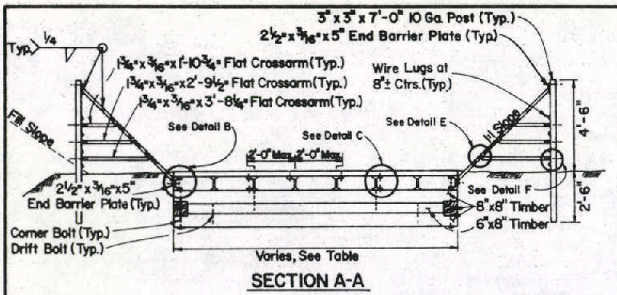
STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

**STEEL CATTLE GUARD
(TYPE C)**

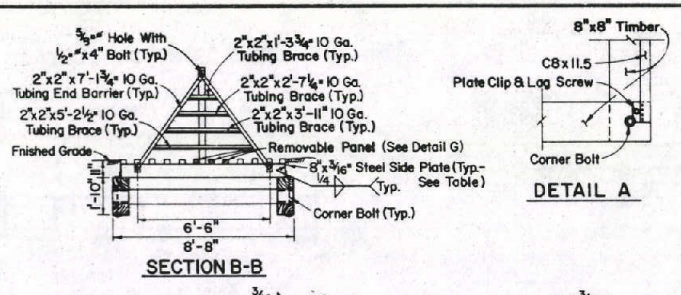
Adopted 12/70

R-7.1.4 - (817)

ADOPTED: 12/70

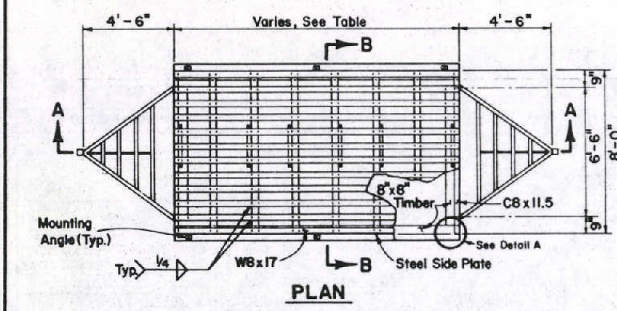


SECTION A-A

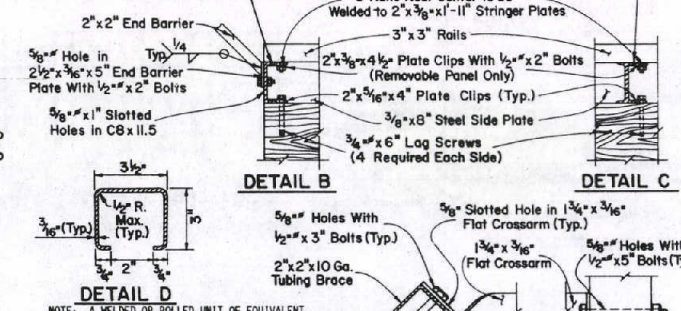


SECTION B-B

DETAIL A



PLAN



DETAIL B

DETAIL C

DETAIL D

DETAIL E

DETAIL F

NOTE: A WELDED OR ROLLED UNIT OF EQUIVALENT DESIGN LOADING CAPACITY, MAY BE SUBMITTED TO THE ENGINEER FOR APPROVAL IN PLACE OF 3" X 3" X 3/16" TUBING.

THIS DESIGN IS NOT FOR USE ON MAINLINES, RAMPS, OR CROSSROADS

NOTE: MATERIAL LIST IS FOR INFORMATION ONLY.

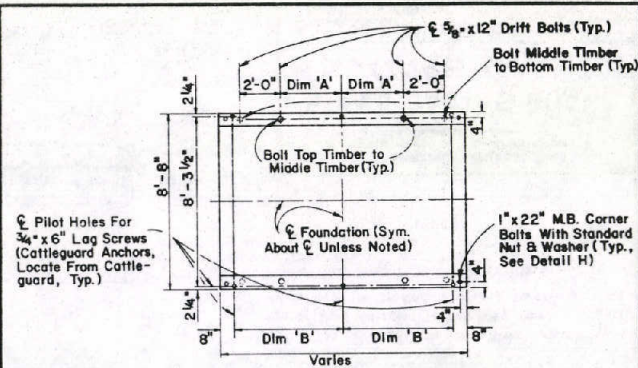
MATERIAL LIST FOR WINGS				
ITEM	REQD.	SIZE	LENGTH	WT. LBS.
FLAT CROSSARMS	2	1 3/4" X 3/16"	1' 10 3/4"	4
FLAT CROSSARMS	2	1 3/4" X 3/16"	2' 9 1/2"	6
FLAT CROSSARMS	2	1 3/4" X 3/16"	3' 3 1/4"	8
BRACES	2	2" X 2" X 10GA	1' 3 3/4"	11
BRACES	2	2" X 2" X 10GA	2' 7 1/4"	23
BRACES	2	2" X 2" X 10GA	3' 11"	38
BRACES	2	2" X 2" X 10GA	5' 2 1/2"	45
END BARRIER PLATES	4	2" X 2" X 10GA	7' 1 3/4"	123
UPRIGHT POST	2	3" X 3" X 3/16"	7' 0"	96

GALVANIZED HARDWARE			
ITEM	NO. REQ'D.	SIZE	LENGTH
BOLTS	6	1/2"	3"
BOLTS	6	1/2"	5"
BOLTS	16	1/2"	2"
WASHERS	56	9/16"	
WASHERS	14	13/16"	
NUTS	28	1/2"	
NUTS	14	3/4"	
LAG SCREWS	14	3/4"	6"

BILL OF MATERIALS										
FRAME SIZE		LONGITUDINAL STRINGERS			STRUCTURAL STEEL					
LENGTH	WIDTH	NO. REQD.	SIZE	SPACING	WT. LBS.	ITEM	NO. REQD.	SIZE	LENGTH	WT. LBS.
8' 0"	14' 0"	6	W8x17	EQUAL	816	RAILS	13	3" X 3" X 3/16"	14' 0"	1249
						SIDE PLATES	2	8" X 3/16"	14' 0"	143
8' 0"	12' 0"	5	W8x17	EQUAL	680	RAILS	13	3" X 3" X 3/16"	12' 0"	1070
						SIDE PLATES	2	8" X 3/16"	12' 0"	122
8' 0"	10' 0"	4	W8x17	EQUAL	544	RAILS	13	3" X 3" X 3/16"	10' 0"	892
						SIDE PLATES	2	8" X 3/16"	10' 0"	102
8' 0"	8' 0"	3	W8x17	EQUAL	408	RAILS	13	3" X 3" X 3/16"	8' 0"	713
						SIDE PLATES	2	8" X 3/16"	8' 0"	82

STEEL CATTLE GUARD DETAILS

MATERIAL LIST FOR ALL SIZES				
ITEM	NO. REQ'D.	SIZE	LENGTH	WT. LBS.
CHANNELS	2	CBx11.5	8' 0"	184
STRINGER PLATES	6	2" X 3/8"	1' 11"	30
PLATE CLIPS	12	2" X 3/8"	4-1/2"	9
ANCHOR BOLT CLIPS	14	2" X 5/16"	4"	10

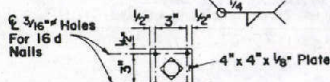


PLAN

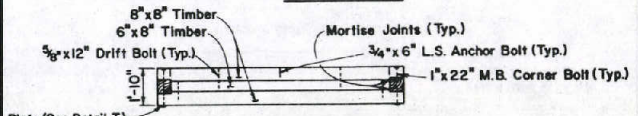
Counterbore so Nut & Washer Will be Below Surface. Cut Bolt Flush With Surface if Necessary to Seat Cattleguard.



DETAIL H

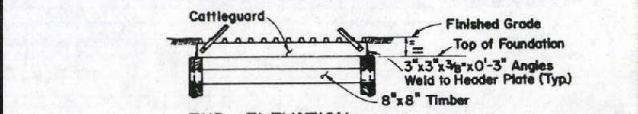


DETAIL I



SIDE ELEVATION

(Without Cattleguard)



END ELEVATION

(With Cattleguard)

- GENERAL NOTES
- ALTERNATE DESIGN MAY BE SUBSTITUTED BY THE CONTRACTOR FOR APPROVAL BY THE ENGINEER.
 - LIVE LOADING: H-20
 - CATTLE GUARD IS TO BE PLACED ON LEVEL GRADE ACROSS ROADWAY - ROADWAY CROSS SLOPE IS TO TRANSITION FROM NORMAL SECTION TO LEVEL SECTION 25' BACK ON LINE AND 25' AHEAD ON LINE FROM EDGE OF CATTLE GUARD.
 - FRAME WIDTHS COMBINATIONS MAY BE VARIED TO OBTAIN THE SPECIFIED WIDTH OF CATTLE GUARDS.
 - USE SELF-LOCKING NUTS ON REMOVABLE PANEL.

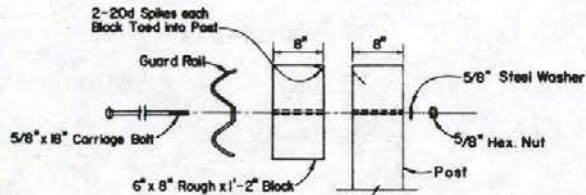
FRAME SIZE	LENGTH	WIDTH	DIR.	
			'A'	'B'
8' 8"	14' 0"	4' 0"	6' 4"	5' 4"
8' 8"	12' 0"	3' 0"	5' 4"	4' 4"
8' 8"	10' 0"	2' 0"	4' 4"	3' 4"

TIMBER FOUNDATION DETAILS

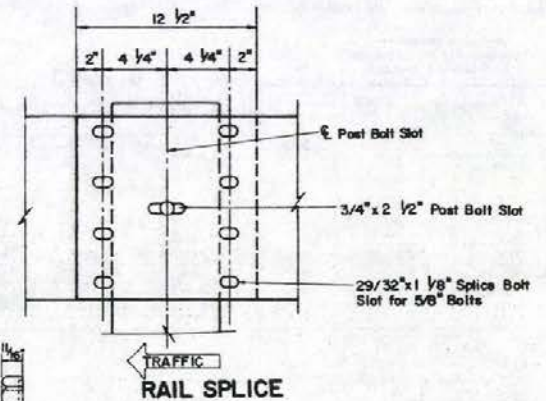
STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

**STEEL CATTLE GUARD
TIMBER FOUNDATION**

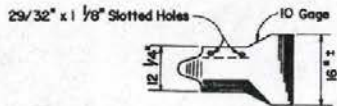
R-7.1.5 (617)
ADOPTED 7/77 REVISION
1-8/80



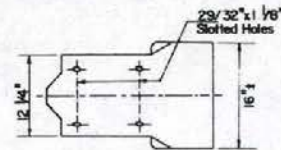
POST BOLT HARDWARE
(Galvanized)



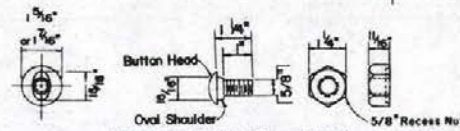
RAIL SPLICE



ELEVATION

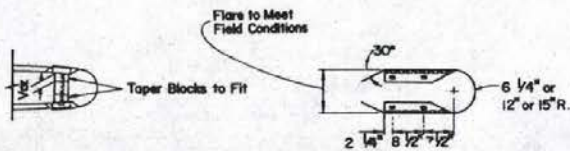


ELEVATION



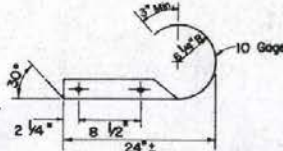
NOTE: Post Bolt Similar Except Length

SPLICE BOLT & NUT



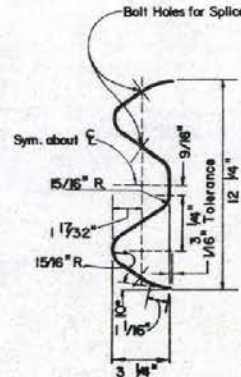
PLAN

TERMINAL RETURN SECTION

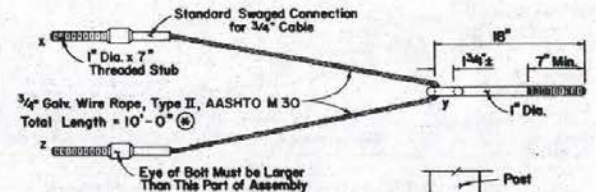


PLAN

TERMINAL SECTION



SECTION THRU RAIL ELEMENT



CABLE ASSEMBLY DETAIL

For Typical Installation Plan - R-81.4

GUIDEPOST PLACEMENT ALONG GUARDRAIL

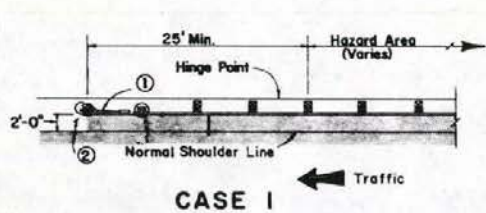
SPACING SHALL BE AS SHOWN ON SHEET R-9.1.1 EXCEPT:

- (A) 50 FEET ON TANGENTS AND ON CURVES OF 300 FEET RADIUS OR GREATER.
- (B) ON CURVES OF LESSER RADIUS, THE PLACEMENT SHALL BE AS INDICATED ON TABLE 1, SHEET R-9.1.1.
- (C) GUIDE POSTS SHALL BE OMITTED ON THE FLARED SECTIONS OF GUARDRAIL.

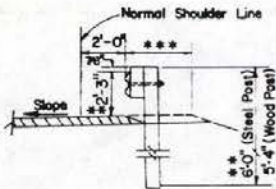
STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION
**GALVANIZED GUARDRAIL
ELEMENTS**

Michael O'Neil
CHIEF PROJECT DESIGN ENGINEER
R-81.1-(888)
ADOPTED: 9-73(4)

R-88

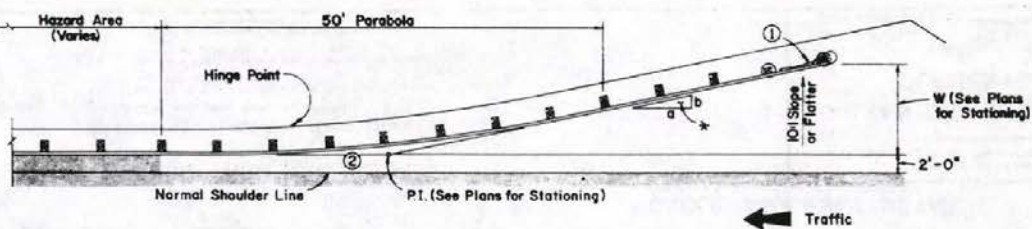


CASE 1

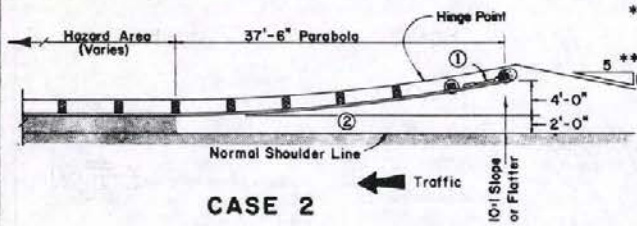


CASE 2

SUPERELEVATED INSTALLATION



CASE 4
(FLARED APPROACH)



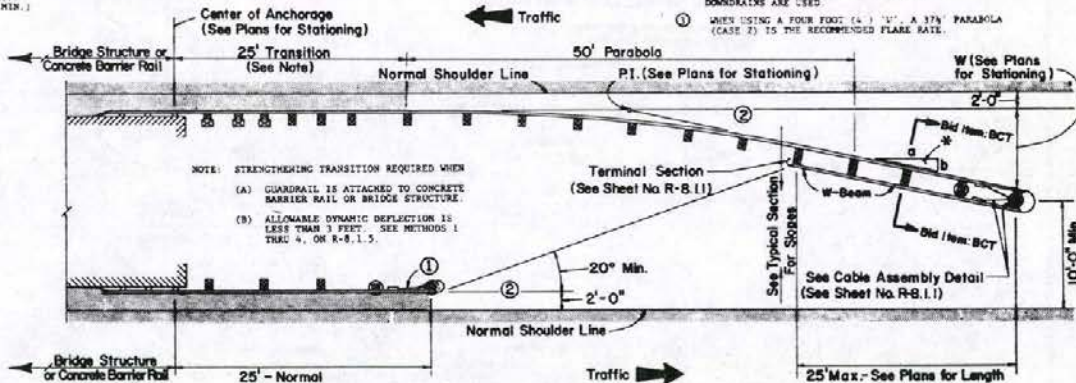
PLAN

ELEVATION

CASE 3
(BURIAL IN BACKSLOPE)

** GUARDRAIL HEIGHTS ON STAGE CONSTRUCTION PROJECTS SHALL BE GOVERNED BY FINAL SURFACING ELEVATION. THE SECTIONS SHOWN DEPICT W-BEAM INSTALLATIONS. IF TRIPLE CONFIGURATION GUARDRAILS ARE SPECIFIED, USE POST AND BLOCK DIMENSIONS SHOWN ON SHEET R-8.1.1.7. *** SEE PROJECT TYPICAL SECTIONS FOR WINDSHIELD (3' MIN.).

SHOULDER DIKE INSTALLATION



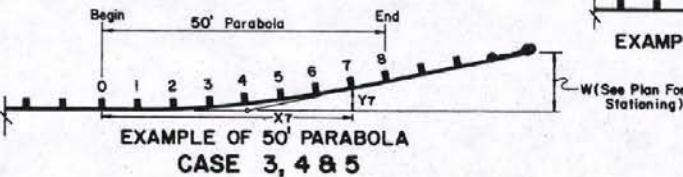
CASE 5

NOTE: STRENGTHENING TRANSITION REQUIRED WHEN
(A) GUARDRAIL IS ATTACHED TO CONCRETE BARRIER RAIL OR BRIDGE STRUCTURE.
(B) ALLOWABLE DYNAMIC DEFLECTION IS LESS THAN 3 FEET. SEE METHODS 1 THRU 4, ON R-8.1.5.

- ① FOR DETAILS OF BREAKAWAY CABLE TERMINAL, SEE STANDARD SHEET R-8.1.1.
- ② AREAS IN THE GUARDRAIL WIDTH TRANSITIONS MAY REQUIRE PAVING IF SHOULDER DIZES AND/OR DOWNDRAINS ARE USED.
- ③ WHEN USING A FOUR FOOT (4') 10' PARABOLA (CASE 2) IS THE RECOMMENDED FLARE RATE.

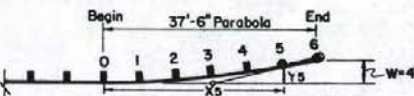
MPH	FLARE RATE a:b	POST NUMBER							
		1	2	3	4	5	6	7	8
70	15:1	Y .03'	.10'	.23'	.42'	.65'	.94'	1.28'	1.67'
60	13:1	Y .03'	.12'	.27'	.48'	.75'	1.08'	1.47'	1.92'
50	11:1	Y .04'	.14'	.32'	.57'	.89'	1.28'	1.74'	2.27'
40	9:1	Y .04'	.17'	.39'	.69'	1.09'	1.56'	2.13'	2.78'

NOTE: X AND Y DIMENSIONS ARE TO THE FACE OF THE GUARDRAIL.



EXAMPLE OF 50' PARABOLA
CASE 3, 4 & 5

MPH	FLARE RATE a:b	POST NUMBER					
		1	2	3	4	5	6
70	15:1	Y .03'	.10'	.23'	.42'	.65'	.94'
60	13:1	Y .03'	.12'	.27'	.48'	.75'	1.08'
50	11:1	Y .04'	.14'	.32'	.57'	.89'	1.28'
40	9:1	Y .04'	.17'	.39'	.69'	1.09'	1.56'



EXAMPLE OF 37'-6" PARABOLA
CASE 2

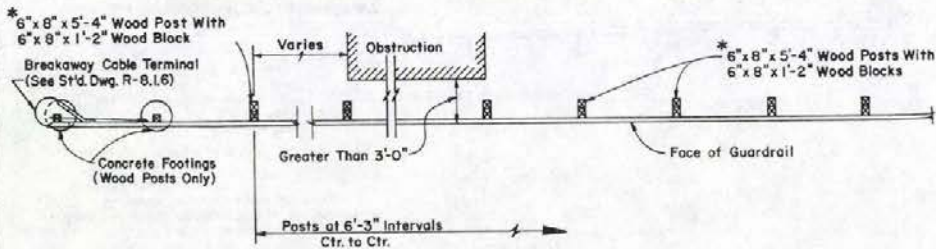
OPERATING SPEED	* FLARE RATES	
	FLARE RATE	a:b
70	15:1	15:1
60	13:1	13:1
50	11:1	11:1
40	9:1	9:1

LEGEND
PAVED AREAS

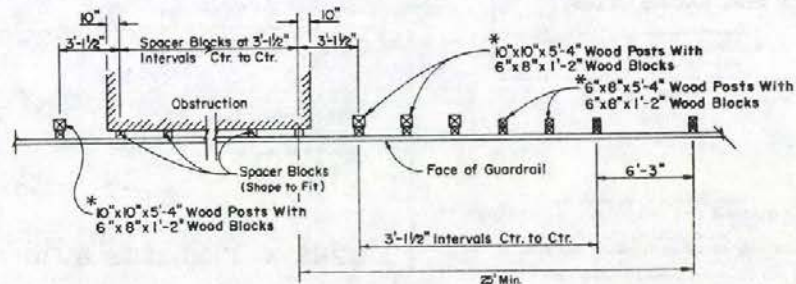
STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

TYPICAL INSTALLATIONS
GUARDRAIL FLARES

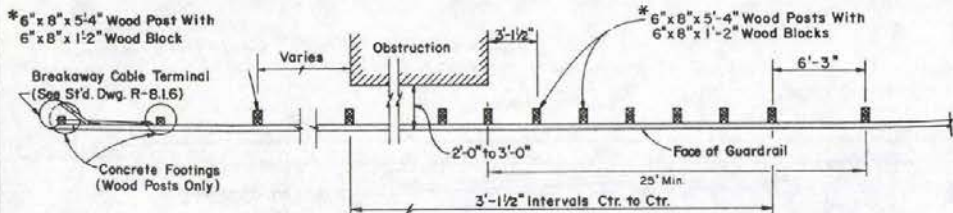
ADOPTED 7/88
R-8.1.4 (8/88)



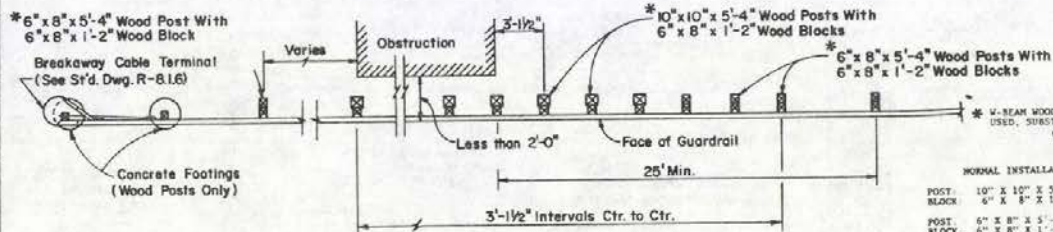
METHOD 1



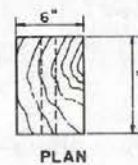
METHOD 4



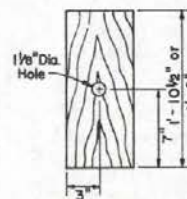
METHOD 2



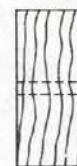
METHOD 3



PLAN



FRONT



SIDE

SPACER BLOCK DETAIL

NOTE: SPACER MATERIAL MAY BE "I" BEAM, "C" BEAM OR FORMED STRUCTURAL TUBING BY PRIOR APPROVAL OF THE ENGINEER. FOR DETAILS SEE STANDARD SHEET R-8.2.2.

NOTES:

- 1) WHEN SLOPE STABILITY COMPROMISES THE INTEGRITY OF THE POSTS - THE POSTS SHALL BE LENGTHENED AS REQUIRED
- 2) USE OF TRIPLE CORRUGATED GUARDRAIL REQUIRES 1'-10 1/2" LENGTH BLOCK

* W-BEAM WOOD POSTS ARE SHOWN. WHEN TRIPLE CORRUGATED GUARDRAIL IS USED, SUBSTITUTE APPROPRIATE POSTS AND BLOCKS LISTED BELOW:
W-BEAM GUARDRAIL

NORMAL INSTALLATION

POST:	10" X 10" X 5'-4" WOOD
BLOCK:	6" X 8" X 1'-2" WOOD
POST:	6" X 8" X 5'-4" WOOD
BLOCK:	6" X 8" X 1'-2" WOOD

ACCEPTABLE ALTERNATES

W6 X 15.5 X 6'-0" STEEL	OR 4-3/8" X 5-7/8" X 3/16" X 6'-0" C STEEL
W6 X 8.5 (OR 9.0) X 1'-2" STEEL	OR 4-3/8" X 5-7/8" X 3/16" X 1'-2" C STEEL

TRIPLE CORRUGATED GUARDRAIL

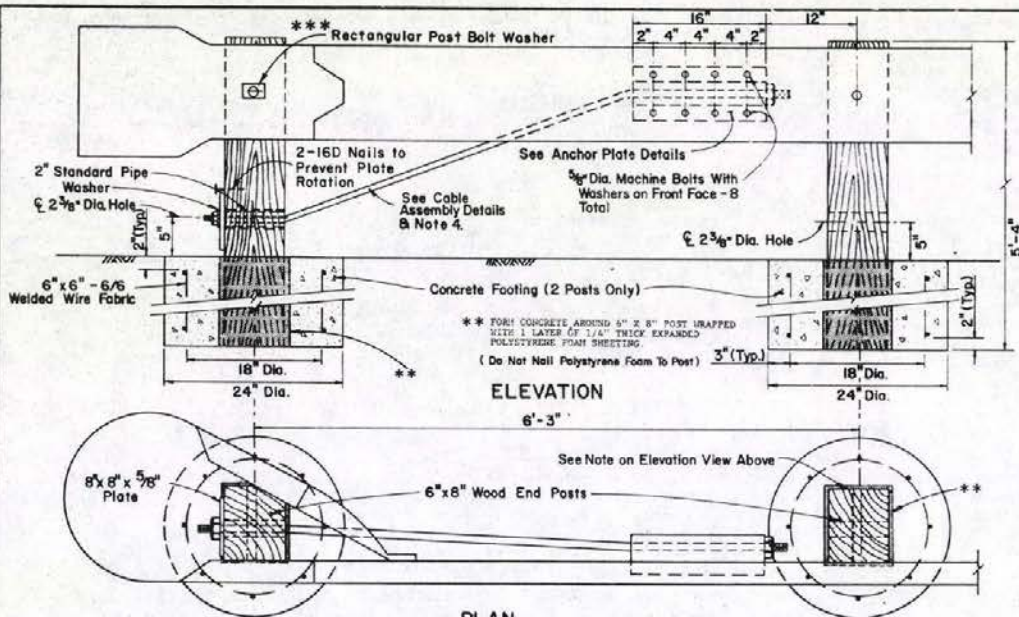
POST:	10" X 10" X 6'-0" WOOD
BLOCK:	6" X 8" X 1'-10 1/2" WOOD
POST:	6" X 8" X 6'-0" WOOD
BLOCK:	6" X 8" X 1'-10 1/2" WOOD

W6 X 15.5 X 6'-8" STEEL	OR 4-3/8" X 5-7/8" X 3/16" X 6'-8" C STEEL
W6 X 8.5 (OR 9.0) X 1'-9 1/2" STEEL	OR 4-3/8" X 5-7/8" X 3/16" X 1'-9 1/2" C STEEL

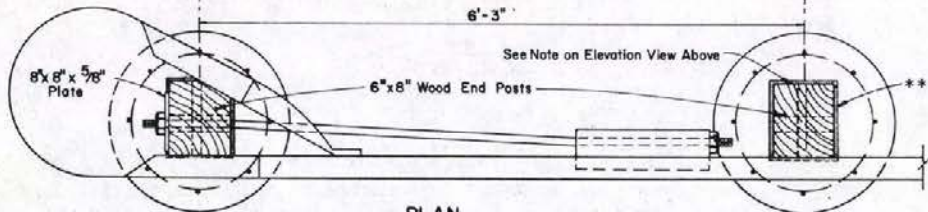
STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

**TYPICAL
GUARDRAIL-TRANSITION
INSTALLATIONS**

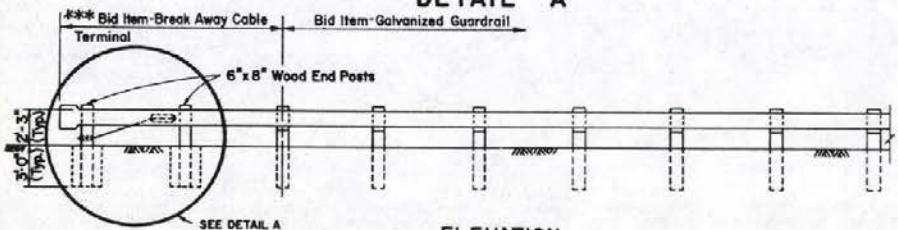
ADOPTED: 6/81 REVISION



ELEVATION

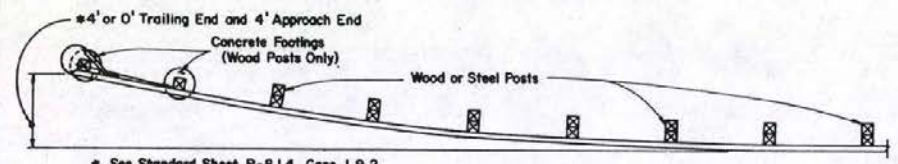


PLAN
DETAIL A

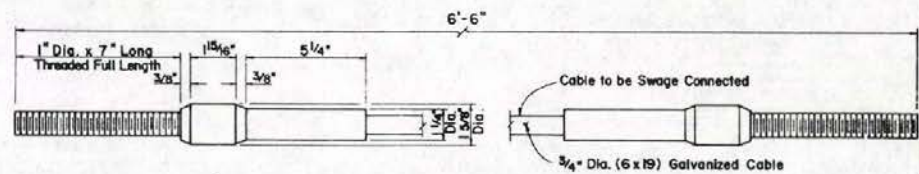


ELEVATION

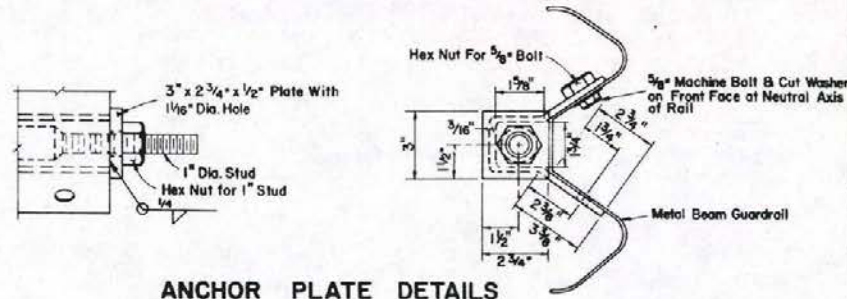
*** See Standard Sheet R-8.1.7 for Galvanized Guardrail Triple Corrugation Details



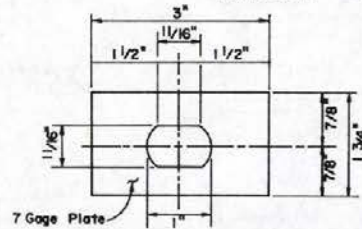
PLAN



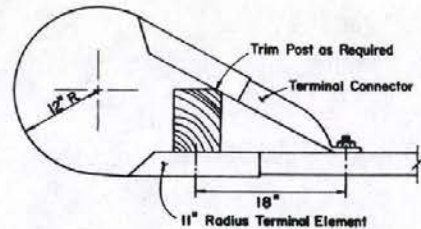
CABLE ASSEMBLY DETAILS



ANCHOR PLATE DETAILS



RECTANGULAR POST BOLT WASHER
(Galvanized)



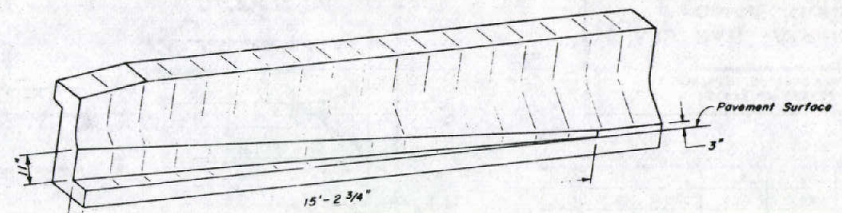
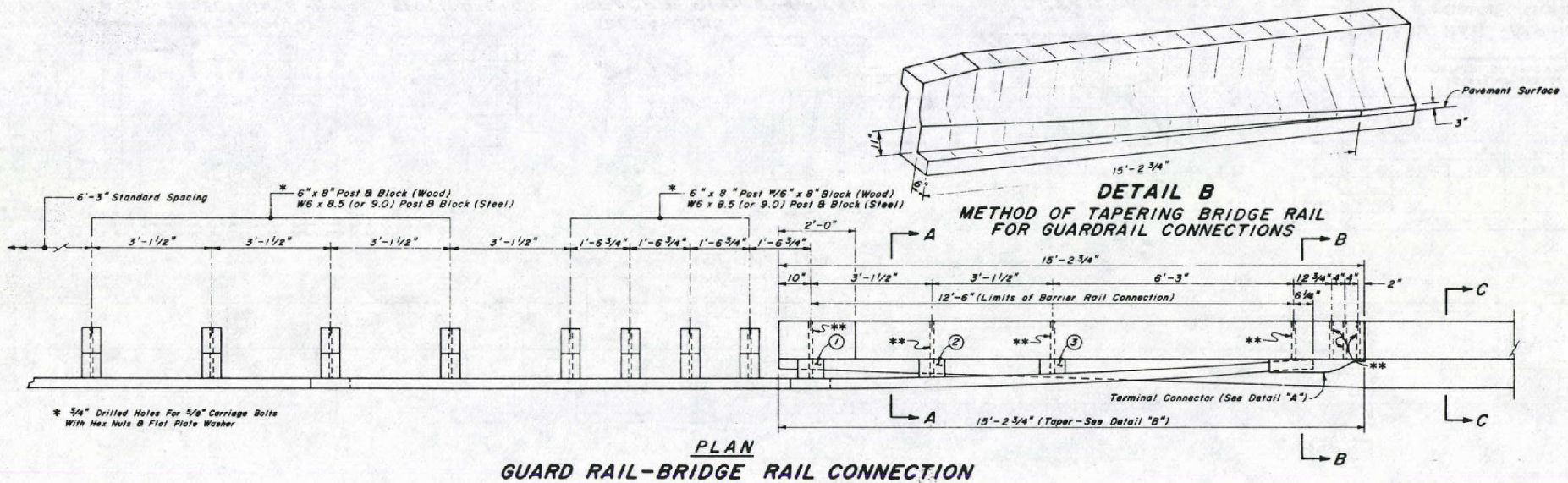
END SECTION

— GENERAL NOTES —

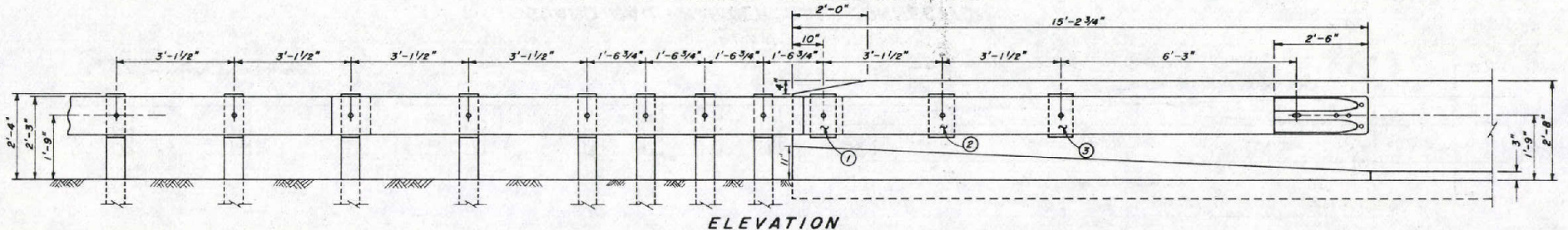
1. Post Spacing Shall be 6'-3" Except as Otherwise Noted.
2. For Details Not Shown Refer to Standard Guardrail Sheets.
3. Terminal May be Omitted When End of Guardrail is Buried in Backslope. (See R-8.1.4, Case 3.)
4. Cable Assembly Should be Taut with No Obvious Slack in Cable.
5. Rectangular Post Bolt Washer Shall be Installed on First Post Only.

STATE OF NEVADA DEPARTMENT OF TRANSPORTATION	
BREAKAWAY CABLE TERMINAL	
<i>Michael A. Hill</i> CHIEF ROAD DESIGN ENGINEER	R-8.1.6 (618) ADOPTED: 7/7/74 2-8-88

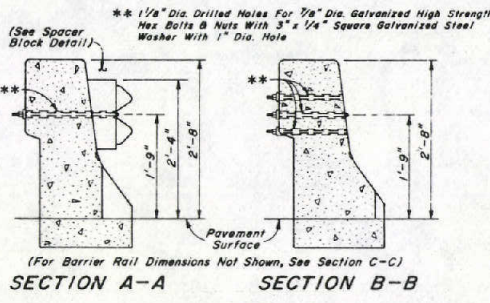
R-61



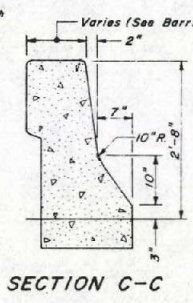
PLAN
GUARD RAIL-BRIDGE RAIL CONNECTION



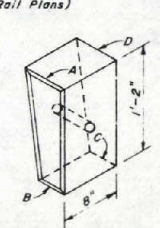
ELEVATION



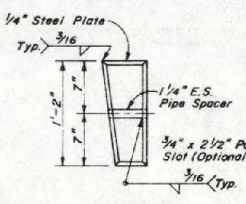
SECTION A-A **SECTION B-B**



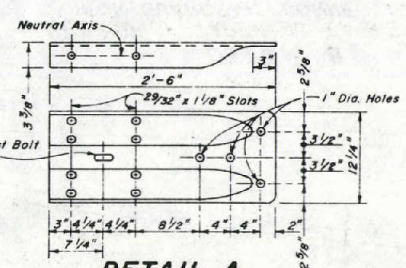
SECTION C-C



ELEVATION
SPACER BLOCK DETAIL
(SEE TABLE E)



END VIEW



DETAIL A
TERMINAL CONNECTOR

SPACER BLOCK	A	B	C	D
①	6"	3 3/4"	3 3/4"	6"
②	5 5/8"	3 5/8"	3 1/8"	5 3/8"
③	4 1/8"	1 7/8"	1 3/8"	3 3/8"

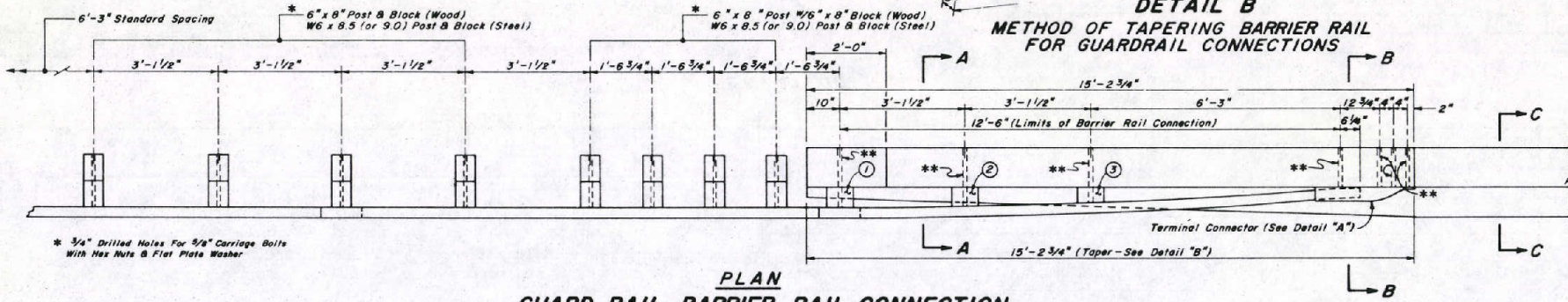
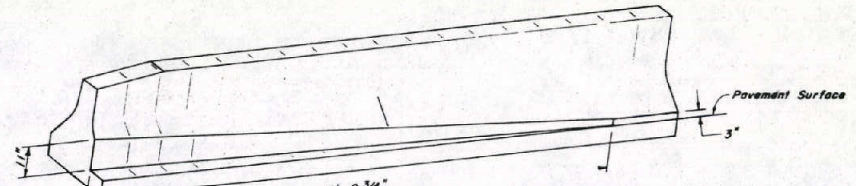
STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

GUARD RAIL-BRIDGE RAIL CONNECTIONS ("W"-BEAM)

Michael J. Kelly
CHIEF ROAD DESIGN ENGR

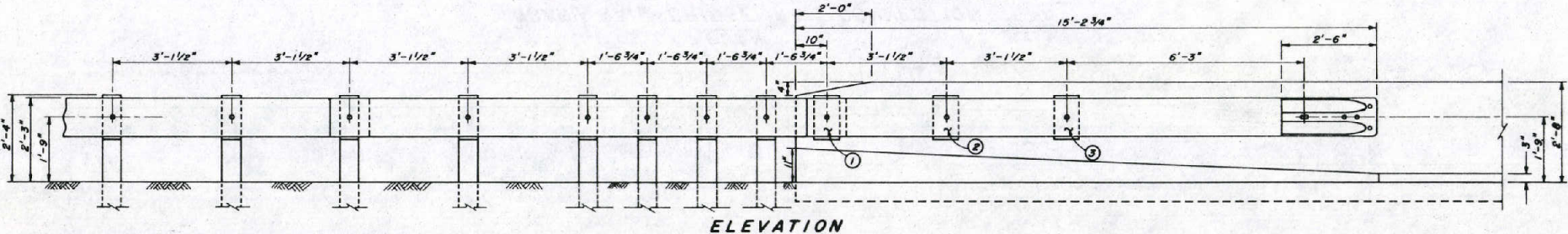
R-8 2.3
ADOPTED 11-86

(618)
REVISION

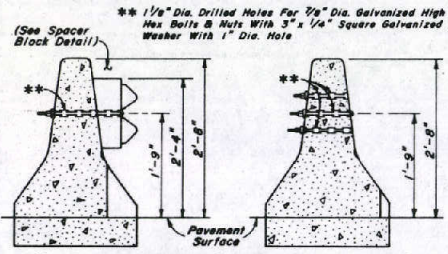


* 3/4" Drilled Holes For 3/8" Carriage Bolts With Hex Nuts & Flat Plate Washer

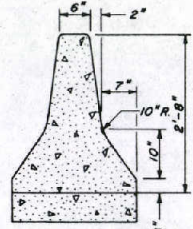
PLAN
GUARD RAIL-BARRIER RAIL CONNECTION



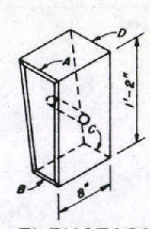
ELEVATION



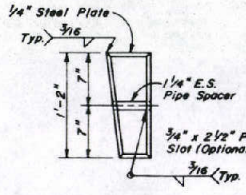
SECTION A-A **SECTION B-B**



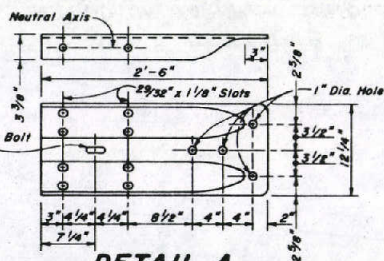
SECTION C-C



ELEVATION SPACER BLOCK DETAIL
(SEE TABLE E)



END VIEW



DETAIL A
TERMINAL CONNECTOR

SPACER BLOCK	A	B	C	D
①	6"	3 3/8"	3 3/8"	6"
②	5 3/8"	3 3/8"	3 1/8"	5 3/8"
③	4 1/8"	1 7/8"	1 3/8"	3 5/8"

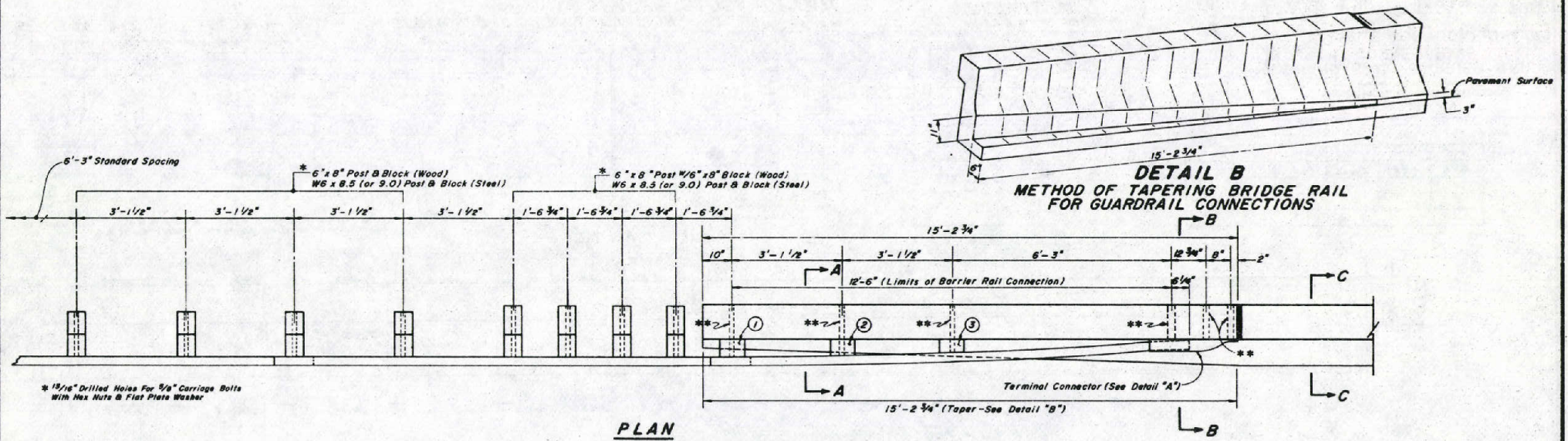
STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

GUARD RAIL-BARRIER RAIL CONNECTIONS ("W"-BEAM)

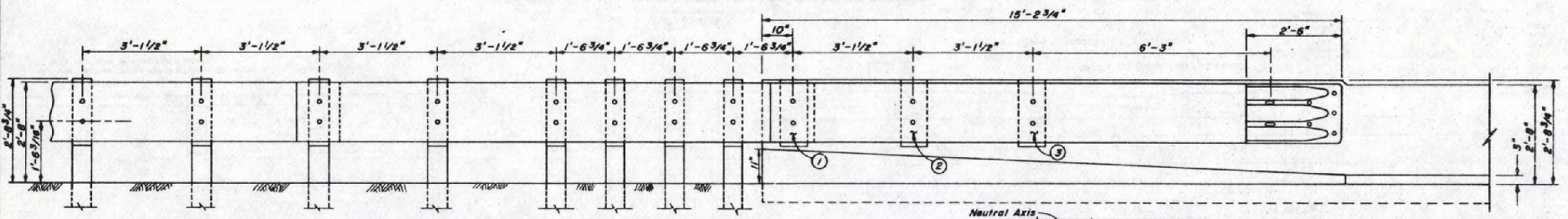
John D. Hill R-82.31
CHIEF ROAD DESIGN ENGR. ADOPTED: 11/88 REVISION

R-62

R-63



PLAN
GUARD RAIL-BRIDGE RAIL CONNECTION



ELEVATION

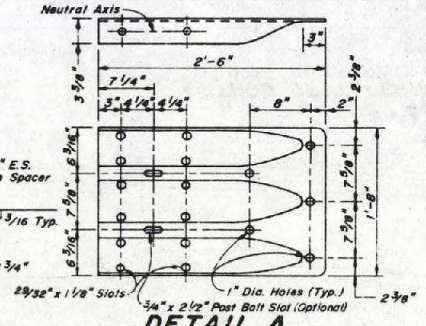
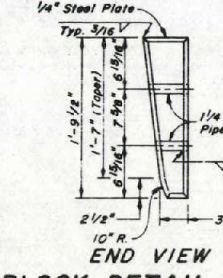
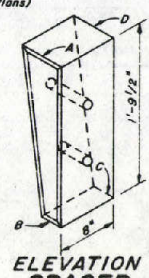
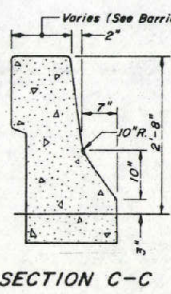
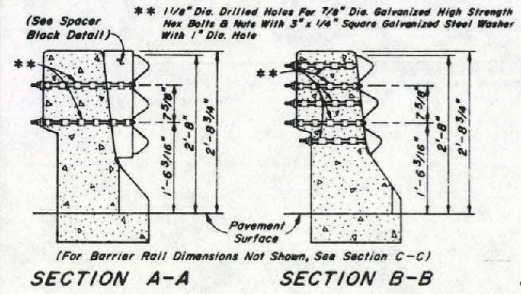


TABLE E				
SPACER BLOCK	A	B	C	D
①	6"	3"	3"	6"
②	5 3/8"	2 3/8"	2 3/8"	5 3/8"
③	4 1/8"	1 1/8"	3/8"	3 3/8"

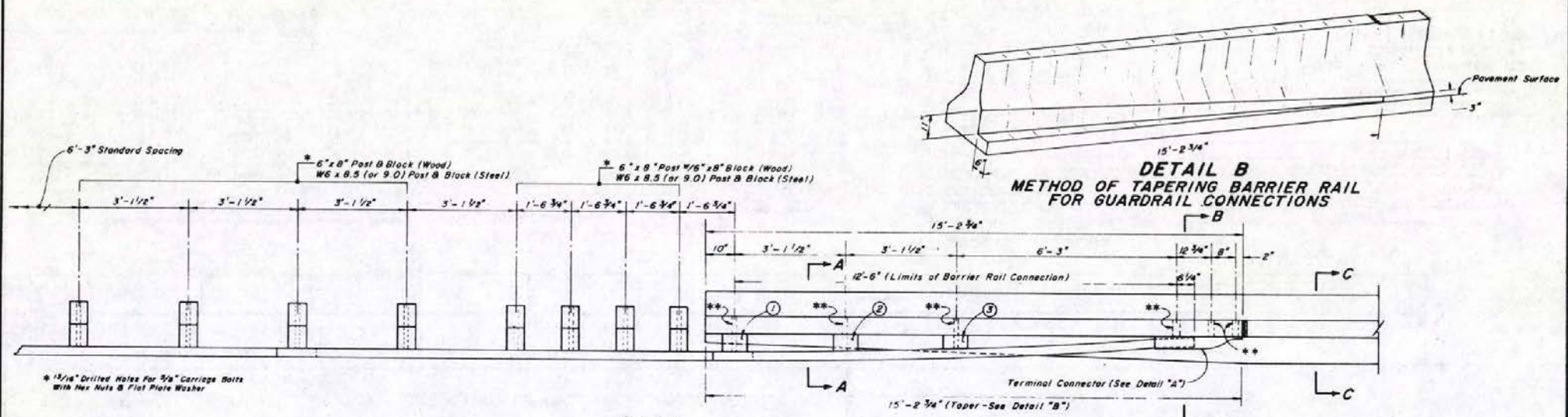
STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

GUARD RAIL-BRIDGE RAIL CONNECTIONS (TRIPLE CORRUGATION)

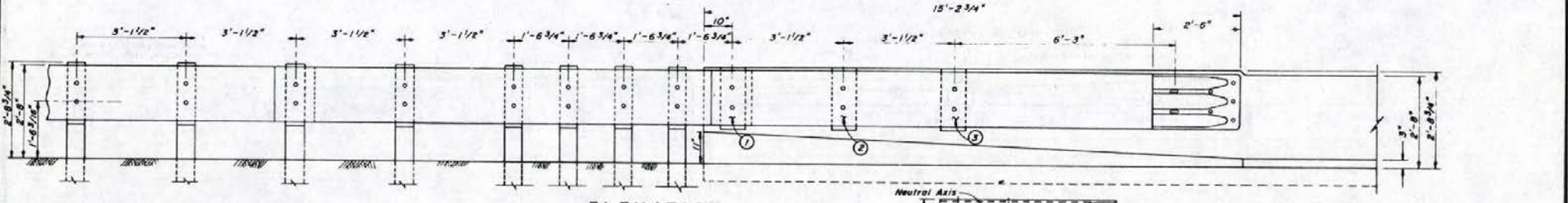
Michael G. Hill
CHIEF ROAD DESIGN ENGINEER

R-8.2.4 (8/8)
ADOPTED 11/86 REVISION

R-84



PLAN
GUARD RAIL-BARRIER RAIL CONNECTION



ELEVATION

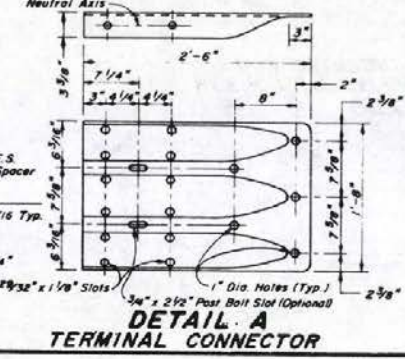
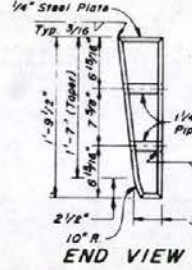
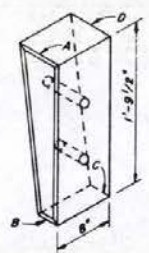
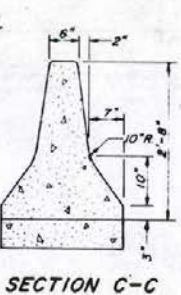
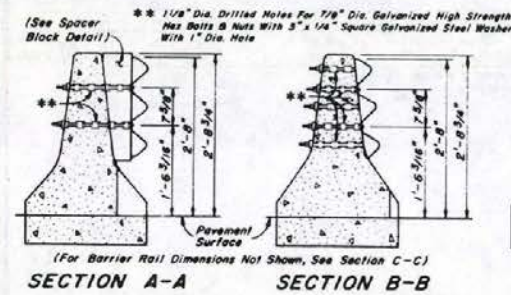
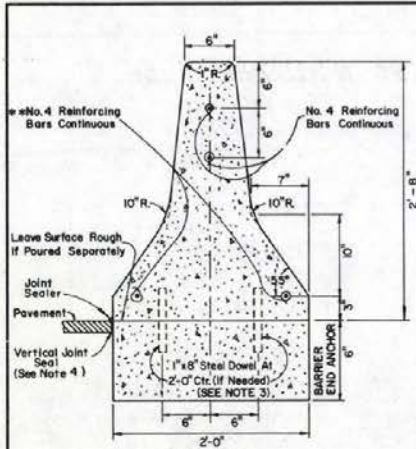


TABLE E				
SPACER BLOCK	A	B	C	D
1	6"	3"	3"	6"
2	5 3/8"	2 3/8"	2 3/8"	5 3/8"
3	4 1/8"	1 1/8"	5/8"	3 3/8"

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION
GUARD RAIL-BARRIER RAIL CONNECTIONS
(TRIPLE CORRUGATION)

Amel B. Hill
CHIEF ROAD DESIGN ENGINEER

R-82.4.1 (819)
ADOPTED 11/85 REVISION

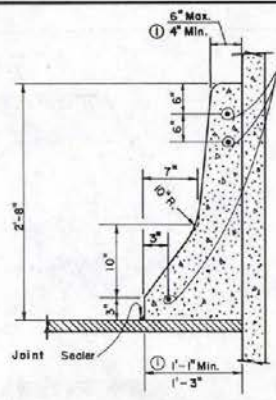


SECTION TYPE A

CONCRETE (INFORMATION ONLY)

0.1032 CU. YD. PER LIN. FT. WITHOUT BASE SLAB
0.1402 CU. YD. PER LIN. FT. WITH BASE SLAB

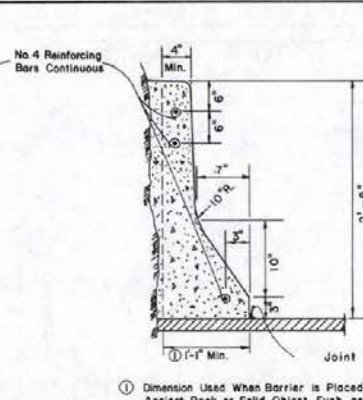
** AT THE CONTRACTOR'S OPTION, 6" BASE MAY BE POURED MONOLITHICALLY FULL LENGTH UNDER THE BARRIER RAIL. IN WHICH CASE, THE TWO LOWER #4 BARS MAY BE ELIMINATED.
FOR VEHICULAR IMPACT ATTENUATION OPTIONS SEE MANUFACTURER'S DESIGN MANUALS.



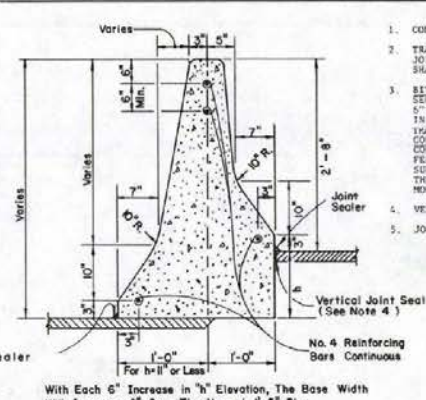
TYPE B

CONCRETE (INFORMATION ONLY)

4" MIN. 0.0598 CU. YD. PER LIN. FT.
6" MIN. 0.0765 CU. YD. PER LIN. FT.



TYPE C

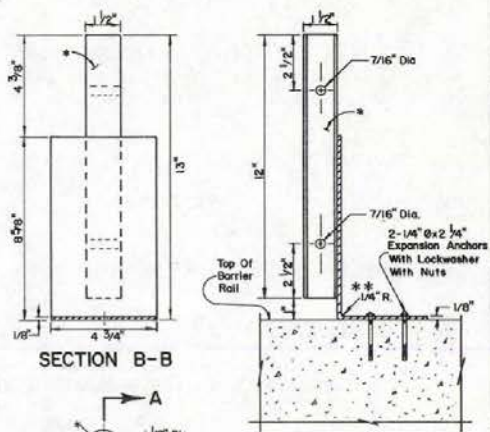


TYPE D

① Dimension Used When Barrier is Placed Against Rock or Solid Object Such as A Retaining Wall.

With Each 6" Increase in h Elevation, The Base Width Will Increase 2" Over The Normal 1'-0" Dim.

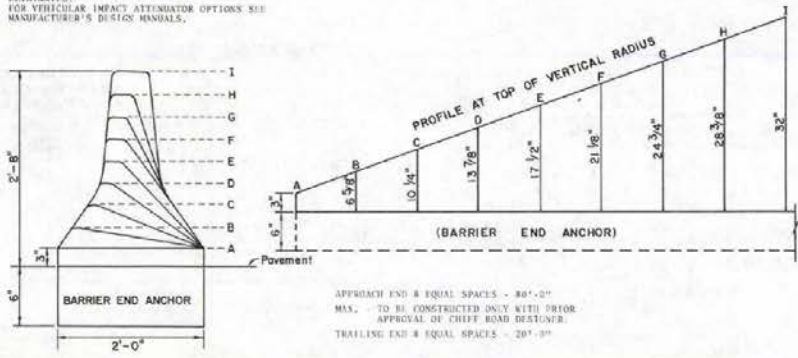
- GENERAL NOTES**
- CONCRETE SHALL BE CLASS A OR AA.
 - TRANSVERSE JOINTS WITH 1" PREFOULDED EXPANSION JOINT FILLED OR 1" OPEN TRANSVERSE JOINTS SHALL BE PLACED AT STRUCTURES. JOINTS IN BARRIER RAIL OVER A STRUCTURE SHALL BE AT THE SAME LOCATION AND OF THE SAME DIMENSION AS THOSE IN THE STRUCTURE.
 - BITUMINOUS PAVING REQUIRED: PAVING SHALL BUTT AGAINST THE BARRIER RAIL END ANCHOR SECTION AND SHALL EXTEND FULL WIDTH UNDER THE NORMAL BARRIER RAIL SECTION PLUS 5" MINIMUM (SEE SECTION-K). 6-INCH DEEP BARRIER END ANCHORS SHALL BE CONSTRUCTED IN THE FIRST AND LAST 10 LINEAR FEET OF THE FULL WEIGHT BARRIER RAIL RUN. IF TRANSITION PAVING IS USED, THE ANCHOR SHALL BE EXTENDED UNDER THE TRANSITION CONCRETE PAVING REQUIRED. THE NORMAL BARRIER RAIL SECTION MAY BE PLACED ON THE CONCRETE PAVING. DOWELS SHALL BE REQUIRED IN THE FIRST AND LAST 10 LINEAR FEET OF THE FULL WEIGHT BARRIER RAIL AND THROUGH TRANSITION SECTIONS. THE SURFACE OF THE CONCRETE SHALL BE CLEAR PRIOR TO PLACEMENT OF BARRIER RAIL. AT THE CONTRACTOR'S OPTION, CONCRETE PAVEMENT AND BARRIER RAIL MAY BE PLACED MONOLITHICALLY, IN WHICH CASE DOWELS MAY BE ELIMINATED.
 - VERTICAL JOINTS SHALL HAVE HOT RUBBERIZED ASPHALT SEALS FULL DEPTH OF THE JOINT.
 - JOINT SEALER SHALL BE HOT RUBBERIZED ASPHALT 1" THICK.



SECTION B-B

SECTION A-A

* Where Snow Markers Are Not Needed, the Installation Shall Consist Only of the Delineator Portion. See Project Plans for the Specified Installation.
** Cold Bending of this Corner shall not be permitted.

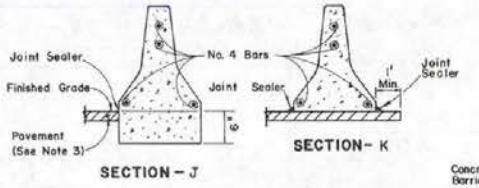


TRANSITION DETAIL

TRANSITION OF END OF BARRIER TO BE USED ONLY IF END IS FLARED

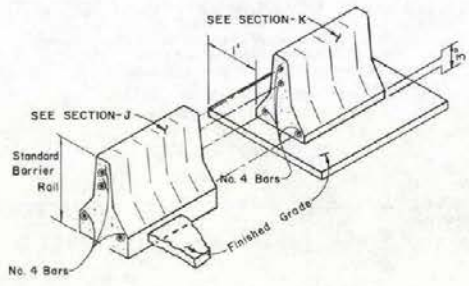
CONCRETE BARRIER RAIL FLARE RATES

OPERATING SPEED	FLARE RATE
70	20:1 MAX.
60	17:1
50	14:1
40	11:1



SECTION - J

SECTION - K



BARRIER END ANCHOR

(SEE NOTE 3)

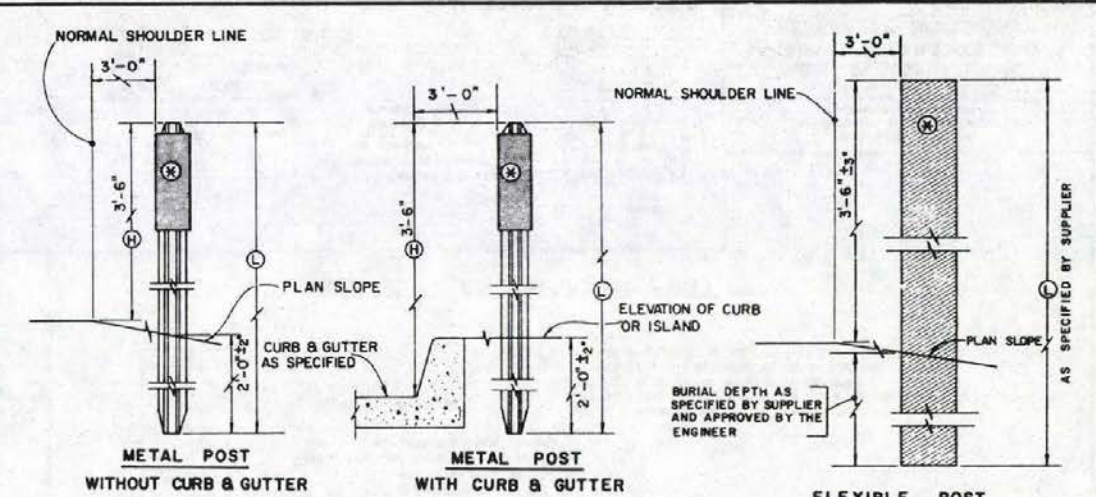
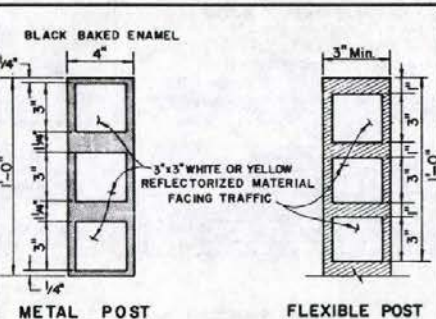
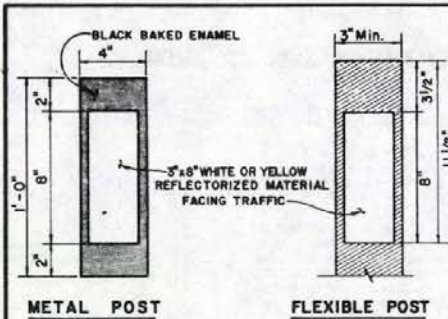
SNOWPOLE MARKER OR DELINEATOR *

FOR PERMANENT BARRIERS ONLY
(FOR SPACING OF DELINEATORS, SEE SHEETS R-8.1.1 & R-9.1.1.)

