R.O.W. PURCHASED UNDER U 005-3(13)

1, 2, 4, 32, 33, 39

FEDERAL ROAD REGION NO.	DIVISION	
9	COLORADO	U 00

ADDED ACCESS, 9-16-59.

COLORADO
DEPARTMENT OF HIGHWAYS

PLAN AND PROFILE OF PROPOSED
FEDERAL AID PROJECT NO. U 005-3 (15)
STATE HIGHWAY NO. 2
DENVER COUNTY

INDEX OF SHEETS

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1	SKETCH MAP, TITLE PAGE & TABULATION OF LENGTH & DESIGN DATA	
2	TYPICAL SECTIONS & GENERAL NOTES	
3	DETAILS OF CURB AND GUTTER AND STREET CAR TRACK SKETCH	
▲ 4	SUMMARY OF APPROXIMATE QUANTITIES	
5	TABULATIONS OF SURFACING, SANITARY SEWERS, SPRINKLING SYSTEM, FENCING, GUARD POSTS & FENCE	
6	TABULATIONS OF CURB & GUTTER, STORM SEWERS	
ø 7	GENERAL PLAN & ELEVATION, COLFAX VIADUCT ABUTMENT	
8	DETAILS OF COLFAX VIADUCT ABUTMENT	
9	GENERAL PLAN & ELEVATION, FEDERAL BRIDGES	
10-14	DETAILS OF FEDERAL BRIDGES	
15	DETAILS SHOWING PORTIONS OF STRUCTURE TO RECEIVE CLASS "1" SURFACE FINISH	
16-17	FENCING, SPRINKLING & UTILITY PLANS	
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22	DELETED	
23	STANDARD MARKER POSTS & BENCH MARKS	M-7-D
24	STANDARD LETTERS & FIGURES FOR YEAR NUMBERS & STRUCTURE NUMBERS	M-10-D
25	STANDARD TIMBER GUARD POSTS	M-19-E
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27	CHAIN LINK WIRE MESH (SCHOOL) FENCE	M-26-D
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32-33	PLAN	
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▲ 3a	DETAILS OF METER VAULT	
ø 6a	DETOUR LAYOUT	

TABULATION OF LENGTH & DESIGN DATA

STATION	DESCRIPTION	ROADWAY LINEAR FEET
0+95.5	Begin U 005-3(15)=Sta. 8+24.5 N.R.M. 81-C	824.5
9+20.0	=0+00 BEGIN N.R.M. 81-C	1012.8
19+32.8	End U 005-3(15)	
	TOTAL ROADWAY	1837.3

SUMMARY

	Lin. Ft.	Miles
Total Roadway	1837.3	0.348
Net and Gross Length U 005-3 (15)	1837.3	0.348

DESIGN DATA

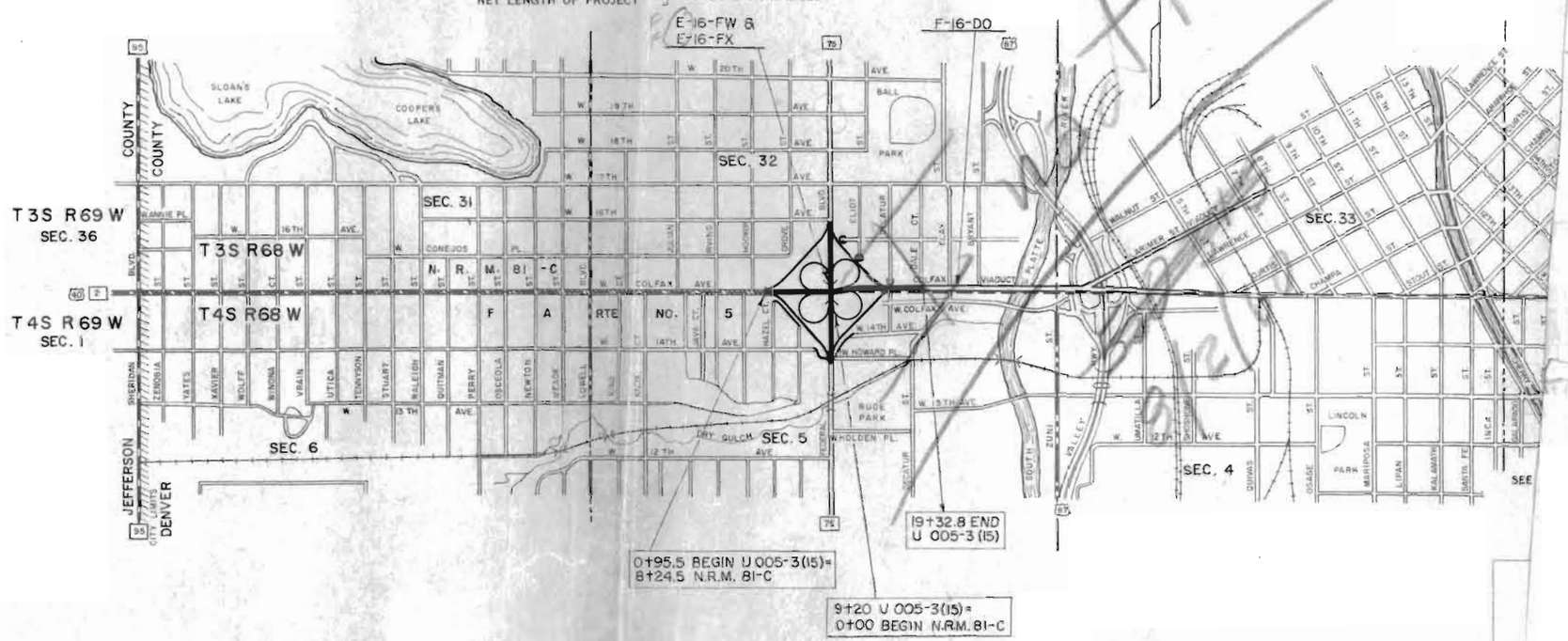
Maximum Grade	5.45%
Maximum Degree of Curve	2°00'
Minimum N.P.S.D.-Horizontal	1300'
Minimum N.P.S.D.-Vertical	230'
Maximum Design Speed	35 MPH.

SCALES OF ORIGINAL DRAWINGS

ON PLAN, 1 IN = 50 FT.
ON PROFILE, 1 IN = 50 FT. HORIZONTAL
1 IN = 5 FT. VERTICAL

GRADE LINE ON PROFILE IS SHOWN AS GRADE OF FINISHED ROAD

GROSS LENGTH OF PROJECT
NET LENGTH OF PROJECT } 1837.3 FT. = 0.348 MILES



SCALE IN MILES

0 1/4 1/2 1

CONVENTIONAL SIGNS

CENTER LINE — PLAN SHEET
RIGHT OF WAY LINE — R.O.W. MARKER
CITY LIMITS
TOWNSHIP OR RANGE LINE
SECTION LINE — TITLE SHEET
RAILROAD
CHAIN LINK FENCE
ACCESS DENIED BY DEED — Outside R.O.W. Line A — 24'C A — 16' NC (C = COMMERC, NC = NON-CON)
C. OF A. LINE (CONTROL OF ACCESS)

N

KEN R. WHITE
CONSULTING ENGINEER

SUBMITTED — February 27, 1959 DATE

KEN R. WHITE

T.V. STRADLEY
BRIDGE DIVISION

J.D. ANDERSON
HIGHWAY DIVISION

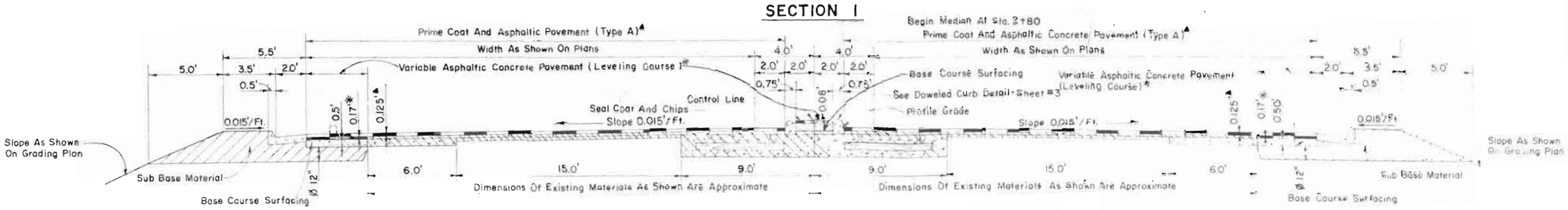
PHOTOGRAMMETRY BY FALCON AIR MAPS

D.H.H.

FEDERAL ROAD REGION NO.	DIVISION	PROJ. NO	SHEET NO.
9	COLORADO	U005-3(15)	2

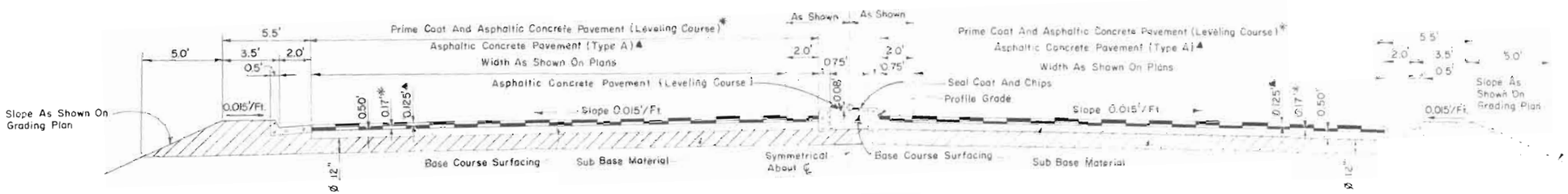
TYPICAL SECTIONS

SECTION 1



COLFAX AVE. STA. 0+95 TO STA. 5+00-TYPICAL SECTION

SECTION 2

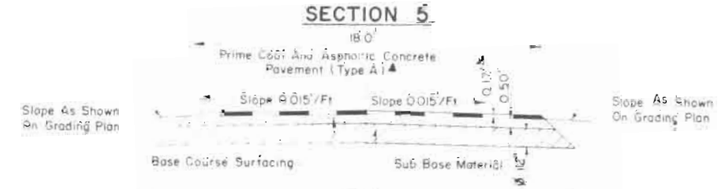


FEDERAL BLVD.-COLFAX AVE.

STA. 5+00 TO STA. 19+33-TYPICAL SECTION

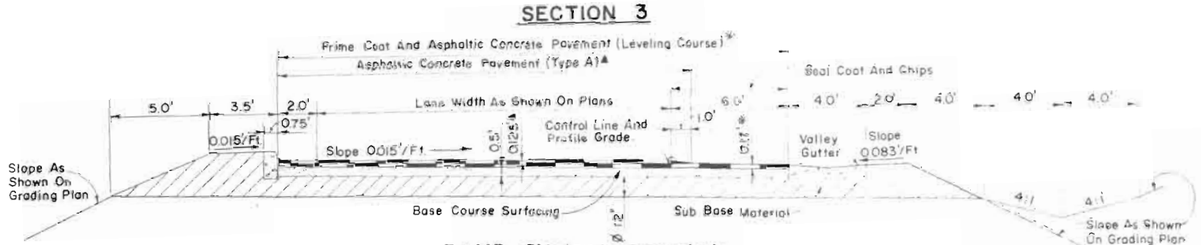
Ø MAY BE VARIED DURING CONSTRU

SECTION 5



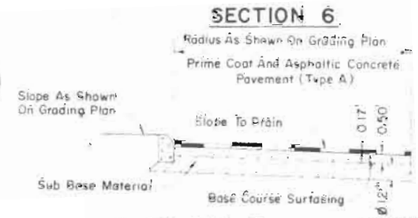
ALLEY CONNECTIONS-TYPICAL SECTION

SECTION 3



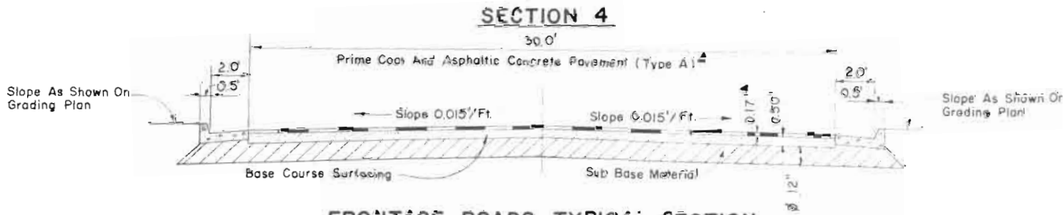
RAMP-TYPICAL SECTION

SECTION 6



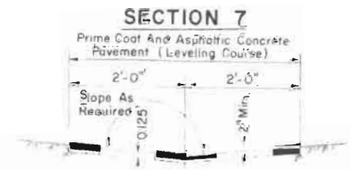
CUL-DE-SAC TYPICAL SECTION

SECTION 4



FRONTAGE ROADS-TYPICAL SECTION

SECTION 7



ASPHALTIC SLOPE PROTECTION TYPICAL SECTION

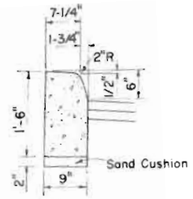
GENERAL NOTES

1. This Project Is To Be Constructed In Conformity With The Standard Specifications Of The Colorado Department Of Highways Adopted January 1, 1958.
2. Quantities Are To Be Considered Approximate Only.
3. All Curves Are To Be Superelevated As Provided By The Superelevation Sheet Included With The Plans.
4. Site Preparations For This Project Have Been Provided For Under A Previous Contract.
5. The Contractor Shall Be In Agreement With The Traffic Engineer, City And County Of Denver, As To The Methods Of Handling Traffic, Prior To The Construction Of This Project.
6. For Preliminary Plan Quantities Of Asphaltic Road Materials, Asphaltic Concrete Pavement And Asphalt, The Following Rates Of Application Were Used.

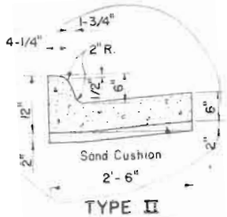
Prime Coat (Over Concrete) R.C.	.10 Gal. Per Sq. Yd.
Prime Coat (Over Other Areas) M.C.	.40 Gal. Per Sq. Yd.
Asphaltic Concrete Pavement (Leveling Course)	109 Lbs. Per Sq. Yd. Per 1" Thickness
Asphaltic Concrete Pavement (Type A)	112.5 Lbs. Per Sq. Yd. Per 1" Thickness
Asphalt (85-100) Penetration) - (Leveling Course)	5.5 Lbs. Per Sq. Yd. Per 1" Thickness
Asphalt (85-100) Penetration) - Type A)	6.5 Lbs. Per Sq. Yd. Per 1" Thickness
Seal Coat R.C.	.30 Gal. Per Sq. Yd.
Stone Screenings (Type 1)	22 Lbs. Per Sq. Yd.

7. Rate Of Application And Grade Of Oil Shall Be As Determined By The Engineer At The Time Of Application.
8. *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.*
9. Application Methods For Liquid Asphaltic Road Material, Which Result In The Discoloration Of The Concrete Pavement, Curbs And Gutters Will Not Be Permitted.
10. 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.

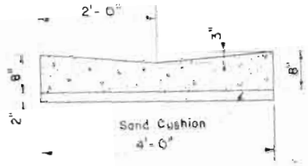
REGION NO.	PROJECT NO.	SHEET NO.	TOTAL SHEETS
8	COLORADO	U005-3(15)	9



BARRIER CURB
TYPE II

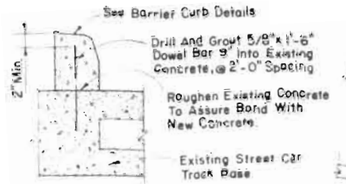


TYPE II
CURB AND GUTTER

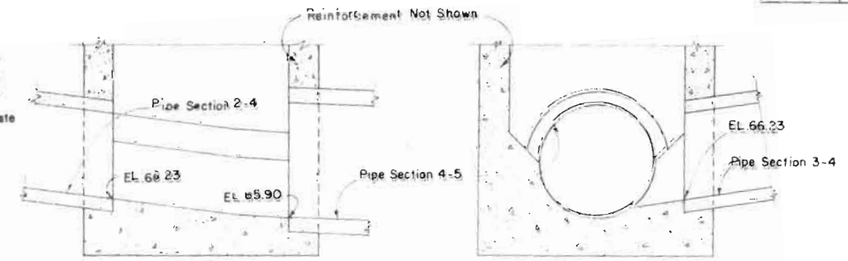


VALLEY GUTTER

CURB AND GUTTER DETAILS



DOWELED CURB
TYPE I



Trowel Invert Of Structure To Approximate Cross Section Of Bottom Half Of Outflow Pipe To Facilitate Best Possible Flow Conditions From Pipe Section 2-4 Into Pipe Section 4-5, As Shown.

STRUCTURE #4 INVERT DETAILS

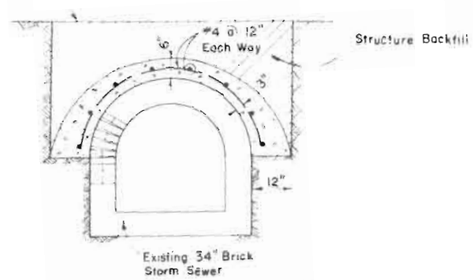
DETAILS

NOTE: On curves 3° 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 10ft. may be used when the degree of curve is less than 3°.

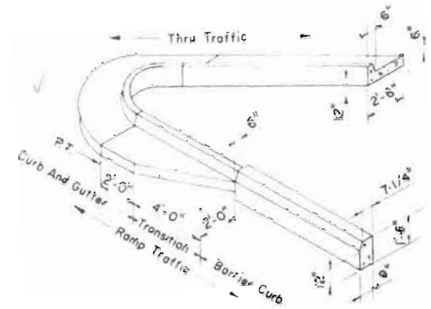
At locations where in place Concrete Pavement has been overlayed with Asphalt, the Asphalt shall be removed before placement of Doweled-Type curb.

Subgrade Elev. Sta. 9+65 To Sta. 9+75

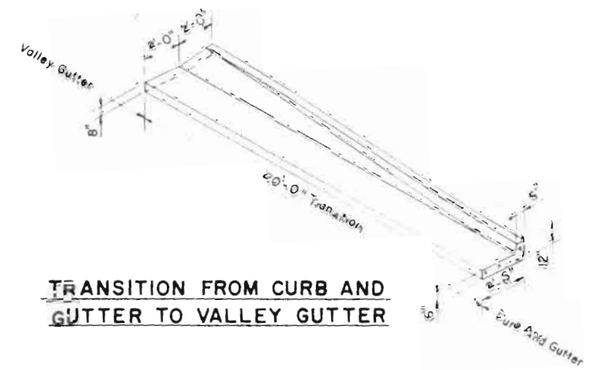
NOTE: The existing brick sewer in the center of Federal Blvd. shall be exposed and cleaned between the indicated stations. The contractor shall then call for inspection by the Engineer and the need for protecting this sewer shall be determined. If the reinforcement is to be employed it shall be paid for under the contract unit prices of; Class "A" Concrete (46), Reinforcing Steel (47), Unclassified Structural Excavation-Miscellaneous (14) and Structure Backfill (Class I)(16) For exposing and inspection purposes, it is estimated that 2 cu. yds. of Structural Excavation-Miscellaneous, and 2 cu. yds. of Structure Backfill (Class I) will be required.



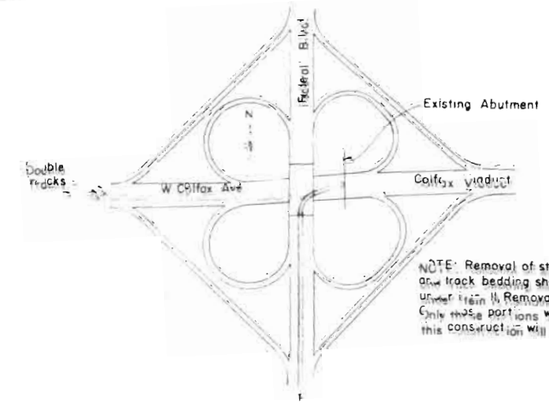
SEWER REINFORCEMENT
FEDERAL BLVD.
STA. 9+65 TO STA. 9+85



TRANSITION FROM CURB AND GUTTER TO BARRIER CURB

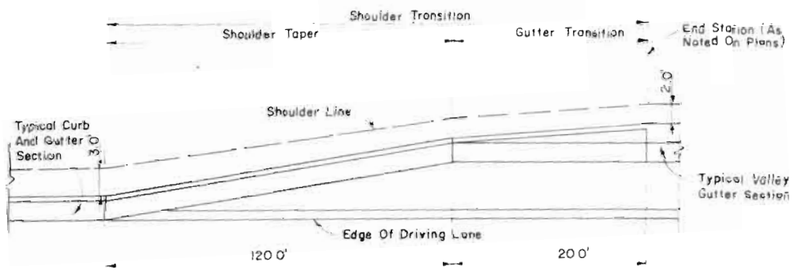


TRANSITION FROM CURB AND GUTTER TO VALLEY GUTTER

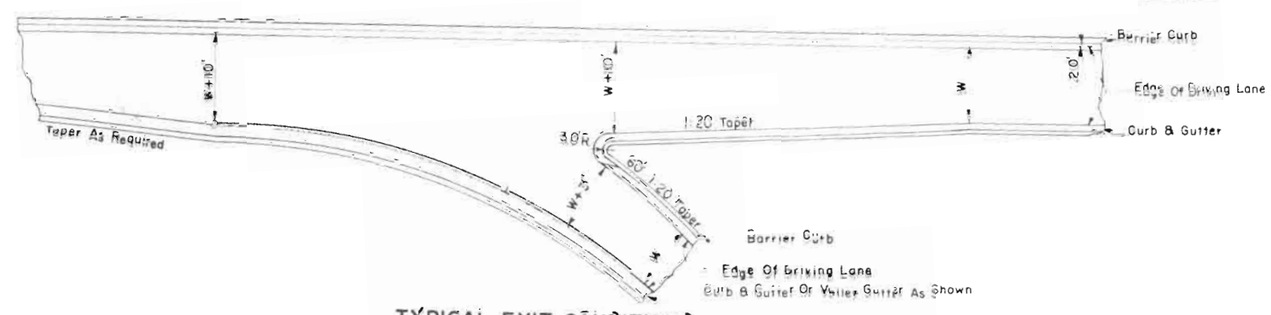


NOTE: Removal of street car tracks and track bedding shall be paid for under Item 11, Removal of Obstructions. Only those portions which conflict with this construction will be removed.

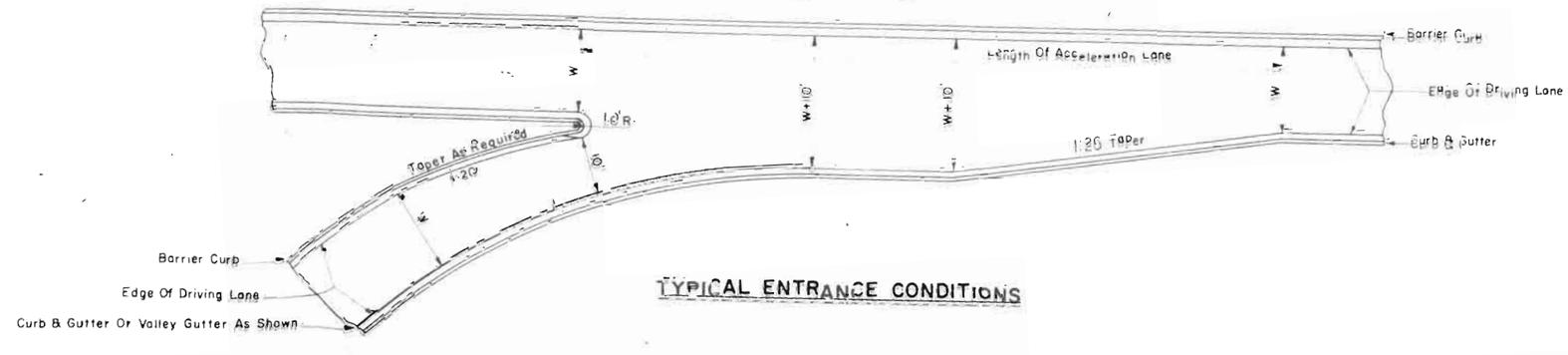
SKETCH MAP OF BURIED STREET CAR TRACKS



PLAN OF TYPICAL SECTION SHOULDER TRANSITION



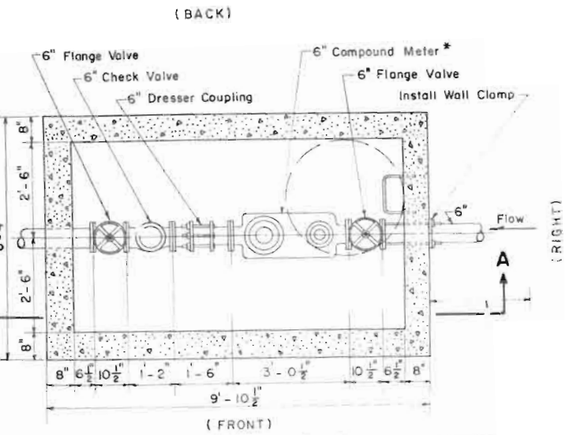
TYPICAL EXIT CONDITIONS



TYPICAL ENTRANCE CONDITIONS

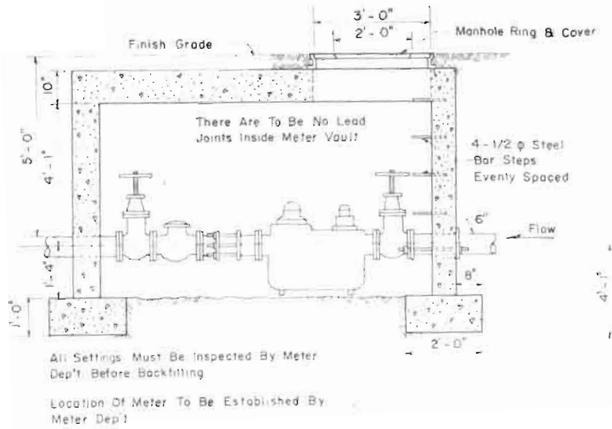
METER VAULT DETAILS

FEDERAL ROAD OR YEAR NO.	DISTRICT	PROJ. NO.	SHEET NO.	TOTAL SHEETS
9	COLORADO	U 005-3(15)	3A	

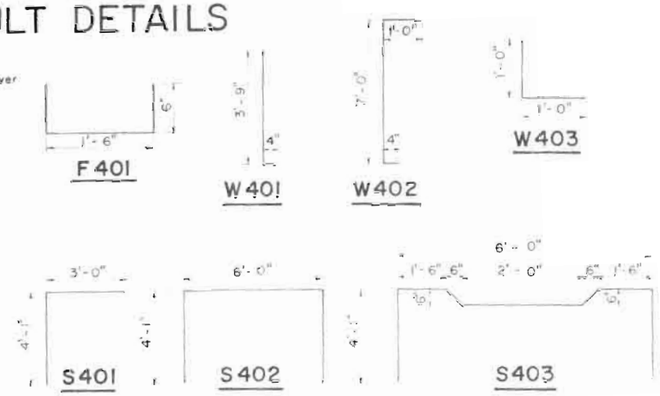


* Approved By Denver Board Of Water Commissioners

PLAN



ELEVATION



BAR BENDING DETAILS

BAR SUMMARY

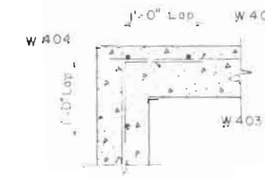
890 Lin. Ft. #4 @ 0.668 #/ft = 595 Lb.
33 Lin. Ft. #6 @ 1.502 #/ft = 50 Lb.
Overrun = 5 Lb.
TOTAL = 650 Lb.

SUMMARY OF QUANTITIES

ITEM	DESCRIPTION	UNIT	AMT
A6	Class "A" Concrete	Cu. Yd.	8.0
47	Reinforcing Steel (1% Overrun)	Lb.	650
152	Manhole Rings & Covers	Each	1

BAR LIST

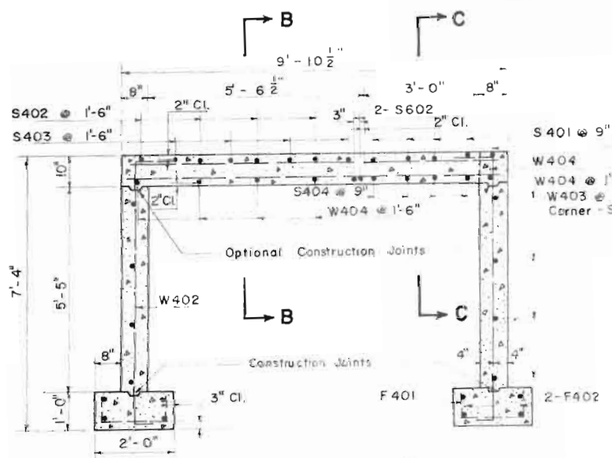
MARK	SHAPE	LENGTH	NO. REQD.
F 401		2'-6"	34
F 402		7'-4"	8
F 403		10'-10"	8
W 401		4'-1"	22
W 402		8'-4"	16
W 403		2'-0"	16
W 404		6'-0"	17
W 405		9'-6"	14
S 401		7'-1"	4
S 402		14'-2"	5
S 403		14'-7"	4
S 404		3'-0"	4
S 601		4'-6"	2
S 602		6'-0"	4



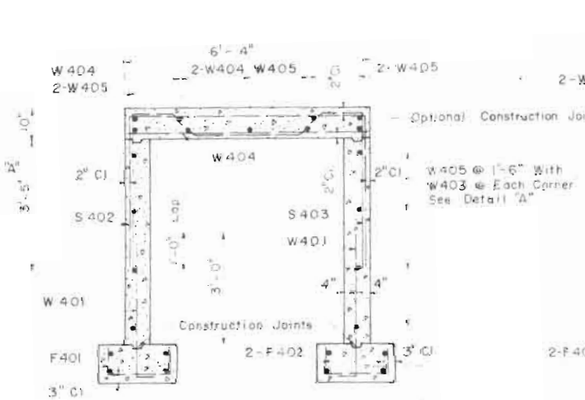
DETAIL "A"

