

Oversight / NHS		Other Project Information:	As Constructed
FHWA REGION VIII OVERSIGHT? <input type="checkbox"/> NO <input type="checkbox"/> YES		Construction Project Name: E. OF RANGELY	No Revisions:
NATIONAL HIGHWAY SYSTEM? <input type="checkbox"/> NO <input type="checkbox"/> YES			Revised: 8-1-01
			Void:

DEPARTMENT OF TRANSPORTATION STATE OF COLORADO

HIGHWAY CONSTRUCTION BID PLANS OF PROPOSED

COLORADO PROJECT NO. STA 0641-011

STATE HIGHWAY NO. 64

RIO BLANCO COUNTY


CONSTRUCTION PROJECT CODE NO. 13106

SHEET NO.

- 1 INDEX OF SHEETS
- 2 PROJECT LOCATION MAP
- 3 TABULATION OF LENGTH AND DESCRIPTION OF PROJECT
- 4 STANDARD PLANS LIST
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NEW AND REVISED STANDARD PLANS:

M-606-1 GUARDRAIL TYPE 3, W-BEAM JANUARY 5, 2000 (REVISED)(15 SHEETS)

<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Index of Revisions		Contract Information				
			Contractor <i>UNITED COMPANIES OF MESA Co.</i>				
			Resident Engineer - James E. Patton				
			Project Engineer <i>KEN LUCAS</i>				
			PROJECT STARTED <i>6-25-01</i> ACCEPTED <i>8-1-01</i>				
			Comments:				
Computer File Information			<h2 style="margin: 0;">Index of Sheets</h2>		Project No./Code		
Creation Date: 09/05/00		Initials: JEP			STA 0641-011		
Last Modification Date:		Initials:			13106		
Full Path: D:\13106 EAST OF RANGELY\DRAWINGS					Designer: BKA	Region: 3	1
Drawing File Name: 01TITLE.DWG					Detailer:	Unit Leader: JEP	
Acad Ver.	Scale:	Units:	Sheet Subset:		Sheet:		

AS CONSTRUCTED

FED. ROAD REGION

DIVISION

PROJECT NO.

SHEET NO.

NO REVISIONS

9-1-01

REVISED

VOID

VIII

COLO.

STA 0641-011

2

UTILITIES

SEE SPECIAL PROVISIONS

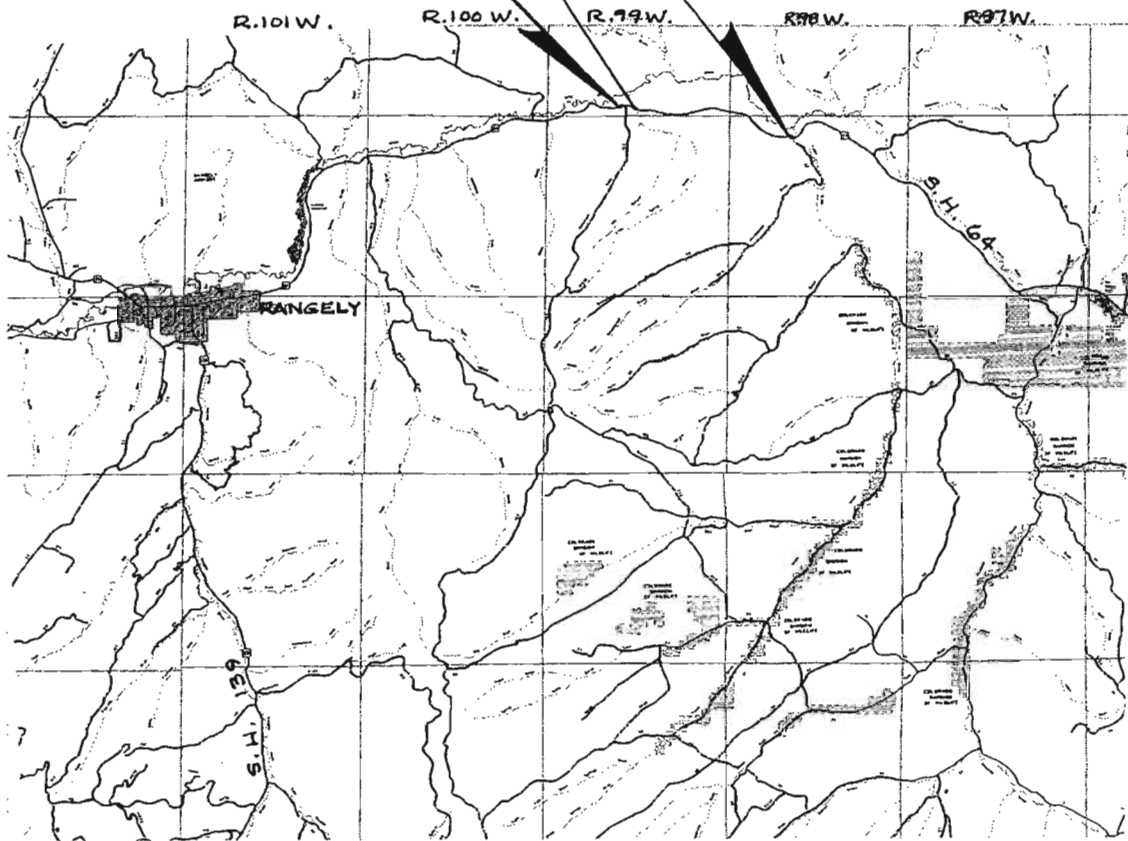
PROJECT LOCATION MAP

RIO BLANCO COUNTY

Little Spring Creek ~ Guardrail

M.P. 14.0 - END STA 0641-011

M.P. 38.0 - Begin STA 0641-011



AS CONSTRUCTED			FED. ROAD REGION	DIVISION	PROJECT NO.	SHEET NO.	
NO REVISIONS	B-1-01	REVISED	VOID	VII	COLO.	STA 0641-011	3

TABULATION OF LENGTH AND DESCRIPTION OF PROJECT

LOCATION (MILE POST TO MILE POST)	LENGTH (LINEAR FEET)	
	ROADWAY	
M.P. 38.00, BEGIN STA 0641-011	31,680	
M.P. 44.00, END STA 0641-011		
TOTAL	31,680	
SUMMARY	LIN. FT.	MILES
Project Net Length	31,680.00	6.00
Project Gross Length	31,680.00	6.00

THIS PROJECT IS LOCATED ON SH 64 IN RIO BLANCO COUNTY. IT BEGINS APPROXIMATELY 20 MILES EAST OF RANGELY AT MILE POST 38.00 AND CONTINUES EASTERLY TOWARD MEEKER ENDING AT MILE POST 44.00.

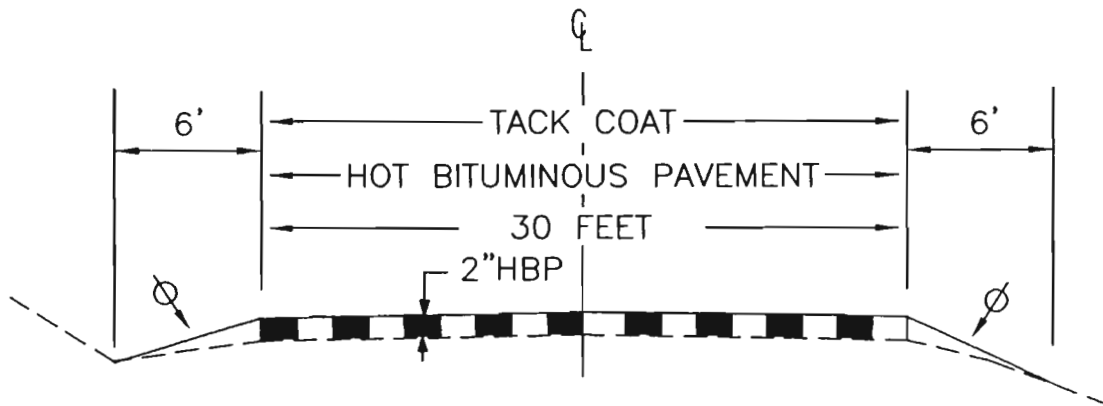
THE WORK CONSISTS OF A NOMINAL 2-INCH HOT BITUMINOUS PAVEMENT OVERLAY OF THE EXISTING PAVEMENT FOR ITS FULL WIDTH. AGGREGATE BASE COURSE WILL BE REQUIRED FOR SHOULDERING. GUARD RAIL WILL BE REQUIRED.

AS CONSTRUCTED				FED. ROAD REGION	DIVISION	PROJECT NO.	SHEET NO.
NO REVISIONS	B701	REVISED		VOID		STA 0641-011	5
				VII	COLD.		

TYPICAL SECTION & TYPICAL SECTION NOTES

Mile Post 38.00 To Mile Post 44.00

TYPICAL SECTION



TYPICAL SECTION NOTES

A 1-inch Leveling Course is required from MP 41.3 to MP 42.3 ✓

All thicknesses are approximate.

☉ Aggregate Base Course (Cl. 7) for shoulder gravel ✓

Materials shall be placed in separate courses at the following approximate rates per 100 L.F. of roadway:

Bituminous Pavement:	2" Overlay....	36.66 Tons	✓
Shoulder Gravel:	A.B.C. Cl. 7.....	3.33 Tons/Side	✓

The rates shown have been determined from information available at the time of design. Rates should be adjusted during construction to obtain the required approximate thickness.

Pavement overlays and leveling are to be placed to the full width of the existing pavement.

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GENERAL NOTES

For preliminary plan quantities of pavement materials, the following rates of application were used:

Emulsified Asphalt (Slow Setting)

Tack Coat.....@ 0.1 Gals./Sq. Yd. (Diluted)
 Bituminous Pavement.....@ 146 2/3 Lbs./Cu. Ft.
 Aggregate Base Course.....@ 133 Lbs./Cu. Ft.

Diluted Emulsified Asphalt for Tack Coat shall consist of 1 part Emulsified Asphalt and 1 part water. Emulsified Asphalt shall not be measured and paid for separately; but shall be included in the cost of the item for Hot Bituminous Pavement.

Rates of application shall be as determined by the Engineer at the time of application.

The following shall be furnished with each bituminous paver:

1. A ski type device at least 40 feet in length. ✓
2. A short ski or shoe.

Road approaches shall be paved with a 2" thickness of pavement after the top mat has been placed and shall be placed as follows:

All approaches shall be paved 4 feet out from edge of shoulder.

The Contractor will take precautions to maintain the existing Delineators and Mile Posts in their current condition. If the Contractor damages or destroys the integrity of a Delineator or Mile Post, the Contractor will be required to replace the Delineator or Mile Post at his own expense.

It is estimated that 20 hours of Blading with a motor grader in the 130 to 140 flywheel horsepower range will be required for shoulder shaping or as directed by the Engineer.

Temporary pavement marking will be provided and placed by the Contractor in accordance with Std. S-627-1 and the Standard Special Provisions. Aligning and placement shall be done under the supervision of the Traffic Control supervisor. The Temporary Pavement Markings shall be placed at the end of each working day. This work will not be measured and paid for separately, but shall be included in the cost of the item for Hot Bituminous Pavement.

No contractor staging or material storage areas shall be allowed within 100 feet of riparian or wetlands areas.

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GENERAL NOTES (CONTINUED)

A.B.C. (CL. 7) shall not be dumped directly on freshly laid asphalt and bladed to the shoulders. The shoulder material shall be dumped directly on the shoulders by side dump equipment or other methods as approved by the Engineer.

It is estimated that 66 Sq. Yds. of Removal of Asphalt Mat (Planing) will be required for this project as follows: ✓

1. MP 38.00 – Plane 33 Sq. Yds. at a 2-inch depth and a 10-foot transition to provide a butt joint at the beginning of the project. ✓
2. MP 44.00 – Plane 33 Sq. Yds. at a 2-inch depth and 10-foot transition to provide a butt joint at the end of the project. ✓

All planing quantities and locations are approximate. Locations and quantities will be field adjusted as determined by the Project Engineer.

Planing will not be paid for separately, but shall be included in the work.

654

It is estimated that ~~728~~ gallons of Pavement Marking Paint will be required for final striping in two applications as follows:

411
 White.....~~408~~ Gal.
 Yellow.....~~320~~ Gal.

243

Beads will be included in both applications. Final striping will match the spacing of existing striping at the project termini.

The contractor shall log the type, size, color and location of existing lane markings for duplication prior to paving operations. All lane markings shall be laid out by the contractor on the new surface for final striping. This work will not be measured and paid for separately but shall be included in the cost of the item.

Department maintenance forces anticipate the need for an estimated 1,500 tons of Hot Bituminous Pavement (Grading SX)(75) for their work outside the project. The contractor will furnish this material at the hot plant loaded onto the Department's trucks. This material will be paid for under a separate agreement with the Department. To establish a price, 1 ton of Furnish Hot Bituminous Pavement is estimated for this project. ✓


A truck turn-around at Mile Post 39.2 may be paved as extra work. It is estimated that ~~150~~ tons will be required for a two-inch thickness. This location has now been prepared with rotomillings for surfacing. ✓

224

COLORADO PROJECT
STA 0641-011

As Constructed
No Revisions:
Revised: 8-1-01
Void:

INDEX			CONTRACT ITEM NUMBER	CONTRACT ITEM	PROJECT TOTALS		
B O O K	P A G E	S H E E T			UNIT	PLAN QUANTITY	AS CONST.
0005			202-01130	Removal of Guardrail Type 3	LF	400	400
0010			203-01500	Blading	HOURL	20	-0-
0015			304-07000	Aggregate Base Course (Class 7)	TON	2,200	2,642
0020			403-09500	Furnish Hot Bituminous Pavement	TON	1	0
0025			403-34701	Hot Bituminous Pavement (Grading SX) (75)	TON	13,879	13,023
0030			411-03342	Asphalt Cement Performance Grade (PG 64-28)	TON	697	623
0035			411-03352	Asphalt Cement Performance Grade (PG 58-28)	TON	64	65
0040			606-00301	Guardrail Type 3 (6-3 Post Spacing)	LF	400	400
0045			606-02001	End Anchorage (Slotted Rail Terminal)	EACH	4	4
0115			620-00001	Field Office (Class 1)	EACH	1	1
0120			620-00012	Field Laboratory (Class 2)	EACH	1	1
0125			620-00020	Sanitary Facility	EACH	1	1
0050			626-00000	Mobilization	L S	1	1
0055			627-00001	Pavement Marking Paint	GAL	728	654

Computer File Information		<p align="center">SUMMARY OF APPROXIMATE QUANTITIES</p> 		Project No./Code	
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Last Modification Date:	Initials:	Designer:	Region: 3410	13106	
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Drawing File Name: 13106_Sheet8					
Acad Ver. R14 W					

COLORADO PROJECT

STA 0641-011


As Constructed

No Revisions:

Revised: **8-1-01**

Void:

INDEX			CONTRACT ITEM NUMBER	CONTRACT ITEM	PROJECT TOTALS		
B O O K	P A G E	S H E E T			UNIT	PLAN QUANTITY	AS CONST.
0060			630-00000	Flagging	HOUR	1,200	744.75
0065			630-00001	Pilot Car Operation	HOUR	150	109
0070			630-00002	Traffic Control Supervisor	DAY	30	19
0075			630-00007	Traffic Control Inspection	DAY	12	14
0080			630-80341	Construction Traffic Sign (Panel Size A)	EACH	14	6
0085			630-80342	Construction Traffic Sign (Panel Size B)	EACH	34	30
0090			630-80380	Traffic Cone	EACH	125	125
				FORCE ACCOUNT			
				=====			
0095			700-70010	F/A Minor Contract Revisions	F A	1	-0-
0100			700-70022	F/A OJT Pilot	F A	1	-0-
0105			700-70025	F/A Quality Incentive Payment \$12,363.11	F A	1	-1-
0110			700-70028	F/A ESB Program	F A	1	-0-

Computer File Information		SUMMARY OF APPROXIMATE QUANTITIES		Project No./Code	
Creation Date: 23-Oct-2000	Initials:			STA 0641-011	
Last Modification Date:	Initials:			13106	
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Drawing File Name: 13106_Sheet9	Detailer:	Unit Leader:			
Acad Ver. R14 W					

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NO REVISIONS	REVISED	VOID	VIII	COLO.	STA 0641-011	10

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SURFACING TABULATION

M.P. TO M.P.	SOURCE	PAVEMENT WIDTH	2" H.B.P. (Gr. SX) (75)	FOR INFO. ONLY	*** ASPHALT CEMENT (PG 64-28)	*** ASPHALT CEMENT (PG 58-28)
				TACK COAT Emulsified Asphalt (Slow Setting)	TON	TON
		FT.	TON	GAL.	TON	TON
S. H. 64 38.00 to 44.00	CENTRAL ROAD IRREGULARITIES	30	11,614 11,312	5,280 4000	} 623	} 65
LEVELING (1") 41.3 TO 42.3		30	988 987	888 700		
MAINT TURN-ROUND STA-55+00		VARIES	224			
ROAD APPROACHES			55	446		
IRREGULARITIES			1,262	101	53	8
TOTAL			13,870 13,023	6,306 4801	697 623	64 65

*** QUANTITY OF ASPHALT CEMENT ESTIMATED AT 6.0% FOR H.B.P.

ACTUAL QUANTITY WILL VARY, DEPENDING ON AGGREGATE GRADATION AND SOURCES PROVIDED BY THE CONTRACTOR.

IT IS ESTIMATED THAT ~~2200~~ TONS OF AGGREGATE BASE COURSE (CLASS 7) WILL BE REQUIRED FOR SHOULDER GRAVEL.

2642

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8701

ROAD APPROACH TABULATION ✓

M.P.	DESCRIPTION	SIDE	WIDTH	PAVEMENT LENGTH	RADIUS	TONS	
						HOT BITUMINOUS PAVEMENT (GRADING SX)	ASPHALT CEMENT
			FEET				
38.10	Field	Rt.	16	4	20	0.8	0.048
38.20	Field	Lt.	16	4	20	0.8	0.048
38.35	Field	Rt.	16	4	20	0.8	0.048
39.15	Pullout	Lt.	250	4	-	12.2	0.732
39.25	Pullout	Rt.	250	4	-	12.2	0.732
39.25	Field	Rt.	16	4	20	0.8	0.048
39.30	Private	Lt.	20	4	75	1.0	0.060
41.00	Field	Lt.	16	4	20	0.8	0.048
41.00	Field	Rt.	16	4	20	0.8	0.048
42.15	Field	Lt.	16	4	20	0.8	0.048
42.35	Pullout (old rd.)	Lt.	20	4	20	1.0	0.060
42.75	Private	Lt.	20	4	75	1.0	0.060
43.10	Field	Lt.	16	4	20	0.8	0.048
43.55	Field	Lt.	16	4	20	0.8	0.048
PROJECT TOTAL - ALL ABOVE PAVED - NO						34.6	2.076

NOTE: TOTALS CARRIED TO SURFACING TABULATION. ✓

INDIVIDUAL

QUANTITY

AVAILABLE

AS CONSTRUCTED				FED. ROAD REGION	DIVISION	PROJECT NO.	SHEET NO.
NO REVISIONS	<input type="checkbox"/>	REVISED	<input type="checkbox"/>	VOID	<input type="checkbox"/>	VII	COLO.
						STA 0641-011	12

8-1-01

GUARD RAIL TABULATION

M.P. TO M.P.	SIDE	#REMOVAL OF GUARDRAIL TYPE 3		GUARD RAIL TYPE 3 (6-3 POST SPACING)		END ANCHORAGE EACH	
		AS Const. LF	200	LF	AS Const.	SRT	AS CONST.
38.39 to 38.43	LT.	200	200	200	200	2	2
38.40 to 38.44	RT.	200	200	200	200	2	2
TOTAL		400	400	400	400	4	4

All Type 3 guardrail shall be galvanized steel, and posts shall be steel.

#Removal of guardrail shall include the removal of all end anchors.

AS CONSTRUCTED			FED. ROAD REGION	DIVISION	PROJECT NO.	SHEET NO.
NO REVISIONS <input type="checkbox"/>	REVERSED <input type="checkbox"/>	VOID <input type="checkbox"/>	VIA	COLO.	STA 0641-011	13

8-1-01

CONSTRUCTION TRAFFIC CONTROL DEVICES

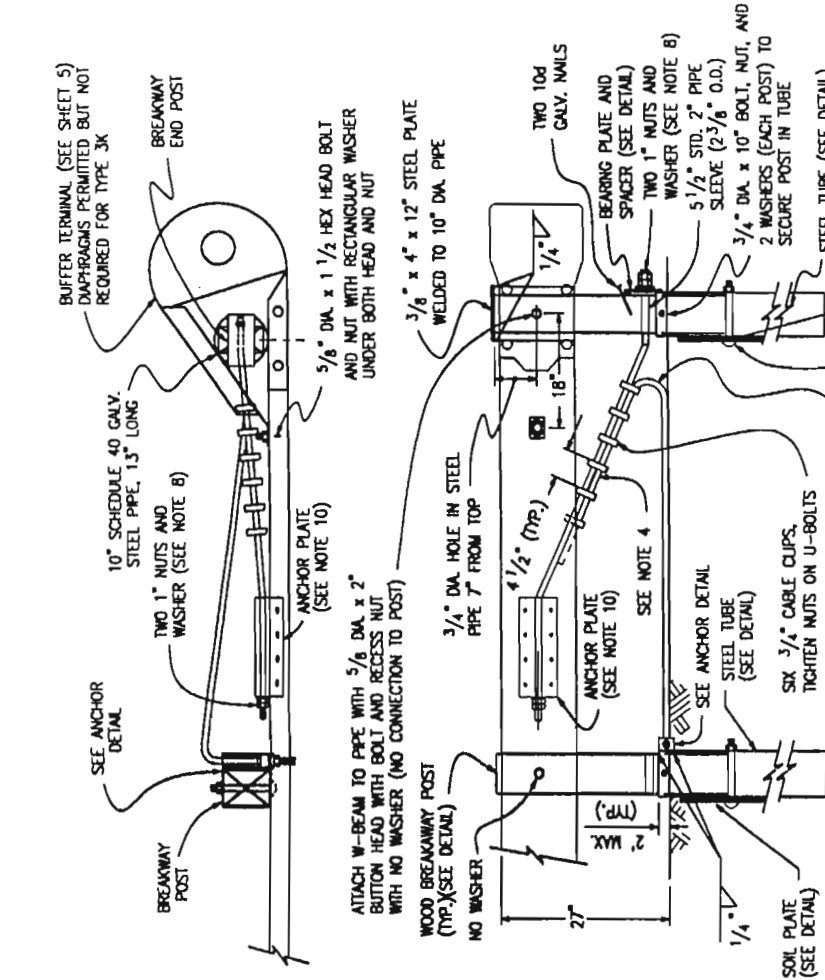
SIGN CODE	LEGEND	DIMENSIONS	PANEL SIZE (EACH)		AS CON	
			A	B		
48W 20-1	ROAD/CONSTRUCTION/AHEAD	48" X 48"		4	2	
48W 20-1	ROAD/CONSTRUCTION/1/2 MILE	48" X 48"		2	2	
60G 20-1	ROAD/CONSTRUCTION/NEXT <u>6</u> MILES	60" X 36"		2	2	
48W 20-7a	FLAGGER (Symbol)	48" X 48"		4	4	
48W 20-51a	GIVE 'EM A/BRAKE	48" X 48"		2	2	
R4-1	DO/NOT/PASS	24" X 30"	2	2-		
R4-2	PASS/WITH/CARE	24" X 30"	2	2-		
48W 20-13R	SHOULDER DROP-OFF (Symbol)	48" X 48"		6	2	
36W 20-13a	SHOULDER/DROP-OFF	24" X 18"		6		
48W 21-14(L)	UNEVEN LANES (Symbol)	48" X 48"		2	2	
30W 21-14a	UNEVEN/LANES	30" X 24"	2			
48W 20-4	ONE LANE/ROAD/AHEAD	48" X 48"		2	2	
48W 8-1	BUMP	48" X 48"		2	4	
36R 2-1(40)	SPEED/LIMIT/40	36" X 48"		2	2	
36R 2-1(40)	SPEED/LIMIT/50	36" X 48"		2	2	
36SR52-4	BEGIN/FINES/DOUBLED/FOR/SPEEDING	36" X 24"		2	2	
36SR52-5	END/FINES/DOUBLED/FOR/SPEEDING	36" X 24"		2	2	
48G 20-10	THANK YOU / * / ** /	48" X 24"	2	2-		
TOTAL			6	14	34	30
CHANNELIZING AND WARNING DEVICES					EACH	
TRAFFIC CONE (28")					(125) ✓	

* CONTRACTOR'S NAME

** CONTRACTOR'S PHONE NUMBER

GENERAL NOTES

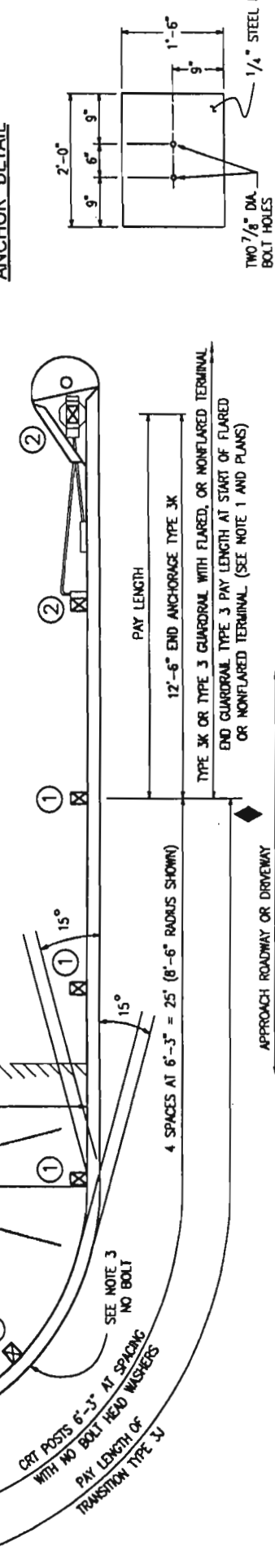
- APPLICATION: THE TYPE 3J END ANCHORAGE MAY BE USED TO SHIELD HAZARDS AT THE INTERSECTION OF TWO ROADWAYS. TYPICAL APPLICATIONS INCLUDE, BUT ARE NOT LIMITED TO, THE FOLLOWING:
 - CANAL SERVICE ROADS AT BRIDGE ENDS.
 - INTERRUPTIONS IN GUARDRAIL RUNS BY INTERSECTING ROADWAYS, ETC.
- THE LOW SPEED TYPE 3K END ANCHORAGE SHALL BE USED ONLY ON APPROVED AND LOW SPEED SERVICE ROADS. WHENEVER AN APPROVED CRASH-TESTED END TREATMENT IS REQUIRED, USE THE FLARED OR NONFLARED TERMINAL WITH 37 FT.-6 IN. LENGTH.
- GRADING AND PAVING FOR THE 3J & 3K SHALL MATCH THE GRADING AND PAVING OF THE GUARDRAIL THAT THEY ARE ATTACHED TO AND SHALL BE IN ACCORDANCE WITH SHEET ONE OF THIS STANDARD. MAX. FILL SLOPE SHALL BE 2:1.
- THE RAIL IS NOT BOLTED TO THE CRT POST AT THE CENTER OF THE CURVE FOR THE 8 FT.-6 IN., 17 FT., AND 25 FT.-6 IN. RADI. PLATES SHALL CONFORM TO ASTM A 36M, AND THE STRUCTURAL TUBING TO ASTM A 500.
- IF IN GALVANIZED WIRE ROPE (CABLE) SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M 30 TYPE II.
- PLATES SHALL CONFORM TO ASTM A 36, AND STRUCTURAL TUBING TO ASTM A 500. WELDING SHALL MEET ALL REQUIREMENTS OF THE AMERICAN WELDING SOCIETY.
- ALL STRUCTURAL STEEL SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A 123. NO PUNCHING, DRILLING, CUTTING OR WELDING WILL BE PERMITTED AFTER GALVANIZING.
- WHEN THE SOIL PLATE WELDED OPTION IS SELECTED, SOIL PLATE CONNECTION BOLT HOLES ARE NOT REQUIRED.
- OUTSIDE NUT SHALL BE TORQUED AGAINST INSIDE NUT WITH THE CABLE INSTALLED TAUT BETWEEN THE ANCHOR PLATE AND FIRST POST.
- ALL CURVED GUARDRAIL SHALL BE SHOP BENT.
- SEE SHEET 5 FOR ANCHOR PLATE AND OTHER DETAILS.
- THE STEEL TUBE MAY BE DRIVEN WITH WOOD POST INSERTED IF NO DAMAGE OCCURS TO THE POST OR BOLTS.