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

CONCRETE BARRIER RAIL

R-8.3.1 (502)
ADOPTED 11/70 REVISION 10-11/86



TYPE 1 REFLECTORS (ROADWAY)

TYPE 3 REFLECTORS (ISLANDS, CURBS, SHOULDER DIKES)

MULTI-LANE DIVIDED HIGHWAY, RAMP, NARROWING ROADWAYS, (FREEWAY STANDARDS)

UNLESS OTHERWISE NOTED ON PLANS, GUIDE POSTS SHALL BE SET AS FOLLOWS:

A) ON TANGENTS, GUIDE POSTS OF THE APPROPRIATE COLOR SHALL BE INSTALLED ALONG THE SIDES OF THE THROUGH ROADWAYS AT APPROXIMATELY 800-FOOT SPACING ALONG THE MEDIAN SIDE AND 400-FOOT SPACING ON THE OUTSIDE SHOULDER. THE POSTS ON THE MEDIAN SIDE SHALL BE PLACED OPPOSITE THOSE ON THE OUTER SHOULDER.

B) SEE TABLE 1 FOR SPACING ON CURVES.

C) NARROWING PAYMENTS: GUIDE POSTS OF APPROPRIATE COLOR SHALL BE PLACED ADJACENT TO THE LANE FOR THE FULL LENGTH OF THE CONVERGENCE.

TWO LANE AND FOUR LANE UNDIVIDED HIGHWAYS, (SECONDARY AND PRIMARY)

A) WHITE REFLECTORIZED GUIDE POSTS SHALL BE INSTALLED ON THE RIGHT SIDE OF THE ROADWAY FACING TRAFFIC AT 400-FOOT INTERVALS ON TANGENTS AND ON CURVES HAVING A RADIUS GREATER THAN 10,000 FEET.

B) SEE TABLE 1 FOR SPACING ON CURVES.

GENERAL:

A) AT TRAFFIC ISLANDS, CURBS, SHOULDER DIKES, ETC. A SINGLE GUIDE POST WITH TRIPLE AMBER REFLECTORS SHALL BE INSTALLED.

B) IN URBAN OR SUBURBAN AREAS WHERE A RAISED AND CURBED MEDIAN IS PROVIDED, EACH PROJECT SHOULD BE INVESTIGATED TO DETERMINE WHETHER OR NOT GUIDE POSTS WILL BE NEEDED IN THE MEDIAN.

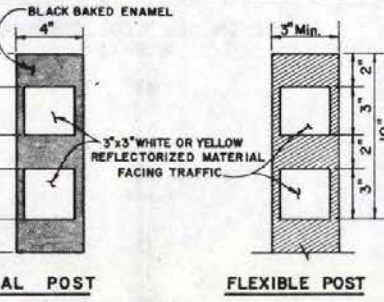
TABLE 1

MAXIMUM SPACING FOR HIGHWAY DELINEATORS ON HORIZONTAL CURVES

(DISTANCE IN FEET ROUNDED TO THE NEAREST 5 FEET)

RADIUS OF CURVE (IN FEET)	SPACING ON CURVE (IN FEET)	SPACING IN ADVANCE & BEYOND CURVE (IN FEET)		
		1ST	2ND	3RD
30	20	40	60	120
150	30	40	90	180
750	35	70	105	210
250	40	80	120	240
300	50	100	150	300
400	55	110	165	300
500	65	130	195	300
700	70	140	210	300
800	75	150	225	300
900	85	170	255	300
1,000	90	180	270	300
1,200	100	200	300	300
1,400	110	220	300	300
1,600	120	240	300	300
1,800	125	250	300	300
2,000	130	260	300	300
2,500	150	300	300	300
3,000	165	300	300	300
3,500	180	300	300	300
4,000	210	300	300	300
10,000	300	300	300	300

SPACING FOR SPECIFIC RADIUS NOT SHOWN MAY BE INTERPOLATED FROM TABLE OR COMPUTED FROM THE FORMULA $S = \sqrt{R \cdot C}$. THE MINIMUM SPACING SHOULD BE 20 FEET. THE SPACING ON CURVES SHOULD NOT EXCEED 300 FEET. THE SPACING OF THE FIRST DELINEATOR APPROACHING A CURVE IS 2.5 TIMES THE SECOND 3', AND THE THIRD AS SET BUT TO EXCEED 300 FEET. IF A SPACING LESS THAN 300 FEET IS USED APPROACHING THE CURVE, THE DISTANCE SHOWN ABOVE SHOULD BE ADJUSTED ACCORDINGLY.



TYPE 2 REFLECTORS (RAMPS, APPROACHES)

MULTI-LANE DIVIDED HIGHWAYS, (FREEWAY STANDARDS)

A) AT INTERCHANGES, GUIDE POSTS WITH APPROPRIATELY COLORED REFLECTORS SHALL BE INSTALLED AT A MAXIMUM SPACING OF 100' ALONG THE ACCELERATION OR DECELERATION LANES AND IN ACCORDANCE WITH TABLE 1 ON TUBING RAMP.

B) IN RURAL AREAS WHERE MEDIAN CROSSOVERS ARE PROVIDED FOR OFFICIAL OR EMERGENCY USE, A SINGLE GUIDE POST WITH AMBER REFLECTORS SHALL BE PLACED ON THE LEFT SIDE OF THE THROUGH ROADWAY ON THE FAR SIDE OF THE CROSSOVER FOR EACH ROADWAY.

ALL APPROACHES:

ALL APPROACHES SHALL BE DELINEATED WITH WHITE TYPE 2 GUIDE POSTS AT THE BEGINNING AND ENDING LIMITS OF THE APPROACHES. TYPE A AND S APPROACHES WILL HAVE AN ADDITIONAL GUIDE POST AT EACH TAPEL RETAKE.

THE COLOR OF DELINEATORS SHALL BE WHITE ON THE RIGHT SHOULDER INSTALLATIONS AND YELLOW ON THE LEFT EDGE OF DIVIDED OR ONE-WAY ROADWAYS. THE COLORS SHALL BE DENOTED BY A LETTER CODE (EG. TYPE 1-Y FOR SINGLE DELINEATOR, YELLOW) IN THE SUMMARY OF GUIDE POST ONLY.

TYPICAL INSTALLATION

⊗ - TYPE AND COLOR OF REFLECTORS ACCORDING TO THEIR LOCATION

PLACEMENT OF GUIDE POST ON CURVES

MULTI-LANE DIVIDED HIGHWAYS, (FREEWAY STANDARDS)

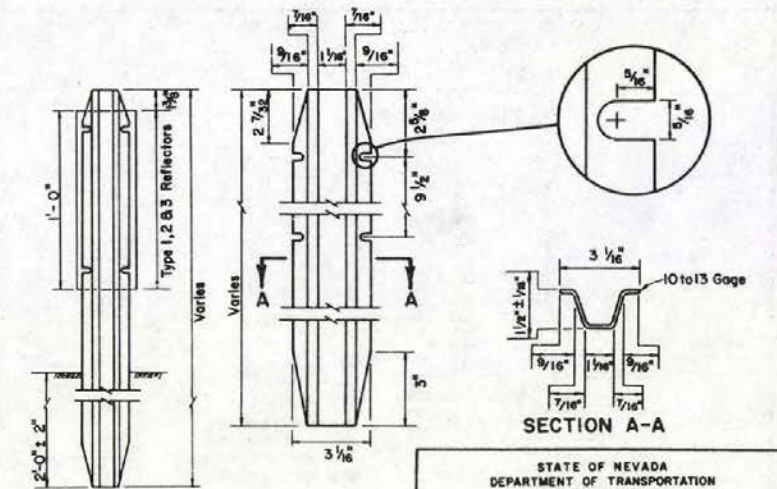
A) ON CURVES, THEY SHALL BE INSTALLED ALONG BOTH SIDES OF THE THROUGH ROADWAYS AT 400-FOOT SPACING ON THE OUTSIDE SHOULDER AND 800-FOOT SPACING ON THE MEDIAN SHOULDER FOR CURVES HAVING A RADIUS OF MORE THAN 10,000 FEET. FOR CURVES OF 10,000 FEET RADIUS OR LESS, THEY SHALL BE SPACED AS SHOWN IN TABLE 1. THE POSTS ON THE MEDIAN SIDE SHALL BE PLACED DIRECTLY OPPOSITE THOSE ALONG THE OUTER SHOULDER. THE SPACING ON THE MEDIAN SIDE SHALL BE ADJUSTED WHERE APPROACHING OR LEAVING A CURVE TO ACCOMPLISH THE ALTERNATED SPACING TO BE USED ON ALL TANGENTS.

TWO LANE AND FOUR LANE UNDIVIDED HIGHWAYS, (SECONDARY AND PRIMARY)

A) ON CURVES HAVING A RADIUS OF 10,000 FEET OR LESS, WHITE GUIDE POSTS SHALL BE INSTALLED ON THE RIGHT SIDE ON THE OUTSIDE OF THE CURVE AT THE SPACING SHOWN IN TABLE 1 AND ON THE INSIDE OF THE CURVE AT DOUBLE THE SPACING SHOWN IN THE TABLE.

B) POST SPACING ON RECREATIONAL ROADWAYS MAY BE VARIED TO ACCOMMODATE DESIGN CONSIDERATIONS.

NOTE: GUIDE POSTS SHALL BE INSTALLED AT THE BEGINNING AND END OF EACH CURVE AND THE SPACING ADJUSTED THROUGH THE LENGTH OF THE CURVE, INTO EQUAL SPACING NEAREST TO THAT SPECIFIED IN TABLE 1.



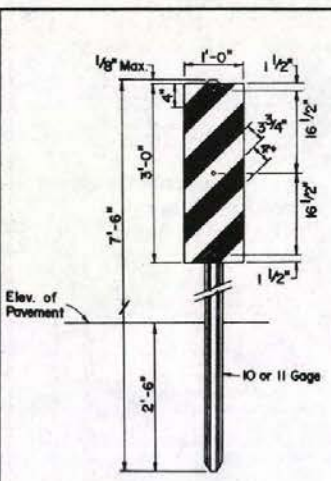
METAL POST DETAILS

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

GUIDE POSTS

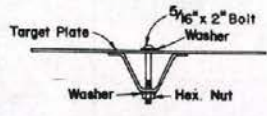
Adrian A. Bell
CHIEF ROAD DESIGN ENGR

R-9.1.1-(619)
ADOPTED 8/69
REVISION 5-10/85



Front Facing Traffic, Alternating Black With ReflectORIZED Yellow Stripes Sloping Down at A 45° Angle Toward Edge of Obstruction on Which Traffic Will Pass.

Back: Solid White

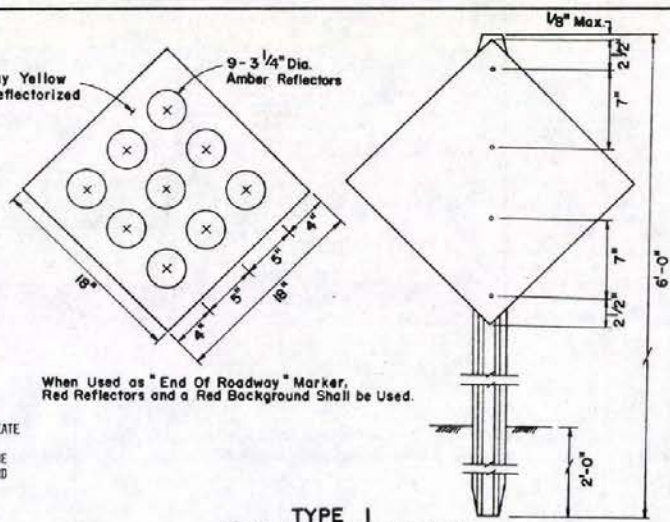


(Electroplated Bolts & Nuts & Protective Flat Non-Metallic Washers.)

OBJECT MARKERS SHALL BE INSTALLED TO DELINEATE BRIDGE ENDS, UNDERPASS ABUTMENTS AND ALL OTHER OBSTRUCTIONS CLOSELY ADJACENT TO THE EDGES OF THE ROADWAY. THEY MAY BE OMITTED ON THE APPROACH END OF THE GUARDRAIL WHEN A FLARE IS USED.

**TYPE 3
BRIDGES, PIERS, ABUTMENTS**

FOR POST DETAILS SEE SHEET R-9.1.1



Highway Yellow Non-reflectORIZED

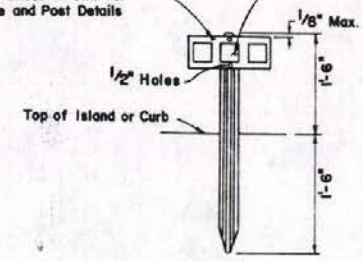
9-3 1/4" Dia. Amber Reflectors

When Used as "End Of Roadway" Marker, Red Reflectors and a Red Background Shall be Used.

**TYPE 1
MEDIAN OBSTRUCTIONS**

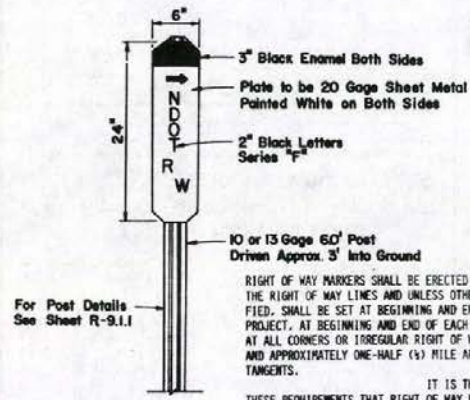
Type 3 Reflector Plate Mounted Horizontally See Sheet R-9.1.1 For Plate and Post Details

3"x3" Amber (Interstate Yellow) ReflectORIZED Material Facing Traffic



**TYPE 2
CURBS OR INLETS**

OBJECT MARKERS



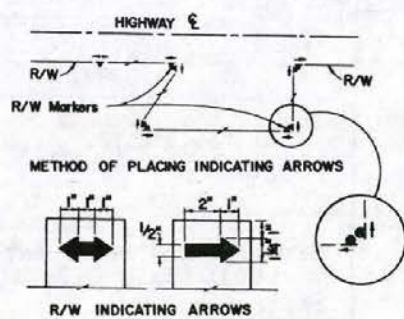
For Post Details See Sheet R-9.1.1

RIGHT OF WAY MARKERS SHALL BE ERECTED TO DEFINE THE RIGHT OF WAY LINES AND UNLESS OTHERWISE SPECIFIED, SHALL BE SET AT BEGINNING AND END OF EACH PROJECT, AT BEGINNING AND END OF EACH CURVE, AND AT ALL CORNERS OR IRREGULAR RIGHT OF WAY LINES, AND APPROXIMATELY ONE-HALF (1/2) MILE APART ON LONG TANGENTS.

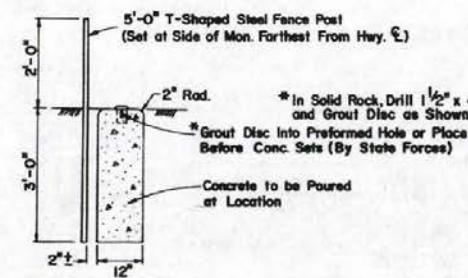
IT IS THE INTENT OF THESE REQUIREMENTS THAT RIGHT OF WAY MARKERS ARE SPACED SO AS TO BE CLEARLY VISIBLE AND ERECTED SO THAT THE RIGHT OF WAY LINE MAY BE EASILY ESTABLISHED.

RIGHT OF WAY MARKERS SHALL BE OMITTED WHERE RIGHT OF WAY LINE IS FENCED.

RIGHT OF WAY MARKERS

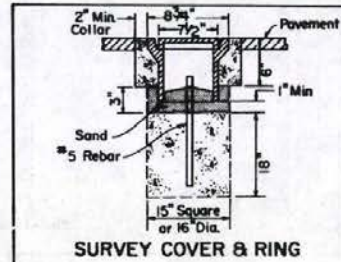


R/W INDICATING ARROWS

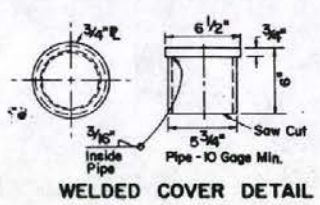


REFERENCE MONUMENT AND MARKER POST

THESE MONUMENTS SHALL BE SET TO ASSIST IN RE-ESTABLISHMENT OF THE CENTERLINE FOR FUTURE USE AND SHALL BE SET AT THE BEGINNING AND END OF EACH PROJECT, AT THE BEGINNING AND END OF EACH CURVE, AND APPROXIMATELY ONE-HALF (1/2) MILE APART ON LONG TANGENTS

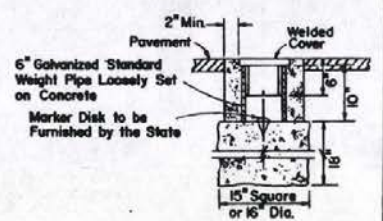


SURVEY COVER & RING



WELDED COVER DETAIL

SURVEY MONUMENTS



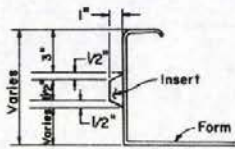
ALTERNATE PLACEMENT

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

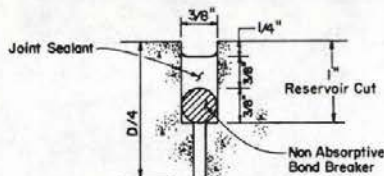
**OBJECT MARKERS,
RIGHT OF WAY MARKERS,
SURVEY MONUMENTS AND
REFERENCE MONUMENTS**

Ronald J. Allen
CHIEF ROAD DESIGN ENGR.

R-921-(619 THRU 621)
ADOPTED 8/89 REVISION 3-11-95

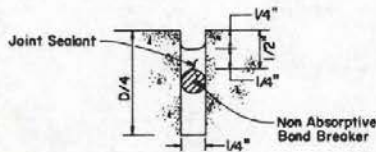


DETAIL OF METAL OR WOODEN INSERT TO BE PLACED ON FORM

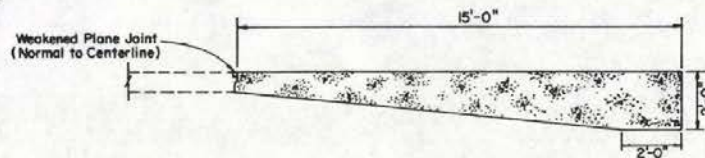


INITIAL 1/8" WEAK JOINT SAW CUTS WILL BE DONE WITHIN SPECIFIED TIME LIMITS. RESERVOIR CUT MAY BE DONE AT A LATER TIME.

TRANSVERSE WEAKENED PLANE JOINT DOUBLE SAW CUT

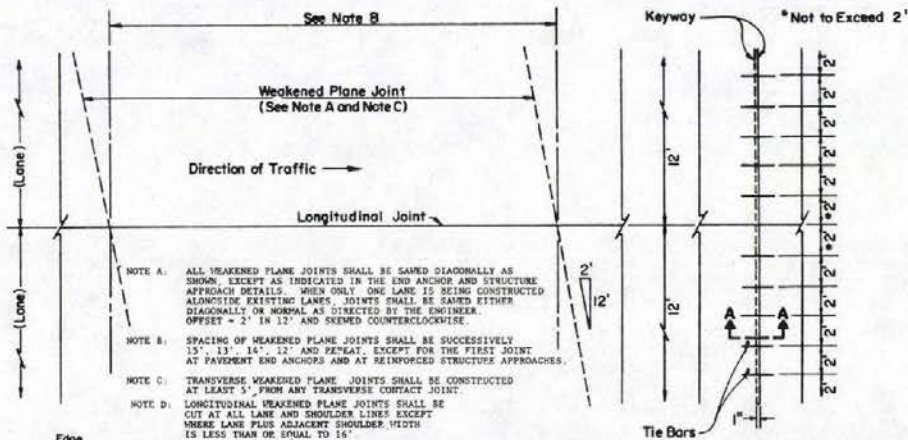


LONGITUDINAL WEAKENED PLANE JOINT SINGLE SAW CUT

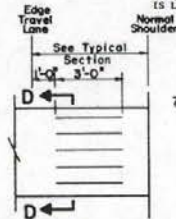


PAVEMENT END ANCHOR DETAIL

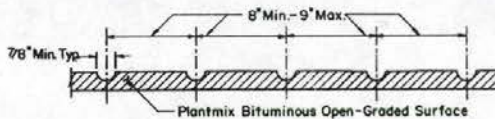
NOTE: PAVEMENT END ANCHORS SHALL BE CONSTRUCTED AS THE TERMINAL PANELS OF ALL PAVEMENT NOT ABUTTING EXISTING PAVEMENTS OR STRUCTURES, AND ELSEWHERE IF ORDERED BY THE ENGINEER.



- NOTE A: ALL WEAKENED PLANE JOINTS SHALL BE SAWS DIAGONALLY AS SHOWN, EXCEPT AS INDICATED IN THE END ANCHOR AND STRUCTURE APPROACH DETAILS. WHEN ONLY ONE LANE IS BEING CONSTRUCTED ALONGSIDE EXISTING LANES, JOINTS SHALL BE SAWS EITHER DIAGONALLY OR NORMAL AS DIRECTED BY THE ENGINEER. OFFSET = 2' IN 12' AND SKEDD COUNTERCLOCKWISE.
- NOTE B: SPACING OF WEAKENED PLANE JOINTS SHALL BE SUCCESSIVELY 12', 13', 14', 15' AND FINAL, EXCEPT FOR THE FIRST JOINT AT PAVEMENT END ANCHORS AND AT REINFORCED STRUCTURE APPROACHES.
- NOTE C: TRANSVERSE WEAKENED PLANE JOINTS SHALL BE CONSTRUCTED AT LEAST 5' FROM ANY TRANSVERSE CONTACT JOINT.
- NOTE D: LONGITUDINAL WEAKENED PLANE JOINTS SHALL BE CUT AT ALL LANE AND SHOULDER LINES EXCEPT WHERE LANE PLUS ADJACENT SHOULDER WIDTH IS LESS THAN OR EQUAL TO 16'.



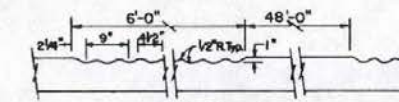
PLAN



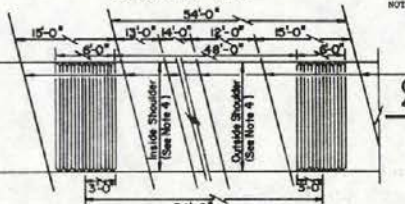
SECTION D-D

RUMBLE STRIP SHALL BE CONTINUOUS AS DESCRIBED ON PLANS TO BE USED ON ROADS WITH SHOULDERS 4' WIDE AND OVER

RUMBLE STRIPS ON ASPHALT SHOULDERS

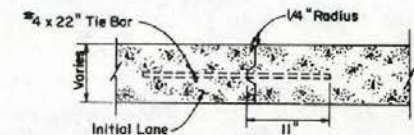


SECTION C-C



RUMBLE STRIPS ON CONCRETE SHOULDERS

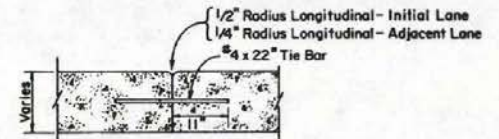
(THIS DESIGN SHALL NOT BE USED IN URBAN AREAS)



SECTION A-A (TIE BAR)

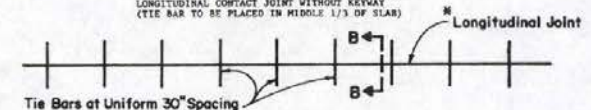
*** TRANSVERSE CONTACT JOINT WITH KEYWAY AND TIE BARS**

NOTE: TRANSVERSE CONTACT JOINTS WITH KEYWAY AND TIE BARS SHALL BE USED AT ALL CONSTRUCTION JOINTS, AND ELSEWHERE IF ORDERED BY THE ENGINEER. TIE BARS TO BE PLACED IN THE MIDDLE 1/3 OF THE SLAB THICKNESS.



SECTION B-B

LONGITUDINAL CONTACT JOINT WITHOUT KEYWAY (TIE BAR TO BE PLACED IN MIDDLE 1/3 OF SLAB)



PLAN TIE BAR DETAIL

- NOTE:
- DO NOT SCORE THRU SAND DECELERATION AND ACCELERATION AREAS.
 - SHOULDER TRANSVERSE JOINTS SHALL BE THE SAME PATTERN AS MAIN ROADWAY.
 - 5' RUMBLE STRIPS SHALL BE SCORED BETWEEN THE 15' DIAGONALLY SAWS TRANSVERSE JOINTS.
 - SEE TYPICAL SECTION FOR WIDTH OF SHOULDER.

*ALL TRANSVERSE AND LONGITUDINAL CONTACT JOINTS SHALL BE SAWS AND JOINT SEALANT USED PER RESPECTIVE WEAKENED PLANE JOINT DETAILS THIS SHEET.

STATE OF NEVADA
DEPARTMENT OF HIGHWAYS

CONCRETE & ASPHALT PAVEMENT DETAILS

Richard D. Hall
CHIEF ROAD DESIGN ENGR. R-10.1.1 (409)
ADOPTED: 8/69 REVISION

NEW	EXISTING	DESCRIPTION
		Luminaire
		Electrolier
		Underpass Luminaire
		Traffic Signal Head, 3 Section, 12" Red, Yellow and Green Sections (Unless Indicated Otherwise)
		Traffic Signal Head with All Sections Louvered
		Traffic Signal Head with Back Plate
		Traffic Signal Head, Programmed Visibility, 12" Green Arrow, 12" Solid Yellow and Red Sections, with Back Plate
		Traffic Signal Head with 12" Green, Yellow and Red Arrow Sections, with Back Plate
		Mast Arm Signal with Back Plate
		Combination Traffic Signal Standard with Luminaire and Signal Mast Arms and Attached Signal Heads, with Back Plate PPB - Pedestrian Push Button and Sign
		Pedestrian Signal (Walk-Don't Walk)
		Vehicle Detector - Inductive Loop Unless Otherwise Indicated (See Sheet T-30.1.4 for Information on Identification and Configuration)
		Quadrupole Detector Loop (See Sheet T-30.1.4)

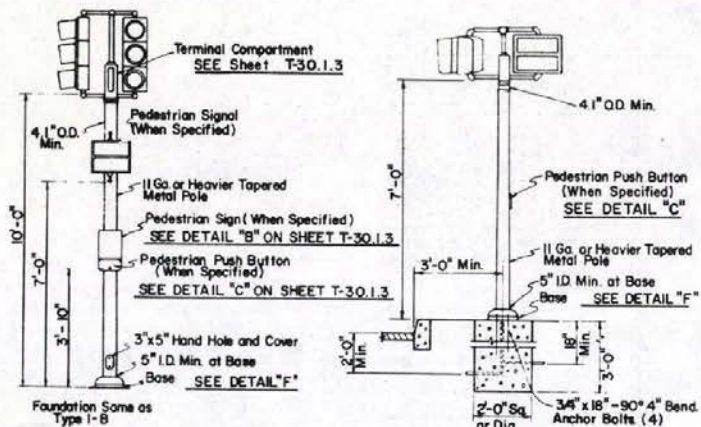
NEW	EXISTING	DESCRIPTION
		Pull Box
		Controller Cabinet (Door Swing As Shown.)
		Service (120-240 V.A.C. Unless Otherwise Specified)
		Transformer Pad
		Power Source
		Conduit
		Conduit (Jacked)
		Pole Designation
		Conduit Run
		Junction Box
		Wood Power Pole
		Flashing Beacons "R" Indicates Red Lens, "Y" Indicates Yellow Lens.
		Special Junction Cabinet (For Interconnect Cable)
		M-5 (Cluster Type Head) (See Sheet T-30.1.2)

NEW	EXISTING	DESCRIPTION
		Traffic Signal Head With Opticom Detector Unit

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

LIGHTING AND SIGNALS

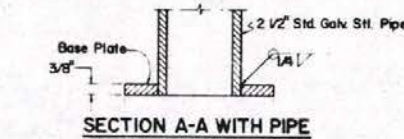
T-30.1.1 (623)
ADOPTED: 12/79
11-96



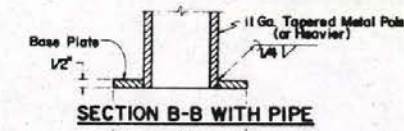
TYPE I-A

SIGNAL STANDARDS

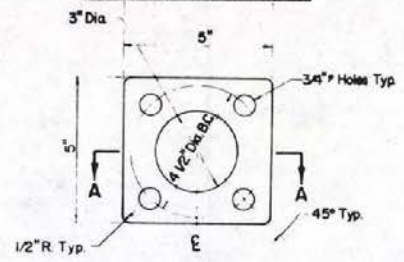
TYPE I-B



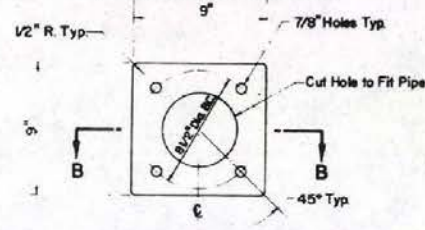
SECTION A-A WITH PIPE



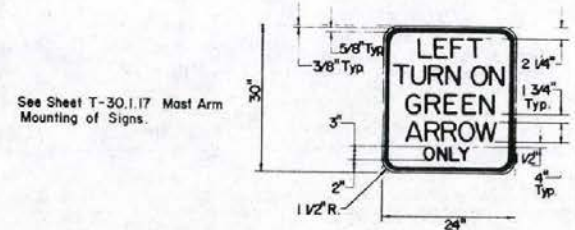
SECTION B-B WITH PIPE



DETAIL - "E"

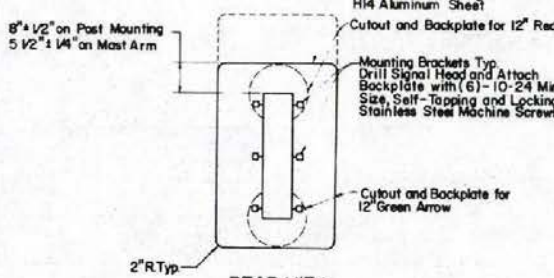


DETAIL - "F"



DETAIL - "D"

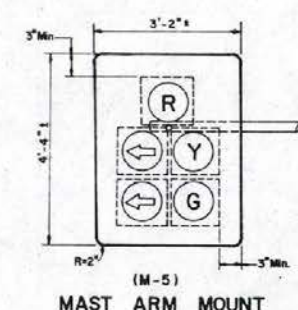
SIGN RIO-5b(S)
BACKGROUND-WHITE (REFL.)
LEGEND, BORDER - BLACK (NON-REFL.)
(For Sign RIO-5(S) See Sheet T-30.1.17)



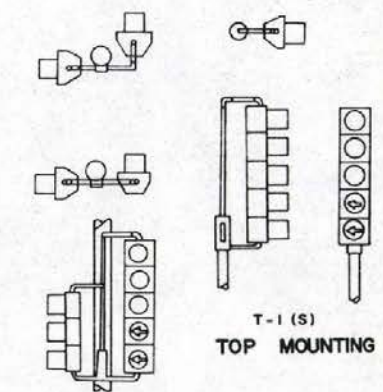
REAR VIEW

NOTE: No Background Light to Show Between Plate and Head. All Mast Arm Backplates Shall be Louvered

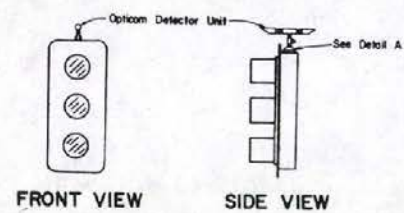
DETAIL - "G"



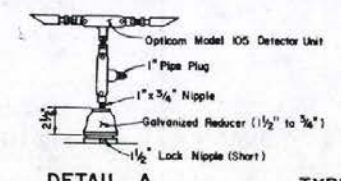
MAST ARM MOUNT



SIDE BRACKET MOUNTING



**MOUNTING DETAIL
OPTICOM MODEL 105 DETECTOR**



DETAIL A



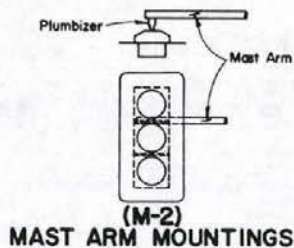
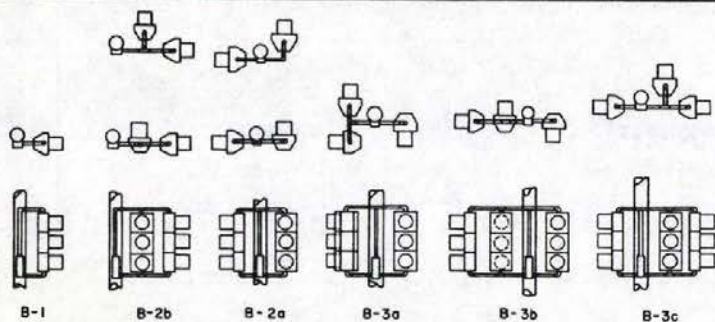
TYPICAL DIRECTIONAL LOUVER



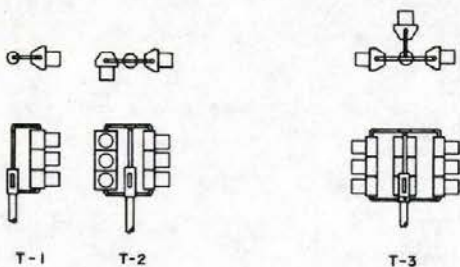
TYPICAL ARROW LENS

STATE OF NEVADA DEPARTMENT OF TRANSPORTATION	
LIGHTING AND SIGNALS	
<i>[Signature]</i> CHIEF TRAFFIC ENGINEER	1-30.12 (623) ADOPTED 2/71 REVISION 7-3/82

RIO-5 Sign, Backplate, Louver, Pole Type I-A and I-B Details

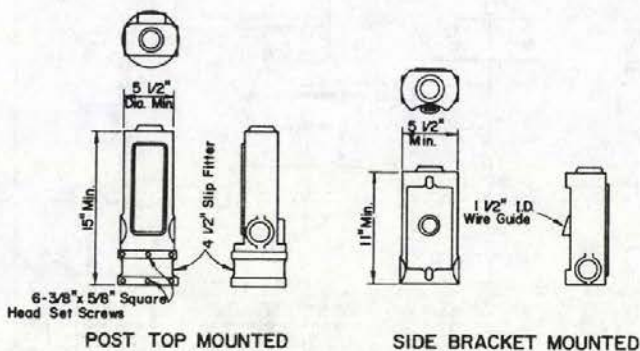


SIDE BRACKET MOUNTINGS



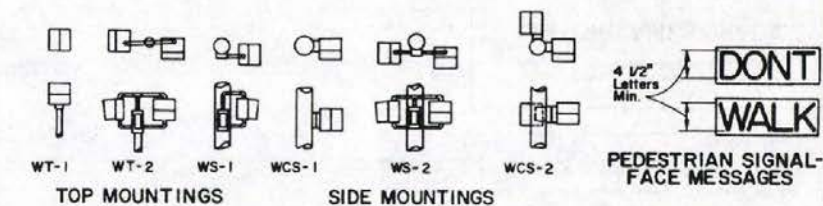
TOP MOUNTINGS

VEHICULAR SIGNALS AND MOUNTINGS



TERMINAL COMPARTMENTS

SIGNAL MOUNTING



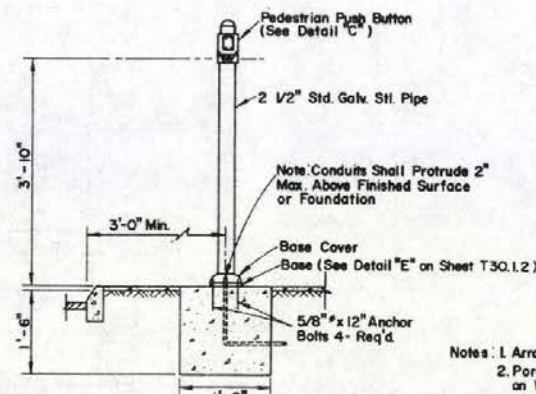
PEDESTRIAN SIGNAL-FACE MESSAGES



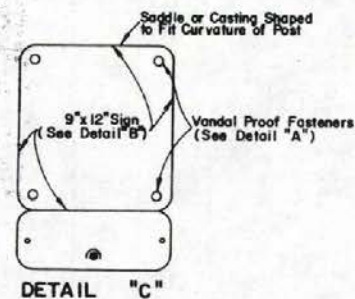
PEDESTRIAN SIGNAL - INTERNATIONAL SYMBOL
(To be Used Only When Specified)

CLAMHELL MOUNTING HARDWARE (CS)
(To be Used Only When Specified)

PEDESTRIAN SIGNALS AND MOUNTINGS



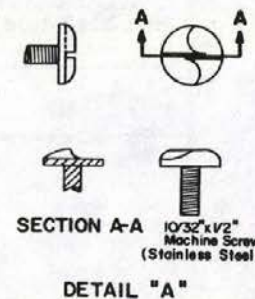
PEDESTRIAN PUSH BUTTON POST



DETAIL "C"



DETAIL "B"



SECTION A-A
DETAIL "A"

Notes: 1. Arrow to be Left or Right or Both as Required.
2. Porcelain Enamelled, 9" x 12" Sign, Black Letters on White Background.

NOTE: IN ADDITION TO THE VANDAL-PROOF FASTENERS SHOWN ABOVE, THE "TOM" TYPE WILL BE ACCEPTABLE. THE DIMENSIONS SHALL BE SIMILAR.

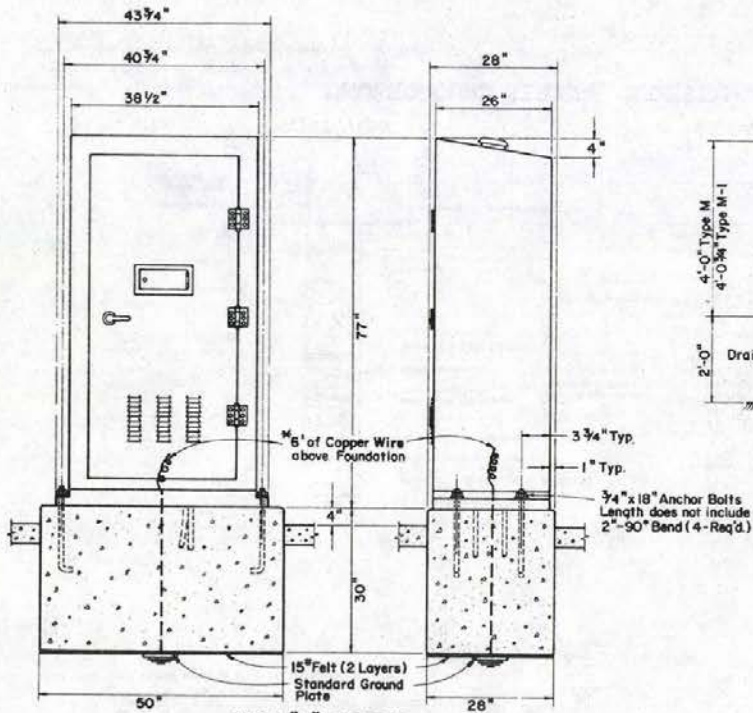
STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

LIGHTING AND SIGNALS

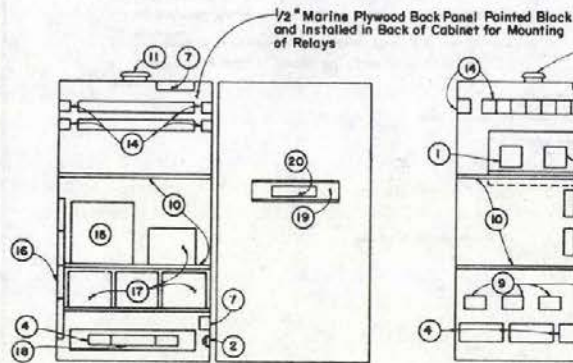
T-30.1.3 (888)

ADOPTED: 1/83 REVISION 1/83

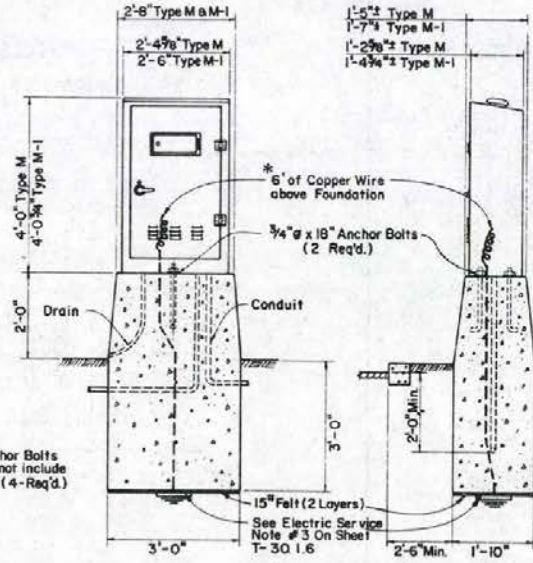
PEDESTRIAN SIGNALS and PUSH BUTTON DETECTORS



TYPE "R" CABINET

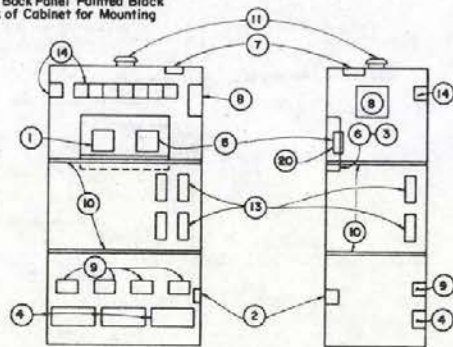


TYPE "R" CABINET

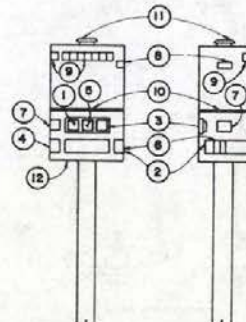


TYPE M & M-I CABINET

- NOTES FOR TYPE R-1:
1. MATERIAL SHALL BE 14 GA. SHEET STEEL.
2. DOOR SHALL LOCK AT THREE POINTS.

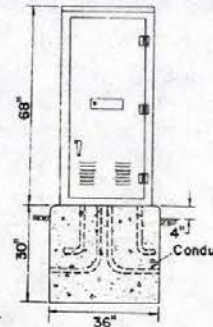


TYPE M & M-I CABINET

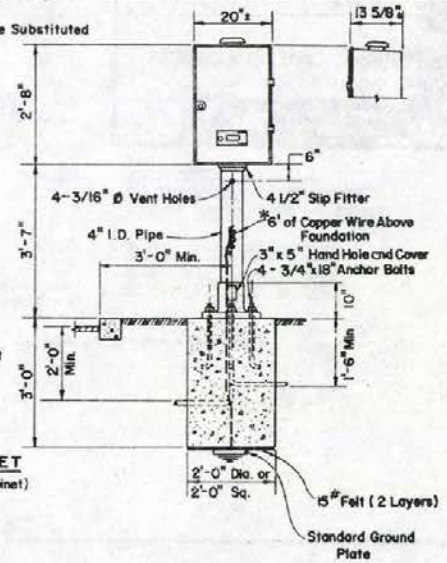


TYPE "G" CABINET

* 1/2" x 8' Ground Rod May be Substituted in Lieu of Copper Wire



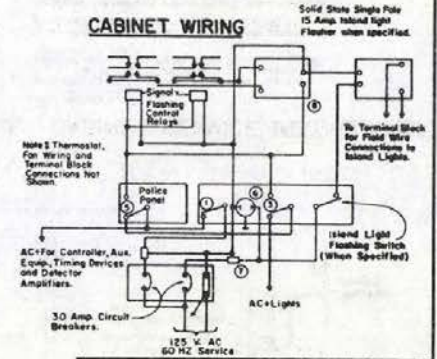
EXTENDED TYPE M CABINET
(For Details Not Shown See Type M Cabinet)



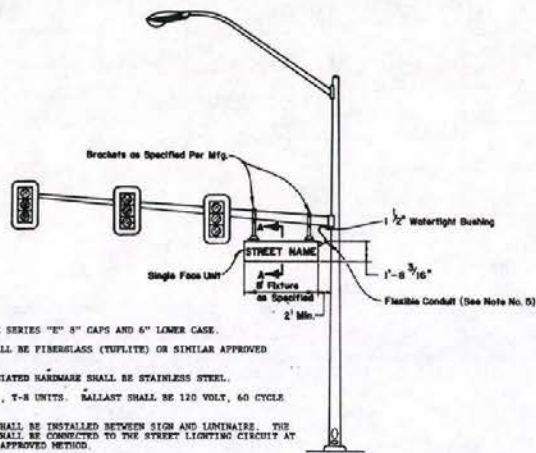
TYPE "G" CABINET

1. MAIN SWITCH.
2. PLUG FUSE.
3. SIGNAL FLASH SWITCH INSIDE CABINET
4. FIELD WIRE TERMINAL BLOCKS.
5. AUXILIARY DOOR FLASH SWITCH.
6. N.E.N.A. STANDARD PLUG RECEPTACLE WITH GROUNDING CONTACT.
7. RADIO INTERFERENCE SUPPRESSOR.
8. SOLID STATE SIGNAL FLASHER (CABINET MFR. TO DETERMINE POLES & CAPACITY, UNLESS OTHERWISE SPECIFIED).
9. EXTERNAL LIGHT RELAYS.
10. SHELF.
11. THERMOSTAT-CONTROLLED FAN WITH T VENT.
12. EIGHT 1/2" SCREWEED VENT HOLES.
13. INSTRUMENT TERMINAL STRIP.
14. CONTROL RELAYS.
15. DISPATCHER UNIT.
16. INTERNAL INTERCONNECT TERMINAL STRIPS.
17. MINOR MOVEMENT UNITS.
18. SLANT PANEL.
19. POLICE PANEL.
20. INTERNAL POWER PANEL AND RECALL SWITCHES FOR ALL DETECTED PHASES.

CABINET WIRING

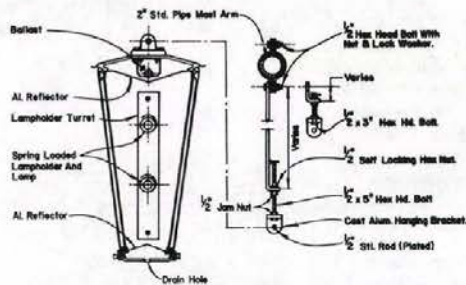


STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION
LIGHTING AND SIGNALS
T-30.1.6 (62.3)
REVISION
4-1/83
ADOPTED 8/71
CHIEF TRAFFIC ENGINEER

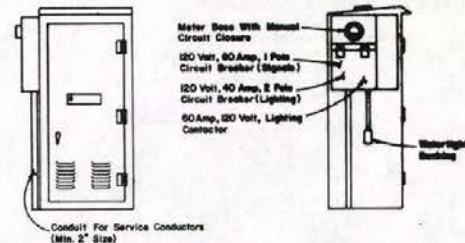


NOTES:

1. LAMPING ON SIGN SHALL BE SERIES "E" 8" CAPS AND 6" LOWER CASE.
2. SIGN PANEL MATERIAL SHALL BE FIBERGLASS (TYFLITE) OR SIMILAR APPROVED MATERIAL.
3. ALL FASTENERS AND ASSOCIATED HARDWARE SHALL BE STAINLESS STEEL.
4. LAMPS SHALL BE 300 M.A., T-8 UNITS. BALLAST SHALL BE 120 VOLT, 60 CYCLE OR STARTING.
5. TWO NO. 12 CONDUCTORS SHALL BE INSTALLED BETWEEN SIGN AND LUMINAIRE. THE SIGN LIGHTING CIRCUIT SHALL BE CONNECTED TO THE STREET LIGHTING CIRCUIT AT THE P. S. CONTROL BY AN APPROVED METHOD.
6. SIGN CLAMPS SHALL BE SIZED TO FIT RESPECTIVE SIGNAL ARMS.



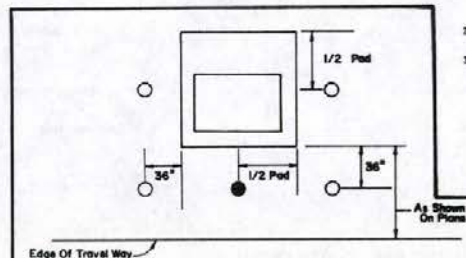
SECTION A-A



CONTROLLER CABINET SERVICE INSTALLATION

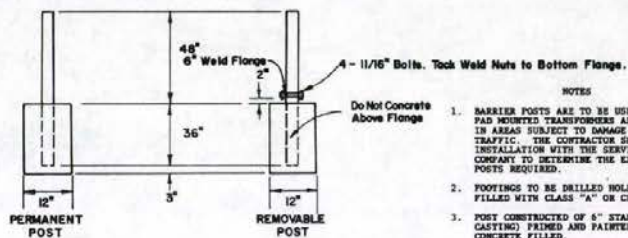
ELECTRIC SERVICE NOTES

1. MAIN BREAKER SHALL BE 100 AMP MINIMUM (120/240 V A.C., 60 Hz, SINGLE PHASE, 1 WIRE). CIRCUIT BREAKERS SHALL BE AS SHOWN ABOVE UNLESS INDICATED OTHERWISE ON PLANS.
2. PANEL OPENINGS FOR BREAKERS OR SEPARATE ENCLOSURES SHALL HAVE GASKETS AND LOCKS (MATER 3900 OR 3943).
3. GROUNTING FOR SERVICE EQUIPMENT AND ALL CONTROLLED CABINETS SHALL BE AS FOLLOWS:
 - a. GROUND WIRE MUST BE A MINIMUM SIZE NO. 8 PER 100 AMP AND NO. 4 FOR THE AMP AND BE CONTINUOUS TO THE SERVICE EQUIPMENT.
 - b. MINIMUM GROUND PLATE DIMENSIONS: AREA - 2 SQUARE FEET (18" x 18" OR 20" DIAMETER ROUND); THICKNESS - 0.111 INCH STEEL, 0.30 INCH COPPER. GROUND ROD OF GALVANIZED STEEL OR PIPE SH ALL BE AT LEAST 3/4" DIAMETER OR 1/2" BREAMETER DIAMETER IF ACCEPTABLE IN LIST OF GROUND PLATE AS SHOWN.



Edge Of Travel Way

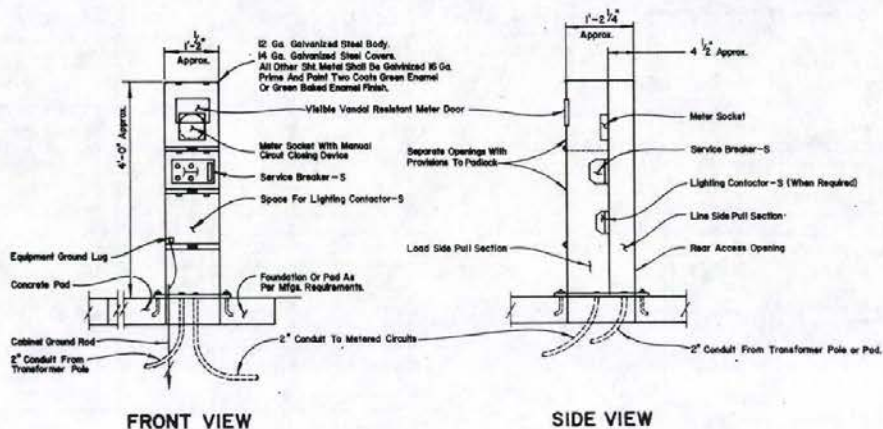
- PERMANENT POST
- REMOVEABLE POST



NOTES

1. BARRIER POSTS ARE TO BE USED ONLY WHERE PAD MOUNTED TRANSFORMERS ARE INSTALLED IN AREAS SUBJECT TO DAMAGE BY VEHICULAR TRAFFIC. THE CONTRACTOR SHALL COORDINATE INSTALLATION WITH THE SERVING UTILITY COMPANY TO DETERMINE THE EXACT NUMBER OF POSTS REQUIRED.
2. FOOTINGS TO BE DRILLED HOLES, AS SHOWN, AND FILLED WITH CLASS "A" OR CLASS "AA" CONCRETE.
3. POST CONSTRUCTED OF 5" STANDARD PIPE (WELL CASTING) PRIMED AND PAINTED YELLOW, CONCRETE FILLED.

TRANSFORMER PAD BARRIER POST



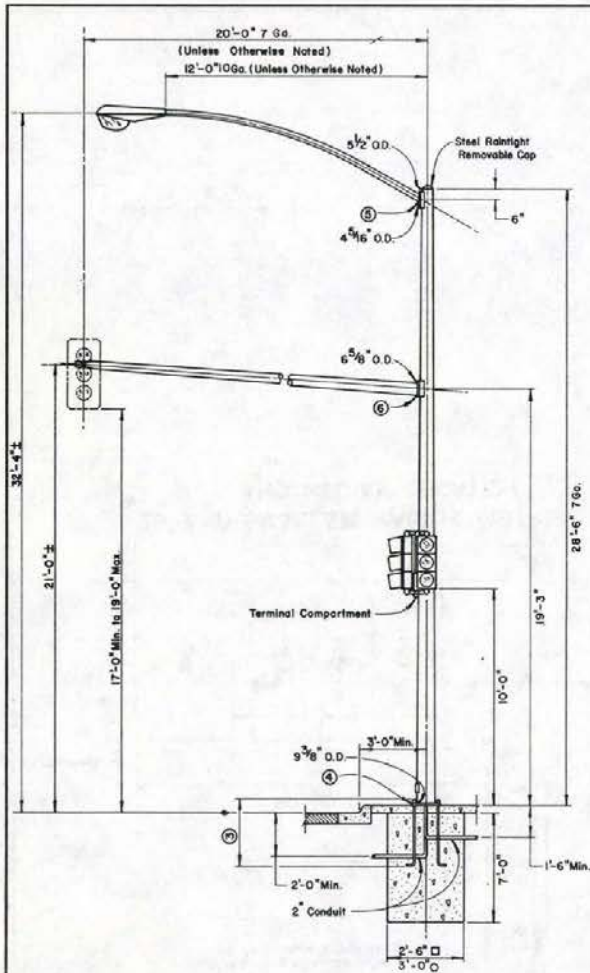
FRONT VIEW SIDE VIEW

UNDERGROUND SERVICE PEDESTAL

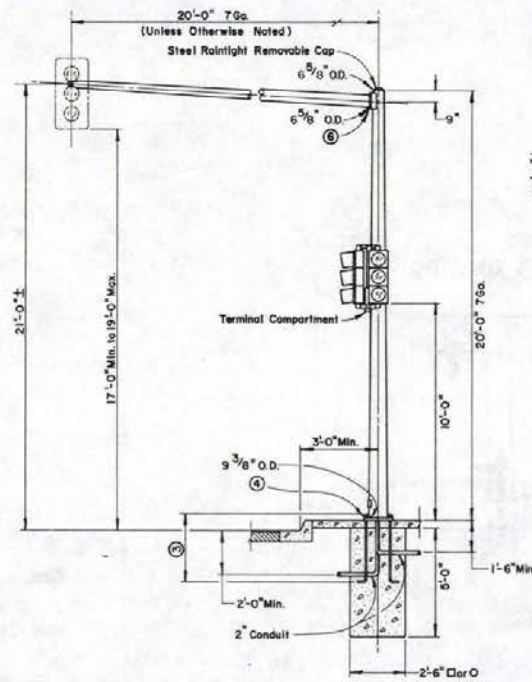
NOTES:

1. CONDUIT MUST EXTEND UP INTO CABINET A MINIMUM OF 2" ABOVE CONCRETE PAD.
2. SEE PLANS FOR LOAD RATING, PANEL DISTRIBUTION AND CIRCUIT BREAKERS REQUIRED.

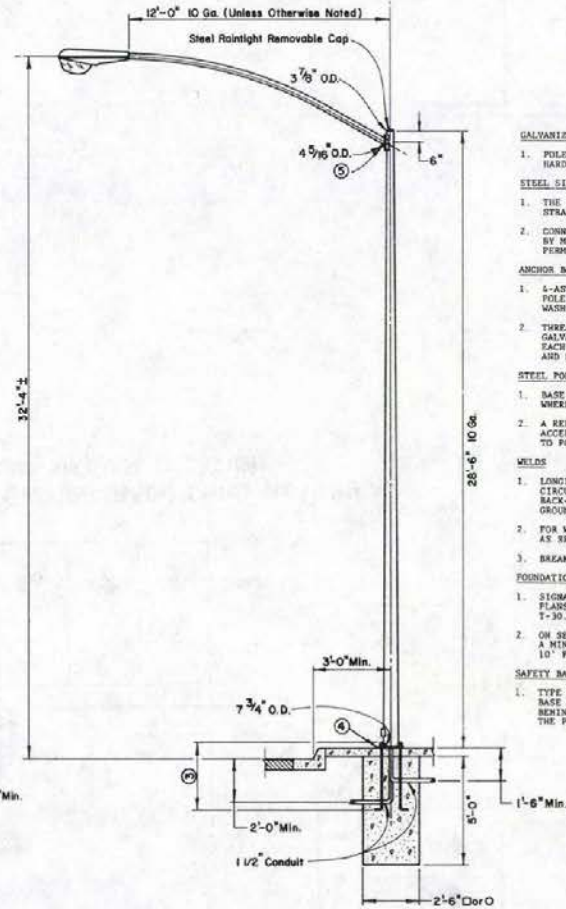
STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION
LIGHTING AND SIGNAL
T-201.6
ADOPTED 11/7/78
CHIEF TRAFFIC ENGINEER



POLE TYPE 6-A



POLE TYPE 5-A



POLE TYPE 7

- GENERAL NOTES
FOR ALL POLE TYPES
- GALVANIZING**
- POLES SHALL BE GALVANIZED AS PER ASTM A-123. HARDWARE SHALL BE GALVANIZED AS PER ASTM A-153.
- STEEL SIGNAL AND LUMINAIRE ARMS**
- THE LAST 3" OF THE LUMINAIRE ARM SHALL BE STRAIGHT AND HORIZONTAL WITH LUMINAIRE ATTACHED.
 - CONNECTION BETWEEN ARMS AND POLES SHALL BE MADE BY MEANS OF A RAIN TIGHT SOCKET OR A DESIGN PERMITTING SIMPLE REMOVAL OF THE ARMS.
- ANCHOR BOLTS**
- 1-ASTM A-307 ANCHOR BOLTS ARE REQUIRED FOR EACH POLE. PROVIDE A HEX NUT, LEVELING NUT AND 2 WASHERS FOR EACH BOLT.
 - THREADS MAY BE CUT OR ROLLED. BOLTS SHALL BE GALVANIZED OR PLATED AFTER THREADS ARE FORMED. EACH BOLT SHALL BE PROVIDED WITH 6" OF THREADS AND FURNISHED WITH TWO NUTS AND TWO WASHERS.
- STEEL POLES**
- BASE COVERS ARE REQUIRED ON ALL POLES EXCEPT WHERE SAFETY BASE IS SPECIFIED.
 - A REDUCED GAGE FOR SHAFT OF POLE WILL BE ACCEPTABLE ABOVE SIGNAL ARM ATTACHMENT SIMILAR TO POLE TYPE 25.
- WELDS**
- LONGITUDINAL WELDS BY SUBMERGED ARC AND CIRCUMFERENTIAL BUTT WELDS SHALL HAVE PERMANENT BACK-UP STICKS. ALL EXPOSED BUTT WELDS SHALL BE GROUND FLUSH.
 - FOR WELD SIZES NOT SHOWN, USE MINIMUM SIZE WELD AS SPECIFIED BY THE LATEST WELDING CODE.
 - BREAK ALL SHARP EDGES FOR WIRE PROTECTION.
- FOUNDATIONS**
- SIGNAL POLE LOCATIONS SHALL BE AS SHOWN ON PLANS AND CONFORM TO SHEET T-30.1.8 AND SHEET T-30.1.17 OF THESE STANDARD PLANS.
 - ON SECTIONS WITHOUT CURBS, BASES SHALL BE PLACED A MINIMUM OF 6" FROM SHOULDER OR A MINIMUM OF 10' FROM TRAVEL WAY, WHICHEVER IS GREATER.
- SAFETY BASE**
- TYPE 7 AND TYPE 14 POLES WILL REQUIRE SAFETY BASE ASSEMBLY UNLESS MOUNTED ON STRUCTURES BEING BARRIER RAIL OR NOTED OTHERWISE ON THE PLANS.