TYPICAL CONSTRUCTION JOINT

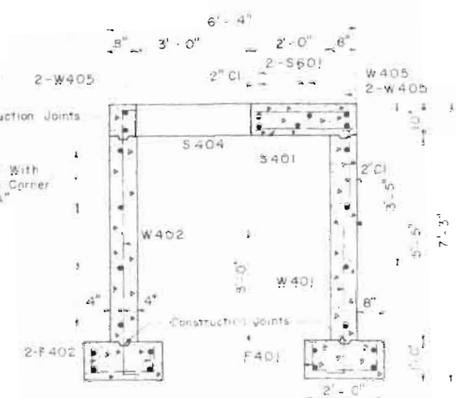
DETAILS OF METER VAULT



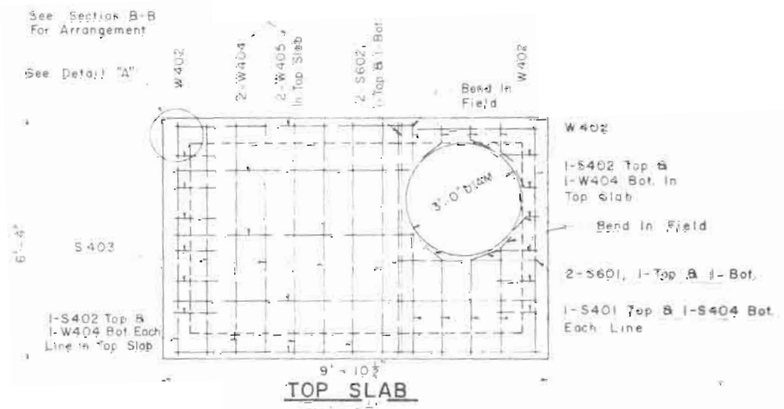
SECTION A - A



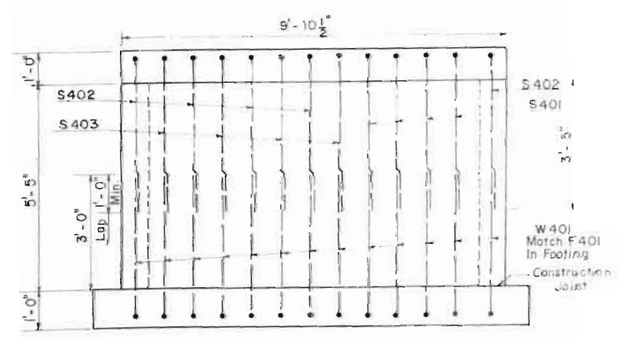
SECTION B - B



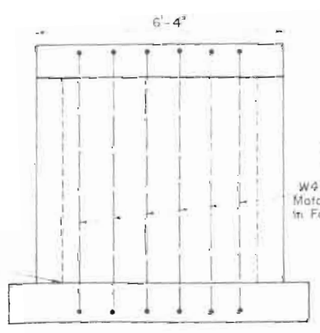
SECTION C - C



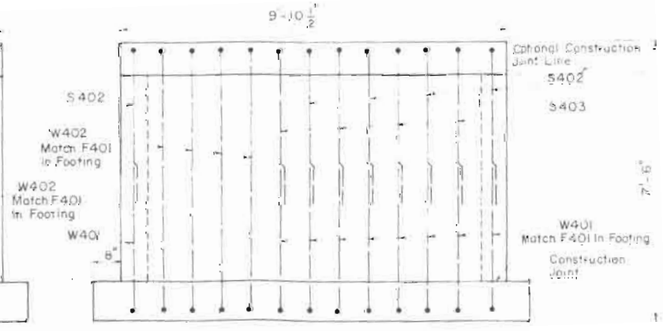
TOP SLAB



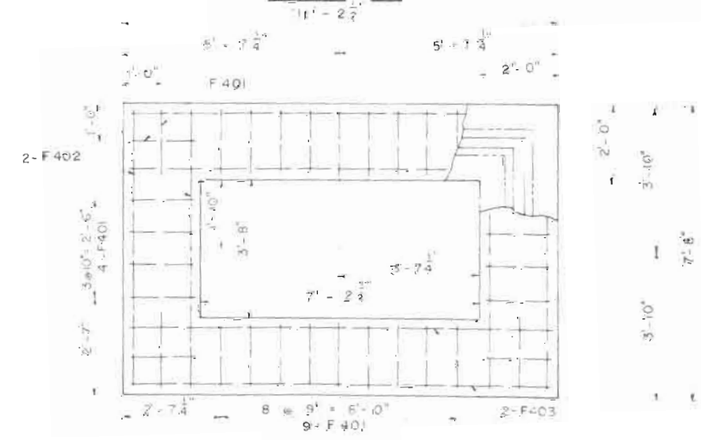
FRONT ELEVATION



RIGHT OR LEFT SIDE ELEVATION



BACK ELEVATION



FOOTING

SUMMARY OF APPROXIMATE QUANTITIES

ITEM NO.	ITEM	UNIT	ROADWAY	STRUCTURES E 16 FX	STRUCTURES E 16 FW	STRUCTURES F 16 DO	PROJECT TOTALS
11	Removal of Obstructions	L. S.	•				•
11	Removal of Portions of Present Structure	L. S.				•	•
11	Reset Guard Posts	Ea.	180				180
11	Adjust Manhole Ring & Cover	Ea.	12				12
12	Removing and Rebuilding Guard Fence	Lin. Ft.	200				200
13	Uncl. Excav.	Cu. Yd.	241,000				241,000
14	Uncl. Str. Excav. - Misc.	Cu. Yd.	10				10
14	Uncl. Str. Excav. - Bridges	Cu. Yd.				86	86
16	Str. Backfill (Cl. 1)	Cu. Yd.	10			60	70
17	Comp. (Std.)	Cu. Yd.	236,000				236,000
17	Watering	M. Gal.	10,380				10,380
23	Sub-Base Mat'l. (Cl. 1)	Ton	47,100				47,100
26	Gr. or Gr. Rock Surf. (Gr. C)	Ton	16,500				16,500
29	Asphalt (85-100 Penetration) (Tack Coat)	Ton	20				20
30	Asph. Rd. Mat'l. MC (Prime)	Gal.	22,100				22,100
30	Asph. Rd. Mat'l. RC	Gal.	2,100	* 150	* 150		2,400
31	Stone Screenings (Limestone)	Ton	80				80
34	Asph. Conc. Pv'mt. (Leveling Course)	Ton	4,980				4,980
34	Asph. Conc. Pv'mt. (Type A)	Ton	4,484	113	113		4,710
46	Cl. "A" Conc.	Cu. Yd.		541	545	81	1,167
47	Reinf. Steel	Lb.		155,300	155,900	7,800	319,000
48	Str. Steel	Lb.		8,900	8,900		17,800
61	Str. Piling (10 B.P. 42)	Lin. Ft.		471	567		1,038
65	Conc. St. & Ditch Pav. (Wire Mesh)	Cu. Yd.		116	125	151	392
75	Met. Pl. Gd. Fence (Beam Type)	Lin. Ft.	200				200
78	Chain Link Wire Mesh Fence	Lin. Ft.	4,500				4,500
84	Conc. Curb (Type I)	Lin. Ft.	440				440
84	Conc. Curb (Type II)	Lin. Ft.	11,498				11,498
84	Conc. Gutter (4 Ft. Wide)	Lin. Ft.	6,285				6,285
84	Conc. Comb. Curb & Gutter (Type II)	Lin. Ft.	8,632				8,632
90	1½" Elec. Cond. with Sch. Boxes	Lin. Ft.		255	255		510
92	Tim. Gd. Posts	Ea.	180				180
110	2" Gate Valve and Valve Box	Ea.	1				1
110	3" Gate Valve and Valve Box	Ea.	16				16
110	6" Gate Valve and Valve Box	Ea.	1				1
113	3" C.I. Water Pipe	Lin. Ft.	582				582
113	6" C.I. Water Pipe	Lin. Ft.	2,365				2,365
121	2" Standard Galv. Pipe	Lin. Ft.	37				37
130	Drop Inlets (Type-2A) 3 Ft. Deep	Ea.	6				6
130	Drop Inlets (Type-2A) 4 Ft. Deep	Ea.	5				5
130	Drop Inlets (Type-2A) 9 Ft. Deep	Ea.	2				2
130	Drop Inlets (Type-4B) 4 Ft. Deep	Ea.	12				12
130	Drop Inlets (Type-4B) 3 Ft. Deep	Ea.	1				1
130	Drop Inlets (Type-4B) 5 Ft. Deep	Ea.	1				1
130	Drop Inlets (Type-4B) 7 Ft. Deep	Ea.	1				1
130	Drop Inlets (Type-4B) 9 Ft. Deep	Ea.	2				2
130	Drop Inlets (Type-2) 3 Ft. Deep	Ea.	9				9
130	Drop Inlets (Type-2) 16 Ft. Deep	Ea.	1				1
130	Drop Inlets (Type-2) 4 Ft. Deep	Ea.	2				2
132	8" Conc. Pipe Sewer (Std. Str.)	Lin. Ft.	905				905
132	18" R.C.P. Sewer (Class III)	Lin. Ft.	4,036				4,036
132	24" R.C.P. Sewer (Class III)	Lin. Ft.	1,104				1,104
132	Manholes (Type I) 5 Ft. Deep	Ea.	1				1
132	Manholes (Type I) 6 Ft. Deep	Ea.	2				2
132	Manholes (Type I) 7 Ft. Deep	Ea.	1				1
132	Manholes (Type I) 8 Ft. Deep	Ea.	4				4
132	Manholes (Type I) 9 Ft. Deep	Ea.	2				2
132	Manholes (Type I) 10 Ft. Deep	Ea.	3				3
132	Manholes (Type I) 11 Ft. Deep	Ea.	1				1
132	Manholes (Type I) 16 Ft. Deep	Ea.	1				1
160	Drilled Caissons	Lin. Ft.		157	188		345
221	Water Meter & Vault	Ea.	1				1
	STATE FURNISHED MATERIAL						
13	Borrow	Cu. Yd.	182,543				182,543
	STATE FORCES						
	Flashing Amber Warning Lights	Each	4				4

* Prime Coat for Bridge Decks

FEDERAL ROUTE SECTION NO.	DIVISION	PROJ. NO.	SHEET NO.	TOTAL SHEETS
9	COLORADO	U965-3(15)	4	

FEDERAL HIGHWAY REGION NO.	DIVISION	PROJ. NO.	SHEET NO.	TOTAL SHEETS
8	COLORADO	U005-3(15)	5	

TABULATION OF SURFACING QUANTITIES

LOCATION	STA.	STA.	LENGTH	SUB BASE MAT'L.	BASE COURSE GRAVEL	PRIME COAT M.C.	ASPH. CONC PV'MT. LEVELING COURSE	ASPH. CONC PV'MT. TYPE A	SEAL COAT RC	STONE SCREENINGS
				Tons	Tons	Gals.	Tons	Tons	Gals.	Tons
West Colfax Ave.										
	0+95	5+00	405	827.8	197.1	657.9	66.2	274.3	18.3	0.7
	5+00	19+33	1433	9,606.0	4,281.5	5,207.1	1,294.7	1,066.4	342.0	12.5
TOTAL West Colfax Ave.				10,433.8	4,478.6	5,865.0	1,360.9	1,340.7	360.3	13.2
Federal Blvd.										
	0-63	8+23.8	886.8	5,562.1	2,259.5	2,973.8	788.1	621.6	61.2	2.2
(Structures No's. E-16-FW & E-16-FX)	8+23.8	10+28.6	204.8							
	10+28.6	19+00	871.4	4,435.4	1,665.5	2,180.8	575.5	455.3	50.9	1.9
TOTAL Federal Blvd.				9,997.5	3,925.0	5,154.6	1,363.6	1,076.9	112.1	4.1
Ramps										
N.E. - 1	0+00	11+33.1	1,133.1	3,202.0	873.9	1,212.0	325.6	195.7	222.0	8.1
N.E. - 2	0+00	8+82.7	882.7	2,387.7	651.1	893.3	245.7	142.2	170.0	5.5
S.E. - 1	0+00	11+25.3	1,125.3	3,281.5	893.8	1,226.1	328.2	195.9	222.0	8.2
S.E. - 2	0+00	8+97.3	897.3	2,435.9	651.6	894.1	242.2	142.5	175.4	6.4
S.W. - 1	0+00	10+35.6	1,035.6	2,945.0	800.0	1,097.5	295.6	176.3	207.1	7.6
S.W. - 2	0+00	8+50.9	850.9	2,339.2	629.9	864.2	223.2	139.7	162.0	5.9
N.W. - 1	0+00	11+22.6	1,122.6	3,247.5	888.0	1,218.3	327.9	195.9	225.0	8.2
N.W. - 2	0+00	8+70.2	870.2	2,412.9	652.7	895.3	241.6	144.4	166.0	6.1
TOTAL Ramps				22,251.7	6,041.0	8,300.8	2,230.0	1,332.6	1,549.5	56.0
Frontage Roads, Cul-de-sacs										
5th Ave. Cul-de-sac					68.3					
Eliot St. Cul-de-sac				357.2	156.0	213.3		60.0		
Decatur St. Cul-de-sac				245.0	105.6	144.4		40.6		
Lower Colfax Alley Connection				398.1	194.0	250.2		70.4		
8th Ave. Connection (East)				1,250.6	539.5	737.8		207.5		
8th Ave. Connection (West)				660.4	284.4	388.9		109.4		
Grove-Hazel Ct. Connection				1,284.1	539.5	737.8		207.5		
Hazel Ct. Alley Connection				218.4	100.0	133.3		36.5		
Grove St. & Conejos Pl. Closure										
Asphaltic Slope Protection										
N.E. - Quad.						72.9	14.9			
S.E. - Quad.						31.1	6.4			
TOTALS				4,413.8	1,987.3	2,709.7	21.3	731.9		
PROJECT TOTALS				47,096.8	16,431.9	22,030.1	4,975.8	4,482.1	2021.9	73.3

Only 4" Base Course Gravel Surfacing Required.

TABULATION OF NEW & EXISTING SANITARY SEWER MANHOLES

APPROXIMATE LOCATION (Colfax Stationing)	ADJUST MANHOLE RING & COVER	▲ ABANDON	NEW MANHOLE NUMBERS	DEPTH FT.
2+98 38' Rt.	1			
3+33 36' Lt.	1			
4+46 235' Rt			57	11
4+62 54' Rt		1		
5+70 432' Lt		1		
5+87 167' Lt		1		
5+99 419' Rt			56	6
6+04 320' Rt		1		
6+20 62' Rt		1		
7+04 160' Lt		1		
7+16 357' Lt.		1		
7+60 420' Rt			55	9
7+63 419' Lt		1		
7+68 337' Rt		1		
7+84 83' Rt		1		
7+96 147' Lt		1		
8+06 323' Lt.		1		
9+17 715' Rt	1			
9+33 436' Rt		1		
9+52 160' Rt		1		
9+56 75' Rt		1		
9+71 121' Lt		1		
9+80 582' Rt		1		
9+88 405' Lt		1		
9+92 387' Rt		1		
10+00 597' Lt		1		
10+09 200' Rt		1		
10+11 782' Lt		1		
11+64 43' Rt		1		
11+78 392' Rt		*		
11+81 211' Lt.		1		
11+97 449' Lt		1		
12+08 621' Lt			46	8
13+31 207' Rt.		*		
13+37 51' Rt.		*		
13+50 287' Lt.		1		
13+54 372' Lt			48	16
13+65 611' Lt.			47	10
13+83 397' Rt			54	8
15+23 224' Lt			49	7
15+29 34' Rt.		*		
16+09 195' Rt.			53	10
16+86 130' Lt.			50	8
16+86 32' Rt		*		
18+64 130' Lt.			51	9
18+64 14' Rt		1		
20+15 14' Rt		1		
20+15 128' Lt			52	6
TOTALS	3	28	12	

* Work Done By Previous Contract
▲ For Information

TABULATION OF SPRINKLING SYSTEM MAINS

RUN FROM	RUN TO	LENGTH 2" GALV. PIPE	LENGTH 3" C.I. PIPE	LENGTH 6" C.I. PIPE	2"** GATE VALVES	3"** GATE VALVES	6"** GATE VALVES
A	B			9 Ft			1
B	C			167 Ft			
C	C_1		43.5 Ft			1	
C	C_2		37.5 Ft			1	
C	D			75 Ft			
D	E			176 Ft			
E	E_1		5.5 Ft			1	
E	G*			219 Ft.			
G	G_1		6 Ft			1	
G	H			178 Ft			
H	I			79 Ft.			
I	I_1		44 Ft			1	
I	I_2		53 Ft.			1	
I	I_3		40 Ft			1	
B	J			139 Ft			
J	K			21 Ft			
K	K_1		5.5 Ft.			1	
K	L*			142 Ft			
L	L_1		6 Ft.			1	
L	M			10 Ft			
M	N			205 Ft.			
N	N_1	37 Ft			1		
N	P			191 Ft			
P	P_1		59 Ft			1	
P	P_2		47 Ft			1	
P	R			136 Ft			
R	S			153 Ft.			
S	S_1		6 Ft			1	
S	T			148 Ft			
T	T_1		6 Ft			1	
T	U			171 Ft			
U	V			146 Ft			
V	V_1		41 Ft			1	
V	V_2		132 Ft			1	
V	V_3		44 Ft			1	
TOTALS		37 Ft	682 Ft	2365 Ft	1	16	1

NOTE: This gravity system shall be constructed to drain to point N_1. Due to the possibility of utility conflicts, undrainable portions of the system may be left in the runs which are indicated with one asterisk (*). However, a minimum of 4 feet of cover must be maintained over the highest elevation of the remaining water. Where the mains are drainable, 3.5 feet of cover shall be used as a minimum. Approximate locations and elevations are shown on the plans. All risers shall be brought to within 6 inches of the finished grade. Riser lengths are included in the length of the runs in which they occur. One six inch compound water meter of the type acceptable to the Denver Board of Water Commissioners will be installed. See detail sheet 3 A.

** Includes Valve Box

SUMMARY OF FENCING

SHEET NO.	CHAIN LINK WIRE FENCE LIN. FT.
17	2,087
16	2,413
TOTALS	4,500

TIMBER GUARD POSTS

An Estimated One Hundred Eighty (180) Timber Guard Posts Will Be Required On This Project. Locations Will Be Staked By The Engineer At The Time Of Construction.

Φ TABULATION OF METAL PLATE GUARD FENCE (BEAM TYPE)

LOCATION FROM	LOCATION TO	ON	LENGTH LIN. FT.
17+33 Rt.	19+33 Rt.	Colfax	200
TOTALS			200

Φ New Guard Fence May Be Used On Detour And Reset In This Location. If This Is Done It Will Be Paid For Under Item 12.

TABULATION OF SANITARY CONCRETE PIPE SEWER

LOCATION FROM	LOCATION TO	INVERT ELEVATIONS	SLOPE	LENGTH OF 8" PIPE
46	47	5257.19		
47	48	5243.79	.0793	169'
48	49	5234.54	EXISTING	
49	50	5216.86	.0762	232'
50	51	5204.16	.0706	180'
51	52	5187.87	.0942	173'
TOTALS		5186.11	.0111	151'
				905'

FEDERAL ROAD REGION NO.	DIVISION	PROJ. NO.	SHEET NO.	TOTAL SHEETS
8	COLORADO	U005-3(15)	6	

TABULATION OF CURBS AND GUTTERS

LOCATION		STA.	TO STA.	① BARRIER CURB LIN. FT.	① CURB & GUTTER LIN. FT.	VALLEY GUTTER LIN. FT.
COLFAX AVE. MEDIAN		2+80	16+00	② 2645		
FEDERAL BLVD. MEDIAN		0+86	8+23.8	1481		
FEDERAL BLVD. MEDIAN		10+28.6	16+44	1235		
COLFAX AVE.	RT.	0+95	3+60		270	
	LT.	0+95	2+60		167	
	LT.	2+90	6+98		420	
	RT.	3+79	7+24		363	
	RT.	7+72	11+69		399	
	LT.	7+79	11+75		397	
	LT.	12+75	16+28		370	
	RT.	12+86	16+70		391	
	LT.	16+91	19+33		246	
	RT.	17+25	19+33		206	
FEDERAL BLVD	RT.	63' BK. OF 0+00	0+39		111	
	LT.	63' BK. OF 0+00	0+32		104	
	RT.	0+62	2+12		152	
	LT.	0+62	2+57		205	
	RT.	2+34	6+34		409	
	LT.	2+45	6+22		384	
	RT.	6+74	8+26		150	
	LT.	6+75	8+22		150	
	LT.	10+26	11+81		155	
	RT.	10+30	11+88		155	
	LT.	11+42	15+85		443	
	RT.	12+90	16+21		338	
	RT.	15+77	18+97		320	
	LT.	15+92	17+53		164	
NW-1	RT.	1+40	10+63			906
	LT.	1+33	10+35	897		
NW-2	RT.	0+80	7+30			612
	LT.	1+51	7+68	688		
SW-1	RT.	1+40	9+42			792
	LT.	1+40	9+58	818		
SW-2	RT.	1+10	7+90			640
	LT.	1+53	7+47	658		
SE-1	RT.	1+00	10+96			981
	LT.	1+09	10+46	936		
SE-2	RT.	0+43	8+24			736
	LT.	1+54	7+93	674		
NE-1	RT.	1+40	10+00			853
	LT.	1+93	10+61	858		
NE-2	RT.	0+60	8+70			765
	LT.	1+53	7+72	651		
Eliot St Cul-de-sac				228		
Decatur St. Cul-de-sac				169		
14th Ave. Connection (East)					818	
14th Ave. Connection (West)					423	
Grove St. – Hazel Ct. Connection					1052	
Grove St. Closure					40	
Conejos Pl. Closure					30	
				① 11,498		
TOTALS				② 440	8832	6285

① TYPE II

② 440' TYPE I CURB

TABULATION OF STORM SEWER STRUCTURES

EXISTING NUMBER	EXISTING TYPE	NEW NUMBER	NEW TYPE	STATION ON COLFAX	LEFT	RIGHT	ELEVATIONS RIM	ELEVATIONS INVERT	DEPTH FT.
2	MH	1	4-B	5+30	315'		89.00	85.25	3.75
				5+49	427'		92.20	83.01	9.19
		3	2	6+82	398'		71.80	68.80	3.00
		4	2-A	6+84	420'		69.40	65.90	3.50
		5	2-A	8+55	407'		67.71	64.21	3.50
⊗6	MH			9+70	400'		72.00	62.89	9.11
		7	4-B	10+41	372'		71.30	67.55	3.75
		8	4-B	9+57	336'		71.10	67.35	3.75
⊗9	MH			9+95	357'		72.00	59.97	12.03
10	MH			10+22	800'		82.00	71.06	10.94
		10a	4-B	10+60	823'		82.03	78.00	4.03
⊗11	MH			2+97	15'		84.75	75.60	9.15
⊗12	MH			4+59	15'		77.00	69.80	7.20
		12a	2	3+73	100'		79.76	76.76	3.00
⊗13	MH			5+20	14'		74.50	66.40	8.10
		14	2-A	5+80		98'	63.00	60.00	3.00
		15	2-A	6+82	60'		64.50	61.50	3.00
		15a	4-B	6+82	50'		65.25	61.00	4.25
⊗16	MH			6+60	5'		67.50	59.70	7.80
		17	4-B	7+13		40'	63.50	59.75	3.75
		18	2	7+69	63'		59.90	56.90	3.00
		19	2-A	8+84	69'		53.00	49.50	3.50
⊗20	MH			9+23		12'	53.00	43.50	9.50
		21	2-A	8+48		127'	51.00	48.00	3.00
⊗22	MH			9+65		72'	57.00	41.76	15.24
⊖23	MH			10+02		187'	41.50	32.50	9.00
		24	MH	10+92		189'	36.00	26.29	9.71
		25	2	7+76		346'	58.30	54.55	3.75
		26	2-A	8+65		497'	43.00	40.00	3.00
		27	2-A	8+37		690'	41.00	38.00	3.00
		28	4-B	8+65		685'	44.50	37.50	7.00
		29	4-B	8+91		665'	45.50	37.00	8.50
		30	4-B	9+73		680'	45.00	36.50	8.50
		31	2-A	10+72		507'	33.00	29.50	3.50
		32	2-A	12+44		192'	24.99	16.09	8.90
⊖33*	MH			13+37		193'	18.60	09.86	8.74
		34	4-B	13+86	400'		46.00	42.50	3.50
		35	2	12+79	70'		47.00	44.00	3.00
		36	2-A	12+97	125'		41.00	38.00	3.00
		37	2-A	14+50	100'		38.50	35.00	3.50
		38	2	13+24		146'	44.50	40.75	3.75
		39	2-A	14+21		118'	39.25	30.75	8.50
		40	MH	15+95		183'	09.05	01.25	7.80
		41	4-B	16+97	142'		11.00	07.25	3.75
		42	4-B	17+45	47'		37.00	33.25	3.75
		43	4-B	17+45		49'	37.00	32.25	4.75
		43a	4-B	16+50		30'	39.25	35.25	4.00
		43b	4-B	15+30	4.5'		42.00	38.00	4.00
		44	MH	18+18		120'	08.00	03.25	4.75
45	MH			17+92		178'	07.00	97.72	9.28
⊗58	MH			10+08	587'		78.00	68.43	9.57
		39a	2	14+82		197'	39.36	36.36	3.00
		39b	2	13+77		311'	39.81	36.81	3.00
		39c	2	12+60		426'	40.26	37.26	3.00
		9a	2	11+84	545'		71.00	68.00	3.00
		14a	2	4+80		190'	71.00	68.00	3.00
		30a	4-B	9+70		850'	40.00	36.75	3.50
		30b	4-B	8+82		850'	40.00	37.00	3.00
		34a	2	13+60	335'		57.00	41.50	15.50

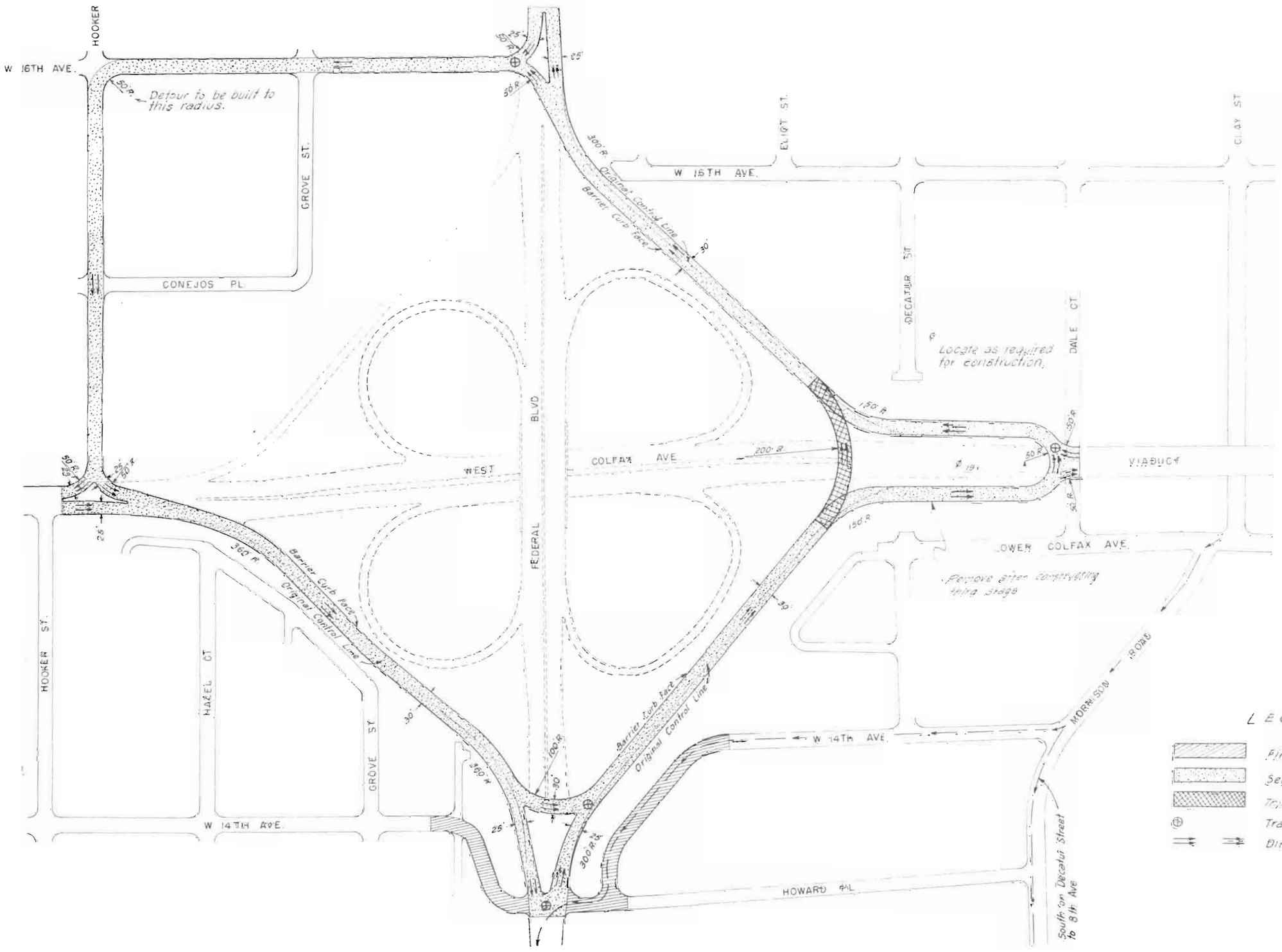
MH Manhole
⊗ To Be Adjusted
⊖ To Be Removed
* Work Done By Previous Contract
2-A Area Inlet
4-B Curb Inlet
2 Valley Gutter Inlet

TABULATION OF STORM SEWER PIPE

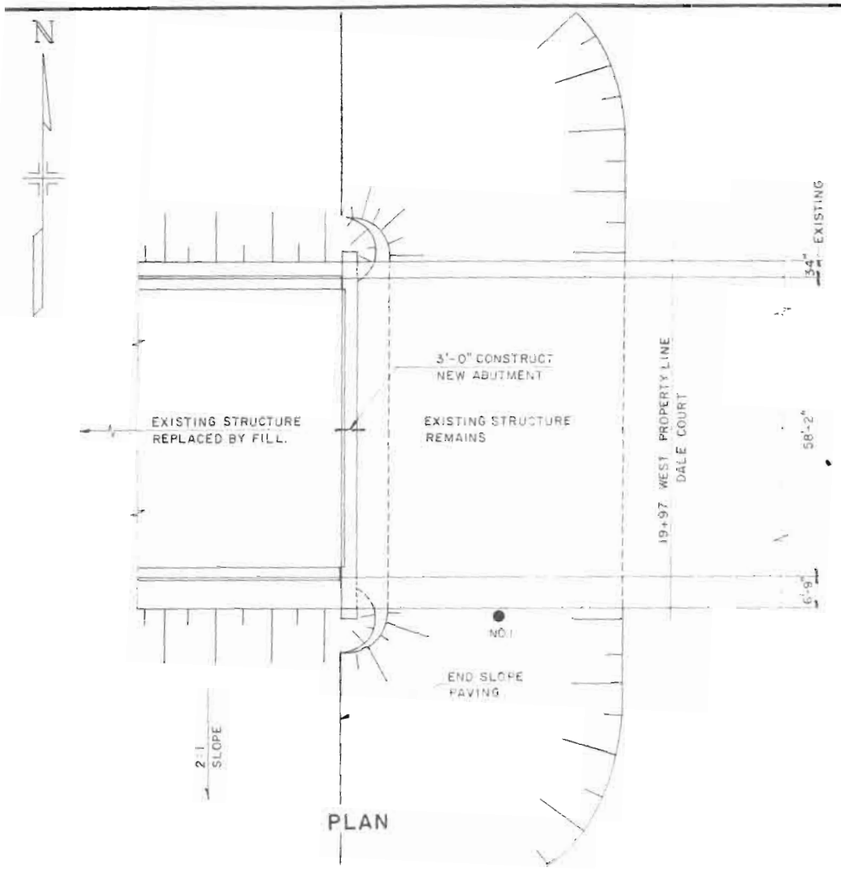
EXISTING FROM	EXISTING TO	EXISTING DIAMETER INCHES	NEW FROM	NEW TO	INVERT ELEVATION UPSTREAM	INVERT ELEVATION DOWNSTREAM	SLOPE FT/FT	LENGTHS FT. 18" DIAM.	LENGTHS FT. 24" DIAM.	LENGTHS FT. EXISTING
			1	2	85.25	83.26	0.0178	112		
			2	4	83.01	66.23	0.1271	132		
			3	4	68.80	66.23	0.1606	16		
			4	5	65.90	64.25	0.0098		168	
			5	6	64.21	63.14	0.0096		112	
6	9	18			62.89	59.97	0.0664			44
			7	9	67.55	60.22	0.1656	44		
			8	9	67.35	60.22	0.1783	40		
9	22	34			59.97	41.76	0.0427			426
			10a	10	78.00	75.00	0.0682	44		
11	12	24	12a	12	75.60	69.80	0.0367			158
12	13	24			76.76	70.76	0.0500	120		
13	16	24			69.80	66.40	0.0630			54
					66.40	59.70	0.0493			136
			14	16	60.00	59.70	0.0024	126		
			15	15a	61.50	61.25	0.0417	6		
			15a	16	61.00	60.45	0.0120	46		
16	20	24			59.70	43.50	0.0623			260
			17	(16-20)	59.75	55.00	0.1033	46		
			18	19	56.90	49.75	0.0638	112		
			19	20	49.50	43.75	0.0669	86		
20	22	27			43.50	41.76	0.0256			68
			21	22	48.00	42.00	0.0476	126		
22	23	34			41.76	32.68	0.0668			136
23	24	34			32.51	26.63	0.0684			86
24	32	34			26.29	16.30	0.0684			146
			25	26	54.55	40.25	0.0831	172		
			26	31	40.00	29.75	0.0507	202		
			27	28	38.00	37.75	0.0096	26		
			28	29	37.50	37.25	0.0096	26		
			29	30	37.00	36.75	0.0032	78		
			30	31	36.50	29.75	0.0344		196	
			31	32	29.50	19.74	0.0274		356	
32	33	34			16.09	10.10	0.0584			88
33	40	36			09.86	01.39	0.0350			242
			34	34a	42.50	41.75	0.0115	65		
			35	36	44.00	38.25	0.1065	54		
			36	37	38.00	35.25	0.0174	158		
			37	39	35.00	31.00	0.0185		216	
			38	39	40.75	30.75	0.1136	88		
			39	40	30.75	04.50	0.1410	184		
40	45	36			01.25	97.82	0.0350			98
			41	44	07.25	03.50	0.0134	280		
			42	43	33.25	32.50	0.0082	92		
			43b	43a	38.00	35.50	0.0219	114		
			43a	43	35.25	32.50	0.0306	90		
			43	44	32.25	03.50	0.3993	72		
			44	45	03.25	01.22	0.0363		56	
			39c	39b	37.26	36.81	0.0030	150		
			39b	39a	36.81	36.36	0.0030	150		
			39a	39	36.36	35.00	0.0136	100		
			9a	9	68.00	60.22	0.0295	260		
			14a	14	68.00	60.25	0.0578	134		
			30b	30a	37.00	36.75	0.0028	90		
			30a	30	36.75	36.50	0.0015	175		
			34a	36	41.50	38.25	0.0148	220		
TOTALS								4,036	1,104	

FEDERAL ROAD DIVISION NO.	DISTRICT	PROJ. NO.	SHEET NO.	TOTAL SHEETS
9	COLORADO	U 005-3 (15)	6 A	

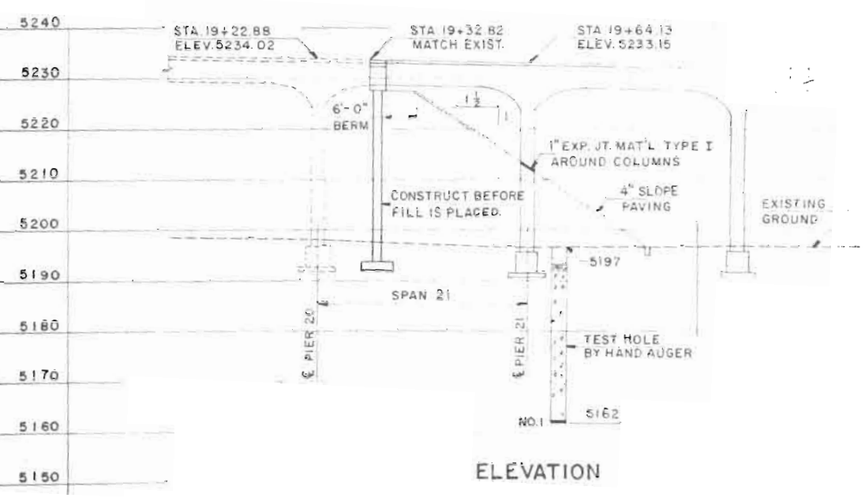
DETOUR LAYOUT



FEDERAL ROAD REGION NO.	DIVISION	PROJ. NO.	SHEET NO.	TOTAL SHEETS
9	COLORADO	S-0005-3(15)	7	



PLAN



ELEVATION

LEGEND

GENERAL NOTES

1. ALL WORK SHALL BE DONE ACCORDING TO THE STANDARD SPECIFICATIONS OF THE COLORADO DEPARTMENT OF HIGHWAYS, ADOPTED JANUARY 1, 1958.
2. DESIGN, MATERIALS AND WORKMANSHIP SHALL BE DONE ACCORDING TO THE A.A.S.H.O. SPECIFICATIONS FOR 1957 AND ANY SUBSEQUENT REVISIONS THEREOF.
3. SOUNDINGS AND DEPTH OF FOOTINGS SHOWN ARE IN ACCORDANCE WITH THE BEST AVAILABLE DATA. IF ESSENTIALLY DIFFERENT CONDITIONS ARE ENCOUNTERED, THE BRIDGE ENGINEER WILL INSPECT THE CONDITION AND DETERMINE IF REDESIGN IS NECESSARY.
4. WHEN EXCAVATING FOR FOOTINGS THE FINAL ONE FOOT IN DEPTH SHALL BE DONE BY HAND LABOR.
5. ALL CONCRETE SHALL BE CLASS "A" AND AIR ENTRAINED AS SPECIFIED.
6. CHAMFER ALL CORNERS 3/4" EXCEPT AS NOTED.
7. ALL REINFORCING BARS SHALL BE TAGGED WITH THE STRUCTURE NUMBER AND MARK.
8. ALL REINFORCING BARS SHALL BE INTERMEDIATE GRADE DEFORMED BARS, CONFORMING TO A.A.S.H.O. SPECIFICATIONS M31 AND M137 (A.S.T.M. DESIGNATIONS A15 AND A305).
9. ALL DIMENSIONS ON REINFORCING BAR DETAILS ARE OUT TO OUT.
10. ALL HOOKS AND BENDS IN BARS SHALL CONFORM TO A.C.I. STANDARD 315A-55.
11. MAIN BARS WILL NOT BE SPLICED EXCEPT WHERE SHOWN ON PLANS. SECONDARY BARS WHEN SPLICED SHALL LAP 17 DIA. OF THE BAR.
12. ALL SURFACES MARKED WITH THE SYMBOL "F" AS SHOWN ON SHEET NO. 15 SHALL RECEIVE CLASS I SURFACE FINISH.
13. FOR DETAILS OF STRUCT. EXCAV. & BACKFILL SEE STD. M-60-8.

