FED. ROAD DIST. NO.	STATE	PROJ. NO.	SHEET NO.	TOTAL SHEETS
3	COLO.	S 0002 (2)	1	

COLORADO
STATE HIGHWAY DEPARTMENT

PLAN AND PROFILE OF PROPOSED
FEDERAL AID SECONDARY PROJECT NO. S 0002 (2)
STATE HIGHWAY NO. 100
BACA COUNTY

INDEX OF SHEETS

SCALES OF ORIGINAL TRACINGS

ON PLAN, 1 IN. = 100 FT.

ON PROFILE { 1 IN. = 100 FT. HORIZONTAL
1 IN. = 10 FT. VERTICAL

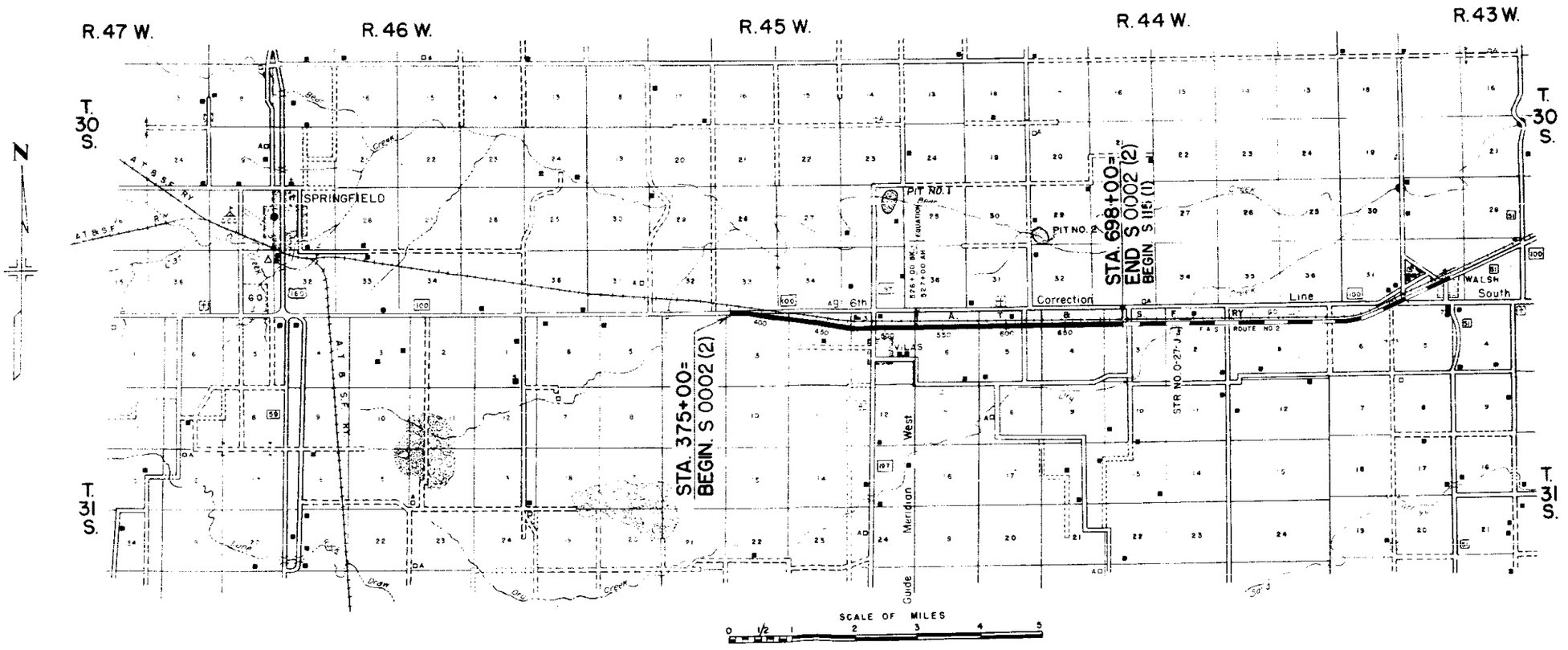
GRADE LINE ON PROFILE IS SHOWN AS GRADE OF FINISHED ROAD

GROSS LENGTH OF PROJECT } 32,200 FT. = 6.098 MI.
NET LENGTH OF PROJECT }

CONVENTIONAL SIGNS

- CENTER LINE OF SURVEY
- RIGHT OF WAY LINES
- COUNTY LINE
- TOWNSHIP LINES
- SECTION LINES
- ONE QUARTER SECTION LINES
- BARBED WIRE FENCE
- TELEPH. & TELEG. LINE
- POWER LINE
- RAILROAD

NOTE
It is recommended that bidders on this Project go over the plan details with the following Field representative of this Department.
G N Miles Division Engineer, Pueblo, Colo.



RECOMMENDED FOR APPROVAL

Jas D Bell
ASSISTANT ENGINEER DATE 4-11-47

APPROVED

Mark C. Walker
STATE HIGHWAY ENGINEER DATE 4-12-47

RECOMMENDED FOR APPROVAL DATE

DISTRICT ENGINEER
PUBLIC ROADS ADMINISTRATION
FEDERAL WORKS AGENCY

APPROVED DATE

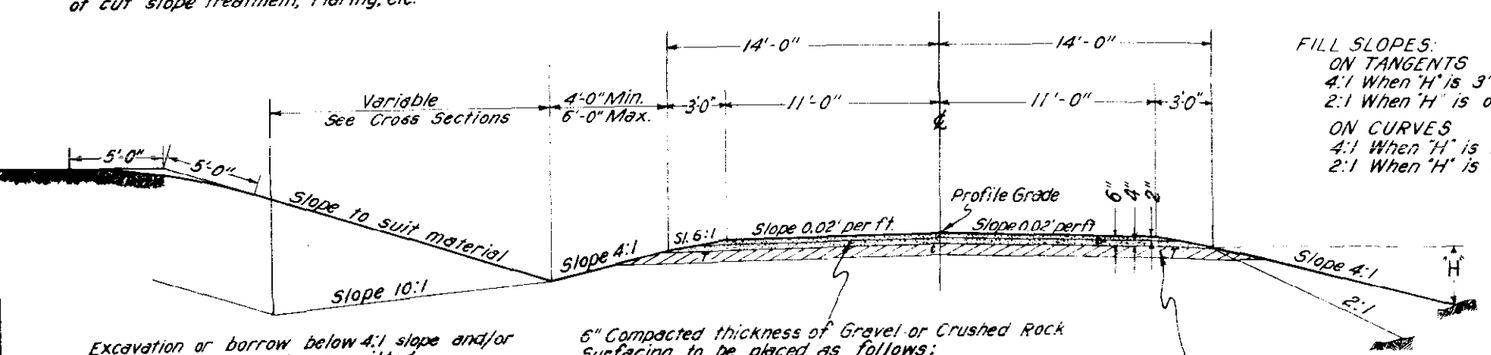
DIVISION ENGINEER
PUBLIC ROADS ADMINISTRATION
FEDERAL WORKS AGENCY

FED. ROAD DIST. NO.	STATE	F.A.S. PROJ. NO.	SHEET NO.	TOTAL SHEETS
3	COLO.	S 0002 (2)	2	

TYPICAL CROSS SECTION OF IMPROVEMENT AND SUMMARY OF QUANTITIES

NOTE:
See Standard M-2-C for details of cut slope treatment, flaring, etc.

TYPICAL SECTION



FILL SLOPES:
ON TANGENTS
4:1 When "H" is 3' or less.
2:1 When "H" is over 3'

ON CURVES
4:1 When "H" is 5' or less.
2:1 When "H" is over 5'

Excavation or borrow 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 that sufficient depth may be acquired to provide entrance to drainage structures

6" Compacted thickness of Gravel or Crushed Rock Surfacing to be placed as follows:

Approximate 2" Top Course Surfacing to be placed at the rate of 24 tons per 100 Lin. ft of roadway.

Approximate 4" Bottom Course Surfacing to be placed at the rate of 55 tons per 100 lin ft of roadway.

The upper portion of subgrade is to be constructed of Ballast Material at locations designated in Ballast Material Tabulation. Estimated quantities involved in this operation and thickness of material required are shown in the tabulation on Sheet No 3

GENERAL NOTES

This project is to be constructed in conformity with the Standard Specifications of the Colorado State Highway Department adopted June 1, 1940.

All quantities on preliminary plans are to be considered approximate only.

All roadway excavation required to construct this Project is to be obtained as indicated on the plans. Quantities involved beyond the limits of the ditch, as shown on the Typical Section, either noted on the profile as "Borrow" or on the List of Structures as "Embankment," are to be classified and paid for as "Unclassified Excavation". These quantities are to be staked as part of the original excavation at locations indicated on the plans. Slope stakes, beyond the limits of the Typical Section as shown, are subject to change by the Engineer to fit conditions actually met in construction.

All poles encroaching on construction are to be moved by the owners.

All corrugated Metal Pipe Cross Culverts including arch culverts shall be laid with Metal Aprons on each end unless otherwise noted on the plans.

Approximately 6 inches of embankment material will be used to cover culverts in such a manner that a minimum of pipe shall be exposed in the completed work. This shall be accomplished by warping embankment slopes around and adjacent to the culvert.

Except as otherwise noted on the plans, payment for overhaul will be based on measurement along the centerline of the project.

The entire project shall be cleared in conformity with the requirements of the Standard Specifications except that such trees or shrubs as the Engineer may designate, shall be left in place and protected from damage during construction operations.

Right of Way fences, including line posts, shall be constructed approximately six (6) inches inside the boundary of the Highway Right of Way as shown on the plans.

Intercepting ditches shall be placed on light grades (not over 1%) following the ground contour, and where possible shall be so constructed that the direction of flow will be away from the roadway, in order to spread runoff and thereby avoid erosion. This work shall be done in accordance with the methods shown on standard sheet included with the plans. These ditches shall be constructed at locations staked by the Engineer. Approximate location and quantities are tabulated on summary of earthwork quantities sheet.

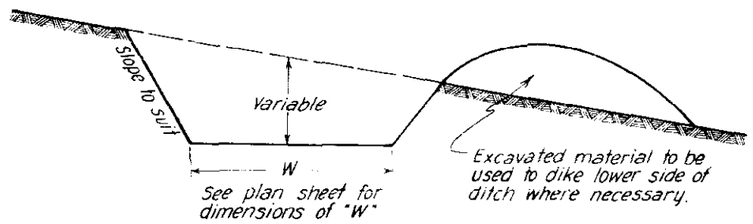
All concrete on this project shall be "Air Entrained Concrete."

All curves are to be superelevated and widened as provided by the Standard Superelevation sheet included with the plans, except as otherwise noted on plans.

The Detour for this project lies along the present traveled road. At all places on the project where the new work lies along the present traveled road, the Contractor shall, at his own expense, prosecute construction in such manner that traffic may readily pass over the road. Also, the Contractor shall maintain in safe condition and at his own expense all temporary approaches to and crossings of intersecting roads.

All side approach roads to the Project shall be gravel surfaced with a 4 inch thickness of Top Course Gravel or Crushed Rock Surfacing extending approximately to the Right of Way Line. Estimated tonnage of Surfacing Material required in this operation is shown in the List of Structures.

TYPICAL SECTION OF DITCHES & CHANNEL CHANGE



SUMMARY OF APPROXIMATE QUANTITIES

ITEM NO.	ITEM	UNIT	ROADWAY	PROJECT TOTALS
10a	Clearing and Grubbing Entire Project	Lump Sum	•	•
12a	Removing Fence	Lin Ft.	1800	1800
13c	Unclassified Excavation	Cu Yd.	43,000	43,000
13d	Unclassified Ditch Excavation	Cu Yd	300	300
14a	Dry Rock Excavation (Str)	Cu Yd.	40	40
14b	Dry Common Excavation (Str)	Cu Yd.	310	310
14c	Wet Rock Excavation (Str)	Cu Yd.	10	10
14d	Wet Common Excavation (Str)	Cu Yd.	40	40
14e	Mechanical Tamping	Hour	50	50
15a	Rolling Embankments and Cuts	Unit Hour	660	660
15b	Furnishing Roller	Roller Unit	2	2
15c	Wetting Embankments and Cuts	M Gal	2920	2920
15d	Rolling with Finishing Roller	Hour	260	260
15e	Furnishing Finishing Roller	Lump Sum	•	•
15y	Selected Backfill	Cu Yd.	310	310
18a	Station Yard Overhaul	Sta Yd	170,000	170,000
18b	Yard Mile Overhaul	Yd Mi.	600	600
23x	Ballast	Ton	30,600	30,600
26a	Gravel or Crushed Rock Surfacing	Ton	26,600	26,600
26c	Overhaul of Surfacing and Ballast	Ton Mi	92,000	92,000
46a	Class "A" Concrete	Cu Yd.	100	100
46b	Class "B" Concrete	Cu Yd	9	9
47	Reinforcing Steel	Lb.	7,700	7,700
53b	18" Corrugated Metal Culvert Pipe	Lin Ft	376	376
53d	30" Corrugated Metal Culvert Pipe	Lin Ft	94	94
53e	36" Corrugated Metal Culvert Pipe	Lin Ft	110	110
53g	48" Corrugated Metal Culvert Pipe	Lin Ft	36	36
76c	Barbed Wire Fence with Metal Posts	Lin Ft	32,000	32,000
81a	Project Markers	Each	1	1
81b	Right of Way Markers	Each	45	45
92	Timber Guard Posts	Each	10	10
95d	Galv Metal Apron for 30" C.M.P.	Each	2	
95e	Galv Metal Apron for 36" C.M.P.	Each	2	
95g	Galv Metal Apron for 48" C.M.P.	Each	2	

F.A.S.	SHEET NO.	TOTAL SHEETS
S 0002 (2)	3	

SURFACING PLAN

It is estimated that material for Gravel Surfacing for the Project is available in the vicinity of the pit indicated in the following tabulation. Estimated quantities involved in this operation are shown below.

No alteration of the Surfacing Plan as here outlined will be allowed without written permission from the Department.

MATERIAL TO BE PLACED	SOURCE		QUANTITY TONS USED TOP COURSE	QUANTITY TONS USED BOTTOM COURSE	OVERHAUL TON MILE
375+00 to 490+00	Pit # 1		2760	6325	20,796
490+00 to 526+00 Bk	11,615' Lt. of Sta.		864	1980	4,383
526+00 Bk = 527+00 Ah	490+00, N.E. ¼	Equation			
527+00 Ah to 534+56	Sec. 26, T. 30 S.,		182	416	1,169
534+56 to 623+00	R. 45 W.		2123	4865	8,299
623+00 to 698+00			1800	4125	6,282
Approaches	Pit # 2			1106	1,780
	7130' Lt. of Sta. 623+00, S.W. ¼ Sec. 29, T. 30 S., R. 44 W.				
			7729	18,817	
TOTALS			26,546		42,709

BALLAST

It is estimated that Ballast for the Project is available in the vicinity of the pit indicated in the following tabulation. Estimated quantities involved in this operation are shown below.

No alteration of the Ballast as here outlined will be allowed without written permission from the Department.

MATERIAL TO BE PLACED	SOURCE		QUANTITY THICKNESS INCHES T	QUANTITY THICKNESS INCHES t	TONS USED	OVERHAUL TON MILE
375+00 to 490+00	Pit # 1		6"	6"	10,925	25,008
490+00 to 526+00 Bk	11,615' Lt. of Sta.		6"	6"	3,420	5,270
526+00 Bk - 527+00 Ah	490+00, N.E. ¼	Equation				
527+00 Ah to 534+56	Sec. 26, T. 30 S.,		6"	6"	719	1,405
534+56 to 623+00	R. 45 W.		6"	6"	8402	9,978
623+00 to 698+00			6"	6"	7,125	7,554
	Pit # 2 7130' Lt. of Sta. 623+00, S.W. ¼ Sec. 29, T. 30 S., R. 44 W.					
TOTALS					30,591	49,215

FENCING REQUIREMENTS

STATION	SIDE	REMOVE FENCE LIN. FT.	BUILD BARBED WIRE FENCE LIN. FT.	GATES NO. B.W.
375+00 to 421+59	Rt.		4646	
409+23	X	135		
421+99 to 489+68	Rt.		6789	
489+68.5	X	155		
490+34	X	300		
490+34 to 528+60	Rt.		3750	
502+95.5	X	204		
517+61	X	154		
529+00	X	120		
529+50 to 622+61	Rt.		9305	
543+39	X	100		
583+24	R X	100		
622+61.1	X	150		
623+23.5	X	150		
623+23 to 696+95	Rt.		7477	
649+22	X	150		
TOTALS		1718	31967	

TIMBER GUARD POSTS

STATION	SIDE	SPACING	NO.
443+16	Rt. & Lt.	C.M.P.	2
489+20	Rt. & Lt.	C.M.P.	2
497+00	Rt. & Lt.	C.M.P.	2
569+74	Rt. & Lt.	C.M.P.	2
606+40	Rt. & Lt.	C.B.C.	2
TOTAL			10

TABULATION OF LENGTH & DESIGN DATA

STATION	ROADWAY LIN. FT.	BRIDGES LIN. FT.	BRIDGES LOADING
375+00 = Begin S 0002(2)	15,100		
526+00 Bk = 527+00 Ah	17,100		
698+00 = End S 0002(2) = Begin S 115(1)			
TOTAL	32,200		

SUMMARY	LIN. FT.	MILES
Roadway S 0002(2)	32,200	6.098
TOTAL	32,200	6.098

DESIGN DATA	
Maximum Degree of Curve	2°
Maximum Grade	1.21%
Minimum N.P.S.D. - Horizontal	1300'
Minimum N.P.S.D. - Vertical	665'
Maximum Design Speed	60 M.P.H.

R.O.W. MARKERS

STATION	SIDE	NO.
375+00	Rt. & Lt.	2
381+90	Lt.	1
394+70	Lt.	1
394+90	Rt.	1
421+46	Lt.	1
421+68	Rt.	1
421+91	Lt.	1
448+10	Lt.	1
448+30	Rt.	1
474+80	Lt.	1
474+96	Lt.	1
489+12	Rt.	1
489+18	Lt.	1
489+66	Rt.	1
489+77	Lt.	1
490+28	Rt.	1
490+50	Lt.	1
490+80	Rt.	1
501+25	Rt.	1
501+35	Lt.	1
504+92	Lt.	2
509+93	Lt.	2
528+57	Rt.	1
528+63	Lt.	1
555+45.2	Rt. & Lt.	2
581+79	Rt.	1
600+86	Lt.	2
608+45	Rt. & Lt.	2
619+65	Lt.	2
622+61.1	Rt. & Lt.	2
634+50.2	Rt. & Lt.	2
660+82	Rt. & Lt.	2
687+26.5	Rt.	1
687+26.5	Lt.	2
TOTAL		45

STATE	F.A.S. NO.	SHEET	TOTAL SHEETS
COLO.	S 0002 (2)	4	

LIST OF STRUCTURES

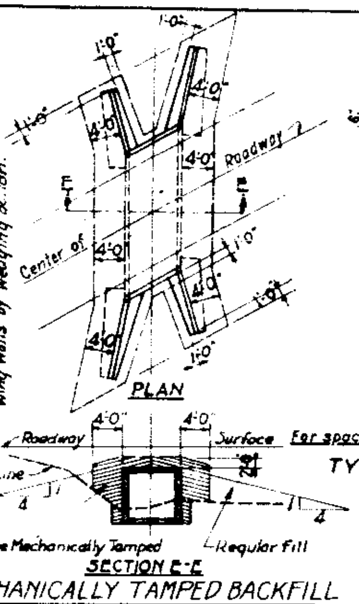
STATION	DESCRIPTION	REMOVE		EXCAVATION			STRUCTURAL EXCAVATION	MECHANICAL TAMPING	SELECTED BACKFILL	GRAVEL OR CRUSHED ROCK SURFACING	CONCRETE		REINFORCING STEEL	CORR METAL CULV PIPE				METAL APRONS FOR C.M.P			MISCELLANEOUS
		STRUCTURE NO.	HEADWALL NO.	UNCLASSIFIED CU.YDS EXCAV.	UNCLASSIFIED CU.YDS EMB.	UNCLASS DITCH CU.YDS	CU.YDS ☆	HOURS	CU.YDS.	TON	CU. YDS. CL"A"	CU. YDS. CL"B"	LBS.	LIN. FT 18"	LIN. FT 30"	LIN. FT 36"	LIN. FT 48"	EACH 30"	EACH 36"	EACH 48"	
375 + 00	Project Marker & Approach to Project		(Quantities Included in Profile)							98											Project Marker
381 + 00 to 387 + 00	Road Approach Lt			334						576											
401 + 00	Side Drain & Road Approach Lt				15		5			20				28							
421 + 88	Side Drains & Road Apprs. Rt & Lt				80		5			78				26 26							
443 + 16	Double Cross Culvert & Channel Improvement (W=75') 2-Type "E" Hdwls					50	20		40			81				36 36					
462 + 72	Side Drain & Road Approach Lt				15		10			20				28							
469 + 65	Side Drain & Road Approach Lt				20		5			20				26							
489 + 20	Cross Culvert, Ditches (W=1)					40	20		15						34			2			
490 + 00	Side Drain Rt. & Road Approach Rt & Lt				20		25			78					60						
497 + 00	Cross Culvert, Ditches (W=2)					20	25		20							38			2		
504 + 00	Side Drain & Road Approach Lt				15		5			20				28							
529 + 00	Side Drains & Road Approaches Rt & Lt				15		15			78				38 38							
544 + 10	Side Drain & Road Approach Lt				15		5			20				26							
569 + 74	Cross Culvert, Ditches (W=2)					30	15		30								36		2		
581 + 79	Side Drain & Road Approach Lt				15		5			20				26							
606 + 40	10' x 7' x 37' C.B.C. & Channel Change (W=12)			614			180	50	200		999		7891								
622 + 94	Side Drains & Road Approaches Rt. & Lt.			15			40			78				Lt 42 Rt 44							
	TOTALS			963	210	140	380	50	305	1106	999	81	7891	376	94	110	36	2	2	2	

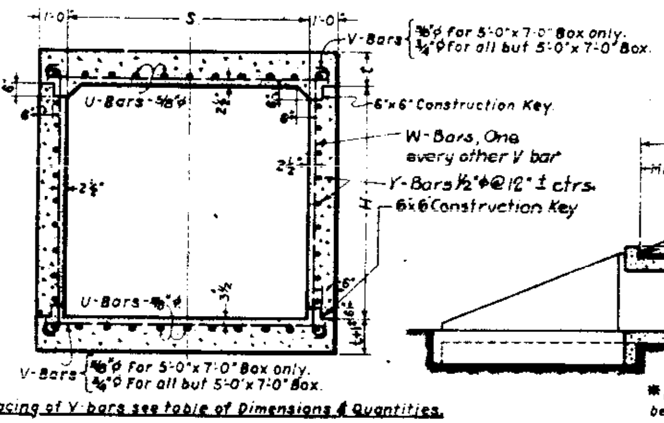
☆ Structural Excavation is estimated to be 90% Common and 10% Rock, each of which is estimated to be 90% Dry and 10% Wet.

STANDARD M-104-E

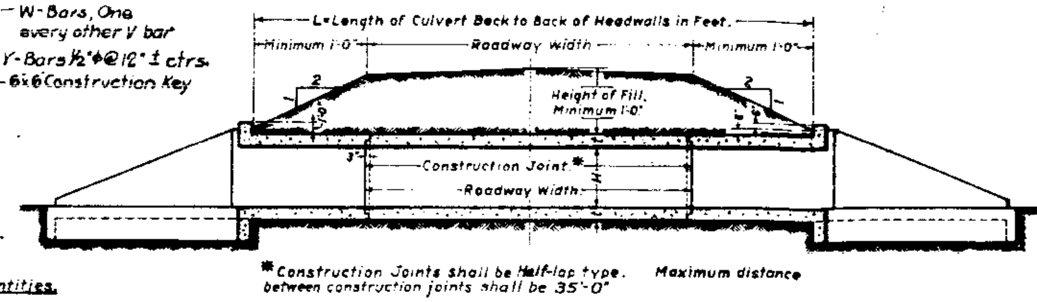
FED. ROAD DIST. NO.	STATE	F. A. P.	SHEET NO	TOTAL SHEETS
3	COLO.	S 0002 (2)	5	

Revised Dec. 10, 1945 by W. W. D.

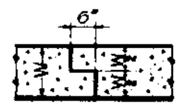




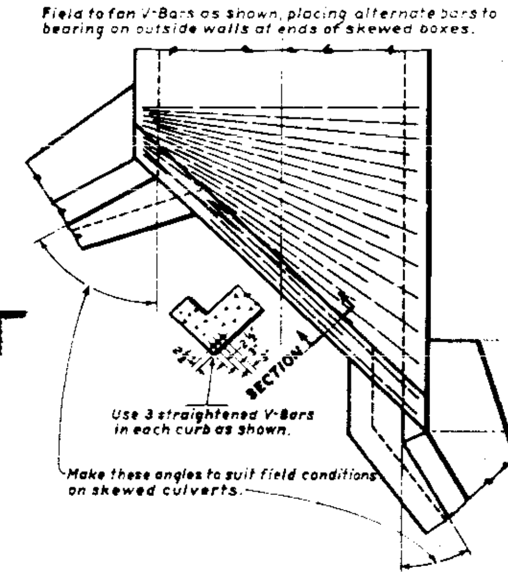
TYPICAL SECTION THRU BOX.



