

17,0208

REGION NO.	DIVISION	PROJECT NO.	SHEET NO.	TOTAL SHEETS
		F 017-2(8)	1	
REF. INDEX OF SHEETS, 7-15-63, G.S.				

# COLORADO DEPARTMENT OF HIGHWAYS

## PLAN AND PROFILE OF PROPOSED FEDERAL AID PROJECT NO. F 017-2(8) STATE HIGHWAY NO. 4 EL PASO COUNTY

### CONVENTIONAL SIGNS

CENTER LINE	PLAN SHEET	TITLE SHEET
RIGHT OF WAY LINE	A	R.O.W. MKR A
COUNTY LINE		
TOWNSHIP OR RANGE LINE		
LAND LINES	SECTION LINE	1/4 SECTION LINE
RAILROAD	TITLE SHEET	PLAN SHEET
BARBED WIRE FENCE	X	X
COMBINATION		
SNOW FENCE		
TELEPHONE & TELEGRAPH LINES	o	o
POWER LINES	+	+
DETOUR		
PRESENT ROAD (Plan Sheets)		

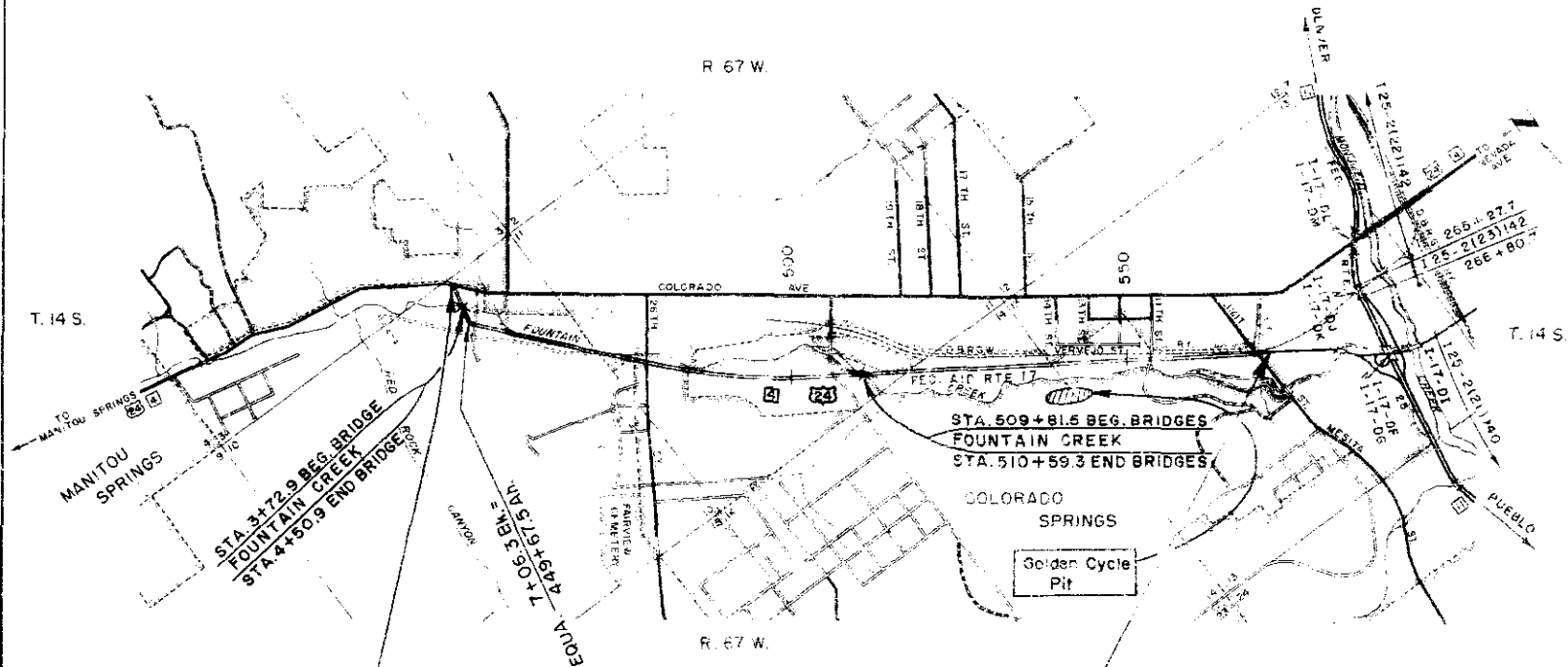
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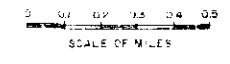
SCALES OF ORIGINAL DRAWINGS  
 ON PLAN 1" = 100 FT.  
 ON PROFILE 1" = 20 FT. HORIZONTAL  
 1" = 10 FT. VERTICAL  
 GRADE LINE ON PROFILE IS SHOWN AS GRADE OF FINISHED ROAD  
 GROSS LENGTH OF PROJECT 12,856.5 LIN. FT. = 2.435 MILES  
 NET LENGTH OF PROJECT

### TABULATION OF LENGTH & DESIGN DATA

STATION	DESCRIPTION	ROADWAY	BRIDGE
		LIN. FT.	LIN. FT.
0+00	BEG. F 017-2(8) = STA. 3+40 on FAP 117	372.9	
3+72.9	BEG. BRIDGE FOUNTAIN CREEK STR. NO. I-17-FM		78.0
4+50.9	END BRIDGE	255.4	
7+06.3Bk* 449+67.5Ah.	EQUATION	6,014.0	
509+81.5	BEG. BRIDGES FOUNTAIN CREEK STR. NO. I-17-EG Westbound		77.8
510+59.3	STR. NO. I-17-EQ Eastbound END BRIDGES	2,061.4	
531+20.7Bk* 531+23.0Ah.	EQUATION	3,997.0	
571+20.0	END F 017-2(8) = STA. 3+60.2 Cimarron St. Conn. Proj. No. I 25-2(21)140		
<b>TOTAL</b>		<b>12,700.7</b>	<b>155.8</b>
<b>SUMMARY</b>		LIN. FT.	MILES
ROADWAY		12,700.7	2.405
BRIDGES		155.8	0.030
<b>TOTAL (NET &amp; GROSS LENGTH)</b>		<b>12,856.5</b>	<b>2.435</b>
<b>DESIGN DATA</b>			
MAXIMUM GRADE		2.10%	
MAXIMUM DEGREE OF CURVE		4° 00'	
MINIMUM S.S.D. HORIZONTAL		640'	
MINIMUM S.S.D. VERTICAL		680'	
MAXIMUM DESIGN SPEED		60 MPH	



STA. 0+00 Begin F 017-2(8) = STA. 3+40 on FAP 117  
 STA. 571+20.0 End F 017-2(8) = STA. 3+60.2 Cimarron St. Conn. Proj. I 25-2(21)140



SEE SPECIAL PROVISIONS FOR NOTICE TO BIDDERS

APPROVAL  
*W. C. Williams* 12-12-62  
 CHIEF ENGINEER DATE

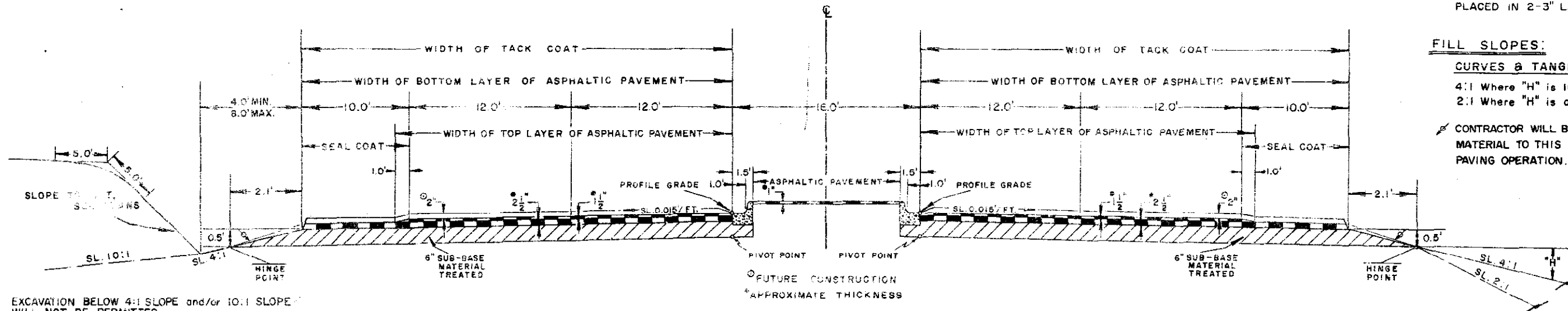
DEPARTMENT OF COMMERCE  
 BUREAU OF PUBLIC ROADS  
 APPROVAL  
 DIVISION ENGINEER  
 DATE

# TYPICAL CROSS SECTIONS OF IMPROVEMENT

FEDERAL ROAD DIVISION NO.	DISTRICT	PROJ. NO.	SHEET NO.	TOTAL SHEETS
9	COLORADO	F 017 - 2(8)	2	

**NOTE:**  
See Standard M-2-A for details of cut slope treatment, flaring & widening.

## SECTION "A"



EXCAVATION BELOW 4:1 SLOPE and/or 10:1 SLOPE WILL NOT BE PERMITTED

THE DEPTH AND WIDTH OF THE SIDE DITCH SHALL BE VARIED WHERE NECESSARY IN ORDER TO PROVIDE PROPER DRAINAGE and/or ENTRANCE TO DRAINAGE STRUCTURES.

**NOTE:**  
TREATED SUB-BASE TO BE PLACED IN 2-3" LAYERS.

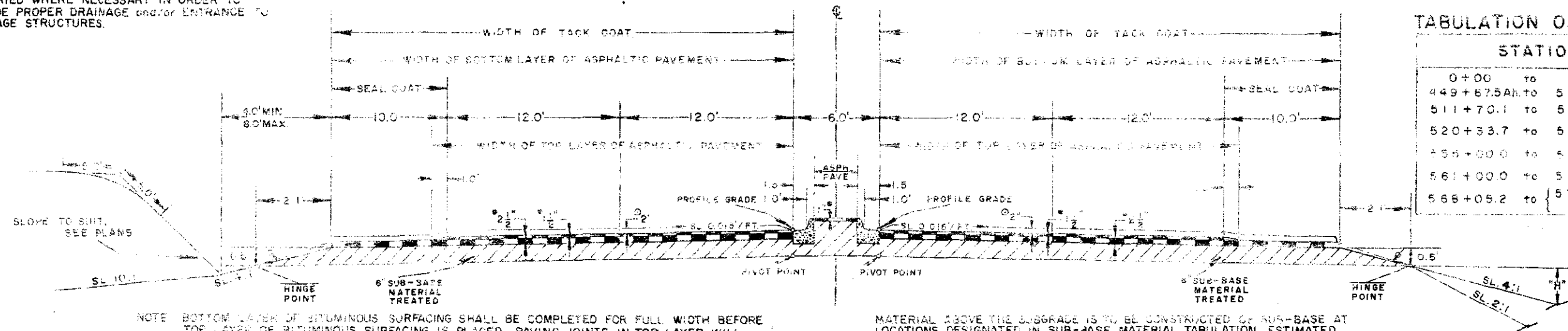
### FILL SLOPES:

#### CURVES & TANGENTS

4:1 Where "H" is 10 Ft. or less  
2:1 Where "H" is over 10 Ft.

CONTRACTOR WILL BE REQUIRED TO BLADE SLOPE MATERIAL TO THIS LINE AFTER COMPLETION OF PAVING OPERATION.

## SECTION "B"



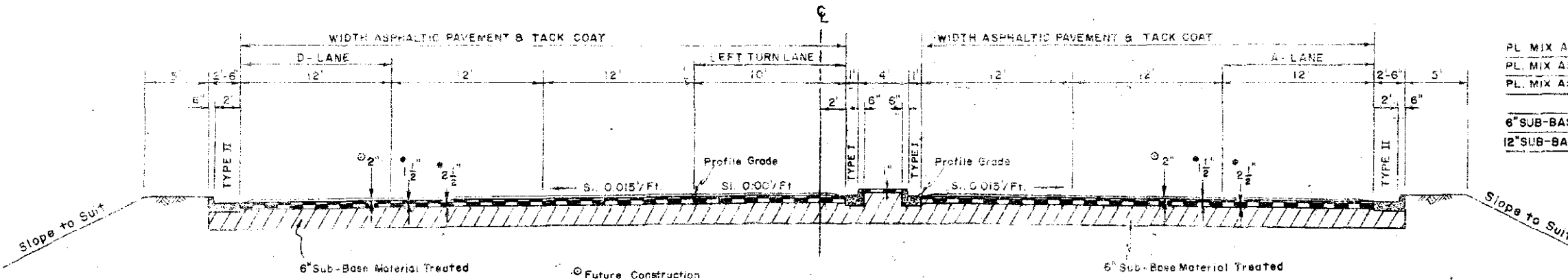
NOTE: BOTTOM LAYER OF BITUMINOUS SURFACING SHALL BE COMPLETED FOR FULL WIDTH BEFORE TOP LAYER OF BITUMINOUS SURFACING IS PLACED. PAVING JOINTS IN TOP LAYER WILL OVERLAP MIN. 1 FT. OVER JOINTS IN BOTTOM LAYER.

MATERIAL ABOVE THE SUBGRADE IS TO BE CONSTRUCTED OF SUB-BASE AT LOCATIONS DESIGNATED IN SUB-BASE MATERIAL TABULATION. ESTIMATED QUANTITIES INVOLVED IN THIS OPERATION AND THICKNESS OF MATERIAL REQUIRED ARE TABULATED IN THE SUB-BASE MATERIAL PLAN.

### TABULATION OF TYPICAL SECTIONS

STATIONS	SECTION
0+00 to 7+06.8k.	"C"
449+67.5Ak. to 511+70.1	"A"
511+70.1 to 520+33.7	Transition "A" to "B"
520+33.7 to 555+00.0	"B"
555+00.0 to 561+00.0	Transition "B" to "A"
561+00.0 to 568+05.2	"A"
568+05.2 to { 571+20.0Bk. = 3+60.7Ak. }	"A" Transition 16' to 12' Median

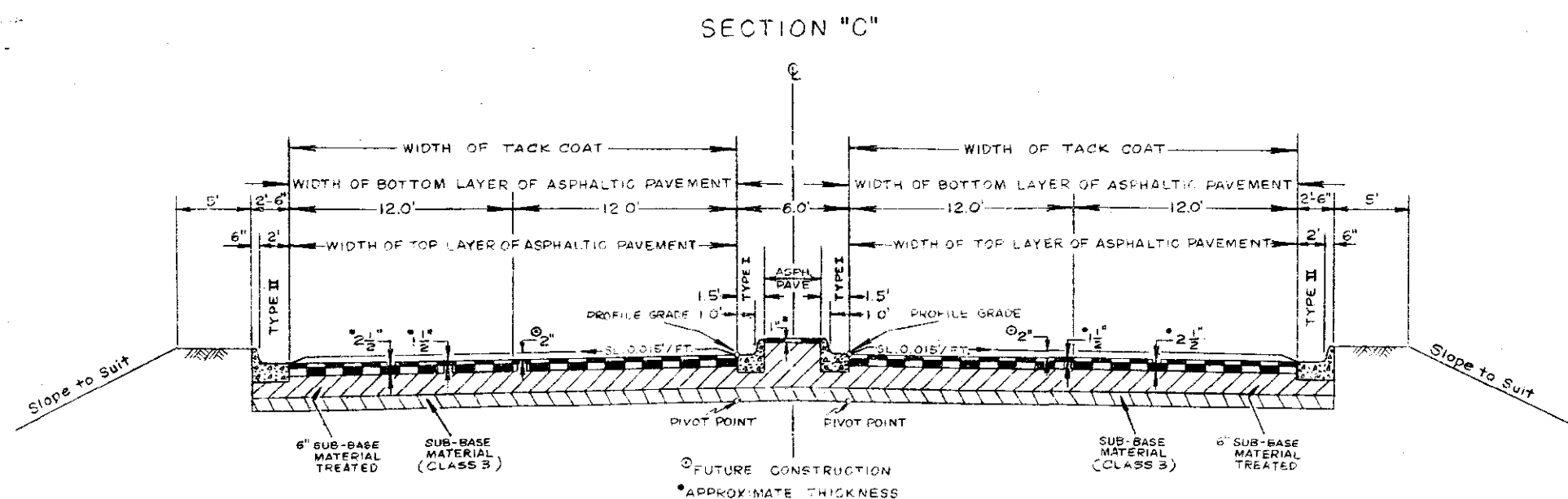
### CHANNEL INTERSECTION



The following rates per 100 Lin. Ft. of Roadway were used for preliminary plan quantities.

	TONS/STA. TYPICAL SECTION		
	A	B	C
PL. MIX ASPH. SURF. (Top Layer)	45	45	44
PL. MIX ASPH. SURF. (Bottom Layer)	104	104	74
PL. MIX ASPH. SURF. (Median)	8	3	3
6" SUB-BASE MATERIAL TREATED	204	225	172
12" SUB-BASE MATERIAL (CLASS 3)	-	-	219

# TYPICAL CROSS SECTIONS OF IMPROVEMENT



NOTE:  
TREATED SUR-BASE TO BE PLACED IN 2-3" LAYERS.

EXCAVATION BELOW 4:1 SLOPE AND/OR 10:1 SLOPE WILL NOT BE PERMITTED.  
THE DEPTH AND WIDTH OF THE SIDE DITCH SHALL BE VARIED WHERE NECESSARY IN ORDER TO PROVIDE PROPER DRAINAGE AND/OR ENTRANCE TO DRAINAGE STRUCTURES.

NOTE:  
BOTTOM LAYER OF BITUMINOUS SURFACING SHALL BE COMPLETED FOR FULL WIDTH BEFORE TOP LAYER OF BITUMINOUS SURFACING IS PLACED. JOINTS IN TOP LAYER WILL OVERLAP MIN. 1 FT. OVER JOINTS IN BOTTOM LAYER.  
MATERIAL ABOVE THE SUBGRADE IS TO BE CONSTRUCTED OF SUB-BASE AT LOCATIONS DESIGNATED IN SUB-BASE MATERIAL TABULATION. ESTIMATED QUANTITIES INVOLVED IN THIS OPERATION AND THICKNESS OF MATERIAL REQUIRED ARE TABULATED IN THE SUB-BASE MATERIAL PLAN.

## GENERAL NOTES

This project is to be constructed in conformity with the Standard Specifications of the Colorado Department of Highways, adopted January 1, 1958.  
All quantities on preliminary plans are to be considered approximate only.  
All poles encroaching on construction are to be moved by the owners.  
For preliminary plan quantities of asphaltic road materials and stone screenings, the following rates of application were used:

- EMULSIFIED ASPHALT @ 4% BY WEIGHT OF MIX
- TACK COAT BETWEEN TREATED SUB-BASE AND PAVEMENT (85/100 PENETRATION) (TACK) @ 0.10 GALS. PER SQ. YD.
- SEAL COAT RC @ 0.35 GALS. PER SQ. YD.
- STONE SCREENINGS (Type 1) @ 24 LBS. PER SQ. YD.

Rate of application and grade of asphaltic material shall be as determined by the engineer at time of application.  
Application methods for liquid asphaltic road material which result in the discoloration of concrete pavement, curbs or gutters will not be permitted.

When ordered by the Engineer, a tack coat is to be applied between pavement courses to improve bond. Tack coat will be placed at the approximate rate of 0.07 to 0.10 gallon per square yard if required.

Thickness of sub-base, surfacing and asphaltic pavement materials as shown on plans is approximate only. These materials are to be placed on the basis of tonnages shown on plans or as directed by the the Engineer.  
Approximate location and quantities involved in construction of intercepting ditches are tabulated in Summary of Earthwork Quantities Tabulation.

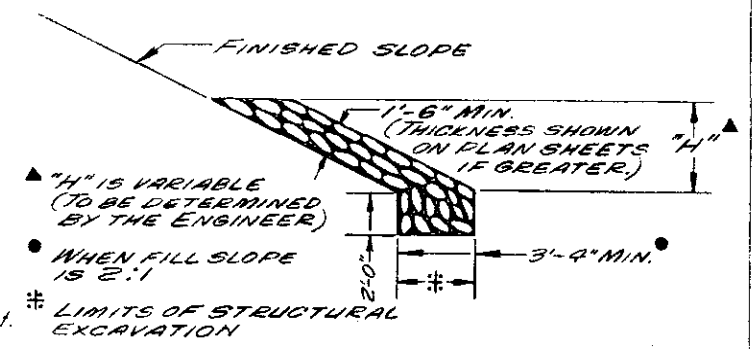
During construction of this project traffic will use the present traveled roadway except where detour is shown on plans.

The force account item, "Clearing of Building Sites, Etc." shall include removal of all foundations, wells, outcrops and other appurtenances not removed by the owner, and any necessary backfilling of cellars, cess pools, wells, etc. to provide neat road-side conditions. It is estimated that this item applies at the following locations:

Sta. 0+ ~ 3+ RI & L.	Sta. 493+ ~ 503+ RI & L.
Sta. 447+ ~ 449+ Lt.	Sta. 516+ ~ 517+ Lt.
Sta. 454+ ~ 455+ RI.	Sta. 559+ ~ 566+ RI & L.
Sta. 479+ RI.	Sta. 476+ Lt.

Class "A" Aggregate may be substituted for Pavement Aggregate.

## RIPRAP DETAIL



"H" IS VARIABLE (TO BE DETERMINED BY THE ENGINEER)  
WHEN FILL SLOPE IS 2:1  
LIMITS OF STRUCTURAL EXCAVATION

## SUMMARY OF APPROXIMATE QUANTITIES

REV. 7-15-63. G.S.

FEDERAL ROAD REGION NO.	DIVISION	PROJ. NO.	SHEET NO.	TOTAL SHEETS
9	COLORADO	F 017-2(B)	4	

SPECIFICATION ITEM NO.	ITEM	UNIT	ROADWAY	BRIDGE		NON FEDERAL AID	PROJECT TOTALS
				STA. 3+	STA. 509+		
10	Clearing & Grubbing Entire Project	Lump Sum	•				•
11	Removal of 9 Structures	Lump Sum	•				•
11	Reset Mail Box	Each	1				1
11	Adjust Manhole Ring & Cover	Each	9				9
11	Removing Concrete Curb & Gutter	Lin. Ft.	610				610
11	Relay and Encase 4" Water Line	Lin. Ft.	170				170
11	Relay and Encase 10" Water Line	Lin. Ft.	240				240
12	Removing Fence	Lin. Ft.	6,200				6,200
12	Removing and Rebuilding Fence	Lin. Ft.	400				400
13	Unclassified Excavation	Cu. Yd.	197,500	1,000		500	199,000
13	Unclassified Ditch Excavation	Cu. Yd.	300				300
13	Stripping	Cu. Yd.	2,000				2,000
14	Unclassified Structural Excavation - Miscellaneous	Cu. Yd.	1,890				1,890
14	Unclassified Structural Excavation - Bridges	Cu. Yd.		145		180	325
16	Structure Backfill (Class X)	Cu. Yd.	890				1,040
17	Compaction (Modified)	Cu. Yd.	222,000	50		100	222,000
17	Wetting	M Gal.	5,950				5,950
18	Station Yard Overhaul	Sta. Yd.	1,347,000				1,347,000
18	Yard Mile Overhaul	Yd. Mi.	19,500				19,500
18	Ton Mile Overhaul	Ton Mi.	43,700				43,700
19	Placing Topsoil	Cu. Yd.	2,700				2,700
23	Sub-Base Material (Class 2) with Emulsion	Ton	34,500				34,500
23	Sub-Base Material (Class 3)	Ton	10,100				10,100
29	Asphalt (85-100 Penetration) (Tack Coat)	Ton	90				90
30	Asphaltic Road Material RC (Seal)	Gal.	5,600				5,600
30	Asphaltic Road Material (Emulsified Asphalt)	Gal.	320,700				320,700
31	Stone Screenings (Type 1)	Ton	190				190
32	Plant Mixed Asphaltic Surfacing	Ton	23,350				23,350
37	Concrete Pavenient (10" Thick)	Sq. Yd.	620				620
46	Class "A" Concrete	Cu. Yd.	30	297		307	634
47	Reinforcing Steel	Lb.	29,800	70,100		72,800	172,700
48	Structural Steel	Lb.		6,900		14,400	21,300
52	18" Reinforced Concrete Culvert Pipe (Class II)	Lin. Ft.	48				48
52	24" Reinforced Concrete Culvert Pipe (Class II)	Lin. Ft.	1,028				1,028
52	36" Reinforced Concrete Culvert Pipe (Class II)	Lin. Ft.	252				252
52	48" Reinforced Concrete Culvert Pipe (Class II)	Lin. Ft.	570				570
53	8" Corrugated Metal Culvert Pipe	Lin. Ft.	170				170
53	12" Corrugated Metal Culvert Pipe	Lin. Ft.	240				240
60	Treated Timber Piling	Lin. Ft.				480	480
61	Steel Piling (10 BP 42)	Lin. Ft.		672		432	1,104
67	Riprap	Cu. Yd.	1,680	220		310	2,210
78	Chain Link Wire Mesh Fence	Lin. Ft.	25,010				25,010
80	Sheet Copper	Lb.		16			16

CONTINUED ON SHEET NO. 5

## SUMMARY OF APPROXIMATE QUANTITIES

REV. 7-15-63: G.S.

FEDERAL ROAD REGION NO.	DIVISION	PROJ. NO.	SHEET NO.	TOTAL SHEETS
9	COLORADO	F 017-2(B)	5	

SPECIFICATION ITEM NO.	ITEM	UNIT	ROADWAY	BRIDGE		NON FEDERAL AID	PROJECT TOTALS
				STA. 3+	STA. 509+		
81	Right of Way Markers	Each	12				12
84	Concrete Combination Curb & Gutter (Type I)	Lin. Ft.	25,989				25,989
84	Concrete Combination Curb & Gutter (Type II)	Lin. Ft.	12,440				12,440
89	Drain Pipe (4"x1'-6")	Each					12
90	1 1/2" Electrical Conduit with Junction Boxes	Lin. Ft.	3,250				3,580
90	3" Electrical Conduit with Junction Boxes	Lin. Ft.	895				895
95	43"x27" Metal Aprons for Corrugated Metal Pipe Arch Culverts	Each	2				2
98	Light Standards (1-arm)	Each				12	12
98	Luminaires (20,000 Lumen) (Type III)	Each				12	12
132	24" Reinforced Concrete Pipe Sewer (Class II)	Lin. Ft.	80				80
132	No. 12 Inlet Grating & Frame	Each	8				8
132	No. 13 Inlet Grating & Frame	Each	2				2
134	43"x27" Corrugated Metal Pipe Arch Culverts	Lin. Ft.	180				180
152	24" Flared End Sections for Reinforced Concrete Culvert Pipe	Each	17				17
152	36" Flared End Sections for Reinforced Concrete Culvert Pipe	Each	3				3
152	48" Flared End Sections for Reinforced Concrete Culvert Pipe	Each	10				10
192	Delineators (Type I)	Each	97				97
192	Delineators (Type II)	Each	80				80
192	Delineators (Type III)	Each	10				10
<b>FORCE ACCOUNT</b>							
	R.R. Grade Crossings with Flashing Lights (Work by D. & R. G. W. R. R. Forces)	Lump Sum	•				•
	Relocate Power Poles (By City of Colo. Springs Power Co. Forces)	Lump Sum	•				•
	Manhole Over Spring	Lump Sum	•				•
	Clearing of Building Sites, Etc.	Lump Sum	•				•
<b>RIGHT OF WAY</b>							
	Right of Way Entire Project including Removing Buildings & Appurtenances	Lump Sum	•				•
<b>STATE FORCES</b>							
	Signing & Striping Entire Project	Lump Sum					•
	R.R. Advanced Warning Reflectorized Signs	Each	4				4

IT IS ESTIMATED THAT MATERIAL FOR SUB-BASE FOR THE PROJECT IS AVAILABLE IN THE VICINITY OF THE PIT INDICATED IN THE FOLLOWING TABULATION. ESTIMATED QUANTITIES INVOLVED IN THESE OPERATIONS ARE SHOWN BELOW.

FEDERAL ROAD REGION NO.	DIVISION	PROJECT NO.	SHEET NO.
9	COLORADO	FO17-2(8)	6

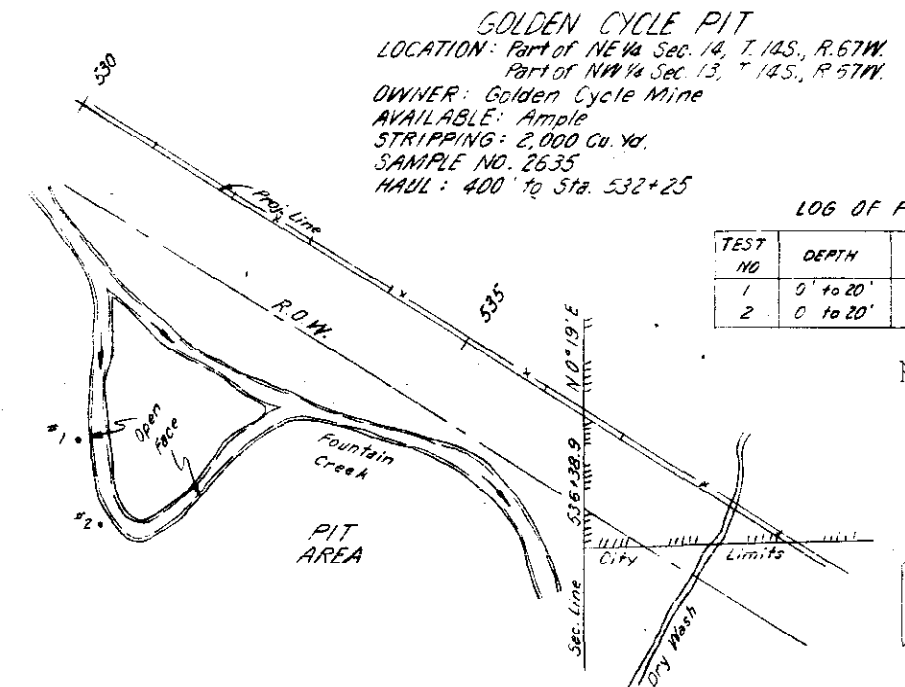
### SUB-BASE MATERIAL PLAN

MATERIAL TO BE PLACED	SOURCE	SUB-BASE MATERIAL				TON MILE OVERHAUL			
		THICKNESS		TONS USED		SUB-BASE MATERIAL		TONS USED	
		CLASS 2 TREATED	CLASS 3	CLASS 2 TREATED	CLASS 3	CLASS 2 TREATED	CLASS 3	CLASS 2 TREATED	CLASS 3
0+27 ~ 1+14 1+14 ~ 3+72.9 4+50.9 ~ 5+90	R=82 (CLASS 2) R=75 (CLASS 3)  GOLDEN CYCLE PIT	0.00'	12"	303	715	539	1,258		
449+67.5 Ah ~ 450+85 450+85 ~ 458+13 458+13 ~ 460+00 460+00 ~ 468+45		0.00'	12"	586	1,384	954	2,253		
468+45 ~ 476+08 476+08 ~ 476+68 476+68 ~ 484+28 484+28 ~ 497+02		0.00'	12"	1,879	4,822	2,275	7,465		
497+02 ~ 499+90 499+90 ~ 500+72 500+72 ~ 509+81.5		0.00'	12"	1,879	4,100	1,984	5,999		
510+59.3 ~ 511+70.1 511+70.1 ~ 520+33.7 520+33.7 ~ 530+75		0.00'	12"	2,120	582	1,516	2,253		
530+75 ~ 532+25 532+25 ~ 537+46.4 537+46.4 ~ 539+54.2 539+54.2 ~ 544+25		0.00'	12"	1,110	1,384	651	2,253		
544+25 ~ 555+00.0 555+00.0 ~ 559+62 559+62 ~ 561+00.0		0.00'	12"	2,120	582	1,516	2,253		
561+00.0 ~ 567+25 567+25 ~ 568+05.2 568+05.2 ~ 571+20.0 Bk		0.00'	12"	1,488	1,384	1,110	2,253		
ESTIMATE FOR IRREGULARITIES				3,134	912	2,510	1,458		
TOTALS				34,473	10,032	27,612	16,036		

BASED ON CURVE "E"

### SURFACING PLAN

MATERIAL TO BE PLACED	SOURCE	TONS USED		
		PLANT MIXED ASPH. SURF.		
		TOP LAYER	BOTTOM LAYER	MED & ISLANDS
0+27 ~ 1+14 1+14 ~ 3+72.9 4+50.9 ~ 5+90	UNDESIGNATED	76	127	9
449+67.5 Ah ~ 450+85 450+85 ~ 458+13 458+13 ~ 460+00 460+00 ~ 468+45		155	258	12
468+45 ~ 476+08 476+08 ~ 476+68 476+68 ~ 484+28 484+28 ~ 497+02		514	859	59
497+02 ~ 499+90 499+90 ~ 500+72 500+72 ~ 509+81.5		64	195	15
510+59.3 ~ 511+70.1 511+70.1 ~ 520+33.7 520+33.7 ~ 530+75		380	879	68
530+75 ~ 532+25 532+25 ~ 537+46.4 537+46.4 ~ 539+54.2 539+54.2 ~ 544+25		554	924	52
544+25 ~ 555+00.0 555+00.0 ~ 559+62 559+62 ~ 561+00.0		172	286	1
561+00.0 ~ 567+25 567+25 ~ 568+05.2 568+05.2 ~ 571+20.0 Bk		555	924	52
ESTIMATE FOR IRREGULARITIES		573	1,325	102
TOTALS		550	918	50
		215	360	7
		309	517	12
		50	115	9
		389	898	48
		469	1,083	31
	354	693	17	
	172	321	15	
	241	475	12	
	484	1,118	32	
	208	481	25	
	97	162	6	
	439	733	25	
	215	360	7	
	252	421	9	
TOTALS	7,770	14,874	697	



**GOLDEN CYCLE PIT**  
 LOCATION: Part of NE 1/4 Sec. 14, T. 14S., R. 67W.  
 Part of NW 1/4 Sec. 13, T. 14S., R. 67W.  
 OWNER: Golden Cycle Mine  
 AVAILABLE: Ample  
 STRIPPING: 2,000 Cu. Yd.  
 SAMPLE NO. 2635  
 HAUL: 400' to Sta. 532+25

LOG OF PIT

TEST NO.	DEPTH	DESCRIPTION
1	0' to 20'	Mill Tailings
2	0' to 20'	Mill Tailings

TABULATION OF DELINEATORS

STATION	SIDE	SPACING	TYPE	DELIN.		
				Type I	Type II	Type III
2+50 ~ 6+50	RY	Tangent	I	2		
451+92 ~ 456+92	RY	A-Lane	II	6		
457+92	RY	A-Lane	III		1	
460+00 ~ 470+00	RY	Tangent	I	6		
471+84 ~ 475+84	RY	D-Lane	II	5		
478+12 ~ 483+12	RY	A-Lane	II	6		
484+12	RY	A-Lane	III		1	
485+66 ~ 499+11	RY	2° Curve	I	12		
500+85 ~ 504+85	RY	D-Lane	II	5		
506+87 ~ 508+87	RY	A-Lane	II	3		
509+90	RY	A-Lane	III		1	
510+79 ~ 522+29	RY	D 30° Curve	I	6		
524+29 ~ 550+29	RY	Tangent	I	14		
552+29 ~ 560+29	RY	D 30° Curve	I	5		
563+00 ~ 566+00	RY	D-Lane	II	4		
569+55 ~ 571+20.0BA } 5+60.2AH ~ 4+95 } 5+95	RY	A-Lane	II	4		
	RY	A-Lane	III		1	
1+12 ~ 451+73	LY	2° Curve	I	19		
452+23 ~ 455+23	LY	D-Lane	II	4		
457+00 ~ 465+00	LY	Tangent	I	5		
468+74	LY	A-Lane	III		1	
469+74 ~ 475+74	LY	A-Lane	II	7		
478+02 ~ 481+02	LY	D-Lane	II	4		
483+66 ~ 501+02	LY	2° Curve	I	14		
457+41	LY	A-Lane	III		1	
498+41 ~ 503+41	LY	A-Lane	II	6		
506+65 ~ 509+65	LY	D-Lane	II	4		
510+45	LY	Bridge	III		1	
510-51 ~ 510+91	LY	Bridge	I	4		
510-57	LY	Bridge	III		1	
512-57 ~ 524-57	LY	D 30° Curve	I	7		
526+57	LY	-	I	1		
530+96	LY	A-Lane	III		1	
531+96 ~ 536+96	LY	A-Lane	II	6		
539+04 ~ 543+04	LY	D-Lane	II	5		
545+00 ~ 559+00	LY	Tangent	I	8		
559+86	LY	A-Lane	III		1	
560+85 ~ 566+86	LY	A-Lane	II	7		
569+55 ~ 571+20.0BA } 3+60.2AH ~ 4+24 }	LY	D-Lane	II	4		
TOTALS				97	10	10

TABULATION OF CONCRETE COMBINATION CURB & GUTTER

STATION	SIDE	DESCRIPTION	TYPE I Lin. Ft.	TYPE II Lin. Ft.	REMOVE Lin. Ft.
0+	RY	Island	100		
Radius	LT.			165	
Radius	RY			181	
0+31 ~ 5+81	LT.	Med.	1,312		
1+55 ~ 3+86.6	LT.			232	
1+14 ~ 3+59.4	RY			245	
4+64.4 ~ 451+73.2	LT.			381	
4+37.4 ~ 9+10	RY	Island		473	
5+ ~ 7+	LT.		402		
451+73.2 ~ 456+43.2	LT.			470	
450+ ~ 451+41.9	RY			186	
451+41.9 ~ 458+11.9	RY			670	
450+18 ~ 476+13	LT.	Med.	5,190		
468+53.8 ~ 475+23.8	LT.			670	
475+23.8 ~ 476+	LT.			165	
470+64.2 ~ 475+34.2	RY			470	
475+34.2 ~ 476+	RY			200	
476+ ~ 477+52	LT.			181	
477+52 ~ 482+22	LT.			470	
476+ ~ 477+62.4	RY			175	
477+62.4 ~ 484+32.4	RY			670	
476+75 ~ 504+90	LT.	Med.	5,628		
497+21.3 ~ 503+91.3	LT.			670	
503+91.2 ~ 504+	LT.			165	
499+65.4 ~ 504+35.4	RY			470	
504+35.4 ~ 506+	RY	Island		215	
505+	LT.	Island	83		
505+	RY	Island	92		
505+ ~ 506+41.8	LT.			202	
506+ ~ 509+85	LT.			322	
506+ ~ 506+87.4	RY			144	
506+87.4 ~ 510+00	RY			313	
505+72 ~ 509+81.5	LT.	Med.	832		
510+59.3 ~ 567+25	LT.	Med.	11,343		
530+76.4 ~ 537+46.4	LT.			670	
537+46.4 ~ 538+	LT.	Island		150	
538+	LT.		148		
538+ ~ 539+54.2	LT.			156	
539+54.2 ~ 544+24.2	LT.			470	
559+65.7 ~ 566+97	LT.			731	
561+80 ~ 566+50	RY			470	
566+50 ~ 567+	RY			165	
568+42 ~ 571+20.0BA } 3+60.2AH ~ 5+94.1 }	LT.			514	
568+ ~ 569+05	RY			138	
569+05 ~ 571+20.0BA } 3+60.2AH ~ 6+15.5 }	RY			*470	
569+05 ~ 571+20.0BA } 3+60.2AH ~ 4+81.2 }		Med.	759		
568+56.5 ~ 571+20.0BA } 3+60.2AH ~ 4+00 }					610
TOTALS			25,989	16,440	610

\* Includes 30' Driveway, Sta. 570+ RY.

TABULATION OF FENCING REQUIREMENTS

STATION	SIDE	REMOVE Lin. Ft.	BUILD		REMOVE & REBUILD Lin. Ft.
			CHAIN LINK Lin. Ft.	WIRE MESH Lin. Ft.	
7+	RY	80			
555+ ~ 562+	LT. & RY	800			
463+30 ~ 467+50	LT.	320			
506+03 ~ 508+41	LT.	238			
510+63 ~ 547+30	LT.	3,750			
517+	LT.	110			
519+ ~ 528+	LT.	900			
0+65 ~ 8+65	RY		985		
451+80 ~ 476+36	RY		2,525		
477+28 ~ 503+72	RY		2,960		
506+55 ~ 567+86	RY		6,265		
0+65 ~ 7+06.3BA } 449+67.5AH ~ 475+70 }	LT.		3,220		
476+55 ~ 504+52	LT.		2,855		
505+53 ~ 538+10	LT.		3,410		
538+95 ~ 566+35	LT.		2,785		
568+30 ~ 571+20.0BA } 3+60.2AH ~ 4+10 }	RY			340	
TOTALS		6,198	25,005		340

FEDERAL ROAD REGION NO.	DIVISION	PROJECT NO.	SHEET NO.
9	COLORADO	F017-2(B)	7

SUMMARY OF EARTHWORK QUANTITIES

EXCAVATION FROM CROSS SECTIONS	56,736 ✓	
BORROW	118,942 ✓	
EST. FOR SUBSIDENCE	17,568 ✓	
LIST OF STRUCTURES AS EXCAVATION	700 ✓	
LIST OF STRUCTURES AS EMBANKMENT	610 ✓	
EST. FOR CUT SLOPE TREATMENT	100 ✓	
EST. FOR STOCKPILING TOPSOIL	2,700 ✓	
TOTAL	197,356 Cu. Yd.	
EXCAVATION FROM CROSS SECTIONS	56,736 ✓	
BORROW	118,942 ✓	
TOTAL	175,678 Cu. Yd.	
EMBANKMENT FROM CROSS SECTIONS	146,397 Cu. Yd.	
EMBANKMENT X FACTOR	175,678 Cu. Yd.	
STATION YARD OVERHAUL FROM MASS DIAGRAM	1,228,542 ✓	
EST. FOR SUBSIDENCE	122,454 ✓	
TOTAL	1,346,996 St. Yd.	
YARD MILE OVERHAUL FROM MASS DIAGRAM	17,655 ✓	
EST. FOR SUBSIDENCE	1,766 ✓	
TOTAL	19,421 Yd. Mi.	
UNCLASSIFIED DITCH EXCAVATION INTERCEPTING DITCHES		
* STATION	SIDE	CU. YDS.
463+ ~ 471+	RY	120
SUB-TOTAL FROM LIST OF STRUCTURES		120 ✓
TOTAL		175 ✓
TOTAL		295 Cu. Yd.
* Approximate location, may be changed by the Engineer.		
COMPACTION		CU. YDS.
TOTAL UNCLASSIFIED EXCAVATION BASE OF CUTS & FILLS		194,656 ✓
TOTAL		27,242 ✓
TOTAL		221,898 Cu. Yd.
* Does not include Topsoil.		
TABULATION OF R.O.V.V. MARKERS		
STATION	SIDE	NO. Each
454+96.3 RC.	LT. & RY	2
465+03.0 RT.	LT. & RY	2
489+57.1 TS.	LT. & RY	2
499+58.8 ST.	LT. & RY	2
512+28.8 RC.	LT. & RY	2
531+20.7 BA RT }	LT. & RY	2
531+23.0 AH }		
TOTAL		12 ✓

STRUCTURE QUANTITIES

REV. 7-15-63 G.S.

FEDERAL ROAD REGION NO.	DIVISION	PROJECT NO.	SHEET NO.
9	COLORADO	F 017-2(8)	8

LOCATION	MISCELLANEOUS	REMOVAL OF STRUCTURES	EXCAVATION			UNCLASSIFIED STRUCTURAL EXCAVATION	STRUCTURE BACKFILL	SUB-BASE MATERIAL TREATED	PLANT MIX	CONCRETE	REINFORCING STEEL	REINFORCED CONCRETE CULVERT PIPE CLASS II				FLARED END SECTIONS FOR R.C.C.P.	INLET GRATING & FRAME	CORRUGATED METAL PIPE ARCH CULVERTS	MET. APRONS FOR C.M.P. ARCH CULVERTS	RIPRAP	REINFORCED CONCRETE PIPE SEWER CLASS II							
			CUBIC YARDS									CUBIC YARDS	CL. X	TONS	TONS							CUBIC YARDS	CL. "A"	LBS	LIN. FT.			
			UNCL.	EMB.	UNCL. DITCH																				MISC.	18"	24"	36"
0+00 to 7+06.3 44+67.5 to 45+31.9 3+52.9 to 3+72.9	320 Lin. Ft. 1/2" Electrical Conduit 758 Sq. Yds. Concrete Pavement.		*					6'	6'		7,256'																	
3+72.9 to 4+50.9 4+50.9 to 4+70.9 7+00	158 Sq. Yds. Concrete Pavement.										7,256'																	
45+100 45+152		"			474		56'			207'	313'	128'	18'	1'	2'													
46+100 46+172		"			333'		24'			108'	166'	121'	34'	2'	1'													
470+ to 476+				600'																	280'							
468+ to 484+	520 - Lin. Ft. 1/2" Electrical Conduit		*					6'	6'																			
469+30 475+55	235 - Lin. Ft. 3" Electrical Conduit.				564'		22'			272'	433'	94'	12'	1'	2'	2'												
478+ to 484+					1550'		16'			093'	152'	70'	10'	2'	1'													
485+ to 500+	2 - Adjust Manhole Ring & Cover.				5	20	23	0'	0'																			
481+								0'	0'																			
486+ to 510+	680 - Lin. Ft. 1/2" Electrical Conduit.		*					0'	0'																			
501+ to 511+	225 - Lin. Ft. 3" Electrical Conduit.				1534'		37'														154'							
501+ to 504+		2'			220'	2'	4'	0'	0'												26'							
504+ to 505+																												
505+80 506+60					551'		21'			205'	268'	1064'		1'	1'	1'												
509+6.3 to 509+81.5 509+81.5 to 510+59.3 510+59.3 to 510+79.3	148 Sq. Yds. Concrete Pavement. 148 Sq. Yds. Concrete Pavement.						331'			6832'	143'			2'														
512+ to 515+			*																									
512+					55'	3'															17'							
516+ to 557+	2 - Adjust Manhole Ring & Cover.																											
515+00					554'		26'					118'		1'														
522+ to 530+			*																		470'							
522+					30'	3'															8'							
525+00 465+	240 Lin. Ft. Relay & Encase 10" Water Line 240 Lin. Ft. of 12" C.M. Culv. Pipes.				3111'	140'	54'														29'							
530+ to 543+			*					6'	6'																			

CONTINUED ON SHEET NO. 9

STRUCTURE QUANTITIES

REV 7-15-63 G.S.

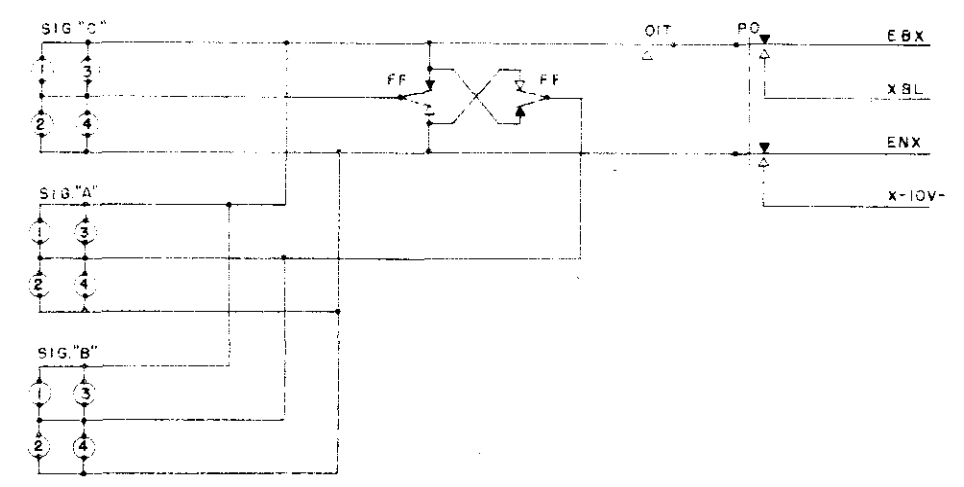
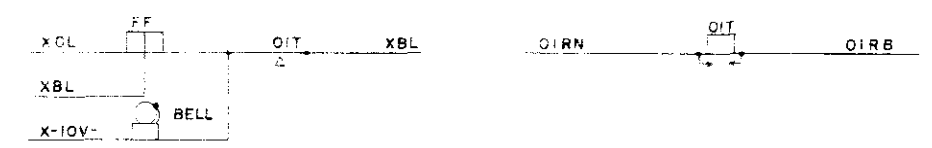
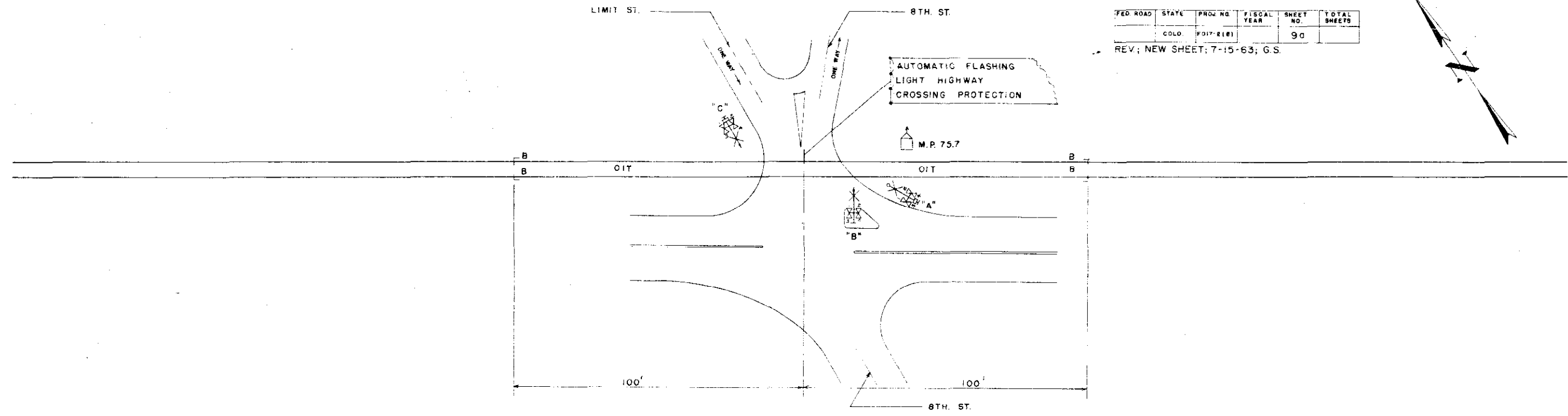
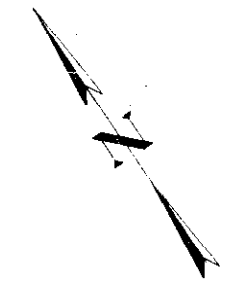
FEDERAL ROAD REGION NO.	DIVISION	PROJECT NO.	SHEET NO.
9	COLORADO	F 017-2(8)	9

LOCATION	MISCELLANEOUS	REMOVAL OF STRUCTURES NO.	EXCAVATION CUBIC YARDS			UNCLASSIFIED STRUCTURAL EXCAVATION CUBIC YARDS MISC.	STRUCTURE BACKFILL CUBIC YARDS CL. X'	SUB-BASE MATERIAL TREATED TONS	PLANT MIX TONS	CONCRETE CUBIC YARDS CL. "A"	REINFORCING STEEL LBS.	REINFORCED CONCRETE CULVERT PIPE CLASS II LIN. FT.				FLARED END SECTIONS FOR R.C.C.P. EACH			INLET GRATING & FRAME EACH		CORRUGATED METAL PIPE ARCH CULVERTS LIN. FT.	MET. APRONS FOR C.M.P. ARCH CULVERTS EACH	RIPRAP CU. YDS.	REINFORCED CONCRETE PIPE SEWER CLASS II LIN. FT.		
			UNCL.	EMB.	UNCL. DITCH							18"	24"	36"	48"	24"	36"	48"	No. 12	No. 13					43" x 27"	43" x 27"
532+25 1+8.3+(14th St)	2-R.R. Advanced Warning Signs (Reflectorized) (State Forces)		100		35		250					134			4											
1+55 (14th St)	R.R. Grade Crossing Flashing Lights (Work By D. G. R. & W. R. Co. Forces) (Force Account)				75	14	27			13.6																
2+43+(14th St)																										
3+(14th St) 540+4559+		1	*		27																			820		
545+60 535+					3	55	50					92			2										66	
552+00 553+		3			3	35	23					102			2											
554+00 556+ 563+	1-Manhole (Force Account)				40	549	5					105			2										11	
567+20	1-Adjust Manhole Ring & Cover																									
552+90	170 Lin. Ft. - Relay & Encase 4" Water Line, 170 Lin. Ft. 8" C.M. Culv. Pipe					113	21																			
557+60						3	76	51				100			2											
558+40 571+700+4 3+60.24m	1230 Lin. Ft. 1 1/2" Electrical Conduit 415 Lin. Ft. 3" Electrical Conduit		*																							
567+08						8	6			255	265	10			1	1									50	
567+		1																								
567+	2-R.R. Advanced Warning Signs (Reflectorized) (State Forces)																									
567+	Force Account - Extend R.R. Grade Crossing Flashing Lights (Work By D. G. R. & W. R. Co. Forces)																									
From Sheet No. 43a						24	18			492																
ENTIRE PROJECT Reset Mail Boxes.																										
<b>TOTALS</b>		9	700	610	175	1890	886		29.48	29781	48	1028	252	579	17	3	10	8	2	180	2	1,672	80			

\*Included in Roadway Quantities.  
 \*Included in Sub-Base Material Plan & Surfacing Plan.

FED. ROAD	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
	COLO.	FO17-2181		90	

REV; NEW SHEET; 7-15-63; G.S.



THE DENVER AND RIO GRANDE WESTERN  
RAILROAD CO.

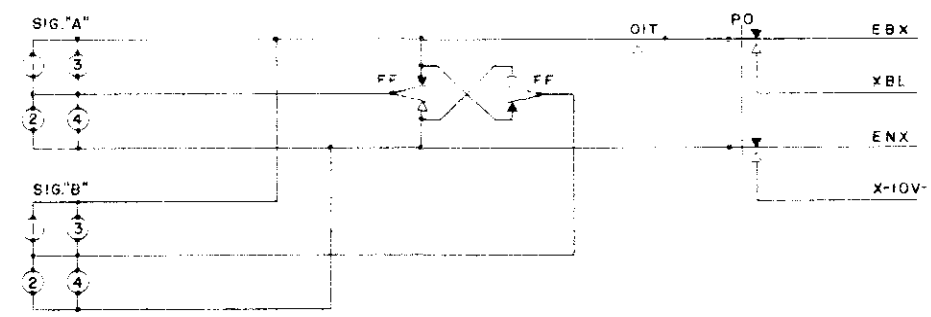
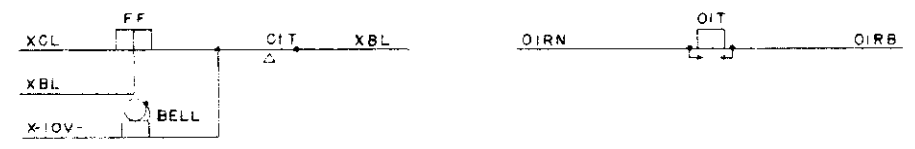
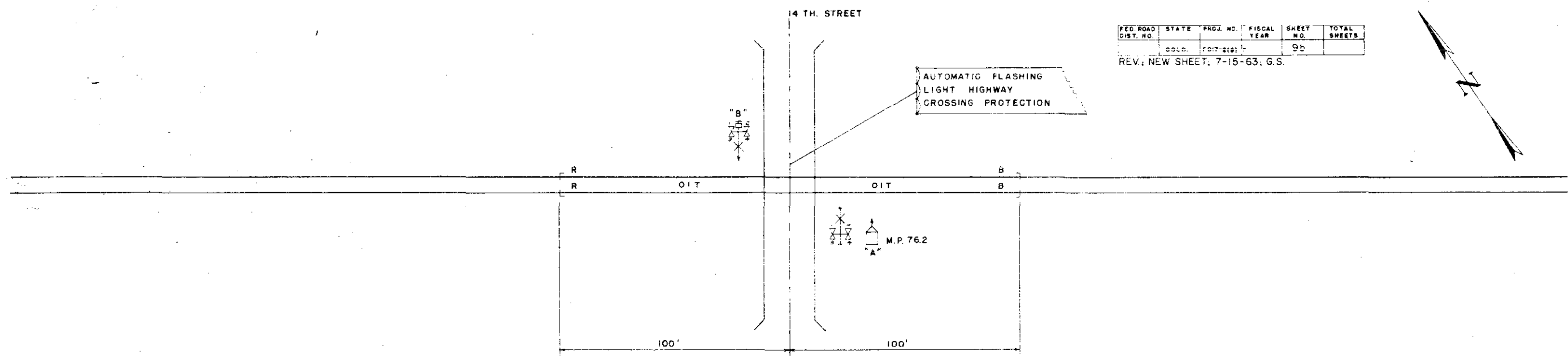
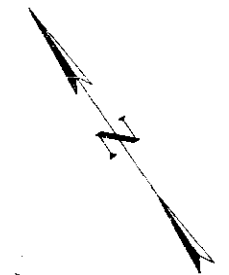
OFFICE OF CHIEF ENGINEER, SIGNAL DEPT. DENVER, COLO.

HIGHWAY CROSSING SIGNAL  
INSTALLATION  
8<sup>TH</sup> STREET COLO. SPRINGS  
M.P. 75.7 MANITOU SPRINGS BRANCH

DRAWN BY Y.B.D. DATE 2/4/63  
CHECKED BY *R.E. Smith*

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
				9b	

REV. NEW SHEET, 7-15-63, G.S.