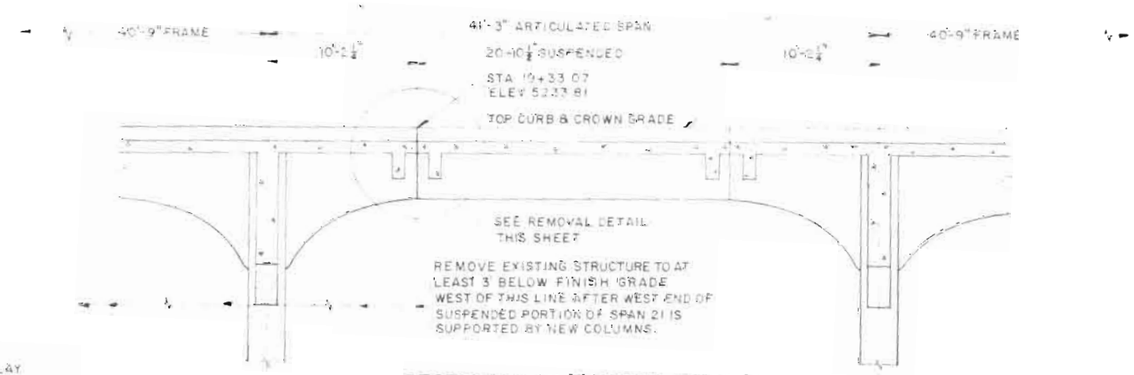
DESIGN SPECIFICATIONS

1. 1957 A.A.S.H.O. SPECIFICATIONS AND SUBSEQUENT REVISIONS.
2. LIVE LOAD: H20-S16-44
3. f'c = 1,200 P.S.I. n = 10
4. fs = 20,000 P.S.I.
5. WEIGHT OF EARTH = 120 LBS. PER CU. FT.
6. EQUIVALENT FLUID PRESSURE = 30 LB. PER CU. FT.

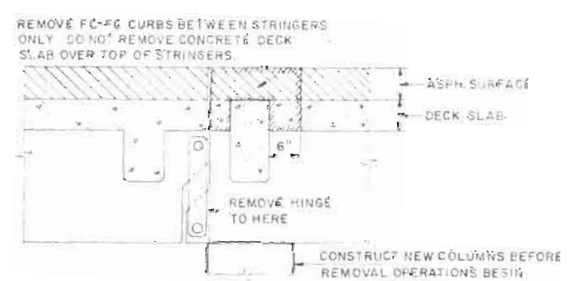
SUMMARY OF QUANTITIES

ITEM	DESCRIPTION	UNIT	AMOUNT
11	REMOVAL OF PORTION OF PRESENT STRUCTURE		L.S.
14	UNCLASSIFIED STRUC. EXCAVATION - BRIDGE	CU. YD.	86
18			
18			
46	CLASS "A" CONCRETE	CU. YD.	80.7
47	REINFORCING STEEL (4.4% OVERRUN)	LB.	7750
65	CONCRETE SLOPE & DITCH PAVING WITH WIRE MESH	CU. YD.	15.1
*	1" EXPANSION JOINT MATERIAL TYPE 1 (AASHO M-213-54)	SQ. FT.	22
16	STRUCTURE BACKFILL - CLASS 1	CU. YD.	52

* COST TO BE INCLUDED IN ITEM 46 (CLASS "A" CONCRETE.)



SECTIONAL ELEVATION SPAN 21
EXISTING COLFAX AVE. VIADUCT



REMOVAL DETAIL

Approved 4-4-58

COLORADO DEPARTMENT OF HIGHWAYS

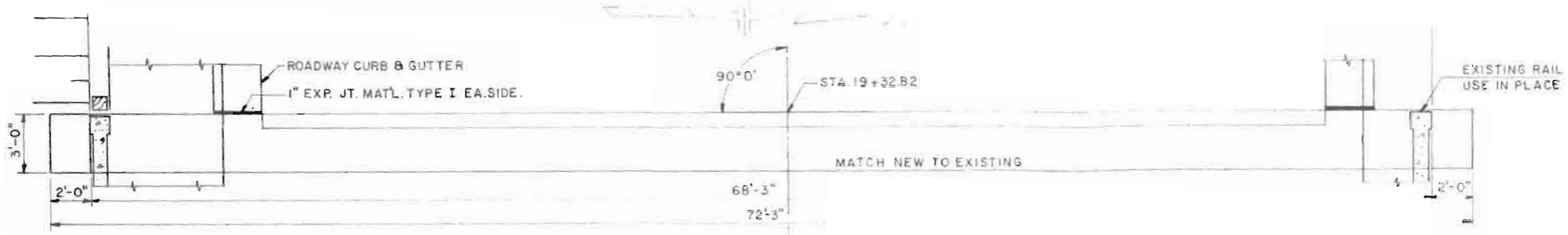
COLFAX AVENUE VIADUCT

GENERAL PLAN & ELEVATION

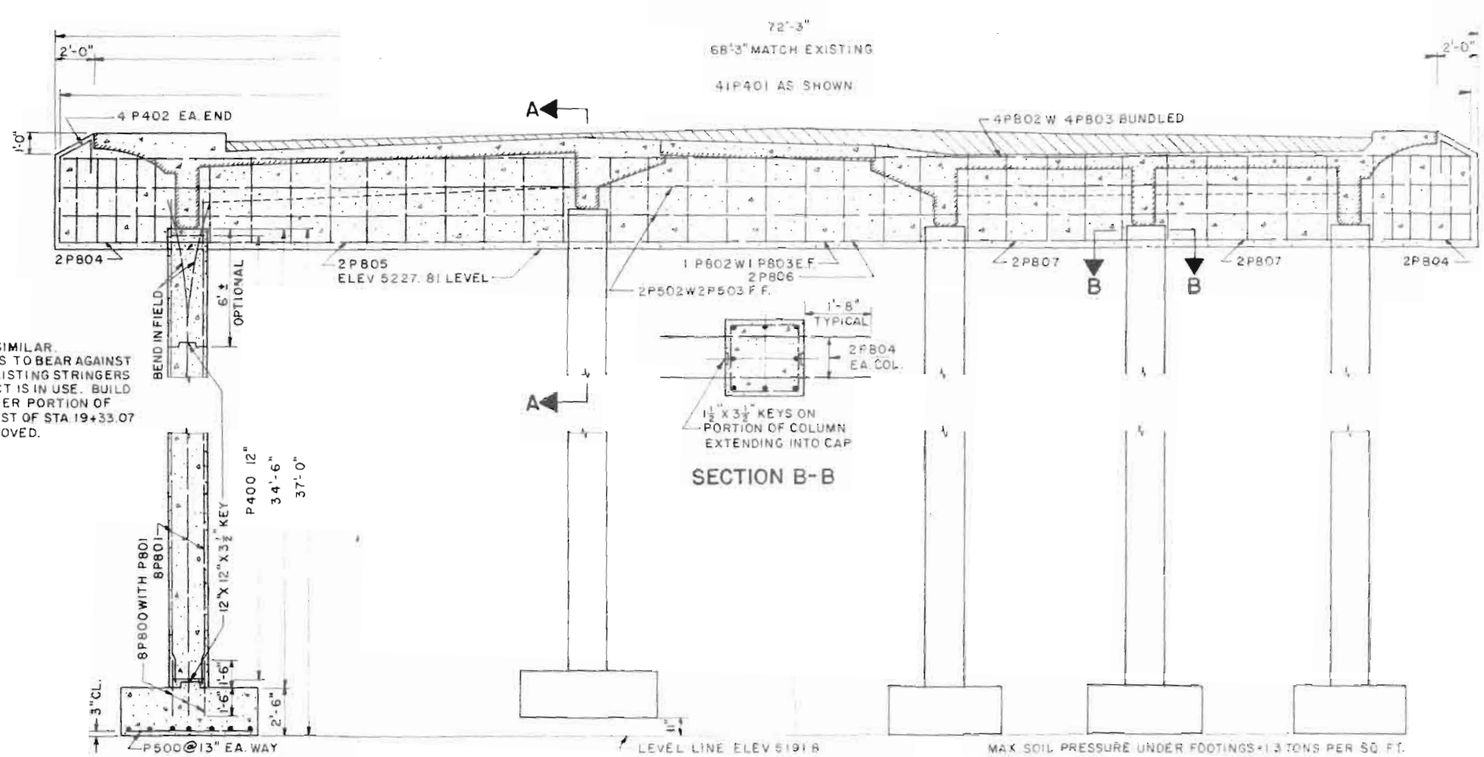
STA. 19+32.82
STRUCTURE NO. S-18-DO

KEN R. WAHLE
CONSULTING ENGINEER
DENVER, COLORADO

FEDERAL ROAD REGION NO.	DIVISION	PROJ. NO	SHEET NO.	TOTAL SHEETS
9	COLORADO	U-005-3(15)	8	



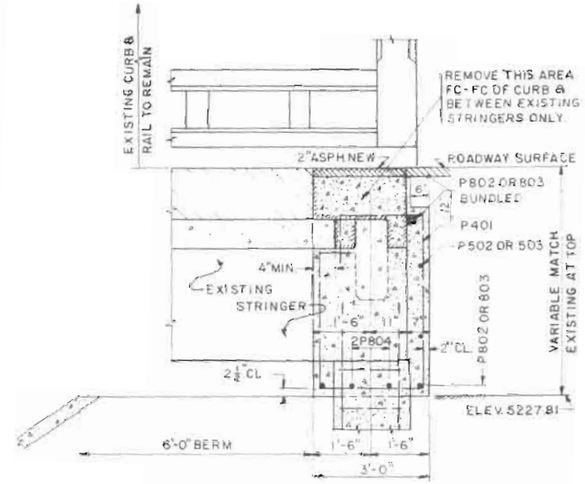
PLAN



LL COLUMNS SIMILAR.
UILD COLUMNS TO BEAR AGAINST
OTTOM OF EXISTING STRINGERS
HILE VIADUCT IS IN USE. BUILD
AP BEAM AFTER PORTION OF
TRUCTURE WEST OF STA 19+33.07
AS BEEN REMOVED.

SECTION B-B

ELEVATION



CONTRACTOR MAY CONSTRUCT CAP BEAM AFTER FILL HAS BEEN COMPLETED TO ELEV. 5227.8

SECTION A-A

BAR LIST

MARK	SHAPE	LENGTH	NO. REQ'D.
P400		7'-9"	175
P401		14'-8"	41
P402		3'-10"	8
P500		6'-6"	28
P501		5'-3"	36
P502		3'-0"	2
P503		60'-0"	2
P800		3'-0"	40
P801		35'-9"	40
P802		14'-0"	6
P803		60'-0"	6
P804		5'-4"	14
P805		18'-0"	2
P806		16'-0"	2
P807		8'-0"	4

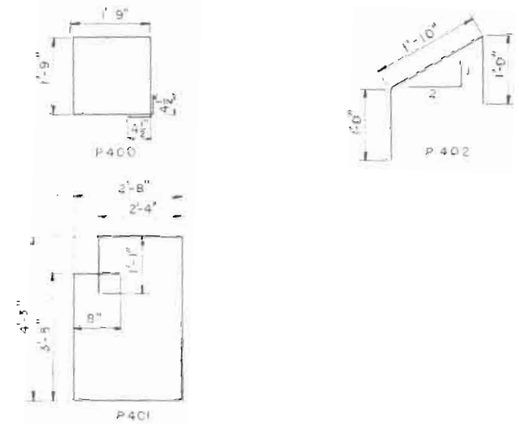
BAR SUMMARY

1995 LIN. FT. #4	0.668 #/FT =	1333 LB.
517 LIN. FT. #5	1.043 #/FT =	540 LB.
2169 LIN. FT. #8	2.670 #/FT =	5799 LB.
	4.1% ± OVERRUN =	78 LB.
	TOTAL =	7750 LB.

SUMMARY OF QUANTITIES

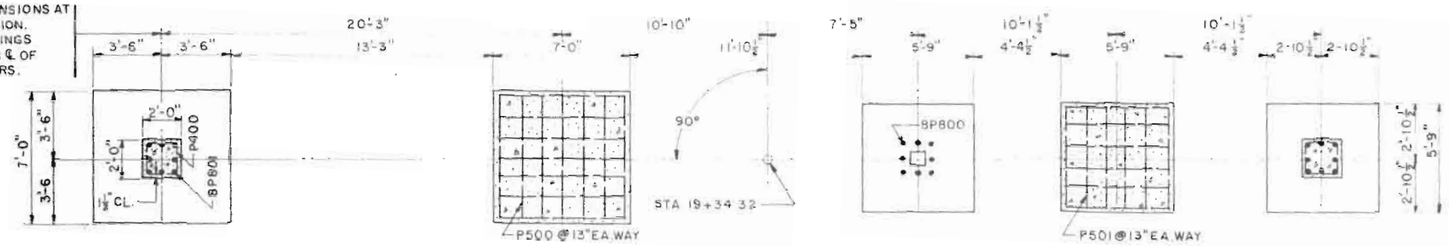
ITEM	DESCRIPTION	AMOUNT
14	UNCL. STRUC. EXCAV.-BRIDGES	730 C.Y.
16	STRUCT. BACKFILL (CLASS 1)	52 C.Y.
46	CLASS "A" CONCRETE	80.7 C.Y.
47	REINFORCING STEEL (+1% ± OVERRUN)	7750 LB.
*	1" EXP. JT. MAT'L. TYPE 1	22 SQ. FT.

* COST TO BE INCLUDED IN ITEM 46 (CLASS "A" CONCRETE).



BAR BENDING DETAILS

ERIFY THESE DIMENSIONS AT
IME OF CONSTRUCTION.
COLUMNS & FOOTINGS
UST COINCIDE WITH ℄ OF
XISTING STRINGERS.



FOOTING PLAN

COLORADO DEPARTMENT OF HIGHWAYS

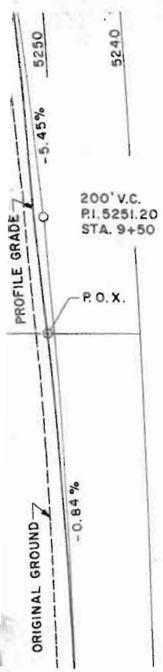
COLFAX AVENUE VIADUCT

ABUTMENT

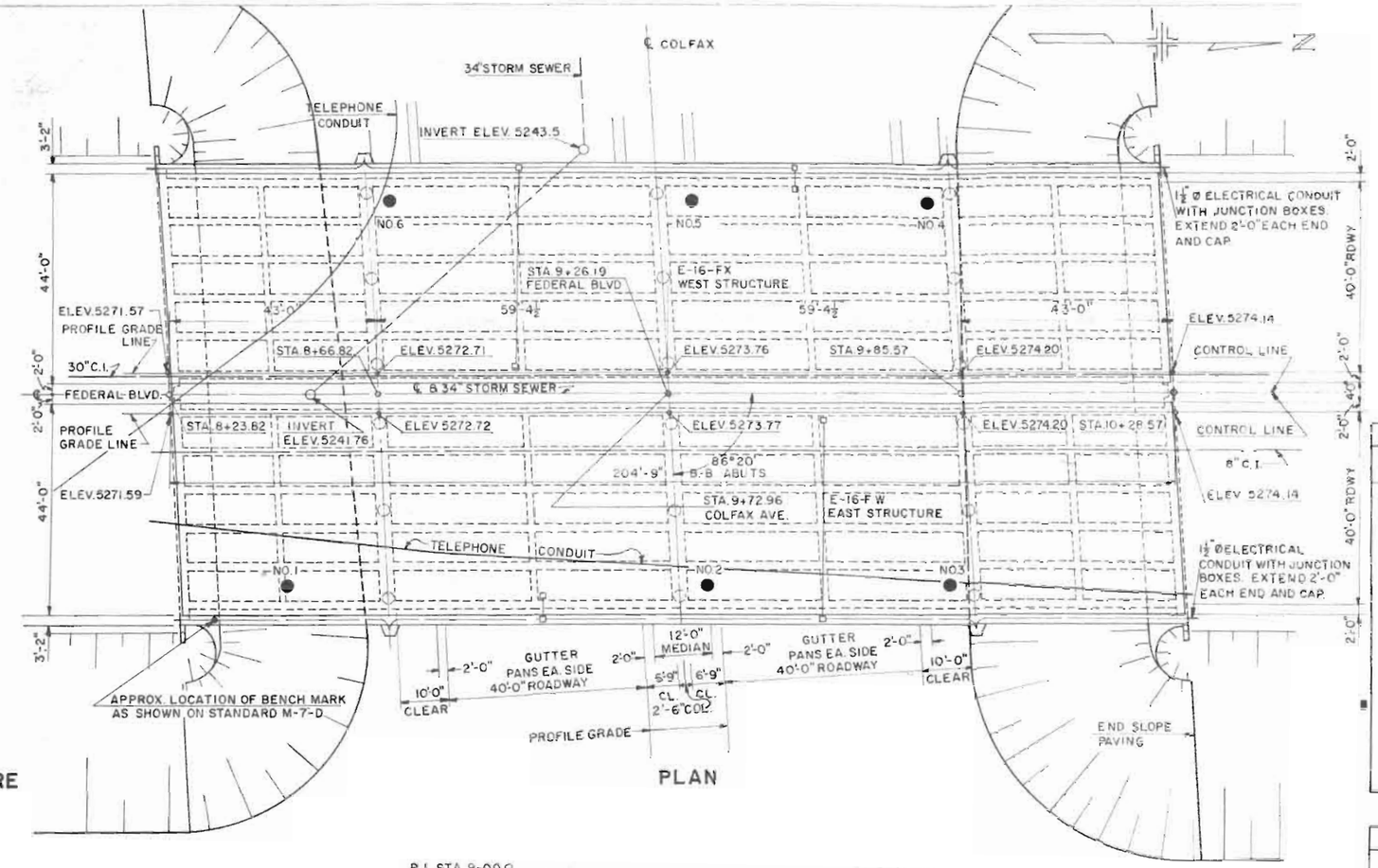
STA. 19+32.82
STRUCTURE NO. F-16-00

KEN R. WHITE
CONSULTING ENGINEER
DENVER, COLORADO

FEDERAL ROAD REGION NO.	DIVISION	PROJ. NO.	SHEET NO.	TOTAL SHEETS
8	COLORADO	U 005-3(15)	8	



PROFILE OF COLFAX AVE. UNDER STRUCTURE



PLAN

DESIGN SPECIFICATIONS

1. 1957 A.A.S.H.O. SPECIFICATIONS AND SUBSEQUENT REVISIONS.
2. LIVE LOAD: H20-S16-44.
3. fc: 1,200 P.S.I. n=10
4. fs: 20,000 P.S.I.
5. WEIGHT OF EARTH = 120 LBS. PER CU. FT.
6. EQUIVALENT FLUID PRESSURE = 30 LBS. PER CU. FT.
7. MAX. LOAD PER 10" BP42 STEEL PILE = 37 TONS.

SUMMARY OF QUANTITIES (STRUCTURE NO. E-16-FX)

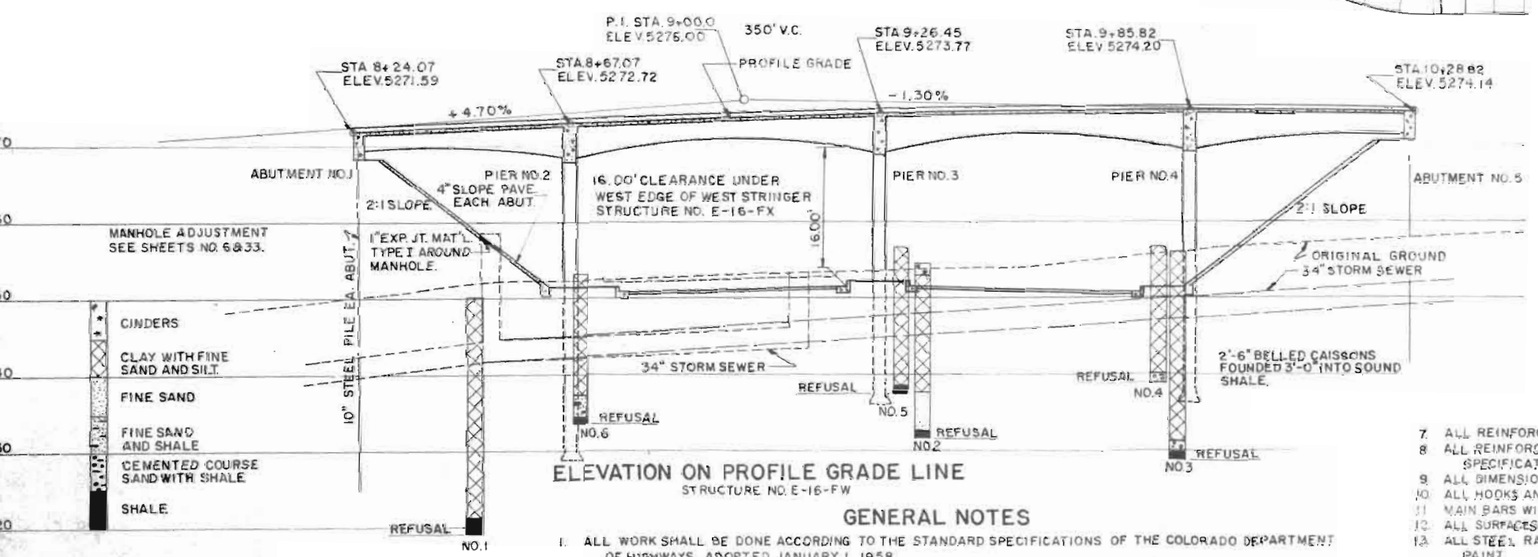
ITEM	DESCRIPTION	UNIT	SUPER STRUC.	ABUT. NO.1	PIER NO.2	PIER NO.3	PIER NO.4	ABUT. NO.5	TOTAL
30	ASPHALTIC ROAD MATERIAL RC (PRIME)	GAL.							150
34	ASPHALTIC CONCRETE PAVEMENT (TYPE A)	TON							113
46	CLASS "A" CONCRETE	CU.YD.	516.2		7.9	8.2	8.7		541.0
47	REINFORCING STEEL (+1% ± OVERRUN)	LB.	146,355		3260	2250	3415		155,280
48	STRUCTURAL STEEL (+½% ± PAINT)	LB.	8875						8875
61	STEEL PILING (BP 10" AT 42#)	LIN. FT.		256				215	471
65	CONCRETE SLOPE & DITCH PAVING WITH WIRE MESH	CU.YD.		52.0				64.0	116.0
*	SHEET COPPER (32 OZ.)	LB.	0.7						0.7
90	1½ Ø ELECTRICAL CONDUIT WITH JUNCTION BOXES	LIN. FT.	255						255
■ 160	DRILLED CAISSONS (2'-6" DIAMETER)	LIN. FT.			62.5	49.0	45.5		157.0
*	1" EXPANSION JOINT MATERIAL, TYPE I } AASHO M-153-54	SQ. FT.	6.5						6.5
*	¾" EXPANSION JOINT MATERIAL, TYPE III } AASHO M-153-54	SQ. FT.	7.2						7.2
*	½ FIBRE BOARD	SQ. FT.			7.6	7.6	7.6		22.8

■ INCLUDES 5585 LBS. OF REINFORCING STEEL & 34.0 CU. YDS. OF CLASS "A" CONCRETE IN CAISSONS.
* COST TO BE INCLUDED IN ITEM 46 (CLASS "A" CONCRETE).

SUMMARY OF QUANTIES (STRUCTURE NO. E-16-FW)

ITEM	DESCRIPTION	UNIT	SUPER STRUC.	ABUT NO.1	PIER NO.2	PIER NO.3	PIER NO.4	ABUT. NO.5	TOTAL
30	ASPHALTIC ROAD MATERIAL RC (PRIME)	GAL.							150
34	ASPHALTIC CONCRETE PAVEMENT (TYPE A)	TON							113
46	CLASS "A" CONCRETE	CU. YD.	516.2		9.0	9.3	9.8		544.3
47	REINFORCING STEEL (+1% ± OVERRUN)	LB.	146,355		3455	2430	3615		155,855
48	STRUCTURAL STEEL (+½% ± PAINT)	LB.	8875						8875
61	STEEL PILING (BP 10" AT 42#)	LIN. FT.		297				270	567
65	CONCRETE SLOPE & DITCH PAVING WITH WIRE MESH	CU. YD.		57.0				68.0	125.0
*	SHEET COPPER (32 OZ.)	LB.	0.7						0.7
90	1½ Ø ELECTRICAL CONDUIT WITH JUNCTION BOXES	LIN. FT.	255						255
■ 160	DRILLED CAISSONS (2'-6" DIAMETER)	LIN. FT.			75.0	54.0	58.5		187.5
*	1" EXPANSION JOINT MATERIAL, TYPE I } AASHO M-153-54	SQ. FT.	6.5						6.5
*	¾" EXPANSION JOINT MATERIAL, TYPE III } AASHO M-153-54	SQ. FT.	7.2						7.2
*	½ FIBRE BOARD	SQ. FT.			7.6	7.6	7.6		22.8

■ INCLUDES 6585 LBS. OF REINFORCING STEEL & 39.6 CU. YDS OF CLASS "A" CONCRETE IN CAISSONS.
* COST TO BE INCLUDED IN ITEM 46 (CLASS "A" CONCRETE)



ELEVATION ON PROFILE GRADE LINE
STRUCTURE NO. E-16-FW

LEGEND

GENERAL NOTES

1. ALL WORK SHALL BE DONE ACCORDING TO THE STANDARD SPECIFICATIONS OF THE COLORADO DEPARTMENT OF HIGHWAYS, ADOPTED JANUARY 1, 1958.
2. DESIGN, MATERIALS AND WORKMANSHIP SHALL BE DONE ACCORDING TO THE A.A.S.H.O. SPECIFICATIONS FOR 1953 AND ANY SUBSEQUENT REVISIONS THEREOF.
3. SOUNDINGS AND DEPTH OF FOOTINGS SHOWN ARE IN ACCORDANCE WITH THE BEST AVAILABLE DATA. IF ESSENTIALLY DIFFERENT CONDITIONS ARE ENCOUNTERED, THE BRIDGE ENGINEER WILL INSPECT THE CONDITION AND DETERMINE IF REDESIGN IS NECESSARY.
4. WHEN EXCAVATING FOR FOOTINGS THE FINAL ONE FOOT IN DEPTH SHALL BE DONE BY HAND LABOR.
5. ALL CONCRETE SHALL BE CLASS "A" AND AIR ENTRAINED AS SPECIFIED
6. CHAMFER ALL CORNERS ¾" EXCEPT AS NOTED.
7. ALL REINFORCING BARS SHALL BE TAGGED WITH THE STRUCTURE NUMBER AND MARK.
8. ALL REINFORCING BARS SHALL BE INTERMEDIATE GRADE DEFORMED BARS, CONFORMING TO A.A.S.H.O. SPECIFICATIONS M 31 AND M 137 (A.S.T.M. DESIGNATIONS A 15 AND A 305).
9. ALL DIMENSIONS ON REINFORCING BAR DETAILS ARE OUT TO OUT.
10. ALL HOOKS AND BENDS IN BARS SHALL CONFORM TO A.C.I. STANDARD 315A-53.
11. MAIN BARS WILL NOT BE SPLICED EXCEPT WHERE SHOWN ON PLANS. (SECONDARY BARS WHEN SPLICED SHALL LAP 17 DIAMETERS OF THE BAR.)
12. ALL SURFACES MARKED WITH THE SYMBOL "*" AS SHOWN ON SHEET NO. 15 SHALL RECEIVE CLASS I SURFACE FINISH.
13. ALL STEEL RAILING SHALL RECEIVE ONE SHOP COAT OF ZINC CHROMATE AND TWO FIELD COATS OF ALUMINUM PAINT.

SPECIAL NOTES

ALL FALSEWORK SHALL BE LEFT IN PLACE FULL LENGTH UNTIL ALL GIRDER POURS HAVE REACHED A MIN STRENGTH OF 2500 PSI.

EXISTING GAS MAIN AND 30" C.I. WATER MAIN ARE TO BE RELOCATED AWAY FROM BRIDGE SITE BY OTHERS.

FOR DETAILS OF STRUCT. EXCAV. & BACKFILL SEE STD. M-60-B.