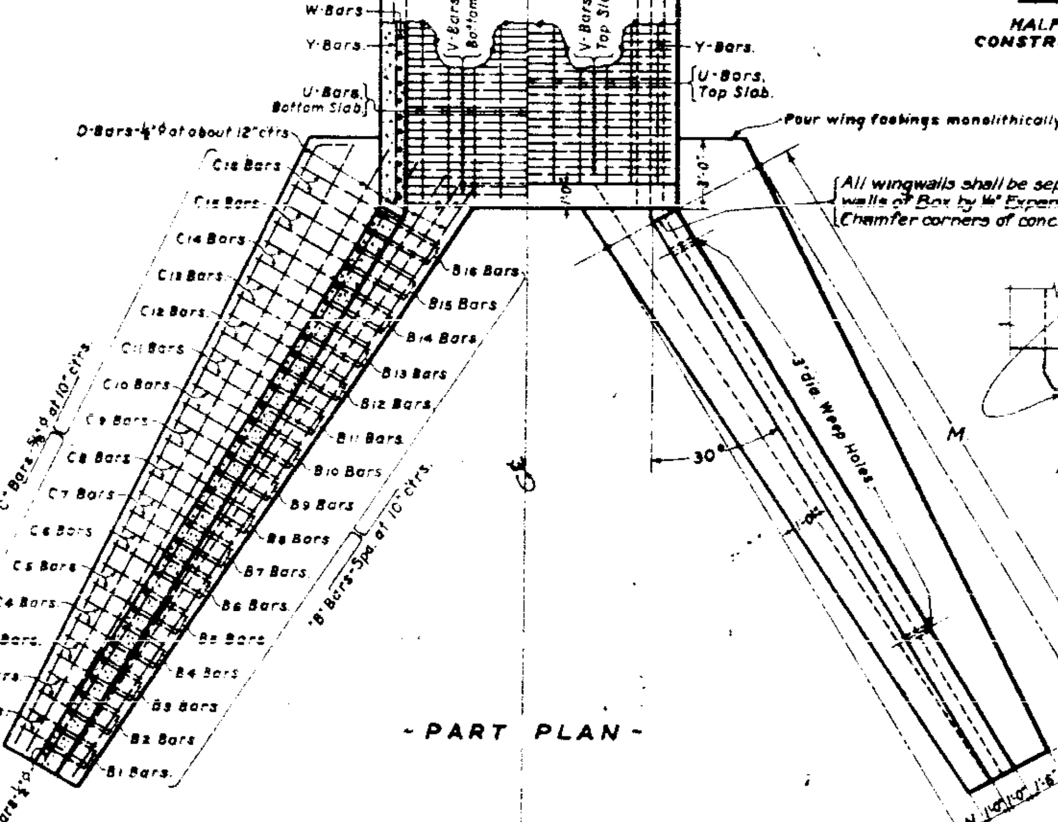
TYPICAL SECTION SHOWING RELATION OF CULVERT TO ROADWAY.



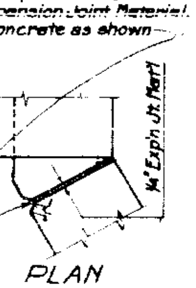
HALF-LAP TYPE CONSTRUCTION JOINT.



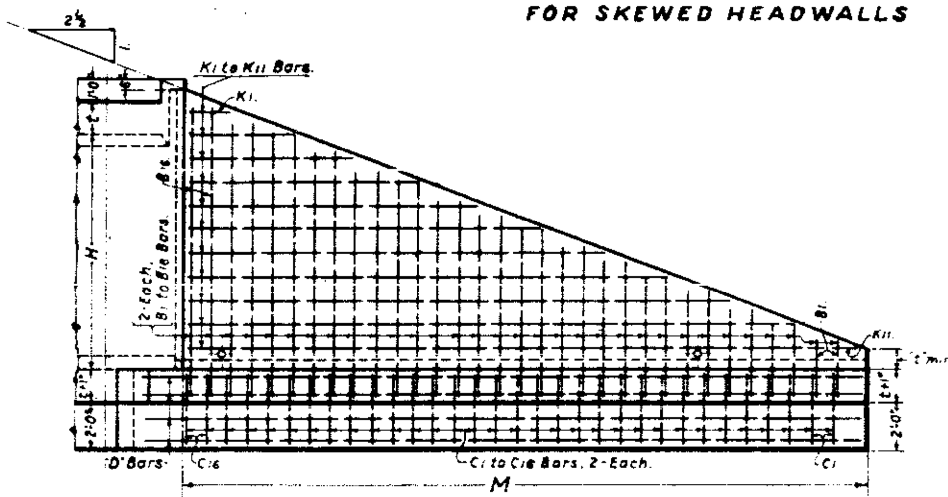
PART PLAN FOR SKEWED HEADWALLS



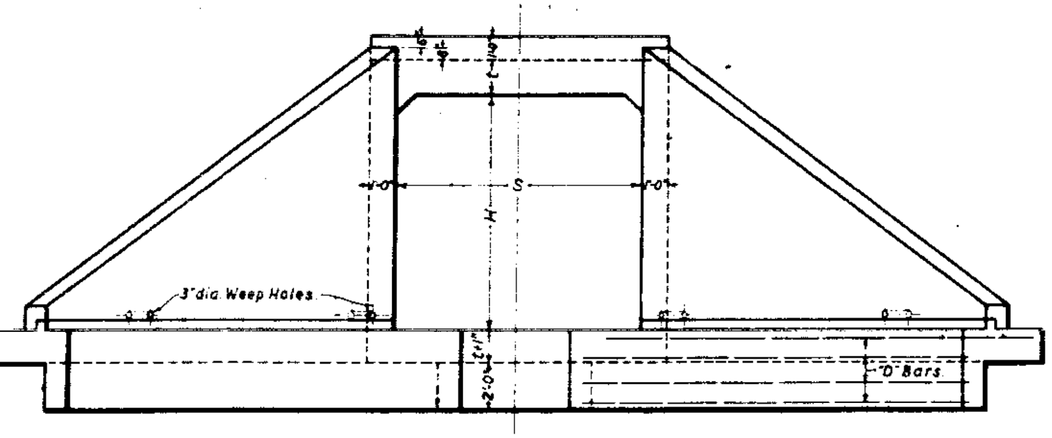
- PART PLAN -



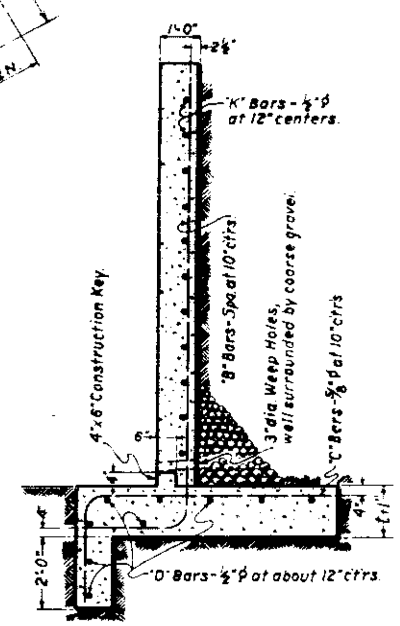
PLAN



TRUE SIDE ELEVATION OF WING WALL.



- END VIEW -



TYPICAL SECTION THRU WINGWALL

REINFORCEMENT BAR LIST.

R.A.D. ✓ H.W.P.

USE BARS FOR	MARK	SIZE	NUMBER	DIMENSION -P-		TOTAL LENGTH
All boxes but 5 x 7	V	1/2"φ	24 (L+2) divided by Spacing	S+14"		P+2'-0"
5' x 7' box, Only	V	5/8"φ		S+14"		P+2'-0"
All Sizes.	W	★	1/2 No. of V Bars.	H+10"		P+2'-0"
All Sizes.	U	5/8"φ	★			L+1'-0"
All Sizes.	Y	1/2"φ	★			L+1'-8"
All Sizes.	D	1/2"φ	36			H+2'-0"
All Sizes.	K1	1/2"φ	4			[illegible]
All Sizes.	K2	1/2"φ	4			[illegible]
All Sizes.	K3	1/2"φ	4			[illegible]
All Sizes.	K4	1/2"φ	4			[illegible]
H=4 Ft. and over.	K5	1/2"φ	4			[illegible]
H=5 Ft. and over.	K6	1/2"φ	4			[illegible]
H=6 Ft. and over.	K7	1/2"φ	4			[illegible]
H=7 Ft. and over.	K8	1/2"φ	4			[illegible]
H=8 Ft. and over.	K9	1/2"φ	4			[illegible]
H=10 Ft.	K10	1/2"φ	4			[illegible]
H=10 Ft.	K11	1/2"φ	4			[illegible]
All Sizes.	B1	5/8"φ	8	P=1'-0"	Q= 8"	[illegible]
All Sizes.	B2	5/8"φ	8	P=1'-0"	Q=1'-2"	[illegible]
All Sizes.	B3	5/8"φ	8	P=1'-1"	Q=1'-10"	[illegible]
All Sizes.	B4	5/8"φ	8	P=1'-[illegible]"	Q=2'-[illegible]"	[illegible]
All Sizes.	B5	5/8"φ	8	P=1'-3"	Q=3'-[illegible]"	[illegible]
All Sizes.	B6	5/8"φ	8	P=1'-4"	Q=3'-10"	[illegible]
H=4 Ft. and over.	B7	5/8"φ	8	P=1'-5"	Q=4'-6"	[illegible]
H=5 Ft. and over	B8	5/8"φ	8	P=1'-5"	Q=5'-2"	7'-4"
H=5 Ft. and over.	B9	3/4"φ	(5Ft=4) 8	P=1'-6"	Q=5'-10"	[illegible]
H=6 Ft. and over.	B10	3/4"φ	8	P=1'-7"	Q=[illegible]	[illegible]
H=7 Ft. and over	B11	[illegible]	8	[illegible]	[illegible]	[illegible]
H=7 Ft. and over.	B12	3/4"φ	(7Ft=4) 8	P=1'-9"	Q=7'-10"	10'-4"
H=8 Ft. and over.	B13	3/4"φ	8	P=1'-10"	Q=[illegible]	11'-1"
H=10 Ft.	B14	[illegible]	8	P=1'-11"	Q=[illegible]	11'-10"
H=10 Ft.	B15	[illegible]	8	P=1'-11"	Q=[illegible]'-10"	[illegible]
H=10 Ft.	B16	[illegible]	8	P=2'-0"	Q=10'-[illegible]"	[illegible]
All Sizes.	C1	5/8"φ	8	P=2'-[illegible]"	Q=1'-10"	[illegible]
All Sizes.	C2	5/8"φ	8	P=2'-11"	Q=1'-10"	[illegible]
All Sizes.	C3	5/8"φ	8	P=3'-1"	Q=1'-10"	[illegible]
All Sizes.	C4	5/8"φ	8	P=3'-4"	Q=1'-10"	[illegible]
All Sizes.	C5	5/8"φ	8	P=3'-[illegible]"	Q=1'-10"	[illegible]
All Sizes.	C6	5/8"φ	8	P=3'-9"	Q=1'-10"	[illegible]
H=4 Ft. and over.	C7	5/8"φ	8	P=4'-0"	Q=1'-10"	[illegible]
H=5 Ft. and over.	C8	5/8"φ	8	P=4'-2"	Q=1'-10"	[illegible]
H=5 Ft. and over	C9	5/8"φ	(5Ft=4) 8	P=4'-5"	Q=1'-10"	7'-1"
H=6 Ft. and over.	C10	5/8"φ	8	P=4'-[illegible]"	Q=1'-10"	7'-4"
H=7 Ft. and over	C11	5/8"φ	8	P=4'-10"	Q=1'-10"	[illegible]
H=7 Ft. and over.	C12	5/8"φ	(7Ft=4) 8	P=5'-1"	Q=1'-10"	[illegible]
H=8 Ft. and over.	C13	5/8"φ	8	P=5'-4"	Q=1'-10"	[illegible]
H=8 Ft. and over.	C14	5/8"φ	8	P=5'-[illegible]"	Q=1'-10"	[illegible]
H=10 Ft.	C15	5/8"φ	8	P=5'-9"	Q=1'-10"	[illegible]
H=10 Ft.	C16	5/8"φ	8	P=6'-0"	Q=1'-10"	[illegible]

★ SEE TABLE OF DIMENSIONS AND QUANTITIES.

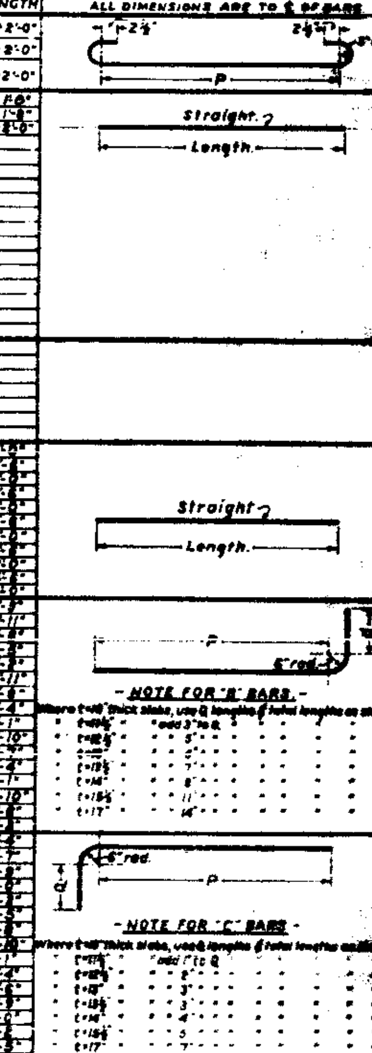


TABLE OF DIMENSIONS AND QUANTITIES.

R.A.D. ✓ H.W.P.

STEEL QUANTITIES GIVEN BELOW INCLUDE ALLOWANCE OF 1% ± FOR OVERRUN.
TOTAL QUANTITIES FOR ONE BOX EQUALS THE QUANTITY FOR TWO HEADWALLS PLUS (L x QUANTITY FOR ONE LINEAL FOOT OF BOX)

HEIGHT OF FILL ALLOWED	TYPE	SPAN -S-	HEIGHT -H-	THICKNESS OF SLAB -t-	SPACING OF BARS -V-	SIZE OF BARS -W-	SPACING OF BARS -U-	NUMBER OF U-BARS PER BOX	NUMBER OF Y-BARS PER BOX	LENGTH OF WINGWALL -M-	DIMENSION -N-	ONE LIN. FT. OF BOX CONCRETE CU. YD.	ONE LIN. FT. OF BOX STEEL LB.	TWO HEADWALLS CONCRETE CU. YD.	TWO HEADWALLS STEEL LB.
12'-0"		5'-0"	7'-0"	10"	6"	5/8"φ	14"	8	16	20'-0"	10"	0.982	78	37.0	2039
7'-0"	8 I	8'-0"	3'-0"	11 1/2"	5 1/2"	1/2"φ	12"	16	8	10'-0"	6"	0.972	104	18.0	873
			4'-0"	11 1/2"	5 1/2"	1/2"φ	12"	16	10	12'-6"	7"	1.047	107	23.5	1081
			5'-0"	11 1/2"	5 1/2"	1/2"φ	12"	16	12	15'-0"	8"	1.121	110	28.0	1367
			6'-0"	11 1/2"	5 1/2"	1/2"φ	12"	16	14	17'-6"	9"	1.195	115	34.0	1679
			8'-0"	11 1/2"	5 1/2"	5/8"φ	12"	16	18	22'-6"	1'-0"	1.349	128	46.5	2565
9'-0"	8 II	8'-0"	4'-0"	12 1/2"	5"	1/2"φ	10"	20	10	12'-6"	7"	1.109	120	24.5	1096
			5'-0"	12 1/2"	5"	1/2"φ	10"	20	12	15'-0"	8"	1.183	123	28.5	1386
			6'-0"	12 1/2"	5"	1/2"φ	10"	20	14	17'-6"	9"	1.257	126	35.0	1700
			8'-0"	12 1/2"	5"	5/8"φ	10"	20	18	22'-6"	1'-0"	1.405	142	48.5	2595
12'-0"	8 III	8'-0"	4'-0"	13 1/2"	4 1/2"	1/2"φ	9"	22	10	12'-6"	7"	1.171	132	25.0	1115
			5'-0"	13 1/2"	4 1/2"	1/2"φ	9"	22	12	15'-0"	8"	1.245	136	30.8	1409
			6'-0"	13 1/2"	4 1/2"	1/2"φ	9"	22	14	17'-6"	9"	1.319	139	36.5	1727
			8'-0"	13 1/2"	4 1/2"	5/8"φ	9"	22	18	22'-6"	1'-0"	1.467	156	49.5	2568
4'-0"	10 I	10'-0"	3'-0"	13"	5"	1/2"φ	12"	20	8	10'-0"	6"	1.231	131	19.0	893
			4'-0"	13"	5"	1/2"φ	12"	20	10	12'-6"	7"	1.306	134	25.0	1105
			6'-0"	13"	5"	1/2"φ	12"	20	14	17'-6"	9"	1.454	140	36.5	1714
			7'-0"	13"	5"	1/2"φ	12"	20	16	20'-0"	10 1/2"	1.529	143	43.3	2400
			10'-0"	13"	5"	5/8"φ	12"	20	22	27'-6"	1'-2"	1.751	162	66.0	3888
7'-0"	10 II	10'-0"	4'-0"	14"	4 1/2"	1/2"φ	10"	24	10	12'-6"	7"	1.380	150	26.0	1125
			6'-0"	14"	4 1/2"	1/2"φ	10"	24	14	17'-6"	9"	1.528	157	38.5	1742
			8'-0"	14"	4 1/2"	1/2"φ	10"	24	18	22'-6"	1'-0"	1.677	165	52.5	2594
			10'-0"	14"	4 1/2"	5/8"φ	10"	24	22	27'-6"	1'-2"	1.825	182	68.0	3942
9'-0"	10 III	10'-0"	4'-0"	15 1/2"	4"	1/2"φ	9"	26	10	12'-6"	7"	1.491	168	28.0	1139
			6'-0"	15 1/2"	4"	1/2"φ	9"	26	14	17'-6"	9"	1.640	175	40.5	1783
			8'-0"	15 1/2"	4"	1/2"φ	9"	26	18	22'-6"	1'-0"	1.788	182	55.5	2622
			10'-0"	15 1/2"	4"	5/8"φ	9"	26	22	27'-6"	1'-2"	1.936	205	71.5	3983
13'-0"	10 IV	10'-0"	4'-0"	17"	3 1/2"	1/2"φ	8"	30	10	12'-6"	7"	1.603	190	30.0	1164
			6'-0"	17"	3 1/2"	1/2"φ	8"	30	14	17'-6"	9"	1.751	198	43.0	1798
			8'-0"	17"	3 1/2"	5/8"φ	8"	30	18	22'-6"	1'-0"	1.899	220	58.5	2672
			10'-0"	17"	3 1/2"	3/4"φ	8"	30	22	27'-6"	1'-2"	2.047	249	75.5	4052

GENERAL NOTES.

ALL WORK SHALL BE DONE ACCORDING TO THE STANDARD SPECIFICATIONS OF THE COLORADO STATE HIGHWAY DEPARTMENT, ADOPTED JUNE 1, 1940.

ALL CONCRETE SHALL BE CLASS "A".

ALL WALLS SHALL HAVE FORMS ON BOTH SIDES.

ALL CONSTRUCTION JOINTS SHALL BE THOROUGHLY CLEANED BEFORE FRESH CONCRETE IS POURED.

ALL BARS SHALL BE DEFORMED.

MINIMUM DISTANCE FROM CENTERLINE OF BARS TO EDGE OF CONCRETE TO BE 2".

SECONDARY BARS WHEN SPLICED SHALL BE GIVEN A LAP OF 30 DIAMETERS.

FOR CULVERTS REQUIRED AND GOVERNING DIMENSIONS SEE SHEET NO 2.

ALL REINFORCING BARS SHALL BE TAGGED WITH THE STATION NUMBER AND LETTER DESIGNATION.

THIS DESIGN NOT TO BE USED WHEN HEIGHT OF FILL OVER BOX EXCEEDS THAT TABULATED AS ALLOWABLE.

POUR WING FOOTINGS MONOLITHICALLY WITH FLOOR OF BOX.

POUR WINGS INDEPENDENT OF SIDES OF BOX.

THE USE OF ADDITIONAL CONSTRUCTION JOINTS UNDESIRABLE, SHOULD FIELD CONDITIONS REQUIRE, CONSTRUCTION JOINTS MAY BE MADE ON A VERTICAL PLANE PERPENDICULAR TO CENTERLINE OF CULVERT, AND SHALL HAVE KEYS AS SHOWN.

SUPPORTING SOILS FOR ALL CULVERTS MUST BE COMPOSED OF FIRM AND UNFORM MATERIAL THROUGHOUT.

ALL BACKFILLING TO AND OVER CULVERTS SHALL BE LAID IN LAYERS NOT EXCEEDING SIX INCHES IN DEPTH AND EACH LAYER SHALL BE COMPACTED IN ACCORDANCE WITH THE ILLUSTRATION FOR MECHANICALLY TAMPED BACKFILL SHOWN ON THIS DRAWING

LOADING DATA. LIVE LOAD = A. A. S. H. O. H20-S16-44.

DEAD LOAD
Earth 120 lb/cu.ft.
Concrete 150 lb/cu.ft.

DESIGN DATA
fs = 18,000 lb/sq. in.
fc = 833 lb/sq. in.
n = 12

COLORADO
STATE HIGHWAY DEPARTMENT
STANDARD
CONCRETE BOX CULVERT.

8 FT. x 3 FT. 5 FT. x 7 FT. 10 FT. x 6 FT.
8 FT. x 4 FT. 8 FT. x 8 FT. 10 FT. x 7 FT.
8 FT. x 5 FT. 10 FT. x 3 FT. 10 FT. x 10 FT.
8 FT. x 6 FT. 10 FT. x 4 FT.

Across DRY WASH
Sta. 606+40.00
Near WALSH Sec. 5 T. 31 S. R. 44 W.

Designed by A.G.K. | Approved by [signature] Bridge Engineer
Made by J.A.V.
Checked by R.A.D. | Date: Sept. 16th 1938

STRUCTURE NO. ______

INITIAL	DATE

[redacted]

STATE [redacted]

5.0002(3) 6

SAMPLE BRIDGE NUMBER

SAMPLE YEAR NUMBER

GENERAL NOTES

ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE [illegible] COLORADO STATE HIGHWAY DEPARTMENT ADOPTED JUNE 1, 1940.

[illegible] SHALL NOT BE PAID FOR AS A SEPARATE ITEM.

THE SIZE, SHAPE AND SPACING OF THE LETTERS AND FIGURES [illegible] IN ACCORDANCE WITH THE FULL SIZE SHOWN ON THIS SHEET. ADDITIONAL COPIES OF THIS FULL SIZE SHEET CAN BE OBTAINED FROM THE DEPARTMENT WITHOUT CHARGE.

THE YEAR NUMBERS ARE RECESSED IN CONCRETE 3/8" MINIMUM AS SHOWN INTO THE PANEL OF THE ENDPOST ON THE RIGHT HAND SIDE OF EACH BRIDGE END AND INTO THE FACE OF THE DOWNSTREAM HEADWALL OF CULVERTS, SYPHONS, [illegible] RETAINING WALL, ETC. 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.

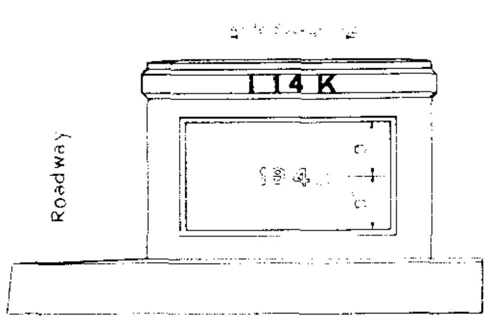
THE STRUCTURE NUMBER SHALL BE STENCILED ON THE RIGHT HAND SIDE OF EACH BRIDGE END AS SHOWN ON THIS STANDARD AND AS SPECIFIED.

THE CORRECT NUMBER FOR EACH BRIDGE IS SHOWN IN THE LOWER RIGHT HAND CORNER OF THE DETAIL SHEETS FOR THAT BRIDGE.

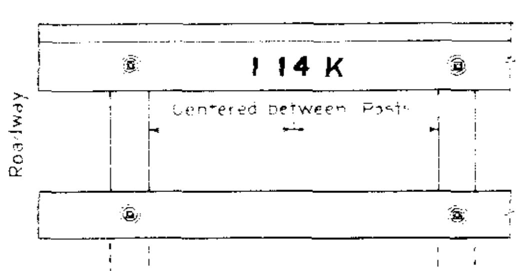
A PROPER WHITE BACKGROUND RECTANGULAR IN SHAPE AND EXTENDING THREE INCHES BEYOND THE LIMITS OF THE NUMBER SHALL BE PAINTED WITH TWO COATS OF ACCEPTABLE WHITE PAINT UNLESS AN APPROVED WHITE CONCRETE PAINT IS USED. BEFORE PAINTING THE SURFACE MUST BE THOROUGHLY DRIED, CLEANED AND PROPERLY SIZED. ON TIMBER 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 STANDARD [illegible] PAINT AS SPECIFIED UNDER ITEM 41 STEEL BRIDGES. THE BRACES OF THE STENCILED LETTERS AND FIGURES SHALL BE CAREFULLY FILLED IN BY HAND TO MAKE SOLID FIGURES.

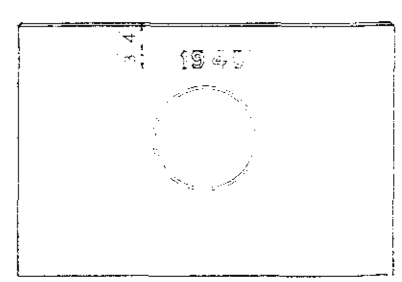
SUFFICIENT TIME BETWEEN SUCCESSIVE COATS SHALL BE ALLOWED TO PERMIT THORO DRYING.



TYPICAL FOR CONCRETE ENDPOST



TYPICAL FOR TIMBER WING HANDRAIL



TYPICAL FOR CULVERT HEADWALL SYPHON, RETAINING WALL, ETC. (Downstream Headwall)

COLORADO
STATE HIGHWAY DEPARTMENT
STANDARD LETTERS AND FIGURES FOR YEAR NUMBERS AND STRUCTURE NUMBERS

Designed by GHD Made by WPV Checked by	Approved by Ed Bailey Bridge Engineer Date: 1 June, 1946

STRUCTURE NO.