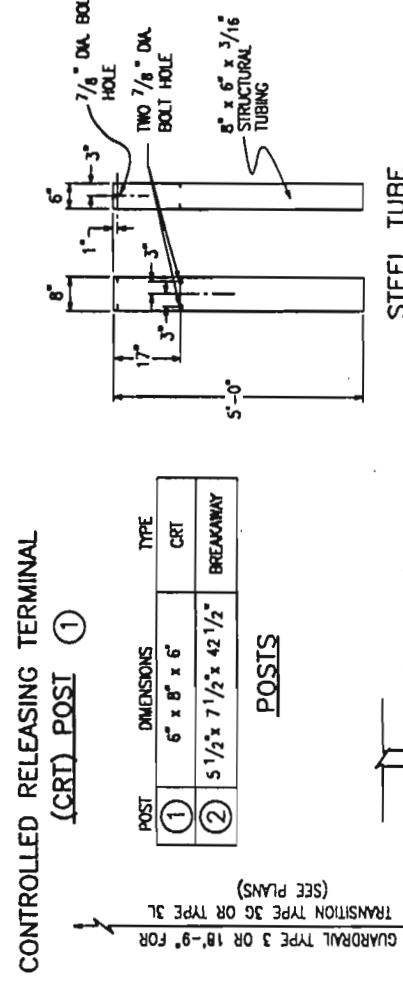
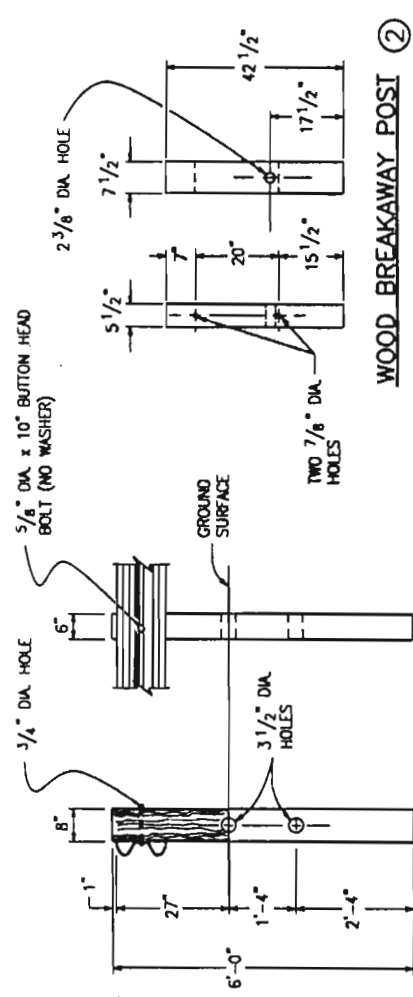
LOW SPEED TERMINAL - TYPE 3K

TRANSITION TYPE 3J APPLICATION

RADIUS	ANGLE	NO. CRT POSTS	AREA FREE OF FIXED OBJECTS	L	W	75K	90K	105K
8'-6"	75°-105°	5	25'	15'	15'	11'	13'	15'
17'	75°-90°	6	30'	15'	15'	22'	27'	31'
25'-6"	91°-105°	7	40'	20'	20'	33'	40'	47'
	86°-95°	8	50'	20'	20'	46'	55'	64'
	96°-105°	9						
	75°-85°	10						
	86°-95°	11						
	96°-105°	11						



INTERSECTING ROADWAYS TRANSITION - TYPE 3J TRANSITION



STEEL TUBE

WOOD BREAKAWAY POST

CONTROLLED RELEASING TERMINAL (CRT) POST

POSTS

STEEL TUBE

WOOD BREAKAWAY POST

CONTROLLED RELEASING TERMINAL (CRT) POST

POSTS

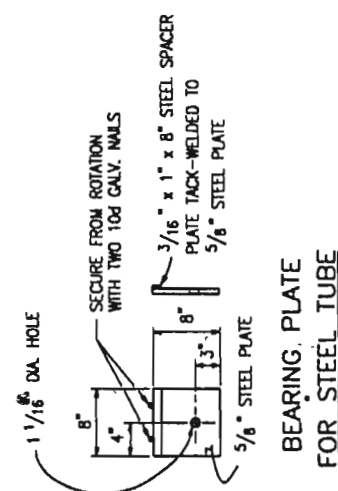
STEEL TUBE

WOOD BREAKAWAY POST

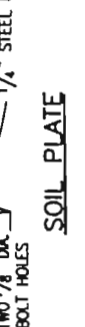
CONTROLLED RELEASING TERMINAL (CRT) POST

POSTS

STEEL TUBE



ANCHOR DETAIL



SOIL PLATE

GUARDRAIL TYPE 3 STANDARD PLAN NO.

W-BEAM M-606-1

Sheet No. 11 of 15

Computer File Information

Standard Plan Revised

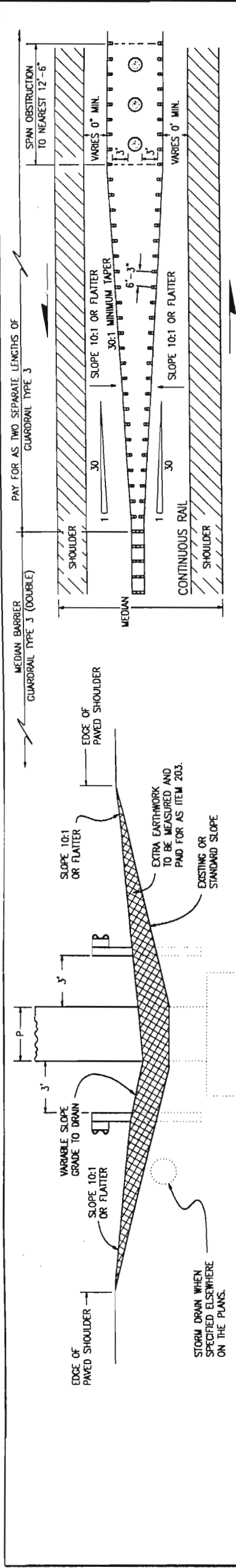
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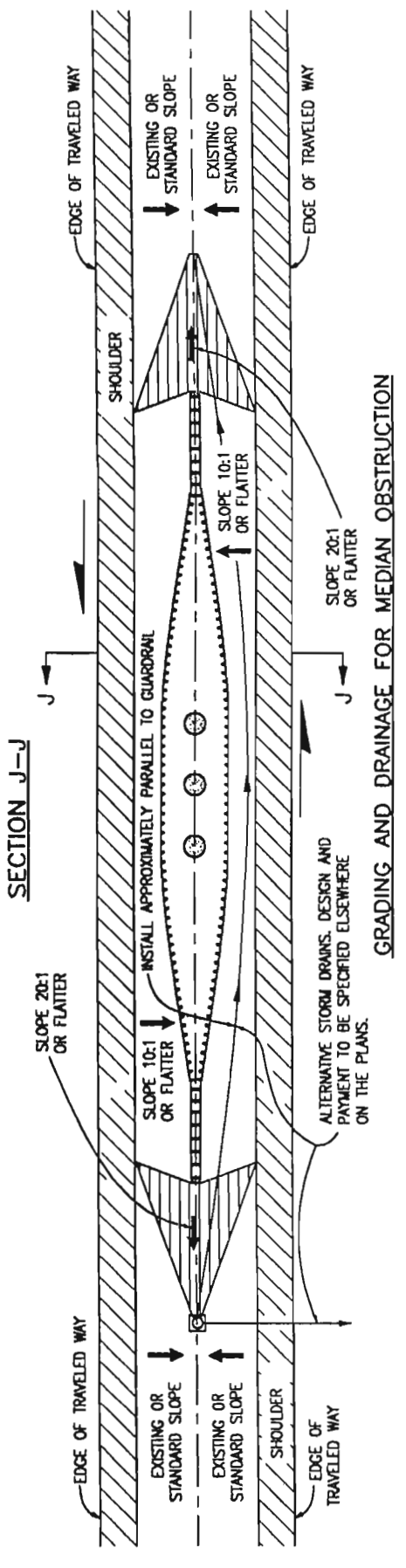
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Standard Plan Revised

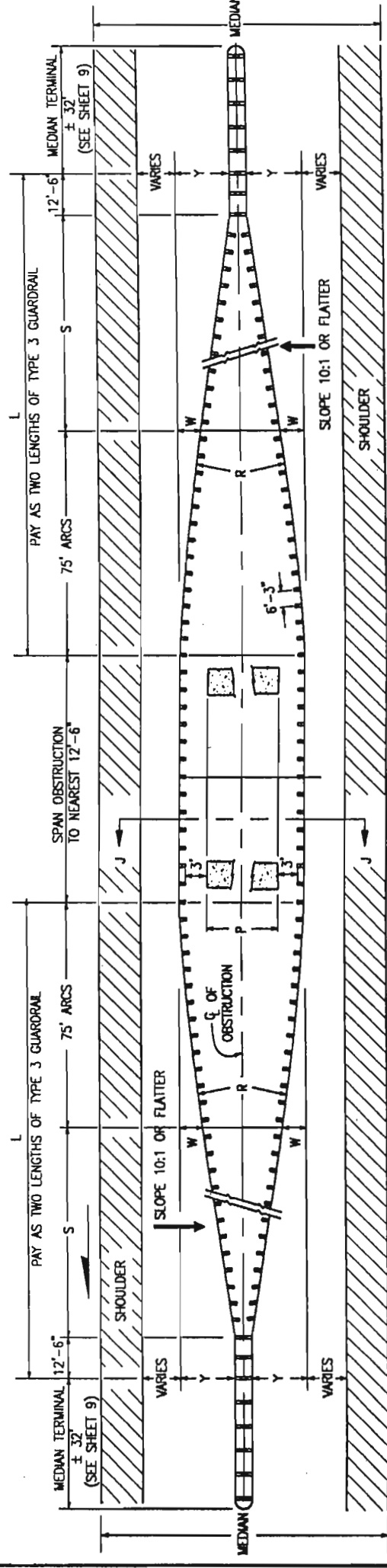
Issued By: Project Development Branch September 1, 2000



OBSTRUCTION IN MEDIAN 30 FT. WIDE OR LESS

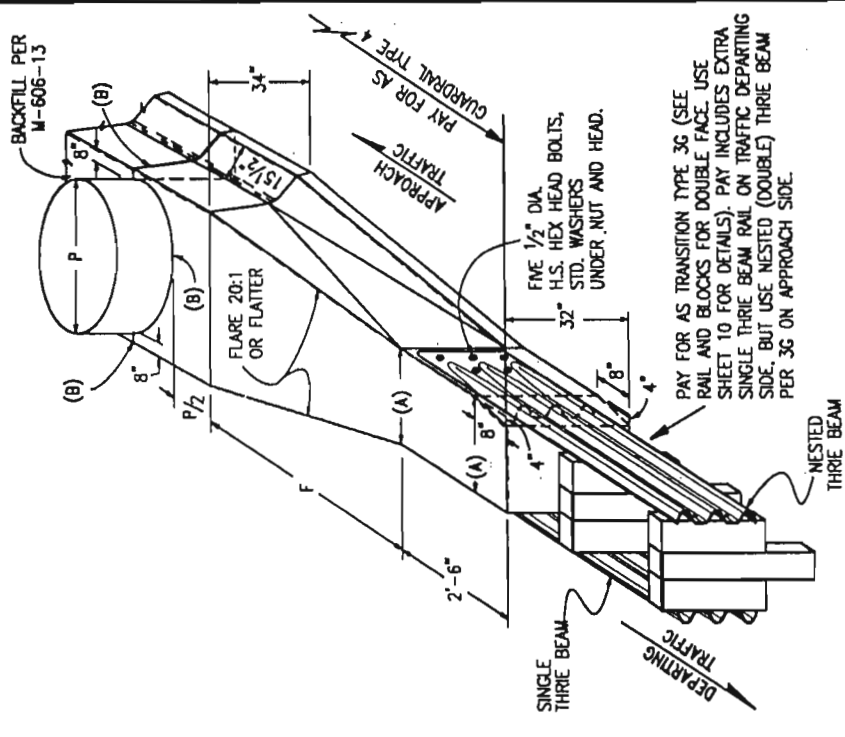


GRADING AND DRAINAGE FOR MEDIAN OBSTRUCTION



P	1'	2'	3'	4'	5'	6'	7'	8'	9'	10'	11'	12'	13'	14'	15'	16'	17'	18'	19'	20'	21'	22'
Y	4.1'	4.6'	5.1'	5.6'	6.1'	6.6'	7.1'	7.6'	8.1'	8.6'	9.1'	9.6'	10.1'	10.6'	11.1'	11.6'	12.1'	12.6'	13.1'	13.6'	14.1'	14.6'
W	1.4'	1.9'	2.4'	2.9'	3.4'	3.9'	4.1'	3.6'	4.1'	3.6'	3.9'	3.5'	3.7'	4.0'	3.6'	3.8'	4.0'	3.7'	3.9'	3.6'	3.8'	4.0'
R	2009'	1480'	1171'	969'	827'	720'	852'	760'	685'	781'	720'	803'	760'	702'	781'	702'	702'	760'	720'	781'	739'	702'
S		25'					37'-6"		50'		62'-6"		75'		87'-6"		100'					
L			112'-6"				125'		137'-6"		150'		162'-6"		175'		187'-6"					

P	F
1'	10'
2'	18'
3'	28'
4'	38'
5'	48'



- (A). TIMBER POSTS 2 FT., STEEL POSTS 1 FT.-6 IN.
- (B). 1/2 IN. PREFORMED JOINT MATERIAL

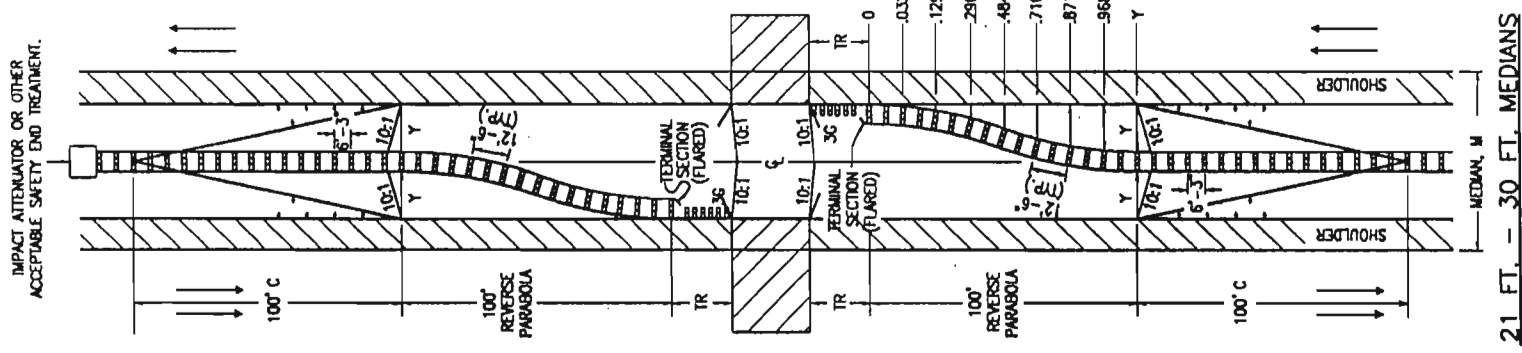
NARROW MEDIAN DETAIL
USUALLY LESS THAN 30 FT. WIDE MEDIAN WITH ALL PAVED SURFACE

OBSTRUCTIONS IN MEDIANS

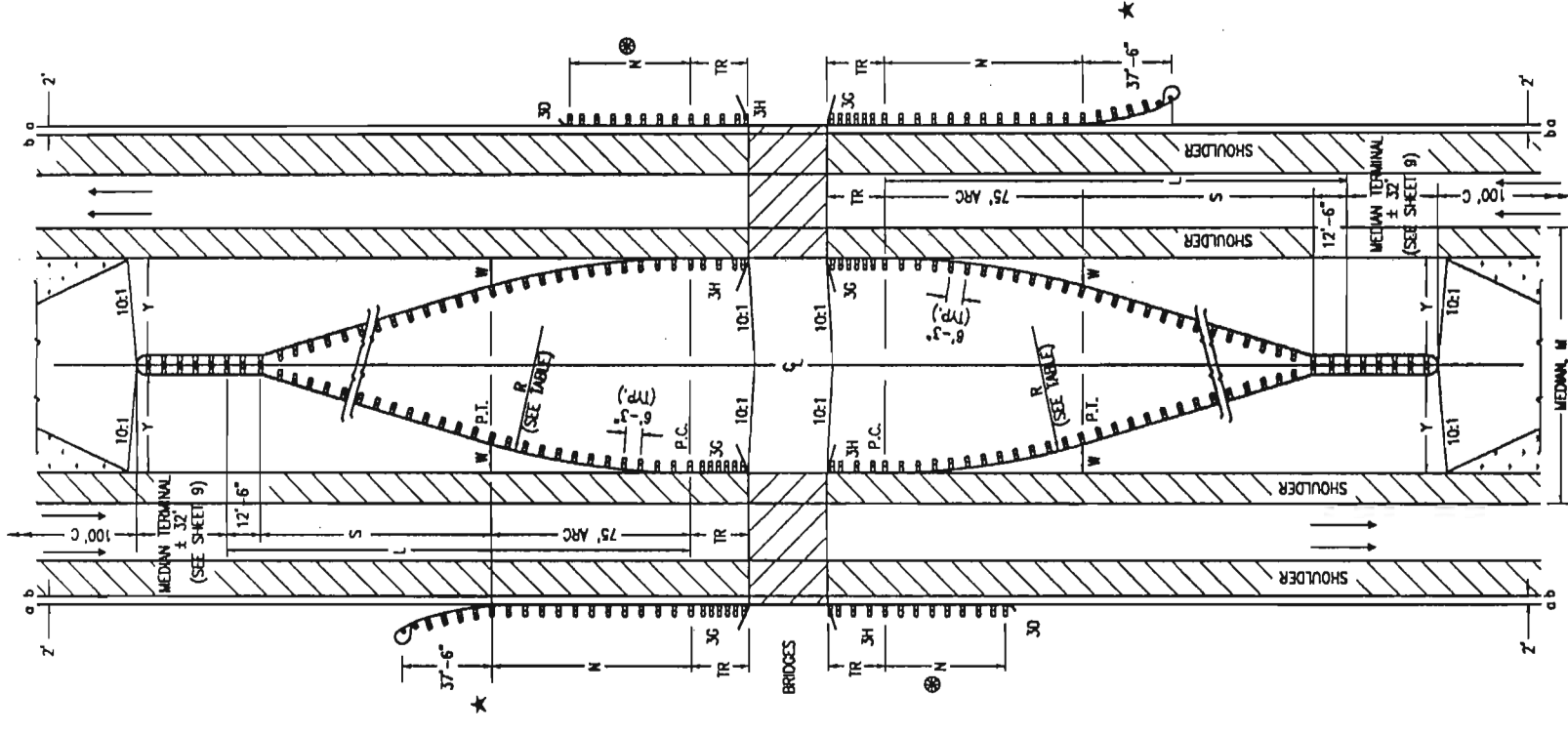
GUARDRAIL FOR OBSTRUCTION IN MEDIANS WIDER THAN 30 FT.
NOTE: FOR OBSTRUCTIONS WIDER THAN 22 FT. USE THE DETAILS SHOWN ON SHEET 13 FOR MEDIANS WIDER THAN 30 FT.

<p>Colorado Department of Transportation 4201 East Arkansas Avenue Denver, Colorado 80222 Phone: (303) 757-9083 FAX: (303) 757-9820</p>	<p>Computer File Information Path: www.dot.state.co.us/Business/Design/Standards/MSStandards Drawing File Name: 60601012015.dwg Acad Version: R14 Scale: NA Units: English</p>	<p>Standard Plan Revised Date: 04-06-98 Comments: Safety/Design Improvements 05-07-99 Safety/Proprietary Improvements 01-05-00 Safety/Proprietary Improvements</p>	<p>GUARDRAIL TYPE 3 W-BEAM</p>	<p>STANDARD PLAN NO. M-606-1</p>
	<p>Project Development Branch SD</p>			<p>Sheet No. 12 of 15</p>

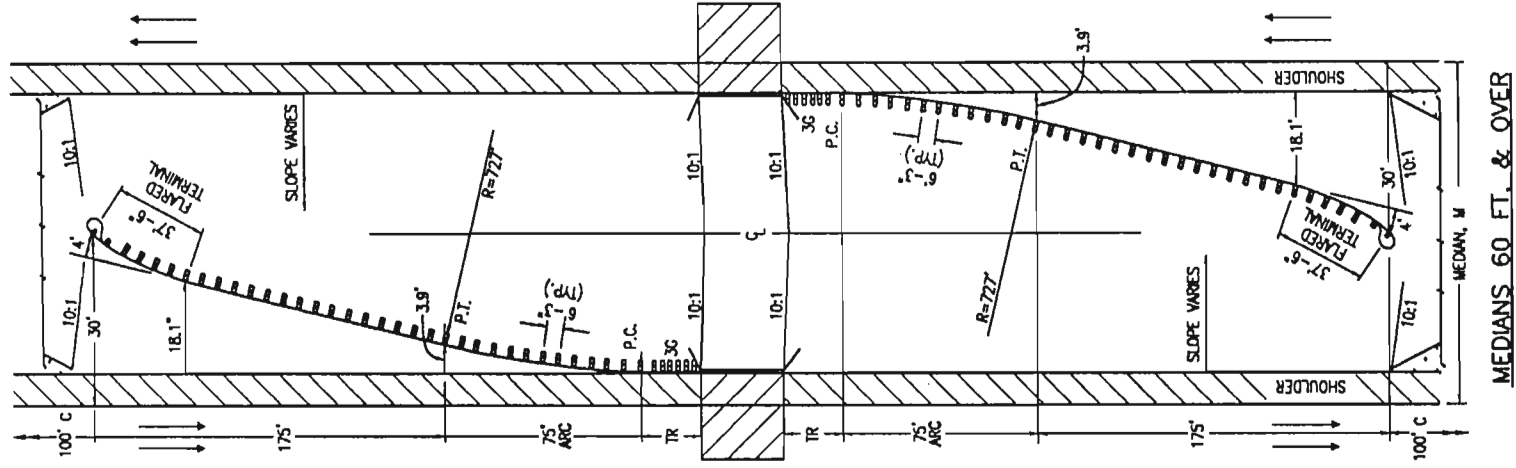
IMPACT ATTENUATOR OR OTHER ACCEPTABLE SAFETY END TREATMENT.



21 FT. - 30 FT. MEDIAN



31 FT. - 59 FT. MEDIAN



MEDIAN 60 FT. & OVER

RIGHT SHOULDER GUARDRAIL IS THE SAME FOR ALL MEDIAN WIDTHS. LENGTHS SHOWN ARE MINIMUM. ADDITIONAL LENGTH TO SATISFY GUARDRAIL WARRANTS SHALL BE PROVIDED.

31 FT. - 59 FT. MEDIAN

MEDIAN W	END Y	ARC W	RADIUS R	EXTENS. S	LENGTH L
FT.	FT.	FT.	FT.	FT.	FT.
31	10.5	3.9	720	62.5	150.0
32	11.0	4.2	669		
33	11.5	3.8	739	75.0	162.5
34	12.0	4.0	702		
35	12.5	4.2	669		
36	13.0	3.9	720	87.5	175.0
37	13.5	4.1	685		
38	14.0	3.8	739		
39	14.5	3.9	720	100.0	187.5
40	15.0	4.1	685		
41	15.5	3.9	720		
42	16.0	4.0	702	112.5	200.0
43	16.5	4.2	669		
44	17.0	3.9	720	125.0	212.5
45	17.5	4.0	702		
46	18.0	3.8	739		
47	18.5	4.0	702	137.5	225.0
48	19.0	4.1	685		
49	19.5	3.9	720		
50	20.0	4.0	702	150.0	237.5
51	20.5	4.1	685		
52	21.0	3.0	720	162.5	250.0
53	21.5	4.0	702		
54	22.0	3.9	739		
55	22.5	4.0	702	175.0	262.5
56	23.0	4.1	685		
57	23.5	3.0	739		
58	24.0	4.0	702	187.5	275.0
59	24.5	4.1	685		

DO NOT CONSTRUCT THE TR AND GUARDRAIL ON THE TRAILING BRIDGE ENDS IF SITE CONDITIONS DO NOT WARRANT THE USE OF GUARDRAIL.

N = SHOWN ON PLANS. LENGTH TO SHIELD ALL HAZARDS IS BASED ON GUARDRAIL'S LENGTH OF NEED COMPUTATION. SEE AASHTO ROADWAY DESIGN GUIDE. MINIMUM 12 FT. - 6 IN. WHERE SITE CONDITIONS ALLOW. THE TOTAL LENGTH OF NEED WILL INCLUDE THE LENGTH OF TRANSITION, THE LENGTH OF RAIL AND ANY REDIRECTIVE LENGTH IN THE RAIL END TREATMENT.

THE TABLE IS BASED ON 4 FT. SHOULDER.

EDGE OF 8 FT. OR 10 FT. SHOULDER.

EDGE OF 6 FT. OR LESS SHOULDER.

CHANGE: 100 FT. TRANSITION TO NORMAL SLOPE.

RADIUS OF 75 FT. ARC.

STRAIGHT EXTENSION, TANGENT TO ARC, FROM NO GUARDRAIL TYPE 3 (DOUBLE) ATTACHED TO MEDIAN TERMINAL.

TR = 18 FT. - 9 IN. FOR 3G AND 3H.

OFFSET AT END OF ARC.

FINAL OFFSET AT END.

TOTAL LENGTH PAD FOR AS GUARDRAIL TYPE 3.

WIDTH OF MEDIAN.

CAN USE FLARED OR NONFLARED TERMINAL.

MULTILANE DIVIDED HIGHWAYS - (DEPRESSED MEDIAN)

Standard Plan Revised

Date:	Comments:
04-06-98	Safety/Design Improvements
05-07-99	Safety/Proprietary Improvements
01-05-00	Safety/Proprietary Improvements

Computer File Information

Path:	www.dot.state.co.us/Business/Design/Standards/MSStandards
Drawing File Name:	6060101.3015.dwg
Acad Version:	R14
Scale:	NA
Units:	English

Colorado Department of Transportation

4201 East Arkansas Avenue
Denver, Colorado 80222
Phone: (303) 757-9083 FAX: (303) 757-9820



Project Development Branch SD

GUARDRAIL TYPE 3 STANDARD PLAN NO.

