NEVADA DOT

Kenny C. Guinn
Governor

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Director

NEVADA DEPARTMENT OF TRANSPORTATION

2003 STANDARD PLANS

Road and Bridge Construction

Nevada Department of Transportation
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Revised *2003*

ENGLISH version

FOREWORD TO 2003 ENGLISH STANDARD PLANS

Nevada Department of Transportation(NDOT) English Standard Plans are published every two years. All significant 2003 revisions to the 2001 Standard Plans will be shown in **"RED"** and new 2003 plan sheets will have the contents entirely in **"RED"**.

NDOT has adopted the MUTCD 2000 Millennium Edition and AASHTO's "A Policy on Geometric Design of Highways and Streets" 2001, Fourth Edition.

Conditional Use of Certain Sheets

Certain sheets will have **"Requires Chief Road Design Engineer Approval"** referenced in the General Notes-this means that the Chief Road Design Engineer must approve the use of the information depicted on that sheet. Another condition would be **"For Repair Only, not NCHRP 350 Approved for Test Level 3"**-this means that the information on that sheet is not to be used for new or retrofit construction and is for repair work only, check with the Designer.

This edition is part of an continuous process to update the Standard Plans. Updates to Standard Plans will reflect the impetus of NCHRP Report 350 requirements, however approved products are shown in the Qualified Products List(QPL), included within each advertized project's Special Provisions. If you find an error/omission or want to make a comment, make a copy of that sheet marked with your comments and mail to Dennis Coyle, Standards and Manuals Engineer, 1263 S. Stewart Street, Carson City, Nevada 89712, (775)-888-7598, Fax (775)-888-7401, Email: dcoyle@dot.state.nv.us.

Printed hardcopies or a CD version of the Standard Plans are available from Administrative Services, 1263 S. Stewart Street, Carson City, Nevada 89712, (775)-888-7070, Fax (775)-888-7101.

T A B L E O F C O N T E N T S

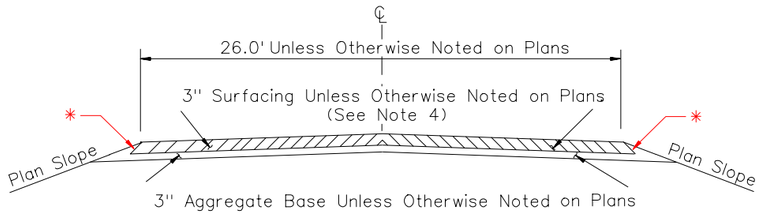
2003 ROAD DESIGN INDEX
ENGLISH VERSION

2003 ROAD DESIGN INDEX (CONTINUED)
ENGLISH VERSION

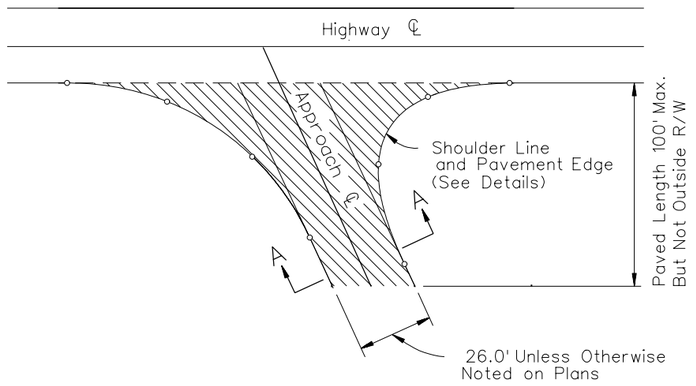
2003 TRAFFIC DESIGN INDEX (CONTINUED)
ENGLISH VERSION

2003 TRAFFIC DESIGN INDEX (CONTINUED)
ENGLISH VERSION

BRIDGE DESIGN SECTION



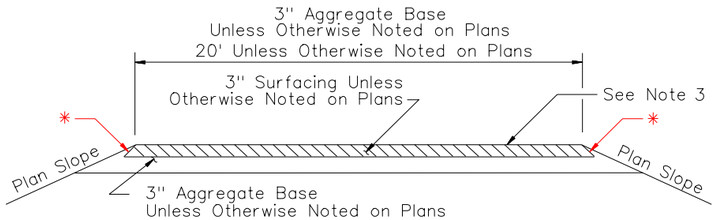
SECTION A-A



PLAN

TYPE 1 APPROACH (3-CENTERED CURVE)

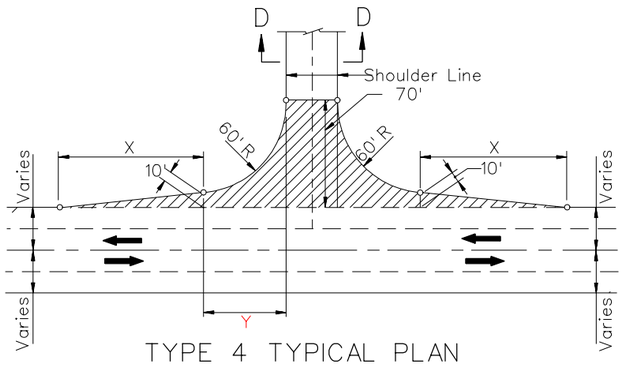
TYPE 2 & 3 APPROACHES



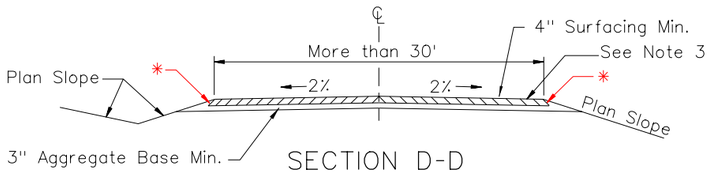
SECTION C-C

APPROACH TYPES

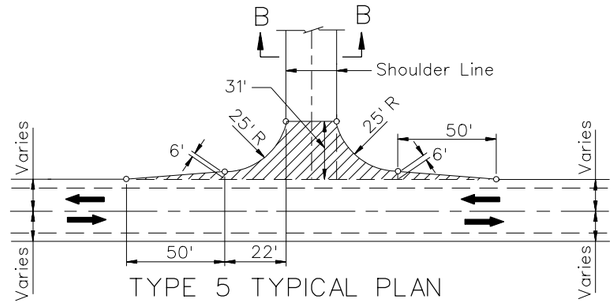
Type 2A - Place Base and Surface as Shown
Type 2B - Place 6" Aggregate Base Course Only
Type 3 - Grade Approach Area Only



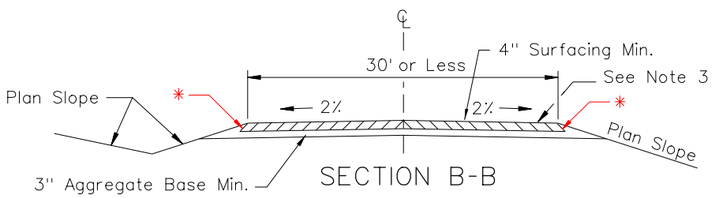
TYPE 4 TYPICAL PLAN



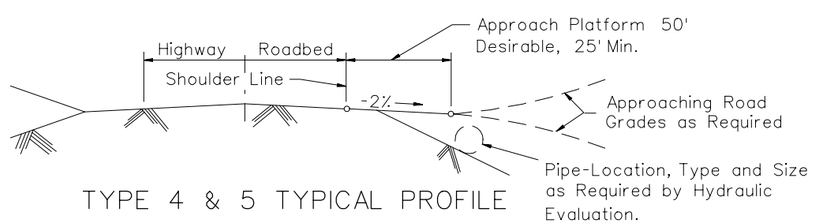
SECTION D-D



TYPE 5 TYPICAL PLAN



SECTION B-B

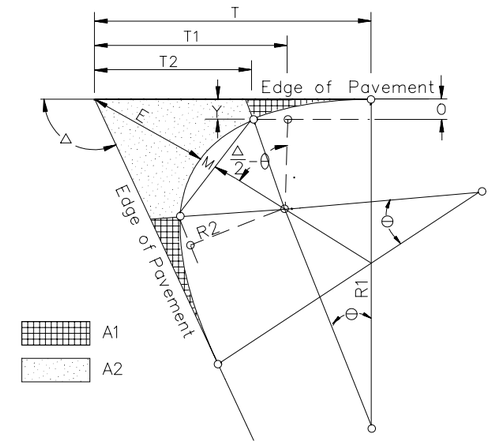


TYPE 4 & 5 TYPICAL PROFILE

Right Angle Road Connection

TYPE 4 AND 5 APPROACHES

X	Y	Design Speed V_D
100'	54'	< 45 mph
150'	56'	≥ 45 mph



3 CENTERED CURVE

Given: Δ, o, R_1 and R_2
To Find: T, T_1, T_2, E, M, θ, v
Area External to Comp. Curve

$T_1 = (R_2 + o) \tan \frac{\Delta}{2}$

$T = T_1 + (R_1 - R_2) \sin \theta$

$T_2 = T_1 - R_2 \sin \theta$

$E = \frac{R_2 + o}{\cos \frac{\Delta}{2}} - R_2$

$M = R_2 - [R_2 \cos (\frac{\Delta}{2} - \theta)]$

$\theta = \cos^{-1} \frac{R_1 - R_2 - o}{R_1 - R_2}$

$y = (R_2 + o) - R_2 \cos \theta$

Area $= A_1 + A_2$
and
$A_1 = R_1^2 \tan\theta \frac{\pi R_1^2 \theta}{180}$

$A_2 = (R_2 + o)[t_1 - (R_2 + o) \tan\theta] - \frac{\pi R_1^2 (\frac{\Delta}{2} - \theta)}{180}$

GENERAL NOTES:

1. See the current edition of the AASHTO "A POLICY ON GEOMETRIC DESIGN OF HIGHWAYS AND STREETS" for further information on at-grade intersections and and design vehicles.
2. Details for the special approaches will be shown on the plans when they are required.
3. Paved approaches shall have a seal coat unless otherwise noted.
4. Approaches to be paved to the throat or right-of-way, whichever occurs first, unless otherwise noted on the plans.
5. Approaches may require the standard stop signs and stop bars as directed by the engineer.

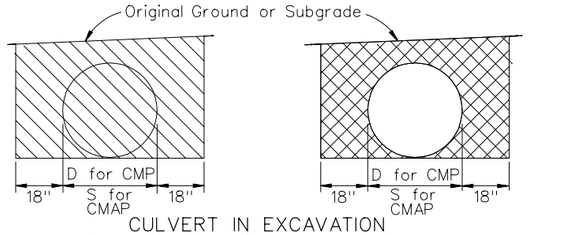
LEGEND:

* - Angle of Repose

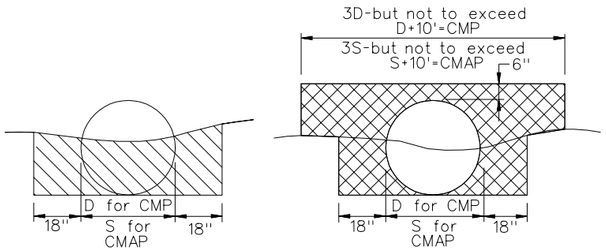
STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

TYPE 1, 2, 3, 4 AND 5 APPROACH ROADS

Signed Original On File	R-S2.1	(000)
CHIEF ROAD DESIGN ENGR.	ADOPTED: 7/96	REVISION 3/02

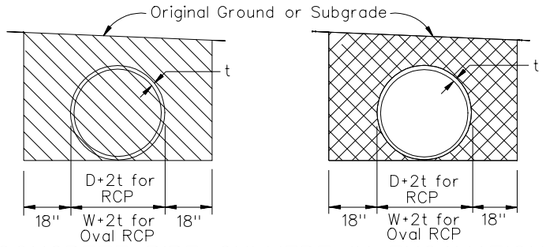


CULVERT IN EXCAVATION
Excavation Depth is Less than 4 Feet



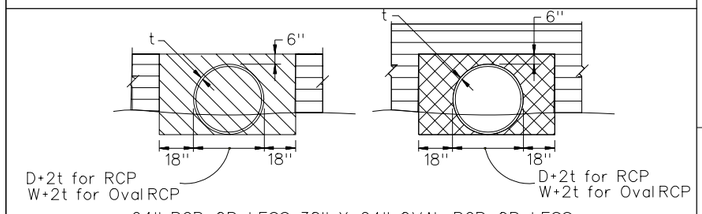
CULVERT IN EMBANKMENT

CMP OR CMAP CULVERTS

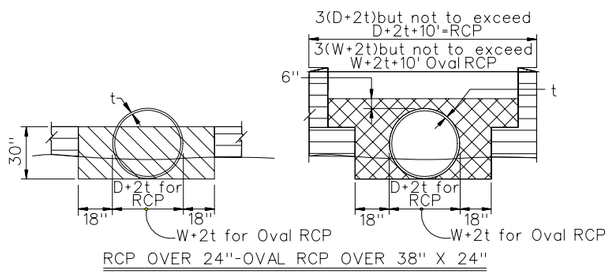


CONCRETE PIPE CULVERT IN EXCAVATION

All RCP and Oval RCP sizes
Excavation Depth is Less than 4 feet

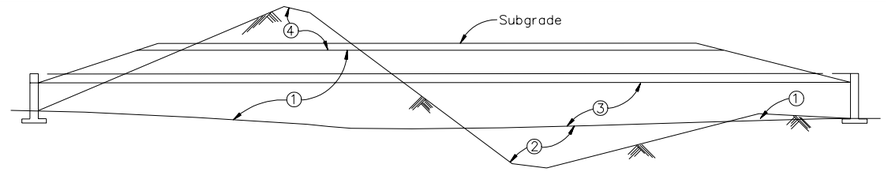


24" RCP OR LESS-38" X 24" OVAL RCP OR LESS



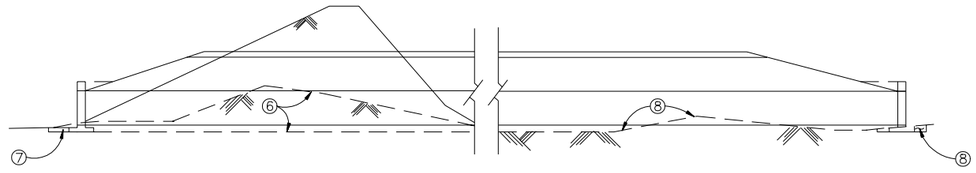
RCP OVER 24"-OVAL RCP OVER 38" X 24"

CONCRETE PIPE CULVERT IN EMBANKMENT (METHOD A)



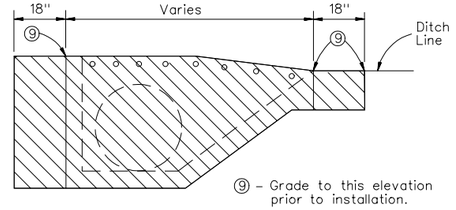
①- Structure Excavation and Backfill in excavation to be paid below subgrade and within designated limits.
②- Embankment to be constructed to flowline prior to installation.
③- Backfill in embankment to be paid from flowline to the designated maximum limits.
④- Roadway Excavation to be paid to subgrade.

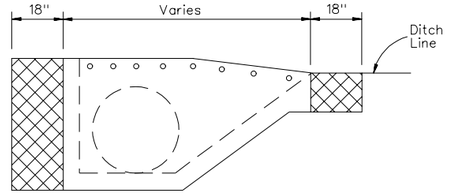
CULVERT INSTALLATION IN ROUGH TERRAIN



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 a 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").

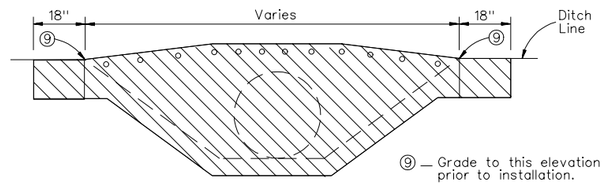
CULVERT INSTALLATION WITH UNSUITABLE FOUNDATIONS

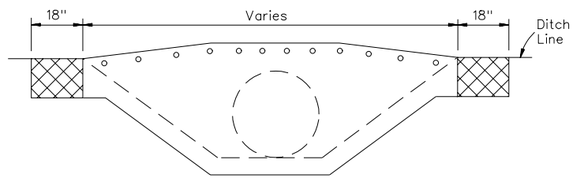




⑨ – Grade to this elevation prior to installation.

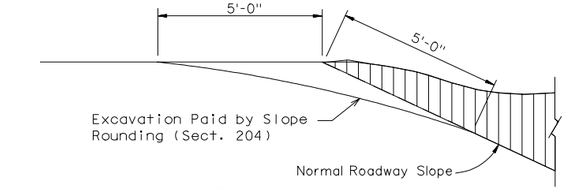
TYPE 7 DROP INLET





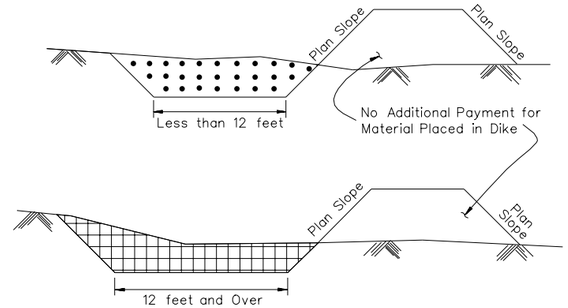
⑨ – Grade to this elevation prior to installation.

TYPE 8 DROP INLET



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

ROUNDED OR TRANSITION SLOPES



FLAT BOTTOM DITCH EXCAVATION

GENERAL NOTES:

1. Excavation for Multiple Pipe Installations 12' and over in Width Will Be Paid as Channel or Roadway Excavation.

LEGEND

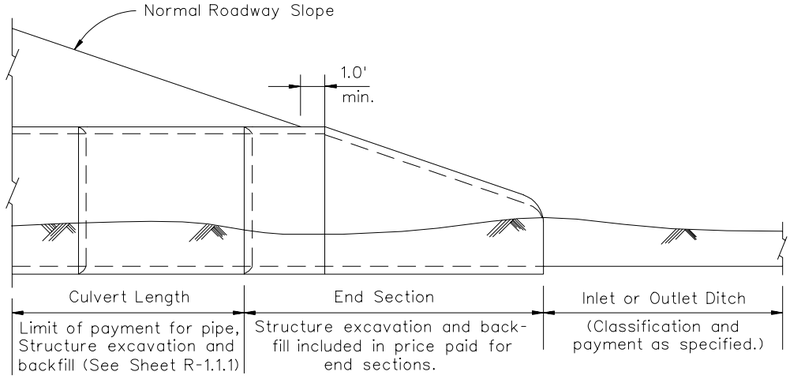
STRUCTURE EXCAVATION
ROADWAY EXCAVATION
DRAINAGE EXCAVATION
GRANULAR BACKFILL
CHANNEL EXCAVATION
ROADWAY EMBANKMENT

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

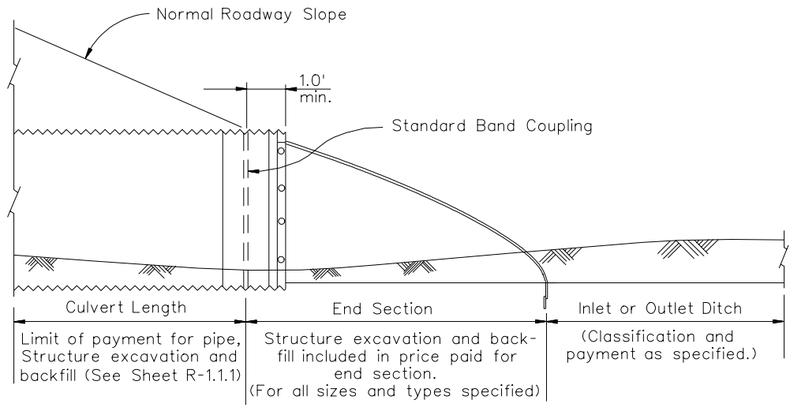
STRUCTURE EXCAVATION & BACKFILL
(METHOD OF MEASUREMENT)

Signed Original On File	R-1.1.1	(206,207)
CHIEF ROAD DESIGN ENGR.	ADOPTED: 8/69	REVISION 10-98

R-2

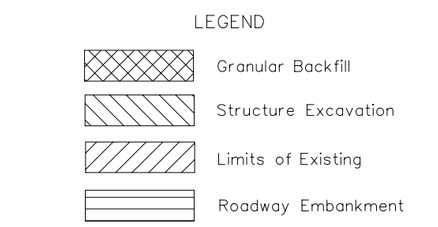


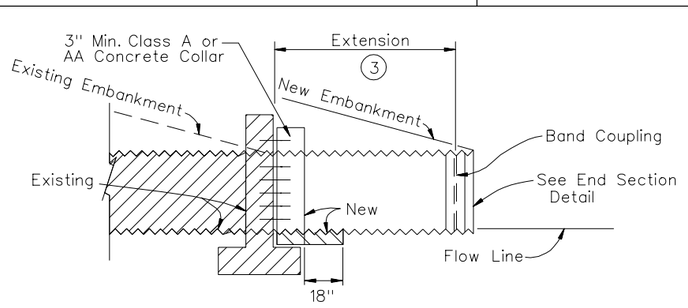
PRECAST CONCRETE END SECTIONS

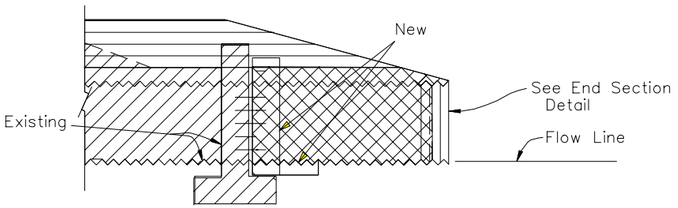


PREFABRICATED METAL END SECTION

(Type 3 Connection)



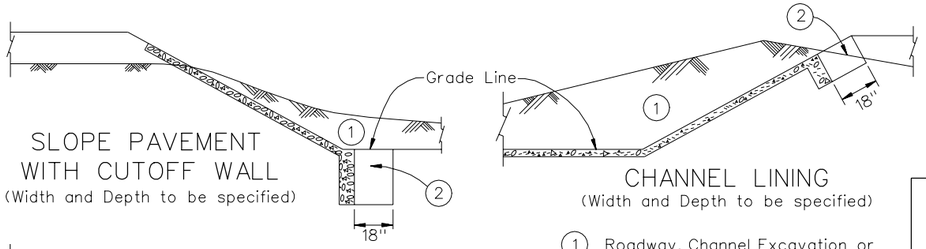




CULVERT EXTENSION OF EXISTING HEADWALL

(See Sheet R-2.1.1 For Pipe Culvert Extension)

(3) Length of Culvert Shall Be Increased As Follows: Consider Each Side Separately. Measure Pipe From Existing Headwall To The Intersection Of The Top of Pipe And Fillslope. 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.

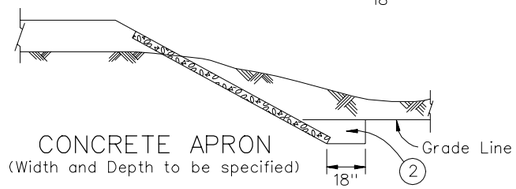


SLOPE PAVEMENT WITH CUTOFF WALL

(Width and Depth to be specified)

CHANNEL LINING

(Width and Depth to be specified)



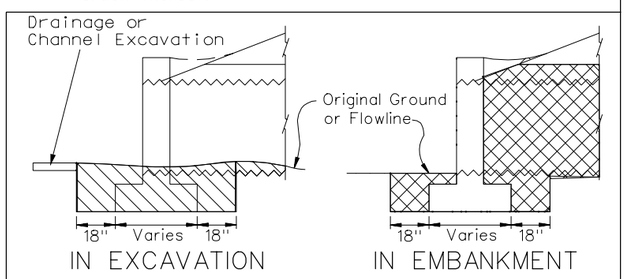
CONCRETE APRON

(Width and Depth to be specified)

(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.

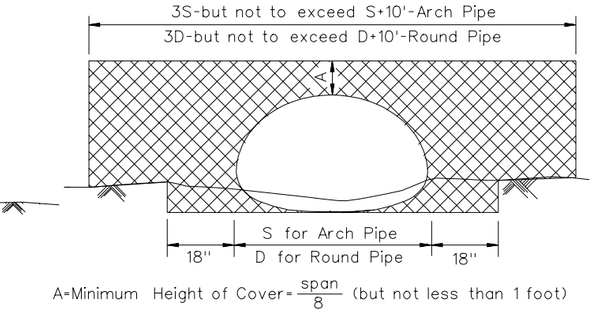
CHANNEL LINING AND SLOPE PAVEMENT



IN EXCAVATION

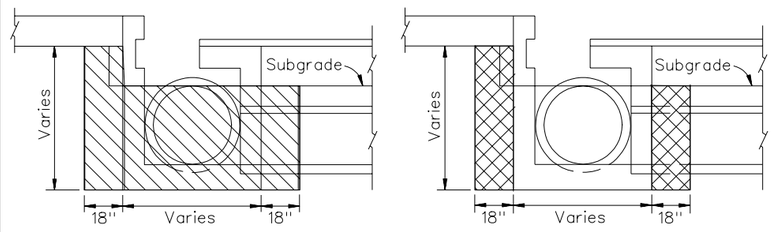
IN EMBANKMENT

CULVERT HEADWALLS



A=Minimum Height of Cover = $\frac{\text{span}}{8}$ (but not less than 1 foot)

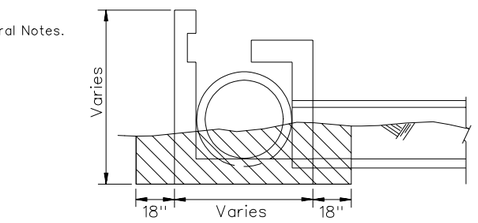
STRUCTURAL PLATE PIPE

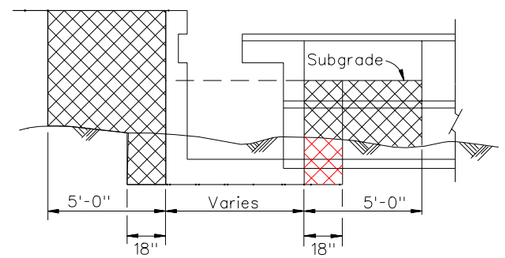


DROP INLETS IN EXCAVATION

(Type 3 Drop Inlet Illustrated)

See R.1.1.1 for General Notes.





DROP INLETS IN EMBANKMENT

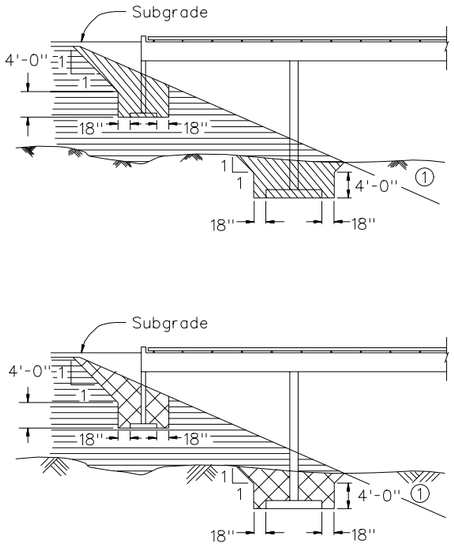
(Type 3 Drop Inlet Illustrated)

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

STRUCTURE EXCAVATION AND BACKFILL

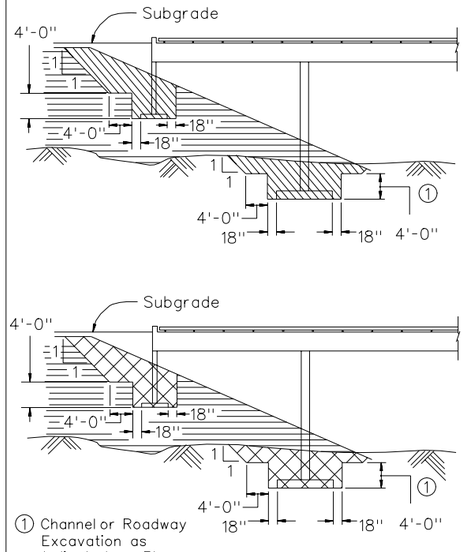
(METHOD OF MEASUREMENT)

Signed Original On File	R-1.1.2 (206,207)	
	ADOPTED:	REVISION
CHIEF ROAD DESIGN ENGR.	8/69	9/02



OPEN ABUTMENT BRIDGES WITH SPREAD FOOTING

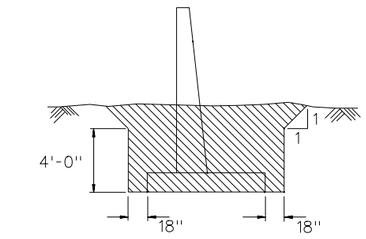
FOOTING WIDTH IS 6 FEET OR LESS

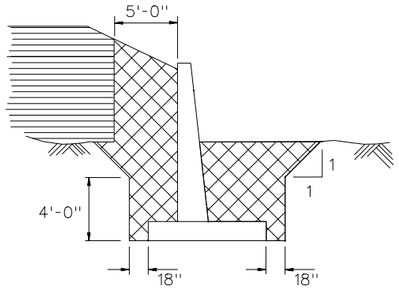


① Channel or Roadway Excavation as Indicated on Plans

OPEN ABUTMENT BRIDGES WITH SPREAD FOOTING

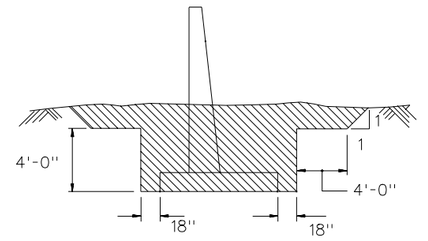
FOOTING WIDTH IS GREATER THAN 6 FEET

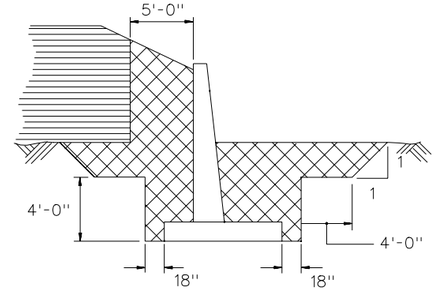




RETAINING WALLS

FOOTING WIDTH IS 6 FEET OR LESS



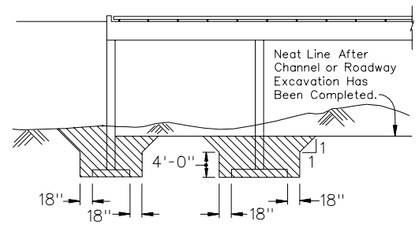


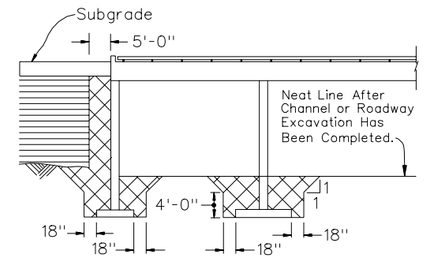
RETAINING WALLS

FOOTING WIDTH IS GREATER THAN 6 FEET

GENERAL NOTES:

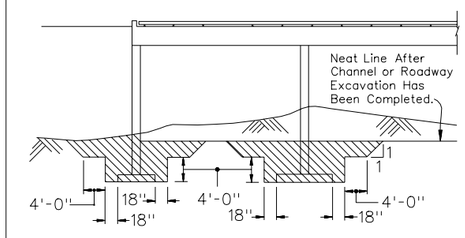
1. Trenches more than 4 feet deep shall be shored, laid back to at least the angle of repose for existing field conditions, or some other means of protection shall be provided.
2. If hazardous field conditions indicate ground movement may be expected, trenches less than 4 feet deep shall also be protected 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 for shoring.
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. Trench Excavation shoring Shall Conform to OSHA Regulations 29 CFR Part 1926, Subpart P, Appendix C.
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. The limits of structure excavation and backfill shown herein shall be used for the method of measurement and payment only. There shall be no additional compensation for any additional excavation or backfill required for excavations to meet OSHA regulations.

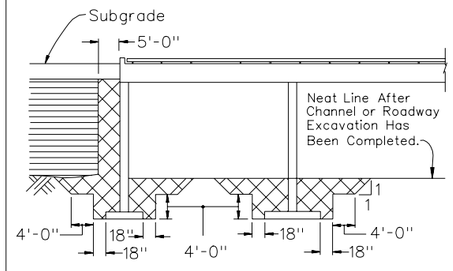




CLOSED ABUTMENT BRIDGES

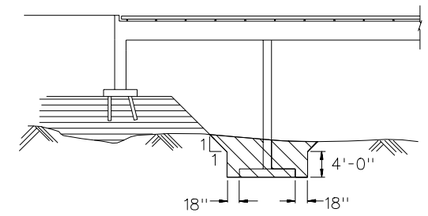
FOOTING WIDTH IS 6 FEET OR LESS

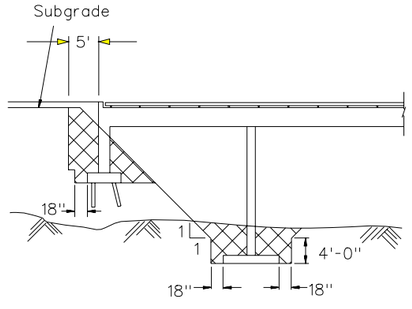




CLOSED ABUTMENT BRIDGES

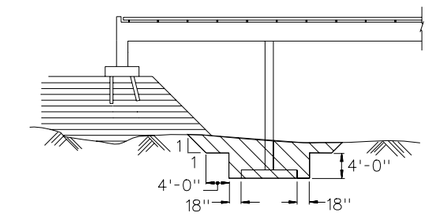
FOOTING WIDTH IS GREATER THAN 6 FEET

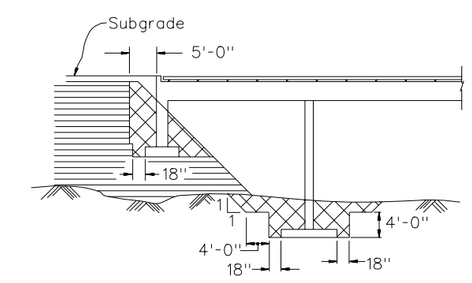




OPEN ABUTMENT BRIDGES ON PILES

FOOTING WIDTH IS 6 FEET OR LESS





OPEN ABUTMENT BRIDGES ON PILES

FOOTING WIDTH IS GREATER THAN 6 FEET

Structure Excavation

Granular Backfill

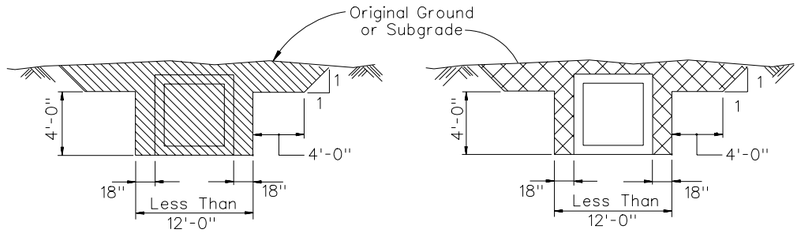
Roadway Embankment

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

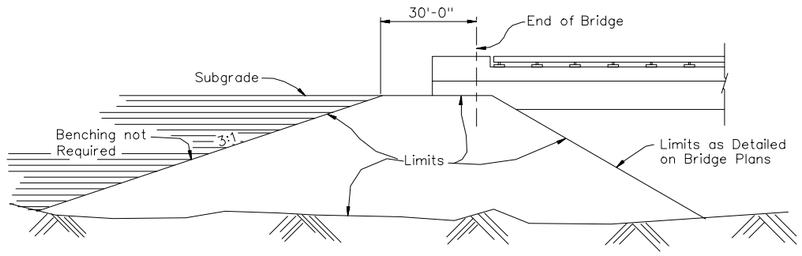
STRUCTURE EXCAVATION AND BACKFILL
(METHOD OF MEASUREMENT)

Signed Original On File	R-1.1.3 (206,207)	
CHIEF ROAD DESIGN ENGR.	ADOPTED: 11/73	REVISION 10/98

R-4



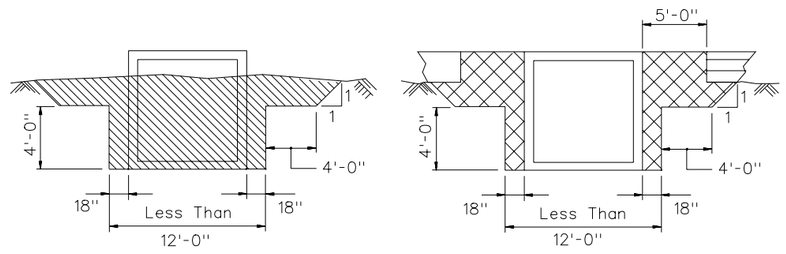
CULVERT IN EXCAVATION



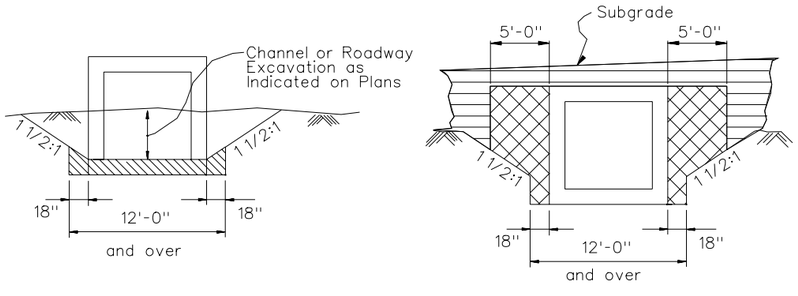
LIMITS OF SELECTED BORROW AT BRIDGE ABUTMENTS

GENERAL NOTES:

1. Trenches more than 4 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 4 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 for shoring.
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. Trench Excavation shoring Shall Conform to OSHA Regulations 29 CFR Part 1926, Subpart P, Appendix C.
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. The limits of structure excavation and backfill shown herein shall be used for the method of measurement and payment only. There shall be no additional compensation for any additional excavation or backfill required for excavations to meet OSHA regulations.
8. See Sheet B-20.1.8 for excavation and backfill for precast concrete box culverts.



CULVERT IN EMBANKMENT



CULVERT IN EXCAVATION OR EMBANKMENT

Structure Excavation

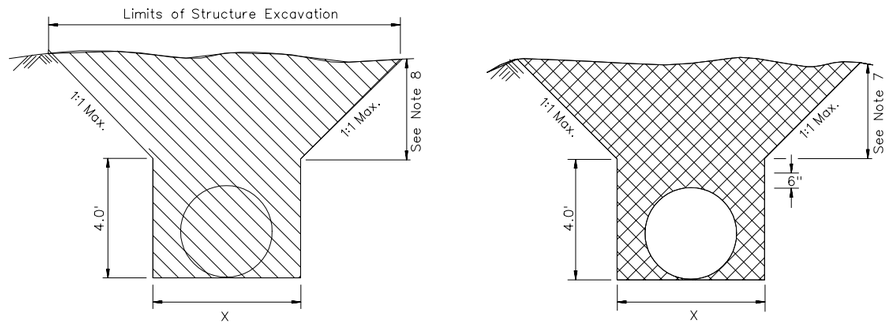
Granular Backfill

Roadway Embankment

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

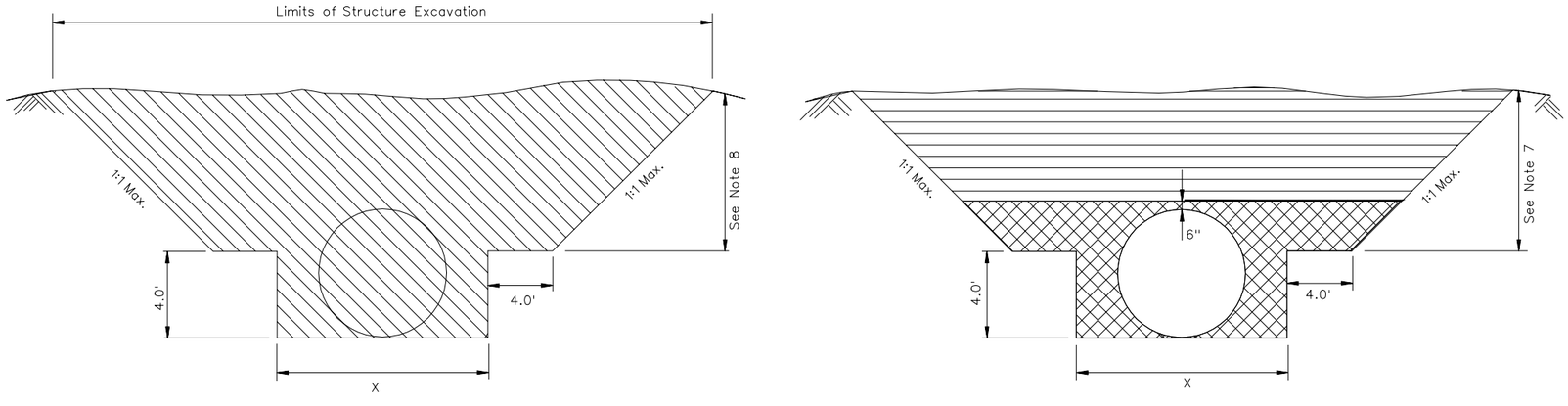
STRUCTURE EXCAVATION AND BACKFILL
(METHOD OF MEASUREMENT)

Signed Original On File	R-1.1.4	(206,207)
CHIEF ROAD DESIGN ENGR.	ADOPTED: 11/73	REVISION 8/97



X= D+3.0' FOR C.M.P.
X= S+3.0' FOR C.M.A.P.
X= D+2t +3.0' FOR R.C.P.
X= W+2t +3.0' FOR OVAL R.C.P.

DIAMETER IS 6 FEET OR LESS



X= D+3.0' FOR C.M.P.
X= S+3.0' FOR C.M.A.P.
X= D+2t +3.0' FOR R.C.P.
X= W+2t +3.0' FOR OVAL R.C.P.

DIAMETER IS GREATER THAN 6 FEET

GENERAL NOTES:

1. Trenches more than 4 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 4 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 for shoring.
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. Trench Excavation shoring Shall Conform to OSHA Regulations 29 CFR Part 1926, Subpart P, Appendix C.
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. If diameter is 6' or less, granular backfill shall be placed for a minimum depth of 6" above the top of the pipe for the width of the trench. Complete the trench backfill with granular backfill or roadway embankment.
   If diameter is greater than 6', granular backfill shall be placed for a minimum depth of 6" above the top of the pipe for the width of the trench. Complete the trench backfill with roadway embankment.
8. The limits of structure excavation and backfill shown herein shall be used for the method of measurement and payment only. There shall be no additional compensation for any additional excavation or backfill required for excavations to meet OSHA regulations.

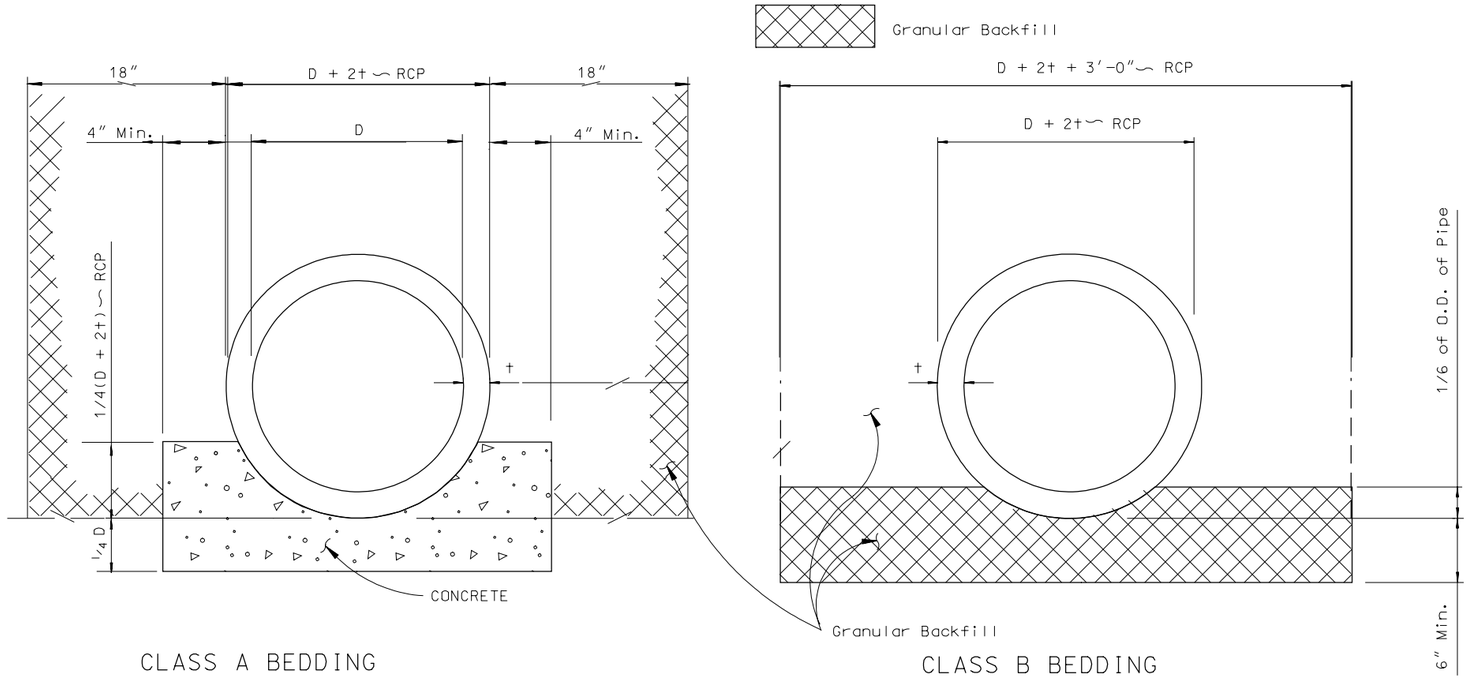
LEGEND:

- Structure Excavation
- Granular Backfill
- Roadway Embankment

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

STRUCTURE EXCAVATION AND BACKFILL
(METHOD OF MEASUREMENT)

Signed Original On File	R-1.1.5 (203,206,207)	
CHIEF ROAD DESIGN ENGR.	ADOPTED: 10/72	REVISION 9/00



CLASS A BEDDING

CLASS B BEDDING

CLASS C BEDDING

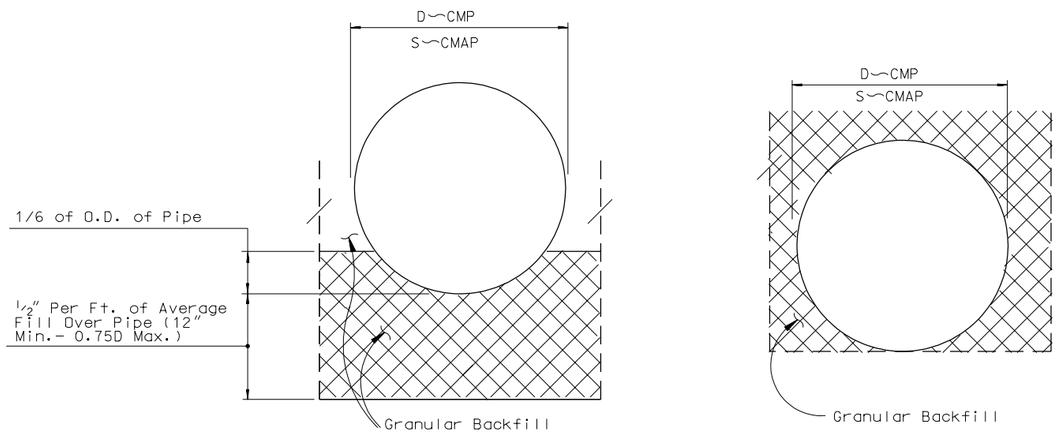
PAYMENT FOR EXCAVATED AREA BELOW THE BOTTOM OF THE PIPE GRADE TO BE INCLUDED IN THE UNIT BID PRICE PER CUBIC YARD OF CONCRETE.

BEDDING SHALL BE CAREFULLY SHAPED TO FIT PIPE PRIOR TO INSTALLATION. NO DIRECT PAYMENT FOR SHAPING THE TRENCH.

BEDDING FOR CONCRETE CULVERT

GENERAL NOTES:

1. MINUMUM DEPTHS AS SPECIFIED IN "CULVERT INSTALLATION WITH UN-SUITABLE FOUNDATIONS" ON SHEET R-1.1.1, NOTES NO. 6 & 8 WILL PREVAIL WHEN THESE CONDITIONS ARE ENCOUNTERED.
2. CONCRETE SHALL BE CLASS A OR AA.



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 FOR REINFORCED CONCRETE PIPE 24" TO 84"

Pipe Class	CLASS II			CLASS III			CLASS IV			CLASS V		
Bedding Class	A	B	C	A	B	C	A	B	C	A	B	C
Pipe Size												
24"	--	--	--	22	14	11	30	18	15	46	29	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	09	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.

Signed Original On File
CHIEF ROAD DESIGN ENGR.

R-1.1.6 (603,604)
ADOPTED: 8/69
REVISION 10/98

2 2/3"x1/2" ROUND CORRUGATED ALUMINUM PIPE

PIPE DIAMETER	MINIMUM COVER	PLATE THICKNESS				
		IN	.060	.075	.105	.135	.164
		GA	16	14	12	10	8
INCHES	INCHES	MAX FILL HEIGHTS ABOVE TOP OF PIPE IN FEET					
18	12		30	30	52		
24	12		22	22	39	41	
30	12			18	31	32	
36	12			15	26	27	
42	12				45	43	
48	18				40	41	43
54	18				35	37	38
60	18					33	34
66	24						31
72	24						28

3"x 1" ROUND CORRUGATED ALUMINUM PIPE

PIPE DIAMETER	MINIMUM COVER	PLATE THICKNESS				
		IN	.060	.075	.105	.135	.164
		GA	16	14	12	10	8
INCHES	INCHES	MAX FILL HEIGHTS ABOVE TOP OF PIPE IN FEET					
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	39	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

6"x 1" ROUND CORRUGATED ALUMINUM PIPE

PIPE DIAMETER	MINIMUM COVER	PLATE THICHNESS				
		IN.	.060	.075	.105	.135	.164
		GA.	16	14	12	10	8
INCHES	INCHES	MAX. FILL HEIGHTS ABOVE TOP OF PIPE IN FEET					
48	18		21	28	37	44	52
54	18		19	25	33	39	46
60	18			19	30	35	42
66	24			20	27	32	38
72	24				25	29	35
78	24				23	27	32
84	24					25	30
90	24					23	28
96	24						26
102	24						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
18x11	18	4	0.060	15
22x13	18	4	0.060	14
25x16	18	4	0.060	12
29x18	18	4 1/2	0.060	10
36x22	18	5	0.060	9
43x27	18	5 1/2	0.075	9
50x31	18	6	0.105	8
58x36	18	7	0.135	8
65x40	18	8	0.135	8
72x44	18	9	0.164	8

* RIVETED OR HELICAL FABRICATION
** TOP OF PIPE TO TOP OF FINISHED GRADE AT SHOULDER LINE FOR 2 TONS PER SQ. FT.

EQUIVALENT GAGE NUMBERS

GAGE NUMBER	THICKNESS IN INCHES		
	STEEL ZN. COAT	UNCOATED	AL.
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	0.2758	

MAXIMUM HEIGHT COVER FOR STRUCTURAL ALUMINUM PLATE PIPE(FEET)
9" x 2 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		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
180	3.0'	.175				18	20	22	24	26	29

MAXIMUM HEIGHT OF COVER FOR ALUMINUM STRUCTURAL PLATE PIPE ARCH 31.8" CORNER RADIUS
Height Of Cover (Feet)

Span Ft.	Min. Cover	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	.150	.150	.175	.200	.225	.250	.275	.275	.300
7-0	1.5'	.100	.100	.100	.100	.100	.100	.100	.100	.100	.100	.100	.100	.125	.125	.150	.150	.150	.150	.175	.175	.200	.225	.250	.250	.300	.300	.300
8-0	2.0'		.125	.100	.100	.100	.100	.100	.100	.100	.100	.100	.125	.125	.125	.150	.150	.150	.175	.175	.200	.225	.250	.275	.275	.300	.300	
9-0	2.0'		.125	.100	.100	.100	.100	.100	.100	.100	.100	.100	.125	.125	.125	.150	.150	.150	.175	.175	.200	.225	.250					
10-0	2.0'		.125	.100	.100	.100	.100	.100	.100	.100	.100	.125	.125	.125	.150	.150	.150	.175	.175	.200	.225	.250	.275					
11-0	2.0'		.150	.125	.100	.100	.100	.100	.100	.100	.100	.125	.125	.150	.150	.150	.150	.175	.200	.225	.250	.275						
12-0	2.0'		.175	.150	.125	.100	.100	.100	.100	.100	.100	.125	.125	.150	.175	.200	.225	.250										
13-0	2.0'		.175	.150	.125	.125	.125	.125	.125	.125	.125	.150	.150	.175	.200	.225	.250											
14-0	2.0'		.175	.150	.125	.125	.125	.125	.125	.125	.150	.175	.175	.200	.225	.250												
15-0	2.0'		.175	.150	.150	.150	.150	.150	.150	.150	.150	.175	.200	.225	.250													
16-0	3.0'				.175	.175	.175	.175	.175	.175	.175	.200	.225	.250														
17-0	3.0'				.175	.175	.175	.175	.175	.175	.200	.225	.250															
18-0	3.0'				.200	.200	.200	.200	.200	.200	.225	.250																
19-0	3.0'				.250	.250	.250	.250	.250	.250	.250	.275																
20-0	3.0'				.275	.275	.275	.275	.275	.275	.275	.300																

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".

NOTE: CONTACT HYDRAULICS ENGINEER FOR MATERIALS OR SIZES NOT LISTED.

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

ALLOWABLE FILL HEIGHTS FOR ALUMINUM CULVERTS

Signed Original On File
CHIEF ROAD DESIGN ENGR.

R-1.3.1 (601,605)
ADOPTED:12/19/78
REVISION 1/98

* ROUND CORRUGATED STEEL PIPE
2 2/3"x1/2" CORRUGATIONS

PIPE DIAMETER	** MIN. COVER	PLATE THICKNESS IN INCHES									
		0.064		0.079		0.109		0.138		0.168	
		R	E	R	E	R	E	R	E	R	E
INCHES	INCHES	MAX. FILL HTS. ABOVE TOP OF PIPE IN FEET									
12	12	63		83							
15	12	50		66							
18	12	42		55		84					
24	12	32		42		61		75			
30	12	25		33		49		60		74	
36	12	21		28		41		50		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
FILL HEIGHTS FOR 5"x1" CORRUGATION ARE 87% OF THOSE SHOWN.

PIPE DIAMETER	** MIN. COVER	PLATE THICKNESS IN INCHES									
		0.064		0.079		0.109		0.138		0.168	
		R	E	R	E	R	E	R	E	R	E
INCHES	INCHES	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	24									25	26

* CORRUGATED STEEL PIPE ARCH
2 2/3"x1/2" CORRUGATIONS

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

* CORRUGATED STEEL PIPE ARCH
5" x 1" & 3" x 1" CORRUGATIONS

PIPE DIMENSIONS SPAN-RISE	** MIN. COVER	EQUIV. DIA.	MIN. THICKNESS	MAX. COVER IN FEET CORNER PRESSURE'S FOR IN TONS PER SQ.FT.	
INCHES	INCHES	INCHES	INCHES	2 TONS	*** 3 TONS
60 x 46	12	54	0.064	12	18
66 x 51	12	60	0.064	12	18
73 x 55	12	66	0.064	12	18
81 x 59	12	72	0.064	12	18
87 x 63	12	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

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	18	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

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

SPAN	RISE	MIN. COVER INCHES	ALLOWABLE FILL HEIGHTS IN FEET							
			2 TONS/SQ.FT. BEARING PRESSURE				▲3 TONS/SQ. FT. BEARING PRESSURE			
			12 GAGE 0.109	10 GAGE 0.138	8 GAGE 0.168	7 GAGE 0.188	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 RADII
6" X 2" CORRUGATIONS

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

▲ MAY BE USED ONLY WHEN SUPPORTED BY FOUNDATION STUDY

EQUIVALENT GAGE NUMBERS			
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	0.1838	
5	0.218	0.2145	
3	0.249	0.2451	
1	0.280	0.2758	

HELICAL RIB LOCK SEAM PIPE
ALLOWABLE FILL HEIGHTS (FEET) 3/4"x1" RIBS OF 11 1/2" PITCH

PIPE DIAMETER INCHES	16 GAGE	14 GAGE	12 GAGE
24	46	64	90
30	37	51	72
36	31	43	60
42	26	37	51
48	23	32	45
54	21	29	40
60	19	26	36
66		23	33
72		21	30
78			28
84			26
90			24

NOTE: BASED ON H-20 LOADING, MINIMUM FILL HEIGHTS IS ONE-QUARTER (1/4) OF THE DIAMETER FOR PIPE OVER FORTY-EIGHT (48) INCHES IN DIAMETER AND ONE (1) FOOT FOR ALL OTHER DIAMETERS.

NOTE: CONTACT HYDRAULICS ENGINEER FOR MATERIALS OR SIZES NOT LISTED.

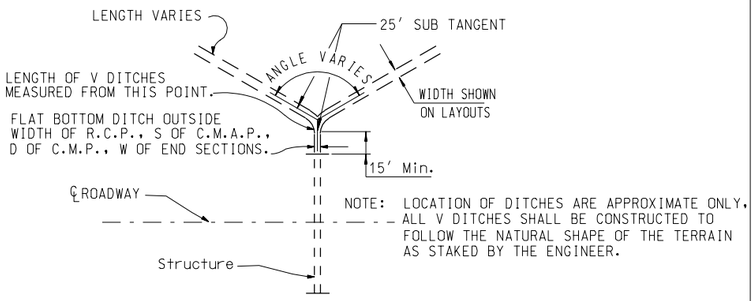
* RIVETED OR HELICAL FABRICATION
** TOP OF PIPE TO TOP OF FINISHED GRADE AT SHOULDER LINE FOR 2 TONS PER SQ. FT.
*** SHALL BE USED ONLY AFTER FOUNDATION INVESTIGATION
**** FOR FIELD STRUTTING C.M.P. DETAIL SEE STANDARD SHEET R-2.1.1

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

ALLOWABLE FILL HEIGHTS FOR STEEL CULVERTS

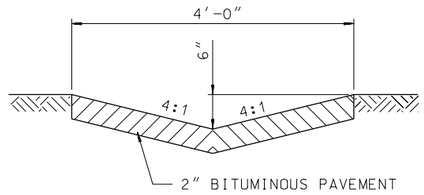
Signed Original On File
CHIEF ROAD DESIGN ENGR.

R-1.3.1.2 (600,604,606)
ADOPTED: 7/73
REVISION 8/97



PLAN

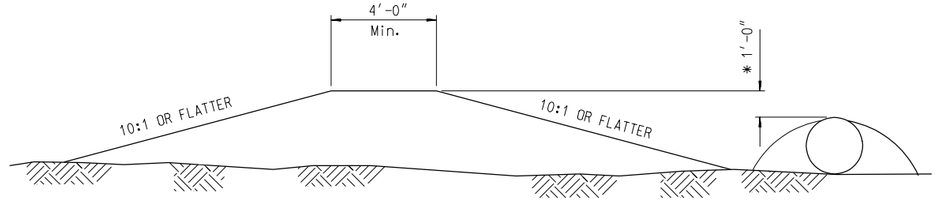
DRAINAGE DITCHES



S E C T I O N

BITUMINOUS TURNOUT DITCH

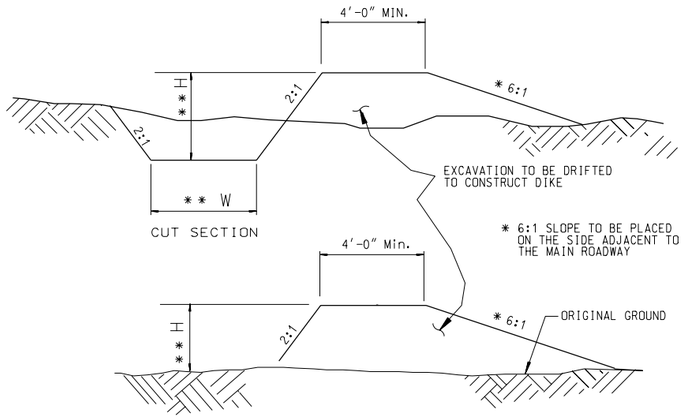
(PLANTMIX OR ROADMIX WITH SEAL COAT)



* NOT TO EXCEED SHOULDER ELEVATION.

DIKE DETAIL

INLET AND OUTLET DIKES WITHIN 30' OF ROADWAY SHOULDER, AND MEDIAN DIKES. LOCATION AS INDICATED ON THE PLANS.

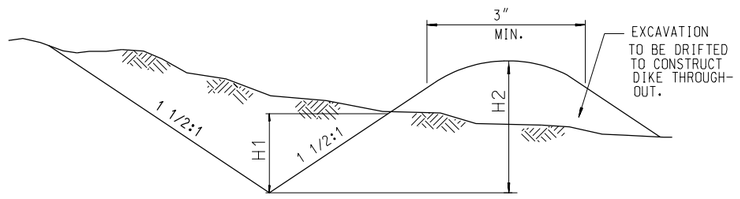


* * - SEE HYDRAULIC ENGINEER FOR H, W, & NEED TO RIP RAP FACE OF DIKE.

* * H = DEPTH OF DITCH OR HEIGHT OF DIKE AS INDICATED ON THE PLANS OR AS DIRECTED BY THE ENGINEER.

* * W = WIDTH OF DITCH AS INDICATED ON THE PLANS OR AS DIRECTED BY THE ENGINEER.

FLAT BOTTOM DITCH AND DIKE



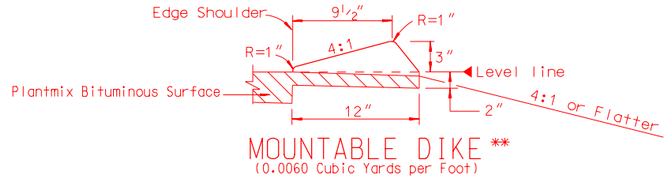
H1 = DEPTH AS ORDERED BY THE ENGINEER. (1'-6" MIN.)

H2 = HEIGHT AS ORDERED BY THE ENGINEER. (2'-6" MIN.)

S E C T I O N

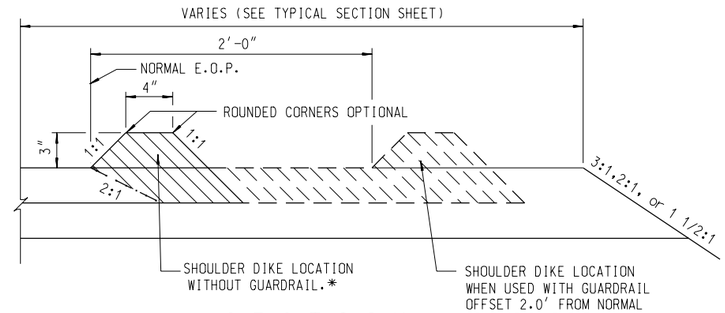
V TYPE DITCH

TO BE USED FOR SURFACE DITCHES AND WHERE ORDERED BY THE ENGINEER.



MOUNTABLE DIKE **

(0.0060 Cubic Yards per Foot)



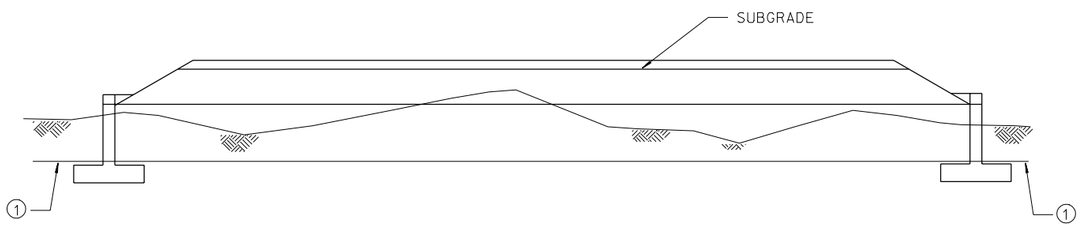
S E C T I O N

BITUMINOUS SHOULDER DIKE

(PLANTMIX OR ROADMIX WITH SEAL COAT)

* SHALL NOT BE USED ALONE IN URBAN AREAS FOR DESIGN SPEED GREATER THAN 50 M.P.H. OR RURAL AREAS FOR DESIGN SPEED GREATER THAN 40 M.P.H.

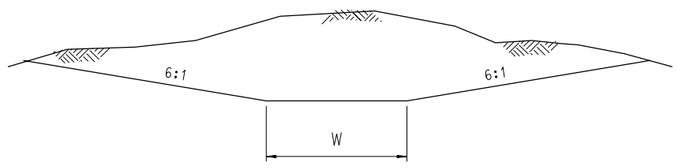
** Application requires Chief Roadway Design Engineer approval



1 INLET AND OUTLET DITCHES TO BE ON SAME GRADE AS CULVERT FOR A DISTANCE OF 25' MINIMUM.
(SEE INLET, OUTLET AND MEDIAN DITCH DETAILS FOR DESIGN OF DITCHES.)

CULVERT INSTALLATION

(PREFERRED)



W = WIDTH OF DITCH AS INDICATED ON THE PLANS OR AS DIRECTED BY THE ENGINEER.

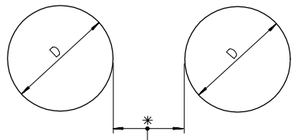
INLET, OUTLET AND MEDIAN DITCH DETAILS

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

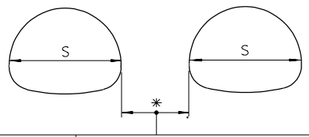
STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

DRAINAGE DITCHES AND DIKES

Signed Original On File	R-1.4.1	(203)
CHIEF ROAD DESIGN ENGR.	ADOPTED: 8/69	REVISION 9/02



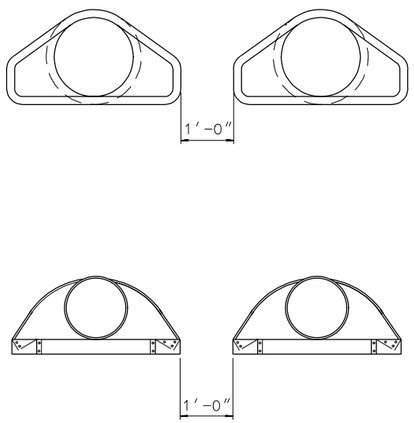
DIAMETER	MINIMUM SPACE BETWEEN PIPES
12" to 24"	1'-0"
30" to 66"	ONE HALF DIAMETER OF PIPE
72" to 84"	3'-0"



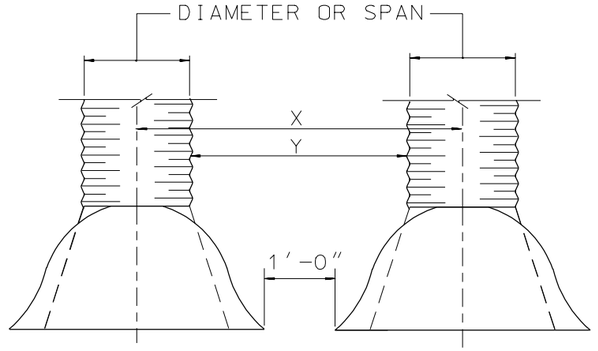
SPAN	MIN. SPACE BETWEEN PIPE ARCHES
17" to 35"	1'-0"
42" to 83"	One Third Span of Pipe Arch

* WHEN HEADWALLS ARE USED OR ANTICIPATED FOR FUTURE USE, SPACE AS PER HEADWALLS STANDARD.

MULTIPLE INSTALLATIONS WITHOUT HEADWALLS



MULTIPLE INSTALLATIONS WITH END SECTIONS

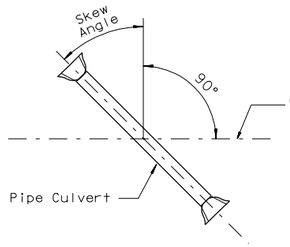


NOTE: WHEN Y DISTANCE EXCEEDS 5'-0", STRUCTURE EXCEXCAVATION AND BACKFILL QUANTITIES SHALL BE CALCULATED FOR EACH CULVERT.

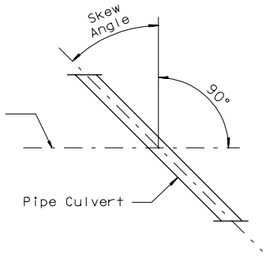
TABLE OF SEPARATION FOR MULTIPLE INSTALLATIONS

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"						

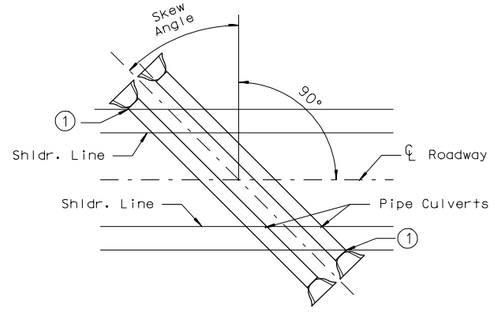
① INTERSECTING POINT OF FILLSLOPE AND TOP OF PIPE CONTROLS THE LENGTH OF PIPE TO BE INSTALLED.



SINGLE CULVERT WITH END SECTIONS

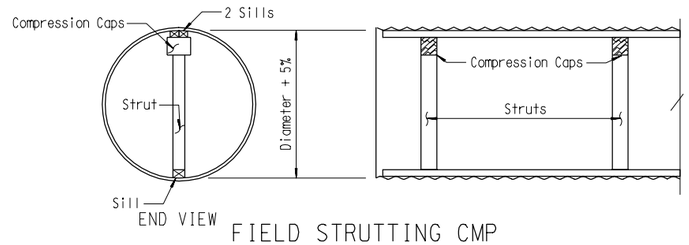


SINGLE CULVERT WITH HEADWALLS



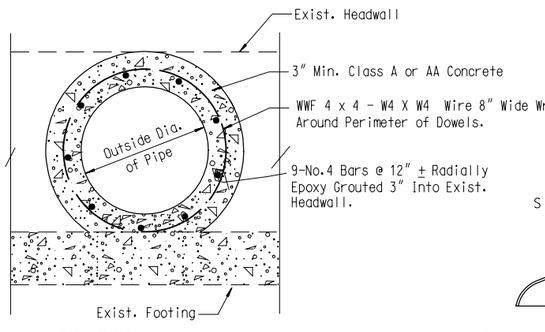
MULTIPLE CULVERT WITH END SECTIONS

STRUTS SHALL BE LEFT IN PLACE UNTIL FILL HAS BEEN COMPLETED AND COMPACTED, UNLESS OTHERWISE DIRECTED BY THE ENGINEER.

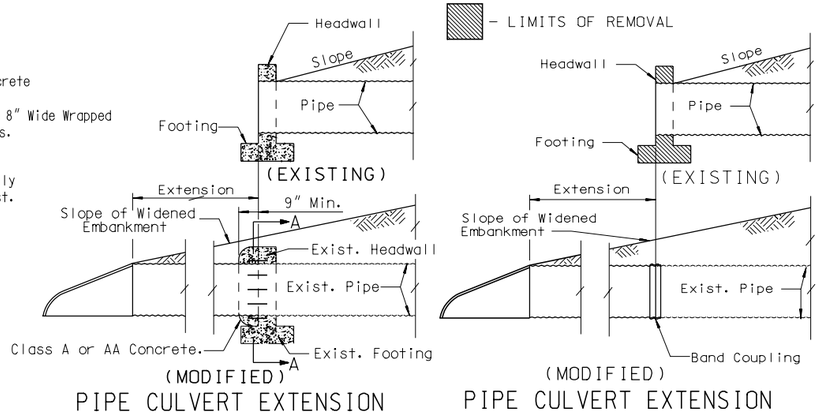


FIELD STRUTTING CMP

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".



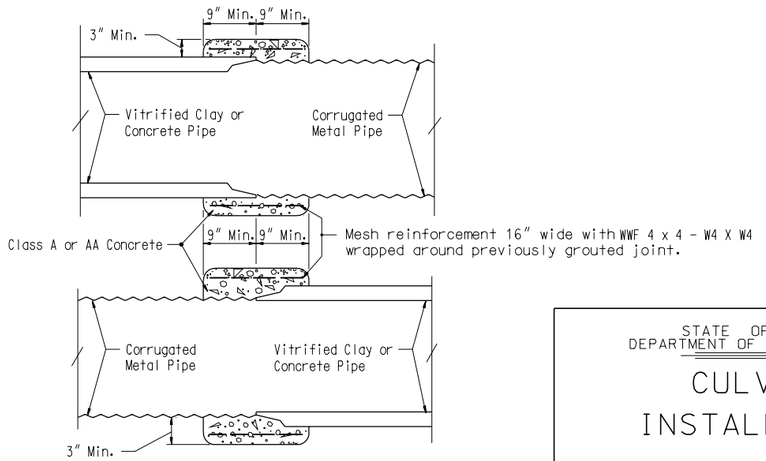
SECTION A-A



PIPE CULVERT EXTENSION TYPE 2

PIPE CULVERT EXTENSION TYPE 1

(FOR ADDITIONAL INFORMATION SEE R-1.1.2)



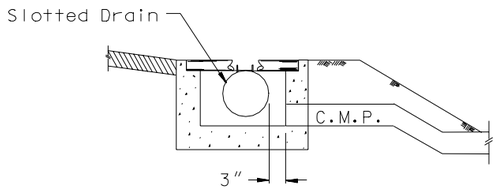
CONCRETE COLLAR

CMP TO RCP OR VITRIFIED CLAY PIPE EXTENSIONS

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

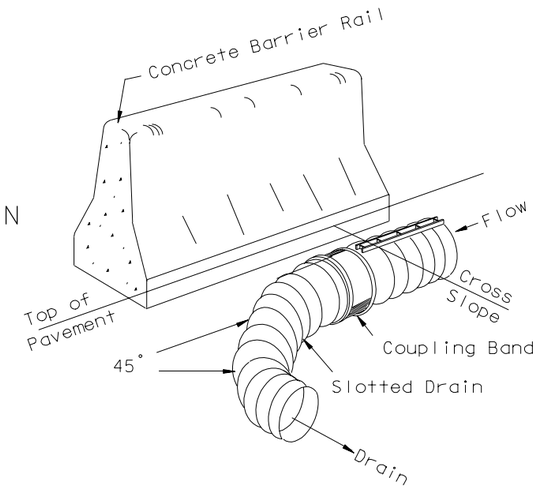
CULVERT INSTALLATION

Signed Original On File	R-2.1.1 (601 THRU 606)
CHIEF ROAD DESIGN ENGR.	ADOPTED: 8/69 REVISION 1/98

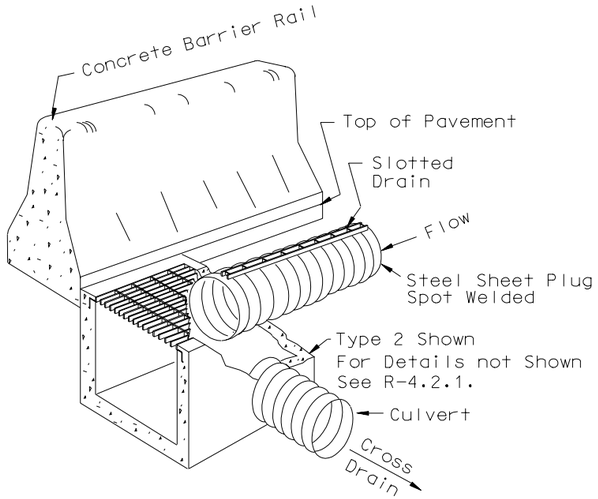


EMBANKMENT PROTECTOR & SLOTTED DRAIN

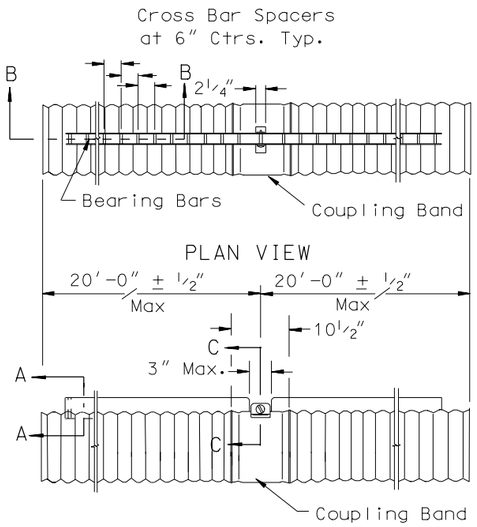
For Details Not Shown See R-3.1.2 and R-3.1.3.



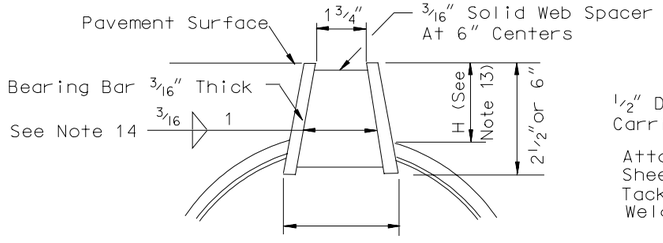
SLOTTED DRAIN & CONCRETE BARRIER RAIL (CAN BE USED WITH SHOULDER DIKE)



SLOTTED DRAIN, CONCRETE BARRIER RAIL & DROP INLET



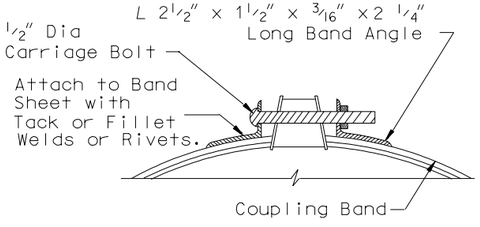
ELEVATION VIEW



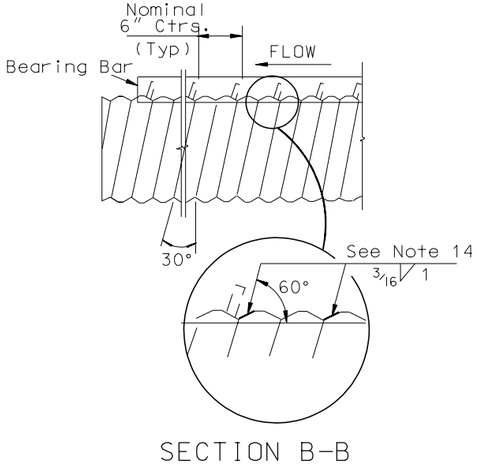
2 1/4" for 2 1/2" Grate
3"for 6"Grate

STANDARD GRATE DETAIL

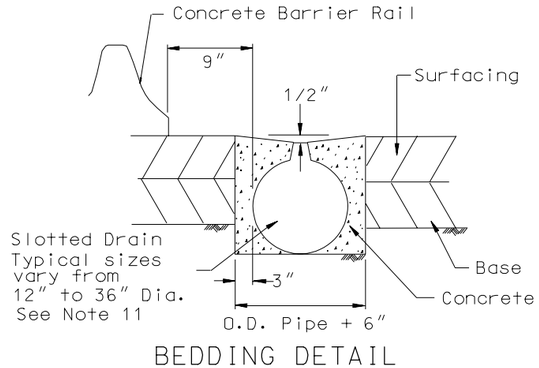
SECTION A-A



SECTION C-C



SECTION B-B



BEDDING DETAIL

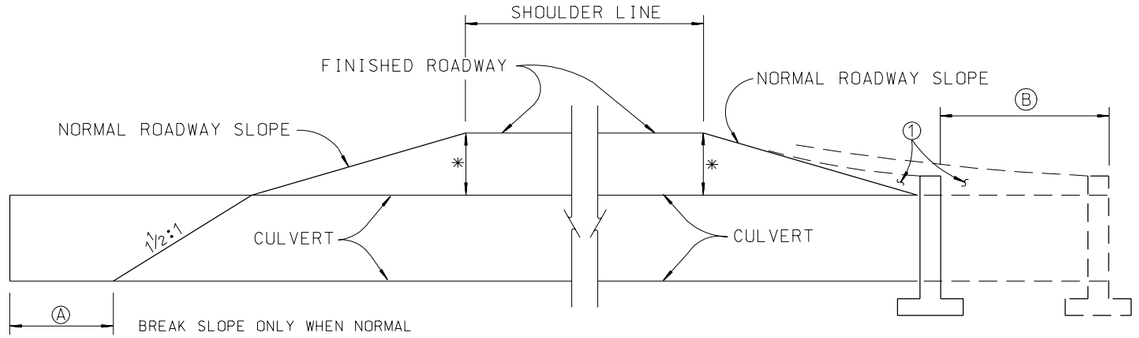
GENERAL NOTES:

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.
4. The maximum variance from a straight line between the extreme top corners of the bearing bars shall be 1/2" in 20'.
5. For continuous runs of S.C.M.P. in excess of 200', cleanout DI or standard flushing inlets shall be installed as shown on the plans.
6. Spot weld shall develop minimum required strength of strap.
7. Dimensions shown are minimums.
8. Contractor to provide an adequate method of keeping the A.C. out of pipe during paving operations.
9. Design shall be in accordance with the latest edition of the AASHTO Standard Specification for Highway Bridges, Section 12. Minimum live load to be H20.
10. Concrete shall be Class A or AA.
11. Hydraulics engineer will state pipe size.
12. The spacer plates shall be welded on both sides to each bearing bar with four 1 1/4" long 3/16" fillet welds.
13. H = height of bearing bar (2 1/2" or 6") - 1/2" corrugation - gage of pipe in inches.
14. The grate shall be welded with a 3/16" fillet weld minimum 1" long to the corrugated steel pipe on each side of the grate at every other corrugation.

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

SLOTTED C.M.P. DRAIN DETAILS

Signed Original On File	R-2.1.3	(604)
	ADOPTED: 6/72	REVISION 9/00
CHIEF ROAD DESIGN ENGR.		



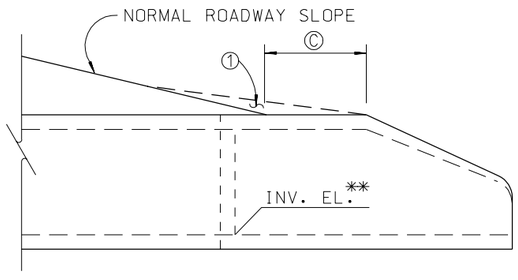
BREAK SLOPE ONLY WHEN NORMAL ROADWAY SLOPE IS FLATTER THAN 2:1

WITHOUT HEADWALL

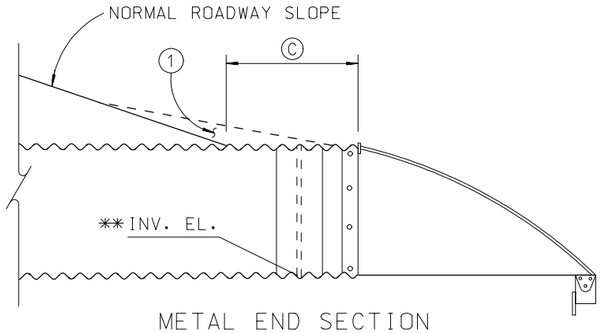
(A)— LENGTH OF CULVERT SHALL BE INCREASED AS FOLLOWS: CONSIDER EACH SIDE SEPARATELY. MEASURE PIPE FROM ROADBED CENTERLINE TO THE INTERSECTION OF PIPE FLOW LINE AND FILLSLOPE. TO THIS DIMENSION ADD 2.0′ WHEN COVER AT SHOULDER IS 1.0′ TO 10.0′ ADD AN ADDITIONAL 0.5′ FOR EACH SUCCEEDING 5.0′ OF COVER OR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

WITH CONCRETE HEADWALL

(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 FILLSLOPE 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.



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 FILLSLOPE. 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.

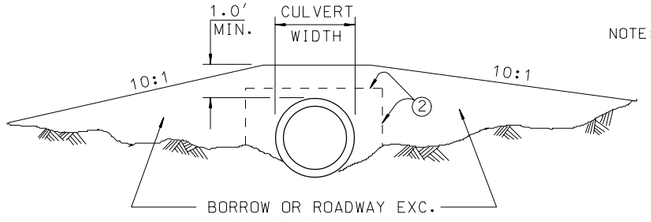
MINIMUM CULVERT INSTALLATION

* RCP: USE 1′6″MIN. WHERE POSSIBLE. IF MINIMUM COVER IS RESTRICTIVE, COMPENSATE BY UTILIZING HIGHER CLASS PIPE OR SELECTIVE BEDDING AS RECOMMENDED BY THE HYDRAULICS SECTION.

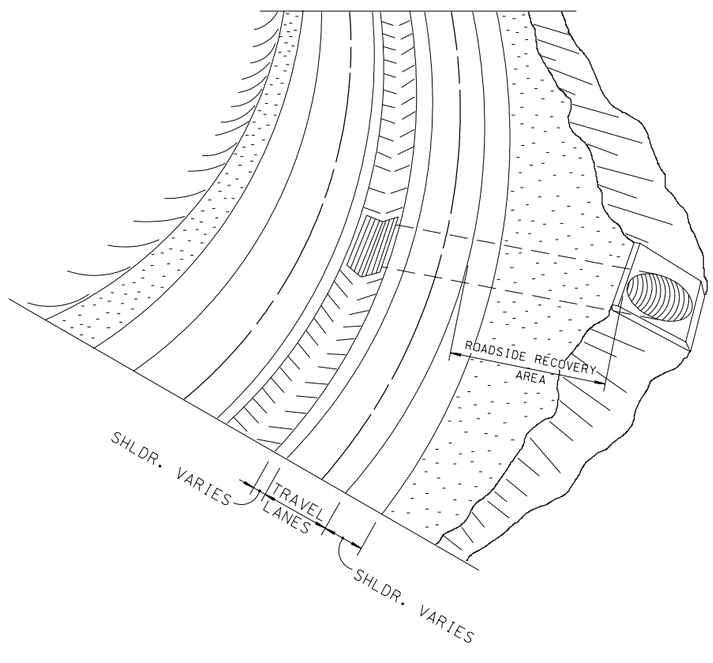
ALUMINUM CULVERTS: SEE STANDARD SHEET R-1.3.1.
STEEL CULVERTS: SEE STANDARD SHEET R-1.3.1.2.

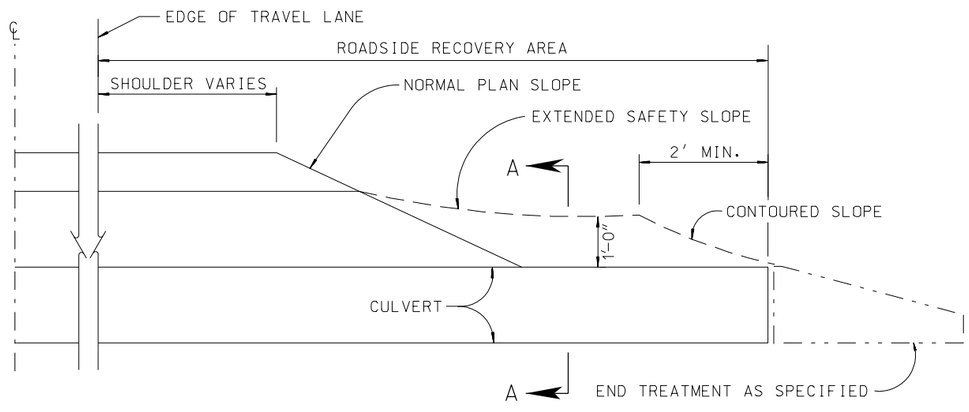
** FOR INFORMATIONAL PURPOSES ONLY

(1)— CONTOUR THIS AREA TO PROVIDE THE MINIMUM AMOUNT OF OBSTRUCTION EXPOSURE.



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





METHOD OF CONTOURING OVER CULVERTS

NOTE:

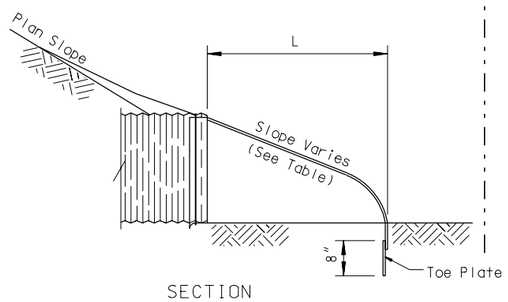
(1)—IF, AFTER EXTENDING THE CULVERT AND/OR WARPING THE FILLSLOPE FOR SAFETY AND/OR AESTHETICS, THE EXTENSION DOES NOT FULFILL THE REQUIREMENTS FOR A CLEAR ROADSIDE RECOVERY AREA, THEN VEHICULAR TRAFFIC MAY BE PROTECTED BY SOME OTHER MEANS, SUCH AS GUARDRAIL, BARRIER RAIL OR ANOTHER ACCEPTABLE SAFETY FEATURE.

(2)—NORMAL STRUCTURE EXCAVATION AND BACKFILL LIMITS.

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

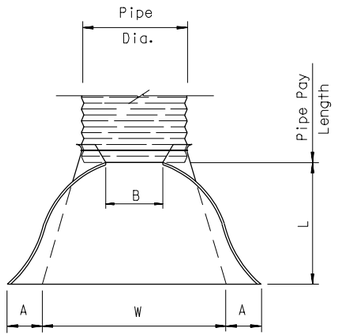
CULVERT INSTALLATION

Signed Original On File	R-2.1.4 (601 THRU 606)	
CHIEF ROAD DESIGN ENGR.	ADOPTED: 6/72	REVISION 1/98

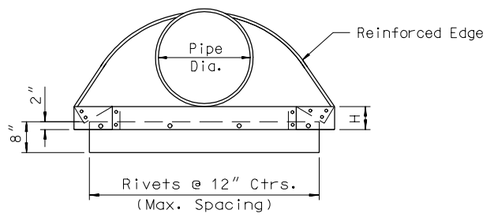


SECTION

TYPE 1 OR 2 CONNECTION

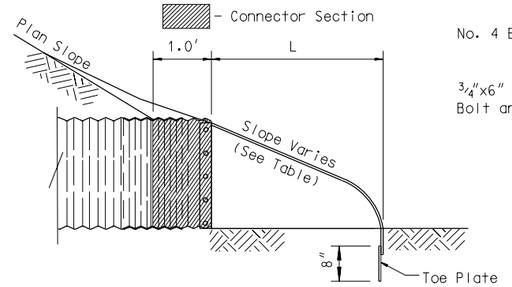


PLAN



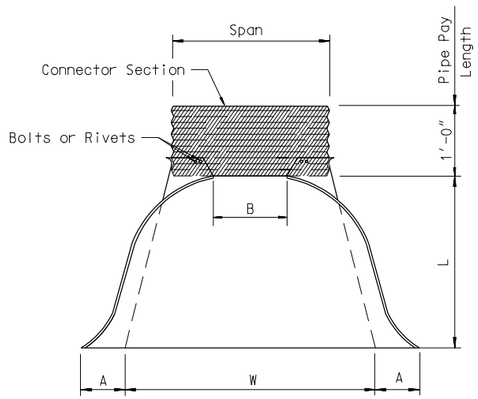
ELEVATION

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.

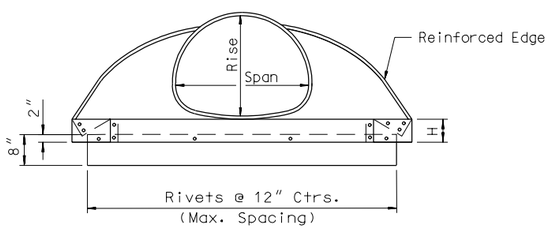


SECTION

TYPE 3 CONNECTION

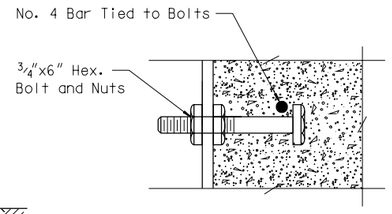


PLAN

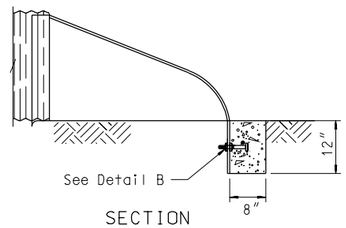


ELEVATION

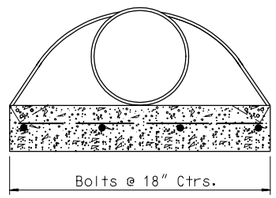
LENGTH OF TOE PLATE TO BE W + 10" MIN. FOR PIPE ARCHES WITH RISE OF 13" TO 29" INCLUSIVE AND W+ 18" MIN. FOR PIPE ARCHES WITH RISE OF 33" AND LARGER.



DETAIL B



SECTION



ELEVATION

ANCHOR BLOCK DETAIL

(See Notes 6 thru 9)

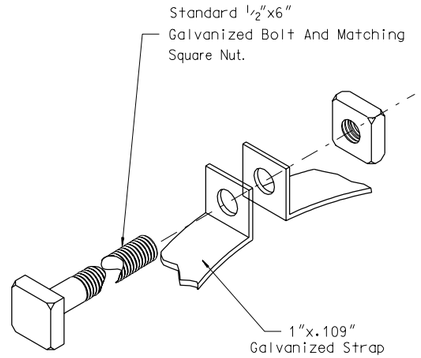
TYPE CONNECTION	PIPE ARCH DIMENSIONS SPAN	PIPE ARCH DIMENSIONS RISE	GAGE	DIMENSIONS A 1" TOL.	B MAX.	H 1" TOL.	L 1 1/2" TOL.	W 2" TOL.	APPROX. SLOPE	*CONCRETE CU. YD.
TYPE 2	17"	13"	16	7"	9"	6"	19"	30"	2 1/2:1	
	21"	15"	16	7"	10"	6"	23"	36"	2 1/2:1	
	24"	18"	16	8"	12"	6"	28"	42"	2 1/2:1	
	28"	20"	16	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	
	49"	33"	12	13"	21"	9"	53"	85"	2 1/2:1	
	57"	38"	12	18"	26"	12"	63"	90"	2 1/2:1	0.26
TYPE 3	64"	43"	12	18"	30"	12"	70"	102"	2 1/4:1	0.29
	71"	47"	12	18"	33"	12"	77"	114"	2 1/4:1	0.31
	77"	52"	12	18"	36"	12"	77"	126"	2:1	0.34
	83"	57"	12	18"	39"	12"	77"	138"	2:1	0.36

TYPE CONNECTION	PIPE DIAM.	GAGE	DIMENSIONS A 1" TOL.	B MAX.	H 1" TOL.	L 1 1/2" TOL.	W 2" TOL.	APPROX. SLOPE	*CONCRETE CU.YD.
TYPE 1	12"	16	6"	6"	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"	36"	42"	2 1/2:1	
	24"	16	10"	13"	6"	41"	48"	2 1/2:1	
TYPE 2	30"	14	12"	16"	8"	51"	60"	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	
	48"	12	18"	27"	12"	78"	90"	2 1/4:1	0.26
	54"	12	18"	30"	12"	84"	102"	2 :1	0.29
	60"	12	18"	33"	12"	87"	114"	1 3/4:1	0.31
	66"	12	18"	36"	12"	87"	120"	1 1/2:1	0.32
	72"	12	18"	39"	12"	87"	126"	1 1/3:1	0.34
	78"	12	18"	42"	12"	87"	132"	1 1/4:1	0.35
	84"	12	18"	45"	12"	87"	138"	1 1/6:1	0.36

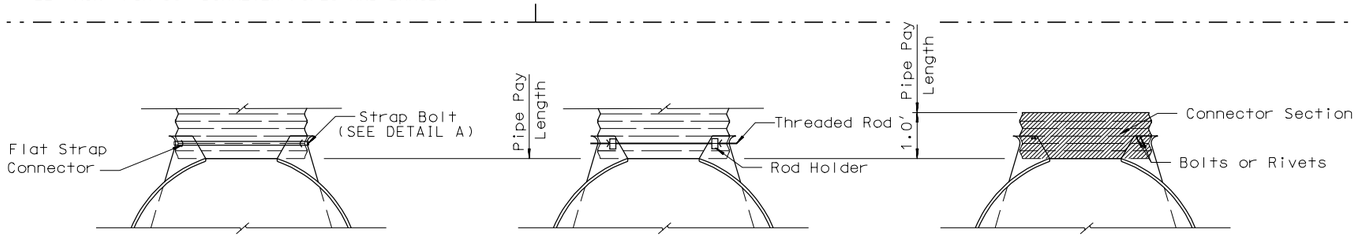
* FOR INFORMATION ONLY

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 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 1/4" 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 1/4"FOR 78" THRU 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" CMAP 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



TYPE 1

FOR 12" CMP THROUGH 24" CMP ONLY

TYPE 2

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

TYPE 3

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

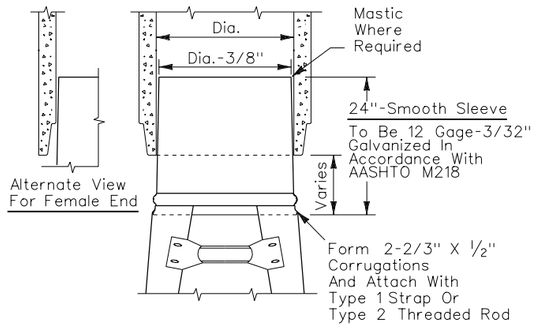
STANDARD CONNECTIONS

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

METAL END SECTIONS 12" CMP TO 84" CMP AND 17"X13" CMAP TO 83"X57" CMAP

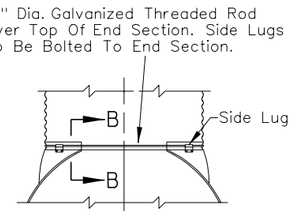
Signed Original On File	R-2.2.1	(604)
CHIEF ROAD DESIGN ENGR.	ADOPTED: 8/75	REVISION 1/98

R-14



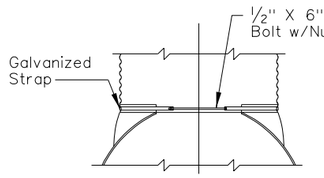
TYPE 3 CONNECTOR DETAIL

For All Concrete Pipes



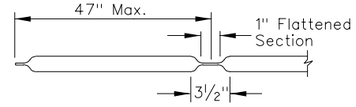
TYPE 2 CONNECTOR DETAIL

For 30" And Larger
20" X 15" And Larger



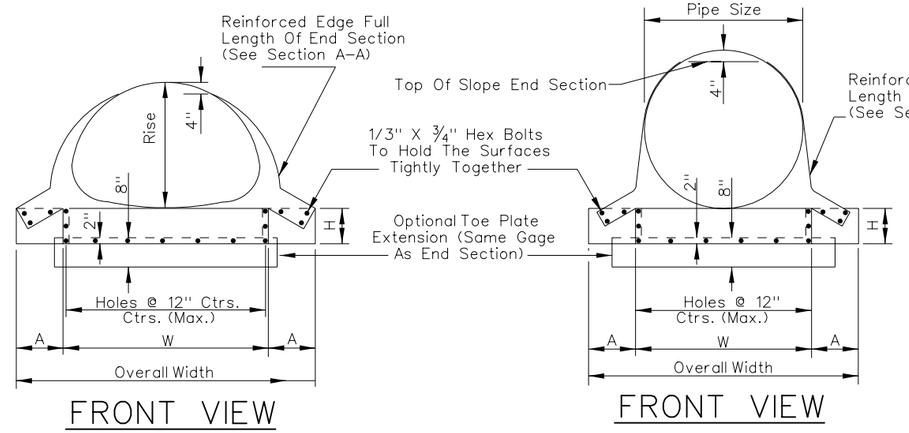
TYPE 1 CONNECTOR DETAIL

Through 24"



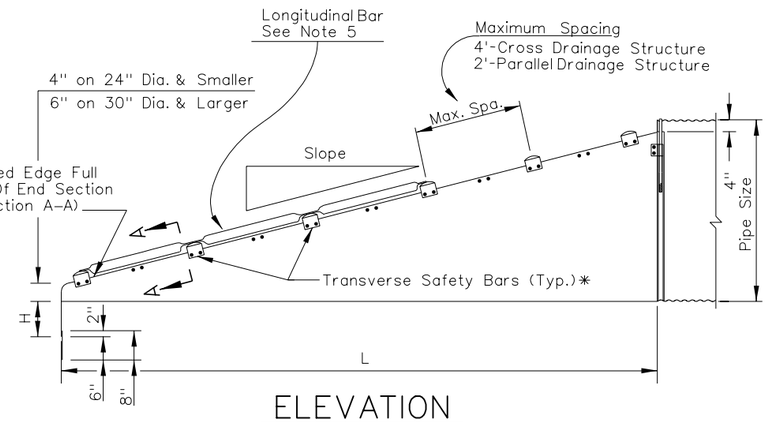
LONGITUDINAL BARS

SAFETY SLOPE END SECTIONS FOR CIRCULAR PIPES												
Pipe Dia. (in.)	Min. Thick. in.	Ga.	Dimensions +/- 2" A	H	W	Overall Width	L Dimensions +/- 2" Slope	Length (in.)	Slope	Length (in.)	Slope	Length (in.)
15	.064	16	8	6	21	37	4:1	28	6:1	41	10:1	70
18	.064	16	8	6	24	40	4:1	40	6:1	60	10:1	100
21	.064	16	8	6	27	43	4:1	51	6:1	77	10:1	128
24	.064	16	8	6	30	46	4:1	63	6:1	95	10:1	157
30	.109	12	12	9	36	60	4:1	80	6:1	118	10:1	197
36	.109	12	12	9	42	66	4:1	104	6:1	154	10:1	256
42	.109	12	16	12	48	80	4:1	128	6:1	200	10:1	315
48	.109	12	16	12	54	86	4:1	152	6:1	225	10:1	375
54	.109	12	16	12	60	92	4:1	176	6:1	260	10:1	433
60	.109	12	16	12	66	98	4:1	200	6:1	295	10:1	492



FRONT VIEW

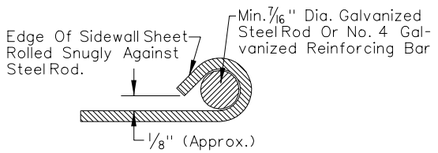
FRONT VIEW



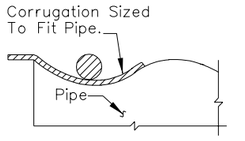
ELEVATION

GENERAL NOTES:

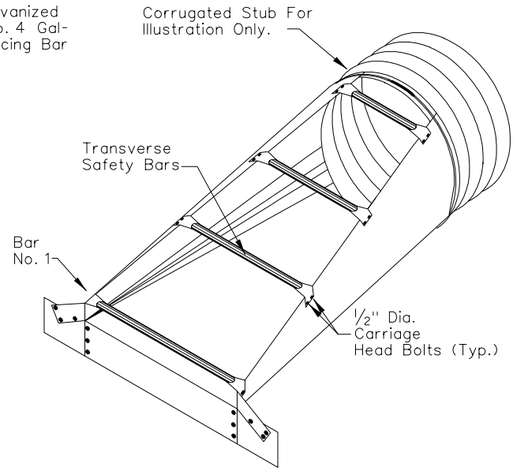
1. STEEL
   Galvanized steel shall meet A.A.S.H.T.O. specifications.
2. CONNECTORS
   Round sizes thru 24" attach to pipe with Type 1 straps. All other sizes attach with Type 2 rods and lugs.
3. TOE PLATE EXTENSIONS
   When required, toe plate extensions are to be the same gage as end section. Dimensions shall be 8" high by overall width less 6".
4. OPTIONAL SAFETY BARS
   Fabricate Safety and Longitudinal bars from steel pipe conforming to ASTM A53 Grade B Schedule 40 Specifications Hot dip galvanize bars after fabrication. Slotted holes for safety bar attachment shall be provided for all end sections.
5. LONGITUDINAL BARS
   Longitudinal bars shown are for cross drainage structures for pipes larger than 30". Longitudinal bar required where open span (as measured perpendicular to the flow line) is greater than 30". Use additional longitudinal bars if after placement of one longitudinal bar the open spacing still exceeds 30" on larger end sections. Where the open span of any cross drainage structure is 30" or smaller, no bars are required. Weld longitudinal bars to cross members to make a single piece structure. Number of longitudinal bars required will vary depending on the length of the end section. Bar No. 1 to be located at the skirt end.



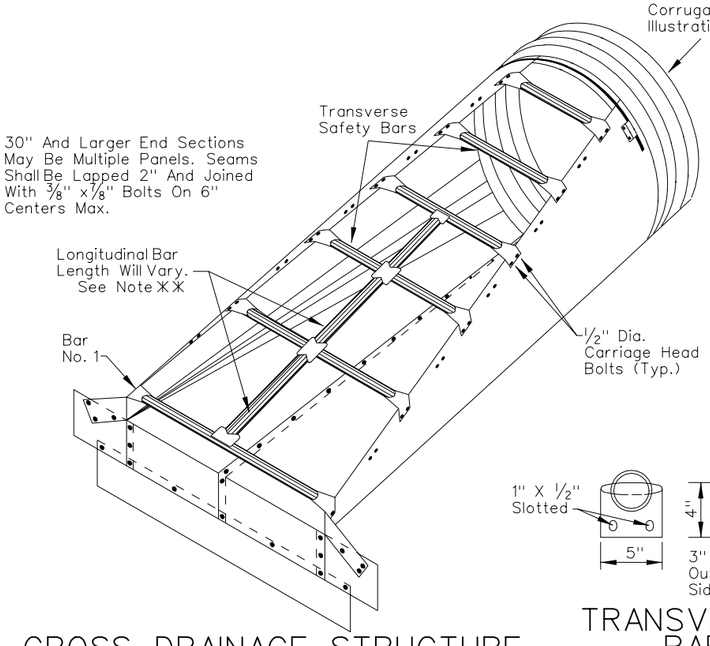
SECTION A-A



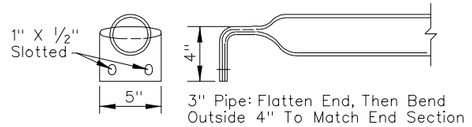
SECTION B-B



PARALLEL DRAINAGE STRUCTURE



CROSS DRAINAGE STRUCTURE



TRANSVERSE SAFETY BARS DETAIL

SAFETY SLOPE END SECTIONS FOR ARCHED PIPES													
Equv. Dia. (in.)	Inches Span	Rise	Min. Thick. in.	Ga.	Dimensions +/- 2" A	H	W	Overall Width	L Dimensions +/- 2" Slope	Length (in.)	Slope	Length (in.)	Slope	Length (in.)
18	21	15	1.6	16	8	6	27	42	4:1	28	6:1	41	10:1	69
21	24	18	1.6	16	8	6	30	45	4:1	40	6:1	60	10:1	98
24	28	20	1.6	16	8	6	33	49	4:1	47	6:1	71	10:1	118
30	34	24	2.0	14	12	9	40	65	4:1	55	6:1	83	10:1	138
35	41	29	2.8	12	12	9	47	71	4:1	74	6:1	112	10:1	187
41	48	32	2.8	12	16	12	54	86	4:1	90	6:1	136	—	—
47	56	37	2.8	12	16	12	62	94	4:1	110	6:1	165	—	—
54	63	42	2.8	12	16	12	69	100	4:1	130	6:1	195	—	—
60	70	46	2.8	12	16	12	76	107	4:1	146	6:1	219	—	—
71	82	56	2.8	12	16	12	88	119	4:1	185	6:1	278	—	—

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

SAFETY SLOPE END SECTIONS FOR CIRCULAR & ARCHED PIPES

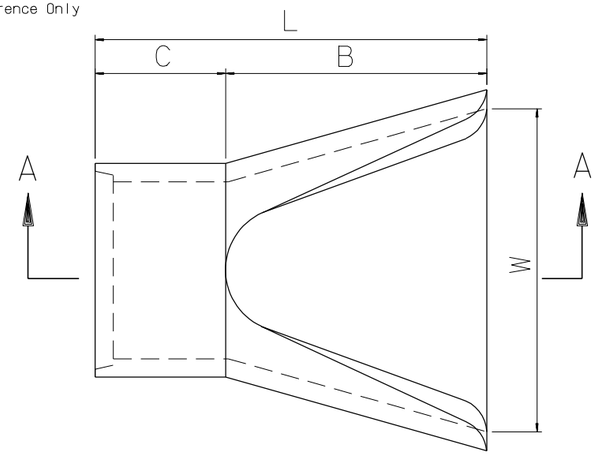
Signed Original On File	R-2.2.2	(604)
CHIEF ROAD DESIGN ENGR	ADOPTED: 9/00	REVISION 1/01

DIAMETER	WEIGHT	A	B	C *	L	W
18″	670	9″	2′-1″	2′-1″	4′-2″	3′-0″
24″	1300	9 1/2″	3′-6″	2′-6″	6′-0″	4′-0″
30″	1850	1′-0″	4′-5″	1′-8″	6′-1″	5′-0″
36″	3500	1′-3″	5′-2″	2′-11″	8′-1″	6′-0″
42″	4930	1′-9″	5′-3″	2′-11″	8′-2″	6′-2″
48″	6700	2′-0″	6′-0″	2′-2″	8′-2″	7′-0″
54″	7150	2′-3″	5′-6″	2′-9″	8′-3″	6′-10″

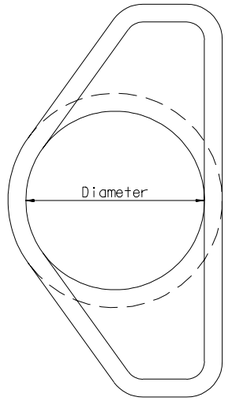
* For Reference Only

GENERAL NOTES:

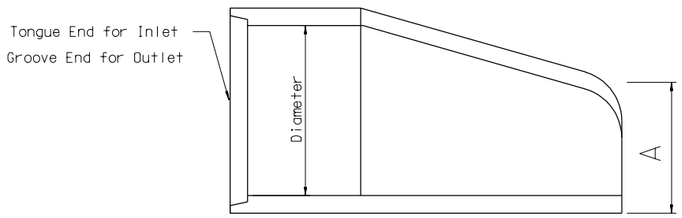
1. CLASS AND TYPE OF CONCRETE SHALL BE AS SPECIFIED FOR REINFORCED CONCRETE PIPE.
2. STRUCTURAL DESIGN OF END SECTION SHALL CONFORM TO THAT OF STANDARD REINFORCED CONCRETE CULVERT PIPE.
3. LENGTH OF PIPE SHOWN ON THE DESIGN PLANS DOES NOT INCLUDE CONNECTOR SECTION (LENGTH C).
4. CONTACT HYDRAULICS ENGINEER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



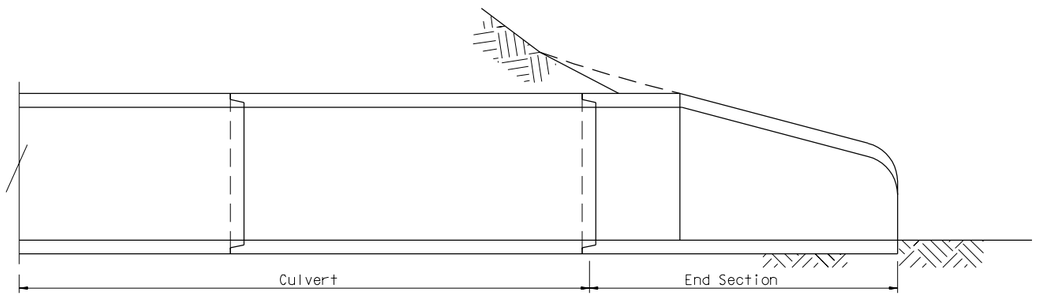
PLAN



END VIEW



SECTION A-A

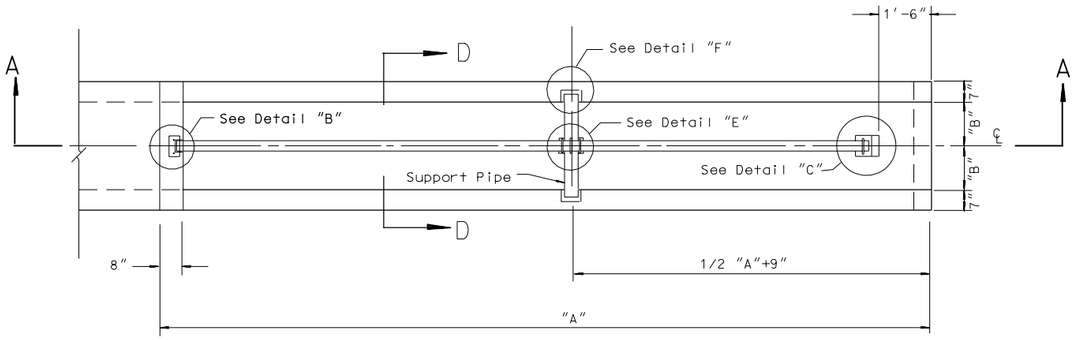


CROSS SECTION VIEW
18″ RCP TO 54″ RCP

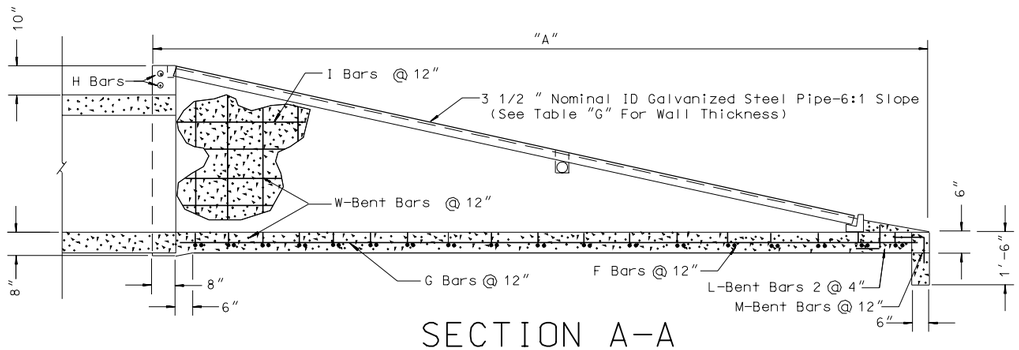
STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

RCP END SECTION
12″ RCP TO 54″ RCP

Signed Original On File	R-2.3.1	(603)
CHIEF ROAD DESIGN ENGR.	ADOPTED: 1/75	REVISION 1- 12/82



PLAN



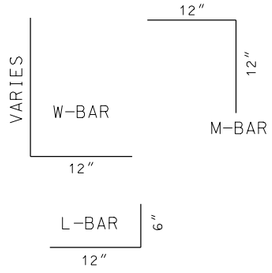
SECTION A-A

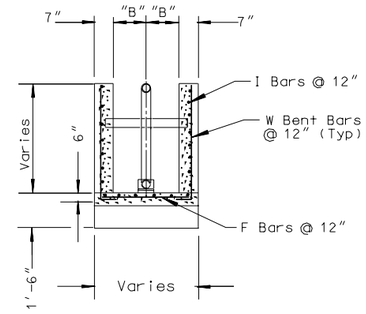
LENGTH OF REINFORCING BARS

DIA. OF PIPE	F NO.4 BARS	G NO.4 BARS	H NO.4 BARS	I NO.4 BARS	M NO.4 BARS	W NO.4 BARS
30"	22'-2"-2"	4-21'-0"	2-3'-3"	3-19'-10" TO 2'-6"	4-2'-0"	19-4'-10" TO 2'-0"
33"	23-2'-5"	4-22'-0"	2-3'-7"	3-20'-10" TO 2'-6"	4-2'-0"	20-5'-2" TO 2'-0"
36"	24-2'-8"	5-23'-6"	2-3'-10"	3-22'-4" TO 2'-6"	5-2'-0"	22-5'-5" TO 2'-0"
39"	26-2'-11"	5-25'-6"	2-4'-1"	4-24'-4" TO 2'-6"	5-2'-0"	24-5'-9" TO 2'-0"
42"	28-3'-2"	5-27'-0"	2-4'-4"	5-25'-10" TO 2'-6"	5-2'-0"	25-6'-0" TO 2'-0"
45"	29-3'5"	6-28'-6"	2-4'-7"	5-27'-4" TO 2'-6"	6-2'-0"	27-6'-3" TO 2'-0"
48"	31-4'-10"	6-30'-0"	2-4'-10"	5-28'-10" TO 2'-6"	6-2'-0"	28-6'-6" TO 2'-0"
51"	33-4'-10"	6-32'-0"	2-5'-1"	6-30'-10" TO 2'-6"	6-2'-0"	30-6'-10" TO 2'-0"
54"	34-5'-4"	6-33'-6"	2-5'-4"	6-32'-4" TO 2'-6"	6-2'-0"	32-7'-1" TO 2'-0"
57"	37-5-7"	7-35'-0"	2-5'-7"	6-33'-10" TO 2'-6"	7-2'-0"	33-7'-4" TO 2'-0"
60"	38-5'10"	7-37'-0"	2-5'-10"	7-35'-10" TO 2'-6"	7-2'-0"	35-7'-8" TO 2'-0"

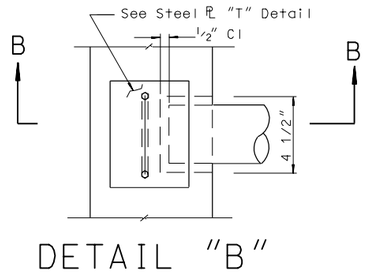
TABLE "G"

DIA. OF PIPE	DIM. "A"	DIM. "B"	PIPE CLASS
30"	22'-0"	1'-3"	40
33"	23'-0"	1'-4 1/2"	40
36"	24'-6"	1'-6"	40
39"	26'-6"	1'-7 1/2"	40
42"	28'-0"	1'-9"	40
45"	29'-6"	1'-10 1/2"	40
48"	31'-0"	2'-0"	40
51"	33'-0"	2'-1 1/2"	80
54"	34'-6"	2'-3"	80
57"	36'-0"	2'-4 1/2"	80
60"	38'-0"	2'-6"	80





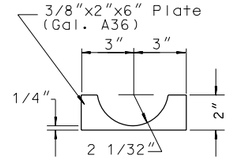
SECTION D-D



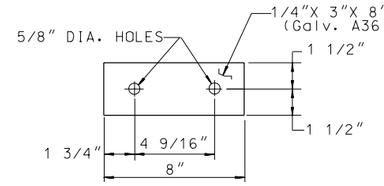
DETAIL "B"
(Plan)

GENERAL NOTES:

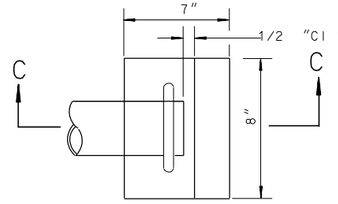
1. CONCRETE SHALL BE CLASS A OR CLASS AA.
2. REINFORCING STEEL SHALL BE DEFORMED BARS WITH THE MAXIMUM SPACING OF 12" SET 2" CLEAR OF SURFACE OF CONCRETE. REINFORCING BARS MAY BE CUT AND BENT IN FIELD.



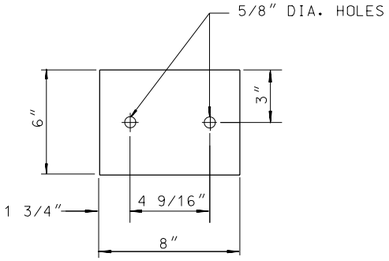
SADDLE PL DETAIL



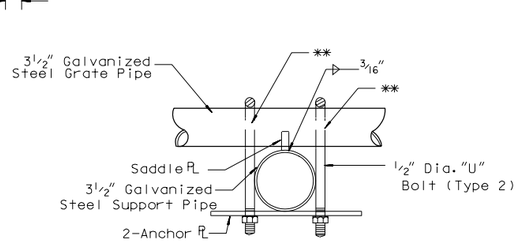
ANCHOR PL DETAIL



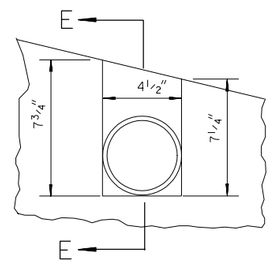
DETAIL "C"
(Plan)



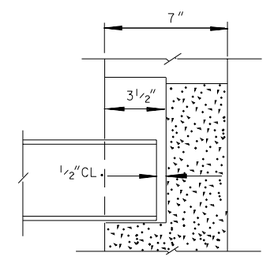
STEEL PL "T" DETAIL



DETAIL "E"

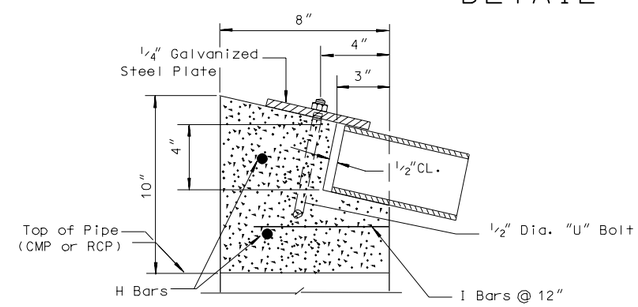


ELEVATION

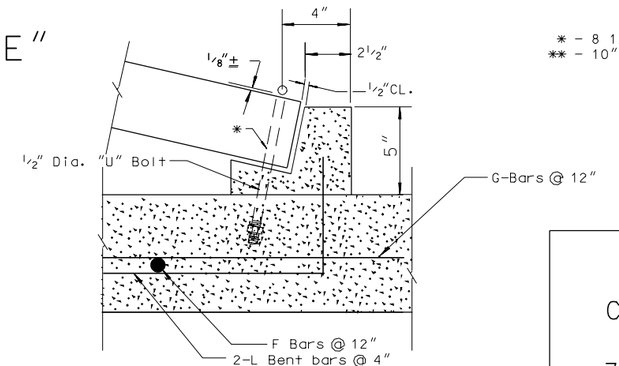


SECTION E-E

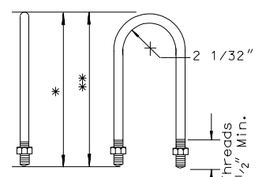
DETAIL "F"



SECTION B-B



SECTION C-C



U-BOLT DETAIL

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

CULVERT END SAFETY GRATE 30"-60" CMP OR RCP

Signed Original On File	R-2.3.1.1	(601)
CHIEF ROAD DESIGN ENGR.	ADOPTED: 1/1	REVISION 8/97

R-17

CMP SIZE Dia.	CORR CMAP SXR	CMP AREA SQ. FT.	L	SINGLE CMP 0°SKEW CONC CU.YD.	0°SKEW STEEL LB.	15°SKEW CONC CU.YD.	15°SKEW STEEL LB.	30°SKEW CONC CU.YD.	30°SKEW STEEL LB.	45°SKEW CONC CU.YD.	45°SKEW STEEL LB.	DOUBLE CMP 0°SKEW CONC CU.YD.	0°SKEW STEEL LB.	15°SKEW CONC CU.YD.	15°SKEW STEEL LB.	30°SKEW CONC CU.YD.	30°SKEW STEEL LB.	45°SKEW CONC CU.YD.	45°SKEW STEEL LB.
12″		0.79	3′-6″	0.85	35	0.93	37	0.94	37	0.99	39	1.21	46	1.30	49	1.35	50	1.49	53
15″	18″X11″	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
18″	22″X13″	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
24″	29″X18″	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
30″	36″X22″	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
36″	43″X27″	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
42″	50″X31″	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

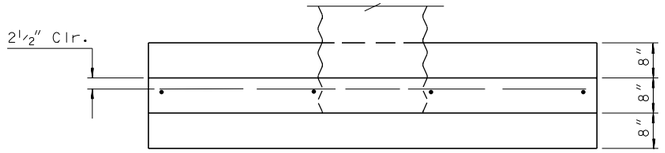
QUANTITIES SHOWN ABOVE ARE FOR TWO HEADWALLS.

QUANTITIES SHOWN BELOW ARE FOR ONE HEADWALL.

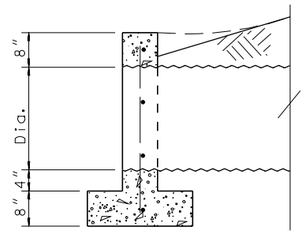
CMP SIZE	LENGTH OF REINFORCING BARS SINGLE CMP 0°-45° NO.4 K	0° NO.5 N	15° NO.5 N	30° NO.5 N	45° NO.5 N	SINGLE OR DOUBLE CMP 0° NO.4 M	15° NO.4 M	NO.4 M1	30° NO.5 M	NO.5 M1	45° NO.4 M	NO.5 M1	DOUBLE CMP 0°-45° NO.4 K	0° NO.5 N	15° NO.5 N	30° NO.5 N	45° NO.5 N
12″	4@2′-5″	2@4′-3″	2@4′-8″	2@4′-9″	2@5′-0″	2@1′-6″	1@1′-4″	1@2′-0″	1@1′-3″	1@2′-1″	1@1′-0″	1@2′-4″	5@2-5″	2@6′-3″	2@6′-9″	2@7′-1″	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@1′-5″	1@2′-3″	1@1′-2″	1@2′-6″	7@2′-8″	2@7′-6″	2@8′-1″	2@8′-6″	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′-0″	1@3′-0″	1@1′-9″	1@3′-3″	7@2′-11″	2@8′-9″	2@9′-5″	2@9′-10″	2@10′-11″
24″	6@3′-5″	2@8′-3″	2@9′-0″	2@9′-3″	2@9′-9″	4@3′-0″	2@2′-10″	2@3′-9″	2@2′-9″	2@3′-10″	2@2′-6″	2@4′-1″	7@3′-5″	2@11′-3″	2@12′-1″	2@12′-8″	2@14′-0″
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@5′-0″	9@3′-11″	2@14′-0″	2@15′-0″	2@15′-9″	2@17′-5″
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@16′-9″	2@18′-0″	2@18′-10″	2@20′-10″
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@19′-6″	2@20′-11″	2@21′-11″	2@24′-3″

GENERAL NOTES:

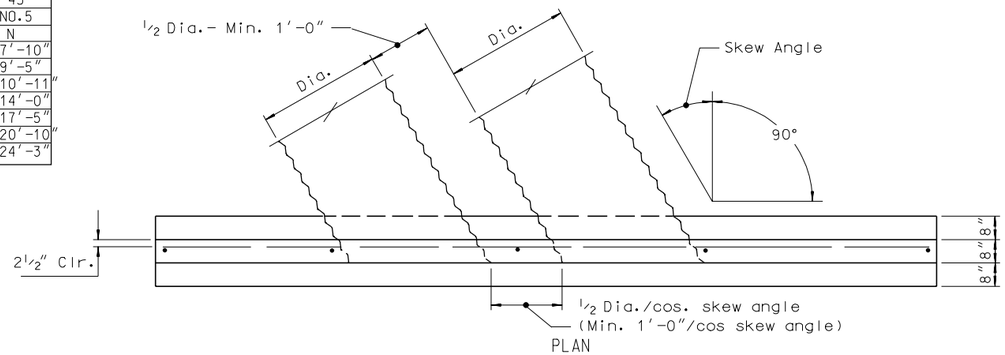
1. CONCRETE SHALL BE CLASS A OR AA.
2. REINFORCING STEEL SHALL BE DEFORMED BARS WITH MAXIMUM SPACING OF 18″ SET 2 1/2″ CLEAR OF SURFACE OF CONCRETE EXCEPT AS NOTED. BAR ENDS SHALL BE KEPT 1 1/2″ CLEAR OF SURFACE OF CONCRETE. REINFORCING BARS MAY BE CUT AND BENT IN FIELD.
3. FOOTINGS SHOWN ARE OF MINIMUM 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 SHEWED 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.



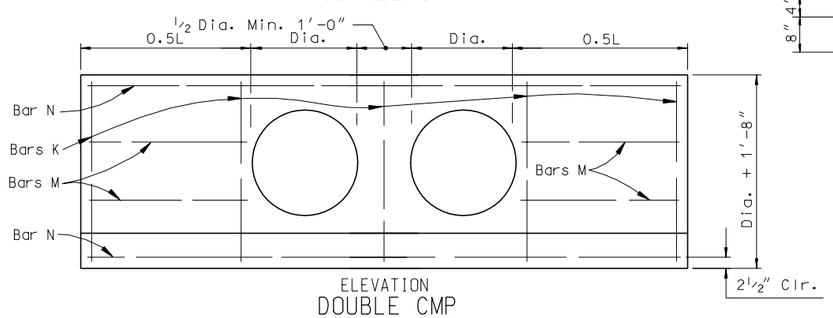
PLAN
SINGLE CMP



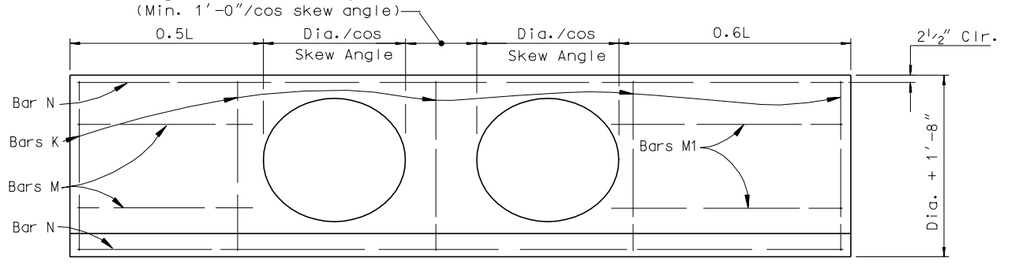
SECTION
(FOR ALL HEADWALLS)



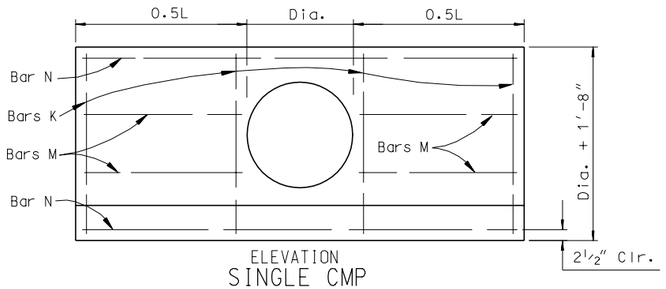
PLAN
DOUBLE CMP



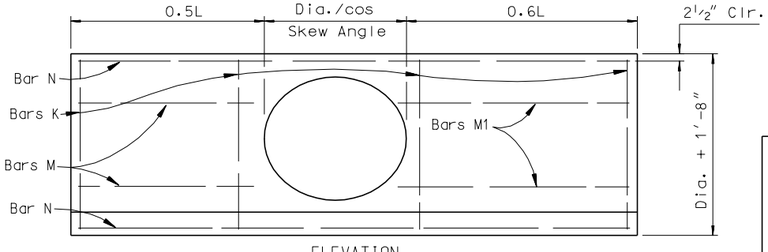
ELEVATION
DOUBLE CMP



ELEVATION
DOUBLE CMP



ELEVATION
SINGLE CMP
0° SKEW



ELEVATION
SINGLE CMP
15° TO 45° SKEW

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

CULVERT HEADWALLS

12″ CMP TO 42″CMP

Signed Original On File	R-2.4.1	(502)
CHIEF ROAD DESIGN ENGR.	ADOPTED: 8/69	REVISION 8/97

CMP SIZE DIA.	LENGTH OF REINFORCING BARS																							
	SINGLE CMP																							
	0° SKEW					15° SKEW						30° SKEW						45° SKEW						
	NO.5		NO.4			NO.5		NO.4				NO.5		NO.4				NO.5		NO.4				
	F	G	M	N	K	F	G	M	M1	N	K	F	G	M	M1	N	K	F	G	M	M1	N	K
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@17'- 8"	11@5'-10"	13@2'-9"	11@7'-7"	6@5'-8"	6@ 7'- 3"	9@18'-2"	11@5'-10"	14@2'-9"	12@7'-7"	6@5'-6"	6@ 7'- 3"	9@19'- 2"	12@5'-10"
54"	13@2'-9"	12@8'-1"	12@6'-9"	9@18'-3"	12@6'- 4"	14@2'-9"	13@8'-1"	6@6'- 7"	6@ 8'- 1"	9@19'-10"	13@6'- 4"	15@2'-9"	14@8'-1"	6@6'-5"	6@ 8'- 1"	9@20'-4"	14@6'- 4"	15@2'-9"	14@8'-1"	6@6'-3"	6@ 8'- 1"	9@21'- 6"	14@6'- 4"
60"	21@3'-9"	18@8'-9"	12@7'-6"	10@20'-3"	12@6'-10"	23@3'-9"	20@8'-9"	6@7'- 4"	6@ 9'- 0"	10@22'- 0"	13@6'-10"	23@3'-9"	20@8'-9"	6@7'-2"	6@ 9'- 0"	10@22'-7"	13@6'-10"	24@3'-9"	21@8'-9"	6@7'-0"	6@ 9'- 0"	10@23'-11"	14@6'-10"
72"	25@3'-9"	20@9'-9"	16@9'-0"	10@24'-3"	14@7'-10"	27@3'-9"	22@9'-9"	8@8'-10"	8@10'-10"	10@26'- 4"	15@7'-10"	28@3'-9"	23@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@28'- 7"	17@7'-10"
DOUBLE CMP																							
48"	16@2'-9"	11@7'-7"	12@6'-0"	9@22'-3"	11@5'-10"	17@2'-9"	12@7'-7"	6@5'-10"	6@ 7'- 3"	9@23'-10"	12@5'-10"	18@2'-9"	13@7'-7"	6@5'-8"	6@ 7'- 3"	9@25'-1"	13@5'-10"	19@2'-9"	14@7'-7"	6@5'-6"	6@ 7'- 3"	9@27'- 8"	14@5'-10"
54"	18@2'-9"	13@8'-1"	12@6'-9"	9@25'-0"	13@6'- 4"	19@2'-9"	14@8'-1"	6@6'- 7"	6@ 8'- 1"	9@26'-10"	14@6'- 4"	20@2'-9"	15@8'-1"	6@6'-5"	6@ 8'- 1"	9@28'-2"	15@6'- 4"	22@2'-9"	17@8'-1"	6@6'-3"	6@ 8'- 1"	9@31'- 1"	17@6'- 4"
60"	29@3'-9"	21@8'-9"	12@7'-6"	10@27'-9"	14@6'-10"	31@3'-9"	23@8'-9"	6@7'- 4"	6@ 9'- 0"	10@29'- 9"	15@6'-10"	32@3'-9"	24@8'-9"	6@7'-2"	6@ 9'- 0"	10@31'-3"	16@6'-10"	36@3'-9"	28@8'-9"	6@7'-0"	6@ 9'- 0"	10@34'- 6"	18@6'-10"
72"	34@3'-9"	23@9'-9"	16@9'-0"	10@33'-3"	16@7'-10"	36@3'-9"	25@9'-9"	8@8'-10"	8@10'-10"	10@35'- 8"	17@7'-10"	38@3'-9"	27@9'-9"	8@8'-8"	8@10'-10"	10@37'-5"	19@7'-10"	42@3'-9"	31@9'-9"	8@8'-6"	8@10'-10"	10@41'- 4"	21@7'-10"

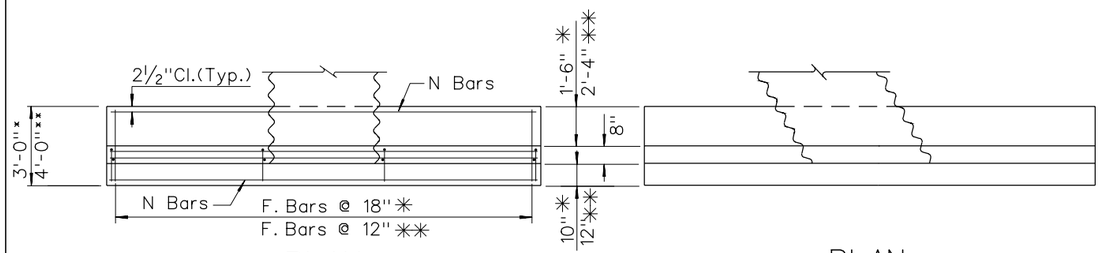
QUANTITIES SHOWN ABOVE ARE FOR ONE HEADWALL.

QUANTITIES SHOWN BELOW ARE FOR TWO HEADWALLS.

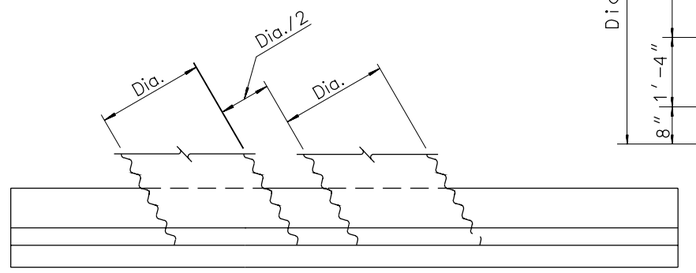
CMP SIZE DIA.	CMP AREA SQ FT	L	SINGLE CMP								DOUBLE CMP							
			0° SKEW		15° SKEW		30° SKEW		45° SKEW		0° SKEW		15° SKEW		30° SKEW		45° SKEW	
			CONC CU YD	STEEL LB	CONC CU YD	STEEL LB	CONC CU YD	STEEL LB	CONC CU YD	STEEL LB	CONC CU YD	STEEL LB	CONC CU YD	STEEL LB	CONC CU YD	STEEL LB	CONC CU YD	STEEL LB
48"	12.57	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"	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"	19.64	15'-6"	10.17	993	11.07	1089	11.28	1095	11.74	1147	13.28	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

✳ - For 48"&54" Dia.

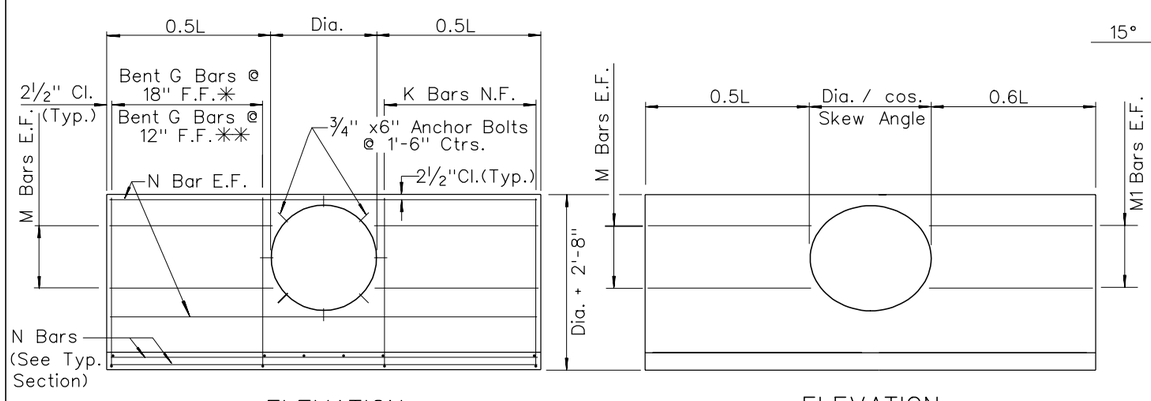
✳✳ - For 60"&72" Dia.



PLAN



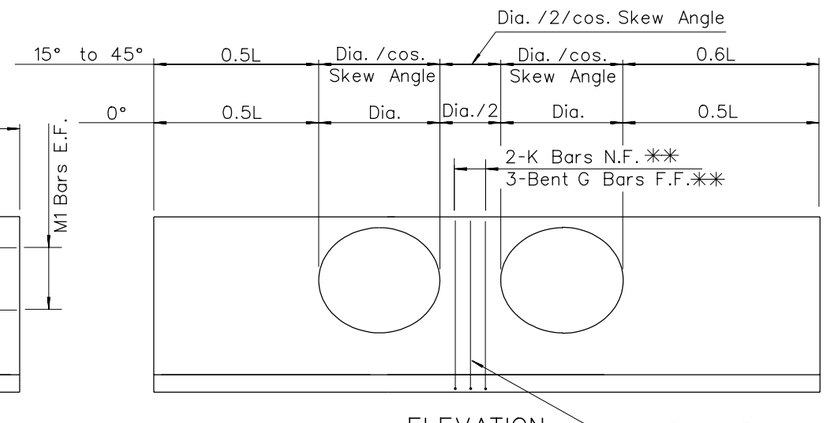
PLAN



ELEVATION
SINGLE CMP
0° SKEW

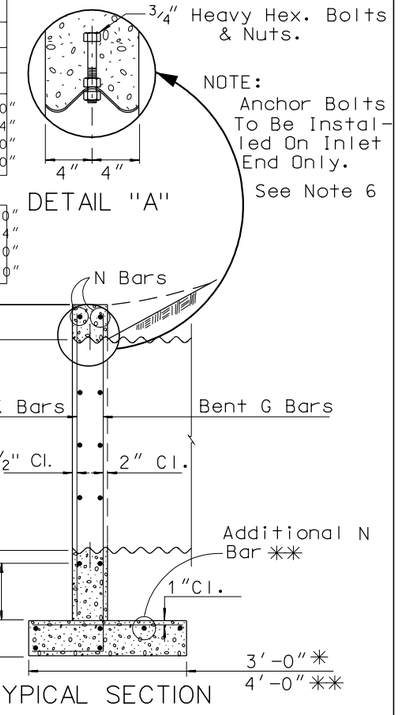
ELEVATION
SINGLE CMP
15° TO 45° SKEW

FOR DIMENSIONS & REINFORCING NOT SHOWN SEE 0° SKEW



ELEVATION
DOUBLE CMP
0° TO 45° SKEW

FOR DIMENSIONS & REINFORCING NOT SHOWN SEE 0° SKEW



TYPICAL SECTION

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. NO DIRECT PAYMENT FOR ANCHOR BOLTS.

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

CULVERT HEADWALLS
48" CMP TO 72" CMP

Signed Original On File	R-2.4.2	(502)
CHIEF ROAD DESIGN ENGINEER	ADOPTED: 8/69	REVISION 10/98

QUANTITIES SHOWN BELOW ARE FOR TWO HEADWALLS.

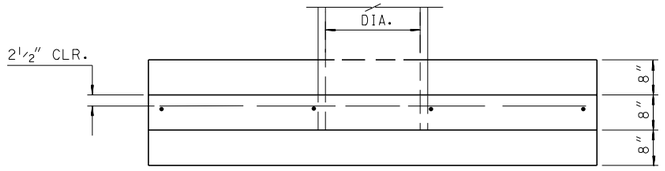
RCP SIZE DIA.	RCP AREA SQ.FT.	SINGLE RCP 0° SKEW CONC. CU. YD.	0° SKEW STEEL LB.	15° SKEW CONC. CU. YD.	15° SKEW STEEL LB.	30° SKEW CONC. CU. YD.	30° SKEW STEEL LB.	45° SKEW CONC. CU. YD.	45° SKEW STEEL LB.	DOUBLE RCP 0° SKEW CONC. CU. YD.	0° SKEW STEEL LB.	15° SKEW CONC. CU. YD.	15° SKEW STEEL LB.	30° SKEW CONC. CU. YD.	30° SKEW STEEL LB.	45° SKEW CONC. CU. YD.	45° SKEW STEEL LB.	X	Y	L	h
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	1.80	70	1.93	73	2.01	75	2.18	79	0′-10 1/4″	1′-2 1/4″	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	2.60	96	0′-10 1/2″	1′-2 1/2″	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′-10 3/4″	1′-2 3/4″	6′-6″	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	3.37	125	3.64	131	0′-11″	1′-3″	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″	1′-3″	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 1/2″	1′-3 1/2″	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′-1/2″
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.

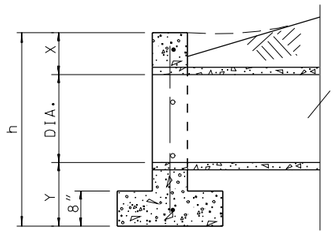
	LENGTH OF REINFORCING BARS																	
	SINGLE RCP					SINGLE OR DOUBLE RCP							DOUBLE RCP					
RCP	0°-45°	0°	15°	30°	45°	0°	15°		30°		45°		0°-45°	0°	15°		30°	45°
SIZE	NO.4	NO.5	NO.5	NO.5	NO.5	NO.4	NO.4	NO.4	NO.4	NO.4	NO.4	NO.4	NO.4	NO.5	NO.5		NO.5	NO.5
Dia.	K	N	N	N	N	M	M	M1	M	M1	M	M1	K	N	N		N	N
12″	6@2′-9″	2@4′-9″	2@5′-2″	2@5′-4″	2@5′-7″	2@1′-7″	1@1′-5″	1@2′-1″	1@1′-4″	1@2′-2″	1@1′-1″	1@2′-5″	7@2-9″	2@7′-0″	2@7′-6″		2@7′-11″	2@8′-9″
15″	6@3′-1″	2@6′-0″	2@6′-6″	2@6′-8″	2@7′-0″	2@2′-1″	1@1′-11″	1@2′-8″	1@1′-10″	1@2′-9″	1@1′-7″	1@3′-0″	7@3′-1″	2@8′-6″	2@9′-2″		2@9′-7″	2@10′-7″
18″	6@3′-4″	2@7′-0″	2@7′-8″	2@7′-10″	2@8′-2″	4@2′-5″	2@2′-3″	2@3′-1″	2@2′-2″	2@3′-2″	2@1′-11″	2@3′-5″	7@3′-4″	2@9′-9″	2@10′-6″		2@11′-0″	2@12′-1″
21″	6@3′-8″	2@8′-0″	2@8′-9″	2@8′-11″	2@9′-5″	4@2′-9″	2@2′-7″	2@3′-6″	2@2′-6″	2@3′-7″	2@2′-3″	2@3′-10″	7@3′-8″	2@11′-2″	2@12′-0″		2@12′-7″	2@13′-10″
24″	8@3′-11″	2@9′-0″	2@9′-10″	2@10′-1″	2@10′-7″	4@3′-2″	2@3′-0″	2@4′-0″	2@2′-11″	2@4′-1″	2@2′-8″	2@4′-4″	9@3′-11″	2@12′-7″	2@13′-7″		2@14′-2″	2@15′-8″
27″	8@4′-2″	2@10′-0″	2@10′-11″	2@11′-2″	2@11′-9″	4@3′-6″	2@3′-4″	2@4′-4″	2@3-3″	2@4′-5″	2@3′-0″	2@4′-8″	9@4′-2″	2@14′-1″	2@15′-1″		2@15′-10″	2@17′-6″
30″	8@4′-6″	2@11′-3″	2@12′-3″	2@12′-7″	2@13′-2″	4@4′-0″	2@3′-10″	2@5′-0″	2@3-9″	2@5′-1″	2@3′-6″	2@5′-4″	9@4′-6″	2@15′-9″	2@16′-11″		2@17′-9″	2@19′-7″
33″	8@4′-10″	2@12′-3″	2@13′-4″	2@13′-8″	2@14′-4″	4@4′-3″	2@4′-1″	2@5′-3″	2@4-0″	2@5′-4″	2@3′-9″	2@5′-7″	9@4′-10″	2@17′-3″	2@18′-6″		2@19′-5″	2@21′-5″
36″	10@5′-1″	2@13′-3″	2@14′-5″	2@14′-9″	2@15′-7″	6@4′-8″	3@4′-6″	3@5′-9″	3@4′-5″	3@5′-10″	3@4′-2″	3@6′-1″	11@5′-1″	2@18′-8″	2@20′-0″		2@21′-0″	2@23′-2″

GENERAL NOTES:

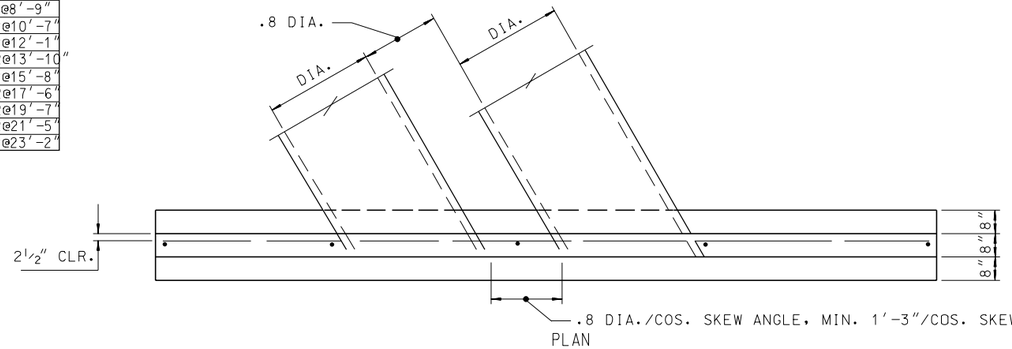
1. CONCRETE SHALL BE CLASS A OR AA.
2. REINFORCING STEEL SHALL BE DEFORMED BARS WITH MAXIMUM SPACING OF 18″ SET 2 1/2″ CLEAR OF SURFACE OF CONCRETE EXCEPT AS NOTED. BAR ENDS SHALL BE KEPT 1 1/2″ CLEAR OF SURFACE OF CONCRETE. REINFORCING BARS MAY BE CUT AND BENT IN FIELD.
3. FOOTINGS SHOWN ARE OF MINIMUM 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.



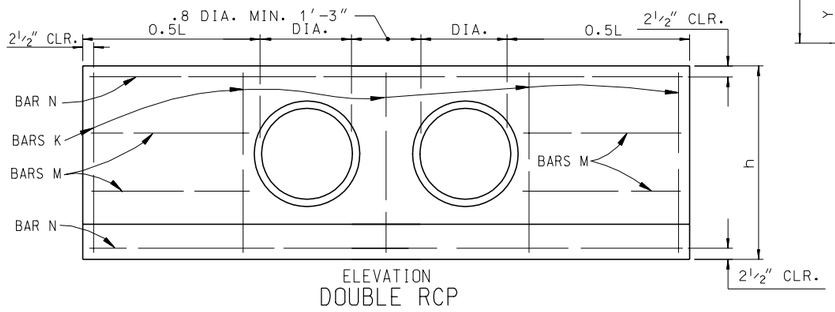
PLAN
SINGLE RCP



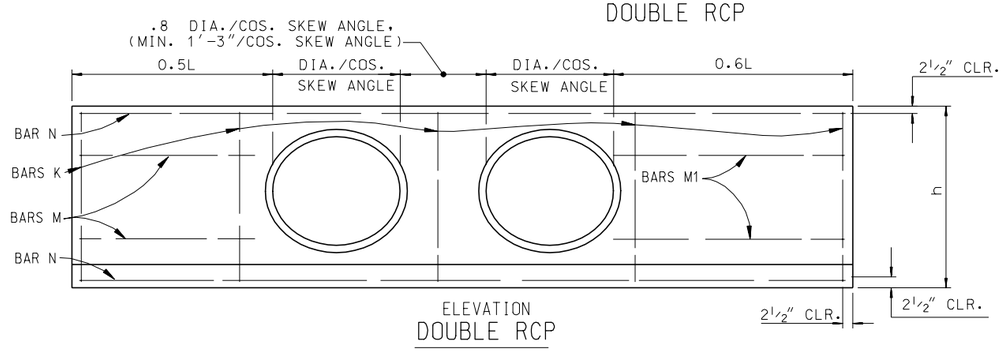
SECTION
(FOR ALL HEADWALLS)



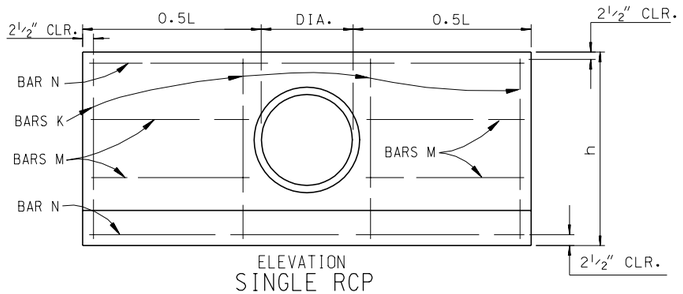
PLAN
DOUBLE RCP



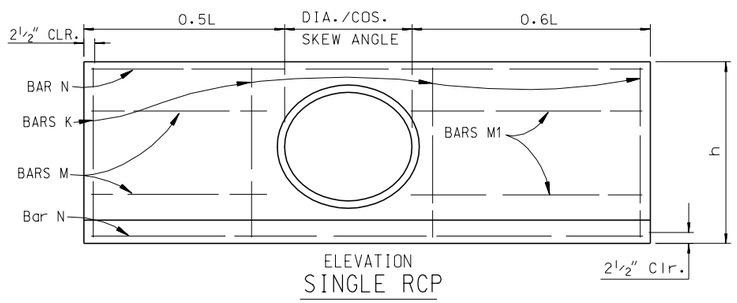
ELEVATION
DOUBLE RCP



ELEVATION
DOUBLE RCP



ELEVATION
SINGLE RCP
0° SKEW



ELEVATION
SINGLE RCP
15° TO 45° SKEW

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

CULVERT HEADWALLS

12″ RCP TO 36″RCP

Signed Original On File	R-2.5.1	(502)
CHIEF ROAD DESIGN ENGR.	ADOPTED: 8/69	REVISION 10/94

R-20

QUANTITIES SHOWN BELOW ARE FOR TWO HEADWALLS.

RCP SIZE DIA.	RCP AREA SQ.FT.	SINGLE RCP 0° SKEW CONC. CU. YD.	SINGLE RCP 0° SKEW STEEL LB.	SINGLE RCP 15° SKEW CONC. CU. YD.	SINGLE RCP 15° SKEW STEEL LB.	SINGLE RCP 30° SKEW CONC. CU. YD.	SINGLE RCP 30° SKEW STEEL LB.	SINGLE RCP 45° SKEW CONC. CU. YD.	SINGLE RCP 45° SKEW STEEL LB.	DOUBLE RCP 0° SKEW CONC. CU. YD.	DOUBLE RCP 0° SKEW STEEL LB.	DOUBLE RCP 15° SKEW CONC. CU. YD.	DOUBLE RCP 15° SKEW STEEL LB.	DOUBLE RCP 30° SKEW CONC. CU. YD.	DOUBLE RCP 30° SKEW STEEL LB.	DOUBLE RCP 45° SKEW CONC. CU. YD.	DOUBLE RCP 45° SKEW STEEL LB.	X	Y	L	h
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′-0¼″	2′-0¼″	12′-0″	6′-6½″
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′-1½″	2′-1½″	15′-6″	7′-9″
60″	19.64	11.29	1137	12.32	1244	12.50	1250	12.88	1332	15.08	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.

LENGTH OF REINFORCING BARS

SINGLE RCP

RCP SIZE DIA.	0°SKEW NO.5 F	0°SKEW NO.5 G	0°SKEW NO.4 M	0°SKEW NO.4 N	0°SKEW NO.4 K	15°SKEW NO.5 F	15°SKEW NO.5 G	15°SKEW NO.4 M	15°SKEW NO.4 M1	15°SKEW NO.4 N	15°SKEW NO.4 K
42″	12@2′-9″	10@7′-6″	12@5′-5″	9@15′-3″	10@5′-8″	13@2′-9″	11@7′-6″	6@5′-3″	6@6′-6″	9@16′-7″	11@5′-8″
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″
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″
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″
72″	27@4′-6″	30@11′-7″	20@9′-11″	12@26′-0″	16@8′-7″	29@4′-6″	33@11′-7″	10@9′-2″	10@11′-3″	12@28′-3″	18@8′-7″

DOUBLE RCP

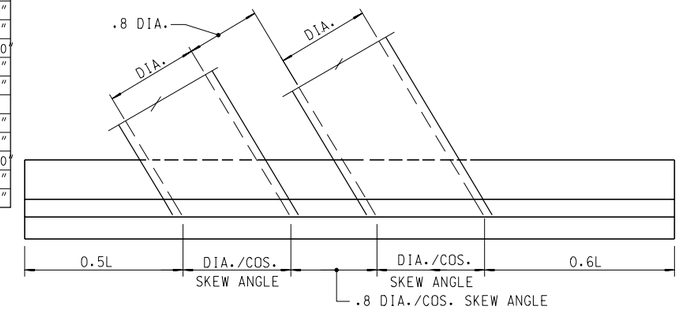
RCP SIZE DIA.	0°SKEW NO.5 F	0°SKEW NO.5 G	0°SKEW NO.4 M	0°SKEW NO.4 N	0°SKEW NO.4 K	15°SKEW NO.5 F	15°SKEW NO.5 G	15°SKEW NO.4 M	15°SKEW NO.4 M1	15°SKEW NO.4 N	15°SKEW NO.4 K
42″	16@2′-9″	11@7′-6″	12@5′-5″	9@21′-6″	11@5′-8″	17@2′-9″	12@7′-6″	6@5′-3″	6@6′-6″	9@23′-1″	12@5′-8″
48″	18@2′-9″	13@8′-1″	12@6′-3″	9@24′-9″	13@6′-3″	19@2′-9″	14@8′-1″	6@6′-1″	6@7′-5″	9@26′-6″	14@6′-3″
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″
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″
72″	37@4′-6″	35@11′-7″	20@9′-11″	12@36′-10″	19@8′-7″	40@4′-6″	39@11′-7″	10@9′-2″	10@11′-3″	12@39′-5″	21@8′-7″

RCP SIZE DIA.	30°SKEW NO.5 F	30°SKEW NO.5 G	30°SKEW NO.4 M	30°SKEW NO.4 M1	30°SKEW NO.4 N	30°SKEW NO.4 K	45°SKEW NO.5 F	45°SKEW NO.5 G	45°SKEW NO.4 M	45°SKEW NO.4 M1	45°SKEW NO.4 N	45°SKEW NO.4 K
42″	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@7′-11″	12@5′-8″
48″	15@2′-9″	14@8′-1″	6@5′-11″	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″
54″	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″
60″	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″
72″	30@4′-6″	34@11′-7″	10@9′-0″	10@11′-3″	12@29′-0″	18@8′-7″	32@4′-6″	37@11′-7″	10@8′-10″	10@11′-3″	12@30′-6″	19@8′-7″

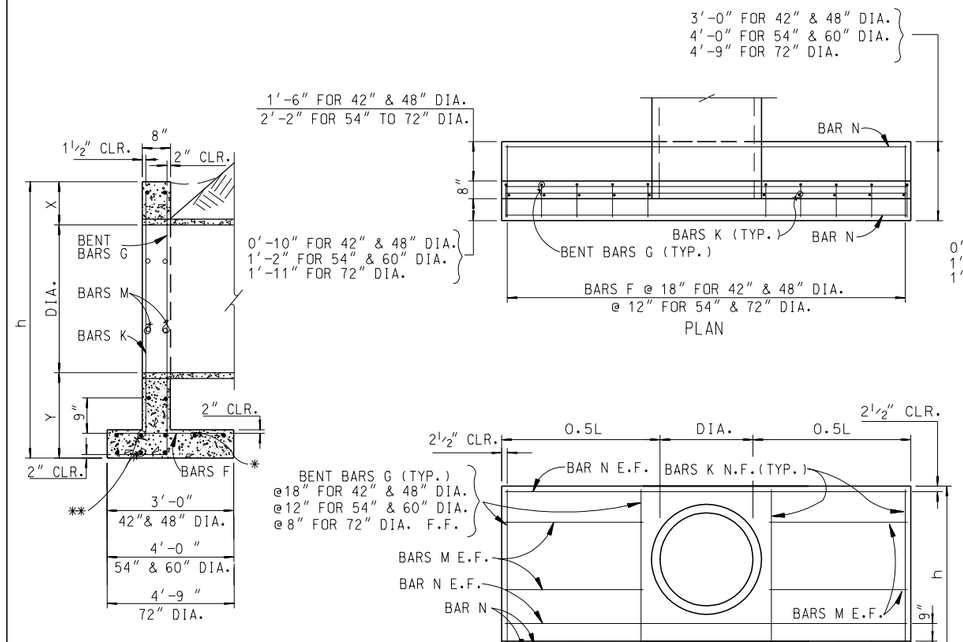
RCP SIZE DIA.	30°SKEW NO.5 F	30°SKEW NO.5 G	30°SKEW NO.4 M	30°SKEW NO.4 M1	30°SKEW NO.4 N	30°SKEW NO.4 K	45°SKEW NO.5 F	45°SKEW NO.5 G	45°SKEW NO.4 M	45°SKEW NO.4 M1	45°SKEW NO.4 N	45°SKEW NO.4 K
42″	18@2′-9″	13@7′-6″	6@5′-1″	6@6′-6″	9@24′-3″	13@5′-8″	20@2′-9″	15@7′-6″	6@4′-11″	6@6′-6″	9@26′-10″	15@5′-8″
48″	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″
54″	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″
60″	35@3′-9″	24@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″
72″	42@4′-6″	42@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″

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.



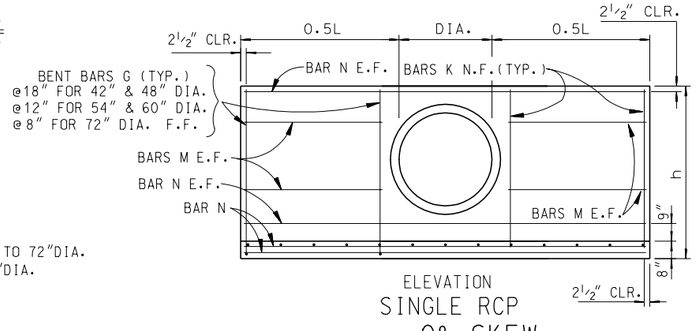
PLAN



* - ADDITIONAL BAR N FOR 54″ TO 72″DIA.
** - ADDITIONAL BARS N FOR 72″DIA.

SECTION

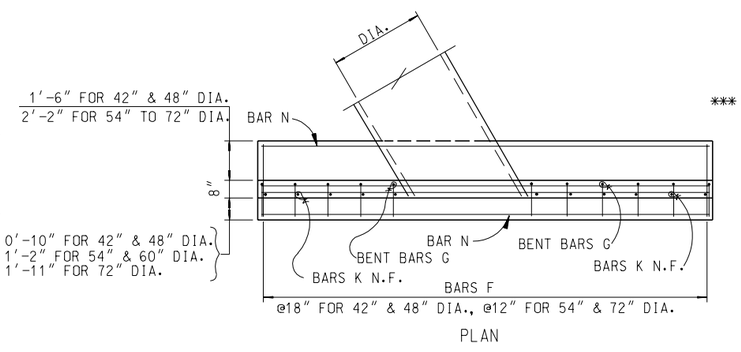
PLAN



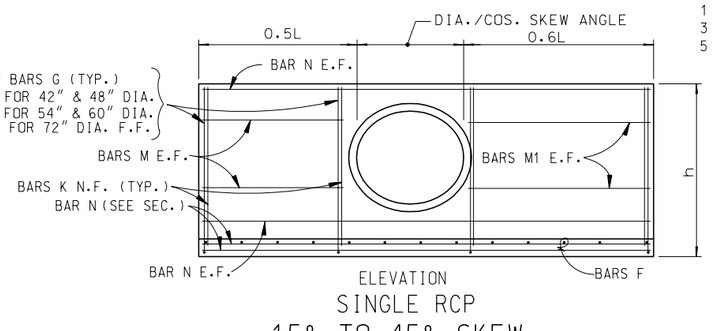
ELEVATION

SINGLE RCP

0° SKEW



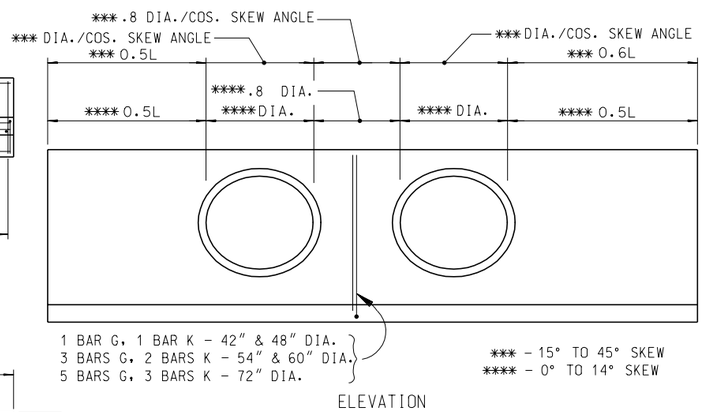
PLAN



ELEVATION

SINGLE RCP

15° TO 45° SKEW



*** - 15° TO 45° SKEW
**** - 0° TO 14° SKEW

ELEVATION

DOUBLE RCP

0° TO 45° SKEW

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

CULVERT HEADWALLS

42″ RCP TO 72″RCP

Signed Original On File	R-2.5.2	(502)
CHIEF ROAD DESIGN ENGR.	ADOPTED: 8/69	REVISION 8/97

R-21

QUANTITIES SHOWN BELOW ARE FOR TWO HEADWALLS

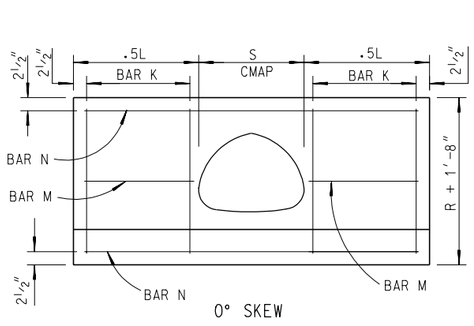
CMAP SIZE S X R	CMP DIA.	CMAP AREA SQ. FT.	L	SINGLE CMAP 0° SKEW		SINGLE CMAP 15° SKEW		SINGLE CMAP 30° SKEW		SINGLE CMAP 45° SKEW		DOUBLE CMAP 0° SKEW		DOUBLE CMAP 15° SKEW		DOUBLE CMAP 30° SKEW		DOUBLE CMAP 45° SKEW	
				CONC. CU. YD.	STEEL LB.	CONC. CU. YD.	STEEL LB.	CONC. CU. YD.	STEEL LB.	CONC CU. 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	1.03	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″	1.93	70	2.09	74	2.15	75	2.28	79	2.67	91	2.86	95	3.00	99	3.32	106
42″ X 29″	36″	6.4	7′-3″	2.49	101	2.70	107	2.78	109	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

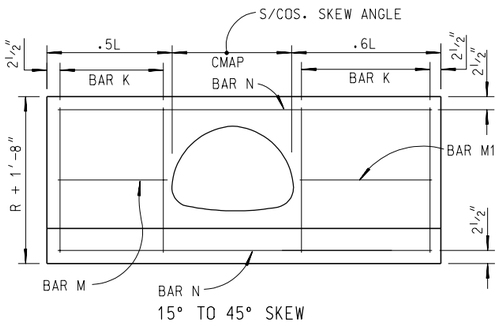
QUANTITIES SHOWN BELOW ARE FOR ONE HEADWALL

CMP SIZE S X R	LENGTH OF REINFORCING BARS: SINGLE CMAP 0°-45° NO. 4 K	SINGLE CMAP 0° NO. 5 N	SINGLE CMAP 15° NO. 5 N	SINGLE CMAP 30° NO. 5 N	SINGLE CMAP 45° NO. 5 N	SINGLE OR DOUBLE CMAP 0° NO. 4 M	SINGLE OR DOUBLE CMAP 15° NO. 4 M	SINGLE OR DOUBLE CMAP 15° NO. 4 M1	SINGLE OR DOUBLE CMAP 30° NO. 4 M	SINGLE OR DOUBLE CMAP 30° NO. 4 M1	SINGLE OR DOUBLE CMAP 45° NO. 4 M	SINGLE OR DOUBLE CMAP 45° NO. 4 M1	DOUBLE CMAP 0°-45° NO. 4 K	DOUBLE CMAP 0° NO. 5 N	DOUBLE CMAP 15° NO. 5 N	DOUBLE CMAP 30° NO. 5 N	DOUBLE CMAP 45° NO. 5 N
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@ 5′-9″	2@ 6′-0″	2@ 6′-6″	2@ 1′-7″	1@ 1′-5″	1@ 2′-1″	1@ 1′-4″	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′-6″	2@ 7′-1″	2@ 7′-2″	2@ 7′-9″	2@ 2′-1″	1@ 2′-1″	1@ 2′-7″	1@ 2′-1″	1@ 2′-7″	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′-6″	1@ 3′-7″	1@ 2′-6″	1@ 3′-10″	7@ 3′-3″	2@ 12′-9″	2@ 13′-7″	2@ 14′-5″	2@ 16′-3″
42″ 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′-8″	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′-1″	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′-9″	3@ 8′-2″	3@ 6′-9″	3@ 8′-2″	3@ 6′-9″	3@ 8′-2″	12@ 6′-2″	2@ 29′-11″	2@ 31′-11″	2@ 33′-9″	2@ 38′-0″

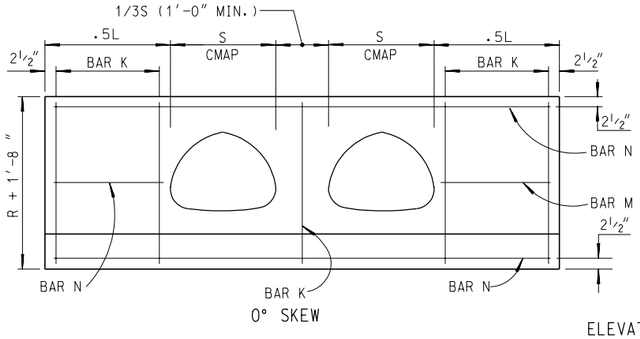
GENERAL NOTES:

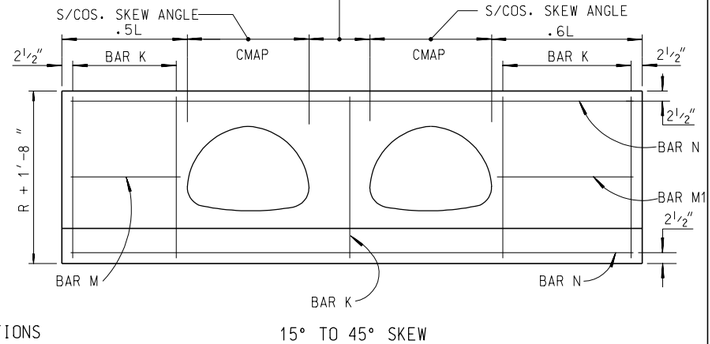
1. CONCRETE SHALL BE CLASS A OR AA.
2. REINFORCING STEEL SHALL BE DEFORMED BARS WITH MAXIMUM SPACING OF 18″ SET 2 1/2″ CLEAR OF SURFACE OF CONCRETE EXCEPT AS NOTED. BAR ENDS SHALL BE KEPT 1 1/2″ CLEAR OF SURFACE OF CONCRETE. REINFORCING BARS MAY BE CUT AND BENT IN FIELD.
3. FOOTINGS SHOWN ARE OF MINIMUM 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.



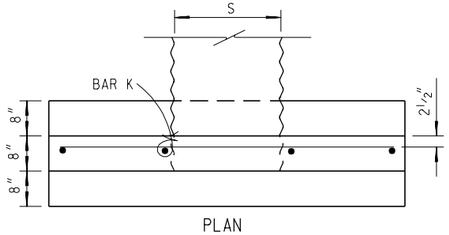


ELEVATIONS

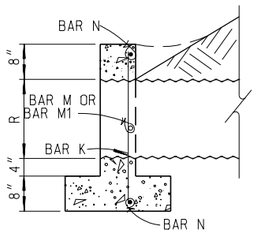




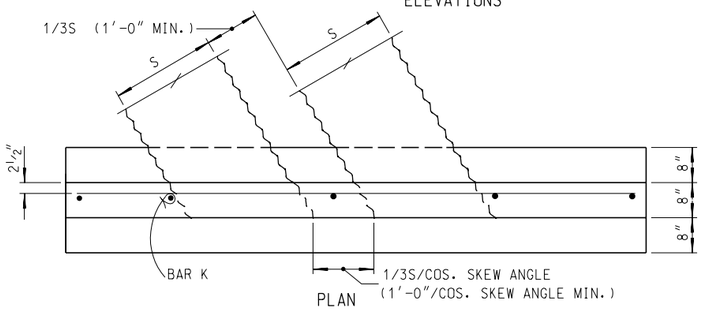
ELEVATIONS



PLAN
SINGLE CMAP



SECTION
FOR ALL HEADWALLS



PLAN
DOUBLE CMAP

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

CULVERT HEADWALLS

17″ X 13″ CMAP TO 83″ X 57″CMAP

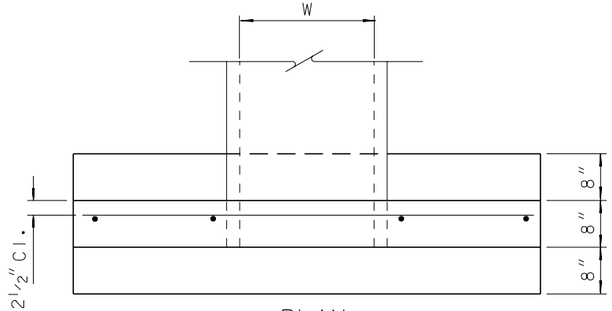
Signed Original On File	R-2.6.1	(502)
CHIEF ROAD DESIGN ENGR.	ADOPTED: 8/69	REVISION 8/97

QUANTITIES SHOWN BELOW ARE FOR TWO HEADWALLS.

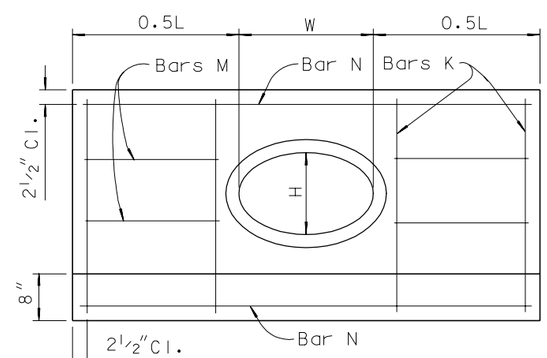
OVAL RCP SIZE W X H	RCP SIZE	OVAL RCP AREA SQ.FT	SINGLE OVAL RCP 0° SKEW CONC. CU. YD.	0° SKEW STEEL LB.	15° SKEW CONC. CU. YD.	15° SKEW STEEL LB.	30° SKEW CONC. CU. YD.	30° SKEW STEEL LB.	45° SKEW CONC. CU. YD.	45° SKEW STEEL LB.	DOUBLE OVAL RCP 0° SKEW CONC. CU. YD.	0° SKEW STEEL LB.	15° SKEW CONC. CU. YD.	15° SKEW STEEL LB.	30° SKEW CONC. CU. YD.	30° SKEW STEEL LB.	45° SKEW CONC. CU. YD.	45° SKEW STEEL LB.	X	Y	L	h
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	10¾″	1′-2¾″	4′-9″	3′-3½″
30″x19″	24″	3.21	1.95	79	2.13	82	2.17	83	2.27	86	2.64	98	2.85	103	2.97	106	3.25	113	11¼″	1′-3¼″	6′-3″	3′-9½″
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	11½″	1′-3½″	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	11¾″	1′-3¾″	7′-6″	4′-3½″
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	11¾″	1′-3¾″	8′-3″	4′-6½″
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	1′-0½″	1′-4½″	9′-0″	4′-10″
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	1′-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	1′-1½″	1′-5½″	11′-6″	5′-9″

QUANTITIES SHOWN BELOW ARE FOR ONE HEADWALL.

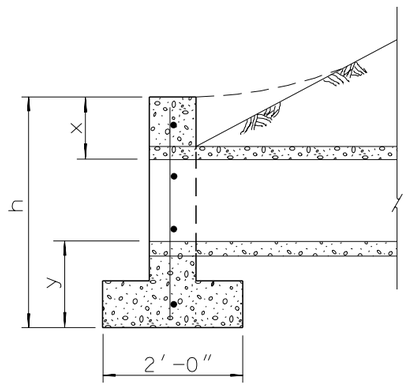
OVAL RCP SIZE W & H	LENGTH OF REINFORCING BARS: SINGLE OVAL RCP 0°-45° No.4 K	0° No.5 N	15° No.5 N	30° No.5 N	45° No.5 N	SINGLE OR DOUBLE OVAL RCP 0° No.4 M	15° No.4 M	15° M1	30° No.4 M	30° M1	45° No.4 M	45° M1	DOUBLE OVAL RCP 0°-45° No.4 K	0° No.5 N	15° No.5 N	30° No.5 N	45° No.5 N
23″x14″	6@3′-1″	2@6′-5″	2@7′-0″	2@7′-2″	2@7′-8″	2@1′-11″	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″x19″	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′-11″	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′-11″	2@14′-10″	2@15′-8″	2@17′-6″
38″x24″	6@4′-1″	2@10′-5″	2@11′-3″	2@11′-8″	2@12′-6″	4@3′-2″	2@3′-0″	2@4′-0″	2@2′-11″	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′-11″	2@13′-9″	4@3′-7″	2@3′-5″	2@4′-6″	2@3′-6″	2@4′-9″	2@3′-3″	2@5′-0″	9@4′-4″	2@16′-10″	2@17′-11″	2@19′-0″	2@21′-3″
45″x29″	8@4′-7″	2@12′-6″	2@13′-6″	2@14′-0″	2@14′-11″	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@18′-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′-11″	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′-11″	3@6′-3″	3@4′-10″	3@6′-4″	3@4′-7″	3@6′-7″	11@5′-6″	2@23′-9″	2@25′-5″	2@26′-10″	2@30′-2″



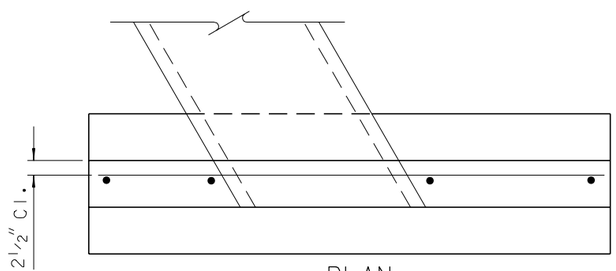
PLAN



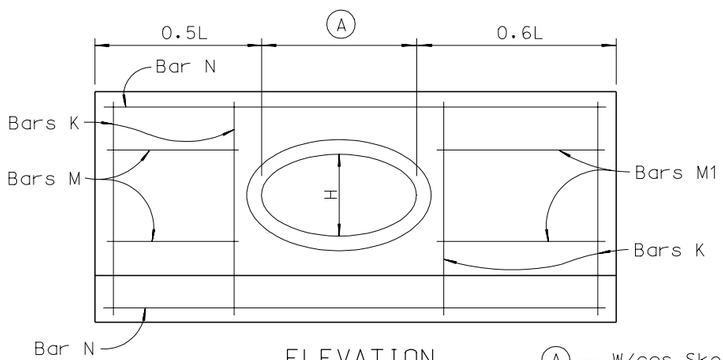
ELEVATION
SINGLE OVAL RCP
0° SKEW



SECTION
(FOR ALL HEADWALLS)



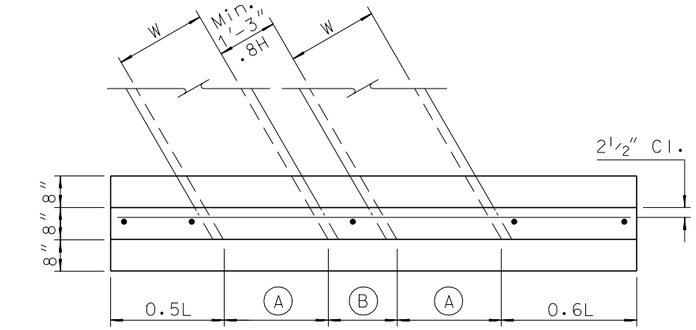
PLAN



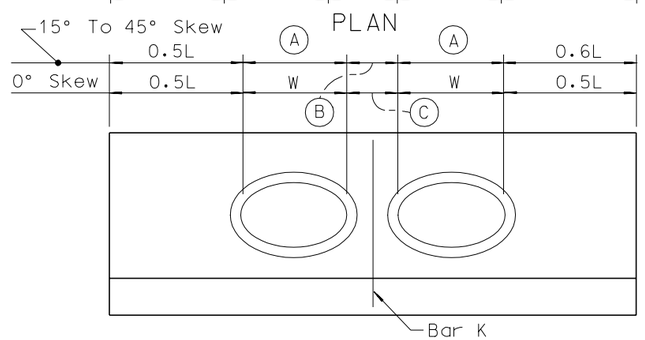
ELEVATION
SINGLE OVAL RCP
15° TO 45° SKEW

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. 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.
   CULVERTS SHOULD BE INSTALLED ON 5° INCREMENTS WHERE IT IS FEASIBLE.



PLAN



ELEVATION
DOUBLE OVAL RCP
0° TO 45° SKEW

NOTE: For Reinforcing Not Shown See Single Culvert Headwalls.

(A) — W/cos Skew Angle
(B) — .8H/cos Skew Angle, Min.1′-3″/cos Skew Angle
(C) — .8H at Right Angle to Pipe

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

CULVERT HEADWALLS 23″x14″ OVAL RCP TO 60″x38″ OVAL RCP

Signed Original On File	R-2.7.1	(502)
CHIEF ROAD DESIGN ENGR.	ADOPTED: 8/69	REVISION 12-94

QUANTITIES SHOWN BELOW ARE FOR TWO HEADWALLS.

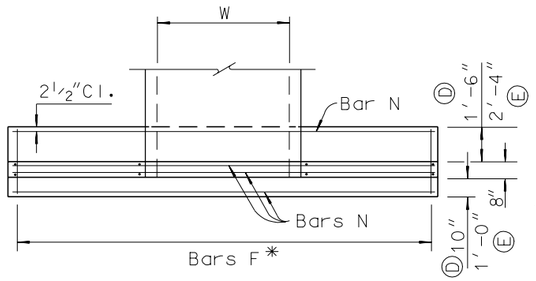
OVAL RCP SIZE W X H	RCP SIZE	OVAL RCP AREA SQ.FT	SINGLE OVAL RCP 0° SKEW CONC. CU. YD.	0° SKEW STEEL LB.	15° SKEW CONC. CU. YD.	15° SKEW STEEL LB.	30° SKEW CONC. CU. YD.	30° SKEW STEEL LB.	45° SKEW CONC. CU. YD.	45° SKEW STEEL LB.	DOUBLE OVAL RCP 0° SKEW CONC. CU. YD.	0° SKEW STEEL LB.	15° SKEW CONC. CU. YD.	15° SKEW STEEL LB.	30° SKEW CONC. CU. YD.	30° SKEW STEEL LB.	45° SKEW CONC. CU. YD.	45° SKEW STEEL LB.	X	Y	L	h
68"x43"	54"	16.62	7.19	628	7.82	683	7.98	720	8.34	767	9.86	789	10.58	848	11.07	897	12.11	1031	1'-2½"	2'-2 "	12'-9"	6'-11"
76"x48"	60"	20.55	8.39	746	9.13	805	9.32	813	9.71	889	11.47	921	12.31	985	13.06	1075	15.66	1207	1'-2½"	2'-2½"	14'-3"	7'-5"
91"x58"	72"	29.71	12.11	1168	13.18	1273	13.43	1321	14.02	1412	16.59	1495	17.82	1616	18.61	1730	20.36	1965	1'-3½"	2'-3½"	17'-0"	8'-5"

QUANTITIES SHOWN BELOW ARE FOR ONE HEADWALL.

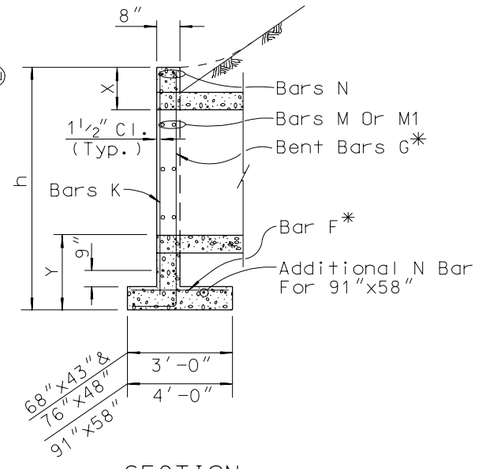
OVAL RCP SIZE W & H	LENGTH OF REINFORCING BARS																					
	SINGLE OVAL RCP																					
	0° SKEW					15° Skew					30° SKEW					45° SKEW					
	No. 5		No. 4			No. 5		No. 4			No. 5		No. 4			No. 5		No. 4			
	F	G	M	N	K	F	G	M	M1	N	K	F	G	M	M1	N	K	F	G	M	M1	N	K
68"x43"	13@2'-9"	10@7'-10"	12@5'-8"	9@18'-2"	10@6'-0"	14@2'-9"	12@7'-10"	6@5'-6"	6@6'-10"	9@19'-8"	11@6'-0"	15@2'-9"	12@7'-10"	6@5'-4"	6@6'-10"	9@20'-4"	12@6'-0"	16@2'-9"	13@7'-10"	6@5'-2"	6@6'-10"	9@21'-10"	13@6'-0"
76"x48"	15@2'-9"	12@8'-4"	12@6'-4"	9@20'-4"	12@6'-6"	16@2'-9"	13@8'-4"	6@6'-2"	6@7'-7"	9@22'-0"	13@6'-6"	16@2'-9"	13@8'-4"	6@6'-0"	6@7'-7"	9@22'-9"	13@6'-6"	17@2'-9"	15@8'-4"	6@5'-10"	6@7'-7"	9@24'-5"	15@6'-6"
91"x58"	25@3'-9"	18@9'-8"	16@7'-7"	10@20'-4"	12@7'-6"	27@3'-9"	20@9'-8"	8@7'-5"	8@9'-1"	10@26'-4"	13@7'-6"	28@3'-9"	21@9'-8"	8@7'-3"	8@9'-1"	10@27'-9"	14@7'-6"	30@3'-9"	23@9'-8"	8@7'-1"	8@9'-1"	10@29'-2"	15@7'-6"
DOUBLE OVAL RCP																						
68"x43"	19@2'-9"	11@7'-10"	12@6'-8"	9@26'-8"	11@6'-0"	20@2'-9"	12@7'-10"	6@5'-6"	6@6'-10"	9@28'-6"	12@6'-0"	21@2'-9"	13@7'-10"	6@5'-4"	6@6'-11"	9@30'-2"	13@6'-0"	24@2'-9"	16@7'-10"	6@5'-2"	6@6'-10"	9@33'-10"	16@6'-0"
76"x48"	21@2'-9"	13@8'-4"	12@6'-4"	9@29'-10"	13@6'-6"	22@2'-9"	14@8'-4"	6@6'-2"	6@7'-7"	9@31'-10"	14@6'-6"	24@2'-9"	16@8'-4"	6@6'-0"	6@7'-7"	9@34'-2"	13@6'-6"	26@2'-9"	19@8'-4"	6@5'-10"	6@7'-7"	9@37'-10"	19@6'-6"
91"x58"	37@3'-9"	21@9'-8"	16@7'-7"	10@35'-9"	14@7'-6"	39@3'-9"	23@9'-8"	8@7'-5"	8@9'-1"	10@38'-2"	16@7'-6"	41@3'-9"	26@9'-8"	8@7'-3"	8@9'-1"	10@40'-5"	17@7'-6"	46@3'-9"	31@9'-8"	8@7'-1"	8@9'-1"	10@45'-4"	20@7'-6"

GENERAL NOTES:

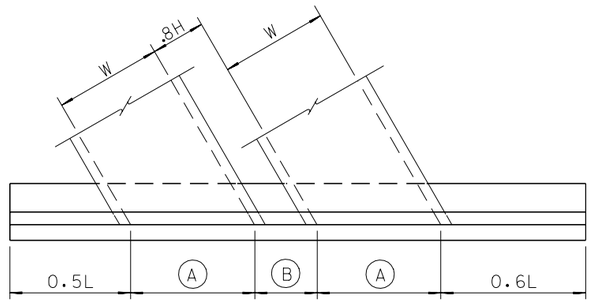
1. CONCRETE SHALL BE CLASS A OR AA.
2. REINFORCING STEEL SHALL BE DEFORMED BARS WITH MAXIMUM SPACING OF 18" SET 2 1/2" CLEAR OF SURFACE OF CONCRETE EXCEPT AS NOTED. BAR ENDS SHALL BE KEPT 1 1/2" CLEAR OF SURFACE OF CONCRETE. REINFORCING BARS MAY BE CUT AND BENT IN FIELD.
3. FOOTINGS SHOWN ARE OF MINIMUM 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. 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.
   CULVERTS SHOULD BE INSTALLED ON 5° INCREMENTS WHERE IT IS FEASIBLE.



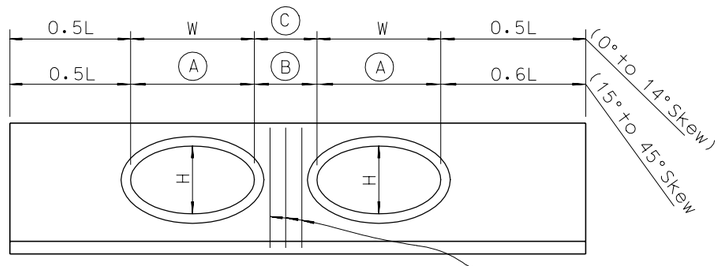
PLAN



SECTION
(FOR ALL HEADWALLS)

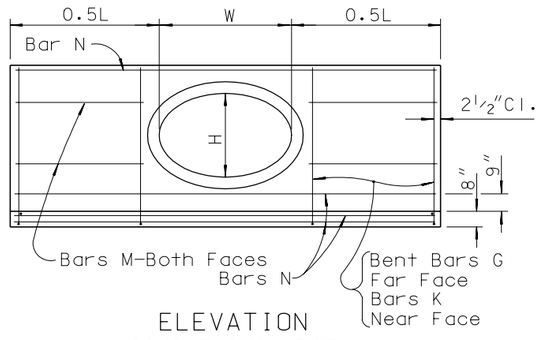


PLAN



0° TO 45° SKEW
Add 1-G Bar & 1-K Bar for 68"x43" & 76"x48"
Add 3-G Bars & 2-K Bars for 91"x58"

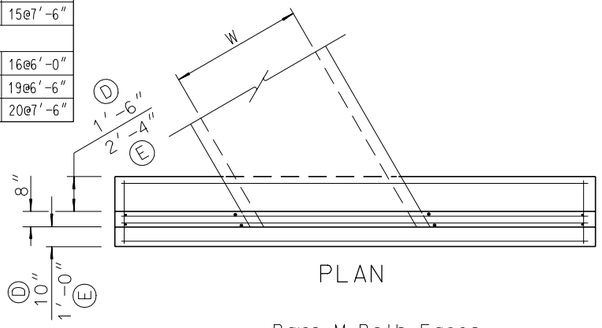
ELEVATION
DOUBLE OVAL RCP
15° TO 45° SKEW



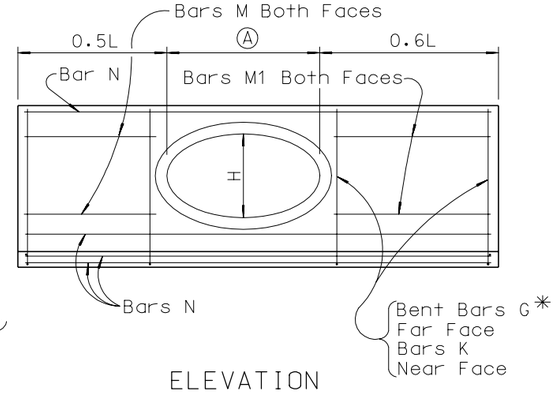
ELEVATION
SINGLE OVAL RCP
0° SKEW

Ⓐ — W/cos Skew Angle
Ⓑ — .8H/cos Skew Angle
Ⓒ — .8H at Right Angle to Pipe
Ⓓ — For 68"x43" & 76"x48"
Ⓔ — For 91"x58"

NOTE: For Details Of Other Reinforcing Bars, See Single Culvert Headwalls.



PLAN



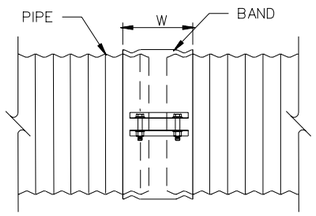
ELEVATION
SINGLE OVAL RCP
0° TO 45° SKEW

*-@18" ctrs. 68"x43" & 76"x48" @ 12" ctrs. 91"x58"

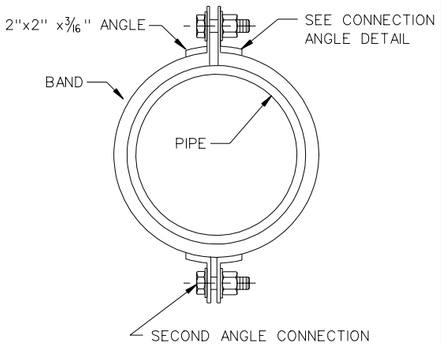
STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

CULVERT HEADWALLS 68"x43" OVAL RCP TO 91"x58" OVAL RCP

Signed Original On File	R-2.7.2	(502)
CHIEF ROAD DESIGN ENGR.	ADOPTED: 8/69	REVISION 8/97



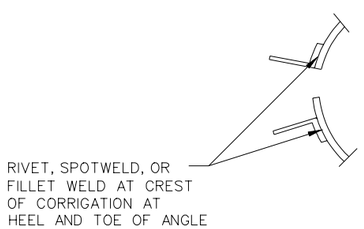
SIDE VIEW



SECOND ANGLE CONNECTION ASSEMBLY IS OPTIONAL FOR PIPE 36" DIA. OR LESS, IS REQUIRED FOR PIPE GREATER THAN 36" DIA.

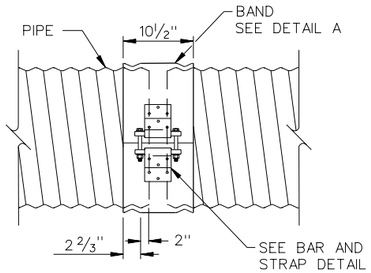
END VIEW

ANNULAR COUPLING BAND

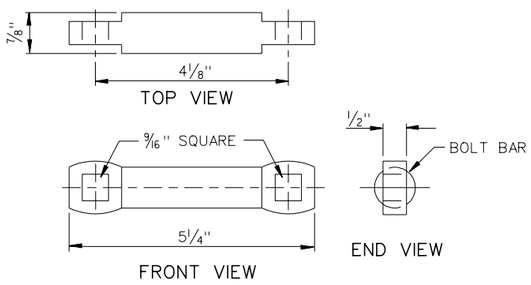


CONNECTION ANGLE DETAIL

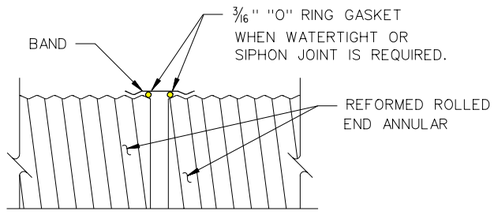
ANNULAR COUPLING BAND			
CORRIGATION	PIPE SIZE	"W" (IN MIN.)	1/2" BOLTS (NO. EACH CONNECTION)
2 2/3" x1/2"	THRU 30"	7	2
2 2/3" x1/2"	THRU 60"	12	3
2 2/3" x1/2"	THRU 84"	24	5
3"x1"	54" THRU 60"	14	3
3"x1"	THRU 96"	26	5



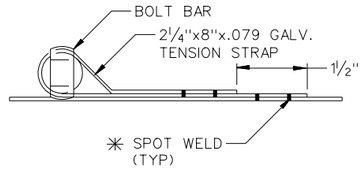
SIDE VIEW



BAR DETAIL

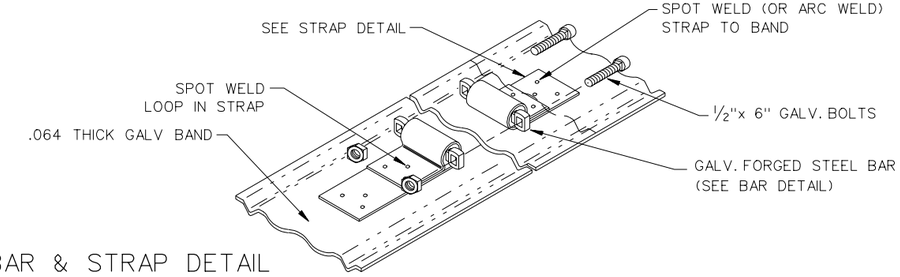


DETAIL A



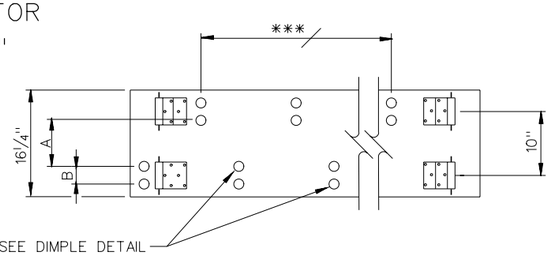
✳ SPOT WELDS SHALL DEVELOP FULL STRENGTH OF STRAP

STRAP DETAIL



BAR & STRAP DETAIL

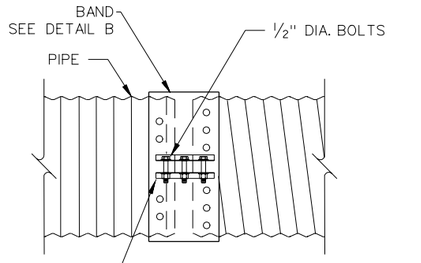
ALTERNATIVE ANNULAR COUPLING BAND FOR HCMP THRU 84"



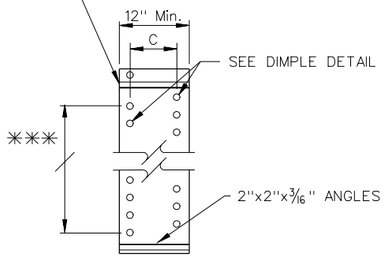
UNIVERSAL COUPLING BAND FOR USE ON 42" THRU 60" CMP INCLUSIVE

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.

COUPLING BAND FOR HELICAL WELD SEAM ONLY

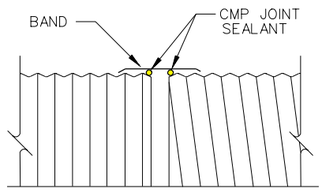


SIDE VIEW



BAND DETAIL

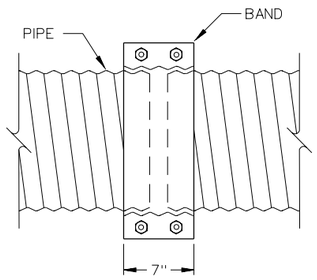
DIMENSION "C": 7" MIN. BETWEEN DIMPLES, AS REQUIRED TO FIT THE HELIX ANGLES.



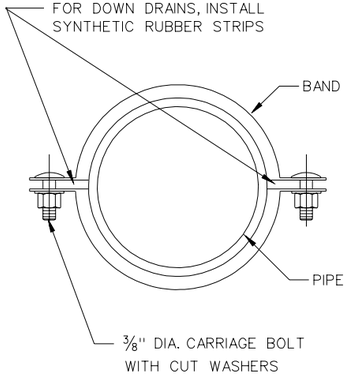
DETAIL B

NOTE: FOR HMCP DOWN DRAINS AND SLOTTED DRAINS

✳✳ UNIVERSAL COUPLING BAND FOR USE ON CMP THRU 36" INCLUSIVE

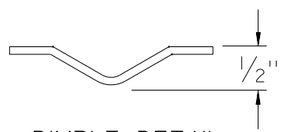


TOP VIEW



END VIEW

✳✳ TWO PIECE INTEGRAL FLANGE DIE FORMED FOR USE ON 6", 8", AND 10" HCMP



DIMPLE DETAIL

✳✳✳ 8 SPACES AS REQUIRED TO FIT HELIX ANGLE.

✳✳ TO BE USED ONLY FOR EXISTING HELICALLY CORRUGATED PIPES.

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 MASTIC SEALANT STRIP 1/8" THK x 1 1/2" WIDE x 5" LONG IN LAP BETWEEN BANDS.
4. FOR ALTERNATIVE ANNULAR COUPLING BAND, 2 BAR AND STRAP ASSEMBLIES ARE REQUIRED FOR PIPE GREATER THAN 42" DIA., OPTIONAL FOR SIZES LESS THAN 42".