Rev. 6-28-40, A.E. 1940 Specs.
Rev. 1-2-46, C.S.D. Item 818

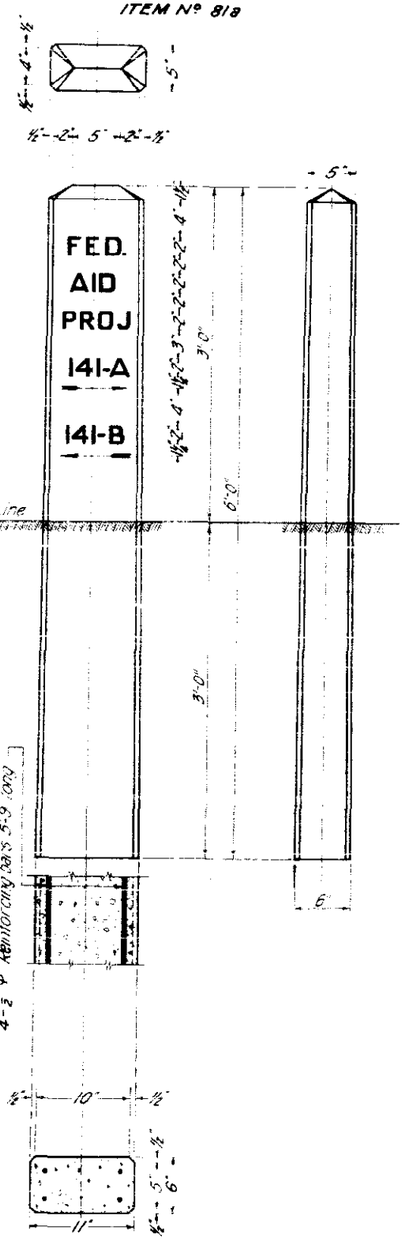
STANDARD M-7-B

Rev. 8 Jan. 46 P.S.B. 1/2" ø to 1/2" ø
Rev. June 10 '46, W.E.M. Bronze Tablet
Rev. Mar. 21-1947, W.H.M. – Project Marker Post

FED. ROAD DIST. NO.	STATE	SHEET NO	TOTAL SHEETS
3	COLO.	5.8002(2)	7

PROJECT MARKER POST

ITEM Nº 818a



NOTES FOR PROJECT MARKER POSTS

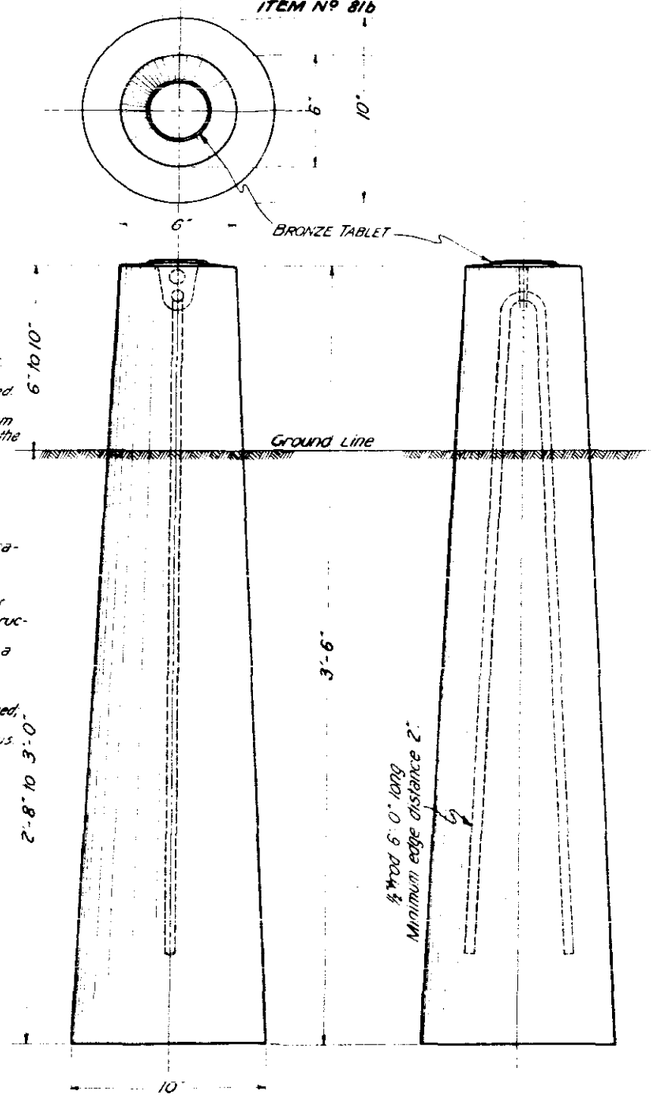
All work shall be done in accordance with the Standard Specifications of the Colorado State Highway Department, adopted June 1, 1940.
Posts shall be made of Class "A" concrete, except use White Portland Cement.
All exposed surfaces shall be rubbed free of form marks.
All letters, numbers and arrows shall be recessed a minimum of 1/4" into the concrete and painted black with black paint conforming to Item No. 41 "Second Field Coat-Dark" of the specifications. Numbers and arrows shall show the proper numbers and directions of the projects each way from where the post is placed. Post to be set with sign facing the road at the end of the project, two feet inside the R.O.W. line or at a point amply protected from traffic in such a position that the sign will indicate properly the projects to which it refers.

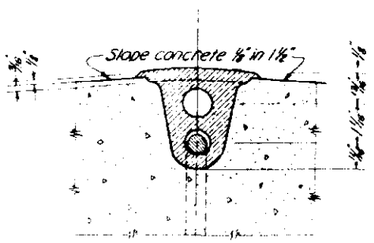
NOTES FOR R.O.W. MARKER POSTS

All work shall be done in accordance with the Standard Specifications of the Colorado State Highway Department, adopted June 1, 1940.
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 the field by the engineering party after post is placed. 3/8 inch letters and figures to be used.
Project designations on tablets shall be properly shown. Thus "F.A.P.Nº" for Federal Aid Projects, "S.P.Nº" for State Projects, "P.W.A. Nº" for P.W.A. Projects, etc.

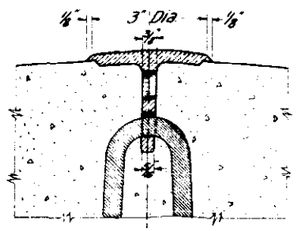
RIGHT OF WAY MARKER POST

ITEM Nº 818b





SECTION B-B



SECTION A-A

DETAIL OF BRONZE TABLET FOR RIGHT OF WAY MARKER POST

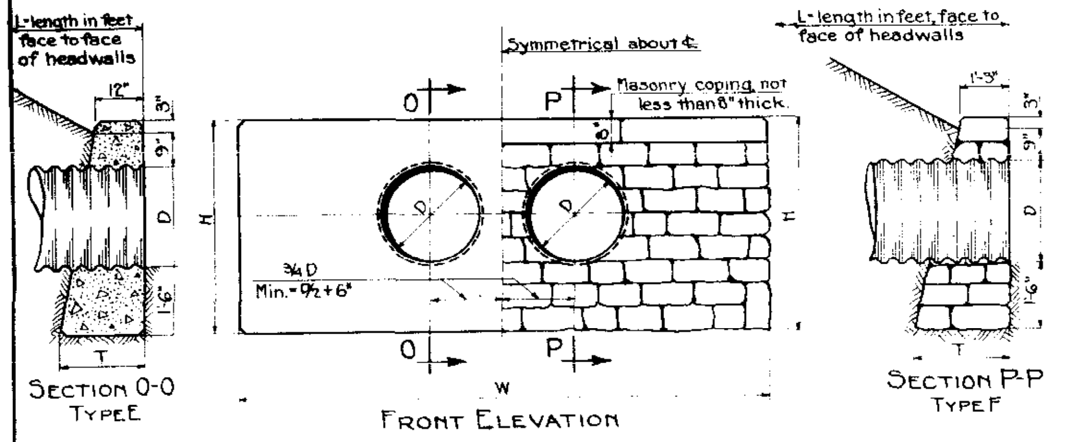
COLORADO
STATE HIGHWAY DEPARTMENT
STANDARD
MARKER POSTS

Designed by R.E.L.	Approved by
Made by F.F.S.	
Checked by R.E.L.	Date: Apr 27 1948

STANDARD M-102-G

FED. AID ROAD DIST. NO.	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
3	COLO.	S. 0602(1)	8	

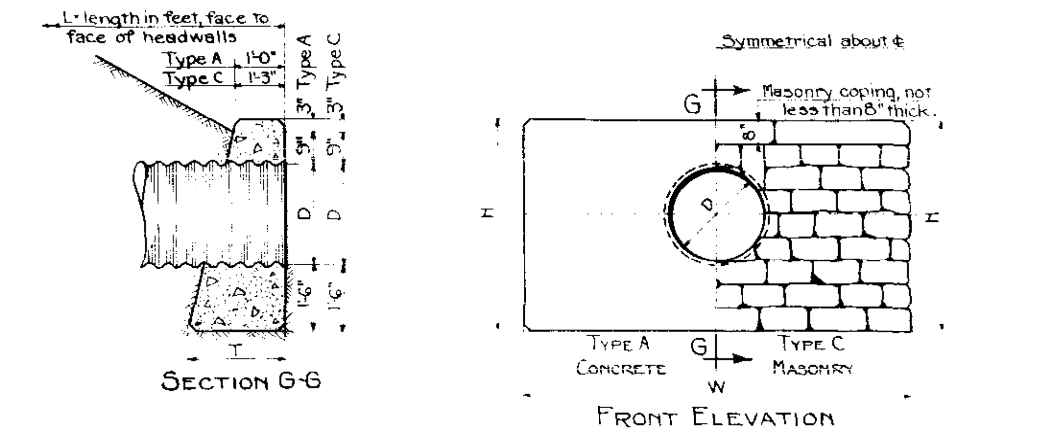
Rev Types K&L Jan. 17, 1946; A.L.P. Rev 3-7-47 Type K&L. H.O.W.
Rev. Types C&F June 11, 1946; A.L.P.
Rev. Types K&L Nov 6, 1946; A.L.P.



STANDARD HEADWALLS FOR DOUBLE CORRUG. METAL PIPE CULVERTS

TABLE OF DIMENSIONS AND QUANTITIES

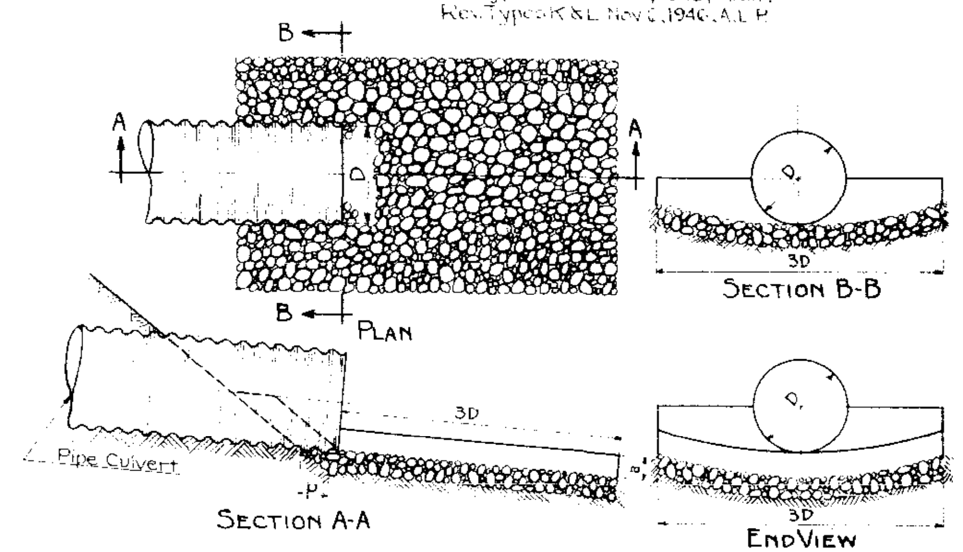
Type E: D Diam.	Type E: T	Type E: Class B Concrete in Two Headwalls	Both Types: W	Both Types: H	Both Types: Corrugated Metal Pipe	Both Types: Corrugated Metal Pipe	Type F: Cement Rubble Masonry in Two Headwalls	Type F: T	Type F: D Diam.
15"	1'-6"	2.4 Cu. Yds.	7'-6"	3'-9"	16 Gage	2xL= Lin. Ft.	3.1 Cu. Yds.	2'-0"	15"
18"	1'-7"	3.0 Do	8'-6"	4'-0"	16 Do	2xL= Do	3.8 Do	2'-1"	18"
24"	1'-10"	4.4 Do	10'-6"	4'-6"	14 Do	2xL= Do	5.5 Do	2'-4"	24"
30"	2'-0"	6.1 Do	12'-9"	5'-0"	14 Do	2xL= Do	7.5 Do	2'-6"	30"
36"	2'-2"	8.1 Do	15'-0"	5'-6"	12 Do	2xL= Do	10.0 Do	2'-8"	36"
42"	2'-5"	10.8 Do	17'-3"	6'-0"	12 Do	2xL= Do	12.8 Do	2'-10"	42"
48"	2'-7"	13.6 Do	19'-6"	6'-6"	12 Do	2xL= Do	16.3 Do	3'-0"	48"



STANDARD HEADWALLS FOR SINGLE CORRUG. METAL PIPE CULVERTS

TABLE OF DIMENSIONS AND QUANTITIES

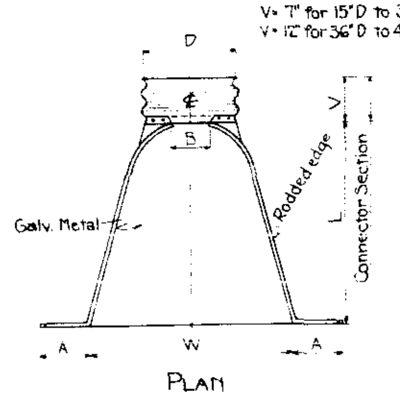
Type A: D Diam.	Type A: T	Type A: Class B Concrete in Two Headwalls	Both Types: W	Both Types: H	Both Types: Corrugated Metal Pipe	Both Types: Corrugated Metal Pipe	Type C: Cement Rubble Masonry in Two Headwalls	Type C: T	Type C: D Diam.
15"	1'-6"	1.8 Cu. Yds.	5'-3"	3'-9"	16 Gage	L= Lin. Ft.	2.2 Cu. Yds.	2'-0"	15"
18"	1'-7"	2.2 Do	6'-0"	4'-0"	16 Do	L= Do	2.8 Do	2'-1"	18"
24"	1'-10"	3.3 Do	7'-6"	4'-6"	14 Do	L= Do	4.1 Do	2'-4"	24"
30"	2'-0"	4.5 Do	9'-0"	5'-0"	14 Do	L= Do	5.6 Do	2'-6"	30"
36"	2'-2"	6.0 Do	10'-6"	5'-6"	12 Do	L= Do	7.4 Do	2'-8"	36"
42"	2'-5"	8.0 Do	12'-0"	6'-0"	12 Do	L= Do	9.2 Do	2'-10"	42"
48"	2'-7"	10.0 Do	13'-6"	6'-6"	12 Do	L= Do	11.5 Do	3'-0"	48"



STANDARD GROUTED RUBBLE APRON FOR PIPE CULVERTS

Square Yards Grouted Rubble Slope and Ditch Paving 1 Foot Thick														
Fill Slope	D	15"	18"	24"	30"	36"	42"	48"	54"	60"	66"	72"	78"	84"
	p \ q	7½"	9"	12"	12"	12"	12"	12"	12"	12"	12"	12"	12"	12"
1½:1	2'-0"	3	4	6	8	12	17	21	27	33	39	46	54	62
2:1	2'-0"	3	4	7	10	13	18	22	28	34	41	49	57	66
3:1	3'-0"	3	4	7	11	15	20	25	31	38	45	54	63	72
4:1	4'-0"	3	5	8	12	16	22	28	34	42	50	59	69	79

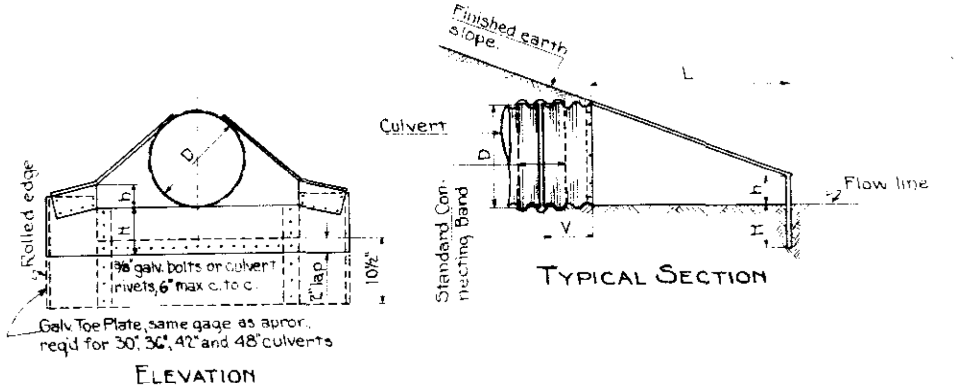
V=7" for 15"D to 30"D.
V=12" for 36"D to 48"D.



TYPE K

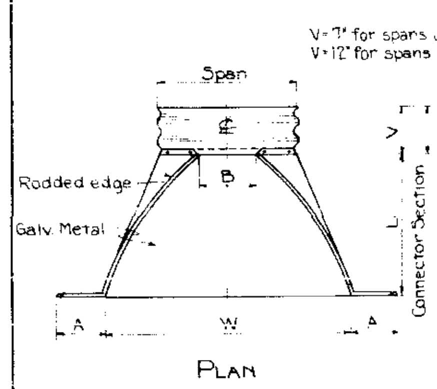
Culv. Diam. D▲	Gage	Dimensions: A Min.	Dimensions: B Max.		Dimensions: L 2" Tol.	Dimensions: W 2" Tol.	Dimensions: H ½" Tol.	Dimensions: h ½" Tol.	Remarks
15"	16	9"	7½"		30"	30"	6"	5"	One piece.
18"	16	9"	9"		36"	36"	6"	6"	One piece
24"	14	9"	12"		46"	48"	6"	8"	One piece
30"	14	9"	15"		60"	59"	6"	10"	Two pieces. ◉
36"	12	14"	18"		72"	70"	6"	12"	Three pieces. ●
42"	12	14"	21"		84"	82"	6"	14"	Three pieces ■
48"	12	14"	24"		96"	94"	6"	16"	Three pieces. ■

Splices to be the lap riveted type.
- ◉ One splice on ℄.
- ● Two splices approximately 1'-6" each side of ℄.
- ■ Two splices approximately 2'-0" each side of ℄.
- ▲ Culvert diameter is equal to dimension D of connector section.



STANDARD METAL APRONS FOR CORRUGATED METAL PIPE CULVERTS TYPE K

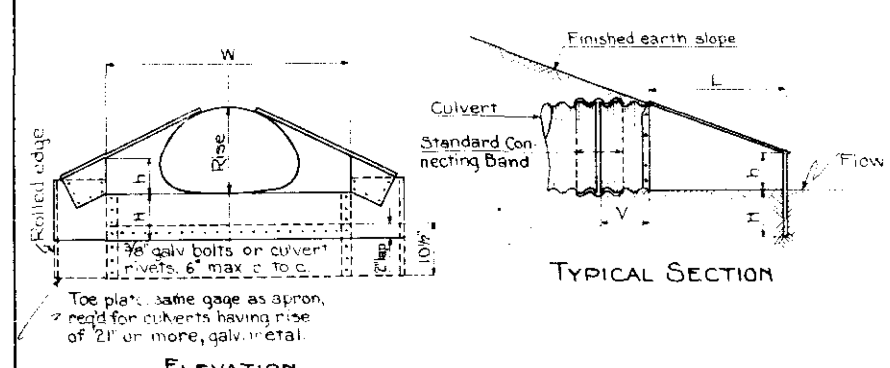
V=7" for spans up to 37"
V=12" for spans over 37"



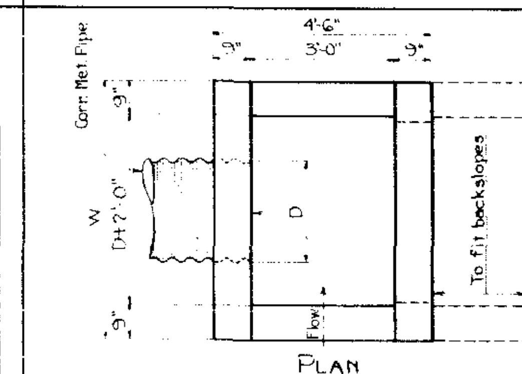
TYPE L

Normal Culvert Diam.	Arch Dimensions: Span	Arch Dimensions: Rise	Gage	Dimensions: A Min.	Dimensions: B Max.		Dimensions: L 2" Tol.	Dimensions: W 2" Tol.	Dimensions: H ½" Tol.	Dimensions: h ½" Tol.	Remarks
15"	18"	11"	16	9"	9"		22"	30"	6"	3¾"	One piece.
18"	22"	13"	16	9"	10"		26"	36"	6"	4½"	One piece.
24"	29"	18"	14	9"	13¼"		36"	48"	6"	6"	One piece.
30"	36"	22"	14	9"	16"		44"	60"	6"	7¼"	One piece.
36"	43"	27"	12	14"	17½"		54"	73"	6"	9"	Riveted splice upper corners.
42"	50"	31"	12	14"	20"		62"	86"	6"	10¼"	Two pieces. Splice on ℄.
48"	58"	36"	12	14"	22"		72"	100"	6"	12"	Three pieces. Two splices 2' ea. side ℄
54"	65"	40"	12	14"	23"		80"	113"	6"	13¼"	Four pieces.
60"	72"	44"	10	14"	24"		88"	128"	6"	14¾"	Four pieces.

Splices to be the lap riveted type.



STANDARD METAL APRONS FOR CORRUGATED METAL PIPE ARCH CULVERTS TYPE L

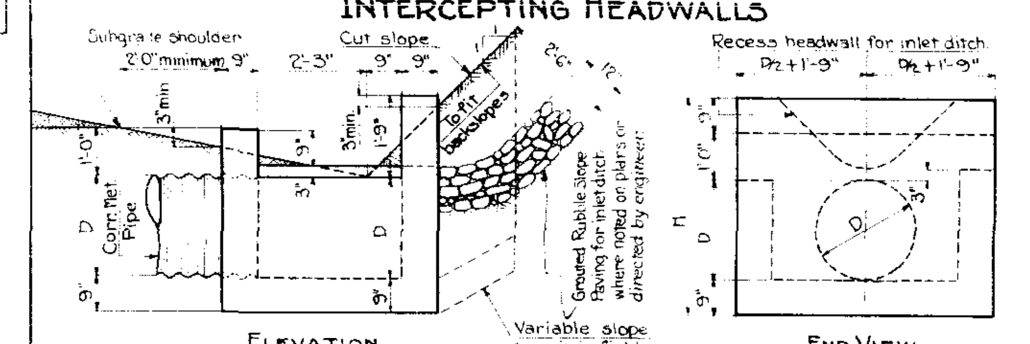


QUANTITIES OF CLASS B CONCRETE OR CEMENT RUBBLE MASONRY

Size of Pipe	Width of Wall	Height of Wall	Quantities in One Headwall
D	W	H	Cu. Yds.
15"	4'-9"	3'-9"	1.48
18"	5'-0"	4'-0"	1.64
24"	5'-6"	4'-6"	1.99
30"	6'-0"	5'-0"	2.34
36"	6'-6"	5'-6"	2.72

NOTE: Backwall to be eliminated and end walls connected to back slope where ordered by the Engineer. Floor slab is to be extended with side walls if in common material and is to be omitted when inlet is in rock. Actual quantities involved in such operation shall be allowed and paid for. Increases in plan quantities must be covered by work order.

INTERCEPTING HEADWALLS



GENERAL NOTES FOR ALL STRUCTURES

All work shall be done according to the standard specifications of the Colorado State Highway Department, adopted June 1, 1940.
All exposed concrete surfaces shall be rubbed free of form marks.
All exposed concrete corners shall be beveled to a 2 inch face.
All construction joints shall be thoroughly cleaned before fresh concrete is poured.
All walls shall have forms on both sides.
The minimum fill over top of culverts shall be 1'-0".
When culvert is skewed, headwalls shall be placed parallel to ℄ of roadway.
Minimum grade of pipe shall be 1%.
For size and location of culverts see plan sheets for project.
Footings in rock shall be poured out to rock and not formed.
Mechanical Tamping, as provided under Item No. 14 of the specifications, shall be applied over such areas as shown on the plans or as ordered by the Engineer.