- FOR FOUNDATION ISLAND, SEE DETAIL "B", SHEET T-30.1.10
- FOR SAFETY BASE, SEE SHEET T-30.1.9
- FOR ANCHOR BOLT LENGTHS AND DIMENSIONS, SEE SHEET T-30.1.10
- FOR BASE PLATE DETAIL, SEE DETAIL "A", SHEET T-30.1.10
- FOR LUMINAIRE ARM CONNECTION, SEE DETAIL "C", SHEET T-30.1.10
- FOR SIGNAL ARM CONNECTION, SEE DETAIL "D", SHEET T-30.1.10

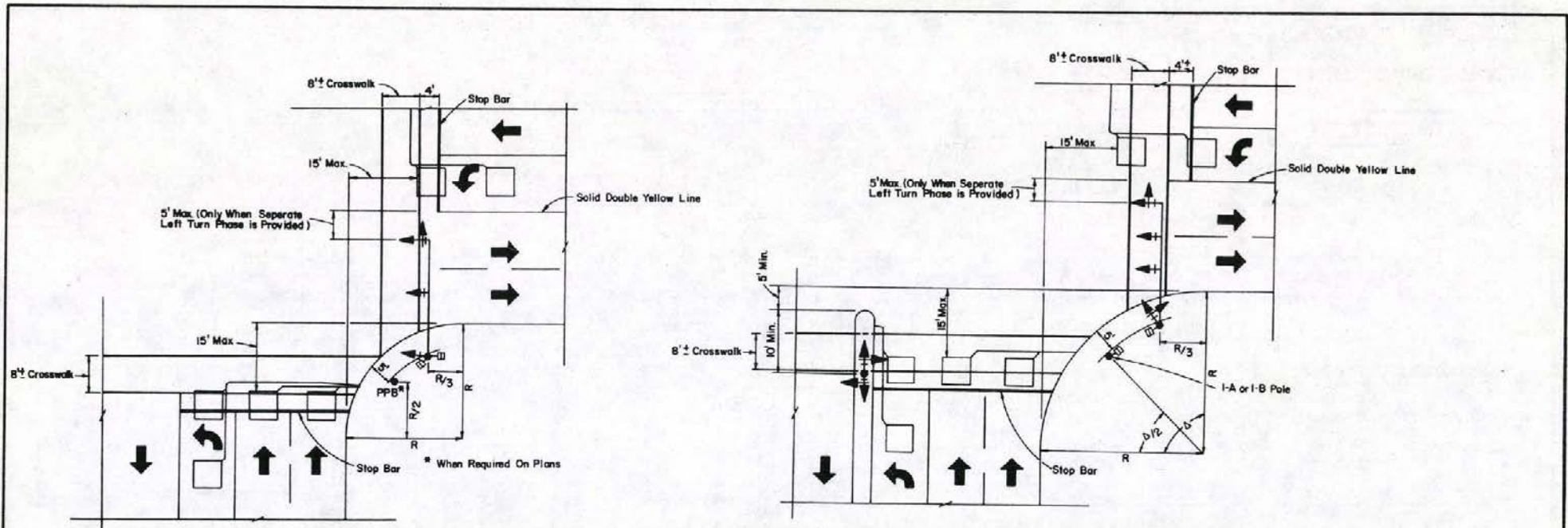
POLE TYPES 5-A-(S), 6-A-(L&S) & 7-(L)

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

LIGHTING AND SIGNALS

T-30.17 (823)
ADOPTED: 2/71

T 8

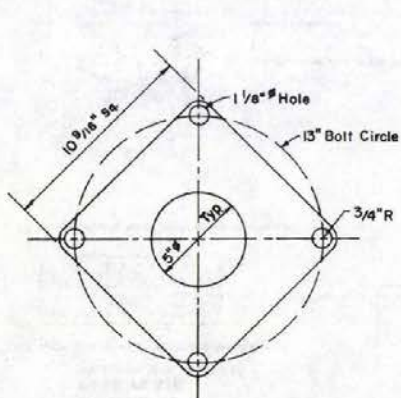


25' AND SMALLER RADII CURB RETURN AND MEDIAN LOCATION

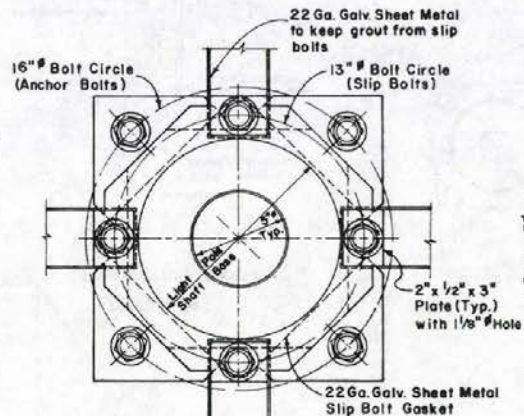
30' AND LARGER RADII CURB RETURN AND MEDIAN LOCATION

TYPICAL LOCATIONS FOR SIGNAL POLES AND LOOP DETECTORS

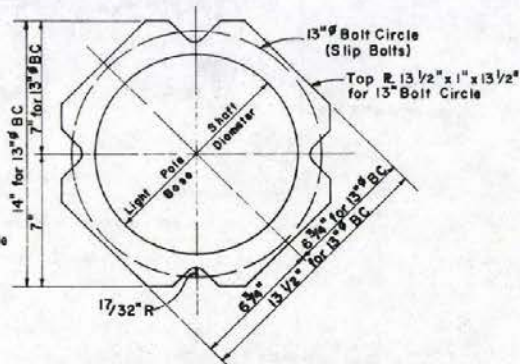
STATE OF NEVADA DEPARTMENT OF TRANSPORTATION	
LIGHTING AND SIGNALS	
<i>[Signature]</i> CHIEF TRAFFIC ENGR.	T-30.1.8 (883) ADOPTED 3/82 REVISION



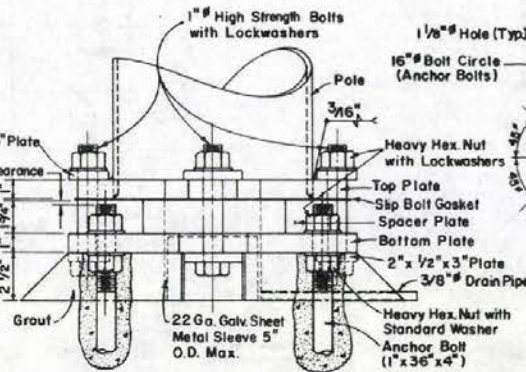
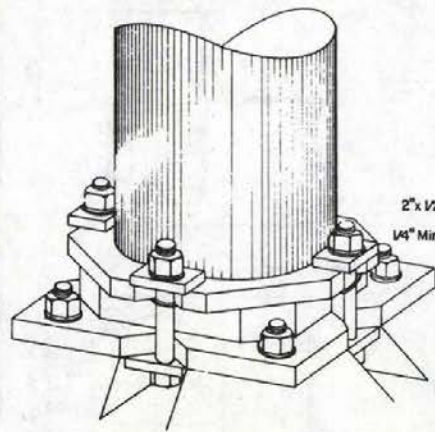
SLIP BOLT GASKET
(22 Gage Galvanized Sheet Metal)



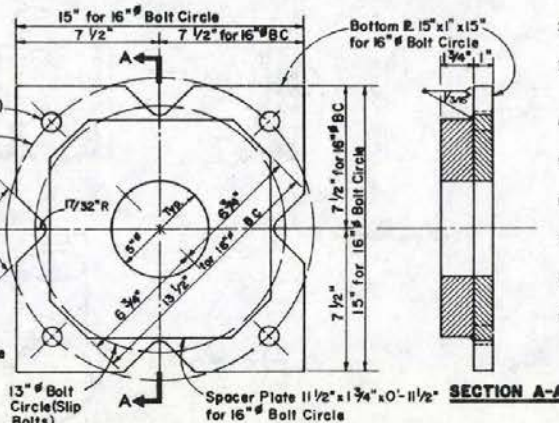
PLAN



PLAN OF TOP PLATE



LIGHT POLE BASE



PLAN OF BOTTOM AND SPACER PLATE

SECTION A-A

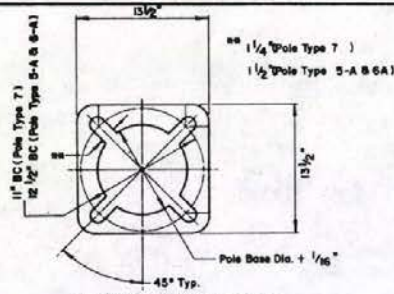
**SAFETY BASE NOTES
FOR POLE TYPES 7 & 14**

1. PLACE BOTTOM PLATE WITH SPACER PLATE ON LEVELING NUTS ON ANCHOR BOLTS AND FASTEN IN PLACE.
2. TOP PLATE SHALL BE FURNISHED BY LIGHT POLE FABRICATOR AS LIGHT POLE BASE PLATE WITH DIMENSIONS AS SHOWN IN PLAN VIEW.
3. ERECT LIGHT POLE AND SECURE WITH 1" HIGH STRENGTH BOLTS. BOLTS SHALL BE INSTALLED IN THE SLOTS SO THAT THE BOLT SHANKS ARE IN CONTACT WITH THE PLATES.
4. ALL STEEL PLATE ASSEMBLIES SHALL BE HOT-DIP GALVANIZED AFTER FABRICATION.
5. ALL NUTS, BOLTS AND WASHERS SHALL BE ELECTRO-PLATED CADMIUM IN ACCORDANCE WITH ASTM A-165, TYPE TS.
6. ALL CONTACT AREAS OF PLATES SHALL BE FREE OF GALVANIZING BEADS OR RIMS.
7. SAFETY BASES SHALL BE UTILIZED ON ALL STEEL LIGHT POLES EXCEPT ON STRUCTURES OR UNLESS OTHERWISE NOTED ON THE PLANS.
8. SLIP BOLTS SHALL BE TORQUED TO 150 FOOT-POUNDS OR 1800 INCH-POUNDS.
9. GROUTING SHALL BE DONE AFTER LIGHT POLE HAS BEEN LOCATED IN FINAL POSITION.

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

LIGHTING AND SIGNALS

01.1

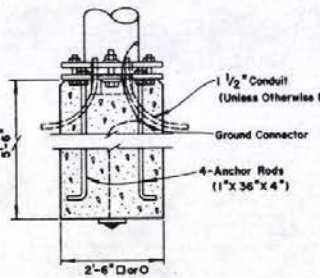


**DETAIL "A"
BASE PLATE**
(POLE TYPE 5-A, 6A & 7)

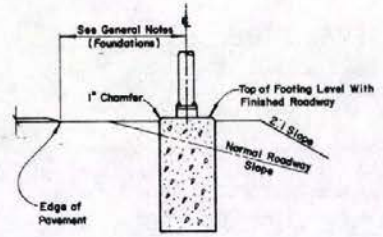
(Not Applicable When Safety Bases Are Required)

POLE TYPE	ANCHOR BOLT SIZE
5-A	1 1/4" x 44" x 4"
6-A	1 1/4" x 45" x 4"
7	1" x 36" x 4"

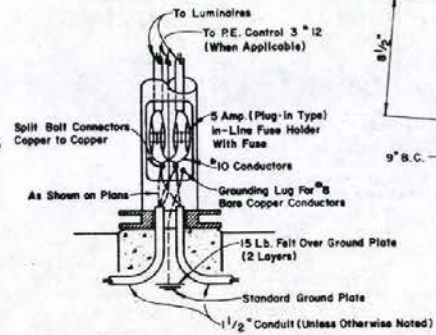
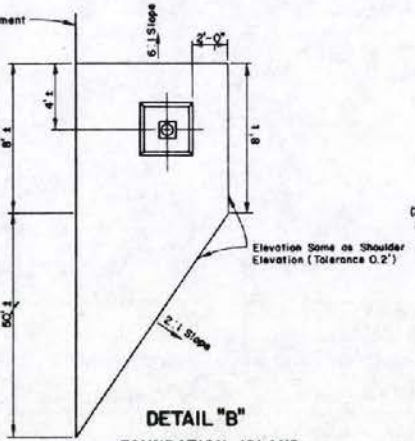
* Not Applicable When Mounted on Structures



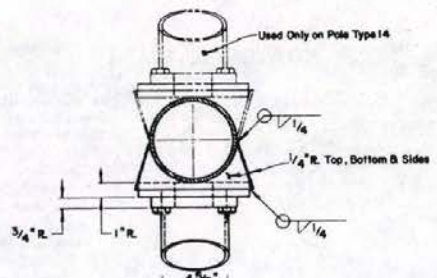
**FOUNDATION DETAIL
FOR POLE TYPE 14**



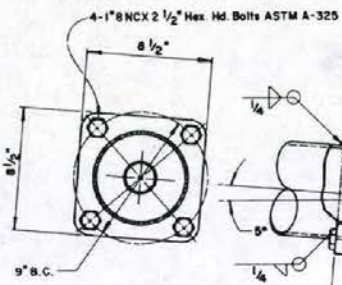
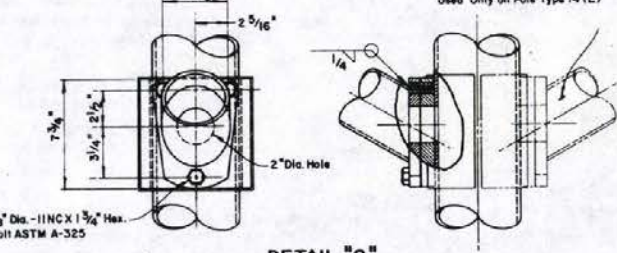
**DETAIL "B"
FOUNDATION ISLAND**



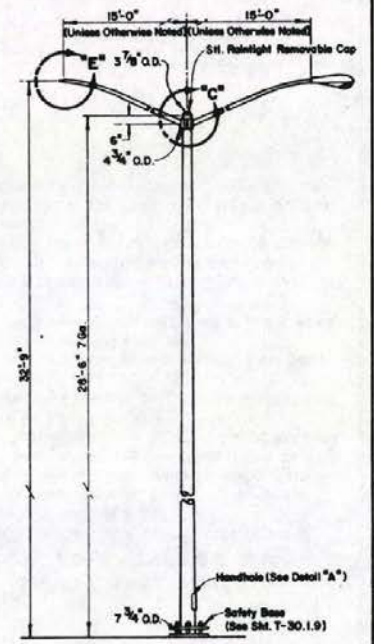
WIRING DIAGRAM FOR POLE TYPE 14



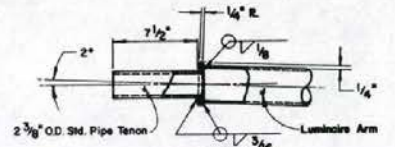
**DETAIL "C"
LUMINAIRE ARM CONNECTION**
(POLE TYPE 6-A, 7 & 14)



**DETAIL "D"
SIGNAL ARM CONNECTION**
(POLE TYPE 5-A & 6-A)



POLE TYPE 14



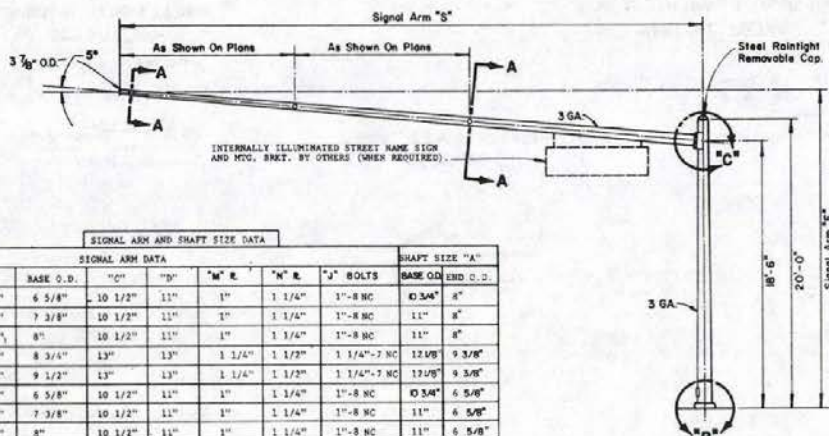
**DETAIL "E"
LUMINAIRE TENON DETAIL**

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

LIGHTING AND SIGNALS

T-30.1.10 623
ADOPTED 12/79
CHIEF TRAFFIC ENGR. REVISION

**POLE TYPE 14, 5-A, 6A, 7 & 14
MAST ARM MOUNTING AND TYPICAL FOUNDATION ISLAND DETAILS**

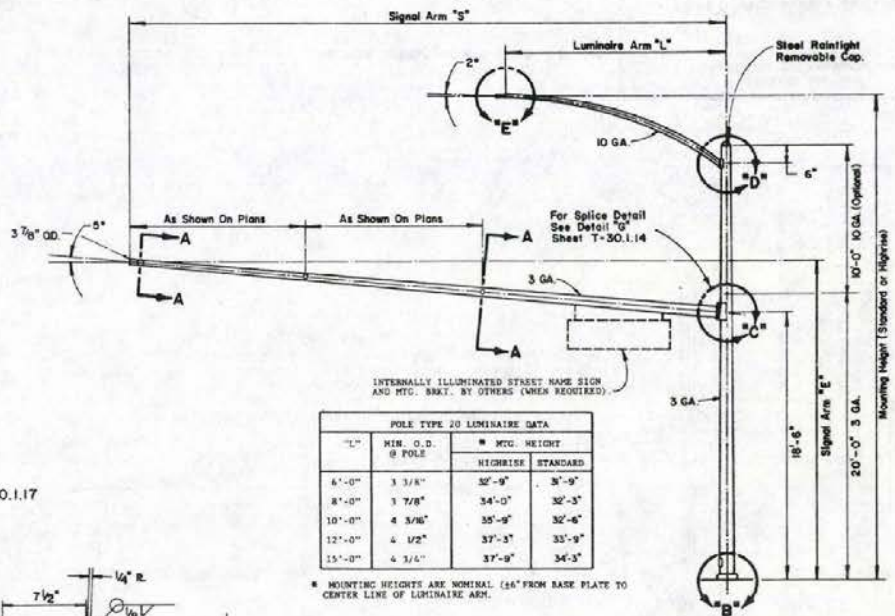


INTERNALLY ILLUMINATED STREET NAME SIGN AND MTC. BKMT. BY OTHERS (WHEN REQUIRED).

SIGNAL ARM AND SHAFT SIZE DATA

POLE TYPE	SIGNAL ARM DATA										SHAFT SIZE "A"	
	"B"	"E"	BASE O.D.	"O"	"P"	"M" R.	"N" R.	"J" BOLTS	BASE O.D.	END O.D.		
10	20'-0"	20'-3"	6 5/8"	10 1/2"	11"	1"	1 1/4"	1"-8 NC	Ø 3 3/4"	8"		
	25'-0"	20'-8"	7 3/8"	10 1/2"	11"	1"	1 1/4"	1"-8 NC	11"	8"		
	30'-0"	21'-2"	8"	10 1/2"	11"	1"	1 1/4"	1"-8 NC	11"	8"		
	35'-0"	21'-4"	8 3/4"	13"	13"	1 1/4"	1 1/2"	1 1/4"-7 NC	12 5/8"	9 3/8"		
	40'-0"	22'-0"	9 1/2"	13"	13"	1 1/4"	1 1/2"	1 1/4"-7 NC	12 5/8"	9 3/8"		
20	20'-0"	20'-3"	6 5/8"	10 1/2"	11"	1"	1 1/4"	1"-8 NC	Ø 3 3/4"	8"		
	25'-0"	20'-8"	7 3/8"	10 1/2"	11"	1"	1 1/4"	1"-8 NC	11"	6 5/8"		
	30'-0"	21'-2"	8"	10 1/2"	11"	1"	1 1/4"	1"-8 NC	11"	6 5/8"		
	35'-0"	21'-4"	8 3/4"	13"	13"	1 1/4"	1 1/2"	1 1/4"-7 NC	12 5/8"	8"		
	40'-0"	22'-0"	9 1/2"	13"	13"	1 1/4"	1 1/2"	1 1/4"-7 NC	12 5/8"	8"		

POLE TYPE 10
FOR POLE FOUNDATIONS SEE SHEET T-30.1.17



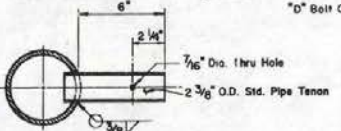
INTERNALLY ILLUMINATED STREET NAME SIGN AND MTC. BKMT. BY OTHERS (WHEN REQUIRED).

"L"	MIN. O.D. Ø POLE	MOUNTING HEIGHT	
		HIGHWAY	STANDARD
6'-0"	3 3/8"	32'-9"	30'-9"
8'-0"	3 7/8"	34'-0"	32'-3"
10'-0"	4 3/8"	35'-9"	32'-6"
12'-0"	4 1/2"	37'-3"	33'-9"
15'-0"	4 3/4"	37'-9"	34'-3"

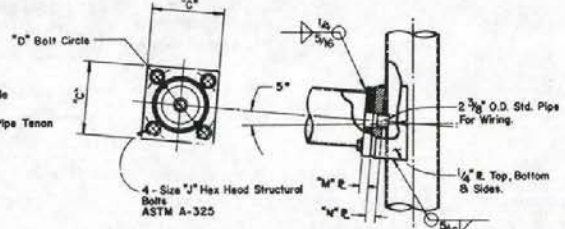
* MOUNTING HEIGHTS ARE NOMINAL (±6" FROM BASE PLATE TO CENTER LINE OF LUMINAIRE ARM).

POLE TYPE 20
FOR POLE FOUNDATIONS SEE SHEET T-30.1.17

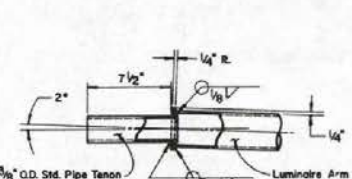
Removable Cap End of Mast Arm
Secured with Three (3) Set Screws at 120° Spacing



SECTION A-A
SIGNAL TENON ATTACHMENT



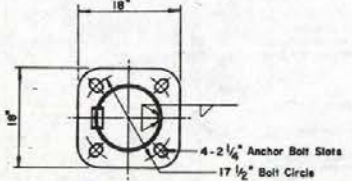
DETAIL "C"
SIGNAL ARM CONNECTION



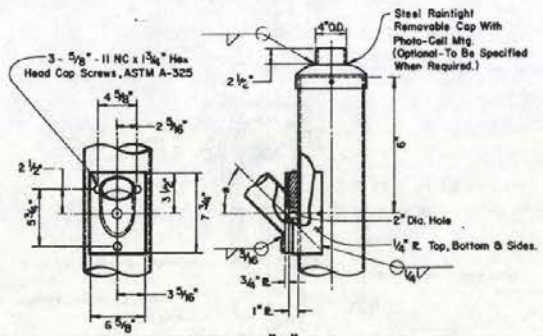
DETAIL "E"
LUMINAIRE TENON DETAIL



SPECIAL DETAIL
FOR MOUNTING SIGNAL HEAD



DETAIL "B"
POLE BASE



DETAIL "D"
LUMINAIRE ARM CONNECTION

For General Notes, (See Sheet No. T-30.1.7)

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

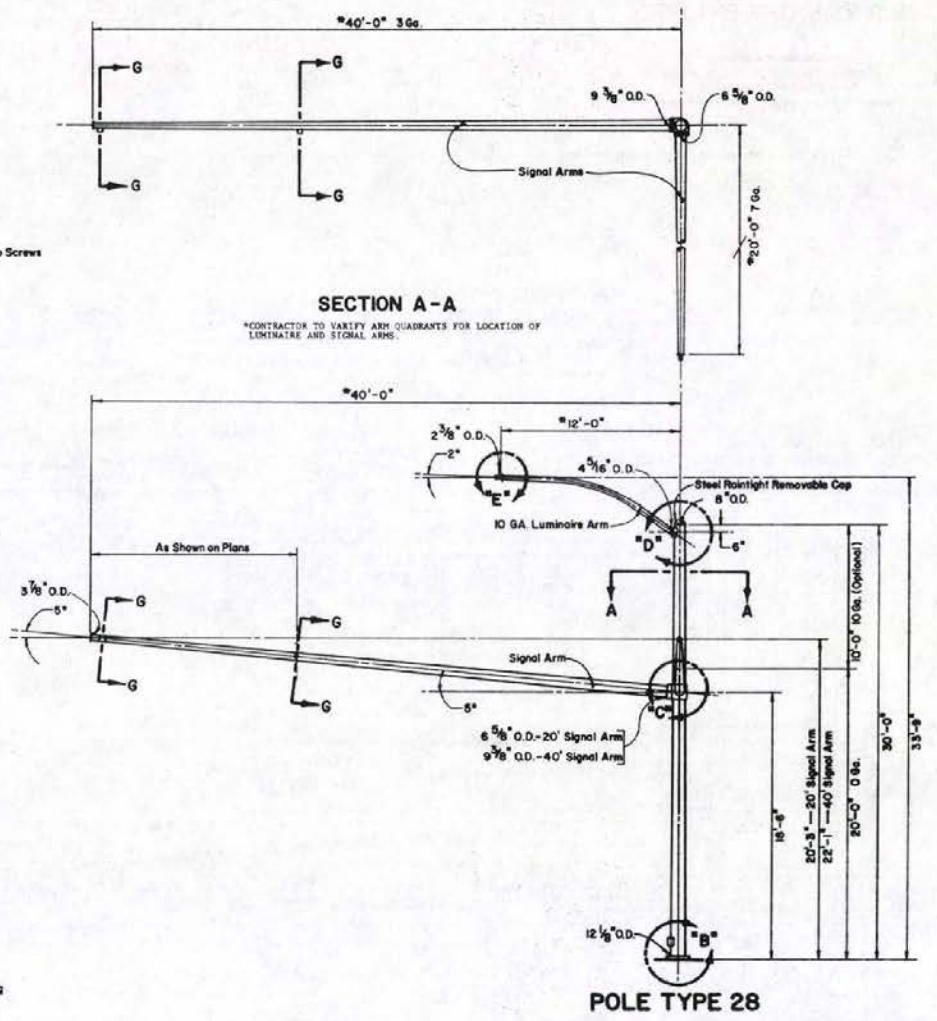
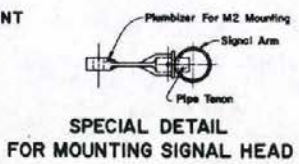
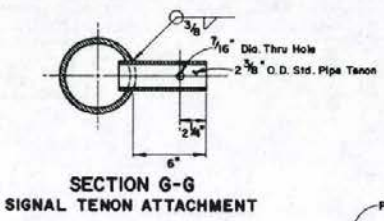
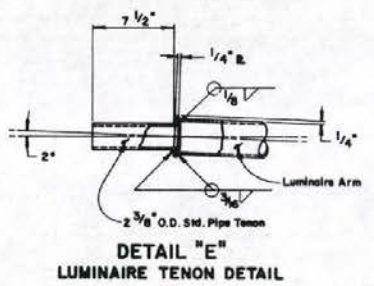
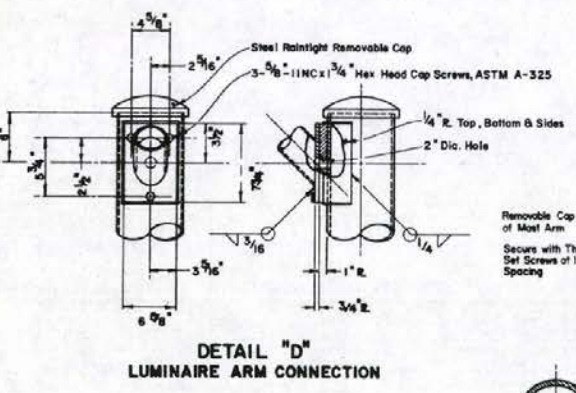
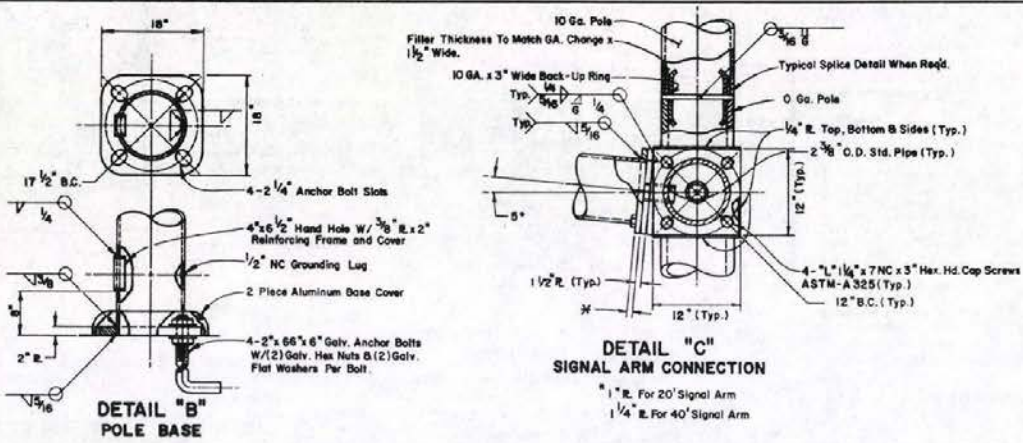
LIGHTING AND SIGNALS

T-30.1.11 623
ADOPTED: 12/79 REVISION: 1-1/98

CHIEF TRAFFIC ENGR.

POLE TYPES 10 AND 20

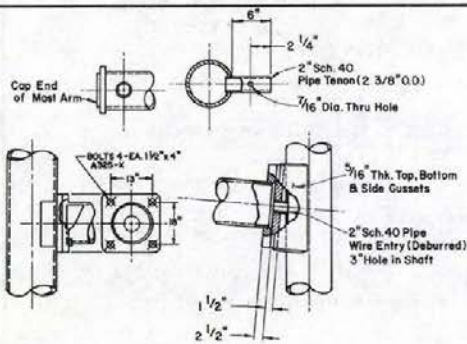
T12



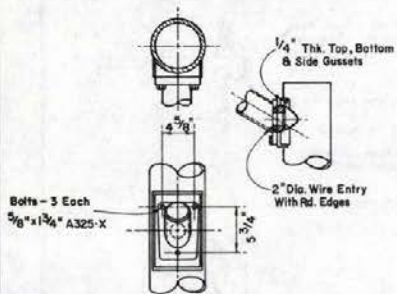
FOR POLE FOUNDATION SEE SHEET T-30.1.17

POLE TYPE 28 AND MAST ARM MOUNTING DETAILS

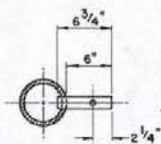
STATE OF NEVADA DEPARTMENT OF TRANSPORTATION		
LIGHTING AND SIGNALS		
<i>[Signature]</i> CHIEF TRAFFIC ENGR	T-30.1.12 ADOPTED: 12/79	625 REVISION 1-17/88



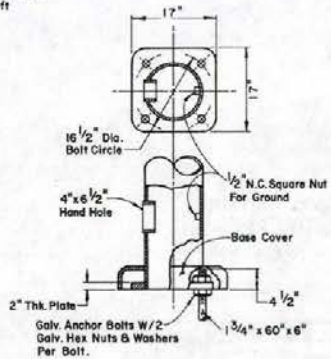
SIGNAL ARM ATTACHMENT



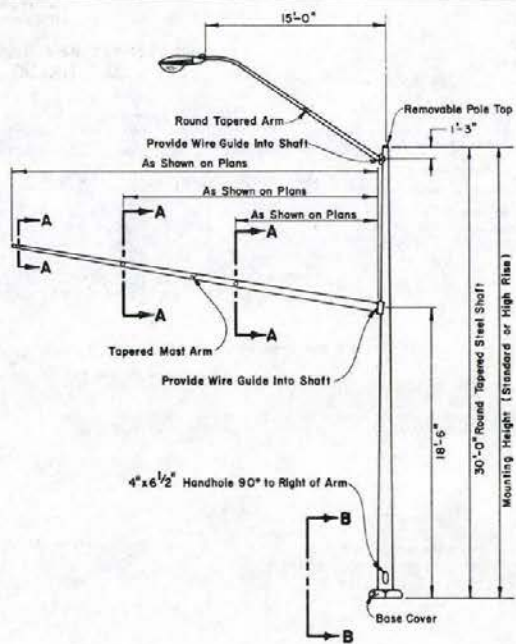
LUMINAIRE ARM ATTACHMENT



SECTION A-A



VIEW B-B

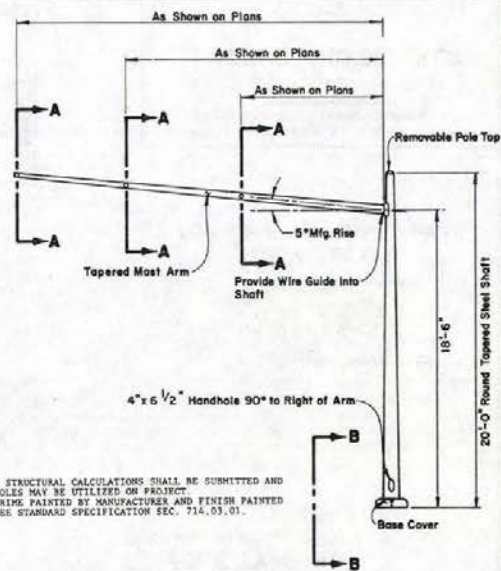


POLE TYPE 35

(FOR FOUNDATION SEE DETAIL "1", SHEET T-30.117)

L	POLE TYPE 35 LUMINAIRE DATA	
	MIN. O.D. OF POLE	* MFG. HEIGHT STANDARD
6'-0"	3 3/8"	32'-0"
8'-0"	3 7/8"	33'-3"
10'-0"	4 3/16"	35'-0"
12'-0"	4 1/2"	36'-6"
15'-0"	4 3/4"	37'-0"

*MOUNTING HEIGHTS ARE NOMINAL (+4" FROM BASE PLATE TO CENTER LINE OF LUMINAIRE ARM)



POLE TYPE 30

(USE SAME FOUNDATION AS POLE TYPE 35)

- NOTES:
1. SHOP DRAWINGS AND STRUCTURAL CALCULATIONS SHALL BE SUBMITTED AND APPROVED BEFORE POLES MAY BE UTILIZED ON PROJECT.
 2. ALL POLES TO BE PRIME PAINTED BY MANUFACTURER AND FINISH PAINTED BY CONTRACTOR. SEE STANDARD SPECIFICATION SEC. 714.03.01.

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

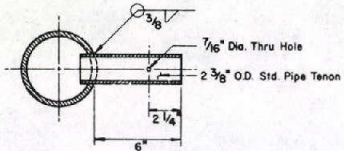
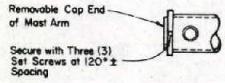
LIGHTING AND SIGNALS

POLE TYPES 35 AND 30

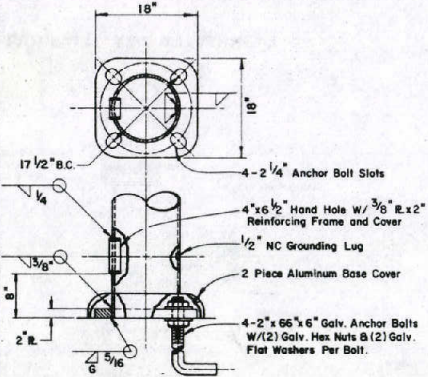
ADOPTED: 2/79
REVISION: 9/11-86

T-30.1.13 (623)

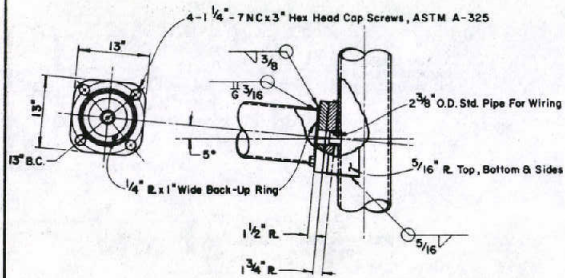
CHIEF TRAFFIC ENGR.



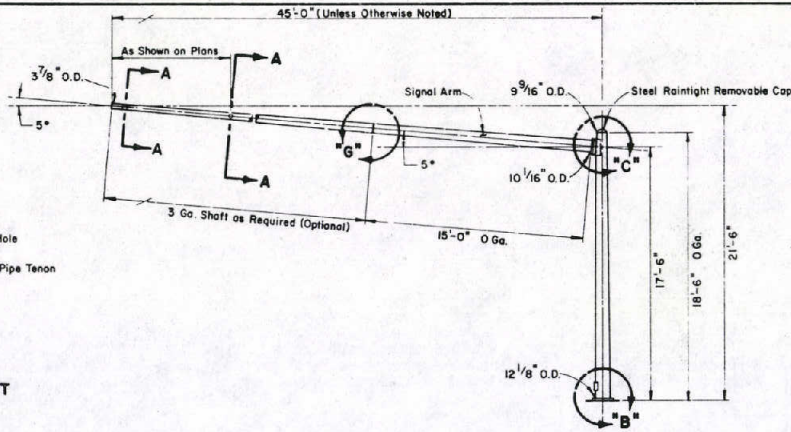
SECTION A-A
SIGNAL TENON ATTACHMENT



DETAIL "B"
POLE BASE

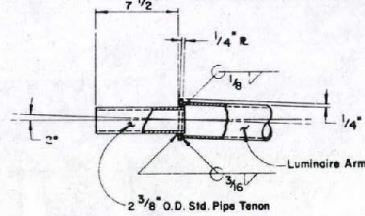


DETAIL "C"
SIGNAL ARM CONNECTION

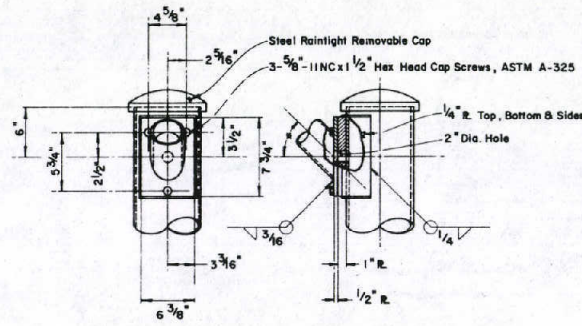


POLE TYPE 40

FOR FOUNDATION SEE DETAIL "I" SHEET T-30.1.17

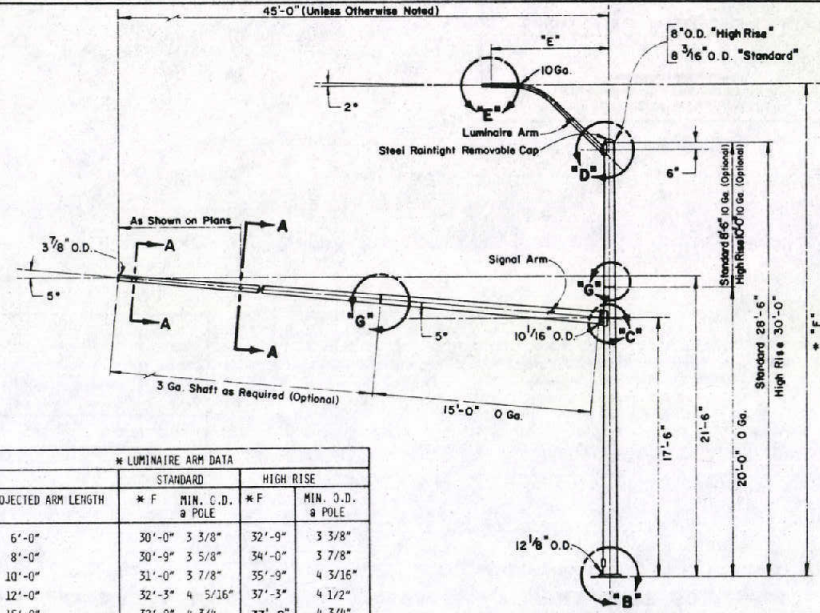


DETAIL "E"
LUMINAIRE TENON DETAIL



DETAIL "D"
LUMINAIRE ARM CONNECTION

* Standard - 28"
High Rise - 45"

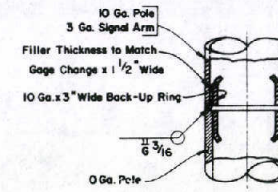
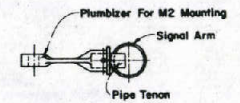


POLE TYPE 45

FOR FOUNDATION SEE DETAIL "I" SHEET T-30.1.17

"E" PROJECTED ARM LENGTH	* LUMINAIRE ARM DATA	
	STANDARD	HIGH RISE
6'-0"	* F MIN. C.D. OF POLE 30'-0" 3 3/8"	* F MIN. C.D. OF POLE 32'-9" 3 3/8"
8'-0"	30'-9" 3 5/8"	34'-0" 3 7/8"
10'-0"	31'-0" 3 7/8"	35'-9" 4 5/16"
12'-0"	32'-3" 4 5/16"	37'-3" 4 1/2"
15'-0"	32'-9" 4 3/4"	37'-0" 4 3/4"

* MOUNTING HEIGHTS ARE NOMINAL (± 6" FROM BASE PLATE TO C OF LUMINAIRE ARM)



DETAIL "G"
SPLICE DETAIL

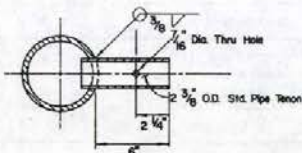
POLE TYPES 40 AND 45

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

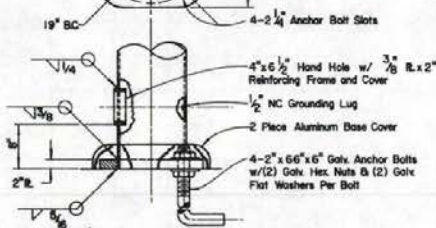
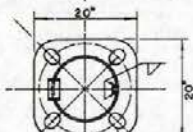
LIGHTING AND SIGNALS

T-30.1.14 623
CHIEF TRAFFIC ENGR. ADOPTED 12/79 REVISION 1-1/85

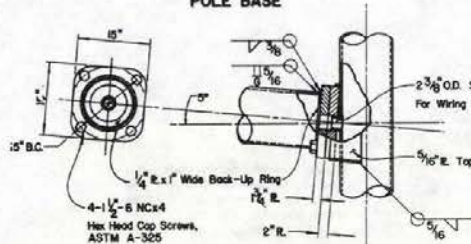
Removable Cap End of Mast Arm
Secure with Three (3) Set Screws at 120° Spacing



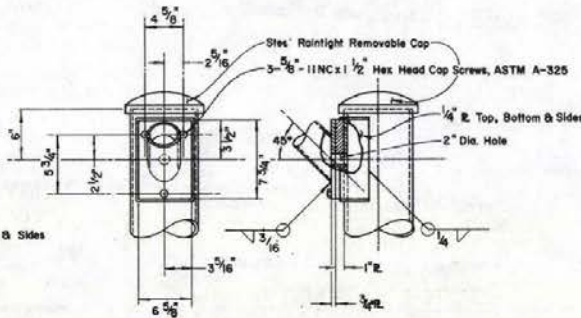
**SECTION A-A
SIGNAL TENON ATTACHMENT**



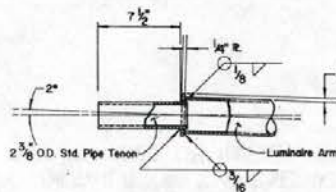
**DETAIL "B"
POLE BASE**



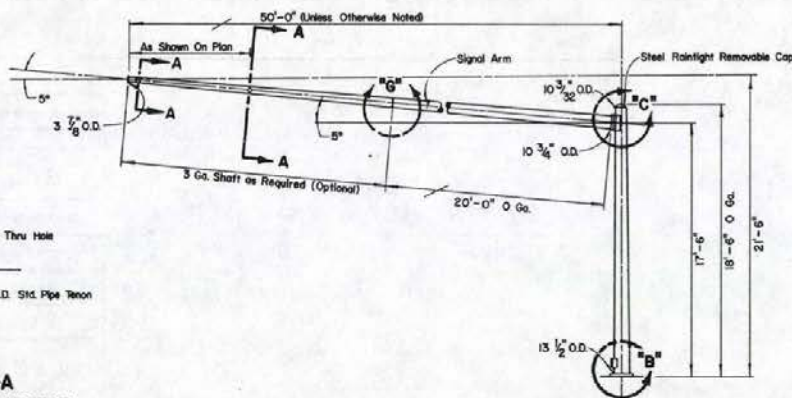
**DETAIL "C"
SIGNAL ARM CONNECTION**



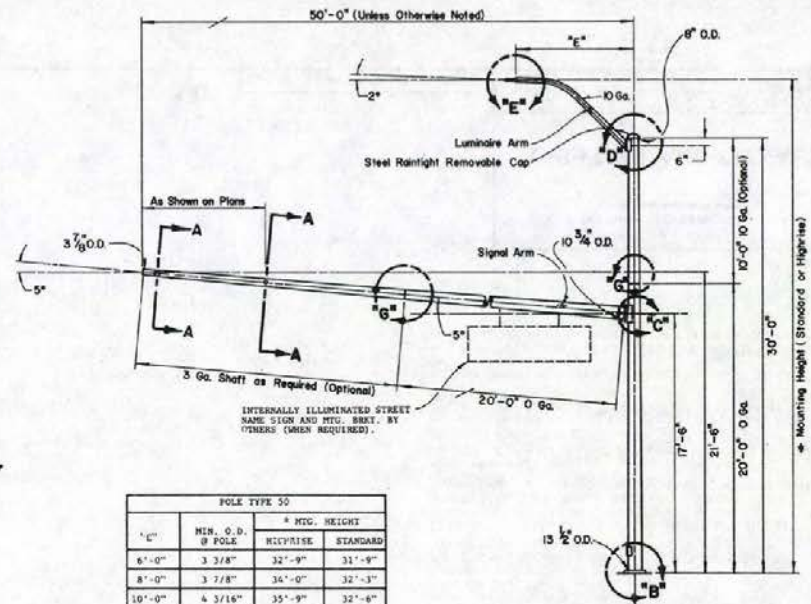
**DETAIL "D"
LUMINAIRE ARM CONNECTION**



**DETAIL "E"
LUMINAIRE TENON DETAIL**



**POLE TYPE 49
FOR POLE FOUNDATION SEE SHEET T-30.1.17**



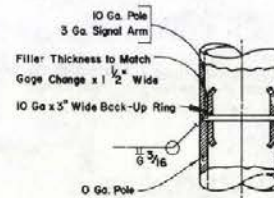
LUM.	POLE TYPE 50		
	MIN. O. D. OF POLE	* MTD. HEIGHT	
		RISER/RISE STANDARD	
6'-0"	3 3/8"	32'-9"	31'-9"
8'-0"	3 7/8"	34'-0"	32'-3"
10'-0"	4 3/16"	35'-9"	32'-6"
12'-0"	4 1/2"	37'-3"	33'-9"
15'-0"	4 3/4"	37'-9"	34'-3"

* MOUNTING HEIGHTS ARE NOMINAL (± 0" FROM BASE PLATE TO 1/4 OF LUMINAIRE ARM).

**POLE TYPE 50
FOR POLE FOUNDATION SEE SHEET T-30.1.17**



**SPECIAL DETAIL
FOR MOUNTING SIGNAL HEAD**



**DETAIL "G"
SPLICE DETAIL**

NOTE: USED ONLY WHEN REDUCED GAGE OPTION IS USED.

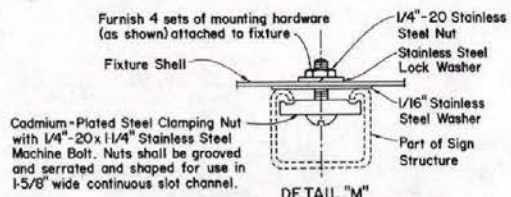
POLE TYPE 49 AND 50 AND MAST ARM MOUNTING DETAILS

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

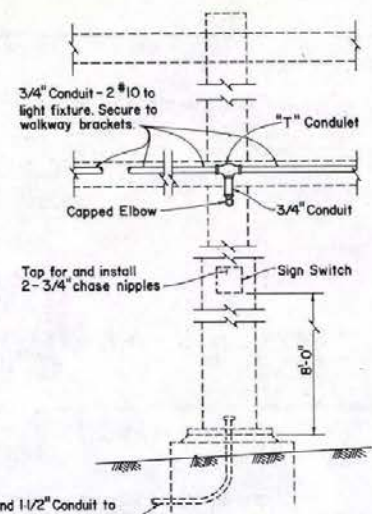
LIGHTING AND SIGNALS

ADOPTED: 12/74 REVISION: 1-1/88
CHIEF TRAFFIC ENGR.

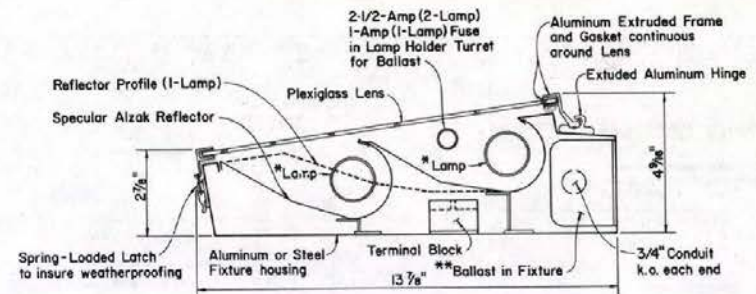
T-30.1.15 623



DETAIL "M"
FIXTURE MOUNTING ON CONTINUOUS SLOT CHANNEL



DETAILS OF TYPICAL WIRING & SIGN SWITCH INSTALLATION



*Lamp: T2T12 Slimline Standard Cool White Fluorescent
**Ballast: 1500ma, 240 V.A.C.

SECTION
LIGHTING FIXTURE
(72\"/>

LIGHTING FIXTURE DATA

LENGTH OF PANEL (FEET)	HEIGHT OF PANEL (INCHES)	NUMBER OF FIXTURES	NUMBER OF LAMPS	CONSECUTIVE SPACING FROM LEFT EDGE OF PANEL TO CENTER OF FIXTURES (INCHES)
10	40-70 80-120	1	1 2	60
12	40-70 80-120	2	2 4	36 1/2-74
14	40-70 80-120	2	2 4	42-84
16	40-70 80-120	2	2 4	47 1/2-97
18	40-70 80-120	3	3 6	36 1/2-74-74
20	40-70 80-120	3	3 6	40-80-80
22	40-70 80-120	3	3 6	44-88-88
24	40-70 80-120	4	4 8	36 1/2-74-74-74
26	40-70 80-120	4	4 8	39-78-78-78
28	40-70 80-120	4	4 8	42-84-84-84
30	40-70 80-120	4	4 8	45-90-90-90
32	40-70 80-120	5	5 10	38-77-77-77-77
34	40-70 80-120	5	5 10	42-81-81-81-81
36	40-70 80-120	5	5 10	44-86-86-86-86
38	40-70 80-120	6	6 12	38-76-76-76-76-76
40	40-70 80-120	6	6 12	40-80-80-80-80-80
42	40-70 80-120	6	6 12	42-84-84-84-84-84
44	40-70 80-120	7	7 14	38-76-76-76-76-76-76
46	40-70 80-120	7	7 14	36 1/2-80-80-80-80-80-80

GENERAL NOTES

- WHERE STEEL IS INDICATED, PART SHALL BE HOT-DIPPED GALVANIZED AFTER FABRICATION. WHERE SHEET STEEL IS INDICATED, PART SHALL BE FABRICATED FROM HOT-DIPPED GALVANIZED SHEET STEEL. AFTER FABRICATION, EDGES AND FLANS IN GALVANIZING SHALL BE CLEANED AND PAINTED WITH TWO COATS OF MIL. SPEC. MIL-P-22025. OTHER METAL PARTS SHALL BE MADE OF BRONZE, PHOSPHOR BRONZE, BRASS, COPPER BERYLLIUM OR AISI TYPE 316 STAINLESS STEEL, UNLESS OTHERWISE NOTED.
- WIRING BETWEEN FIXTURES SHALL BE RUN IN 3/4" LIQUID-TIGHT FLEXIBLE CONDUIT. FLEXIBLE CONDUIT SHALL BE SECURED TO NEAREST WALKWAY STRUCTURAL MEMBER BRACKET USING GALVANIZED BONDING STRAP AND BRASS MACHINE SCREWS.
- TWO LAMP FIXTURES SHALL BE USED FOR SIGNS OVER 70" VERTICAL DIMENSION AND ONE LAMP FIXTURE SHALL BE USED FOR SIGNS WITH VERTICAL DIMENSION OF 70" AND LESS.
- ALTERNATE FIXTURE FABRICATION METHODS AND DESIGN DETAILS MAY BE ACCEPTABLE PROVIDED THE LIGHT DISTRIBUTION, LAMP SIZE, MOUNTING DETAILS AND INTEGRAL BALLAST ARE EQUIVALENT TO THE FIXTURE SHOWN. ALL VARIATIONS MUST BE APPROVED BY THE ENGINEER.
- MANUFACTURER SHALL SUBMIT FIVE COPIES OF SHOP DRAWINGS TO THE ENGINEER FOR APPROVAL PRIOR TO FABRICATION, IF FIXTURES HAVE NOT PREVIOUSLY BEEN APPROVED.
- FOR METHOD OF MOUNTING FLUORESCENT FIXTURES SEE WALKWAYS PLAN TITLED "WALKWAY DETAILS NO. 1" AND "WALKWAY DETAILS NO. 2" (T-56.1.9 AND T-56.1.10).
- SEE SIGN LAYOUT SHEETS FOR SIZE OF PANELS.
- A SIGN SWITCH SHALL BE REQUIRED AS DESCRIBED IN SECTION 623.03.09 OF THE 1986 STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION.

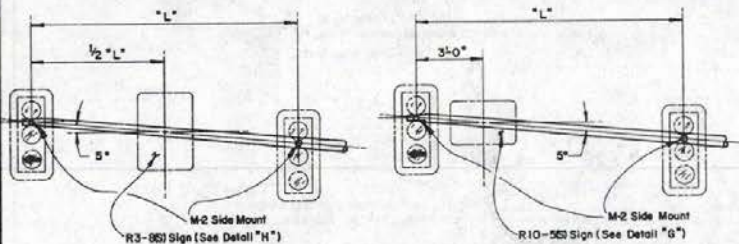
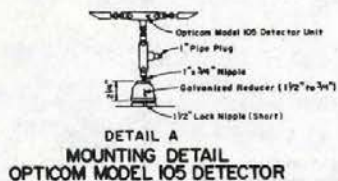
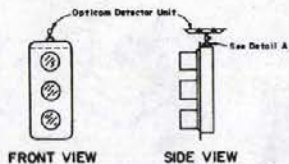
STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

LIGHTING AND SIGNALS

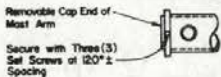
SIGN LIGHTING FIXTURES

T-30.116-(623)
ADOPTED: 1/73 REVISION: 1/74

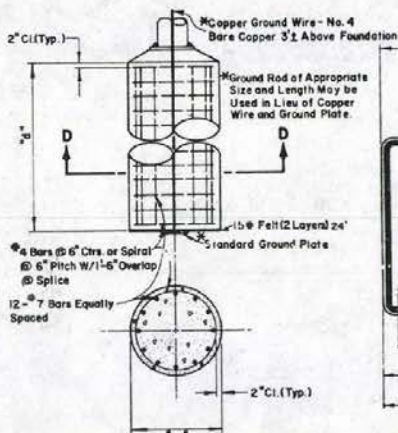
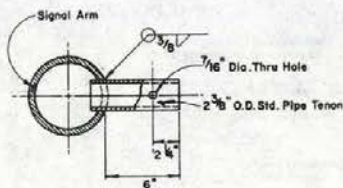
T16



MAST ARM SIGNAL AND SIGN PLACEMENT
"L" = AS SHOWN OR FLARE

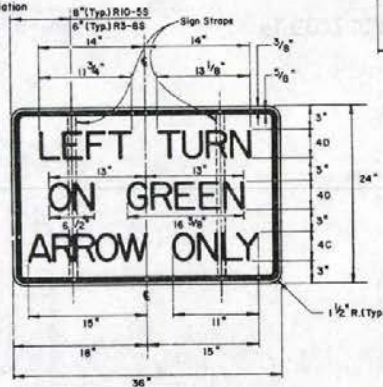


Secure with Three (3) Set Screws at 120° Spacing



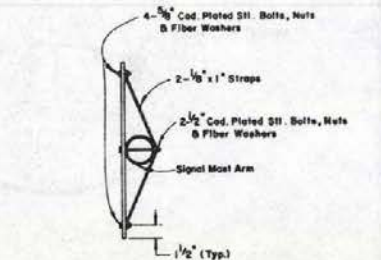
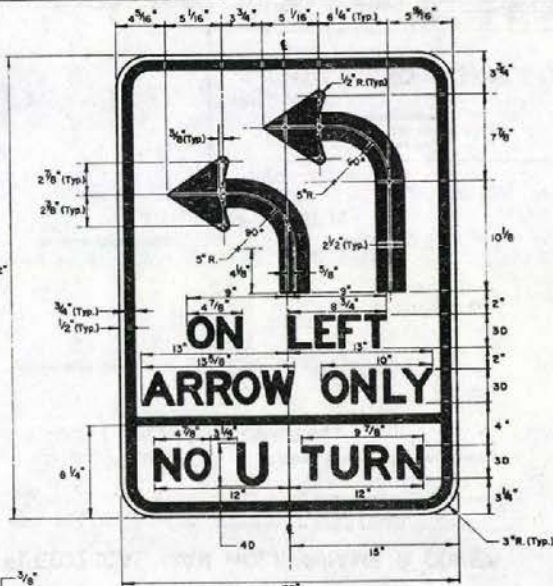
POLE TYPE	SIGNAL ARM LENGTH	"H"	"W"
20	≤ 30'	8'-6"	30"
28, 35 AND 45	> 30'	10'-6"	36"
30	ALL	12'-0"	36"

DETAIL "J"
* When Specified



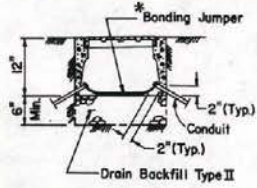
GENERAL NOTES

- ALL BOXES WILL HAVE 2-3/8" BRASS STUD BOLTS, NUTS AND WASHERS. COVER SHALL BE RECESSED FOR NUTS.
- ALL BOXES AND EXTENSIONS SHALL BE PRECAST REINFORCED CONCRETE.
- BOXES SHALL BE SEALED WITH MORTAR WHERE CONDUIT ENTERS BOX.
- SIGN R10-5(S) SHALL BE USED WHEN A SINGLE LEFT TURN LANE IS REQUIRED AND SIGN R3-8(S) SHALL BE USED WHEN TWO LEFT TURN LANES ARE REQUIRED.

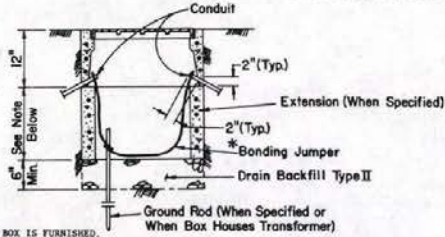


STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION
LIGHTING AND SIGNALS

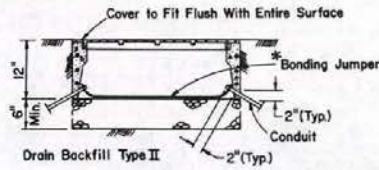
* APPLICABLE ONLY WHEN METAL CONDUIT IS USED



SECTION A-A

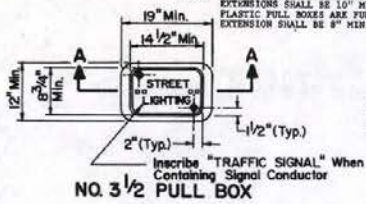


SECTION B-B

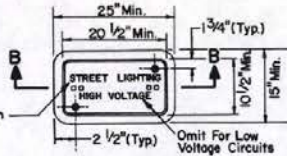


SECTION C-C

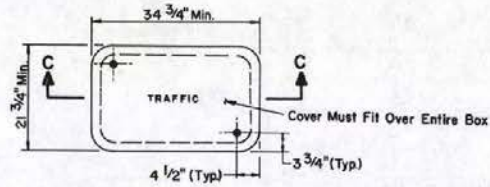
NOTE: WHEN CONCRETE PULL BOX IS FURNISHED, EXTENSIONS SHALL BE 10" MIN. UNLESS PLASTIC PULL BOXES ARE FURNISHED, EXTENSION SHALL BE 8" MIN.



NO. 3 1/2 PULL BOX

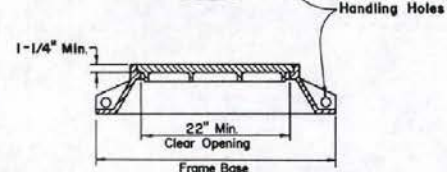
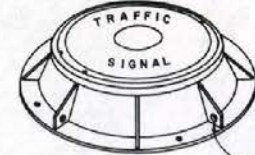


NO. 5 PULL BOX



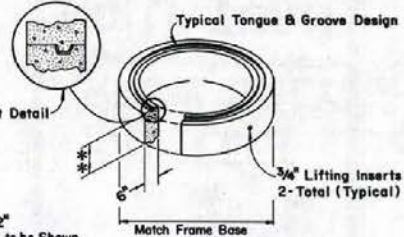
NO. 7 PULL BOX

- NOTES FOR PULL BOXES:
1. USE STEEL COVER WHEN BOX IS SUBJECT TO VEHICULAR TRAFFIC LOADS, HOWEVER, WHEN THE BOX IS LOCATED IN THE TRAVEL WAY, AN ELECTRICAL MANHOLE FRAME AND COVER SHALL BE INSTALLED.
 2. WHEN THE PULL BOX IS INSTALLED IN A SIDEWALK AREA OR IN A STRUCTURE, THE DEPTH OF THE TOP OF THE PULL BOX SHALL BE ADJUSTED SO THAT THE TOP OF THE BOX IS FLUSH WITH THE TOP OF THE SIDEWALK.
 3. IN AREAS WHERE THE POSSIBILITY OF MATERIAL EROSION FROM AROUND THE PULL BOX EXISTS, THE PULL BOX SHALL BE PLACED IN TYPE II DRAIN BACKFILL MATERIAL (3 FT ON EACH SIDE AND 1 FT DEPTH) AS DIRECTED BY THE ENGINEER.

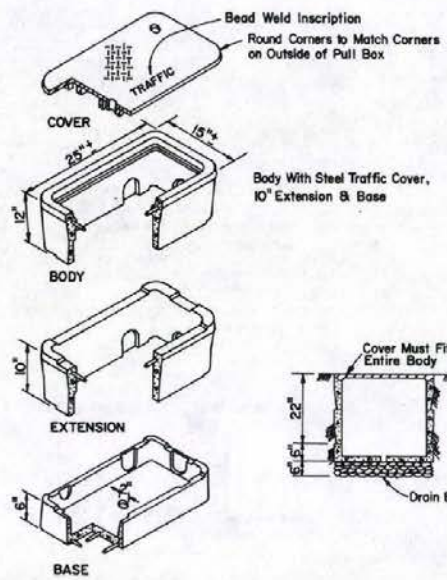


ELECTRICAL MAN HOLE FRAME & COVER

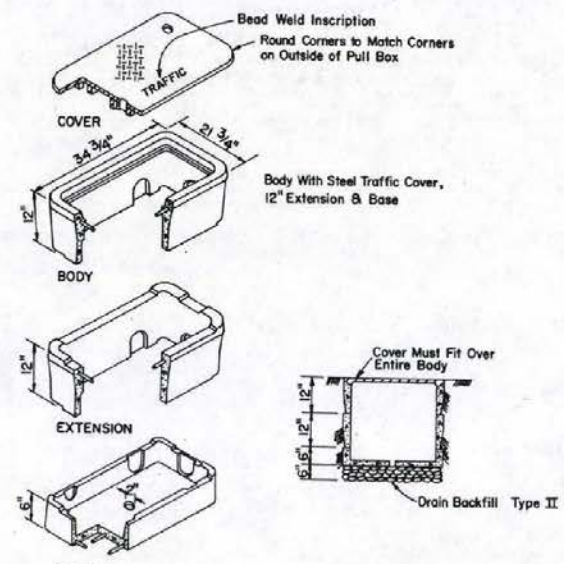
- NOTES:
1. A COMPACTED BASE AND A CONCRETE FOOTING SUPPORT SHALL BE CONSTRUCTED PRIOR TO PLACEMENT OF THE CAST IRON FRAME AS DIRECTED BY THE ENGINEER.
 2. ADJUSTMENTS TO ELEVATIONS SHALL BE MADE WITH COLLARS/RISERS AS REQUIRED.



COLLAR / RISER



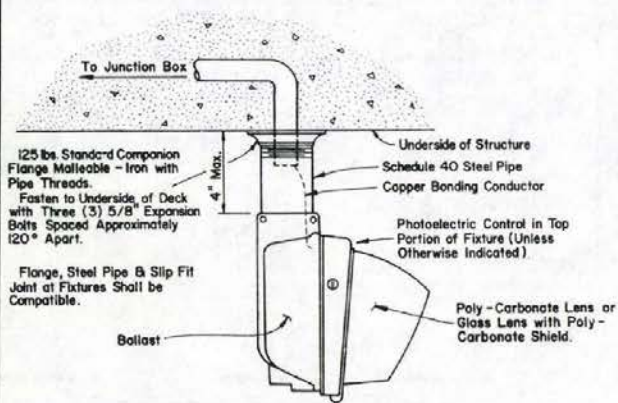
SPECIAL NO. 5 PULL BOX



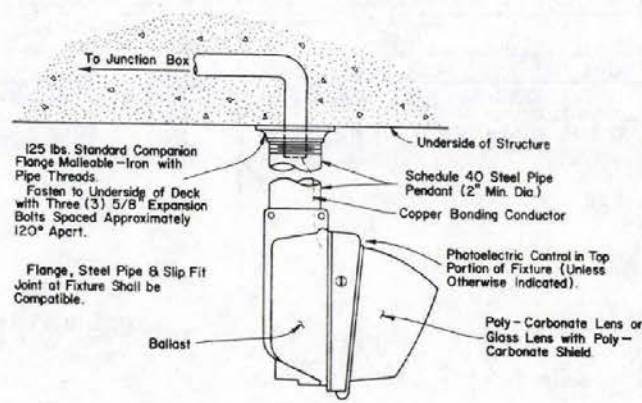
SPECIAL NO. 7 PULL BOX

PULL BOXES & ELECTRICAL MANHOLE FRAME & COVER

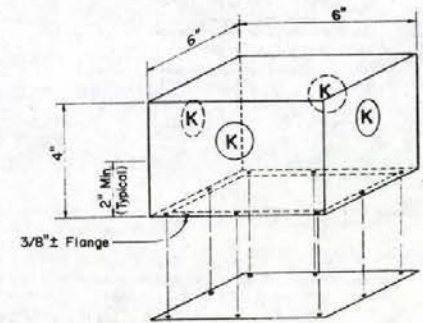
STATE OF NEVADA DEPARTMENT OF TRANSPORTATION		
LIGHTING AND SIGNALS		
<i>D. J. Miller</i> CHIEF TRAFFIC ENGR.	T 50.118 ADOPTED: 1/83	623 REVISION



TYPE "A" UNDERPASS LUMINAIRE

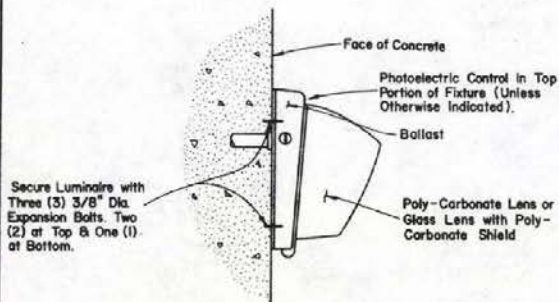


TYPE "C" UNDERPASS LUMINAIRE

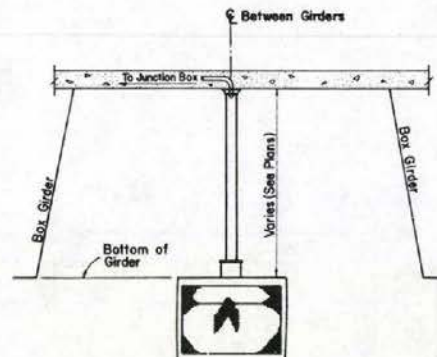


JUNCTION BOX DETAIL (J)

1. JUNCTION BOX AND COVER SHALL BE 16 GA. STEEL.
2. GALVANIZE ASSEMBLY AFTER FABRICATION.
3. BOX SHALL BE FLUSH WITH BOTTOM OF STRUCTURE.
4. FASTER COVER BY DRILL AND TAP WITH EIGHT (8) #10-24 UNC BRASS SCREWS.
5. COVER SHALL BE ON BOX DURING POURING.
6. AN EQUIVALENT APPROVED MFG. BOX MAY BE USED IN LIEU OF DETAIL (J) JUNCTION BOX.
7. (K) KNOCK OUT FOR 1" CONDUIT. BOTTOM SHALL BE MIN OF 3/4" ABOVE COVER TO CLEAR STRUCTURAL STEEL.