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

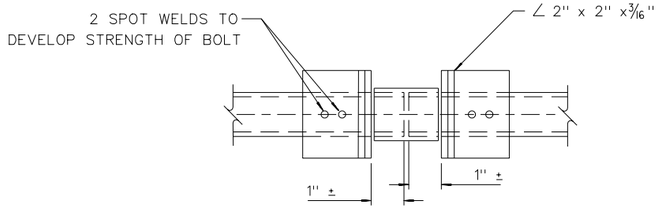
COUPLING BAND DETAILS CMP AND PIPE ARCHES

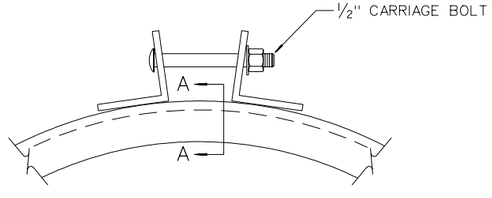
Signed Original On File	R-2.8.1	(604)
CHIEF ROAD DESIGN ENGR	ADOPTED 6/71	REVISION 8/97

R-25

✳ SEE SHEET R-2.8.1. FOR "W" DIMENSION

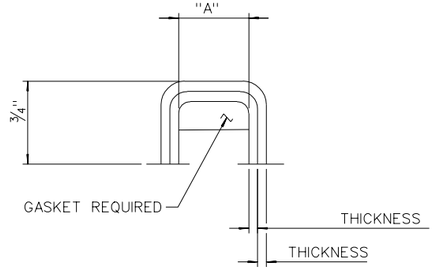
COUPLING TYPE	CORRUGATION	PIPE SIZE	* W OR A	BAR & STRAP: THICKNESS PIPE WALL	BAR & STRAP: THICKNESS BAND	BAR & STRAP: THICKNESS STRAP	BAR & STRAP: BOLTS (DIA.)	BAR & STRAP: BAR (DIA.)	BAR & STRAP: BAR YIELD STRENGTH (P.S.I.)	ANGLE: DIMENSIONS	ANGLE: BOLTS	ANGLE: RIVETS ANGLE TO BAND	ANGLE: SPOT WELDS ANGLE TO BAND	WEDGE & STRAP: THICKNESS STRAP	WEDGE & STRAP: THICKNESS WEDGE
TWO PIECE INTEGRAL FLANGE	1½" x ¼"	6" THRU 10" 12" THRU 18"	7" 7" OR 12"	0.064 - 0.079	0.064						2 - ⅜"				
UNIVERSAL	2⅔" X ½"	THRU 36"	12"	0.064 - 0.138	0.064									0.079	0.138
		THRU 36"	12"	0.064 - 0.138	0.064	0.079	½"	⅞"	32,000	2" x 2" x 3/16"	3 - ½"	3 - ⅜"	5 - ½"		
		42" THRU 60"	16¼"	0.064 - 0.168	0.064	DBL 0.079	½"	⅞"	32,000						
ANNULAR	2⅔" X ½"	THRU 36"	12"	0.064 - 0.138	0.064					2" x 2" x 3/16"	3 - ½"	3 - ⅜"	5 - ½"		
		42" THRU 60"	12"	0.064 - 0.079	0.064					2" x 2" x 3/16"	3 - ½"	3 - ⅜"	5 - ½"		
		42" THRU 60"	12"	0.064 - 0.168	0.064					2" x 2" x 5/16"	3 - ½"	5 - ⅜"			
		66" THRU 84"	24"	0.109 - 0.168	0.064					2" x 2" x 7/16"	5 - ½"	7 - ⅜"			
	3" X 1"	48" THRU 60"	14"	0.064 - 0.079	0.064					2" x 2" x 3/16"	3 - ½"	3 - ⅜"	5 - ½"		
		48" THRU 60"	14"	0.109	0.064					2" x 2" x 5/16"	3 - ½"	5 - ⅜"			
		66" THRU 120"	25"	0.064 - 0.079	0.064					2" x 2" x 5/16"	5 - ½"	9 - ⅜"			
CHANNEL	2⅔" X ½"	THRU 24"	¾"	0.064 - 0.079	0.079	0.079	½"	⅞"	32,000	2" x 2" x 5/16"	1 - ½"	SEE NOTE 8			
		30" THRU 42"	¾"	0.064 - 0.079	0.079	0.079	½"	⅞"	32,000						
		30" THRU 42"	1"	0.109	0.109	0.079	½"	⅞"	32,000						
		48" THRU 54"	1"	0.064 - 0.079	0.109	0.079	½"	⅞"	32,000						





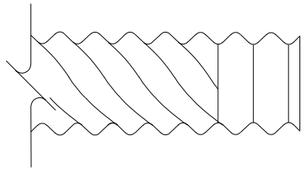
CHANNEL COUPLING BAND
FOR USE ON FLANGED END CMP

(CHANNEL COUPLING BAND SHALL BE TWO PIECE)



NOMINAL DIMENSIONS		
THICKNESS	"A"	FOR USE WITH CMP
0.079"	¾"	0.079" THICK OR LIGHTER
0.109"	1"	0.138" THICK OR HEAVIER

SECTION A-A



SPIRAL CMP

REFORMED TO ACCEPT UNIVERSAL, ANNULAR, AND CHANNEL COUPLERS

GENERAL NOTES:

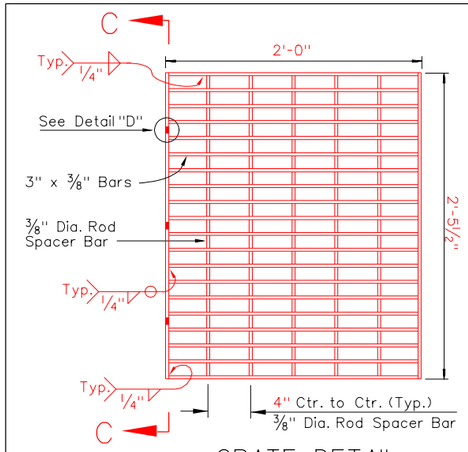
1. ALL COUPLING BAND CONNECTION HARDWARE SHALL BE GALVANIZED OR ELECTROPLATED IN ACCORDANCE WITH STANDARD SPECIFICATIONS.
2. FOR PIPE ARCHES, USE SAME WIDTH BAND AS FOR ROUND PIPE OF EQUAL PERIPHERY.
3. TWO PIECE BAND IS REQUIRED FOR PIPE GREATER THAN 42" DIAMETER.
4. TENSION STRAP MAY BE CONNECTED TO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

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

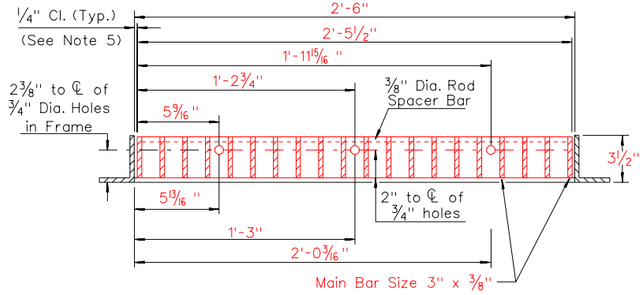
CMP COUPLING BAND DETAILS

Signed Original On File
CHIEF ROAD DESIGN ENGINEER

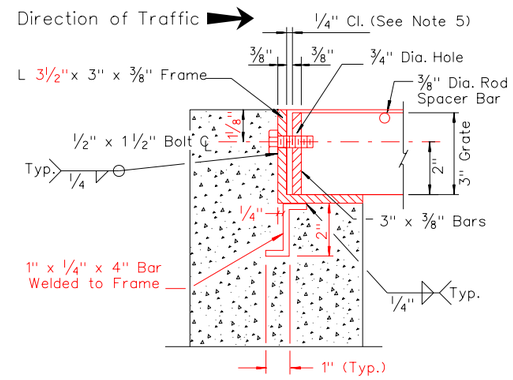
R-2.8.2 (604)
ADOPTED: 1/78
REVISION 8/97



GRATE DETAIL



SECTION C-C
GRATE HOLE DETAIL



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

GENERAL NOTES:

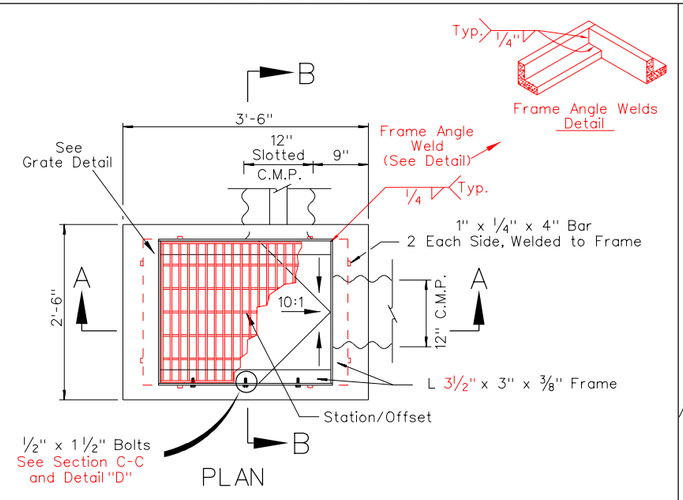
1. ALL CONCRETE SHALL BE CLASS A OR AA.
2. REINFORCING BARS SHALL BE NO. 4 BARS WITH MAXIMUM SPACING AT 18" CENTERS. BARS TO BE EMBEDDED A MINIMUM OF TWO INCHES AND BAR ENDS MUST CLEAR SURFACE BY ONE AND ONE-HALF INCHES.
3. ALL EXPOSED CONCRETE EDGES SHALL BE CHAMFERED ONE INCH.
4. GRATE AND FRAME ANGLE TO BE WELDED AT ALL CONTACT POINTS.
5. 1/4" MAX. CL. BETWEEN GRATE & FRAME ON EACH SIDE.
6. CATCH BASIN FLOORS SHALL HAVE A MINIMUM SLOPE OF 10:1 FROM ALL DIRECTIONS TOWARD OUTLET PIPE. IF BASIN IS USED AS A JUNCTION. SHAPE FLOWLINE(S) TO OUTLET PIPE, AND PROVIDE A MINIMUM SLOPE OF 10:1 TO FLOWLINE(S).
7. STATION/OFFSET DISTANCE LISTED IN PLANS IS MEASURED TO CENTER OF GRATE.
8. 12" C.M.P. DOWNDRAIN PIPE SHOWN, CAN BE UPSIZED TO 18" C.M.P., WITH 6" INCREASE IN BASIN DEPTH.

QUANTITIES

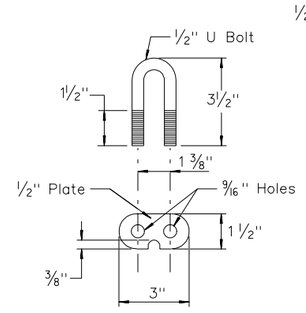
FOR INFORMATION ONLY

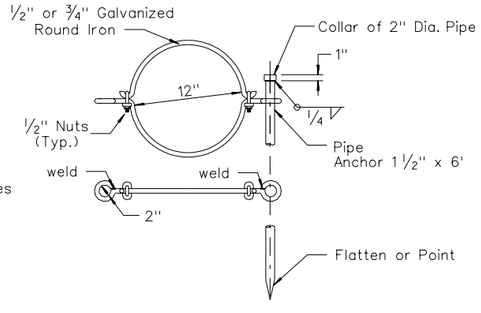
CONCRETE	REINFORCING STEEL	STRUCTURAL STEEL
0.46 CU. YD.	30 LBS.	245 LBS.*

* (Includes Frame, Welded Angle, Grate & Spacer Bars)

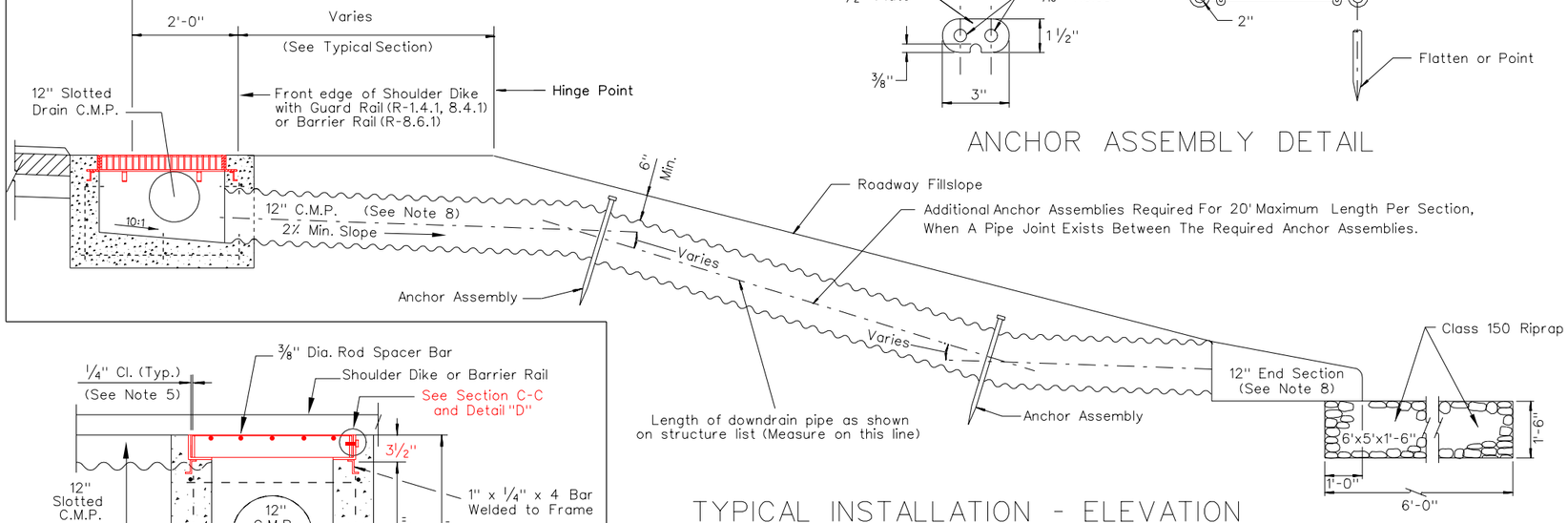


PLAN

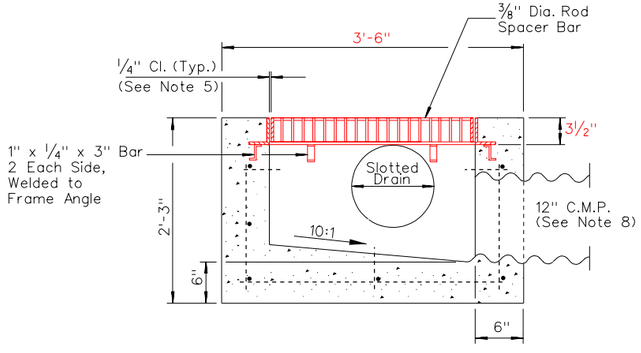




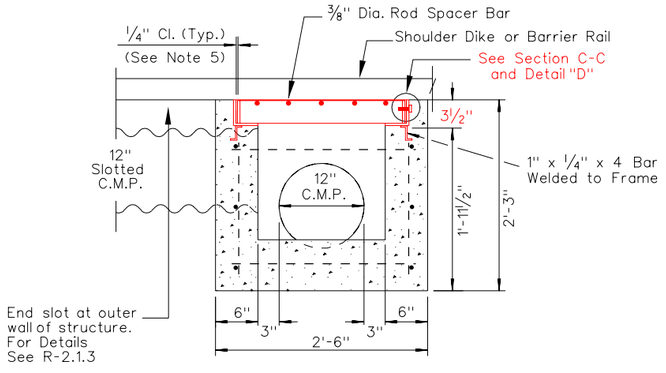
ANCHOR ASSEMBLY DETAIL



TYPICAL INSTALLATION - ELEVATION



SECTION A-A



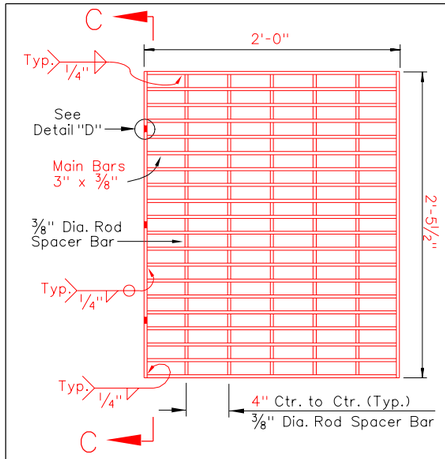
SECTION B-B

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

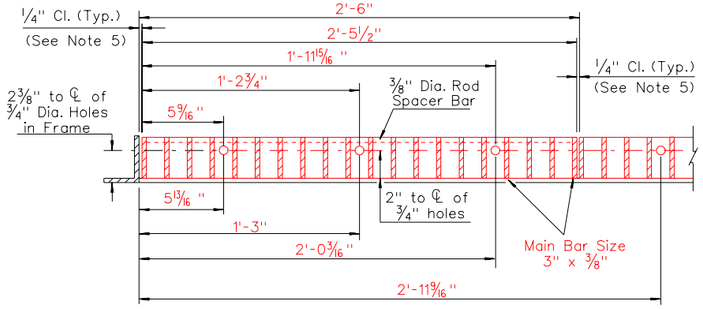
EMBANKMENT PROTECTOR TYPE 5

Signed Original On File	R-3.1.2	(608)
CHIEF ROAD DESIGN ENGR.	ADOPTED: 5/79	REVISION: 8/02

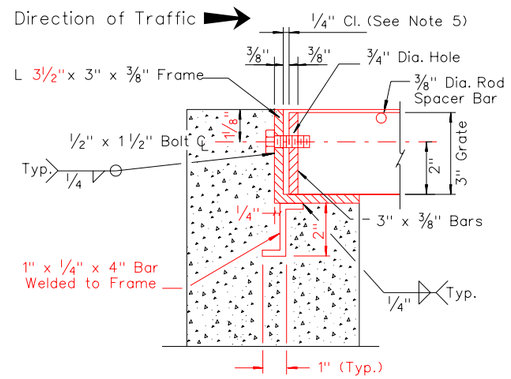
R-27



GRATE DETAIL



SECTION C-C
GRATE HOLE DETAIL



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

GENERAL NOTES:

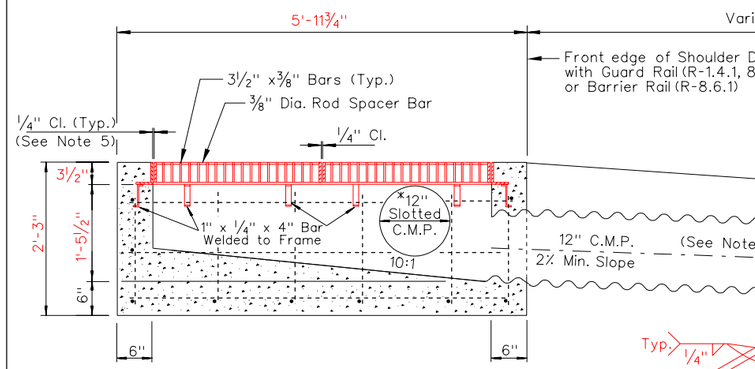
1. ALL CONCRETE SHALL BE CLASS A OR AA.
2. REINFORCING BARS SHALL BE NO. 4 BARS WITH MAXIMUM SPACING AT 18" CENTERS. BARS TO BE EMBEDDED A MINIMUM OF TWO INCHES AND BAR ENDS MUST CLEAR SURFACE BY ONE AND ONE-HALF INCHES.
3. ALL EXPOSED CONCRETE EDGES SHALL BE CHAMFERED ONE INCH.
4. GRATE AND FRAME ANGLE TO BE WELDED AT ALL CONTACT POINTS.
5. 1/4" MAX. CL. BETWEEN GRATE & FRAME ON EACH SIDE.
6. CATCH BASIN FLOORS SHALL HAVE A MINIMUM SLOPE OF 10:1 FROM ALL DIRECTIONS TOWARD OUTLET PIPE. IF BASIN IS USED AS A JUNCTION, SHAPE FLOWLINE(S) TO OUTLET PIPE, AND PROVIDE A MINIMUM SLOPE OF 10:1 TO FLOWLINE(S).
7. STATION/OFFSET DISTANCE LISTED IN PLANS IS MEASURED TO CENTER OF GRATE.
8. 12" C.M.P. DOWNDRAIN PIPE SHOWN, CAN BE UPSIZED TO 18" C.M.P., WITH 6" INCREASE IN BASIN DEPTH.

QUANTITIES

FOR INFORMATION ONLY

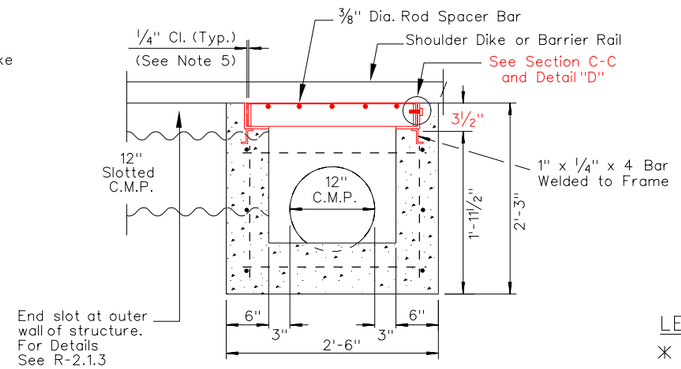
CONCRETE	REINFORCING STEEL	STRUCTURAL STEEL
0.78 CU. YD.	52 LBS.	456 LBS. ✳

✳ (Includes Frame, Welded Angle, Grate & Spacer Bars)

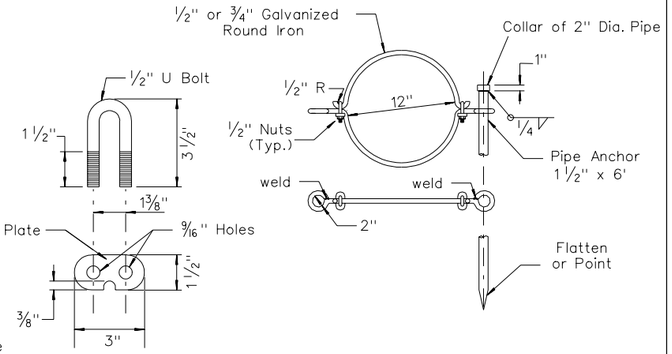


SECTION A-A

PLAN



SECTION B-B



ANCHOR ASSEMBLY DETAIL

LEGEND:

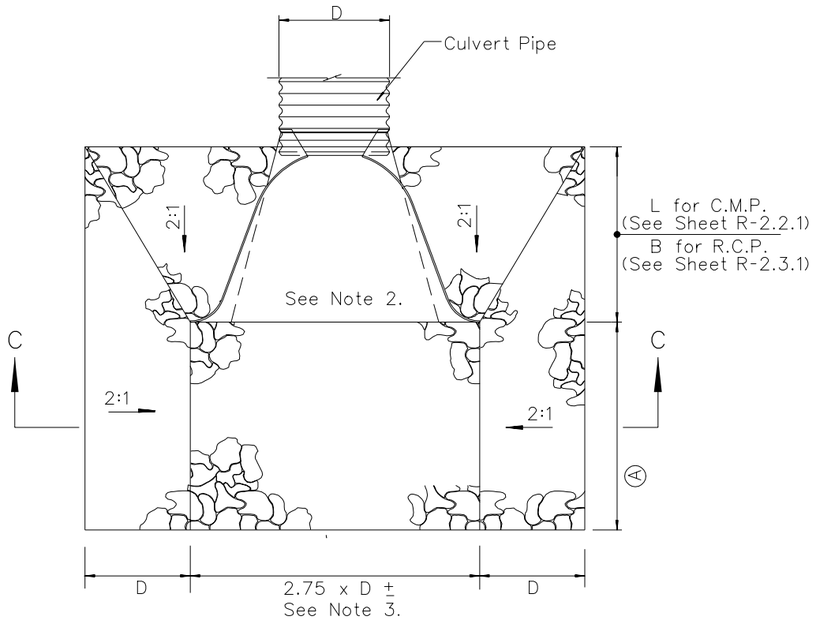
✳ — 12" Slotted C.M.P. as noted, end slot at outer wall of structure, (For Details See R-2.1.3.)

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

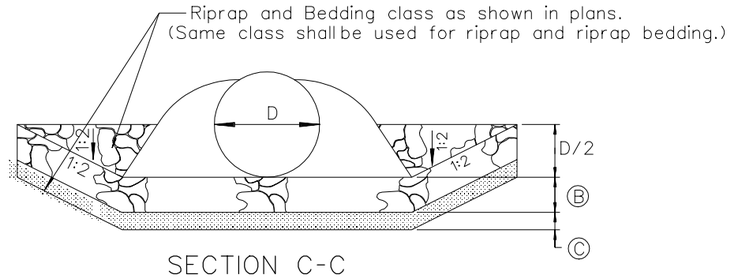
EMBANKMENT PROTECTOR (TYPE 5-2G)

Signed Original On File	R-3.1.3	(608)
CHIEF ROAD DESIGN ENGR.	ADOPTED: 5/79	REVISION: 8/02

R-28



PLAN



SECTION C-C

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

RIPRAP AND BEDDING CLASS	Ⓑ in.	Ⓒ in.
150	12	8
300	24	8
400	32	10
550	44	10
700	56	12
900	72	12

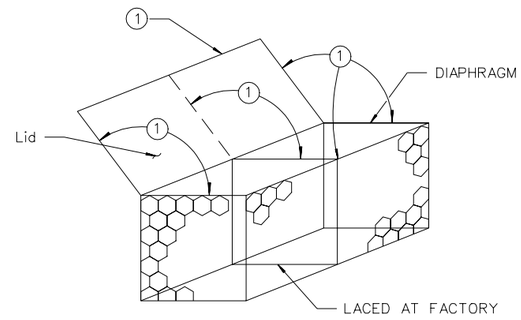
RIPRAP APRON

NOTES:

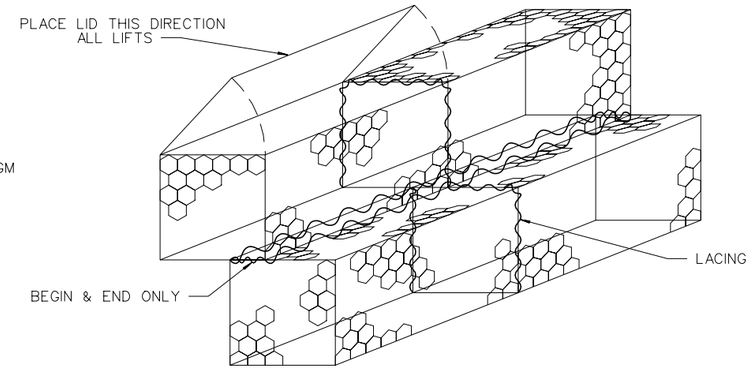
1. Hydraulic Section's approval must be obtained prior to incorpation into plans.
2. When no End Section is used, additional Riprap shall be as required by the Hydraulic Engineer.
3. For muultiple pipe installations, this dimension shall be adjusted according to pipe separation. Information is on drawing R-2.1.1.

NOTE:

① WHEN FULL, LACED TOGETHER

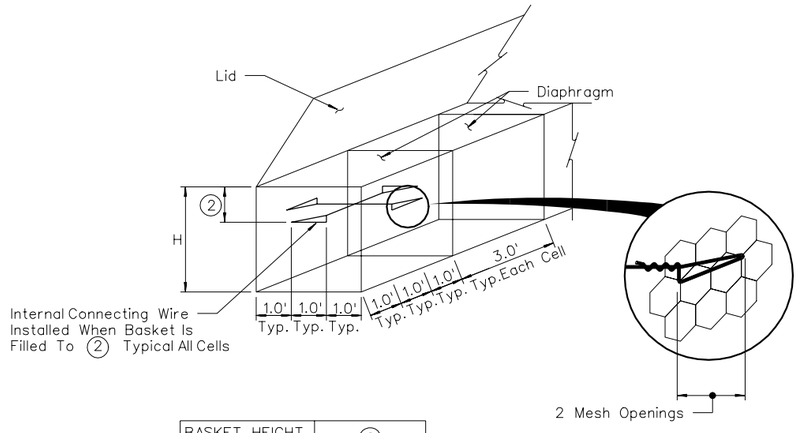


LACING: SINGLE BASKET



LACING: BASKET TO BASKET

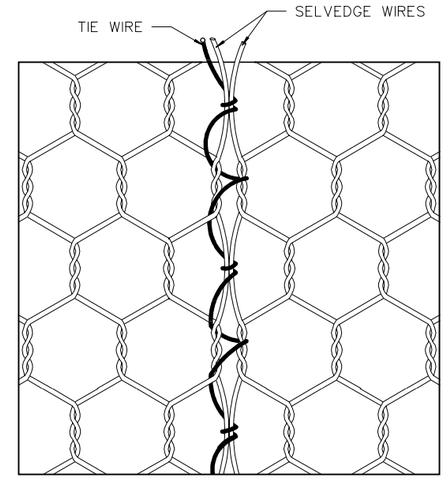
NOTE: OPTIONAL WIRE RING FASTENERS ALLOWED AS PER SPECIAL PROVISIONS.



BASKET HEIGHT H	②
3'-0"	1/3H & 2/3H
1'-6"	1/2H
1'-0"	NONE

INTERNAL CONNECTING WIRE DETAIL
FOR WIRE MESH GABIONS

GABIONS LACING DETAIL

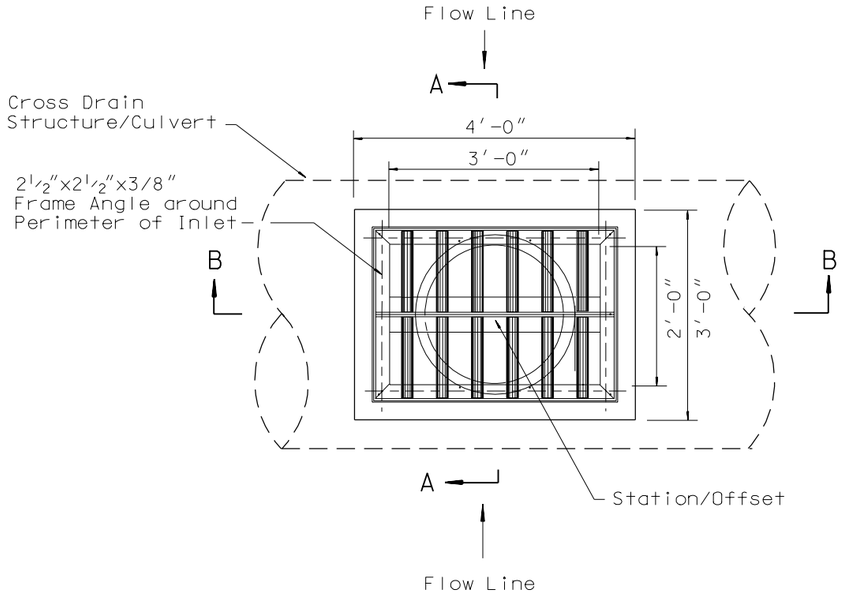


WIRE MESH LACING DETAIL

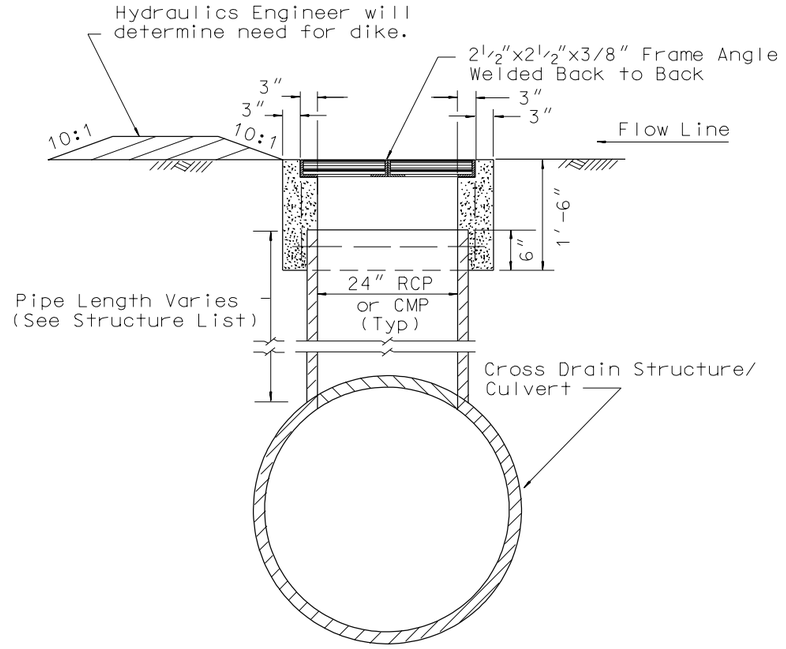
STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

RIPRAP APRON
GABIONS LACING DETAIL

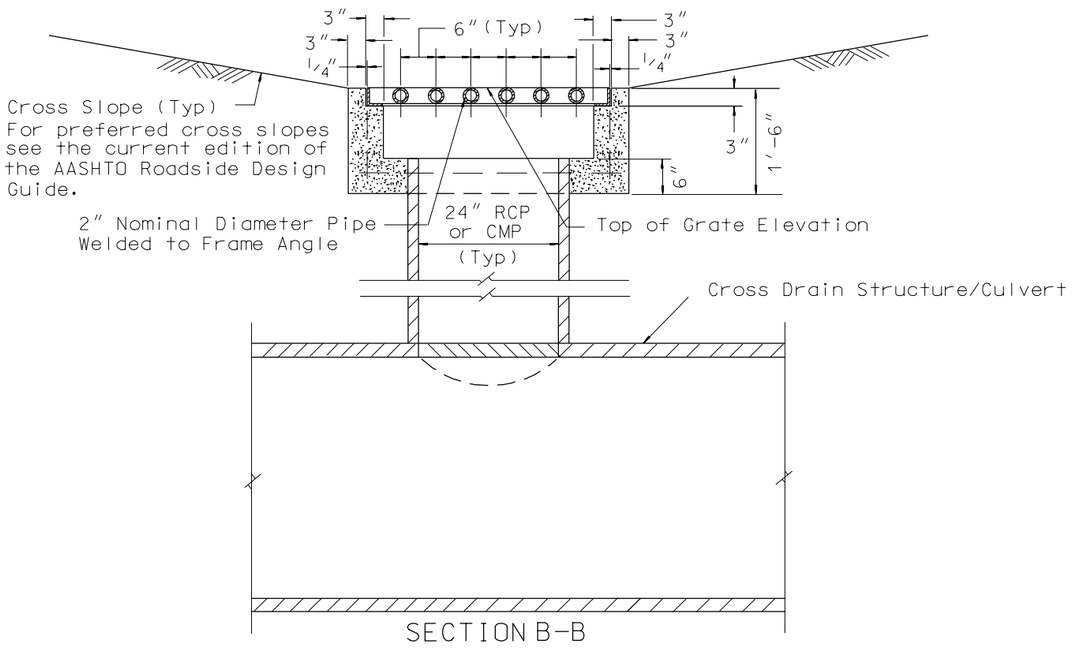
Signed Original On File	R-3.1.4	(610)
CHIEF ROAD DESIGN ENGR.	ADOPTED: 10/85	REVISION: 8/97



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 2" and bar ends must clear concrete surfaces by 1 ½".
3. All exposed concrete edges shall be chamfered 1".
4. Structural steel weight includes 2" pipe and the 2½"X2½"X3/8" frame angles.
5. Station/Offset distance listed in plans is measured to the center of grate.

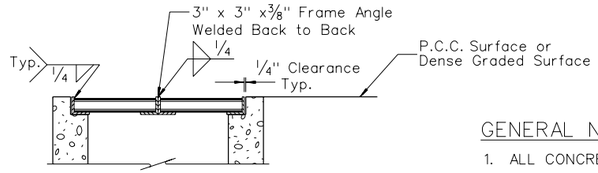
QUANTITIES*		
CONCRETE	REINF. STEEL	STRUCT. STEEL
0.36 Cu. Yd.	23 lbs.	170 lbs.

* For Information Only

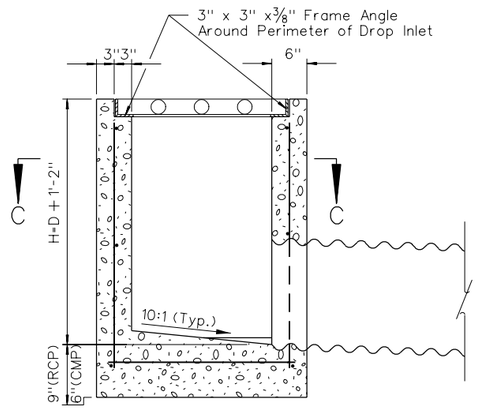
STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

PIPE RISER INLET (TYPE 3)

Signed Original On File	R-4.1.2	(609)
CHIEF ROAD DESIGN ENGR.	ADOPTED: 8/69	REVISION 9/00



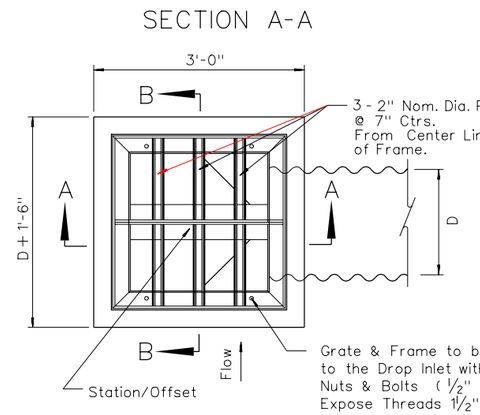
SECTION B-B



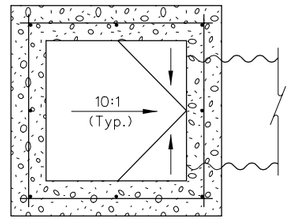
SECTION A-A

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. STRUCTURAL STEEL WEIGHT INCLUDES THE 2" PIPE, STANDARD WEIGHT, AND THE 3"x3"x3/8" FRAME ANGLES.
5. FOR 2" PIPE SEE ASTM A53.
6. STATION/OFFSET DISTANCE LISTED IN PLANS IS MEASURED TO THE CENTER OF GRATE.



PLAN

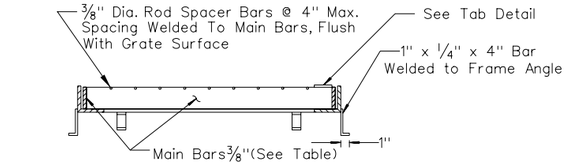


SECTION C-C

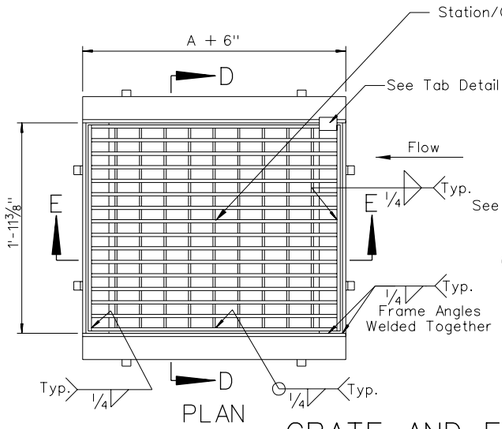
C.M.P. SIZE	CONCRETE CU. YD.	REINFORCING LB.	STRUCTURAL STEEL LB.
18"	0.62	39	120
24"	0.77	44	132
30"	0.93	59	145
36"	1.11	64	158
42"	1.29	69	170

R.C.P. SIZE	CONCRETE CU. YD.	REINFORCING LB.	STRUCTURAL STEEL LB.
18"	0.68	40	120
24"	0.84	45	132
30"	0.99	60	145
36"	1.17	65	158
42"	1.35	70	170

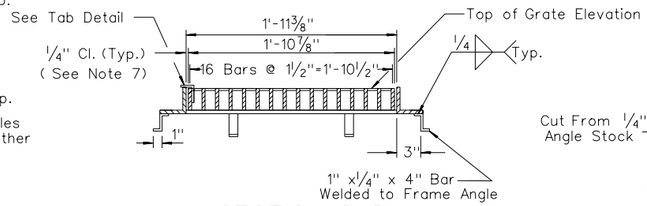
TYPE 2A DROP INLET



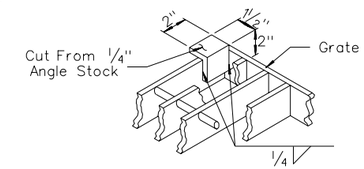
SECTION E-E



PLAN



SECTION D-D

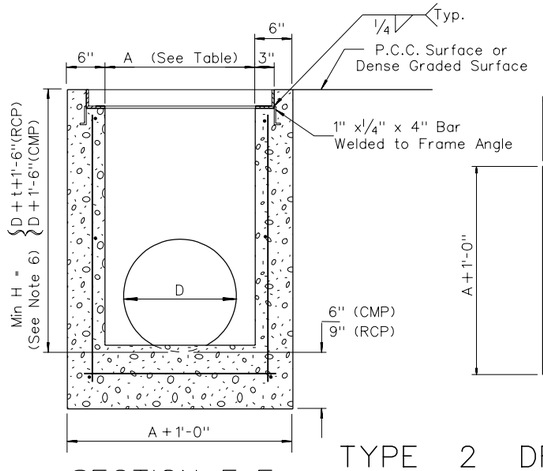


TAB DETAIL

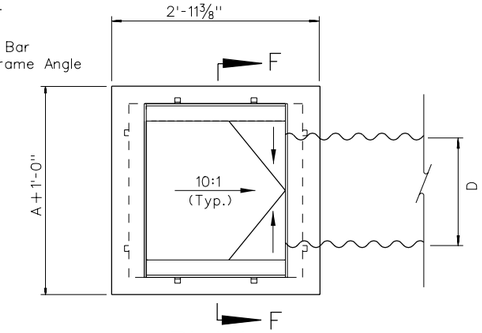
GRATE AND FRAME DETAIL

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. EXTREME LOW COVER SITUATIONS TO BE REVIEWED BY THE HYDRAULICS ENGR.
7. 1/4" MAX.CL. BETWEEN GRATE & FRAME ON EACH SIDE.
8. STATION/OFFSET DISTANCE LISTED IN PLANS IS MEASURED TO THE CENTER OF GRATE.



SECTION F-F



PLAN

TYPE 2 DROP INLET

NOTE:
Catch Basin Floors Shall Have A Minimum Slope of 10:1 From All Directions Toward Outlet Pipe. If Basin is Used As A Junction, Shape Flowline(s) To Outlet Pipe, And Provide A Minimum Slope Of 10:1 To Flowline(s).

BILL OF MATERIALS

X(t=Wall Thickness of RCP)

RCP

PIPE SIZE (INCH)	A=D+2t+X	H (FT.)	CONCRETE CU. YD.	REINF. LB.	MAIN BARS (INCH)	FRAME ANGLES (INCH)	GRATE LB.	FRAME LB.	TOTAL LB.
15	1'-7 1/2"	2.94	0.67	41	3X3/8	3 1/2X3X3/8	152	67	219
18	1'-11"	3.21	0.76	44	3X3/8	3 1/2X3X3/8	170	72	242
24	2'-6	3.75	0.95	53	3X3/8	3 1/2X3X3/8	204	81	285
30	3'-1"	4.29	1.15	59	3 1/2X3/8	4X3X3/8	279	97	376
36	3'-8"	4.83	1.36	71	4 1/2X3/8	5X3X3/8	422	123	545
42	4'-3"	5.38	1.59	82	4 1/2X3/8	5X3X3/8	478	134	612

CMP

PIPE SIZE (INCH)	A	H (FT.)	CONCRETE CU. YD.	REINF. LB.	MAIN BARS (INCH)	FRAME ANGLES (INCH)	GRATE LB.	FRAME LB.	TOTAL LB.
15	2'-0"	2.75	0.67	36	3X3/8	3 1/2X3X3/8	171	73	244
18	2'-0"	3.00	0.65	37	3X3/8	3 1/2X3X3/8	171	73	244
24	2'-6"	3.50	0.80	51	3X3/8	3 1/2X3X3/8	203	81	284
30	3'-0"	4.00	0.96	56	3 1/2X3/8	4X3X3/8	273	95	368
36	3'-6"	4.50	1.12	60	4 1/2X3/8	5X3X3/8	395	119	514
42	4'-0"	5.00	1.30	77	4 1/2X3/8	5X3X3/8	442	129	571

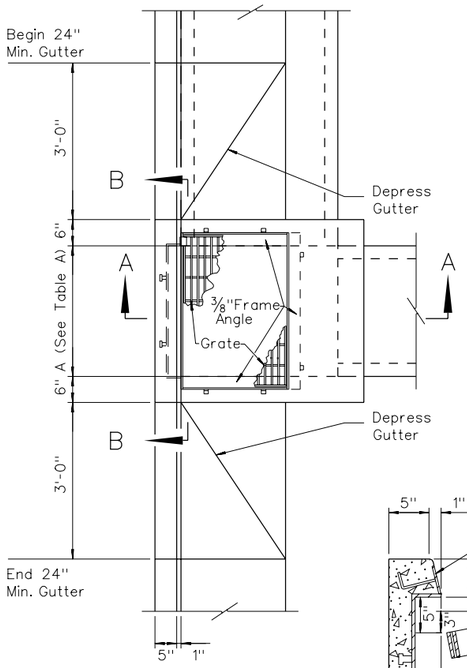
STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

TYPE 2 AND 2A DROP INLET

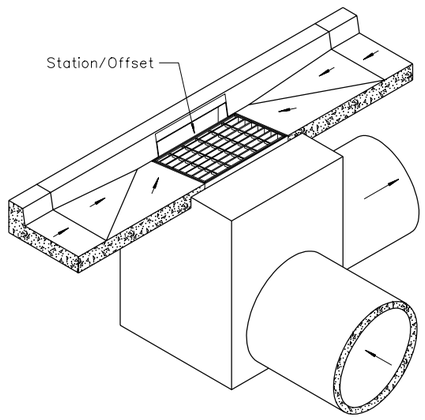
Signed Original On File
CHIEF ROAD DESIGN ENGR.

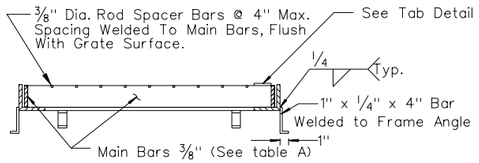
R-4.2.1 (609)
ADOPTED: 11/70
REVISION: 2/02

R-31



PLAN

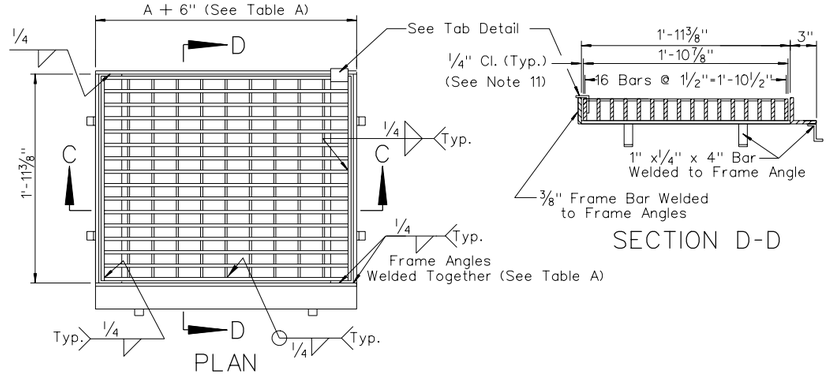




SECTION C-C

TABLE B

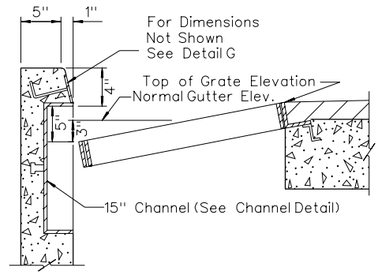
MAXIMUM H		
CMAP	J OR A	H
29" x 18" OR LESS 36" x 22" 43" x 27"	30" OR LESS 36" 42" 48" 54" 60"	21'-0" 16'-0" 12'-0" 9'-0" 7'-0" 7'-0" (WITH #4 BARS @ 12" CENTERS)



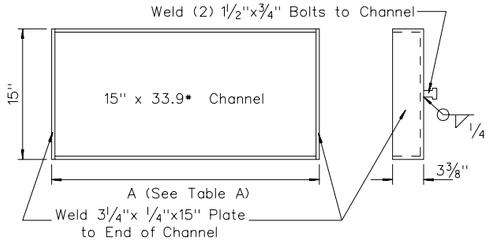
PLAN

SECTION D-D

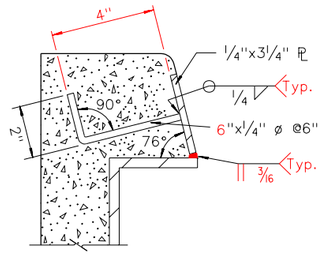
GRATE AND FRAME DETAIL



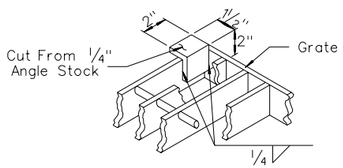
DETAIL F



CHANNEL DETAIL



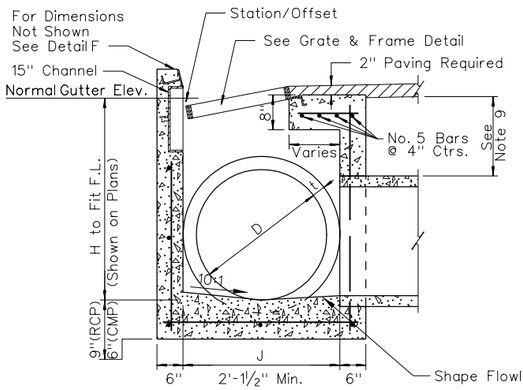
DETAIL G



TAB DETAIL

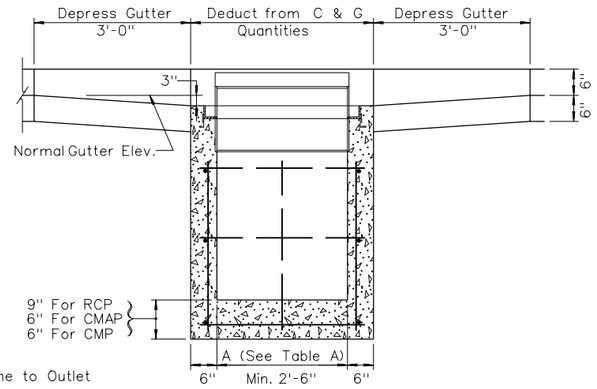
GENERAL NOTES:

1. ALL CONCRETE SHALL BE CLASS A OR AA.
2. ALL REINFORCING STEEL SHALL BE TIGHTLY WIRED AND EMBEDDED 1 1/2" CLEAR OF CONCRETE SURFACE. EXCEPT AS NOTED, ALL REINFORCING SHALL BE NO. 4 BARS WITH MAXIMUM SPACING OF 12" 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.
3. EXPOSED EDGES OF CONCRETE SHALL BE CHAMFERED ONE INCH.
4. WHERE PIPE INTERSECTS DROP INLET ON A 12° OR LARGER SKEW INCREASE J TO $\frac{J}{\cos \text{SKEW } \angle}$, REDESIGN FOR SKEWS AT A.
5. WHERE PIPE INTERSECTS DROP INLET ON A 12° OR LARGER SKEW INCREASE S TO $\frac{S}{\cos \text{SKEW } \angle}$, REDESIGN FOR SKEWS AT A.
6. FOR VALUES OF "H" SEE STORM DRAIN SCHEDULE OR STRUCTURE LIST.
7. "H" IS THE DIFFERENCE IN ELEVATION BETWEEN THE OUT FLOW PIPE AND THE NORMAL GUTTER GRADE LINE AT THE CURB FACE.
8. PIPE(S) CAN BE PLACED IN ANY WALL.
9. FOR DROP INLET, CONFIGURATIONS WITH 2 PIPES-INFLOW PIPE INVERT ELEVATION SHALL BE ≥ 0.1' ABOVE OUTFLOW PIPE INVERT ELEVATION.
10. EXTREME LOW COVER SITUATIONS TO BE REVIEWED BY THE HYDRAULICS ENGR.
11. 1/4" MAX. CL. BETWEEN GRATE & FRAME ON EACH SIDE.
12. CATCH BASIN FLOORS SHALL HAVE A MINIMUM SLOPE OF 10:1 FROM ALL DIRECTIONS TOWARD OUTLET PIPE. IF BASIN IS USED AS A JUNCTION, SHAPE FLOWLINE(S) TO OUTLET PIPE, AND PROVIDE A MINIMUM SLOPE OF 10:1 TO FLOWLINE(S).
13. STATION/OFFSET DISTANCE LISTED IN PLANS IS MEASURED TO THE FACE OF CURB AT THE GUTTER FLOW LINE.



S FOR CMAP
D FOR CMP
D+6" FOR RCP 24" OR LESS
D+2† FOR RCP 30" OR MORE
S+2† FOR LO-HED RCP

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



S FOR CMAP
D FOR CMP
D+6" FOR RCP 42" OR LESS
D+2† FOR RCP 48" OR MORE
S+6" FOR LO-HED RCP 29"x45" OR LESS
S+2† FOR LO-HED RCP 34"x53" OR MORE

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

STRUCTURAL STEEL TABLE A

PIPE SIZE				A	MAIN BARS	FRAME ANGLES	FRAME BAR	GRATE LBS.	FRAME LBS.	CHANNEL & PLATES, LBS.	TOTAL LBS.
CMAP	CMP	RCP	LO-HED								
29" x 18"	30"	24"	14" x 23"								
OR LESS	OR LESS	OR LESS	OR LESS	2'-6"	3" x 3/8"	3 1/2"x 3"x 3/8"	3 1/2" x 3/8"	203	81	93	377
36" x 22"	36"	30"	19" x 30"	3'-0"	3 1/2" x 3/8"	4" x 3" x 3/8"	4" x 3/8"	273	95	107	475
43" x 27"	42"	36"	22" x 34"	3'-6"	4 1/2" x 3/8"	5" x 3" x 3/8"	5" x 3/8"	395	119	126	640
	48"	42"	27" x 34"	4'-0"	4 1/2" x 3/8"	5" x 3" x 3/8"	5" x 3/8"	442	129	143	714
	54"		29" x 45"	4'-6"	4 1/2" x 3/8"	5" x 3" x 3/8"	5" x 3/8"	517	144	160	821

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

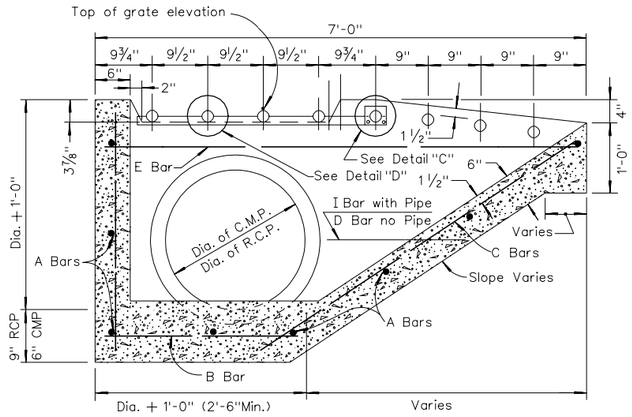
TYPE 3 DROP INLET

Signed Original On File
CHIEF ROAD DESIGN ENG.

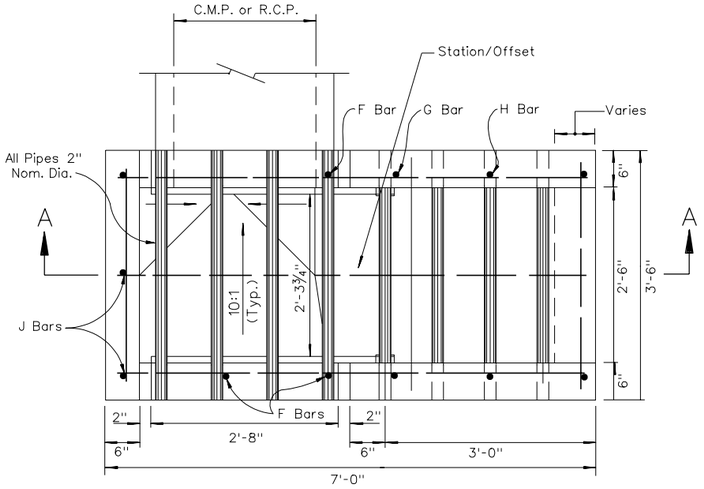
R-4.3.1 (609)
ADOPTED: 10/85
REVISION: 2/02

R-32

TYPE 7 DROP INLET



SECTION A-A



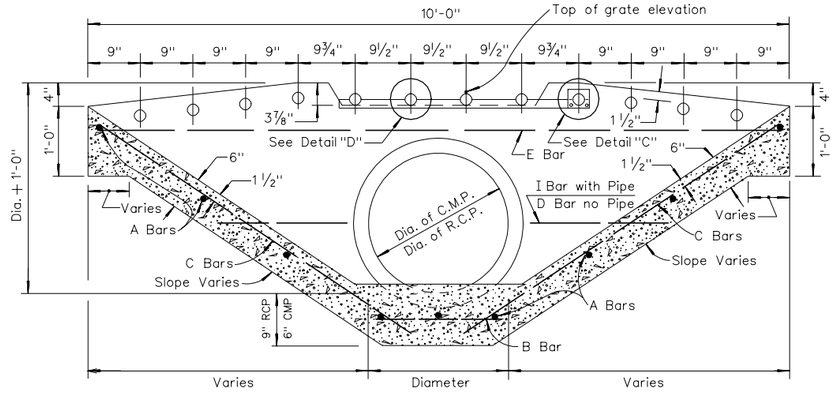
PLAN

TYPE 7 DROP INLET

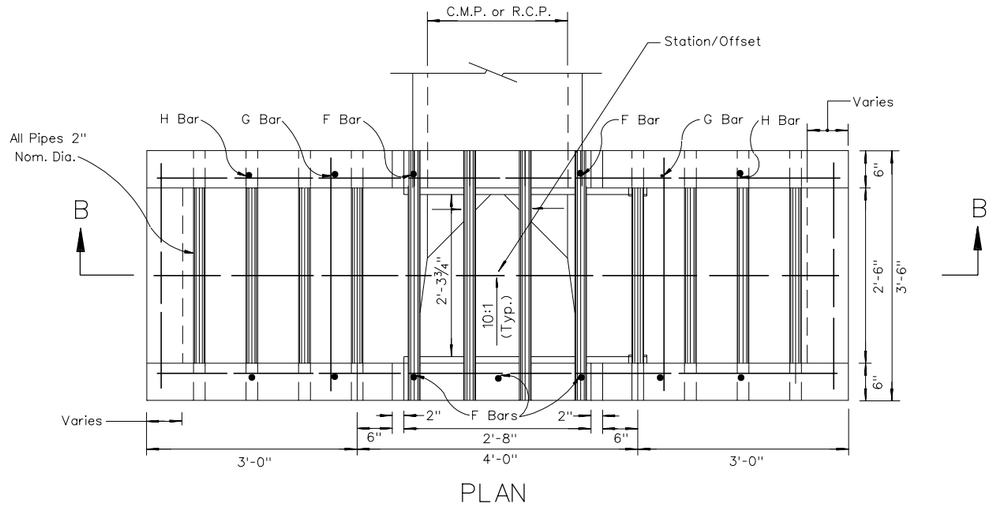
TABLE OF QUANTITIES

SIZE DIA.	A Bars	B Bars	C Bars	D Bars	E Bars	F Bars	G Bars	H Bars	I Bars	J Bars	CONC. CU. YD.	REINF. STEEL LB.	STR. STL. GRATE LB.
CMP													
18"	8@3'-2"	3@2'-3"	3@4'-9"	1@5'-0"	2@6'-8"	3@2'-3"	2@1'-10"	2@1'-2"	1@2'-4"	3@2'-8"	1.11	61	117
24"	8@3'-2"	3@2'-9"	3@4'-9"	1@5'-0"	2@6'-8"	3@2'-9"	2@2'-0"	2@1'-4"	1@2'-3"	3@3'-2"	1.21	63	117
30"	8@3'-2"	3@3'-4"	3@4'-9"	1@5'-4"	2@6'-8"	3@3'-3"	2@2'-8"	2@1'-9"	1@1'-10"	3@3'-8"	1.34	67	117
RCP													
18"	8@3'-2"	3@2'-4"	3@5'-0"	1@5'-0"	2@6'-8"	3@2'-6"	2@1'-10"	2@1'-2"	1@2'-1"	3@2'-11"	1.18	62	117
24"	8@3'-2"	3@2'-4"	3@5'-0"	1@5'-0"	2@6'-8"	3@3'-0"	2@2'-0"	2@1'-4"	1@2'-0"	3@3'-5"	1.27	65	117
30"	8@3'-2"	3@3'-4"	3@5'-0"	1@5'-4"	2@6'-8"	3@3'-6"	2@2'-8"	2@1'-9"	1@1'-8"	3@3'-11"	1.41	68	117

TYPE 8 DROP INLET



SECTION B-B

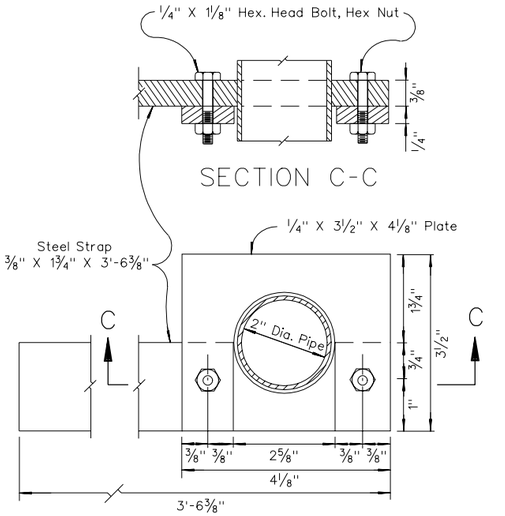


PLAN

TYPE 8 DROP INLET

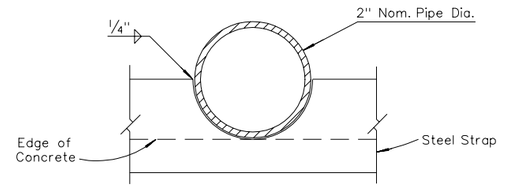
TABLE OF QUANTITIES

SIZE DIA.	A Bars	B Bars	C Bars	D Bars	E Bars	F Bars	G Bars	H Bars	I Bars	J Bars	CONC. CU. YD.	REINF. STEEL LB.	STR. STL. GRATE LB.
CMP													
18"	9@3'-2"	3@2'-0"	6@4'-9"	1@6'-6"	2@9'-8"	5@2'-3"	4@1'-10"	4@1'-2"	2@2'-4"	Not Applicable	1.33	78	168
24"	9@3'-2"	3@2'-6"	6@4'-9"	1@6'-10"	2@9'-8"	5@2'-9"	4@2'-0"	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"	5@3'-3"	4@2'-8"	4@1'-9"	2@1'10"		1.59	87	168
RCP													
18"	9@3'-2"	3@2'-0"	6@5'-0"	1@6'-6"	2@9'-8"	5@2'-6"	4@1'-10"	4@1'-2"	2@2'-1"		1.35	80	168
24"	9@3'-2"	3@2'-6"	6@5'-0"	1@6'-10"	2@9'-8"	5@3'-3"	4@2'-0"	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"	5@3'-6"	4@2'-8"	4@1'-9"	2@1'-8"		1.63	89	168

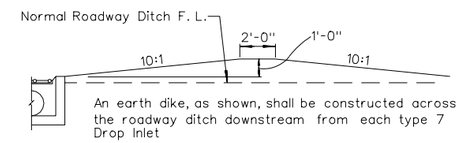


SECTION C-C

DETAIL "C"



DETAIL "D"



SKETCH OF ROADWAY DITCH DIKE

GENERAL NOTES:

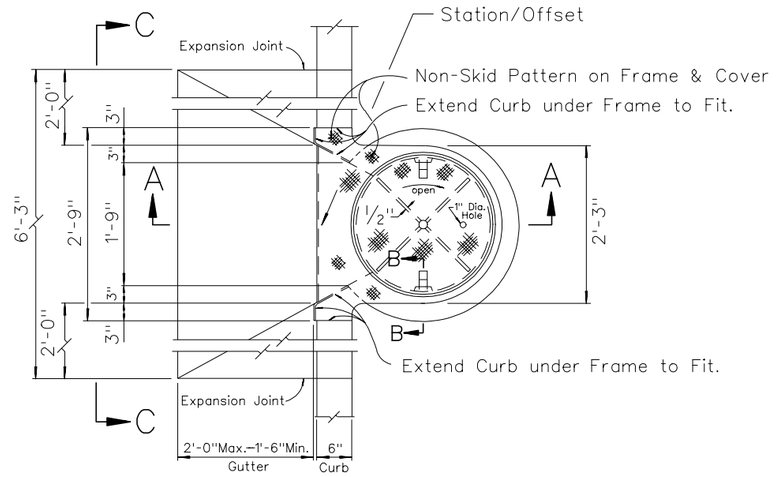
1. All concrete shall be Class A or AA.
2. Reinforcing steel shall be No. 4 bars with maximum spacing of 18" centers, wired tightly at all intersections and embedded at least one and one half inch clear of concrete surface.
3. Dimensions may be varied by the Engineer to fit local conditions.
4. No deductions in concrete shall be made for the 2" crossbars.
5. All exposed edges of concrete shall be chamfered one inch.
6. Steel strap and pipe for crossbars are included in the structural steel grate quantities.
7. Catch Basin Floors Shall Have A Minimum Slope of 10:1 From All Directions Toward Outlet Pipe. If Basin is Used As A Junction, Slope Flowline(s) To Outlet Pipe, And Provide A Minimum Slope Of 10:1 To Flowline(s).
8. Station/Offset distance listed in plans is measured to the center of grate.

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

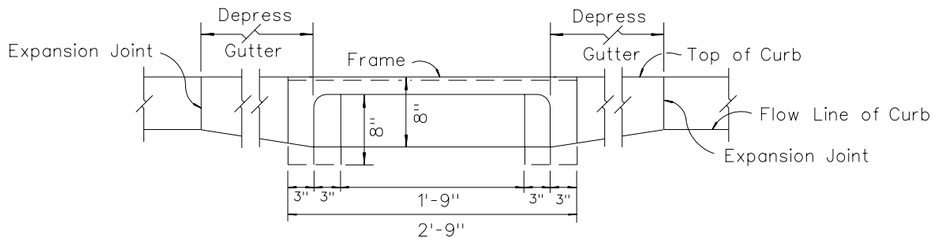
TYPE 7 & 8 DROP INLETS

Signed Original On File	R-4.6.1	(609)
CHIEF ROAD DESIGN ENGR.	ADOPTED: 8/69	REVISION 9/00

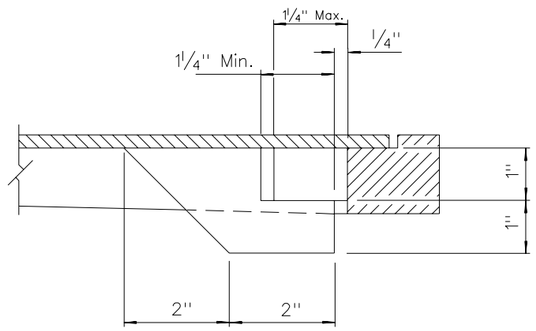
R-33



PLAN VIEW

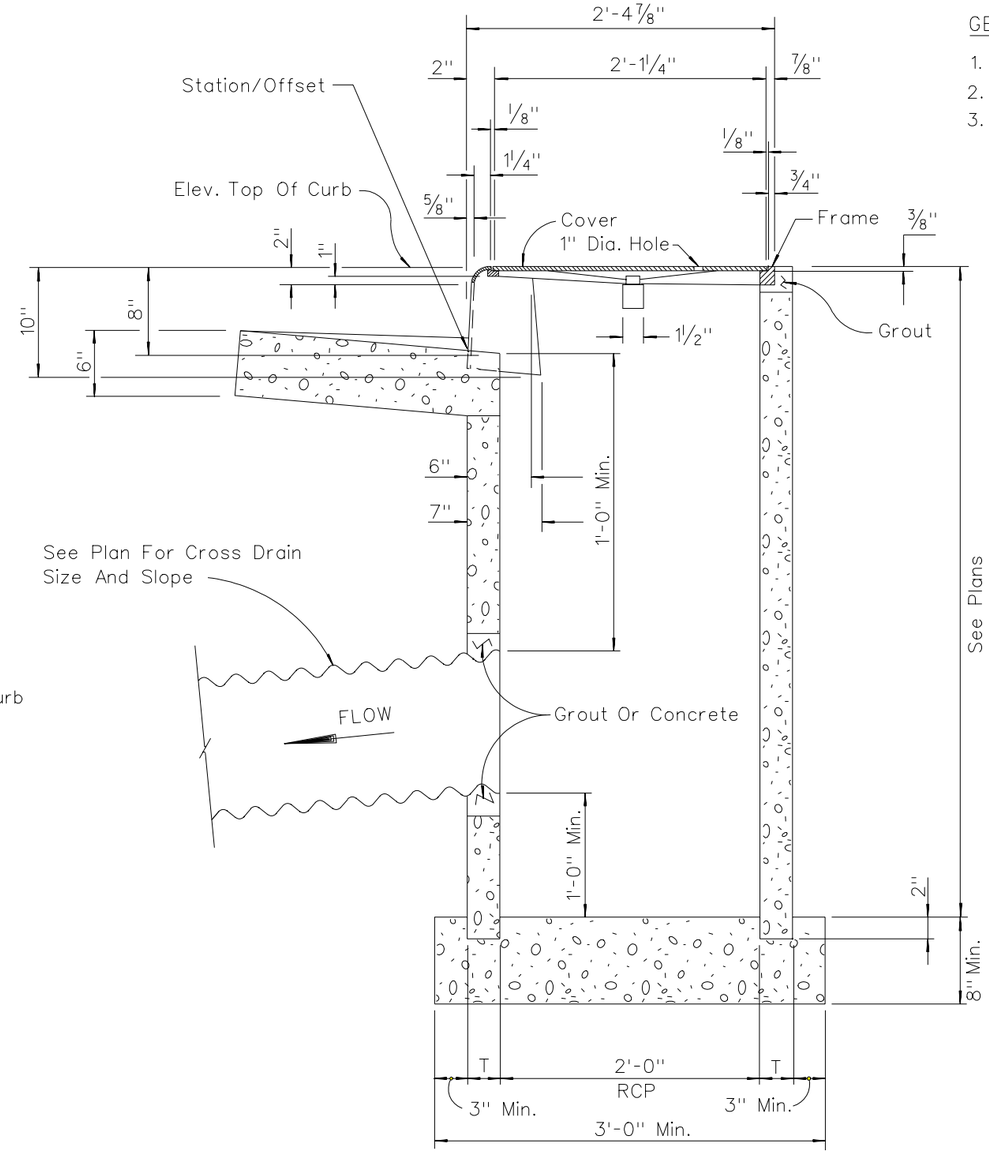


VIEW C-C



SECTION B-B

WEDGE LOCK HOLD DOWN



SECTION A-A

GENERAL NOTES:

1. All concrete shall be A or AA.
2. Forming of the base will not be required.
3. Station/Offset Distance listed in Plans is measured to curb flowline.

CASTINGS *		
	FRAME	COVER
TYPE 10	90 Lbs.	70 Lbs.

*For Information Only

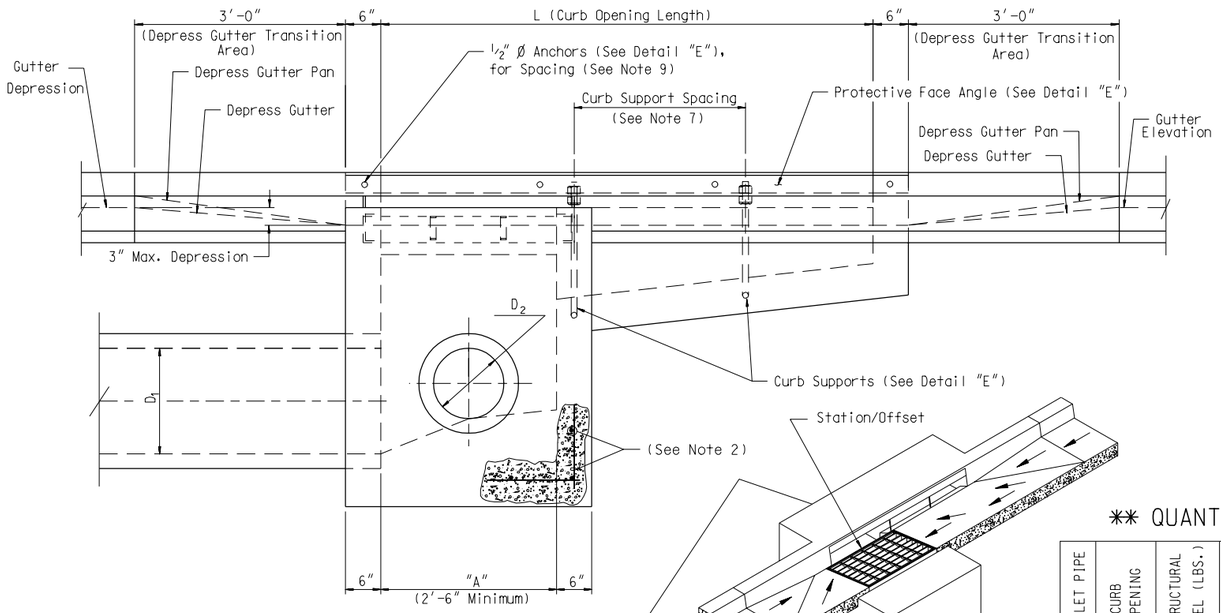
T = WALL THICKNESS

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

DROP INLET TYPE 10

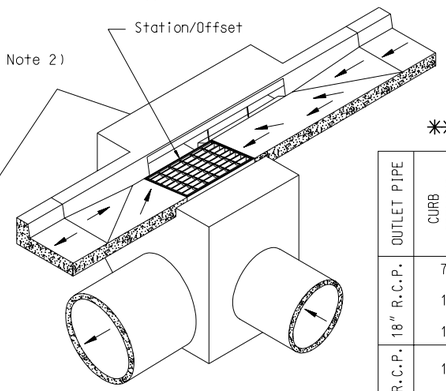
Signed Original On File
CHIEF ROAD DESIGN ENGR.

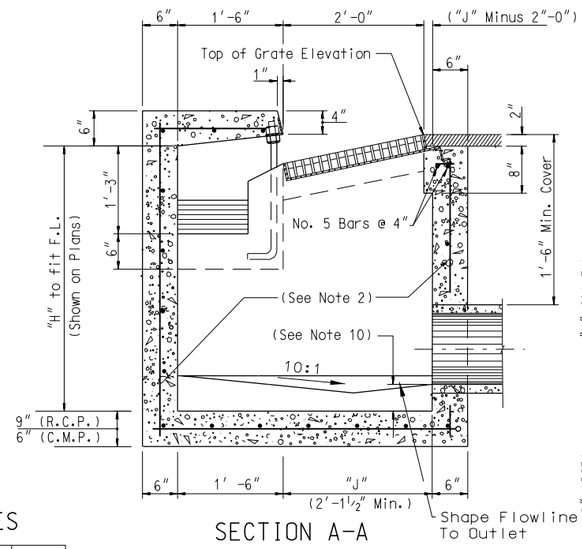
R-4.6.1.2 (609)
ADOPTED: 11/71
REVISION 1/01



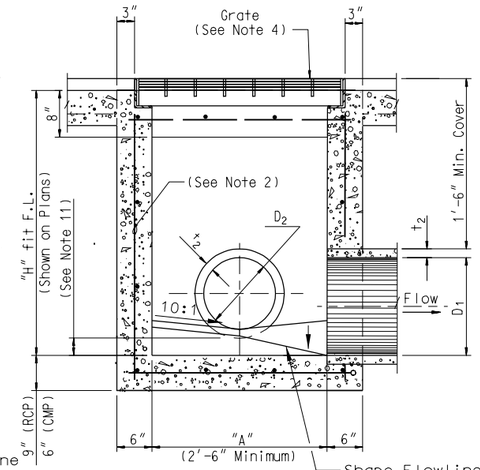
ELEVATION

Side curb opening to be upstream of grate





SECTION A-A

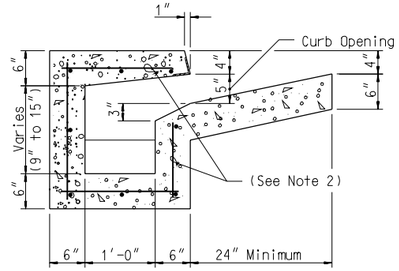


SECTION B-B

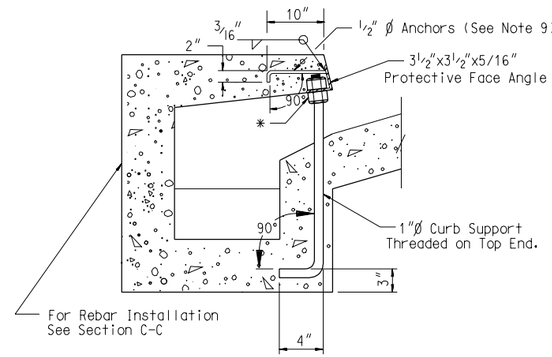
** QUANTITIES

OUTLET PIPE	CURB OPENING	STRUCTURAL STEEL (LBS.)	REINFORCING STEEL (LBS.)	CONCRETE (CU.YDS.)
18″ R.C.P.	7′	325	126	1.64
	10′	352	155	2.01
	12′	367	176	2.26
24″ R.C.P.	12′	367	179	2.34
	15′	394	209	2.72

** ASSUMED MINIMUM H 15″ INLET PIPE

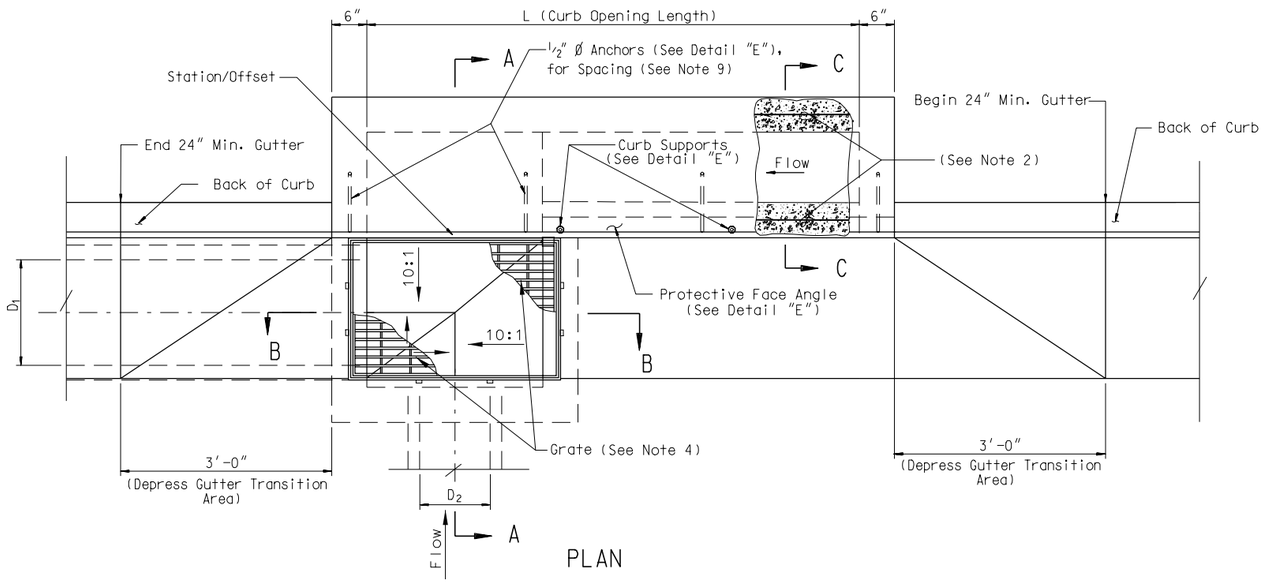


SECTION C-C



* - Bottom Nut Tight On Last Threads.

DETAIL E



PLAN

GENERAL NOTES:

1. ALL CONCRETE SHALL BE CLASS AA OR A.
2. 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 1½″ CLEAR OF CONCRETE SURFACE, EXCEPT AS NOTED.
3. EXPOSED EDGES OF CONCRETE SHALL BE CHAMFERED ONE INCH.
4. FOR GRATE AND FRAME DETAIL, SEE STANDARD PLANS SHEET R-4.3.1 (TYPE 3 DROP INLET).
5. FOR VALUES OF "H" AND "L" SEE STORM DRAIN SCHEDULE.
6. "H" IS THE DIFFERENCE IN ELEVATION BETWEEN THE OUT PIPE FLOW LINE AND THE NORMAL GUTTER GRADE LINE AT THE CURB FACE.
7. CURB OPENINGS LONGER THAN 7′ SHALL HAVE ONE CURB SUPPORT FOR EACH 7′ INCREMENT OR FRACTION THEREOF, EVENLY SPACED.
8. PIPE(S) CAN BE PLACED IN ANY WALL.
9. ANGLE ANCHORS SHALL BE EMBEDDED MIDPOINT IN EACH ENDWALL AND EVENLY SPACED. (MAXIMUM SPACING OF 5′).
10. FOR DROP INLET CONFIGURATIONS WITH 2 PIPES-INFLOW PIPE INVERT ELEVATION SHALL BE ≥ 0.1′ ABOVE OUTFLOW PIPE INVERT ELEVATIONS.
11. CATCH BASIN FLOORS SHALL HAVE A MINIMUM SLOPE OF 10:1FROM ALL DIRECTIONS TOWARD OUTLET PIPE. IF BASIN IS USED AS A JUNCTION, SHAPE FLOWLINE(S) TO OUTLET PIPE, AND PROVIDE A MINIMUM SLOPE OF 10:1 TO FLOWLINE(S).
12. STATION/OFFSET DISTANCE LISTED IN PLANS IS MEASURED TO THE FACE OF CURB AT THE GUTTER FLOW LINE.

"A"
D_2 for CMP

D_2 + 6″ for RCP 42″ or Less

D_2 + 2 t_2 for RCP 48″ or More

"J"
D_1 for CMP

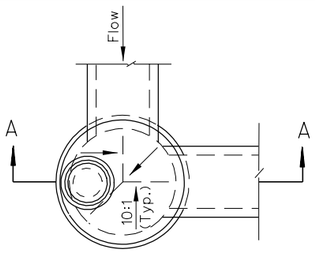
D_1 + 6″ for RCP 24″ or Less

D_1 + 2 t_1 for RCP 30″ or More

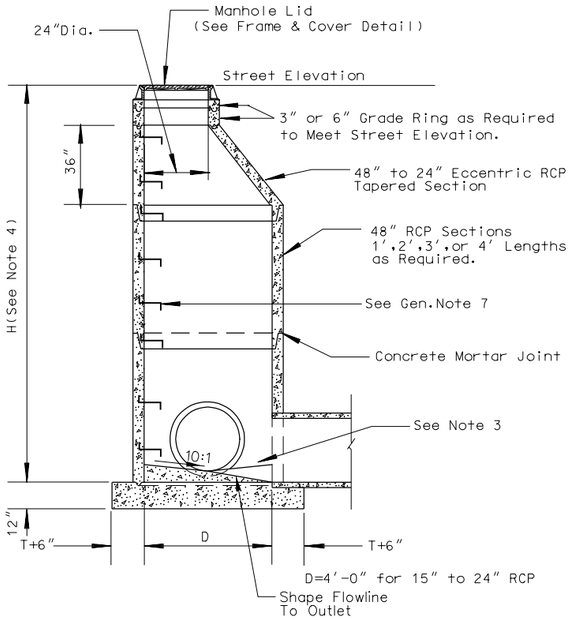
STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

TYPE 11 DROP INLET

Signed Original On File	R-4.6.2	(609)
CHIEF ROAD DESIGN ENGR.	ADOPTED: 5/85	REVISION 1/01

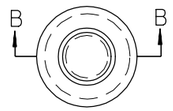


PLAN



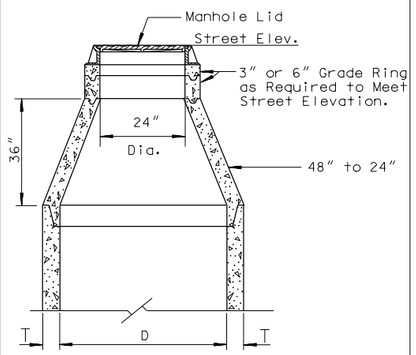
SECTION A-A

TYPE I MANHOLE
ECCENTRIC



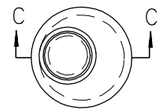
PLAN

NOTE: For Dimensions Not Shown
See Type I Manhole Eccentric.

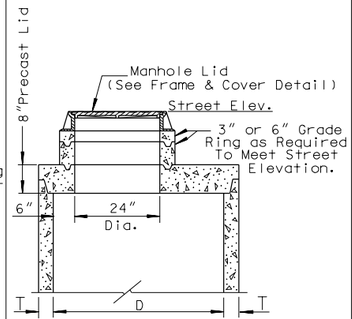


SECTION B-B

TYPE I MANHOLE
CONCENTRIC



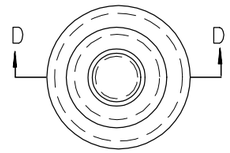
PLAN



For Use in Minimum Cover Situation
Where Tapered Section Will Not Fit.

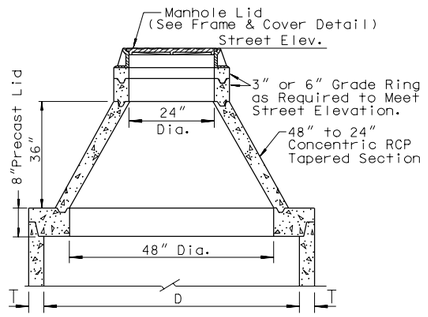
SECTION C-C

TYPE I & 2 MANHOLE
MODIFIED



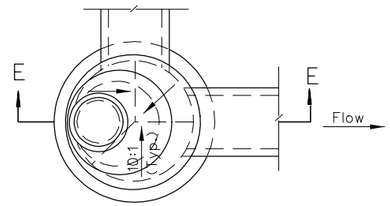
PLAN

NOTE: For Dimensions Not Shown
See Type 2 Manhole Eccentric

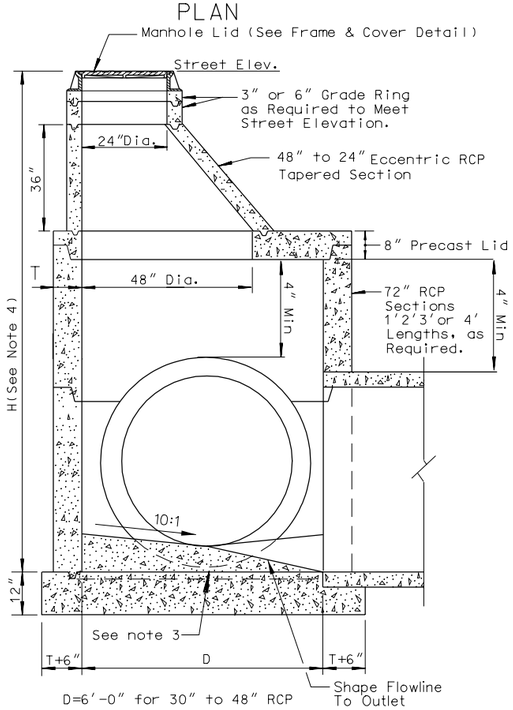


SECTION D-D

TYPE 2 MANHOLE
CONCENTRIC



PLAN



SECTION E-E

TYPE 2 MANHOLE
ECCENTRIC

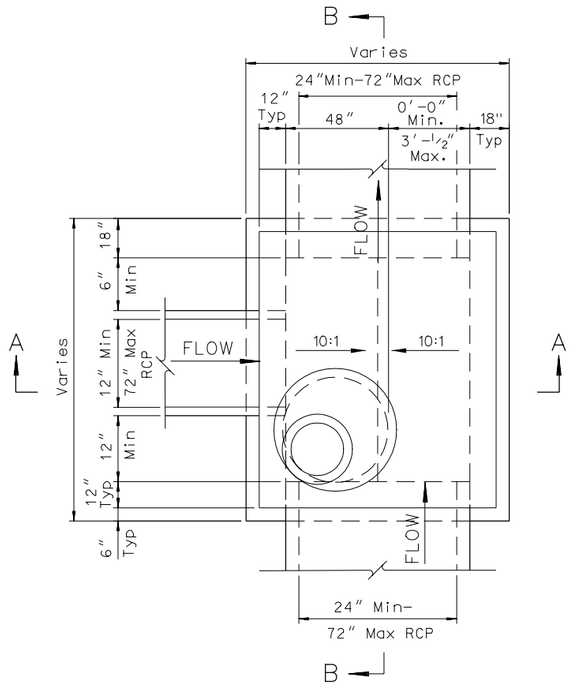
GENERAL NOTES:

1. FOR CAST IN PLACE CONCRETE BASE ALL REINFORCING STEEL TO BE NO. 4 BARS AT 18" CENTERS TIGHTLY WOUND AT ALL INTERSECTIONS AND EMBEDDED IN CONCRETE AT LEAST 2" AND BAR ENDS MUST CLEAR CONCRETE SURFACES BY $1\frac{1}{2}$".
2. ALL CONCRETE SHALL BE CLASS A OR AA.
3. MANHOLE WITH MORE THAN ONE PIPE-INFLOW PIPE INVERT ELEVATIONS SHALL BE ≥ 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 ENTITY IDENTIFICATION AND SYSTEM FUNCTION (IF APPLICABLE).
7. PRECAST CONCRETE PIPE SECTIONS, TAPERED SECTIONS, LIDS, GRADE RINGS, AND STEPS SHALL CONFORM TO AASHTO M 199 (ASTM C-478).
8. SHAPE FLOWLINE IN MANHOLE TO OUTLET PIPE, AND PROVIDE A 10:1 MINIMUM SLOPE FROM ALL DIRECTIONS TOWARD FLOWLINE
9. THICKNESS PIPE WALL

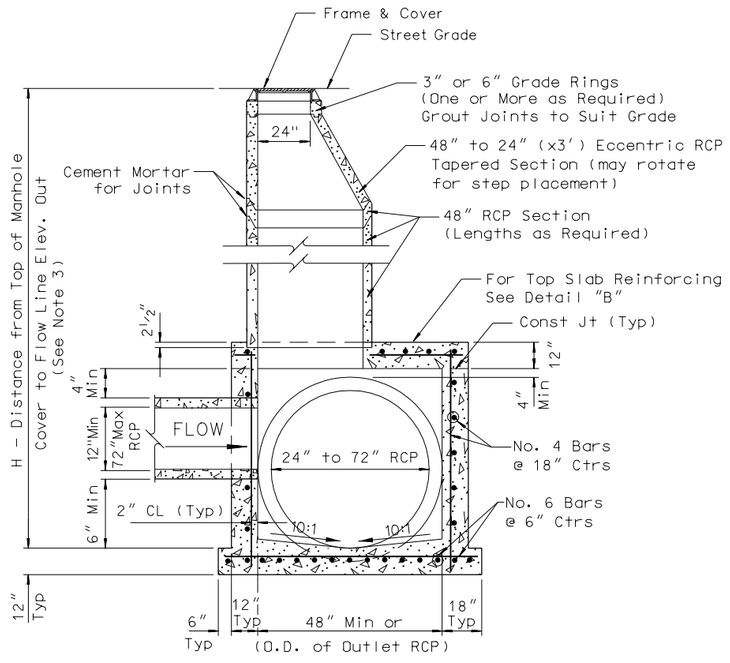
STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

TYPE 1 & 2
AND TYPE 1 & 2 MODIFIED
MANHOLES

Signed Original On File	R-4.7.1	(609)
CHIEF ROAD DESIGN ENGR.	ADOPTED:10/85	REVISION 1/01



PLAN

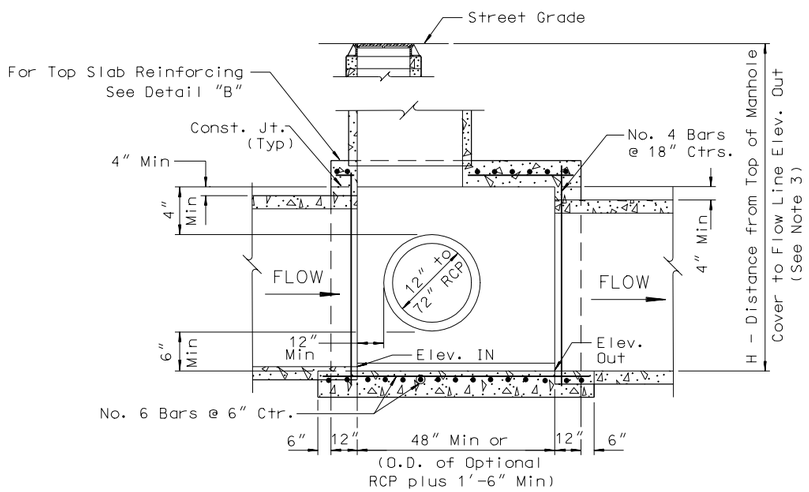


SECTION A-A

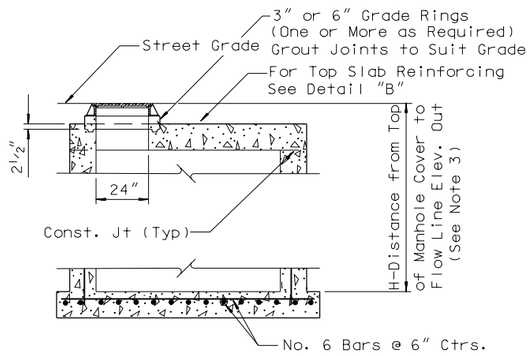
(For Variable Height Situations)

GENERAL NOTES:

1. ALL CONCRETE SHALL BE CLASS A OR CLASS AA.
2. MANHOLES WITH MORE THAN ONE PIPE: THE INFLOW PIPE 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. PRECAST CONCRETE PIPE SECTIONS, TAPERED SECTIONS, LIDS, GRADE RINGS, AND STEPS SHALL CONFORM TO AASHTO M 199 (ASTM C-478).
5. MANHOLE COVER SHALL BEAR ENTITY IDENTIFICATION AND SYSTEM FUNCTION (IF APPLICABLE).
6. SHAPE FLOWLINE IN MANHOLE TO OUTLET PIPE, AND PROVIDE A 10:1 MINIMUM SLOPE FROM ALL DIRECTIONS TOWARD FLOW LINE.

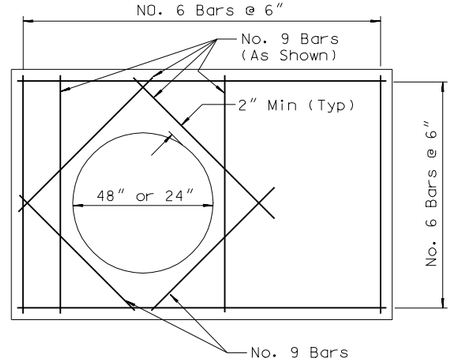


SECTION B-B



SECTION A-A

(For Minimum Height Situation)
Note: Hydraulic Engineer Will Look at Other Options for Extreme Minimum Cover Situations.



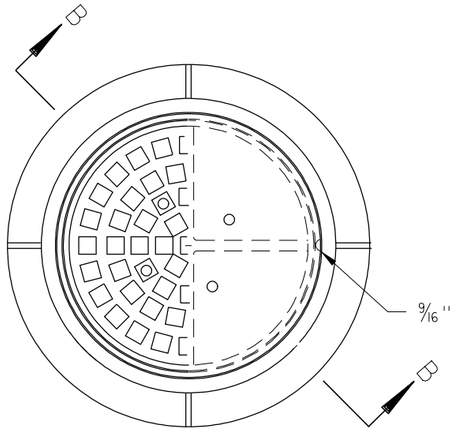
DETAIL "B"

(TOP SLAB REINFORCING)

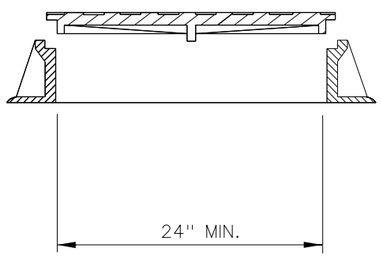
STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

TYPE 4 MANHOLE

Signed Original On File	R-4.7.2	(609)
CHIEF ROAD DESIGN ENGR.	ADOPTED: 10/85	REVISION 1/01

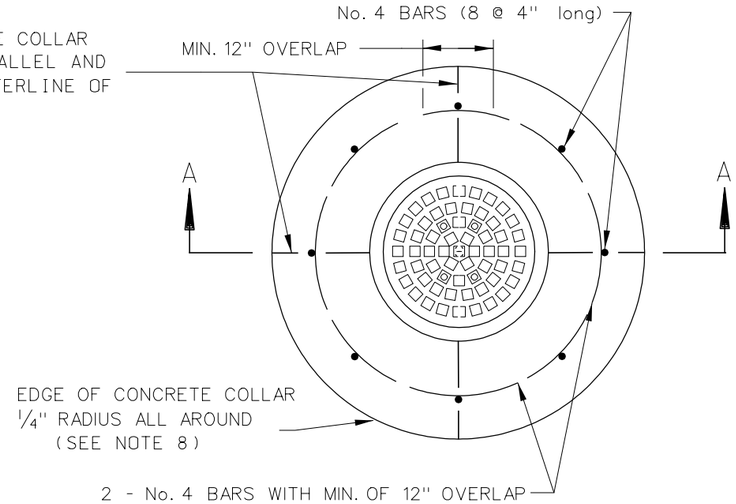


PLAN



SECTION B–B

TRAFFIC–STRENGTH
MANHOLE FRAME & COVER

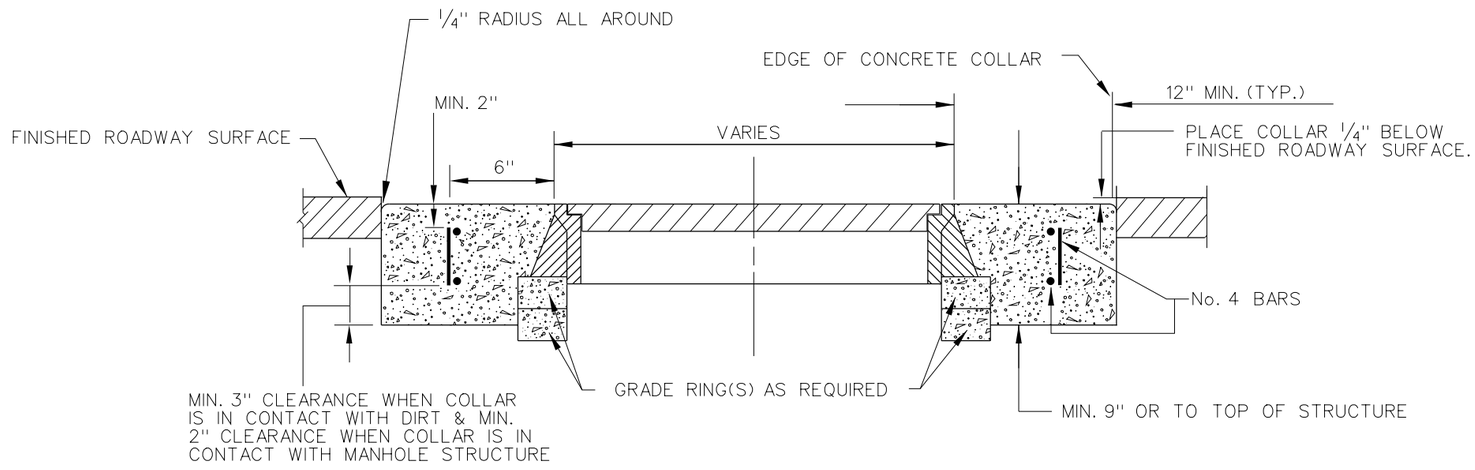


CONCRETE COLLAR PLAN

(SEE NOTE 10)

GENERAL NOTES:

1. THE WEIGHT OF FRAME SHALL BE 145 lbs. MINIMUM AND THE WEIGHT OF COVER SHALL BE 125 lbs. MINIMUM. TRAFFIC–STRENGTH MANHOLE FRAME & COVER SHALL COMPLY WITH AASHTO M18 WHEEL LOADS. EQUIVALENT MANHOLE FRAMES & COVERS OTHER THAN SHOWN MAY BE USED UPON APPROVAL BY THE ENGINEER.
2. THE FRAME SEAT AND COVER EDGE SHALL BE MACHINED TO A TRUE BEARING SURFACE ALL AROUND. THE FRAME & COVER SHALL BE COMPATIBLE TO THE MANUFACTURERS SPECIFICATIONS.
3. THE SURFACE SHOWN IS FOR ILLUSTRATION ONLY. ANY SURFACE DESIGN, OTHER THAN SMOOTH, MAY BE USED UPON APPROVAL.
4. FRAMES & COVERS SHALL CONFORM TO ASTM A48, CLASS 40 FOR GRAY IRON CASTINGS.
5. A CAST–IN–PLACE CONCRETE COLLAR SHALL BE PLACED AROUND A MANHOLE FRAME UNLESS OTHERWISE DIRECTED.
6. MANHOLE COVER SHALL BEAR NAME OF ENTITY & SYSTEM FUNCTION (IF APPLICABLE).
7. ALL CONCRETE SHALL BE CLASS A OR AA.
8. CONCRETE COLLARS MAY BE POURED ROUND, OR ANY OTHER APPROPRIATE SHAPE WHEN APPROVED BY THE ENGINEER.
9. COMMERCIAL PREFABRICATED GRADE RINGS FOR MANHOLES SHALL CONFORM TO AASHTO M 199 (ASTM C–478).
10. MANHOLE COVER & FRAME SHOWN. OTHER SHAPES MAY APPLY TO UTILITY AND VALVE COVERS AND FRAMES



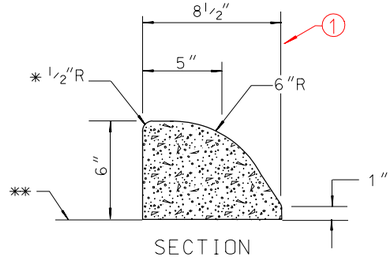
SECTION A–A

(SEE NOTE 10.)

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

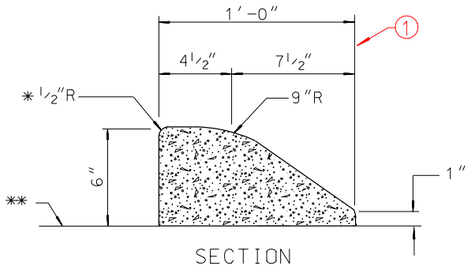
MANHOLE COVER, FRAME
& CONCRETE COLLAR

Signed Original On File	R-4.7.3	(609)
	ADOPTED: 8/69	REVISION 1/01
CHIEF ROAD DESIGN ENGR.		



SECTION
TYPE A

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



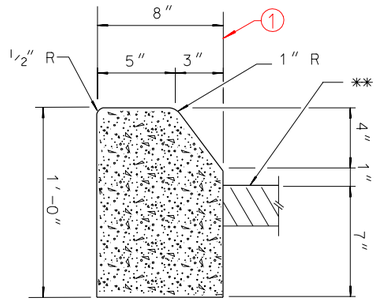
SECTION
TYPE B

(0.0185 Cu. Yds. Per Lin. Ft.)

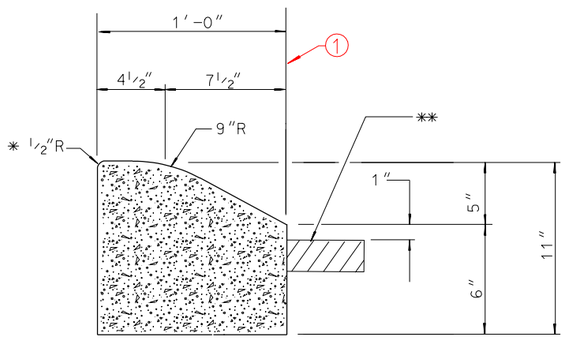
* Omit Rounding When Curbs Are Back To Back (Epoxy Curb To Plantmix Surface)
Note: Epoxy Cement May Be Omitted When Installation Is Temporary.

** P.C.C. or Dense Graded

GLUE DOWN CURBS



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

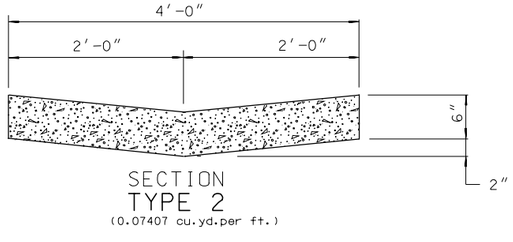


SECTION
TYPE 3
(0.02894 cu. yd. per ft.)

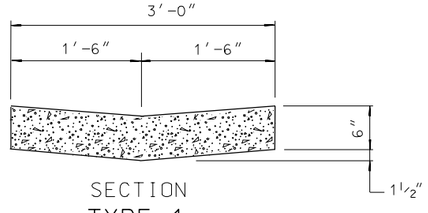
** P.C.C. or Dense Graded

CURB

* Omit Rounding When Curbs Are Back To Back.

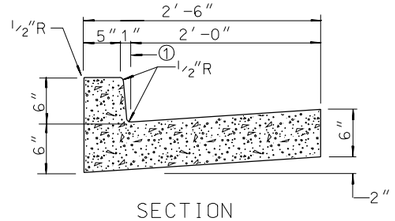


SECTION
TYPE 2
(0.07407 cu.yd.per ft.)

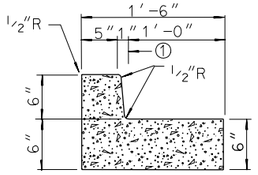


SECTION
TYPE 1
(0.0556 cu.yd.per.ft.)

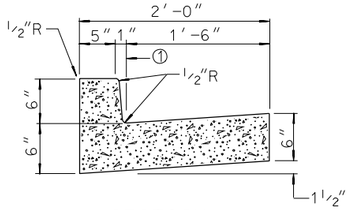
VALLEY GUTTER



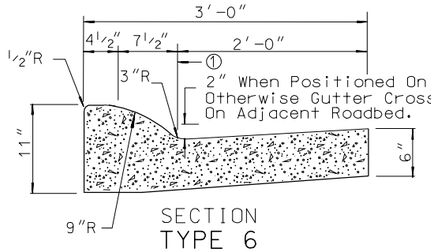
SECTION
TYPE 1
(0.05478 cu.yd.per ft.)



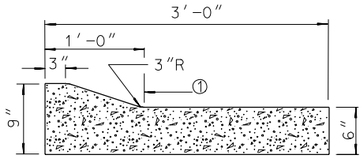
SECTION
TYPE 4
(0.03627 cu.yd. per ft.)



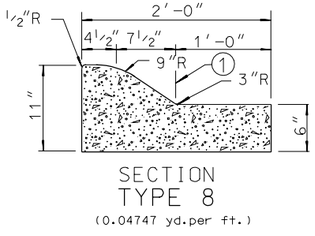
SECTION
TYPE 5
(0.04552 cu.yd. per ft.)



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



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

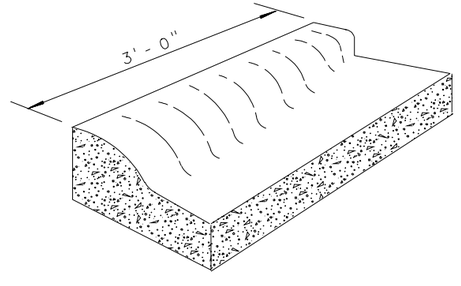


SECTION
TYPE 8
(0.04747 yd.per ft.)

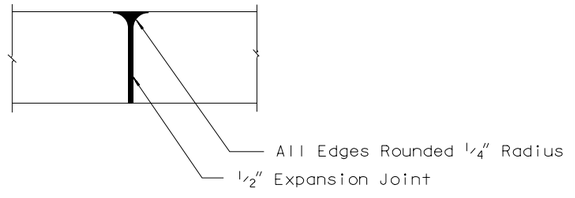
GENERAL NOTES:

1. This Line Should Be Used To Dimension Offsets.
2. When Distance Between Back of Curb on Islands Is 4 Feet or Less, Use 4" Class A or AA Concrete (Island Paving) And 2" Of Gravel Base.
3. Concrete Shall Be Class A or AA.
4. All Concrete Unit Volume For Information Only.

CURB AND GUTTER



TYPICAL TRANSITION FROM ROLLED CURB TO VERTICAL FACE

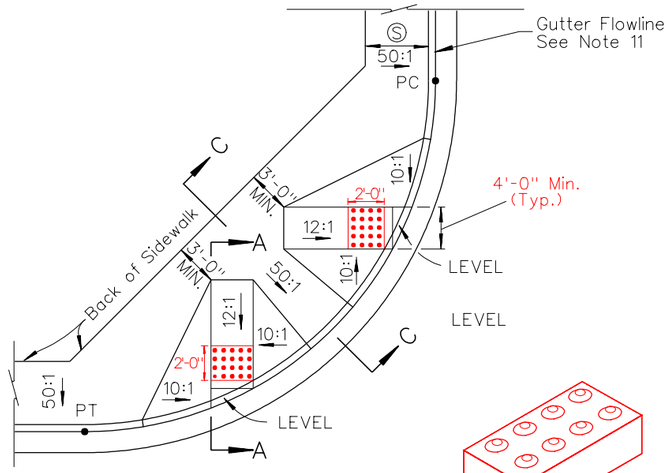


ELEVATION
TYPICAL EXPANSION JOINT DETAIL

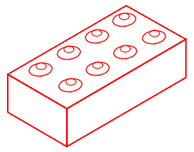
STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

CURB & GUTTERS

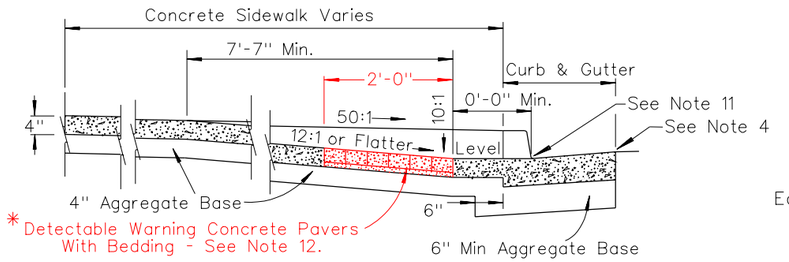
Signed Original On File	R-5.1.1	(502, 613)
CHIEF ROAD DESIGN ENGR.	ADOPTED: 8/69	REVISION 12/02



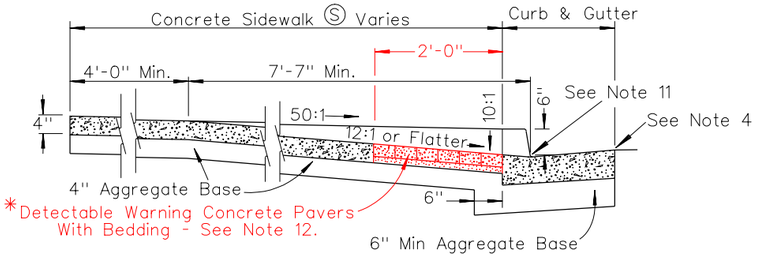
NARROW SIDEWALKS
CURB RAMP
TYPE A



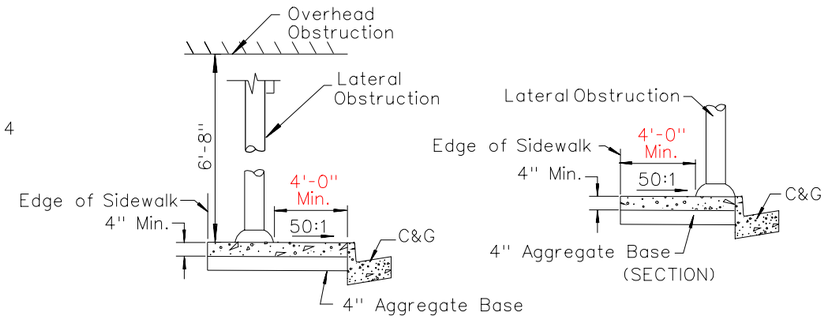
DETECTABLE WARNING PAVER
(Nominal 8" x 4")



SECTION A-A



SECTION B-B



TYPICAL SIDEWALK vs OBSTRUCTION
CLEARANCE DETAIL
(See Note 13 - Protruding Objects)

LEGEND

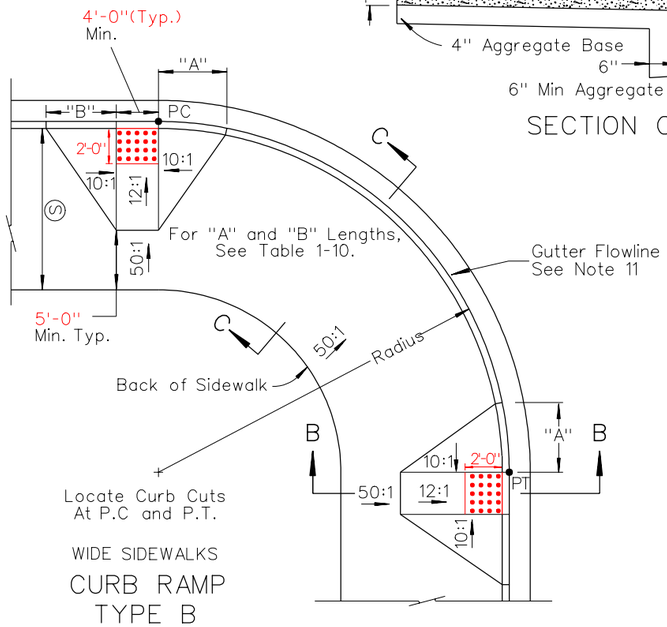
Ⓢ SIDEWALK, 5'-0" NORMAL, SEE NOTE 9

DETECTABLE WARNING PAVERS, SEE NOTE 12.

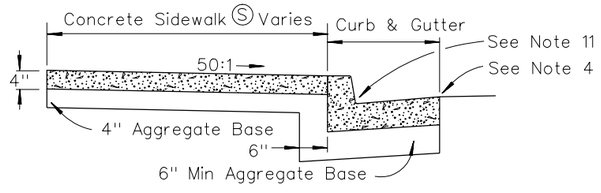
* ADDITIONAL DEPTH MAY BE REQUIRED UNDER DETECTABLE WARNING PAVERS FOR BEDDING PER MANUFACTURERS INSTALLATION GUIDELINES.

GENERAL NOTES:

1. SEE STRUCTURE LIST AND PLAN SHEETS FOR Ⓢ , "A", AND "B".
2. GRATINGS OR SIMILAR ACCESSES SHALL NOT BE LOCATED IN AREA AT THE BASE OF THE CURB RAMP OR LANDING AREA.
3. NO LIP SHALL BE PERMITTED AT THE CURB RAMP SLOPE TO GUTTER PAN.
4. PLANTMIX BITUMINOUS OPEN-GRADED SURFACE SHALL BE FLUSH WITH THE EDGE OF THE GUTTER PAN IN THE AREA OF THE CURB RAMP, AND FEATHERED AT 12:1 IN LINE WITH THE CROSSWALK.
5. ROUGH BROOM TEXTURE ON CURB RAMPS AND WINGS. TEXTURE SHALL PROVIDE A VISUAL CONTRAST TO THE SIDEWALK.
6. CURB RAMP WINGS DO NOT HAVE TO BE WITHIN CROSS-WALK HOWEVER, THE RAMP ITSELF HAS TO BE INSIDE CROSS-WALK.
7. ALL RAMPS SHALL BE 12:1 OR FLATTER.
8. ALL SLOPE RATES ARE RELATIVE TO LEVEL.
9. IF THERE ARE R/W RESTRICTIONS, SIDEWALK WIDTHS CAN BE REDUCED TO 4'-0" WITH PRIOR APPROVAL FROM ASSISTANT CHIEF ROAD DESIGN ENGINEER. IN THIS INSTANCE A 5'-0" X 5'-0" PASSING ZONE IS REQUIRED EVERY 200'-0" PER ADA APPENDIX C, SECTION 4.3.4.
10. CONCRETE SHALL BE CLASS A OR AA.
11. RAISE GUTTER FLOWLINE 2" MAX., WHEN REQUIRED TO PREVENT PONDING AT THE RAMP AND MAINTAIN POSITIVE DRAINAGE.
12. DETECTABLE WARNING SHALL BE CONSTRUCTED WITH CONCRETE PAVERS AND BEDDING PER MANUFACTURERS INSTALLATION GUIDELINES AND CONFORM TO ADAAG (4.29.2) "CONTRAST". DETECTABLE WARNING PAVERS AND REQUIRED BEDDING WILL BE PAID FOR AS THE APPROPIATE SIDEWALK AND CURB RAMP BID ITEM.
13. PROTRUDING OBJECTS MOUNTED ON WALLS OR POSTS THAT HAVE LEADING EDGES 27" ABOVE THE SIDEWALK AND BELOW THE STANDARD HEAD ROOM CLEARANCE OF 80" WILL BE LIMITED TO A 4" PROTRUSION.



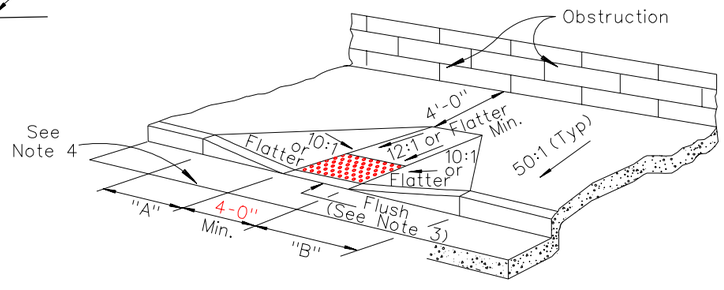
WIDE SIDEWALKS
CURB RAMP
TYPE B



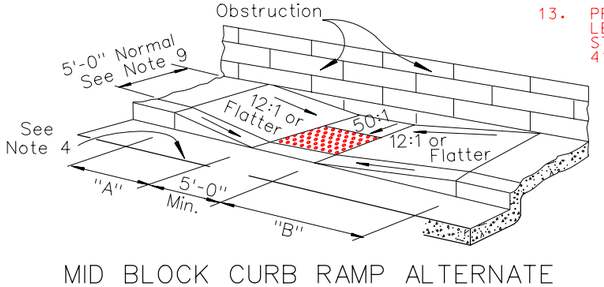
SECTION C-C

(For 12:1 See Table 1-12, Sheet R-5.2.2)

GRADE % "B" TO "A"	"A" MIN.	"B" MIN.
-6 TO -5.01	4'-0"	12'-6"
-5 TO -4.01	4'-0"	10'-0"
-4 TO -3.01	4'-0"	8'-6"
-3 TO -2.01	4'-0"	7'-6"
-2 TO -1.01	4'-6"	6'-6"
-1 TO 1	5'-6"	5'-6"
1.01 TO 2	6'-6"	4'-6"
2.01 TO 3	7'-6"	4'-0"
3.01 TO 4	8'-6"	4'-0"
4.01 TO 5	10'-0"	4'-0"
5.01 TO 6	12'-6"	4'-0"



MID BLOCK CURB RAMP



MID BLOCK CURB RAMP ALTERNATE

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

SIDEWALKS, CURB RAMPS, (NEW CONSTRUCTION)

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CHIEF ROAD DESIGN ENGR.	ADOPTED:7/96	REVISION 10/02

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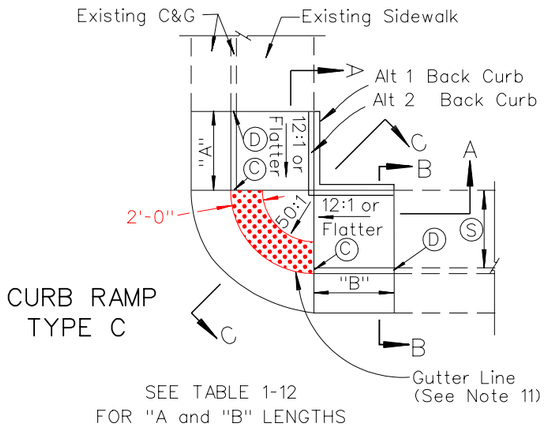


CURB RAMP TYPE C

SEE TABLE 1-12
FOR "A and "B" LENGTHS

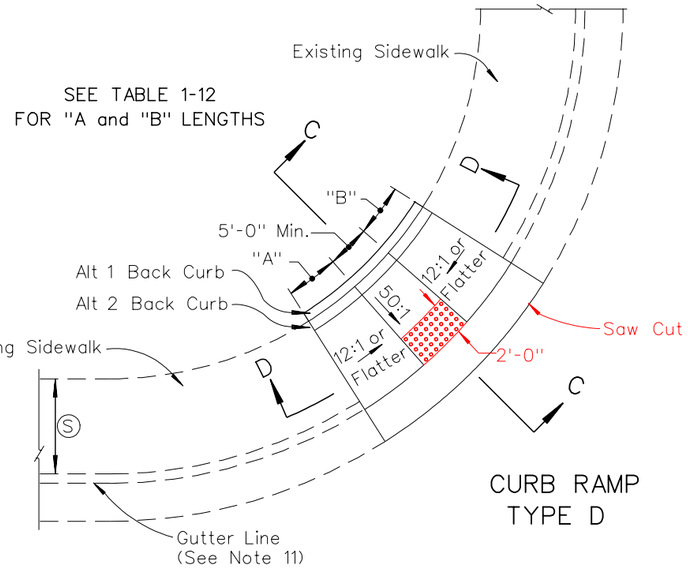
Alt 1: Back Curb Outside Ramp - No R/W Restrictions

Alt 2: Back Curb Inside Ramp - If R/W Restrictions

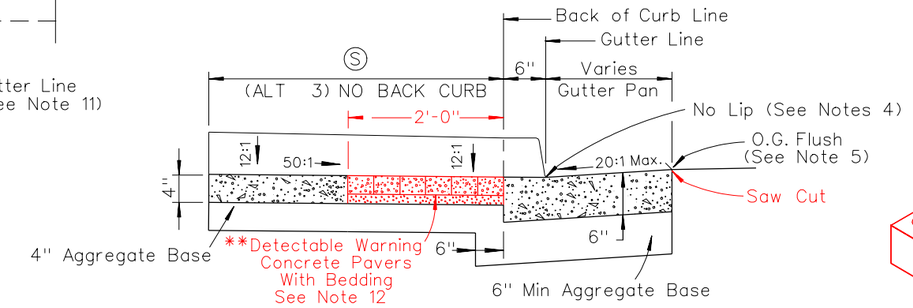
Alt 3: No Back Curb

TABLE 1-12
Transition Lengths for 12:1 Side Slopes

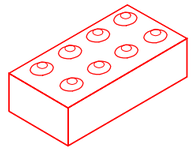
GRADE % "B" TO "A"	"A" MIN.	"B" MIN.
-6 TO -5.01	4' - 6"	21' - 6"
-5 TO -4.01	4' - 6"	15' - 0"
-4 TO -3.01	4' - 6"	12' - 0"
-3 TO -2.01	5' - 0"	9' - 6"
-2 TO -1.01	5' - 6"	8' - 0"
-1 TO 1	7' - 0"	7' - 0"
1.01 TO 2	8' - 0"	5' - 6"
2.01 TO 3	9' - 6"	5' - 0"
3.01 TO 4	12' - 0"	4' - 6"
4.01 TO 5	15' - 0"	4' - 6"
5.01 TO 6	21' - 6"	4' - 6"



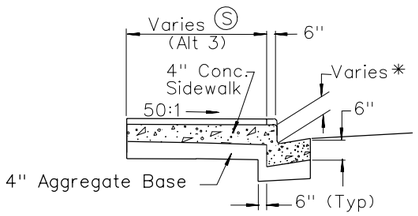
CURB RAMP TYPE D



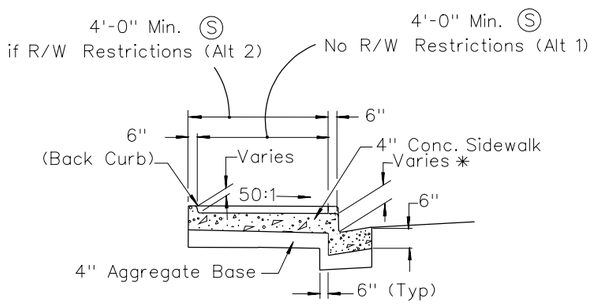
SECTION C-C WITHOUT BACK CURB



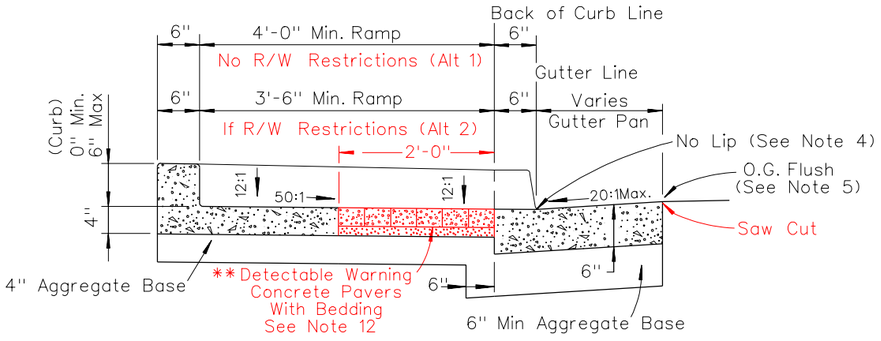
DETECTABLE WARNING PAVER
(Nominal 8" x 4")



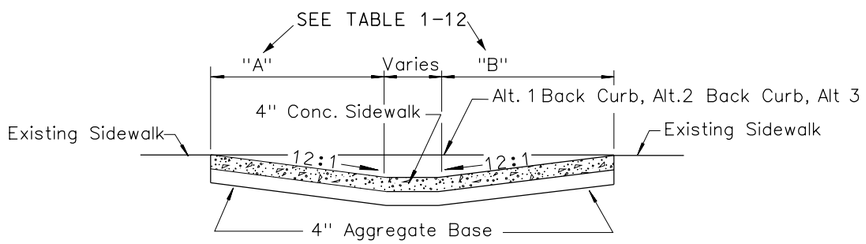
SECTION B-B



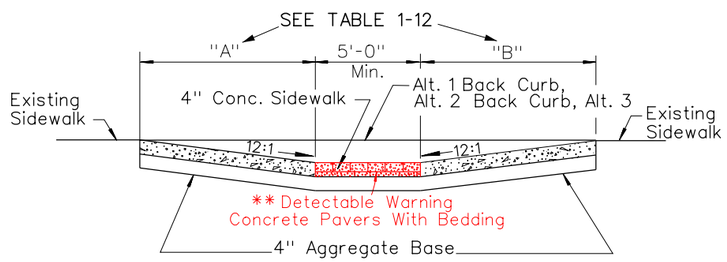
SECTION B-B WITH BACK CURB



SECTION C-C WITH BACK CURB



SECTION A-A



SECTION D-D

LEGEND:

(S) SIDEWALK, 5'-0" NORMAL, SEE NOTE 9

* FROM 0" AT (C) TO 6" AT (D)

DETECTABLE WARNING PAVER, SEE NOTE 12.

** ADDITIONAL DEPTH MAY BE REQUIRED UNDER DETECTABLE WARNING PAVERS FOR BEDDING PER MANUFACTURERS INSTALLATION GUIDELINES.

GENERAL NOTES:

1. IF RIGHT OF WAY IS AVAILABLE, USE TYPE A CURB RAMP.
2. SEE STRUCTURE LIST AND PLAN SHEETS FOR (S), "A" AND "B".
3. GRATINGS OR SIMILAR ACCESSES SHALL NOT BE LOCATED IN THE AREA AT THE BASE OF THE CURB RAMP OR LANDING AREA.
4. NO LIP SHALL BE PERMITTED AT THE CURB RAMP SLOPE TO GUTTER PAN. GRINDING SHALL BE 6" MINIMUM PERPENDICULAR TO FLOWLINE FOR RETROFIT.
5. PLANTMIX BITUMINOUS OPEN-GRADED SURFACE SHALL BE FLUSH WITH THE EDGE OF THE GUTTER PAN IN THE AREA OF THE CURB RAMP. GRINDING WIDTH 9" MINIMUM OR 12:1 PLANTMIX BITUMINOUS SURFACE MINIMUM FOR RETROFIT.
6. ROUGH BROOM TEXTURE ON CURB RAMPS AND WINGS. TEXTURE SHALL PROVIDE A VISUAL CONTRAST TO THE SIDEWALK.
7. ALL RAMPS SHALL BE 12:1 OR FLATTER.
8. ALL SLOPE RATES ARE RELATIVE TO LEVEL.
9. IF THERE ARE R/W RESTRICTIONS, SIDEWALK WIDTHS CAN BE REDUCED TO 4'-0" WITH PRIOR APPROVAL FROM ASSISTANT CHIEF ROAD DESIGN ENGINEER. IN THIS INSTANCES A 5'-0" X 5'-0" PASSING ZONE IS REQUIRED EVERY 200'-0" PER ADA APPENDIX C, SECTION 4.3.4.
10. CONCRETE SHALL BE CLASS A OR AA.
11. ADJUST FLOWLINE WHEN REQUIRED TO PREVENT PONDING AT THE RAMP AND MAINTAIN POSITIVE DRAINAGE.
12. DETECTABLE WARNING SHALL BE CONSTRUCTED WITH CONCRETE PAVERS AND BEDDING PER MANUFACTURERS INSTALLATION GUIDELINES AND CONFORM TO ADAAG (4.29.2) "CONTRAST". DETECTABLE WARNING PAVERS AND REQUIRED BEDDING WILL BE MEASURED AND PAID FOR AS THE APPROPIATE SIDEWALK AND CURB RAMP BID ITEM.
13. NO DIRECT PAYMENT FOR NEAT LINE SAW CUT. AN ADDITIONAL ONE FOOT OF PAVEMENT MAY BE REMOVED. IF ELECTING TO REMOVE AN ADDITIONAL ONE FOOT: MATCH EXISTING STRUCTURAL SECTION WITH PATCH; NO ADJUSTMENT TO THE PLAN QUANTITIES FOR REMOVAL AND PATCHING

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

SIDEWALKS, CURB RAMPS, (EXISTING SIDEWALKS)

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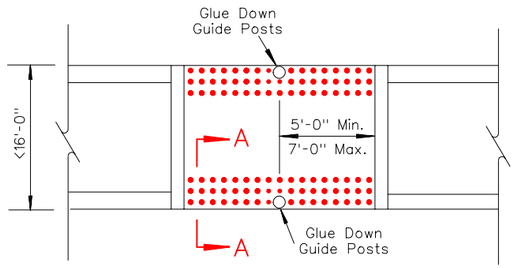
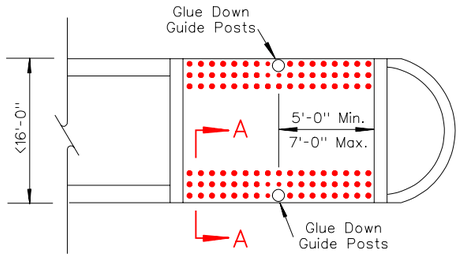
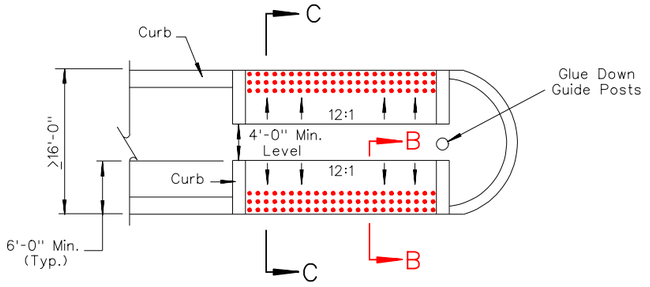
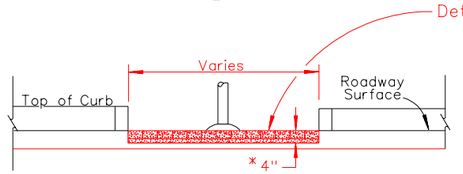


PLAN



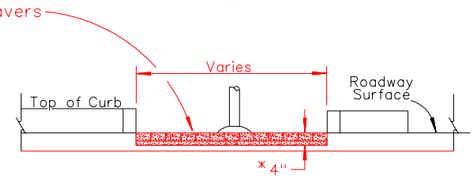
PLAN





ELEVATION

Type A-At Mid Block



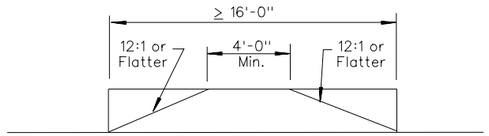
ELEVATION

Type B-At Nose

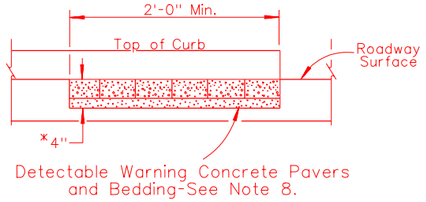
(ELEVATION)

TYPE C

OPTION TO USE TYPE B



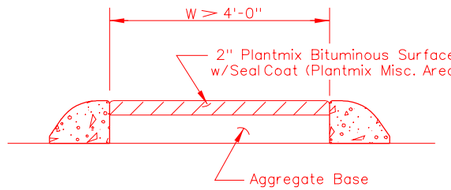
SECTION C-C

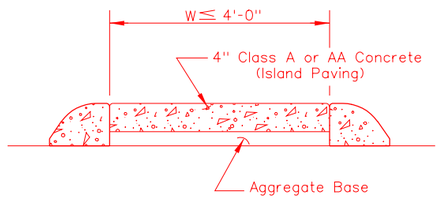


SECTION A-A

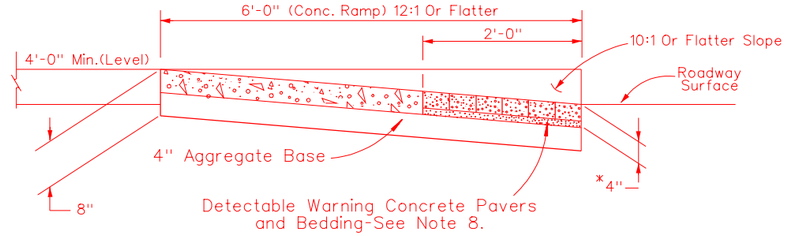
GENERAL NOTES:

1. ALL CURB RAMPS SHALL BE 12:1 OR FLATTER.
2. GRATING OR SIMILAR ACCESSES SHALL NOT BE LOCATED IN AREA AT THE BASE OF THE CURB RAMP OR LANDING AREA.
2. GRATING, MANHOLES, VALVE COVERS, OR SIMILAR ACCESSES SHALL NOT BE LOCATED IN AREA AT THE BASE OF THE CURB RAMP OR LANDING AREA.
3. NO LIP SHALL BE PERMITTED AT THE CURB RAMP SLOPE TO GUTTER PAN.
4. PLANTMIX BITUMINOUS OPEN-GRADED SURFACE SHALL BE FLUSH WITH THE EDGE OF THE GUTTER PAN IN THE AREA OF THE CURB RAMP.
5. ROUGH BROOM TEXTURE ON CURB RAMPS AND WINGS. TEXTURE SHALL PROVIDE A VISUAL CONTRAST TO THE MEDIAN ISLAND.
6. CONCRETE SHALL BE CLASS A OR AA.
7. AVOID DRAINAGE POCKETS IN CROSS WALK AREAS.
8. DETECTABLE WARNING SHALL BE CONSTRUCTED WITH CONCRETE PAVERS AND BEDDING PER MANUFACTURERS INSTALLATION GUIDELINES AND CONFORM TO ADAAG (4.29.2) "CONTRAST". DETECTABLE WARNING PAVERS AND REQUIRED BEDDING WILL BE MEASURED AND PAID FOR AS THE APPROPIATE SIDEWALK AND CURB RAMP BID ITEM.





TYPICAL ISLAND PAVING DETAILS

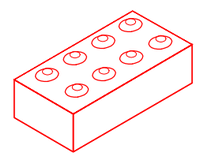


SECTION B-B

LEGEND:

DETECTABLE WARNING PAVER

* ADDITIONAL DEPTH MAY BE REQUIRED UNDER DETECTABLE WARNING PAVERS FOR BEDDING PER MANUFACTURERS INSTALLATION GUIDELINES.



DETECTABLE WARNING PAVER

(Nominal 8" x 4")

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

MEDIAN ISLANDS, CURB RAMPS, AND ISLAND PAVING

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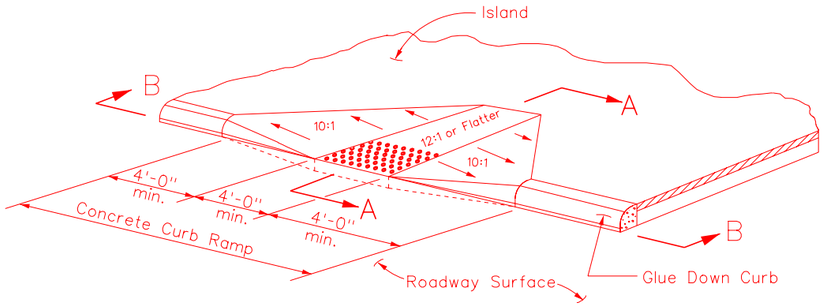
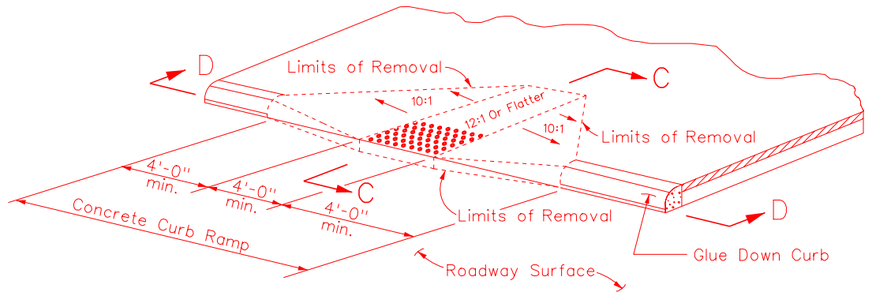
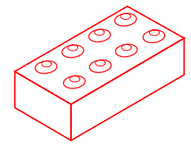
R-42



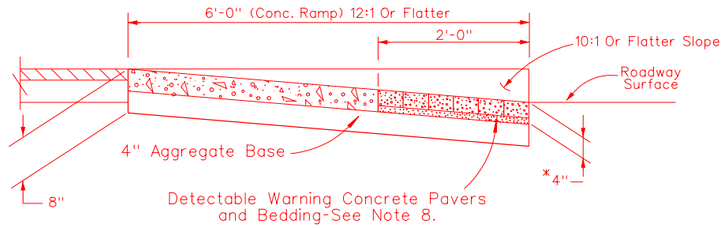
NEW ISLAND



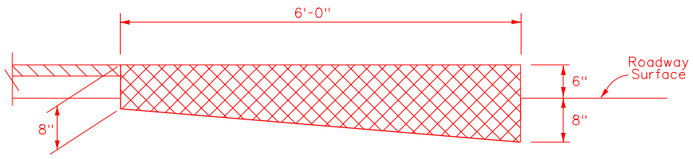
EXISTING ISLAND



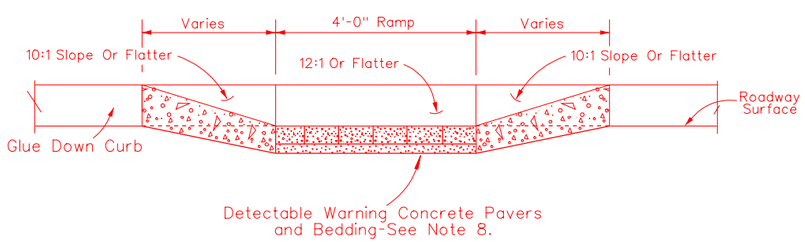
DETECTABLE WARNING PAVER
(Nominal 8" x 4")



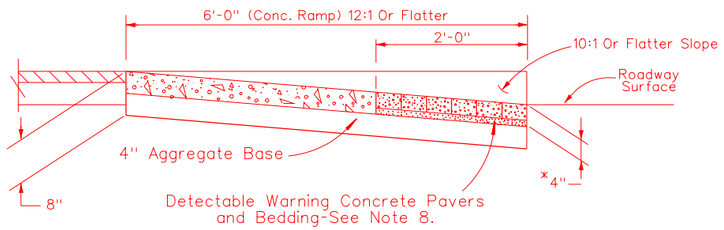
SECTION A-A



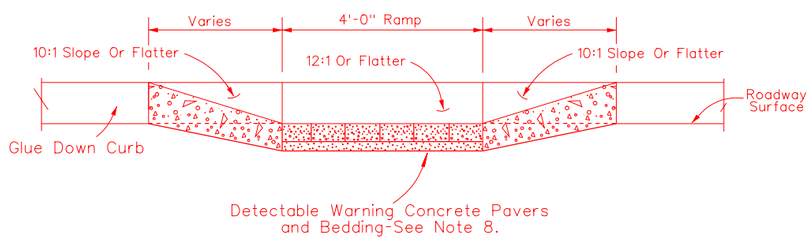
SECTION C-C
REMOVAL IN EXISTING ISLAND



SECTION B-B



SECTION C-C MODIFIED



SECTION D-D

LEGEND

DETECTABLE WARNING PAVERS, SEE NOTE 8.

* ADDITIONAL DEPTH MAY BE REQUIRED UNDER DETECTABLE WARNING PAVERS FOR SAND BEDDING PER MANUFACTURERS INSTALLATION GUIDELINES.

GENERAL NOTES:

1. ALL CURB RAMPS SHALL BE 12:1 OR FLATTER. ALL SLOPE RATES ARE RELATIVE TO LEVEL.
2. GRATING, MANHOLES, VALVE COVERS OR SIMILAR APPURTENANCES SHALL NOT BE LOCATED IN AREA AT THE BASE OF THE CURB RAMP OR LANDING AREA.
3. NO LIP SHALL BE PERMITTED AT THE CURB RAMP SLOPE TO GUTTER PAN.
4. PLANTMIX BITUMINOUS OPEN-GRADED SURFACE SHALL BE FLUSH WITH THE EDGE OF THE GUTTER PAN IN THE AREA OF THE CURB RAMP.
5. ROUGH BROOM TEXTURE ON CURB RAMPS AND WINGS. TEXTURE SHALL PROVIDE A VISUAL CONTRAST TO THE MEDIAN ISLAND.
6. CONCRETE SHALL BE CLASS A OR AA.
7. AVOID DRAINAGE POCKETS IN CROSS WALK AREAS.
8. DETECTABLE WARNING SHALL BE CONSTRUCTED WITH CONCRETE PAVERS AND BEDDING PER MANUFACTURERS INSTALLATION GUIDELINES AND CONFORM TO ADAAG (4.29.2) "CONTRAST". DETECTABLE WARNING PAVERS AND REQUIRED BEDDING WILL BE MEASURED AND PAID FOR AS THE APPROPIATE SIDEWALK AND CURB RAMP BID ITEM.

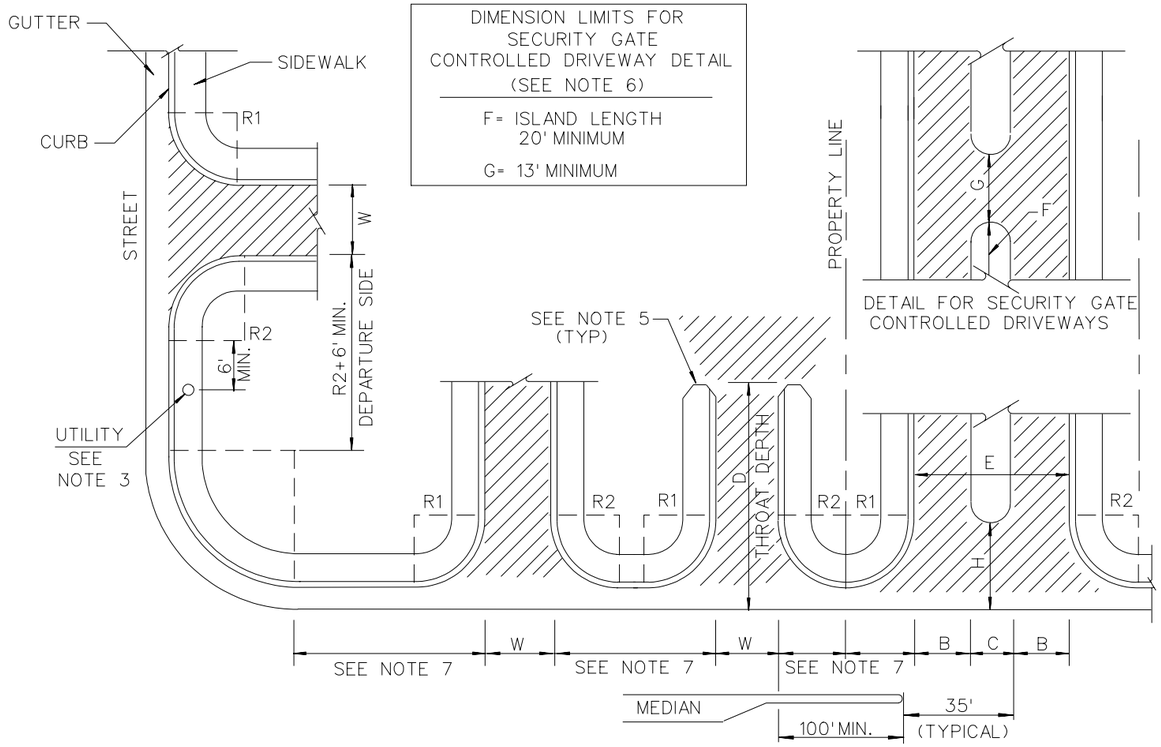
STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

ISLAND CURB RAMPS

Signed Original On File	R-5.2.4	(613)
CHIEF ROAD DESIGN ENGR.	ADOPTED: 2/03	REVISION

DIMENSION LIMITS (SEE NOTE 6)	
W= 12' MINIMUM FOR ONE-WAY DRIVEWAYS 24' MINIMUM FOR TWO-WAY DRIVEWAYS 40' MAXIMUM	D = THROAT DEPTH 25' MINIMUM 35' MINIMUM FOR > 50 CARS/DAY 65' MINIMUM FOR > 150 CARS/DAY 100' MINIMUM FOR > 300 CARS/DAY
B= 20' MINIMUM & 25' MAXIMUM	R2 = 25' MIN.
C= 7' MINIMUM, FACE TO FACE	
E= 50' MINIMUM	
H= 8' MINIMUM & 15' MAXIMUM	
R1 = 25' MIN.	

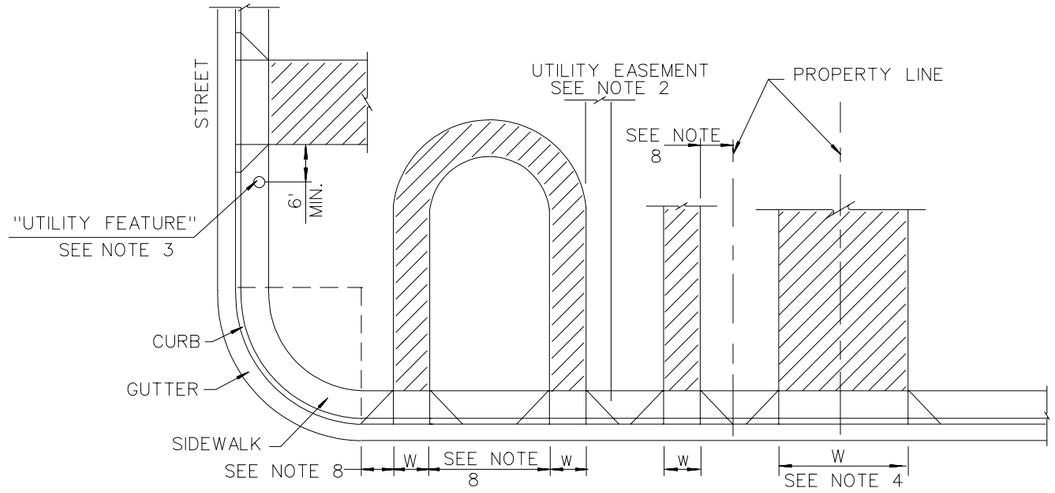
DIMENSION LIMITS FOR SECURITY GATE CONTROLLED DRIVEWAY DETAIL (SEE NOTE 6)
F= ISLAND LENGTH 20' MINIMUM
G= 13' MINIMUM



GENERAL NOTES:

1. TYPE C DRIVEWAYS SHALL BE CONSTRUCTED IN ACCORDANCE WITH STANDARD DRAWING R-5.3.3.
2. THE TOTAL WIDTH "W" OF DRIVEWAY CURB OPENINGS SHALL NOT EXCEED 65% OF FRONT FOOTAGE.
3. NO DRIVEWAY SHALL BE LOCATED WITHIN 6 FEET OF A LIGHT POLE, FIRE HYDRANT, MAIL BOX, ABOVE-GROUND ELECTRICAL TRANSFER BOX, OR BLOCK WALL HIGHER THAN 2 FEET.
4. THE CENTERLINES OF DRIVEWAYS ON OPPOSITE SIDES OF THE STREET AT A MEDIAN OPENING SHOULD BE D ±10 FEET FROM EACH OTHER. WHEN A PROPERTY LINE FALLS IN A MEDIAN OPENING A JOINT DRIVEWAY AGREEMENT SHALL BE REQUIRED OR NO DRIVEWAY WILL BE ALLOWED.
5. HANDICAPPED ACCESSIBLE SIDEWALKS SHALL BE PROVIDED. SEE STANDARD DRAWINGS R-5.2.1 TO R-5.2.2 and R-5.3.3.
6. FOR ACTUAL DIMENSIONS SEE STRUCTURE LIST.
7. DRIVEWAY SPACING, CLEARANCES, AND RETURN RADII SHALL BE IN ACCORDANCE WITH THE DEPARTMENT'S ACCESS MANAGEMENT STANDARDS.

TYPE C
COMMERCIAL, INDUSTRIAL, AND MULTI-FAMILY DRIVEWAY GEOMETRICS



W = WIDTH OF DRIVEWAY = 12' MIN.
16' MAX. FOR 1 OR 2 CAR GARAGE, OR
28' MAX. FOR 3 + GARAGE

GENERAL NOTES:

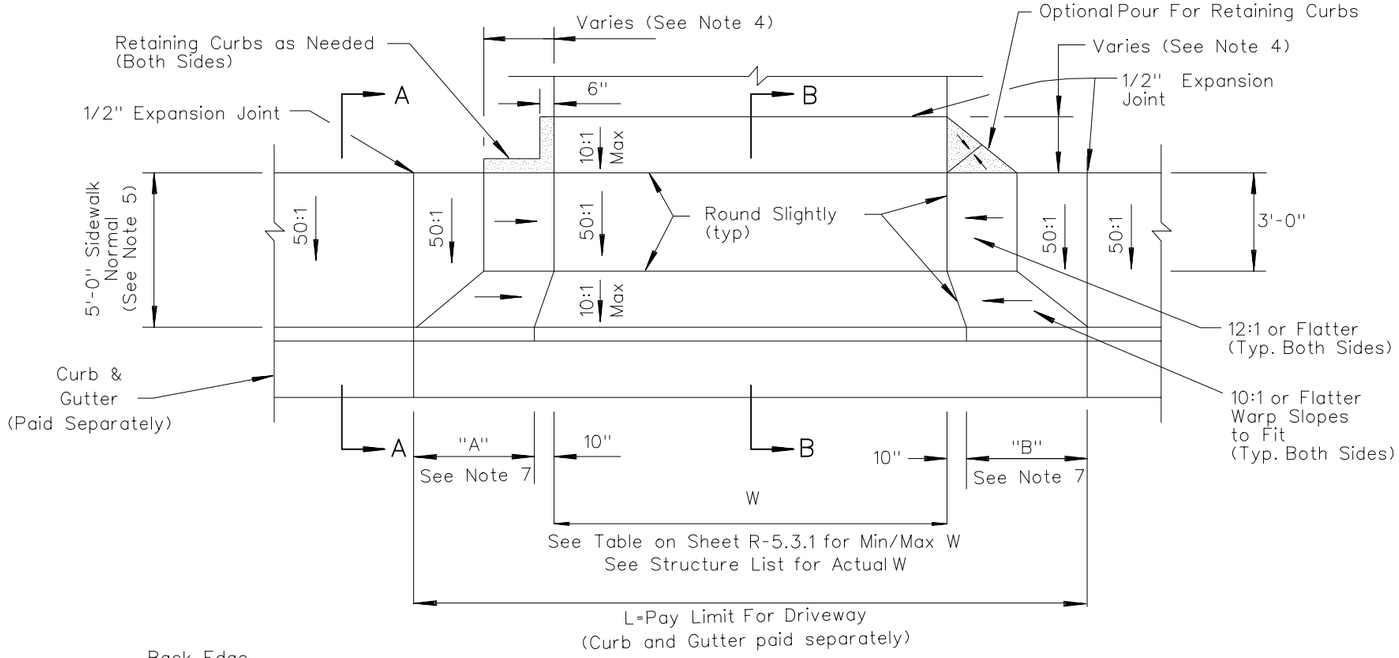
1. ALL RESIDENTIAL PROPERTIES MAY HAVE ONLY ONE CURB CUT EXCEPT CIRCULAR DRIVEWAYS AS SHOWN.
2. NO DRIVEWAY SHALL BE LOCATED, WHOLLY OR PARTIALLY, ON OR OVER A UTILITY EASEMENT WHICH RUNS PERPENDICULAR TO THE CURB LINE.
3. NO DRIVEWAY SHALL BE LOCATED WITHIN 6 FEET OF A LIGHT POLE, FIRE HYDRANT, MAIL BOX, ABOVE-GROUND ELECTRICAL TRANSFER BOX. BLOCK WALL HIGHER THAN 2 FEET, OR THE CURB RETURN AT A STREET INTERSECTION OR ALLEY.
4. COMMON DRIVEWAY CONSTRUCTION MAY BE PERMITTED AT ANY TWO RESIDENTIAL PROPERTIES OF 60 FEET IN WIDTH OR LESS. THE WIDTH OF THE JOINT DRIVEWAY SHALL BE A MAXIMUM OF 24 FEET. A JOINT DRIVEWAY AGREEMENT SHALL BE REQUIRED.
5. MULTI-FAMILY RESIDENTIAL AND ALL NON-RESIDENTIAL DRIVEWAYS SHALL CONFORM TO THE COMMERCIAL DRIVEWAY STANDARDS.
6. ALL DRIVEWAY LOCATIONS SHALL BE SUBJECT TO REVIEW AND APPROVAL BY THE ENGINEER.
7. FOR CURB RAMPS AND DRIVEWAY APRON DETAIL, SEE STD. DWGS. NO. R-5.2.1 TO R-5.2.2 and R-5.3.2.
8. DRIVEWAY SPACING, CLEARANCES, AND RETURN RADII SHALL BE IN ACCORDANCE WITH THE DEPARTMENT'S ACCESS MANAGEMENT STANDARDS.

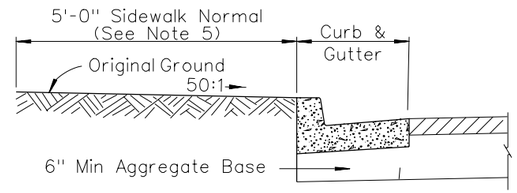
TYPE R
RESIDENTIAL DRIVEWAY GEOMETRICS

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

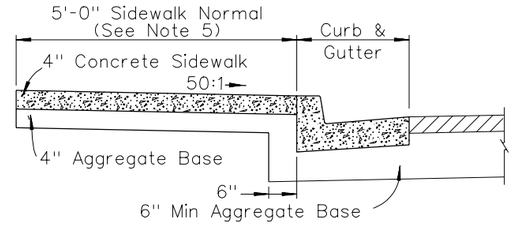
DRIVEWAY GEOMETRICS
TYPE C AND TYPE R

Signed Original On File	R-5.3.1	(613)
CHIEF ROAD DESIGN ENGR.	ADOPTED: 1/95	REVISION 10/02

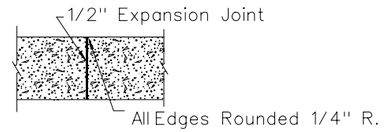




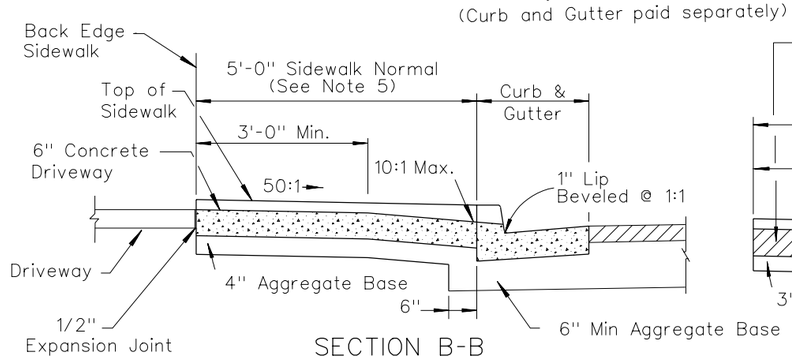
SECTION A-A
(ORIGINAL GROUND)



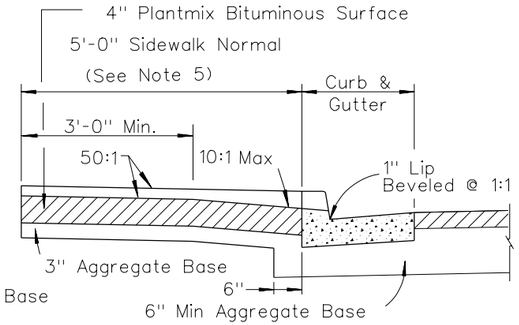
SECTION A-A
(CONCRETE)



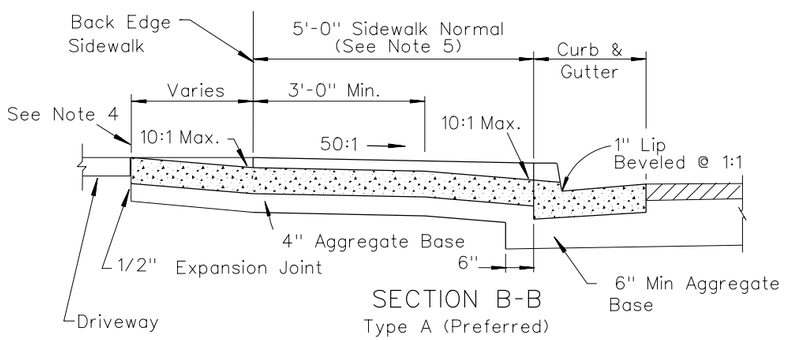
TYPICAL EXPANSION JOINT DETAIL
(ELEVATION)



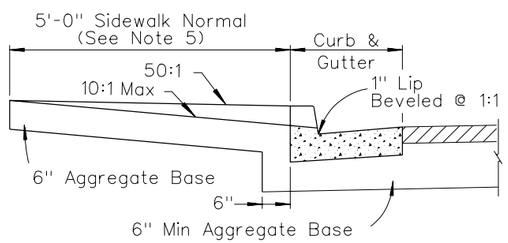
SECTION B-B
Type B (Used With Constrained R/W)
(CONCRETE)



SECTION B-B
(BITUMINOUS SURFACE)



SECTION B-B
Type A (Preferred)
(CONCRETE)



SECTION B-B
(AGGREGATE)

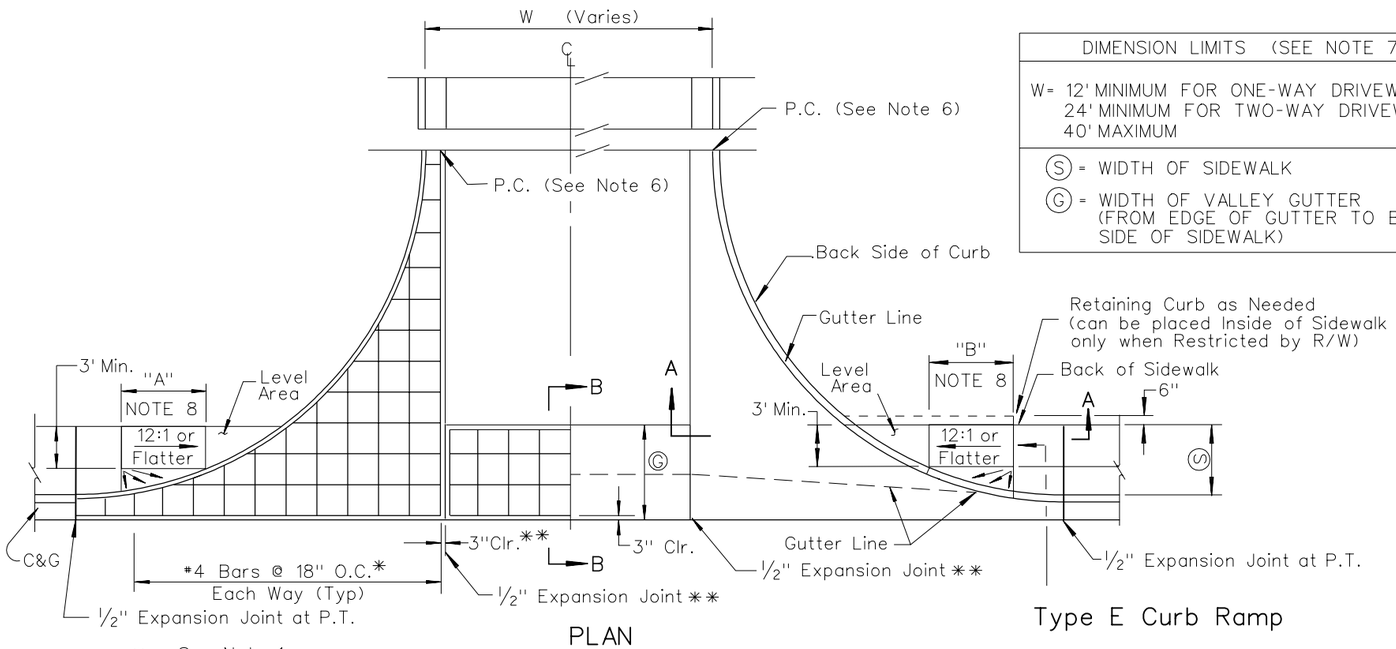
GENERAL NOTES:

1. ALL RAMPS SHALL BE 12:1 OR FLATTER.
2. CONCRETE DRIVEWAY CAN BE POURED MONOLITHICALLY WITH CURB AND GUTTER.
3. ALL SLOPE RATES ARE RELATIVE TO LEVEL.
4. LENGTH VARIES ACCORDING TO CURB AND GUTTER PROFILE. RETAINING CURBS AND ACQUISTION OF CONSTRUCTION EASEMENTS MAY BE NECESSARY.
5. IF THERE ARE R/W RESTRICTIONS, SIDEWALK WIDTHS CAN BE REDUCED TO 4'-0" WITH PRIOR APPROVAL FROM ASSISTANT CHIEF ROAD DESIGN ENGINEER. A 5'-0" x 5'-0" PASSING ZONE IS REQUIRED EVERY 200' PER ADA. APPENDIX C, SECTION 4.3.4.
6. CONCRETE SHALL BE CLASS A OR AA.
7. SEE TABLE 1-10, ON STANDARD DRAWING R-5.2.1.

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

SINGLE FAMILY DRIVEWAYS WITH CURB

Signed Original On File	R-5.3.2	(613)
CHIEF ROAD DESIGN ENGR	ADOPTED: 7/96	REVISION 2/98

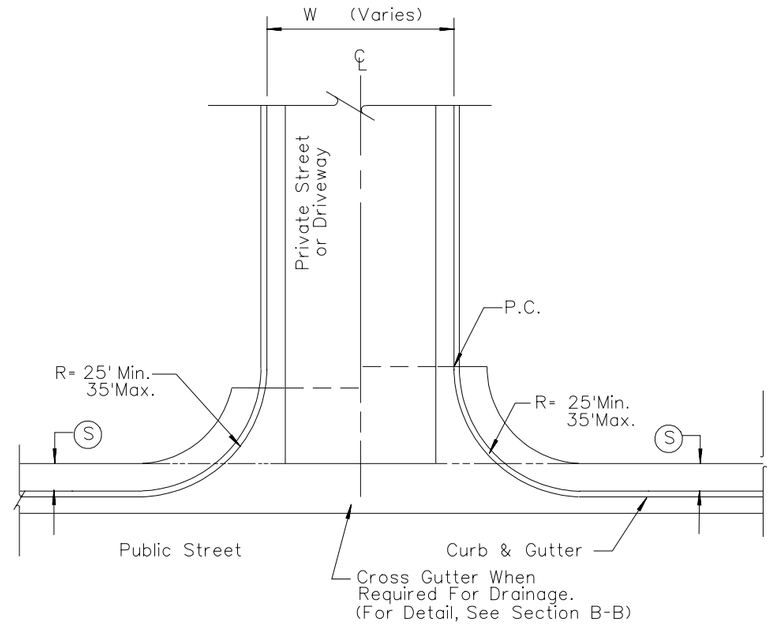


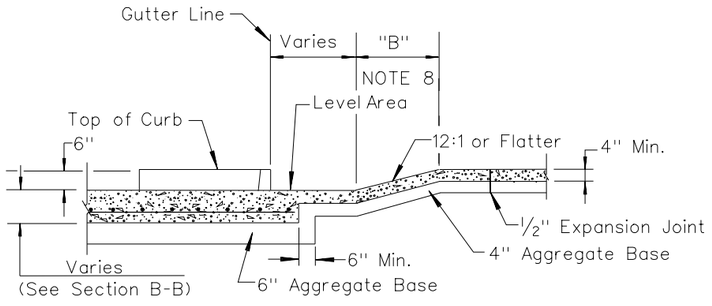
PLAN

DIMENSION LIMITS (SEE NOTE 7)
W= 12' MINIMUM FOR ONE-WAY DRIVEWAYS 24' MINIMUM FOR TWO-WAY DRIVEWAYS 40' MAXIMUM
Ⓢ = WIDTH OF SIDEWALK
Ⓖ = WIDTH OF VALLEY GUTTER (FROM EDGE OF GUTTER TO BACK OF SIDE OF SIDEWALK)

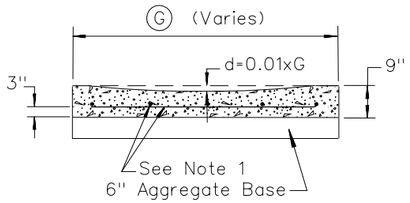
* - See Note 1.
** - For Optional Sectional Pour, See Note 2.

Type E Curb Ramp

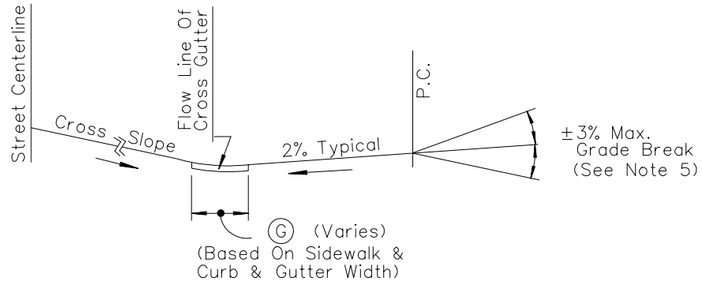




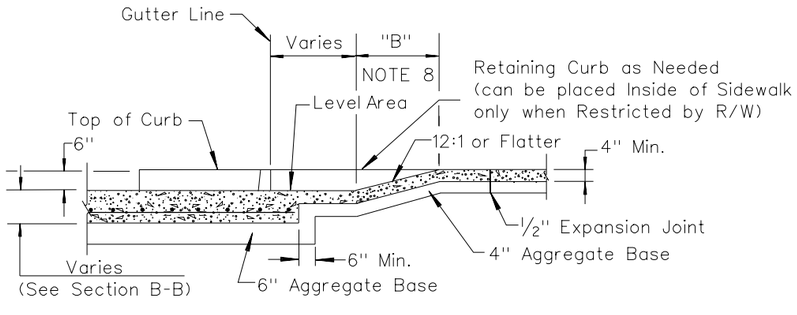
SECTION A-A



SECTION B-B



TYPICAL CROSS SECTION
@ ℄



SECTION A-A WITH RETAINING CURB

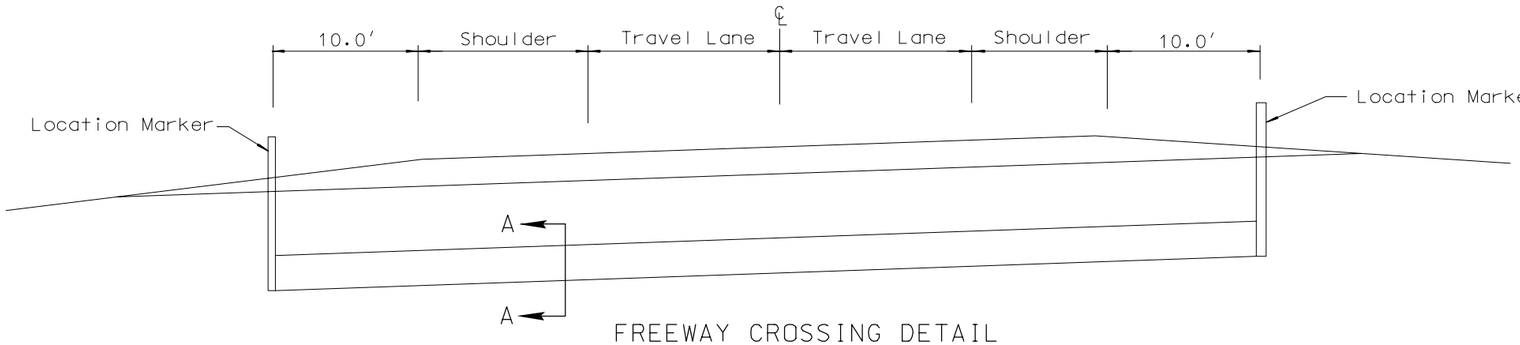
GENERAL NOTES:

1. SPACING OF NO. 4 BARS LESS THAN 18" TO MEET LOCAL CODES SHALL BE NOTED IN THE STRUCTURE LIST.
2. WHEN CONSTRUCTING DRIVEWAYS WHERE CURB AND GUTTER EXISTS, COMPLETELY REMOVE EXISTING SECTIONS. DRIVEWAY MAY BE POURED MONOLITHIC TO A.C. LINE, IN WHICH CASE THE BARS SHALL BE CONTINUOUS. IF OPTIONAL SECTIONAL POUR IS USED, EXPANSION JOINTS AND REBAR END CLEARANCE SHALL APPLY AS SHOWN.
3. CONCRETE SHALL BE CLASS A OR AA.
4. CURB RAMPS SHALL BE CONSTRUCTED IN ACCORDANCE WITH STANDARD DRAWINGS R-5.2.1 TO R-5.2.2 AND R-5.3.1.
5. FOR GRADE CHANGES GREATER THAN 3%, VERTICAL CURVES OF AT LEAST 10 FEET MUST BE USED.
6. DRIVEWAY GEOMETRICS SHALL GO TO THE P.C.
7. FOR ACTUAL DIMENSIONS SEE STRUCTURE LIST.
8. SEE TABLE 1-12, ON DRAWING R-5.2.2 , FOR "A" AND "B".
9. AVOID DRAINAGE POCKETS IN CROSS WALK AREAS.

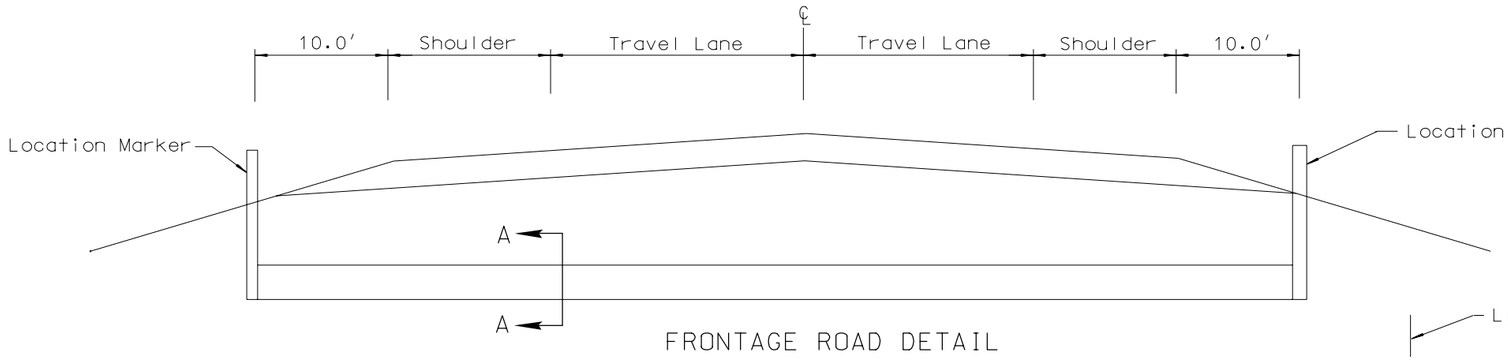
STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

MULTI-FAMILY, COMMERCIAL & INDUSTRIAL DRIVEWAY DETAILS

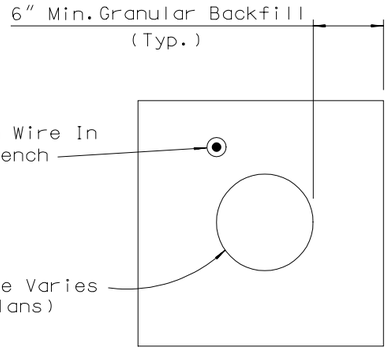
Signed Original On File	R-5.3.3	(613)
CHIEF ROAD DESIGN ENGR.	ADOPTED: 7/96	REVISION 1/01



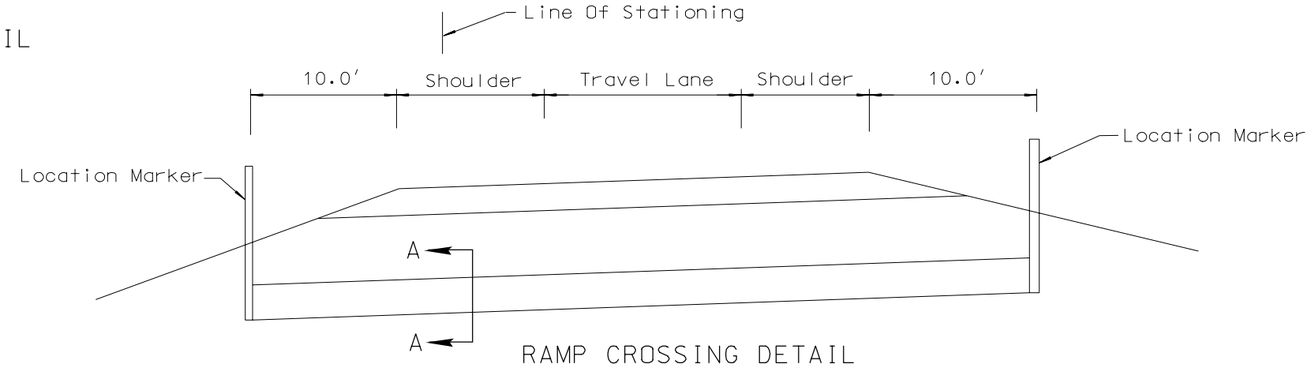
FREEWAY CROSSING DETAIL



FRONTAGE ROAD DETAIL



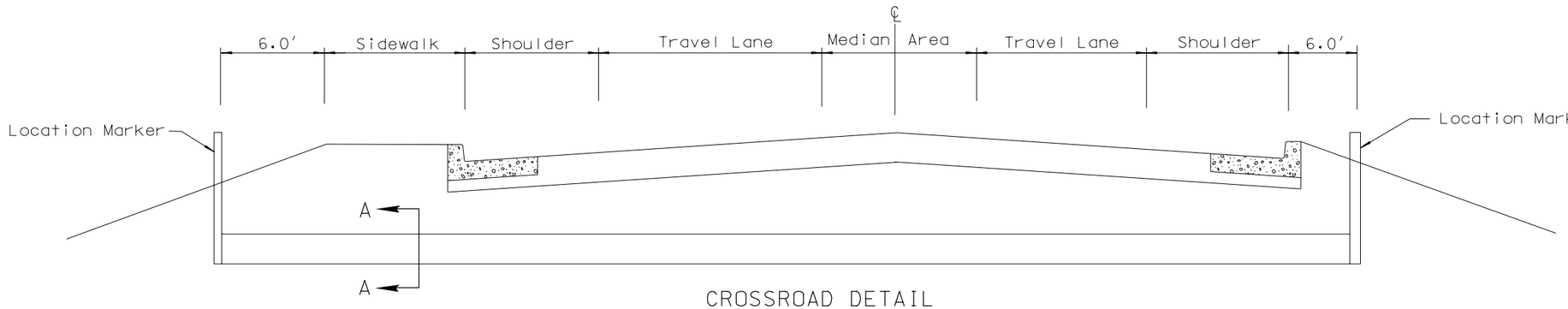
SECTION A-A



RAMP CROSSING DETAIL

GENERAL NOTES:

1. MINIMUM 3.0′ COVER OVER TOP OF CONDUIT AT SHOULDER LINE.
2. 12 GAGE 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.



CROSSROAD DETAIL

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

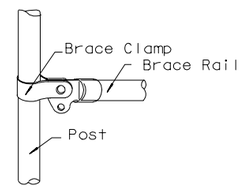
CONDUIT INSTALLATION FOR FUTURE WATER LINES

Signed Original On File	R-5.4.1	(213)
CHIEF ROAD DESIGN ENGR.	ADOPTED: 5/73	REVISION 2/98

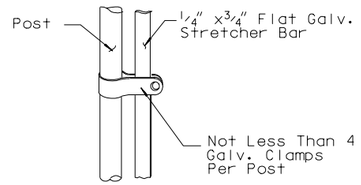
R-47

SIZE OF POSTS–STANDARD FENCING

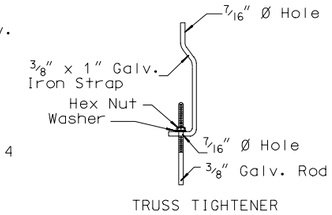
FENCE HEIGHT	CORNER, END & PULL			LINE		BRACES		
	ROUND PIPE O.D.	MIN. WT. (LBS/L.F.) CLASS 1	MIN. WT. (LBS/L.F.) CLASS 2	T-SECTION	MIN. WT. (LBS/L.F.)	ROUND PIPE O.D.	MIN. WT. (LBS/L.F.) CLASS 1	MIN. WT. (LBS/L.F.) CLASS 2
3' to 6'	2.375"	3.65	2.64	———	1.30	1.660"	2.27	1.45



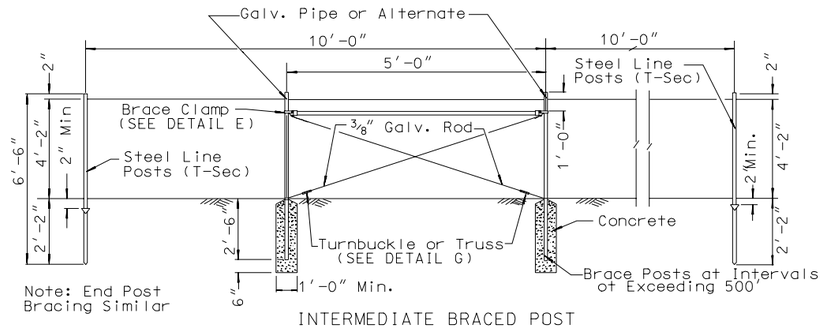
DETAIL E



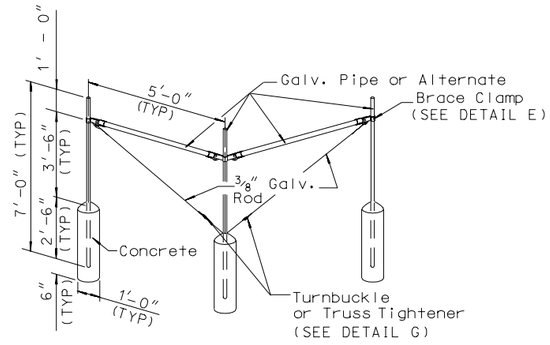
DETAIL F



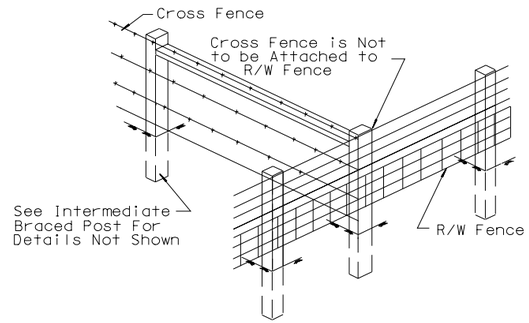
TRUSS TIGHTENER
DETAIL G



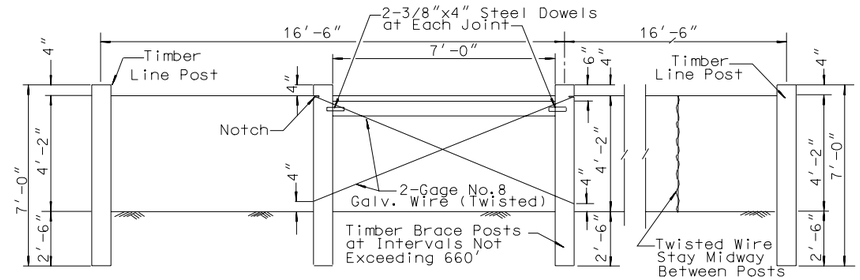
INTERMEDIATE BRACED POST
TYPE A FENCE



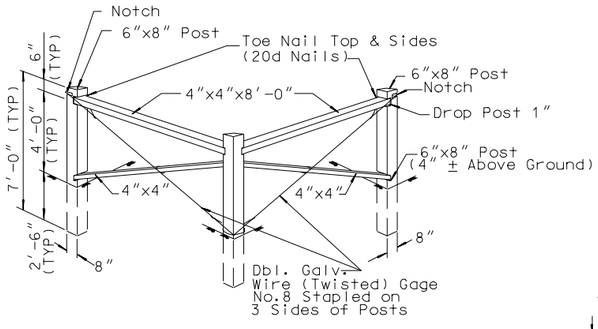
CORNER BRACE FOR
TYPE A FENCE



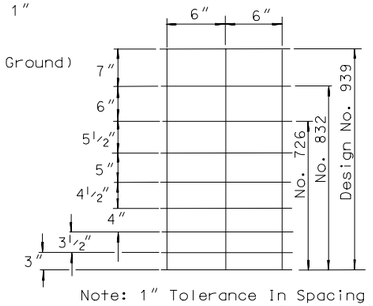
TYPICAL EXISTING CROSS FENCE TIE



INTERMEDIATE BRACED POST
TYPE B FENCE

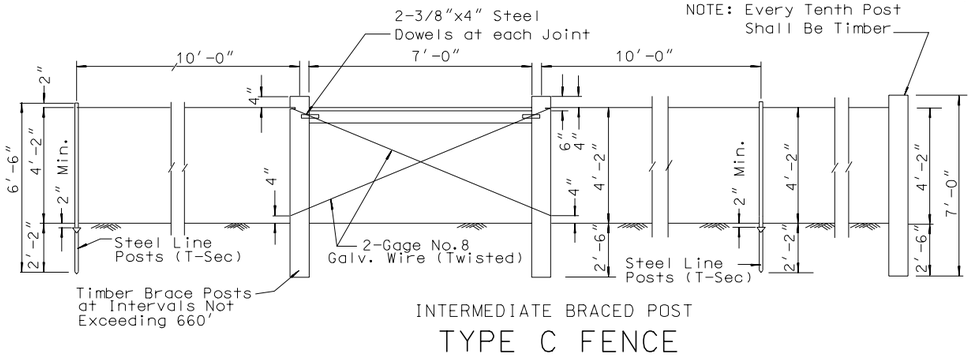


TIMBER CORNER BRACE

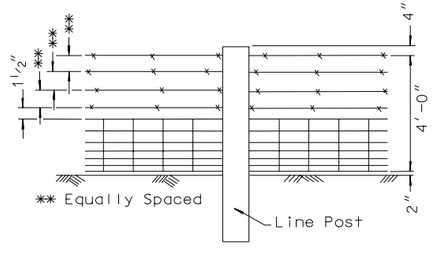


Note: 1" Tolerance In Spacing Allowed Above Bottom Space

WOVEN WIRE (FARM FENCE)
FABRIC



INTERMEDIATE BRACED POST
TYPE C FENCE



TYPICAL DETAIL OF WOVEN WIRE
& BARBED WIRE FENCE APPLICABLE
TO TYPE A,B & C FENCING

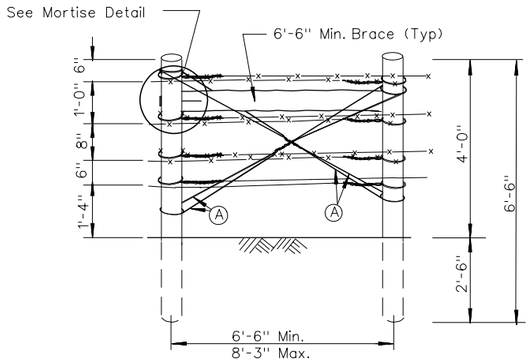
GENERAL NOTES:

1. FENCE POSTS AND MATERIALS SHALL CONFORM TO THE REQUIREMENTS OF STANDARD SPECIFICATIONS AND SUPPLEMENTS.
2. STANDARD FENCING SHALL CONSIST OF GALVANIZED BARBED WIRE. GALVANIZED WOVEN WIRE (FARM FENCE) OR A COMBINATION OF BOTH ON WOOD OR METAL POSTS OR COMBINATIONS OF POSTS.
3. BARBED WIRE SHALL BE SPACED AS FOLLOWS:
   4 WIRE: BOTTOM WIRE 15 1/2" ABOVE GROUND. OTHER SPACING 11 1/2
   5 WIRE: BOTTOM WIRE 10" ABOVE GROUND.OTHER SPACING 10"
4. STANDARD FENCING WILL BE DESIGNATED BY TYPE, DESIGN OF FABRIC, AND/OR NUMBER OF BARBED WIRES. THUS:
   TYPE A-832-3B DESIGNATES METAL POSTS, 32" WOVEN (FARM) WIRE, AND 3 BARBED WIRES:
   TYPE B-4B DESIGNATES WOOD POSTS, 4 BARBED WIRES:
   TYPE C-726-4B DESIGNATES COMBINATION OF WOOD AND METAL POSTS, 26" WOVEN (FARM) WIRE, 4 BARBED WIRES.
5. CONCRETE SHALL BE CLASS A OR AA.
6. MANUFACTURE STEEL LINE POSTS (T-SEC) TO TOLERANCES AND WORKMANSHIP AS PROVIDED IN AASHTO M281.

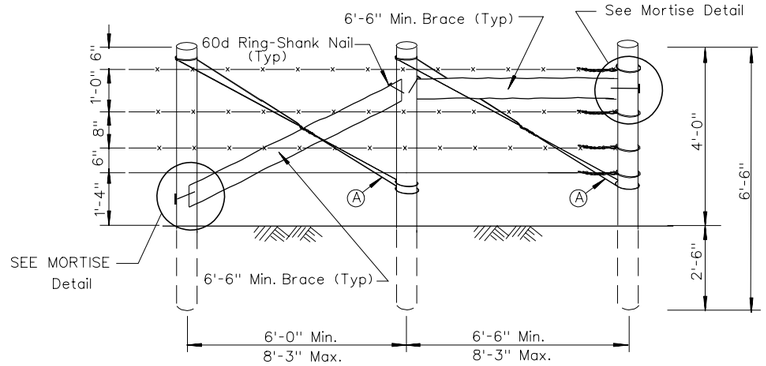
STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

FENCE DETAILS

Signed Original On File	R-6.1.1	(616,724)
CHIEF ROAD DESIGN ENGR.	ADOPTED: 8/69	REVISION 10/02



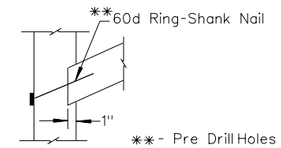
STRESS PANEL

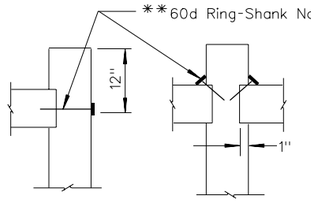


END PANEL

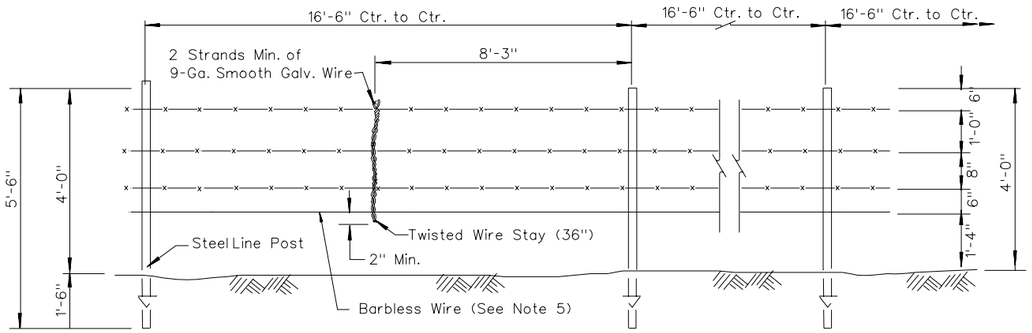
GENERAL NOTES:

1. STRESS PANELS SHALL BE PLACED EVERY 1320' ON TANGENTS.
2. STRESS PANELS SHALL BE PLACED EVERY 660' ON CURVES.
3. END PANELS SHALL BE USED WHEREVER A BREAK IN THE FENCE OCCURS. (I.E. GATES, CATTLEGUARDS) AND AT THE BEGINNING AND ENDING OF ALL CURVES.
4. SEE TABLE A FOR WOOD POST SPACING ON CURVES.
5. BARBED WIRE SHALL BE USED FOR BOTTOM STRAND WHEN REQUIRED BY NEV. DEPT. OF WILDLIFE OR BUREAU OF LAND MANAGEMENT.
6. WIRES ARE TO BE TIED OFF AT STRETCH POINTS. WRAP AND SPLICE TO SELF WITH AT LEAST 4 TURNS AT OPPOSITE END OF PANELS.
7. WOOD POSTS SHALL BE 6" NOMINAL DIAMETER.
8. ADD ADDITIONAL STRAND OF BARBED WIRE AND/OR ROCK DEADMAN (MIN. WEIGHT 50 LBS.) WHEN SPACE BETWEEN BOTTOM WIRE AND GROUND EXCEEDS 20".
9. STEEL POST DEADMAN DRIVEN APPROXIMATELY 3'-0" INTO GROUND MAY BE USED IN LIEU OF ROCK DEADMAN.



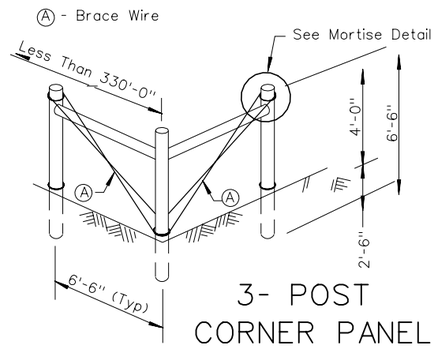


MORTISE DETAIL

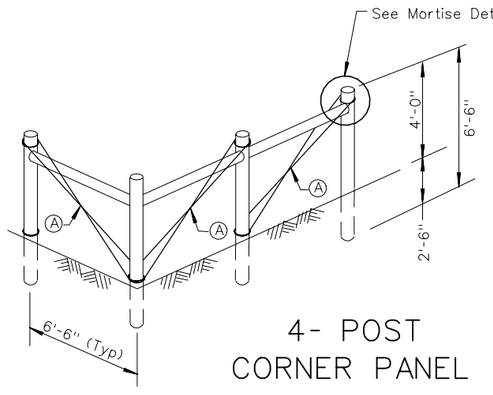


LINE PANELS

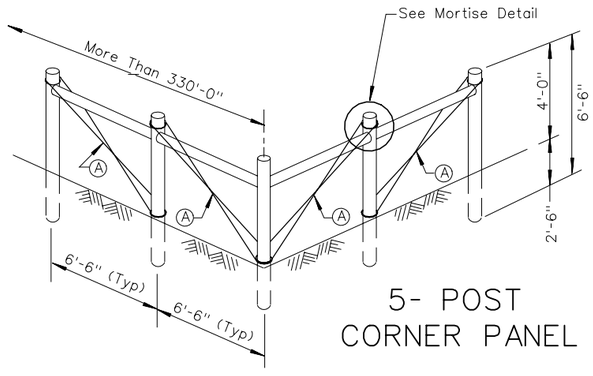
TABLE A: WOOD POST SPACING ON CURVED FENCE LINES	
RADIUS OF CURVE AT FENCE LINE (FT.)	RATIO (STEEL POST : WOOD POST)
< 1,000	3:1
1,000 TO 2,500	4:1
2,500TO 5,000	7:1
5,000 TO 10,000	NO WOOD POST NEEDED BETWEEN STRESS PANELS AT 660'-0".
> 10,000	TREAT CURVE AS TANGENT



3- POST CORNER PANEL



4- POST CORNER PANEL



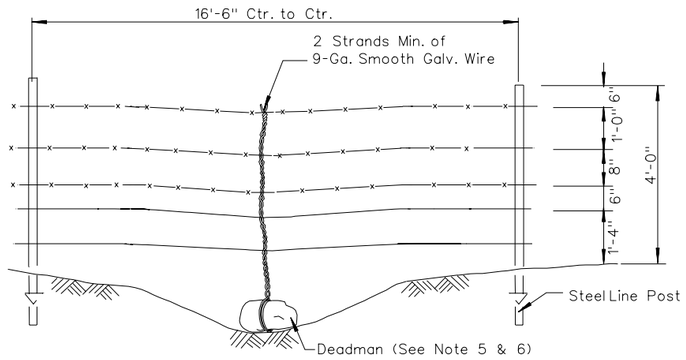
5- POST CORNER PANEL

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

NEVADA 4-WIRE FENCE PANEL DETAILS (TYPE C-NV-4B)

Signed Original On File	R-6.1.2	(616,724)
CHIEF ROAD DESIGN ENGR	ADOPTED: 7/96	REVISION 10/98

R-49

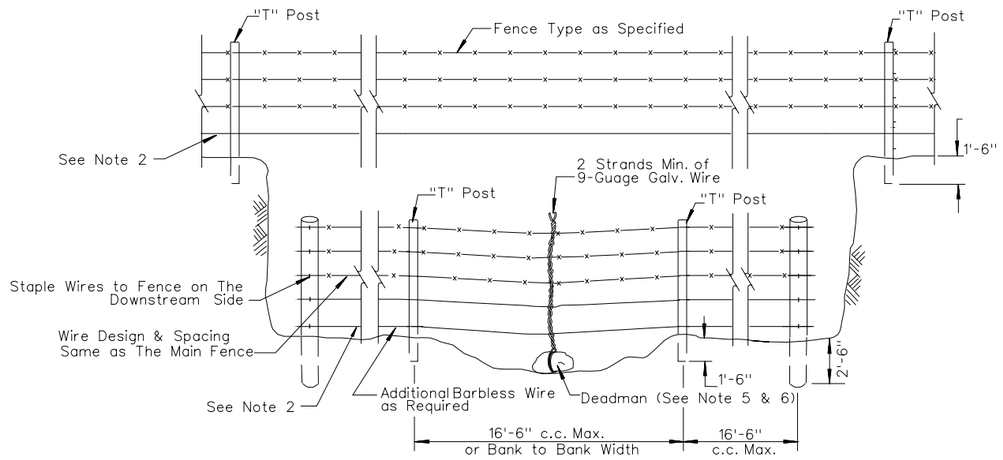


PANEL AT MINOR DEPRESSION

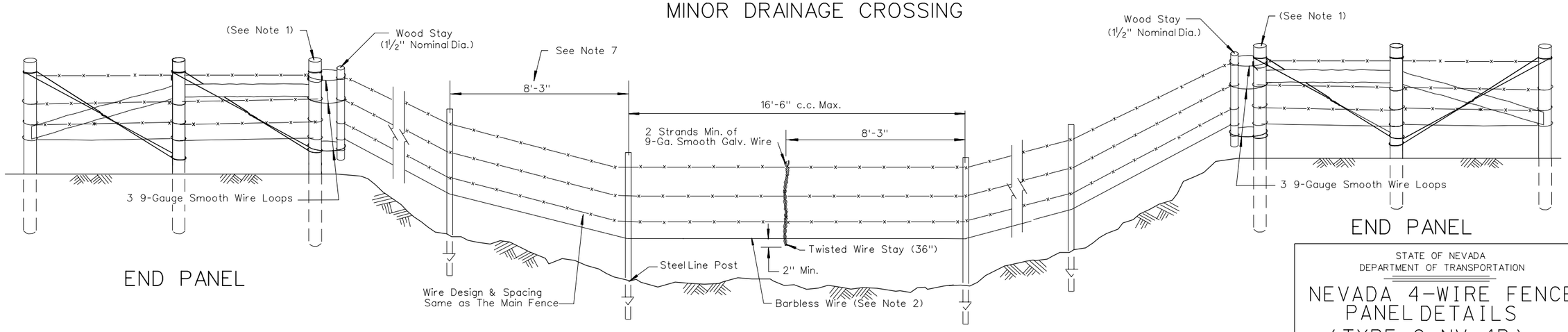
OR INTERMITTENT STREAM

GENERAL NOTES:

1. HINGE POST SHALL BE 8' IN LENGTH AND SHALL BE BURIED 3' IN GROUND.
2. BARBED WIRE SHALL BE USED FOR BOTTOM STRAND WHEN REQUIRED BY NEV. DEPT. OF WILDLIFE OR BUREAU OF LAND MANAGEMENT.
3. WIRES ARE TO BE TIED OFF AT STRETCH POINTS. WRAP AND SPLICE TO SELF WITH AT LEAST 4 TURNS AT OPPOSITE END OF PANELS.
4. WOOD POSTS SHALL BE 6" NOMINAL DIAMETER.
5. ADD ADDITIONAL STRAND OF BARBED WIRE AND/OR A ROCK DEADMAN (MIN. WEIGHT 50 LBS.) WHEN SPACE BETWEEN BOTTOM WIRE AND GROUND EXCEEDS 20".
6. STEEL POST DEADMAN DRIVEN APPROXIMATELY 1 m INTO GROUND MAY BE USED IN LIEU OF ROCK DEADMAN.
7. STEEL LINE POSTS AT 8'-3" SPACING TO MAINTAIN BOTTOM WIRE CLEARANCE.



MINOR DRAINAGE CROSSING



END PANEL

END PANEL

MAJOR DRAINAGE CROSSING

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

NEVADA 4-WIRE FENCE PANEL DETAILS (TYPE C-NV-4B)

Signed Original On File	R-6.1.2.1	(616, 724)
CHIEF ROAD DESIGN ENGR.	ADOPTED: 7/96	REVISION 10/98

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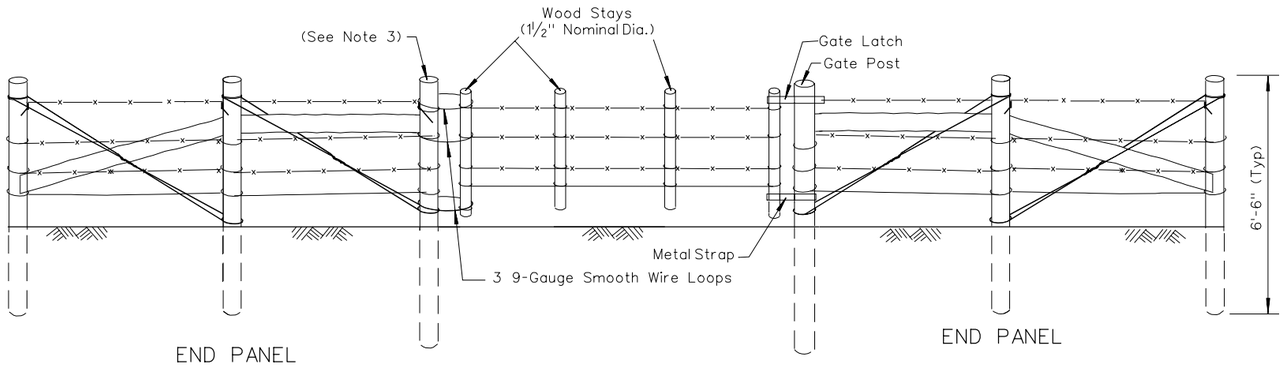
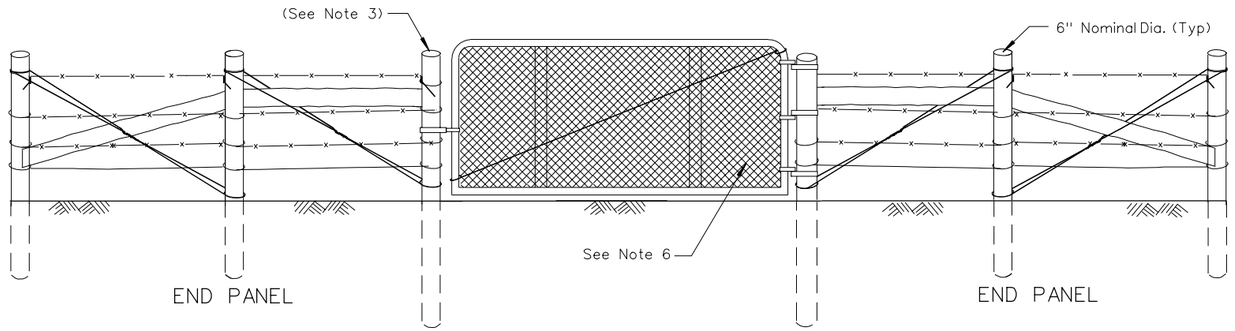
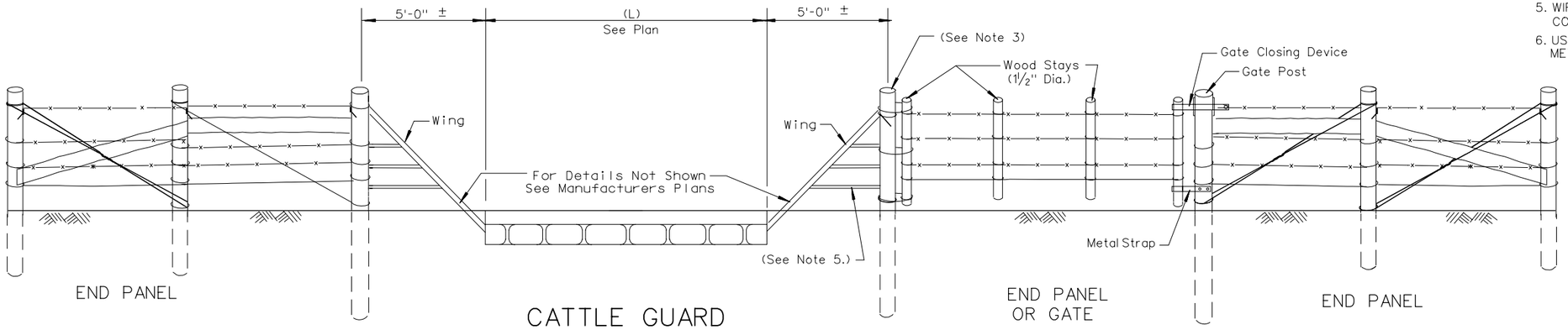


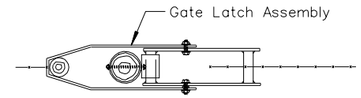
MISSOURI GATE



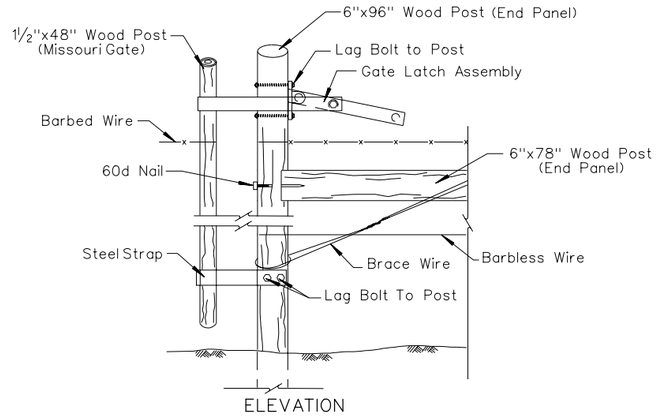
METAL DRIVE GATE



CATTLE GUARD



PLAN



ELEVATION

TYPICAL GATE LATCH

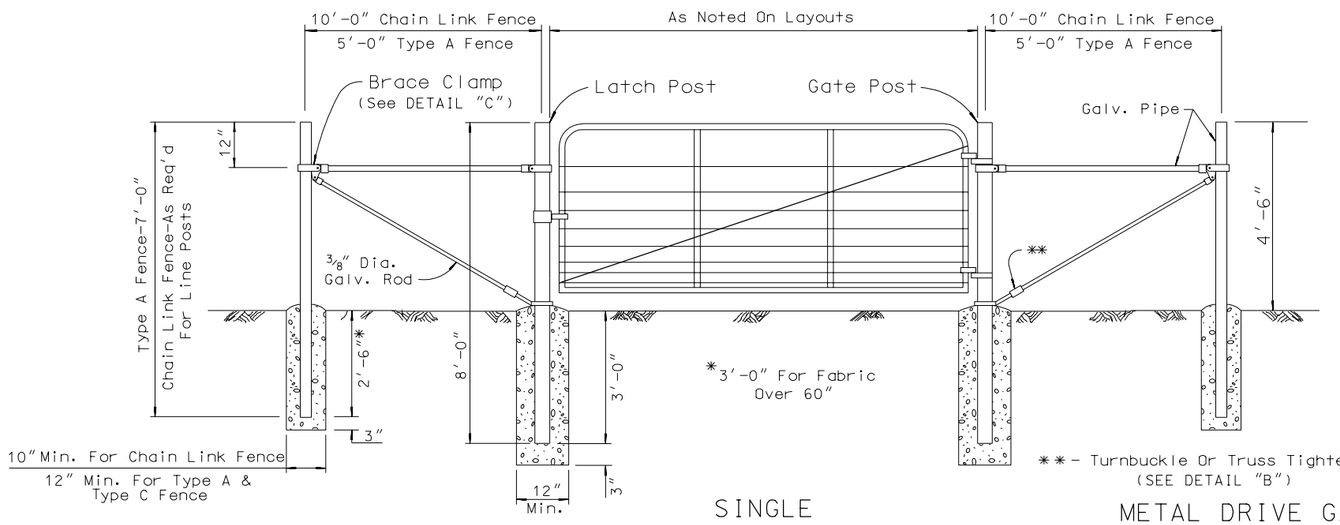
GENERAL NOTES:

1. SPACING BETWEEN WIRES ON MISSOURI GATE SHALL BE THE SAME AS WIRES ON ADJACENT FENCE.
2. GATE LATCH SHALL BE LAG BOLTED FIRMLY TO THE GATE POST.
3. HINGE POSTS, LATCH POSTS, AND CATTLE GUARD WING ATTACHMENT POSTS SHALL BE 8 FT. IN LENGTH AND SHALL BE BURIED 3 FT. IN GROUND.
4. FOR END PANEL DETAILS, SEE SHEET R-6.1.2.
5. WIRE MAY BE USED IN LIEU OF METAL STRAP FOR CONNECTION OF CATTLEGUARD WING TO FENCE POST.
6. USE RECTANGULAR MESH OR 2" DIAMOND MESH ON METAL DRIVE GATE.