W-BEAM

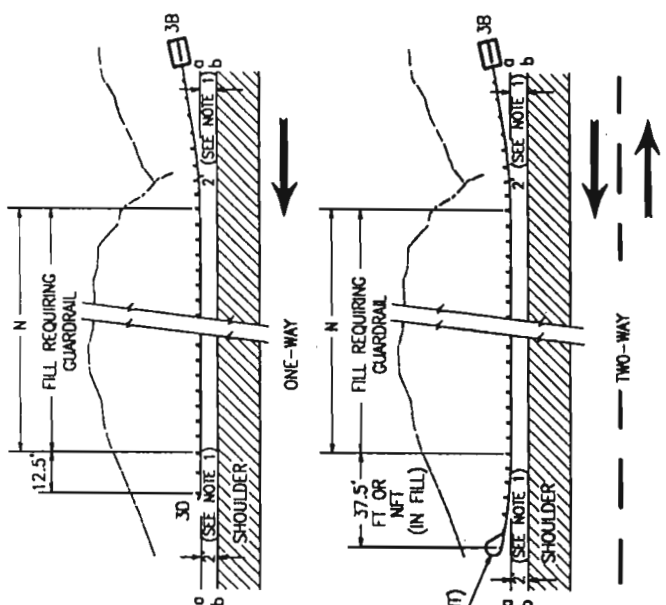
M-606-1

Sheet No. 13 of 15

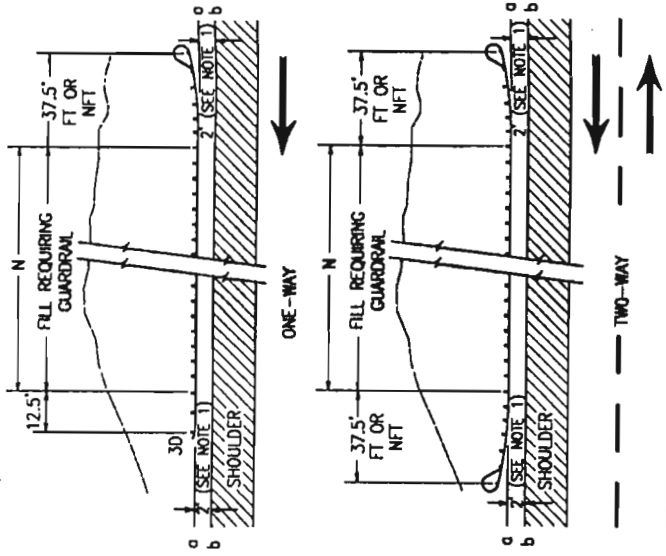
Issued By: Project Development Branch September 1, 2000

GENERAL NOTES

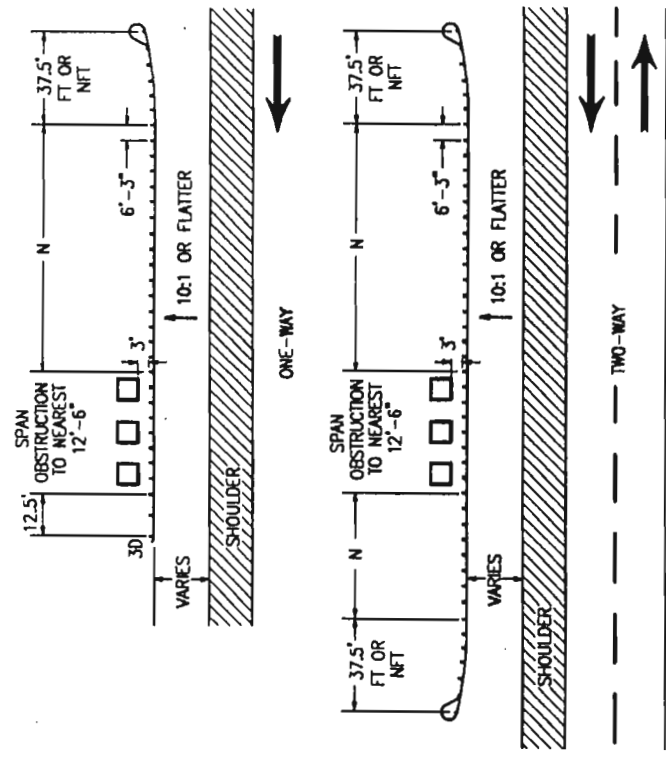
1. THE 2 FT. OFFSET FROM THE EDGE OF THE PAVED SHOULDER TO THE FACE OF THE GUARDRAIL (FOR SHOULDERS 6 FT. OR LESS IN WIDTH) IS DESIRABLE BUT NOT MANDATORY WHEN THE ROADWAY DESIGN SPEED IS LESS THAN 50 MPH. THE MINIMUM OFFSET OF GUARDRAIL FROM THE EDGE OF TRAVELED WAY IS 4 FT. "a" IS THE EDGE OF AN 8 FT. OR 10 FT. SHOULDER. "b" IS THE EDGE OF AN 6 FT. OR LESS SHOULDER. SEE NOTES AND DETAILS ON SHEETS 1, 13, & 15.
2. THE TYPE 3C OR 3H TRANSITIONS (SHEET 10) SHALL BE USED TO CONNECT A TYPE 3 W-BEAM TO A TYPE 4 CONCRETE BARRIER OR TO A TYPE 4, 8, OR 10 BRIDGE RAIL FOR A TRANSITION FROM A ROADWAY TYPE 3 W-BEAM TO A BRIDGE RAIL TYPE 3 WITH BACKING TUBES. THE TYPE 3L TRANSITION SHOWN ON SHEET 15 SHALL BE USED.
3. "TR" WILL BE 18 FT.-9 IN. FOR THE TRANSITIONS TYPE 3G AND 3H, AND 25 FT. FOR THE TYPE 3L TRANSITION.
4. "FT" IS THE FLARED TERMINAL AND "NFT" IS THE NONFLARED TERMINAL
5. THE GUARDRAIL LENGTH DIMENSION "N" IS THE LENGTH AS DETERMINED BY THE LENGTH OF NEED COMPUTATION AND IS SHOWN ON THE PLANS. THE MINIMUM IS 12 FT.-6 IN. WHERE SITE CONDITIONS ALLOW. THE OVERALL REQUIRED LENGTH OF NEED CAN INCLUDE THE LENGTH OF TRANSITION, THE LENGTH OF RAIL (N), AND ANY REDIRECTIVE LENGTH IN THE RAIL END TREATMENT.



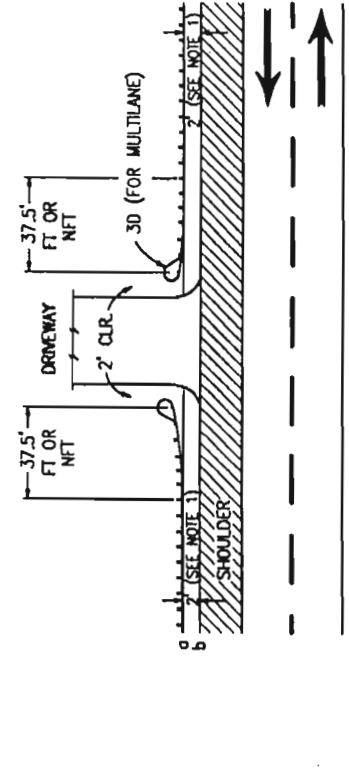
GUARDRAIL FOR ROADSIDE CUT-TO-FILL CONDITION



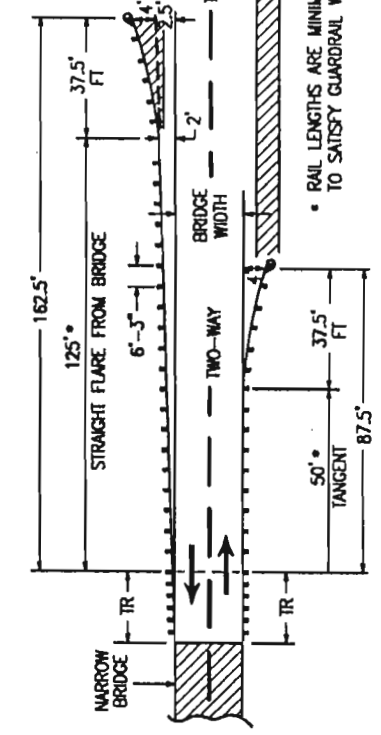
GUARDRAIL FOR ROADSIDE FILL CONSTRUCTION



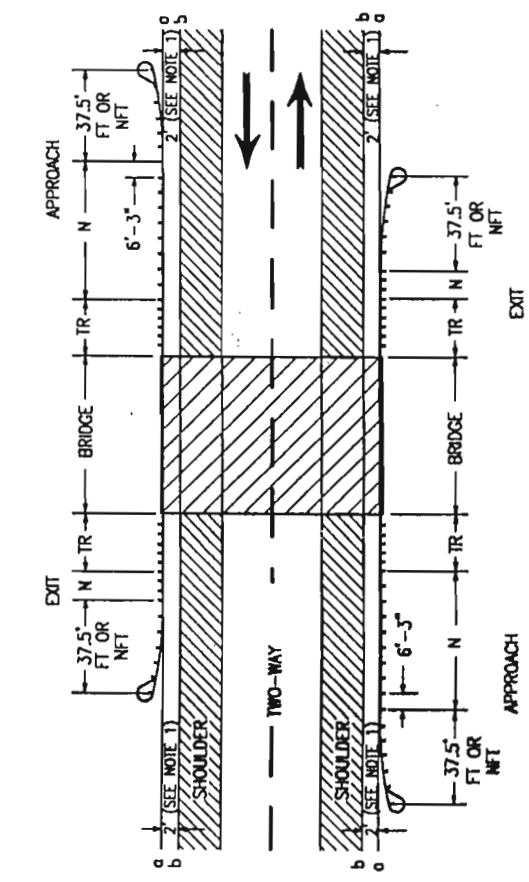
GUARDRAIL FOR ROADSIDE OBSTRUCTIONS



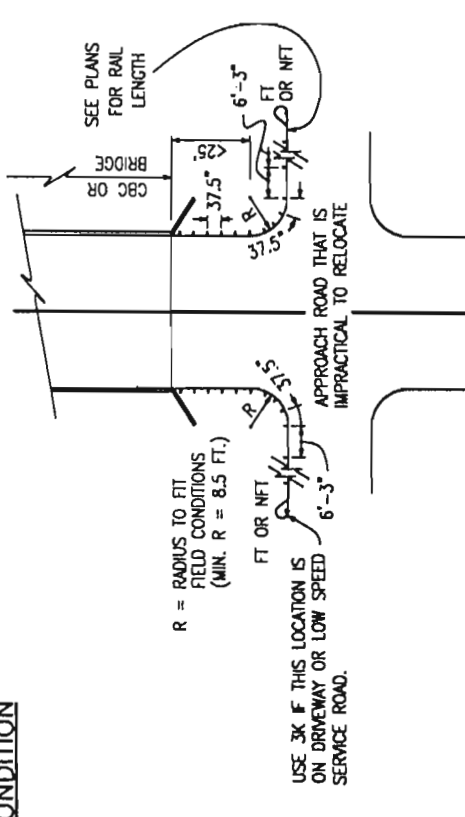
LAYOUT FOR DRIVEWAY APPROACH



2-WAY NARROW APPLICATION



2-WAY NORMAL BRIDGE APPLICATION



TYPE 3 GUARDRAIL WITH BLOCKED OUT POSTS SPACED AT 37 FT.-1/2 IN. FROM STRUCTURE AROUND CURVE.

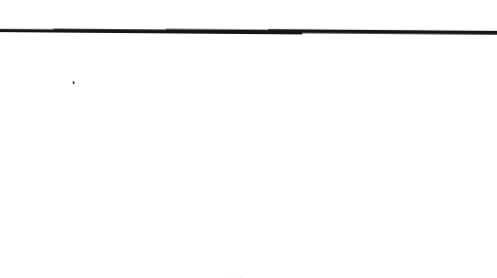
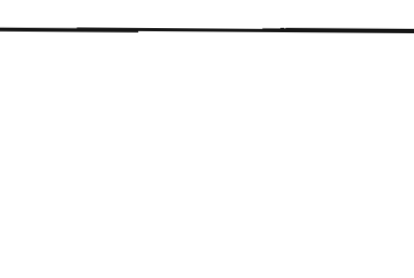
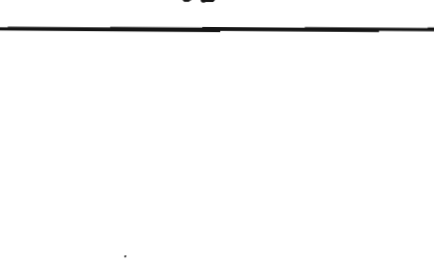
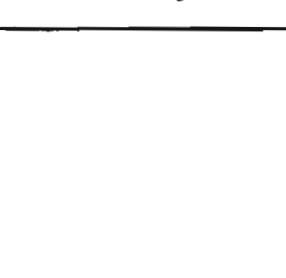
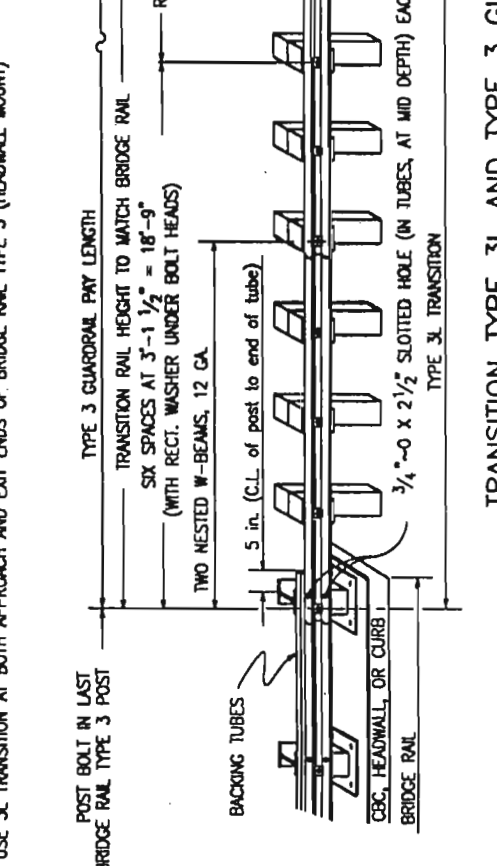
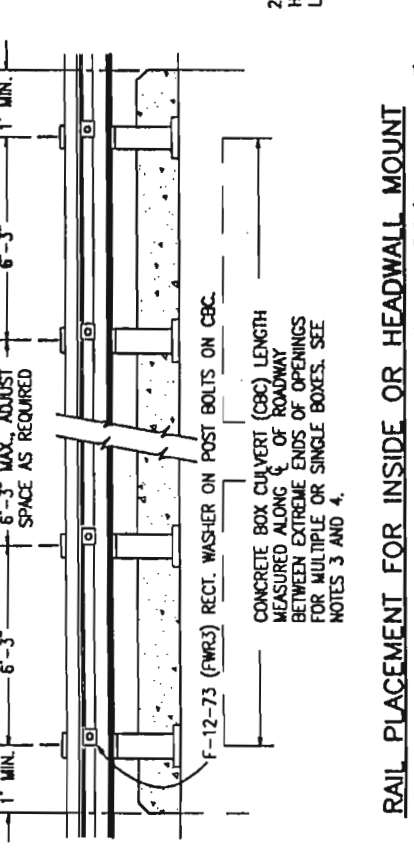
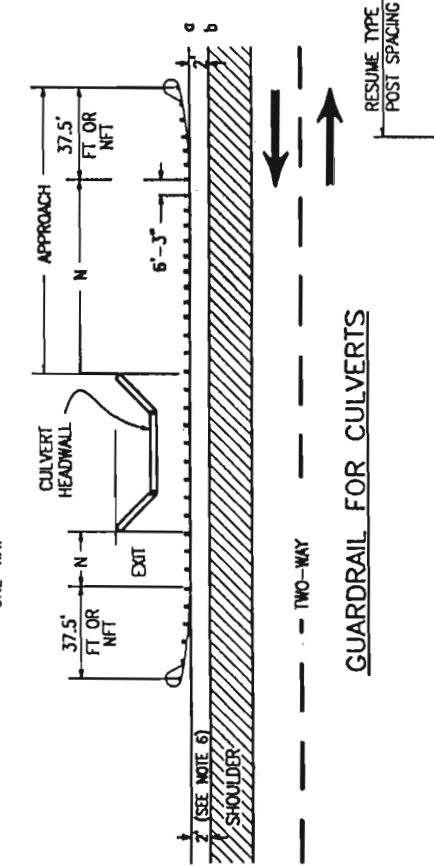
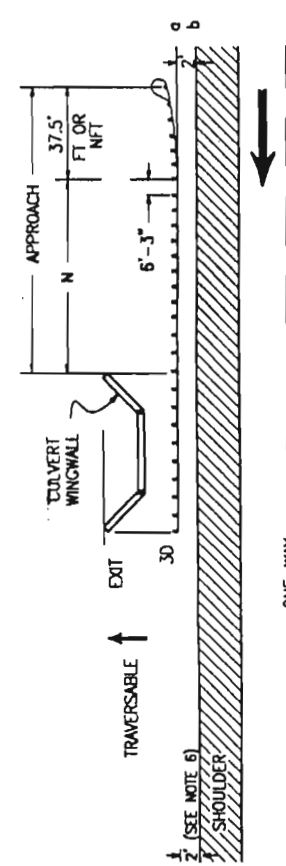
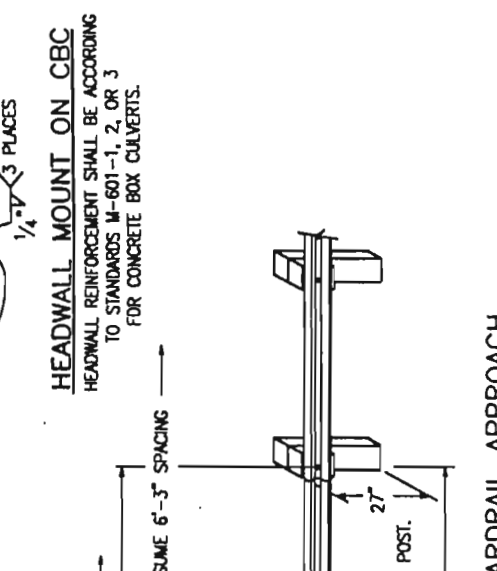
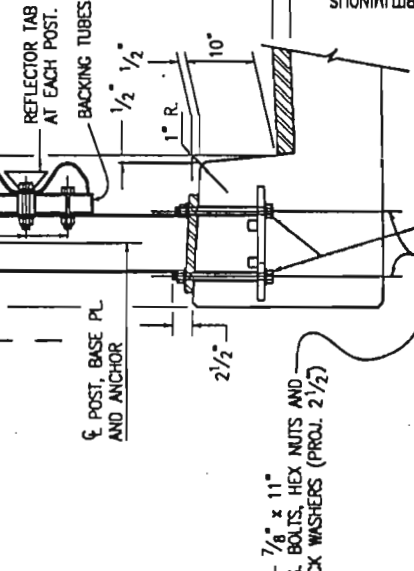
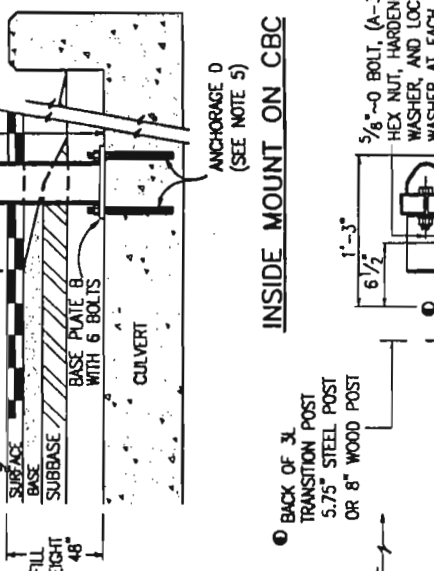
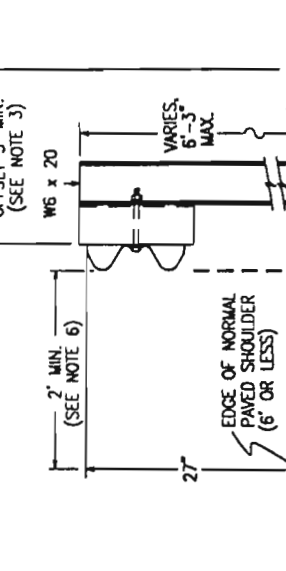
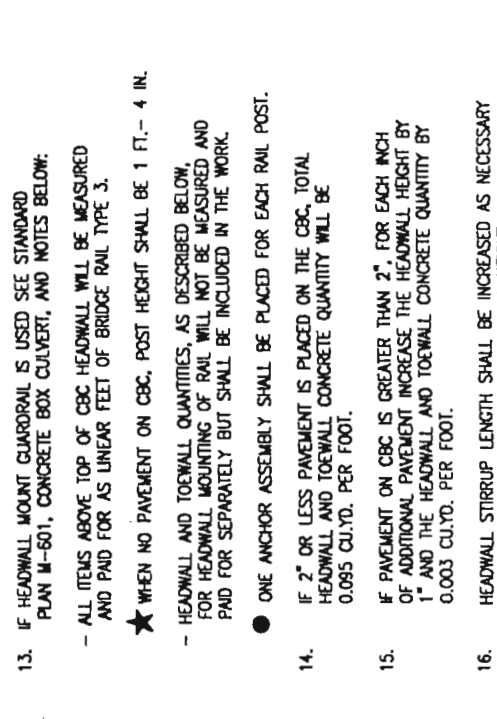
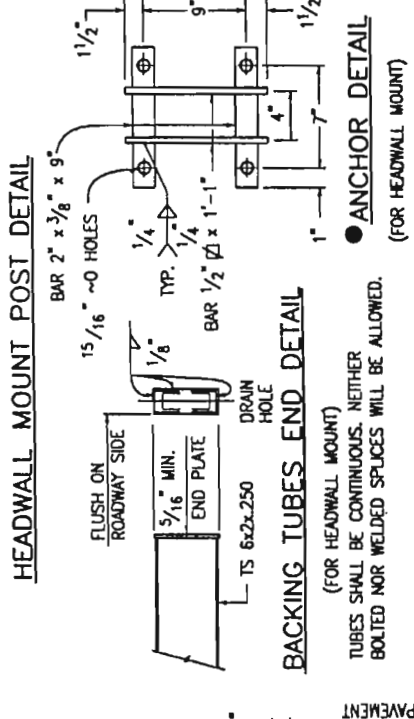
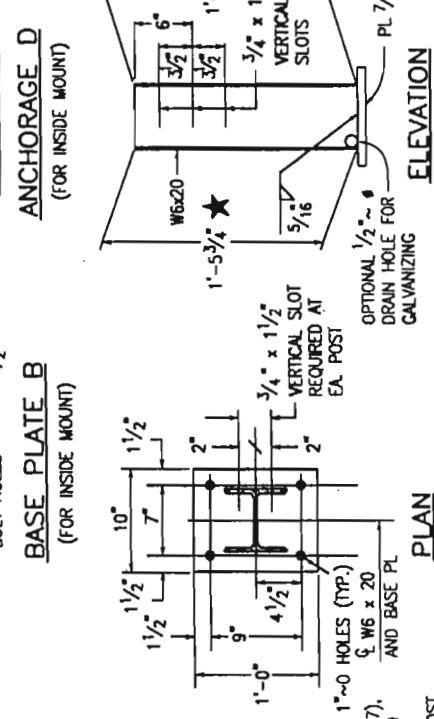
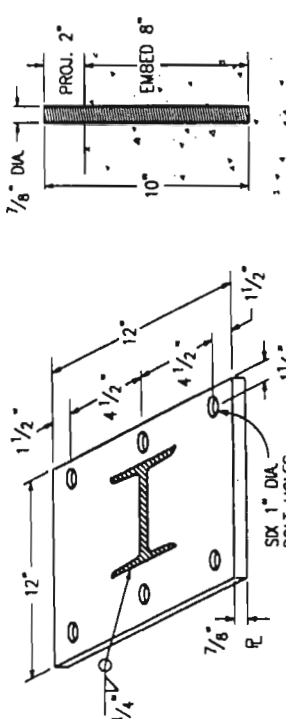
INTERRUPTED STRUCTURE APPROACH

(USE TYPE 3J ON SHEET 11 WHEN PRACTICAL)

Colorado Department of Transportation 4201 East Arkansas Avenue Denver, Colorado 80222 Phone: (303) 757-9083 FAX: (303) 757-9820	Computer File Information Path: www.dcd.state.co.us/Business/Design/Standards/MSStandards Drawing File Name: 60601014015.dwg Acad Version: R14 Scale: NA Units: English	Standard Plan Revised Date: 04-06-98 05-07-99 01-05-00 Comments: Safety/Design Improvements Safety/Proprietary Improvements Safety/Proprietary Improvements	GUARDRAIL TYPE 3 W-BEAM M-606-1
	Project Development Branch SD	Issued By: Project Development Branch September 1, 2000	STANDARD PLAN NO. Sheet No. 14 of 15

GENERAL NOTES

1. LOCATION AND LENGTH OF MEDIAN GUARDRAIL APPROACHES TO CULVERTS WITH FULL HEADWALL AND WINGWALLS SHALL BE AS SHOWN FOR BRIDGES ON SHEET 13. THE TYPE 3 GUARDRAIL SHALL CONTINUE ACROSS THE CULVERT AS SHOWN ON THIS SHEET.
2. RIGHT SHOULDER BOX CULVERT TREATMENT IS SHOWN ON THIS SHEET FOR CULVERTS 20 FT. OR LESS IN LENGTH.
3. GUARDRAIL ACROSS CULVERTS WITH A LENGTH OF 20 FT. OR LESS SHALL BE AS FOLLOWS:
 - (A) FILL HEIGHT AT GUARDRAIL POST 48 IN. OR GREATER. CONSTRUCTION AND PAYMENT AS GUARDRAIL TYPE 3.
 - (B) FILL HEIGHT AT GUARDRAIL LESS THAN 48 IN. & BLOCK FACE TO HEADWALL OFFSET OF 3 FT. OR GREATER. CONSTRUCTION AND PAYMENT AS GUARDRAIL TYPE 3.
 - (C) FILL HEIGHT AT GUARDRAIL POST 48 IN. OR LESS AND BLOCK FACE TO HEADWALL OFFSET LESS THAN 3 FT. CONSTRUCT ACCORDING TO HEADWALL MOUNT DETAILS. PAY FOR AS BRIDGE RAIL TYPE 3.
4. GUARDRAIL ACROSS CULVERTS WITH LENGTH GREATER THAN 20 FT. SHALL BE AS FOLLOWS:
 - (A) FILL HEIGHT AT GUARDRAIL POSTS 48 IN. OR GREATER. CONSTRUCTION AND PAYMENT WILL BE FOR STANDARD GUARDRAIL TYPE 3.
 - (B) FILL HEIGHT AT GUARDRAIL POSTS 47 IN. OR LESS CONSTRUCTION AND PAYMENT IN ACCORDANCE WITH THE CONTRACT BRIDGE PLANS.
5. ANCHORAGE D: SIX BOLTS FOR BASE PLATE "B" WITH INSIDE MOUNT. THE BOLTS SHALL BE 7/8 IN. DIA. x 10 IN. HIGH STRENGTH ROOFS THREADED FULL LENGTH AND ALL GALVANIZED. ROOFS SHALL BE CAST-IN-PLACE FOR A NEW STRUCTURE. FOR AN EXISTING STRUCTURE, THE ROOFS SHALL BE INSTALLED IN 1-1/4 IN. DIA. HOLES WITH NON-SHRINK GROUT OR EPOXY PER ASTM C 881.
6. THE 2 FT. OFFSET FROM THE EDGE OF THE PAVED SHOULDER TO THE FACE OF THE GUARDRAIL (FOR SHOULDERS 6 FT. OR LESS IN WIDTH) IS DESIRABLE BUT NOT MANDATORY WHEN THE ROADWAY DESIGN SPEED IS LESS THAN 50 MPH. THE MINIMUM OFFSET OF GUARDRAIL FROM THE EDGE OF TRAVELED WAY IS 4 FT. SEE NOTES AND DETAILS ON SHEETS 1, 13, AND 14.
7. TYPE 3L POSTS SHALL BE STEEL OR WOOD TO MATCH POSTS USED ON THE APPROACH GUARDRAIL.
8. "TT" IS THE FLARED TERMINAL AND "NFT" IS THE NONFLARED TERMINAL.
9. THE GUARDRAIL LENGTH DIMENSION "N" IS THE LENGTH AS DETERMINED BY THE LENGTH OF NEED COMPUTATION AND IS SHOWN ON THE PLANS. THE MINIMUM IS 12 FT.-6 IN. WHERE SITE CONDITIONS ALLOW. THE OVERALL REQUIRED LENGTH OF NEED CAN INCLUDE THE LENGTH OF TRANSITION, THE LENGTH OF RAIL (N), AND ANY REDIRECTIVE LENGTH IN THE RAIL END TREATMENT.
10. ALL BRIDGE RAIL TYPE 3 BACKING TUBES SHALL BE FABRICATED FROM ASTM A-500 GRADE B. ALL POSTS, BASE PLATES, AND ANCHOR BOLTS SHALL BE FABRICATED FROM ASTM A-36 STEEL. THE ABOVE MATERIAL, W-BEAM, AND ALL ANCHOR BOLTS AND MISCELLANEOUS BOLTS, NUTS, AND WASHERS SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH SECTION 509. CONCRETE REINFORCING STEEL AND STRUCTURAL STEEL ELEMENTS SHALL CONFORM TO THE REQUIREMENTS OF SECTIONS 601, 602, AND 509, RESPECTIVELY.
11. POST ANCHORS, ENCASED IN CONCRETE, SHALL BE ASTM A-36 STEEL, AND NEED NOT BE GALVANIZED.
12. PRIOR TO FABRICATION OF BRIDGE RAIL, THREE SETS OF WORKING DRAWINGS WHICH COMPLY WITH THE REQUIREMENTS OF SECTION 105 SHALL BE SUBMITTED TO THE ENGINEER FOR INFORMATION ONLY.