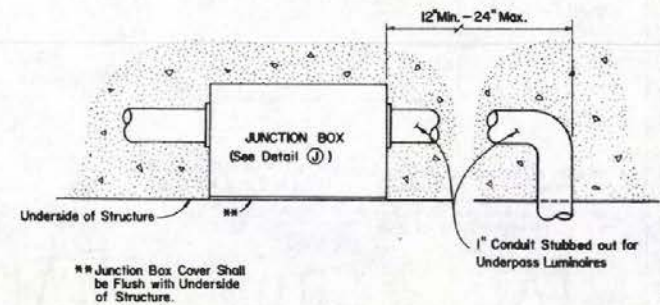


TYPE "B" UNDERPASS LUMINAIRE



DETAIL

PENDANT INSTALLATION
(TYPE "C" UNDERPASS LUMINAIRE)



DETAIL "B"

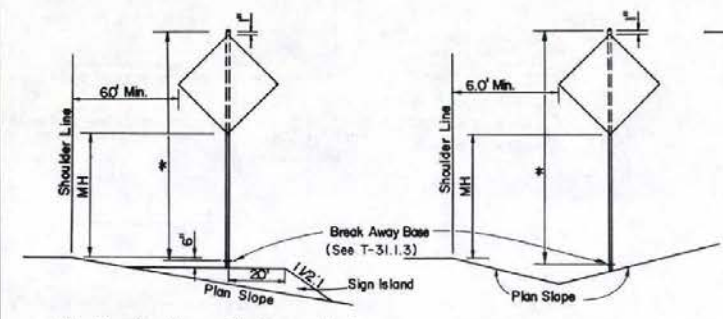
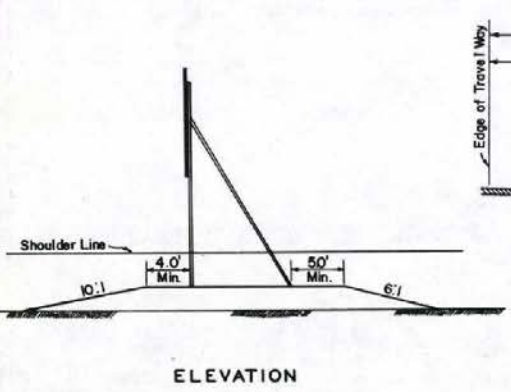
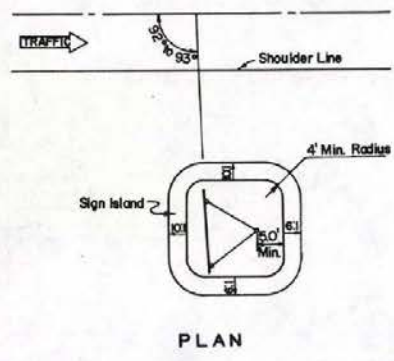
STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

LIGHTING & SIGNALS

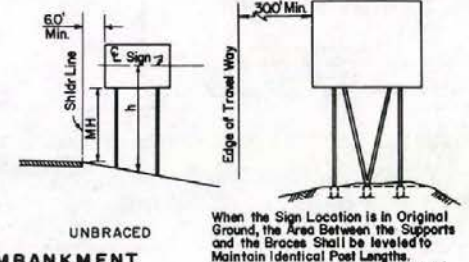
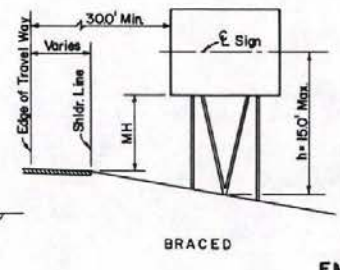
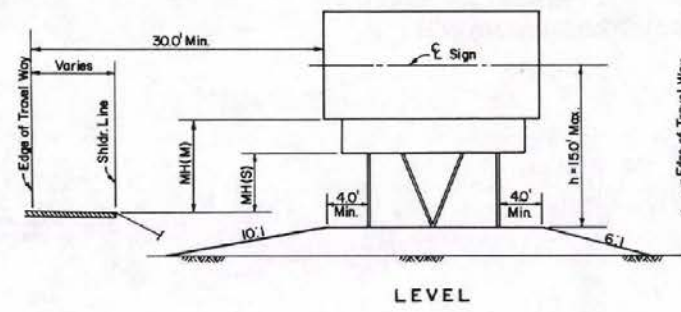
UNDERPASS LUMINAIRES & JUNCTION BOX

T-30.119 (623)
CHIEF TRAFFIC ENGR. ADOPTED 12/79 REVISION 1/78

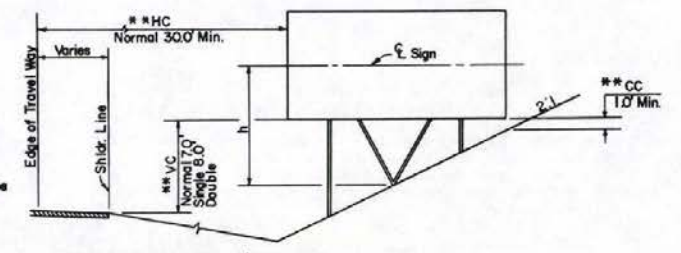
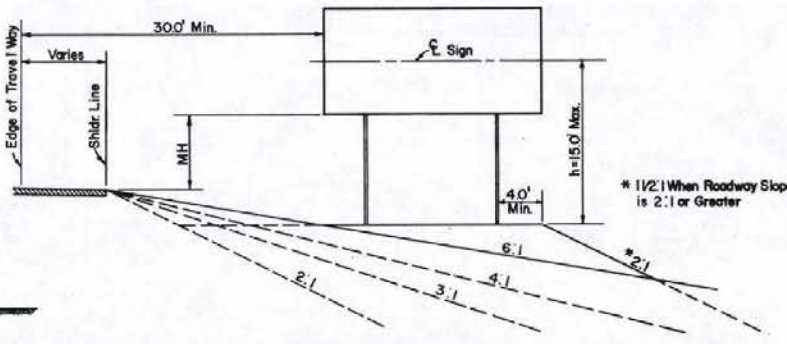
T-20



* Post Length as Shown on Sign Summary Sheet
Post Length Calculations Are Based on Use of
Sign Island. Sign Island Shall be Used Except
When Signpost is Located in Backslope.



When the Sign Location is in Original Ground, the Area Between the Supports and the Braces Shall be leveled to Maintain Identical Post Lengths. (No Direct Payment for the Leveling)



NOTE: If CC is Less than 1.0' Minimum
(1) Raise Sign Until CC = 1.0' or VC = 10.0' Max. for Single Sign
VC = 11.0' Max. for Double Sign, or h = 15.0' Max.
(2) Maintain VC = 10.0' or 11.0' and Move Sign Toward Shoulder
Until CC = 1.0', HC = 16.0' Min., or h = 15.0' Max.
(3) Special Consideration is Necessary if Given Limits are Exceeded.

GENERAL NOTES

1. SIGN ISLAND FOR TWO POST SIGNS REQUIRED ONLY WHEN h EXCEEDS 15.0'. ISLAND TO BE COMPACTED TO 95%
2. FOOTING AND SIGN DETAILS SHOWN ON SHEETS T-31.1.2, T-31.1.3, T-31.1.4
3. 30.0' MIN. DISTANCE FROM EDGE OF TRAVEL WAY TO EDGE OF SIGN PANEL MAY BE REDUCED TO 16.0' MIN. IN SPECIAL SITUATIONS.
4. ALL SIGN SUPPORTS SHALL BE OF BREAK-AWAY DESIGN.
5. SIGNS SHOULD NOT BE CLOSER THAN 6 FT. FROM THE EDGE OF THE SHOULDER, OR IF NONE, 12 FT. FROM THE EDGE OF THE TRAVELED WAY. IN URBAN AREAS A LESSER CLEARANCE MAY BE USED WHERE NECESSARY.

MINIMUM MOUNTING HEIGHTS (MH) FOR SIGNS

	*SINGLE GUIDE SIGNS	**DOUBLE GUIDE SIGNS	ROUTE MARKERS, REGULATORY AND WARNING SIGNS
FRERWAYS AND EXPRESSWAYS	7'	8' (M) 5' (S)	6'
COMMERCIAL, RESIDENTIAL, CURB AND GUTTER	7'	7'	7'
RURAL ROADS AND INTERCHANGE RAMP	5'	5'	5'
FRERWAY ENTRANCE AND DO NOT ENTER - WRONG WAY ASSEMBLIES			2'

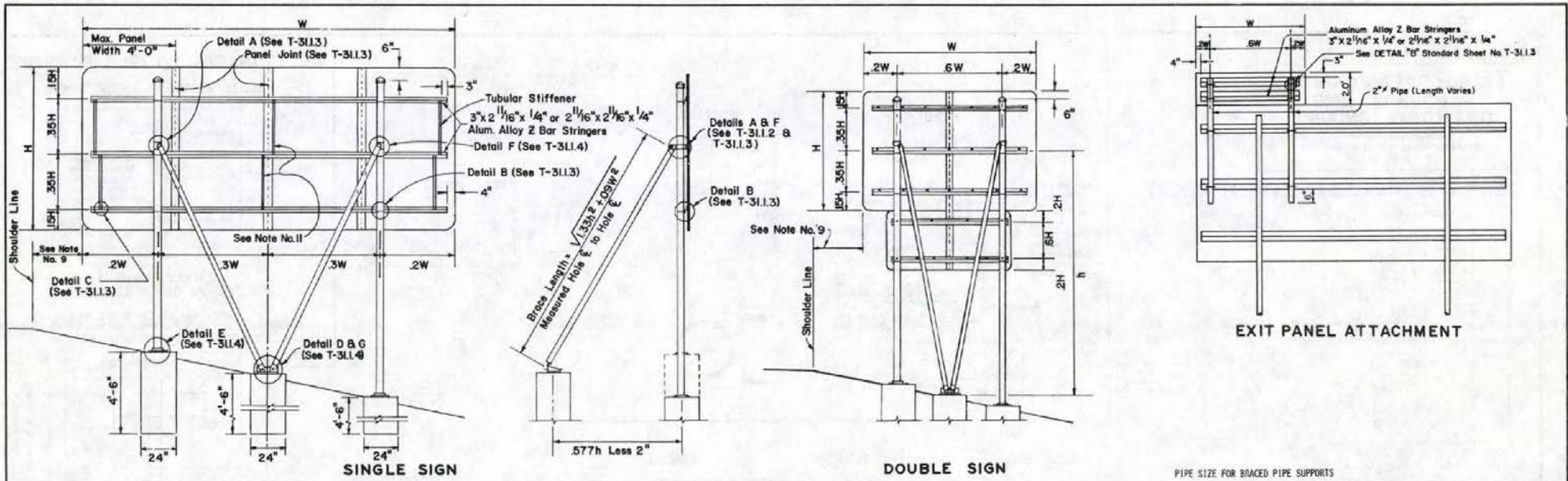
(M) MAJOR SIGN (S) SECONDARY SIGN
NOTE: FOR MOUNTING HEIGHT (MH) FOR CONSTRUCTION SIGNS AND TEMPORARY SIGNS, (SEE SHEET T-31.1.2).

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

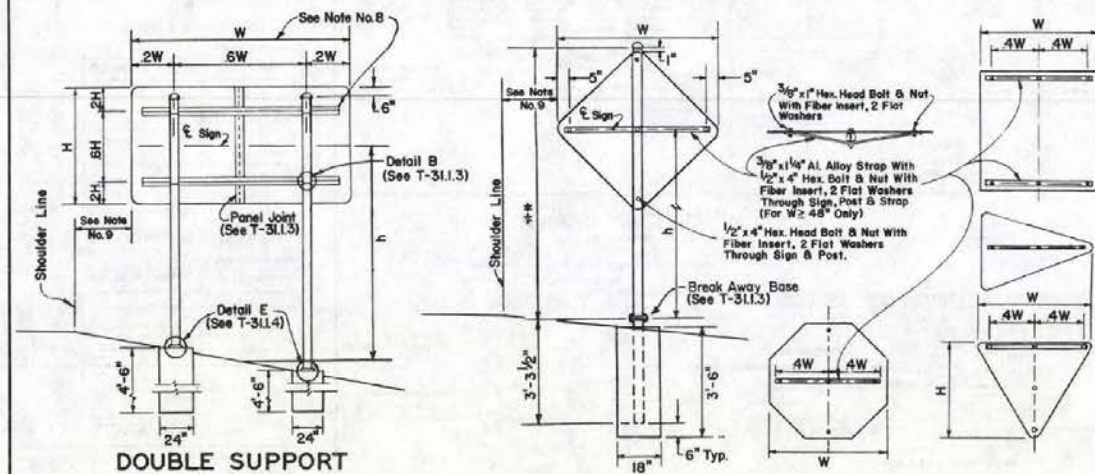
**GROUND MOUNTED
SIGN SUPPORTS
(ROUND METAL POSTS)**

Russell Hill
CHIEF TRAFFIC ENGR.

T-31.1.1 - (627)
ADOPTED: 8/88 REVISION: 11/2/76



DOUBLE SUPPORT WITH BRACES



PIPE SIZE FOR BRACED PIPE SUPPORTS

SIGN AREA SQ. FT.	VERTICAL POST SIZE					BRACE SIZE				
	0' to 5'	5' to 10'	10' to 15'	15' to 20'	20' to 25'	0' to 8'	8' to 10'	10' to 12'	12' to 14'	14' to 15'
0' to 70'	2"	2"	2"	2"	2"	2"	2"	2"	3"	3"
70' to 140'	2"	2"	3"	3"	3"	2"	2"	2"	3"	3"
140' to 200'	3"	3"	3"	-	-	2"	2"	3"	3"	3"

NOTE: WHEN PIPE SIZE FROM TABLES FOR VERTICAL POSTS AND BRACES DIFFER, USE LARGER DIAMETER INDICATED FOR BOTH SUPPORTS.

GENERAL NOTES

- SIZES AND TYPES OF SIGNS, POSTS AND BRACES ARE AS SHOWN ON SIGN SUMMARY SHEET.
- FOR MATERIALS NOT DIRECTLY SPECIFIED SEE SPECIAL PROVISIONS.
- FOOTINGS TO BE DRILLED HOLES, AS SHOWN, AND FILLED WITH CLASS A OR CLASS AA CONCRETE.
- SIGN PANELS TO BE ALUMINUM SHEET CONSTRUCTION.
- TUBULAR STIFFENERS REQUIRED ONLY WHEN 2H EXCEEDS 2'-0" ALUMINUM SHEET CONSTRUCTION.
- SIGN ISLAND REQUIRED ONLY WHEN IN H EXCEEDS 15'-0" ISLAND TO BE COMPACTED TO 95% (SEE T-31.1.1).
- FOR DOUBLE SIGN, DOUBLE SUPPORT WITH BRACES, AREA FOR TABLES IS TOTAL AREA OF TWO SIGNS. H' IS NOT CONSIDERED PART OF H.
- "2" BAR WILL BE USED ON ALL SIGNS REQUIRING TWO POSTS EXCEPT REGULATORY AND WARNING SIGNS. SPACING OF THE POSTS ON REGULATORY AND WARNING SIGNS REQUIRING TWO POSTS SHALL BE 2'-8".
- SEE T-31.1.1 FOR SIGN PLACEMENT.
- SEE T-31.1.4 FOR ANCHOR BOLT DETAILS.
- TUBULAR STIFFENERS TO BE ADDED WHEN "W" EXCEEDS 10'-0".
- REFER TO THE STANDARD HIGHWAY SIGN MANUAL FOR DRILL HOLE PLACEMENT.

PIPE SIZE DETERMINATION FOR SINGLE POST AND DOUBLE POST WITHOUT BRACE

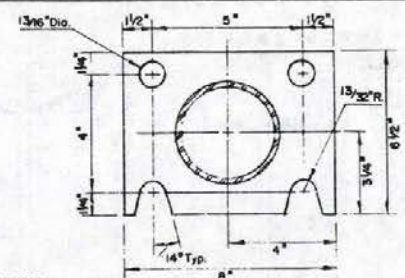
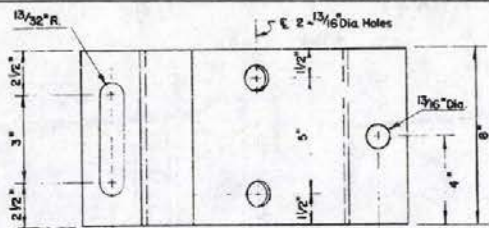
SIGN AREA SQ. FT.	h									
	0' to 5'	5' to 7.5'	7.5' to 10'	10' to 12.5'	12.5' to 15'	15' to 17.5'	17.5' to 20'	20' to 25'	25' to 43'	-
0' to 5'	S 2"	S 2"	S 2"	S 2"	S 2"	S 2"	S 2"	S 2"	S 2"	-
5' to 7.5'	S 2"	S 2"	S 2"	S 2"	S 2"	S 3"	S 3"	S 3"	S 3"	-
7.5' to 10'	S 2"	S 2"	S 3"	S 3"	S 3"	S 3"	S 3"	S 3"	S 3"	-
10' to 12.5'	S 2"	S 3"	S 3"	S 3"	S 3"	D 3"	D 3"	D 3"	D 3"	-
12.5' to 15'	S 3"	S 3"	S 3"	S 3"	D 3"	D 3"	D 3"	D 3"	D 3"	-
15' to 17.5'	S 3"	S 3"	S 3"	S 3"	D 3"	D 3"	D 3"	D 3"	D 3"	-
17.5' to 20'	S 3"	S 3"	S 3"	D 3"	D 3"	D 3"	D 3"	D 3"	D 3"	-
20' to 25'	S 3"	S 3"	S 3"	D 3"	D 3"	D 3"	D 3"	D 3"	D 3"	-
25' to 43'	S 3"	S 3"	S 3"	D 3"	D 3"	D 3"	D 3"	D 3"	D 3"	-

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

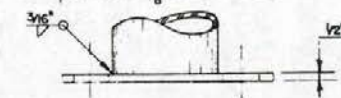
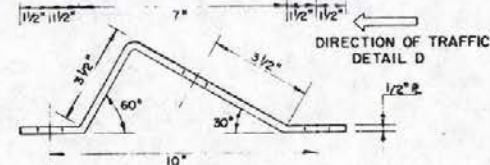
**GROUND MOUNTED
SIGN SUPPORTS
(ROUND METAL POSTS)**

Joseph J. Phillips
CHIEF TRAFFIC ENGINEER

T-31.1.2 (827)
ADOPTED: 8/89
11-5/81



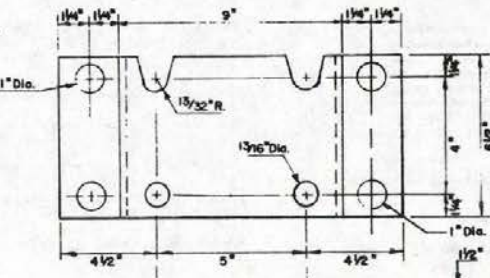
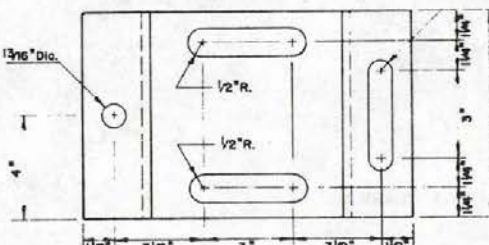
BRACE NOM. DIA.	BR RADIUS
2"	1 3/16"
3"	1 3/4"



DIRECTION OF TRAFFIC
DETAIL E

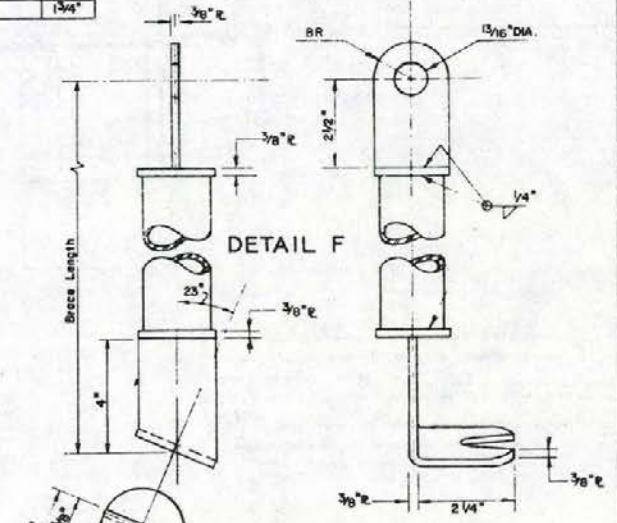
TOP PLATE

TOP PLATE

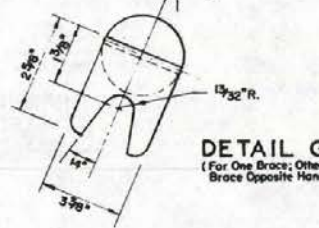


BOTTOM PLATE

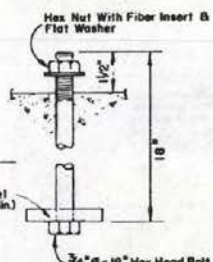
BOTTOM PLATE



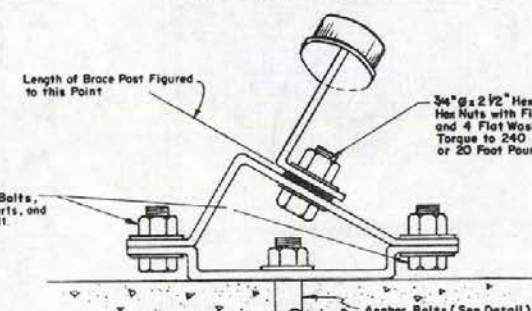
DETAIL F



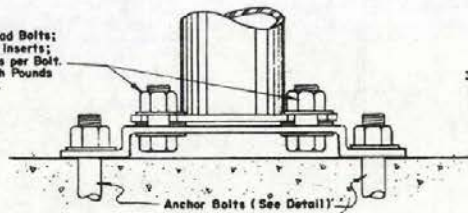
DETAIL G
(For One Brace; Other
Brace Opposite Hand)



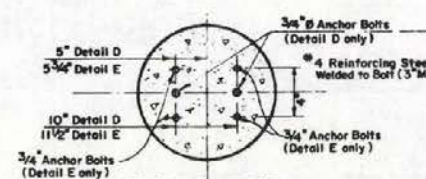
Hex Nut With Fiber Insert &
Flat Washer



ASSEMBLY
DETAIL D



ASSEMBLY
DETAIL E



PLACEMENT
ANCHOR BOLTS

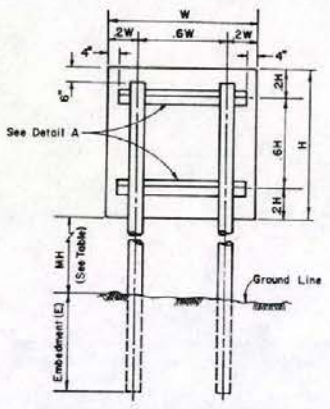
GENERAL NOTES
1 FLAT WASHERS REQUIRED AS SHOWN

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

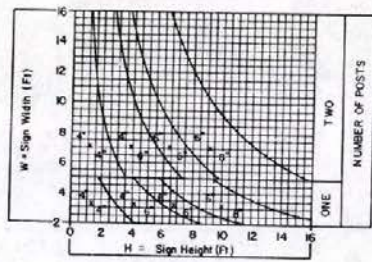
**GROUND MOUNTED
SIGN SUPPORTS
(ROUND METAL POSTS)**

ADOPTED: 8/69
REVISION 5-1/76

T-23



RECTANGULAR TIMBER POST SELECTION



SIGN POST EMBEDMENTS

4" x 4" = 3'-0"	4" x 6" = 4'-0"
6" x 6" = 3'-0"	6" x 8" = 6'-0"

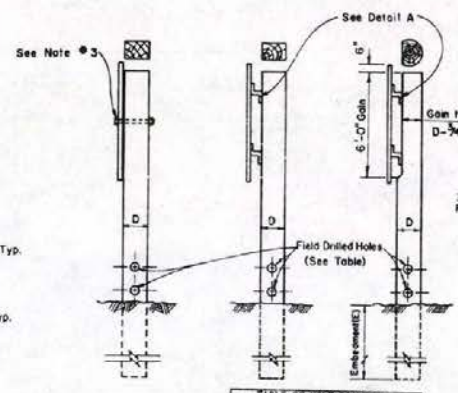
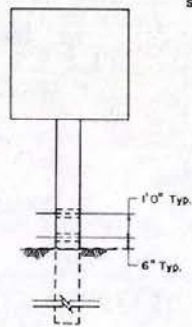
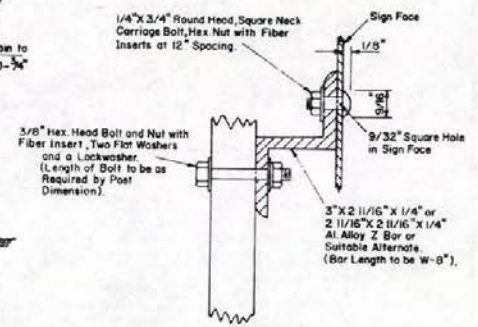


TABLE OF BOLT STANDARDS

POST SIZE	LESS THAN 6" DIA.	6" x 6" OR 4" x 8"
	NO BOLTS	



DETAIL A

MINIMUM MOUNTING HEIGHTS (MH) FOR SIGNS

	*SINGLE SIDE SIGNS	**DOUBLE SIDE SIGNS	ROUTE MARKERS, REGULATORY AND WARNING SIGNS
FREWAYS AND EXPRESSWAYS	7'	8' (M) 5' (S)	6'
COMMERCIAL, RESIDENTIAL CURBS AND GUTTER	7'	7'	7'
RURAL ROADS AND INTERCHANGE RAMP	5'	5'	5'
BARRICADE AND TRIPOD MOUNTING			1'

(M) MAJOR SIGN (S) SECONDARY SIGN

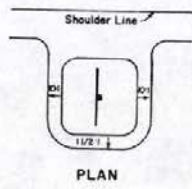
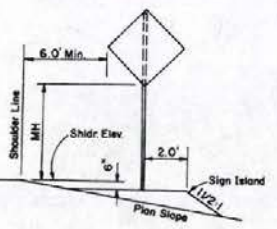
TIMBER POST SIGN SUPPORT



3/8" x 1/4" Al Alloy Strip with 1/2" Carriage Bolt, Hex Nut with Fiber Insert, 2 Flat Washer Through Sign, Post and Strip. (For W=48"± Temporary Signs Only) Suggested Single Sign Method of Attachment.

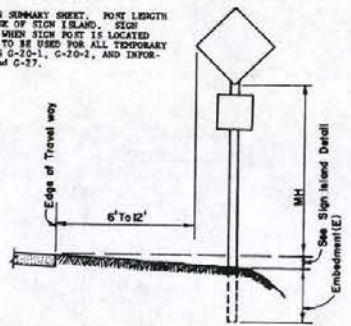
GENERAL NOTES

1. ALL BOLTS, NUTS AND WASHERS TO BE GALVANIZED.
2. ALL POSTS WITH CROSS SECTIONAL AREA LARGER THAN 24 SQUARE INCHES ARE TO BE DRILLED AS SHOWN.
3. "Z" BARS WILL BE USED ON ALL SIGNS REQUIRING TWO POSTS EXCEPT CONSTRUCTION REGULATORY AND WARNING SIGNS. SPACING OF THE POSTS ON REGULATORY AND WARNING SIGNS REQUIRING TWO POSTS SHALL BE 2'-0".
4. CONSTRUCTION SIGNS REQUIRING PORTABILITY MAY BE MOUNTED ON TRIPODS.
5. SIGN ISLAND FOR TWO POST SIGNS REQUIRED ONLY WHEN H EXCEEDS 15'-0". ISLAND TO BE COMPACTED TO 95%.

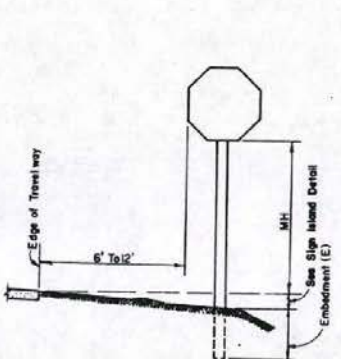


SIGN ISLAND

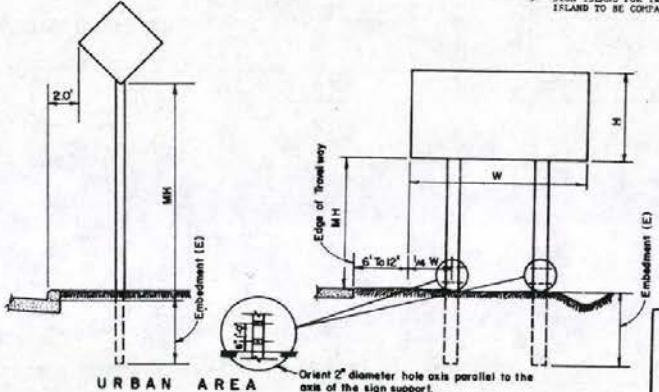
POST LENGTH AS SHOWN ON SIGN SUMMARY SHEET. POST LENGTH CALCULATIONS ARE BASED ON USE OF SIGN ISLAND. SIGN ISLAND SHALL BE USED EXCEPT WHEN SIGN POST IS LOCATED IN BACK SLOPE. SIGN ISLANDS TO BE USED FOR ALL TEMPORARY SIGNS AND CONSTRUCTION SIGNS C-20-1, C-20-2, AND INFORMATIONAL SIGNS C-25, C-26 and C-27.



RURAL AREA



URBAN AREA



TYPICAL SIGN ERECTION

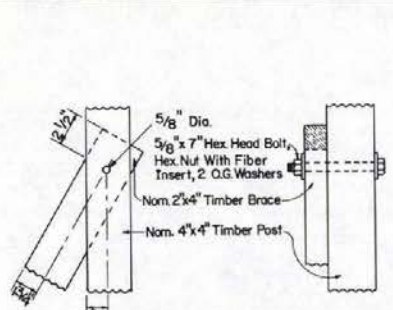
RURAL AND URBAN
 DIRECTION: RIGHT-HAND SIDE OF ROADWAY;
 FACING AND AT RIGHT ANGLES TO DIRECTION OF TRAFFIC.

STATE OF NEVADA
 DEPARTMENT OF TRANSPORTATION

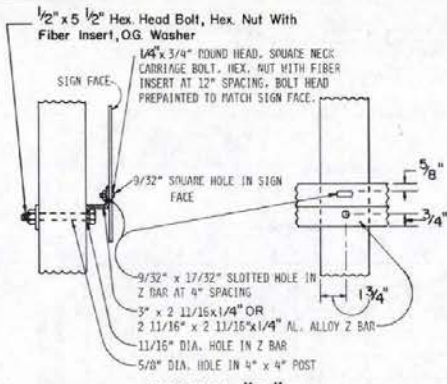
**GROUND MOUNTED
 SIGN SUPPORTS
 (TIMBER POSTS)**

T-31.15 (826)
 ADOPTED 6/73 REVISION 2/78

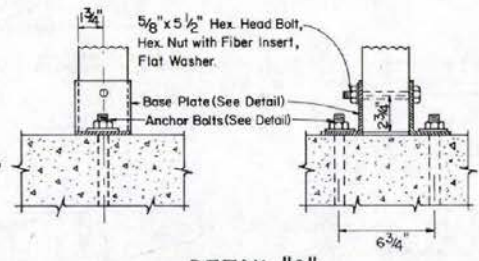
T-25



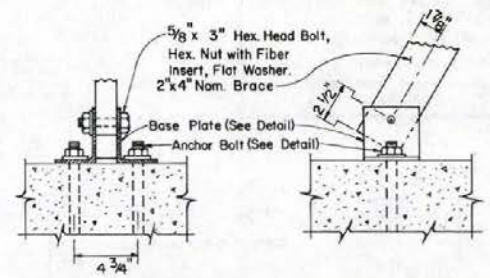
DETAIL "A"



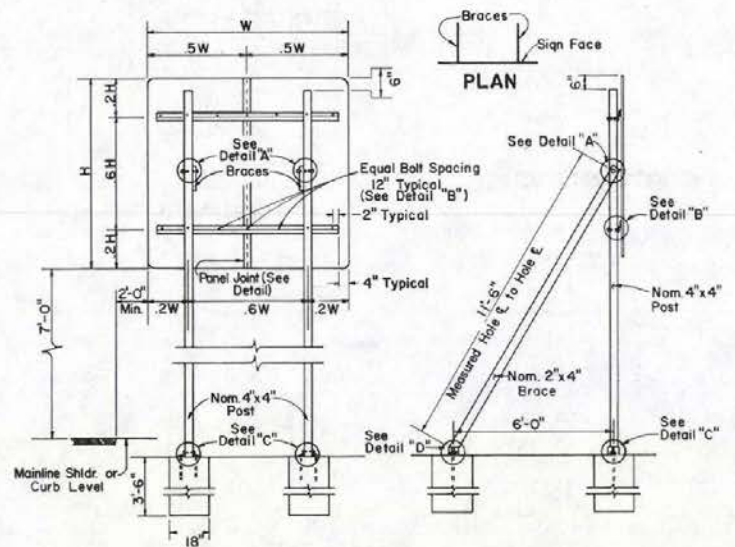
DETAIL "B"



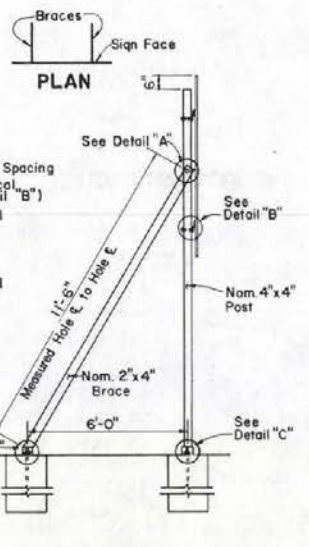
DETAIL "C"



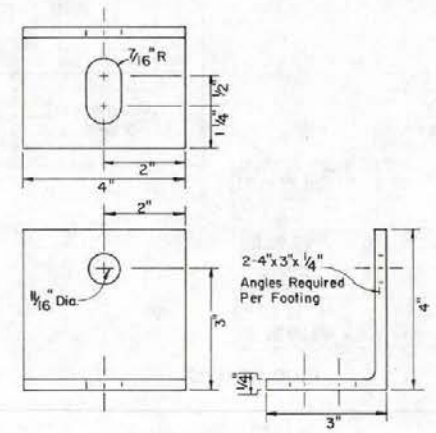
DETAIL "D"



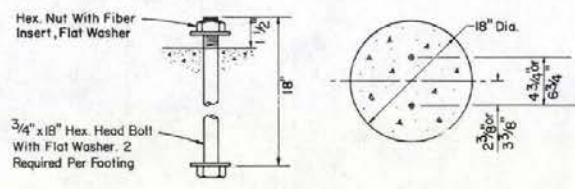
ELEVATION



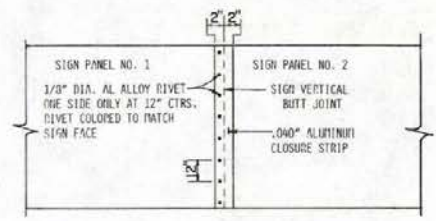
PLAN



BASE PLATE DETAIL



ANCHOR BOLT DETAIL



PANEL JOINT CLOSURE STRIP

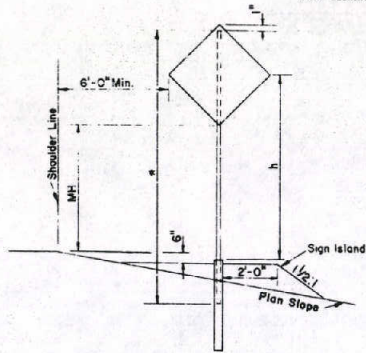
GENERAL NOTES

1. ALL DRILLED HOLES IN TIMBER TO BE 5/8" DIAMETER UNLESS OTHERWISE NOTED.
2. BACK BRACE HOLE IN 4" x 4" POST TO BE DRILLED AND FITTED IN FIELD. ALL OTHER HOLES MAY BE SHOP DRILLED IN STANDARD POSITION.
3. FOOTINGS TO BE DRILLED HOLES - 18" DIAMETER, 3'6" DEEP, FILLED WITH CLASS A OR CLASS AA CONCRETE.

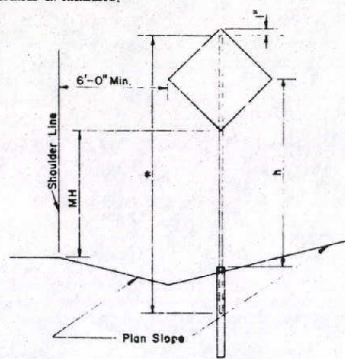
STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION
**GROUND MOUNTED GORE SIGN
(TIMBER SUPPORTS)**

T 31.1.6 (627)
ADOPTED: 10-68 REVISION T-1783
1-1/83

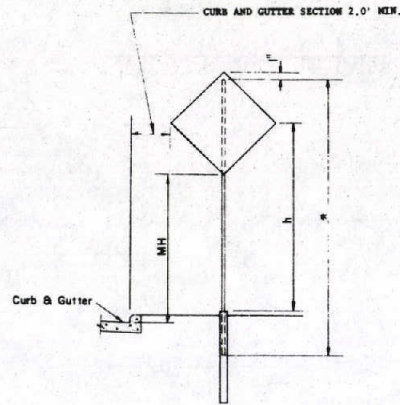
*POST LENGTH AS SHOWN ON SIGN SUMMARY SHEET.
 POST LENGTH CALCULATIONS ARE BASED ON USE OF
 SIGN ISLAND, SIGN ISLAND SHALL BE USED EXCEPT
 WHEN SIGNPOST IS LOCATED IN BACKSLOPE.



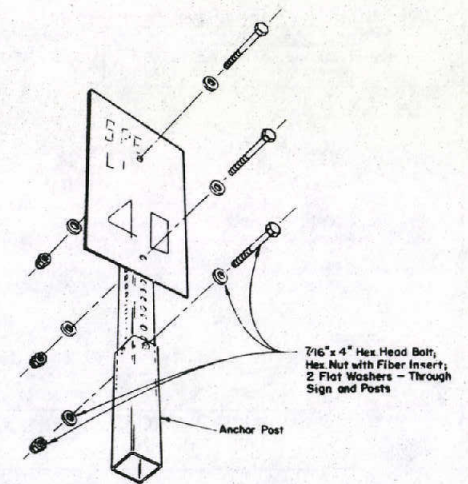
ELEVATION



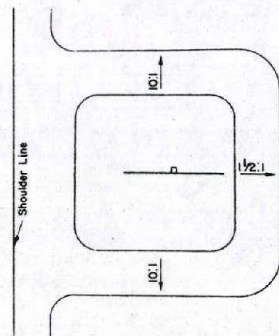
SIGN ON BACKSLOPE



SIGN ON GORE

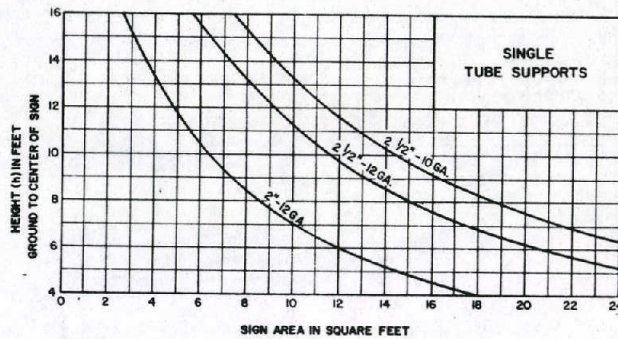


7/16" x 4" Hex Head Bolt;
 Hex Nut with Fiber Insert;
 2 Flat Washers - Through
 Sign and Posts

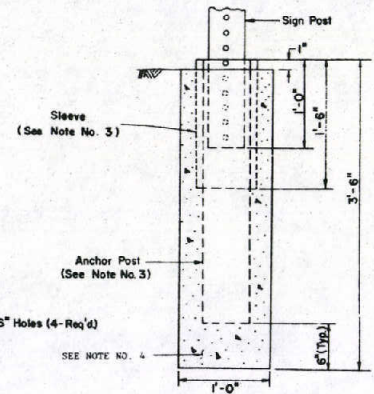
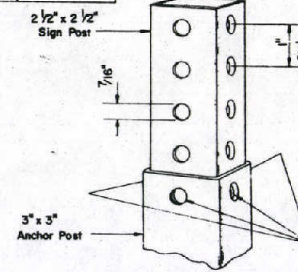


PLAN

SIGN ON SIGN ISLAND



MINIMUM MOUNTING HEIGHTS (MH) FOR SIGNS	
ALL SIGNS	
FREWAYS AND EXPRESSWAYS	6'
COMMERCIAL, RESIDENTIAL, CURB AND GUTTER	7'
RURAL ROADS AND INTERCHANGE RAMP	5'
FREWAY ENTRANCE AND DO NOT ENTER WRONG WAY ASSEMBLIES	2'



POST SIZE	ANCHOR SIZE	SLEEVE SIZE
2"	2-1/4"	2-1/2"
2-1/2"	3"	NOT REQUIRED

GENERAL NOTES

- SIGN ISLAND TO BE COMPACTED TO 95%
- SIGNS SHOULD NOT BE CLOSER THAN 6 FT. FROM THE EDGE OF THE SHOULDER, OR IF NONE, 12 FT. FROM THE EDGE OF THE TRAVELED WAY. IN URBAN AREAS A LESSER CLEARANCE MAY BE USED WHERE NECESSARY.
- ANCHOR POST AND SLEEVE TO BE INCLUDED IN COST OF POST LENGTH AS SHOWN ON THE SIGN SUMMARY SHEET.
- THE ANCHOR AND SLEEVE (WHEN USED) SHALL BE DRIVEN INTO THE GROUND. IF THE CONTRACTOR CHOOSES TO DRILL A HOLE, IT SHALL BE AS SHOWN AND FILLED WITH CLASS A OR CLASS AA CONCRETE AT NO EXTRA COST TO THE STATE.

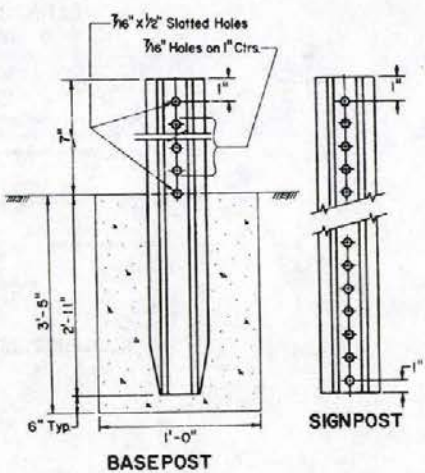
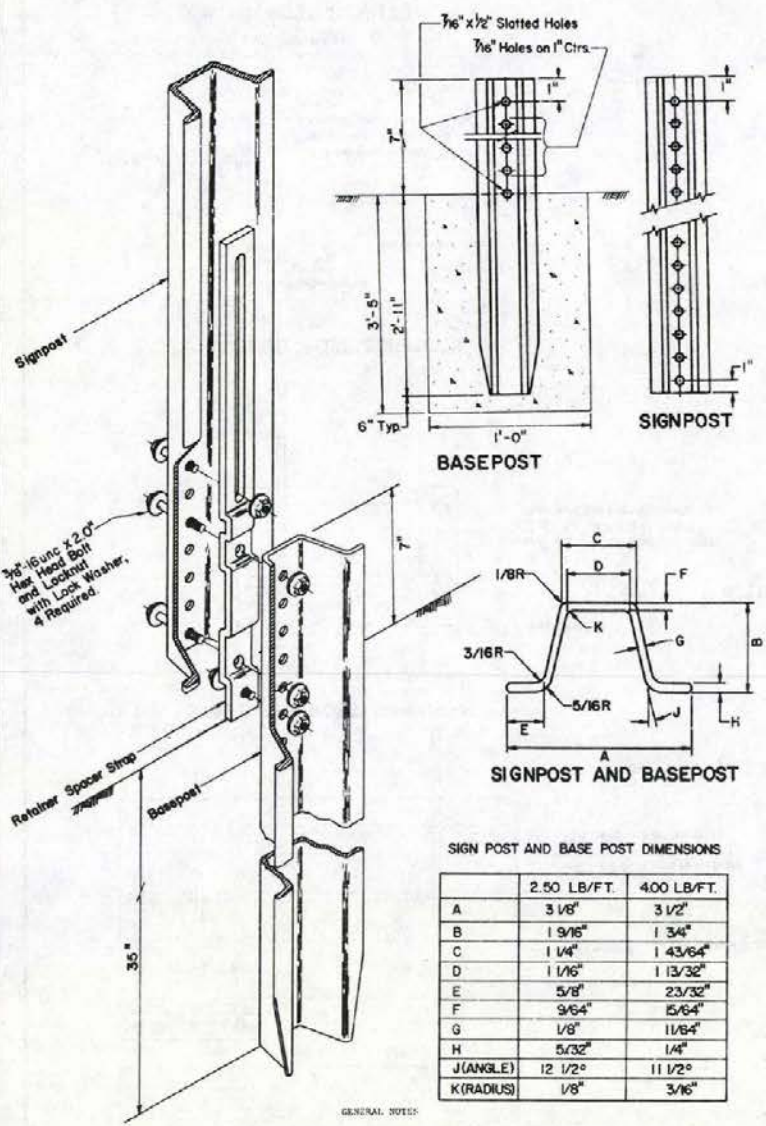
STATE OF NEVADA
 DEPARTMENT OF TRANSPORTATION

**GROUND MOUNTED
 SIGN SUPPORTS
 (SQUARE METAL POSTS)**

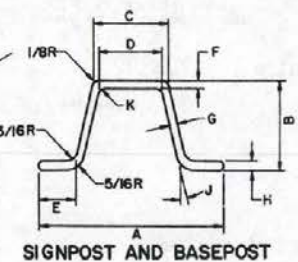
Russell C. Hill
 CHIEF TRAFFIC ENG.

T-311.7(627)
 ADOPTED: 1/76 REVISION
 2-2/83

T-27



BASEPOST



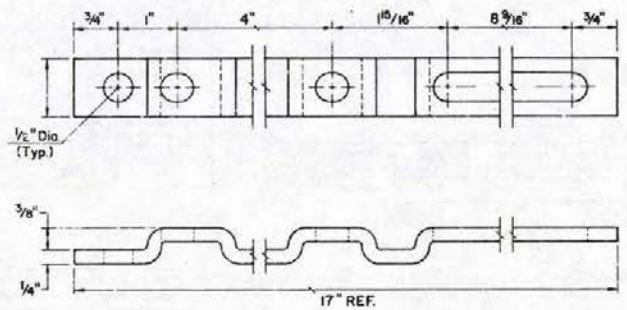
SIGNPOST AND BASEPOST

SIGN POST AND BASE POST DIMENSIONS

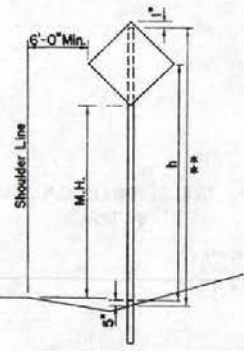
	2.50 LB./FT.	4.00 LB./FT.
A	3 1/8"	3 1/2"
B	1 9/16"	1 3/4"
C	1 1/4"	1 43/64"
D	1 1/16"	1 13/32"
E	5/8"	23/32"
F	9/64"	15/64"
G	1/8"	11/64"
H	5/32"	1/4"
J (ANGLE)	12 1/2°	11 1/2°
K (RADIUS)	1/8"	3/16"

GENERAL NOTES:

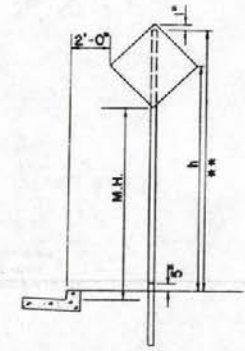
1. THE BASEPOST SHALL BE DRIVEN INTO THE GROUND. IF THE CONTRACTOR CHOOSES TO DRILL A HOLE, IT SHALL BE AS SHOWN AND FILLED WITH CLASS A OR CLASS AA CONCRETE AT NO EXTRA COST TO THE STATE.



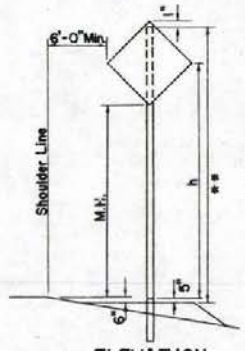
RETAINER - SPACER STRAP



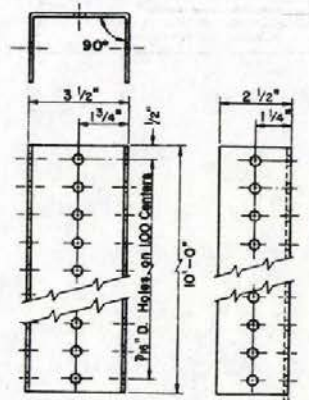
Sign on Backslope



Sign on Curb & Gutter

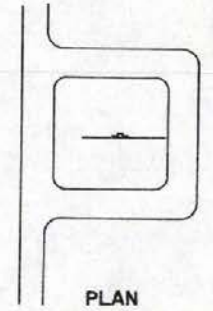
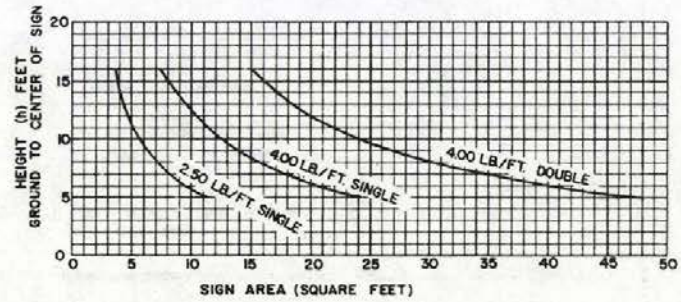


ELEVATION
Sign on Sign Island



FORMED CHANNEL SIGN MOUNT

** POST LENGTH AS SHOWN ON SIGN SUMMARY SHEET.
POST LENGTH CALCULATIONS ARE BASED ON USE OF SIGN ISLAND AND SIGN ISLAND BUILT IN USED EXCEPT WHEN SIGN POST IS LOCATED IN BACKSCOPE.



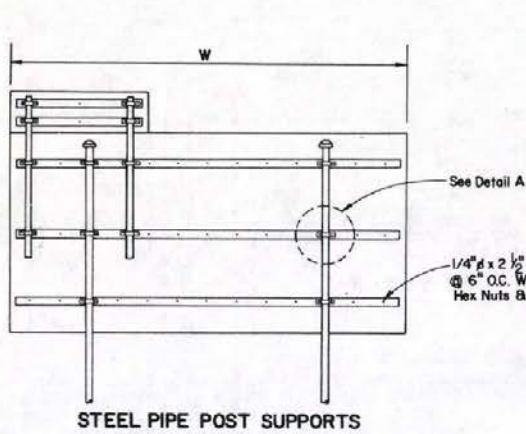
PLAN

THE INFORMATION ON THIS SHEET DELETES AND SUPERCEDES THE 1983 STANDARD PLAN SHEET NO. T-31.1.8

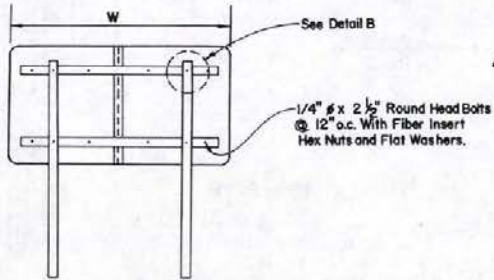
STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

**GROUND MOUNTED SIGN SUPPORTS
FLANGED CHANNEL STEEL POSTS**

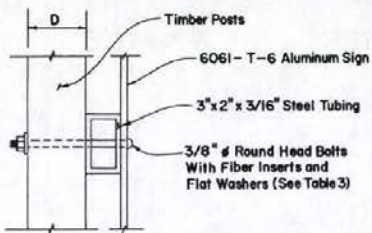
T31.1.8 (627)
ADOPTED 3/79



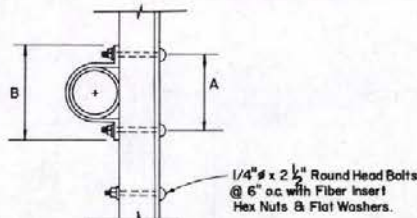
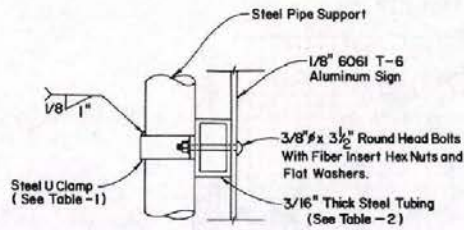
STEEL PIPE POST SUPPORTS



WOOD POST SUPPORTS



DETAIL B
WOOD POST MOUNTING



DETAIL A
ALTERNATE MOUNTING (STEEL POSTS)

TABLE-2
(Tubing Size)

SIGN WIDTH	TUBING SIZE
24' or Less	3" x 2" x 3/16"
24' to 28'	4" x 2" x 3/16"

TABLE-3

POST SIZE	"D"	BOLT SIZE
4 x 4	3 1/2"	3/8" x 6 1/4"
4 x 6	5 1/2"	3/8" x 6 1/4"
6 x 6	5 1/2"	3/8" x 8 1/4"
6 x 8	7 1/2"	3/8" x 10 1/4"

TABLE-1
(Clamp Sizes)

Pipe Diam.	O.D.	A	B	Clamplock
2" Nom.	2 3/8"	4 1/16"	5 1/16"	1/4" x 1 1/2"
3" Nom.	3 1/2"	5 3/16"	6 3/16"	1/4" x 1 1/2"

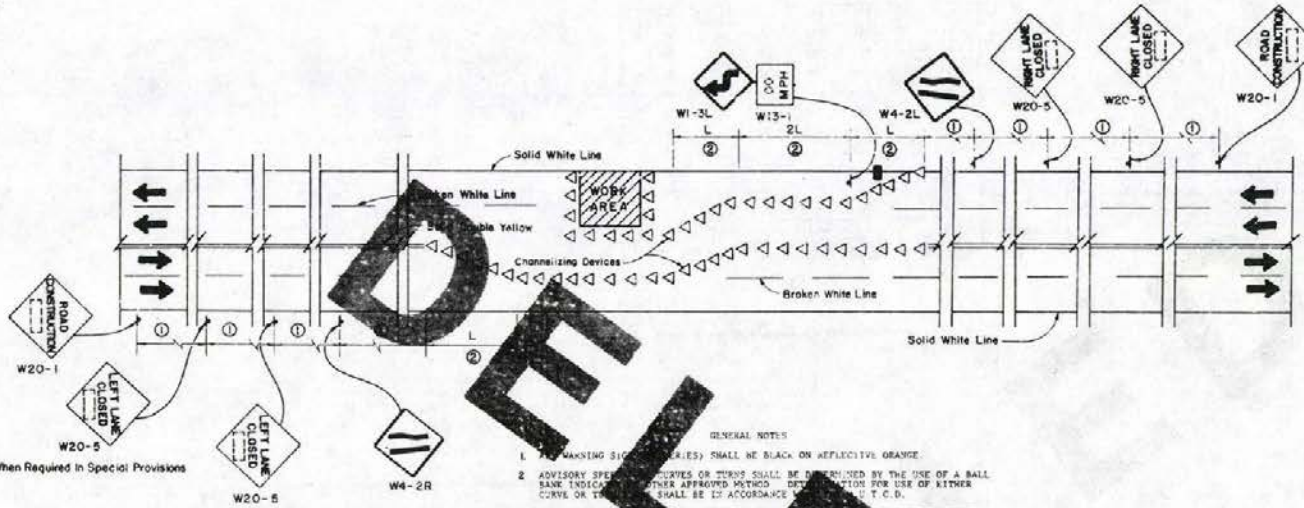
GENERAL NOTES
1. FOR MOUNTING DETAILS NOT SHOWN, SEE SHEET NOS. T-31.1.1 THROUGH T-31.1.4 FOR ROUND METAL SUPPORTS AND SHEET NOS. T-31.1.5 AND T-31.1.6 FOR TIMBER SUPPORTS.

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

**ALTERNATE MOUNTING
DETAIL**

[Signature]
CHIEF TRAFFIC ENGR.

T-31.9 (827)
ADOPTED 8/82 REVISION



①

TABLE FOR SPACING OF ADVANCE WARNING SIGNS

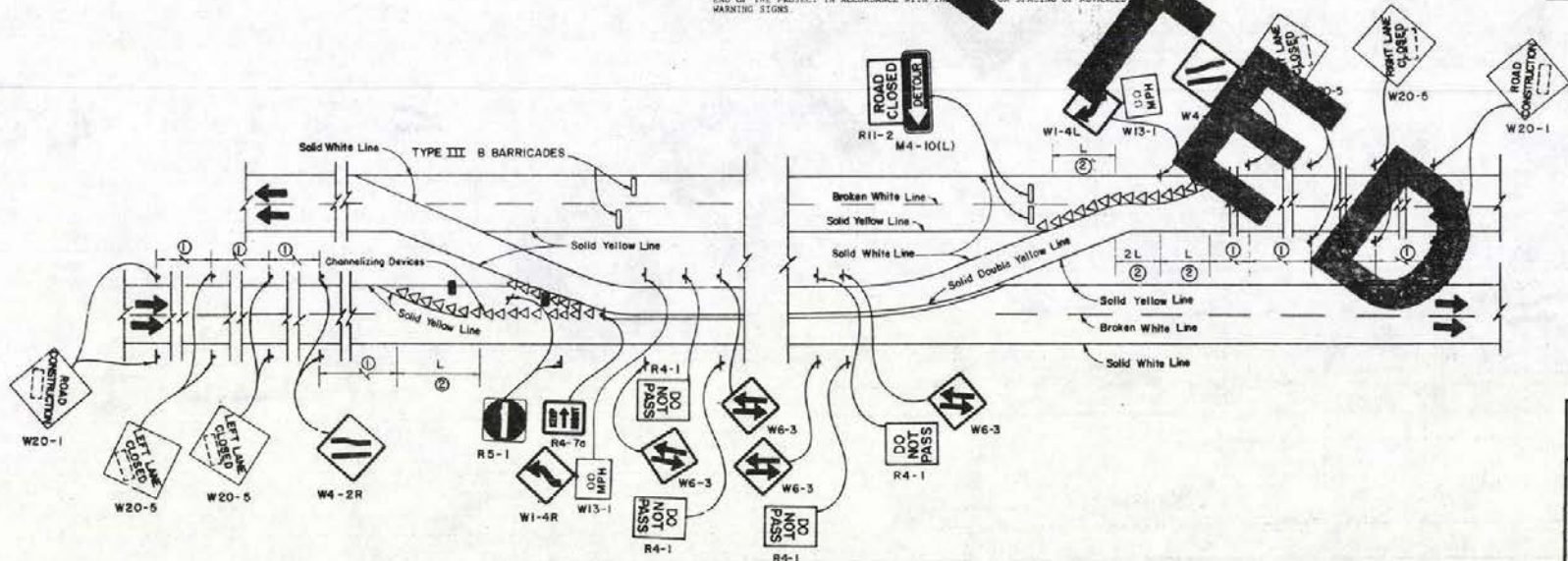
SPEED	MINIMUM SPACING	
	BEFORE SIGNS	FROM LAST SIGN TO TAPE
MILES PER HOUR 85th Percentile		
0-20	200	200
25-30	300	300
30-35	400	400
40-45	500	500
50-60	700	700

②

TABLE OF TAPER LENGTHS AND CHANNELIZING DEVICE SPACING

SPEED	MINIMUM TAPER LENGTH PER LANE WIDTH			DEVICE SPACING IN FEET
	10 FT.	11 FT.	12 FT.	
20	70	75	80	20
25	101	111	121	25
30	150	165	180	30
35	213	233	245	35
40	285	315	330	40
45	372	415	440	45
50	500	550	600	50
55	650	715	770	55
60	820	900	970	60
65	1020	1115	1210	65
70	1250	1360	1470	70

- GENERAL NOTES
1. ALL MARKING SIGNS (ARROWS) SHALL BE BLACK ON REFLECTIVE ORANGE.
 2. ADVISORY SPEED SIGNS FOR CURVES OR TURNS SHALL BE DETERMINED BY THE USE OF A BALL BANK INDICATOR. OTHER APPROVED METHODS OF DETERMINATION FOR USE OF EITHER CURVE OR TURN SHALL BE IN ACCORDANCE WITH THE M.T.C.D.
 3. TRAFFIC CONES, BARRICADES, VERTICAL PANELS, AND PORTABLE BARRICADES SHALL BE PLACED IN ACCORDANCE WITH THE SPACING AND CHANNELIZING DEVICE SPACING. CONES SHALL BE PLACED NO CLOSER THAN 2'-0" TO THE WORK AREA AND NO MORE THAN 6'-0" TO THE SOLID WHITE OR DOUBLE YELLOW LINES. TYPE OF CHANNELIZATION DEVICE TO BE USED SHALL BE AS DIRECTED BY THE ENCLINES.
 4. THE W4-3 SIGN SHALL BE INSTALLED WHILE INTERSECTING WHEN THE LEFT CROSSOVER EXCEEDS ONE-HALF MILE.
 5. END CONSTRUCTION SIGNS (C20-2) WHEN REQUIRED SHALL BE INSTALLED AT EACH END OF THE PROJECT IN ACCORDANCE WITH THE MINIMUM SPACING OF ADVANCED WARNING SIGNS.



BALL BANK INDICATOR TABLE

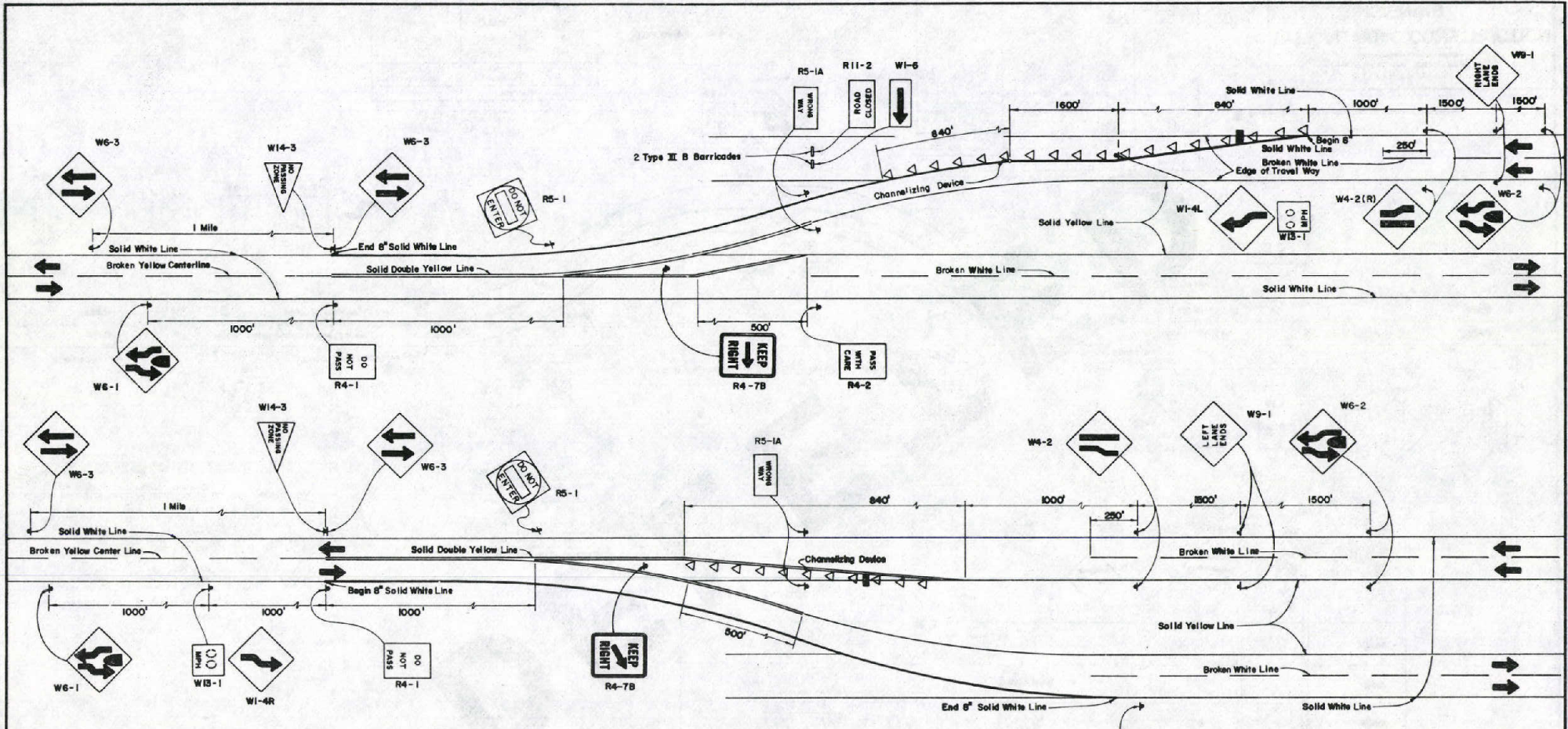
BELOW 10 MPH	14 DEGREES
10 TO 30 MPH	12 DEGREES
30 TO 60 MPH	10 DEGREES

ADVISORY SPEED PLATED SHALL NOT BE POSTED FOR CURVES OVER 50 MPH.