Revised 1-4-59 [illegible]

COLORADO DEPARTMENT OF HIGHWAYS

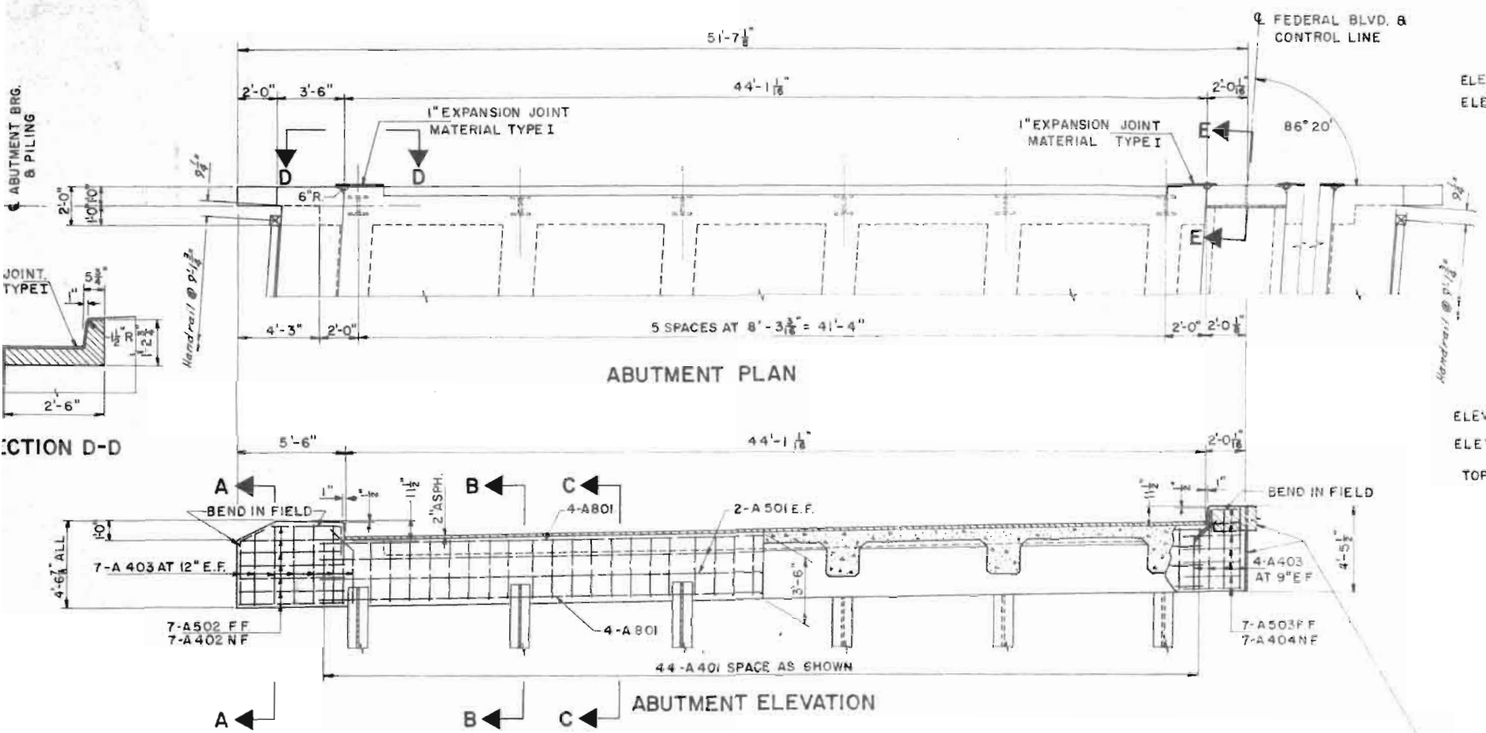
FEDERAL & COLFAX INTERCHANGE

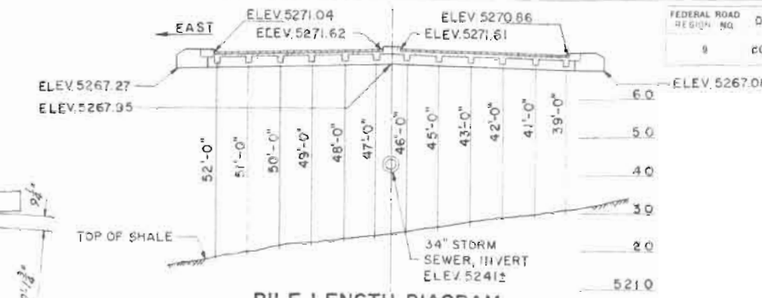
GENERAL PLAN & ELEVATION

STA. 9+26.19
STRUCTURE NOS. E-16-FW & E-16-FX

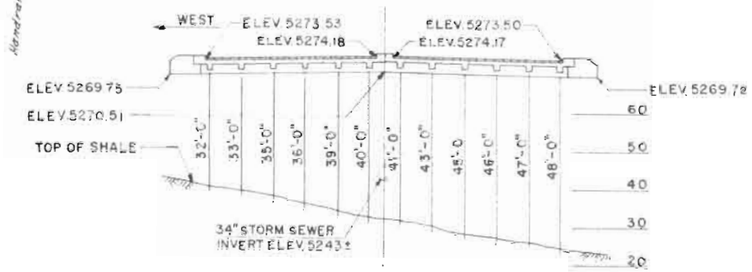
KEN R. WHITE
CONSULTING ENGINEER
DENVER, COLORADO

FEDERAL ROAD REGION NO.	DIVISION	PROJ. NO.	SHEET NO.	TOTAL SHEETS
9	COLORADO	U 005-3(15)	10	





PILE LENGTH DIAGRAM
ABUTMENT NO.1



PILE LENGTH DIAGRAM
ABUTMENT NO.5

BAR LIST

MARK	SHAPE	LENGTH	NO. REQ'D. ABUT. 1-E	ABUT. 5-E	ABUT. 1-W.	ABUT. 5-W
A 401		11'-0"	44	44	44	44
A 402		5'-3"	7	7	7	7
A 403		4'-3"	22	22	22	22
A 404		3'-0"	7	7	7	7
A 501		45'-0"	4	4	4	4
A 502		5'-3"	7	7	7	7
A 503		3'-0"	7	7	7	7
A 801		45'-0"	8	8	8	8

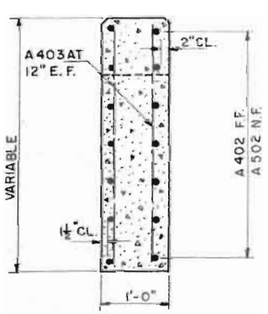
BAR SUMMARY

	ABUT. 1-E.	ABUT. 5-E	ABUT. 1-W.	ABUT. 5-W.
643 LIN. FT. #4 AT 0.668#/FT	430 LB.	430 LB.	430 LB.	430 LB.
238 LIN. FT. #5 AT 1.043#/FT.	248 LB.	248 LB.	248 LB.	248 LB.
360 LIN. FT. #8 AT 2.670#/FT.	960 LB.	960 LB.	960 LB.	960 LB.
+1%± OVERRUN	17 LB.	17 LB.	17 LB.	17 LB.
TOTAL	1655 LB.	1655 LB.	1655 LB.	1655 LB.

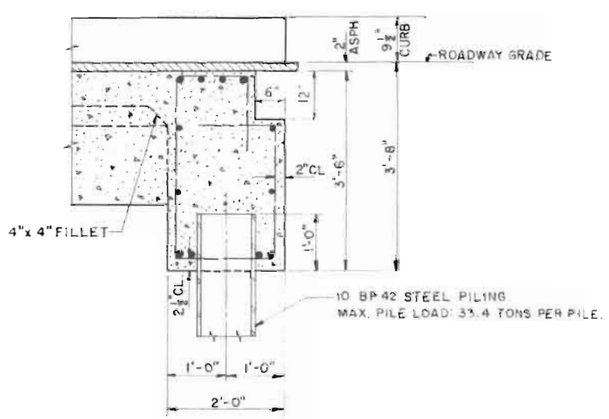
SUMMARY OF QUANTITIES*

ITEM	DESCRIPTION	UNIT	AMOUNT ABUT. 1-E.	ABUT. 5-E.	ABUT. 1-W.	ABUT. 5-W.
61	STEEL PILING 10BP42	LIN.FT.	297	270	256	215

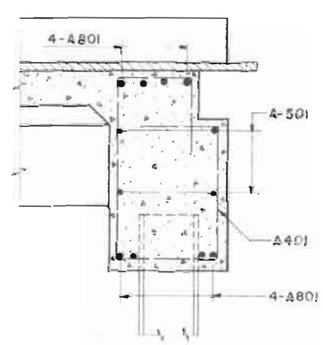
* ALL ITEMS OTHER THAN PILING INCLUDED IN DECK QUANTITIES SHT. NO. 13



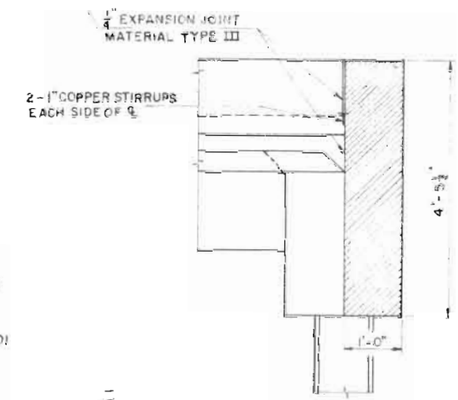
SECTION A-A



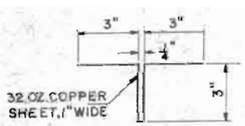
SECTION B-B



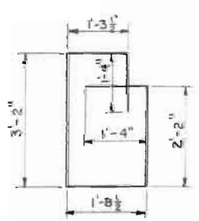
SECTION C-C



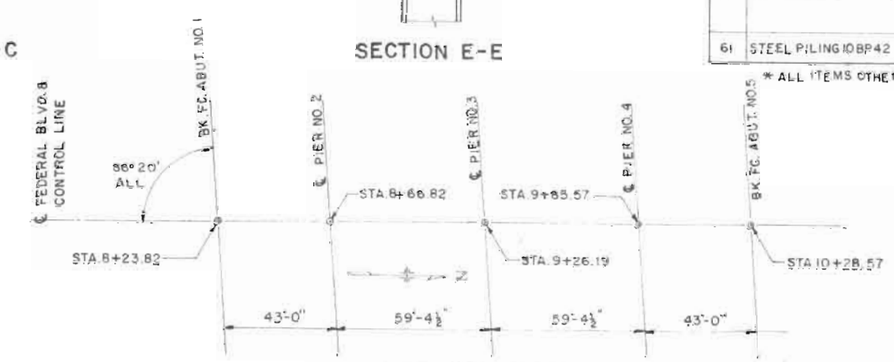
SECTION E-E



COPPER STIRRUP DETAIL



BAR BENDING DETAILS



SUBSTRUCTURE LAYOUT

COLORADO DEPARTMENT OF HIGHWAYS

FEDERAL & COLFAX INTERCHANGE

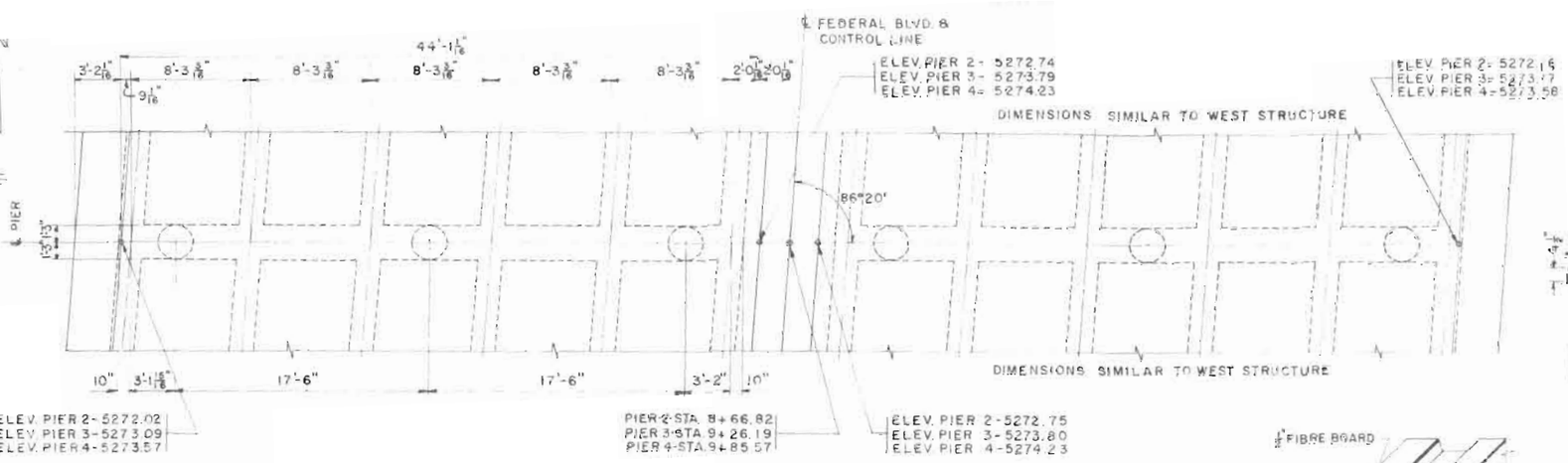
ABUTMENTS NO. 1-E, 1-W, 5-E & 5-W

STA. 9+26.19
STRUCT. NOS. E-16-FW & E-16-FX

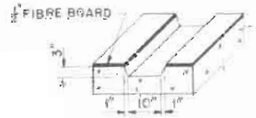
KEN R. WHITE
CONSULTING ENGINEER
DENVER, COLORADO

Revised Caisson Bar splice : 31 July 1959 J.N.M.

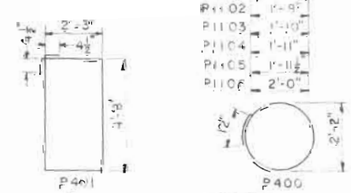
FEDERAL ROAD DIVISION NO	DIVISION	PROJ NO	SHEET NO	TOTAL SHEETS
9	COLORADO	U 005-3(15)	11	



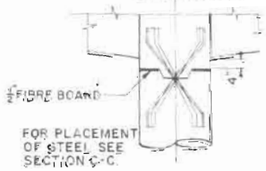
PLAN



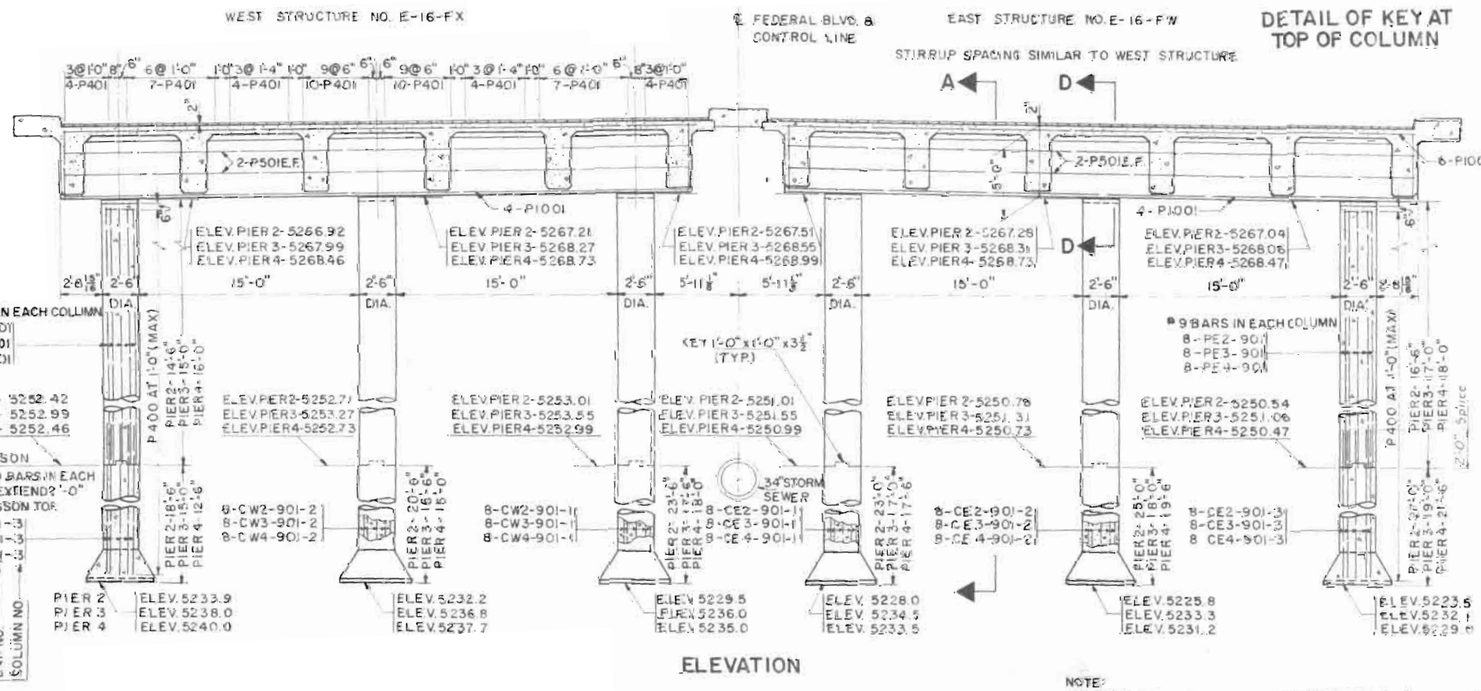
DETAIL OF KEY AT TOP OF COLUMN



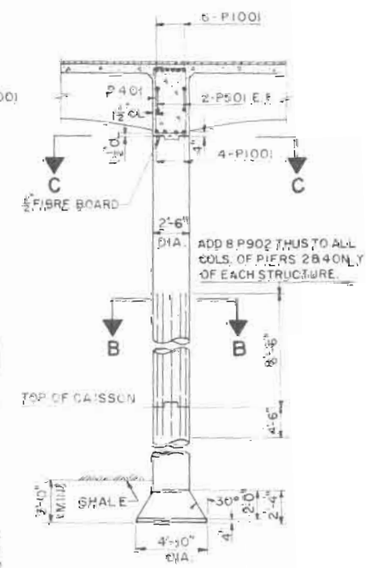
BAR BENDING DETAILS



SECTION D-D

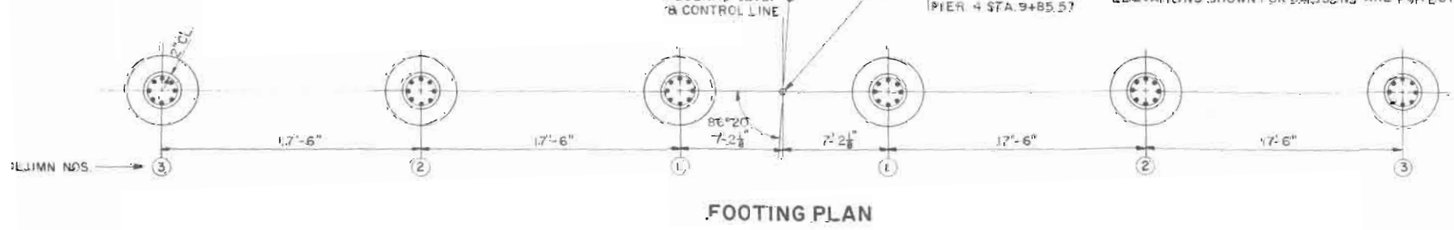


ELEVATION

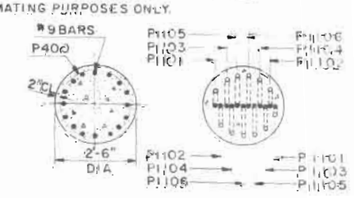


SECTION A-A

NOTE:
CAISSONS SHALL EXTEND FROM A MINIMUM OF 3'-0" INTO SOUND SHALE TO THE SURFACE OF THE GROUND IN ITS FINAL POSITION. ALL CONCRETE AND REINFORCING STEEL IN CAISSONS TO BE INCLUDED IN THE UNIT PRICE PER LINEAR FOOT FOR ITEM 160, DRILLED CAISSONS. ALL ELEVATIONS SHOWN FOR CAISSONS ARE FOR ESTIMATING PURPOSES ONLY.



FOOTING PLAN



SECTION B-B SECTION C-C

WEST STRUCTURE

PIER 2 WEST

BAR LIST

MARK	SHAPE	LENGTH	NO REQ'D
P400	○	7'-10"	45
PW2-901	——	14'-3"	24
P902	——	13'-0"	24
P1101 THRU P1106	⌇	3'-10" THRU 4'-3" X 1"	6 EA

BAR SUMMARY

352 L.F. OF #4 @ 0.668#/FT = 235 LB.
654 L.F. OF #9 @ 3.400#/FT = 2221 LB.
145 L.F. OF #11 @ 5.313#/FT = 771 LB.
+1% ± OVERRUN = 33 LB.
TOTAL = 3260 LB.

SUMMARY OF QUANTITIES

ITEM	DESCRIPTION	AMOUNT
46	CLASS "A" CONCRETE	7.8 C.Y.
47	REINFORCING STEEL	3260 LB.
■ 160	DRILLED CAISSONS	62.5 L.F.
*	1/2" FIBRE BOARD	7.6 SQ.FT.

■ INCLUDES 2190 LBS. OF REINFORCING STEEL & 13.2 CU. YDS. OF CLASS "A" CONCRETE IN CAISSONS.
* COST TO BE INCLUDED IN ITEM 46 (CLASS "A" CONC.)

PIER 3 WEST

BAR LIST

MARK	SHAPE	LENGTH	NO. REQ'D
P400	○	7'-10"	48
PW3-901	——	14'-9"	24
P1101 THRU P1106	⌇	3'-10" THRU 4'-3" X 1"	6 EA.

BAR SUMMARY

376 L.F. OF #4 @ 0.668#/FT = 255 LB.
354 L.F. OF #9 @ 3.400#/FT = 1204 LB.
145 L.F. OF #11 @ 5.313#/FT = 771 LB.
+1% ± OVERRUN = 20 LB.
TOTAL = 2250 LB.

SUMMARY OF QUANTITIES

ITEM	DESCRIPTION	AMOUNT
46	CLASS "A" CONCRETE	8.2 CU.YD.
47	REINFORCING STEEL	2250 LB.
■ 160	DRILLED CAISSONS	49.0 L.F.
*	1/2" FIBRE BOARD	7.6 SQ.FT.

■ INCLUDES 1755 LBS. OF REINFORCING STEEL & 10.7 CU. YDS. OF CLASS "A" CONCRETE IN CAISSONS.
* COST TO BE INCLUDED IN ITEM 46 (CLASS "A" CONC.)

EAST STRUCTURE

PIER 2 EAST

BAR LIST

MARK	SHAPE	LENGTH	NO REQ'D
P400	○	7'-10"	51
PE2-901	——	16'-3"	24
P902	——	13'-0"	24
P1101 THRU P1106	⌇	3'-10" THRU 4'-3" X 1"	6 EA

BAR SUMMARY

399 L.F. #4 @ 0.668#/FT. = 266 LB.
762 L.F. #9 @ 3.400#/FT. = 2384 LB.
145 L.F. #11 @ 5.313#/FT = 771 LB.
+1% ± OVERRUN = 34 LB.
TOTAL = 3455 LB.

SUMMARY OF QUANTITIES

ITEM	DESCRIPTION	AMOUNT
46	CLASS "A" CONCRETE	9.0 C.Y.
47	REINFORCING STEEL	3455 LB.
■ 160	DRILLED CAISSONS	75.0 L.F.
*	1/2" FIBRE BOARD	7.6 SQ.FT.

■ INCLUDES 2595 LBS. OF REINFORCING STEEL & 15.5 CU. YDS. OF CLASS "A" CONCRETE IN CAISSONS.
* COST TO BE INCLUDED IN ITEM 46 (CLASS "A" CONC.)

PIER 3 EAST

BAR LIST

MARK	SHAPE	LENGTH	NO. REQ'D
P400	○	7'-10"	51
PE3-901	——	16'-9"	24
P1101 THRU P1106	⌇	3'-10" THRU 4'-3" X 1"	6 EA

BAR SUMMARY

399 L.F. OF #4 @ 0.668#/FT = 266 LB.
402 L.F. OF #9 @ 3.400#/FT = 1368 LB.
145 L.F. OF #11 @ 5.313#/FT = 771 LB.
+1% ± OVERRUN = 25 LB.
TOTAL = 2430 LB.

SUMMARY OF QUANTITIES

ITEM	DESCRIPTION	AMOUNT
46	CLASS "A" CONCRETE	9.3 CU.YD.
47	REINFORCING STEEL	2430 LB.
■ 160	DRILLED CAISSONS	54.0 L.F.
*	1/2" FIBRE BOARD	7.6 SQ.FT.

■ INCLUDES 1930 LBS. OF REINFORCING STEEL & 11.6 CU. YDS. OF CLASS "A" CONCRETE IN CAISSONS.
* COST TO BE INCLUDED IN ITEM 46 (CLASS "A" CONC.)

PIER 4 WEST

BAR LIST

MARK	SHAPE	LENGTH	NO REQ'D
P400	○	7'-10"	57
PW4-901	——	15'-9"	24
P902	——	13'-0"	24
P1101 THRU P1106	⌇	3'-10" THRU 4'-3" X 1"	6 EA

BAR SUMMARY

389 L.F. OF #4 @ 0.668#/FT = 266 LB.
690 L.F. OF #9 @ 3.400#/FT = 2344 LB.
145 L.F. OF #11 @ 5.313#/FT = 771 LB.
+1% ± OVERRUN = 34 LB.
TOTAL = 3415 LB.

SUMMARY OF QUANTITIES

ITEM	DESCRIPTION	AMOUNT
46	CLASS "A" CONCRETE	8.7 C.Y.
47	REINFORCING STEEL	3415 LB.
■ 160	DRILLED CAISSONS	45.5 L.F.
*	1/2" FIBRE BOARD	7.6 SQ.FT.

■ INCLUDES 1640 LBS. OF REINFORCING STEEL & 10.1 CU. YDS. OF CLASS "A" CONCRETE IN CAISSONS.
* COST TO BE INCLUDED IN ITEM 46 (CLASS "A" CONC.)

PIER 4 EAST

BAR LIST

MARK	SHAPE	LENGTH	NO REQ'D
P400	○	7'-10"	57
PE4-901	——	17'-9"	24
P902	——	13'-0"	24
P1101 THRU P1106	⌇	3'-10" THRU 4'-3" X 1"	6 EA

BAR SUMMARY

447 L.F. OF #4 @ 0.668#/FT = 298 LB.
738 L.F. OF #9 @ 3.400#/FT = 2509 LB.
145 L.F. OF #11 @ 5.313#/FT = 771 LB.
+1% ± OVERRUN = 37 LB.
TOTAL = 3615 LB.

SUMMARY OF QUANTITIES

ITEM	DESCRIPTION	AMOUNT
46	CLASS "A" CONCRETE	9.8 C.Y.
47	REINFORCING STEEL	3615 LB.
■ 160	DRILLED CAISSONS	58.5 L.F.
*	1/2" FIBRE BOARD	7.6 SQ.FT.

■ INCLUDES 2060 LBS. OF REINFORCING STEEL & 12.6 CU. YDS. OF CLASS "A" CONCRETE IN CAISSONS.
* COST TO BE INCLUDED IN ITEM 46 (CLASS "A" CONC.)

1 CAP (ONE STRUCTURE)*

BAR LIST

MARK	SHAPE	LENGTH	NO. REQ'D.
P401	□	14'-7"	56
P501	——	4'-8"	4
P1001	——	42'-8"	10

BAR SUMMARY

729 L.F. OF #4 @ 0.668#/FT = 487 LB.
171 L.F. OF #6 @ 1.043#/FT = 178 LB.
427 L.F. OF #10 @ 4.303#/FT = 1838 LB.
+1% ± OVERRUN = 22 LB.
TOTAL = 2525 LB.

*ILL. EAPS SIMILAR, QUANTITIES INCLUDED IN DECK QUANTITIES ON SHEET NO. 13

COLORADO DEPARTMENT OF HIGHWAYS

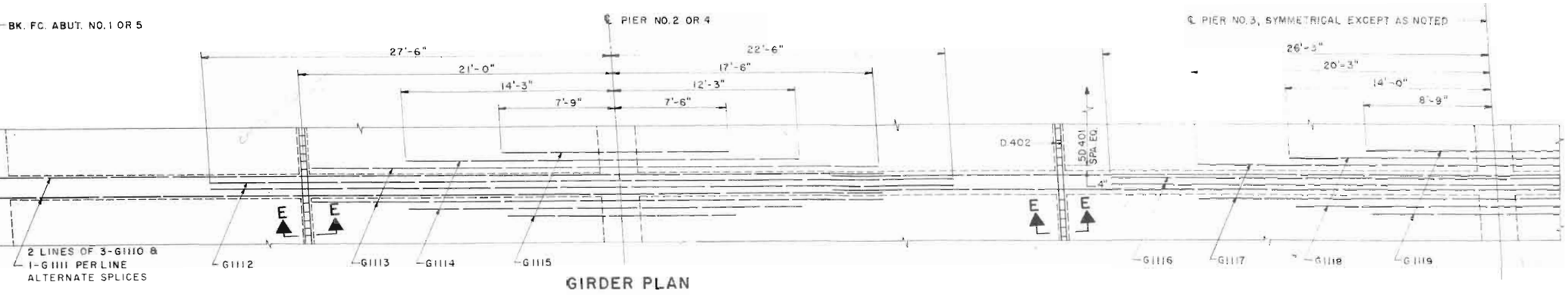
FEDERAL & COLFAX INTERCHANGE

PIER DETAILS

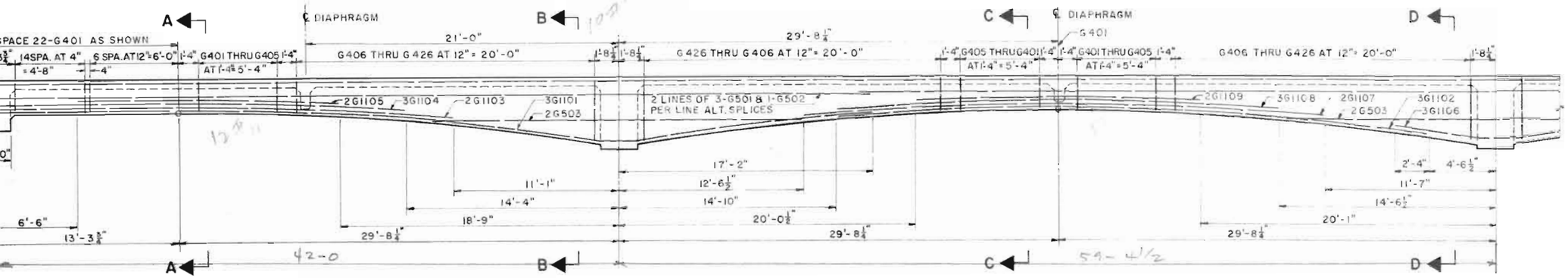
STA. 9+26.19
STRUCTURE NOS. E-16-FW & E-16-FX

KEN R. WHITE
CONSULTING ENGINEER
DENVER, COLORADO

FEDERAL ROAD REGION NO.	DIVISION	PROJ. NO.	SHEET NO.	TOTAL SHEETS
9	COLORADO	U005-3(15)	12	



GIRDER PLAN



SECTIONAL ELEVATION

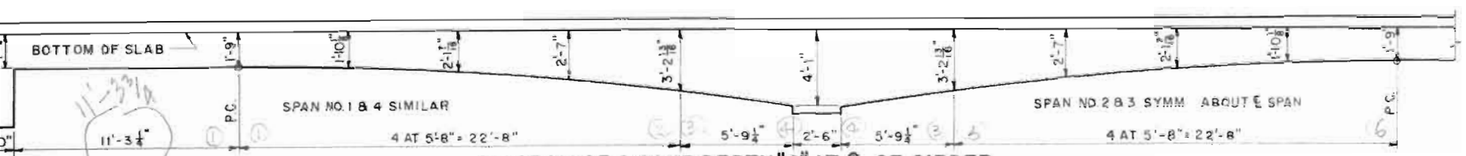
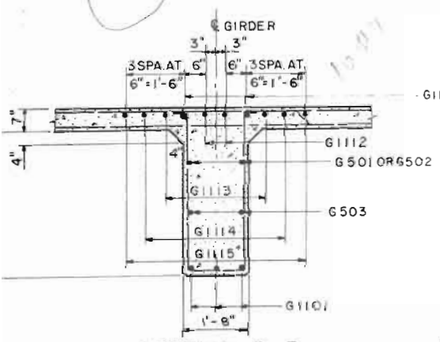
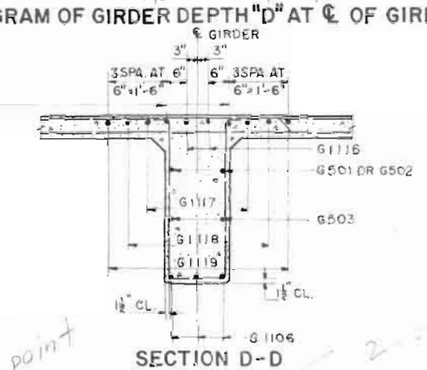


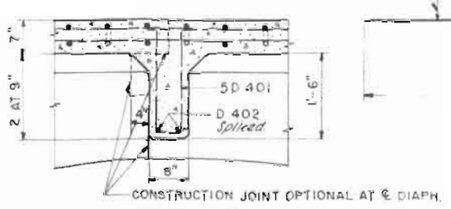
DIAGRAM OF GIRDER DEPTH "D" AT ℄ OF GIRDER



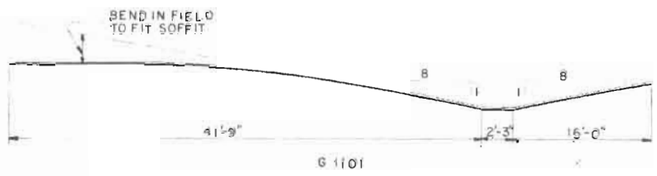
SECTION B-B

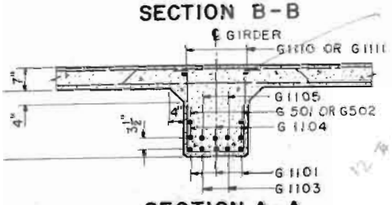


SECTION D-D

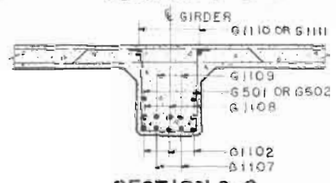


SECTION E-E

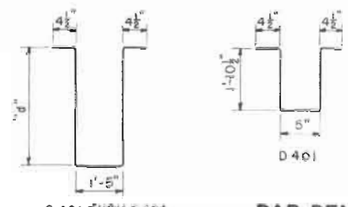




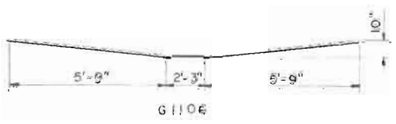
SECTION A-A



SECTION C-C



G 401 THRU G 426



BAR BENDING DETAILS

BAR LIST (ONE STRUCTURE)

MARK	SHAPE	DEPTH "d"	LENGTH	NO. REQ'D.
G 401		2'-1½"	6'-5"	312
G 402		2'-1¾"	6'-5½"	36
G 403		2'-2"	6'-6"	36
G 404		2'-2½"	6'-7"	36
G 405		2'-3"	6'-8"	36
G 406		2'-3¾"	6'-9½"	36
G 407		2'-4¼"	6'-10½"	36
G 408		2'-5"	7'-0"	36
G 409		2'-5¾"	7'-1½"	36
G 410		2'-6½"	7'-3"	36
G 411		2'-7¼"	7'-4½"	36
G 412		2'-8"	7'-6"	36
G 413		2'-9"	7'-8"	36
G 414		2'-10¼"	7'-10½"	36
G 415		2'-11¾"	8'-1"	36
G 416		3'-0½"	8'-3"	36
G 417		3'-2"	8'-6"	36
G 418		3'-3¼"	8'-8½"	36
G 419		3'-4¾"	8'-11½"	36
G 420		3'-6"	9'-2"	36
G 421		3'-7¾"	9'-5½"	36
G 422		3'-9½"	9'-9"	36
G 423		3'-11"	10'-0"	36
G 424		4'-0¾"	10'-3½"	36
G 425		4'-2½"	10'-7"	36
G 426		4'-4½"	10'-11"	36
D 401		1'-10½"	4'-11"	100
D 402			21'-10"	16
G 501			60'-0"	36
G 502			27'-5"	12
G 503			28'-6"	36
G1101			60'-0"	36
G1102			40'-0"	36
G1103			31'-9"	24
G1104			28'-6"	36
G1105			17'-9"	24
G1106			13'-9"	18
G1107			35'-3"	24
G1108			30'-0"	36
G1109			19'-3"	24
G1110			80'-0"	36
G1111			34'-0"	12
G1112			50'-0"	24
G1113			38'-6"	24
G1114			26'-8"	24
G1115			15'-3"	24
G1116			52'-6"	12
G1117			40'-6"	12
G1118			28'-0"	12
G1119			17'-6"	12

BAR SUMMARY (ONE STRUCTURE)

10,194 LIN. FT. #4 AT 0.668 #/FT. = 6810 LB.
3515 LIN. FT. #5 AT 1.043 #/FT. = 3666 LB.
15,806 LIN. FT. #11 AT 5.313 #/FT. = 83977 LB.
+1% ± OVERRUN = 942 LB.
TOTAL = 95,395 LB.