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

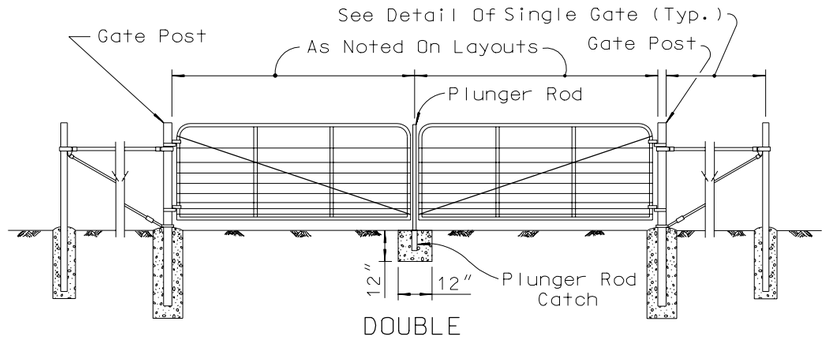
NEVADA 4-WIRE FENCE GATE DETAILS (TYPE C-NV-4B)

Signed Original On File	R-6.1.2.2	(616, 724)
CHIEF ROAD DESIGN ENGR.	ADOPTED: 10/98	REVISION 10/00



SINGLE

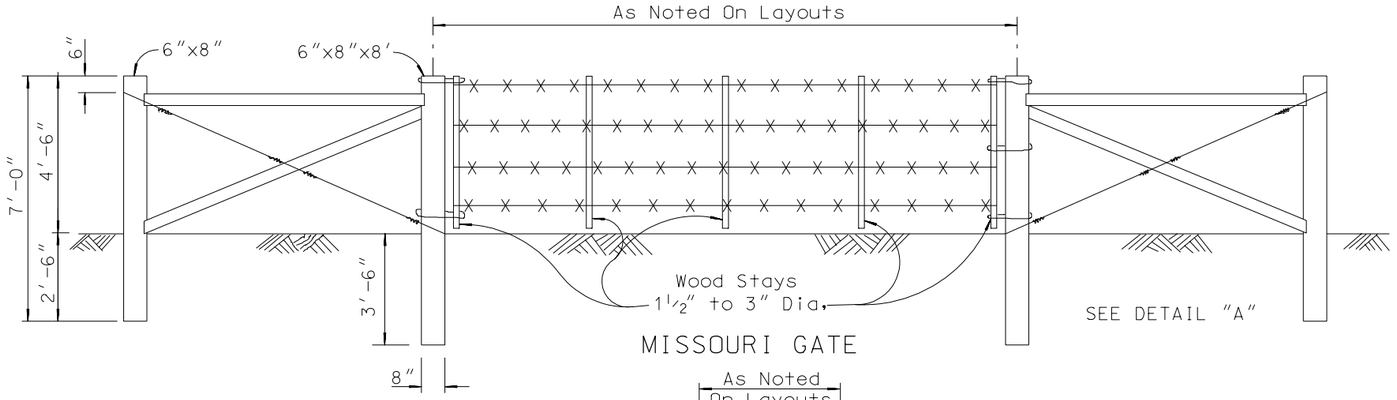
METAL DRIVE GATES



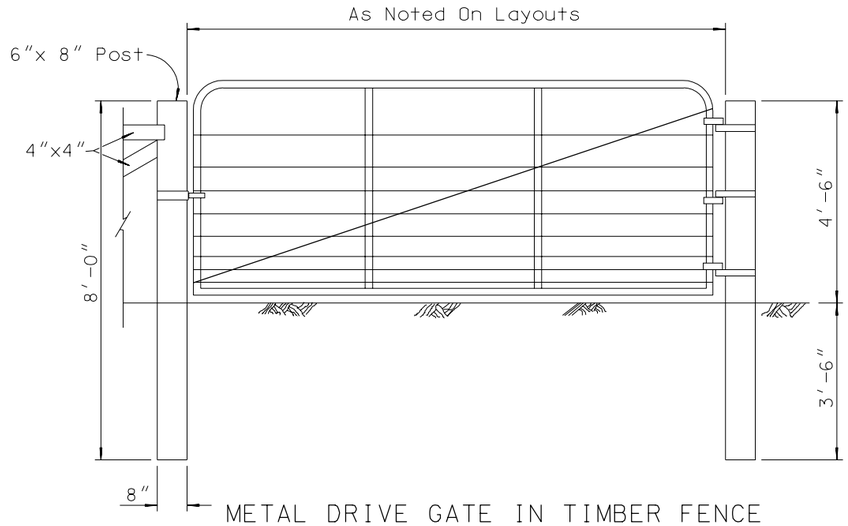
DOUBLE

NOTE:

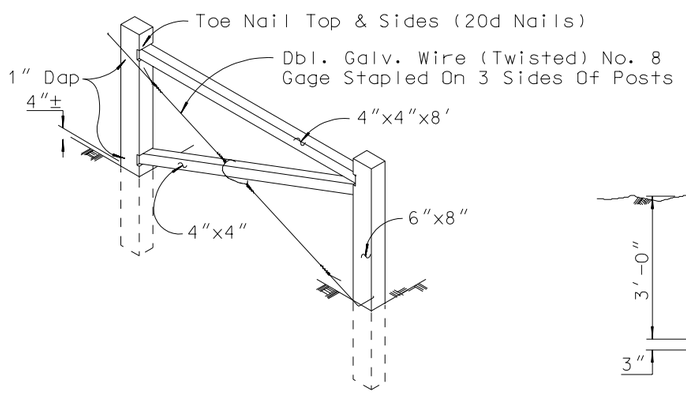
Bracing Is For Chain Link Fencing.
See Intermediate Braced Post,Type A Fence,
For Bracing Detail When Type A Fence Is Specified.



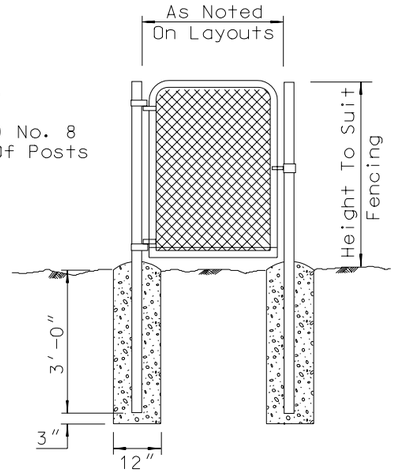
MISSOURI GATE



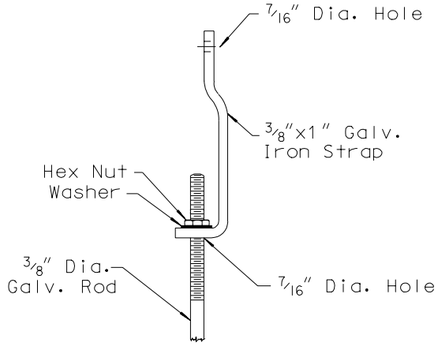
METAL DRIVE GATE IN TIMBER FENCE



DETAIL "A"



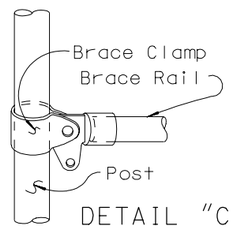
WALK GATE



DETAIL "B"
(TRUSS TIGHTENER)

GENERAL NOTES:

1. STANDARD GATES, CHAIN LINK GATES, AND WALK GATES SHALL BE CONSTRUCTED AS SPECIFIED IN THE STANDARD SPECIFICATIONS.
2. BRACED POSTS AND BRACES SHALL CONFORM TO THE REQUIREMENTS OF THE STANDARD SPECIFICATIONS.
3. LUMBER USED IN THE CONSTRUCTION OF TIMBER GATES SHALL CONFORM TO THE REQUIREMENTS OF THE STANDARD SPECIFICATIONS.
4. CONCRETE SHALL BE CLASS A OR AA.

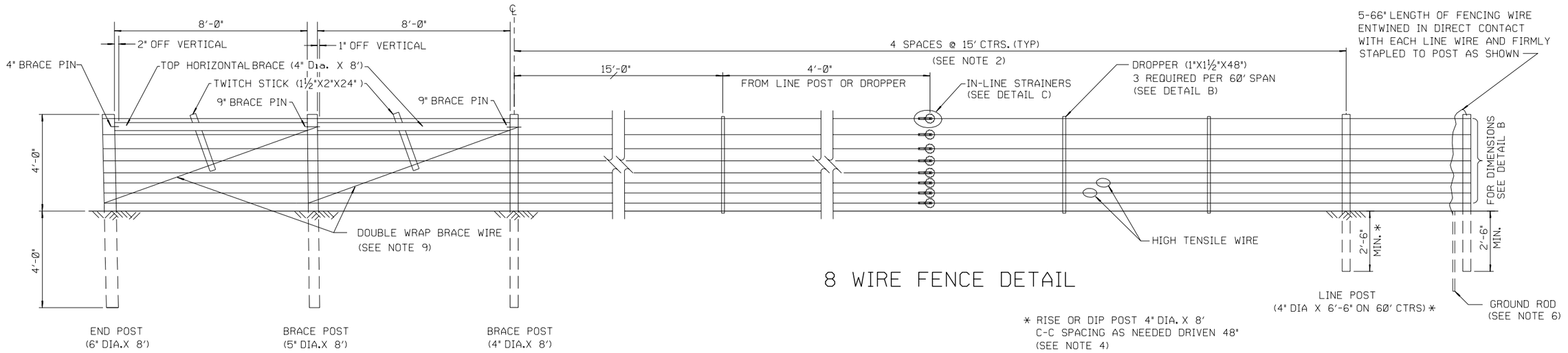


DETAIL "C"

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

GATE AND FENCE DETAILS

Signed Original On File	R-6.1.3	(616,724)
CHIEF ROAD DESIGN ENGR.	ADOPTED: 8/69	REVISION 10/00



8 WIRE FENCE DETAIL

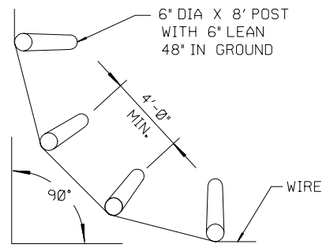
* RISE OR DIP POST 4" DIA. X 8'
C-C SPACING AS NEEDED DRIVEN 48"
(SEE NOTE 4)

DOUBLE BRACE END ASSEMBLY

NOTE: FARM GATE 12' OR LESS MAY BE INSTALLED ON POST AFTER FINAL WIRE TENSIONING.

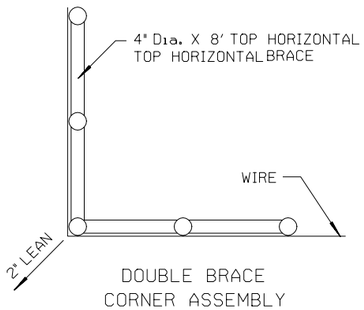
DETAIL C

(IN-LINE WIRE STRAINERS
AND TENSION INDICATOR SPRING)



ALTERNATE FOUR POST
CORNER ASSEMBLY

PLAN

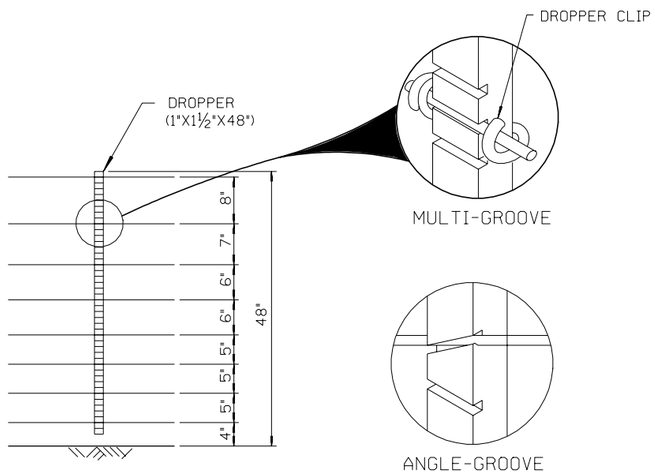


DOUBLE BRACE
CORNER ASSEMBLY
(FOR DETAILS-SEE ABOVE)

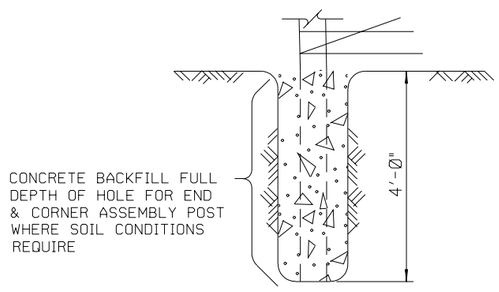
PLAN

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 ON 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 POST 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 250 LBS. (± 10 LBS.).
4. MAXIMUM LENGTH OF WIRE PER IN-LINE STRAINER ON LEVEL TERRAIN: STRAIGHT=5000'; 1-90 DEGREE CORNER: 3000'; 2-90 DEGREE CORNERS: 2000'; 3-90 DEGREE CORNERS: 1500'; 4-90 DEGREE CORNERS: 1000'. FOR UNEVEN TERRAIN REDUCE DISTANCES BY 500' FOR EACH MAJOR RISE AND DIP. DIP OR RISE POSTS SHALL BE A MINIMUM OF 4" DIAMETER SMALL END, 8' LONG, POSITIONED AT HIGH POINTS OF RIDGES AND LOW POINTS OF GULLIES.
5. EXCEPT FOR FASTENING LINE WIRE, WHICH HAS BEEN STRUNG AROUND THE OUTSIDES OF WOOD POSTS 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 (5/8"x8'), SHALL BE PLACED EVERY 150' IN DRY SOILS, OR EVERY 300' 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 25' TO 50' AWAY.
7. IT IS RECOMMENDED FOR TYING OFF WIRES ON END POSTS TO USE TWO (2) NICROPRESS SLEEVES CAT. NO. FW-2-3, MANUFACTURED BY THE NATIONAL TELEPHONE SUPPLY COMPANY OR ACCEPTABLE EQUAL.
8. IT IS RECOMMENDED FOR SPLICING WIRES TO USE THREE (3) NICROPRESS SLEEVES OR 1 RELIABLE WIRELINK, NUMBER 5057V, 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. T111575, "HOW TO BUILD FENCES WITH UNITED STATES STEEL MAX TEN 200 HIGH-TENSILE FENCE WIRE".
12. CONCRETE SHALL BE CLASS A OR AA.



DROPPER DETAIL B



DETAIL A

POST WITH CONCRETE FILL

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 12 1/2 GA., WITH A MINIMUN OF 200,000 LB/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.

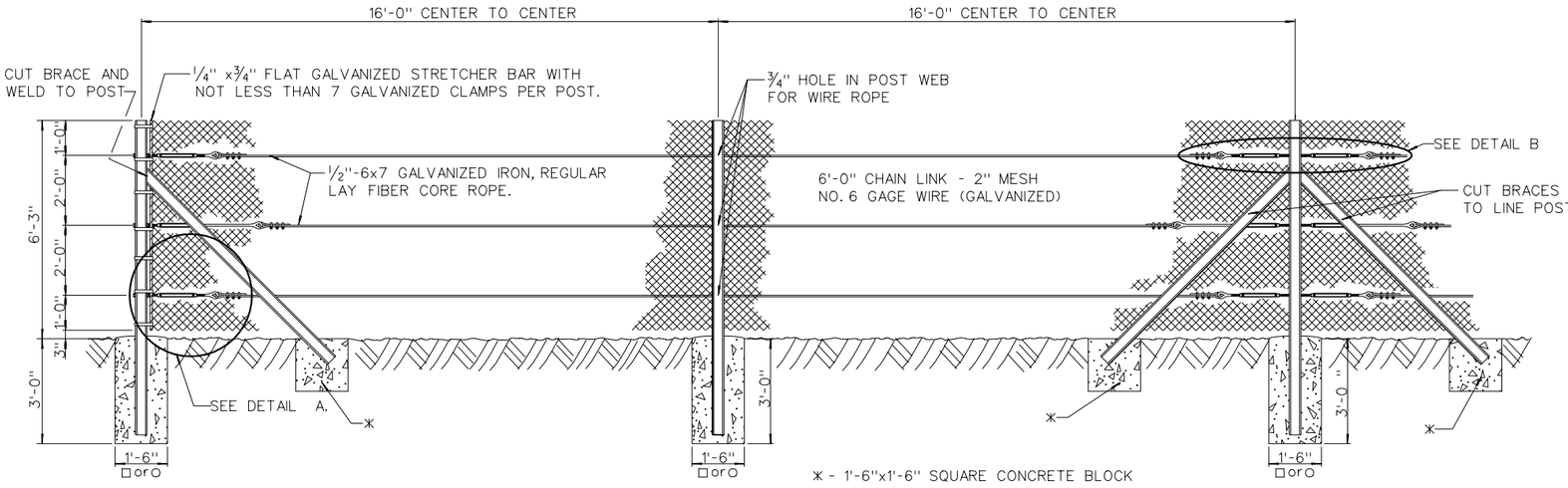
D STAPLES ARE 1¾". 9 GAUGE WITH SLASH CUT POINTS AND SHALL CONFORM WITH THE REQUIREMENTS FOR CLASS 3 ZINC COATING OF ASTM SPECIFICATION A116.

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

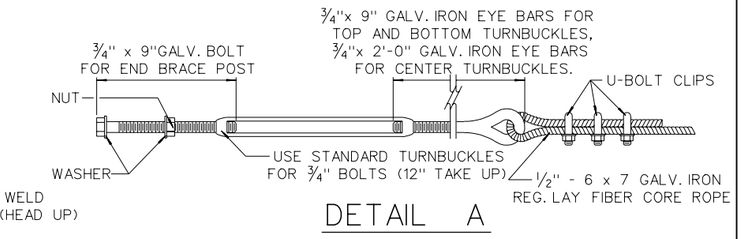
HIGH-TENSILE
8-WIRE RANGE FENCE

Signed Original On File	R-6.1.4	(616, 724)
CHIEF ROAD DESIGN ENGR.	ADOPTED 11/82	REVISION 2/98

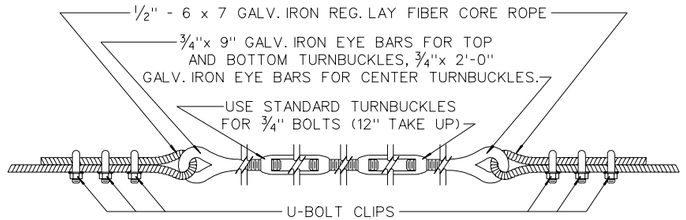
R-53



BENCH FENCE (630)



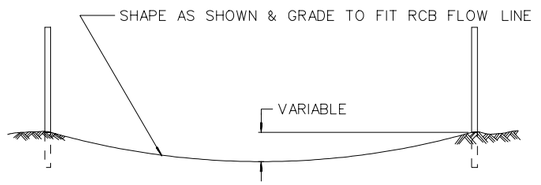
DETAIL A



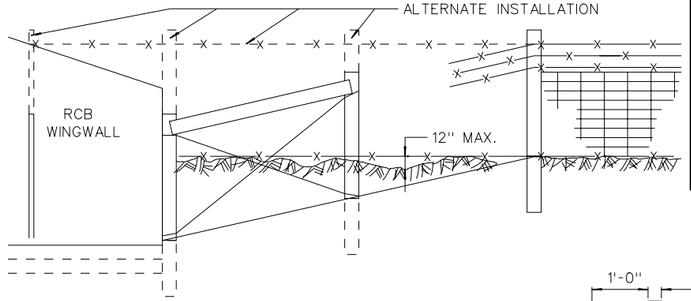
DETAIL B

BENCH FENCE NOTES:

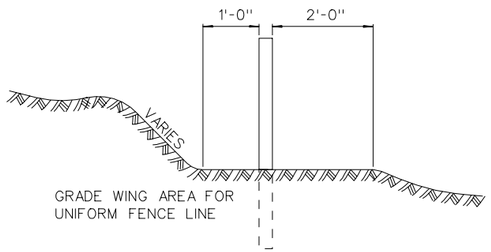
1. ALL POSTS AND BRACES SHALL BE 50 POUND CRANE RAIL OR 4"X4"X13 POUND WIDE FLANGE, 9' LONG.
2. INSTALL LINE BRACES AT INTERVALS NOT EXCEEDING 275'.
3. ALL POSTS SHALL BE AT 16' CENTERS.
4. POSTS AND BRACES TO BE SET IN CONCRETE AS SHOWN, EXCEPT IN ROCK THEY MAY BE GROUTED IN DRILL HOLE.
5. 3 GALVANIZED 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.
8. CONCRETE SHALL BE CLASS A OR AA.



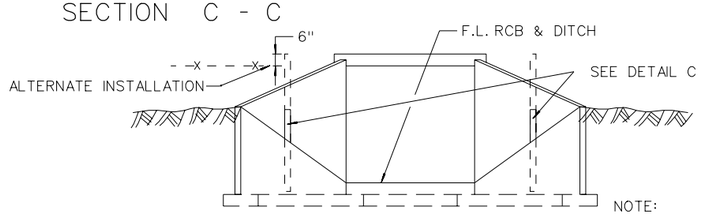
SECTION A - A



SECTION B - B



SECTION C - C

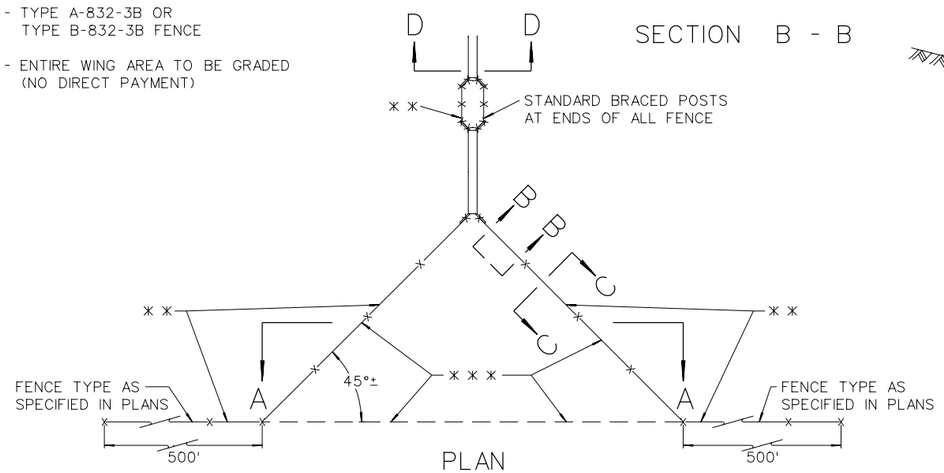


SECTION D - D

NOTE:
FENCE ATTACHMENT AND/OR ALTERNATE INSTALLATION TO BE PLACED AT THE DIRECTION OF THE ENGINEER. (1'-0" MIN. FROM OUTER END OF WINGWALL).

* * - TYPE A-832-3B OR TYPE B-832-3B FENCE

* * * - ENTIRE WING AREA TO BE GRADED (NO DIRECT PAYMENT)



PLAN

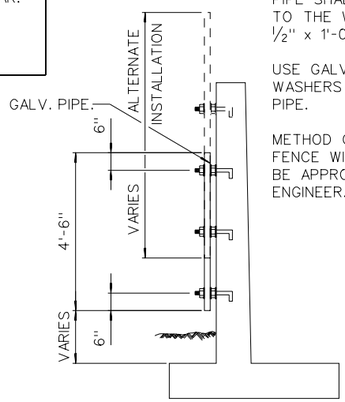
CATTLE PASS FENCING (616)

NOTE :

PIPE SHALL BE FASTENED TO THE WINGWALL WITH 1/2" x 1'-0" GALVANIZED ROD.

USE GALVANIZED NUTS AND WASHERS BOTH SIDES OF PIPE.

METHOD OF ATTACHING FENCE WIRE TO PIPE SHALL BE APPROVED BY THE ENGINEER.



DETAIL C

METHOD OF ATTACHING FENCE TO RCB WINGWALL (OPTIONAL)

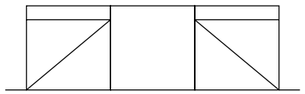
STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

BENCH FENCE AND CATTLE PASS FENCING

Signed Original On File	R-6.2.1	(616-630, 724)
CHIEF ROAD DESIGN ENGR.	ADOPTED: 8/69	REVISION: 2-11/82

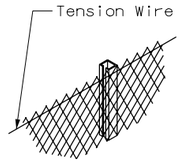
R-54

Less Than 2 Line Posts
Brace Only

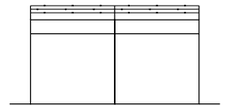


More Than 2 Line Posts
Brace & Truss Rod

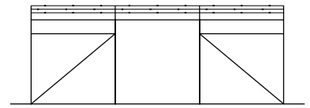
BRACING ARRANGEMENT



LINE POST TOP

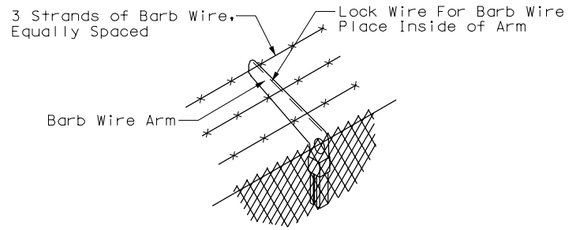


Less Than 2 Line Posts
Brace Only

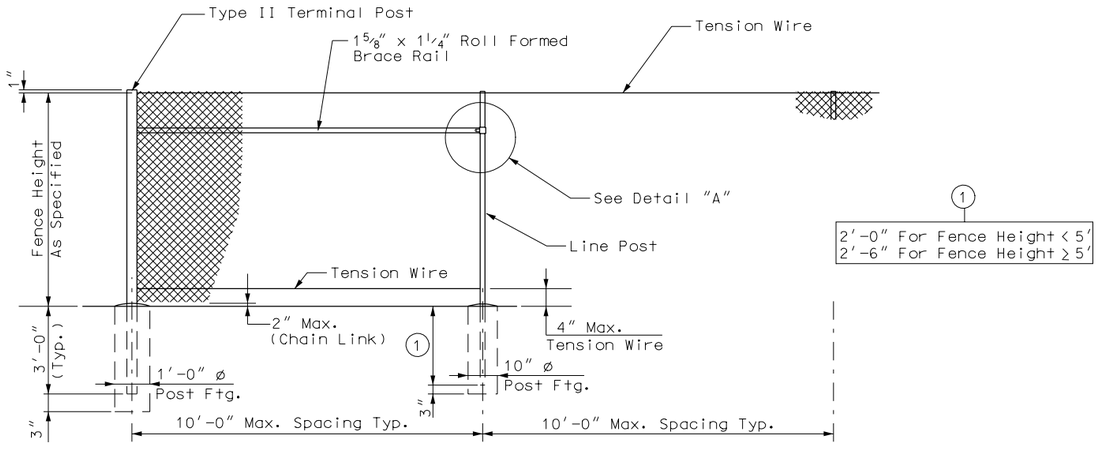


More Than 2 Line Posts
Brace & Truss Rod

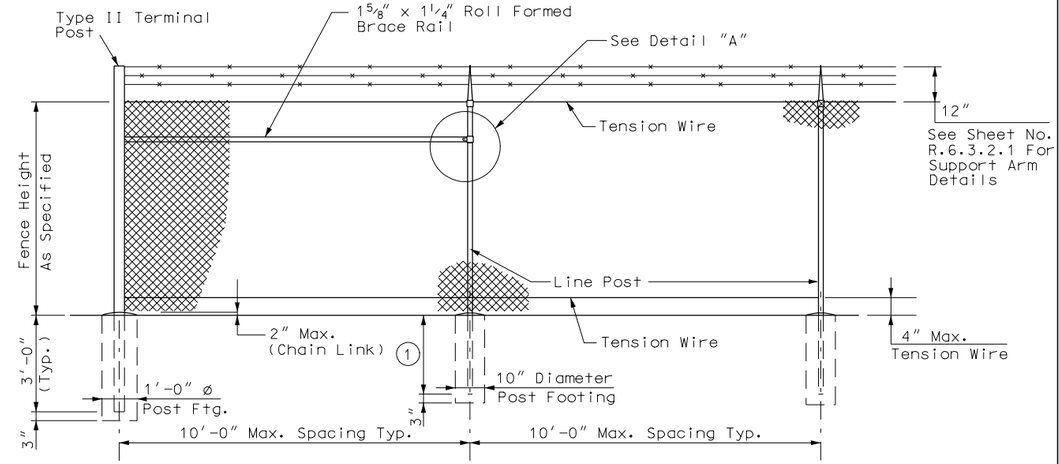
BRACING ARRANGEMENT



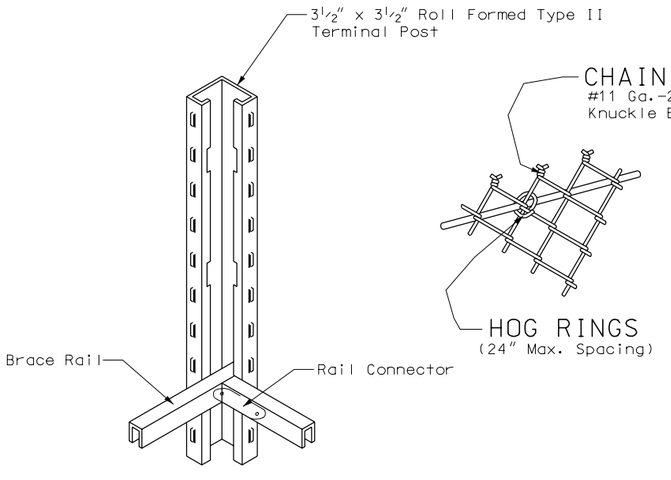
LINE POST TOP



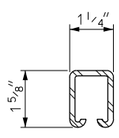
UP TO 72-INCH CHAIN LINK FENCE



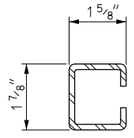
UP TO 72-INCH HEIGHT CHAIN LINK 3B FENCE



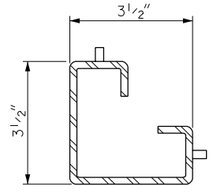
RAIL CONNECTION AT CORNER POSTS



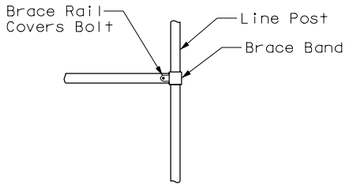
BRACE RAIL



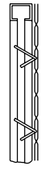
LINE POST



TYPE II TERMINAL POST



BRACE CONNECTION AT LINE POST (DETAIL "A")



FABRIC BAND FOR LINE POST #11 GA.

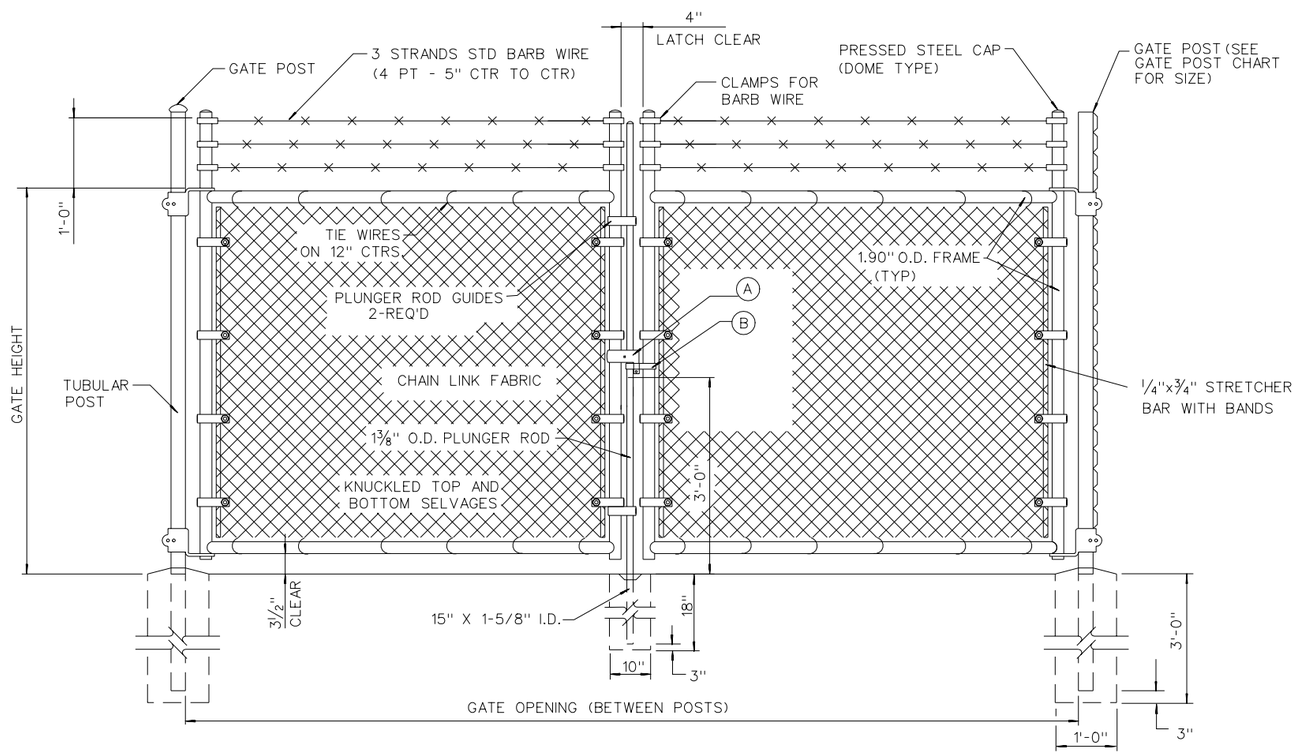
GENERAL NOTES:

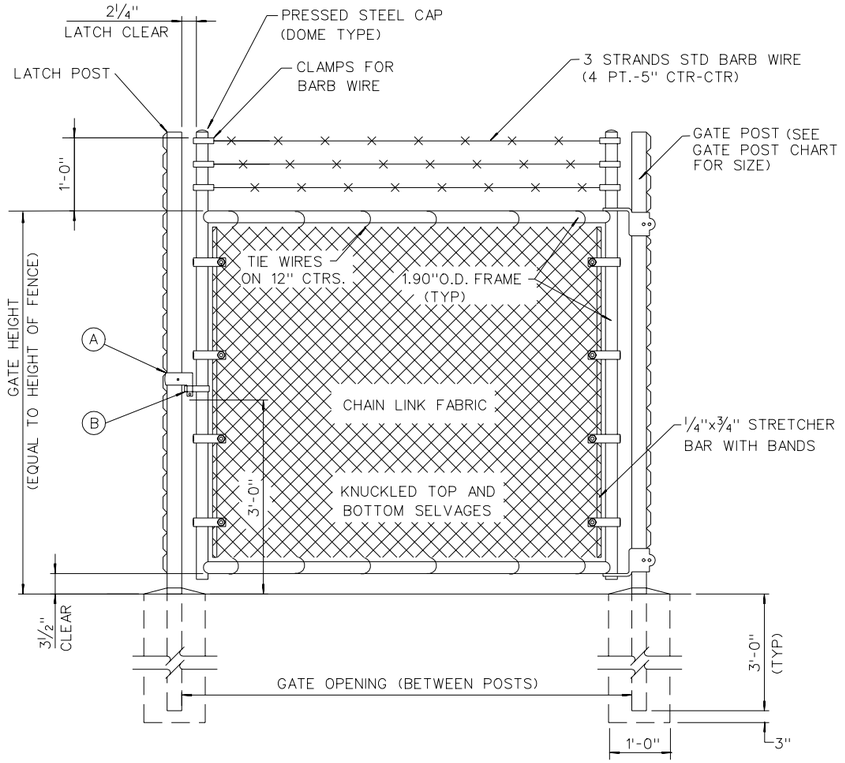
1. FENCE POSTS AND MATERIALS SHALL CONFORM TO THE REQUIREMENTS OF STANDARD SPECIFICATIONS AND SUPPLEMENTS.
2. CHAIN LINK FENCING SHALL CONSIST OF GALVANIZED CHAIN LINK FABRIC ON STEEL POSTS (TUBULAR OR C-COLUMN).
3. (A) ALL POSTS SHALL BE SET IN CLASS A OR AA CONCRETE.
   (B) BRACES SHALL BE SPACED APPROXIMATELY 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 AND BOTTOM TENSION WIRE WITH HOG RINGS OR TIE WIRES SPACED APPROXIMATELY 24" APART.
   (E) FOR TUBULAR POST AND BRACE RAIL DETAILS, SEE SHEET NO. R-6.1.1.

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

FENCE DETAILS
CHAIN LINK WITH C-TYPE POST

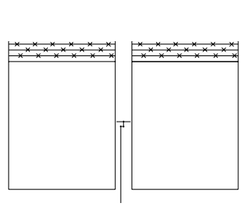
Signed Original On File	R-6.3.1 (616,724)	
CHIEF ROAD DESIGN ENGR.	ADOPTED: 3/79	REVISION 10/00



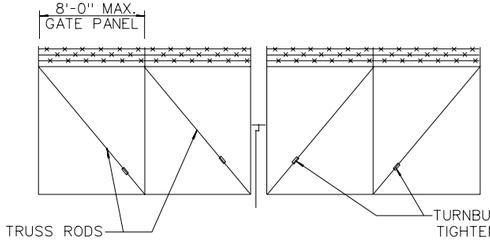


SINGLE SWING GATE

DOUBLE SWING GATE

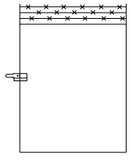


FRAME CONSTRUCTION GATES
THRU 12'-0" OPENING

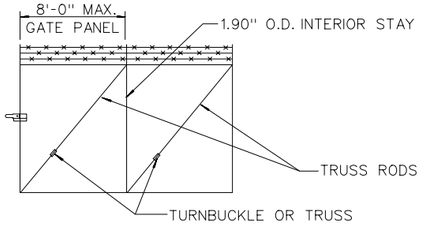


FRAME CONSTRUCTION GATES
OVER 12'-0" to 32'-0" OPENING

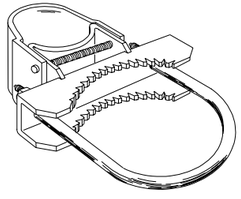
NOTE: 3/8" ADJUSTABLE TRUSS RODS SHALL BE INSTALLED ON ALL GATES OVER 6 FEET IN WIDTH.
(SEE DETAIL B, SHEET R-6.1.3, FOR TRUSS TIGHTENER DETAIL.)



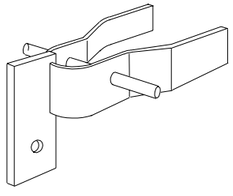
FRAME CONSTRUCTION GATES
THRU 6'-0" OPENING



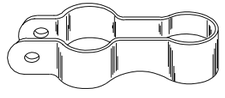
FRAME CONSTRUCTION GATES
THRU 6'-0" to 18'-0" OPENING



HINGE FOR TUBULAR POSTS



(A) LOCK KEEPER



(B) LOCK KEEPER GUIDE

GATE POST

GATE OPENING IN FEET		ROUND GATE POSTS O.D. DIA. (INCHES)	MIN. WEIGHT POUNDS/LIN. FT.	
SINGLE GATE	DOUBLE GATE		CLASS 1	CLASS 2
UP TO 6	UP TO 12	2.875	5.79	4.64
7 THRU 13	13 THRU 26	4.000	9.11	6.56
14 THRU 18	27 THRU 36	6.625	18.97	—

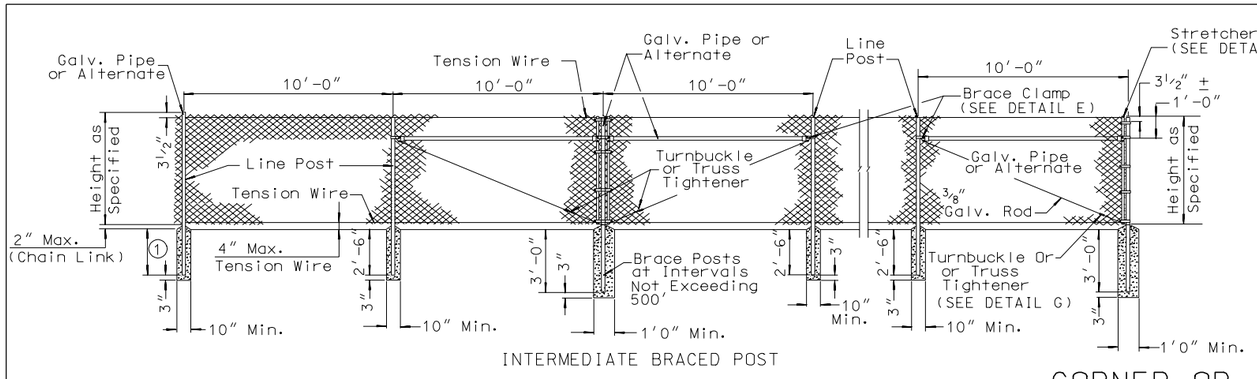
GENERAL NOTES:

1. DIAMETERS AND WEIGHTS LISTED ABOVE ARE MINIMUMS. LARGER SIZES MAY BE USED ON APPROVAL OF ENGINEER.
2. 3½" X 3½" TYPE II POST (4.65 LBS/FT) CAN BE USED IN PLACE OF 2.875" O.D. ROUND GATE POST.
3. CONCRETE SHALL BE CLASS A OR AA.

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

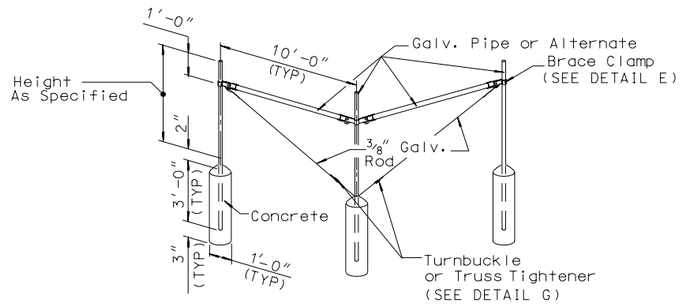
FENCE DETAILS
SWING GATES FOR UP TO 72 INCH HEIGHT CHAIN LINK 3B FENCE

Signed Original On File	R-6.3.2		(616)
CHIEF ROAD DESIGN ENGR.	ADOPTED:	3/79	REVISION 10/97

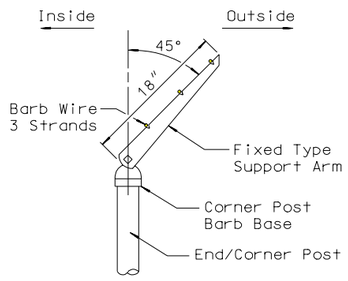


TYPICAL CHAIN LINK FENCE

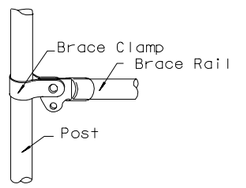
CORNER OR END POST



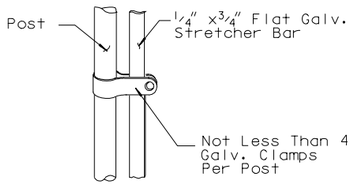
CORNER BRACE FOR CHAIN LINK FENCE



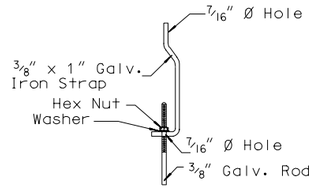
CORNER POST SUPPORT ARM



DETAIL E

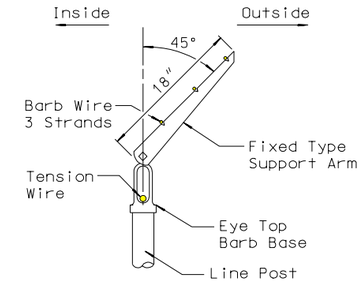


DETAIL F

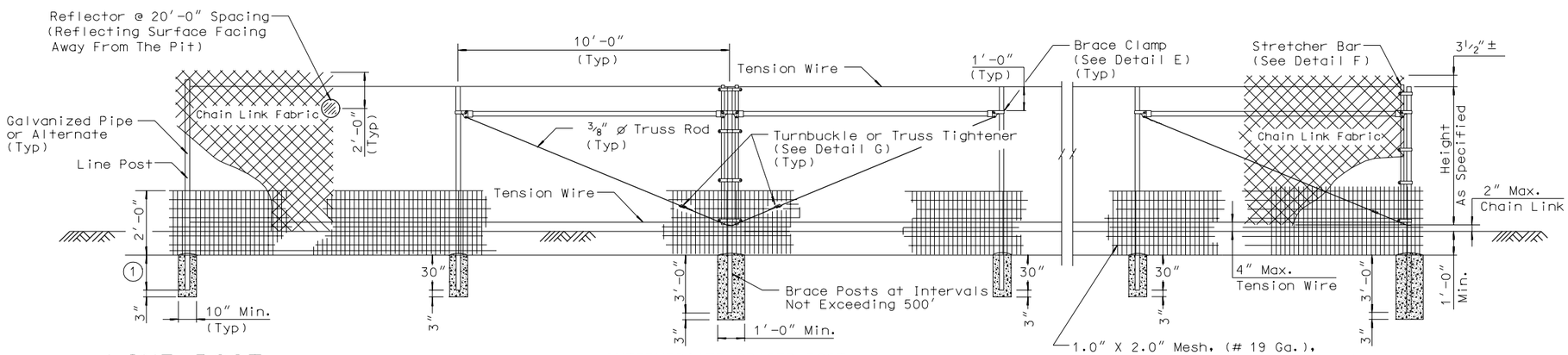


TRUSS TIGHTENER

DETAIL G



LINE POST SUPPORT ARM



LINE POST

INTERMEDIATE BRACED POST

CORNER OR END POST

TORTOISE FENCE

① 2′-0″ For Fence Height< 5′
2′-6″ For Fence Height≥ 5′

GENERAL NOTES:

1. CHAIN-LINK FENCING SHALL CONSIST OF GALVANIZED CHAIN-LINK FABRIC ON STEEL POSTS (TUBULAR OR C-SECTION).
2. ALL POSTS SHALL BE SET IN CLASS A OR AA CONCRETE.
3. ALL POSTS TOPS SHALL BE FITTED WITH SUITABLE FINIALS.
4. 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.
5. ALL FITTINGS SHALL BE HOT-DIPPED GALVANIZED MALLEABLE, CAST IRON, OR PRESSED STEEL.
6. FABRIC SHALL BE FASTENED TO LINE POSTS WITH FABRIC BANDS SPACED APPROXIMATELY 14″ APART, AND TO TOP TENSION WIRE AND BOTTOM TENSION WIRE WITH HOG RINGS OR TIE WIRES SPACED APPROXIMATELY 24″ APART.
7. FOR ALTERNATE POST AND BRACERAIL DETAILS SEE SHEETS NO. R-6.3.1 THROUGH R-6.3.3.
8. CLEARANCE BETWEEN BOTTOM OF GATE AND ORIGINAL GROUND SHALL BE 1″ MAXIMUM ON TORTOISE FENCES ONLY.
9. HARDWARE CLOTH TO BE ATTACHED TO CHAIN LINK FENCE FABRIC WITH HOG RINGS AT 12″ MAXIMUM SPACING TO BE INSTALLED OUTSIDE OF PIT. DITCH SHALL BE BACKFILLED WITH EXCAVATED MATERIAL AND COMPACTED AS DIRECTED BY THE ENGINEER.

SIZE OF POSTS

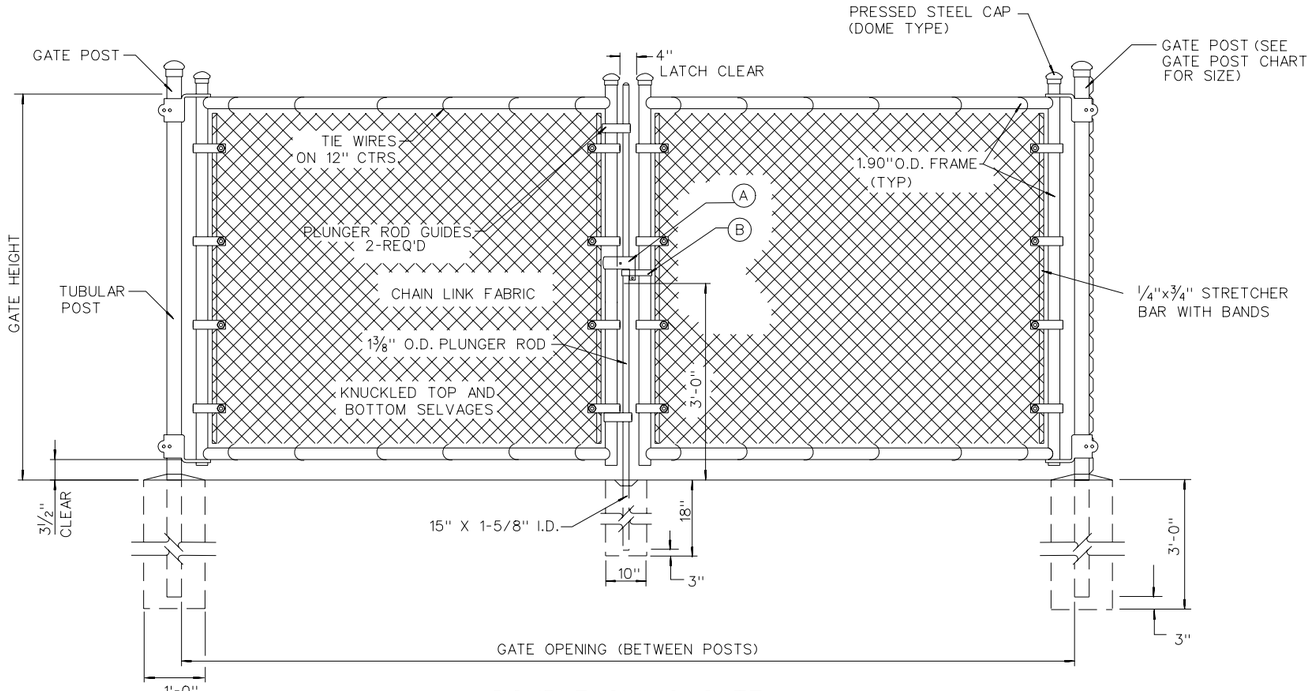
FENCE HEIGHT	CORNER, END, PULL AND BRACE POSTS					LINE POSTS					BRACE RAIL				
	ROUND PIPE O.D.	MIN. WT. (LBS/L.F.) CLASS 1	MIN. WT. (LBS/L.F.) CLASS 2	TYPE II	MIN. WT. (LBS/L.F.)	ROUND PIPE O.D.	MIN. WT. (LBS/L.F.) CLASS 1	MIN. WT. (LBS/L.F.) CLASS 2	C-SECTION DIMENSIONS	MIN. WT. (LBS/L.F.)	ROUND PIPE O.D.	MIN. WT. (LBS/L.F.) CLASS 1	MIN. WT. (LBS/L.F.) CLASS 2	C-SECTION DIMENSIONS	MIN. WT. (LBS/L.F.)
3′ to 6′	2.375″	3.65	2.64	3.5″x3.5″	4.85	1.900″	2.72	1.94	1.875″x1.625″	1.60	1.660″	2.27	1.45	1.625″x1.250″	1.35

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

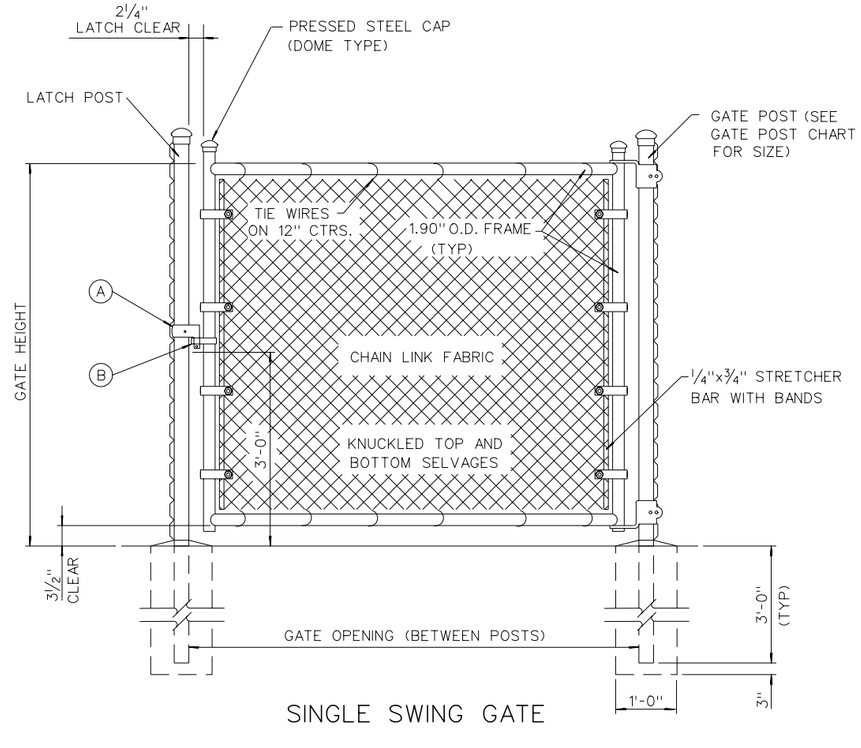
FENCE DETAILS CHAIN LINK FENCE AND TORTOISE FENCE

Signed Original On File	R-6.3.2.1	(616)
CHIEF ROAD DESIGN ENGR.	ADOPTED: 10/94	REVISION 10/00

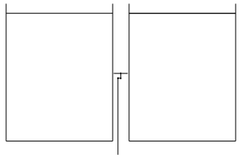
R-57



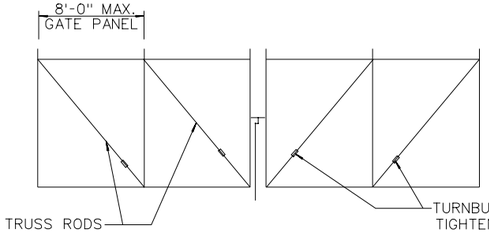
DOUBLE SWING GATE



SINGLE SWING GATE

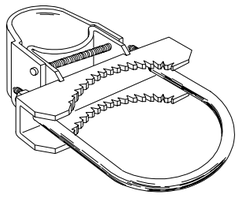


FRAME CONSTRUCTION GATES
THRU 12'-0" OPENING

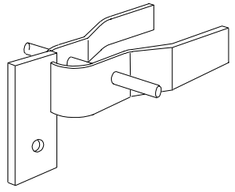


FRAME CONSTRUCTION GATES
OVER 12'-0" to 32'-0" OPENING

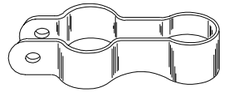
NOTE: ⅜" ADJUSTABLE TRUSS RODS SHALL BE INSTALLED ON ALL GATES OVER 6 FEET IN WIDTH.
(SEE DETAIL B, SHEET R-6.1.3, FOR TRUSS TIGHTENER DETAIL.)



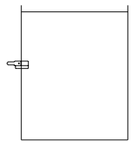
HINGE FOR TUBULAR POSTS



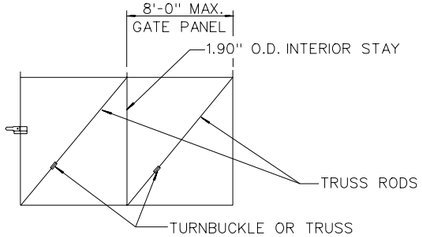
(A) LOCK KEEPER



(B) LOCK KEEPER GUIDE



FRAME CONSTRUCTION GATES
THRU 6'-0" OPENING



FRAME CONSTRUCTION GATES
OVER 6'-0" to 18'-0" OPENING

GATE POST

GATE OPENING IN FEET		ROUND GATE POSTS O.D. DIA. (INCHES)	MIN. WEIGHT POUNDS/LIN. FT.	
SINGLE GATE	DOUBLE GATE		CLASS 1	CLASS 2
UP TO 6	UP TO 12	2.875	5.79	4.64
7 THRU 13	13 THRU 26	4.000	9.11	6.56
14 THRU 18	27 THRU 36	6.625	18.97	—

GENERAL NOTES:

1. DIAMETERS AND WEIGHTS LISTED ABOVE ARE MINIMUMS. LARGER SIZES MAY BE USED ON APPROVAL OF ENGINEER.
2. 3½" X 3½" TYPE II POST (4.65 LBS/FT) CAN BE USED IN PLACE OF 2.875" O.D. ROUND GATE POST.
3. CONCRETE SHALL BE CLASS A OR AA.

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

FENCE DETAILS
SWING GATE FOR UP TO 72-INCH CHAIN LINK FENCE

Signed Original On File	R-6.3.3	(616)
CHIEF ROAD DESIGN ENGR.	ADOPTED: 3/79	REVISION 1-11/82

R-58

BILL OF MATERIALS

TIMBER				
ITEM	NO. REQ'D	SIZE	LENGTH	FT.BM
WHEEL GUARDS	2	6"x6"	7'-3"	43.5
WING SLOPE	4	2"x6"	8'-0"	32.0
WING SLOPE	2	2"x6"	6'-4½"	12.8
WING BRACES	2	2"x6"	3'-4"	6.7
WING BRACES	4	2"x6"	5'-3"	21.0
WING BRACES	2	2"x6"	7'-3"	14.5
WING BRACES	2	2"x6"	2'-1"	4.2
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	¾"	12"	15
WASHERS	8	¾"		1
WASHERS (LOCK)	4	¾"		½
NAILS	50	40d		3
NAILS	72	20d		2-¼
BOLTS	4	¾"	1 ½"	1
TOTAL				22-¾

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	2½"x5/16"	0'-6 13/16"	109
ANCHOR BOLTS	12	7/8"	1'-0"	12
END PLATES	2	8"x1/2"	13'-0"	177
STEEL STRAPS	3	4"x1/4"	7'-2"	74
TOTAL				2,473

14' ROADBED				
ITEM	NO. REQ'D	SIZE	LENGTH	WT. LBS.
I BEAMS	13	S4x7.7	15'-0"	1,502
I BEAMS	7	S8x18.4	7'-3"	934
SPACERS	84	2½"x5/16"	0'-6 13/16"	127
ANCHOR BOLTS	14	7/8"	1'-0"	14
END PLATES	2	8"x1/4"	15'-0"	204
STEEL STRAPS	4	4"x1/4"	7'-2"	98
TOTAL				2.879

16' ROADBED				
ITEM	NO. REQ'D	SIZE	LENGTH	WT. LBS.
I BEAMS	13	S4x7.7	17'-0"	1,702
I BEAMS	8	S8x18.4	7'-3"	1,067
SPACERS	84	2½"x5/16"	0'-6 13/16"	127
ANCHOR BOLTS	14	7/8"	1'-0"	14
END PLATES	2	8"x1/4"	17'-0"	231
STEEL STRAPS	4	4"x1/4"	7'-2"	98
TOTAL				3.239

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	2½"x5/16"	0'-6 13/16"	163
ANCHOR BOLTS	18	7/8"	1'-0"	18
END PLATES	2	8"x1/4"	21'-0"	286
STEEL STRAPS	5	4"x1/4"	7'-2"	122
TOTAL				3,892

ALL ROADBED WIDTH				
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	22	NO. 6	12'-1"	400
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	24	NO. 6	12'-1"	436
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
VERTICAL BARS	26	NO. 4	2'-9"	48
U-BARS	29	NO. 6	12'-1"	527
HORIZONTAL BARS	4	NO. 4	17'-2"	46
TOTAL				1.125

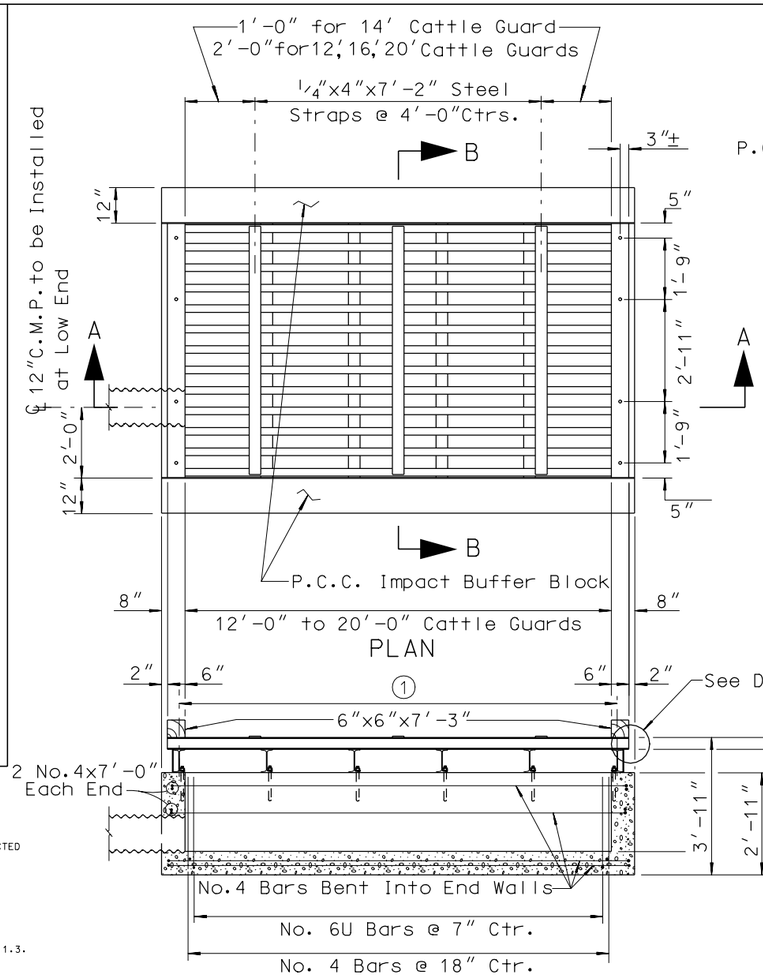
20' ROADBED				
ITEM	NO. REQ'D	SIZE	LENGTH	WT. LBS.
HORIZONTAL BARS	*12	NO. 4	20'-6"	164
HORIZONTAL BARS	17	NO. 4	7'-0"	79
HORIZONTAL BARS	18	NO. 4	24'-9"	297
VERTICAL BARS	30	NO. 4	2'-9"	55
U-BARS	36	NO. 6	12'-1"	654
HORIZONTAL BARS	4	NO. 4	21'-2"	57
TOTAL				1.359

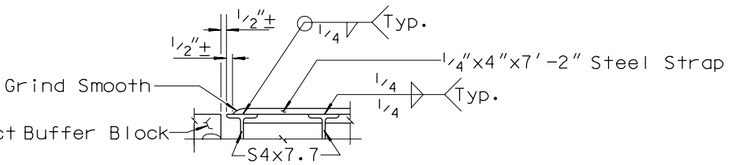
CONCRETE	
12' ROADBED	6.25 CU. YD.
14' ROADBED	7.03 CU. YD.
16' ROADBED	7.79 CU. YD.
20' ROADBED	9.34 CU. YD.

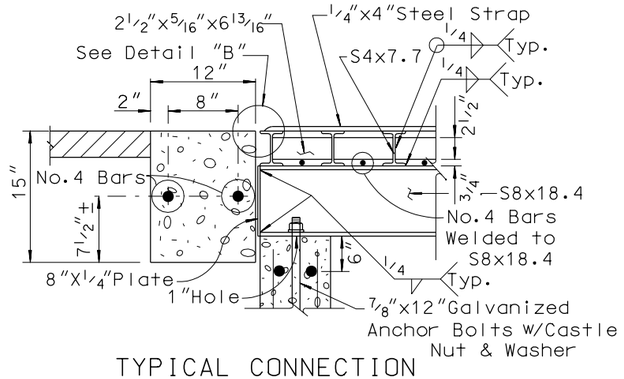
* NO. 4 BARS WELDED TO 8" I BEAMS

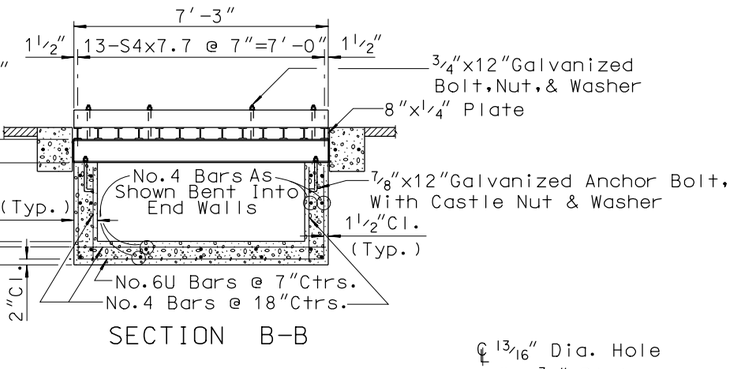
GENERAL NOTES:

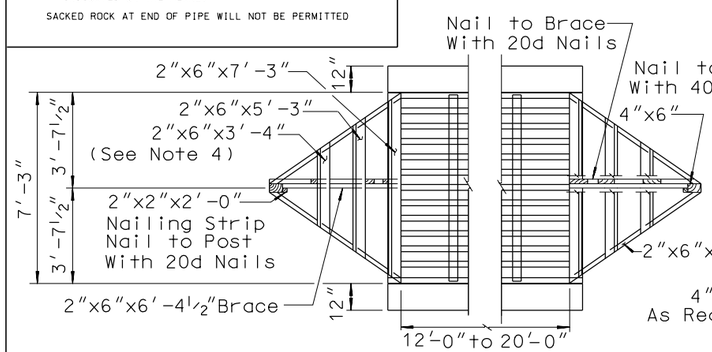
1. ALL CONCRETE TO BE CLASS A OR AA.
2. STANDARD METAL OR TIMBER GATES SHALL BE CONSTRUCTED WHEN SHOWN ON PLANS OR ORDERED BY THE ENGINEER.
3. ALL CONNECTIONS TO BE WELDED.
4. ALL TIMBER SHALL BE PAINTED WHITE PER STANDARD SPECIFICATIONS.
5. METAL WINGS ARE OPTIONAL. SEE DETAIL "A". FOR ADDITIONAL DETAILS AND QUANTITIES SEE SHEET R-7.1.3.
6. ALL WINGS SHALL BE PAINTED WHITE PER STANDARD SPECIFICATIONS.
7. CATTLE GUARD WIDTH SHALL INCLUDE A 2' SHY DISTANCE FROM THE NORMAL EDGE OF PAVEMENT, EACH SIDE (PER AASHTO).

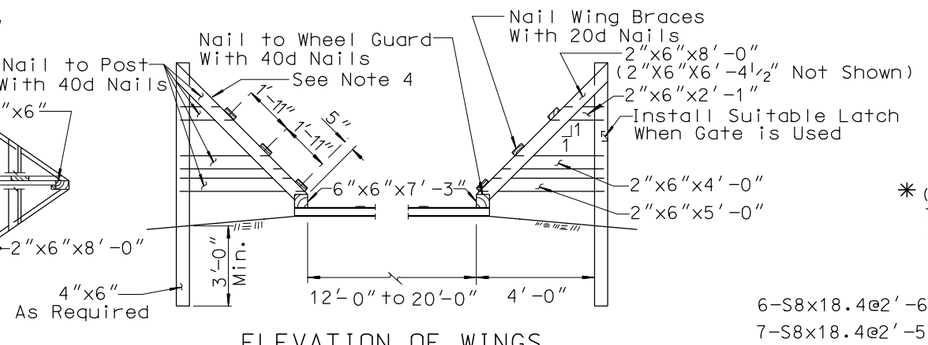


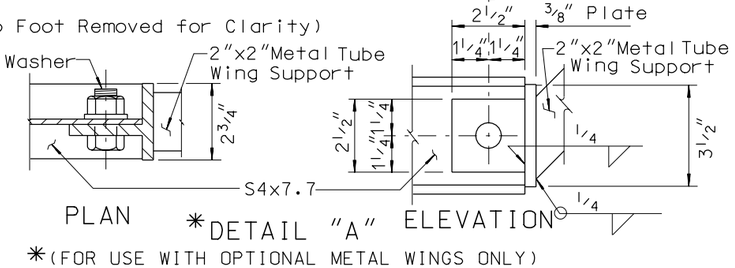












*(This Connection Shall Be Made To Second S4x7.7 Beam At 8.33" From Impact Buffer Blocks)

①

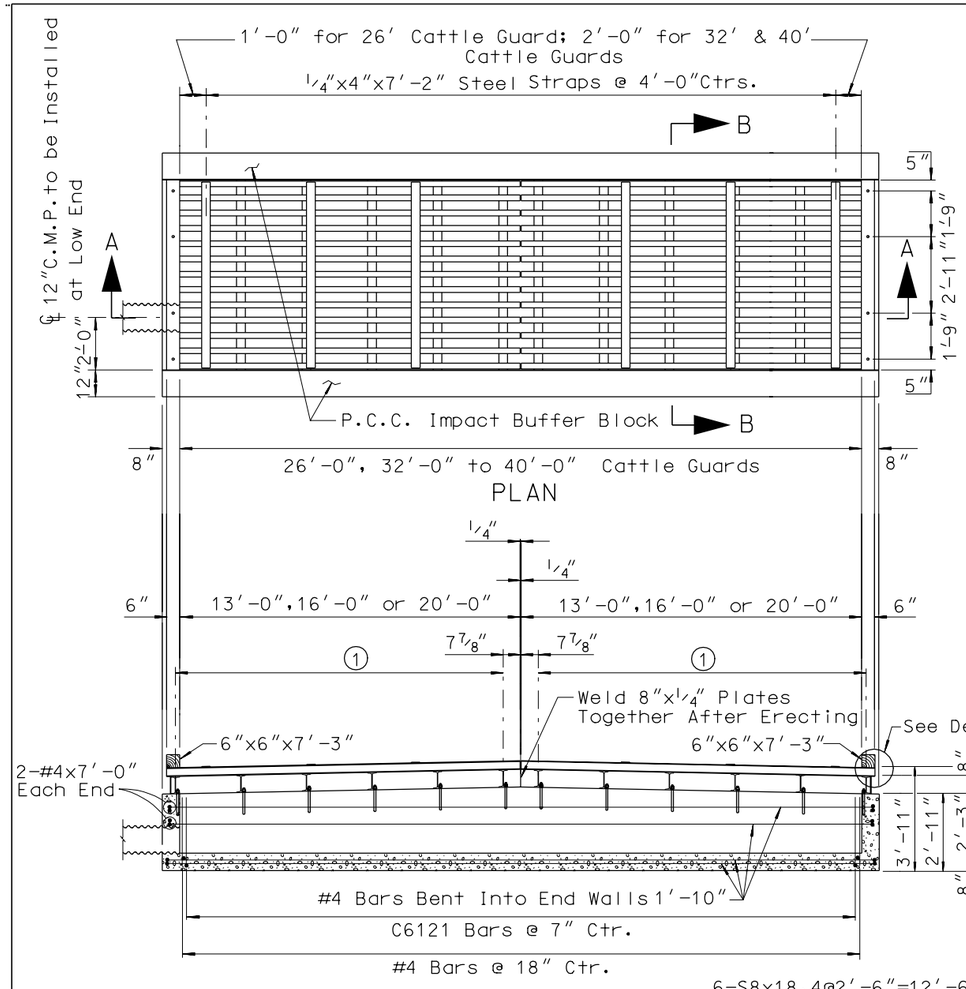
6-S8x18.4@2'-6"=12'-6" for 12'Cattle Guard
7-S8x18.4@2'-5"=14'-6" for 14'Cattle Guard
8-S8x18.4@2'-4¼"=16'-6" for 16'Cattle Guard
9-S8x18.4@2'-6¾"=20'-6" for 20'Cattle Guard

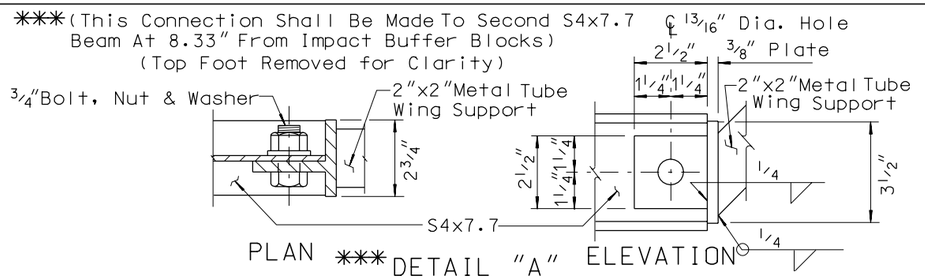
STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

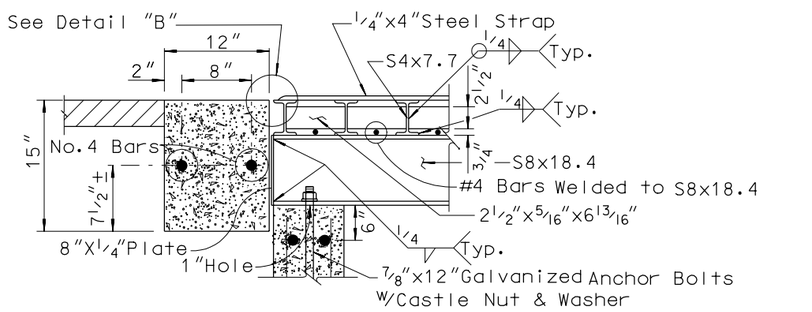
STEEL CATTLE GUARD
12' TO 20' ROADBED

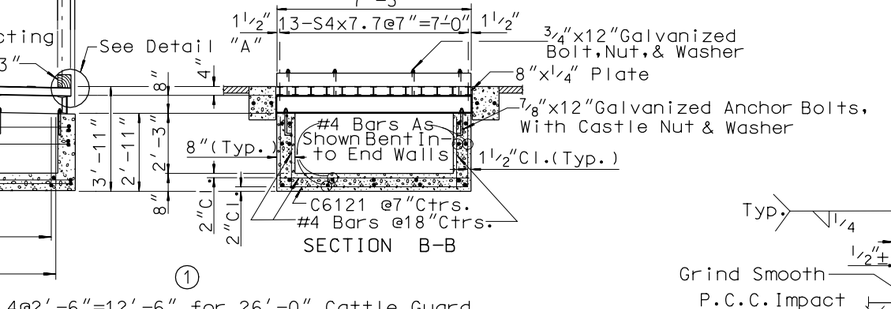
Signed Original On File	R-7.1.1	(617)
CHIEF ROAD DESIGN ENGR.	ADOPTED -8/69	REVISION 2/98

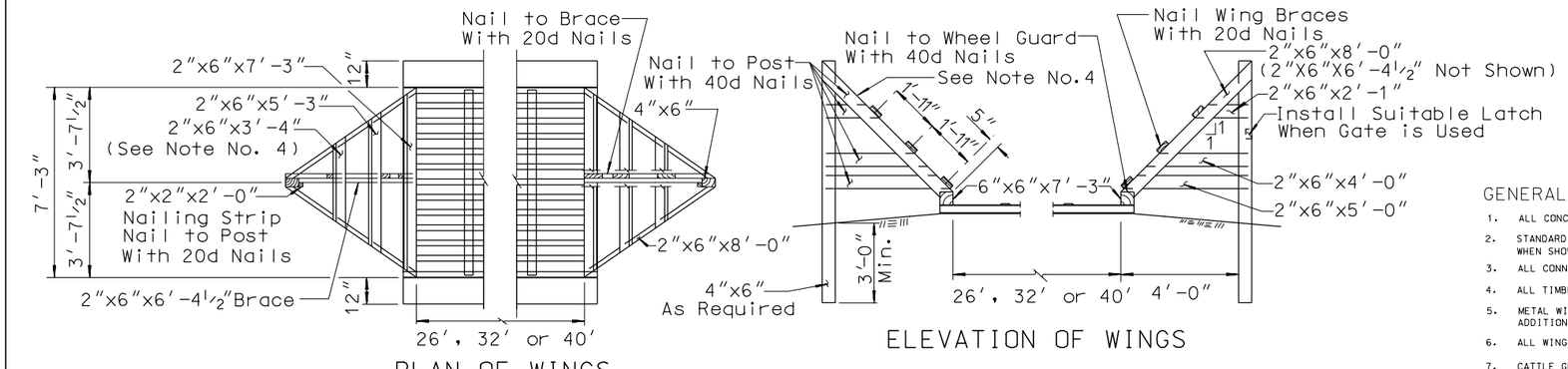
R-59

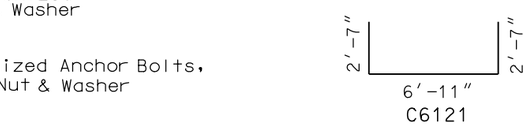


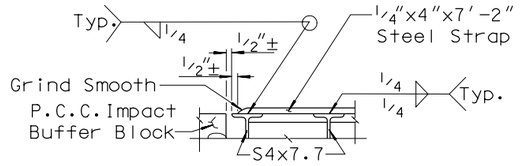












6-S8x18.4@2'-6"=12'-6" for 26'-0" Cattle Guard
7-S8x18.4@2'-7"=15'-6" for 32'-0" Cattle Guard
9-S8x18.4@2'-5 1/4"=19'-6" for 40'-0" Cattle Guard

STRUCTURAL STEEL

26' ROADBED				
ITEM	NO. REQ'D	SIZE	LENGTH	WT. LBS.
I BEAMS	26	S4x7.7	13'-5 3/4"	2,699
I BEAMS	12	S8x18.4	7'-3"	1,331
SPACERS	144	2 1/2"x5/16"	0'-6 13/16"	217
ANCHOR BOLTS	24	7/8"Ø	1'-0"	23
END PLATES	4	7"x1/4"	13'-6"	320
STEEL STRAPS	7	4"x1/4"	7'-2"	171
TOTAL				4,567

32' ROADBED				
ITEM	NO. REQ'D	SIZE	LENGTH	WT. LBS.
I BEAMS	26	S4x7.7	16'-5 3/4"	3,299
I BEAMS	14	S8x18.4	7'-3"	1,553
SPACERS	168	2 1/2"x5/16"	0'-6 13/16"	254
ANCHOR BOLTS	28	7/8"Ø	1'-0"	27
END PLATES	4	7"x1/4"	16'-6"	392
STEEL STRAPS	8	4"x1/4"	7'-2"	195
TOTAL				8,408

40' ROADBED				
ITEM	NO. REQ'D	SIZE	LENGTH	WT. LBS.
I BEAMS	26	S4x7.7	20'-5 3/4"	4,100
I BEAMS	18	S8x18.4	7'-3"	1,997
SPACERS	216	2 1/2"x5/16"	0'-6 13/16"	326
ANCHOR BOLTS	36	7/8"Ø	1'-0"	35
END PLATES	4	7"x1/4"	20'-6"	487
STEEL STRAPS	10	4"x1/4"	7'-2"	244
TOTAL				6,951

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
HORIZONTAL BARS	4	NO. 4	27'-2"	72
TOTAL				1738

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
HORIZONTAL BARS	4	NO. 4	33'-2"	89
TOTAL				2.089

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	18	NO. 4	44'-9"	538
VERTICAL BARS	58	NO. 4	2'-9"	107
U-BARS	74	NO. 6	12'-1"	1344
HORIZONTAL BARS	4	NO. 4	41'-2"	110
TOTAL				2,569

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

* #4 BARS WELDED TO 8" I BEAMS

BILL OF MATERIALS

TIMBER				
ITEM	NO. REQ'D	SIZE	LENGTH	FT.BM
WHEEL 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"	6.7
WING BRACES	4	2"x6"	5'-3"	21.0
WING BRACES	2	2"x6"	7'-3"	14.5
WING BRACES	2	2"x6"	2'-1"	4.2
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

ALL ROADBED WIDTH				
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.

GALVANIZED HARDWARE				
ITEM	NO. REQ'D	SIZE	LENGTH	WT. LBS.
BOLTS	8	3/4" Ø	12"	15
WASHERS	8	3/4" Ø		6
WASHERS (LOCK)	4	3/4" Ø		1/2
NAILS	50	40d		3
NAILS	72	20d		2-1/4
BOLTS	4	3/4" Ø	1 1/2"	1
TOTAL				22-3/4

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. ALL TIMBER SHALL BE PAINTED WHITE PER STANDARD SPECIFICATIONS.
5. METAL WINGS ARE OPTIONAL. SEE DETAIL "A". FOR ADDITIONAL DETAILS AND QUANTITIES SEE SHEET R-7.1.3.
6. ALL WINGS SHALL BE PAINTED WHITE PER STANDARD SPECIFICATIONS.
7. CATTLE GUARD WIDTH SHALL INCLUDE A 2' SHY DISTANCE FROM THE NORMAL E.O.P., EACH SIDE (PER AASHTO).

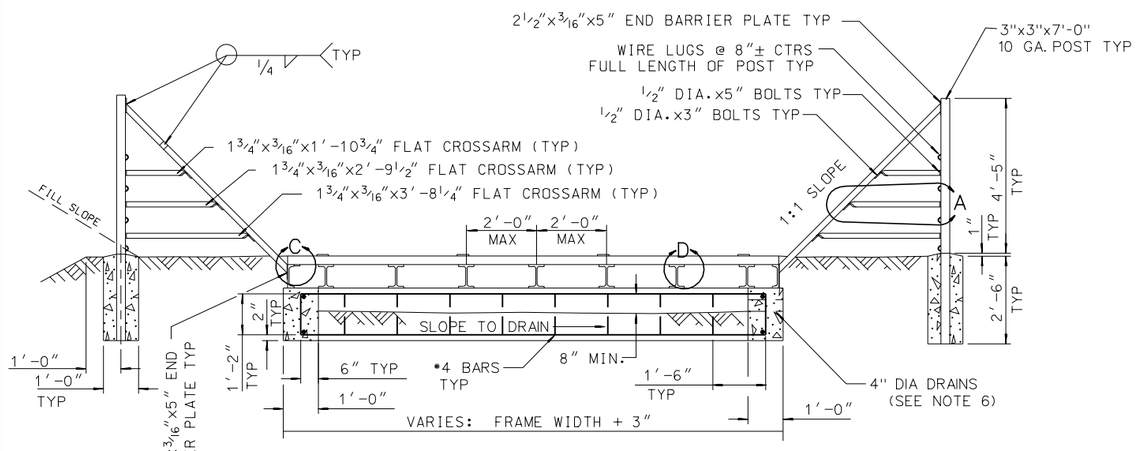
STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

STEEL CATTLE GUARD
26' TO 40' ROADBED

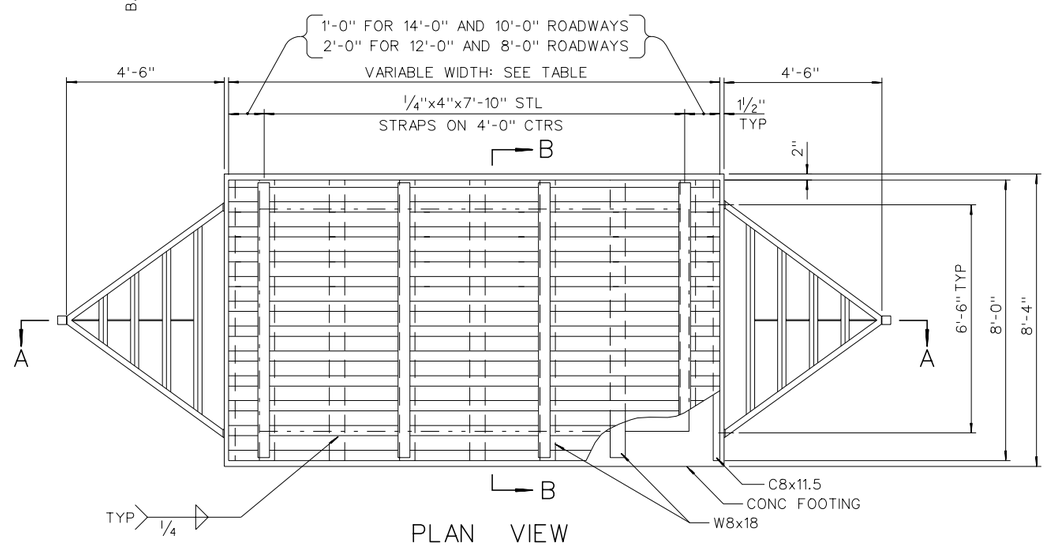
Signed Original On File
CHIEF ROAD DESIGN ENGR.

R-7.1.2 (617)
ADOPTED -8/69 REVISION 9/97

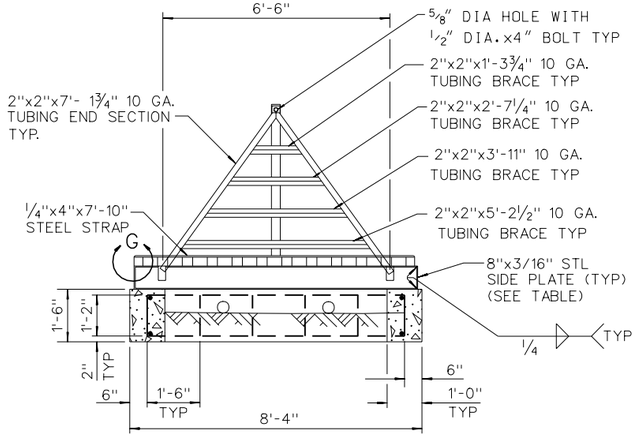
R-60



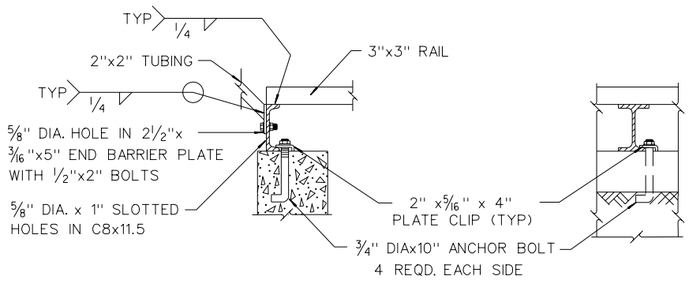
SECTION A-A



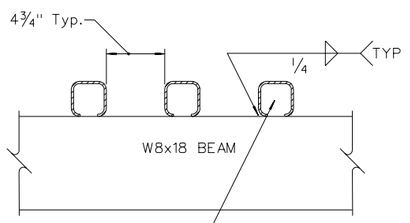
PLAN VIEW



SECTION B-B



DETAILS "C" & "D"



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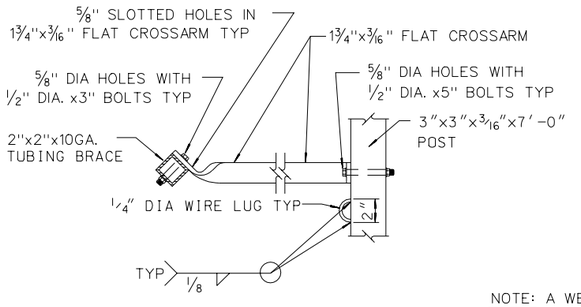

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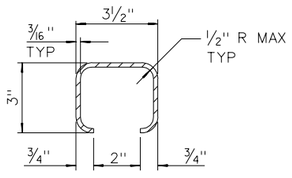
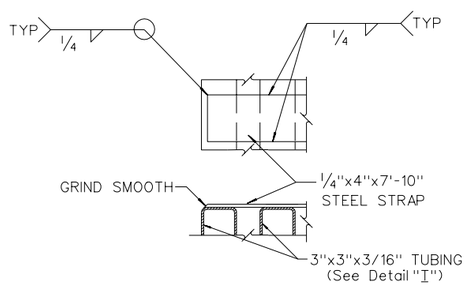


DETAIL "H"

NOTE: A WELDED OR ROLLED UNIT OF EQUIVALENT DESIGN LOADING CAPACITY MAY BE SUBMITTED TO THE ENGINEER FOR APPROVAL IN PLACE OF A 3"x3"x3/16" TUBING



DETAIL "G"

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

BILL OF MATERIALS

FRAME SIZE		LONGITUDINAL STRINGERS			
LENGTH	WIDTH	NO. REQD	SIZE	SPACING	WT. LBS
8'-0"	14'-0"	6	W8x18	EQUAL	859
8'-0"	12'-0"	5	W8x18	EQUAL	716
8'-0"	10'-0"	4	W8x18	EQUAL	573
8'-0"	8'-0"	3	W8x18	EQUAL	430

STRUCTURAL STEEL				
ITEM	NO. REQD	SIZE	LENGTH	WT. LBS
RAILS	13	3"x3"x3/16"	14'-0"	1249
SIDE PLATE	2	8"x3/16"	14'-0"	143
RAILS	13	3"x3"x3/16"	12'-0"	1070
SIDE PLATE	2	8"x3/16"	12'-0"	122
RAILS	13	3"x3"x3/16"	10'-0"	892
SIDE RAILS	2	8"x3/16"	10'-0"	102
RAILS	13	3"x3"x3/16"	8'-0"	713
SIDE RAILS	2	8"x3/16"	8'-0"	82

STRUCTURAL STEEL				
ROAD WIDTH	ITEM	NO. REQD	SIZE	WT. LBS
14'	STEEL STRAP	4	1/4"x4"x7'-10"	107
12'	STEEL STRAP	3	1/4"x4"x7'-10"	80
10'	STEEL STRAP	3	1/4"x4"x7'-10"	80
8'	STEEL STRAP	2	1/4"x4"x7'-10"	53

MATERIAL LIST FOR WINGS				
ITEM	NO. REQD	SIZE	LENGTH	WT. LBS
FLAT CROSSARMS	2	1-3/4"x3/16"	1'-10 3/4"	4
FLAT CROSSARMS	2	1-3/4"x3/16"	2'- 9 1/2"	6
FLAT CROSSARMS	2	1-3/4"x3/16"	3'- 8 1/4"	8
BRACES	2	2"x2"x10 GA	1'- 3 3/4"	11
BRACES	2	2"x2"x10 GA	2'- 7 1/4"	23
BRACES	2	2"x2"x10 GA	3'- 11"	38
BRACES	2	2"x2"x10 GA	5'- 2 1/2"	45
END BARRIER	4	2"x2"x10 GA	7'- 1 3/4"	123
END BARRIER PLATE	6	2 1/2"x3/16"	5"	4
UPRIGHT POST	2	3"x3"x 3/16"	7'-0"	96

MATERIAL LIST FOR ALL SIZES				
ITEM	NO. REQD	SIZE	LENGTH	WT. LBS
CHANNELS	2	C8x11.5	8'-0"	184
PLATE CLIP	12	2"x3/8"	4 1/2"	9
ANCHOR BOLT CLIP	14	2"x5/16"	4"	10

CONCRETE		REINFORCING STEEL
LENGTH	CUBIC YDS.	WT. LBS
14'-0"	2.29	82
12'-0"	2.06	74
10'-0"	1.84	67
8'-0"	1.62	60

GALVANIZED HARDWARE			
ITEM	NO. REQD	SIZE	LENGTH
BOLT	6	1/2"	3"
BOLT	16	1/2"	2"
BOLT	6	1/2"	5"
WASHER	56	9 1/16"	-
WASHER	14	13/16"	-
NUT	28	1/2"	-
NUT	14	3/4"	-
ANCHOR BOLT	14	3/4"	-

NOTE: MATERIAL LISTS ARE FOR INFORMATION ONLY.

GENERAL NOTES:

1. ALL CONCRETE SHALL BE CLASS A OR AA.
2. ALTERNATIVE DESIGN MAY BE SUBSTITUTED BY THE CONTRACTOR FOR APPROVAL BY THE ENGINEER.
3. LIVE LOADING: H-20
4. CATTLE GUARD SLOPE IS TO CONFORM TO THE ROADWAY CROSS SLOPE AND GRADE.
5. "FRAME WIDTH" COMBINATIONS MAY BE VARIED TO OBTAIN THE SPECIFIED WIDTH OF CATTLE GUARDS.
6. EXTEND 4" DRAINS TO FACILITATE DRAINAGE OF STRUCTURE.
7. ALL WINGS SHALL BE PAINTED WHITE PER STANDARD SPECIFICATION.

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

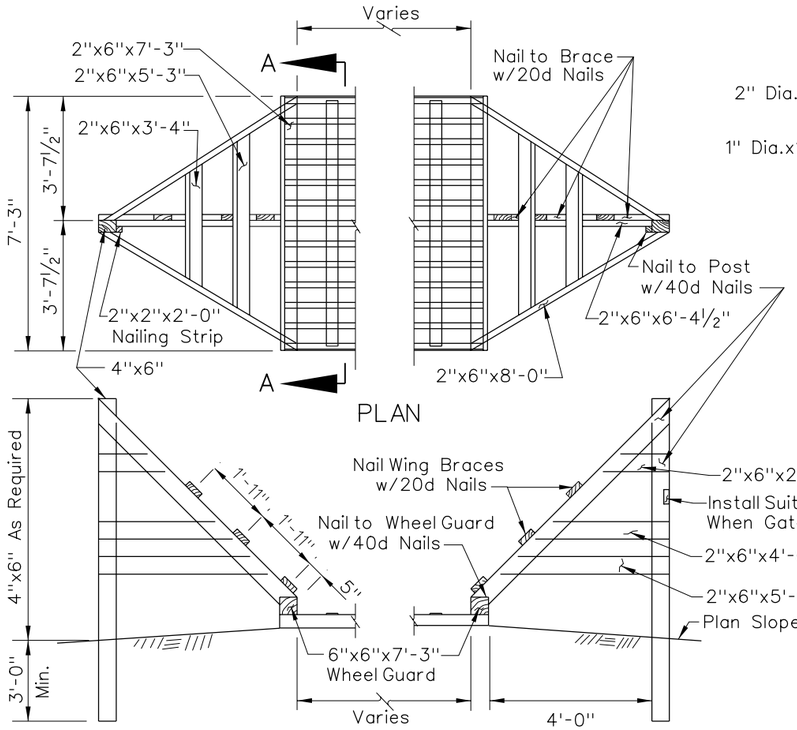
STEEL CATTLE GUARD

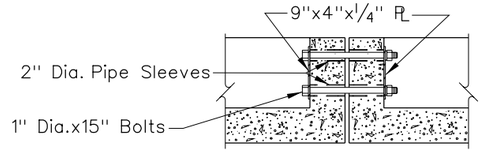
(TYPE B)

Signed Original On File
CHIEF ROAD DESIGN ENGR.

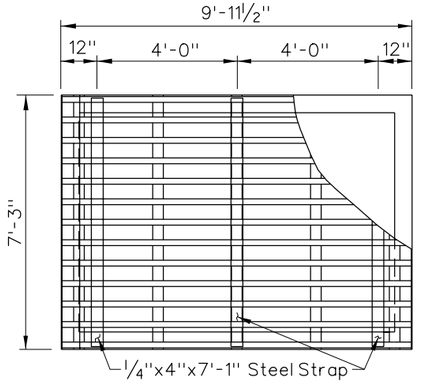
R-7.1.3 (617)
ADOPTED: 3-71
REVISION 9/97

R-61

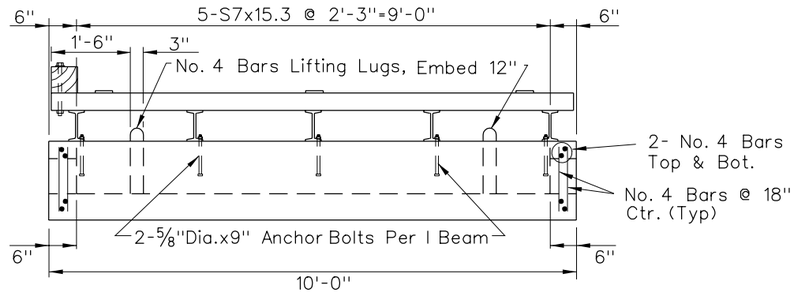




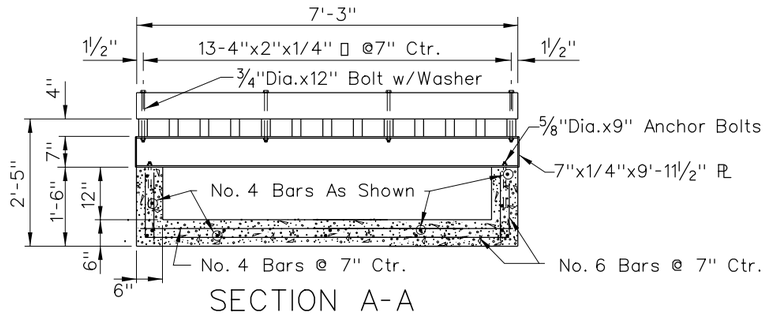
CONNECTION DETAIL



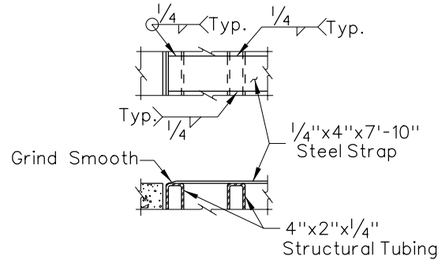
PLAN



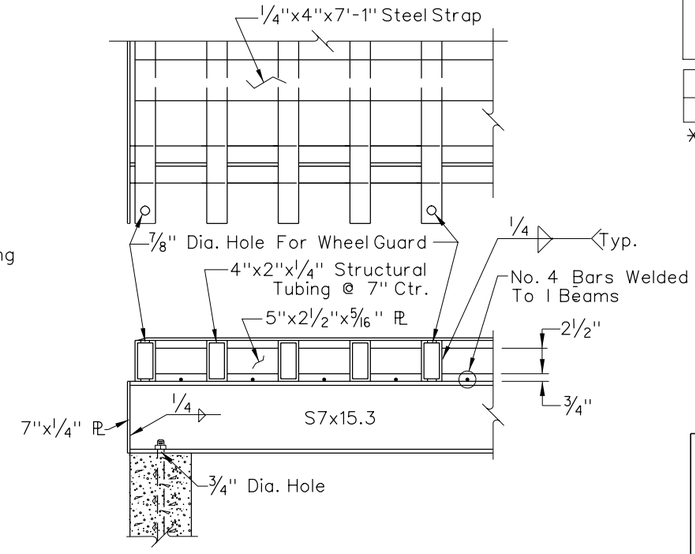
ELEVATION



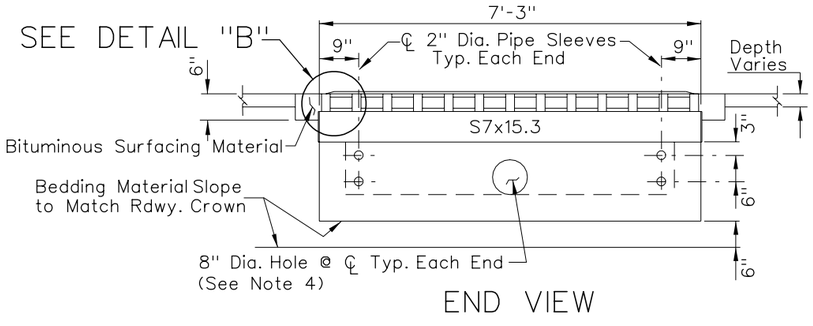
SECTION A-A



DETAIL "B"



TYPICAL CONNECTION



END VIEW

STRUCTURAL STEEL (1-10'-0" COMPONENT)				
ITEM	NO. REQUIRED	SIZE	LENGTH	WT.LBS
BEAMS	5	S7x15.3	7'-3"	554.6
STRUCTURAL TUBING	13	4"x2"x 1/4"	9'-11 1/2"	1139.3
SPACER PLATES	60	2½"x5/16"	0'-5"	67.0
ANCHOR BOLTS	10	5/8"	0'-9"	9.0
STEEL STRAPS	3	4"x 1/4"	7'-1"	72.3
END PLATES	2	7"x 1/4"	9'-11 1/2"	118.5
PIPE SLEEVES	8	2"	0'-6"	14.6
CONNECTION PLATES	AS REQ'D	9"x4"x 1/4"	-	-
CONNECTION BOLTS	AS REQ'D	1"	15"	-

REINFORCING STEEL (1-10'-0" COMPONENT)				
ITEM	NO. REQ'D	SIZE	LENGTH	WT. LBS
✕ HORIZONTAL BARS	12	NO. 4	9'-6"	76
HORIZONTAL BARS	18	NO. 4	9'-9"	117
HORIZONTAL BARS	18	NO. 4	7'-0"	84
VERTICAL BARS	44	NO. 4	1'-3"	37
LIFTING LUGS	4	NO. 4	2'-9"	7
U BARS	18	NO. 6	9'-6"	259
		TOTAL		580

TIMBER				
ITEM	NO. REQUIRED	SIZE	LENGTH	BD. FT.
WHEEL 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"	6.7
WING BRACES	4	2"x6"	5'-3"	21.0
WING BRACES	2	2"x6"	7'-3"	14.5
WING BRACES	2	2"x6"	2'-1"	4.2
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. REQUIRED	SIZE	LENGTH	WT. LBS
BOLTS	8	3/4" DIA.	12"	15
WASHERS	8	3/4"	-	6
NAILS	50	40d	-	3
NAILS	72	40d	-	2 1/4
			TOTAL	26 1/4

CONCRETE	
1-10'-0" COMPONENT	1.94 CU. YDS.

✕ - NO. 4 BARS WELDED TO IBEAMS.

GENERAL NOTES:

1. ALL CONCRETE TO BE CLASS DA.
2. ALL CONNECTIONS TO BE WELDED.
3. 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.
4. EXTEND DRAIN PIPES TO FACILITATE DRAINAGE OF STRUCTURE.
5. WINGS SHALL BE PAINTED WHITE PER STANDARD SPECIFICATIONS.

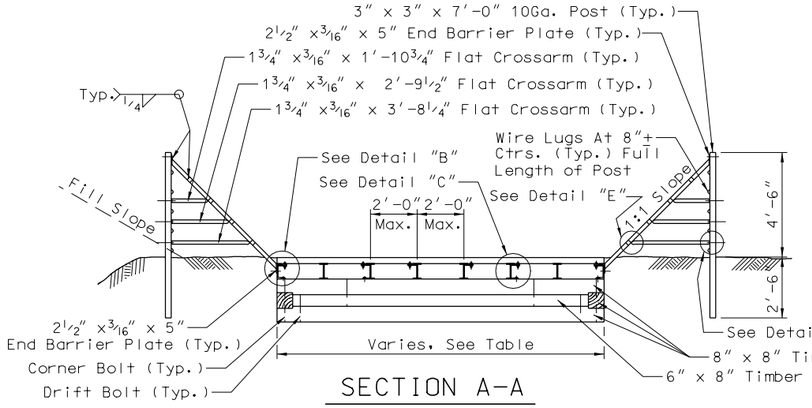
THIS DESIGN IS NOT FOR USE ON MAINLINES, RAMPS, OR CROSSROADS

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

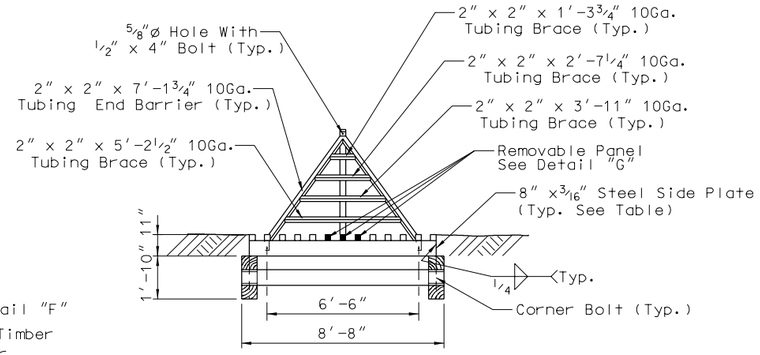
STEEL CATTLE GUARD (TYPE C)

Signed Original On File	R-7.1.4	(617)
CHIEF ROAD DESIGN ENGR.	ADOPTED: 10/70	REVISION 2/98

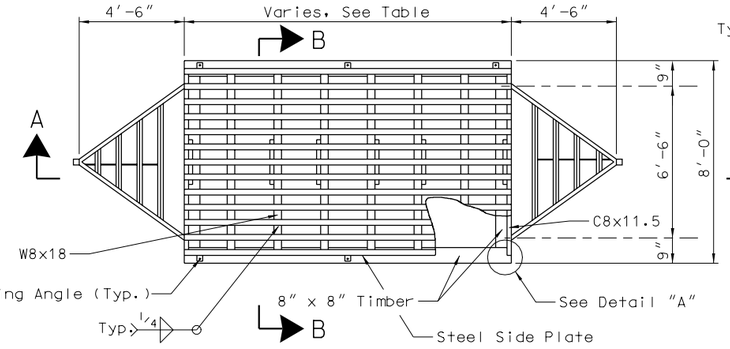
R-62



SECTION A-A

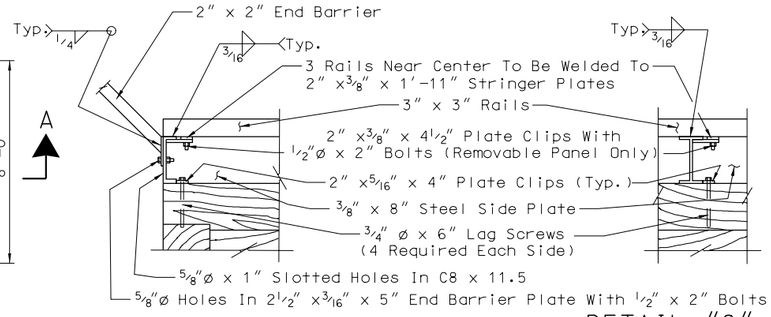


SECTION B-B



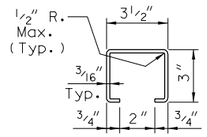
PLAN

NOTE: MATERIAL LIST IS FOR INFORMATION ONLY.



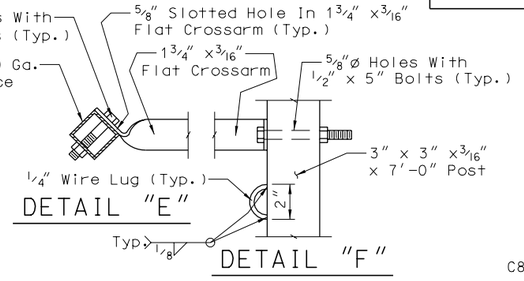
DETAIL "B"

DETAIL "C"



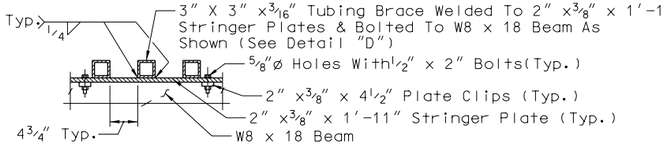
DETAIL "D"

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.



DETAIL "E"

DETAIL "F"



DETAIL "G"

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

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	4	2" X 2" X 10GA.	7'-1 3/4"	123
END BARRIER PLATES	6	2 1/2" X 3/16"	5"	4
UPRIGHT POST	2	3" X 3" X 3/16"	7'-0"	96

GALVANIZED HARDWARE			
ITEM	NO. REQD.	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"

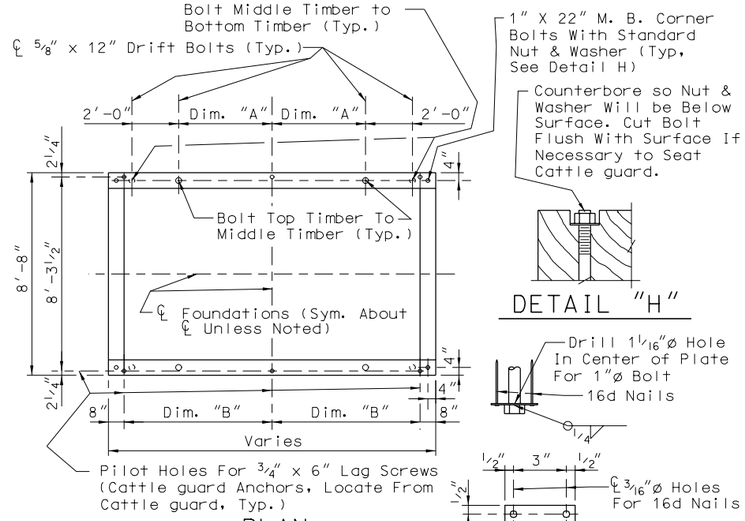
BILL OF MATERIALS

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	W8X18	EQUAL	859	RAILS	13	3" X 3" X3/16"	14'-0"	1249
						SIDE PLATES	2	8" X 3/16"	14'-0"	143
8'-0"	12'-0"	5	W8X18	EQUAL	716	RAILS	13	3" X 3" X3/16"	12'-0"	1070
						SIDE PLATES	2	8" X 3/16"	12'-0"	122
8'-0"	10'-0"	4	W8X18	EQUAL	573	RAILS	13	3" X 3" X3/16"	10'-0"	892
						SIDE PLATES	2	8" X 3/16"	10'-0"	102
8'-0"	8'-0"	3	W8X18	EQUAL	430	RAILS	13	3" X 3" X3/16"	8'-0"	713
						SIDE PLATES	2	8" X 3/16"	8'-0"	82

MATERIAL LIST FOR ALL SIZES				
ITEM	NO. REQD.	SIZE	LENGTH	WT. LBS.
CHANNELS	2	C8 X 11.5	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

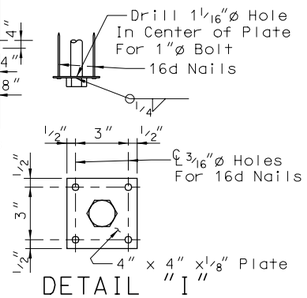
GENERAL NOTES:

1. ALTERNATE DESIGN MAY BE SUBSTITUTED BY THE CONTRACTOR FOR APPROVAL BY THE ENGINEER.
2. LIVE LOADING: H20
3. 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.
4. "FRAME WIDTH" COMBINATIONS MAY BE VARIED TO OBTAIN THE SPECIFIED WIDTH OF CATTLE GUARDS.
5. USE SELF-LOCKING NUTS ON REMOVABLE PANEL.
6. ALL WINGS SHALL BE PAINTED WHITE PER STANDARD SPECIFICATIONS.

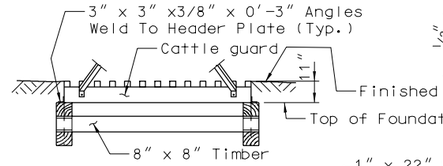


PLAN

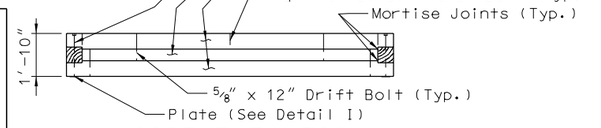
DETAIL "H"



DETAIL "I"

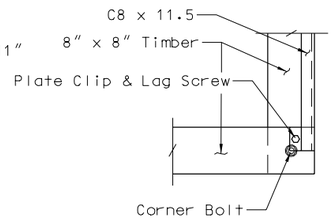


END ELEVATION
(With Cattle guard)



SIDE ELEVATION
(Without Cattleguard)

FRAME SIZE		DIM.	DIM.
LENGTH	WIDTH	"A"	"B"
8'-8"	14'-0"	4'-0"	6'-4"
8'-8"	12'-0"	3'-0"	5'-4"
8'-8"	10'-0"	2'-0"	4'-4"
8'-8"	8'-0"	1'-0"	3'-4"



DETAIL "A"

GENERAL NOTES:

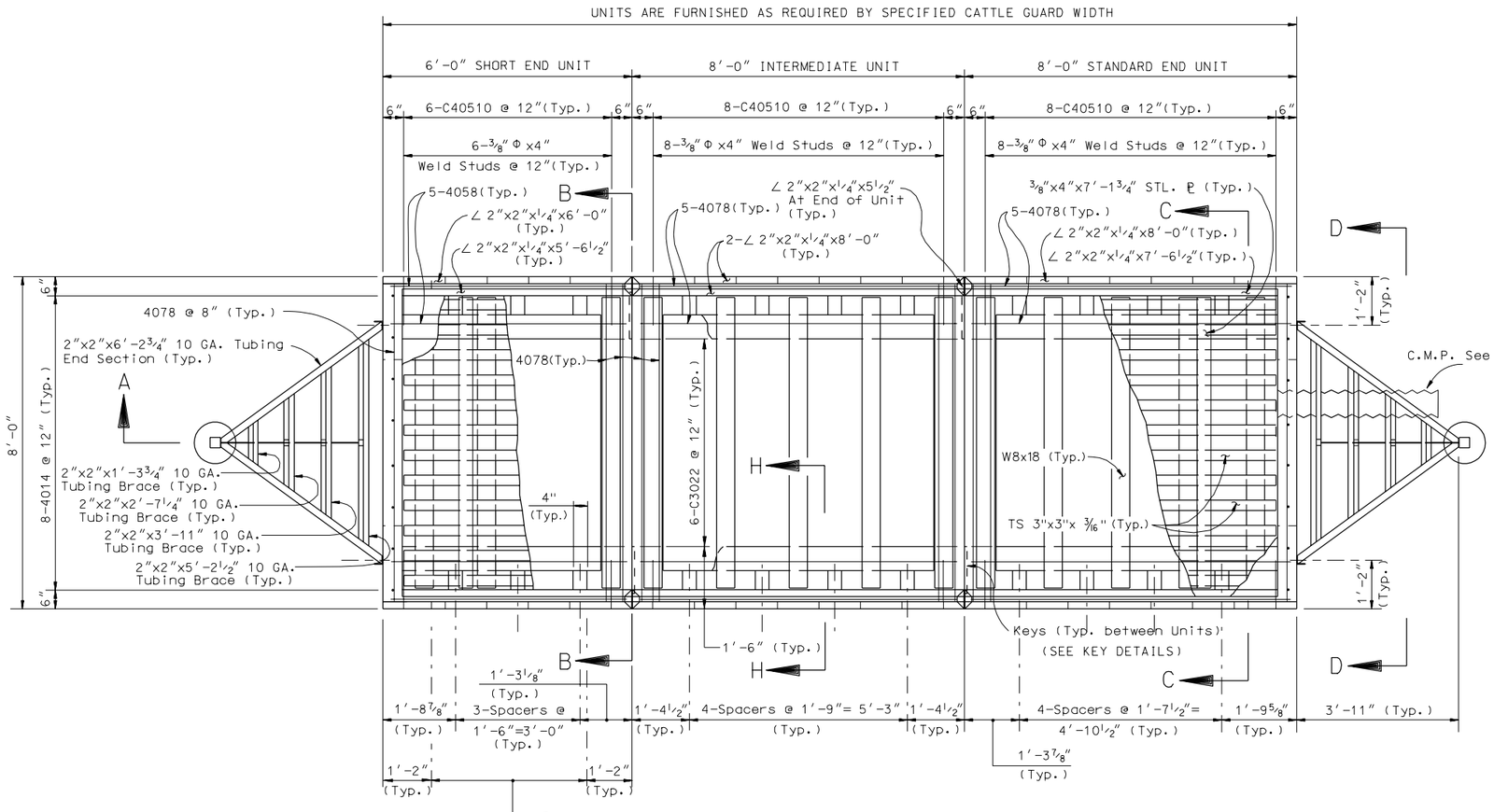
1. USE SINGLE LAYER FOUNDATION UNIT FOR EACH CATTLE GUARD FRAME.
2. TIMBERS USED IN FOUNDATIONS SHALL BE TREATED.

TIMBER FOUNDATION DETAILS

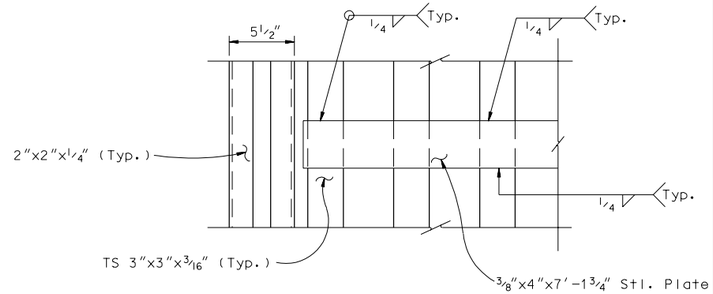
STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

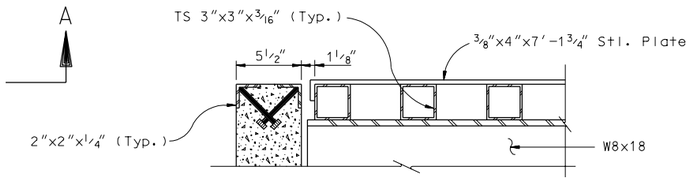
STEEL CATTLE GUARD TIMBER FOUNDATION

Signed Original On File	R-7.1.5 (617)
CHIEF ROAD DESIGN ENGINEER	ADOPTED: 7/77 REVISION 1-6/80



PLAN

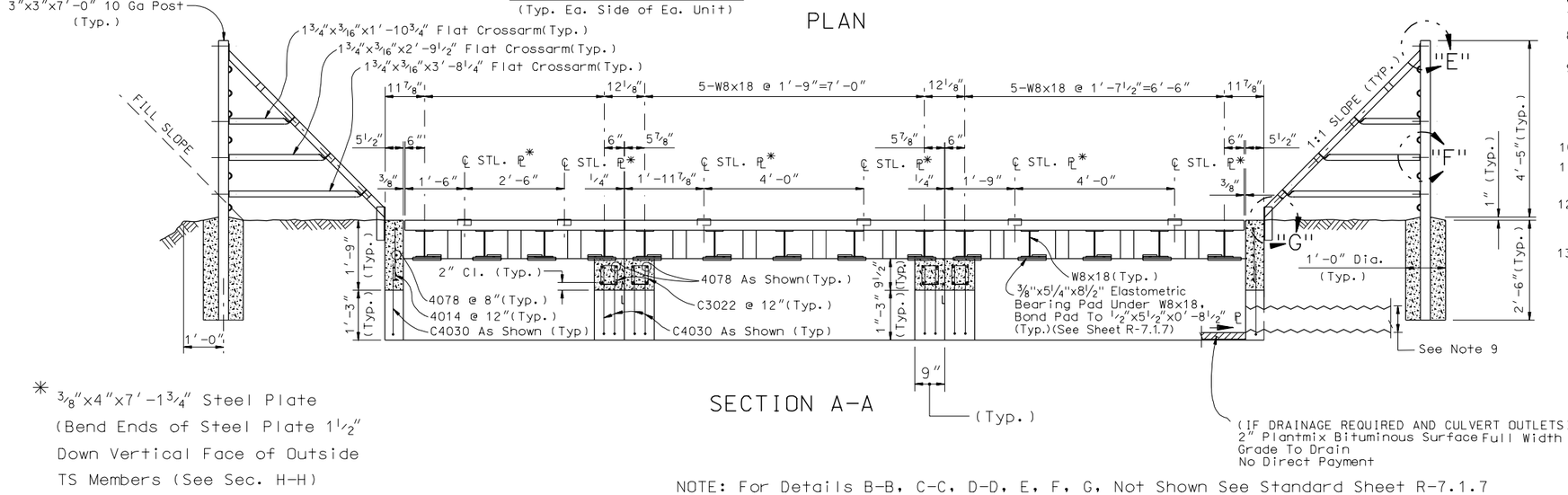




ELEVATION
SECTION H-H

GENERAL NOTES:

1. PRECAST CONCRETE SHALL REACH Fc' = 4500 PSI AT 28 DAYS. ALL OTHER CONCRETE SHALL BE CLASS A OR AA.
2. REINFORCING STEEL SHALL BE GRADE 40 (Fs =20,000 PSI)
3. DESIGN LIVE LOAD H-20.
4. MINIMUM SOIL BEARING PRESSURE OF 4000 LBS/FT^2 SHALL BE OBTAINED BY PLACING A FINE AGGREGATE (SECTION 706.03.03) BED 3 INCHES THICK OVER SOIL COMPACTED TO NOT LESS THAN 95% DENSITY AND HAND LEVELED.
5. STRUCTURAL STEEL SHALL CONFORM TO ASTM A36.
6. FASTENERS SHALL BE GALVANIZED.
7. BEARING PADS SHALL BE 50 DUROMETER HARDNESS.
8. CATTLE GUARD SHALL BE SLOPED TO CONFORM TO THE ROADWAY CROSS SECTION.
9. WHEN CATTLE GUARD IS INSTALLED ADEQUATE DRAINAGE SHALL BE PROVIDED TO INSURE AGAINST POSSIBLE SUBGRADE DAMAGE. DRAINAGE DETAILS SHALL BE AS SHOWN ON THE PLANS. 8" CMP TO BE INSTALLED AT LOW END. SEE STRUCTURE LIST FOR LENGTH OF CMP, 2'-0" MINIMUM.
10. APPROVED ALTERNATE DESIGNS MAY BE USED.
11. METAL WINGS SHALL BE PAINTED WHITE PER STANDARD SPECIFICATIONS.
12. SHOP DRAWINGS SHOWING THE DETAILS OF FABRICATION AND THE PROPOSED LAYOUT OF UNITS SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL.
13. CATTLE GUARD WIDTH SHALL INCLUDE A 2'-0" SHY DISTANCE FROM THE NORMAL E.O.P., EACH SIDE (PER AASHTO).



PLAN

SECTION A-A

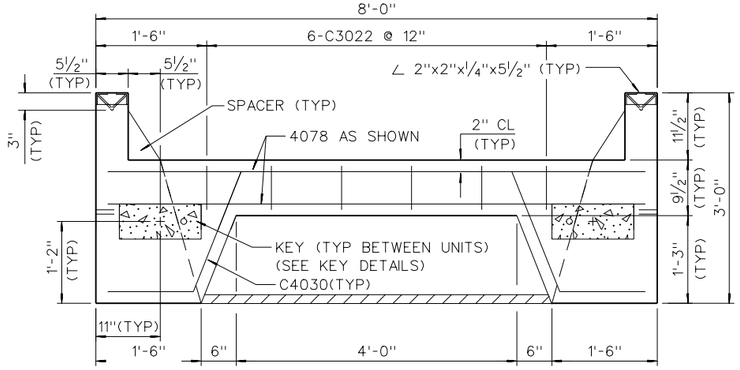
* 3/8"x4"x7'-1 3/4" Steel Plate (Bend Ends of Steel Plate 1 1/2" Down Vertical Face of Outside TS Members (See Sec. H-H)

NOTE: For Details B-B, C-C, D-D, E, F, G, Not Shown See Standard Sheet R-7.1.7

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

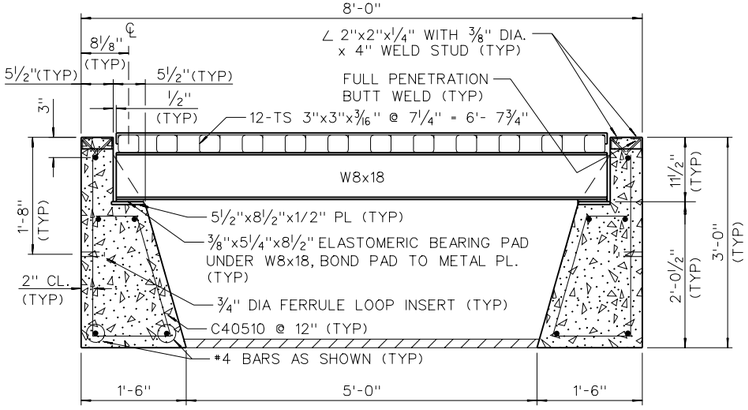
PRECAST CATTLE GUARD

Signed Original On File	R-7.1.6	(617)
CHIEF ROAD DESIGN ENGR.	ADOPTED: 11/88	REVISION 9/00



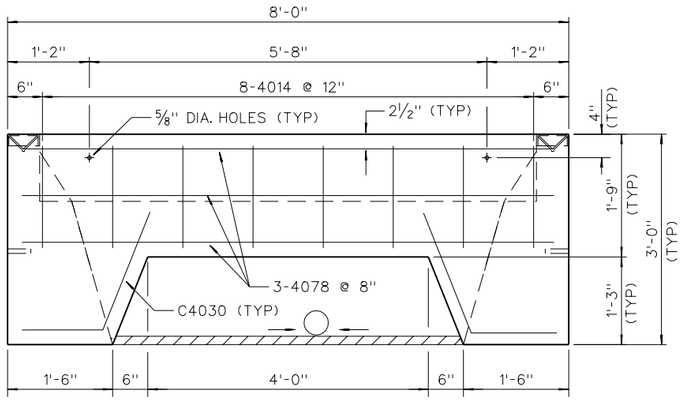
SECTION B-B

(ALL DIMENSIONS, KEYS, REINFORCING & STRUCTURAL STEEL TYPICAL ALL UNITS)



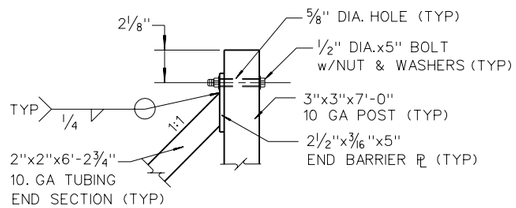
SECTION C-C

(ALL DIMENSIONS, KEYS, REINFORCING & STRUCTURAL STEEL TYPICAL ALL UNITS)

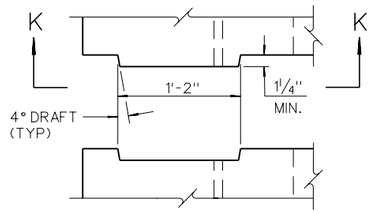


VIEW D-D

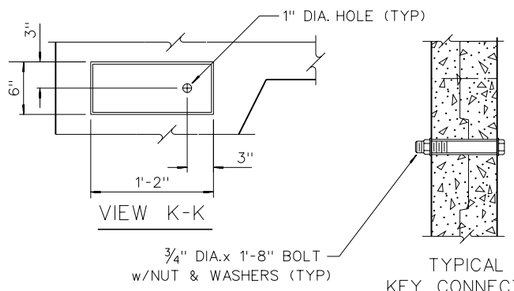
(ALL DIMENSIONS, KEYS, REINFORCING & STRUCTURAL STEEL TYPICAL ALL UNITS)



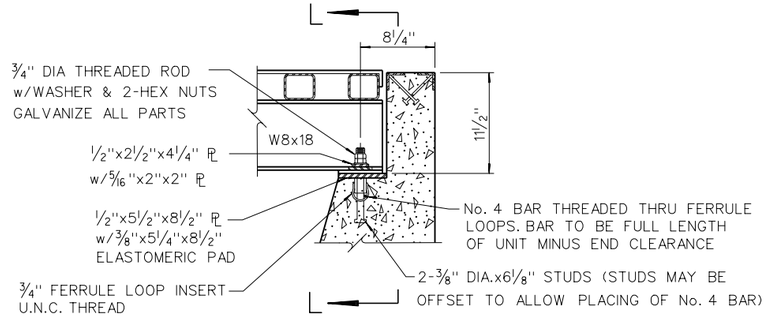
DETAIL "E"



PLAN

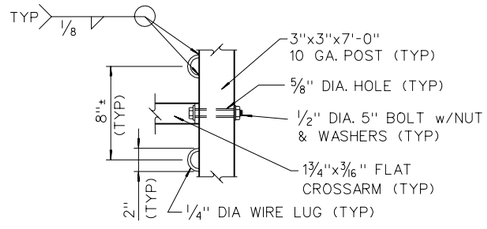


KEY DETAILS

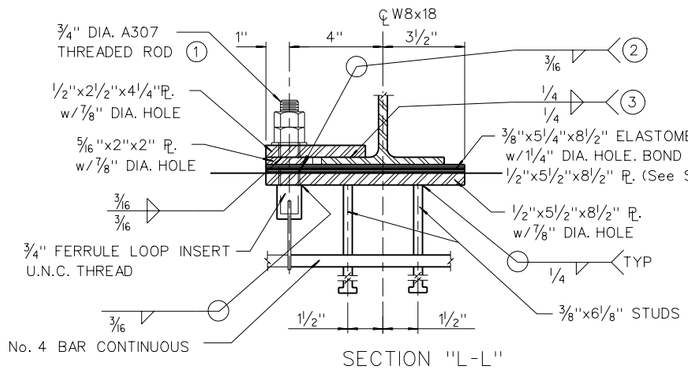


W8x18 ANCHOR ASSY.

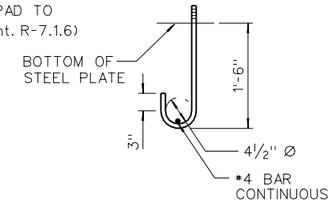
DETAIL "G"



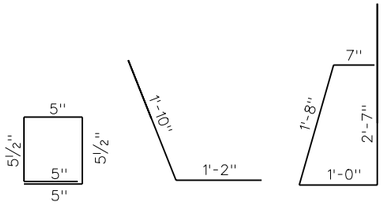
DETAIL "F"



SECTION "L-L"



"J" BOLT ALTERNATIVE



BAR BENDING DETAILS

GENERAL NOTES:

1. ½"x5-1/2"x8-1/2" PLATE WITH FERRULE AND STUDS ATTACHED IS TO BE CAST IN THE CONCRETE FRAME. AFTER THE CONCRETE FRAME HAS BEEN MANUFACTURED: THE 3/4" DIA. A307 THREADED ROD (1) IS TO BE TIGHTENED INTO THE FERRULE. THE ROD IS THEN TO BE WELDED (2) TO THE PLATE. THE ELASTOMERIC PAD IS THEN BONDED TO THE PLATE. THE STEEL GRATE IS THEN PLACED AND ADJUSTED TO ITS SPECIFIC POSITION. THE METAL CLAMPS ARE PLACED AND THE NUTS TIGHTENED. THE FIRST NUT IS JUST TO BE SNUG TIGHT. THE SECOND NUT IS TO BE TIGHT AGAINST THE FIRST NUT TO LOCK IT IN PLACE. AFTER A FINAL CHECK THAT THE STEEL GRATE IS STILL IN ITS SPECIFIED POSITION, THE METAL CLAMPING PLATE IS THEN WELDED (3) TO THE FRAME OF THE STEEL GRATE. ALL WELDING SHALL BE DONE AT THE PLACE OF THE FABRICATION. IF STEEL GRATE AND CONCRETE FRAME ARE SHIPPED SEPARATELY, THEY SHALL BE MATCH MARKED.

2. ALTERNATE: USE OF "J" BOLT.
   1/2"x5-1/2"x8-1/2" PLATE WITH 3/4" DIA. A307 "J" BOLT (1) AND STUDS ATTACHED IS TO BE CAST IN THE CONCRETE FRAME. THE "J" BOLT IS TO BE WELDED TO BOTH FACES OF THE PLATE (2). THE ELASTOMERIC PAD IS BONDED TO THE PLATE. THE STEEL GRATE IS PLACED AND ADJUSTED TO ITS SPECIFIED POSITION. THE METAL CLAMPS ARE PLACED AND THE NUTS TIGHTENED. THE FIRST NUT IS JUST TO BE SNUG TIGHT. THE SECOND NUT IS TO BE TIGHT AGAINST THE FIRST NUT TO LOCK IT IN PLACE. AFTER A FINAL CHECK THAT THE STEEL GRATE IS IN ITS SPECIFIED POSITION. THE METAL CLAMPING PLATE IS WELDED (3) TO THE FRAME OF THE STEEL GRATE. ALL WELDING SHALL BE DONE AT THE PLACE OF FABRICATION. IF STEEL GRATE AND CONCRETE FRAME ARE SHIPPED SEPARATELY, THEY SHALL BE MATCH MARKED.

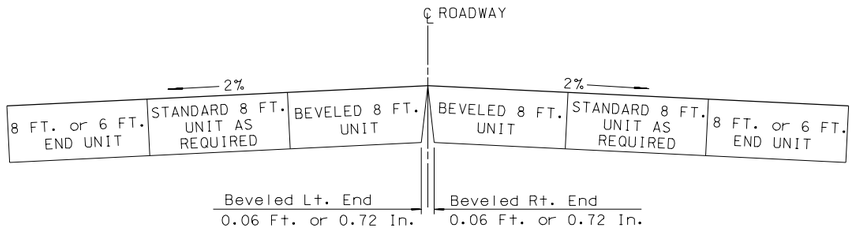
3. PRECAST CONCRETE SHALL REACH Fc' = 4500 PSI AT 28 DAYS. ALL OTHER CONCRETE SHALL BE CLASS A OR AA.

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

PRECAST CATTLE GUARD SECTIONS & DETAILS

Signed Original On File	R-7.1.7	(617)
CHIEF ROAD DESIGN ENGR.	ADOPTED: 11/88	REVISION 8/98

R-95



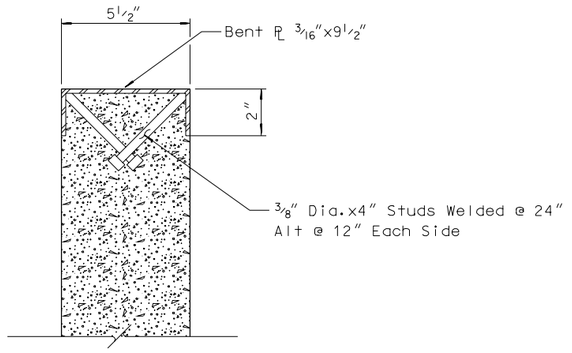
TYPICAL CATTLE GUARD INSTALLATION ON CROWNED ROADWAYS

NOTE: ALL CATTLE GUARD INSTALLATIONS, ON CROWNED ROADWAYS, SHALL BE INSTALLED USING AN EVEN NUMBER OF UNITS AS SHOWN ABOVE, AND AS INDICATED IN THE TABLE BELOW.

UNITS FOR ROADWAY CROWNED AT					
WIDTH OF ROADWAY	LENGTH OF END UNITS	8 FT. UNITS BEVELED	8 FT. UNITS STANDARD	LENGTH SUPPLIED	LENGTH BEYOND SHLDR.
24.0′	2 @ 6.0′	2		28.0′	2.0′
26.0′	2 @ 6.0′	2		28.0′	1.0′
28.0′	2 @ 6.0′	2		28.0′	0.0′
30.0′	2 @ 8.0′	2		32.0′	1.0′
32.0′	2 @ 8.0′	2		32.0′	0.0′
34.0′	2 @ 6.0′	2	2	44.0′	5.0′
36.0′	2 @ 6.0′	2	2	44.0′	4.0′
38.0′	2 @ 6.0′	2	2	44.0′	3.0′
40.0′	2 @ 6.0′	2	2	44.0′	2.0′
42.0′	2 @ 6.0′	2	2	44.0′	1.0′
44.0′	2 @ 6.0′	2	2	44.0′	0.0′
46.0′	2 @ 8.0′	2	2	48.0′	1.0′
48.0′	2 @ 8.0′	2	2	48.0′	0.0′
50.0′	2 @ 6.0′	2	4	60.0′	5.0′
52.0′	2 @ 6.0′	2	4	60.0′	4.0′
54.0′	2 @ 6.0′	2	4	60.0′	3.0′
56.0′	2 @ 6.0′	2	4	60.0′	2.0′
58.0′	2 @ 6.0′	2	4	60.0′	1.0′
60.0′	2 @ 6.0′	2	4	60.0′	0.0′

GENERAL NOTES:

1. PRECAST CONCRETE SHALL REACH Fc′ = 4500 PSI AT 28 DAYS. ALL OTHER CONCRETE SHALL BE CLASS A OR AA.
2. MATERIAL LIST IS FOR INFORMATION ONLY.

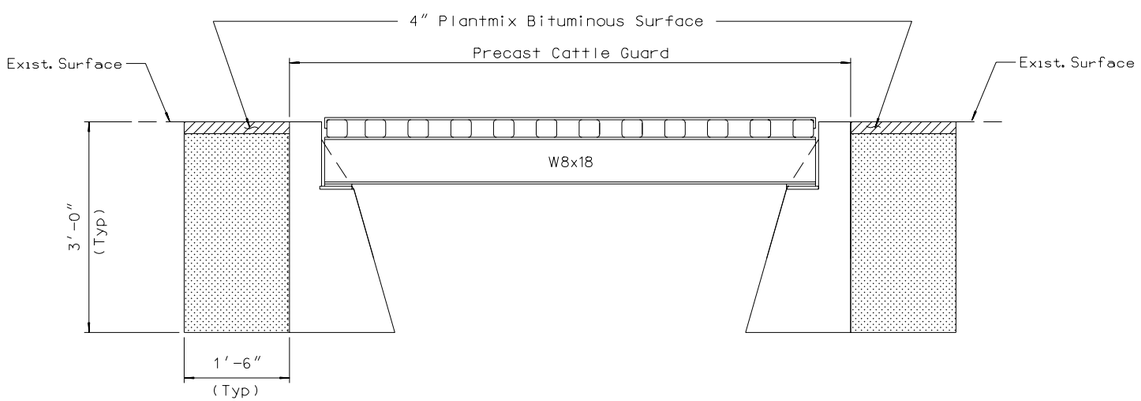


ALTERNATE ARMOR DETAIL

NOTE: The Above Alternate Armor Detail May be Substituted for The 2″x2″x¼″ Armor Angles at The Contractors Option.

STRUCTURAL STEEL				
UNIT	ITEM	REQ′D	LENGTH	WT. LBS.
SHORT END	TS3″x3″x3/16″	12	5′-6″	678
	W8x18	4	7′-0″	504
	L 2″x2″x1/4″	2	0′-5 1/2″	3
	L 2″x2″x1/4″	2	6′-0″	38
	L 2″x2″x1/4″	2	5′-6 1/2″	35
	3/8″ DIA. STUD	12	0′-4″	2
	ANCHOR ASSY.	8	— — —	90
	3/8″x4″ PLATE	2	7′-1 3/4″	73
				1423
INTERMEDIATE	TS 3″x3″x3/16″	12	7′-11 3/4″	984
	W8x18	5	7′-0″	630
	L 2″x2″x1/4″	4	0′-5 1/2″	6
	L 2″x2″x1/4″	4	8′-0″	102
	3/8″ DIA. STUD	14	0′-4″	2
	ANCHOR ASSY.	10	— — —	113
	3/8″x4″ PLATE	2	7′-1 3/4″	73
				1910
STANDARD END	TS 3″x3″x3/16″	12	7′-6″	925
	W8x18	5	7′-0″	630
	L 2″x2″x1/4″	2	0′-5 1/2″	3
	L 2″x2″x1/4″	2	8′-0″	51
	L 2″x2″x1/4″	2	7′-6 1/2″	48
	3/8″ DIA. STUD	14	0′-4″	2
	ANCHOR ASSY.	10	— — —	113
	3/8″x4″ PLATE	2	7′-1 3/4″	73
				1845

REINFORCING STEEL AND CONCRETE				
UNIT	NO. REQ′D	BAR MARK	WT. LBS.	CONCRETE
SHORT END	7	4078	36	1.68 C.Y.
	10	4058	38	
	8	4014	7	
	6	C3022	5	
	12	C40510	47	
	6	C4030	12	
			145	
INTERMEDIATE	18	4078	92	1.76 C.Y.
	12	C3022	10	
	8	C4030	16	
			180	
STANDARD END	17	4078	87	2.11 C.Y.
	8	4014	7	
	6	C3022	5	
	16	C40510	62	
	6	C4030	12	
			173	



METHOD OF PATCHING AT PRECAST CATTLE GUARDS

MATERIAL LIST FOR WINGS				
ITEM	REQ′D	SIZE	LENGTH	WT. LBS
FLAT CROSSARMS	2	1¾″x3/16″	1′-10¾″	4
FLAT CROSSARMS	2	1¾″x3/16″	2′-9½″	6
FLAT CROSSARMS	2	1¾″x3/16″	3′-8¼″	8
BRACES	2	2″x2″x10 GA	1′- 3 3/4″	11
BRACES	2	2″x2″x10 GA	2′- 7 1/4″	23
BRACES	2	2″x2″x10 GA	3′-11″	38
BRACES	2	2″x2″x10 GA	5′- 2 1/2″	45
END BARRIER	4	2″x2″x10 GA	6′- 2 3/4″	107
BARRIER PLATES	2	2½″x2½″x¼″	0′-5″	1
BARRIER ANGLES	4	2½″x 2½″x¼″	0′-10″	14
UPRIGHT POSTS	2	3″x3″x3/16″	7′-0″	96

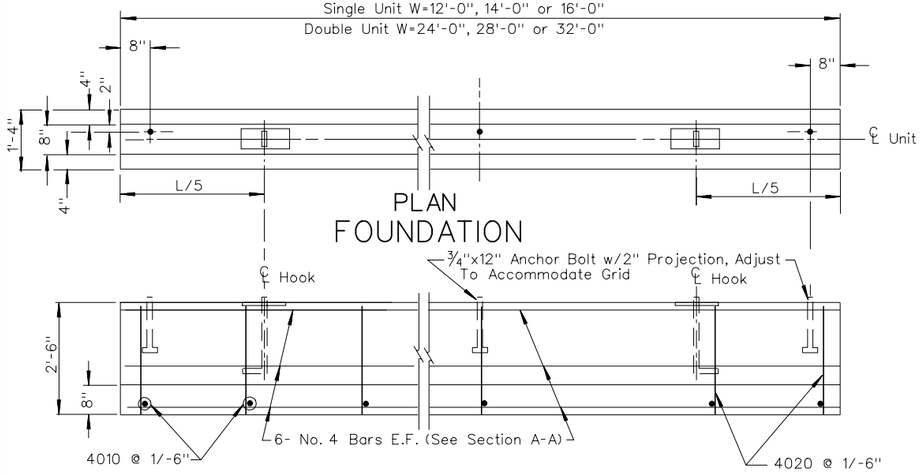
HARDWARE				
LOCATION	ITEM	NO. REQ′D	SIZE	LENGTH
WINGS	BOLTS	4	1/2″	8″
	BOLTS	6	1/2″	4″
PER UNIT CONNECTION	BOLTS	8	1/2″	5″
	WASHERS	36	17/32″	–
	NUTS	18	1/2″	–
	BOLTS	2	3/4″	1′-8″
	WASHERS	4	13/16″	–
	NUTS	2	3/4″	–

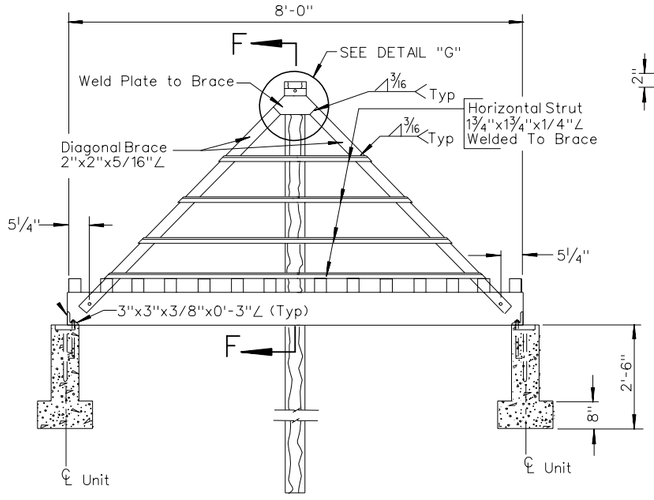
STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

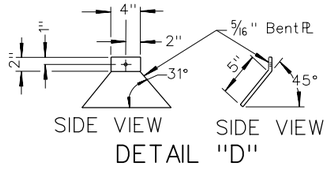
PRECAST CATTLE GUARD SECTIONS & DETAILS

Signed Original On File	R-7.1.8	(617)
CHIEF ROAD DESIGN ENGR.	ADOPTED: 11/88	REVISION 9/00

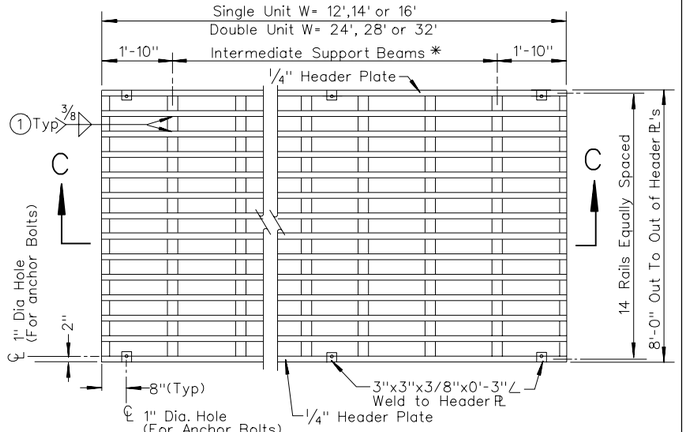
R-66

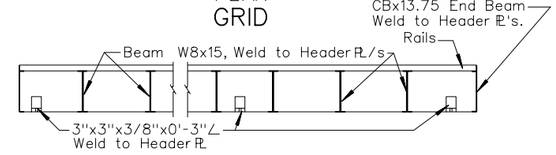


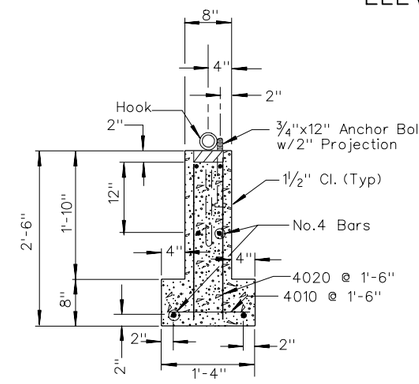


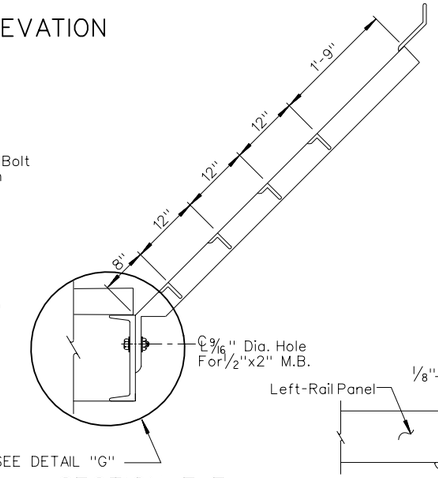


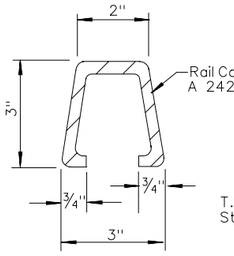
① Weld Rails to Intermediate and End Beams At Junctures
✱- Spacing For W=12' is 1'-6"
W=14' is 1'-6 2/3"
W=16' is 1'-8 1/8"

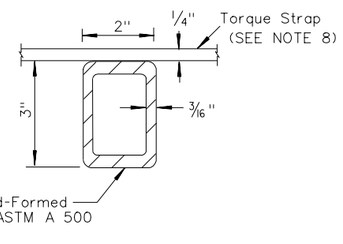




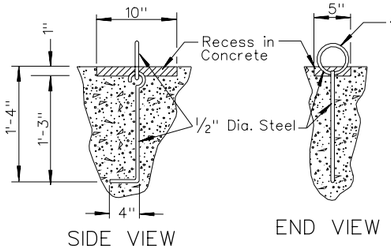


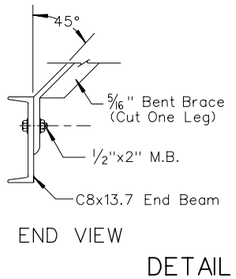


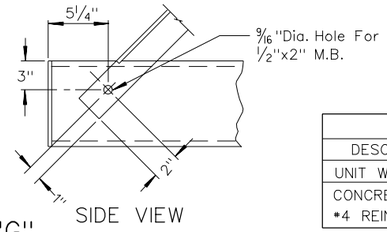


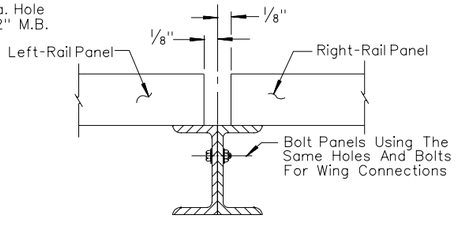


ALTERNATE RAIL
Note: When Using Alternate Rail, Use 15 Rails Evenly Spaced.

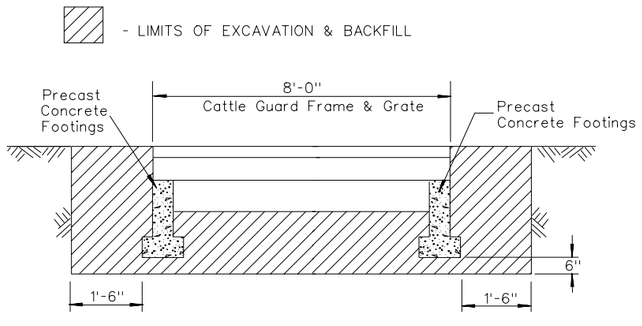








CONNECTION FOR MULTIPLE INSTALLATION



CATTLE GUARD EXCAVATION DETAIL

ESTIMATED QUANTITIES FOR FOUNDATION					
DESCRIPTION	QUANTITIES				
UNIT WIDTHS	14'	16'	24'	28'	32'
CONCRETE	2.2 C.Y.	2.5 C.Y.	3.8 C.Y.	4.4 C.Y.	5.0 C.Y.
#4 REINFORCING STEEL	276 L.F.	311 L.F.	471 L.F.	543 L.F.	624 L.F.

GENERAL NOTES:

1. PRECAST CONCRETE SHALL REACH Fc' = 4500 PSI AT 28 DAYS. ALL OTHER CONCRETE SHALL BE CLASS A OR AA.
2. STANDARD NUTS & WASHERS SHALL BE FURNISHED WITH EACH FOUNDATION UNIT INCLUDING ANCHOR ANGLES. WELD OR BOLT ANCHOR ANGLES TO CATTLE GUARD.
3. ON EARTH-SURFACED ROADS, SET TOP OF CATTLE GUARD EIGHT INCHES ABOVE SUBGRADE UNLESS PLANS OR STAKES INDICATE ANOTHER ELEVATION. TAPER FILL BACK FROM CATTLE GUARD APPROX. 50' IN BOTH DIRECTIONS.
4. NO. 4 REINFORCEMENT MAY BE SPLICED WITH 24" LAP UNLESS PROHIBITED.
5. SEE PROJECT PLANS FOR WIDTH (W).
6. BOLTS ARE TO BE SUPPLIED WITH STANDARD NUTS AND WASHERS.
7. RAILS SHALL BE PLACED ADJACENT TO THE HEADER PLATES.
8. PROVIDE FOUR 7'10"X2"X1/4" TORQUE BARS EQUALLY SPACED, WELDED BY 3/16" FILLET WELDS PERPENDICULAR TO THE TOP OF THE RAILS WHEN ALTERNATE RECTANGULAR TUBE RAILS ARE PROVIDED.
9. STEEL FOR COMPONENTS SHALL BE ASTM A 36, UNLESS INDICATED OTHERWISE ON THE DRAWING.
10. DESIGN LOADING OF GRID SHALL CONFORM TO AASHTO H-20.

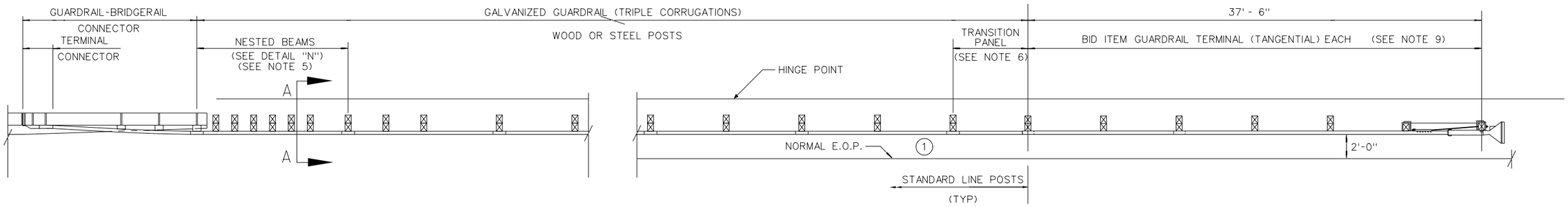
STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

STEEL CATTLE GUARD GRID AND WINGS & CATTLE GUARD FOUNDATION (BLM)

Signed Original On File
CHIEF ROAD DESIGN ENGR.

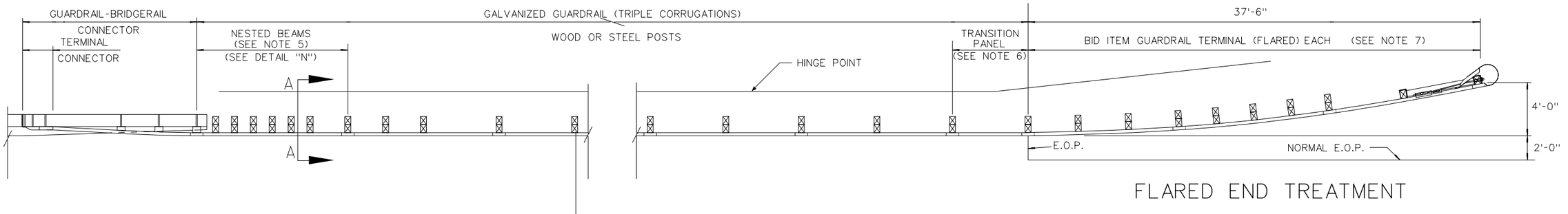
R-7.1.9 (617)
ADOPTED: 1/95
REVISION 9/97

R-67

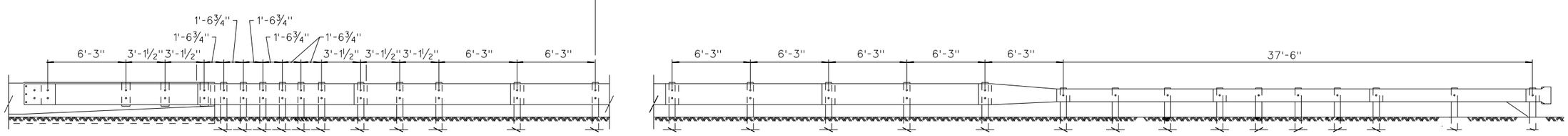


TANGENT END TREATMENT

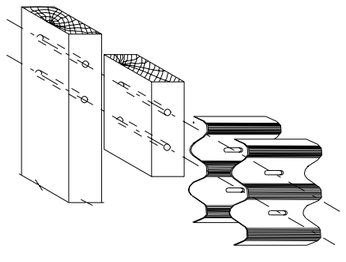
(1) ON RETROFIT INSTALLATION, PAVING IS OPTIONAL. ON NEW CONSTRUCTION, PAVING IS REQUIRED. SEE R-8.2.1.



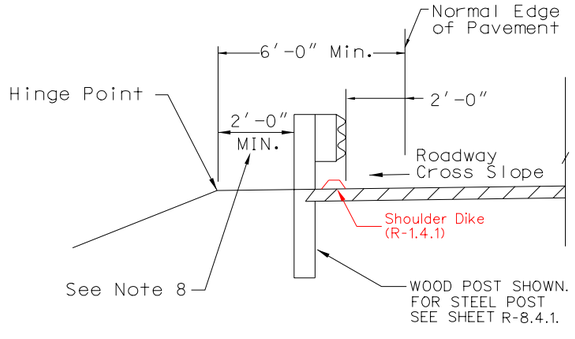
FLARED END TREATMENT



TYPICAL GUARDRAIL INSTALLATION



NESTED BEAMS
DETAIL "N"



SECTION A-A

GENERAL NOTES:

1. FOR DETAILS AND DIMENSIONS NOT SHOWN SEE SHEETS R-8.1.2 THRU R-8.4.3.
2. SEE SHEET T-35.2.1 FOR SPECIAL GUARDRAIL TERMINAL END FOR RAILROAD CROSSING.
3. SEE SHEET R-8.2.2 FOR TRAILING END ANCHOR FOR ONE-WAY ROADS.
4. MINIMUM INSTALLATION:

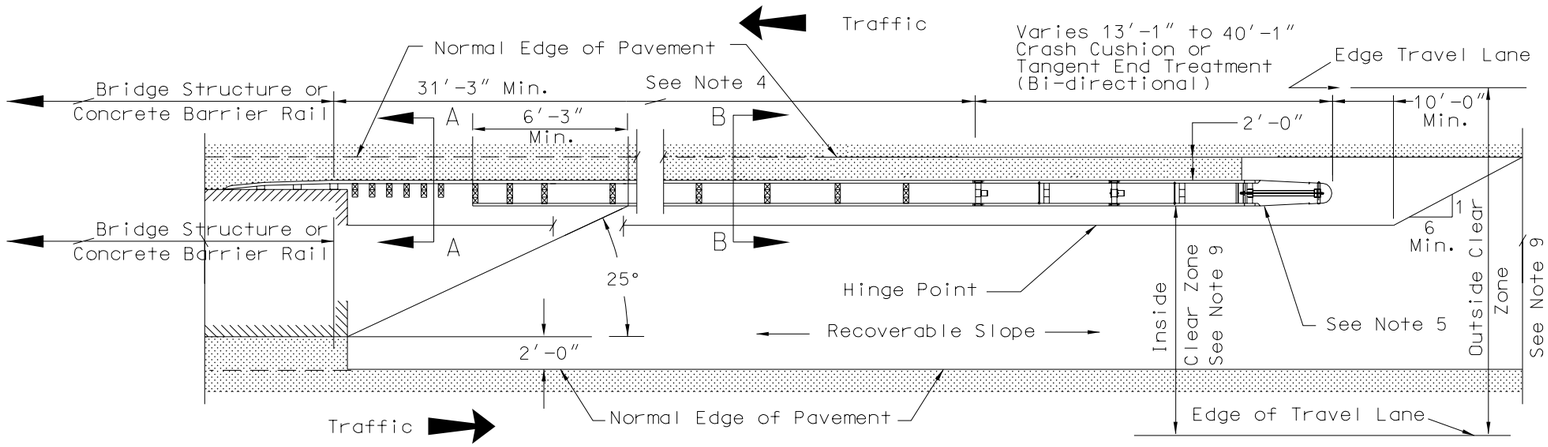
GUARDRAIL-BRIDGERAIL CONNECTOR	-	14'-4¾"
NESTED BEAM SECTION	-	12'-6"
THRIE BEAM SECTION	-	12'-6"
TRANSITION PANEL	-	6'-3"
APPROVED "350" TERMINAL	-	37'-6"
		83'-1¾"

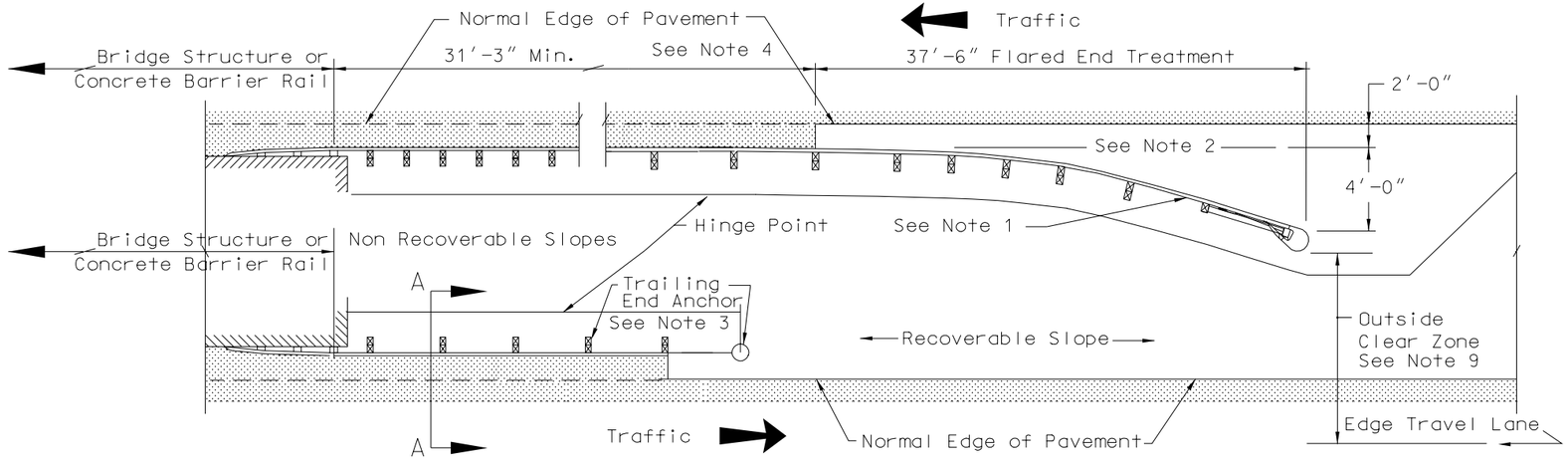
   ANY OTHER VARIATION THAT REDUCES THE MINIMUM LENGTH SHALL REQUIRE APPROVAL OF THE CHIEF ROAD DESIGN ENGINEER.
5. NO DIRECT PAYMENT FOR THE ADDITIONAL GUARDRAIL PANEL.
6. THE LENGTH OF THE TRANSITION PANEL (6' - 3") SHALL BE ADDED TO THE ESTIMATED LENGTH OF THE THRIE BEAM GUARDRAIL. SEE SHEET R-8.4.1.
7. FOR GRADING DETAILS NOT SHOWN, SEE R-8.2.1. FOR OTHER GUARDRAIL ENERGY ABSORBING TERMINALS NOT SHOWN, REFER TO MANUFACTURERS' DRAWINGS.
8. ON RETROFIT INSTALLATIONS IF MINIMUM CANNOT BE MET AND THE DISTANCE BETWEEN BACK OF POST AND HINGE POINT IS LESS THAN 2', THE POST SHALL BE LENGTHENED 1' MIN.
9. WHEN GUARDRAIL IS PLACED AT NORMAL EDGE OF PAVEMENT, THE TANGENT END TREATMENT SHALL BE FLARED @ 50:1 TAPER TO GET HEAD PIECE CLEAR OF EDGE OF PAVEMENT.
10. APPROACH GUARDRAIL TERMINALS SHALL BE "NCHRP 350", FHWA, AND NEVADA DOT APPROVED.

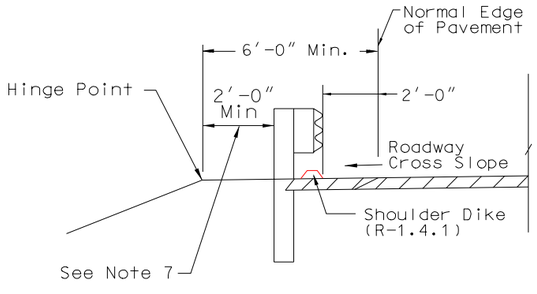
STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

TYPICAL GUARDRAIL INSTALLATION

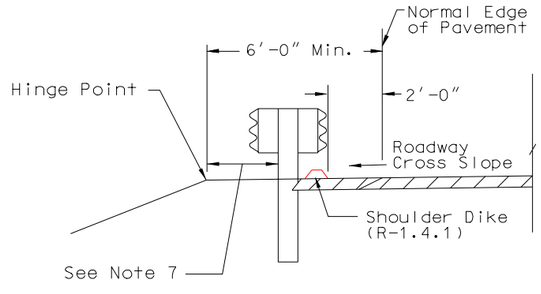
Signed Original On File	R-8.1.1	(618)
CHIEF ROAD DESIGN ENGR.	ADOPTED: 1/89	REVISION: 10/02







SECTION A-A



SECTION B-B

Design Speed (MPH)	Flare Rate
75	16:1
70	15:1
60	13:1
50	11:1
40	9:1
30	7:1

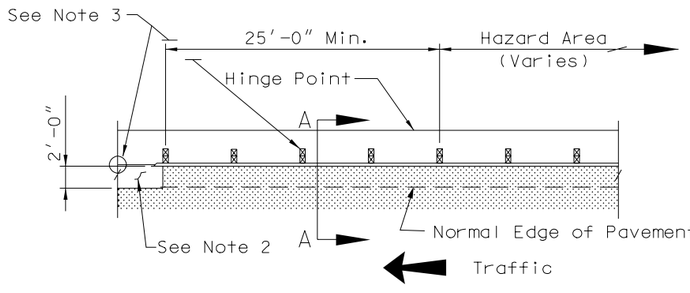
GUARDRAIL FLARE RATES

GENERAL NOTES:

1. FOR END TREATMENTS NOT SHOWN, REFER TO MANUFACTURER'S DRAWINGS.
2. THESE AREAS MAY REQUIRE PAVING IF SHOULDER DIKES AND/OR DOWN DRAINS ARE USED.
3. SEE STANDARD DRAWING R-8.2.2 FOR DETAILS NOT SHOWN.
4. GALVANIZED GUARDRAIL (TRIPLE CORRUGATIONS): SEE STANDARD DRAWING R-8.4.1.
5. CRASH CUSHION OR TANGENT END TREATMENT (BI-DIRECTIONAL) CAN BE FLARED AT 50:1 TAPER.
6. RECOVERABLE SLOPES REQUIRED BEHIND GATING PORTION OF END TREATMENT OR CRASH CUSHION.
7. ON RETROFIT INSTALLATIONS WHEN DISTANCE BETWEEN BACK OF POST AND HINGE POINT IS LESS THAN 2 FEET, THE POST SHALL BE LENGTHENED 1 FOOT MINIMUM.
8. GUARDRAIL HEIGHTS ON STAGE CONSTRUCTION PROJECTS SHALL BE GOVERNED BY FINAL SURFACING HEIGHT.
9. REFERENCE: AASHTO ROADSIDE DESIGN GUIDE, CURRENT EDITION.
10. CLEAR ZONE SHOULD BE BASED ON DESIGN YEAR TRAFFIC VOLUMES.
11. RECOVERABLE SLOPES ARE 4:1 OR FLATTER.
12. APPROACH GUARDRAIL TERMINALS SHALL BE NCHRP 350, FHWA, AND NEVADA DOT APPROVED.

LEGEND:

- PAVED AREAS

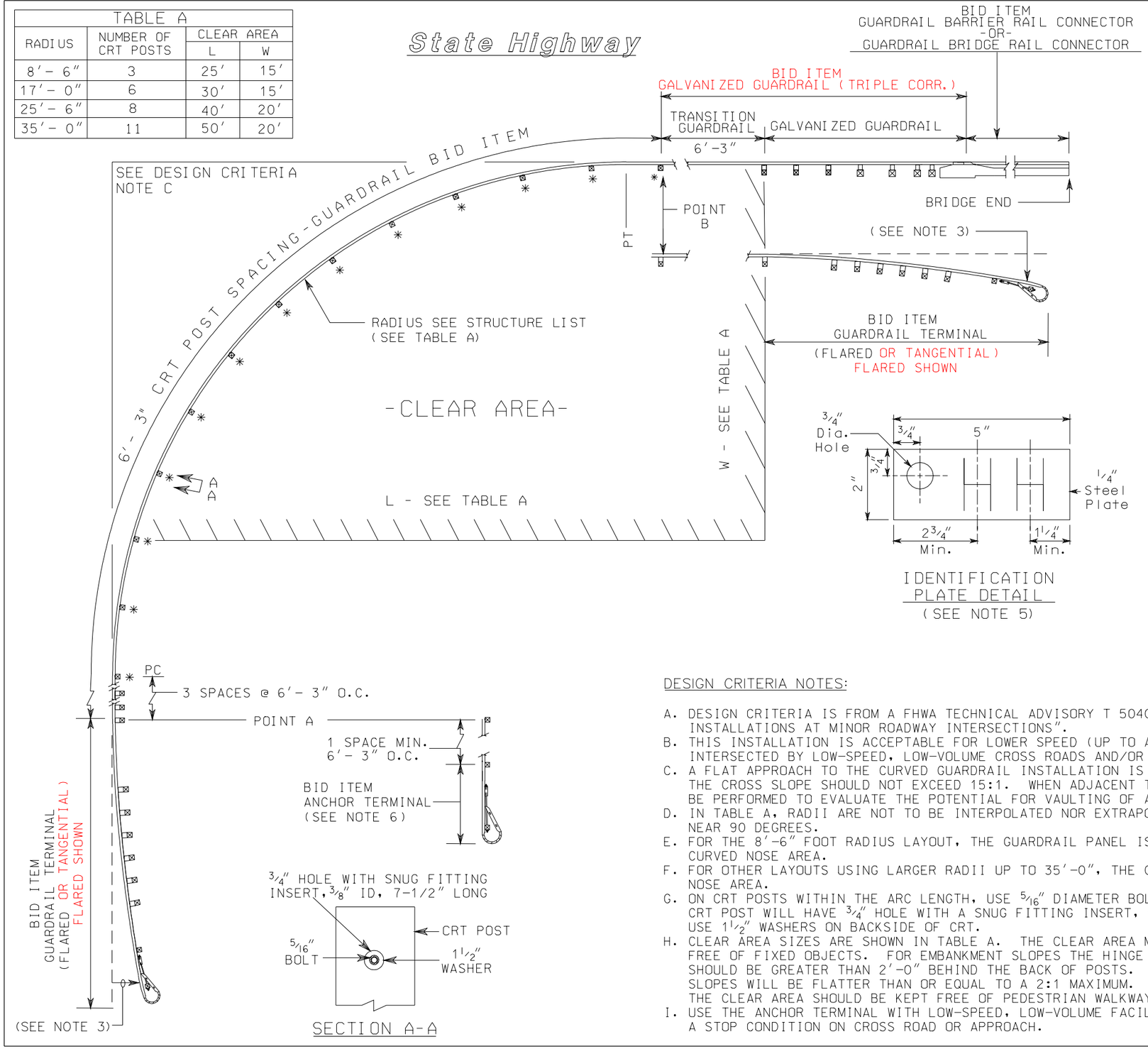


STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

TYPICAL GUARDRAIL INSTALLATION

Signed Original On File	R-8.1.2	(618)
CHIEF ROAD DESIGN ENGR.	ADOPTED:07/96	REVISION 10/02

TABLE A			
RADIUS	NUMBER OF CRT POSTS	CLEAR AREA	
		L	W
8′- 6″	3	25′	15′
17′- 0″	6	30′	15′
25′- 6″	8	40′	20′
35′- 0″	11	50′	20′



GENERAL NOTES:

1. USE OF THIS DETAIL REQUIRES CHIEF ROADWAY DESIGN ENGINEER APPROVAL. THIS INSTALLATION IS INTENDED FOR THE LEADING SIDE TO A BRIDGE END , ESPECIALLY WHERE INADEQUATE ROOM IS AVAILABLE TO INSTALL OTHER STANDARD INSTALLATIONS OF GUARDRAIL-BRIDGE RAIL CONNECTORS, GUARDRAIL AND GUARDRAIL TERMINALS (FLARED) OR GUARDRAIL TERMINAL (TANGENTIAL) DUE TO A NEARBY CROSSROAD OR APPROACH.

2. SEE CONTRACT STRUCTURE LIST AND STANDARD PLANS FOR TRANSITION AND TERMINAL CONNECTOR TYPE.

3. THE SLOPE FROM THE EDGE OF THE SHOULDER INTO THE FACE OF THE GUARDRAIL SHOULD BE 10:1 OR FLATTER. SEE STANDARD PLAN SHEET R-8.2.1.

4. GUARDRAIL INSTALLATION SHALL BE W-BEAM GUARDRAIL WITH BREAKAWAY CRT POSTS AND WITHOUT BLOCKS. CRT(CONTROLLED RELEASE TERMINAL) TIMBER POSTS ARE SHOWN AS ITEM "PDE09" IN THE AASHTO-AGC-ARTBA JOINT COMMITTEE TASK FORCE 13 REPORT "A GUIDE TO STANDARIZED HIGHWAY BARRIER HARDWARE:.

5. RADIUS IN FEET SHALL BE ETCHED INTO PLATE REPLACING THE LETTERS "HH" SHOWN ON THE IDENTIFICATION PLATE DETAIL. DIGITS SHALL BE 1 1/2″ MIN HEIGHT AND 3/4″ MAX WIDTH. PLATE SHALL BE GALVANIZED AFTER ETCHING.

   THE GUARDRAIL IDENTIFICATION PLATE SHALL BE MOUNTED AT THE LOWER SPLICE BOLT ON THE BACK SIDE OF THE RAIL ELEMENT AT THE PC OF THE GUARDRAIL RADIUS.

6. ANCHOR TERMINAL TO BE USED ONLY WHEN THERE IS NOT ENOUGH ROOM TO ACCOMODATE AN NCHRP REPORT 350 TERMINAL.

LEGEND:

- CLEAR AREA
- CRT POSTS, NO BLOCKS, SEE NOTE 4.

DESIGN CRITERIA NOTES:

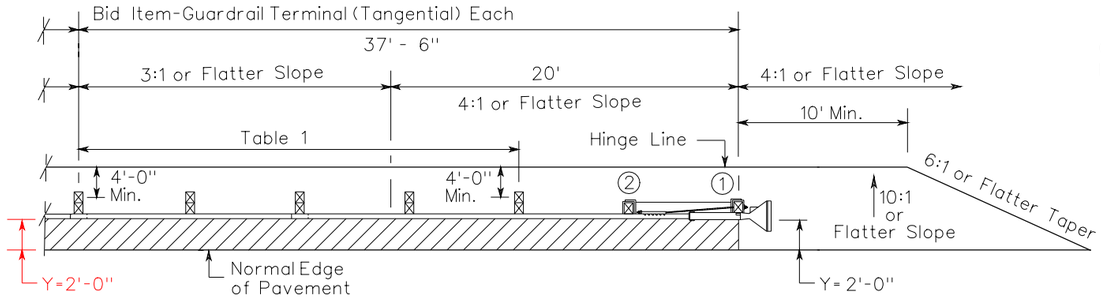
A. DESIGN CRITERIA IS FROM A FHWA TECHNICAL ADVISORY T 5040.32, DATED APRIL 13, 1992 CALLED "CURVED W-BEAM GUARDRAIL INSTALLATIONS AT MINOR ROADWAY INTERSECTIONS".
B. THIS INSTALLATION IS ACCEPTABLE FOR LOWER SPEED (UP TO AND EQUAL TO 50 mph), LOW-VOLUME THROUGH ROADWAYS INTERSECTED BY LOW-SPEED, LOW-VOLUME CROSS ROADS AND/OR DRIVEWAYS.
C. A FLAT APPROACH TO THE CURVED GUARDRAIL INSTALLATION IS NECESSARY TO ENSURE PROPER PERFORMANCE OF THE SYSTEM. THE CROSS SLOPE SHOULD NOT EXCEED 15:1. WHEN ADJACENT TO A SUPERELEVATED SECTION ON THE MAINLINE, AN ANALYSIS SHOULD BE PERFORMED TO EVALUATE THE POTENTIAL FOR VAULTING OF AN ERRANT VEHICLE.
D. IN TABLE A, RADII ARE NOT TO BE INTERPOLATED NOR EXTRAPOLATED. THIS INSTALLATION IS BASED ON INTERSECTION ANGLES NEAR 90 DEGREES.
E. FOR THE 8′-6″ FOOT RADIUS LAYOUT, THE GUARDRAIL PANEL IS NOT BOLTED TO THE ONE CRT POST AT THE CENTER OF THE CURVED NOSE AREA.
F. FOR OTHER LAYOUTS USING LARGER RADII UP TO 35′-0″, THE GUARDRAIL PANEL IS BOLTED TO THE CRT POSTS IN THE CURVED NOSE AREA.
G. ON CRT POSTS WITHIN THE ARC LENGTH, USE 5/16″ DIAMETER BOLTS. EACH CRT POST WILL HAVE 3/4″ HOLE WITH A SNUG FITTING INSERT, 3/8″ ID X 7 1/2″ LONG. USE 1 1/2″ WASHERS ON BACKSIDE OF CRT.
H. CLEAR AREA SIZES ARE SHOWN IN TABLE A. THE CLEAR AREA MUST BE KEPT FREE OF FIXED OBJECTS. FOR EMBANKMENT SLOPES THE HINGE POINT SHOULD BE GREATER THAN 2′-0″ BEHIND THE BACK OF POSTS. EMBANKMENT SLOPES WILL BE FLATTER THAN OR EQUAL TO A 2:1 MAXIMUM. THE CLEAR AREA SHOULD BE KEPT FREE OF PEDESTRIAN WALKWAYS.
I. USE THE ANCHOR TERMINAL WITH LOW-SPEED, LOW-VOLUME FACILITIES WITH A STOP CONDITION ON CROSS ROAD OR APPROACH.

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

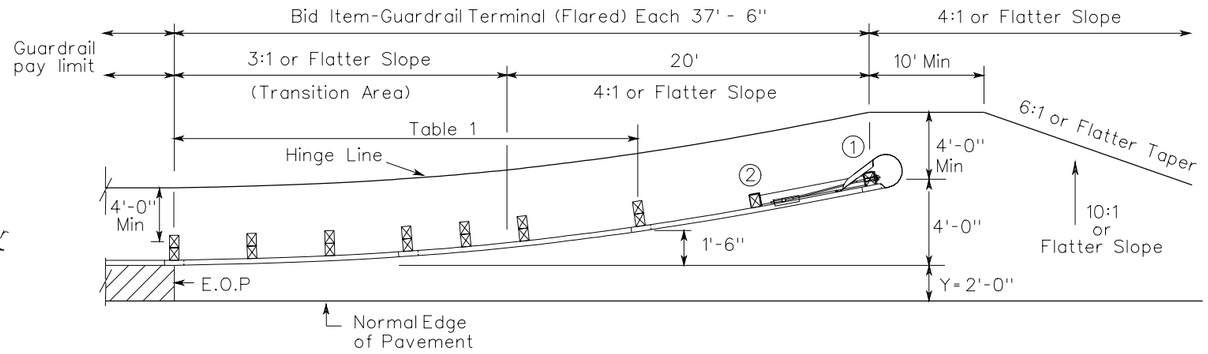
SPECIAL GUARDRAIL INSTALLATION CRT POST

Signed Original On File	R-8.1.3	(618)
CHIEF ROAD DESIGN ENGR.	ADOPTED: 1/01	REVISION 2/02

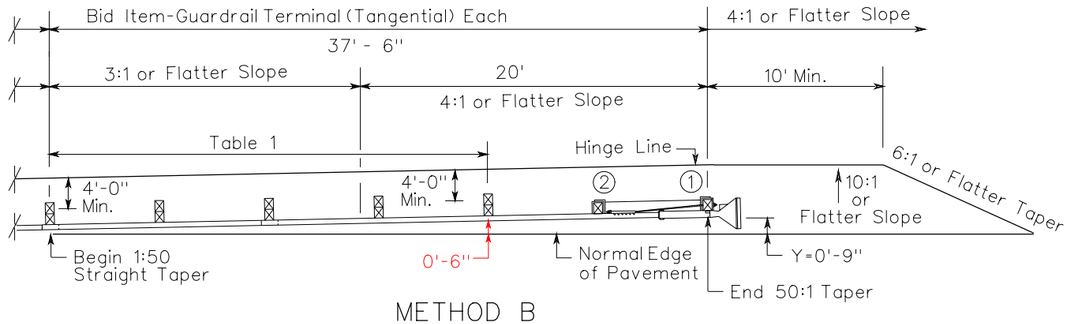
R-70



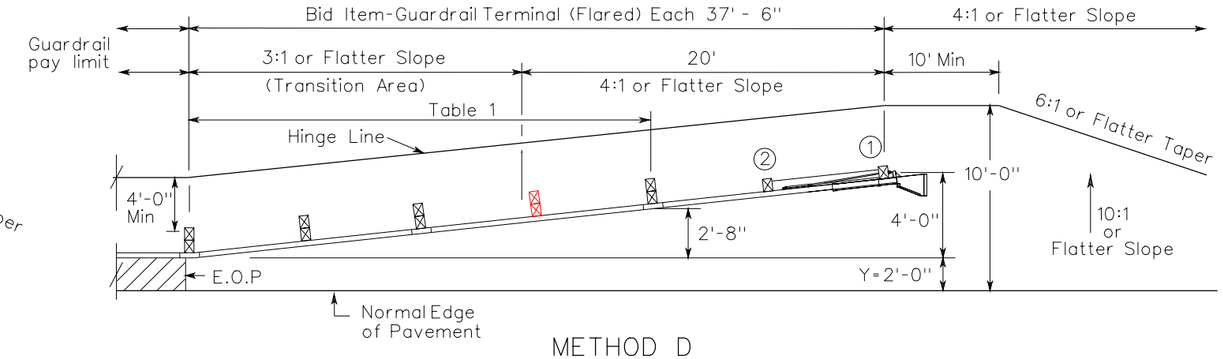
METHOD A
GUARDRAIL TERMINAL (TANGENTIAL)



METHOD C
GUARDRAIL TERMINAL (FLARED) (PARABOLIC)



METHOD B
Terminal at 50:1 Straight Taper
GUARDRAIL TERMINAL (TANGENTIAL)



METHOD D
GUARDRAIL TERMINAL (FLARED) (STRAIGHT)

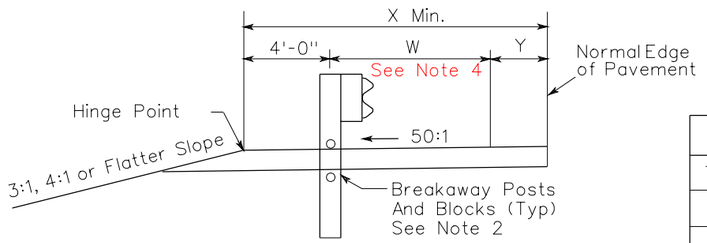


TABLE 1 SECTION

TABLE 1			
Terminal Ends	W (Flare)	X (Widening)	Y (Shy)
Method A	1'-3 1/4"	7'-3 1/4"	2'-0"
Method B	1'-3 1/4"	5'-3 1/4" to 5'-9 1/4"	0'-6"
Method C	1'-3 1/4" to 2'-9 1/4"	7'-3 1/4" to 8'-9 1/4"	2'-0"
Method D	1'-3 1/4" to 3'-11 1/4"	7'-3 1/4" to 9'-11 1/4"	2'-0"

GENERAL NOTES:

1. For typical guardrail installation, See R-8.1.1.
2. For details not shown, including heights of posts for soil tube installation on posts (1) and (2), see manufacturer's drawings.
3. Approach and trailing end guardrail terminals shall be "NCHRP Report 350" Test Level 3 (TL-3), FHWA, and Nevada DOT approved.
4. "W" is to the center of post, excluding Posts (1) and (2). Use Table 1 for breakaway posts with blocks, excluding Posts (1) and (2).

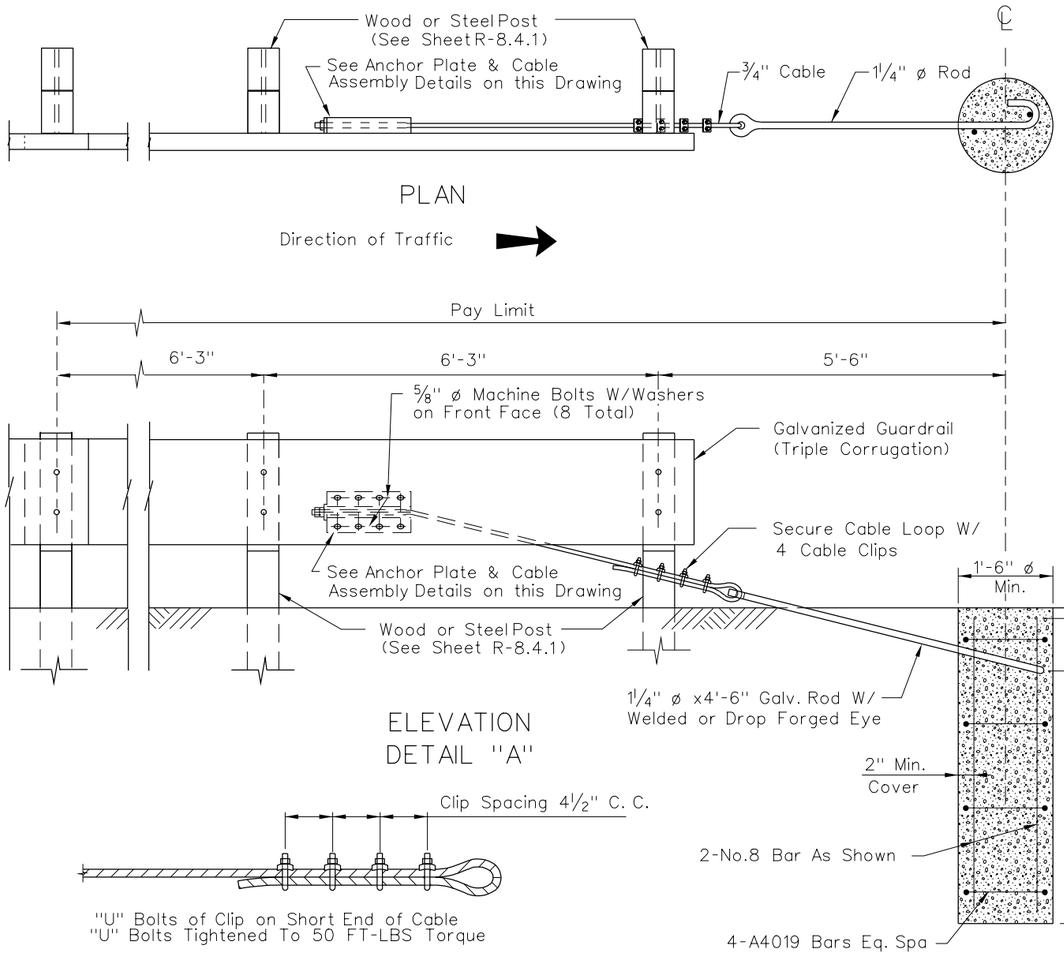
LEGEND:

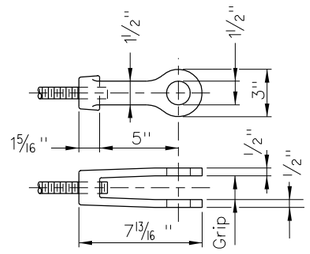
Paved Areas

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

GUARDRAIL TERMINALS GRADING PLAN

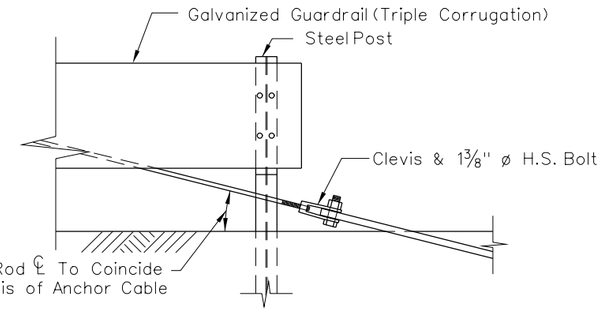
Signed Original On File	R-8.2.1	(618)
CHIEF ROAD DESIGN ENGR.	ADOPTED: 4/98	REVISION 10/02





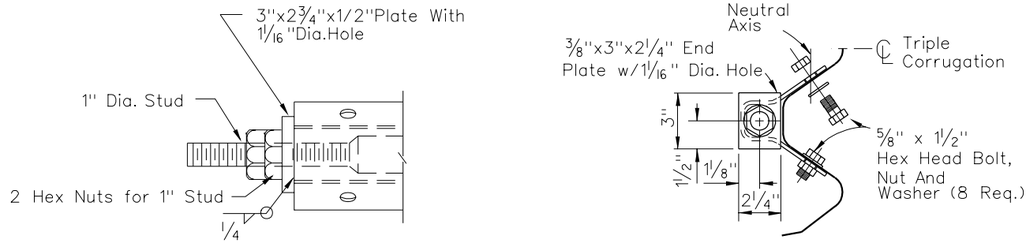
Grip = Thickness Of Eye On Anchor Rods + 1/4"

CLEVIS



DETAIL "B"
CABLE ANCHOR ASSEMBLY STEEL POST GUARD RAIL

NOTE: Other Alternative For Attaching Cable To Anchor Rod Must Be Approved By The Engineer



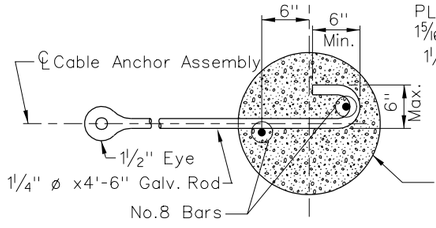
ANCHOR PLATE DETAILS

"U" Bolts of Clip on Short End of Cable
"U" Bolts Tightened To 50 FT-LBS Torque

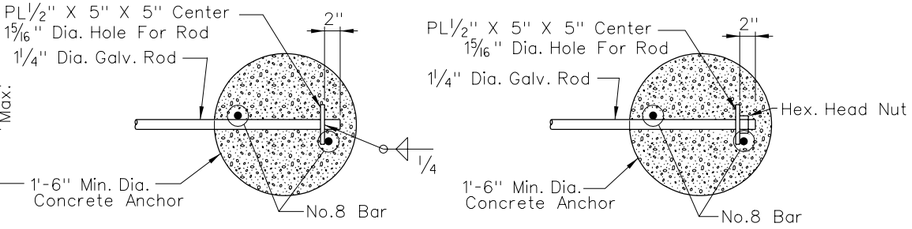
CABLE CLIP INSTALLATION

GENERAL NOTES:

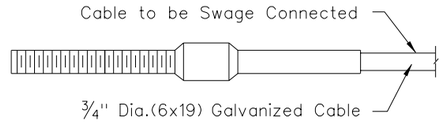
1. Anchor cable to be parallel to guard rail for straight runs of rail. Anchor cable may have angle point at anchor plate if guard rail is curved.
2. Anchor rod hooks to be in contact with anchor reinforcement when concrete is placed. Wire ties may be used to position anchor rods.
3. Cable clip connection (DETAIL A) or clevis and bolt connection (DETAIL B) to be used with wood post guard railing installation. For steel post guard railing installations, clevis and bolt connection (DETAIL B) is to be used. Other alternatives for attaching cable to anchor rod must be approved by the engineer.
4. For trailing end anchor concept, refer to plan view shown on Standard Drawing R-8.1.2 and R-8.3.1.
5. Concrete shall be Class A or AA.
6. The trailing end anchor shall be installed outside the clear zone for opposing traffic.
7. Cable shall be restrained from moving during tightening.



SINGLE ANCHOR



OPTIONAL ANCHOR ROD END DETAILS
(Single Anchors Only)

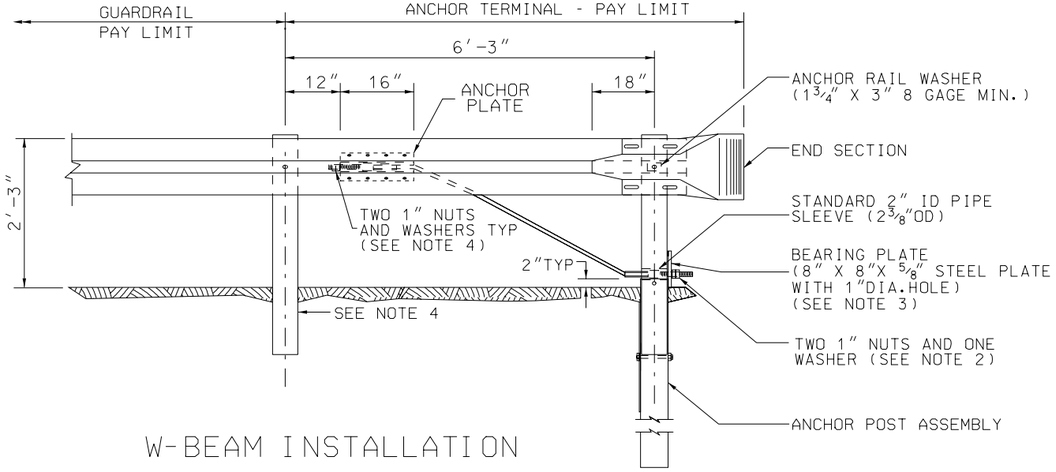


CABLE ASSEMBLY DETAILS

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

TRAILING END ANCHOR (FOR ONEWAY ROADWAYS ONLY)

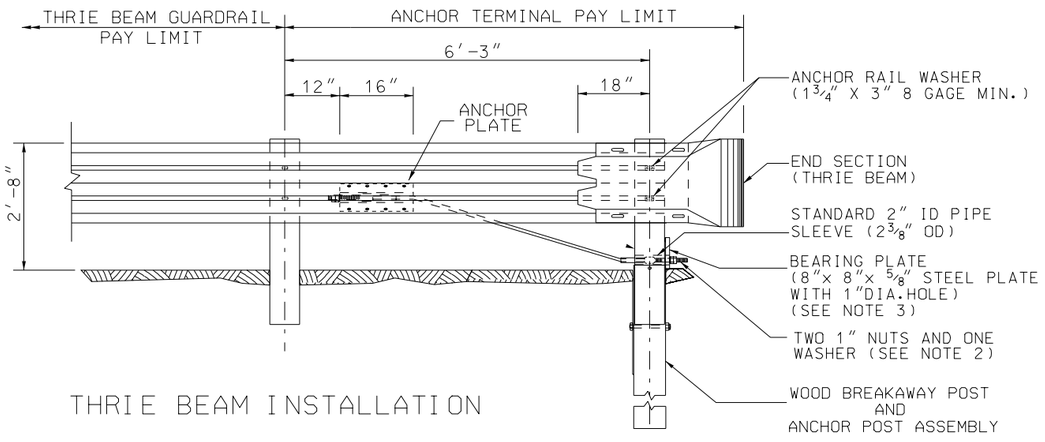
Signed Original On File	R-8.2.2	(618)
CHIEF ROAD DESIGN ENGR.	ADOPTED: 7/96	REVISION 2/03



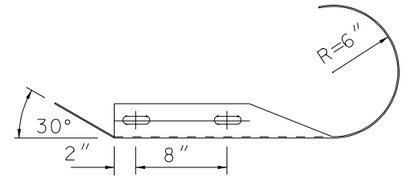
W-BEAM INSTALLATION

GENERAL NOTES:

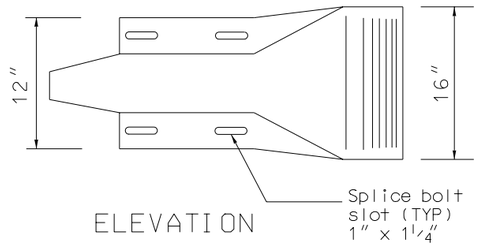
1. USE OF THIS DETAIL REQUIRES CHIEF ROADWAY DESIGN ENGINEER APPROVAL.
2. TO BE USED ONLY WITH SPECIAL GUARDRAIL INSTALLATION. SEE STANDARD PLAN SHEET R-8.1.3.
3. OUTSIDE NUT SHALL BE TORQUED AGAINST INSIDE NUT A MINIMUM OF 100 FT-LBS.
4. TOENAIL PLATE AT CORNERS WITH 10D NAILS.
5. SEE STANDARD PLAN SHEET R-8.1.3 FOR DETAILS NOT SHOWN.



THRIE BEAM INSTALLATION

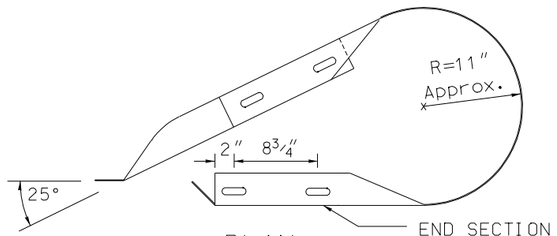


PLAN

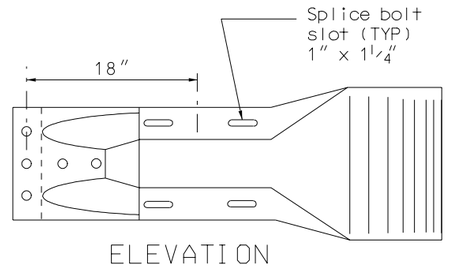


ELEVATION

W-BEAM
END SECTION

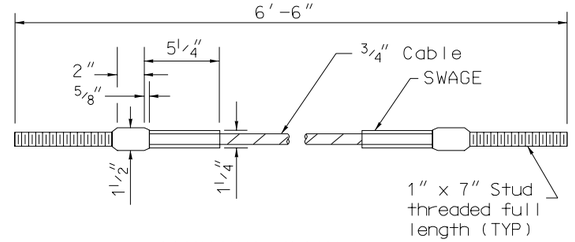


PLAN

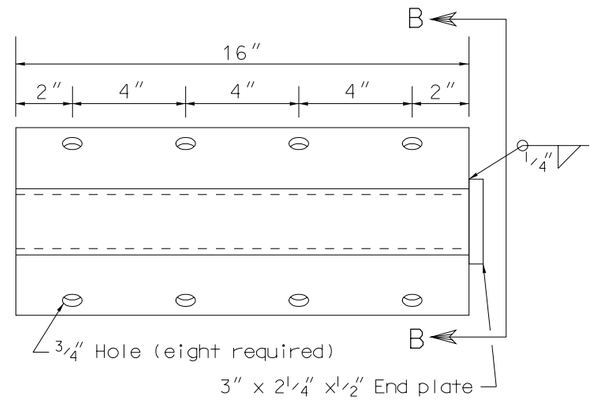


ELEVATION

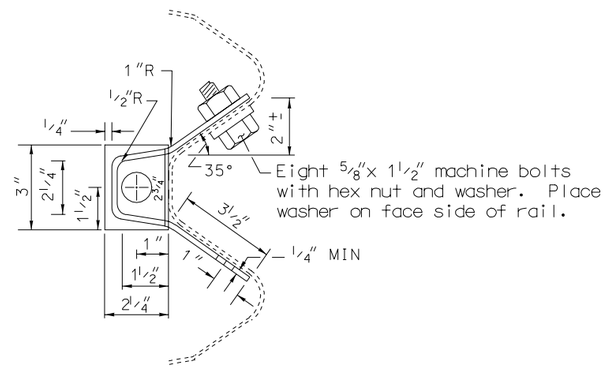
THRIE
END SECTION



ANCHOR CABLE



ANCHOR PLATE - ELEVATION



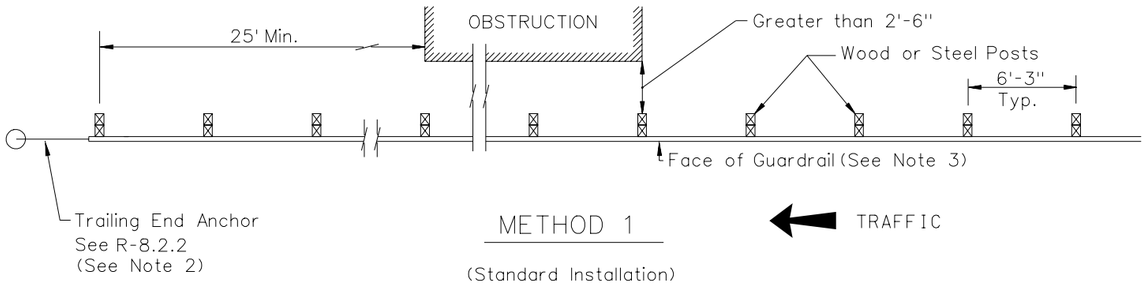
SECTION B-B

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

ANCHOR TERMINAL

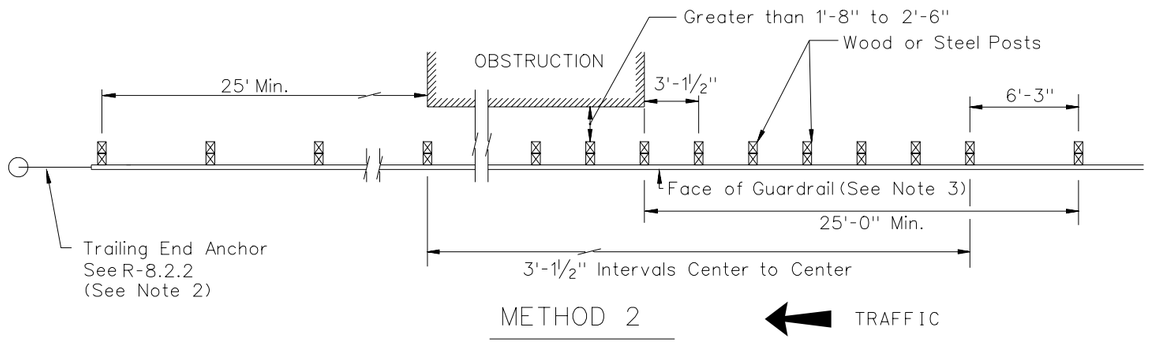
Signed Original On File	R-8.2.3	(618)
CHIEF ROAD DESIGN ENGR.	ADOPTED: 1/01	REVISION

R-73

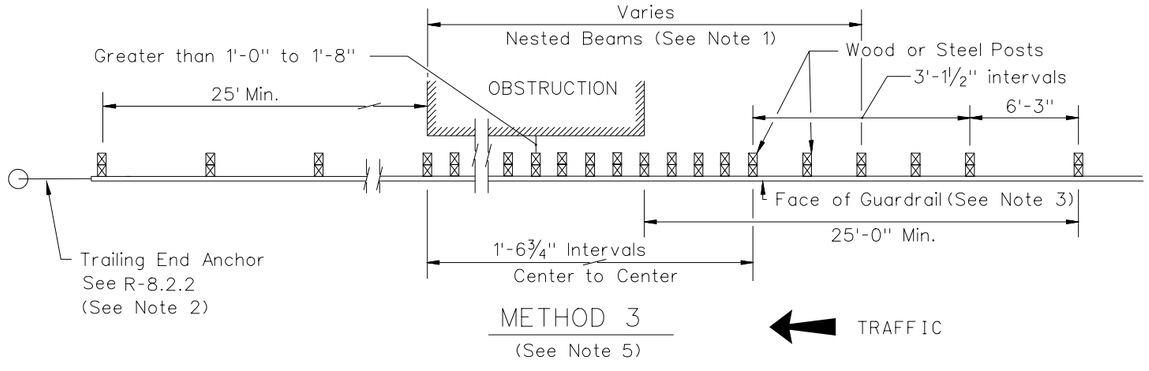


METHOD 1

(Standard Installation)



METHOD 2

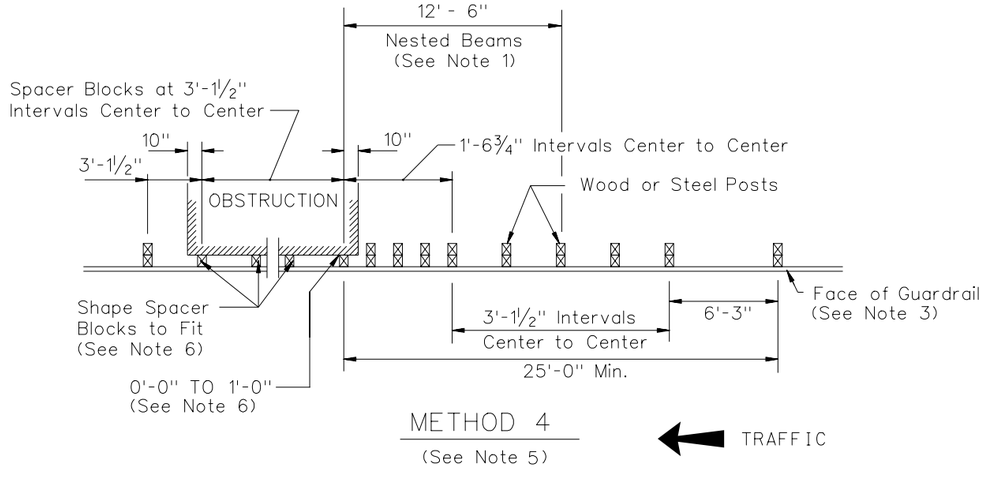


METHOD 3

(See Note 5)

GENERAL NOTES:

1. Use nested thrie beam. See detail "N", Standard Plan Drawing R-8.1.1.
2. A "NCHRP 350", FHWA, and Nevada DOT approved guardrail terminal should be used if the one way facility is to be used as a two way detour. The terminal should be left in place once the detour is removed.
3. For details of triple corrugation guardrail see Standard Plan Drawing R-8.4.1.
4. Refer to AASHTO Roadside Design Guide, 1996 Edition, Section 5.6.1 for design information not shown.
5. If guardrail system is not satisfactory, use concrete barrier rail. Check for vehicle roll angle (top of taller vehicles hitting the obstructions).
6. Spacer material may be "I" beam, wood block or formed structural tubing by prior approval of the engineer. For details of a spacer block see Standard Plan Drawing R-8.4.1. Shy distance can be adjusted upward to fit the spacer block.