BASE PLATE B (FOR INSIDE MOUNT)

ANCHORAGE D (FOR INSIDE MOUNT)

PLAN

ELEVATION

HEADWALL MOUNT POST DETAIL

BACKING TUBES END DETAIL

ANCHOR DETAIL (FOR HEADWALL MOUNT)

INSIDE MOUNT ON CBC

HEADWALL MOUNT ON CBC

RAIL PLACEMENT FOR INSIDE OR HEADWALL MOUNT

TRANSITION TYPE 3L AND TYPE 3 GUARDRAIL APPROACH

RAIL PLACEMENT FOR INSIDE OR HEADWALL MOUNT

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TRANSITION TYPE 3L AND TYPE 3 GUARDRAIL APPROACH

RAIL PLACEMENT FOR INSIDE OR HEADWALL MOUNT

TRANSITION TYPE 3L AND TYPE 3 GUARDRAIL APPROACH

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RAIL PLACEMENT FOR INSIDE OR HEADWALL MOUNT

TRANSITION TYPE 3L AND TYPE 3 GUARDRAIL APPROACH

RAIL PLACEMENT FOR INSIDE OR HEADWALL MOUNT

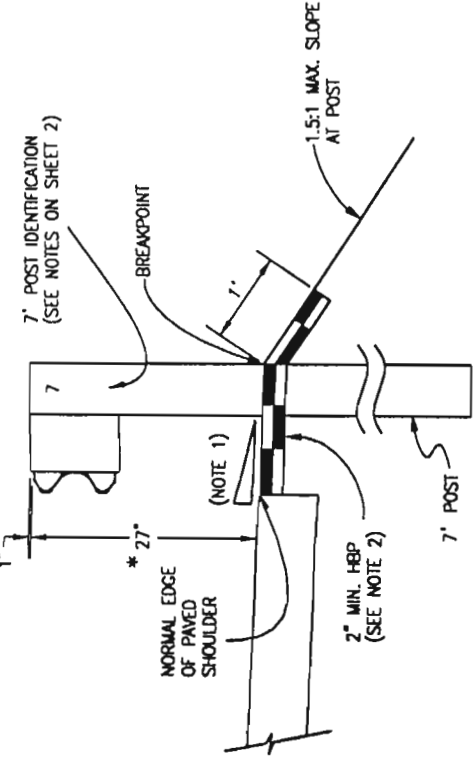
GENERAL NOTES

1. RATE OF SLOPE DEPENDS ON GUARDRAIL LOCATION:
 - FOR GUARDRAIL FACE 2 FT. OR LESS FROM THE NORMAL EDGE OF PAVED SHOULDER, CONTINUE THE RATE OF SLOPE OF THE NORMAL PAVED SHOULDER TO THE BREAKPOINT.
 - FOR GUARDRAIL FACE MORE THAN 2 FT. FROM THE NORMAL EDGE OF THE PAVED SHOULDER, THE SLOPE SHALL BE 10:1 OR FLATTER.
 - EXTEND A 2 IN. MINIMUM THICKNESS PAVED SURFACE TO 1 FT. BEHIND THE GUARDRAIL POSTS OR TO THE EROSION CONTROL CURB AS SHOWN ON PLANS. ASPHALT CUTTING & PATCHING OR OTHER APPROVED METHOD SHALL BE USED TO MINIMIZE DAMAGE TO ALL PAVED SURFACES UNDER GUARDRAIL INSTALLATIONS. COST FOR ALL REPAIRS TO THE PAVED AREA WILL NOT BE MEASURED AND PAID FOR SEPARATELY BUT SHALL BE INCLUDED IN THE COST OF THE WORK. A MINIMUM 3 IN. THICK FIBER REINFORCED CONCRETE PAVEMENT MAY ALSO BE USED FOR PAVING BENEATH THE GUARDRAIL INSTALL POST IN A 1/2 IN. OVERSIZED FORMED HOLE FOR RAIL RUNS AND TERMINALS AS DIRECTED. PAYMENT FOR THIS PAVED SURFACE WILL BE MADE UNDER A PAVEMENT OR CONCRETE PAY ITEM WITH QUANTITIES SHOWN ON THE PLANS.
2. THE MINIMUM GUARDRAIL OFFSET FROM PAVED SHOULDER EDGE SHALL BE:
 0 FT. FOR SHOULDERS 8 FT. OR WIDER
 2 FT. FOR SHOULDERS 6 FT. OR LESS
 THE ABOVE 2 FT. GUARDRAIL TO SHOULDER OFFSET IS DESIRABLE BUT NOT REQUIRED FOR:
 I. EXISTING HIGHWAY WITH DESIGN SPEED OF LESS THAN 50 MPH. MINIMUM OFFSET OF RAIL IS 0 FT. FROM ANY WIDTH PAVED SHOULDER OR 4 FT. FROM TRAVELED WAY.
 II. A ONE-WAY ONE-LANE RAMP AND:
 - THE NON-OFFSET GUARDRAIL BEGINS AT LEAST 100 FT. BEYOND RAMP NOSE.
 - THE NON-OFFSET GUARDRAIL IS NOT LOCATED ON THE RAMP EXIT OR ENTRANCE CURVE CONNECTION TO THE MAJOR HIGHWAY.
 - THE RAMP SHOULDERS ARE 4 FT. OR WIDER.
 USE OF GREATER THAN MINIMUM OFFSET DIMENSIONS IS ENCOURAGED TO MEET THE DESIRABLE GOAL OF PLACING THE GUARDRAIL AS FAR AS POSSIBLE FROM THE TRAVELED WAY, EVEN FOR SHORT DISTANCES, WHILE PROVIDING A SMOOTH CHANGE IN GUARDRAIL ALIGNMENT.
3. IF 2 FT. CANNOT BE PROVIDED BETWEEN THE BACK OF THE GUARDRAIL POST AND THE BREAKPOINT, USE 7 FT. GUARDRAIL POSTS. REFER TO THE "RESTRICTIVE ROADSIDE INSTALLATION" DETAIL.

4. WHEN SPECIFIED ON THE PLANS, INSTALL 4 IN. HIGH TYPE 6 CURB WITH ITS FACE AT OR BEHIND THE RAIL FACE. AS AN ALTERNATIVE WHEN SPECIFIED ON THE PLANS, INSTALL A 2 IN. x 6 IN. TREATED (ASHITO M 133) WOOD CURB FASTENED WITH A 4 IN. LAG BOLT AND WASHER AT EACH WOOD POST, OR WITH A 1/4 IN. DIA. BOLT WITH WASHER AND NUT AT EACH STEEL POST. IF THE 2 IN. x 6 IN. WOOD CURB IS SPECIFIED, IT WILL BE INCLUDED IN THE COST OF THE GUARDRAIL IF APPROVED BY THE ENGINEER. A 2 IN. x 4 IN. TREATED WOOD CURB MAY BE SUBSTITUTED FOR THE 2" x 6" CURB AND SET ON TOP OF PAVEMENT SURFACE AND ATTACHED AS DESCRIBED ABOVE. NO SPLICING SHALL BE ALLOWED IN WOOD CURBS. ADJACENT BOARDS SHALL BE BUTTED TOGETHER AND BOLTED AT A POST LOCATION. JOINTS SHALL BE LOCATED AT THE POSTS.
5. ONE POST MAY BE OMITTED IN A GUARDRAIL RUN, SUCH AS AT A PIPE CULVERT WITH MINIMUM COVER. THE W-BEAM RAIL SPANNING THE OMITTED-POST GAP SHALL BE DOUBLED (ONE RAIL NESTED IN THE OTHER) AND SHALL EXTEND A MINIMUM OF 6 FT.-3 IN. ON EITHER SIDE OF THE GAP USING 12 FT.-6 IN. RAIL SECTIONS. ONE OMITTED POST, DEPENDING ON SPLICE LOCATION, REQUIRES 25 FT. OR 37 FT. - 6 IN. OF NESTED RAIL. SEE NESTED RAIL AT OMITTED POST DETAIL ON THIS SHEET.
6. SEE SHEET 6 FOR CURB TREATMENTS AT GUARDRAIL TERMINALS.

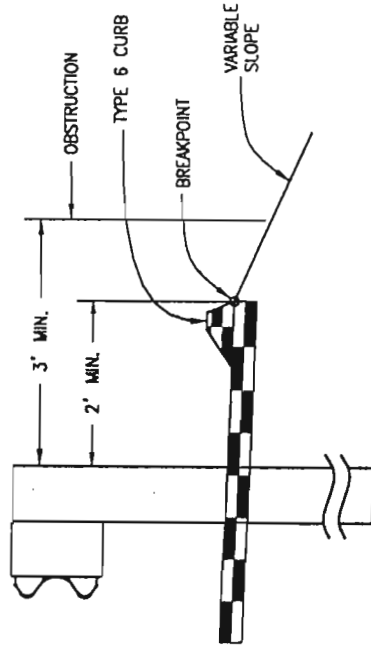
NORMAL CENTER-TO-CENTER POST SPACING

LOCATION	SPACING
ALL LOCATIONS EXCEPT BRIDGE RAIL LOCATIONS	6'-3"
BRIDGE OR STRUCTURE APPROACH	SEE SHEETS 7, 12, & 15

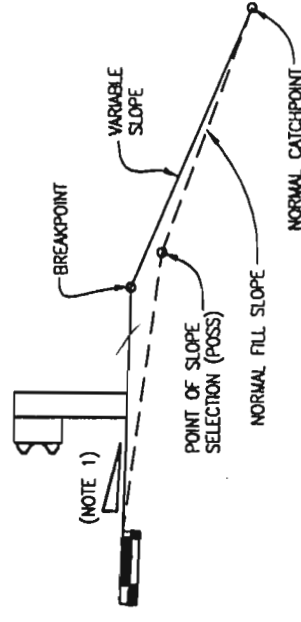


RESTRICTIVE ROADSIDE INSTALLATION WITH 7 FOOT GUARDRAIL POSTS

(SEE NOTE 4)

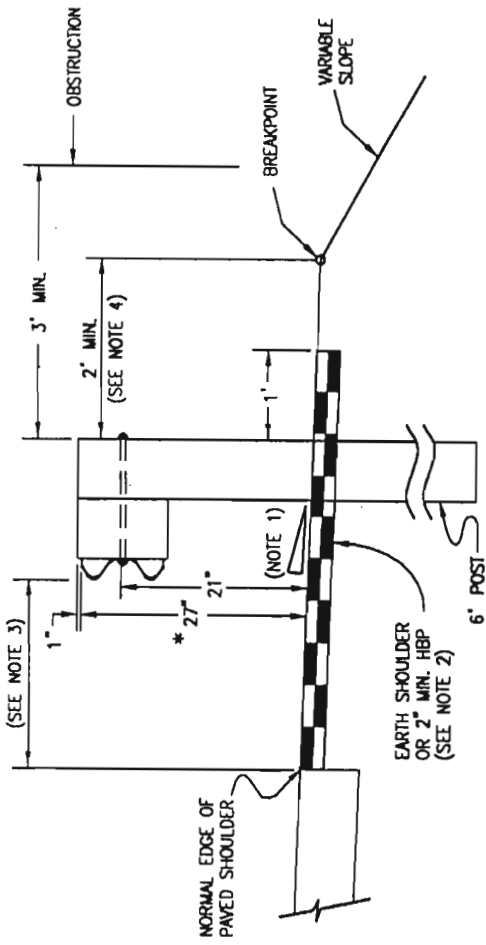


OPTION B



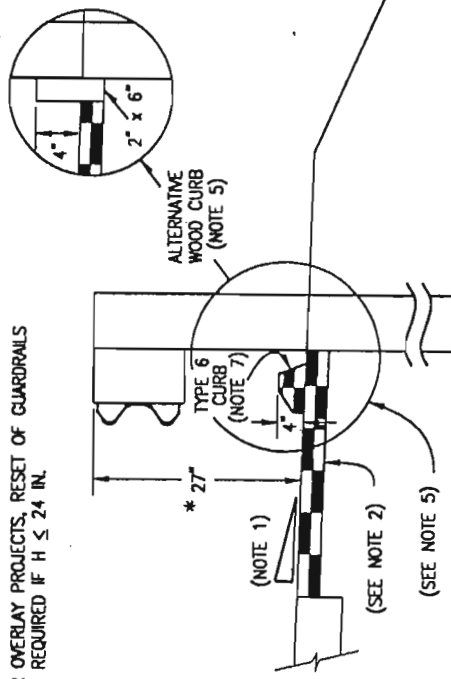
EMBAKMENT WITH GUARDRAIL

(NOTE: THE CATCHPOINT REMAINS THE SAME AS THAT FOR "NORMAL" FILL SLOPE. FOR THE WIDER 7" DISTANCES, THE VARIABLE SLOPE MAY "CATCH" AT THE POSTS.)



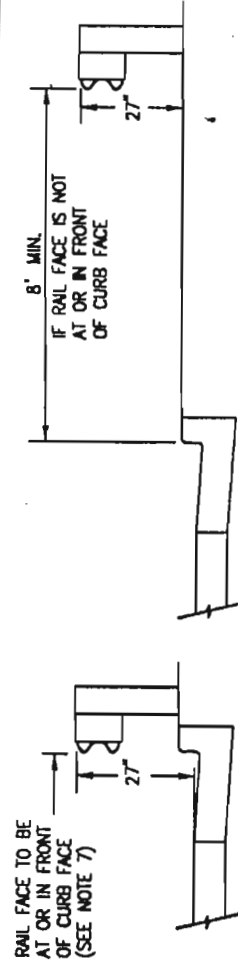
NORMAL ROADSIDE INSTALLATION WHEN FILL REQUIRES GUARDRAIL

* FOR OVERLAY PROJECTS, RESET OF GUARDRAILS ARE REQUIRED IF H ≤ 24 IN.

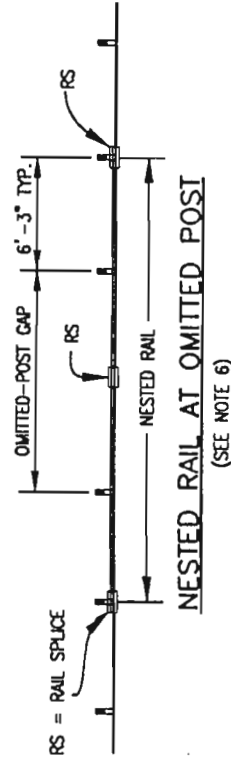


OPTION A

ROADSIDE INSTALLATION WITH EROSION CONTROL CURB



URBAN ROADSIDE INSTALLATION WITH CURB AND GUTTER



Colorado Department of Transportation

4201 East Arkansas Avenue
 Denver, Colorado 80222
 Phone: (303) 757-9083 FAX: (303) 757-9820

Project Development Branch SD

Computer File Information

Path: www.dot.state.co.us/Business/Design/Standards/MSStandards
 Drawing File Name: 6060101015.dwg
 Acad Version: R14 Scale: NA Units: English

Standard Plan Revised

Date	Comments
04-06-98	Safety/Design Improvements
05-07-99	Safety/Proprietary Improvements
01-05-00	Safety/Proprietary Improvements

GUARDRAIL TYPE 3 STANDARD PLAN NO.

W-BEAM

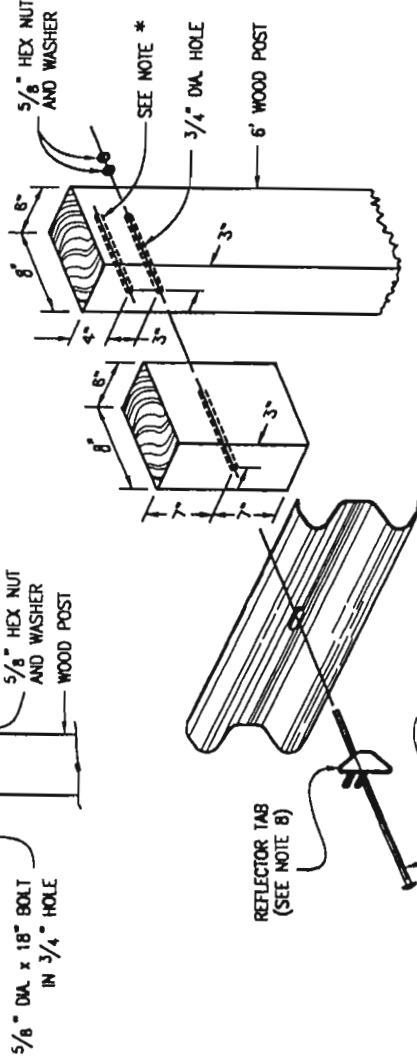
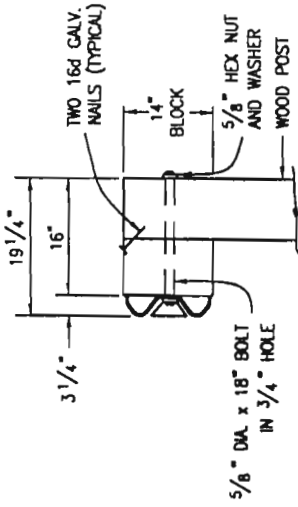
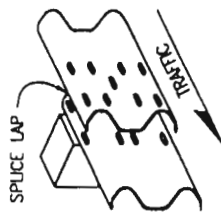
M-606-1

Issued By: Project Development Branch September 1, 2000

Sheet No. 1 of 15

GENERAL NOTES

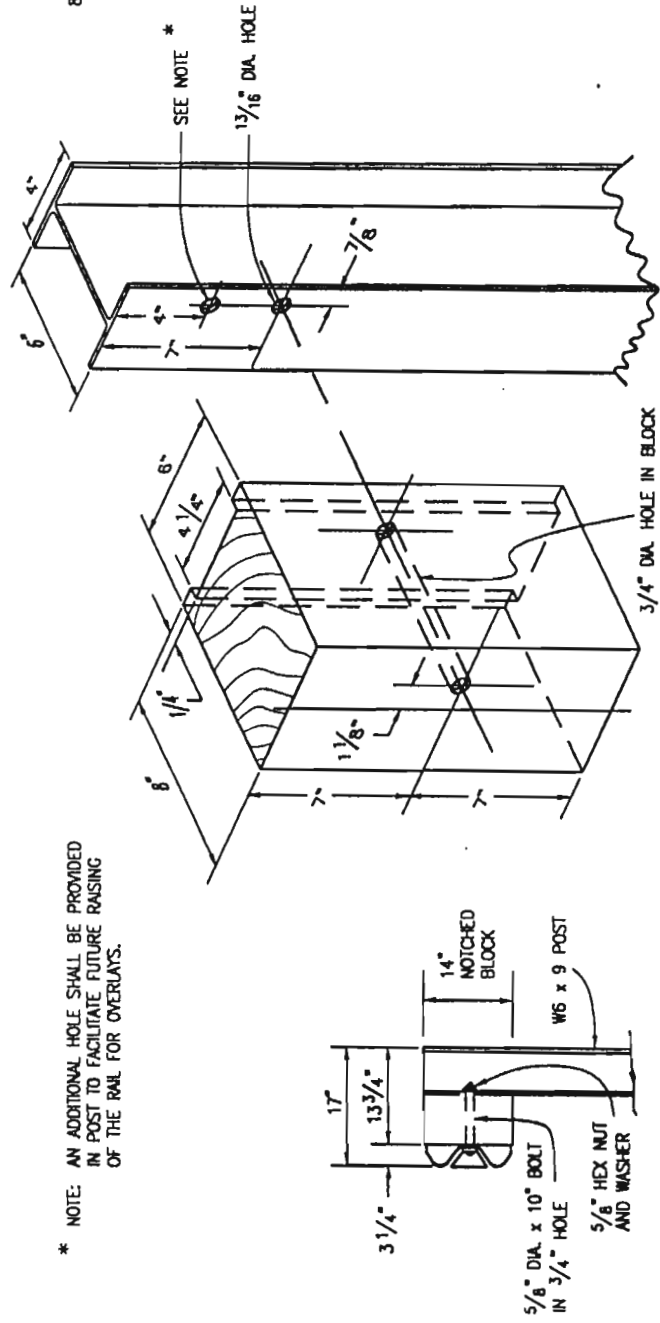
1. ALL W-BEAM SPICES, AND SPICES OF TERMINAL CONNECTORS TO W-BEAM SHALL BE LAPPED IN THE DIRECTION OF TRAFFIC UNLESS OTHERWISE NOTED.
2. MATERIAL TYPE AND SHAPE OF POSTS AND BLOCKS SHALL BE THE SAME THROUGHOUT THE PROJECT EXCEPT WHEN SPECIFIC POSTS AND BLOCKS ARE SPECIFIED SUCH AS AT END ANCHORAGES AND BOX CULVERTS.
3. CONCRETE MAY BE READY-MIXED OR FIELD-MIXED AND SHALL CONSIST OF A MINIMUM OF 1 PART CEMENT TO 6 PARTS AGGREGATE BY VOLUME.
4. WHEN SPECIFIED IN THE CONTRACT, 7 FT. POSTS SHALL BE INSTALLED INSTEAD OF THE STANDARD 6 FT. POSTS. 7 FT. POSTS SHALL BE MARKED WITH THE NUMBER 7 TO ENSURE PERMANENT IDENTIFICATION. THE NUMBER 7 SHALL BE A MINIMUM 2 IN. HEIGHT AND LOCATED AS SHOWN IN THE ELEVATION VIEWS ON SHEET 1.
5. THE STANDARD 3" x 1 3/4" x 3/16" RECTANGULAR WASHER USED UNDER POST BOLT HEADS IN THE PAST MAY REMAIN IN EXISTING INSTALLATIONS BUT SHALL NOT BE USED IN NEW CONSTRUCTION, REPAIRS, OR RESETTING OF RAIL. THERE ARE EXCEPTIONS WHERE RECTANGULAR WASHER LOCATIONS ARE SPECIFICALLY IDENTIFIED ON THIS STANDARD PLAN.
6. STANDARD GALVANIZED ROUND STEEL WASHERS SHALL BE USED UNDER ALL NUTS IN CONTACT WITH WOOD POSTS.
7. REFLECTOR TABS SHALL BE INSTALLED AT 25 FT. INTERVALS (EXCEPTION BELOW). REFLECTOR TABS WILL NOT BE PAID FOR SEPARATELY BUT SHALL BE INCLUDED IN THE COST OF THE GUARDRAIL. THE TABS SHALL BE MOUNTED SO THAT THE BOLT SLOT FACES AWAY FROM TRAFFIC AND THE REFLECTORIZED SURFACE FACES THE APPROACHING TRAFFIC FOR ONE-WAY ROADS. FOR TWO-WAY ROADS, BOTH SIDES OF THE TABS SHALL BE REFLECTORIZED SO THAT DELINEATION IS PROVIDED FOR BOTH DIRECTIONS OF TRAVEL. THAT DELINEATION IS PROVIDED FOR BOTH DIRECTIONS OF TRAVEL. REFLECTORIZED COLOR SHALL MATCH THE COLOR OF THE ADJACENT TRAVELED WAY EDGE LINE. SEE TAB DETAIL ON SHEET 3.
8. AT THE TIME A POST OR BLOCK IS INSTALLED, NO SEASONING CHECK WILL BE PERMITTED WHICH EXCEEDS 1/4 IN. IN WIDTH WHEN THE CHECK EXTENDS THE FULL LENGTH OF THE PIECE.
9. WOOD BLOCKS SHALL BE CUT FROM THE SAME CROSS-SECTION, SPECIES, AND GRADE AND SHALL RECEIVE THE SAME PRESERVATIVE TREATMENT AS THE POSTS WHEN WOOD POSTS ARE USED.
10. REFERENCES SUCH AS "PDB01", "PDE01", AND "PWE01" IN THIS STANDARD SPECIFY HARDWARE DETAILS ARE FROM "A GUIDE TO STANDARDIZED HIGHWAY BARRIER HARDWARE" PREPARED BY THE ASHTO-AGC-ARTBA JOINT COOPERATIVE COMMITTEE.
11. NOTCHED RAIL BLOCKS MANUFACTURED FROM SYNTHETIC MATERIAL WILL BE ACCEPTED AS ALTERNATIVES TO WOOD NOTCHED BLOCKS FOR USE WITH STEEL POSTS PROVIDED THAT THE BLOCKS HAVE RECEIVED FHWA APPROVAL AND ARE CERTIFIED AS IDENTICAL TO THE SPECIMENS USED FOR TESTING AND APPROVAL.
12. WOOD POSTS SHALL BE MADE OF TIMBER WITH AN EXTREME FIBER STRESS IN BENDING OF 1200 psi. STRESS GRADING AND POST DIMENSIONS SHALL BE IN ACCORDANCE WITH THE RULES OF THE WEST COAST INSPECTION BUREAU OR THE SOUTHERN PINE BUREAU OR THE WESTERN WOOD PRODUCTS ASSOCIATION. TIMBER FOR POSTS SHALL BE EITHER ROUGH SAWN (UNPLANED) OR S4S (SURFACED FOUR SIDES) WITH NOMINAL DIMENSIONS INDICATED. ONLY ONE TYPE OF SURFACE FINISH SHALL BE USED FOR POSTS AND BLOCKS IN ANY ONE CONTINUOUS LENGTH OF GUARDRAIL.
13. PRESERVATIVE TREATMENT OF POSTS AND BLOCKS SHALL BE IN ACCORDANCE WITH ASHTO M133 EXCEPT THAT BLOCKS NEED NOT BE INCISED. PRESERVATION ASSAY RETENTION REPORTS SHALL BE FORWARDED TO THE ENGINEER. THE CONTRACTOR SHALL CERTIFY THE SPECIES AND GRADE MEET THE REQUIREMENTS OF THE CONTRACT.
14. W-BEAM AND THREE-BEAM GUARDRAIL POSTS SHALL BE MANUFACTURED USING ASHTO M270 (ASTM A709) GRADE 36 STEEL UNLESS CORROSION RESISTANT STEEL IS REQUIRED IN WHICH CASE THE POST SHALL BE MANUFACTURED FROM ASHTO M270 (ASTM A709) GRADE 50W STEEL. THE DIMENSIONS OF THE CROSS-SECTION SHALL CONFORM TO A W6 x 9 SECTION AS DEFINED IN ASHTO M160 (ASTM A6). W6 x 8.5 WIDE FLANGE POSTS ARE AN ACCEPTABLE ALTERNATIVE THAT IS CONSIDERED EQUIVALENT TO THE W6 x 9.
15. AFTER THE SECTION IS CUT AND ALL HOLES ARE DRILLED OR PUNCHED THE COMPONENT SHALL BE ZINC-COATED ACCORDING TO ASHTO M111 (ASTM A123) UNLESS CORROSION RESISTANT STEEL IS USED. WHEN CORROSION RESISTANT STEEL IS USED THE PORTION OF THE POST TO BE EMBEDDED IN SOIL SHALL BE ZINC-COATED ACCORDING TO ASHTO M111 (ASTM A123) AND THE PORTION ABOVE THE SOIL SHALL NOT BE ZINC-COATED, PAINTED OR OTHERWISE TREATED.