COLORADO STATE HIGHWAY DEPARTMENT

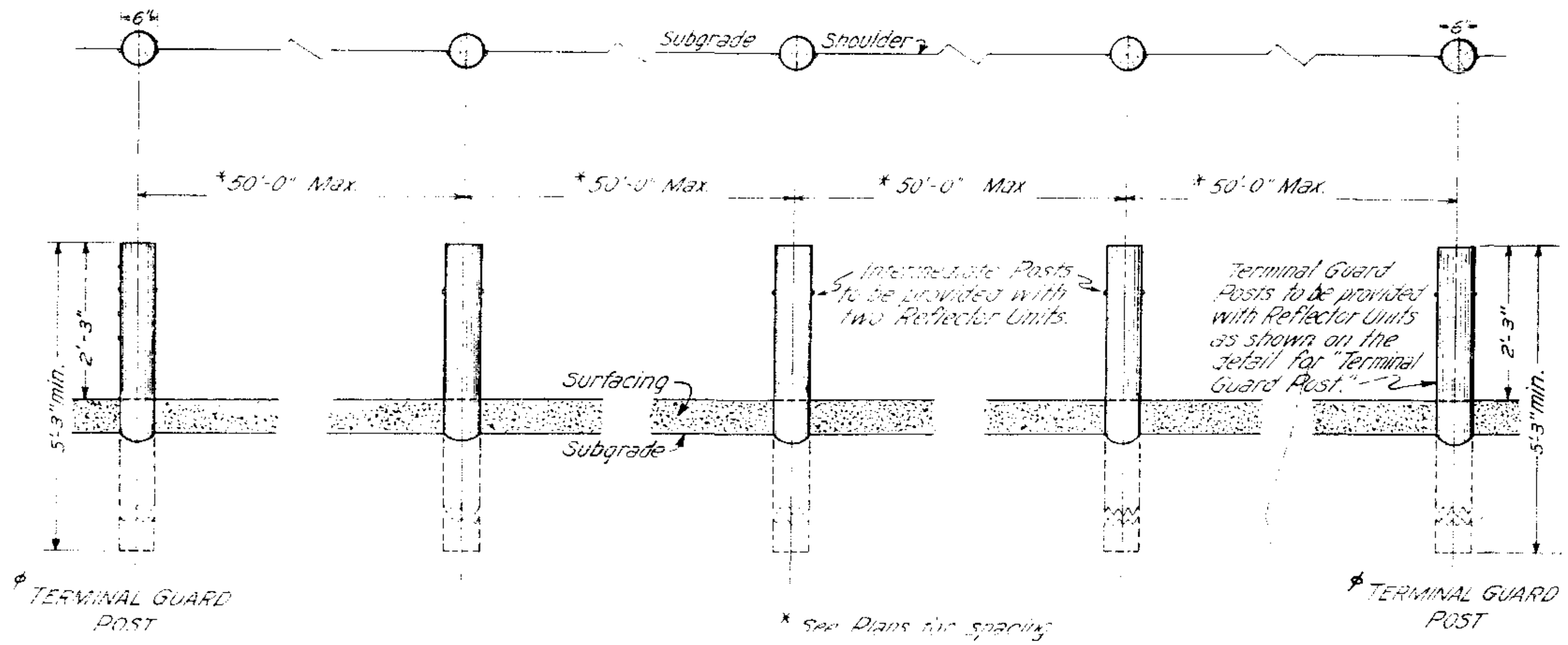
STANDARD HEADWALLS
INTERCEPTING HEADWALLS
GALVANIZED METAL APRONS
GROUTED RUBBLE APRONS
FOR CORR. MET. PIPE CULVERTS

Designed by P.S.B.-G.H.D.	Approved by [signature]
Made by A.L.P.	Bridge Engineer
Checked by H.W.P.	Date: 15 Dec 1945.

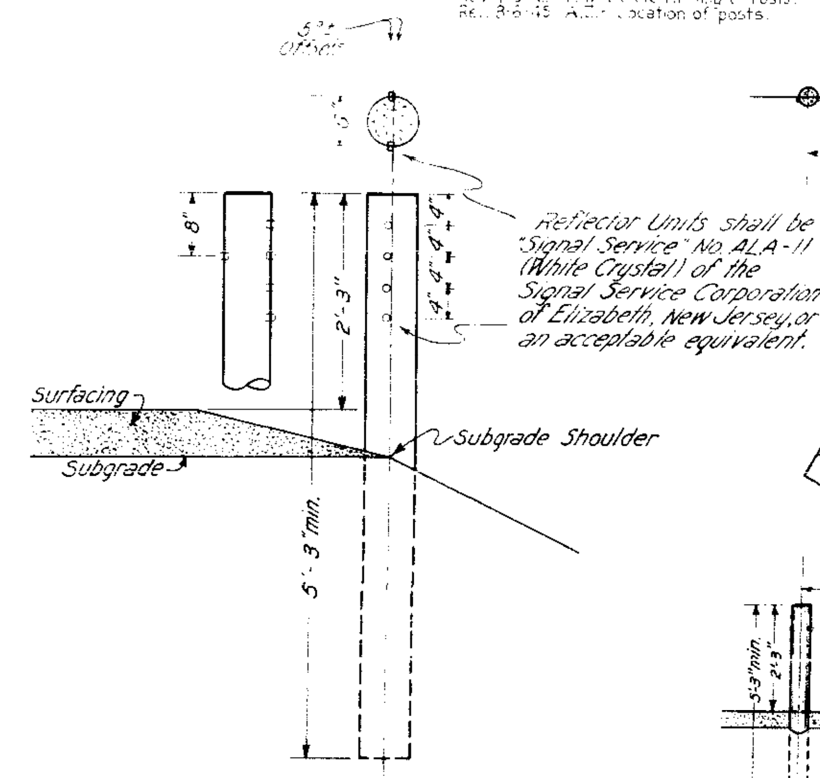
STANDARD M-19-B

Rev 6-28-40-A.Z.-1940 Specs. & Location of posts.
Rev 2-24-... PBB Terminal Guard Post Placement.
Rev 9-... Delete Painting of Posts.
Rev 8-6-45 A.Z. Location of posts.

FED. ROAD DIST. NO.	STATE		SHEET NO.	TOTAL SHEETS
3	COLO.	S, 0002(1)	9	

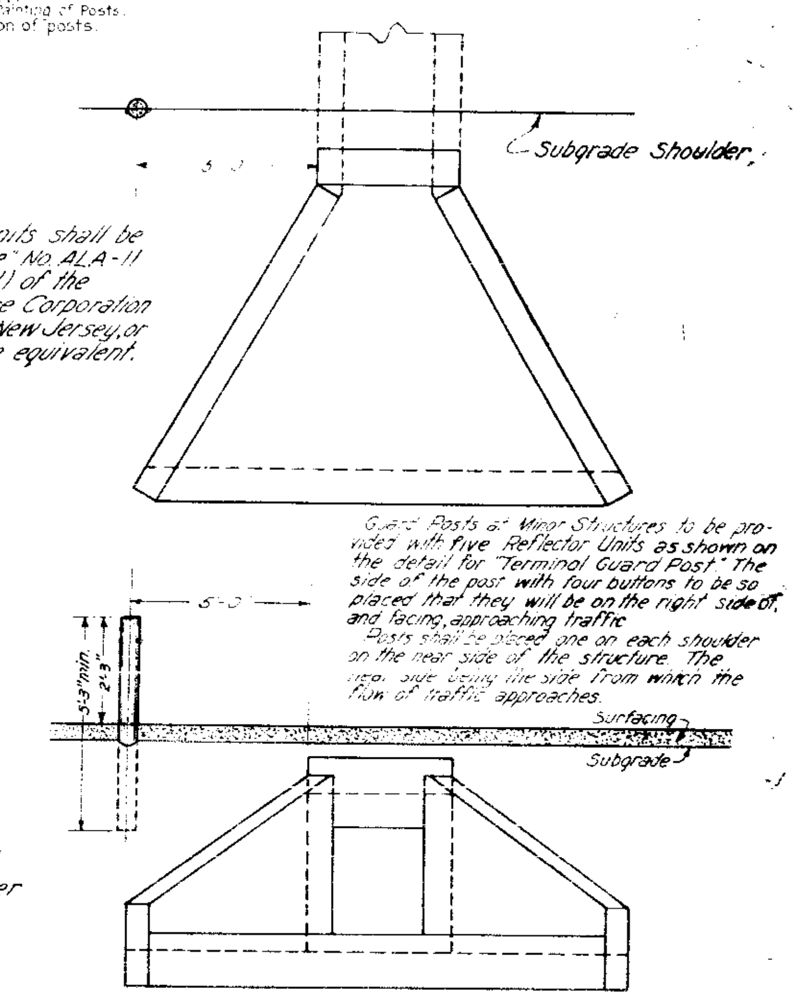


SHOWING PLACEMENT ON NORMAL ROADWAY FILLS



TERMINAL GUARD POST

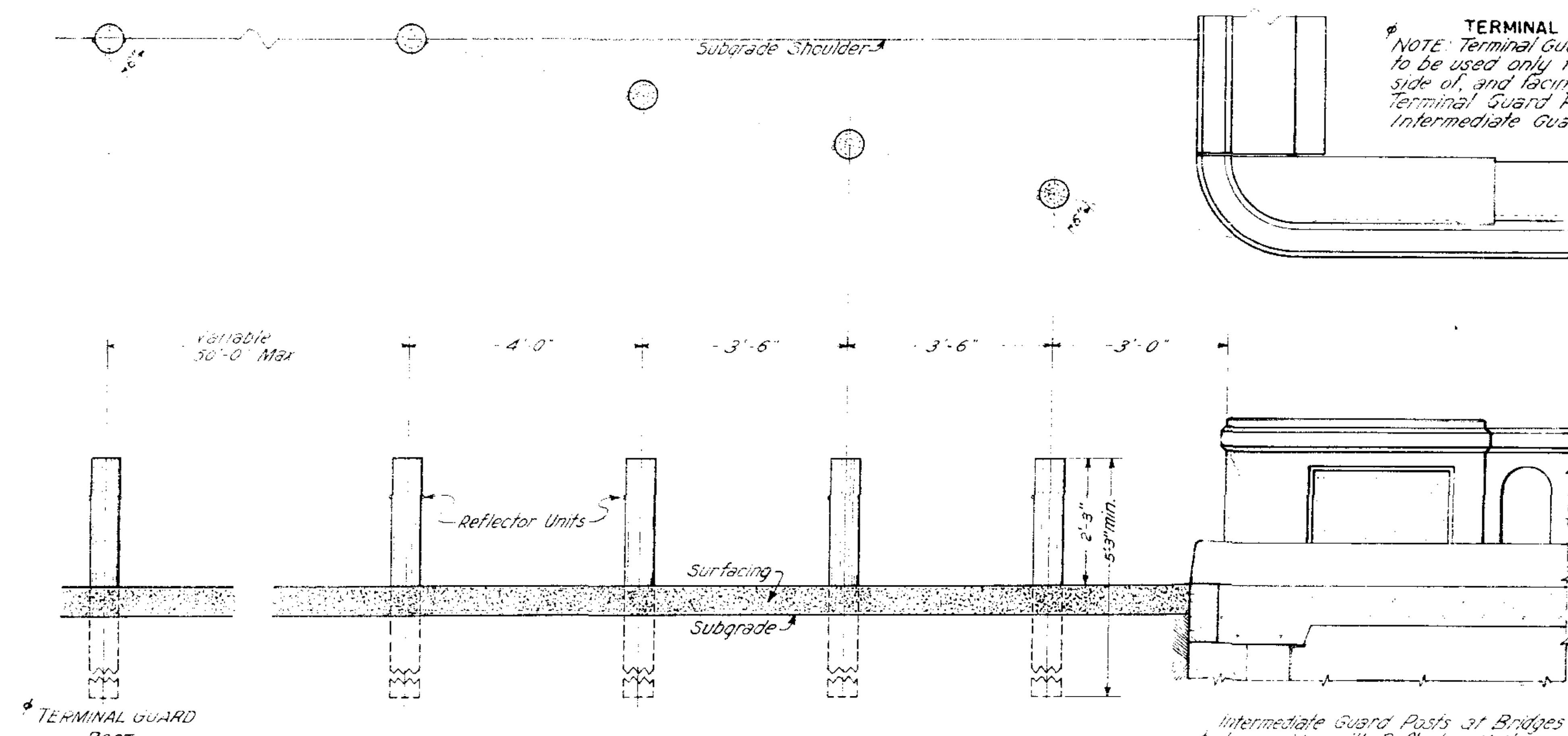
ϕ NOTE: Terminal Guard Posts as detailed above to be used only for the near Post on the right side of, and facing, approaching traffic. All other Terminal Guard Posts to be identical with Intermediate Guard Posts.



Guard Posts at Minor Structures to be provided with five Reflector Units as shown on the detail for "Terminal Guard Post." The side of the post with four buttons to be so placed that they will be on the right side of, and facing, approaching traffic.

Posts shall be placed one on each shoulder on the near side of the structure. The near side being the side from which the flow of traffic approaches.

SHOWING PLACEMENT AT MINOR STRUCTURES



SHOWING PLACEMENT AT BRIDGE APPROACHES

Intermediate Guard Posts at Bridges to be provided with Reflector Units as shown: that is, one Unit each on the three Posts nearest the bridge end and two Units on the fourth Post.

GENERAL NOTES

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

All wood posts shall be made from seasoned, straight, sound Lodgepole Pine, Southern Yellow Pine, or West Coast Douglas Fir.

No section of wood posts shall be less than 6" in diameter.

All wood posts shall be entirely peeled and shaved, thoroughly seasoned and dry, with square tops.

All wood posts shall be set and tamped in plumb and firm, to the lines and grades as directed by the Engineer.

Reflector Units in all posts shall be placed in such position that the units will function at a distance of 500 feet.

On tangents the Reflector Units shall be placed at an angle of approximately five degrees to a line parallel to the center-line of the highway.

In all instances a test shall be made to assure the position of the Reflector Units to be the most effective possible.

The diameter of holes drilled in the posts shall be drilled approximately one-sixteenth (1/16) inch less than the diameter of the signal button base. In all instances the hole shall be enough undersize that the button when driven into the post shall have complete bond with the post and be securely locked in correct position.

Posts shall be given a standard pressure Creosote treatment and then be thoroughly steam-cleaned in accordance with requirements of specifications.

COLORADO
STATE HIGHWAY DEPARTMENT

STANDARD

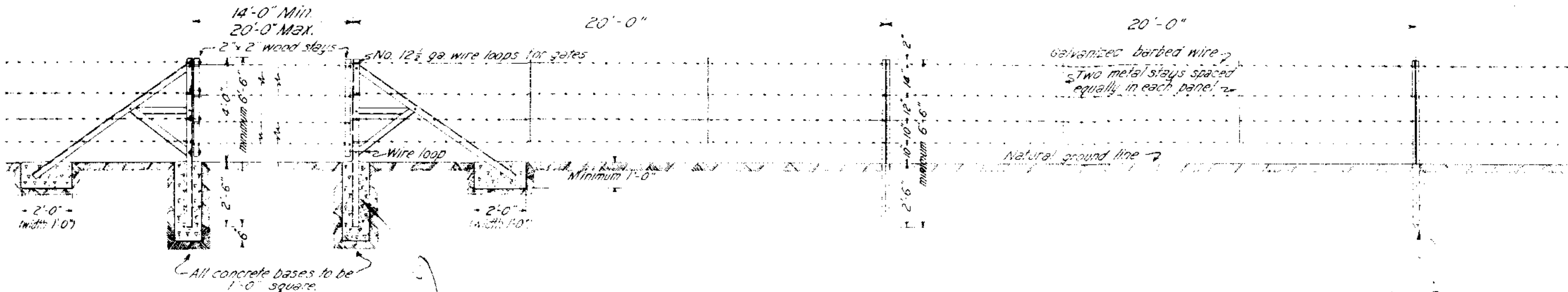
TIMBER GUARD POSTS

Designed by R.E.L.	Approved by [signature]
Made by P.B.B.	Chief Draftsman
Checked by	Date: ...15, 1939

STANDARD M-27-B

FED ROAD DIST NO	STATE	[redacted]	SHEET NO	TOTAL SHEETS
3	COLO.	S0002(2)	10	[redacted]

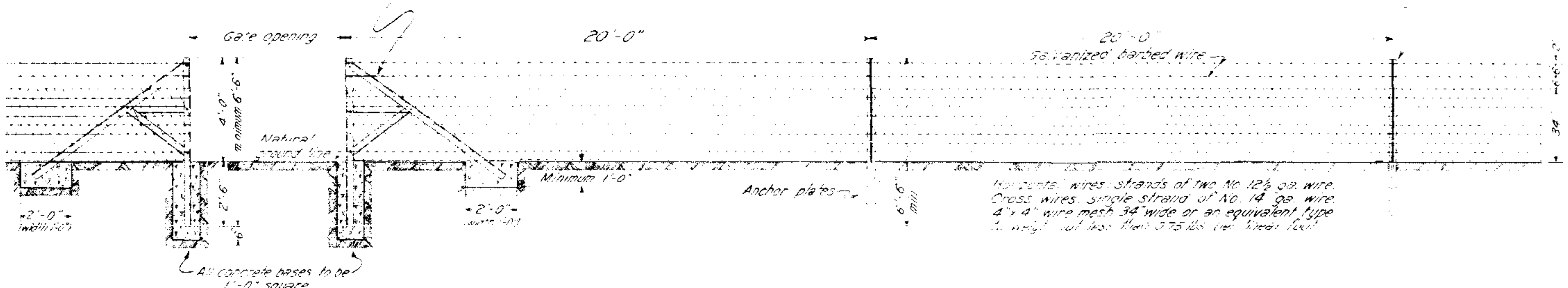
Rev 6-?-40 P.B.F. Alternate for End and Corner Posts
Rev 6-28-40-A.Z.-1930 Specs.



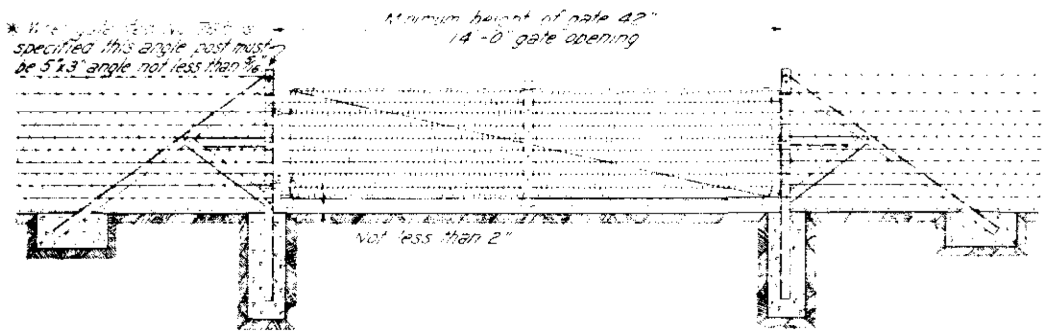
END POST WITH BRACING
Item No. 76 cy

LINE POST
Item No 76 cx

BARBED WIRE FENCE WITH METAL POSTS
Item No. 76 c

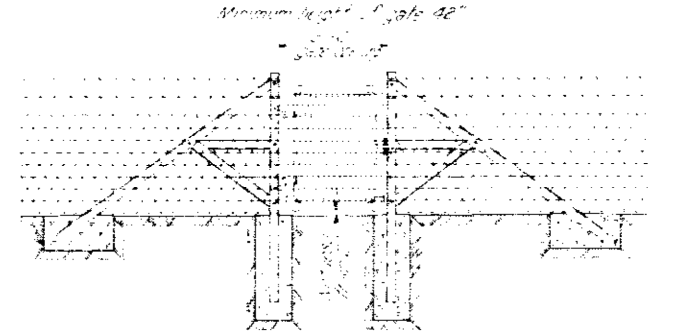


COMBINATION WIRE FENCE WITH METAL POSTS
Item No. 76 f



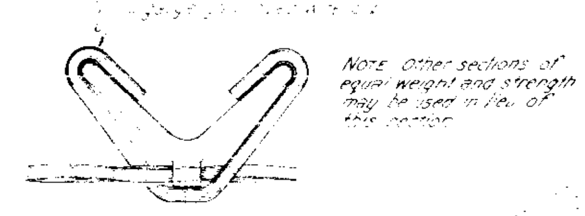
DRIVEWAY GATE
Item No. 76h

Gate complete with hinges and latch to weigh not less than 70 lbs.
2"x4" single strand wire mesh filler or an equivalent type.
Width of mesh approximately 40 inches.
Horizontal wires No. 10 gauge.
Cross wires No. 12½ gauge.
Galvanized metal latch and hinges.
Minimum 1" diameter galvanized pipe frame or an equivalent.

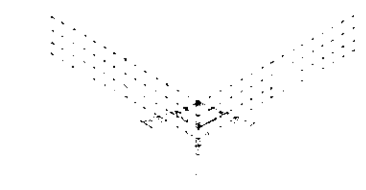


WALK GATE
Item No. 76i

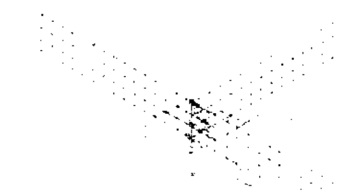
Gate complete with hinges and latch to weigh not less than 19 lbs.
2"x4" single strand wire mesh filler or an equivalent type.
Width of mesh approximately 40 inches.
Horizontal wires No. 10 gauge.
Cross wires No. 12½ gauge.
Galvanized metal latch and hinges.
Minimum ¾" diameter galvanized pipe frame or an equivalent.



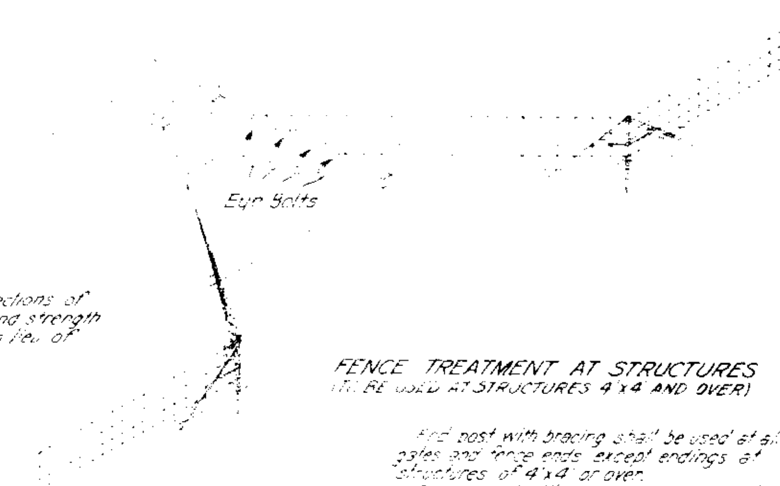
TYPICAL SECTION THROUGH FENCE POST



CORNER POST WITH BRACING
Item No. 76 cz



FENCE INTERSECTION WITH BRACING



FENCE TREATMENT AT STRUCTURES
(TO BE USED AT STRUCTURES 4'x4' AND OVER)

End post with bracing shall be used at all gates and fence ends except endings at structures of 4'x4' or over.

Corner post with bracing shall be used at all corners and angles in fences.

Fence intersection with bracing shall consist of one corner post with bracing and one end post with bracing and shall be used at all fence intersections.

At all structures of 4'x4' or over the fence shall be ended at eye-bolts in the wings of the structure. Where the type of construction prohibits the use of eye-bolts, an end post with bracing shall be used.

Eye-bolts shall be made from ½" round iron bars with a minimum of 6" of body length embedded in the concrete and a minimum 1" of inside eye diameter.

GENERAL NOTES

All work shall be done in accordance with the Standard Specifications of the Colorado State Highway Department, adopted June 1, 1940.

Barbed wire shall be of standard make not lighter than No. 12½ gauge, galvanized, with two point barb spaced not more than five inches apart.

Wire mesh must be galvanized and not lighter than shown and noted on this plan.

All line posts to be structural steel to weigh not less than 2.00 pounds per lineal foot.

Suitable anchor plates shall be securely riveted or welded to each line post.

All posts to be painted with an approved waterproof asphalt or mineral paint or hot dip galvanized.

All corner, end, and gate posts including braces are to be structural steel 2"x2"x¼" angles to weigh not less than 3.15 lbs. per lineal foot, except post supporting driveway gate, Item No. 76h.

All footings or bases shall be of class "A" concrete with crowned tops and shall be included in the price bid per lineal foot of fence with metal posts.

If knee braces are omitted from end, corner, and gate posts the vertical post must be at least 2½"x2½"x¼".

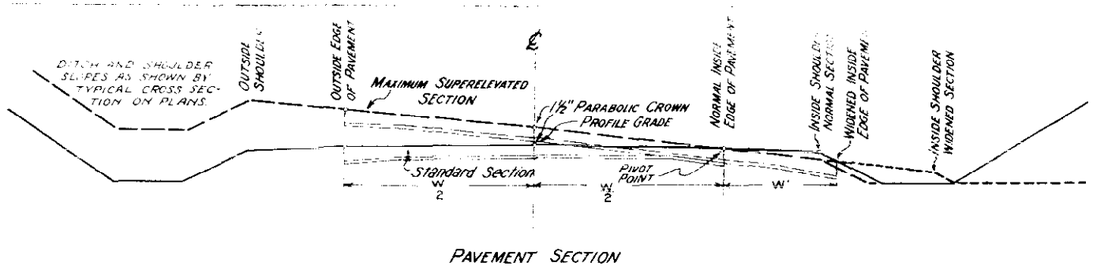
Corner posts are to be of the same detail for bracing as End Posts and shall be provided with bracing on both legs of the corner angle.

* In lieu of the end and corner posts shown hereon, A.S. & W. Co. "Expanding Anchor End and Corner Posts (Extra Heavy Duty, 7'0")", or an acceptable equivalent of similar type may be used, concrete omitted.