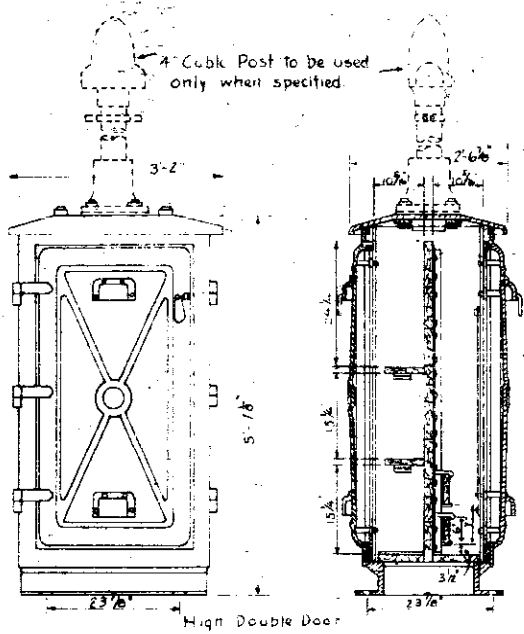


THE DENVER AND RIO GRANDE WESTERN RAILROAD CO.  
 OFFICE OF CHIEF ENGINEER, SIGNAL DEPT DENVER COLO.  
 HIGHWAY CROSSING SIGNAL INSTALLATION  
 14<sup>TH</sup> STREET COLO. SPRINGS  
 M.P. 76.2 MANITOU SPRINGS BRANCH  
 DRAWN BY *V.L.W.* DATE 2/1/63  
 CHECKED BY *B.W.M.*

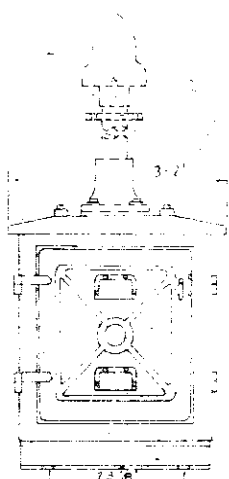
GENERAL NOTES

1. Flashing lights shall flash in both directions along the highway.
2. Illuminated sign shall display the word "STOP" in red letters toward highway traffic approaching the near side of the crossing.
3. Details not shown shall conform to A.A.R. Signal Section rules and standard practice as revised.
4. All signs shall be reflectorized type.
5. Except as otherwise specified, all shall be painted with aluminum paint and the signal units black.
6. Where a highway has 2 or more traffic lanes in either direction the cantilever type signal shall be used.
7. Numerals in parentheses refer to A.A.R. Signal Drawings.
8. Use water shields from cables.

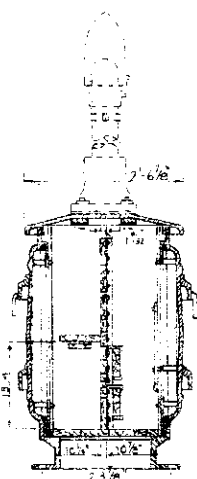
REV. NEW SHEET, 7-15-63, G.S.



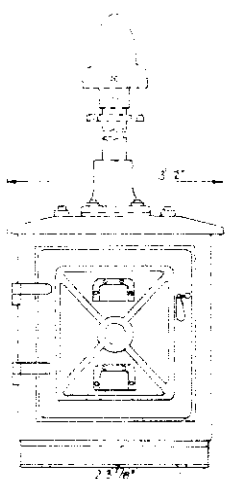
High Double Door  
Fig. 1A



Low Double Door  
Fig. 1B

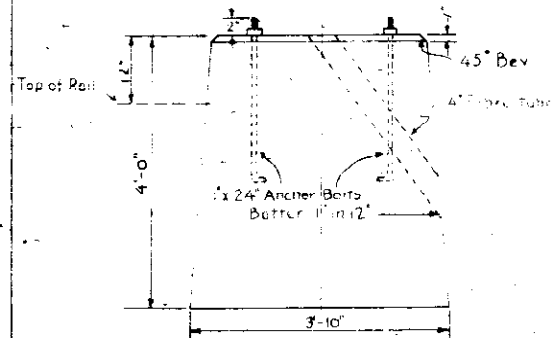


High Single Door  
Fig. 1C

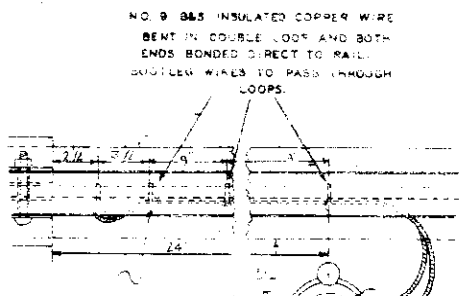


Low Single Door  
Fig. 1D

INSTRUMENT CASES  
Scale: 3/4"=1'-0"



INSTRUMENT CASE FOUNDATION  
Scale: 3/4"=1'-0"



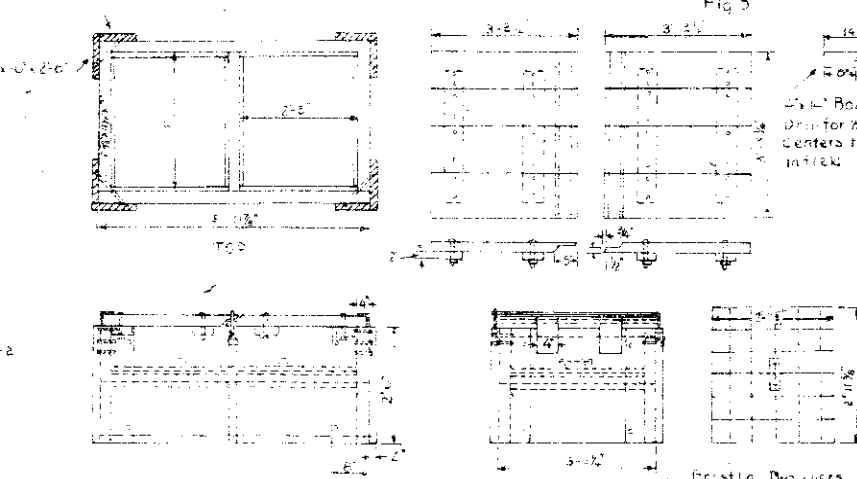
METHOD OF INSTALLING  
BOOTLEGS AND CONNECTIONS  
Not to scale  
Fig. 3

DETAILS FOR INSULATED JOINTS

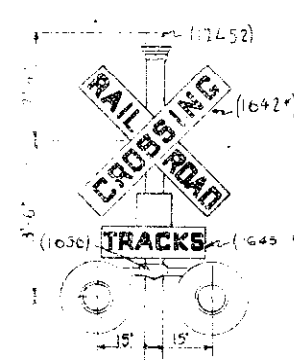
ITEM NO.	DESCRIPTION	REMARKS
1	20 lb. (CR) 200	Anchor bolts
2	30 lb. (CR) 300	Anchor bolts
3	45 lb. (CR) 450	Anchor bolts
4	75 lb. (CR) 750	Anchor bolts

DETAILS FOR INSULATED JOINTS

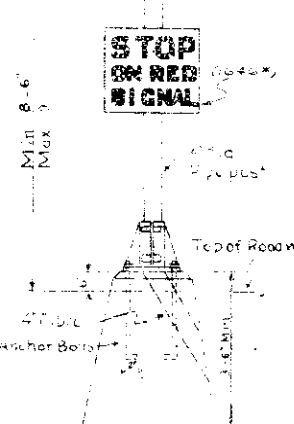
TRACK BATTERY CELLAR  
Scale: 1/2"=1'-0"  
Fig. 5



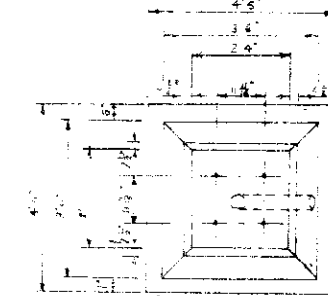
TREATED WOOD BATTERY BOX  
Scale: 1/2"=1'-0"  
Fig. 4



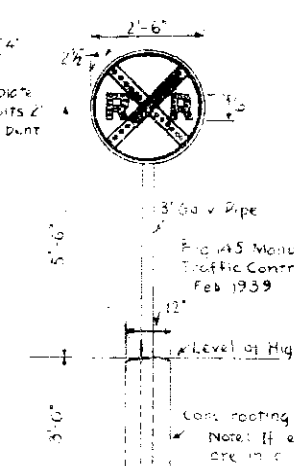
ADVANCE WARNING SIGN  
Scale: 1/2"=1'-0"  
Fig. 6



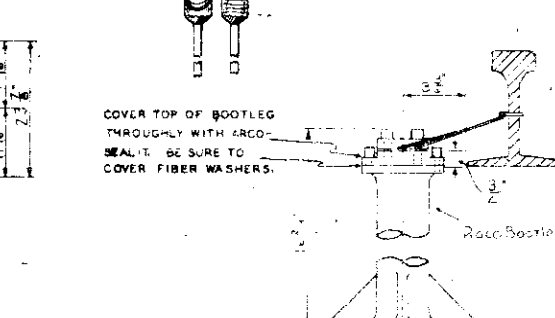
FLASHING LIGHT HIGHWAY  
CROSSING SIGNAL AND FOUNDATION  
Scale: 1/2"=1'-0"



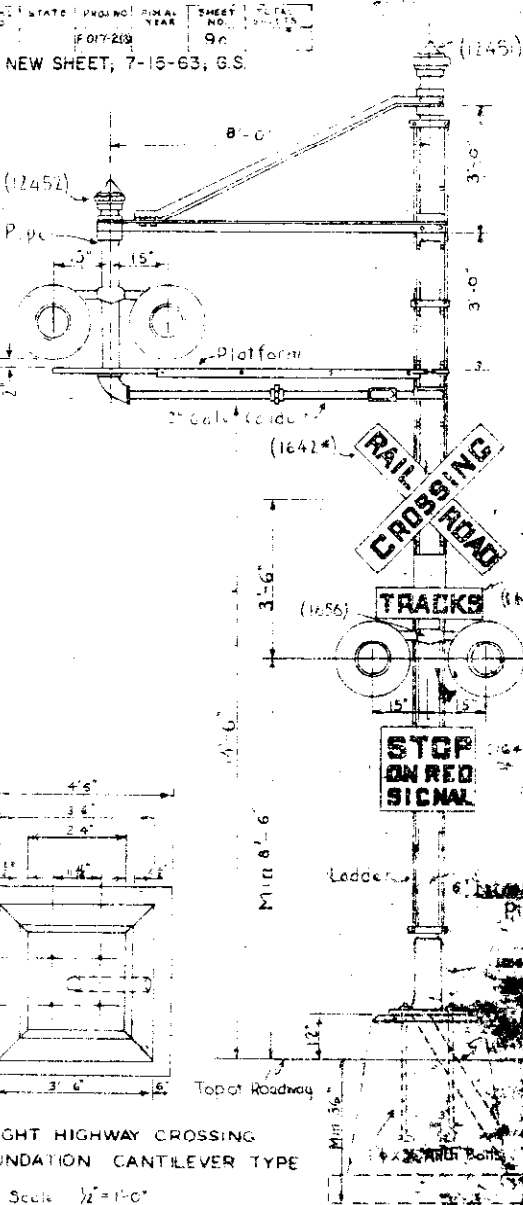
FLASHING LIGHT HIGHWAY CROSSING  
SIGNAL AND FOUNDATION CANTILEVER TYPE  
Scale: 1/2"=1'-0"



METHOD OF TWISTING  
NO. 9 WIRE USED TO  
RETAIN CALSIUM  
BRONZE BOOTLEG  
WIRES



METHOD OF TWISTING  
NO. 9 WIRE USED TO  
RETAIN CALSIUM  
BRONZE BOOTLEG  
WIRES



FLASHING LIGHT HIGHWAY CROSSING  
SIGNAL AND FOUNDATION CANTILEVER TYPE  
Scale: 1/2"=1'-0"

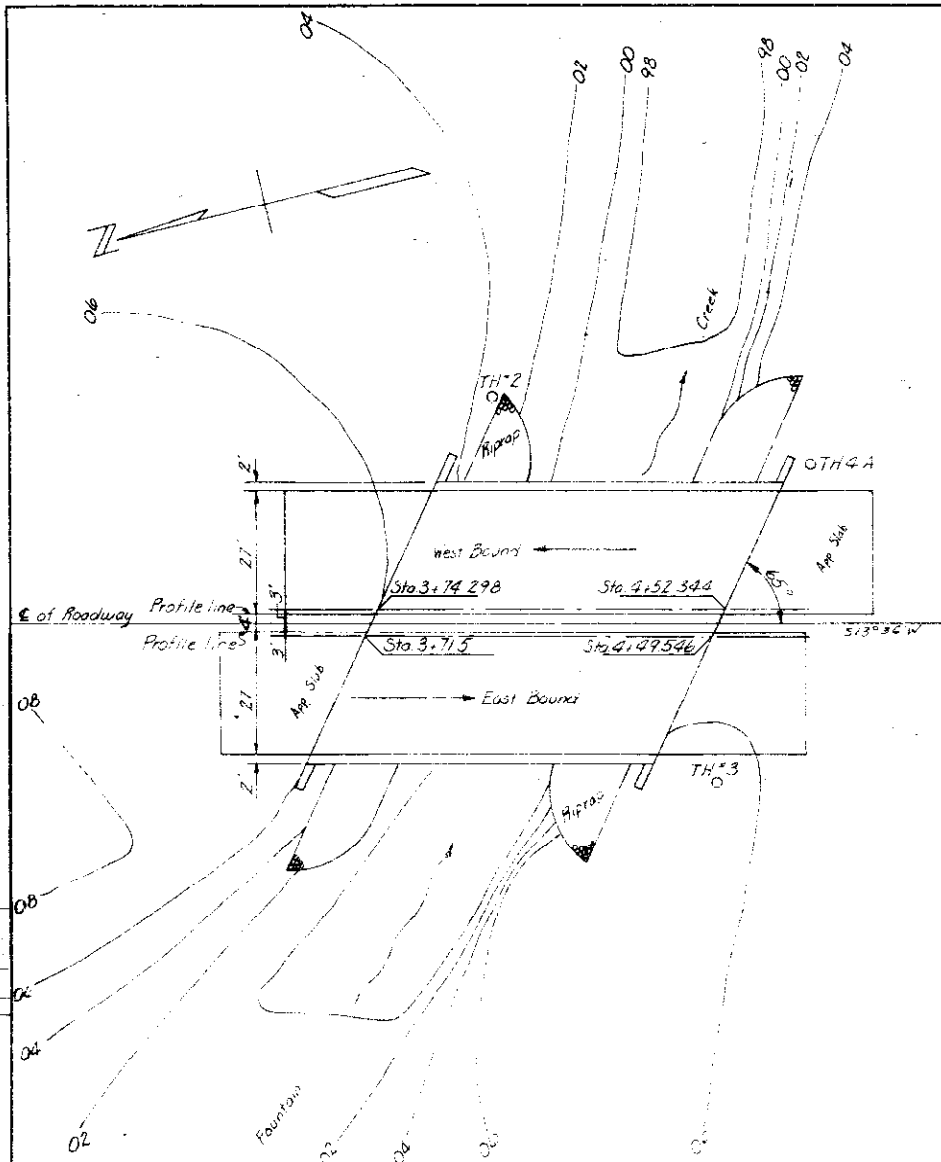
THE DENVER AND RIO GRANDE WESTERN  
RAILROAD  
OFFICE OF SIGNAL ENGINEER DENVER, COLO.  
STANDARD HIGHWAY CROSSING  
SIGNALS AND ACCESSORY  
EQUIPMENT  
SHEET ONE

DWN BY: [Signature]  
CKD BY: [Signature]  
DATE: 6-15-63

REVISIONS

Rev. Gen. Notes, Design Data of Reinf. Steel Quantities 7-15-63 RLS

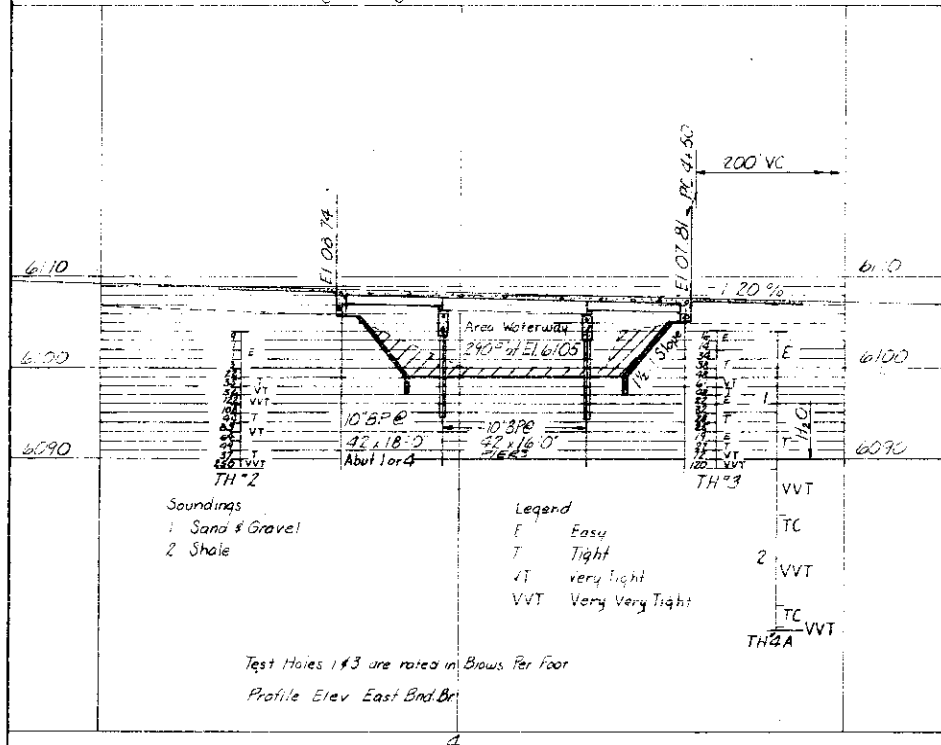
FED. ROAD REG. NO.	DIVISION	PROJECT NO.	SHEET NO.	TOTAL SHEETS
9	COLO.	FC17-2(8)	10	



Summary of Quantities

Item	Description	Unit	Super structure	Abut. No. 1	Pier No. 2	Pier No. 3	Abut. No. 4	Totals
13	Unclass. Excav.	Cu yd						900
14	Unclass. Struct. Excav. (Bridge)	Cu yd		30	23	23	27	125
16	Struct. Backfill (Class X)	Cu yd			25	25		50
44	Class "A" Conc.	Cu yd	172.2	147	477	477	127	2997
47	Reinf. Steel (Incl 1% for overrun)	Lb	57,610	1850	2360	2360	1850	70,030
48	Struct. Steel (Incl 1/2% for paint)	Lb	5260	545	265	265	545	6880
61	Steel Piling (10" BP @ 42")	Lin Ft		144	97	192	22	472
67	Riprap (6" thick)	Cu yd		112			103	215
80	Sheet Copper (36 oz)	Lb	16					15
87	Drain Pipe (4" dia. Conc. Floor)	Ea	6					6
90	1 1/2" Elect. Conduit with Junction Boxes	Lin Ft	155					155
9	1/2" Expt. of Mat'l. ashd. M 153-54 Type III	Sq Ft	134	3	20	20	3	180

⊕ To be included in the Bid Price for Item 46



**GENERAL NOTES**

ALL WORK SHALL BE DONE ACCORDING TO THE STANDARD SPECIFICATIONS OF THE COLORADO DEPARTMENT OF HIGHWAYS APPLICABLE TO THE PROJECT.

ALL CONCRETE SHALL BE CLASS "A".

ALL REINFORCING STEEL SHALL BE INTERMEDIATE GRADE STEEL OF A DEFORMED TYPE, EACH BAR SHALL BE TAGGED WITH THE BAR DESIGNATION AND STATION NUMBER OF THE PROJECT.

IF BY PERMISSION OF THE ENGINEER PRIMARY BARS ARE SPICED, THEY SHALL LAP A MINIMUM OF 25 DIAMETERS FOR BARS NEAR TOPS OF BEAMS HAVING MORE THAN 12 INCHES OF CONCRETE UNDER THE BARS AND 17 DIAMETERS FOR BARS NEAR BOTTOMS OF MEMBERS. SECONDARY BARS WHEN SPICED SHALL LAP 17 DIAMETERS OF THE BAR.

DIMENSIONS FOR REINFORCING STEEL NOT SHOWN AS CLEAR SHALL BE TO THE CENTERLINE OF THE BAR.

SOUNDINGS AND DEPTH OF FOOTINGS ARE IN ACCORDANCE WITH THE BEST AVAILABLE DATA AND WHEN DIFFERENT CONDITIONS ARE ENCOUNTERED THE BRIDGE ENGINEER WILL INSPECT AND DETERMINE IF REDESIGN IS NECESSARY.

FOOTINGS IN ROCK SHALL BE PEGGED OUT TO ROCK AND NOT FORMED.

WHEN EXCAVATING FOR FOOTINGS THE FINAL ONE FOOT IN DEPTH SHALL BE DONE BY HAND-LABOR METHODS.

FOR DETAILS OF STRUCTURAL EXCAVATION AND STRUCTURE BACKFILL SEE STANDARD M-64.

ALL CONCRETE SURFACES MARKED WITH THE SYMBOL ? AS SHOWN ON SHEET M-64 SHALL RECEIVE CLASS 1 SURFACE FINISH.

ALL STRUCTURAL STEEL SHALL BE PAINTED WITH ONE SHOP COAT OF ZINC CHROMATE AND TWO FIELD COATS OF ALUMINUM PAINT UNLESS OTHERWISE NOTED.

ALL RIVETS SHALL BE 3/4 INCH DIAMETER UNLESS OTHERWISE NOTED.

HIGH TENSILE BOLTS MAY BE SUBSTITUTED FOR FIELD RIVETS AT THE CONTRACTORS OPTION. BOLTS SHALL BE FURNISHED IN THE AMOUNT OF FIVE PERCENT IN EXCESS OF THE NOMINAL NUMBER REQUIRED FOR EACH SIZE AND LENGTH.

WELDING SHALL CONFORM TO THE LATEST EDITION OF THE A.W.S. STANDARD SPECIFICATIONS FOR WELDING HIGHWAY BRIDGES.

FOR WELDED GIRDERS ALL SHOP BUTT WELDS IN FLANGES AND WEBS SHALL BE MADE BEFORE WELDING INTO GIRDER.

WHEN CALLED FOR IN THE SPECIAL PROVISIONS, SHOP WELDS SHALL BE INSPECTED RADIO GRAPHICALLY AND BY THE PRESERVATIVE DYE METHOD.

WHEN TREATED TIMBER PILING IS SHOWN ON THE PLANS THE PRESERVATIVE FOR TREATMENT SHALL BE CREOSOTE OIL.

ALL STRUCTURAL STEEL NOT OTHERWISE NOTED SHALL ASTM A36-62T.

**LOADING DATA.**  
 LIVE LOAD - A. A. S. H. O. H20-S16-44  
 DEAD LOAD - ASSUMES 15 LBS. PER SQ. FT. ADDITIONAL WEARING SURFACE WHICH INCLUDES THE 1/2 INCH CONCRETE MONOLITHIC WEARING SURFACE SHOWN.

**DESIGNING DATA.**  
 A. A. S. H. O. 1957 UNIT STRESSES.  
 f<sub>c</sub> = 3,000 Lbs. per Sq. In.  
 f<sub>s</sub> = 20,000 Lbs. per Sq. In. (Reinf. Steel) A36 Struct. Steel  
 n = 10  
 f<sub>a</sub> = 18,000 Lbs. per Sq. In. (Struct. A7 Steel)

**COLORADO**  
 DEPARTMENT OF HIGHWAYS

3 Spans (22'-30'-22')  
 Conc. Slab & Girder  
 27' Rdwy. 2' Curbs @ 5° Skew

Across Fountain Creek

Sta. 3+74.3 to 4+52.3  
 Near Colo Springs Sec. 10 T. 14 S. R. 67 W.

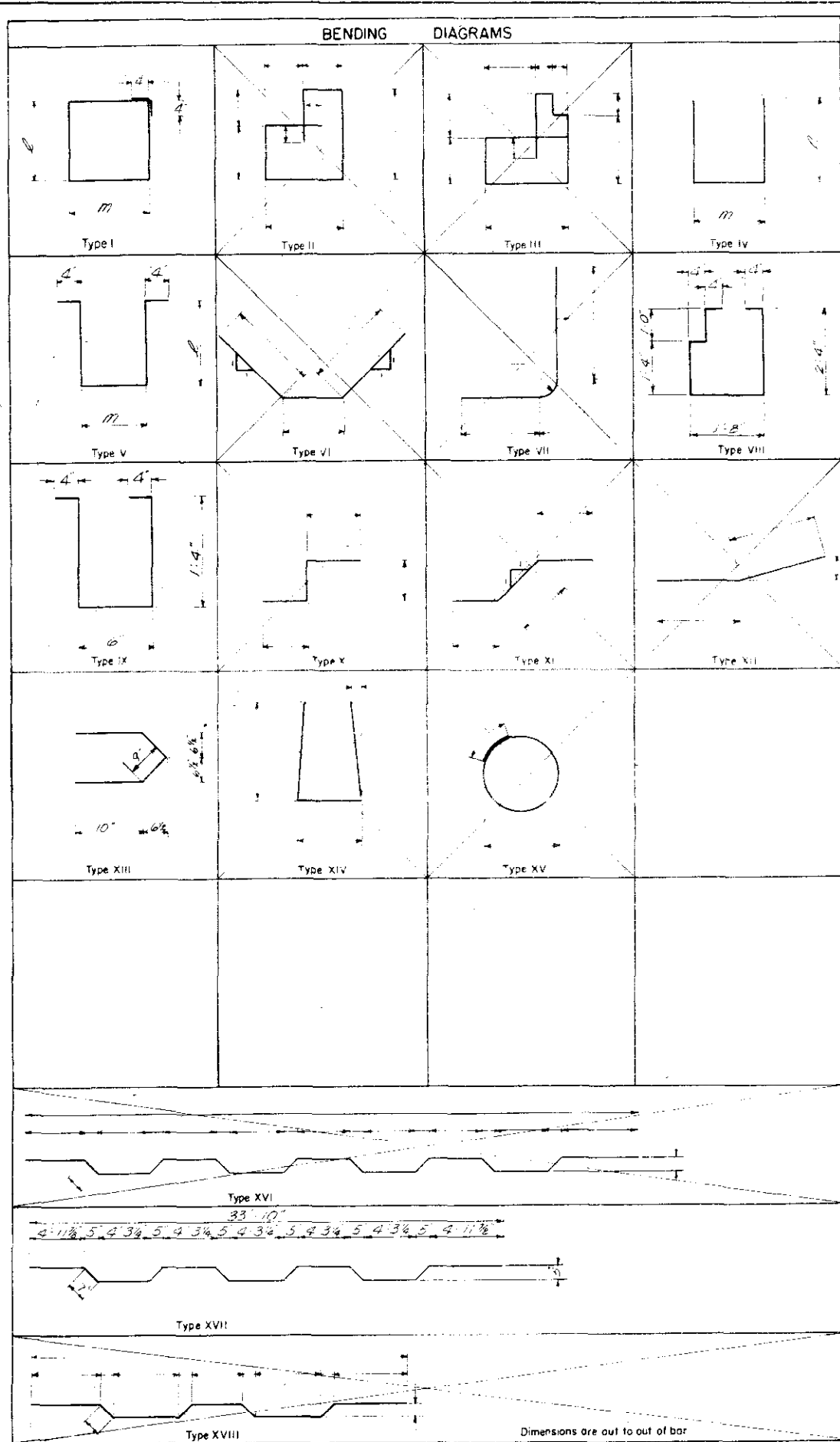
Designed by *[Signature]* Approved by *[Signature]*  
 Made by *[Signature]* Bridge Engineer  
 Checked by *[Signature]* Date: 2 Nov 1962

WB Sta 3+74.3 to 4+52.3  
 EB Sta 3+71.5 to 4+47.5  
 STRUCTURE NO. I-17-FM

REVISIONS

Revised: Superstr. Bar List 401, 215 Summary  
7-15-63 R.L.S.

FED. ROAD REG. NO.	DIVISION	PROJECT NO.	SHEET NO.	TOTAL SHEETS
9	COLO.	FO:17-2(8)	11	



**Bar List Superstructure**

Mark	Size	No. Reqd.	Length	Type	Dimension	
					L	M
401	7/8"	312	22'-10"	Str.		
402	1/2"	156	30'-6"	Str.		
403	3/8"	308	4'-0"	IV	1'-4"	1'-5"
404	1/2"	48	5'-0"	I	11"	1'-3"
405	1/2"	192	3'-10"	IX		
406	1/2"	752	4'-9"	V	1'-6"	1'-1"
407	3/8"	456	5'-5"	V	1'-10"	1'-1"
501	3/8"	70	36'-10"	XVII		
502	1/2"	344	33'-10"	Str.		
701	1/2"	24	23'-0"	Str.		
702	1/2"	24	33'-10"	Str.		
901	1/2"	16	13'-0"	Str.		
1001	1/2"	32	12'-6"	Str.		
1002	1/2"	32	2'-6"	Str.		
1101	1/2"	32	4'-0"	Str.		
1102	1/2"	64	23'-0"	Str.		
1103	1/2"	32	30'-6"	Str.		
1104	1/2"	16	25'-0"	Str.		
1105	1/2"	16	20'-0"	Str.		

**Bar Summary**

3330 Lb Ft 1/2" @ 3000 PLF = 2224 Lb  
 96 Lb Ft 1/2" @ 2600 PLF = 256 Lb  
 500 Lb Ft 1/2" @ 3400 PLF = 183 Lb  
 Plus 16 Lb for overrun = 96 Lb  
 Total = 4360 Lb

**Bar List Pier 2 (Pier 3 Similar)**

Mark	Size	No. Reqd.	Length	Type	Dimension	
					L	M
413	3/8"	8	33'-2"	Str.		
414	1/2"	16	33'-9"	Str.		
415	1/2"	140	2'-8"	Str.		
416	1/2"	27	2'-9"	IV	10"	1'-1"
417	1/2"	9	3'-2"	XIII		
418	1/2"	70	7'-10"	I	1'-8"	1'-11"
419	3/8"	68	3'-10"	IV	1'-7"	8"
801	1/2"	32	3'-0"	Str.		
902	1/2"	16	33'-9"	Str.		

**Bar Summary**

3330 Lb Ft 1/2" @ 3000 PLF = 2224 Lb  
 96 Lb Ft 1/2" @ 2600 PLF = 256 Lb  
 500 Lb Ft 1/2" @ 3400 PLF = 183 Lb  
 Plus 16 Lb for overrun = 96 Lb  
 Total = 4360 Lb

**Bar List**

Mark	Size	No. Reqd.	Length	Type	Dimension	
					L	M
408	1/2"	60	7'-0"	Str.		
409	1/2"	2	7'-0"	Str.		
410	1/2"	2	7'-0"	Str.		
411	1/2"	12	6'-9"	Str.		
412	1/2"	24	5'-6"	Str.		
503	3/8"	4	33'-10"	Str.		
601	3/8"	60	1'-6"	Str.		
703	3/8"	16	33'-10"	Str.		

**Bar Summary**

678 Lb Ft 1/2" @ 3000 PLF = 453 Lb  
 135 Lb Ft 3/8" @ 2600 PLF = 141 Lb  
 90 Lb Ft 3/8" @ 2200 PLF = 135 Lb  
 60 Lb Ft 3/8" @ 2000 PLF = 100 Lb  
 Plus 15 Lb for overrun = 15 Lb  
 Total = 844 Lb

STRUCTURE NO. I-17 FM

**COLORADO**  
 DEPARTMENT OF HIGHWAYS

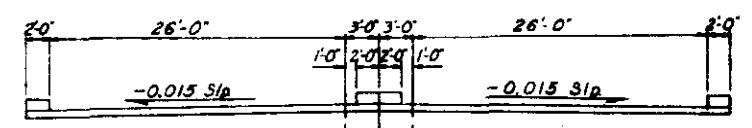
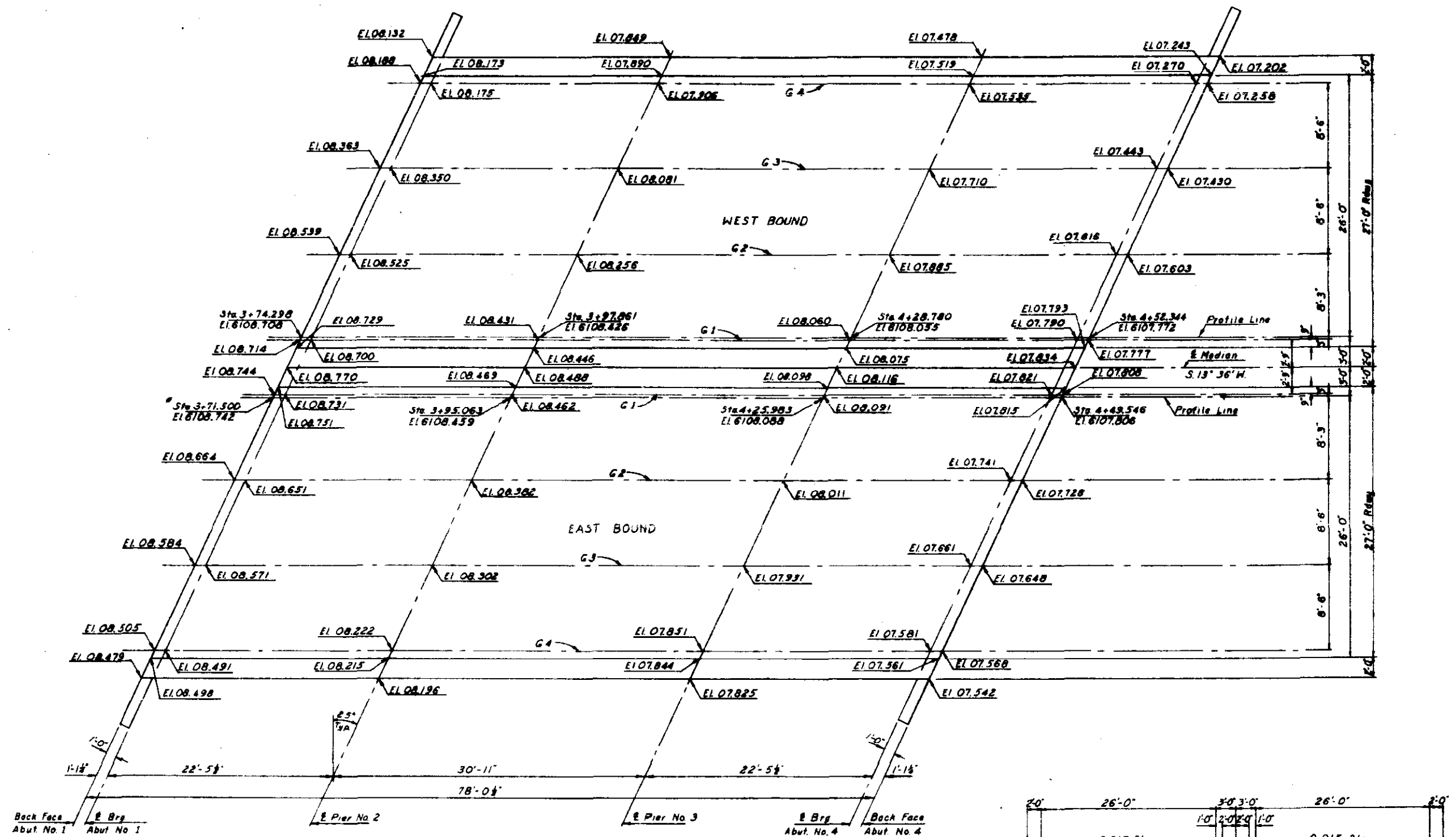
BENDING DIAGRAMS & BAR LIST

Across Fountain Creek  
 Sta. z

Near Cole Sarge Sec. 10 T. 19 S. R. 6 W.

Designed by J.B. PC Approved by J.B. PC  
 Made by J.B. PC Bridge Engineer  
 Checked by Date: 2-15-1962

NO. ROAD	SECTION	PROJECT NO.	DATE	SCALE
0	00A	FO17-2(B)	12	



TYPICAL CROSS SECTION

CONSTRUCTION LAYOUT  
Stations & Elevations are to top of slab.

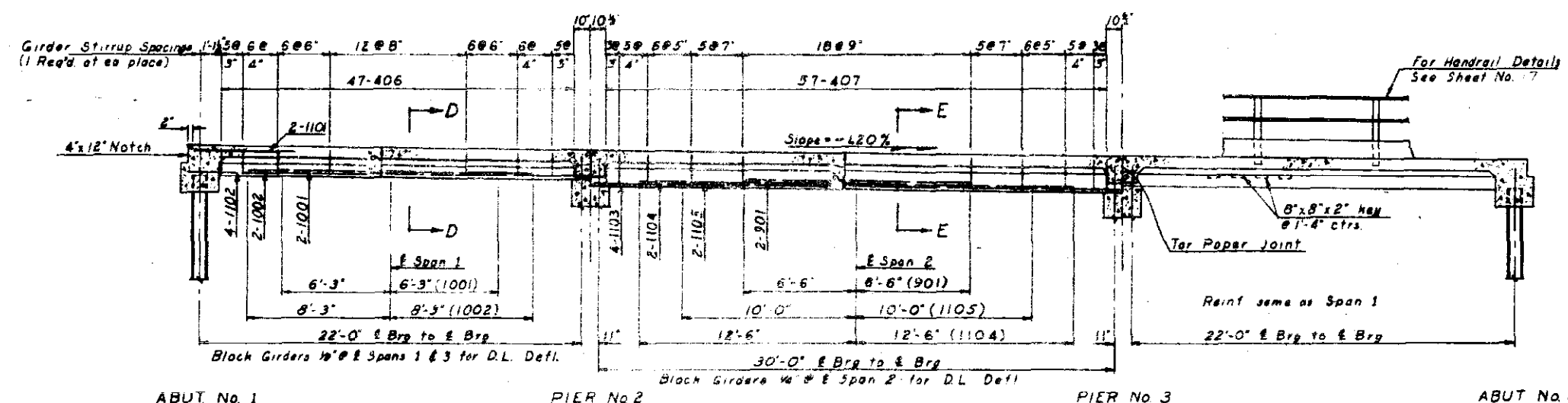
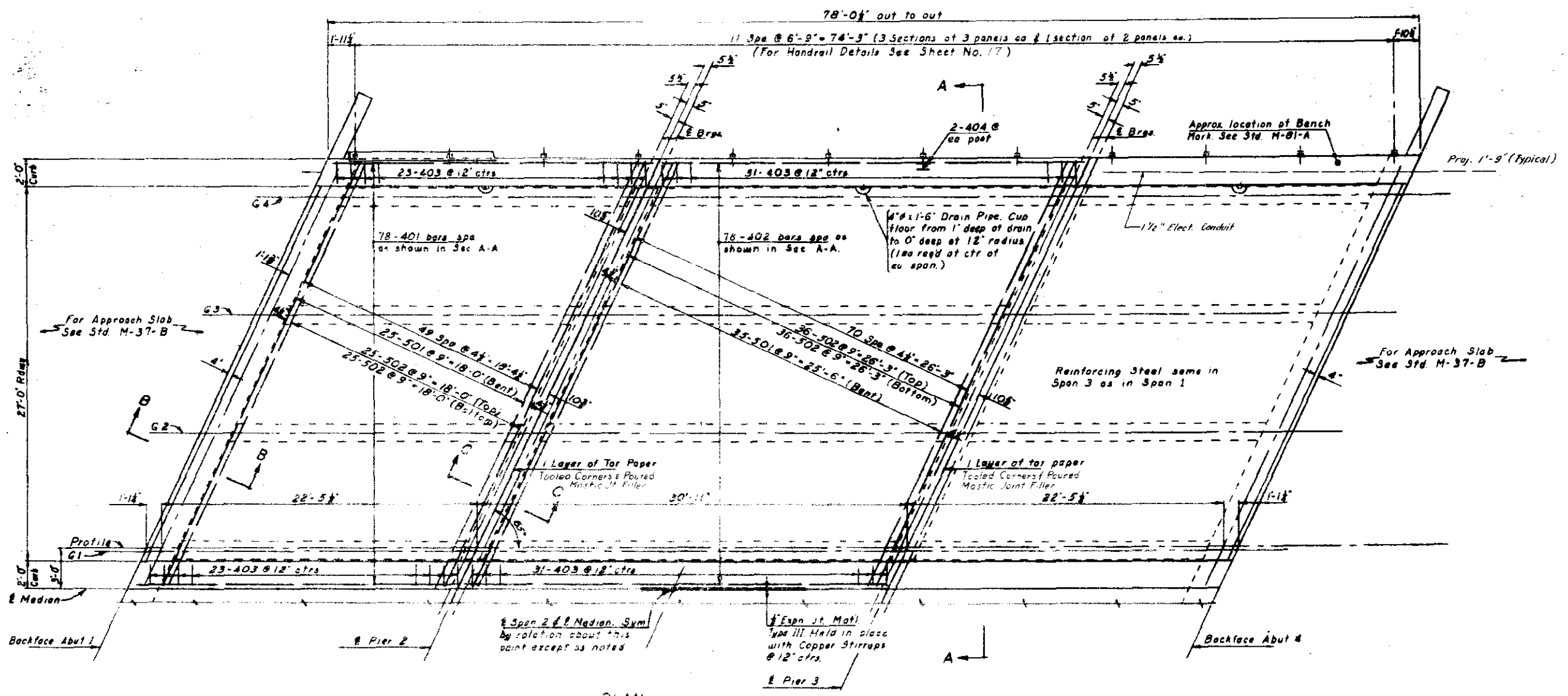
**COLORADO**  
**DEPARTMENT OF HIGHWAYS**  
**CONSTRUCTION LAYOUT**

Across FOUNTAIN CREEK  
West bound Sta 3+74.298 to 4+52.344  
East bound Sta 3+71.500 to 4+49.546  
Plan COLO. SPRES. Sec. 10 T. 14S. R. 68E

Designed by G.M.H. Checked by J.M.H.	Approved by G.D. [Signature] Bridge Engineer Date: 2/26/42
---	--

Revised: N#4 Slab Steel 7-15-63 R.L.S.

NO. DRAW	DIVISION	PROJECT NO.	SHEET NO.	TOTAL SHEETS
9	CULV.	FO 17-2(B)	13	



**COLORADO DEPARTMENT OF HIGHWAYS SUPERSTRUCTURE**

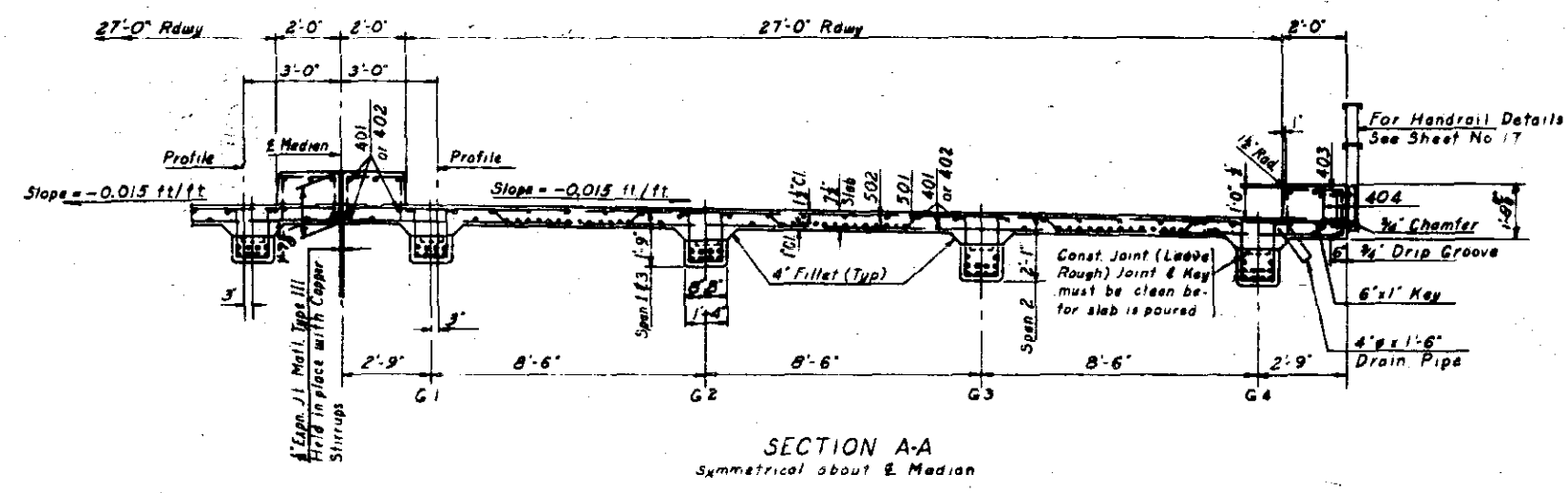
ASPECT: FOUNTAIN CREEK  
 Westbound Sta. 2+74.3 to 4+77.2  
 Eastbound Sta. 3+77.5 to 5+77.2  
 Near COLO. SPRINGS See 10 & 11

Designed by G.W. [Signature]  
 Made by J.H.W. [Signature]  
 Checked by [Signature]

Approved by [Signature]  
 [Signature]  
 Date: 2/26/63

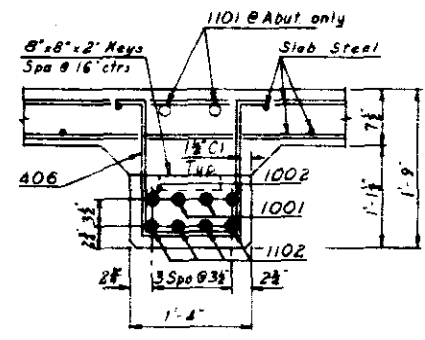
STRUCTURE NO. F-17-FM

REV. NO.	DESCRIPTION	PROJECT NO.	SHEET NO.	TOTAL SHEETS
4	CHG.	FO 17-2(B)	14	

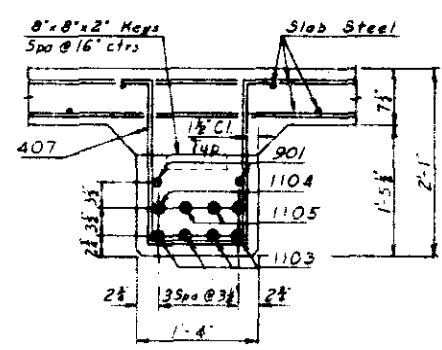


SECTION A-A  
Symmetrical about E Median

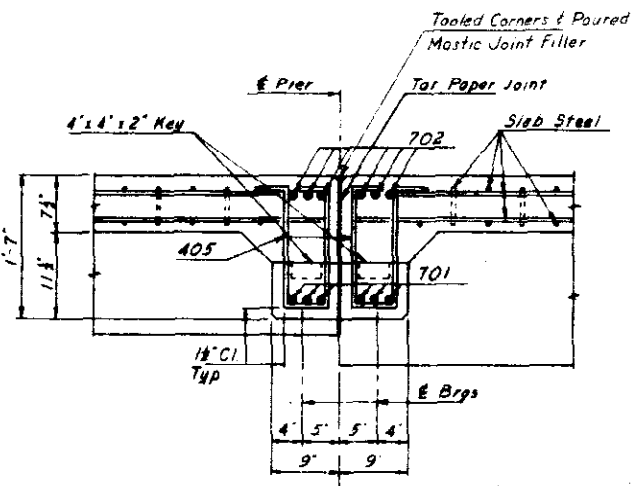
NOTE: 403 bars may be placed after slab is poured but before initial set takes place.



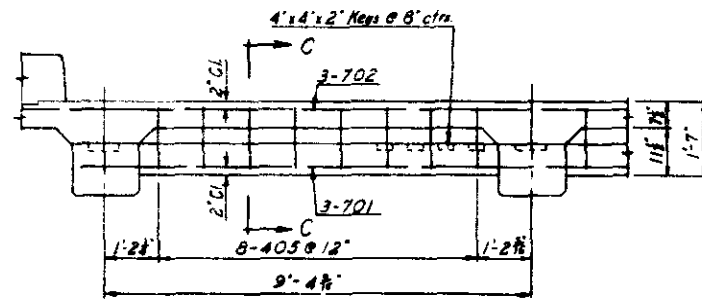
SECTION D-D  
(Spans 1 & 3)



SECTION E-E  
(Span 2)



SECTION C-C



TYPICAL DIAPH. ELEV.

NOTE: Girder Shoring shall remain in place full length in any span until all pours have reached a min strength of 2500 psi in that span & the slab shall not be poured until the girder pours have reached a min strength of 2500 psi.  
All filllets are 4" & all chamfers are 3/4" unless otherwise noted.

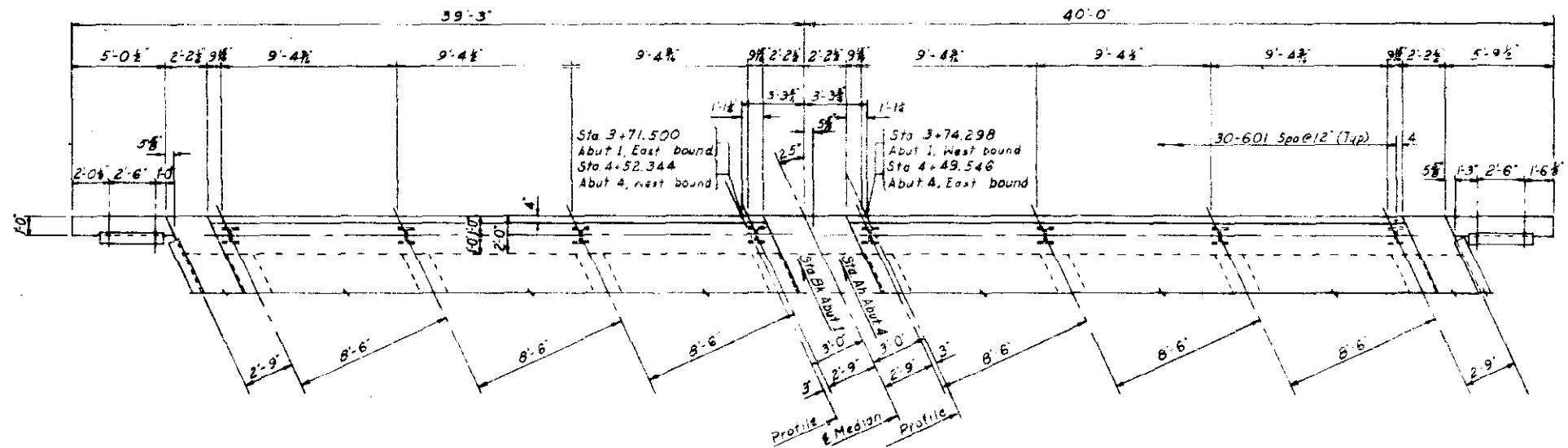
**COLORADO**  
**DEPARTMENT OF HIGHWAYS**  
**SUPERSTR. DETAILS**

Across FOUNTAIN CREEK  
Westbound 3m 3+74.3 to 4+52.3  
Eastbound 3m 3+71.2 to 4+49.2  
Village COLO SPRGS Sta. 10 +14.5 to 14m

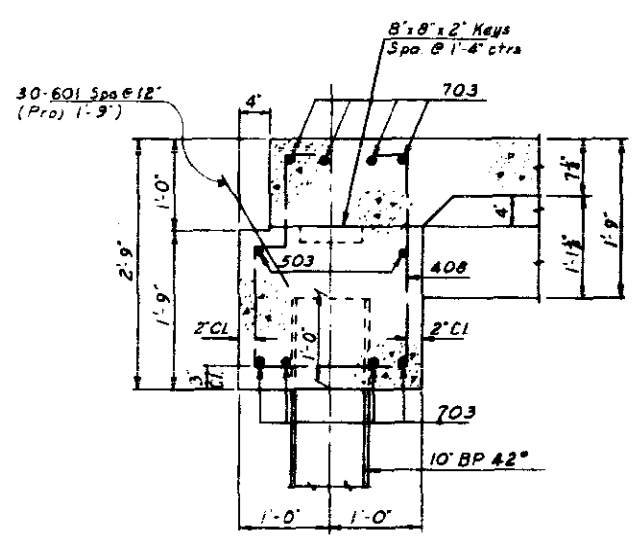
Designed by GWN  
Checked by JMN  
Date 2 Nov 62

Approved by A.D. [Signature]  
Checked by [Signature]  
Date 2 Nov 62

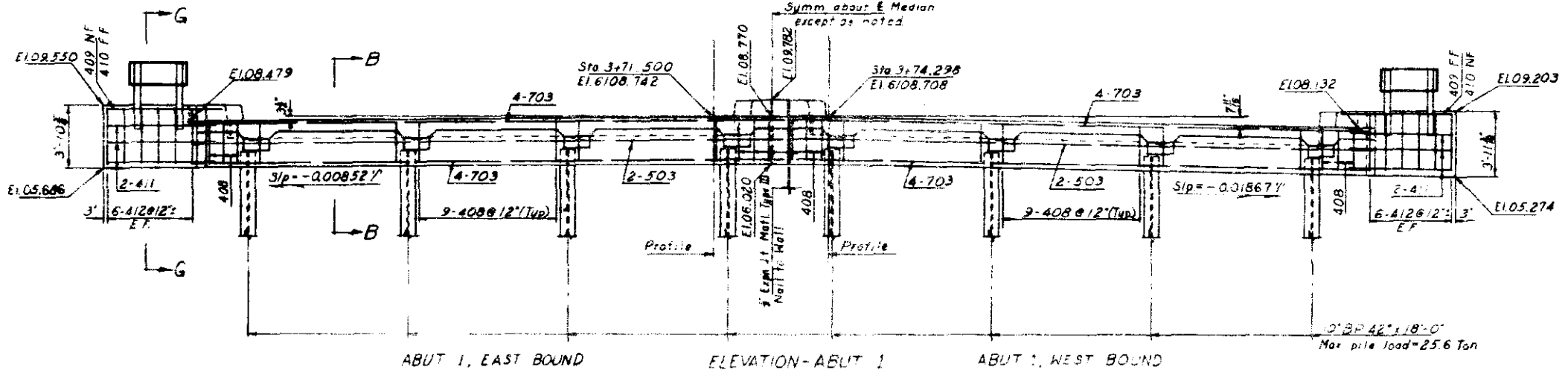
REV. NO.	DATE	BY	REASON
0			



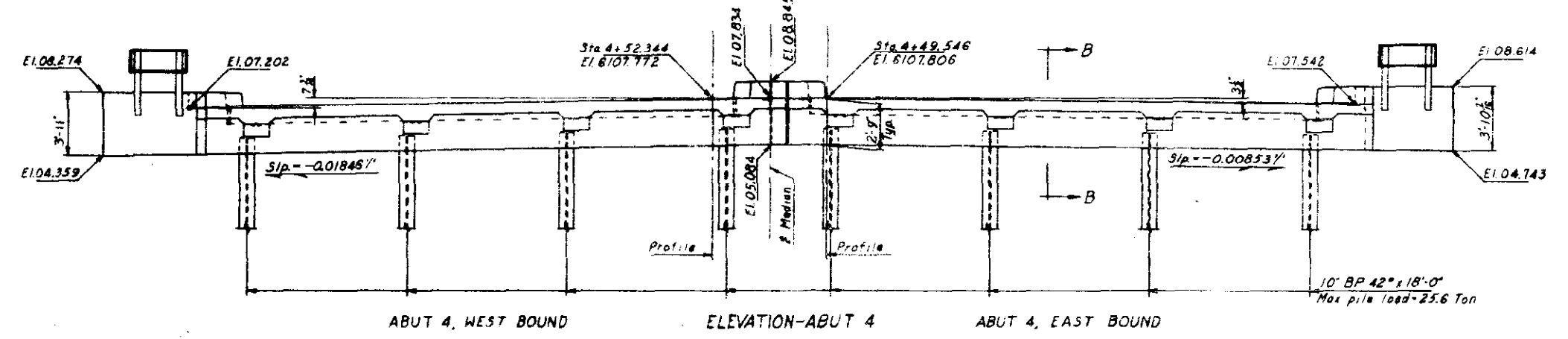
PLAN-ABUT No 1  
ABUT No 4 SIMILAR BY ROTATION



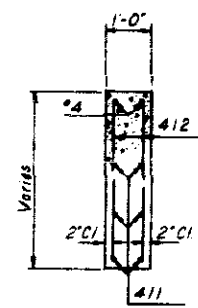
SECTION B-B



ABUT 1, EAST BOUND ELEVATION-ABUT 1 ABUT 1, WEST BOUND



ABUT 4, WEST BOUND ELEVATION-ABUT 4 ABUT 4, EAST BOUND



SECTION G-G

NOTE: Sta & Elev are taken at backface of Abut. Abut 1 & 4 are similar except as noted.  
E.F. = Each Face  
N.F. = Near Face  
F.F. = Far Face

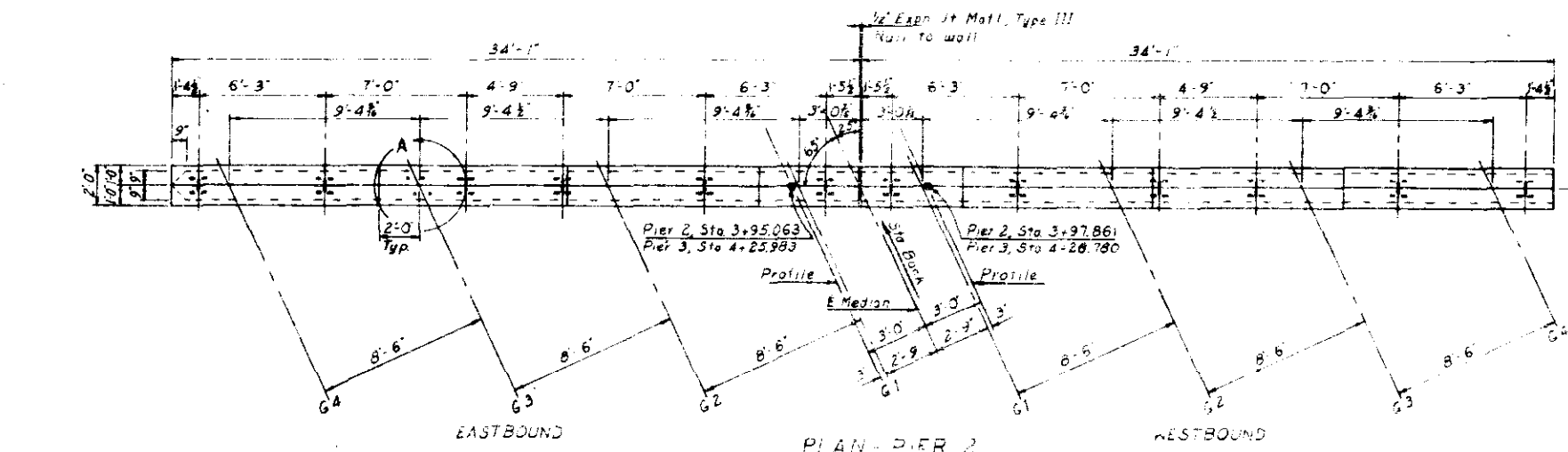
NOTE: All fillets are 4" & all chamfers are 30° unless otherwise noted.