NOTE: QUANTITIES INCLUDED IN DECK QUANTITIES SHT. NO. 13

COLORADO DEPARTMENT OF HIGHWAYS

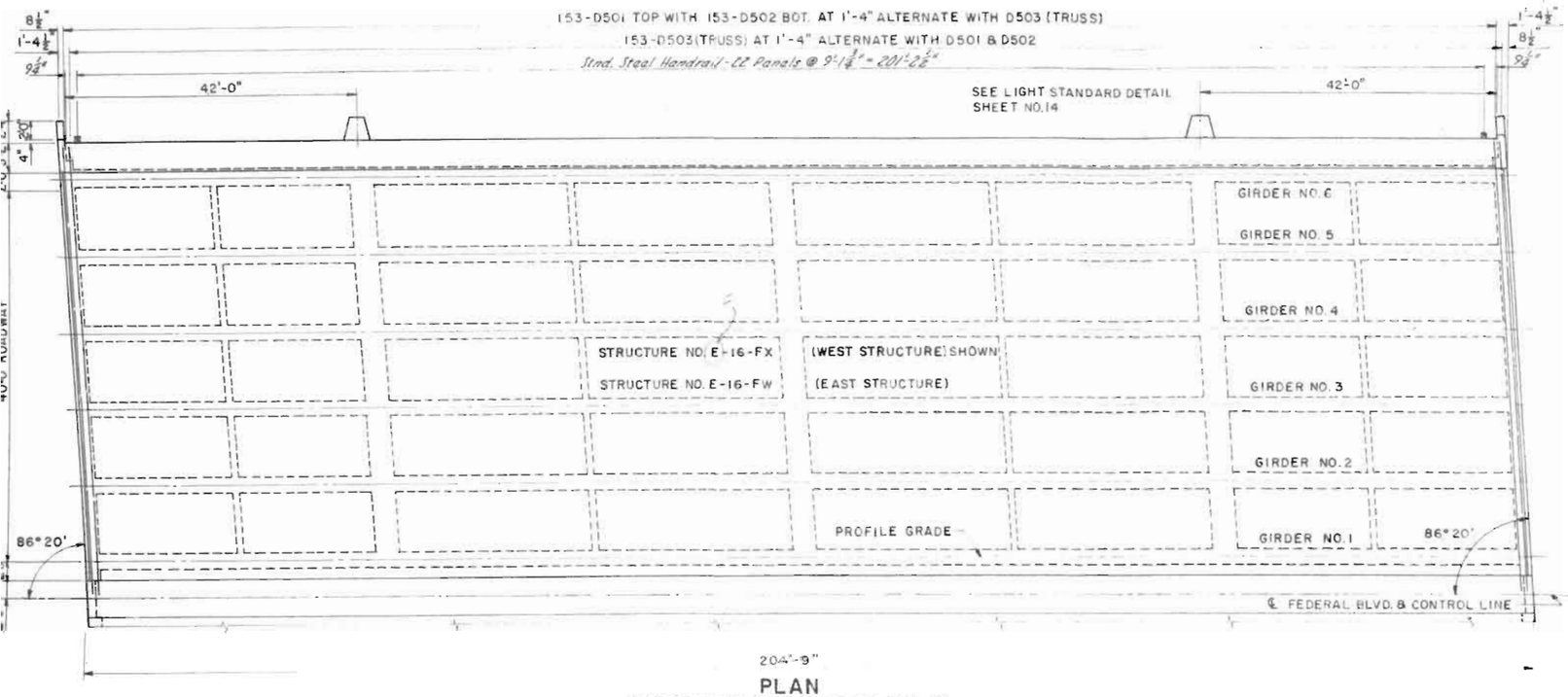
FEDERAL & COLFAX INTERCHANGE

GIRDER DETAILS

STA. 9+26.19
STRUCTURE NOS. E-16-FW & E-16-FX

KEN R. WHITE
CONSULTING ENGINEER
DENVER, COLORADO

FEDERAL ROAD REGION NO.	DIVISION	PROJ. NO.	SHEET NO.	TOTAL SHEETS
9	COLORADO	U 005-3 (15)	13	



PLAN

WEST STRUCTURE (EAST STRUCTURE SIMILAR)

ELEVATIONS

TOP OF ASPHALT AT GIRDER ℄
(CORRECTED FOR DEAD LOAD DEFLECTION)
STRUCTURE NO. E-16-FX (WEST STRUCTURE)

POINT NO. / GIRDER NO.	BACK ABUT. NO. 1	FACE ABUT. NO. 1	℄ SPAN NO. 1	℄ PIER NO. 2	℄ SPAN NO. 2	℄ PIER NO. 3	℄ SPAN NO. 3	℄ PIER NO. 4	℄ SPAN NO. 4	FACE ABUT. NO. 2	BACK ABUT. NO. 2
1	5271.57	5271.64	5272.22	5272.71	5273.35	5273.76	5274.10	5274.21	5274.24	5274.16	5274.15
2	5271.43	5271.50	5272.08	5272.58	5273.22	5273.63	5273.97	5274.08	5274.12	5274.04	5274.02
3	5271.30	5271.36	5271.94	5272.44	5273.08	5273.50	5273.84	5273.96	5273.99	5273.91	5273.90
4	5271.16	5271.22	5271.81	5272.31	5272.95	5273.37	5273.71	5273.83	5273.87	5273.79	5273.78
5	5271.02	5271.08	5271.67	5272.17	5272.82	5273.24	5273.59	5273.71	5273.75	5273.67	5273.66
6	5270.88	5270.94	5271.53	5272.04	5272.69	5273.11	5273.46	5273.58	5273.62	5273.55	5273.54
STRUCTURE NO. E-16-FW (EAST STRUCTURE)											
1	5271.59	5271.66	5272.23	5272.73	5273.36	5273.77	5274.10	5274.21	5274.24	5274.15	5274.14
2	5271.48	5271.54	5272.12	5272.61	5273.25	5273.65	5273.98	5274.08	5274.11	5274.03	5274.02
3	5271.37	5271.44	5272.01	5272.50	5273.13	5273.53	5273.86	5273.96	5273.99	5273.90	5273.89
4	5271.27	5271.33	5271.90	5272.39	5273.02	5273.41	5273.74	5273.84	5273.86	5273.77	5273.76
5	5271.16	5271.22	5271.79	5272.28	5272.90	5273.30	5273.62	5273.72	5273.74	5273.65	5273.64
6	5271.05	5271.11	5271.68	5272.17	5272.79	5273.18	5273.50	5273.59	5273.62	5273.52	5273.51

BAR LIST (ONE STRUCTURE)

MARK	SHAPE	LENGTH	NO. REQD.
S 501		4'-0"	92
D 501		47'-6"	153
D 502		48'-10"	153
D 503		49'-2"	153
D 504		60'-0"	207
D 505		27'-6"	69
M 500		3'-9"	102
M 501		6'-2"	102

BAR SUMMARY (ONE STRUCTURE)

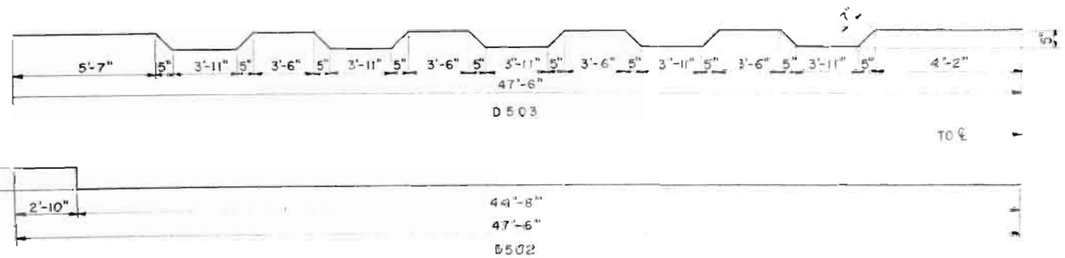
37,812 LIN. FT. # 5 AT 1.043 #/FT. = 39,438 LB.
+1% OVERRUN = 397 LB.
TOTAL = 39,835 LB.

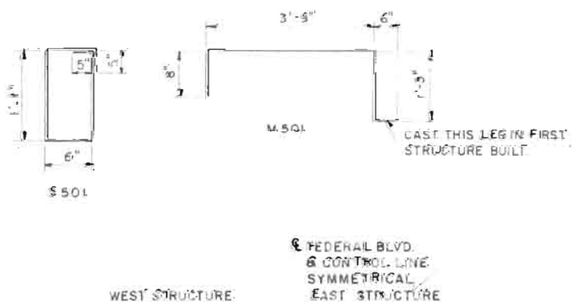
SUMMARY OF QUANTITIES (ONE STRUCTURE)

	ITEM	DESCRIPTION	AMOUNT
■	46	CLASS "A" CONCRETE	516.2 C.Y.
■	47	REINF. STEEL (+1% OVERUN)	146,355 LB.
■	48	STRUCT. STEEL (+½% PAINT)	8,870 LB.
*		SHEET COPPER (32 oz.)	0.7 LB.
	90	1½" ϕ ELEC. CONDUIT W/ JUN. BX'S	255 LIN. FT.
*		½" EXPAN. JOINT MAT'L TYPE III	7.2 SQ. FT.
*		1" EXPAN. JOINT MAT'L TYPE I	6.5 SQ. FT.

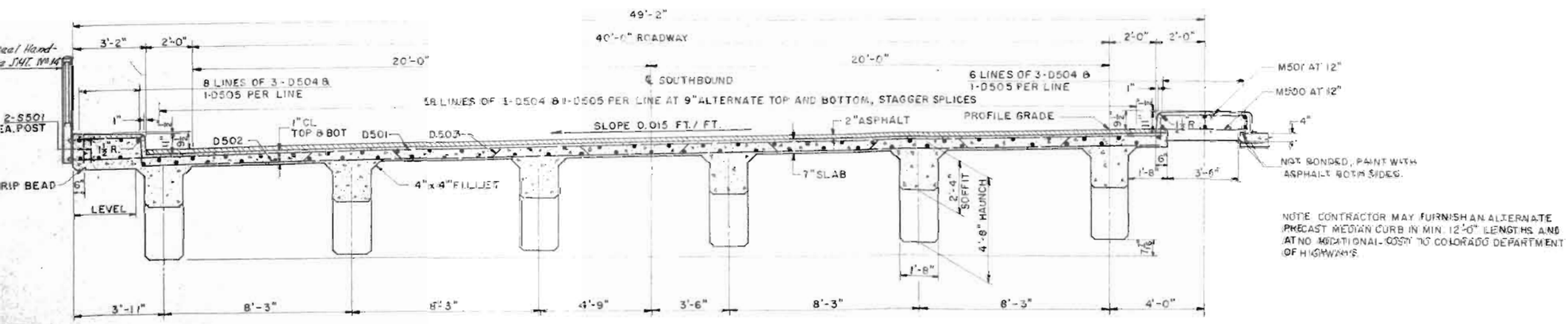
■ INCLUDES QUANTITIES FOR 2 LIGHT STANDARD SUPPORTS

* COST TO BE INCLUDED IN ITEM 46 (CLASS "A" CONCRETE.)





BAR BENDING DETAILS



NOTE: CONTRACTOR MAY FURNISH AN ALTERNATE PRECAST MEDIAN CURB IN MIN. 12'-0" LENGTHS AND AT NO ADDITIONAL COST TO COLORADO DEPARTMENT OF HIGHWAYS.

DECK SECTION

COLORADO DEPARTMENT OF HIGHWAYS

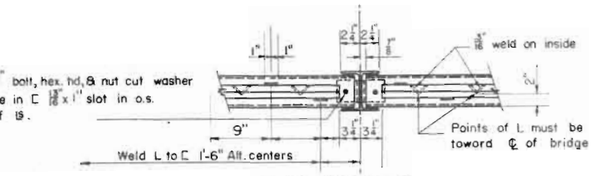
FEDERAL & COLFAX INTERCHANGE

DECK PLAN & SECTION

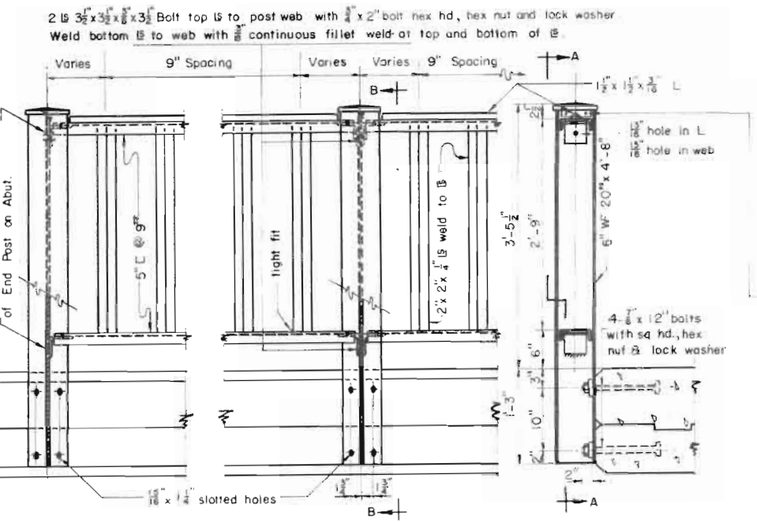
STA. 9+26.15
STRUCTURE NOS. E-16-FW & E-16-FX

KEN R. WHITE
CONSULTING ENGINEER
DENVER, COLORADO

FED. ROAD DIV. NO	DISTRICT	PROJECT NO.	SHEET NO.	TOTAL SHEETS
9	COLO	U005-3(15)	14	



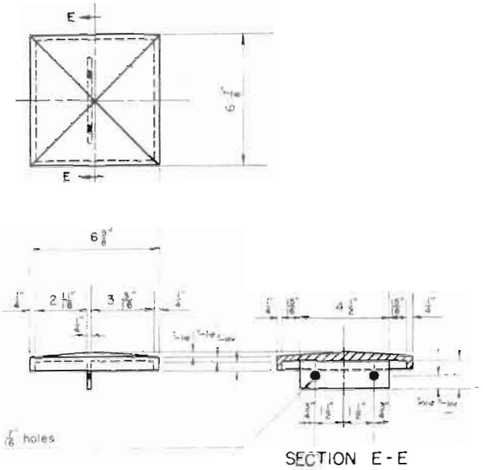
PLAN WITHOUT CAP



SECTION A-A

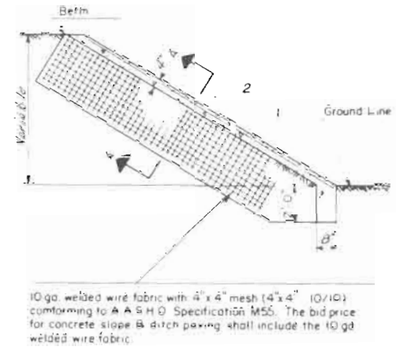
SECTION B-B

STEEL HANDRAIL WITH ANGLE
(To Be Used With Sidewalk)

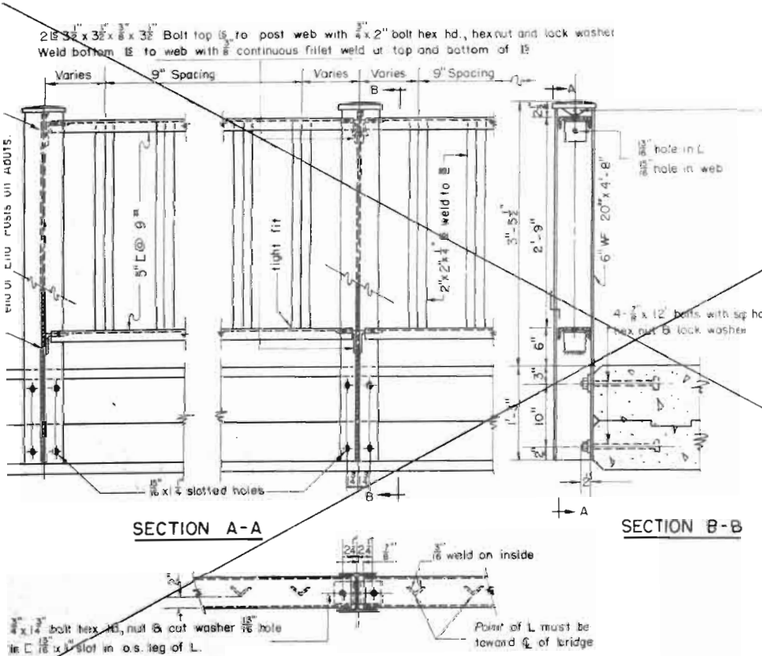


SECTION E-E

CAST IRON CAP FOR POST



CONCRETE SLOPE & DITCH PAVING DETAIL

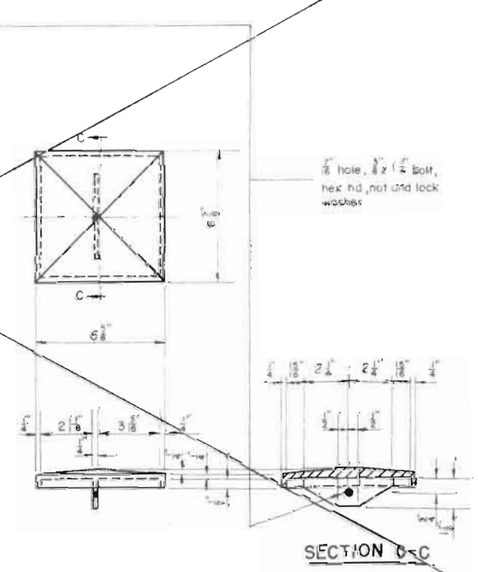


SECTION A-A

SECTION B-B

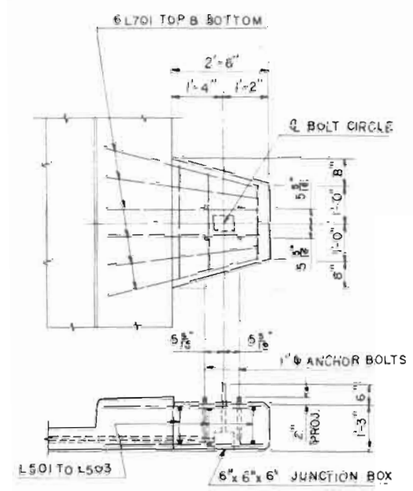
PLAN WITHOUT CAP

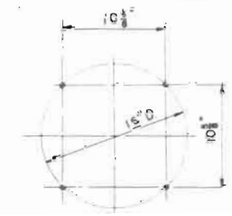
STEEL HANDRAIL

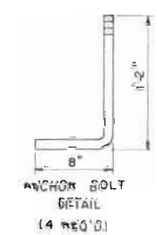


SECTION C-C

CAST IRON CAP FOR POST







LIGHT STANDARD SUPPORT
DETAILS & QUANTITIES

BAR LIST

MARK	SHAPE	LENGTH	NO REQ'D
L501		2'-0"	2
L502		2'-6"	2
L503		2'-9"	2
L701		4'-4"	12

BAR SUMMARY

15 LIN. FT. #5 AT 1.043 #/FT =		16 LB.
490 LIN. FT. #7 AT 2.044 #/FT =		1001 LB.
4% OVERRUN	=	4 LB.
TOTAL	=	1020 LB.

SUMMARY OF QUANTITIES

ITEM	DESCRIPTION	UNIT	AMOUNT
46	CLASS "A" CONC.	C.Y.	0.31
47	REINFORCING STEEL	LBS.	120
48	STRUCTURAL STEEL	LBS.	20

QUANTITIES INCLUDED IN SUMMARY OF QUANTITIES ON DECK SHEET

COLORADO
DEPARTMENT OF HIGHWAYS
DETAIL OF HANDRAIL AND BEARINGS

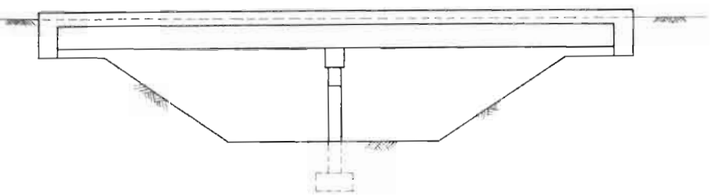
Across Colfax Ave.
Sta. 9+26.19
In Denver: Sec. T. R.

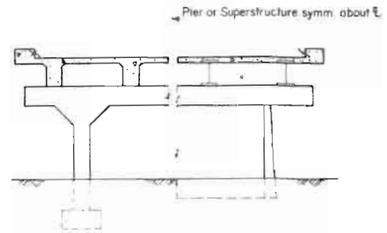
Designed by
Made by E.A.B.
Checked by

Approved by
Bridge Engineer
Date: 19

STRUCTURE NO. E-16-FW & FX

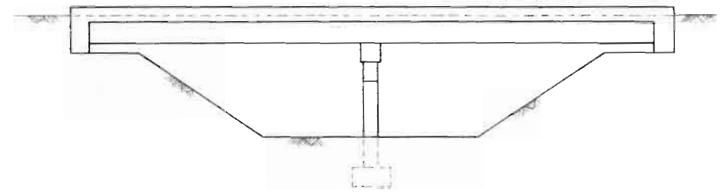
FED. ROAD REGION NO.	DIVISION	PROJECT NO.	SHEET NO.	TOTAL SHEETS
9	COLO.	U005-3(15)	15	

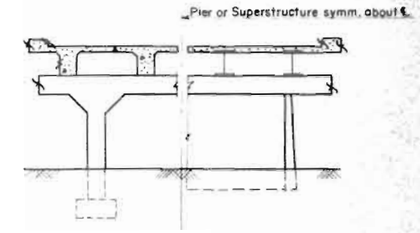




PIER AND SUPERSTRUCTURE

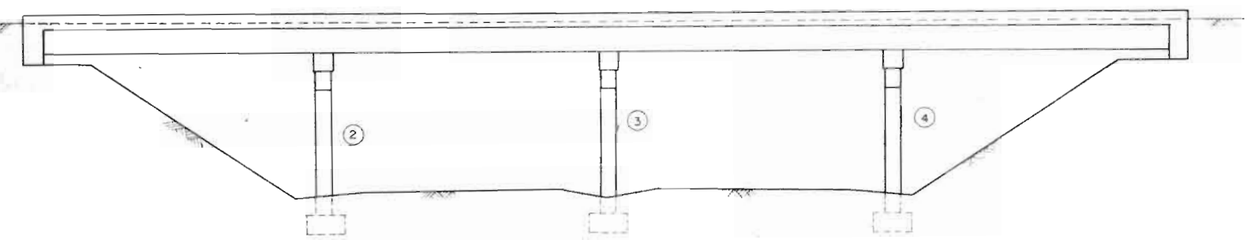
RURAL STREAM CROSSING

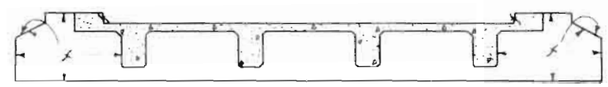




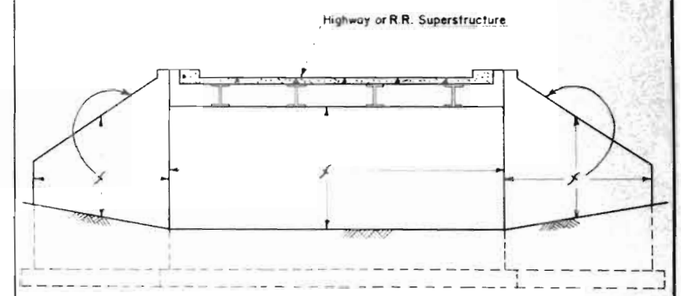
PIER AND SUPERSTRUCTURE

URBAN STREAM CROSSING OR NEAR URBAN AREA

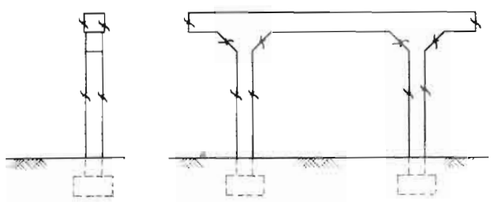




STUB ABUTMENTS
(Underpass Only)

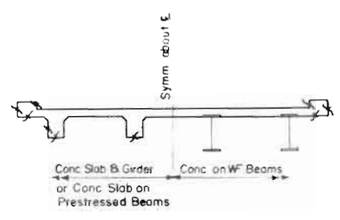


CANTILEVER ABUTMENTS
(Underpass Only)



Piers 2,3 & 4

All Piers



Superstructure

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

UNDERPASS

STRUCTURE NO. F-16-FX West Br.
F-16-FW East Br.

COLORADO
DEPARTMENT OF HIGHWAYS

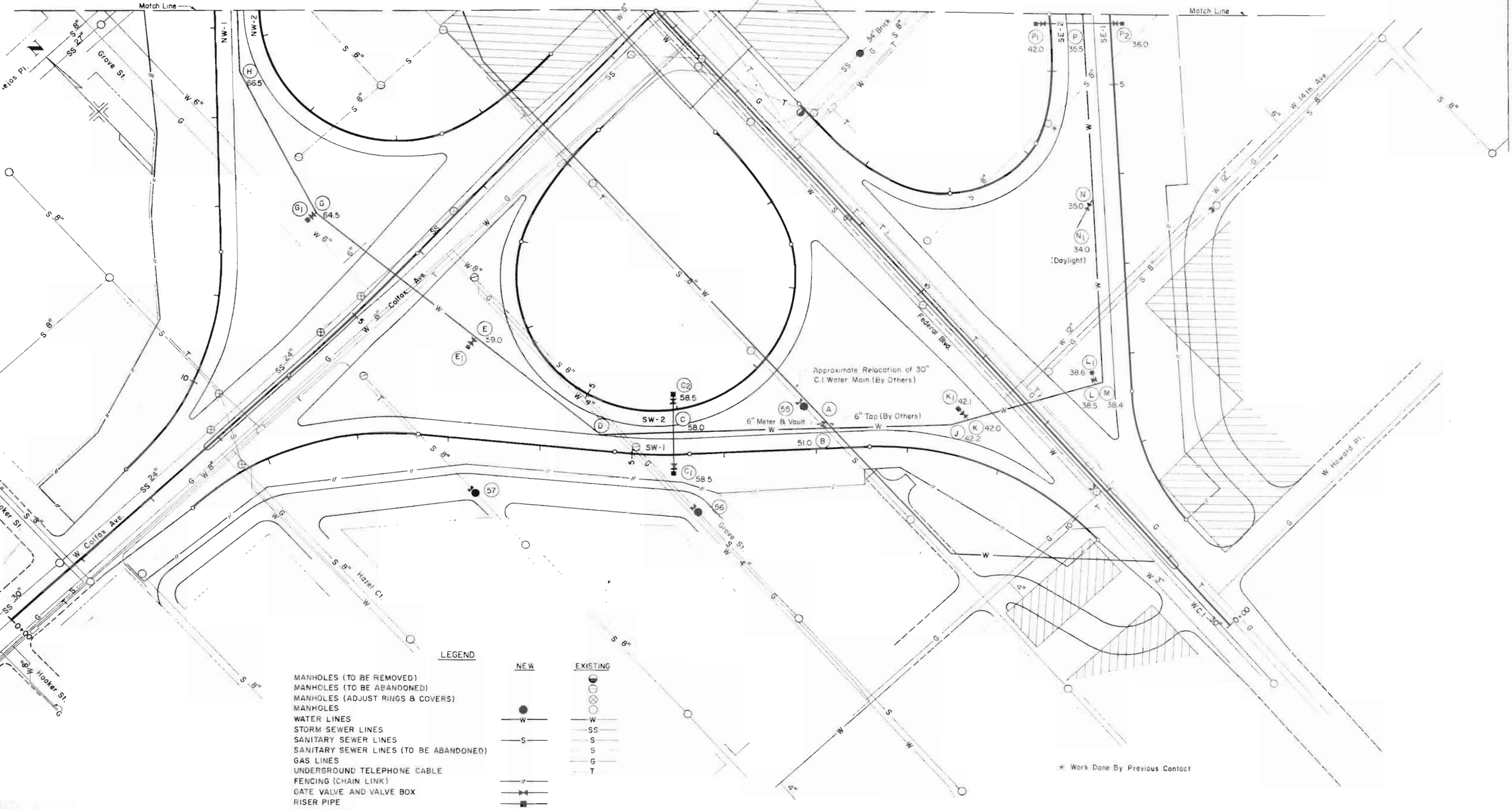
DETAILS SHOWING PORTIONS OF STRUCTURE TO RECEIVE CLASS "I" SURFACE FINISH.