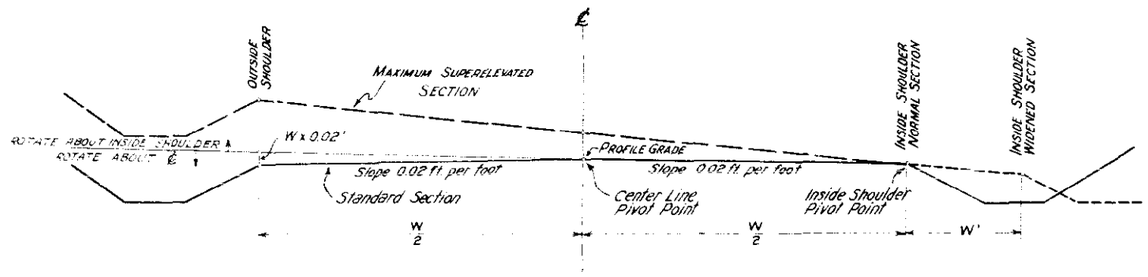
COLORADO
STATE HIGHWAY DEPARTMENT
STANDARD
WIRE FENCE WITH METAL POSTS

Designed by R.E.L. Made by P.B.B. Checked by R.E.L. | Approved by [signature] Date Apr. 27 1939

STANDARD M-1-B



PAVEMENT SECTION

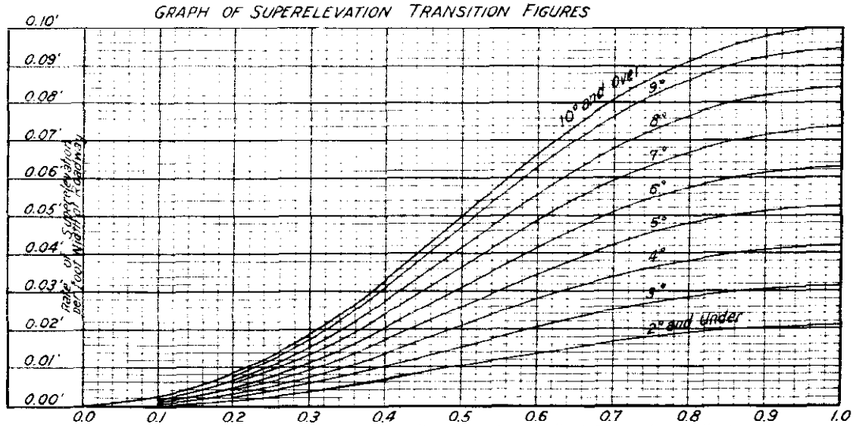


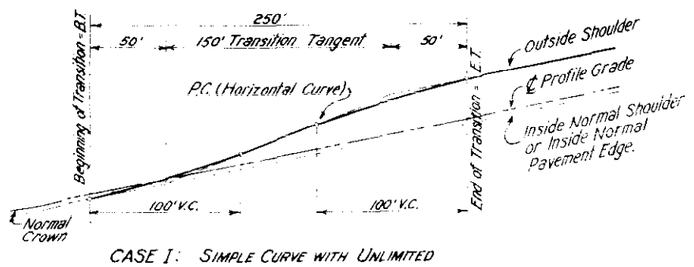
GRADED OR SURFACED SECTION

SUPERELEVATION AND WIDENING TABLES

DISTANCE FROM B.T. (PROPORTION)	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	Max. 1.0
Degree of Curvature	RATE OF SUPERELEVATION (IN FEET) PER FOOT WIDTH OF ROADWAY									
2° and Under	0.00044	0.00175	0.00394	0.00700	0.01050	0.01400	0.01706	0.01925	0.02056	0.02100
3°	0.00066	0.00263	0.00591	0.01050	0.01575	0.02100	0.02559	0.02888	0.03084	0.03150
4°	0.00088	0.00350	0.00788	0.01400	0.02100	0.02800	0.03413	0.03850	0.04113	0.04200
5°	0.00109	0.00438	0.00984	0.01750	0.02625	0.03500	0.04266	0.04813	0.05141	0.05250
6°	0.00131	0.00525	0.01181	0.02100	0.03150	0.04200	0.05119	0.05775	0.06169	0.06300
7°	0.00153	0.00613	0.01378	0.02450	0.03675	0.04900	0.05972	0.06738	0.07197	0.07350
8°	0.00175	0.00700	0.01575	0.02800	0.04200	0.05600	0.06825	0.07700	0.08225	0.08400
9°	0.00197	0.00788	0.01772	0.03150	0.04725	0.06300	0.07678	0.08663	0.09253	0.09450
10° and Over	0.00208	0.00833	0.01875	0.03333	0.05000	0.06667	0.08125	0.09166	0.09792	0.10000
	OFFSETS FOR WIDENING - W' - (IN FEET)									
Over 10° - Under 12°	0.03	0.12	0.27	0.48	0.75	1.08	1.47	1.92	2.43	3.00
12° - " 15°	0.04	0.16	0.36	0.64	1.00	1.44	1.96	2.56	3.24	4.00
15° - " 20°	0.05	0.20	0.45	0.80	1.25	1.80	2.45	3.20	4.05	5.00
20° and Over	0.06	0.24	0.54	0.96	1.50	2.16	2.94	3.84	4.86	6.00

GRAPH OF SUPERELEVATION TRANSITION FIGURES

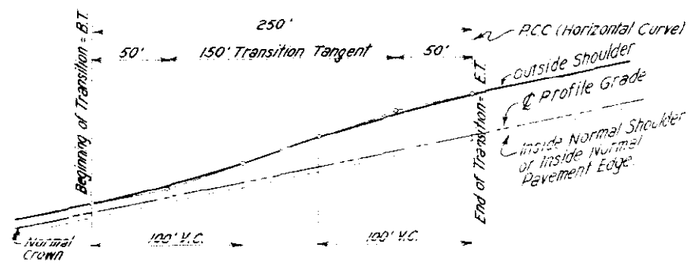




CASE I: SIMPLE CURVE WITH UNLIMITED TANGENT APPROACH

NOTE: CASE I

The transition in this case, from crowned section to superelevated section, shall proceed uniformly by raising the outside shoulder, over a distance of 250 ft. as shown, beginning at a point on the tangent 150 ft. from the end of the curve and acquiring full superelevation at a point 100 ft. inside the curve.



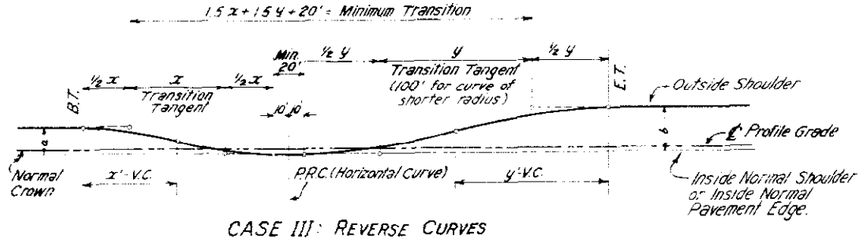
CASE II: COMPOUND CURVE

NOTE: CASE II

Superelevation transitions at the outside ends of compound curves shall be constructed in accordance with rules given under CASE I.

Superelevation transition between the arcs of different radii shall be made as in CASE I, except that the entire transition shall lie within the limits of the curve of the longer radius.

In cases where curves in the same direction have a tangent distance of less than 300 ft between points of curve, the intervening tangent shall be superelevated an amount equal to that of the curve of greater radius and the transition shall be made as in the case of a true compound curve.



CASE III: REVERSE CURVES

NOTE: CASE III

Transitions between true reverse curves shall be accomplished as shown on the above diagram.

Transition tangents shall be directly proportional to the amount of superelevation of the respective curves.

EXAMPLE: Let a represent the amount of superelevation on 1st curve;
" b " " " " " " 2nd " ;
" x " " " " transition tangent on 1st " ;
" y " " " " " " 2nd " ;
then, a : b = x : y.

The transition tangent of the curve having the shorter radius shall be set at 100 ft.

A normal crowned section 20 ft long, 10 ft on each side of the P.R.C. shall be used.

In cases where curves in opposite directions are in such proximity that a standard transition can not be had, the practice outlined for true reversing curves shall be used.

The total distance between the P.T. of the first curve and the P.C. of the succeeding curve shall be prorated into the transition distance of the respective curves until a maximum of 150 ft. of transition tangent for each curve is achieved.

GENERAL NOTES

Curves on projects using the Sections shown are to be superelevated and widened as indicated in the accompanying drawings and tables.

The normal inside edge of the Pavement slab is to remain at the standard elevation of 0.125 ft. below the profile grade, and the outside edge of the slab is to be superelevated at the rate per foot width of roadway given in the table. The Section is to be rotated about the normal inside edge of the Pavement, with a 1½" parabolic crown for curves of 10° and under, and a flat crown for widened Sections.

The normal inside edge of the Graded or Surfaced Section is to remain at the standard elevation of 0.02 ft. per foot width of roadway below the profile grade, or as shown on the Typical Section for the Project. Also, the centerline pivot point is to be used until the superelevation equals 0.02 ft. per foot width of roadway, but when this elevation is exceeded the normal inside shoulder pivot point is to be used.

When the degree of curvature exceeds 10°, the inside edge of the Pavement slab or the inside shoulder of the Graded or Surfaced Section is to be widened from the normal inside edge or shoulder, respectively, as shown by the table and plan or by cross-sections. Curves of 10° or less are not to be widened.

The slope of the shoulders and widened sections shall conform to the rate per foot width of roadway required, except that the inside shoulder of paved sections shall maintain the Typical Section slope until this slope is exceeded by the required superelevation slope.

The outside ditch on superelevated Sections is to be modified, where necessary to provide drainage. Otherwise, this ditch shall conform to normal ditch section shown for Project.

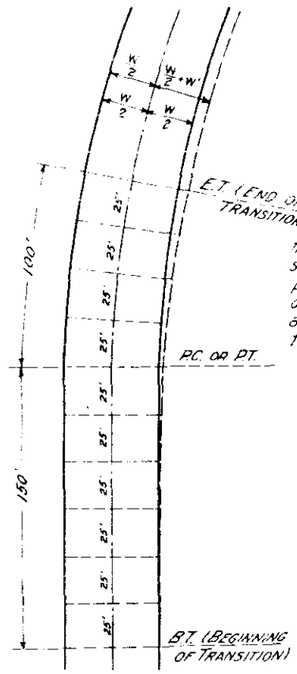
The rate of superelevation per foot width of roadway to be applied at the outside shoulder of the roadway is computed as follows:

The full superelevation per foot width of roadway rate for a given degree of curvature is

0.0105 ft. x Degree of Curvature.

The maximum superelevation of 0.10 ft per foot width, applying to curves of 10° and over, is not to be exceeded.

Special transition problems not covered by this standard sheet shall be covered by appropriate notes included with curve data on plans.



Curves of over 10° are to have the inside portion of the pavement slab and shoulder, or the inside portion and shoulder in a graded or surfaced section, widened in accordance with the plan, offsets for widening, and cross sections.

GENERAL PLAN OF WIDENING

COLORADO STATE HIGHWAY DEPARTMENT

STANDARD METHODS FOR SUPERELEVATION & WIDENING OF CURVES

Prepared by R.E.L. Approved by [signature]
Made by P.B.B.
Checked by E.F.S. & P.A.D. Date FEB 23rd 1937

Rev 11-2-38 P.B.B. Widening Transition.

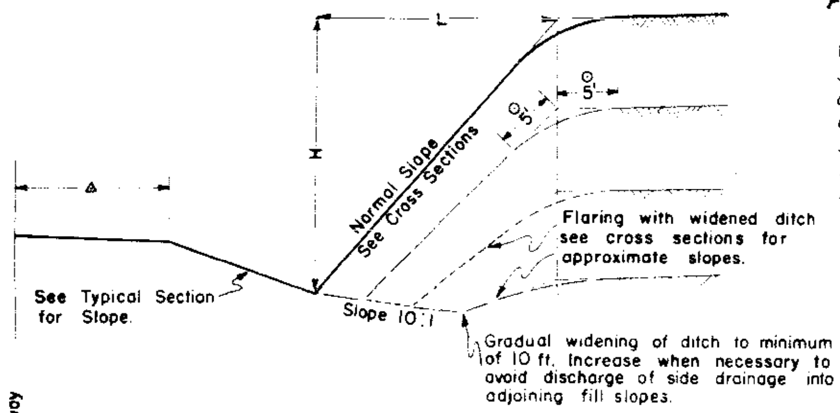
STANDARD M-2-C

FED. ROAD DIST. NO.	STATE	[redacted]	SHEET NO.	TOTAL SHEETS
3	COLO.	S0002(2)	/2	[redacted]

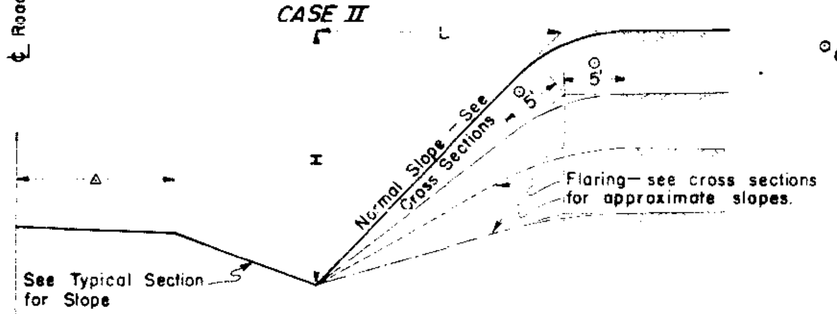
Rev. for 50'R on Type II Rd. Appr. 3/5/46 J.R.L.
Rev. Gen'l. Notes-"Appr. Surf." 4-5-46-A.Z.
Rev. Type I Road Approach. 7-31-46 J.P.K.
Rev. "Guard Fence" Note. 10-16-46 C.R.S.
Rev. Decel. Dist. 60 M.P.H. to 300 ft. R.O.W.

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

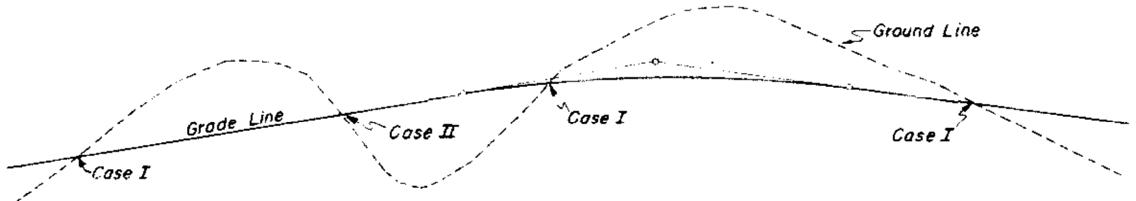
CASE I

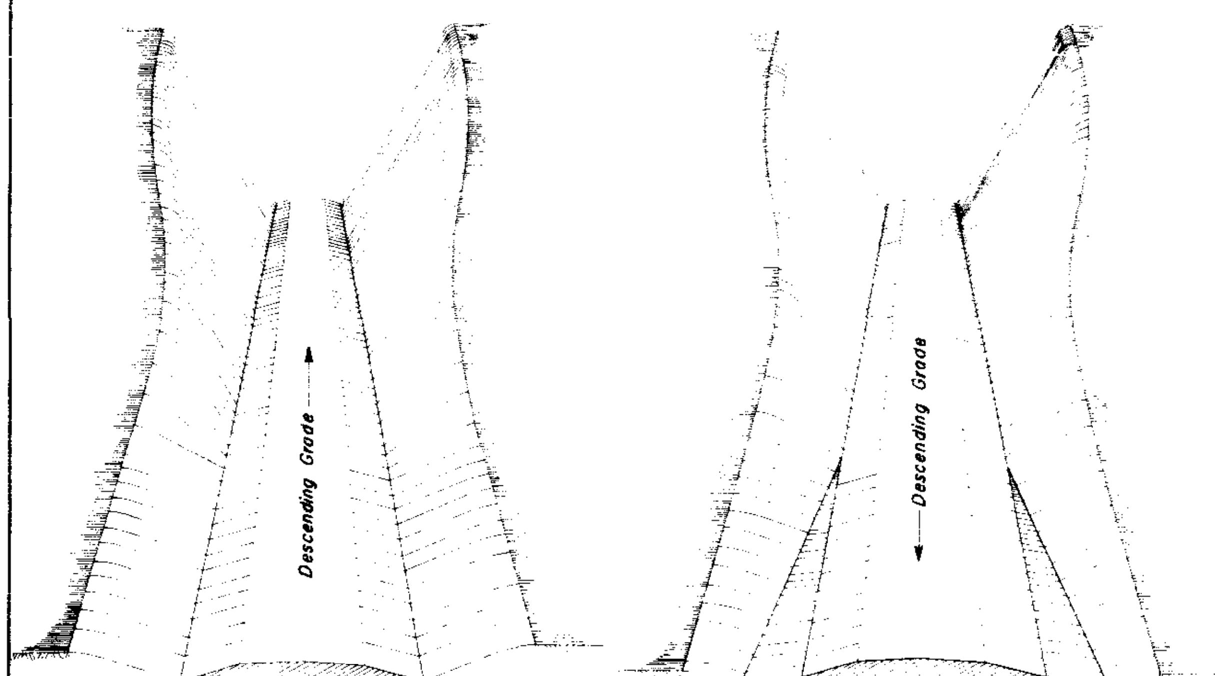


CASE II



PLAN OF FLARING IN EARTH CUTS





CASE II CASE I

FLARING OF EARTH CUTS:

The backslopes at ends of all earth cuts shall be flattened and 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 and to improve appearance. The transition of flattened backslopes and widened ditch shall be constructed in such a manner that a uniform appearance of slope and ditch results. Backslopes shall be flared to the approximate L distance shown in table below. Rock cuts shall not be flared.

NORMAL SLOPE	CUT H	DISTANCE L
1 To 1	24'	24'±
1.5 To 1	16'	24'±
2 To 1	12'	24'±
3 To 1	8'	24'±

⊙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."

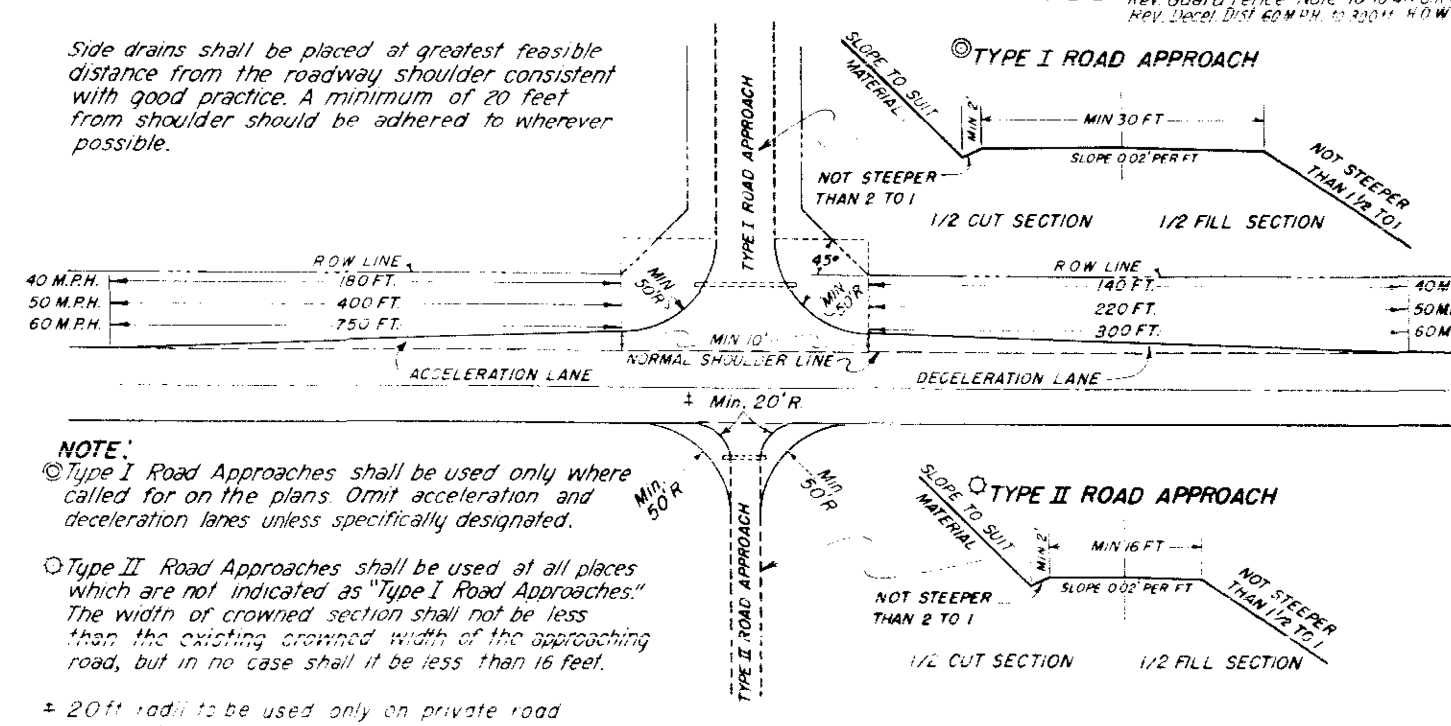
ΔWIDENING AT BRIDGE APPROACHES:

Roadway Embankment at Bridge Approaches shall be so constructed that the finish point of the subgrade shoulder is a minimum 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. This is done to accommodate Guard Fence and/or Guard Posts at Bridge Approaches. (See additional requirements for Guard Fences below.)

WIDENING TO ACCOMMODATE GUARD FENCES:

At all locations on the project (except as provided above for bridge approaches) where guard fence is to be constructed the shoulders shall be widened 2 feet to provide additional lateral support for guard fence posts.

TYPICAL PLANS FOR SIDE APPROACH ROADS



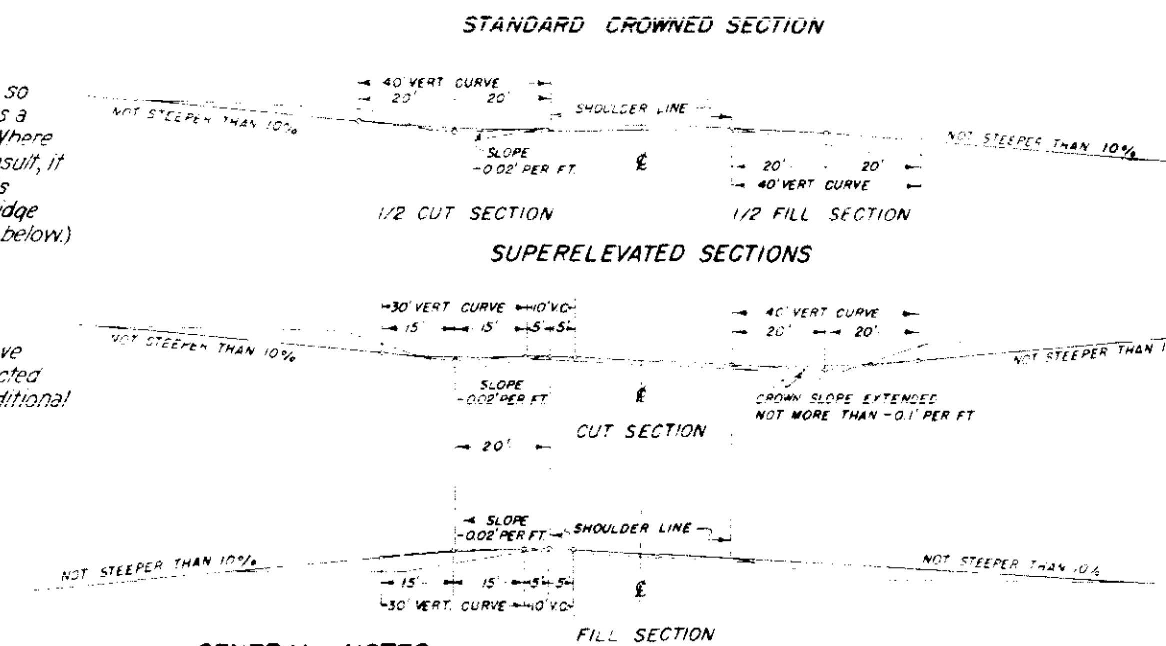
Side drains shall be placed at greatest feasible distance from the roadway shoulder consistent with good practice. A minimum of 20 feet from shoulder should be adhered to wherever possible.

NOTE:

⊚Type I Road Approaches shall be used only where called for on the plans. Omit acceleration and deceleration lanes unless specifically designated.

○Type II Road Approaches shall be used at all places which are not indicated as "Type I Road Approaches." The width of crowned section shall not be less than the existing crowned width of the approaching road, but in no case shall it be less than 16 feet.

‡ 20 ft. radii to be used only on private road approaches.



GENERAL NOTES

All work shall be done in accordance with the Standard Specifications of the Colo. State Highway Dep't. applicable to the Project.

All side approach roads to the Project shall be gravel surfaced with a 4 inch thickness of "Gravel or Crushed Rock Surfacing" extending approximately to the right of way line. Estimated tonnage and 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
STATE HIGHWAY DEPARTMENT
STANDARD
SIDE APPROACH ROADS, FLARING, CUT SLOPE TREATMENT & WIDENING AT BRIDGES.