(PDB01 & PDE01)

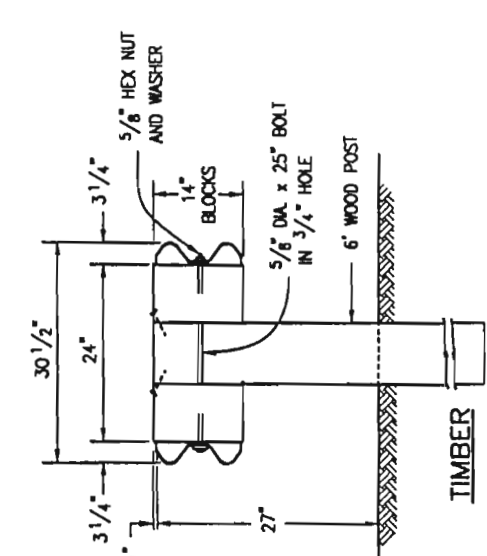
WOOD POST & BLOCK

(DIMENSIONS SHOWN ARE FOR NOMINAL 6" x 8" POSTS & BLOCKS)

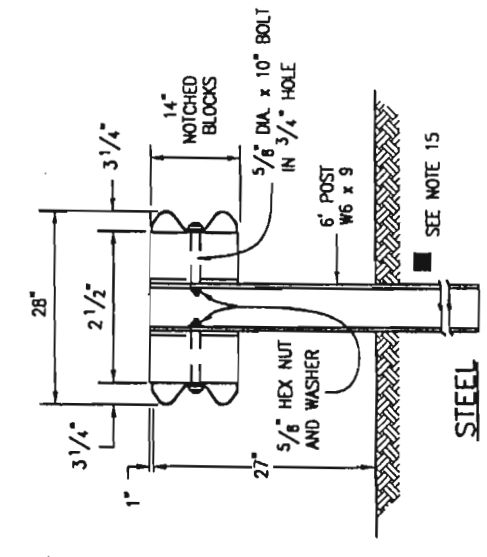


STEEL POST & NOTCHED BLOCK
(NOMINAL DIMENSIONS ARE SHOWN FOR THE POSTS & BLOCKS)

(PWE01)



TIMBER

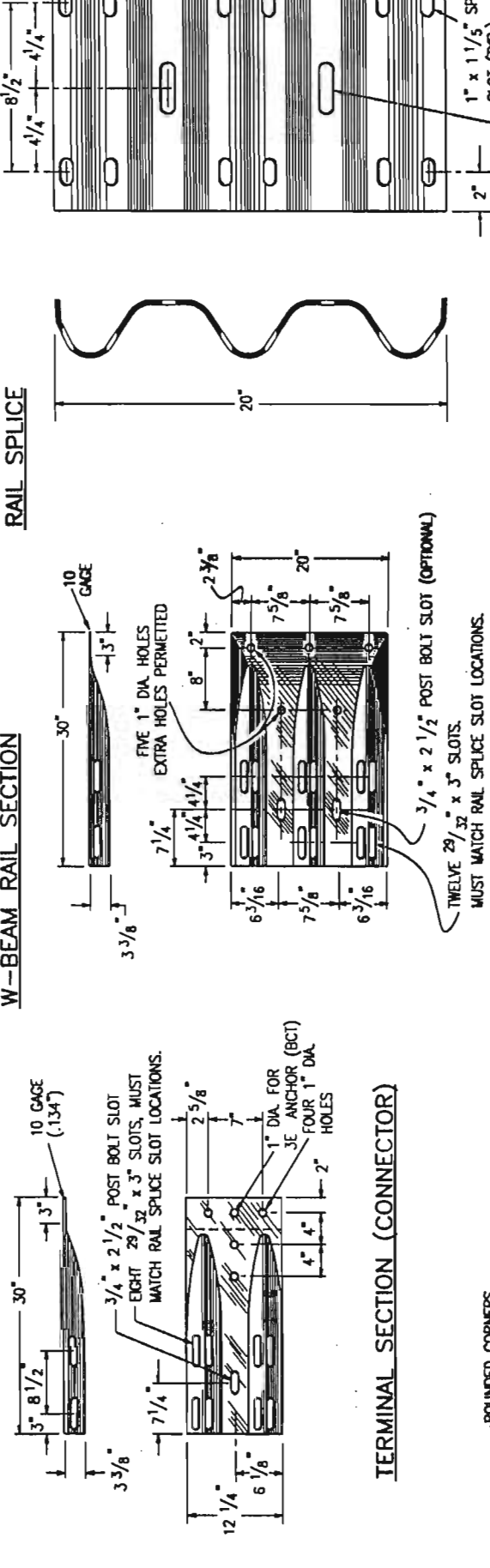
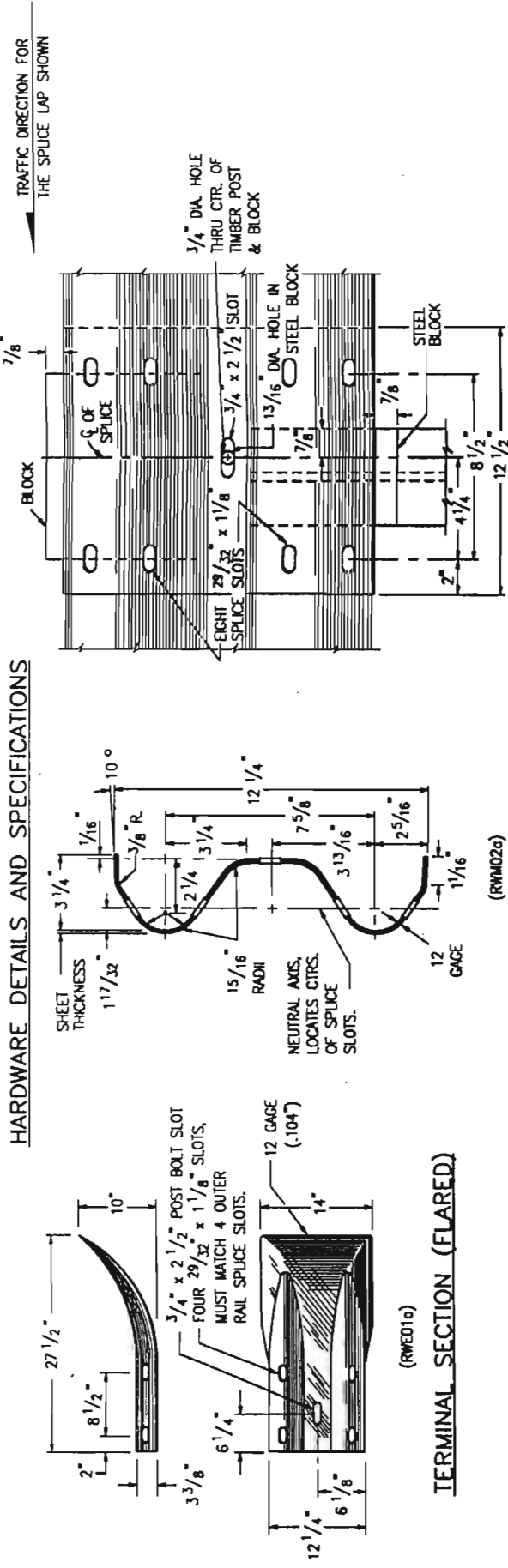


STEEL

DOUBLE BLOCK AND RAIL MEDIAN BARRIER
GUARDRAIL TYPE 3 (DOUBLE)

Colorado Department of Transportation		Standard Plan Revised	
4201 East Arkansas Avenue Denver, Colorado 80222 Phone: (303) 757-9083 FAX: (303) 757-9820		Date: 04-06-98 05-07-99 01-05-00	
Path: www.dot.state.co.us/Business/Design/Standards/MSstandards Drawing File Name: 6060102015.dwg		Comments: Safety/Design Improvements Safety/Proprietary Improvements Safety/Proprietary Improvements	
Project Development Branch	SD	Acad Version: R14	Scale: NA
Units: English			
Colorado Department of Transportation Project Development Branch		GUARDRAIL TYPE 3 W-BEAM	
4201 East Arkansas Avenue Denver, Colorado 80222 Phone: (303) 757-9083 FAX: (303) 757-9820		STANDARD PLAN NO. M-606-1	
Project Development Branch		Sheet No. 2 of 15	

HARDWARE DETAILS AND SPECIFICATIONS



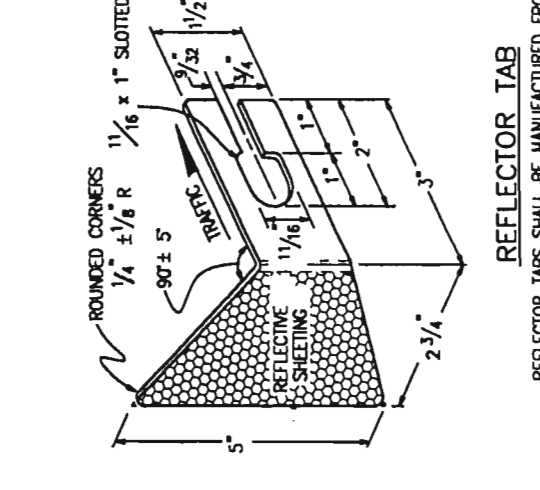
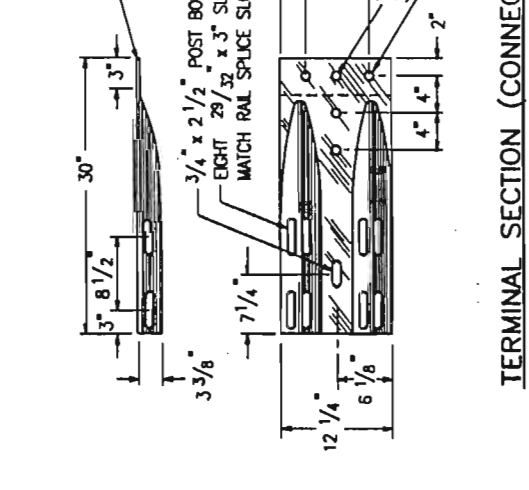
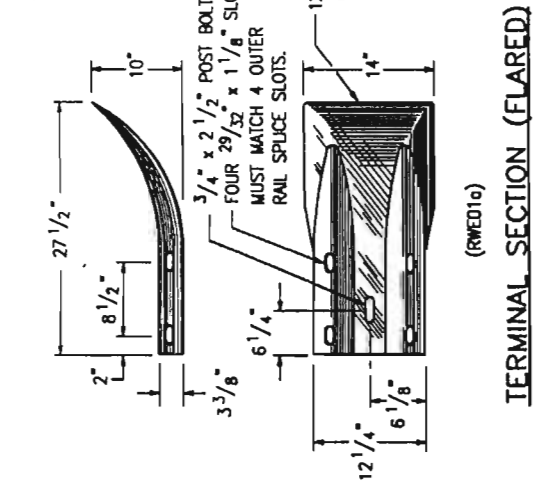
THE TABULATION OF GUARDRAIL WILL SPECIFY THE TYPE OF CORROSION PROTECTION: GALVANIZED OR CORROSION - RESISTANT STEEL.

STEEL POSTS SHALL HAVE THE SAME CORROSION PROTECTION AS SPECIFIED FOR THE METAL BEAM RAIL PUNCHING, DRILLING, OR CUTTING WILL NOT BE PERMITTED AFTER GALVANIZING.

RECTANGULAR WASHER
(TO BE USED ONLY WHERE SPECIFIED.)

DIAMETER & TYPE (INCHES)	LENGTH (INCHES)	THREAD LENGTH (INCHES)	INTENDED USE	AASHTO-AGC-ARTBA STANDARD NUMBER	NO. BOLTS, NUTS & WASHERS
5/8" BUTTON HEAD OVAL SHLDR.	1 1/4"	FULL (1 1/2")	ALL RAIL SPLICES	FBB01	8 PER SPACE*
1 1/4" OVAL SHLDR.	18"	MIN. 2 1/2"	SINGLE BLOCK & POST (TIMBER)	FBB04	1 PER POST
1 1/4" OVAL SHLDR.	25"	MIN. 2"	DOUBLE BLOCK & POST (TIMBER)	FBB05	1 PER POST
1 1/4" OVAL SHLDR.	10"	MIN. 2"	FASTEN NOTCHED BLOCK TO STEEL POST	FBB03	1 PER BLOCK

* WASHERS NOT USED AT RAIL SPLICES

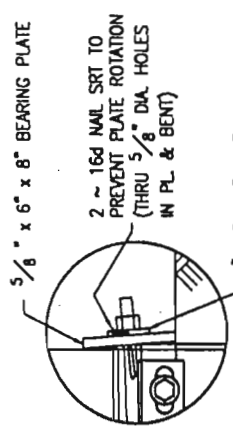
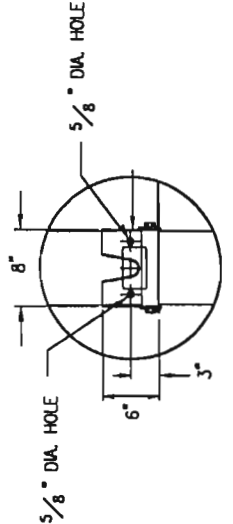
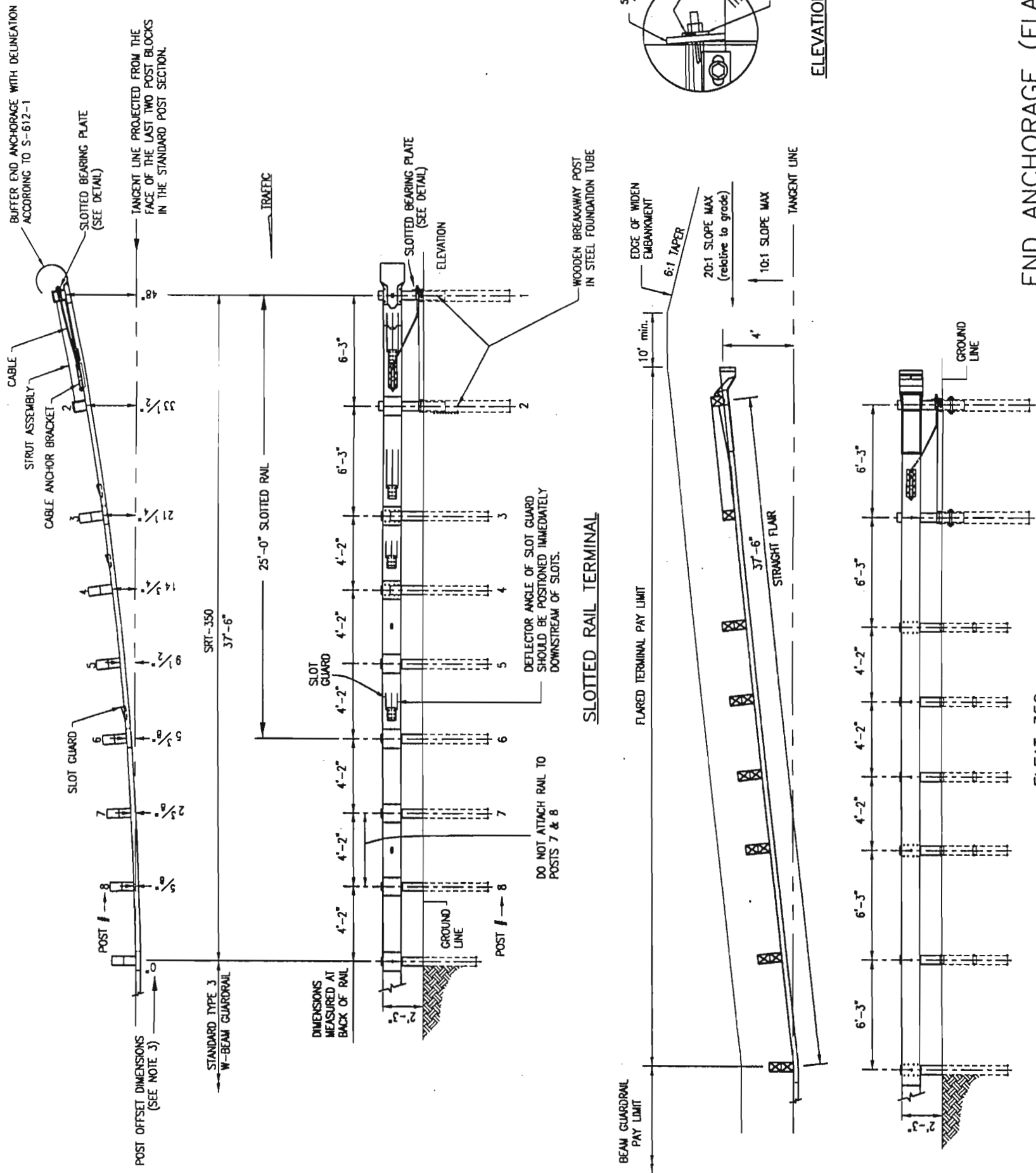


REFLECTOR TABS SHALL BE MANUFACTURED FROM 12 TO 14 GAUGE STEEL. REFLECTIVE SHEETING SHALL CONFORM TO ASTM D4956 TYPE III. SEE NOTES ON SHEET 2

Colorado Department of Transportation 4201 East Arkansas Avenue Denver, Colorado 80222 Phone: (303) 757-9083 FAX: (303) 757-9820		Computer File Information Path: www.dot.state.co.us/Business/Design/Standards/MSIStandards Drawing File Name: 6060103015.dwg Acad Version: R14 Scale: NA Units: English		Standard Plan Revised Date: 04-06-98 Comments: Safety/Design Improvements 05-07-99 Safety/Proprietary Improvements 01-05-00 Safety/Proprietary Improvements	
GUARDRAIL TYPE 3			STANDARD PLAN NO.		
W-BEAM			M-606-1		
Issued By: Project Development Branch September 1, 2000					
Sheet No. 3 of 15					

GENERAL NOTES

1. THE END ANCHORAGE (FLARED) TERMINAL SHALL BE THE SLOTTED RAIL TERMINAL (SRT-350) GUARDRAIL END TREATMENT, AS MANUFACTURED BY THE SYRO/TRINITY STEEL COMPANY, CENTERVILLE, UTAH (TELEPHONE #: 801-292-4461) OR THE FLEAT-350, AS MANUFACTURED BY ROAD SYSTEMS INC. (TELEPHONE #: 815-464-5917). ONE END ANCHORAGE (FLARED) SHALL INCLUDE ALL POST, RAIL AND HARDWARE ITEMS REQUIRED FOR A COMPLETE UNIT. THE END ANCHORAGE (FLARE) SHALL BE INSTALLED ACCORDING TO THE MANUFACTURER'S RECOMMENDATIONS. THE CONTRACTOR SHALL PROVIDE A COPY OF THE MANUFACTURER'S INSTALLATION INSTRUCTIONS AND PARTS LIST TO THE ENGINEER PRIOR TO INSTALLATION OF THE DEVICE.
2. IN HEAVY SNOW LOCATIONS, TRIM POSTS #1 & #2 FLUSH WITH RAIL TOP AND TREAT END WITH SEALANT, IN ACCORDANCE WITH ASHTO M133.
3. THE POST OFFSET DIMENSIONS ARE GIVEN TO THE CENTER OF THE TRAFFIC FACE OF THE BLOCKOUTS FROM THE PROJECTED RAIL TANGENT LINE, EXCEPT AT THE FIRST TWO POSTS WHERE THE DIMENSION IS TO THE CENTER OF THE TRAFFIC FACE OF THE POST. OFFSET POINTS ARE TO BE LOCATED BY CHORD MEASUREMENTS AT THE BACK OF THE RAIL EQUAL TO THE NOMINAL POST SPACINGS SHOWN. POSTS ARE TO BE SET APPROXIMATELY RADIAL TO THE RAILING AT EACH POST LOCATION.
4. THE SRT SLOTTED BEARING PLATE SHALL BE INSTALLED WITH THE SLOT FACING UP.
5. POSTS SHALL BE DRILLED FOR BREAKAWAY ACCORDING TO THE MANUFACTURER'S INSTRUCTIONS.
6. SEE SHEETS 1, 2 AND 3 FOR STANDARD TYPE 3 GUARDRAIL AND INSTALLATION DETAILS.
7. DO NOT USE REFLECTOR TABS ON POSTS 1 THROUGH 8.
8. THE SRT PANELS SHALL BE SUPPLIED IN EITHER THREE 12 FT. - 6 IN. RAIL PANELS, OR ONE 25 FT. - 0 IN. AND ONE 12 FT. - 6 IN. RAIL PANELS.



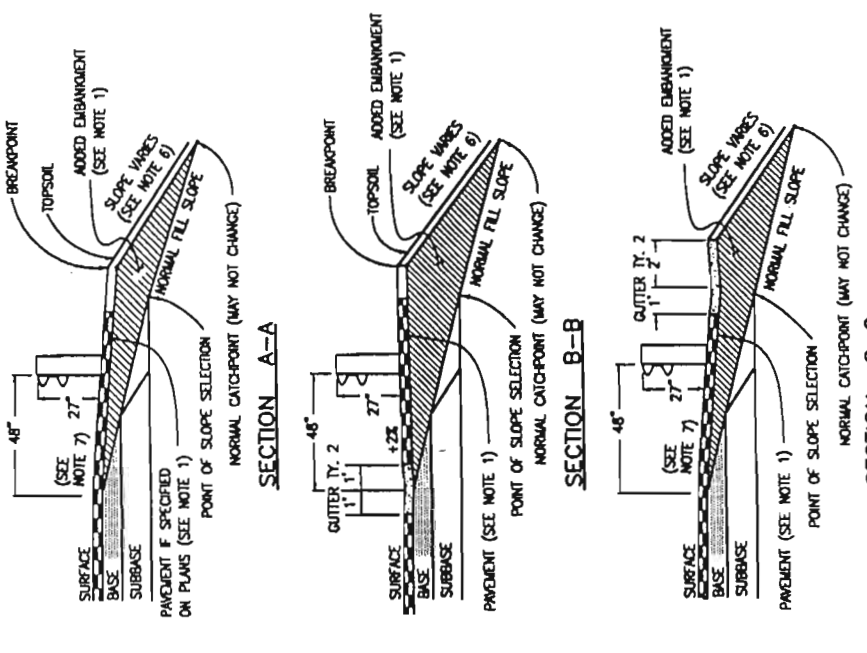
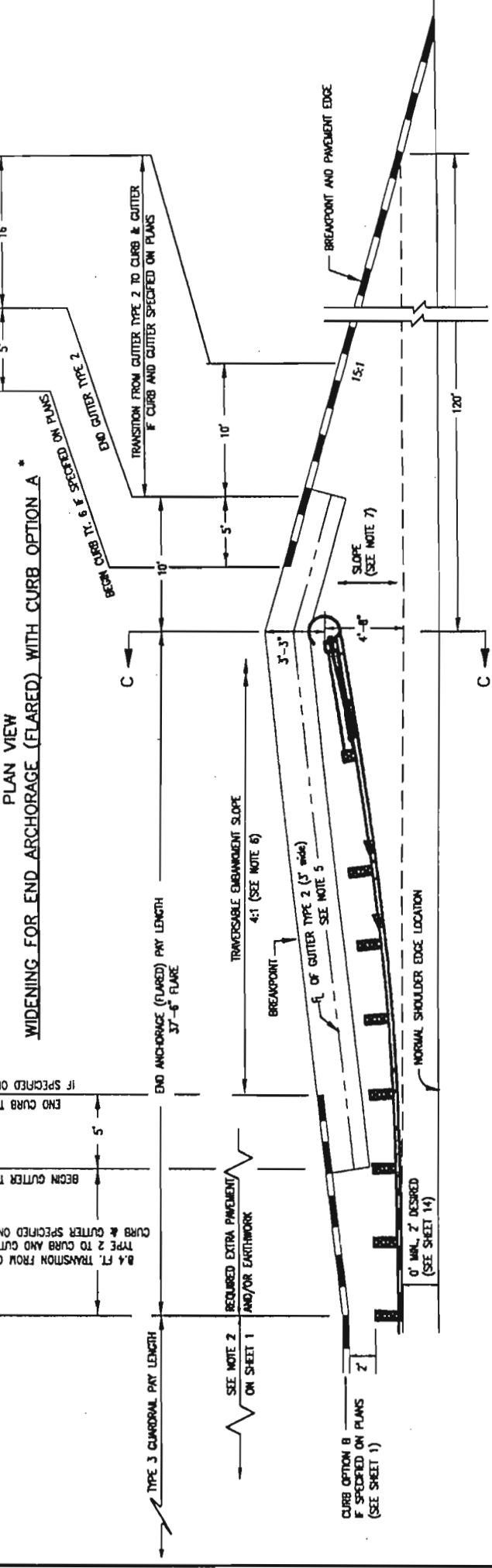
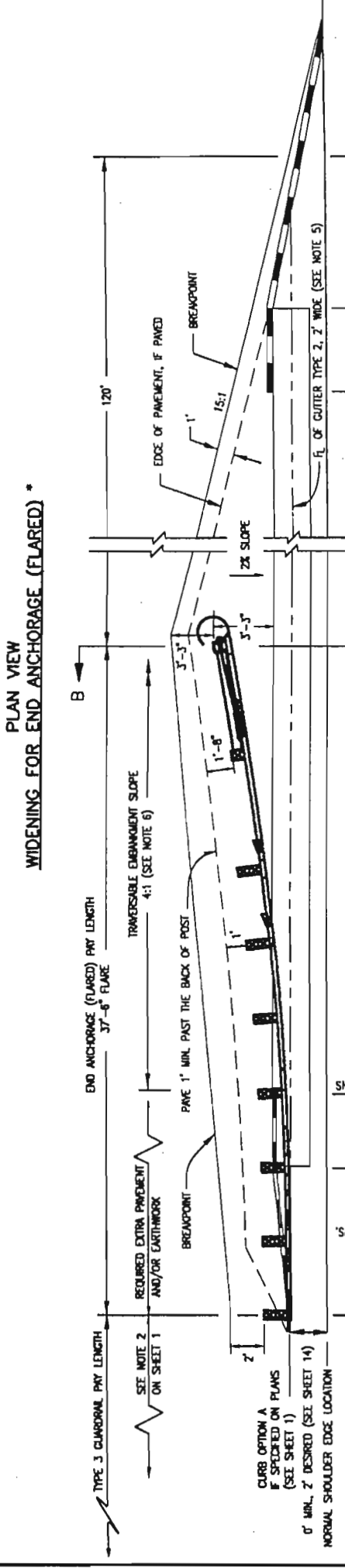
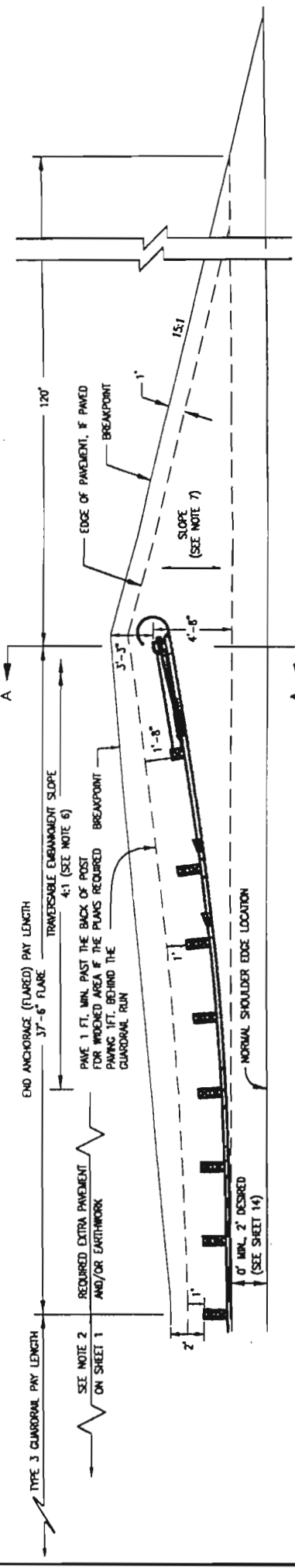
SLOTTED BEARING PLATE DETAIL

END ANCHORAGE (FLARED)

Colorado Department of Transportation 4201 East Arkansas Avenue Denver, Colorado 80222 Phone: (303) 757-9083 FAX: (303) 757-9820 Project Development Branch	Computer File Information Path: www.dot.state.co.us/Business/Design/Standards/MSIstandards Drawing File Name: 6060105015.dwg Acad Version: R14 Scale: NA Units: English	Standard Plan Revised Comments: 04-06-98 Safety/Design Improvements 05-07-99 Safety/Proprietary Improvements 01-05-00 Safety/Proprietary Improvements	GUARDRAIL TYPE 3 W-BEAM	STANDARD PLAN NO. M-606-1
	Issued By: Project Development Branch September 1, 2000			Sheet No. 5 of 15

GENERAL NOTES

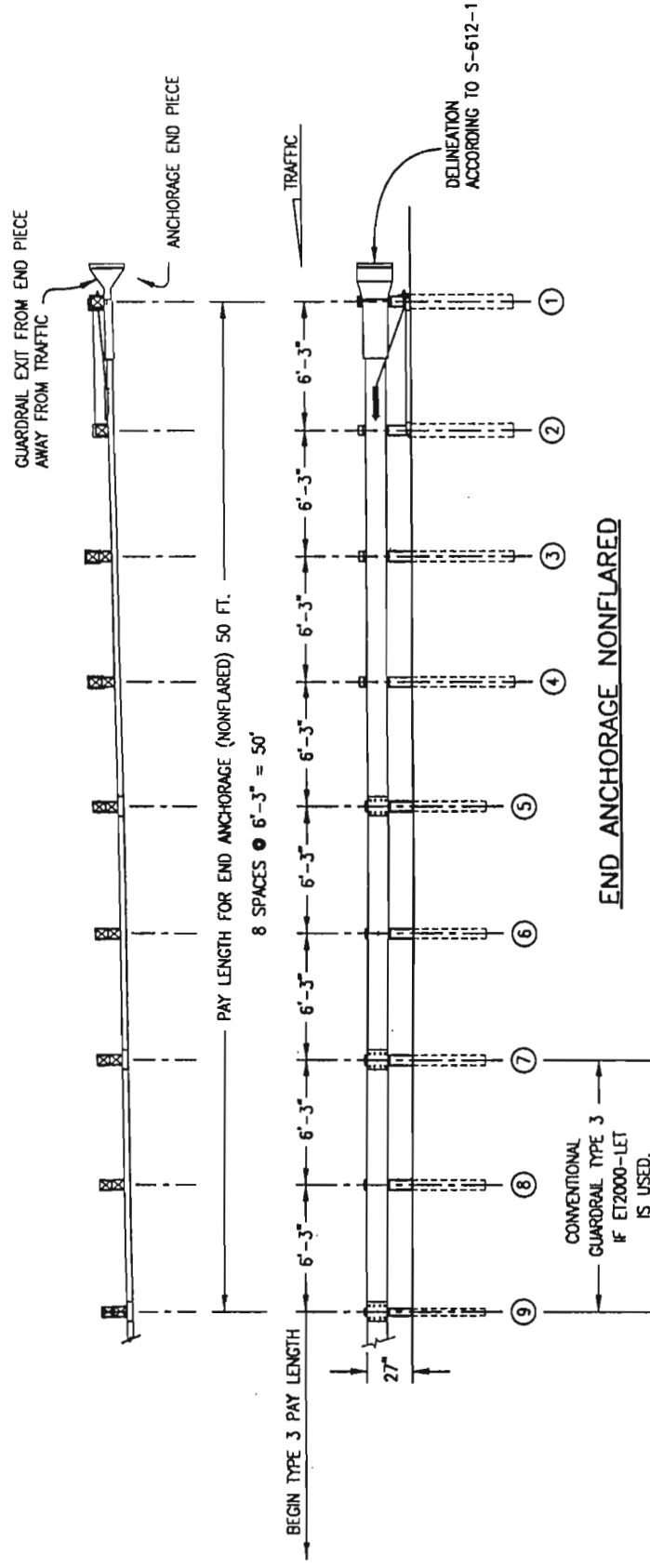
1. PAYMENT FOR THE ADDED EMBANKMENT (APPROXIMATELY 65 CU. YDS.) FOR THE FLARE SHALL BE AS FOLLOWS:
 -INCLUDED IN THE COST OF THE SRT ITEM 606 PAY ITEM 203
 -INCLUDED IN THE COST OF THE SRT ITEM 606 PAY ITEM WHEN THE CONTRACT PLAN DOES NOT INCLUDE PAY ITEM 203
 WHEN THE WIDENED AREA IS PAVED, PAYMENT FOR THE PAVEMENT (APPROX. 60 SQ. YDS.) SHALL BE AS FOLLOWS:
 -UNDER PAY ITEM 403 OR 412 WHEN THE CONTRACT PLAN INCLUDES PAY ITEM 403 OR 412
 -INCLUDED IN THE COST OF THE END ANCHORAGE (NONFLARED) PAY ITEM WHEN THE CONTRACT PLAN DOES NOT INCLUDE PAY ITEM 403 OR 412 (SEE SHEET 1, NOTE 2 FOR PAVEMENT TYPES)
 CONCRETE PAVED AREAS SHALL HAVE THEIR TAPERED ENDS SQUARED OFF AS DIRECTED BY THE ENGINEER.
 WHEN OVERLAY PAVING, THE FINISHED SURFACE AT EACH POST SHALL NOT BE ABOVE THE POSTS' TOP BREAKWAY HOLE OR STRUT ASSEMBLY. THE WIDENED AREA AT THE FLARED END ANCHORAGE SHOULD NOT BE OVERLAYED UNLESS PAVEMENT CONDITIONS WARRANT IT BEING OVERLAYED. ANY OVERLAY PAVEMENT ABUTTING THE FLARED END ANCHORAGE SHALL BE TAPERED TO PREVENT A DROP IN THE PAVED SURFACE BELOW THE RAIL.
 SEE SHEETS 1, 2 AND 3 FOR STANDARD TYPE 3 GUARDRAIL AND INSTALLATION DETAILS.
 THE COST OF THE GUTTER WILL BE PAID FOR AS "GUTTER TYPE 2 (2 FT.)" FOR A LENGTH OF 13.4 FT. OR "GUTTER TY. 2 (3 FT.)" FOR A LENGTH OF 40 FT.
 INLETS OR RUNDOWNS MAY BE USED INSTEAD OF THE GUTTER IF SPECIFIED ON THE PLANS. NO ADDITIONAL CURB SHALL BE ADDED IN THE VICINITY OF THE END ANCHORAGE.
 4-1 OR FLATTER SLOPES SHALL BE USED BEHIND THE END ANCHORAGE. IF THIS IS NOT POSSIBLE, A MINIMUM 3:1 SLOPE MAY BE USED IF APPROVED BY THE ENGINEER.
 THE WIDENED AREA, EXCEPT FOR CURB OPTION A, SHALL HAVE THE SAME GRADING AS THE ADJACENT GUARDRAIL: 10:1 OR FLATTER IF MORE THAN 2 FT. FROM SHOULDER, SLOPE EQUAL TO ROADWAY SLOPE IF 2 FT. OR LESS FROM SHOULDER.
 * THIS PLAN VIEW SHOWS ONLY THE SRT. THE FLEAT-350 USES THE SAME WIDENING DETAILS.