**COLORADO DEPARTMENT OF HIGHWAYS**  
ABUT. DETAILS

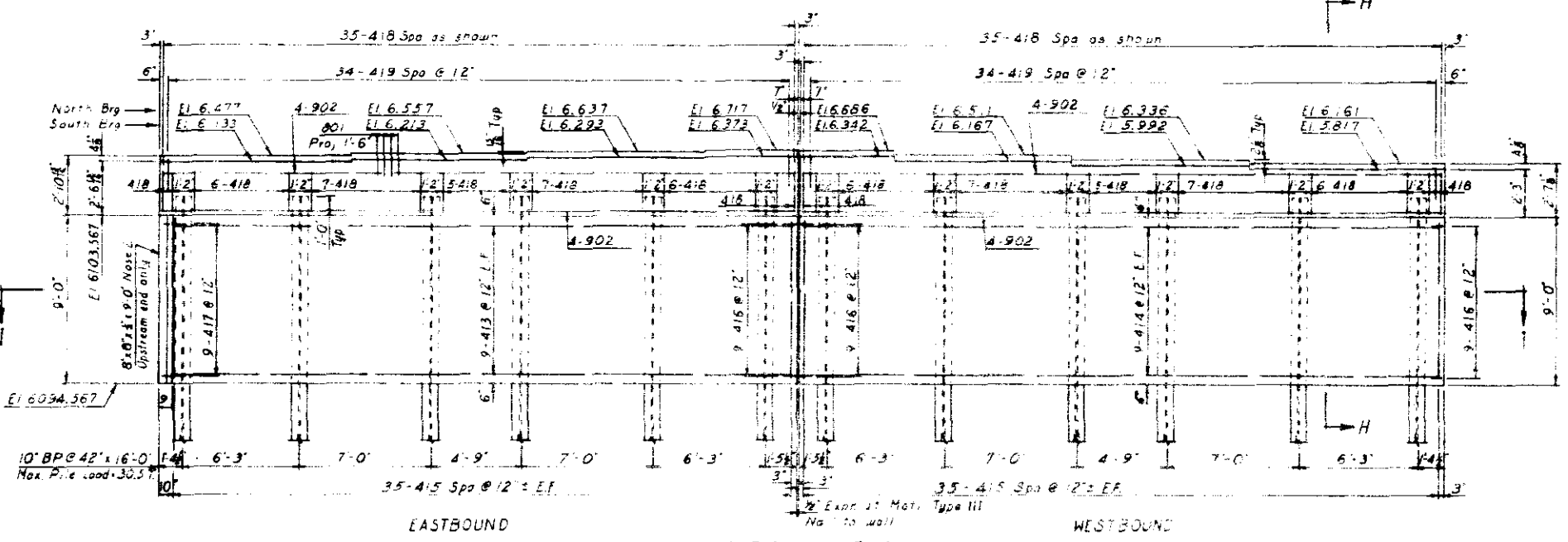
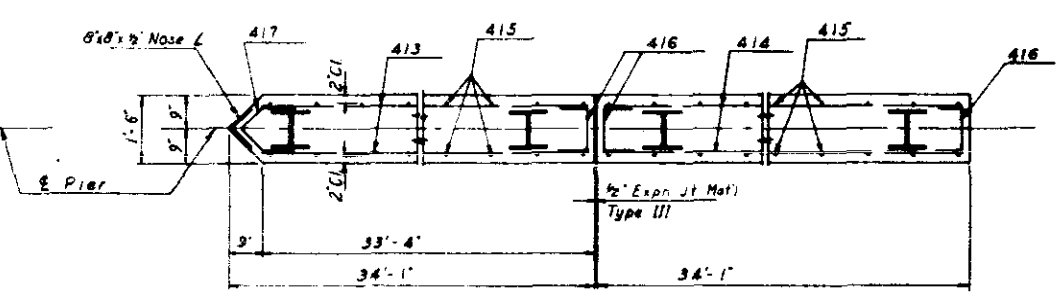
Across FOUNTAIN CREEK  
West bound Sta. 3+74.3 to 4+52.3  
East bound Sta. 3+71.5 to 4+49.5  
Near COLO SPRING Sta. 10+14.5 north

Designed by GWH Approved by J. D. [Signature]  
Drawn by JNH Bridge Engineer  
Checked by [Signature] Date 2/25/62

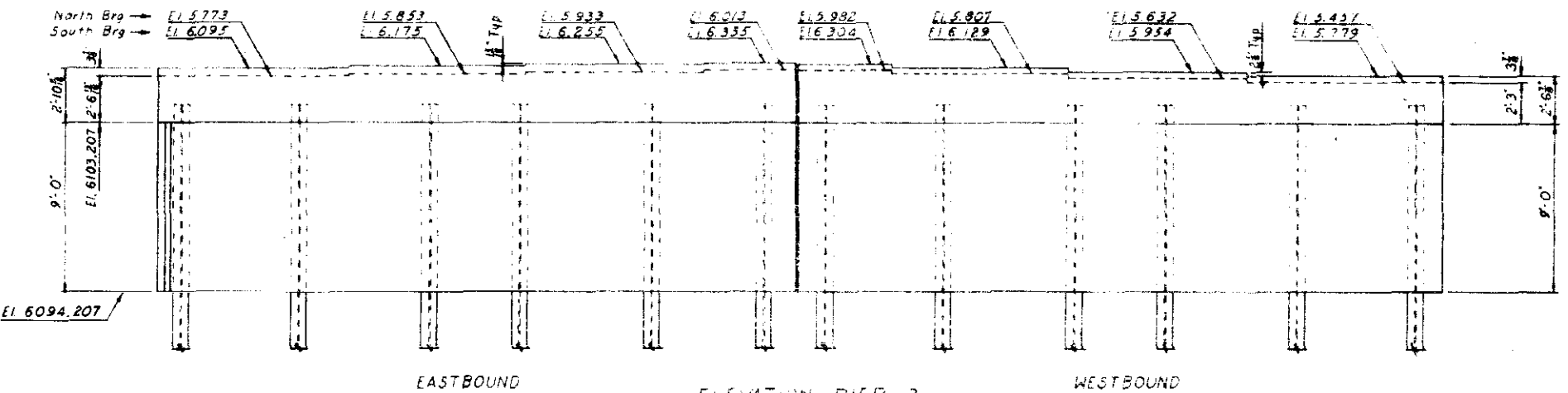
REV. NO.	DESCRIPTION	DATE	BY	CHKD.
1	AS SHOWN			



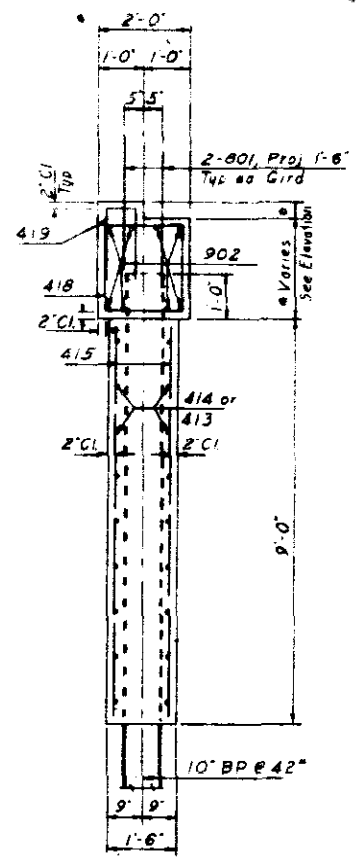
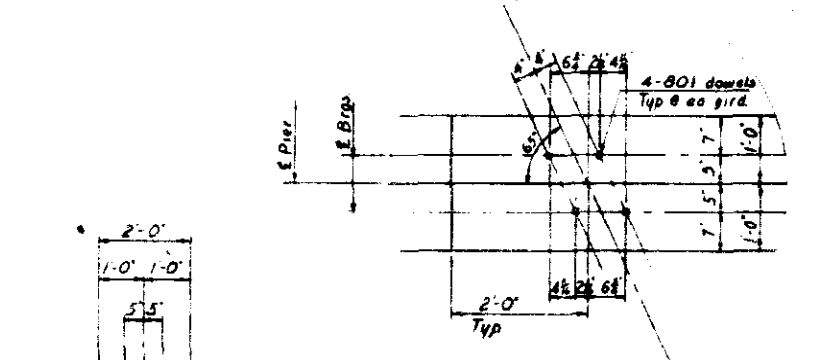
PLAN - PIER 2  
(Pier 3 similar)



ELEVATION - PIER 2  
(Pier 3 similar except as noted)



ELEVATION - PIER 3



NOTE: All corner chamfers are 90° unless otherwise noted.

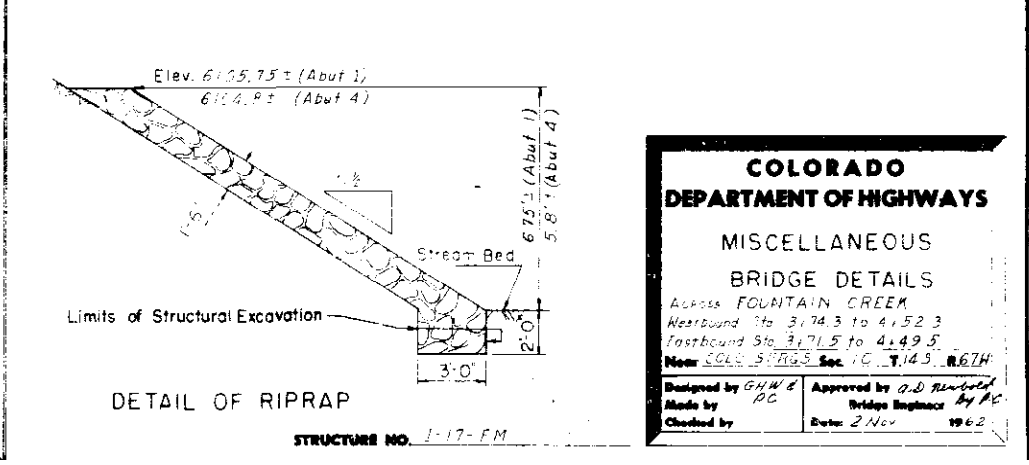
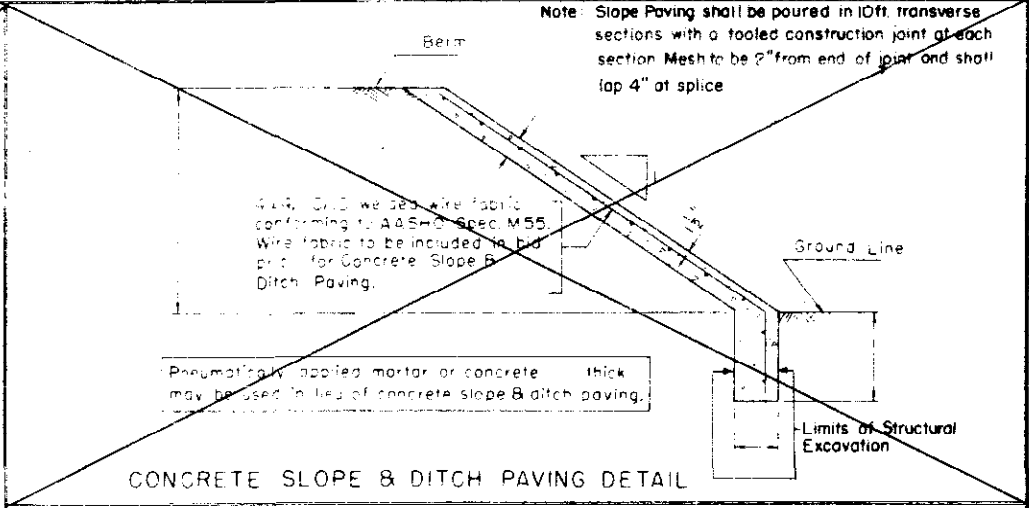
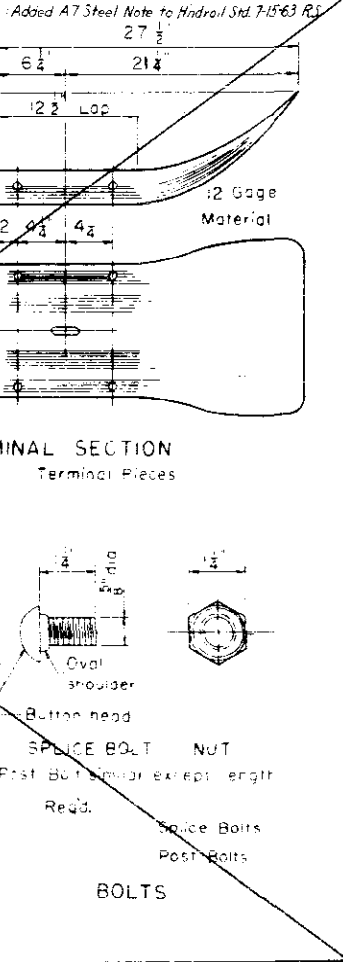
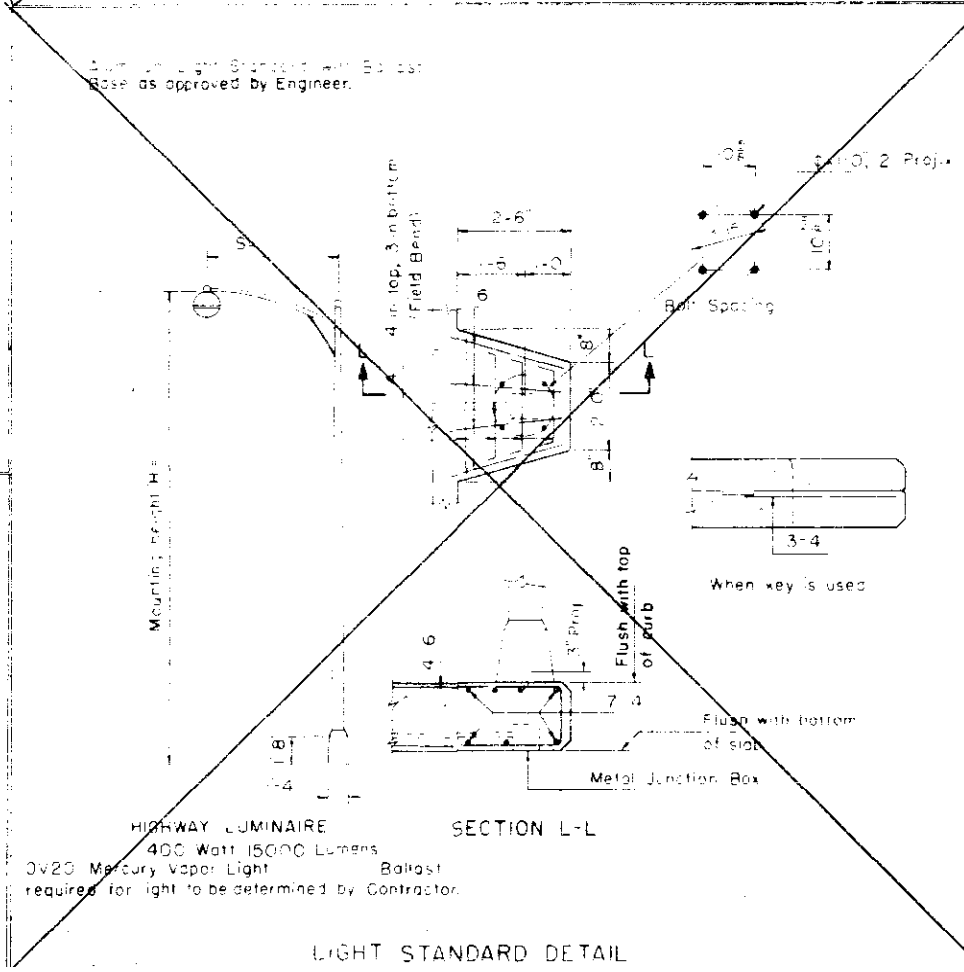
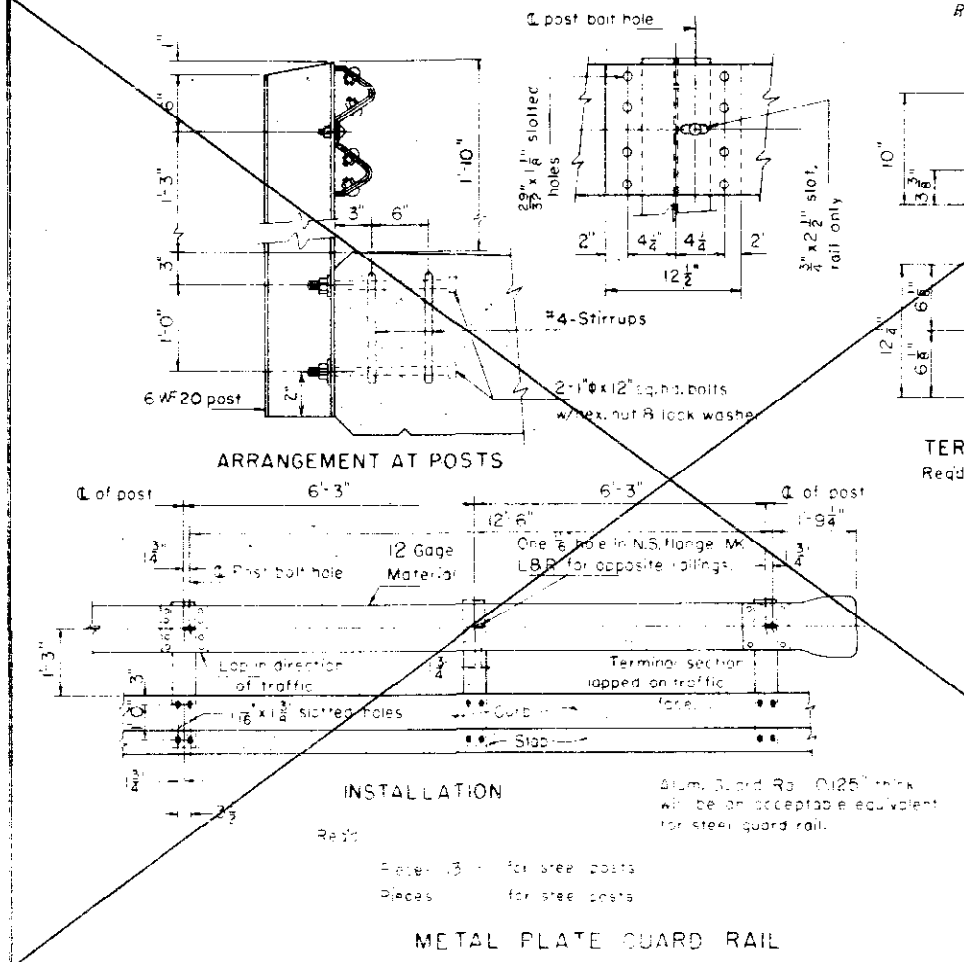
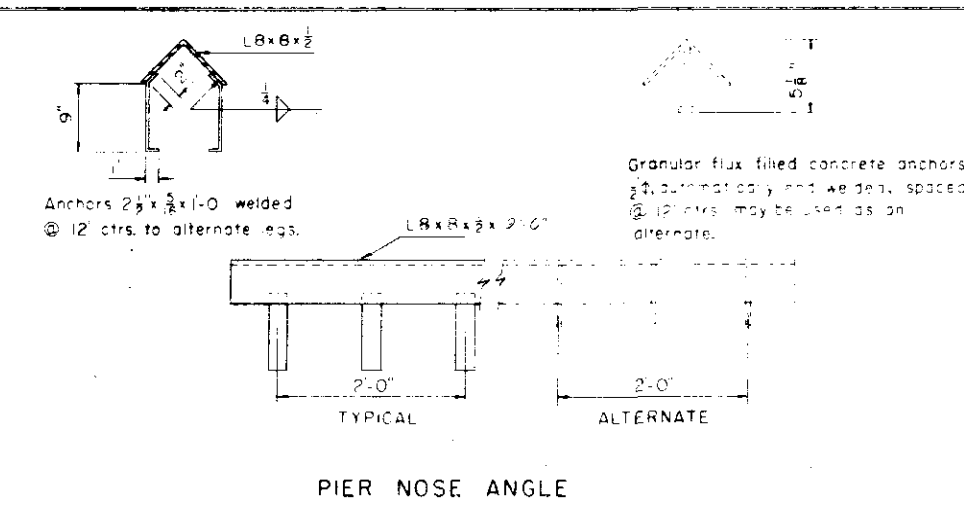
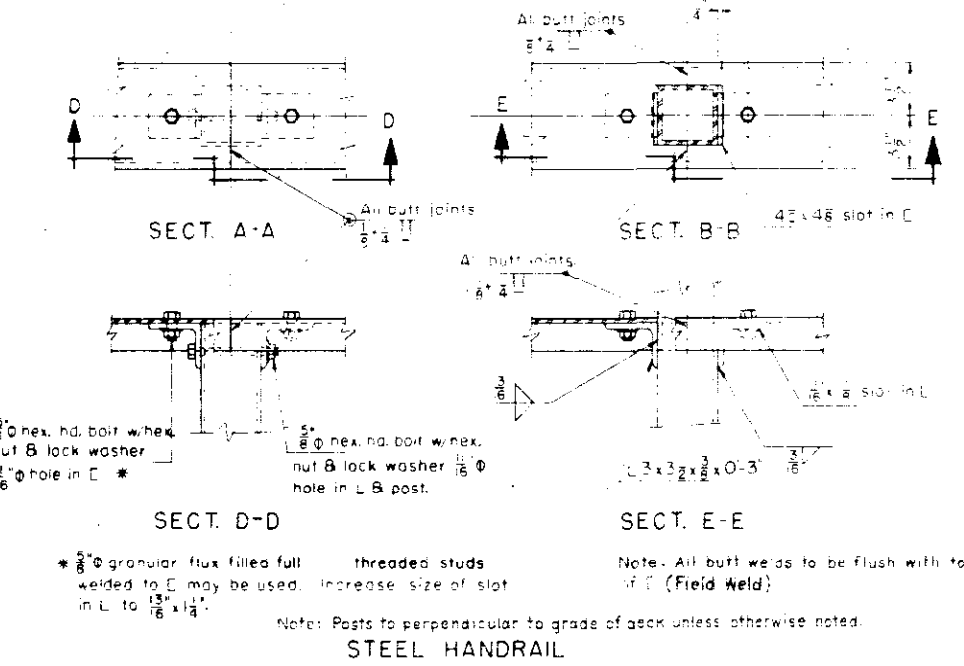
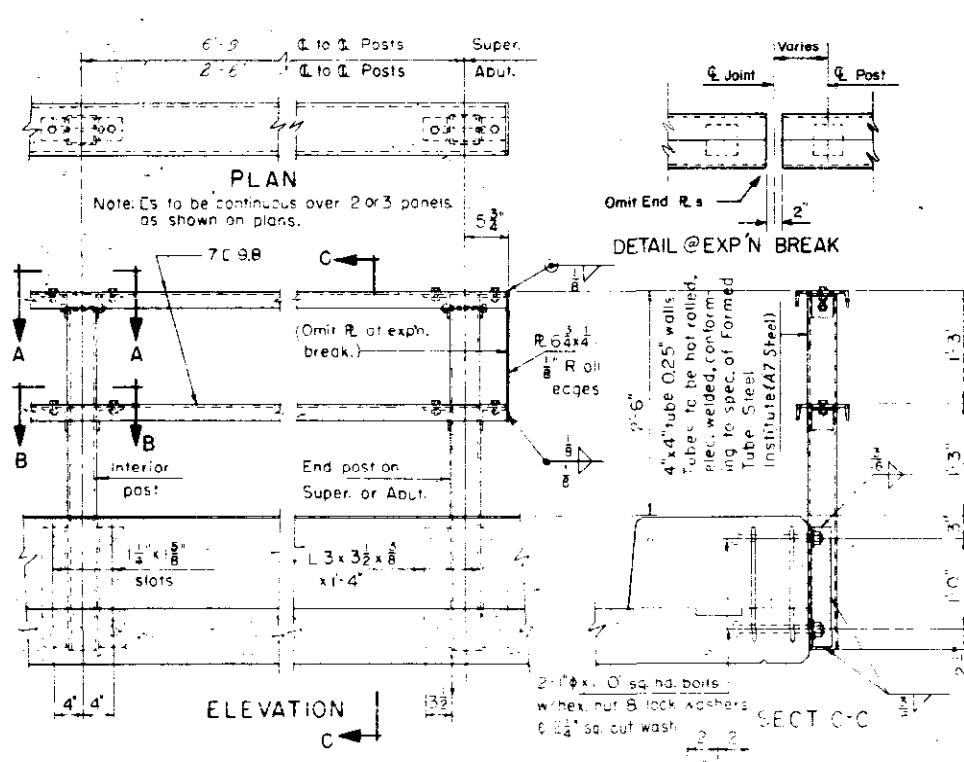
**COLORADO**  
**DEPARTMENT OF HIGHWAYS**  
**PIER DETAILS**

Across FOUNTAIN CREEK  
Westbound Sta 2+74.3 to 4+82.3  
Eastbound Sta 3+71.5 to 6+69.5  
Near COLO SPRGS Sta 10+71.9 to 14.9

Designed by P.C.  
Checked by J.W.M.  
Approved by R.D. Newberry  
Bridge Engineer  
Date: 2 Nov 1962

REVISIONS

REV. NO.	DESCRIPTION	DATE	BY	CHECKED
1	Added A7 Steel Note to Handrail Std. 7-15-63 R.J.	7-15-63	R.J.	



**COLORADO DEPARTMENT OF HIGHWAYS**

MISCELLANEOUS BRIDGE DETAILS

ALONG FOUNTAIN CREEK  
Nearbound Sta 3+74.3 to 4+52.3  
Inbound Sta 3+71.5 to 4+49.5  
Near S.C.R. 3+76.3 Sec 10, T.14S., R.67W.

Designed by G.H.W. PC  
Checked by

Approved by G.D. [Signature]  
Bridge Engineer

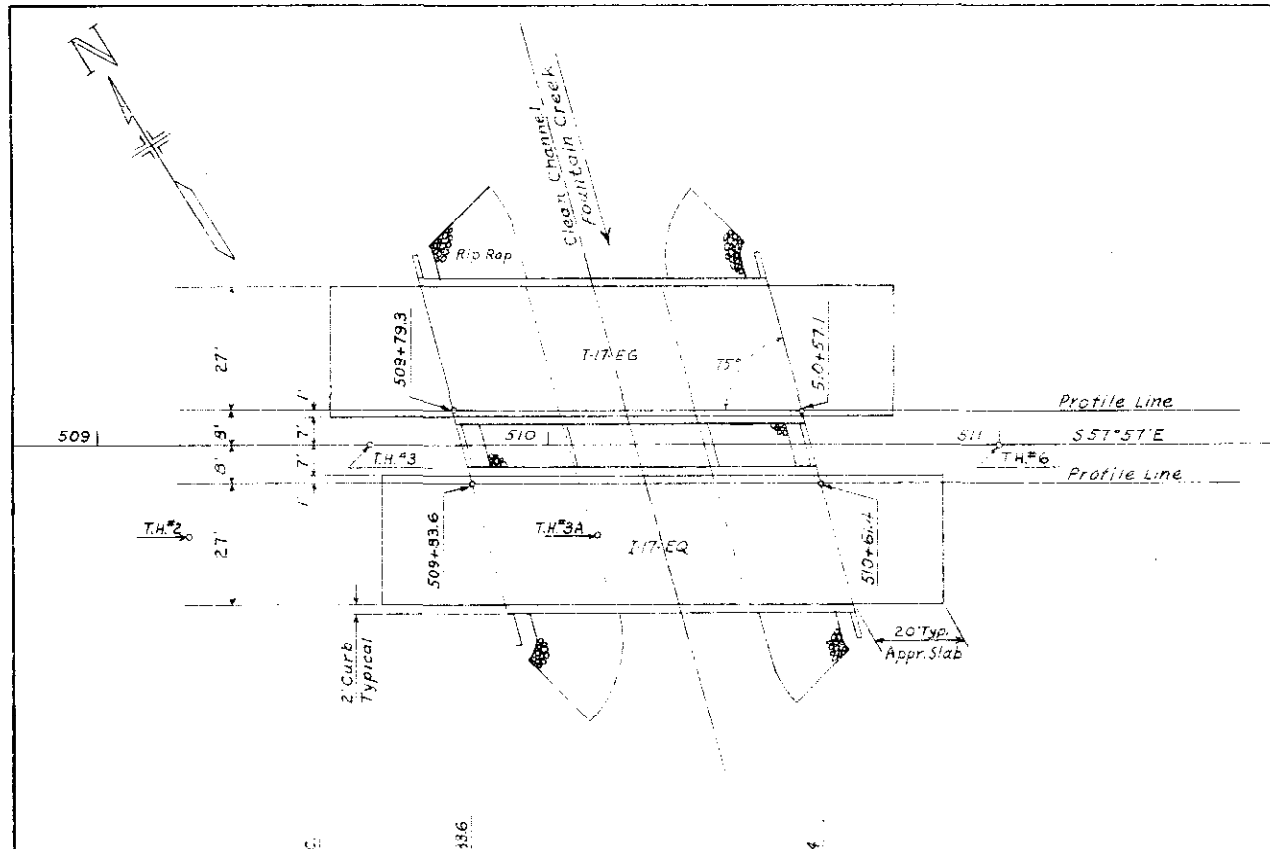
Series 2/16/64 1962

STRUCTURE NO. 1-17-FM

REVISIONS

Revised: Item 17, September 1963, R. J. H.

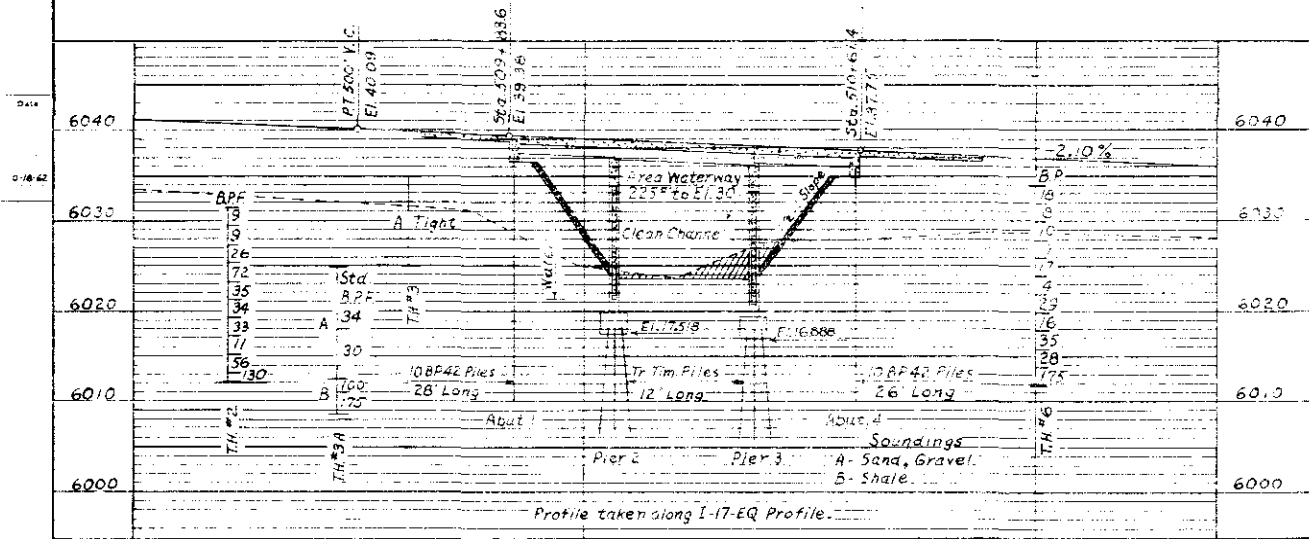
FED. ROAD REG. NO.	DIVISION	PROJECT NO.	SHEET NO.	TOTAL SHEETS
9	COLO.	F017-2(B)	18	



SUMMARY OF QUANTITIES FOR STR. I-17-EQ or EQ

Item	Description	Unit	Super-structure	Abut. No. 1	Pier No. 2	Pier No. 3	Abut. No. 4	Totals	
								I-17-EQ	I-17-EQ
13	Unclassified Excavation	Cu. Yd.						155	155
14	Unclass. Struct. Excav. (Bridge)	Cu. Yd.		9	33	38	10	90	90
16	Structure Backfill (Class X)	Cu. Yd.			25	25		50	50
46	Class "A" Concrete	Cu. Yd.	89.3	7.9	24.7	24.7	7.9	153.5	153.5
47	Reinforcing Steel (incl. 1% for overrun)	Lbs.	28,200	950	3,090	3,090	950	30,270	30,270
48	Structural Steel (incl. 1% for paint)	Lbs.	5,260	560	410	410	560	7,200	7,200
60	Treated Timber Piling	Lin. Ft.			120	20		240	240
61	Steel Piling (10" BP @ 42")	Lin. Ft.		112			104	216	216
67	Riprap (1'-6" thick)	Cu. Yd.		80			75	155	155
89	Drain Pipe (4" φ x 1'-6", Conc. Floor)	Each	3					3	3
90	1/2" Elect. Conduit with Junction Boxes	Lin. Ft.	82.5					82.5	82.5
(1)	1/2" Exp'n. Joint Mat'l. (AASHO. M153-54 Type III)	Sq. Ft.		4			4	8	8

(1) To be included in the Bid Price for Item 46



GENERAL LAYOUT

GENERAL NOTES

ALL WORK SHALL BE DONE ACCORDING TO THE STANDARD SPECIFICATIONS OF THE COLORADO DEPARTMENT OF HIGHWAYS AND CABLE TO THE PROJECT.

CONCRETE SHALL BE CLASS "A".

REINFORCING STEEL SHALL BE INTERMEDIATE GRADE STEEL OF A DEFORMED TYPE. EACH BAR SHALL BE TAGGED WITH THE BAR DESIGNATION AND STATION NUMBER OF THE PROJECT.

IN THE ABSENCE OF THE ENGINEER'S PRIMARY BARS ARE SPECIFIED, THEY SHALL LAP A MINIMUM OF 25 DIAMETERS FOR BARS NEAR TOPS OF BEAMS HAVING MORE THAN 12 INCHES OF CONCRETE UNDER THE BARS AND 40 DIAMETERS FOR BARS NEAR BOTTOMS OF MEMBERS. SECONDARY BARS WHEN SPECIFIED SHALL BE 1/2" DIAMETERS OF THE BAR DIMENSIONS FOR REINFORCING STEEL NOT SHOWN AS CLEAR SHALL BE TO THE CENTERLINE OF THE BAR.

FOUNDATIONS AND DEPTH OF FOOTINGS ARE IN ACCORDANCE WITH THE BEST AVAILABLE DATA AND WHEN DIFFERENT CONDITIONS ARE ENCOUNTERED THE BRIDGE ENGINEER WILL INSPECT AND ESTIMATE OF REVISION IS NECESSARY.

LOADING IN ROCK SHALL BE POURED OUT TO ROCK AND NOT FORMED.

WHEN EXCAVATING FOR FOOTINGS THE FINAL ONE FOOT IN DEPTH SHALL BE DONE BY HAND LABOR METHODS.

FOR DETAILS OF STRUCTURAL EXCAVATION AND STRUCTURE BACKFILL SEE STANDARD 16-A.

ALL CONCRETE SURFACES MARKED WITH THE SYMBOL AS SHOWN ON SHEET NO. 26 SHALL RECEIVE "PLAIN" SURFACE FINISH.

ALL STRUCTURAL STEEL SHALL BE PAINTED WITH ONE SHOP COAT OF ZINC CHROMATE AND TWO FIELD COATS OF ALUMINUM PAINT UNLESS OTHERWISE NOTED.

ALL BOLTS SHALL BE 1/2" INCH DIAMETER UNLESS OTHERWISE NOTED.

WELDING SHALL BE DONE IN ACCORDANCE WITH THE LATEST EDITION OF THE A.W.S. STANDARD SPECIFICATIONS FOR WELDING HIGHWAY BRIDGES.

FOR WELDED STEELS ALL SHOP BUTT WELDS IN FLANGES AND WEBS SHALL BE MADE BEFORE FIELD WELDING.

WHEN CALLED FOR IN THE SPECIAL PROVISIONS, SHOP WELDS SHALL BE INSPECTED RADIOGRAPHICALLY AND BY THE PENETRANT DYE METHOD.

WHEN "GRADED" THICKENING IS SHOWN ON THE PLANS, THE PRESERVATIVE FOR TREATMENT SHALL BE SPECIFIED.

ALL STRUCTURAL STEEL NOT OTHERWISE NOTED SHALL BE ASTM A36-62T.

**LOADING DATA.**  
LIVE LOAD A. A. S. H. O. H20-S16-44  
DEAD LOAD ASSUMES 15 LBS. PER SQ. FT. ADDITIONAL WEARING SURFACE WHICH INCLUDES THE 4 INCH CONCRETE FOUNDRY WEARING SURFACE SHOWN.

**DESIGNING DATA.**  
A. A. S. H. O. 1957 UNIT STRESSES.  
f<sub>c</sub> = 1,800 Lbs. per Sq. In.  
f<sub>s</sub> = 20,000 Lbs. per Sq. In. (Reinf. & A36 Struct. Steel)  
k = 10.  
f<sub>w</sub> = 18,000 Lbs. per Sq. In. (Struct. Steel AT)

**COLORADO**  
**DEPARTMENT OF HIGHWAYS**

2 Concrete Slab & Girder Bridges  
3 Span (22'-30'-22') 75° Skew  
28 R'dwy. 2' Curbs. Std. Steel Rail.  
Summary of Quantities, Notes  
& General Layout.

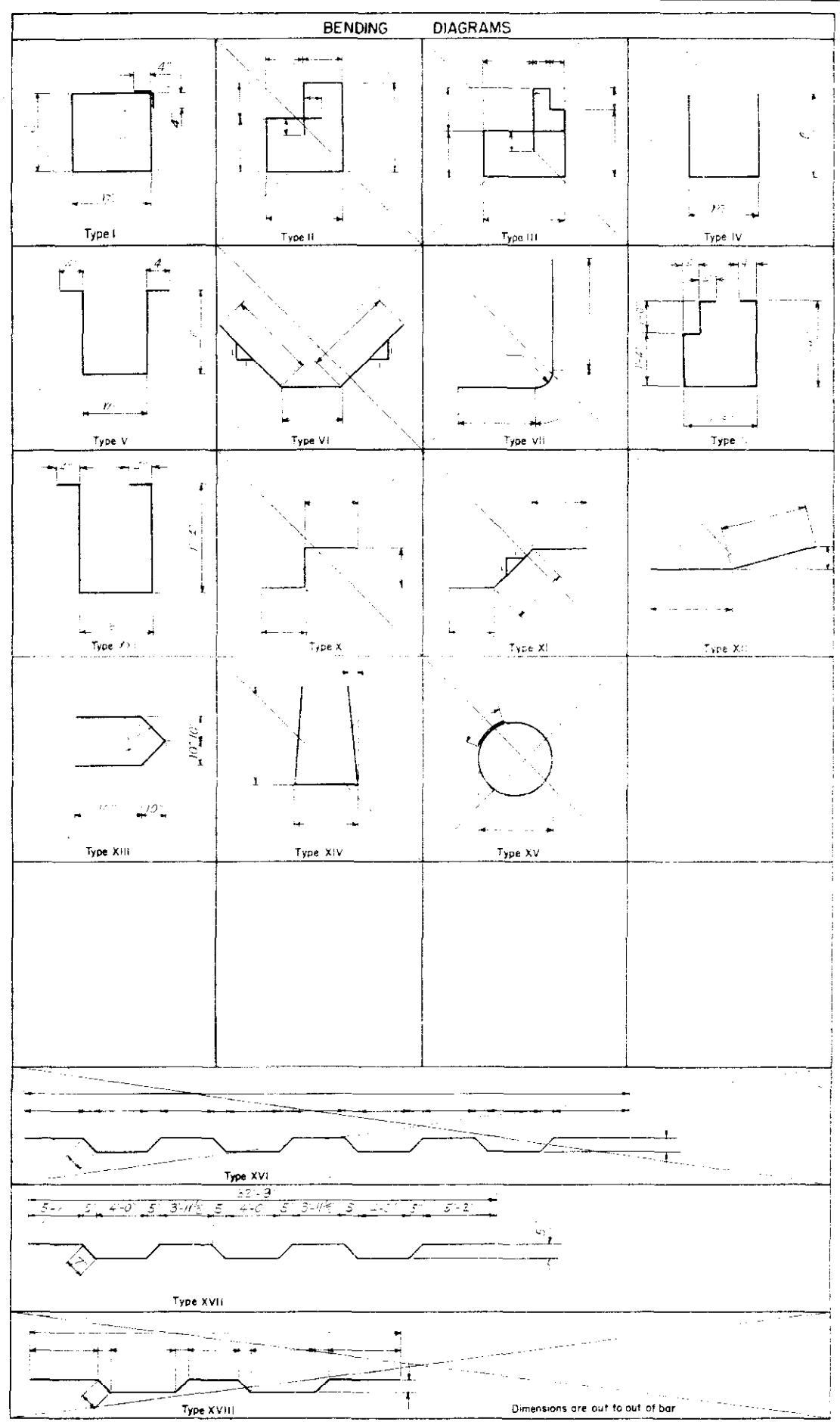
Address: FOUNTAIN CREEK  
Sta. \*  
Near Colo. Springs Sec. 11 T. 14 S. R. 67 W.

Designed by C. W. H. Approved by J. D. R. H. H.  
Made by J. H. Bridge Engineer  
Checked by Date: 2/1/62 1962

STRUCTURE NO. I-17-EQ (Eastbound)

Revised: Superstr. Bar List 7-15-63 R.R.A.

FED. ROAD REG. NO.	DIVISION	PROJECT NO.	SHEET NO.	TOTAL SHEETS
9	COLO.	FO17-2(B)	19	



BAR LIST - SUPERSTRUCTURE

Mark	Size	No. Reqd.	Length	Type	Dimensions
					ℓ m
401	1/2" φ	152	22'-10"	Str.	
402	1/2" φ	16	30'-6"	Str.	
403	1/2" φ	154	4'-4"	IV	1'-4" 1'-8"
404	1/2" φ	48	5'-0"	I	0'-11" 1'-3"
406	1/2" φ	375	4'-9"	I	1'-6" 1'-1"
407	1/2" φ	228	5'-5"	V	1'-10" 1'-1"
408	1/2" φ	96	3'-10"	XXI	
501	3/8" φ	164	32'-8"	Str.	
502	3/8" φ	82	33'-9"	XVII	
701	1/8" φ	12	27'-4"	Str.	
702	1/8" φ	12	32'-9"	Str.	
901	1/8" φ	8	13'-0"	Str.	
1001	1/4" φ	16	12'-6"	Str.	
1002	1/4" φ	16	16'-6"	Str.	
1101	1/8" φ	16	6'-0"	Str.	
1102	1/8" φ	32	23'-0"	Str.	
1103	1/8" φ	16	30'-6"	Str.	
1104	1/8" φ	8	25'-0"	Str.	
1105	1/8" φ	8	20'-0"	Str.	

BAR LIST - PIER 2 (Pier 3 Similar)

Mark	Size	No. Reqd.	Length	Type	Dimensions
					ℓ m
417	1/2" φ	28	7'-4"	I	1'-8" 1'-8"
418	1/2" φ	14	4'-0"	XIII	
419	1/2" φ	7	13'-10"	Str.	
420	1/2" φ	34	13'-3"	Str.	
421	1/2" φ	24	19'-0"	Str.	
422	1/2" φ	20	4'-2"	IX	1'-9" 0'-8"
506	3/8" φ	20	5'-8"	Str.	
507	3/8" φ	7	29'-8"	Str.	
508	3/8" φ	30	7'-10"	I	1'-11" 1'-8"
601	3/4" φ	20	5'-8"	Str.	
801	1" φ	32	3'-0"	Str.	
802	1" φ	16	15'-6"	Str.	
803	1" φ	3	19'-0"	Str.	
1003	1/4" φ	2	29'-8"	Str.	
1004	1/4" φ	9	8'-6"	Str.	

BAR SUMMARY

1265 Lin.Ft. 1/2" φ @ 0.660#/Lin.Ft. = 845 Lb.  
 408 Lin.Ft. 3/8" φ @ 1.043#/Lin.Ft. = 426 Lb.  
 113 Lin.Ft. 1/4" φ @ 1.502#/Lin.Ft. = 170 Lb.  
 401 Lin.Ft. 1" φ @ 2.670#/Lin.Ft. = 1071 Lb.  
 127 Lin.Ft. 1/4" φ @ 4.303#/Lin.Ft. = 546 Lb.  
 Plus 1% for overrun = 32 Lb.  
 Total = 3090 Lb.

BAR SUMMARY

1265 Lin.Ft. 1/2" φ @ 0.660#/Lin.Ft. = 845 Lb.  
 408 Lin.Ft. 3/8" φ @ 1.043#/Lin.Ft. = 426 Lb.  
 113 Lin.Ft. 1/4" φ @ 1.502#/Lin.Ft. = 170 Lb.  
 401 Lin.Ft. 1" φ @ 2.670#/Lin.Ft. = 1071 Lb.  
 127 Lin.Ft. 1/4" φ @ 4.303#/Lin.Ft. = 546 Lb.  
 Plus 1% for overrun = 32 Lb.  
 Total = 3090 Lb.

Bar lists & Summary for Structure No. I-17-E3 or I-17-EQ

BAR LIST - ABUT. 4 (Similar)

Mark	Size	No. Reqd.	Length	Type	Dimensions
					ℓ m
411	1/2" φ	2	7'-2"	Str.	
412	1/2" φ	2	2'-8"	Str.	
413	1/2" φ	12	6'-8"	Str.	
414	1/2" φ	12	3'-5"	Str.	
415	1/2" φ	12	3'-4"	Str.	
416	1/2" φ	30	7'-4"	II	
505	3/8" φ	2	32'-9"	Str.	
602	3/4" φ	29	1'-6"	Str.	
703	1/8" φ	8	32'-9"	Str.	

BAR SUMMARY

408 Lin.Ft. 3/8" φ @ 1.043#/Lin.Ft. = 426 Lb.  
 26 Lin.Ft. 1/2" φ @ 0.660#/Lin.Ft. = 171 Lb.  
 24 Lin.Ft. 1/4" φ @ 1.502#/Lin.Ft. = 36 Lb.  
 262 Lin.Ft. 1" φ @ 2.670#/Lin.Ft. = 701 Lb.  
 Plus 1% for overrun = 6 Lb.  
 Total = 950 Lb.

**COLORADO**  
 DEPARTMENT OF HIGHWAYS

BENDING DIAGRAMS & BAR LIST

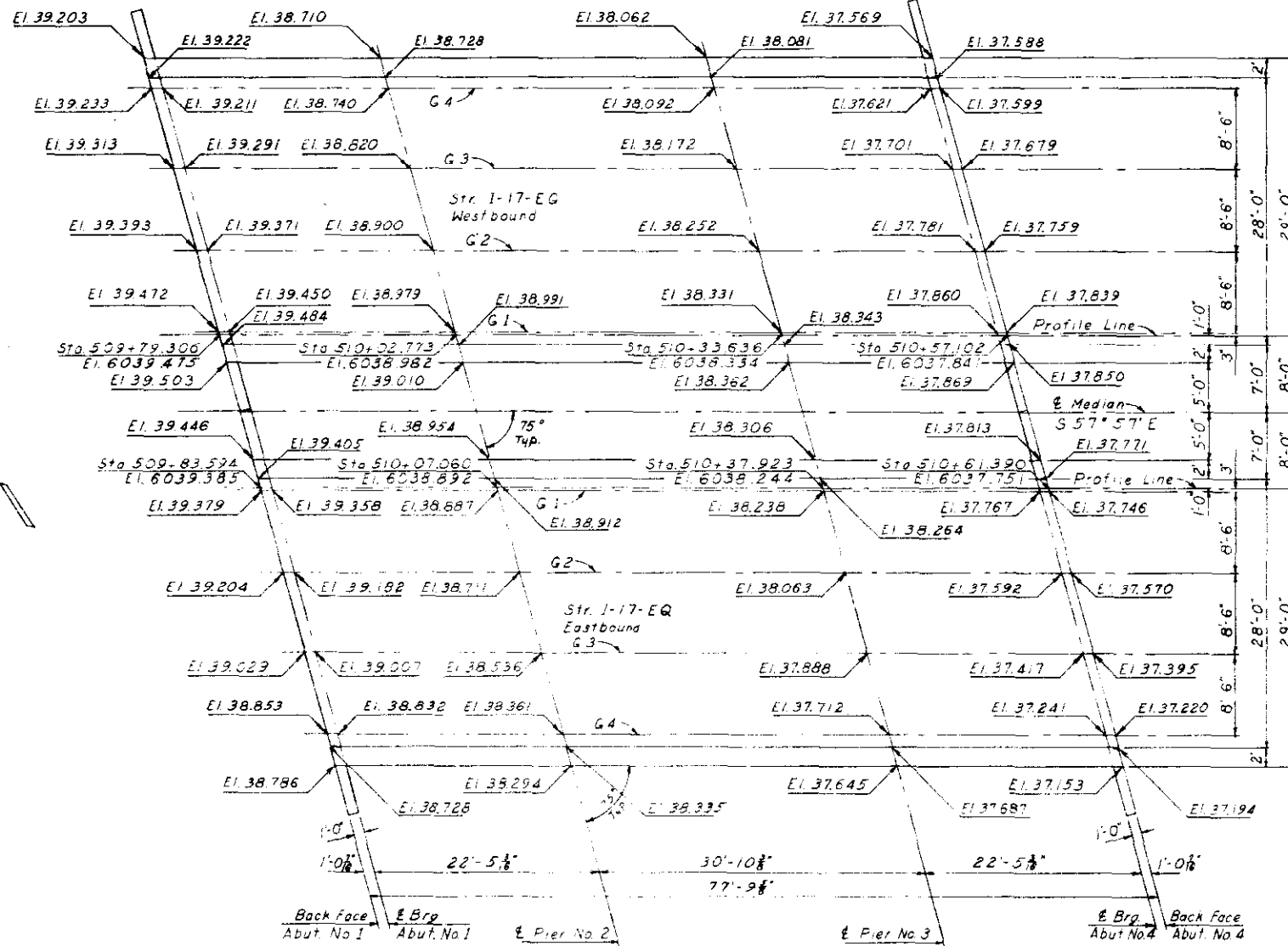
Across FOUNTAIN CREEK  
 Sta. X  
 Near COLO. SPRGS. Sec. 11 T.14S. R.67W

Designed by ENR Approved by J.B. PC  
 Made by J.B. PC Bridge Engineer  
 Checked by J.B. PC Date: 2 Nov 1962

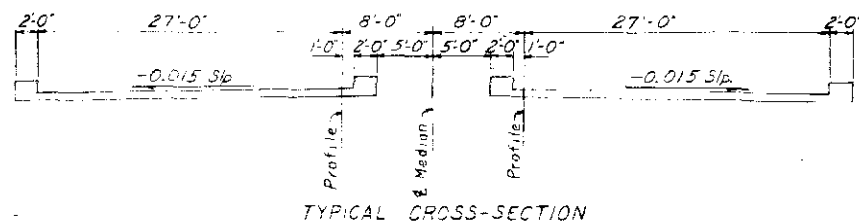
\* I-17-EQ Sta. 509+79.3 to 510+57.1  
 I-17-EQ Sta. 509+83.6 to 510+61.4  
 I-17-EQ (Westbound)  
 STRUCTURE NO I-17-EQ (Eastbound)

Dimensions are out to out of bar

FILE NO.	DIVISION	PROJECT NO.	SHEET NO.	TOTAL SHEETS
9	COLO.	FO17-2(B)	20	



CONSTRUCTION LAYOUT  
 Stationing & Elevations are to top of slab



TYPICAL CROSS-SECTION

**COLORADO DEPARTMENT OF HIGHWAYS**  
**CONSTRUCTION LAYOUT**

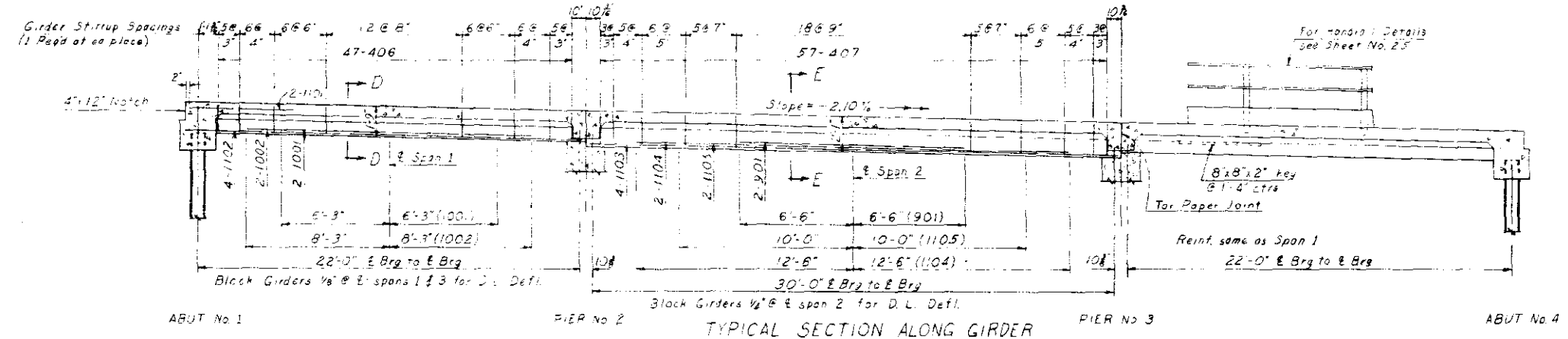
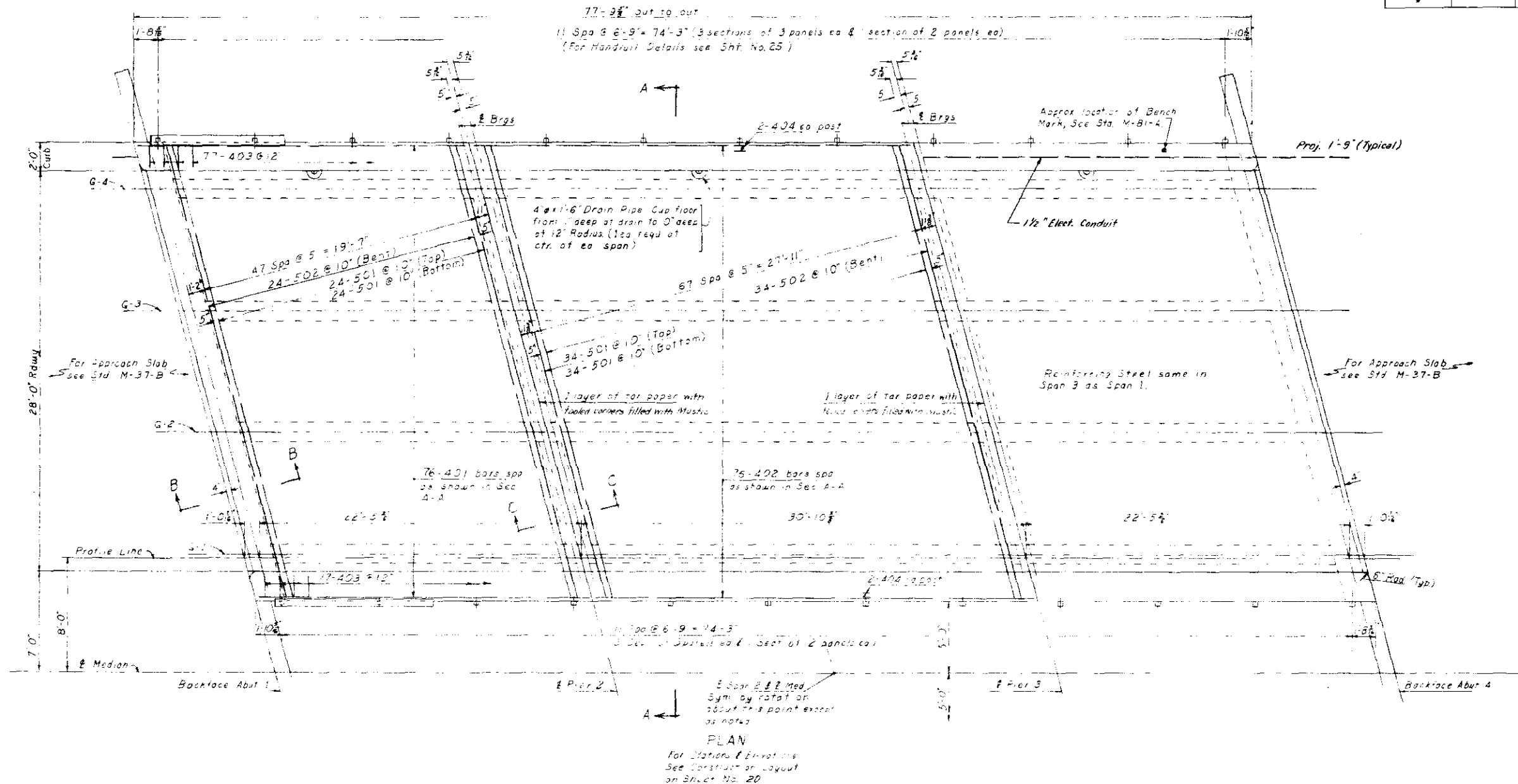
ACROSS FOUNTAIN CREEK  
 I-17-EG Sta. 509+79.3 to 510+57.1  
 I-17-EQ Sta. 509+83.6 to 510+61.4  
 Near COLO. SPRGS. Sec. 11 T.14S. R.67W

Designed by JHM      Approved by G.D. [Signature]  
 Made by JHM          Bridge Engineer  
 Checked by [Signature]      Date: 2 Nov 1962

REVISIONS

Revised: Put in additional #4 Slab Steel 7-15-63 R.R.A.