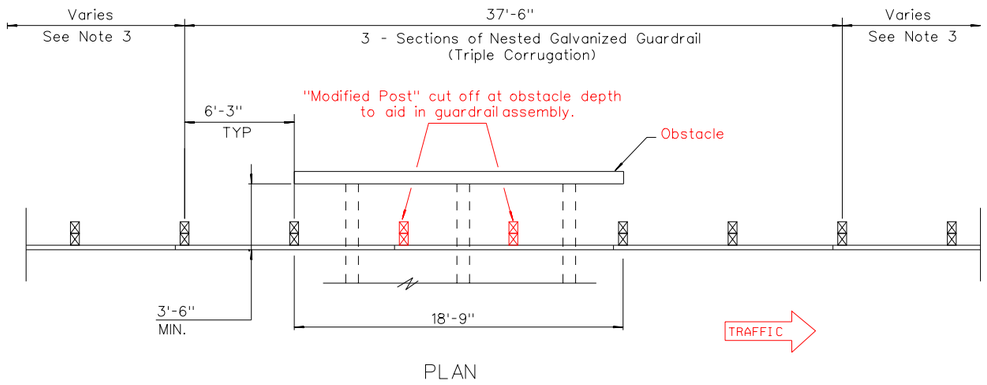
METHOD 4

(See Note 5)

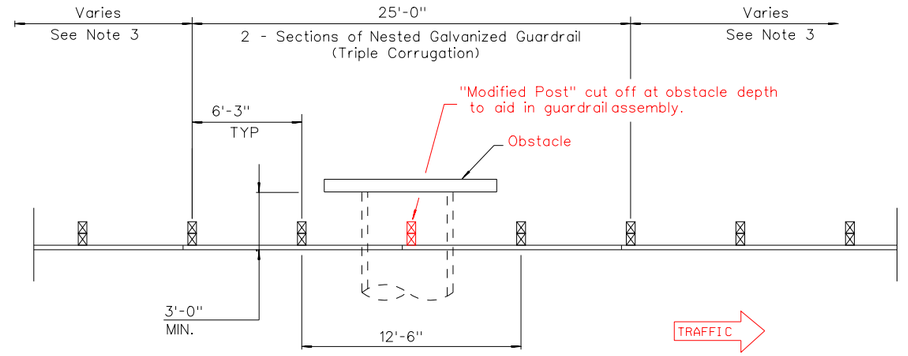
STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

GUARDRAIL INSTALLATION DEFLECTIONS AND BACK SPACING

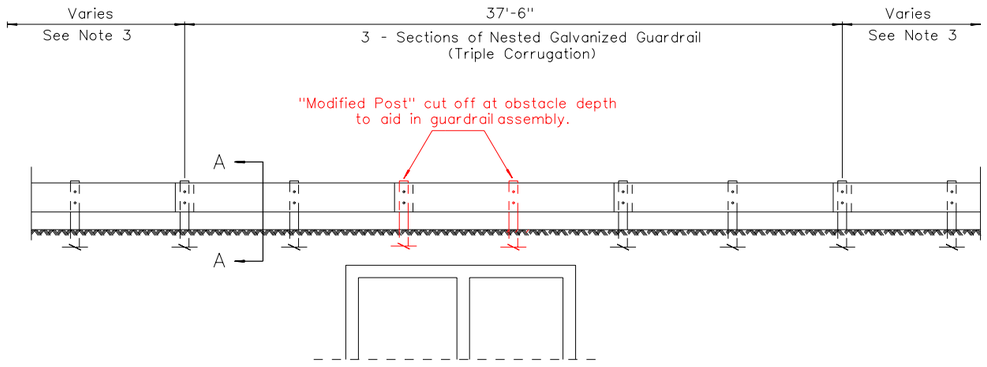
Signed Original On File	R-8.3.1	(618)	
CHIEF ROAD DESIGN ENGR.	ADOPTED: 7/96	REVISION 8/98	



PLAN

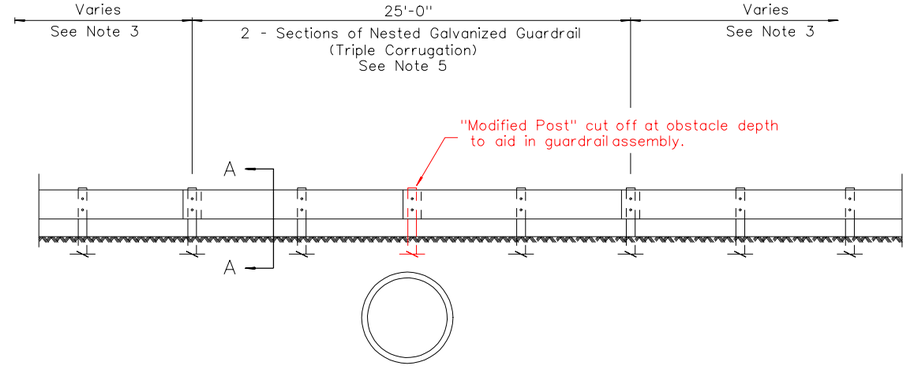


PLAN



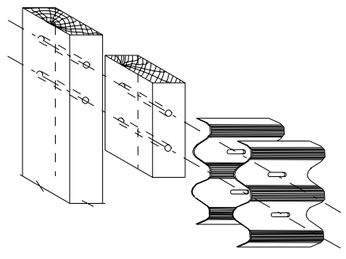
ELEVATION

TYPE 2
(2 Posts Modified)



ELEVATION

TYPE 1
(1 Post Modified)



NESTED BEAMS
SECTION "A-A"

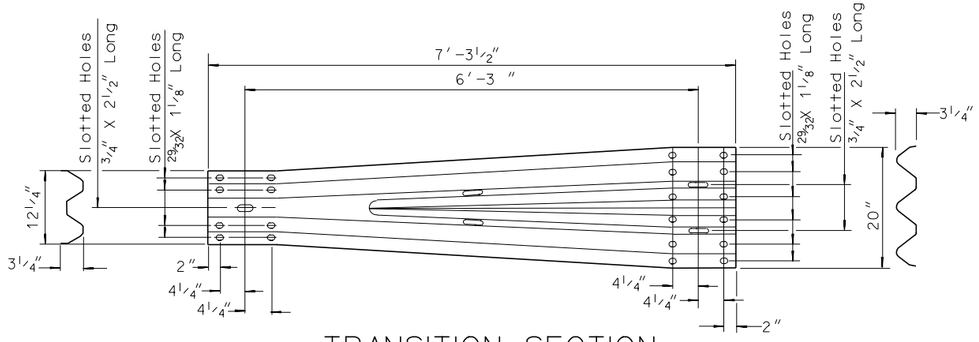
GENERAL NOTES:

1. THESE DETAILS ARE TO BE USED ONLY WHEN GUARDRAIL POST CANNOT BE INSTALLED TO AVOID UNDERGROUND OBSTRUCTIONS WITH GUARDRAIL POSTS.
2. SEE SHEET R-8.4.1 FOR DETAILS ON GALVANIZED GUARDRAIL (TRIPLE CORRUGATIONS) NOT SHOWN.
3. GUARDRAIL LENGTHS OF NEED SHALL BE BASED ON DESIGN YEAR TRAFFIC VOLUMES-SEE CURRENT EDITION OF THE AASHTO ROADSIDE DESIGN GUIDE FOR DETAILS.
4. CHECK FEASIBILITY OF REMOVING OBSTACLE OR EXTENDING CULVERT OUTSIDE CLEAR ZONE VERSUS COST OF GUARDRAIL.
5. IF THE GUARDRAIL SPLICE OCCURS ON THE POSTS WHICH ARE ADJACENT TO THE MODIFIED POST THEN THREE CONTIGUOUS SECTIONS (37'-6") OF NESTED GUARDAIL ARE REQUIRED, WITH THE MIDDLE SECTION BEING CENTERED AT THE LOCATION OF THE MODIFIED POST.

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

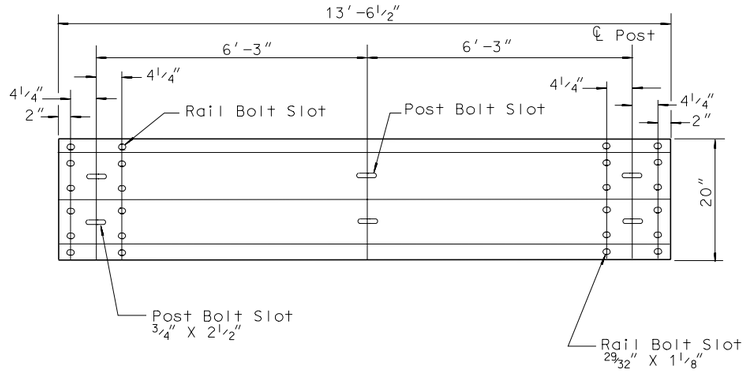
GUARDRAIL INSTALLATION MODIFIED POST

Signed Original On File	R-8.3.2	(618)
CHIEF ROAD DESIGN ENGR.	ADOPTED: 7/96	REVISION 10/02

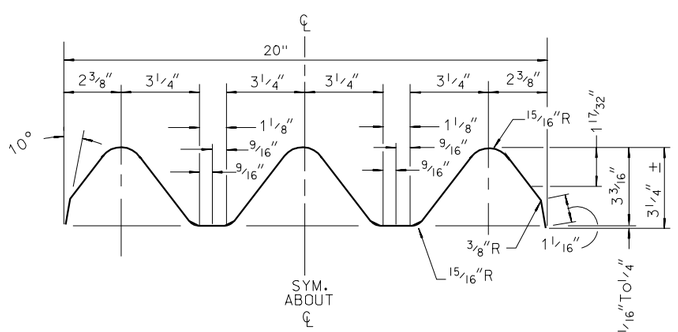


TRANSITION SECTION

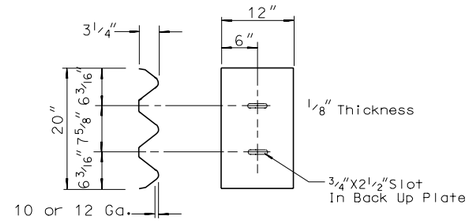
PLAN VIEW



FRONT ELEVATION

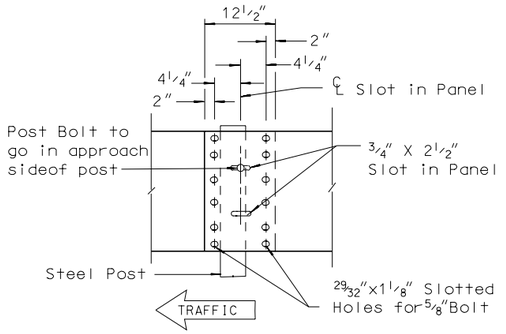


SECTION THROUGH RAIL ELEMENT

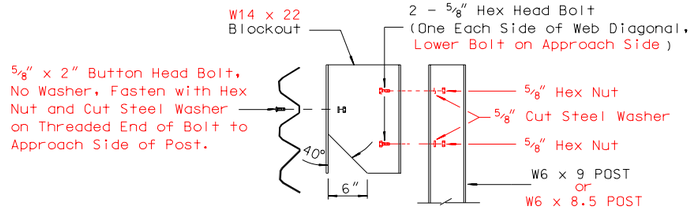


BACK-UP PLATE

(FOR USE BETWEEN GUARDRAIL AND STEEL BLOCK AT POSTS BETWEEN RAIL SPLICES)

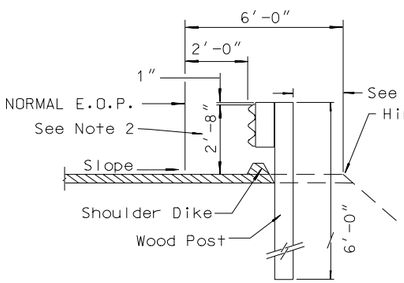


RAIL SPLICE

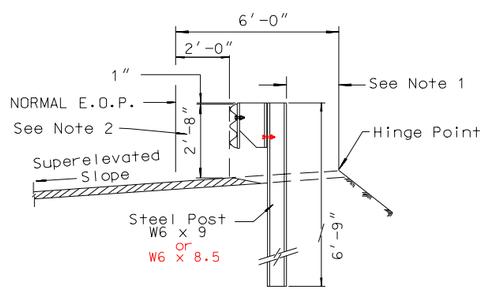


STEEL POST BOLT HARDWARE AND BLOCKOUT DETAIL

(SEE NOTE 5)

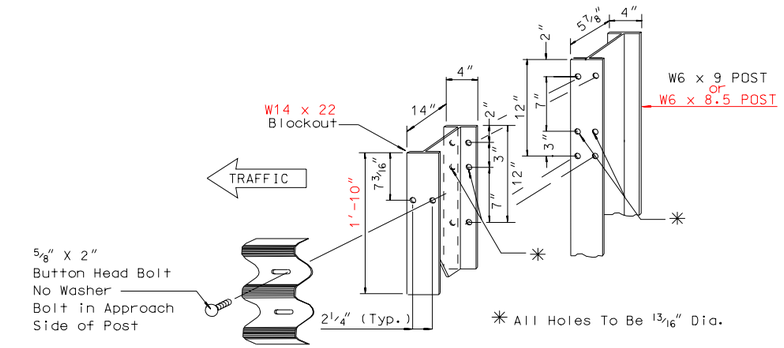


WOOD POST



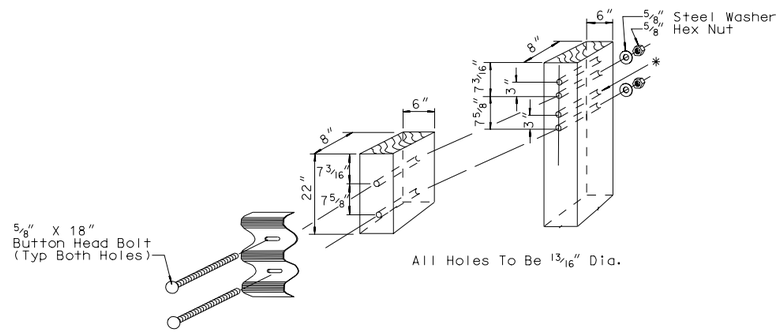
STEEL POST

TYPICAL GUARDRAIL INSTALLATIONS



TRIPLE CORRUGATED RAIL-STEEL POST

NTS



TRIPLE CORRUGATED RAIL-WOOD POST

NTS

GENERAL NOTES:

1. WHEN DISTANCE BETWEEN BACK OF GUARDRAIL POST AND HINGE POINT IS LESS THAN 2'-0", THE POST SHALL BE LENGTHENED 1'-0" MIN.
2. GUARDRAIL HEIGHTS ON STAGE CONSTRUCTION PROJECTS SHALL BE GOVERNED BY FINAL SURFACING ELEVATIONS. HEIGHT MEASURED AT FACE OF RAIL ELEMENT.
3. WHEN BLOCKOUT RAISED TO AUXILIARY HOLES, BOLT SPACING REDUCES FROM 10" to 7"
4. FOR STEEL POSTS/BLOCKS ONLY - BLOCK MOUNTS TO POST WITH 2 BOLTS STAGGERED, LOWER BOLT ON APPROACHING TRAFFIC SIDE OF BLOCK AND POST WEB.
5. ALL HARDWARE TO BE GALVANIZED.

LEGEND:

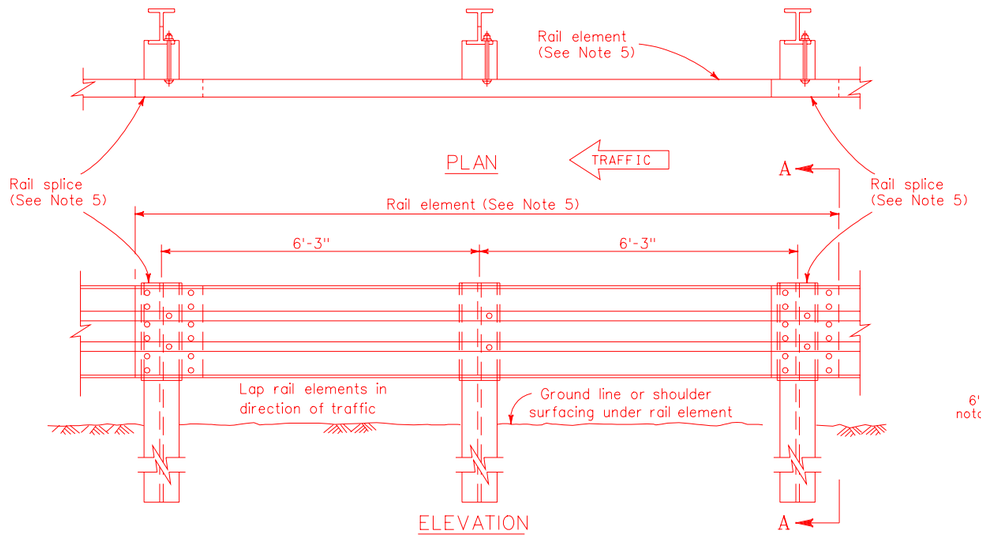
✳ AUXILIARY HOLE TO BE USED WHEN ROADWAY SURFACE TO RAIL BOTTOM IS LESS THAN 10".

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

GALVANIZED GUARDRAIL (TRIPLE CORRUGATION)

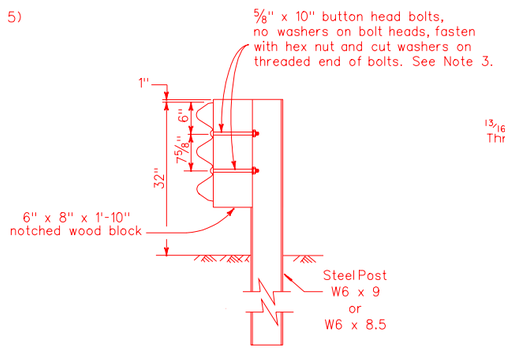
Signed Original On File	R-8.4.1	(618)
CHIEF ROAD DESIGN ENGR.	ADOPTED:11/86	REVISION 6/02

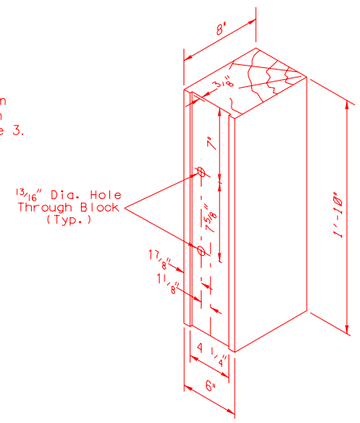
R-76



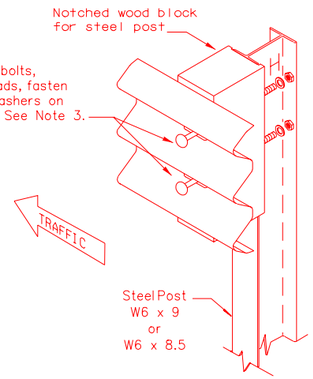
SINGLE THRIE BEAM BARRIER

SECTION A-A
STEEL POST BOLT HARDWARE
AND WOOD BLOCKOUT DETAIL

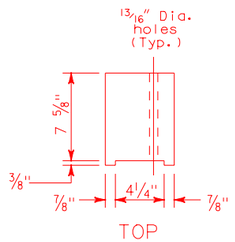


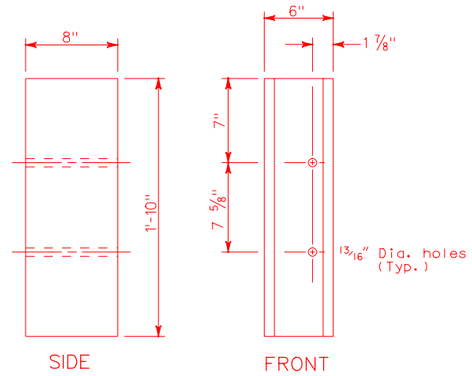


NOTCHED WOOD BLOCK
FOR STEEL POST

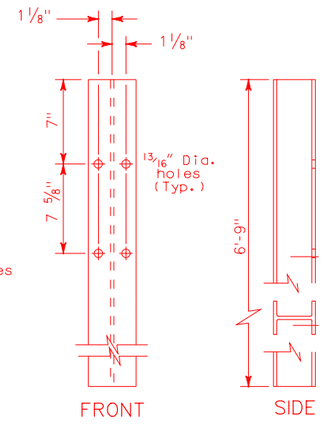


STEEL POST
ASSEMBLY

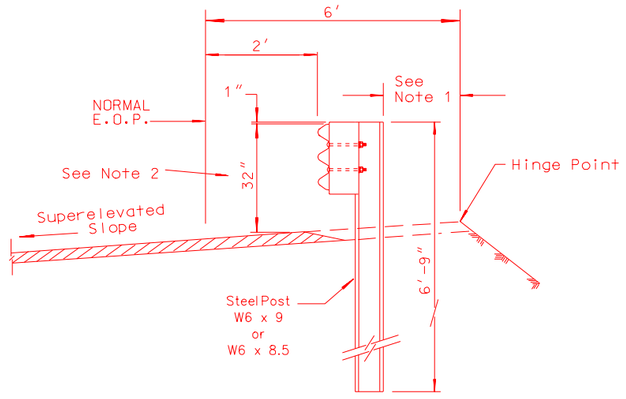




6" x 8" x 1'-10"
NOTCHED WOOD BLOCK



STEEL POST
W6x 9 or W6 x 8.5



TYPICAL GUARDRAIL INSTALLATIONS

GENERAL NOTES:

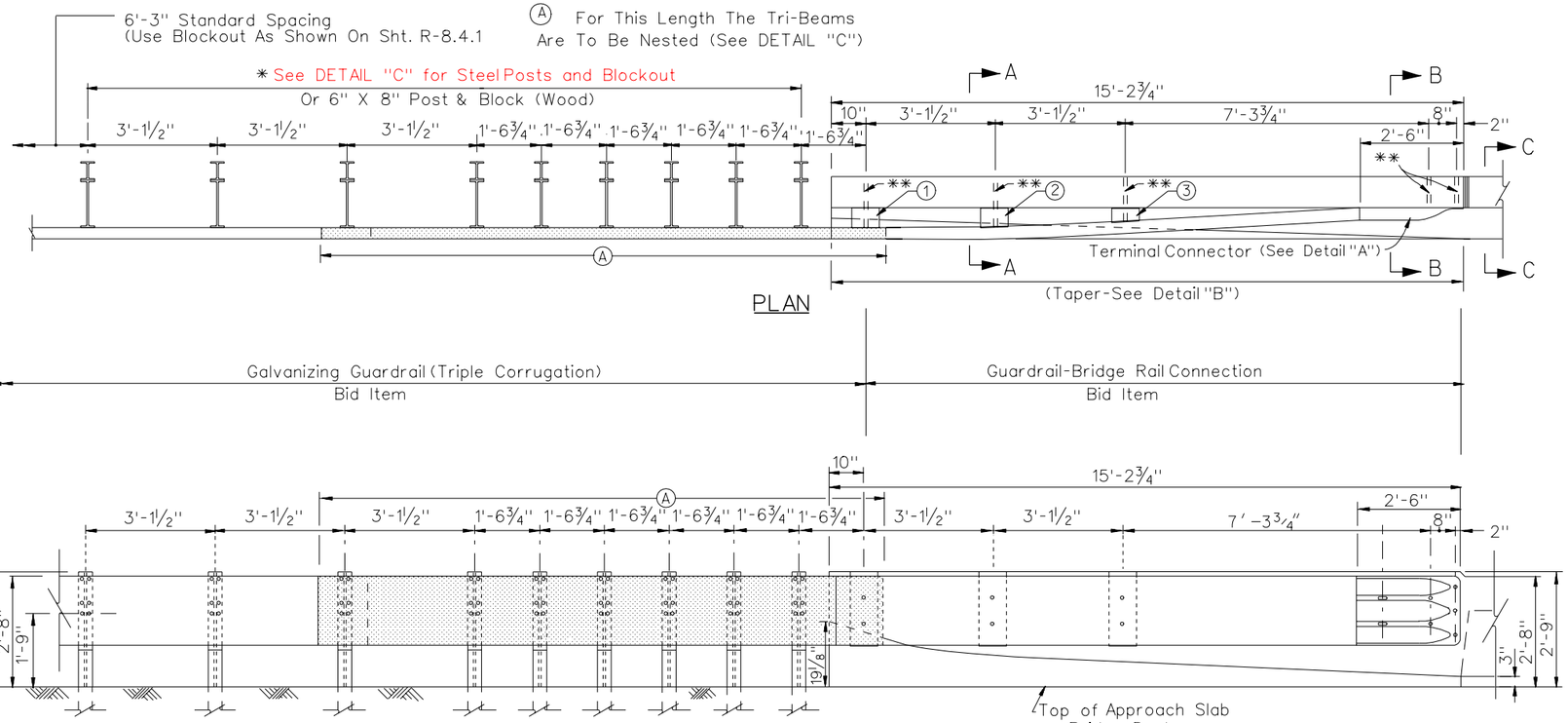
1. WHEN DISTANCE BETWEEN BACK OF GUARDRAIL POST AND HINGE POINT IS LESS THAN 2' THE POST SHALL BE LENGTHENED 1' MIN.
2. GUARDRAIL HEIGHTS ON STAGE CONSTRUCTION PROJECTS SHALL BE GOVERNED BY FINAL SURFACING ELEVATIONS. HEIGHT MEASURED AT FACE OF RAIL ELEMENT.
3. ATTACH GUARDRAIL TO WOOD BLOCK AND STEEL POST WITH TWO BOLTS ON APPROACHING TRAFFIC SIDE OF BLOCK AND POST WEB.
4. TOP OF GUARDRAIL TO BE 32" ABOVE GROUND LINE OR SHOULDER SURFACING.
5. FOR DETAILS OF THE CROSS SECTION OF THRIE BEAM, RAIL ELEMENT, RAIL SPLICE, TRANSITION SECTION, AND BACKUP PLATE-SEE STANDARD PLAN SHEET R-8.4.1.
6. ALL HARDWARE TO BE GALVANIZED.

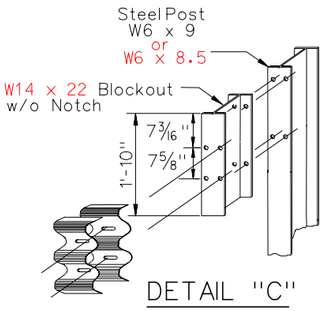
STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

GALVANIZED GUARDRAIL (TRIPLE CORRUGATION) STEEL POST/WOOD BLOCK

Signed Original On File	R-8.4.1.1	(618)
CHIEF ROAD DESIGN ENGR.	ADOPTED:07/96	REVISION: 6/02

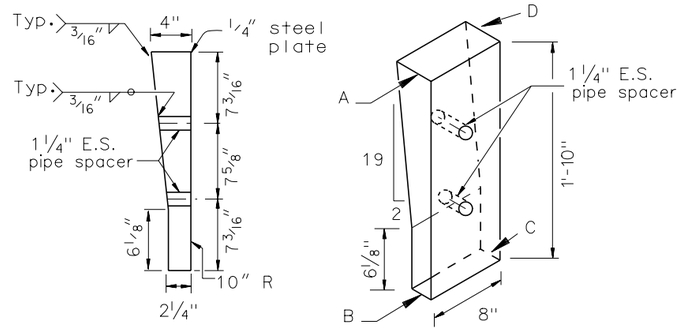
R-77





DETAIL "C"

SPACER BLOCK TABLE				
SPACER BLOCK	A	B	C	D
①	4"	2¼"	2¼"	4"
②	3½"	1¼"	1¼"	3⅛"
③	2⅛"	¾"	¾"	2⅛"



SIDE VIEW ISOMETRIC

SPACER BLOCK 1 DETAIL

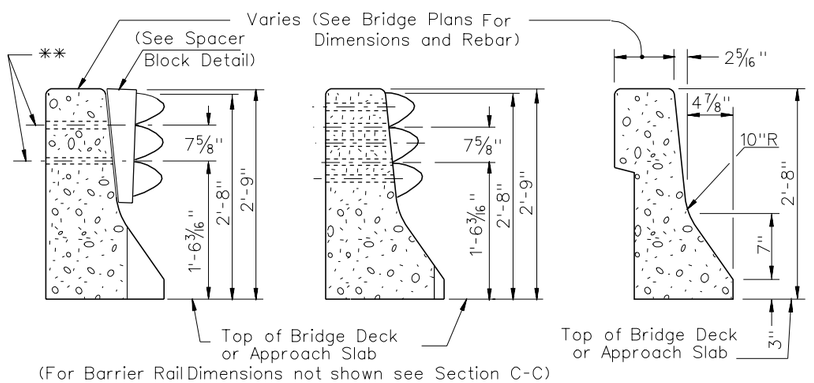
GENERAL NOTES:

1. Wood spacer blocks (of the proper dimensions) may be substituted for the detailed steel blocks.

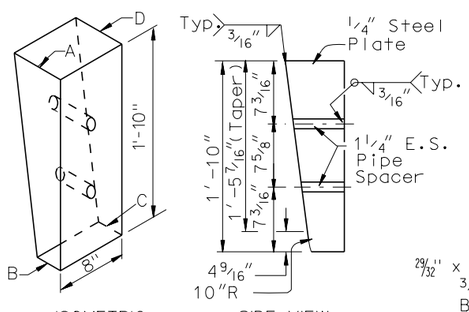
LEGEND:

* Uses same bolt hole pattern as DETAIL "C"
(13/16" drilled holes for ⅝" button head bolts with hex nuts and flat plate washers)

** 1⅛" Dia. core drilled holes for ⅞" Dia. galvanized high strength hex bolts & nuts with 3" x ¼" square galvanized steel washer with 1" Dia. hole.

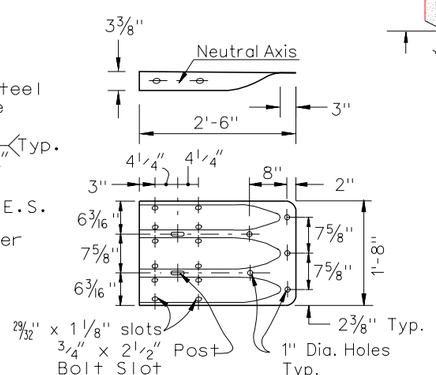


SECTION A-A SECTION B-B SECTION C-C

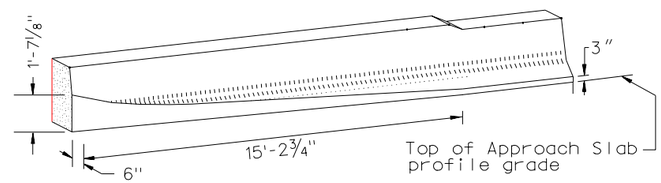


ISOMETRIC SIDE VIEW

SPACER BLOCKS 2 AND 3 DETAIL



DETAIL "A"



DETAIL "B"

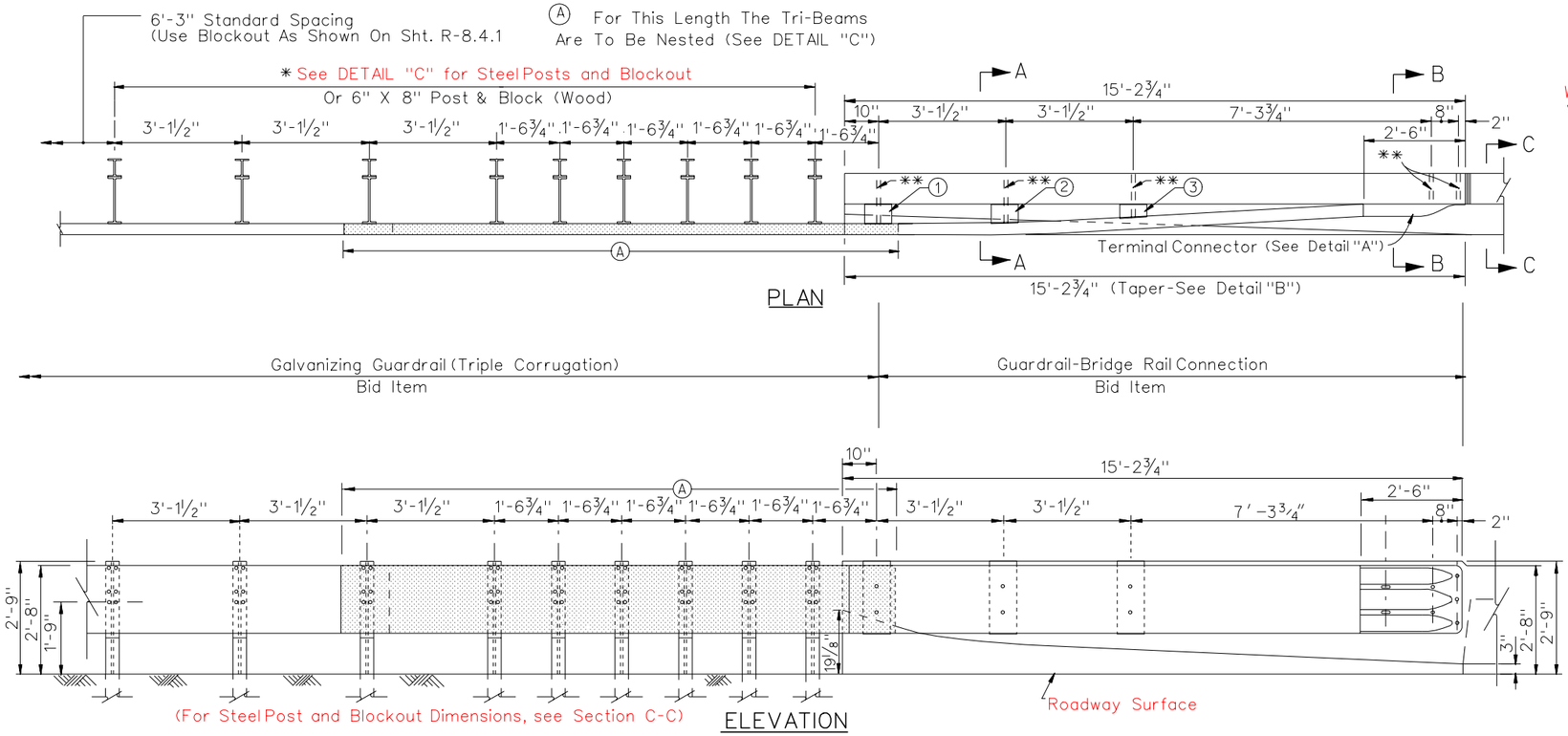
Method of tapering bridge rail For Guardrail Connections

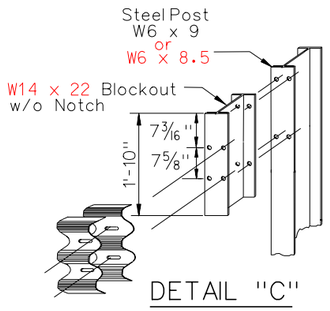
STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

GUARDRAIL-BRIDGE RAIL CONNECTION (TRIPLE CORRUGATION)

Signed Original On File	R-8.4.2	(618)
CHIEF ROAD DESIGN ENGR.	ADOPTED: 7/96	REVISION 5/02

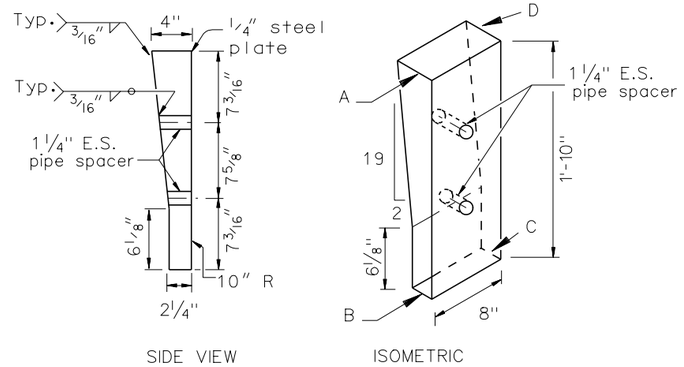
R-78





DETAIL "C"

SPACER BLOCK TABLE				
SPACER BLOCK	A	B	C	D
①	4"	2¼"	2¼"	4"
②	3½"	1¼"	1¼"	3⅜"
③	2⅛"	¾"	¾"	2⅛"



SPACER BLOCK 1 DETAIL

GENERAL NOTES:

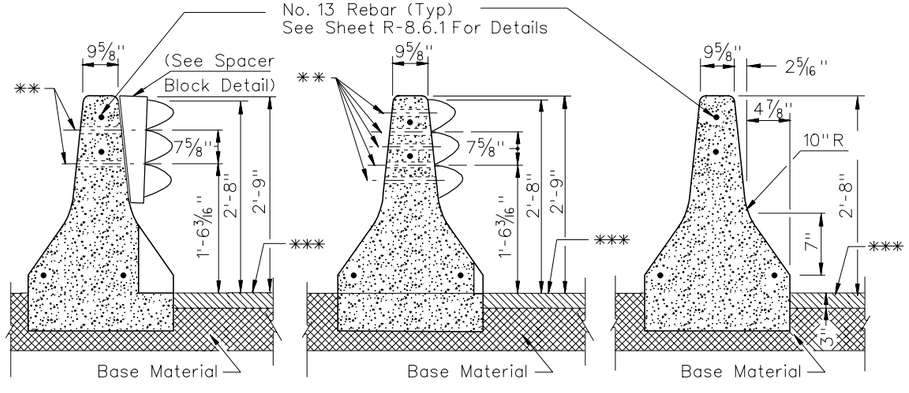
1. Wood spacer blocks (of the proper dimensions) may be substituted for the detailed steel blocks.

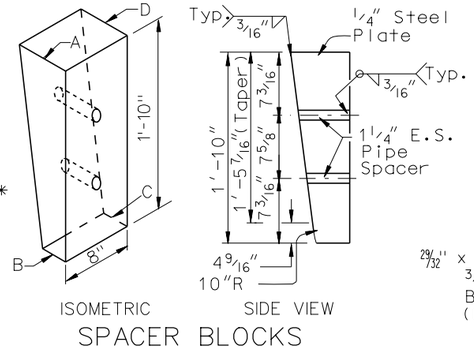
LEGEND:

* Uses same bolt hole pattern as DETAIL "C" (13/16" drilled holes for ⅝" button head bolts with hex nuts and flat plate washers)

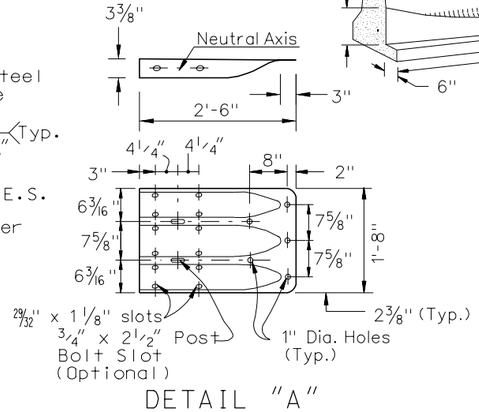
** 1⅛" Dia. core drilled holes for ⅞" Dia. galvanized high strength hex bolts & nuts with 3" x ¼" square galvanized steel washer with 1" Dia. hole.

*** Dense Graded or Profile Grade

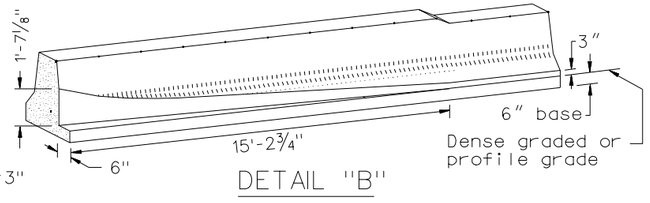




SPACER BLOCKS 2 AND 3 DETAIL



DETAIL "A"



DETAIL "B"

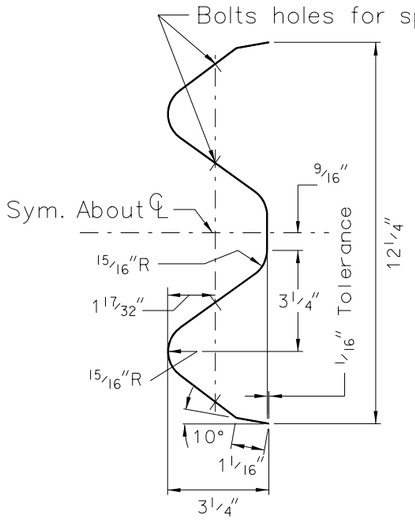
Method of Tapering Barrier Rail For Guardrail Connections

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

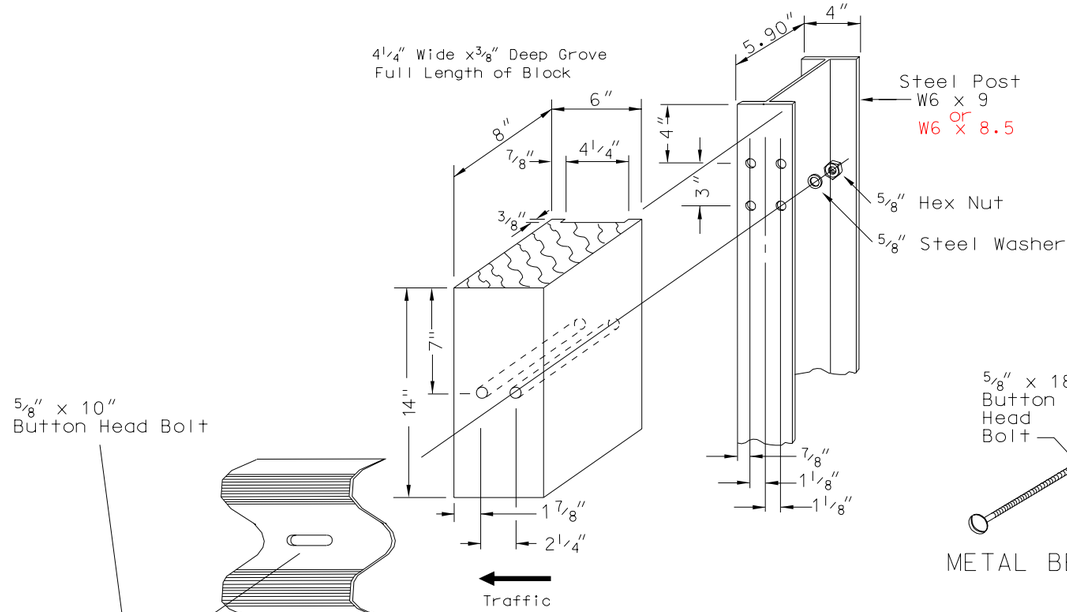
GUARDRAIL-BARRIER RAIL CONNECTION (TRIPLE CORRUGATION)

Signed Original On File	R-8.4.3	(618)
CHIEF ROAD DESIGN ENGR.	ADOPTED: 7/96	REVISION 10/02

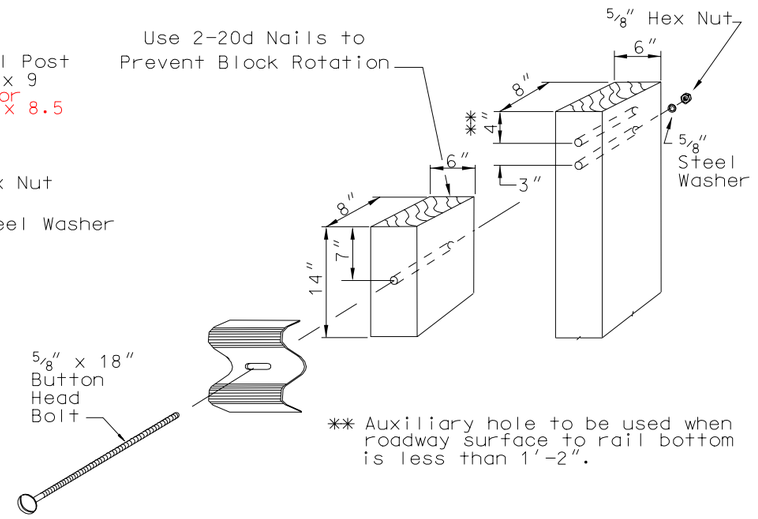
R-79



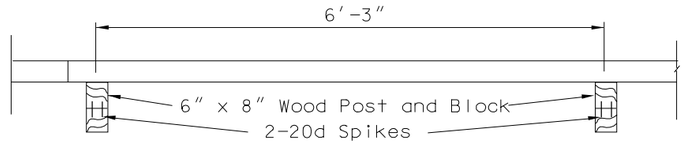
SECTION THRU RAIL ELEMENT



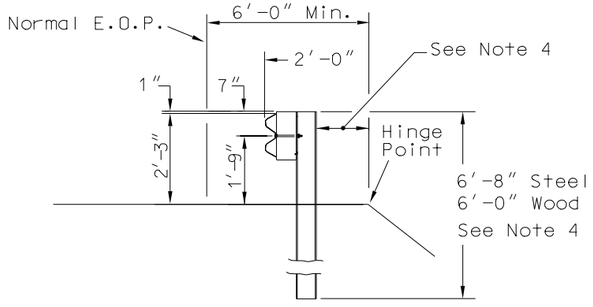
METAL BEAM GUARDRAIL WITH
STEEL POST AND WOOD BLOCK



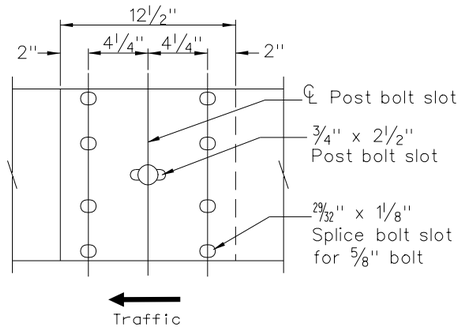
METAL BEAM GUARDRAIL WITH WOOD POSTS & BLOCKS



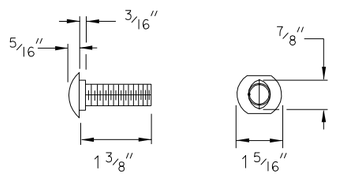
PLAN
(METAL BEAM GUARDRAIL
WITH WOOD POST AND BLOCK)



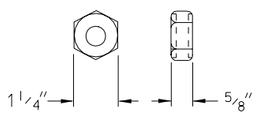
TYPICAL GUARD RAIL INSTALLATION



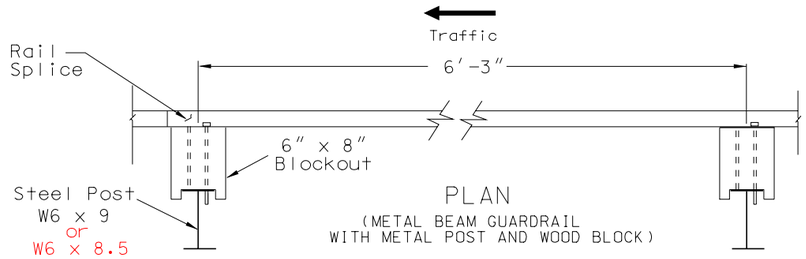
RAIL SPLICE



5/8" SPLICE BOLT



5/8" RECESSED NUT



PLAN
(METAL BEAM GUARDRAIL
WITH METAL POST AND WOOD BLOCK)

GENERAL NOTES:

1. ALL HOLES 3/4" DIA.
2. FOR METAL POSTS - RAIL MOUNTS TO BLOCK WITH BOLT ON APPROACHING TRAFFIC SIDE OF BLOCK AND POST WEB.
3. ON RETROFIT INSTALLATIONS WHEN DISTANCE BETWEEN BACK OF GUARDRAIL POST AND HINGE POINT IS LESS THAN 2'-0", THE POST SHALL BE LENGTHENED 1'-0" MIN.
4. GUARDRAIL HEIGHTS ON STAGED CONSTRUCTIONS PROJECTS SHALL BE GOVERNED BY FINAL SURFACING ELEVATIONS.

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

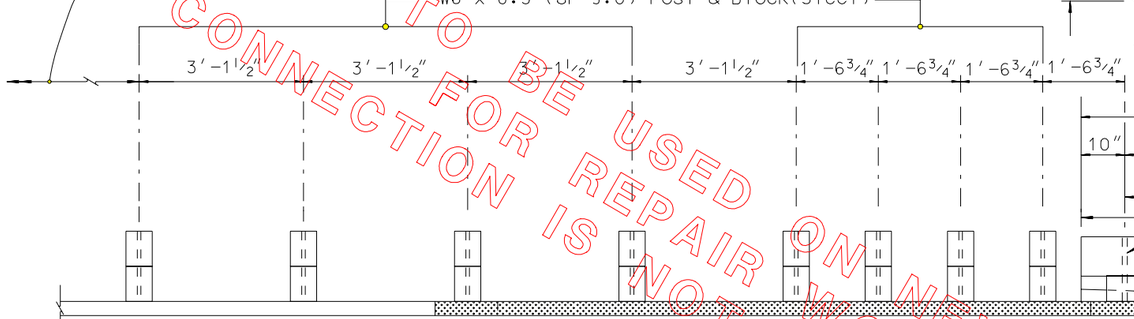
GALVANIZED GUARDRAIL
("W" BEAM)

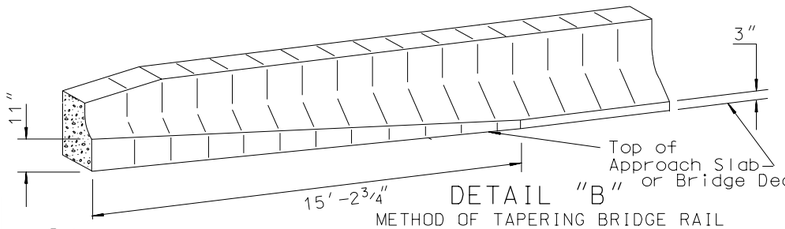
Signed Original On File	R-8.5.1	(618)
	ADOPTED: 2/79	REVISION 5/02
CHIEF ROAD DESIGN ENGR.		

R-81

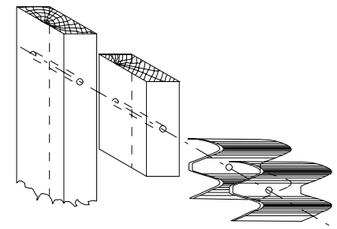
* 13/16" Drilled Holes For 5/8" Button Head Bolts With Hex Nuts & Flat Plate Washer.

(A) — For This Length The W-Beams Are To Be Nested. (See Detail "C")

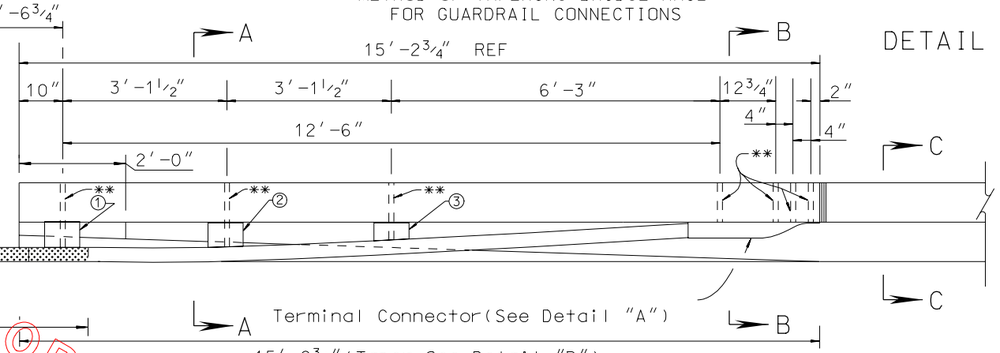




DETAIL "B"
METHOD OF TAPERING BRIDGE RAIL FOR GUARDRAIL CONNECTIONS

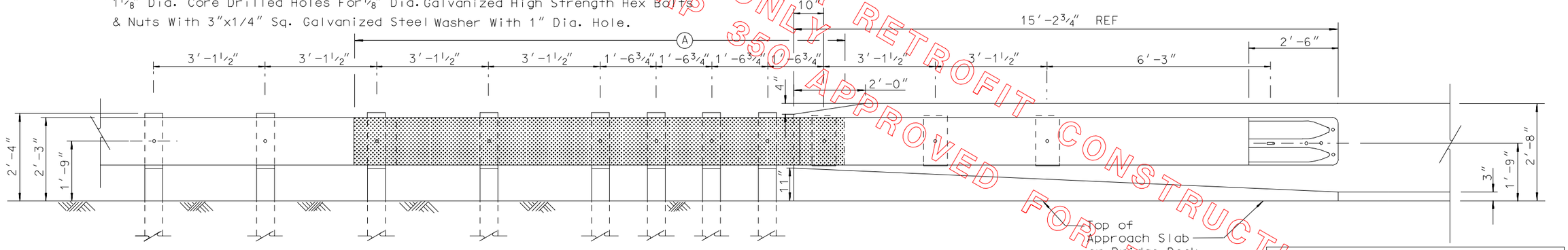


DETAIL "C"

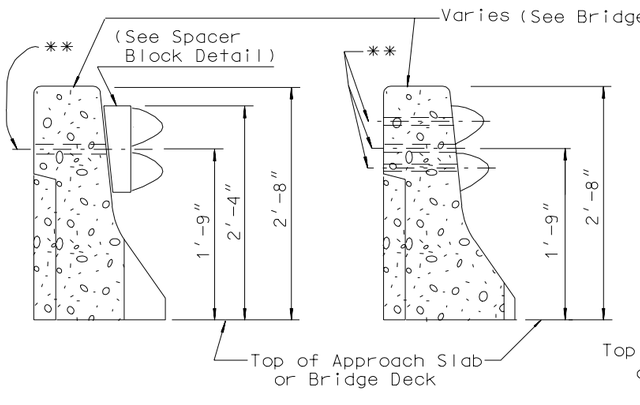


PLAN

** 1 1/8" Dia. Core Drilled Holes For 7/8" Dia. Galvanized High Strength Hex Bolts & Nuts With 3"x1/4" Sq. Galvanized Steel Washer With 1" Dia. Hole.



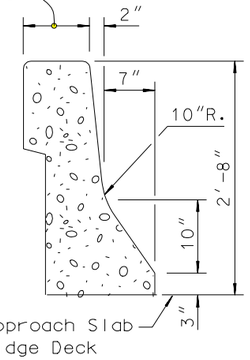
ELEVATION



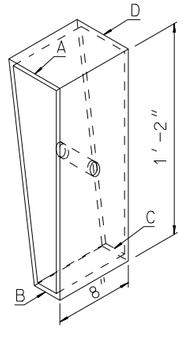
(For Barrier Rail Dimensions Not Shown See Sec. C-C)

SECTION A-A

SECTION B-B

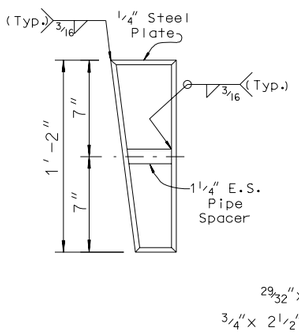


SECTION C-C

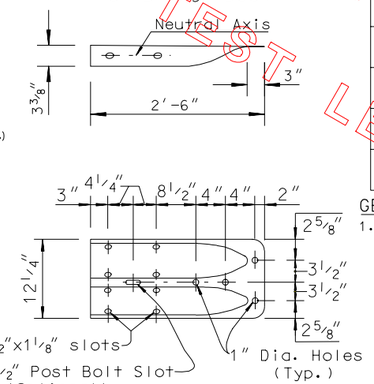


ELEVATION

SPACER BLOCK DETAIL



SIDE VIEW



DETAIL "A"

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

GENERAL NOTES:

1. Wood Spacer Blocks (Of The Proper Dimensions) May Be Substituted For The Detailed Steel Blocks.

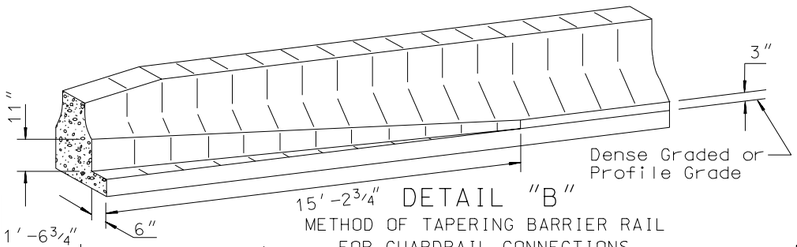
STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

GUARD RAIL-BRIDGE RAIL CONNECTIONS "W" BEAM

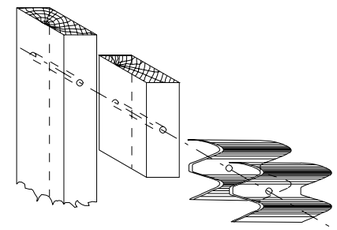
Signed Original On File	R-8.5.2	(618)
CHIEF ROAD DESIGN ENGR.	ADOPTED: 11/86	REVISION 10/98

*13/16" Drilled Holes For 5/8" Button Head Bolts With Hex Nuts & Flat Plate Washer.

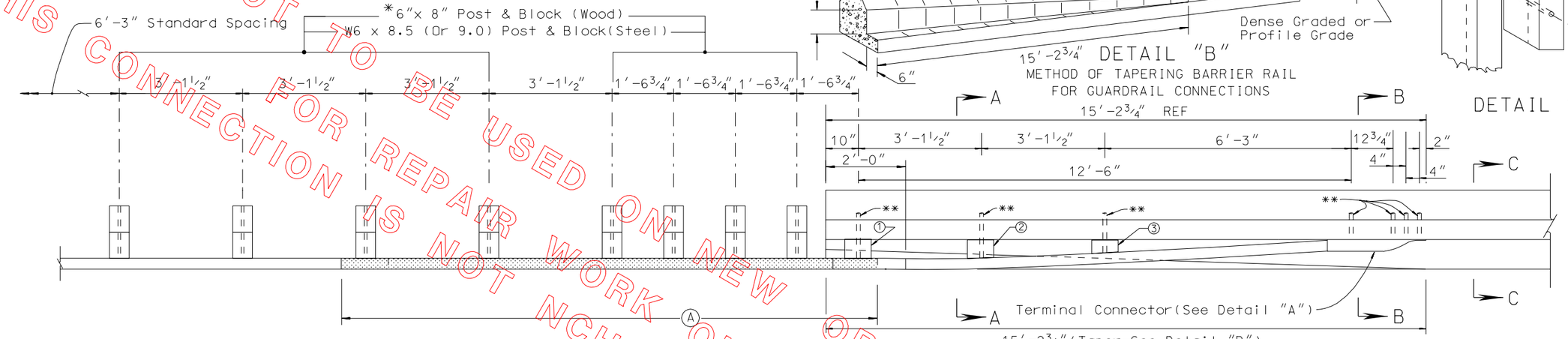
(A) — For This Length The W-Beams Are To Be Nested. (See Detail "C")



DETAIL "B"
METHOD OF TAPERING BARRIER RAIL FOR GUARDRAIL CONNECTIONS

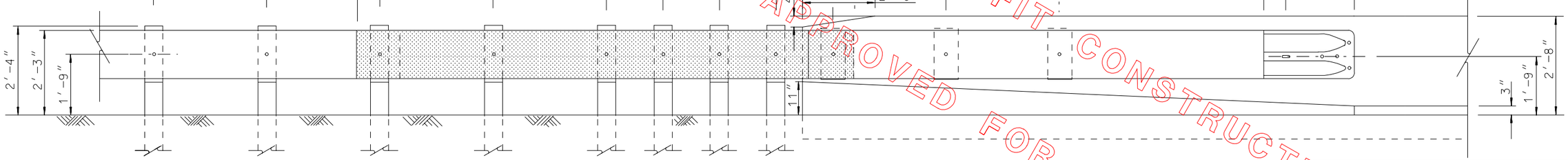


DETAIL "C"



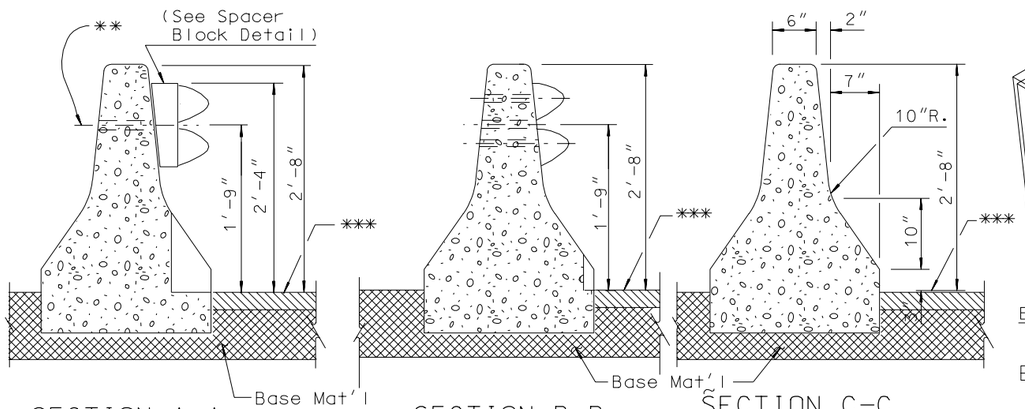
PLAN

**1 1/8" Dia. Core Drilled Holes For 7/8" Dia. Galvanized High Strength Hex Bolts & Nuts With 3"x1/4" Sq. Galvanized Steel Washer With 1" Dia. Hole.



(For Barrier Rail Dimensions Not Shown See Sec. C-C)
*** - Dense Graded or Profile Grade

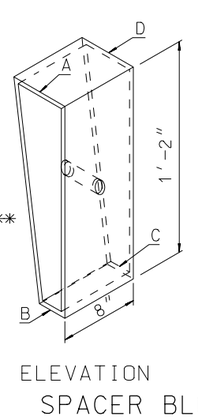
ELEVATION



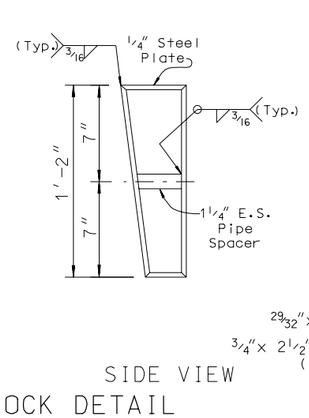
SECTION A-A

SECTION B-B

SECTION C-C

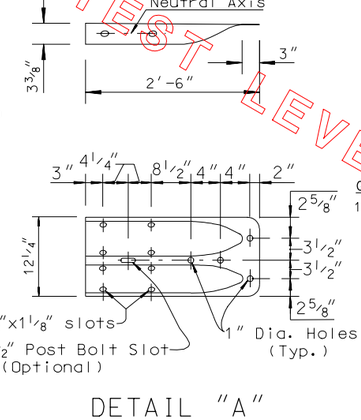


ELEVATION



SIDE VIEW

SPACER BLOCK DETAIL



DETAIL "A"

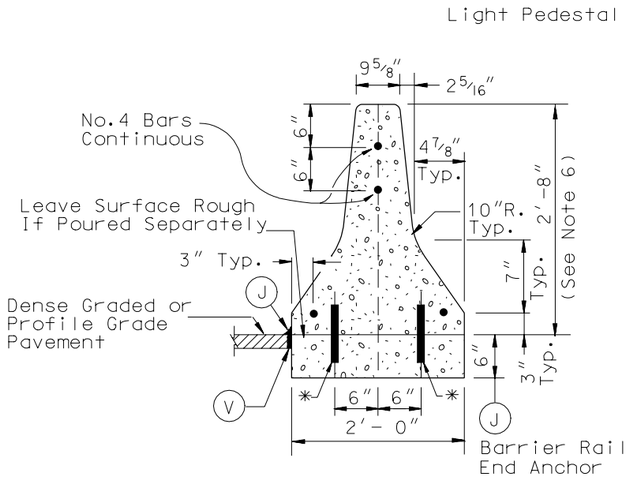
SPACER BLOCK TABLE				
SPACER BLOCK	A	B	C	D
①	6"	3 3/4"	3 3/4"	6"
②	5 5/8"	3 3/8"	3 1/8"	5 3/8"
③	4 1/8"	1 7/8"	1 3/8"	3 5/8"

GENERAL NOTES:
1. Wood Spacer Blocks (Of The Proper Dimensions) May Be Substituted For The Detailed Steel Blocks.

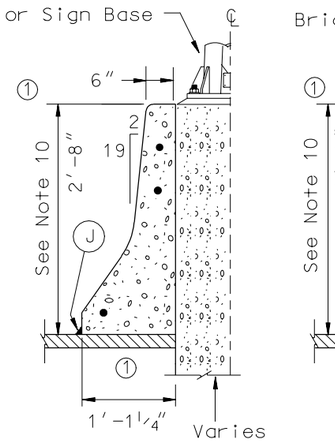
STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

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

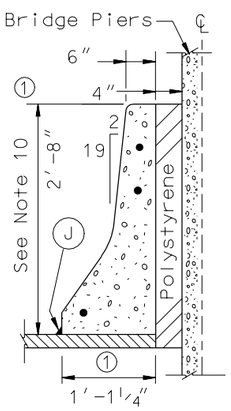
Signed Original On File	R-8.5.3	(618)
CHIEF ROAD DESIGN ENGR.	ADOPTED: 11/86	REVISION 10/98



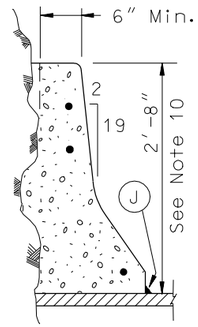
TYPE A



TYPE B



TYPE B



TYPE C

TYPE A
CONCRETE (INFORMATION ONLY)

0.1208 $Yd.^3$ Per Ft., Without Base Slab

0.1578 $Yd.^3$ Per Ft., With Base Slab

TYPE B
CONCRETE (INFORMATION ONLY)

0.0702 $Yd.^3$ Per Ft.

LEGEND:

(1) Dimension Used When Barrier Is Placed Against Rock Or Solid Object Such As A Retaining Wall

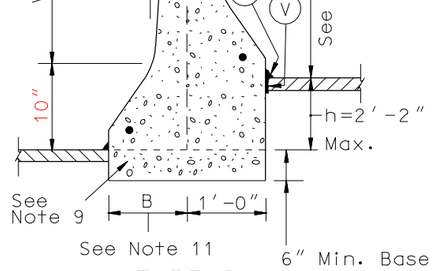
(M) Pavement (See Note 3)

(J) Joint Sealer Typical (See Note 5)

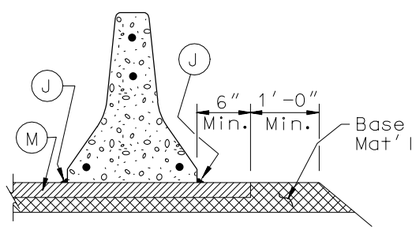
(V) Vertical Joint Sealer Typical (See Note 4)

* 1"x 8" Steel Dowel @ 2'-0" Centers (If Needed See Note 3)

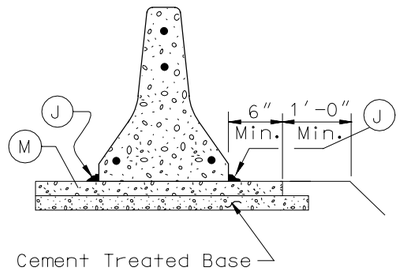
● No.4 Bars Continuous



TYPE D



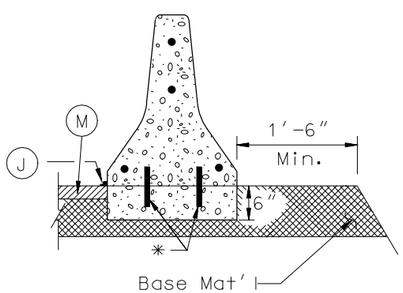
BITUMINOUS SECTION



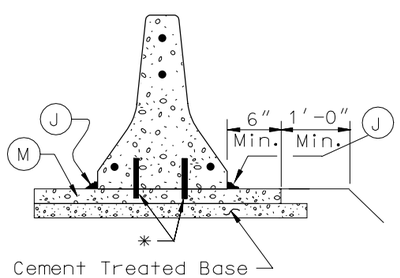
CONCRETE SECTION

NORMAL ROADWAY DETAIL

(1/4" Scored Joints @ 15'-0")



BITUMINOUS SECTION



CONCRETE SECTION

BARRIER RAIL END ANCHOR DETAIL

(First and Last 10')

GENERAL NOTES:

1. Concrete shall be Class A or AA. Reinforcing Steel: USE 4-No.4 bars continuous in Type A and Type D, Concrete Barrier Rail. Use 3-No.4 bars continuous in Type B and Type C, Concrete Barrier Rail.
2. Expansion joints at all structures. Joints in barrier rail over a structure shall be at the same location and of the same dimensions as those in the structure. Joint filler not required in expansion joint in barrier rail.
3. Bituminous paving requirements: the barrier end anchors shall be constructed in the first and last 10' of the barrier rail run. At the contractors option, 6" concrete base and barrier rail may be placed monolithically, in which case dowels may be eliminated. See barrier rail end anchor details.

   Concrete paving requirements: dowels shall be required in the first and last 10' of the barrier rail run. The surface of the concrete shall be clean prior to placement of the barrier rail. At the contractors option, concrete pavement and barrier rail may be placed monolithically, in which case dowels may be eliminated. See concrete section for dowels in barrier rail end anchor.
4. Vertical joints shall have a single component hot applied sealant full depth of joint.
5. Joint sealer shall be a single component hot applied sealant 1" thick.
6. The height of the barrier rail shall be measured from the top of the plantmix bituminous surface or the top of concrete pavemant.
7. For impact attenuator attachment details, see manufacturer's drawings.. For guardrail energy absorbing terminal attachment, see Standard Drawing R.8.1.1.
8. Depth of 6" base shall be checked and increased as needed for foundation stability. When barrier rail sits on pavement, the base can be eliminated. Barrier rail and anchors may be required.
9. For details not shown, see TYPE A.
10. B = 2/19 x h + 12"
11. See contract plans for exact dimensions.

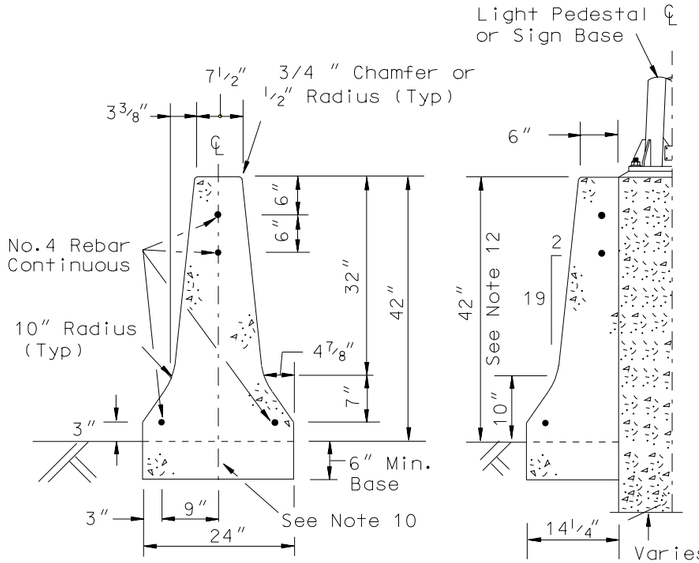
Concrete Barrier Rail Lateral Flare Rates

DESIGN SPEED	FLARE RATE
75 MPH	22:1
70 MPH	20:1
60 MPH	17:1
50 MPH	14:1
40 MPH	11:1
30 MPH	8:1

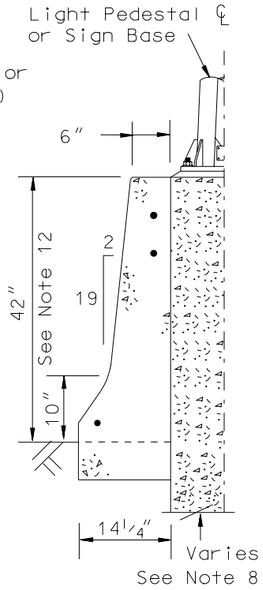
STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

CONCRETE BARRIER RAIL

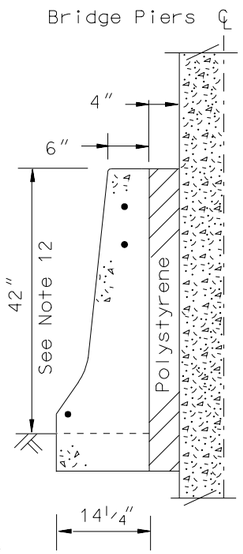
Signed Original On File	R-8.6.1	(502)
CHIEF ROAD DESIGN ENGR.	ADOPTED:11/86	REVISION 3/02



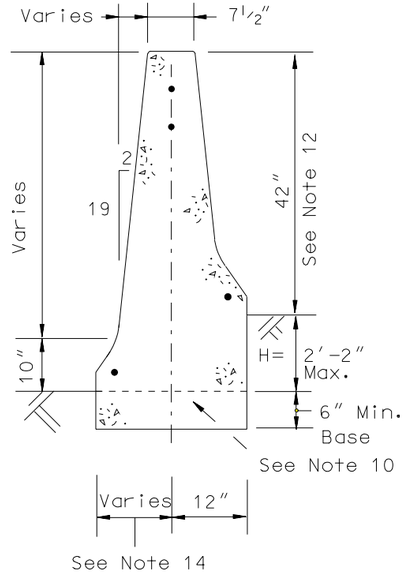
TYPE FA



TYPE FB



TYPE FB



TYPE FD

CONCRETE (FOR INFORMATION ONLY)

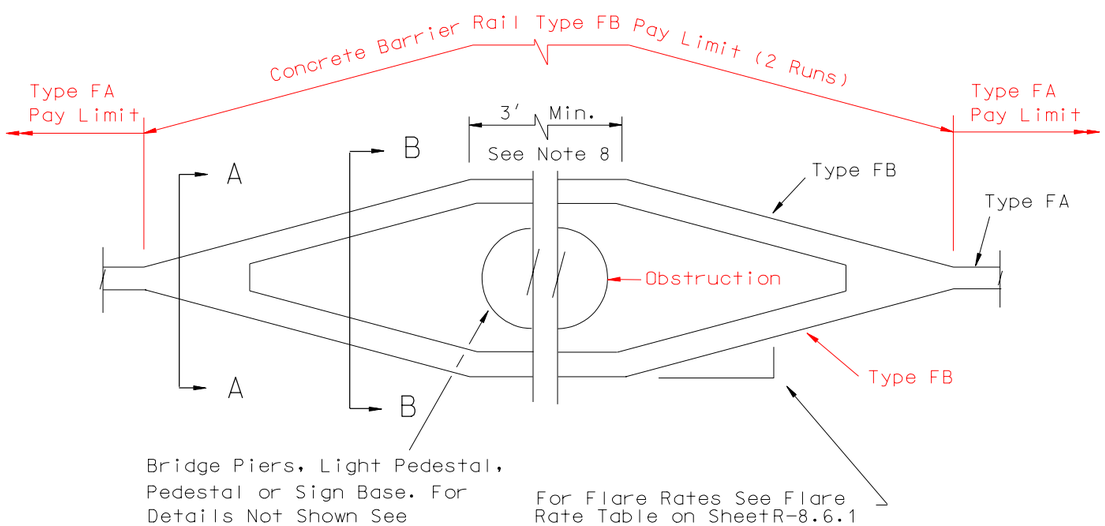
0.1533 yd.^{3} PER LIN. FT. WITH BASE
0.1168 yd.^{3} PER LIN. FT. WITHOUT BASE

CONCRETE (FOR INFORMATION ONLY)

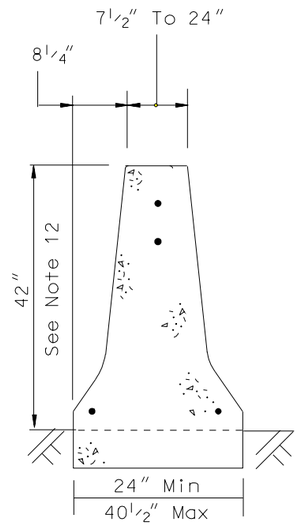
0.1178 yd.^{3} PER LIN. FT. WITH BASE
0.0958 yd.^{3} PER LIN. FT. WITHOUT BASE

GENERAL NOTES:

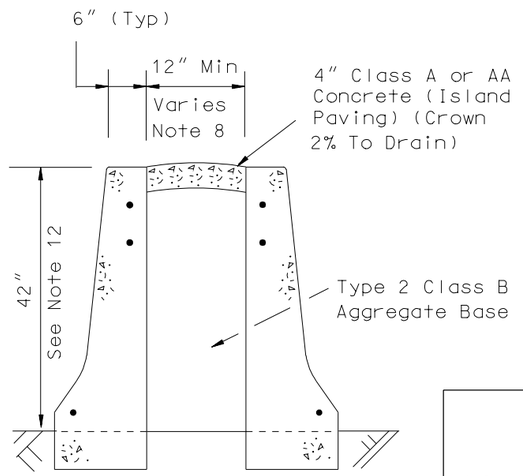
1. CONCRETE SHALL BE CLASS A OR AA.
2. MEDIAN BARRIER RAIL SHALL BE SCORED ¼" DEEP VERTICALLY EVERY 15'.
3. ALL CONTACT JOINTS SHALL BE AT PLANNED SCORED JOINT LOCATIONS.
4. ALL JOINTS AND OTHER LOCATIONS NEEDING SEALING SHALL FOLLOW REQUIREMENT SET IN DRAWING R-8.6.1.
5. FOR IMPACT ATTENUATOR ATTACHMENT DETAILS, SEE MANUFACTURES DRAWINGS. MEDIAN END TREATMENTS SHALL BE BI-DIRECTIONAL.
6. REFER TO THE 1996 ROADSIDE DESIGN GUIDE FOR FURTHER DESIGN INFORMATION NOT SHOWN HERE.
7. EXPANSION JOINTS AT ALL STRUCTURES. JOINTS IN BARRIER RAIL OVER A STRUCTURE SHALL BE AT THE SAME LOCATION AND OF THE SAME DIMENSIONS AS THOSE IN THE STRUCTURE. JOINT FILLER NOT REQUIRED IN EXPANSION JOINT IN BARRIER RAIL.
8. LENGTH 3'-0" MINIMUM OR LENGTH OF OBSTRUCTION, WHICHEVER IS GREATER. SEE CONTRACT PLANS FOR EXACT DIMENSIONS.
9. THESE 42" BARRIER RAILS ARE CONSIDERED INNOVATIVE.
10. DEPTH OF 6" BASE SHALL BE CHECKED AND INCREASED AS NEEDED FOR FOUNDATION STABILITY. WHEN BARRIER RAIL SITS ON PAVEMENT, THE BASE CAN BE ELIMINATED. BARRIER RAIL END ANCHORS SHALL BE REQUIRED. SEE DRAWING R-8.6.1.
11. THE 42" TYPE FA BARRIER RAIL MAY ALSO BE CONSIDERED ON THE OUTSIDE CURVE NEXT TO SENSITIVE AREAS SUCH AS SCHOOLS, HOUSING DEVELOPMENTS, AND PROBLEM AREAS THAT NEED EXTRA PROTECTION.
12. FOR DETAILS NOT SHOWN SEE TYPE FA.
13. NTS = NOT TO SCALE.
14. VARIES = 2/19 x H + 12"
15. FOR TRANSITIONS FOR HEIGHTS, SEE STANDARD PLAN SHEET R-8.6.3.



PLAN



SECTION A-A

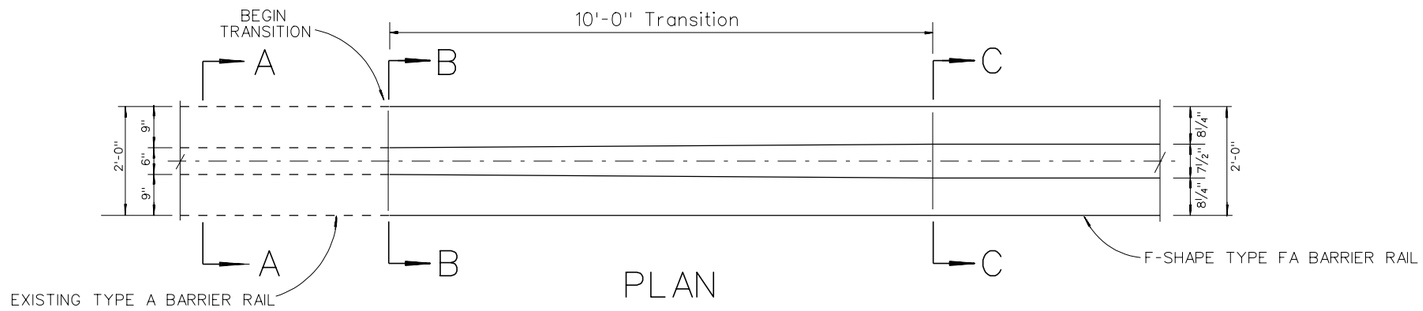


SECTION B-B

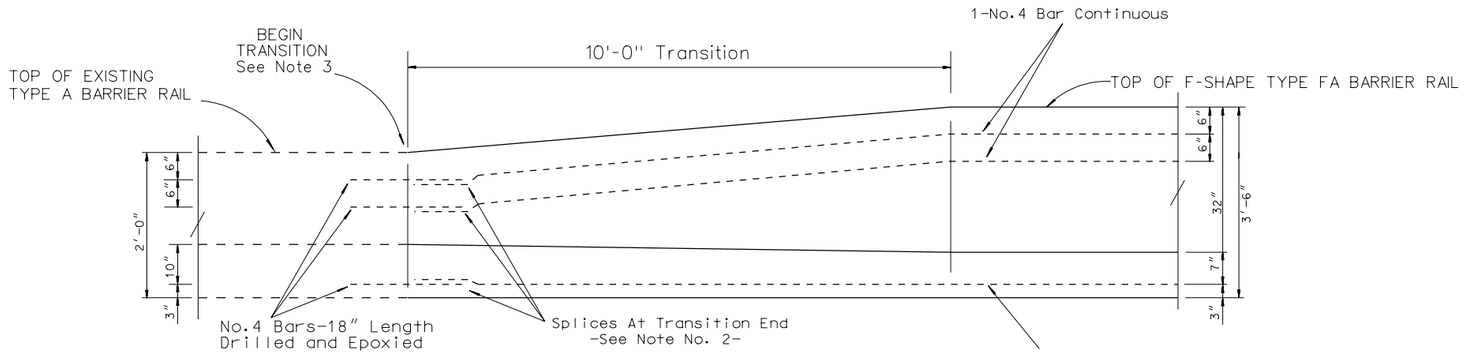
STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

CONCRETE BARRIER RAIL

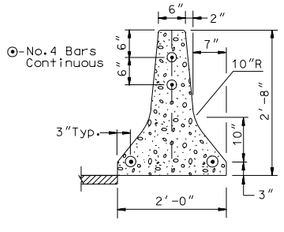
Signed Original On File	R-8.6.2	(502)
CHIEF ROAD DESIGN ENGR.	ADOPTED: 9/97	REVISION 1/03



PLAN

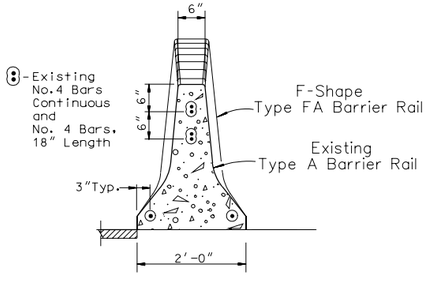


ELEVATION

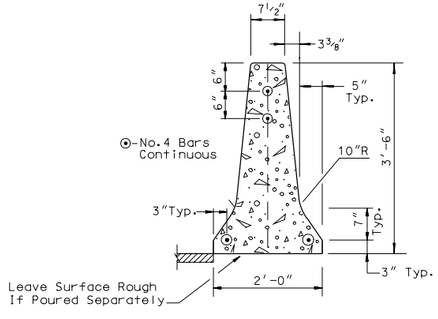


SECTION A-A

(EXISTING TYPE A)



SECTION B-B



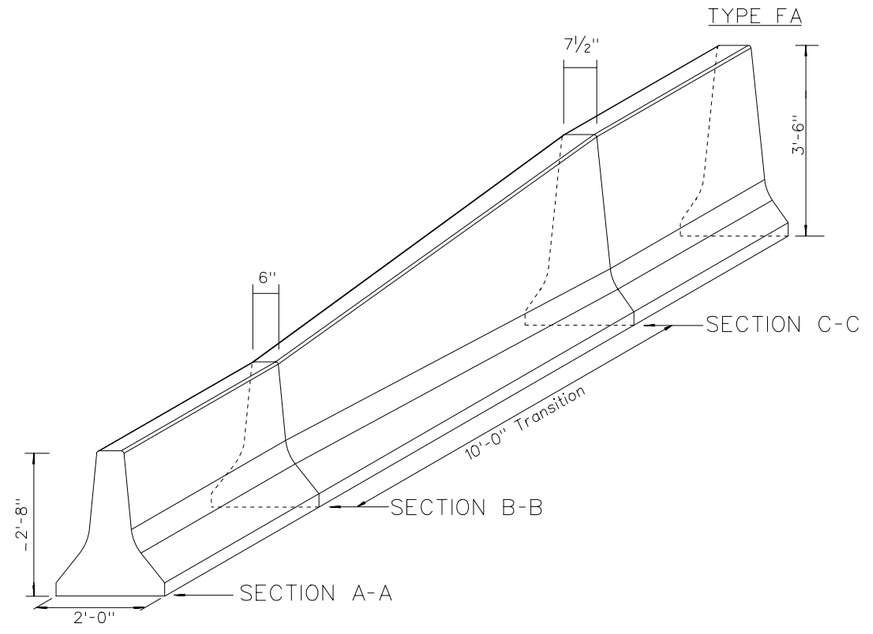
SECTION C-C

(TYPE FA)

General Notes:

1. CONCRETE SHALL BE CLASS A OR AA.
2. THE HEIGHT OF THE BARRIER RAIL SHALL BE MEASURED FROM THE TOP OF THE PLANTMIX BITUMINOUS SURFACE OR THE TOP OF CONCRETE PAVEMENT.
3. ROUGHEN CONTACT FACE OF EXISTING RAIL TO 1/4-INCH RELIEF PRIOR TO POURING NEW RAIL TRANSITION.
4. AT THE INDICATED REINFORCING LOCATIONS, DRILL 3/4-INCH HOLES IN CONTACT FACE OF EXISTING RAIL TO A MINIMUM DEPTH OF 12 INCHES AND INCLINED 5 DEGREES FROM THE HORIZONTAL. SECURE #4 REINFORCING BARS IN THE DRILLED HOLES WITH AN EPOXY CONFORMING TO SECTION 728 OF THE STANDARD SPECIFICATIONS.
5. PLACE STRAIGHT AND/OR BENT #4 REINFORCING BARS IN RAIL TRANSITIONS AS INDICATED. SPLICES IN REINFORCING STEEL AT TRANSITION ENDS ARE PERMITTED (MINIMUM 12" LAP LENGTH).
6. FOR DETAILS NOT SHOWN, SEE R-8.6.1 TO R-8.6.2.

TYPE FA



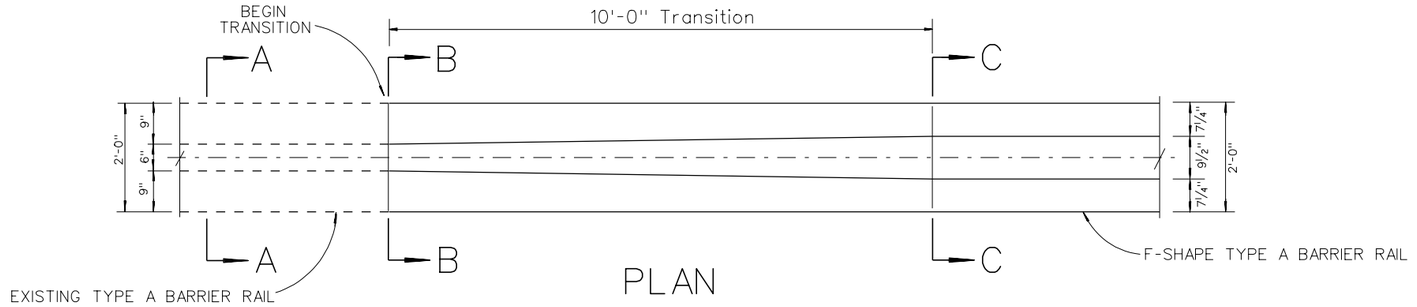
EXISTING TYPE A

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

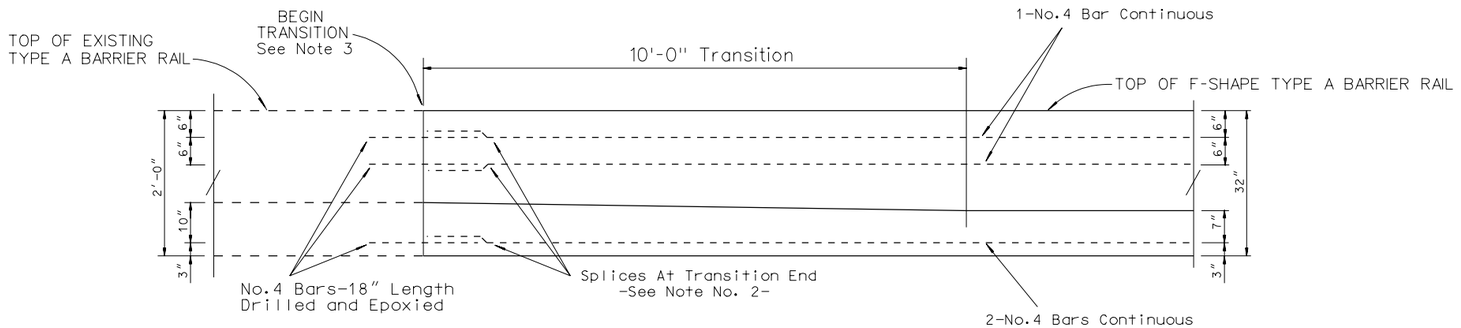
CONCRETE BARRIER RAIL Type A to Type FA

Signed Original On File	R-8.6.3	(502)
CHIEF ROAD DESIGN ENGR.	ADOPTED: 1/01	REVISION

R-85



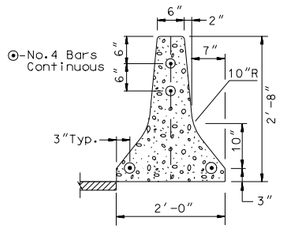
PLAN



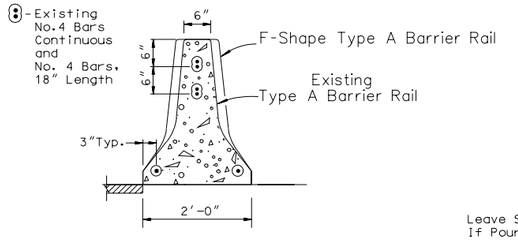
ELEVATION

GENERAL NOTES:

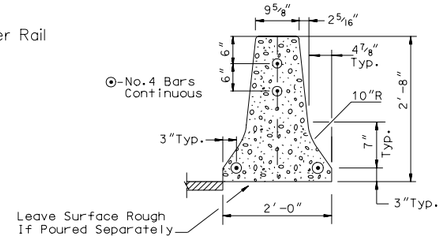
1. CONCRETE SHALL BE CLASS A OR AA.
2. THE HEIGHT OF THE BARRIER RAIL SHALL BE MEASURED FROM THE TOP OF THE PLANTMIX BITUMINOUS SURFACE OR THE TOP OF CONCRETE PAVEMENT.
3. ROUGHEN CONTACT FACE OF EXISTING RAIL TO 1/4-INCH RELIEF PRIOR TO POURING NEW RAIL TRANSITION.
4. AT THE INDICATED REINFORCING LOCATIONS, DRILL 3/4-INCH HOLES IN CONTACT FACE OF EXISTING RAIL TO A MINIMUM DEPTH OF 12 INCHES AND INCLINED 5 DEGREES FROM THE HORIZONTAL. SECURE #4 REINFORCING BARS IN THE DRILLED HOLES WITH AN EPOXY CONFORMING TO SECTION 728 OF THE STANDARD SPECIFICATIONS.
5. PLACE STRAIGHT AND/OR BENT #4 REINFORCING BARS IN RAIL TRANSITIONS AS INDICATED. SPLICES IN REINFORCING STEEL AT TRANSITION ENDS ARE PERMITTED (MINIMUM 12" LAP LENGTH).
6. FOR DETAILS NOT SHOWN, SEE R-8.6.1 TO R-8.6.2.



SECTION A-A
(EXISTING TYPE A)

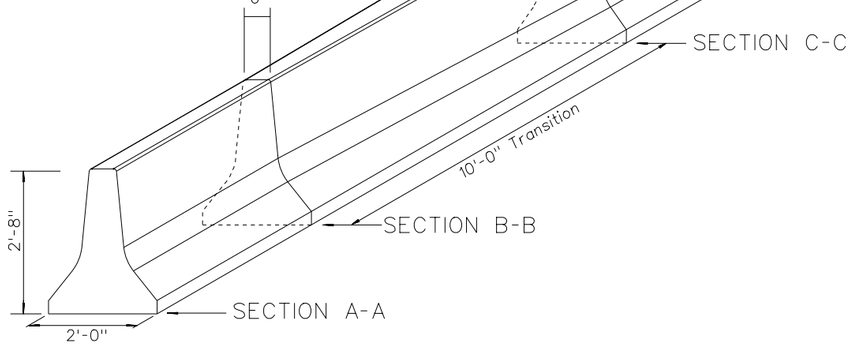


SECTION B-B



SECTION C-C
(F-SHAPE, TYPE A)

NEW TYPE A

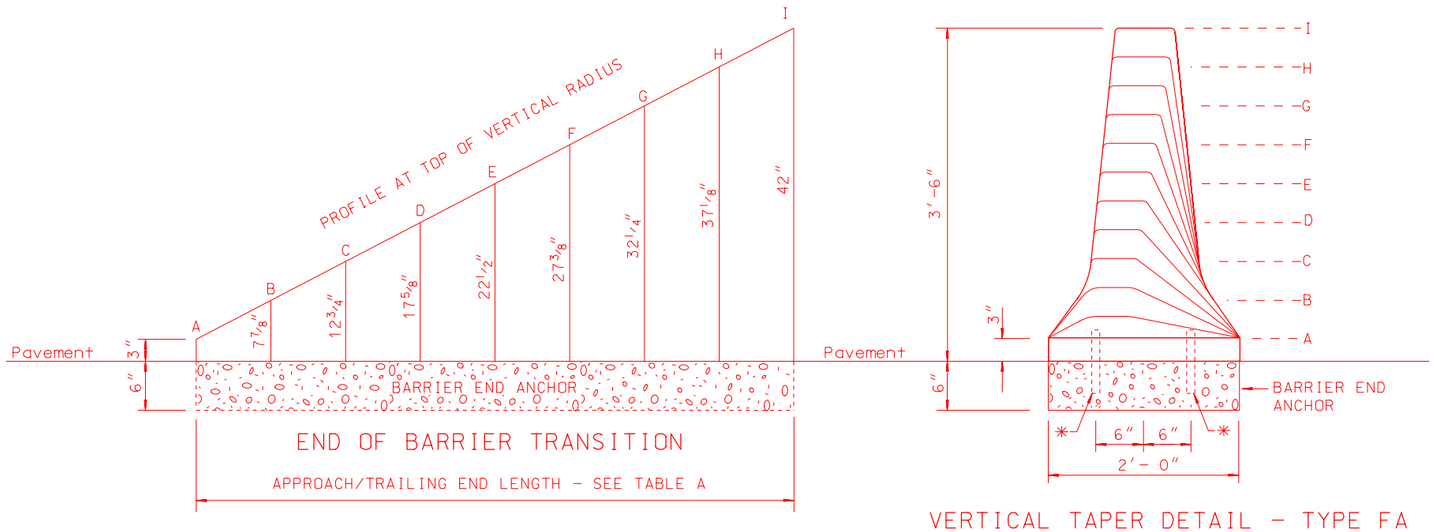


EXISTING TYPE A

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

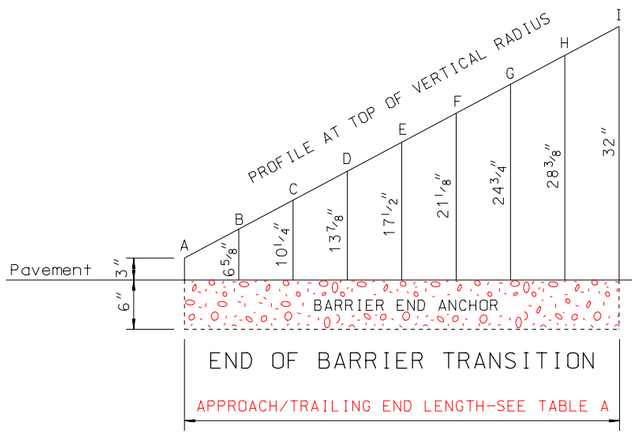
CONCRETE BARRIER RAIL
Type A to F-Shape Type A

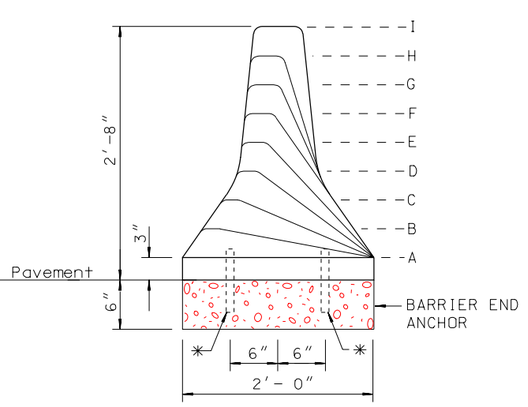
Signed Original On File	R-8.6.4	(502)
CHIEF ROAD DESIGN ENGR.	ADOPTED: 1/01	REVISION



VERTICAL TAPER DETAIL - TYPE FA

TABLE A
20'0" TRAILING END LENGTH WITH 8 - 2'6" EQUAL SPACES
80'0" APPROACH END LENGTH WITH 8 - 10' EQUAL SPACES





VERTICAL TAPER DETAIL - TYPE A

GENERAL NOTES:

1. USE ONLY WHEN SPECIFIC CRITERIA ARE MET. THE CRITERIA FACTORS ARE THE CLEAR ZONE, DIRECTION OF TRAFFIC, OFFSET DISTANCES, AND SPEED ZONES. APPROACH AND TRAILING END CRITERIA ARE TREATED SEPARATELY.

   APPROACH END CRITERIA - REQUIRES CHIEF ROADWAY DESIGN ENGINEER APPROVAL. MAY ONLY BE USED FOR APPROACH ENDS WHEN OUTSIDE CLEAR ZONE OR SPEEDS ARE LESS THAN OR EQUAL TO 40 MPH.

   TRAILING END CRITERIA - MAY BE USED FOR TRAILING END FOR ALL SPEEDS WHEN TRAFFIC IS ONE-WAY TRAFFIC AND BEYOND THE OPPOSING DIRECTION CLEAR ZONE, E.G. SOME ON-RAMPS, OFF-RAMPS, AND DIVIDED HIGHWAYS.

2. CONCRETE SHALL BE CLASS A OR AA. TRANSVERSE JOINTS WITH 1" PREMOLDED EXPANSION JOINT FILLER 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.
3. 6" DEEP BARRIER END ANCHORS SHALL BE CONSTRUCTED IN THE FIRST AND LAST 10 LINEAR FEET OF THE FULL HEIGHT BARRIER RAIL RUN. IF TRANSITIONS ARE USED, THE ANCHOR SHALL BE EXTENDED UNDER THE TRANSITION SECTION.
4. VERTICAL JOINTS SHALL HAVE A SINGLE COMPONENT HOT APPLIED SEALANT FULL DEPTH OF JOINT.
5. JOINT SEALER SHALL BE A SINGLE COMPONENT HOT APPLIED SEALANT 1" THICK.
6. THE HEIGHT OF THE BARRIER RAIL SHALL BE MEASURED FROM THE TOP OF THE OPEN GRADED (PLANTMIX BITUMINUOUS SURFACE), OR THE TOP OF THE FINISH GRADE (P.C.C.P.).
7. JOINT FILLER SHALL BE PLACED IN OPEN JOINTS IN THE BARRIER AS REQUIRED TO MATCH JOINTS IN THE APPROACH SLAB DETAIL.
8. DOWELS AND REINFORCING STEEL TO EXTEND INTO END SECTIONS. ADJUST LOCATIONS AND TERMINATE BARS AS NECESSARY TO MAINTAIN 2" MINIMUM COVER.
9. FOR DETAILS NOT SHOWN, REFER TO STANDARD PLAN R-8.6.1.

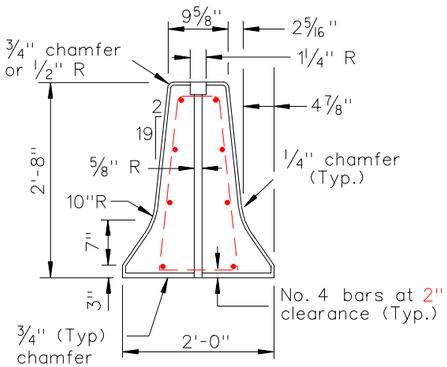
LEGEND:

✳ - 1" X 8" STEEL DOWEL @ 2'-0" CENTERS (IF NEEDED SEE NOTE 3)

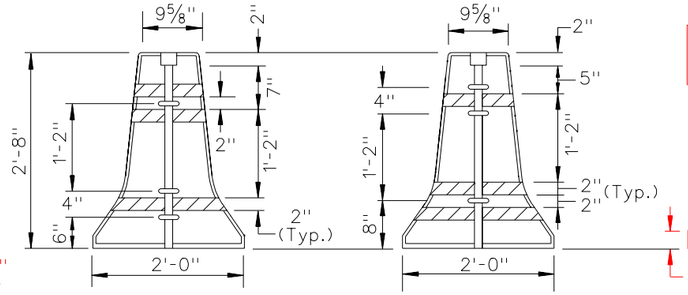
STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

VERTICAL TAPER CONCRETE BARRIER RAIL

Signed Original On File	R-8.6.5	(502)
CHIEF ROAD DESIGN ENGR.	ADOPTED: 11/86	REVISION 2/03

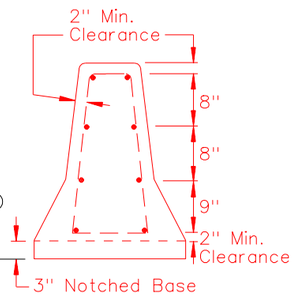


TYPICAL F SHAPE



SECTION A-A

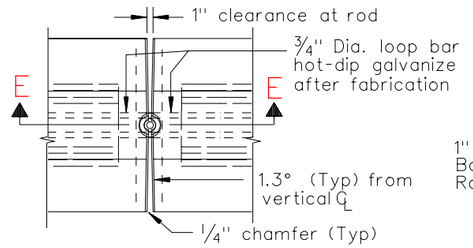
SECTION B-B

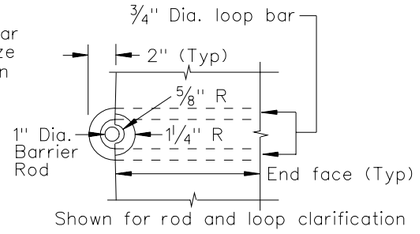


1½" deep x 2" tall slots
For dimensions not shown see TYPICAL F SHAPE

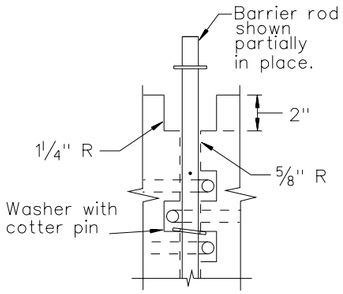
ELEVATION VIEW @ 3" DEEP NOTCHED BASE

SECTION C-C





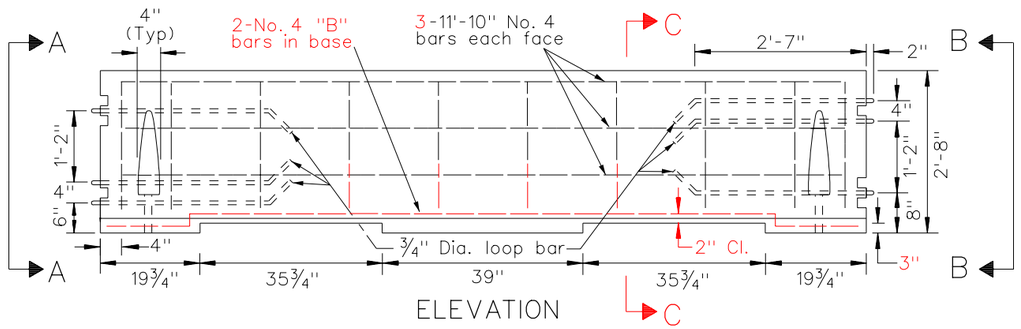
Shown for rod and loop clarification



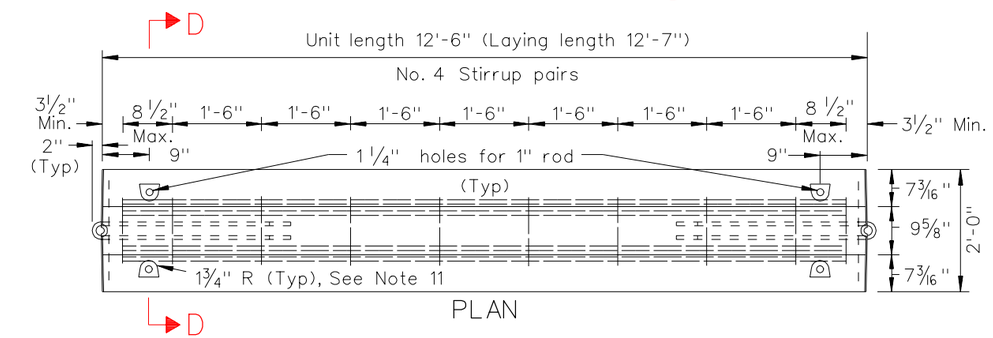
SECTION E-E

For details not shown, see SECTION A-A and SECTION B-B

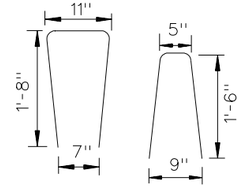
ROD AND LOOP CONNECTION (PLAN VIEW)



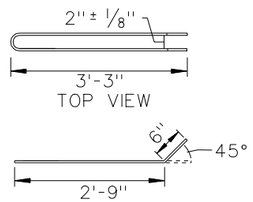
ELEVATION



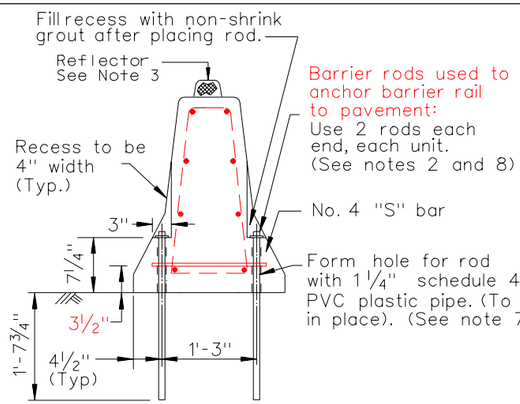
PLAN



No. 4 Rebar
STIRRUP BARS

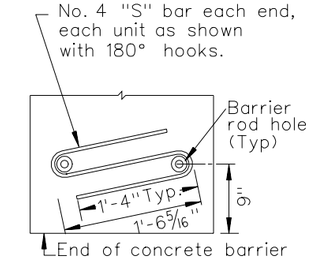


¾" Dia. (A36)
LOOP BAR

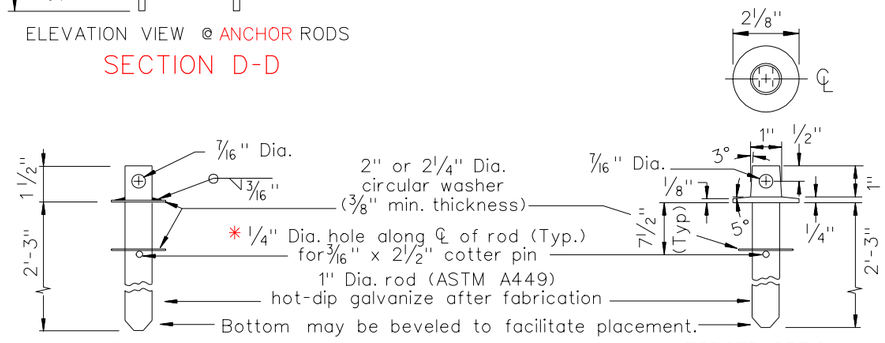


ELEVATION VIEW @ ANCHOR RODS

SECTION D-D



"S" BAR DETAILS



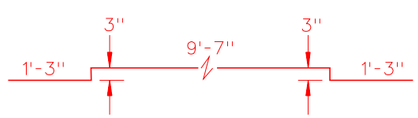
WELDED OPTION FORGED OPTION

*Not required if barrier rod is to be used to anchor barrier rail to pavement.

BARRIER ROD DETAIL
Also see Section D-D and Section E-E

GENERAL NOTES:

1. Reinforcing steel shall be grade 60. A minimum clearance of 2.0" from reinforcing steel exterior to concrete surface, see Detail Section C-C.
2. For edge of bridges, back spacing from the back of the barrier rail to the edge of the bridge shall be 4'. For the edge of shoulders, back spacing shall be 3'. If backspacing cannot be obtained, anchor pin all sections adjacent to the bridge edge or shoulder.
3. Place reflectors as per drawing R-9.1.1 and R-9.2.2.
4. Top washer shall be forged as integral part of rod or shall be welded as shown.
5. Rods that conform to critical dimensions, (rod length and diameter, washer diameter and thickness) are acceptable if an approved top configuration for lifting the rod is provided.
6. Concrete shall be Class A or AA.
7. See ASTM D 1785
8. Drill 1" diameter holes, after placement of rail, for anchor pinning through the pavement. Drilling operation is not to damage the pavement.
9. The weight per barrier rail panel is approximately 3.0 tons.
10. Pin first and last units of each run (long term stationary as defined by MUTCD, Part 6).
11. Rectangular pockets may be used in lieu of conical pockets.
12. Each ¾" Dia. Loop bar to be hot-dip galvanize after fabrication.
13. When used as a permanent installation, all sections shall be pinned, except in medians wider than 10 feet.



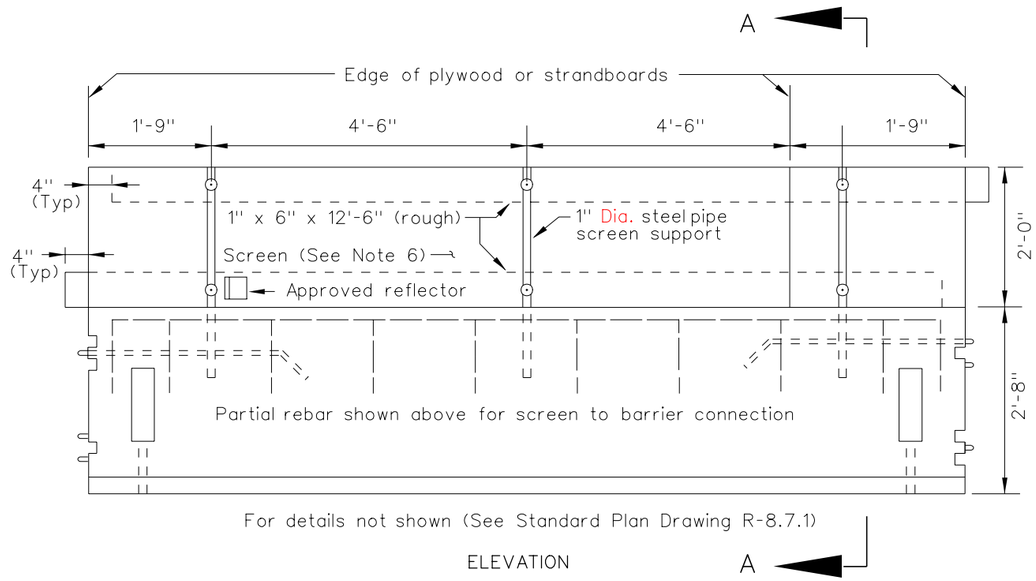
No. 4 "B" Bar

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

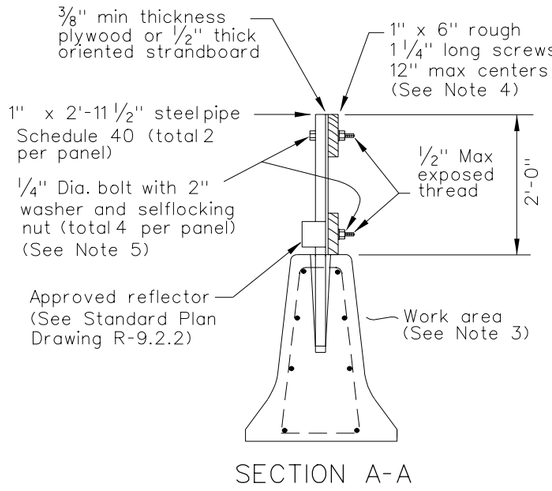
PORTABLE PRECAST CONCRETE BARRIER RAIL

Signed Original On File	R-8.7.1	(502)
CHIEF ROAD DESIGN ENGR.	ADOPTED: 8/98	REVISION 10/02

R-88



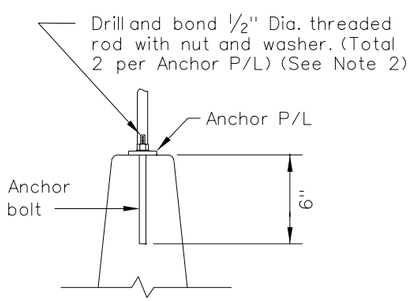
PORTABLE PRECAST BARRIER RAIL F-SHAPES



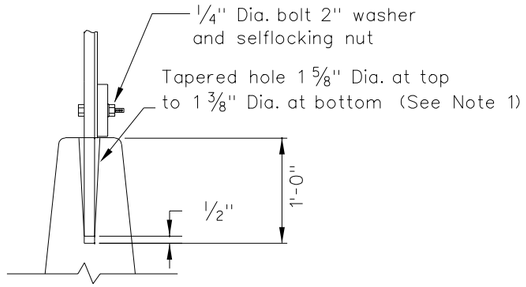
SECTION A-A

GENERAL NOTES:

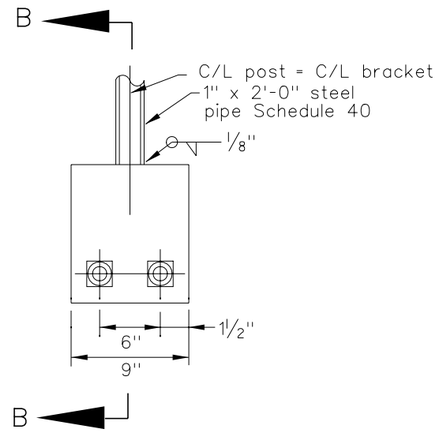
1. Straight holes 1 1/2" diameter may be used in lieu of the tapered holes.
2. Resin capsule-type anchorage devices may be substituted for threaded rods.
3. Place screen on work area side of temporary railing where traffic will only be on one side of the temporary railing. The screen may be placed on either side of the pipe support where traffic will be on both sides of the temporary railing.
4. Clinched 8d box nails may be substituted for screws. The nails shall be clinched on the work area side of the screen where traffic will only be on one side of the temporary railing.
5. 1/4" u-bolts may be substituted for 1/4" diameter bolts.
6. Openings in the screen area of 3'-0" shall be provided at 200' intervals.



ALTERNATIVE "A"

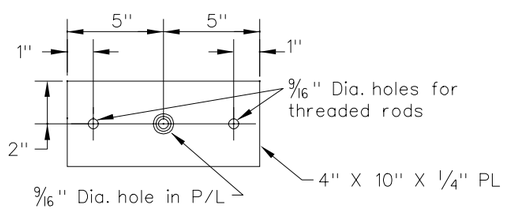


ALTERNATIVE "B"

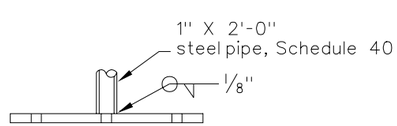


ALTERNATIVE "C"

SCREEN ANCHORAGE DETAILS

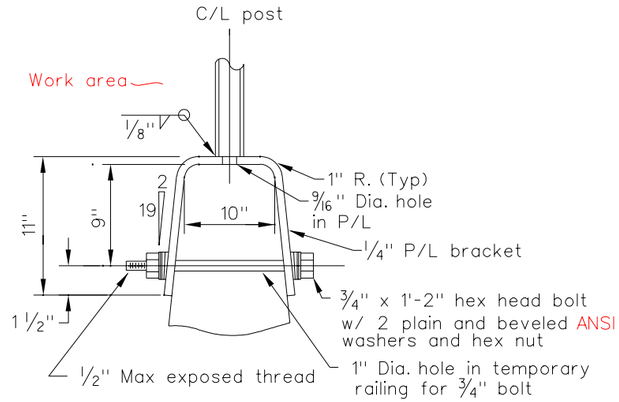


PLAN



ELEVATION

ANCHOR PLATE DETAIL (ALTERNATIVE "A")

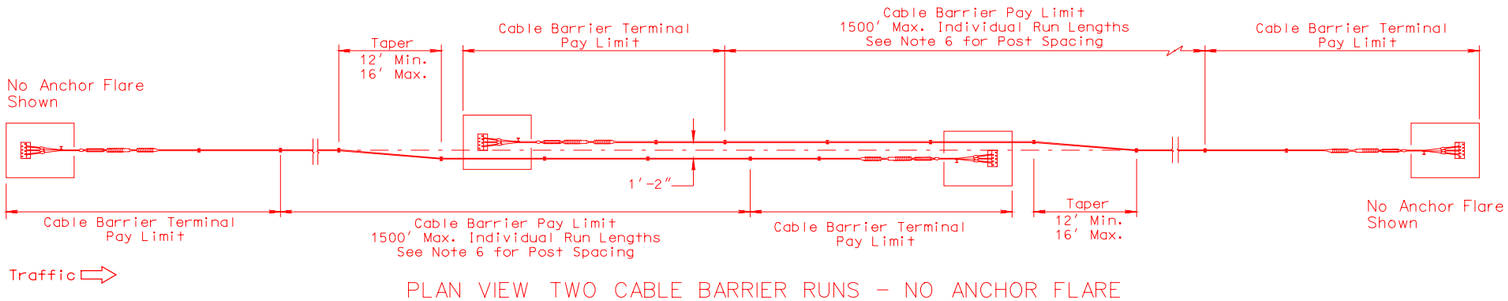


SECTION B-B

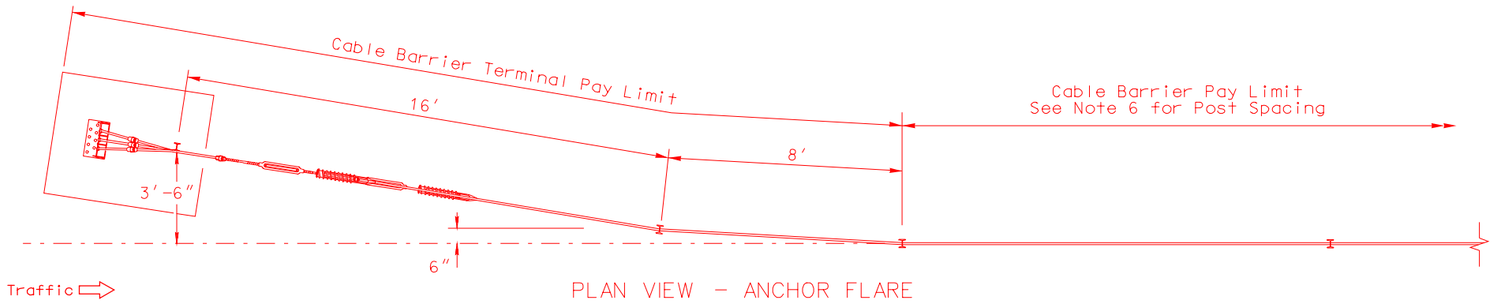
STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

TEMPORARY TRAFFIC SCREEN "F"

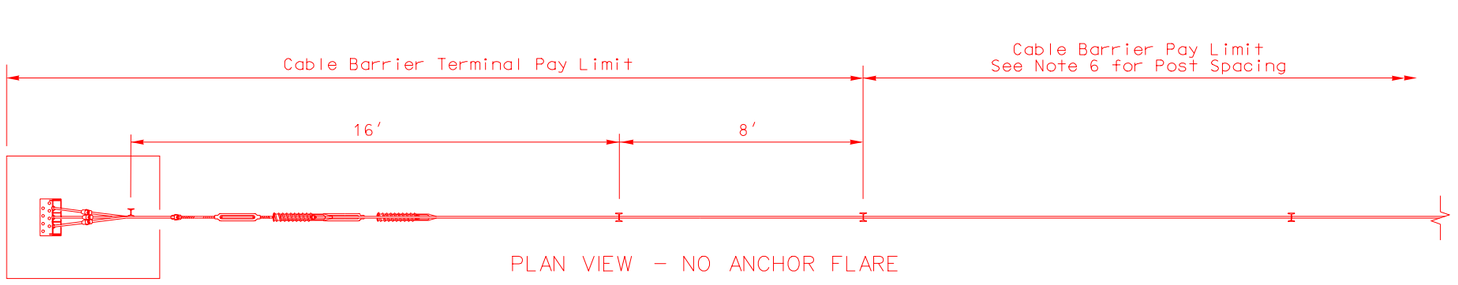
Signed Original On File	R-8.8.1	(502)
CHIEF ROAD DESIGN ENGR.	ADOPTED: 8/98	REVISION 4/02



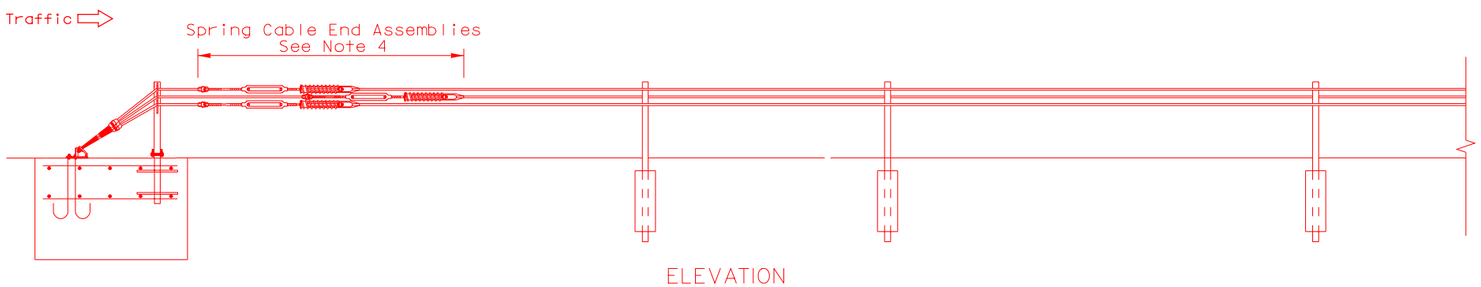
PLAN VIEW TWO CABLE BARRIER RUNS - NO ANCHOR FLARE



PLAN VIEW - ANCHOR FLARE



PLAN VIEW - NO ANCHOR FLARE



ELEVATION

PLACING CABLE BARRIER AND CABLE BARRIER TERMINAL:

Cable barrier tensioning shall be installed by properly seating the spring compensation device and then permanently marking the unloaded position. Complete assembly of the cable barrier and set the compensating devices to a spring compression of 3.5". Leave the springs at this setting for at least 2 weeks then set them to the proper setting as listed in the Temperature Spring Compression Table:

Setting Temperature / Spring Compression Table

Degree F	Inches	Degree F	Inches
110 to 120	1.00	40 to 49	2.75
100 to 109	1.25	30 to 39	3.00
90 to 99	1.50	20 to 29	3.25
80 to 89	1.75	10 to 19	3.50
70 to 79	2.00	0 to 9	3.75
60 to 69	2.25	-10 to -1	4.00
50 to 59	2.50	-20 to -11	4.25

GENERAL NOTES:

1. Use of these details requires Chief Road Design Engineer approval. Minimum requirements for use in a median - median must be at least 24' wide and graded smooth with 6:1 or flatter slopes.

2. Cable shall be 3/4" Dia. wire rope and shall conform to AASHTO M30. Type I, Class A coating. Posts shall meet the requirements of AASHTO M270 Grade 36 and shall be galvanized in accordance with AASHTO M111.

3. When barrier is in median, install 2 yellow reflectors every fifth post on both sides of post facing traffic. When barrier is on the right side of traffic install a white reflector every sixth post on traffic side only.

4. Stagger Spring Cable End Assemblies for clearance between units. Installation of cable end assemblies shall be as follows:

   LENGTH OF CABLE RUNS:

   Up to 500' - Use the Spring Cable End Assembly on one end, and turnbuckle only on the other end of each cable.

   Over 500' to 1500' - Use the Spring Cable End Assembly on each end of each cable.

5. See Setting Temperature/Spring Compression Table and reference Special Provisions for additional tensioning requirements.

6. Post spacing on a tangent shall be 12' Min. to 16' Max. Post spacing on a curve shall be as follows:

CURVE RADIUS	SPACING
700' or more	16'
699' to 220'	12'
219' to 110'	6'
Less than 110'	Use Not Recommended

7. Distance from tangent of barrier run to notch for top cable on breakaway anchor angle shall be 4'.

8. Where the cable is connected to a cable socket with a wedge type connector, one wire of the cable shall be crimped over the base of the wedge to hold it firmly in place during tensioning.

9. All holes shall be 1/16" larger than the bolt diameter unless otherwise noted.

10. Concrete shall be Class A or AA with f'c=4000 psi. Place concrete terminal and backfill at least 2 weeks prior to tensioning the cables. The bottom of the terminal shall have full and even bearing on the surface under it.

11. Welding per AWS D1.1. Reinforcing steel A615 Grade 60 and A706 Grade 60 as noted.

12. Payment will be made under:

Cable Barrier	Lin. Foot
Cable Barrier Terminal	Each

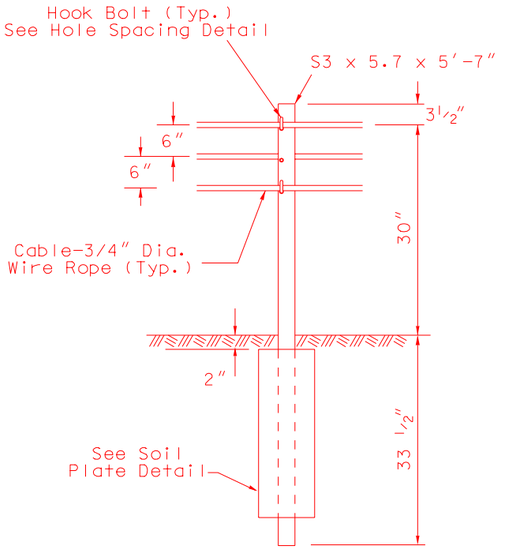
STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

CABLE BARRIER

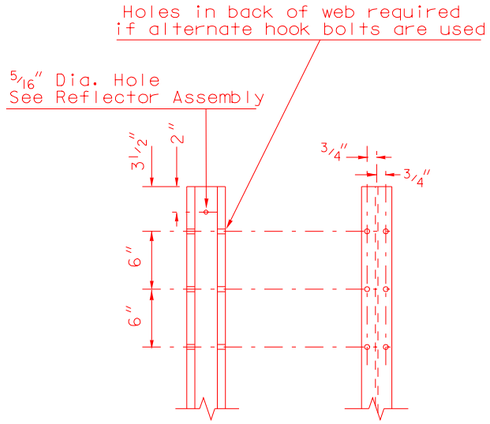
Signed Original On File
CHIEF ROAD DESIGN ENGR.

R-8.9.1 (618)
ADOPTED: 1/03
REVISION

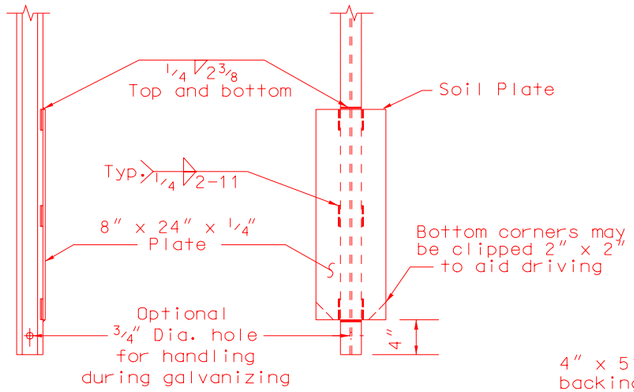
R-90



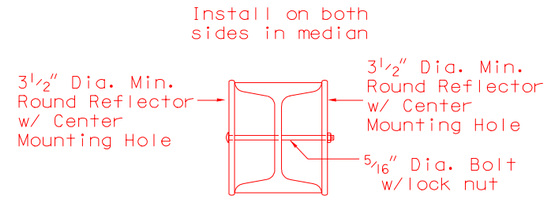
POST DETAIL



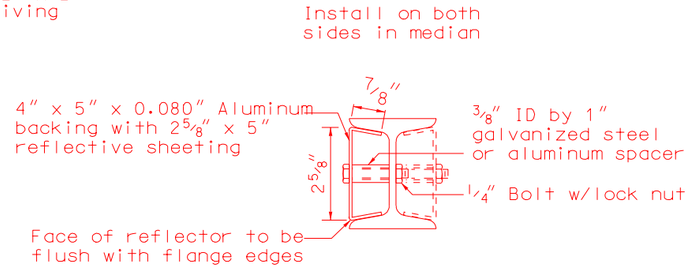
HOOK BOLT
HOLE SPACING DETAIL



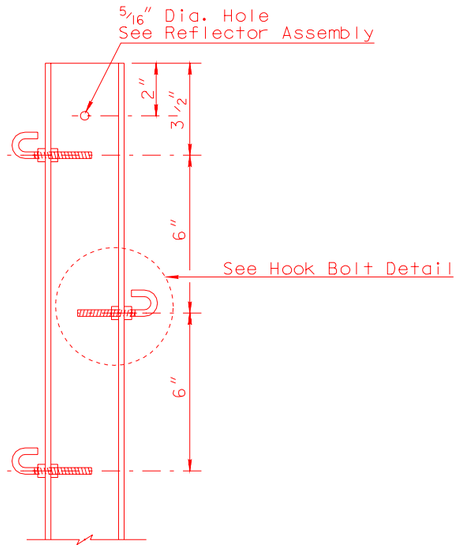
SOIL PLATE DETAIL



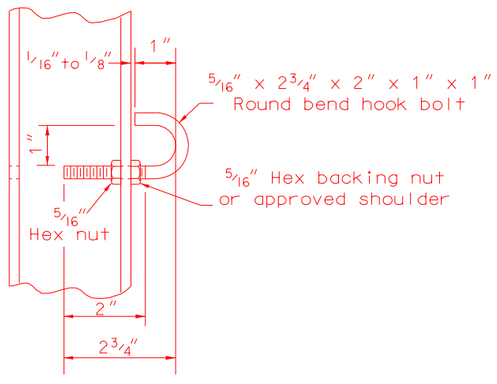
ROUND REFLECTOR ASSEMBLY
See Note 3



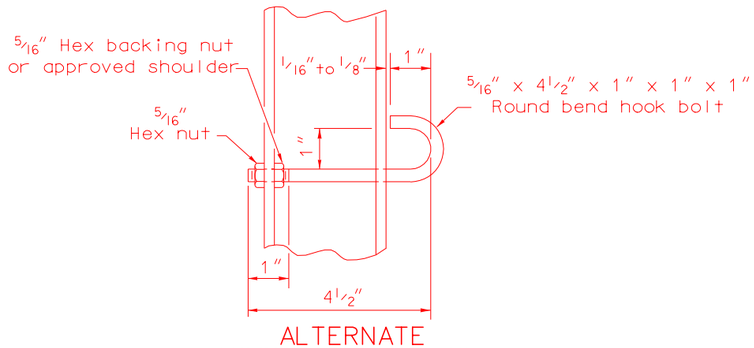
RECTANGLE REFLECTOR ASSEMBLY
See Note 3



HOOK ASSEMBLY



HOOK BOLT DETAIL



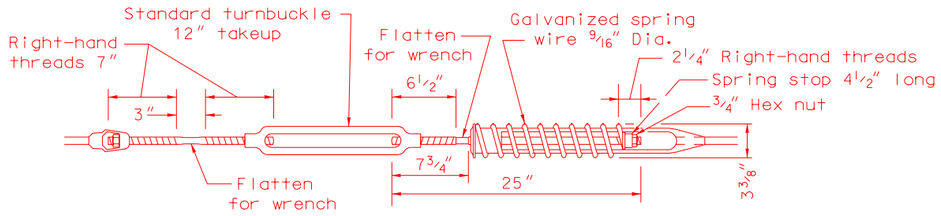
ALTERNATE
HOOK BOLT DETAIL

POST, HOOK, AND REFLECTOR ASSEMBLY DETAILS

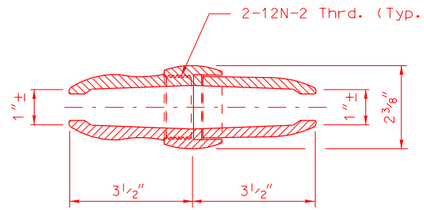
STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

CABLE BARRIER

Signed Original On File	R-8.9.1	(618)
CHIEF ROAD DESIGN ENGR.	ADOPTED: 1/03	REVISION

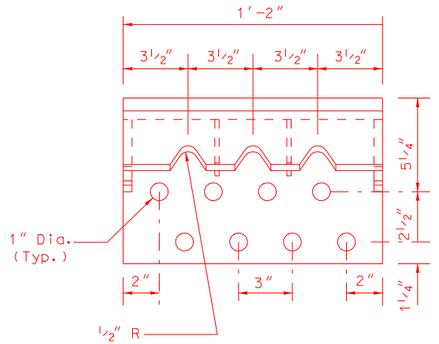


SPRING CABLE END ASSEMBLY

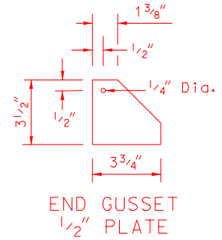


CABLE SPLICE

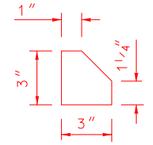
Use with wedge as shown in cable wedge detail



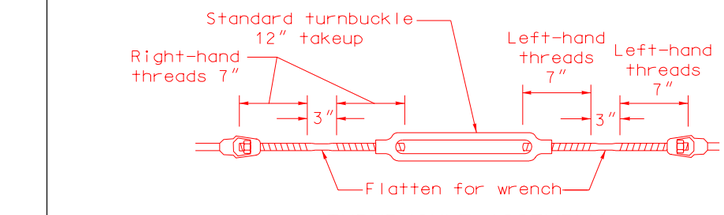
PLAN



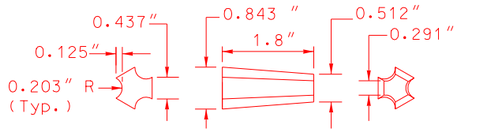
END GUSSET
1/2" PLATE



INSIDE GUSSET
1/4" PLATE

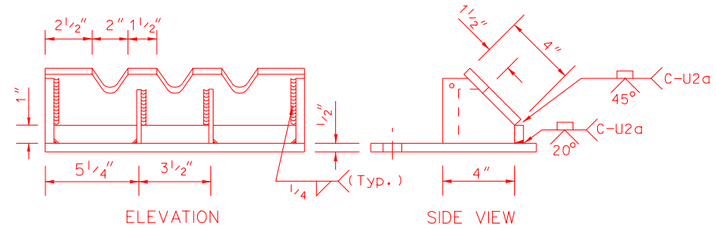


TURNBUCKLE ASSEMBLY



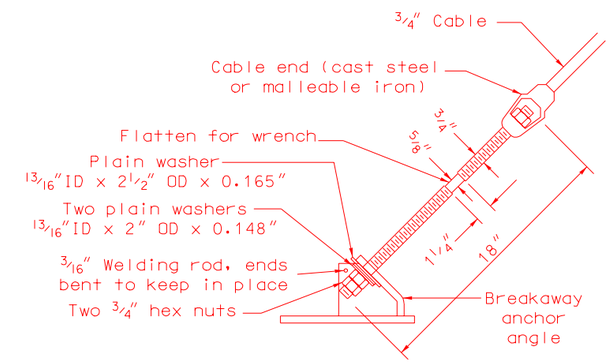
CABLE WEDGE

Use with all splices and cable fittings



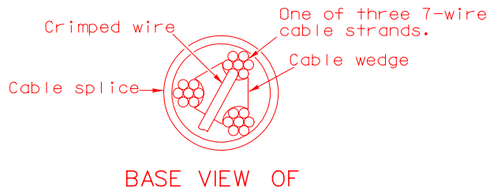
ELEVATION SIDE VIEW

BREAKAWAY ANCHOR ANGLE



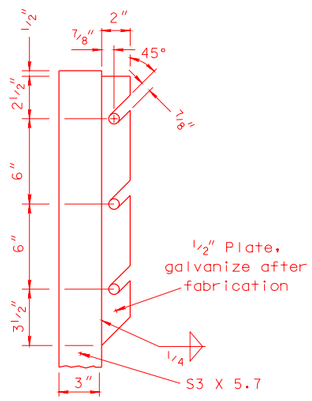
CABLE END ASSEMBLY TO
BREAKAWAY ANCHOR ANGLE DETAIL

Brass keeper rod must be installed
prior to tensioning cable

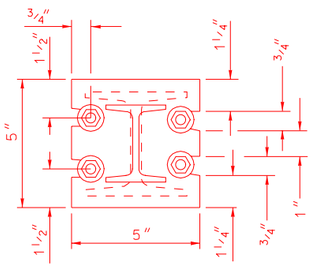


BASE VIEW OF
CABLE WEDGE ASSEMBLY

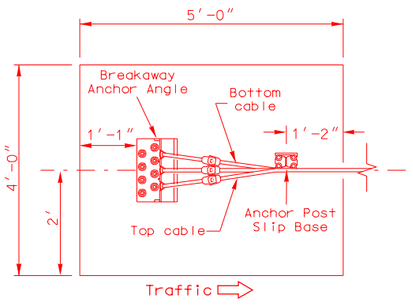
One wire of the cable will be crimped
over the base of the cable wedge to hold
it firmly in place during tensioning.



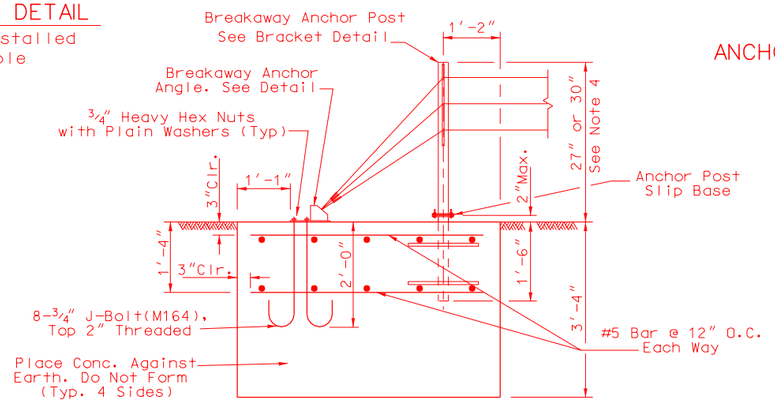
ANCHOR POST BRACKET DETAIL



PLAN VIEW
ANCHOR POST SLIP BASE

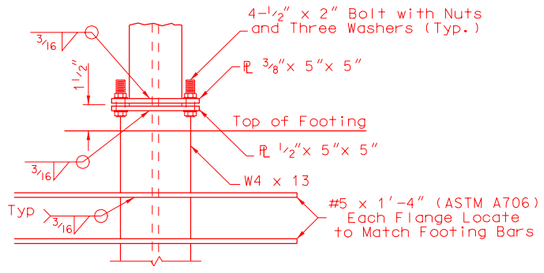


PLAN



ELEVATION

FOOTING DETAILS



ELEVATION
ANCHOR POST SLIP BASE

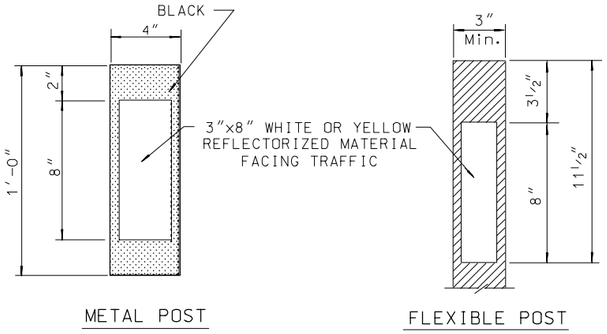
R-92

SHEET 3 OF 3

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

CABLE BARRIER

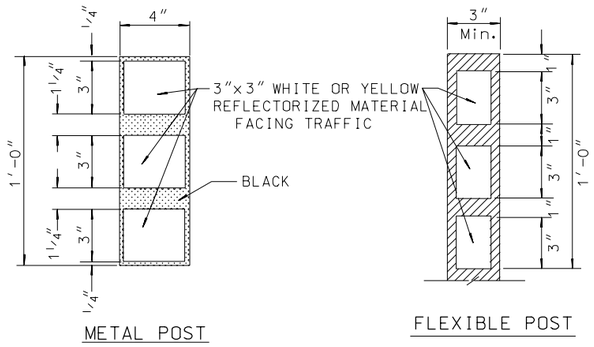
Signed Original On File	R-8.9.1	(618)
CHIEF ROAD DESIGN ENGR.	ADOPTED: 1/03	REVISION



TYPE 1 REFLECTORS

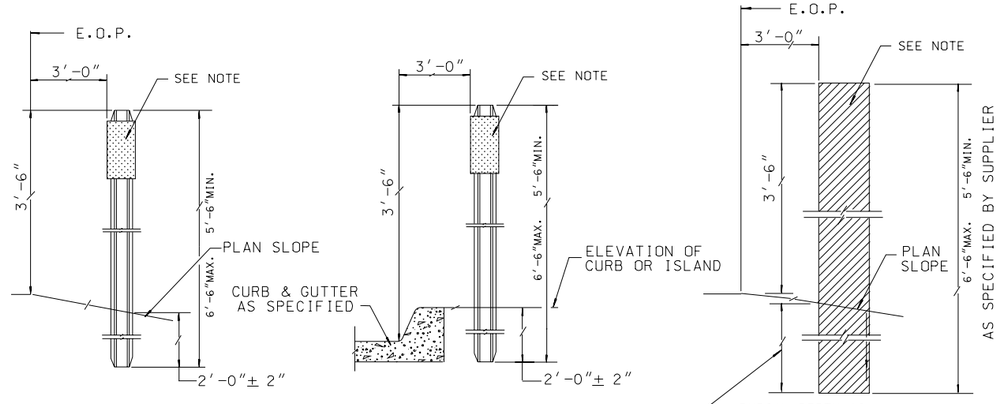
(ROADWAY - RAMPS)

NOTE:
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.



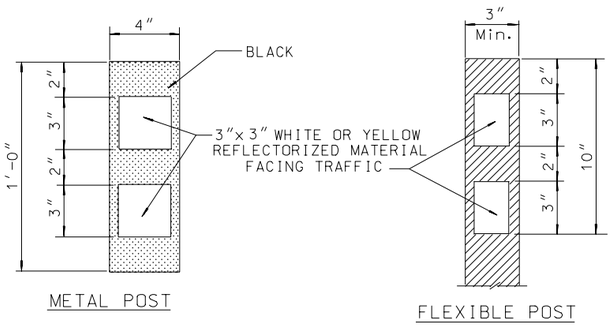
TYPE 3 REFLECTORS

(ISLANDS, CURBS, SHOULDER DIKES)



TYPICAL INSTALLATION

NOTE:
TYPE OF REFLECTORS ACCORDING TO LOCATION. COLOR TO MATCH ADJACENT EDGE LINE.



TYPE 2 REFLECTORS

(APPROACHES)

MULTI-LANED DIVIDED HIGHWAYS:
(FREEWAY STANDARDS)

IN AREAS WHERE MEDIAN CROSSOVERS ARE PROVIDED 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 4 AND 5 APPROACHES WILL HAVE AN ADDITIONAL GUIDE POST AT EACH TAPER SETBACK.

TABLE 1

MAXIMUM SPACING FOR HIGHWAY DELINEATORS
ON HORIZONTAL CURVES LESS THAN OR EQUAL TO 10,000 FEET

(DISTANCE IN FEET ROUNDED TO THE NEAREST 5 FEET)

RADIUS OF CURVE (R) (FT.)	SPACING ON CURVE (S) (FT.)	SPACING IN ADVANCE OF & BEYOND CURVE(FT.)		
		1ST	2ND	3RD
50	20	40	60	120
150	30	60	90	180
200	35	70	105	210
250	40	80	120	240
300	50	100	150	300
400	55	110	165	300
500	65	130	195	300
600	70	140	210	300
700	75	150	225	300
800	80	160	240	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
5,000	210	300	300	300
10,000	300	300	300	300

SPACING FOR SPECIFIC RADII NOT SHOWN MAY BE INTERPOLATED FROM TABLE 1 OR COMPUTED FROM THE FORMULA $S = 3\sqrt{R-50}$. S REFERS TO THE DELINEATOR SPACING AND R REFERS TO THE RADIUS OF THE CURVE. THE MINIMUM SPACING SHOULD BE 20 FEET. THE MAXIMUM SPACING ON CURVES SHOULD NOT EXCEED 300 FEET. IN ADVANCE OF & BEYOND A CURVE, AND MEASURED PROCEEDING AWAY FROM THE END POINT OF THE CURVE, THE SPACING OF THE FIRST DELINEATOR IS 2S, THE SECOND IS 3S, AND THE THIRD 6S; BUT IN NO CASE TO EXCEED 300 FEET.

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.

FOR PLACEMENT OF GUIDE POSTS ALONG GUARDRAIL SEE SHEET R-9.2.2

GENERAL NOTES:

1. 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.
2. WHERE NORMAL UNIFORM SPACING IS INTERRUPTED BY DRIVEWAYS, INTERSECTIONS, ETC., GUIDE POSTS MAY BE MOVED A DISTANCE NOT EXCEEDING ¼ OF THE NORMAL SPACING. IF THEY STILL FALL WITHIN SUCH AREAS, THE GUIDE POSTS SHOULD BE ELIMINATED.
3. TYPE OF REFLECTORS ACCORDING TO LOCATION. COLOR TO MATCH ADJACENT EDGE LINE.
4. FOR DETAILS NOT SHOWN, REFER TO M.U.T.C.D., 1988 EDITION.

GUIDE POST SPACING NOTES:

TYPE OF ROADWAY;

1. MULTI-LANE DIVIDED, ONE-WAY RAMPS. (POSTS SHALL BE INSTALLED ON BOTH SIDES OF THE ROADWAY WITH THE APPROPRIATE COLORED REFLECTORS).

A. CURVES (RADIUS LESS THAN OR EQUAL TO 10,000 FEET):
SPACING SHALL BE AS SHOWN IN TABLE 1. THE POSTS ON THE MEDIAN SIDE SHALL HAVE YELLOW REFLECTORS AND BE PLACED DIRECTLY OPPOSITE THOSE ON THE OUTER SIDE. THE POSTS ON THE OUTER SIDE SHALL HAVE WHITE REFLECTORS. THE SPACING ON THE MEDIAN SIDE SHALL BE ADJUSTED WHERE APPROACHING OR LEAVING A CURVE TO MATCH THE SPACING USED ON TANGENTS.

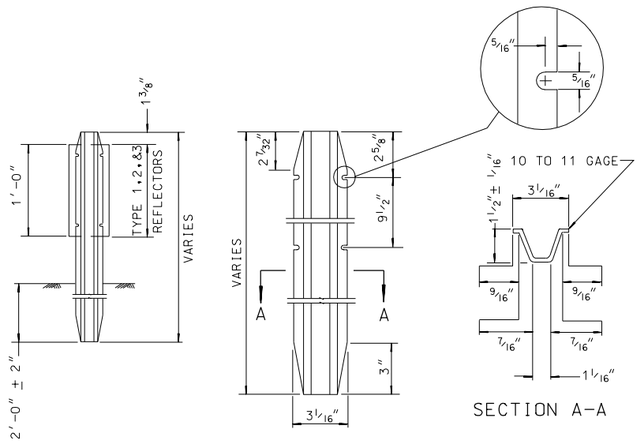
B. TANGENTS AND CURVES WITH RADIUS GREATER THAN 10,000 FEET:
SPACING SHALL BE 800 FEET FOR POSTS ON THE MEDIAN SIDE, AND THE MEDIAN GUIDE POSTS SHALL HAVE YELLOW REFLECTORS. SPACING SHALL BE 400 FEET FOR POSTS ON THE OUTER SIDE AND THESE POSTS SHALL HAVE WHITE REFLECTORS.

C. ACCELERATION AND DECELERATION LANES, AND RAMPS:
SPACING SHALL BE 100 FEET MAXIMUM AND IN ACCORDANCE WITH TABLE 1 FOR TURNING RAMPS. MEDIAN GUIDE POSTS SHALL HAVE YELLOW REFLECTORS AND THE GUIDE POSTS ON THE OUTER SIDE SHALL HAVE WHITE REFLECTORS.

2. TWO LANE AND MULTI-LANE UNDIVIDED . (POSTS SHALL BE INSTALLED ON THE RIGHT SIDE OF THE SHOULDER WITH THE APPROPRIATE COLORED REFLECTORS).

A. ON CURVES HAVING A RADIUS OF 10,000 FEET OR LESS GUIDE POSTS SHALL HAVE WHITE REFLECTORS AND 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 AND SHALL NOT EXCEED 300 FEET.

B. TANGENTS AND CURVES WITH RADIUS GREATER THAN 10,000 FEET:
SPACING SHALL BE 600 FEET. GUIDE POSTS SHALL HAVE WHITE REFLECTORS.



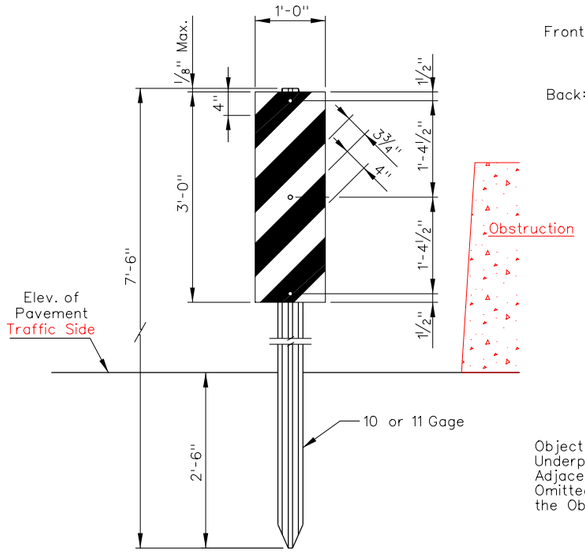
METAL POST DETAILS

10 OR 11 GAGE THICKNESS

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

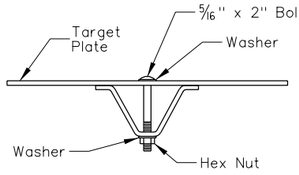
GUIDE POSTS

Signed Original On File	R-9.1.1	(619)
CHIEF ROAD DESIGN ENGR.	ADOPTED: 8/69	REVISION 3/01



Front: Alternating black and retroreflective yellow stripes sloping downward at a 45° angle toward the side of the obstruction on which traffic is to pass.

Back: Solid White

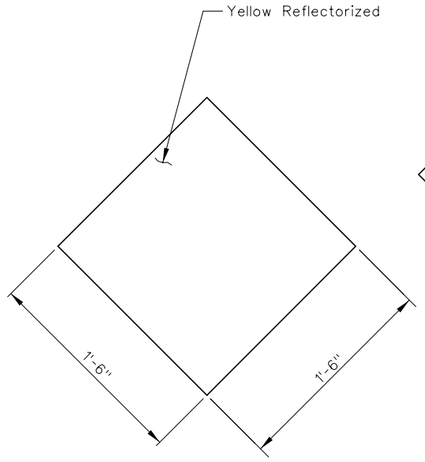


(Electroplated Bolts & Nuts & Protective Flat Non-Metalic Washers.)

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 When Guardrail or Barrier Rail Protects the Obstruction.

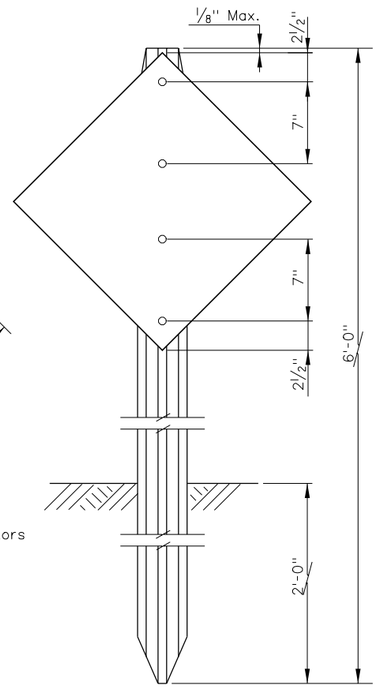
For Post Details See Sheet R-9.1.1

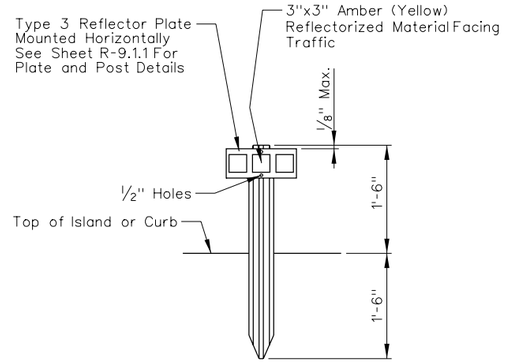
TYPE 3
BRIDGES, PIERS, ABUTMENTS



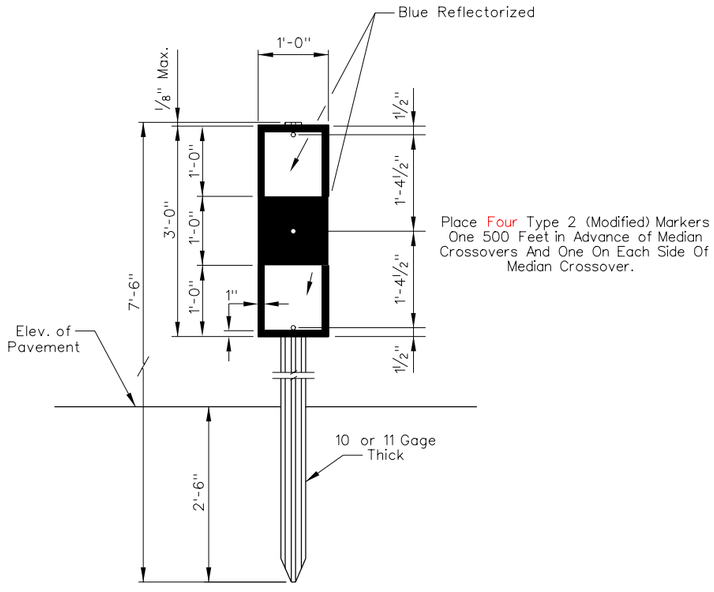
When Used as "End Of Roadway" Marker, Red Reflectors On a Red Background or Type III Reflectorized Sheeting Shall be Used.

TYPE 1
MEDIAN OBSTRUCTIONS



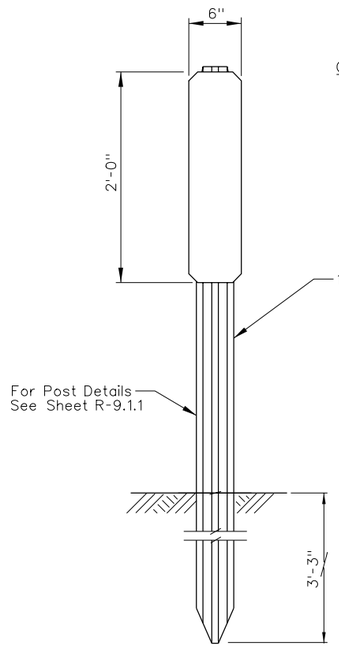


TYPE 2
(USE ON APPROACH END OF MEDIAN ISLANDS ONLY)



Place Four Type 2 (Modified) Markers One 500 Feet in Advance of Median Crossovers And One On Each Side Of Median Crossover.

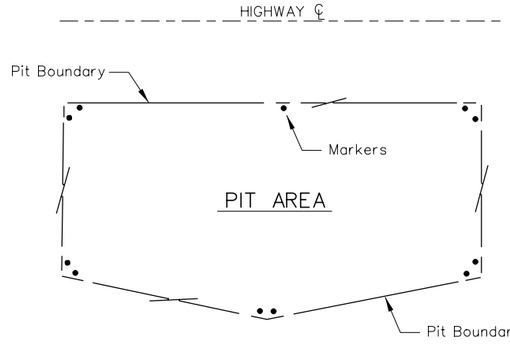
TYPE 2 (MODIFIED)
MEDIAN CROSSOVER
(BLACK - BLUE)



GENERAL NOTES:

1. MARKERS MAY BE ERECTED TO DEFINE WITHDRAWN AREA OF MATERIAL SITES, AND SHALL BE SET AT ALL CORNERS OR IRREGULAR LINES, AND APPROXIMATELY ONE-HALF (1/2) MILE APART ON LONG TANGENTS.
2. THESE MARKERS ARE SPACED SO AS TO BE CLEARLY VISIBLE AND ERECTED SO THAT THE WITHDRAWN AREA MAY EASILY BE ESTABLISHED.
3. MARKERS SHALL BE OMITTED WHERE THE WITHDRAWN AREA IS FENCED.

MATERIAL SITE BOUNDARY MARKERS

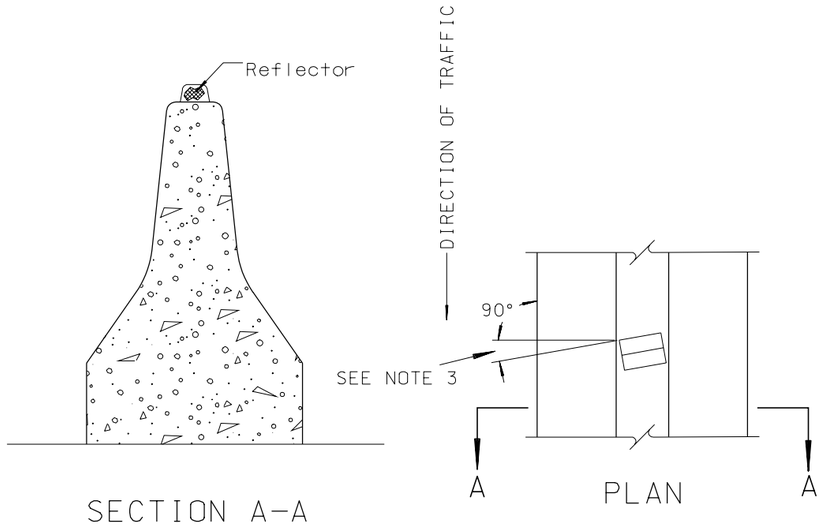


METHOD OF PLACING MATERIAL SITE BOUNDARY MARKERS

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

OBJECT MARKERS

Signed Original On File	R-9.2.1 (619-620)	
CHIEF ROAD DESIGN ENGR	ADOPTED: 8/69	REVISION 11/02



BARRIER RAIL REFLECTOR INSTALLATION

GENERAL NOTES:

1. ALL REFLECTORS SHALL BE SELECTED & INSTALLED PURSUANT TO THE PROJECT PLANS & SPECIFICATIONS OR AT THE DIRECTION OF THE ENGINEER. THE DEPICTED REFLECTORS ARE FOR MOUNTING LOCATION INFORMATION ONLY.
2. SPACING: SEE "REFLECTOR PLACEMENT ON GUARDRAIL" NOTES AND TABLE "A", OF THIS SHEET.
3. REFLECTORS SHALL BE MOUNTED AT THE ANGLE SPECIFIED BY THE MANUFACTURER OR AS DIRECTED BY THE ENGINEER.
4. COLOR: SHALL COMPLY WITH THE GUIDELINES ESTABLISHED BY THE M.U.T.C.D., 1988 EDITION AND REVISIONS THERETO.

REFLECTOR PLACEMENT SPACING ON GUARDRAIL/BARRIER RAIL

SPACING SHALL BE:

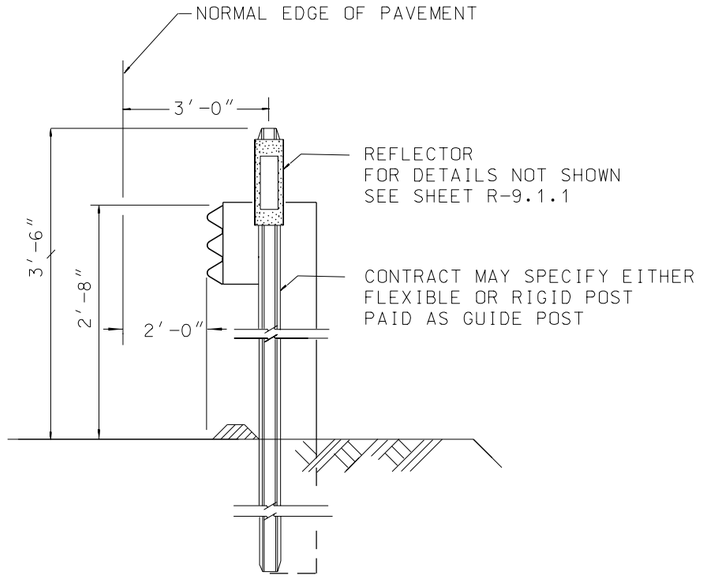
(a) 50 FEET ON TANGENTS AND ON CURVES OF 300 FOOT RADIUS OR GREATER. IF LESS THAN 300 FOOT RADIUS SEE TABLE "A".

(b) REFLECTORS SHALL BE OMITTED ON THE FLARED SECTIONS OF GUARDRAIL.

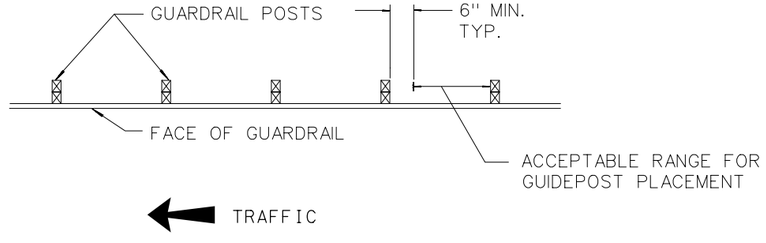
(c) NO DIRECT PAYMENT FOR REFLECTORS ON BARRIER RAIL.

TABLE "A"

Radius of Curve (In Feet)	Reflector Spacing
≤ 50	20 FT.
150	30 FT.
200	35 FT.
250	40 FT.
≥ 300	50 FT.



TYPICAL GUARDRAIL-GUIDE POST INSTALLATION



GUARDRAIL-GUIDE POST LOCATION

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

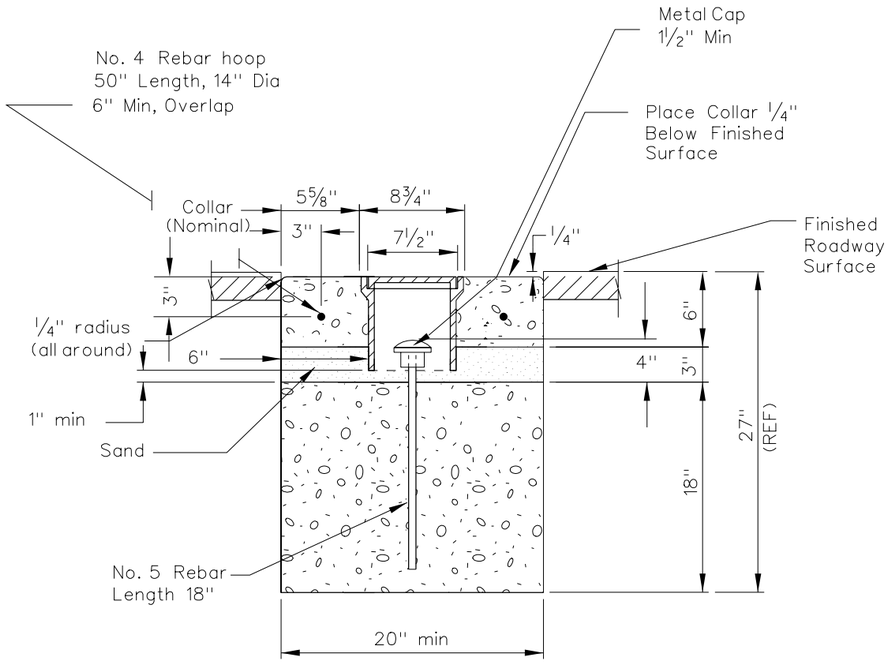
REFLECTORS GUARDRAIL-GUIDE POST

Signed Original On File	R-9.2.2	(618-619)
CHIEF ROAD DESIGN ENGR.	ADOPTED: 07/96	REVISION 10/98

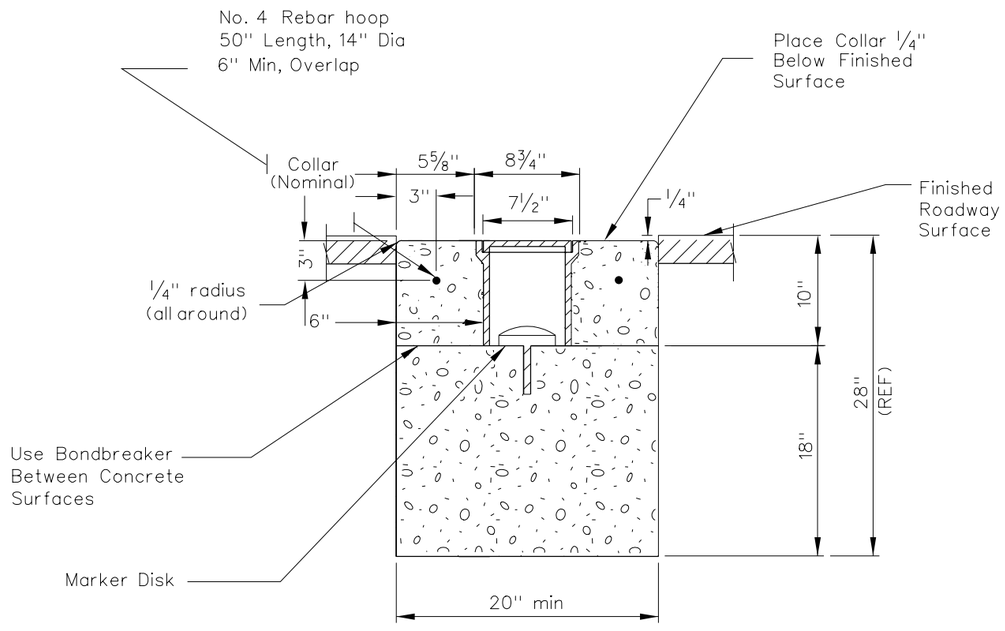
R-96

GENERAL NOTES:

1. CONCRETE SHALL BE CLASS A OR AA.
2. MONUMENTS MAY BE POURED SQUARE OR ROUND.
3. MONUMENT STAMPING SHALL BE DONE ACCORDING TO LOCATION DIVISION'S "SPECIAL INSTRUCTIONS FOR SURVEY OR MAPPING CONSULTANTS" MANUAL.



SURVEY COVER & RING
(CAST IRON)



ALTERNATE PLACEMENT
(CAST IRON)

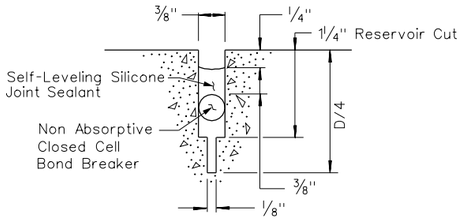
SURVEY MONUMENTS

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

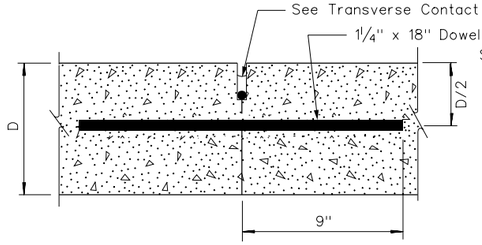
SURVEY MONUMENTS

Signed Original On File	R-9.3 (621)
CHIEF ROAD DESIGN ENGR	ADOPTED: 7/96 REVISION 3/02

ALL MEASUREMENT ± 1/16" TOLERANCE

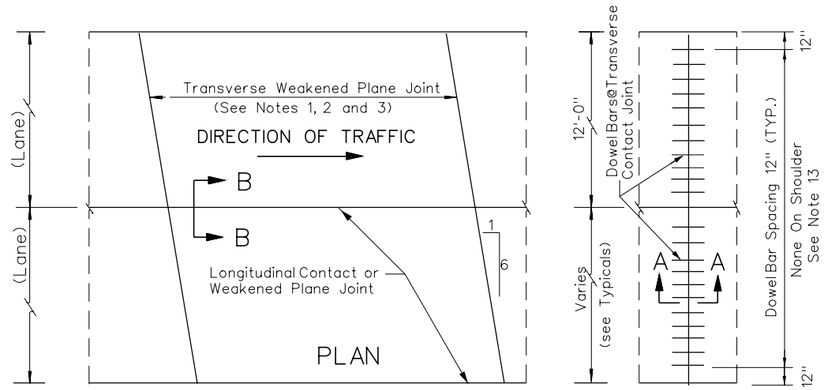


TRANSVERSE WEAKENED PLANE JOINT
DOUBLE SAW CUT

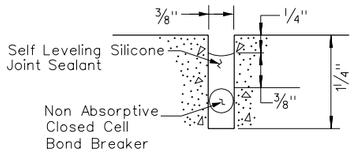


SECTION A-A

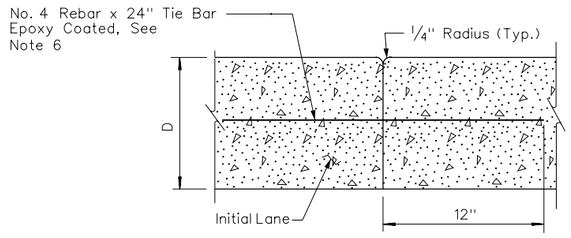
TRANSVERSE CONTACT JOINT WITH DOWEL BARS
See Note 5



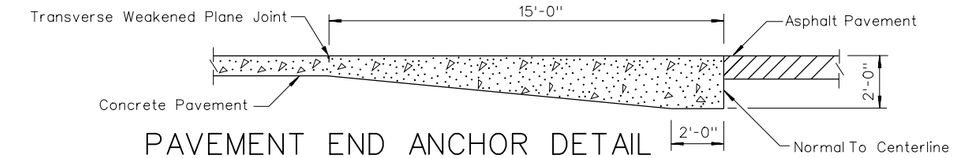
ALL MEASUREMENT ± 1/16" TOLERANCE



TRANSVERSE CONTACT JOINT
SINGLE SAW CUT

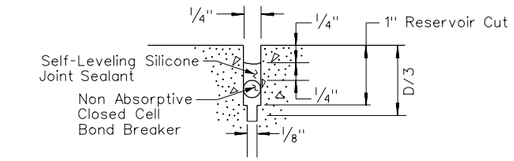


SECTION B-B
LONGITUDINAL CONTACT JOINT

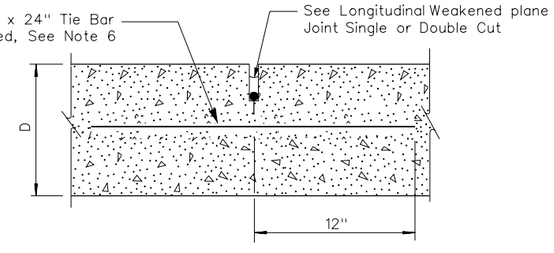


PAVEMENT END ANCHOR DETAIL
See Note 8

ALL MEASUREMENT ± 1/16" TOLERANCE



LONGITUDINAL WEAKENED PLANE JOINT
DOUBLE SAW CUT

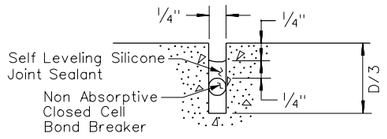


SECTION B-B
LONGITUDINAL WEAKENED PLANE JOINT

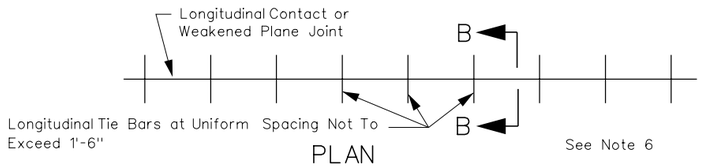
GENERAL NOTES:

1. ALL WEAKENED PLANE JOINTS SHALL BE SAWED 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 SAWED EITHER DIAGONALLY OR AS DIRECTED BY THE ENGINEER. OFFSET IS 1 IN 6 AND SKEWED COUNTERCLOCKWISE.
2. SPACING OF WEAKENED PLANE JOINTS SHALL BE SUCCESSIVELY 15'-0", 13'-0", 14'-0", 12'-0" AND REPEAT, EXCEPT FOR THE FIRST JOINT AT PAVEMENT END ANCHORS AND AT REINFORCED STRUCTURE APPROACHES.
3. TRANSVERSE CONTACT JOINTS SHALL BE CONSTRUCTED AT LEAST 6'-0" FROM ANY TRANSVERSE WEAKENED PLANE JOINT.
4. 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'-0".
5. ALL TRANSVERSE CONTACT JOINTS SHALL BE SAWED AND JOINT SEALER USED PER RESPECTIVE TRANSVERSE CONTACT JOINT DETAIL THIS SHEET.
6. ALL TIE BARS TO BE EPOXY COATED EXCEPT IN CLARK CO.. TIE BARS TO BE PLACED IN MIDDLE 1/3 OF SLAB THICKNESS.
7. TRANSVERSE CONTACT JOINTS WITH DOWEL BARS SHALL BE USED AT ALL CONSTRUCTION JOINTS AND ELSEWHERE IF ORDERED BY THE ENGINEER.
8. PAVEMENT END ANCHORS SHALL BE CONSTRUCTED AS THE TERMINAL PANELS OF ALL PAVEMENT NOT ABUTTING EXISTING CONCRETE PAVEMENTS OR STRUCTURES, AND ELSEWHERE IF ORDERED BY THE ENGINEER.
9. INITIAL 1/8" WEAKENED PLANE JOINT SAW CUT TO BE DONE WITHIN SPECIFIED TIME LIMIT. RESERVOIR CUT SHALL BE DONE AT A LATER TIME.
10. RATIO OF DEPTH TO WIDTH OF JOINT SEALANT SHALL BE 1:1
11. DOWEL BARS SHALL BE LOCATED WITHIN 1" OF THE PLANNED TRANSVERSE AND DEPTH LOCATION AND WITHIN 2" OF THE PLANNED LONGITUDINAL LOCATION.
12. THE DOWEL BARS SHALL BE PARALLEL TO THE PAVEMENT SURFACE AND CENTERLINE WITHIN A TOLERANCE OF 1/2" IN 18".
13. DOWEL BARS SHALL NOT BE PLACED WITHIN 12" OF LONGITUDINAL JOINTS.
14. D = SLAB THICKNESS.

ALL MEASUREMENT ± 1/16" TOLERANCE



LONGITUDINAL WEAKENED PLANE JOINT
SINGLE SAW CUT



PLAN
TIE BAR DETAIL

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

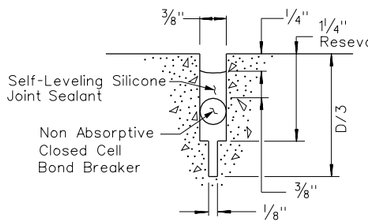
PLAIN JOINTED CONCRETE PAVEMENT DETAILS

Signed Original On File
CHIEF ROAD DESIGN ENGR.

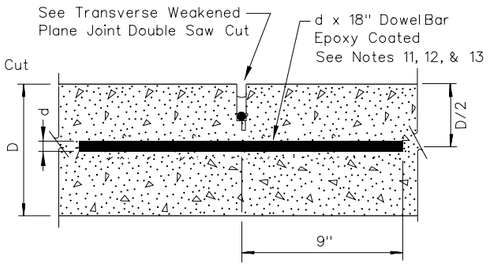
R-10.1.1 (409)
ADOPTED 07/96 | REVISION 9/97

R-97

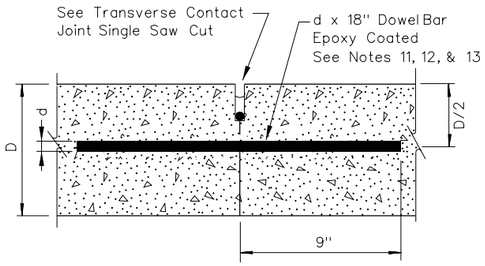
ALL MEASUREMENT ±1/16" TOLERANCE



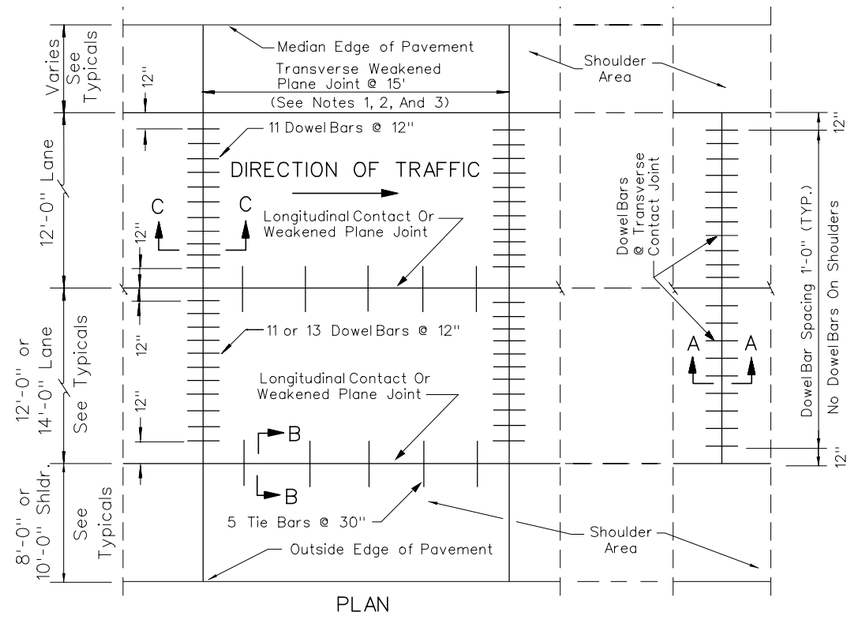
TRANSVERSE WEAKENED
PLANE JOINT
DOUBLE SAW CUT



SECTION C-C
TRANSVERSE WEAKENED PLANE JOINT



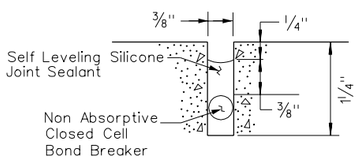
SECTION A-A
TRANSVERSE CONTACT JOINT
See Note 5



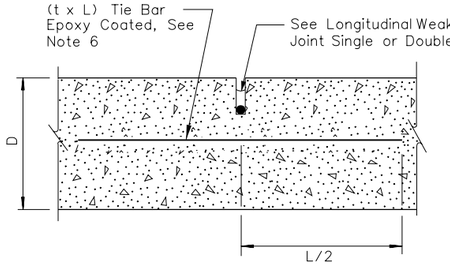
PLAN

TIE BAR AND DOWEL BAR APPLICATIONS
(TWO LANES SHOWN, TYP. FOR ADDITIONAL LANES)

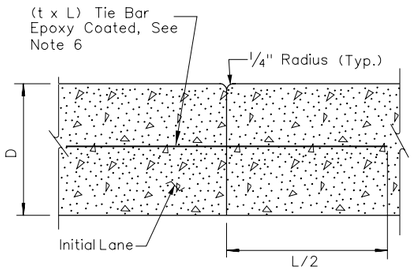
ALL MEASUREMENT ±1/16" TOLERANCE



TRANSVERSE CONTACT JOINT
SINGLE SAW CUT



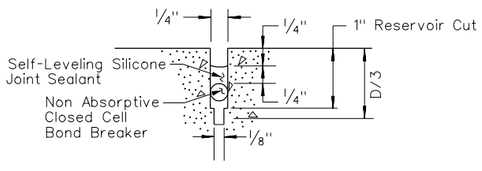
SECTION B-B
LONGITUDINAL WEAKENED PLANE JOINT



SECTION B-B
LONGITUDINAL CONTACT JOINT

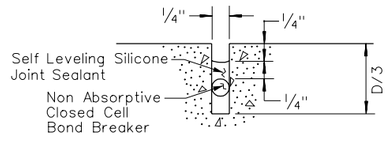
PAVEMENT THICKNESS D IN.	DOWEL BAR DIA. d IN. MIN.	TIE BAR SIZE REBAR t	LENGTH OF TIE BAR L IN.
10	1 1/4"	No. 4	24
11	1 3/8"	No. 5	30
12 & 13	1 1/2"	No. 5	30

ALL MEASUREMENT ±1/16" TOLERANCE



LONGITUDINAL WEAKENED
PLANE JOINT
DOUBLE SAW CUT

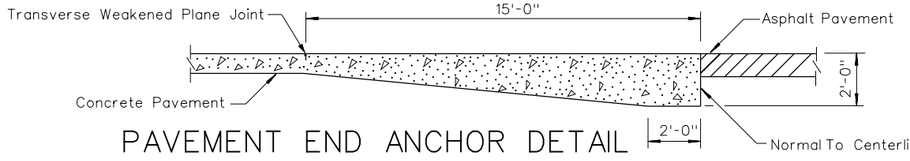
ALL MEASUREMENT ±1/16" TOLERANCE



LONGITUDINAL WEAKENED
PLANE JOINT
SINGLE SAW CUT

GENERAL NOTES:

1. ALL WEAKENED PLANE JOINTS SHALL BE SAWED PERPENDICULAR AS SHOWN, EXCEPT AS INDICATED IN THE STRUCTURE APPROACH DETAILS. WHEN ONLY ONE LANE IS BEING CONSTRUCTED ALONGSIDE EXISTING LANES, JOINTS SHALL BE SAWED AS DIRECTED BY THE ENGINEER.
2. SPACING OF WEAKENED PLANE JOINTS SHALL BE 15'-0" EXCEPT AT REINFORCED STRUCTURE APPROACHES.
3. TRANSVERSE WEAKENED PLANE JOINTS SHALL BE AT LEAST 6'-0" FROM ANY CONTACT JOINT.
4. 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'-0".
5. ALL TRANSVERSE CONTACT JOINTS SHALL BE SAWED AND JOINT SEALER USED PER RESPECTIVE TRANSVERSE CONTACT JOINT DETAIL THIS SHEET.
6. ALL TIE BARS TO BE EPOXY COATED EXCEPT IN CLARK CO.. TIE BARS TO BE PLACED IN MIDDLE 1/3 OF SLAB THICKNESS. TIE BARS SHALL NOT BE PLACED WITHIN 1'-0" OF DOWEL BARS.
7. TRANSVERSE CONTACT JOINTS WITH DOWEL BARS SHALL BE USED AT ALL CONSTRUCTION JOINTS AND ELSEWHERE IF ORDERED BY THE ENGINEER.
8. PAVEMENT END ANCHORS SHALL BE CONSTRUCTED AS THE TERMINAL PANELS OF ALL PAVEMENT NOT ABUTTING EXISTING CONCRETE PAVEMENTS OR STRUCTURES, AND ELSEWHERE IF ORDERED BY THE ENGINEER.
9. INITIAL 1/8" WEAKENED PLANE JOINT SAW CUT TO BE DONE WITHIN SPECIFIED TIME LIMIT. RESERVOIR CUT SHALL BE DONE AT A LATER TIME.
10. RATIO OF DEPTH TO WIDTH OF JOINT SEALANT SHALL BE 1:1
11. DOWEL BARS SHALL BE LOCATED WITHIN 1" OF THE PLANNED TRANSVERSE AND DEPTH LOCATION AND WITHIN 2" OF THE PLANNED LONGITUDINAL LOCATION.
12. DOWEL BARS SHALL BE PARALLEL TO THE PAVEMENT SURFACE AND CENTERLINE WITHIN A TOLERANCE OF 1/2" IN 18".
13. DOWEL BARS SHALL NOT BE PLACED WITHIN 1'-0" OF LONGITUDINAL JOINTS.
14. D = SLAB THICKNESS



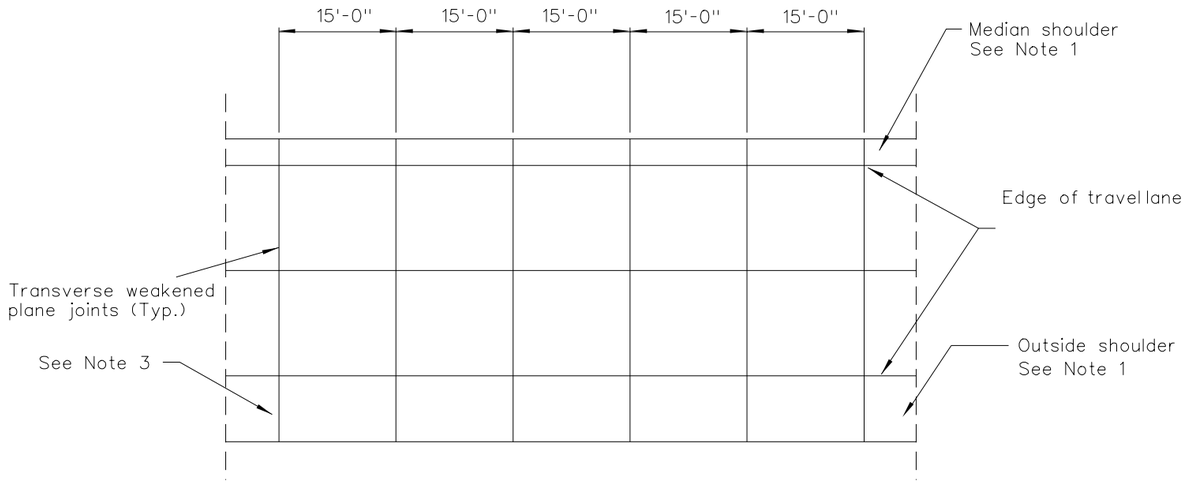
PAVEMENT END ANCHOR DETAIL
See Note 8

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

DOWELED CONCRETE PAVEMENT DETAILS

Signed Original On File	R-10.1.2 (409)	
CHIEF ROAD DESIGN ENGR.	ADOPTED 07/96	REVISION 10/98

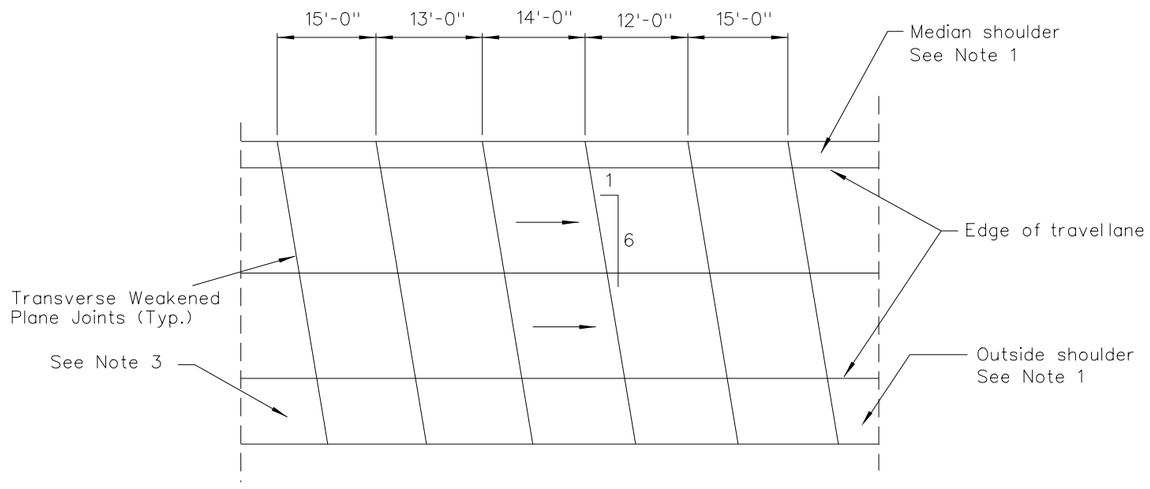
R-98



WEAKENED PLANE JOINTS LOCATION
(DOWELED PAVEMENT ONLY)

(Rumble strips shall not be used in urban areas)

For details not shown See Standard Plan Drawing R-10.1.2



WEAKENED PLANE JOINTS LOCATION

(Rumble strips shall not be used in urban areas)

For details not shown See Standard Plan Drawing R-10.1.1

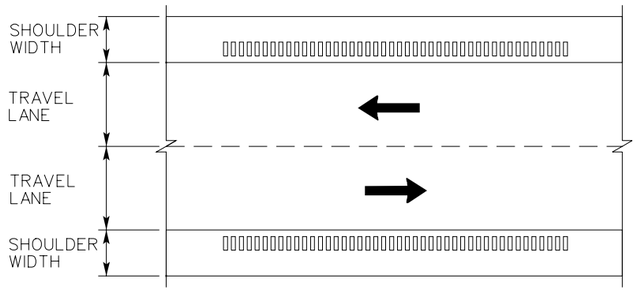
GENERAL NOTES:

1. Shoulder transverse joints shall be the same pattern as main roadway.
2. See typical section for width of shoulder and longitudinal weakened plane joint location.
3. See Contract Plans Special Detail for concrete rumble strips.

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

WEAKENED PLANE JOINTS CONCRETE

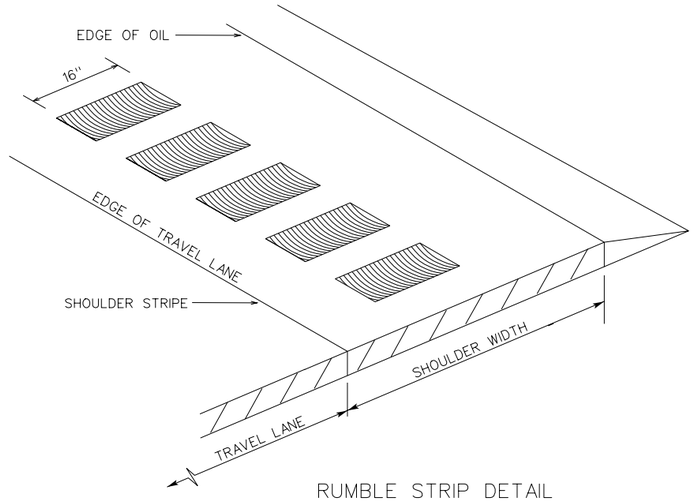
Signed Original On File	R-10.1.3	(409)
CHIEF ROAD DESIGN ENGR.	ADOPTED 07/96	REVISION 1/01



TWO WAY TRAFFIC LAYOUT

GENERAL NOTES:

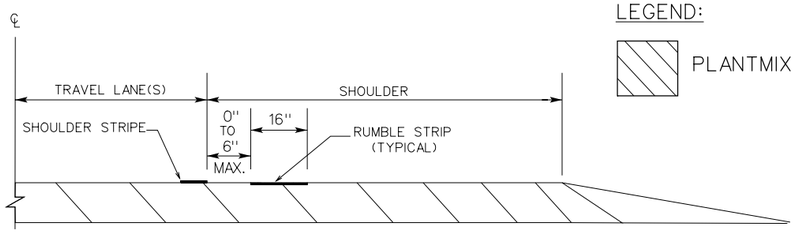
1. RUMBLE STRIPS SHALL BE USED ON ALL OUTSIDE SHOULDERS THAT ARE 4'-0" WIDE OR WIDER ON BOTH RURAL AND RURAL DIVIDED HIGHWAYS. RUMBLE STRIPS SHALL BE USED ON ALL THE INSIDE SHOULDERS OF RURAL DIVIDED HIGHWAYS WITH SHOULDER WIDTH OF 2'-0" OR MORE.
2. RUMBLE STRIPS WILL NOT BE PLACED IN URBAN LOCATIONS, NOR ON RAMP SHOULDERS, BRIDGES, OR BRIDGE APPROACH SLABS, UNLESS SPECIFICALLY DESIGNATED IN THE PLANS.
3. RUMBLE STRIPS MAY BE CONTINUOUS THROUGH ALL MINOR APPROACHES, BUT SHALL BE OMITTED ACROSS PRINICIPAL INTERSECTING ROADWAYS.
4. RUMBLE STRIPS CAN BE PLACED ON EXISTING ROLLED IN RUMBLE STRIPS IF PRESENT.
5. FOR RAMPS AND STRUCTURES, SEE STANDARD PLAN SHEET R-10.1.5.
6. ON CONCRETE PAVEMENTS, DUE TO TRANSVERSE JOINTS, RUMBLE STRIPS WILL REQUIRE A SPECIAL DETAIL.



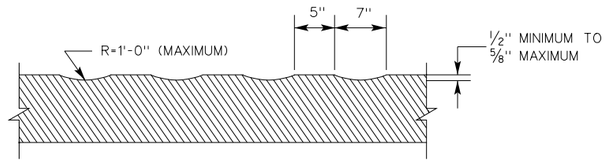
RUMBLE STRIP DETAIL

LEGEND:

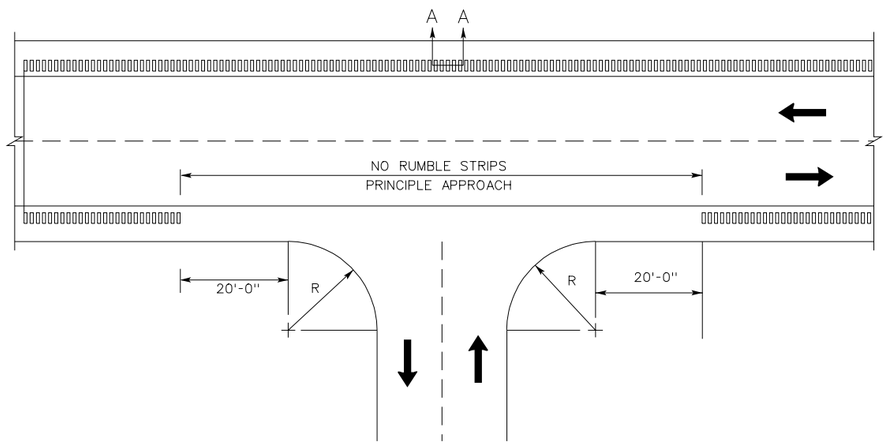
PLANTMIX BITUMINOUS SURFACE

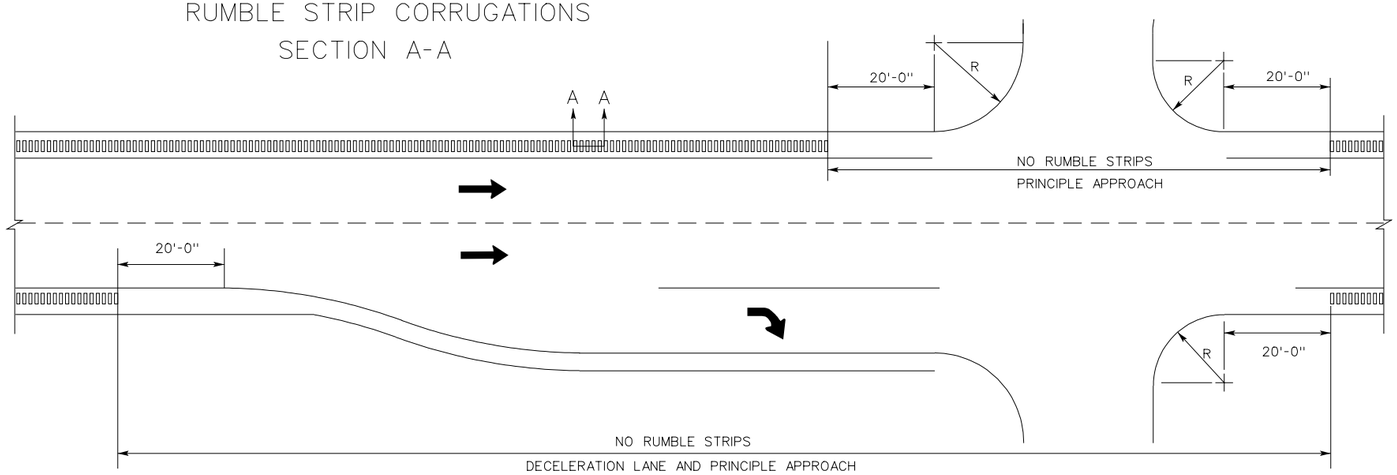


SHOULDER SECTION



RUMBLE STRIP CORRUGATIONS
SECTION A-A



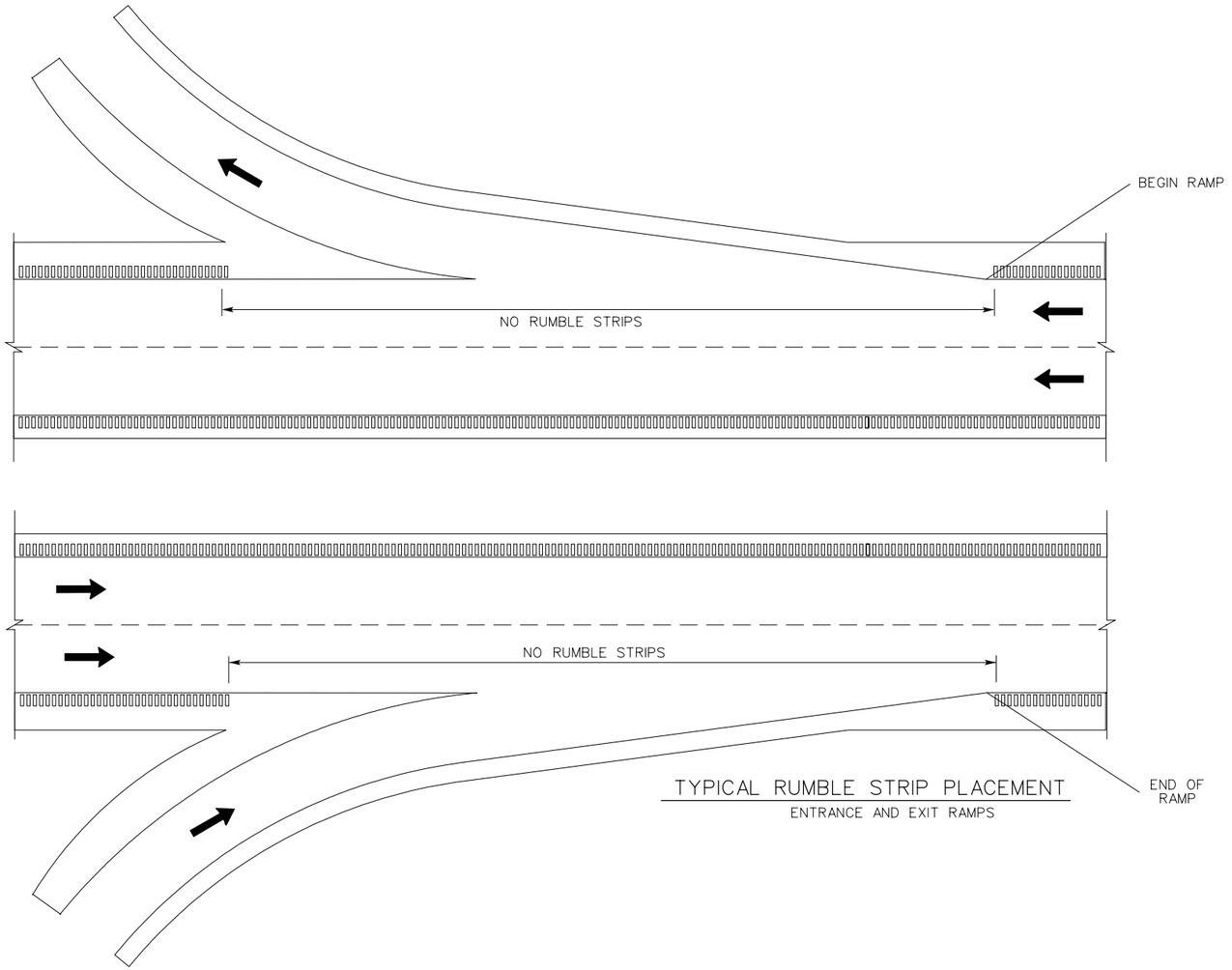


TYPICAL RUMBLE STRIP PLACEMENT

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

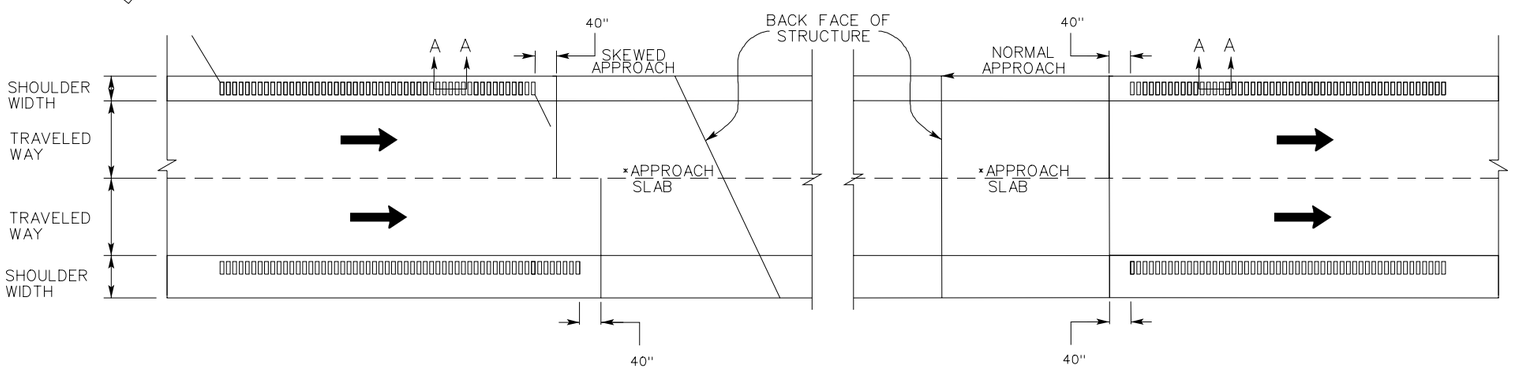
RUMBLE STRIPS-RURAL PLANTMIX BITUMINOUS SURFACE

Signed Original On File	R-10.1.4	(403)
CHIEF ROAD DESIGN ENGR.	ADOPTED 1/01	REVISION



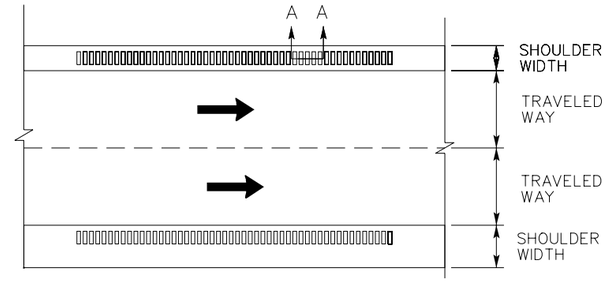
TYPICAL RUMBLE STRIP PLACEMENT

ENTRANCE AND EXIT RAMPS



DIVIDED HIGHWAY LAYOUT AT BRIDGE STRUCTURE

× IF NO APPROACH SLAB THEN 40" FROM BACK FACE OF STRUCTURE



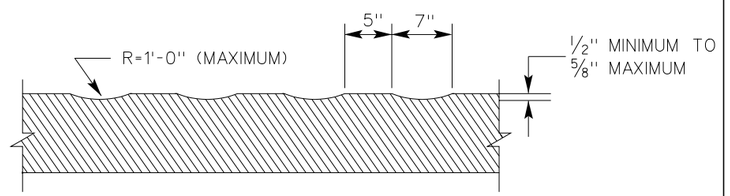
DIVIDED HIGHWAY LAYOUT

GENERAL NOTES:

1. RUMBLE STRIPS SHALL BE USED ON ALL OUTSIDE SHOULDERS THAT ARE 4'-0" WIDE OR WIDER ON BOTH RURAL AND RURAL DIVIDED HIGHWAYS. RUMBLE STRIPS SHALL BE USED ON ALL THE INSIDE SHOULDERS OF RURAL DIVIDED HIGHWAYS WITH SHOULDER WIDTH OF 2'-0" OR MORE.
2. RUMBLE STRIPS WILL NOT BE PLACED IN URBAN LOCATIONS, NOR ON RAMP SHOULDERS, BRIDGES, OR BRIDGE APPROACH SLABS, UNLESS SPECIFICALLY DESIGNATED IN THE PLANS.
3. RUMBLE STRIPS MAY BE CONTINUOUS THROUGH ALL MINOR APPROACHES, BUT SHALL BE OMITTED ACROSS PRINICIPAL INTERSECTING ROADWAYS.
4. RUMBLE STRIPS CAN BE PLACED ON EXISTING ROLLED IN RUMBLE STRIPS IF PRESENT.
5. FOR RURAL NON-FREEWAY HIGHWAYS, SEE STANDARD PLAN SHEET R-10.1.4.
6. ON CONCRETE PAVEMENT, DUE TO TRANSVERSE JOINTS, RUMBLE STRIPS WILL REQUIRE A SPECIAL DETAIL.