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

TYPICAL ROAD CONSTRUCTION SIGNING

T-35.1.1 (625)
ADOPTED 5/79 REVISION



GENERAL NOTES:

1. ALL WARNING SIGNS (W SERIES) SHALL BE BLACK ON REFLECTIVE YELLOW FOR SEMI-PERMANENT INSTALLATIONS SUCH AS LONG TERM NON-CONSTRUCTION OR MAINTENANCE ZONE USE. BLACK ON REFLECTIVE ORANGE SHALL BE USED ON TEMPORARY INSTALLATIONS SUCH AS IN A CONSTRUCTION OR MAINTENANCE ZONE.
2. TRAFFIC CONES, GUIDE POSTS, VERTICAL PANELS OF TYPE III B BARRICADES SHALL BE PLACED IN ACCORDANCE WITH THE SPACING AS SHOWN IN THE TABLE OF TAPER LENGTHS AND CHANNELIZING DEVICE SPACING. THESE DEVICES SHOULD BE PLACED NO CLOSER THAN 2'-0" NOR MORE THAN 6'-0" OUTSIDE THE SOLID WHITE OR DOUBLE YELLOW LINES. TYPE OF DELINEATION DEVICE USED SHALL BE AS DIRECTED BY THE ENGINEER.
3. ADVISORY SPEEDS FOR CURVES OR TURNS SHALL BE DETERMINED BY THE USE OF A BALL BANK INDICATOR OR OTHER APPROVED METHOD. DETERMINATION FOR USE OF EITHER CURVE OR TURN SIGNS SHALL BE IN ACCORDANCE WITH THE H.U.T.C.D.
4. EXISTING PAVEMENT MARKINGS MAY REQUIRE REMOVAL IN THE CROSSOVER AREA AND NEW MARKINGS INSTALLED. SEE SPECIAL PROVISIONS FOR TYPE OF REMOVAL AND NEW MARKINGS.

BALL BANK INDICATOR TABLE

BELOW 20 MPH	14 DEGREES
25 TO 30 MPH	12 DEGREES
35 TO 60 MPH	10 DEGREES

ADVISORY SPEED PLATES SHALL NOT BE POSTED FOR CURVES OVER 50 MPH.

Arrow Board - When Required in Special Provisions

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

**TYPICAL 2 LANE
TO 4 LANE CONNECTION
SIGNING (RURAL)**

Russell C. Hill
CHIEF TRAFFIC ENGINEER

T-35.1.3 (REV. 6/28)
ADOPTED 1/6/72 REVISION 9-7/80

DEFERRED

GENERAL NOTES

1. ALL WARNING SIGNS (W SERIES) SHALL BE BLACK ON REFLECTIVE ORANGE.
2. ADVISORY SPEEDS FOR CURVES OR TURNS SHALL BE DETERMINED BY THE USE OF A BALL BANK INDICATOR OR OTHER APPROVED METHOD. DETERMINATION FOR USE OF EITHER CURVE OR TURN SIGNS SHALL BE IN ACCORDANCE WITH THE M.U.T.C.D.
3. TRAFFIC CONES, GUIDE POSTS, VERTICAL PANELS OR TYPE III B BARRICADES SHALL BE PLACED IN ACCORDANCE WITH THE SPACING AS SHOWN IN THE TABLE OF TAPER LENGTHS AND CHANNELIZING DEVICE SPACING. THESE DEVICES SHOULD BE PLACED NO CLOSER THAN 2'-0" NOR MORE THAN 6'-0" OUTSIDE THE SOLID WHITE OR DOUBLE YELLOW LINES. TYPE OF DELINEATION DEVICE USED SHALL BE AS DIRECTED BY THE ENGINEER.
4. THE W6-3 SIGN SHALL BE INSTALLED AT ONE MILE INTERVALS WHEN THE LENGTH OF CROSSOVER EXCEEDS ONE-HALF MILE.
5. END CONSTRUCTION SIGNS (W20-2) WHEN NECESSARY SHALL BE INSTALLED AT EACH END OF THE PROJECT IN ACCORDANCE WITH THE TABLE FOR SPACING OF ADVANCED WARNING SIGNS.

BALL BANK INDICATOR TABLE

BELOW 20 MPH	14 DEGREES
25 TO 30 MPH	12 DEGREES
35 TO 60 MPH	10 DEGREES

ADVISORY SPEED PLATES SHALL NOT BE POSTED FOR CURVES OVER 50 MPH.

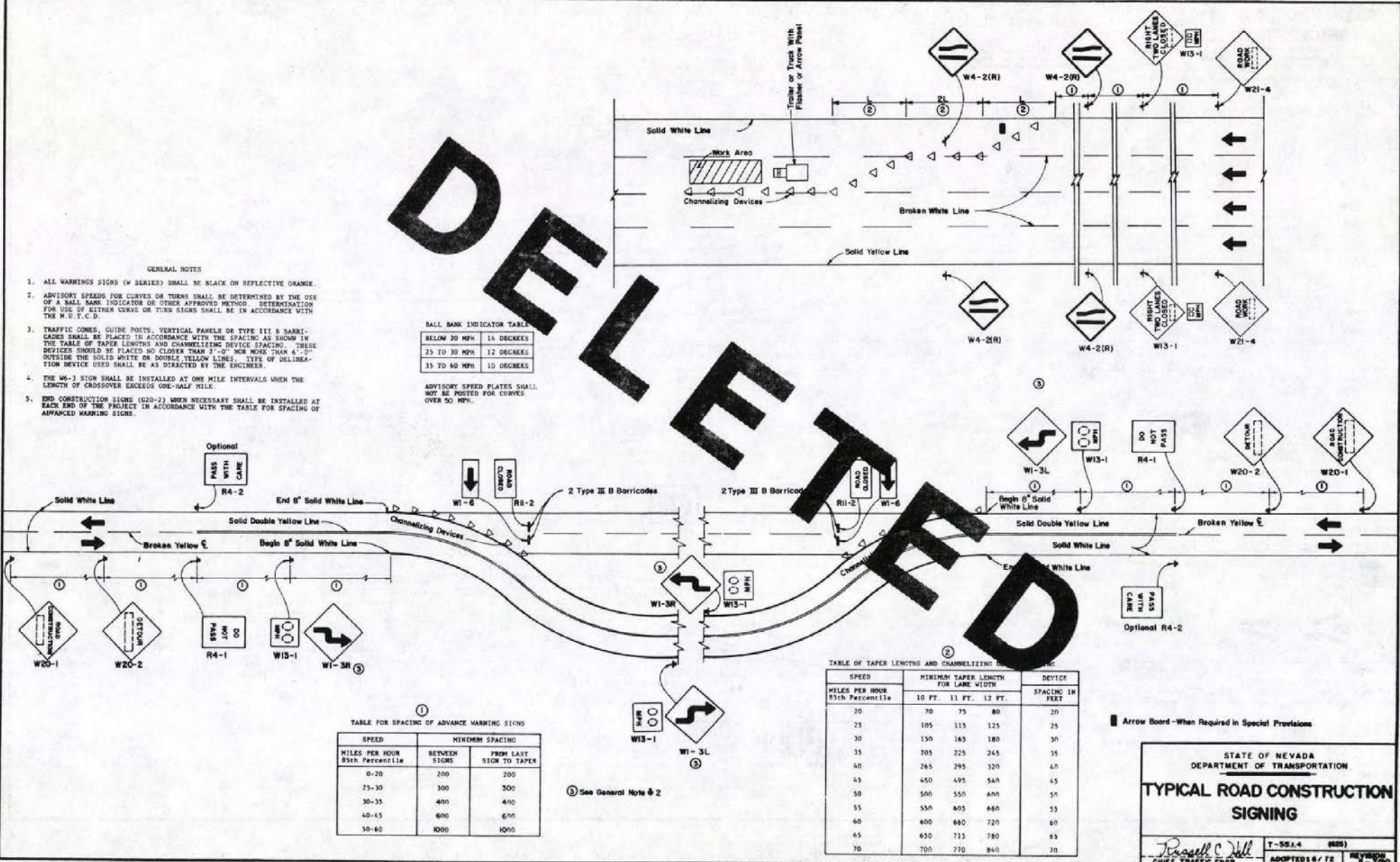
TABLE FOR SPACING OF ADVANCE WARNING SIGNS

SPEED MILES PER HOUR 85th Percentile	MINIMUM SPACING	
	BETWEEN SIGNS	FROM LAST SIGN TO TAPER
0-20	200	200
25-30	300	300
30-35	400	400
40-45	600	600
50-60	1000	1000

TABLE OF TAPER LENGTHS AND CHANNELIZING DEVICE SPACING

SPEED MILES PER HOUR 85th Percentile	MINIMUM TAPER LENGTH FOR LANE WIDTH			DEVICE SPACING IN FEET
	10 FT.	11 FT.	12 FT.	
20	70	75	80	20
25	105	115	125	25
30	150	165	180	30
35	205	225	245	35
40	265	295	320	40
45	450	495	540	45
50	500	550	600	50
55	550	605	660	55
60	600	660	720	60
65	650	715	780	65
70	700	770	840	70

See General Note # 2



Arrow Board - When Required in Special Provisions

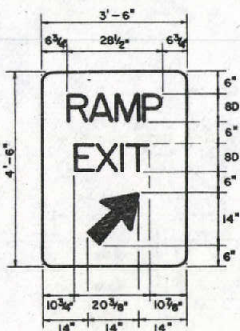
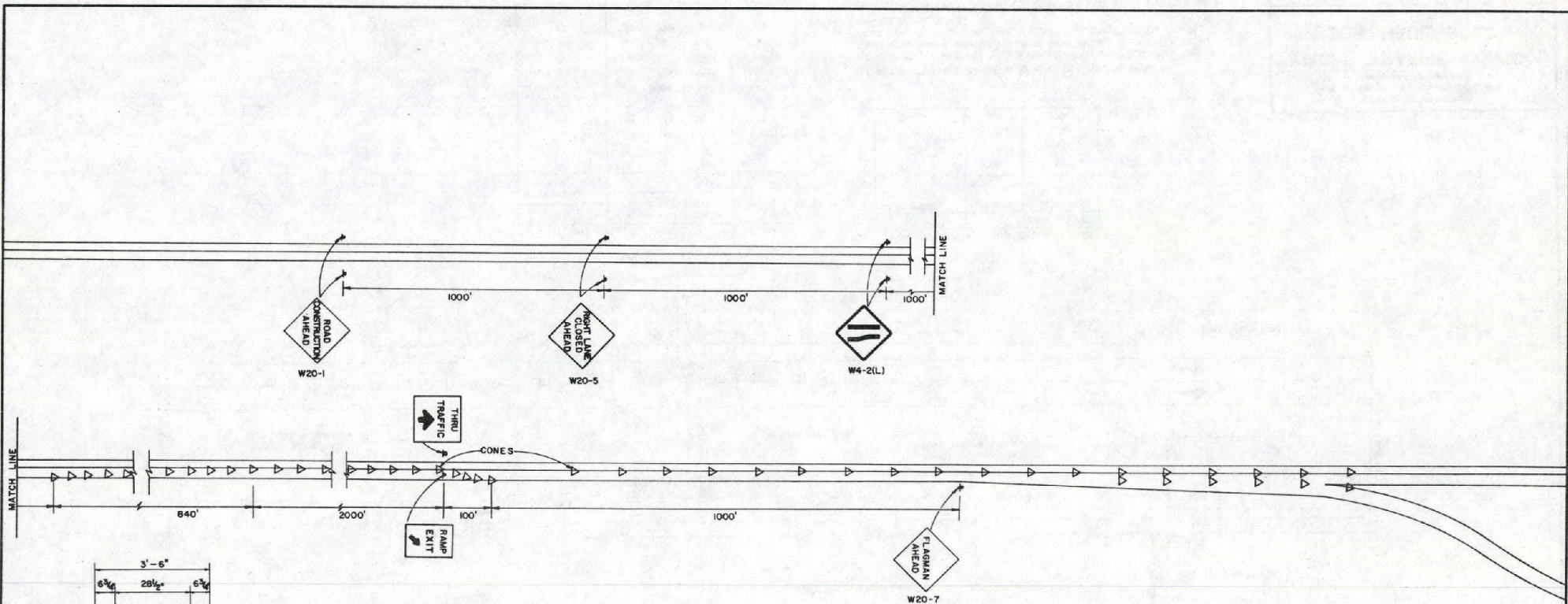
STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

**TYPICAL ROAD CONSTRUCTION
SIGNING**

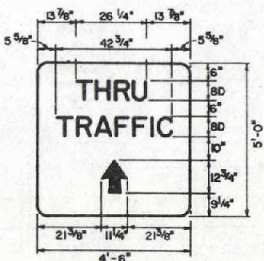
Russell C. Hill
CHIEF TRAFFIC ENGR.

T-59.1.4 (825)
ADOPTED 6/72

REVISED 8-79/80



BACKGROUND . . . ORANGE
 LEGEND, BORDER . . . BLACK
 BORDER . . . 1"
 CORNER RADIUS . . . 6"



BACKGROUND . . . ORANGE
 LEGEND, BORDER . . . BLACK
 BORDER . . . 1"
 CORNER RADIUS . . . 6"

NOTE: TO BE USED FOR STORAGE OF VEHICLES ONLY WHEN TEMPORARY CLOSURES OF RAMP ARE ANTICIPATED.

STATE OF NEVADA
 DEPARTMENT OF TRANSPORTATION

**TYPICAL TRAFFIC CONTROL
 FOR RAMP WORK**

Ronald Paul Hill
 CHIEF TRAFFIC ENGR.

T-38.1.5 (625)
 ADOPTED: 12/79 REVISION

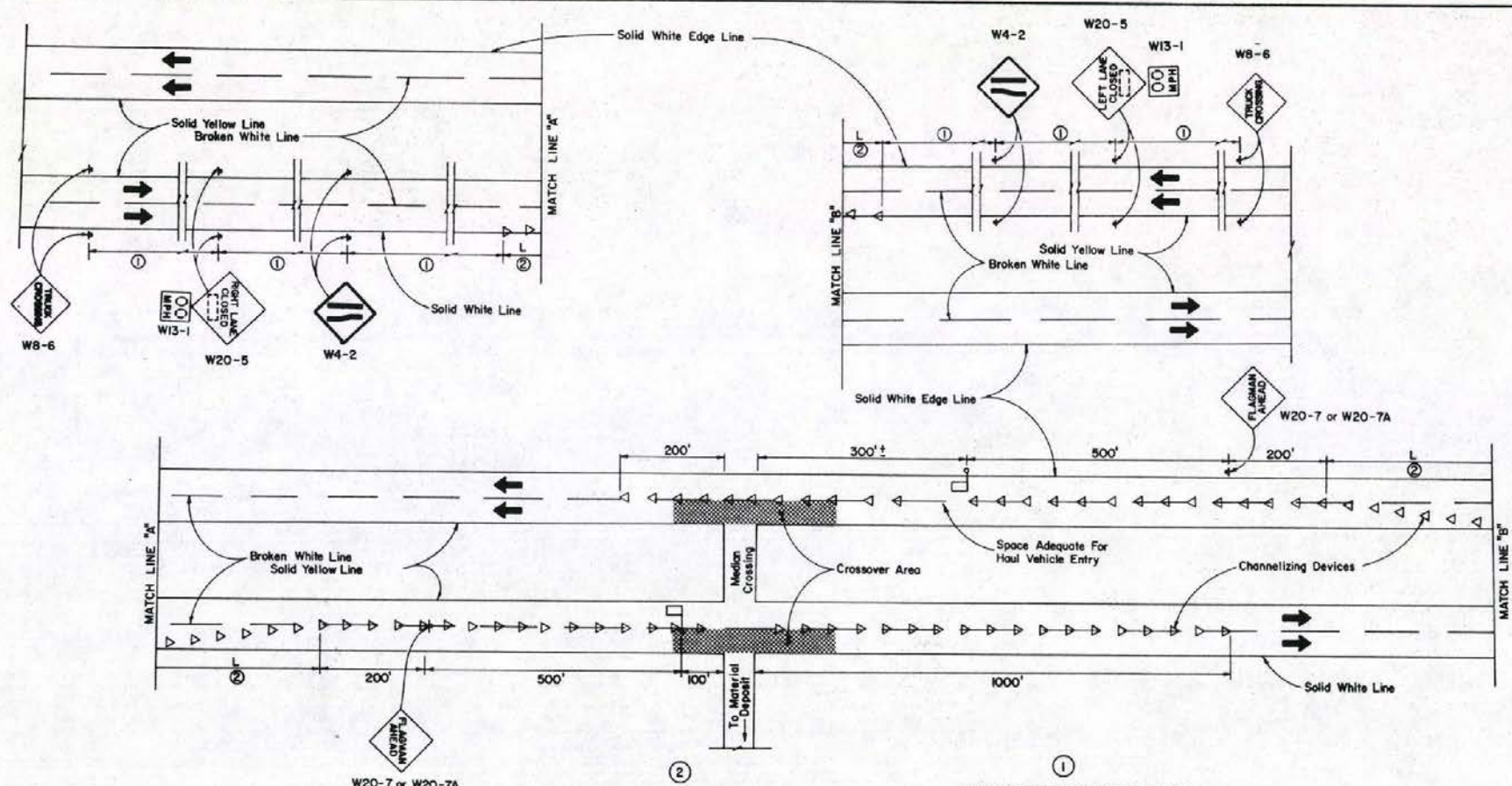


TABLE OF TAPER LENGTHS AND CHANNELIZING DEVICE SPACING

SPEED MILES PER HOUR 85TH PERCENTILE	MINIMUM TAPER LENGTH FOR LANE WIDTH			DEVICE SPACING IN FEET
	10 FT.	11 FT.	12 FT.	
20	70	75	80	20
25	105	115	125	25
30	150	165	180	30
35	205	225	245	35
40	265	295	320	40
45	450	495	540	45
50	500	550	600	50
55	550	605	660	55
60	600	660	720	60
65	650	715	780	65
70	700	770	840	70

TABLE FOR SPACING OF ADVANCE WARNING SIGNS

SPEED MILES PER HOUR 85TH PERCENTILE	MINIMUM SPACING	
	BETWEEN SIGNS	FROM LAST SIGN TO TAPER
0-20	200	200
25-30	300	300
30-35	400	400
40-45	600	600
50-60	1000	1000

- GENERAL NOTES
1. ALL WARNING SIGNS (W SERIES) SHALL BE BLACK ON REFLECTIVE ORANGE.
 2. TRAFFIC CONES, DELINEATORS, VERTICAL PANELS OR TYPE 111 B BARRICADES SHALL BE PLACED IN ACCORDANCE WITH THE SPACING AS SHOWN ON TABLE OF TAPER LENGTHS AND CHANNELIZING DEVICE SPACING. TYPE OF DELINEATION DEVICE USED SHALL BE AS DIRECTED BY THE ENGINEER.
 3. END CONSTRUCTION SIGN (620-2) WHEN NECESSARY SHALL BE INSTALLED AT EACH END OF THE PROJECT IN ACCORDANCE WITH THE TABLE FOR SPACING OF ADVANCE WARNING SIGN.

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

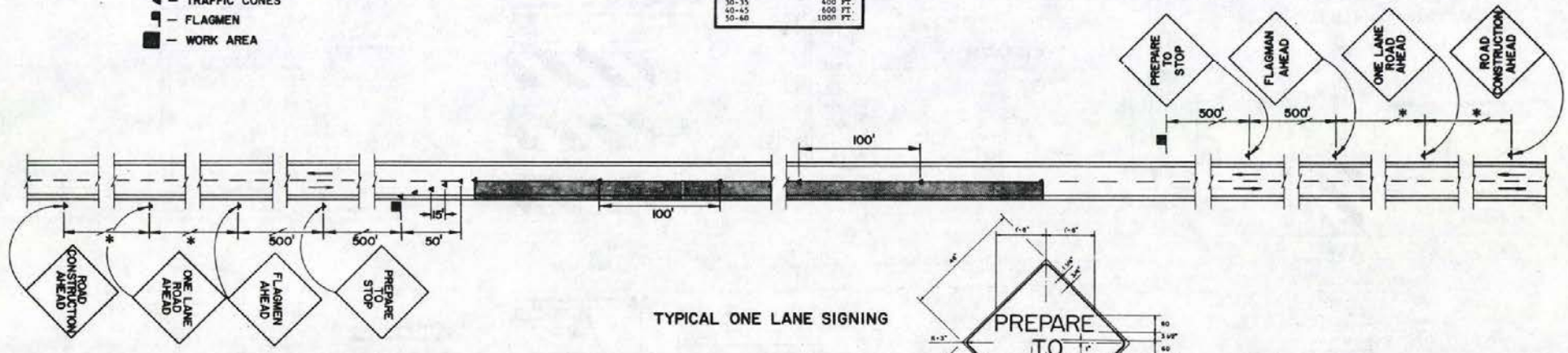
**TYPICAL TRAFFIC CONTROL
FOR HAUL ROAD**

[Signature]
CHIEF TRAFFIC ENGR.

T-35.1.6 (825)
ADOPTED 8/82 REVISION

- LEGEND**
- ▲ - TRAFFIC CONES
 - - FLAGMEN
 - - WORK AREA

SPEED 55TH PERCENTILE MPH	MARKING DEVICE SPACING
0-70	200 FT.
71-90	300 FT.
91-95	400 FT.
96-95	600 FT.
96-100	1000 FT.

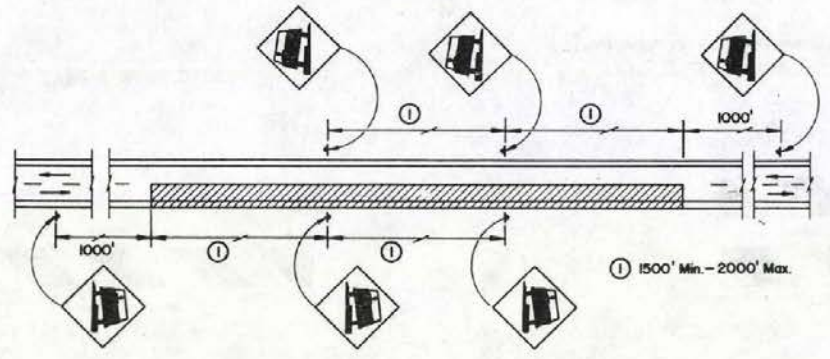


TYPICAL ONE LANE SIGNING

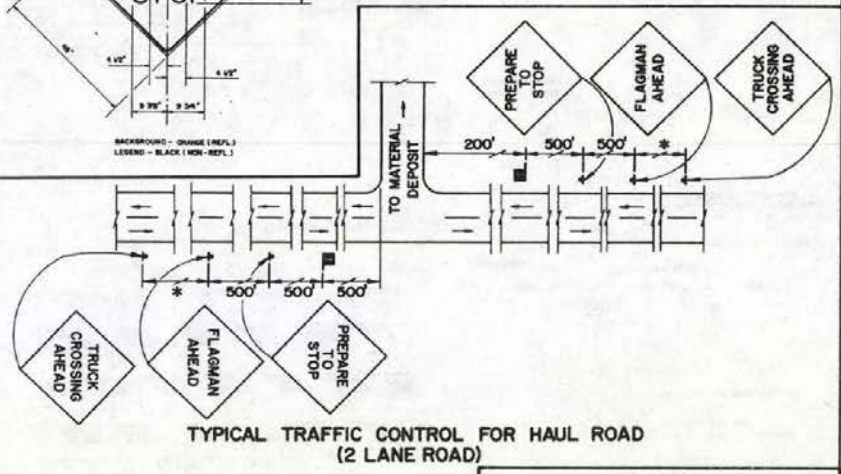


BACKGROUND - ORANGE (REFL.)
LEGEND - BLACK (NON-REFL.)

- ▨ - LIMITS OF PAVING OPERATION (DAILY RUN)



TYPICAL PLACEMENT OF DROP OFF SIGNS
(PLACED WHEN DROP OFF EXIST DURING NON-WORKING HOURS)



TYPICAL TRAFFIC CONTROL FOR HAUL ROAD
(2 LANE ROAD)

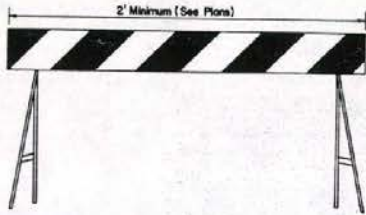
* See Table Above

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

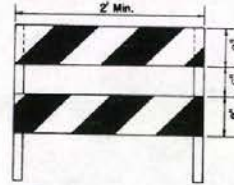
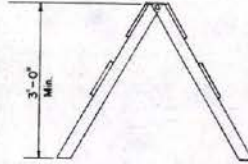
TYPICAL ONE LANE SIGNING
TYPICAL DROP OFF SIGNING
(2 LANE ROAD)
TYPICAL HAUL ROAD SIGNING
(2 LANE ROAD)

T-35.1.6.1 (625)
ADOPTED 4/85 REVISION

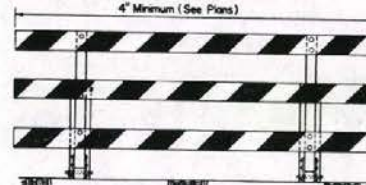
CHIEF TRAFFIC DESIGN ENGINEER



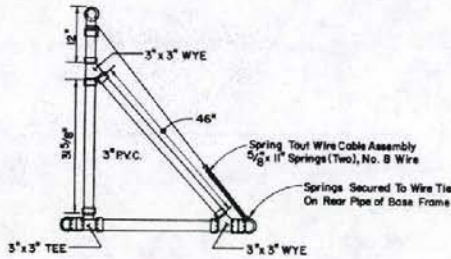
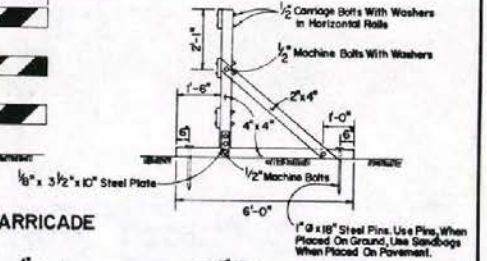
TYPE I BARRICADE



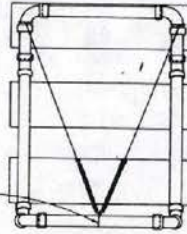
TYPE II BARRICADE
(FRAMEWORK TO BE PAINTED WHITE)



TYPE III A BARRICADE



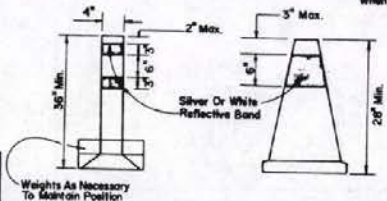
SIDE VIEW



BACK VIEW

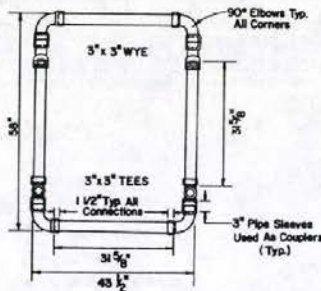
TYPE	BARRICADE CHARACTERISTICS		
	I	II	III
WIDTH OF RAIL	8" MIN. -- 11" MAX.	8" MIN. -- 12" MAX.	8" MIN. -- 12" MAX.
LENGTH OF RAIL	2' MIN.	2' MIN.	4' MIN.
WIDTH OF STRIPES	RAIL LENGTH 3' - 4" RAIL LENGTH 5' OR - 6"	RAIL LENGTH 3' - 4" RAIL LENGTH 5' OR - 6"	4' MIN.
HEIGHT	3' MIN.	3' MIN.	5' MIN.
NUMBER OF REFLECTORIZED RAIL FACES	2 (ONE EACH DIRECTION)	4 (TWO EACH DIRECTION)	3 IF FACING TRAFFIC IN ONE DIRECTION. 6 IF FACING TRAFFIC IN TWO DIRECTIONS

MARKINGS FOR BARRIER RAILS AND VERTICAL PANELS SHALL BE ALTERNATE REFLECTORIZED ORANGE AND REFLECTORIZED WHITE STRIPES SLOPING DOWNWARD AT AN ANGLE OF 45 DEGREES IN THE DIRECTION OF TRAFFIC.

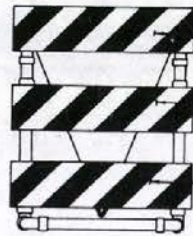


TRAFFIC CONES

- CONES TO BE PREDOMINANTLY ORANGE.
- CONES TO BE USED DURING HOURS OF DARKNESS SHALL BE REFLECTORIZED AS SHOWN ABOVE.
- CONES SHALL HAVE WEIGHTED BASES, HOWEVER, IF THE CONTRACTOR WISHER IN LIEU OF WEIGHTED BASES, HE MAY FLY OR NAIL THE CONES IN PLACE.

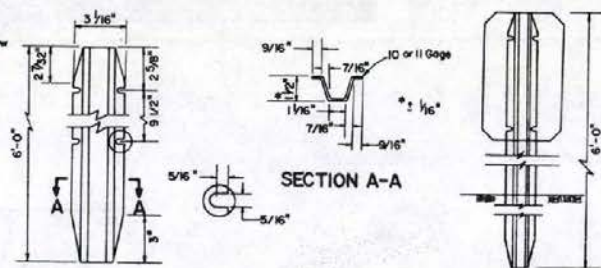


TOP VIEW OF BASE

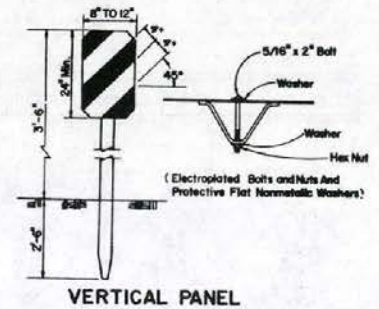


NOTE: 9" x 46" Barricade Hazard Panels Orange and White Right or Left. (.025 Anodized Aluminum)
Panels Attached With 1" No.14 Pan Head Metal Screw

FRONT VIEW



POST DETAILS



VERTICAL PANEL

TYPE III B BARRICADE
(Barricade to be Weighted Down With Sandbags)

STATE OF NEVADA DEPARTMENT OF TRANSPORTATION	
BARRICADES	
<i>D. Phillips</i> CHIEF TRAFFIC ENGR.	T-35.17 (625-626) ADOPTED 6/82 REVISION

INSTRUCTIONS TO FABRICATOR

FORMAT SHEET SHOWS:

- 1 - Sign structure location
- 2 - Length of structure frame
- 3 - Panel size and locations on structure
- 4 - Post type and height to bottom of frame
- 5 - Base plate elevation
- 6 - Footing elevation or location of alternate pile foundation
- 7 - Photoelectric cell location if required.

REFER TO THE FOLLOWING SHEETS FOR DETAILS NOT SHOWN ON FORMAT SHEET:

- T-36.1.1 - Instructions and examples
- T-36.1.2 - Post type II thru XIII
- T-36.1.3 - Post type I-s thru XII-s
- T-36.1.4 - Structural frame members (single post type)
- T-36.1.5 - Structural frame members (two post type)
- T-36.1.6 - Structural frame details
- T-36.1.7 - Frame juncture details
- T-36.1.8 - Removable sign panel frames
- T-36.1.10 - Walkway details no. 1 B no. 2
- T-36.1.11 - Walkway safety railing details
- T-36.1.12 - Alternate pile foundations.

GENERAL NOTES

SPECIFICATIONS:

DESIGN: A.A.S.H.O. Specifications for the design and construction of structural supports for highway signs, dated 1968.

CONSTRUCTION: Standard Specifications for Road and Bridge Construction, Current Edition and Supplements There to.

LOADING:

WIND LOADING: Normal to face of sign: 30 P.S.F.
Transverse to face of sign: 0.2 of normal force.

WALKWAY LOADING: Dead load + 500 lbs. concentrated live load.

UNIT STRESSES:

STRUCTURAL STEEL: $F_s = 20,000$ P.S.I.

REINFORCED CONCRETE: $F_s = 20,000$ P.S.I., $F_c = 1,200$ P.S.I.

FOOTING SOIL PRESSURE: $1\frac{1}{2}$ tons/sq. ft.

WALKWAY BRACKETS: Maintain uniform spacing where possible. Maximum spacing shall not exceed 5'-6".

LIGHTING FIXTURE SUPPORTS: Where distance from walkway bracket to end of sign panel exceeds 1'-4", extend lighting fixture supports to next walkway bracket. See example 2.

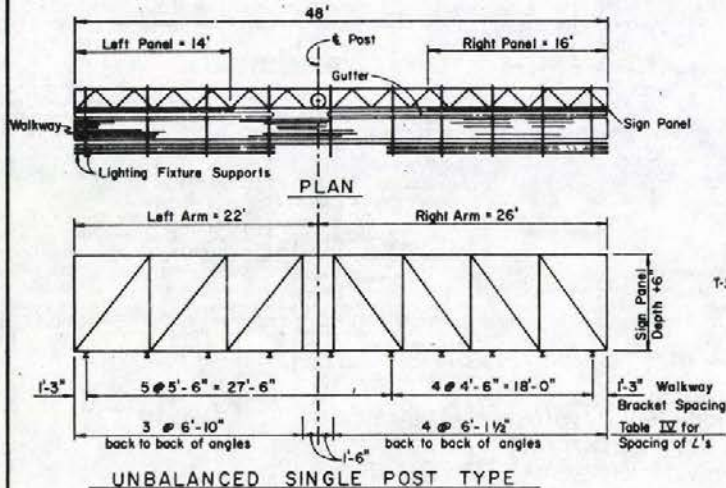
WALKWAY AND SAFETY RAILING: Walkway to be continuous for entire length of frame for single post signs and for 2 post signs from the nearest post continuous across all the sign panels. Safety railing to protect entire walkway, but continuous for no more than 11' in one unit.

NOTE: Signs are shown and dimensioned looking in the direction of traffic. Double faced signs are shown and dimensioned looking ahead along stationing.

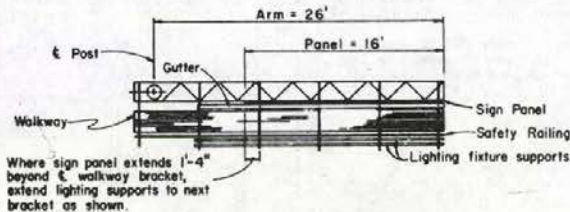
MINIMUM CLEARANCE: Vertical roadway clearance 16'-0".

WELDING: All welding continuous unless otherwise noted on the plans. All welding to be done in accordance with the standard specifications for road and bridge construction.

FINISH: All steel parts to be hot-dipped galvanized after fabrication except as shown on plans or as called for in special provisions.

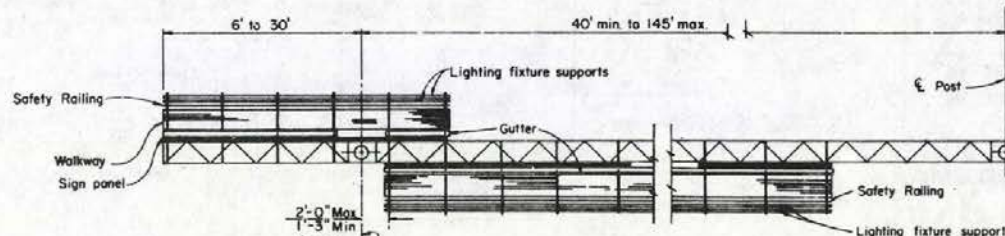


EXAMPLE NO. 1



PLAN
CANTILEVER SINGLE
POST TYPE

EXAMPLE NO. 2



PLAN

TWO POST TYPE WITH CANTILEVER
(PART DOUBLE-FACED)

EXAMPLE NO. 3

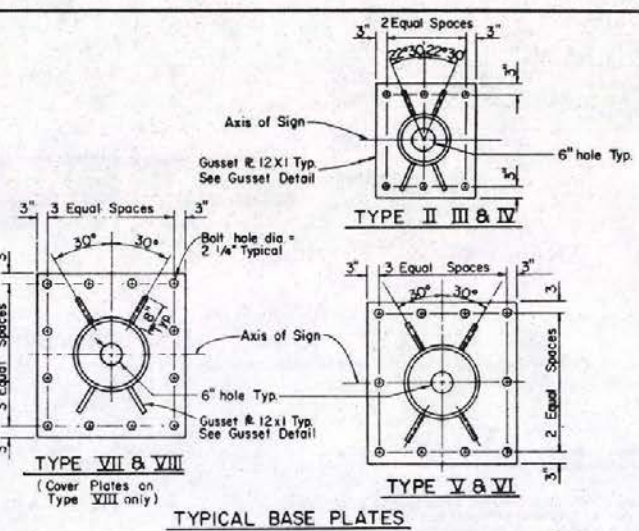
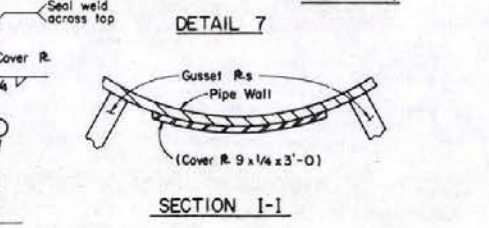
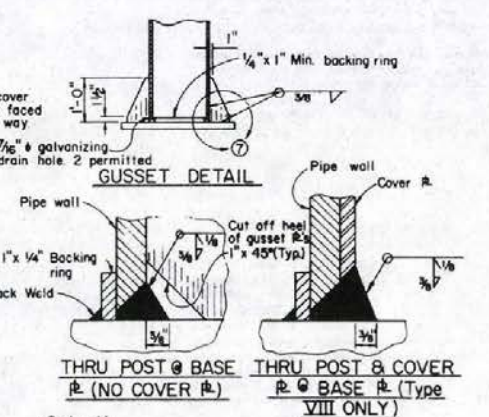
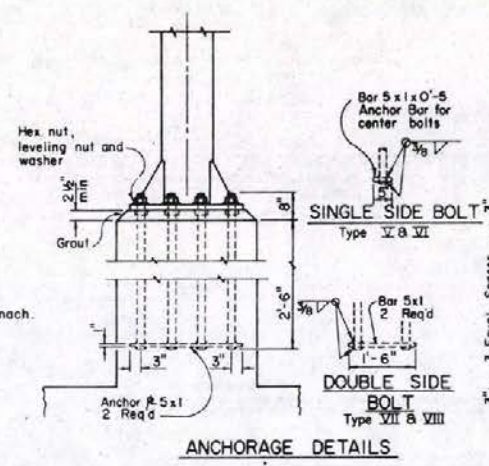
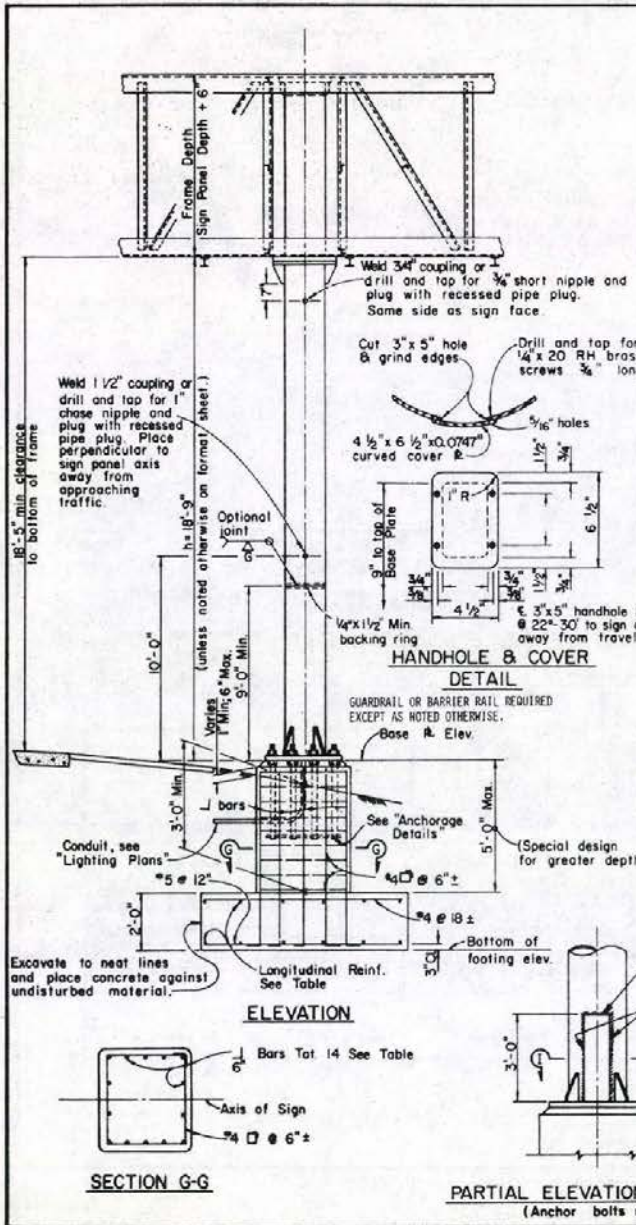
STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

**OVERHEAD SIGNS
INSTRUCTIONS & EXAMPLES**

T-36.1.1 - (627)

ADOPTED: 8/98

Russell S. Hill
Civil Engineer



Post Type	Pipe Size	Cap Plate Size	Base Plate Size (Note #2)	2\"/>
II	12\"/>			
III	14\"/>			
IV	16\"/>			
V	18\"/>			
VI	20\"/>			
VII	24\"/>			
VIII	24\"/>			

- NOTES:
- For "General Notes" see "Instructions and Examples" sheet.
 - Base Plates, Pedestals, & Footings; longer sides shall be normal to axis of sign.
 - Backfill shall be in place prior to erection of post.
 - Thread upper 8" of anchor bolts and galvanize upper 1'-0".
 - Spread footing shown. Alternate Pile Foundation is optional.
 - For reinforcement, embedment is clear to outside of bar and is 2" to main reinforcement, except as noted.
 - Anchor R.s may be retained with hex. nut or formed head.
 - On single post sign structures. The post shall be raked out of plumb, with the use of the leveling nuts to make the bottom of the sign frame level.
 - At final position of post all top and bottom nuts shall be tightened against base plate.
 - When foundation is located on a steep slope with exposed face of concrete adjacent to traffic, see detail on "Pile Foundation" sheet.
 - USE POST FOOTING CONNECTION ON TOP OF FOOTING WHERE REQUIRED TO ATTACH GUARDRAIL POSTS.

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

**OVERHEAD SIGNS - SINGLE POST
TYPES II THRU VIII**

T-36.12-(627)
ADOPTED: 6/68

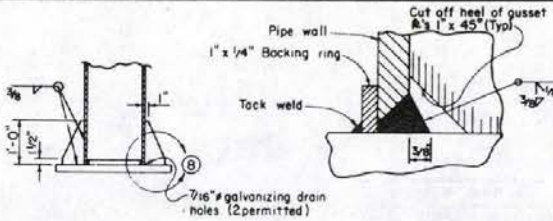
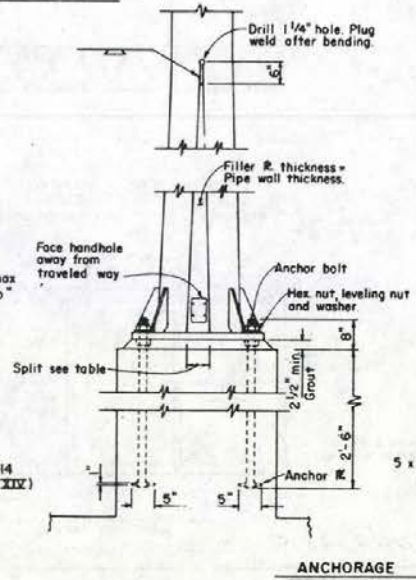
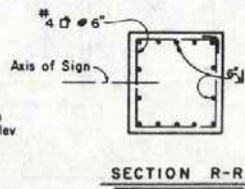
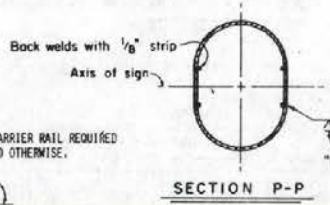
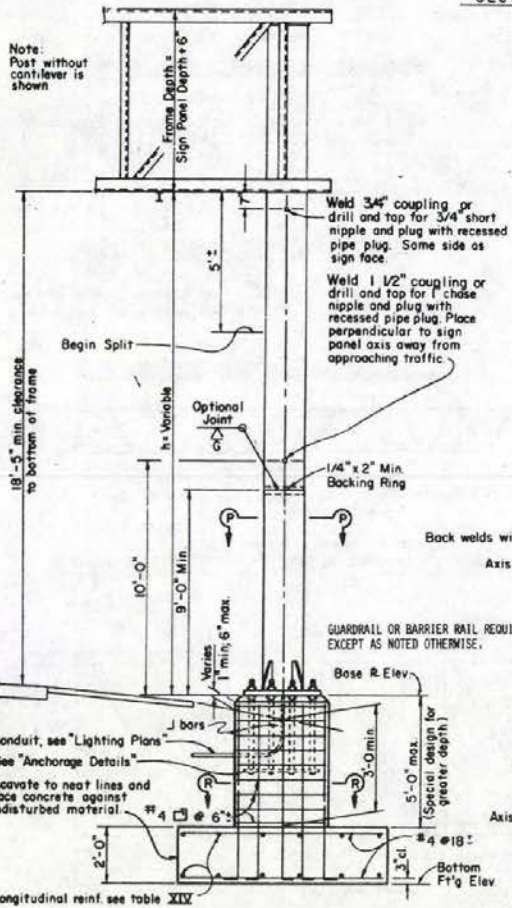
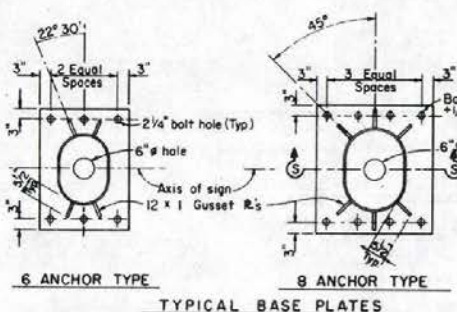


TABLE XIV

Post Type	Pipe Size	Split	Base Plate Size (Note #3)	Anchor Bolts	Pedestal Size (Note #3)	Footing Size (Note #3)	Longitudinal Footing Reinforcement		J Bars
							Top	Bottom	
I - S	10" O.D. @ 40.48	4"	2'-3"x1'-9"x2"	6-2"#	2'-9"x2'-3"	5'-0"x10'-0"	5-#4 bars	5-#6 bars	# 6
II - S	12" O.D. @ 49.56	5"	2'-6"x1'-11"x2"	6-2"#	3'-0"x2'-6"	6'-0"x11'-0"	6-#4 bars	6-#7 bars	# 6
III - S	14" O.D. @ 72.09	5"	2'-9"x2'-0"x2"	6-2"#	3'-4"x2'-7"	7'-0"x13'-0"	7-#4 bars	7-#8 bars	# 8
IV - S	16" O.D. @ 82.77	6"	2'-11"x2'-7"x2"	8-2"#	3'-6"x3'-2"	8'-0"x14'-0"	8-#5 bars	8-#9 bars	# 8
V - S	18" O.D. @ 93.45	7"	3'-1"x2'-9"x2"	8-2"#	3'-8"x3'-4"	8'-0"x16'-0"	8-#5 bars	8-#9 bars	# 9
VI - S	20" O.D. @ 104.13	8"	3'-5"x2'-9"x2"	8-2"#	4'-0"x3'-4"	9'-0"x17'-0"	9-#5 bars	9-#10 bars	# 10
VII - S	24" O.D. @ 125.49	8"	3'-9"x3'-3"x2"	8-2-1/2"#	4'-5"x3'-11"	10'-0"x18'-0"	10-#6 bars	10-#11 bars	# 11

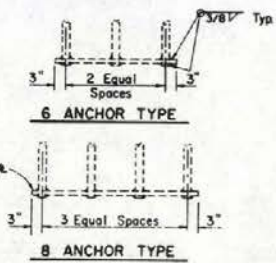
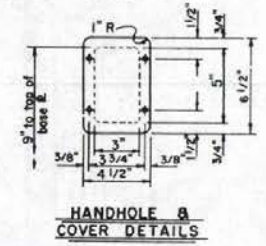
- Notes:**
- 1 For reinforcement, embedment is clear to outside of bar and is 2" to main reinf except as noted.
 - 2 For "General Notes" see "Instruction & Examples" sheet.
 - 3 Base Plates, Pedestals, & Footings, longer sides shall be normal to axis of sign.
 - 4 Backfill shall be in place prior to erection of post.
 - 5 Thread upper 8" of anchor bolts and galvanize upper 1'-0".
 - 6 Spread footing shown. Alternate Pile Foundation is optional.
 - 7 Anchor B's may be retained with hex nut or formed head.
 8. USE POST FOOTING CONNECTION ON TOP OF FOOTING WHERE REQUIRED TO ATTACH GUARDRAIL POSTS.



Drill and tap for 1/4" x 20 RH brass mach screws 3/4" long

4 1/2" x 6 1/2" x 0.0747"

4 1/2" x 6 1/2" x 0.0747"



STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

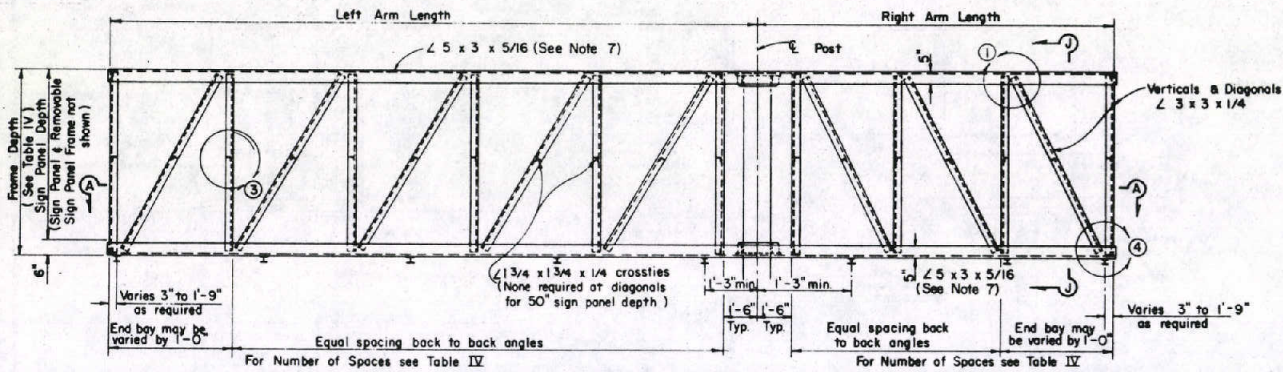
OVERHEAD SIGNS - TWO POST TYPES I-S THRU VII-S

Russell C. Hill
CHIEF TRAFFIC ENGINEER

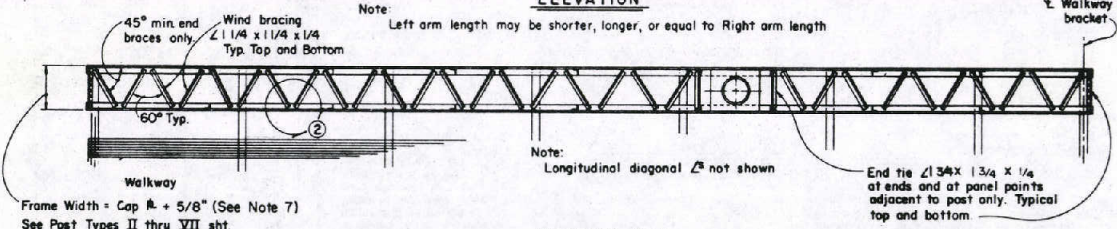
T-38.13 - (627)

ADOPTED: 1/58

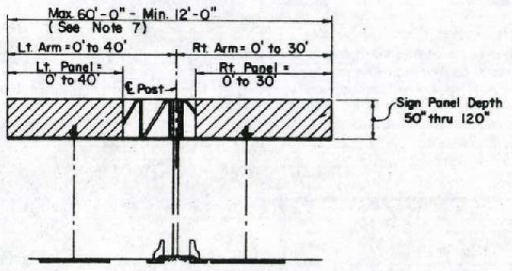
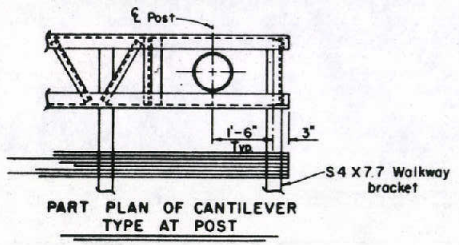
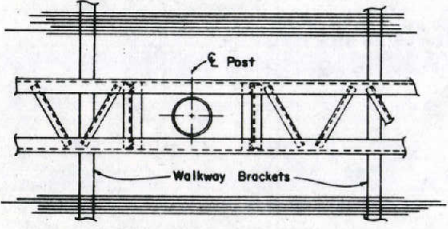
REVISION 2 - 57



ELEVATION



SECTION A-A



LIMITING DIMENSIONS OF FRAME & SIGN PANEL

Sign Panel Depth	Frame Depth	Minimum Vertical Spacing	Arm Length
60"	5'-6"	5'-0"	4'
70"	6'-4"	5'-6"	4'
80"	7'-2"	6'-0"	5'
90"	8'-0"	7'-0"	5'
100"	8'-10"	7'-0"	6'
110"	9'-8"	7'-6"	6'
120"	10'-6"	7'-6"	6'

TABLE IV

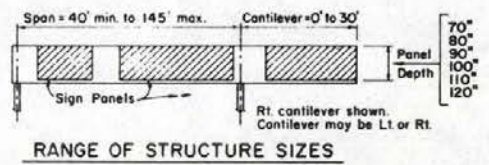
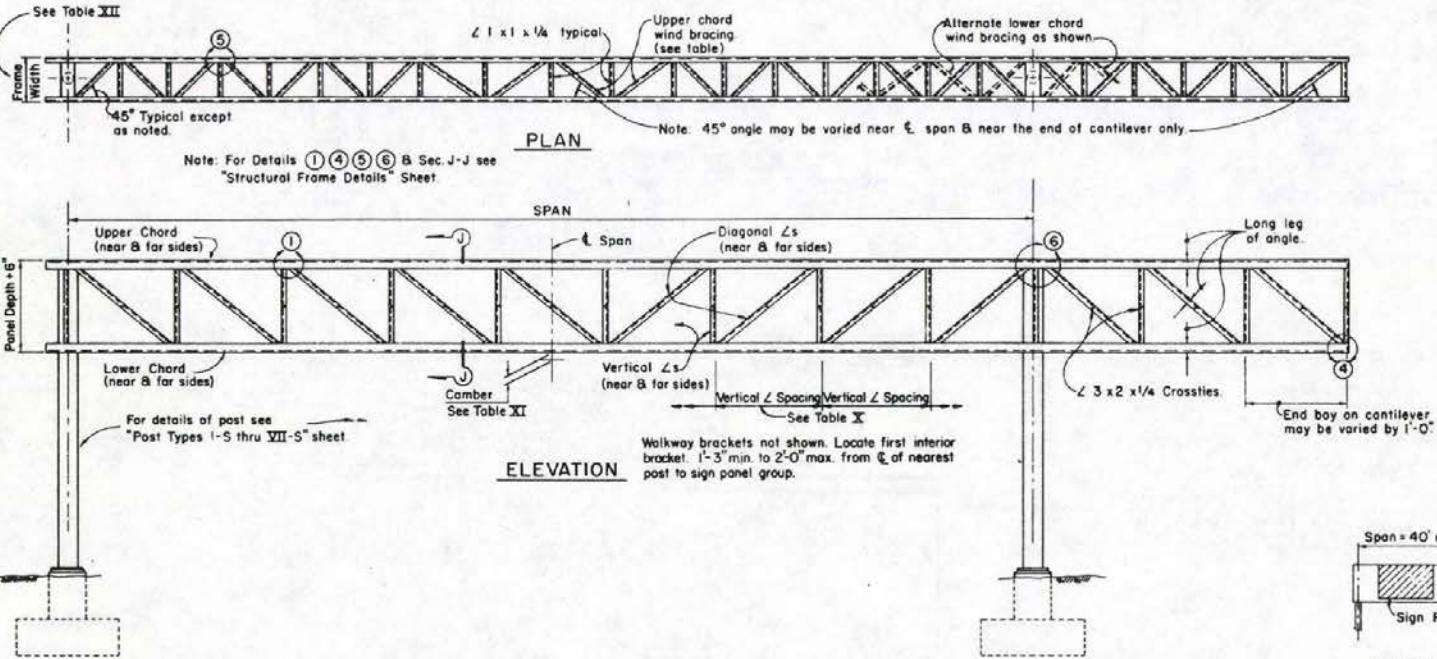
- NOTES:
- For Details ① thru ④ see "Structural Frame Details" sheet.
 - For sign panel frames see "Removable Sign Panel Frames" sheet.
 - For connection of frame to post see Frame Junction Details sheet.
 - For walkway see "Standard Walkway Details" 1 and 2 sheets.
 - For typical walkway arrangement, special instructions and examples, see "Instructions and Examples" sheet (T-36.1.1).
 - Minimum length of frame = 12'-0".
 - For arm lengths 35' to 40' and sign depths 80" thru 120"
 - Use $5 \times 3 \times 7/16$ chord \angle s.
 - Frame width = Cap $\# + 7/8"$.
 - On single post sign structures the post shall be raked out of plumb, with the use of the leveling nuts to make the bottom of the sign frame level.
 - At final position of post all top and bottom nuts shall be tightened against base plate.

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

**OVERHEAD SIGNS - SINGLE POST
STRUCTURAL FRAME MEMBERS**

Russell C. Hill
CHIEF TRAFFIC ENGINEER

T-36.1.4 - (237)
ADOPTED 8/58



Span	70" Panel Depth					80" Panel Depth					90" Panel Depth				
	Frame Width	Chord Ls	Vertical Ls	Diagonal Ls	Wind Bracing	Frame Width	Chord Ls	Vertical Ls	Diagonal Ls	Wind Bracing	Frame Width	Chord Ls	Vertical Ls	Diagonal Ls	Wind Bracing
40' - 50'	2'-0"	5x3 1/2 x 5/8	3x3 x 1/4	3x3 x 1/4	1 1/4 x 1 1/4 x 1/4	2'-0"	5x3 1/2 x 5/8	3x3 x 1/4	3x3 x 1/4	1 1/4 x 1 1/4 x 1/4	2'-0"	5x3 1/2 x 5/8	3x3 x 5/8	3x3 x 5/8	1 1/4 x 1 1/4 x 1/4
51' - 60'	2'-0"	5x3 1/2 x 5/8			1 1/4 x 1 1/4 x 1/4	2'-0"	5x3 1/2 x 5/8			1 1/4 x 1 1/4 x 1/4	2'-0"	5x3 1/2 x 5/8			1 1/4 x 1 1/4 x 1/4
61' - 70'	2'-6"	5x3 1/2 x 5/8			1 1/4 x 1 1/4 x 1/4	2'-6"	5x3 1/2 x 5/8			1 1/4 x 1 1/4 x 1/4	2'-6"	5x3 1/2 x 5/8			1 1/4 x 1 1/4 x 1/4
71' - 80'	2'-6"	6x4 x 3/8			1 1/4 x 1 1/4 x 1/4	2'-6"	6x4 x 3/8			1 1/4 x 1 1/4 x 1/4	3'-0"	6x4 x 3/8			1 1/2 x 1 1/2 x 1/4
81' - 90'	3'-0"	6x4 x 3/8			1 1/2 x 1 1/2 x 1/4	3'-0"	6x4 x 3/8			1 1/2 x 1 1/2 x 1/4	3'-0"	6x4 x 3/8			1 1/2 x 1 1/2 x 1/4
90' - 100'	3'-0"	6x4 x 3/8			1 1/2 x 1 1/2 x 1/4	3'-0"	6x4 x 3/8			1 1/2 x 1 1/2 x 1/4	3'-0"	6x4 x 3/8			1 1/2 x 1 1/2 x 1/4
101' - 110'	3'-0"	7x4 x 7/8			1 1/2 x 1 1/2 x 1/4	3'-0"	7x4 x 7/8			1 1/2 x 1 1/2 x 1/4	3'-0"	7x4 x 7/8			1 1/2 x 1 1/2 x 1/4
111' - 120'	3'-0"	7x4 x 7/8			1 1/2 x 1 1/2 x 1/4	3'-0"	7x4 x 7/8			1 1/2 x 1 1/2 x 1/4	3'-0"	8x4 x 1/2			1 1/2 x 1 1/2 x 1/4
121' - 132'	3'-0"	8x4 x 1/2			1 1/2 x 1 1/2 x 1/4	3'-0"	8x4 x 1/2			1 1/2 x 1 1/2 x 1/4	3'-6"	8x4 x 1/2			2 x 2 x 1/4
133' - 145'	3'-0"	8x4 x 1/2			1 1/2 x 1 1/2 x 1/4	3'-0"	8x4 x 1/2			1 1/2 x 1 1/2 x 1/4	3'-6"	8x4 x 1/2			2 x 2 x 1/4

Span	100" Panel Depth					110" Panel Depth					120" Panel Depth				
	Frame Width	Chord Ls	Vertical Ls	Diagonal Ls	Wind Bracing	Frame Width	Chord Ls	Vertical Ls	Diagonal Ls	Wind Bracing	Frame Width	Chord Ls	Vertical Ls	Diagonal Ls	Wind Bracing
40' - 50'	2'-0"	5x3 1/2 x 5/8	3x3 x 5/8	3x3 x 5/8	1 1/4 x 1 1/4 x 1/4	2'-0"	5x3 1/2 x 5/8	3x3 x 5/8	3x3 x 5/8	1 1/4 x 1 1/4 x 1/4	2'-0"	5x3 1/2 x 5/8	3x3 x 5/8	4 x 3 1/2 x 5/8	1 1/4 x 1 1/4 x 1/4
51' - 60'	2'-0"	5x3 1/2 x 5/8			1 1/4 x 1 1/4 x 1/4	2'-6"	5x3 1/2 x 5/8			1 1/4 x 1 1/4 x 1/4	2'-6"	5x3 1/2 x 5/8			1 1/4 x 1 1/4 x 1/4
61' - 70'	2'-6"	5x3 1/2 x 5/8			1 1/2 x 1 1/2 x 1/4	3'-0"	5x3 1/2 x 5/8			1 1/2 x 1 1/2 x 1/4	3'-0"	6x4 x 3/8			1 1/2 x 1 1/2 x 1/4
71' - 80'	3'-0"	6x4 x 3/8			1 1/2 x 1 1/2 x 1/4	3'-6"	6x4 x 3/8			1 1/2 x 1 1/2 x 1/4	3'-6"	6x4 x 3/8			2 x 2 x 1/4
81' - 90'	3'-0"	6x4 x 3/8			1 1/2 x 1 1/2 x 1/4	3'-6"	6x4 x 3/8			1 1/2 x 1 1/2 x 1/4	3'-6"	6x4 x 3/8			2 x 2 x 1/4
91' - 100'	3'-0"	6x4 x 3/8			1 1/2 x 1 1/2 x 1/4	3'-6"	6x4 x 3/8			1 1/2 x 1 1/2 x 1/4	3'-6"	7x4 x 7/8			2 x 2 x 1/4
101' - 110'	3'-6"	7x4 x 7/8			2 x 2 x 1/4	3'-6"	7x4 x 7/8			2 x 2 x 1/4	3'-6"	7x4 x 7/8			2 x 2 x 1/4
111' - 120'	3'-6"	7x4 x 7/8			2 x 2 x 1/4	3'-6"	8x4 x 1/2			2 x 2 x 1/4	3'-6"	8x4 x 1/2			2 1/2 x 2 1/2 x 1/4
121' - 132'	3'-6"	8x4 x 1/2			2 x 2 x 1/4	3'-6"	8x4 x 1/2			2 1/2 x 2 1/2 x 1/4	3'-6"	8x4 x 1/2			2 1/2 x 2 1/2 x 1/4
133' - 145'	3'-6"	8x4 x 1/2			2 x 2 x 1/4	3'-6"	8x4 x 1/2			2 1/2 x 2 1/2 x 1/4	3'-6"	8x4 x 1/2			2 1/2 x 2 1/2 x 1/4

TABLE XII

Panel Depth	Frame Depth	Max. Vertical L Spacing
70"	6'-4"	72"
80"	7'-2"	72"
90"	8'-0"	90"
100"	8'-10"	90"
110"	9'-8"	120"
120"	10'-6"	120"

TABLE X

Camber For Fabrication At Span	
Span	Camber
40' - 50'	1/2"
51' - 100'	1"
101' - 145'	1 1/2"

Fabricate camber to approximate parabola. Camber of cantilever arm = 1/2" for arms greater than 10'.

TABLE XI

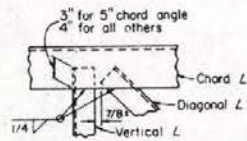
NOTE:
 Frame widths shown are nominal. These widths may be varied by 1/4" to standardize fabrication methods.
 Add 6" to frame width for Post Type V-S & VI-S; Add 1'-0" for Post Type VII-S.
 Add 6" to frame width for Post Type VIII-S.