Colorado Department of Transportation 4201 East Arkansas Avenue Denver, Colorado 80222 Phone: (303) 757-9083 FAX: (303) 757-9870	Computer File Information	Standard Plan Revised	GUARDRAIL TYPE 3 W-BEAM STANDARD PLAN NO. M-606-1 Sheet No. 6 of 15
	Path: www.dot.state.co.us/Business/Design/Standards/Standards Drawing File Name: 6060106015.dwg Acad Version: R14 Scale: NA Units: English	Date: 04-06-98 05-07-99 01-05-00	
Project Development Branch	SD	Issued By: Project Development Branch	September 1, 2000

GENERAL NOTES

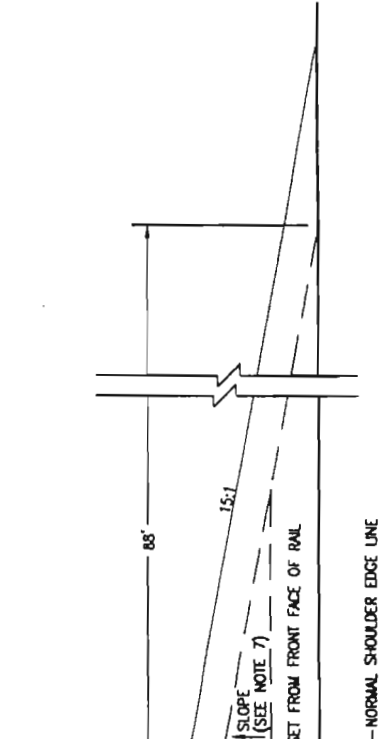
1. THE END ANCHORAGE (NONFLARED) SHALL BE THE ET2000-LET GUARDRAIL END ANCHORAGE (NONFLARED) AS MANUFACTURED BY THE SYRO STEEL COMPANY, CENTERVILLE, UTAH (TEL: 801-292-4461), OR THE SKT GUARDRAIL END ANCHORAGE (NONFLARED) AS MANUFACTURED BY UNIVERSAL INDUSTRIAL SALES, INC., OF PLEASANT GROVE, UTAH (TEL: 800-424-9825), OR AN APPROVED EQUAL ONE. END ANCHORAGE (NONFLARED) SHALL INCLUDE ALL POST, RAIL, AND HARDWARE ITEMS REQUIRED FOR A COMPLETE UNIT. THE END ANCHORAGE (NONFLARED) SHALL BE INSTALLED ACCORDING TO THE MANUFACTURER'S RECOMMENDATIONS. THE CONTRACTOR SHALL PROVIDE A COPY OF THE MANUFACTURER'S INSTALLATION INSTRUCTIONS AND PARTS LISTS TO THE ENGINEER PRIOR TO THE INSTALLATION OF THE DEVICE.
2. POSTS SHALL BE DRILLED FOR BREAKAWAY ACCORDING TO THE MANUFACTURER'S INSTRUCTIONS.
3. DO NOT USE REFLECTOR TABS ON THE LAST 7 POSTS OF THE END ANCHORAGE (NONFLARED).
4. USE MANUFACTURER'S RECOMMENDED STEEL FOUNDATION TUBE FOR POSTS NO.1, NO.2, NO.3, AND NO.4 FOR ET2000-LET AND SKT END ANCHORAGES (NONFLARED).



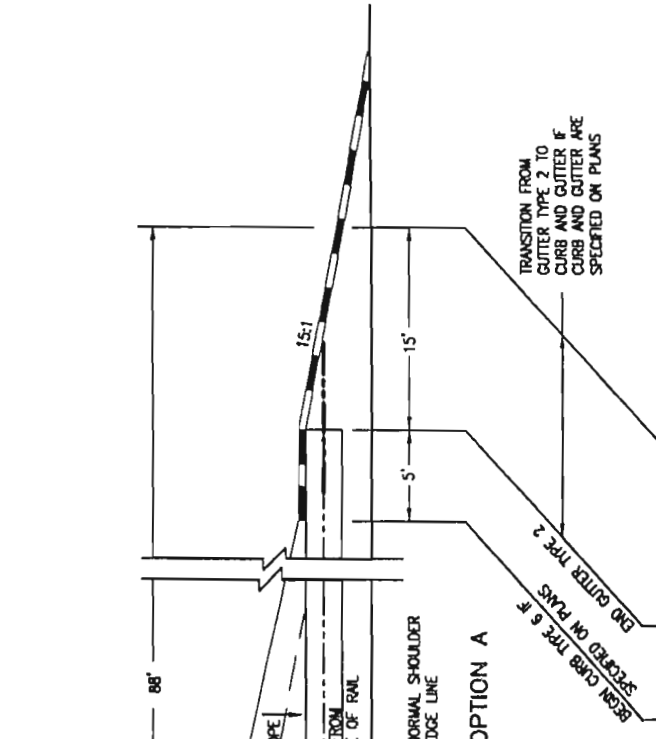
 <p>Colorado Department of Transportation 4201 East Arkansas Avenue Denver, Colorado 80222 Phone: (303) 757-9083 FAX: (303) 757-9820</p>	<p>Project Development Branch SD</p>	<p>GUARDRAIL TYPE 3 W-BEAM</p>	<p>STANDARD PLAN NO. M-606-1</p>
<p>Computer File Information</p> <p>Path: www.dot.state.co.us/Business/Design/Standards/MSstandards Drawing File Name: 6060107015.dwg Acad Version: R14 Scale: NA Units: English</p>		<p>Standard Plan Revised</p> <p>Date: 04-06-98 Comments: Safety/Design Improvements 05-07-99 Safety/Proprietary Improvements 01-05-00 Safety/Proprietary Improvements</p>	
<p>Issued By: Project Development Branch September 1, 2000</p>		<p>Sheet No. 7 of 15</p>	

GENERAL NOTES

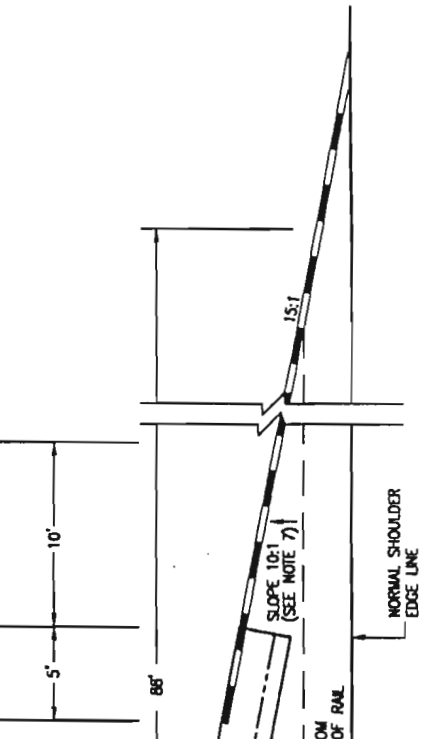
1. PAYMENT FOR THE ADDED EMBANKMENT (APPROXIMATELY 40 CU. YDS.) FOR THE FLARE SHALL BE AS FOLLOWS:
 -UNDER PAY ITEM 203 WHEN THE CONTRACT PLAN INCLUDES PAY ITEM 203
 -INCLUDED IN THE COST OF THE NONFLARED TERMINAL ITEM 606 PAY ITEM WHEN THE CONTRACT PLAN DOES NOT INCLUDE PAY ITEM 203
 WHEN THE WIDENED AREA IS PAVED, PAYMENT FOR THE PAVEMENT (APPROX. 41 SQ. YDS.) SHALL BE AS FOLLOWS:
 -UNDER PAY ITEM 403 OR 412 WHEN THE CONTRACT PLAN INCLUDES PAY ITEM 403 OR 412
 -INCLUDED IN THE COST OF THE NONFLARED TERMINAL PAY ITEM WHEN THE CONTRACT PLAN DOES NOT INCLUDE PAY ITEM 403 OR 412 (SEE SHEET, NOTE 2 FOR PAVEMENT TYPES)
2. WHEN OVERLAY PAVING, THE FINISHED SURFACE AT EACH POST SHALL NOT BE ABOVE THE POST'S TOP BREAKAWAY HOLE OR STRUT ASSEMBLY. THE WIDENED AREA AT THE NONFLARED TERMINAL SHALL NOT BE OVERLAY PAVEMENT ABUTTING THE NONFLARED TERMINAL. SHALL BE TAPERED TO PREVENT A DROP IN THE PAVED SURFACE BELOW THE RAIL.
3. SEE SHEETS 1, 2 AND 3 FOR STANDARD TYPE 3 GUARDRAIL AND INSTALLATION DETAILS.
4. THE COST OF THE GUTTER WILL BE PAID FOR AS "GUTTER TYPE 2 (2 FT.)" FOR A LENGTH OF 103 FT. OR "GUTTER TY. 2 (3 FT.)" FOR A LENGTH OF 50 FT.
5. INLETS OR RUNDOWNS MAY BE USED INSTEAD OF THE GUTTER IF SPECIFIED ON THE PLANS. NO ADDITIONAL CURB SHALL BE ADDED IN THE VICINITY OF THE END TREATMENT.
6. 4:1 OR FLATTER SLOPES SHALL BE USED BEHIND THE TERMINAL IF THIS IS NOT POSSIBLE, A MINIMUM 3:1 SLOPE MAY BE USED WHEN APPROVED BY THE ENGINEER.
7. THE WIDENED AREA, EXCEPT FOR CURB OPTION A, SHALL HAVE THE SAME GRADING AS BENEATH THE ADJACENT GUARDRAIL: 10:1 OR FLATTER IF MORE THAN 2 FT. FROM SHOULDER, SLOPE EQUAL TO ROADWAY SLOPE IF 2 FT. OR LESS FROM SHOULDER.



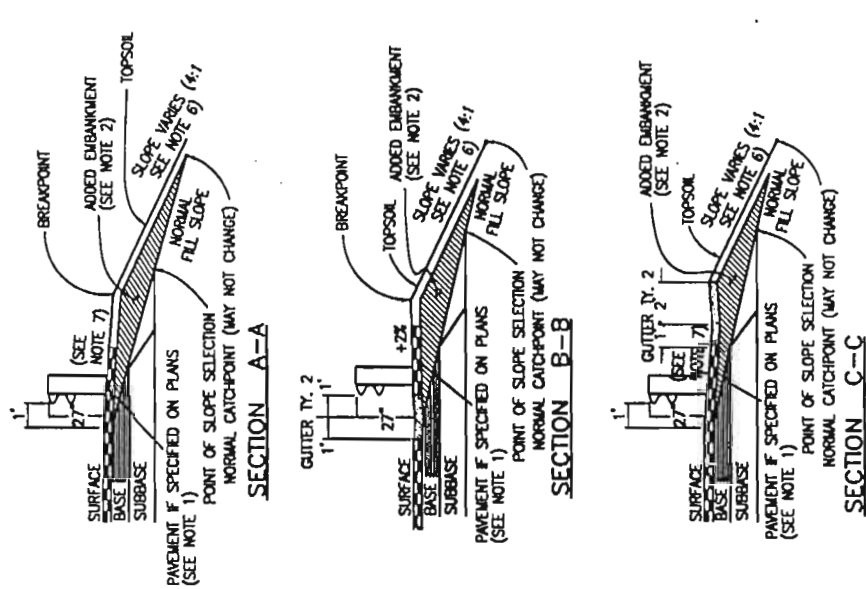
**WIDENED AREA FOR NONFLARED TERMINAL
PLAN VIEW**



**WIDENED AREA FOR NONFLARED TERMINAL WITH CURB OPTION A
PLAN VIEW**



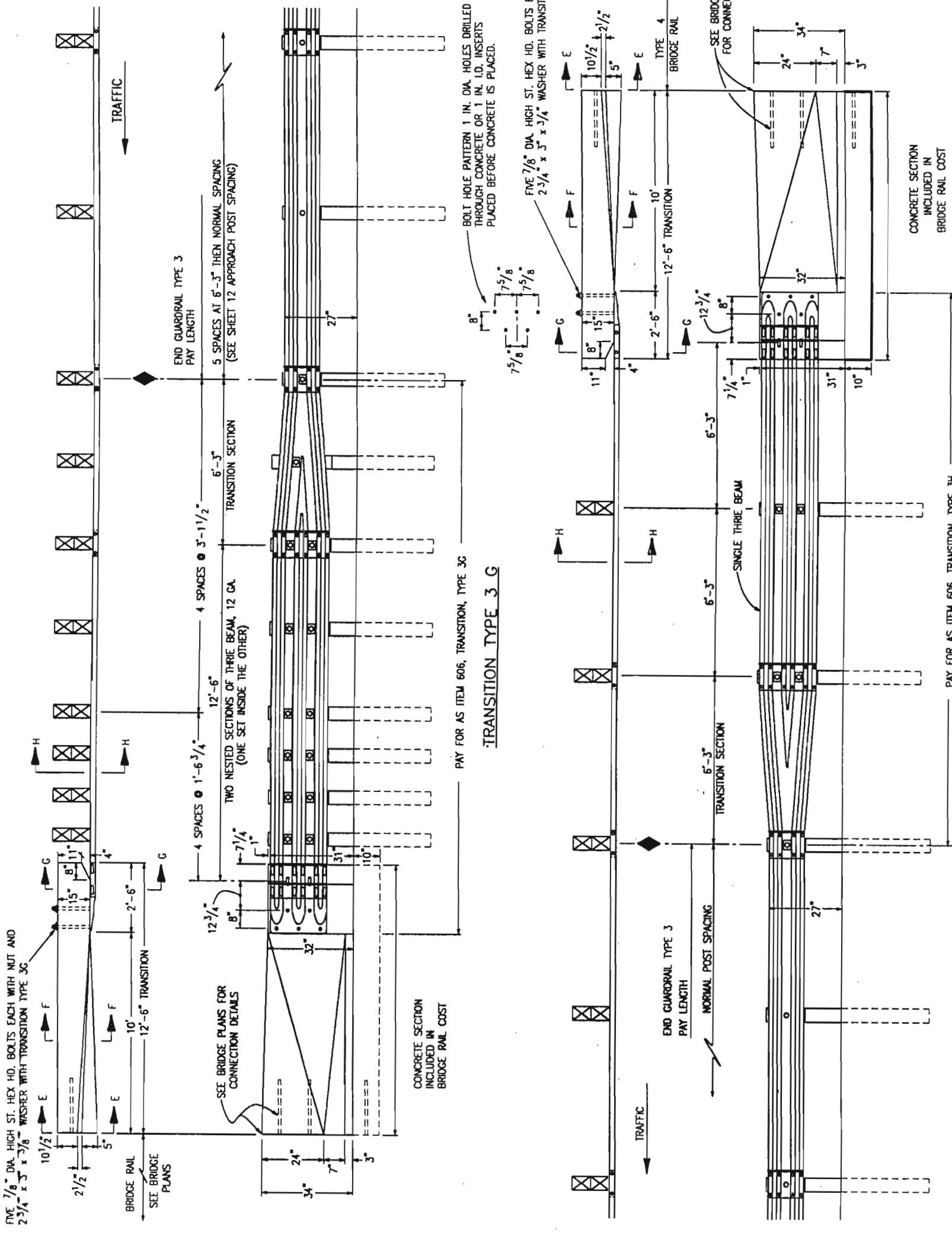
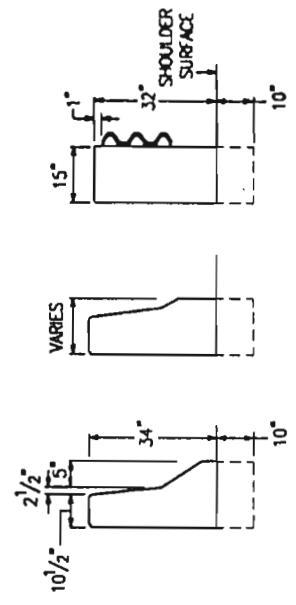
**WIDENED AREA FOR NONFLARED TERMINAL WITH CURB OPTION B
PLAN VIEW**



Colorado Department of Transportation 4201 East Arkansas Avenue Denver, Colorado 80222 Phone: (303) 757-9083 FAX: (303) 757-9820		Computer File Information Path: www.dot.state.co.us/Business/Design/Standards/Standards		Standard Plan Revised Date: 04-06-98 Comments: Safety/Design Improvements	
Project Development Branch SD		Drawing File Name: 6060108015.dwg Acad Version: R14 Scale: NA Units: English		Safety/Proprietary Improvements Safety/Proprietary Improvements	
GUARDRAIL TYPE 3			STANDARD PLAN NO.		
W-BEAM			M-606-1		
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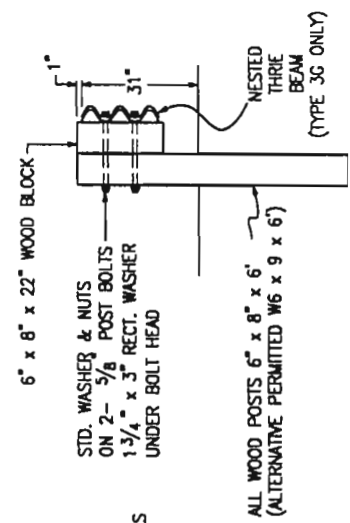
GENERAL NOTES

1. TRANSITION TYPE 3G IS FOR USE AT BOTH ENDS OF BRIDGES ON TWO-WAY ROADS AND AT THE APPROACH END OF BRIDGES ON ONE-WAY ROADS.
2. TRANSITION TYPE 3H IS FOR USE AT THE TRAILING END OF BRIDGES ON ONE-WAY ROADS.
3. THE THREE BEAM SECTION IN TRANSITIONS TYPES 3G AND 3H MAY BE SHOP BENT TO FIT CURVES UP TO 10 FT. IN RADIUS. HOWEVER, THE 6 FT. - 3 IN. TRANSITION SECTION SHALL NOT BE BENT.
4. THE 12 FT. - 6 IN. CONCRETE TRANSITION IS BETWEEN TYPE 3 GUARDRAIL AND TYPE 4 OR 7 BRIDGE RAIL. SEE STD. PLAN M-606-12 FOR THE TRANSITION BETWEEN TYPE 3 GUARDRAIL AND TYPE 4 OR 7 GUARDRAIL.
5. TRANSITIONS TYPE 3G AND TYPE 3H ARE ALSO USED TO CONNECT TO TYPE 8 AND TYPE 10 BRIDGE RAIL. SEE BRIDGE PLANS FOR CONNECTION DETAILS.
6. BACKUP PLATE NOT REQUIRED AT POSTS ON TYPE 3G AND 3H.
7. (B) THIS SHOWS RECTANGULAR WASHER IS REQUIRED UNDER POST BOLT HEAD.



BOLT HOLE PATTERN 1 IN. DIA. HOLES DRILLED THROUGH CONCRETE OR 1 IN. I.D. INSERTS PLACED BEFORE CONCRETE IS PLACED.

FIVE 7/8" DIA. HIGH ST. HEX HD. BOLTS EACH WITH NUT AND 2 3/4" x 3" x 3/4" WASHER WITH TRANSITION TYPE 3H



STD. WASHER & NUTS ON 2- 5/8" POST BOLTS 1-3/4" x 3" RECT. WASHER UNDER BOLT HEAD

ALL WOOD POSTS 6" x 8" x 6" (ALTERNATIVE PERMITTED W6 x 9 x 6) (TYPE 3G ONLY)

CONCRETE SECTION INCLUDED IN BRIDGE RAIL COST

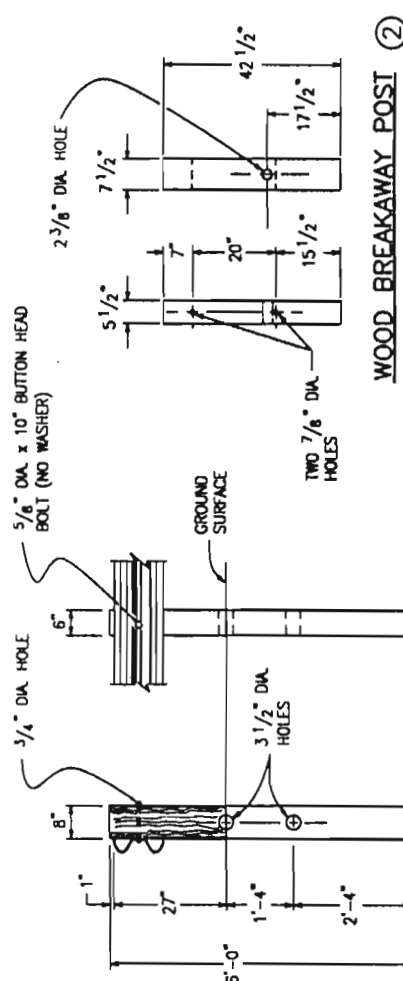
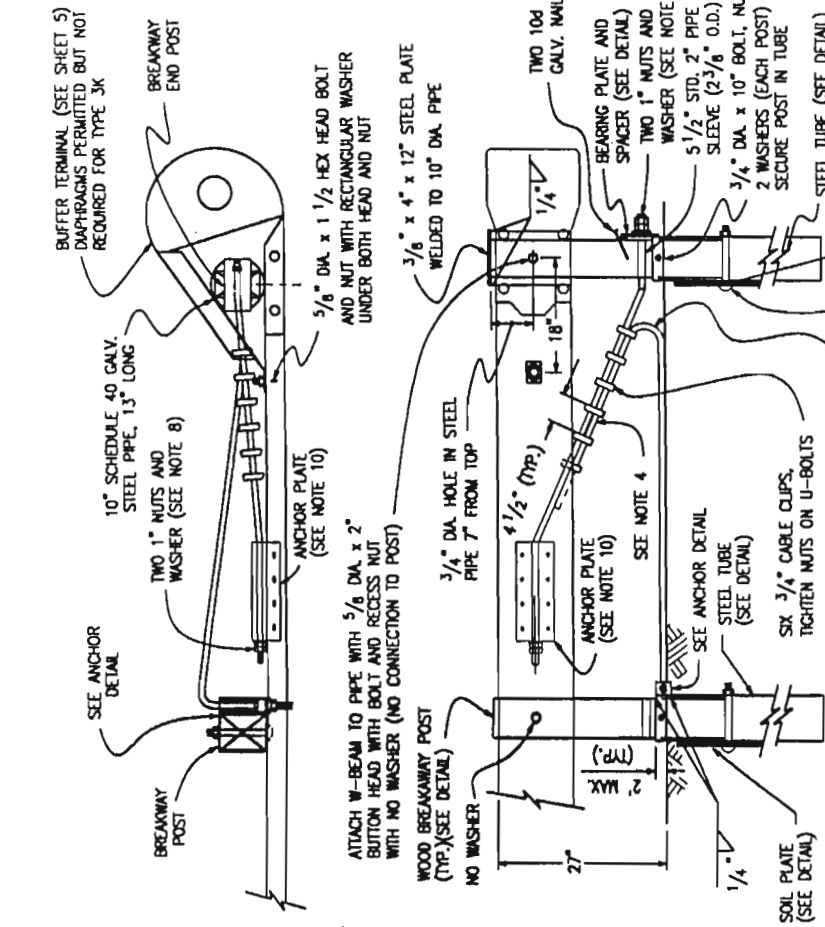
PAY FOR AS ITEM 606, TRANSITION, TYPE 3H

TRANSITION TYPE 3 G

<p>Colorado Department of Transportation</p> <p>4201 East Arkansas Avenue Denver, Colorado 80222 Phone: (303) 757-9083 FAX: (303) 757-9820</p> <p>Project Development Branch SD</p>	<p>Computer File Information</p> <p>Path: www.dot.state.co.us/Business/Design/Standards/MSStandards Drawing File Name: 60601010015.dwg Acad Version: R14 Scale: NA Units: English</p>	<p>Standard Plan Revised</p> <p>Date: 04-06-98 05-07-99 01-05-00</p> <p>Comments: Safety/Design Improvements Safety/Proprietary Improvements Safety/Proprietary Improvements</p>	<p>GUARDRAIL TYPE 3</p>	<p>STANDARD PLAN NO.</p> <p>M-606-1</p>
			<p>TRANSITION TYPE 3 G</p>	<p>Sheet No. 10 of 15</p>

GENERAL NOTES

- APPLICATION: THE TYPE 3J END ANCHORAGE MAY BE USED TO SHIELD HAZARDS AT THE INTERSECTION OF TWO ROADWAYS. TYPICAL APPLICATIONS INCLUDE, BUT ARE NOT LIMITED TO, THE FOLLOWING:
 - CANAL SERVICE ROADS AT BRIDGE ENDS.
 - INTERRUPTIONS IN GUARDRAIL RUNS BY INTERSECTING ROADWAYS, ETC.
- THE LOW SPEED TYPE 3K END ANCHORAGE SHALL BE USED ONLY ON DRIVEWAYS AND LOW SPEED SERVICE ROADS. WHENEVER AN APPROVED CRASH-TESTED END TREATMENT IS REQUIRED, USE THE FLARED OR NONFLARED TERMINAL WITH 37 FT.-6 IN. LENGTH.
- GRADING AND PAVING FOR THE 3J & 3K SHALL MATCH THE GRADING AND PAVING OF THE GUARDRAIL THAT THEY ARE ATTACHED TO AND SHALL BE IN ACCORDANCE WITH SHEET ONE OF THIS STANDARD. MAX. FILL SLOPE SHALL BE 2:1.
- THE RAIL IS NOT BOLTED TO THE CRT POST AT THE CENTER OF THE CURVE FOR THE 8 FT.-6 IN., 17 FT., AND 25 FT.-6 IN. RADI. PLATES SHALL CONFORM TO ASTM A 36M, AND THE STRUCTURAL TUBING TO ASTM A 500.
- IF IN GALVANIZED WIRE ROPE (CABLE) SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M 30 TYPE II.
- PLATES SHALL CONFORM TO ASTM A 36, AND STRUCTURAL TUBING TO ASTM A 500. WELDING SHALL MEET ALL REQUIREMENTS OF THE AMERICAN WELDING SOCIETY.
- ALL STRUCTURAL STEEL SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A 123. NO PUNCHING, DRILLING, CUTTING OR WELDING WILL BE PERMITTED AFTER GALVANIZING.
- WHEN THE SOIL PLATE WELDED OPTION IS SELECTED, SOIL PLATE CONNECTION BOLT HOLES ARE NOT REQUIRED.
- OUTSIDE NUT SHALL BE TORQUED AGAINST INSIDE NUT WITH THE CABLE INSTALLED TAUT BETWEEN THE ANCHOR PLATE AND FIRST POST.
- ALL CURVED GUARDRAIL SHALL BE SHOP BENT.
- SEE SHEET 5 FOR ANCHOR PLATE AND OTHER DETAILS.
- THE STEEL TUBE MAY BE DRIVEN WITH WOOD POST INSERTED IF NO DAMAGE OCCURS TO THE POST OR BOLTS.