LEGEND:

PLANTMIX BITUMINOUS SURFACE



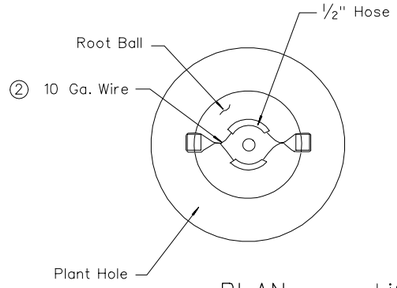
RUMBLE STRIP CORRUGATIONS

SECTION A-A

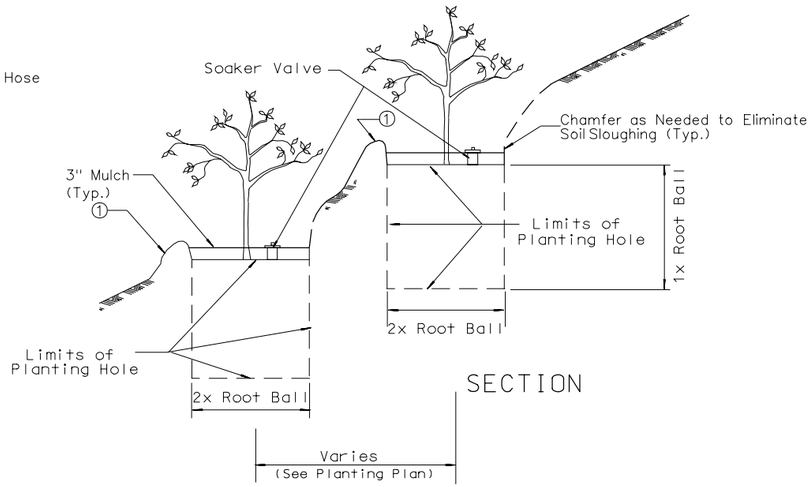
STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

RUMBLE STRIPS RAMPS/STRUCTURES

Signed Original On File	R-10.1.5	(403)
CHIEF ROAD DESIGN ENGR.	ADOPTED 1/01	REVISION



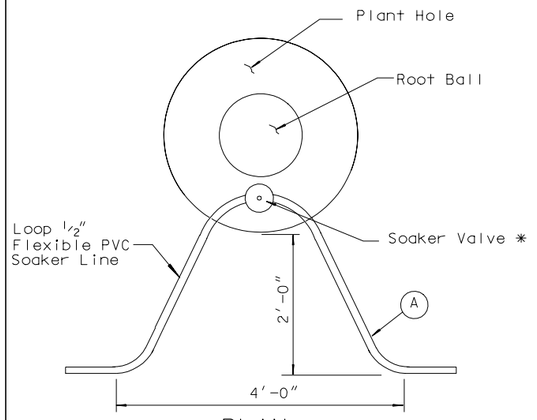
PLAN



SECTION

SLOPING AREAS

PLANTHOLE & SOAKER IRRIGATION DETAILS

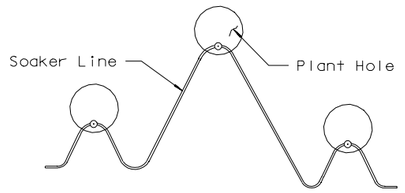


PLAN

TYPICAL LOOP INSTALLATION

SHRUB

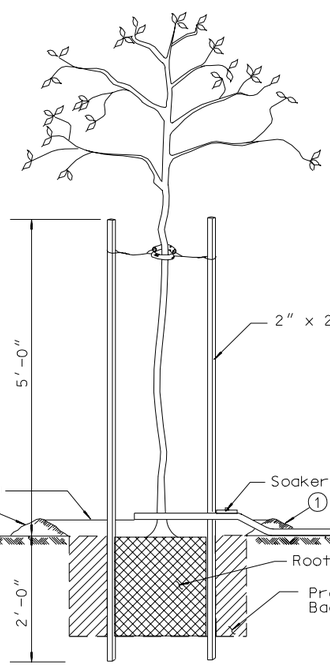
* - Install One Soaker Valve per Shrub. Set Valve Above Mulch.



PLAN

TYPICAL MULTIPLE INSTALLATION

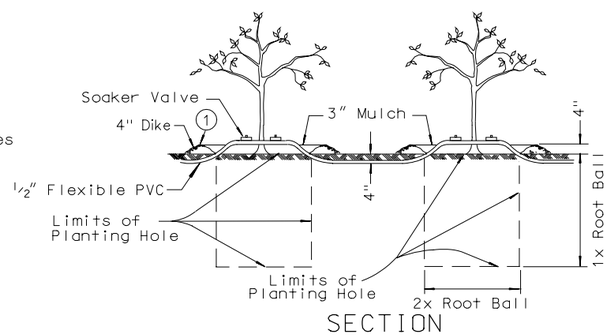
Ⓐ Loops Shall Be on Opposite Side of Plant From Travel Way



SECTION

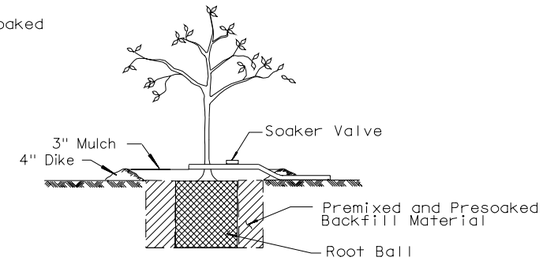
STAKING DETAILS

NOTE:
TOP OF ROOT BALL TO BE 1" ABOVE GRADE.



SECTION

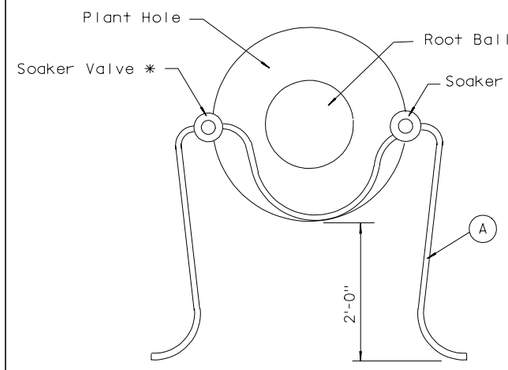
LEVEL AREAS



SECTION

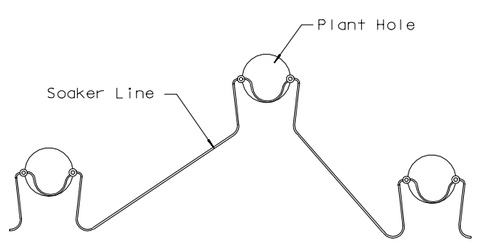
PLANTING TECHNIQUES

* - Install Two Soaker Valves Per Tree. Set Valves Above Mulch.



PLAN

TYPICAL LOOP INSTALLATION



PLAN

TYPICAL MULTIPLE INSTALLATION

TREE

① Dike To be Constructed of Soil From Plant Hole and Shall be 3'-0" Inside Diameter.

② See Section 726.03.09 of Specifications for Additional Approved Tree Ties.

SOIL SCHEDULE

BACKFILL MATERIAL SHALL CONSIST OF TWO PARTS NATIVE SOIL AND ONE PART HUMUS.

PLANT TABLET SCHEDULE

FOR TREES, SHRUBS AND GROUNDCOVERS

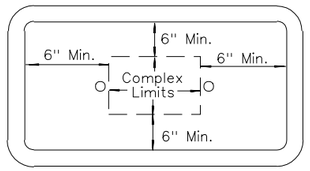
No.1	1 TABLET
No.5	2 TABLETS
No.15	3 TABLETS
24" BOX	5 TABLETS

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

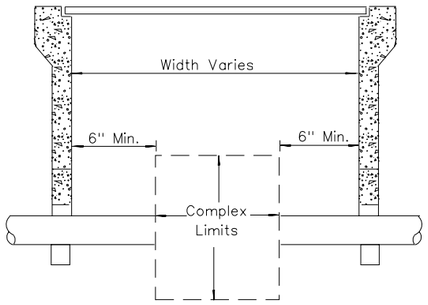
PLANTING DETAILS

Signed Original On File	R-11.1.1	(212)
	ADOPTED: 7/96	REVISION 10/00
CHIEF ROAD DESIGN ENGR.		

R-102

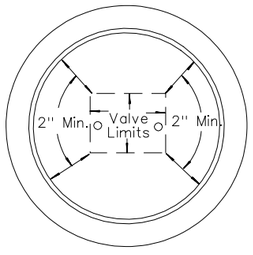


TOP VIEW VALVE BOX

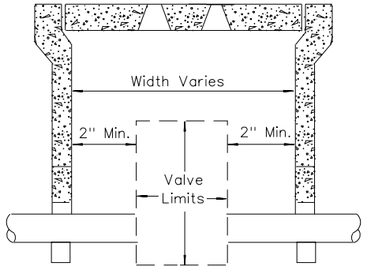


SECTION
VALVE BOX

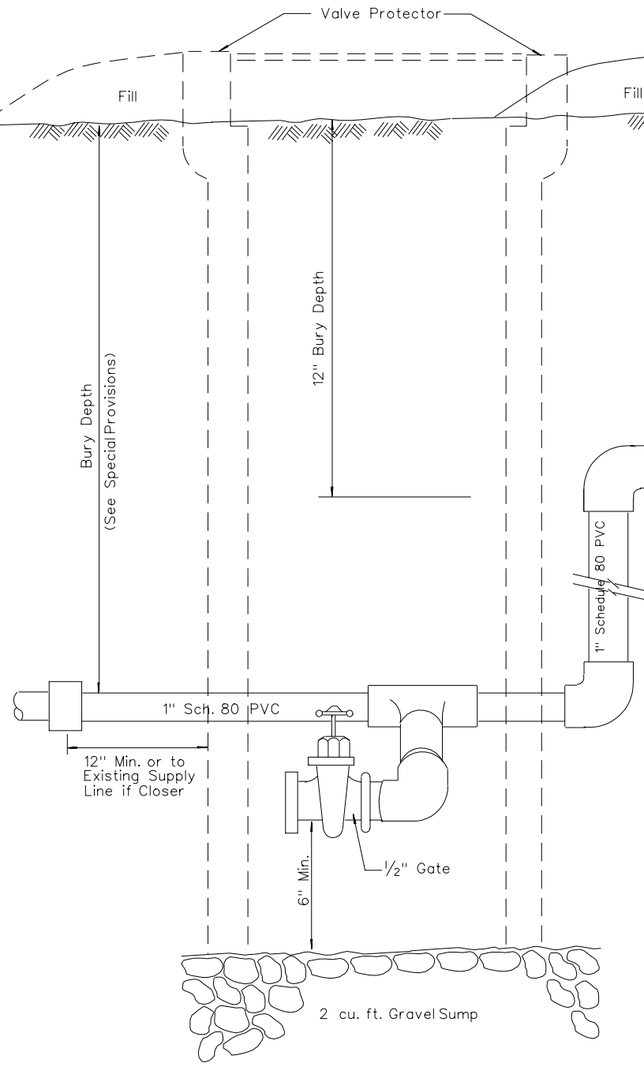
One for Each: Soaker Irrigation Control Unit
Electric Control Valve
Gate Valves 1" & Larger
Filtration Unit.



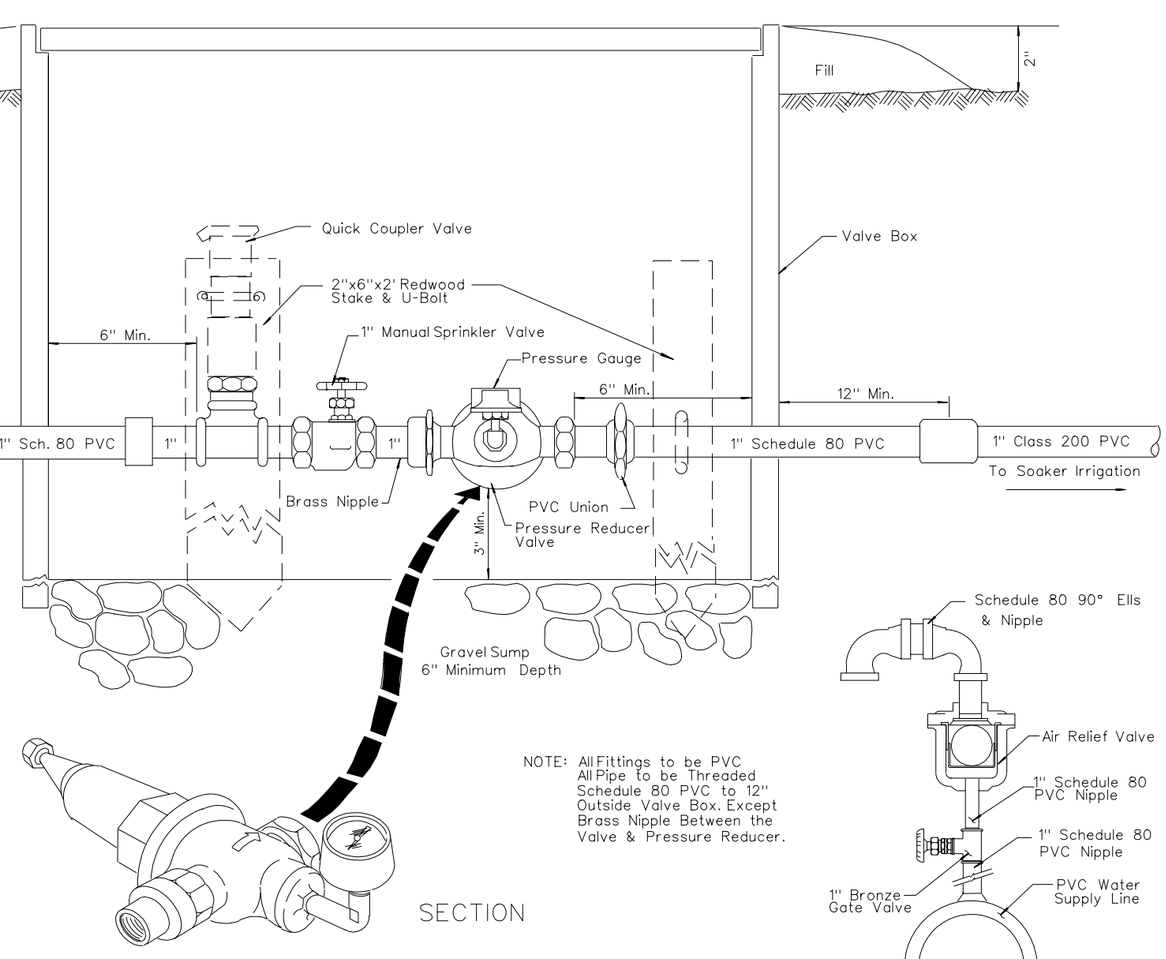
TOP VIEW VALVE PROTECTOR



SECTION
VALVE PROTECTOR
(One For Each ½" Gate Valve)



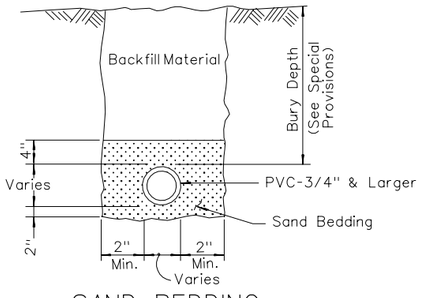
DRAIN DETAIL
(Delete in Las Vegas Area)



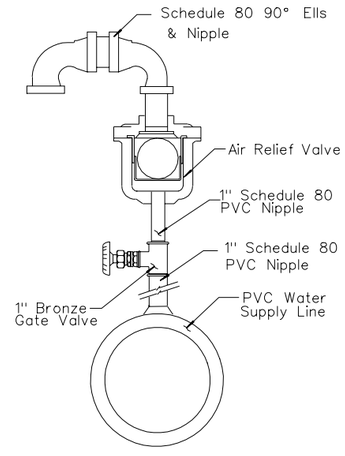
NOTE: All Fittings to be PVC
All Pipe to be Threaded
Schedule 80 PVC to 12"
Outside Valve Box. Except
Brass Nipple Between the
Valve & Pressure Reducer.

SECTION

SOAKER IRRIGATION CONTROL UNIT
WITH QUICK COUPLER VALVE



SAND BEDDING



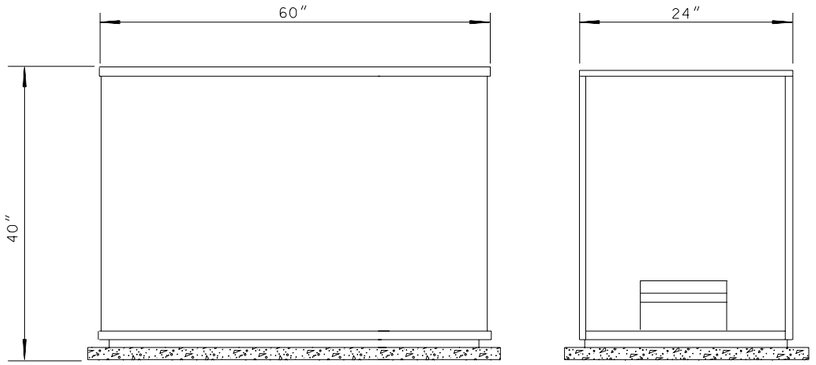
ELEVATION
AIR RELIEF VALVE UNIT

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

SOAKER CONTROL AND VALVE BOX DETAILS

Signed Original On File	R-11.1.2	(213)
CHIEF ROAD DESIGN ENGR.	ADOPTED: 10/92	REVISION 10/6/94

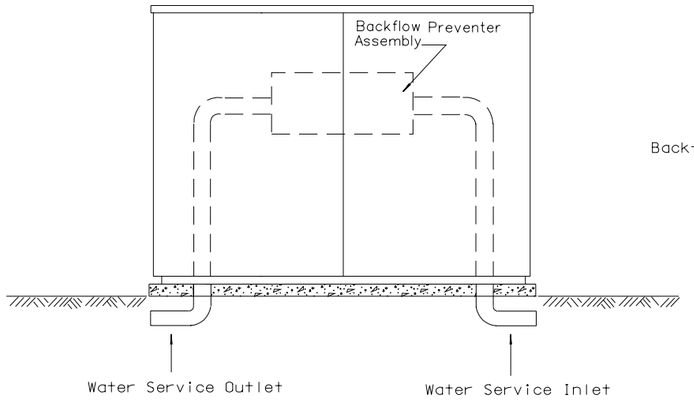
R-10.3

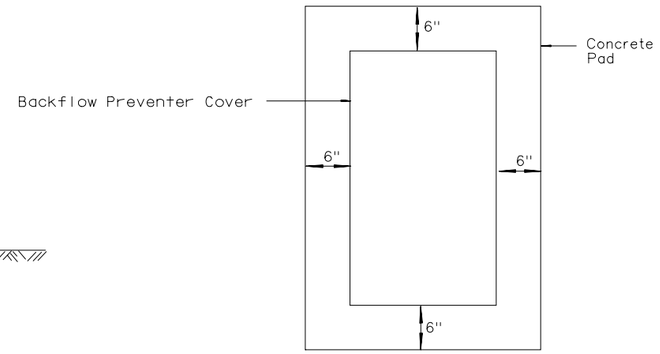


SIDE VIEW

FRONT VIEW

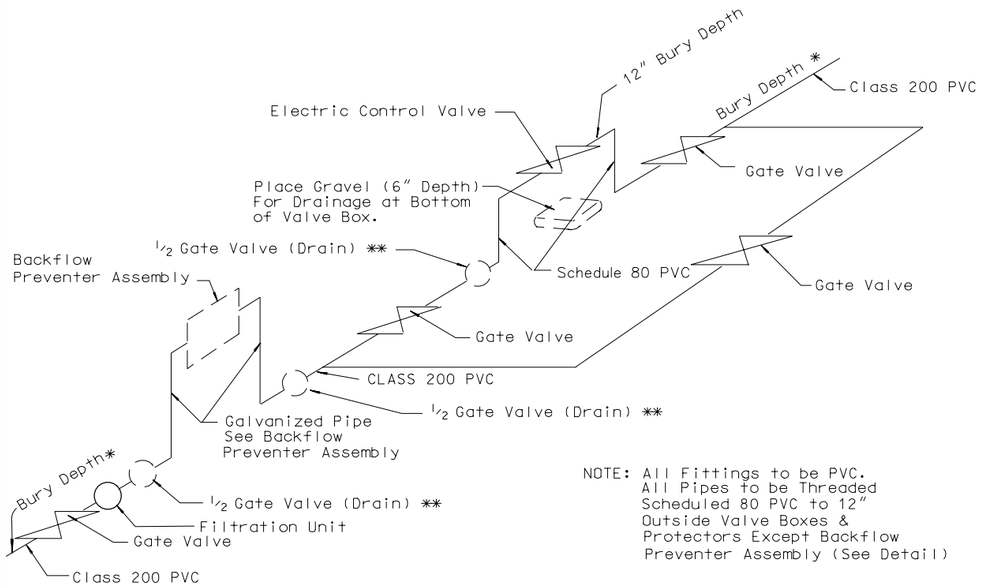
Concrete Shall Be Class A or AA





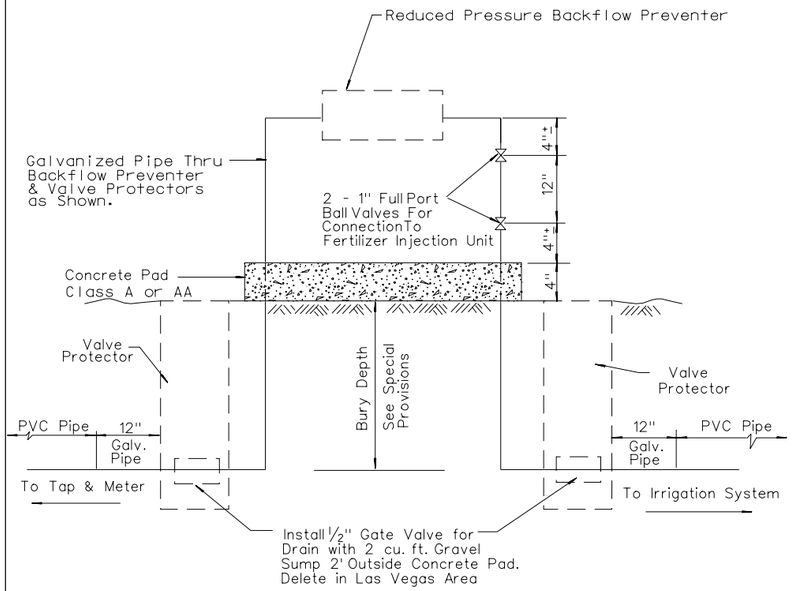
BACKFLOW PREVENTER COVER

* Bury Depth, See Special Provisions
** Delete in Las Vegas Area

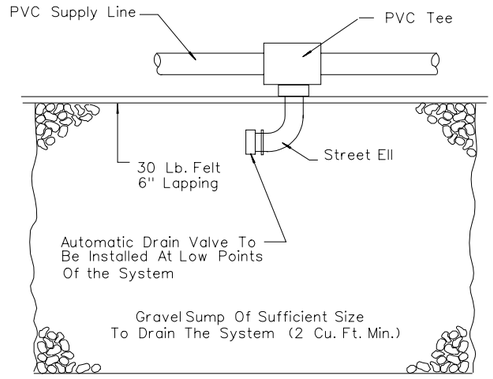


NOTE: All Fittings to be PVC. All Pipes to be Threaded Scheduled 80 PVC to 12" Outside Valve Boxes & Protectors Except Backflow Preventer Assembly (See Detail)

TYPICAL VALVE COMPLEX



BACKFLOW PREVENTER ASSEMBLY



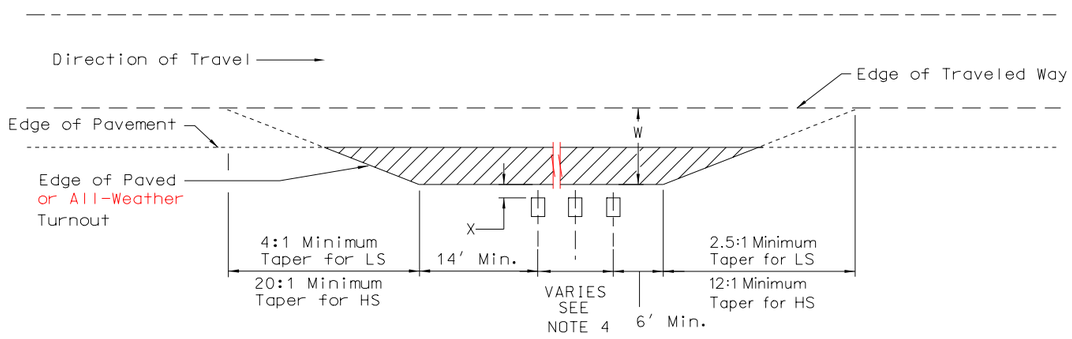
SECTION

AUTOMATIC DRAIN VALVE & SUMP
(Delete in Las Vegas Area)

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

BACKFLOW PREVENTER AND VALVE COMPLEX DETAILS

	R-11.1.3	(213)
Signed Original On File	ADOPTED: 10/92	REVISION 10/6/94
CHIEF ROAD DESIGN ENGR.		

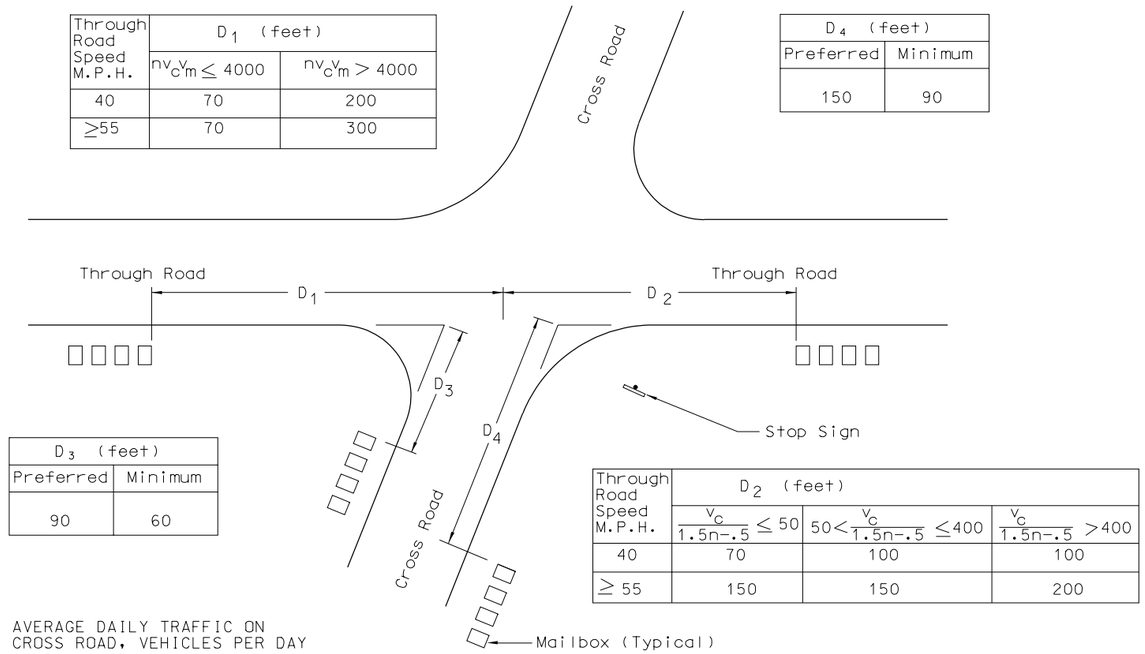


LS = Roads Carrying LOW speed Traffic and for Local and Collector Roads.
HS = Roads Carrying HIGH Speed Traffic.
W = For Suggested Widths See TABLE 1.
X = For Mailbox Face Offset See TABLE 1 (0" TO 12").

MAILBOX TURNOUT

Through Road Speed M.P.H.	D_1 (feet)	
	$nv_cv_m \leq 4000$	$nv_cv_m > 4000$
40	70	200
≥55	70	300

D_4 (feet)	
Preferred	Minimum
150	90



D_3 (feet)	
Preferred	Minimum
90	60

Through Road Speed M.P.H.	D_2 (feet)		
	$\frac{v_c}{1.5n-.5} \leq 50$	$50 < \frac{v_c}{1.5n-.5} \leq 400$	$\frac{v_c}{1.5n-.5} > 400$
40	70	100	100
≥ 55	150	150	200

v_c AVERAGE DAILY TRAFFIC ON CROSS ROAD, VEHICLES PER DAY

v_m AVERAGE DAILY TRAFFIC ON THROUGH ROAD, VEHICLES PER DAY

n NUMBER OF MAILBOXES AT MAIL STOP

MINIMUM CLEARANCE DISTANCES TO NEAREST MAILBOX IN MAIL STOPS AT INTERSECTIONS

TABLE 1 — SUGGESTED GUIDELINES FOR LATERAL PLACEMENT OF MAILBOXES

HIGHWAY TYPE AND TRAFFIC CONDITIONS	WIDTH (W) OF ALL-WEATHER SURFACE OF TURNOUT OR AVAILABLE SHOULDER AT MAILBOX		DISTANCE (X) ROADSIDE FACE OF MAILBOX IS TO BE OFFSET BEHIND EDGE OF TURN OUT OR USABLE SHOULDER		DEPTH BASE AGGREGATE
RURAL HIGHWAY	PREFERRED (FT.)	MINIMUM (FT.)	PREFERRED (INCH)	MINIMUM (INCH)	(INCH)
ADT= OVER 10000 vpd	> 12	12	8 TO 12	0	4
ADT= 1,500 TO 10,000 vpd	12	10	8 TO 12	0	4
ADT= 100 TO 1500 vpd	10	8	8 TO 12	0	4
RURAL ROAD ADT= UNDER 100 vpd - OR - RESIDENT STREET WITHOUT CURB OR ALL WEATHER SHOULDER	8	6**	8 TO 12	8*	4
RESIDENTIAL STREET CURBED	N/A	N/A	8 TO 12 BEHIND TRAFFIC FACE OF CURB	6 BEHIND TRAFFIC FACE OF CURB	0

* IF TURNOUT IS PROVIDED, THIS MAY BE REDUCED TO ZERO.
** RESIDENTIAL STREET WITHOUT CURB MAY BE REDUCED TO ZERO.

GENERAL NOTES:

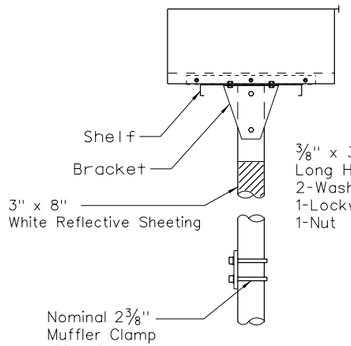
1. FOR FURTHER INFORMATION ON MAILBOXES SEE AASHTO "A GUIDE FOR ERECTING MAILBOXES ON HIGHWAYS, 1994 EDITION.
2. MAILBOXES WITHIN THE CLEAR ZONE SHALL BE THE TYPES SHOWN IN SHEETS R-12.1.2 AND R-12.1.3 OR AN APPROVED EQUAL.
3. ADT = AVERAGE DAILY TRAFFIC, vpd = VEHICLES PER DAY
4. FOR MAILBOX SPACING AND VARIABLE LENGTH SEE SHEETS SHEETS R-12.1.2 AND R-12.1.3
5. TURNOUT QUANTITIES IN PLAN SUMMARY SHEETS.
6. MILLED MATERIAL MAY BE USED IN LIEU OF AGGREGATE BASE.

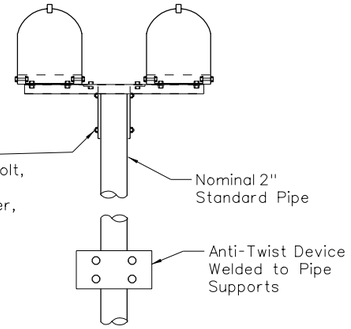
STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

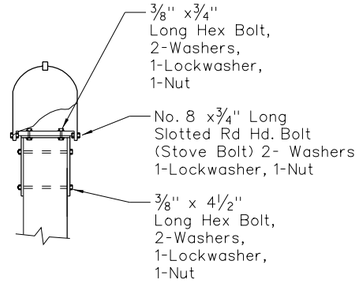
MAILBOX TURNOUTS

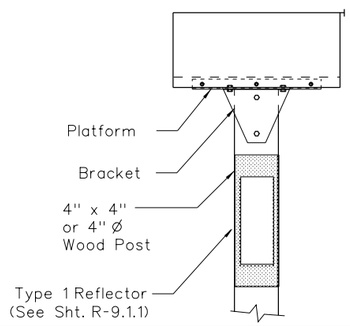
Signed Original On File
CHIEF ROAD DESIGN ENGR.

R-12.1.1 (214)
ADOPTED: 7/96
REVISION 4/02

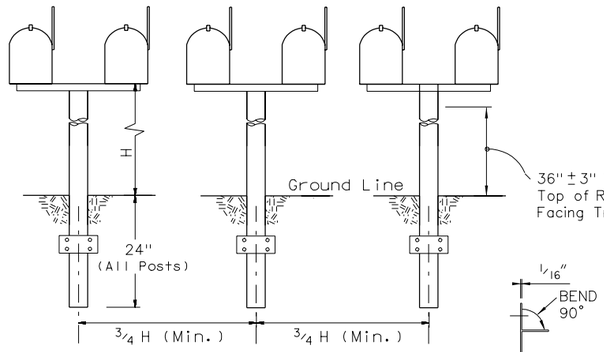








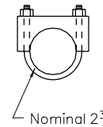
SINGLE AND DOUBLE MAILBOX ASSEMBLIES
TYPE A – WOODEN POST or PIPE POST



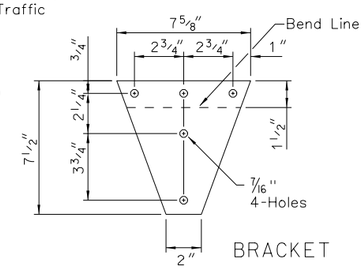
SPACING FOR MULTIPLE
POST INSTALLATION

GENERAL NOTES:

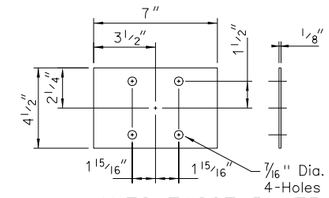
1. H = 3'-6" Min., 4'-0" Max.
2. See Structure List For Mailbox Type.
3. Refer To Standard Plan Sheet R-12.1.1 Table 1 For Suggested Guidelines For Lateral Placement Of Mailboxes.



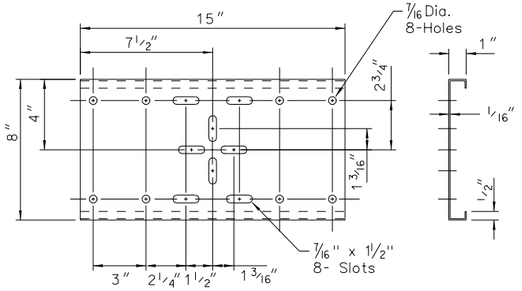
U-BOLT CLAMP



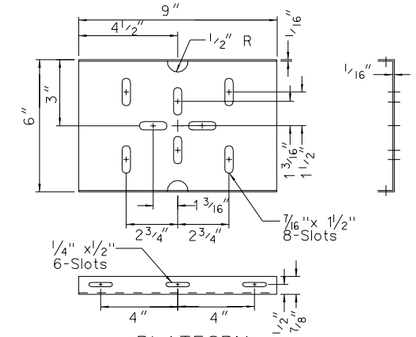
BRACKET



ANTI-TWIST PLATE

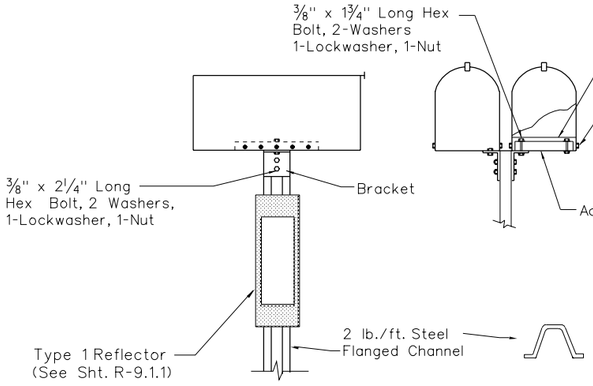


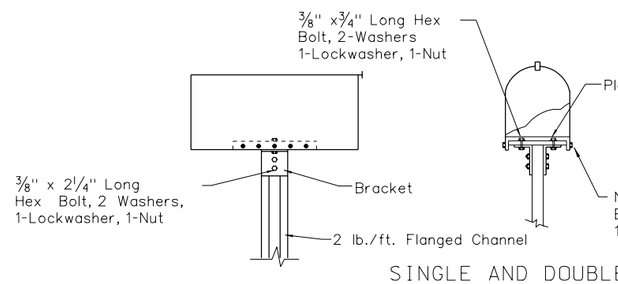
SHELF



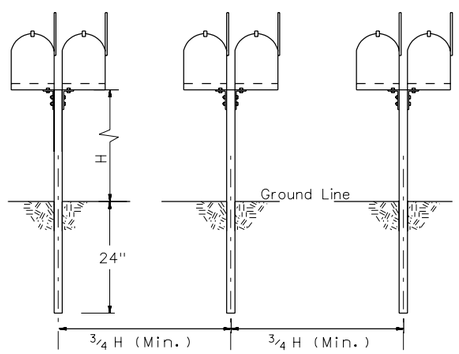
PLATFORM

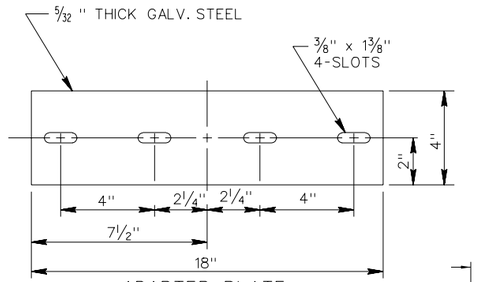
R-106



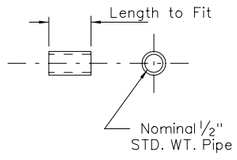


SINGLE AND DOUBLE MAILBOX ASSEMBLIES
TYPE B – METAL POSTS

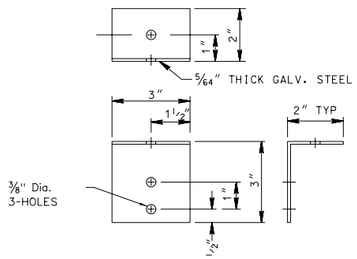




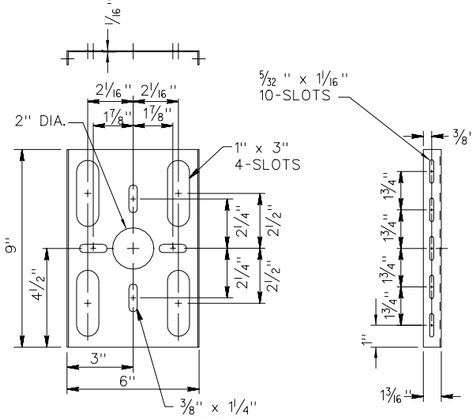
ADAPTER PLATE
FOR DOUBLE INSTALLATIONS



SPACER



POST MOUNTING ANGLE
FOR MOUNTING MAILBOXES
TO POST.
(2 REQ'D PER POST)

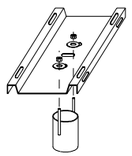


PLATFORM

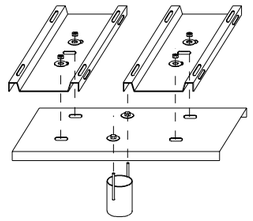
STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

MAILBOX SUPPORTS

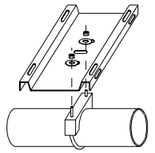
Signed Original On File	R-12.1.2	(214)
CHIEF ROAD DESIGN ENGR.	ADOPTED: 7/96	REVISION 2/03



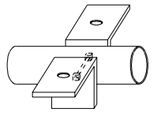
SINGLE MAILBOX MOUNT



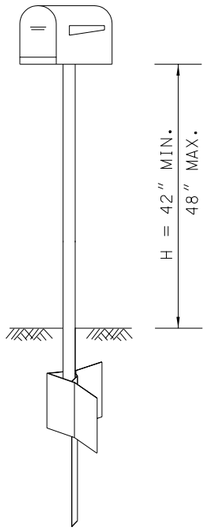
DOUBLE MAILBOX MOUNT



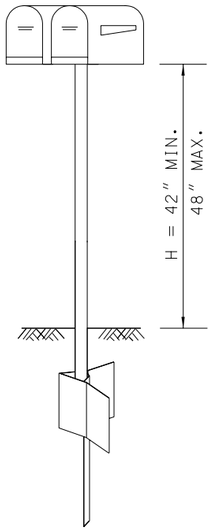
MULTIPLE MAILBOX MOUNT



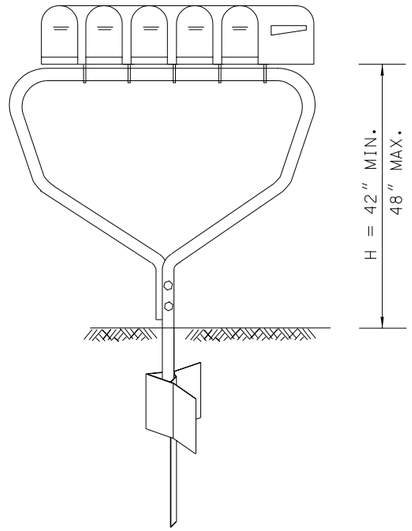
BRACKET MOUNT ALTERNATIVE



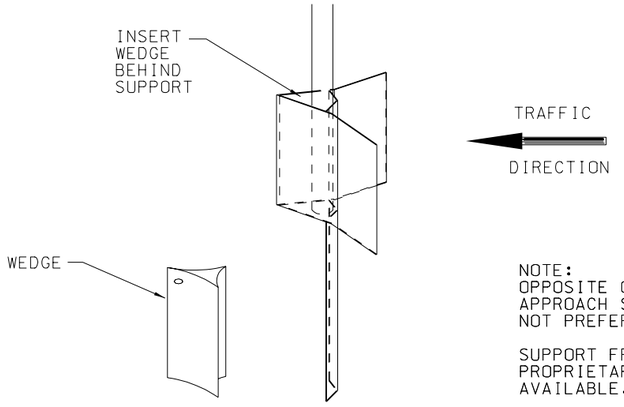
SINGLE SUPPORT SYSTEM



DOUBLE SUPPORT SYSTEM



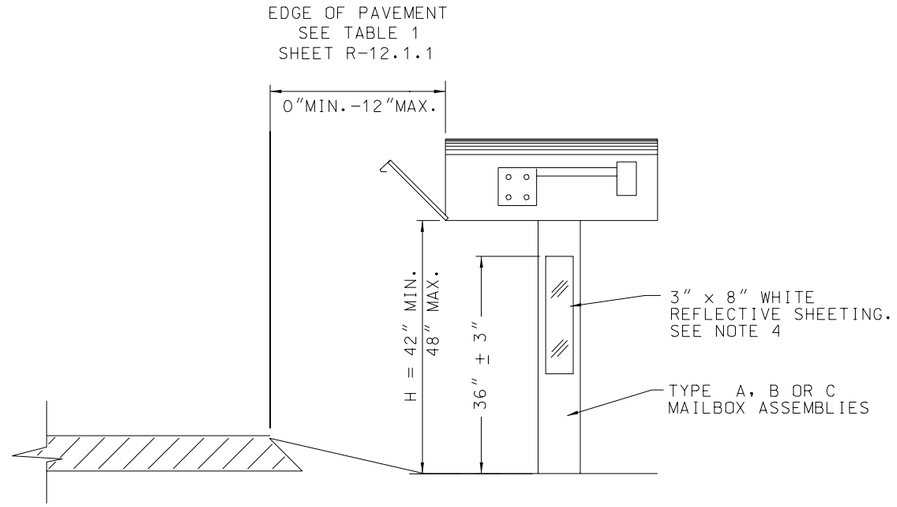
MULTIPLE SUPPORT SYSTEM



NOTE:
OPPOSITE ORIENTATION WITH WEDGE ON TRAFFIC APPROACH SIDE OF POST IS ALLOWABLE BUT NOT PREFERRED

SUPPORT FRAME AND FOUNDATION ARE PROPRIETARY PRODUCTS COMMERCIALLY AVAILABLE.

SINGLE AND MULTIPLE MAILBOX ASSEMBLIES
TYPE C



ALTERNATE PLACEMENT
(SEE NOTE 3)

GENERAL NOTES:

1. FOR FURTHER INFORMATION ON MAILBOXES SEE AASHTO "A GUIDE FOR ERECTING MAIL BOXES ON HIGHWAYS", 1994 EDITION.
2. INSTALLATION OF TYPE C MAILBOX ASSEMBLIES SHALL BE IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.
3. THE DIRECTION OF THE MAILBOX OPENING IN RELATION TO THE TRAVEL LANES SHALL BE SET BY THE UNITED STATES POSTAL SERVICE.
4. 3" x 8" WHITE REFLECTORIZED SHEETING SHALL BE PLACED FACING TRAFFIC 36" +/- 3" FROM GROUND ON ALL MAILBOX SUPPORT STRUCTURES.
5. LIGHTWEIGHT NEWSPAPER BOXES MAY BE MOUNTED BELOW THE MAILBOX ON THE MAILBOX SUPPORT.
6. HEAVY GAUGE STEEL MAILBOXES (>11 lb) ARE NOT ALLOWED ON HIGH-SPEED HIGHWAYS.

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

MAILBOX SUPPORTS

Signed Original On File	R-12.1.3	(214)
	ADOPTED: 7/96	REVISION 1/01
CHIEF ROAD DESIGN ENGR.		

R-107

NEW	EXISTING	DESCRIPTION
		Luminaire
		Light Pole, Type 7
		Light Pole, Type 14
		High Mast Light Pole, (No. of Lamps Indicated on Plans)
		Overhead Sign Light, 150 Watt Lamp
		Underpass Luminaire
		Traffic Signal Head, 3 Section, 1'-0", red, Yellow, and Green Sections,(Unless Indicated Otherwise)
		Traffic Signal Head With Back Plate
		Traffic Signal Head, with 1'-0" Green, Yellow and Red Arrow Sections, With Back Plate
OP	OP	Traffic Signal Head With Optical Detector Unit
		M-5 (Cluster Type Head) 1'-0" Green, Yellow And Red Balls with 1'-0" Green And Yellow Arrows.
		Internally Illuminated Sign
		Pedestrian Signal

NEW	EXISTING	DESCRIPTION
R	R	Flashing Signal Flashers ("R" Indicates Red Lens)
Y	Y	Flashing Signal Flashers ("Y" Indicates Yellow Lens)
		Pull Box
		Controller Cabinet
E	E	Electrical Cabinet
		Service (120-240 V.A.C. Unless Otherwise Specified)
		Transformer Pad
		Power Source
		Conduit
J J		Conduit (Jacked)
J	J	Junction Box
		Wood Power Pole
		Signal or Light Pole
		Special Junction Cabinet (For Interconnect Cable)

NEW	EXISTING	DESCRIPTION
E	E	Electrical Manhole Cover
		Vehicle Detector-Inductive Loop Unless Otherwise Indicated
		Quadrapole Detector Loop
		Video Detection Camera
S	S	Video Surveillance Camera
		Microwave Antenna

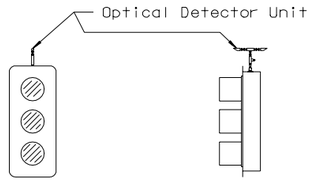
A	Pole Designation
5	Note Designation
3	Conduit Run
PS	Portable Traffic Signal (Trailer Mount)
	Traffic Signal Sign
Ø8PPB	Pedestrian Push Button

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

SIGNAL AND LIGHTING SYMBOLS

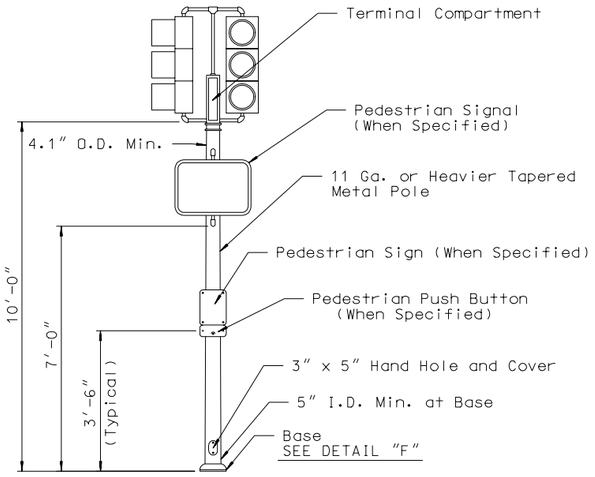
Signed Original On File	T-30.1.1 (623)	
CHIEF SAFETY/TRAFFIC ENGINEER	ADOPTED: 7/96	REVISION 9/02

T-1



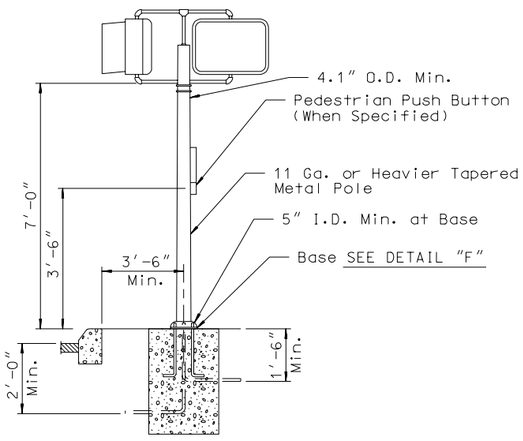
FRONT VIEW SIDE VIEW

MOUNTING DETAIL
OPTICAL DETECTOR



Foundation Same as Type 1-B

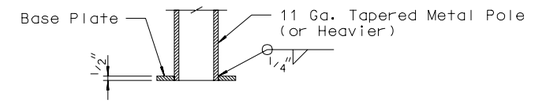
TYPE 1-A



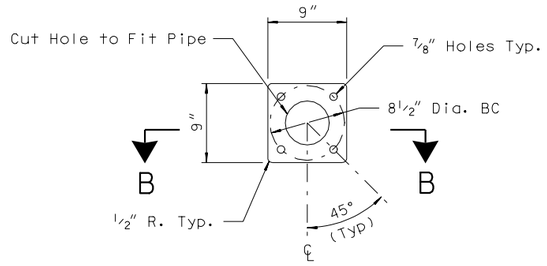
TYPE 1-B

SIGNAL STANDARDS

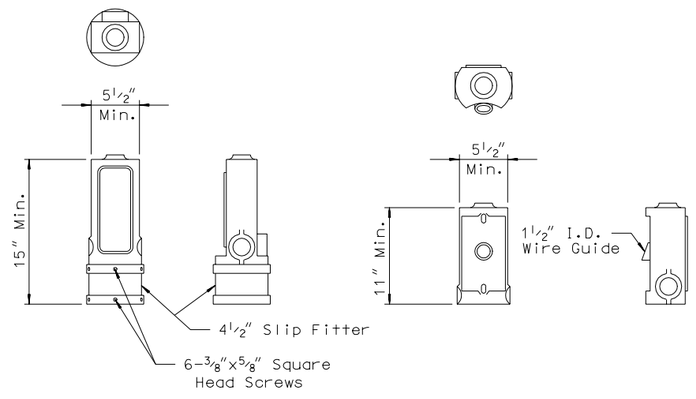
1. For Pedestrian Push Button And Sign See Sheet T-30.1.3
2. For Foundation Details See Sheet T-30.1.16.
3. Mounting Heights of Signal And Pedestrian Heads And Pedestrian Push Buttons Shall Be Applicable To Installations on Pole Types 28, 30 & 35.



SECTION B-B WITH PIPE



DETAIL "F"



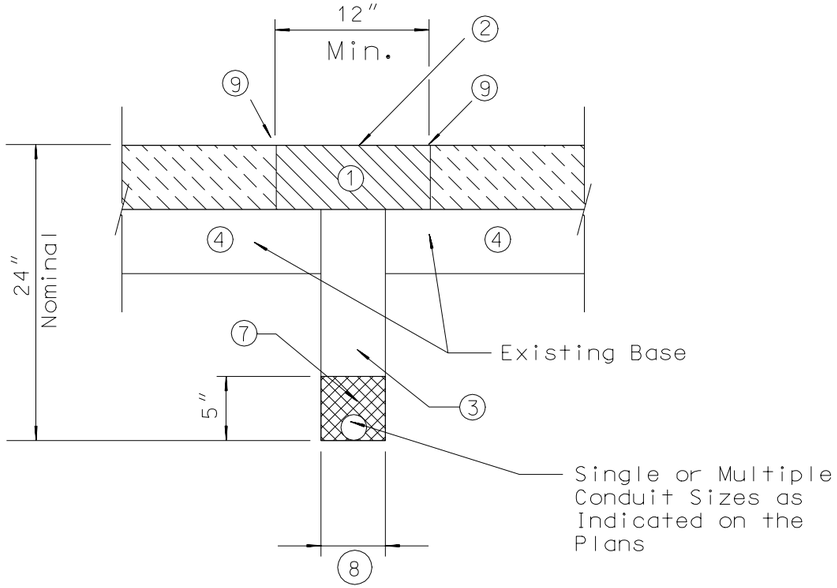
POST TOP MOUNTED SIDE BRACKET MOUNTED

TERMINAL COMPARTMENTS

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

TYPE 1A AND 1B POLES,
OPTICAL MOUNT AND
TERMINAL COMPARTMENTS

Signed Original On File	T-30.1.2	(623)
CHIEF SAFETY/TRAFFIC ENGR.	ADOPTED 2/71	REVISION 10/00



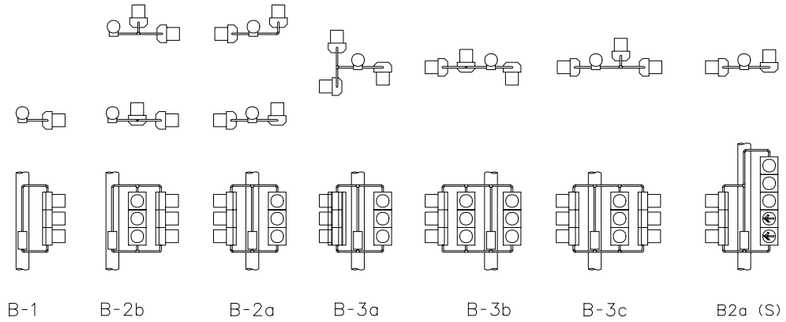
TRENCHING DETAIL

1. Remove And Replace Existing Surface. New Surface Material Shall Be From An Approved Commercial Source.
2. Seal And Sand New Surface. (As Directed By The Engineer)
3. Two Sack Slurry Mix Cement.
4. Recompact Existing Base.
5. All New Surface And Concrete Material Shall Be Approved By Engineer.
6. New Material And Trenching Shall Not Be Paid For Directly But Included in The Price For The Conduit.
7. Sand Bedding.
8. 2 Conduit Diameters Min.
9. Saw Cut As Directed By Engineer.

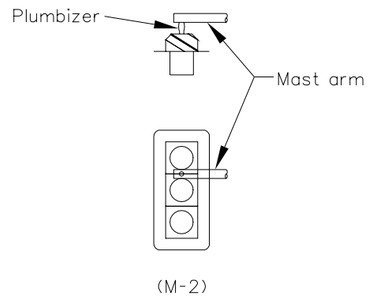
STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

TRENCHING DETAIL

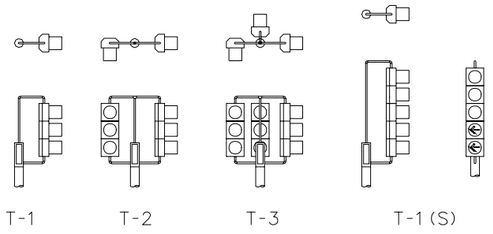
Signed Original On File	T-30.1.2.1 (623)	
CHIEF SAFETY/TRAFFIC ENGR.	ADOPTED 2/71	REVISION 10/00



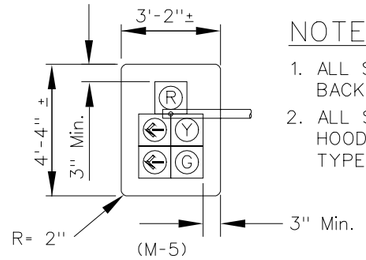
SIDE BRACKET MOUNTINGS



MAST ARM MOUNTINGS



TOP MOUNTINGS

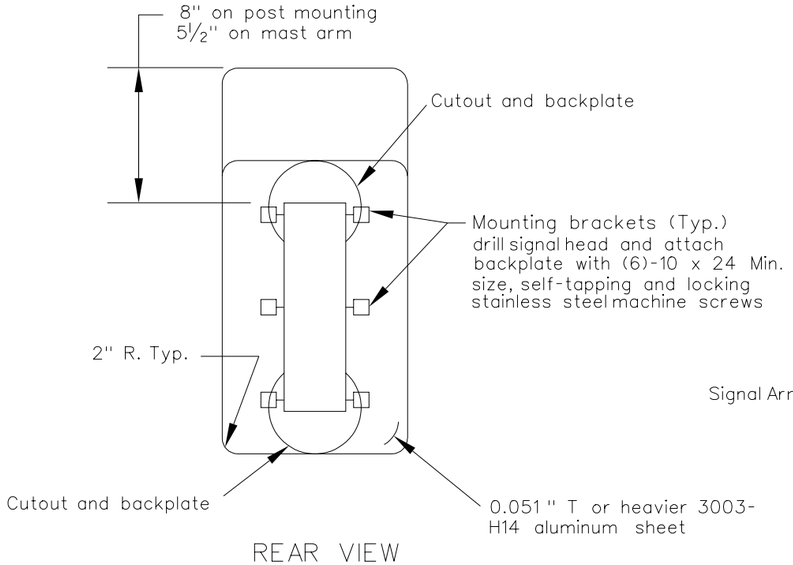


MAST ARM MOUNT
(M-2 Mount)

NOTES:

1. ALL SIGNAL HEADS SHALL HAVE BACKPLATES.
2. ALL SIGNAL HEADS SHALL HAVE HOODS. HOODS SHALL BE TUNNEL TYPE, OPEN AT THE BOTTOM.

VEHICULAR SIGNALS AND MOUNTINGS

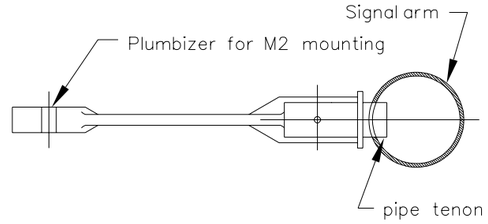


REAR VIEW

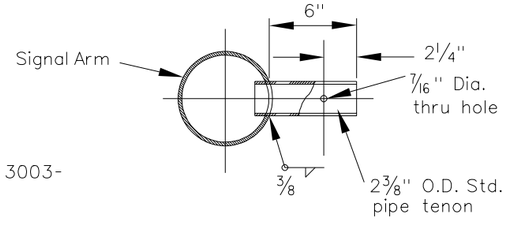
NOTE: No background light to show between plate and head. All mast arm backplates shall be louvered.

BACKPLATE

T= THICKNESS

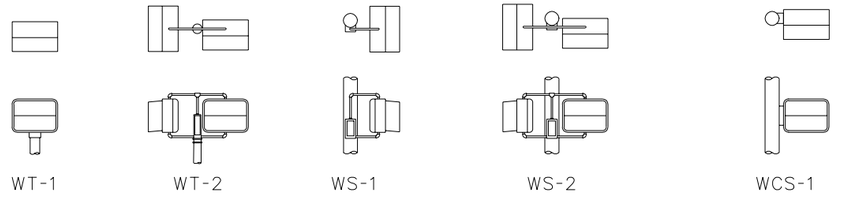


SPECIAL DETAIL
FOR MOUNTING SIGNAL HEAD



See detail for mounting signal head on Standard Plan Drawing T-30.1.15

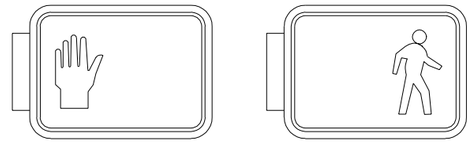
M-2 SIDE MOUNT



TOP MOUNTINGS

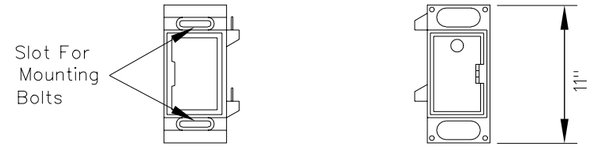
SIDE MOUNTINGS

CLAMSHELL MOUNT



(To be used unless otherwise specified)

PEDESTRIAN SIGNAL-INTERNATIONAL SYMBOL



POLE PLATE

TERMINAL COMPARTMENT

(To be used only when specified)

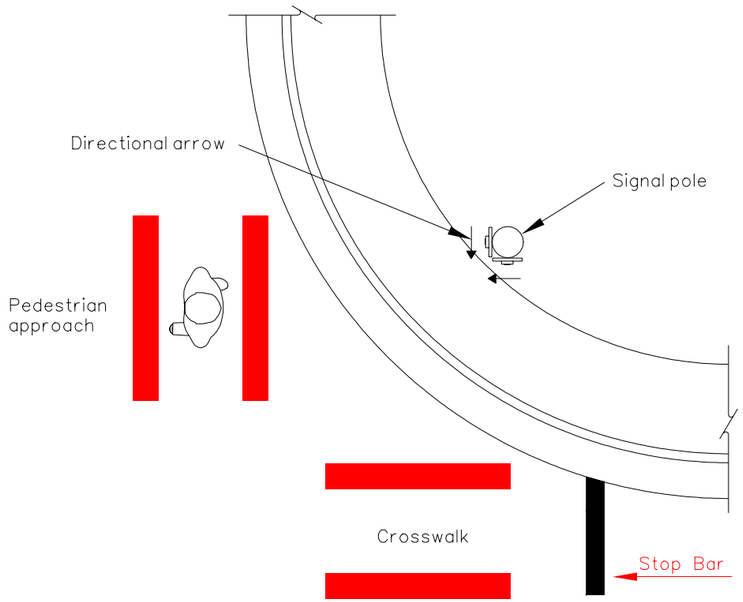
CLAMSHELL MOUNTING HARDWARE (CS)

PEDESTRIAN SIGNALS AND MOUNTINGS

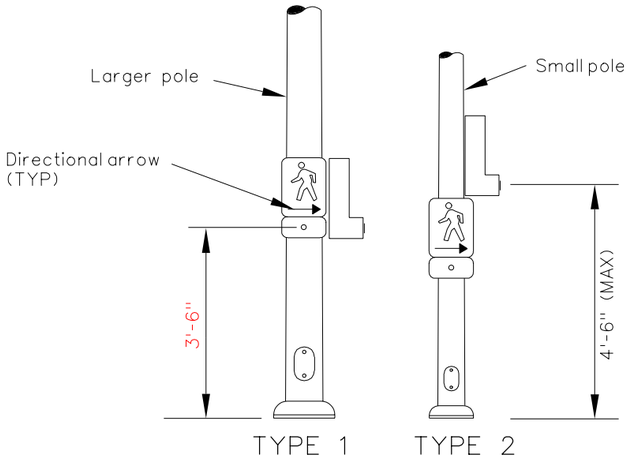
STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

SIGNAL MOUNTING PEDESTRIAN SIGNALS

Signed Original On File	T-30.1.3 (623)	
CHIEF SAFETY/TRAFFIC ENGR.	ADOPTED 7/96	REVISION 6/00



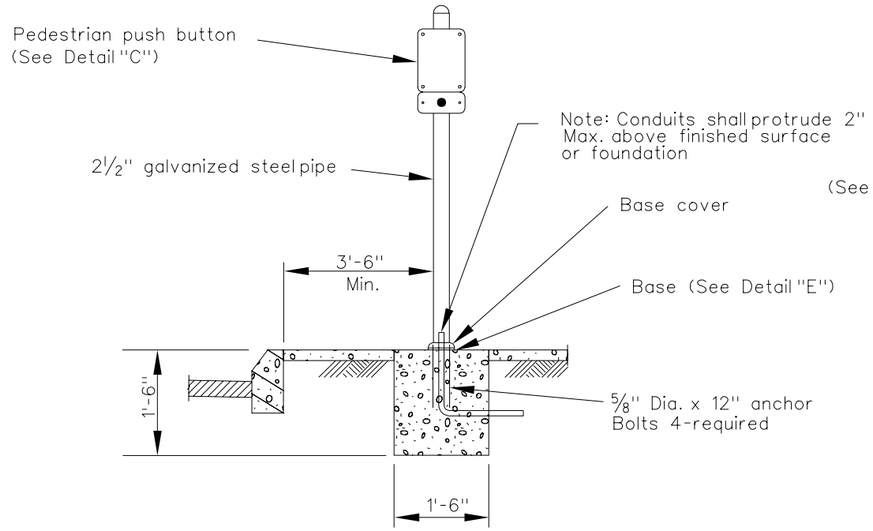
Pedestrian push buttons shall be installed on the crosswalk side of the signal pole, with the proper directional arrow positioned correctly.



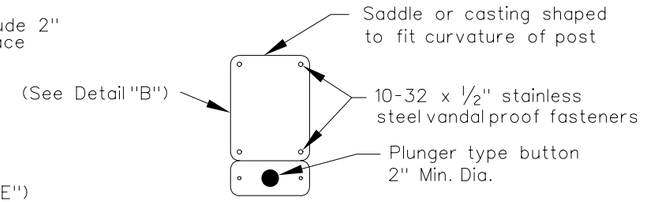
TYPE 1 - Position pedestrian push buttons on signal pole when the width of the pole allows (2) pedestrian heads to be at the same mounting height.

TYPE 2 - Position pedestrian push buttons on signal pole when the width of the pole does not allow (2) pedestrian heads to be mounted at the same height.

PUSH BUTTON POSITIONING DETAIL



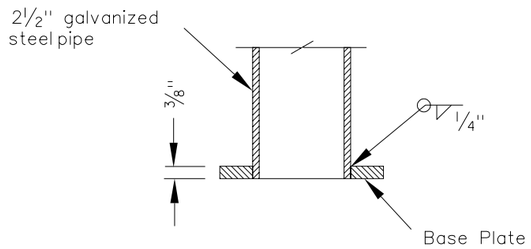
PEDESTRIAN PUSH BUTTON POST



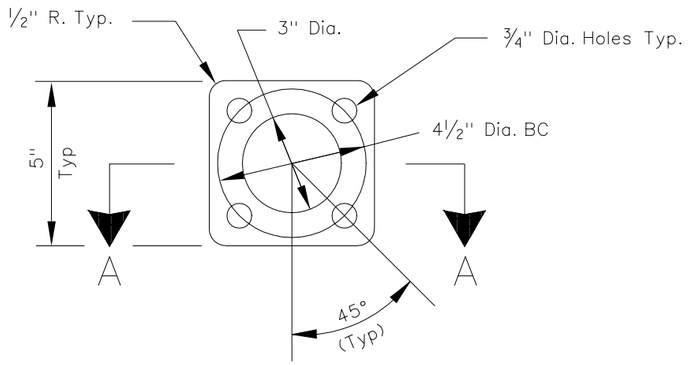
DETAIL "C"

DETAIL "B"

Note: 1. Arrow to be left or right or both as required.
2. Porcelain enameled, 9" x 12" sign, black symbols on white background.



SECTION A-A WITH PIPE



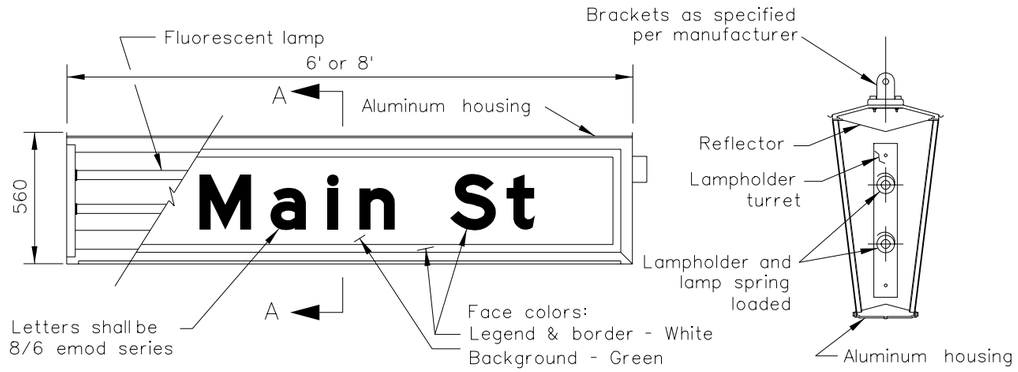
DETAIL-"E"

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

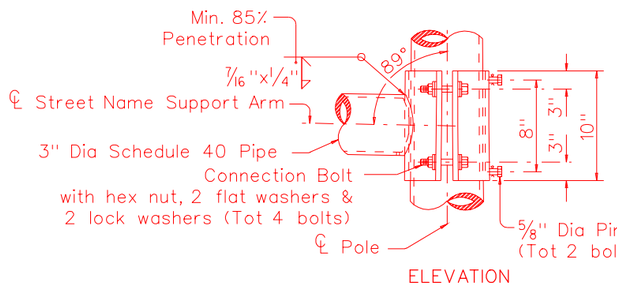
PEDESTRIAN PUSH BUTTON DETAILS

Signed Original On File	T-30.1.3.1	(623)
CHIEF SAFETY/TRAFFIC ENGINEER	ADOPTED 8/98	REVISION 8/02

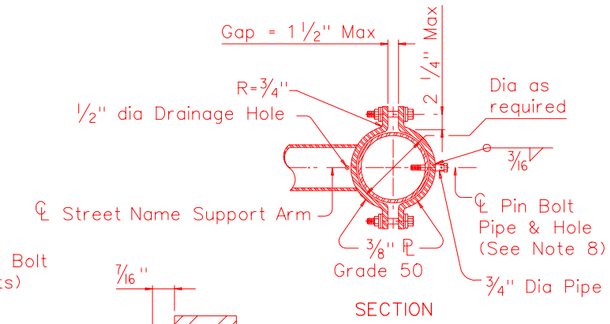
T-5



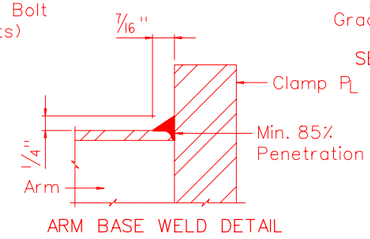
SECTION A-A



ELEVATION

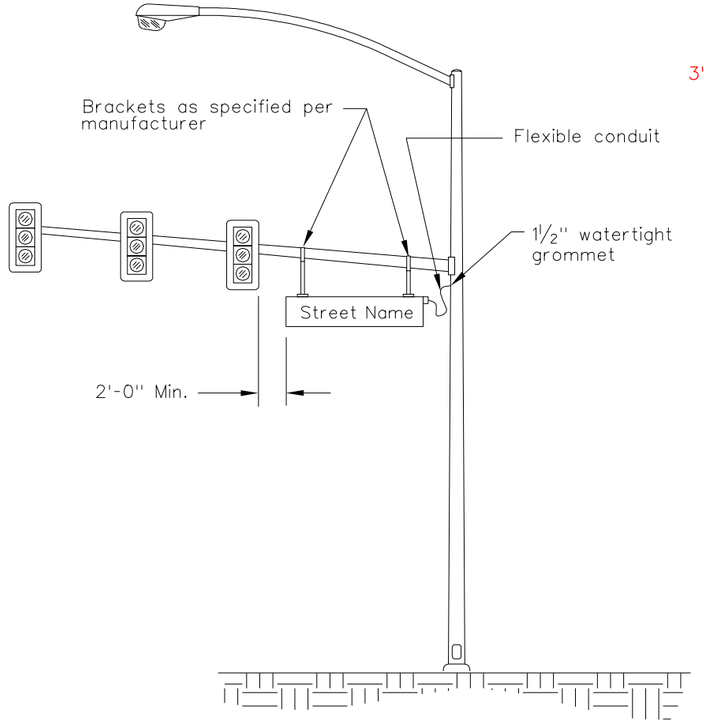


SECTION

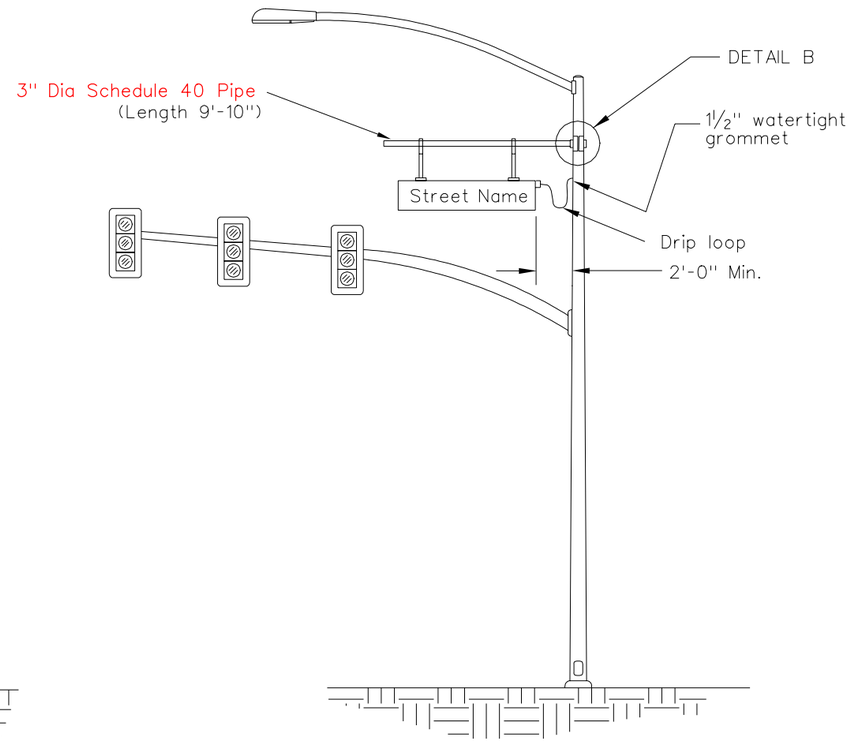


ARM BASE WELD DETAIL

DETAIL B
(CLAMP-ON CONNECTION)
(See Note 7)



INSTALLATION METHOD 1



INSTALLATION METHOD 2

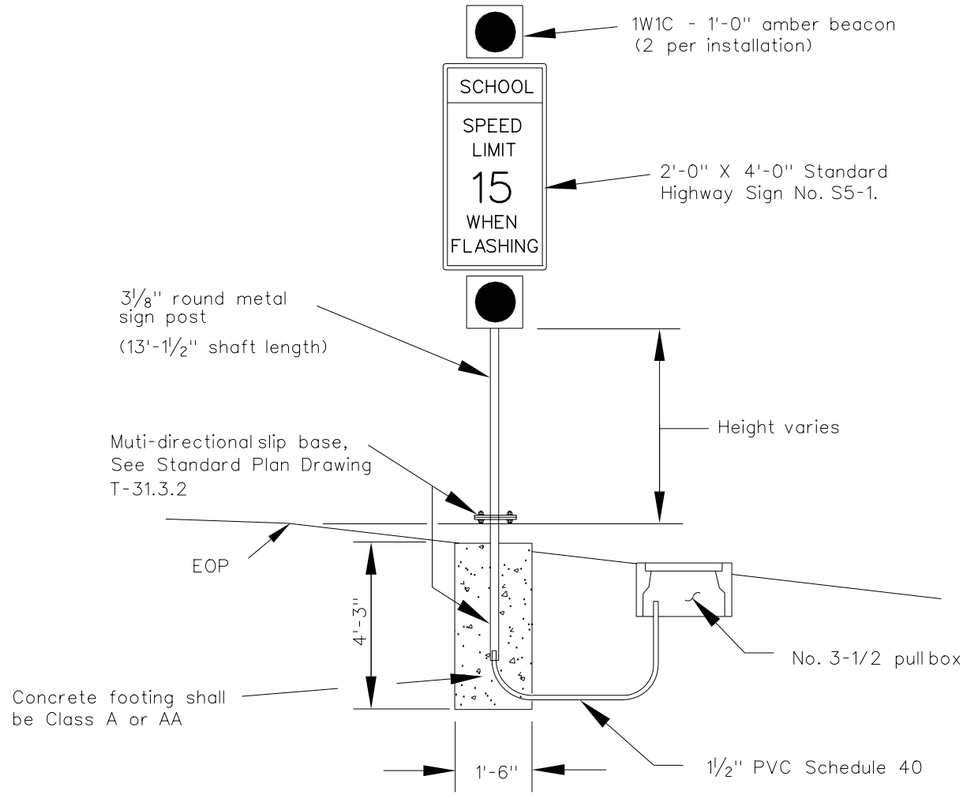
GENERAL NOTES:

1. All fasteners and associated hardware shall be stainless steel.
2. Two (2) No. 12 AWG conductors shall be installed between the internally illuminated street name sign and the pole luminaire. The photo electric (PE) control for the luminaire or electrical service will operate the internally illuminated sign.
3. The ballast will be, high output, "Valmont No. 6G3934WF" or equivalent. Ballasts shall be encased and potted.
4. Fluorescent lighting will be provided by 2-800MA standard lamps. Fluorescent sockets will be d-die snap-in type sockets with a rubber gasket on the lamp mating surface to prevent possible water damage.
5. Wire connections will be made with insulated compression wire nuts.
6. Street name sign wiring to run through two (2) water-tight 90 ° fittings with flexible conduit. Use a drip loop sufficient enough to allow sign movement. Use watertight rubber grommet or bushing at pole entry.
7. Clamp-on details shall be used for Internally Illuminated Street Name Sign support arm assembly.
8. Pin bolts shall be A325 with threads excluded from the shear plane. Pin bolt and 3/4" dia pipe shall have 3/16" dia holes for a 1/8" dia galvanized cotter pin. Back clamp plate shall be furnished with a 3/4" dia hole for each pin bolt. An 11/16" dia hole for each pin bolt shall be field drilled through the pole after arm orientation has been approved by the Engineer.

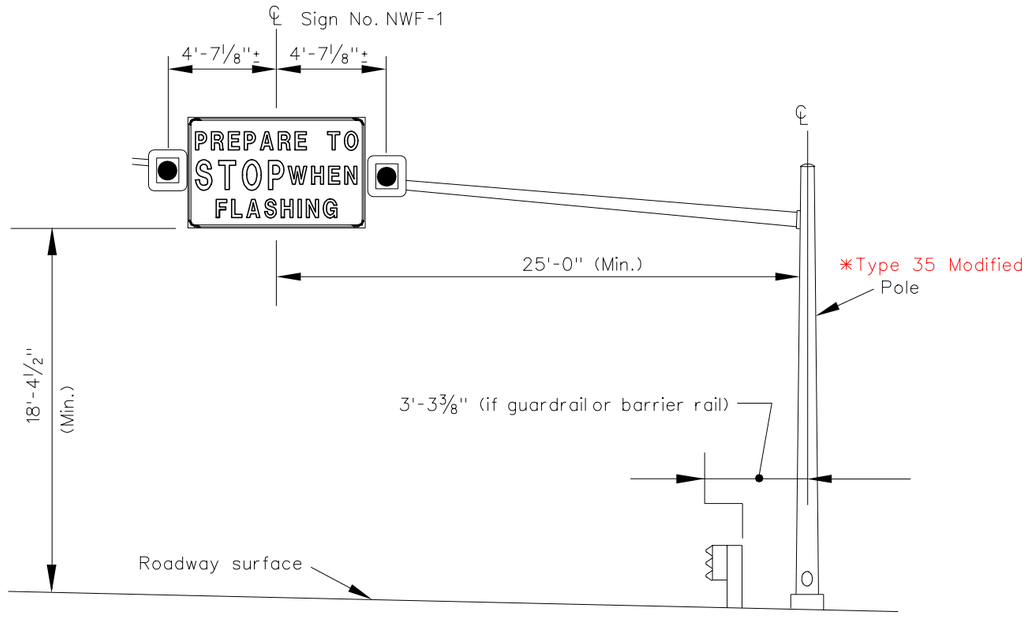
STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

INTERNALLY ILLUMINATED STREET NAME SIGNS

Signed Original On File	T-30.1.3.2	(623)
CHIEF SAFETY/TRAFFIC ENGR.	ADOPTED 8/98	REVISION 12/02



SCHOOL ZONE FLASHER



FLASHING WARNING SIGN DETAIL

Locate NWF-1 signal sign vertically on mast arm no lower than 18'-4½" from the roadway surface. Distance is measured from the bottom edge of the sign to the actual travel lane surface. Locate the sign horizontally on mast arm 25'-0" from pole. Distance is measured from the middle of the sign to the perimeter of the Type 35 Modified Pole.

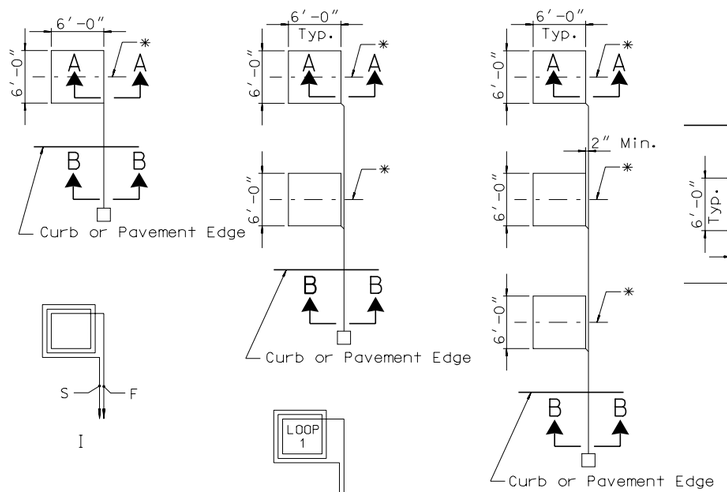
LEGEND

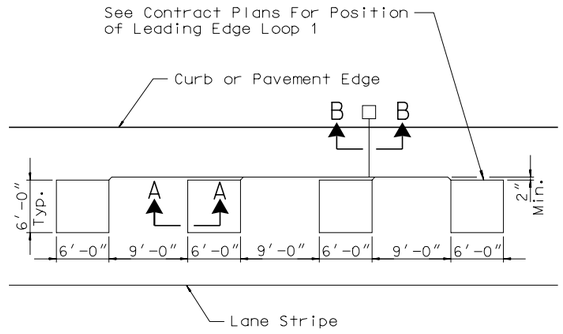
* Shop drawings shall be submitted on all Type 30 and Type 35 Modified Poles.

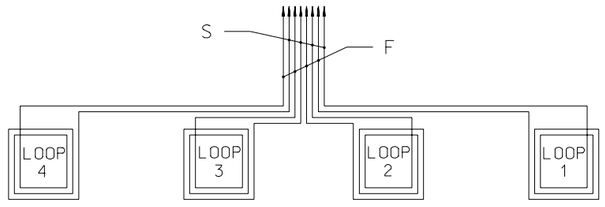
STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

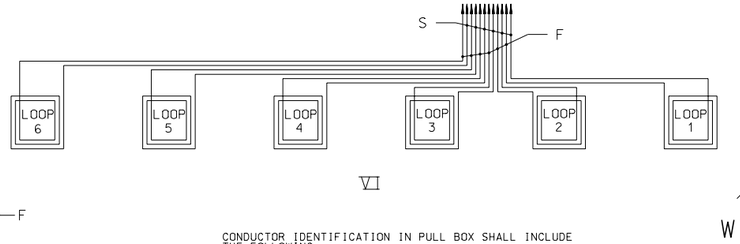
FLASHING WARNING SIGN SCHOOL ZONE FLASHER

Signed Original On File	T-30.1.3.3	(623)
CHIEF SAFETY/TRAFFIC ENGR.	ADOPTED: 8/98	REVISION: 12/02









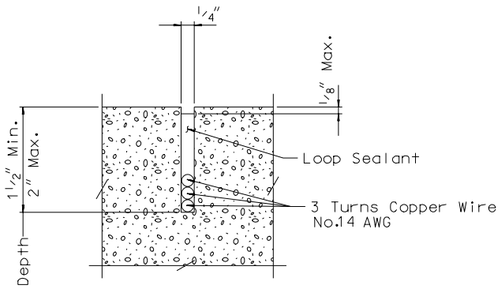
CONDUCTOR IDENTIFICATION IN PULL BOX SHALL INCLUDE THE FOLLOWING:

1. SENSOR NUMBER AND PHASE
2. LOOP NUMBER
3. START (S) AND FINISH (F)

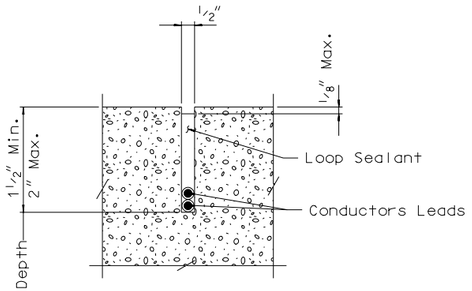
CABLE IDENTIFICATION IN CONTROLLER CABINET SHALL INCLUDE THE FOLLOWING

1. LOWER CASE LETTER AS SHOWN ON PLANS FOR DECTECTOR AMPLIFIER ASSIGNMENT
2. PHASE DESIGNATION

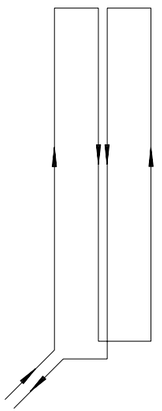
DETECTOR LAYOUTS, DIMENSIONS & WIRING PATTERNS



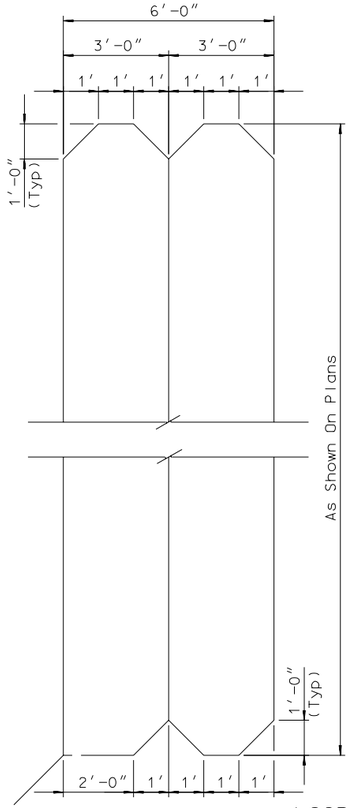
SECTION A-A



SECTION B-B

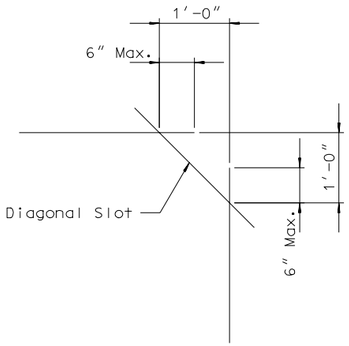


WINDING DETAIL (TWO TURNS)

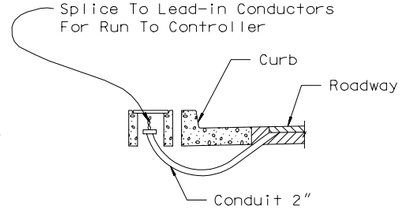


SAWSLOT DETAIL

QUADRAPOLE LOOP DETECTOR

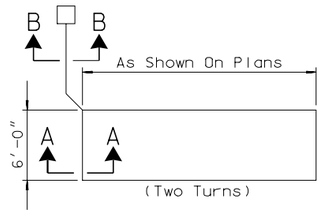


PLAN VIEW OF DIAGONAL SLOT AT CORNERS



CONDUIT INSTALLATION

NOTE:
AT PULLBOX LOCATIONS WHERE THERE IS NO CURB AND GUTTER THE CONDUIT SHALL EXTEND FROM THE PULLBOX TO 12″ INSIDE THE EDGE OF THE PAVEMENT.



LOOP DETECTOR
6′ x 20′ AND LONGER

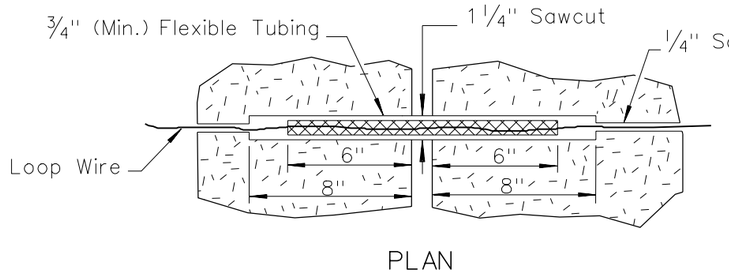
LOOP INSTALLATION PROCEDURE:

1. SAW SLOTS IN PAVEMENT FOR LOOP CONDUCTORS AS SHOWN IN DETAILS. BLOW OUT AND DRY THOROUGHLY WITH COMPRESSED AIR.
2. INSTALL TERMINATION PULL BOX.
3. INSTALL #14 AWG LOOP CONDUCTOR IN SLOTS USING A 3/16″ TO 1/4″ THICK WOOD PADDLE (SEE "LOOP WINDING PATTERNS"). ALLOW ADDITIONAL LENGTH FOR THE RUN TO TERMINATION PULL BOX PLUS 5 FEET OF SLACK IN PULL BOX. THIS ADDITIONAL LENGTH OF CONDUCTOR FOR EACH LOOP CIRUIT SHALL BE TWISTED TOGETHER INTO A PAIR (AT LEAST 5 TURNS PER FOOT) BEFORE BEING RUN TO PULL BOX.
4. IDENTIFY LOOP CIRCUIT PAIRS. IDENTIFY START AND FINISH OF CONDUCTOR.
5. SPLICE LOOP CONDUCTORS TO LEAD-IN CABLE. ALL SPLICES SHALL BE SOLDERED USING 60/40 RESIN CORE SOLDER.
6. ALL SPLICES AND TAPINGS SHALL BE PROVIDED A SOUND ENVIRONMENTAL SEAL.
7. WHERE LOOP CONDUCTORS ARE NOT TO BE SPLICED TO A LEAD-IN CABLE. ENDS OF CONDUCTORS SHALL SHALL BE TAPED.
8. FILL SLOTS AS SHOWN IN DETAILS.
9. NO MORE THAN FOUR LOOP DETECTOR CONDUCTORS SHALL BE INSTALLED IN ONE SAWED SLOT. ALL LOOP CONDUCTORS IN SAME SLOT SHALL BE FOR SAME SIGNAL PHASE.
10. LEAD-IN CABLE SHALL NOT BE SPLICED BETWEEN THE TERMINATION PULL BOX AND THE CONTROLLER CABINET.
11. DISTANCE BETWEEN SIDE OF LOOP AND LEAD-IN SAW CUT SHALL BE 2′-0″ MINIMUM. DISTANCE BETWEEN LEAD-IN SAW CUTS SHALL BE 6″ MINIMUM.
12. WHEN LEAD-IN SAW CUTS ARE FOR SAMPLING DETECTORS OR FOR LEFT TURN LANE DETECTORS WHERE SAW CUTS CROSS OTHER TRAFFIC LANES, CONDUCTORS SHALL BE PAIRED FOR EACH LOOP CIRCUIT AND TWISTED FIVE TURNS PER FOOT BETWEEN LOOP AND PULL BOX.
13. WHERE DETECTOR LOOPS ARE CUT INTO PAVEMENT, 6′ ROUND LOOPS MAY BE USED IN LIEU OF 6′ X 6′ SQUARE LOOP DETECTORS.

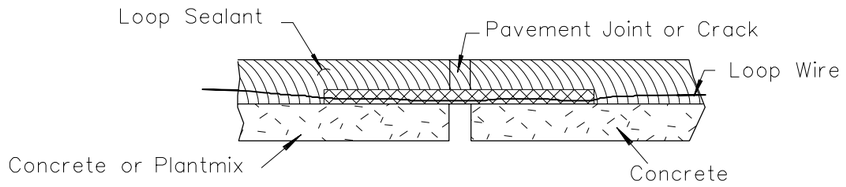
STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

LOOP DETECTORS

Signed Original On File	T-30.1.4	(623)
CHIEF SAFETY/TRAFFIC ENGINEER	ADOPTED 12/79	REVISION 10/98



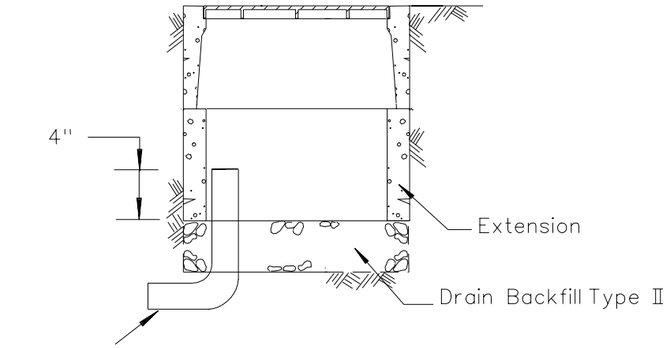
PLAN



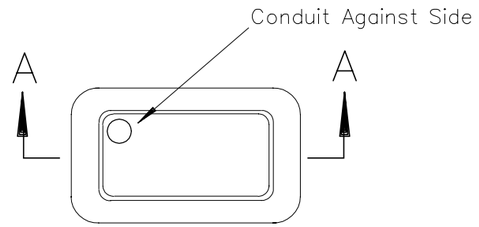
ELEVATION

PAVEMENT JOINT CROSSING DETAILS

(NO DIRECT PAYMENT)



SECTION A-A



NO.5 PULL BOX

CONDUIT LOCATION (SEE GENERAL NOTES 1 AND 2)

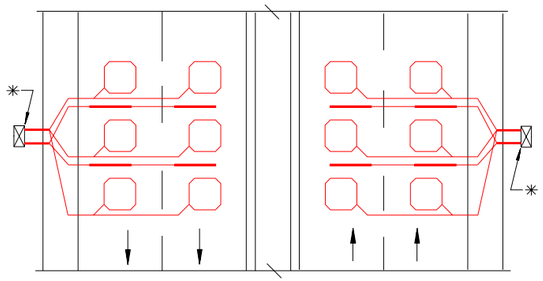
GENERAL NOTES:

1. ALL PULL BOXES SHALL BE NO. 5.
   SEE SHEET T-30.1.18 FOR DETAILS NOT SHOWN.
2. PAYMENT SHALL BE MADE UNDER THE FOLLOWING ITEMS:
   CONDUIT - DIAMETER VARIES
   NO. 5 PULL BOX
   6 FOOT X 6 FOOT DETECTOR LOOPS

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

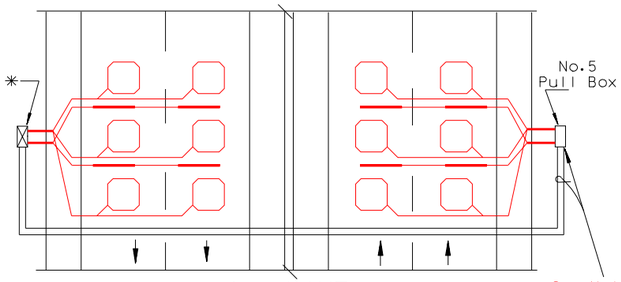
No. 5 PULL BOX & PAVEMENT JOINT LOOP CROSSING DETAILS

Signed Original On File	T-30.1.4.1	(623)
CHIEF SAFETY/TRAFFIC ENGINEER	ADOPTED: 9/97	REVISION 7/02



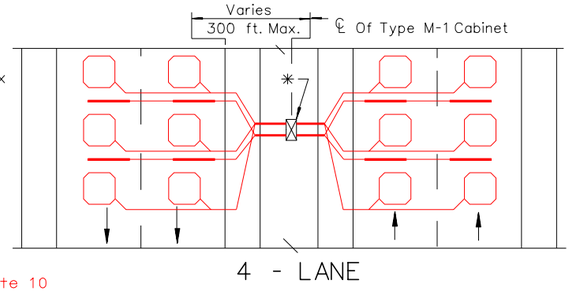
4 - LANE

WITH TWO SPECIAL M-1 CABINETS LOCATED TO THE OUTSIDE



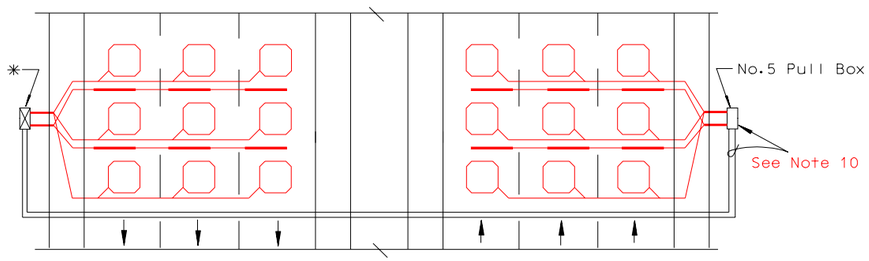
4 - LANE

WITH ONE SPECIAL M-1 CABINET TO THE OUTSIDE



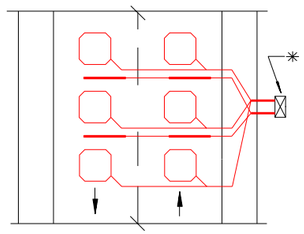
4 - LANE

WITH ONE SPECIAL M-1 CABINET LOCATED IN MEDIAN

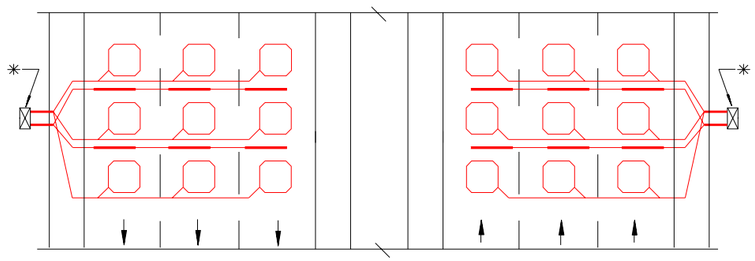


6 - LANE

WITH ONE SPECIAL M-1 CABINET TO THE OUTSIDE

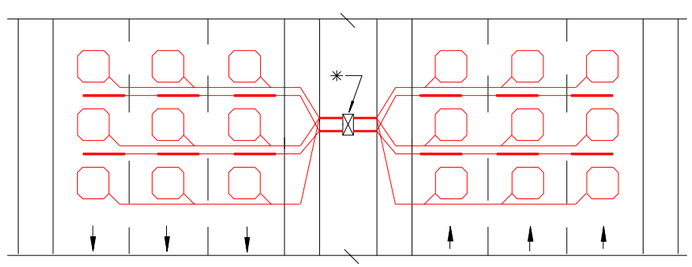


2 - LANE
1 EACH DIRECTION



6 - LANE

WITH TWO SPECIAL M-1 CABINETS LOCATED TO THE OUTSIDE



6 - LANE

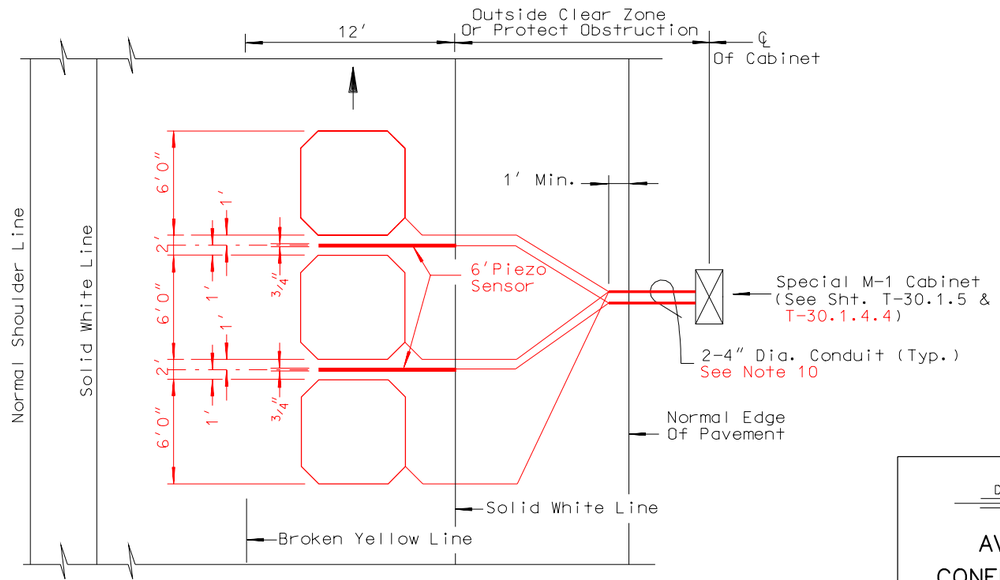
WITH ONE SPECIAL M-1 CABINET LOCATED IN MEDIAN

GENERAL NOTES:

1. ALL LOOPS SHALL BE 6′x 6′ SQUARE WITH 4 TURNS OF WIRE OR, ALL LOOPS SHALL BE 6′ ROUND LOOPS WITH 4 TURNS OF WIRE.
2. EACH LOOP SHALL BE A CONTINUOUS RUN TO THE SPECIAL M-1 CABINET WITH NO SPLICES AND SHALL BE LABELED AT THE ENDS WITH LANE PLACEMENT ASSIGNMENT.
3. LOOP WIRE PAIRS FROM LOOP PROPER TO NO. 5 PULL BOX OR SPECIAL M-1 CABINET SHALL BE TWISTED NO LESS THAN FOUR TIMES PER FOOT.
4. LOOP WIRE PAIRS SHALL BE TWISTED NO LESS THAN FOUR TIMES PER FOOT FOR THE ENTIRE HOME RUN.
5. LOOPS SHALL BE CENTERED IN ALL TRAVEL LANES.
6. LOOP CUTS SHALL BE $^{3}/_{8}$″ WIDE x $2^{1}/_{2}$′ – 3′ MAXIMUM DEPTH.
7. LOOP WIRE SHALL BE AWG 14 STRANDED IMSA-51-1.
8. FOR DIAGONAL SLOT CORNER OR PAVEMENT JOINT DETAIL SEE STANDARD PLAN SHEET T-30.1.4.
9. 2″ BACKER ROD SHALL BE PLACED ON ALL CORNERS OF THE LOOPS AND EVERY 2′ ALONG THE LOOP TO THE EDGE OF THE PAVEMENT.
10. LOOP WIRE AND PIEZOELECTRIC SENSOR CABLE WIRES SHALL BE CARRIED IN SEPARATE CONDUIT TO NO.5 PULL BOX AND/OR SPECIAL M-1 CABINET. CONDUIT GOING UNDER PAVEMENT AREAS IS SHOWN OUTSIDE THE LOOP DEPICTIONS FOR CLARITY.
11. PIEZOELECTRIC SENSORS SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURES SPECIFICATIONS UNLESS OTHERWISE MENTIONED HERE.
12. PIEZOELECTRIC SENSOR CABLE WIRE SHALL BE A CONTINUOUS RUN TO THE SPECIAL M-1 CABINET AND LABELED WITH LANE PLACEMENT ASSIGNMENT.
13. AVC DETECTOR SHALL INCLUDE ALL CONDUCTORS AND SAW CUTTING NECESSARY FOR INSTALLATION.
14. IF GUARDRAIL/BARRIER RAIL IS PROVIDED, SPECIAL M-1 CABINET SHALL BE A MINIMUM OF 24″ BEHIND THE RAIL.
15. PAYMENT WILL BE MADE UNDER THE FOLLOWING:
    - 6′x 6′ LOOPS (EACH)
    - SPECIAL M-1 CABINET (EACH)
    - 4″ CONDUIT (LINFT)
    - PIEZOELECTRIC SENSORS (EACH)
    - NO. 5 PULL BOX (EACH)

LEGEND:

✳ -Special M-1 Cabinet

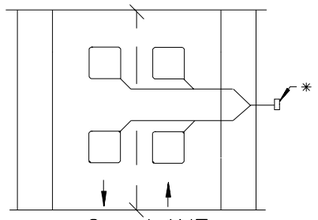


AVC DETECTOR LOOP PLACEMENT DETAIL
(OPPOSITE LANE LOOPS NOT SHOWN FOR CLARITY)

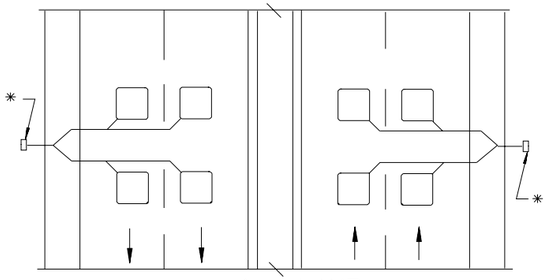
STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

AVC DETECTOR LOOP CONFIGURATION AND NOTES

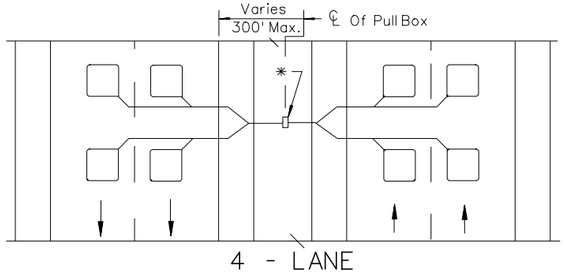
Signed Original On File	T-30.1.4.2	(623)
CHIEF SAFETY/TRAFFIC ENGINEER	ADOPTED: 9/97	REVISION 11/02



2 - LANE
BOTH DIRECTIONS

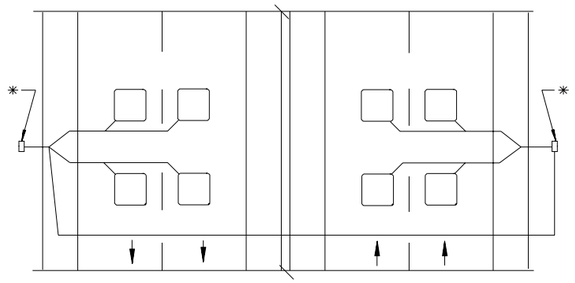


4 - LANE



4 - LANE

✳ -#5 Pull Box



4 - LANE

LEGEND:

✳ -No. 5 Pull Box

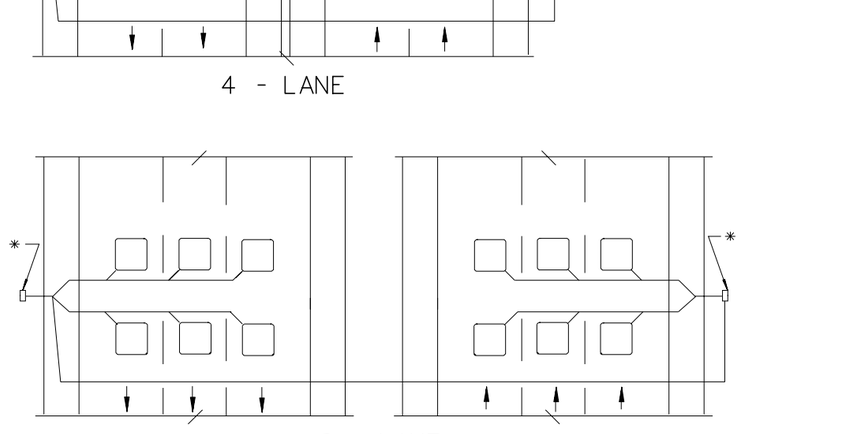
GENERAL NOTES:

1. ALL LOOPS SHALL BE 6'x 6' SQUARE WITH 4 TURNS OF WIRE OR, ALL LOOPS SHALL BE 6' ROUND LOOPS WITH 4 TURNS OF WIRE.
2. LOOP WIRE PAIRS FROM LOOP PROPER TO NO. 5 PULL BOX OR SPECIAL M-1 CABINET SHALL BE TWISTED NO LESS THAN FOUR TIMES PER FOOT.
3. LOOP WIRE PAIRS SHALL BE TWISTED NO LESS THAN FOUR TIMES PER FOOT FOR THE ENTIRE HOME RUN.
4. LOOP CUTS SHALL BE $\frac{3}{8}$" WIDE x 2$\frac{1}{2}$' - 3' MAXIMUM DEPTH.
5. 2" BACKER ROD SHALL BE PLACED ON ALL CORNERS OF THE LOOPS AND EVERY 2' ALONG THE LOOP TO THE EDGE OF THE PAVEMENT.
6. LOOPS SHALL BE CENTERED IN ALL TRAVEL AND TURN LANES.
7. LOOP WIRE SHALL BE AWG 14 STRANDED IMSA-51-1.
8. EACH INDIVIDUAL CONDUCTOR SHALL BE A CONTINUOUS RUN WITH NO SPLICES AND SHALL BE LABELED AT EACH END WITH THE LANE ASSIGNMENT.
9. IT SHALL BE THE CONTRACTORS RESPONSIBILITY TO ASCERTAIN THAT THE LOOP PLACEMENT IS NOT IN CONFLICT WITH OTHER ITEMS OF WORK.
10. PRIOR TO PLACEMENT OF LOOP DETECTORS THE RESIDENT ENGINEER SHALL NOTIFY THE TRAFFIC SECTION OF THE PLANNING DIVISION (888-7383) FOR ASSISTANCE IN ESTABLISHING THE EXACT LOCATION.
11. DETECTORS SHALL BE INSTALLED AFTER DENSE GRADE PAVING OR PROFILE GRADE IS ESTABLISHED
12. LOOP LOCATION SHALL BE MARKED ON THE EDGE OF THE PAVEMENT BY PAINTING THE WORD "LOOP" IN WHITE.
13. FOR DIAGONAL SLOT AT CORNERS DETAIL SEE STANDARD SHT. T-30.1.4.
14. SEE STANDARD SHEET T-30.1.4.1 FOR PAVEMENT JOINT DETAILS.
15. PAYMENT WILL BE MADE UNDER THE FOLLOWING ITEMS:

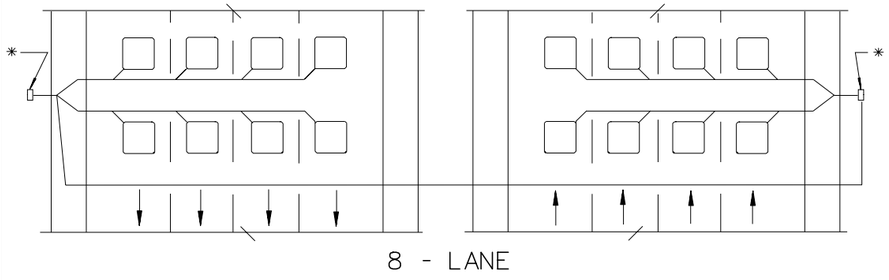
    NO. 5 PULL BOX (EACH)

    6' X 6' LOOPS (EACH)

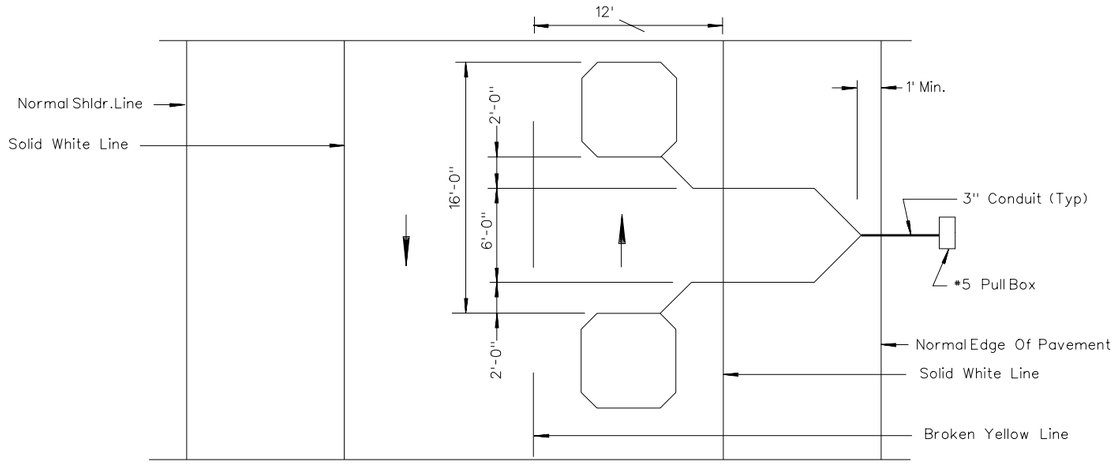
    3" DIA. CONDUIT (LINFT)



6 - LANE



8 - LANE



SPEED DETECTOR LOOP PLACEMENT DETAIL

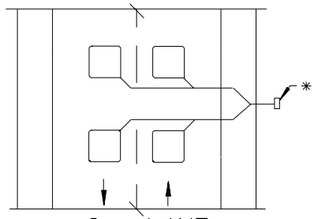
(OPPOSITE LANE LOOPS NOT SHOWN FOR CLARITY)

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

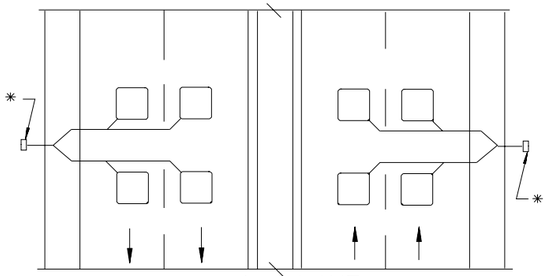
SPEED DETECTOR LOOP CONFIGURATION AND NOTES

Signed Original On File	T-30.1.4.3	(623)	
CHIEF SAFETY/TRAFFIC ENGR.	ADOPTED: 9/97	REVISION 7/02	

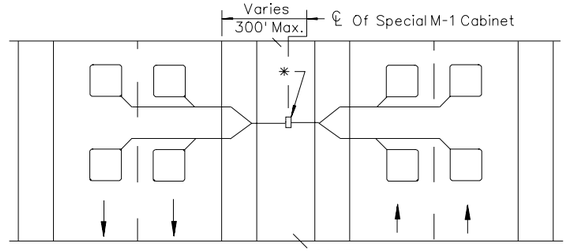
T-11



2 - LANE
BOTH DIRECTIONS

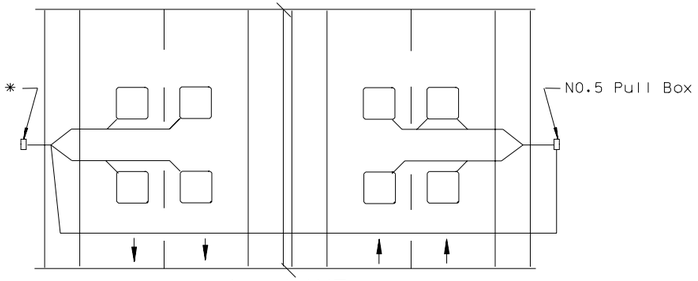


4 - LANE
WITH TWO SPECIAL M-1 CABINETS
LOCATED TO THE OUTSIDE

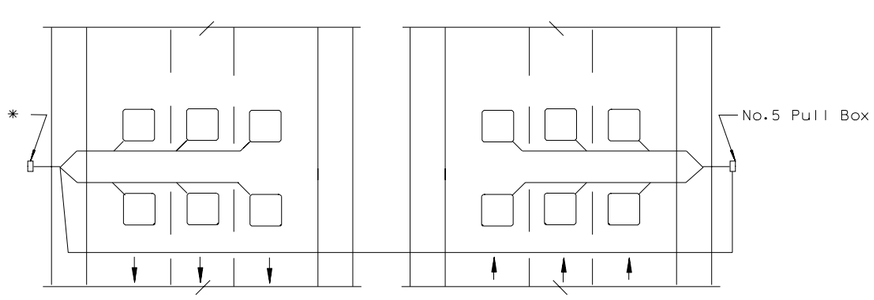


4 - LANE
WITH ONE SPECIAL M-1 CABINET LOCATED IN MEDIAN

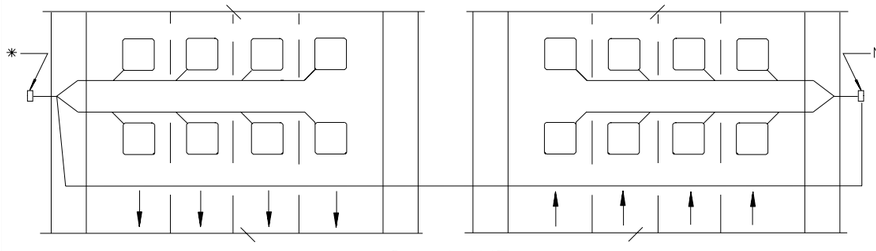
✳ - Special M-1 Cabinet



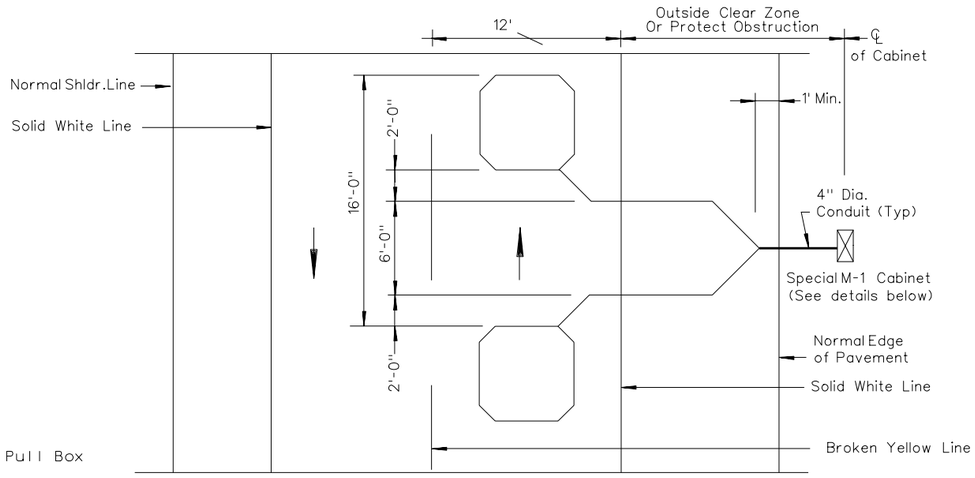
4 - LANE
WITH ONE SPECIAL M-1 CABINET TO THE OUTSIDE



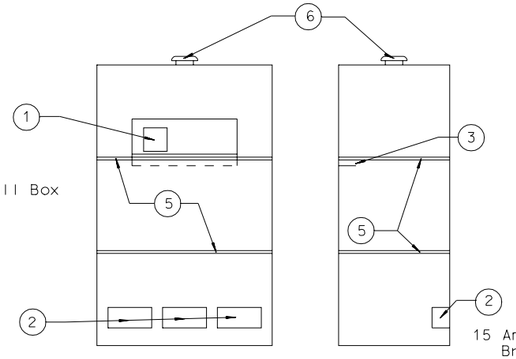
6 - LANE
WITH ONE SPECIAL M-1 CABINET TO THE OUTSIDE



8 - LANE
WITH ONE SPECIAL M-1 CABINET TO THE OUTSIDE

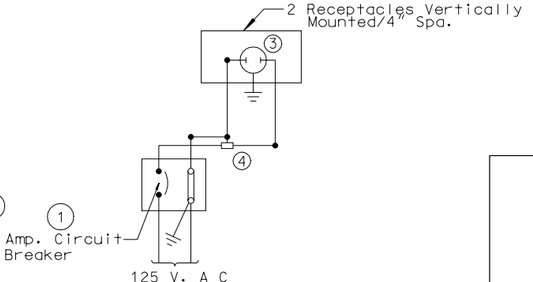


ATR DETECTOR LOOP PLACEMENT DETAIL
(OPPOSITE LANE LOOPS NOT SHOWN FOR CLARITY)



SPECIAL M-1 CABINET
SEE SHEET T-30.1.5 FOR ADDITIONAL DETAILS

1. MAIN SWITCH.
2. FIELD WIRE TERMINAL BLOCKS.
3. N.E.M.A. STANDARD PLUG RECEPTACLE WITH GROUNDING CONTACT.
4. RADIO INTERFERENCE SUPPRESSOR.
5. SHELF.
6. THERMOSTAT-CONTROLLED FAN WITH T VENT.



CABINET WIRING

GENERAL NOTES:

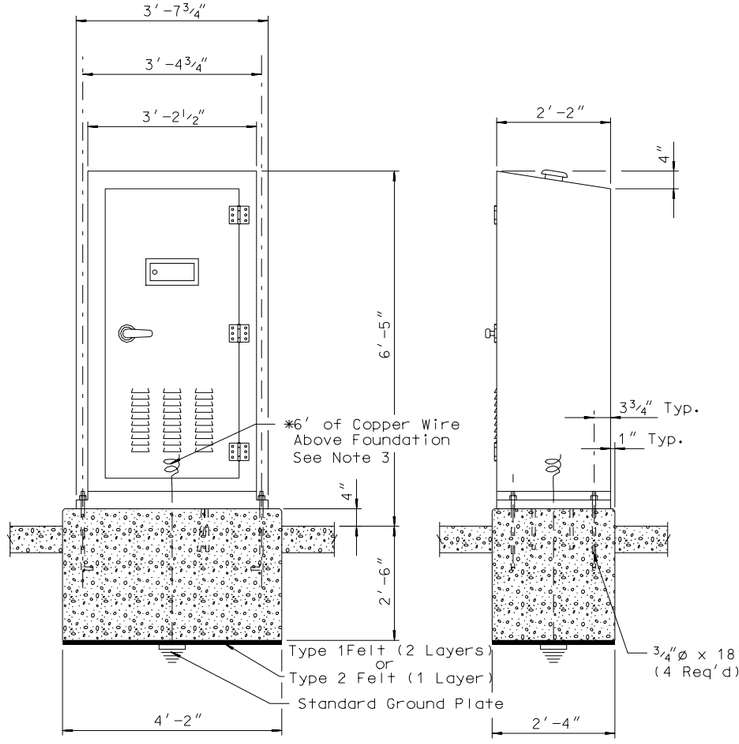
1. ALL LOOPS SHALL BE 6'x 6' SQUARE WITH 4 TURNS OF WIRE OR, ALL LOOPS SHALL BE 6' ROUND LOOPS WITH 4 TURNS OF WIRE.
2. LOOP WIRE PAIRS FROM LOOP PROPER TO NO. 5 PULL BOX OR SPECIAL M-1 CABINET SHALL BE TWISTED NO LESS THAN FOUR TIMES PER FOOT.
3. LOOP WIRE PAIRS SHALL BE TWISTED NO LESS THAN FOUR TIMES PER FOOT FOR THE ENTIRE HOME RUN.
4. LOOP CUTS SHALL BE $^{3}/_{8}$" WIDE x $2^{1}/_{2}$' - 3' MAXIMUM DEPTH.
5. 2" BACKER ROD SHALL BE PLACED ON ALL CORNERS OF THE LOOPS AND EVERY 2' ALONG THE LOOP TO THE EDGE OF THE PAVEMENT.
6. LOOPS SHALL BE CENTERED IN ALL TRAVEL AND TURN LANES.
7. LOOP WIRE SHALL BE AWG 14 STRANDED IMSA-51-1.
8. EACH INDIVIDUAL CONDUCTOR SHALL BE A CONTINUOUS RUN WITH NO SPLICES AND SHALL BE LABELED AT EACH END WITH THE LANE ASSIGNMENT.
9. IT SHALL BE THE CONTRACTORS RESPONSIBILITY TO ASCERTAIN THAT THE LOOP PLACEMENT IS NOT IN CONFLICT WITH OTHER ITEMS OF WORK.
10. PRIOR TO PLACEMENT OF LOOP DETECTORS THE RESIDENT ENGINEER SHALL NOTIFY THE TRAFFIC SECTION OF THE PLANNING DIVISION (888-7383) FOR ASSISTANCE IN ESTABLISHING THE EXACT LOCATION.
11. DETECTORS SHALL BE INSTALLED AFTER DENSE GRADE PAVING OR PROFILE GRADE IS ESTABLISHED
12. LOOP LOCATION SHALL BE MARKED ON THE EDGE OF THE PAVEMENT BY PAINTING THE WORD "LOOP" IN WHITE.
13. FOR DIAGONAL SLOT AT CORNERS DETAIL SEE STANDARD SHT. T-30.1.4.
14. FOR SPECIAL M-1 CABINET ONLY - IN CONFORMANCE WITH NATIONAL ELECTRIC CODE 250-56, WHEN THE GROUNDING PLATE DOES NOT HAVE A RESISTANCE TO GROUND OF 25 OHMS OR LESS, IT SHALL BE AUGMENTED BY ONE ADDITIONAL ELECTRODE PREFERABLY A $^{1}/_{2}$" X 96" COPPER GROUND ROD.
15. IF GUARDRAIL/BARRIER RAIL IS PROVIDED, THE CABINET SHALL BE PLACED A MINIMUM OF 24" BEHIND RAIL.
16. SEE STANDARD SHEET T-30.1.4.1 FOR PAVEMENT JOINT DETAILS.
17. PAYMENT WILL BE MADE UNDER THE FOLLOWING ITEMS:

SPECIAL CABINET (EACH)	6' X 6' LOOPS (EACH)
NO. 5 PULL BOX (EACH)	4" DIA. CONDUIT (LINFT)

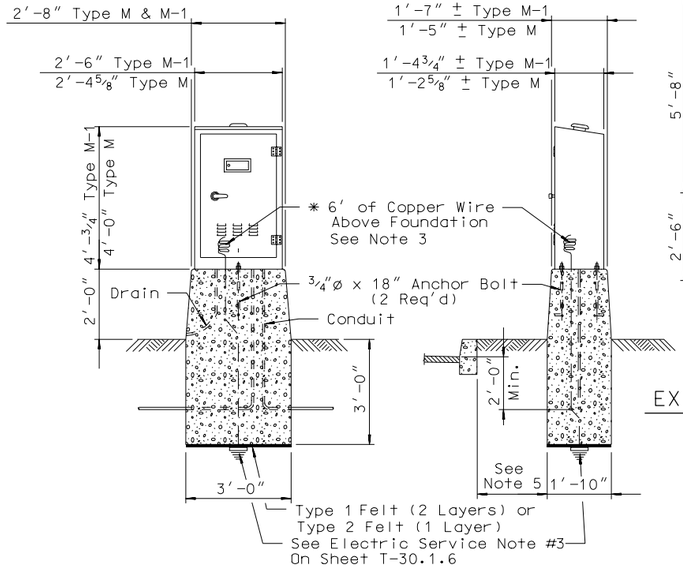
STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

ATR DETECTOR LOOP CONFIGURATION AND NOTES

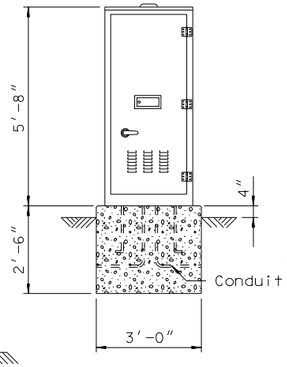
Signed Original On File	T-30.1.4.4	(623)
CHIEF SAFETY/TRAFFIC ENGINEER	ADOPTED: 10/98	REVISION 7/02



TYPE "R" CABINET

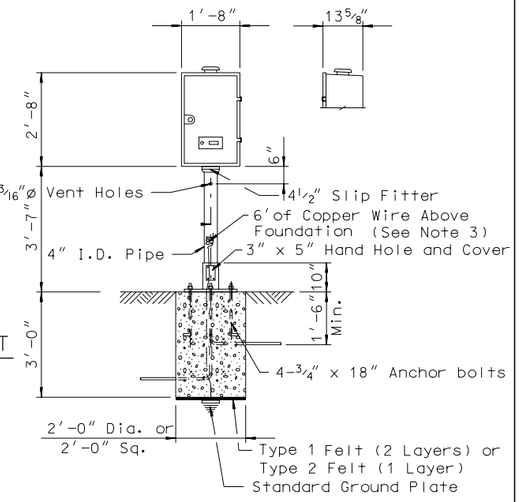


TYPE M & M-1 CABINET



EXTENDED TYPE M CABINET

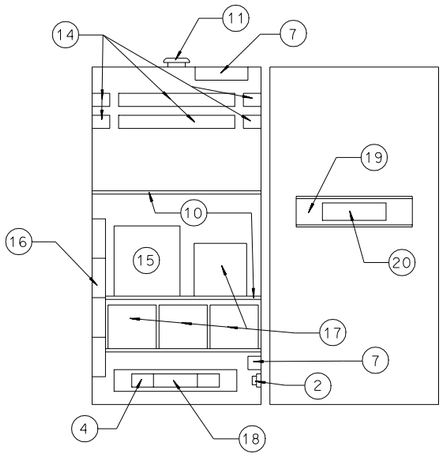
(For Details Not Shown See
Type M Cabinet)



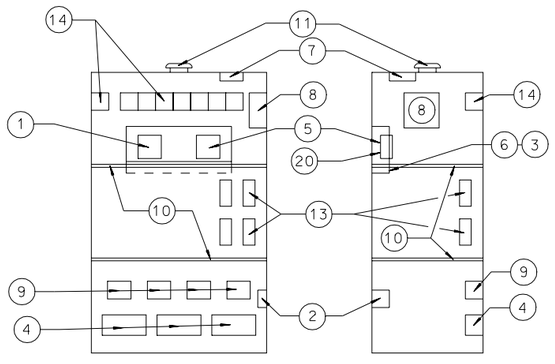
TYPE "G" CABINET

GENERAL NOTES:

1. ALL CONDUITS SHALL EXTEND ABOVE FOUNDATIONS A MINIMUM OF 2".
2. ALL CABINETS SHALL BE PAINTED WHITE ON THE INSIDE AND OUTSIDE UNLESS SPECIFIED IN THE SPECIAL PROVISIONS.
3. ½" X 96" GROUND ROD MAY BE SUBSTITUTED IN LIEU OF COPPER WIRE.
4. CONCRETE SHALL BE CLASS A OR AA.
5. IF A CABINET IS TO BE INSTALLED IN OR NEAR A SIDEWALK AREA, THE HORIZONTAL AND VERTICAL CLEARANCE, AS SHOWN IN R-5.2.1, "TYPICAL SIDEWALK VS. OBSTRUCTION CLEARANCE DETAIL", SHALL BE MET.

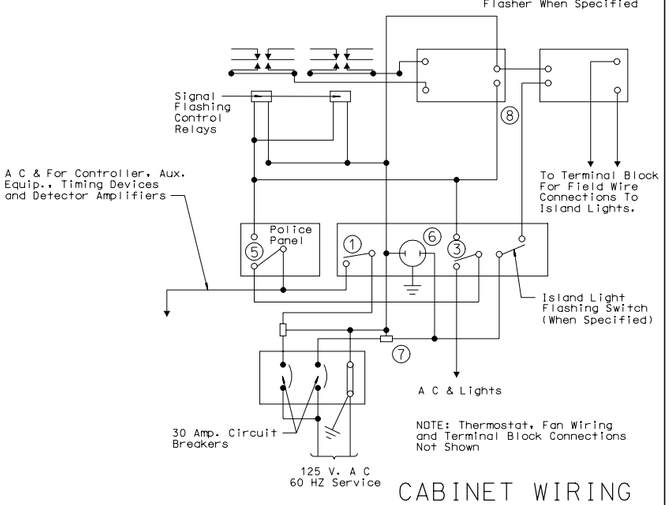


TYPE "R" CABINET



TYPE M & M-1 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.M.A. STANDARD PLUG RECEPTACLE WITH GROUNDING CONTACT.
7. RADIO INTERFERENCE SUPRESSOR.
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. NOT USED
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.

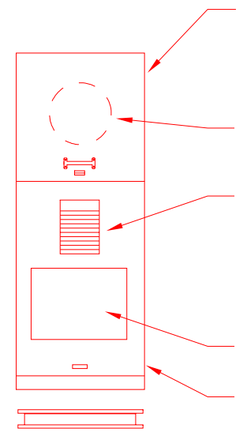


CABINET WIRING

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

CONTROLLER CABINETS

Signed Original On File	T-30.1.5	(623)
CHIEF SAFETY/TRAFFIC ENGINEER	ADOPTED 2/71	REVISION 2/02



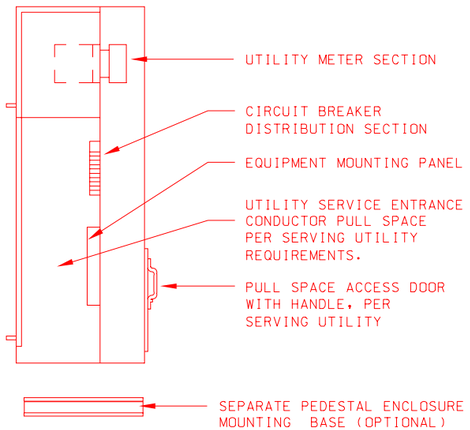
SERVICE PEDESTAL ENCLOSURE, 12 GA. SHEET METAL BODY AND EQUIPMENT MOUNTING PANEL, 14 GA. FRONT COVER(S) AND 16 GA. MIN. FOR ALL OTHER PANELS. ALL SHEET METAL SHALL BE FINISHED WITH ZINC CHROMATE PRIMER AND GREEN BAKED ENAMEL OR POWDER COAT FINISH. METERING SECTION PER P.U.E.S.E.R. STANDARDS.

UTILITY METER SECTION, 100, 125 OR 200 AMP AS INDICATED, ON PLANS, 120/240 VOLT, 1 PHASE, 3 WIRE. THE SECTION SHALL HAVE A HINGED COVER WITH PADLOCK TAB.

CIRCUIT BREAKER DISTRIBUTION SECTION, 125 OR 200 AMP AS NEEDED, 120/240 VOLT, 1 PHASE, 3 WIRE. THE SECTION SHALL BE COMPLETE WITH SEPARATE DEAD FRONT, COPPER BUSSING, SPACE FOR A MINIMUM OF TEN FULL SIZE (1") GE TYPE PLUG-IN CIRCUIT BREAKERS (EXCLUDING MAIN BREAKER), COPPER NEUTRAL/GROUNDING BUS AND MAIN BREAKER AS SPECIFIED BY THE ENGINEER. THE SECTION SHALL BE FACTORY WIRED TO THE METER SECTION WITH THE APPROPRIATE SIZE COPPER CONDUCTORS.

EQUIPMENT MOUNTING PANEL, 10" H X 12" W MIN., OPEN OR ENCLOSED, FOR LIGHTING CONTACTORS AS NEEDED.

DISTRIBUTION AND EQUIPMENT SECTION DOOR WITH HINGE AND PADLOCK TAB.



UTILITY METER SECTION

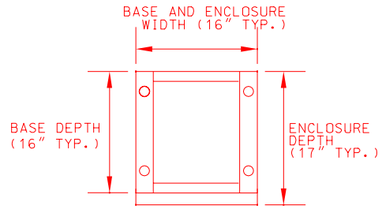
CIRCUIT BREAKER DISTRIBUTION SECTION

EQUIPMENT MOUNTING PANEL

UTILITY SERVICE ENTRANCE CONDUCTOR PULL SPACE PER SERVING UTILITY REQUIREMENTS.

PULL SPACE ACCESS DOOR WITH HANDLE, PER SERVING UTILITY

SEPARATE PEDESTAL ENCLOSURE MOUNTING BASE (OPTIONAL)

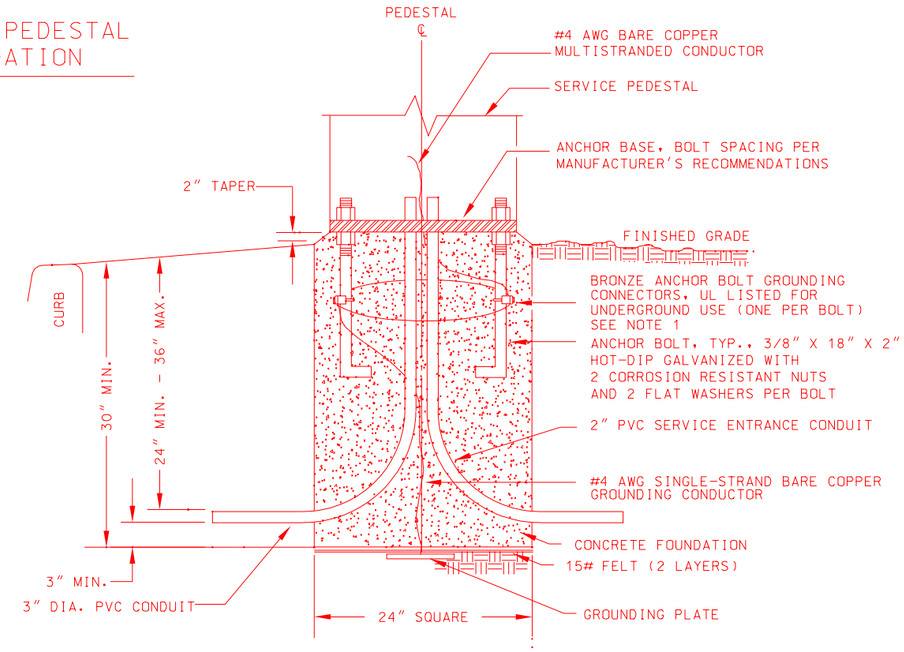


TYPICAL MOUNTING BASE DETAIL

(DIMENSIONS MAY VARY DEPENDING ON MANUFACTURER)

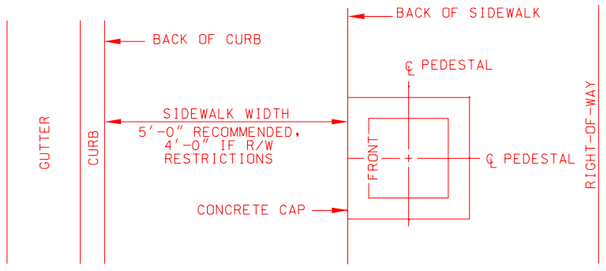
SINGLE METER SERVICE PEDESTAL

SERVICE PEDESTAL FOUNDATION

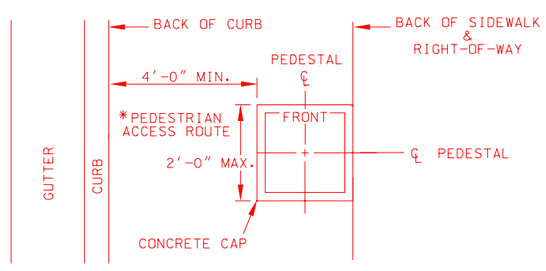


GENERAL NOTES:

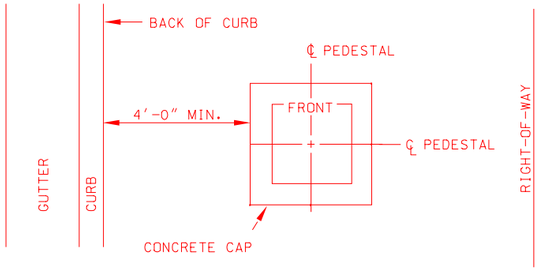
1. BARE COPPER GROUNDING CONDUCTOR SHALL BE LOOPED AROUND ANCHOR BOLTS ONE TIME AND CONNECTED TO EACH ANCHOR BOLT BEFORE CONTINUING DOWN TO THE GROUNDING PLATE.
2. CABINET COVERS SHALL BE PARALLEL WITH CURB.
3. IN AREAS WHERE R/W PERMITS, THE CONCRETE BASE SHALL BE PLACED AT AT THE BACK EDGE OF THE SIDEWALK.
4. CABINET COVERS SHALL OPEN TOWARDS THE STREET WHEN CABINETS ARE LOCATED AT BACK OF WALK. CABINET COVERS SHALL OPEN PARALLEL TO THE SIDEWALK FACING THE DIRECTION OF TRAFFIC WHEN LOCATED WITHIN THE SIDEWALK.
5. GROUND PLATE SHALL BE MADE OF NONFERROUS MATERIALS (TYPICALLY BRASS OR COPPER).



BEHIND SIDEWALK (FOR WIDTHS 5 FT. OR LESS)



BACK PORTION OF SIDEWALK (FOR WIDTHS OF 5 FT. OR MORE)



OPEN AREA

SERVICE PEDESTAL SETBACK WITHIN R/W LIMITS

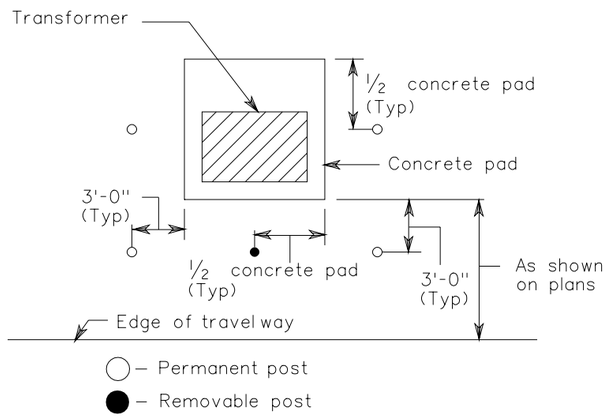
LEGEND:

* WHERE INSUFFICIENT PUBLIC RIGHT-OF-WAY IS AVAILABLE TO LOCATE STREET FIXTURES OUTSIDE THE 5'-0" NORMAL SIDEWALK WIDTH, THE PEDESTRIAN ACCESS MAY BE REDUCED TO 4'-0" FOR A LENGTH OF 2'-0".

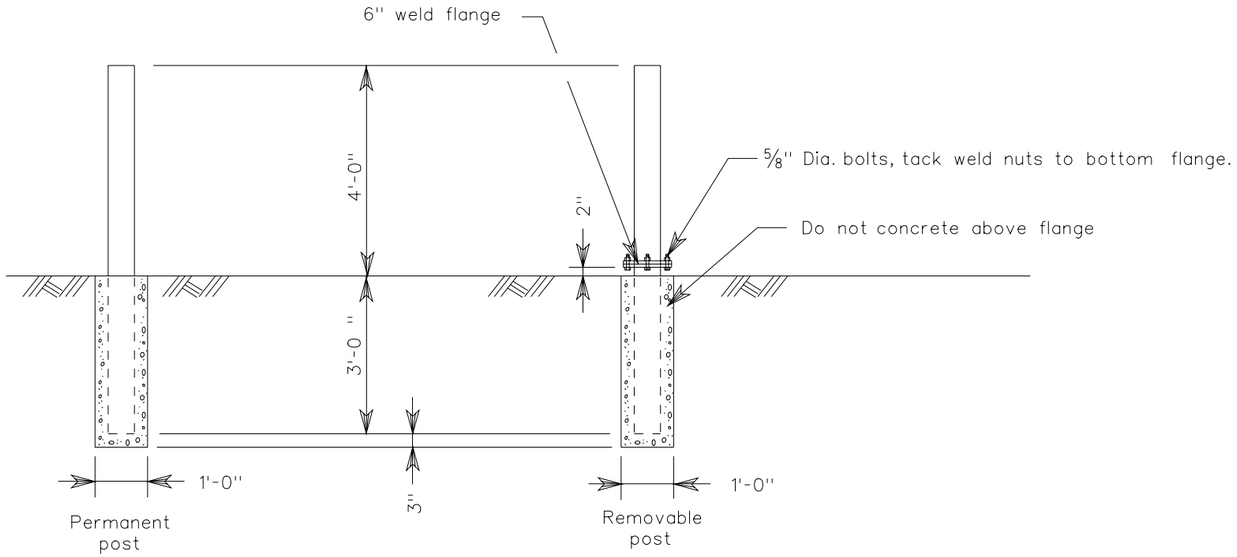
STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

100 & 200 AMP UNDERGROUND ELECTRICAL SERVICE

Signed Original On File	T-30.1.6	(623)
CHIEF SAFETY/TRAFFIC ENGINEER	ADOPTED 12/79	REVISION 10/02



TOP VIEW



TRANSFORMER PAD BARRIER POST

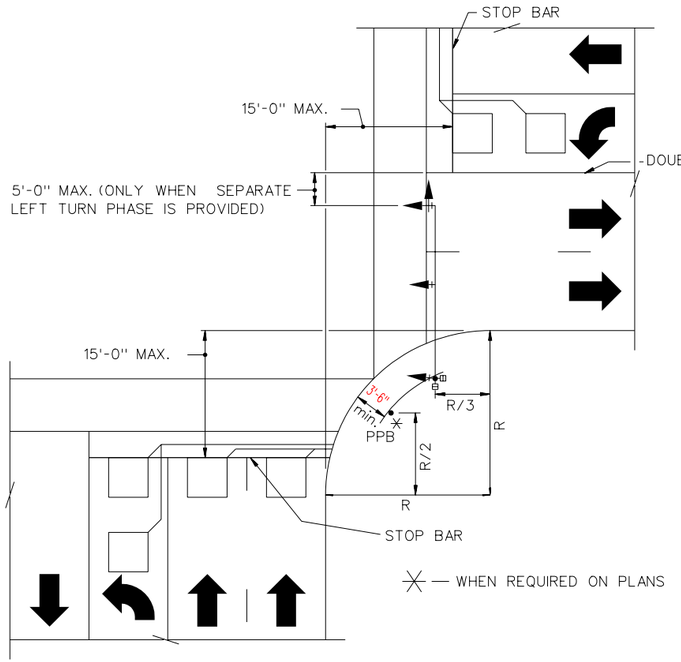
GENERAL NOTES:

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 AA concrete.
3. Post consructed of 6" Standard Pipe (Well Casing) primed and painted yellow, and concrete filled.

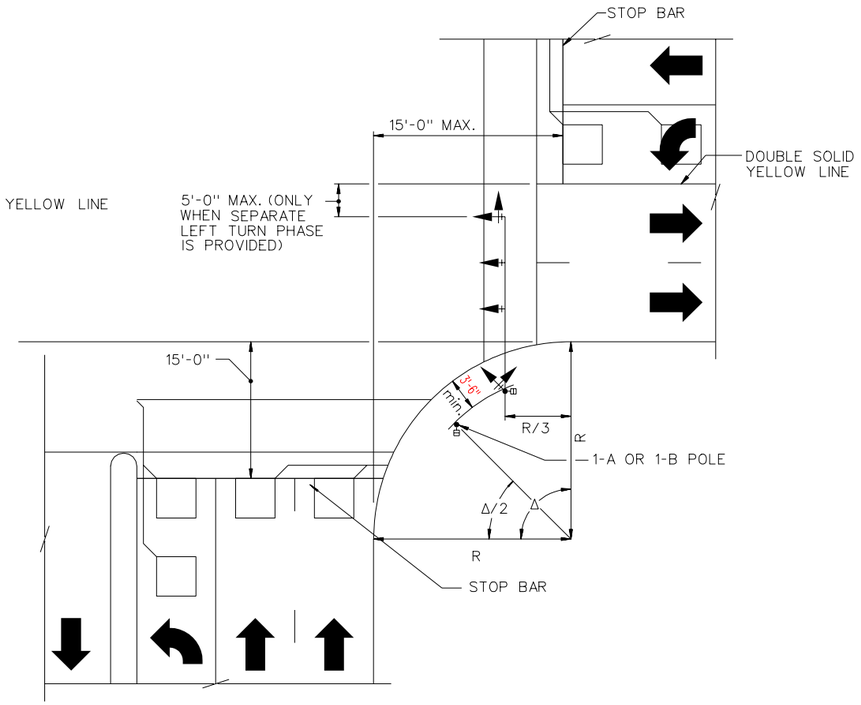
STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

TRANSFORMER PAD BARRIER POST

Signed Original On File	T-30.1.6.2	(623)
CHIEF SAFETY/TRAFFIC ENGINEER	ADOPTED 8/98	REVISION



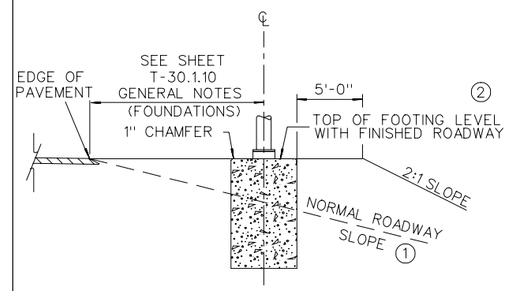
25'-0" AND SMALLER RADII CURB RETURN AND MEDIAN LOCATION



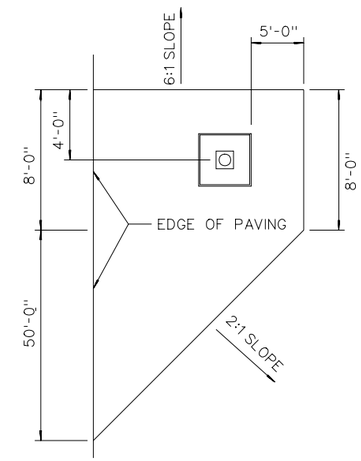
>25'-0" AND LARGER RADII CURB RETURN AND MEDIAN LOCATION

GENERAL NOTES:

1. ISLANDS SHALL BE PLACED ONLY ON SLOPES GREATER THAN 10:1.
2. WHEN USING SAFETY BASES THE TOP OF THE FOUNDATION SHALL BE PLACED FLUSH WITH THE TOP OF THE FOUNDATION ISLAND.
3. CONCRETE SHALL BE CLASS A OR AA.
4. WHERE DETECTOR LOOPS ARE CUT INTO PAVEMENT, 6' ROUND LOOPS MAY BE USED IN LIEU OF 6' X 6' m SQUARE LOOP DETECTORS.



SECTION

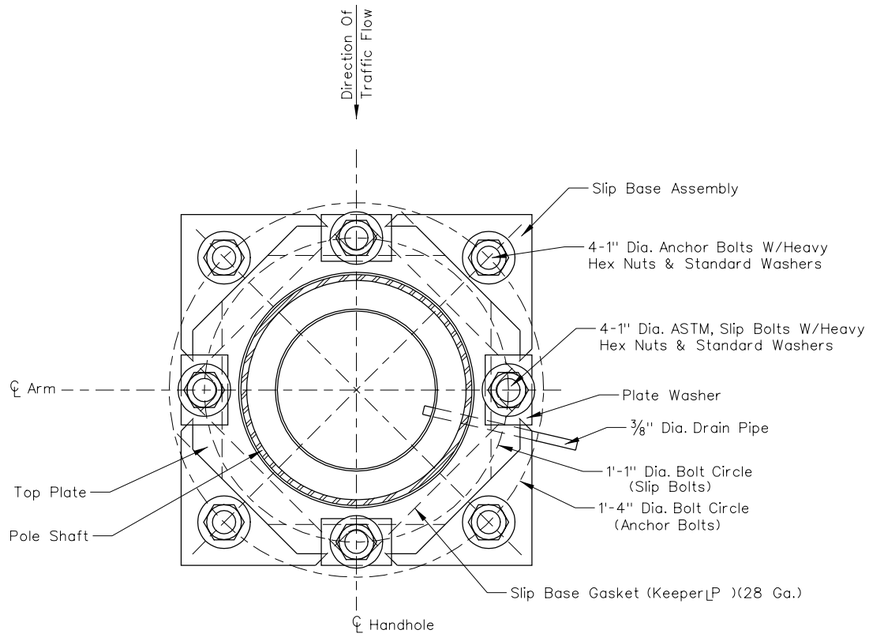


FOUNDATION ISLAND PLAN

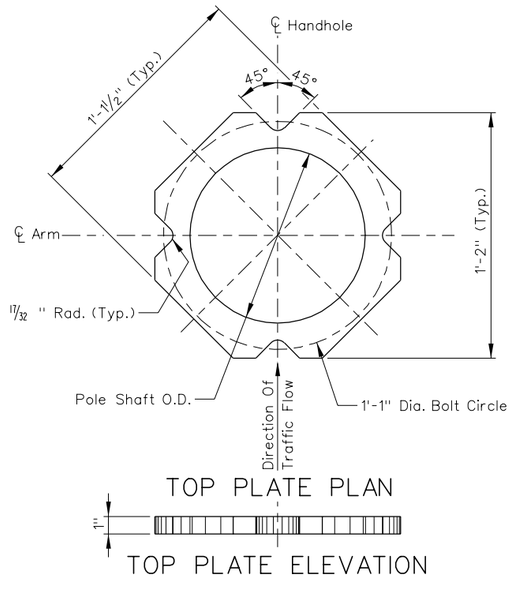
STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

SIGNAL POLE AND LOOP DETECTOR LOCATIONS FOUNDATION ISLAND

Signed Original On File	T-30.1.8 (623)	
CHIEF SAFETY/TRAFFIC ENGINEER	ADOPTED: 7/96	REVISION: 2/03



SAFETY BASE PLAN

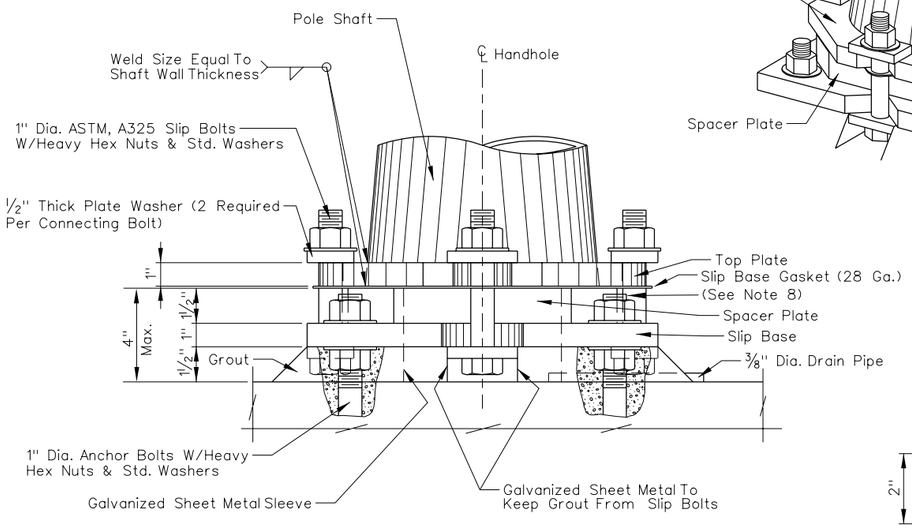


TOP PLATE PLAN

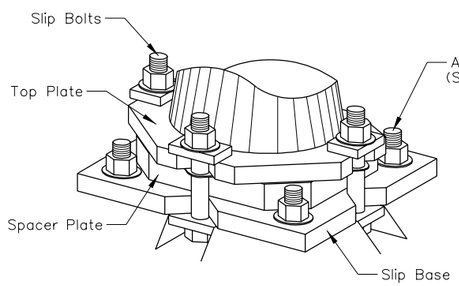
TOP PLATE ELEVATION

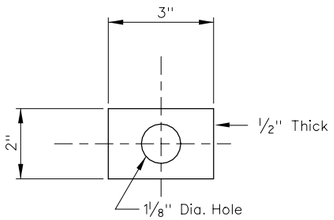
GENERAL NOTES:

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. ALL STEEL PLATE ASSEMBLIES SHALL BE HOT-DIP GALVANIZED AFTER FABRICATION.
4. ALL NUTS, BOLTS AND WASHERS SHALL BE ELECTRO-PLATED CADMIUM IN ACCORDANCE WITH ASTM B-766. TYPE NS.
5. ALL CONTACT AREAS OF PLATES SHALL BE FREE OF GALVANIZING BEADS OR RUNS.
6. SAFETY BASES SHALL BE UTILIZED ON ALL STEEL LIGHT POLES EXCEPT ON STRUCTURES OR IF PLACED BEHIND BARRIER RAIL OR GUARDRAIL.
7. GROUTING SHALL BE DONE AFTER LIGHT POLE HAS BEEN LOCATED IN FINAL POSITION.
8. ANCHOR BOLT SHALL NOT EXTEND ABOVE SLIP BASE GASKET.
9. SLIP BOLT TORQUING REQUIREMENTS:
   A. TORQUE ALL BOLTS TO 80 FT. LBS.
   B. LOOSEN BOLTS.
   C. RETIGHTEN TO FINAL TORQUE USING THE FOLLOWING SEQUENCES:
      1, 3, 4, 2
      60 FT. LBS., 65 FT. LBS. THEN 70 FT. LBS., RECHECK EACH BOLT FOR 70 FT. LBS.
   D. CAULK AREAS AROUND SLIP BASE GASKET. MATERIAL SHALL CONFORM TO FED. SPEC. NO. TT-S-230, TYPE II OR EQUAL.
   E. SPRAY CADMIUM BOLTS WITH GALVILITE COLD GALVANIZING COMPOUND OR EQUIVALENT.

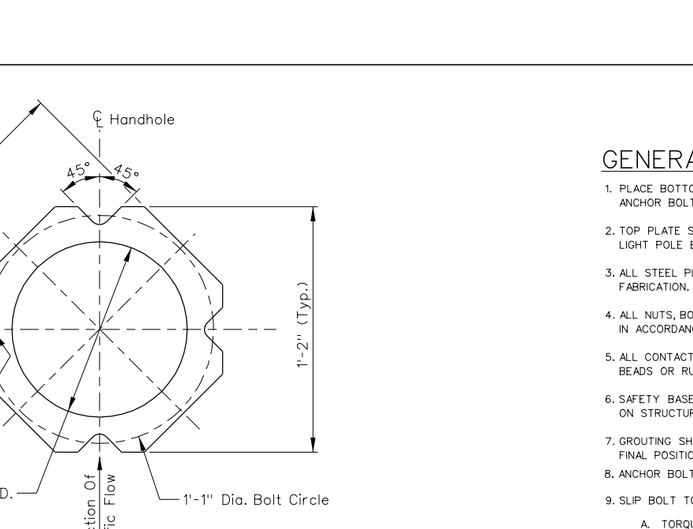


SAFETY BASE ELEVATION

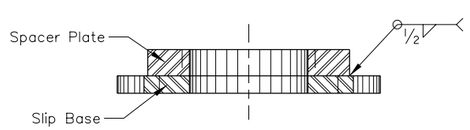




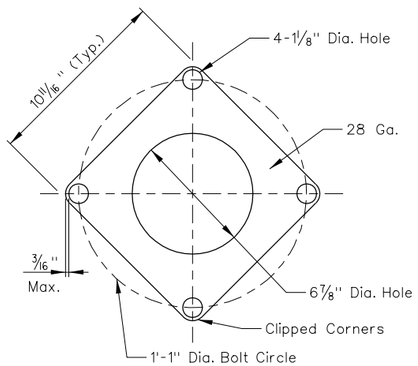
PLAN
PLATE WASHER



SLIP BASE & SPACER PLATE PLAN



SECTION A-A



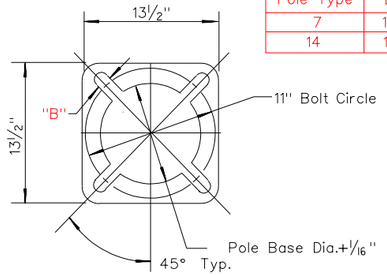
SLIP BASE GASKET

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

SAFETY BASE

Signed Original On File	T-30.1.9	(623)
CHIEF SAFETY/TRAFFIC ENGR.	ADOPTED 1/91	REVISION 10/98

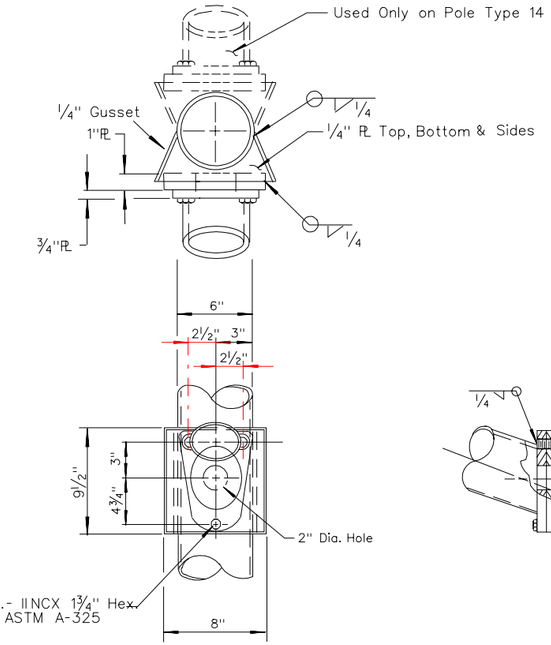
Pole Type	"B"
7	1¼
14	1¾



DETAIL "A"

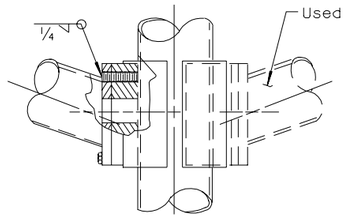
BASE PLATE

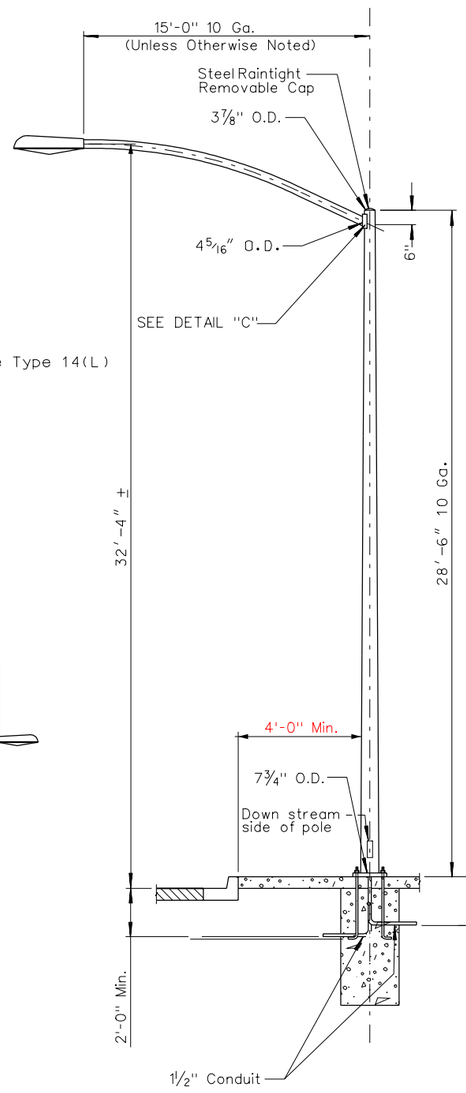
(NOT APPLICABLE WHEN SAFTEY BASES ARE REQ'D.)



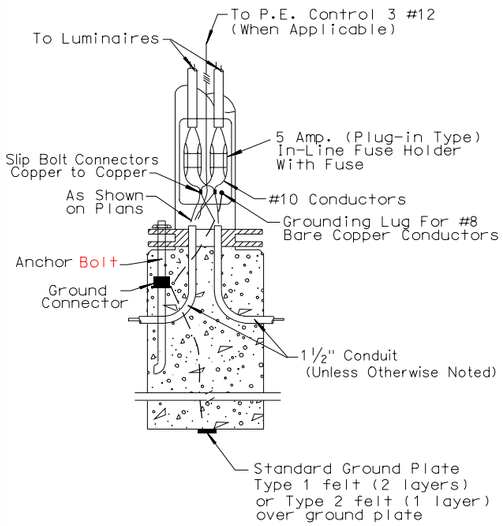
DETAIL "C"

LUMINAIRE ARM CONNECTION

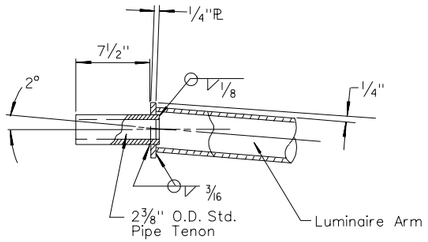




POLE TYPE 7

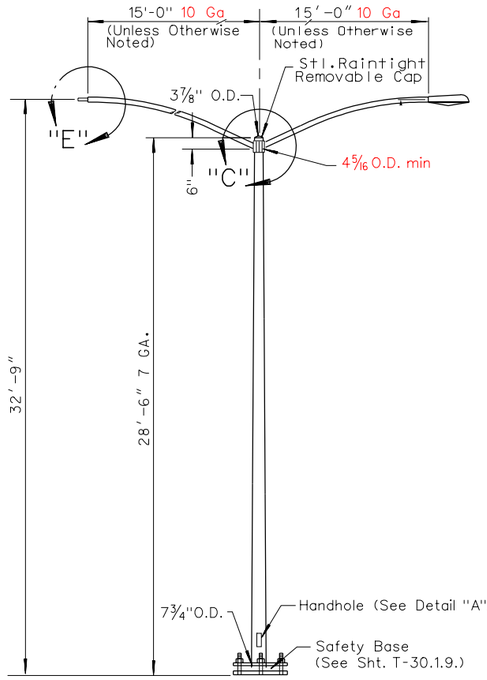


WIRING DIAGRAM FOR POLE TYPE 7 AND TYPE 14



DETAIL "E"

LUMINAIRE TENON DETAIL



POLE TYPE 14

GENERAL NOTES FOR ALL POLE TYPES:

DESIGN CRITERIA

AASHTO STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS,LUMINAIRES AND TRAFFIC SIGNALS, 4th EDITION DATED 2001 AND CURRENT INTERIMS (EXCLUDING SECTION 11: FATIGUE DESIGN).

BASIC WIND SPEED = 90 MPH.

GALVANIZING

1. POLES SHALL BE GALVANIZED AS PER ASTM A-123. HARDWARE SHALL BE GALVANIZED AS PER ASTM A-153.

STEEL SIGNAL AND LUMINAIRE ARMS

1. THE LAST 3" OF THE LUMINAIRE ARM SHALL BE STRAIGHT AND HORIZONTAL WITH LUMINAIRE ATTACHED.
2. 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. PROVIDE 4-ASTM A-307 ANCHOR BOLTS, 8-ASTM A-563 HEAVY HEX NUTS, AND 8-ASTM F-436 HARDENED STEEL WASHERS FOR EACH POLE.
2. 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.
3. WHEN USING A SAFETY BASE, ANCHOR BOLTS SHALL NOT EXTEND ABOVE THE SLIP BOLT GASKET.

STEEL POLES

1. BASE COVERS ARE REQUIRED ON ALL POLES EXCEPT WHERE SAFETY BASE IS SPECIFIED.
2. A REDUCED GAGE FOR SHAFT OF POLE WILL BE ACCEPTABLE ABOVE SIGNAL ARM ATTACHMENT SIMILAR TO POLE TYPE 20.

WELDS

1. LONGITUDINAL WELDS BY SUBMERGED ARC OR ERW CIRCUMFERENTIAL BUTT WELDS SHALL HAVE PERMANENT BACK-UP RINGS. ALL EXPOSED BUTT WELDS SHALL BE GROUND FLUSH.
2. FOR WELD SIZES NOT SHOWN, USE MINIMUM SIZE WELD AS SPECIFIED BY THE LATEST WELDING CODE.
3. BREAK ALL SHARP EDGES FOR WIRE PROTECTION.

FOUNDATIONS

1. AT LOCATIONS BEHIND CURB, ALL SIGNAL AND LIGHTING POLES SHALL BE LOCATED AT THE BACK EDGE OF SIDEWALK OR AT THE R/W LINE, TO OBTAIN A MINIMUM SETBACK DISTANCE OF 5' BEHIND THE BACK EDGE OF CURB TO CENTER OF POLE. (SEE SHEET T-30.1.8 FOR TYPICAL LOCATIONS.)
2. AT LOCATIONS WITHOUT CURB, POLES SHALL BE PLACED A MINIMUM DISTANCE OF 6' FROM SHOULDER OR A MINIMUM OF 10' FROM TRAVEL WAY, WHICH EVER IS GREATER.
3. FOR FOUNDATION DETAILS SEE SHEET T-30.1.16.
4. FOR FOUNDATION ISLAND SEE SHEET T-30.1.8.
5. CONCRETE SHALL BE CLASS A OR AA.

SAFETY BASES

1. TYPE 7 AND TYPE 14 POLES SHALL REQUIRE SAFETY BASE ASSEMBLIES UNLESS MOUNTED ON STRUCTURE BEHIND BARRIER RAIL OR NOTED OTHERWISE ON THE PLANS. (SEE SHEET T-30.1.9 FOR DETAILS)

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

TYPE 7 & 14 POLE LIGHTING & SIGNAL LIGHT POLES

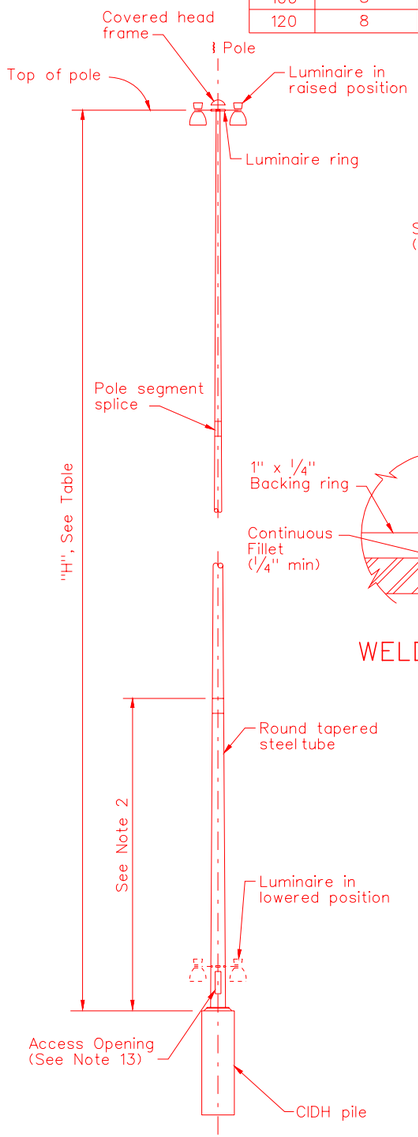
Signed Original On File	T-30.1.10	(623)
CHIEF SAFETY/TRAFFIC ENGR.	ADOPTED:12/79	REVISION 12/02

Height "H" (ft)	Min Pole Base OD (in) Note 5	Min Pole Base Wall Thickness (in)	Base Plate		Anchor Bolts				CIDH Pile Data	
			Diameter (in)	Thickness (in)	Total	Size "d" (in)	BC (in)	"I" (in)	"D" (in)	Reinforcement
70	16¾	¼	30½	1¼	6	1¼	25	58	42	10-#8
100	18⅝	⅝	30½	1¼	6	1½	25	84	42	13-#8
120	21	⅝	37½	1½	8	1½	32	84	48	20-#8

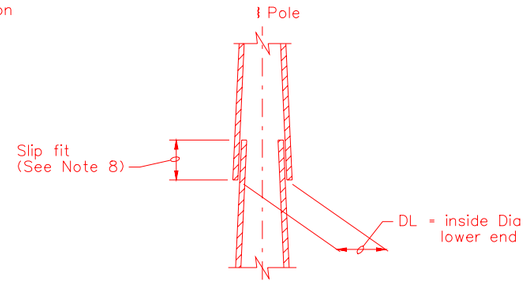
"H" (ft)	Minimum Shaft Length, "L" (ft) × Site Foundation Material ××		
	Weak Rock	Stiff Clay, Sand, Gravel	Soft Clay
70	7	11	14
100	8	13	20
120	8	14	22

Increase "L" by 2 feet for all heights, "H," and all site foundation materials for construction on or within 3 feet of sloping ground (slopes up to 1.5H:1V).

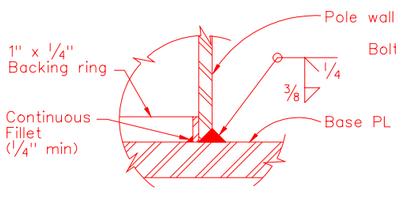
Site foundation material shall be assumed as stiff clay, sand or gravel unless otherwise noted in the contract documents. NDOT Materials Section shall verify weak rock and soft clay on a case-by-case basis.



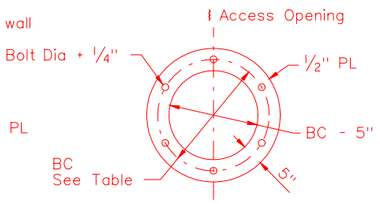
POLE DETAILS



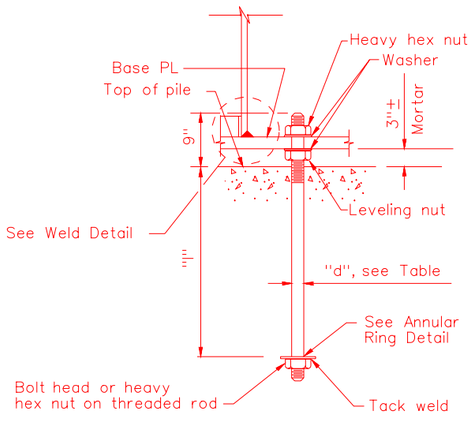
POLE SEGMENT SPLICE DETAIL



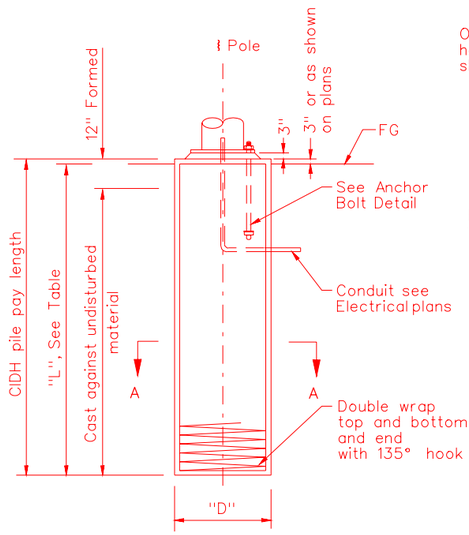
WELD DETAIL



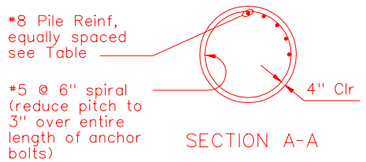
ANNULAR RING DETAIL



ANCHOR BOLT DETAIL
See Note 10

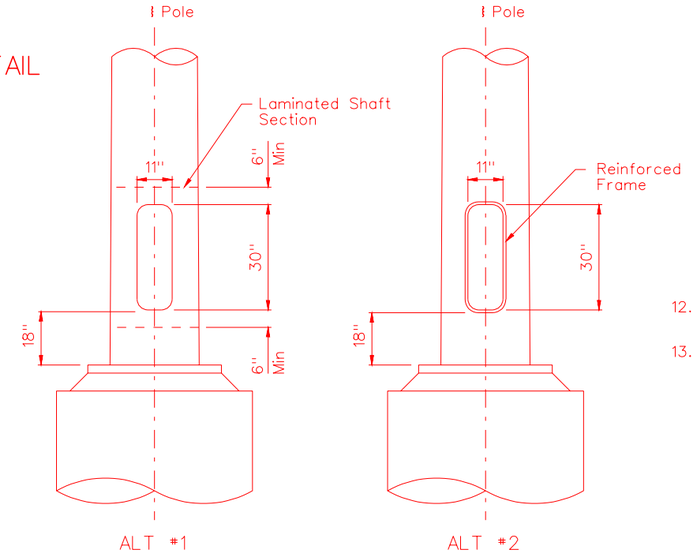


TYPICAL ELEVATION

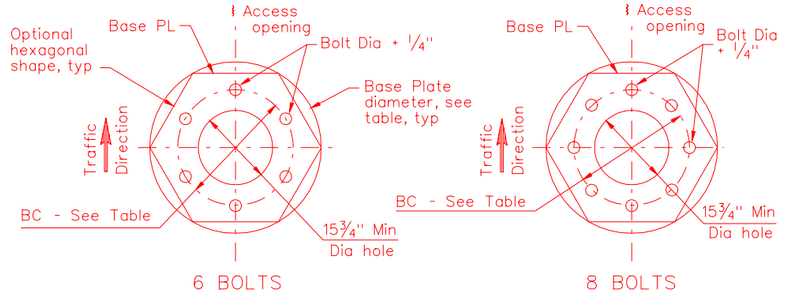


SECTION A-A

CIDH PILE DETAILS



HANDHOLE DETAIL
See Note 13



BASE PLATE DETAILS
See Note 9

NOTES:

1. Design Specifications: AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals 2001.
2. Pole details shall suit the lowering device and this foundation plan. Pole details shall be submitted to the Engineer for approval. All High Mast Luminaires are bottom latching with an internal winch assembly and external motor. Pole shall have a minimum taper of 0.0117 ft/ft
3. All materials to be galvanized after fabrication.
4. For number of luminaires to be mounted on the pole, see Electrical Plans.
5. Foundation, pole, base plate, and anchor bolt design is based on a maximum of 8 luminaires and a maximum Effective Projected Area (EPA) of 14.5 ft 2 and a maximum weight of 770 lbs (including fixtures, hood, and lowering ring). Increase minimum pole diameter if required to accommodate lowering device. Limit the design deflection at the top of the pole to 10% of the pole height.
6. Design wind pressures are based on a 3 - second gust speed of 90 mph and a 50 year Design Life.
7. Fatigue design based on Natural Wind Gust loads and Fatigue Importance Category I
8. Slip fit length shall not be less than 1.5 DL.
9. Base plate shape optional, either round or hexagonal as shown.
10. Anchor bolts shall be made from steel bar conforming to AASHTO M 314 Grade 55 including S1 supplementary requirements.
11. The following soil parameters were used to determine pile length, "L":

Site Foundation Material	Minimum Dry Unit Weight (pcf)	Internal Friction Angle (deg)	Cohesion (psf)	Subgrade Modulus (pci)	Strain e_{50}
Stiff Clay	100	n/a	1000	n/a	0.01
Sand	110	30 ×××	n/a	60	n/a
Gravel	125	35	n/a	175	n/a
Soft Clay	90	n/a	250	n/a	0.02

××× Increased to 35 deg for sloping ground surface condition

Site Foundation Material	Unit Weight (pcf)	Unconfined Compressive Strength (tsf)	Initial Rock Modulus E_{ir} (tsf)	Rock Constant k_{rm}	Rock Quality Designation (%)
Weak Rock	130	18	36,000	0.0005	50

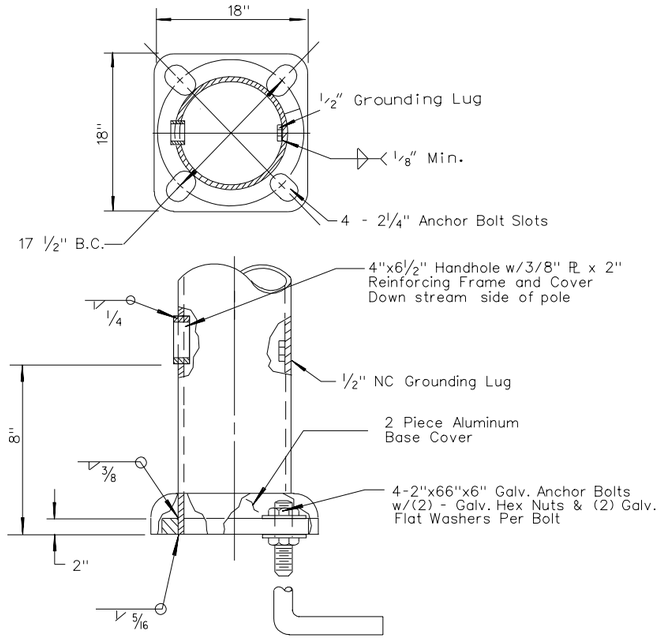
12. Pile length, "L", based on maximum ½" lateral deflection at top of pile under Group II Loads.
13. Access Opening shall be 11" x 30" with a lockable hinged handhole cover plate. The handhole shall be gasketed to make waterproof. Access Opening shall be reinforced as required in the Standard Specifications and shall suit the lowering device.

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

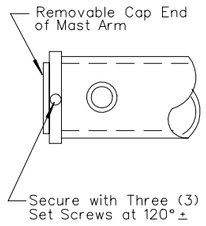
HIGH MAST LIGHT
POLE & FOUNDATION DETAILS

Signed Original On File	T-30.1.11 (623)
CHIEF SAFETY/TRAFFIC ENGINEER	ADOPTED: 12/02 REVISION: X/XX

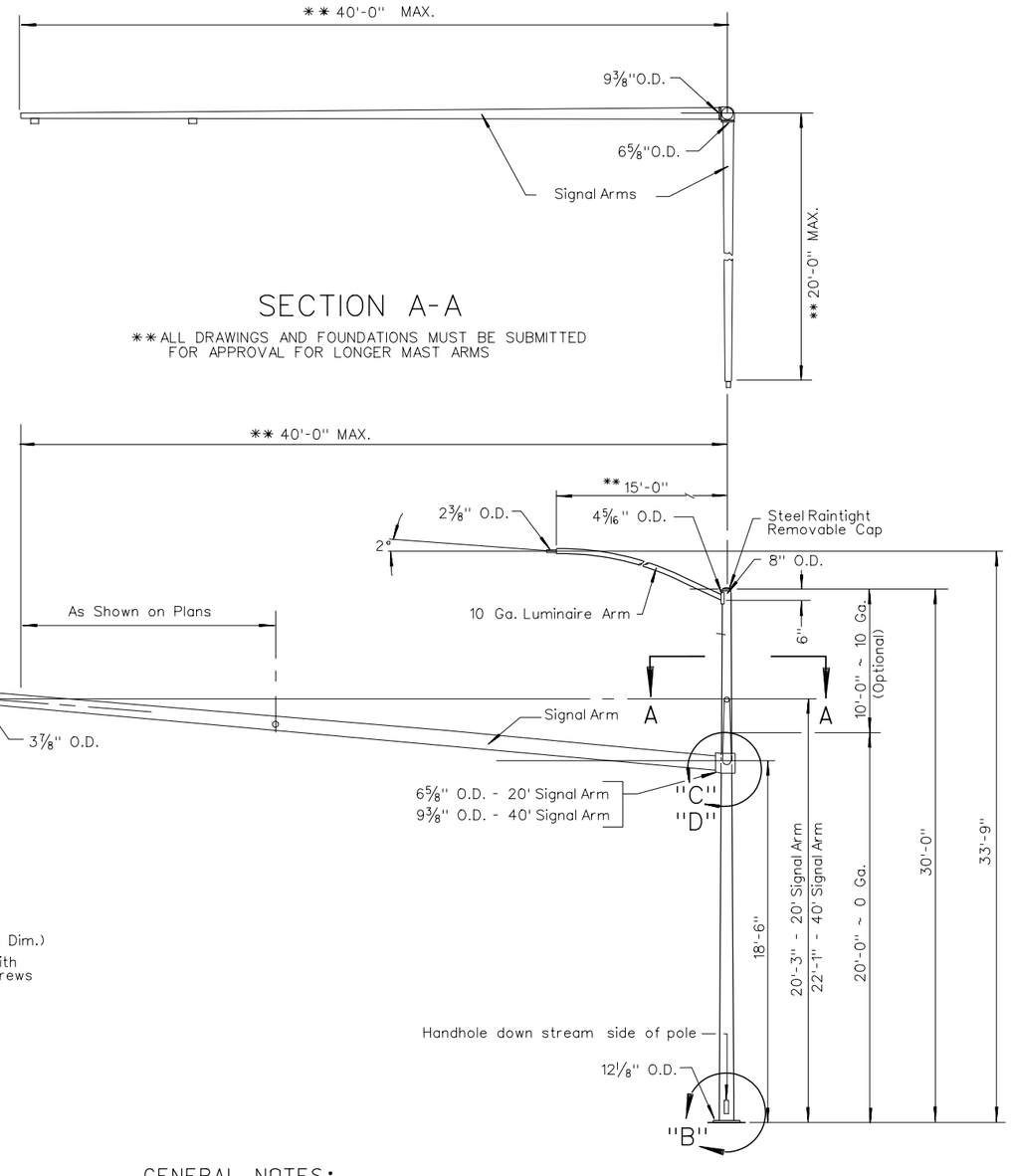
T-19



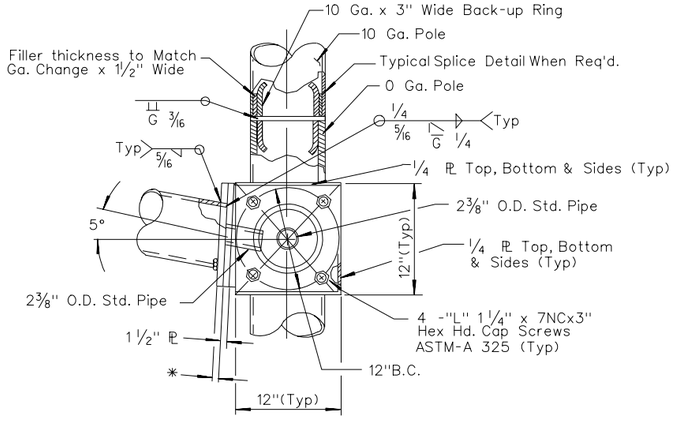
DETAIL "B"
POLE BASE



MAST ARM END CAP

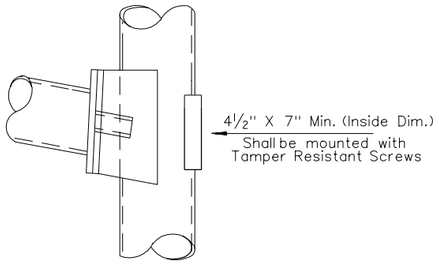


SECTION A-A
**ALL DRAWINGS AND FOUNDATIONS MUST BE SUBMITTED FOR APPROVAL FOR LONGER MAST ARMS



DETAIL "C"
SIGNAL ARM CONNECTION

* 1" PL FOR 20' SIGNAL ARM
1 1/4" PL FOR 40' SIGNAL ARM



DETAIL "D"
HANDHOLE AND COVER
LOCATED 180° OPPOSITE MAST ARM

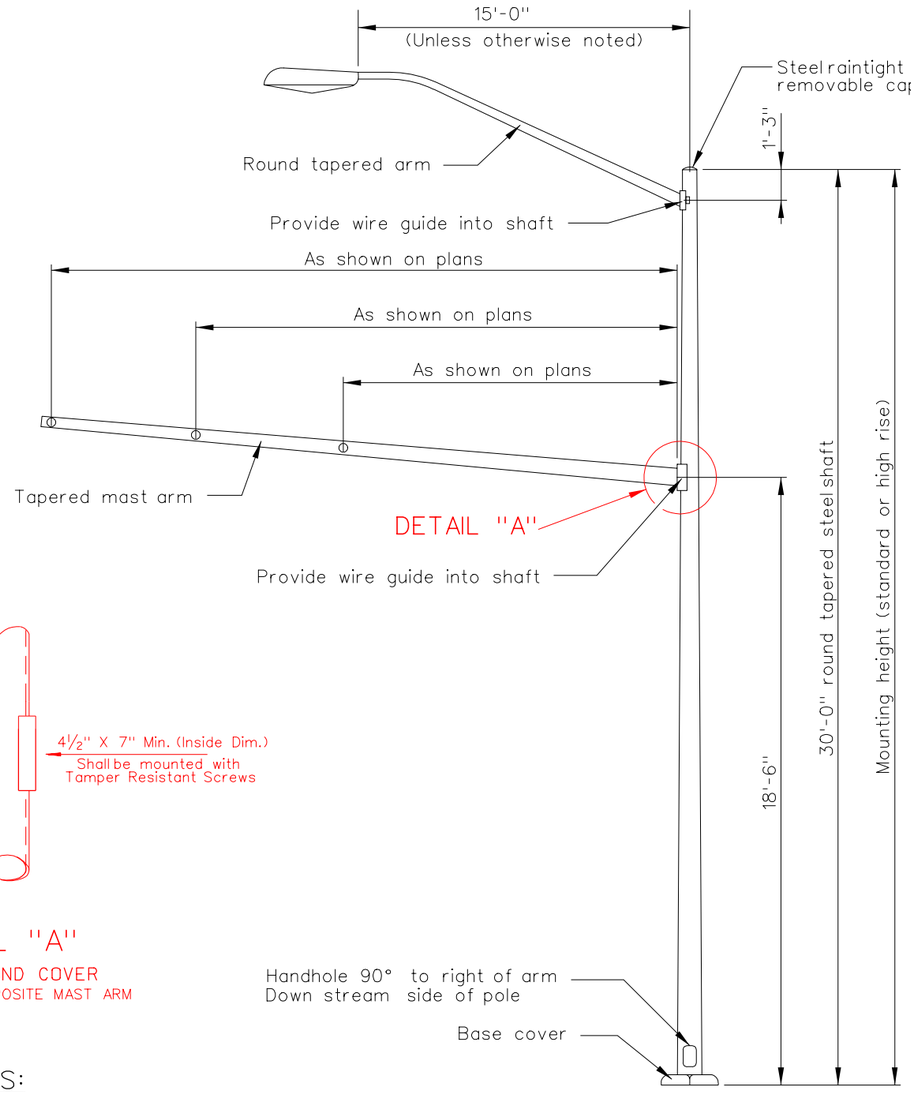
GENERAL NOTES:

1. FOR POLE FOUNDATION SEE SHEET T-30.1.16
   FOR M-2 SIDEMOUNT DETAIL SEE SHEET T-30.1.3
2. FOR LUMINAIRE ARM CONNECTION & LUMINAIRE TENON DETAIL SEE SHEET T-30.1.10
3. THE DISTANCE FROM THE ROADWAY SURFACE TO THE BOTTOM OF THE MAST ARM SIGNAL HEADS SHALL BE 17'-0".

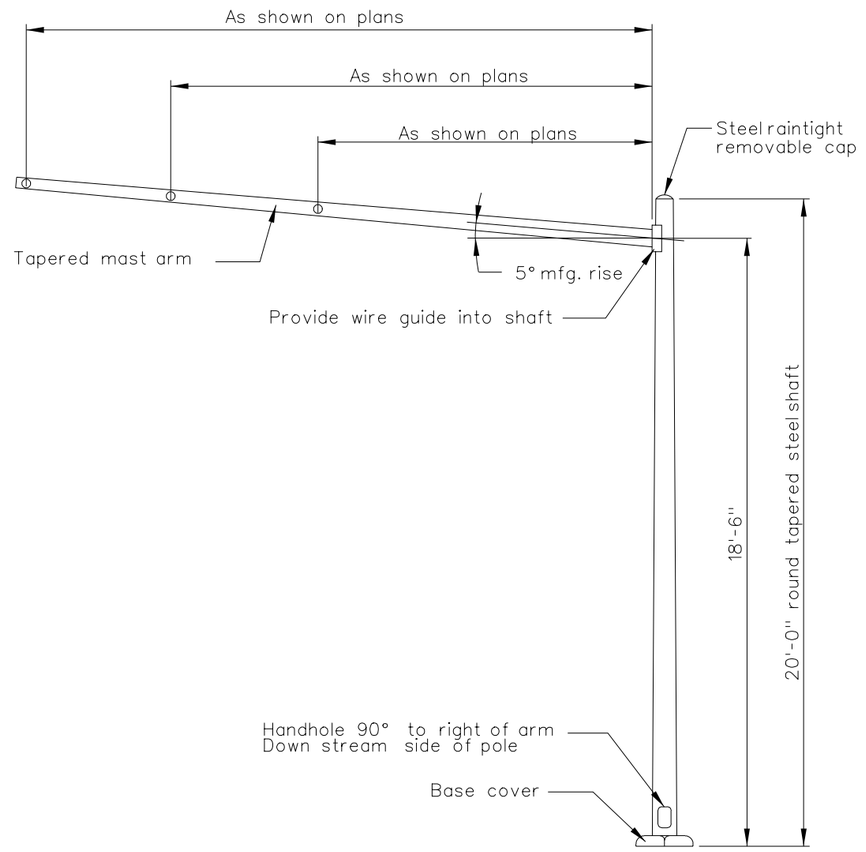
STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

TYPE 28 POLE

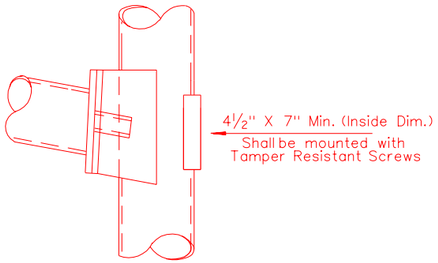
Signed Original On File	T-30.1.12	(623)
CHIEF SAFETY/TRAFFIC ENGR.	ADOPTED: 12/79	REVISION 9/00



POLE TYPE 35 (MAST ARMS 45' AND LESS)
POLE TYPE 35-A (MAST ARMS 50' AND GREATER)



POLE TYPE 30 (MAST ARMS 45' AND LESS)
POLE TYPE 30-A (MAST ARMS 50' AND GREATER)



DETAIL "A"
HANDHOLE AND COVER
LOCATED 180° OPPOSITE MAST ARM

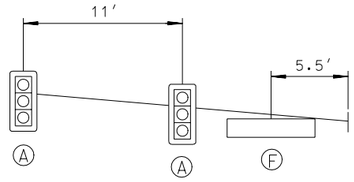
GENERAL NOTES:

1. Shop drawings and structural calculations shall be submitted and approved, before poles may be utilized on project.
2. If indicated in the plans, all poles shall be prime painted by manufacturer and finish painted by contractor. See Standard Specification Sec. 714.03.01.
3. The distance from the roadway surface to the bottom of the mast arm signal heads shall be 17'-0".
4. See Standard Plan Drawing No. T-30.1.15 for pole base, handhole, signal arm and luminaire attachment details.

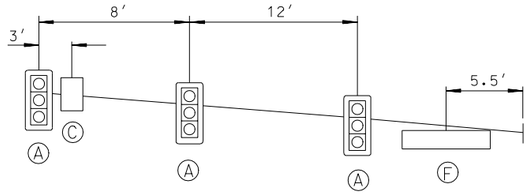
STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

TYPE 30 AND 35 POLES

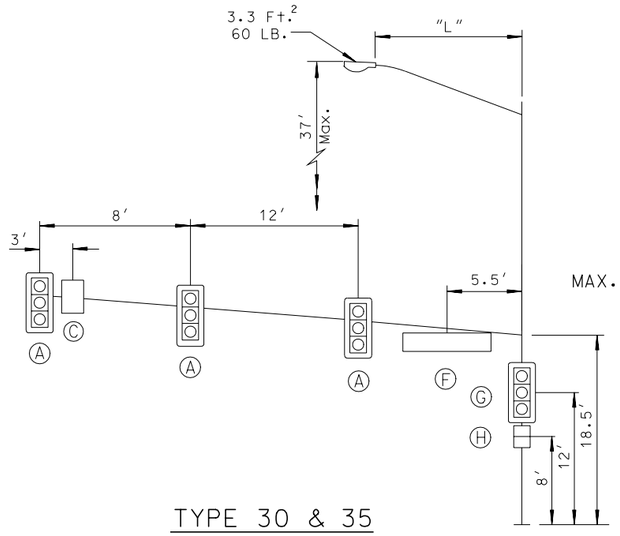
Signed Original On File	T-30.1.13	(623)
CHIEF SAFETY/TRAFFIC ENGINEER	ADOPTED: 7/96	REVISION: 8/98



20′ THRU 25′ SPANS

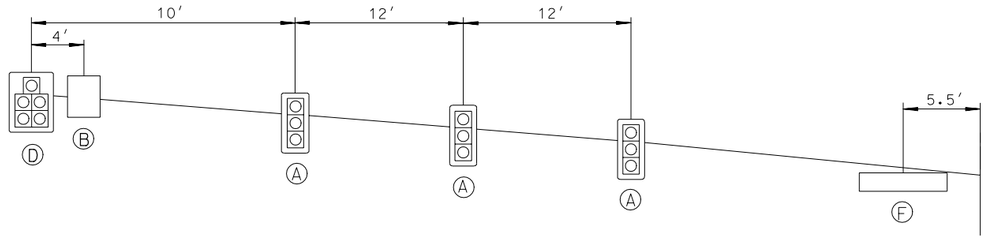


30′ THRU 45′ SPANS

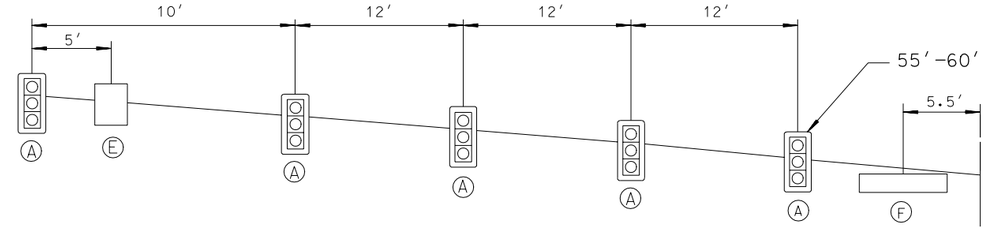


MAX. 45′ SPAN

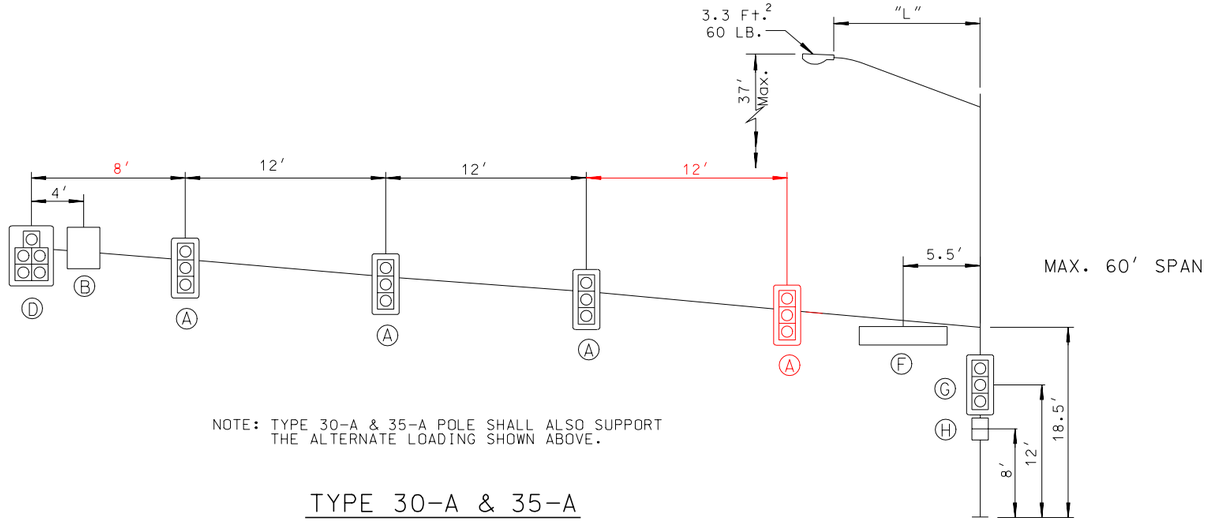
TYPE 30 & 35



50′ THRU 60′ SPANS



50′ THRU 60′ SPANS
(ALTERNATE LOADING)



MAX. 60′ SPAN

NOTE: TYPE 30-A & 35-A POLE SHALL ALSO SUPPORT THE ALTERNATE LOADING SHOWN ABOVE.

TYPE 30-A & 35-A

DEVICE	DESCRIPTION	PROJECT AREA(Ft.²)	WEIGHT (LBS.)
Ⓐ SIGNAL	12"-3 Sec. w/Backplates (2M)	9.80	40
Ⓑ SIGN	--See Plans--	----	----
Ⓒ SIGN	R3-4 24" x 24"	4.00	10
Ⓓ SIGNAL	12"-5 Sec. w/Backplates	13.68	80
Ⓔ SIGN	R10-5d S 36" x 45"	11.25	30
Ⓕ SIGN	Street Name-Free Swinging 1.68′ x 8′	13.44	100
Ⓖ SIGNAL	Dual-12"-3 Sec. w/Backplates	17.34	80
Ⓗ SIGNAL	Dual-Pedestrian	8.00	60

LUMINAIRE ARM DATA					
ARM SPAN "L" (FT.)	FIXED END DIA. (IN.)	FREE END DIA. (IN.)	GAUGE	LUMINAIRE MOUNTING HEIGHT	
				Low Rise	High Rise
6	3.42	2.38	11	31′-0"	32′-0"
8	3.75	2.38	11	31′-6"	33′-3"
10	4.16	2.38	11	31′-9"	35′-0"
12	4.52	2.38	11	33′-0"	36′-6"
15	4.95	2.38	11	33′-6"	37′-0"

DESIGN CRITERIA:

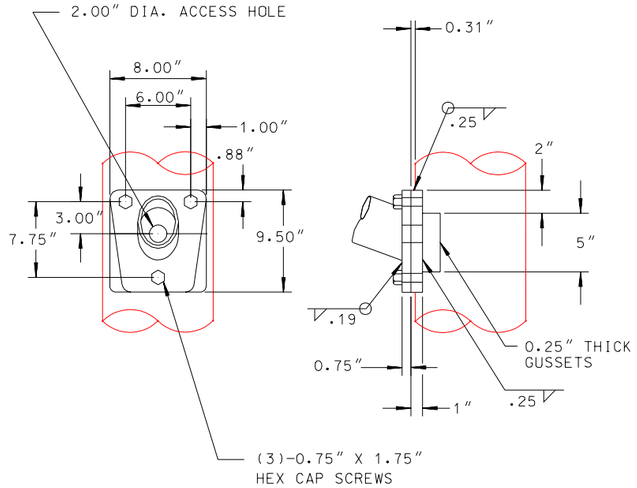
AASHTO STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS,LUMINAIRES AND TRAFFIC SIGNALS, 4th EDITION DATED 2001 AND CURRENT INTERIMS (EXCLUDING SECTION 11: FATIGUE DESIGN).