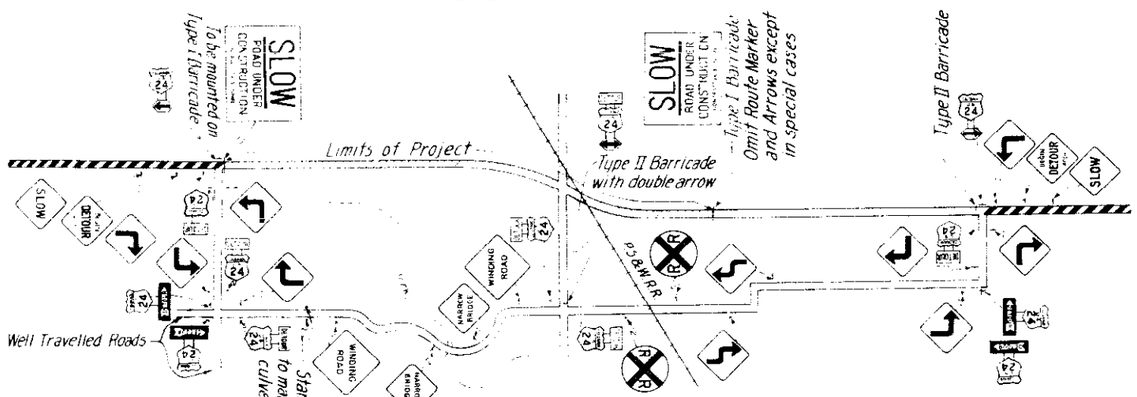
Designed by A.Z.	Approved by R.E.L.
Made by C.R.S.	
Checked by	Date Sept. 25 1945

STANDARD M-2-D

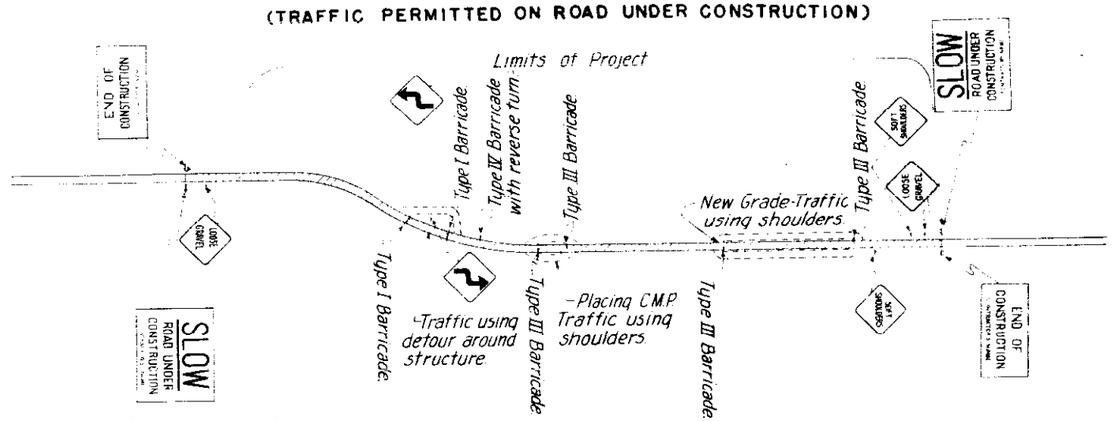
FED. ROAD DIST. NO.	STATE		SHEET NO.	TOTAL SHEETS
3	COLO.	S.0002(2)	1	3

Rev 9-10 46 Slow Signs RBR

TYPICAL METHOD OF MARKING DETOUR
(TRAFFIC PROHIBITED ON ROAD UNDER CONSTRUCTION)

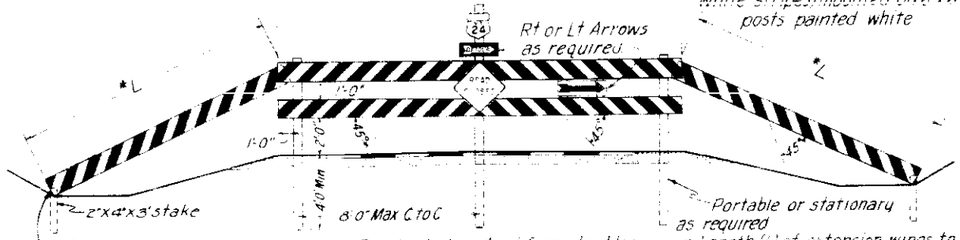


TYPICAL METHOD OF MARKING HIGHWAY
(TRAFFIC PERMITTED ON ROAD UNDER CONSTRUCTION)



DETAILS OF BARRICADES

TYPE I
(ROAD CLOSED)
14'-0" Min



Detachable extension wings for by-passing construction equipment.

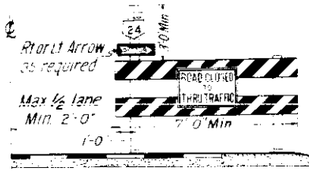
Barricade to extend from shoulder to shoulder as shown.

Portable or stationary as required

* Length (L) of extension wings to be modified where necessary to provide satisfactory closing of borrow pit and shoulder

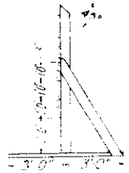
All barricades to be 1"x12" lumber (8" alternate black and white stripes) mounted on 6"x6" posts painted white

TYPE II
(BEGINNING OF DETOUR FOR THROUGH TRAFFIC)



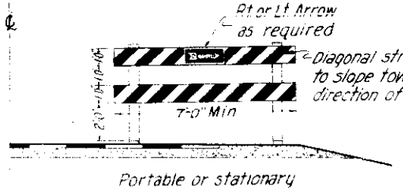
Portable or stationary as required.

END VIEW OF PORTABLE BARRICADE



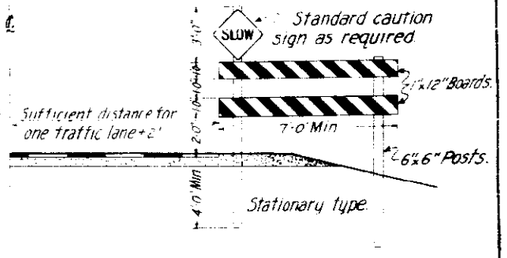
Base and brace to be 2"x6" painted white and nailed with 12d nails. Base to be weighted for stability

TYPE III
(BOTH ENDS OF BY-PASS AREAS WITHIN PROJECT)



Portable or stationary as required

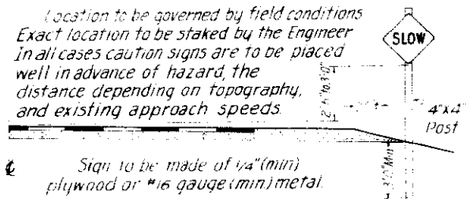
TYPE IV
(SUPPLEMENT TO ADVANCE WARNING SIGNS TO BE PLACED AT POINTS OF EXTREME HAZARD)



Stationary type.

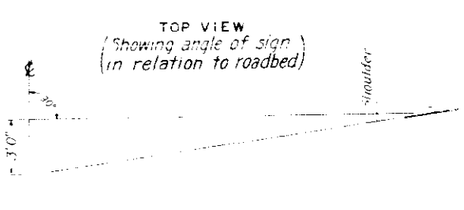
POSITION OF SIGNS RELATIVE TO ROADBED & HAZARDS

Location to be governed by field conditions. Exact location to be staked by the Engineer. In all cases caution signs are to be placed well in advance of hazard, the distance depending on topography, and existing approach speeds.

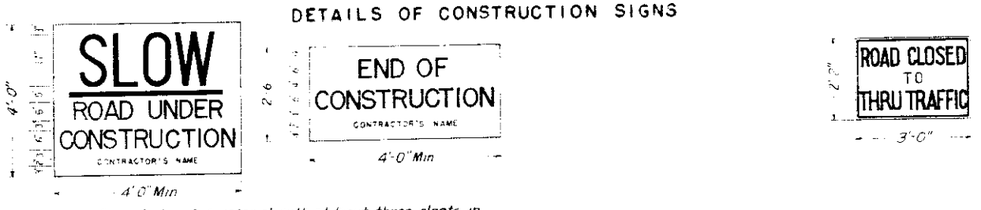


Sign to be made of ¼" (min) plywood or #16 gauge (min) metal.

TOP VIEW
(Showing angle of sign in relation to roadbed)



DETAILS OF CONSTRUCTION SIGNS



Signs to be of 1" material with at least three cleats in back. Background to be white, SLOW and underline to be red, and all other lettering to be black. Sign to be set on 2-4"x4" posts 4 feet in the ground, except when mounted on face of Type I barricades (opposite side from reflectorized arrow) at limits of project. Not required on Type I barricades inside limits of project

Above sign to be furnished and installed by the Department where required.

GENERAL NOTES

ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS OF THE COLORADO STATE HIGHWAY DEPARTMENT 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 PAINTED, WELL MAINTAINED BARRICADES AND STANDARD CAUTION SIGNS. WARNING SIGNS AND DIRECTIONAL TYPE SIGNS. BARRICADES AND SIGNS SHALL BE MOVED, ADDED TO, CHANGED OR REMOVED AS REQUIRED DURING THE PROGRESS OF CONSTRUCTION TO MEET CHANGING CONDITIONS.

THE CONTRACTOR SHALL FURNISH AND INSTALL THE FOLLOWING AS REQUIRED WITHIN THE LIMITS OF THE PROJECT:

1. ALL BARRICADES
2. APPROVED REFLECTORIZED DIRECTIONAL ARROW FOR EACH TYPE I BARRICADE
3. SLOW - ROAD UNDER CONSTRUCTION (CONTRACTOR'S NAME) SIGNS - MINIMUM 2
4. "END OF CONSTRUCTION (CONTRACTOR'S NAME)" SIGNS - MINIMUM 2.
5. STANDARD CAUTION, WARNING AND DIRECTIONAL TYPE SIGNS AS REQUIRED
6. FLARES OR TORCHES AS FOLLOWS:
   - A. TYPE I BARRICADES - MINIMUM 3 EACH
   - B. TYPE III OR IV BARRICADES - MINIMUM 1 EACH
   - C. STANDARD CAUTION OR WARNING SIGNS - MINIMUM 1 EACH

   NOTE: FLARES OR TORCHES SHALL BE OF AN OIL BURNING TYPE APPROVED BY THE STATE OF COLORADO AND SHALL BE PLACED FROM 3 TO 5 FEET AHEAD OF THE SIGN OR OBJECT TO BE ILLUMINATED. IN ALL CASES, FLARES OR TORCHES SHALL BE PLACED A SUFFICIENT DISTANCE AWAY, WITHIN THE ABOVE RANGE, TO AVOID DAMAGE TO FACE OF SIGN FROM SMOKE OR FLAME, AND SHALL BE KEPT BURNING FROM SUNSET TO SUNRISE.

ALL LUMBER USED IN BARRICADES AND SIGNS SHALL BE SOUND, DURABLE MATERIAL AND SHALL BE KEPT WELL PAINTED WITH NEAT, UNIFORM LETTERS AND SYMBOLS CONFORMING TO STYLE SHOWN FOR THE VARIOUS SIGNS. UNEVEN OR SMEARED LETTERING WILL NOT BE PERMITTED.

WHERE TRAFFIC IS PROHIBITED FROM THE PROJECT, THE DETOUR WILL BE MARKED BY THE DEPARTMENT, EXCEPT THAT TYPE I BARRICADES, COMPLETE WITH NECESSARY ARROWS AND SIGNS, SHALL BE PROVIDED, ERECTED, PAINTED AND MAINTAINED BY THE CONTRACTOR AT BOTH ENDS OF THE PROJECT AND AT ALL INTERSECTING ROADS REQUIRED TO BE LEFT OPEN FOR CROSS TRAFFIC.

U.S. AND/OR STATE ROUTE MARKERS DEEMED NECESSARY FOR GUIDANCE OF TRAFFIC OVER THE PROJECT OR FOR USE ON TYPE I BARRICADES WILL BE FURNISHED BY THE DEPARTMENT TO BE INSTALLED BY THE CONTRACTOR.

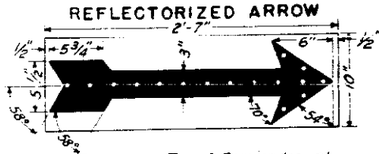
THE CONTRACTOR WILL BE RESPONSIBLE FOR ALL SIGNS FURNISHED HIM BY THE DEPARTMENT AND SHALL RETURN SAME UPON COMPLETION OF THE PROJECT. THE CONTRACTOR WILL BE REQUIRED TO REIMBURSE THE DEPARTMENT FOR ANY SIGNS FURNISHED HIM WHICH HAVE BECOME DAMAGED OR LOST DURING HIS OPERATIONS.

THE TYPICAL METHOD OF MARKING AS SHOWN ILLUSTRATES THE MINIMUM ACCEPTABLE SIGNING PROCEDURE. MODIFICATIONS AND ADDITIONAL REQUIREMENTS WILL BE DETERMINED BY LOCATION, TRAFFIC VOLUME AND OTHER PERTINENT CONDITIONS AFFECTING THE PUBLIC CONVENIENCE AND SAFETY.

ANY SPECIAL SIGNS DEEMED NECESSARY FOR THE GUIDANCE AND PROTECTION OF TRAFFIC OVER THE PROJECT OR DETOUR WILL BE FURNISHED AND INSTALLED BY THE DEPARTMENT.

ALL COSTS INCIDENTAL TO THE FOREGOING REQUIREMENTS WILL NOT BE PAID FOR AS A SEPARATE ITEM BUT SHALL BE INCLUDED IN THE ORIGINAL CONTRACT PRICES FOR THE PROJECT.

DETAILS OF REFLECTORIZED ARROW



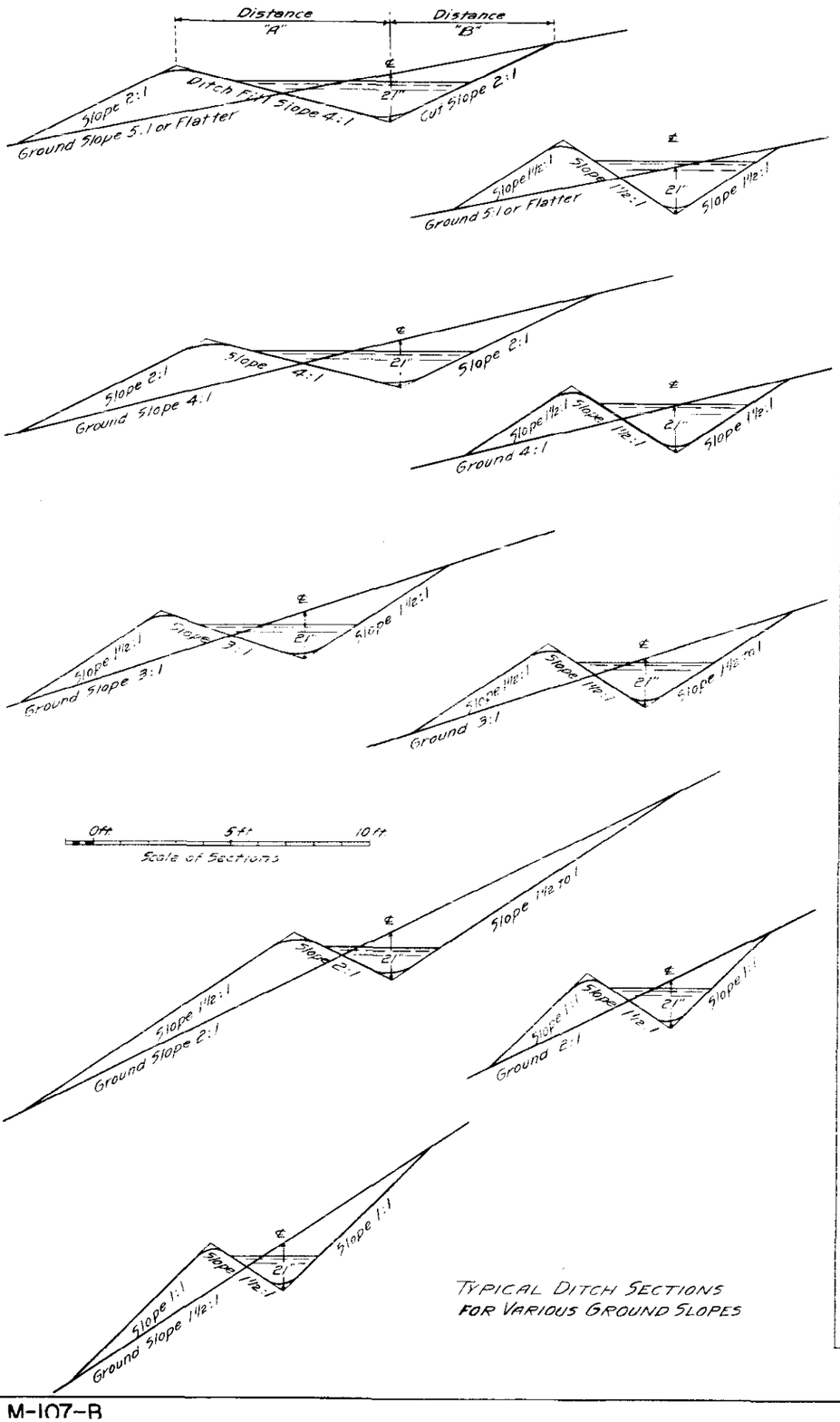
For use on Type I Barricades at ends of project and/or inside of project where needed.

Reflector buttons shall be Signal Service ALA 31 (white crystal) or suitable equivalent. Minimum thickness of lumber to be 1".

COLORADO STATE HIGHWAY DEPARTMENT

STANDARD ROADWAY CONSTRUCTION TRAFFIC SIGNS

Designed by ARP A.Z.	Approved by R.E.L.
Made by B.O.C.	
Checked by	Date: Sept. 25 1945

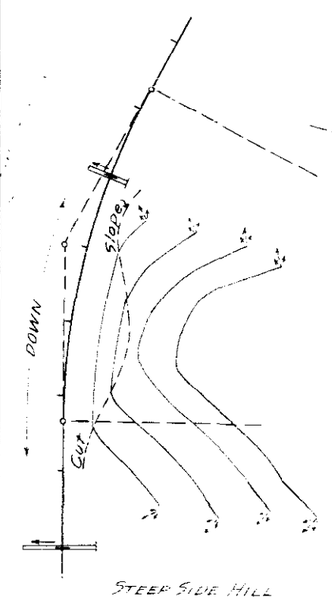


TYPICAL DITCH SECTIONS FOR VARIOUS GROUND SLOPES

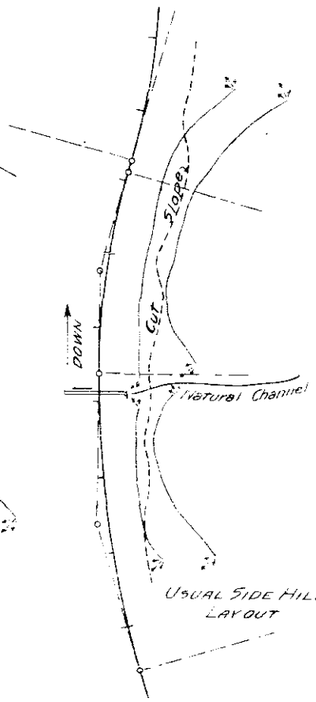
DETAILS OF DITCH SECTIONS

Ground Slope	Cut Slope	Ditch Fill Slope	℄ Cut	Cut Area Sq. Ft.	Cu Yd. per 50 ft of Cut	Ditch Area Sq. Ft.	Dist "A" Ft.	Dist "B" Ft.
5:1	2:1	4:1	15"	4.3	15.8	3.7	4.2	5.6
			18"	6.2	22.9	5.9	5.0	6.7
			• 21"	8.5	31.5	8.5	5.8	7.8
		3:1	15"	4.1	15.1	4.1	4.2	4.7
			18"	5.8	21.5	6.5	5.0	5.6
			21"	8.0	29.5	9.3	5.8	6.6
		2:1	15"	3.7	13.8	4.6	4.2	3.6
			18"	5.3	19.8	7.0	5.0	4.3
			21"	7.3	27.0	10.0	5.8	5.0
		1½:1	15"	3.5	13.0	4.8	4.2	2.9
			18	5.0	18.6	7.3	5.0	3.5
			21"	6.9	25.4	10.3	5.8	4.0
5:1	1½:1	4:1	15"	3.3	12.4	3.4	2.7	5.6
			18"	4.8	17.9	5.4	3.2	6.7
			21	6.7	24.7	7.8	3.7	7.8
		3:1	15"	3.1	11.6	3.8	2.7	4.7
			18"	4.5	16.7	5.8	3.2	5.6
			21"	6.2	22.8	8.3	3.7	6.6
		2:1	15"	2.8	10.3	4.0	2.7	3.6
			18"	4.0	14.8	6.1	3.2	4.3
			21"	5.5	20.2	8.8	3.7	5.0
		1½:1	15"	2.6	9.5	4.1	2.7	2.9
			18"	3.7	13.7	6.3	3.2	3.5
			• 21"	5.1	18.7	8.8	3.7	4.0
4:1	2:1	4:1	15"	4.7	17.4	2.8	5.0	5.0
			18"	6.7	24.8	4.5	6.0	6.0
			• 21"	9.2	34.0	6.6	7.0	7.0
		3:1	15"	4.5	16.5	3.3	5.0	4.3
			18"	6.4	23.6	5.2	6.0	5.1
			21	8.8	32.4	7.5	7.0	6.0
		2:1	15"	4.2	15.4	3.3	5.0	3.3
			18"	6.0	22.1	6.0	6.0	4.0
			21"	8.2	30.2	8.5	7.0	4.7
		1½:1	15"	4.0	14.7	4.2	5.0	2.7
			18"	5.7	21.0	6.4	6.0	3.3
			21"	7.7	28.5	9.1	7.0	3.8
4:1	1½:1	4:1	15"	3.4	12.7	2.6	3.0	5.0
			18"	4.9	18.3	4.1	3.6	6.0
			21"	6.7	24.9	6.0	4.2	7.0
		3:1	15"	3.2	11.9	3.0	3.0	4.3
			18"	4.6	17.0	5.9	3.6	5.1
			21"	6.3	23.3	6.8	4.2	6.0
		2:1	15"	2.9	10.8	3.4	3.0	3.3
			18"	4.2	15.5	5.3	3.6	4.0
			21"	5.7	21.1	7.5	4.2	4.7
		1½:1	15"	2.7	10.1	3.6	3.0	2.7
			18"	3.9	14.3	5.5	3.6	3.3
			• 21"	5.3	19.5	7.8	4.2	3.8
3:1	2:1	3:1	15"	5.9	21.7	2.3	7.5	3.8
			18" ◦	8.4	31.1	3.8	9.0	4.5
			21" ◦	11.5	42.6	5.5	10.5	5.3
		2:1	15	5.6	20.8	3.0	7.5	3.0
			18" ◦	8.1	29.9	4.7	9.0	3.6
			21" ◦	11.0	40.8	6.7	10.5	4.2
		1½:1	15"	5.5	20.3	3.4	7.5	2.5
			18" ◦	7.8	29.0	5.3	9.0	3.0
			21 ◦	10.7	39.8	7.5	10.5	2.5
3:1	1½:1	3:1	15"	3.5	13.1	2.1	3.8	3.8
			18"	5.0	18.7	3.4	4.5	4.5
			• 21"	6.9	25.6	4.9	5.3	5.3
		2:1	15"	3.3	12.1	2.6	3.8	3.0
			18"	4.7	17.4	4.1	4.5	3.6
			21"	6.5	23.8	5.9	5.3	4.2
		1½:1	15"	3.1	11.6	2.9	3.8	2.5
			18"	4.5	16.6	4.5	4.5	3.0
			• 21"	6.1	22.7	6.4	5.3	3.5
2:1	1½:1	2:1	15"	5.5	20.3	1.6	7.5	2.5
			18" ◦	7.9	29.0	2.6	9.0	3.0
			• 21" ◦	10.7	39.7	3.8	10.5	3.5
		1½:1	15"	5.4	19.8	2.0	7.5	2.1
			18" ◦	7.7	28.4	3.1	9.0	2.6
			21" ◦	10.5	38.9	4.5	10.5	3.0
2:1	1:1 ♮	2:1	15"	2.4	8.7	1.4	2.5	2.5
			18"	3.4	12.5	2.3	3.0	3.0
			21"	4.6	17.0	3.3	3.5	3.5
		1½:1	15"	2.2	8.3	1.7	2.5	2.1
			18"	3.2	11.9	2.6	3.0	2.6
			• 21"	4.4	16.2	3.8	3.5	3.0
1½:1	1:1 ♮	1½:1	15"	2.9	10.8	1.2	3.8	1.9
			18"	4.2	15.6	1.9	4.5	2.3
			• 21"	5.8	21.3	2.7	5.3	2.6

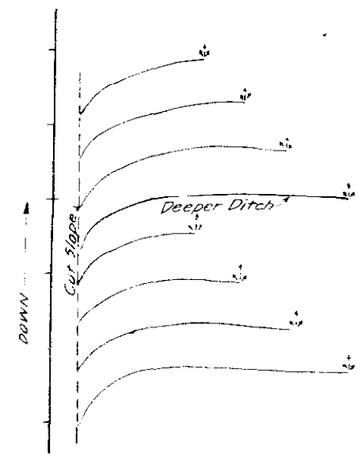
• Section shown at left.
♮ 1:1 Slopes are difficult to seed.
◦ Cut Slope exceeds a 10ft length.



STEEP SIDE HILL ABOVE CUT SLOPE

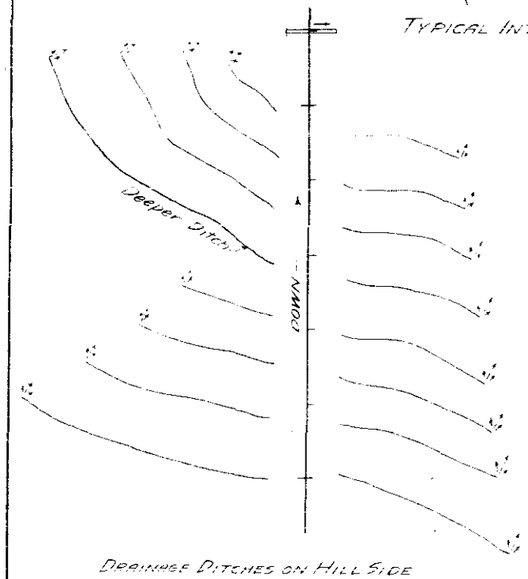


USUAL SIDE HILL LAYOUT

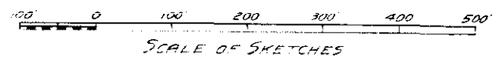


LONG SIDE HILL CUT

TYPICAL INTERCEPTING DITCH ARRANGEMENTS



DRAINAGE DITCHES ON HILL SIDE



SCALE OF SKETCHES

GENERAL NOTES

Contour intercepting and Drainage Ditches on this Project are to be constructed to the line and grade staked by the Engineer using the Ditch Section called for on the Plans or ordered by the Engineer.

Ends of intercepting and Drainage 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. Use a deeper ditch when any such flow might be picked up.

The following horizontal spacing of ditches is recommended.

Slope % or Slope Ratio	Horizontal Spacing of Ditches
4% to 6%	70 ft. centers
8% to 10%	60 ft. centers
20% to 4:1	55 ft. centers
30% to 1½:1	50 ft. centers

Ditches are to be laid out along the ground contour on a grade of not over -1%. (Type of soil and volume of flow shall govern the grade.)