STATE OF NEVADA
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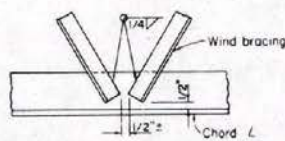
**OVERHEAD SIGNS - TWO POST
 STRUCTURAL FRAME MEMBERS**

T-36.15 - (627)
 ADOPTED: 8/98 REVISION

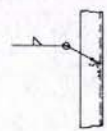
Russell C. Hill
 CHIEF TRAFFIC ENGR.



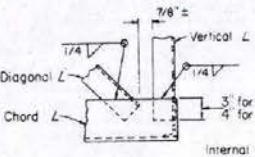
DETAIL 1



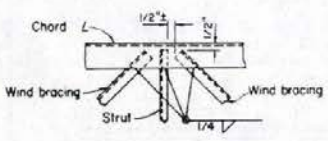
DETAIL 2



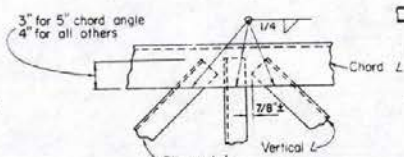
DETAIL 3



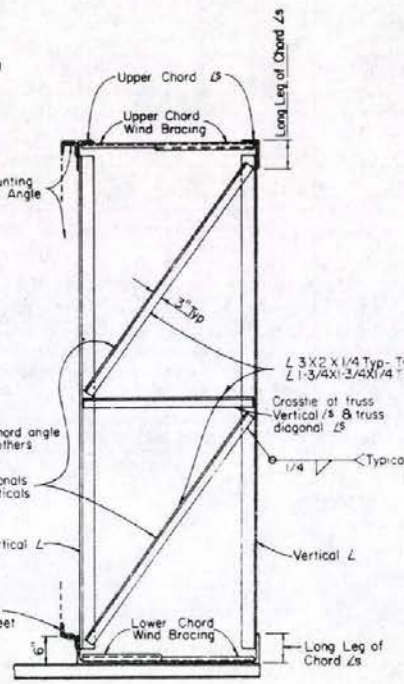
DETAIL 4



DETAIL 5

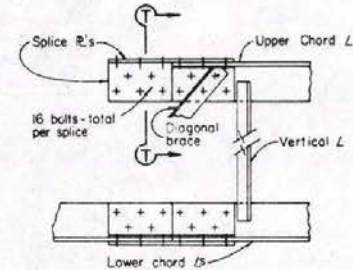


DETAIL 6

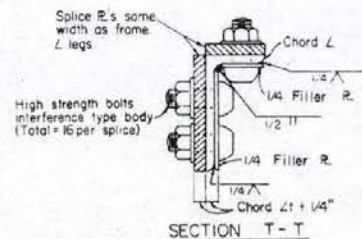


TYPICAL SECTION J-J

Note: Diagonal Ls in plane of truss, not shown. Bracing shown is at all vertical Ls of truss.



OPTIONAL BOLTED CHORD SPLICE



SECTION T-T

SPLICE NOTES

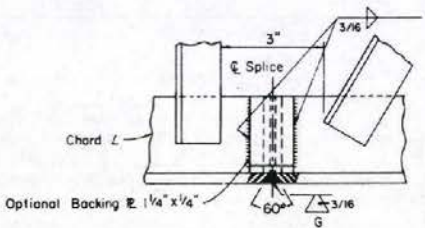
Specifications: The bolted splice shall conform to current Specifications for Structural Joints Using ASTM A325 Bolts approved by the Research Council on Riveted and Bolted Structural Joints of the Engineering Foundation.

Location of Splices: The splice shall be located so as not to interfere with mounting the walkway brackets or the clip angles for the removable sign panel frame. The wind bracing in the area of the bolted chord splice will be bolted to the chord angles with a 3/8 inch unfinished bolt, with hex head and nut, 2 cut washers and lock washer.

Bolts: The bolts shall be high strength with an interference type body and torqued to the required amount as stated in the above specifications.

Filler R: The plates welded to the angle legs on the inside shall be welded before punching the bolt holes. They shall be the same length as the cover plates. The plates are not necessary on the single post signs if the splice is located over 1/3 of the cantilever length from the post. Alternative splice details may be used if approved by the Engineer.

Note: 1 Prepare edges by beveling to angle shown. 2 Weld to 100% full penetration. 3 Grind flush with base metal.



WELDED CHORD SPLICE

BOLTED CHORD SPLICE	
TWO POST SIGNS	
Chord L	Nominal Bolt Diam
5 X 3 1/2 X 5/8	3/8
6 X 4 X 3/8	7/8
7 X 4 X 7/8	1
8 X 4 X 1/2	1 1/8
8 X 4 X 5/8	1 1/4
SINGLE POST SIGNS	
Chord L	Nominal Bolt Diam
5 X 3 X 5/8	3/8
5 X 3 X 7/8	3/4

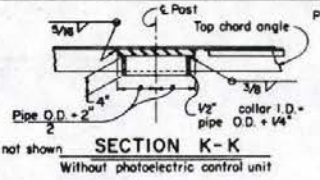
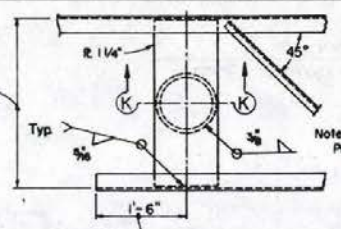
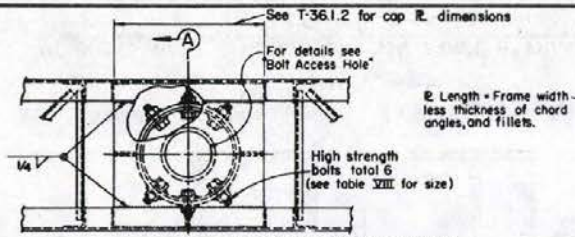
STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

**OVERHEAD SIGNS
STRUCTURAL FRAME DETAILS**

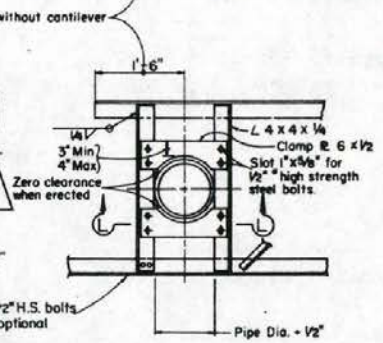
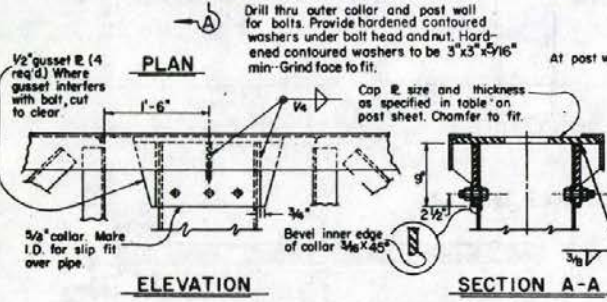
Russell C. Hill
CHIEF TRAFFIC ENGINEER

T-36.1.6 - (827)
ADOPTED: 8/68 REVISION 12- 2/79

T-43

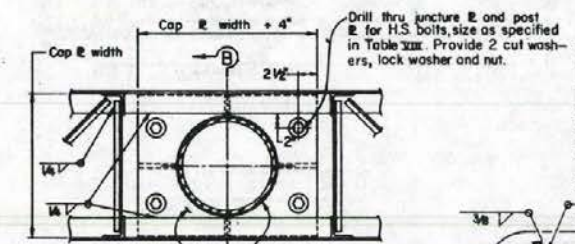


UPPER CHORD CONNECTION TO POST
TWO POST TYPE

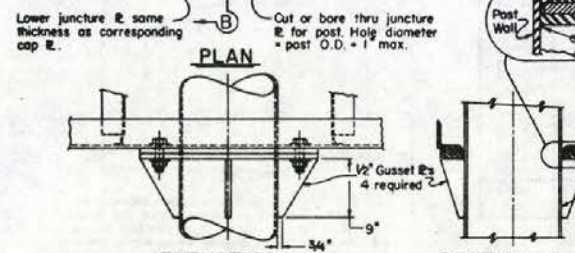


UPPER JUNCTURE CONNECTION
SINGLE POST TYPE

LOWER CHORD CONNECTION TO POST
TWO POST TYPE

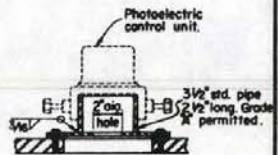
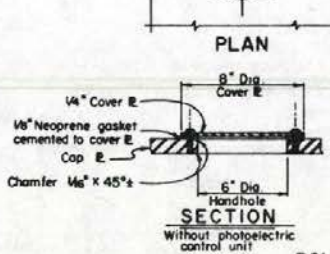
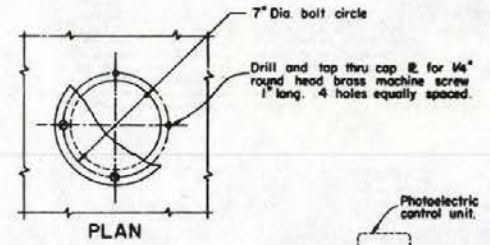


Post Type	Bolt Size
I	3/8"
II	7/8"
III	1 1/8"
IV	1 1/2"
V	1 3/4"
VI	1 7/8"
VII	1 3/4"
VIII	1 3/4"
IX	1 3/4"



LOWER JUNCTURE CONNECTION
SINGLE POST TYPE

- Notes: (SINGLE POST TYPE)
1. Drilled holes for unfinished bolts shall not exceed nominal bolt diameter by more than 1/16".
 2. All bolts, nuts and washers shall be galvanized.
 3. In all cases, sign frame shall be supported at top of post. Bearing surface at top of post shall be finished true.
 4. At lower juncture connection, shims shall be used where any clearance exists between bottom of frame and post E prior to tightening of bolts in lower connection. Shims may be galvanized steel cut washers.



BOLT-ACCESS HOLE
SINGLE POST TYPE

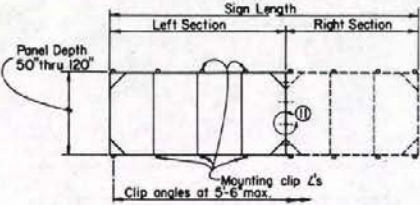
STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

**OVERHEAD SIGNS
FRAME JUNCTURE DETAILS**

T-36.1.7 - (827)
ADOPTED: 8/88 REVISION 9/89

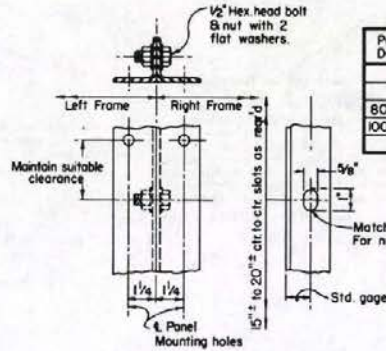
NOTES:

Frames for signs greater than 20'-0" in length shall be fabricated in two sections with left section a multiple of 4'-0" in length. See table above.
 Sections shall be hoisted into place individually and bolted together as per detail (I) prior to tightening of mounting clip bolts.
 Bolting two sections together and hoisting simultaneously will not be permitted.



**REMOVABLE FRAME
 GREATER THAN 20'-0"**

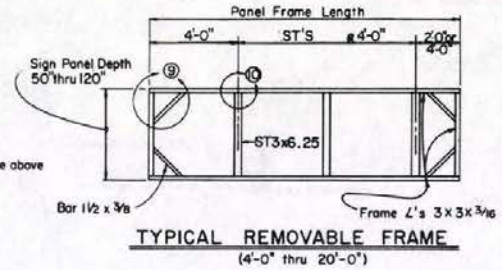
Sign Length	Left Section	Right Section
22'-0"	12'	10'
24'-0"	12'	12'
26'-0"	12'	14'
28'-0"	16'	12'
30'-0"	16'	14'
32'-0"	16'	16'
34'-0"	16'	18'
36'-0"	20'	16'
38'-0"	20'	18'
40'-0"	20'	20'



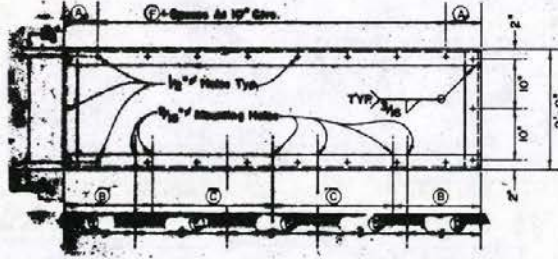
DETAIL (I)
 No Scale

Panel Depth	No. of slots
50"	2
70"	3
80" & 90"	4
100" & 110"	5
120"	6

Note: Panel mounting holes not shown.
 Panel lengths available in 2'-0" increments.



TYPICAL REMOVABLE FRAME
 (4'-0" thru 20'-0")

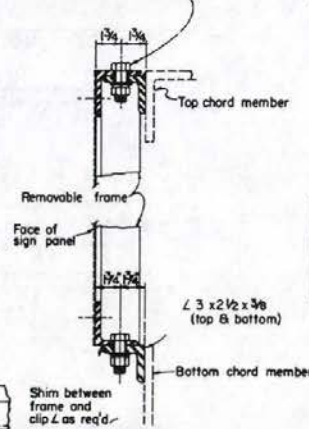


TYPICAL EXIT PANEL FRAMES

FRAME WIDTH	(A)	(B)	(C)	(D)	(E)	(F)
5'-6"	0'-8"	0'-9"	2'-0"	1'-0"	1'-3"	2'-0"
7'-0"	0'-7"	0'-7"	2'-0"	1'-0"	1'-3"	2'-0"
8'-6"	0'-6"	0'-6"	2'-0"	1'-0"	1'-3"	2'-0"

- NOTES:**
1. Frame L's shall be 3" x 3" x 5/16" ASTM-A36.
 2. 5" PANEL MOUNTING HOLES SHALL BE DRILLED WITH TEMPLATES.
 3. HOLES FOR MOUNTING SIGN MAY BE SLOTTED 1".
 4. Mount Exit Frame At Right Edge Of Removable Frame So Front Faces Are Flush.

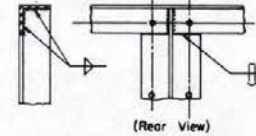
1/2" Hex head bolt & nut. Provide flat washer & lockwasher top & bottom



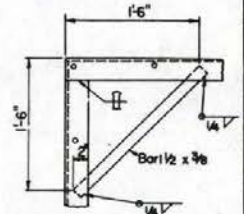
SECTION T-T

NOTES:

1. Frames shall be all-welded construction.
2. 1/2" Panel mounting holes shall be drilled by template. Sign panel may be considered a template.
3. Drilled and topped holes (1/4"-20 N.C.) may be used where interference due to welds or structural members is encountered.
4. ST3x6.25 faces shall be flush with faces of frame angles.
5. Mounting clip angles shall be located such as to allow the top and bottom frame angles of the removable sign panel frame to lie on a straight horizontal line.
6. Holes for mounting removable sign panel frame may be slotted 1" maximum parallel to the axis of the sign.
7. ST3x6.25 may be crimped at ends to join frame angles. Fillet weld all around.
8. Panels shall be 2'-0" minimum and 4'-0" maximum.

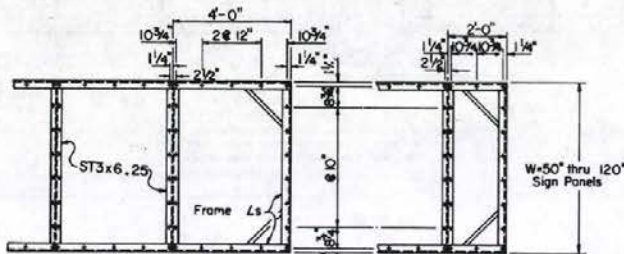


DETAIL (O)



DETAIL (9)

TYPICAL JOINT DETAILS

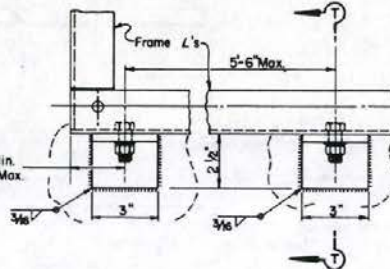


TYPICAL 4'-0" PANEL TYPICAL 2'-0" PANEL

Note: All holes 1/2" diameter

MOUNTING HOLE SPACING FOR SIGN PANEL & FRAME

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



FRAME MOUNTING DETAILS

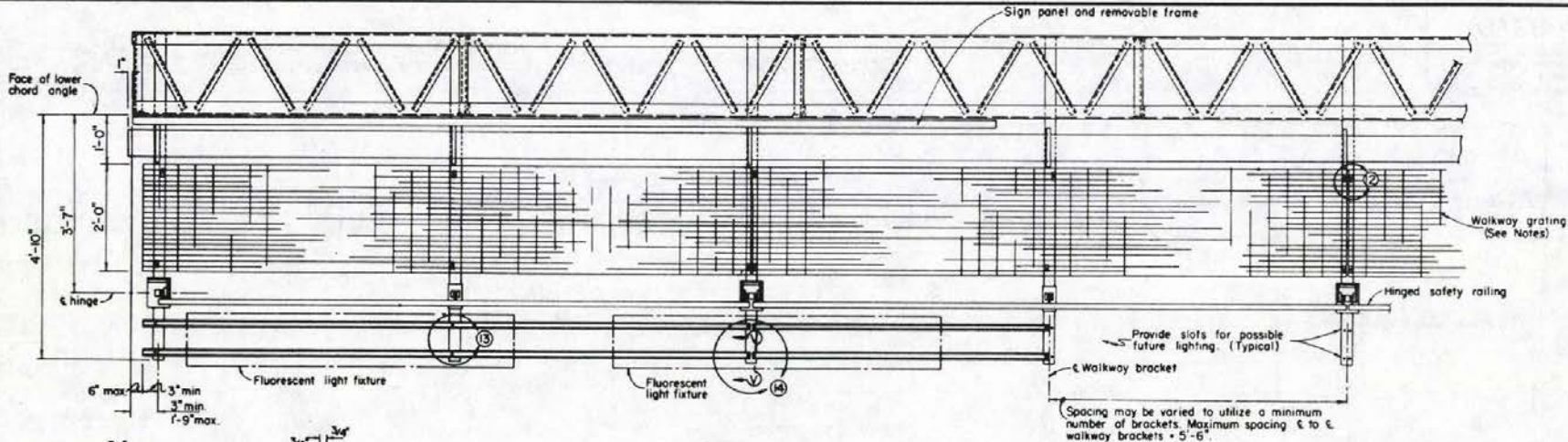
No Scale

STATE OF NEVADA
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**OVERHEAD SIGNS
 REMOVABLE SIGN PANEL FRAMES**

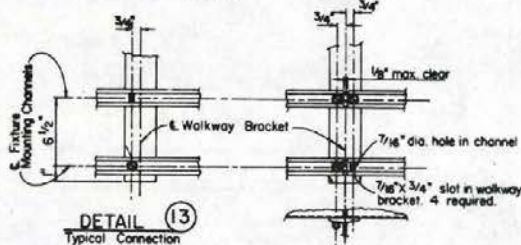
Donaldd Hill
 CHIEF TRAFFIC ENGINEER

T - 36.1.8 - (627)
 ADOPTED: 8/69 REVISION: 2-8/73

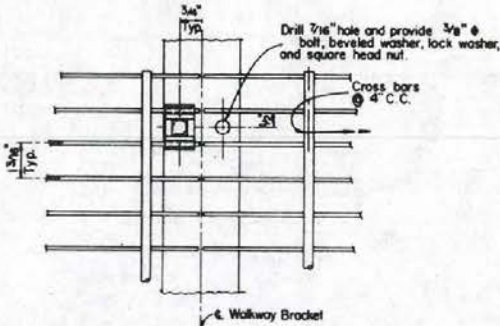


WALKWAY PLAN
Scale 1" = 1'-0"

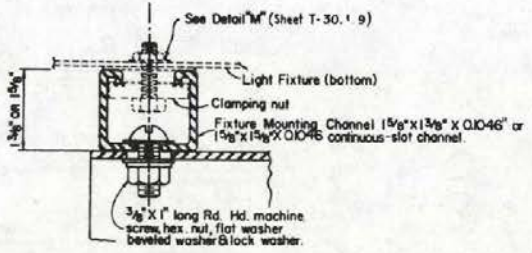
1. Welded-type grating shall have 1 1/2" x 1/8" bearing bars @ 1 3/4" centers with 1/2" diameter (or equal) cross bars @ 4" centers. See detail (12). If mechanical lock grating is used it shall be equal in strength to the welded-type. Alternate hold-down clips may be submitted for approval.
2. For spacing of lighting fixtures see table of spacings on "fluorescent sign lighting equipment" sheet.
3. Walkway grating and light fixture mounting channels to be continuous (no splices) over as many walkway brackets as practicable consistent with fabrication, ease of handling and assembling.
4. Bolts, nuts, washers, etc. to be galvanized.



DETAIL (14)
Connection of Splice



DETAIL (12)
Scale 1/2" = 1"



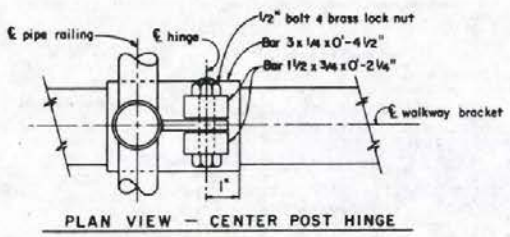
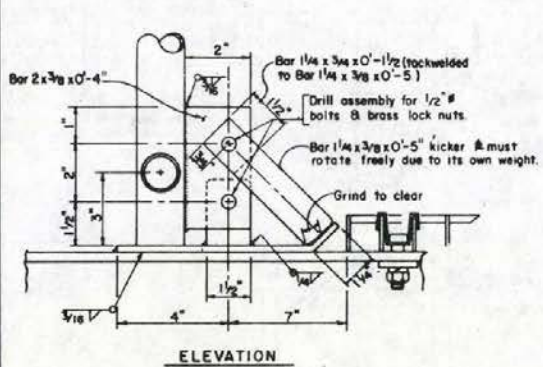
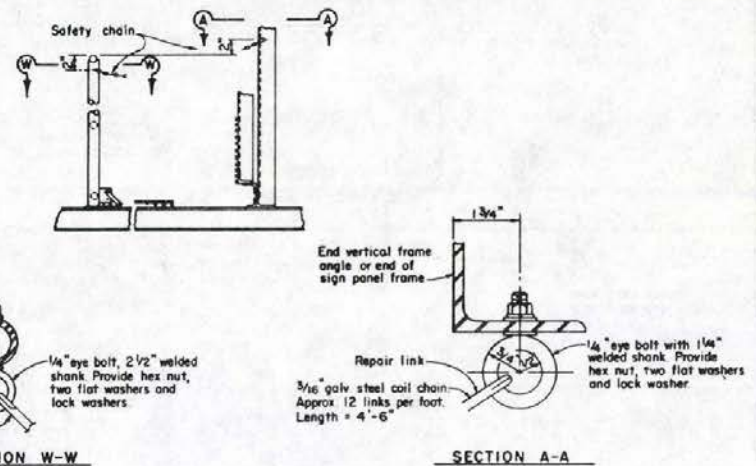
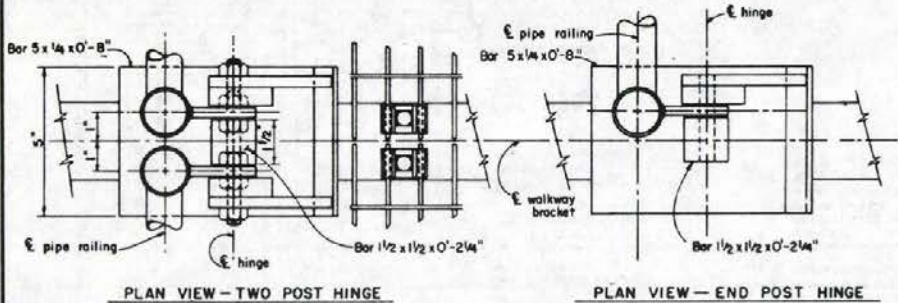
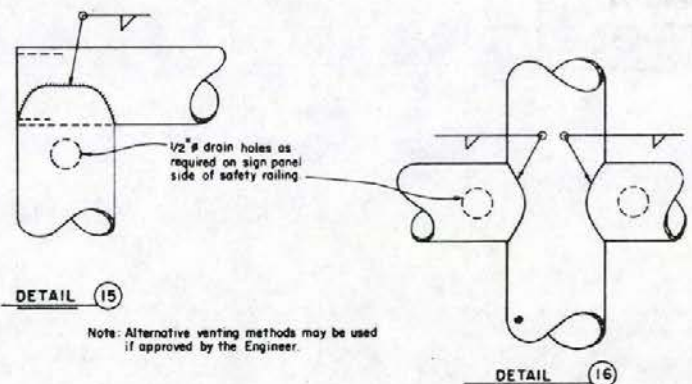
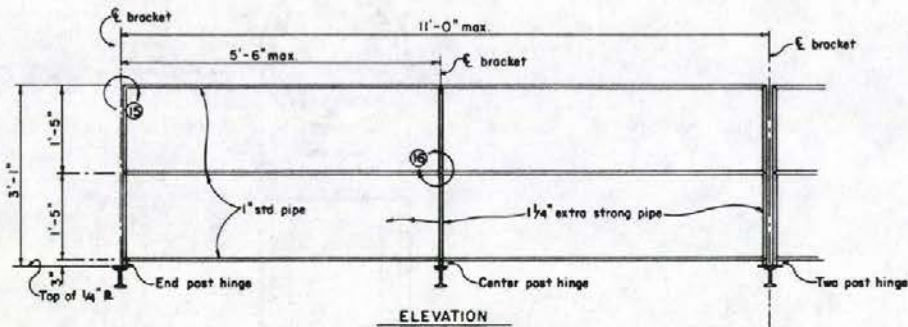
SECTION V-V
Full Scale

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

**OVERHEAD SIGNS
WALKWAY DETAILS NO. 1**

T-36.1.9 - (627)
ADOPTED: 8/69 REVISION
3 - 2/79

Raymond C. Hill
CHIEF TRAFFIC ENGINEER



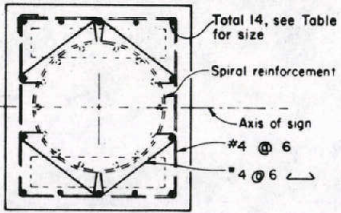
- Note:**
1. Special care shall be taken to insure that the completed hinge and latch assembly will hold the safety railing in a steady manner, free of wobble while in the raised position. Maximum allowable displacement from vertical at top of railing when latched shall be 1".
 2. Details for bolting hinge base R to walkway bracket may be submitted for approval.
 3. Alternative details approved by the Engineer may be substituted for the safety chain connections shown.

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

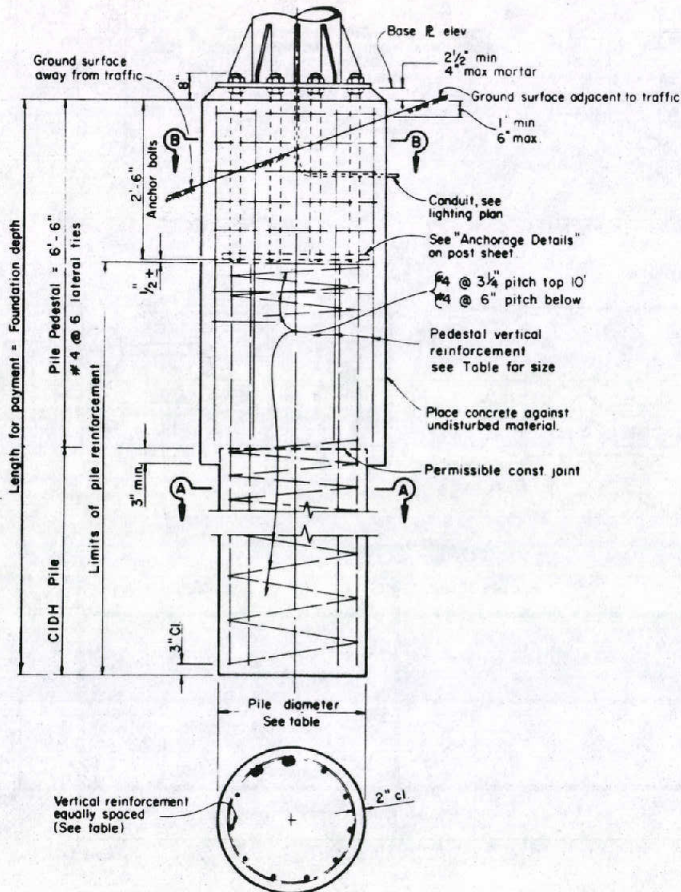
**OVERHEAD SIGNS
WALKWAY SAFETY RAILING DETAILS**

T-36.1.11-(627)
ADOPTED: 6/68 REVISION: E-2/79

Russell Hill
CHIEF TRAFFIC ENGINEER



SECTION B-B



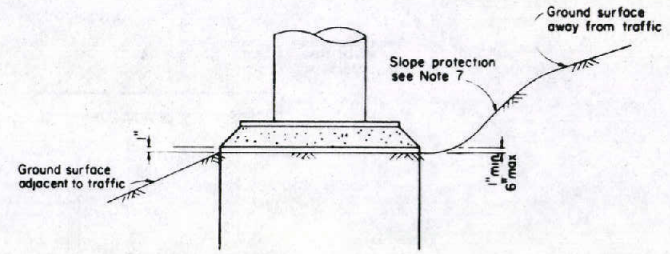
SECTION A-A

Post Type	Anchor Bolts	Pedestal Size	Reinforcing Steel Vertical	Pile Diameter	Foundation Depth**
II	6 - 2"	2'-11" x 2'-10"	14 - # 7	30"	14'
III	6 - 2"	3'-2" x 2'-10"	14 - # 8	30"	14'
IV	6 - 2"	3'-8" x 3'-4"	16 - # 8	36"	14'
V	10 - 2"	3'-10" x 3'-7"	16 - # 9	36"	17'
VI	10 - 2"	3'-10" x 3'-7"	16 - #10	36"	18'
VII	12 - 2"	4'-3" x 3'-11"	16 - #11	36"	21'
VIII	12 - 2"	4'-5" x 3'-11"	24 - #11	36"	22'
I-S	6 - 2"	2'-10" x 2'-10"	14 - # 7	30"	14'
II-S	6 - 2"	3'-1" x 2'-10"	14 - # 8	30"	16'
III-S	6 - 2"	3'-4" x 2'-10"	14 - #10	30"	18'
IV-S	8 - 2"	3'-6" x 3'-4"	16 - #10	36"	19'
V-S	8 - 2"	3'-9" x 3'-4"	16 - #11	36"	22'
VI-S	8 - 2"	4'-1" x 3'-4"	16 - #11	36"	23'
VII-S	8 - 2 1/4"	4'-5" x 3'-11"	24 - #11	36"	25'

** Use Foundation Depth shown in table unless otherwise shown on the "Format" Sheet
• Bundled bars @

NOTES

- 1 For anchor bolt layout see post sheet
- 2 For "Base R Elev" see "Format" Sheet
- 3 Pedestal and pile shall be Class "A" or Class "AA" PCC
- 4 Pedestals & Base Plates, longer sides shall be normal to axis of sign
- 5 Prior to erection of the post, backfill which is equivalent to the surrounding material shall be in place
- 6 Pedestal shall be formed 6" min below ground surface Remainder to be placed against undisturbed material
- 7 Slope protection required when indicated on the Road Plans.

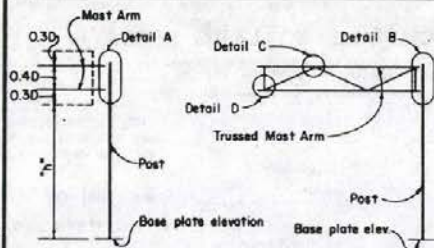


DETAIL C

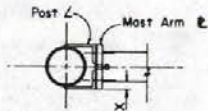
STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

**OVERHEAD SIGNS
ALTERNATE PILE FOUNDATION**

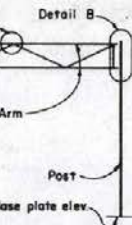
David M. Burt



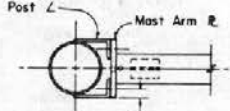
DOUBLE MAST ARM SERIES
TYPE C-1



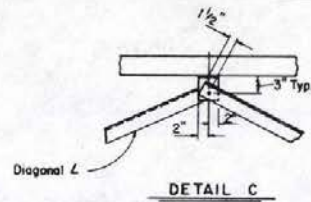
SECTION F-F



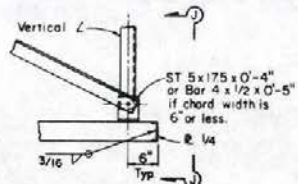
TRUSSED MAST ARM SERIES
TYPE C-2



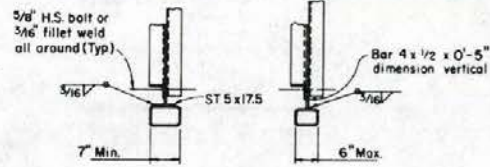
SECTION G-G



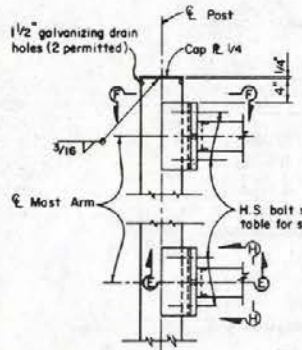
DETAIL C



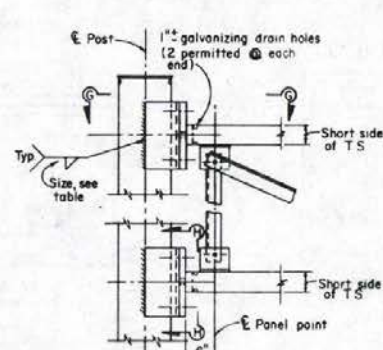
DETAIL D



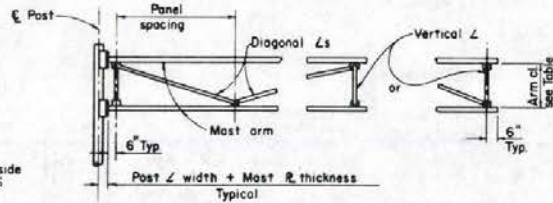
VIEW J-J



DETAIL A



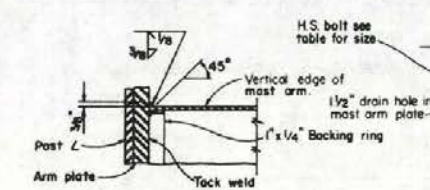
DETAIL B



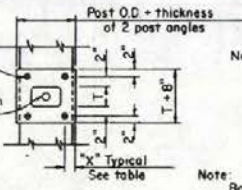
SIGN DEPTH INCHES	ARM CLEARANCE	MAX PANEL SPACING	VERTICAL ANGLE	DIAGONAL ANGLE
D = 40" - 70"	2' - 0"	4' - 4"	L 2 x 2 x 1/4	L 2 x 2 x 1/4
D = 80" - 100"	3' - 0"	6' - 6"	L 3 1/2 x 2 1/2 x 1/4	L 3 1/2 x 2 1/2 x 1/4

* Short leg outstanding

TRUSS FRAMING DATA



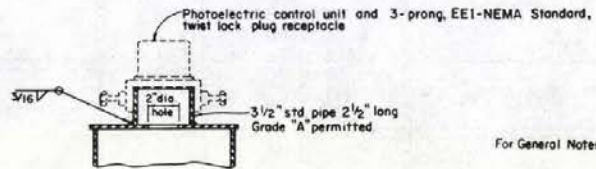
SECTION E-E



SECTION H-H

Note: "T" equals vertical dimension of mast arm.

Note: Bottom connection shown. Top similar.



PHOTOELECTRIC CONTROL UNIT

For General Notes see T-36.1.16

POST ANGLES			
POST SIZE	ANGLE	X	WELD
6	L 5 x 3 x 1/2	1 3/4"	1/4"
8	L 6 x 4 x 5/8	2 1/4"	1/4"
10	L 7 x 4 x 5/8	2 1/4"	1/4"
12	L 8 x 4 x 3/4	2 1/4"	5/16"
14	L 8 x 4 x 3/4	2 1/4"	5/16"

MAST ARM PLATE			
TWO ARMS	TRUSSED ARMS	PLATE	H.S. BOLT
TS 3 x 3 x 8.80		3/4"	1/2"
TS 4 x 4 x 12.02		1"	5/8"
TS 5 x 5 x 15.42		1"	3/4"
TS 6 x 6 x 18.82		1"	3/4"
TS 7 x 7 x 22.04	TS 5 x 3 x 16.84	1 1/4"	3/4"
	TS 6 x 4 x 21.94	1 1/4"	7/8"
	TS 7 x 5 x 27.04	1 1/4"	7/8"
	TS 8 x 6 x 31.73	1 1/4"	7/8"
	TS 10 x 6 x 36.83	1 1/4"	1"

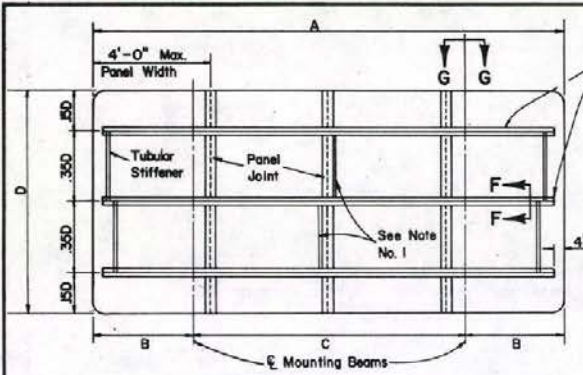
POST TO ARM FRAMING DATA

Note: For post connection to base R see T-36.1.16
For mast arm length and mast-arm-to sign panel connections see T-36.1.14

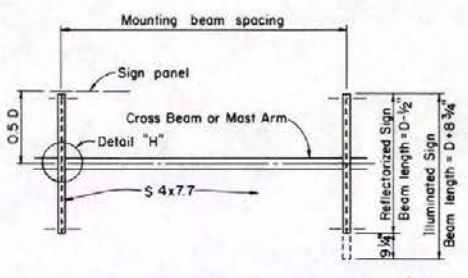
STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION
**OVERHEAD SIGNS
LIGHTWEIGHT
TYPE C
CONNECTION DETAILS**

Russell J. ...
CHIEF TRAFFIC ENGINEER

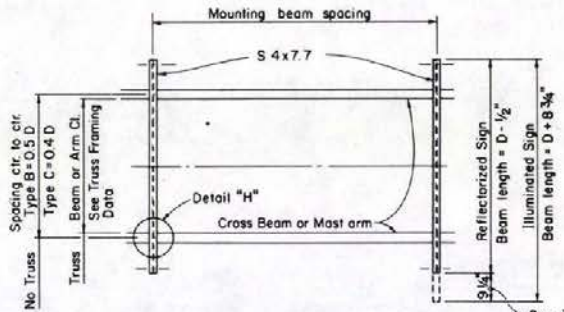
T-36.1.13 (627)
ADOPTED: 8/79 REVISION



3" x 2 1/16" x 1/4" or 2 1/16" x 2 1/16" x 1/4"
Al. Alloy Z Bar Stringers

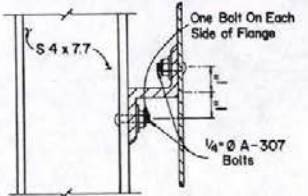
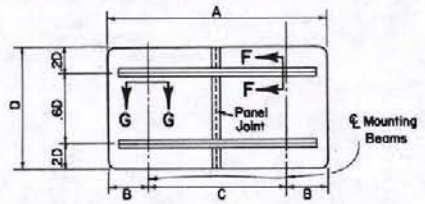


SINGLE BEAM OR ARM SERIES

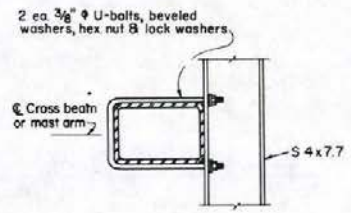


DOUBLE BEAM OR ARM SERIES

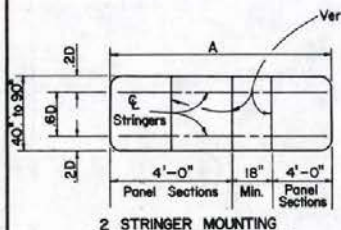
See T-36.1.15



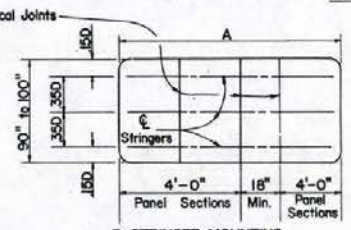
SECTION F-F



SECTION J-J

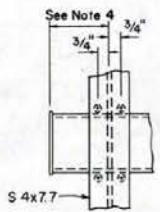


2 STRINGER MOUNTING

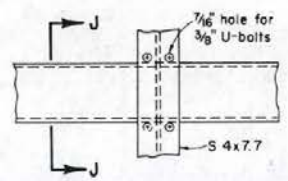


3 STRINGER MOUNTING

STRINGER AND PANEL ARRANGEMENT



END ARM DETAIL SINGLE POST SIGNS

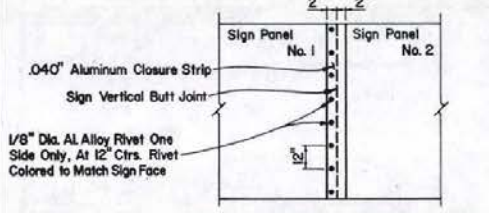


DETAIL H

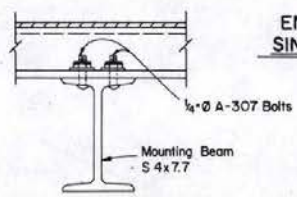
Sign Panel Length	Number Mounting Beams	Mounting Beam Spacing	
		B	C
5'-0"	2	9"	3'-6"
6'-0"	2	12"	4'-0"
7'-0"	2	15"	4'-6"
8'-0"	2	18"	5'-0"
9'-0"	2	21"	5'-6"
10'-0"	2	24"	6'-0"
11'-0"	2	27"	6'-6"
12'-0"	2	30"	7'-0"
13'-0"	2	30"	8'-0"
14'-0"	2	30"	9'-0"
15'-0"	2	36"	9'-0"
16'-0"	2	36"	10'-0"
17'-0"	2	39"	10'-6"
18'-0"	2	42"	11'-0"

MOUNTING BEAM SPACING

- Flat washers required on all bolts, 1 or 2 as necessary
- All nuts to have fiber inserts
- To obtain desired panel width, max. of 2 panels may be cut less than 4'-0" (18" min. each)
- Tubular stiffeners required only when panel overhang exceeds 2'-0"



ALUMINUM SHEET CONSTRUCTION



SECTION G-G

- NOTES**
- Tubular stiffeners to be added when "A" exceeds 10'-0"
 - Position sign panel so that mounting beams will clear truss connections and arm to post joints. Where interference cannot be avoided, 1/2" holes to pass the 3/8" U-bolts may be drilled through mast arm angles or truss connection members as necessary.
 - Torque aluminum sign panel mounting bolt to 100 in.-lbs.
 - 11" for Type C-1 and C-2. Others 4"

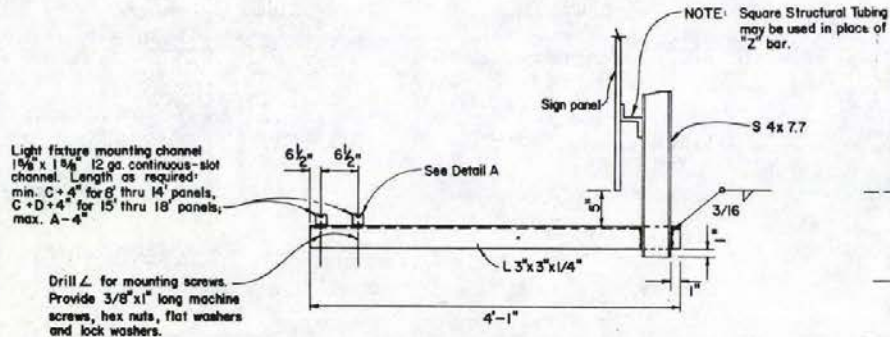
STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

**OVERHEAD SIGNS
LIGHTWEIGHT
SIGN PANEL MOUNTING DETAILS**

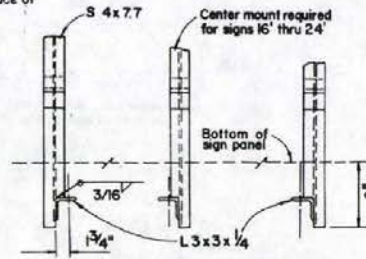
Russell "Bud" Hill
CHIEF TRAFFIC ENGINEER

T-36.1.14 (627)
ADOPTED: 8/79 REVISION

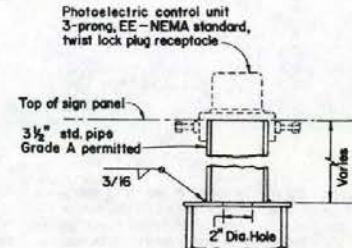
08-1



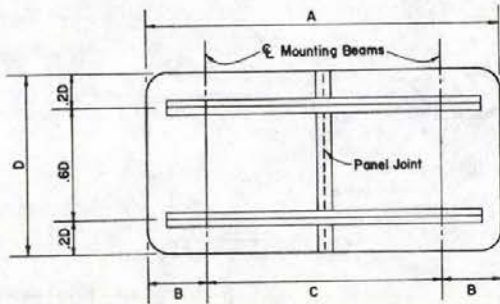
**SIDE VIEW - SINGLE FACED SIGN TYPES A, B & C
LIGHT FIXTURE MOUNTING DETAIL
SIGNS GREATER THAN 5'-6" IN LENGTH**



FRONT VIEW

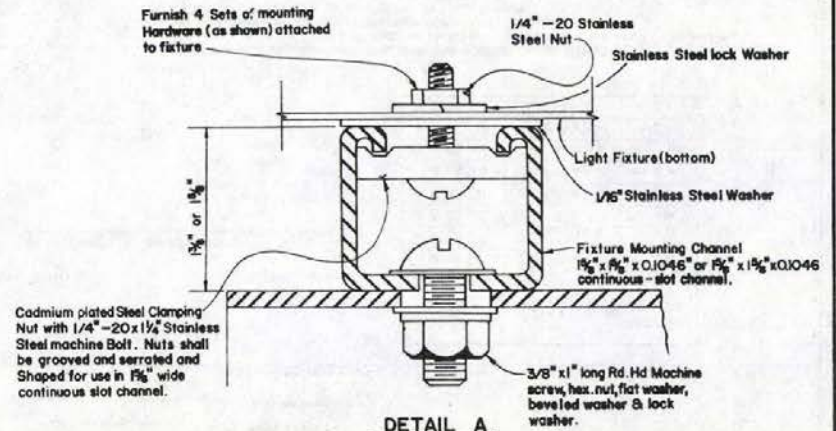


PHOTOELECTRIC CONTROL UNIT



MOUNTING BEAM SPACING

Sign Panel Length A	Number Mounting Beams	Sign Panel Overhang B	Mounting Beam Spacing C
		B	C
5'-0"	2	9"	3'-6"
6'-0"	2	12"	4'-0"
7'-0"	2	15"	4'-6"
8'-0"	2	18"	5'-0"
9'-0"	2	21"	5'-6"
10'-0"	2	24"	6'-0"
11'-0"	2	27"	6'-6"
12'-0"	2	30"	7'-0"
13'-0"	2	30"	8'-0"
14'-0"	2	30"	9'-0"
15'-0"	2	36"	9'-0"
16'-0"	2	36"	10'-0"
17'-0"	2	39"	10'-0"
18'-0"	2	42"	11'-0"



DETAIL A

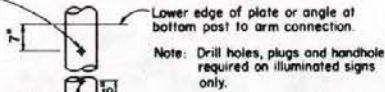
STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

**OVERHEAD SIGNS
LIGHTWEIGHT
LIGHT FIXTURE MOUNTING DETAILS**

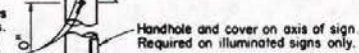
T-36.1.15 (627)
ADOPTED: 6/82 REVISION

S. J. Miller
CHIEF TRAFFIC ENGR.

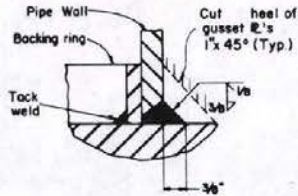
Drill and top for $\frac{3}{8}$ " short nipple and plug with recessed pipe plug. Same side as sign face.



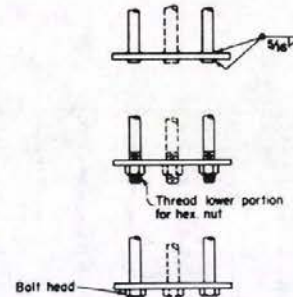
Drill and top for $1\frac{1}{2}$ " hose nipples and plug with recessed pipe plugs. Place perpendicular to sign panel axis away from approaching traffic.



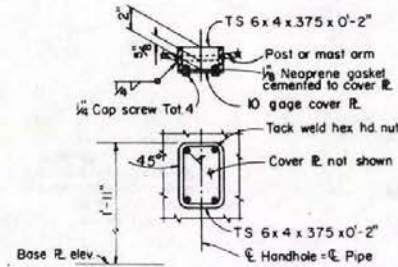
ELEVATION



DETAIL A



ALTERNATIVE BAR CONNECTIONS

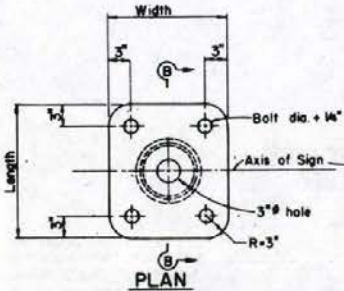


HANDHOLE & COVER DETAILS

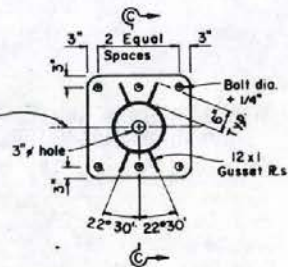
POST SIZE	BASE PLATE	ANCHOR BOLTS (Min.)
6 @ 18.97	1 1/2 x 1'-2" x 1'-2"	4-1 1/4"
6 @ 28.57	1 1/2 x 1'-2" x 1'-2"	4-1 1/2"
8 @ 28.55	1 1/2 x 1'-6" x 1'-6"	4-1 3/4"
8 @ 43.39	2' x 1'-6" x 1'-6"	4-2"
10 @ 54.74	2' x 1'-8" x 1'-8"	4-2 1/4"
12 @ 65.42	2' x 1'-8" x 1'-8"	4-2 1/2"
14 @ 72.09	2' x 2'-4" x 2'-4"	6-2"
14 @ 89.30	2' x 2'-4" x 2'-4"	6-2 1/4"

NOTES:

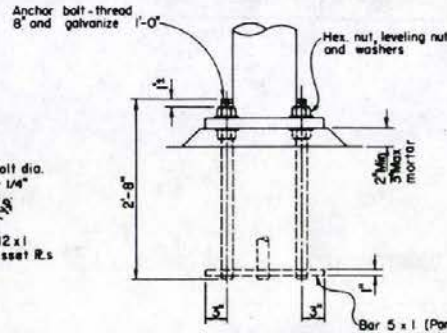
1. Footings shall be placed with long dimensions normal to axis of sign.
2. On single post signs the post shall be raked out of plumb with the use of the leveling nuts to make the bottom of the sign frame level.
3. 2" anchor bolts may be substituted for 1 3/4" anchor bolts.
2 1/2" anchor bolts may be substituted for 2 1/4" anchor bolts.



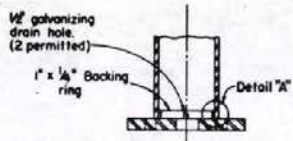
PLAN



PLAN

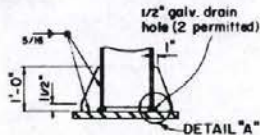


ANCHOR BOLT



SECTION B-B

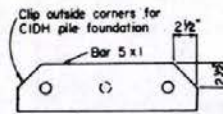
6" THRU 12" POSTS



SECTION C-C

14" POST

BASE PLATE DETAILS



BAR PLAN

ANCHORAGE DETAILS

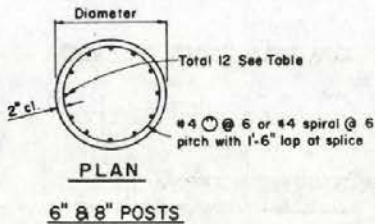
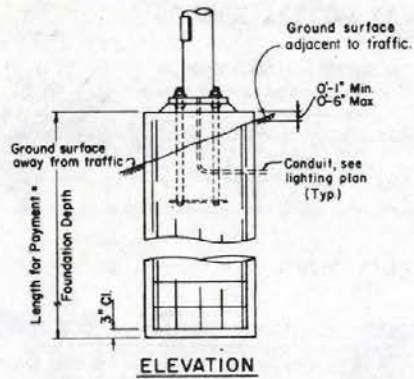
GENERAL NOTES

- DESIGN: A.A.S.H.T.O. SPECIFICATIONS FOR THE DESIGN AND CONSTRUCTION OF STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINARIES, AND TRAFFIC SIGNALS, DATED 1975, REVISED 1979.
- CONSTRUCTION: STANDARD SPECIFICATIONS, DIVISION OF HIGHWAYS DATED 1976 AND THE SPECIAL PROVISION.
- WELDING: ALL WELDING CONTINUOUS UNLESS OTHERWISE NOTED ON THE PLANS. ALL WELDING TO BE DONE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

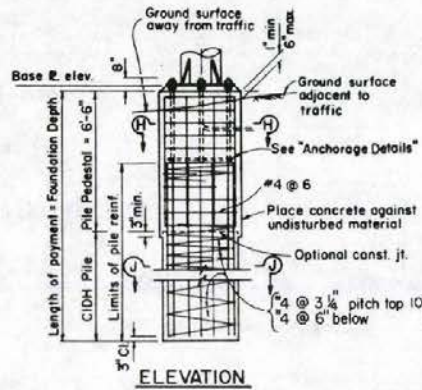
STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION
**OVERHEAD SIGNS
LIGHTWEIGHT
POST DETAILS**

Chief Traffic Engr. *Red 2.19* T-36.1.16 (827)
ADOPTED 8/79 REVISION

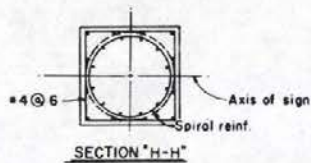
POST SIZE	PILE FOUNDATION				SPREAD FOOTING				
	Pedestal	Pile Dia.	Found Depth	Reinf. Size	Pedestal	Footing	Reinf.		
							Top	Bot.	L Bar
6 # 18.97		24"	8'	#5	1'-10" x 1'-10"	4'-0" x 6'-0"	#4	#4	#5
6 # 28.57		24"	9'	#5	1'-10" x 1'-10"	4'-0" x 7'-0"	#4	#4	#5
8 # 28.55		30"	9'	#6	2'-2" x 2'-2"	5'-0" x 8'-0"	#4	#4	#5
8 # 43.39		30"	11'	#7	2'-2" x 2'-2"	6'-0" x 9'-0"	#4	#5	#5
10 # 54.74	2'-10" x 2'-10"	30"	13'	#8	2'-4" x 2'-4"	7'-0" x 10'-0"	#5	#7	#7
12 # 65.42	2'-10" x 2'-10"	30"	15'	#10	2'-4" x 2'-4"	7'-0" x 12'-0"	#6	#8	#8
14 # 72.09	3'-4" x 3'-4"	36"	15'	#10	2'-11" x 2'-11"	7'-0" x 13'-0"	#7	#9	#8
14 # 89.30	3'-4" x 3'-4"	36"	16'	#10	2'-11" x 2'-11"	8'-0" x 14'-0"	#7	#9	#8



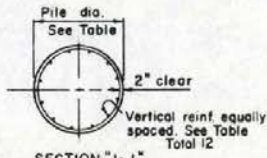
6" & 8" POSTS



ELEVATION



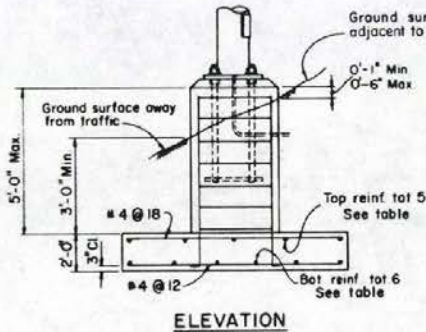
SECTION "H-H"



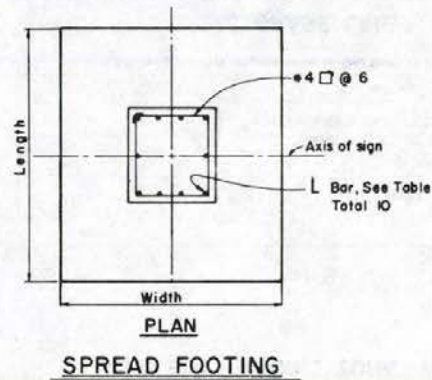
SECTION "J-J"

10" THRU 14" POSTS

PILE FOUNDATION



ELEVATION



SPREAD FOOTING

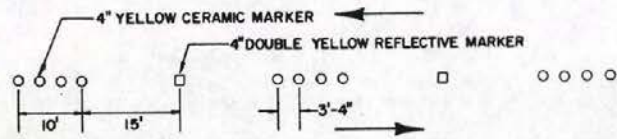
NOTES

1. Backfill shall be in place prior to erection of post.
2. Slope protection required when indicated on the plans.
3. Pile pedestal shall be formed 6" min. below ground surface. Remainder to be placed against undisturbed material.

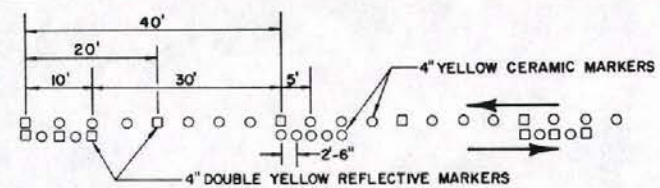
STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

OVERHEAD SIGNS
LIGHT WEIGHT
FOUNDATION

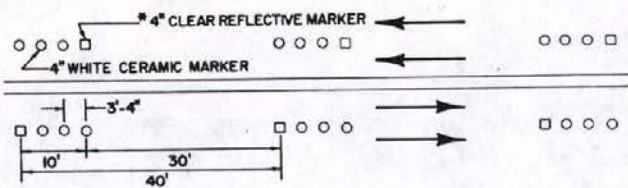
Russell Post Hill
CHIEF TRAFFIC ENGR. T-36.1.17 (627)
ADOPTED: 8/79 REVISION



CENTER LANE TWO WAY TRAFFIC

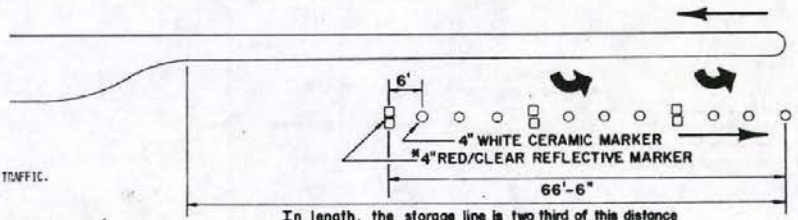


ONE WAY PASSING ZONE

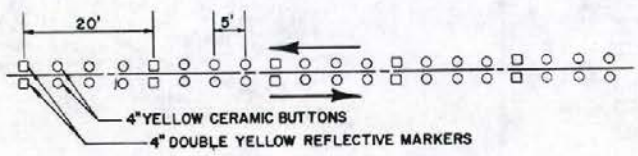


LANE LINE

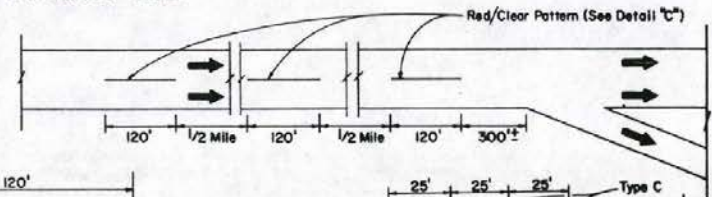
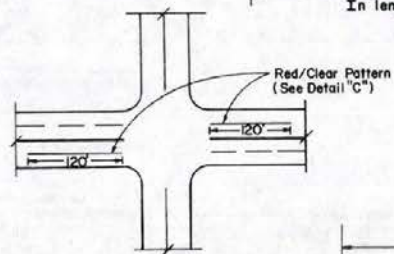
* CLEAR SIDE SHALL FACE ON-COMING TRAFFIC.



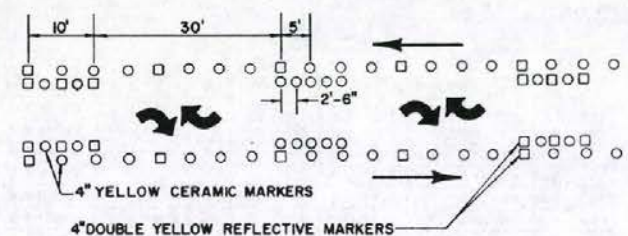
STORAGE LINE



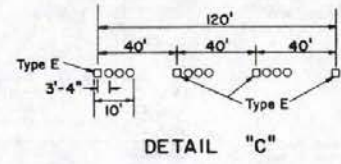
DOUBLE YELLOW CENTER LINE



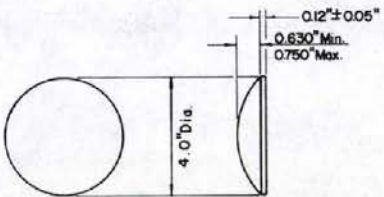
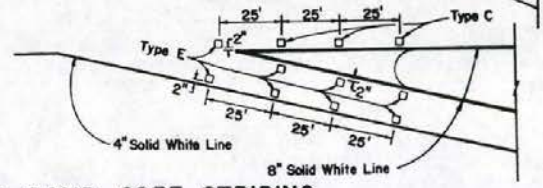
EXIT RAMP GORE STRIPING



TWO WAY LEFT TURN LANE

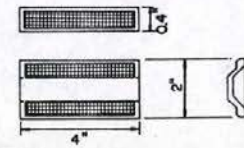


DETAIL "C"



NON-REFLECTIVE & REFLECTIVE MARKERS

- TYPE A - NON - REFLECTIVE YELLOW MARKER
- TYPE B - NON - REFLECTIVE WHITE MARKER
- TYPE C - CLEAR REFLECTIVE MARKER
- TYPE D - TWO WAY YELLOW REFLECTIVE MARKER
- TYPE E - RED/CLEAR REFLECTIVE MARKER



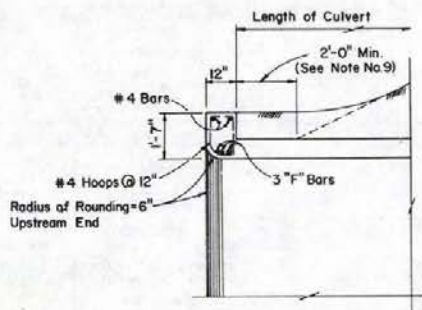
STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

PAVEMENT MARKER

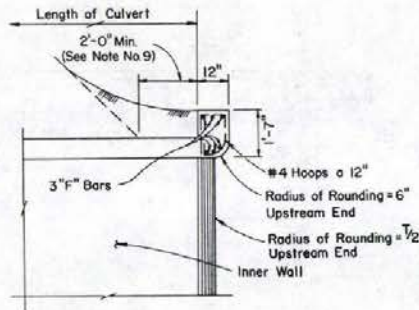
T-37.1.1 (033)

ADOPTED 2/79 REVISION 1-87

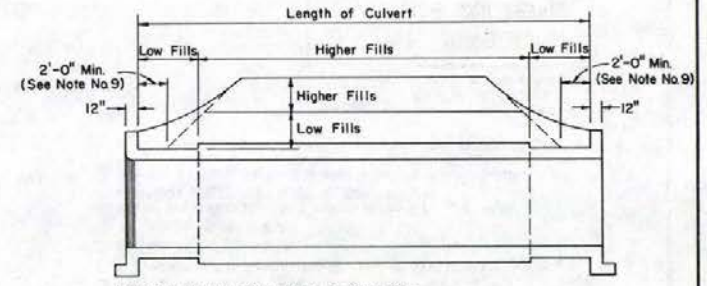
CHIEF TRAFFIC ENGR.