BASIC WIND SPEED = 90 MPH.

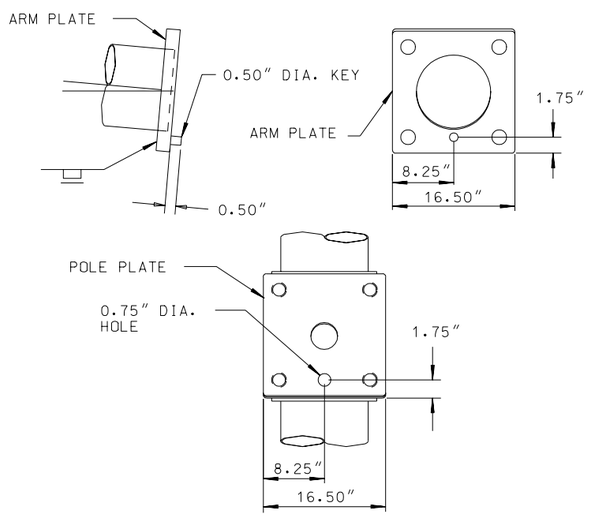
STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

TYPE 30 & 30A 35 & 35A LOADING INFORMATION

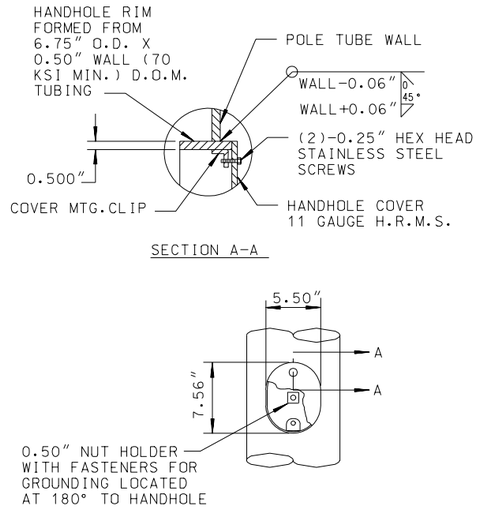
Signed Original On File	T-30.1.14	623
CHIEF SAFETY/TRAFFIC ENGR.	ADOPTED:10/94	REVISION: 12/02



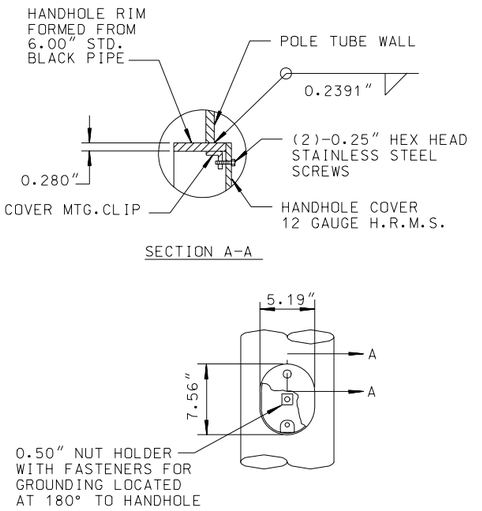
LUMINAIRE ARM ATTACHMENT



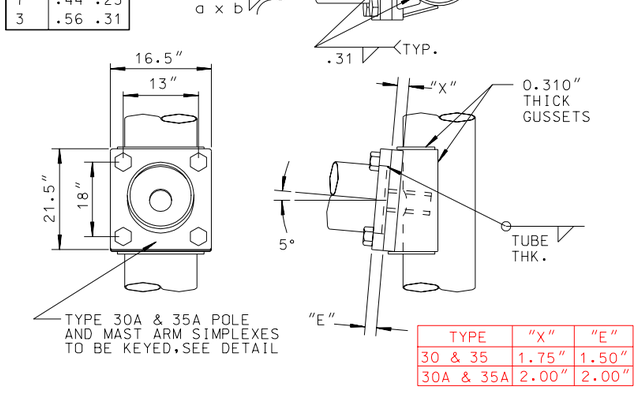
SIGNAL ARM SIMPLEX KEY



TYPE 30-A & 35-A HANDHOLE



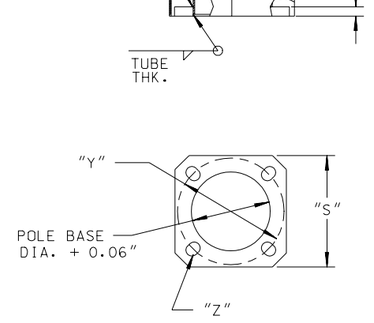
TYPE 30 & 35 HANDHOLE



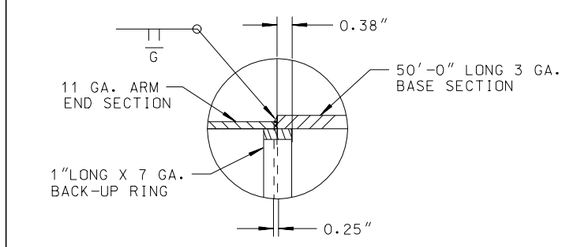
ga	a	b
7	.44	.25
3	.56	.31

TYPE	"X"	"E"
30 & 35	1.75"	1.50"
30A & 35A	2.00"	2.00"

SIGNAL ARM ATTACHMENT



POLE BASE PLATE



55' & 60' SIGNAL ARM SPLICE

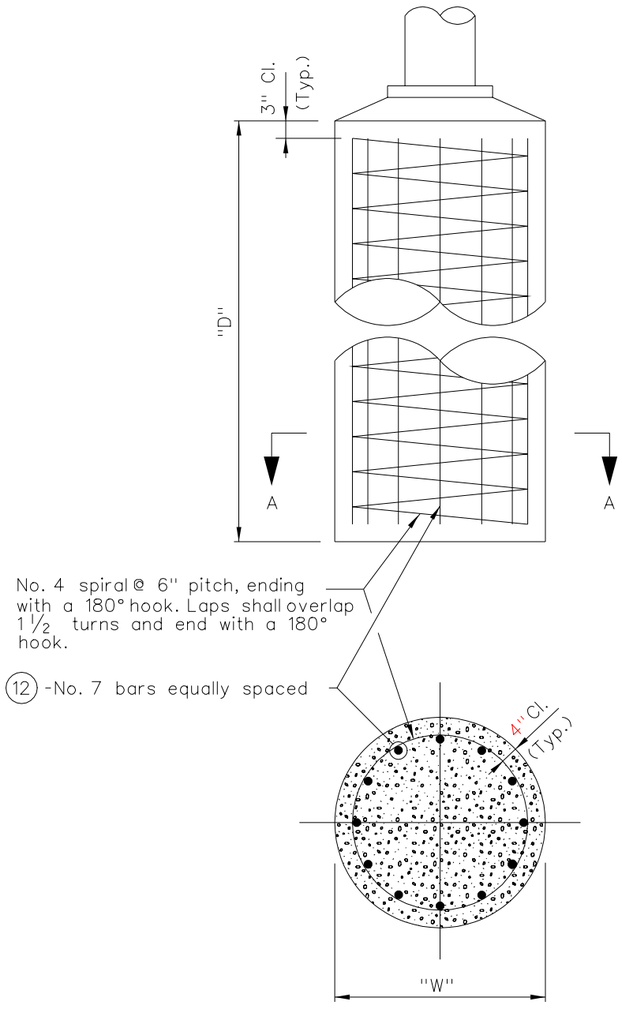
POLE BASE PLATE				
TYPE	SQUARE "S" (In.)	BOLT CIRCLE "Y" (In.)	THK. "M" (In.)	HOLE "Z" (In.)
30 & 35	17.00	16.5	1.50	2.00
30A & 35A	19.00	19.00	1.75	2.25

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

TYPE 30 & 30A 35 & 35A DETAILS

Signed Original On File
CHIEF SAFETY/TRAFFIC ENGINEER

T-30.1.15 (623)
ADOPTED: 10/94 REVISION: 12/02



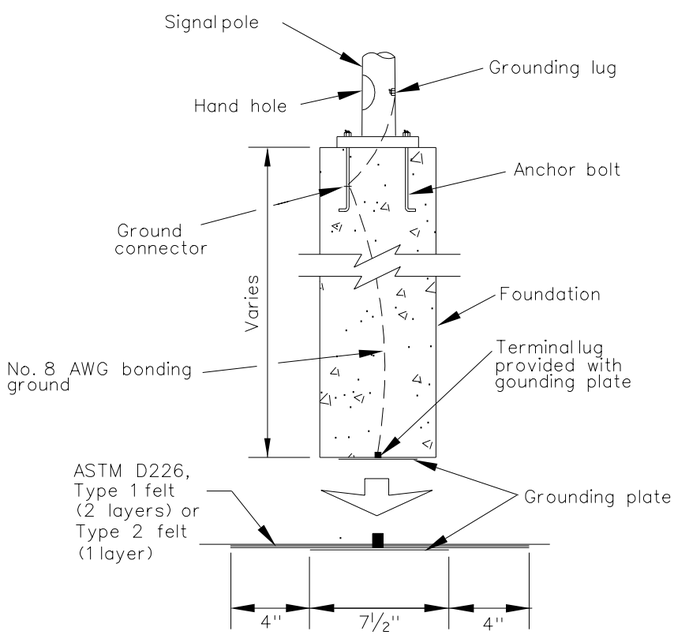
Note: Concrete shall be Class A or AA.

SECTION A-A
PILE FOUNDATION

PILE FOUNDATION TABLE

POLE TYPE	MAST ARM LENGTH	××"D"	××"W" ①	ANCHOR BOLTS (4 EACH)
1A & 1B	N/A	3'-0"	2'-0"	3/4" x 18" x 4"
7	ALL	5'-0"	2'-6"	×1" x 36" x 4"
14	ALL	5'-0"	2'-6"	×1 1/2" x 48" x 4"
28	ALL	12'-0"	3'-0"	2" x 66" x 6"
30 AND 35	≤ 45'	12'-0"	3'-0"	1 3/4" x 60" x 6"
30A AND 35A	>45'	12'-0"	3'-0"	2" x 66" x 6"

×× Unless otherwise shown on plans.
× Not applicable when mounted on structures.
① - When "W" = 2'-0" use 4-No.5 bars equally spaced.
When "W" = 2'-6" use 8-No.5 bars equally spaced.

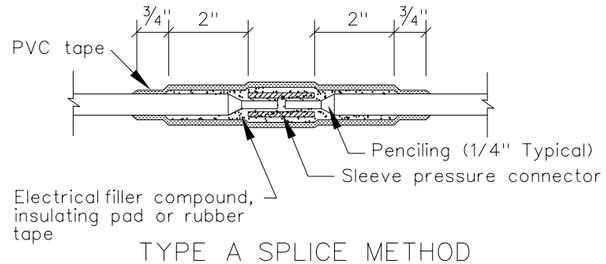


1. Connect bonding wire to the reinforcing steel cage near the midpoint of the foundation or anchor bolts.
2. Ground plate shall be made of nonferrous material (typically brass or copper). Install "NSI" ground plate or equivalent;

POLE GROUNDING DETAIL

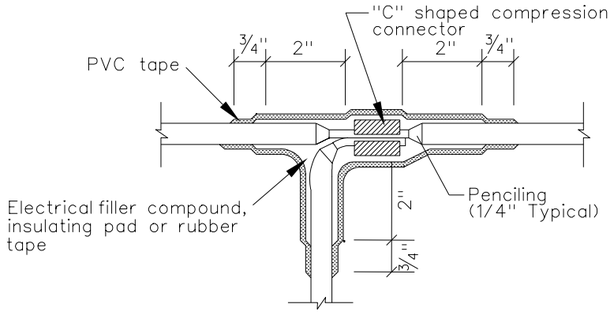
GENERAL NOTES:

1. All dimensions are minimal.
2. Rubber tapes shall be rolled after application.
3. When PVC tape is used as a final layer, paint finished splice with electrical insulating coating.



TYPE A SPLICE METHOD
(TWO FREE ENDS)

1. Completely cover the splice area with an electrical insulating coating and allow to dry.
2. Apply electrical filler compound with minimum thickness of 1/8".
3. Apply 3 layers of half lapped PVC tape.



TYPE B SPLICE METHOD
(THREE FREE ENDS OR ONE FREE END AND ONE THROUGH CONDUCTOR)

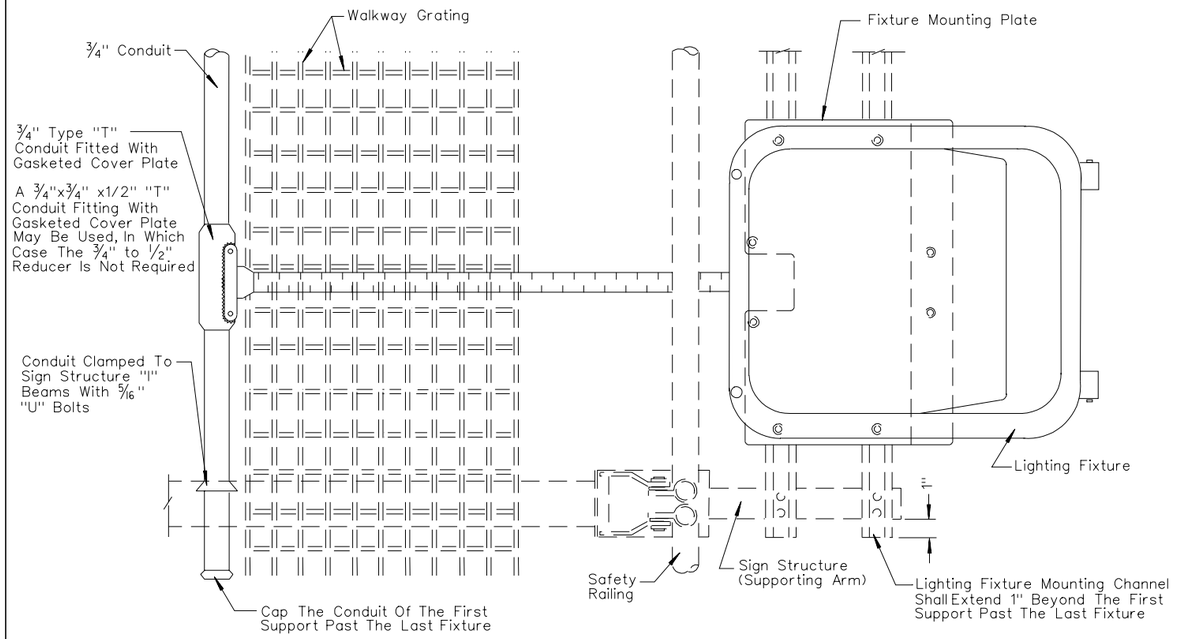
1. Completely cover the splice area with an electrical insulating coating and allow to dry.
2. Apply 2 layers of electrical insulating pad with minimum thickness of 1/8" each layer or 2 layes, half lapped, synthetic oil resistant, self fusing rubber tape.
3. Apply 3 layers of half lapped PVC tape.

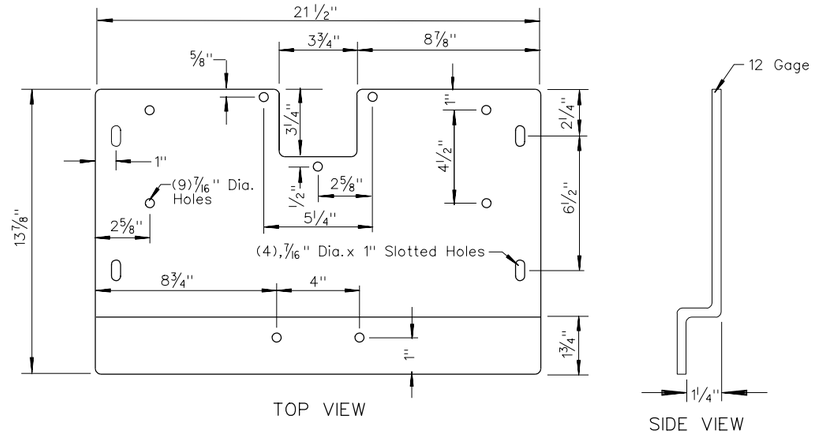
CONDUCTOR SPLICING METHODS

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

PILE FOUNDATION, POLE GROUNDING DETAIL, CONDUCTOR SPLICE METHODS

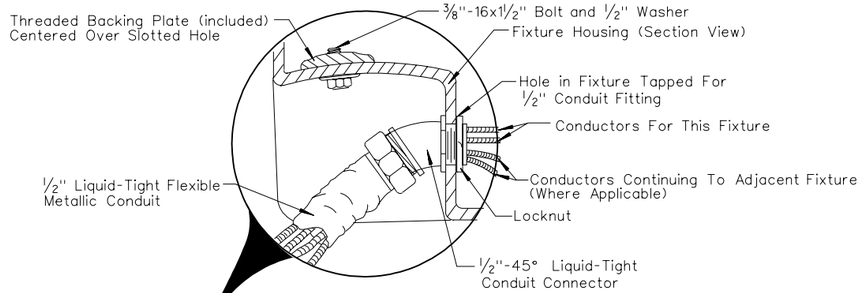
Signed Original On File	T-30.1.16 (623)	
CHIEF SAFETY/TRAFFIC ENGINEER	ADOPTED 8/98	REVISION 12/02

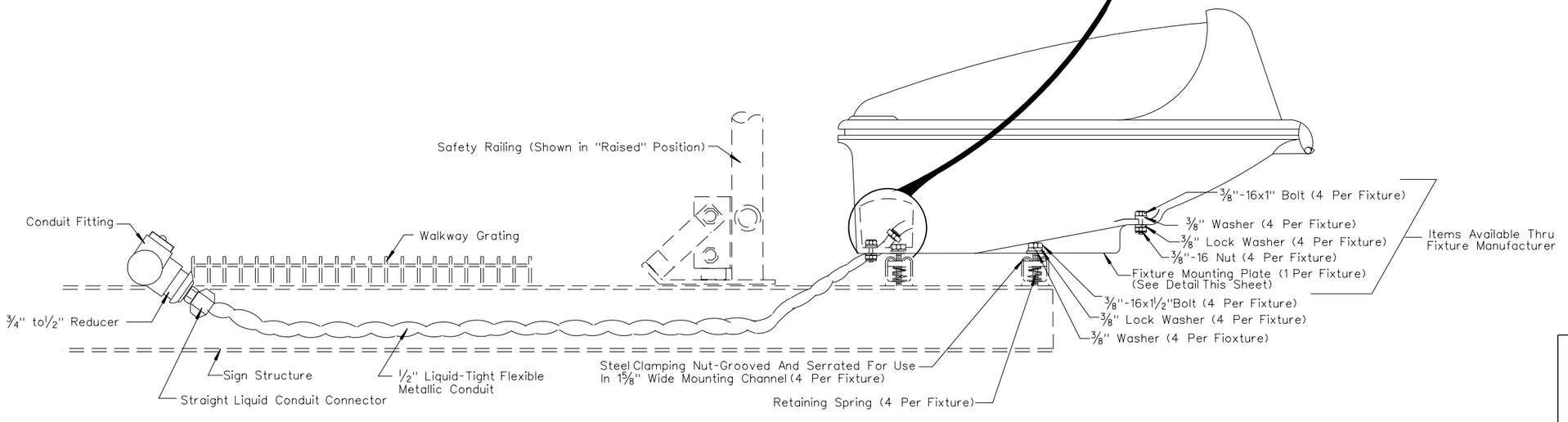




SIGN LIGHTING FIXTURE MOUNTING PLATE

Material Hot-Dip Galvanized Sheet Steel After Fabrication
All Dimensions Typical





All Bolts, Nuts, Washers and Other Hardware Shall Be SAE Grade 5 and Cadmium-Plated.

LIGHTING FIXTURE MOUNTING DETAIL (TYPICAL)

FIXTURE SPACING TABLE

LENGTH OF PANEL (FEET)	NUMBER OF FIXTURES (EACH)	FIXTURE SPACING (INCHES) SEE NOTES #1 & #2
5	1	30
6		36
7		42
8		48
9		54
10		60
11		66
12		72
13		78
14		84
15		90
16		96
17	2	51:102
18		54:108
19		57:114
20		60:120
21		63:126
22		66:132
23		69:138
24		72:144
25		75:150
26		78:156
27		81:162
28		84:168
29		87:174
30		90:180
31		93:186
32		96:192
33	3	66:132
34		68:136
35		70:140
36		72:144
37		74:148
38		76:152
39		78:156
40		80:160
41		82:164
42		84:168
43		86:172
44		88:176
45		90:180
46		92:184
47		94:188
48		96:192
49	4	73.5:147
50		75.0:150
51		76.5:153
52		78.0:156
53		79.5:159
54		81.0:162
55		82.5:165
56		84.0:168
57		85.5:171
58		87.0:174
59		88.5:177
60		90.0:180
61		91.5:183
62		93.0:186
63		94.5:189
64		96.0:192

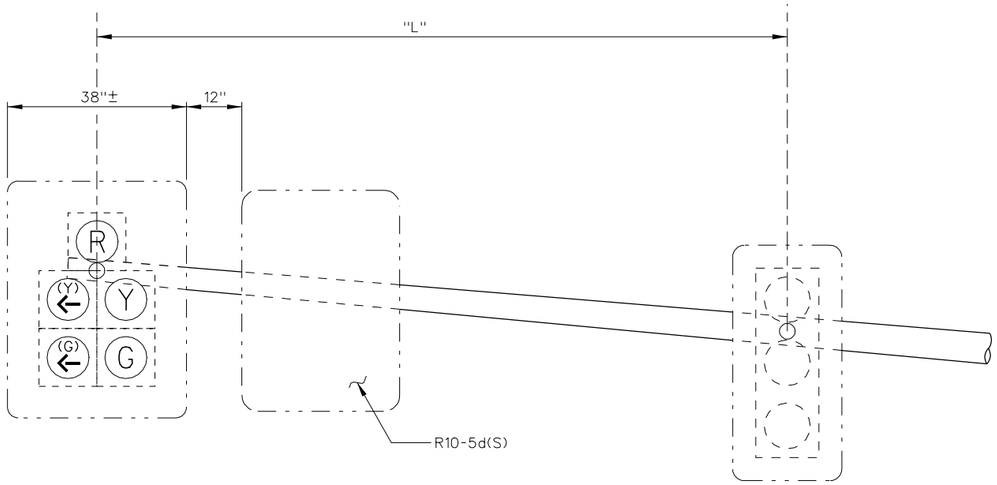
NOTES:

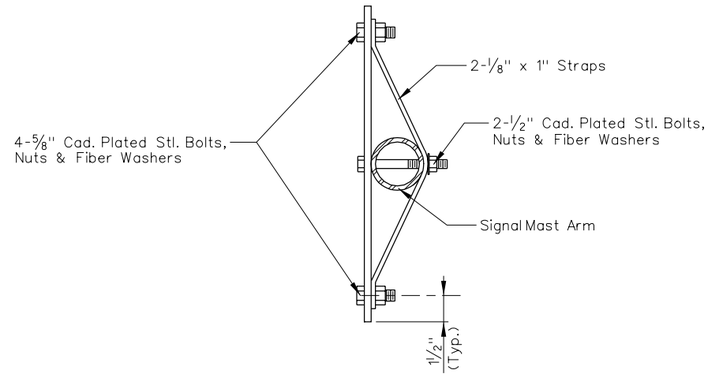
1. The First Number Listed Is The Dimension From The Edge Of The Sign Panel To The Center Of The End-Most Fixture. The Second Number Listed Is The Dimension Between Centers Of Successive Fixtures.
2. Where Adjacent Sign Panels Are Spaced 1' Or Less The Combination Of These Panels (And Spaces) Shall Be Considered A Single Panel.

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

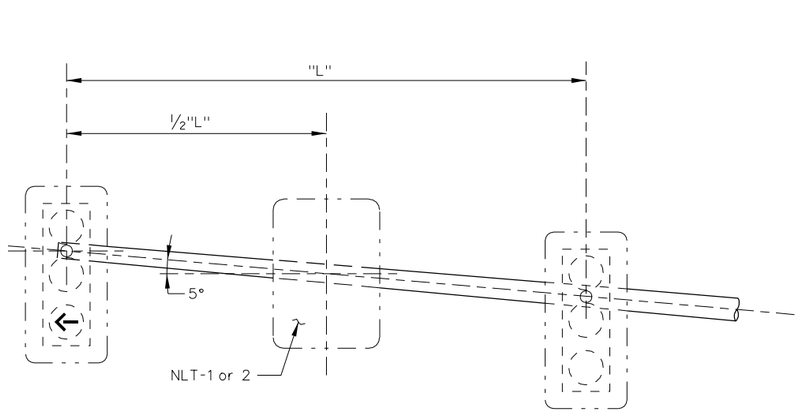
SIGN LIGHTING FIXTURES

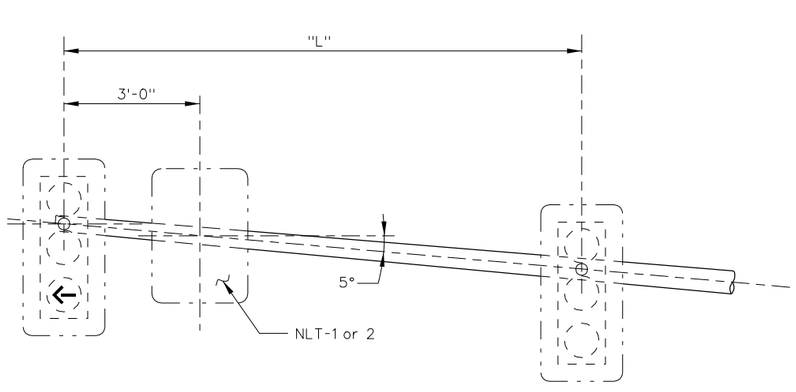
Signed Original On File	T-30.1.16.1	(623)
CHIEF SAFETY/TRAFFIC ENGR.	ADOPTED: 10/92	REVISION 3/97





TYPICAL METHOD OF ATTACHMENT





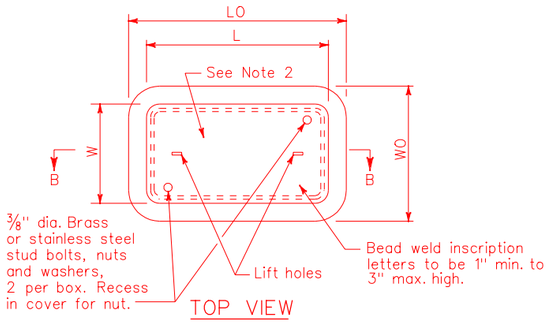
MAST ARM SIGNAL AND SIGN PLACEMENT

"L" = AS SHOWN ON PLANS

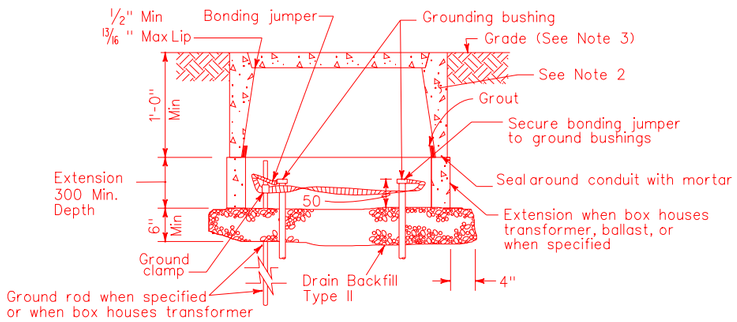
STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

TRAFFIC SIGNAL SIGN PLACEMENT

Signed Original On File	T-30.1.17 (623)
CHIEF SAFETY/TRAFFIC ENGINEER	ADOPTED:12/79 REVISION: 3/97

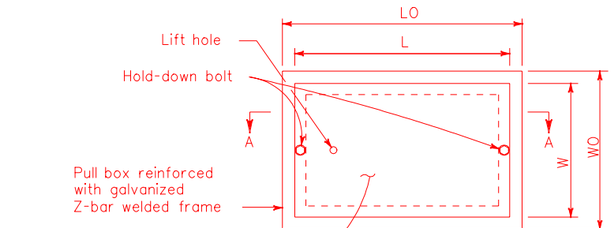


TOP VIEW

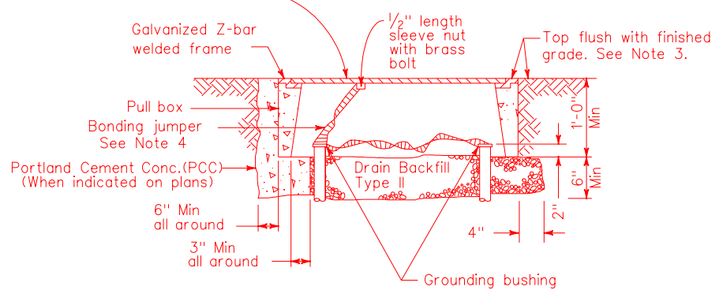


SECTION B-B

Special Pull Box No. 3 1/2, No. 5, No. 7 & No. 9



TOP VIEW



SECTION A-A

No. 3 1/2(T), No. 5(T), No. 7(T) & No. 9(T) Traffic Rated Pull Box

GENERAL NOTES FOR PULL BOXES:

1. Traffic pull box shall be provided with steel cover and special concrete footing. Steel cover shall have embossed non-skid pattern.
2. Steel reinforcing shall be as regularly used in the standard products of the respective manufacturer.
3. Top of pull boxes shall be flush with surrounding grade or top of adjacent curb, except that in unpaved areas where pull box is not immediately adjacent to and protected by a concrete foundation, pole or other construction, the box shall be placed with its top 1" above surrounding grade. Where practicable, pull boxes shown in the vicinity of curbs shall be placed adjacent to the back of curb, and pull boxes shown adjacent to standards shall be placed on side of foundation facing away from traffic, unless otherwise noted. When pull box is installed in sidewalk area, the depth of the pull box shall be adjusted so that the top of the pull box is flush with the top of sidewalk.
4. Bonding jumper for metal covers shall be 3'-4" long, minimum-applicable only when metal conduit is used.
5. The nominal dimensions of the opening in which the cover sets shall be the same as the cover dimensions except the length and width dimensions shall be 1/8" greater.
6. All covers and boxes shall be interchangeable with Nevada standard male and female gages. When interchanged with a standard male or female gage. the top surfaces shall be flush within 1/8". Top outside edge of all concrete covers and pull boxes shall have a 1/4" minimum radius.
7. Pull box shall not be installed within the boundaries of new or existing curb ramps.
8. Pull boxes for electroliers and signal standards shall be located at the same station (± 5'-0") as the adjacent electrolier or signal standard. Pull boxes shall be placed adjacent to back of curb or edge of shoulder except where this is impractical, a box may be placed in another suitable protected and accessible location.
9. In areas where the possibility of material eroding from around the pull box exists, the pull box shall be placed in Drain Backfill Type II-(2'-0" depth on each side and 1'-0" depth), as directed by the Engineer.
10. Use special pull boxes only when indicated on plans.

SPECIAL PULL BOX MINIMUM DIMENSION TABLE

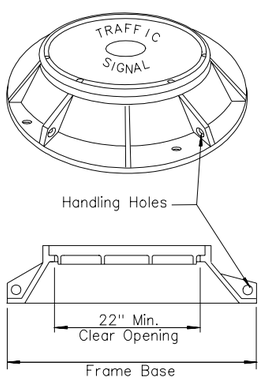
Pull Box	CONCRETE BOX			NON-PCC BOX		CONCRETE OR NON-PCC COVERS				
	Minimum Depth Box and Extension	LO	WO	Minimum ** Thickness	Minimum Depth Box and Extension	L **	W***	R	Edge Thickness	Edge Taper
No. 3 1/2	No Extension	20"	14"	5/16"	No Extension	15 3/8"	10 1/4"	1"	2"	1/8"
No. 5	22 1/4"	28"	18"	5/16"	20"	23 1/4"	13 3/4"	1"	2"	1/8"
No. 6	24"	36"	23"	3/8"	20"	30 3/4"	17 3/4"	1"	2"	1/8"

** Top dimension

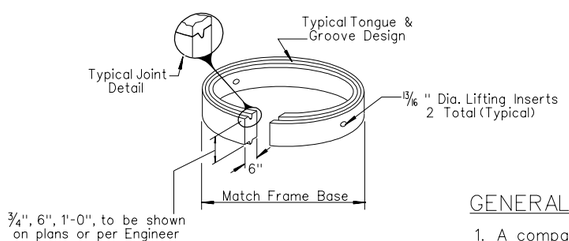
ELECTRICAL TRAFFIC RATED PULL BOX MINIMUM DIMENSION TABLE

Pull Box	CONCRETE BOX			STEEL COVER			EXTENSION
	LO	WO	Height	L **	W **	Edge Taper	Height
No. 3 1/2(T)	19"±	12"±	12"±	14 1/2"±	8 3/4"±	None	12"
No. 5(T)	25"±	15"±	12"±	20 1/2"±	10 1/2"±	None	10"
No. 7(T)	35"±	22"±	12"±	30"±	17"±	None	8"
No. 9(T)	52"±	35"±	14"±	47 3/4"±	30"±	None	10"

** Top Dimension
*** Top of Box



ELECTRICAL MANHOLE FRAME & COVER



COLLAR RISER

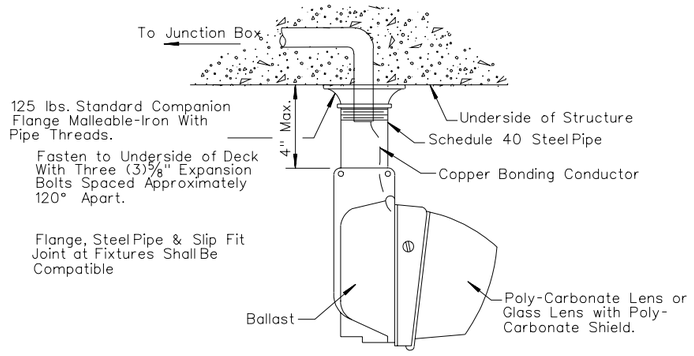
GENERAL NOTES FOR ELECTRICAL MANHOLE:

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 collar/risers as required. Minimum depth 18".
3. Refer to Standard Plan R-4.7.3 for concrete collar details.

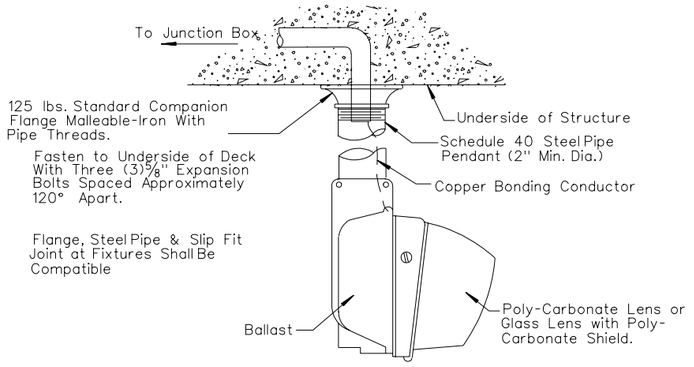
STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

TRAFFIC RATED ELECTRICAL PULL BOXES/ MANHOLE FRAME & COVER

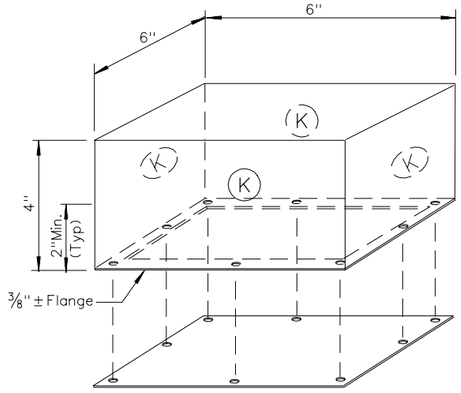
Signed Original On File	T-30.1.18	(623)
CHIEF SAFETY/TRAFFIC ENGR.	ADOPTED: 7/96	REVISION 12/02



TYPE "A" UNDERPASS LUMINAIRE

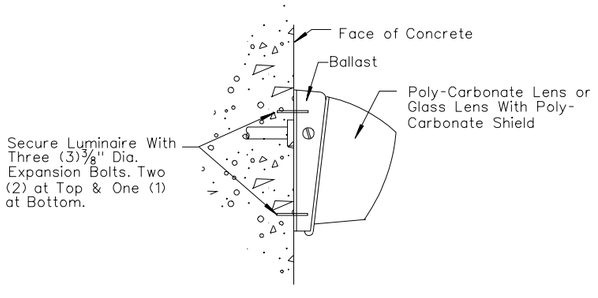


TYPE "C" UNDERPASS LUMINAIRE

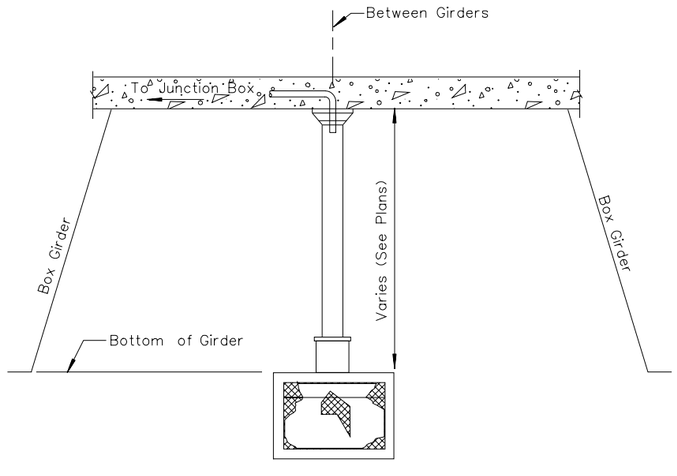


JUNCTION BOX DETAIL (J)

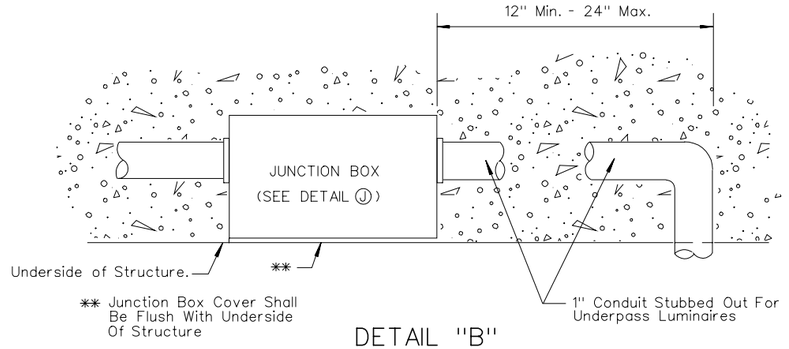
1. JUNCTION BOX AND COVER SHALL BE 16 GA. STEEL.
2. GALVANIZE ASSEMBLY AFTER FABRIACATION
3. BOX SHALL BE FLUSH WITH BOTTOM OF STRUCTURE.
4. FASTEN COVER BY DRILL AND TAP WITH EIGHT (8) #10-24 UNC BRASS SCREWS.
5. COVER SHALL BE ON BOX DURING POURING.
6. AN EQUIVALENT APPROVED MFG. BOX MAY BE USED IN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



TYPE "B" UNDERPASS LUMINAIRE



PENDANT INSTALLATION
(TYPE "C" UNDERPASS LUMINAIRE)

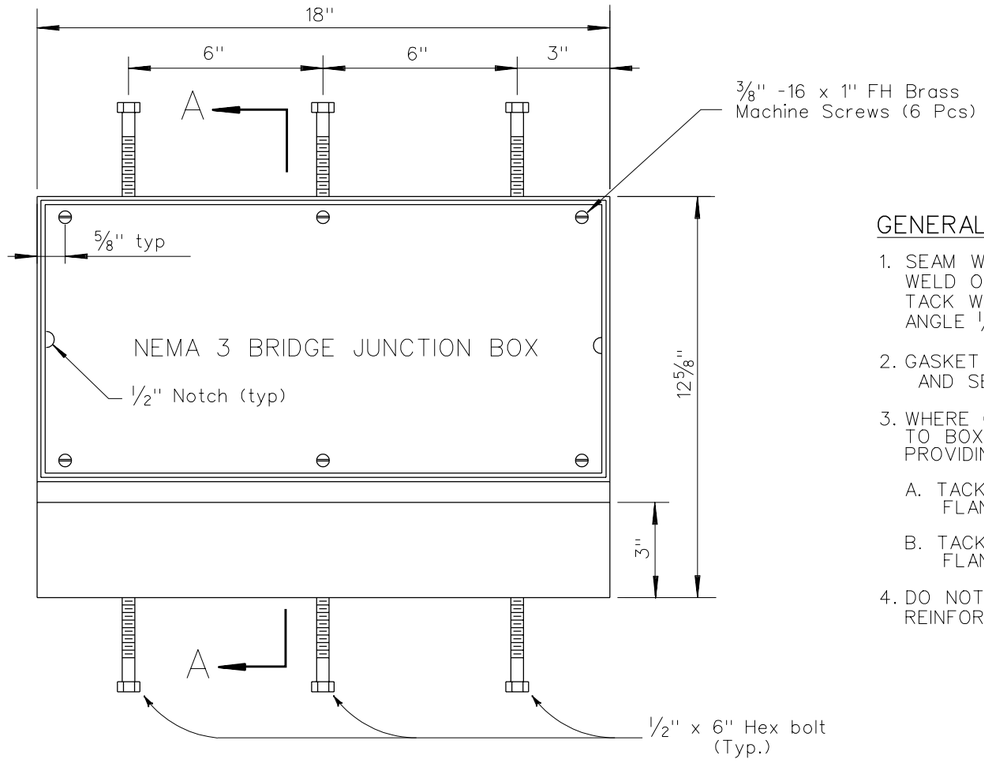


DETAIL "B"

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

UNDERPASS LUMINAIRES & JUNCTION BOX

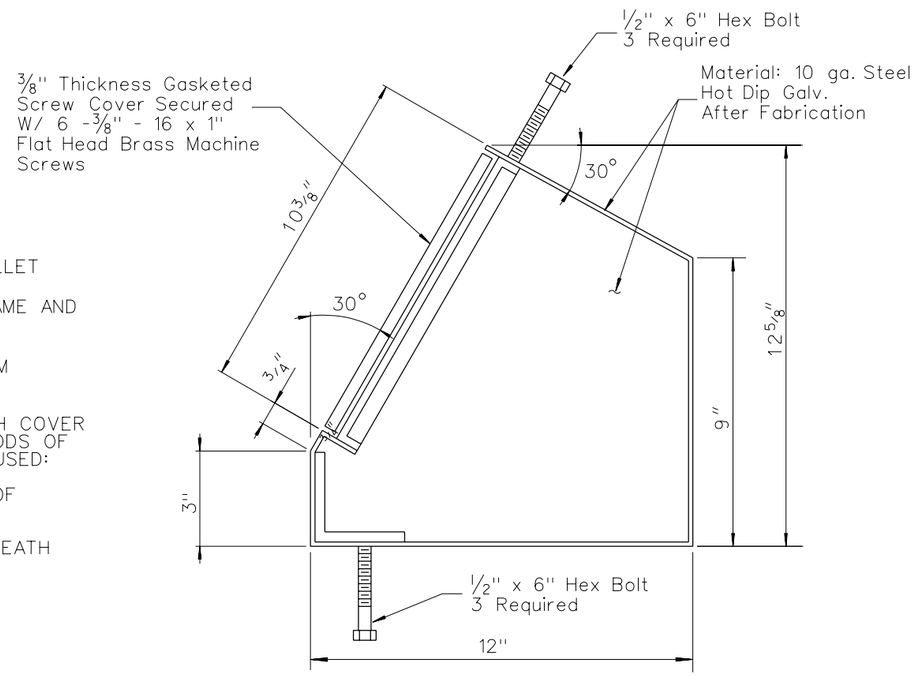
Signed Original On File	T-30.1.19 (623)	
CHIEF SAFETY/TRAFFIC ENGR.	ADOPTED: 12/79	REVISION 3/97



TYPE 1

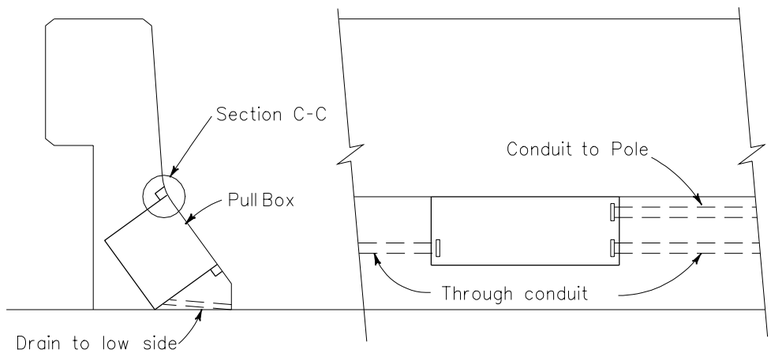
GENERAL NOTES:

1. SEAM WELD CONSTRUCTION W/ 3/16" DIA FILLET WELD OUTSIDE EDGES. TACK WELD CONSTRUCTION FOR INNER FRAME AND ANGLE 1/4" x 3/4" x 5" CENTERS.
2. GASKET MATERIAL 1/8" x 2" NEOPRENE EPDM AND SBR SPONGE WITH PSA.
3. WHERE CAP SCREWS ARE USED TO ATTACH COVER TO BOX, EITHER OF THE FOLLOWING METHODS OF PROVIDING ADEQUATE THREADING MAY BE USED:
   A. TACK WELD SQUARE NUT TO BOTTOM OF FLANGE (TOTAL 4), OR
   B. TACK WELD A 1/4" x 5/8" x 8" BAR BENEATH FLANGE (TOTAL 2).
4. DO NOT CUT OR WELD TO BRIDGE RAIL REINFORCING STEEL.

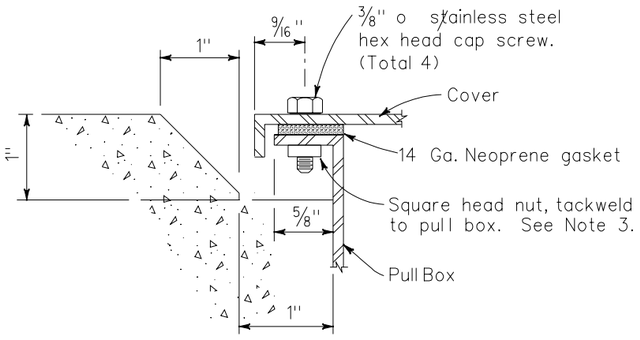


VIEW A-A

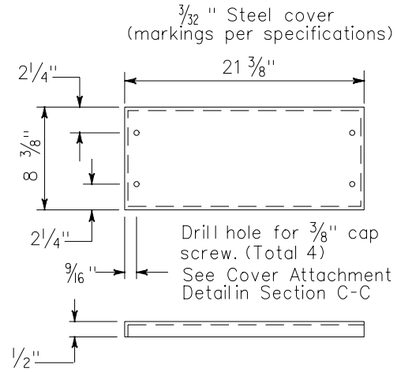
TYPE 2



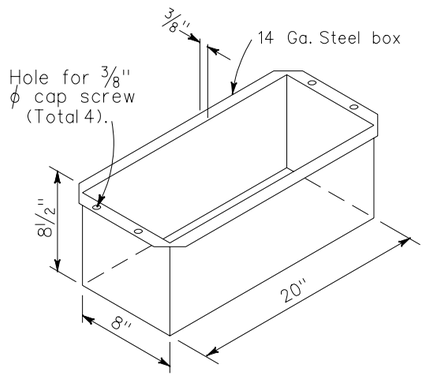
INSTALLATION IN SLOPING PARAPETS



SECTION C-C



COVER DETAILS

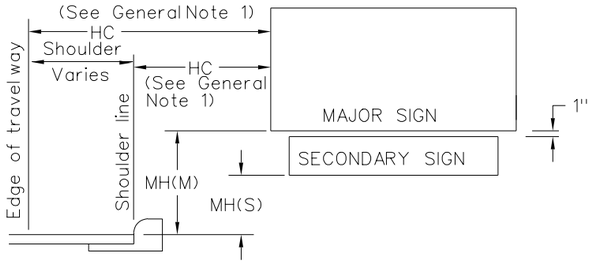


PULL BOX DETAIL

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

BRIDGE / BARRIER RAIL JUNCTION BOX TYPE 1 AND 2

Signed Original On File	T-30.1.20	(623)
CHIEF SAFETY/TRAFFIC ENGR.	ADOPTED: 7/96	REVISION 10/00



SIGN LOCATION (GENERAL)

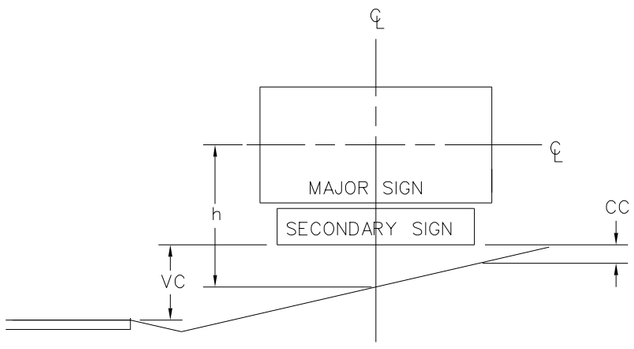
Freeways And Expressways	8' (M) 5' (S)
Commercial, Residential, Curb & Gutter	7' (M) 6' (S)
Rural Roads And Interchange Ramps	7' (M) 6' (S)
Freeway Entrance Assembly	2' (S)

(M) Major Sign (S) Secondary Sign

MINIMUM MOUNTING HEIGHTS (MH)

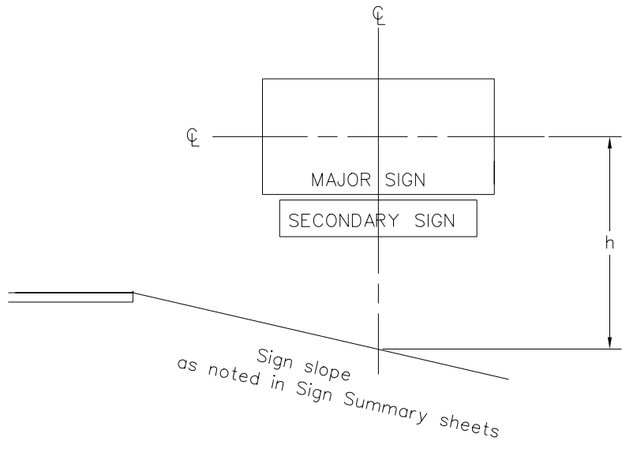
GENERAL NOTES:

1. HC should not be less than 6' from the shoulder line. If no shoulder, HC should not be less than 12' from the edge of travel way. In urban areas, a lesser clearance may be used where necessary.
2. For sign panel bracing details, see T-31.1.4
3. All sign supports shall be of breakaway design.
4. For double post braced supports, maintain HC > clear zone width maximum of 30', except when protected by guardrail or barrier rail. For clear zone widths, refer to AASHTO Roadside Design Guide 1996 Ed. Chapter 3.
5. Sign Island required when h>15'-0", or sign slope is steeper than 1:6, or when required in contract plans.
6. See sheet T-31.1.5 for Sign Island construction.
7. For sign posts, see Post Selection charts, sheet T-31.1.2.
8. For materials not directly specified, see Standard Specifications, & Special Provisions.
9. Sign panels to be aluminum sheet construction.
10. CC-Corner clearance
    HC-Horizontal clearance
    VC-Vertical clearance
11. Prepaint the exposed portion of fastening hardware on the face of the sign panels with baked enamel to match the sign face.



SIGN IN EXCAVATION

NOTES:
1. Min CC=1.0 '
2. Max VC for single sign=10.0'
3. Max VC for double sign =11.0'
4. Max h=15.0'
5. Special design may be necessary if given limits are exceeded.



SIGN IN EMBANKMENT

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

ROADSIDE SIGNS
GENERAL
SIGN LOCATION

Signed Original On File	T-31.1.1	(627)
CHIEF SAFETY/TRAFFIC ENGINEER	ADOPTED: 8/69	REVISION: 8/98

POST SELECTION CHART

SIGN AREA(a) (SQ. FT.)	h(FT.)					
	0'≤h<8'	8'≤h<10'	10'≤h<12'	12'≤h<14'	14'≤h<15'	15'≤h<17'
0≤a<6.5	A	A	A	A	A	B
6.5≤a<8.5	A	A	A	B	B	C
8.5≤a<11	A	A	B	C	C	C
11≤a<13	A	B	C	C	C	D
13≤a<15	A	C	C	D	D	D
15≤a<17	B	C	C	D	D	F
17≤a<19.5	C	C	D	D	D	F
19.5≤a<21.5	C	C	D	E	F	F
21.5≤a<23.5	C	C	D	E	F	F
23.5≤a<43	C	C	E	E	F	F
43≤a<70	E	E	E	E	F	F
70≤a<140	E	E	E	E	F	F
140≤a<200	E	E	E	F	F	F

GENERAL NOTES:

1. Sign area is total of Major & Secondary signs.
2. Alternate posts must be approved by Traffic Engineering.
3. For double post braced supports, maintain HC > clear zone width maximum of 30', except when protected by guardrail or barrier rail. For clear zone widths, refer to AASHTO Roadside Design Guide 1996 Ed. Chapter 3.

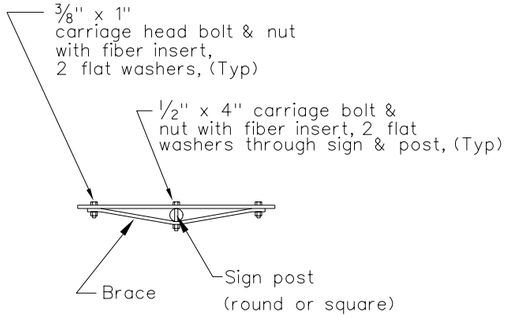
POST SELECTION CHART

POST TYPE	DESCRIPTION	REFERENCE SHEET
A	2½" Square Metal Post (12 gage)-single post	T-31.2.1
B	2½" Square Metal Post (10 gage)-single post	T-31.2.1
C	Single Post Unbraced 3" Dia Round Metal Post	T-31.3.1 thru T-31.3.2
D	Double Post Unbraced 3" Dia Round Metal Post	T-31.3.1 thru T-31.3.2
E	Double Post Braced (See Note 3) Post-3" Dia Round Metal Post Brace-3" Dia Round Metal Post	T-31.4.1 thru T-31.4.3
F	Special Design: contact Traffic Engineering	

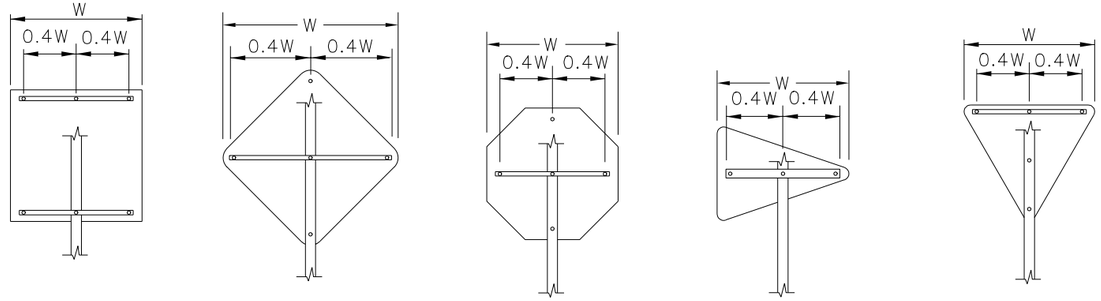
STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

ROADSIDE SIGNS
GENERAL
POST SELECTION CHARTS

Signed Original On File	T-31.1.2 (627)	
CHIEF SAFETY/TRAFFIC ENGINEER	ADOPTED: 7/96	REVISION: 8/98



TOP VIEW
(ALL PANELS)

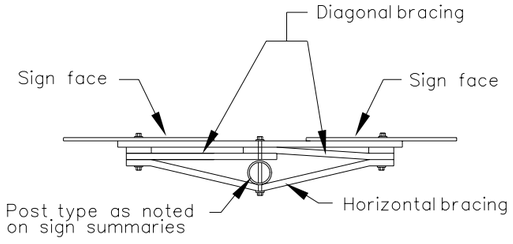


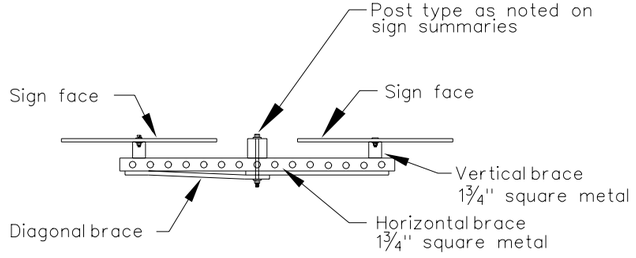
TYPICAL SINGLE PANEL BRACING

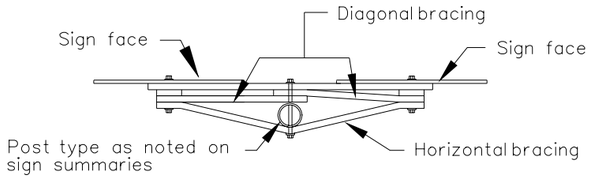
GENERAL NOTES:

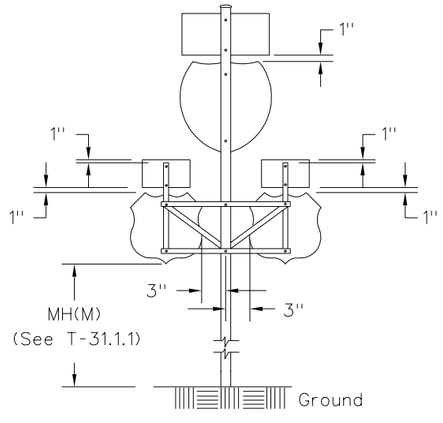
1. Brace(s) required if W>3'-0". Install as shown.
2. Brace: 3/8" x 1 1/4" aluminum alloy.
3. Cost for bracing is included in sign.

TYPICAL MULTIPLE PANEL BRACING

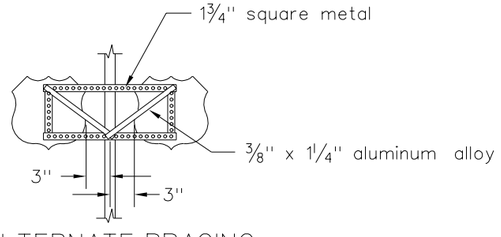




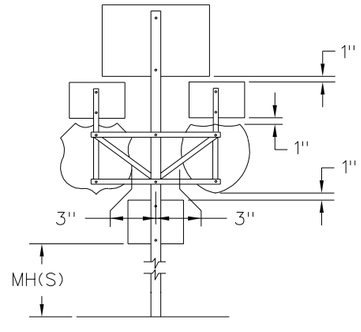




TYPICAL ROUTE MARKER ASSEMBLY



ALTERNATE BRACING
SQUARE METAL POST

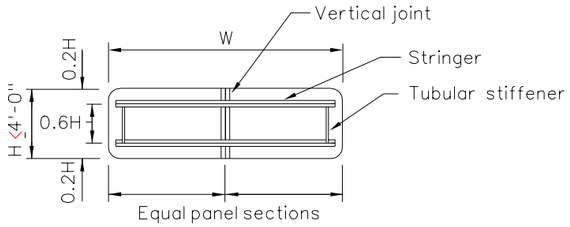


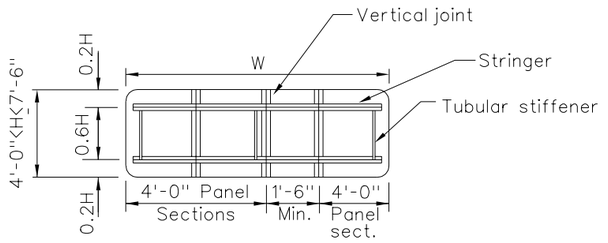
TYPICAL
FREEWAY ENTRANCE

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

ROADSIDE SIGNS
GENERAL
SIGN PANEL BRACING

Signed Original On File	T-31.1.3 (627)	
CHIEF SAFETY/TRAFFIC ENGINEER	ADOPTED: 7/96	REVISION: 8/98

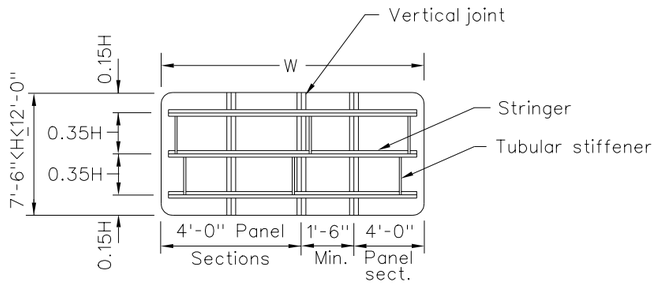




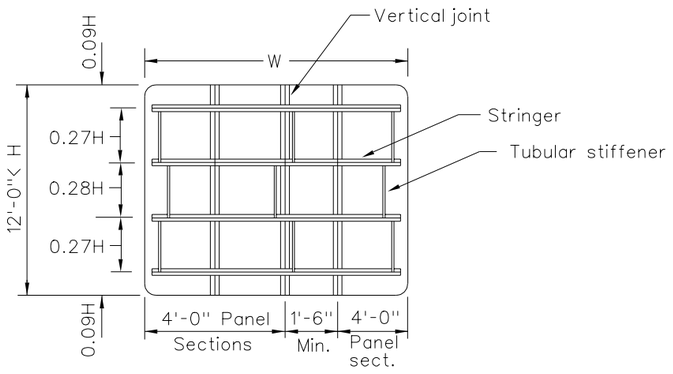
2 STRINGER MOUNTING

GENERAL NOTES:

1. Stringers: 3" X $2\frac{11}{16}$ " X $\frac{1}{4}$" or 2-11/16" X $2\frac{11}{16}$ X $\frac{1}{4}$" aluminum alloy z-bar.
2. Stringers required on all signs requiring multiple posts.
3. Tubular stiffeners required when W>3.0m
4. Cost for bracing is included in sign.
5. One vertical joint if W exceeds 12'. Two vertical joints if W exceeds 24'.
6. For alternate steel tube bracing, see Standard Plan Drawing T-31.1.5.



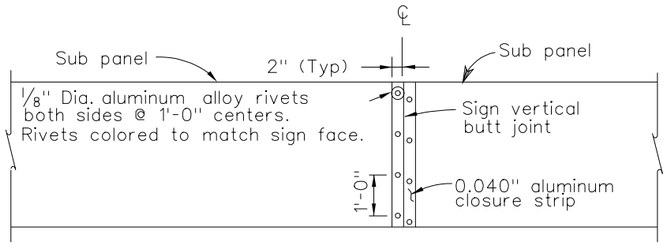
3 STRINGER MOUNTING



4 STRINGER MOUNTING

NOTE: To obtain desired panel width, Max. of 2 panels may be cut less than 4'-0", (1'-6" Min. each)

SUB PANEL ASSEMBLY & Z BAR BRACING

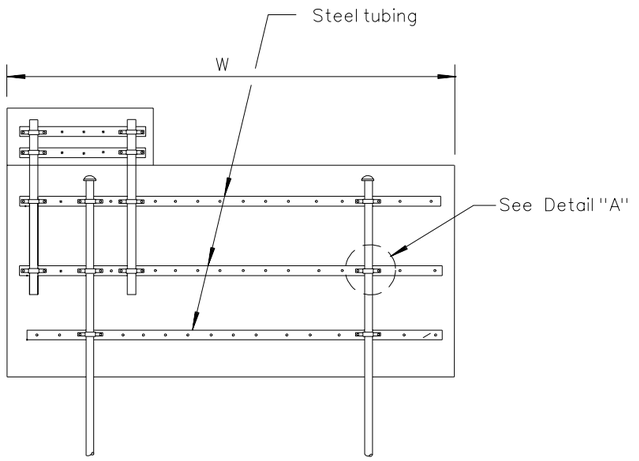


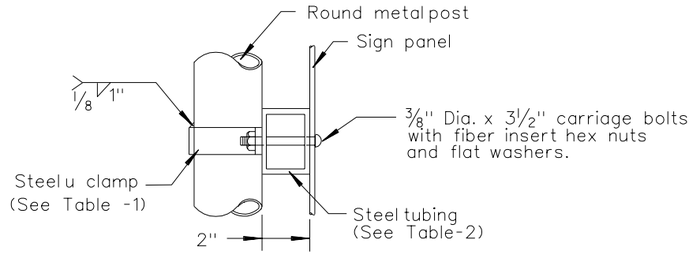
VERTICAL JOINT CLOSURE STRIP

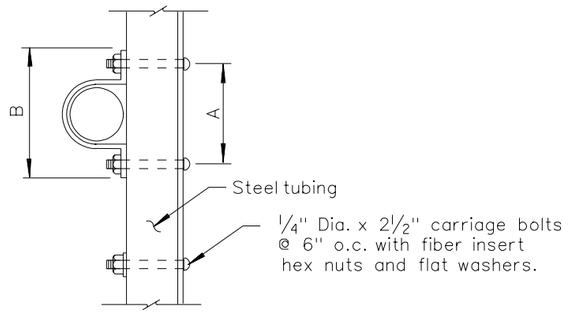
STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

ROADSIDE SIGNS
GENERAL
SIGN PANEL BRACING

Signed Original On File	T-31.1.4 (627)
CHIEF SAFETY/TRAFFIC ENGINEER	ADOPTED: 8/69 REVISION: 8/98

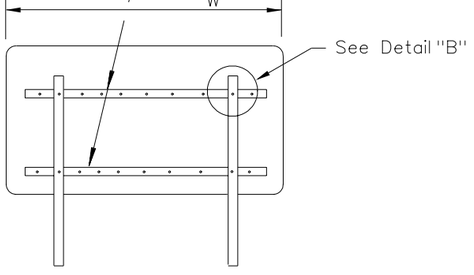


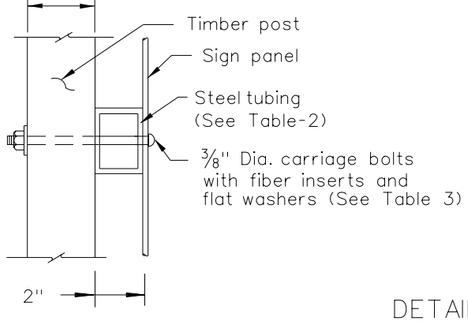


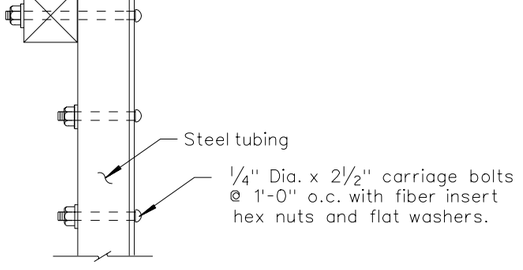


DETAIL "A"

(STEEL TUBE BRACING ON ROUND METAL POSTS)







DETAIL "B"

STEEL TUBE BRACING ON WOOD POSTS

GENERAL NOTES:

1. For sub-panel assembly, & vertical joint closure strip details, see Standard Plan Drawing T-31.1.4.

TABLE - 1 (Clamp Sizes)				
PIPE DIA.	O.D.	A	B	CLAMPSTOCK
3" Nom.	3 1/2"	5 3/16"	6 13/16"	1/4" x 1 1/2"

TABLE - 2 (Tubing Size)	
SIGN WIDTH (W)	TUBING SIZE
24' or Less	3"x2"x3/16"
24' to 28'	4"x2"x3/16"

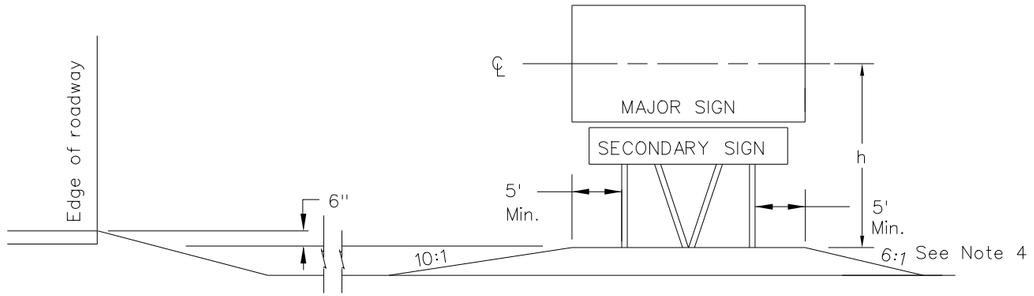
TABLE - 3		
POST SIZE	"D"	BOLT SIZE
4"x4"	3 1/2"	3/8"Dia. x 6 1/4"
4"x6"	5 1/2"	3/8"Dia. x 6 1/4"
6"x6"	5 1/2"	3/8"Dia. x 8 1/4"
6"x8"	7 1/2"	3/8"Dia. x 10 1/4"

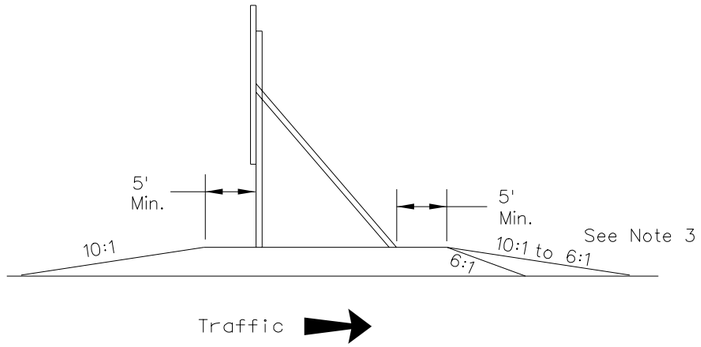
STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

ROADSIDE SIGNS GENERAL SIGN PANEL BRACING

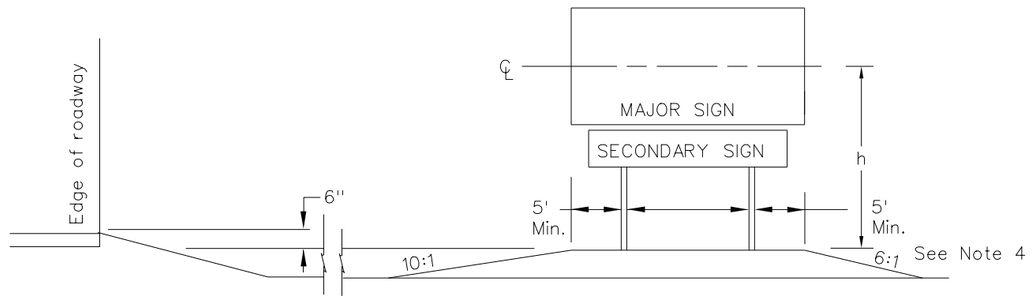
Signed Original On File
CHIEF SAFETY/TRAFFIC ENGR.

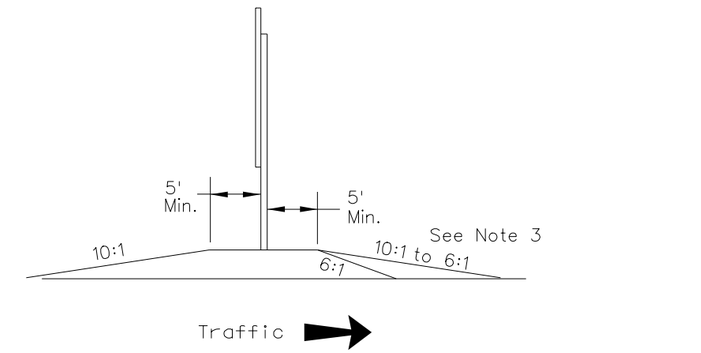
T-31.1.5 (627)
ADOPTED:8/82
REVISION 8/98



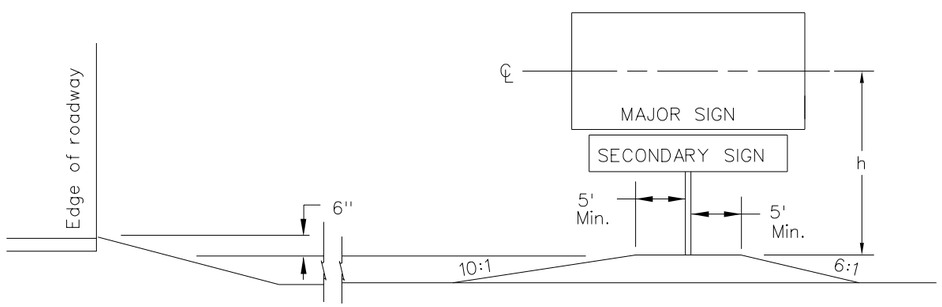


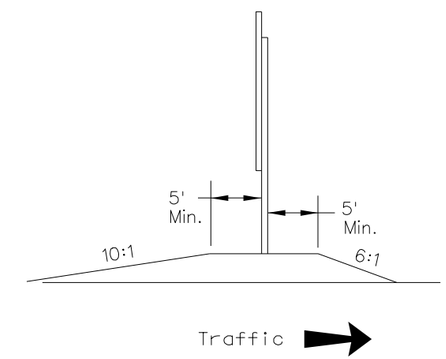
DOUBLE POST BRACED





DOUBLE POST UNBRACED





SINGLE POST

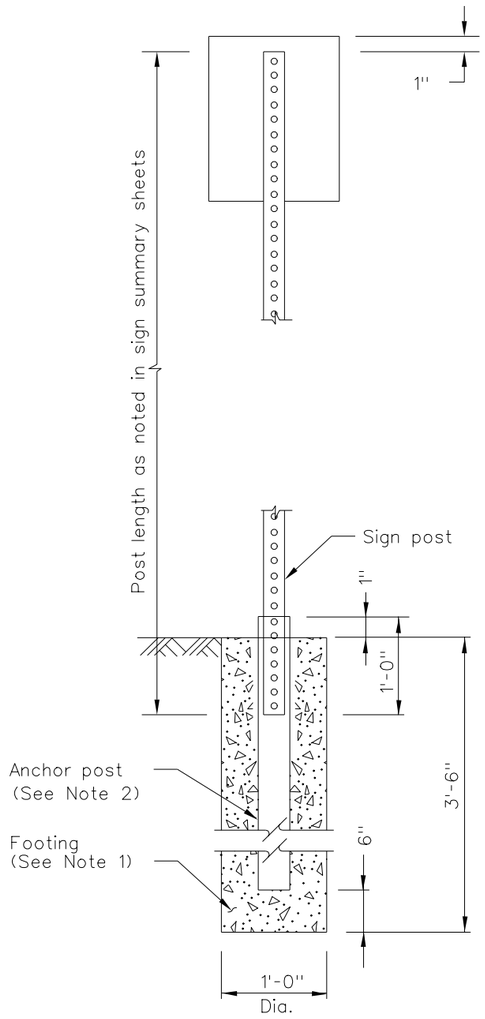
GENERAL NOTES:

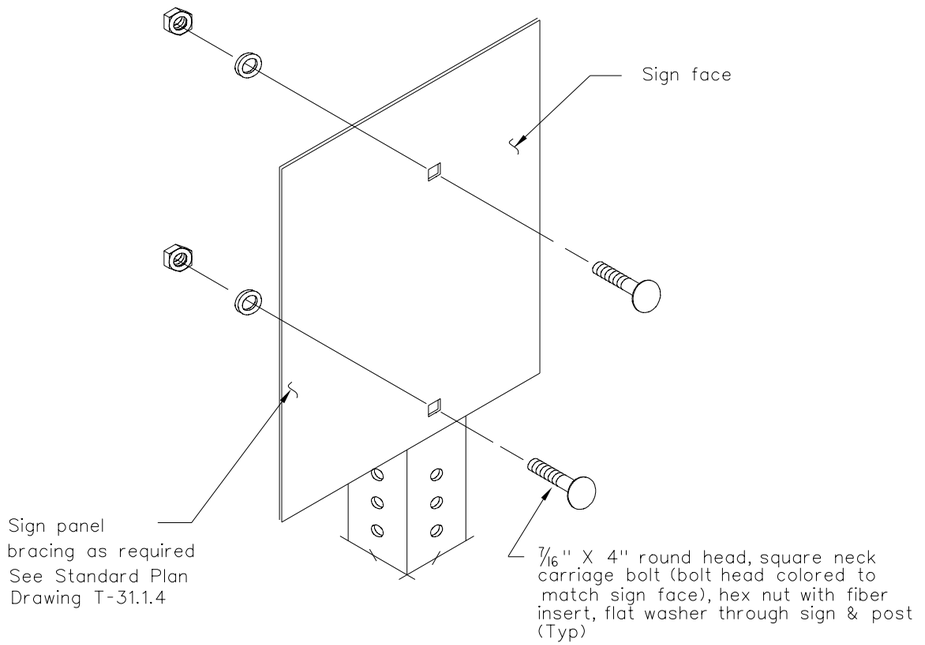
1. Sign islands to be compacted to 95%.
2. Payment for sign island will be as noted in contract plans and Special Provisions.
3. Undivided routes use 10:1. All divided routes use 6:1.
4. Use 2:1 max for narrow right-of-ways or 6:1 preferred for all others.

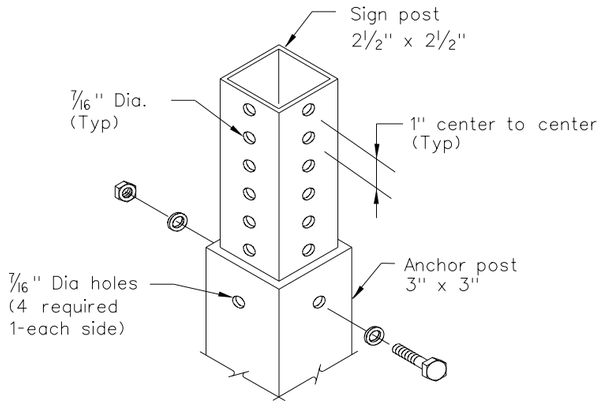
STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

ROADSIDE SIGNS
GENERAL
SIGN ISLANDS

Signed Original On File	T-31.1.6	(627)
CHIEF SAFETY/TRAFFIC ENGR.	ADOPTED: 10/68	REVISION: 6/00







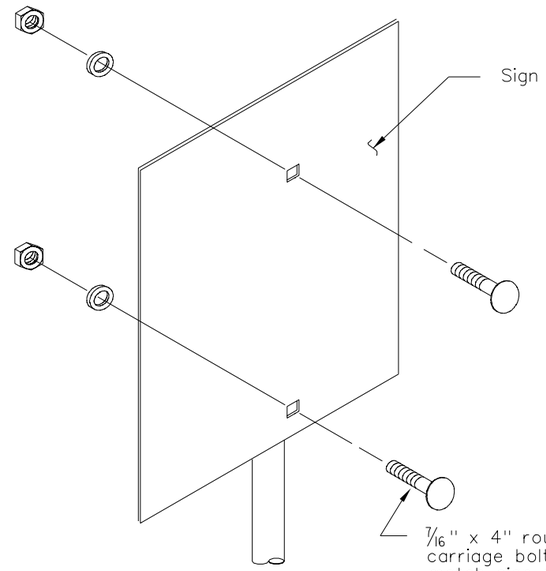
GENERAL NOTES:

1. Footings to be drilled holes as shown, & filled with class A or class AA concrete.
2. Anchor post included in cost of sign post.
3. For details on sign location, post type, panel bracing, and sign islands, See Standard Plan Drawings T-31.1.1 through T-31.1.6.

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

ROADSIDE SIGNS
SQUARE METAL POSTS

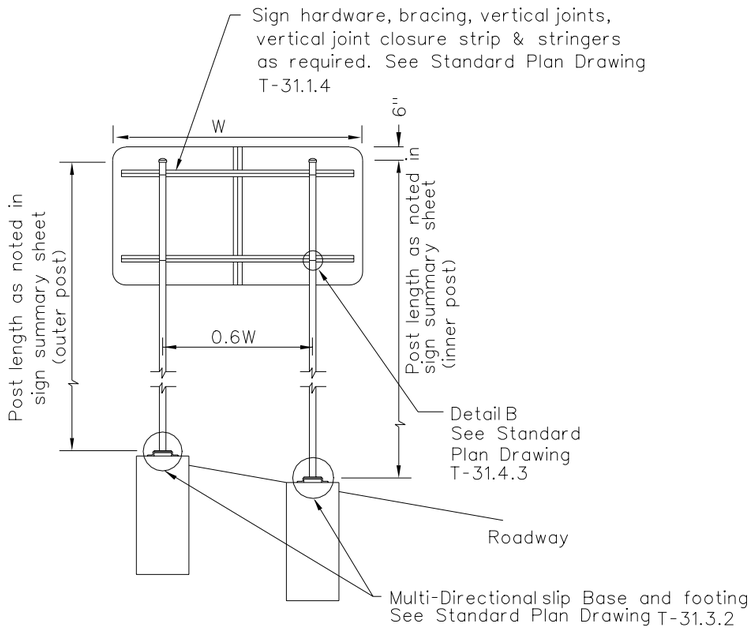
Signed Original On File	T-31.2.1	(627)
CHIEF SAFETY/TRAFFIC ENGINEER	ADOPTED: 8/98	REVISION



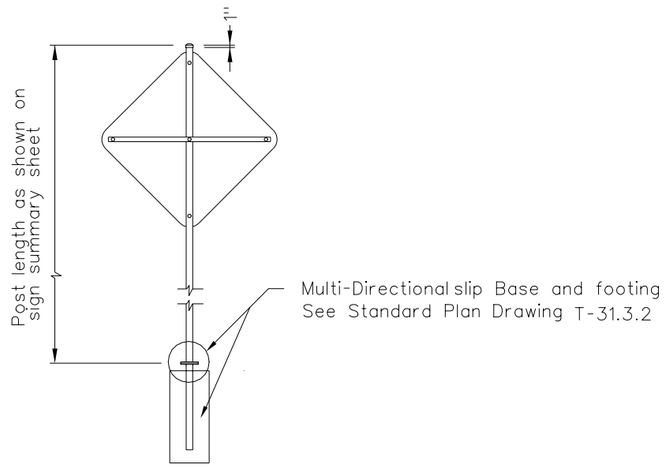
7/16" x 4" round head, square neck carriage bolt (bolt head colored to match sign face), hex nut with fiber insert, flat washer through sign & post (Typ)

GENERAL NOTES:

1. Anchor post included in cost of sign post.
2. For details on sign location, post type, panel bracing, and sign islands, See Standard Plan Drawings T-31.1.1 through T-31.1.6.
3. Inner posts are those closest to roadway, and the outer posts are those farthest away.



DOUBLE POST UNBRACED

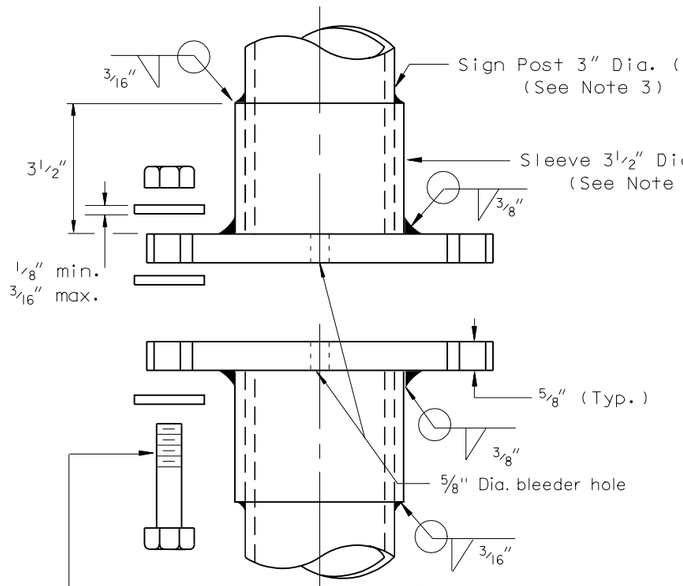


SINGLE POST

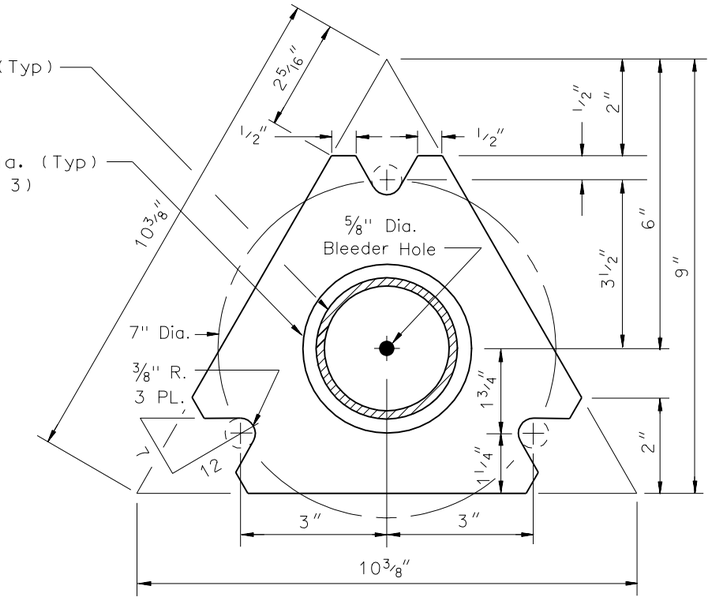
STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

ROADSIDE SIGNS
ROUND METAL POSTS
UNBRACED

Signed Original On File	T-31.3.1	(627)
CHIEF SAFETY/TRAFFIC ENGR.	ADOPTED: 8/98	REVISION:



ASSEMBLY ELEVATION VIEW



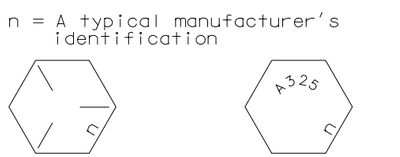
PLAN VIEW
TOP/BOTTOM PLATE

Plate Thickness = 5/8"

5/8" -11 x 3 1/8" Bolt, Type 1 ASTM A 325 or Type 1 ASTM A 449 (grade 5); Each With Three USS Through Hardened Washers ASTM F 436 Type 1; And One Nylon Insert Stop Nut ASTM A 563 DH. All items shall be galvanized as per manufacturer's specifications. Torque within the range of 24 - 29 Ft-Lb. See BOLT DETAIL below.

GENERAL NOTE:

1. All parts and hardware shall be galvanized as per Section 715 of the Nevada DOT Standard Specifications, except as noted.
2. Multi-directional slip bases are not required behind concrete barrier rail or behind guardrail where the sign post is greater than 2'-6" from the back side of the guardrail post.
3. Use standard weight pipe for sign post and sleeve. See ASTM A 53.
4. For details on sign location, post type, panel bracing, and sign islands, see Standard Plan Drawings T-31.1.1 through T-31.1.6.

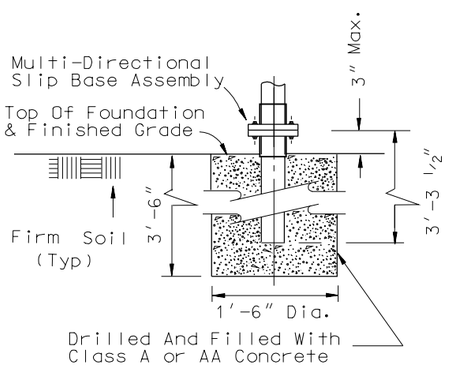


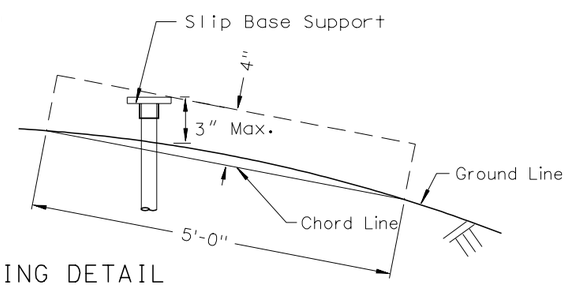
Type 1 ASTM A449
5/8" X 3 1/8" bolt

Type 1 ASTM A325
5/8" X 3 1/8" bolt

TOP VIEW

BOLT DETAIL





FOOTING DETAIL

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

ROADSIDE SIGNS
ROUND METAL POSTS
MULTI-DIRECTIONAL
SLIP BASE

Signed Original On File	T-31.3.2 (627 715)	
CHIEF SAFETY/TRAFFIC ENGR.	ADOPTED: 7/96	REVISION 9/00

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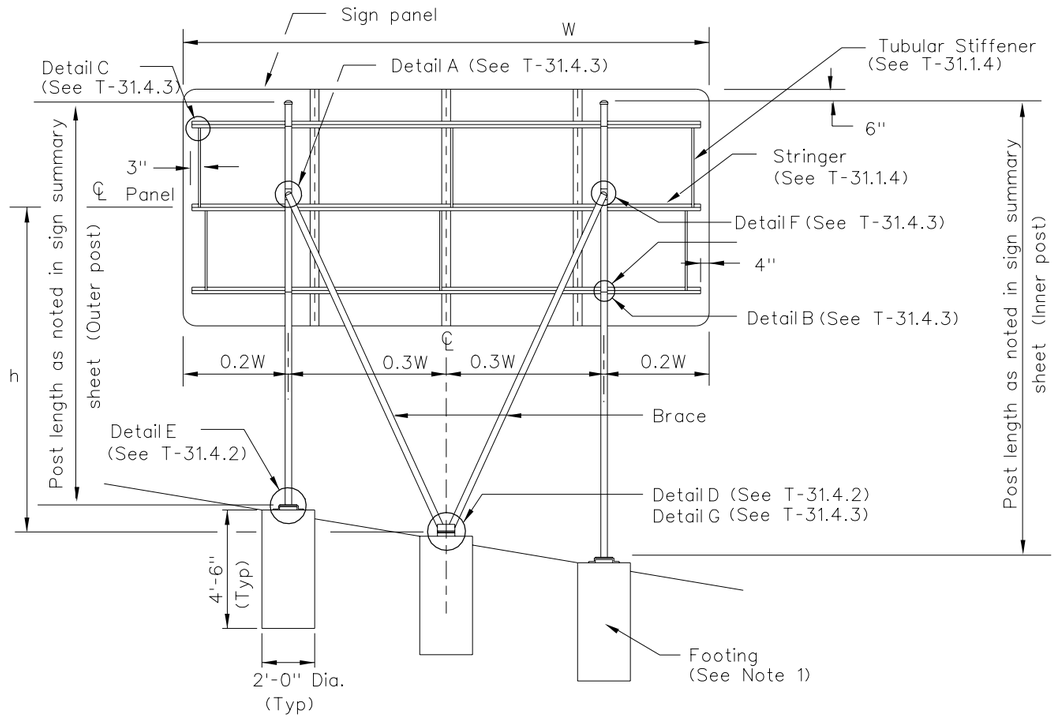
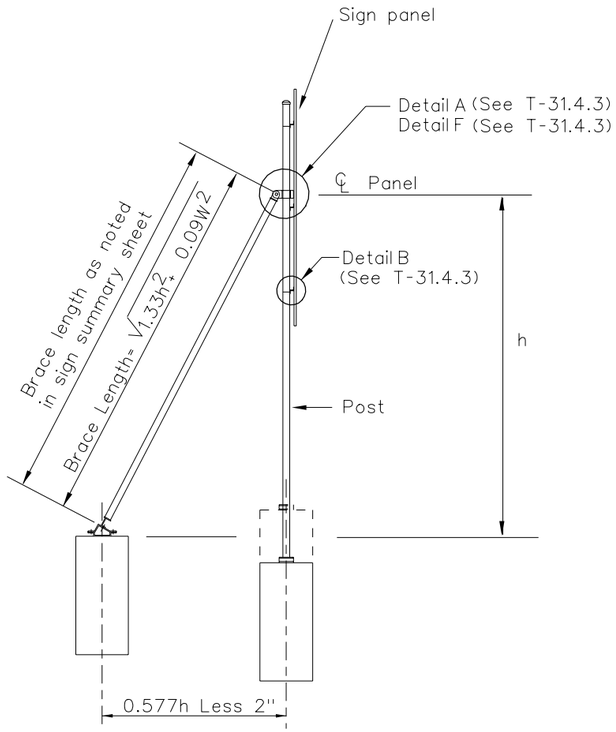
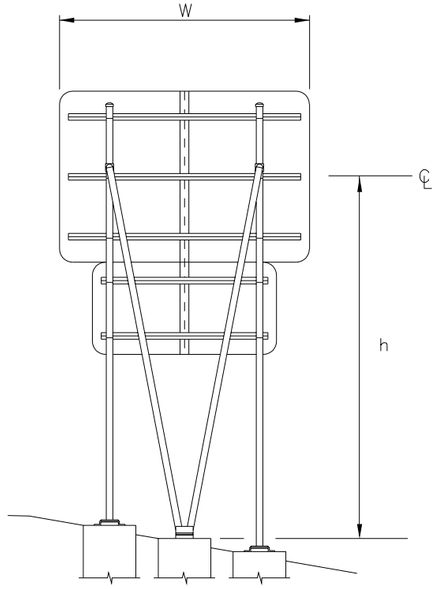
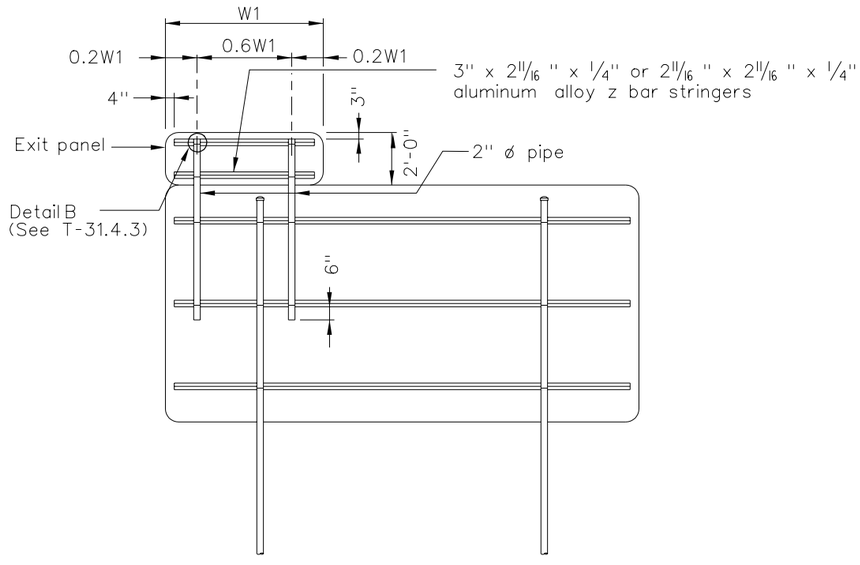


SINGLE SIGN





DOUBLE SIGN



EXIT PANEL ATTACHMENT

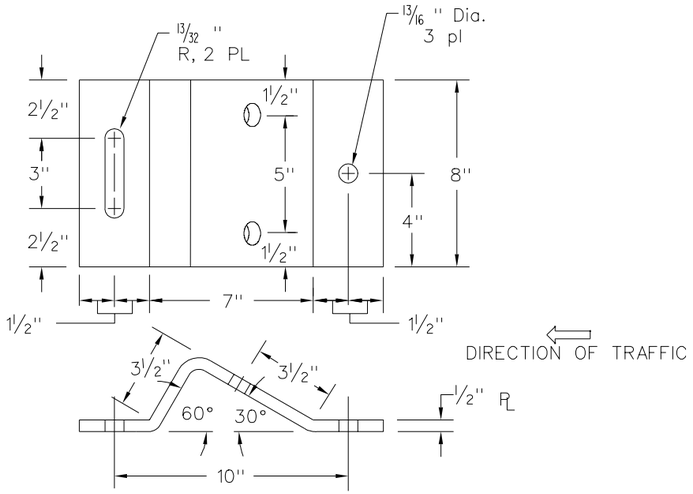
GENERAL NOTES:

1. Footings to be drilled holes as shown, & filled with Class A or Class AA concrete.
2. Anchor post & bracing included in cost of sign post.
3. For details on sign location, post type, panel bracing, and sign islands, see Standard Plan Drawings T-31.1.1 through T-31.1.6.
4. Inner posts are those closest to the roadway, and the outer posts are those farthest away.

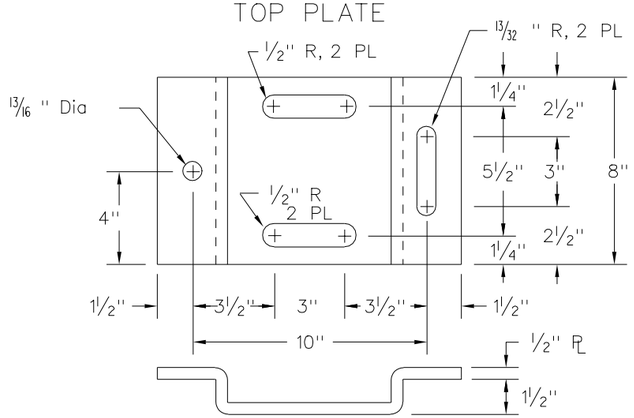
STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

ROADSIDE SIGNS ROUND METAL POSTS BRACED

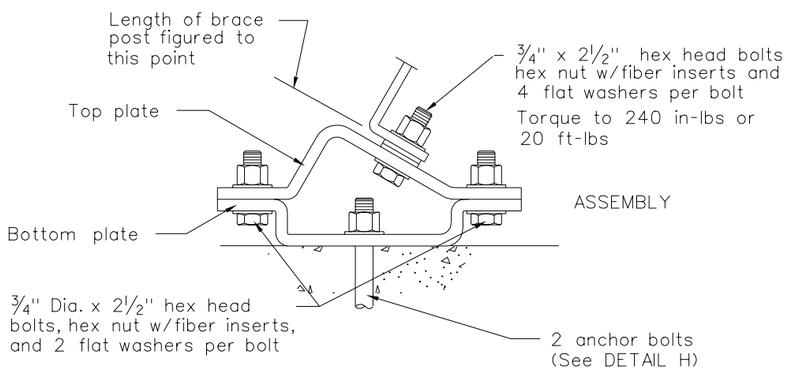
Signed Original On File	T-31.4.1	(627)
CHIEF SAFETY/TRAFFIC ENGR.	ADOPTED: 8/98	REVISION:



TOP PLATE

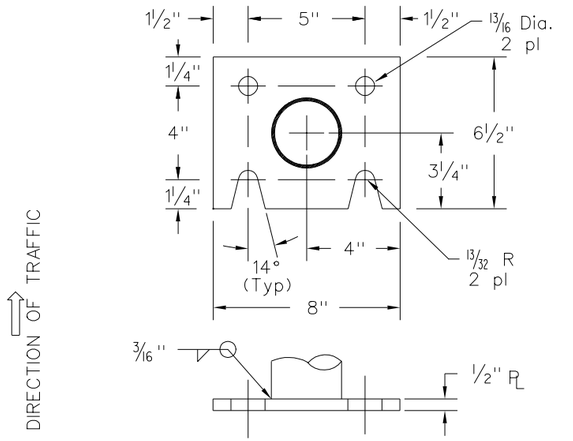


BOTTOM PLATE

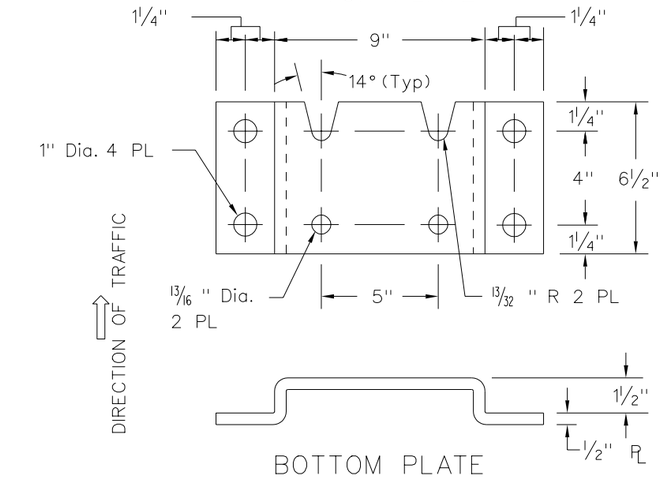


DETAIL "D" (BRACE)

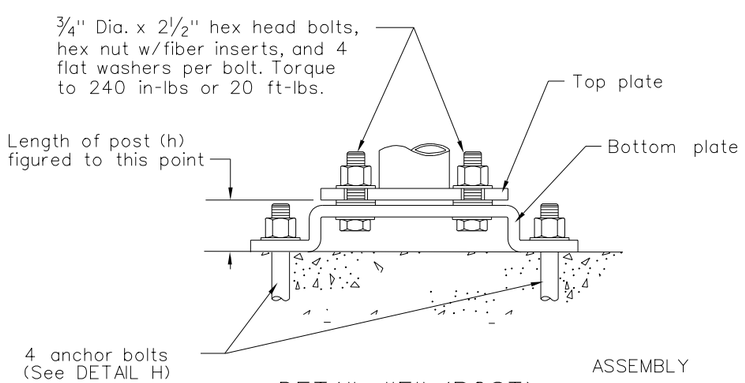
For details on sign location, post type, panel bracing, and sign islands, see Standard Plan Drawings T-31.1.1 through T-31.1.6.



TOP PLATE

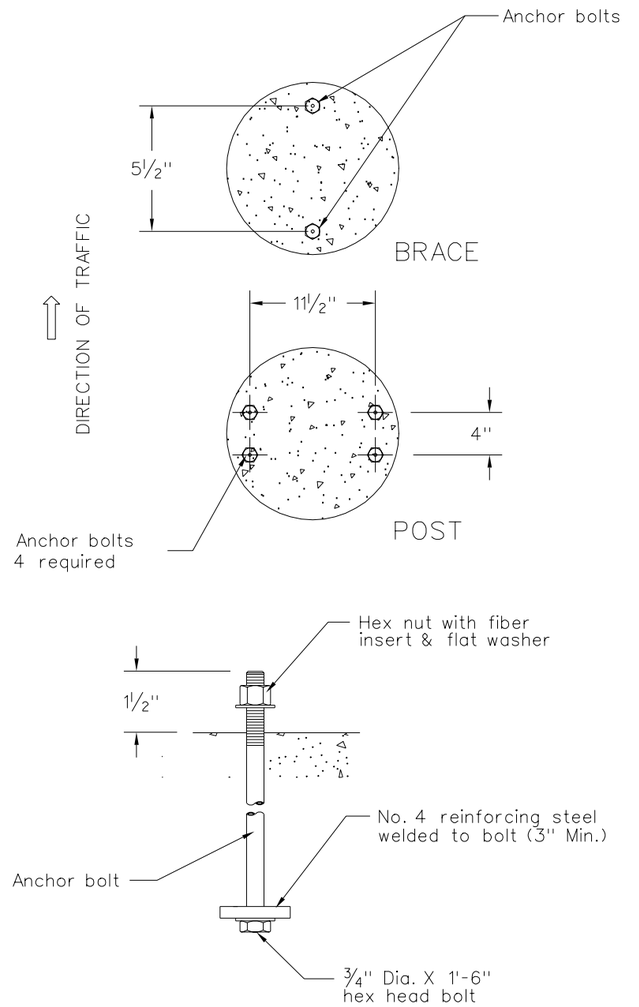


BOTTOM PLATE



DETAIL "E" (POST)

For details on sign location, post type, panel bracing, and sign islands, see Standard Plan Drawings T-31.1.1 through T-31.1.6.



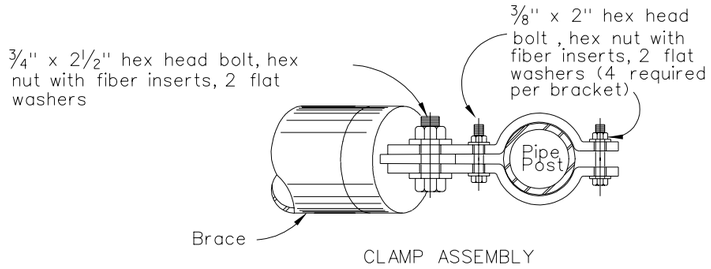
DETAIL "H" (ANCHOR BOLTS)

For details on sign location, post type, panel bracing, and sign islands, see Standard Plan Drawings T-31.1.1 through T-31.1.6.

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

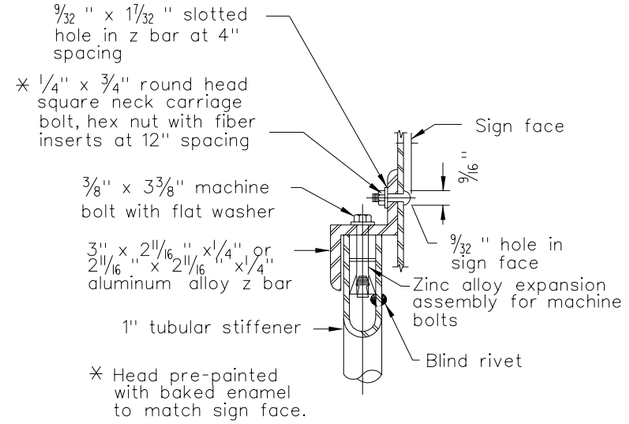
ROADSIDE SIGNS
ROUND METAL POSTS
BRACED

Signed Original On File	T-31.4.2	(627)
CHIEF SAFETY/TRAFFIC ENGR.	ADOPTED: 8/98	REVISION:



CLAMP ASSEMBLY

DETAIL A

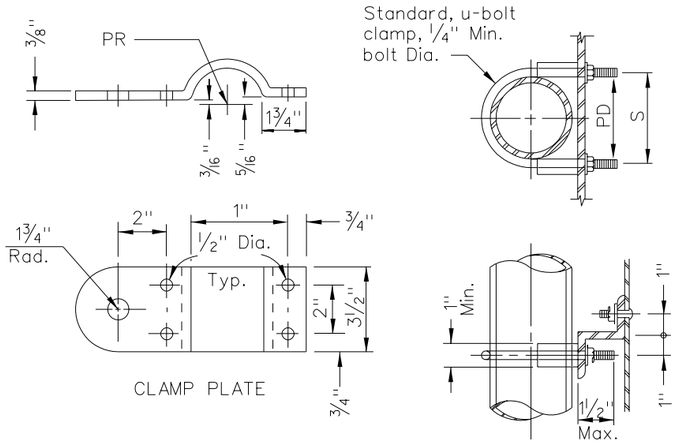


DETAIL C

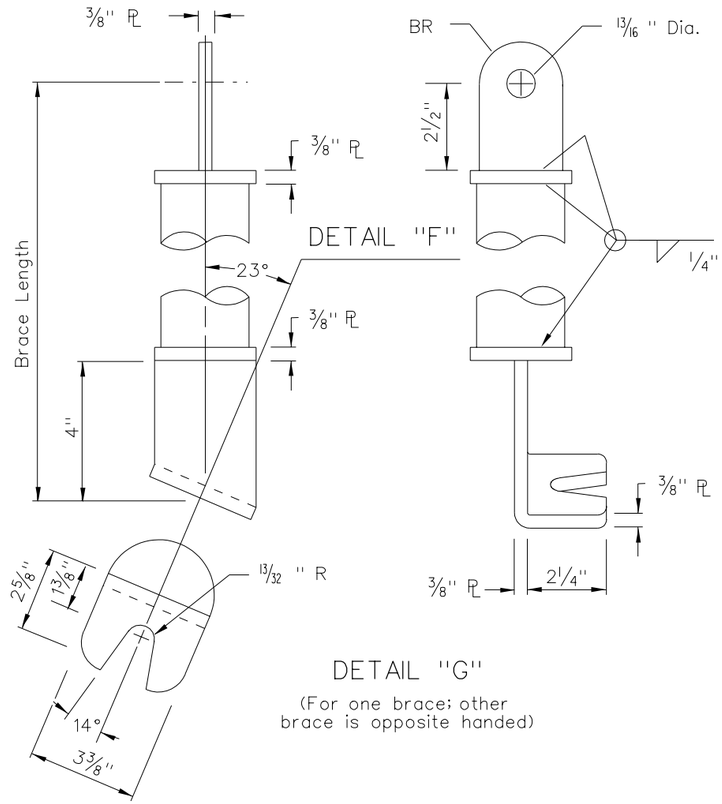
POST Nom. Dia.	PR	PD	S
1"	21/32 "	1 5/16 "	1 9/16 "
2"	1 13/16 "	2 3/8"	2 5/8"
3"	1 3/4"	3 1/2"	3 3/4"

GENERAL NOTES:

1. For details on sign location, post type, panel bracing, and sign islands, see Standard Plan Drawings T-31.1.1 through T31.1.6.



DETAIL B



DETAIL "G"

(For one brace; other brace is opposite handed)

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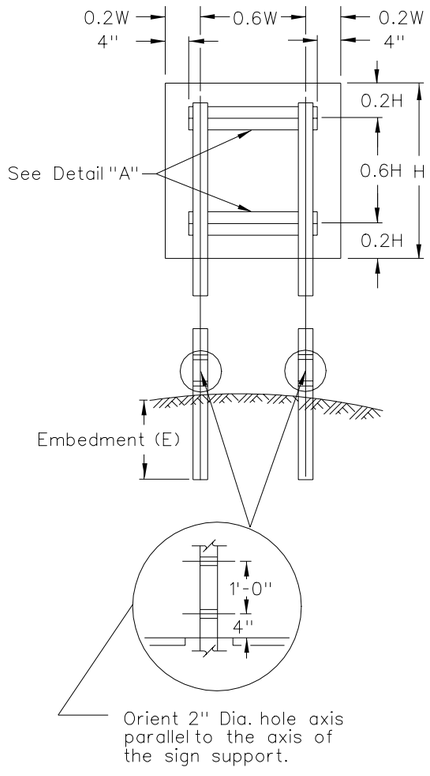
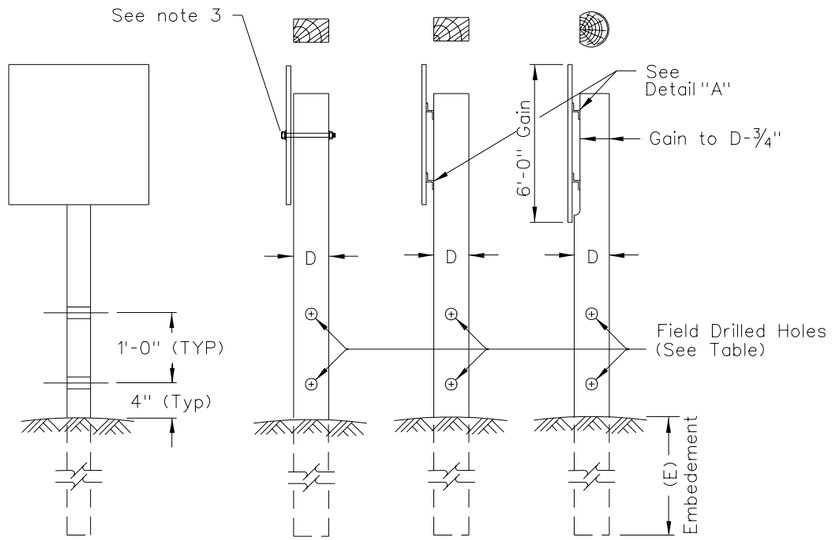
STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

ROADSIDE SIGNS
ROUND METAL POSTS
BRACED

Signed Original On File	T-31.4.3	(627)
CHIEF SAFETY/TRAFFIC ENGINEER	ADOPTED: 8/98	REVISION:





GENERAL NOTES:

1. All posts with cross sectional area larger than 4" x 4" are to be drilled as shown.
2. For details on sign location, post type, panel bracing, and sign islands, see Standard Plan Drawings T-31.1.1 through T-31.1.6.
3. "Z" bars will be used on all signs requiring two posts.
4. For double post installations, inner posts are those closest to roadway, and outer posts are those farthest away.

Sign Post Embedments	
4" x 4" = 3'-0"	4" x 6" = 4'-0"
6" x 6" = 5'-0"	6" x 8" = 6'-0"

RECTANGULAR TIMBER POST SELECTION

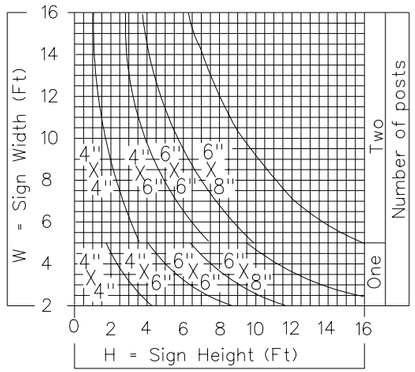
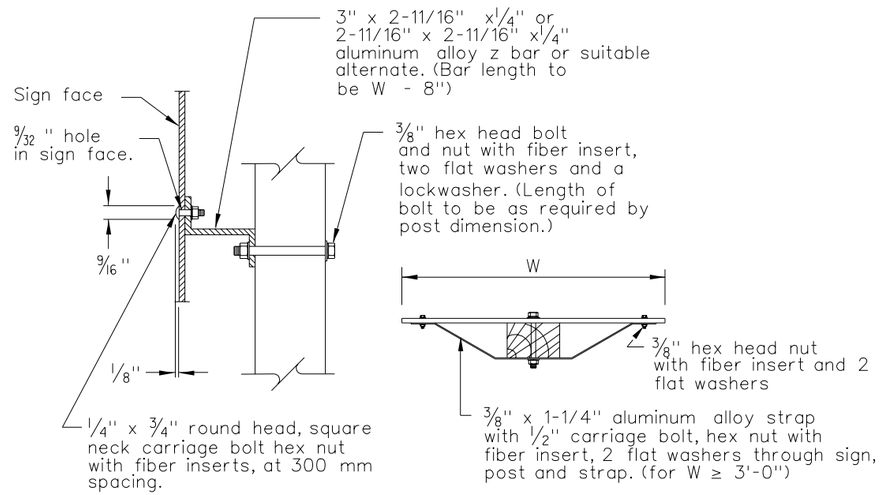


TABLE of HOLE DIAMETERS		
Post Size (D)	< 4" x 4" or 4" Dia.	> 4" x 4" or 4" Dia.
Hole Dia.	No Hole	2"

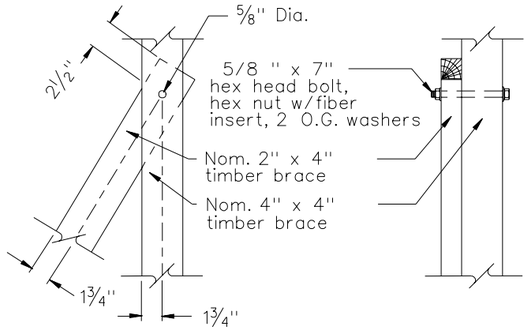


DETAIL "A"

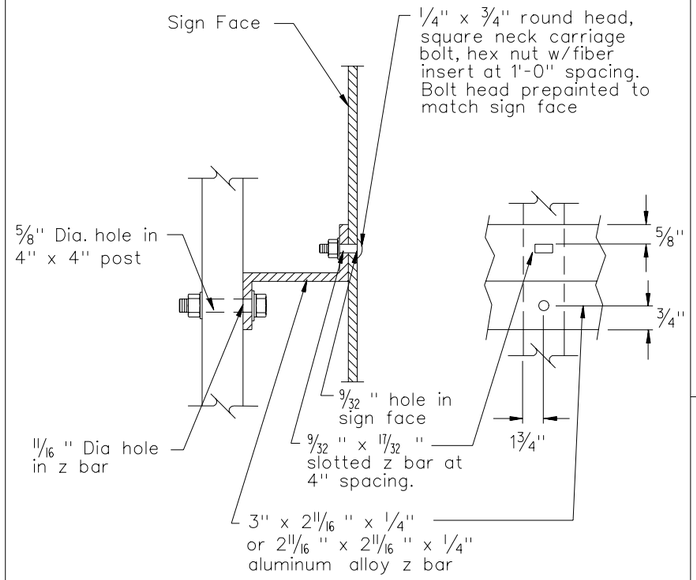
STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

ROADSIDE SIGNS
TIMBER
GENERAL

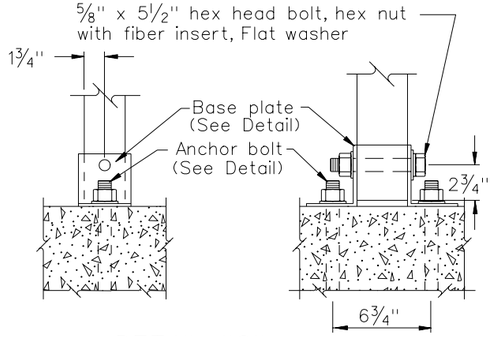
Signed Original On File	T-31.5.1	(627)
CHIEF SAFETY/TRAFFIC ENGINEER	ADOPTED: 8/98	REVISION:



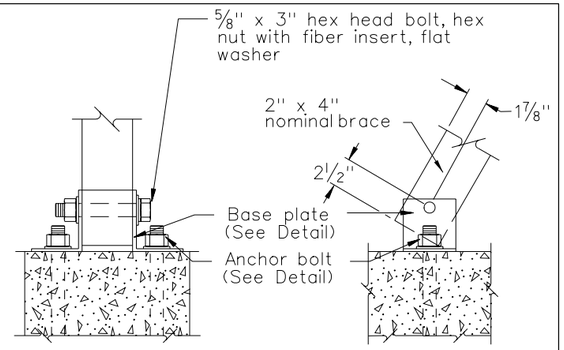
DETAIL "A"



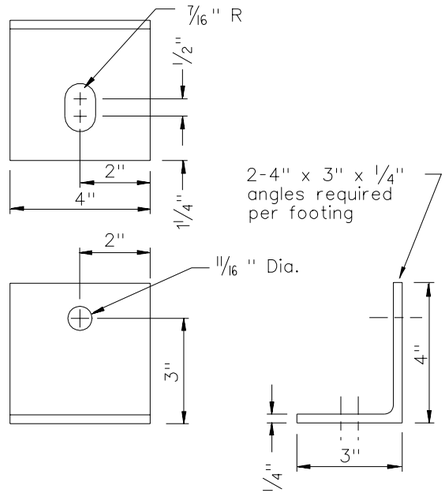
DETAIL "B"



DETAIL "C"



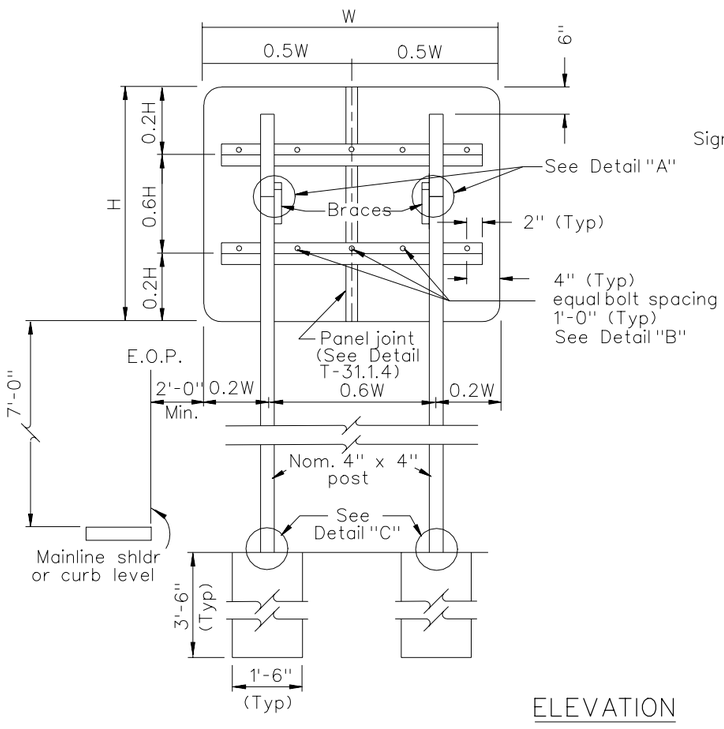
DETAIL "D"



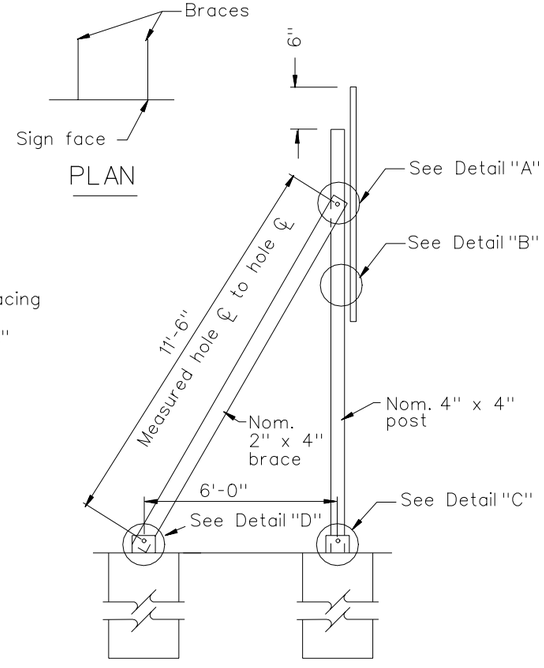
BASE PLATE DETAIL

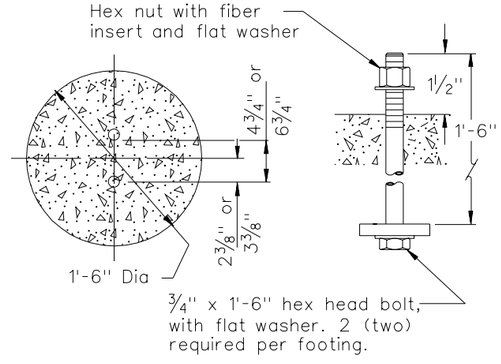
GENERAL NOTES:

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 - 1'-6" diameter, 3'-6" deep, filled with Class A, or Class AA concrete.
4. For details on sign location, post type, panel bracing, and sign islands, see Standard Plan Drawings T-31.1.1 through T-31.1.6.



ELEVATION



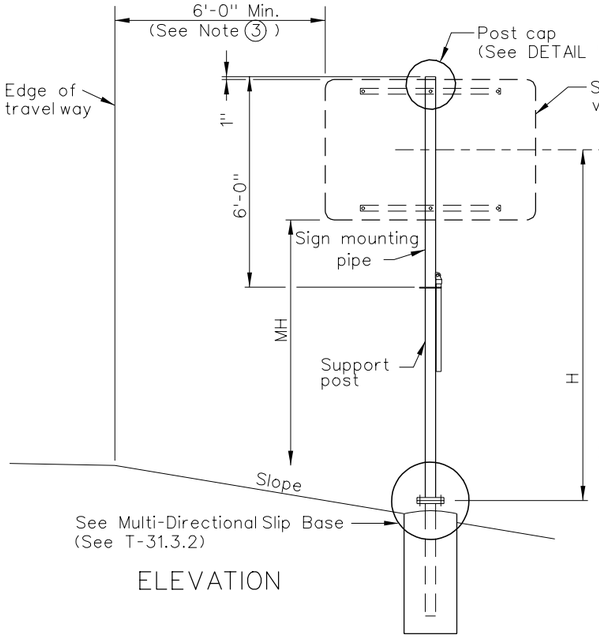


ANCHOR BOLTS DETAIL

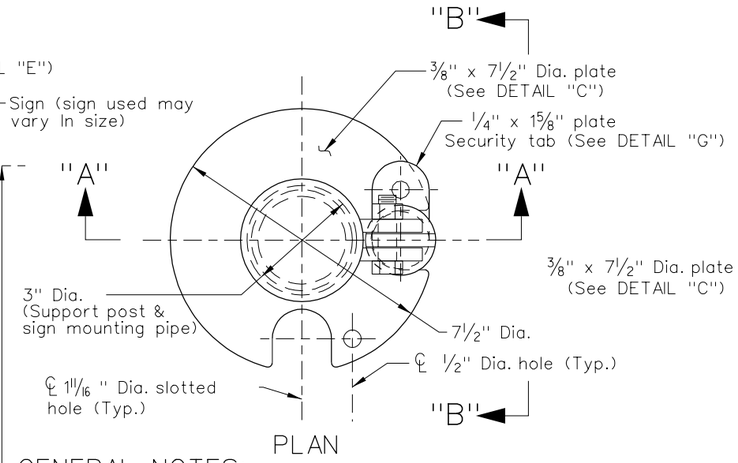
STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

ROADSIDE SIGNS
TIMBER GORE SIGNS

Signed Original On File	T-31.5.2 (627)
CHIEF SAFETY/TRAFFIC ENGINEER	ADOPTED: 8/98 REVISION:



ELEVATION



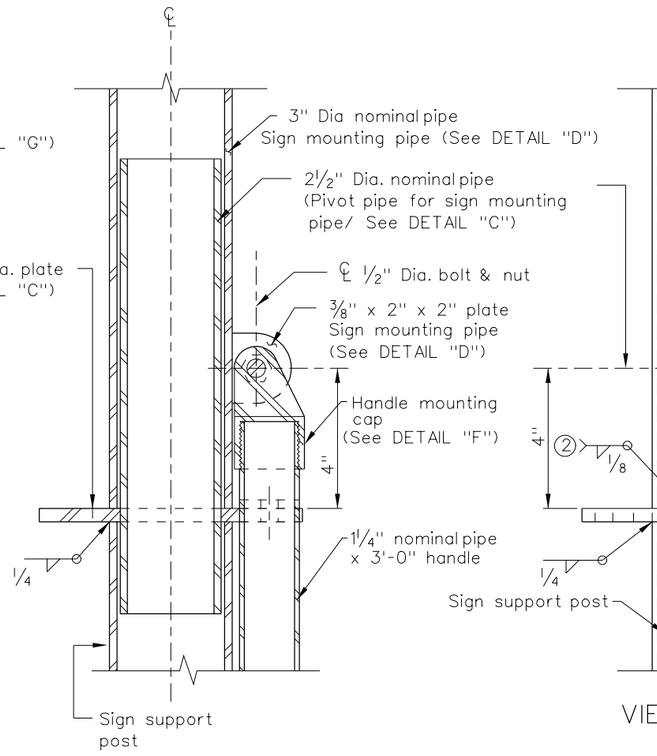
PLAN

GENERAL NOTES:

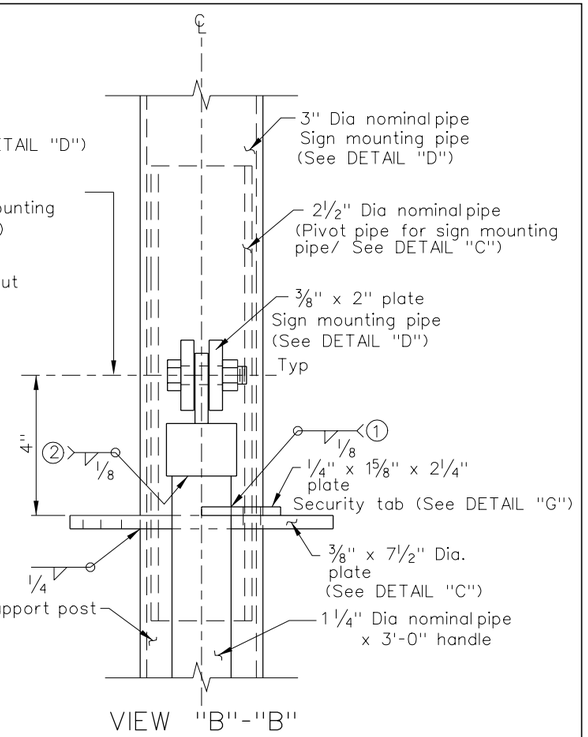
① Weld in field or after pre-assembly of other components in shop.

② Tack weld at 1" increments, after 1/2" diameter hole alignment, of security tab and pivot base plate.

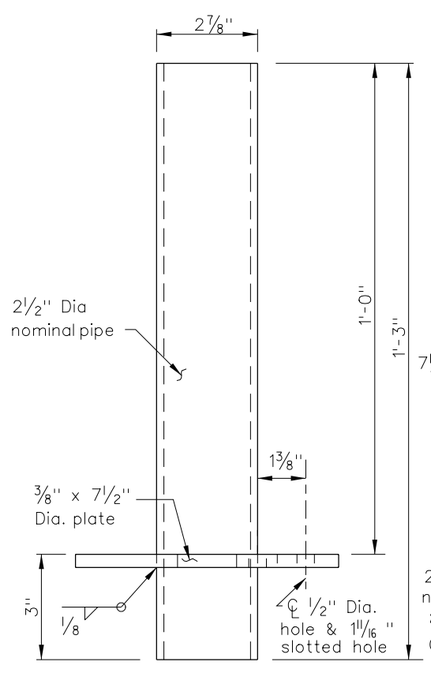
③ For details on sign location, post type, panel bracing, and sign islands, see Standard Plan Drawings T-31.1.1 through T-31.1.6.



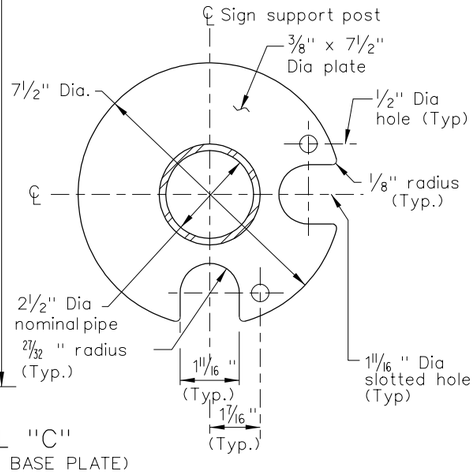
SECTION "A"-"A"

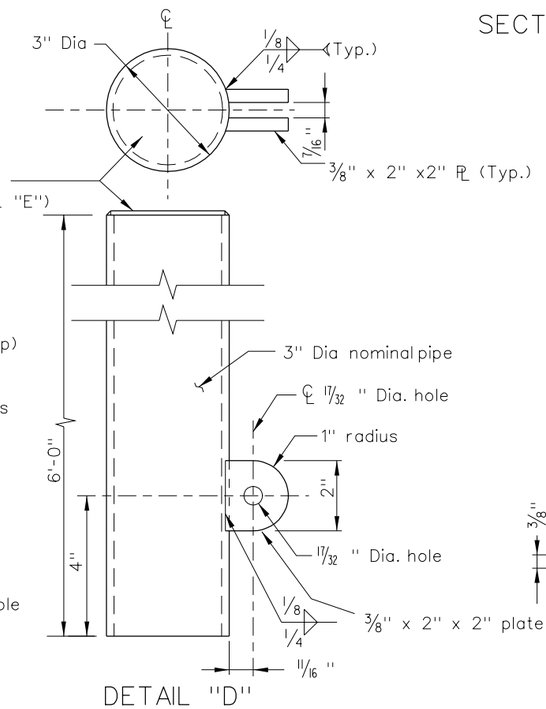


VIEW "B"-"B"

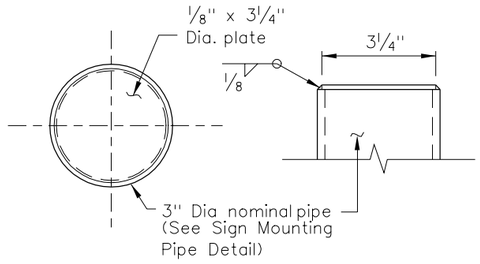


DETAIL "C"
(PIVOT PIPE & BASE PLATE)

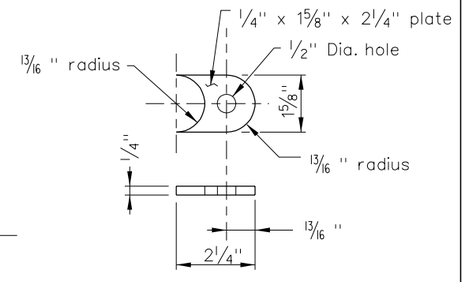




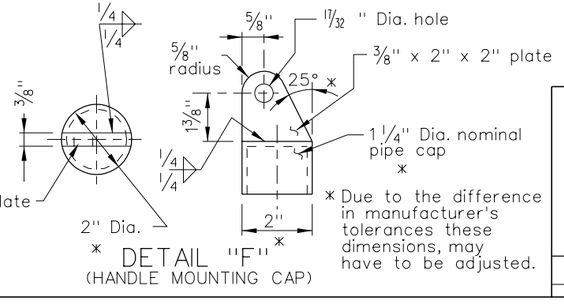
DETAIL "D"



DETAIL "E"



DETAIL "G"



DETAIL "F"
(HANDLE MOUNTING CAP)

* Due to the difference in manufacturer's tolerances these dimensions, may have to be adjusted.

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

ROADSIDE SIGNS
SPECIAL PIVOT POST

Signed Original On File	T-31.6.1 (627)
CHIEF SAFETY/TRAFFIC ENGINEER	ADOPTED: 8/98 REVISION:

(1) ADVANCE WARNING SIGN SPACING

SPEED (mph)	DISTANCE BETWEEN SIGNS (ft)		
	A	B	C
0-20	200	200	200
25-30	300	300	300
35-40	400	400	400
45-50	600	600	600
55-75	1000	1600	2600

(2) TAPER LENGTH AND CHANNELIZING DEVICE SPACING

SPEED (mph)	LENGTH FOR MERGING TAPER (L) LANE WIDTH			DEVICE SPACING (ft)
	10.0ft	11.0ft	12.0ft	
20	80	80	80	20
25	125	125	125	25
30	150	180	180	30
35	210	245	245	35
40	280	320	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
75	750	825	900	75

(3) BUFFER LENGTH

SPEED (mph)	LENGTH (ft)
20	40
25	50
30	90
35	140
40	160
45	225
50	300
55	330
60	420
65	520
70	560
75	675

(4) SHIFTING TAPER = 1/2 L
SHOULDER TAPER = 1/3 L

≤ 40 mph $\quad L = \frac{WS^2}{60}$

≥ 45 mph $\quad L = WS$

S = Speed(mph)
L = Taper Length(ft)
W = Width of Taper(ft)

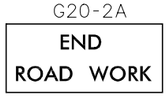
TYPICAL APPLICATIONS:

NDOT STANDARD SHEETS T-35.1.2 THRU T-35.1.17 INCLUDE A VARIETY OF TRAFFIC CONTROL METHODS, BUT DO NOT INCLUDE A LAYOUT FOR EVERY CONCEIVABLE WORK SITUATION. TYPICAL APPLICATIONS SHOULD BE ALTERED, WHEN NECESSARY, TO FIT THE CONDITIONS OF A PARTICULAR TEMPORARY TRAFFIC CONTROL ZONE. STANDARDS PRESENTED IN PART VI OF THE 2000 M.U.T.C.D. AND REVISIONS SHOULD BE GIVEN PRIORITY OVER THE EXAMPLES GIVEN HERE.

ROAD WORK SIGNS:

NRW-1

G20-2A



PLACE AT BEGINNING AND END OF PROJECT
WHEN PROJECT LENGTH $\geq$ 2.0 miles

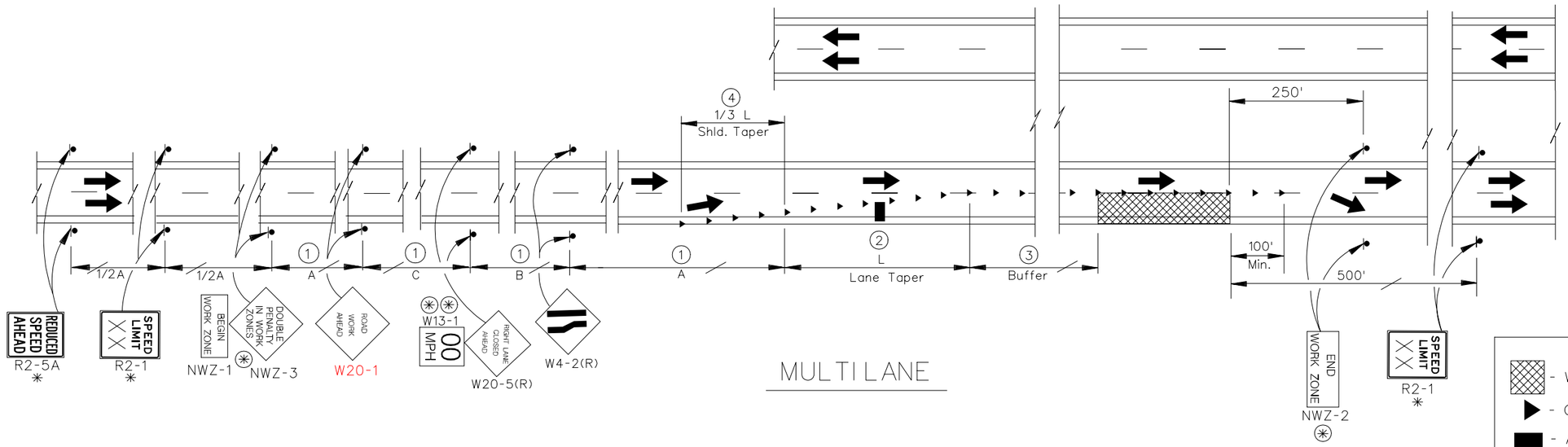
GENERAL NOTES:

1. R2-1 AND R2-5A MAY BE USED TO REDUCE EXISTING SPEED LIMIT TO 55 mph IF EXISTING SPEED LIMIT IS 65 mph THRU 75 mph, OTHER SPEED REDUCTIONS MUST BE APPROVED BY THE DIRECTOR. SPEED LIMIT MAY BE REDUCED BY 10 mph MIN. TO 15 mph MAX, IF ADDITIONAL SPEED LIMIT SIGNS (NOT SHOWN) ARE REQUIRED PLACE AT $\frac{1}{2}$A.
2. THE W1-3 SIGNS SHALL BE USED WHEN THE RECOMMENDED SPEED ON A CURVE IS 30 mph OR LESS. THE W1-4 SIGNS SHALL BE USED WHEN THE RECOMMENDED SPEED IS 35 mph OR GREATER.
3. THE W6-3 AND R4-1 SIGNS SHALL BE INSTALLED ALTERNATELY AT 0.5 mile INTERVALS WHEN THE LENGTHS OF CROSSOVERS EXCEEDS 0.5 mile.
4. ALL REGULATORY SIGNS (R SERIES) SHALL BE BLACK ON RETROREFLECTIVE WHITE.
5. ALL WARNING SIGNS (W SERIES) SHALL BE BLACK ON RETROREFLECTIVE ORANGE.
6. WARNING SIGNS SHALL BE 3' x 3' FOR SPEEDS OF 45 mph OR LESS, R2-1 AND R2-5A SHALL BE 3' x 4'.
7. WARNING SIGNS SHALL BE 4' x 4' FOR SPEEDS OF 50 mph OR GREATER, R2-1 AND R2-5A SHALL BE 4' x 5'.

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

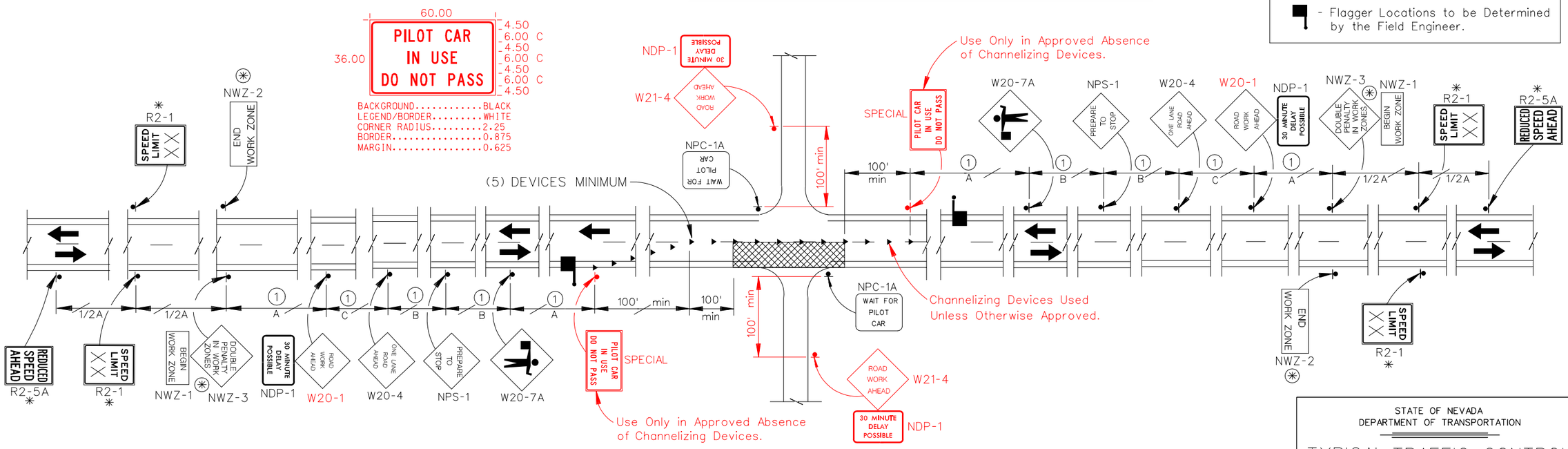
TYPICAL TABLES/NOTES FOR TRAFFIC CONTROL SHEETS T-35.1.1 thru T-35.1.17

Signed Original On File	T-35.1.1 (625)	
CHIEF SAFETY/TRAFFIC ENGR.	ADOPTED: 9/00	REVISION 10/02



MULTI LANE

See T-35.1.1 For TABLES and GENERAL NOTES

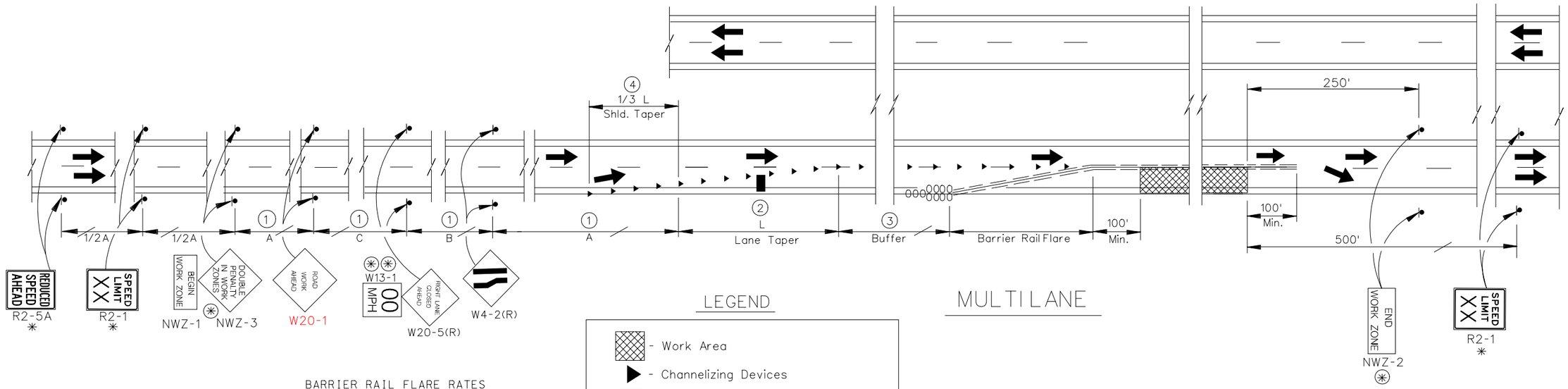


TWO LANE — TWO WAY

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

TYPICAL TRAFFIC CONTROL FOR ONE LANE CLOSURES

Signed Original On File	T-35.1.2	(625)
CHIEF SAFETY/TRAFFIC ENGINEER	ADOPTED: 7/96	REVISION 2/03



MULTI LANE

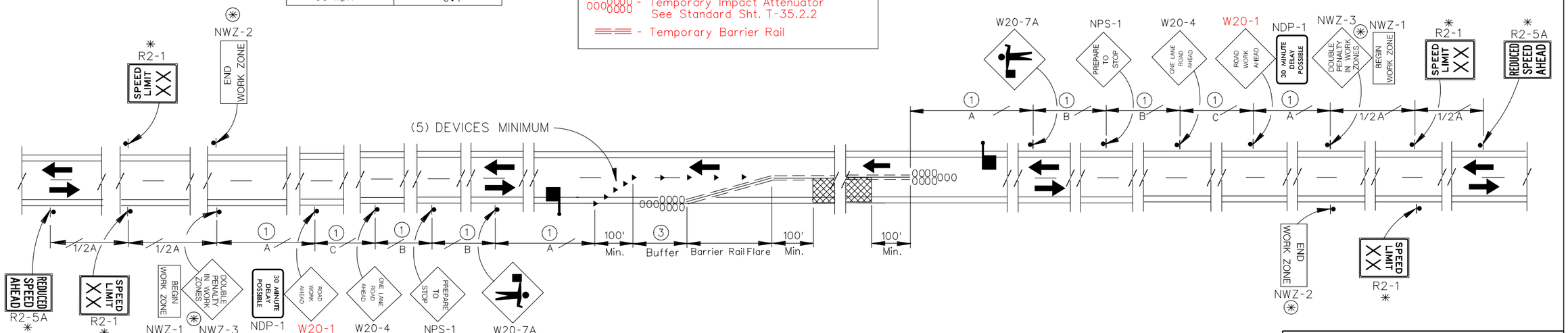
BARRIER RAIL FLARE RATES

DESIGN SPEED	FLARE RATE
75 mph	22:1
70 mph	20:1
60 mph	18:1
55 mph	16:1
50 mph	14:1
45 mph	12:1
40 mph	10:1
30 mph	8:1

LEGEND

- Work Area
- Channelizing Devices
- Arrow Board
- ✳ - ≥ 45 mph
- ✳✳ - Optional
- ✳ - See GENERAL NOTE No. 1.
- Flagger Locations to be Determined by the Field Engineer.
- Temporary Impact Attenuator See Standard Sht. T-35.2.2
- Temporary Barrier Rail

See T-35.1.1 For TABLES and GENERAL NOTES

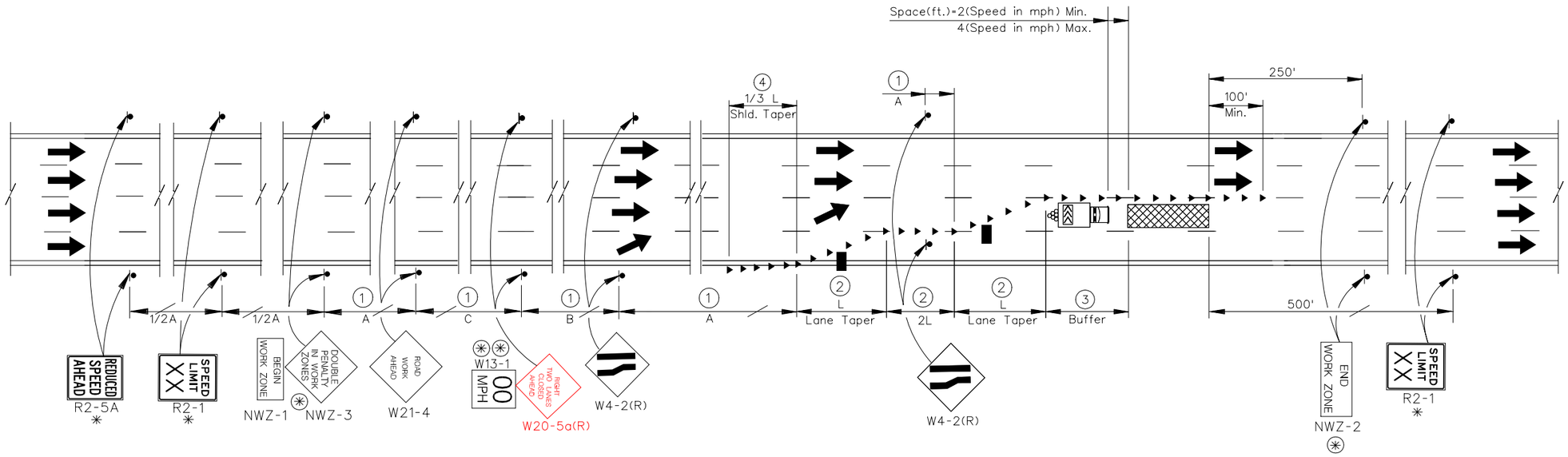


TWO LANE — TWO WAY

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

TYPICAL TRAFFIC CONTROL FOR PORTABLE PRECAST CONCRETE BARRIER RAIL CLOSURES

Signed Original On File	T-35.1.3	(625)
CHIEF SAFETY/TRAFFIC ENGR.	ADOPTED: 7/96	REVISION 2/03



See T-35.1.1 For TABLES and GENERAL NOTES

LEGEND

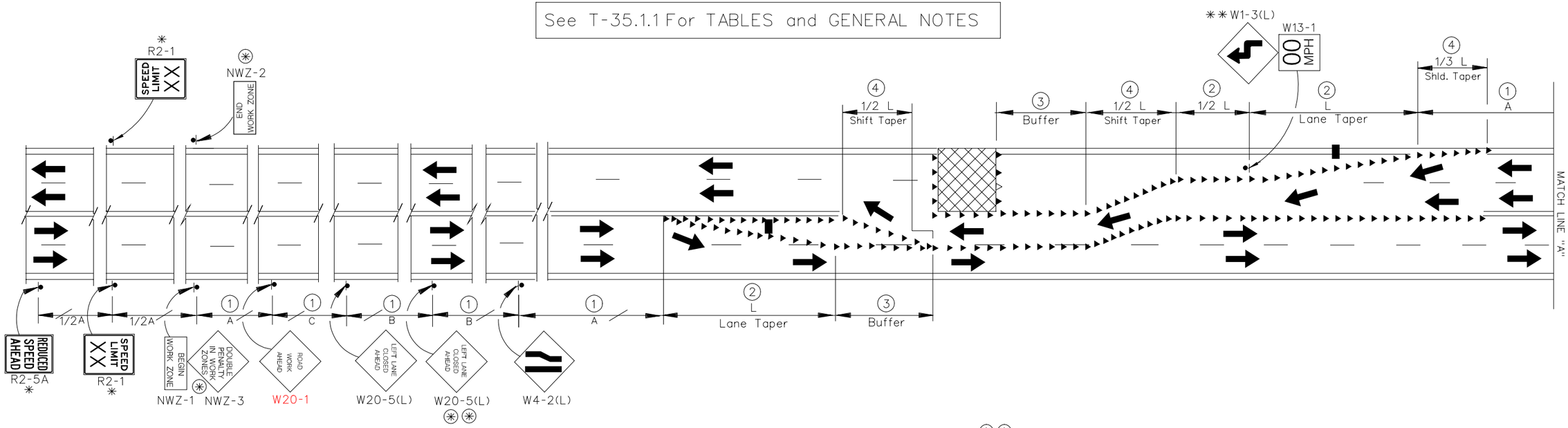
- Work Area
- Channelizing Devices
- Arrow Board
- ⊛ - ≥ 45 mph
- ⊛⊛ - Optional
- ✳ - See GENERAL NOTE No. 1.
- Truck Mounted Attenuator (Optional)

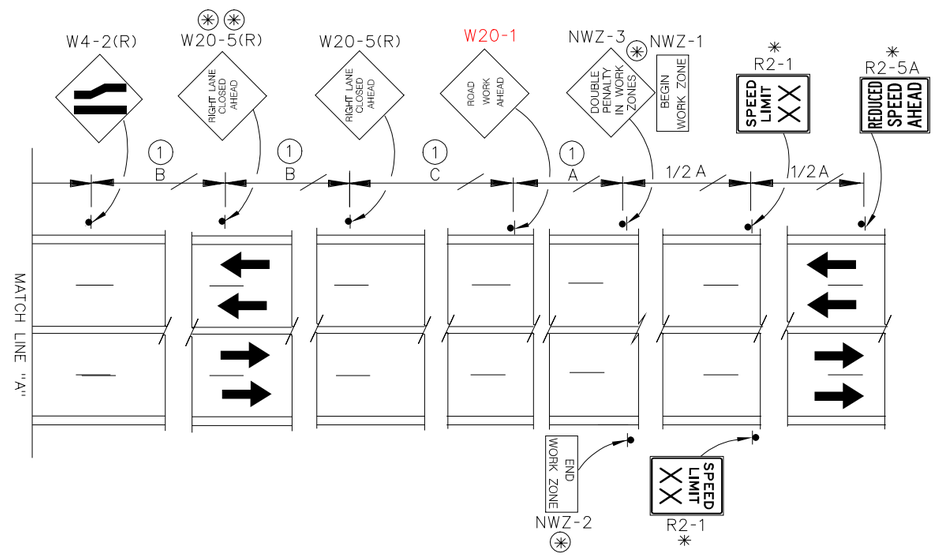
STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

TYPICAL TRAFFIC CONTROL FOR MULTILANE CLOSURE

Signed Original On File	T-35.1.4	625
CHIEF SAFETY/TRAFFIC ENGR.	ADOPTED: 7/96	REVISION 2/03

See T-35.1.1 For TABLES and GENERAL NOTES





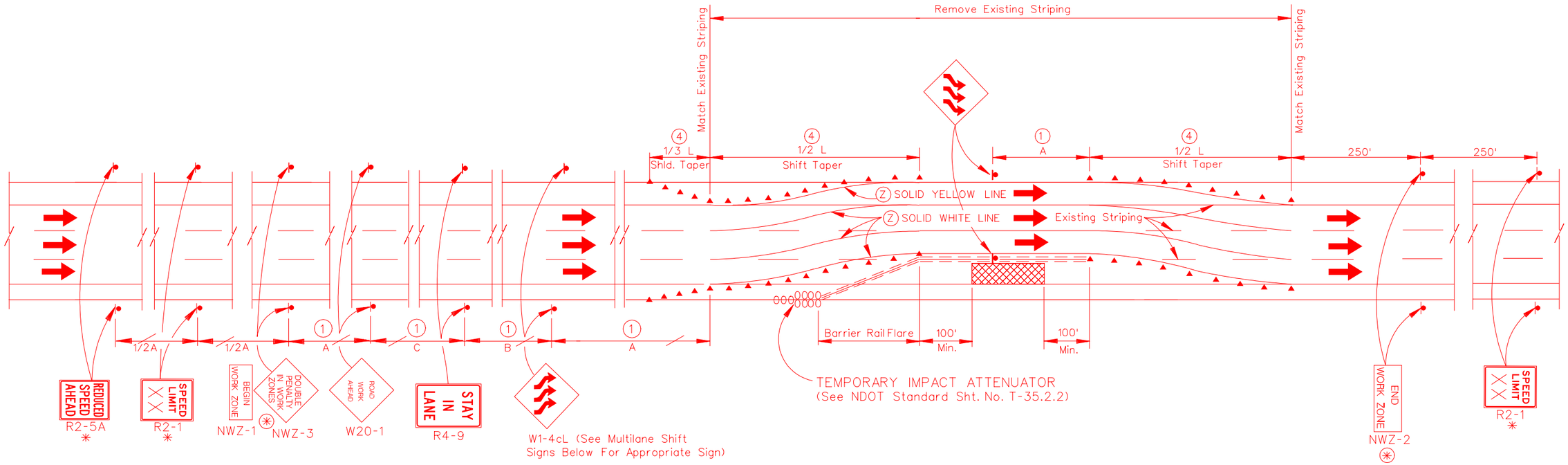
LEGEND

- Work Area
- Channelizing Devices
- Arrow Board
- ✳ - ≥ 45 mph
- ✳✳ - Optional
- ✳ - See GENERAL NOTE No. 1.
- ✳✳ - See GENERAL NOTE No. 2.

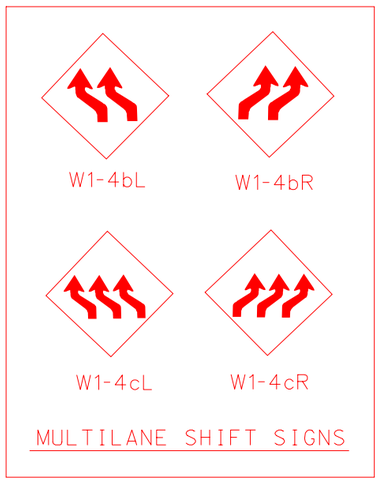
STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

TYPICAL TRAFFIC CONTROL FOR HALF ROAD CLOSURE (MULTILANE UNDIVIDED)

Signed Original On File	T-35.1.5	(625)
CHIEF SAFETY/TRAFFIC ENGR.	ADOPTED: 5/79	REVISION 2/03



See T-35.1.1 For TABLES and GENERAL NOTES



MULTILANE SHIFT SIGNS

LEGEND

- Work Area
- Channelizing Devices
- ⊛ - ≥ 45 mph
- ✳ - See GENERAL NOTE No. 1.
- Z - Temporary Striping
- Temporary Impact Attenuator See Standard Sht. T-35.2.2
- Temporary Barrier Rail

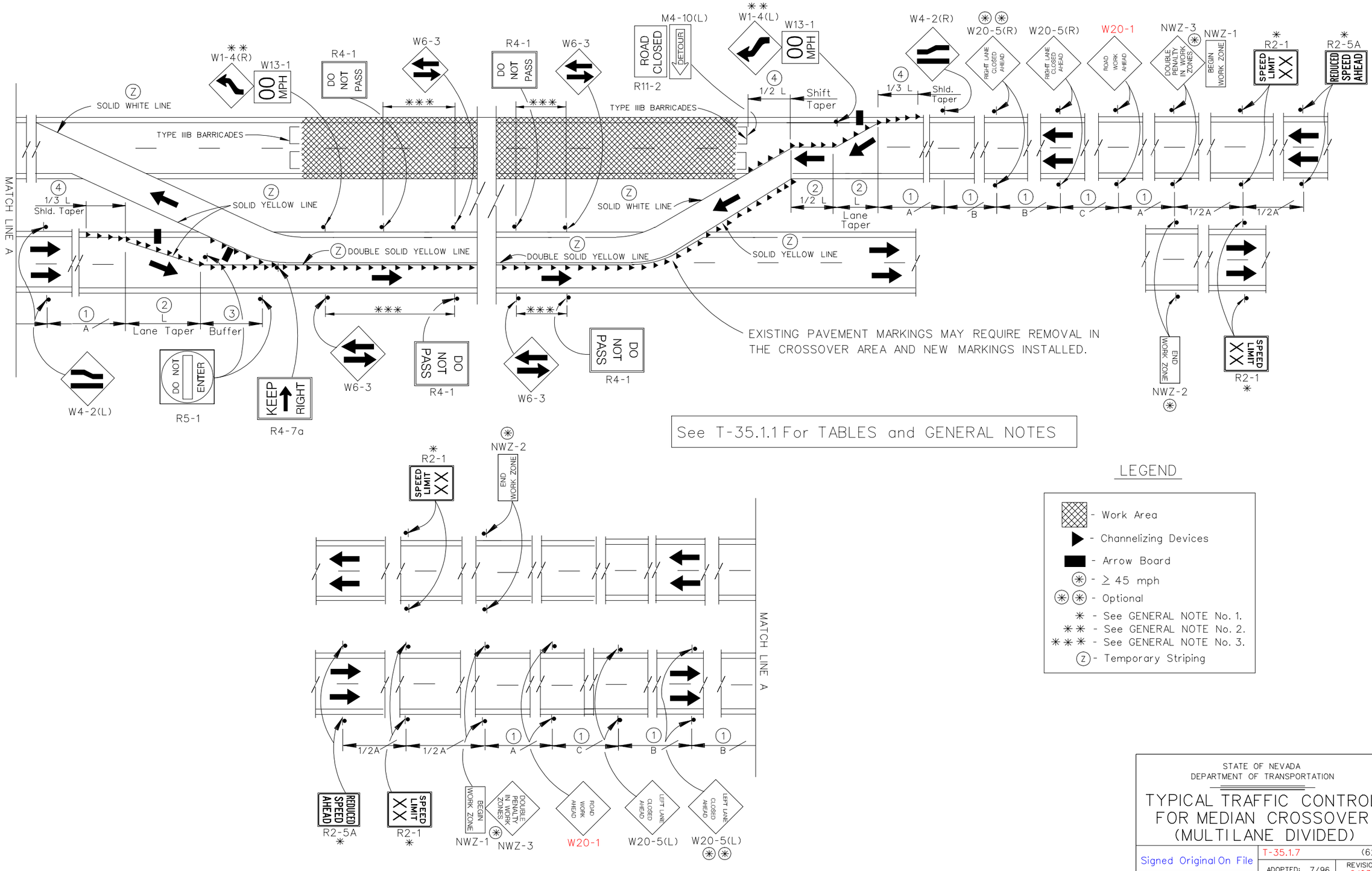
BARRIER RAIL FLARE RATES

DESIGN SPEED	FLARE RATE
75 mph	22:1
65-70 mph	20:1
60 mph	18:1
55 mph	16:1
50 mph	14:1
45 mph	12:1
35-40 mph	10:1
30 mph	8:1

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

TYPICAL TRAFFIC CONTROL FOR MULTILANE SHIFT

Signed Original On File	T-35.1.6	625
CHIEF SAFETY/TRAFFIC ENGINEER	ADOPTED: 3/02	REVISION



See T-35.1.1 For TABLES and GENERAL NOTES

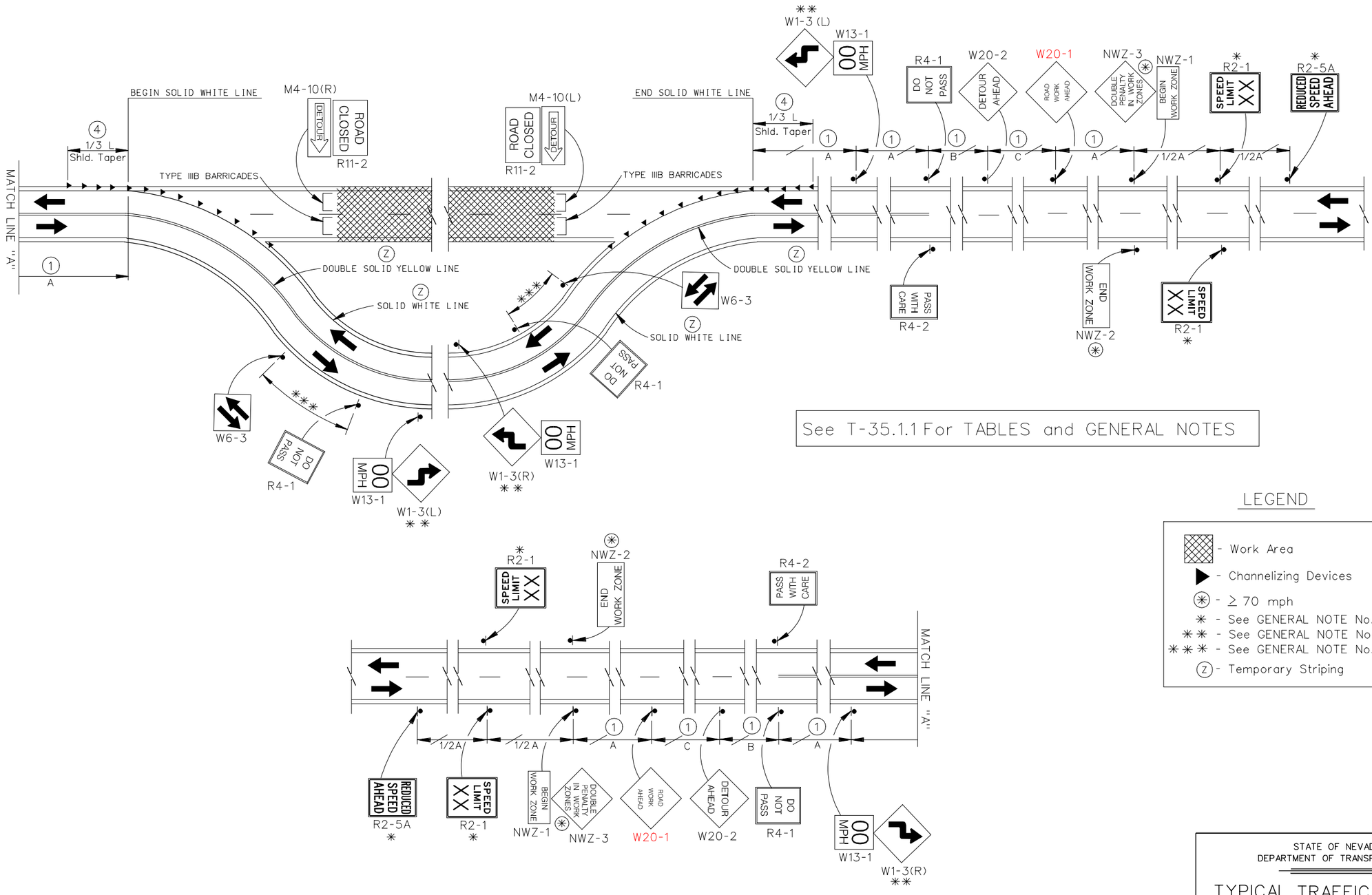
LEGEND

- Work Area
- Channelizing Devices
- Arrow Board
- ✳ ≥ 45 mph
- ✳✳ Optional
- ✳ See GENERAL NOTE No. 1.
- ✳✳ See GENERAL NOTE No. 2.
- ✳✳✳ See GENERAL NOTE No. 3.
- (Z) Temporary Striping

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

TYPICAL TRAFFIC CONTROL FOR MEDIAN CROSSOVER (MULTILANE DIVIDED)

Signed Original On File	T-35.1.7	(625)
CHIEF SAFETY/TRAFFIC ENGR.	ADOPTED: 7/96	REVISION 2/03



See T-35.1.1 For TABLES and GENERAL NOTES

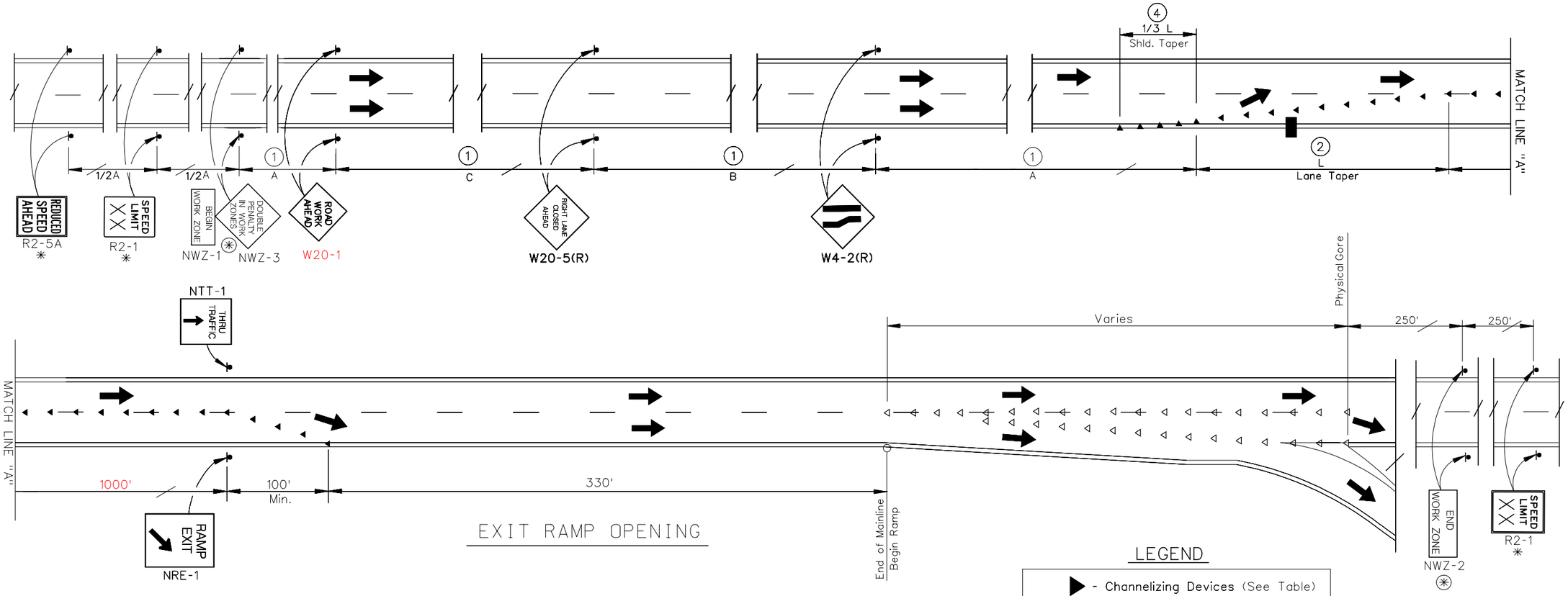
LEGEND

- Work Area
- Channelizing Devices
- ⊛ - ≥ 70 mph
- * - See GENERAL NOTE No. 1.
- ** - See GENERAL NOTE No. 2.
- *** - See GENERAL NOTE No. 3.
- Z - Temporary Striping

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

TYPICAL TRAFFIC CONTROL FOR ROAD CLOSURE DETOUR

Signed Original On File	T-35.1.8	(625)
CHIEF SAFETY/TRAFFIC ENGR.	ADOPTED: 7/96	REVISION 2/03

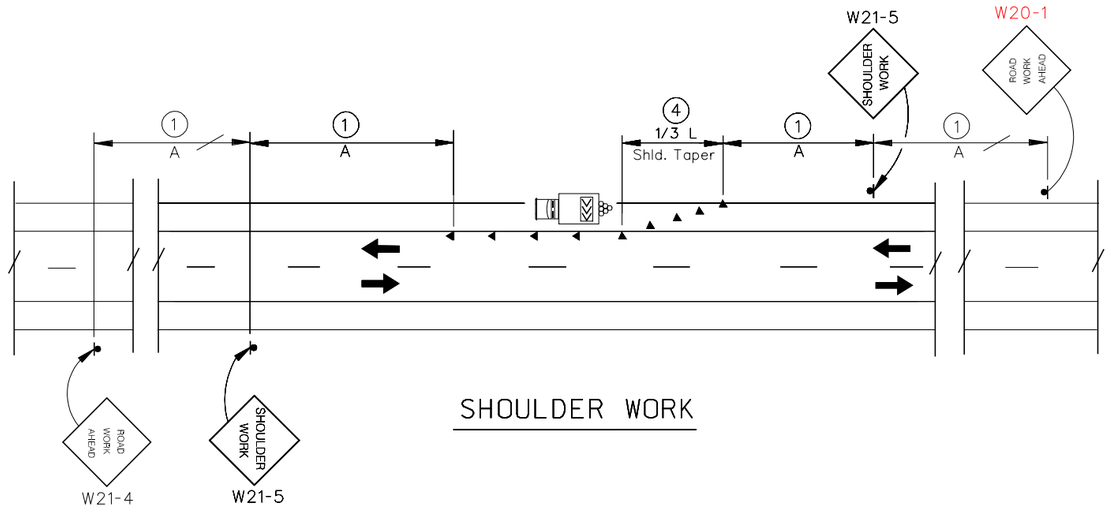


EXIT RAMP OPENING

LEGEND

- ▶ - Channelizing Devices (See Table)
- ▷ - Channelizing Devices (33' Spacing)
- ■ - Arrow Board
- ✳ - ≥ 45 mph
- ✳ - See GENERAL NOTE No. 1.
- Truck Mounted Attenuator (Optional). See Std. Sheet T-35.1.4 For Spacing.

See T-35.1.1 For TABLES and GENERAL NOTES



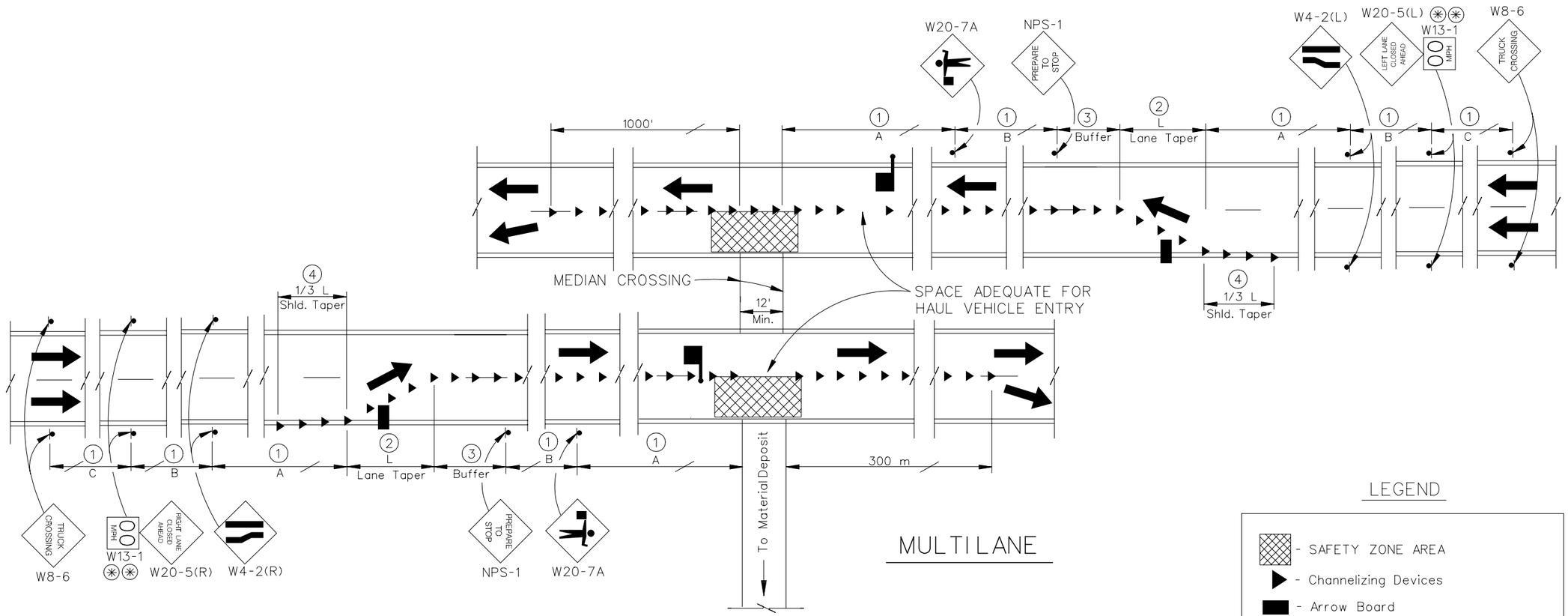
SHOULDER WORK

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

TYPICAL TRAFFIC CONTROL FOR EXIT RAMP & SHOULDER WORK

Signed Original On File
CHIEF SAFETY/TRAFFIC ENGR.

T-35.1.9 (625)
ADOPTED: 7/96
REVISION 2/03

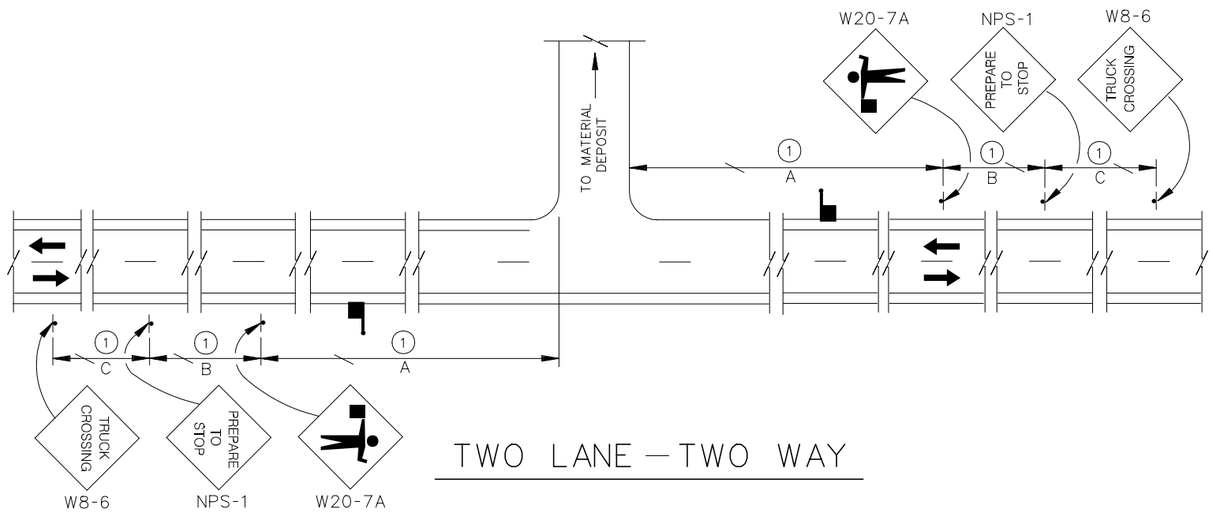


MULTILANE

See T-35.1.1 For TABLES and GENERAL NOTES

LEGEND

- SAFETY ZONE AREA
- Channelizing Devices
- Arrow Board
- Optional
- Flagger Locations to be Determined by the Field Engineer.

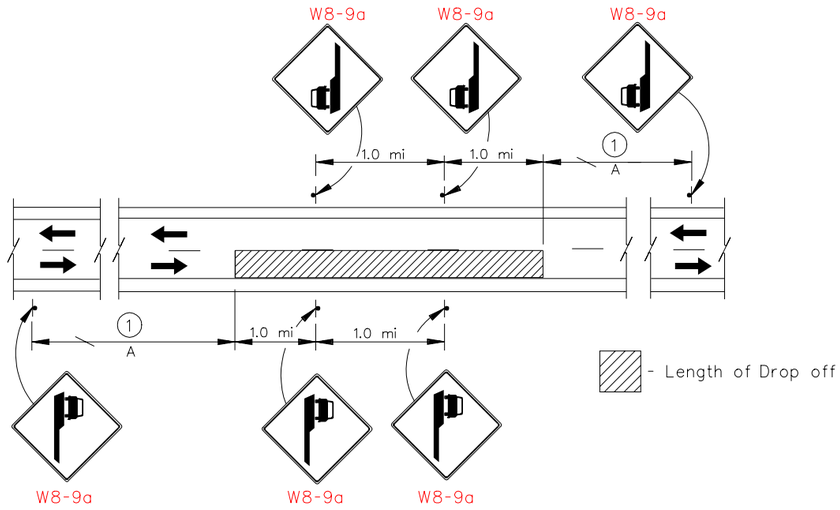


TWO LANE — TWO WAY

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

TYPICAL TRAFFIC CONTROL FOR HAUL ROAD

Signed Original On File	T-35.1.10	(625)
CHIEF SAFETY/TRAFFIC ENGR.	ADOPTED: 7/96	REVISION 6/02



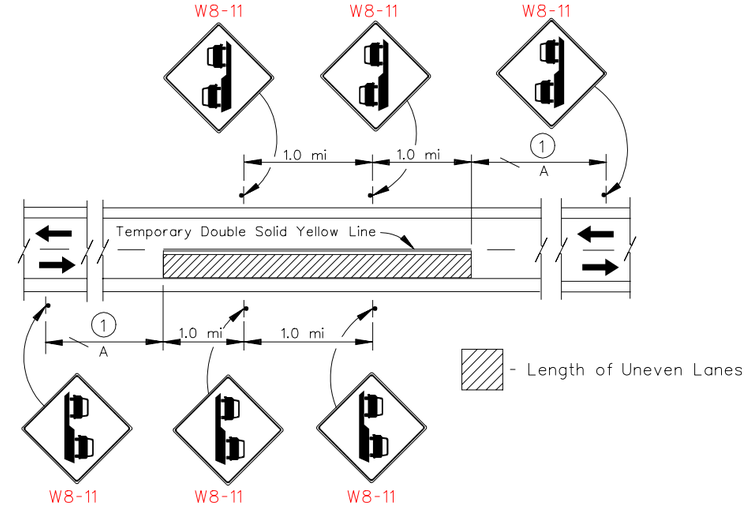
TYPICAL PLACEMENT OF SHOULDER DROP OFF SIGNS
(PLACED WHEN SHOULDER DROP-OFF EXIST DURING NON-WORKING HOURS)

NOTE: NSD-1 SHALL BE USED IN ALL CASES WHERE THERE IS A VERTICAL DIFFERENCE OF 2.0" OR GREATER AT THE SHOULDER.

LEGEND

(✳✳) - Optional

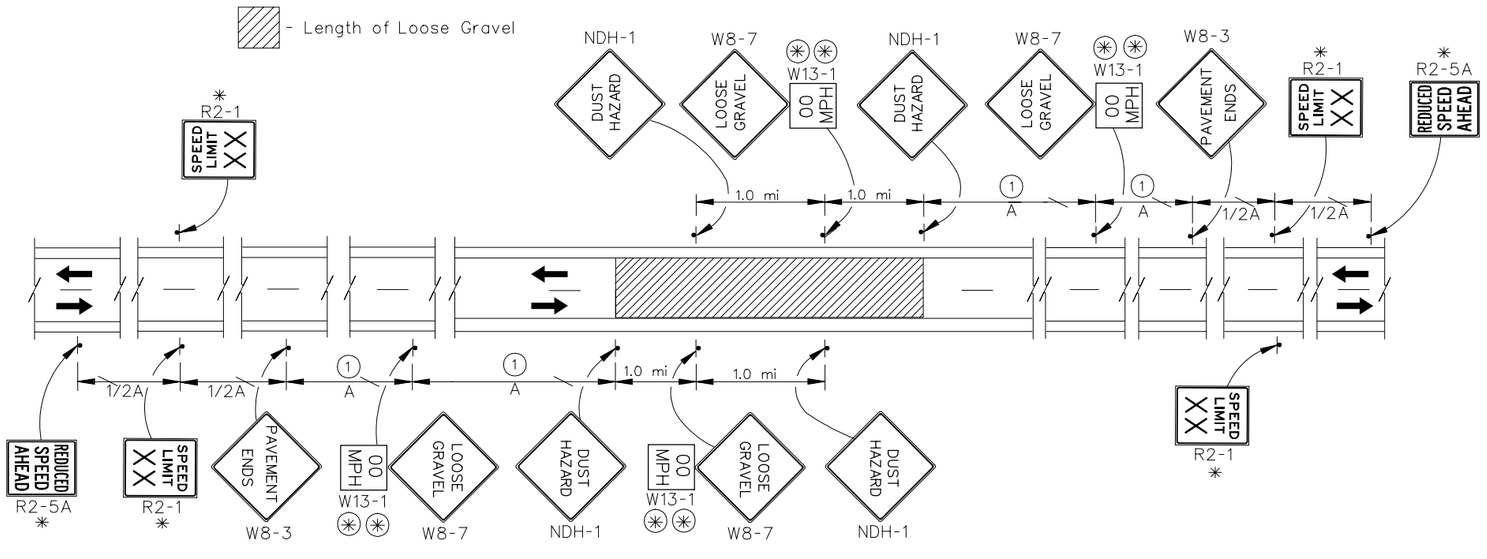
✳ - See GENERAL NOTE No. 1.



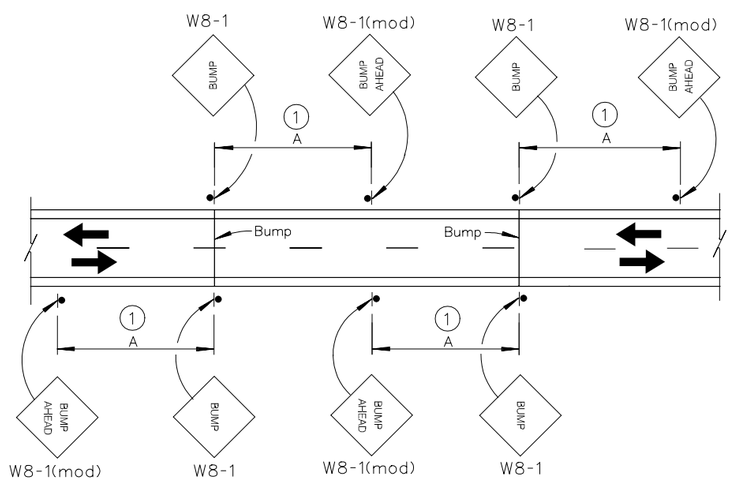
TYPICAL PLACEMENT OF UNEVEN LANES SIGNS
(PLACED WHEN UNEVEN LANES EXIST DURING NON-WORKING HOURS)

NOTE: NUL-1 AND NUL-2 SHALL BE USED IN ALL CASES WHERE THERE IS A VERTICAL DIFFERENCE OF 1.0" TO 3.0" BETWEEN THE TRAVEL LANES.

See T-35.1.1 For TABLES and GENERAL NOTES



TYPICAL PLACEMENT OF LOOSE GRAVEL/DUST HAZARD SIGNS



TYPICAL PLACEMENT OF BUMP SIGNS

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

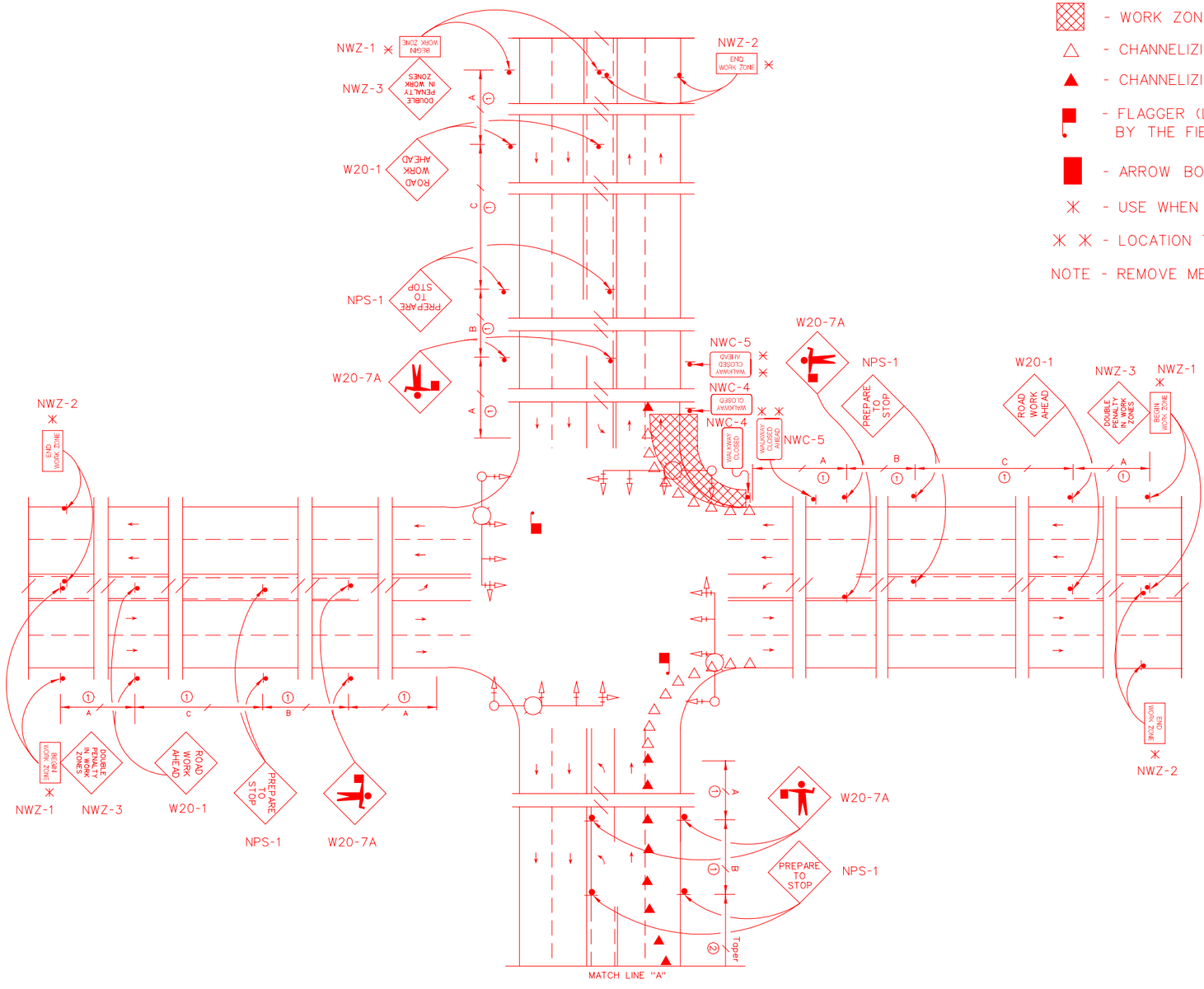
TYPICAL TRAFFIC CONTROL SIGNAGE FOR SHLD. DROP OFF/UNEVEN LANES/ LOOSE GRAVEL & DUST HAZARD/BUMP

Signed Original On File	T-35.1.11	(625)
CHIEF SAFETY/TRAFFIC ENGR.	ADOPTED: 7/96	REVISION 2/03

LEGEND:

- WORK ZONE
- △ - CHANNELIZING DEVICES @ 6.0 ft SPACING
- ▲ - CHANNELIZING DEVICES
- FLAGGER (LOCATIONS TO BE DETERMINED BY THE FIELD ENGINEER)
- ARROW BOARD
- ✳ - USE WHEN SPEEDS ARE ≥ 45mph
- ✳ ✳ - LOCATION TO BE DETERMINED BY FIELD ENGINEER

NOTE - REMOVE MEDIAN TRAFFIC CONTROL SIGNS ON A TWO LANE FACILITY.

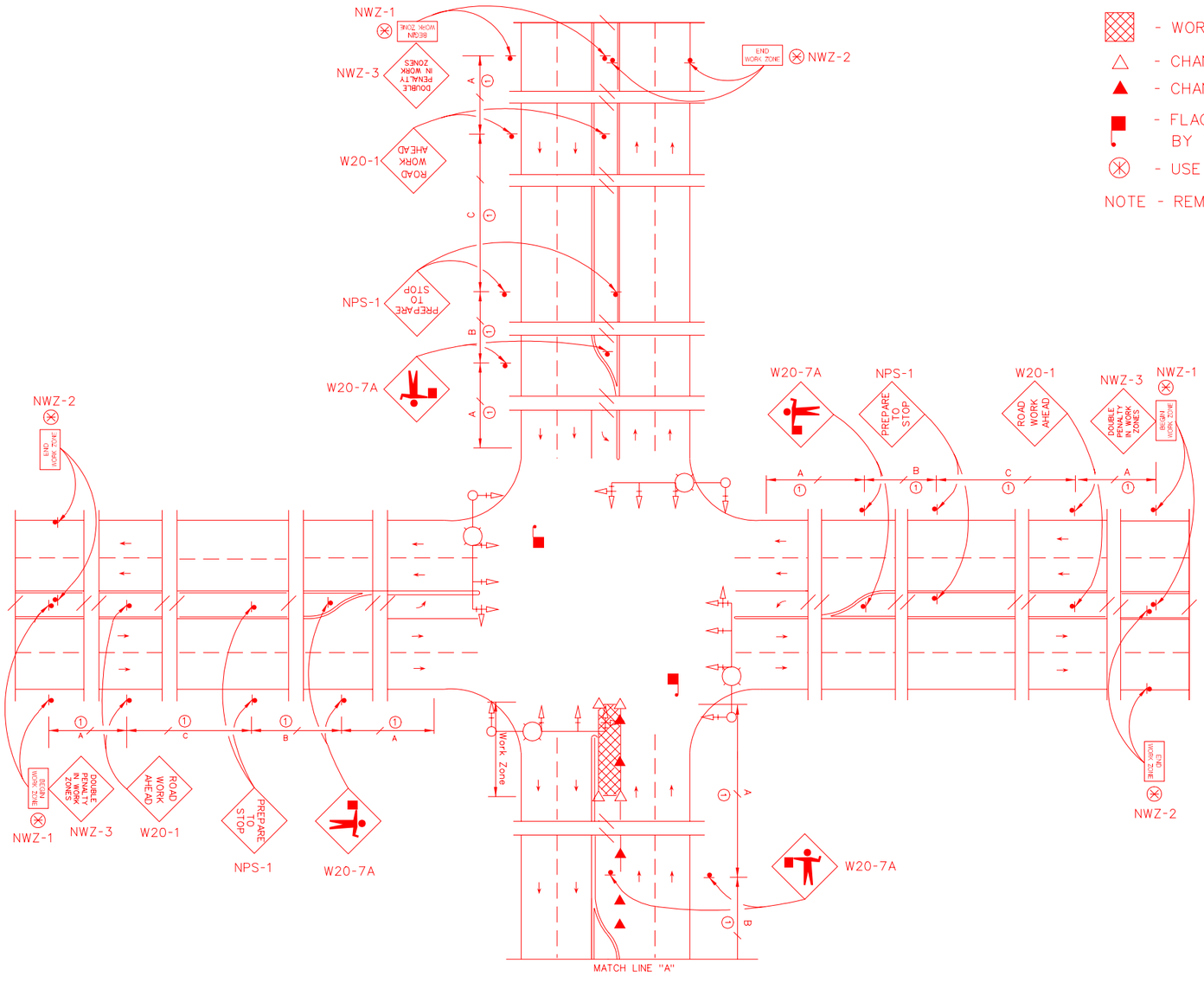


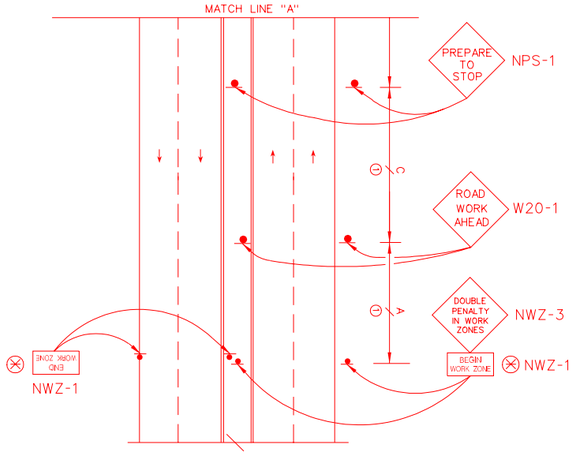
See T-35.1.1 For TABLES and GENERAL NOTES

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

TYPICAL TRAFFIC CONTROL FOR INTERSECTION WORK ONLY (OUTSIDE LANE)

Signed Original On File	T-35.1.12	(625)
CHIEF SAFETY/TRAFFIC ENGINEER	ADOPTED:10/02	REVISION





LEGEND:

- ▨ - WORK ZONE
- △ - CHANNELIZING DEVICES @ 6.0 ft SPACING
- ▲ - CHANNELIZING DEVICES
- ■ - FLAGGER (LOCATIONS TO BE DETERMINED BY THE FIELD ENGINEER)
- ⊗ - USE WHEN SPEEDS ARE ≥ 45 mph

NOTE - REMOVE MEDIAN TRAFFIC CONTROL SIGNS ON A TWO LANE FACILITY

See T-35.1.1 For TABLES and GENERAL NOTES

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

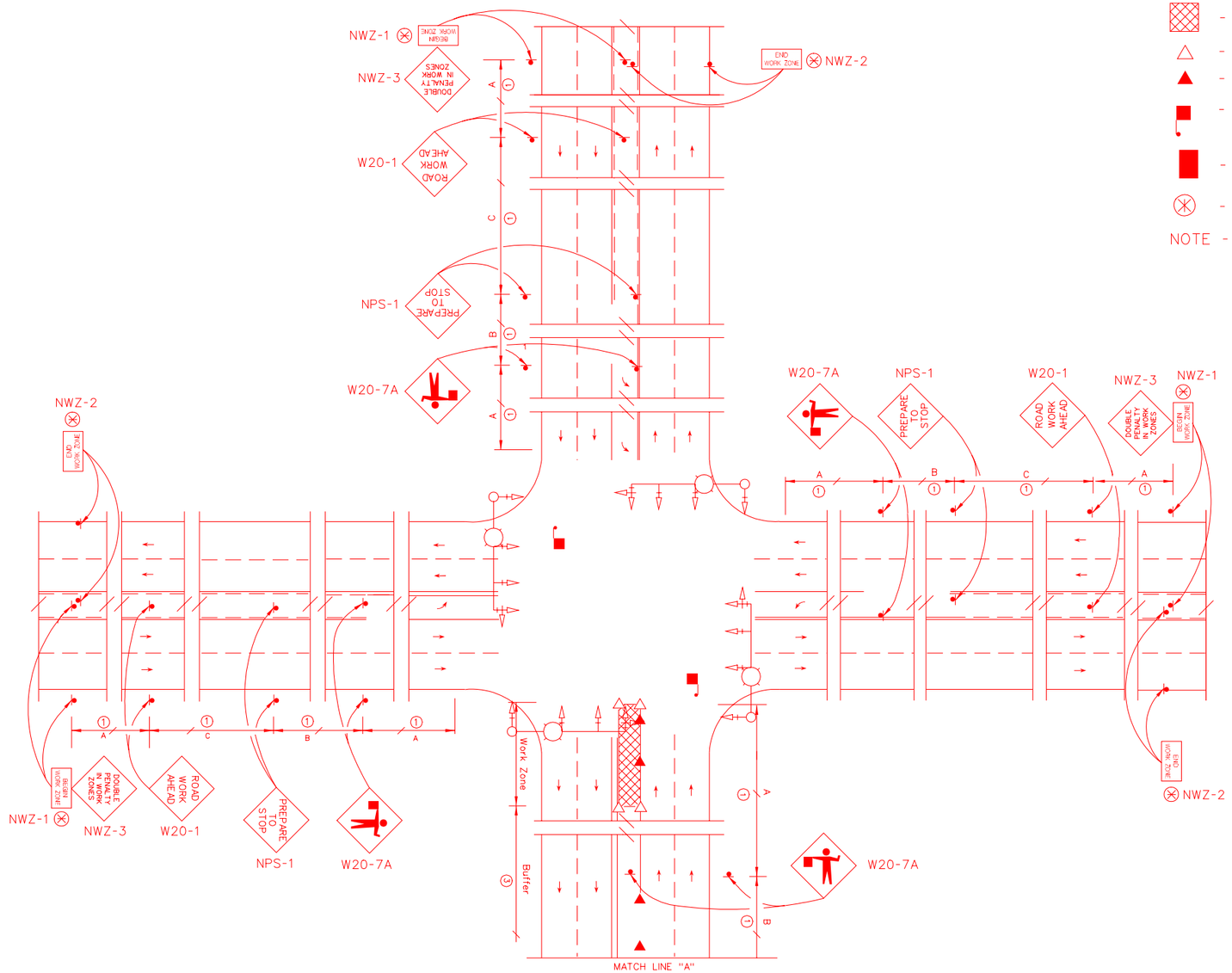
TYPICAL TRAFFIC CONTROL FOR INTERSECTION WORK ONLY (MEDIAN WITH ISLAND)

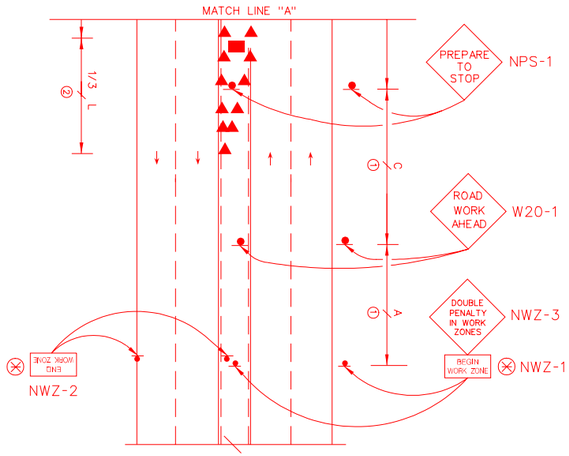
Signed Original On File	T-35.1.13	(625)
CHIEF SAFETY/TRAFFIC ENGINEER	ADOPTED: 10/02	REVISION

LEGEND:

- WORK ZONE
- △ - CHANNELIZING DEVICES @ 6.0 ft SPACING
- ▲ - CHANNELIZING DEVICES
- - FLAGGER (LOCATIONS TO BE DETERMINED BY THE FIELD ENGINEER)
- - ARROW BOARD
- ⊗ - USE WHEN SPEEDS ARE ≥ 45 mph

NOTE - REMOVE MEDIAN TRAFFIC CONTROL SIGNS ON A TWO LANE FACILITY





See T-35.1.1 For TABLES and GENERAL NOTES

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

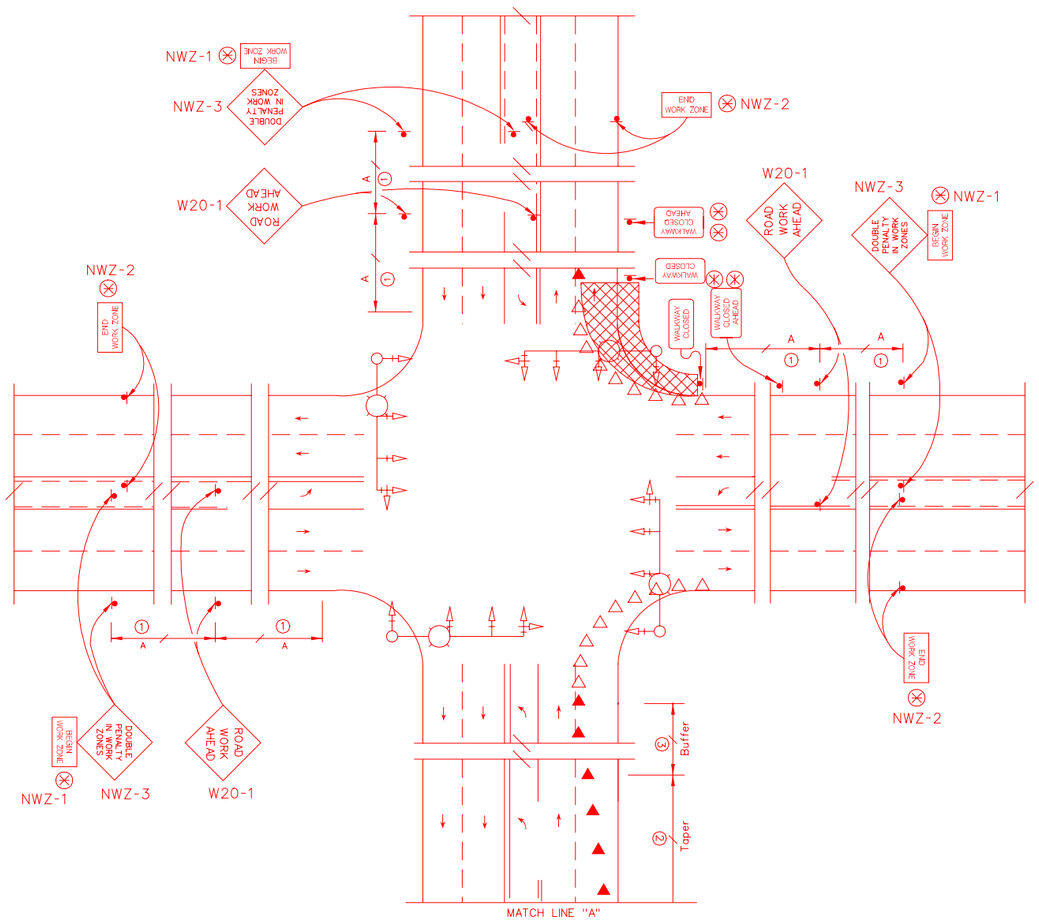
TYPICAL TRAFFIC CONTROL FOR INTERSECTION WORK ONLY (MEDIAN WITH NO ISLAND)

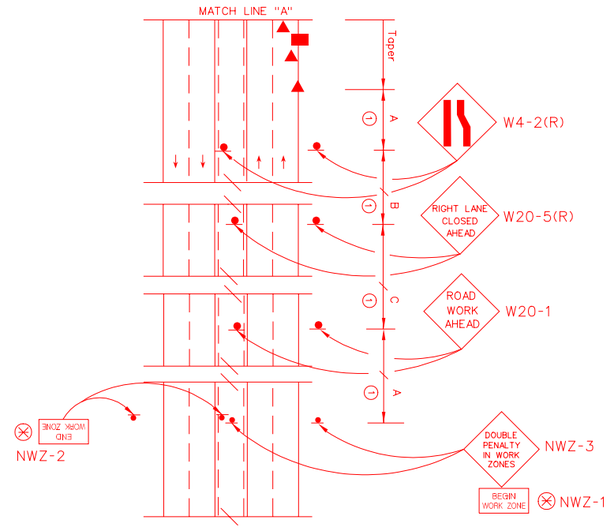
Signed Original On File	T-35.1.14	(625)
CHIEF SAFETY/TRAFFIC ENGINEER	ADOPTED: 10/02	REVISION

LEGEND:

- WORK ZONE
- △ - CHANNELIZING DEVICES @ 6.0 ft SPACING
- ▲ - CHANNELIZING DEVICES
- ▮ - ARROW BOARD
- ⊗ - USE WHEN SPEEDS ARE ≥ 45 mph
- ⊗⊗ - LOCATION TO BE DETERIMINED BY FIELD ENGINEER

NOTE - REMOVE MEDIAN TRAFFIC CONTROL SIGNS ON A TWO LANE FACILITY.