Federal & Colfax Interchange
Sta. 9+26.19
Near _____ Sec. ____ T. ____ R. ____

Designed by A.D.N. Made by R.R.A.-J.B. Checked by	Approved by Bridge Engineer Date: 19

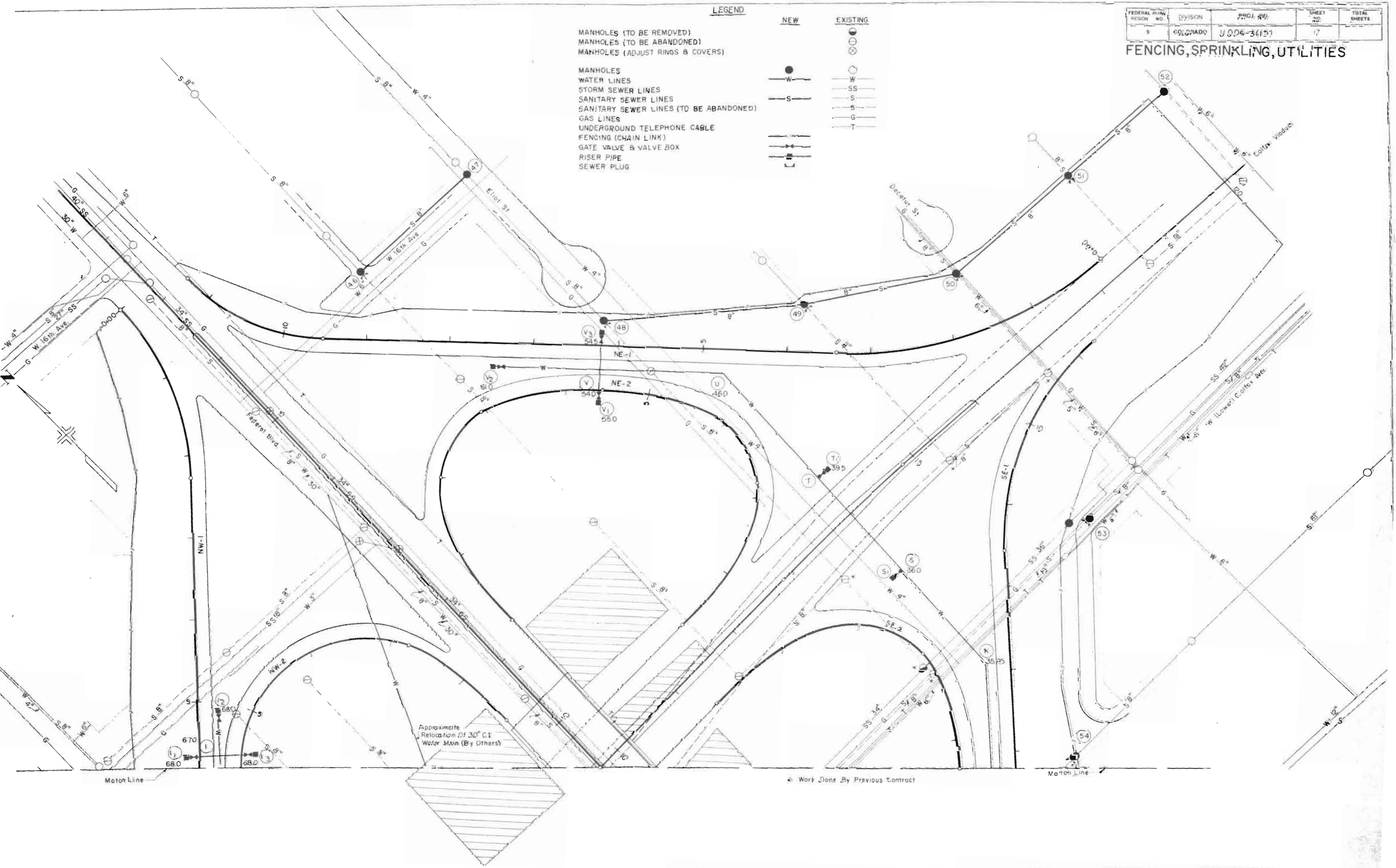
FEDERAL ROAD REGION NO.	DIVISION	PROJ. NO.	SHEET NO.	TOTAL SHEETS
9	COLORADO	U 005-3 (15)	16	

FENCING, SPRINKLING, UTILITIES

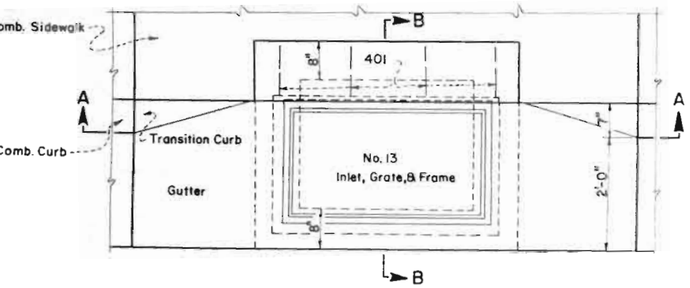


FEDERAL HIGHWAY REGION NO.	DIVISION	PROJ. NO.	SHEET NO.	TOTAL SHEETS
9	COLORADO	U 006-3(15)	17	

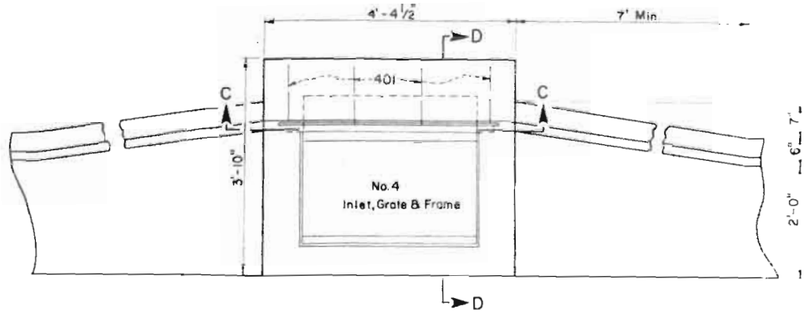
FENCING, SPRINKLING, UTILITIES



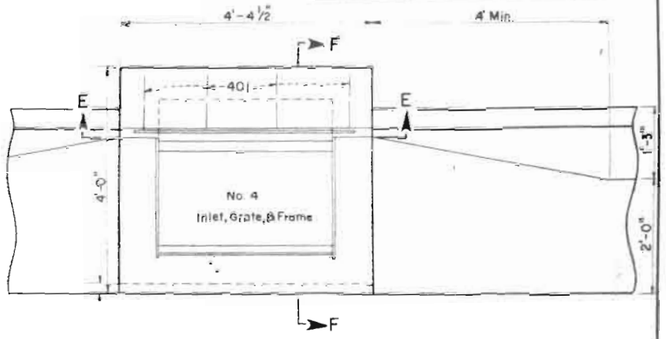
FED. ROAD DIVISION NO.	DISTRICT	PROJ. NO.	SHEET NO.	TOTAL SHEETS
6	COLO.	U005-3(15)	18	



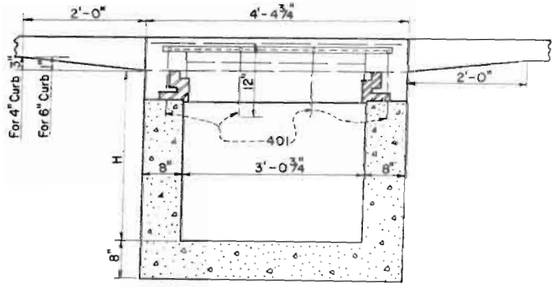
PLAN - (For Comb. Curb, Gutter & Sidewalk or Type 2 Curb & Gutter)



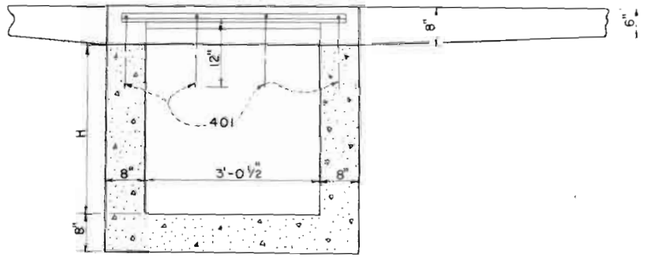
PLAN (For Type 2 Curb & Gutter)



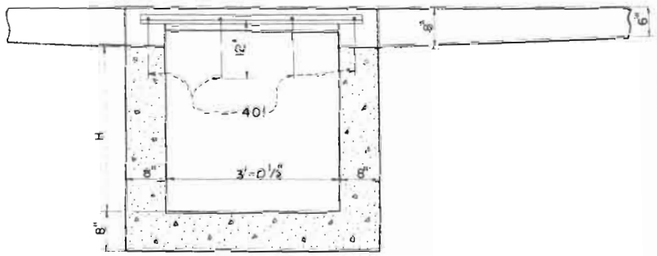
PLAN (For Type Curb & Gutter)



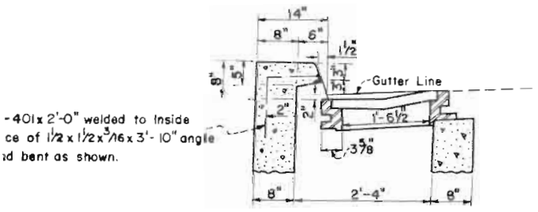
SECTION A-A (For Comb. Curb, Gutter, & Sidewalk or Type 2 Curb & Gutter)



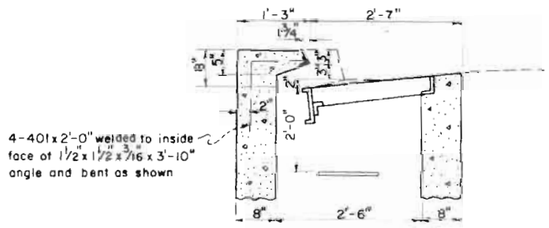
SECTION C-C (For Type 2 Curb & Gutter)



SECTION E-E (For Type Curb & Gutter)

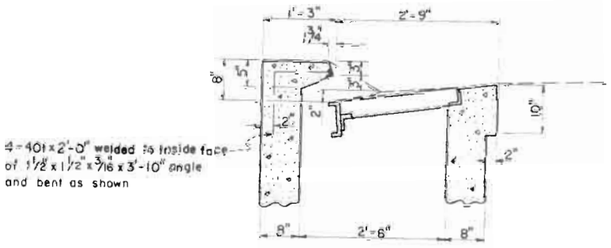


SECTION B-B
Use with Type 2 Curb & Gutter



SECTION D-D
Use with Type 2 Curb & Gutter

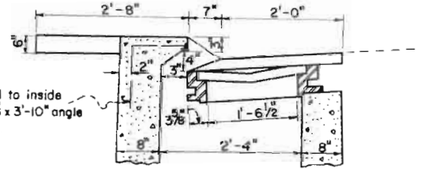
INLET TYPE 4-B



SECTION F-F
Use with Type Curb & Gutter

INLET TYPE 4-C

No. 4 Grate and Frame to be used with Type 4B & 4C Inlets



SECTION B-B
Use with Comb. Curb, Gutter, & Sidewalk

INLET TYPE 3

No. 13 Grate and Frame to be used with Type 3 Inlet.

GENERAL NOTES

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

All concrete shall be class "A" and air entrained as specified.

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 conform to A.S.T.M. Spec. A-305-507 or latest revision.

All castings shall be painted with two coats of asphalt or coal tar and oil.

NOTE: Use steps for all inlets with H = 3'-6" or more. Start 2'-0" below gutter line and space equally at Minimum of 18". (See Section D-D)

* Volumes of concrete occupied by inlet or outlet pipes to be deducted from quantities of Concrete.

QUANTITIES-TYPE 3, 4-B & 4-C INLETS		
H	CLASS A CONCRETE	REINFORCING STEEL
	* CU. YDS.	LBS.
3'-0"	1.37	5.4
3'-6"	1.54	5.4
4'-0"	1.71	5.4
4'-6"	1.88	5.4
5'-0"	2.05	5.4
5'-6"	2.22	5.4
6'-0"	2.39	5.4
6'-6"	2.56	5.4
7'-0"	2.73	5.4
7'-6"	2.90	5.4
8'-0"	3.07	5.4

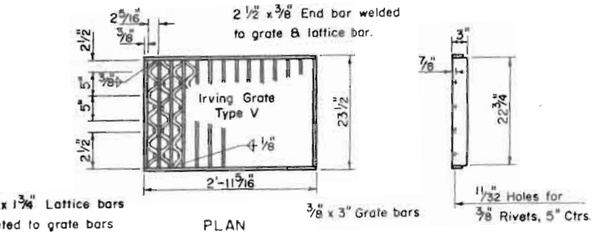
COLORADO
DEPARTMENT OF HIGHWAYS

CONCRETE INLETS

No. 3, No. 4-B, & No. 4-C

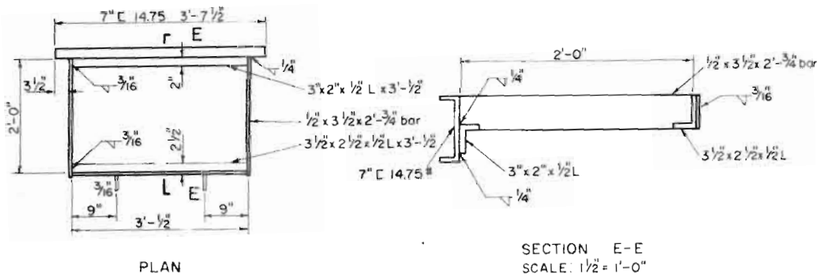
Designed by: Made by: Checked by:	Approved by: Date:

FED. ROAD DIVISION NO.	DISTRICT	PROJ. NO.	SHEET NO.	TOTAL SHEETS
9	COLO.	U005-3 (15)	18A	

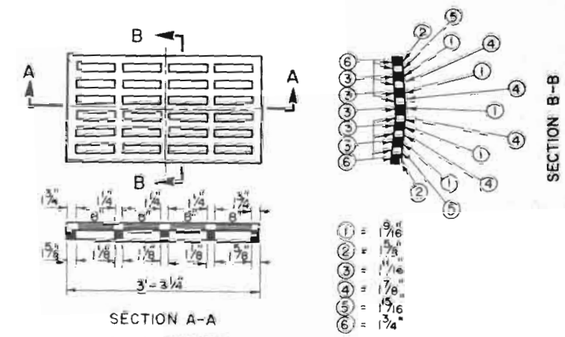


NO. 4 GRATE

NOTE: NO. 4 GRATE AND FRAME TO BE USED WITH TYPE 4-B AND 4-C INLET.

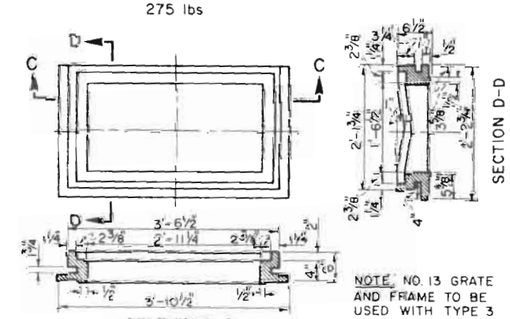


NO. 4 FRAME



NO. 13 GRATE

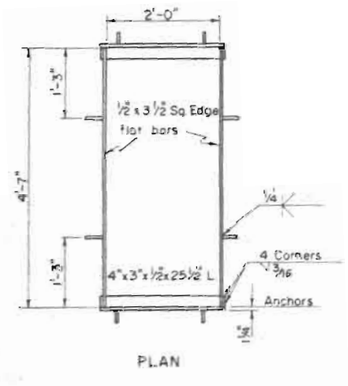
275 lbs

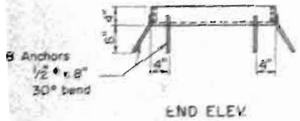


NOTE: NO. 13 GRATE AND FRAME TO BE USED WITH TYPE 3 INLET.

NO. 13 FRAME

508 lbs.

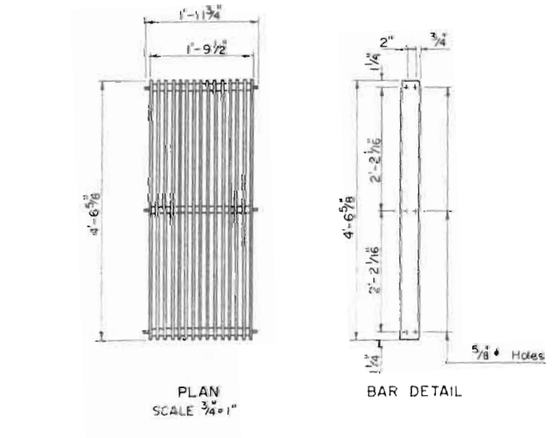




NO. 5 FRAME

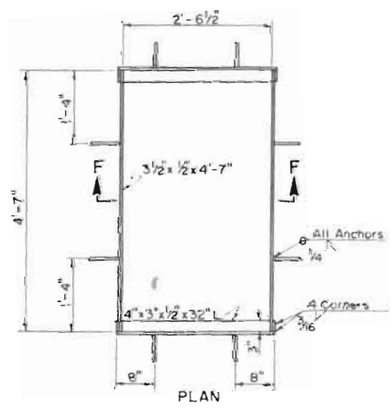
108 lbs.

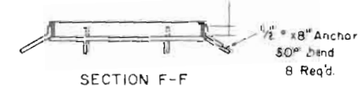
NOTE: NO. 5 GRATE & FRAME MAY BE USED WITH INLET TYPE 1.



NO. 5 GRATE

473 lbs.

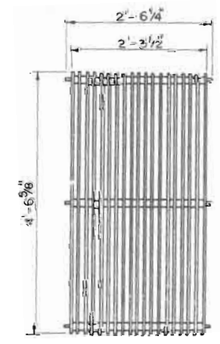


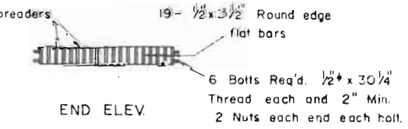


NO. 5A FRAME

120 lbs.

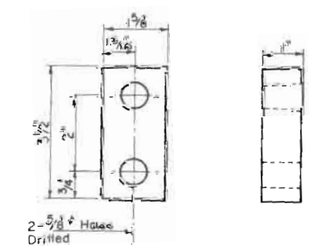
NOTE: NO. 5A GRATE AND FRAME MAY BE USED WITH INLET TYPE 2.





NO. 5A GRATE

597 lbs.



Cast Iron (SPREADER)
SCALE 1"=2"
1.321 lbs. ea.

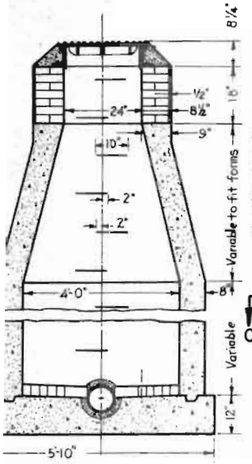
USE ABOVE SPREADER IN GRATE NO. 5 & NO. 5A.

COLORADO
DEPARTMENT OF HIGHWAYS

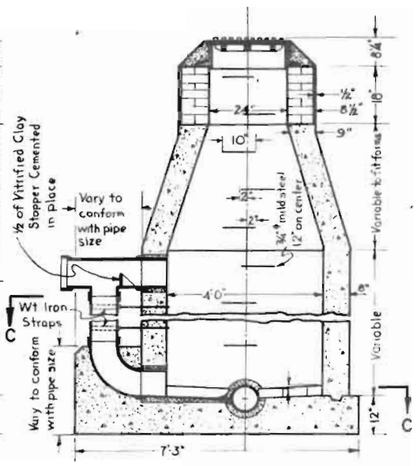
CONCRETE INLETS
GRATES & FRAMES
NO. 13, NO. 4, NO. 5 & 5A

Designed by:
Made by:
Checked by:
Approved by:
Date:

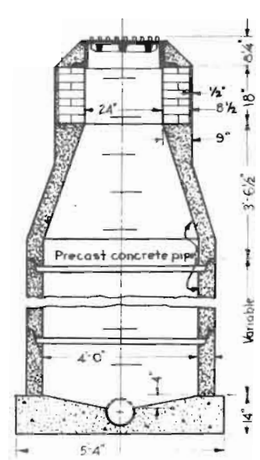
FED ROAD DIV. NO.	STATE	PROJ. NO.	SHEET NO.	TOTAL SHEET
9	COLO.	U005-3(15)	19	



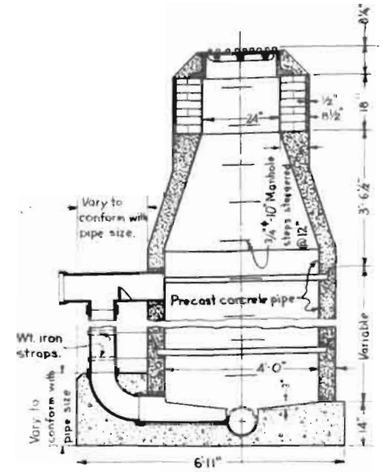
SECTION A-A



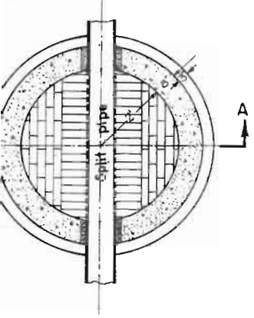
SECTION B-B



SECTION D-D

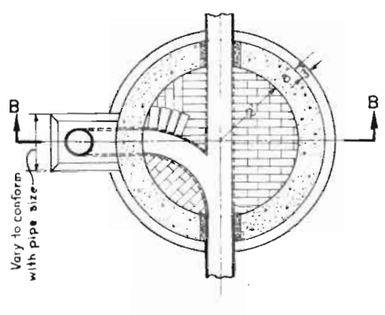


SECTION E-E



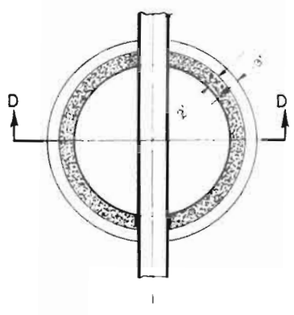
SECTIONAL PLAN

TYPE 3



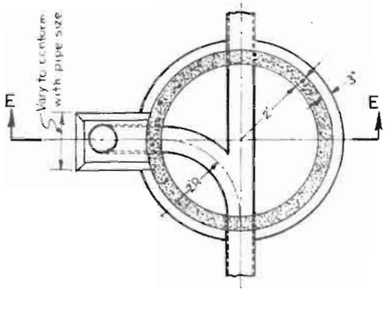
SECTION C-C

TYPE 3A



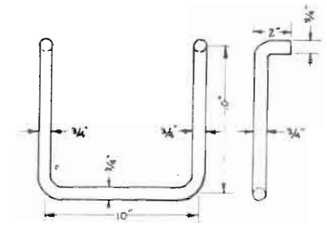
SECTIONAL PLAN

TYPE 4



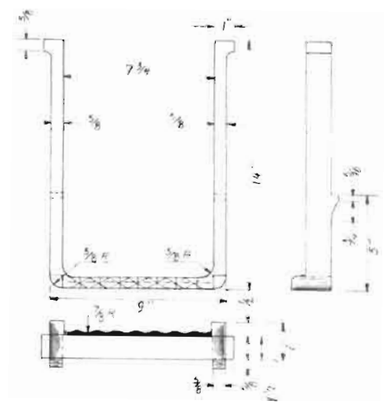
SECTIONAL PLAN

TYPE 4A



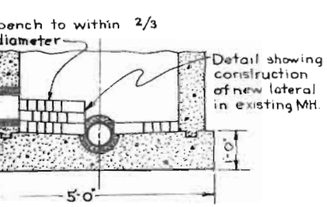
MILD STEEL STEPS

For Concrete Manholes

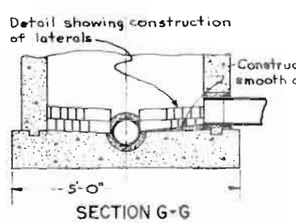


CAST IRON STEPS

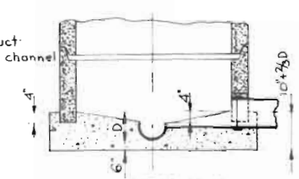
For Brick Manholes



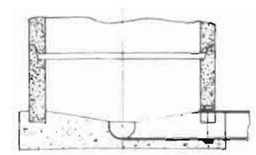
SECTION F-F



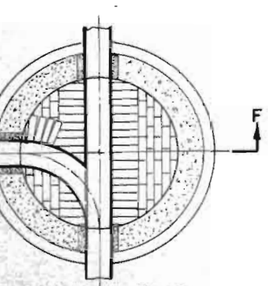
SECTION G-G



SECTION H-H

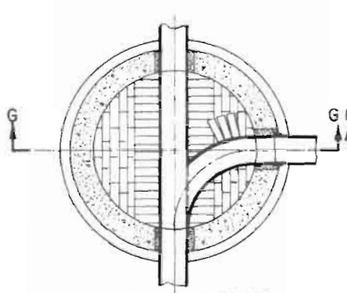


SECTION J-J



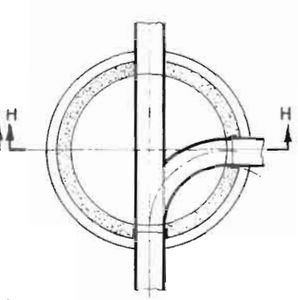
SECTIONAL PLAN

TYPE 3B



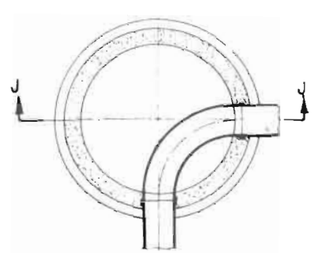
SECTIONAL PLAN

TYPE 3C



SECTIONAL PLAN

TYPE 4B



SECTIONAL PLAN

TYPE 4C

COLORADO

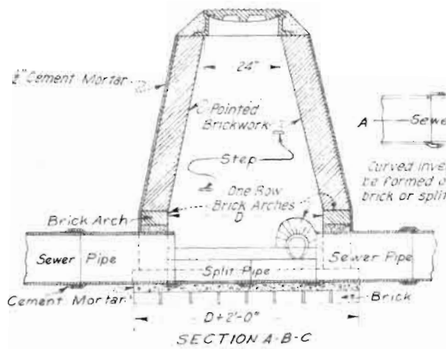
DEPARTMENT OF HIGHWAYS

MANHOLE DETAILS

TYPE 3,3A,3B,3C,4,4A,4B,4C

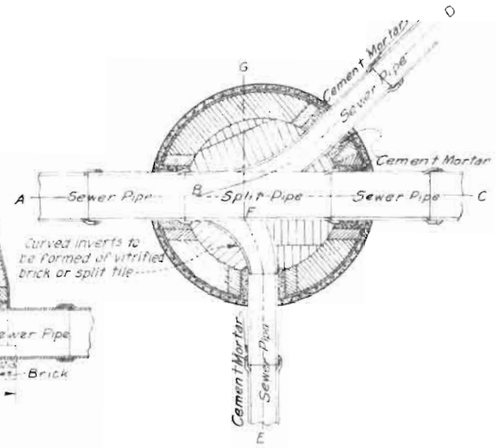
Designed by: Made by: Checked by:	Approved by: Date:

FED. ROAD DIV. NO.	STATE	PROJ. NO.	SHEET NO.	TOTAL SHEETS
9	COLO.	U 005-3(15)	19A	

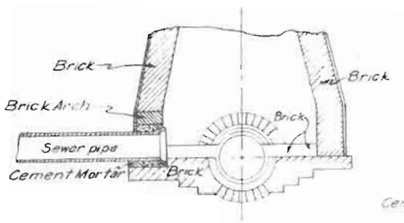


SECTION A-B-C

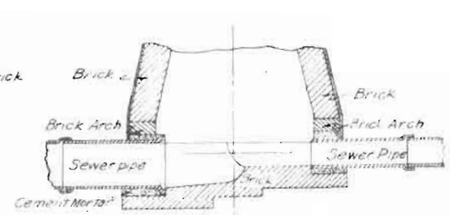
Diameter of Manhole to be 4' for Pipe Sewers 18" & under, 5' for Pipe Sewers 21" to 36" incl, and 6' for Pipe Sewers 42" to 48" incl



PLAN



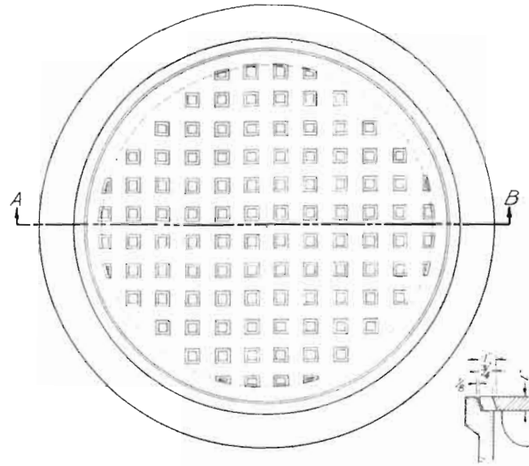
SECTION E-F-G



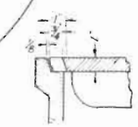
SECTION A-B-D

TYPE 1 MANHOLE (STORM & SANITARY)

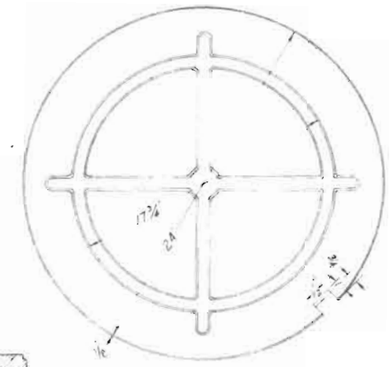
Scale ½"=1'-0"



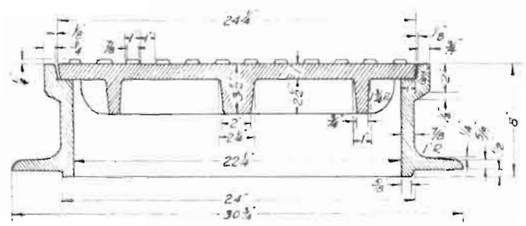
TOP VIEW OF RING & COVER



SECTION THRU SLOT USED TO LIFT COVER



BOTTOM VIEW OF COVER



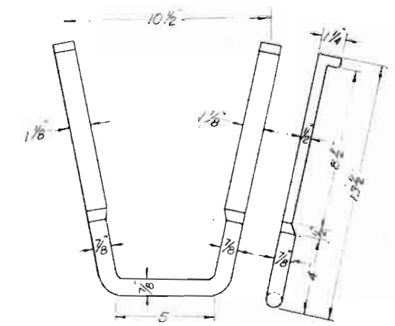
SECTION A-B

Weight - Frame Approx 224#
Cover Approx 176#
400#

Dipped or Painted with Asphalt or Coal Tar & Oil

DETAILS OF MANHOLE RING & COVER

Scale 3/16"=1'



WROUGHT IRON OR MILD STEEL STEPS

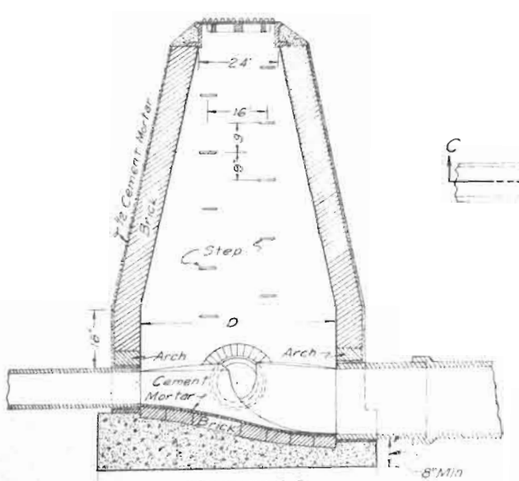
Scale 3"=1'-0"

This Step to be Used for All Types Manholes

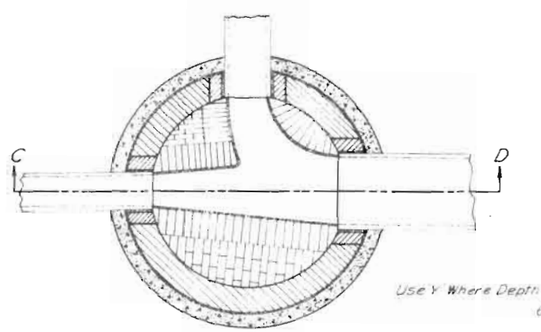
GENERAL NOTES:

All brick in manholes to conform to requirements of grade MA of AASHO Designation M-91-42. Manhole bottoms may be either brick or concrete. Manhole benches shall be of brick as specified.

Alternate design for Manholes using Precast Concrete Blocks, Cast in place Concrete, or Precast Concrete Manholes will be Permitted after approval of Details by the Department.



SECTION C-D

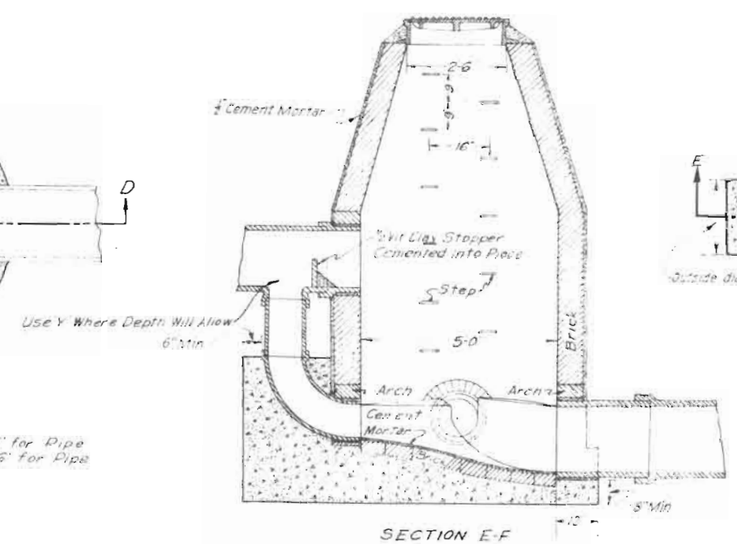


PLAN

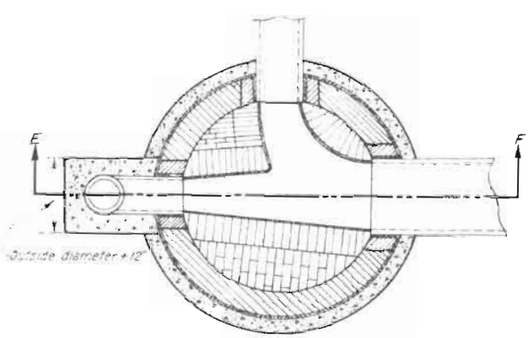
Diameter of Manhole to be 5' for Pipe Sewers 36" and Under, and 6' for Pipe Sewers 42" to 48".