REV. NO.	DIVISION	PROJECT NO.	SHEET NO.	TOTAL SHEETS
9	COLO.	FO 17-2(B)	21	



**COLORADO DEPARTMENT OF HIGHWAYS SUPERSTRUCTURE**

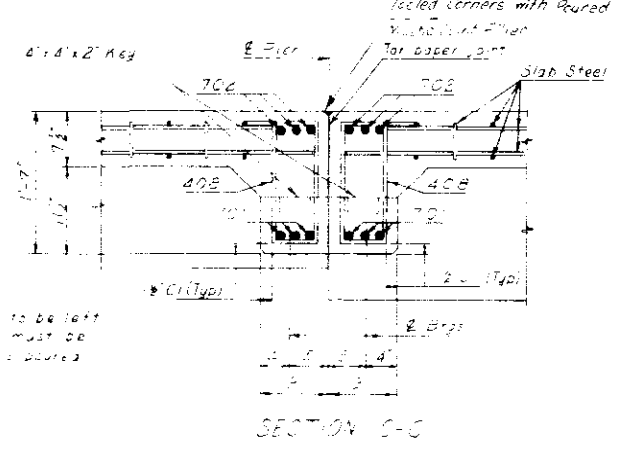
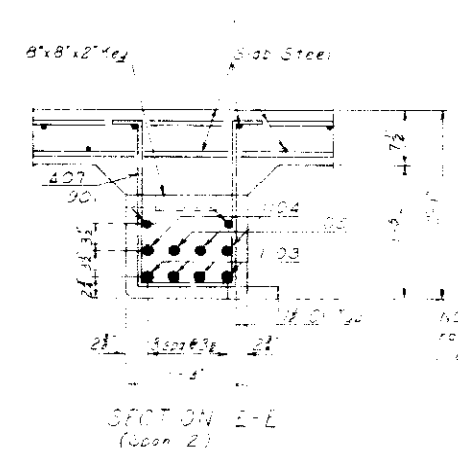
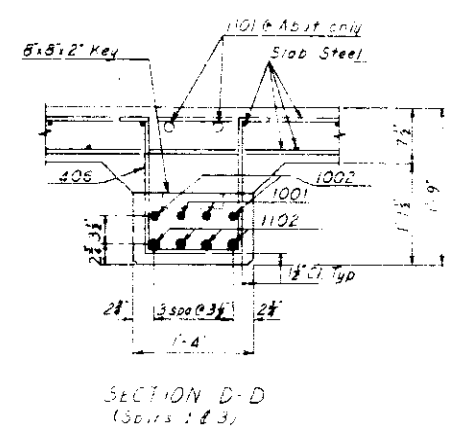
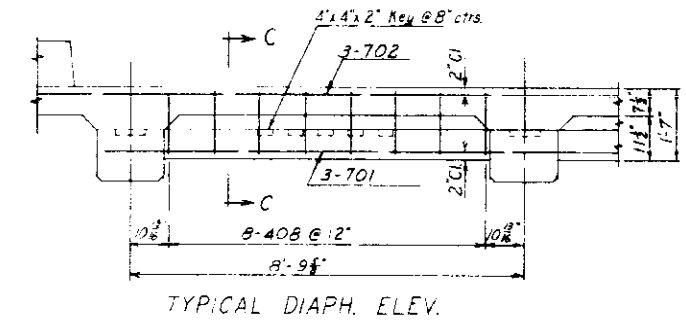
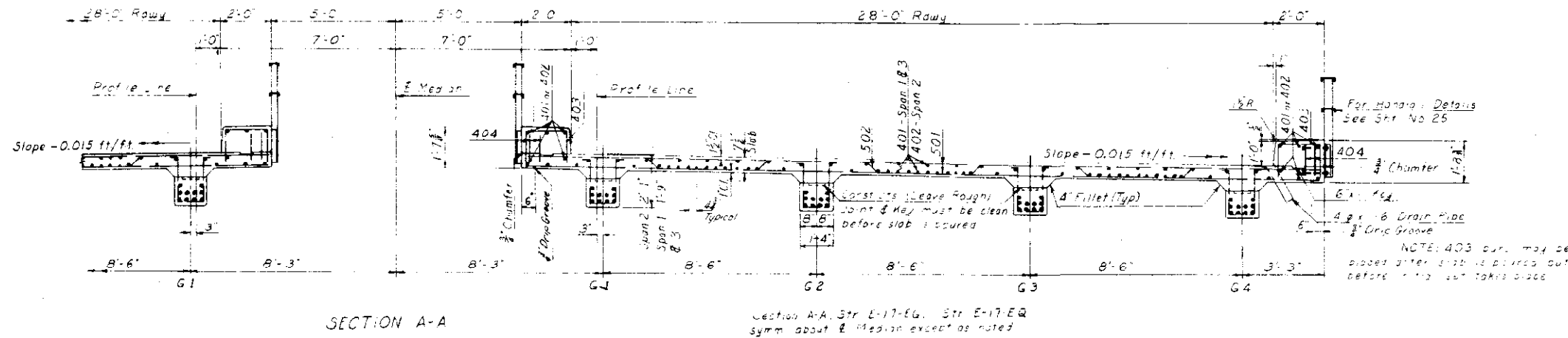
Across FOUNTAIN CREEK  
 1-17-EG Sta. 509+19.3 to 510+57.1  
 1-17-EQ Sta. 509+03.6 to 510+61.4  
 Near COLO SPRGS. Sec. 11, T.14S. R.67W

Designed by G.H.N.  
 Made by J.W.M.  
 Checked by

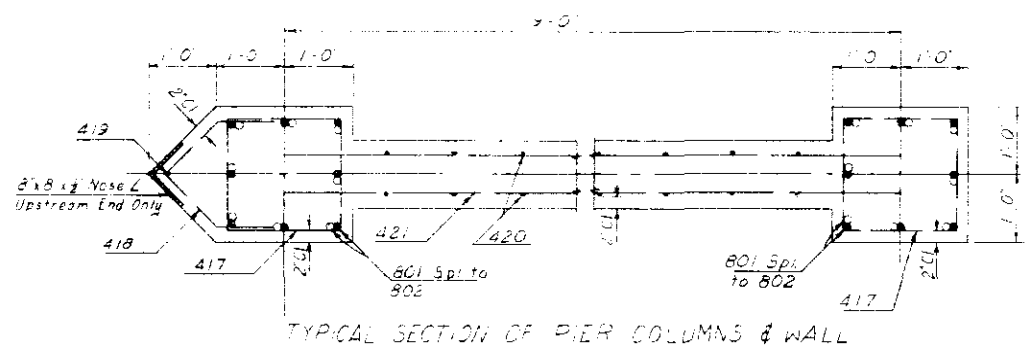
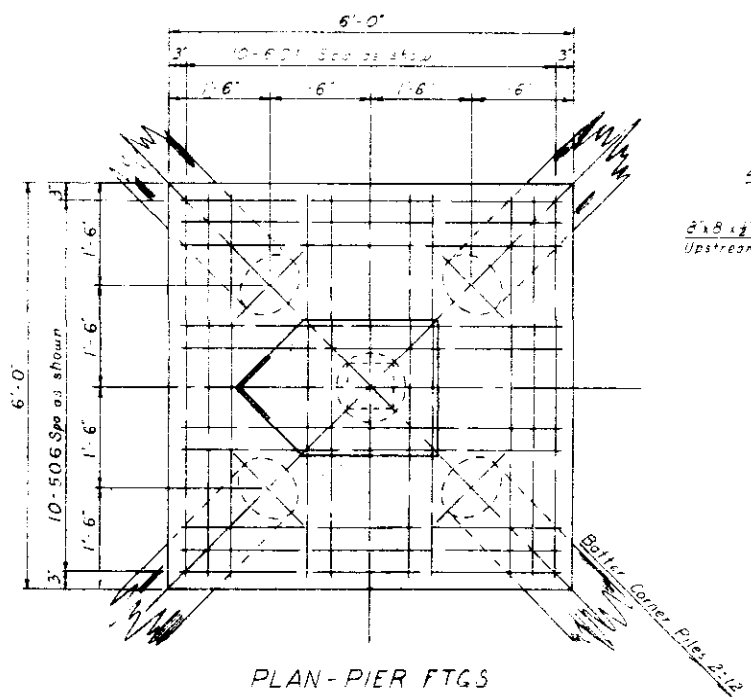
Approved by J.S. Newcomb  
 Bridge Engineer  
 Date: 2 Nov 1962

STRUCTURE NO. 1-17-EG (westbound)  
 1-17-EQ (Eastbound)

RD. ROAD SEG. NO.	DIVISION	PROJECT NO.	SHEET NO.	TOTAL SHEETS
9	COLO.	FO 17-2(B)	22	



NOTE: Constants to be left rough. Joint & key must be clean before slab is poured.



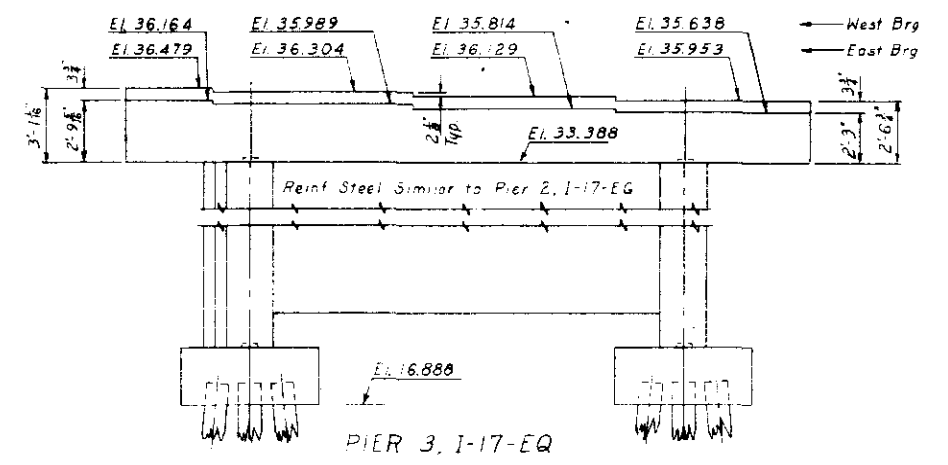
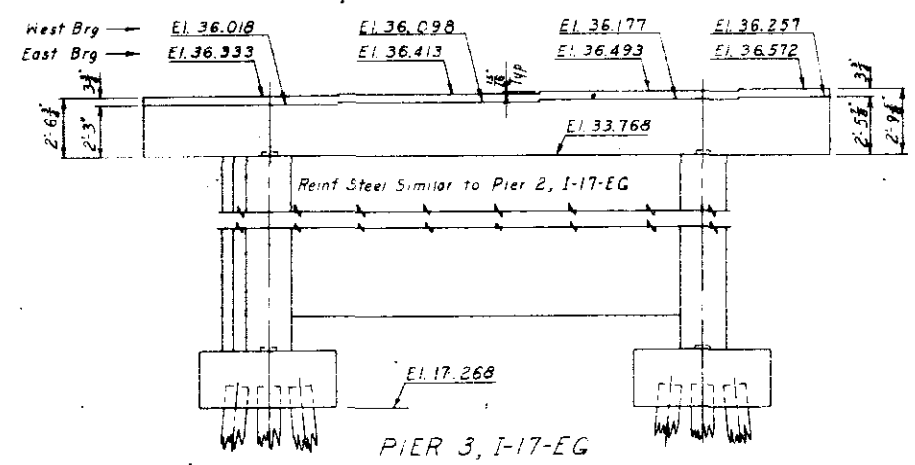
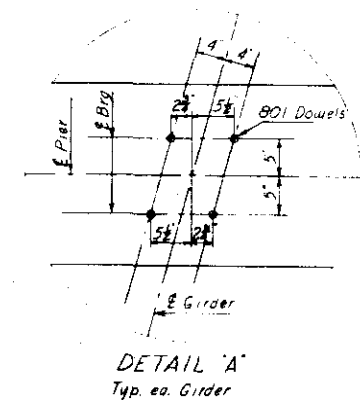
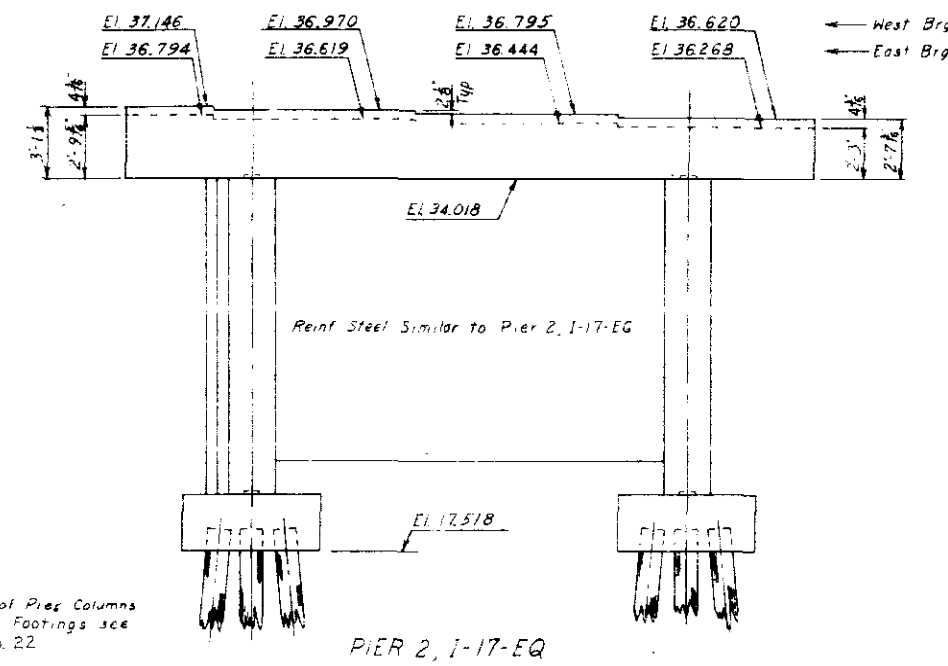
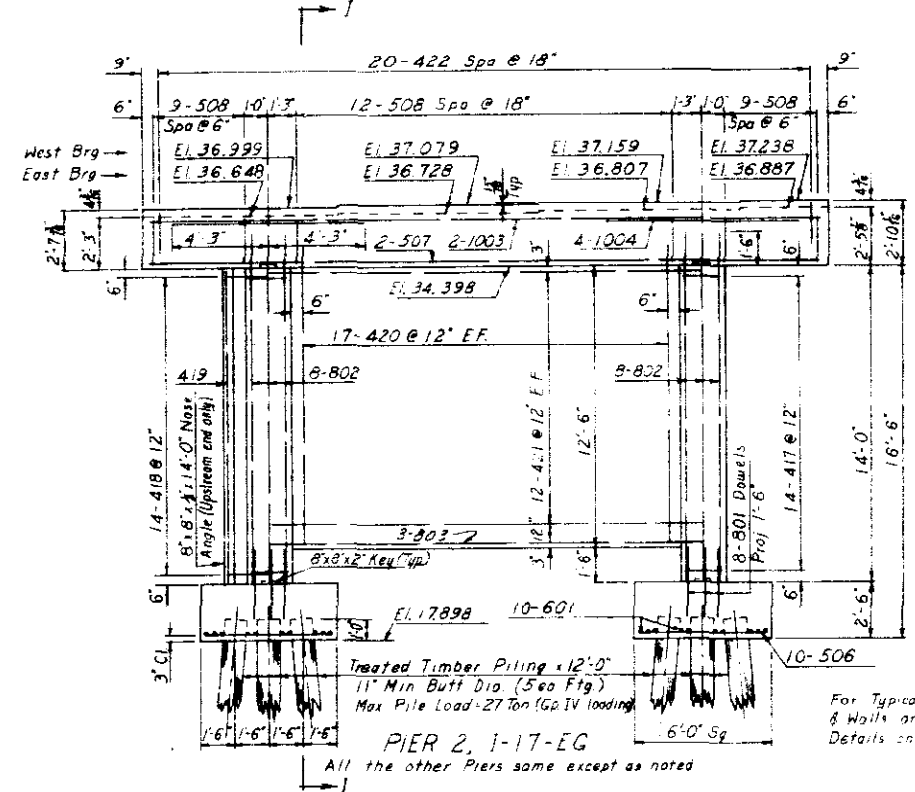
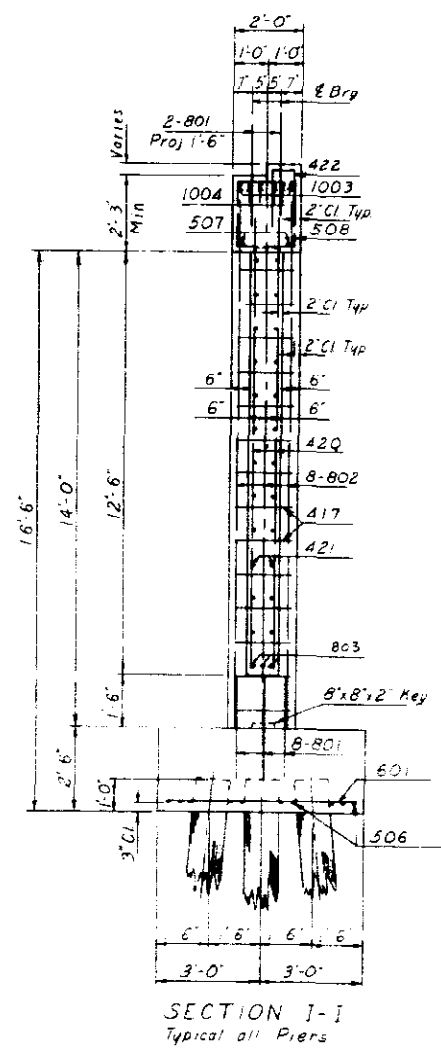
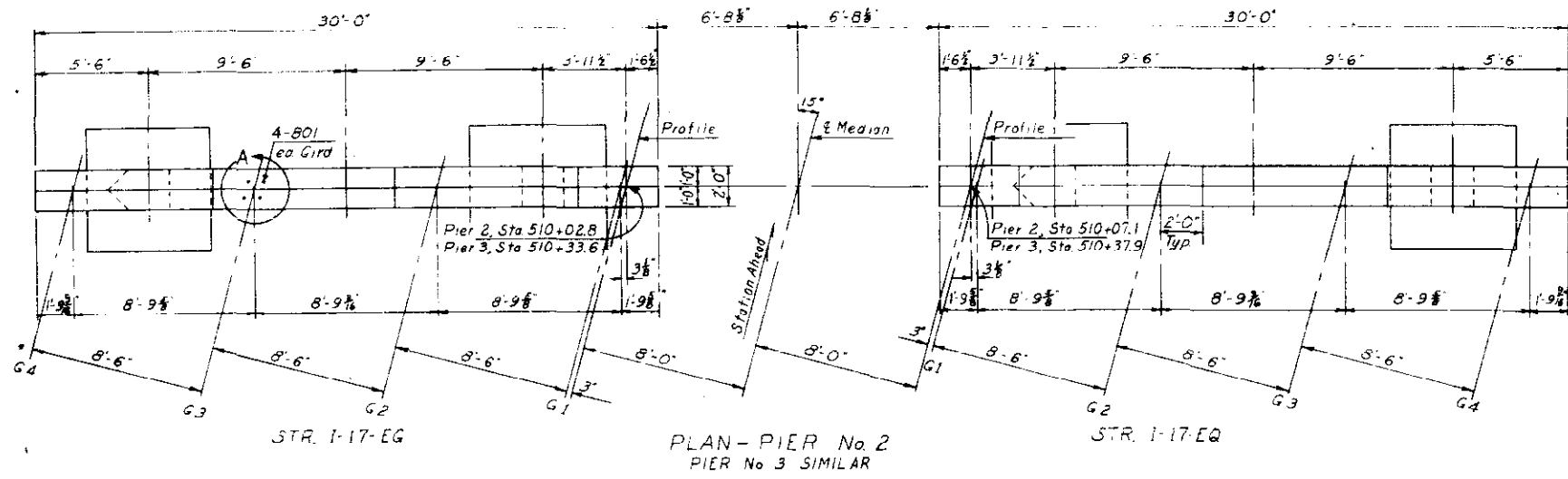
NOTE: Girder shoring shall remain in place full length in any span until all spurs have reached a min. strength of 2500 psi. In that span the slab shall not be poured until the girder spurs have reached a min. strength of 2500 psi.  
NOTE: All fillets are 4" & all chamfers are 3/4" unless otherwise noted.

**COLORADO**  
**DEPARTMENT OF HIGHWAYS**  
**SUPERSTR DETAILS**

Across FOUNTAIN CREEK  
I-17-EG Sta 509+79.3 to 510+57.1  
I-17-EG Sta 509+83.6 to 510+81.4  
Near COLO. SPRGS Sec. 11, T.M.S. R.67M

Designed by G.H.W. Approved by P. B. [Signature]  
Made by J.M.H. Bridge Engineer  
Checked by [Signature] Date: 2 Nov 68

FED. ROAD DIST. NO.	DIVISION	PROJECT NO.	SHEET NO.	TOTAL SHEETS
9	COLO.	FO17-2(B)	23	



NOTE: All chamfers are 4" unless otherwise noted

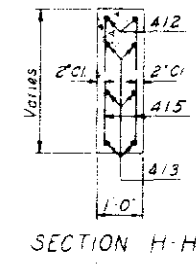
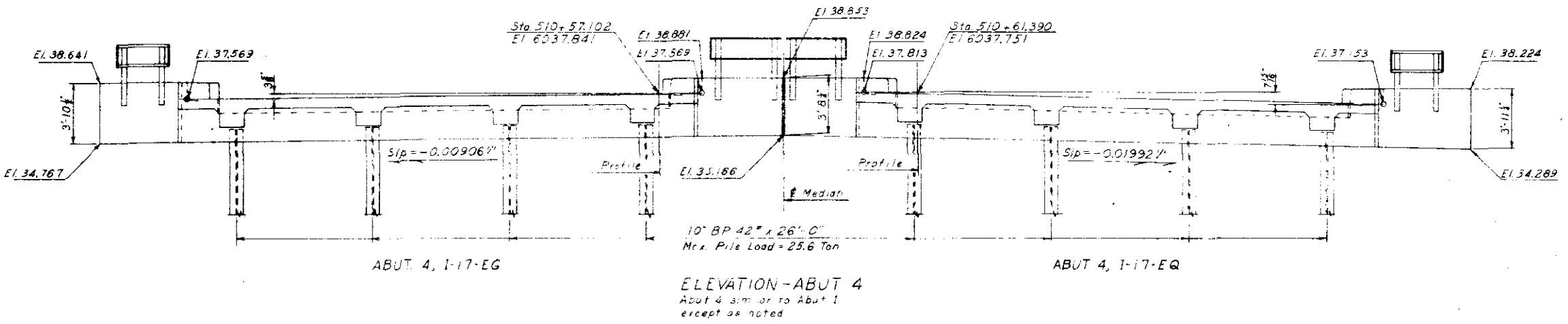
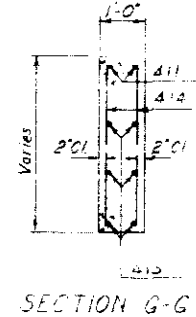
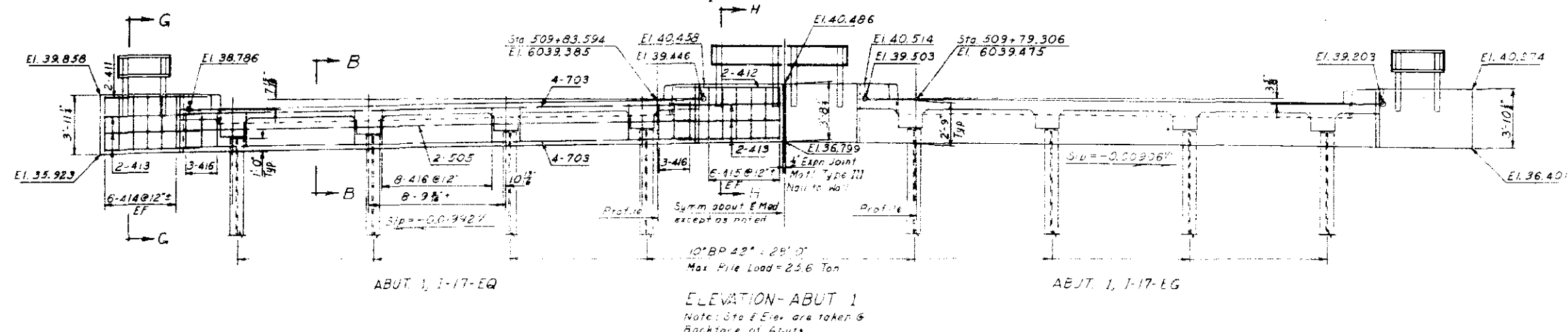
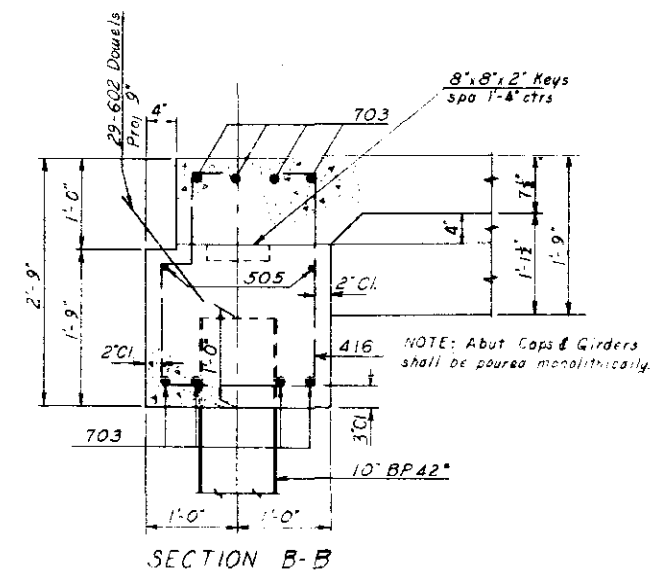
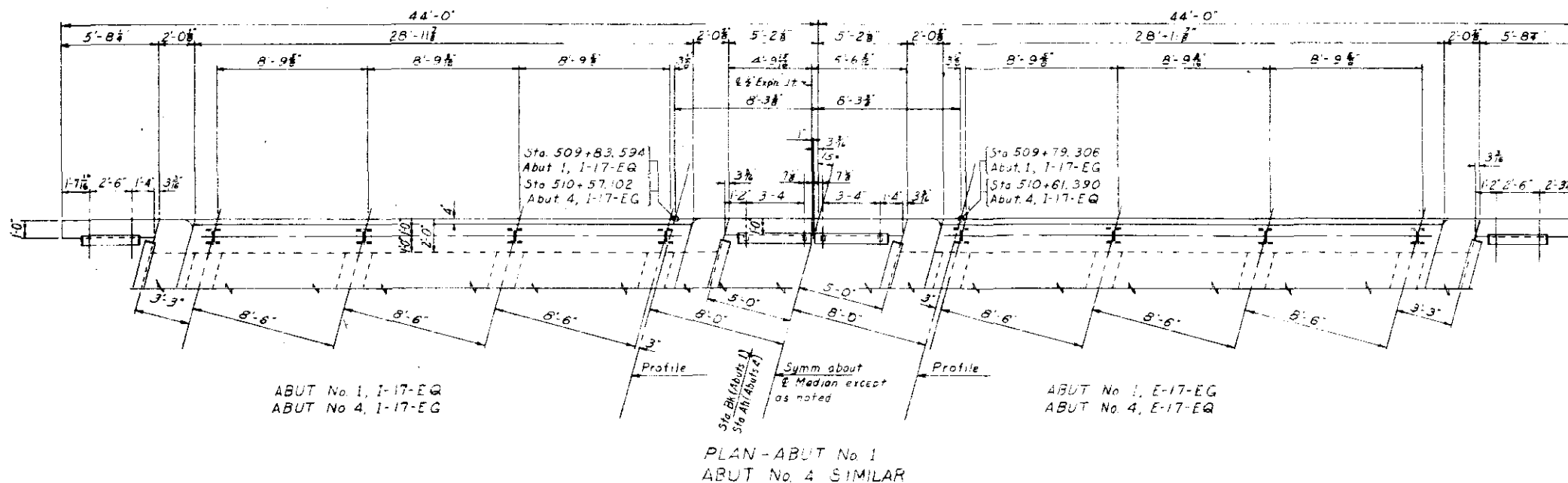
**COLORADO**  
**DEPARTMENT OF HIGHWAYS**  
**PIER DETAILS**

Across FOUNTAIN CREEK  
1-17-EG Sta 509+79.3 to 510+57.1  
1-17-EQ Sta 509+83.6 to 510+61.4  
Near COLO SPRGS Sec. 11 T.14S. R67M

Designed by P.C.      Approved by P.C. Newbold  
Made by J.N.M.      Bridge Engineer  
Checked by      Date: 2/20/22

STRUCTURE NO. 1-17-EG (Westbound)  
1-17-EQ (Eastbound)

RES. ROAD DIST. NO.	DIVISION	PROJECT NO.	SHEET NO.	TOTAL SHEETS
9	COLO.	FO 17-2 (B)	24	



Note: All fillets are 4" & all chamfers are 3/8" unless otherwise noted.

**COLORADO**  
**DEPARTMENT OF HIGHWAYS**  
ABUT. DETAILS

ACROSS FOUNTAIN CREEK  
I-17-EG Sta. 509+79.3 to 510+27.1  
I-17-EG Sta. 509+83.6 to 510+61.4  
Near COLO. SPRINGS, CO. 11. 1145. RD 7th

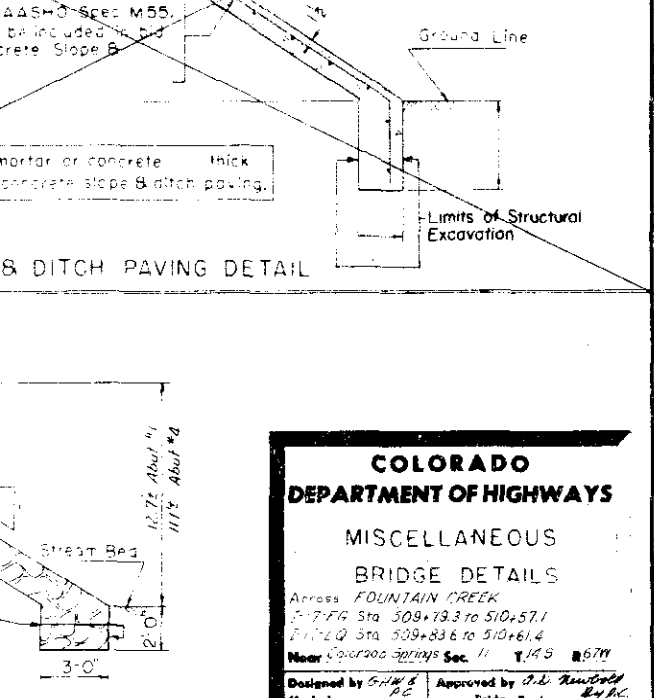
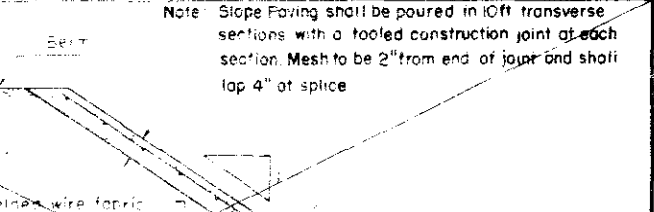
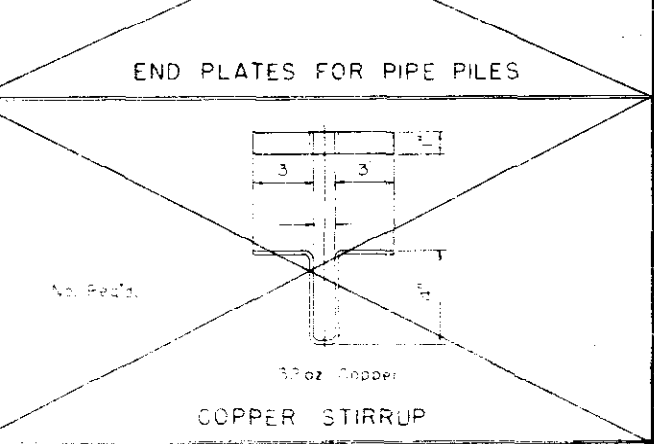
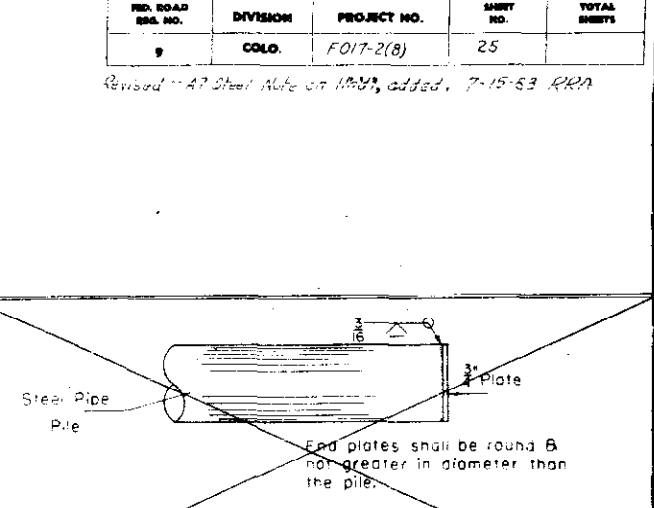
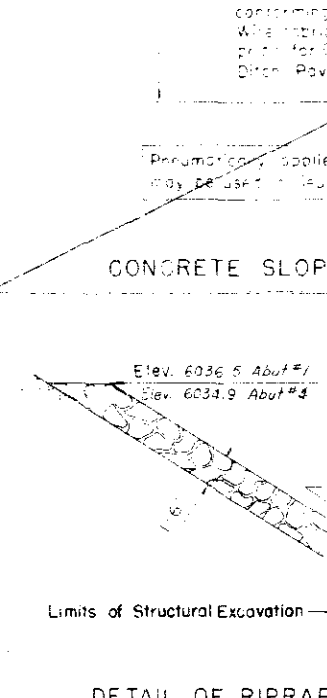
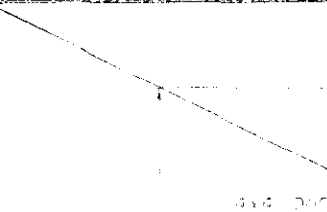
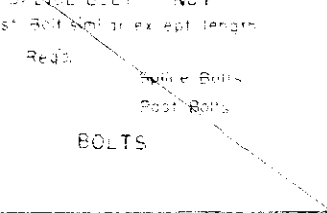
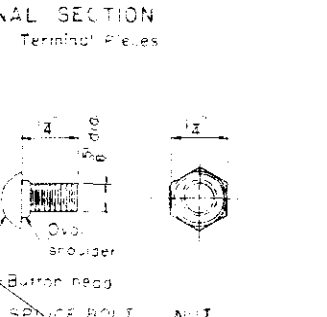
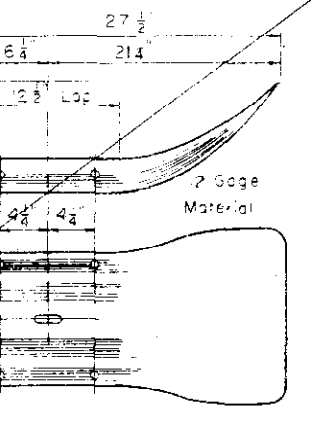
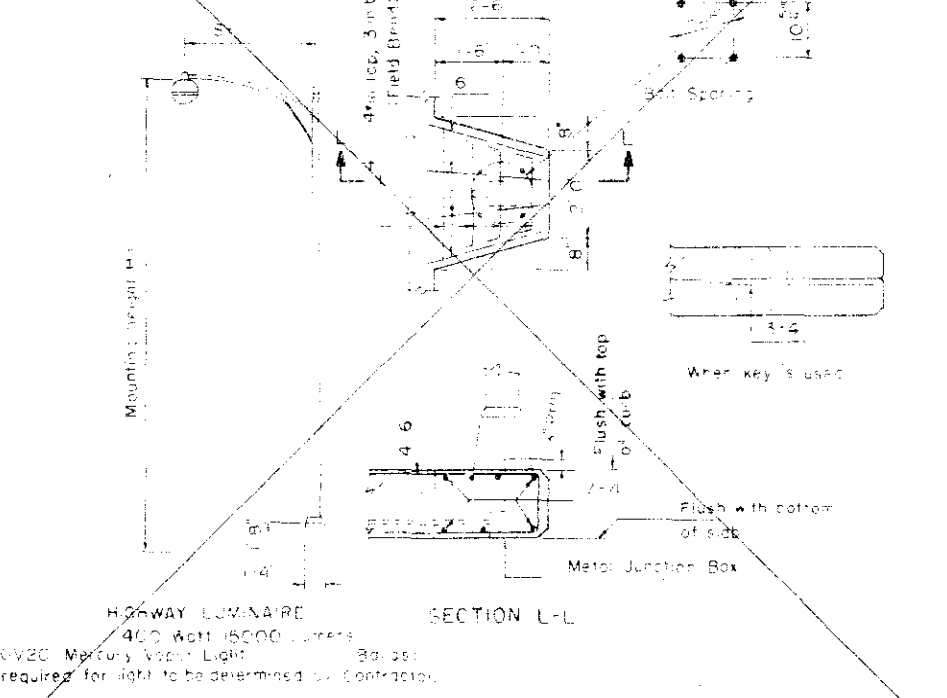
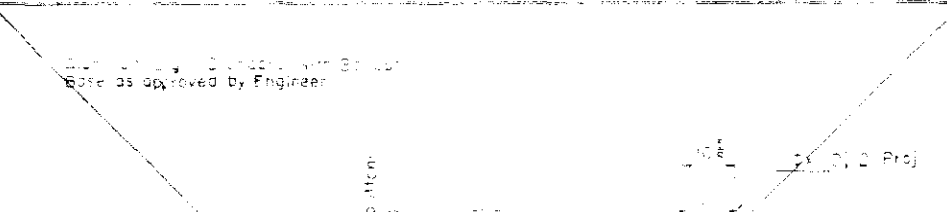
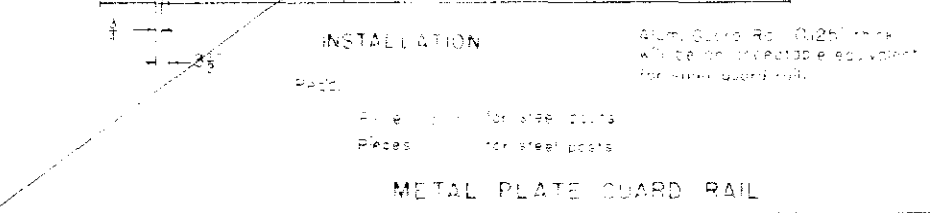
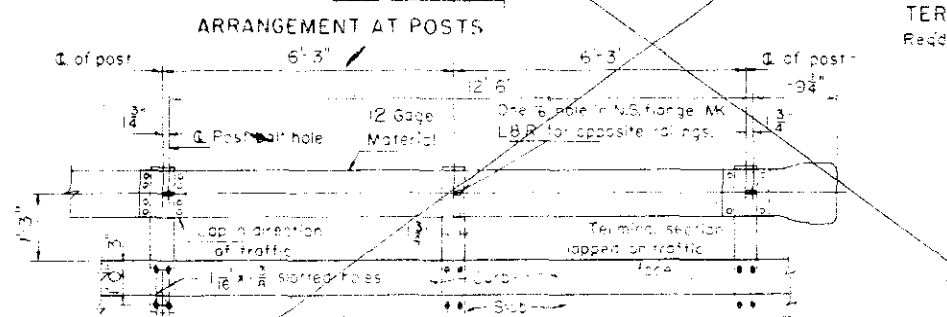
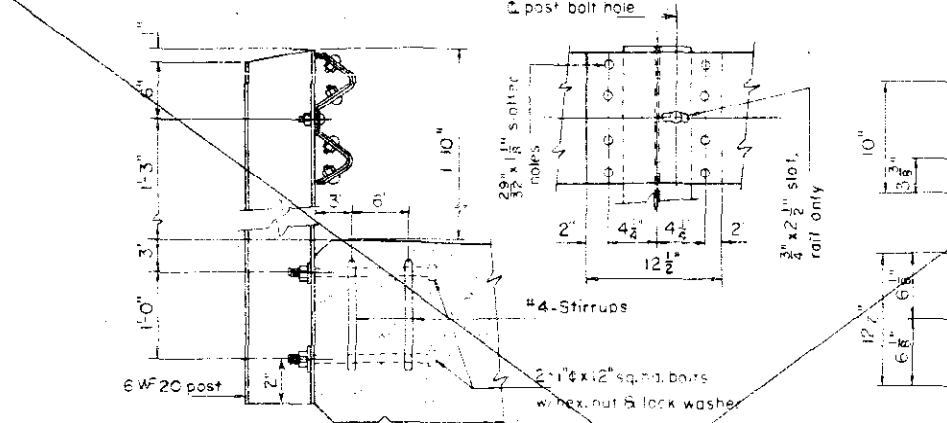
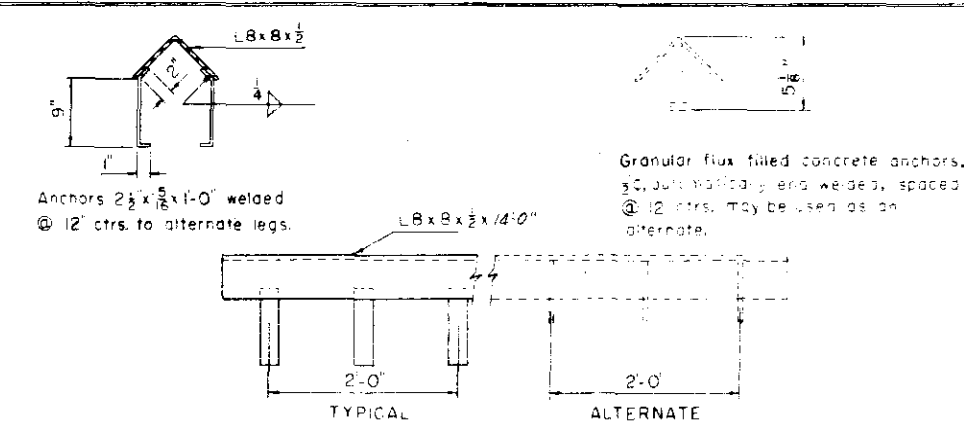
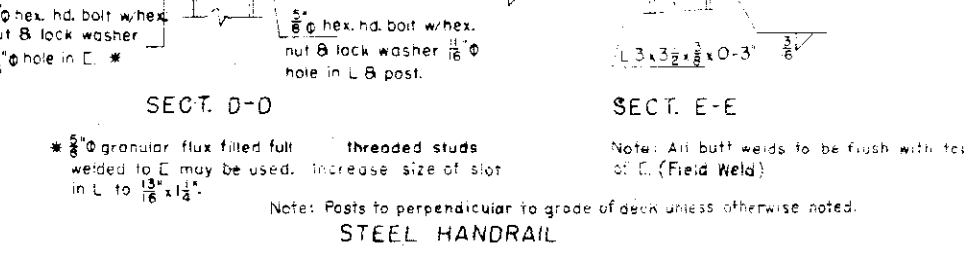
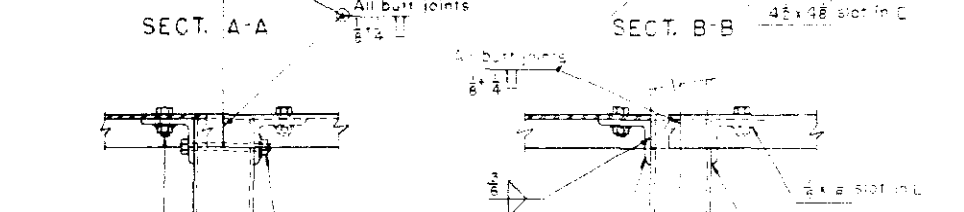
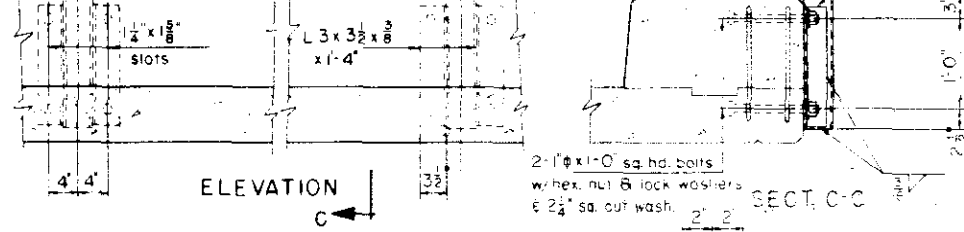
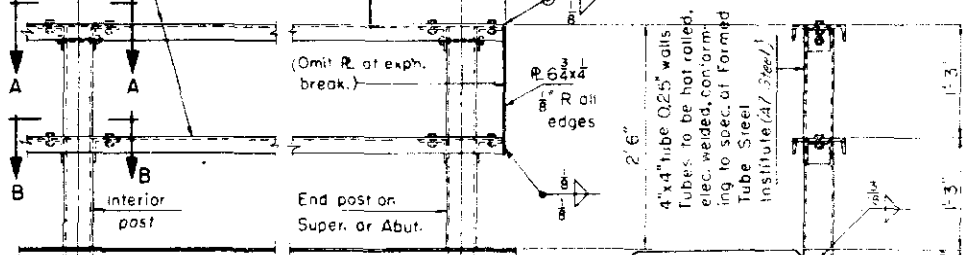
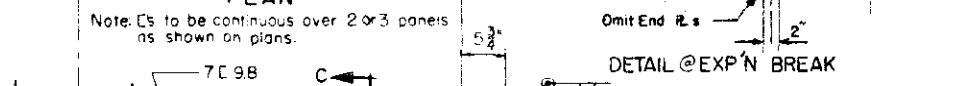
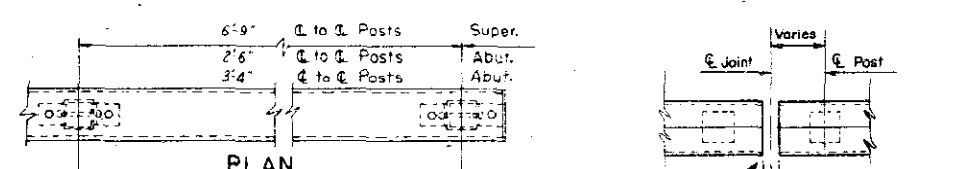
Designed by G.H.W.  
Made by J.H.M.  
Checked by

Approved by P.D. Newcomb  
Bridge Engineer  
Date: 2 Nov 1962

REVISIONS

NO. ROAD DIST. NO.	DIVISION	PROJECT NO.	SHEET NO.	TOTAL SHEETS
9	COLO.	FOIT-2(8)	25	

Revised to A7 Steel Tube on 11/22/53, added, 7-15-53 RRA



**COLORADO DEPARTMENT OF HIGHWAYS**

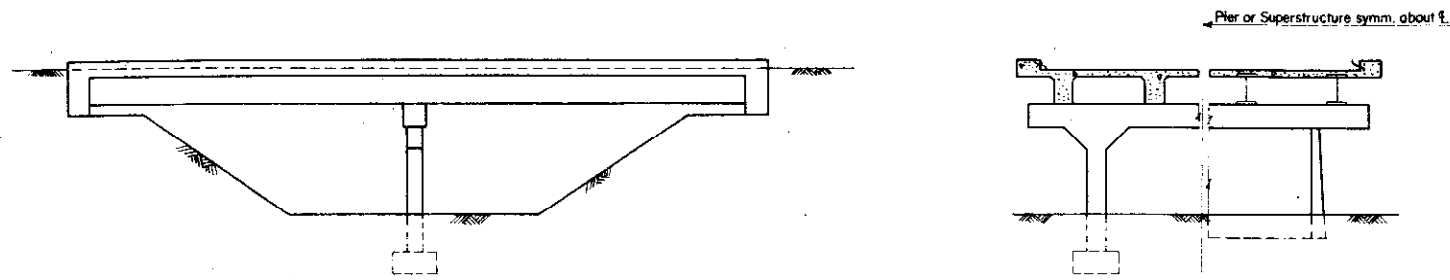
MISCELLANEOUS BRIDGE DETAILS

Across FOUNTAIN CREEK  
 5+77.76 Sta. 509+79.3 to 510+57.1  
 5+112.0 Sta. 509+83.6 to 510+61.4  
 Near Colorado Springs Sec. 11 T. 14 S. R. 67 W.

Designed by S.H.B. & P.C. Approved by J.H. Reustold  
 Made by R.C. Bridge Engineer  
 Checked by Date: Nov 19 1953

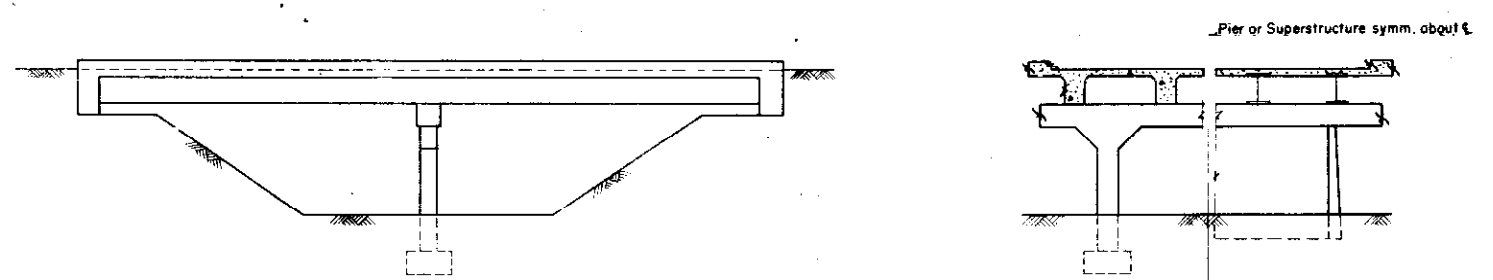
STRUCTURE NO. I-17-EG Westbound  
 I-17-FD Eastbound

FED. ROAD REGION NO.	DIVISION	PROJECT NO.	SHEET NO.	TOTAL SHEETS
9	COLO.	F 017-2 (B)	26	



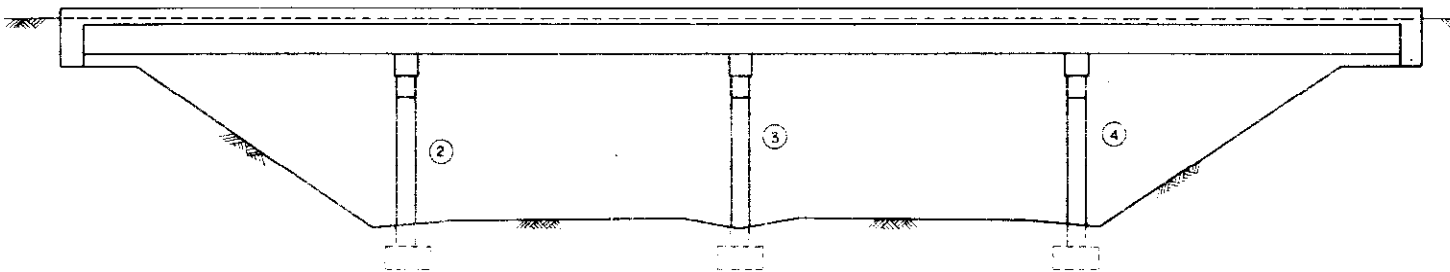
PIER AND SUPERSTRUCTURE

RURAL STREAM CROSSING

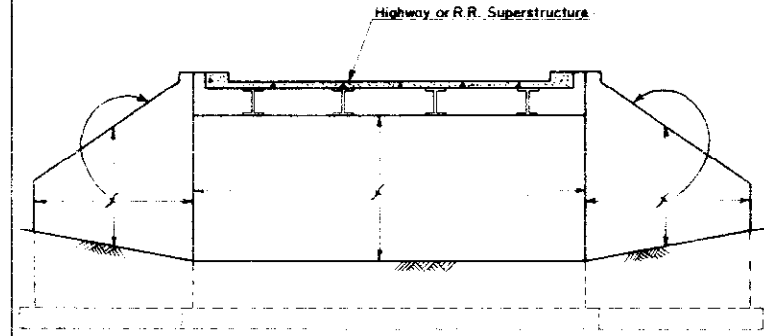


PIER AND SUPERSTRUCTURE  
I-17-EG, EQ & FM

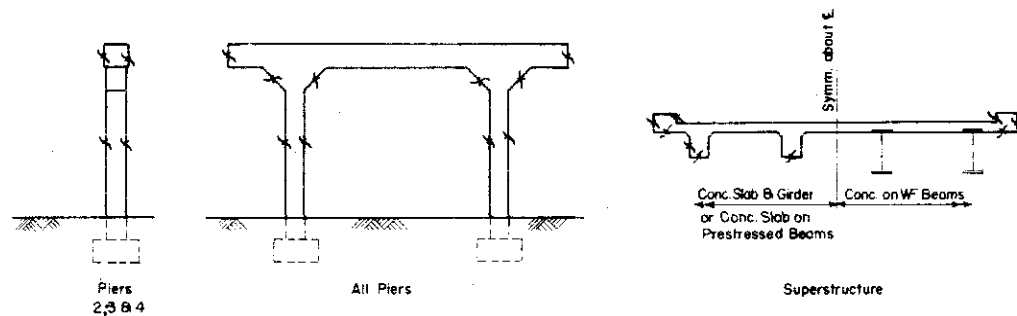
STREAM CROSSING IN OR NEAR URBAN AREA



STUB ABUTMENTS  
(Underpass Only)



CANTILEVER ABUTMENTS  
(Underpass Only)



In case of round columns the whole column shall receive Class "I" finish on all Piers.

UNDERPASS

**COLORADO DEPARTMENT OF HIGHWAYS**  
 DETAILS SHOWING PORTIONS OF STRUCTURE TO RECEIVE CLASS "I" SURFACE FINISH.

Across Fountain Creek  
 Sta. \_\_\_\_\_  
 Near Colo. Spgs Sec. \_\_\_\_\_ T. \_\_\_\_\_ R. \_\_\_\_\_

Designed by A.D.N. Approved by [Signature]  
 Made by R.R.A.-J.B. Bridge Engineer  
 Checked by \_\_\_\_\_ Date: 2 Nov 1962

STRUCTURE NO. I-17-EG, EQ & FM

# STANDARD M-37-B

(MAY 1, 1962)

SPECIAL REVISION THIS PROJECT ONLY

FED. ROAD REGION NO.	DIVISION	PROJECT NO.	SHEET NO.
9	COLORADO	FO17-2(B)	26

Bars Required For 1 Approach Slab / 27'-0" Roadway

T = No. 5; Str.		F = No. 5; Str.		L = No. 7; Str.		D = No. 8; Str.	
No.	Length	No.	Length	No.	Length	No.	Length
20	26'-6"	13.5 tan θ	26'-6"	53	19'-6" by (6 tan θ) inches to 19'-6" + (26 tan θ) ft.	18	2'-0"

Quantities For 1 Approach Slab

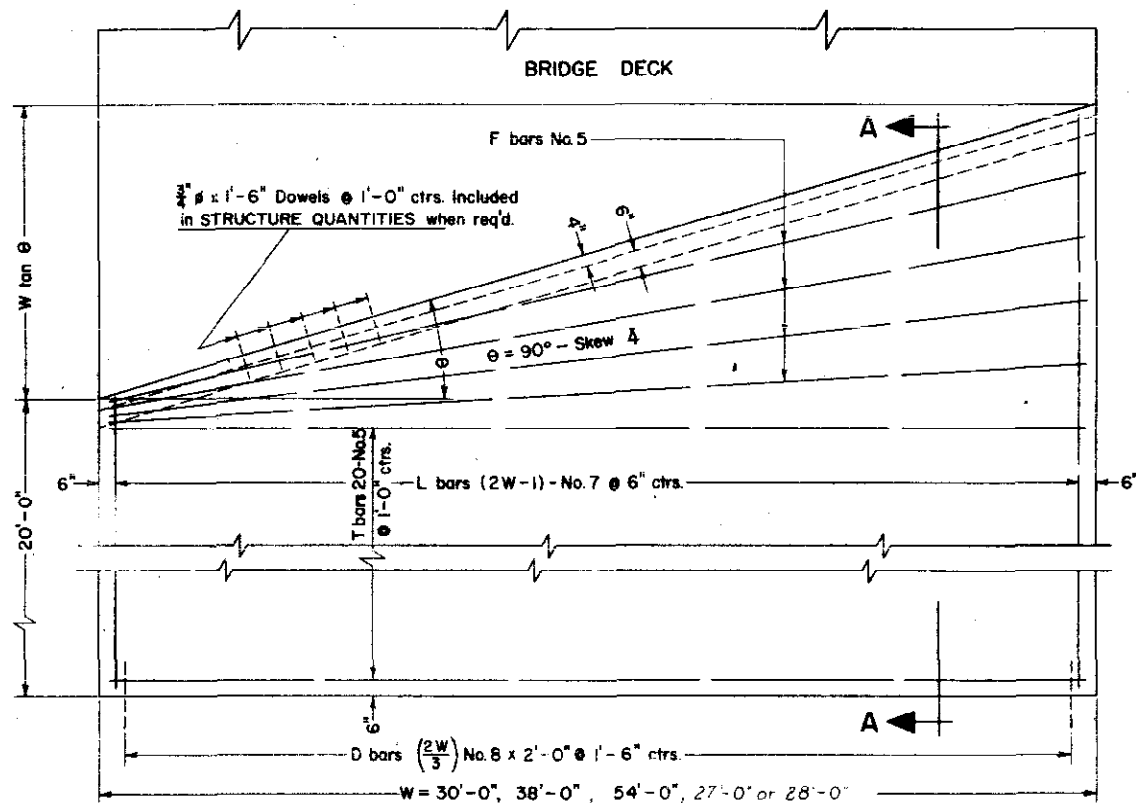
Reinforcing Steel			
F bars	377 tan θ	=	Lb.
L bars	2134 + 1422 tan θ	=	Lb.
T + D bars		=	655 Lb.
TOTAL (Includes 1% ± Overrun)		=	Lb.

Bars Required For 1 Approach Slab / 28'-0" Roadway

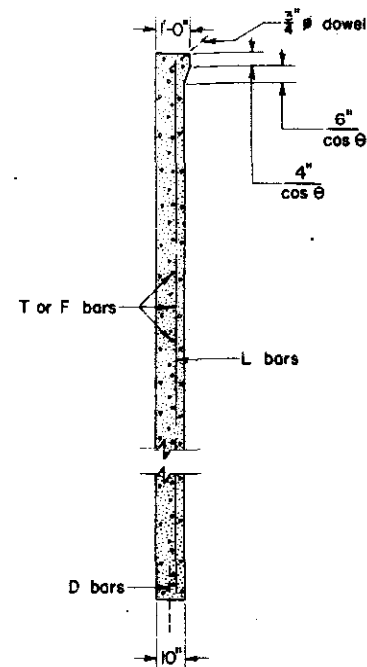
T = No. 5; Str.		F = No. 5; Str.		L = No. 7; Str.		D = No. 8; Str.	
No.	Length	No.	Length	No.	Length	No.	Length
20	27'-6"	14 tan θ	27'-6"	55	19'-6" by (6 tan θ) inches to 19'-6" + (27 tan θ) ft.	19	2'-0"

Quantities For 1 Approach Slab

Reinforcing Steel			
F bars	406 tan θ	=	Lb.
L bars	2214 + 1533 tan θ	=	Lb.
T + D bars		=	682 Lb.
TOTAL (Includes 1% ± Overrun)		=	Lb.