See T-35.1.1 For TABLES and GENERAL NOTES

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

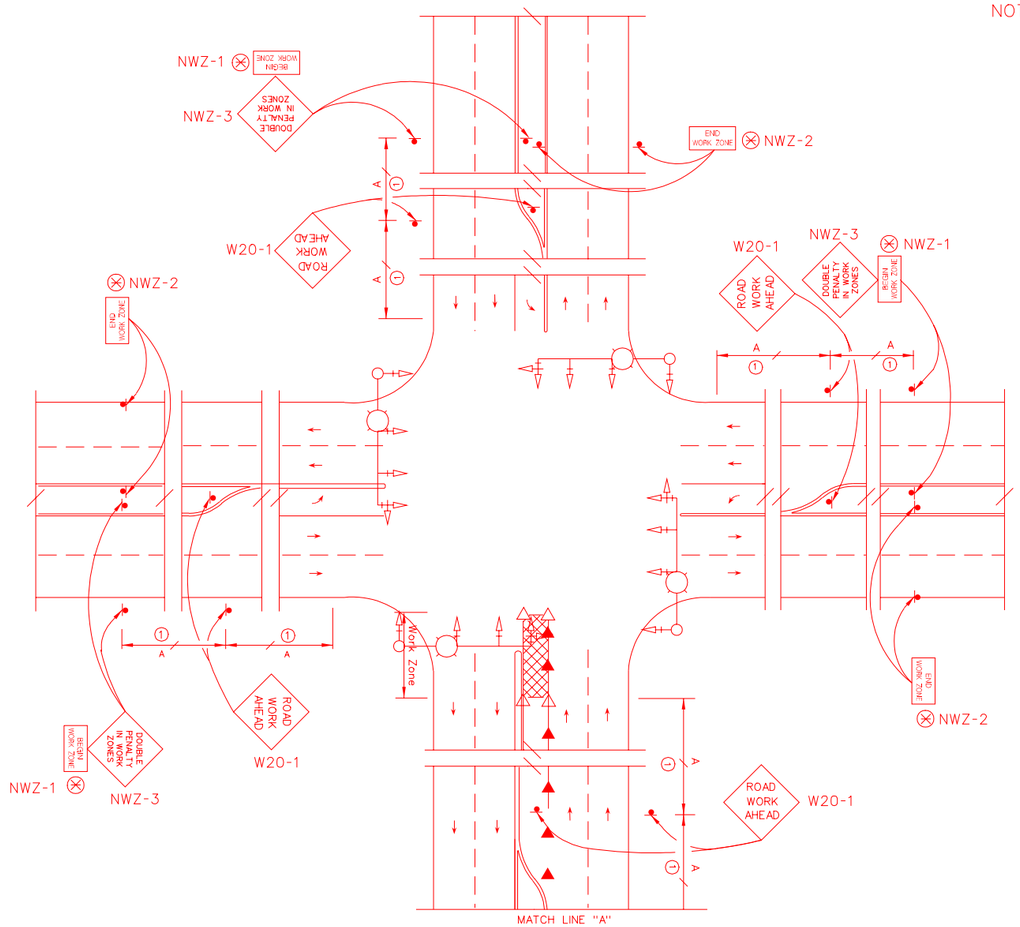
TYPICAL TRAFFIC CONTROL FOR INTERSECTION WORK ONLY NO FLAGGERS (OUTSIDE LANE)

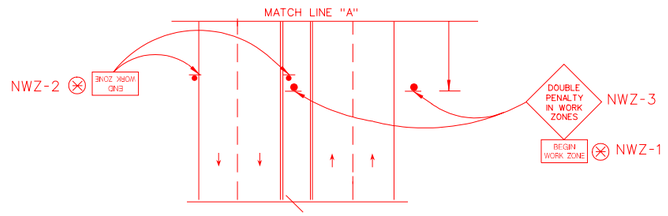
Signed Original On File	T-35.1.15	(625)
CHIEF SAFETY/TRAFFIC ENGINEER	ADOPTED:10/02	REVISION

LEGEND:

- WORK ZONE
- △ - CHANNELIZING DEVICES @ 6.0 ft SPACING
- ▲ - CHANNELIZING DEVICES
- ⊗ - USE WHEN SPEEDS ARE ≥ 45 mph

NOTE - REMOVE MEDIAN TRAFFIC CONTROL SIGNS ON A TWO LANE FACILITY



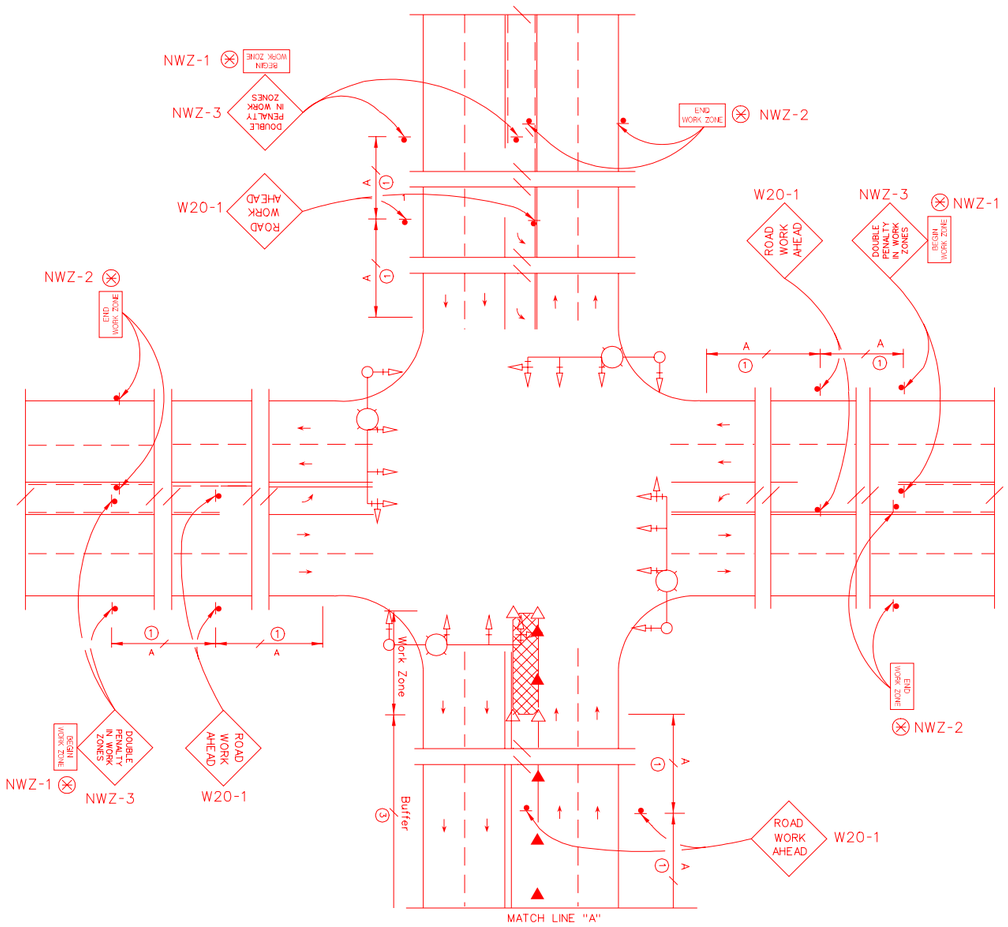


See T-35.1.1 For TABLES and GENERAL NOTES

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

TYPICAL TRAFFIC CONTROL FOR INTERSECTION WORK ONLY NO FLAGGERS (MEDIAN WITH ISLAND)

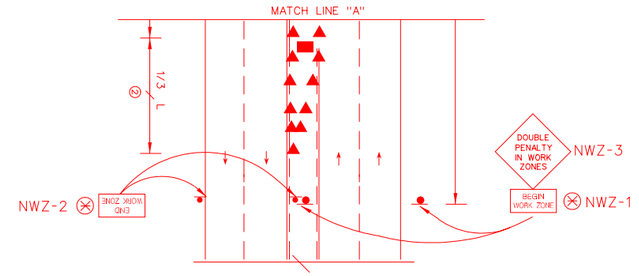
Signed Original On File	T-35.1.16	(625)
CHIEF SAFETY/TRAFFIC ENGINEER	ADOPTED:10/02	REVISION



LEGEND:

- ⊠ - WORK ZONE
- △ - CHANNELIZING DEVICES @ 6.0 ft SPACING
- ▲ - CHANNELIZING DEVICES
- ■ - ARROW BOARD
- ⊗ - USE WHEN SPEEDS ARE ≥ 45 km/h

NOTE - REMOVE MEDIAN TRAFFIC CONTROL SIGNS ON A TWO LANE FACILITY

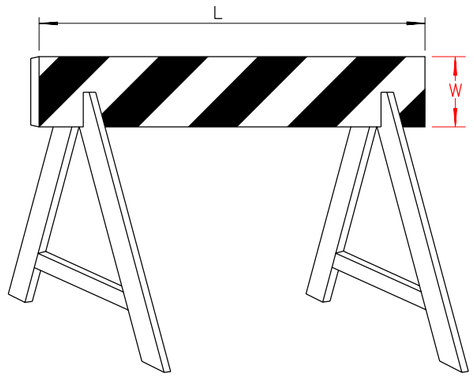


See T-35.1.1 For TABLES and GENERAL NOTES

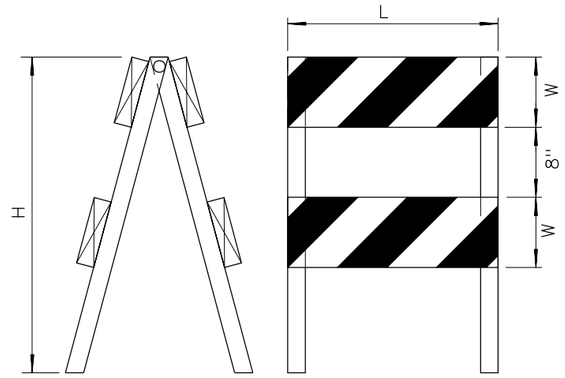
STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

TYPICAL TRAFFIC CONTROL FOR INTERSECTION WORK ONLY NO FLAGGERS (MEDIAN WITH NO ISLAND)

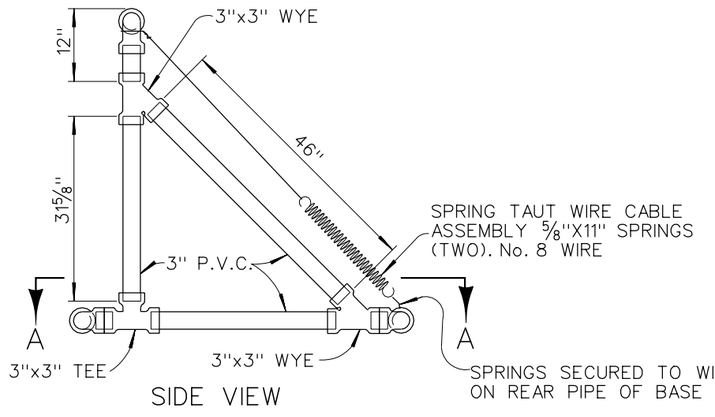
Signed Original On File	T-35.1.17	(625)
CHIEF SAFETY/TRAFFIC ENGINEER	ADOPTED:10/02	REVISION



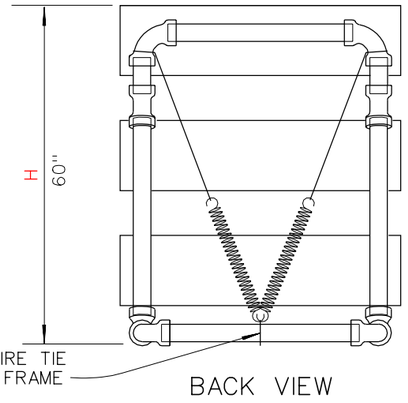
TYPE I BARRICADE



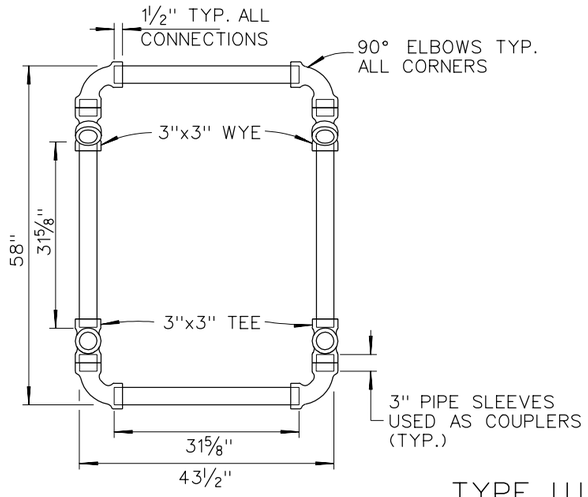
TYPE II BARRICADE
(FRAMEWORK TO BE WHITE)



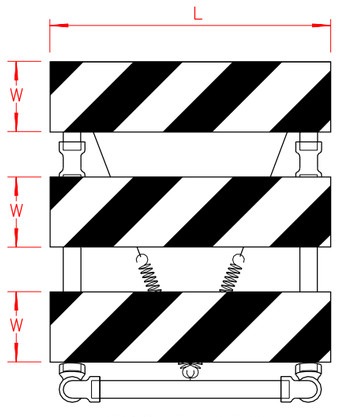
SIDE VIEW



BACK VIEW



SECTION A-A



FRONT VIEW

TYPE III B BARRICADE
(BARRICADE TO BE WEIGHTED DOWN WITH SANDBAGS.)

BARRICADE CHARACTERISTICS

	TYPE I BARRICADE	TYPE II BARRICADE	TYPE IIIB BARRICADE
W= Width of Rail	8" Min. - 12" Max.	8" Min. - 12" Max.	8" Min. - 12" Max.
L= Length of Rail	2' Min.	2' Min.	4' Min.
Width of Stripes	Rail Length< 3' = 4" Rail Length≥ 3' = 6"	Rail Length< 3' = 4" Rail Length≥ 3' = 6"	6"
H= Height	3' Min.	3' Min.	5'
Number of Retroreflective Rail faces	2 (One each Direction)	4 (Two each Direction)	3 (One direction only)

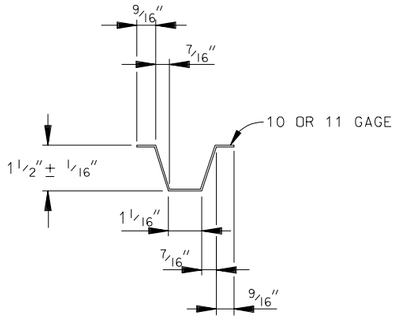
GENERAL NOTES:

1. ALL BARRICADES USED MUST COMPLY WITH NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM REPORT 350.
2. TYPE III B BARRICADES USED FOR TEMPORARY SIGN SUPPORTS, SIGNS SHALL BE MOUNTED 1'-0" MIN. FROM GROUND AND COMPLY WITH M.U.T.C.D. 2000, SEE NOTE 5.
3. CABLE(S) THREADED THROUGH ALL PIPES.
4. Markings for barricade rails shall be retroreflective orange and white stripes sloping downward at an angle of 45 degrees in the direction of traffic.
5. BARRICADE HAZARD PANELS (0.025 ANODIZED ALUMINUM) ATTACHED WITH 1" No. 14 PAN HEAD METAL SCREW OR 0.125" POLYETHYLENE PLASTIC RIVETS.
6. A SIGN FROM M.U.T.C.D. 2000 FOR LOCAL TRAFFIC ONLY (SECTION 6F.09) SHALL BE INSTALLED WITH THE APPROPRIATE LEGEND CONCERNING PERMISSIBLE USE BY LOCAL ROAD USERS. LOCAL TRAFFIC ONLY SIGNS ARE RII-3A AND R11-4.

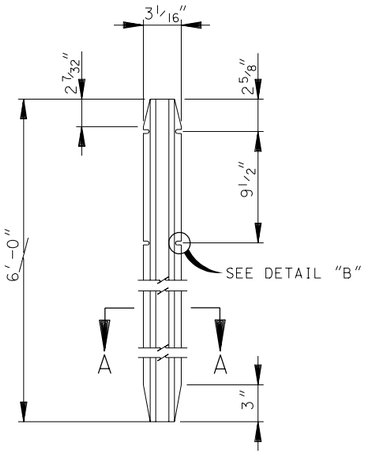
STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

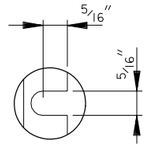
TRAFFIC CONTROL BARRICADES

Signed Original On File	T-35.2	(625)
CHIEF SAFETY/TRAFFIC ENGR.	ADOPTED: 8/82	REVISION 6/02



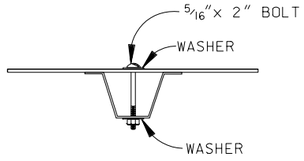
SECTION A-A

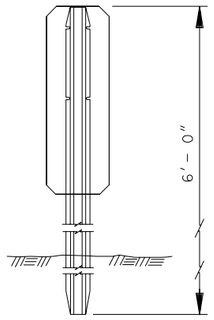


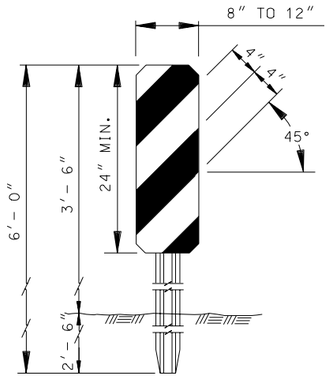


DETAIL "B"

POST DETAILS

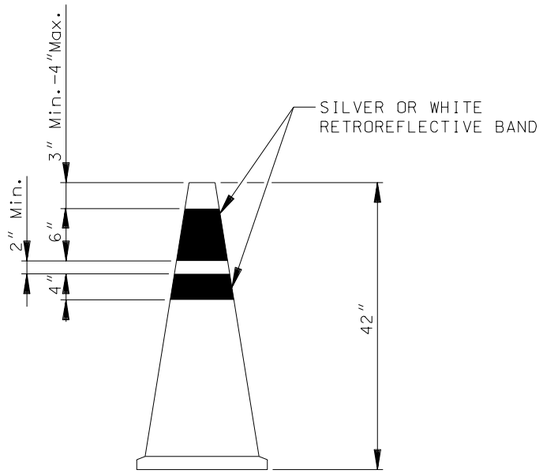






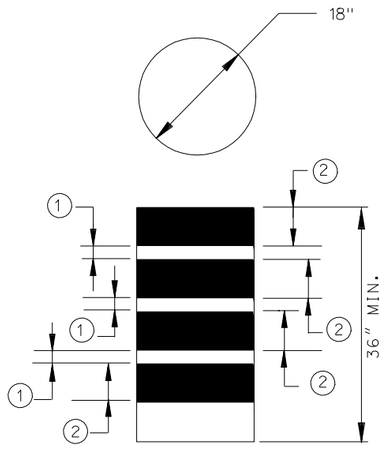
(ELECTROPLATED BOLTS AND NUTS AND PROTECTIVE FLAT NONMETALLIC WASHERS)

VERTICAL PANEL



1. CONES TO BE PREDOMINATELY ORANGE.
2. CONES TO BE USED DURING HOURS OF DARKNESS SHALL BE RETROREFLECTIVE AS SHOWN ABOVE.
3. CONES SHALL HAVE WEIGHTED BASES.

TRAFFIC CONES



TRAFFIC DRUMS

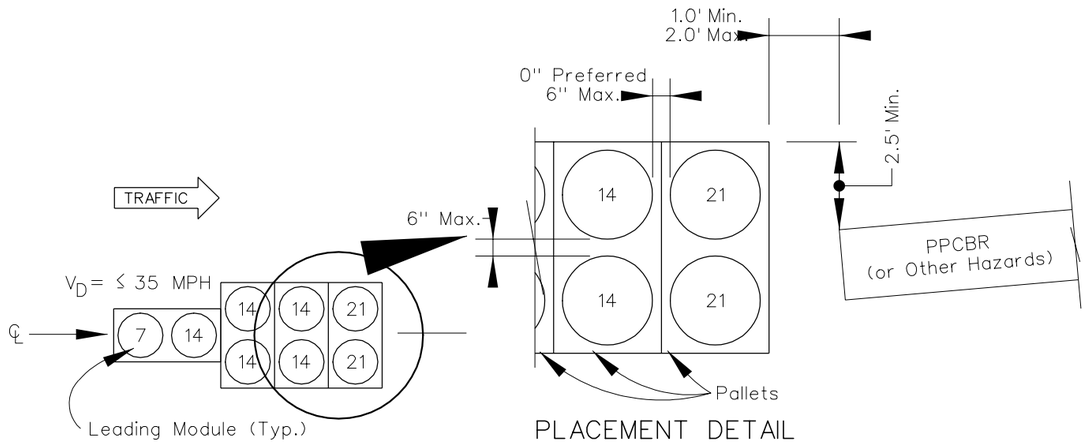
①-2" MAX. NON RETROREFLECTIVE MATERIAL
②-4" MIN.- 6"MAX. RETROREFLECTIVE MATERIAL

NOTE: DRUMS/BARRELS SHALL HAVE A MIN. OF 2 WHITE AND 2 ORANGE RETROREFLECTIVE BANDS AND 18" WIDTH REGARDLESS OF ORIENTATION

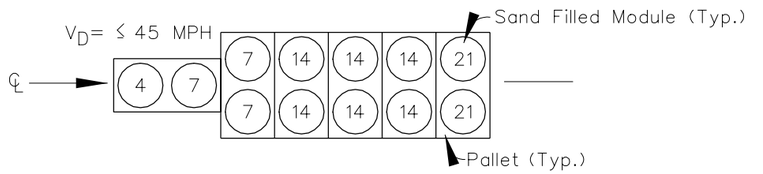
STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

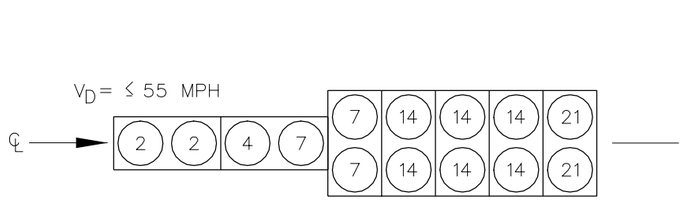
TRAFFIC CONTROL CONES, DRUMS, AND VERTICAL PANELS

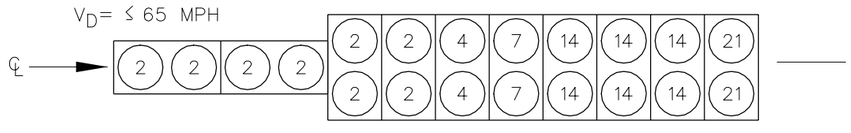
Signed Original On File	T-35.2.1	(625)
CHIEF SAFETY/TRAFFIC ENGR.	ADOPTED: 10/92	REVISION 6/02

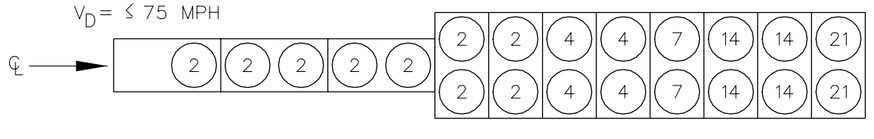


PLACEMENT DETAIL

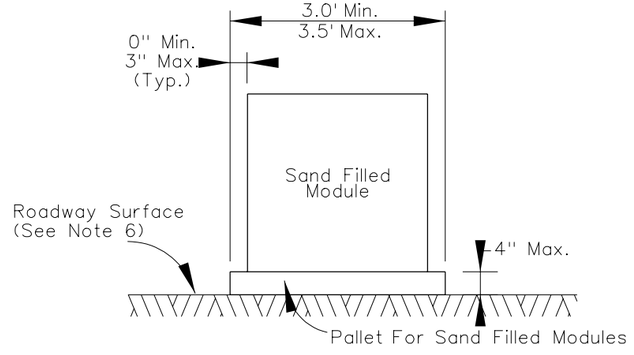


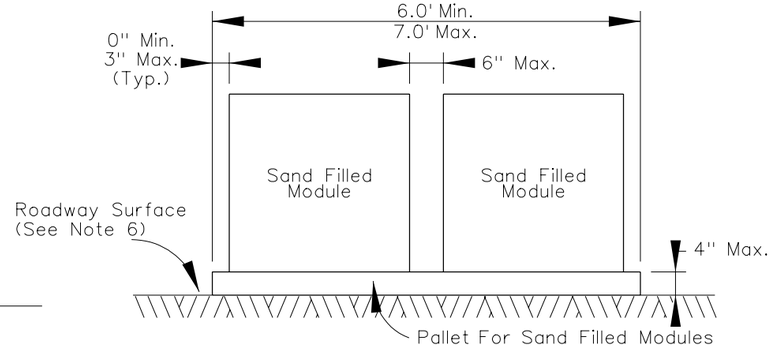






TYPICAL LAYOUTS (SEE LEGEND)





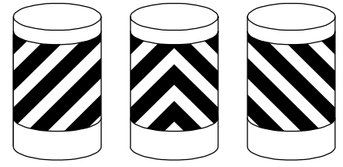
PALLET DETAILS

GENERAL NOTES:

1. SHAPES OF THE SAND FILLED MODULES ARE USED FOR ILLUSTRATION PURPOSES ONLY.
2. AT LOCATIONS WHERE VIBRATIONS AND/OR SURFACE SLOPES MAY CAUSE MODULES TO SHIFT, MODULES SHALL BE ANCHORED TO PREVENT MOVEMENT ACCORDING TO THE MANUFACTURER'S INSTRUCTIONS AND AS APPROVED BY THE ENGINEER.
3. IN FREEZING CONDITIONS, SAND HAVING A MOISTURE CONTENT OF 3% OR MORE SHALL BE MIXED WITH 5% ROCK SALT.
4. FOR OTHER SAND MODULE LAYOUTS NOT SHOWN, SEE STANDARD AND MANUALS ENGINEER.
5. THE LEADING MODULE OF EACH ATTENUATOR SHALL BE DELINEATED. THE BLACK STRIPE SHALL BE SLOPED DOWN TOWARD THE SIDE WHICH TRAFFIC WILL PASS. THE BACKGROUND SHALL BE RETRO-REFLECTIVE YELLOW. ADDITIONALLY A MARKER PANEL SHALL BE PLACED WITH SHEETING APPROXIMATELY 30" SQUARE. THE PANEL IS COVERED WITH YELLOW RETROREFLECTIVE SHEETING WITH BLACK STRIPES 5" WIDE. BLACK STRIPES SHALL BE AT 45 DEGREES WITH 4" SPACE BETWEEN STRIPES.
6. THE MAXIMUM LATERAL AND LONGITUDINAL SLOPE THAT SAND MODULES MAY BE INSTALLED ON SHALL NOT EXCEED 5%
7. AN ANGLED CENTERLINE OF THE SAND BARREL ARRAY MAY BE SHIFTED UP TO 5 DEGREES TOWARDS ON-COMING TRAFFIC.

LEGEND:

1. THE CIRCLED NUMBER INDICATES THE WEIGHT X 100 IN POUNDS OF THAT SAND FILLED MODULE.
2. PPCBR = PORTABLE PRECAST CONCRETE BARRIER RAIL. V_D = DESIGN VELOCITY.



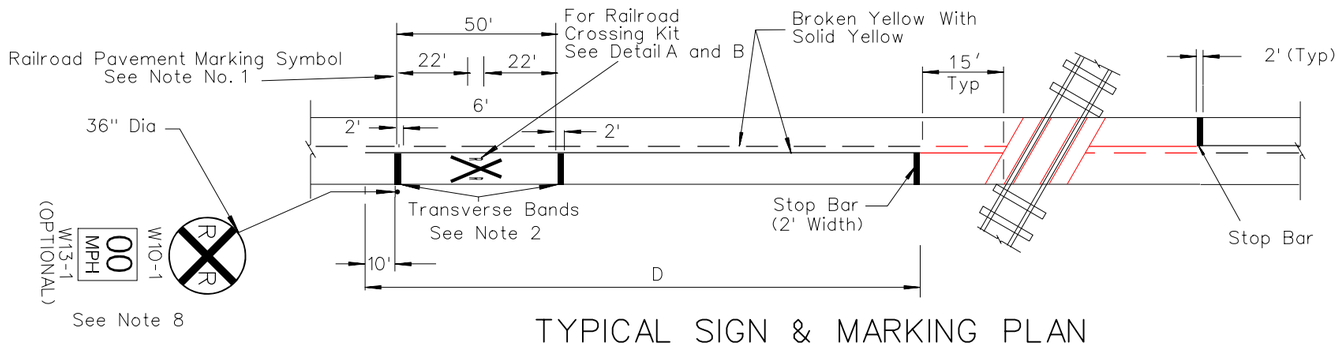
DELINEATION FOR LEADING MODULE
(USE CORRECT PANEL)

(See Note 5)

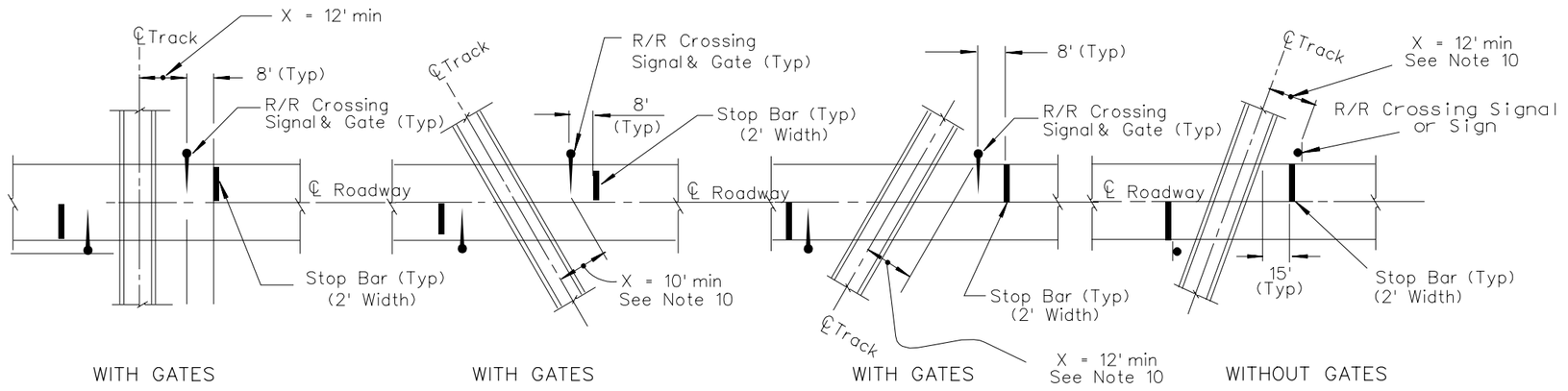
STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

TRAFFIC CONTROL TEMPORARY IMPACT ATTENUATORS

Signed Original On File	T-35.2.2	(625)
CHIEF SAFETY/TRAFFIC ENGR.	ADOPTED: 3/97	REV: 6/02

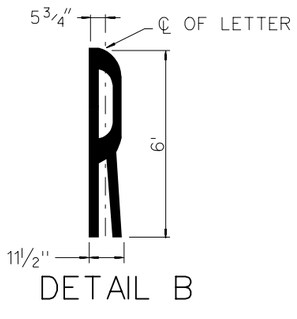


TYPICAL SIGN & MARKING PLAN

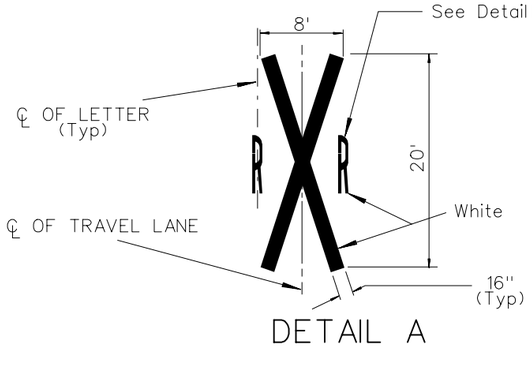


WITH GATES | WITH GATES | WITH GATES | WITHOUT GATES

R/R STOP BAR, SIGNAL & GATE PLACEMENT



DETAIL B



DETAIL A

D

Table For Minimum Spacing of Advance Warning Sign

SPEED (MPH)	SPACING (ft)
20	100
25	100
30	100
35-40	200
45	260
50	375
55	450
60	590
65-70	720
75	850

RAILROAD CROSSING KIT

One Set of Markers Per Travel Lane (70 ft^2)
See Note 5

GENERAL NOTES:

1. RAILROAD PAVEMENT MARKING SYMBOL INCLUDES THE TWO TRANSVERSE BANDS PLUS THE RAILROAD CROSSING KIT.

2. THE FIRST TRANSVERSE BAND OF THE RAILROAD PAVEMENT SYMBOL SHOULD BE DIRECTLY OPPOSITE THE ADVANCE WARNING SIGN (W10-1). IF NEEDED, SUPPLEMENTAL RAILROAD PAVEMENT MARKING SYMBOL(S) MAY BE PLACED BETWEEN THE FIRST RAILROAD PAVEMENT MARKING SYMBOL AND THE RAILROAD CROSSING, BUT SHOULD BE AT LEAST 50 FEET FROM THE STOP BAR.

3. A THREE-LANE ROADWAY SHOULD BE MARKED WITH A CENTERLINE FOR TWO-LANE APPROACH OPERATION ON THE APPROACH TO A RAILROAD CROSSING.

4. ON MULTI-LANE ROADS, THE TRANSVERSE BANDS SHOULD EXTEND ACROSS ALL APPROACH TRAVEL LANES, AND INDIVIDUAL RXR SYMBOLS SHOULD BE USED IN EACH APPROACH TRAVEL LANE.

5. PAVEMENT MARKINGS FOR STOP BARS, TRANSVERSE BANDS AND CENTER LINES ARE REQUIRED IN ADDITION TO PAVEMENT MARKINGS AS SHOWN IN DETAIL A.

6. ADDITIONAL INFORMATION ON RAILROAD GRADE CROSSINGS CAN BE FOUND IN MUTCD, PART VIII.

7. STOP BARS SHALL BE PERPENDICULAR TO ROADWAY AND SHALL BE WHITE.

8. FOR SIGN MOUNTING DETAILS, SEE STANDARD PLANS DRAWINGS T-31.1.1 THRU T-31.1.3, T-31.1.6, AND T-31.2.1.

9. REFER TO STANDARD ALPHABET FOR HIGHWAY SIGNS AND MARKINGS FOR RXR SYMBOL DETAILS.

10. THE DISTANCE X SHALL BE NOTED IN THE PLANS AND/OR STRUCTURE LIST.

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

RAILROAD CROSSING: SIGNAL & GATE PLACEMENT PAVEMENT MARKINGS

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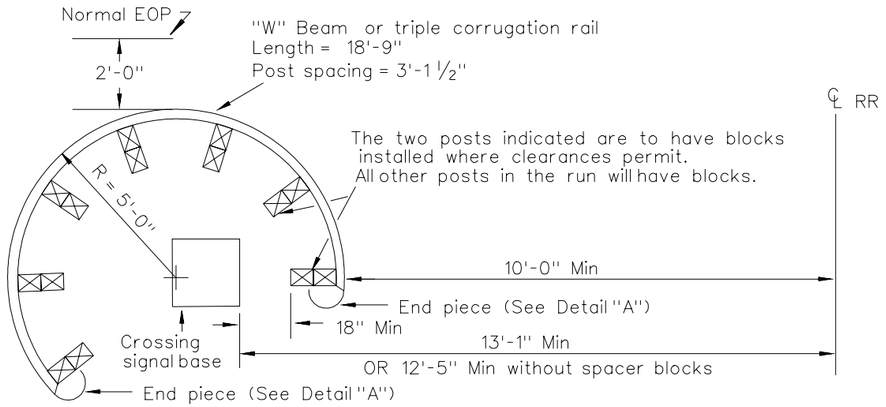
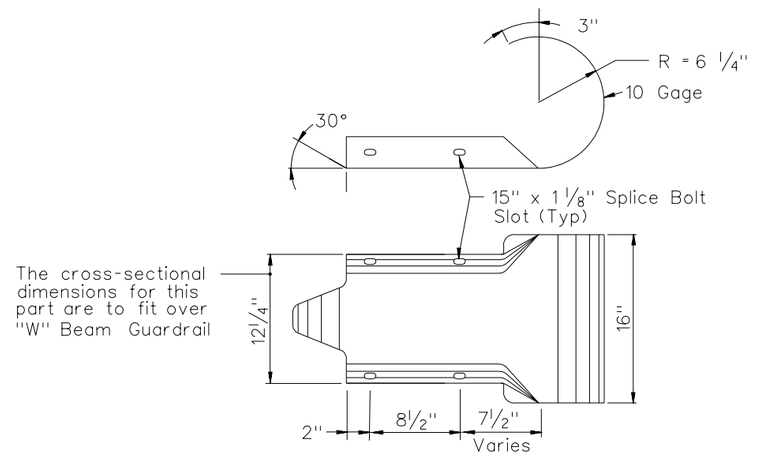
CHIEF SAFETY/TRAFFIC ENGR.	ADOPTED: 7/96	REVISION 6/02



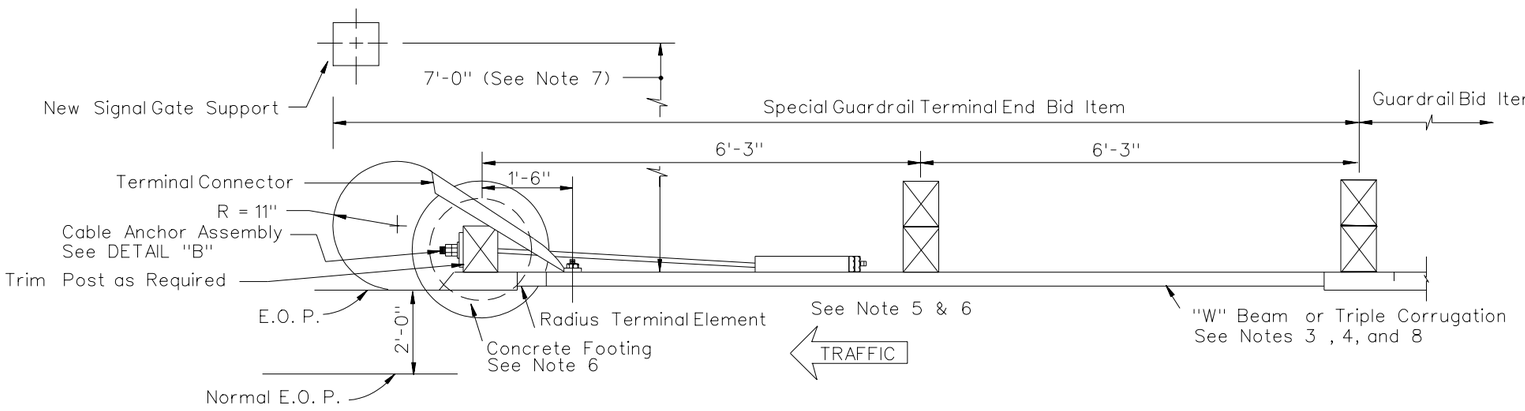
URBAN INSTALLATION

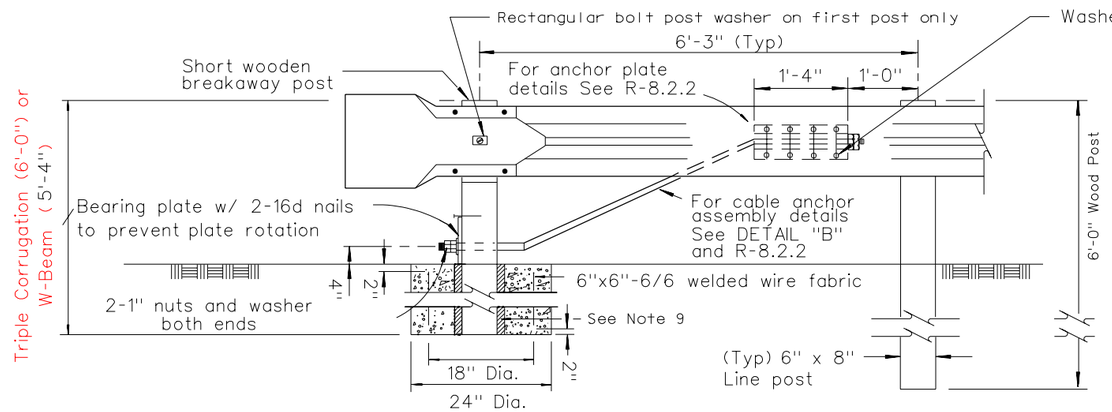


DETAIL "A"

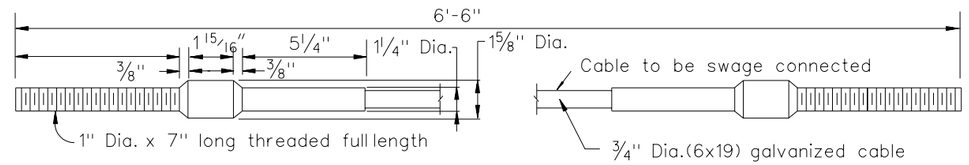
GENERAL NOTES:

1. Ring type guardrail may be installed to provide protection for the signal assembly in industrial or other areas involving only low-speed highway traffic and where signals are vulnerable to damage by turning truck traffic. Use of ring type guardrail requires approval by the Chief Safety Engineer or the Chief Roadway Design Engineer.
2. For railroad-highway grade crossings marking details refer to Standard Plan Drawing T-35.3.
3. For "W" beam guardrail details see Standard Plan Drawing R-8.5.1.
4. For triple corrugation guardrail details see Standard Plan Drawing R-8.4.1.
5. Special guardrail terminal end to be installed on guardrail end nearest to railroad.
6. No post holes shall be drilled next to the signal apparatus without first notifying the railroad inspector.
7. For signals with less than 7 feet, refer to Drawing R-8.3.1 and 1996 AASHTO Roadside Design Guide TABLE 5.3 for alternate post spacing.
8. For triple corrugation terminal connector details not shown refer to standardized highway barrier hardware by AASHTO-AGC-ARTBA Report May 1995.
9. Form concrete around 6" x 8" post wrapped with 1 layer of 1/4" to 1/2" thick expanded polystyrene foam sheeting. Don't nail polystyrene foam to post.





SPECIAL GUARDRAIL TERMINAL END



DETAIL "B"

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

RAILROAD CROSSING GUARDRAIL DETAILS

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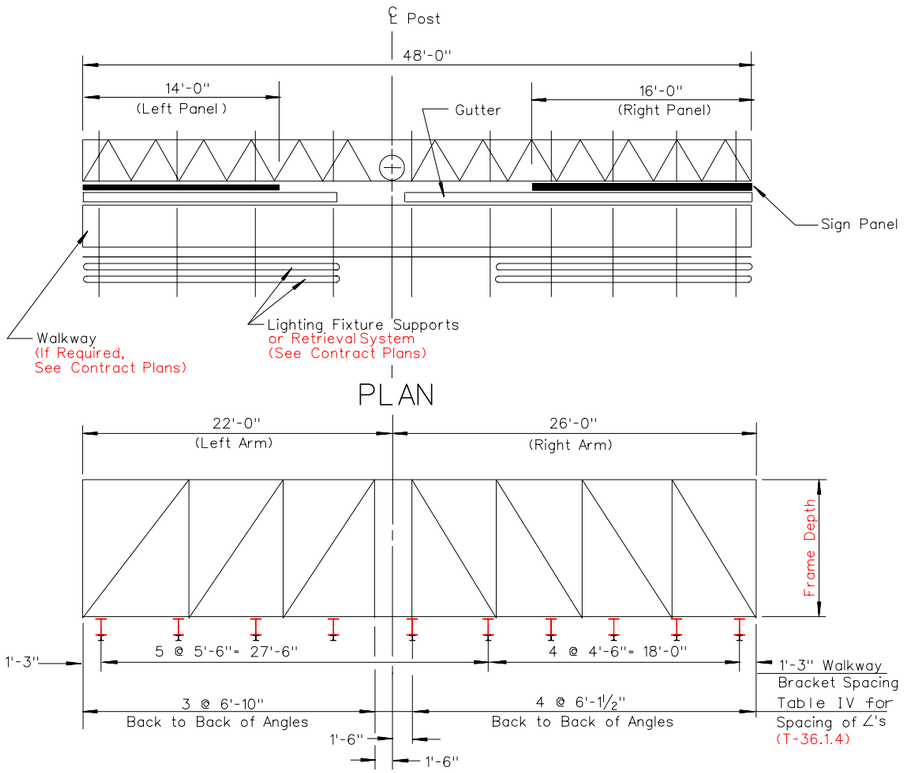
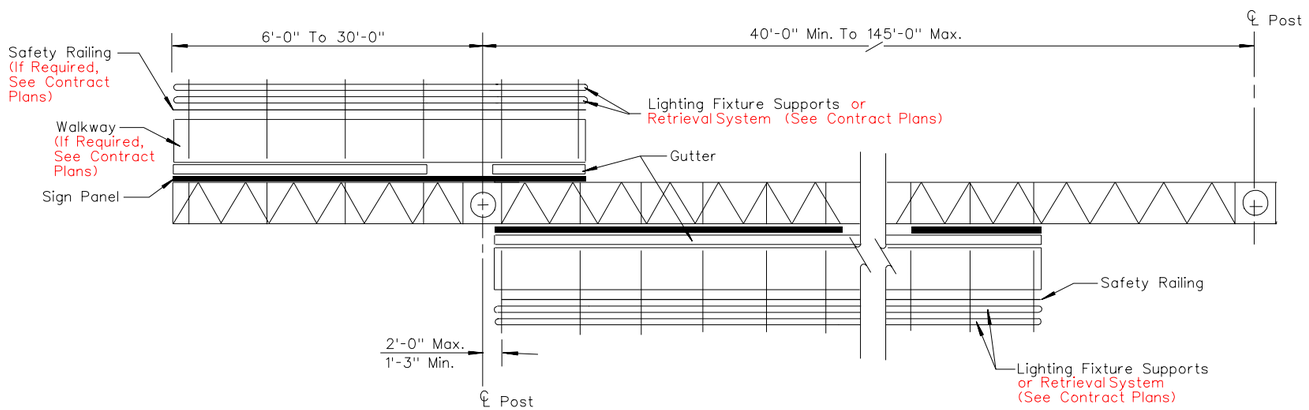


UNBALANCED SINGLE POST TYPE
EXAMPLE NO. 1



PLAN
TWO POST TYPE WITH CANTILEVER
(PART DOUBLE-FACED)
EXAMPLE NO. 3

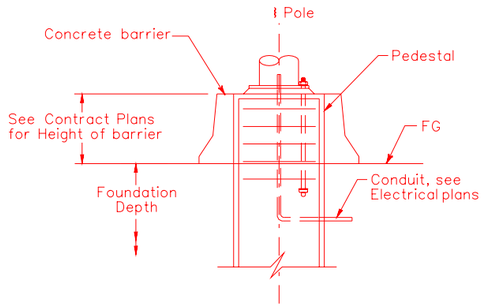
INSTRUCTIONS TO FABRICATOR

CONTRACT PLANS SHOW:

1. Sign Structure Type and 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. Photo Electric Cell Location if Required.
8. Extent of Walkway Grating (if Required) and Type of Lighting System (Fixed or Luminaire Retrieval System).

REFER TO THE FOLLOWING SHEETS FOR DETAILS NOT SHOWN ON CONTRACT PLANS:

T-36.1.1 - Instructions & Examples
T-36.1.2 - Post Type II Thru VII.
T-36.1.3 - Post Type I-S Thru VII-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-36.1.8.1 - Removable Sign Panel Frames 110" and 120" Sign Panels
T-36.1.8.2 - Sign Extension Bracket Retrofit Methods A and B
T-36.1.9 & T-36.1.10 - Walkway Details No. 1 & No. 2.
T-36.1.11 - Walkway Safety Railing Details.
T-36.1.12 - Alternate Pile Foundations.



MEDIAN LOCATION

GENERAL NOTES AND SPECIFICATIONS:

DESIGN: A.A.S.H.T.O. Specifications For Structural Supports for Highway Signs, Luminaires, and Traffic Signals, 4th Edition Dated 2001 (excluding Section II: Fatigue Design).

CONSTRUCTION: Standard Specifications for Road and Bridge Construction and the Special Provisions.

LOADING: Basic Wind Speed = 90 mph
Group Load Combinations:
Group I - Dead Load
Group II - Dead Load + Wind Load
Group III - Dead Load + Ice Load + ½Wind Load

Walkway Loading:
Dead Load + 500 lb. Concentrated Live Load

UNIT STRESSES:

STRUCTURAL STEEL:	Fs = 20,000 P.S.I.
REINFORCED CONCRETE:	Fs = 20,000 P.S.I.
	Fc = 1200 P.S.I.
FOOTING SOIL PRESSURE:	1¼ Tons/Sq.Ft.

MINIMUM CLEARANCE: Vertical Roadway Clearance 18'-0"

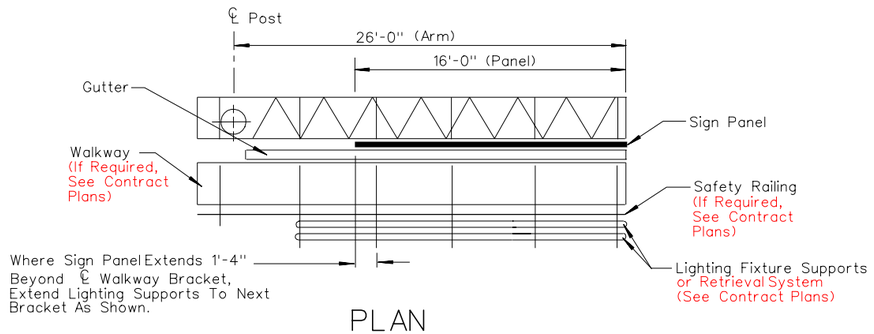
WELDING: All Welding Continuous Unless Otherwise Noted on the Plans. All Welding to be Done in Accordance With the Standard Specifications For Road and Bridge Construction.

FINISH: All Steel Parts to be Hot-Dipped Galvanized After Fabrication Except As Shown on Plans Or As Called For In Special Provisions.

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 No. 2.

WALKWAY AND SAFETY RAILING: Walkway (when required) 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.



PLAN
CANTILEVER SINGLE
POST TYPE
EXAMPLE NO. 2

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

OVERHEAD SIGNS
INSTRUCTIONS & EXAMPLES

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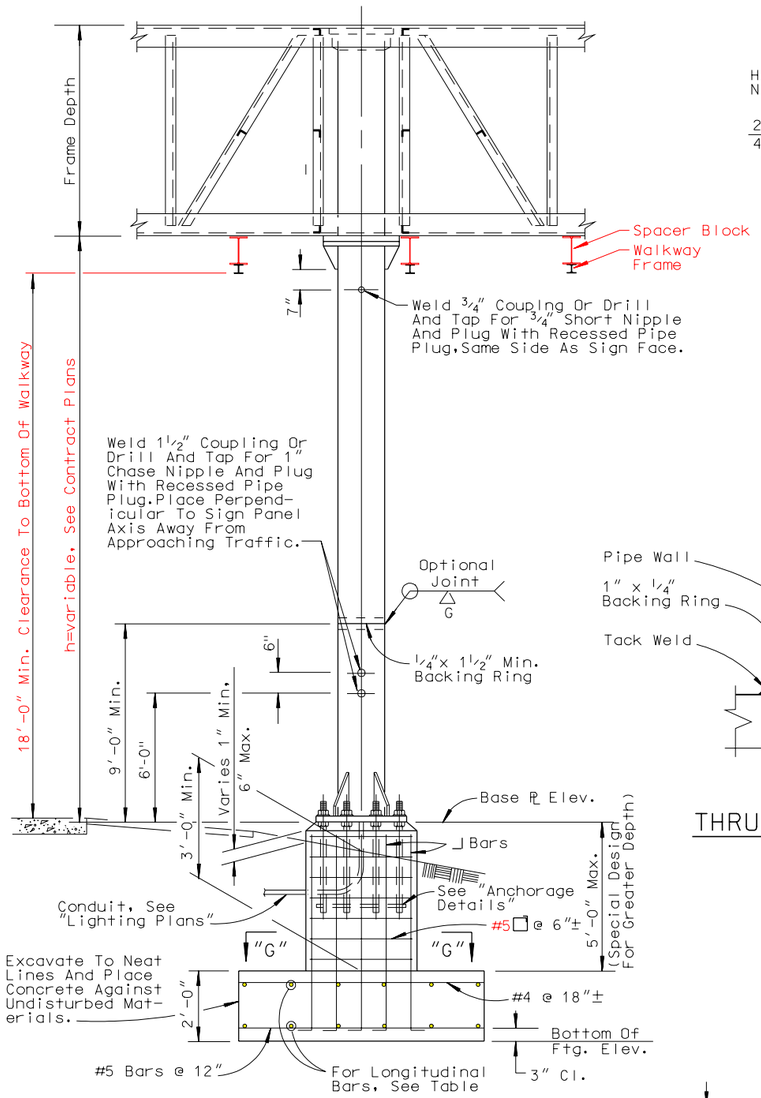
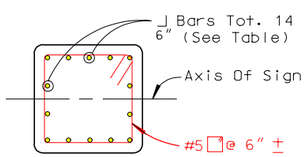
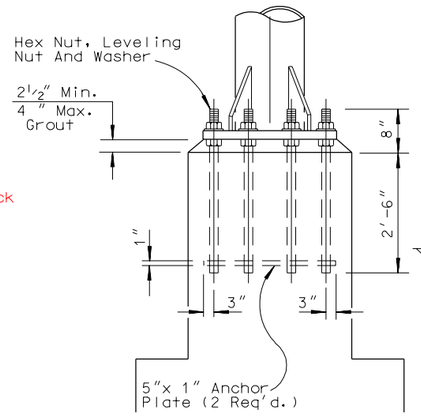
CHIEF BRIDGE ENGINEER	ADOPTED: 11/95	REVISION 12/02

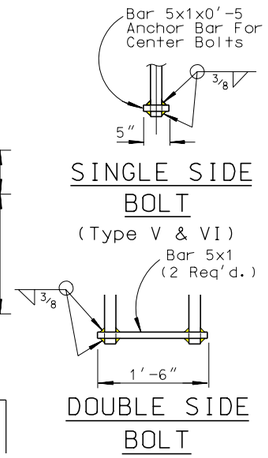


ELEVATION

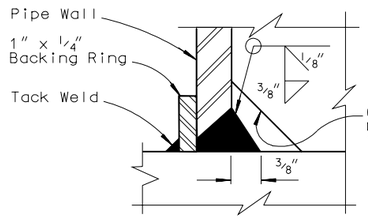


SECTION "G"–"G"

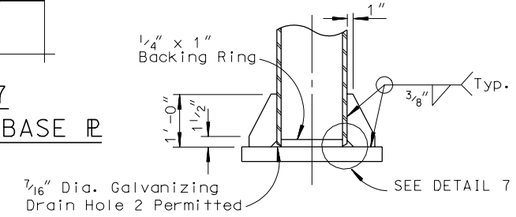




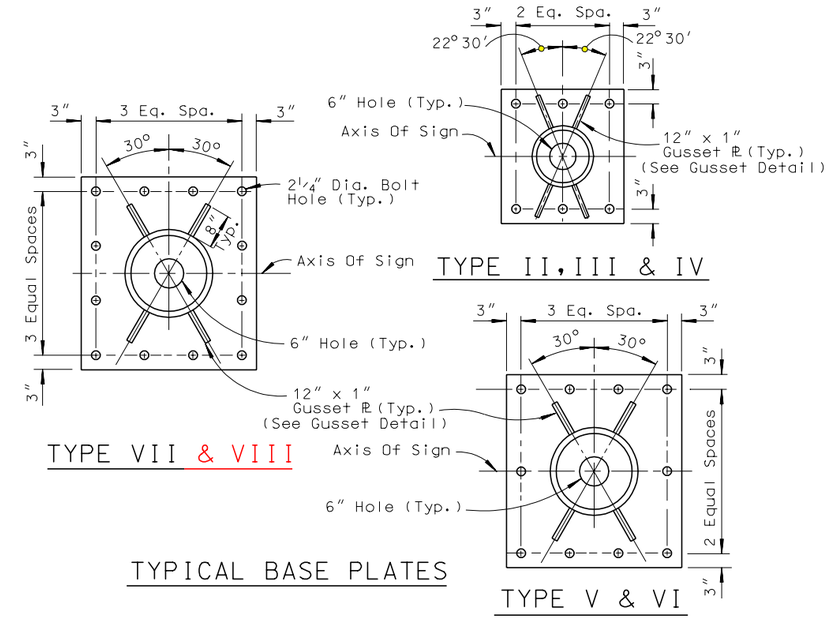
ANCHORAGE DETAILS



DETAIL 7 THRU POST @ BASE ℄

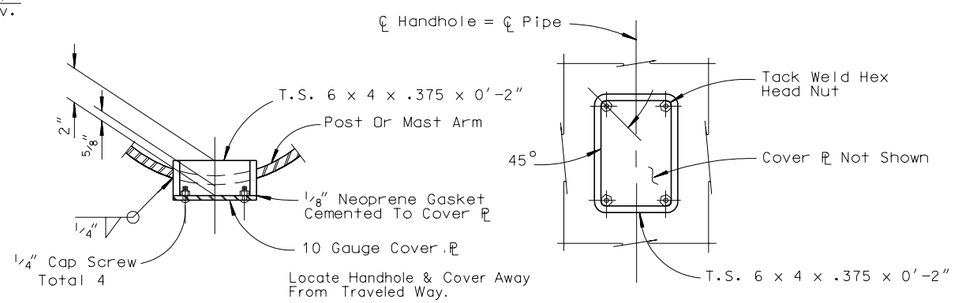


GUSSET DETAIL



TYPICAL BASE PLATES

Post Type	Pipe Size NPS	Pipe Size t(in)	Cap Plate Size	Base Plate Size (Note 2)	2"ϕ Anchor Bolts	Pedestal Size (Note 2)	Footing Size (Note 2)	Longitudinal Footing Reinforcement Top	Longitudinal Footing Reinforcement Bottom	⌋ Bars
II	12	3/8"	1'-7"x1'-7"x 7/8"	2'-4"x2'-1"x2"	6	2'-11"x2'-8"	7'-10"x10'-0"	6-#4 Bars	9-#5 Bars	#5
III	14	1/2"	1'-8"x1'-8"x 7/8"	2'-7"x2'-3"x2"	6	3'-2"x2'-10"	8'-0"x12'-0"	8-#5 Bars	8-#7 Bars	#6
IV	16	1/2"	1'-10"x1'-10"x 7/8"	3'-1"x2'-9"x2"	6	3'-8"x3'-4"	8'-0"x14'-0"	9-#5 Bars	9-#8 Bars	#6
V	18	1/2"	2'-0"x2'-0"x 7/8"	3'-3"x3'-0"x2"	10	3'-10"x3'-7"	9'-0"x15'-0"	9-#5 Bars	9-#9 Bars	#8
VI	20	1/2"	2'-2"x2'-2"x1"	3'-3"x3'-0"x2"	10	3'-10"x3'-7"	9'-0"x16'-0"	8-#6 Bars	8-#10 Bars	#8
VII	24	1/2"	2'-6"x2'-6"x1"	3'-7"x3'-3"x2"	12	4'-3"x3'-11"	10'-0"x17'-0"	10-#6 Bars	10-#10 Bars	#10
VIII	24"	5/8"	2'-6"x2'-6"x1"	3'-9"x3'-6"x2 1/2"	12	4'-5"x4'-1"	10'-0"x17'-0"	10-#6 Bars	10-#10 Bars	#11



HANDHOLE AND COVER DETAILS

GENERAL NOTES:

1. For General Notes See "Instructions And Examples" Sheet T-36.1.1
2. Base Plates, Pedestals And Footings Longer Sides Shall Be Normal To Axis Of Sign.
3. Backfill Shall Be In Place Prior To Erection Of Post.
4. Thread Upper 8" Of Anchor Bolts And Galvanize Upper 1'-0".
5. Spread Footing Shown. Alternate Pile Foundation Is Optional.
6. For Reinforcement, Embedment Is Clear To Outside Of Bar And Is 2" To Main Reinforcement, Except As Noted.
7. Anchor Plates May Be Retained With Hex Nut Or Formed Head.
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.
9. At Final Position Of Post All Top And Bottom Nuts Shall Be Tightened Against Base Plate.
10. When Foundation Is Located On A Steep Slope With Exposed Face Of Concrete Adjacent To Traffic, See Detail C On "Alternate Pile Foundation" Sheet.

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

OVERHEAD SIGNS SINGLE POST TYPES II THRU VIII

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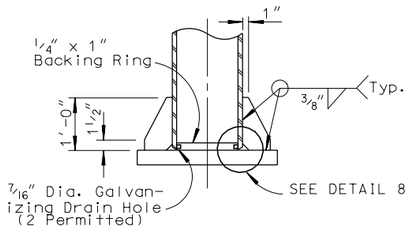
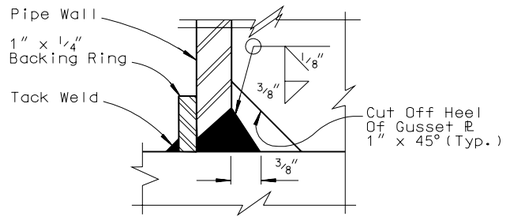
CHIEF BRIDGE ENGINEER

T-36.1.2 (627)
ADOPTED: 7/96 REVISION: 12/02



SECTION S-S

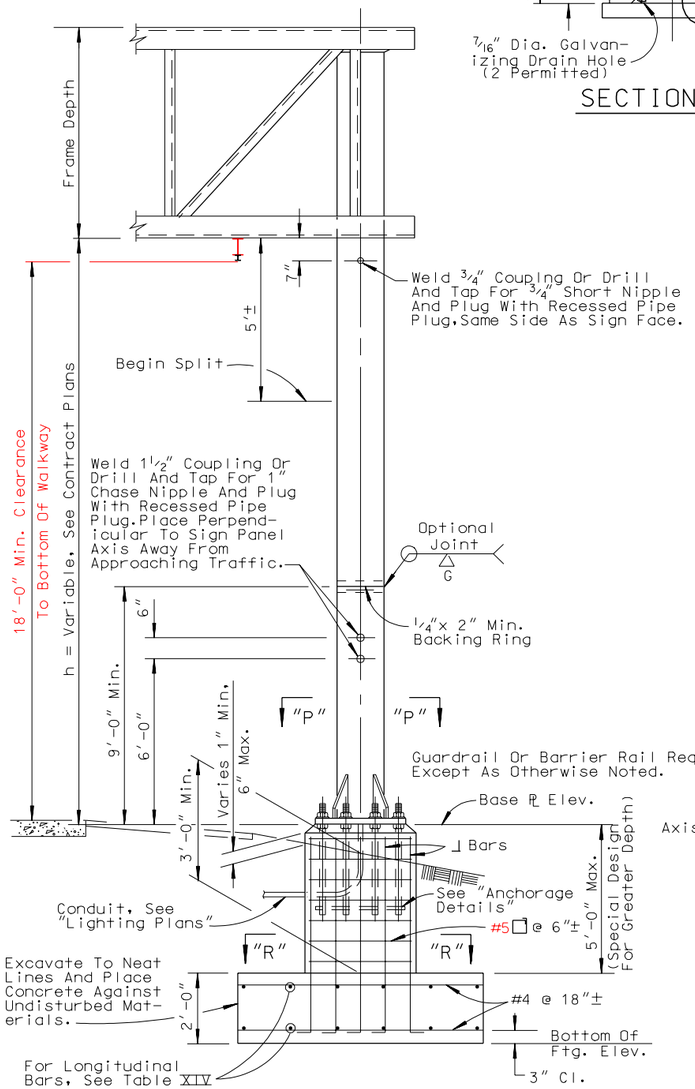


DETAIL 8

TABLE XIV									
Post Type	Pipe Size NPS	Pipe Size t (in)	Split	Base Plate Size (Note 2)	Anchor Bolts	Pedestal Size (Note 2)	Footing Size (Note 2)	Longitudinal Footing Reinforcement Top	Longitudinal Footing Reinforcement Bottom	⌟ Bars
I-S	10"	23/64	4"	2'-3"x1'-9"x 2"	6-2" ϕ	2'-9"x2'-3"	5'-0"x10'-0"	5-#4 Bars	5-#6 Bars	#6
II-S	12"	3/8	5"	2'-6"x1'-11"x 2"	6-2" ϕ	3'-0"x2'-6"	6'-0"x11'-0"	6-#4 Bars	6-#7 Bars	#6
III-S	14"	1/2	5"	2'-9"x2'-0"x 2"	6-2" ϕ	3'-4"x2'-7"	7'-0"x13'-0"	8-#5 Bars	8-#9 Bars	#9
IV-S	16"	1/2	6"	2'-11"x2'-7'x 2"	8-2" ϕ	3'-6"x3'-2"	8'-0"x14'-0"	8-#5 Bars	8-#9 Bars	#9
V-S	18"	1/2	7"	3'-1"x2'-9"x 2"	8-2" ϕ	3'-8"x3'-4"	8'-0"x16'-0"	8-#5 Bars	8-#9 Bars	#9
VI-S	20"	1/2	8"	3'-5"x2'-9"x 2"	8-2" ϕ	4'-0"x3'-4"	9'-0"x17'-0"	9-#5 Bars	9-#10 Bars	#10
VII-S	24"	1/2	8"	3'-9"x3'-3"x 2"	8-2 1/4" ϕ	4'-5"x3'-11"	10'-0"x18'-0"	10-#6 Bars	10-#11 Bars	#11
VIII-S	24"	3/4	8"	3'-9"x3'-3"x 2"	8-2 1/4" ϕ	4'-5"x3'-11"	10'-0"x18'-0"	10-#6 Bars	10-#11 Bars	#11

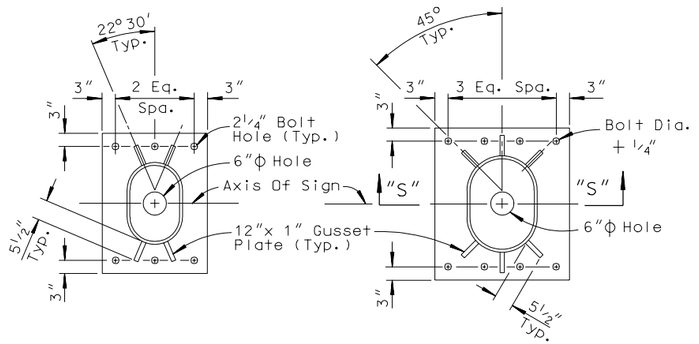
GENERAL NOTES:

1. For General Notes See "Instructions And Examples" Sheet T-36.1.1
2. Base Plates, Pedestals And Footings Longer Sides Shall Be Normal To Axis Of Sign.
3. Backfill Shall Be In Place Prior To Erection Of Post.
4. Thread Upper 8" Of Anchor Bolts And Galvanize Upper 1'-0".
5. Spread Footing Shown. Alternate Pile Foundation Is Optional.
6. For Reinforcement, Embedment Is Clear To Outside Of Bar And Is 2" To Main Reinforcement, Except As Noted.
7. Anchor Plates May Be Retained With Hex Nut Or Formed Head.

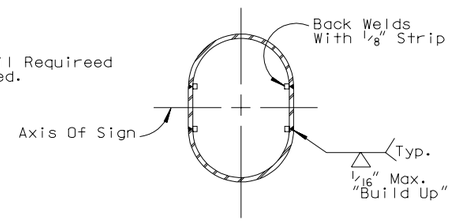


ELEVATION

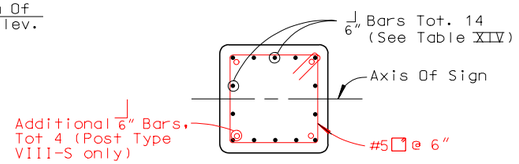
NOTE: Post Without Cantilever Is Shown.



TYPICAL BASE PLATES



SECTION "P"-"P"



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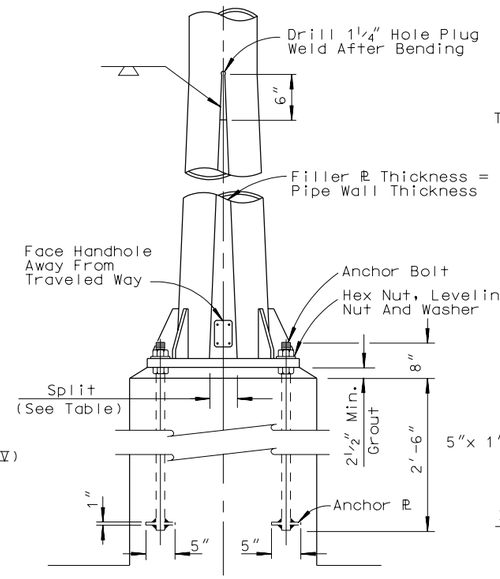
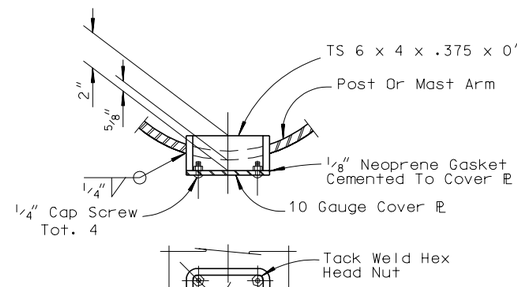
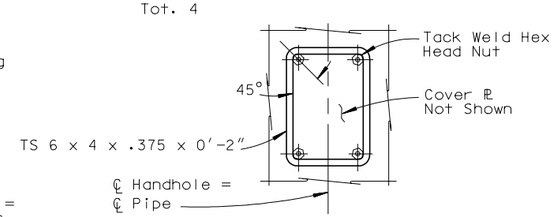
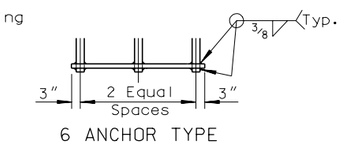


ANCHORAGE DETAILS





HANDHOLE & COVER DETAIL



STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

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

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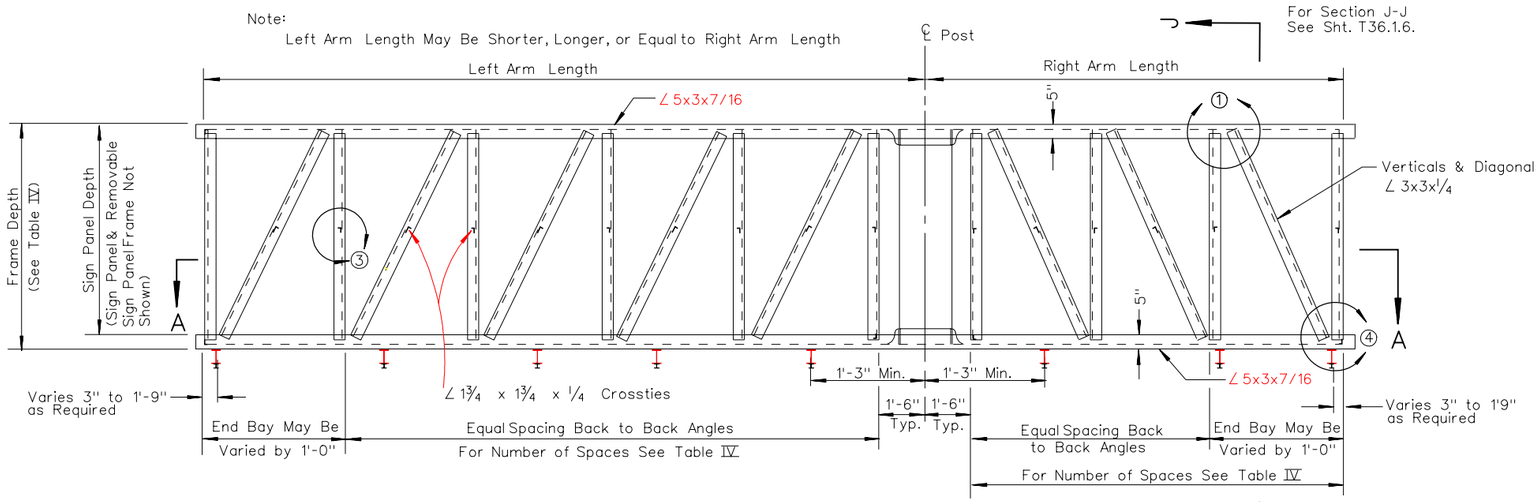
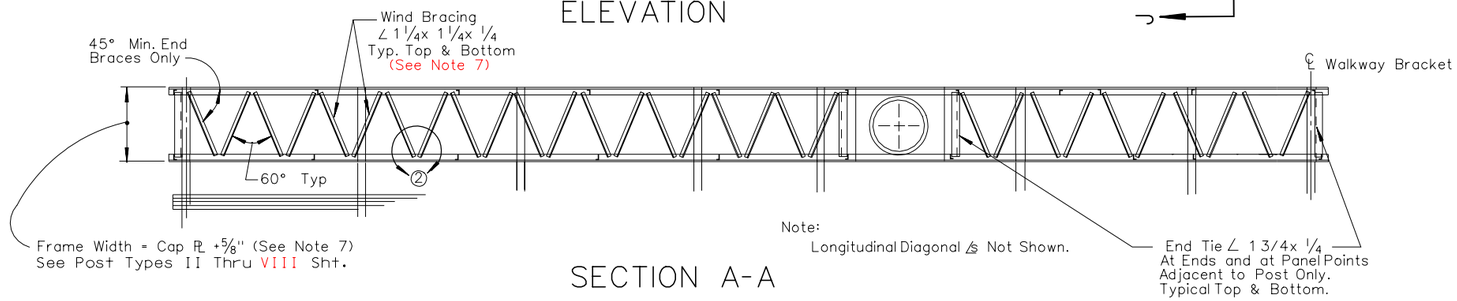
CHIEF BRIDGE ENGINEER	ADOPTED:11/95 REVISION: 12/02

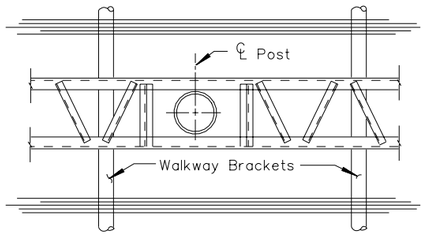
Note:
Left Arm Length May Be Shorter, Longer, or Equal to Right Arm Length



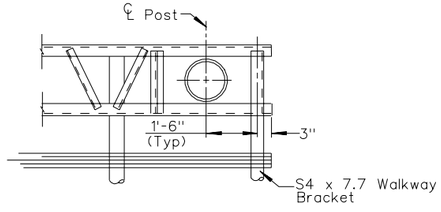
ELEVATION



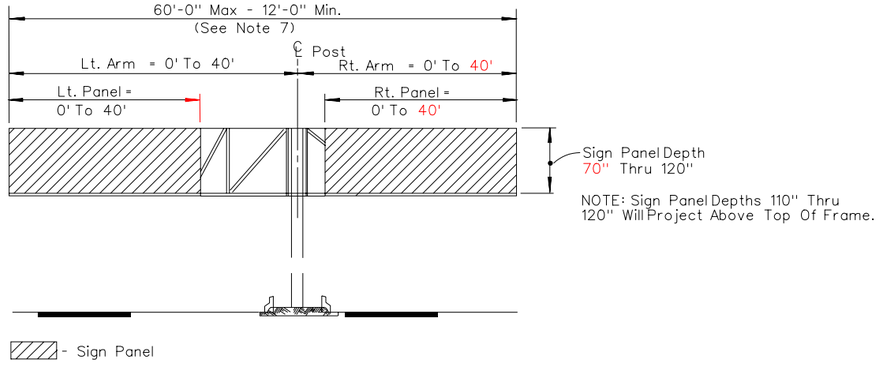
SECTION A-A



PART PLAN OF DOUBLE FACED TYPE AT POST



PART PLAN OF CANTILEVER TYPE AT POST



LIMITING DIMENSIONS OF FRAME & SIGN PANEL

TABLE IV

Sign Panel Depth	Frame Depth	Maximum Vertical ∠ Spacing	Arm Length See Note No. 10
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"	8'-10"	7'-6"	6'
120"	8'-10"	7'-6"	6'

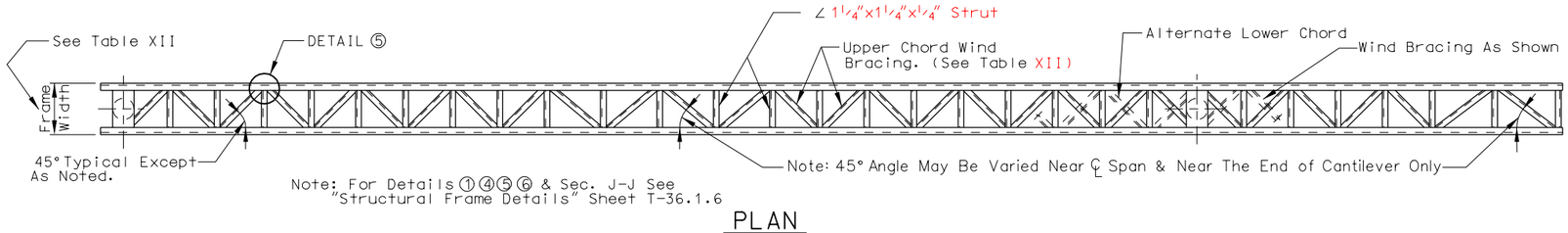
GENERAL NOTES:

1. FOR DETAILS ① THRU ④ SEE "STRUCTURAL FRAME DETAILS" SHT. T-36.1.6.
2. FOR SIGN PANEL FRAMES SEE "REMOVABLE SIGN PANEL FRAMES " SHT. T-36.1.8.
3. FOR CONNECTION OF FRAME TO POST SEE "FRAME JUNCTURE DETAILS" SHT. T-36.1.7.
4. FOR WALKWAY SEE "STANDARD WALKWAY DETAILS NO. 1 & NO. 2 SHTS. T-36.1.9 & T-36.1.10
5. FOR TYPICAL WALKWAY ARRANGEMENT, SPECIAL INSTRUCTIONS AND EXAMPLES, SEE "INSTRUCTIONS AND EXAMPLES" SHT. T-36.1.1.
6. MINIMUM LENGTH OF FRAME = 12'-0". MAXIMUM LENGTH OF FRAME = 60'-0".
7. FOR ARM LENGTHS 35' TO 40' AND SIGN DEPTHS 80" THRU 120" :
   A. USE 1½ x 1½ x ¼ WIND BRACING
   B. FRAME WIDTH = CAP PL + ⅞".
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.
9. AT FINAL POSITION OF POST ALL TOP AND BOTTOM NUTS SHALL BE TIGHTENED AGAINST BASE PLATE.
10. DIAGONAL NOT REQUIRED IF ARM LENGTH IS EQUAL TO OR LESS THAN SHOWN IN THIS COLUMN OF TABLE IV.

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

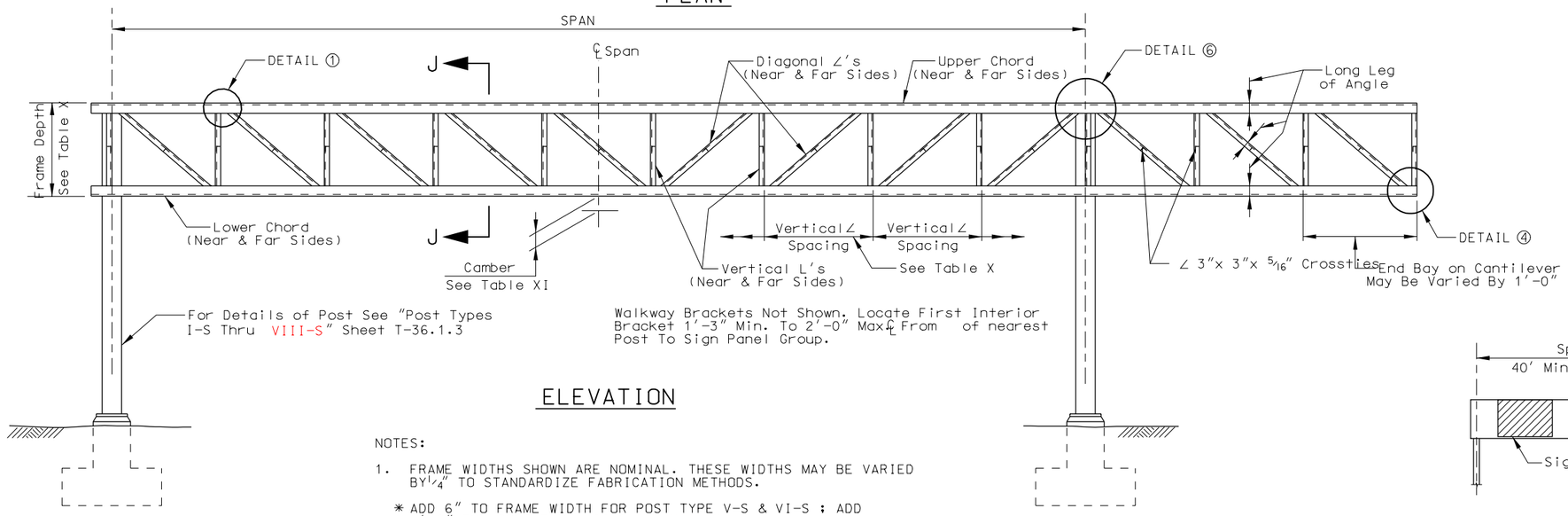
OVERHEAD SIGNS SINGLE POST STRUCTURAL FRAME MEMBERS

Signed Original On File	T-36.1.4	(627)
CHIEF BRIDGE ENGINEER	ADOPTED: 11/95	REVISION 12/02



Note: For Details ①④⑤⑥ & Sec. J-J See "Structural Frame Details" Sheet T-36.1.6

PLAN



ELEVATION

NOTES:

1. FRAME WIDTHS SHOWN ARE NOMINAL. THESE WIDTHS MAY BE VARIED BY ¼" TO STANDARDIZE FABRICATION METHODS.

* ADD 6" TO FRAME WIDTH FOR POST TYPE V-S & VI-S ; ADD 1'-0" FOR POST TYPE VII-S AND VIII-S.

** ADD 6" TO FRAME WIDTH FOR POST TYPE VII-S AND VIII-S .

PANEL DEPTH	FRAME DEPTH	MAX VERTICAL ∠ SPACING
70"	6'-4"	72"
80"	7'-2"	72"
90"	8'-0"	90"
100"	8'-10"	90"
110"	8'-10"	120"
120"	8'-10"	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

RANGE OF STRUCTURE SIZES

NOTE: Sign Panel Depths 110" And 120" Will Project Above Top Of Frame.

Span	70" Panel Depth					80" PANEL DEPTH					90" PANEL DEPTH				
	Frame Width	Chord ∠'s	Vertical ∠'s	Diagonal ∠'s	Wind Bracing	FRAME WIDTH	CHORD ∠'S	VERTICAL ∠'S	DIAGONAL ∠'S	WIND BRACING	FRAME WIDTH	CHORD ∠'S	VERTICAL ∠'S	DIAGONAL ∠'S	WIND BRACING
40'-50'	2'-0" *	5x3-1/2x7/16	3x3x1/4	3x3x1/4	2-1/2x2-1/2x1/4	2'-0" *	5x3-1/2x7/16	3x3x1/4	3x3x1/4	2-1/2x2-1/2x1/4	2'-0" *	5x3-1/2x7/16	3x3x5/16	3x3x5/16	2-1/2x2-1/2x1/4
51'-60'	2'-0" *	5x3-1/2x7/16			2-1/2x2-1/2x1/4	2'-0" *	5x3-1/2x7/16			2-1/2x2-1/2x1/4	2'-0" *	5x3-1/2x7/16			2-1/2x2-1/2x1/4
61'-70'	2'-6"**	5x3-1/2x7/16			2-1/2x2-1/2x1/4	2'-6"**	5x3-1/2x7/16			2-1/2x2-1/2x1/4	2'-6"**	5x3-1/2x7/16			2-1/2x2-1/2x1/4
71'-80'	2'-6"**	6x4x1/2			2-1/2x2-1/2x1/4	2'-6"**	6x4x1/2			2-1/2x2-1/2x1/4	3'-0"	6x4x1/2			2-1/2x2-1/2x1/4
81'-90'	3'-0"	6x4x1/2			2-1/2x2-1/2x1/4	3'-0"	6x4x1/2			2-1/2x2-1/2x1/4	3'-0"	6x4x1/2			2-1/2x2-1/2x1/4
91'-100'	3'-0"	6x4x1/2			2-1/2x2-1/2x1/4	3'-0"	6x4x1/2			2-1/2x2-1/2x1/4	3'-0"	6x4x1/2			2-1/2x2-1/2x1/4
101'-110'	3'-0"	7x4x5/8			2-1/2x2-1/2x1/4	3'-0"	7x4x5/8			2-1/2x2-1/2x1/4	3'-0"	7x4x5/8			2-1/2x2-1/2x1/4
111'-120'	3'-0"	7x4x5/8			2-1/2x2-1/2x1/4	3'-0"	7x4x5/8			2-1/2x2-1/2x1/4	3'-0"	8x4x3/4			2-1/2x2-1/2x1/4
121'-132'	3'-0"	8x4x3/4			2-1/2x2-1/2x1/4	3'-0"	8x4x3/4			2-1/2x2-1/2x1/4	3'-6"	8x4x3/4			2-1/2x2-1/2x1/4
133'-145'	3'-0"	8x4x3/4			2-1/2x2-1/2x1/4	3'-0"	8x4x3/4			2-1/2x2-1/2x1/4	3'-6"	8x4x3/4			2-1/2x2-1/2x1/4

Span	100" Panel Depth					110" AND 120" PANEL DEPTH				
	Frame Width	Chord ∠'s	Vertical ∠'s	Diagonal ∠'s	Wind Bracing	FRAME WIDTH	CHORD ∠'S	VERTICAL ∠'S	DIAGONAL ∠'S	WIND BRACING
40'-50'	2'-0"*	5x3-1/2x7/16	3x3x5/16	3x3x5/16	2-1/2x2-1/2x1/4	2'-0" *	5x3-1/2x7/16	3x3x5/16	3x3x5/16	2-1/2x2-1/2x1/4
51'-60'	2'-0"*	5x3-1/2x7/16			2-1/2x2-1/2x1/4	2'-6"**	5x3-1/2x7/16			2-1/2x2-1/2x1/4
61'-70'	2'-6"**	5x3-1/2x7/16			2-1/2x2-1/2x1/4	3'-0"	5x3-1/2x7/16			2-1/2x2-1/2x1/4
71'-80'	3'-0"	6x4x1/2			2-1/2x2-1/2x1/4	3'-6"	6x4x1/2			2-1/2x2-1/2x1/4
81'-90'	3'-0"	6x4x1/2			2-1/2x2-1/2x1/4	3'-6"	6x4x1/2			2-1/2x2-1/2x1/4
91'-100'	3'-0"	6x4x1/2			2-1/2x2-1/2x1/4	3'-6"	6x4x1/2			2-1/2x2-1/2x1/4
101'-110'	3'-6"	7x4x5/8			2-1/2x2-1/2x1/4	3'-6"	7x4x5/8			2-1/2x2-1/2x1/4
111'-120'	3'-6"	7x4x5/8			2-1/2x2-1/2x1/4	3'-6"	8x4x3/4			3x3x1/2
121'-132'	3'-6"	8x4x3/4			2-1/2x2-1/2x1/4	3'-6"	8x4x3/4			3x3x1/2
133'-145'	3'-6"	8x4x3/4			2-1/2x2-1/2x1/4	3'-6"	8x4x3/4			3x3x1/2

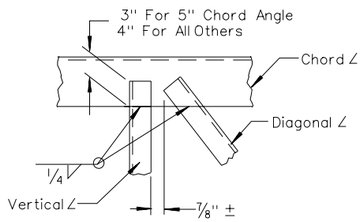
TABLE XII

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

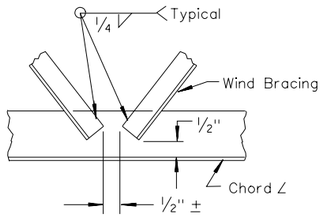
OVERHEAD SIGNS-TWO POST STRUCTURAL FRAME MEMBERS

Signed Original On File
CHIEF BRIDGE ENGINEER

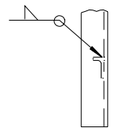
T-36.1.5 (627)
ADOPTED 11/95 REVISION: 2/03



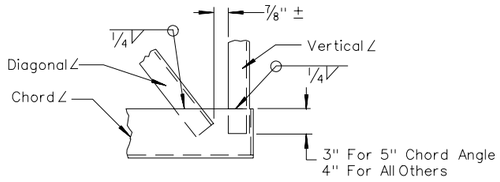
DETAIL ①



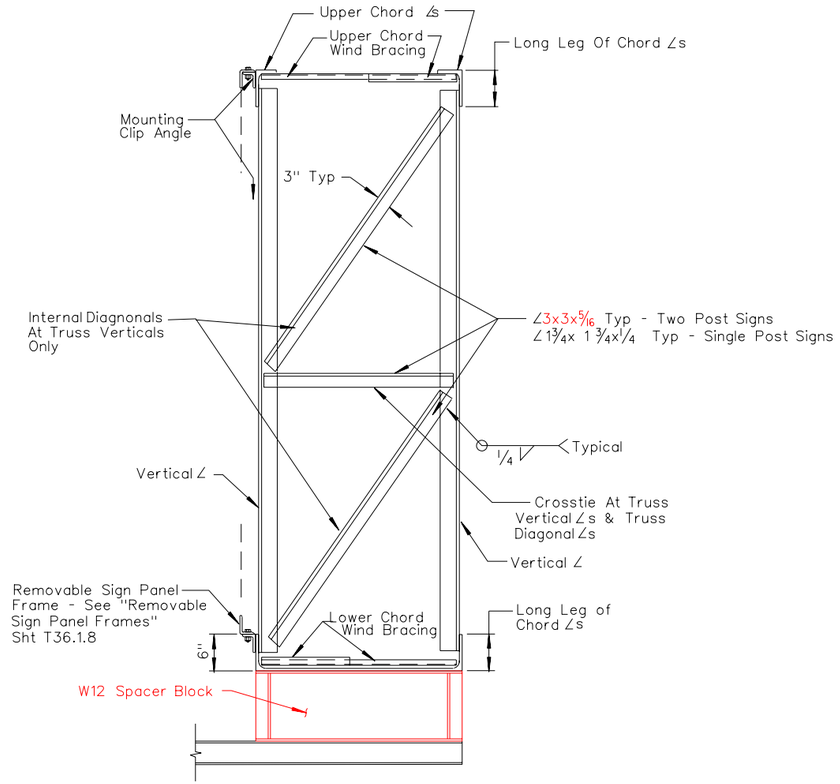
DETAIL ②



DETAIL ③



DETAIL ④



TYPICAL SECTION J-J

Note:
Diagonal s∠in Plane of Truss, Not Shown. Bracing Shown Is At All Vertical s ℄f Truss.

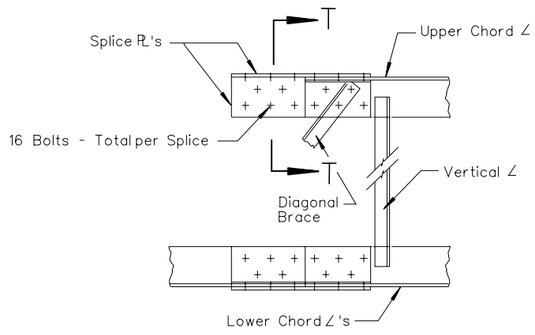
SPLICE NOTES:

Specifications:
The Bolted Splice Shall Conform To Current "Specifications For Structural Joints Using ASTM A325 Bolts".

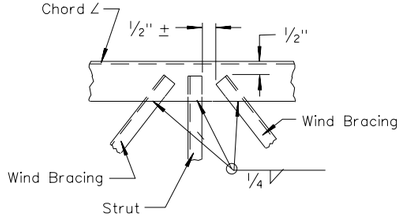
Location of Splices:
The Splice Shall Be Located So As Not To Interfere With Mounting The Walkway Brackets Or The Clip Angles For The Removable Sign Panel Frame. The Wind Bracing In The Area Of The Bolted Chord Splice Shall Be Bolted To The Chord Angles With a 3/8" Unfinished Bolt, With Hex Head and Nut, 2 Cut Washers And Lock Washer.

Bolts:
The A325 Bolts Shall Be High Strength With An Interference Type Body And Torqued To The Required Amount As Stated In The Above Specifications.

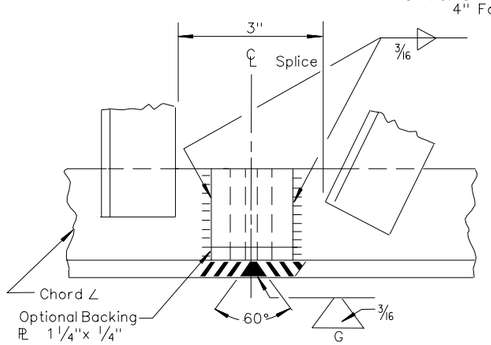
Filler P L:
The Plates Welded To The Angle Legs On The Inside Shall Be Welded Before Punching The Bolt Holes. They Shall Be The Same Length As The Cover Plates. The Plates Are Not Necessary On The Single Post Signs If The Splice Is Located Over 1/3 Of The Cantilever Length From The Post Alternative Splice Details May Be Used If Approved By The Engineer.



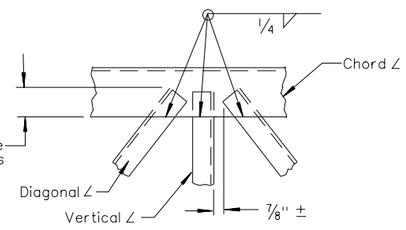
OPTIONAL
BOLTED CHORD SPLICE



DETAIL ⑤

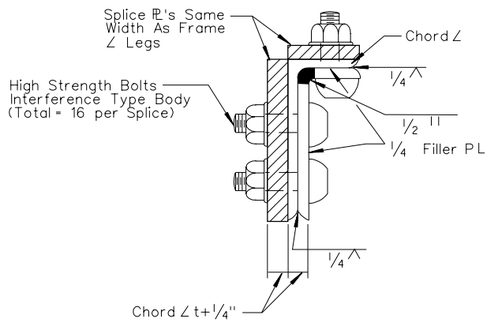


WELDED CHORD SPLICE



DETAIL ⑥

Note:
1. Prepare Edges By Beveling to Angle Shown.
2. Weld to 100% Full Penetration.
3. Grind Flush With Base Metal.



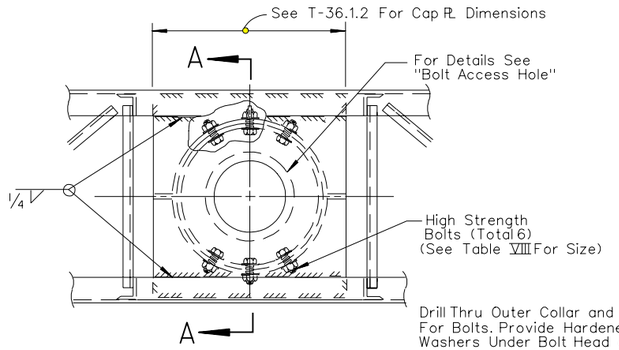
SECTION T-T

BOLTED CHORD SPLICE	
Chord ∠ (Inch.)	Nominal Bolt Diam. (Inch.)
TWO POST SIGNS	
5x3 1/2x 7/16	3/4
6x4x 1/2	7/8
7x4x 5/8	1
8x4x 5/8	1 1/4
SINGLE POST SIGNS	
5x3x 7/16	3/4

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

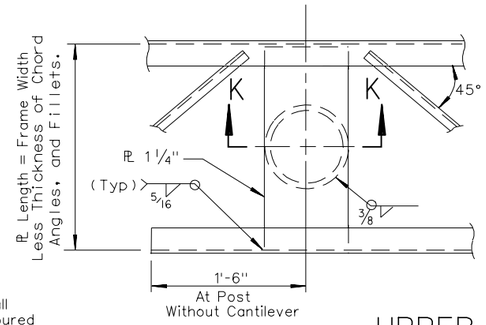
OVERHEAD SIGNS
STRUCTURAL FRAME DETAILS

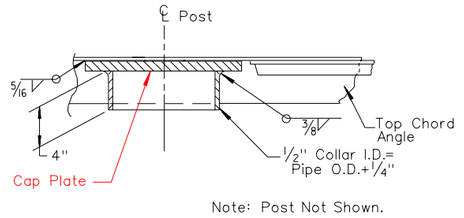
Signed Original On File	T-36.1.6	(627)
CHIEF BRIDGE ENGINEER	ADOPTED: 7/96	REVISION 2/03



PLAN

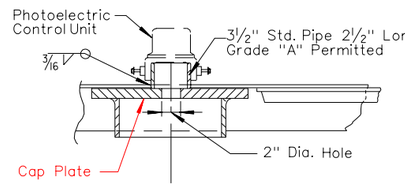
Drill Thru Outer Collar and Post Wall For Bolts. Provide Hardened Contoured Washers Under Bolt Head and Nut. Hardened Contoured Washers to Be 3"x3"x5/16" Min. Grind Face to Fit.





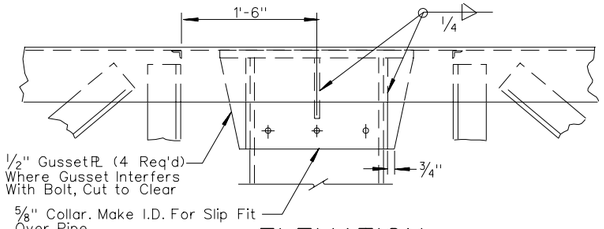
Note: Post Not Shown.

SECTION K-K
WITHOUT PHOTOELECTRIC CONTROL UNIT

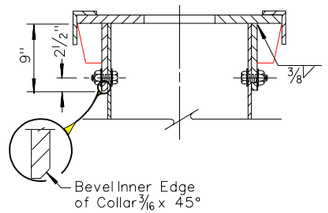


SECTION K-K
WITH PHOTOELECTRIC CONTROL UNIT

UPPER CHORD CONNECTION TO POST
TWO POST TYPE

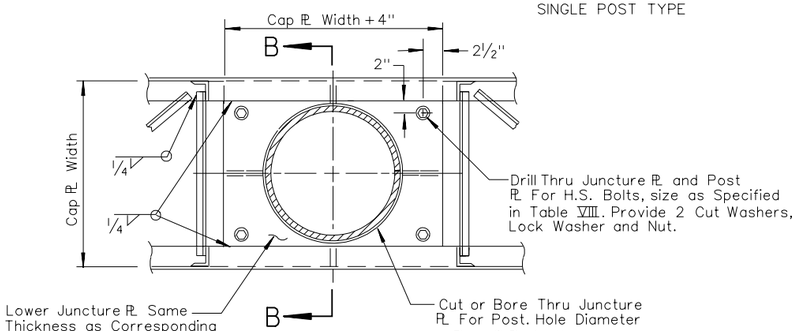


ELEVATION



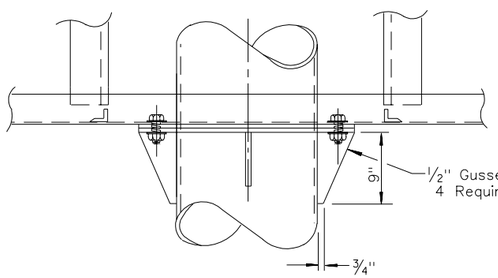
SECTION A-A

UPPER JUNCTURE CONNECTION
SINGLE POST TYPE

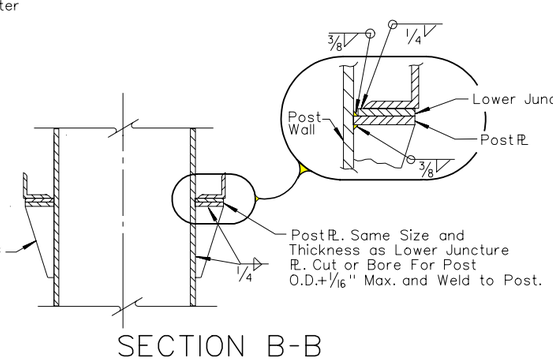


PLAN

TABLE VIII	
Post Type	Bolt Size
II	7/8"
III	1"
IV	1 1/8"
V	1 1/8"
VI	1 1/4"
VII	1 1/4"

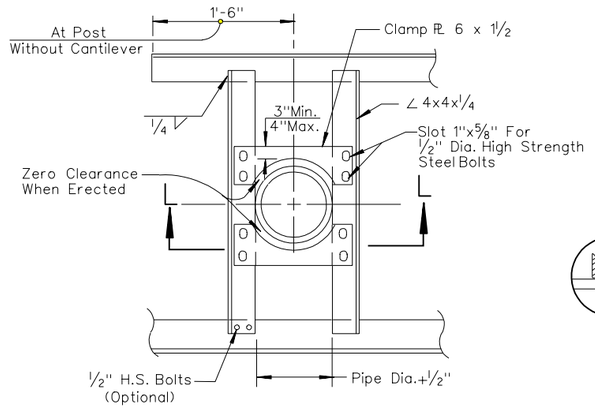


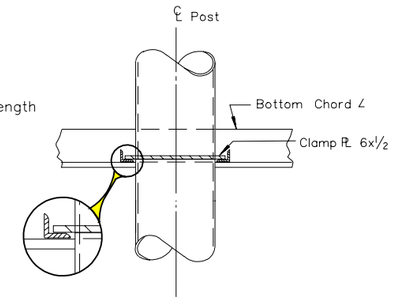
ELEVATION



SECTION B-B

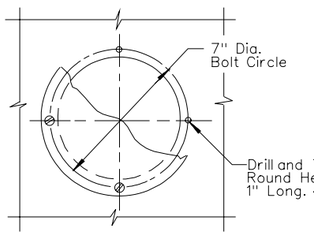
LOWER JUNCTURE CONNECTION
SINGLE POST TYPE





SECTION L-L

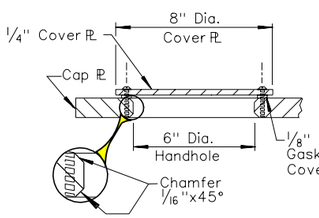
LOWER CHORD CONNECTION TO POST
TWO POST TYPE



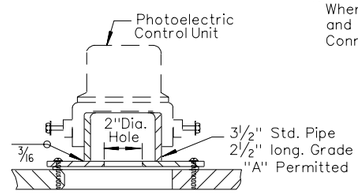
PLAN

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 PL Prior to Tightening of Bolts in Lower Connection. Shims May be Galvanized Steel Cut Washers.



SECTION
WITHOUT PHOTOELECTRIC CONTROL UNIT



SECTION
WITH PHOTOELECTRIC CONTROL UNIT

BOLT ACCESS HOLE
SINGLE POST TYPE

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

OVERHEAD SIGNS
FRAME JUNCTURE DETAILS

Signed Original On File	T-36.1.7 (627)
CHIEF BRIDGE ENGINEER	ADOPTED:7/96 REVISION 10/02

FRAME NOTES:

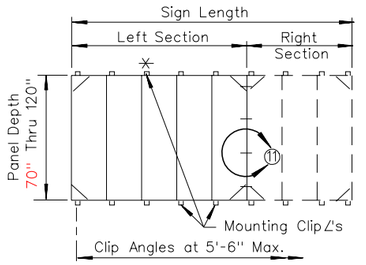
Frames for Signs Greater than 20'-0" in Length Shall be Fabricated In Two Sections With Left Section A Multiple of 4'-0" in Length. See Table A.

Sections Shall be Hoisted Into Place Individually and Bolted Together As Per Detail 11 (F) Prior to Tightening of Mounting Clip Bolts.

Bolting Two Sections Together and Hoisting Simutaneously Will Not be Permitted.

Table A

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'



✳ - 110" And 120" Sign Panel Frames Will Project Above The Top Chord Of The Truss. In These Cases, The Top Clips Shall Be Bolted To Vertical Frame Members.
SEE SHEET T-36.1.8.1

REMOVABLE FRAME GREATER THAN 20'-0"

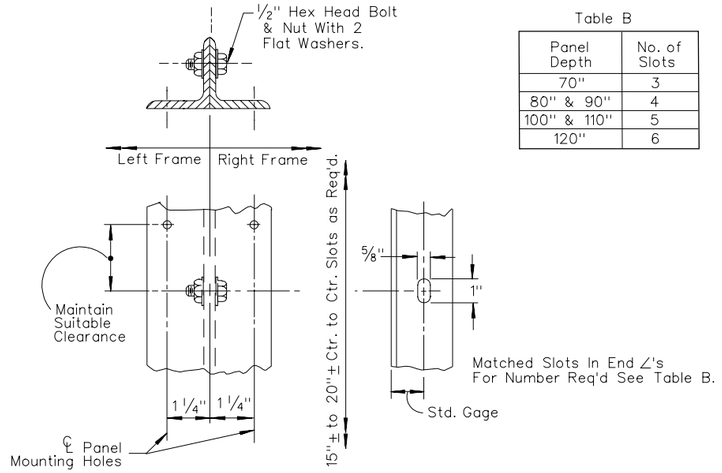


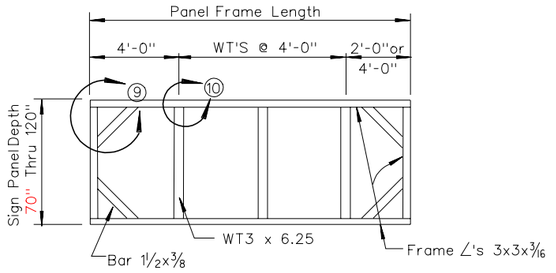
Table B

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

Matched Slots In End ∠'s For Number Req'd See Table B.

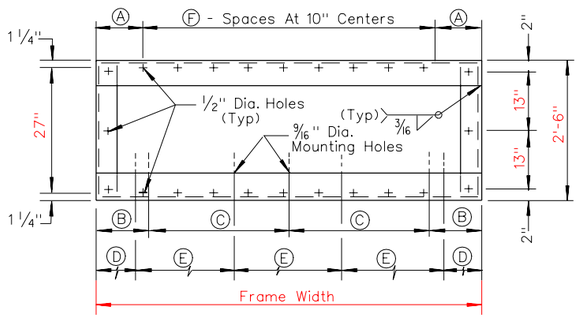
DETAIL (11)

Note: Panel Mounting Holes Not Shown.
Panel Lengths Available in 2'-0" Increments.



TYPICAL REMOVABLE FRAME

(4'-0" THRU 20'-0")

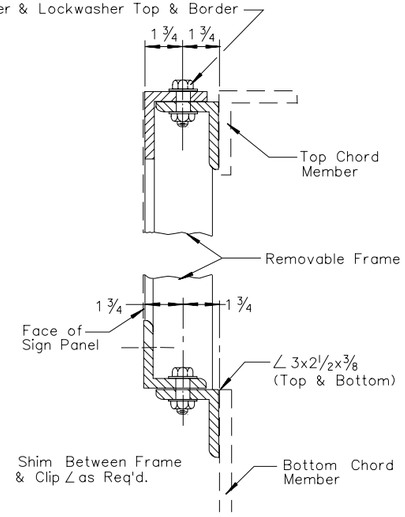


Frame Width	Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ	Ⓕ
5'-6"	0'-8"	0'-9"	2'-0"	—	—	5
7'-0"	0'-7"	1'-6"	2'-0"	—	—	7
8'-6"	0'-6"	—	—	1'-3"	2'-0"	9

NOTES:
1. Frame ∠s Shall Be 3"x3"x3/16" ASTM-A36
2. 1/2" 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.

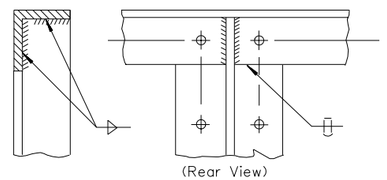
TYPICAL EXIT PANEL FRAMES

1/2" Hex Head Bolt & Nut. Provide Flat Washer & Lockwasher Top & Border

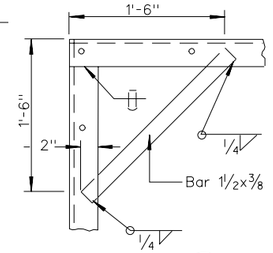


GENERAL NOTES:

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 Tapped Holes (1/4" -20 N.C.) May Be Used Where Interference Due To Welds or Structural Members Is Encountered.
4. WT3x6.25 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. WT3x6.25 May Be Crimped at Ends to Join Frame Angles. Fillet Weld All Around.
8. Frames Shall Be 2'-0" Minimum and 4'-0" Maximum.

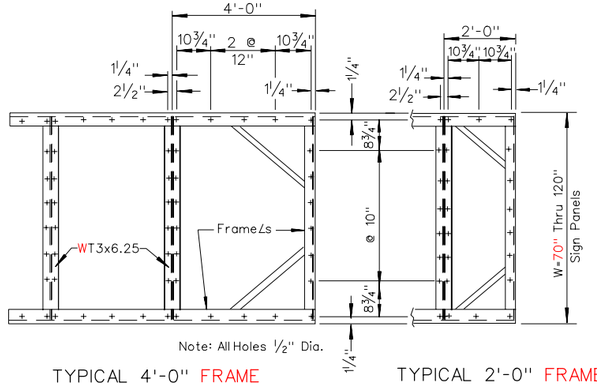


DETAIL (10)



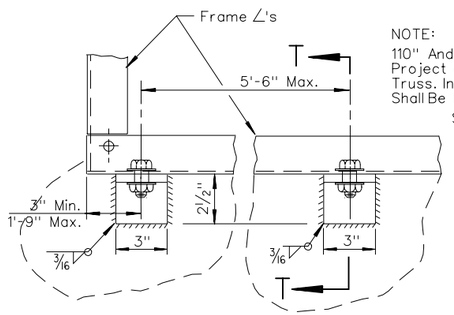
DETAIL (9)

TYPICAL JOINT DETAILS



TYPICAL 4'-0" FRAME TYPICAL 2'-0" FRAME

MOUNTING HOLE SPACING FOR SIGN PANEL & FRAME



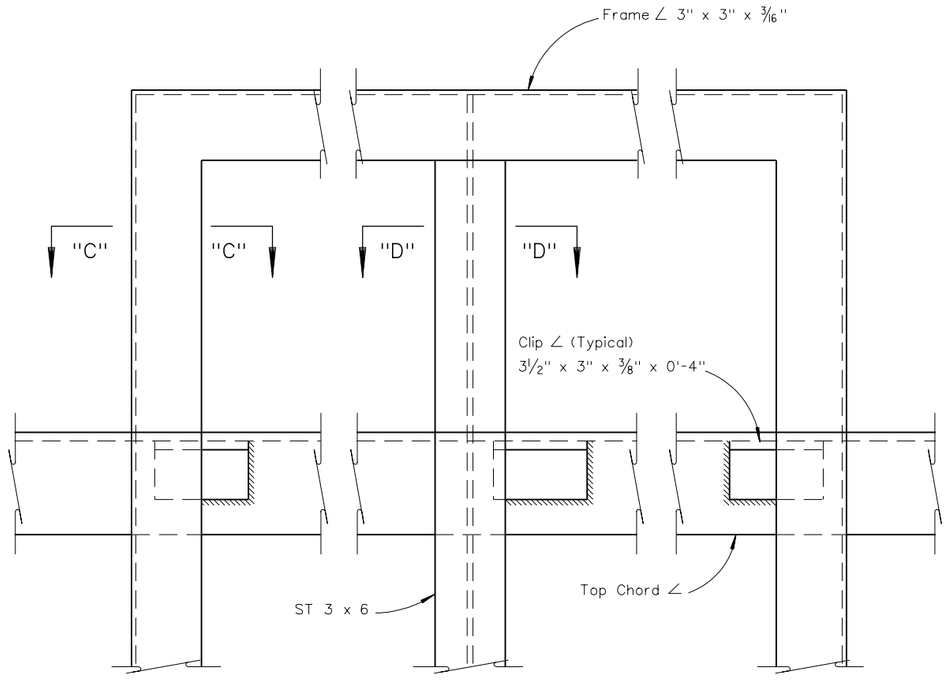
NOTE:
110" And 120" Sign Panel Frames Will Project Above The Top Chord Of The Truss. In These Cases, The Top Clips Shall Be Bolted To Vertical Frame Members.
SEE SHEET T-36.1.8.1

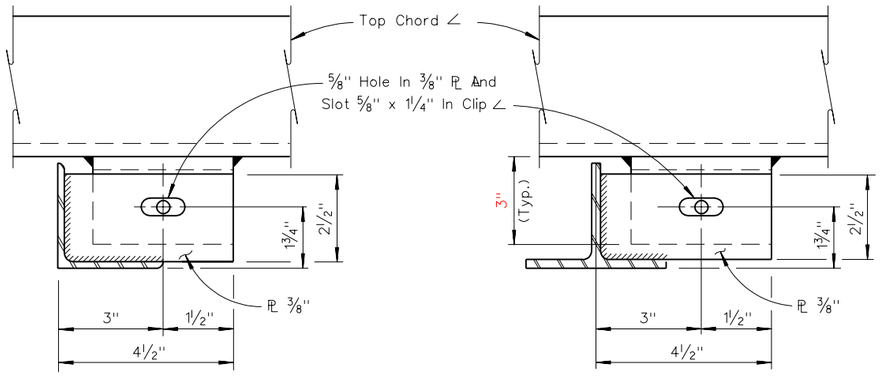
FRAME MOUNTING DETAILS

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

OVERHEAD SIGNS
REMOVABLE SIGN PANEL FRAMES

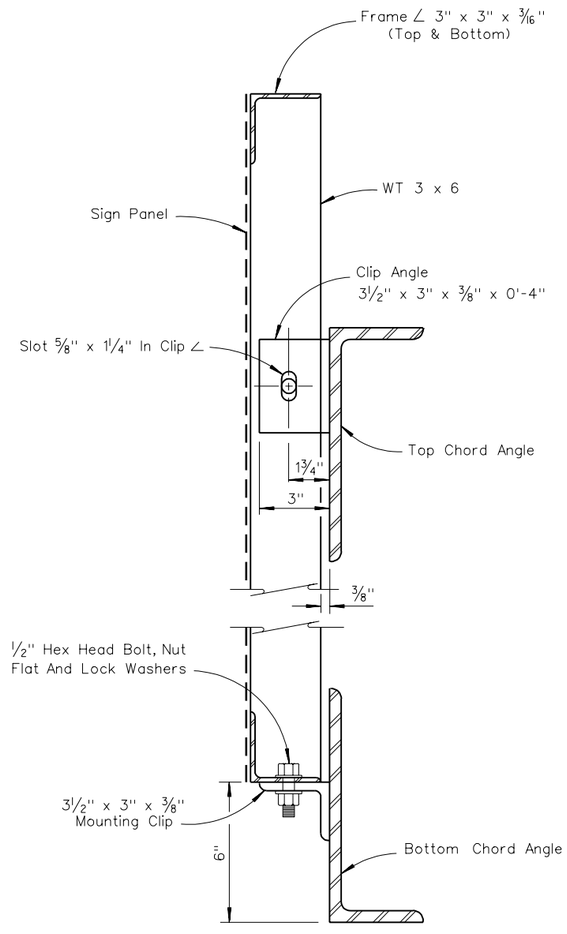
Signed Original On File	T-36.1.8	(627)
CHIEF BRIDGE ENGINEER	ADOPTED: 7/96	REVISION 2/03



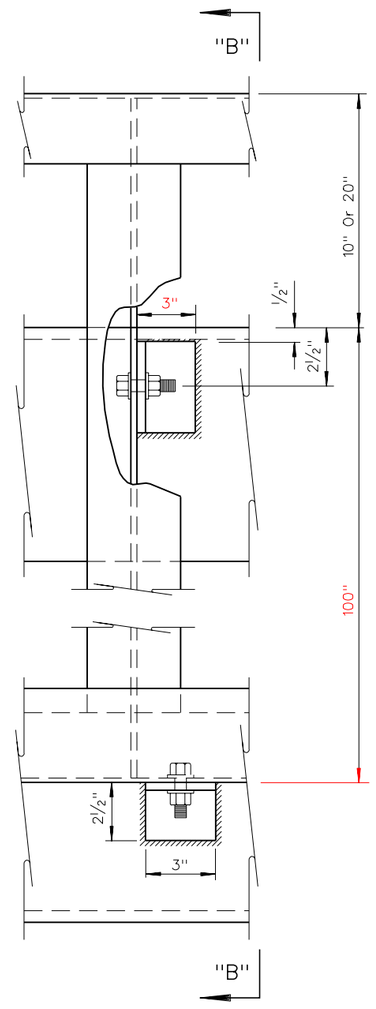


SECTION "C"-"C" SECTION "D"-"D"

ALTERNATIVE CONNECTIONS AT TOP CHORD



SECTION "B"-"B"



ELEVATION VIEW

STEEL REMOVABLE SIGN PANEL FRAMES

NOTES:

1. For Steel Removable Sign Panel Frame Details, See Standard Plan T-36.1.8.
2. Minimum Fillet Weld Is ¼" For Clip Angles Welded To Chord Member Of Truss.
3. Maximum Spacing Of Bottom Clip Angle Is 5'-6".
4. Top Clip Required For Each Vertical Member Or Removable Sign Panel Frame.

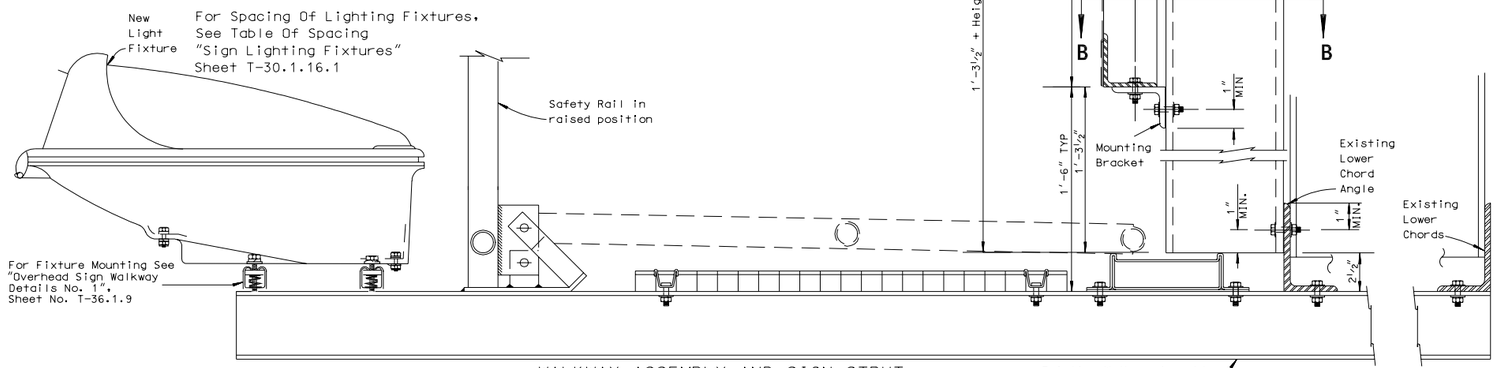
STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

OVERHEAD SIGNS
REMOVABLE SIGN PANEL FRAMES 110" AND 120" SIGN PANELS

Signed Original On File	T-36.1.8.1	(627)
CHIEF BRIDGE ENGINEER	ADOPTED: 7/96	REVISION 10/02

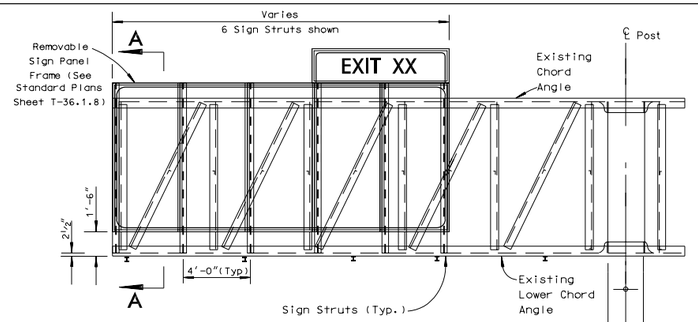
NOTES: Method A

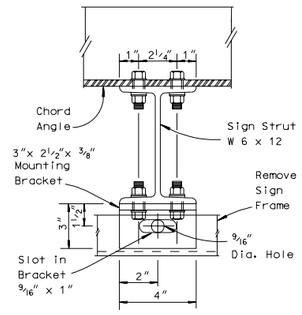
1) SIGN STRUTS SHALL BE INSTALLED ALONG EACH OF THE REMOVABLE SIGN FRAMES VERTICAL MEMBERS. ALL NEW ANGLES AND W-SHAPES SHALL CONFORM TO ASTM A-36. SIGN STRUTS MAY BE CUT TO LENGTH ON SITE. SIGN STRUTS, MOUNTING CLIPS AND ALL MOUNTING HARDWARE SHALL BE HOT DIP GALVANIZED AFTER FABRICATION. TOUCH UP ALL FIELD CUTS WITH A ZINC RICH PAINT.
2) SIGN PANEL MAY BE ADJUSTED HORIZONTALLY TO AVOID EXISTING MOUNTING BRACKETS. IF EXISTING MOUNTING BRACKETS NEED TO BE REMOVED USE CARE DURING CUTTING OPERATION. DO NOT GOUGE EXISTING CORD ANGLES, GRIND WELD AREAS SMOOTH, TOUCH UP GRIND AREA WITH A ZINC RICH PAINT.
3) DISCARD ALL EXISTING 1/2" BOLTS, NUTS AND WASHERS.
4) ALL HOLES TO BE 9/16" IN DIAMETER UNLESS OTHERWISE NOTED. ALL NEW BOLTS SHALL BE A 1/2" DIA. HEX BOLT HEAD WITH NUT, FLAT WASHER AND LOCKING WASHER. ALL BOLTS TO BE GALVANIZED PER AASHTO M 164 (ASTM A-325).
5) THE COST OF REMOVING EXISTING PANEL, MANUFACTURING SIGN STRUTS, MOUNTING BRACKETS, MOUNTING HARDWARE, REINSTALLATING OF THE EXISTING AND/OR NEW SIGN PANEL AND ANY OTHER RELATED WORK IN RELOCATING THE EXISTING SIGN PANEL SHALL BE INCLUDED IN THE BID ITEM 627 0022 "PERMENENT OVERHEAD SIGN PANEL, RECONSTRUCT", EACH.
6) REMOVE EXISTING LIGHT FIXTURES. TO BE PAID FOR UNDER BID ITEM 202 0318 "REMOVE LIGHTING FIXTURE", EACH. ANY ADDITIONAL CONDUIT AND/OR CONDUCTOR NEEDED TO INSTALL LIGHT FIXTURES, TO BE PAID FOR UNDER BID ITEM 623 0144 "SODUIM VAPOR LUMINAIRE, 150 WATT", EACH.
7) INSTALL NEW 150 WATT HIGH PRESSURE SODIUM VAPOR SIGN LIGHTING FIXTURES, USE HOLOPHANE "PANL15AHP#24DG" OR AN APPROVED EQUAL. ITEM INCLUDES COST OF ANY ADDITIONAL CONDUIT AND/OR CONDUCTOR NEEDED TO INSTALL LIGHT FIXTURES, TO BE PAID FOR UNDER BID ITEM 623 0144 "SODIUM VAPOR LUMINAIRE, 150 WATT", EACH.
8) WALKWAY GRATING AND SAFETY RAILING TO BE REMOVED IF LUMINAIRE RETRIEVAL SYSTEM IS TO BE INSTALLED.



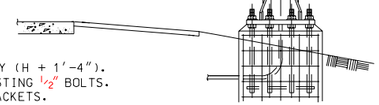
METHOD A

WALKWAY ASSEMBLY AND SIGN STRUT
SECTION A-A





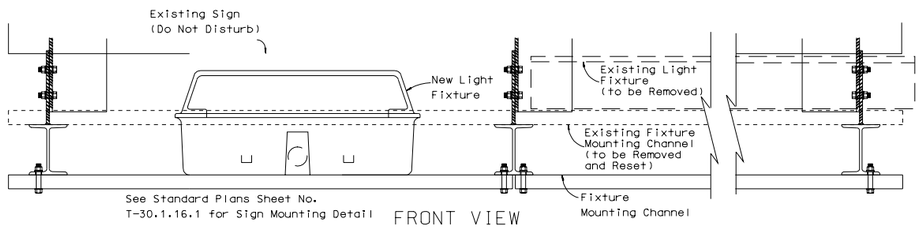
SECTION B-B



ELEVATION

PROCEDURE:

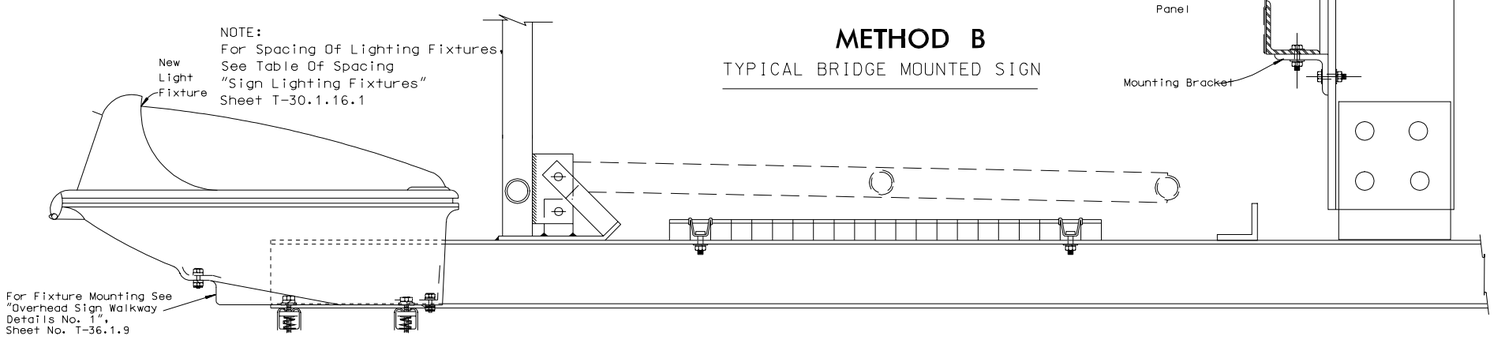
1) FIELD MEASURE EXISTING SIGN H = HEIGHT.
2) CUT W 6"x ¾" TO LENGTH NEEDED, GENERALLY (H + 1'-4").
3) REMOVE EXISTING SIGN PANEL. DISCARD EXISTING 1/2" BOLTS.
4) INSTALL NEW SIGN STRUTS AND MOUNTING BRACKETS.
5) REINSTALL EXISTING SIGN PANEL.
6) REMOVE AND DISCARD EXISTING SIGN LIGHTING FIXTURE WHEN NOTED.
7) INSTALL NEW SIGN LIGHTING FIXTURES AND LUMINAIRE RETRIEVAL SYSTEM AS NOTED IN PLANS.



FRONT VIEW

NOTES: Method B

1) ENSURE VERTICAL CLEARANCE TO MOUNTING HARDWARE IS NOT LESS THAN VERTICAL CLEARANCE TO BRIDGE SOFFIT.
2) DISCARD ALL EXISTING BOLTS, NUTS, AND WASHERS.
3) USE ALL NEW BOLTS, FLAT AND LOCKING WASHERS, AND NUTS.
4) ALL BOLTS TO BE GALVANIZED PER AASHTO M 164 (ASTM A-325).
5) THE COST OF REMOVING EXISTING LIGHT FIXTURE MOUNTING CHANNEL (NEW IF REQUIRED) AND REINSTALLING IT SHALL BE INCLUDED IN THE COST OF THE NEW LIGHT FIXTURE (NO ADDITIONAL PAYMENT).
6) REMOVE EXISTING LIGHT FIXTURES. TO BE PAID FOR UNDER BID ITEM 202 0318 "REMOVE LIGHTING FIXTURE", EACH.
7) INSTALL NEW 150 WATT HIGH PRESSURE SODIUM VAPOR SIGN LIGHTING FIXTURES. ITEM INCLUDES COST OF ANY ADDITIONAL CONDUIT AND/OR CONDUCTOR NEEDED TO INSTALL LIGHT FIXTURES. TO BE PAID FOR UNDER BID ITEM 623 0144 "SODUIM VAPOR LUMINAIRE, 150 WATT", EACH.
8) ON STRUCTURES WITH EXISTING HIGH PRESSURE SODIUM VAPOR LUMINAIRES, REMOVE AND RESET LIGHTS AS SHOWN. ALL WORK ASSOCIATED WITH REMOVING AND RESETTING LUMINAIRES INCLUDING ANY NEW CONDUIT OR CONDUCTOR SHALL BE PAID FOR UNDER BID ITEM 623 0840, "REMOVE AND RESET LUMINAIRE", EACH



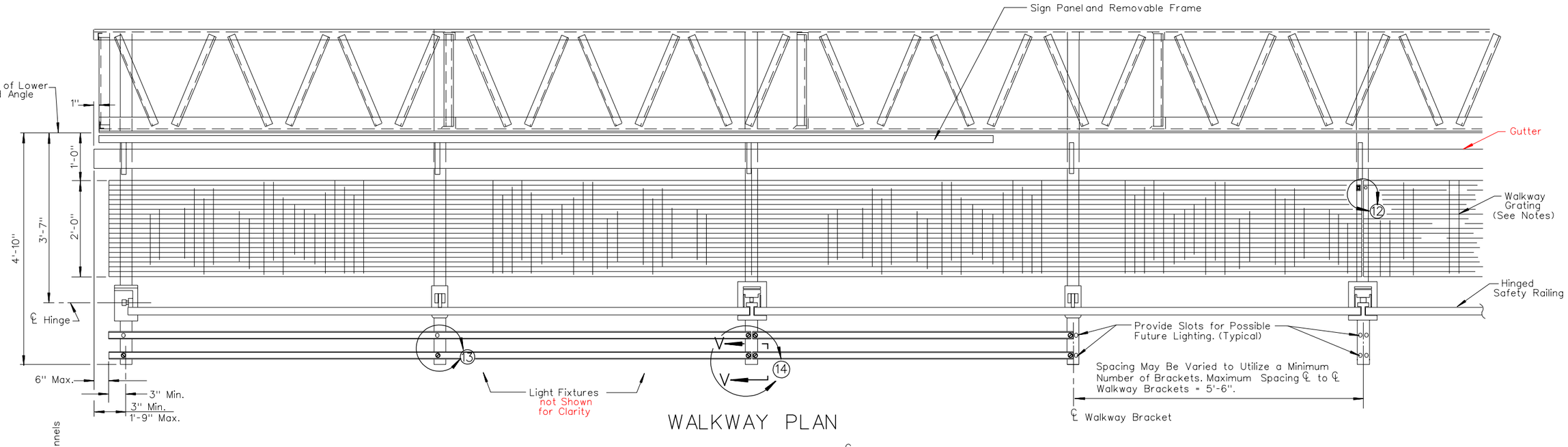
METHOD B

TYPICAL BRIDGE MOUNTED SIGN

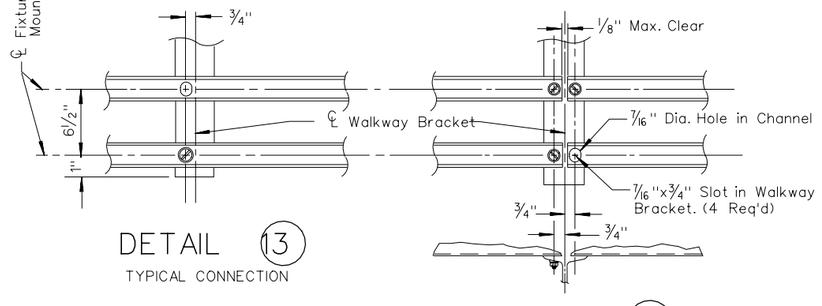
STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

OVERHEAD SIGNS
SIGN EXTENSION BRACKET
RETROFIT METHODS A AND B

Signed Original On File	T-36.1.8.2	(627)
CHIEF BRIDGE ENGINEER	ADOPTED: 9/00	REVISION 2/03

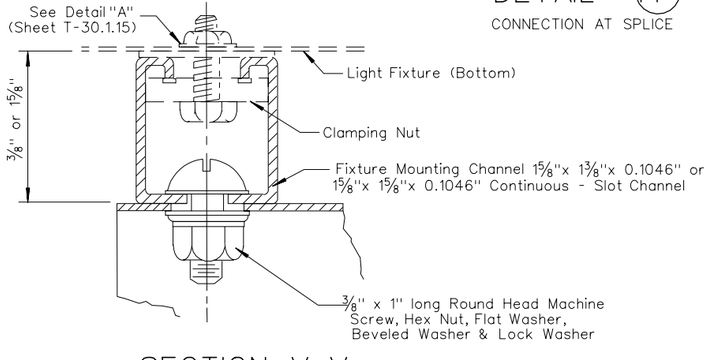


WALKWAY PLAN

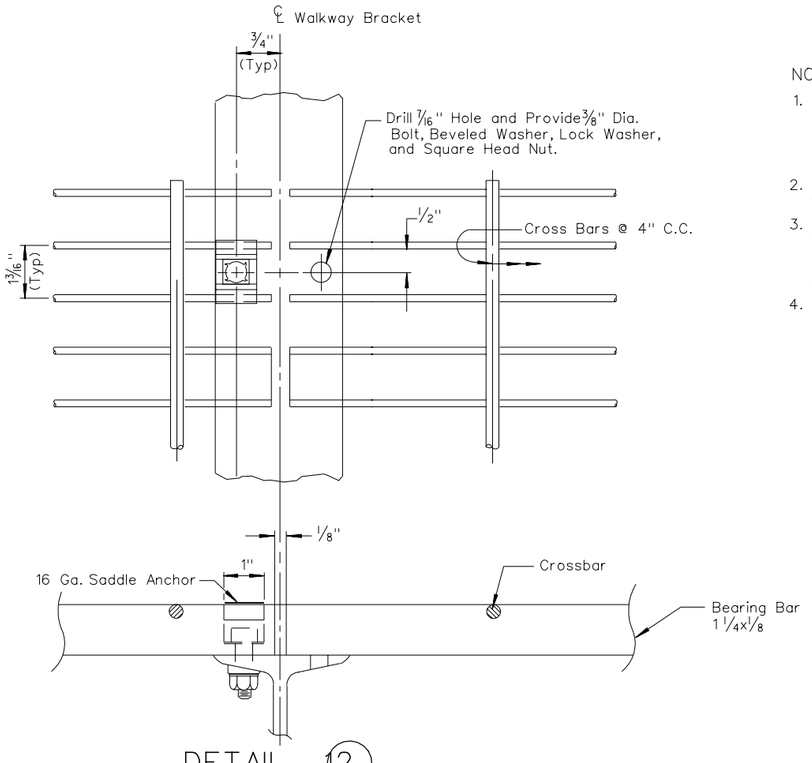


DETAIL 13
TYPICAL CONNECTION

DETAIL 14
CONNECTION AT SPLICE



SECTION V-V



DETAIL 12

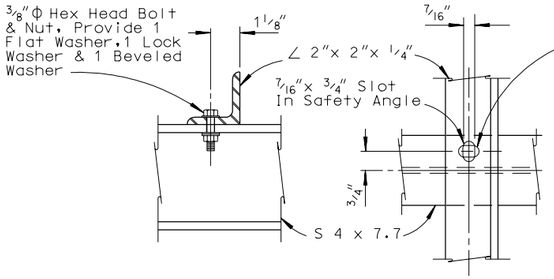
NOTES:

1. Welded-Type Grating Shall Have 1 1/4"x1/8" Bearing Bars @ 1 3/16" Centers with 1/4" 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 "Sign Lighting Fixtures" Sheet T-30.1.16.1
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. See Contract Plans to Determine if Walkway Grating and Safety Railing is Required.
4. Bolts, Nuts, Washers, Etc. To Be Galvanized.

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

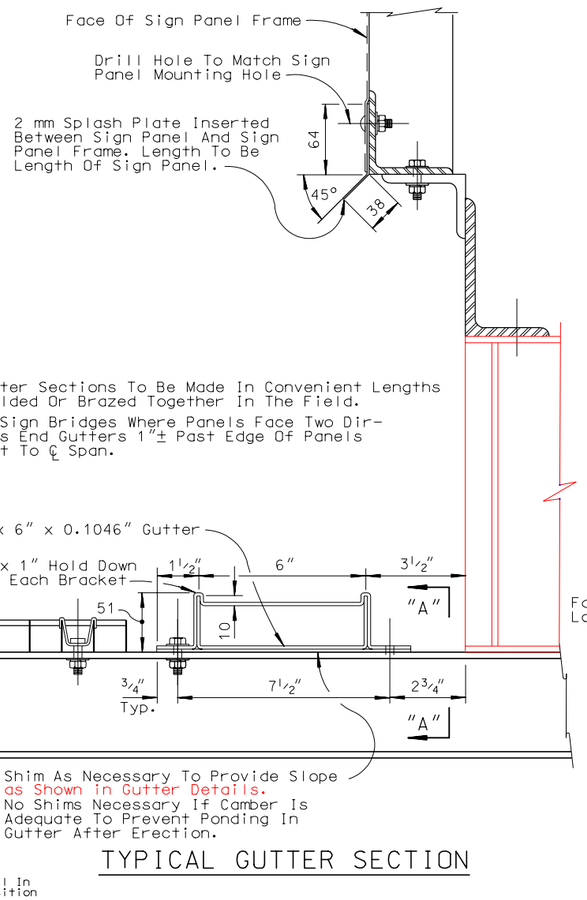
OVERHEAD SIGNS
WALKWAY DETAILS NO. 1

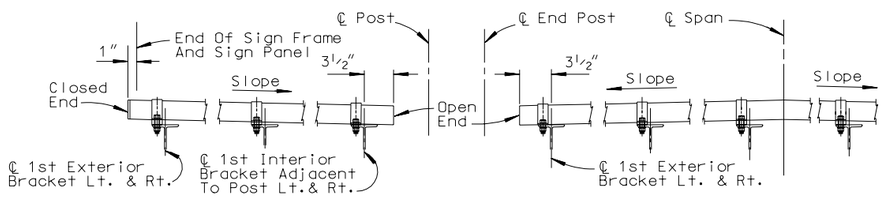
Signed Original On File	T-36.1.9 (627)
CHIEF BRIDGE ENGINEER	ADOPTED: 11/95 REVISION 10/02



SAFETY ANGLE DETAILS

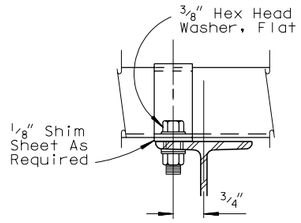
NOTE: On Structure Mounted Signs Replace Gutter With A ∠ 2"x 2"x 1/4" Positioned With Gage Line 7 Inches From Mounting Bracket ∠ 5"x 3"x 1/4".



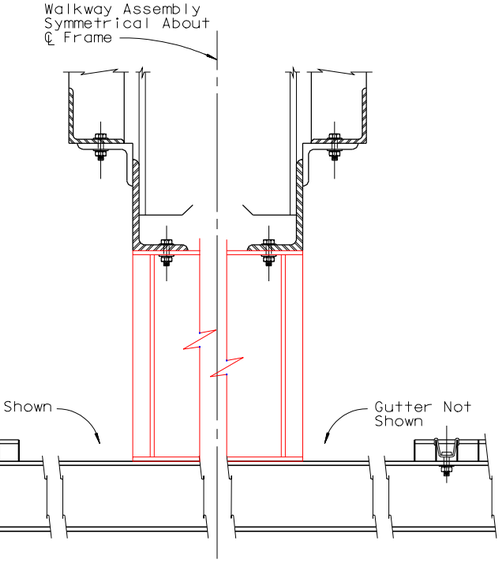


SINGLE SIGN POST SIGN BRIDGE

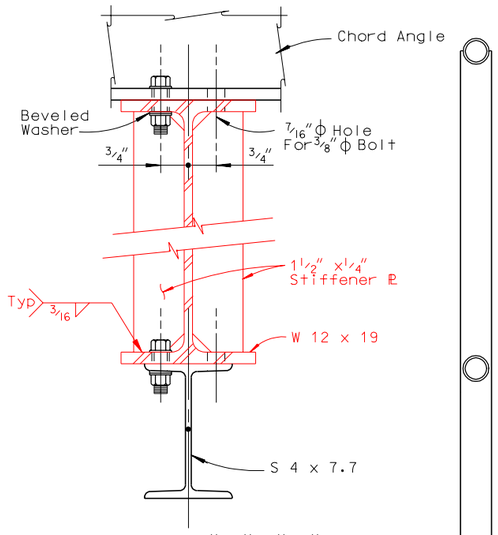
GUTTER DETAILS



SECTION "A"–"A"



FOR DOUBLE-FACED SIGN FRAMES

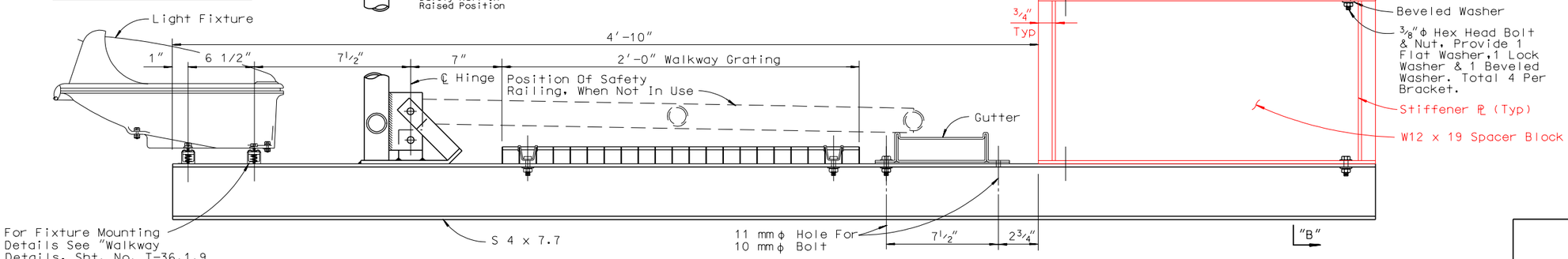


SECTION "B"–"B"

NOTES:

1. Gutter Sections To Be Made In Convenient Lengths And Welded Or Brazed Together In The Field.
2. On Sign Bridges Where Panels Face Two Directions End Gutters 1"± Past Edge Of Panels Nearest To ℄ Span.

TYPICAL GUTTER SECTION



WALKWAY ASSEMBLY

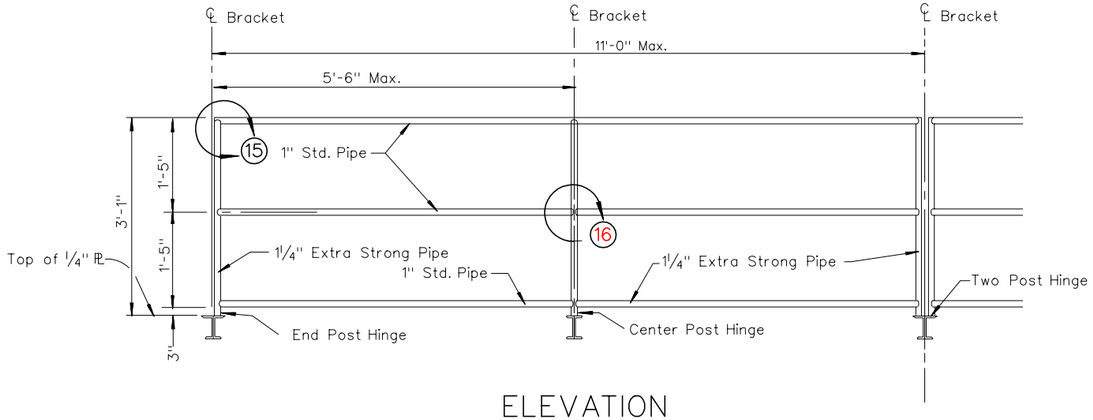
NOTE: See Contract Plans to determine if fixed lighting, safety rail and walkway grating or luminaire retrieval system is required.

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

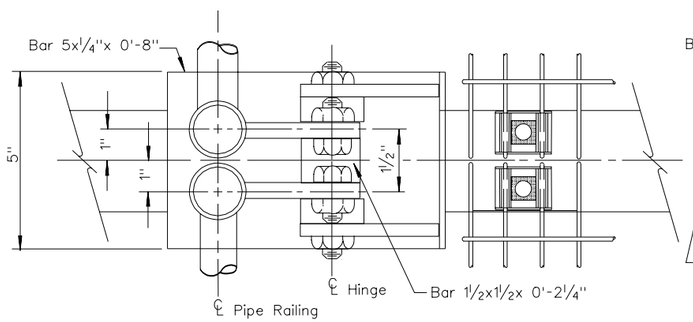
OVERHEAD SIGNS

WALKWAY DETAILS NO. 2

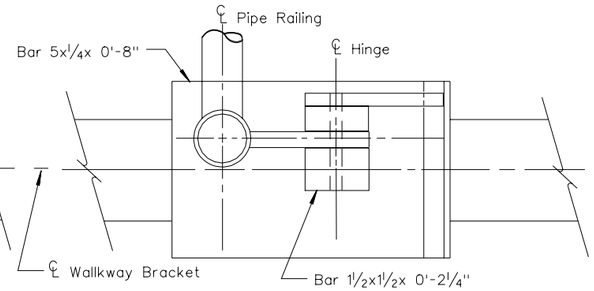
Signed Original On File	T-36.1.10	(627)
CHIEF BRIDGE ENGINEER	ADOPTED: 7/96	REVISION: 12/02



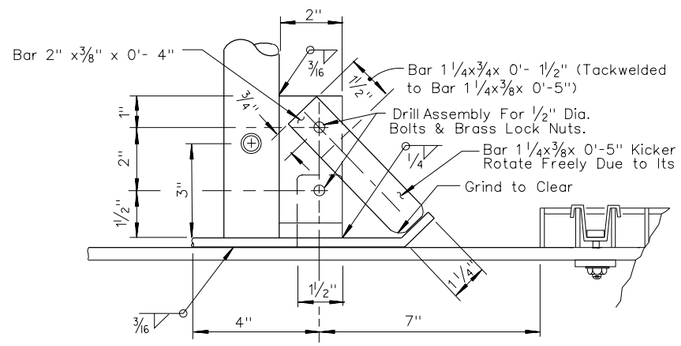
ELEVATION



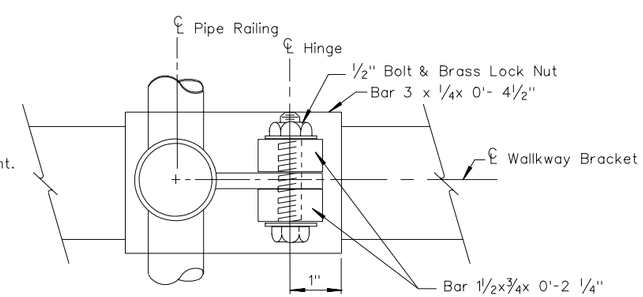
PLAN VIEW - TWO POST HINGE



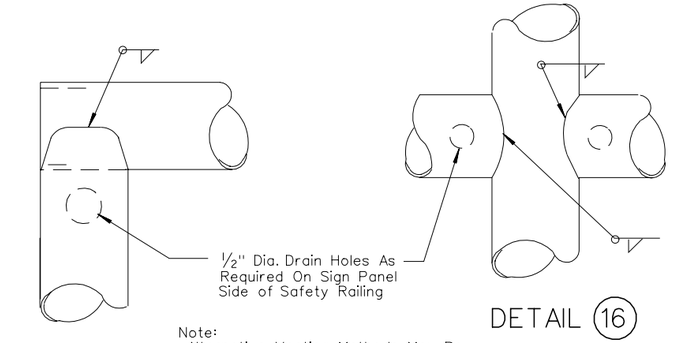
PLAN VIEW - END POST HINGE



ELEVATION



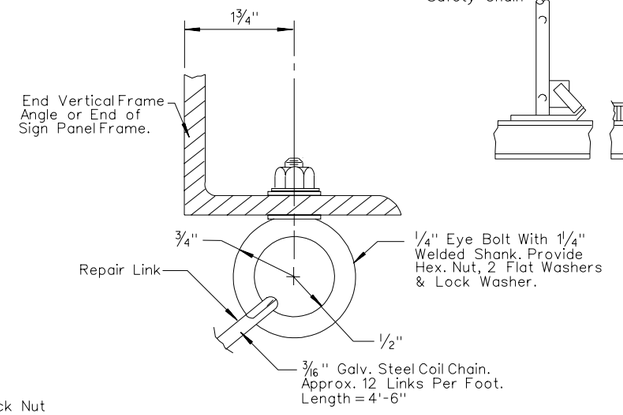
PLAN VIEW - CENTER POST HINGE



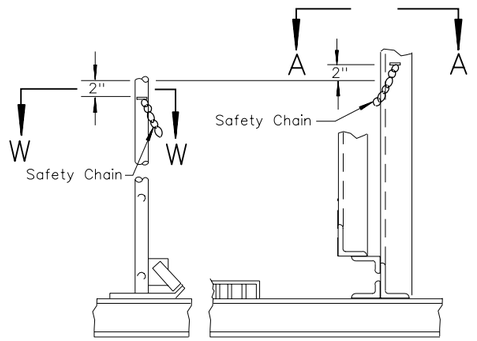
DETAIL (15)

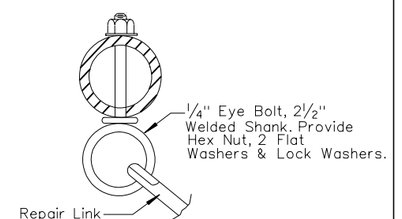
DETAIL (16)

Note:
Alternative Venting Methods May Be Used If Approved by The Engineer.



SECTION A-A





SECTION W-W

CHAIN ASSEMBLY

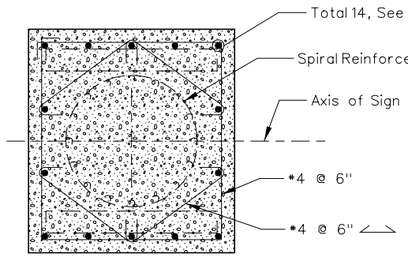
GENERAL NOTES:

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 PL to Walkway Bracket May Be Submitted for Approval.
3. Alternative Details Approved By The Engineer May Be Substituted For The Safety Chain Connections Shown.

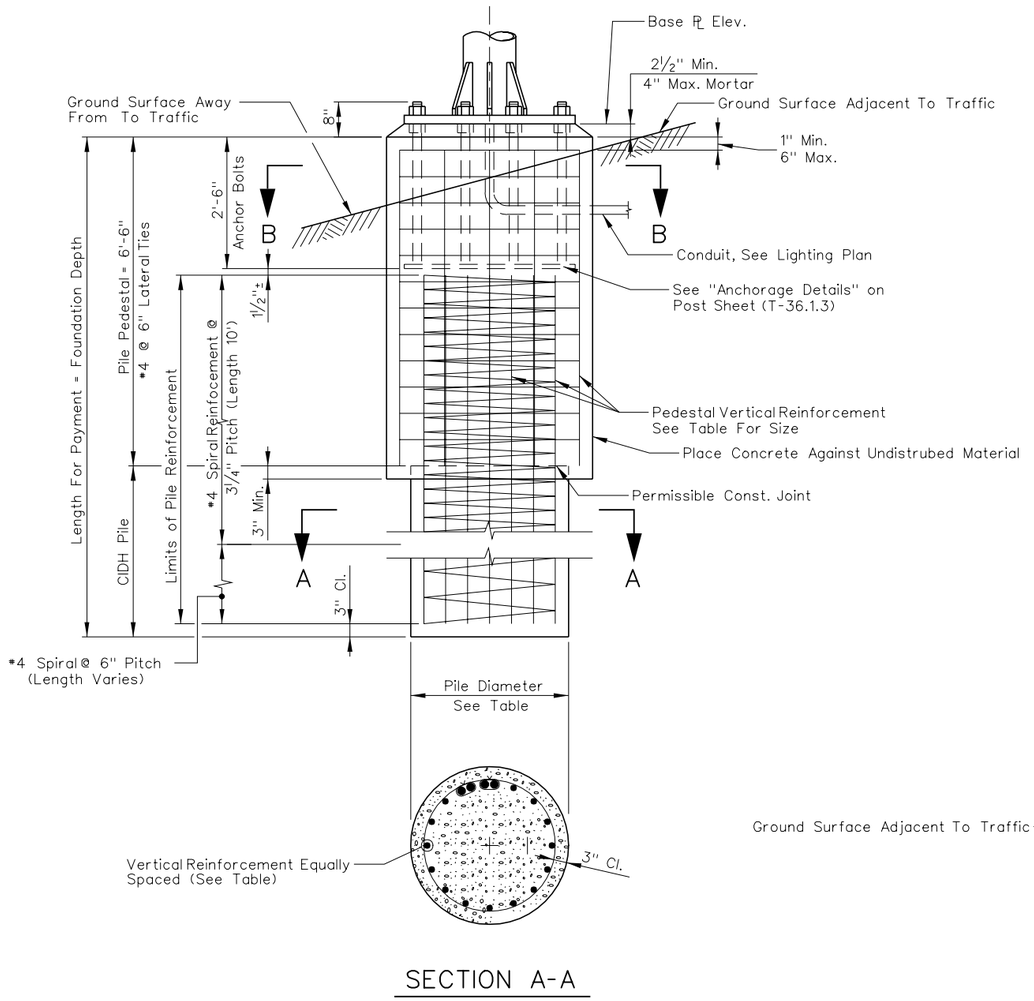
STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

OVERHEAD SIGNS
WALKWAY SAFETY RAILING DETAILS

Signed Original On File	T-36.1.11 (627)
CHIEF BRIDGE ENGINEER	ADOPTED:11/95 REVISION 12/02



SECTION B-B



SECTION A-A

POST TYPE	ANCHOR BOLTS	PEDESTAL SIZE	REINFORCING STEEL VERTICAL	STANDARD (SEE NOTE 8) PILE DIAMETER	STANDARD (SEE NOTE 8) FOUNDATION DEPTH	SPECIAL (SEE NOTE 8) PILE DIAMETER	SPECIAL (SEE NOTE 8) 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′	36″	21′
VII	12– 2″	4′-3″ X 3′-11″	16 – #11	36″	21′	42″	26′
VIII	12– 2″	4′-5″ X 4′-1″	16 – #11	36″	25′	42″	26′
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 – 2¼″	4′-5″ X 3′-11″	✱ 24 – #11	36″	25′	—	—
VIII-S	8 – 2½″	5′-0″ X 4′-4″	✱ 24 – #11	42″	32′	—	—

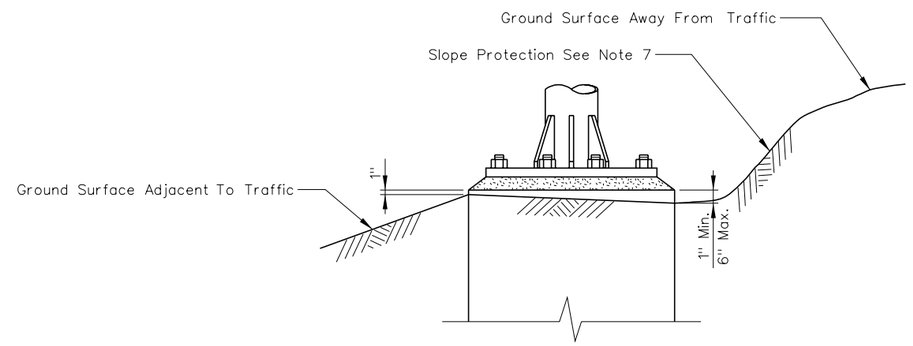
✱ BUNDLED BARS

GENERAL NOTES:

1. FOR ANCHOR BOLT LAYOUT SEE POST SHEET(T-36.1.3).
2. FOR "BASE ℄ ELEV." SEE CONTRACT PLANS.
3. PEDESTRAL 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 CONTRACT PLANS.
8. AN ALLOWABLE SKIN RESISTANCE OF 500 PSF WAS USED IN THE DESIGN OF ALL PILES EXCEPT THOSE FOR POST TYPES VI, VII, AND VIII. THE ALLOWABLE SKIN RESISTANCE (PSF) FOR POST TYPES VI, VII, AND VIII ARE AS FOLLOWS:

POST TYPE	VI	VII	VIII
W/ STANDARD PILE	590	810	700
W/ SPECIAL PILE	500	490	490

NDOT MATERIALS DIVISION WILL REVIEW SITE CONDITIONS AND DETERMINE IF "STANDARD" OR "SPECIAL" PILES ARE APPROPRIATE FOR POST TYPES VI, VII & VIII. IF "SPECIAL" PILES ARE REQUIRED, THEY WILL BE DESIGNATED AS SUCH ON THE CONTRACT PLANS. UNLESS "SPECIAL" PILES ARE SPECIFIED IN THE PLANS, USE "STANDARD" PILE DIAMETER AND FOUNDATION DEPTH.

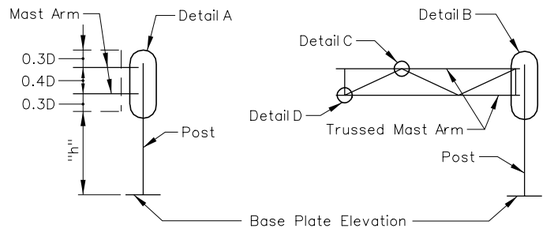


DETAIL C

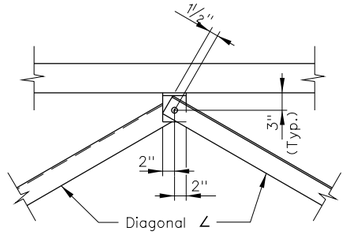
STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

OVERHEAD SIGNS
ALTERNATE PILE FOUNDATION

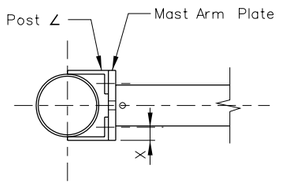
Signed Original On File	T-36.1.12	(627)
CHIEF BRIDGE ENGINEER	ADOPTED: 7/96	REVISION: 12/02



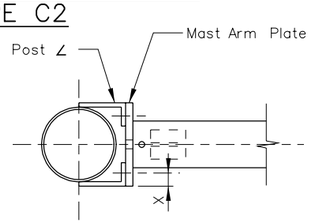
DOUBLE MAST ARM SERIES TRUSSED MAST ARM SERIES
TYPE C1 TYPE C2



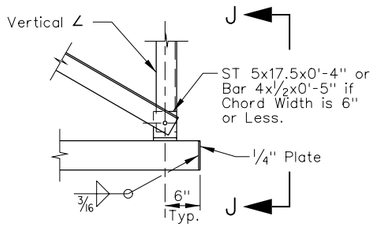
DETAIL C



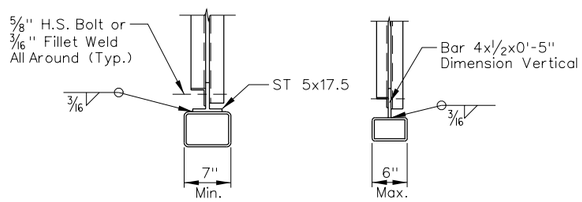
SECTION F-F



SECTION G-G

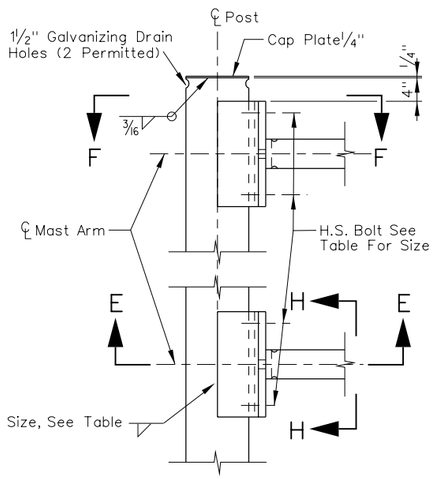


DETAIL D

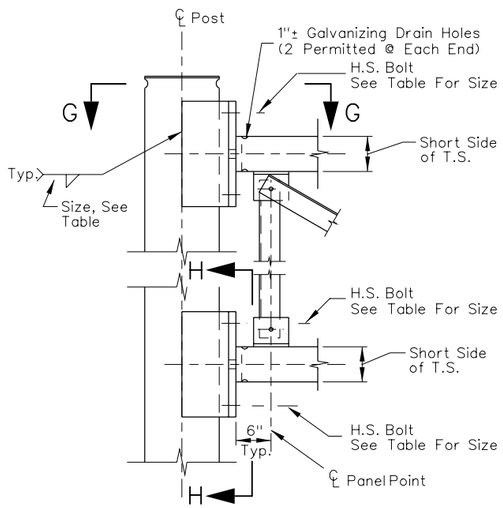


VIEW J-J

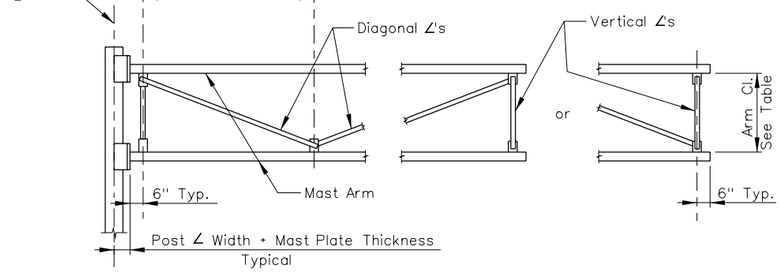
POST ANGLES			
POST SIZE	ANGLE	X	WELD
6	∠ 5X3X½	1¾"	¼
8	∠ 6X4X⅝	2¼"	¼
10	∠ 7X4X⅝	2¼"	¼
12	∠ 8X4X¾	2¼"	5/16
14	∠ 8X4X¾	2¼"	5/16



DETAIL A



DETAIL B



MAST ARM PLATE			
TWO ARMS	TRUSSED ARMS	PLATE	H.S. BOLT
TS 3X3X8.80		3/4"	1/2"
TS 4X4X12.02		1"	5/8"
TS 5X5X15.42		1"	3/4"
TS 6X6X18.82		1"	3/4"
TS 7X7X22.04	TS 5X3X16.84	1 1/4"	3/4"
	TS 6X4X21.94	1 1/4"	7/8"
	TS 7X5X27.04	1 1/4"	7/8"
	TS 8X6X31.73	1 1/4"	7/8"
	TS 10X6X36.83	1 1/4"	1"

POST TO ARM FRAMING DATA

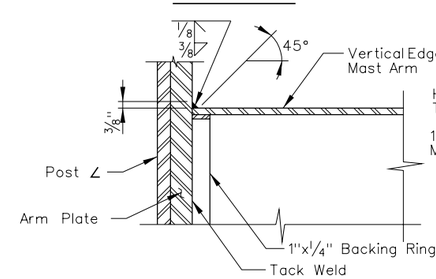
SIGN DEPTH INCHES	ARM CLEARANCE	MAX. PANEL SPACING	VERTICAL ANGLE	DIAGONAL ANGLE
D=40"-70"	2'-0"	4'-4"	∠ 2X2X¼	∠ 2X2X¼
D=80"-100"	3'-0"	6'-6"	∠ 3 1/2X2 1/2X¼✳	∠ 3 1/2X2 1/2X¼✳

✳ Short Leg Outstanding

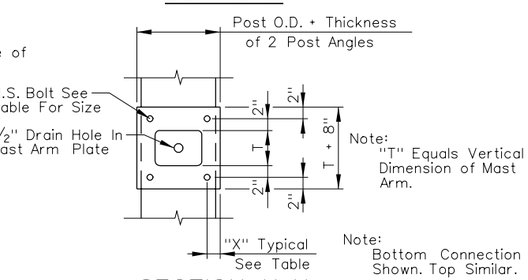
TRUSS FRAMING DATA

NOTES:

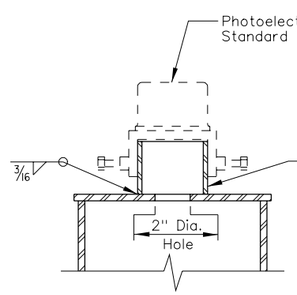
1. For Post Connection To Base Plate See T-36.1.16
2. For Mast Arm Length And Mast Arm To Sign Panel Connections See T-36.1.14



SECTION E-E



SECTION H-H



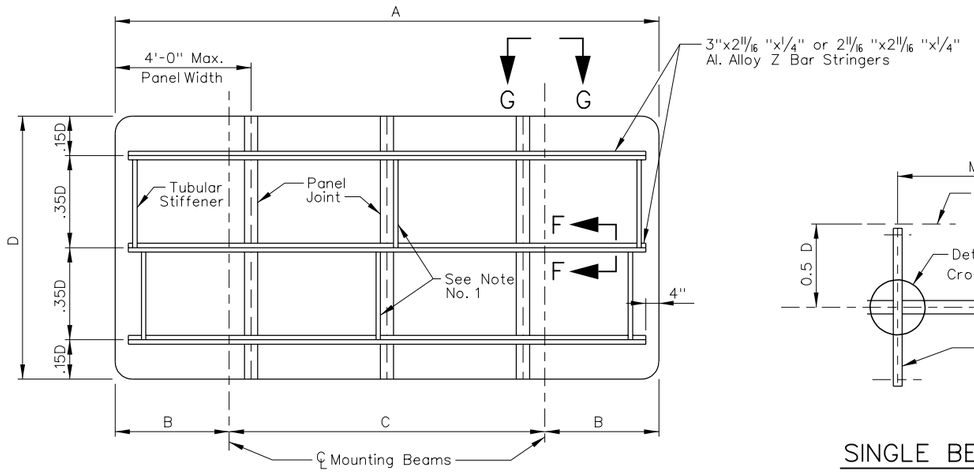
PHOTOELECTRIC CONTROL UNIT

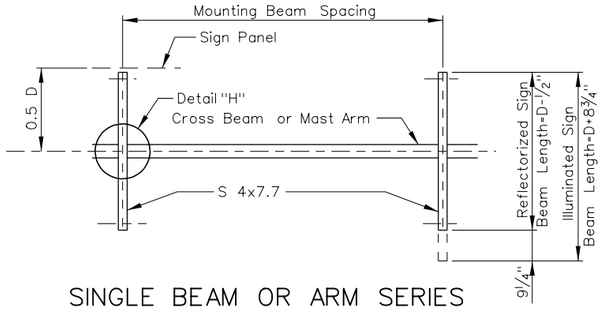
For General Notes See T-36.1.16

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

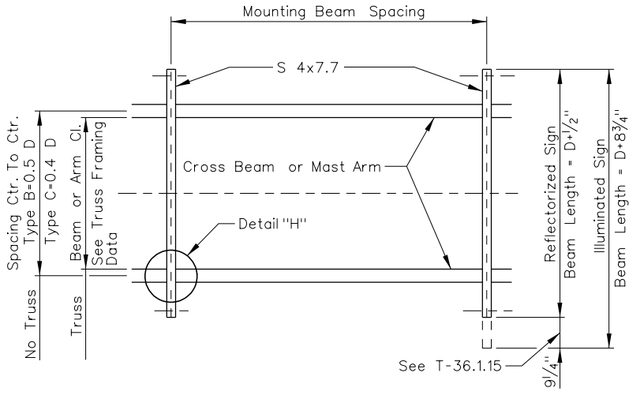
OVERHEAD SIGNS LIGHTWEIGHT TYPE C CONNECTION DETAILS

Signed Original On File	T-36.1.13	(627)
CHIEF SAFETY/TRAFFIC ENGINEER	ADOPTED: 11/95	REVISION: 9/97

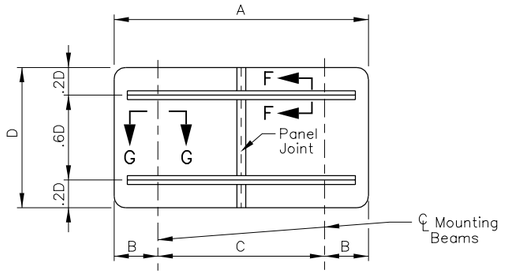


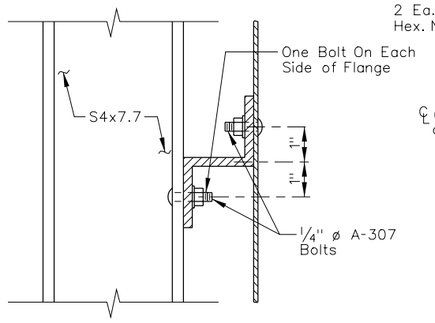


SINGLE BEAM OR ARM SERIES

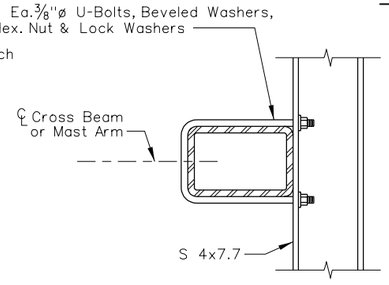


DOUBLE BEAM OR ARM SERIES





SECTION F-F

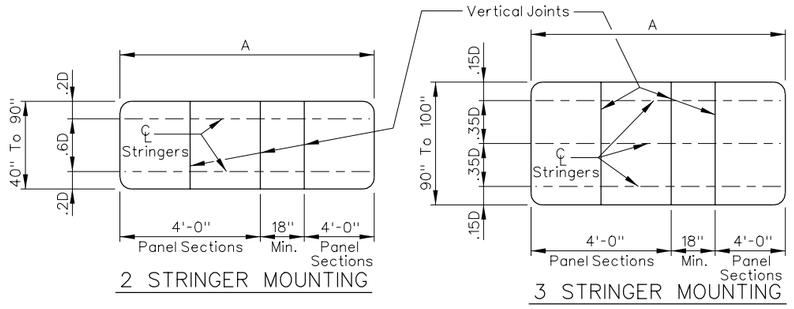


SECTION J-J

SIGN PANEL LENGTH A	NUMBER MOUNTING BEAMS	SIGN PANEL OVERHANG B	MOUNTING BEAM SPACING 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" *

*- CENTER MOUNT REQUIRED. DIVIDE "C" SPACING BY 2.

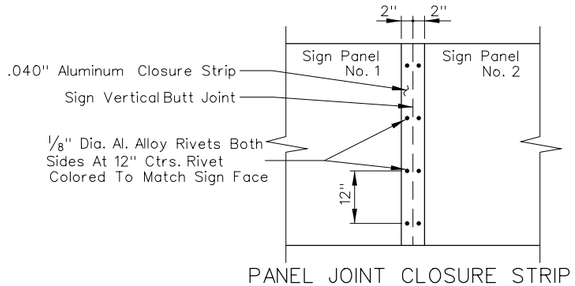
MOUNTING BEAM SPACING



2 STRINGER MOUNTING

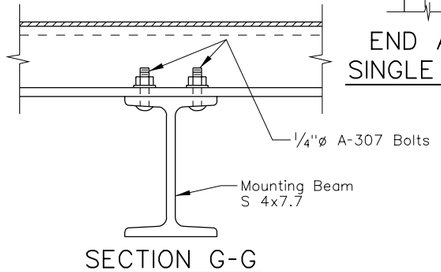
3 STRINGER MOUNTING

STRINGER AND PANEL ARRANGEMENT

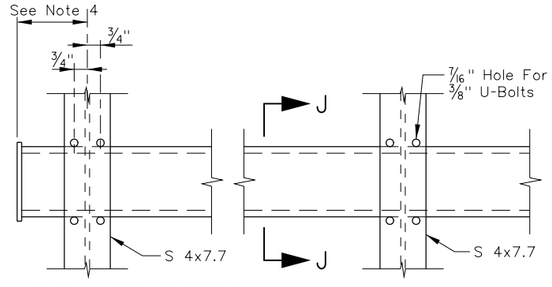


PANEL JOINT CLOSURE STRIP

ALUMINUM SHEET CONSTRUCTION



SECTION G-G



END ARM DETAIL SINGLE POST SIGNS

DETAIL H

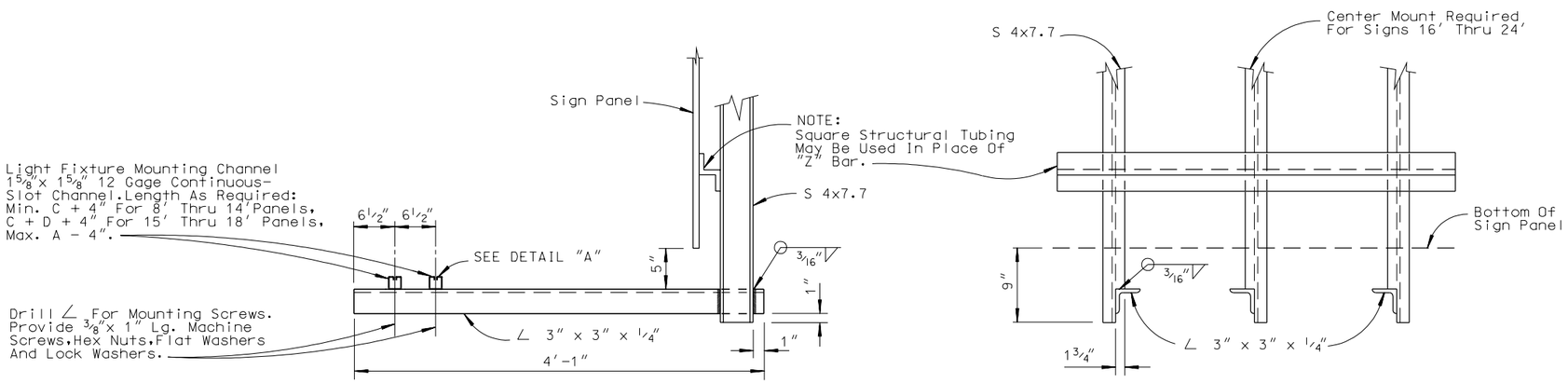
NOTES:

1. TUBULAR STIFFENERS TO BE ADDED WHEN "A" EXCEEDS 10'-0".
2. POSITION SIGN PANEL SO THAT MOUNTING BEAMS WILL CLEAR TRUSS CONNECTIONS AND ARM TO POST JOINTS. WHERE INTERFERENCE CANNOT BE AVOIDED, 1/2" O HOLES TO PASS THE 3/8" O U-BOLTS MAY BE DRILLED THROUGH MAST ARM ANGLES OR TRUSS CONNECTION MEMBERS AS NECESSARY.
3. TORQUE ALUMINUM SIGN PANEL MOUNTING BOLT TO 100 IN.-LBS.
4. 11" FOR TYPE C-1 AND C-2, OTHERS 4".
5. FLAT WASHERS REQUIRED ON ALL BOLTS, 1 OR 2 AS NECESSARY.
6. ALL NUTS TO HAVE FIBER INSERTS.
7. TO OBTAIN DESIRED PANEL WIDTH, MAX. OF 2 PANELS MAY BE CUT LESS THAN 4'-0" (18" MIN. EACH).
8. TUBULAR STIFFENERS REQUIRED ONLY WHEN PANEL OVERHANG EXCEEDS 2'-0".

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

OVERHEAD SIGNS LIGHTWEIGHT SIGN PANEL MOUNTING DETAILS

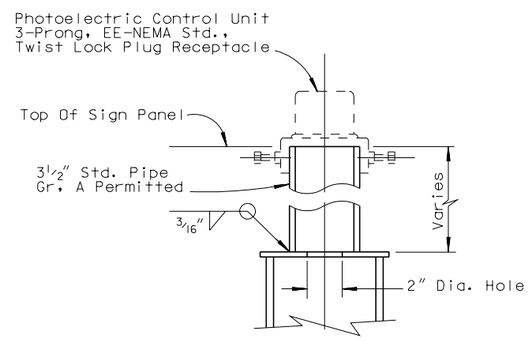
Signed Original On File	T-36.1.14	(627)
CHIEF SAFETY/TRAFFIC ENGINEER	ADOPTED: 11/95	REVISION: 9/97



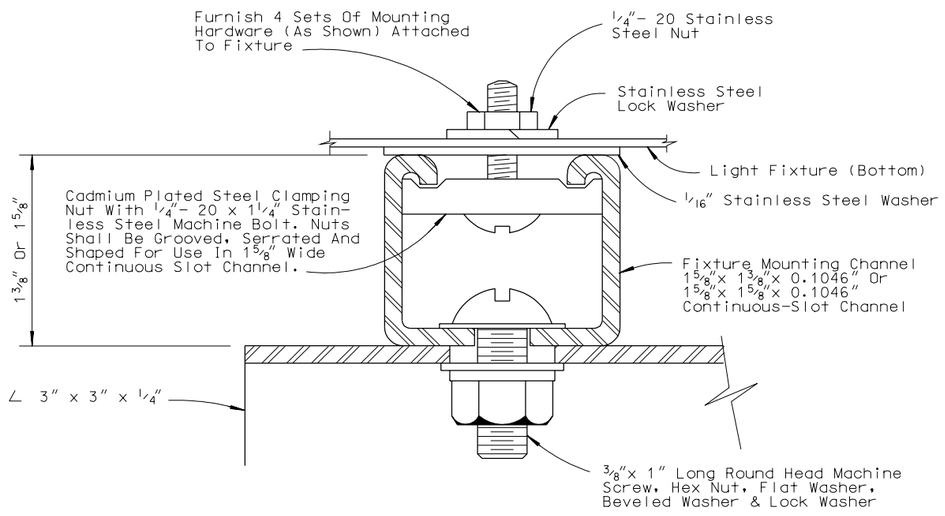
SIDE VIEW - SINGLE FACED SIGN TYPE A

FRONT VIEW

LIGHT FIXTURE MOUNTING DETAIL



PHOTOELECTRIC CONTROL UNIT



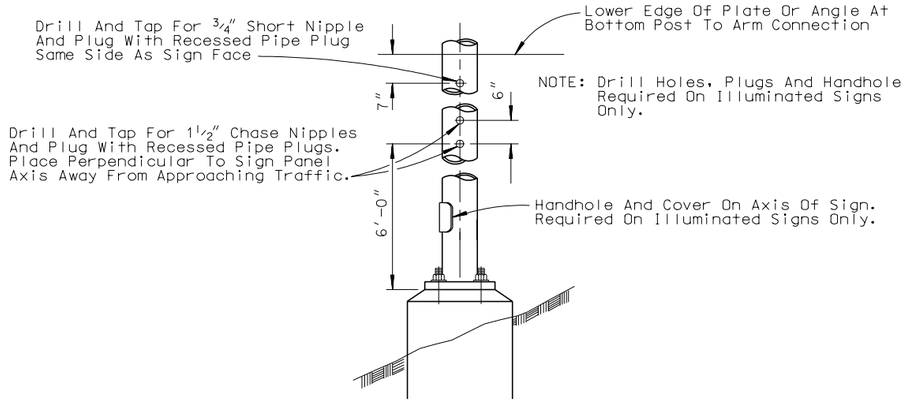
DETAIL "A"

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

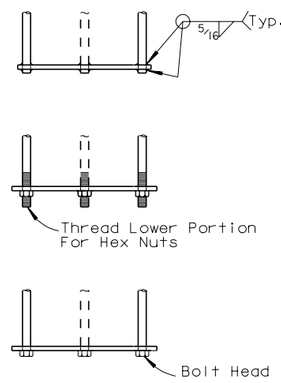
OVERHEAD SIGNS LIGHTWEIGHT

(LIGHT FIXTURE MOUNTING DETAILS)

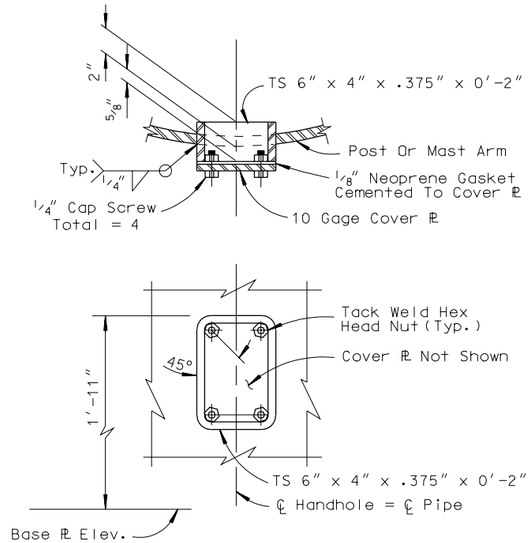
Signed Original On File	T-36.1.15	(627)
CHIEF SAFETY/TRAFFIC ENGINEER	ADOPTED: 7/96	REVISION: 3/97



ELEVATION

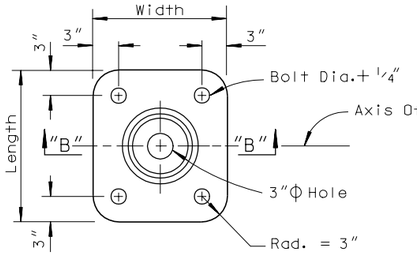


ALTERNATIVE BAR CONNECTIONS

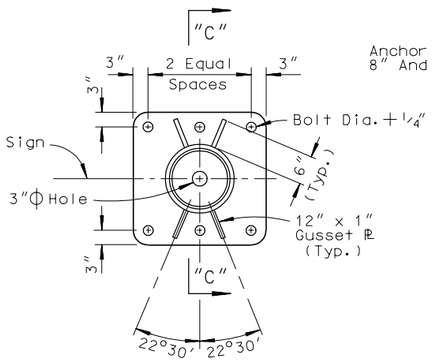


HANDHOLE AND COVER DETAILS

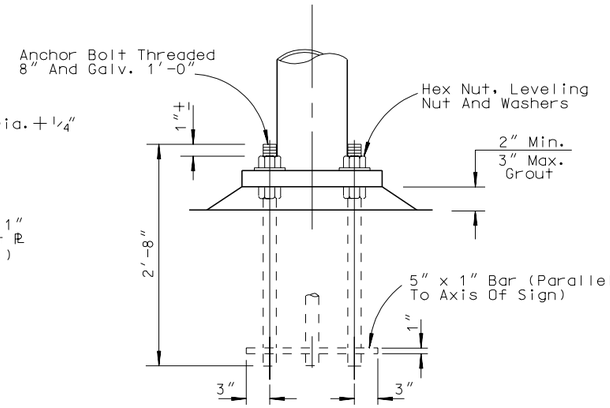
POST SIZE	BASE PLATE	ANCHOR BOLTS (Min.)
6 @ 18.97	1'-2"x 1'-2"x 1 1/2"	4-1 1/4"
6 @ 28.57	1'-2"x 1'-2"x 1 1/2"	4-1 1/2"
8 @ 28.55	1'-6"x 1'-6"x 1 1/2"	4-1 3/4"
8 @ 43.39	1'-6"x 1'-6"x 2"	4-2"
10 @ 54.74	1'-8"x 1'-8"x 2"	4-2 1/4"
12 @ 65.42	1'-8"x 1'-8"x 2"	4-2 1/2"
14 @ 72.09	2'-4"x 2'-4"x 2"	6-2"
14 @ 106.13	2'-4"x 2'-4"x 2"	6-2 1/4"



PLAN



PLAN



ANCHOR BOLT

NOTES:

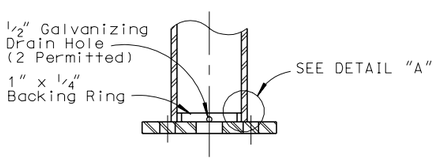
1. Footings Shall Be Placed With Long Dimensions Normal To Axis Of Sign.
2. On Single Post Signs The Post Shall Be Raked Out Of Plumb With The Use Of The Leveling Nuts To Make The Bottom Of The Sign Frame Level.
3. 2"ϕ Anchor Bolts May Be Substituted For 1 3/4"ϕ Bolts. 2 1/2"ϕ Anchor Bolts May Be Substituted For 2 1/4"ϕ Bolts.

GENERAL NOTES:

DESIGN: A.A.S.H.O. Specifications For The Design And Construction Of Structural Supports For Highway Signs, Luminaires And Traffic Signals, Dated 1975, Revised 1979.

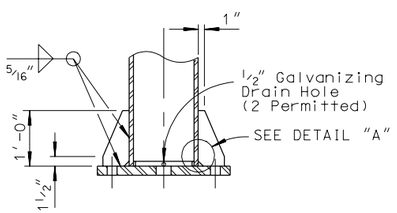
CONSTRUCTION: Standard Specifications For Road And Bridge Construction, Current Edition And Supplements There To.

WELDING: All Welding Continuous Unless Otherwise Noted On The Plans. All Welding To Be Done In Accordance With The Standard Specifications.



SECTION "B"-"B"

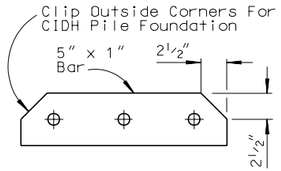
6" THRU 12" POST



SECTION "C"-"C"

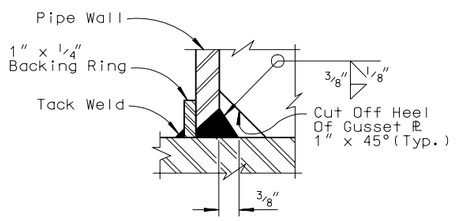
14" POST

BASE PLATE DETAILS



BAR PLAN

ANCHORAGE DETAILS



DETAIL "A"

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

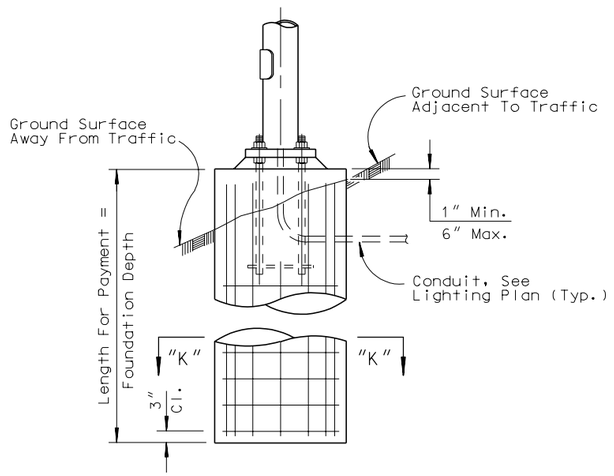
OVERHEAD SIGNS LIGHTWEIGHT POST DETAILS

Signed Original On File	T-36.1.16 (627)
CHIEF SAFETY/TRAFFIC ENGINEER	ADOPTED: 11/95 | REVISION: 3/97

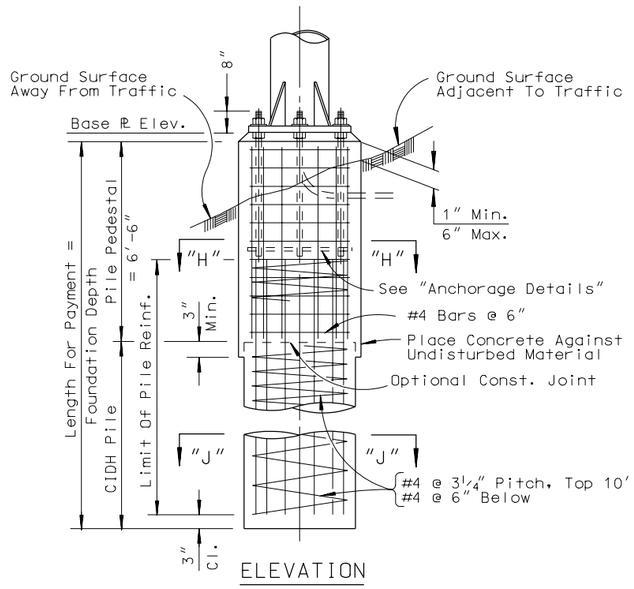
POST SIZE	PILE FOUNDATION				SPREAD FOOTING				
	Pedestal	Pile Dia.	Fdn. Depth	Reinf. Size	Pedestal	Footing	Reinf. Top	Reinf. Bot.	Reinf. ⌋ Bar
6 @ 18.97		24"	8'	#5	1'-10"x 1'-10"	4'-0"x 6'-0"	#4	#4	#5
6 @ 28.57		24"	9'	#5	1'-10"x 1'-10"	4'-0"x 7'-0"	#4	#4	#5
8 @ 28.55		30"	9'	#6	2'-2"x 2'-2"	5'-0"x 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 @ 106.13	3'-4"x 3'-4"	36"	16'	#10	2'-11"x 2'-11"	8'-0"x 14'-0"	#7	#9	#8

NOTES:

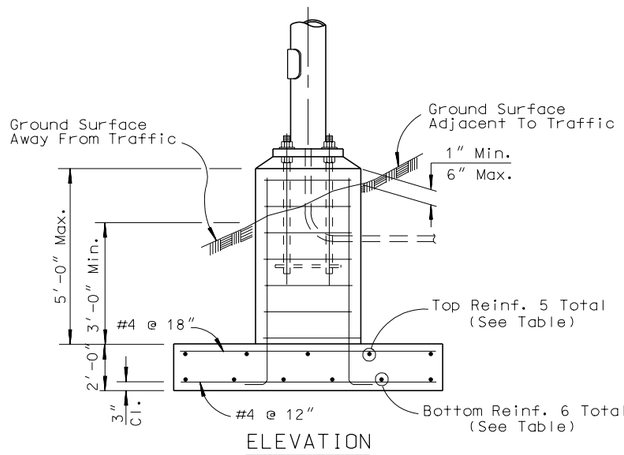
1. Backfill Shall Be In PLace Prior To Erection Of Post.
2. Slope Protection Required When Indicated On The Plans.
3. Pile Pedestal Shall Be Formed 6" Min. Below Ground Surface, Remainder Shall Be Placed Against Undisturbed Material.



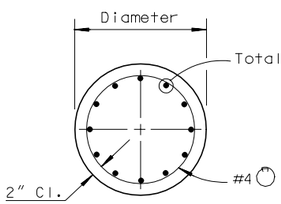
ELEVATION



ELEVATION

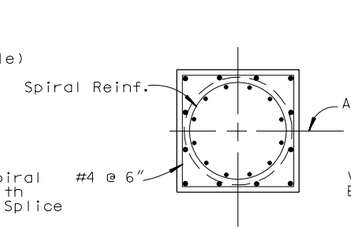


ELEVATION

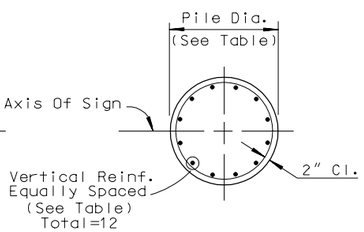


SECTION "K"-"K"

6" AND 8" POSTS



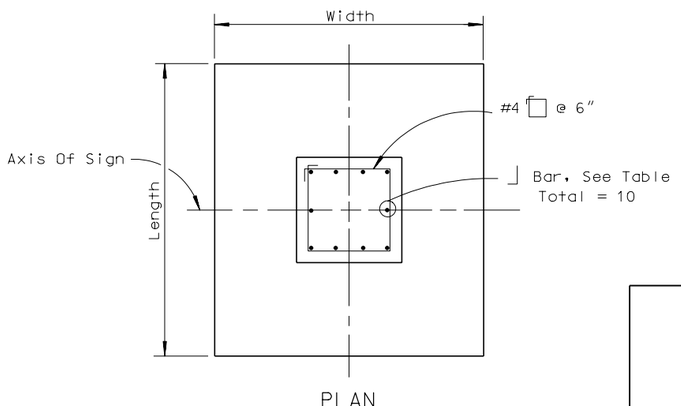
SECTION "H"-"H"



SECTION "J"-"J"

10" THRU 14" POSTS

PILE FOUNDATION



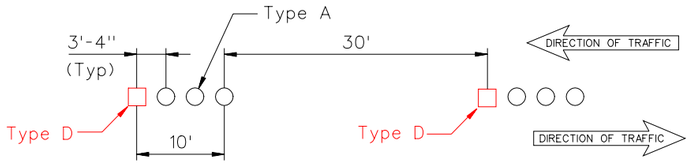
PLAN

SPREAD FOOTING

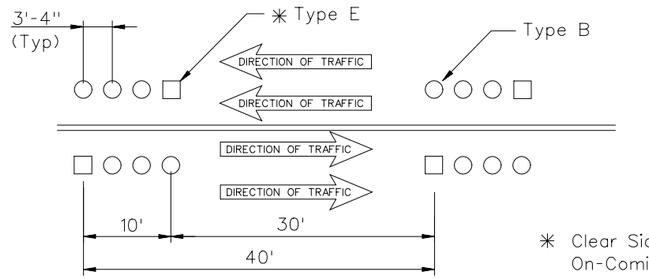
STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

OVERHEAD SIGNS LIGHTWEIGHT FOUNDATION

Signed Original On File	T-36.1.17 (627)
CHIEF SAFETY/TRAFFIC ENGINEER	ADOPTED: 11/95 REVISION: 9/97



BROKEN YELLOW LINE



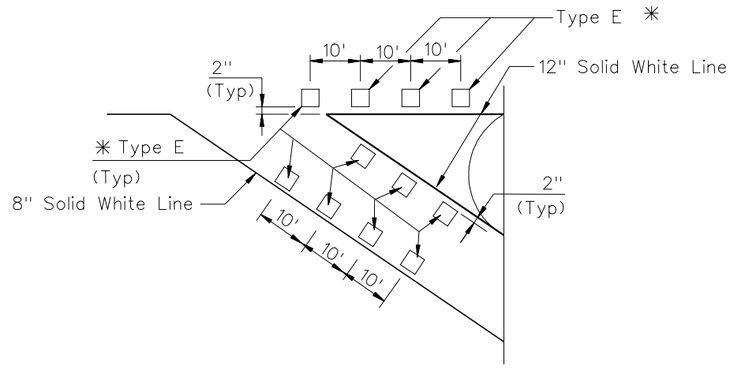
✳ Clear Side Shall Face
On-Coming Traffic.

INCLUDING FREEWAYS

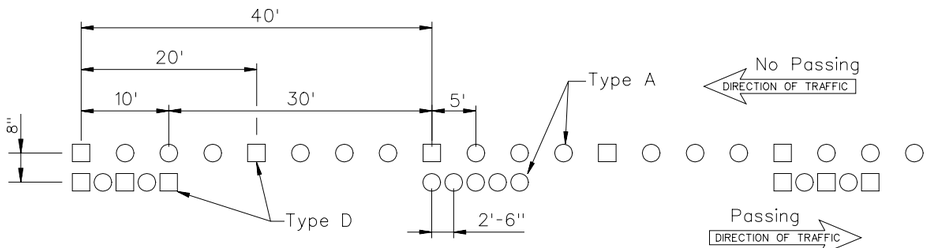
I-15: Stateline north to northern I-215 Junction
US-93: Northside of Boulder City north to northernmost I-215 Junction
US-95: US-95 Junction north to SR-157 Junction
I-215: I-515 Junction north to I-15

BROKEN WHITE LINE (URBAN)

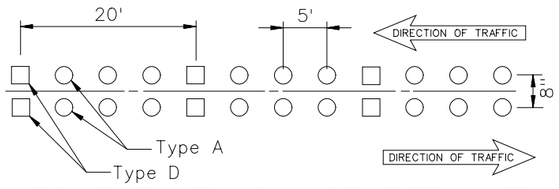
✳Red Side Shall Face
Wrong Way Traffic.



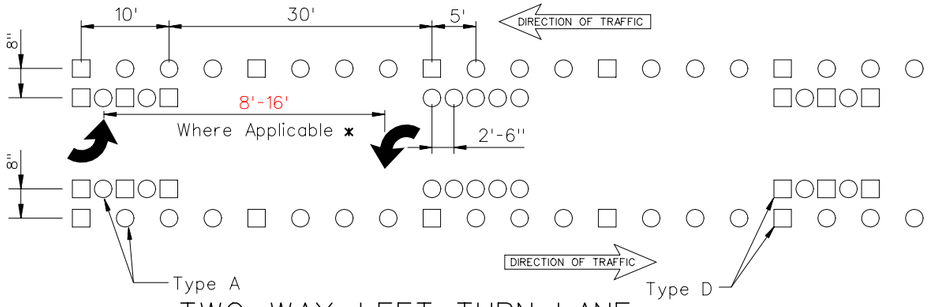
EXIT RAMP (GORE)



PASSING/NO PASSING ZONE

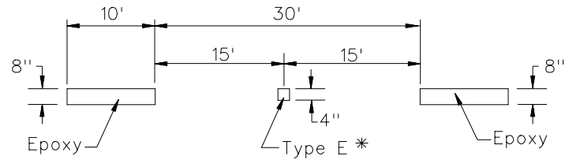


DOUBLE YELLOW CENTER LINE



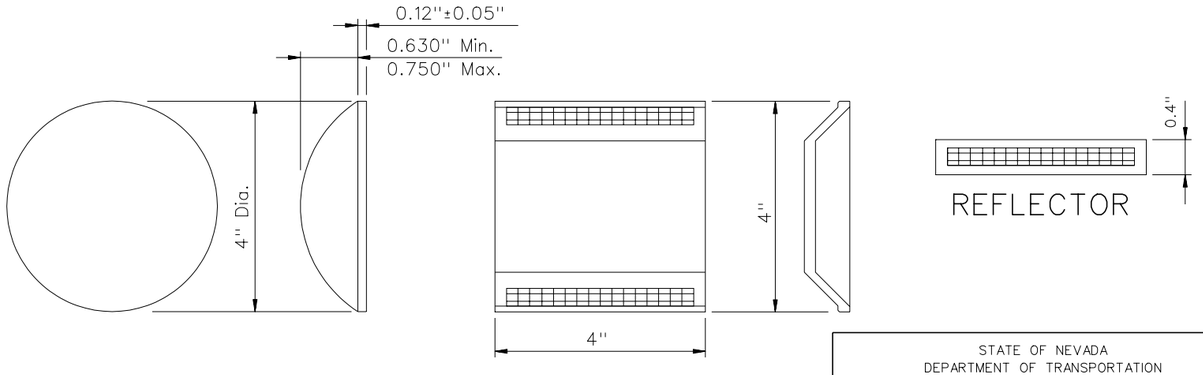
✳See Plan Sheets for Location

TWO WAY LEFT TURN LANE



✳Red Side Shall Face
Wrong Way Traffic.