TYPE 1-A MANHOLE

Scale ½"=1'-0"



SECTION E-F



PLAN

TYPE 2 MANHOLE (SANITARY ONLY)

Scale ½"=1'-0"

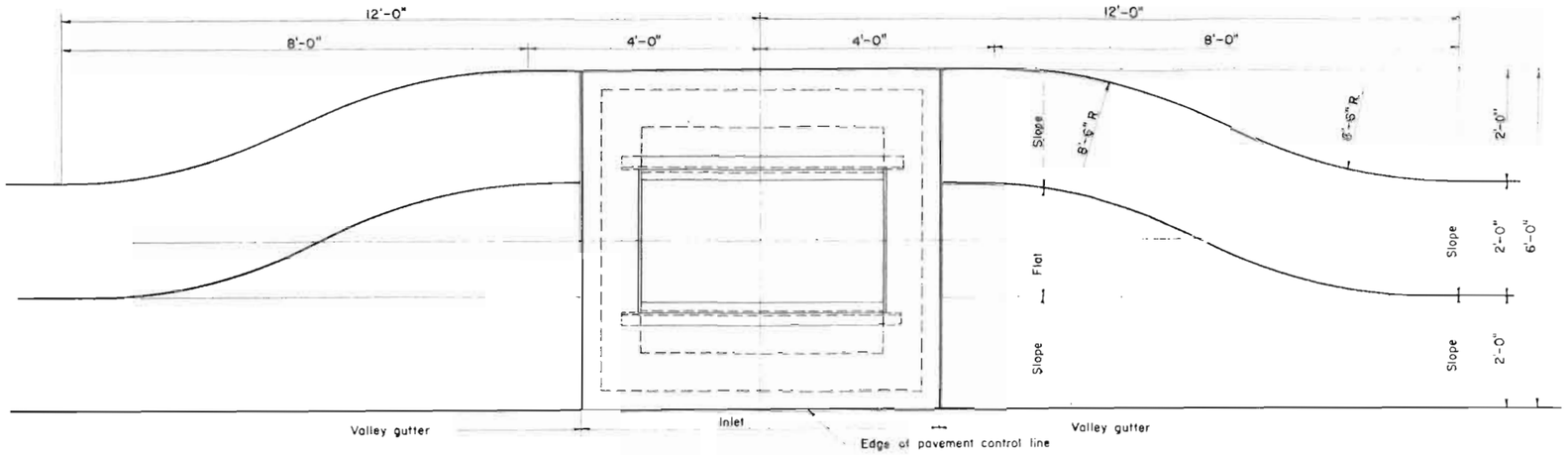
SANITARY & STORM SEWERS

COLORADO
DEPARTMENT OF HIGHWAYS

MANHOLE DETAILS TYPE 1, 1A AND 2

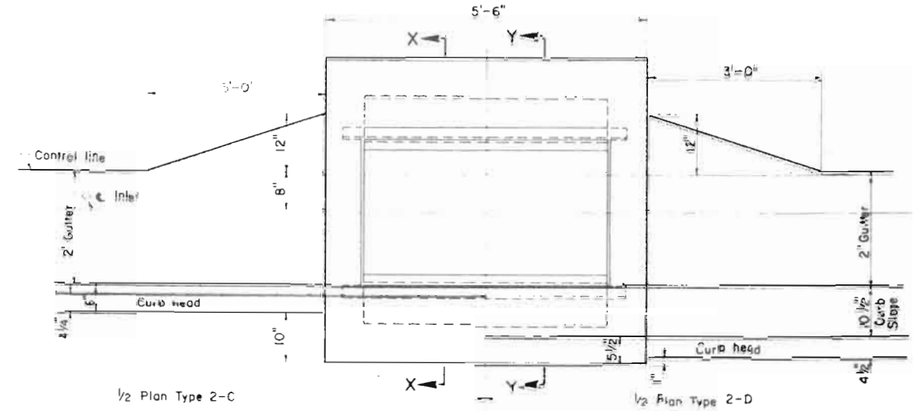
Designed by:	Approved by:
Made by:	
Checked by:	Date:

FED. ROAD DIVISION NO.	STATE	PROJ. NO.	SHEET NO.	TOT. SHEETS
9	COLO.	U 605-3(15)	19 B	

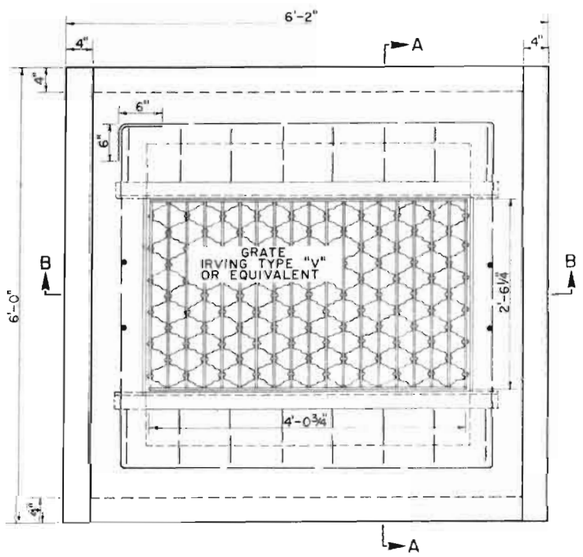


PLAN OF WIDENING OF VALLEY GUTTER AT INLETS

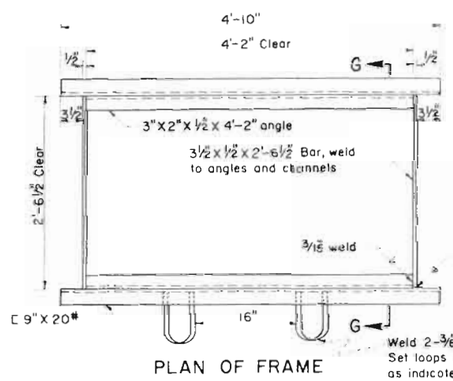
Scale 3/4" = 1'-0"



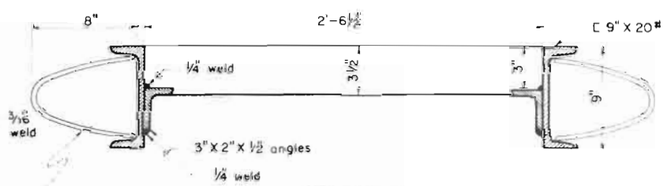
DROP INLETS IN CURB & GUTTER



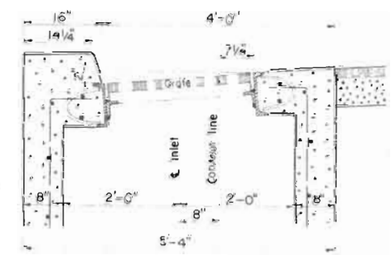
PLAN DROP INLET TYPE 2



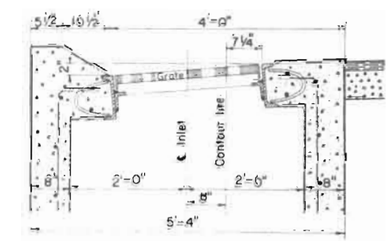
PLAN OF FRAME



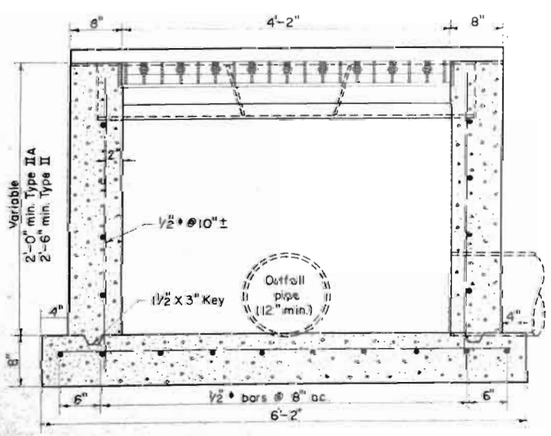
SECTION G-G



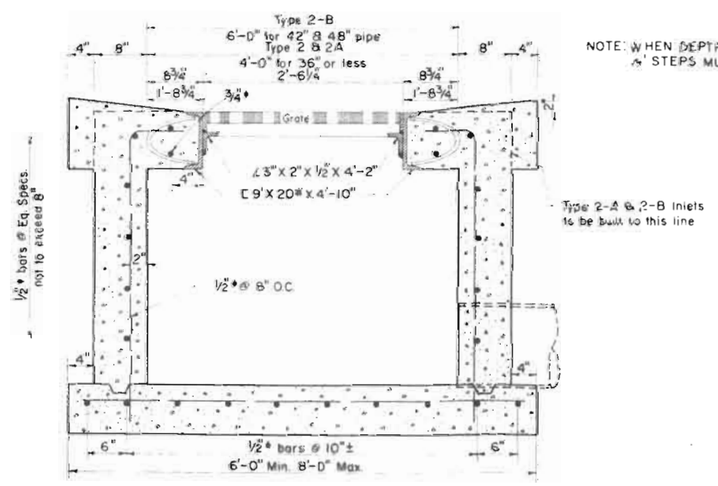
Type 2-C
SECTION X-X



Type 2-D
SECTION Y-Y



SECTION B-B



SECTION A--A

NOTE: WHEN DEPTH OF INLET IS OVER 4' STEPS MUST BE PROVIDED.

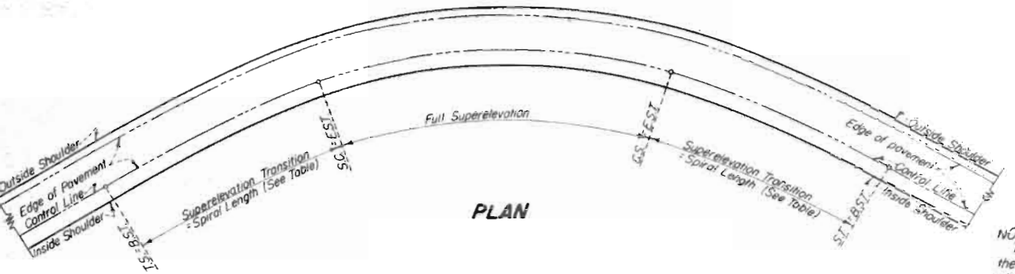
Type 2-A & 2-B Inlets to be built to this line

COLORADO
DEPARTMENT OF HIGHWAYS

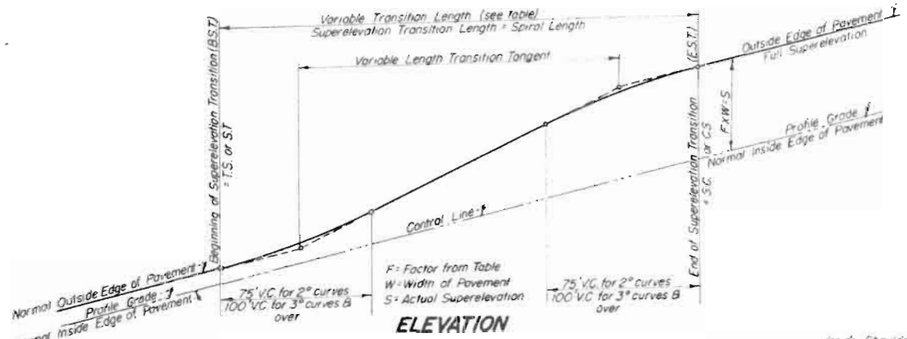
CONCRETE INLET
TYPE 2, 2C AND 2D

Designed by: Made by: Checked by:	Approved by: Date:

FEDERAL ROAD DIVISION NO.	STATE	PROJ. NO.	SHEET NO.	TOTAL SHEETS
9	COLORADO	U 005-3 (15)	28	



PLAN



ELEVATION

NOTE CASE I

The normal roadway slope is approximately equal to the superelevation for a 1° curve. Therefore no superelevation is required for 1° curves.

For curves of over 1° the factors shown in the table for Case I include the normal roadway slope of .001 Ft per Ft, thereby giving values of actual superelevation at any point on the transition.

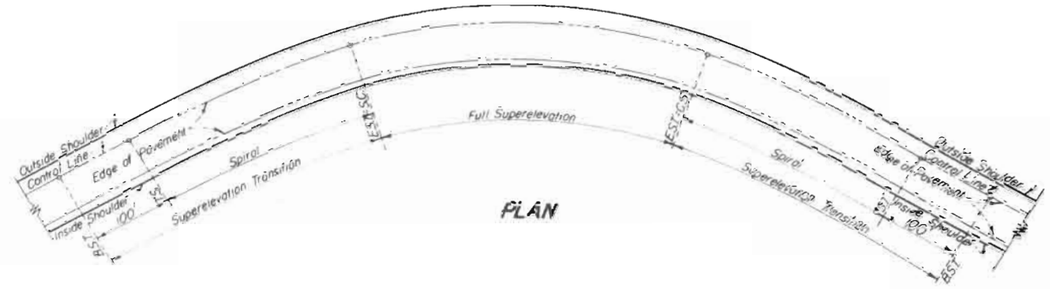
NOTE CASE II

In order that the opposing slope of the normal roadway be eliminated before entering the horizontal curve, Case II, superelevation transitions shall begin on the tangent one hundred feet (100') from the TS and/or ST of the spiral. Case II superelevation, calculated as indicated in the table, is to be added to the normal low edge of pavement.

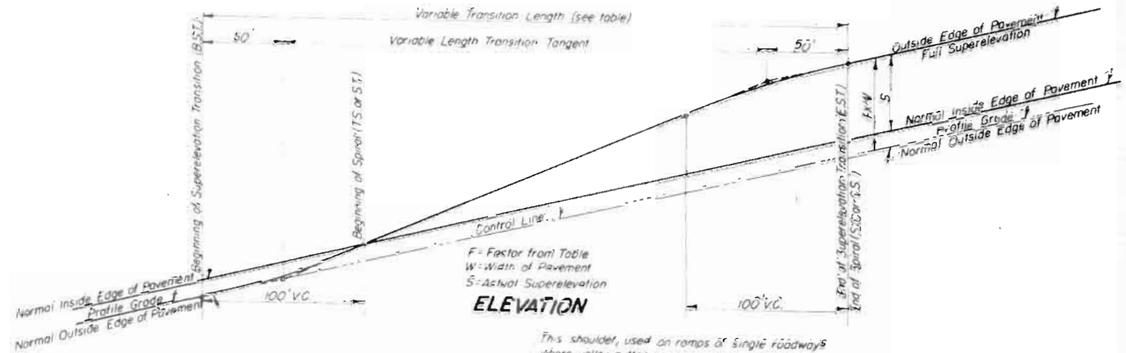
NOTE CASE I & II

On curves where no spirals are used the superelevation transition shall be on the tangent approaching each end of the curve. Full superelevation to coincide with the PC or PT of such curve.

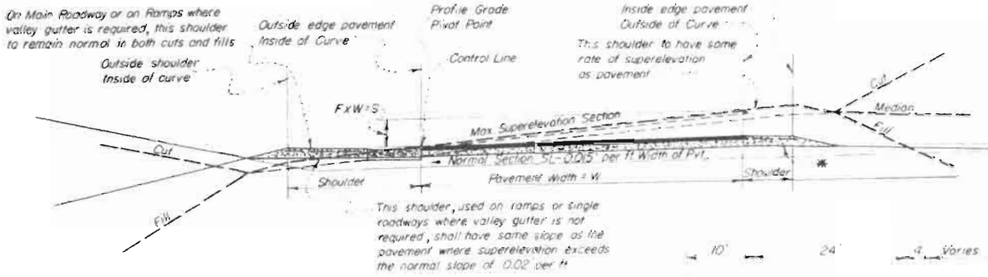
* Shoulders having slopes adverse to or greater than normal pavement slope shall be raised to coincide with the pavement slope at beginning of transition. Raising of shoulder to take place gradually over a distance of not less than 50 ft.



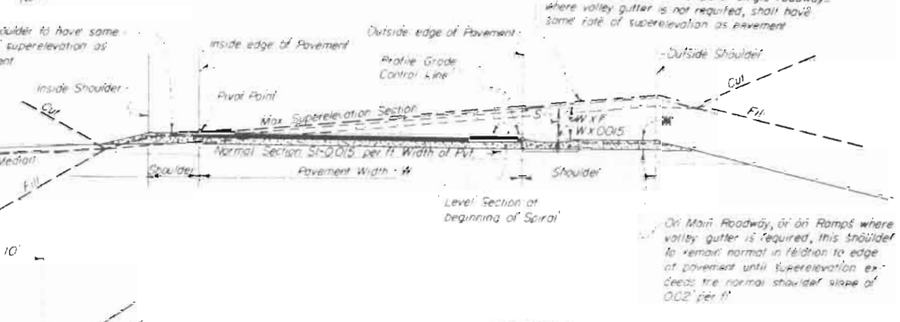
PLAN



ELEVATION



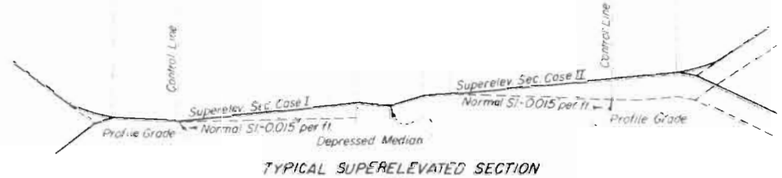
Note
Ditch width of superelev. section to conform to Typical Cross Sections of Improvement except where widening is necessary to accomodate drainage



SECTION
CASE I

SUPERELEVATION TRANSITION

CURVES HAVING SUPERELEVATION IN SAME DIRECTION AS NORMAL ROADWAY SLOPE



TYPICAL SUPERELEVATED SECTION OF 4 LANE DIVIDED HIGHWAY

SECTION
CASE II

SUPERELEVATION TRANSITION

CURVES HAVING SUPERELEVATION IN OPPOSITE DIRECTION TO NORMAL ROADWAY SLOPE

SUPERELEVATION TABLE

DEG. OF CURVE		PROPORTIONAL DISTANCE FROM BEGINNING OF TRANSITION									
CASE I	CASE II	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	Max 1.0
		RATE OF SUPERELEVATION (IN FEET) PER FT. WIDTH OF ROADWAY									
	1°	.00060	.00240	.00540	.00960	.01500	.02040	.02460	.02760	.02940	.03000
2°		.01512	.01548	.01608	.01692	.01800	.01909	.01992	.02052	.02088	.02100
	2°	.00073	.00290	.00653	.01162	.01800	.02438	.02947	.03310	.03527	.03600
3°		.01533	.01632	.01797	.02028	.02325	.02622	.02853	.03018	.03117	.03150
	3°	.00097	.00390	.00876	.01558	.02325	.03092	.03774	.04260	.04553	.04650
4°		.01554	.01716	.01986	.02364	.02850	.03336	.03714	.03984	.04146	.04200
	4°	.00127	.00506	.01140	.01984	.02850	.03716	.04560	.05194	.05573	.05700
5°		.01575	.01800	.02175	.02700	.03375	.04050	.04575	.04950	.05175	.05250
	5°	.00160	.00640	.01440	.02408	.03375	.04343	.05310	.06110	.06590	.06750
6°		.01618	.01970	.02556	.03228	.03900	.04572	.05244	.05830	.06182	.06300
	6°	.00194	.00778	.01740	.02820	.03900	.04980	.06060	.07022	.07606	.07800
7°		.01643	.02073	.02787	.03606	.04425	.05244	.06063	.06777	.07207	.07350
	7°	.00205	.00928	.02054	.03240	.04425	.05610	.06795	.07922	.08645	.08850

FACTORS SHOWN IN ABOVE TABLE ARE BASED ON TRANSITION LENGTHS SHOWN AT RIGHT

FACTORS SHOWN IN TABLE AT LEFT ARE BASED ON THE FOLLOWING TRANSITION LENGTHS

DEG. OF CURVE	LENGTH OF SPIRAL	LENGTH OF SUPERELEVATION TRANSITION	
		CASE I	CASE II
1 Degree	None	None	200'
2 Degrees	150'	150'	250'
3 Degrees	200'	200'	300'
4 Degrees	250'	250'	350'
5 Degrees	300'	300'	400'
6 Degrees	350'	350'	450'
7 Degrees	350'	350'	450'

Factors from table x W (Width of pavement in ft.) = Value of Superelev. in ft. to be added to normal low elev. of edge of pavement.
See notes on sections above for superelevation of shoulders.

COLORADO
DEPARTMENT OF HIGHWAYS

METHODS FOR SUPERELEVATION OF CURVES

Designed by:
Made by:
Checked by:
Approved by:
Date:

FED ROAD DIVISION NO.	DISTRICT	PROJ. NO.	SHEET NO.	TOTAL SHEETS
	COLO.	U 005-3(151)	21	

CASE II SUPERELEVATION

1° CURVE (TRANS.-200')

Rate of superelevation (in feet) per ft. width of roadway — Proportional distance from beginning of transition

	0.00	0.10	0.20	0.30	0.40	0.50	0.60	0.70	0.80	0.90	1.00
.00	.00000	.00060	.00240	.00540	.00960	.01500	.02040	.02460	.02760	.02940	.03000
.01	.00001	.00073	.00265	.00577	.01009	.01559	.02087	.02495	.02783	.02951	
.02	.00002	.00086	.00290	.00644	.01058	.01618	.02134	.02530	.02806	.02962	
.03	.00005	.00101	.00317	.00653	.01109	.01685	.02179	.02563	.02827	.02971	
.04	.00010	.00118	.00346	.00694	.01162	.01750	.02222	.02594	.02846	.02978	
.05	.00015	.00135	.00375	.00735	.01215	.01785	.02265	.02625	.02866	.02985	
.06	.00022	.00154	.00406	.00778	.01270	.01838	.02306	.02654	.02882	.02990	
.07	.00029	.00173	.00037	.00821	.01325	.01891	.02347	.02683	.02899	.02995	
.08	.00038	.00194	.00470	.00866	.01382	.01942	.02386	.02710	.02914	.02998	
.09	.00049	.00217	.00505	.00913	.01441	.01991	.02423	.02735	.02927	.02999	

2° CURVE (TRANS.-250')

Rate of superelevation (in feet) per ft. width of roadway — Proportional distance from beginning of transition

	0.00	0.10	0.20	0.30	0.40	0.50	0.60	0.70	0.80	0.90	1.00
.00	.00000	.00073	.00290	.00653	.01162	.01800	.02438	.02947	.03310	.03527	.03600
.01	.00001	.00088	.00340	.00698	.01220	.01866	.02496	.02989	.03338	.03541	
.02	.00003	.00105	.00351	.00743	.01281	.01932	.02552	.03038	.03365	.03551	
.03	.00007	.00123	.00384	.00791	.01342	.01998	.02606	.03059	.03390	.03564	
.04	.00012	.00142	.00418	.00839	.01406	.02064	.02659	.03109	.03414	.03574	
.05	.00018	.00163	.00454	.00889	.01470	.02130	.02711	.03146	.03437	.03582	
.06	.00026	.00186	.00491	.00941	.01536	.02194	.02761	.03182	.03458	.03588	
.07	.00036	.00210	.00529	.00994	.01602	.02257	.02809	.03216	.03477	.03593	
.08	.00046	.00235	.00569	.01048	.01668	.02319	.02857	.03249	.03495	.03597	
.09	.00059	.00262	.00611	.01104	.01734	.02380	.02902	.03280	.03512	.03599	

3° CURVE (TRANS.-300')

Rate of superelevation (in feet) per ft. width of roadway — Proportional distance from beginning of transition

	0.00	0.10	0.20	0.30	0.40	0.50	0.60	0.70	0.80	0.90	1.00
.00	.00000	.00097	.00390	.00876	.01558	.02325	.03092	.03774	.04260	.04553	.04650
.01	.00001	.00118	.00429	.00936	.01634	.02402	.03167	.03831	.04298	.04571	
.02	.00004	.00140	.00471	.00997	.01711	.02493	.03244	.03837	.04334	.04588	
.03	.00009	.00165	.00515	.01061	.01788	.02555	.03317	.03940	.04369	.04602	
.04	.00016	.00191	.00561	.01126	.01865	.02632	.03388	.03945	.04401	.04615	
.05	.00024	.00219	.00609	.01193	.01941	.02709	.03457	.04041	.04431	.04626	
.06	.00035	.00249	.00658	.01262	.02018	.02765	.03524	.04089	.04459	.04634	
.07	.00048	.00281	.00710	.01333	.02095	.02862	.03590	.04135	.04485	.04641	
.08	.00062	.00316	.00763	.01406	.02172	.02939	.03653	.04179	.04510	.04646	
.09	.00079	.00352	.00819	.01481	.02248	.03016	.03714	.04221	.04532	.04649	

4° CURVE (TRANS.-350')

Rate of superelevation (in feet) per ft. width of roadway — Proportional distance from beginning of transition

	0.00	0.10	0.20	0.30	0.40	0.50	0.60	0.70	0.80	0.90	1.00
.00	.00000	.00127	.00506	.01140	.01984	.02850	.03716	.04560	.05194	.05573	.05700
.01	.00001	.00153	.00558	.01217	.02070	.02937	.03803	.04635	.05243	.05597	
.02	.00005	.00182	.00613	.01297	.02157	.03023	.03890	.04707	.05290	.05619	
.03	.00011	.00214	.00670	.01379	.02244	.03110	.03976	.04777	.05334	.05638	
.04	.00020	.00248	.00729	.01464	.02330	.03197	.04063	.04844	.05376	.05654	
.05	.00032	.00285	.00791	.01550	.02417	.03283	.04150	.04909	.05415	.05668	
.06	.00046	.00324	.00856	.01637	.02503	.03370	.04236	.04971	.05432	.05680	
.07	.00062	.00366	.00923	.01724	.02590	.03457	.04321	.05030	.05486	.05689	
.08	.00081	.00410	.00993	.01810	.02677	.03543	.04403	.05087	.05518	.05695	
.09	.00103	.00457	.01065	.01897	.02763	.03630	.04483	.05142	.05547	.05699	

5° CURVE (TRANS.-400')

Rate of superelevation (in feet) per ft. width of roadway — Proportional distance from beginning of transition

	0.00	0.10	0.20	0.30	0.40	0.50	0.60	0.70	0.80	0.90	1.00
.00	.00000	.00160	.00640	.01440	.02408	.03375	.04343	.05310	.06110	.06590	.06750
.01	.00002	.00194	.00706	.01537	.02504	.03472	.04439	.05404	.06172	.06620	
.02	.00006	.00230	.00774	.01634	.02601	.03569	.04536	.05496	.06232	.06648	
.03	.00014	.00270	.00846	.01730	.02697	.03665	.04633	.05584	.06288	.06672	
.04	.00026	.00314	.00922	.01827	.02795	.03762	.04730	.05668	.06340	.06692	
.05	.00040	.00360	.01000	.01924	.02891	.03859	.04826	.05750	.06390	.06710	
.06	.00058	.00410	.01082	.02021	.02988	.03956	.04923	.05828	.06436	.06724	
.07	.00078	.00462	.01166	.02117	.03085	.04052	.05020	.05904	.06480	.06736	
.08	.00102	.00518	.01254	.02214	.03182	.04149	.05117	.05976	.06520	.06744	
.09	.00130	.00578	.01346	.02311	.03278	.04246	.05213	.06044	.06556	.06748	

CASE I SUPERELEVATION

2° CURVE (TRANS.-150')

Rate of superelevation (in feet) per ft. width of roadway — Proportional distance from beginning of transition

	0.00	0.10	0.20	0.30	0.40	0.50	0.60	0.70	0.80	0.90	1.00
.00	.01500	.01512	.01548	.01608	.01692	.01800	.01909	.01992	.02052	.02088	.02100
.01	.01500	.01515	.01553	.01615	.01702	.01812	.01918	.01999	.02057	.02090	
.02	.01501	.01517	.01558	.01623	.01712	.01824	.01927	.02006	.02061	.02092	
.03	.01501	.01520	.01564	.01631	.01722	.01835	.01936	.02013	.02065	.02094	
.04	.01502	.01524	.01569	.01639	.01732	.01846	.01945	.02019	.02069	.02096	
.05	.01503	.01527	.01575	.01647	.01743	.01857	.01953	.02025	.02073	.02097	
.06	.01504	.01531	.01581	.01656	.01754	.01868	.01961	.02031	.02077	.02098	
.07	.01506	.01535	.01587	.01664	.01765	.01878	.01969	.02037	.02080	.02099	
.08	.01508	.01539	.01594	.01673	.01777	.01888	.01977	.02042	.02083	.02099	
.09	.01510	.01543	.01601	.01683	.01788	.01902	.01985	.02047	.02086	.02100	

3° CURVE (TRANS.-200')

Rate of superelevation (in feet) per ft. width of roadway — Proportional distance from beginning of transition

	0.00	0.10	0.20	0.30	0.40	0.50	0.60	0.70	0.80	0.90	1.00
.00	.01500	.01533	.01632	.01797	.02028	.02325	.02622	.02853	.03018	.03117	.03150
.01	.01500	.01540	.01646	.01818	.02055	.02358	.02648	.02872	.03031	.03123	
.02	.01501	.01548	.01660	.01838	.02082	.02390	.02674	.02891	.03043	.03129	
.03	.01503	.01556	.01675	.01859	.02110	.02421	.02698	.02909	.03055	.03134	
.04	.01505	.01565	.01690	.01883	.02135	.02452	.02722	.02927	.03064	.03138	
.05	.01508	.01574	.01706	.01904	.02168	.02482	.02746	.02944	.03076	.03142	
.06	.01512	.01586	.01723	.01928	.02198	.02511	.02767	.02960	.03085	.03145	
.07	.01516	.01595	.01741	.01952	.02229	.02540	.02791	.02975	.03094	.03147	
.08	.01521	.01607	.01759	.01977	.02260	.02568	.02812	.02990	.03103	.03149	
.09	.01527	.01619	.01778	.02002	.02292	.02595	.02833	.03004	.03110	.03150	

4° CURVE (TRANS.-250')

Rate of superelevation (in feet) per ft. width of roadway — Proportional distance from beginning of transition

	0.00	0.10	0.20	0.30	0.40	0.50	0.60	0.70	0.80	0.90	1.00
.00	.01500	.01556	.01725	.02006	.02400	.02850	.03300	.03694	.03975	.04144	.04200
.01	.01500	.01568	.01748	.02041	.02445	.02895	.03345	.03727	.03997	.04165	
.02	.01502	.01581	.01772	.02076	.02490	.02940	.03388	.03759	.04018	.04164	
.03	.01505	.01595	.01798	.02113	.02535	.02985	.03430	.03790	.04038	.04173	
.04	.01509	.01610	.01824	.02150	.02580	.03030	.03471	.03820	.04056	.04180	
.05	.01514	.01627	.01852	.02189	.02625	.03075	.03511	.03849	.04074	.04186	
.06	.01520	.01644	.01880	.02229	.02670	.03120	.03550	.03876	.04090	.04191	
.07	.01528	.01663	.01910	.02270	.02715	.03165	.03588	.03903	.04105	.04195	
.08	.01536	.01682	.01941	.02312	.02760	.03210	.03624	.03928	.04119	.04198	
.09	.01546	.01703	.01973	.02355	.02805	.03255	.03660	.03952	.04132	.04200	

5° CURVE (TRANS.-300')

Rate of superelevation (in feet) per ft. width of roadway — Proportional distance from beginning of transition

	0.00	0.10	0.20	0.30	0.40	0.50	0.60	0.70	0.80	0.90	1.00
.00	.01500	.01584	.01837	.02259	.02812	.03374	.03937	.04490	.04912	.05165	.05249
.01	.01501	.01602	.01872	.02310	.02868	.03431	.03993	.04540	.04945	.05181	
.02	.01503	.01621	.01908	.02364	.02975	.03487	.04049	.04588	.04976	.05195	
.03	.01507	.01642	.01946	.02418	.02981	.03543	.04106	.04634	.05005	.05208	
.04	.01513	.01665	.01986	.02475	.03037	.03599	.04162	.04679	.05033	.05219	
.05	.01521	.01690	.02030	.02531	.03093	.03656	.04218	.04719	.05059	.05228	
.06	.01530	.01716	.02070	.02587	.03149	.03712	.04274	.04763	.05084	.05236	
.07	.01541	.01744	.02115	.02643	.03206	.03768	.04330	.04803	.05107	.05242	
.08	.01554	.01773	.02161	.02700	.03262	.03824	.04385	.04841	.05128	.05246	
.09	.01568	.01804	.02209	.02756	.03318	.03881	.04438	.04877	.05147	.05248	

Above tables apply to Valley Highway project only or similar urban projects.