APPROACH SLAB - PLAN



SECTION A-A

Bars Required For 1 Approach Slab / 30'-0" Roadway

T = No. 5; Str.		F = No. 5; Str.		L = No. 7; Str.		D = No. 8; Str.	
No.	Length	No.	Length	No.	Length	No.	Length
20	29'-6"	15 tan θ	29'-6"	59	19'-6" by (6 tan θ) inches to 19'-6" + (29 tan θ) ft.	20	2'-0"

Quantities For 1 Approach Slab

Reinforcing Steel			
F bars	466 tan θ	=	Lb.
L bars	2375 + 1766 tan θ	=	Lb.
T + D bars		=	729 Lb.
TOTAL (Includes 1% ± Overrun)		=	Lb.

Bars Required For 1 Approach Slab / 54'-0" Roadway

T = No. 5; Str.		F = No. 5; Str.		L = No. 7; Str.		D = No. 8; Str.	
No.	Length	No.	Length	No.	Length	No.	Length
20	53'-6"	27 tan θ	53'-6"	107	19'-6" by (6 tan θ) inches to 19'-6" + (53 tan θ) ft.	36	2'-0"

Quantities For 1 Approach Slab

Reinforcing Steel			
F bars	1522 tan θ	=	Lb.
L bars	4307 + 5854 tan θ	=	Lb.
T + D bars		=	1321 Lb.
TOTAL (Includes 1% ± Overrun)		=	Lb.

Quantity of Concrete Pavement for 1 Approach Slab

$$\frac{W}{18} (40 + W \tan \theta) = \text{Sq. Yds.}$$

Bars Required For 1 Approach Slab / 38'-0" Roadway

T = No. 5; Str.		F = No. 5; Str.		L = No. 7; Str.		D = No. 8; Str.	
No.	Length	No.	Length	No.	Length	No.	Length
20	37'-6"	19 tan θ	37'-6"	75	19'-6" by (6 tan θ) inches to 19'-6" + (37 tan θ) ft.	25	2'-0"

Quantities For 1 Approach Slab

Reinforcing Steel			
F bars	750 tan θ	=	Lb.
L bars	3019 + 2864 tan θ	=	Lb.
T + D bars		=	925 Lb.
TOTAL (Includes 1% ± Overrun)		=	Lb.

## NOTES

- Class of Concrete shall be "Pavement".
- Concrete shall be paid for under Item 37 by the Sq. Yd. as "Concrete Pavement" of the specified thickness.
- Reinforcing Steel required in Approach Slab will be paid for under Item 47.

**COLORADO**  
DEPARTMENT OF HIGHWAYS

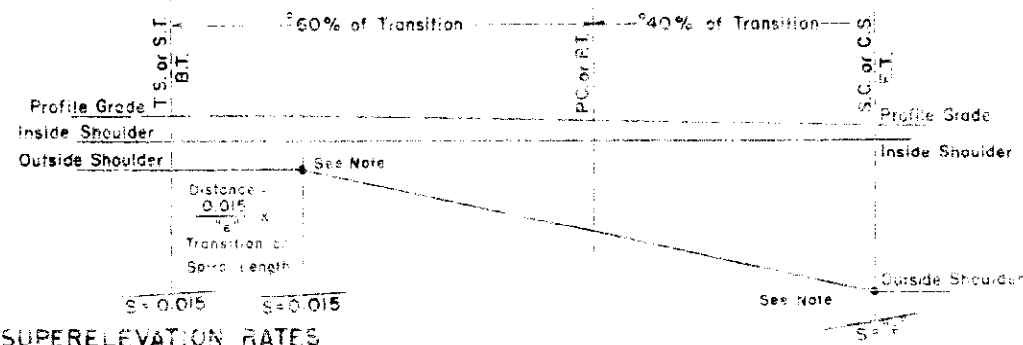
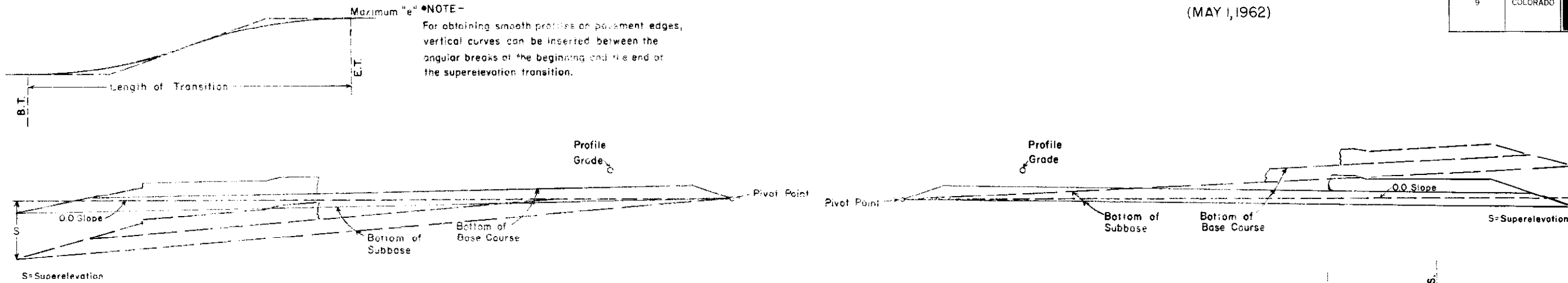
**CONCRETE PAVEMENT**  
**BRIDGE APPROACH**  
**SLAB**

Designed by J.G.G.	Approved by <i>[Signature]</i>
Made by T.F.	Bridge Engineer
Checked by R.C.	Date: March 7, 1962

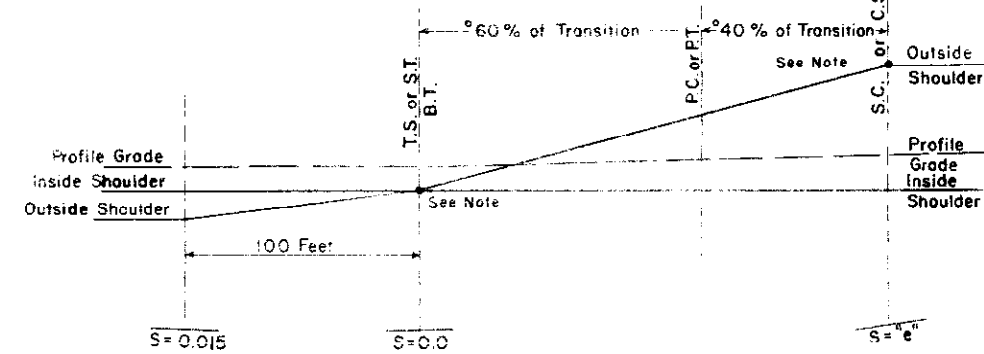
# STANDARD M-I-D-I

(MAY 1, 1962)

FEDERAL ROAD REGION NO.	DIVISION	PROJECT NO.	SHEET NO.
9	COLORADO		



**SUPERELEVATION RATES  
FOR FOUR LANE DIVIDED SECTION  
TABLE 1**



**SUPERELEVATION RATES  
FOR SPECIAL CASES  
TABLE 2**

REVISIONS	

Degree of Curve	Maximum Superelevation = 0.08			Maximum Superelevation = 0.10		
	Super Rate Ft./Ft.	Maximum Design Speed M.P.H.	Minimum Transition or Spiral Length	Super Rate Ft./Ft.	Maximum Design Speed M.P.H.	Minimum Transition or Spiral Length
0° 15'	RC	70	200'	RC	70	200'
0° 30'	RC	70	200'	RC	70	200'
0° 45'	.021	70	200'	.020	70	200'
1° 00'	.028	70	200'	.028	70	200'
1° 30'	.042	70	200'	.042	70	200'
2° 00'	.056	70	250'	.055	70	250'
2° 30'	.069	70	250'	.069	70	250'
3° 00'	.077	70	250'	.083	70	300'
3° 30'	.080	70	300'	.096	70	350'
4°	.080	65	300'	100	70	350'
5°	.080	60	300'	100	65	350'
6°	.080	55	250'	100	55	300'
7°	.080	50	250'	100	55	300'
8°	.080	50	250'	100	50	300'
9°	.080	45	250'	100	45	300'
10°	.080	45	250'	100	45	300'
11°	.080	40	200'	100	40	250'
12°	.080	40	200'	100	40	250'
13°	.080	35	200'	100	40	250'
14°	.080	35	200'	100	35	200'
15°	.080	35	150'	100	35	200'
16°	.080	35	150'	100	35	200'
17°	.080	30	150'	100	35	200'
18°	.080	30	150'	100	35	200'
19°	.080	30	150'	100	30	200'
20°	.080	30	150'	100	30	200'
21°	.080	30	150'	100	30	200'
22°	.080	30	150'	100	30	200'
23°	.080	30	150'	100	30	200'
24°	.080	30	150'	100	30	200'
25°	.080	30	150'	100	30	200'

NOTES—Plains Areas use 0.10 Maximum Superelevation Rate.  
Mountainous Areas & areas where icing conditions frequently exist, use 0.08 Maximum Superelevation Rate.

Degree of Curve	25 M.P.H.		30 M.P.H.		35 M.P.H.		40 M.P.H.		45 M.P.H.		50 M.P.H.		55 M.P.H.		60 M.P.H.		Degree of Curve	
	Required Super Rate Ft./Ft.	Minimum Length of Transition	Required Super Rate Ft./Ft.	Minimum Length of Transition	Required Super Rate Ft./Ft.	Minimum Length of Transition	Required Super Rate Ft./Ft.	Minimum Length of Transition	Required Super Rate Ft./Ft.	Minimum Length of Transition	Required Super Rate Ft./Ft.	Minimum Length of Transition	Required Super Rate Ft./Ft.	Minimum Length of Transition	Required Super Rate Ft./Ft.	Minimum Length of Transition		
0° 15'	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	0° 15'	
0° 30'	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	0° 30'	
0° 45'	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	0° 45'	
1° 00'	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	1° 00'	
1° 30'	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	1° 30'	
2° 00'	RC	RC	RC	RC	RC	RC	RC	RC	RC	RC	RC	RC	RC	RC	RC	RC	2° 00'	
2° 30'	RC	RC	RC	RC	RC	RC	RC	RC	RC	RC	RC	RC	RC	RC	RC	RC	2° 30'	
3° 00'	.016	.017	.00	.023	.024	.100'	.029	.031	.150'	.035	.038	.150'	.042	.046	.150'	.050	.052	3° 00'
3° 30'	.019	.019	.00	.026	.027	.100'	.033	.035	.150'	.040	.045	.150'	.048	.053	.150'	.056	.063	3° 30'
4°	.021	.021	.00	.029	.030	.100'	.037	.040	.150'	.044	.050	.150'	.053	.060	.150'	.062	.070	4°
5°	.026	.026	.00	.035	.038	.100'	.044	.048	.150'	.053	.060	.150'	.062	.071	.200'	.070	.083	5°
6°	.031	.031	.00	.041	.044	.100'	.050	.056	.150'	.060	.068	.150'	.069	.080	.200'	.076	.091	6°
7°	.036	.036	.00	.046	.050	.100'	.056	.063	.150'	.066	.076	.200'	.074	.088	.250'	.079	.097	7°
8°	.039	.041	.00	.050	.055	.100'	.061	.069	.150'	.071	.084	.200'	.078	.094	.250'	.080	.100	8°
9°	.043	.044	.00	.054	.061	.100'	.065	.075	.150'	.074	.089	.200'	.080	.097	.300'			9°
10°	.046	.044	.00	.058	.065	.150'	.069	.081	.150'	.077	.093	.200'						10°
11°	.049	.052	.100'	.061	.070	.150'	.072	.085	.200'	.079	.096	.250'						11°
12°	.052	.056	.100'	.065	.074	.150'	.075	.089	.200'	.080	.098	.250'						12°
13°	.054	.060	.100'	.067	.078	.150'	.077	.092	.200'									13°
14°	.057	.063	.100'	.070	.082	.150'	.078	.095	.200'									14°
15°	.059	.067	.100'	.072	.085	.150'	.079	.097	.200'									15°
16°	.061	.070	.100'	.074	.087	.150'	.080	.099	.200'									16°
17°	.063	.073	.100'	.076	.090	.150'		.100	.200'									17°
18°	.065	.076	.100'	.077	.093	.200'												18°
19°	.067	.078	.100'	.078	.095	.200'												19°
20°	.069	.081	.100'	.079	.096	.200'												20°
21°	.070	.083	.100'	.080	.098	.200'												21°
22°	.072	.086	.100'	.080	.099	.200'												22°
23°	.073	.088	.100'		.100	.200'												23°
24°	.075	.090	.100'															24°
25°	.077	.091	.100'															25°
26°	.077	.095	.50'															26°
27°	.078	.094	.50'															27°
28°	.079	.096	.50'															28°
29°	.079	.097	.50'															29°
30°	.080	.098	.50'															30°
32°	.080	.099	.50'															32°
35°	.100	.100	.50'															35°

NOTES—A Minimum 50 Foot Tangent Runout is required for all outside parts of Divided Highways on curve.  
Transition or Spiral Lengths are shown in the tables for 4 Lane Divided Highways.  
For 6 Lane Divided Highways use 1.2 times the lengths shown, rounded to the nearest 50 feet.  
Width of Roadway to be figured for Superelevation = Length at base of subbase.

Table 2 data may be used for City Streets & interchanges.  
NS = Normal Slope section.  
RC = Remove adverse crown, superelevate at normal section slope.

**COLORADO  
DEPARTMENT OF HIGHWAYS**

**SUPERELEVATION  
OF CURVES  
DIVIDED HIGHWAYS**

Designed by S.B.L.    Approved by \_\_\_\_\_  
Made by S.B.L.        Date \_\_\_\_\_  
Checked by L.E.O.

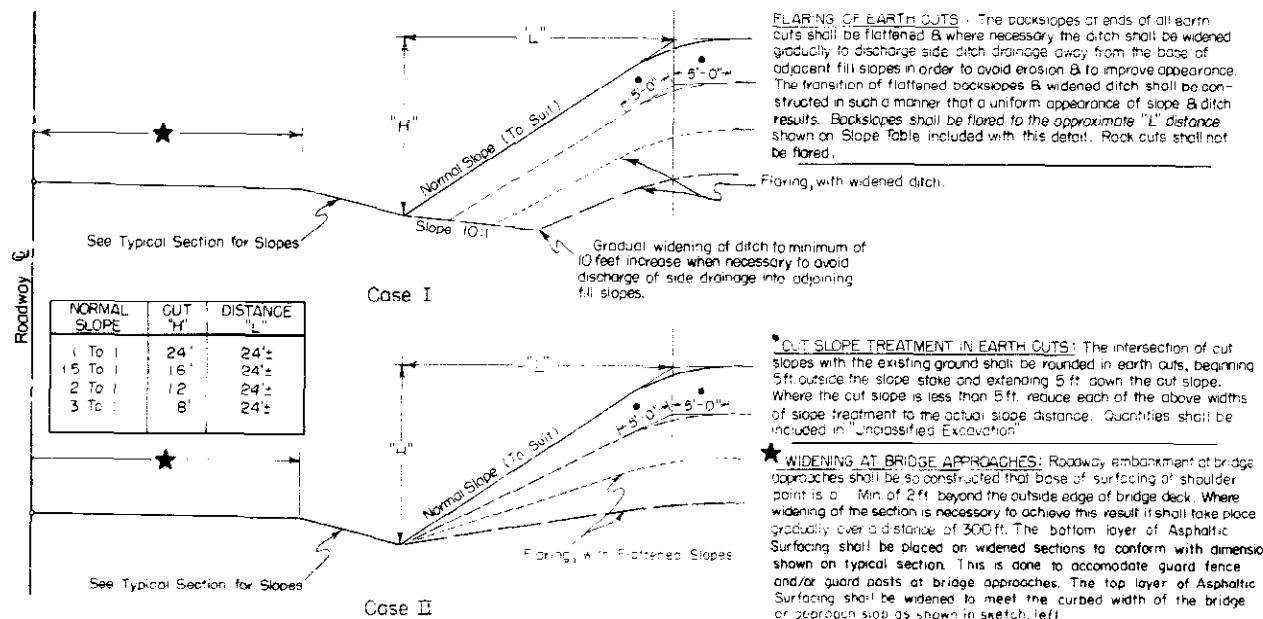
# STANDARD SIDE APPROACH ROADS, FLARING, CUT SLOPE TREATMENT & WIDENING AT BRIDGES AND AT CREST OF GRADES

# STANDARD M-2-A (MAY 1, 1962)

FED. ROAD REG. NO.	DIVISION	PROJECT NO.	SHEET NO.
9	COLO.		

REVISIONS	
4-22-63 Rev. Bridge Approaches	LEO

## GENERAL DETAILS FOR FLARING OF EARTH CUTS, CUT SLOPE TREATMENT & WIDENING AT BRIDGES



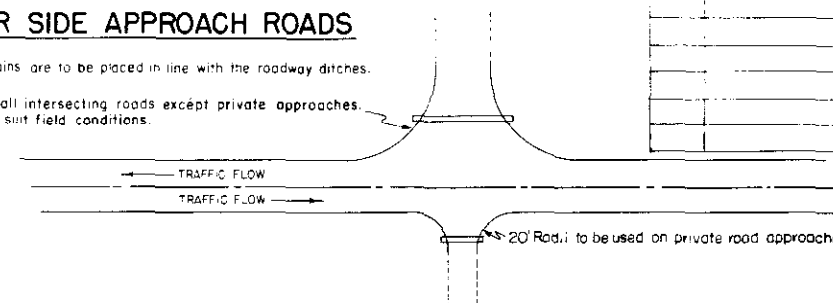
**FLARING OF EARTH CUTS:** The backslopes or ends of all earth cuts shall be flattened & where necessary the ditch shall be widened gradually to discharge side ditch drainage away from the base of adjacent fill slopes in order to avoid erosion & to improve appearance. The transition of flattened backslopes & widened ditch shall be constructed in such a manner that a uniform appearance of slope & ditch results. Backslopes shall be flared to the approximate "L" distance shown on Slope Table included with this detail. Rock cuts shall not be flared.

**CUT SLOPE TREATMENT IN EARTH CUTS:** The intersection of cut slopes with the existing ground shall be rounded in earth cuts, beginning 5 ft. outside the slope stake and extending 5 ft. down the cut slope. Where the cut slope is less than 5 ft., reduce each of the above widths of slope treatment to the actual slope distance. Quantities shall be included in Unclassified Excavation.

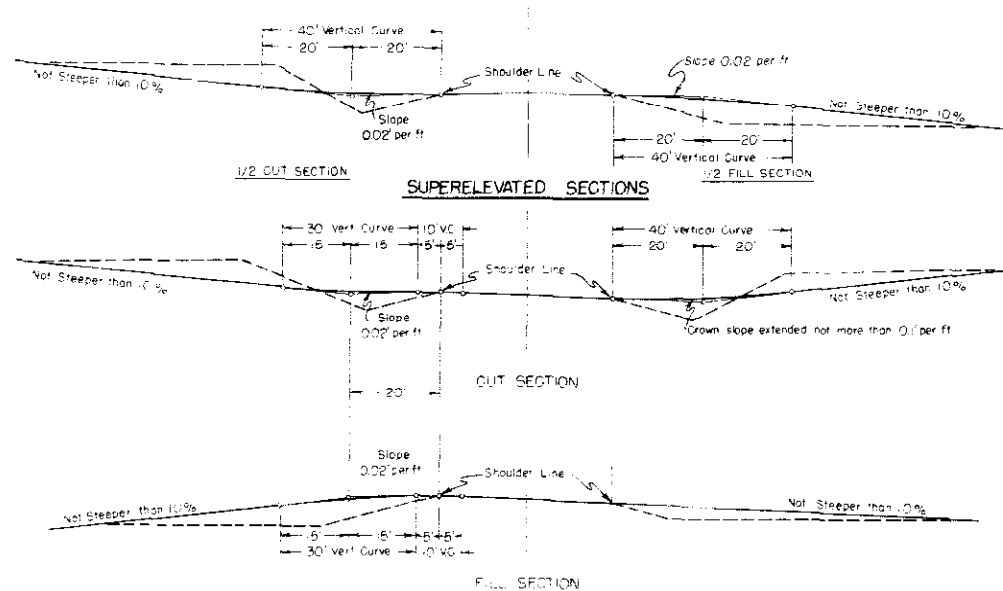
**WIDENING AT BRIDGE APPROACHES:** Roadway embankment at bridge approaches shall be so constructed that base of surfacing at shoulder point is a Min. of 2 ft. beyond the outside edge of bridge deck. Where widening of the section is necessary to achieve this result it shall take place gradually over a distance of 300 ft. The bottom layer of Asphaltic Surfacing shall be placed on widened sections to conform with dimensions shown on typical section. This is done to accommodate guard fence and/or guard posts at bridge approaches. The top layer of Asphaltic Surfacing shall be widened to meet the curbed width of the bridge or approach slab as shown in sketch, left.

## TYPICAL PLANS FOR SIDE APPROACH ROADS

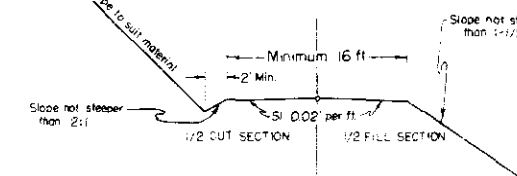
Where practical Side Drains are to be placed in line with the roadway ditches. 50' Radii to be used on all intersecting roads except private approaches. Radii may be varied to suit field conditions.



### STANDARD CROWNED SECTION

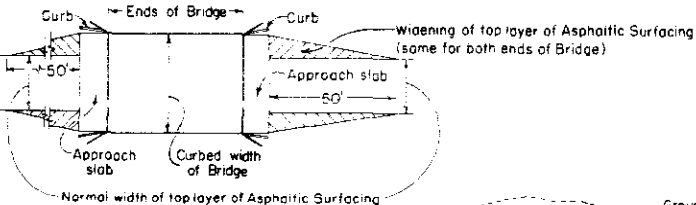


### TYPICAL SECTION FOR APPROACH

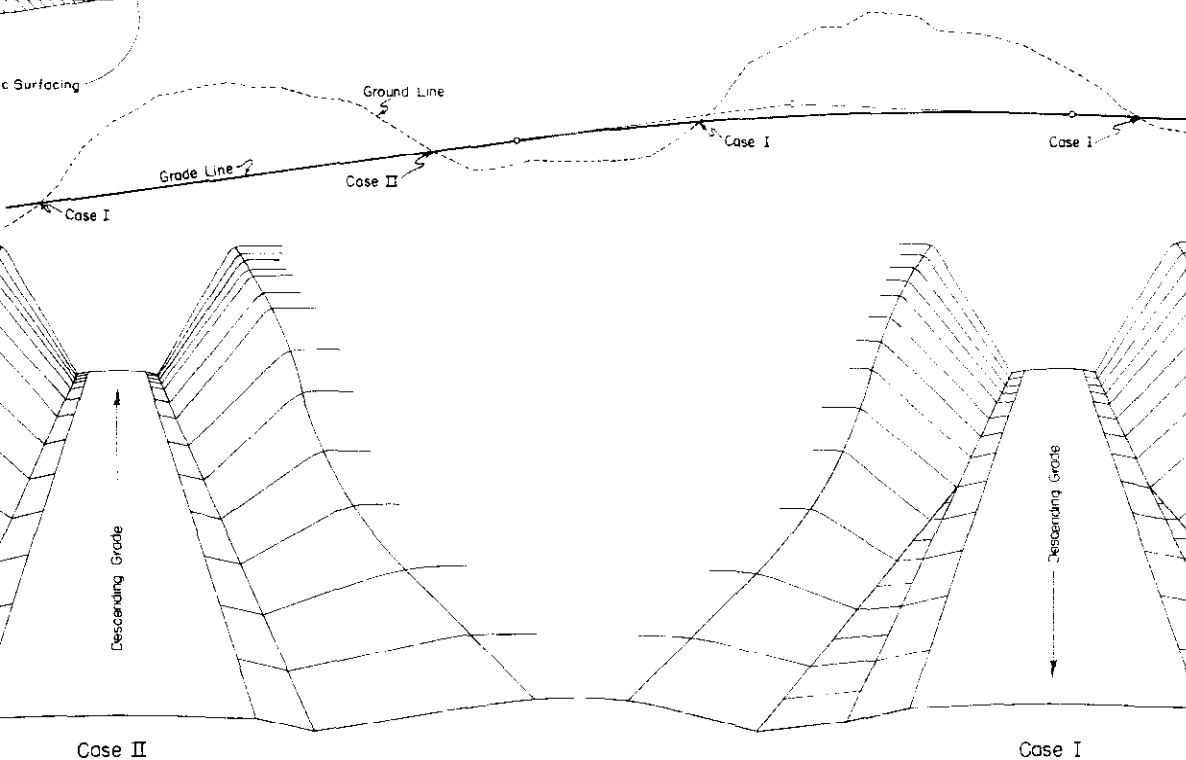


**NOTE:** ROAD APPROACHES: To conform to the above details unless otherwise indicated on plans by Special Details. The width of the crowned section shall be not less than the width of the crowned section of the existing approach road and in no case shall the new construction be less than sixteen (16) feet in width.

### PLAN OF WIDENING TOP LAYER OF ASPHALTIC SURFACING AT BRIDGE APPROACHES

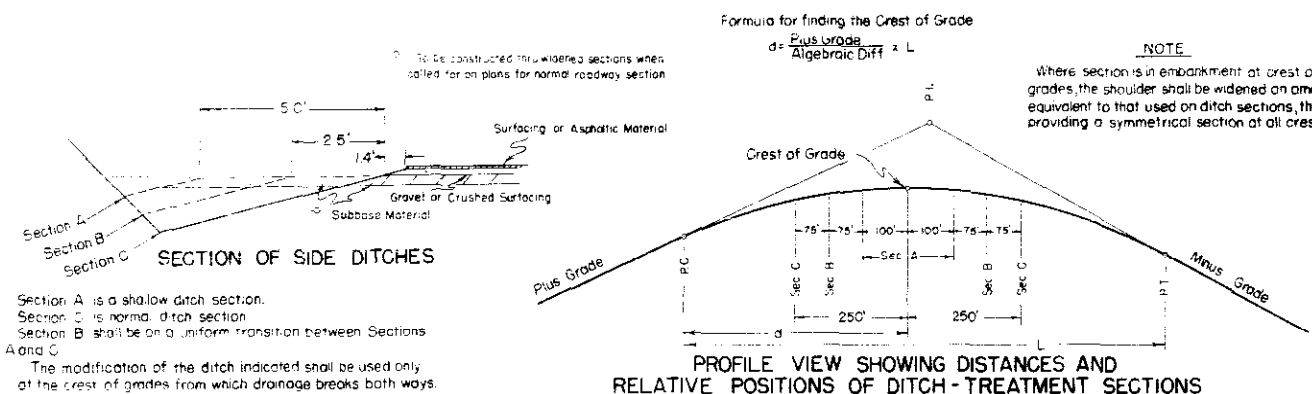


### PLAN OF FLARING IN EARTH CUTS



## DETAILS FOR DITCH & WIDENED SHOULDERS AT CREST OF GRADES

(TO BE USED ONLY WHERE SIGHT DISTANCE AT CREST OF GRADE IS 600 FT. OR LESS)



### GENERAL NOTES

All work shall be done in accordance with the Standard Specifications of the Colorado Department of Highways applicable to the Project.  
 All side approach roads to the Project shall be Gravel Surfaced with a four (4) inch thickness of Gravel or Crushed Rock Surfacing extending approximately to the Right of Way Line. Estimated tonnage & type of material required for this operation are shown in the Surfacing Plan.  
 The maximum grades shown are to be the limiting grades for all road approaches. Modifications of grades will be permitted where adherence to the grades as shown would cause damage to property or create other unsatisfactory conditions. Grades less than the maximum shown are to be used wherever feasible.

**COLORADO DEPARTMENT OF HIGHWAYS**

**APPROACH ROADS, FLARING, CUT SLOPE TREATMENT, BRIDGE & CREST WIDENING**

Designed by A.Z. Approved by A. Julian  
 Made by S.J.M. & A.S.H.  
 Checked by C.R.S. Date: November 1, 1953

# STANDARD M-5-A

(MAY 1, 1962)

FED. ROAD REG. NO.	DIVISION	PROJECT NO.	SHEET NO.
9	COLO.		

1 2 3 4 5 6 7 8 9 0.

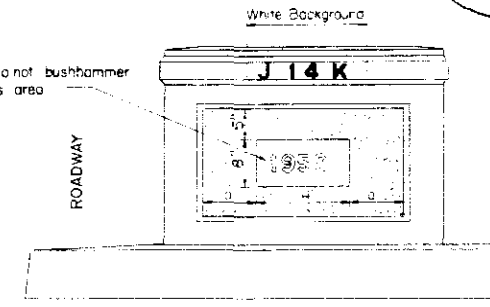
A B C D E F G H I J K L

M N O P Q R S T U V W

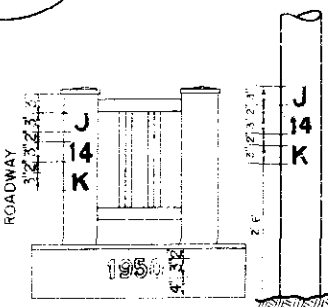
a b c d e f g h i j k l m n o p q r s t u v w x y z

Scale in inches  
3  
2  
1

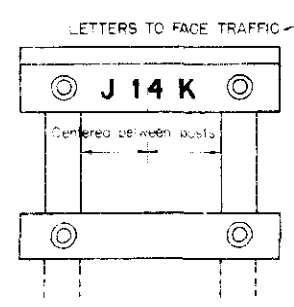
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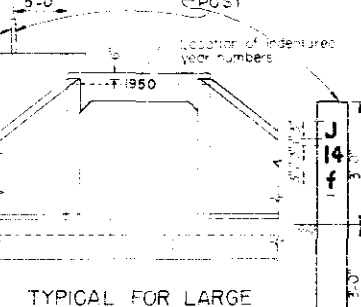
TYPICAL FOR CONCRETE ENDPOST



TYPICAL FOR STEEL HANDRAIL END POST



TYPICAL FOR TIMBER WING HANDRAIL



TYPICAL FOR LARGE BOX CULVERTS & STRUCTURES WITHOUT END POSTS

SIGN POSTS

SAMPLE BRIDGE NUMBER

GENERAL NOTES

SAMPLE YEAR NUMBER

ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS OF THE COLORADO DEPARTMENT OF HIGHWAYS APPLICABLE TO THE PROJECT. THE SIZE, SHAPE AND PLACING OF THE LETTERS AND FIGURES SHALL BE IN ACCORDANCE WITH THE FULL SIZE SHOWN ON THIS SHEET. ADDITIONAL COPIES OF THIS FULL SIZE SHEET MAY BE ORDERED FROM THE DEPARTMENT WITHOUT CHARGE.

THE YEAR NUMBERS ARE RECESSED IN CONCRETE. MINIMUM AS SHOWN INTO THE PANEL ON THE ENDPOST ON THE RIGHT HAND SIDE OF EACH BRIDGE END AND INTO THE FACE OF THE DOWNSTREAM HEADWALL OF CULVERTS AS SHOWN ON PLAN DETAILS. NUMBERS TO BE MADE OF WOOD, METAL OR OTHER SUITABLE MATERIAL AND ATTACHED TO THE FORMS BEFORE CONCRETE IS POURED. THE YEAR NUMBER OF EACH STRUCTURE SHALL CORRESPOND WITH THE YEAR IN WHICH THE CONCRETE IS POURED.

THE CORRECT NUMBER SHALL BE STENCILED ON THE RIGHT HAND SIDE OF EACH BRIDGE END AS SHOWN ON THIS STANDARD AND AS SPECIFIED WHERE THE STRUCTURE HAS NO END POSTS THE NUMBER SHALL BE PLACED ON A POST ON THE RIGHT HAND SIDE OF THE ROAD AS SHOWN FOR SIGNS THE NUMBER SHALL BE PLACED ON SIGN POSTS ON THE RIGHT HAND SIDE OF THE ROADWAY.

THE CORRECT NUMBER FOR EACH BRIDGE OR SIGN IS SHOWN ON THE PLANS.

THE NUMBERS FOR MAJOR STRUCTURES OF OVER 20 FEET CLEAR SPAN SHALL BE UPPER CASE LETTERS. THE NUMBERS FOR MINOR STRUCTURES OF 12 TO 20 FEET CLEAR SPAN SHALL BE LOWER CASE LETTERS. SIGN BRIDGES SHALL BE CONSIDERED AS MAJOR STRUCTURES.

A PROPER WHITE BACKGROUND RECTANGULAR IN SHAPE AND EXTENDING THREE INCHES BEYOND THE LIMITS OF THE NUMBER SHALL BE PAINTED WITH TWO COATS OF ACCEPTABLE WHITE PAINT. IN CASE AN APPROVED WHITE CONCRETE PAINT IS USED BEFORE PAINTING THE SURFACE MUST BE THOROUGHLY DRIED, CLEANED AND PROPERLY SIZED ON TIMBER HANDRAILS THE WHITE PAINT USED ON THE BRIDGE WILL BE SATISFACTORY.

AFTER THE WHITE BACKGROUND HAS DRIED SUFFICIENTLY THE CORRECT STRUCTURE NUMBER SHALL BE CAREFULLY STENCILED ON IT, WITH TWO COATS OF "SECOND FIELD COATS-DARK OR EXTERIOR BLACK PAINT (MAINT)" AS SPECIFIED UNDER ITEM 35 "PAINTS AND PAINTING". THE BRACES OF THE STENCILED LETTERS AND FIGURES SHALL BE CAREFULLY FILLED IN BY HAND TO MAKE SOLID FIGURES.

SUFFICIENT TIME BETWEEN SUCCESSIVE COATS SHALL BE ALLOWED TO PERMIT THORO DRYING.

THE COST OF PAINTING OF STRUCTURE NUMBERS AND FURNISHING AND PLACING POSTS FOR STRUCTURE NUMBERS SHALL BE CONSIDERED SUBSIDIARY WORK AND SHALL BE INCLUDED IN THE ORIGINAL CONTRACT ITEMS AND WILL NOT PAID FOR AS A SEPARATE ITEM.

THE LENGTH OF SPAN OR CLEAR SPAN SHALL BE MEASURED ALONG CENTER LINE OF ROADWAY. IN CASE OF DOUBLE OR MULTIPLE BOX CULVERTS THE CENTER WALL OR WALLS SHALL BE DISREGARDED AND CLEAR SPAN MEASURED FROM INSIDE OF END WALLS.

**COLORADO**  
DEPARTMENT OF HIGHWAYS

LETTERS AND FIGURES  
FOR  
STRUCTURE NUMBERS

Designed by \_\_\_\_\_  
Made by \_\_\_\_\_  
Checked by \_\_\_\_\_

Approved by *A.L. Newbold*  
Bridge Engineer  
Date: *Oct 17, 1958*

STRUCTURE NO. \_\_\_\_\_

# STANDARD M-6-A

(MAY 1, 1962)

## Standard Types of Railroad Warning Signs

FED. ROAD REG. NO.	DIVISION	PROJECT NO.	SHEET NO.
9	COLORADO		

REVISIONS	

### RAILROAD ADVANCE WARNING SIGNS

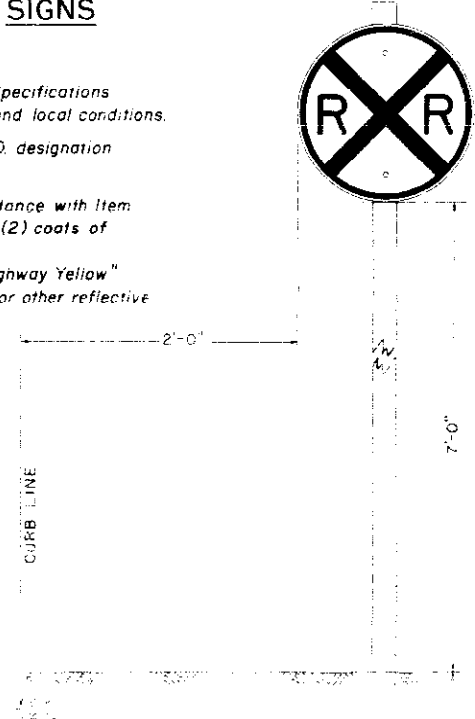
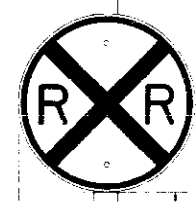
#### SPECIFICATIONS

**POSTS:** 4"x4" Untreated Wood conforming to Item 42 of the Specifications. Length of posts to be determined from typical section on plans and local conditions.

**SIGN:** 16 ga steel plate or acceptable equivalent. Type - A.A.S.H.O. designation W 10-1.

**PAINTING and MARKING:** Wood posts shall be painted in accordance with Item 38 of the Specifications using one (1) coat of primer and two (2) coats of outside white.

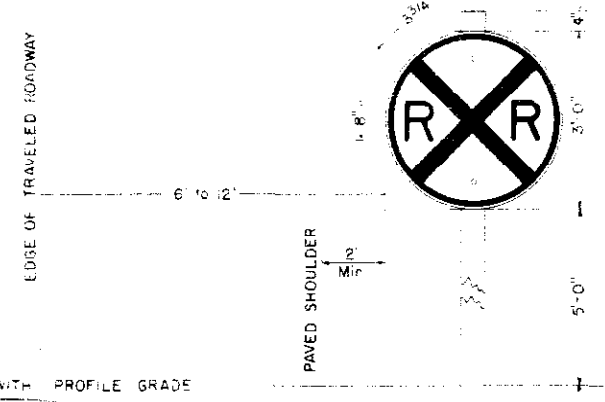
Metal sign to have a black crossbuck and letters on a "Highway Yellow" background. Sign shall be reflectorized with reflective sheeting or other reflective materials approved by the Department.



#### URBAN INSTALLATION

**NOTE:** On sign installations where roadway grades are not level it may be desirable to place signs out of plumb either forward or rearward depending on the grade, so as to keep the angle of view close to 90°.

For Urban and Rural installation, see "Manual on Uniform Traffic Control Devices"



#### RURAL INSTALLATION

### RAILROAD CROSSBUCK SIGNS

#### SPECIFICATIONS

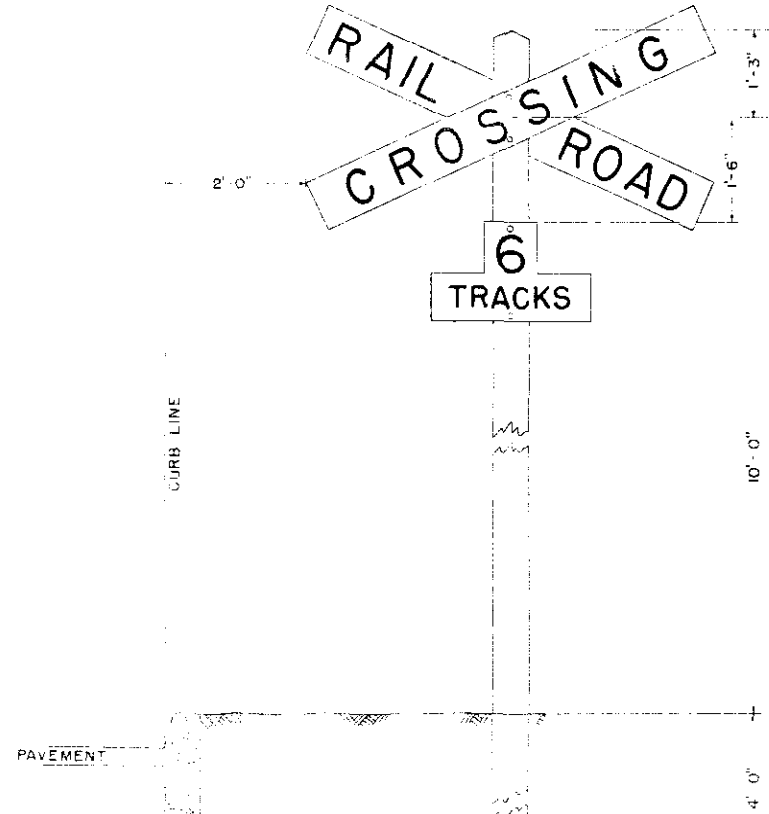
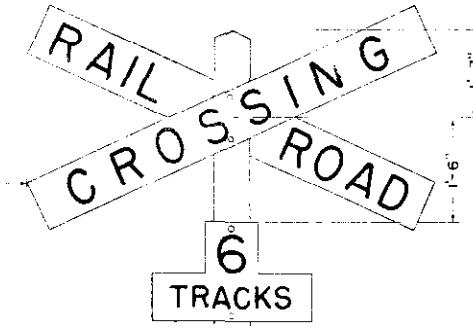
**POSTS:** 6"x6" Untreated Wood conforming to Item 42 of the Specifications. Length of posts to be determined from typical section on plans and local conditions.

**CROSSBUCKS:** Extruded aluminum alloy 6063-T6, 0.081" thick or acceptable equivalent. Type - A.A.S.H.O. designation W 10-2.

**TRACK SIGN:** 1/4 ga. flat steel or acceptable equivalent.

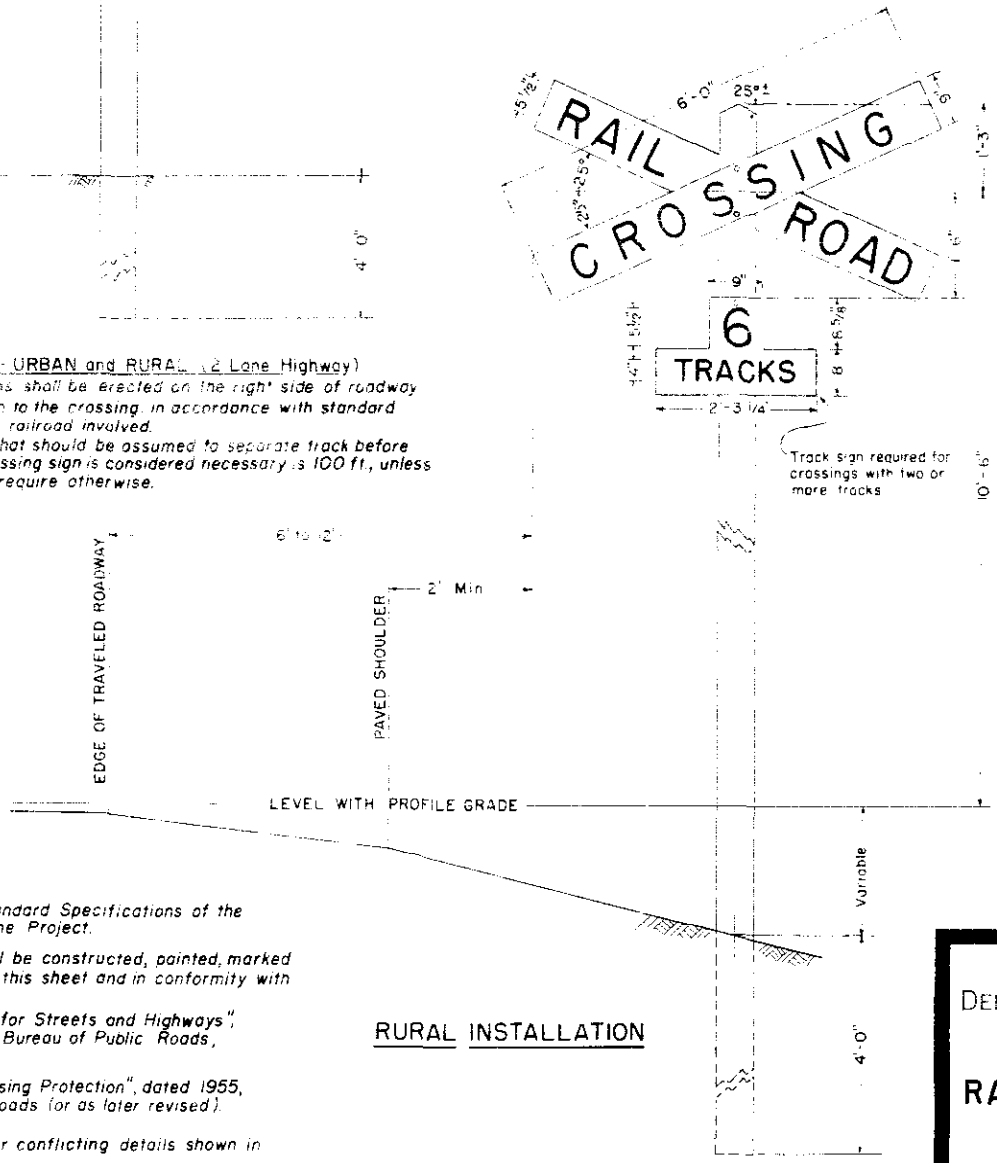
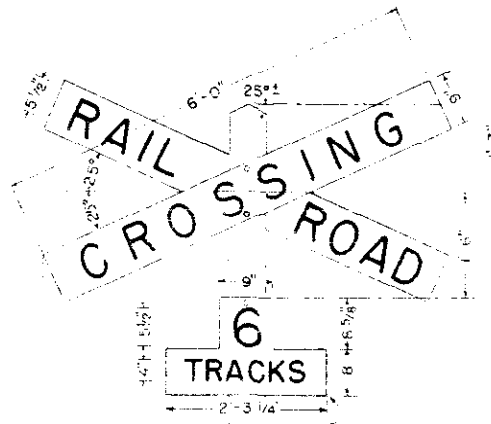
**PAINTING and MARKING:** Wood posts shall be painted in accordance with Item 38 of the Specifications using one (1) coat of primer and two (2) coats of outside white.

Crossbuck and track signs shall be white with all lettering and numerals black. All signs are to be reflectorized with reflective sheeting, or other reflective materials of approved types.

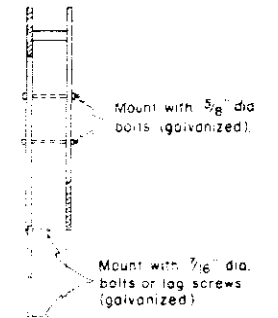


#### URBAN INSTALLATION

**INSTALLATION - URBAN and RURAL (2 Lane Highway)**  
Crossbuck signs shall be erected on the right side of roadway on each approach to the crossing, in accordance with standard practices of the railroad involved.  
The distance that should be assumed to separate track before an additional crossing sign is considered necessary is 100 ft, unless local conditions require otherwise.



#### RURAL INSTALLATION



#### SIDE VIEW

#### GENERAL NOTES

All work shall be done in accordance with the Standard Specifications of the Colorado Department of Highways applicable to the Project.

All Crossbuck and Advance Warning Signs shall be constructed, painted, marked and erected in accordance with details shown on this sheet and in conformity with data set forth under the following publications:

"Manual on Uniform Traffic Control Devices for Streets and Highways", published by U.S. Department of Commerce, Bureau of Public Roads, June, 1961 (or latest revision).

"Bulletin No. 5, Railroad-Highway Grade Crossing Protection", dated 1955, published by Association of American Railroads (or as later revised).

Details shown on this sheet take precedence over conflicting details shown in Bulletin No. 5 referred to above.

Supplemental signs on the left of the roadway will be installed where warranted.

**COLORADO**  
DEPARTMENT OF HIGHWAYS

**RAILROAD WARNING SIGNS**

Designed by C.L.S. | Approved by  
 Made by [Signature] | Date: Apr 17 1962  
 Checked by C.R.S.

# STANDARD ROADWAY CONSTRUCTION TRAFFIC SIGNS

# STANDARD M-6-B

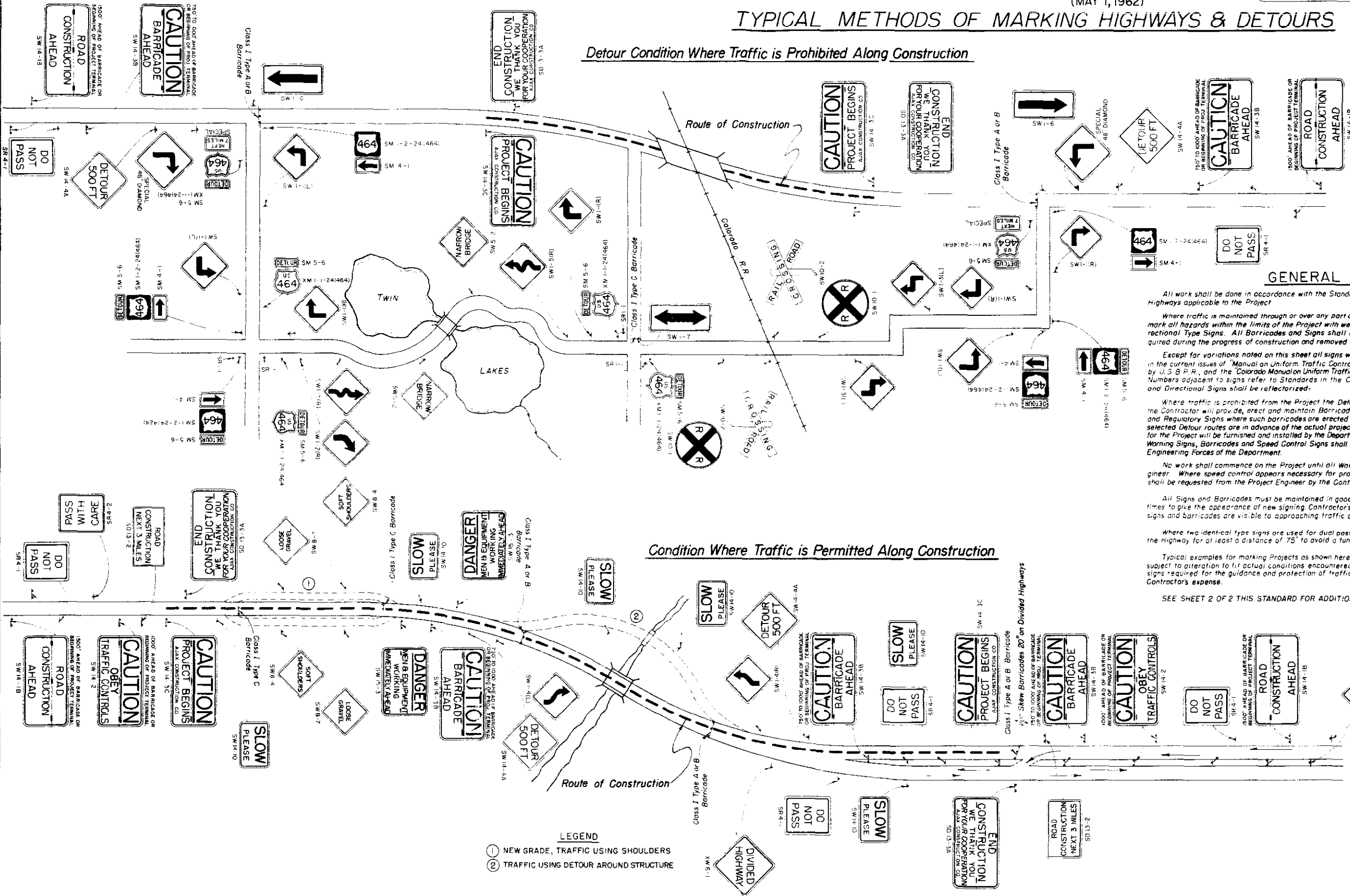
(SHEET 1 OF 2 SHEETS)

(MAY 1, 1962)

## TYPICAL METHODS OF MARKING HIGHWAYS & DETOURS

FED. ROAD RED. NO.	DIVISION	PROJECT NO.	SHEET NO.
9	COLO.		

REVISIONS	
1-16-63	GENERAL REV. L.E.O.



### GENERAL NOTES

All work shall be done in accordance with the Standard Specifications of the Colorado Department of Highways applicable to the Project.

Where traffic is maintained through or over any part of the Project, the Contractor will be required to mark all hazards within the limits of the Project with well maintained Barricades, Warning Signs and Directional Type Signs. All Barricades and Signs shall be moved, added to, changed or removed as required during the progress of construction and removed entirely when project is completed.

Except for variations noted on this sheet all signs will be in conformity with the specification outlined in the current issues of "Manual on Uniform Traffic Control Devices for Streets & Highways," issued by U.S.B.P.R., and the "Colorado Manual on Uniform Traffic Control Devices for Streets & Highways." Numbers adjacent to signs refer to Standards in the Colorado manual. Standard Warning, Regulatory and Directional Signs shall be reflectorized.

Where traffic is prohibited from the Project the Detour will be marked by the Department except that the Contractor will provide, erect and maintain Barricades complete with approved Directional Arrows and Regulatory Signs where such barricades are erected and maintained at the ends of the Project or where selected Detour routes are in advance of the actual project terminal. U.S. or State Route Markers required for the Project will be furnished and installed by the Department. The location and positioning of Advance Warning Signs, Barricades and Speed Control Signs shall be as recommended by the appropriate District Engineering Forces of the Department.

No work shall commence on the Project until all Warning Signs are in place and approved by the Engineer. Where speed control appears necessary for protection of the traveling public, such speed control shall be requested from the Project Engineer by the Contractor.

All Signs and Barricades must be maintained in good condition and kept clean and free of dirt at all times to give the appearance of new signing. Contractor's and Engineer's equipment must be parked so that signs and barricades are visible to approaching traffic at all times.

Where two identical type signs are used for dual posting they are to be staggered on the two sides of the Highway for at least a distance of 75' to avoid a tunneling effect.

Typical examples for marking Projects as shown hereon constitute a minimum of signs required and are subject to alteration to fit actual conditions encountered in the field. Additional markings and any special signs required for the guidance and protection of traffic will be placed as required on the project at the Contractor's expense.

SEE SHEET 2 OF 2 THIS STANDARD FOR ADDITIONAL NOTES AND DETAILS.

**LEGEND**  
 (1) NEW GRADE, TRAFFIC USING SHOULDERS  
 (2) TRAFFIC USING DETOUR AROUND STRUCTURE

**COLORADO  
DEPARTMENT OF HIGHWAYS**

*Construction Traffic Signs*

Designed by J.C.R. Approved by J.C.R.  
 Made by J.C.R. Engineer, Surveys & Plans  
 Checked by Date: July 22, 1955

# STANDARD ROADWAY CONSTRUCTION TRAFFIC SIGNS

# STANDARD M-6-B

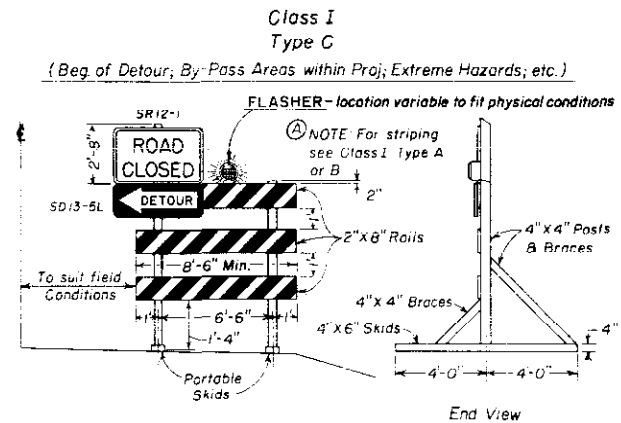
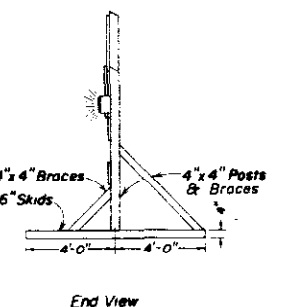
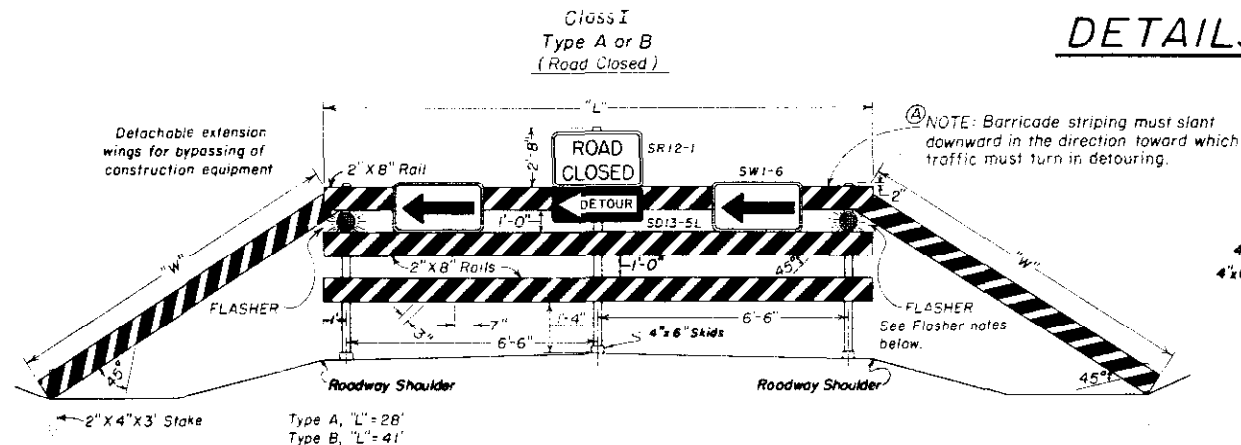
(SHEET 2 OF 2 SHEETS)

(MAY 1, 1962)

FEDERAL ROAD REGION NO.	DIVISION	PROJECT NO.	SHEET NO.
9	COLORADO		

REVISIONS		
5-16-62	Rev. Margin & Border Color	L.E.O.
1-14-63	General Rev.	L.E.O.

## DETAILS OF BARRICADES



**PAIN** - All paint and methods of painting shall be in conformity with Item 38 of the Standard Specifications.

**STRIPING** - Planing and Wings on all Barricades shall be painted with Maintenance Flat Black on both sides before adding Reflective Strips. Reflective Strips shall be "Cutout Smooth Surface Yellow," of a type approved by the Department, 3" wide and spaced 7" apart as shown in the detail.

**Diversion of traffic will be accomplished as follows:**  
 1- Stripes for Barricades diverting traffic to the left shall start on the left hand side of the lower plank and progress up to the right with the stripes making an angle of 45 degrees with the horizontal axis of the board as shown in the detail. Traffic diversion to the right will be just the opposite.  
 2- Stripes on Barricades diverting traffic in both directions shall begin at the center of the lower plank and progress down in both directions.

**TIMBER** - All Timber used shall conform to the Standard Specifications for Miscellaneous Untreated Timber.

Material	Quantity	Grade
Planing	2' x 8"	S 4 S
Posts (Barricades)	4' x 4"	S 4 S
Posts (Signs)	4' x 4" or 6' x 6"	S 4 S

Barricades may be either portable as shown or fixed with posts set into the ground.