Ditch checks may be required for drainage which cannot be diverted as shown. Ditch checks and ditches shall be set in such a manner that the grade of the ditch from the downstream side of the check to the lip of the adjacent downstream check shall not exceed -0.5%. The checks shall conform to standard plans of the Department.

Grasses are to be planted to stabilize the slope and ditch banks whenever conditions permit.

STANDARD M-107-B

FED. ROAD DIST. NO.	STATE	SHEET NO.	TOTAL SHEETS
3	COLO	S-[redacted] G	14

COLORADO STATE HIGHWAY DEPARTMENT
CONTOUR INTERCEPTING AND DRAINAGE DITCHES

Designed by S.B.L.
Made by S.B.L.
Checked by

Approved by
Chief Draftsman
Date 6-5-41

SW 1/4 SEC. 33, T. 30 S., R. 45 W.

STATE	PROJ. NO.	SHEET NO.	TOTAL SHEETS
COLO.	S 0002 (2)	15	

NOTE:

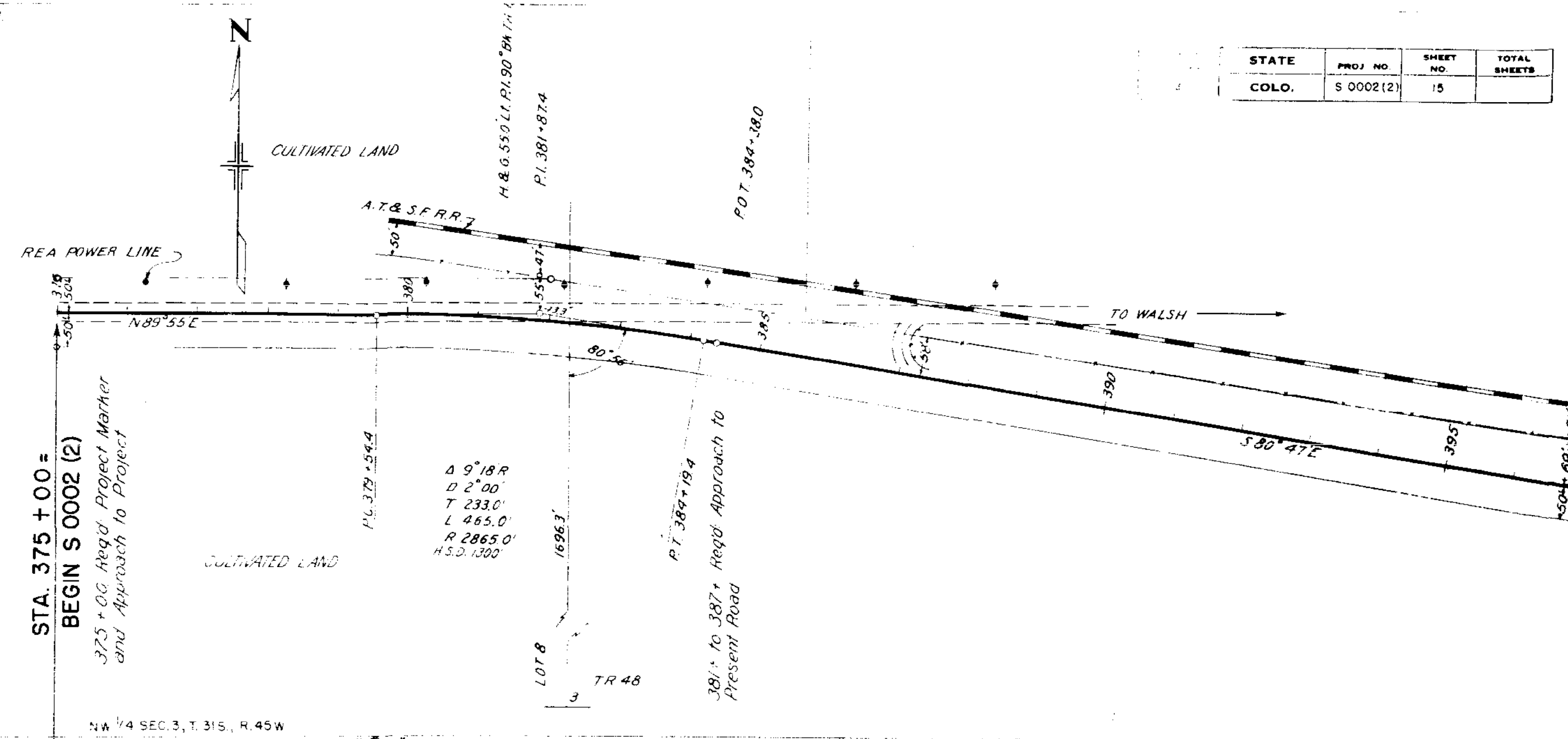
Alignment and Grades as shown are subject to modification during construction after approval by the Denver Office.

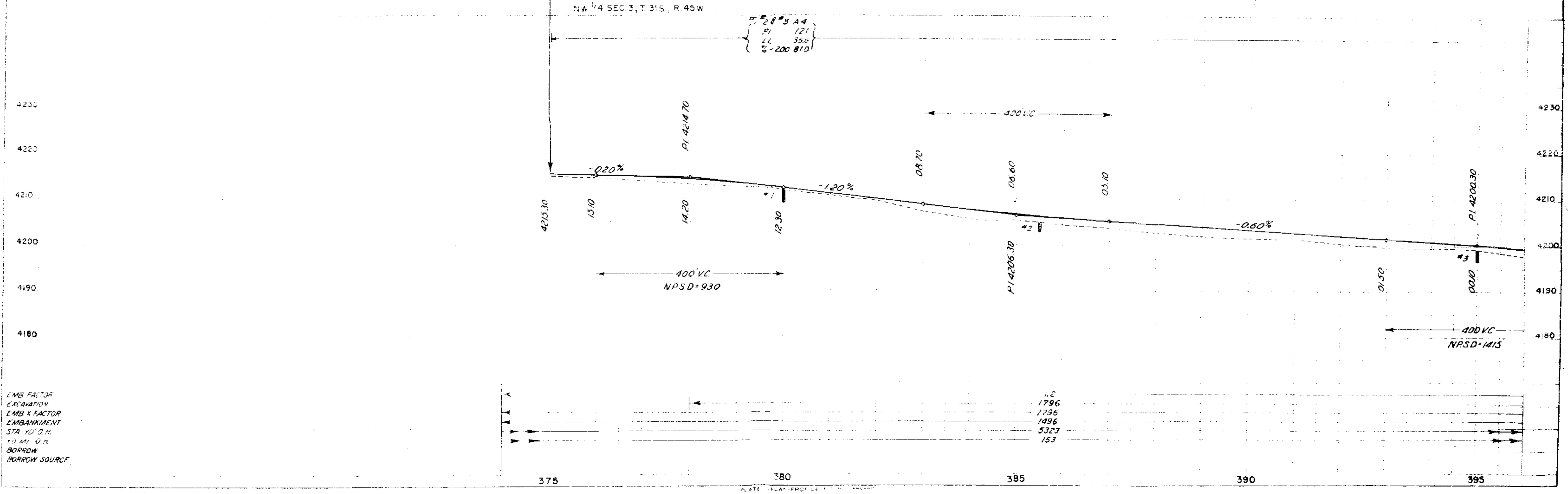
Typical Section for Channel and Ditch Changes is shown on sheet 2.

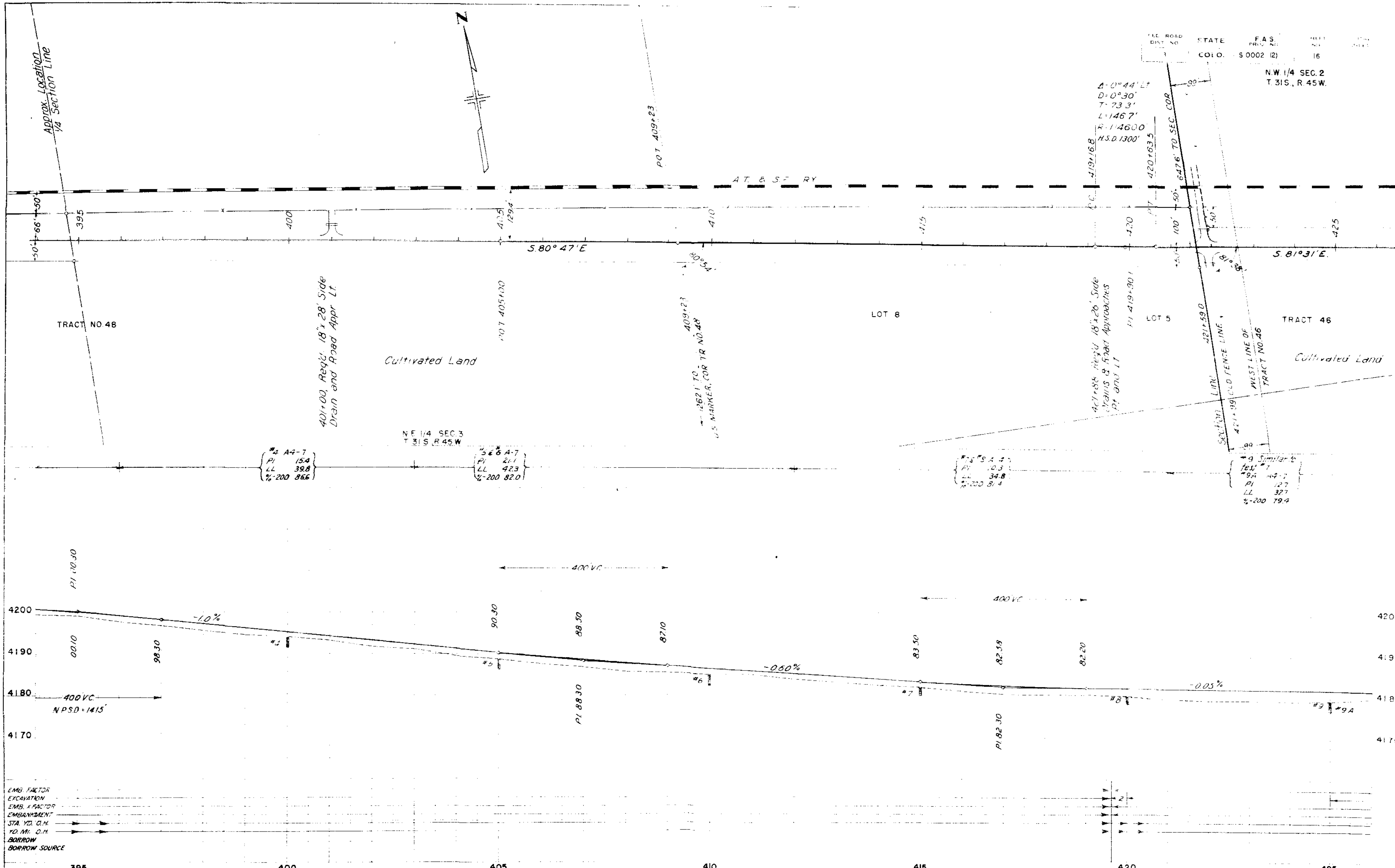
The soil data shown on the plans is obtained from the best available testing laboratory information. This information is shown for the convenience of the Contractor and the Department does not guarantee the accuracy of these tests. If materials not conforming to the data on the plans are encountered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

Right of Way Markers are tabulated on sheet 3.

Fencing requirements and Guard Posts are tabulated on sheet 3.

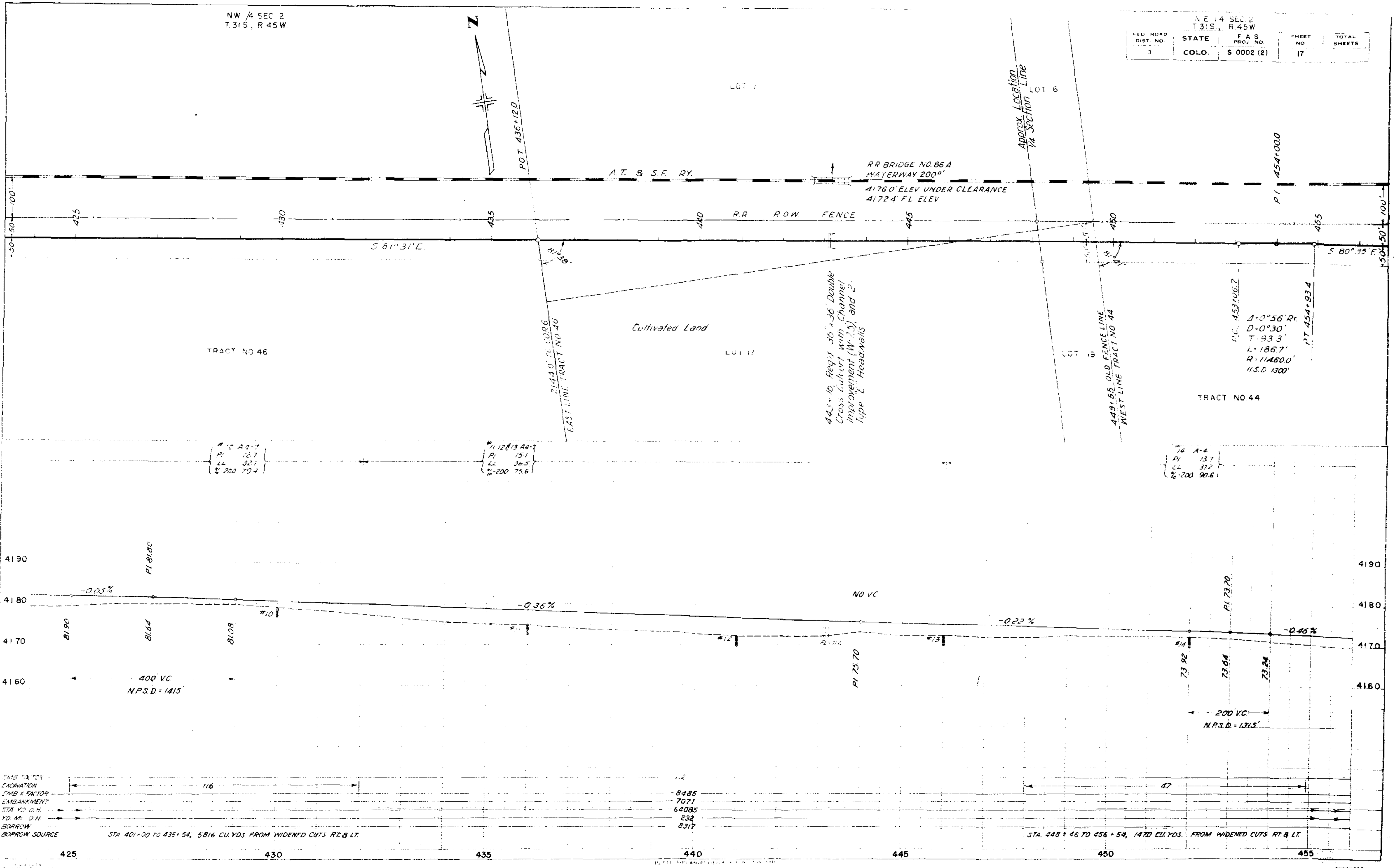


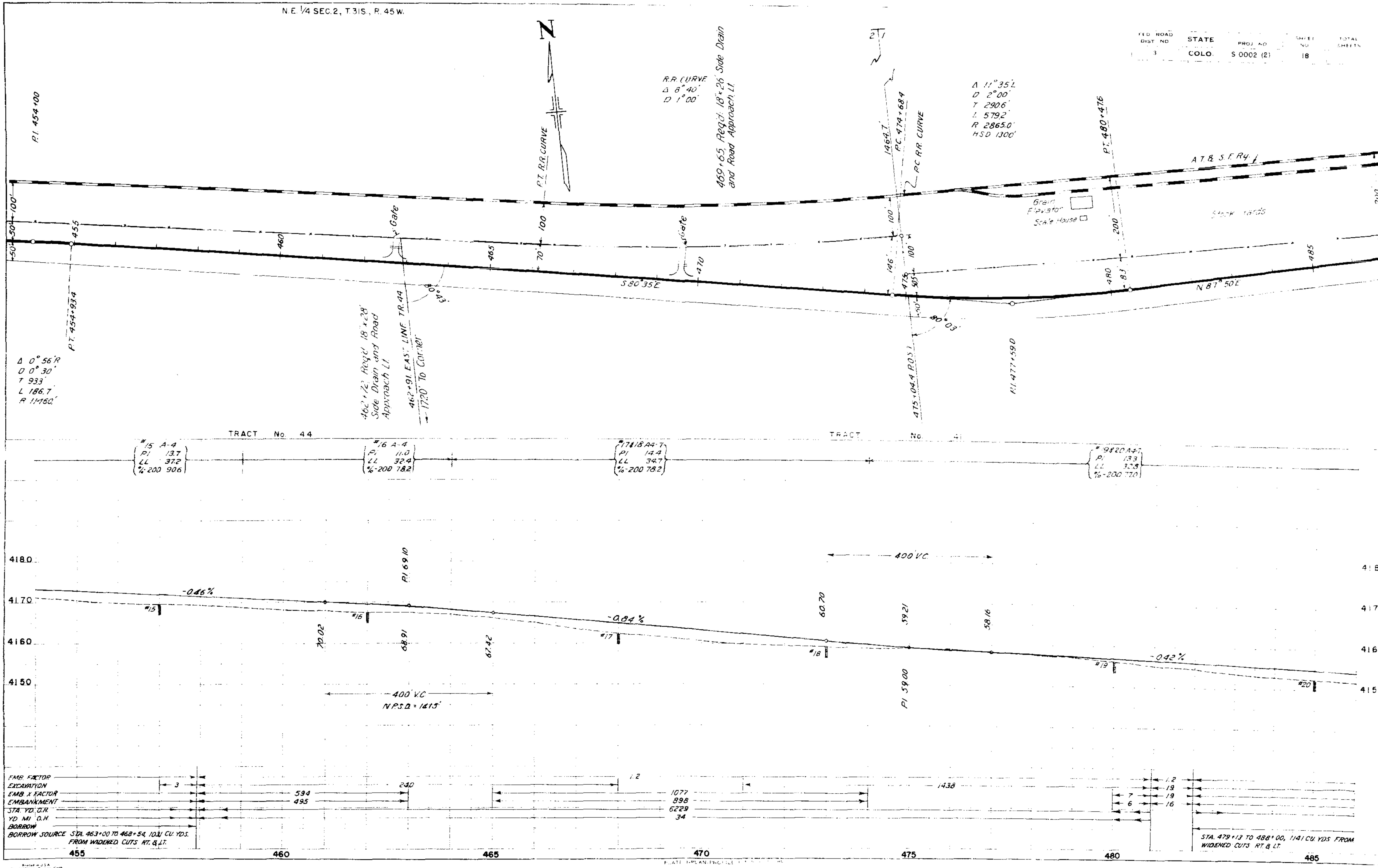




STATE COLO.
F.A.S. S 0002 (2)
16
N.W. 1/4 SEC. 2
T. 31 S., R. 45 W.
Approx. Location 1/4 Section Line
Δ=0°44' Lt
D=0°30'
T=73.3'
L=146.7'
R=11460.0
H.S.D. 1300'
419+16.8
420+63.5
647.6' TO SEC. COR.
P.O.T. 409+23
A.T. & S.F. RY.
S. 80° 47' E
S. 81° 31' E.
TRACT NO. 48
LOT 8
LOT 5
TRACT 46
Cultivated Land
Cultivated Land
401+00, Req'd. 18"x28' Side Drain and Road Appr. Lt.
P.O.T. 405+00
409+23 1262' TO U.S. MARKER, COR. TR. NO. 48
P.I. 419+90
421+59.0
OLD FENCE LINE
WEST LINE OF TRACT NO. 46
Section Line
421+99
N.E. 1/4 SEC. 3
T. 31 S., R. 45 W.
#4 A4-7 PI 15.4 LL 39.8 %-200 86.6
#5 & 6 A-7 PI 21.1 LL 42.3 %-200 82.0
#9 Similar to Test #7
#9A A4-7 PI 12.7 LL 32.7 %-200 79.4
400' V.C.
-1.0%
-0.60%
-0.05%
400' V.C.
N.P.S.D.=1415'
P.I. 00.30
P.I. 88.30
P.I. 82.30
4200
4190
4180
4170
EMB. FACTOR
EXCAVATION
EMB. x FACTOR
EMBANKMENT
STA. YD. O.H.
YD. MI. O.H.
BORROW
BORROW SOURCE
395
400
405
410
415
420
425

FED. ROAD DIST. NO.	STATE	F.A.S. PROJ. NO.	SHEET NO.	TOTAL SHEETS
3	COLO.	S 0002 (2)	17	





N.E. 1/4 SEC. 2, T. 31S., R. 45 W.
FED. ROAD DIST. NO. 3
STATE COLO.
PROJ. NO. S 0002 (2)
SHEET NO. 18
TOTAL SHEETS
P.I. 454+00
P.T. 454+93.4
Δ 0° 56' R
D 0° 30'
T 93.3'
L 186.7'
R 11460'
455
460
465
470
475
480
485
Gate
462+72 Reqd. 18"x28" Side Drain and Road Approach Lt.
462+91 EAST LINE TR. 44
1720' To Corner
80° 43'
P.T. R.R. CURVE
R.R. CURVE
Δ 8° 40'
D 1° 00'
469+65 Reqd. 18"x26" Side Drain and Road Approach Lt.
S 80° 35' E
1464.7'
P.C. 474+68.4
P.C. R.R. CURVE
475+04.4 POST
80° 03'
Δ 11° 35' L
D 2° 00'
T 290.6'
L 579.2'
R 2865.0'
HSD 1300'
P.T. 480+47.6
P.I. 477+59.0
A.T. & S.F. Ry.
Grain Elevator
Scale House
Stock Yards
N 87° 50' E
TRACT No. 44
TRACT No. 41
#15 A-4 PI 13.7 LL 37.2 %-200 90.6
#16 A-4 PI 11.0 LL 32.4 %-200 78.2
#17&18 A4-7 PI 14.4 LL 34.7 %-200 78.2
#19&20 A4-7 PI 13.3 LL 32.8 %-200 77.0
4180
4170
4160
4150
-0.46%
P.I. 69.10
70.02
68.91
67.42
400' V.C.
N.P.S.D. = 1415'
-0.84%
60.70
59.21
58.16
P.I. 59.00
-0.42%
#15
#16
#17
#18
#19
#20
EMB. FACTOR
EXCAVATION
EMB. X FACTOR
EMBANKMENT
STA. YD. O.H.
YD. MI. O.H.
BORROW
BORROW SOURCE STA. 463+00 TO 468+54, 1031 CU. YDS. FROM WIDENED CUTS RT. & LT.
3
240
594
495
1.2
1077
898
6229
34
1438
7
6
19
16
STA. 479+13 TO 488+00, 1141 CU. YDS. FROM WIDENED CUTS RT. & LT.