SINGLE SPAN

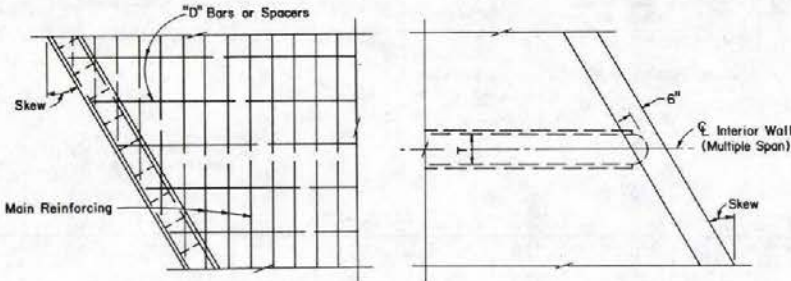


MULTIPLE SPAN

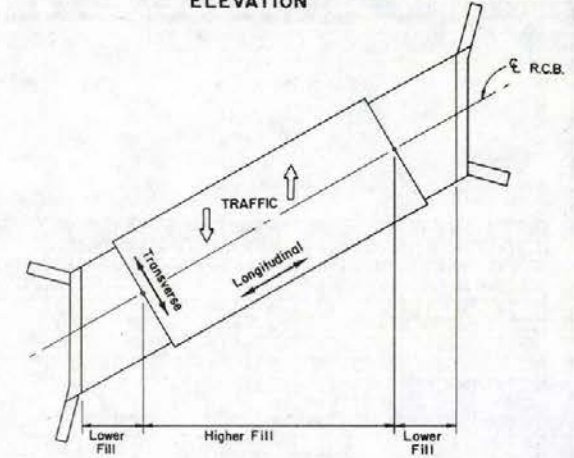


Low Fills = Lowest Table Value for Given Span
Higher Fills = Slab Increase as Shown in Table

ELEVATION

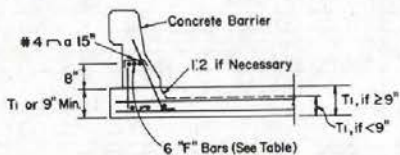


PLANS - SKEWED



PLAN - SKEWED

FILL HEIGHT TRANSITIONS



BARRIER SECTION

PARAPET DETAILS
COPING REINFORCING INCLUDED IN THE HEADWALL QUANTITIES

		SKEWED PARAPETS						
SKEW ANGLE	SPAN	5	6	7	8	10	12	14
0°-15°	BAR NO.	4	5	5	6	7	8	8
16°-30°	BAR NO.	5	6	6	7	8	8	8
31°-45°	BAR NO.	6	6	6	7	8	8	8
0°-45°	#4 HOOPS	12" CTR						

COVER HEIGHTS	TON/SQ. FT.	
	10 FT.	20 FT.
6 FT.	1.0	1.6
8 FT.	1.1	1.7
10 FT.	1.2	1.8
12 FT.	1.3	1.9
14 FT.	1.4	2.0

- GENERAL NOTES
- DESIGN SPECIFICATIONS: AASHTO "STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES, 1977," AND INTERIM SPECIFICATIONS THROUGH 1980, EXCEPT AS NOTED BELOW.
 - CONSTRUCTION SPECIFICATIONS: STATE OF NEVADA DEPARTMENT OF HIGHWAYS, "STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION," CURRENT EDITION, AND SPECIAL PROVISIONS THEREON.
 - LOADING: LIVE LOAD: STANDARD HS20-44 OR ALTERNATE FHMA MILITARY LOADING. IMPACT FOR TOP SLAB IS 30% UP TO 3 FT. COVER, NO IMPACT ABOVE 3 FT. COVER. NO IMPACT FOR INVERT. NO SURCHARGE FOR WALLS. FARTH LOAD: EQUIVALENT FLUID PRESSURE FOR TWO CONDITIONS. 1) 140 LBS./CU. FT. VERTICAL, 42 LBS./CU. FT. HORIZONTAL. 2) 140 LBS./CU. FT. VERTICAL, 140 LBS./CU. FT. HORIZONTAL. LOAD FACTORS: 1.50 + 1.5E + 3.5 (E + 3).
 - CONCRETE: THE CONCRETE SHALL HAVE A MINIMUM 28 DAY COMPRESSIVE STRENGTH OF 3,750 PSI. MAXIMUM ALLOWABLE SHEAR, $V_u = 3.5 \sqrt{f'_c}$ PSI, TAKEN AT A DISTANCE "d" FROM THE SUPPORTING MEMBER.
 - REINFORCING STEEL: ALL REINFORCING STEEL TO BE ASTM A615 GRADE 60. MAIN REINFORCEMENT IS TO BE PLACED IN THE TRANSVERSE DIRECTION. STAGGER SPLICES NOT SHOWN. HOOKS MAY BE ROTATED OR TILTED, AS NECESSARY, FOR CLEARANCE. REINFORCEMENT SHALL HAVE A 3/4 INCH CLEARANCE ON BOTTOM OF BOTTOM SLAB AND 2 INCH CLEARANCE ON REMAINDER OF STRUCTURE AND ITS APPURTENANCES UNLESS OTHERWISE NOTED ON THE PLANS.
 - FOUNDATION PRESSURE: THE R.C.B. CULVERTS ARE DESIGNED TO THE FOLLOWING SOIL BEARING PRESSURES:

- SPECIAL DESIGN: CULVERTS WITH CONDITIONS, LOADINGS, OR SIZES DISSIMILAR TO THOSE GIVEN ON THESE R.C.B. CULVERT SHEETS MAY REQUIRE A SPECIAL DESIGN.
- DESIGNATION: R.C.B. CULVERTS ARE SHOWN ON PLANS AS SPAN TIMES HEIGHT TIMES LENGTH (10' x 8' x 196' R.C.B.).
- ADDITIONAL LENGTH: LENGTH OF CULVERT SHALL BE INCREASED AS FOLLOWS: ADD 3.0 FT. TO EACH END WHEN COVER AT SHOULDER IS 0.0 TO 3.0 FEET, ADD AN ADDITIONAL 1.0 FT. TO EACH END FOR EACH SUCCEEDING 3.0 FT. OF COVER OR PORTION THEREOF.
- HEADWALLS: ALL R.C.B. CULVERTS SHALL HAVE TYPE I HEADWALLS UNLESS OTHERWISE NOTED ON THE PLANS.
- QUANTITIES: QUANTITIES DO NOT INCLUDE "d" BARS, NOR SPLICES IN BARS, NOR TEMPERATURE BARS FOR EXPOSED TOP SLAB, NOR CONCRETE OR REINFORCEMENT FOR PARAPETS OR PAVING LEDGES.
- THREE OR MORE CELLS: FOR CULVERTS WITH MORE THAN TWO CELLS, USE DIMENSIONS AND REINFORCEMENT FOR THE "DOUBLE BOX CULVERT" AND ADJUST THE QUANTITIES ACCORDINGLY.

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

R.C.B., CULVERTS,
GENERAL NOTES

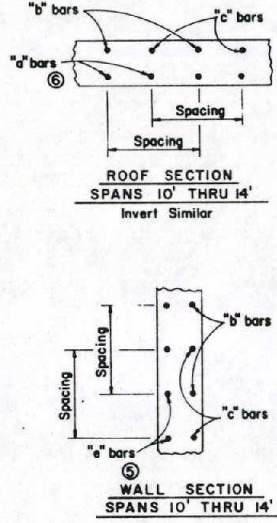
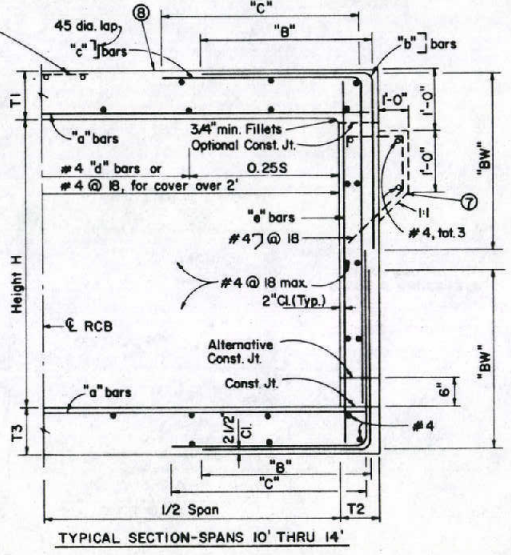
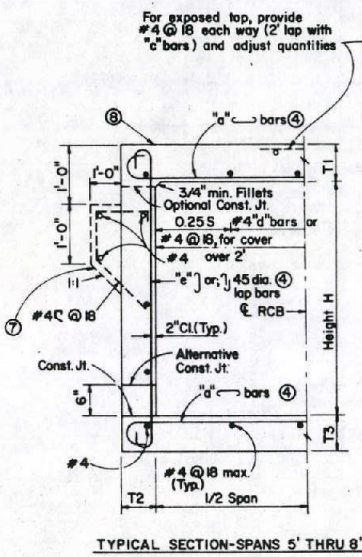
Chief Bridge Engr. *Hugh E. Dierma* B-20.11(502)
ADOPTED 11/73 REVISION
2-3/82

SPAN	5					6					7					8							
	HEIGHT	3	4	5	5	3	4	5	6	6	3	4	5	6	7	3	4	5	6	7	8		
MAXIMUM EARTH COVER	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	
ROOF	T1	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	
MALLS	T2	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
INVERT	T3	6 1/2	7	6 1/2	7	6 1/2	7	6 1/2	7	6 1/2	7	6 1/2	7	6 1/2	7	6 1/2	7	6 1/2	7	6 1/2	7	6 1/2	
SPACING		8	5 1/2	8	5 1/2	8	5 1/2	8	5 1/2	8	5 1/2	8	5 1/2	8	5 1/2	8	5 1/2	8	5 1/2	8	5 1/2	8	5 1/2
"a" SIZE BAR	#	7	6	7	6	7	6	7	6	7	6	7	6	7	6	7	6	7	6	7	6	7	6
"a" SIZE BAR	#	4	4	5	5	6	6	4	4	5	5	6	6	4	4	5	5	6	6	4	4	5	5
CONCRETE	CF/LF	10.0	10.2	11.0	12.0	12.5	13.7	11.7	12.3	12.7	14.2	14.2	15.9	15.9	18.3	13.7	14.9	14.6	16.8	16.1	18.5	18.1	21.0
REINFORCEMENT	LBS/LF	58	66	67	81	82	105	70	81	82	96	97	120	124	148	94	94	105	118	121	147	130	177

"a" BARS, FOR EARTH COVERS OF 2' AND LESS TO BE PLACED IN TOP SLAB ONLY

SPAN	5'	6'	7'	8'	10'	12'	14'
NUMBER	6	7	8	9	10	12	16

SPAN	10										12										14									
	HEIGHT	3	4	5	6	7	8	9	10	10	4	5	6	7	8	9	10	11	12	12	7	8	9	10	11	12	13	14		
MAXIMUM EARTH COVER	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20		
ROOF	T1	8	10 1/2	8	10 1/2	8	10 1/2	8	10 1/2	8	10 1/2	8	10 1/2	8 1/2	11	8 1/2	12	8 1/2	12	8 1/2	12	8 1/2	12	9 1/2	12	9 1/2	14	9 1/2	14	
MALLS	T2	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	
INVERT	T3	8	11	8	11	8	11	8	11	8	11	8	11	8	11	8	11	8	12 1/2	8	12 1/2	8	12 1/2	9	12 1/2	9	12 1/2	10	14 1/2	
SPACING		13	12	13	12	13	12	13	12	13	12	13	12	13	12	13	12	13	12	13	12	13	12	13	12	13	12	13	12	
"a" SIZE BAR	#	6	7	6	7	6	7	6	7	6	7	6	7	6	7	6	7	6	7	6	7	6	7	6	7	6	7	6	7	
"b" SIZE BAR	#	6	7	6	7	6	7	6	7	6	7	6	7	6	7	6	7	6	7	6	7	6	7	6	7	6	7	6	7	
"b" DIMENSION "B"	"	2-10	2-11	2-10	2-11	2-11	2-11	3-0	2-11	3-9	2-11	3-9	2-11	3-9	2-11	3-9	2-11	3-9	3-9	3-9	3-9	3-9	3-7	3-9	3-7	4-4	4-4	4-4	4-4	
"b" DIMENSION "BW"	"	2-10	3-0	2-10	3-0	4-10	5-0	4-10	5-0	4-10	5-0	4-10	5-0	4-10	5-0	4-10	5-0	6-2	6-2	6-2	6-2	4-11	4-11	4-11	4-11	4-4	4-4	6-5	7-0	
"c" SIZE BAR	#	6	7	6	7	6	7	6	7	6	7	6	7	6	7	6	7	6	7	6	7	6	7	6	7	6	7	6	7	
"c" DIMENSION "C"	"	3-4	3-4	3-4	3-4	3-4	3-4	7-4	4-8	7-7	4-8	8-2	4-8	7-7	4-8	4-4	4-4	4-4	4-4	3-7	8-1	5-7	8-1	5-7	8-1	5-7	8-1	5-7	8-1	
"c" SIZE BAR	#	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	
CONCRETE	CF/LF	19.1	24.3	20.4	25.6	21.6	26.8	23.0	29.5	24.3	31.0	25.6	34.1	27.8	37.7	32.1	42.3	24.2	34.6	25.5	36.2	26.8	37.7	29.3	40.1	30.3	41.9	32.2	45.4	
REINFORCEMENT	LBS/LF	161	230	169	237	191	267	233	285	260	325	300	339	314	327	360	373	271	331	278	339	295	362	353	409	365	420	402	413	



- NOTES
- FOR BOXES WITH SPAN OR HEIGHT LESS THAN ANY OF THOSE SHOWN IN TABLE, USE NEXT GREATER SIZE BOX CONCRETE DIMENSIONS AND REINFORCEMENT. MAKE NECESSARY CHANGES IN BAR LENGTHS AND QUANTITIES.
 - FOR BOXES WITH SPAN OR HEIGHT OR COVER GREATER THAN THOSE SHOWN IN TABLES, A SPECIAL DESIGN IS REQUIRED.
 - QUANTITIES ARE APPROXIMATE AND FOR DESIGN PURPOSES ONLY.
 - IT IS PERMISSIBLE TO ELIMINATE THE 180° HOOKS ON EVERY OTHER BAR.
 - "a" BARS ARE AT HALF SPACING.
 - "c" BARS ARE AT HALF SPACING.
 - PROVIDE PAVING NOTCH WHEN TOP IS EXPOSED AND WHERE P.C.C. PAVEMENT OR APPROACH SLAB IS USED. ADJUST THE QUANTITIES.
 - WHEN TOP IS EXPOSED, THE TOP SLAB CONCRETE SHALL BE "EA", f'c=5000 psi. OR "A", f'c=4000 psi. AS DETERMINED BY THE ENGINEER. IF "EA" CONCRETE IS TO BE USED, THE TOP SLAB REINFORCING STEEL SHALL HAVE AN EPOXY COATING.

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

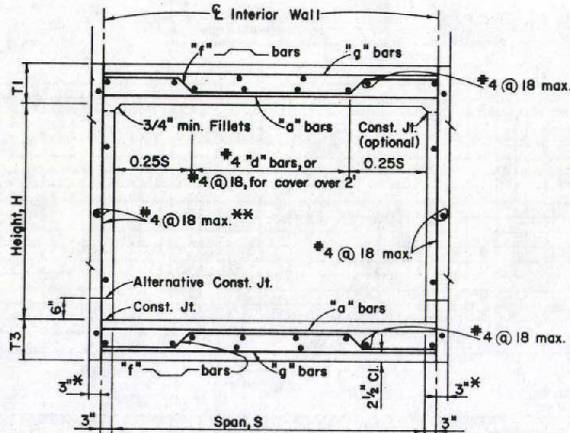
**SINGLE
RCB CULVERTS**

High E. Brinson
CHIEF ENGINEER

B-2012(5-2)
ADOPTED 8/78 REVISION 3-9/82

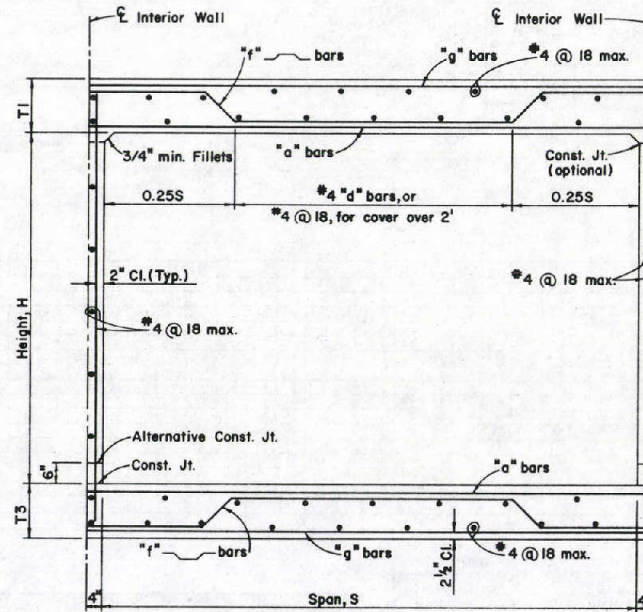
SPAN	5					6					7					8																				
	HEIGHT		3		4		5		6		3		4		5		6		3		4		5		6		7		8							
MAX. EARTH COVER	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20								
CONCRETE CF/LF	7.9	8.6	8.4	9.1	8.9	9.6	9.1	11.3	9.6	11.8	10.1	12.3	10.6	12.8	10.9	14.3	11.4	14.8	11.9	15.3	12.4	15.8	13.2	16.3	12.8	17.4	13.3	17.9	13.8	18.4	14.3	18.9	14.8	19.4	15.3	19.9
REINF LBS/LF	56	54	58	57	60	56	81	68	83	70	86	73	88	75	102	94	104	96	107	98	109	100	110	101	133	106	135	108	137	111	139	113	140	114	142	116

SPAN	10										12										14																													
	HEIGHT		3		4		5		6		7		8		9		10		4		5		6		7		8		9		10		11		12		13		14											
MAX. EARTH COVER	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20												
CONCRETE CF/LF	18.0	24.2	18.7	24.9	19.3	25.6	20.0	26.2	20.7	26.9	21.3	27.6	22.5	28.2	23.1	28.9	23.8	33.8	24.4	34.5	25.1	35.1	25.8	35.8	26.4	36.5	27.1	37.1	27.8	37.8	28.4	38.5	29.1	39.1	32.8	45.6	33.4	46.3	34.1	46.9	34.8	47.6	35.4	48.3	36.1	48.9	36.8	49.6	37.4	50.3
REINF LBS/LF	141	160	142	161	144	163	139	165	145	158	147	160	144	162	145	156	196	219	198	221	201	223	201	224	203	216	205	218	196	219	199	210	201	212	246	261	249	264	251	266	252	267	254	269	256	271	246	272	248	274



TYPICAL SECTION - 5' THRU 8' SPANS

* - Concrete For This Portion Is Included In Quantities Of Adjoining Cells.
 ** - Reinforcing Steel Included In Previous Cells Quantities.



TYPICAL SECTION - 10' THRU 14' SPANS

- NOTES
- NOTES ON (1), (2), (3), & (7) OF SHEET B-20.1.3(502) SHALL APPLY.
 - WHEN THE ADDITION OF CELLS CAUSES THE LENGTHS OF THE "f", "g", AND "a" BARS TO EXCEED 60 FEET, THE BARS WILL REQUIRE SPLICING. SPLICES FOR THE "a" BARS SHALL BE CENTERED ABOUT THE CENTER LINE OF THE INTERIOR WALLS. SPLICES FOR THE "g" BARS SHALL BE CENTERED ABOUT THE CENTER OF THE CELLS. SPLICES FOR THE "f" BARS SHALL BE DONE AT THE 45 DEGREE LEG AND CONFORM TO THE SPLICE DETAIL SHOWN. SPLICE LOCATIONS SHALL BE ALTERNATED FROM BAR TO BAR. SEE DETAIL SHOWN. SPLICE LENGTHS FOR THE "g" AND "a" BARS SHALL BE AS FOLLOWS:
 - #4 BARS = 16 INCHES
 - #6 BARS = 24 INCHES
 - #7 BARS = 31 INCHES
 - #8 BARS = 40 INCHES
- 12" **"f" BAR SPLICE DETAIL**
- ALTERNATING SPLICE DETAIL**
- FOR DIMENSIONS, BAR SIZES, BAR SPACING, AND ROOF SECTION SPACING DETAIL, SEE SHEET B-20.1.3(502). FOR GENERAL NOTES, SEE SHEET B-20.1.1(502).

STATE OF NEVADA
 DEPARTMENT OF TRANSPORTATION

ADDITIONAL CELLS TO BE USED
 WITH DOUBLE RCB CULVERTS TO
 PROVIDE FOR MULTIPLE CELL CULVERTS

J. J. [Signature]
 CHIEF BRIDGE ENGR

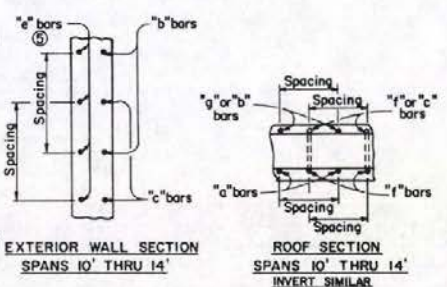
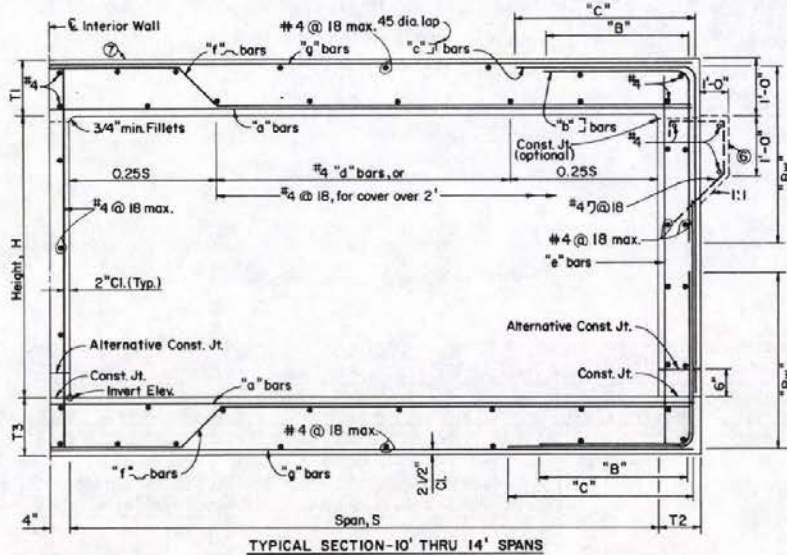
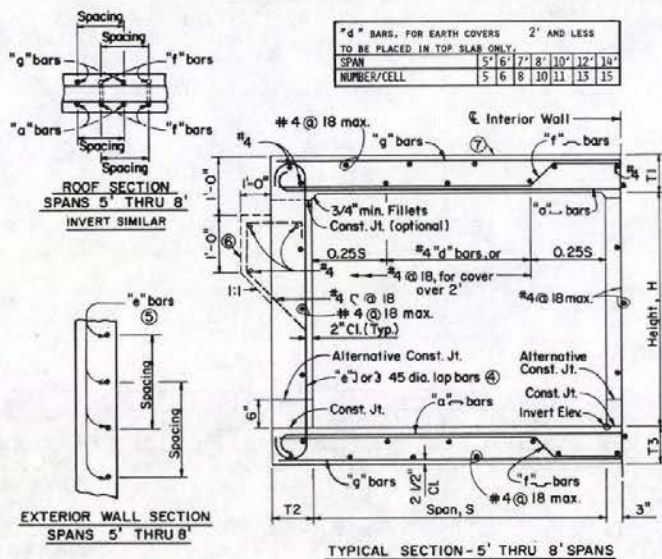
B-20.1.3.1 (502)
 ADOPTED 8/84 REVISION

SPAN	3				5				6				7				8																				
	HEIGHT	3	4	5	6	7	8	9	10	3	4	5	6	7	8	9	10	3	4	5	6	7	8	3	4	5	6	7	8								
MAXIMUM EARTH COVER	T1	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20										
CONC.	ROOF	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7										
	EXTERIOR WALL	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6										
	INVERT	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7										
REINFC.	SPACING	11 1/4	14	11 1/4	14	11 1/4	15	11 1/4	12	11 1/4	12	11 1/4	12	11 1/4	12	11 1/4	12	11 1/4	12	11 1/4	12	11 1/4	12	11 1/4	12	11 1/4	12										
	"g" SIZE	BAR #	4	7	4	7	4	7	4	7	4	7	4	7	4	7	4	7	4	7	4	7	4	7	4	7	4	7									
	"f" SIZE	BAR #	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5									
	"a" SIZE	BAR #	6	4	6	4	6	4	6	4	6	4	6	4	6	4	6	4	6	4	6	4	6	4	6	4	6	4									
	"c" SIZE	BAR #	4	5	5	6	5	7	4	5	6	5	6	5	6	7	4	5	6	5	6	7	4	5	6	5	6	7	4								
CONCRETE	CF/LF	17.8	19.3	13.3	21.6	21.3	23.8	20.1	24.6	21.6	27.0	23.6	29.7	25.8	32.2	23.7	30.8	25.2	33.3	27.2	35.5	29.4	33.1	32.4	41.8	27.8	36.5	29.2	40.1	31.2	42.4	35.4	45.3	36.4	48.9	39.0	52.6
REINFORCEMENT	LBS/LF	122	121	134	157	145	162	186	162	192	179	206	190	227	212	207	140	220	208	227	228	252	262	260	276	270	224	285	237	302	266	340	279	350	312	360	326

NOTES

- FOR BOXES WITH SPAN OR HEIGHT LESS THAN ANY OF THOSE SHOWN IN TABLE. USE NEXT GREATER SIZE BOX CONCRETE DIMENSIONS AND REINFORCEMENT. MAKE NECESSARY CHANGES IN BAR LENGTHS AND QUANTITIES.
- FOR BOXES WITH SPAN OR HEIGHT OR COVER GREATER THAN THOSE SHOWN IN TABLES, A SPECIAL DESIGN IS REQUIRED.
- QUANTITIES ARE APPROXIMATE AND FOR DESIGN PURPOSES ONLY.
- IT IS PERMISSIBLE TO ELIMINATE THE 180° HOOKS ON EVERY OTHER "a" BAR.
- "a" BARS ARE AT HALF SPACING.
- PROVIDE PAVING NOTCH WHEN TOP IS EXPOSED AND WHERE P.C.C. PAVEMENT OR APPROACH SLAB IS USED. ADJUST THE QUANTITIES.
- WHEN TOP IS EXPOSED, THE TOP SLAB CONCRETE SHALL BE "EA", F'C = 4500 PSI, OR "A", F'C = 4000 PSI, AS DETERMINED BY THE ENGINEER. IF "EA" CONCRETE IS TO BE USED, THE TOP SLAB REINFORCING STEEL SHALL HAVE AN EPOXY COATING.

SPAN	10														12														14													
	HEIGHT	3	4	5	6	7	8	9	10	3	4	5	6	7	8	9	10	3	4	5	6	7	8	9	10	3	4	5	6	7	8	9	10									
MAXIMUM EARTH COVER	T1	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20									
CONC.	ROOF	9	12	9	12	9	12	9	12	9	12	9	12	9	12	9	12	9	12	9	12	9	12	9	12	9	12	9	12	9	12	9	12									
	EXTERIOR WALLS	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8									
	INVERT	9	12	9	12	9	12	9	12	9	12	9	12	9	12	9	12	9	12	9	12	9	12	9	12	9	12	9	12	9	12	9	12									
REINFORCEMENT	SPACING	11 1/4	14	11 1/4	14	11 1/4	15	11 1/4	12	11 1/4	12	11 1/4	12	11 1/4	12	11 1/4	12	11 1/4	12	11 1/4	12	11 1/4	12	11 1/4	12	11 1/4	12	11 1/4	12	11 1/4	12											
	"g" SIZE	BAR #	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7											
	"f" SIZE	BAR #	7	5	7	5	7	5	7	5	7	5	7	5	7	5	7	5	7	5	7	5	7	5	7	5	7	5	7	5	7	5										
	"a" SIZE	BAR #	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4										
	"c" SIZE	BAR #	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5										
	"b" DIMENSION	"b"	1-9	2-7	1-9	2-7	1-9	2-7	2-0	2-9	2-3	2-9	2-7	3-1	2-7	3-1	2-7	3-1	2-7	3-1	2-7	3-1	2-7	3-1	2-7	3-1	2-7	3-1	2-7	3-1	2-7	3-1										
	"b" DIMENSION	"b"	3-6	3-10	3-6	3-10	4-0	4-11	4-0	4-11	4-0	4-11	4-0	4-11	4-0	4-11	4-1	5-2	4-1	5-2	4-1	5-2	4-1	5-2	4-1	5-2	4-1	5-2	4-1	5-2	4-1	5-2										
	"c" DIMENSION	"c"	3-0	2-9	3-0	2-9	3-1	2-9	3-3	4-6	4-3	5-6	4-6	4-9	6-0	4-9	5-10	3-7	5-10	3-7	5-10	3-7	5-10	3-7	5-10	3-7	5-10	3-7	5-10	3-7	5-10	3-7										
	"c" DIMENSION	"c"	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4										
	CONCRETE	CF/LF	35.0	51.8	41.0	53.8	42.7	55.6	44.7	58.2	46.7	61.8	48.7	65.6	52.5	70.0	58.3	78.5	51.3	72.4	55.3	74.4	55.0	75.3	57.0	79.1	59.8	83.8	62.7	88.1	65.9	92.7	69.1	98.8	73.7	104						
REINFORCEMENT	LBS/LF	359	435	340	428	370	454	383	494	418	494	460	510	486	550	518	586	505	567	514	577	553	604	563	646	600	663	614	688	627	691	701	749	733	764							



NOTE: This plan sheet may be used for Multiple Cell Culverts by making necessary adjustments.

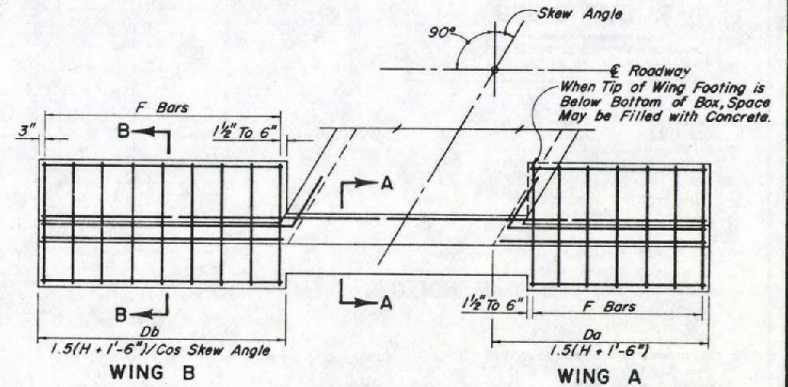
STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

DOUBLE RCB CULVERTS

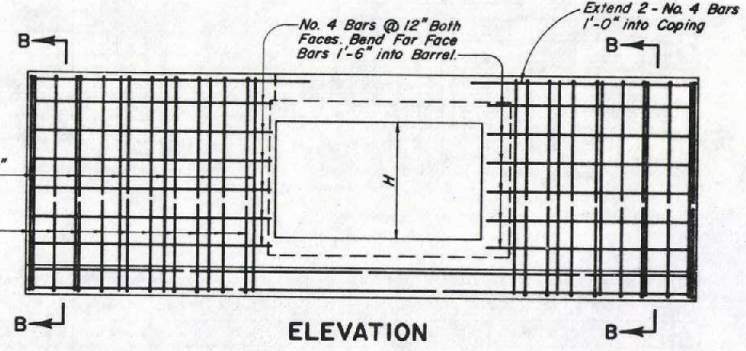
Highway Division
CHIEF ENGINEER

B-20.1.3(502)
ADOPTED 12/2013 REVISION 12-3/13

SPAN	HEIGHT	CUBIC YARDS OF CONCRETE AND POUNDS OF REINFORCING FOR TWO TYPE II HEADWALLS																								SPAN	HEIGHT
		SINGLE BOX								DOUBLE BOX								TRIPLE BOX									
		0° SKEW		15° SKEW		30° SKEW		45° SKEW		0° SKEW		15° SKEW		30° SKEW		45° SKEW		0° SKEW		15° SKEW		30° SKEW		45° SKEW			
CONC.	REINF.	CONC.	REINF.	CONC.	REINF.	CONC.	REINF.	CONC.	REINF.	CONC.	REINF.	CONC.	REINF.	CONC.	REINF.	CONC.	REINF.	CONC.	REINF.	CONC.	REINF.	CONC.	REINF.				
5	3	9.4	871	9.4	888	10.2	947	11.5	1073	11.4	991	11.6	1013	12.4	1085	14.3	1243										
5	4	12.8	1141	12.8	1163	13.5	1237	15.6	1399	14.8	1261	15.0	1287	15.9	1376	18.6	1568	16.8	1367	17.0	1397	18.5	1498	21.4	1718		
5	5	16.4	1678	16.6	1707	17.5	1813	19.8	2044	18.6	1795	18.6	1831	19.9	1952	22.8	2214	20.6	1901	20.8	1941	22.3	2074	25.6	2364		
5	6	9.3	896	9.8	903	10.6	963	12.1	1094	12.2	1094	12.2	1119	13.2	1204	15.3	1399										
6	3	13.2	1158	13.2	1178	14.1	1254	15.2	1419	15.4	1364	15.6	1395	16.7	1495	19.4	1714	17.8	1536	18.0	1572	19.5	1693	22.8	1957		
6	4	16.8	1690	17.8	1722	18.9	1830	20.5	2064	20.0	1898	20.4	1937	21.7	2071	24.8	2360	22.4	2070	22.8	2116	24.5	2269	28.2	2605		
6	5	32.0	3666	32.3	3733	34.2	3960	38.6	4453																		
6	6	10.2	900	10.2	918	11.0	980	12.5	1114																		
7	3	13.6	1170	13.6	1195	14.5	1270	16.6	1439																		
7	4	17.2	1704	17.3	1736	18.3	1846	20.9	2085																		
7	5	26.2	2612	26.3	2660	28.0	2824	31.7	3181																		
7	6	32.2	3682	32.7	3750	34.6	3978	39.0	4485																		
7	7	10.6	914	10.6	933	11.4	996	13.1	1134	13.8	1296	14.0	1328	15.2	1437	17.1	1675										
8	3	14.0	1184	14.0	1207	14.9	1287	17.0	1460	17.0	1566	17.2	1602	18.5	1728	21.6	2000	20.2	1830	20.4	1876	24.1	2033	26.0	2373		
8	4	17.6	1718	17.7	1781	18.8	1863	21.3	2105	20.8	2100	20.9	2146	22.6	2304	25.9	2646	24.8	2364	25.1	2420	27.0	2609	31.5	3019		
8	5	26.4	2626	26.7	2675	28.4	2941	32.1	3201	29.2	3008	29.9	3070	31.8	3282	36.3	3742	32.4	3272	33.1	3344	35.4	3567	40.9	4115		
8	6	32.8	3697	33.0	3765	34.9	3955	39.3	4496	35.8	4067	36.2	4147	38.5	4422	43.7	5019	39.0	4331	39.6	4421	42.3	4727	48.3	5392		
8	7	40.4	4979	40.8	5070	43.3	5377	48.8	6046	43.8	5332	44.2	5434	47.1	5785	53.3	6546	47.0	5596	47.6	5708	50.9	6190	57.9	6919		
8	8	11.4	943	11.4	962	12.5	1029	14.3	1174	14.8	1604	15.0	1648	16.3	1793	18.9	2110										
10	3	14.6	1212	14.7	1237	15.8	1320	18.1	1500	18.2	1874	18.3	1922	19.8	2084	24.1	2435										
10	4	18.4	1747	18.5	1781	19.8	1895	22.5	2145	20.4	2408	22.0	2466	23.9	2660	26.8	3081	25.6	2836	25.9	2909	28.2	3154	32.9	3686		
10	5	27.0	2655	27.2	2705	28.9	2978	32.8	3241	30.4	3316	31.2	3390	33.1	3638	38.0	4117	34.1	3744	35.0	3833	37.5	4132	43.4	4782		
10	6	33.4	3729	33.8	3799	36.1	4033	40.9	4542	37.2	4375	37.6	4467	40.1	4778	45.7	5454	41.0	4803	41.6	4910	44.5	5272	51.1	6059		
10	7	41.2	5015	41.5	5107	44.0	5419	48.6	6097	44.4	5640	44.7	5724	47.8	6141	54.2	6981	48.4	6068	48.9	6197	52.2	6635	69.8	7586		
10	8	49.8	5687	50.2	5791	53.1	6144	59.6	6909																		
10	9	61.0	8535	61.4	8690	65.2	9216	73.2	10,358	65.2	9109	65.8	9285	70.2	9878	79.2	11,169	69.6	9537	70.4	9728	75.2	10,372	85.4	11,774		
12	3	15.4	1241	15.5	1266	16.6	1356	19.1	1540	19.6	2290	19.9	2352	21.4	2564	24.9	3023										
12	4	18.8	1775	18.9	1810	20.2	1929	22.9	2185	23.0	2824	23.1	2896	25.0	3140	28.9	3669										
12	5	28.0	2683	28.2	2734	29.9	2908	33.9	3281	32.2	3732	33.6	3820	35.1	4118	40.1	4786	36.8	4381	37.4	4492	40.3	4867	46.7	5683		
12	6	34.2	3761	33.8	3831	36.5	4069	41.3	4596	38.4	4791	39.0	4897	41.6	5258	47.5	6042	43.0	5440	43.8	5569	47.0	6007	54.1	6960		
12	7	42.0	5050	42.1	5143	44.8	5459	50.6	6147	46.6	6056	46.9	6140	50.2	6621	56.0	7569	51.2	6705	51.7	6856	55.9	7370	63.6	8487		
12	8	50.4	5722	50.8	5828	53.8	6187	60.6	6959	55.2	6728	55.8	6869	59.4	7346	67.4	8381	60.0	7377	60.8	7541	65.0	8095	74.2	9299		
12	9	61.8	8580	62.3	8736	65.9	9267	74.3	10,421	66.6	9525	67.1	9715	71.4	10,358	81.1	11,757	71.4	10,174	72.3	10,387	77.5	11,107	88.1	12,675		
12	10	88.0	12,939	88.8	13,172	94.0	13,963	105.7	15,682	93.2	13,894	94.2	14,150	99.8	15,054	113.1	17,018	98.0	14,533	99.2	14,822	105.6	15,803	119.4	17,936		



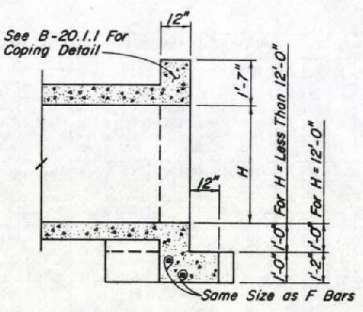
PLAN



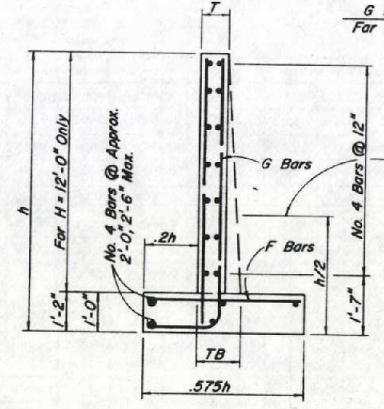
ELEVATION

NOTE: For General Notes See Sheet B-20.1.1

H - FEET	T - INCHES	TB - INCHES	G BARS		F BARS	
			SIZE NO.	SPACE IN.	SIZE NO.	SPACE IN.
4	8	8	9	4	12	
4	8	8	9	4	12	
5	9	6	9	4	11	
6	10	7	10	4	6 1/2	
7	12	7	8 1/2	5	7 1/2	
8	12	7	6 1/2	6	8	
9	12	7	7	6	7 1/2	
10	12	8	6 1/2	8	10	
12	12	20	9	7	8 1/2	



SECTION A-A



SECTION B-B

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

**RCB CULVERTS
TYPE II HEADWALLS**

David A. ...
CHIEF BRIDGE ENGR.

B-20.1.4 - (502)
ADOPTED 11/70 REVISION


CUBIC YARDS OF CONCRETE AND POUNDS OF REINFORCING FOR TWO TYPE I HEADWALLS

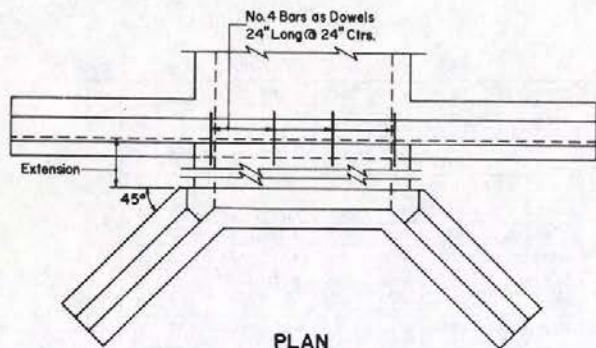
SPAN HEIGHT	SINGLE BOX								DOUBLE BOX								TRIPLE BOX									
	0°SKEW		15°SKEW		30°SKEW		45°SKEW		0°SKEW		15°SKEW		30°SKEW		45°SKEW		0°SKEW		15°SKEW		30°SKEW		45°SKEW			
	CONC.	REINF.	CONC.	REINF.	CONC.	REINF.	CONC.	REINF.	CONC.	REINF.	CONC.	REINF.	CONC.	REINF.	CONC.	REINF.	CONC.	REINF.	CONC.	REINF.	CONC.	REINF.	CONC.	REINF.		
5	3	5.6	393	6.4	476	7.2	563	8.9	739	7.7	508	8.5	597	9.5	700	11.8	910									
	4	7.6	609	8.0	644	9.6	774	11.6	946	9.7	726	10.1	767	12.0	912	14.6	1119	11.8	842	12.3	886	14.4	1045	17.6	1280	
	5	9.6	705	10.2	782	11.8	942	15.0	1238	11.7	825	12.4	908	14.3	1085	18.0	1414	13.9	944	14.6	1030	16.8	1220	21.0	1578	
6	3	6.0	418	6.6	504	7.6	595	9.4	779	8.3	600	9.2	699	10.3	817	12.7	1062									
	4	7.9	637	8.3	673	10.0	807	12.1	985	10.3	821	10.8	869	12.7	1032	15.5	1270	12.6	1004	13.2	1058	15.4	1243	18.8	1525	
	5	9.9	730	10.6	809	12.2	974	15.4	1278	12.3	917	13.0	1009	15.0	1203	18.8	1566	14.7	1103	15.5	1199	17.7	1413	22.1	1823	
	6	12.4	983	12.6	1106	15.5	1505	20.4	2158	14.8	1173	15.0	1310	18.3	1740	23.7	2449	17.2	1361	17.5	1502	21.0	1951	27.1	2708	
7	3	6.3	442	7.1	532	8.0	626	9.9	820																	
	4	8.3	665	8.7	702	10.4	839	12.6	1025																	
	5	10.3	756	10.9	837	12.6	1006	15.9	1319																	
	6	12.8	1011	12.9	1137	15.9	1544	20.8	2209																	
8	3	5.7	467	7.5	559	8.4	658	10.4	861	7.8	817	10.7	1064	11.8	1109	14.5	1268									
	4	8.6	693	9.1	731	10.8	872	13.1	1065	11.8	1045	12.3	1078	14.3	1238	17.3	1475	14.9	1320	15.5	1365	17.8	1558	21.4	1858	
	5	10.6	782	11.3	864	13.0	1038	16.4	1360	13.8	1137	14.5	1216	16.6	1405	20.6	1773	17.0	1414	17.8	1501	20.2	1720	25.0	2159	
	6	13.1	1039	13.3	1169	16.3	1583	21.3	2261	16.4	1401	16.6	1525	19.9	1958	25.6	2676	19.6	1677	19.9	1814	23.6	2276	29.9	3065	
	7	16.0	1464	16.7	1673	20.6	2242	27.5	3219	19.2	1824	21.0	2133	24.3	2620	31.8	3637	22.5	2107	24.4	2428	28.0	2946	36.1	4029	
	8	17.9	1904	20.2	2234	24.2	2778	33.1	3938	21.2	2267	23.6	2552	27.9	3051	39.5	4359	24.5	2552	27.0	2850	31.7	3381	43.9	4753	
	9	7.3	515	8.2	612	9.2	721	11.4	942	11.2	1111	12.2	1227	13.6	1383	16.8	1734									
10	4	9.3	749	9.8	789	11.6	936	14.1	1144	13.2	1348	13.8	1396	16.1	1608	19.6	1939									
	5	11.3	833	12.0	920	13.8	1101	17.4	1441	15.2	1434	16.1	1531	18.4	1770	23.0	2239	19.2	1876	20.1	1985	22.9	2274	28.5	2857	
	6	13.8	1093	14.0	1233	17.1	1661	22.3	2365	17.8	1697	18.1	1775	21.7	2187	28.0	3165	21.8	2141	22.2	2219	26.3	2666	33.6	3786	
	7	16.6	1528	17.4	1745	21.4	2329	28.4	3334	20.7	2135	21.6	2359	26.1	3006	34.1	4137	24.7	2582	25.8	2821	30.7	3519	39.8	4761	
	8	18.6	1978	20.9	2314	25.0	2870	34.1	4054	22.7	2587	25.2	2935	29.7	3544	39.9	4860	26.8	3037	29.4	3399	34.4	4057	45.6	5486	
	9	23.2	2117	25.4	2482	31.1	3244	41.4	4597																	
	10	29.5	3352	31.6	3598	38.6	4397	51.7	5892	33.7	3967	36.0	4217	43.5	5077	57.6	6703	37.8	4422	40.3	4688	48.3	5598	63.5	7335	
12	4	10.0	804	10.5	848	12.4	1001	15.1	1224	14.6	1732	15.2	1806	17.6	2090	21.5	2549									
	5	12.0	884	12.7	975	14.6	1165	18.4	1522	16.6	1815	17.5	1941	20.0	2247	24.9	2849									
	6	14.5	1148	14.7	1296	17.9	1738	23.3	2469	19.2	2086	19.6	2244	23.3	2817	29.9	3799	23.9	2744	24.4	2922	28.7	3576	36.5	4733	
	7	17.3	1591	18.1	1817	22.2	2416	29.4	3449	22.1	2531	23.0	2775	27.7	3497	36.1	4782	26.8	3195	27.9	3460	33.1	4261	42.8	5719	
	8	18.3	1945	21.8	2404	25.8	2962	35.1	4171	23.1	2884	26.7	3396	31.3	4048	41.8	5506	27.8	3554	31.6	4094	36.8	4830	48.6	6446	
	9	23.9	2181	26.1	2563	31.9	3327	42.4	4704	28.7	3123	31.1	3522	37.5	4414	49.2	6042	33.5	3796	36.1	4218	43.0	5191	56.1	6984	
	10	30.2	3429	32.3	3680	39.4	4488	52.7	6003	35.0	4373	37.4	4646	45.1	5580	59.6	7344	39.9	5049	42.4	5341	50.7	6353	66.5	8289	
12	42.8	5137	47.2	5372	56.4	6075	80.1	8124	47.8	6087	52.3	6340	62.2	7141	87.2	9470	52.7	6768	57.5	7045	67.9	7930	94.2	10,420		

B-7

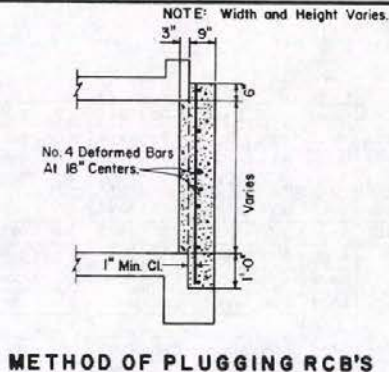
STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

**ESTIMATE OF QUANTITIES
TYPE I HEADWALLS**


B-20.16-(502)
 ADOPTED 11/70 REVISION

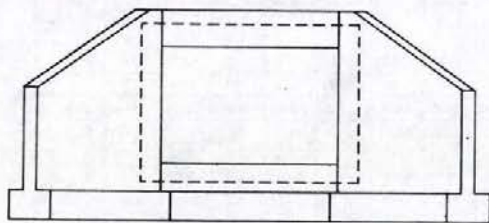


PLAN

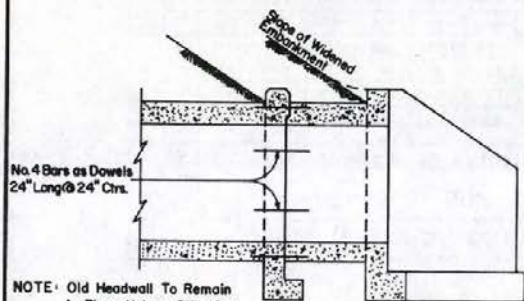


METHOD OF PLUGGING RCB'S

- GENERAL NOTES—
- 1.) ALL CONCRETE SHALL BE CLASS A OR AA.
 - 2.) REINFORCING STEEL SHALL BE DEFORMED BARS WIRED TIGHTLY AT ALL INTERSECTIONS AND EMBEDDED AT LEAST 1" CLEAR OF CONCRETE SURFACE EXCEPT AS NOTED.
 - 3.) FOOTINGS SHOWN ARE OF MINIMUM DEPTH AND SHALL BE EXTENDED IF SOIL IS UNSTABLE.
 - 4.) DOWEL HOLES SHALL BE DRILLED TO FULL DEPTH AND DOWELS CAREFULLY GROUTED IN PLACE WITH A THIN NEAT CEMENT MOTAR.



ELEVATION



NOTE: Old Headwall To Remain
In Place Unless Otherwise
Noted.

PART LONGITUDINAL SECTION
RCB CULVERT EXTENSION

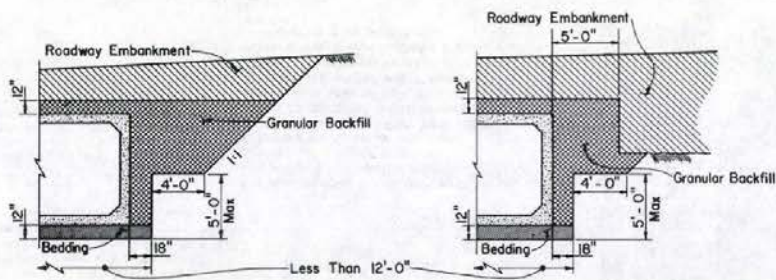
STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

**METHOD OF EXTENDING
RCB CULVERTS**

Jim Olson
CHIEF BRIDGE ENGR

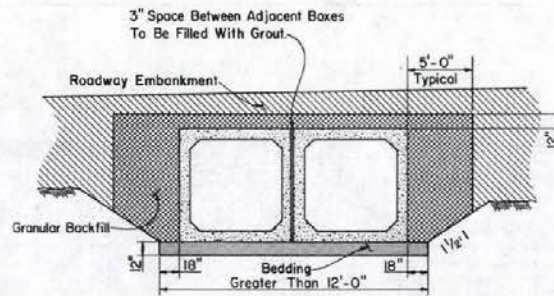
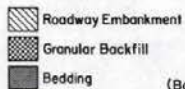
B-2017-(502)
ADOPTED 11/70 REVISION

B-8



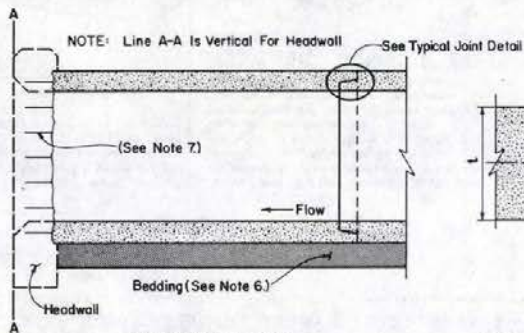
CULVERT IN EXCAVATION

CULVERT IN EMBANKMENT

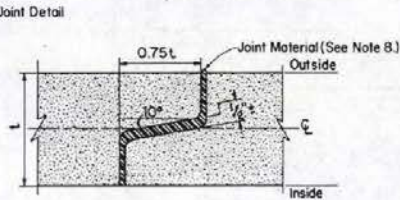


CULVERT IN EXCAVATION OR EMBANKMENT
(SHOWING A DOUBLE CULVERT INSTALLATION)

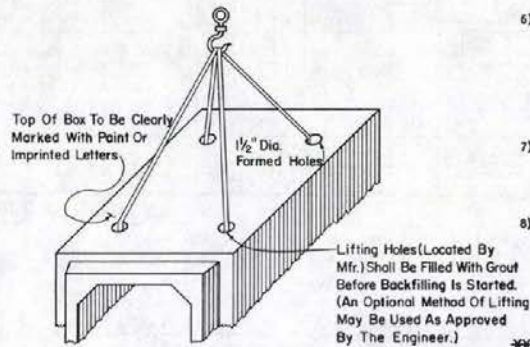
EXCAVATION AND BACKFILL
(Backfill Shown. Excavation As Shown On Sheet R-1.1.4 With The Addition Of The Area For Bedding.)



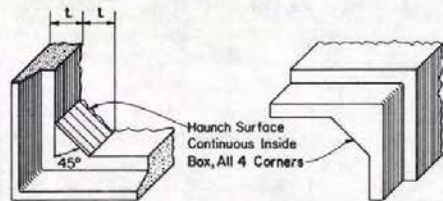
CULVERT END



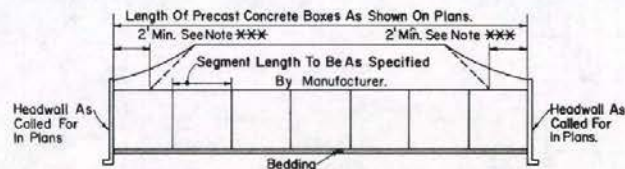
TYPICAL JOINT DETAIL



LIFTING



CORNERS



*** Length of Culvert Shall Be Increased As Follows: Add 2.0' To Each End When Cover At Shoulder Is 0.0' To 5.0' Add An Additional 1.0' To Each End For Each Succeeding 5.0' On Cover Or Portion Thereof.

TYPICAL CULVERT INSTALLATION

GENERAL NOTES

1) DESIGN SPECIFICATIONS: AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES, 1983, AND AASHTO SPECIFICATIONS M259 OR M273 AS INDICATED BY THE FOLLOWING:

CONDITION	MIN. COVER	AASHTO	EQUIV. ASTM
2 FT. OR MORE COVER	2 FT.	M259, TABLE 2	C789, TABLE 2
LESS THAN 2 FT. COVER	0 FT.	M273, TABLE 2	C850, TABLE 2

THE ABOVE SHOWS CONCRETE DIMENSIONS, REINFORCING PLACEMENT, EARTH COVER, AND OTHER DETAILS NEEDED TO MANUFACTURE THE BOX CULVERTS.

2) CONSTRUCTION SPECIFICATIONS: CURRENT EDITION STATE OF NEVADA DEPARTMENT OF HIGHWAYS STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, AND SPECIAL PROVISIONS THERE TO.

3) LIVE LOAD: STANDARD HS20-44 OR FHMA ALTERNATE MILITARY LOADING.

4) THE CONCRETE SHALL BE CLASS AA MODIFIED OR CLASS DA MODIFIED WITH A MINIMUM 28 DAY COMPRESSIVE STRENGTH OF 5000 P.S.I. FOR AN APPROVED "DRY-CAST" MANUFACTURING PROCESS, THE ENTRAINED AIR AND MINIMUM SLOMP REQUIREMENTS MAY BE DISREGARDED.

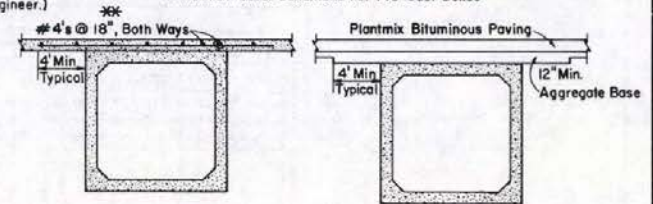
5) REINFORCING STEEL: ALL REINFORCING BARS TO BE ASTM 615 GRADE 60. WELDED WIRE FABRIC SHALL CONFORM TO ASTM A185, SMOOTH WIRE, OR ASTM A497, DEFORMED WIRE.

6) BEDDING: BEDDING MATERIAL SHALL BE EITHER 12 INCHES OF GRANULAR BACKFILL OR 6 INCHES OF TYPE 2 CLASS B AGGREGATE. CHOICE OF BEDDING WILL BE AT THE CONTRACTOR'S OPTION. EXCAVATION FOR BEDDING SHALL BE PAID FOR AS 12 INCHES OF STRUCTURE EXCAVATION AND BEDDING MATERIAL SHALL BE PAID FOR AS 12 INCHES OF GRANULAR BACKFILL REGARDLESS OF WHICH OPTION THE CONTRACTOR USES. BEDDING SHALL NOT BE REQUIRED WHERE EXISTING MATERIAL CAN BE GRADED AND COMPACTED TO MEET THE REQUIREMENTS OF SECTION 207.03.01 OF THE STANDARD SPECIFICATIONS. WHERE BEDDING IS NOT REQUIRED, STRUCTURE EXCAVATION SHALL BE PAID FOR TO THE GRADE LINE OF THE BOXES ONLY.

7) HEADWALLS: HEADWALL DETAILS SHALL BE AS SHOWN IN THE STANDARD PLANS. EXPOSED REINFORCING TO THE CAST-IN-PLACE HEADWALL TO PRECAST BOX SHALL CONSIST OF #4 BARS AT 12-INCH SPACING. THESE #4 BARS SHALL BE CAST A MINIMUM OF 18 INCHES INTO THE PRECAST BOX SEGMENT AND SHALL EXTEND A MINIMUM OF 12 INCHES INTO THE CAST-IN-PLACE HEADWALL.

8) JOINT MATERIAL: JOINT MATERIAL SHALL BE A PREFORMED JOINT MATERIAL MEETING AASHTO SPECIFICATION M198, TYPE B. THE PREFORMED JOINT MATERIAL USED SHALL BE OF SUFFICIENT SIZE THAT WHEN THE BOX SECTIONS ARE IN THEIR FINAL POSITION A "SQUEEZE-OUT" IS EVIDENT AROUND THE EXTERIOR OF THE JOINT. JOINT MATERIAL EXTRUDING FROM THE INTERIOR OF THE JOINT SHALL BE REMOVED FLUSH WITH THE BOX WALL.

* Minimum Cover Conditions For Pre-Cast Boxes



CONCRETE PAVING

BITUMINOUS PAVING

*** Reinforcing Steel Shall Extend Full Width Of Concrete Pavement. The Reinforcement Shall Have A Minimum Clearance Of 3" On The Bottom. In Areas Of The State Where Road Salts Are Used, The Reinforcing Shall Be Epoxy Coated. Reinforcing Is To Be Placed Parallel To The Centerline Of Road For Longitudinal Reinforcement And Parallel To The Precast Box For Transverse Reinforcement.

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

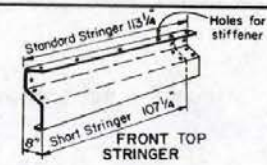
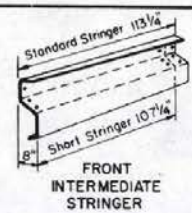
**PRECAST CONCRETE
BOX CULVERT**

Designer To Investigate The Availability Of The Required Box Size.

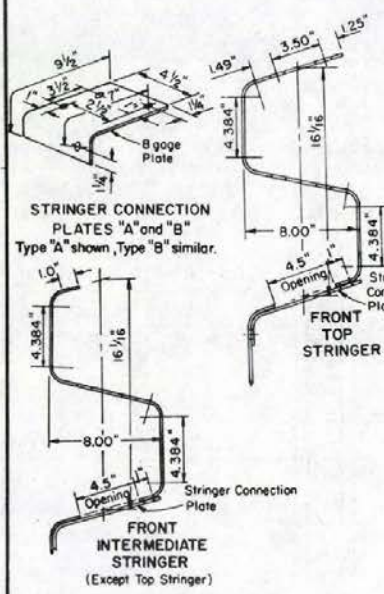
Jim Nelson
CHIEF BRIDGE ENGR.

B-2018-(002)
ADOPTED: 4/85 REVISION

Surcharge Batter	Level No Live Load	With Superimposed Load
Wall On 1:6 Batter		
Wall Vertical		



① Curve number: TABLE Y



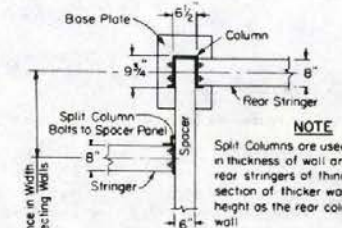
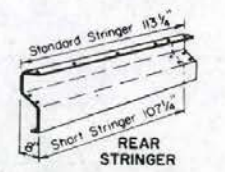
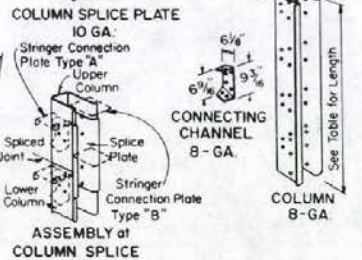
Base Widths

16.5'
14.3'
12.1'
9.9'
7.7'
5.5'

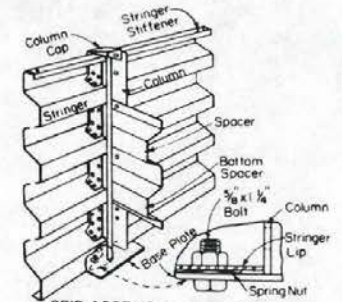
Wall Heights

1.33
2.67
4.00
5.33
6.67
8.00
9.33
10.67
12.00
13.33
14.67
16.00
17.33
18.67
20.00
21.33
22.67
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26.67
28.00
29.33
30.67
32.00
33.33
34.67
36.00

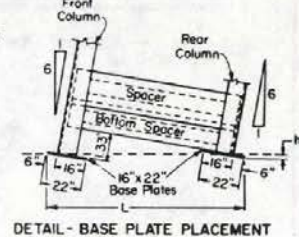
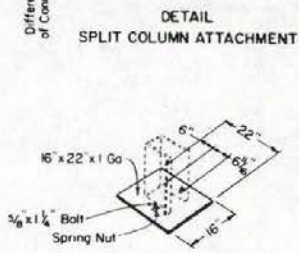
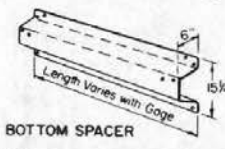
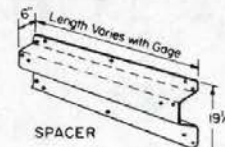
Chart X



NOTE
Split Columns are used where changes in thickness of wall are made to connect rear stringers of thinner wall to transverse section of thicker wall. They are the same height as the rear columns for the thinner wall.

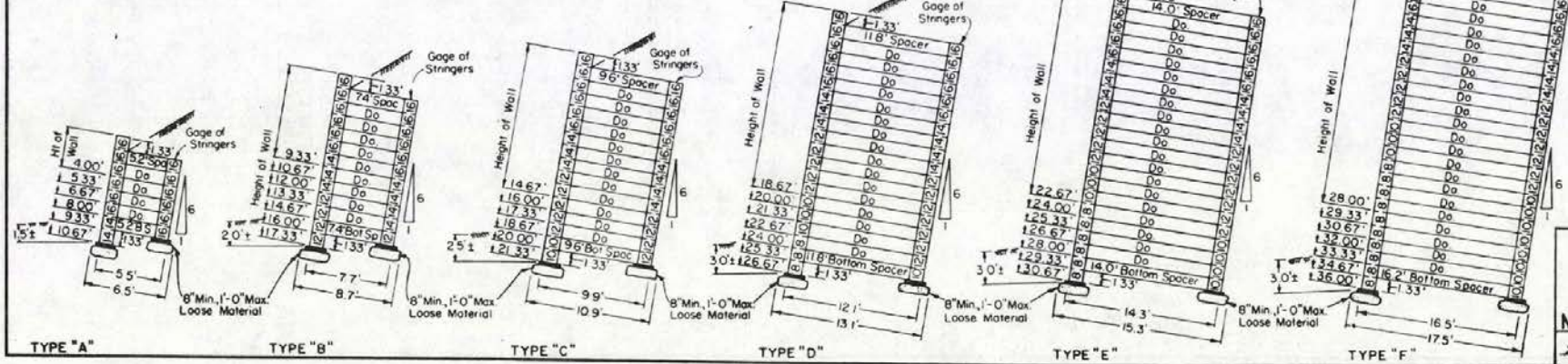


NOTE
Before Setting Base Plate, insert Bolt and Fasten with Spring Nut



HOW TO USE- Select proper circled number in Table (Y) according to batter and surcharge conditions, in Chart (X), determine where the line with that number intercepts the desired height.