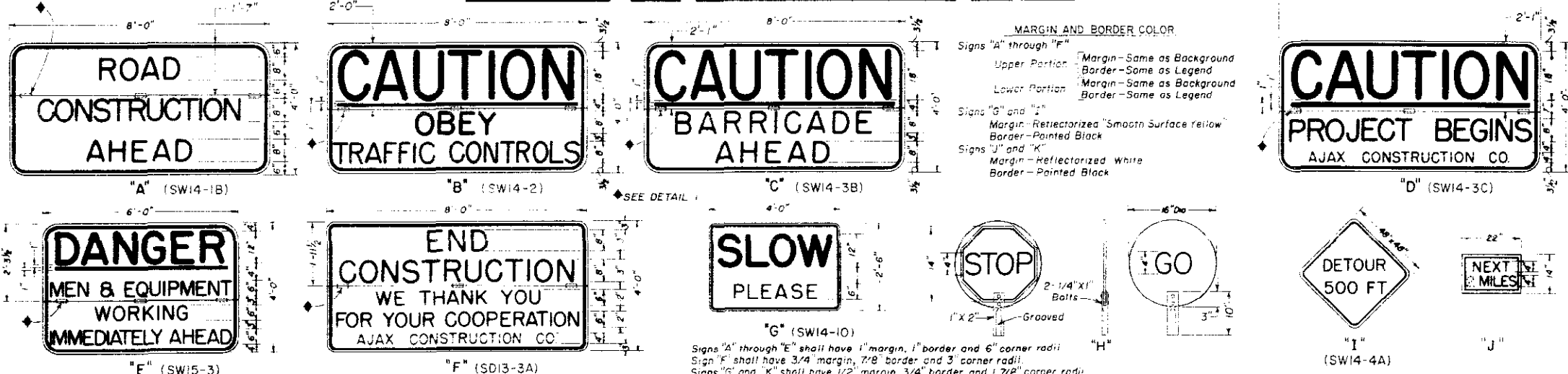
All skids, braces and posts to be painted yellow and nailed together with No. 20 d nails.

Bases to be weighted where necessary to provide stability.

### NOTES

- Signs "A" through "F" shall be of the hinge and fold type to facilitate the closing down of the sign when the need is not prevalent. These signs shall be hinged with 3-4" Butt Hinges (right pin) mortised into the face surface of the sign.
- The reflective sheeting used on the sign background shall be placed over the leaves of the hinges.
- Hinges shall be fastened to the sign with flat head stove bolts having a flat washer under the nut on back of sign.
- All hinges, bolts, nuts and washers to be rust resistant.
- Sign panels to be held in the open position with hooks and eyes or other approved fastening devices.
- 90° Countersunk Steel or Aluminum Lock Bolt Fasteners with Collars suitable for use on wood may be used in lieu of stove bolts.

## DETAILS OF CONSTRUCTION SIGNS



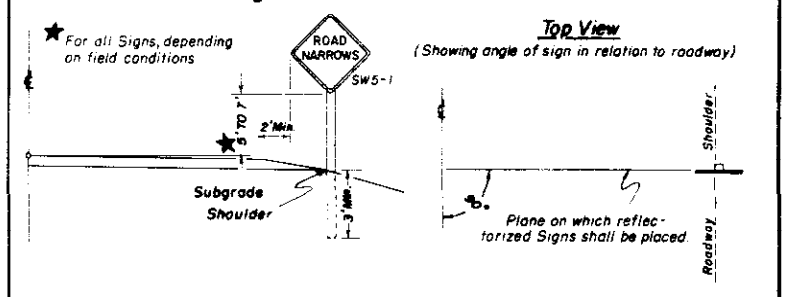
## DETAILS OF SIGN AND BEACON FABRICATION AND USAGE

Construction Signs "A" through "G" and "K" shall be made of 5/8" Plywood or other material approved by the Department and as per details above.  
 Signs having reflectorized Yellow or Red surfaces shall be fabricated from "Flexible Reflective Sheeting" of the "Non-Exposed Lens" type approved by the Department. Signs having reflectorized White surfaces shall be fabricated from "Flexible Reflective Sheeting" of the "Exposed Lens" type approved by the Department.  
 Construction Sign "A" - Reflectorized yellow background with painted Black lettering.  
 Construction Signs "B" through "D" - Top background to be reflectorized "Smooth Surface Red" with the legend and underline to be a White process point. Balance of lettering to be painted Black over a reflectorized Yellow background.  
 Construction Sign "E" - The word "DANGER" and the underline only are to be of a White process point over a reflectorized "Smooth Surface Red" background. Balance of lettering to be painted Black over a reflectorized Yellow background.  
 Construction Sign "F" - The words "End Construction" and "Contractors Name" shall be painted Black over a reflectorized White background. Balance of lettering to be painted with a White process point over a reflectorized "Smooth Surface Red" background.  
 Construction Sign "G" - The legend to be painted Black over a reflectorized "Smooth Surface Yellow" background.  
 Flagman Warning Sign "H" - This sign shall be made of Plastic or other lightweight material, approved by the Department, having a painted Red background with White lettering on the "Stop" side and a painted Green background with White lettering on the "Go" side. Handle to be grooved on one side to indicate reading of sign to Flagman. This sign will be used whenever Flagmen are necessary. Sign to be reflectorized if used to stop traffic at night.  
 Detour Warning Sign "I" - This sign shall be made of 3/8" (Min.) Plywood or other material suitable to the Department. Legend to be painted Black on a reflectorized "Smooth Surface Yellow" background.  
 Construction Sign "J" - This sign shall be made of 3/8" (Min.) Plywood or other suitable material. Legend to be painted Black on a reflectorized White background. 3/4" x 9" metal slides to be placed between "NEXT 5 MILES," spaced so as to accommodate appropriate sized numerals. Numerals calculated to the nearest Mile.

Construction Sign "K" - Reflectorized White background with painted Black lettering.  
 Signs "A" through "E" and "G" shall be painted on the backside with one coat of white primer and one coat of yellow enamel.  
 Signs "F," "J" and "K" shall be given 2 coats of white paint on the backside.  
 Construction Signs shall be placed as follows:  
 Sign "A" - This is the first advance warning sign and shall be placed 1,500 feet ahead of barricade or beginning of project terminal and on both sides of the traveled way in all cases.  
 Sign "B" - This is the second advance warning sign and shall be placed 1,000 feet ahead of barricade or beginning of project terminal and on both sides of the traveled way on divided highways and singly on two-lane highways.  
 Sign "C" - This is the third advance warning sign in cases where barricades are used and shall be placed 750 to 1,000 feet ahead of barricade or beginning of project terminal and on both sides of the traveled way on divided highways and singly on two-lane highways.  
 Sign "D" - This sign shall be placed to mark the beginning of the Project. It shall be placed singly and may be placed opposite barricade if desirable.  
 Sign "E" - This sign shall be placed 500 feet ahead of the situation being advised of.  
 Sign "F" - This sign shall be placed to mark the end of the Project. It shall be placed singly and may be placed opposite barricade if desirable.  
 Sign "G" - This sign shall be used frequently within the limits of the Project.  
 Sign "H" - This sign shall be erected at the limits of any project more than 2 miles in extent, where traffic is maintained through the job.  
 Signs and Torches shall be either of the oil burning or electrical type approved by the Department and shall be placed 3 to 5 feet ahead of the object to be illuminated. Particular care shall be taken to protect all signs and barricades from smoke and smudge arising from the use thereof.  
 Flashers used on the Barricades shall be of the Battery or Electrical Type and shall have no less than a 4" diameter lens. The illuminating element in a flashing yellow beacon or signal shall be flashed continuously at a rate between 50 to 70 flashes per minute with the "on" time being at least 25% of the cycle and which will be clearly distinguishable to traffic. The duration in which Flashers will be left in operation will be governed by field conditions and subject to approval

by the Engineer.  
 All material shall be sound and durable. Barricades, signs, symbols and lettering shown herein will be of good workmanship and well maintained. Uneven lettering will not be accepted.  
 Alternate methods of processing signs or the substitution of symbols or other reflecting elements for painted symbols will be permitted only after approval of such methods or materials by the Department.  
 The Department shall furnish and install the following as required OUTSIDE THE LIMITS of the Project:  
 1. "ROAD CONSTRUCTION AHEAD" Minimum 4  
 2. "CAUTION OBEY TRAFFIC CONTROLS" Minimum 2  
 3. "CAUTION BARRICADE AHEAD" As Required  
 4. Standard Warning, Guide & Directional Signs As Required  
 5. "ROAD CONSTRUCTION NEXT 5 MILES" As Required  
 The Contractor shall furnish and install the following as required WITHIN THE LIMITS of the Project:  
 1. All Barricades As Required  
 2. "CAUTION PROJECT BEGINS" Minimum 2  
 3. "DANGER MEN & EQUIPMENT WORKING IMMEDIATELY AHEAD" As Required  
 4. "END CONSTRUCTION WE THANK YOU FOR YOUR COOPERATION" Minimum 2  
 5. "SLOW PLEASE" As Required  
 6. Standard Warning & Directional Signs As Required  
 7. Approved Directional Arrows & Regulatory Signs for Barricades As Required  
 8. Torches and Flares as follows: Class I Type A or B Barricade Minimum 3  
 Class I Type C Barricade Minimum 1  
 9. Flashers - Class I Type A or B Barricade 2 Required  
 Class I Type C Barricade As Required  
 At the request of the Contractor layouts of signs will be furnished by the Traffic Operations Section indicating the details as to letter size, symbols, spacing, etc. which are required for these signs.

### Position of Signs Relative to Roadbed & Hazards



**NOTE**  
 Warning Signs to be made of 3/8" (Min.) plywood or other material suitable to the Department and shall be reflectorized.  
 Location to be governed by field conditions.  
 Exact location to be staked by the Engineer in all cases warning signs are to be placed well in advance of hazard, the distance depending on topography, and existing approach speeds.  
 For all signs prefixed with the letters "R," "M" or "W" refer to the "Colorado Manual on Uniform Traffic Control Devices for Streets and Highways" of current issue.

**COLORADO**  
**DEPARTMENT OF HIGHWAYS**

**Construction Traffic Signs**

Designed by J.C.R. Approved by J. Fishman  
 Made by J.C.R. Engineer, Surveys & Plans  
 Checked by \_\_\_\_\_ Date: July 22, 1955

# TYPICAL SIGNS

# STANDARD M-6-C

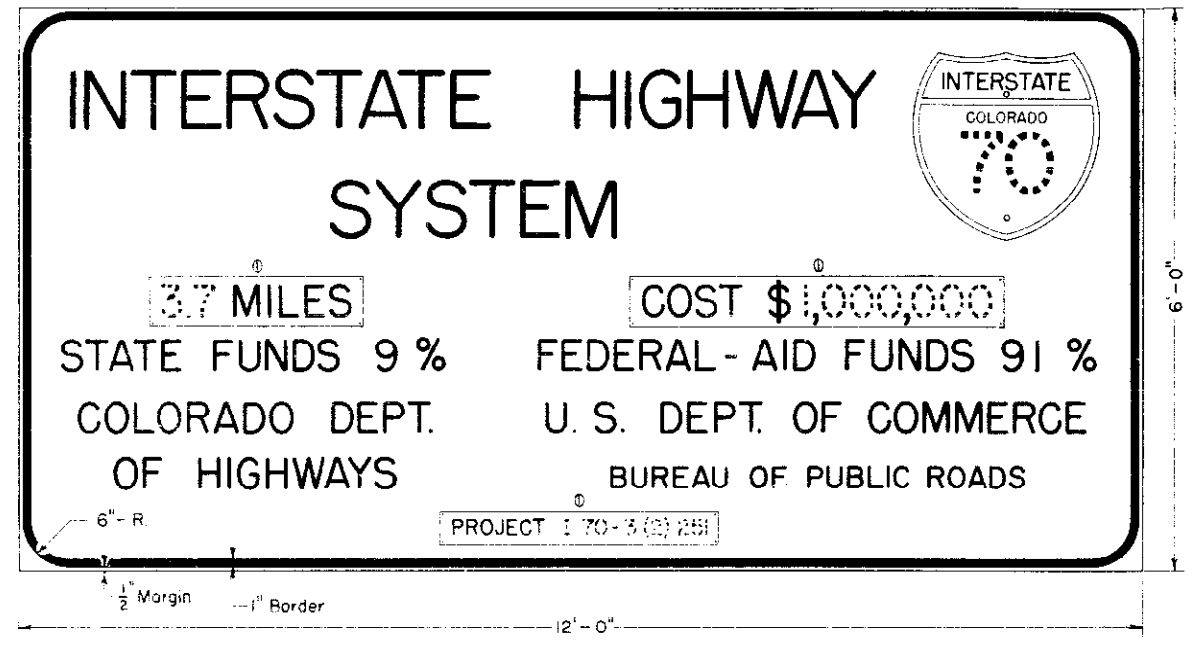
(MAY 1, 1962)

## INSTALLATION DETAIL

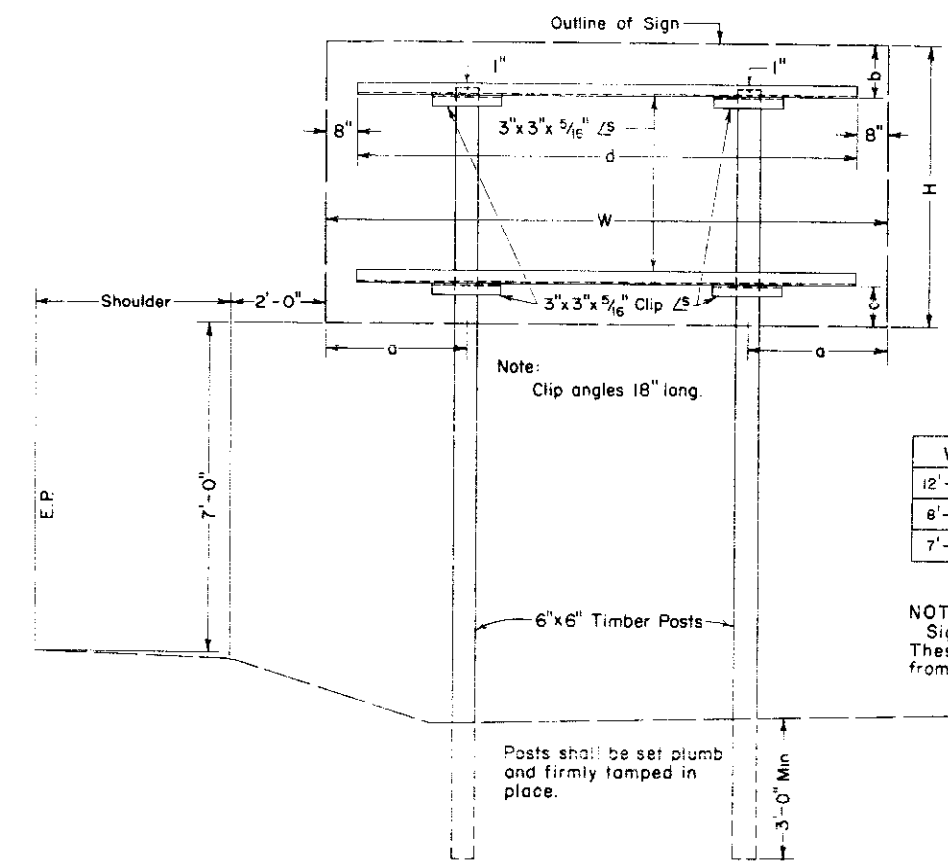
FED. ROAD REG. NO.	DIVISION	PROJECT NO.	SHEET NO.
9	COLO.		

REVISIONS	

### INTERSTATE SYSTEM



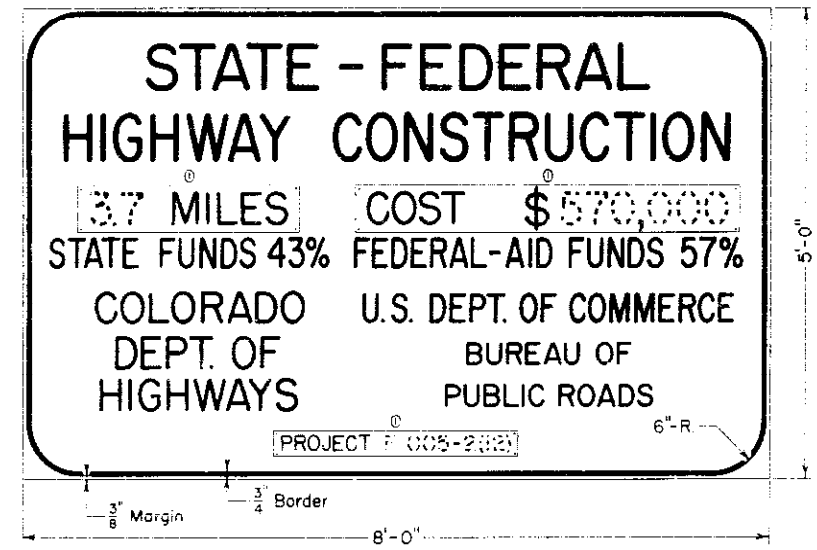
① Plaque length variable, as determined by message.  
 ② 24" Standard Interstate Shield for dimensions see "Interstate Signing Manual." Background, letters and numerals also: Interoffective - Red, White and Blue; (Removable Plaque)



W	H	a	b	c	d
12'-0"	6'-0"	3'-0"	1'-1 1/2"	0'-10 1/2"	10'-8"
8'-0"	5'-0"	2'-0"	1'-1 1/2"	0'-10 1/2"	6'-8"
7'-0"	4'-0"	1'-9"	1'-1 1/2"	0'-10 1/2"	5'-8"

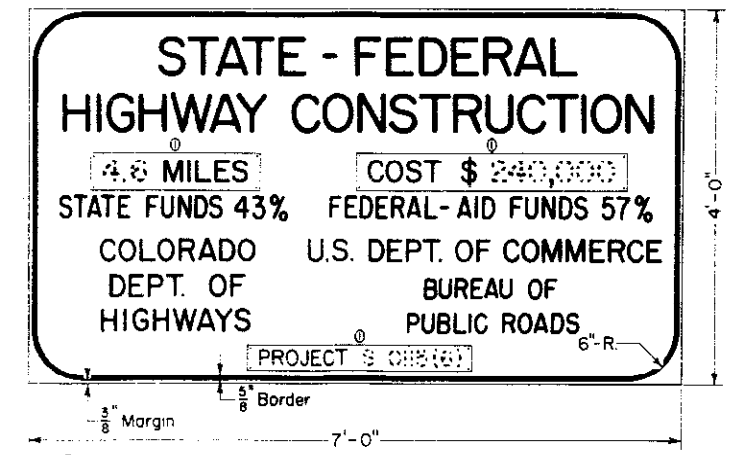
NOTE: Signs are to be placed facing traffic approaching the work. These signs should be located so as not to obscure or detract from the effectiveness of other official signs.

### PRIMARY SYSTEM



① Plaque length variable, as determined by message.

### SECONDARY SYSTEM



① Plaque length variable, as determined by message.

### GENERAL NOTES

All work shall be done in accordance with the Standard Specifications of the Colorado Department of Highways, applicable to the Project.

Signs shall be made of 3/4" Plywood or other material approved by the Department.

Background to be painted plain white with stencil black letters, numerals and border.

Posts shall be 6"x6" S4S timber or other material approved by the Department and shall be painted white.

Layout of signs will be furnished the Contractor by the Traffic Operations Section indicating the details as to letter size, symbols, spacing, etc. which are required for these signs.

Figure for cost of project to be furnished contractor by Department.

If signs are for a single structure or interchange, name will be used in lieu of mileage. Such as: COLORADO RIVER BRIDGE or ARAPAHOE INTERCHANGE.

**COLORADO**  
DEPARTMENT OF HIGHWAYS

**IDENTIFICATION**  
SIGNS

Designed by V.H. Approved by [Signature]  
 Made by D.M.E. Engr. Surveys & Plans  
 Checked by E.E.O. Date: 15 1962

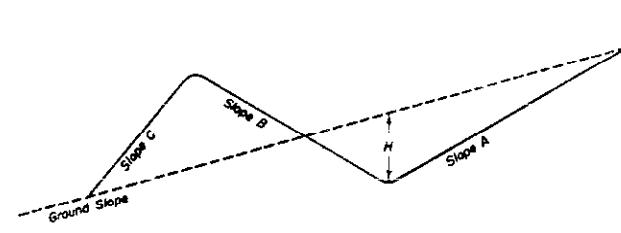
# STANDARD TYPES of DITCHES and CONSTRUCTION METHODS

## STANDARD M-13-A (MAY 1, 1962)

FED. ROAD REG. NO.	DIVISION	PROJECT NO.	SHEET NO.
9.	COLO.		34

### DETAILS for CONTOUR INTERCEPTING DITCHES

Typical Section for Contour Intercepting Ditches



**PURPOSE & USE OF THE TABLE**

The primary purpose of the information for Contour and Intercepting Ditches shown on this sheet is to serve as a guide in construction and to readily arrive at yardages of excavation involved. Foremost consideration in constructing these ditches is given first to the natural ground line slope confronted in construction, thence to the other values shown on the Typical Section. By properly arriving at the combination of values shown on the Typical Section and in the Table for a specified condition, the number of cubic yards of excavation per 100 lin. ft. of ditch may be read under the appropriate column for this item.

### Typical Construction Layouts

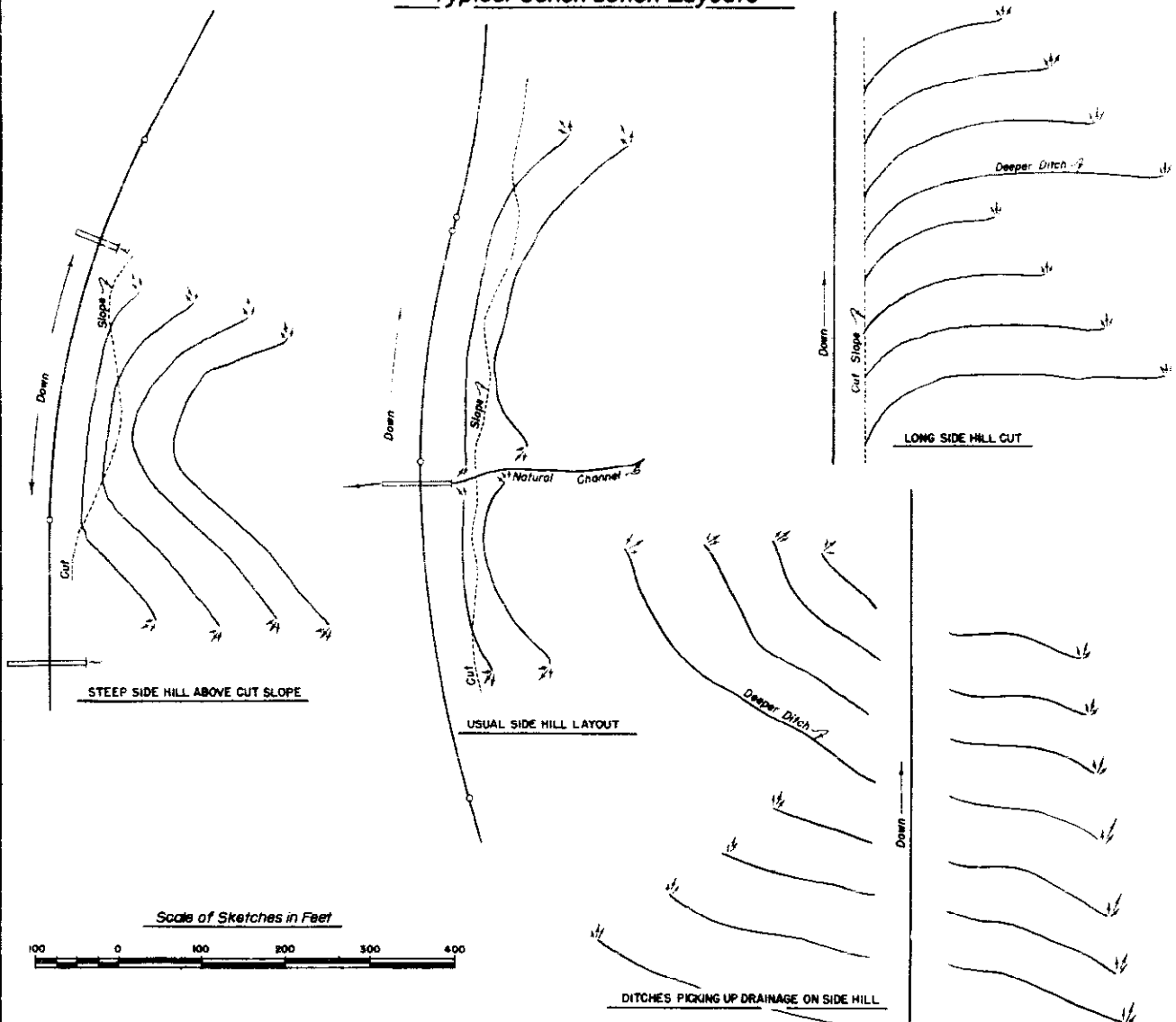
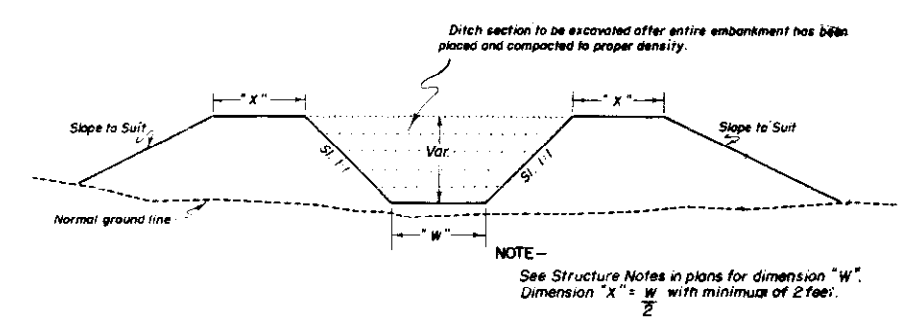


Table of Slopes and Yardages

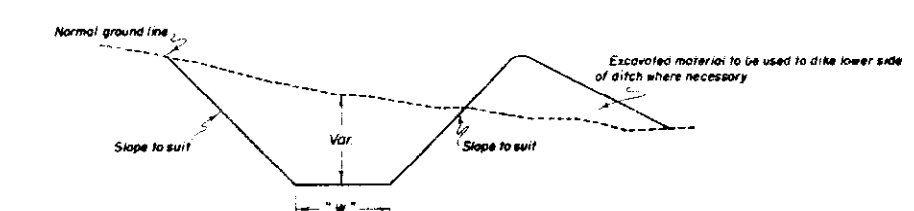
Ground	SLOPES			H	Cubic Yards per 100 lin. ft. of Ditch	
	A	B	C			
5:1 Or Flatter	2:1	4:1	2:1	15"	16	
				18"	23	
				21"	32	
	1-1/2:1	3:1	2:1	15"	15	
				18"	22	
				21"	30	
		2:1	1-1/2:1	1-1/2:1	15"	14
					18"	20
					21"	27
	4:1	1-1/2:1	4:1	1-1/2:1	15"	13
					18"	19
					21"	25
3:1			2:1	1-1/2:1	15"	12
					18"	18
					21"	25
2:1		1-1/2:1	1-1/2:1	15"	12	
				18"	17	
				21"	23	
		1-1/2:1	3:1	2:1	15"	10
					18"	15
					21"	20
3:1	2:1	4:1	2:1	15"	17	
				18"	25	
				21"	34	
		3:1	2:1	1-1/2:1	15"	17
					18"	24
					21"	32
	1-1/2:1	1-1/2:1	1-1/2:1	15"	15	
				18"	22	
				21"	30	
		1-1/2:1	4:1	1-1/2:1	15"	15
					18"	21
					21"	29
2:1	1-1/2:1	3:1	2:1	15"	13	
				18"	18	
				21"	25	
		2:1	1-1/2:1	1-1/2:1	15"	12
					18"	17
					21"	23
	1-1/2:1	1-1/2:1	1-1/2:1	15"	11	
				18"	16	
				21"	21	
		1-1/2:1	3:1	1-1/2:1	15"	10
					18"	14
					21"	20
1-1/2:1	1-1/2:1	2:1	1-1/2:1	15"	22	
				18"	31	
				21"	43	
		2:1	1-1/2:1	1-1/2:1	15"	21
					18"	30
					21"	41
	1-1/2:1	1-1/2:1	1-1/2:1	15"	20	
				18"	29	
				21"	40	
		1-1/2:1	3:1	1-1/2:1	15"	13
					18"	19
					21"	26
1-1/2:1	2:1	1-1/2:1	15"	12		
			18"	17		
			21"	24		
	1-1/2:1	1-1/2:1	1-1/2:1	15"	12	
				18"	17	
				21"	23	
1-1/2:1	1-1/2:1	2:1	1-1/2:1	15"	20	
				18"	29	
				21"	40	
		1-1/2:1	1-1/2:1	1-1/2:1	15"	20
					18"	28
					21"	39
	1-1/2:1	1:1	1:1	15"	9	
				18"	13	
				21"	17	
		1-1/2:1	1-1/2:1	1-1/2:1	15"	8
					18"	12
					21"	16
1-1/2:1	1:1	1:1	15"	11		
			18"	16		
			21"	21		

▲ Slopes are approximate and may be varied to suit conditions encountered during construction.

### TYPICAL SECTIONS for DRAINAGE, IRRIGATION DITCHES and CHANNEL CHANGES



For Embankment Sections  
(Generally for use in Irrigation Ditches & Channel Changes)



For Cut Sections

NOTE - Unless otherwise shown in Structure Notes of plans, dimension "W" = 1 foot.

### GENERAL NOTES

- All work shall be done in accordance with the Standard Specifications of the Colorado State Highway Department applicable to the Project.
- All ditches are to be constructed to lines and grades as stated by the Engineer using the ditch section shown on plans or as ordered by the Engineer.
- CONTOUR INTERCEPTING DITCHES: Ditches are to be laid out along the ground contour on a grade of not over 1% (Type of soil shall govern the grade).
- Ends of ditches are to be lined up so that concentration of flow from a higher contour ditch into one of lower contour is, as far as possible avoided. The use of a deeper ditch is recommended where this condition is encountered.
- The following horizontal spacing of ditches is recommended:
  - 4% to 6% Approximately 70' Centers
  - 8% to 10% Approximately 60' Centers
  - 20% to 4:1 Slope Approximately 55' Centers
  - 30% to 1-1/2:1 Slope Approximately 50' Centers
- Where ditch checks are required the intervening ditch between one set of ditch checks shall not exceed a grade of 1.0%. Details of checks will be shown on plans when required.

REVISIONS

**COLORADO DEPARTMENT OF HIGHWAYS**

DITCH TYPES

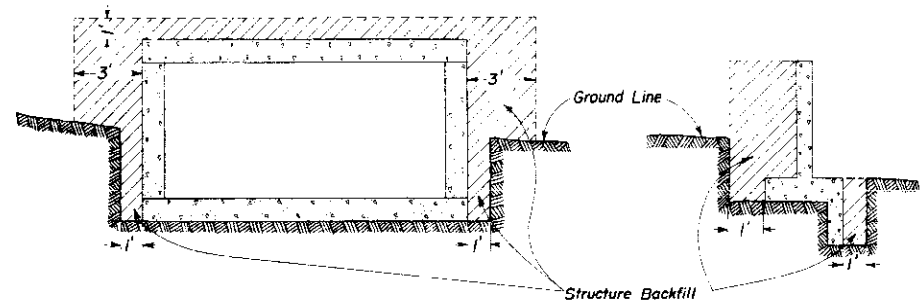
Designed by C.G.M.	Approved by <i>[Signature]</i>
Made by C.G.M.	Engineer, Surveys & Plans
Checked by	Date: <i>Apr. 13, 1962</i>

# STANDARD M-16-A

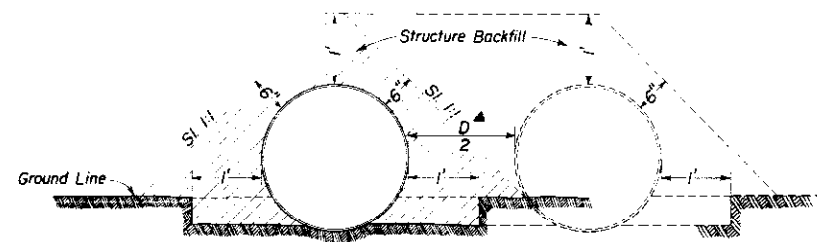
(MAY 1, 1962)

FED. ROAD REGION NO.	DIVISION	PROJECT NO.	SHEET NO.
9	COLO.		
REVISION			
5-2-63	Rev. Backfill		L.E.O.

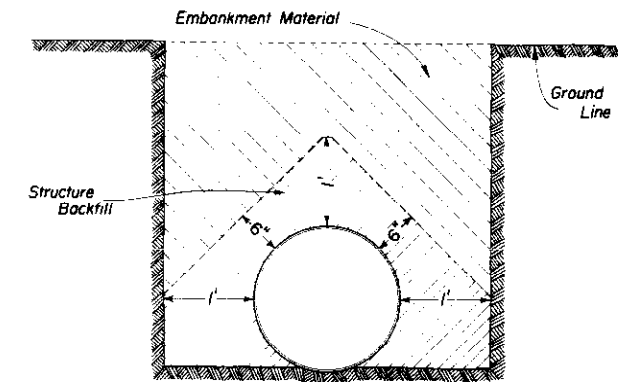
## CONCRETE BOX CULVERTS & WINGWALLS



## CIRCULAR CONDUIT

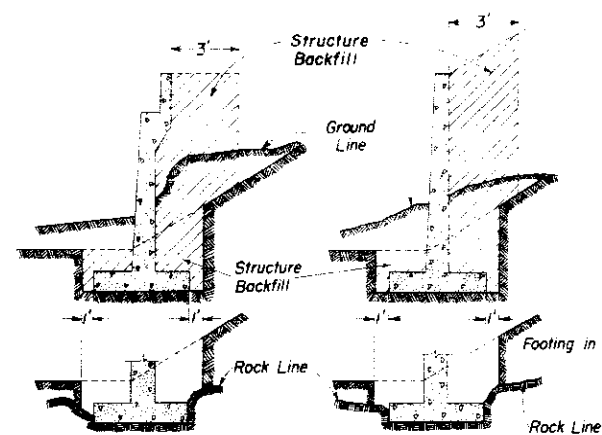


## SIPHONS OR CONDUIT IN TRENCH

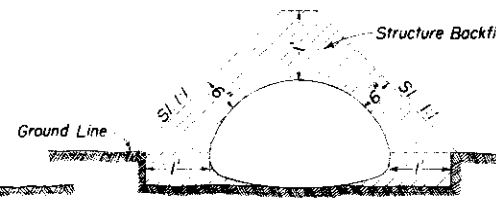


## PIERS, ABUTMENTS, RETAINING WALLS ETC.

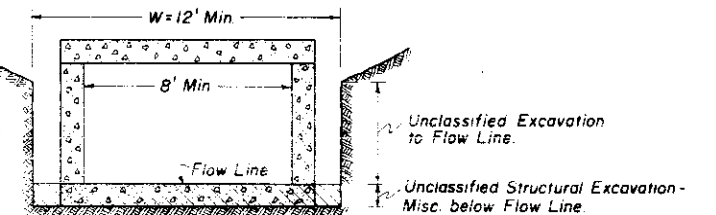
All material that is to be compacted shall be placed in horizontal layers not more than 6" inches in depth and compacted before the next layer is placed. For Arches, Rigid Frames and Box Culverts the fill shall be brought up uniformly on both sides of the center of structure to avoid stresses in the structure caused by unsymmetrical loading.



## ELLIPTICAL OR ARCH CONDUIT



On all structures of 8' span or over, including extensions of old structures, excavation for structures shall be classified and paid for as "Unclassified Excavation" to Flow Line and "Unclassified Structural Excavation - Misc." below the Flow Line of box.

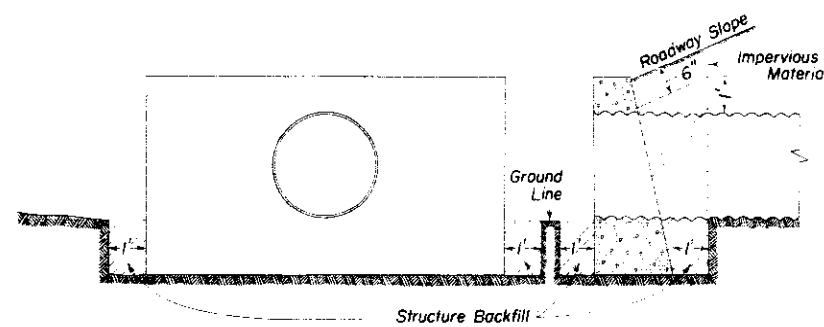


## GENERAL NOTES

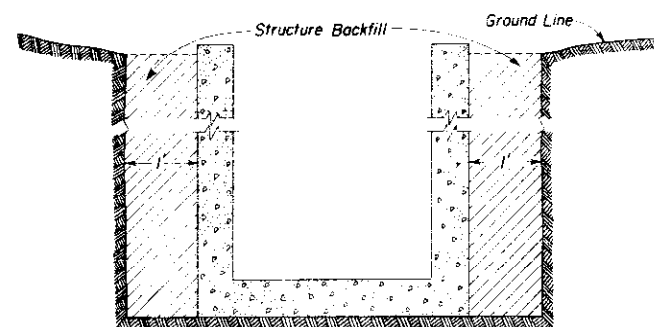
All work shall be done according to the Standard Specifications of the Colorado Department of Highways applicable to the Project.  
If, in the opinion of the Engineer, the material beneath the Structure is of such character as to cause unequal settlement along the length of the Structure, the material shall be removed to such a depth ordered, and backfilled with gravel or Structure Backfill and compacted in accordance with Item 16 of the Standard Specifications.

For concrete box culverts located where roadway cross section is in Fill, embankment shall be built up and compacted to a point one (1) ft. above flow line of box. The trench shall then be excavated as shown to accommodate construction of the box.

## HEADWALLS AND END OF CULVERTS



## DROP INLETS, DIVISION BOXES, INTERCEPTING HEADWALLS ETC.



**COLORADO**  
DEPARTMENT OF HIGHWAYS

**BACKFILL**  
AROUND STRUCTURES

Designed by H.E.P.    Approved by *L.S. Newbold*  
Made by D.M.E.        Bridge Engineer  
Checked by L.E.O.     Date: *May 2, 1968*

# STANDARD M-46-A

(MAY 1, 1962)

FED. ROAD REGION NO.	DIVISION	PROJECT NO.	SHEET NO.
9	COLO.		

## NO. 12 CONCRETE INLET

## NO. 13 CONCRETE INLET

### BAR LIST FOR H = 3' 0"

MARK	SIZE	NO. REQD.	LENGTH	TYPE	DIMENSIONS		BENDING DIAGRAM
					p	q	
Steps	+	Note	3'-4"	+			
401	1/2"	4	12'-10"	II	3'-5"	2'-1"	
402	1/2"	7	6'-1"	I	2'-0"	2'-1"	
403	1/2"	4	7'-5"	I	3'-4"	2'-1"	
404	1/2"	2	2'-7"	STR.			

▲ Omit Steps when H is 4'-0" or less.  
 \* These dimensions to be increased in increments of 6" for H above 3'-0".  
 Add 1-401 for each 6" additional height above 3'-0".  
 Steps required as follows:  
 H= 4'-6" to 5'-6" 1 Step  
 H= 6'-0" to 7'-0" 2 Steps  
 H= 7'-6" to 8'-6" 3 Steps  
 Cut or bend bars around pipes as required.

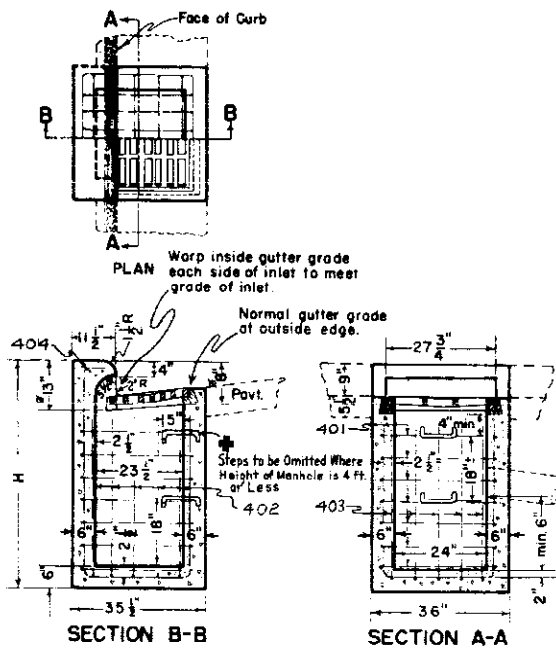
See Plans for size and locations of outlets.

### BAR LIST FOR H = 3' 0"

MARK	SIZE	NO. REQD.	LENGTH	TYPE	DIMENSIONS		BENDING DIAGRAM
					l	m	
Steps	+	Note	3'-4"	+			
401	1/2"	3	11'-10"	II	2'-6"	2'-6"	
402	1/2"	5	5'-6"	II	2'-5"	1'-7"	
403	1/2"	5	7'-7"	I	2'-7"	1'-6"	
404	1/2"	2	2'-7"	STR.			

▲ Omit Steps when H is 4'-0" or less.  
 \* These dimensions to be increased in increments of 6" for H above 3'-0".  
 Add 1-401 for each 6" additional height above 3'-0".  
 Steps required as follows:  
 H= 4'-6" to 5'-6" 1 Step  
 H= 6'-0" to 7'-0" 2 Steps  
 H= 7'-6" to 8'-6" 3 Steps  
 Cut or bend bars around pipes as required.

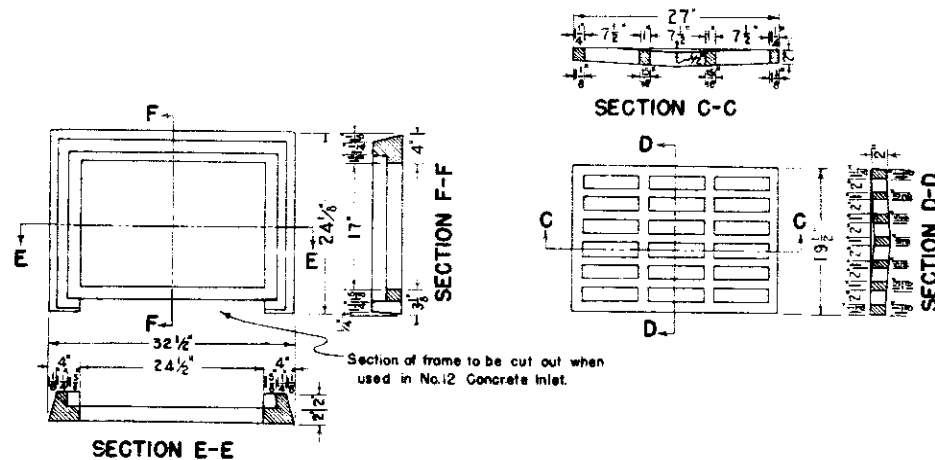
See Plans for size and locations of outlets.



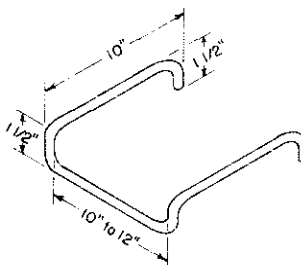
These dimensions for 6" curb. Dimensions to be modified as required for other heights of curb.

### NO. 12 INLET GRATING & FRAME

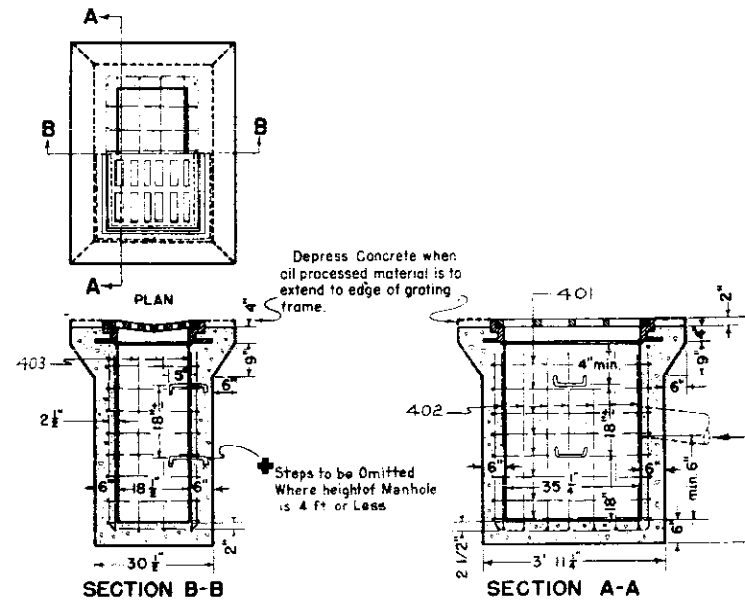
Approx. Weight 340 lbs.



### DETAIL OF INLET STEP

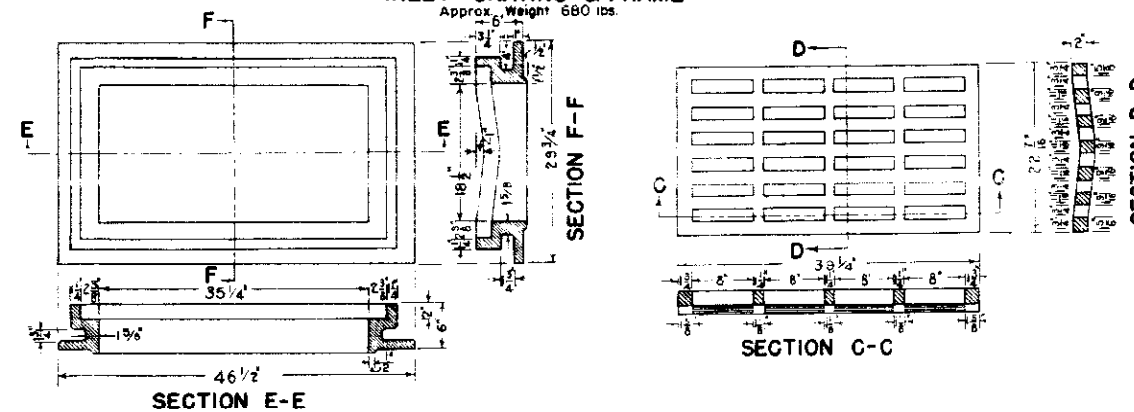


▲ All Steps shall be 3/4" A-7 Steel Bars and shall be galvanized per ASTM Designation A123-59. Steps for inlets shall be included for payment under "Reinforcing Steel."



### NO. 13 INLET GRATING & FRAME

Approx. Weight 680 lbs.



H	CLASS "A" CONCRETE CU YDS	X REINFORCING STEEL
3' 0"	0.54	70 lbs.
3' 6"	0.63	85 "
4' 0"	0.72	100 "
4' 6"	0.81	119 "
5' 0"	0.90	137 "
5' 6"	0.99	152 "
6' 0"	1.08	166 "
6' 6"	1.17	185 "
7' 0"	1.27	200 "
7' 6"	1.36	215 "
8' 0"	1.45	233 "
8' 6"	1.54	248 "
9' 0"	1.63	263 "
9' 6"	1.73	282 "
10' 0"	1.82	297 "

\* Volume occupied by pipes not to be deducted from Structure.

\* Includes 1% allowance for overrun.

### GENERAL NOTES

All work shall be done in accordance with the Standard Specifications of the Colorado Department of Highways applicable to this Project  
 All concrete shall be class "A"  
 All concrete walls shall be formed on both sides.  
 All exposed concrete corners shall be beveled to a 1" face.  
 All reinforcing bars shall be deformed, of intermediate grade, and shall be tagged with bar designation and station number.

ALL DIMENSIONS NOT SHOWN AS CLEAR ARE TO FACE OF BAR.

### QUANTITIES

H	CLASS "A" CONCRETE CU YDS	X REINFORCING STEEL
3' 0"	.86	84 lbs.
3' 6"	.96	100 "
4' 0"	1.06	116 "
4' 6"	1.16	136 "
5' 0"	1.26	156 "
5' 6"	1.36	172 "
6' 0"	1.46	192 "
6' 6"	1.57	208 "
7' 0"	1.67	225 "
7' 6"	1.77	245 "
8' 0"	1.87	261 "
8' 6"	1.97	277 "
9' 0"	2.07	297 "
9' 6"	2.17	313 "
10' 0"	2.28	329 "

\* Volume occupied by pipes not to be deducted from Structure.

\* Includes 1% allowance for overrun.

REVISIONS		
4-19-63	Rev. Steps	L.E.O.
7-2-63	Rev. Step Dimension	L.E.O.

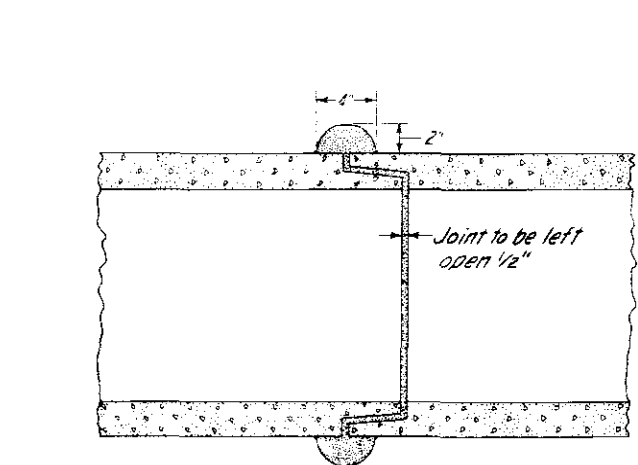
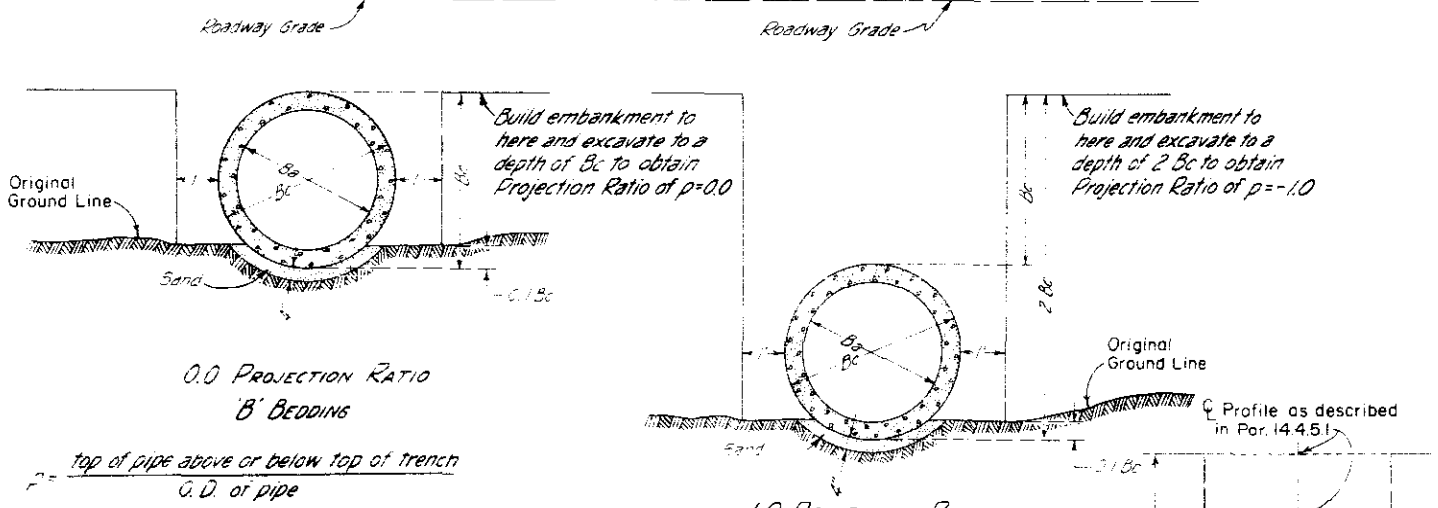
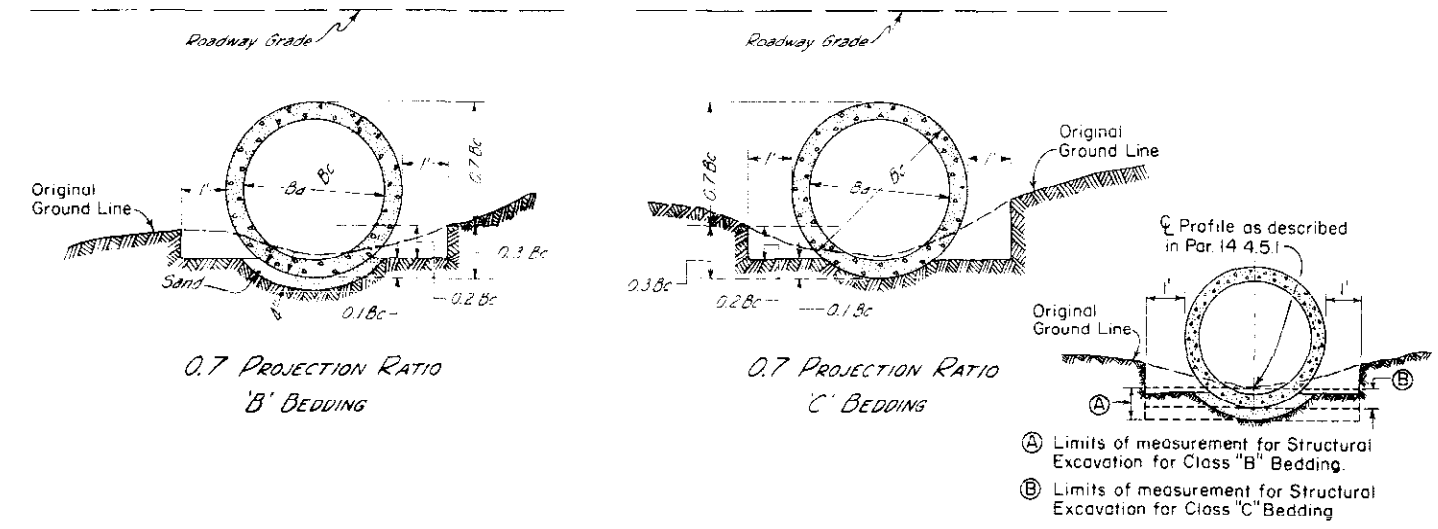
COLORADO DEPARTMENT OF HIGHWAYS  
 NO. 12 AND NO. 13 CONCRETE INLETS

Designed by A.P.G.  
 Made by A.P.G.  
 Check Design A.Z.  
 Check Detail C.R.S. Date May 17, 1962

# STANDARD M-52-A

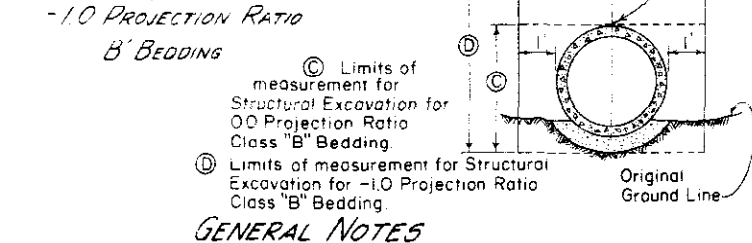
(MAY 1, 1962)

FED. ROAD REG. NO.	DIVISION	PROJECT NO.	SHEET NO.
9	COLO		



**CONCRETE OR MORTAR PIPE JOINT**

Where the flow line grade of the pipe is 10% or greater, all pipe shall be the Bell and Spigot type or shall be Tongue and Groove pipe with concrete collars as detailed above or a type approved in writing by the Engineer.



**GENERAL NOTES**

All work shall be done according to the Standard Specifications of the Colorado Department of Highways applicable to the Project.

The Height of Fill for each culvert shall determine the bedding and class of concrete pipe to be used (See table herewith). Location, length and inside diameter of pipe, and class of pipe required shall be shown on plans. Type 'B' bedding is to be used in solid rock.

Details for placement of structure backfill materials are shown elsewhere in plans.

When projection ratios of 0.0 or -1.0 are used, backfilling above structure backfill material shall be made with materials excavated in order to produce the projection ratio. Cost of this backfilling is to be included in the contract unit price for Item 52. If material does not stand with a vertical face when attempting to produce 0.0 or -1.0 projection ratios, this standard is not applicable.