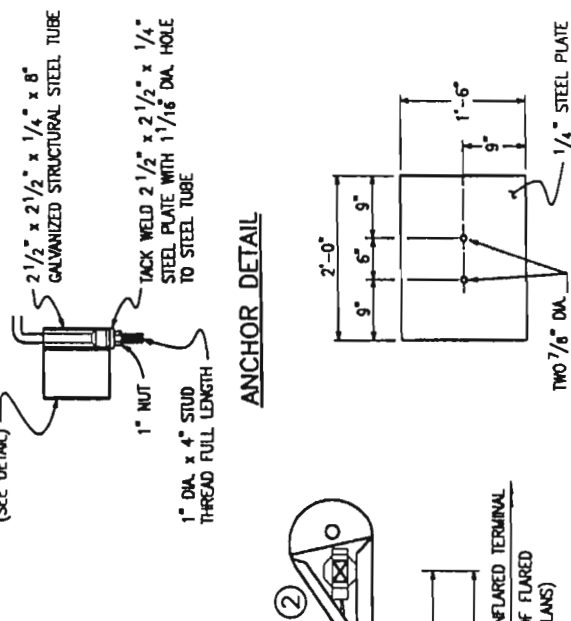
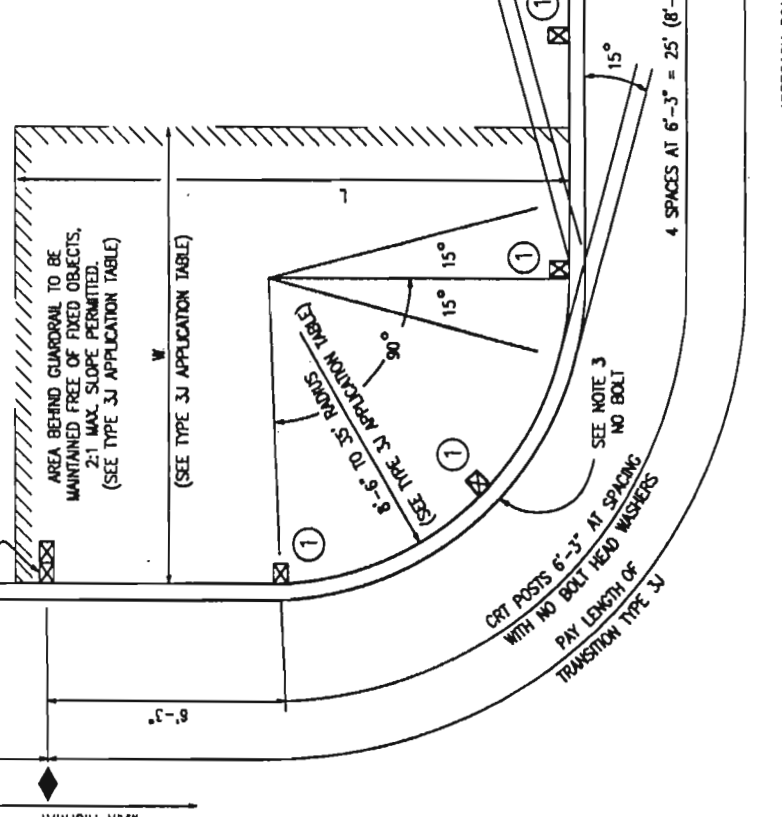


POSTS

POST	DIMENSIONS	TYPE
①	6" x 8" x 6"	CRT
②	5 1/2" x 7 1/2" x 42 1/2"	BREAKAWAY

TRANSITION TYPE 3J APPLICATION

RADIUS	ANGLE	NO. CRT POSTS	AREA FREE OF FIXED OBJECTS	CURVED RAIL FOR ANGLE
8'-6"	75°-105°	5	L 25', W 15'	75X 90X 105X
	90°	6	L 30', W 15'	90X 105X 120X
17'	75°-90°	7	L 30', W 15'	75X 90X 105X
	91°-105°	7	L 40', W 20'	91X 106X 121X
25'-6"	75°-85°	7	L 40', W 20'	75X 85X 105X
	86°-95°	8	L 40', W 20'	86X 96X 116X
35'	96°-105°	9	L 50', W 20'	96X 106X 126X
	75°-85°	9	L 50', W 20'	75X 85X 105X
	86°-95°	10	L 50', W 20'	86X 96X 116X
	96°-105°	11	L 50', W 20'	96X 106X 126X



INTERSECTING ROADWAYS TRANSITION - TYPE 3J TRANSITION

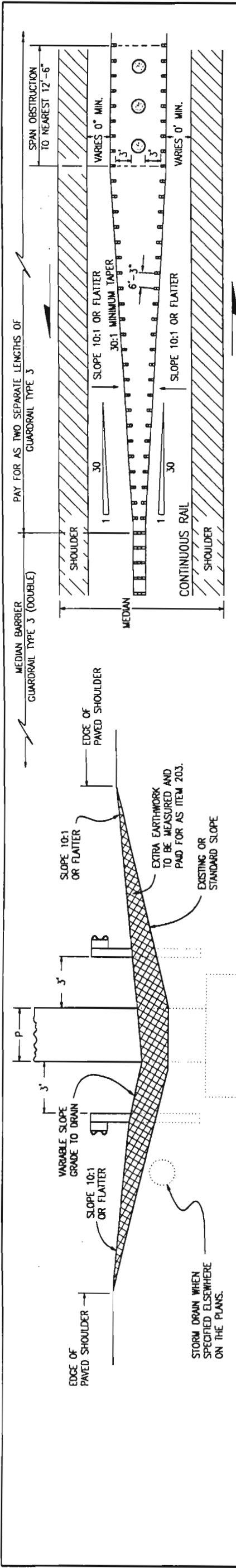
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Acad Version: R14	Scale: NA
Units: English	

GUARDRAIL TYPE 3 W-BEAM

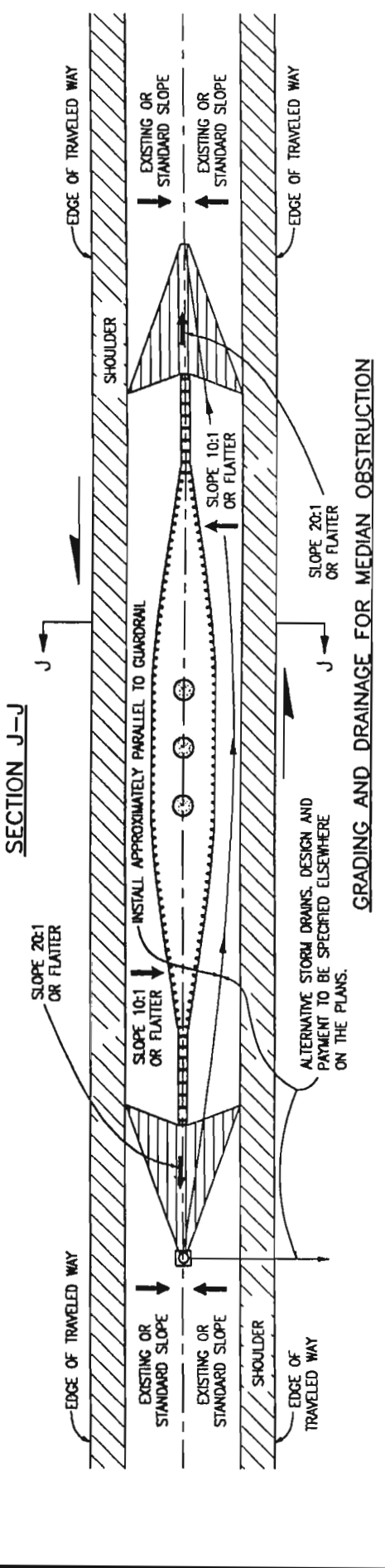
STANDARD PLAN NO. M-606-1

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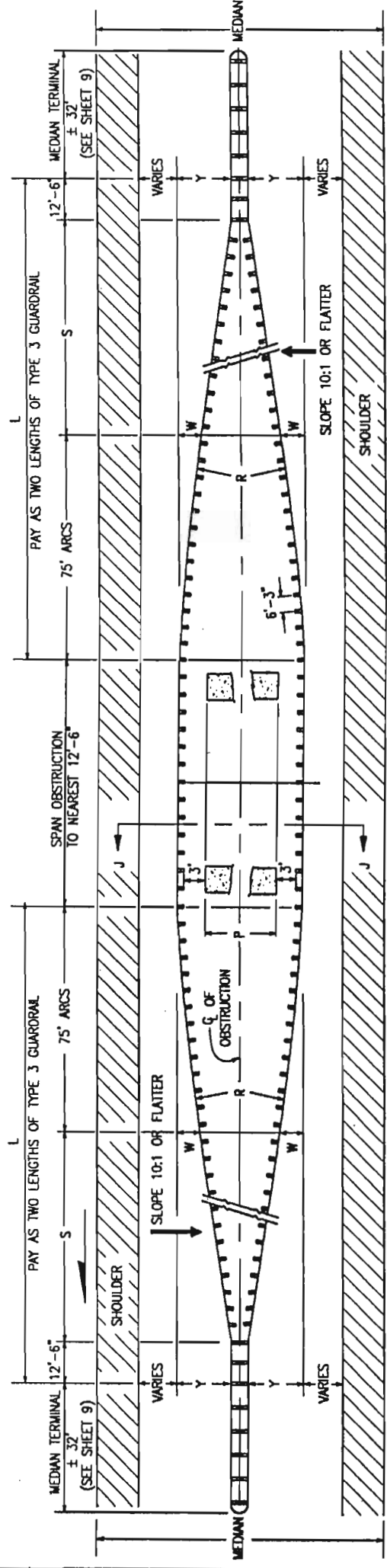
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OBSTRUCTION IN MEDIAN 30 FT. WIDE OR LESS



GRADING AND DRAINAGE FOR MEDIAN OBSTRUCTION



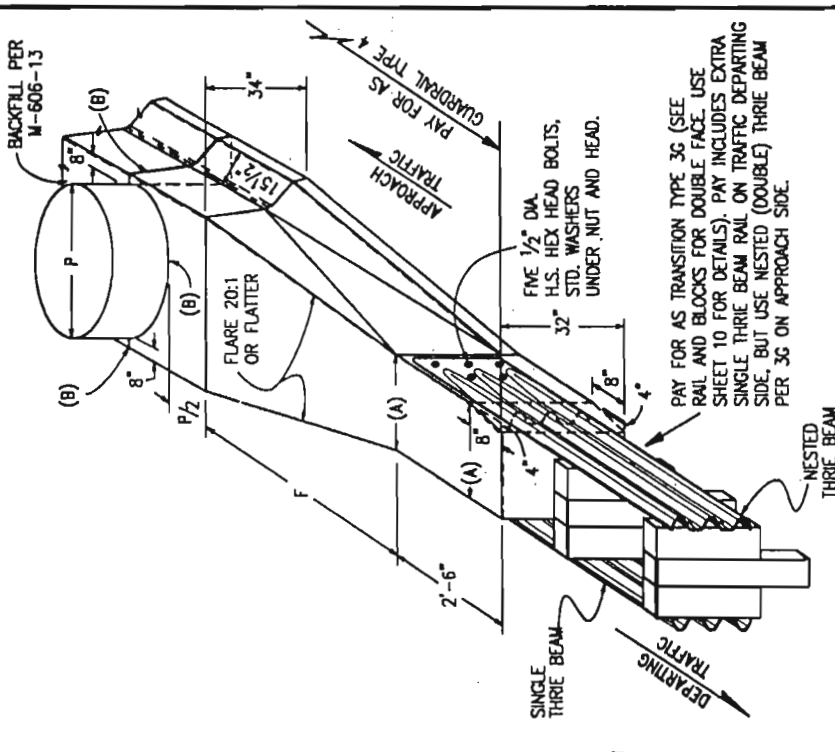
P	F	1'	2'	3'	4'	5'	6'	7'	8'	9'	10'	11'	12'	13'	14'	15'	16'	17'	18'	19'	20'	21'	22'
Y	4.1'	4.6'	5.1'	5.6'	6.1'	6.6'	7.1'	7.6'	8.1'	8.6'	9.1'	9.6'	10.1'	10.6'	11.1'	11.6'	12.1'	12.6'	13.1'	13.6'	14.1'	14.6'	15.1'
W	1.4'	1.9'	2.4'	2.9'	3.4'	3.9'	4.1'	4.1'	3.6'	3.3'	3.3'	3.5'	3.5'	4.0'	3.7'	3.7'	4.0'	3.7'	3.9'	3.6'	3.8'	4.0'	4.0'
R	2009'	1480'	1171'	969'	827'	720'	652'	585'	518'	451'	384'	317'	250'	183'	116'	50'	15'	15'	15'	15'	15'	15'	15'
S	25'	112'-6"	125'	137'-6"	150'	162'-6"	175'	187'-6"	200'	212'-6"	225'	237'-6"	250'	262'-6"	275'	287'-6"	300'	312'-6"	325'	337'-6"	350'	362'-6"	375'
L	112'-6"	125'	137'-6"	150'	162'-6"	175'	187'-6"	200'	212'-6"	225'	237'-6"	250'	262'-6"	275'	287'-6"	300'	312'-6"	325'	337'-6"	350'	362'-6"	375'	387'-6"

GUARDRAIL FOR OBSTRUCTION IN MEDIANS WIDER THAN 30 FT.
 NOTE: FOR OBSTRUCTIONS WIDER THAN 22 FT. USE THE DETAILS SHOWN ON SHEET 13 FOR MEDIANS WIDER THAN 30 FT.

OBSTRUCTIONS IN MEDIANS

NARROW MEDIAN DETAIL
 USUALLY LESS THAN 30 FT. WIDE MEDIAN
 WITH ALL PAVED SURFACE

P	F
1'	10'
2'	18'
3'	28'
4'	38'
5'	48'



(A). TIMBER POSTS 2 FT., STEEL POSTS 1 FT.-6 IN.
 (B). 1/2 IN. PREFORMED JOINT MATERIAL

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 Drawing File Name: 60601012015.dwg
 Acad Version: R14 Scale: NA Units: English

Standard Plan Revised
 Date: 04-06-98 Comments: Safety/Design Improvements
 05-07-99 Safety/Proprietary Improvements
 01-05-00 Safety/Proprietary Improvements

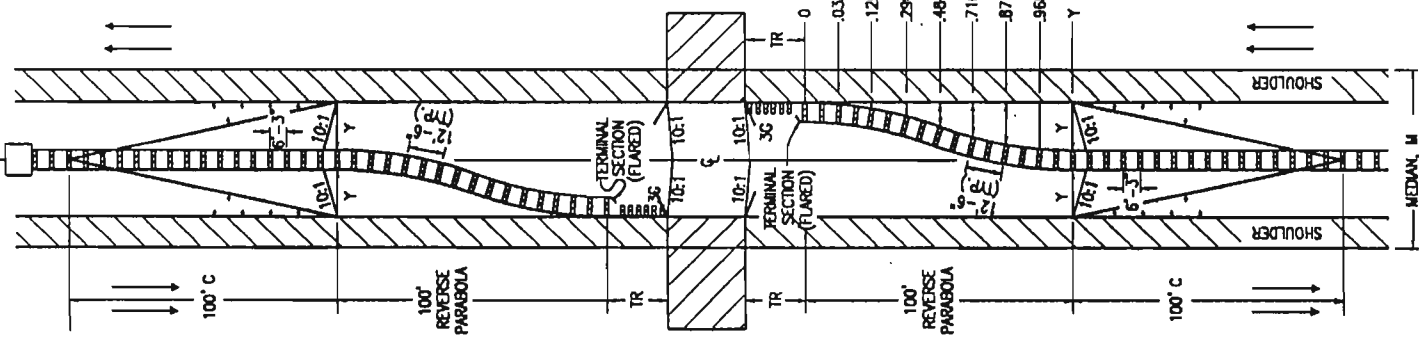
GUARDRAIL TYPE 3 STANDARD PLAN NO. M-606-1

W-BEAM

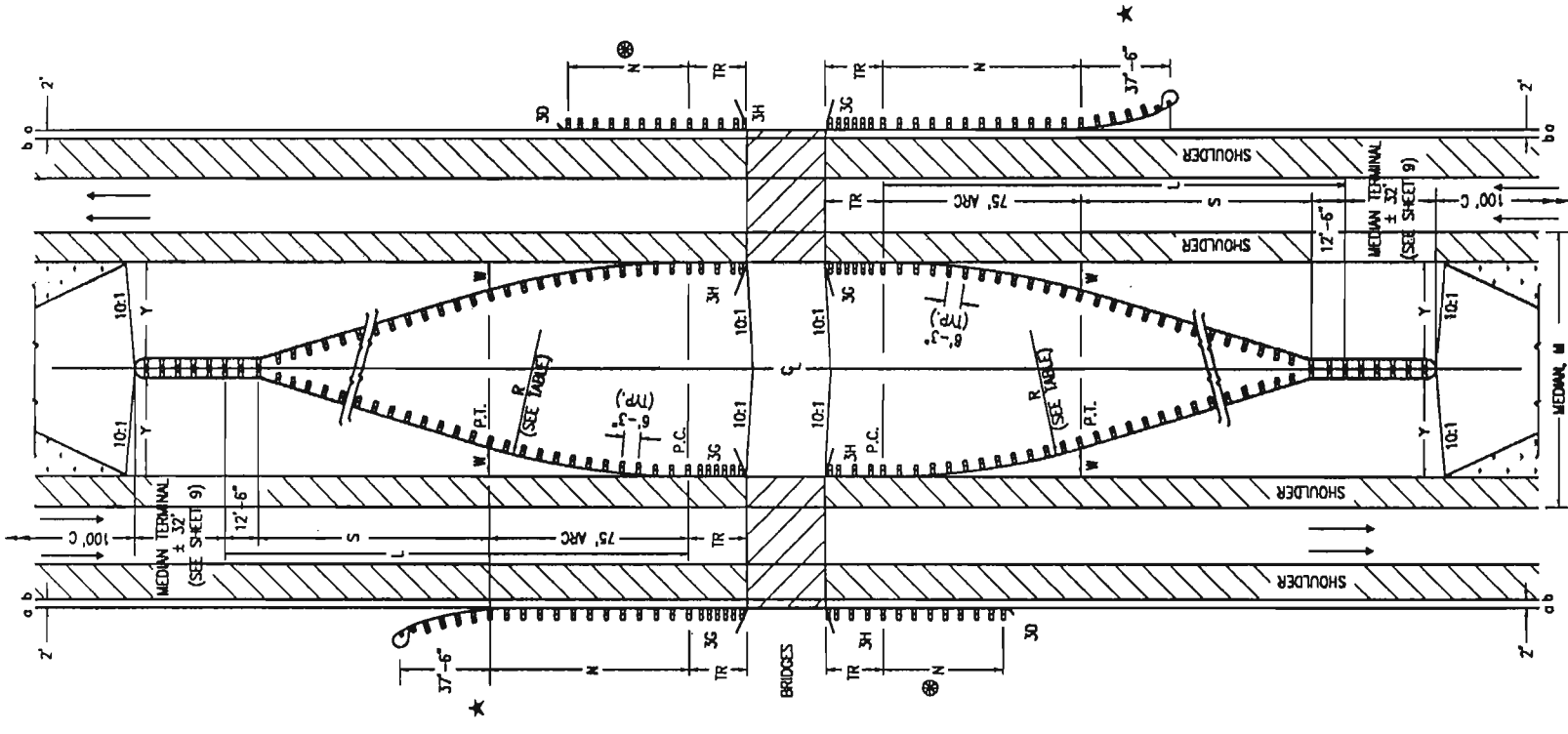
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IMPACT ATTENUATOR OR OTHER ACCEPTABLE SAFETY END TREATMENT.

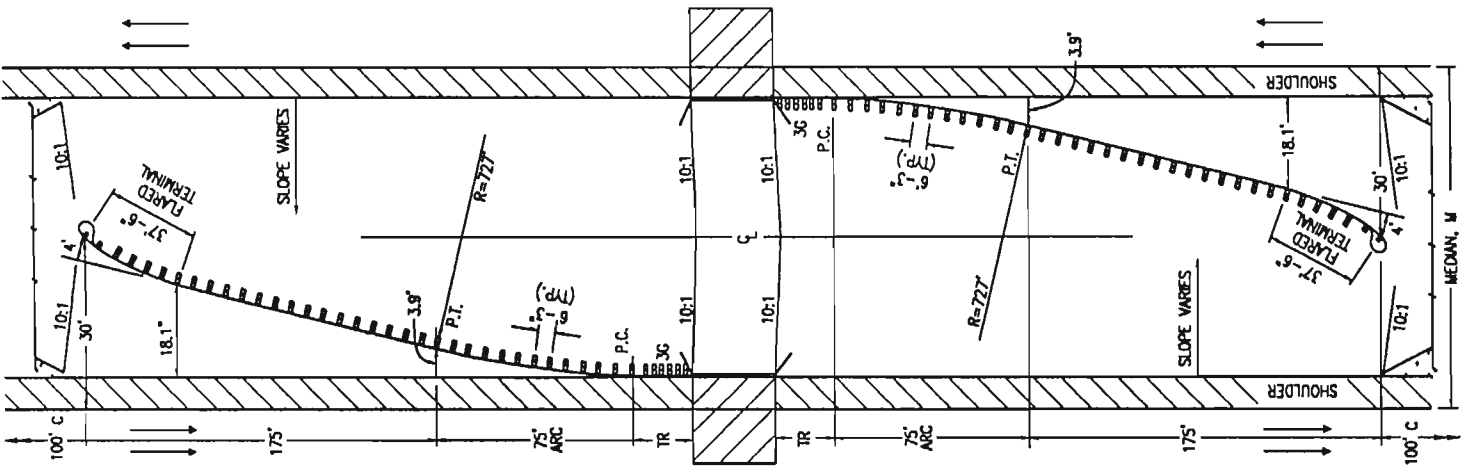


31 FT. - 59 FT. MEDIAN



31 FT. - 59 FT. MEDIAN

RIGHT SHOULDER GUARDRAIL IS THE SAME FOR ALL MEDIAN WIDTHS. LENGTHS SHOWN ARE MINIMUM. ADDITIONAL LENGTH TO SATISFY GUARDRAIL WARRANTS SHALL BE PROVIDED.



31 FT. - 59 FT. MEDIAN

MEDIAN	END	ARC	RADIUS	EXTENS.	LENGTH
M	Y	W	R	S	L
FT.	FT.	FT.	FT.	FT.	FT.
31	10.5	3.9	720	62.5	150.0
32	11.0	4.2	669		
33	11.5	3.8	739	75.0	162.5
34	12.0	4.0	702		
35	12.5	4.2	669		
36	13.0	3.9	720	87.5	175.0
37	13.5	4.1	685		
38	14.0	3.8	739		
39	14.5	3.9	720	100.0	187.5
40	15.0	4.1	685		
41	15.5	3.9	720	112.5	200.0
42	16.0	4.0	702		
43	16.5	4.2	669		
44	17.0	3.9	720	125.0	212.5
45	17.5	4.0	702		
46	18.0	3.8	739		
47	18.5	4.0	702	137.5	225.0
48	19.0	4.1	685		
49	19.5	3.9	720	150.0	237.5
50	20.0	4.0	702		
51	20.5	4.1	685		
52	21.0	3.0	720	162.5	250.0
53	21.5	4.0	702		
54	22.0	3.9	739		
55	22.5	4.0	702	175.0	262.5
56	23.0	4.1	685		
57	23.5	3.0	739	187.5	275.0
58	24.0	4.0	702		
59	24.5	4.1	685		

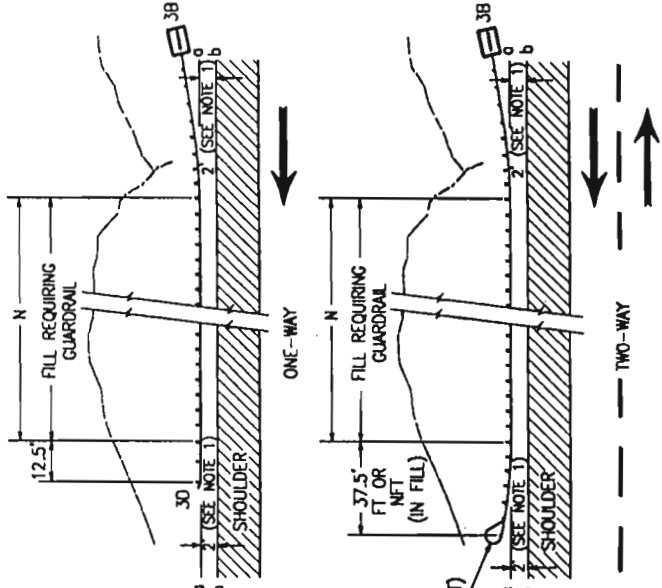
- ⊙ = DO NOT CONSTRUCT THE TR AND GUARDRAIL ON THE TRAILING BRIDGE ENDS IF SITE CONDITIONS DO NOT WARRANT THE USE OF GUARDRAIL.
- N = SHOWN ON PLANS. LENGTH TO SHIELD ALL HAZARDS IS BASED ON GUARDRAIL'S LENGTH OF MED COMPUTATION. SEE ASHTO ROADWAY DESIGN GUIDE. MINIMUM 12 FT. - 6 IN. WHERE SITE CONDITIONS ALLOW. THE TOTAL LENGTH OF NEED WILL INCLUDE THE LENGTH OF TRANSITION, THE LENGTH OF RAIL (N), AND ANY REDIRECTIVE LENGTH IN THE RAIL END TREATMENT.
- Y = THE TABLE IS BASED ON 4 FT. SHOULDER.
- a = EDGE OF 6 FT. OR 10 FT. SHOULDER.
- b = EDGE OF 6 FT. OR LESS SHOULDER.
- C = CHANGE: 100 FT. TRANSITION TO NORMAL SLOPE.
- R = RADIUS OF 75 FT. ARC.
- S = STRAIGHT EXTENSION, TANGENT TO ARC, FROM NO GUARDRAIL TYPE 3 (DOUBLE) ATTACHED TO MEDIAN TERMINAL.
- TR = 18 FT.-9 IN. FOR 3G AND 3H.
- W = OFFSET AT END OF ARC.
- Y = FINAL OFFSET AT END.
- L = TOTAL LENGTH PAID FOR AS GUARDRAIL TYPE 3.
- M = WIDTH OF MEDIAN.
- ★ = CAN USE FLARED OR NONFLARED TERMINAL.