Example- Wall on 1:6 batter, with live load, wall height 18 ft. These conditions are found as (2) in table, in chart, line (2) intercepts the 18-ft. height line about midway of Type "C", which has a base width of 9.9 feet



WALL WIDTH TYPE	h	L
"A"	3"	6'-7 7/8"
"B"	1 1/2"	8'-9 3/8"
"C"	5 1/8"	10'-11 1/8"
"D"	10 3/8"	13'-2 1/8"
"E"	14 3/8"	15'-4 3/8"
"F"	18 3/8"	17'-8 1/2"

***NOTE**- Distance "h" for Type "A" is a Minus Quantity... that is, Front Column Base is LOWER than Rear Column Base.

All bolts to be 3/8" with a minimum length of 1 1/4"

GENERAL NOTES

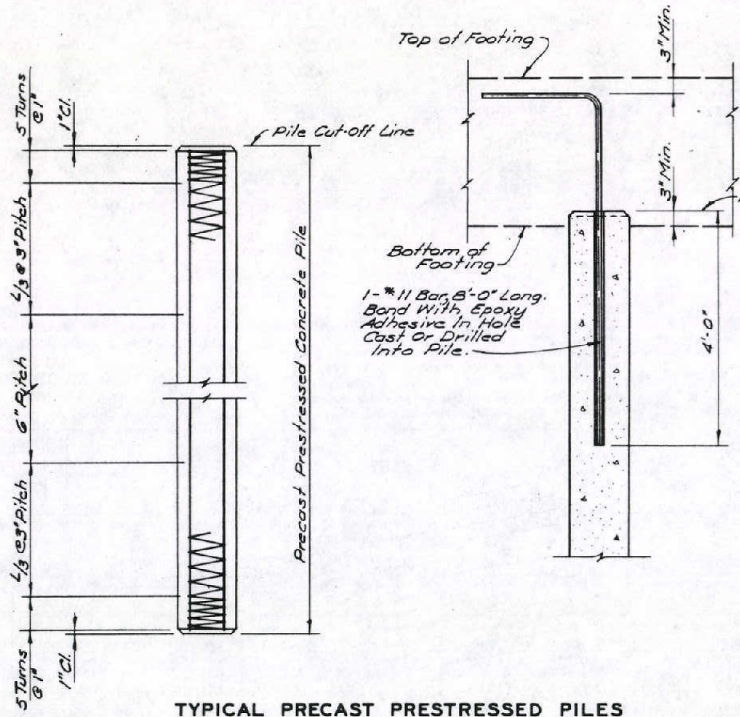
Design "Type" to be shown on all crib layouts
For Design Data see 8-21.1.1

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

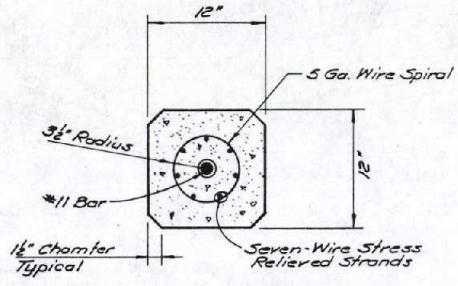
CONSTRUCTION DETAILS FOR METAL RETAINING WALL

B-211.2 (412)
ACCEPTED: 1/11/20
8/02

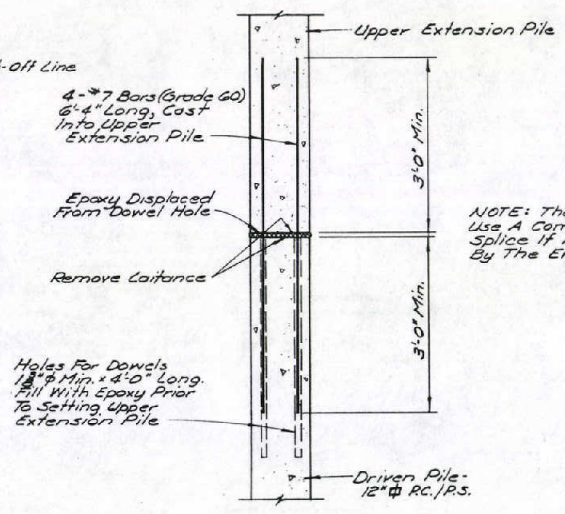
H. Allen Schell
CHIEF BRIDGE ENGR.



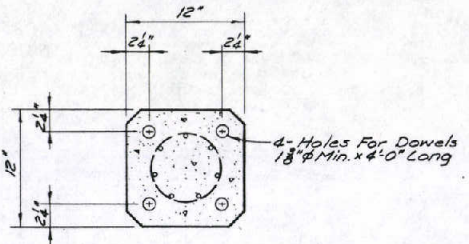
TYPICAL PRECAST PRESTRESSED PILES



SECTION



NOTE: The Contractor May Use A Commercial Pile Splice If It Is Approved By The Engineer.

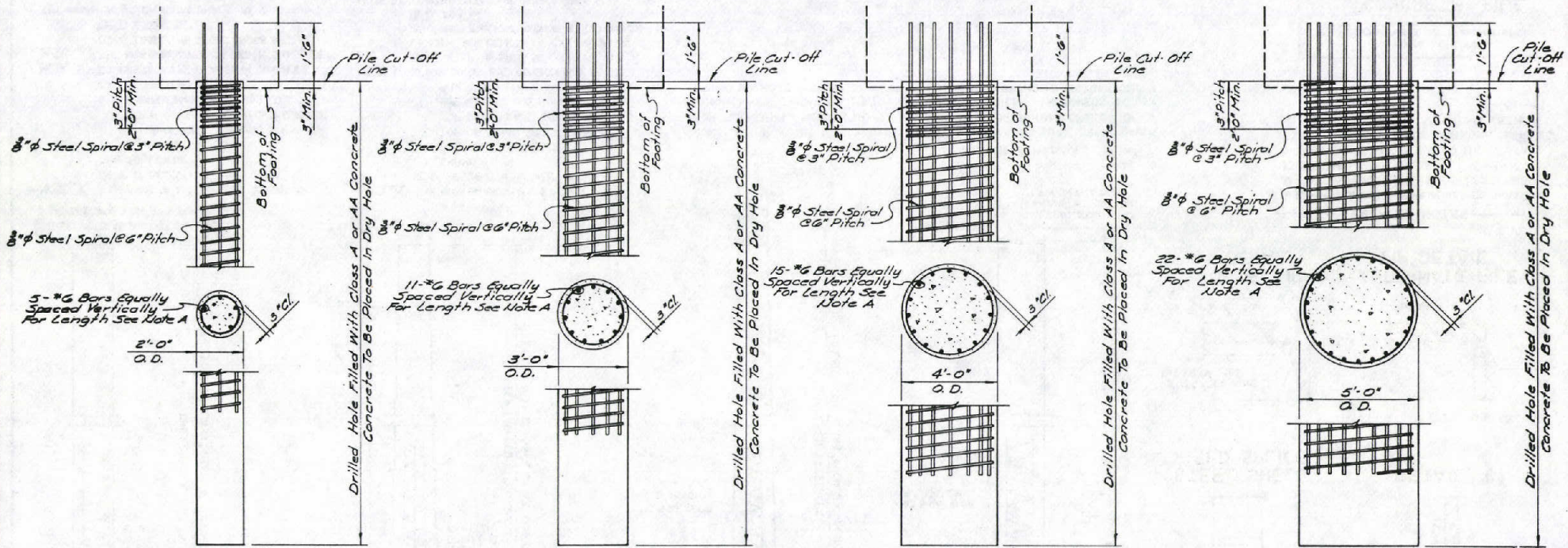


PILE SPLICE DETAILS

— GENERAL NOTES —

1. AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES 1969 EDITION, INTERIM SPECIFICATIONS AASHTO 1971 - PRESTRESSED CONCRETE.
2. THE UNIT PRESTRESS AFTER LOSSES SHALL BE NOT LESS THAN 700 p.s.i.
3. CONCRETE STRENGTH: $f'_c = 4,000$ p.s.i., $f'_c = 6,000$ p.s.i.
4. PRESTRESSING REINFORCEMENT: SEVEN-WIRE STRESS RELIEVED STRANDS CONFORMING TO THE REQUIREMENTS OF ASTM DESIGNATION A416 SHALL BE USED.
5. STRANDS TO BE BURNED FLUSH.
6. CONCRETE MIX: ALL CONCRETE IN PILES AND PILE EXTENSIONS SHALL CONTAIN NOT LESS THAN 8 SACKS OF CEMENT PER CUBIC YARD. IF THE CLEARANCE TO ANY STEEL FROM THE SURFACE OF THE CONCRETE IS INCREASED TO 3", 7 SACKS OF CEMENT PER CUBIC YARD MAY BE USED.

STATE OF NEVADA DEPARTMENT OF TRANSPORTATION	
PRECAST PRESTRESSED CONCRETE PILE DETAILS	
Hugh E. Brian CHIEF BRIDGE ENGR.	B-23.1.1 - (508) ADOPTED: 11/78 REVISION 1-11/78



2'-0" DIAMETER PILES

3'-0" DIAMETER PILES

4'-0" DIAMETER PILES

5'-0" DIAMETER PILES

NOTE A: THE #6 BARS SHALL EXTEND TO:

1) 12' - 0" BELOW THE LOWEST OF THE FOLLOWING:

- A) BOTTOM OF FOOTING.
- B) TOP OF FINAL GROUND SURFACE.
- C) TOP OF ORIGINAL GROUND SURFACE WHEN HOLES ARE DRILLED THROUGH EMBANKMENT CONSTRUCTED BY CONTRACTOR.

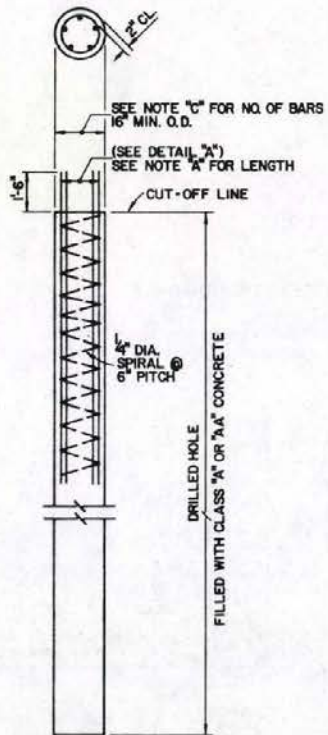
2) TO THE ELEVATION SHOWN ON THE PLANS OR SPECIFIED IN THE SPECIAL PROVISIONS.

NOTE B: ALL BARS EXTENDED INTO SLAB OR FOOTING SHALL BE HOOKED AS REQUIRED TO PROVIDE 2" MINIMUM CLEARANCE.

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

**CAST-IN-DRILLED HOLE
CONCRETE PILE DETAILS**

<i>Hugh E. Brinson</i> CHIEF BRIDGE ENGR.	B-23.1.2-(508) ADOPTED: 11/78 REVISION 1-11/78
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TO BE USED AS AN OPTION ONLY IF SPECIFIED ON THE PLANS.

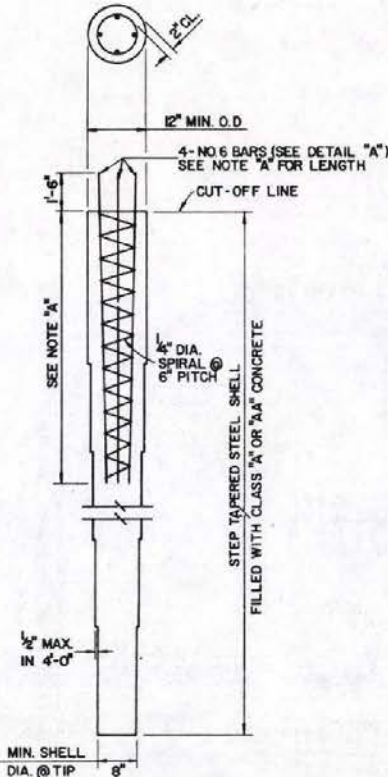
NOTE "A" - THE BARS SHALL EXTEND A MINIMUM OF 12'-0" BELOW THE LOWEST OF THE FOLLOWING:

1. BOTTOM OF FOOTING.
2. TOP OF FINAL GROUND SURFACE.
3. TOP OF ORIGINAL GROUND SURFACE WHEN PILES ARE DRILLED THROUGH FILL.

NOTE "B" - CONCRETE TO BE PLACED IN DRY HOLE.

NOTE "C" - THE MINIMUM AREA OF REBAR SHALL BE 0.005 TIMES THE GROSS CROSS SECTION OF THE CONCRETE. THE MINIMUM NO. OF BARS SHALL BE FIVE (5).

CAST-IN-DRILLED HOLE CONCRETE PILE



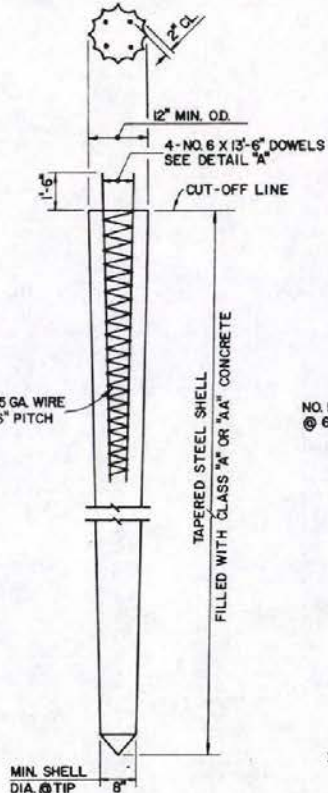
NOTE "A" - THE NO. 6 BARS SHALL EXTEND A MIN. 12'-0" BELOW THE LOWEST OF THE FOLLOWING:

1. BOTTOM OF FOOTING.
2. TOP OF FINAL GROUND SURFACE.
3. TOP OF ORIGINAL GROUND SURFACE WHEN PILES ARE DRIVEN THROUGH FILL.

NOTE "B" - 10" MIN. DIA. PIPE EXTENSION MAY BE USED WHEN STEP TAPER IS 30° OR MORE IN LENGTH. MIN. LENGTH OF EXTENSION IS 15'-0". MIN. THICKNESS OF PIPE EXTENSION IS 0.1793".

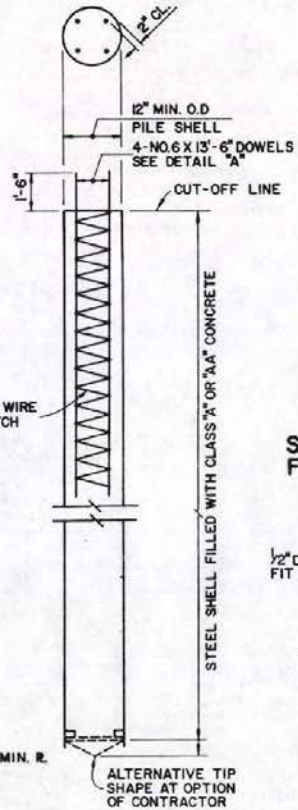
NOTE "C" - CONTRACTOR TO BE RESPONSIBLE FOR FURNISHING SHELLS OF SUFFICIENT STRENGTH TO DRIVE WITHOUT DISTORTION.

CAST-IN-PLACE CONCRETE PILE ALTERNATE "A"



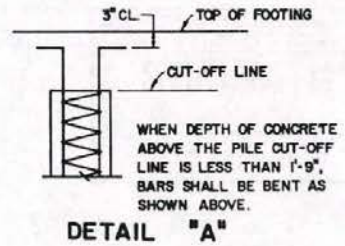
CONTRACTOR TO BE RESPONSIBLE FOR FURNISHING SHELLS OF SUFFICIENT THICKNESS TO DRIVE WITHOUT DISTORTION.

CAST-IN-PLACE CONCRETE PILE ALTERNATE "B"

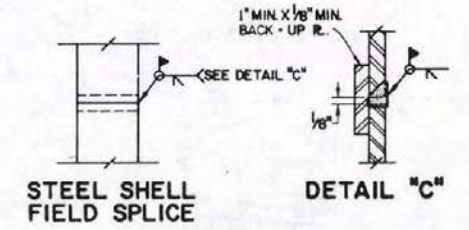


MIN. SHELL THICKNESS IS 1/4" CONTRACTOR TO BE RESPONSIBLE FOR FURNISHING SHELLS OF SUFFICIENT THICKNESS TO DRIVE WITHOUT DISTORTION.

CAST-IN-PLACE CONCRETE PILE

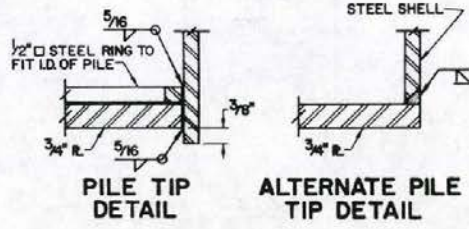


DETAIL "A"



STEEL SHELL FIELD SPLICE

DETAIL "C"



PILE TIP DETAIL

ALTERNATE PILE TIP DETAIL

GENERAL NOTES

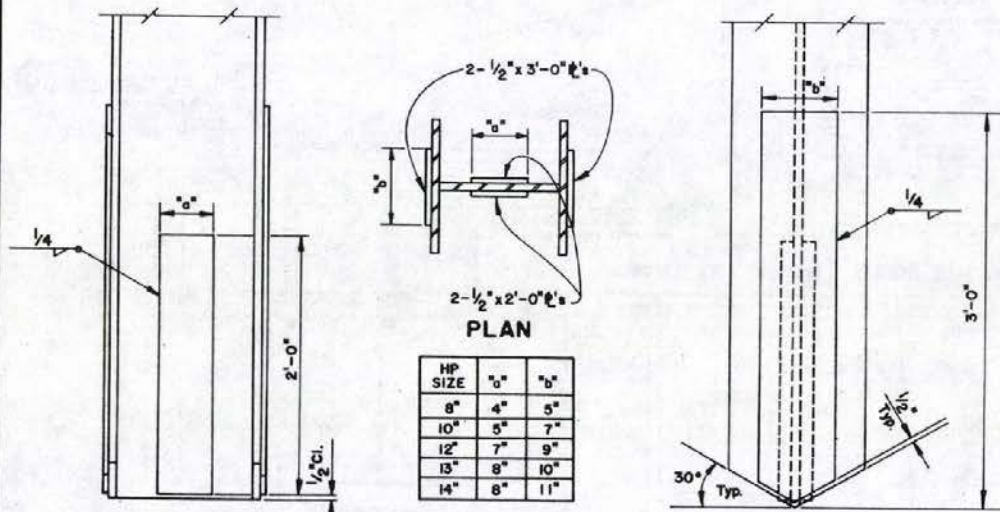
1. ALL REINFORCING SHOWN SHALL BE INCLUDED IN THE CONTRACT PRICE FOR "FURNISHING STEEL SHELL FOR PILES."
2. IF LOAD TESTS ARE REQUIRED THE CONTRACTOR SHALL SUBMIT FOR APPROVAL DETAILED PLANS OF HIS PROPOSED TESTING METHOD.

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

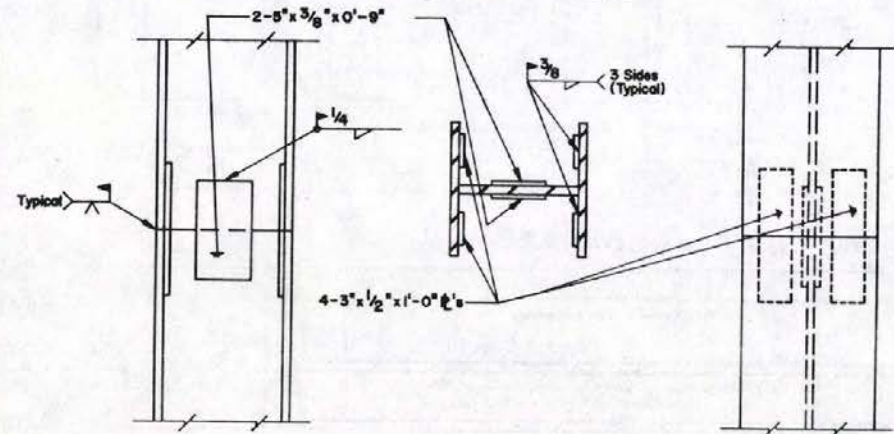
CONCRETE PILE DETAILS

B-23.1.3 (50B)
ADOPTED: 3/85 REVISION: 2-3/85

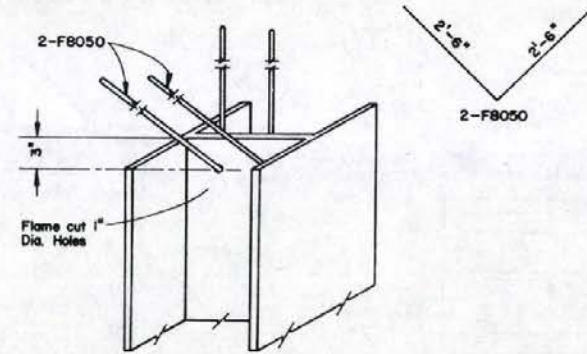
CHIEF ENGINEER



TYPICAL HP PILE POINT REINFORCEMENT DETAIL



HP PILE SPLICE DETAIL



HP PILE ANCHORAGE DETAIL

- NOTE: 1. Weld Splice Bars To Upper Pile Section. Set In Place & Tap Several Times With Pile Hammer Before Completion Of Welding. Piles Must Be Stopped At Least 3'-0" Above Ground, Prior To Splicing.
2. Contractor May Submit Other Pile Splice Detail And Other Pile Point Reinforcement For Approval.

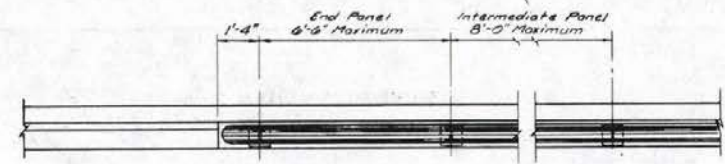
STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

**"HP" PILE
DETAILS**

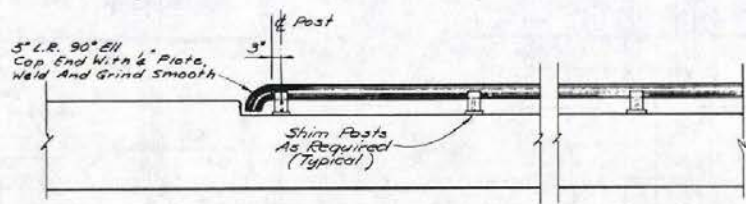
John Adams
CHIEF BRIDGE ENGINEER

8-2314-(508)
ADOPTED: 4/85 REVISION

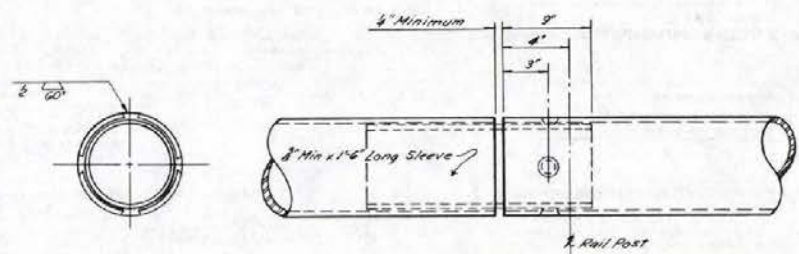
B-17



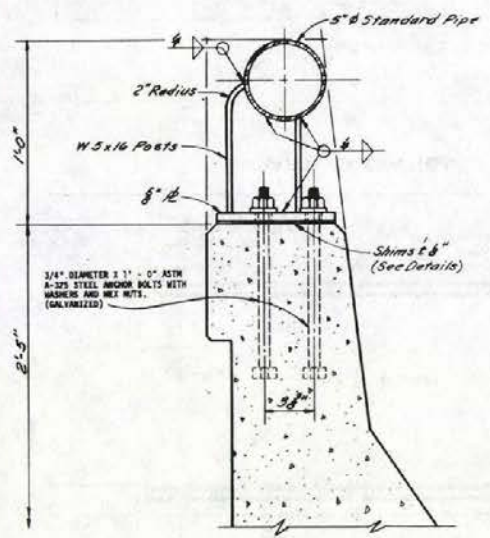
PART PLAN



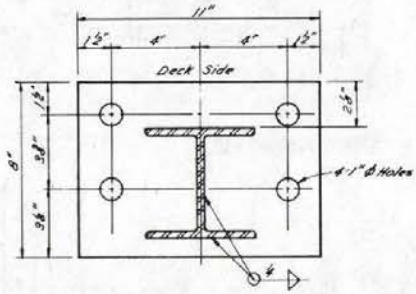
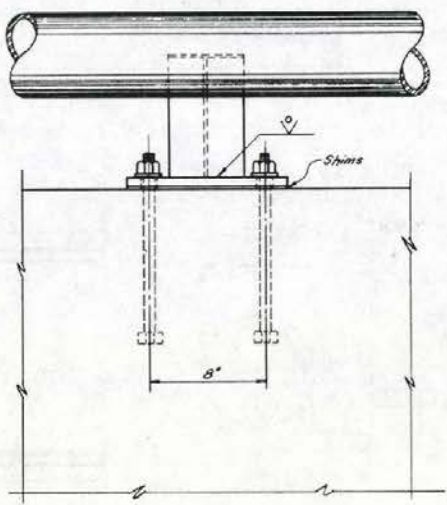
PART ELEVATION



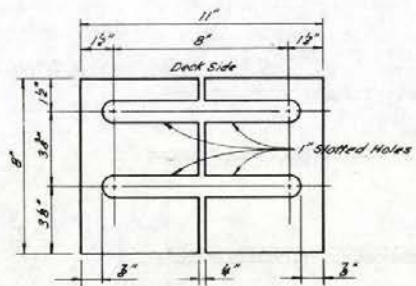
SLIP JOINT DETAIL



RAILING DETAIL



ANCHOR PLATE DETAIL

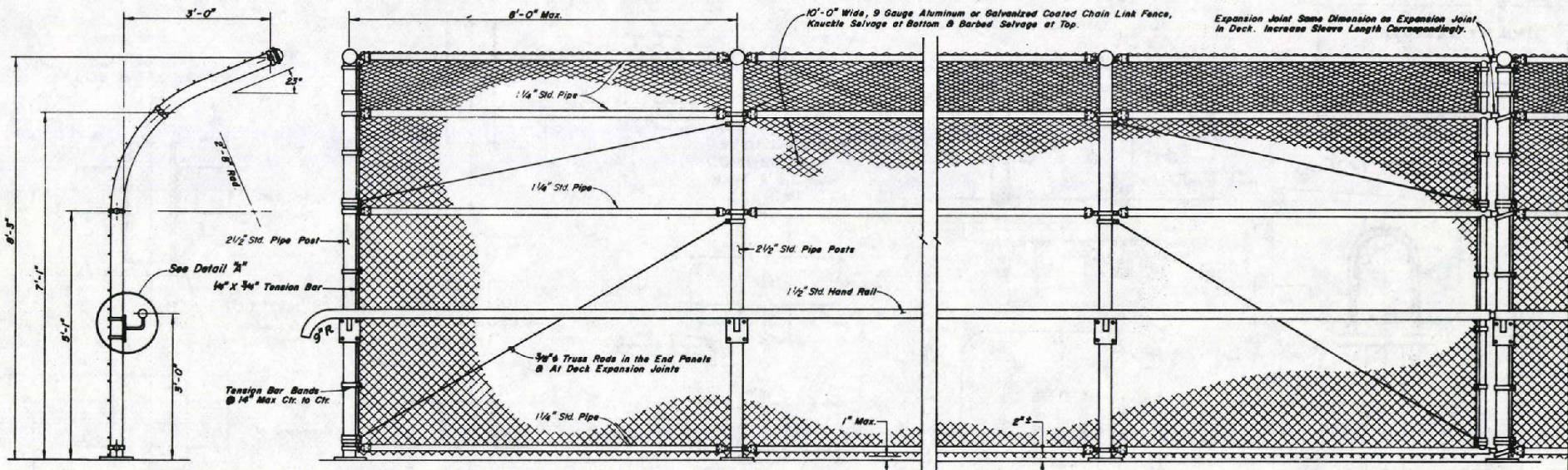


SHIM DETAIL

-GENERAL NOTES-

1. RAILING TO CONFORM TO VERTICAL AND HORIZONTAL ALIGNMENT.
2. JOINTS TO BE SPACED 40' - 0" CENTER TO CENTER, MAXIMUM.
3. SLIP JOINTS TO BE PLACED IN PANELS TO MATCH EXPANSION JOINTS IN DECK. THE 1/4" FOR MOVEMENT WILL BE CHANGED TO MATCH ALLOWANCE FOR MOVEMENT IN THE DECK AND CURB.
4. DESIGN WEIGHT: 17 LBS. PER FT.
5. RAILING ASSEMBLY SHALL BE GALVANIZED AFTER FABRICATION.
6. ALL EXPOSED SURFACES OF RAILING ASSEMBLY SHALL BE PAINTED WHITE.

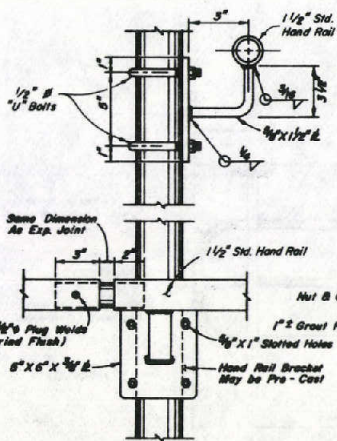
STATE OF NEVADA DEPARTMENT OF TRANSPORTATION	
STEEL BRIDGE RAIL TYPE "H"	
High C. Bonness CHIEF BRIDGE ENGR.	B-25.1.2-(506) ADOPTED: 11/78 REVISION



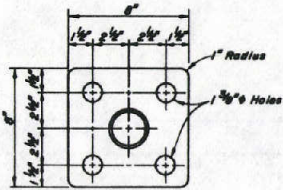
END POST

TYPICAL INTERIOR PANEL

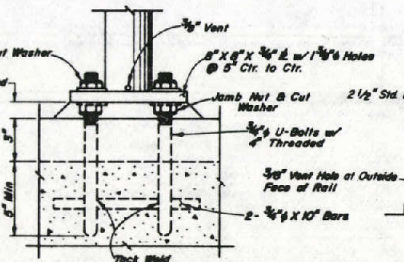
AT EXPANSION JOINT



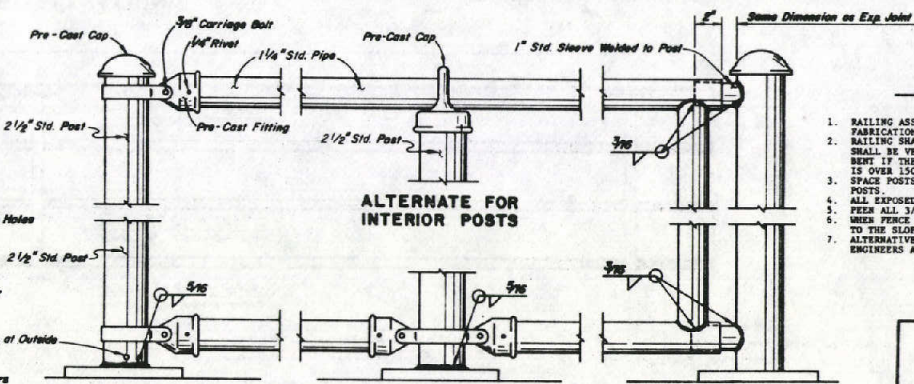
DETAIL "A"



BASE PLATE



ANCHORAGE DETAILS



ALTERNATE FOR INTERIOR POSTS

TYPICAL CONNECTION DETAILS

GENERAL NOTES

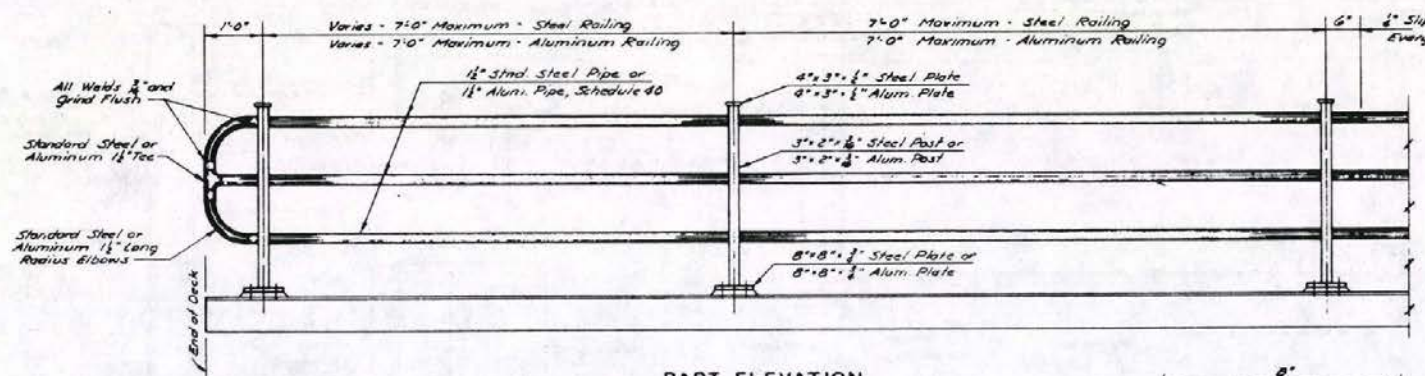
1. RAILING ASSEMBLY EXCEPT CHAIN LINK FABRIC, TO BE GALVANIZED AFTER FABRICATION.
2. RAILING SHALL CONFORM TO HORIZONTAL AND VERTICAL ALIGNMENTS. POSTS SHALL BE VERTICAL. TOP, INTERMEDIATE AND BOTTOM PIPES SHALL BE BENT IF THE RADIUS IS 150' OR LESS; MAY BE ON A CHORD IF RADIUS IS OVER 150'.
3. SPACE POSTS TO CLEAR EXPANSION JOINTS BY 6" MINIMUM TO CENTERLINE POSTS.
4. ALL EXPOSED CORNERS TO BE SMOOTH.
5. FEEL ALL 3/8" BOLTS.
6. WHEN FENCE IS ON SLOPE THE 10'-0" FABRIC SHALL BE PLACED PARALLEL TO THE SLOPE.
7. ALTERNATIVE DETAILS MAY BE SUBMITTED BY THE CONTRACTOR FOR THE ENGINEER'S APPROVAL.

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

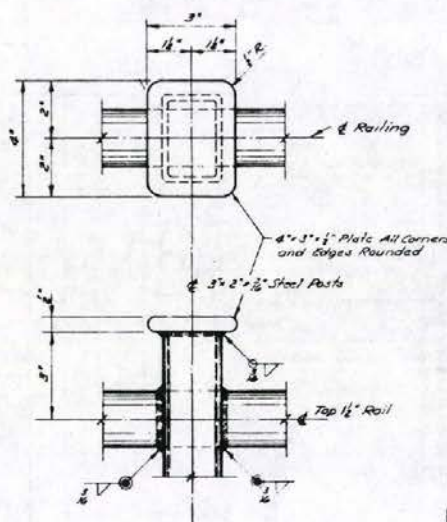
PEDESTRIAN RAIL
TYPE "M"

8-25.1.4-(506)
ADOPTED: 8/85. REVISION

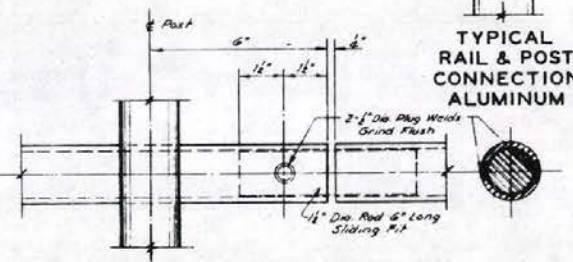
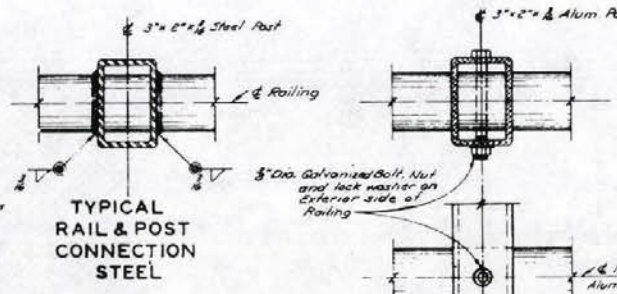
1. All Steel Railing Assembly Shall Be Galvanized After Fabrication.
 2. All Exposed Surfaces of Steel Railing Assembly Shall Be Painted White.



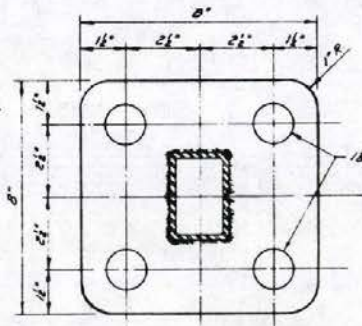
PART ELEVATION



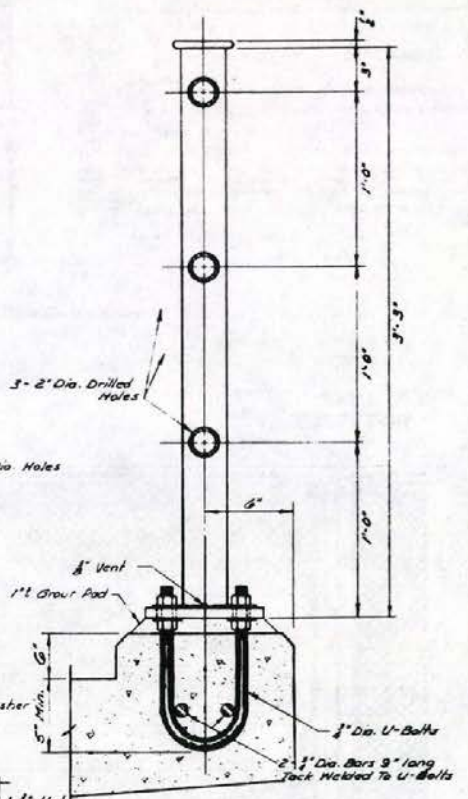
TOP POST PLATE DETAILS



SLIP JOINT DETAILS



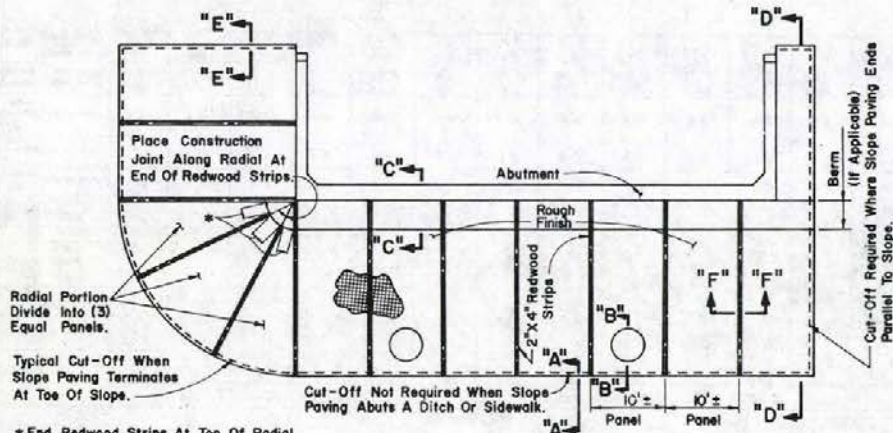
BOTTOM PLATE DETAILS



TYPICAL SECTION

STATE OF NEVADA DEPARTMENT OF TRANSPORTATION	
PEDESTRIAN RAIL TYPE "R"	
State of Nevada CHIEF BRIDGE ENGR.	B-25.1.5 - (506) ADOPTED: 11/78 REVISION 1-11/79

B-20



Place Construction Joint Along Radial At End Of Redwood Strips.

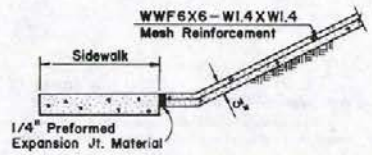
Radial Portion Divide Into (3) Equal Panels.

Typical Cut-Off When Slope Paving Terminates At Toe Of Slope.

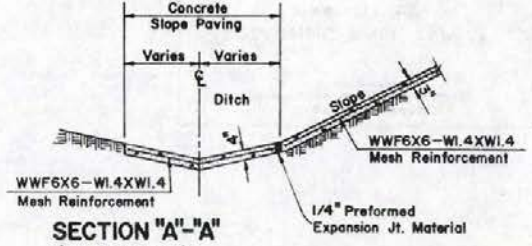
* End Redwood Strips At Top Of Radial Section When Their Intermediate Distance From Each Other Reaches Three (3) Feet.

NOTE: 1. SLOPE PAVING IS TO BE DIVIDED INTO EQUALLY SPACED PANELS. THE WIDTH OF EACH PANEL IS TO BE AS NEARLY 10' AS SITE DIMENSIONS WILL PERMIT. 2. THESE DETAILS WILL NOT APPLY IN TOTAL TO ANY ONE SITE, BUT ARE INTENDED TO BE GENERAL ENOUGH TO COVER ALL POSSIBILITIES. TO OBTAIN LIMITS OF SLOPE PAVING FOR A SPECIFIC SITE, CONSULT THE PLAN SHEETS.

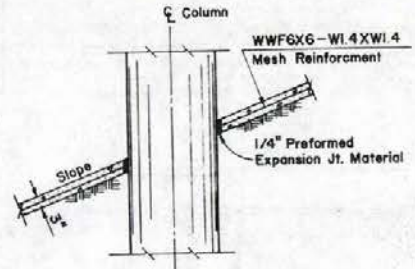
PLAN VIEW



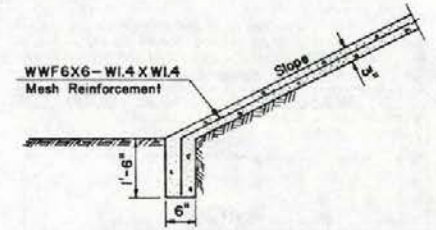
SECTION "A"- "A"
(WITH SIDEWALK)



SECTION "A"- "A"
(WITH DITCH)

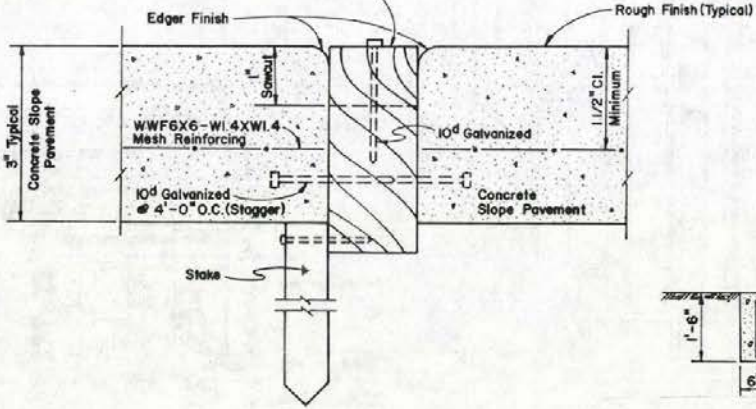


SECTION "B"- "B"
(AT PIER)

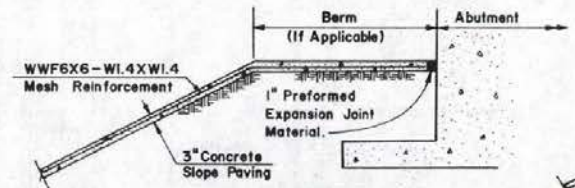


SECTION "A"- "A"
(TOE OF SLOPE)

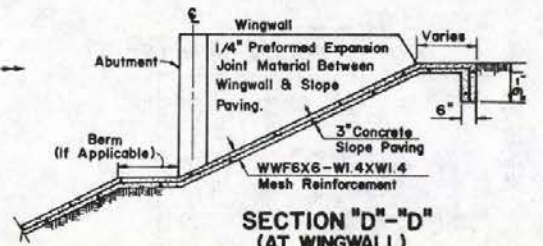
2"x4" Redwood. Saw As Shown & Reassemble. Remove Upper Portion After Concrete Cures.



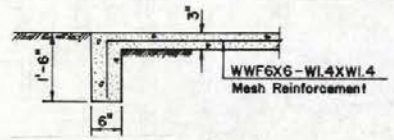
SECTION "F"- "F"



SECTION "C"- "C"
(AT ABUTMENT)



SECTION "D"- "D"
(AT WINGWALL)



SECTION "E"- "E"
(EDGE OF SLOPE)

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

CONCRETE SLOPE
PAVING DETAILS

ADOPTED-11-78
B-26.11-(GII)

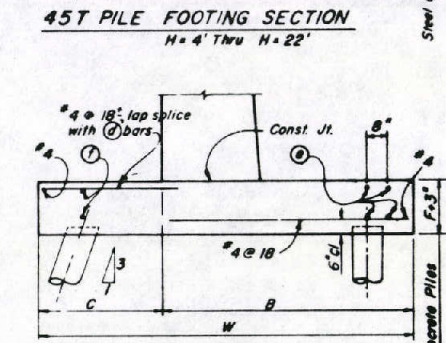
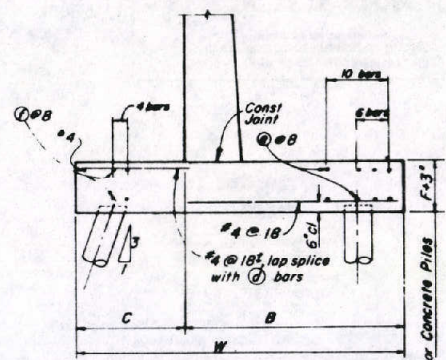
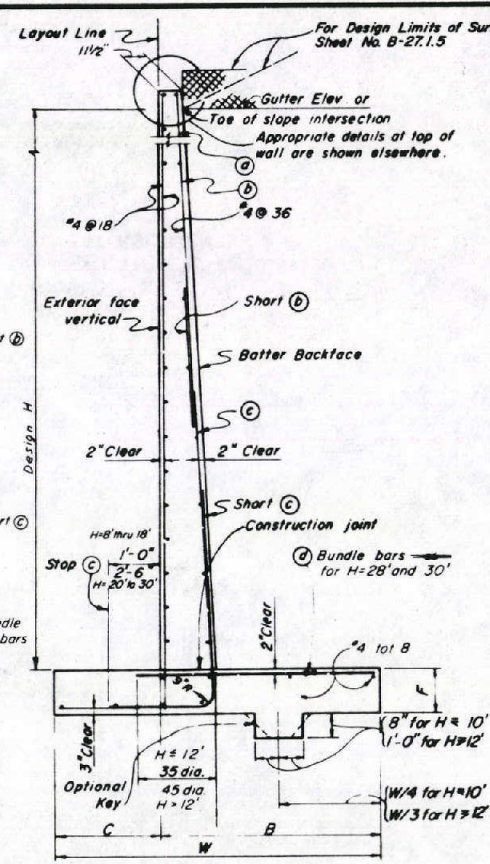
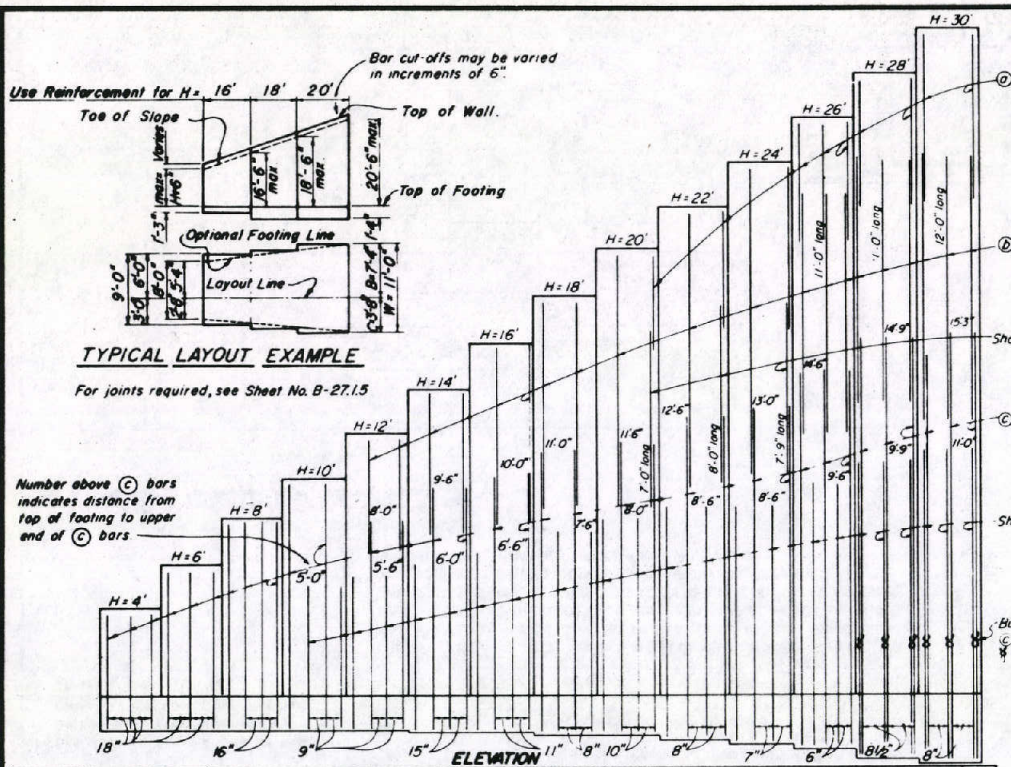


TABLE OF REINFORCING STEEL DIMENSIONS AND DATA

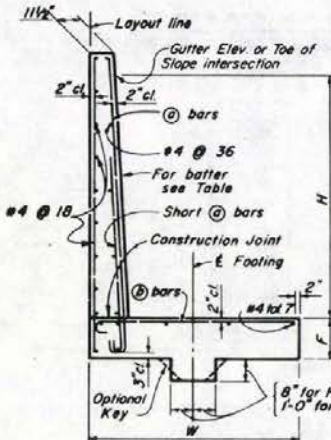
Design H	4'	6'	8'	10'	12'	14'	16'	18'	20'	22'	24'	26'	28'	30'
W	3'-2"	4'-2"	5'-2"	6'-2"	7'-2"	8'-0"	9'-0"	10'-0"	11'-0"	12'-0"	13'-3"	14'-3"	15'-3"	16'-9"
C	1'-0"	1'-4"	1'-8"	2'-0"	2'-4"	2'-6"	3'-0"	3'-4"	3'-8"	4'-0"	4'-5"	4'-9"	5'-1"	5'-5"
B	2'-2"	2'-10"	3'-6"	4'-2"	4'-10"	5'-4"	6'-0"	6'-8"	7'-4"	8'-0"	9'-6"	10'-2"	11'-4"	
F Spread Fig.	1-2	1-2	1-2	1-2	1-2	1-3	1-3	1-4	1-4	1-6	1-8	1-11	2-2	2-4
Batter	1/2-12	1/2-12	1/2-12	1/2-12	1/2-12	1/2-12	1/2-12	1/2-12	1/2-12	3/4-12	3/4-12	3/4-12	1/2-12	
⊙ bars						#4 @ 18"	#6 @ 30"	#6 @ 22"	#8 @ 16"	#8 @ 20"	#8 @ 16"	#8 @ 14"	#8 @ 12"	#8 @ 12"
⊙ bars						#4 @ 18"	#6 @ 30"	#6 @ 22"	#8 @ 16"	#8 @ 20"	#8 @ 16"	#8 @ 14"	#8 @ 12"	#8 @ 12"
⊙ bars	#3 @ 18"	#5 @ 18"	#5 @ 16"	#5 @ 9"	#6 @ 9"	#9 @ 15"	#9 @ 11"	#9 @ 8"	#10 @ 10"	#10 @ 8"	#10 @ 7"	#10 @ 6"	#10 @ 6"	#10 @ 6"
⊙ bars	#3 @ 18"	#5 @ 18"	#5 @ 16"	#4 @ 9"	#5 @ 9"	#8 @ 15"	#8 @ 11"	#9 @ 8"	#10 @ 10"	#10 @ 8"	#10 @ 7"	#10 @ 6"	#10 @ 6"	#10 @ 6"
⊙ bars	#6 @ 6"	#6 @ 6"	#6 @ 6"	10-#7	10-#7	10-#7	10-#7	6-#7	6-#7	6-#7	4-#7	4-#7	4-#7	4-#7
⊙ bars	4-#7	4-#7	4-#7	4-#7	4-#7	4-#7	4-#7	4-#7	4-#7	4-#7	2-#7	2-#7	2-#7	2-#7
2' Level surcharge	16	19	22	25	28	33	35	40	43	46	49	53	57	62
2' unspaced piles	11	15	20	23	27	33	36	42	47	55	59	65	71	75
1 1/2' spaced piles	13	17	21	25	29	34	38	43	48	54	58	65	72	75
Spread Footing	Steel Bar/ft	18	22	28	37	51	80	105	153	192	248	307	409	449
	Conc CF/ft	8.9	12.5	16.3	20.2	25.4	30.1	34.6	40.1	45.0	52.1	63.3	77.0	88.1
Pile Pile	Steel Bar/ft	30	34	41	70	84	113	140	178	217	273	326	429	469
	Conc CF/ft	10.2	12.7	16.7	20.8	25.2	30.1	34.8	40.6	45.7	53.1	64.7	78.6	89.9

NOTES:
 For details not shown and drainage notes see sheet No B-27.1.5
 Quantities do not include the wall portion above "Gutter Elevation" and are for design purposes only.
 For pile footing Design H=4' use same footing dimensions as Design H=6'

STATE OF NEVADA
 DEPARTMENT OF TRANSPORTATION

**RETAINING WALL TYPE 1
 H=4' TO 30'**

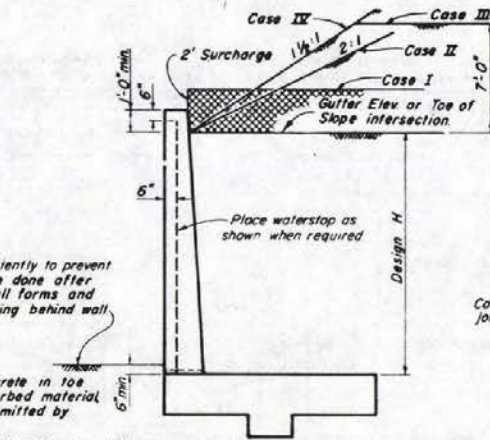
B-27.1.1 - (502)
 ADOPTED: 1-1-80



SPREAD FOOTING SECTION

Backfill sufficiently to prevent ponding. To be done after removal of wall forms and before backfilling behind wall.

Place concrete in toe against undisturbed material except as permitted by the Engineer.



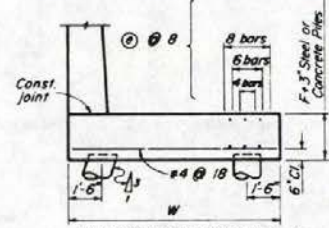
Loading Conditions:
 Case I 2' level surcharge
 Case II 2:1 unlimited surcharge
 Case III 1 1/2:1 limited surcharge
 Case IX 1 1/2:1 unlimited surcharge

For drainage notes and other details, see Steel A.9.2.1.C.

MAX. PILE SPACING FOR 45 TON PILES

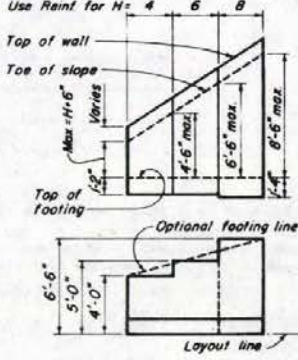
Design H	1:3 Batter	Vertical
4	18'-0"	18'-0"
6	12'-0"	18'-0"
8	9'-0"	18'-0"
10	6'-0"	12'-0"
12	4'-0"	8'-0"

For actual spacing, see Wall Layout.
 Pile layout does not apply to Case II conditions.



Reinforcement detailed is to be placed in addition to that shown for spread footings.
 For Design H=4' use W=5'-0".
 All others from table.

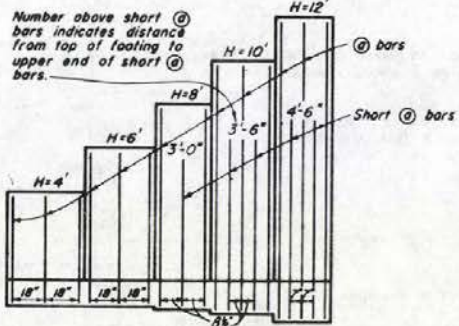
45T PILE FOOTING SECTION



TYPICAL LAYOUT EXAMPLE

For joints required, see Chart No. 27.1.4

TABLE OF REINFORCING STEEL DIMENSIONS AND DATA					
Design H ft	4'	6'	8'	10'	12'
W	4'-0"	5'-0"	6'-6"	8'-0"	9'-6"
F Spread Ftg	1'-2"	1'-2"	1'-4"	1'-6"	1'-10"
Batter	None	None	None	1/2:12	1/2:12
⊙ bars	#4 @ 18	#5 @ 18	#5 @ 17	#6 @ 17	#6 @ 14
Short ⊙ bars	None	None	#5 @ 17	#6 @ 17	#6 @ 14
⊙ bars	#4 @ 18	#5 @ 18	#5 @ 17	#6 @ 17	#6 @ 14
Total ⊙ bars	6-#7	6-#7	8-#7	6-#7	4-#7
Case I k/cf	1.6	2.2	2.5	3.0	3.5
Case II k/cf	1.5	2.1	2.7	3.4	4.1
Case III k/cf	1.6	2.3	2.9	3.8	4.4
Case IX k/cf	2.0	3.2	4.2	5.3	6.5
Spread Steel #/ft	16	22	35	55	73
Fig. Conc. #/ft	9.4	12.5	17.2	24.4	36.1
Pile Steel #/ft	31	36	54	70	85
Footing Conc. #/ft	10.9	12.9	17.9	25.5	36.5



ELEVATION

NOTES

Design Conditions:
 Design H may be exceeded by 6" before going to the next size.
 Special footing design is required where foundation material is incapable of supporting toe pressure loads listed in table.

Design Data:
 $f_c = 1300$ psi $f'_c = 3250$ psi $f_s = 24,000$ psi $n = 10$
 earth = 120 pcf Case I - Wall design for equivalent fluid pressure = 27 and 36 pcf Case II, III, IX - Wall design is based on Rankine's formula with $\phi = 33^\circ - 42^\circ$.

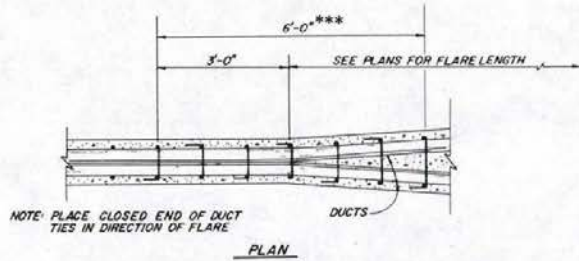
Quantities:
 Quantities do not include the wall portion above "Gutter Elevation" and are for design purposes only.

STATE OF NEVADA
 DEPARTMENT OF TRANSPORTATION

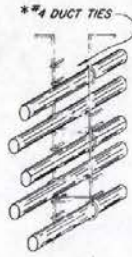
RETAINING WALL TYPE 3
 H=4' TO 12'

B-27.1.4-(502)
 ADOPTED: 1/83 REVISION

*** @ 12" MAX. W/1/4 TIE ON EACH DUCT



NOTE: PLACE CLOSED END OF DUCT TIES IN DIRECTION OF FLARE



STIRRUP REINFORCEMENT AT FLARE OF GIRDER STEM

DISTRIBUTION OF PRESTRESSING FORCE:

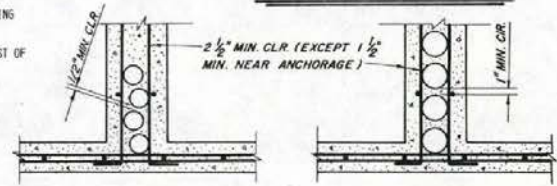
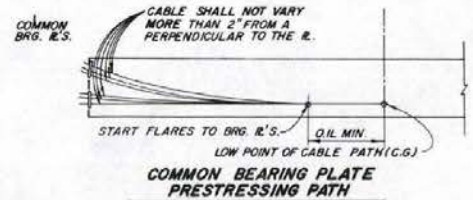
UNLESS OTHERWISE NOTED THE PRESTRESSING FORCE, P JACK OR P_f, SHALL BE DISTRIBUTED WITH AN APPROXIMATELY EQUAL AMOUNT IN EACH GIRDER AND SHALL BE PLACED SYMMETRICALLY ABOUT THE CENTERLINE OF THE STRUCTURE. IN SLABS, THE PRESTRESSING FORCE SHALL BE UNIFORMLY DISTRIBUTED ACROSS THE SLAB. STRESSING SEQUENCE:

NO MORE THAN 1/2 OF THE PRESTRESSING FORCE IN ANY GIRDER MAY BE STRESSED BEFORE AN EQUAL FORCE IS STRESSED IN THE ADJACENT GIRDERS. AT NO TIME DURING THE STRESSING OPERATIONS WILL MORE THAN 1/6 OF THE TOTAL PRESTRESSING FORCE BE APPLIED ECCENTRICALLY ABOUT THE CENTERLINE OF THE STRUCTURE.

GIRDER STEM SHALL BE FLARED NEAR ANCHORAGE TO PROVIDE A MINIMUM OF 1-1/2" CONCRETE COVERING THE REBAR. FLARE MAY BE ON ONE SIDE OF GIRDER ONLY. BAR REINFORCEMENT INTERFERING WITH THE PRESTRESSING TENDON ALIGNMENT SHALL BE ADJUSTED AS APPROVED BY THE ENGINEER.

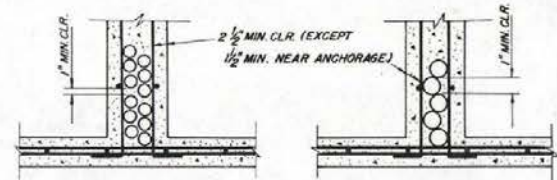
* BARS MARKED THUSLY ARE TO BE INCLUDED IN THE COST OF PRESTRESSING CAST-IN-PLACE CONCRETE.

** CONCRETE USED IN THE BEARING SEATS IS TO BE INCLUDED IN THE COST OF PRESTRESSING CAST-IN-PLACE CONCRETE.



DUCTS 4" TO 4 1/2" O.D.

DUCTS OVER 4 1/2" O.D.

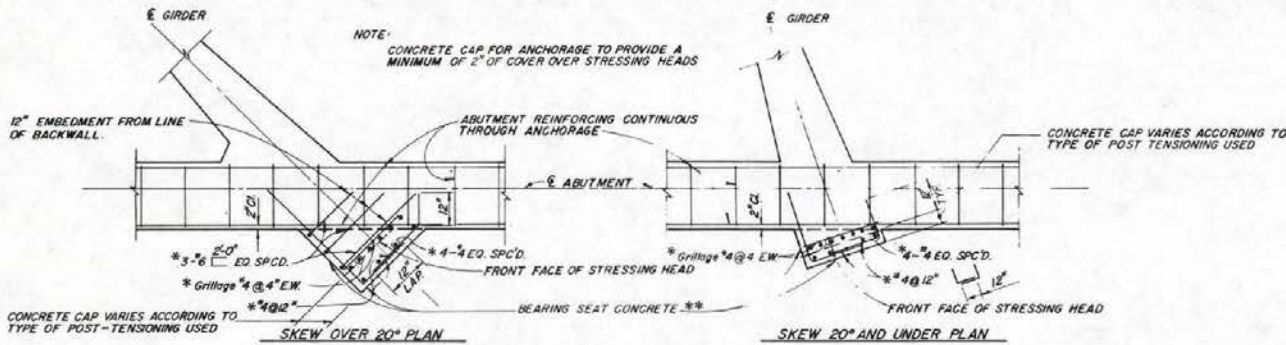


DUCTS 3" O.D. & LESS

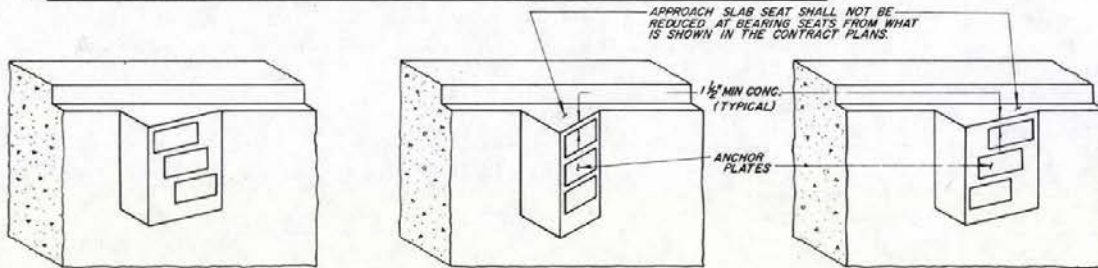
DUCTS OVER 3" O.D. & LESS THAN 4" O.D.

CLEARANCE REQUIREMENTS FOR DUCTS

1. DUCT PATTERNS SHOWN ARE FOR A 12" WIDE GIRDER STEM. FOR OTHER WIDTHS THE MINIMUM CLEARANCES MUST BE MAINTAINED.
2. VERTICAL DIMENSIONS AT TENTH POINTS TO BE SHOWN IN ORDER TO FACILITATE THE PLACING OF THE DUCTS ACCURATELY.
3. APPROVAL OF THE ENGINEER IS REQUIRED FOR DEVIATIONS.



BEARING SEAT FOR PRESTRESSED ANCHORAGE AT DIAPHRAGM TYPE ABUTMENTS



EXT. SLOPING GIRDER

VERTICAL GIRDER
NOTE: DETAILS MAY BE MODIFIED TO SUIT SPECIFIC ANCHORAGE

EXT. SLOPING GIRDER

TYPICAL BEARING SEAT ILLUSTRATIONS

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

CAST-IN-PLACE PRESTRESSED GIRDER DETAILS

Janis Adron
CHIEF BRIDGE ENGINEER

B-28.1.1-(503)
ADOPTED: 3/85 REVISION