FED. ROAD DIST. NO.	STATE	F.A.S. PROJ. NO.	SHEET NO.	TOTAL SHEETS
3	COLO.	S 0002 (2)	19	

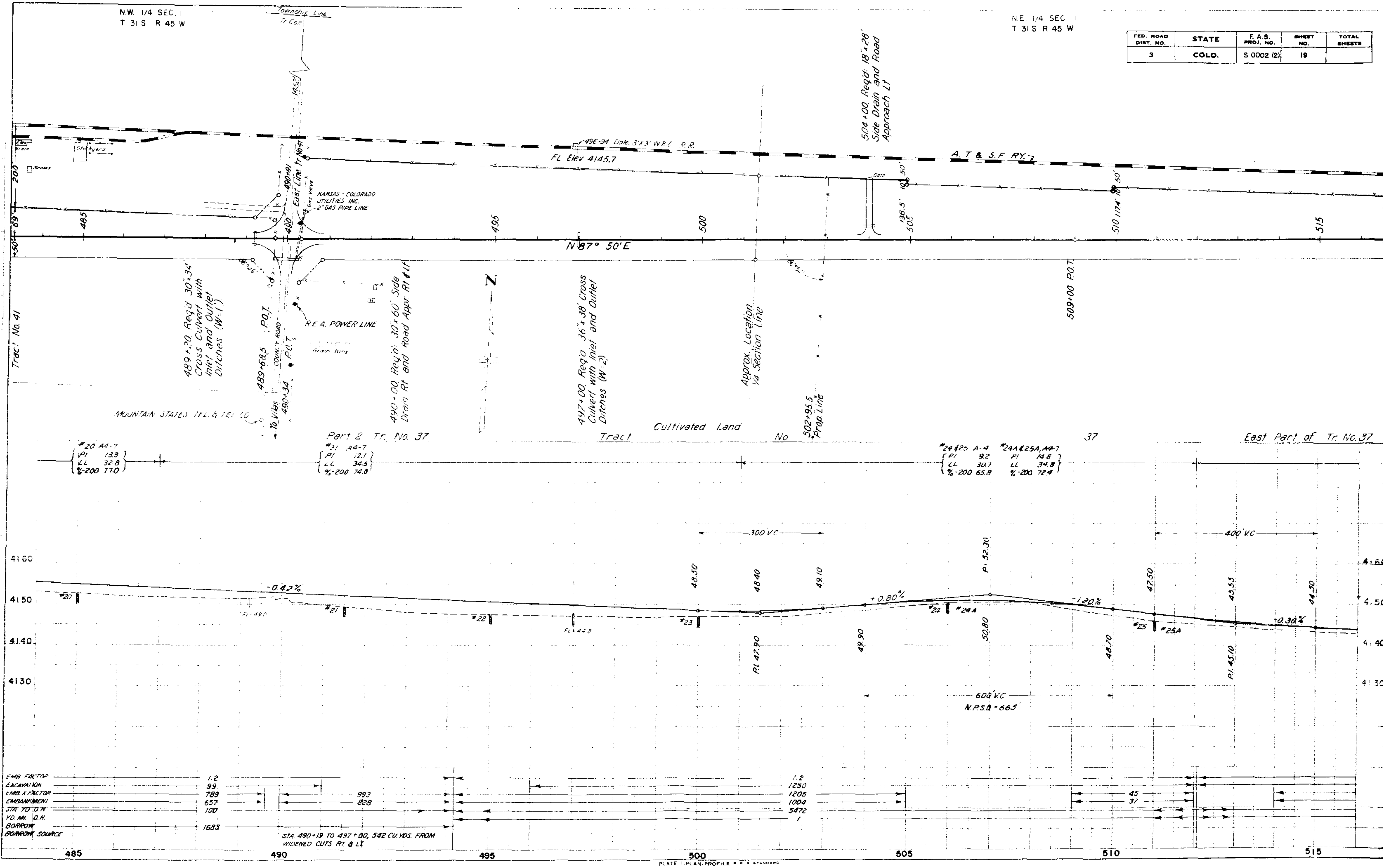
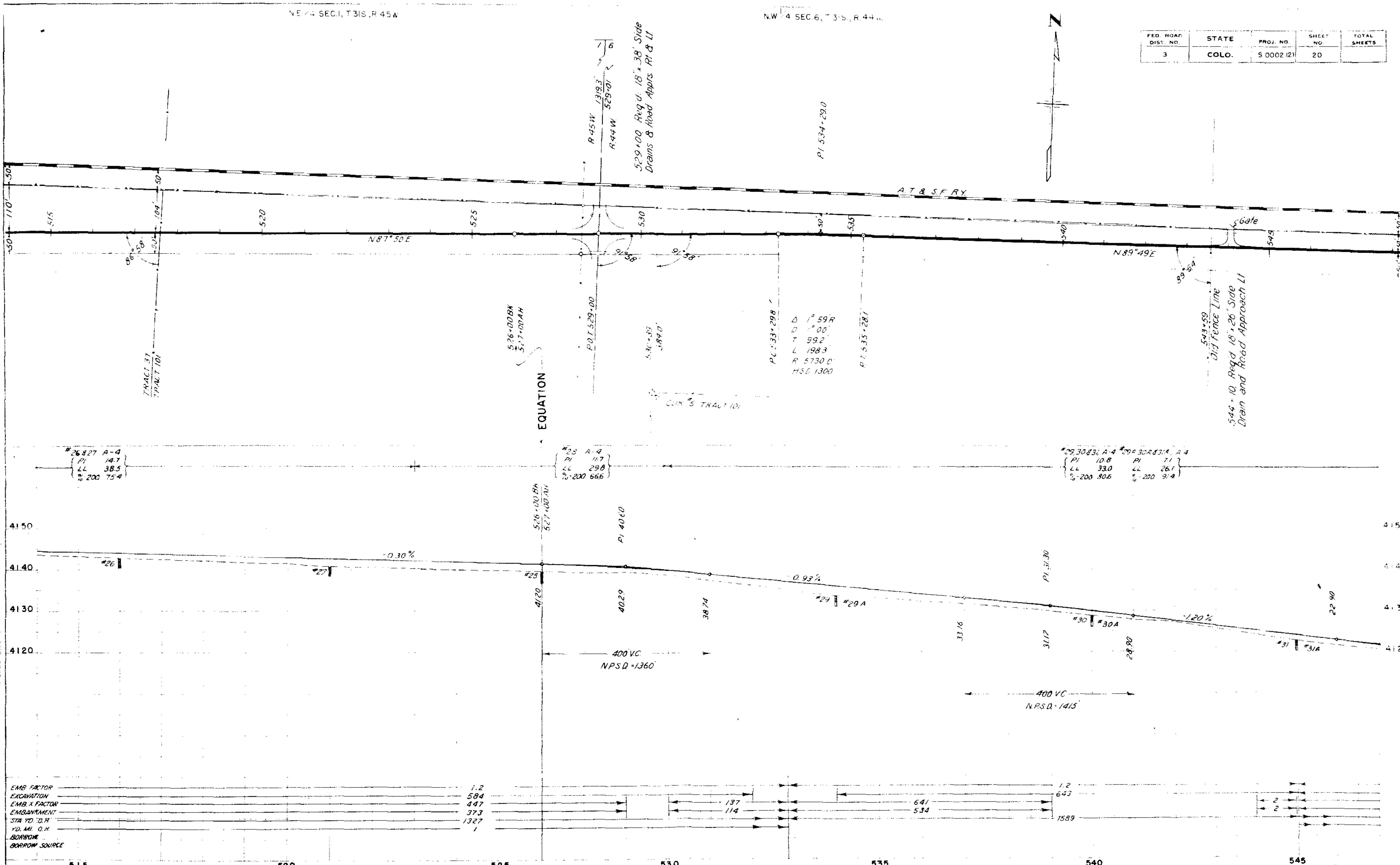
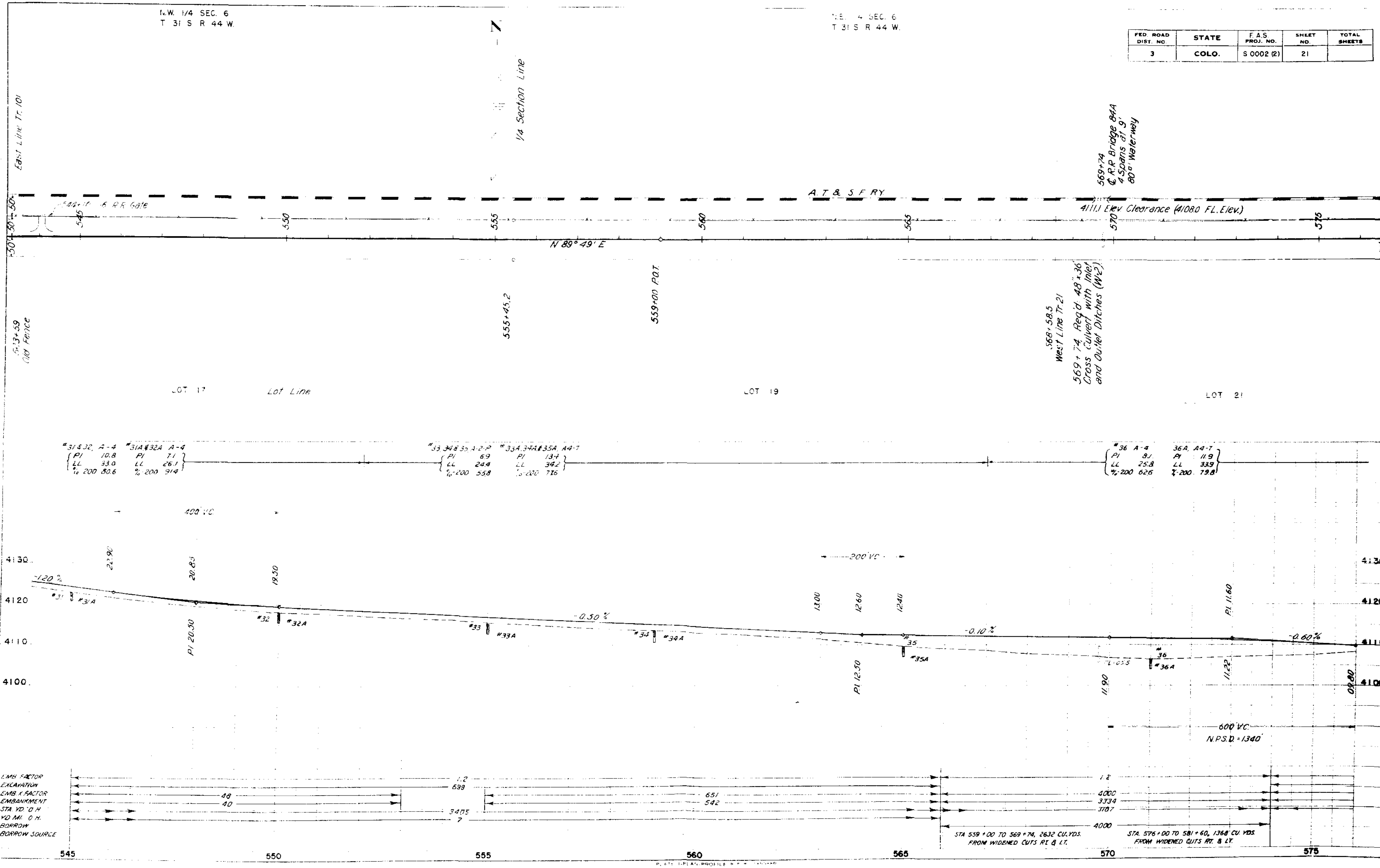


PLATE 1-PLAN-PROFILE B.P.R. STANDARD
EUGENE DIETZGEN CO. Chicago New York

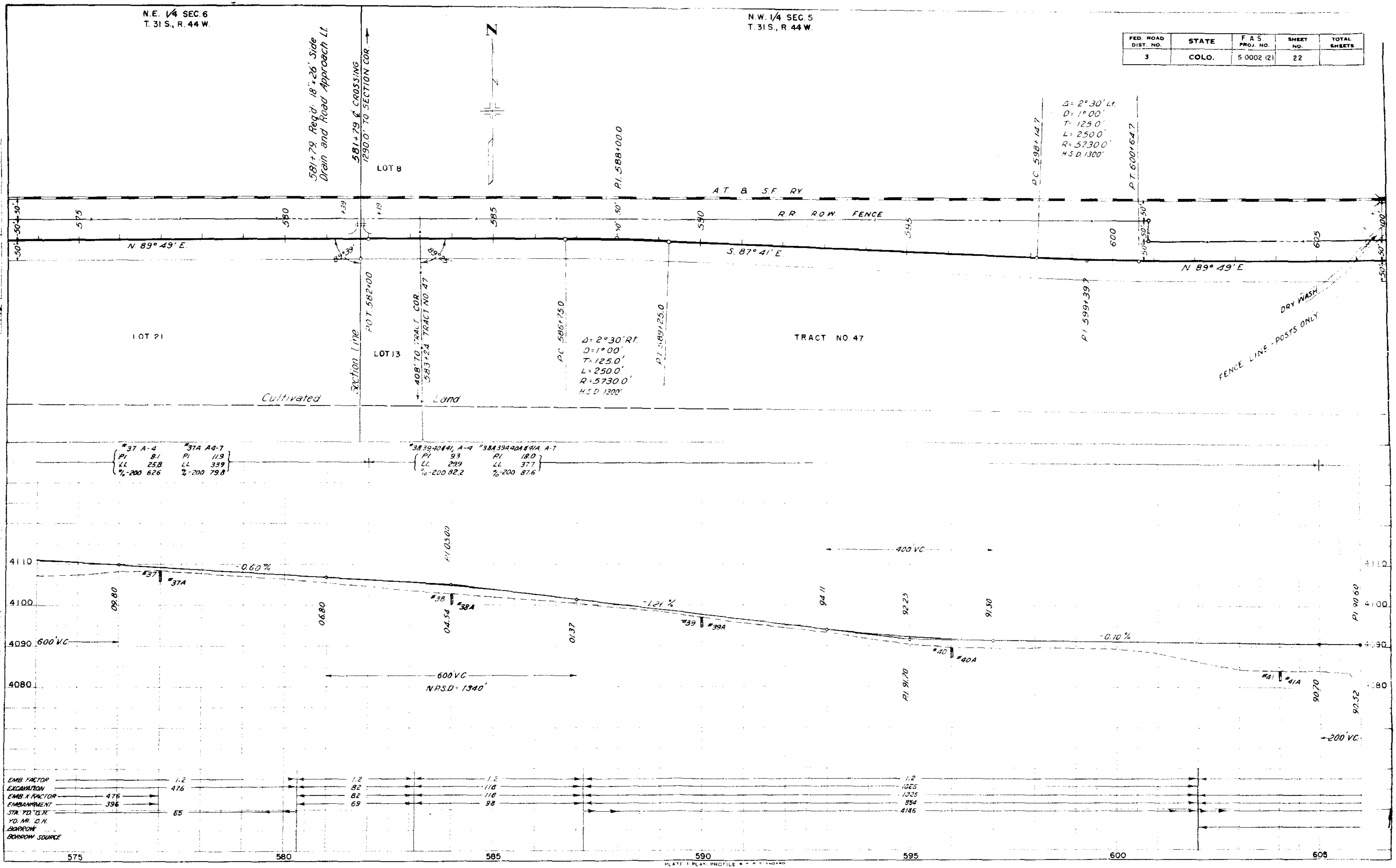
FED. ROAD DIST. NO.	STATE	PROJ. NO.	SHEET NO.	TOTAL SHEETS
3	COLO.	S 0002 (21)	20	



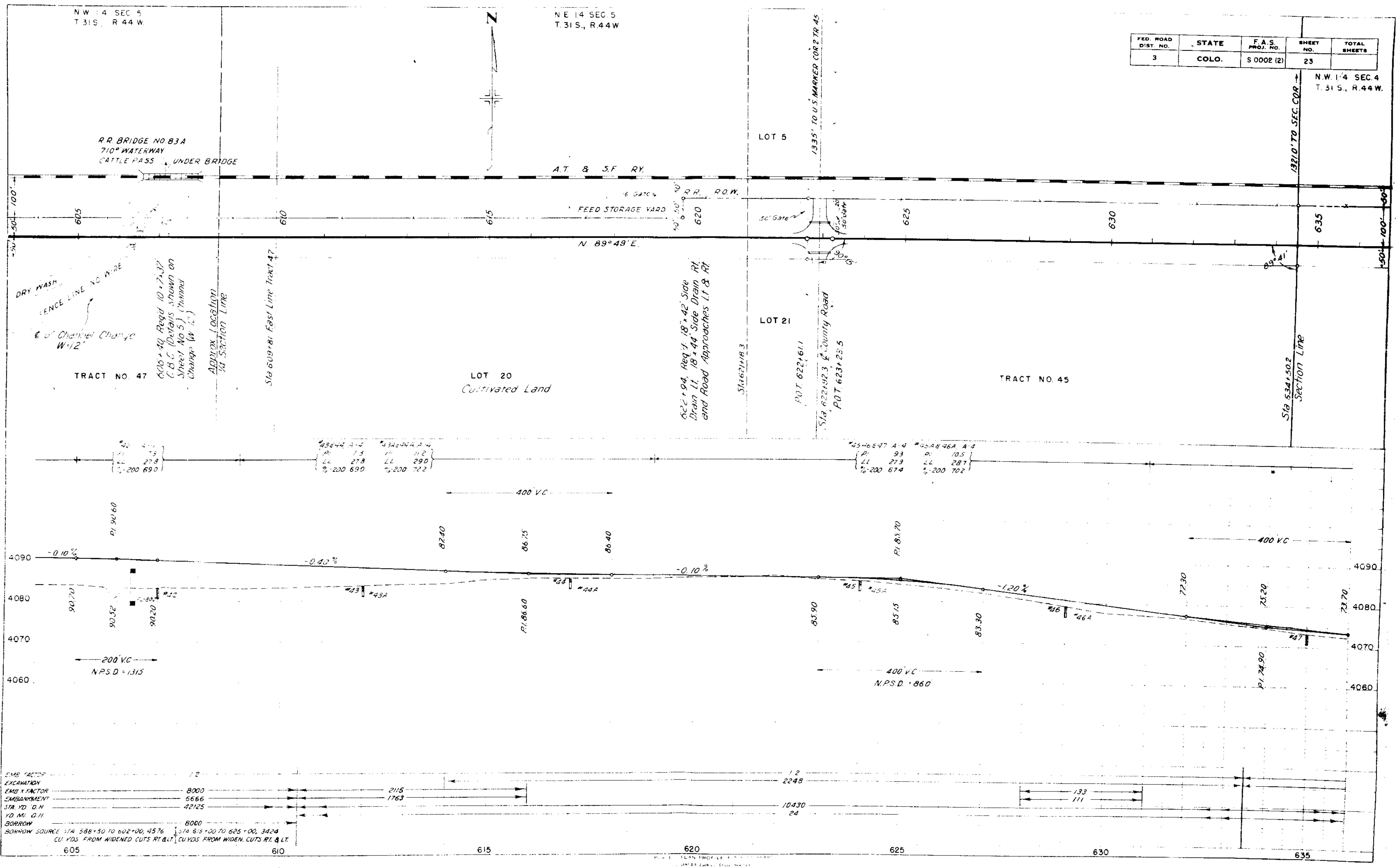
FED. ROAD DIST. NO.	STATE	F.A.S. PROJ. NO.	SHEET NO.	TOTAL SHEETS
3	COLO.	S 0002 (2)	21	

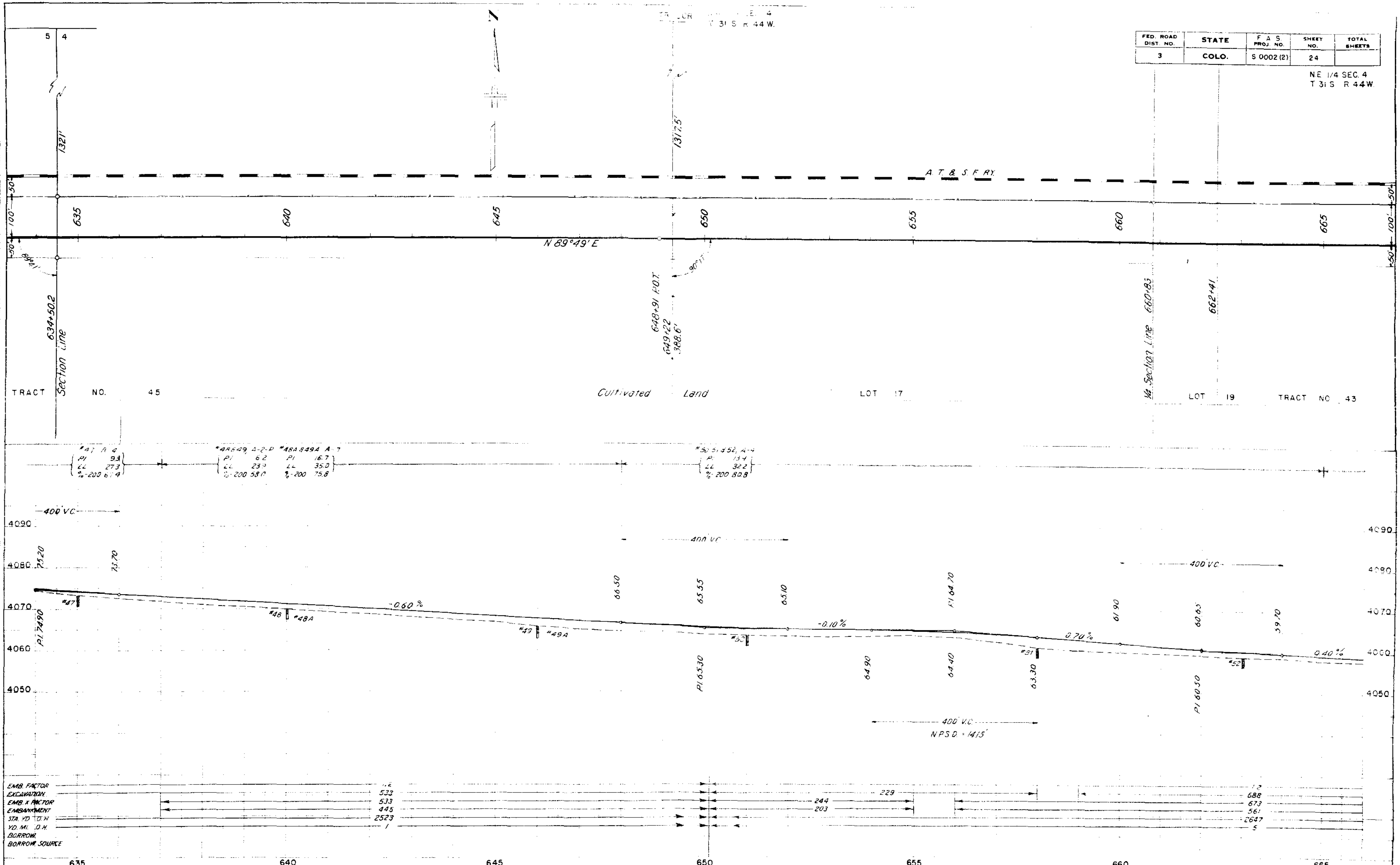


FED. ROAD DIST. NO.	STATE	F.A.S. PROJ. NO.	SHEET NO.	TOTAL SHEETS
3	COLO.	S 0002 (2)	22	



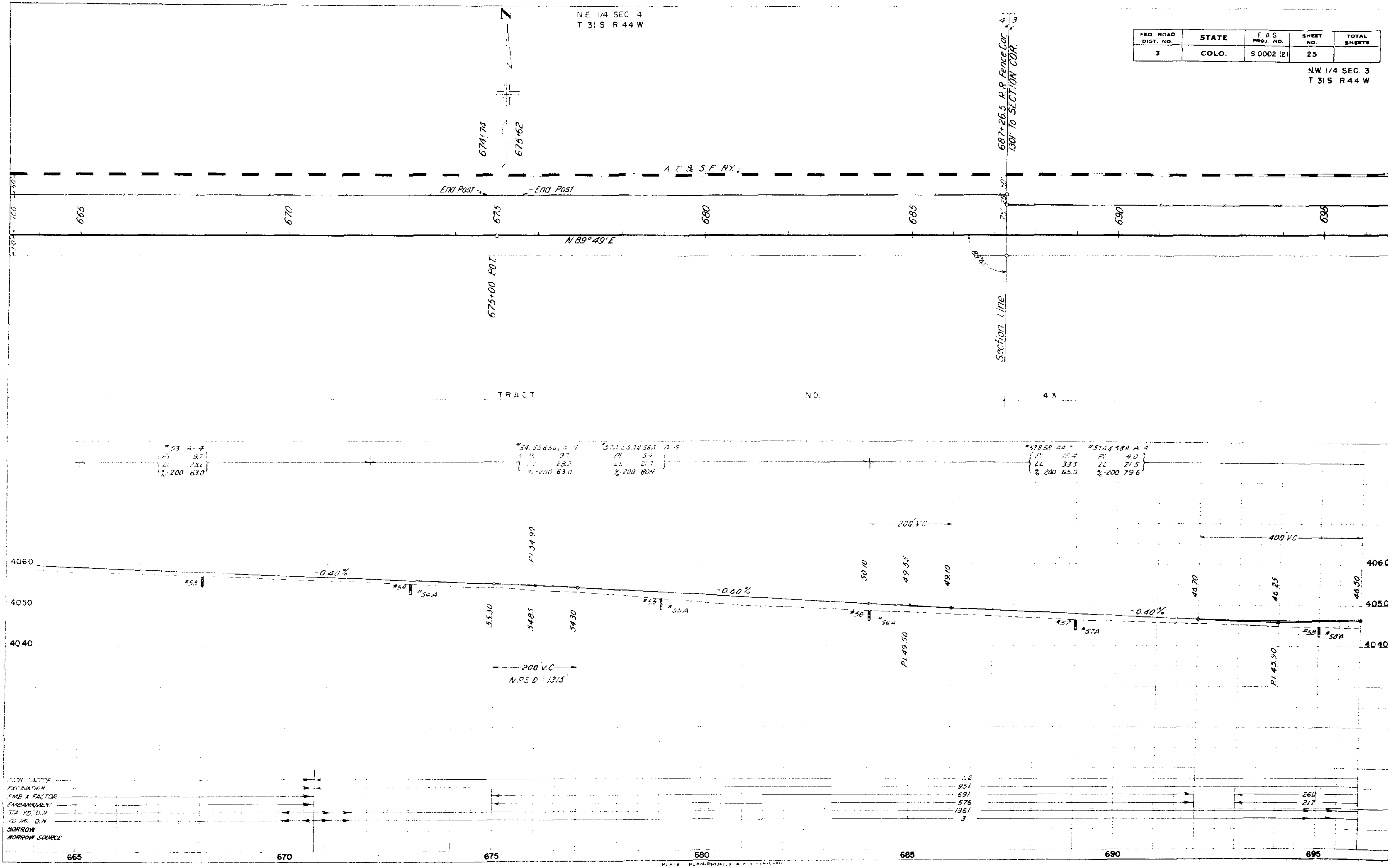
FED. ROAD DIST. NO.	STATE	F.A.S. PROJ. NO.	SHEET NO.	TOTAL SHEETS
3	COLO.	S 0002 (2)	23	





FED. ROAD DIST. NO. 3
STATE COLO.
F. A. S. PROJ. NO. S 0002 (2)
SHEET NO. 24
TOTAL SHEETS
NE 1/4 SEC. 4
T 31 S R 44 W.
5 4
1321'
1317.5'
A. T. & S. F. RY.
N 89°49' E
634+50.2
Section Line
648+91 P.O.T.
649+22
388.6'
1/4 Section Line 660+83
662+41
TRACT NO. 45
Cultivated Land
LOT 17
LOT 19
TRACT NO. 43
#47 A-4 PI 9.3 LL 27.3 %-200 61.4
#48 & 49 A-2-P PI 6.2 LL 23.9 %-200 58.0
#48A & 49A A-7 PI 16.7 LL 35.0 %-200 75.8
#50 51 & 52 A-4 PI 13.4 LL 32.2 %-200 80.8
400' V.C.
-0.60 %
-0.10 %
0.70 %
0.40 %
PI 74.90
PI 65.30
PI 64.70
PI 60.50
NPSD = 1415'
EMB. FACTOR
EXCAVATION
EMB. X FACTOR
EMBANKMENT
STA. YD. O.H.
YD. MI. O.H.
BORROW
BORROW SOURCE
635
640
645
650
655
660
665
4090
4080
4070
4060
4050

FED. ROAD DIST. NO.	STATE	F.A.S. PROJ. NO.	SHEET NO.	TOTAL SHEETS
3	COLO.	S 0002 (2)	25	



FED. ROAD DIST. NO.	STATE	PROJ. NO.	SHEET NO.	TOTAL SHEETS
3	COLO.	S 0002 (2)	26