APPROVED COMBINATIONS OF HEIGHT OF FILL - PROJECTION RATIO - BEDDING - CLASS

B <sub>2</sub>	HEIGHT OF FILL	PROJECTION RATIO	BEDDING	CLASS
12"	*-7'	0.7	C	II
	7'-10'	0.7	C	III
	10'-15'	0.7	C	IV
	15'-19'	0.7	B	IV
	19'-29'	0.0	B	IV
	29'-42'	0.0	B	V
15"	*-8'	0.7	C	II
	8'-11'	0.7	C	III
	11'-16'	0.7	C	IV
	16'-20'	0.7	B	IV
	20'-30'	0.0	B	IV
	30'-44'	0.0	B	V
	44'-47'	-1.0	B	V
18"	*-8'	0.7	C	II
	8'-11'	0.7	C	III
	11'-16'	0.7	C	IV
	16'-20'	0.7	B	IV
	20'-30'	0.0	B	IV
	30'-45'	0.0	B	V
	45'-51'	-1.0	B	V
21"	*-8'	0.7	C	II
	8'-11'	0.7	C	III
	11'-17'	0.7	C	IV
	17'-21'	0.7	B	IV
	21'-31'	0.0	B	IV
	31'-46'	0.0	B	V
	46'-53'	-1.0	B	V
24"	*-9'	0.7	C	II
	9'-12'	0.7	C	III
	12'-17'	0.7	C	IV
	17'-22'	0.7	B	IV
	22'-31'	0.0	B	IV
	31'-46'	0.0	B	V
	46'-58'	-1.0	B	V
27"	*-9'	0.7	C	II
	9'-13'	0.7	C	III
	13'-18'	0.7	C	IV
	18'-22'	0.7	B	IV
	22'-32'	0.0	B	IV
	32'-49'	0.0	B	V
	49'-61'	-1.0	B	V
30"	*-9'	0.7	C	II
	9'-12'	0.7	C	III
	12'-18'	0.7	C	IV
	18'-22'	0.7	B	IV
	22'-32'	0.0	B	IV
	32'-49'	0.0	B	V
	49'-62'	-1.0	B	V
33"	*-9'	0.7	C	II
	9'-13'	0.7	C	III
	13'-18'	0.7	C	IV
	18'-23'	0.7	B	IV
	23'-33'	0.0	B	IV
	33'-50'	0.0	B	V
	50'-65'	-1.0	B	V
36"	*-10'	0.7	C	II
	10'-13'	0.7	C	III
	13'-19'	0.7	C	IV
	19'-23'	0.7	B	IV
	23'-34'	0.0	B	IV
	34'-51'	0.0	B	V
	51'-67'	-1.0	B	V
42"	*-10'	0.7	C	II
	10'-13'	0.7	C	III
	13'-18'	0.7	C	IV
	18'-22'	0.7	B	IV
	22'-34'	0.0	B	IV
	34'-51'	0.0	B	V
	51'-69'	-1.0	B	V
48"	*-11'	0.7	C	II
	11'-14'	0.7	C	III
	14'-19'	0.7	C	IV
	19'-24'	0.7	B	IV
	24'-34'	0.0	B	IV
	34'-53'	0.0	B	V
	53'-71'	-1.0	B	V

REVISIONS

NO.	DESCRIPTION

**COLORADO**  
DEPARTMENT OF HIGHWAYS

**REINFORCED CONCRETE PIPE**

Checked by LEO Date: May 16, 1960

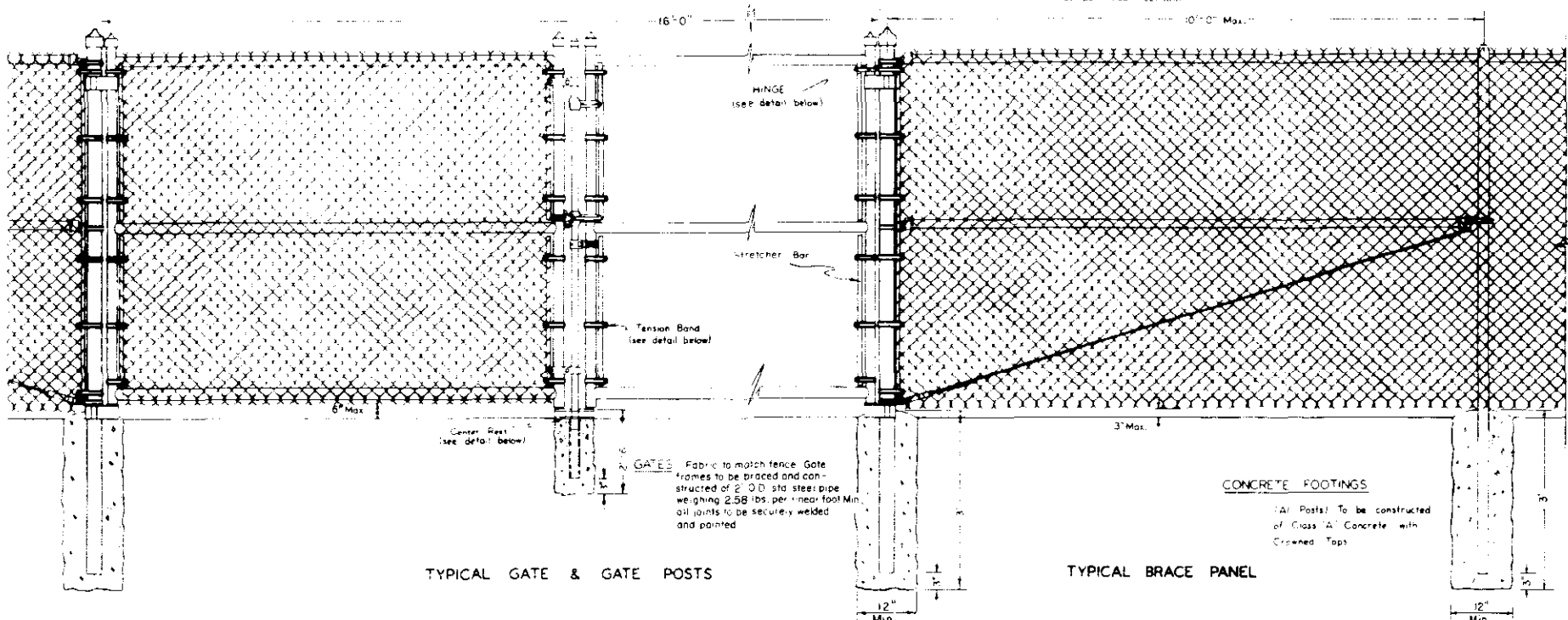
# STANDARD M-78-A

(MAY 1, 1962)

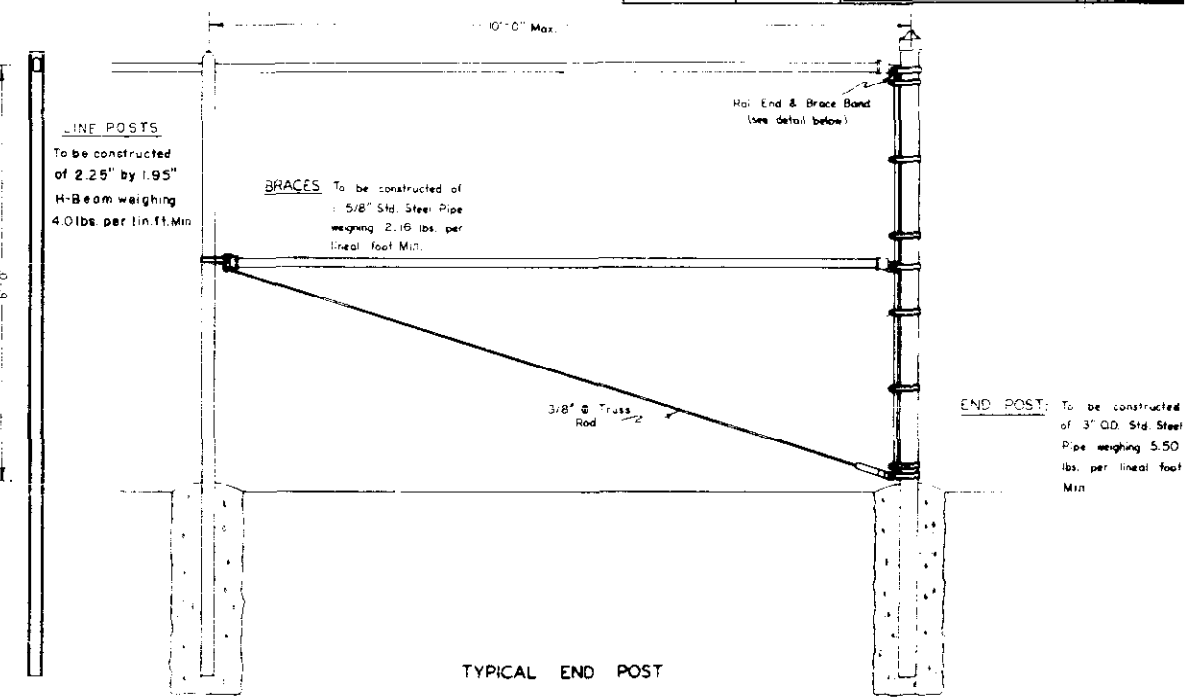
FED. ROAD REG NO.	DIVISION	PROJECT NO.	SHEET NO.
9	COLORADO		

**TOP RAIL:** To be constructed of 1 5/8" O.D. Std. Steel Pipe weighing 2.16 lbs. per lineal foot Min.

**GATE POSTS:** To be constructed of 3" O.D. std. steel pipe weighing 5.50 lbs. per lineal foot Min.



TYPICAL GATE & GATE POSTS

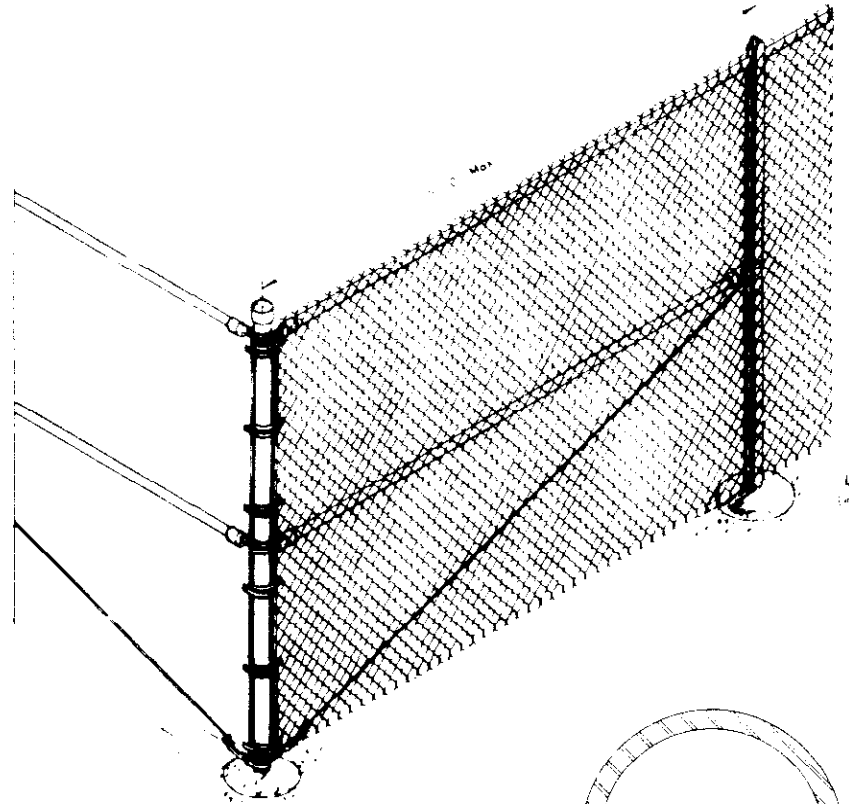


TYPICAL END POST

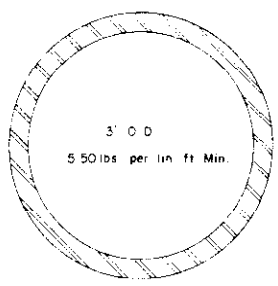
**CONCRETE FOOTINGS:** (All Posts) To be constructed of Class "A" Concrete with Crowned Top.

TYPICAL LINE POST  
(See alternate below)

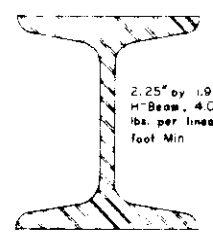
ITEM NO.	ITEM	UNIT
78	Chain Link Wire Mesh Fence	Lin. Ft.
78	Double Driveway Gates	Each



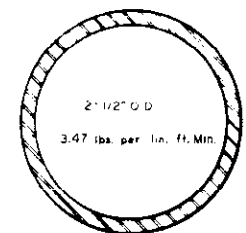
TYPICAL CORNER SECTION WITH POST & BRACES



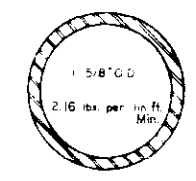
TERMINAL POSTS



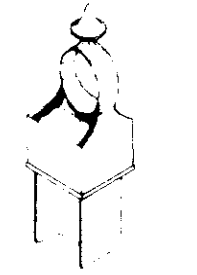
H-BEAM LINE POST



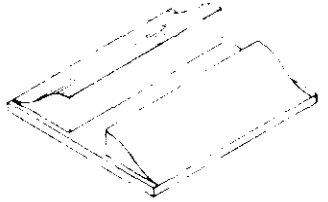
ALTERNATE LINE POST



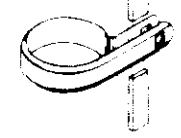
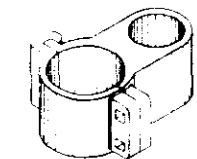
BRACE RAIL & TOP RAIL



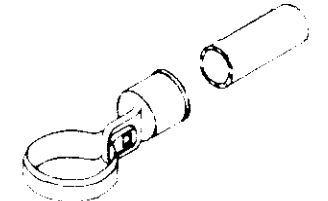
LINE POST TOP  
(see view of punched & painted posts)



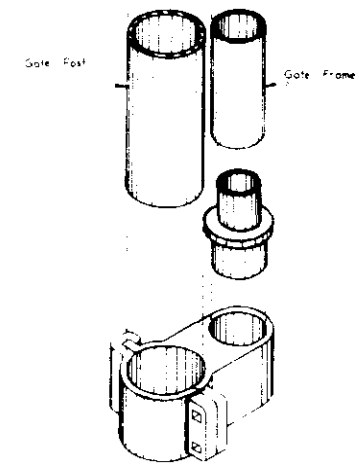
CENTER REST



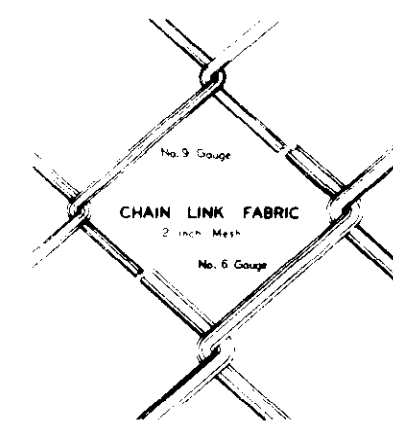
TENSION BAND



BRACE BAND & RAIL END



HINGE ASSEMBLY



All Fabric shall be No. 9 Gauge with a barbed finish on the top and bottom selvage unless otherwise specified. It shall meet ASTM 392-59T, Class I.

**GENERAL NOTES**

- All work shall be done in accordance with the Standard Specifications of the Colorado State Highway Department applicable to the project.
- Weights of Pipe as shown are the minimum allowed for the nominal Diameters designated.
- Alternate Equipment Standard Fittings, Gates, Posts, and Rails of other than sections shown will be acceptable subject to the Engineer's approval.
- See Plan Sheets for Location and Number of Gates and Length of Fence required.
- Wire Mesh Fabric shall be securely fastened to all Line Posts, Rails and Braces with No. 7 (B&S) Gauge Aluminum and/or No. 12-1/2 (W&M) Gauge Galvanized Steel Wire and spaced at a minimum of 6 per 10 feet horizontally & 1 per foot vertically. Suitable Attachment Bands shall be used on all Gate Posts, End Posts, Braces and Stretcher Bars.

**COLORADO**  
**DEPARTMENT OF HIGHWAYS**

**CHAIN LINK FENCE**

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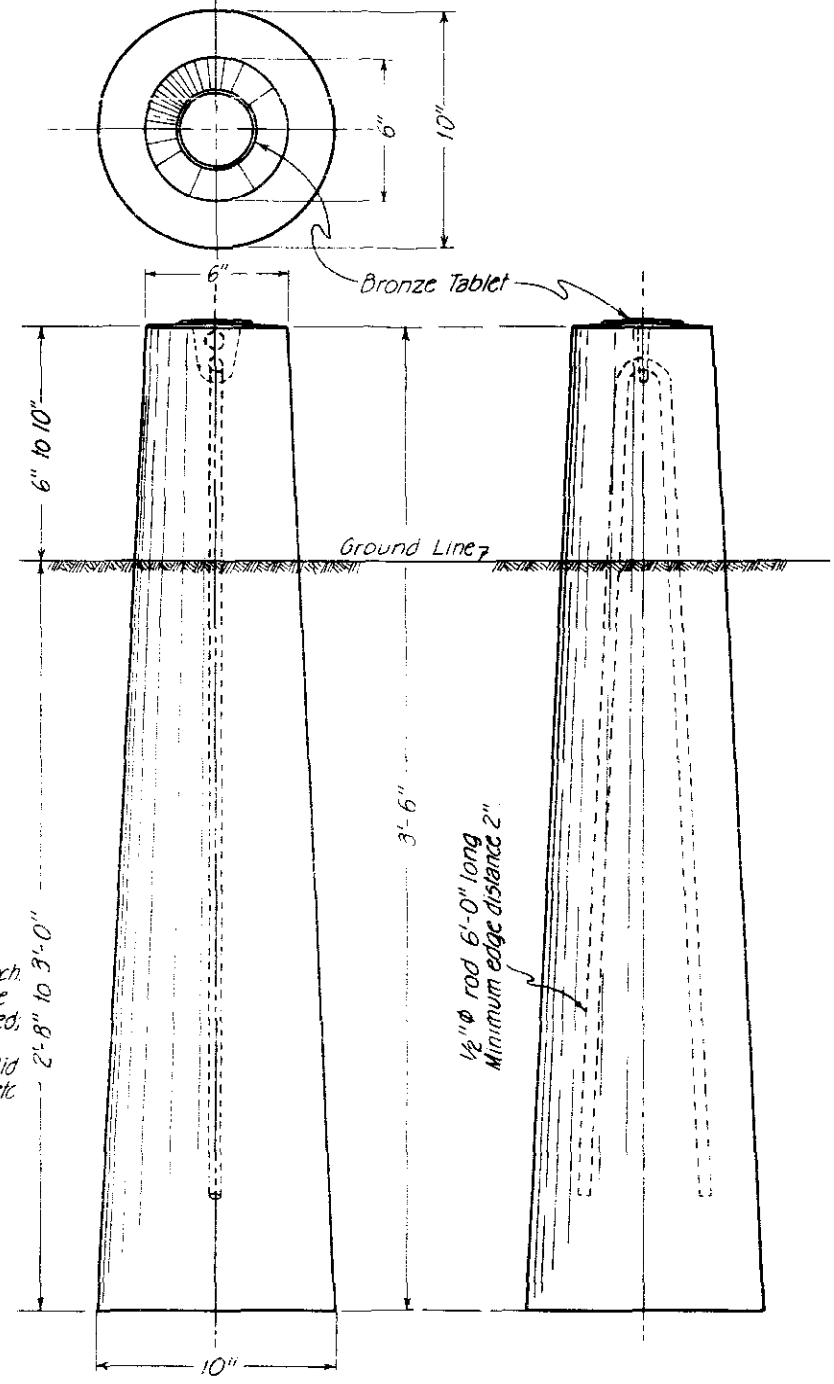
Designed by: V.L.A. Approved by: *[Signature]*  
 Made by: E.L.H. Design Engineer  
 Checked by: \_\_\_\_\_ Date: 9-1-56

# RIGHT OF WAY MARKER POST STANDARD M-81-A

(MAY 1, 1962)

FEDERAL ROAD REG. NO.	DIVISION	PROJECT NO.	SHEET NO.
5	COLORADO		

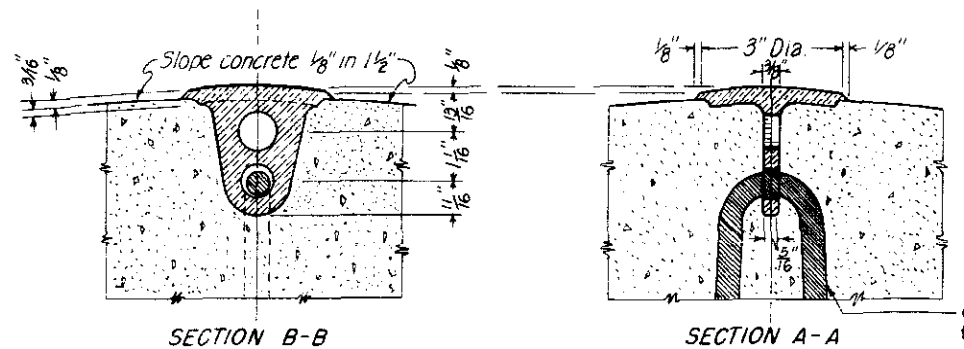
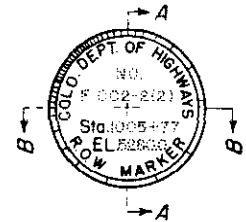
REVISIONS	



**NOTES FOR R.O.W. MARKER POSTS**

All work shall be done in accordance with the Standard Specifications of the Colorado Department of Highways applicable to the project. Posts shall be made of Class 'A' Concrete. The upper 12 inches of marker posts shall be rubbed free of form marks, and the top surface of the post must be constructed to drain thoroughly.

All exposed surfaces of the bronze tablet are to be ground to a smooth surface. All letters are to be depressed a minimum of 1/16 inch. Information on the bronze tablet indicated by pin lines is to be stamped in field by the engineering party after post is placed. 3/16 inch letters and figures to be used. Project designations on tablets shall be properly shown (i.e., I for Fed. Aid Interstate, F for Fed. Aid Primary, S for Fed. Aid Secondary, etc. & C. for State Projects. see detail below.)



**DETAIL OF BRONZE TABLET FOR RIGHT OF WAY MARKER POST AND BENCH MARK**

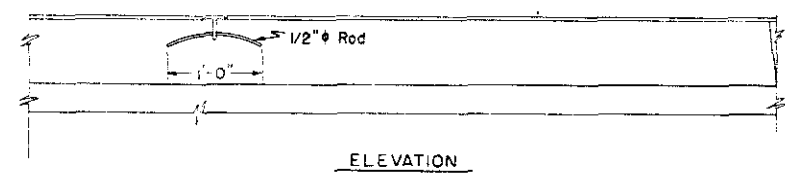
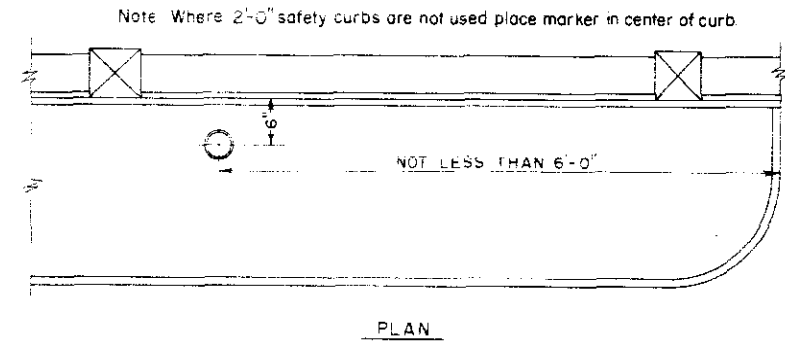
**BENCH MARK**

All work shall be done in accordance with Standard Specifications of the Colorado Department of Highways applicable to the project.

All exposed surfaces of the bronze tablet are to be ground to a smooth surface. All letters are to be depressed a minimum of 1/16 inch. Information on the bronze tablet indicated by pin lines is to be stamped in field by the engineering party after marker is placed. 3/16 inch letters and figures to be used. Project designation on tablets shall be properly shown (i.e.; I for Fed. Aid Interstate, F for Fed. Aid Primary, S for Fed. Aid Secondary, etc. & C for State Projects. See details below).

Bronze Bench Mark Tablets will be furnished by the Department at no expense to the Contractor.

Installation of Bronze Bench Mark Tablets will not be paid for directly, but shall be included in the price bid for Concrete



One marker to be placed on Bridges as shown. The station shown on marker shall be the center-line stationing directly opposite the marker.

**COLORADO DEPARTMENT OF HIGHWAYS**

**MARKER POSTS AND BENCH MARKS**

Designed by R.E.L. Approved by *A. Julian*  
 Made by E.E.O. Date: Nov. 12, 1953  
 Checked by R.E.L.

# STANDARD CURBS AND GUTTERS

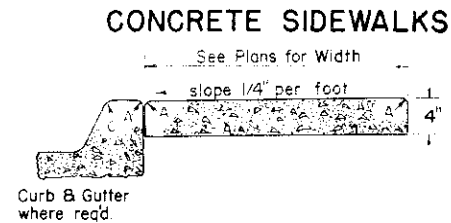
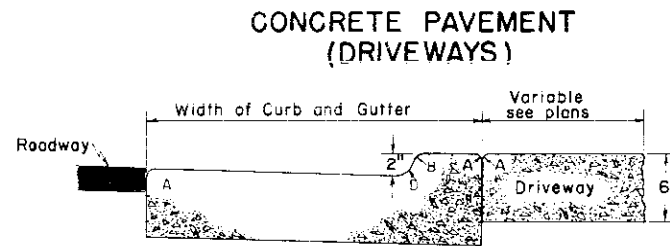
# STANDARD M-84-A

(MAY 1, 1962)

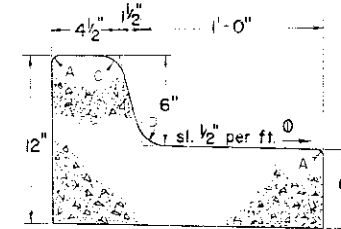
FED. ROAD REG. NO.	DIVISION	PROJECT NO.	SHEET NO.
3	COLC.		

REVISIONS		
3-25-63	Added Approach Slab Curbs.	C.R.S.

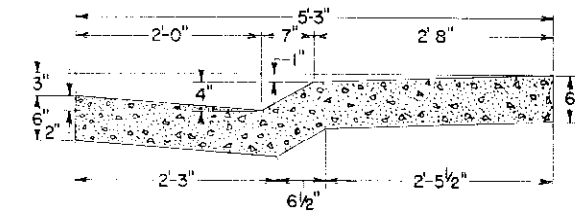
LEGEND FOR RADII	
A	= 1/2"
B	= 1"
C	= 1 1/2"
D	= 1/2' to 2'



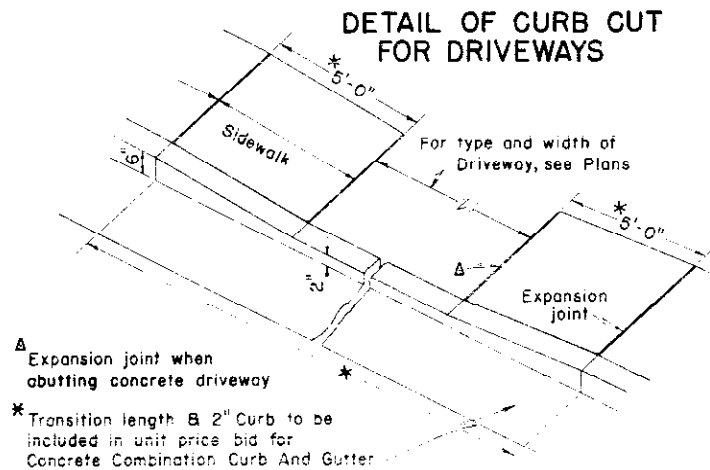
CONCRETE COMBINATION CURB AND GUTTER (6" Barrier-1' Gutter) (Type I)



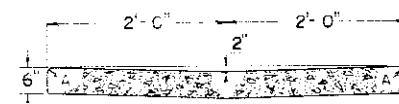
CONCRETE COMBINATION CURB, GUTTER AND SIDEWALK (TYPE II-M)



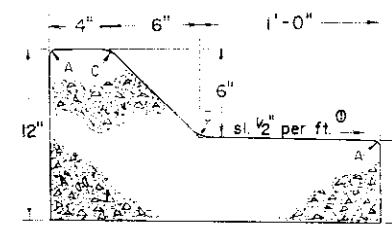
DETAIL OF CURB CUT FOR DRIVEWAYS



CONCRETE GUTTER

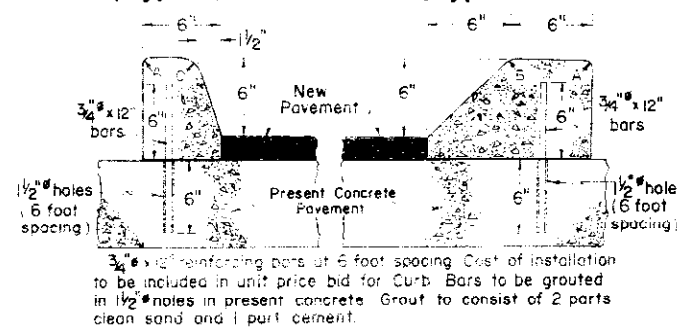


CONCRETE COMBINATION CURB AND GUTTER (6" Mountable-1' Gutter) (Type I-M)

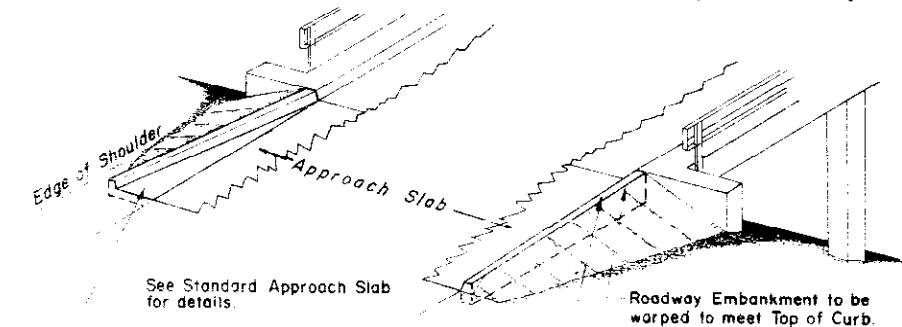


CONCRETE CURB (6" Barrier-Doweled) (Type I)

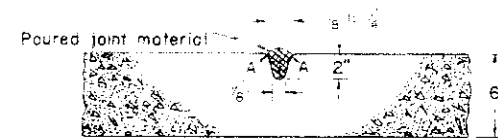
CONCRETE CURB (6" Mountable-Doweled) (Type I-M)



DETAILS OF CONCRETE COMBINATION CURB & GUTTER (VARIABLE) AND CONCRETE CURB (VARIABLE)

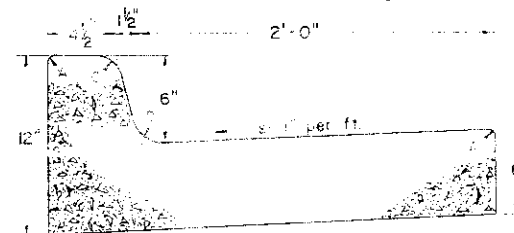


TRANSVERSE WEAKENED PLANE JOINT FOR CONCRETE PAVEMENT (DRIVEWAYS)



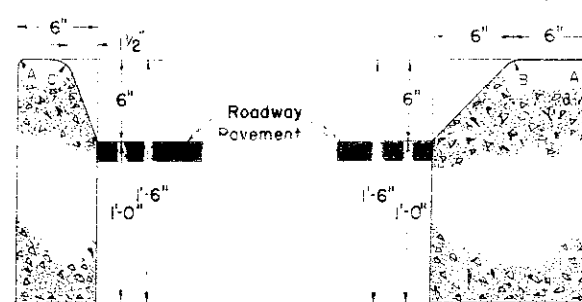
This joint required where length of slab exceeds 15 feet

CONCRETE COMBINATION CURB AND GUTTER (6" Barrier-2' Gutter) (Type II)

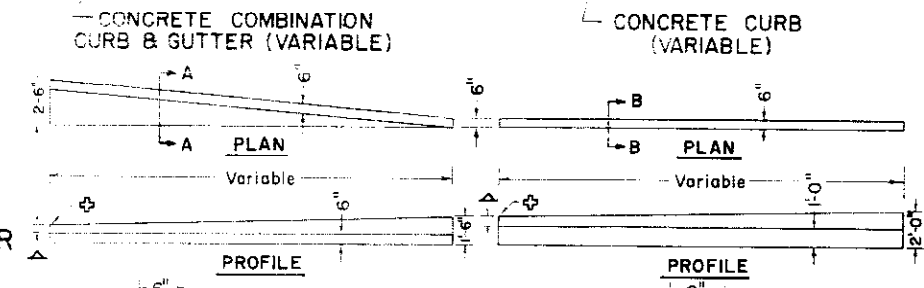
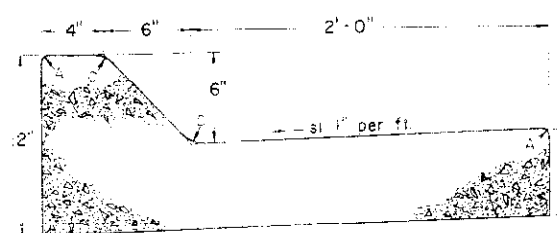


CONCRETE CURB (6" Barrier) (Type II)

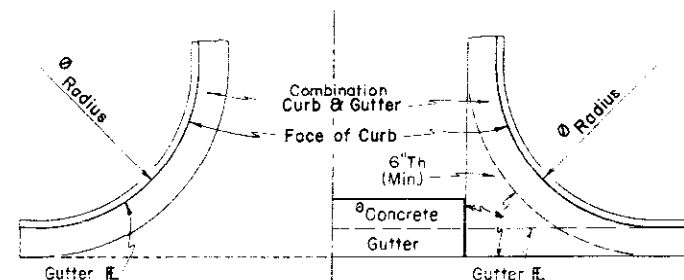
CONCRETE CURB (6" Mountable) (Type II-M)



CONCRETE COMBINATION CURB AND GUTTER (6" Mountable-2' Gutter) (Type II-M)



CONSTRUCTION OF CONCRETE GUTTERS AT INTERSECTIONS

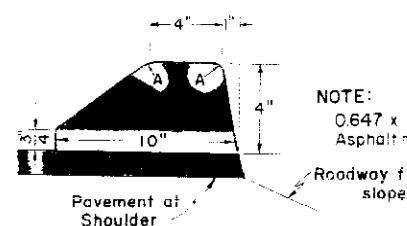


Length of Radius as shown elsewhere on Plans.

This section to be built when Concrete Gutter is not required.

This section to be built when Concrete Gutter is required.

ASPHALTIC SHOULDER ROLL



NOTE: 0.647 x Specific Gravity of Asphalt = Tons per Station.

GENERAL NOTES

All work shall be done in accordance with the Specifications of the Colorado Department of Highways.

On Curves 3 degrees and sharper, Curbs and/or Gutters are to be placed on the Arc of the Curve unless otherwise noted on plans. A maximum chord length of 10 feet may be used when the degree of curve is less than 3 degrees.

- 4" (To meet Asphaltic Shoulder Roll)
- 6" (To meet Concrete Combination Curb & Gutter)
- Use 1/2" R when no asphaltic or concrete curb is to be met. No radius required when meeting asphaltic or concrete curb.

COLORADO DEPARTMENT OF HIGHWAYS

CURBS AND GUTTERS

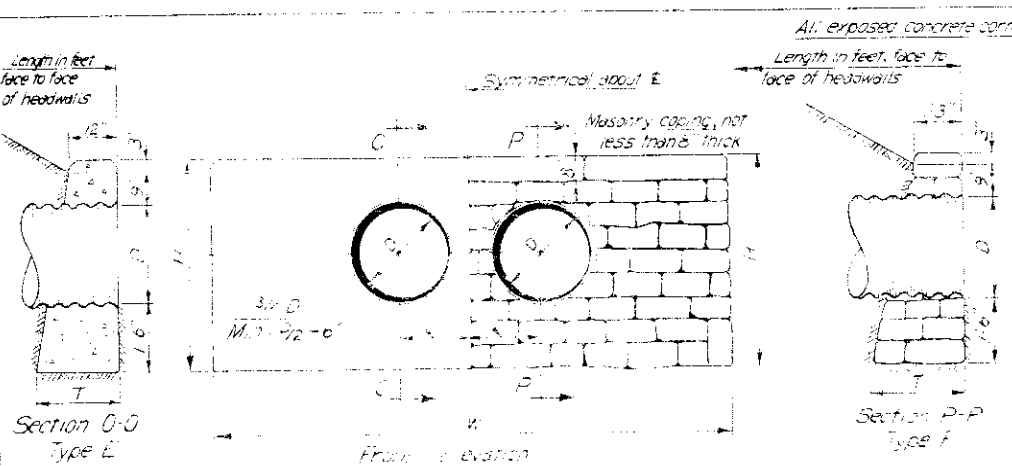
Designed by *[Signature]* Approved by *[Signature]*  
 Made by *[Signature]* Checked by *[Signature]*  
 Date: *[Date]* 24 19 58

# STANDARD M-95-A

(MAY 1, 1962)

FEDERAL ROAD REG. NO.	DIVISION	PROJECT NO.	SHEET NO.
3	COLORADO		

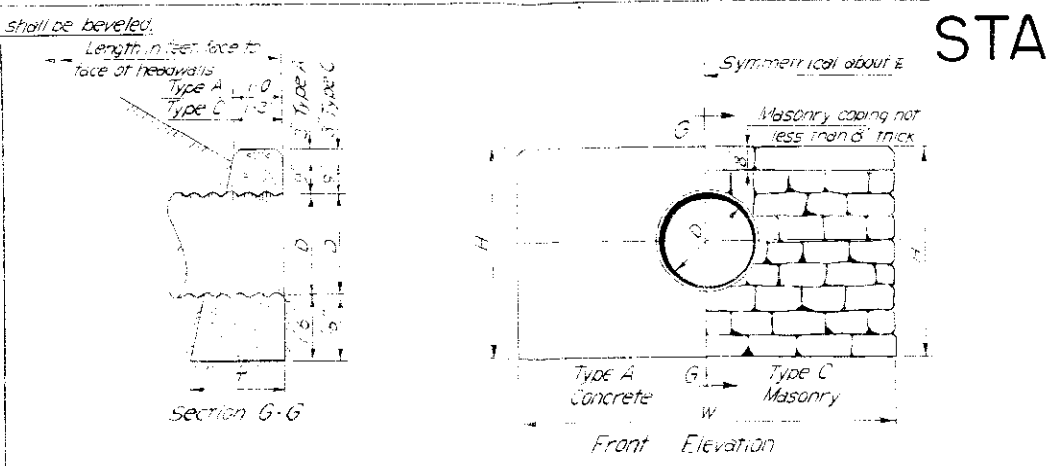
REVISIONS



STANDARD HEADWALLS FOR DOUBLE CORRUGATED METAL PIPE CULVERTS

Table of Dimensions and Quantities

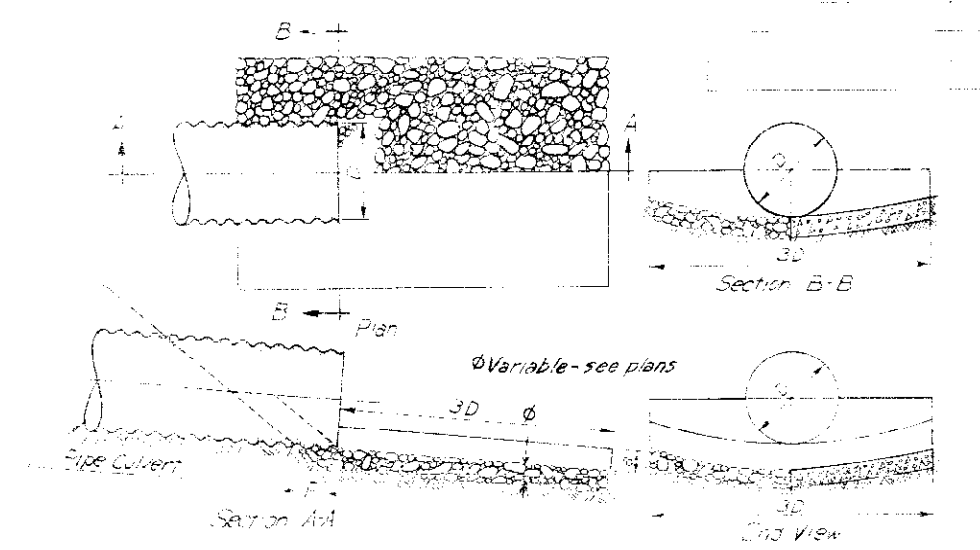
Type E		Both Types		Type F	
Diag.	T	W	H	W	H
5	1-6	3-0	3-9	3-0	3-9
18	1-7	3-3	4-0	3-3	4-0
24	1-10	4-4	4-6	4-4	4-6
30	2-0	6-1	5-0	6-1	5-0
36	2-2	8-1	5-6	8-1	5-6
42	2-3	10-2	6-0	10-2	6-0
48	2-7	13-6	6-6	13-6	6-6



STANDARD HEADWALLS FOR SINGLE CORRUGATED METAL PIPE CULVERTS

Table of Dimensions and Quantities

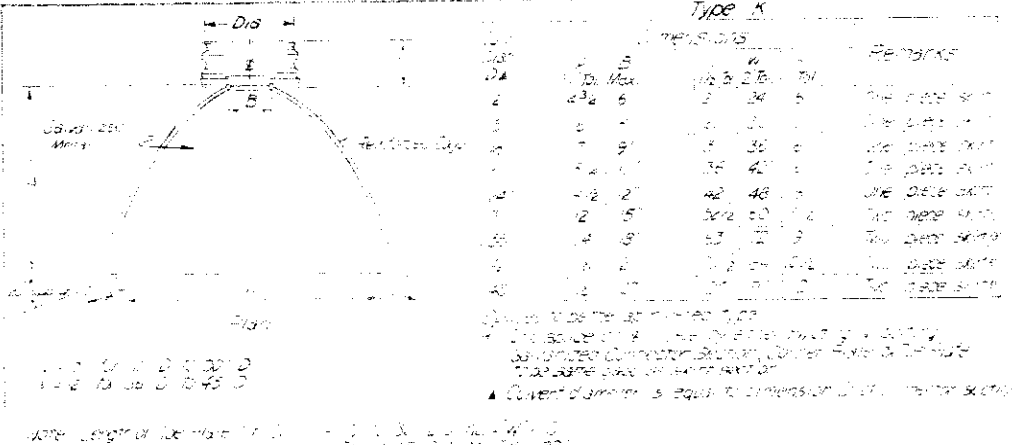
Type A		Both Types		Type C	
Diag.	T	W	H	W	H
15	1-6	3-0	3-9	3-0	3-9
18	1-7	3-3	4-0	3-3	4-0
24	1-10	4-4	4-6	4-4	4-6
30	2-0	6-1	5-0	6-1	5-0
36	2-2	8-1	5-6	8-1	5-6
42	2-3	10-2	6-0	10-2	6-0
48	2-7	13-6	6-6	13-6	6-6



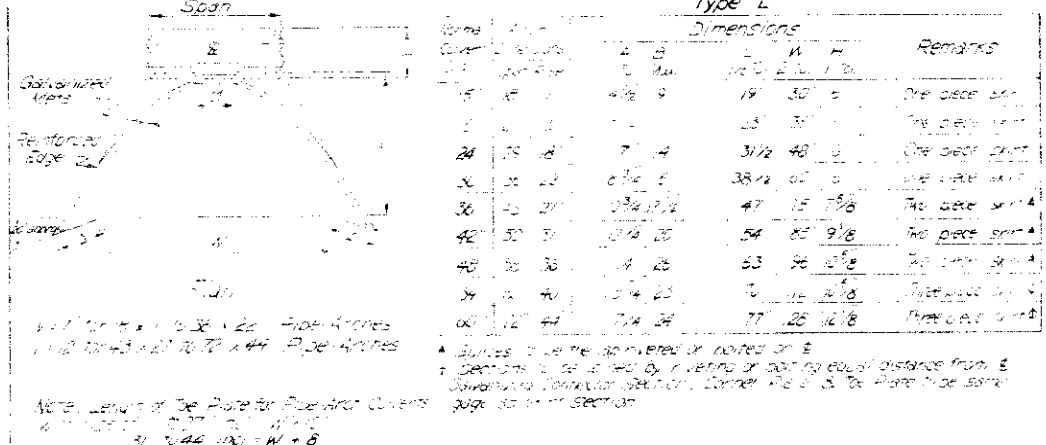
CONCRETE OR GROUTED RUBBLE APRON FOR PIPE CULVERT

Square Yards of Slope and Ditch Paving

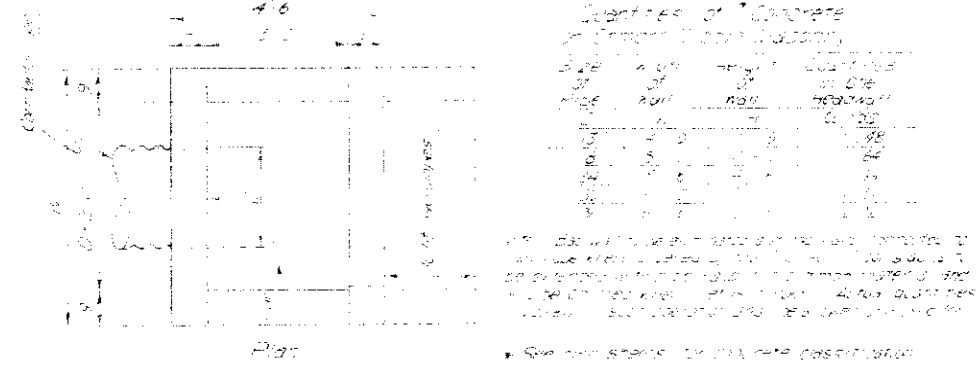
Fill	Slope	Top	Bottom	Side	Ditch	Total
12	1:1	1	1	1	1	4
12	1:1 1/2	1	1	1	1	4
12	2:1	1	1	1	1	4
12	3:1	1	1	1	1	4
12	4:1	1	1	1	1	4
12	5:1	1	1	1	1	4
12	6:1	1	1	1	1	4
12	7:1	1	1	1	1	4
12	8:1	1	1	1	1	4
12	9:1	1	1	1	1	4
12	10:1	1	1	1	1	4
12	12:1	1	1	1	1	4
12	15:1	1	1	1	1	4
12	20:1	1	1	1	1	4
12	25:1	1	1	1	1	4
12	30:1	1	1	1	1	4
12	40:1	1	1	1	1	4
12	50:1	1	1	1	1	4
12	60:1	1	1	1	1	4
12	75:1	1	1	1	1	4
12	100:1	1	1	1	1	4



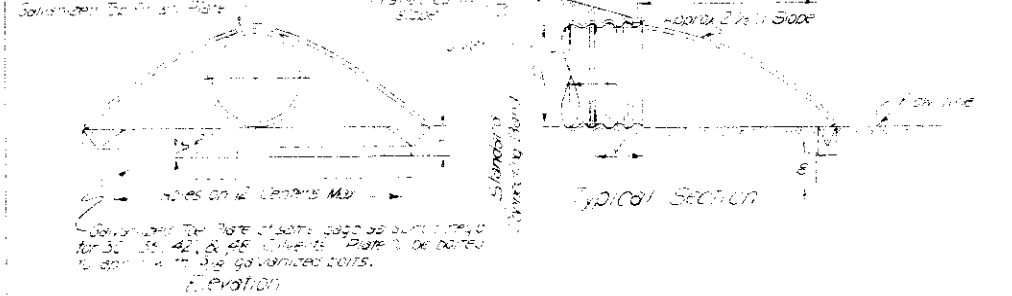
STANDARD METAL APRONS FOR CORRUGATED METAL PIPE CULVERTS TYPE K



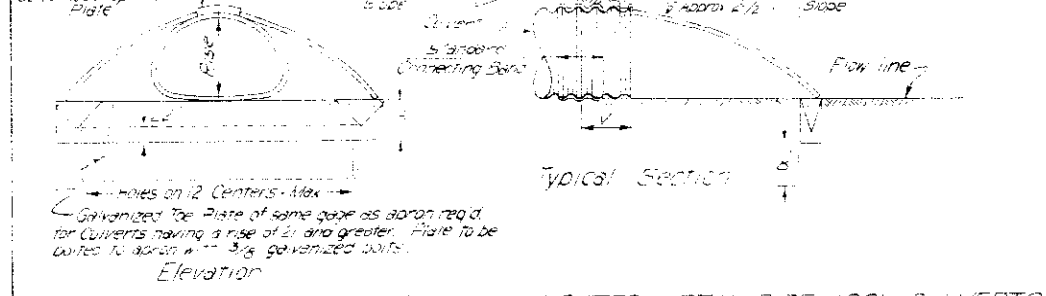
STANDARD METAL APRONS FOR CORRUGATED METAL PIPE ARCH CULVERTS TYPE L



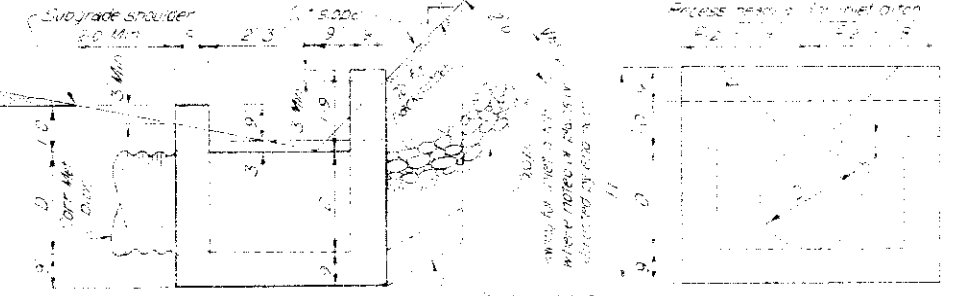
INTERCEPTING HEADWALLS



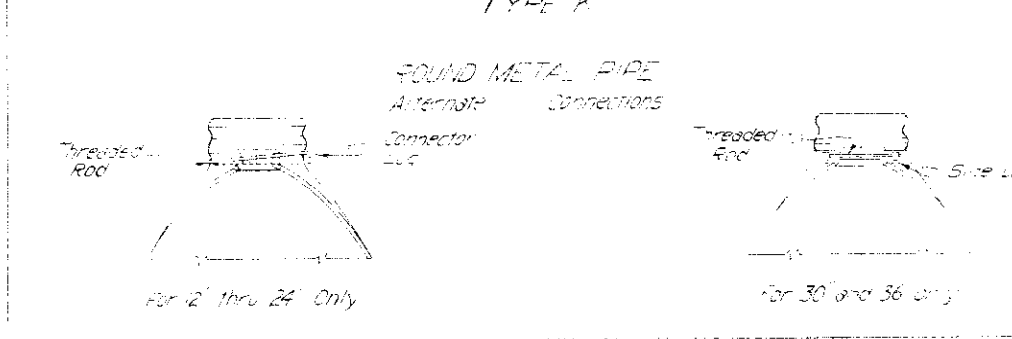
STANDARD METAL APRONS FOR CORRUGATED METAL PIPE CULVERTS TYPE K



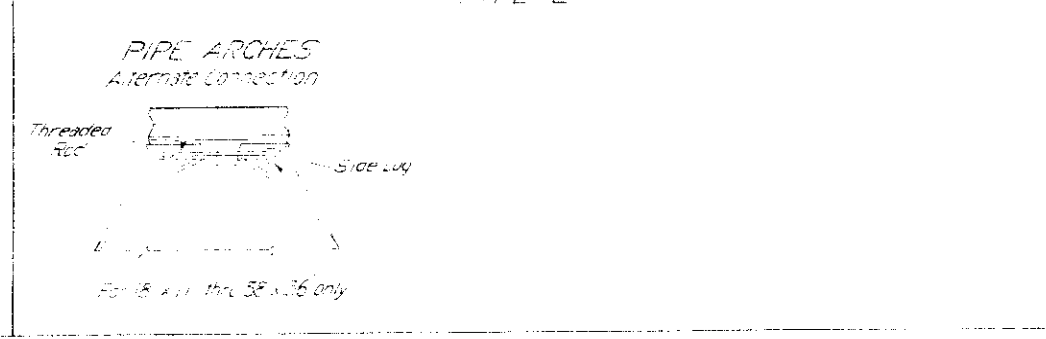
STANDARD METAL APRONS FOR CORRUGATED METAL PIPE ARCH CULVERTS TYPE L



General Notes for All Structures



STANDARD METAL APRONS FOR CORRUGATED METAL PIPE CULVERTS TYPE K



STANDARD METAL APRONS FOR CORRUGATED METAL PIPE ARCH CULVERTS TYPE L

General Notes for All Structures  
 All work shall be done according to the standards specifications of the Colorado Department of Highways and shall be to the Project.

All construction work shall be thoroughly cleaned before fresh concrete is placed.

When culvert is skewed, roadway shall be placed parallel to E of roadway.

DESIGNED BY: [Signature] APPROVED BY: [Signature]  
 DRAWN BY: [Signature] CHECKED BY: [Signature]

**COLORADO DEPARTMENT OF HIGHWAYS**  
**HEADWALLS AND APRONS FOR G.M.P. CULVERTS**

# STANDARD M-152-A

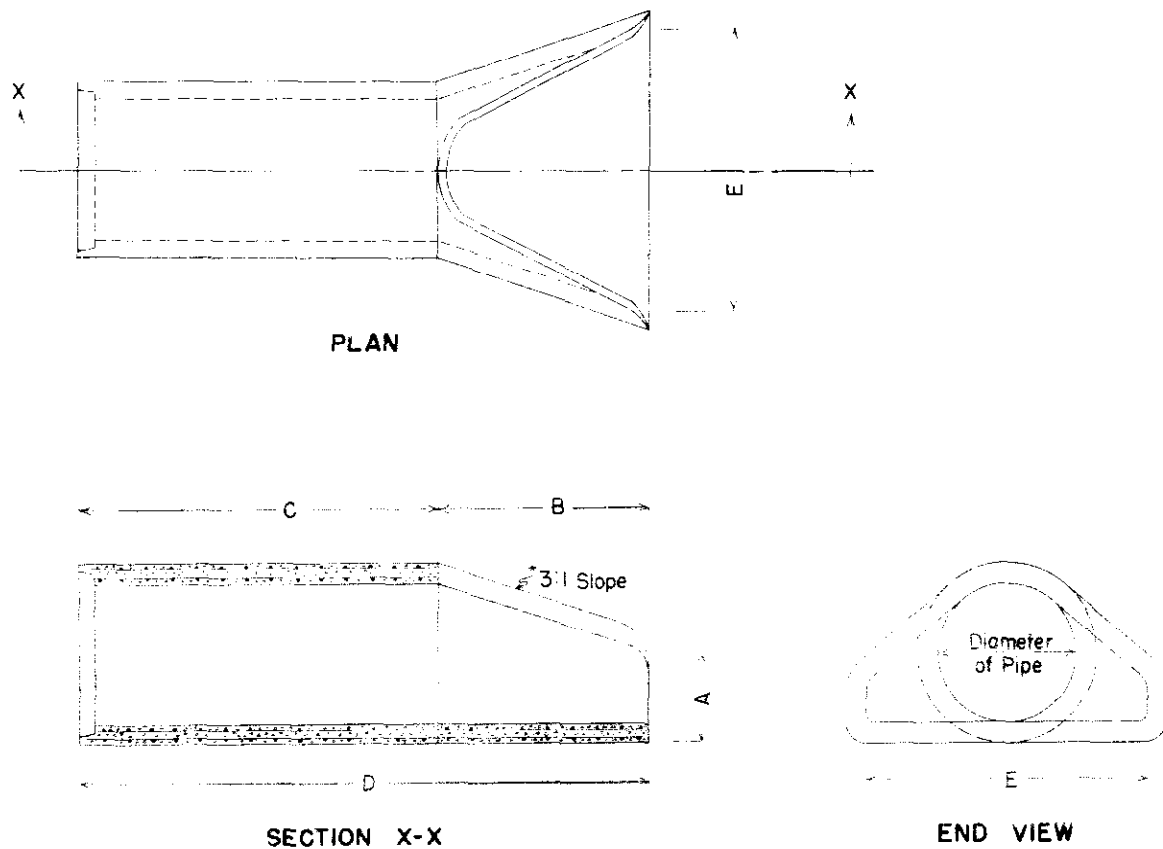
(MAY 1, 1962)

FED. ROAD REG. NO.	DIVISION	PROJECT NO.	SHEET NO.
9	COLO.		

REVISIONS		

FLARED END SECTION FOR CONCRETE PIPE

7°30' ANGLE SECTION FOR CONCRETE PIPE



DIMENSIONS FOR FLARED END SECTIONS

DIAMETER	A	B	C	D	E
12"	4"	2'-0"	4'-0 <sup>7</sup> / <sub>8</sub> "	6'-0 <sup>7</sup> / <sub>8</sub> "	2'-0"
15"	6"	2'-3"	3'-10"	6'-1"	2'-6"
18"	9"	2'-3"	3'-10"	6'-1"	3'-0"
24"	9 <sup>1</sup> / <sub>2</sub> "	3'-7 <sup>1</sup> / <sub>2</sub> "	4'-6"	8'-1 <sup>1</sup> / <sub>2</sub> "	4'-0"
30"	1'-0"	4'-6"	3'-7 <sup>3</sup> / <sub>4</sub> "	8'-1 <sup>3</sup> / <sub>4</sub> "	5'-0"
36"	1'-3"	5'-3"	2'-10 <sup>3</sup> / <sub>4</sub> "	8'-1 <sup>3</sup> / <sub>4</sub> "	6'-0"
42"	1'-9"	5'-3"	2'-11"	8'-2"	6'-6"
48"	2'-0"	6'-0"	2'-2"	8'-2"	7'-0"
54"	2'-6"	6'-0"	2'-3"	8'-3"	7'-6"
*60"	2'-6"	5'-0"	3'-3"	8'-3"	8'-0"

\*60" end section is based on a slope of 2:1

NOTE:

Alternate equivalent designs for flared end sections may be submitted to the Department for approval. Payment for "Flared End Sections" will be based on the lengths as shown in Column D. Any additional culvert pipe required to provide the lengths as shown in Column D will be included in the unit price bid for "Flared End Sections" of the several sizes.

DIMENSIONS FOR 7°30' ANGLE SECTIONS

DIAMETER OF PIPE	LENGTH ON OUTSIDE OF PIPE				AVERAGE LAYING LENGTH ON E
	A	B	C	D	
12"	4 <sup>1</sup> / <sub>2</sub> "	4 <sup>1</sup> / <sub>2</sub> "	3 <sup>1</sup> / <sub>2</sub> "	3 <sup>1</sup> / <sub>2</sub> "	8"
15"	5 <sup>1</sup> / <sub>2</sub> "	5 <sup>1</sup> / <sub>8</sub> "	4 <sup>1</sup> / <sub>4</sub> "	3 <sup>7</sup> / <sub>8</sub> "	9 <sup>3</sup> / <sub>8</sub> "
18"	3 <sup>1</sup> / <sub>2</sub> "	6 <sup>1</sup> / <sub>2</sub> "	2"	5"	8 <sup>1</sup> / <sub>2</sub> "
24"	4"	6 <sup>1</sup> / <sub>2</sub> "	2"	4 <sup>9</sup> / <sub>16</sub> "	8 <sup>1</sup> / <sub>2</sub> "
30"	4 <sup>1</sup> / <sub>2</sub> "	7"	2"	4 <sup>1</sup> / <sub>2</sub> "	9"
36"	4 <sup>7</sup> / <sub>8</sub> "	8 <sup>7</sup> / <sub>16</sub> "	2"	5 <sup>9</sup> / <sub>16</sub> "	10 <sup>7</sup> / <sub>16</sub> "
42"	6"	9 <sup>1</sup> / <sub>2</sub> "	2 <sup>9</sup> / <sub>8</sub> "	6 <sup>1</sup> / <sub>8</sub> "	12 <sup>1</sup> / <sub>8</sub> "
48"	7"	11"	3 <sup>3</sup> / <sub>16</sub> "	7 <sup>3</sup> / <sub>16</sub> "	14 <sup>3</sup> / <sub>16</sub> "
54"	8 <sup>1</sup> / <sub>8</sub> "	12 <sup>1</sup> / <sub>8</sub> "	4"	8"	16 <sup>1</sup> / <sub>8</sub> "
60"	9 <sup>1</sup> / <sub>8</sub> "	14"	4 <sup>7</sup> / <sub>8</sub> "	9 <sup>1</sup> / <sub>4</sub> "	18 <sup>3</sup> / <sub>8</sub> "

A, B, C and D apply to Tongue and Groove type of Joint only and can be varied for other types of Joints.

GENERAL NOTES

Joints other than Tongue and Groove may be used for Flared End Sections, 7°30' Angle but all joints for any one pipe structure must be uniform.

Concrete, wall thickness and reinforcing steel in Flared End Sections and 7°30' Angle Sections must conform with the requirements of the pipe with which they are used.