BROKEN WHITE LINE (RURAL)



REFLECTOR

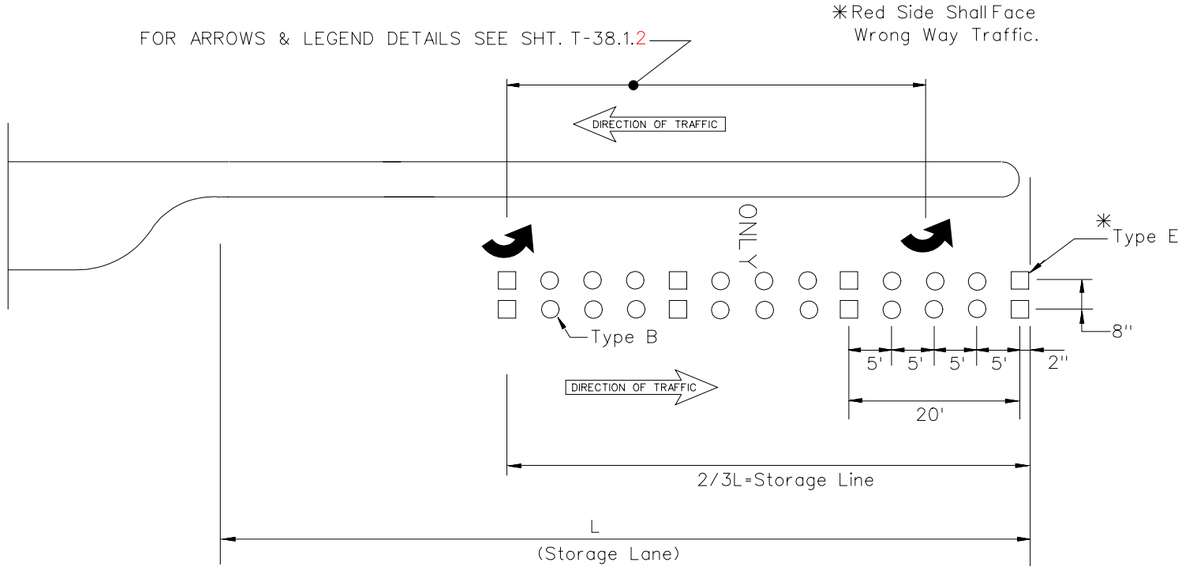
NON-REFLECTIVE & REFLECTIVE MARKERS

Type A - Non-Reflective Yellow Marker
Type B - Non-Reflective White Marker
Type C - One Way Clear Reflective Marker
Type D - Two Way Yellow Reflective Marker
Type E - Red/Clear Reflective Marker

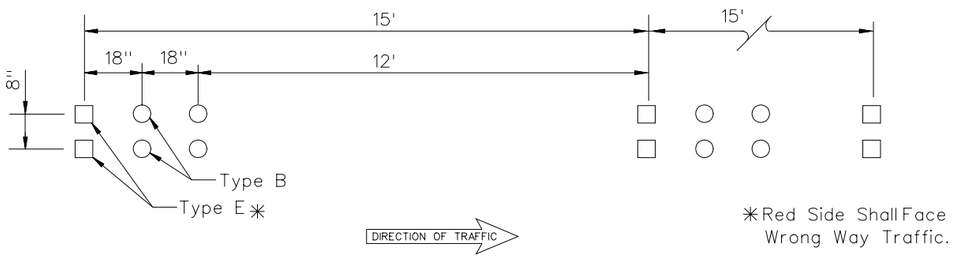
STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

PERMANENT RAISED PAVEMENT MARKERS

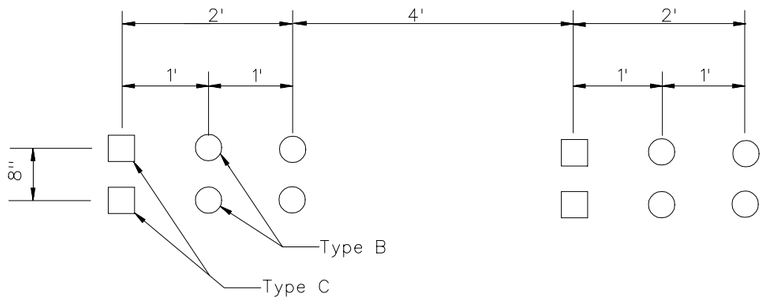
Signed Original On File	T-37.1.1	(633)
CHIEF SAFETY/TRAFFIC ENGR	ADOPTED 2/79	REVISION 1/03



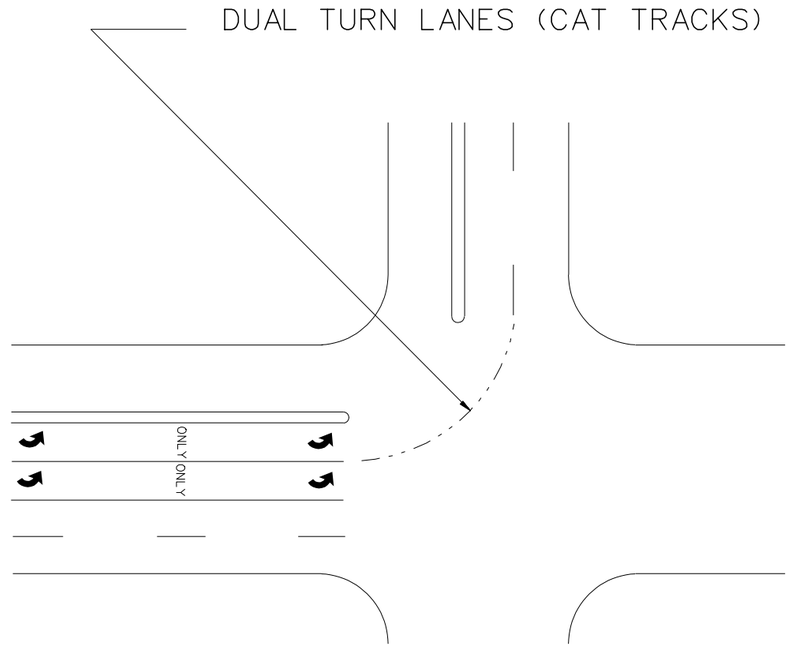
STORAGE LINE



DOTTED WHITE LINE



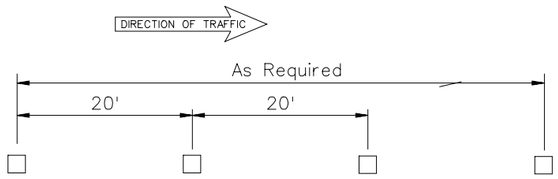
DOTTED WHITE--INTERSECTIONS
DUAL TURN LANES (CAT TRACKS)



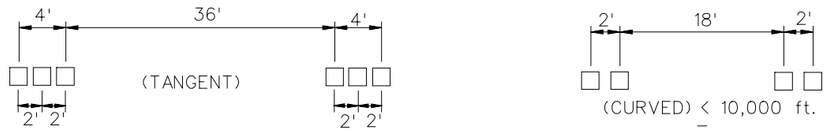
STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

PERMANENT RAISED PAVEMENT MARKERS

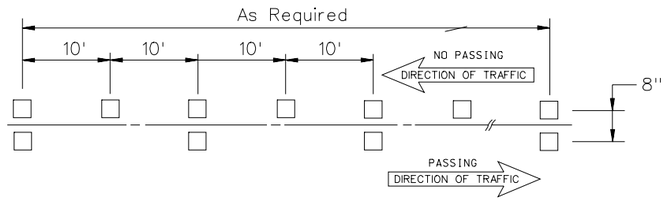
Signed Original On File	T-37.1.2	(633)
CHIEF SAFETY/TRAFFIC ENGINEER	ADOPTED 2/79	REVISION 5/02



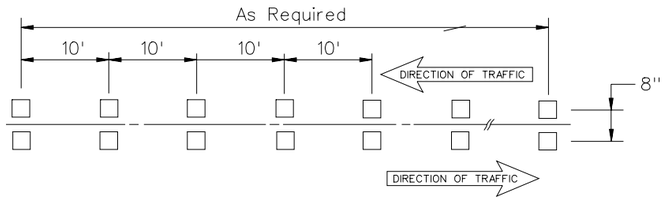
SHOULDER LINE (WHITE OR YELLOW)



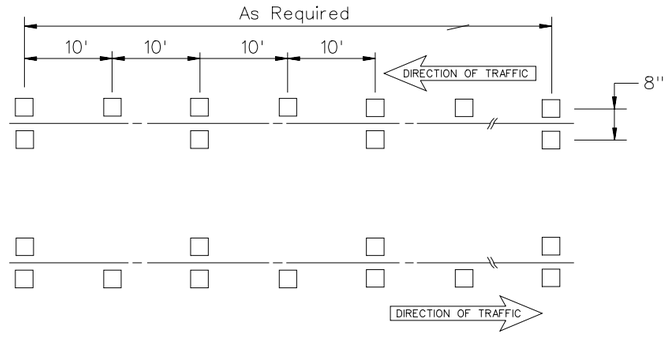
BROKEN YELLOW LINE
OR
BROKEN WHITE LINE



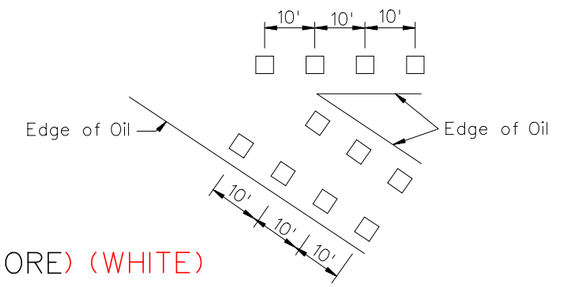
PASSING/NO PASSING ZONE (YELLOW)



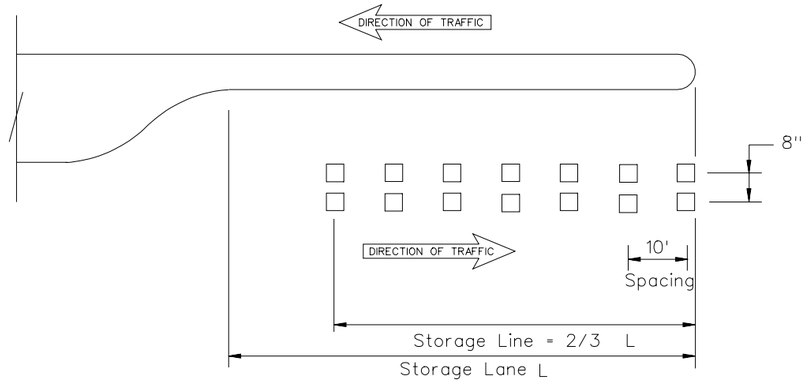
DOUBLE YELLOW CENTER LINE



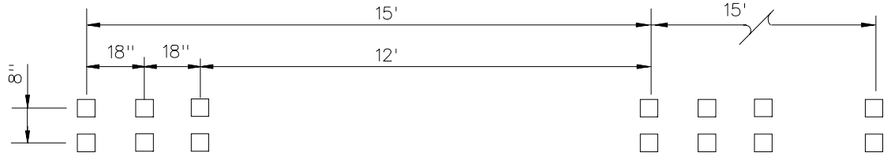
TWO WAY LEFT TURN LANE (YELLOW)



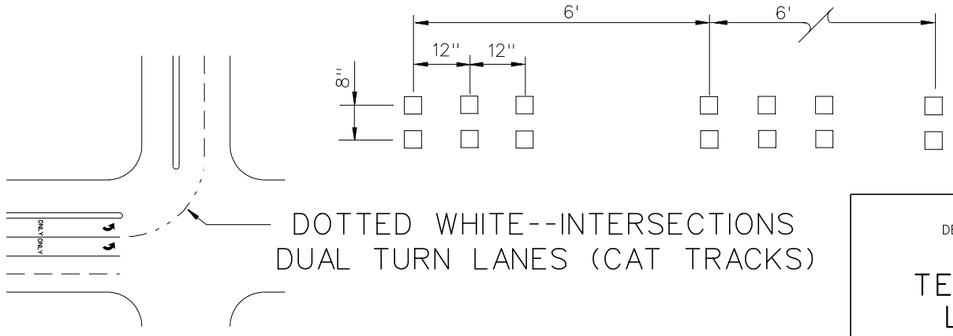
EXIT RAMP (GORE) (WHITE)



STORAGE LINE (WHITE)



DOTTED WHITE LINE



DOTTED WHITE--INTERSECTIONS
DUAL TURN LANES (CAT TRACKS)

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

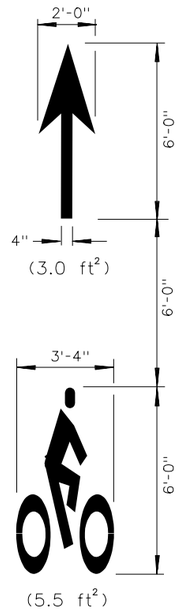
TEMPORARY LANE LINE MARKERS

Signed Original On File	T-37.1.3	(634)
CHIEF SAFETY/TRAFFIC ENGR.	ADOPTED: 8/98	REVISION 6/02

XING
ONLY

4'-0"
4'-0"

NOTE: THESE LEGENDS AS SHOWN ARE FOR BIKE LANE USE.

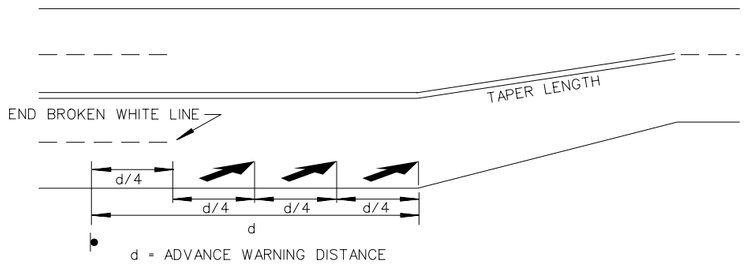


(3.0 ft²)

(5.5 ft²)

BICYCLE

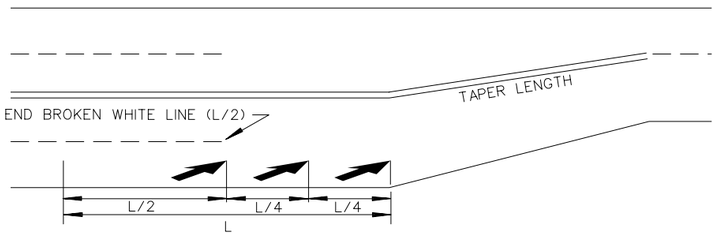
PLACEMENT OF MERGE ARROWS



d = ADVANCE WARNING DISTANCE

TYPICAL LANE REDUCTION

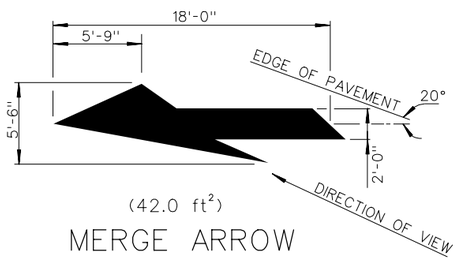
For further details on "LANE REDUCTION" See Part III of the MUTCD



L = LENGTH OF FULL WIDTH ACCELERATION LANE

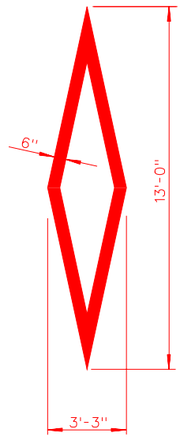
TYPICAL
PARALLEL ACCELERATION LANE

For further details on "PARALLEL ACCELERATION LANE" See Part III of the MUTCD

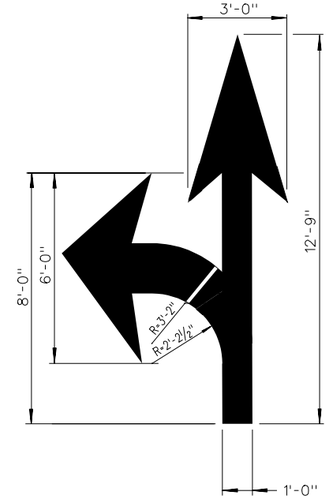


(42.0 ft²)

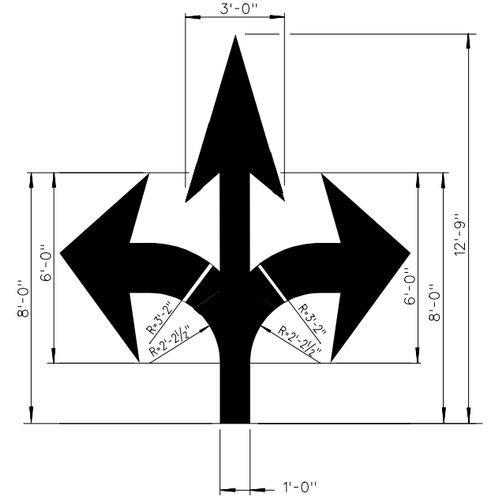
MERGE ARROW



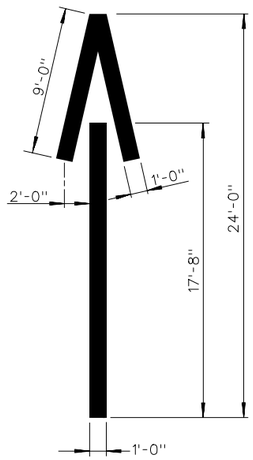
HOV LANE
(12.0 ft²)



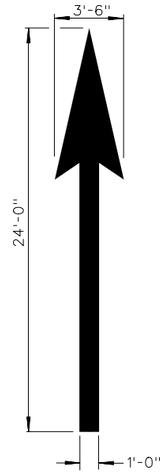
LEFT/STRAIGHT ARROW
(27.0 ft²)



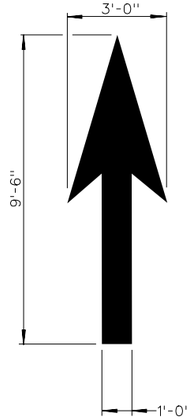
LEFT/STRAIGHT/RIGHT ARROW
(36.0 ft²)



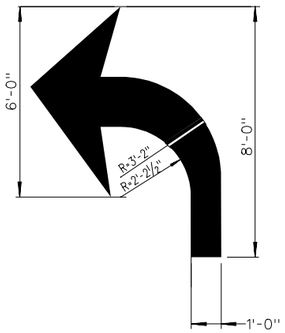
WRONG WAY ARROW
(33.0 ft²)



EXIT ARROW
(31.0 ft²)



STRAIGHT ARROW
(12.5 ft²)



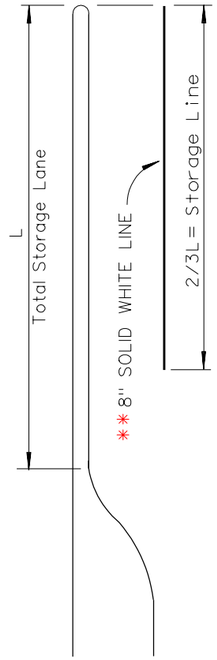
TURN ARROW
(15.5 ft²)

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

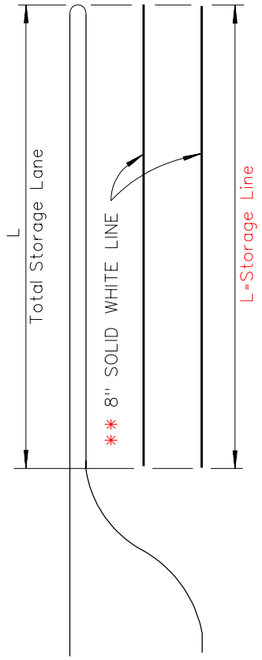
PERMANENT PAVEMENT MARKINGS: BICYCLE/HOV/ARROWS

Signed Original On File	T-38.1.1	(634)
CHIEF SAFETY/TRAFFIC ENGR.	ADOPTED: 7/96	REVISION 7/02

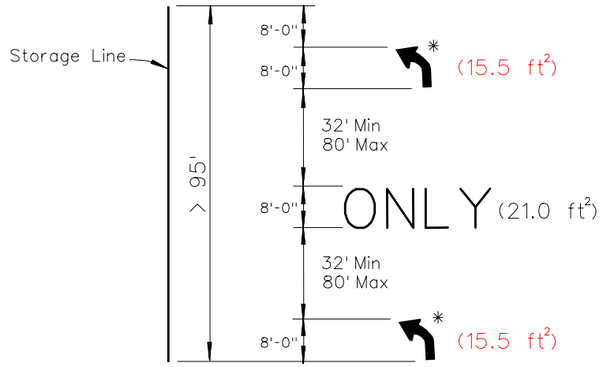
T-89



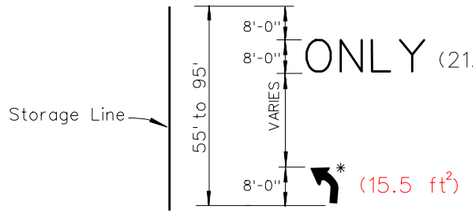
SINGLE STORAGE LANE



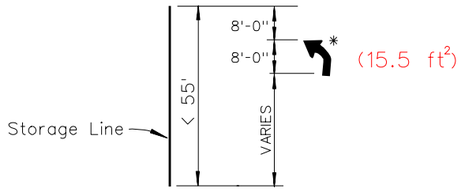
MULTIPLE STORAGE LANES



(>95 ft)



(55 ft to 95 ft)



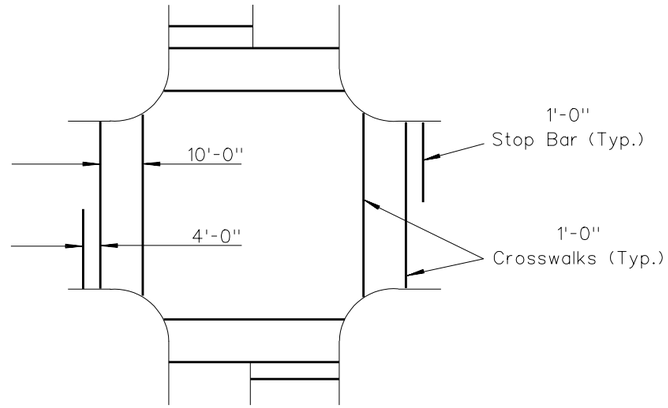
(<55 ft)

PERMANENT STORAGE LANES, TURN ARROWS & ONLY'S

LEGEND

* Right Arrows Where Applicable

** Raised Pavement Markers Where Applicable, for Details See Standard Plan Sheet T-37.1.2.



TEMPORARY CROSSWALK

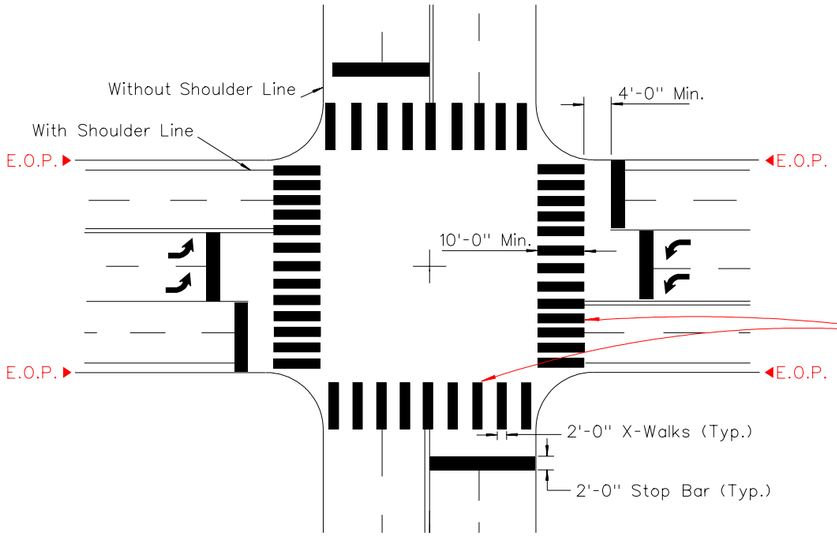
NOTE:

For TEMPORARY STRIPING Exclude:
PAVEMENT WORDS And SYMBOL MARKINGS
(i.e.TURN ARROWS,ONLY'S,etc.)

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

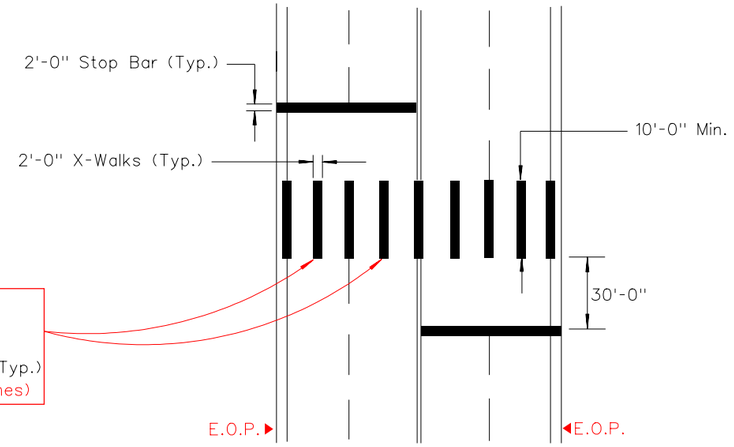
PERMANENT STORAGE LANES, TURN ARROWS AND ONLY'S. TEMPORARY CROSSWALK

Signed Original On File	T-38.1.2 (634)	
CHIEF SAFETY/TRAFFIC ENGR.	ADOPTED: 8/98	REVISION 2/03



PERMANENT (TYPICAL)
SIGNALIZED, STOP
CONTROLLED CROSSWALK INTERSECTION

Crosswalk Bar Spacing:
Place On Travel Lane Lines, Shoulder Lines and Centered Between Travel Lane Lines (Typ.)
(Placed Parallel to Travel Lanes)

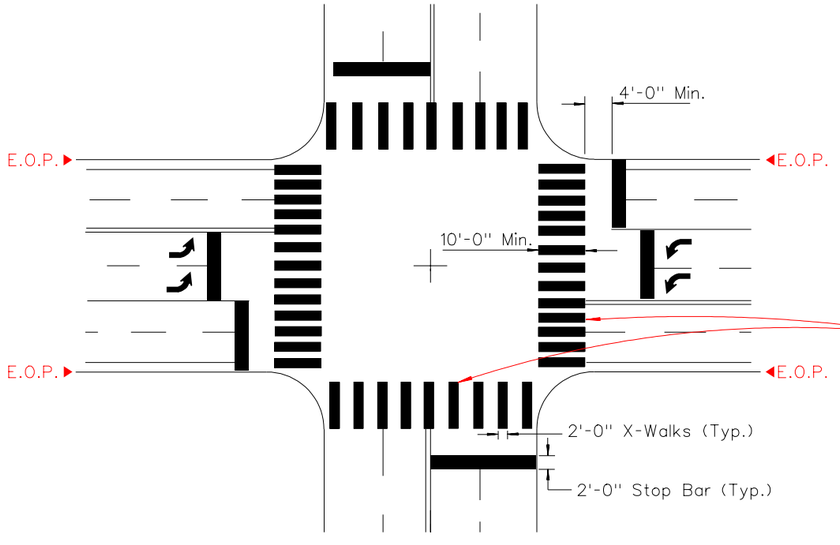


PERMANENT (TYPICAL)
NON-SIGNALIZED, NON-STOP
CONTROLLED CROSSWALK

DISTRICT 1

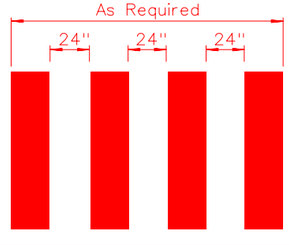
NOTE: For additional crosswalk/stop bar details, see Standard Plan Sheet T-38.1.2 & T-38.1.3.

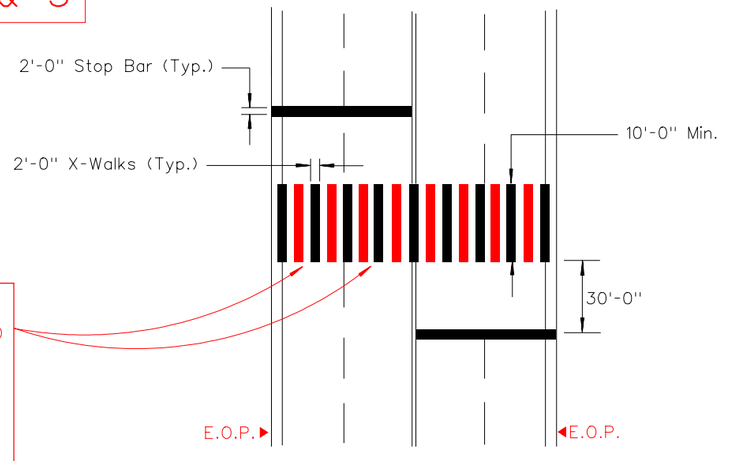
DISTRICT 2 & 3



PERMANENT (TYPICAL)
SIGNALIZED, STOP
CONTROLLED CROSSWALK INTERSECTION

Crosswalk Bar Spacing:
(Placed Parallel to Travel Lanes)



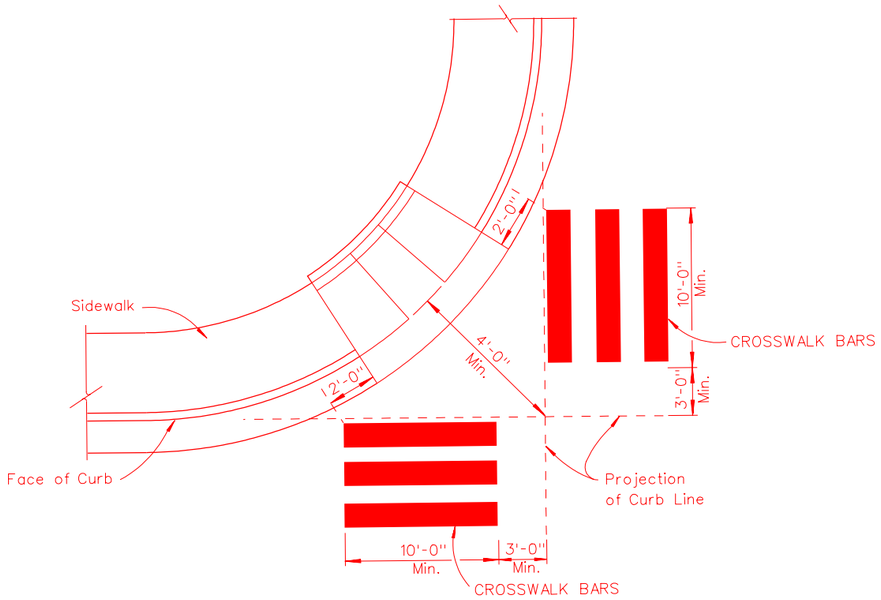


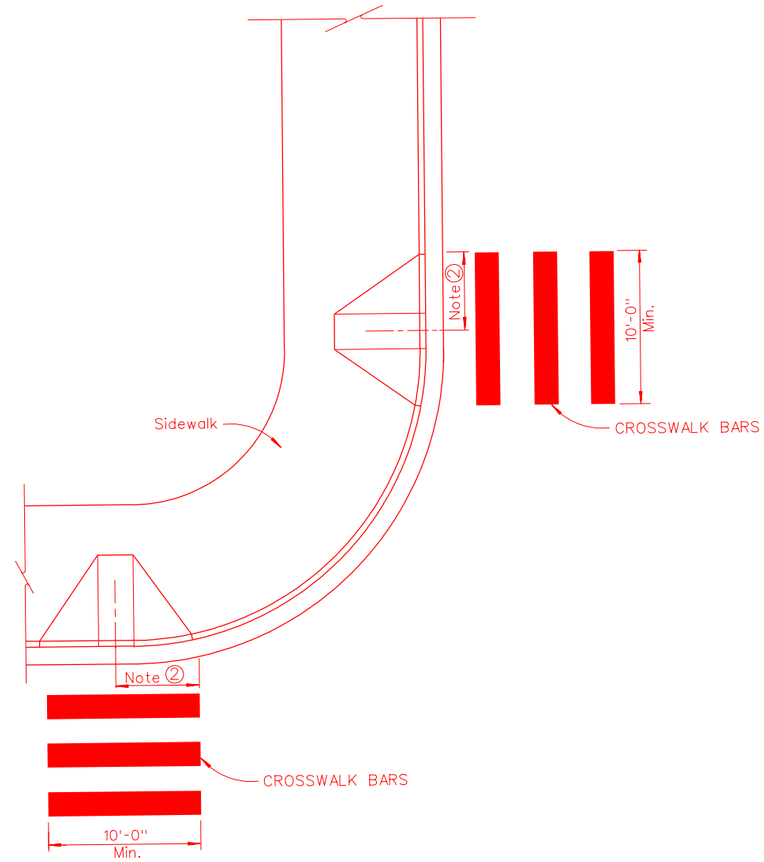
PERMANENT (TYPICAL)
NON-SIGNALIZED, NON-STOP
CONTROLLED CROSSWALK

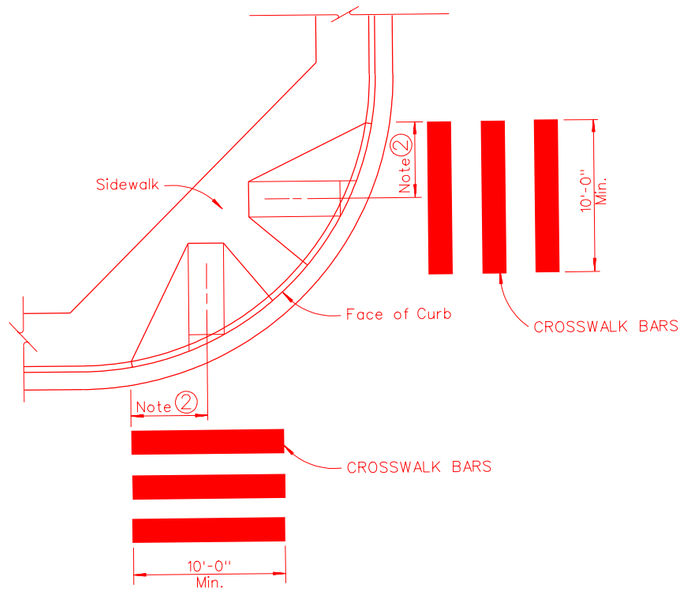
STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

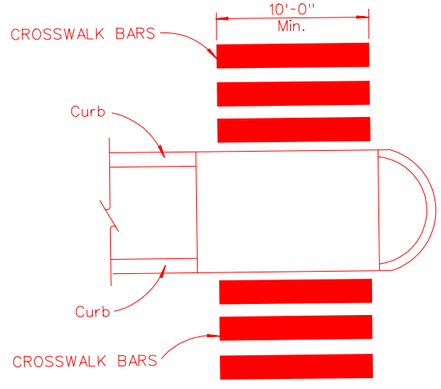
PERMANENT CROSSWALK MARKINGS

Signed Original On File	T-38.1.2.1 (634)	
CHIEF SAFETY/TRAFFIC ENGR.	ADOPTED: 2/03	REVISION









GENERAL NOTES:

1. FOR SPACING OF CROSSWALK BARS, SEE NDOT STANDARD PLAN SHEET T-38.1.2.
2. CENTER OF CURB RAMP TO BE CENTER OF CROSSWALK.

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

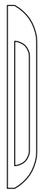
PERMANENT PAVEMENT MARKINGS: CROSSWALKS

Signed Original On File	T-38.1.3	(634)
CHIEF SAFETY/TRAFFIC ENGR.	ADOPTED: 5/02	REVISION


5.20 ft²


6.85 ft²


4.75 ft²


6.05 ft²


5.84 ft²


4.61 ft²


5.88 ft²


5.94 ft²

2.56 ft²


3.69 ft²


5.64 ft²


3.79 ft²


7.41 ft²


7.07 ft²


5.89 ft²

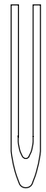

5.11 ft²


6.20 ft²


6.16 ft²


5.87 ft²


3.79 ft²


5.49 ft²


4.70 ft²


6.75 ft²


4.69 ft²


3.79 ft²


5.04 ft²

2.56 ft²


5.45 ft²


5.53 ft²


5.63 ft²

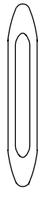

6.20 ft²


6.16 ft²


4.20 ft²


6.13 ft²

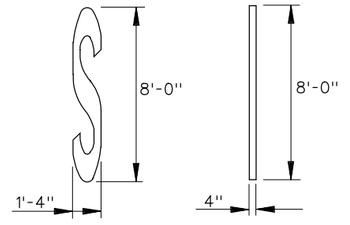

6.17 ft²


5.89 ft²

TYPICAL MARKINGS

AHEAD	28.5 ft²
EXIT	17.0 ft²
MPH	18.5 ft²
PED	17.0 ft²
SCHOOL	32.5 ft²
STOP	21.0 ft²
XING	20.5 ft²
YIELD	22.0 ft²
HOV	16.5 ft²

TYPICAL MARKINGS



STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

PERMANENT PAVEMENT MARKINGS: LETTERS/NUMBERS

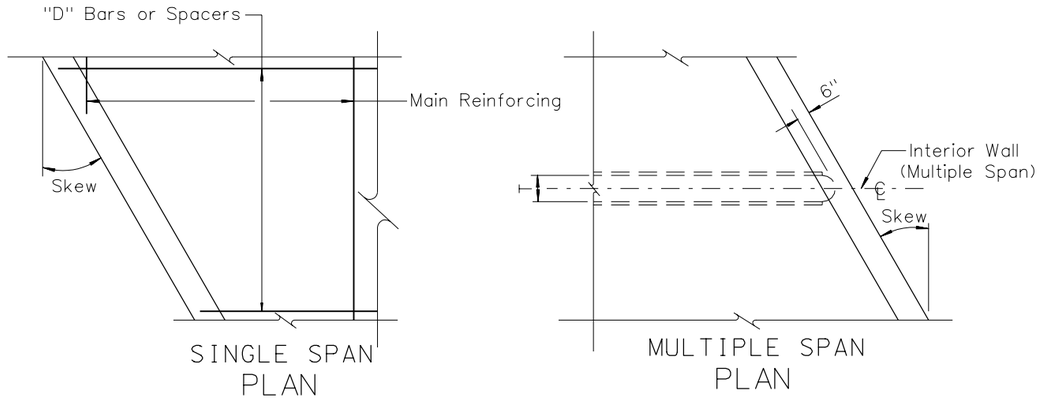
Signed Original On File
CHIEF SAFETY/TRAFFIC ENGR.

T-38.1.4 (634)

ADOPTED: 9/00

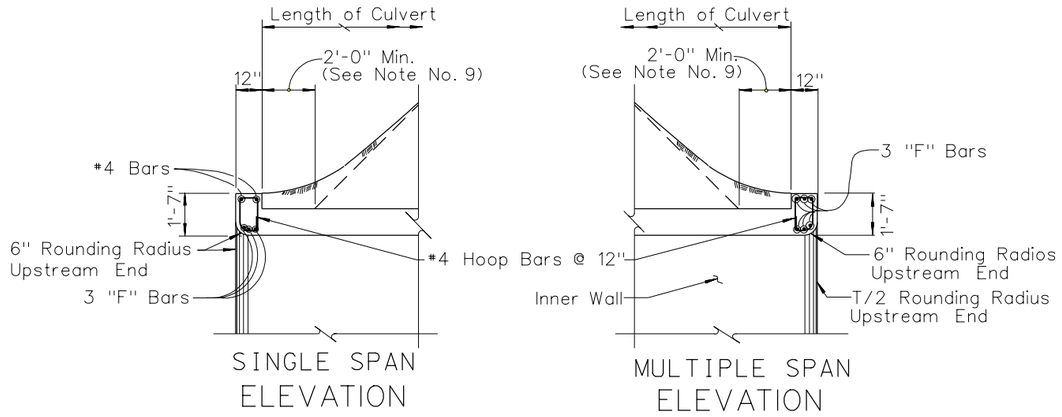
REVISION 7/02

T-93



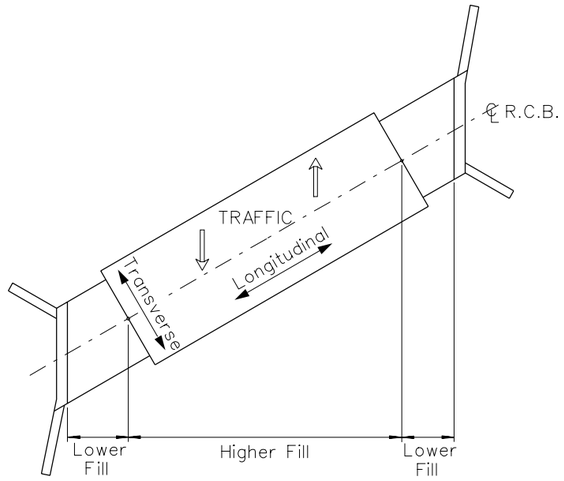
SINGLE SPAN PLAN

MULTIPLE SPAN PLAN

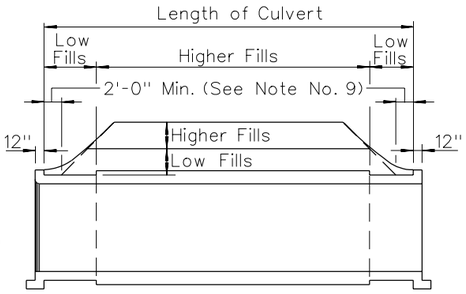


SINGLE SPAN ELEVATION

MULTIPLE SPAN ELEVATION



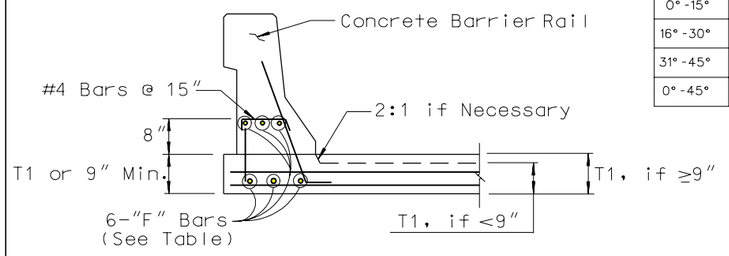
PLAN – SKEWED



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

ELEVATION

FILL HEIGHT TRANSITIONS



PARAPET DETAILS

COPING REINFORCING INCLUDED IN THE HEADWALL QUANTITIES

SKEWED PARAPETS									
SKEW ANGLE	SPAN		5	6	7	8	10	12	14
0°-15°	"F" BARS	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" CTRS.						

GENERAL NOTES:

1) DESIGN SPECIFICATIONS : AASHTO "STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES, 1983, EXCEPT AS NOTED BELOW.
2) CONSTRUCTION SPECIFICATIONS: STATE OF NEVADA DEPARTMENT OF HIGHWAYS "STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION," CURRENT EDITION, AND SPECIAL PROVISIONS THERETO.
3) LOADING: LIVE LOAD: STANDARD HS20-44 OR ALTERNATE FHWA 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. EARTH 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: 1.5D + 1.5E + 2.5 (L+I).
4) CONCRETE: THE CONCRETE SHALL HAVE A MINIMUM 28 DAY COMPRESSIVE STRENGTH OF 3,250 PSI. MAXIMUM ALLOWABLE SHEAR, Vc = 3.5 f'c, PSI. TAKEN AT A DISTANCE "d" FROM THE SUPPORTING MEMBER.
5) 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 2-1/2 INCH CLEARANCE ON BOTTOM OF BOTTOM SLAB AND 2 INCH CLEARANCE ON REMAINDER OF STRUCTURE AND ITS APPURTENANCES UNLESS OTHERWISE NOTED ON THE PLANS.
6) FOUNDATION PRESSURE: THE RCB CULVERTS ARE DESIGNED TO THE FOLLOWING SOIL BEARING PRESSURES:

COVER HEIGHTS	10 FT.	20 FT.
RCB HEIGHT	TON/SQ.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

7) SPECIAL DESIGN: CULVERTS WITH CONDITIONS, LOADING, OR SIZES DISSIMILAR TO THOSE GIVEN ON THESE RCB CULVERT SHEETS MAY REQUIRE A SPECIAL DESIGN.
8) DESIGNATION: BOX CULVERTS ARE SHOWN ON PLANS AS SPAN TIMES HEIGHT TIMES LENGTH (10' x 8' x 196' RCB).
9) ADDITIONAL LENGTH: LENGTH OF CULVERT SHALL BE INCREASED AS FOLLOWS: ADD 2.0 FT. TO EACH END WHEN COVER AT SHOULDER IS 0.0 TO 5.0 FEET. ADD AN ADDITIONAL 1.0 FT. TO EACH END FOR EACH SUCCEEDING 5.0 FT. OF COVER OR PORTION THEREOF.
10) HEADWALLS: ALL RCB CULVERTS SHALL HAVE TYPE IHEADWALLS UNLESS OTHERWISE NOTED ON THE PLANS.
11) 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.
12) 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

Signed Original On File
CHIEF BRIDGE ENGINEER

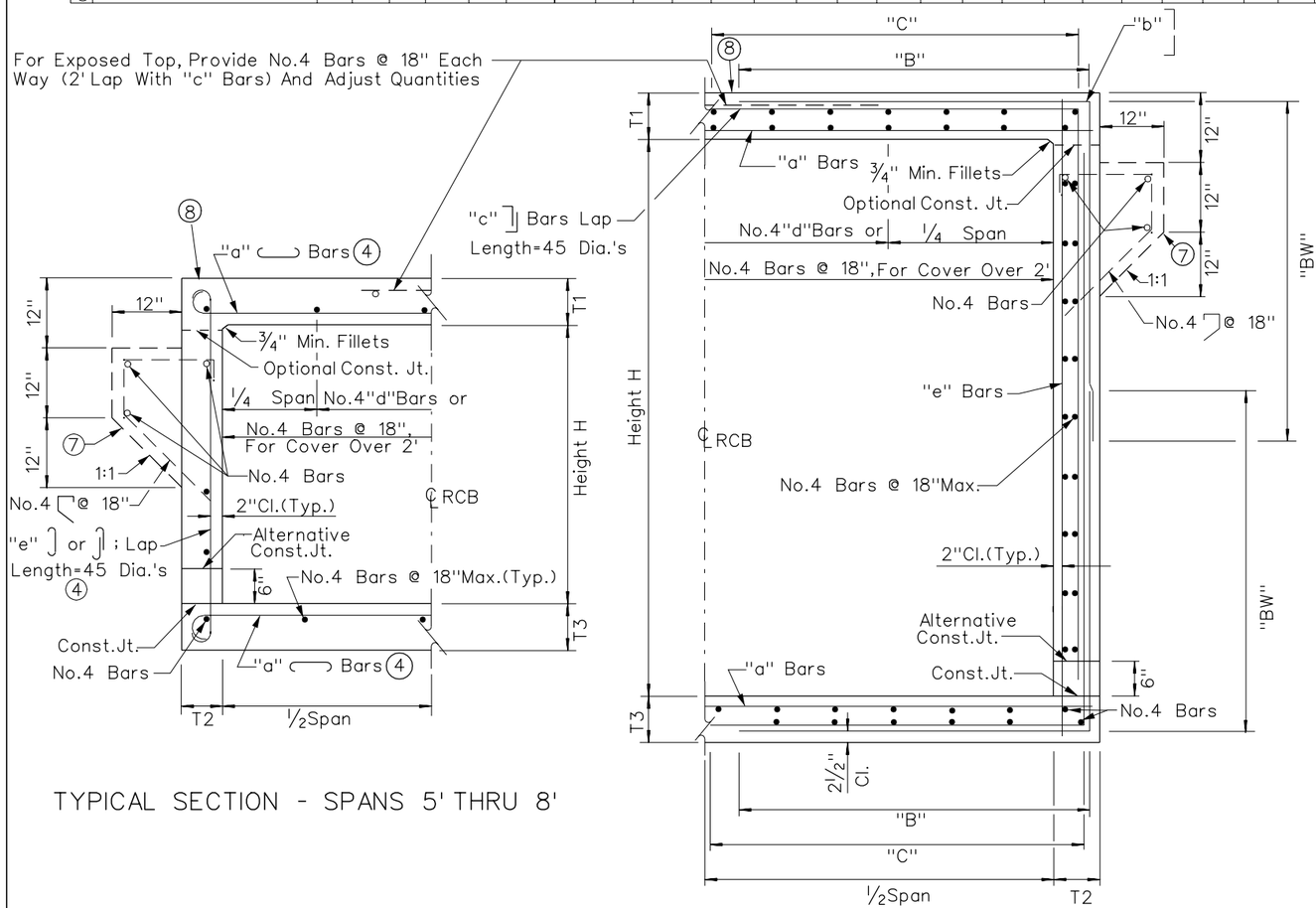
B-20.1.1 (502) (505)
ADOPTED-11/73 REVISION 9/00

	SPAN FT.	5						6								7								8							
	HEIGHT FT.	3		4		5		3		4		5		6		3		4		5		6		7		3		4		5	
	MAXIMUM EARTH COVER FT.	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 T1 INCH	7½	7½	7½	7½	7½	7½	8	8	8	8	8	8	8	8	8	9	8	9	8	9	8½	9	8½	9	8½	9½	8½	9½	8½	9½
	WALLS T2 INCH	6	6	6	7	6½	7½	6	6	6	7	6½	7½	7	8½	6	6	6	7	6½	7½	7	8½	8	9½	6	7	6	7	6½	7½
	INVERT T3 INCH	6½	7	6½	7	6½	7	7	8	7	8	7	8	7	8	8	9	8	9	8	9	8	9	8	9	8	9½	8	10	8	10
REINF.	SPACING INCH	8½	5½	8½	5½	8½	5½	7½	5	7½	5	7½	5	7½	4½	6½	5	6½	4½	6½	5½	6½	5½	6½	5½	6	5	6	5	6	4½
	"a" BAR NO.	7	6	7	6	7	6	7	6	7	6	7	6	7	6	7	6	7	6	7	7	7	7	7	7	7	7	7	7	7	7
	"e" BAR NO.	4	4	5	5	6	6	4	4	5	5	6	6	7	6	4	4	5	5	6	6	6	7	7	7	5	5	5	5	5	6
QUAN.	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	20.7	23.8	15.4	18.0	16.4	19.0	17.9	21.1
	REINFORCEMENT LBS/LF	58	68	67	81	82	105	70	81	82	96	97	120	124	148	94	94	105	118	121	147	130	177	160	192	115	139	123	151	131	171

"d" BARS, FOR EARTH COVERS OF 2' AND LESS TO BE PLACED IN TOP SLAB ONLY							
SPAN	5'	6'	7'	8'	10'	12'	14'
NUMBER of BARS	6	7	8	9	10	12	16

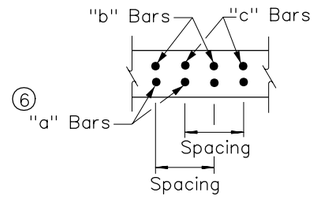
	SPAN FT.	10												12																	
	HEIGHT FT.	3		4		5		6		7		8		9		10		4		5		6		7		8		9		10	
	MAXIMUM EARTH COVER FT.	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20
CONC.	ROOF T1 INCH	8	10½	8	10½	8	10½	8	10½	8	10½	8	10½	8	10½	8½	11	8½	12	8½	12	8½	12	8½	12	8½	12	8½	12	9½	12
	WALLS T2 INCH	8	8	8	8	8	8	8	9	8	9	8	10	8½	11½	9½	12½	8	10	8	10	8	10	8½	10½	8½	10½	8½	11½	9	12½
	INVERT T3 INCH	8	11	8	11	8	11	8	11	8	11	8	11	8	11	8½	11	8½	12½	8½	12½	9	12½	9	12½	9	12½	9	12½	9½	13
REINFORCEMENT	SPACING INCH	13	12	13	12	13	12	12	12	11	11	10	11	11	10	11	10	9	10	9	10	9	10	9	10	8	10	8	10	10	9
	"a" ⑥ BAR NO.	6	7	6	7	6	7	6	7	6	7	6	7	6	6	6	6	6	7	6	7	6	7	6	7	6	7	6	7	6	6
	"b" BAR NO.	6	7	6	7	6	7	6	7	6	7	6	7	6	7	7	7	6	7	6	7	6	7	6	7	6	7	7	7	6	7
	"b" DIMENSION "B" FT.- INCH	2-10	2-11	2-10	2-11	2-11	2-11	2-11	3-0	2-11	3-9	2-11	3-9	2-11	3-9	2-11	3-9	3-1	3-2	3-1	3-2	3-1	3-2	3-9	3-9	3-9	3-9	3-7	3-9	3-7	4-4
	"b" DIMENSION "BW" FT.- INCH	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	4-7	4-7	4-0	4-0	4-0	4-0	6-0	5-10	6-2	6-7	6-2	6-7	4-11	4-11	4-11	4-11
	"c" BAR NO.	6	7	6	7	6	7	6	7	6	7	6	7	7	7	7	7	6	7	6	7	6	7	6	7	7	7	7	7	7	7
	"c" DIMENSION "C" FT.- INCH	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	7-7	4-8	4-4	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
	"e" ⑤ BAR NO.	4	4	4	4	4	4	4	4	4	4	4	4	4	4	5	5	4	4	4	4	4	4	4	4	4	4	5	5	5	5
QUAN.	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	34.5	49.8
	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	415	424

	SPAN FT.	14													
	HEIGHT FT.	7		8		9		10		11		12		13	
	MAXIMUM EARTH COVER FT.	10	20	10	20	10	20	10	20	10	20	10	20	10	20
CONC.	ROOF T1 INCH	9½	14	9½	14	9½	14	9½	14	10	14	10	14	10½	14
	WALLS T2 INCH	9½	11	9½	11½	9½	11½	10	12½	10½	14	11½	15	12½	16½
	INVERT T3 INCH	10	14½	10	14½	10	14½	10	14½	10½	14½	10½	15	11	15
REINFORCEMENT	SPACING INCH	10	9	10	9	10	8	10	8	8	8	10	10	10	10
	"a" ⑥ BAR NO.	7	7	7	7	7	7	7	7	7	7	6	7	6	7
	"b" BAR NO.	7	7	7	7	7	7	7	7	7	7	6	8	7	8
	"b" DIMENSION "B" FT.- INCH	2-9	4-2	3-4	4-4	3-4	4-6	3-4	4-6	3-6	4-6	3-6	4-6	3-6	4-6
	"b" DIMENSION "BW" FT.- INCH	6-5	7-0	7-0	8-4	7-0	8-4	6-0	6-0	6-0	6-0	6-0	6-0	5-0	6-0
	"c" BAR NO.	7	7	7	7	7	7	7	7	7	7	7	8	8	8
	"c" DIMENSION "C" FT.- INCH	4-0	4-2	6-9	6-9	5-10	5-10	6-0	6-4	8-11	6-4	8-11	6-4	8-11	6-4
	"e" ⑤ BAR NO.	4	4	4	4	4	4	4	4	4	4	4	5	6	6
QUAN.	CONCRETE CF/LF	36.2	51.0	37.8	53.1	39.5	54.9	41.9	58.7	45.9	64.1	49.9	69.5	55.6	75.8
	REINFORCEMENT LBS/LF	374	471	449	522	446	587	449	580	492	596	537	605	564	634



TYPICAL SECTION - SPANS 5' THRU 8'

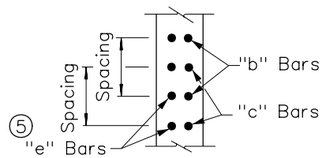
TYPICAL SECTION - SPANS 10' THRU 14'



ROOF SECTION

SPANS 10' THRU 14'

Invert Similar



WALL SECTION

SPANS 10'THRU 14'

NOTES:

1. 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.
2. FOR BOXES WITH SPAN OR HEIGHT OR COVER GREATER THAN THOSE SHOWN IN TABLES, A SPECIAL DESIGN IS REQUIRED.
3. QUANTITIES ARE APPROXIMATE AND FOR DESIGN PURPOSES ONLY.
4. IT IS PERMISSIBLE TO ELIMINATE THE 180° HOOKS ON EVERY OTHER BAR.
5. "e" BARS ARE AT HALF SPACING.
6. "a" BARS ARE AT HALF SPACING.
7. PROVIDE PAVING NOTCH WHEN TOP IS EXPOSED AND WHERE P.C.C. PAVEMENT OR APPROACH SLAB IS USED. ADJUST THE QUANTITIES.
8. 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.

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

SINGLE RCB CULVERTS

Signed Original On File
CHIEF BRIDGE ENGINEER

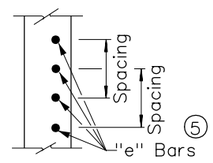
B-20.1.2 (502) (505)
ADOPTED 11/70 REVISION 9/00

	SPAN FT.	5						6						7						8					
	HEIGHT FT.	3		4		5		3		4		5		6		3		4		5		6		7	
	MAXIMUM EARTH COVER FT.	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 T1 INCH	7	7 1/2	7	7 1/2	7	7 1/2	7	9	7	9	7	9	7	9	7 1/2	10	7 1/2	10	7 1/2	10	7 1/2	10	8	10
	EXTERIOR WALL T2 INCH	6	6	6	7	6 1/2	7 1/2	6	6	6	7	6 1/2	8	7	8 1/2	6	6	6	7	6 1/2	7 1/2	7	9	8	9 1/2
	INVERT T3 INCH	7	8	7	8	7	8	7	9	7	9	7	9	7	9	7 1/2	10 1/2	7 1/2	10 1/2	7 1/2	10 1/2	7 1/2	10 1/2	7 1/2	10 1/2
REINFORCEMENT	SPACING INCH	11 1/2	14	11 1/2	14	11 1/2	15	11 1/2	12	11 1/2	12	11 1/2	12	11 1/2	12	11	10 1/2	11	10 1/2	11	10 1/2	11	10 1/2	11	10 1/2
	"g" BAR NO.	4	7	4	7	4	7	6	7	6	7	6	7	6	7	6	7	6	7	6	7	6	7	6	7
	"f" BAR NO.	5	5	5	5	5	5	5	5	5	5	5	5	5	5	6	5	6	5	6	5	6	5	6	5
	"a" BAR NO.	6	4	6	4	6	4	7	4	7	4	7	4	7	4	6	4	6	4	6	4	6	4	6	4
	"e" ⑤ BAR NO.	4	5	5	6	5	7	4	5	4	6	5	6	6	7	4	5	5	5	5	6	6	6	6	7
QUAN.	CONCRETE CF/LF	17.8	19.3	19.3	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	39.1	32.4	41.8
	REINFORCEMENT LBS/LF	122	121	134	137	145	162	186	162	192	179	206	190	227	212	207	197	220	208	227	228	252	262	260	276

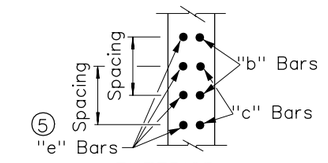
	SPAN FT.	8								10								12											
	HEIGHT FT.	3		4		5		6		7		8		9		10		4		5		6		7		8		9	
	MAXIMUM EARTH COVER FT.	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20
CONC.	ROOF T1 INCH	8	11	8	11	8	11	8	11	8	11	8	11	8	11	8	11	8	11	8	11	8	11	8	11	8	11	8	11
	EXTERIOR WALL T2 INCH	6	7 1/2	6	7 1/2	6	7 1/2	6 1/2	8	7	9	7	9	8	10	8	10 1/2	6	7 1/2	6	7 1/2	6	7 1/2	6 1/2	8	7	9	8	10
	INVERT T3 INCH	8	11 1/2	8	11 1/2	8	11 1/2	8	11 1/2	8	11 1/2	8	11 1/2	8	11 1/2	8	11 1/2	8	11 1/2	8	11 1/2	8	11 1/2	8	11 1/2	8	11 1/2	8	11 1/2
REINFORCEMENT	SPACING INCH	11	10 1/2	11	10 1/2	11	10 1/2	11	10 1/2	11	10 1/2	11	10 1/2	11	10 1/2	11	10 1/2	9	10	9	10	9	10	9	10	9	10	9	10
	"g" BAR NO.	6	7	6	7	6	7	6	7	6	7	6	7	6	7	6	7	7	7	7	7	7	7	7	7	7	7	7	7
	"f" BAR NO.	6	5	6	5	6	5	6	5	6	5	6	5	6	5	6	5	5	5	5	5	5	5	5	5	5	5	5	5
	"a" BAR NO.	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	6	4
	"e" ⑤ BAR NO.	5	6	6	6	6	7	6	6	6	7	6	7	7	7	7	7	4	5	4	5	5	6	5	6	6	6	6	7
QUAN.	CONCRETE CF/LF	23.7	30.8	25.2	33.3	27.2	35.5	29.4	39.1	32.4	41.8	36.4	48.8	39.0	52.6	51.3	72.4	53.3	73.4	55.0	76.3	57.0	79.1	59.8	83.8	62.7	88.1	65.9	92.7
	REINFORCEMENT LBS/LF	207	197	220	208	227	228	252	262	260	276	270	224	283	237	302	266	340	279	350	312	360	326	505	567	514	577	543	604

	SPAN FT.	12																											
	HEIGHT FT.	10		11		12		4		5		6		7		8		9		10		11		12					
	MAXIMUM EARTH COVER FT.	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 T1 INCH	9	12 1/2	9	12 1/2	9	12 1/2	9	12 1/2	9	12 1/2	9	12 1/2	9	12 1/2	9	12 1/2	9 1/2	12 1/2	9 1/2	12 1/2	10	14 1/2	10	14 1/2	10	14 1/2	10	14 1/2
	EXTERIOR WALLS T2 INCH	8	8	8	8	8	8	8	8	8	8 1/2	8	9 1/2	8	10 1/2	8 1/2	11 1/2	9	12 1/2	9 1/2	12 1/2	10	15	10	15	10	15	10	15
	INVERT T3 INCH	9	12 1/2	9	12 1/2	9	12 1/2	9	12 1/2	9	12 1/2	9	12 1/2	9	12 1/2	9	12 1/2	9	12 1/2	9	12 1/2	10	15	10	15	10	15	10	15
REINFORCEMENT	SPACING INCH	11	7 1/2	11	7 1/2	11	7 1/2	10 1/2	7 1/2	10	8	10	8	10 1/2	8	10 1/2	8 1/2	9	8	9	8	9	8	8	7 1/2	8	7 1/2	8 1/2	8
	"g" BAR NO.	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" BAR NO.	7	5	7	5	7	5	6	5	6	5	6	5	6	5	6	5	6	5	7	7	7	7	7	6	6	6	6	6
	"a" BAR NO.	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
	"b" BAR NO.	5	5	5	5	5	5	5	5	5	5	6	5	6	6	6	6	6	5	6	5	6	5	6	5	6	6	6	6
	"b" DIMENSION "B" FT.-INCH	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	3-0	3-2	3-6	3-2	3-6	3-4
	"b" DIMENSION "Bw" FT.-INCH	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	4-0	4-11	4-0	4-11	4-1	3-2	4-1	3-2	4-1	3-4	4-1	3-4	4-1	3-7
	"c" BAR NO.	5	5	5	5	5	5	6	6	6	6	6	6	7	6	7	6	7	6	6	6	6	6	6	6	6	6	6	7
	"c" DIMENSION "C" FT.-INCH	3-0	2-9	3-0	2-9	3-1	2-9	3-9	3-3	4-6	4-3	5-6	4-6	6-0	4-9	6-0	4-9	3-10	3-7	3-10	3-7	3-10	3-7	4-6	4-4	5-7	5-0	6-6	5-2
	"e" ⑤ BAR NO.	4	4	4	4	4	4	4	4	4	4	4	4	4	5	5	5	4	4	4	4	4	4	4	4	4	4	4	5
QUAN.	CONCRETE CF/LF	39.0	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	56.3	74.5	51.3	72.4	53.3	73.4	55.0	76.3	57.0	79.1	59.8	83.8	62.7	88.1
	REINFORCEMENT LBS/LF	339	415	349	428	370	454	381	494	418	494	460	510	486	550	518	568	505	567	514	577	543	604	563	646	600	663	614	688

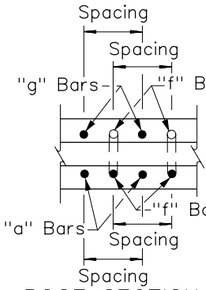
	SPAN FT.	12								14																			
	HEIGHT FT.	9		10		11		12		7		8		9		10		11		12		13		14					
	MAXIMUM EARTH COVER FT.	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20				
CONC.	ROOF T1 INCH	9 1/2	12 1/2	9 1/2	12 1/2	9 1/2	12 1/2	9 1/2	12 1/2	11 1/2	16 1/2	11 1/2	16 1/2	11 1/2	16 1/2	11 1/2	16 1/2	11 1/2	16 1/2	11 1/2	16 1/2	11 1/2	16 1/2	11 1/2	16 1/2				
	EXTERIOR WALLS T2 INCH	9	11 1/2	9	12 1/2	10	12 1/2	10	12 1/2	8 1/2	9 1/2	8 1/2	10 1/2	9	11 1/2	9 1/2	12 1/2	10	14	11	15	12	16 1/2	13	17 1/2				
	INVERT T3 INCH	11	15	11	15	11	15	11	15	11 1/2	17	11 1/2	17	11 1/2	17	11 1/2	17	11 1/2	17	11 1/2	17	11 1/2	17	11 1/2	17				
REINFORCEMENT	SPACING INCH	9	8	9	8	9	8	9	8	8 1/2	8	8 1/2	8	8 1/2	8	8 1/2	8	8 1/2	8	9	8	9	8	9	8				
	"g" BAR NO.	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8				
	"f" BAR NO.	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6				
	"a" BAR NO.	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4				
	"b" BAR NO.	5	6	6	6	6	6	6	6	6	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7				
	"b" DIMENSION "B" FT.-INCH	2-7	2-7	3-3	3-3	4-0	4-0	4-0	4-0	4-7	4-4	4-7	4-4	4-7	4-4	4-7	4-4	4-7	4-4	4-7	4-4	4-7	4-4	4-7	4-4				
	"b" DIMENSION "Bw" FT.-INCH	5-0	3-9	5-0	4-6	5-0	5-0	5-0	5-0	4-9	5-6	4-9	5-6	4-9	5-6	4-9	5-6	4-6	5-6	4-6	4-4	5-6	4-4	5-6	4-4				
	"c" BAR NO.	6	6	6	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	8	8	8	8				
	"c" DIMENSION "C" FT.-INCH	4-3	3-11	5-6	4-6	7-0	5-0	7-9	5-9	8-6	6-3	9-0	6-9	9-3	6-9	9-3	6-9	9-3	6-9	9-3	6-9	9-3	6-9	9-3	6-9				
	"e" ⑤ BAR NO.	4	4	4	4	4	4	4	4	4	5	5	5	5	5	5	5	5	5	5	6	6	6	6	6				
QUAN.	CONCRETE CF/LF	71.8	99.7	73.9	104	76.9	108	80.0	113	84.2	119	88.8	124	94.1	131	98.1	137												
	REINFORCEMENT LBS/LF	662	710	715	783	756	820	807	846	833	873	881	958	884	978	1002	1110												



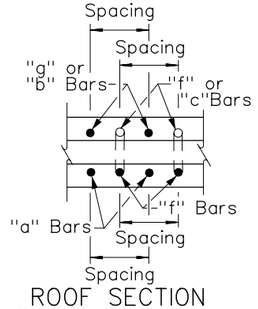
EXTERIOR WALL SECTION SPANS 5' THRU 8'



EXTERIOR WALL SECTION SPANS 10' THRU 14'

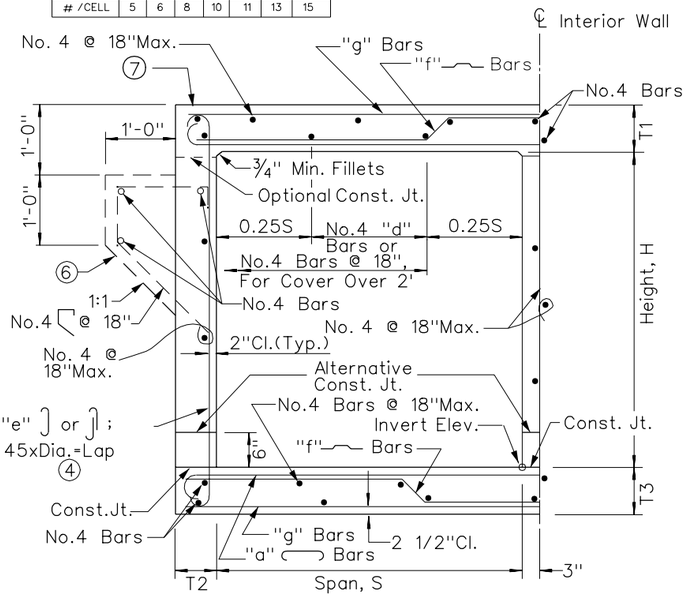


ROOF SECTION SPANS 5' THRU 8'
INVERT SIMILAR

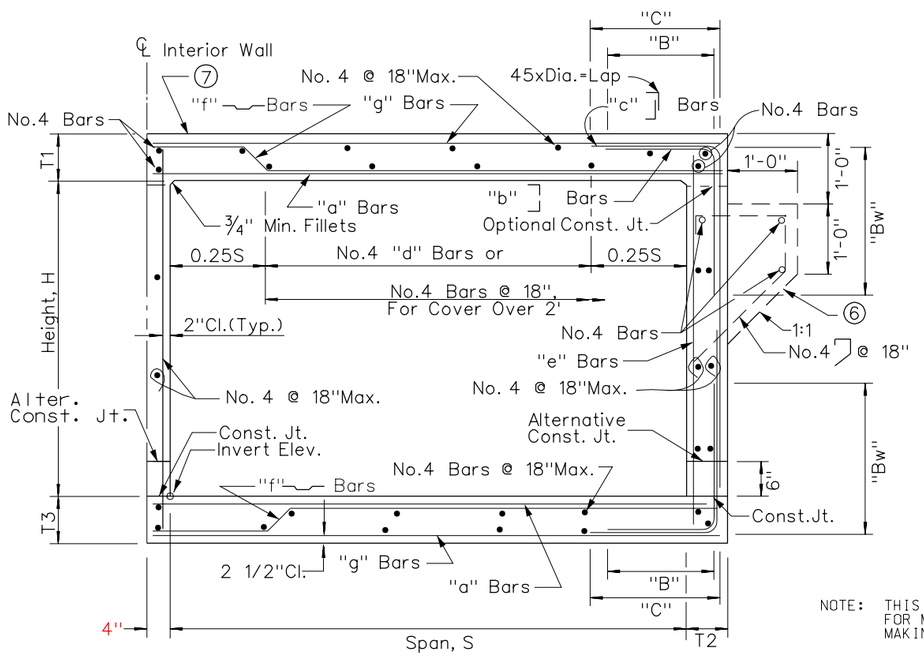


ROOF SECTION SPANS 10' THRU 14'
INVERT SIMILAR

"d" BARS, FOR EARTH COVERS OF 2' AND LESS TO BE PLACED IN TOP SLAB ONLY							
SPAN	5'	6'	7'	8'	10'	12'	14'
# /CELL	5	6	8	10	11	13	15



TYPICAL SECTION - SPANS 5' THRU 8'



TYPICAL SECTION - SPANS 10' THRU 14'

NOTE: THIS PLAN SHEET MAY BE USED FOR MULTIPLE CELL CULVERTS BY MAKING NECESSARY ADJUSTMENTS.

NOTES:

1. 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.
2. FOR BOXES WITH SPAN OR HEIGHT OR COVER GREATER THAN THOSE SHOWN IN TABLES, A SPECIAL DESIGN IS REQUIRED.
3. QUANTITIES ARE APPROXIMATE AND FOR DESIGN PURPOSES ONLY.
4. IT IS PERMISSIBLE TO ELIMINATE THE 180° HOOKS ON EVERY OTHER "e" BAR.
5. "e" BARS ARE AT HALF SPACING.
6. PROVIDE PAVING NOTCH WHEN TOP IS EXPOSED AND WHERE P.C.C. PAVEMENT OR APPROACH SLAB IS USED. ADJUST THE QUANTITIES.
7. 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.

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

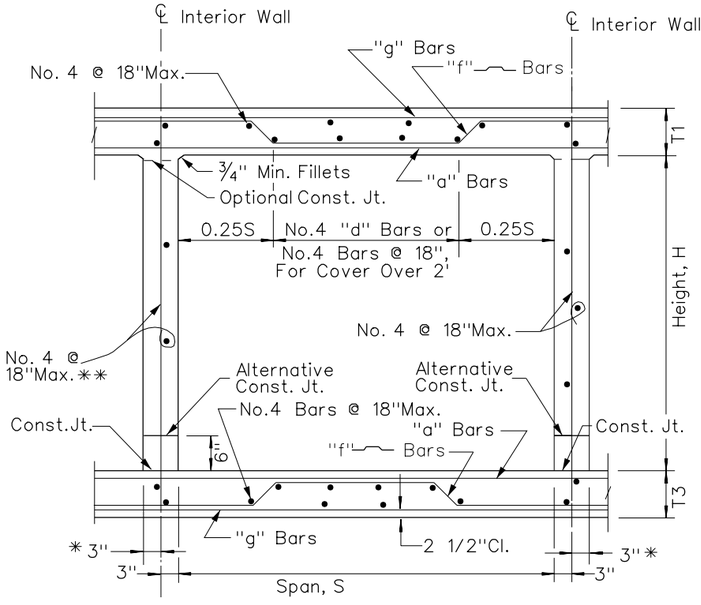
DOUBLE RCB CULVERTS

Signed Original On File	B-20.1.3	(502)
CHIEF BRIDGE ENGINEER	ADOPTED: 11/70	REVISION 1/03

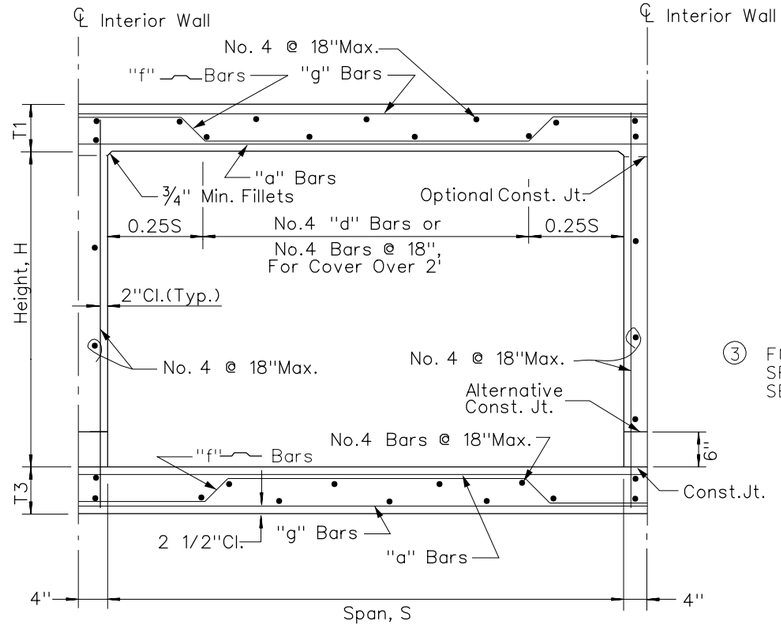
SPAN FT.		5						6								7										8									
HEIGHT FT.		3		4		5		3		4		5		6		3		4		5		6		7		3		4		5		6		7		8	
MAXIMUM EARTH COVER FT.		10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20
QUAN	CONCRETE CF/LF	7.9	8.6	8.4	9.1	8.9	9.6	9.1	11.3	9.6	11.8	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 FT.		10												12												14											
HEIGHT FT.		3		4		5		6		7		8		9		10		4		5		6		7		8		9		10		11		12		7	
MAXIMUM EARTH COVER FT.		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
QUAN	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
	REINFORCEMENT 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

SPAN FT.		14													
HEIGHT FT.		8		9		10		11		12		13		14	
MAXIMUM EARTH COVER FT.		10	20	10	20	10	20	10	20	10	20	10	20	10	20
QUAN	CONCRETE CF/LF	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
	REINFORCEMENT LBS/LF	249	264	251	266	252	267	254	269	256	271	246	272	248	274



TYPICAL SECTION - SPANS 5' THRU 8'



TYPICAL SECTION - SPANS 10' THRU 14'

* - CONCRETE FOR THIS PORTION IS INCLUDED IN QUANTITIES OF ADJOINING CELLS.

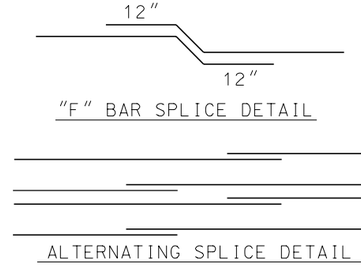
** - REINFORCING STEEL INCLUDED IN PREVIOUS CELLS QUANTITIES.

NOTES:

① NOTES ON ①, ②, ③ & ⑦ OF SHEET B-20.1.3 SHALL APPLY.

② WHEN THE ADDITION OF CELLS CAUSES THE LENGTHS OF THE "a", "f" AND "g" 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 "a" AND "g" BARS SHALL BE AS FOLLOWS:

NO. 4	BARS -	16	INCHES
NO. 6	BARS -	24	INCHES
NO. 7	BARS -	31	INCHES
NO. 8	BARS -	40	INCHES



"F" BAR SPLICE DETAIL

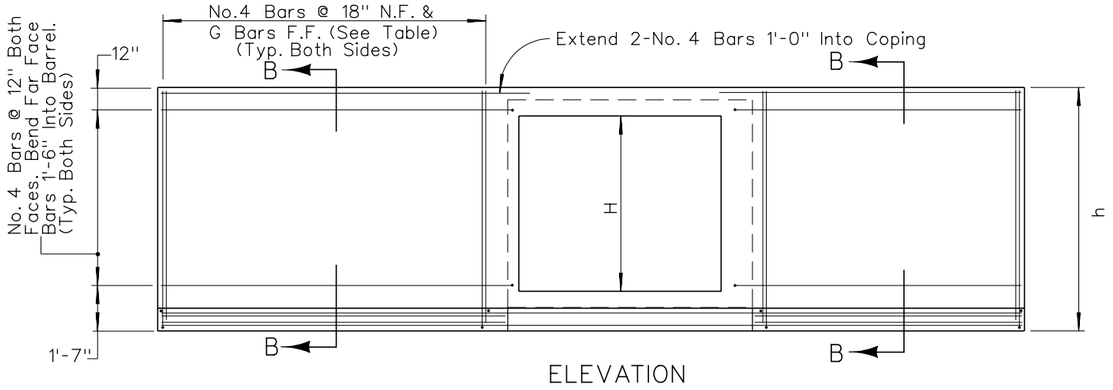
ALTERNATING SPLICE DETAIL

③ FOR DIMENSIONS, BAR SIZES, BAR SPACING, AND ROOF SECTION SPACING DETAIL. SEE SHEET B-20.1.3. FOR GENERAL NOTES, SEE SHEET B-20.1.1.

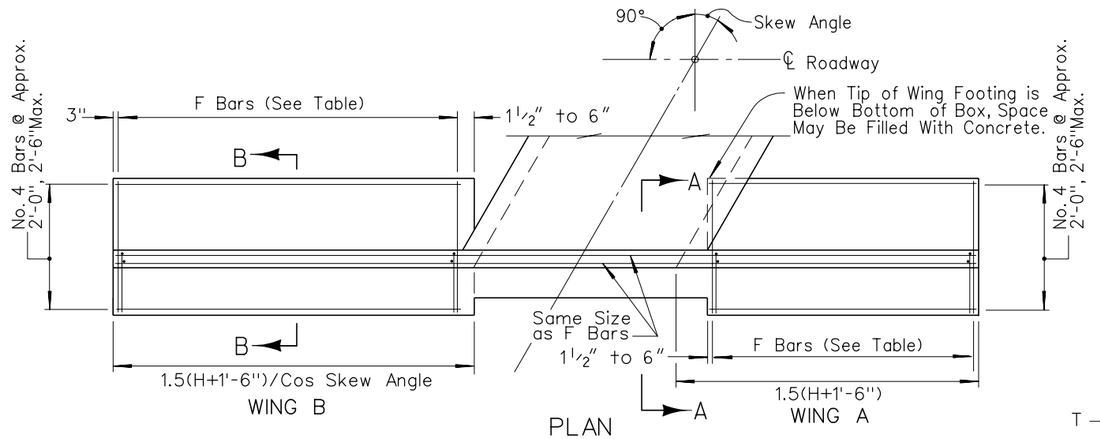
STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

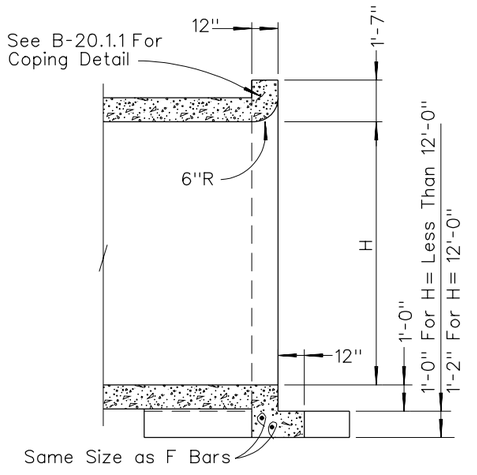
ADDITIONAL CELLS TO BE USED WITH DOUBLE RCB CULVERTS TO PROVIDE FOR MULTIPLE CELL CULVERTS

Signed Original On File	B-20.1.3.1 (502)	
CHIEF BRIDGE ENGINEER	ADOPTED: 8/84	REVISION

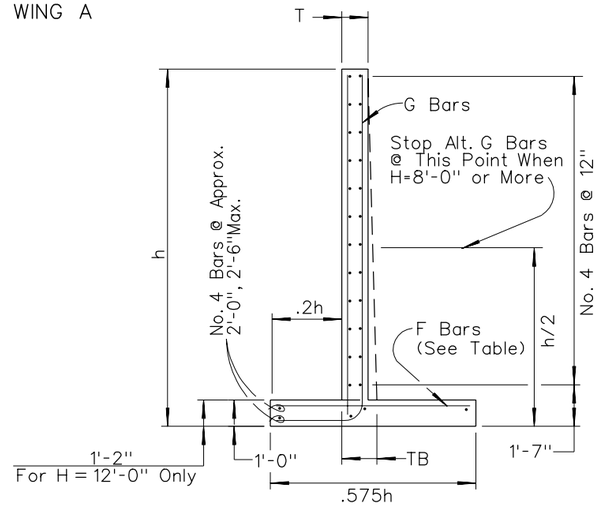


ELEVATION





SECTION A-A



SECTION B-B

TABLE

H = HEIGHT	T = INCHES	TB = INCHES	G.BARS SIZE NO.	G.BARS SPACE IN.	F BARS SIZE NO.	F BARS SPACE IN.
3	8	8	5	9 1/2	4	12
4	8	8	5	9 1/2	4	12
5	9	9	6	9 1/2	4	11
6	10	10	7	10	4	6 1/2
7	12	12	7	8 1/2	5	7 1/2
8	12	13	7	6 1/2	6	8
9	12	14	7	7	6	7 1/2
10	12	16	8	6 1/2	8	10
12	12	20	9	7	8	8 1/2

NOTES:

1. FOR GENERAL NOTES SEE SHEET B-20.1.1
2. FOR QUANTITIES SEE SHEET B-20.1.4.1

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

RCB CULVERTS
TYPE II HEADWALLS

Signed Original On File	B-20.1.4	(502) (505)
CHIEF BRIDGE ENGINEER	ADOPTED: 11/70	REVISION 9/00

SHEET 1 OF 2

① – QUANTITIES SHOWN ARE FOR TWO HEADWALLS AT THE INLET AND OUTLET

CUBIC YARDS OF CONCRETE AND POUNDS OF REINFORCING FOR TWO TYPE II HEADWALLS ①

SPAN	HEIGHT	SINGLE BOX 0° SKEW CONC.	SINGLE BOX 0° SKEW REINF.	SINGLE BOX 15° SKEW CONC.	SINGLE BOX 15° SKEW REINF.	SINGLE BOX 30° SKEW CONC.	SINGLE BOX 30° SKEW REINF.	SINGLE BOX 45° SKEW CONC.	SINGLE BOX 45° SKEW REINF.	DOUBLE BOX 0° SKEW CONC.	DOUBLE BOX 0° SKEW REINF.	DOUBLE BOX 15° SKEW CONC.	DOUBLE BOX 15° SKEW REINF.	DOUBLE BOX 30° SKEW CONC.	DOUBLE BOX 30° SKEW REINF.	DOUBLE BOX 45° SKEW CONC.	DOUBLE BOX 45° SKEW REINF.	TRIPLE BOX 0° SKEW CONC.	TRIPLE BOX 0° SKEW REINF.	TRIPLE BOX 15° SKEW CONC.	TRIPLE BOX 15° SKEW REINF.	TRIPLE BOX 30° SKEW CONC.	TRIPLE BOX 30° SKEW REINF.	TRIPLE BOX 45° SKEW CONC.	TRIPLE BOX 45° SKEW REINF.	HEIGHT	SPAN
5	3	9.4	871	9.4	888	10.2	947	11.5	1,073	11.4	991	11.6	1,013	12.4	1,085	14.3	1,243									3	
	4	12.8	1,141	12.8	1,163	13.5	1,237	15.6	1,399	14.8	1,261	15.0	1,287	15.9	1,376	18.6	1,568	16.8	1,367	17.0	1,397	18.5	1,498	21.4	1,718	4	
	5	16.4	1,676	16.6	1,707	17.5	1,813	19.8	2,044	18.6	1,795	18.6	1,831	19.9	1,952	22.8	2,214	20.6	1,901	20.8	1,941	22.3	2,074	25.6	2,364	5	5
6	3	9.8	886	9.8	903	10.6	963	12.1	1,094	12.2	1,094	12.2	1,119	13.2	1,204	15.3	1,389									3	
	4	13.2	1,155	13.2	1,178	14.1	1,254	16.2	1,419	15.4	1,364	15.6	1,393	16.7	1,495	19.4	1,714	17.8	1,536	18.0	1,572	19.5	1,693	22.8	1,957	4	
	5	16.8	1,690	17.8	1,722	18.9	1,830	20.5	2,064	20.0	1,898	20.4	1,937	21.7	2,071	24.8	2,360	22.4	2,070	22.8	2,116	24.5	2,269	28.2	2,603	5	6
	6	25.8	2,598	26.1	2,646	27.6	2,808	31.1	3,160	27.8	2,806	28.5	2,861	30.2	3,049	34.5	3,456	30.4	2,978	31.1	3,040	33.0	3,247	38.3	3,699	6	
	7	32.0	3,666	32.3	3,733	34.2	3,960	38.6	4,453																	7	
7	3	10.2	900	10.2	918	11.0	980	12.5	1,114																	3	
	4	13.6	1,170	13.6	1,193	14.5	1,270	16.6	1,439																	4	
	5	17.2	1,704	17.3	1,736	19.3	1,846	20.9	2,085																	5	7
	6	26.2	2,612	26.3	2,660	28.0	2,824	31.7	3,181																	6	
	7	32.2	3,682	32.7	3,750	34.6	3,978	39.0	4,485																	7	
8	3	10.6	914	10.6	933	11.4	996	13.1	1,134	13.8	1,296	14.0	1,328	15.2	1,437	17.1	1,675									3	
	4	14.0	1,184	14.0	1,207	14.9	1,287	17.0	1,460	17.0	1,566	17.2	1,602	18.5	1,728	21.6	2,000	20.2	1,830	20.4	1,876	24.1	2,033	26.0	2,373	4	
	5	17.6	1,718	17.7	1,751	18.8	1,863	21.3	2,105	20.8	2,100	20.9	2,146	22.6	2,304	25.9	2,646	24.8	2,364	25.1	2,420	27.0	2,609	31.5	3,019	5	
	6	26.4	2,626	26.7	2,675	28.4	2,841	32.1	3,201	29.2	3,008	29.9	3,070	31.8	3,282	36.3	3,742	32.4	3,272	33.1	3,344	35.4	3,587	40.9	4,115	6	8
	7	32.8	3,697	33.0	3,765	34.9	3,995	39.3	4,496	35.8	4,067	36.2	4,147	38.5	4,422	43.7	5,019	39.0	4,331	39.6	4,421	42.3	4,727	48.3	5,392	7	
	8	40.4	4,979	40.8	5,070	43.3	5,377	48.8	6,046	43.8	5,332	44.2	5,434	47.1	5,785	53.3	6,546	47.0	5,596	47.6	5,708	50.9	6,190	57.9	6,919	8	
10	3	11.4	943	11.4	962	12.5	1,029	14.3	1,174	14.8	1,604	15.0	1,648	16.3	1,793	18.9	2,110									3	
	4	14.6	1,212	14.7	1,237	15.8	1,320	18.1	1,500	18.2	1,874	18.3	1,922	19.8	2,084	24.1	2,435									4	
	5	18.4	1,747	18.5	1,781	19.8	1,895	22.5	2,145	20.4	2,408	22.0	2,466	23.9	2,660	26.8	3,081	25.6	2,836	25.9	2,909	28.2	3,154	32.9	3,686	5	
	6	27.0	2,655	27.2	2,705	28.9	2,874	32.8	3,241	30.4	3,316	31.2	3,390	33.1	3,638	38.0	4,117	34.1	3,744	35.0	3,833	37.5	4,132	43.4	4,782	6	
	7	33.4	3,729	33.8	3,799	36.1	4,033	40.9	4,542	37.2	4,375	37.6	4,467	40.1	4,778	45.7	5,454	41.0	4,803	41.6	4,910	44.5	5,272	51.1	6,059	7	10
	8	41.2	5,015	41.5	5,107	44.0	5,419	48.6	6,097	44.4	5,640	44.7	5,724	47.8	6,141	54.2	6,981	48.4	6,068	48.9	6,197	52.2	6,635	59.8	7,586	8	
	9	49.8	5,687	50.2	5,791	53.1	6,144	59.6	6,909																	9	
	10	61.0	8,535	61.4	8,690	65.2	9,216	73.2	10,358	65.2	9,109	65.8	9,285	70.2	9,878	79.2	11,169	69.6	9,537	70.4	9,728	75.2	10,372	85.4	11,774	10	
12	4	15.4	1,241	15.5	1,266	16.6	1,356	19.1	1,540	19.6	2,290	19.9	2,352	21.4	2,564	24.9	3,023									4	
	5	18.8	1,775	18.9	1,810	20.2	1,929	22.9	2,185	23.0	2,824	23.1	2,896	25.0	3,140	28.9	3,669									5	
	6	28.0	2,683	28.2	2,734	29.9	2,908	33.9	3,281	32.2	3,732	33.6	3,820	35.1	4,118	40.1	4,766	36.8	4,381	37.4	4,492	40.3	4,867	46.7	5,683	6	
	7	34.2	3,761	33.8	3,831	36.5	4,069	41.3	4,586	38.4	4,791	39.0	4,897	41.6	5,258	47.5	6,042	43.0	5,440	43.8	5,569	47.0	6,007	54.1	6,960	7	
	8	42.0	5,050	42.1	5,143	44.8	5,459	50.6	6,147	46.6	6,056	46.9	6,140	50.2	6,621	56.0	7,569	51.2	6,705	51.7	6,856	55.6	7,370	63.6	8,487	8	
	9	50.4	5,722	50.8	5,828	53.8	6,187	60.6	6,959	55.2	6,728	55.8	6,869	59.4	7,346	67.4	8,381	60.0	7,377	60.8	7,541	65.0	8,095	74.2	9,299	9	
	10	61.8	8,580	62.3	8,736	65.9	9,267	74.3	10,421	66.6	9,525	67.1	9,715	71.7	10,358	81.1	11,757	71.4	10,174	72.3	10,387	77.5	11,107	88.1	12,675	10	
	12	88.0	12,939	88.8	13,172	94.0	13,963	105.7	15,682	93.2	13,884	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	12	12

QUANTITIES FOR ADDITIONAL CELLS

CONCRETE FOR TWO TYPE II HEADWALLS FOR EACH ADDITIONAL CELL (CU. YARDS) (ADD THIS QUANTITY TO THE QUANTITY FOR A DOUBLE BOX)

FOR HEIGHT(H) LESS THAN 12ft.
$[8.56 ft^2 (SPAN(ft)+0.67ft)]/COS\ SKEW\ ANGLE$

FOR HEIGHT(H) EQUAL TO OR GREATER THAN 12ft.
$[9.23 ft^2 (SPAN(ft)+0.67ft)]/COS\ SKEW\ ANGLE$

REINFORCING FOR TWO TYPE II HEADWALLS FOR EACH ADDITIONAL CELL (POUNDS) (ADD THIS QUANTITY TO THE QUANTITY FOR A DOUBLE BOX)

FOR HEIGHT(H) LESS THAN OR EQUAL TO 7ft.
$[16.69 lb/ft(SPAN(ft)+0.67ft)]/COS\ SKEW\ ANGLE$

FOR HEIGHT(H) EQUAL TO 8ft OR 9ft.
$[24.03 lb/ft(SPAN(ft)+0.67ft)]/COS\ SKEW\ ANGLE$

FOR HEIGHT(H) EQUAL TO OR GREATER THAN 10ft.
$[42.72 lb/ft(SPAN(ft)+0.67ft)]/COS\ SKEW\ ANGLE$

ANGLE	COSINE
0°	1.0000
15°	0.9659
30°	0.8660
45°	0.7071

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

RCB CULVERTS
TYPE II HEADWALLS

Signed Original On File
CHIEF BRIDGE ENGINEER

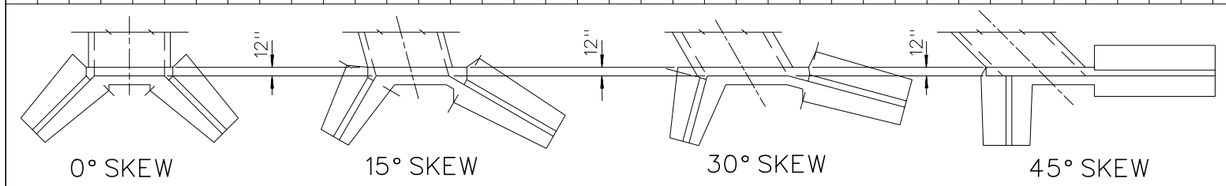
B-20.1.4.1 (502) (505)
ADOPTED: 11/70
REVISION: 10/00

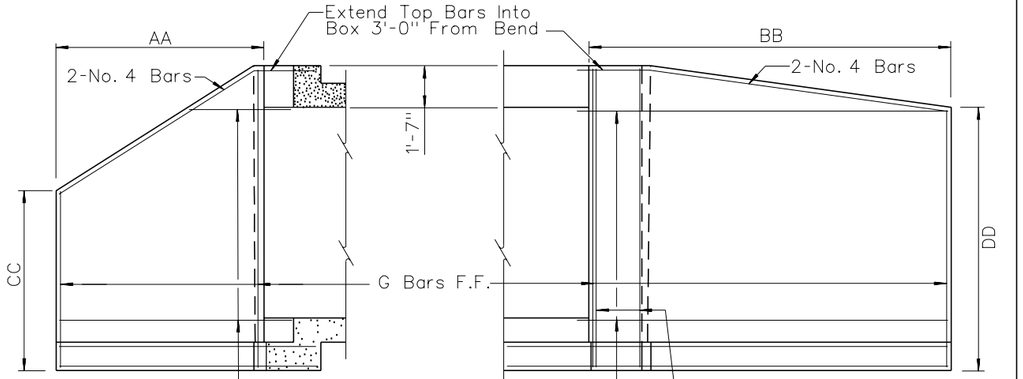
SHEET 2 OF 2

B-6

TYPE I HEADWALL DIMENSIONS AND REINFORCING STEEL

H=Height In Feet	h= All Wings Except B For 45° Skew	0° SKEW										15° SKEW																30° SKEW																45° SKEW																H=Height In Feet
									WINGS A&B										WING A				WING B												WING A				WING B												WING A				WING B				
									G BARS		F BARS								G BARS		F BARS		G BARS		F BARS										G BARS		F BARS		G BARS		F BARS								G BARS		F BARS		G BARS		F BARS		
		AA & BB	CC & DD	C & D	E & K	F & L	G & M	J & N	SIZE	SPACING	SIZE	SPACING	AA	BB	CC	DD	C	D	E & K	F	G	J & N	L	M	SIZE	SPACING	SIZE	SPACING	SIZE	SPACING	SIZE	SPACING	AA	BB	CC	DD	C	D	E & K	F	G	J & N	L	M	SIZE	SPACING	SIZE	SPACING	SIZE	SPACING	SIZE	SPACING	AA	BB	CC	DD	C	D	E & K & L	F	G	J & M & N	h	DD	SIZE	SPACING	SIZE	SPACING	SIZE	SPACING	SIZE	SPACING	
3		6-7	4-0	4-2	8	1-4	0-10	2-1	3-4	4	12	4	12	3-7	4-8	4-11	5-7	8	8	1-4	1-0	2-6	3-4	1-2	2-10	4	12	4	12	4	12	4	12	3-4	5-10	4-8	6-2	8	8	1-4	0-11	2-4	3-4	1-3	3-4	4	12	4	12	4	12	4	12	3-4	8-4	4-7	6-7	8	8	1-4	0-11	2-4	3-4	6-7	6-7	4	12	4	12	4	12	4	12	3
4		7-7	5-0	5-8	8	1-6	1-2	2-10	3-10	4	12	4	12	4-6	5-11	5-4	6-2	8	8	1-6	1-1	2-8	3-10	1-3	3-1	4	12	4	12	4	12	4	12	4-3	7-5	5-2	6-11	8	8	1-6	1-0	2-7	3-10	1-6	3-10	4	12	4	12	4	8½	4	12	4-2	10-5	5-0	7-7	8	8	1-6	1-0	2-6	3-10	7-7	7-7	4	12	4	12	5	9½	4	12	4
5		8-7	6-2	6-2	8	1-9	1-3	3-1	4-4	4	12	4	12	5-6	7-2	5-9	6-9	8	8	1-9	1-2	2-11	4-4	1-4	3-5	4	12	4	12	4	10	4	12	5-2	8-11	5-6	7-8	8	8	1-9	1-1	2-9	4-4	1-9	4-4	4	12	4	12	4	6½	4	12	5-1	12-7	5-5	8-7	9	9	1-9	1-1	2-9	4-4	8-7	8-7	4	12	4	12	6	9½	4	11	5
6		9-7	7-2	6-8	8	1-11	1-4	3-4	4-10	4	10½	4	12	6-5	8-5	6-3	7-4	8	8	1-11	1-3	3-2	4-10	1-6	3-8	4	12	4	12	4	6½	4	12	6-1	10-6	5-11	8-4	8	8	1-11	1-2	3-0	4-10	1-8	4-10	4	12	4	12	6	12	4	12	5-11	14-8	5-10	9-7	10	10	1-11	1-2	2-11	4-10	9-7	9-7	4	12	4	12	7	10	4	6½	6
7		10-7	8-4	7-3	8	2-2	1-6	3-8	5-4	4	7	4	12	7-6	9-9	6-9	8-0	8	8	2-2	1-4	3-5	5-4	1-7	4-0	4	8½	4	12	6	10	4	12	7-0	12-2	6-5	9-3	9	9	2-2	1-4	3-3	5-4	1-10	5-4	4	10½	4	12	6	8½	4	10½	6-11	17-0	6-3	10-7	12	12	2-2	1-3	3-2	5-4	10-7	10-7	4	10½	4	12	7	8½	5	7½	7
8		11-7	9-4	7-9	8	2-4	1-7	3-11	5-10	6	10½	4	11	8-5	11-0	7-2	8-7	9	9	2-4	1-5	3-7	5-10	1-8	4-4	6	12	4	12	6	8	4	9½	7-11	13-9	6-10	10-0	9	9	2-4	1-5	3-5	5-10	2-4	5-10	4	6	4	12	6	7	4	7½	7-9	19-1	6-8	11-7	12	12	2-4	1-4	3-4	5-10	11-7	11-7	4	7	4	12	7	6½	6	8	8
9		12-7	10-5	8-3	9	2-6	1-8	4-2	6-4	6	9	4	9	9-4	12-3	7-7	9-2	9	10	2-6	1-6	3-10	6-4	1-10	4-7	6	10	4	10	7	9	4	8	8-10	15-3	7-3	10-9	9	12	2-6	1-6	3-8	6-4	2-6	6-4	5	7½	4	9	7	8	5	7	8-7	21-2	7-1	12-7	9	14	2-6	1-5	3-7	6-4	12-7	12-7	5	8	4	10	7	6	6	7½	9
10		13-7	11-6	8-10	10	2-9	1-9	4-5	6-10	6	7½	4	6½	10-4	13-6	8-1	9-11	9	12	2-9	1-7	4-1	6-10	2-0	5-0	6	8	4	8½	7	7½	4	6	9-9	16-10	7-8	11-7	9	13	2-9	1-7	3-10	6-10	2-9	6-10	6	9	4	7½	7	6½	6	7½	9-6	23-4	7-6	13-7	9	16	2-9	1-6	3-9	6-10	13-7	13-7	6	9½	4	7½	8	6½	8	10	10
12		15-7	13-7	9-11	12	3-2	2-0	5-0	7-10	7	7	5	6½	12-3	15-11	9-1	11-4	11	15	3-2	1-10	4-7	7-10	2-3	5-8	7	7½	5	6½	7	6	5	6	11-6	19-11	8-7	13-3	11	16	3-2	1-9	4-4	7-10	3-2	7-10	7	9	5	7½	8	6½	6	7½	11-3	27-7	8-6	15-9	11	20	3-2	1-8	4-2	7-10	15-9	15-9	7	9	5	7	7	8	8	8½	12

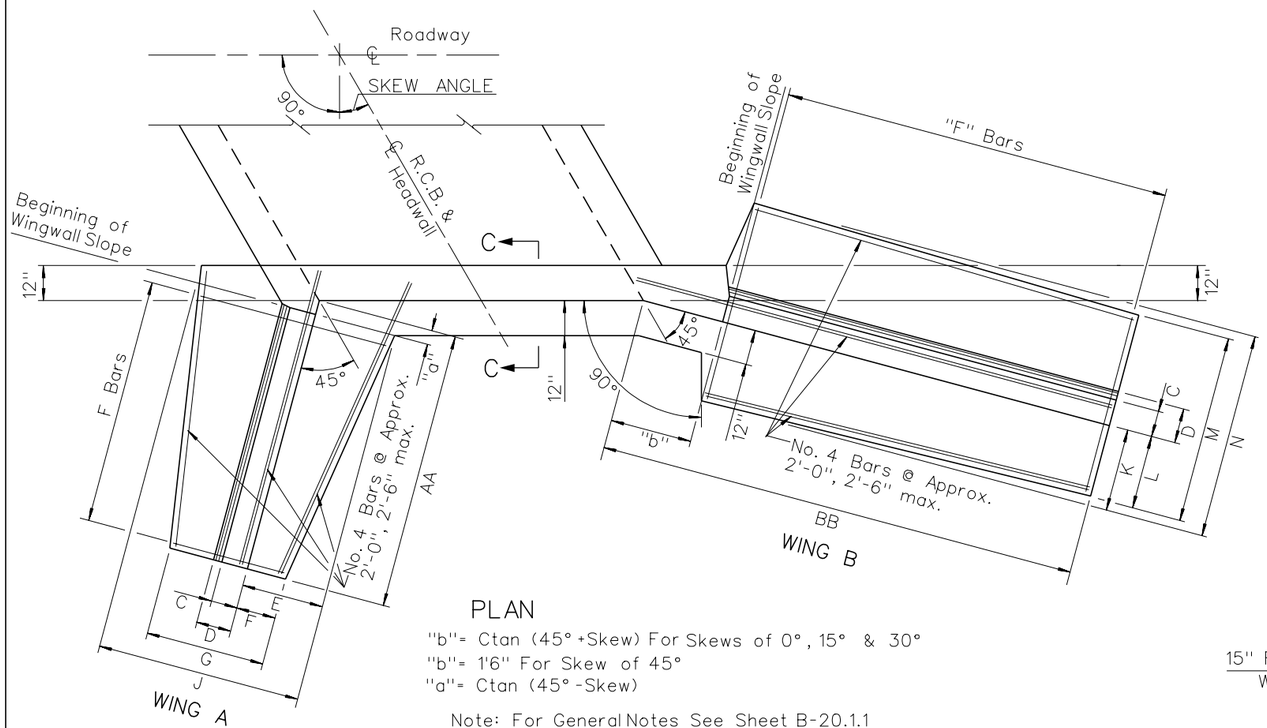




NOTE: For Boxes With 0° Skew Both Wings Are As Shown For Wing A.

SECTION WING A

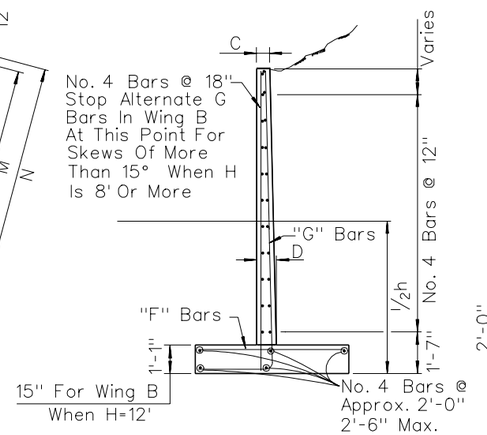
SECTION WING B



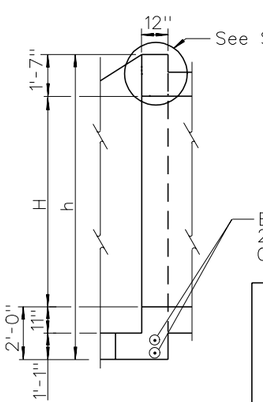
PLAN

"b" = Ctan (45° + Skew) For Skews of 0°, 15° & 30°
"b" = 1'6" For Skew of 45°
"a" = Ctan (45° - Skew)

Note: For General Notes See Sheet B-20.1.1



SECTION OF WINGS A AND B



SECTION C-C

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

RCB CULVERTS TYPE I HEADWALLS

Signed Original On File	B-20.1.5	(502)
CHIEF BRIDGE ENGINEER	ADOPTED-11/70	REVISION 1-12/90

CUBIC YARDS OF CONCRETE AND POUNDS OF REINFORCING FOR TWO TYPE I HEADWALLS ①

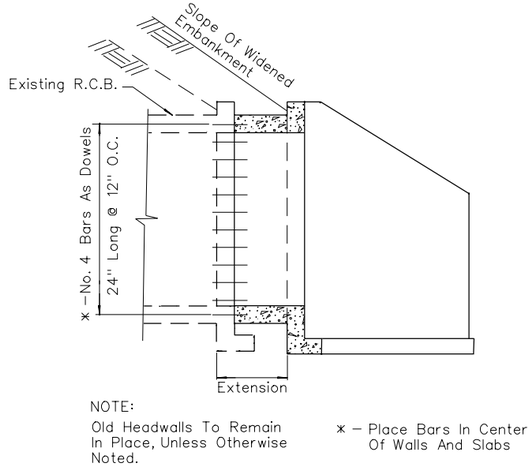
SPAN	HEIGHT	SINGLE BOX								DOUBLE BOX								TRIPLE BOX							
		0° SKEW		15° SKEW		30° SKEW		45° SKEW		0° SKEW		15° SKEW		30° SKEW		45° SKEW		0° SKEW		15° SKEW		30° SKEW		45° SKEW	
		CONC.	REINF.	CONC.	REINF.	CONC.	REINF.	CONC.	REINF.	CONC.	REINF.	CONC.	REINF.	CONC.	REINF.	CONC.	REINF.	CONC.	REINF.	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	6.8	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	15.3	1400	16.0	1601	19.8	2155	26.5	3104																
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																
	7	15.6	1432	16.3	1637	20.2	2199	27.0	3161																
8	3	6.7	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
10	3	7.3	515	8.2	612	9.2	721	11.4	942	11.2	1111	12.2	1227	13.6	1383	16.8	1734								
	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	2449								
	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	2553	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

① -QUANTITIES SHOWN ARE FOR HEADWALLS AT THE INLET AND OUTLET

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

ESTIMATE OF QUANTITIES
TYPE I HEADWALLS

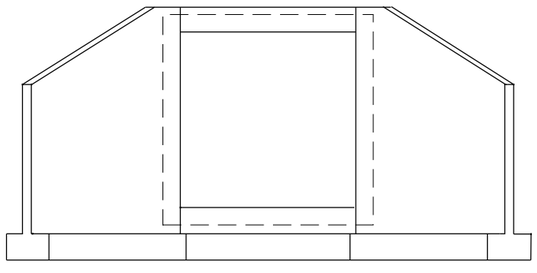
Signed Original On File	B-20.1.6	(502)
CHIEF BRIDGE ENGINEER	ADOPTED: 11/70	REVISION: 3/97



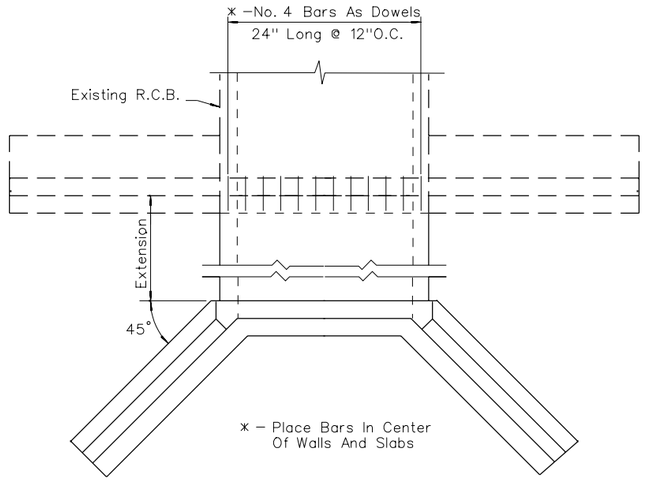
NOTE:
Old Headwalls To Remain In Place, Unless Otherwise Noted.

* – Place Bars In Center Of Walls And Slabs

PART LONGITUDINAL SECTION



ELEVATION

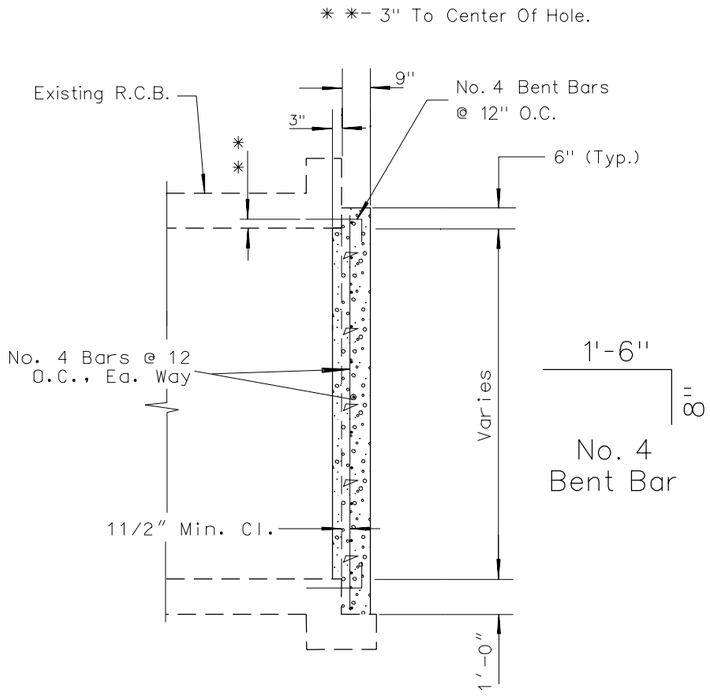


PLAN

R.C.B. CULVERT EXTENSION

NOTES:

1. FOR GENERAL NOTES SEE SHEET B-20.1.1.
2. DOWELLING; DOWEL HOLES SHALL BE DRILLED 12" INTO EXISTING CONCRETE. DIAMETER OF HOLE SHALL BE 1/4" LARGER THAN DIAMETER OF BAR. HOLE MAY BE INCLINED NO MORE THAN 5° OFF THE HORIZONTAL. DOWELS SHALL BE EPOXIED INTO CLEAN HOLES. EPOXY SHALL CONFORM TO THE REQUIREMENT OF SECTION 728 OF THE STANDARD SPECIFICATIONS.



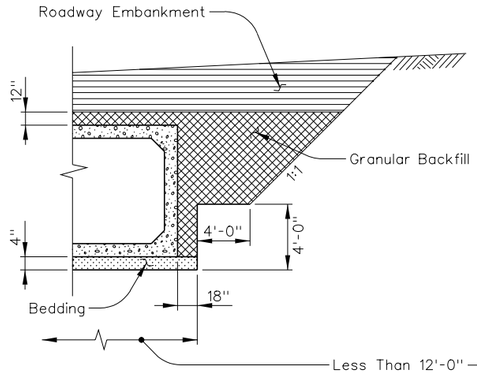
SECTION

METHOD OF PLUGGING R.C.B.
NOTE: Width And Height Varies.

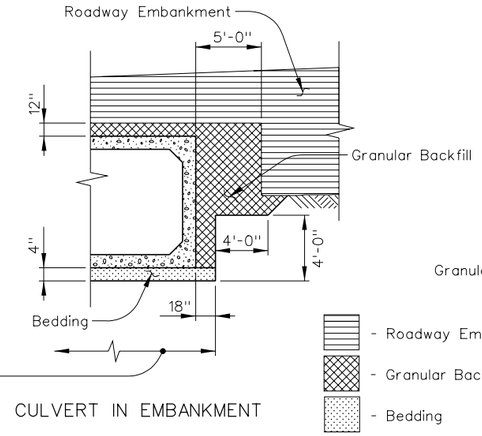
STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

METHOD OF EXTENDING R.C.B. CULVERTS

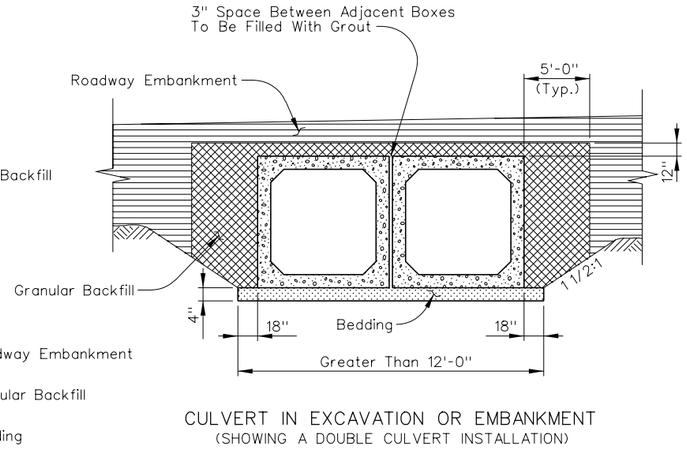
Signed Original On File	B-20.1.7	(502)
CHIEF BRIDGE ENGINEER	ADOPTED-11/70	REVISION 1-12/90



CULVERT IN EXCAVATION



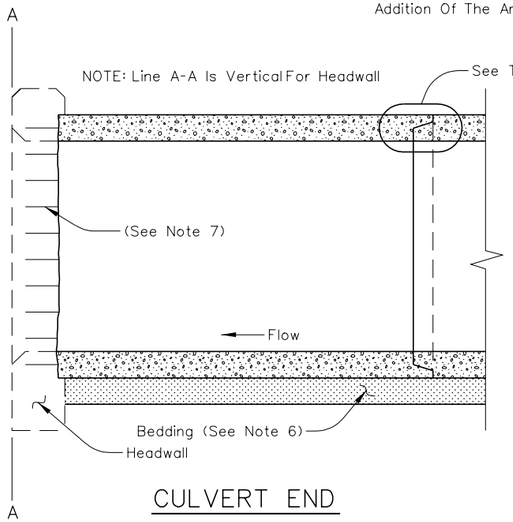
CULVERT IN EMBANKMENT



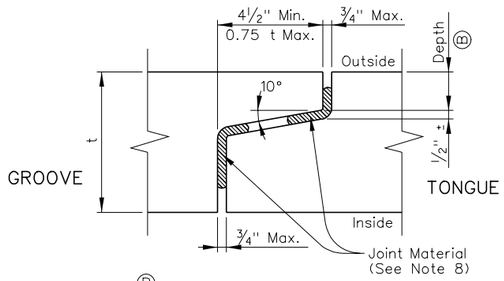
CULVERT IN EXCAVATION OR EMBANKMENT
(SHOWING A DOUBLE CULVERT INSTALLATION)

EXCAVATION AND BACKFILL

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

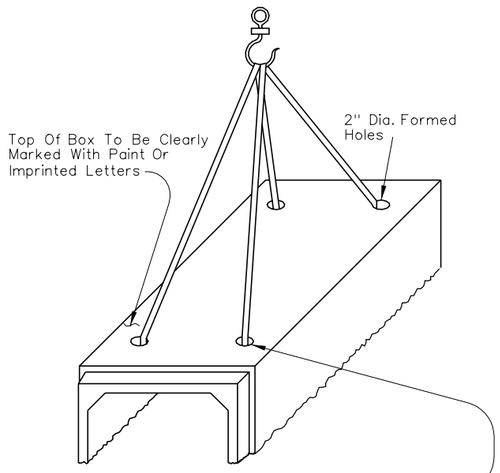


CULVERT END



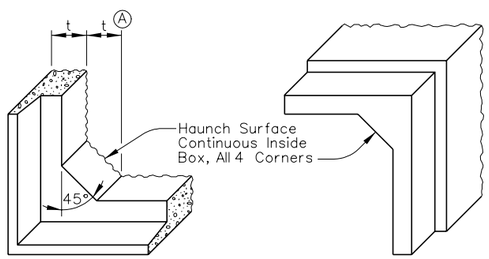
Ⓑ For Spans Thru 8', Dmin.=2"
For Spans Over 8', Dmin.=3¼"

TYPICAL JOINT DETAIL



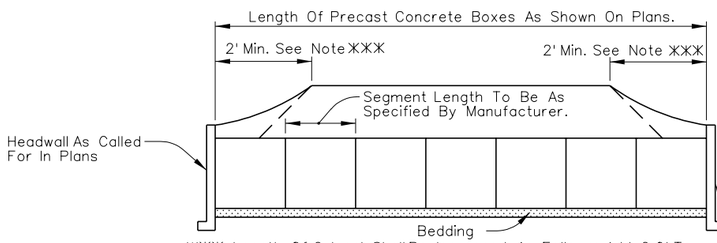
Lifting Holes (Located By Mfr.) Cylindrical Hole Shall Be Filled With An Approved Epoxy Non-Shrink Grout. Hole With An Approved Conical Shape For The Bottom 3" May Be Filled With A Concrete Grout Composed Of One Part By Volume Of Cement To Two Parts By Volume Of Sand With Only Enough Water To Permit Placing & Tamping. An Approved Custom Plug May Be Used. (An Optional Method Of Lifting May Be Used As Approved By The Engineer.)

LIFTING



Ⓐ - t Min. Shall Equal The Wall Thickness
t Max. Shall Be 8" For Spans Thru 8' &
12" For Spans Over 8'.

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

1) Design Specifications: AASHTO "Standard Specifications for Highway Bridges", and AASHTO M259 or M273 (ASTM C789 or C850) 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 Specifications noted above show concrete dimensions, reinforcing placement, earth cover, and other details needed to manufacture the box culverts.

2) Construction Specifications: Current edition of the State of Nevada Department of Transportation "Standard Specifications for Road and Bridge Construction", subsection 502.03.24, and Special Provisions thereto.

3) Live Load: Interstate loading conditions (Table 2). (Standard HS20-44 and FHWA alternate military loading.)

4) Concrete: Concrete shall be as specified in AASHTO M259 or M273 (ASTM C789 or C850), as modified in subsection 502.03.24 of the Standard Specifications and the Special Provisions.

5) Reinforcing Steel: Reinforcing steel shall be AASHTO M31 (ASTM A615) Grade 60. Welded wire fabric shall be AASHTO M55 (ASTM A185) (smooth wire), or AASHTO M22 (ASTM A497) (deformed wire). Reinforcing steel in the top slab shall have an epoxy coating conforming to AASHTO M284 (ASTM D3963), when there is 6 inches or less of cover on the RCB (Clark County excluded).

6) Bedding: Bedding material shall be either 4 inches of granular backfill or 4 inches of type 2 class B aggregate. Choice of bedding will be at the Contractors option. Excavation for bedding shall be paid for as 4 inches of structure excavation, and bedding material shall be paid for as 4 inches of granular backfill regardless of which option the Contractor uses.
There will be no adjustment to plan quantities due to the optional use of the precast method.

7) Headwalls: Headwall details shall be as shown in the Standard Plans. Exposed reinforcements to tie cast-in-place headwall to precast box shall consist of either #4 bars at 12 inch spacings or exposure of the double case of welded wire fabric. The #4 bars shall be case a min. of 18 inches into the precast box segment. Both the #4 bar or welded wire fabric shall extend a min. of 12 inches into the cast in place headwall.

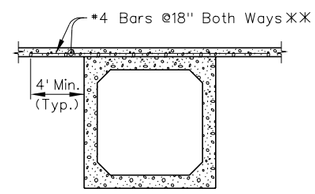
8) Joint Material: Joint material shall be a preformed joint material meeting AASHTO M198 type B. The material shall be installed in accordance with the manufacturers recommendations. A double application of joint material shall be used. One application shall be applied to the tongue and the other to the groove. The minimum size of joint material shall be 1-1/4 inches. Any joint material extruding from the interior of the joint shall be removed flush with the box wall.

9) Special Design: A special design of the precast box shall be required for the following conditions:

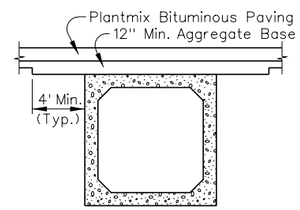
a. RCBs requiring the use of approach slabs.
b. RCBs requiring the use of bridge rail.
c. RCBs requiring the use of guardrail where the height of cover is less than the embedment length of the guardrail post.

10) Marking: In addition to the markings required by the AASHTO and ASTM specifications, each box section shall be marked with appropriate NDOT Contract Number.

* Minimum Cover Conditions For Pre-Cast Boxes



CONCRETE PAVING



BITUMINOUS PAVING

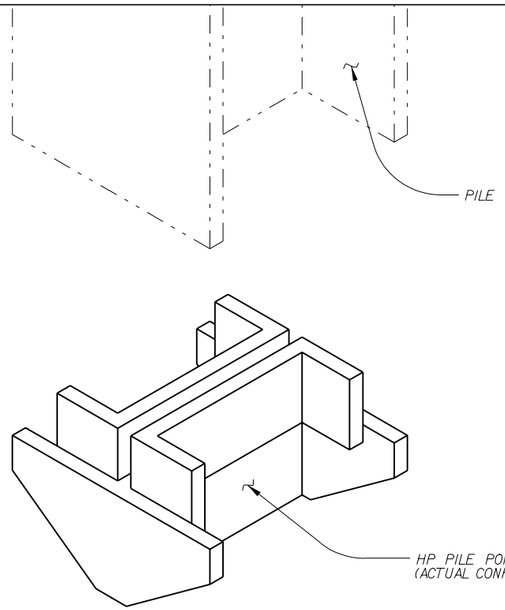
** Reinforcing Steel Shall Extend Full Width Of Concrete Pavement. The Reinforcement Shall Have A Minimum Clearance Of 3" On The Bottom. In Areas Of The State Where Road Salts Are Used, The Reinforcing Shall Be Epoxy Coated. Reinforcing Is To Be Placed Parallel To The Centerline Of Road For Longitudinal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

Designer To Investigate The Availability Of The Required Box Size.

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

PRECAST CONCRETE BOX CULVERT

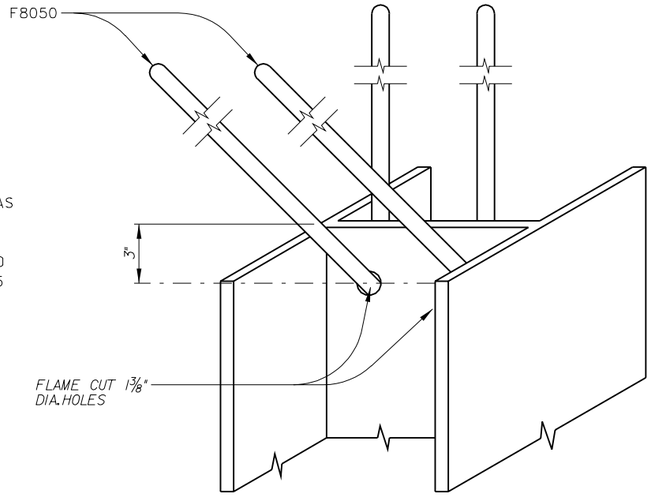
Signed Original On File	B-20.1.8 (502)
CHIEF BRIDGE ENGINEER	ADOPTED: 4/85 REVISION: 1/03



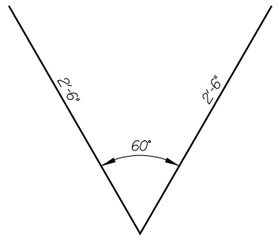
TYPICAL HP PILE POINT DETAIL

HP PILE POINT ATTACHMENT NOTES:

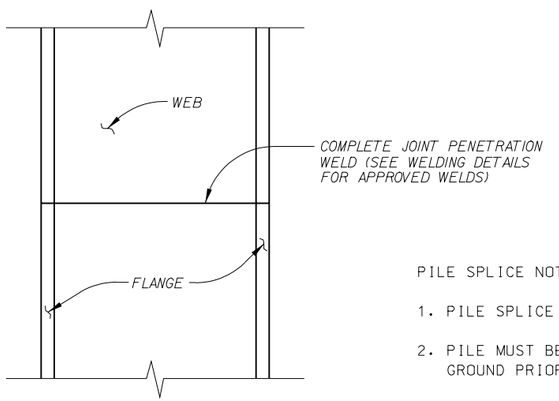
1. HP PILE POINT ATTACHMENTS ARE REQUIRED ONLY WHEN SHOWN ON THE PLANS OR IN THE SPECIAL PROVISIONS.
2. THE PILE POINT CONFIGURATION SHALL BE AS SHOWN ON PLANS.
3. PILE POINT ATTACHMENTS SHALL CONFORM TO THE REQUIRMENTS OF ASTM A27 GRADE 65-35 UNLESS NOTED OTHERWISE.
4. WELDS FOR ATTACHMENTS SHALL BE AS RECOMMENDED BY THE MANUFACTURER.



HP PILE ANCHORAGE DETAIL



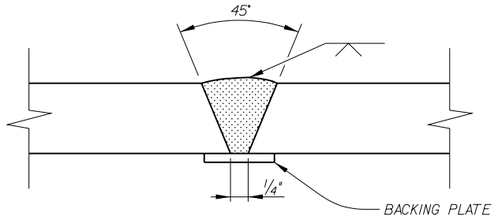
2-F8050



PILE SPLICE NOTES:

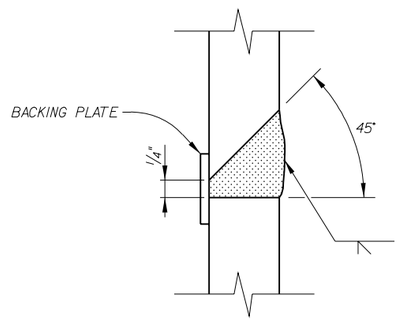
1. PILE SPLICE WELDS SHALL CONFORM TO AWS D1.1.
2. PILE MUST BE STOPPED AT LEAST 3'-0" ABOVE GROUND PRIOR TO SPLICING.

HP PILE SPLICE DETAIL



SINGLE VEE-GROOVE BUTT WELD

PERMITTED FOR ALL POSITIONS



SINGLE BEVEL-GROOVE BUTT WELD

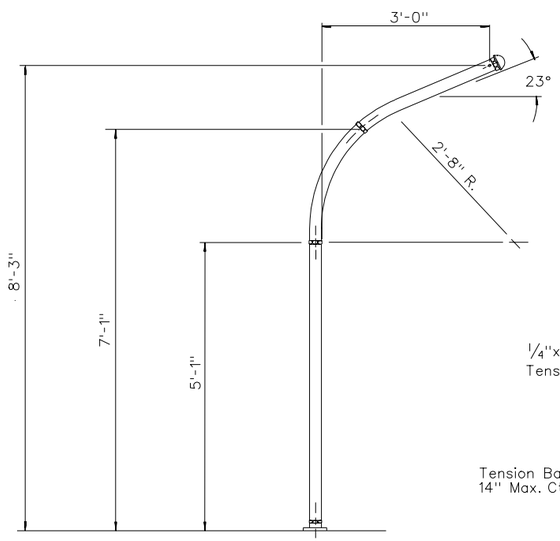
PERMITTED IN HORIZONTAL POSITION ONLY

PILE SPLICE WELDING DETAILS

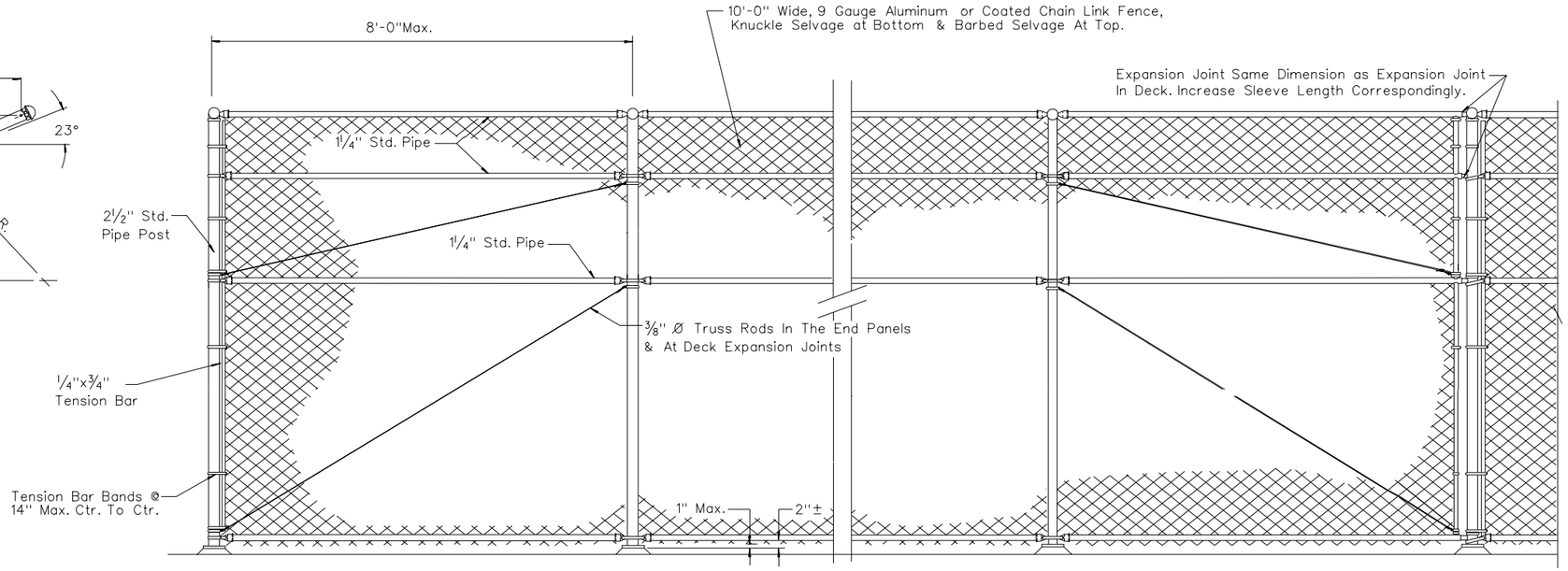
STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

"HP" PILE DETAILS

Signed Original On File	B-23.1.4	(508)
CHIEF BRIDGE ENGINEER	ADOPTED: 12/90	REVISION:



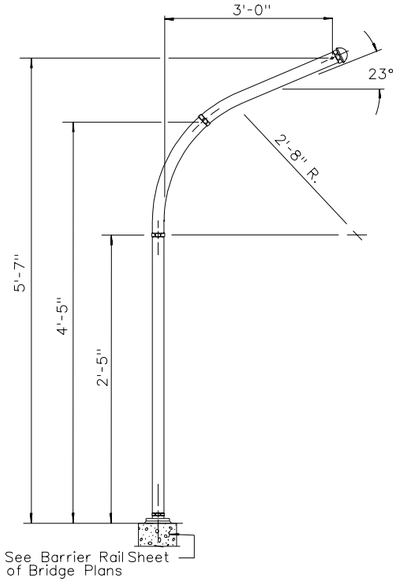
TYPE "M"



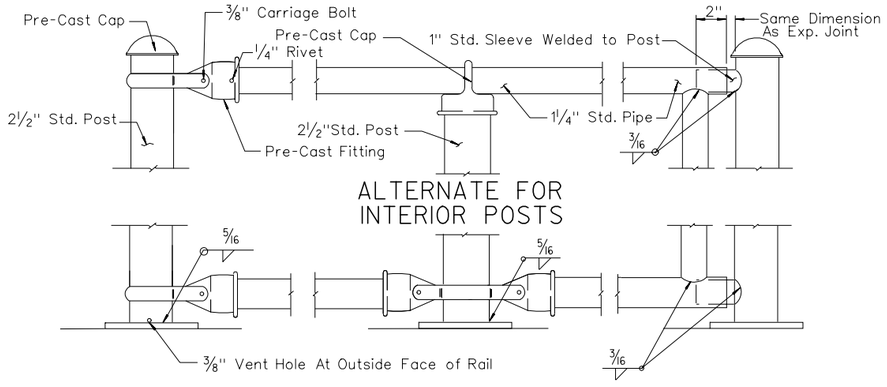
END POST

TYPICAL INTERIOR PANEL

AT EXPANSION JOINT

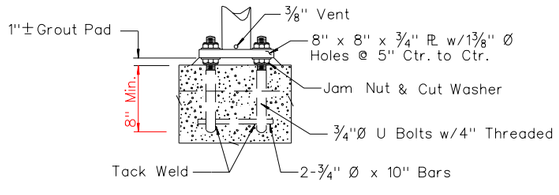


TYPE "M" (MODIFIED)

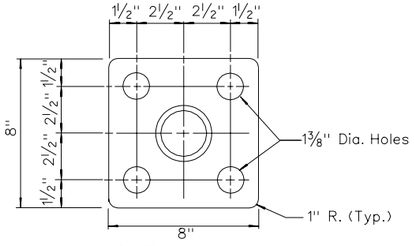


ALTERNATE FOR
INTERIOR POSTS

TYPICAL CONNECTION DETAILS



ANCHORAGE DETAILS



BASE PLATE

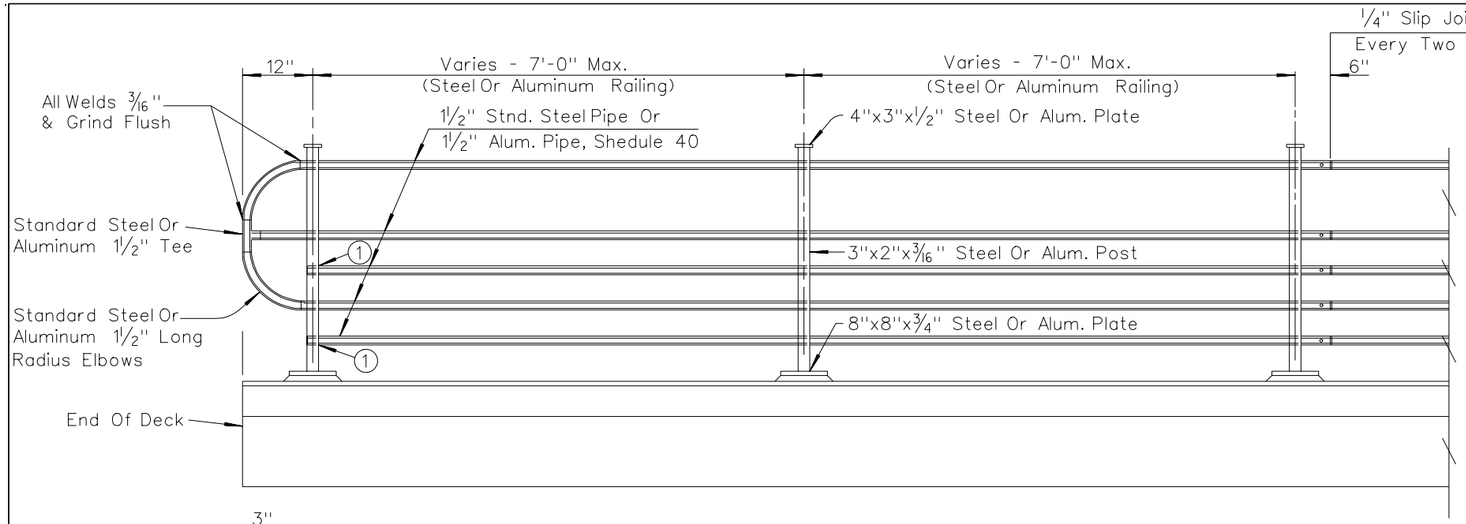
GENERAL NOTES:

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 8′ CHORDS IF RADIUS IS OVER 150′.
3. SPACE POSTS TO CLEAR EXPANSION JOINTS JOINTS BY 6″ MIN. TO CENTERLINE POSTS.
4. ALL EXPOSED CORNERS TO BE SMOOTH.
5. PEEN ALL ⅜″ 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 ENGINEERS APPROVAL.

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

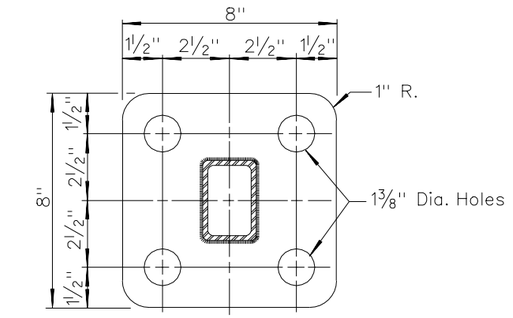
PEDESTRIAN RAIL
TYPE "M"

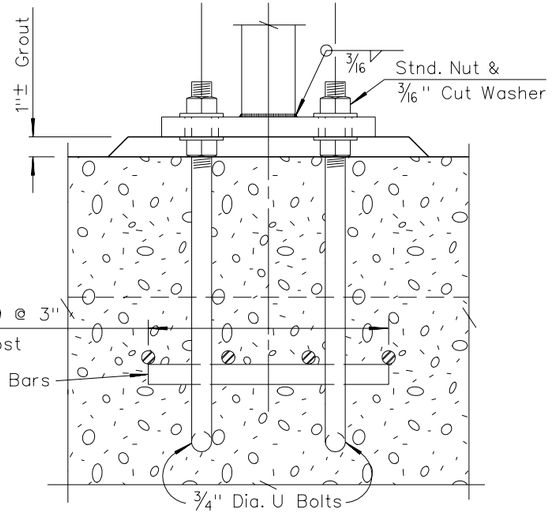
Signed Original On File	B-25.1.4 (506)	
CHIEF BRIDGE ENGINEER	ADOPTED: 8/85	REVISION 8/02



PART ELEVATION

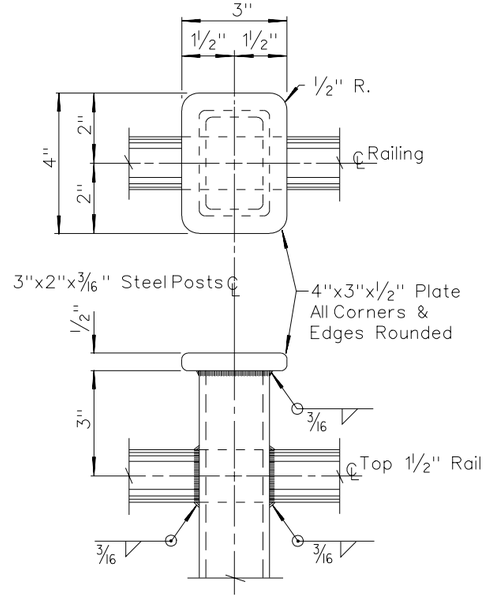
1 Where Rail Ends At Post Drill Post One Side Only And End Rail Within Post



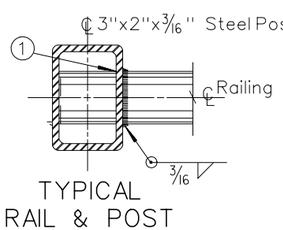


Stainless Steel U-Bolts, Nuts & Washers To Be Used With Aluminum Rail Only

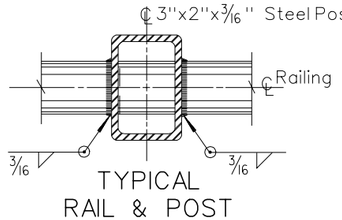
BOTTOM PLATE DETAILS



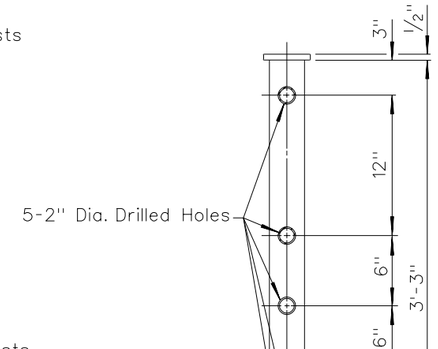
TOP POST PLATE DETAILS



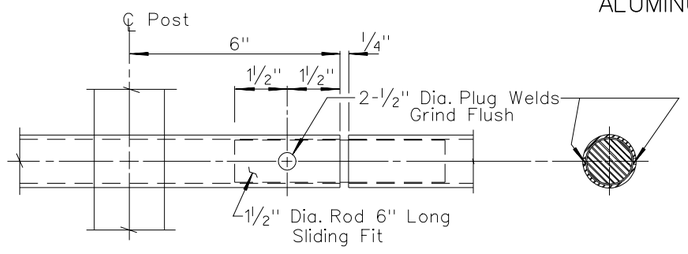
TYPICAL RAIL & POST CONNECTION STEEL



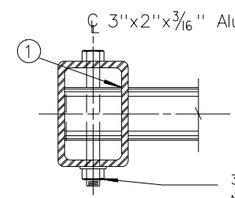
TYPICAL RAIL & POST CONNECTION STEEL



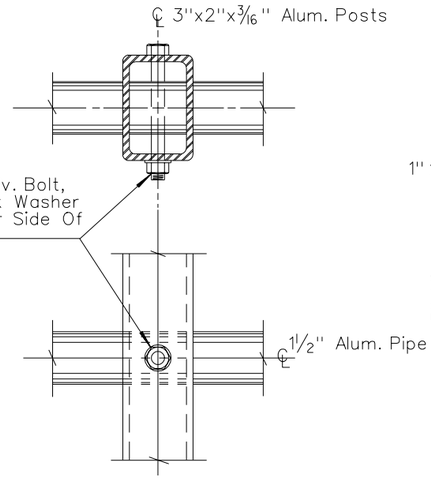
TYPICAL SECTION



SLIP JOINT DETAILS



TYPICAL RAIL & POST CONNECTION ALUMINUM



TYPICAL RAIL & POST CONNECTION ALUMINUM

GENERAL NOTES:

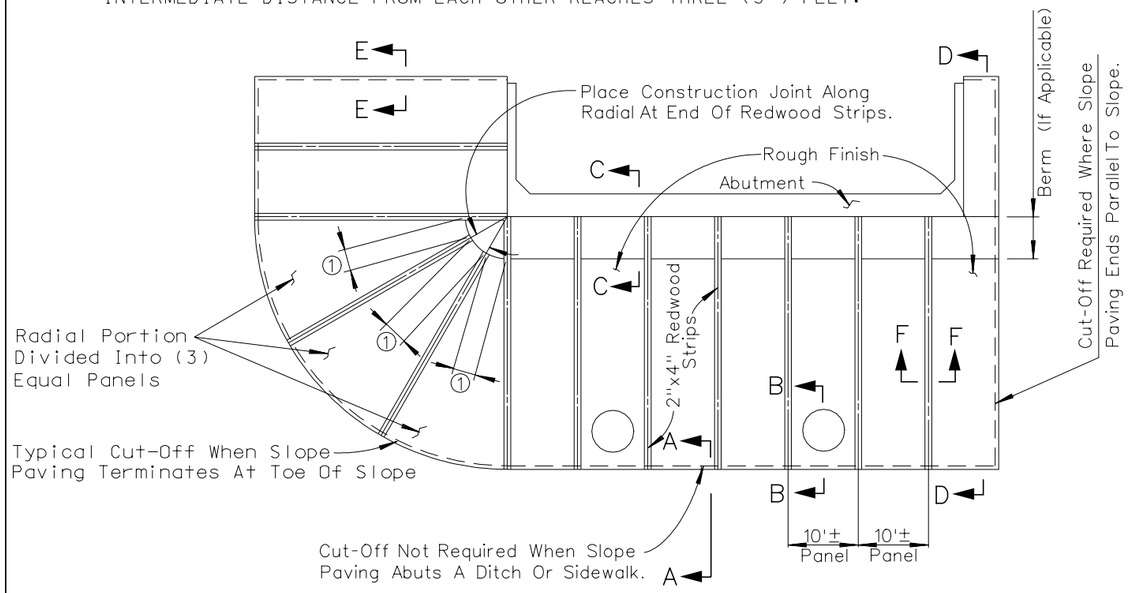
1. ALL STEEL RAILING ASSEMBLY SHALL BE GALVANIZED AFTER FABRICATION.
2. ALL EXPOSED SURFACES OF STEEL RAILING ASSEMBLY SHALL BE PAINTED WHITE.

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

PEDESTRIAN RAIL TYPE "R"

Signed Original On File	B-25.1.5	(506)
CHIEF BRIDGE ENGINEER	ADOPTED-11/78	REVISION 3/27/97

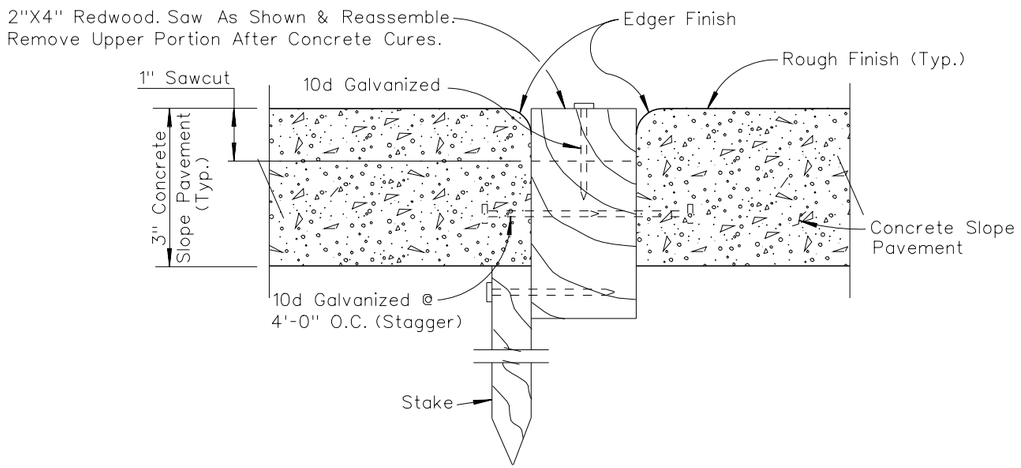
① END REDWOOD STRIPS AT TOP OF RADIAL SECTION WHEN THEIR INTERMEDIATE DISTANCE FROM EACH OTHER REACHES THREE (3') FEET.



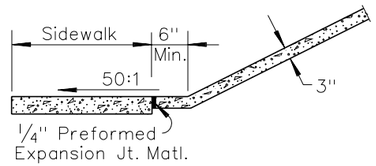
PLAN VIEW

NOTES:

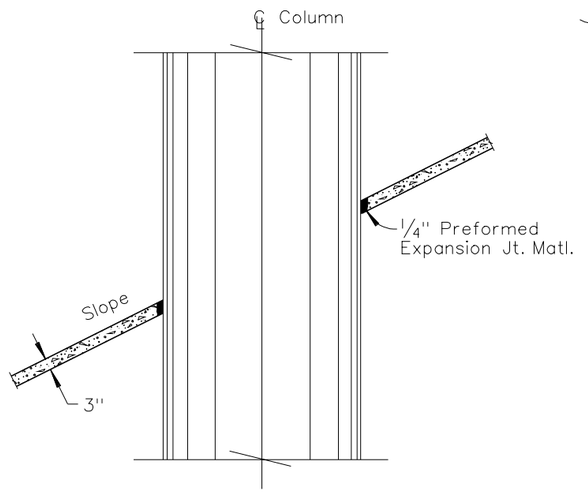
1. SLOPE PAVING IS TO BE DIVIDED INTO EQUALLY SPACED PANELS. THE WIDTH OF EACH PANEL IS TO BE AS NEARLY 10' AS SITE DIMENSIONS WILL PERMIT.
2. THESE DETAILS WILL NOT APPLY IN TOTAL TO ANY ONE SITE, BUT ARE INTENDED TO BE GENERAL ENOUGH TO COVER ALL POSSIBILITIES. TO OBTAIN LIMITS OF SLOPE PAVING FOR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



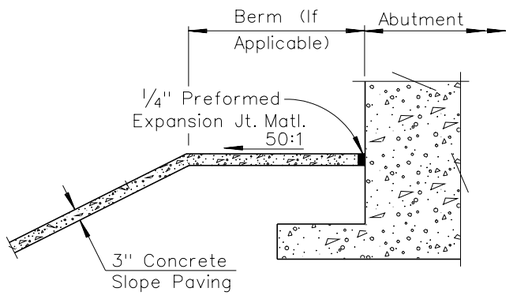
SECTION F-F



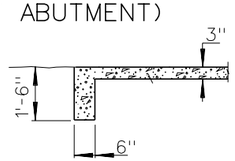
SECTION A-A
(WITH SIDEWALK)



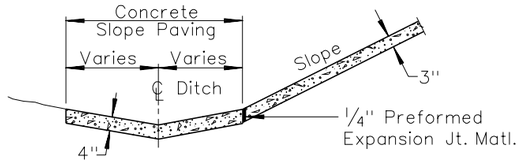
SECTION B-B
(AT PIER)



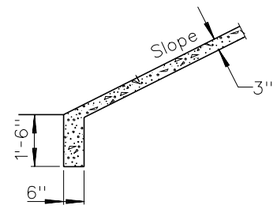
SECTION C-C
(AT ABUTMENT)



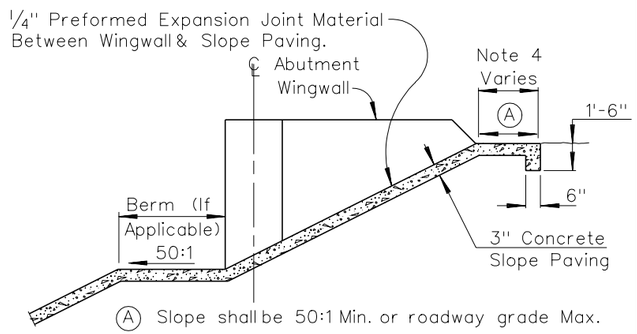
SECTION E-E
(EDGE OF SLOPE)



SECTION A-A
(WITH DITCH)



SECTION A-A
(TOE OF SLOPE)

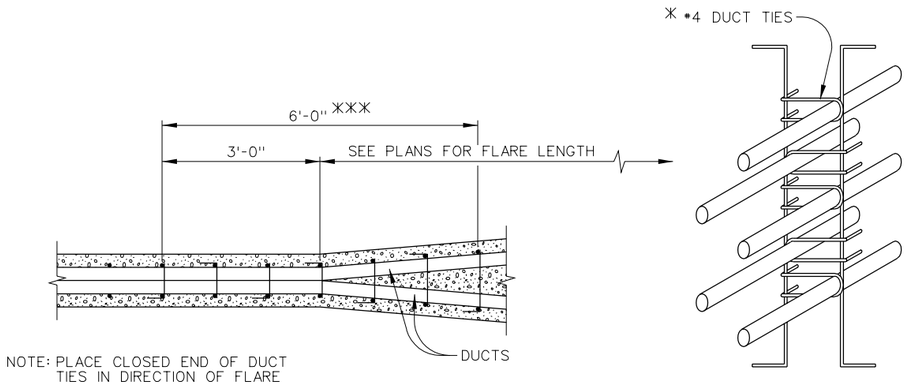


SECTION D-D
(AT WINGWALL)

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

CONCRETE SLOPE PAVING DETAILS

Signed Original On File	B-26.1.1	(611)
CHIEF BRIDGE ENGINEER	ADOPTED-11/78	REVISION 10/98



PLAN

STIRRUP REINFORCEMENT AT FLARE OF GIRDER STEM

DISTRIBUTION OF PRESTRESSING FORCE:

UNLESS OTHERWISE NOTED THE PRESTRESSING FORCE, P JACK OR PF, 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:

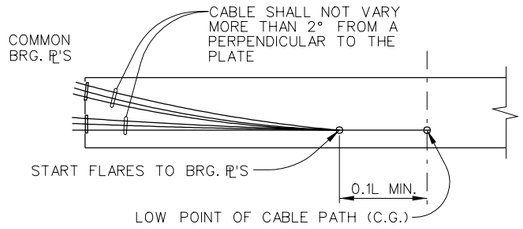
NO MORE THAN 1/2 OF THE PRESTRESSING FORCE IN ANY GIRDER MAY BE STRESSED BEFORE AN EQUAL FORCE IS STRESSED IN THE ADJACENT GIRDERS, AT NO TIME DURING THE STRESSING OPERATIONS WILL MORE THAN 1/6 OF THE TOTAL PRESTRESSING FORCE BE APPLIED ECCENTRICALLY ABOUT THE CENTERLINE OF THE STRUCTURE.

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 THE GIRDER ONLY. BAR REINFORCEMENT INTERFERING WITH THE PRESTRESSING TENDON ALIGNMENT SHALL BE ADJUSTED AS APPROVED BY THE ENGINEER.

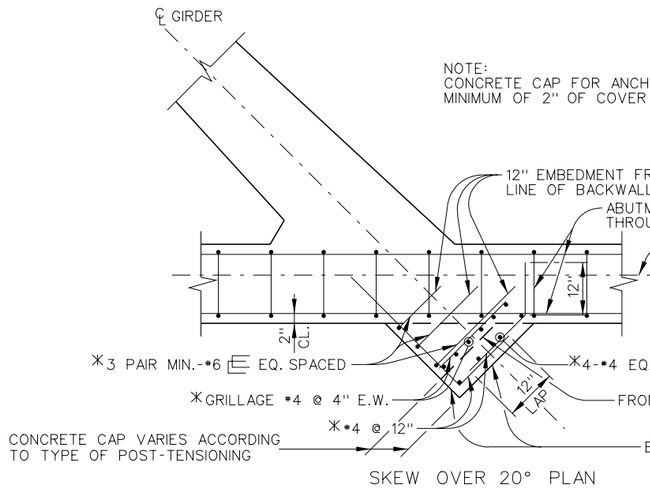
* BARS MARKED THUSLY ARE TO BE INCLUDED IN THE COST OF PRESTRESSING CAST-IN-PLACE CONCRETE.

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

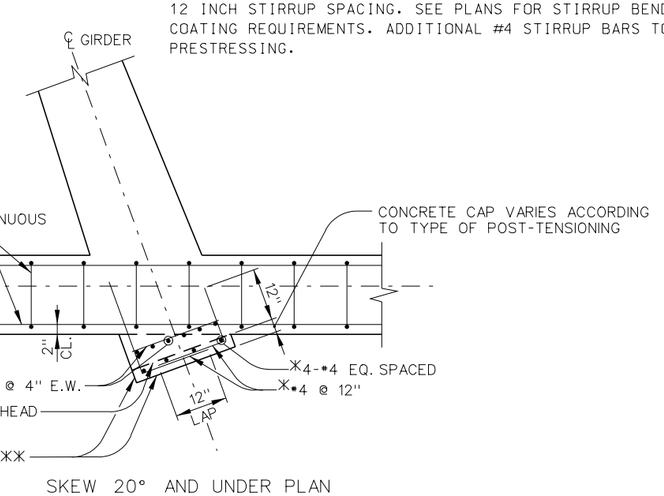
*** ADD ADDITIONAL #4 STIRRUP BARS, IN PAIRS, AS NECESSARY TO MAINTAIN A 12 INCH STIRRUP SPACING. SEE PLANS FOR STIRRUP BENDING DIMENSIONS AND EPOXY COATING REQUIREMENTS. ADDITIONAL #4 STIRRUP BARS TO BE INCLUDED IN COST OF PRESTRESSING.



COMMON BEARING PLATE PRESTRESSING PATH

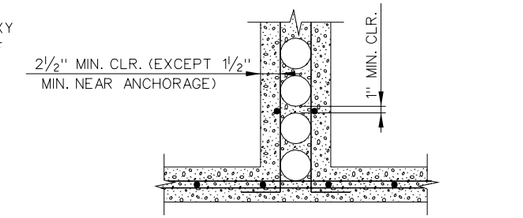


SKEW OVER 20° PLAN

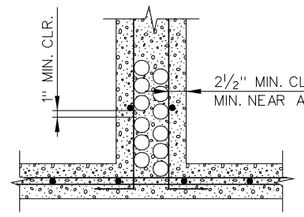


SKEW 20° AND UNDER PLAN

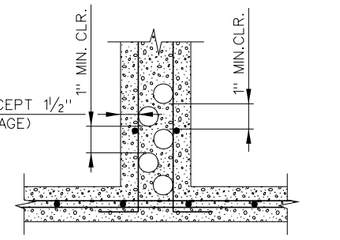
BEARING SEAT FOR PRESTRESSED ANCHORAGE AT DIAPHRAGM TYPE ABUTMENTS



DUCTS OVER 4½" O.D.



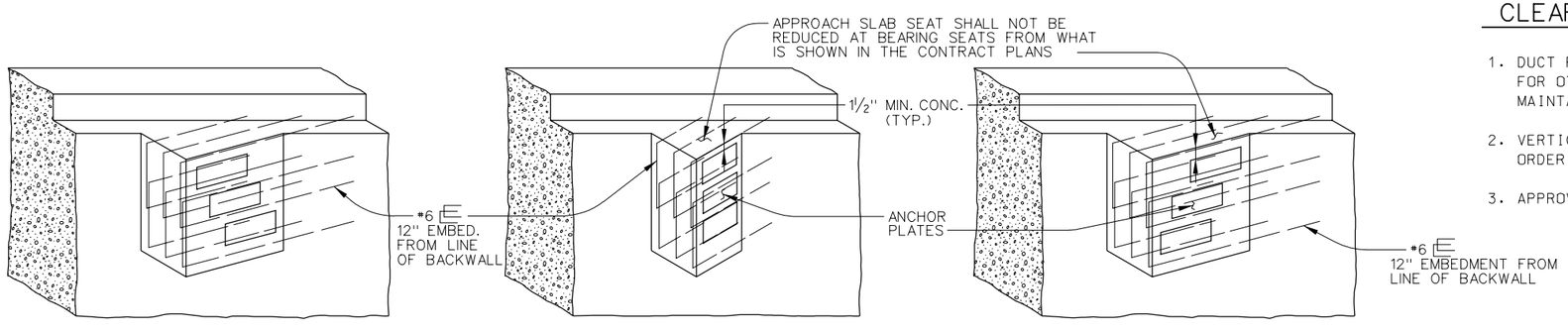
DUCTS 3" O.D. & LESS



DUCTS OVER 3" O.D. TO 4½" O.D.

CLEARANCE REQUIREMENTS FOR DUCTS

1. DUCT PATTERNS SHOWN ARE FOR 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.



EXT.SLOPING GIRDER — VERTICAL GIRDER — EXT.SLOPING GIRDER

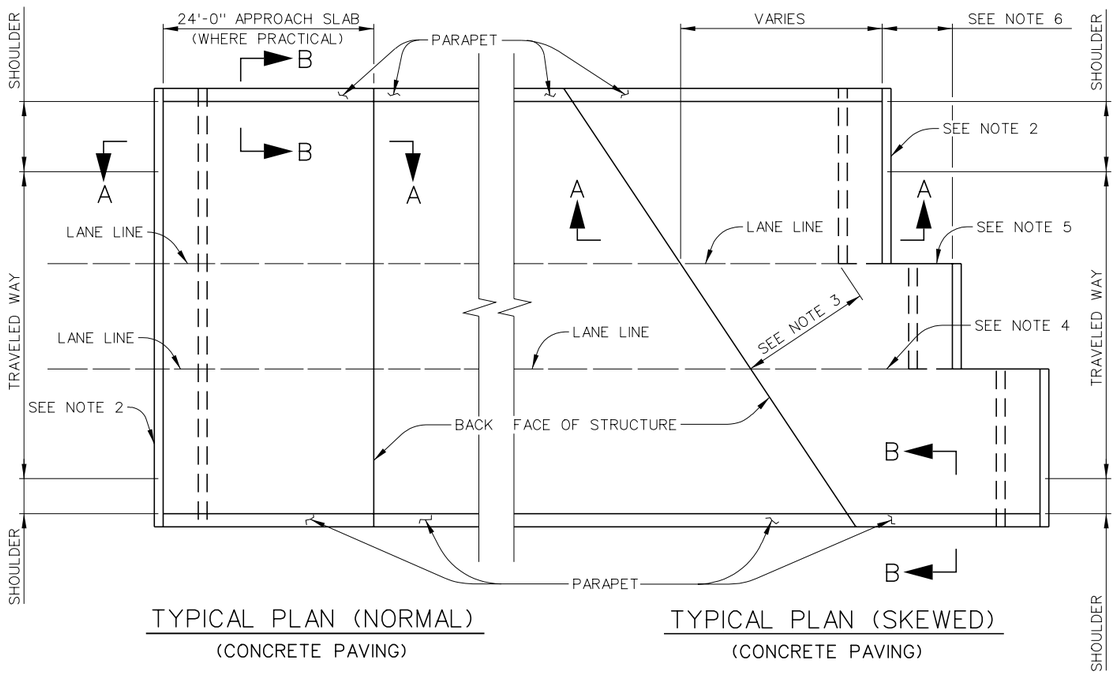
NOTE: DETAILS MAY BE MODIFIED TO SUIT SPECIFIC ANCHORAGE

TYPICAL BEARING SEAT ILLUSTRATIONS

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

CAST-IN-PLACE PRESTRESSED GIRDER DETAILS

Signed Original On File	B-28.1.1	(503)
CHIEF BRIDGE ENGINEER	ADOPTED: 3/85	REVISION: 3/97

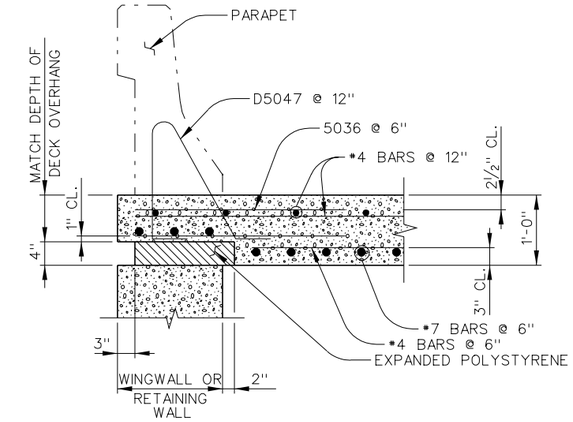


TYPICAL PLAN (NORMAL)

(CONCRETE PAVING)

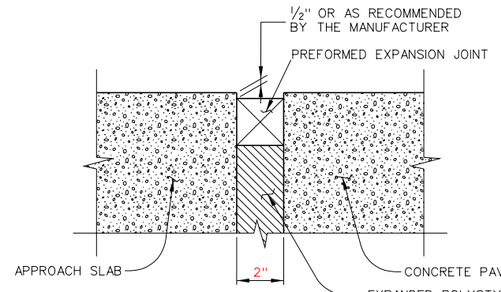
TYPICAL PLAN (SKEWED)

(CONCRETE PAVING)



SECTION B-B

A) WHEN THE APPROACH SLAB EXTENDS BEYOND THE WINGWALLS, EXTEND THE EXPANDED POLYSTYRENE 2 INCHES BEYOND THE WINGWALL ENDS, ADJUST THE APPROACH SLAB TO ITS FULL DEPTH, AND ELIMINATE THE 5036 BARS.



DETAIL "D"

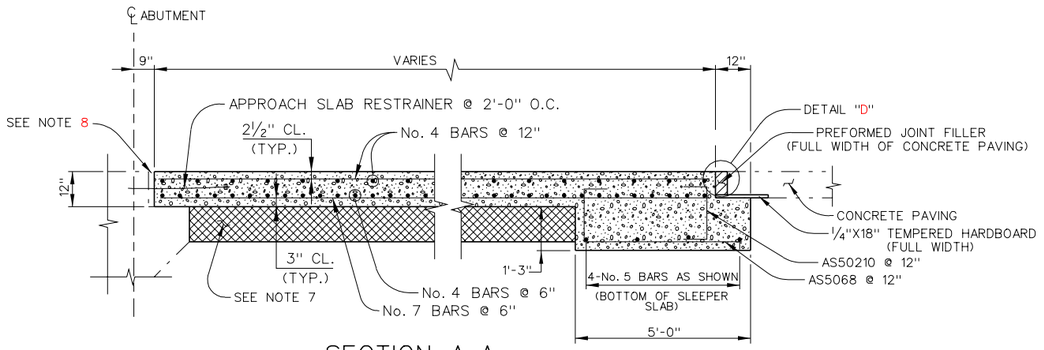
(CONCRETE PAVING OPTION)

NOTE: MAINTAIN 2" GAP BETWEEN BRIDGE RAIL AND BARRIER RAIL WHEN APPLICABLE. INSTALL JOINT FILLER UP INTERIOR FACE OF RAIL A MINIMUM OF 6".

GENERAL NOTES:

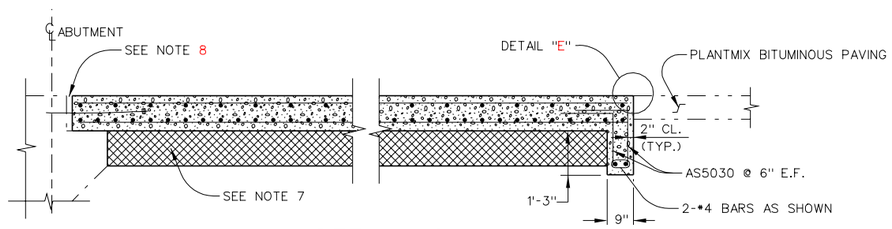
1. THE CONCRETE SHALL BE "EA", F'c=4500 PSI, OR "A" F'c=4000 PSI, AS INDICATED IN THE PLANS. WHEN "EA" CONCRETE IS REQUIRED, THE REINFORCING STEEL SHALL HAVE AN EPOXY COATING.
2. A. THE CONTACT JOINT BETWEEN THE CONCRETE PAVEMENT AND THE APPROACH SLAB SHALL PARALLEL THE BACK FACE OF THE STRUCTURE FOR SKEWS OF 20 DEGREES OR LESS; FOR SKEWS GREATER THAN 20 DEGREES THE CONTACT JOINT SHALL BE NORMAL TO THE ROADWAY ALIGNMENT CONTROL LINE. JOINTS SHALL BE STAGGERED ON LANE LINES FOR SKEWED STRUCTURES. STAGGER LINES SHALL BE AT EACH LANE LINE FOR SKEWS OF 45 DEGREES OR MORE.

   B. THE CONTACT JOINT BETWEEN ASPHALT PAVEMENT AND APPROACH SLAB SHALL PARALLEL THE BACK FACE OF THE STRUCTURE.
3. FOR SKEWS GREATER THAN 20 DEGREES THE DISTANCE MEASURED NORMAL TO AND FROM THE BACK FACE OF THE STRUCTURE TO THE END OF THE APPROACH SLAB SHALL BE A MINIMUM OF 15 FEET.
4. LONGITUDINAL CONSTRUCTION JOINTS IN THE APPROACH SLAB MAY BE LOCATED ON LANE LINES WHEN PERMITTED BY THE ENGINEER.
5. PLACE 1/4-INCH EXPANSION JOINT MATERIAL BETWEEN THE CONCRETE PAVEMENT AND THE LONGITUDINAL FACE OF THE APPROACH SLAB. THE EXPANSION JOINT MATERIAL IS TO BE RECESSED 1/2-INCH FROM THE SURFACE AND THE JOINT SEALED IDENTICALLY TO THE "LONGITUDINAL WEAKENED PLANE JOINT" ON SHEET R-76 OF THE STANDARD PLANS.
6. THE LENGTH OF THE STEPS MUST BE 12'-0" MINIMUM TO 15'-0" MAXIMUM OR INCREMENTAL INTERVALS (24'-0" MIN. TO 30'-0" MAX...) TO MAINTAIN A 12'-0" MINIMUM TO 15'-0" MAXIMUM SPACING OF THE TRANSVERSE WEAKENED PLANE JOINTS IN THE CONCRETE PAVEMENT. SEE SECTION 409.03.09 OF THE SPECIAL PROVISIONS AND SHEET R-76 OF THE STANDARD PLANS FOR SAW-CUTTING DETAILS.
7. COMPACT FILL MATERIAL UNDER APPROACH SLABS TO NOT LESS THAN NINETY-FIVE (95) PERCENT OF THE MAXIMUM DENSITY. SEE SECTION 203.03.17 OF THE STANDARD SPECFICATIONS AND/OR SPECIAL PROVISIONS FOR SPECIFIC TEST METHODS.
8. SEE PLANS FOR EXPANSION JOINT DETAILS.
9. GALVANIZE ASSEMBLY AFTER FABRICATION OR USE A588 STEEL. ASSEMBLY TO EXTEND FULL WIDTH OR TO THE FACE OF ANY BRIDGE OR BARRIER RAILS. FULL PENETRATION BUTT WELD ANY FIELD SPLICES.



SECTION A-A

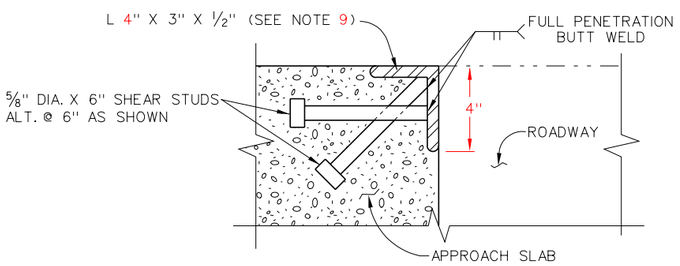
(SEE DETAIL "C" FOR PLANTMIX BITUMINOUS PAVING)



DETAIL "C"

(PLANTMIX BITUMINOUS PAVING)

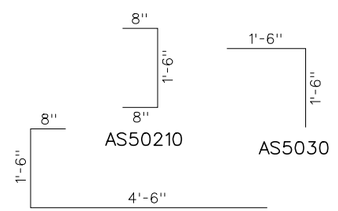
NOTE: FOR INFORMATION & DIMENSIONS NOT SHOWN SEE SECTION A-A



DETAIL "E"

(APPROACH SLAB JOINT PROTECTION-PLANTMIX BITUMINOUS PAVING)

THIS SHEET IS FOR GENERAL INFORMATION FOR ACTUAL DIMENSIONS AND REINFORCING STEEL LAYOUTS, SEE CONTRACT PLANS.



BENT BARS

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

APPROACH SLAB

Signed Original On File	B-29.1.1 (502)	
CHIEF BRIDGE ENGINEER	ADOPTED: 12/90	REVISION: 8/02

REINFORCED CONCRETE RETAINING WALL TYPES 1A & 1B

Backfill Condition	Wall Type Required for Seismic Acceleration	
	0.15g	0.40g
Level backfill w/surcharge	1A	1A
Sloping backfill w/o surcharge		
Slope ≤ 3:1	1A	1B
3:1 < Slope ≤ 2:1	1B	*

* Special design required

STANDARD BAR LAPS		
BAR #	UNCOATED	EPOXIED
4	20"	23"
5	26"	30"
6	31"	36"
7	39"	45"
8	51"	59"
9	59"	67"
10	75"	85"
11	91"	102"

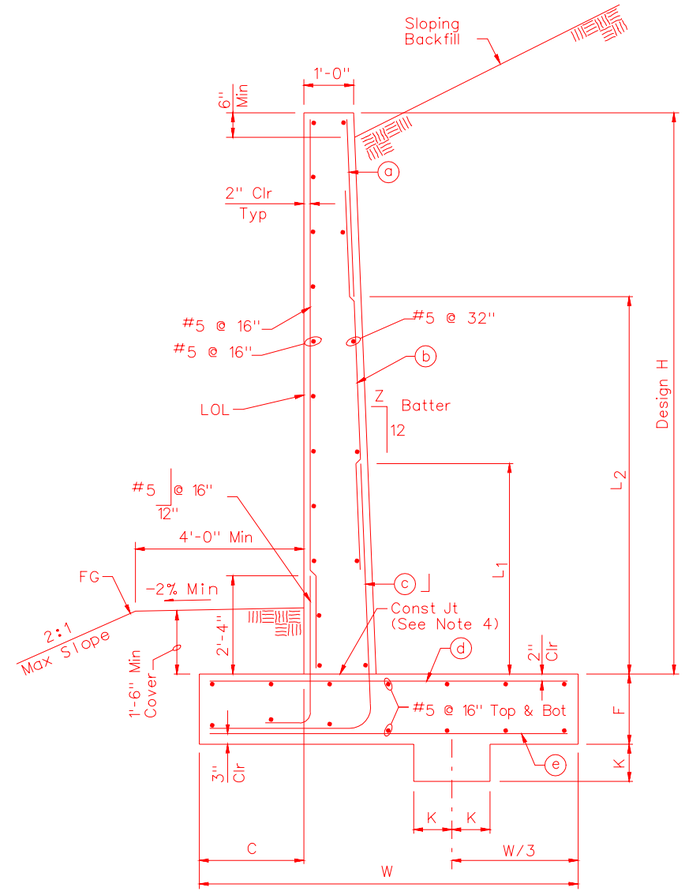
TYPE 1A - REINFORCED CONCRETE RETAINING WALL TABLE OF DIMENSIONS AND REINFORCING STEEL

Layout and reinforcement data	Design H	4'	6'	8'	10'	12'	14'	16'	18'	20'	22'	24'	26'	28'	30'
	W	3'-5"	5'-1"	6'-7"	8'-0"	9'-4"	10'-10"	12'-4"	13'-9"	15'-3"	16'-9"	18'-1"	19'-6"	21'-2"	22'-4"
	F	1'-4"	1'-4"	1'-4"	1'-6"	1'-6"	1'-6"	1'-8"	1'-10"	1'-10"	2'-2"	2'-6"	2'-10"	2'-11"	3'-1"
	C	1'-0"	1'-4"	1'-8"	2'-0"	2'-4"	2'-8"	2'-11"	3'-3"	3'-7"	3'-11"	4'-3"	4'-9"	5'-3"	5'-5"
	K	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Batter, Z	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	5/8	3/4	7/8	7/8	7/8
	ⓐ bars	-	-	-	-	-	-	-	-	#5@24"	#5@24"	#5@28"	#6@24"	#6@24"	#6@24"
	ⓑ bars	-	-	-	-	#5@24"	#6@24"	#6@16"	#8@16"	#8@12"	#8@12"	#9@14"	#9@12"	#10@12"	#10@12"
	ⓒ bars	#5@12"	#5@12"	#5@12"	#6@12"	#7@12"	#8@12"	#8@8"	#9@8"	#9@6"	#9@6"	#10@7"	#10@6"	#11@6"	#11@6"
	ⓓ bars	#5@12"	#5@12"	#5@12"	#6@12"	#7@12"	#8@12"	#8@8"	#9@8"	#9@6"	#9@6"	#10@7"	#10@6"	#11@6"	#11@6"
	ⓔ bars	#5@24"	#5@24"	#5@24"	#5@24"	#6@24"	#7@24"	#7@16"	#8@16"	#8@12"	#8@12"	#9@14"	#9@12"	#9@12"	#9@12"
	L_1	-	-	-	-	5'-7"	5'-11"	5'-11"	5'-11"	6'-3"	7'-3"	8'-2"	8'-2"	8'-2"	9'-10"
	L_2	-	-	-	-	-	-	-	-	8'-10"	10'-2"	12'-2"	12'-2"	12'-6"	14'-9"
Est'd Qtys	Concrete ft^3/ft	8.9	13.6	18.1	24.1	28.8	34.3	41.9	49.9	56.3	70.9	87.2	105.9	118.3	131.8
	Reinf lbs/ft	34	46	55	77	97	132	187	257	337	375	440	536	677	724
Max Pressure (ksf)	Level Slope w/surcharge	1.3	1.5	1.7	2.0	2.2	2.3	2.6	2.9	3.1	3.4	3.8	4.1	4.2	4.6
	Level Slope @ 0.15g	0.9	1.0	1.2	1.4	1.6	1.9	2.1	2.4	2.6	2.9	3.2	3.5	3.8	4.0
	Level Slope @ 0.40g	1.2	1.3	1.6	1.9	2.1	2.3	2.6	2.9	3.1	3.5	3.9	4.3	4.4	4.8
	Slope ≤ 3:1	0.8	1.0	1.2	1.5	1.8	2.0	2.3	2.6	2.9	3.2	3.6	3.9	4.1	4.5
	Slope ≤ 3:1 @ 0.15g	1.1	1.3	1.6	2.0	2.3	2.6	3.0	3.4	3.7	4.2	4.7	5.1	5.4	5.9

TYPE 1B - REINFORCED CONCRETE RETAINING WALL TABLE OF DIMENSIONS AND REINFORCING STEEL

Layout and reinforcement data	Design H	4'	6'	8'	10'	12'	14'	16'	18'	20'	22'	24'	26'	28'	30'
	W	3'-5"	5'-1"	6'-7"	8'-6"	10'-6"	12'-4"	14'-1"	16'-1"	17'-11"	19'-10"	21'-8"	23'-8"	25'-5"	27'-3"
	F	1'-4"	1'-4"	1'-4"	1'-6"	1'-6"	1'-8"	1'-10"	2'-0"	2'-4"	2'-8"	2'-11"	3'-3"	3'-7"	4'-0"
	C	1'-0"	1'-4"	1'-8"	2'-0"	2'-4"	2'-8"	2'-11"	3'-3"	3'-7"	3'-11"	4'-3"	4'-9"	5'-3"	5'-5"
	K	0	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"
	Batter, Z	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	5/8	3/4	3/4	7/8	7/8	1
	ⓐ bars	-	-	-	-	-	-	-	-	#6@32"	#6@32"	#6@28"	#6@24"	#6@20"	#6@20"
	ⓑ bars	-	-	-	-	#5@24"	#6@20"	#8@20"	#8@14"	#9@16"	#10@16"	#10@14"	#11@12"	#11@10"	#11@10"
	ⓒ bars	#5@12"	#5@12"	#5@12"	#5@10"	#7@12"	#8@10"	#9@10"	#9@7"	#10@8"	#11@8"	#11@7"	#11@6"	#11@10" ⅛	#11@10" ⅛
	ⓓ bars	#5@12"	#5@12"	#5@12"	#5@10"	#7@12"	#8@10"	#9@10"	#9@7"	#10@8"	#11@8"	#11@7"	#11@6"	#11@10" ⅛	#11@10" ⅛
	ⓔ bars	#5@24"	#5@24"	#5@24"	#5@20"	#6@24"	#7@20"	#7@20"	#7@14"	#8@16"	#8@16"	#8@14"	#8@12"	#8@10"	#8@10"
	L_1	-	-	-	-	4'-3"	4'-7"	4'-11"	5'-3"	6'-7"	7'-7"	7'-7"	7'-7"	7'-7"	7'-7"
	L_2	-	-	-	-	-	-	-	-	8'-10"	9'-10"	9'-10"	10'-10"	10'-10"	12'-2"
Est'd Qtys	Concrete ft^3/ft	8.9	15.5	20.1	26.8	32.7	40.7	49.2	59.0	74.3	92.0	107.2	129.6	149.6	178.5
	Reinf lb/ft	34	46	55	76	101	153	204	298	370	462	553	710	884	943
Max Pressure (ksf)	Slope ≤ 3:1	0.8	1.0	1.2	1.5	1.6	1.9	2.2	2.5	2.8	3.1	3.4	3.7	3.9	4.4
	Slope ≤ 3:1 @ 0.40g	1.8	2.2	2.7	3.2	3.4	4.0	4.6	5.0	5.7	6.3	6.9	7.4	8.0	8.8
	3:1 < Slope ≤ 2:1	0.8	1.1	1.4	1.7	1.8	2.2	2.6	2.9	3.2	3.6	4.0	4.3	4.6	5.1
	3:1 < Slope ≤ 2:1 @ 0.15g	1.4	1.8	2.3	2.8	3.0	3.6	4.2	4.7	5.3	5.9	6.5	7.0	7.5	8.3

⅛ Denotes a bundle of two bars



TYPICAL SECTION

NOTES:

1. For General Notes see B-30.1.3
2. For details not shown and drainage requirements see sheets B-30.1.3 thru B30-1.5.
3. Roughen construction joint surface to ¼" amplitude.
4. NDOT Geotechnical section will verify maximum allowable bearing pressures for actual site soil conditions.

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

TYPES 1A & 1B CANTILEVER CONCRETE RETAINING WALLS

Signed Original On File	B-30.1.1	(502)
CHIEF BRIDGE ENGINEER	ADOPTED: 12/02	REVISION: X/XX

REINFORCED CONCRETE RETAINING WALL TYPE 2

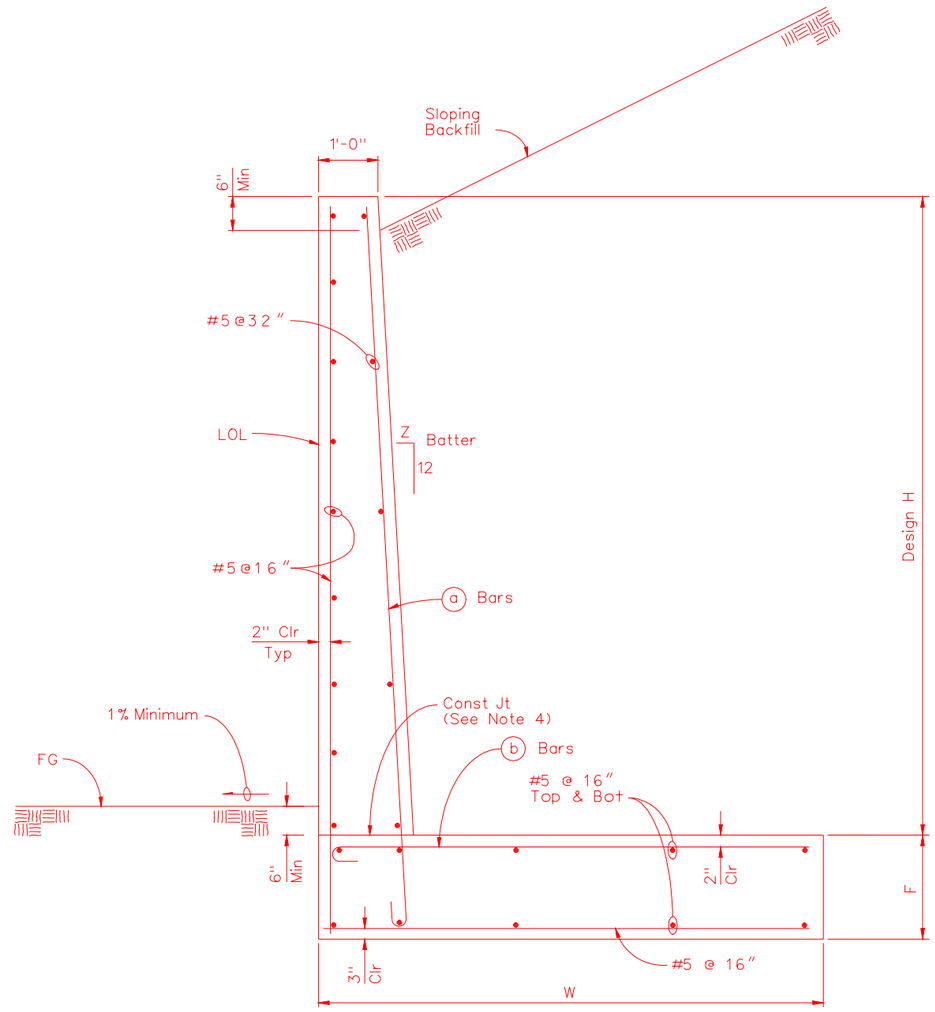
Backfill Condition	Wall Type Required for Seismic Acceleration	
	0.15g	0.40g
Level backfill w/surcharge	2	2
Sloping backfill w/o surcharge		
Slope ≤ 3:1	2	2
3:1 < Slope ≤ 2:1	2	*

* Special design required

STANDARD BAR LAPS		
BAR #	UNCOATED	EPOXIED
4	20"	23"
5	26"	30"
6	31"	36"
7	39"	45"
8	51"	59"
9	59"	67"
10	75"	85"
11	91"	102"

TYPE 2 - REINFORCED CONCRETE RETAINING WALL
TABLE OF DIMENSIONS AND REINFORCING STEEL

Layout and reinforcement data	Design H	4'	6'	8'	10'	12'
	W	4'-1"	5'-1"	6'-7"	8'-0"	9'-6"
	F	1'-4"	1'-4"	1'-6"	1'-6"	1'-10"
	Batter, Z	0	0	0	3/8	3/4
	ⓐ bars	#5@12"	#6@16"	#6@12"	#6@10"	#7@10"
	ⓑ bars	#5@12"	#6@16"	#6@12"	#6@10"	#7@10"
Est'd Qtys	Concrete ft^3/ft	9.5	12.8	17.9	23.6	33.9
	Reinf lb/ft	33	45	61	80	111
Max Pressure (ksf)	Level Backfill w/surcharge	1.8	2.4	2.8	3.2	3.7
	Level Backfill @ 0.15g	1.4	1.8	2.1	2.5	2.9
	Level Backfill @ 0.40g	1.6	2.2	2.6	3.0	3.5
	Slope ≤ 3:1	1.2	1.7	2.3	2.7	3.4
	Slope ≤ 3:1 @ 0.15g	1.4	2.1	2.7	3.3	4.0
	Slope ≤ 3:1 @ 0.40g	2.0	3.3	4.3	5.2	6.4
	3:1 < Slope ≤ 2:1	1.3	2.0	2.6	3.1	3.8
	3:1 < Slope ≤ 2.1 @ 0.15g	1.9	2.9	3.8	4.7	5.8



TYPICAL SECTION

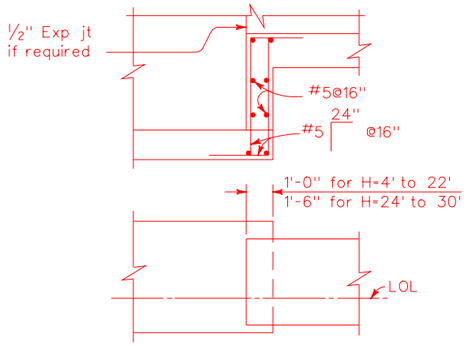
NOTES:

1. For General Notes see B-30.1.3
2. For details not shown and drainage requirements see sheets B-30.1.3 thru B-30.1.5.
3. Roughen construction joint surface to 1/4" amplitude.
4. NDOT Geotechnical section will verify maximum allowable bearing pressures for actual site soil conditions.

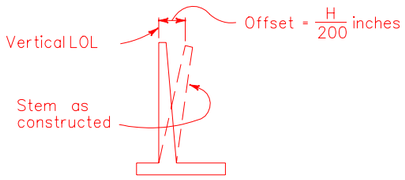
STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

TYPE 2 CANTILEVER CONCRETE RETAINING WALL

Signed Original On File	B-30.1.2	(502)
CHIEF BRIDGE ENGINEER	ADOPTED: 12/02	REVISION: X/XX

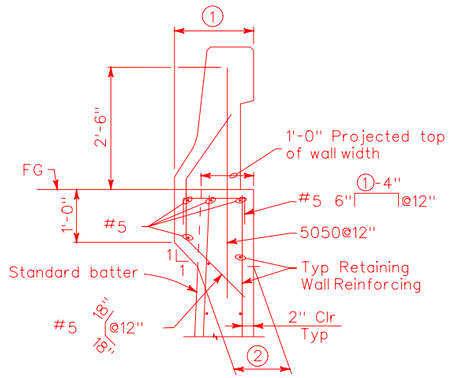


FOOTING STEP



APPROXIMATE WALL OFFSET VALUES

Values for offsetting forms to be determined by the Engineer.



STEM HAUNCH FOR BARRIER RAIL

Dimension (1) (barrier rail width) to be as shown in the Project Plans. Stem width (2) at base of haunch to be determined as shown.

GENERAL NOTES:

1. Design Specifications: AASHTO Standard Specifications for Highway Bridges, 1996 with iterims through 2000.
2. Loading: Live load surcharge pressure equal to 2 feet of earth. Seismic acceleration = 0.15g & 0.4g, where ½ the peak ground acceleration is used in the design.
3. Concrete: All concrete shall be Class A or AA Modified (Major) with f'c = 4000 psi at 28 days.
4. Reinforcing Steel: All reinforcing steel shall be ASTM A615 grade 60 or A706.
5. Design Data: Cantilever walls are designed based on the following parameters:

   Soil properties:

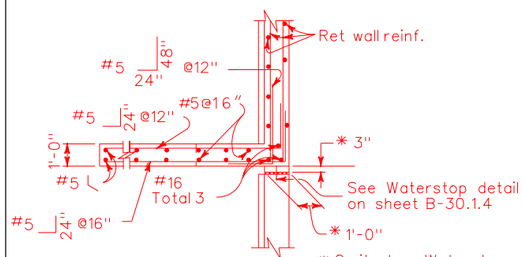
   Internal angle of friction = 35°
   Unit weight = 120 pcf
   Equiv. active fluid pressure = 36 pcf (level backfill)
   Equiv. active fluid pressure = Rankine Method (sloping backfill)
   Equiv. passive fluid pressure = 360 pcf (top of footing down)
   Coefficient of friction between soil and concrete = 0.45

   Wall properties:

   Static design based on Allowable Stress Design
   fc = 1.6 ksi
   fs = 24 ksi
   n = 8

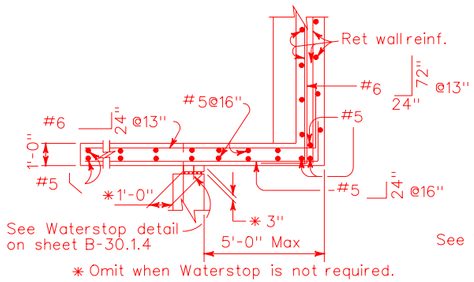
   Seismic design based on Load Factor Design
   f'c = 4 ksi
   fy = 60 ksi

   Factors of safety applied
   Static overturning = 2.0
   Static sliding = 1.5
   Seismic overturning = 1.5
   Seismic sliding = 1.1
6. Return Walls: Return wall not required unless shown in plans. For dimension (D), see project plans.
7. Drainage: Drainage system (gutter, drain, pipe) not required unless specified in the plans.



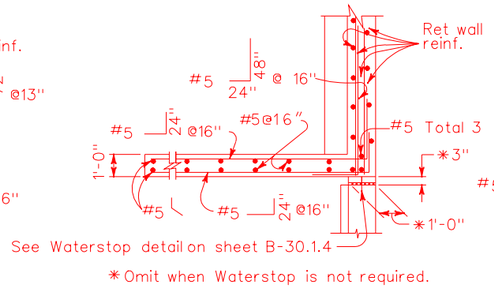
PLAN

(For return wall Type "A")



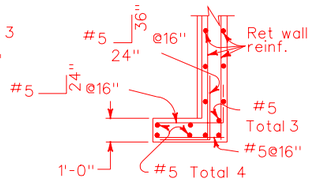
PLAN

(For return wall Type "B")



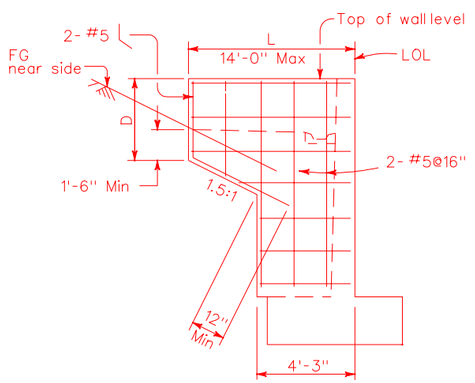
PLAN

(For return wall Type "C")



PLAN

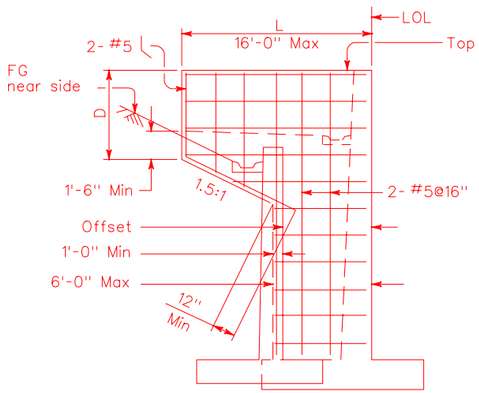
(For return wall Type "D")



ELEVATION

RETURN WALL TYPE "A"

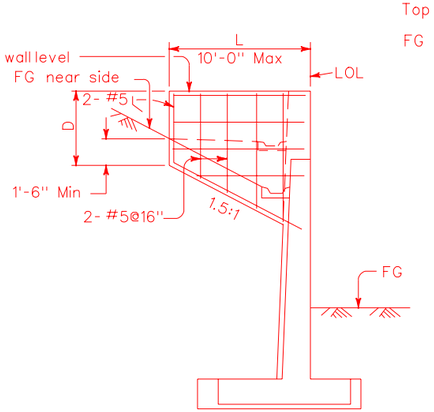
Use where H=8' or less



ELEVATION

RETURN WALL TYPE "B"

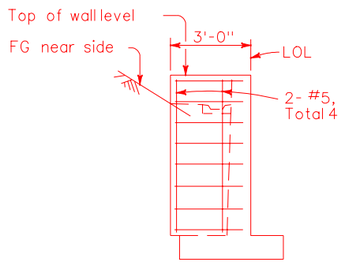
Use where H=10' or more on offset walls



ELEVATION

RETURN WALL TYPE "C"

Use where H=10' or more on straight walls



ELEVATION

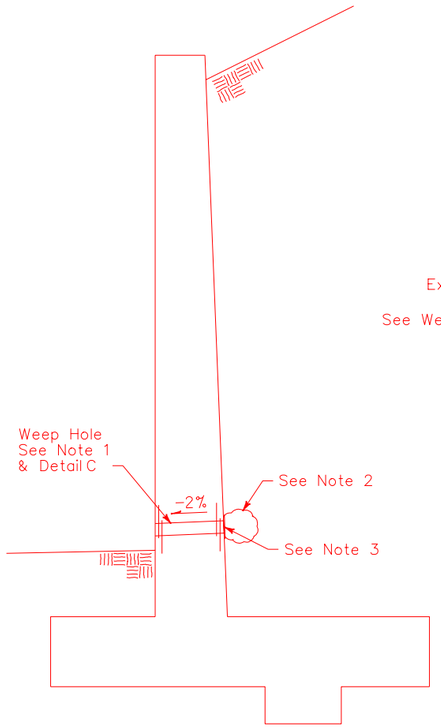
RETURN WALL TYPE "D"

Use where H=6' or less

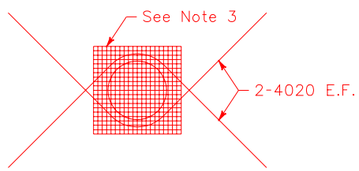
STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

CANTILEVER CONCRETE RETAINING WALL DETAILS No. 1

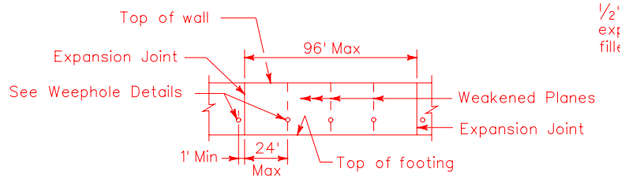
Signed Original On File	B-30.1.3	(502)
CHIEF BRIDGE ENGINEER	ADOPTED: 12/02	REVISION: X/XX



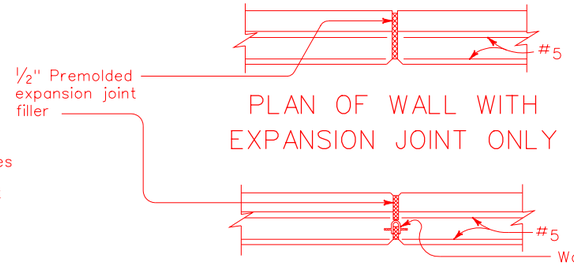
WEEP HOLE



DETAIL C

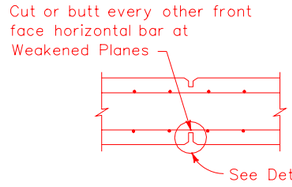


WALL EXPANSION JOINTS
AND WEAKENED PLANES

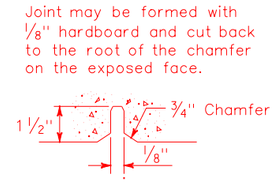


PLAN OF WALL WITH
EXPANSION JOINT ONLY

PLAN OF WALL WITH
EXPANSION JOINT AND WATERSTOP

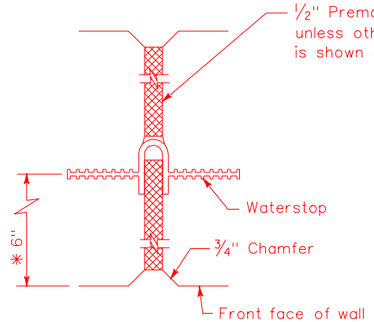


SECTION



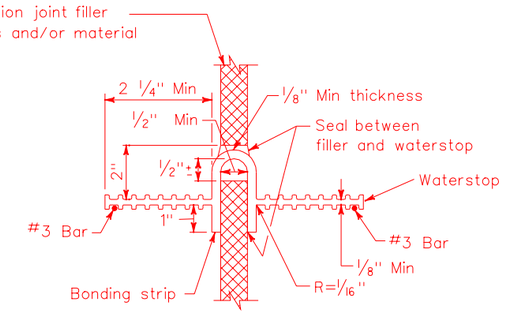
DETAIL A

WEAKENED PLANES



WALL EXPANSION JOINT
WITH WATERSTOP

* For wall thickness less than 12",
use ½ the wall thickness



WATERSTOP

WEEP HOLE NOTES:

1. 4" dia drains at 25' maximum center to center. Exposed drains shall be located 3"± above finish grade.
2. 2 cubic feet of Type 2 Drain Backfill encapsulated in a geotexile fabric securely tied. Geotexile shall meet the following:

   a) meet at least Class 2 strength requirement per AASHTO M288 Test Method.

   b) have an AOS not greater than U.S. Seive No. 40.

   c) have a permitivity of at least 0.5 sec^{-1} . Amoco 2016, Nicolon Mirafi FW 500 and Geotex 601 meet the above requirements.
3. 6" square aluminum or galvanized steel wire mesh hardware cloth (minimum wire diameter 0.03").

WATERSTOP NOTES:

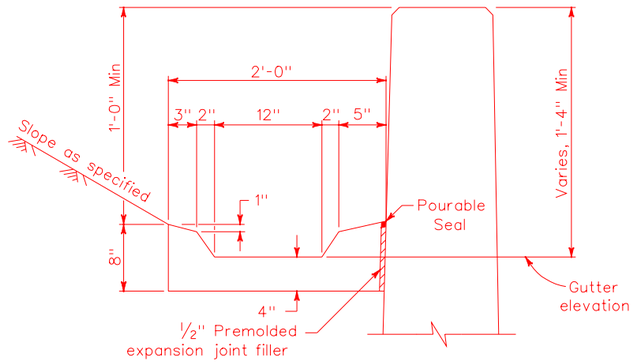
Holes will be permitted in the outer ½" of the web for wire, rings, etc. Tie web to #3 reinforcing bars @ 16" millimeters maximum intervals to support the waterstop in proper position during concrete placement. Alternative detail may be submitted for approval of the Engineer.

Waterstop to have 5 or more pairs of of raised ribs to provide 0.1 square inches minimum rib cross-section area on each half of the waterstop.

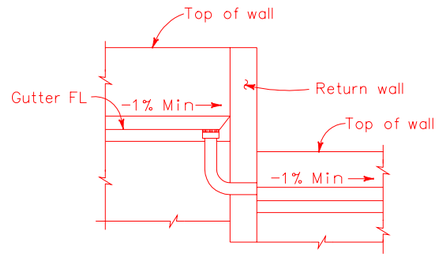
STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

CANTILEVER CONCRETE RETAINING WALL DETAILS No. 2

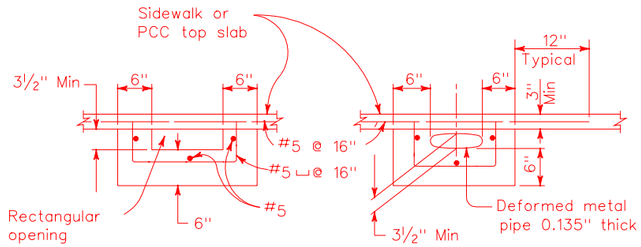
Signed Original On File	B-30.1.4	(502)
CHIEF BRIDGE ENGINEER	ADOPTED: 12/02	REVISION: X/XX



TYPICAL GUTTER DETAIL

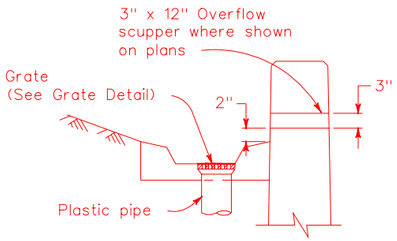


SECTION A-A



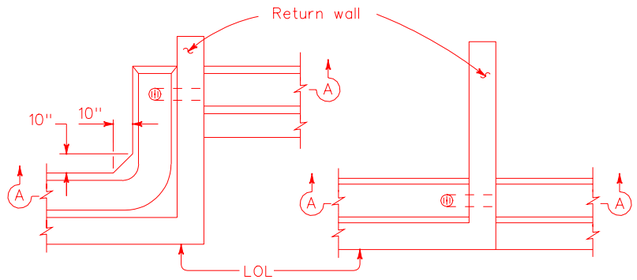
NOTE
Area of opening to be not less than that of pipe from wall gutter. Make opening transition in wall. Edge opening in curb face to ¾" minimum radius.

OUTLET DETAIL - SECTION B-B



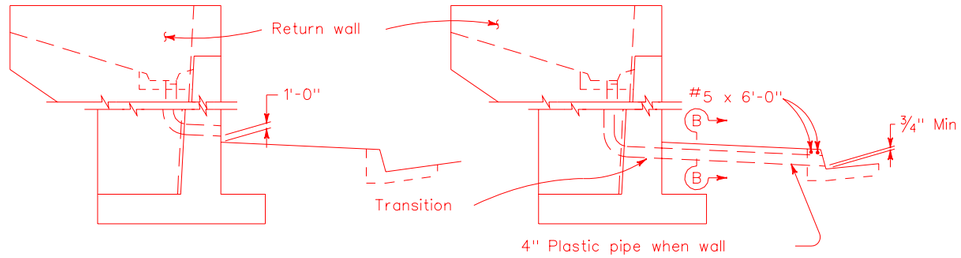
WALL DRAIN DETAIL

GRATE DETAIL
Sizes to fit standard hubs



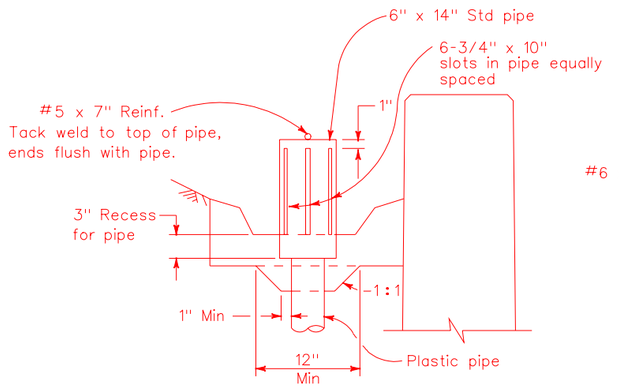
PLAN-OFFSET WALL PLAN-CONTINUOUS WALL

DRAIN THROUGH RETURN WALL

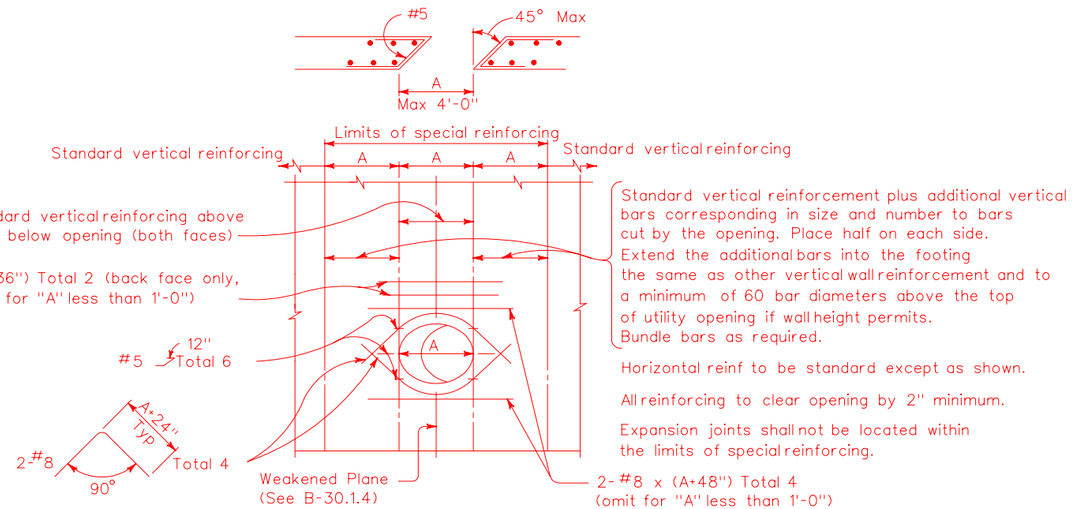


RETAINING WALL, FACE OF WALL OUTLET

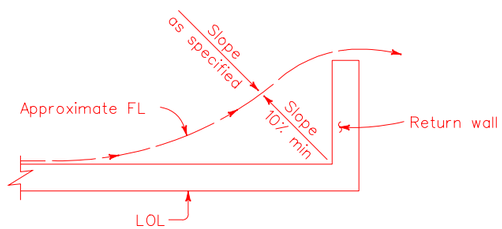
RETAINING WALL, GUTTER OUTLET



ALTENATIVE WALL DRAIN WITH PIPE DOME



RETAINING WALL UTILITY OPENING
Max size of opening (A) = 4'-0"



WALL DRAINAGE WHERE GUTTER NOT REQUIRED

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

CANTILEVER CONCRETE RETAINING WALL DETAILS No. 3

Signed Original On File	B-30.1.5	(502)
CHIEF BRIDGE ENGINEER	ADOPTED:12/02	REVISION: X/XX

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