MULTILANE DIVIDED HIGHWAYS - (DEPRESSED MEDIAN)

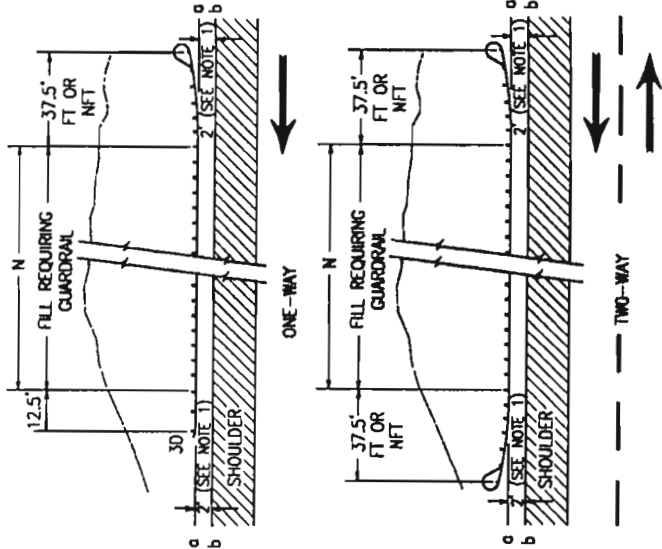
Colorado Department of Transportation 4201 East Arkansas Avenue Denver, Colorado 80222 Phone: (303) 757-9083 FAX: (303) 757-9820 Project Development Branch	Computer File Information Path: www.dot.state.co.us/Business/Design/Standards/MSStandards Drawing File Name: 60601013015.dwg Acad Version: R14 Scale: NA Units: English	Standard Plan Revised Date: 04-06-98 Comments: Safety/Design Improvements 05-07-99 Safety/Proprietary Improvements 01-05-00 Safety/Proprietary Improvements	STANDARD PLAN NO. M-606-1
	GUARDRAIL TYPE 3 W-BEAM		Sheet No. 13 of 15

GENERAL NOTES

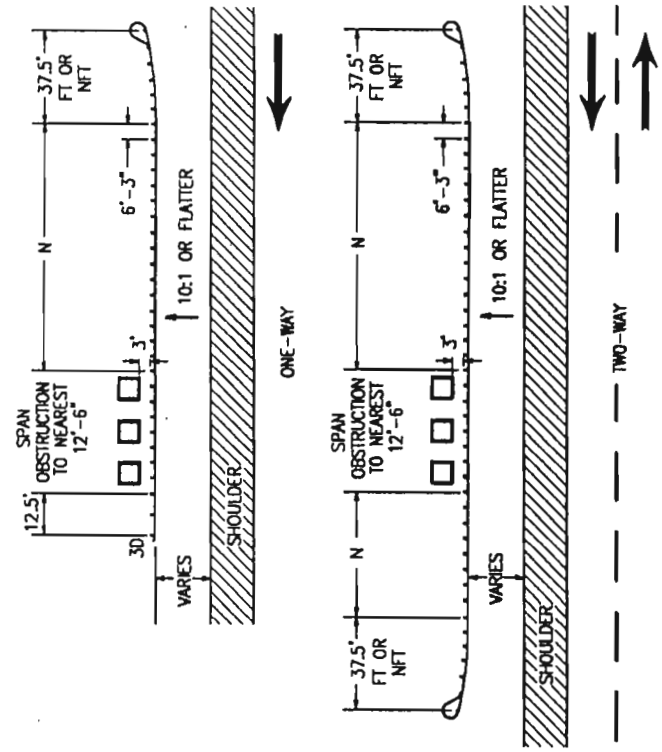
1. THE 2 FT. OFFSET FROM THE EDGE OF THE PAVED SHOULDER TO THE FACE OF THE GUARDRAIL (FOR SHOULDERS 6 FT. OR LESS IN WIDTH) IS DESIRABLE BUT NOT MANDATORY WHEN THE ROADWAY DESIGN SPEED IS LESS THAN 50 MPH. THE MINIMUM OFFSET OF GUARDRAIL FROM THE EDGE OF TRAVELED WAY IS 4 FT. "a" IS THE EDGE OF AN 8 FT. OR 10 FT. SHOULDER. "b" IS THE EDGE OF AN 6 FT. OR LESS SHOULDER. SEE NOTES AND DETAILS ON SHEETS 1, 13, & 15.
2. THE TYPE 3C OR 3H TRANSITIONS (SHEET 10) SHALL BE USED TO CONNECT A TYPE 3 W-BEAM TO A TYPE 4 CONCRETE BARRIER OR TO A TYPE 4, 8, OR 10 BRIDGE RAIL FOR A TRANSITION FROM A ROADWAY TO TYPE 3 W-BEAM TO A BRIDGE RAIL TYPE 3 WITH BACKING TUBES. THE TYPE 3L TRANSITION SHOWN ON SHEET 15 SHALL BE USED.
3. "TR" WILL BE 18 FT.-9 IN. FOR THE TRANSITIONS TYPE 3G AND 3H, AND 25 FT. FOR THE TYPE 3L TRANSITION.
4. "FT" IS THE FLARED TERMINAL AND "NFT" IS THE NONFLARED TERMINAL.
5. THE GUARDRAIL LENGTH DIMENSION "N" IS THE LENGTH AS DETERMINED BY THE LENGTH OF NEED COMPUTATION AND IS SHOWN ON THE PLANS. THE MINIMUM IS 12 FT.-6 IN. WHERE SITE CONDITIONS ALLOW. THE OVERALL REQUIRED LENGTH OF NEED CAN INCLUDE THE LENGTH OF TRANSITION, THE LENGTH OF RAIL (N), AND ANY REDIRECTIVE LENGTH IN THE RAIL END TREATMENT.



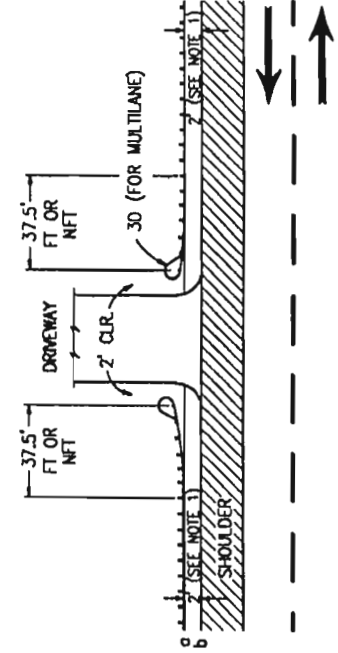
GUARDRAIL FOR ROADSIDE CUT-TO-FILL CONDITION



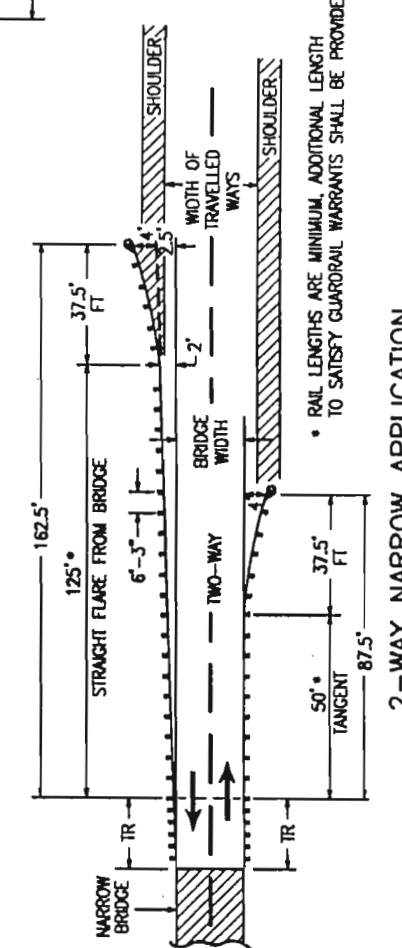
GUARDRAIL FOR ROADSIDE FILL CONSTRUCTION



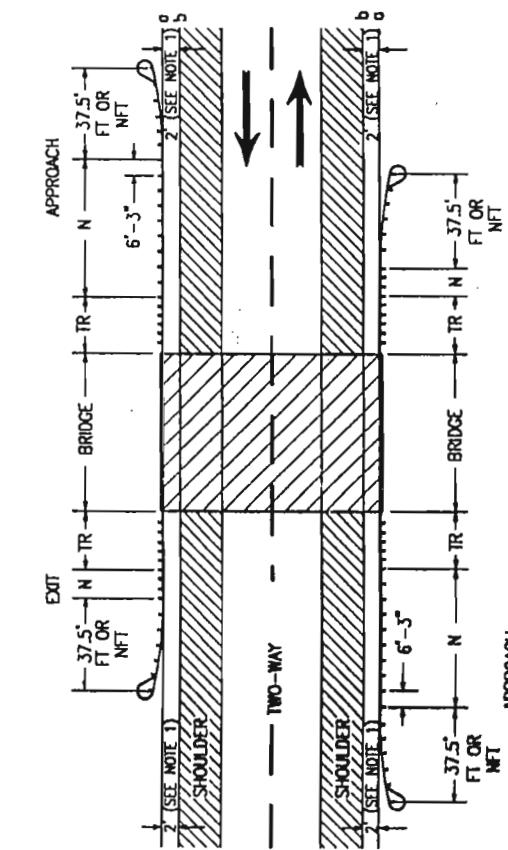
GUARDRAIL FOR ROADSIDE OBSTRUCTIONS



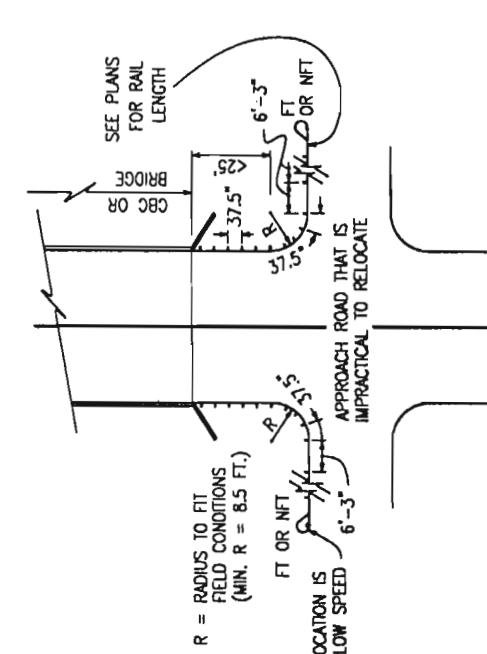
LAYOUT FOR DRIVEWAY APPROACH



2-WAY NARROW APPLICATION



2-WAY NORMAL BRIDGE APPLICATION



INTERRUPTED STRUCTURE APPROACH

TYPE 3 GUARDRAIL WITH BLOCKED OUT POSTS SPACED AT 37 FT.-1/2 IN. FROM STRUCTURE AROUND CURVE.
(USE TYPE 3J ON SHEET 11 WHEN PRACTICAL.)

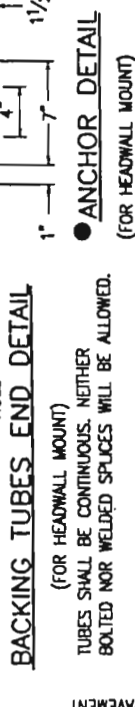
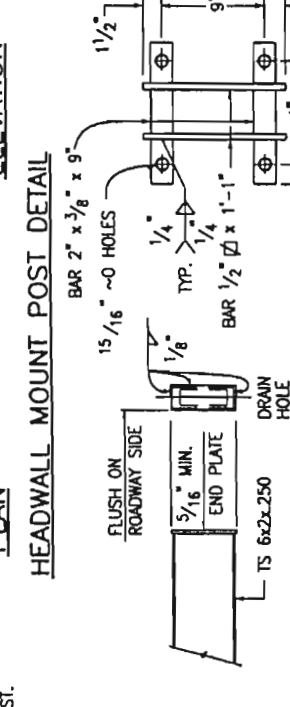
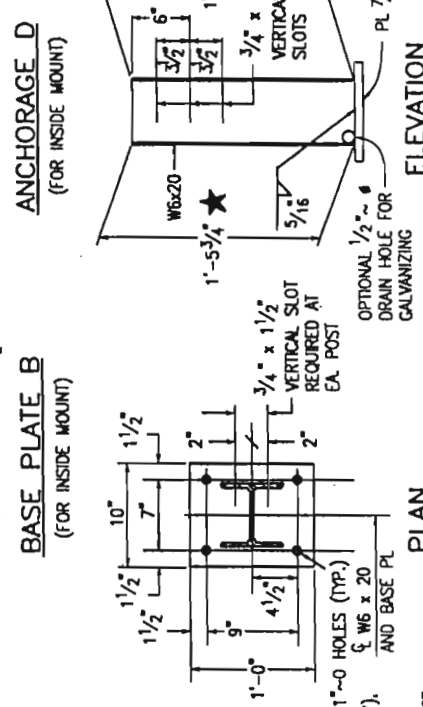
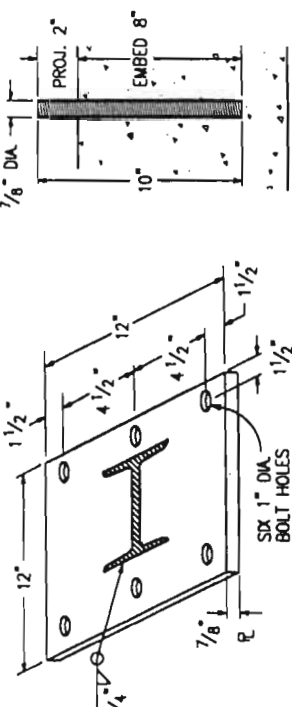
* RAIL LENGTHS ARE MINIMUM. ADDITIONAL LENGTH TO SATISFY GUARDRAIL WARRANTS SHALL BE PROVIDED.

<p>Colorado Department of Transportation 4201 East Arkansas Avenue Denver, Colorado 80222 Phone: (303) 757-9083 FAX: (303) 757-9820</p>	<p>Computer File Information Path: www.dot.state.co.us/Business/Design/Standards/MSStandards Drawing File Name: 60601014015.dwg Acad Version: R14 Scale: NA Units: English</p>	<p>Standard Plan Revised Date: 04-06-98 05-07-99 01-05-00 Comments: Safety/Design Improvements Safety/Proprietary Improvements Safety/Proprietary Improvements</p>	<p>GUARDRAIL TYPE 3 W-BEAM</p>	<p>STANDARD PLAN NO. M-606-1</p>
	<p>Project Development Branch</p>			<p>Sheet No. 14 of 15</p>

GENERAL NOTES

1. LOCATION AND LENGTH OF MEDIAN GUARDRAIL APPROACHES TO CULVERTS WITH FULL HEADWALL AND WINGWALLS SHALL BE AS SHOWN FOR BRIDGES ON SHEET 13. THE TYPE 3 GUARDRAIL SHALL CONTINUE ACROSS THE CULVERT AS SHOWN ON THIS SHEET.
2. RIGHT SHOULDER BOX CULVERT TREATMENT IS SHOWN ON THIS SHEET FOR CULVERTS 20 FT. OR LESS IN LENGTH.
3. GUARDRAIL ACROSS CULVERTS WITH A LENGTH OF 20 FT. OR LESS SHALL BE AS FOLLOWS:
 - (A) FILL HEIGHT AT GUARDRAIL POST 48 IN. OR GREATER. CONSTRUCTION AND PAYMENT AS GUARDRAIL TYPE 3.
 - (B) FILL HEIGHT AT GUARDRAIL LESS THAN 48 IN. & BLOCK FACE TO HEADWALL OFFSET OF 3 FT. OR GREATER. CONSTRUCTION AND PAYMENT AS GUARDRAIL TYPE 3.
 - (C) FILL HEIGHT AT GUARDRAIL POST 48 IN. OR LESS AND BLOCK FACE TO HEADWALL OFFSET LESS THAN 3 FT. CONSTRUCT ACCORDING TO HEADWALL MOUNT DETAILS. PAY FOR AS BRIDGE RAIL TYPE 3.
4. GUARDRAIL ACROSS CULVERTS WITH LENGTH GREATER THAN 20 FT. SHALL BE AS FOLLOWS:
 - (A) FILL HEIGHT AT GUARDRAIL POSTS 48 IN. OR GREATER. CONSTRUCTION AND PAYMENT WILL BE FOR STANDARD GUARDRAIL TYPE 3.
 - (B) FILL HEIGHT AT GUARDRAIL POSTS 47 IN. OR LESS. CONSTRUCTION AND PAYMENT IN ACCORDANCE WITH THE CONTRACT BRIDGE PLANS.

5. ANCHORAGE D: SIX BOLTS FOR BASE PLATE "B" WITH INSIDE MOUNT. THE BOLTS SHALL BE 7/8 IN. DIA. x 10 IN. HIGH STRENGTH RODS. THREADED FULL LENGTH AND ALL GALVANIZED. RODS SHALL BE CAST-IN-PLACE FOR A NEW STRUCTURE. FOR AN EXISTING STRUCTURE, THE RODS SHALL BE INSTALLED IN 1-1/4 IN. DIA. HOLES WITH NON-SHRINK GROUT OR EPOXY PER ASTM C 881.
6. THE 2 FT. OFFSET FROM THE EDGE OF THE PAVED SHOULDER TO THE FACE OF THE GUARDRAIL (FOR SHOULDERS 6 FT. OR LESS IN WIDTH) IS DESIRABLE BUT NOT MANDATORY WHEN THE ROADWAY DESIGN SPEED IS LESS THAN 50 MPH. THE MINIMUM OFFSET OF GUARDRAIL FROM THE EDGE OF TRAVELED WAY IS 4 FT. SEE NOTES AND DETAILS ON SHEETS 1, 13, AND 14.
7. TYPE 3L POSTS SHALL BE STEEL OR WOOD TO MATCH POSTS USED ON THE APPROACH GUARDRAIL.
8. "FT" IS THE FLARED TERMINAL AND "NFT" IS THE NONFLARED TERMINAL.
9. THE GUARDRAIL LENGTH DIMENSION "N" IS THE LENGTH AS DETERMINED BY THE LENGTH OF NEED COMPUTATION AND IS SHOWN ON THE PLANS. THE MINIMUM IS 12 FT.-6 IN. WHERE SITE CONDITIONS ALLOW. THE OVERALL REQUIRED LENGTH OF NEED CAN INCLUDE THE LENGTH OF TRANSITION, LENGTH IN THE RAIL END TREATMENT.
10. ALL BRIDGE RAIL TYPE 3 BACKING TUBES SHALL BE FABRICATED FROM ASTM A-500 GRADE B. ALL POSTS, BASE PLATES, AND ANCHOR BOLTS SHALL BE FABRICATED FROM ASTM A-36 STEEL. THE ABOVE MATERIAL, W-BEAM, AND ALL ANCHOR BOLTS AND MISCELLANEOUS BOLTS, NUTS, AND WASHERS SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH SECTION 509. CONCRETE REINFORCING STEEL AND STRUCTURAL STEEL ELEMENTS SHALL CONFORM TO THE REQUIREMENTS OF SECTIONS 601, 602, AND 509, RESPECTIVELY.
11. POST ANCHORS, ENCASED IN CONCRETE, SHALL BE ASTM A-36 STEEL, AND NEED NOT BE GALVANIZED.
12. PRIOR TO FABRICATION OF BRIDGE RAIL, THREE SETS OF WORKING DRAWINGS WHICH COMPLY WITH THE REQUIREMENTS OF SECTION 105 SHALL BE SUBMITTED TO THE ENGINEER FOR INFORMATION ONLY.



IF HEADWALL MOUNT GUARDRAIL IS USED SEE STANDARD PLAN M-601, CONCRETE BOX CULVERT, AND NOTES BELOW:
- ALL ITEMS ABOVE TOP OF CBC HEADWALL WILL BE MEASURED AND PAID FOR AS LINEAR FEET OF BRIDGE RAIL TYPE 3.
★ WHEN NO PAYMENT ON CBC, POST HEIGHT SHALL BE 1 FT.-4 IN.

HEADWALL AND TOEWALL QUANTITIES, AS DESCRIBED BELOW, FOR HEADWALL MOUNTING OF RAIL WILL NOT BE MEASURED AND PAID FOR SEPARATELY BUT SHALL BE INCLUDED IN THE WORK.

ONE ANCHOR ASSEMBLY SHALL BE PLACED FOR EACH RAIL POST.

IF 2" OR LESS PAVEMENT IS PLACED ON THE CBC, TOTAL HEADWALL AND TOEWALL CONCRETE QUANTITY WILL BE 0.095 CU.YD. PER FOOT.

IF PAVEMENT ON CBC IS GREATER THAN 2", FOR EACH INCH OF ADDITIONAL PAVEMENT INCREASE THE HEADWALL HEIGHT BY 1" AND THE HEADWALL AND TOEWALL CONCRETE QUANTITY BY 0.003 CU.YD. PER FOOT.

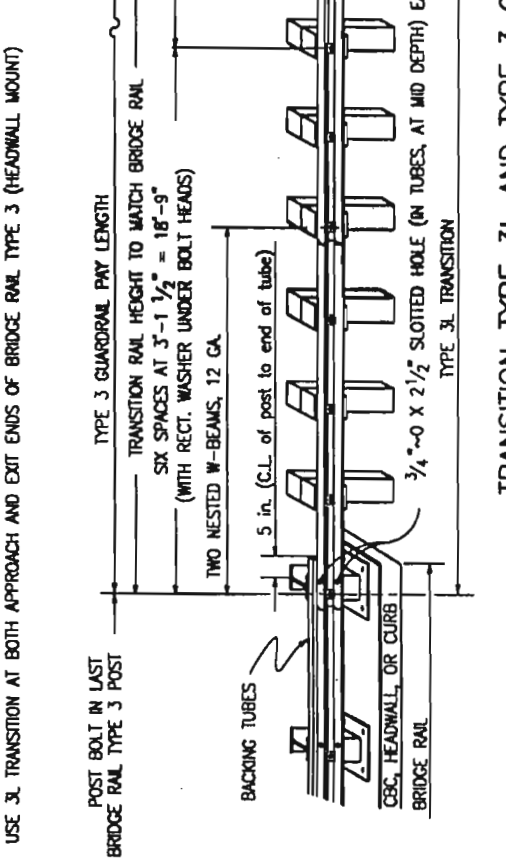
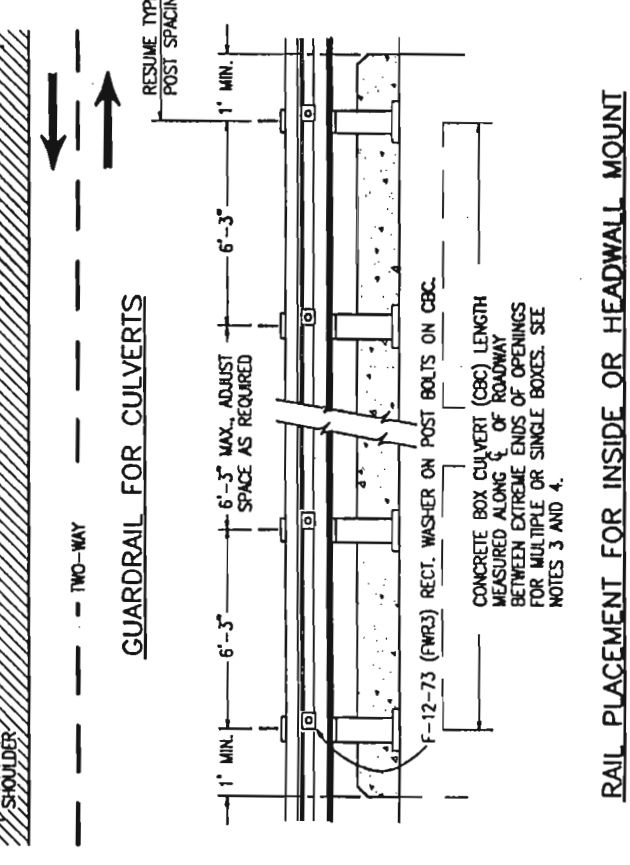
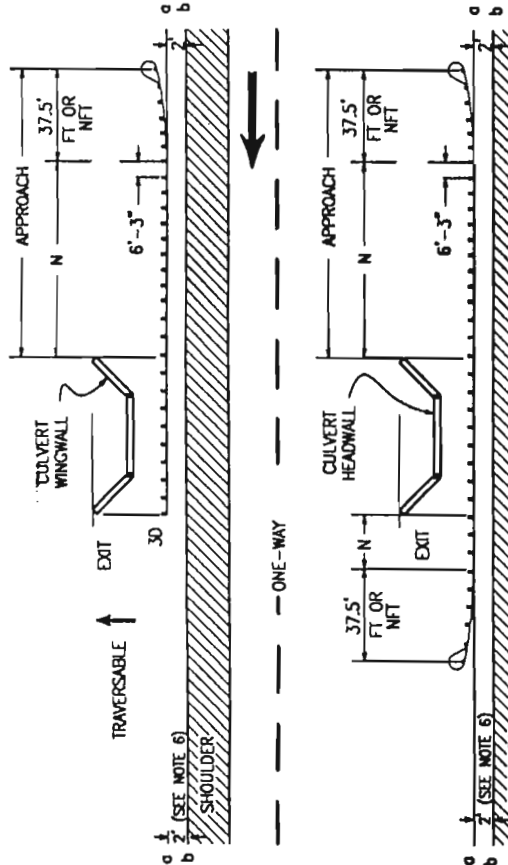
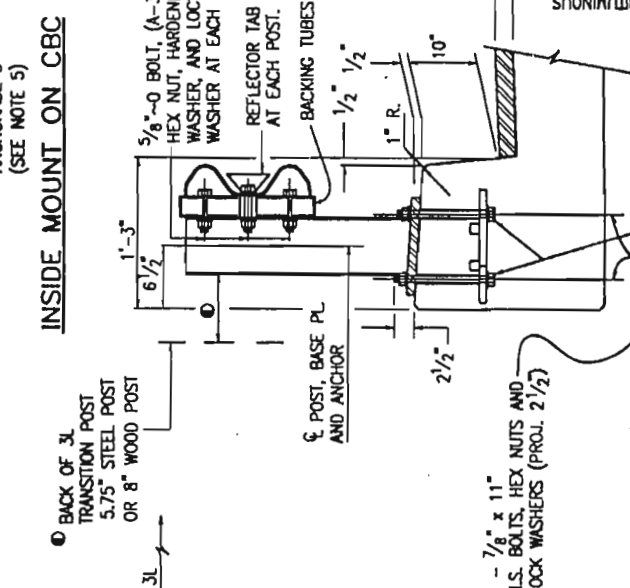
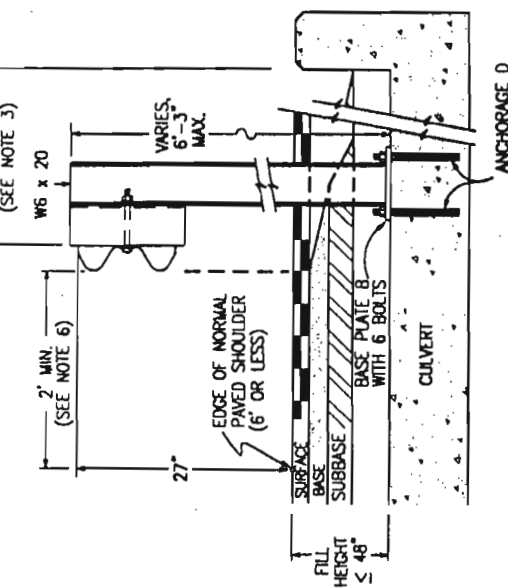
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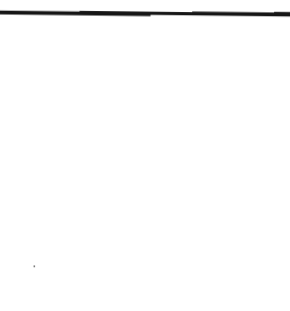
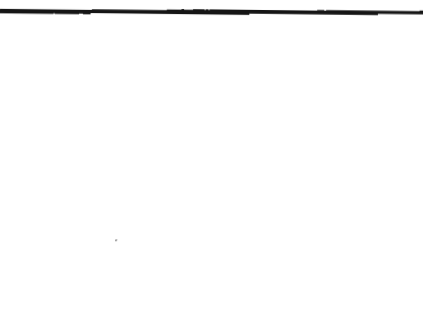
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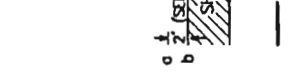
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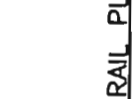
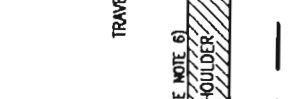
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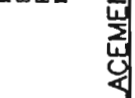
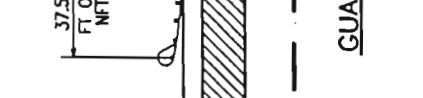
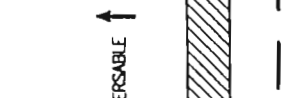
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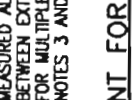
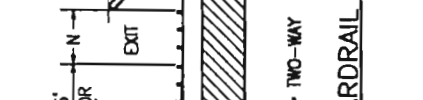
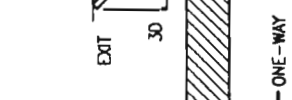
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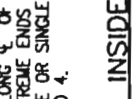
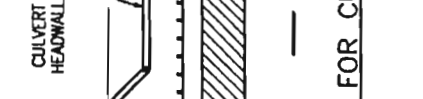
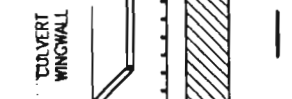
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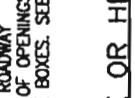
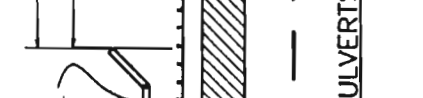
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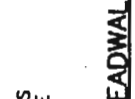
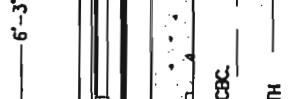
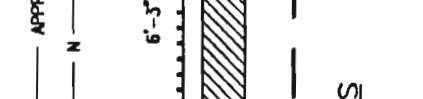
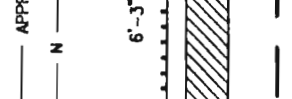
IF 2" OR LESS PAVEMENT IS PLACED ON THE CBC, TOTAL HEADWALL AND TOEWALL CONCRETE QUANTITY WILL BE 0.095 CU.YD. PER FOOT.

IF PAVEMENT ON CBC IS GREATER THAN 2", FOR EACH INCH OF ADDITIONAL PAVEMENT INCREASE THE HEADWALL HEIGHT BY 1" AND THE HEADWALL AND TOEWALL CONCRETE QUANTITY BY 0.003 CU.YD. PER FOOT.

HEADWALL STIRRUP LENGTH SHALL BE INCREASED AS NECESSARY TO CONSTRUCT THE REQUIRED HEADWALL HEIGHT.

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IF HEADWALL MOUNT GUARDRAIL IS USED SEE STANDARD PLAN M-601, CONCRETE BOX CULVERT, AND NOTES BELOW:
- ALL ITEMS ABOVE TOP OF CBC HEADWALL WILL BE MEASURED AND PAID FOR AS LINEAR FEET OF BRIDGE RAIL TYPE 3.
★ WHEN NO PAYMENT ON CBC, POST HEIGHT SHALL BE 1 FT.-4 IN.

HEADWALL AND TOEWALL QUANTITIES, AS DESCRIBED BELOW, FOR HEADWALL MOUNTING OF RAIL WILL NOT BE MEASURED AND PAID FOR SEPARATELY BUT SHALL BE INCLUDED IN THE WORK.

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