Flared end sections are to be furnished with tongue or groove, and/or bell or spigot as required, in order that joints may be laid with the bell or groove end upstream.

**COLORADO**  
**DEPARTMENT OF HIGHWAYS**

**CONCRETE END**  
**AND ANGLE**  
**SECTIONS**

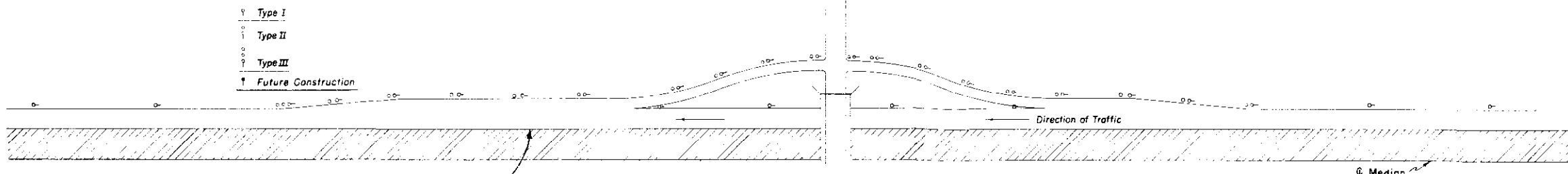
Designed by R.S.M. | Approved by \_\_\_\_\_  
 Made by J.M.K. | \_\_\_\_\_  
 Checked by R.S.M. | Date: January 14, 1949

# STANDARD M-192-A

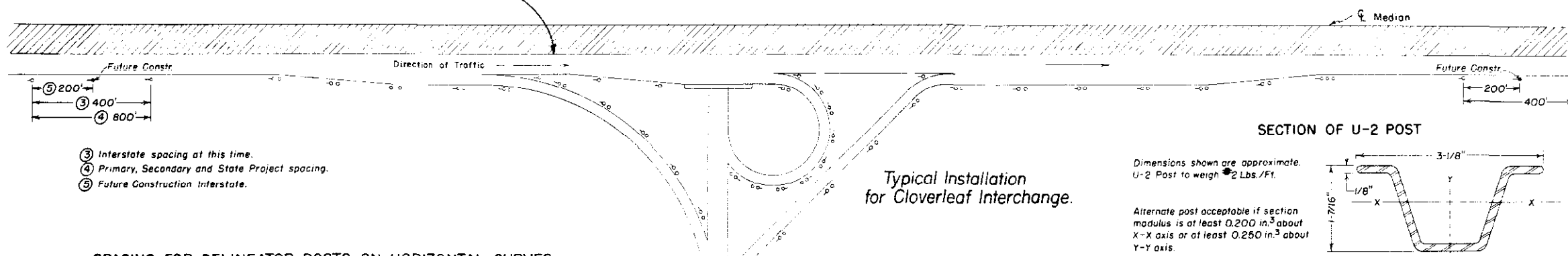
(NOV. 1, 1962)

FED. ROAD REG. NO.	DIVISION	PROJECT NO.	SHEET NO.
9	COLORADO		

REVISIONS	
11-15-62 Rev. Location	L.E.O.
2-26-63 Posts & Bridge Approach	L.E.O.
5-15-63 Reflector Height	J.C.R.
7-5-63 Rev Post Spacing, Tolerance & Reflect. Ht.	L.E.O.



Typical Installation for Diamond Interchange.



Typical Installation for Cloverleaf Interchange.

## GENERAL NOTES

All work shall be done in accordance with the Standard Specifications of the Colorado Department of Highways applicable to the project.

See tabulation in plans for delineator post requirements.

Spacing between Posts on acceleration and deceleration lanes and on relatively straight portions of interchange ramps shall be ②. Spacing between Posts on the outside of interchange ramp curves shall be as indicated in table for the appropriate degree of curve with a 24' min. spacing. Post spacing in advance and beyond curve shall not apply to ramp curves.

Posts shall meet requirements of Par. 4.5 of U.S. Dept. of Commerce Commercial Standard 184-51. Acceptable material includes re-rolled railroad rails.

When normal delineator spacing falls on a road approach or crossroad, move delineator either direction a distance not to exceed 1/4 normal spacing.

② 100' on Interstate and 200' on Primary and Secondary Projects.

Delineator Posts are not to be placed along Frontage Roads

- ③ Interstate spacing at this time.
- ④ Primary, Secondary and State Project spacing.
- ⑤ Future Construction Interstate.

### SPACING FOR DELINEATOR POSTS ON HORIZONTAL CURVES

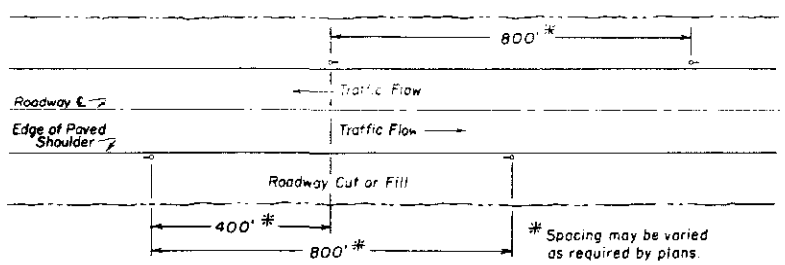
DEGREE OF CURVE	RADIUS	① SPACING ON CURVE			DEGREE OF CURVE	RADIUS	② SPACING IN ADVANCE OF AND BEYOND CURVE			
		FIRST SPACE	SECOND SPACE	THIRD SPACE			FIRST SPACE	SECOND SPACE	THIRD SPACE	
0°30'	11460.0	200	200	200	8°00'	716.3	52	94	156	200
1°00'	5730.0	151	200	200	8°30'	674.1	50	90	150	200
1°30'	3620.0	123	200	200	9°00'	636.7	48	86	144	200
2°00'	2865.0	106	191	200	9°30'	603.2	47	85	141	200
2°30'	2292.0	95	171	200	10°00'	573.0	46	83	138	200
3°00'	1910.3	86	155	200	10°30'	545.7	45	81	135	200
3°30'	1637.1	80	144	200	11°00'	520.9	43	77	129	200
4°00'	1432.5	74	133	200	11°30'	498.3	42	76	126	200
4°30'	1273.3	70	126	200	12°00'	477.5	41	74	123	200
5°00'	1146.0	66	119	198	15°00'	382.0	36	65	108	200
5°30'	1041.8	63	113	189	18°00'	318.3	33	59	99	198
6°00'	955.0	60	108	180	21°00'	272.9	30	54	90	180
6°30'	881.5	58	104	174	25°00'	229.2	27	49	81	162
7°00'	818.6	55	99	165	30°00'	191.0	24	43	72	144
7°30'	764.0	53	95	159						

①  $S = 2 \sqrt{R-50}$  1-ST. SPACE = 18S 2-ND. SPACE = 3S 3-RD. SPACE = 6S  
NO SPACES TO EXCEED 200 FT.

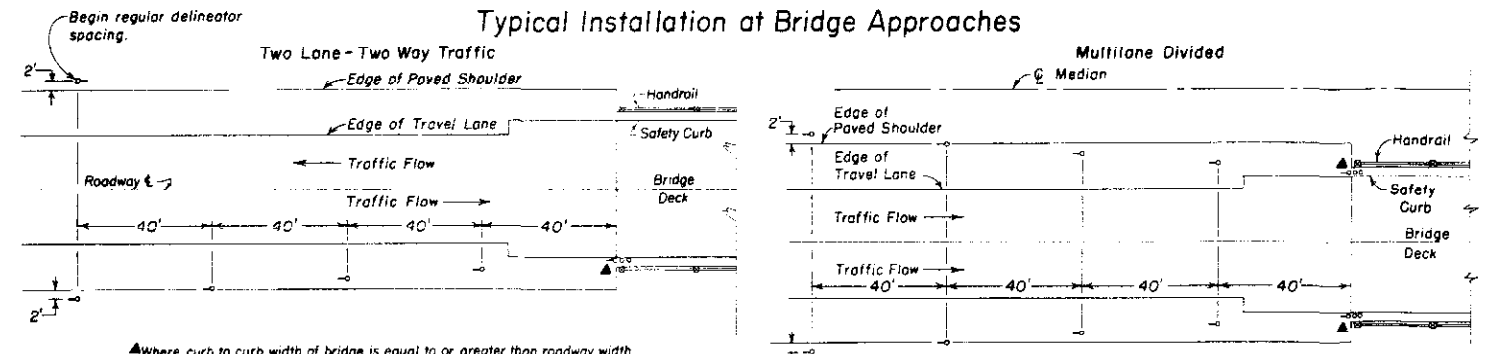
② Omit third space on Secondary and Primary Routes and double the distance on the curve and in advance of and beyond curve.

### Spacing for Delineator Posts on Tangents

(Two Lane - Two Way Traffic)

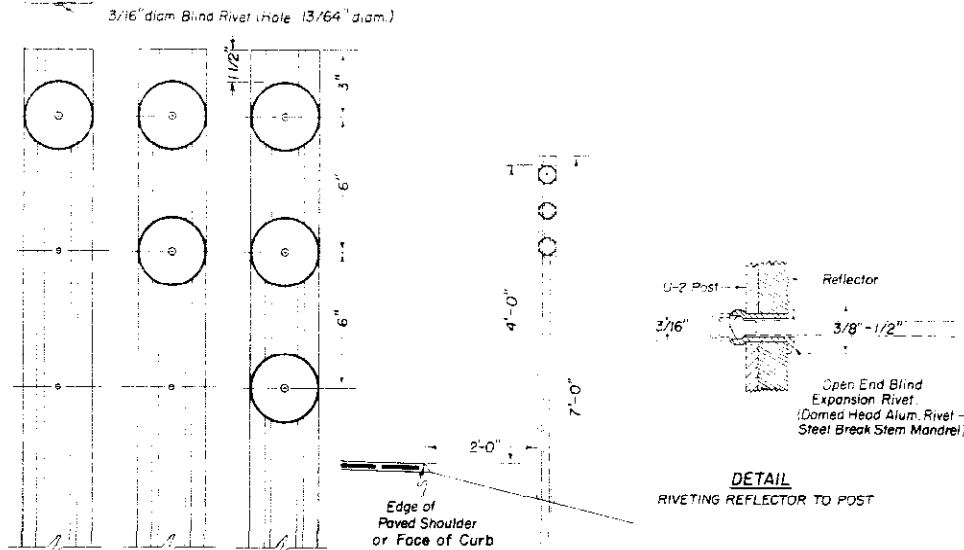


### Typical Installation at Bridge Approaches



▲ Where curb to curb width of bridge is equal to or greater than roadway width plus usable shoulder width, use this delineator only and omit all others.  
Note: Where guard rail is present, place delineators outside of guard rail.

When approach slab has curb, place Type III delineator immediately behind curb.



- TYPE I 1-3" diam Crystal Reflector on U-2 Post
- TYPE II 2-3" diam Yellow Reflectors on U-2 Post
- TYPE III 3-3" diam Yellow Reflectors on U-2 Post

Min. 3 holes in all posts required as shown.

**COLORADO**  
DEPARTMENT OF HIGHWAYS

**DELINEATORS**

Designed by CKM    Approved by J. L. ...  
Made by WNC    Engineer, Surveys & Plans  
Checked by LEO    Date: October 19, 1962

FEDERAL ROAD REGION NO.	DIVISION	PROJECT NO.	SHEET NO.
9	COLORADO	F 017-2(8)	44

Orig. Scale: 1"=50'  
Rev. 7-15-63 Island 6.5

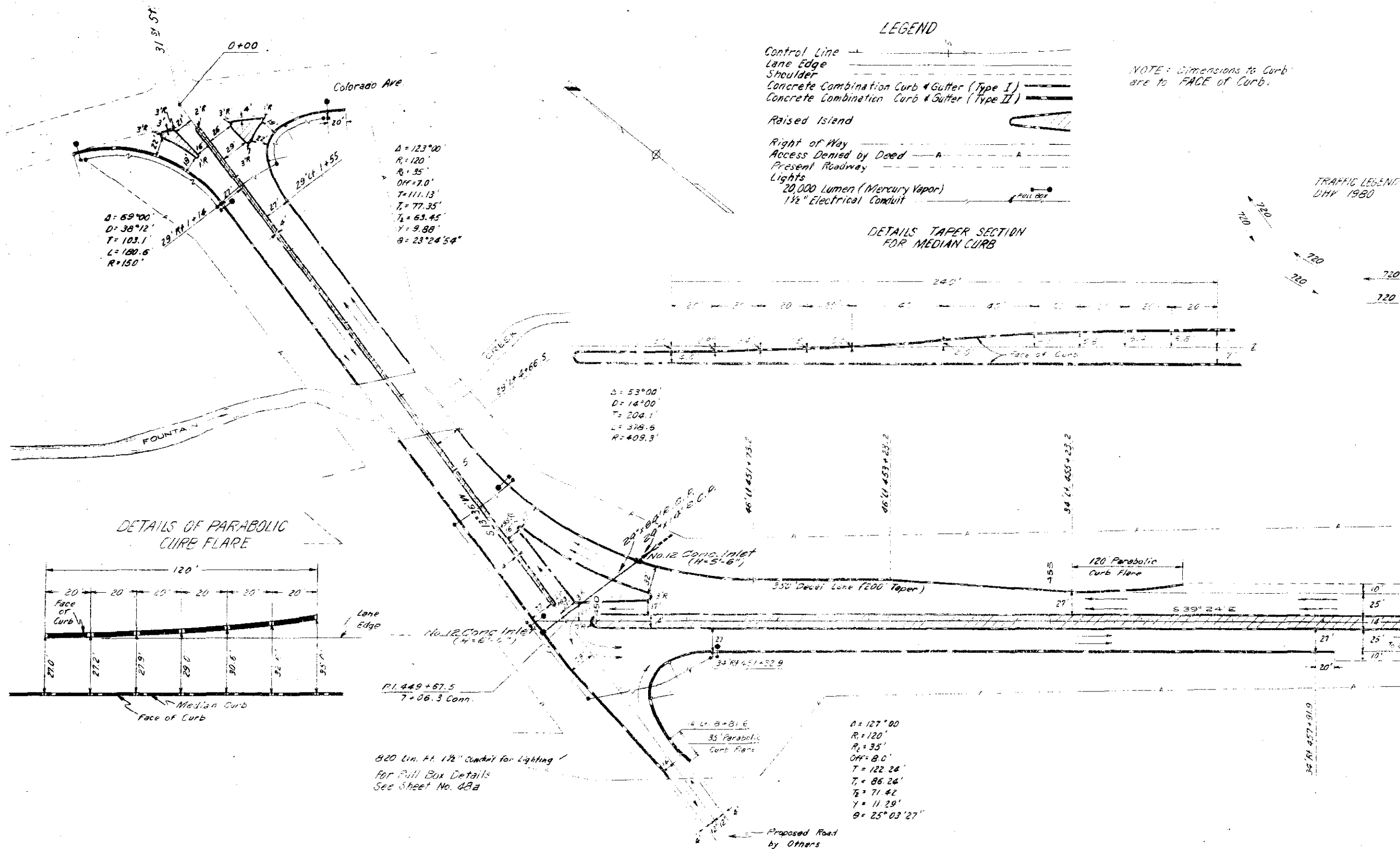
DETAILS OF INTERSECTION  
STA. 449+

LEGEND

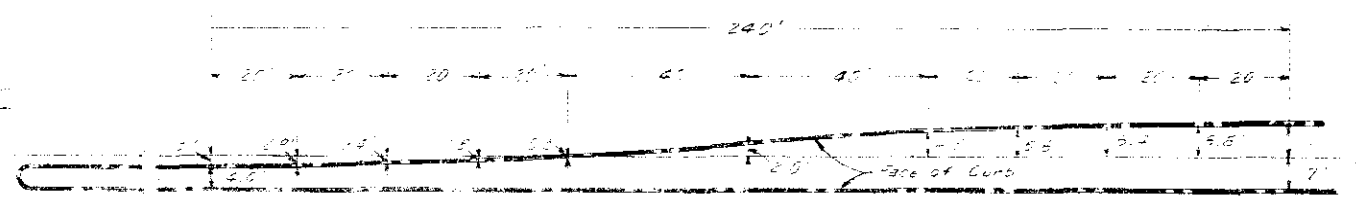
- Control Line ————
- Lane Edge ————
- Shoulder ————
- Concrete Combination Curb & Gutter (Type I) ————
- Concrete Combination Curb & Gutter (Type II) ————
- Raised Island ————
- Right of Way ————
- Access Denied by Deed ————
- Present Roadway ————
- Lights ————
- 20,000 Lumen (Mercury Vapor)
- 1/2" Electrical Conduit

NOTE: Dimensions to Curb are to FACE of Curb.

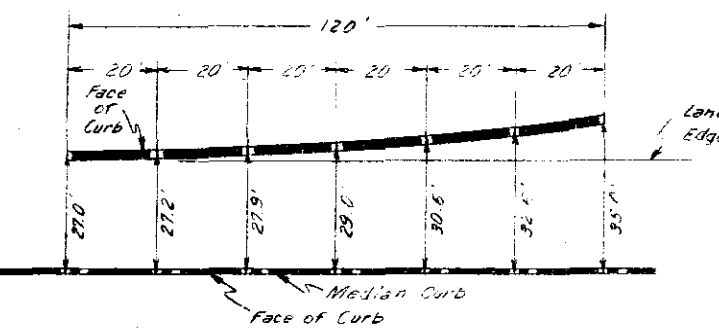
TRAFFIC LEGEND  
DHW 1980



DETAILS TAPER SECTION FOR MEDIAN CURB



DETAILS OF PARABOLIC CURB FLARE



FEDERAL ROAD REGION NO.	DIVISION	PROJECT NO.	SHEET NO.
9	COLORADO	F 917-2(B)	45

Orig. Scale: 1" = 50'  
Rev. 7-15-63 A-Lanes G.S.

DETAILS OF INTERSECTION  
STA. 476+

Control Line  
Shoulder  
Lane Edge  
Concrete Combination Curb & Gutter (Type I)  
Concrete Combination Curb & Gutter (Type II)

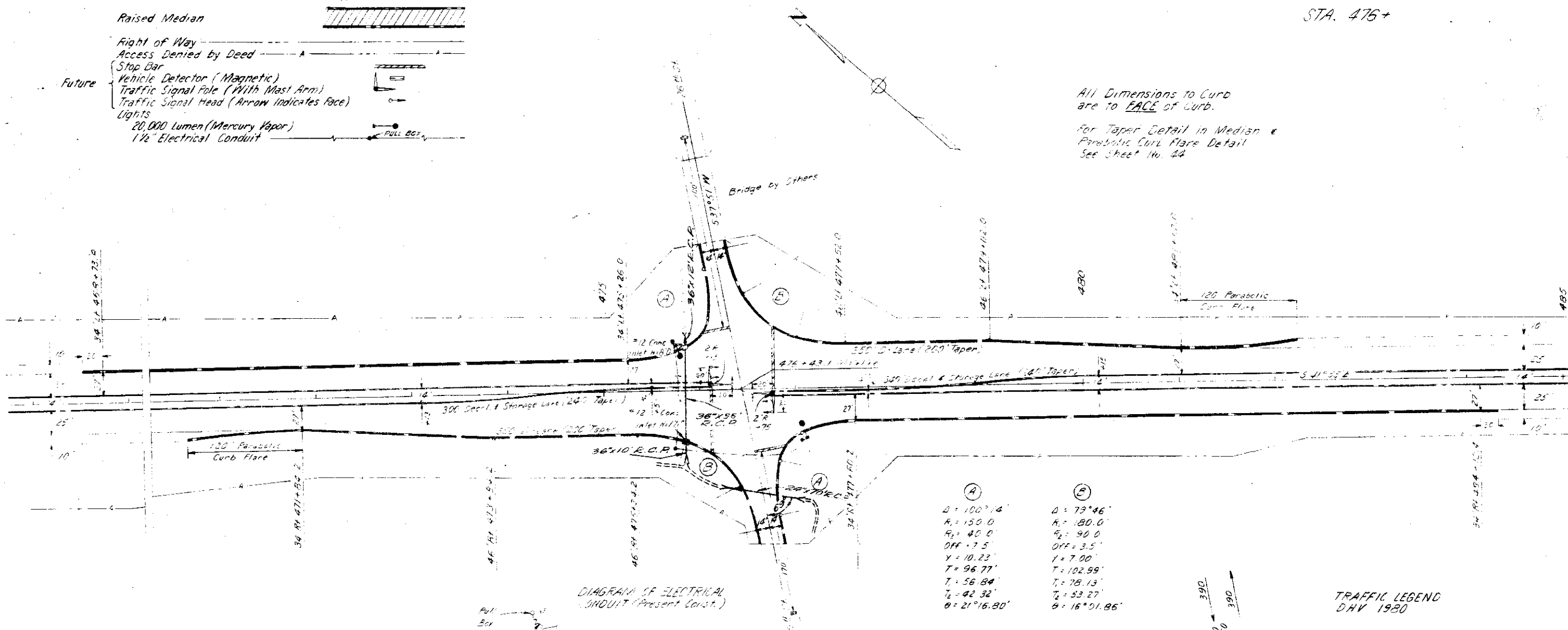
Raised Median

Right of Way  
Access Denied by Deed

Future  
Stop Bar  
Vehicle Detector (Magnetic)  
Traffic Signal Pole (With Mast Arm)  
Traffic Signal Head (Arrow Indicates Face)  
Lights  
20,000 Lumen (Mercury Vapor)  
1/2" Electrical Conduit

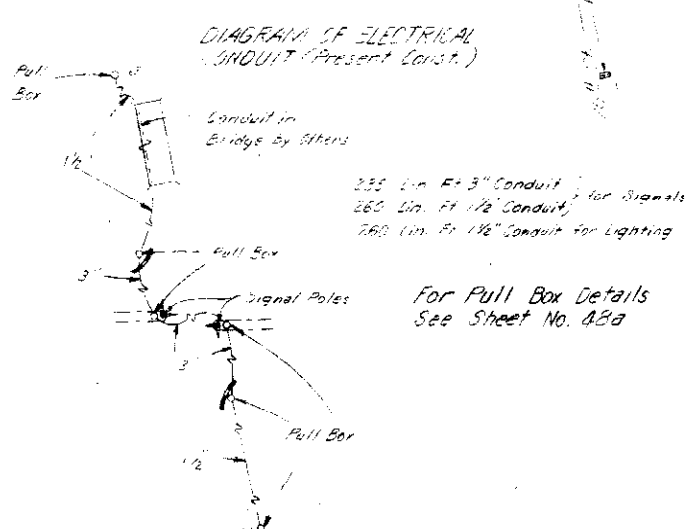
All Dimensions to Curb are to FACE of Curb.

For Taper Detail in Median & Parabolic Curb Flare Detail See Sheet No. 44

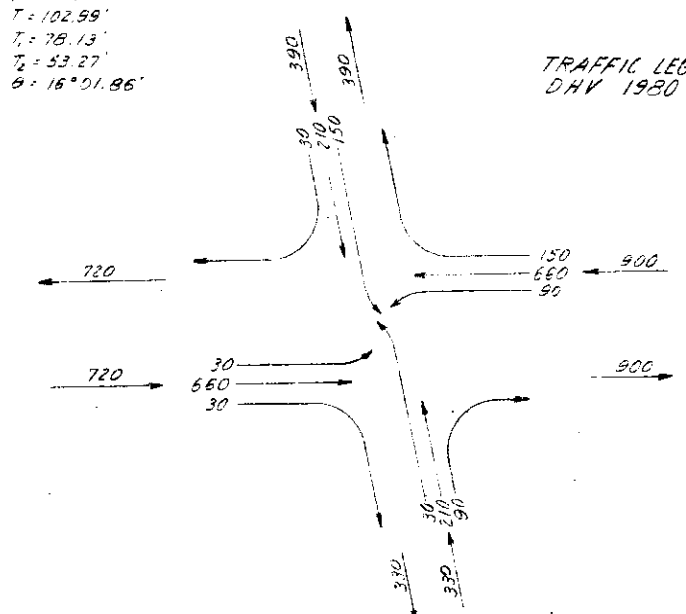


(A)  
 $\Delta = 100^\circ 14'$   
 $R_1 = 150.0'$   
 $R_2 = 40.0'$   
 $OFF = 7.5'$   
 $Y = 10.23'$   
 $T = 96.77'$   
 $T_1 = 56.84'$   
 $T_2 = 42.32'$   
 $\theta = 21^\circ 16.80'$

(B)  
 $\Delta = 73^\circ 46'$   
 $R_1 = 180.0'$   
 $R_2 = 90.0'$   
 $OFF = 3.5'$   
 $Y = 7.00'$   
 $T = 102.99'$   
 $T_1 = 78.13'$   
 $T_2 = 53.27'$   
 $\theta = 16^\circ 01.86'$



For Pull Box Details See Sheet No. 48a



DISTRICT	PROJ. NO.	SHEET NO.	TOTAL SHEETS
9	FO 7-2(6)	46	

Orig. Scale: 1" = 50'  
 Rev. 7-15-63 Islands 5.5

### LEGEND

- Control Line
- Lane Edge
- Shoulder
- Concrete Combination Curb & Gutter (Type I)
- Concrete Combination Curb & Gutter (Type II)
- Raised Island
- Right of Way
- Access Driveway by Deck
- Present Roadway
- Faintly Area (Design to Traffic)
- Stop Bar
- Vehicle Detector (Magnetic)
- Vehicle Detector (Pressure)
- Traffic Signal Pole (With Mast Arm)
- Traffic Signal Head (Arrow Indicate Focus)
- Lights
- 20,000 Lumen (Mercury Vapor)
- 1/2" Electric Conduit

### DETAILS OF INTERSECTION 505+

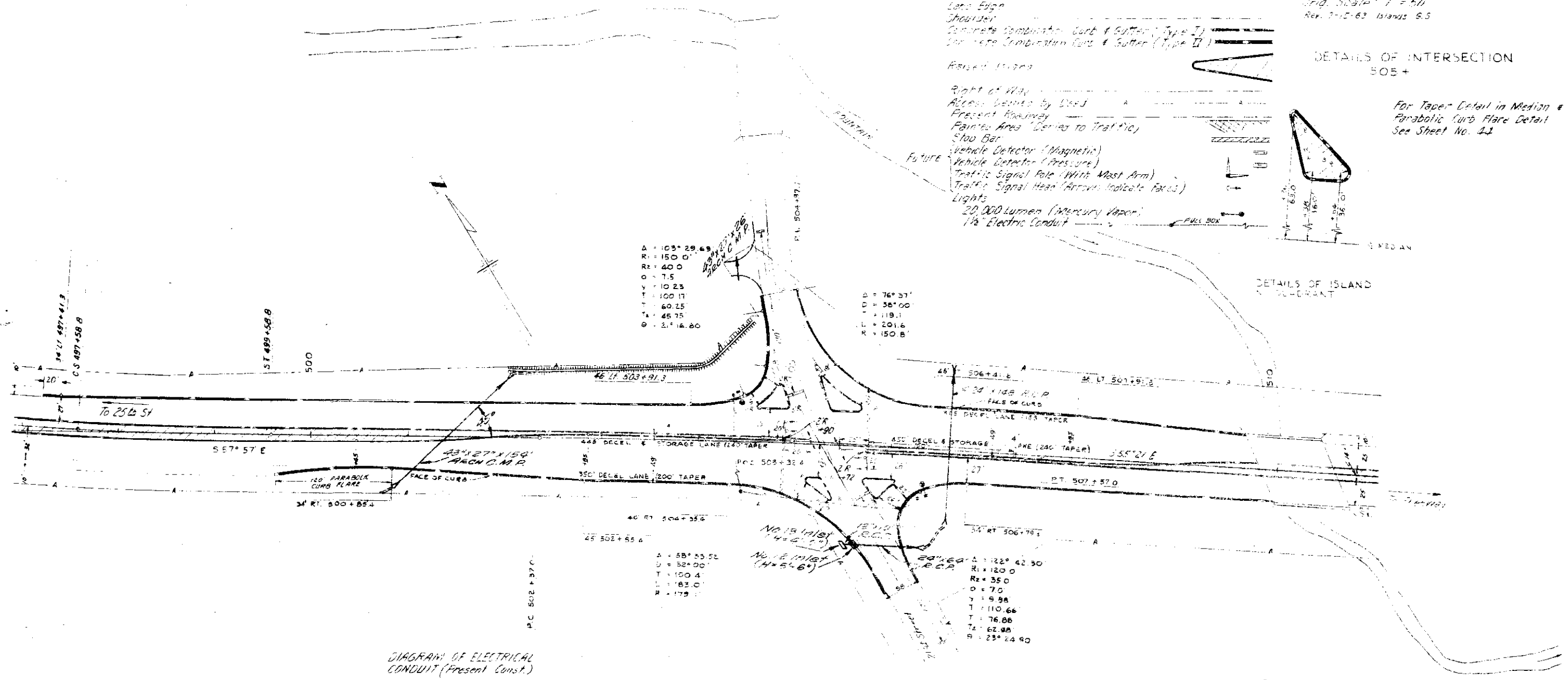
For Taper Detail in Median & Parabolic Curb Flare Detail See Sheet No. 47

### DETAILS OF ISLAND

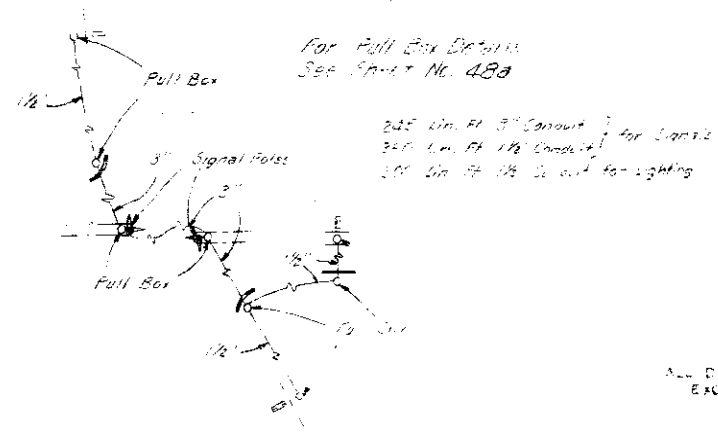
### TRAFFIC LEGEND



DETAILS OF ISLAND  
505+



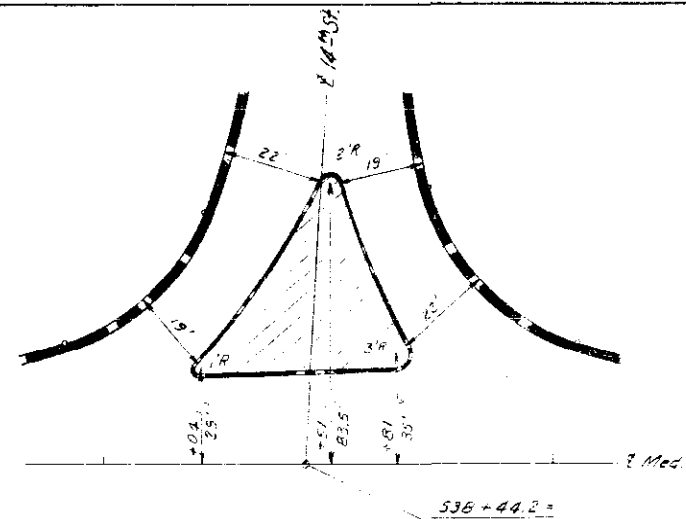
### DIAGRAM OF ELECTRICAL CONDUIT (Present Const.)



ALL DIMENSIONS ARE TO FACE OF CURB EXCEPT ON ISLAND DETAILS

FEDERAL ROAD REGION NO.	DIVISION	PROJECT NO.	SHEET NO.
1	COLORADO	F017-2(B)	47

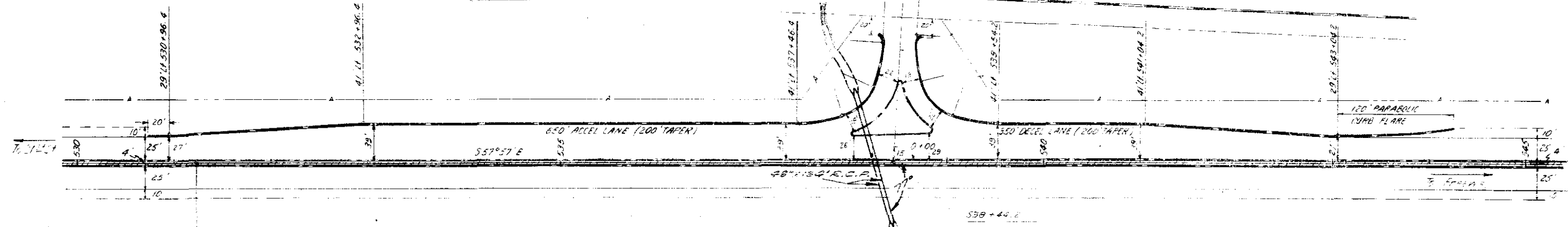
Orig. Scale: 1" = 50'  
 Rev. 7-15-59 Island & S.  
 DETAILS OF INTERSECTION  
 STA 536-



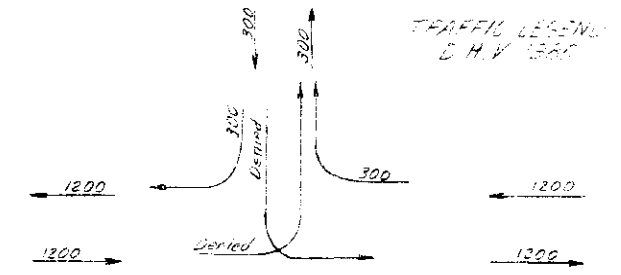
$\Delta = 86^{\circ}34'30''$   
 $R_1 = 150'$   
 $R_2 = 50'$   
 $Off = 5.0'$   
 $l = 7.5'$   
 $T_1 = 83.04'$   
 $T_2 = 51.81'$   
 $T_3 = 36.20'$   
 $\theta = 18^{\circ}11'42''$

$\Delta = 93^{\circ}25'30''$   
 $R_1 = 150'$   
 $R_2 = 50'$   
 $Off = 5.0'$   
 $l = 7.5'$   
 $T_1 = 89.62'$   
 $T_2 = 58.39'$   
 $T_3 = 42.78'$   
 $\theta = 19^{\circ}142''$

NOTE: Dimensions to Curb are to FASs of Curb.  
 For Parabolic Curb Flare See Sheet No. 44



- LEGEND
- Control Line
  - Lane Edge
  - Shoulder
  - Concrete Combination Curb & Sutter (Type I)
  - Concrete Combination Curb & Sutter (Type II)
  - Raised Island
  - Right of Way
  - Access Denied by Dead



FEDERAL ROAD REGION NO.	DISTRICT	PROJ. NO.	SHEET NO.	TOTAL SHEETS
9	COLORADO	F017-2(B)	48	

Orig. Scale: 1" = 50'  
Rev. 7-15-63 Islands 9.5.

DETAILS OF INTERSECTION  
STA. 567+

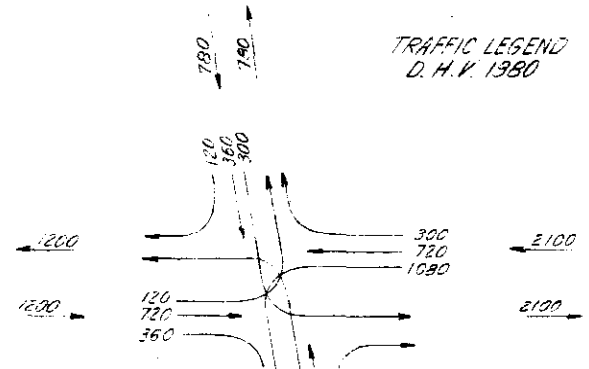
For Taper Detail in Median & Parabolic Curb Flare See Sheet No. 44

**LEGEND**

- Control Line
- Lane Edge
- Shoulder
- Concrete Combination Curb & Gutter (Type I)
- Concrete Combination Curb & Gutter (Type II)
- Raised Island
- Right of Way
- Access Denied by Deed
- Present Roadway
- Painted Area (Denied to Traffic)
- Manhole (In Place)

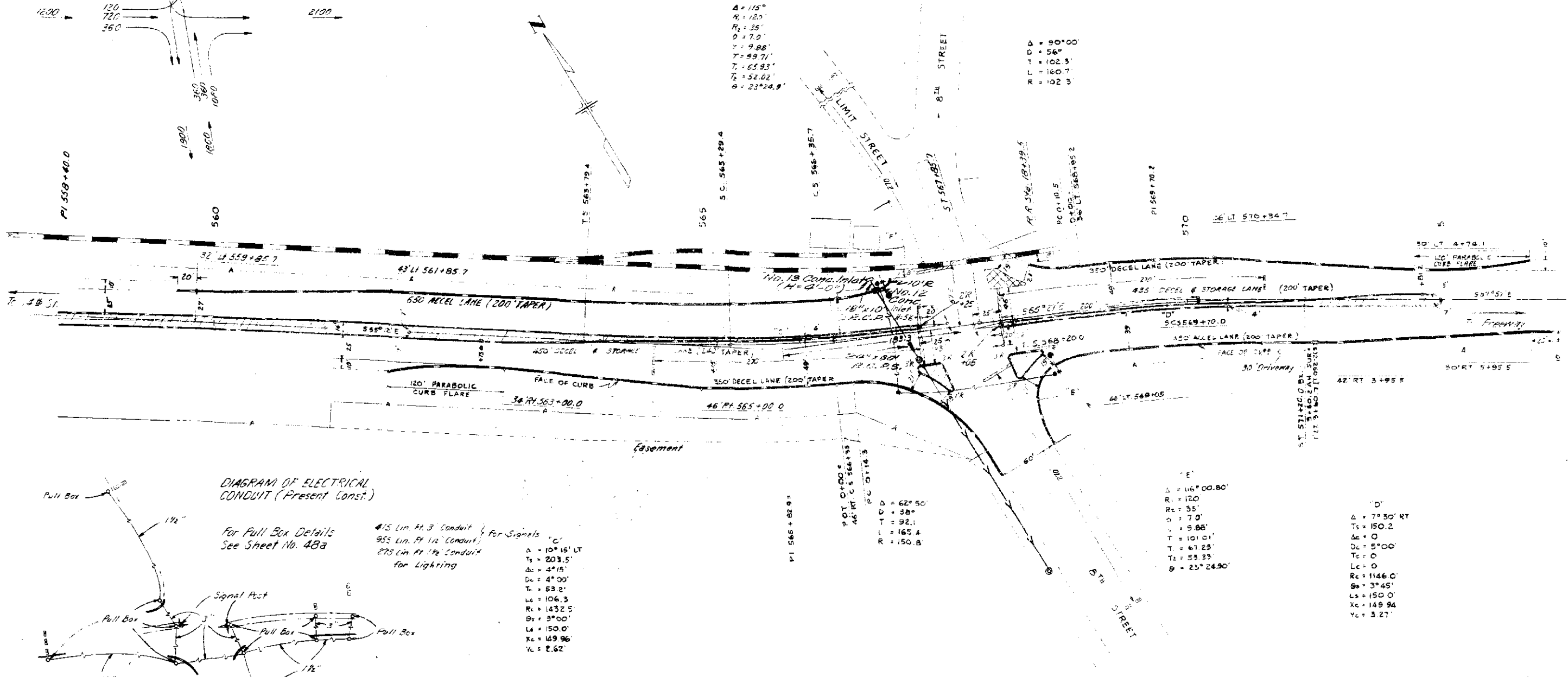
- Stop Bar
- Vehicle Detector (Pressure)
- Traffic Signal Pole (With Mast Arm)
- Traffic Signal Head (Arrow Indicates Face)
- Lights
- 20,000 Lumen (Mercury Vapor)
- 1/2" Electric Conduit

TRAFFIC LEGEND  
D. H. V. 1980



A = 115°  
R = 120'  
R<sub>1</sub> = 35'  
D = 7.0'  
Y = 9.88'  
T = 99.71'  
T<sub>1</sub> = 65.93'  
T<sub>2</sub> = 52.02'  
θ = 23°24.9'

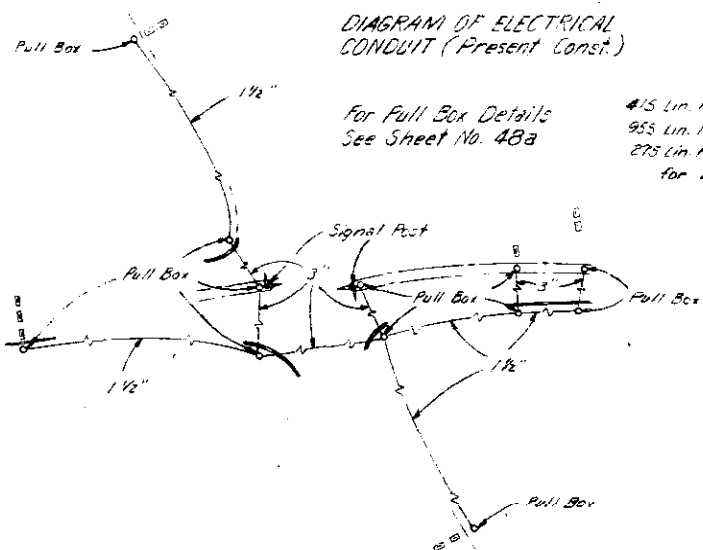
Δ = 90°00'  
D = 56'  
T = 102.3'  
L = 160.7'  
R = 102.3'



**DIAGRAM OF ELECTRICAL CONDUIT (Present Const.)**

For Pull Box Details See Sheet No. 48a

#15 Lin. Ft. 3" Conduit for Signals "C"  
955 Lin. Ft. 1/2" Conduit for Lighting



Δ = 10°15' LT  
Ts = 203.5'  
Dc = 4°15'  
Dc = 4°00'  
Tc = 53.2'  
Lc = 106.3'  
Rc = 1432.5'  
θ = 3°00'  
Ls = 150.0'  
Kc = 149.96'  
Yc = 2.62'

Δ = 62°50'  
D = 38'  
T = 92.1'  
L = 165.4'  
R = 150.8'

Δ = 116°00.80'  
R = 120'  
R = 35'  
D = 7.0'  
Y = 9.88'  
T = 101.01'  
T = 61.23'  
T<sub>2</sub> = 53.23'  
θ = 23°24.90'

Δ = 7°50' RT  
Ts = 150.2'  
Dc = 0'  
Dc = 5°00'  
Tc = 0'  
Lc = 0'  
Rc = 1146.0'  
θ = 3°45'  
Ls = 150.0'  
Kc = 149.94'  
Yc = 3.27'

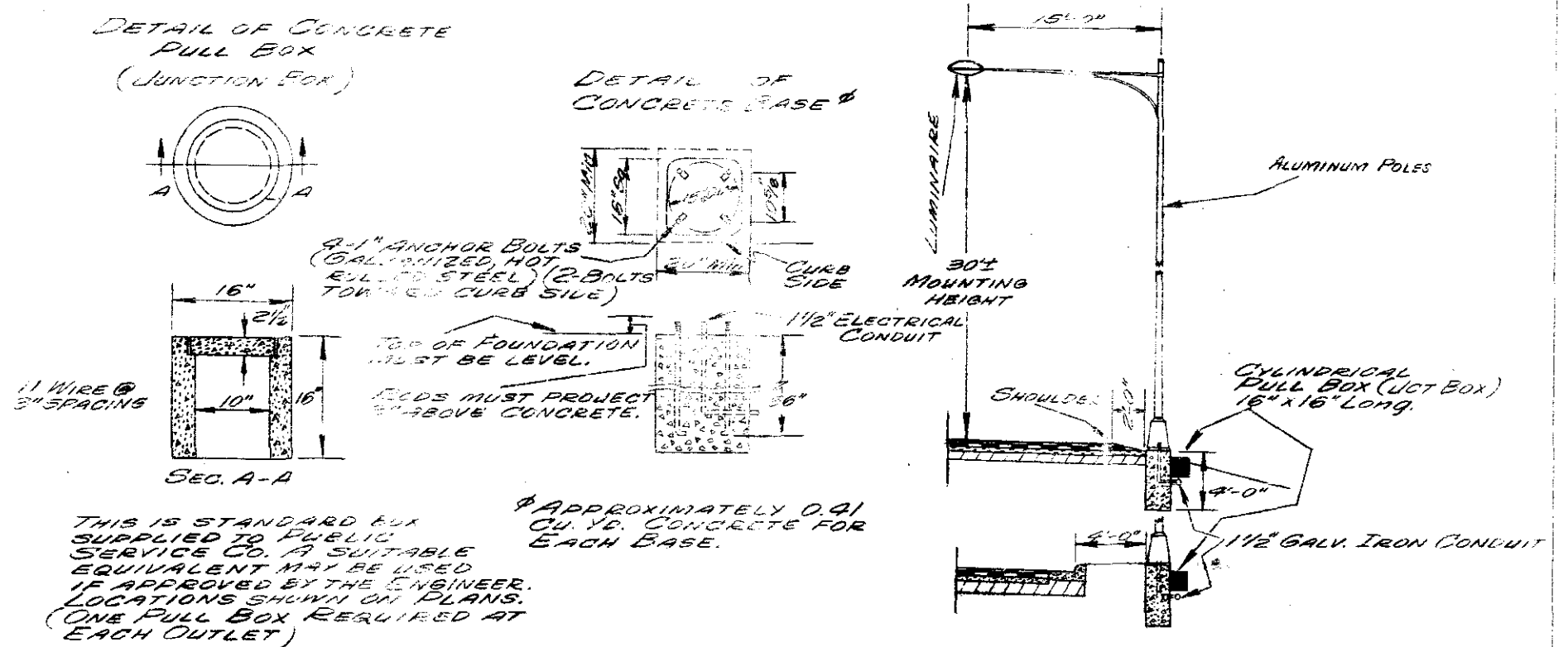
ALL DIMENSIONS ARE TO FACE OF CURB EXCEPT ON ISLAND DETAILS

TABULATION OF LIGHTING REQUIREMENTS

* LOCATION	LUMINAIRES 20,000 LUMEN Type III	LIGHT STANDARDS 1-Arm	CONCRETE Class "A"	UNCLASSIFIED STRUCTURAL EXCAVATION MISC.	STRUCTURE BACKFILL
	No.	No.	Cu. Yd.	Cu. Yd.	Cu. Yd.
0+ ~ 1+	3 ✓	3 ✓	1.23 ✓	6	4.5
5+ ~ 7+	2 ✓	2 ✓	0.82 ✓	4	3
451+	1 ✓	1 ✓	0.41 ✓	2	1.5
475+ ~ 477+	2 ✓	2 ✓	0.82 ✓	4	3
503+ ~ 505+	2 ✓	2 ✓	0.82 ✓	4	3
566+ ~ 568+	2 ✓	2 ✓	0.82 ✓	4	3
TOTALS	12 ✓	12 ✓	4.92 ✓	24 ✓	15 ✓

\* See Details of Intersections.

TYPICAL LIGHT STANDARD



**NOTE:**

Alignment and Grades shown are subject to modification during construction after approval by the Denver Office.

Soil data shown on the plans is obtained from best available testing laboratory information. This information is shown for convenience of the Contractor and the Department does not guarantee the accuracy of these tests. If materials not conforming to the data on plans are encountered during construction the grading plan shown on plans will be modified where necessary to secure dense, stable embankments.

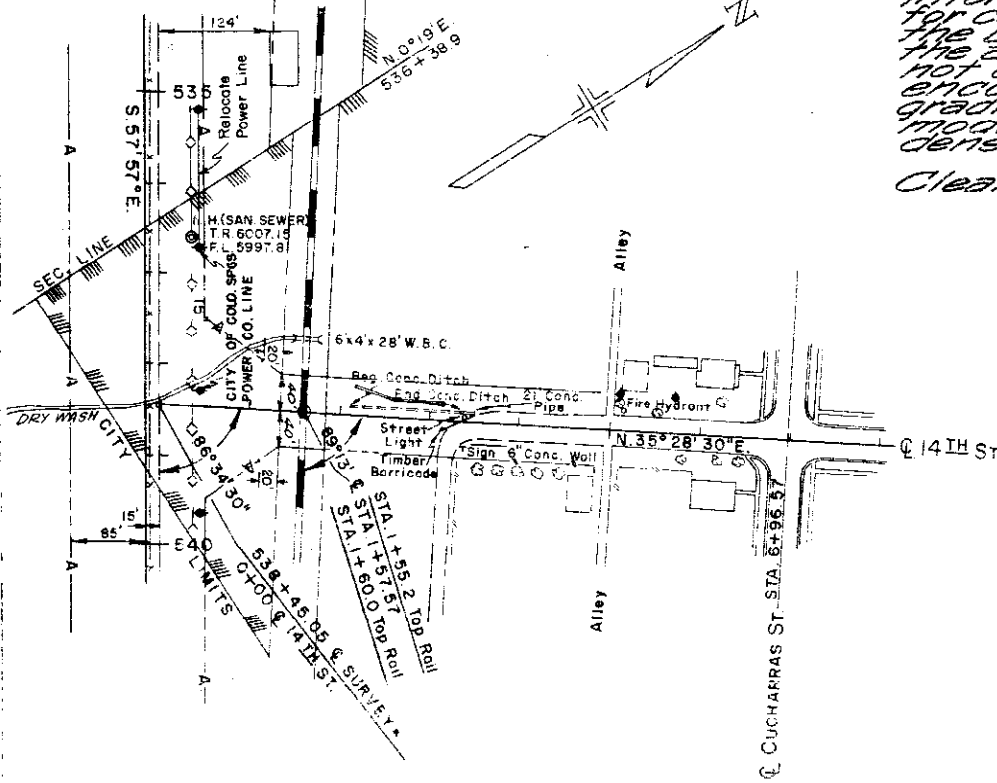
Clearing & Grubbing Scattered Trees.

SE 1/4 SEC. 3  
T. 14 S. R. 67 W.

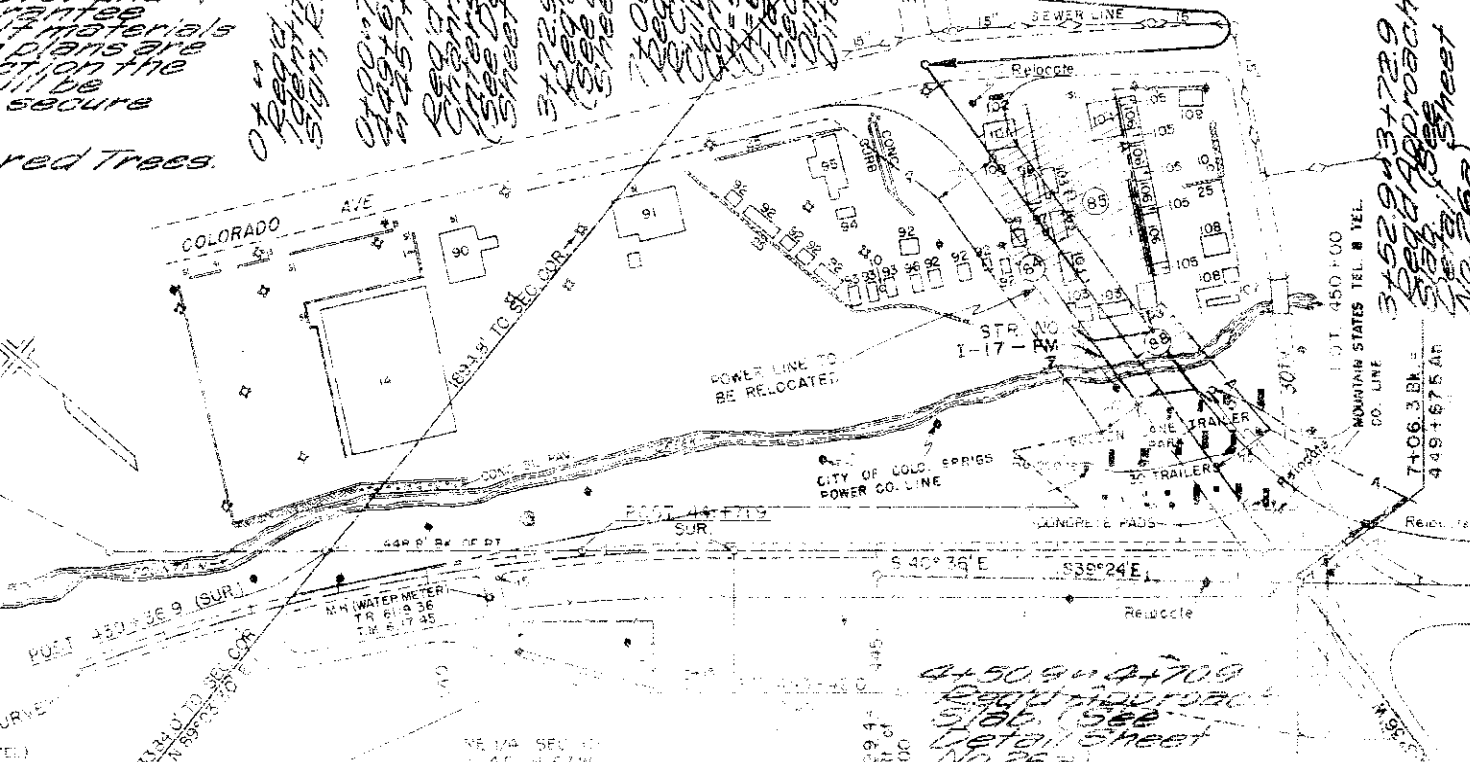
REG. ROAD	DIVISION	PRJ. NO.	SHEET NO.	TOTAL SHEETS
9	COLD	F 017-2(8)	49	

REV 7/19/63 G.S.  
Rev 10-31-63 HW-G.S.

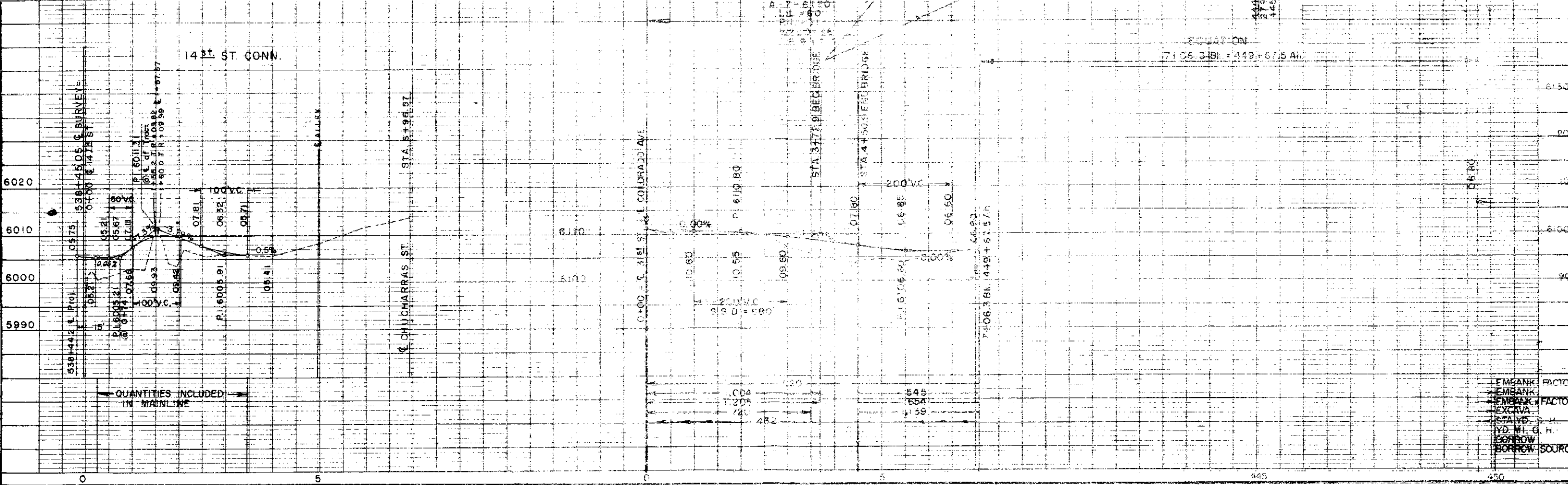
STA 0+00 Begin F 017-2(8)  
STA 3+40 on FAP 117



- 1 - CONC WALL
- 10 - WELL
- 14 - GINDER B.K. BLDG (MILLER'S)
- 15 - WATER VALVE
- 16 - CESSPOOL
- 25 - ROCK WALL
- 90 - RESTUARANT (JAN DEE'S)
- 91 - STORE BLDG
- 92 - STUCCO CABIN
- 93 - LOG CABIN
- 94 - GARAGE
- 95 - HOUSE
- 96 - LAUNDRY HOUSE
- 97 - SHED
- 98 - HOUSE
- 99 - GARAGE
- 100 - OIL PUMP
- 101 - SERVICE STATION
- 102 - GAS PUMPS
- 103 - CABIN
- 104 - OFFICE BLDG (STREAM VALLEY MOTEL)
- 105 - CAR PORT
- 106 - CABIN
- 107 - TRAILER HOUSE
- 108 - COTTAGE
- 109 - SERVICE LODG B - HOUSE (SLEEPY HOLLOW MOTEL)



4+50.9 to 4+70.9  
See FAP 117  
Detail Sheet  
No. 26a



23776  
23664

33777

NE 1/4, SEC. 10  
T. 14S., R. 67W.

$\Delta = 2^{\circ}31'11''$   
 $D = 0^{\circ}15'$   
 $T = 503.4'$   
 $L = 1,006.7'$   
 $R = 22,920.0'$   
 $S = NS$   
 $SSD > 1300'$

- NW 1/4, SEC. 11  
T. 14S., R. 67W
- 17 - CINDER BLK. OFFICE BLDG.
  - 18 - STUCCO HOUSE
  - 19 - CINDER BLK. WASH HOUSE
  - 20 - PUMP HOUSE
  - 21 - PATIO
  - 22 - STUCCO GARAGE
  - 23 - STUCCO HOUSE
  - 24 - STUCCO HOUSE
  - 25 - ROCK WALL

- 26 - WOODEN SHED
- 27 - WOODEN SHED
- 28 - WOODEN SHED
- 29 - BLEACHERS - 13'x27'
- 30 - BASEBALL BACKSTOP (STEEL POLES W/ WIRE)
- 31 - FRAME BLDG.
- 32 - CONC. BLK. & STUCCO APT. HOUSE (2 STORY) - 21'x33'
- 33 - FRAME GARAGE - 11'x37'
- 34 - ORNAMENTAL FENCE
- 35 - CONC. RETAINING WALL - 6'x48"
- 1 - CONC. WALL
- 9 - GAS METER
- 15 - WATER VALVE

FED. ROAD DIST. NO.	DIVISION	PROJ. NO.	SHEET NO.	TOTAL SHEETS
9	COL.	F 017-2 (8)	50	

REV. 7-15-63, G.S.  
REV. 7-25-63, G.S.