COLORADO
DEPARTMENT OF HIGHWAYS

TABLES FOR SUPERELEVATION OF CURVES

Designed by
Made by
Checked by
Approved by
Date

FEB. ROAD DIV. NO.	STATE	PROJ. NO.	SHEET NO.	TOTAL SHEETS
9	COLO.	U 005-3 (15)	21 A	

CASE II SUPERELEVATION

(TRANS. – 450')

° RVE	Proportional distance from beginning of transition 0.00	0.10	0.20	0.30	0.40	0.50	0.60	0.70	0.80	0.90	1.00
	Rate of superelevation (in feet) per. ft. width of roadway										
0	.00000	.00194	.00778	.01740	.02820	.03900	.04980	.06060	.07022	.07606	.07800
1	.00002	.00235	.00857	.01848	.02928	.04008	.05088	.06168	.07098	.07643	
2	.00008	.00280	.00941	.01956	.03036	.04116	.05196	.06276	.07170	.07676	
3	.00018	.00329	.01028	.02064	.03144	.04224	.05304	.06382	.07238	.07705	
4	.00031	.00382	.01120	.02172	.03252	.04332	.05412	.06486	.07302	.07730	
5	.00049	.00437	.01215	.02280	.03360	.04440	.05520	.06585	.07363	.07751	
6	.00070	.00498	.01314	.02388	.03468	.04548	.05628	.06680	.07418	.07770	
7	.00095	.00562	.01417	.02496	.03576	.04656	.05736	.06772	.07471	.07780	
8	.00124	.00630	.01524	.02604	.03684	.04764	.05844	.06859	.07520	.07792	
9	.00157	.00702	.01632	.02712	.03792	.04872	.05952	.06943	.07565	.07798	

(TRANS. – 450')

° RVE	Proportional distance from beginning of transition 0.00	0.10	0.20	0.30	0.40	0.50	0.60	0.70	0.80	0.90	1.00
	Rate of superelevation (in feet) per. ft. width of roadway										
0	.00000	.00205	.00928	.02054	.03240	.04425	.05610	.06795	.07922	.08645	.08850
1	.00002	.00248	.01026	.02173	.03358	.04543	.05728	.06914	.08017	.08684	
2	.00008	.00295	.01129	.02291	.03477	.04662	.05847	.07032	.08107	.08719	
3	.00018	.00352	.01236	.02410	.03595	.04780	.05965	.07151	.08193	.08749	
4	.00033	.00422	.01347	.02528	.03714	.04898	.06084	.07269	.08276	.08776	
5	.00051	.00496	.01462	.02647	.03832	.05017	.06203	.07387	.08354	.08799	
6	.00074	.00574	.01580	.02765	.03951	.05136	.06321	.07503	.08428	.08817	
7	.00101	.00656	.01699	.02884	.04069	.05254	.06440	.07614	.08497	.08832	
8	.00131	.00742	.01817	.03002	.04188	.05373	.06558	.07720	.08555	.08842	
9	.00166	.00833	.01936	.03121	.04306	.05491	.06677	.07823	.08602	.08848	

CASE I SUPERELEVATION

(TRANS – 350')

6° CURVE	Proportional distance from beginning of transition 0.00	0.10	0.20	0.30	0.40	0.50	0.60	0.70	0.80	0.90	1.00
	Rate of superelevation (in feet) per. ft. width of roadway										
.00	.01500	.01618	.01970	.02556	.03228	.03900	.04572	.05244	.05830	.06182	.06300
.01	.01501	.01642	.02019	.02623	.03295	.03967	.04639	.05311	.05875	.06205	
.02	.01505	.01669	.02069	.02690	.03362	.04034	.04706	.05378	.05919	.06225	
.03	.01511	.01699	.02122	.02758	.03430	.04102	.04774	.05443	.05960	.06242	
.04	.01519	.01731	.02177	.02825	.03497	.04169	.04841	.05505	.05999	.06258	
.05	.01529	.01765	.02235	.02892	.03564	.04236	.04908	.05565	.06035	.06271	
.06	.01542	.01801	.02295	.02959	.03631	.04303	.04975	.05623	.06070	.06281	
.07	.01558	.01840	.02357	.03026	.03698	.04370	.05042	.05678	.06101	.06289	
.08	.01575	.01881	.02422	.03094	.03766	.04438	.05110	.05731	.06131	.06295	
.09	.01595	.01925	.02489	.03161	.03833	.04505	.05177	.05774	.06158	.06299	

(TRANS. – 350')

7° CURVE	Proportional distance from beginning of transition 0.00	0.10	0.20	0.30	0.40	0.50	0.60	0.70	0.80	0.90	1.00
	Rate of superelevation (in feet) per. ft. width of roadway										
.00	.01500	.01643	.02073	.02787	.03606	.04425	.05244	.06063	.06777	.07207	.07350
.01	.01501	.01673	.02132	.02869	.03688	.04507	.05326	.06145	.06833	.07233	
.02	.01506	.01706	.02194	.02951	.03770	.04589	.05408	.06226	.06886	.07258	
.03	.01513	.01742	.02258	.03033	.03852	.04671	.05490	.06305	.06936	.07280	
.04	.01523	.01781	.02326	.03115	.03934	.04753	.05572	.06381	.06983	.07298	
.05	.01536	.01823	.02395	.03197	.04016	.04835	.05654	.06455	.07028	.07314	
.06	.01552	.01867	.02469	.03278	.04097	.04916	.05735	.06524	.07069	.07327	
.07	.01570	.01914	.02545	.03360	.04179	.04998	.05817	.06591	.07108	.07337	
.08	.01592	.01964	.02624	.03442	.04261	.05080	.05899	.06656	.07144	.07344	
.09	.01616	.02017	.02705	.03524	.04343	.05162	.05981	.06718	.07177	.07349	

COLORADO
DEPARTMENT OF HIGHWAYS

TABLES FOR
SUPERELEVATION
OF CURVES

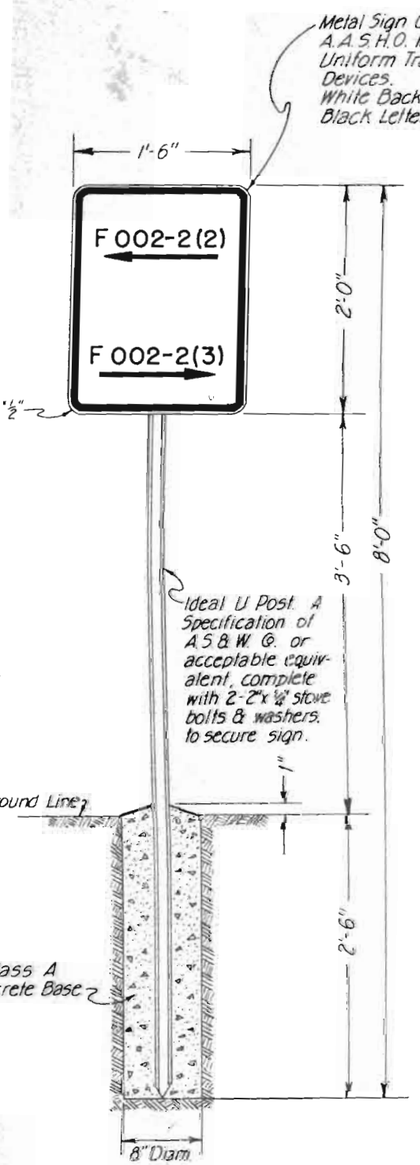
Designed by:
Made by:
Checked by:

Approved by:
Date

FEDERAL ROAD REG. NO.	DIVISION	PROJ. NO.	SHEET NO.	TOTAL SHEETS
9	COLORADO	4005-3(15)	23	

STANDARD M-7-D

PROJECT MARKER POST



NOTES FOR PROJECT MARKER POSTS

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

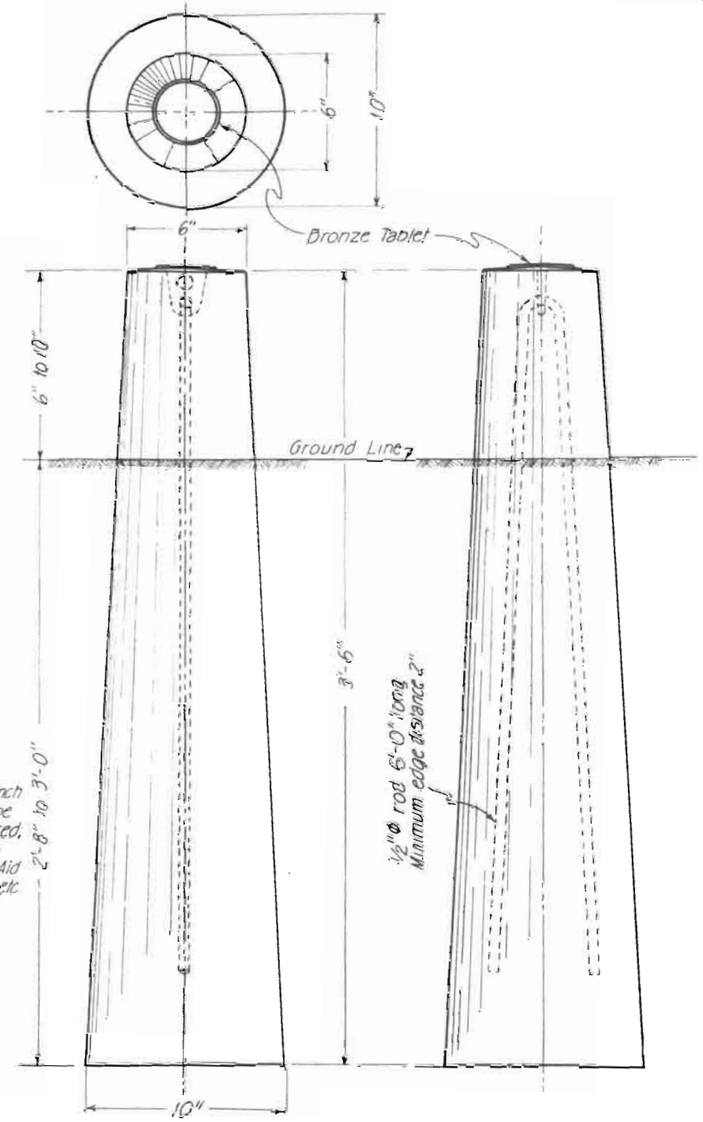
Numbers and arrows shall show the proper numbers and directions of the projects each way from where the post is placed. Post is to be set with sign facing the road at the end of the project, two feet inside the R.O.W. line or at a point amply protected from traffic in such a position that the sign will indicate properly the projects to which it refers.

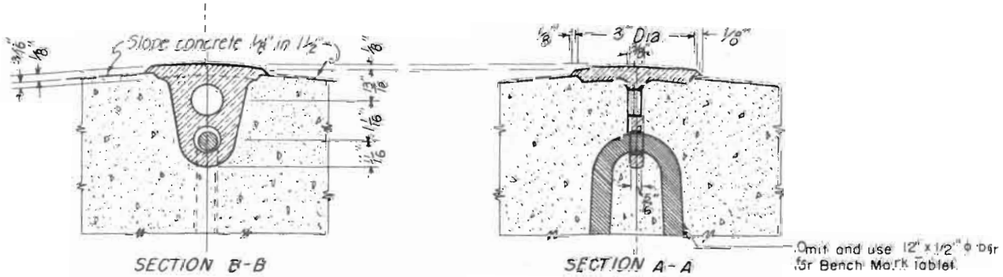
NOTES FOR R.O.W. MARKER POSTS

All work shall be done in accordance with the Standard Specifications of the Colorado 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.)

RIGHT OF WAY MARKER POST





SECTION B-B

SECTION A-A

BENCH MARK

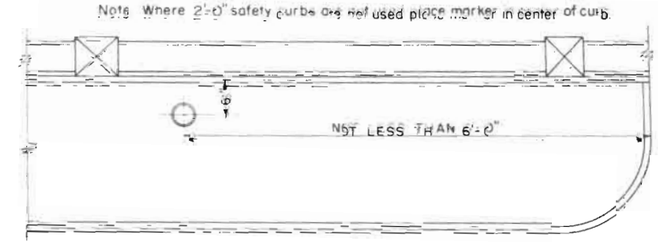
All work shall be done in accordance with Standard Specifications of the Colorado Department of Highways applicable to the project.

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).

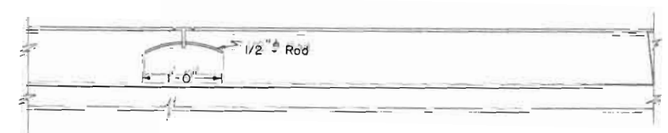
Bronze Bench Mark Tablets will be furnished by the Department at no expense to the Contractor.

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

Note: Where 2'-0" safety curbs are not used place marker in center of curb.



PLAN



ELEVATION

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

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

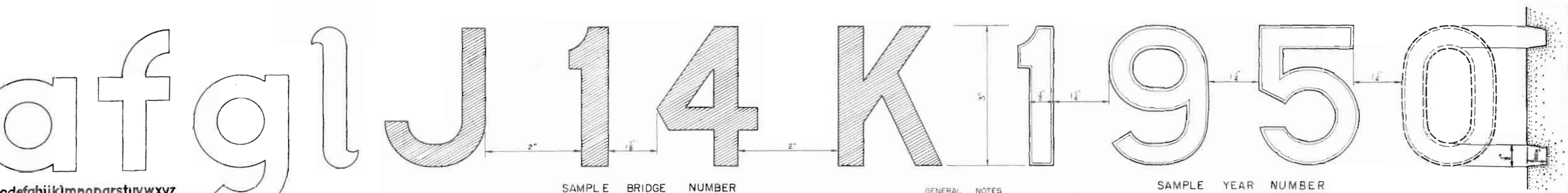
COLORADO
DEPARTMENT OF HIGHWAYS
STANDARD
MARKER POSTS
AND
BENCH MARKS

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

REVISIONS

STANDARD M-10-D

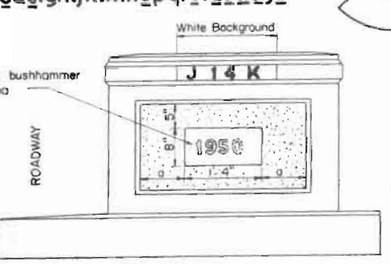
FED. ROAD REG. NO.	DIVISION	PROJECT NO.	SHEET NO.	TOTAL SHEETS
9	COLO.	U 005-3 (18)	24	



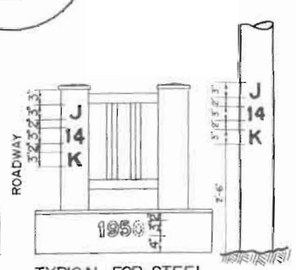
a b c d e f g h i j k l m n o p q r s t u v w x y z

SAMPLE BRIDGE NUMBER

SAMPLE YEAR NUMBER

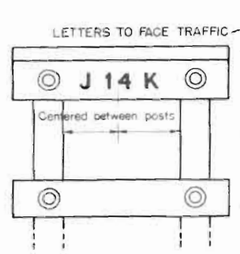


TYPICAL FOR CONCRETE ENDPOST

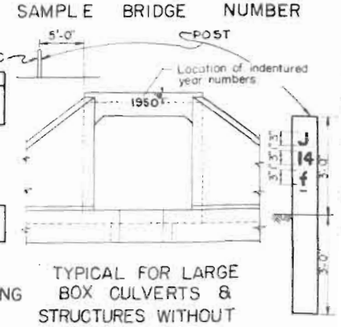


TYPICAL FOR STEEL HANDRAIL END POST

TYPICAL FOR SIGN POSTS



TYPICAL FOR TIMBER WING HANDRAIL



TYPICAL FOR LARGE BOX CULVERTS & STRUCTURES WITHOUT END POSTS

GENERAL NOTES

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 SPACING OF THE LETTERS AND FIGURES SHALL BE 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 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 STRUCTURE 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 UNLESS AN APPROVED WHITE CONCRETE PAINT IS USED BEFORE PAINTING THE SURFACE MUST BE THOROLY 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 38 "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 SUBSIDARY WORK AND SHALL BE INCLUDED IN THE ORIGINAL CONTRACT ITEMS AND WILL NOT PAID FOR AS A SEPERATE ITEM.

STRUCTURE NO.

COLORADO
DEPARTMENT OF HIGHWAYS

STANDARD
LETTERS AND FIGURES
FOR
YEAR NUMBERS AND
STRUCTURE NUMBERS

Designed by Made by Checked by	Approved by [signature] Bridge Engineer Date: Feb. 17, 1958

FED. ROAD REGION NO.	DIVISION		SHEET NO.	TOTAL SHEETS
9	COLO.	M 005-3(15)	25	

STANDARD M-19-E

STANDARD TIMBER GUARD POSTS

SPECIFICATIONS

(Work By Contractor)

POSTS- Lodgepole Pine, Southern Yellow Pine or West Coast Douglas Fir, not less than six (6) inches in diameter. All posts shall be pressure treated with Pentachlorophenol as provided under paragraph 42.2.20 of the specifications, after being peeled and shaved in accordance with specifications.

PAINTING - Posts shall be painted with aluminum paint and a black band placed around each post as per details on this sheet. Number of coats and type of paint applied shall be in accordance with specifications.

(Work By State Forces)

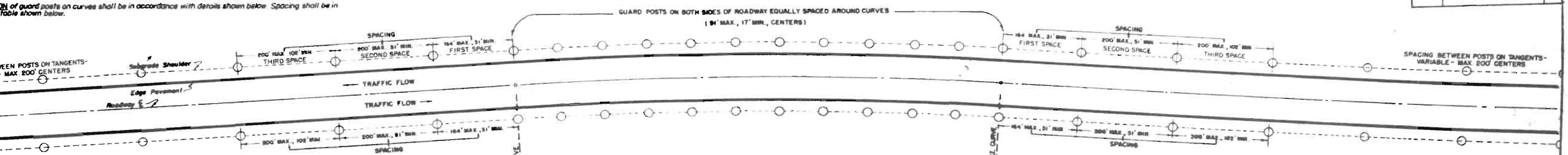
REFLECTIVE SHEETING- In accordance with the details hereon, State Forces will furnish and place the required 2"x 6" smooth surfaced reflective delineators fabricated from 3s - H14 aluminum alloy, minimum thickness 0.025", reflectorized with reflective sheeting strips or other approved reflective materials. Strips shall be suitable for placement around a curved surface.

REVISIONS

10-9-58	Added Spacing Table	J.C.R.

Typical Installation on Curves & Tangents

...ON of guard posts on curves shall be in accordance with details shown below. Spacing shall be in ...table shown below.



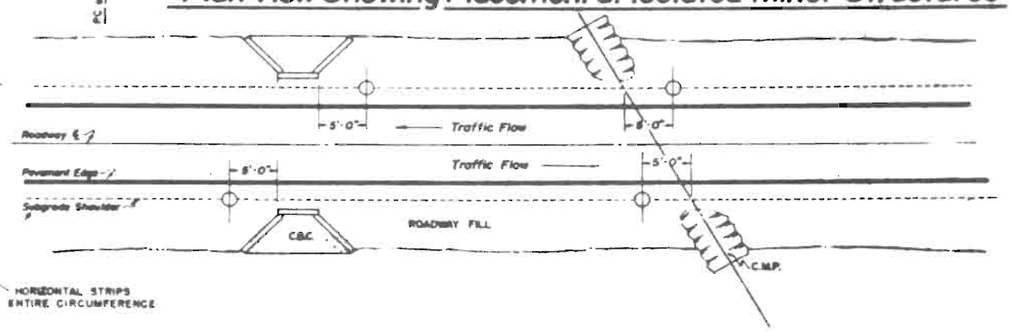
SPACING FOR DELINEATORS ON HORIZONTAL CURVES

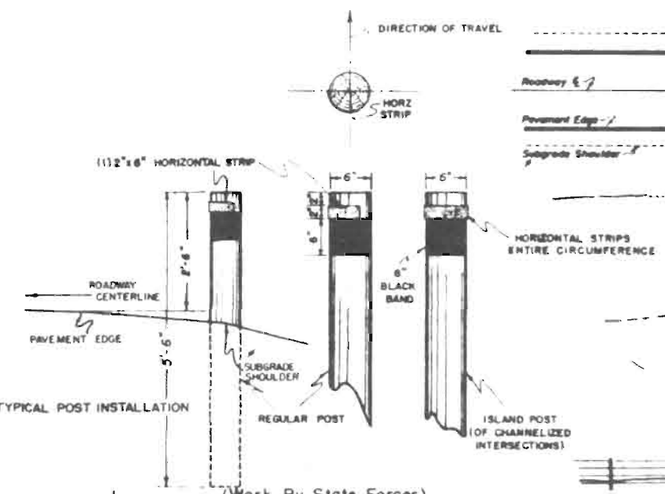
...E	RADIUS	⊙ SPACING ON CURVE	SPACING IN ADVANCE OF AND BEYOND CURVE			DEGREE OF CURVE	RADIUS	⊙ SPACING ON CURVE	SPACING IN ADVANCE OF AND BEYOND CURVE		
			FIRST SPACE	SECOND SPACE	THIRD SPACE				FIRST SPACE	SECOND SPACE	THIRD SPACE
		FEET	FEET	FEET	FEET			FEET	FEET	FEET	FEET
...'	11460.0'	129	200	200	200	8°00'	716.3'	33	59	99	198
...'	5730.0'	91	164	200	200	8°30'	674.1'	32	58	96	192
...'	3820.0'	74	133	200	200	9°00'	636.7'	31	56	93	186
...'	2865.0'	64	115	192	200	9°30'	603.2'	30	54	90	180
...'	2292.0'	58	104	174	200	10°00'	573.0'	29	52	87	174
...'	1910.0'	53	95	159	200	10°30'	545.7'	28	50	84	168
...'	1637.1'	49	88	147	200	11°00'	520.9'	28	50	84	168
...'	1432.5'	46	83	138	200	11°30'	498.3'	27	49	81	162
...'	1273.3'	43	77	129	200	12°00'	477.5'	27	49	81	162
...'	1146.0'	41	75	123	200	15°00'	382.0'	24	43	72	144
...'	1041.8'	39	70	117	200	18°00'	318.3'	22	40	66	132
...'	955.0'	37	67	111	200	21°00'	272.9'	20	36	60	120
...'	881.5'	36	65	108	200	25°00'	229.2'	19	34	57	114
...'	818.6'	35	63	105	200	30°00'	191.0'	17	31	51	102
...'	764.0'	34	61	102	200						

...2√R+18 1-ST. SPACE = 1.8S 2-ND. SPACE = 3S 3-RD. SPACE = 6S

NO SPACES TO EXCEED 200 FT.

Plan View Showing Placement at Isolated Minor Structures

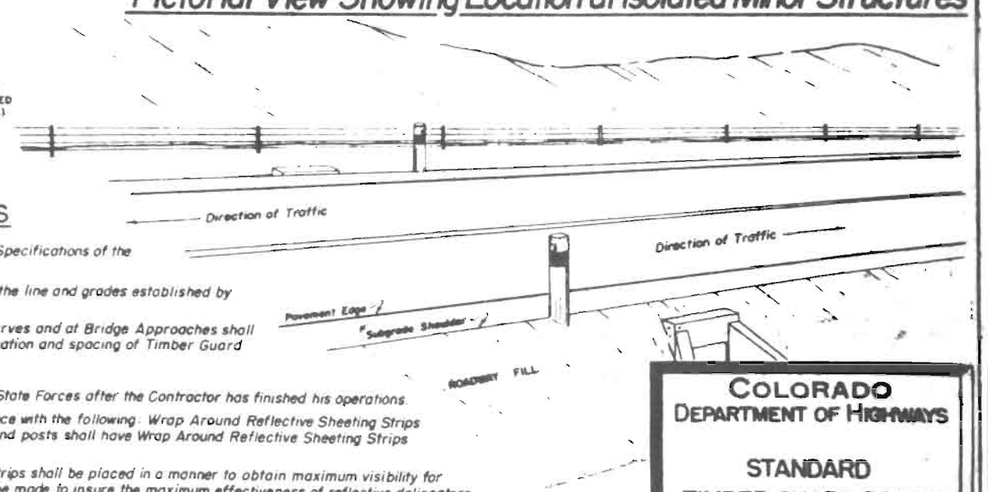




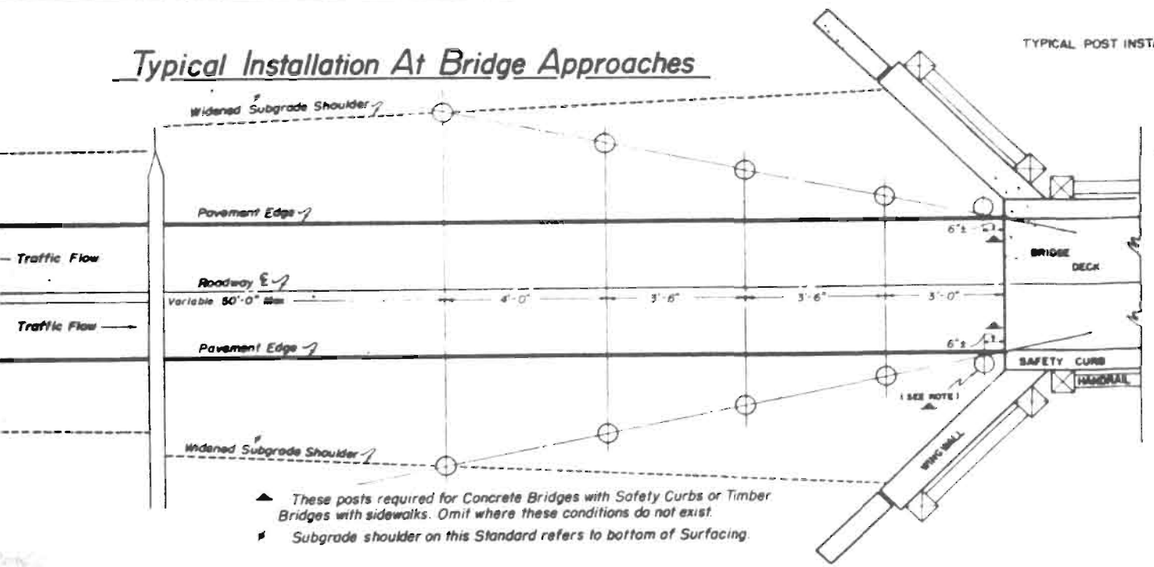
(Work By State Forces)

INSTALLATION DETAILS OF REFLECTORIZED STRIPS

Pictorial View Showing Location at Isolated Minor Structures



Typical Installation At Bridge Approaches



▲ These posts required for Concrete Bridges with Safety Curbs or Timber Bridges with sidewalks. Omit where these conditions do not exist.

Subgrade shoulder on this Standard refers to bottom of Surfacing.

GENERAL NOTES

(Work By Contractor)

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

All posts shall be set and tamped in, plumb and firm, to the line and grades established by the Engineer.

INSTALLATION of Timber Guard Posts on Tangents, Curves and at Bridge Approaches shall be in conformity with details on this sheet. The number, location and spacing of Timber Guard Posts is shown on plans.

(Work By State Forces)

Reflective delineators shall be furnished and installed by State Forces after the Contractor has finished his operations.

Installation of reflective delineators shall be in accordance with the following: Wrap Around Reflective Sheeting Strips shall be installed horizontally one (1) sheet on all posts. Island posts shall have Wrap Around Reflective Sheeting Strips placed horizontally to cover entire circumference of Post.

On Divided Highways and Islands, Reflective Sheeting Strips shall be placed in a manner to obtain maximum visibility for the primary direction of travel. In all instances tests shall be made to insure the maximum effectiveness of reflective delineators.

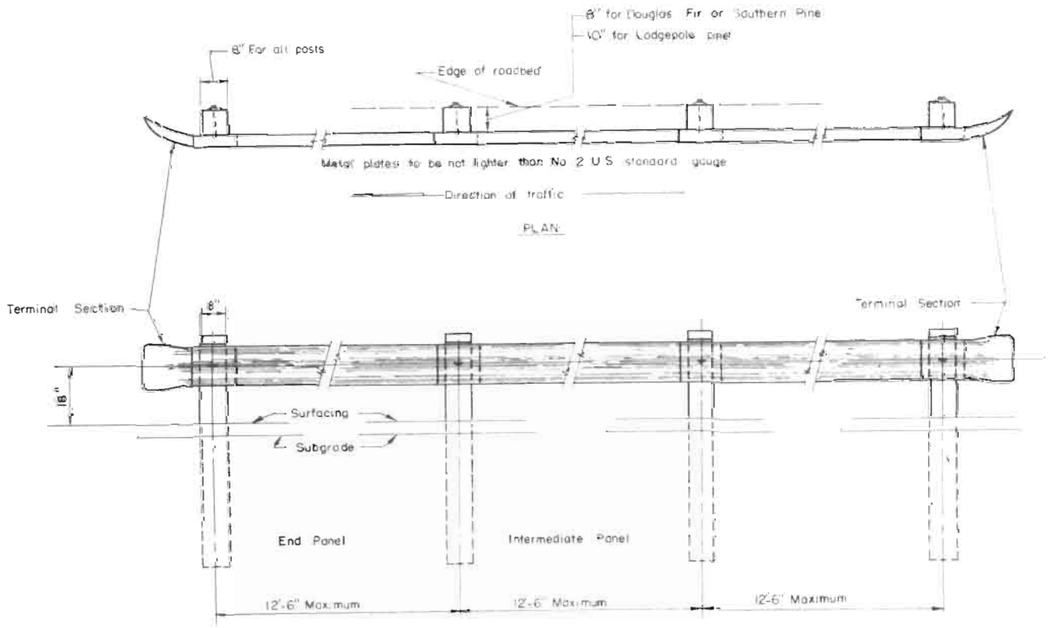
All Traffic Islands shall be marked with island Posts as indicated hereon.

COLORADO DEPARTMENT OF HIGHWAYS

STANDARD TIMBER GUARD POSTS

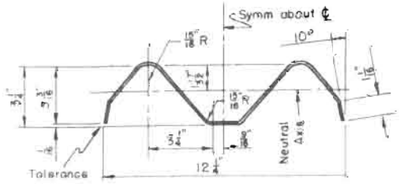
Designed by Made by Checked by	Approved by C. Julian Engineer, Service & Plans Date: March 25, 1959

FED. ROAD REG. NO.	DIVISION	PROJECT NO.	SHEET NO.	TOTAL SHEETS
9	COLO.	4005-3(15)	26	

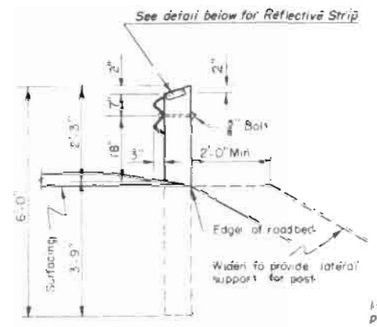


ELEVATION

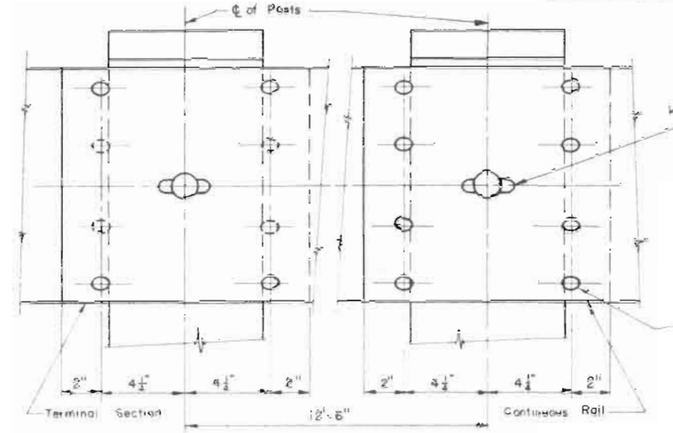
TYPICAL METAL PLATE GUARD RAIL



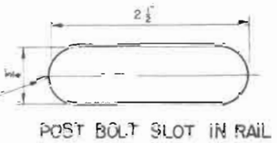
SECTION THRU RAIL ELEMENT



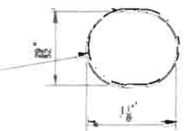
DETAIL SHOWING TYPICAL LOCATION OF GUARD FENCE



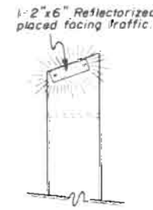
DETAIL OF RAIL SPLICE



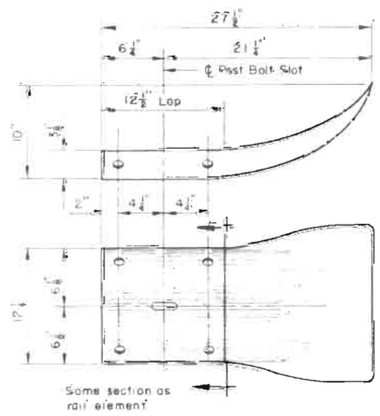
POST BOLT SLOT IN RAIL



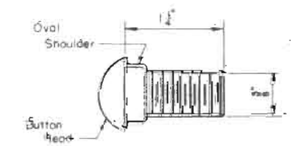
SPLICE BOLT SLOT IN RAIL



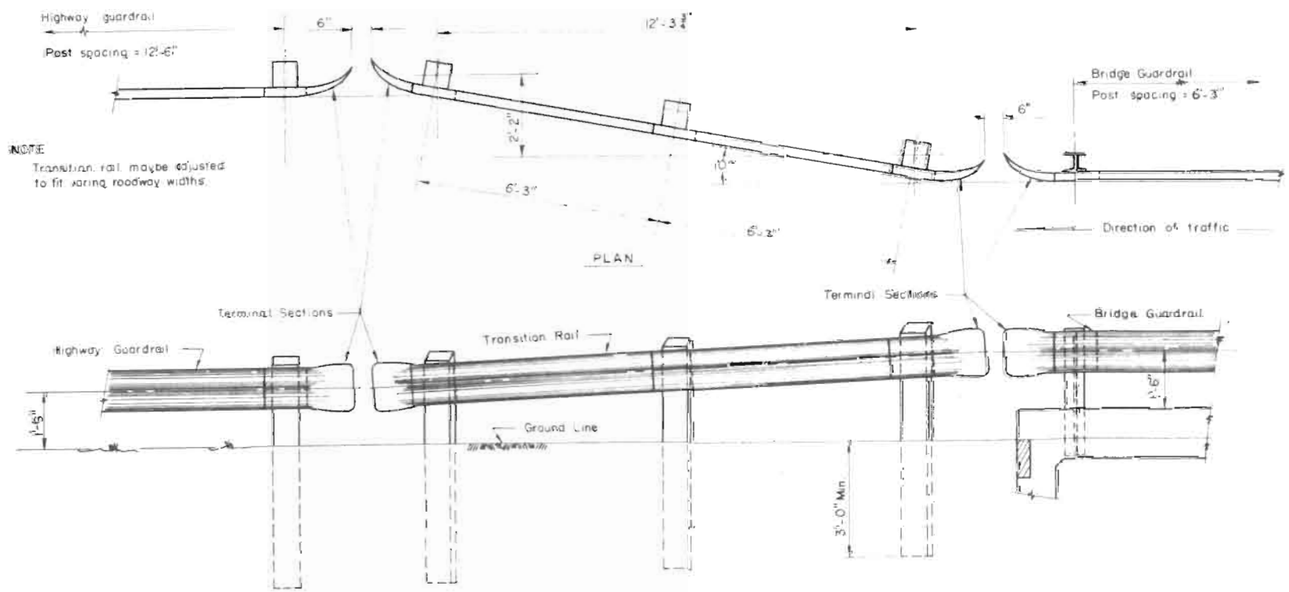
INSTALLATION DETAILS OF REFLECTORIZED STRIP (Work by State Forces)



DETAIL OF TERMINAL SECTION



SPLICE BOLT
8 Req'd per splice
4 Req'd per terminal



ELEVATION

TRANSITION RAIL AT BRIDGES ONLY

GENERAL NOTES

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

All wood posts shall be close grained Douglas Fir of the Coast Region, Dense Longleaf or Shortleaf Southern Pine or Lodgepole Pine.

All wood posts shall be square edged, full sawn, with tops beveled as shown. All bolt holes are to be drilled ⅛ inch larger than diameter of bolt before treatment is applied. All wood posts shall be pressure treated for the full length of the posts as provided for in the specifications.

Timber posts fabricated from Douglas Fir or Southern Pine shall be 8"x8" square. Timber posts fabricated from Lodgepole Pine shall be 8"x10" and shall be installed with the 8" face parallel to the center line of the roadway.

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

Metal plate guard fence shall be painted in accordance with standard specifications.

Metal plate guard fence galvanized in accordance with Table I of ASTM A-93 may be furnished in lieu of painting requirements.

Metal plates shall not be lighter than No 12 U S standard gauge.

Standard galvanized cast iron O G or galvanized malleable cast washers shall be used under all bolt heads and nuts coming in contact with wood posts.

Where sidewalks are constructed adjacent to the lane for traffic, guard fence shall be placed in such a manner that the fence lies on the line between the sidewalk area and the normal roadway shoulder.

Where guard fences are constructed on the approaches to bridges with sidewalks, the fence at bridge shall be placed in line with the face of the curbing on the bridge.

(Work by State Forces)

Reflective delineators shall be furnished and installed by State Forces after the Contractor has finished his operations.

COLORADO
DEPARTMENT OF HIGHWAYS
STANDARD
METAL PLATE GUARD FENCE
(BEAM TYPE)

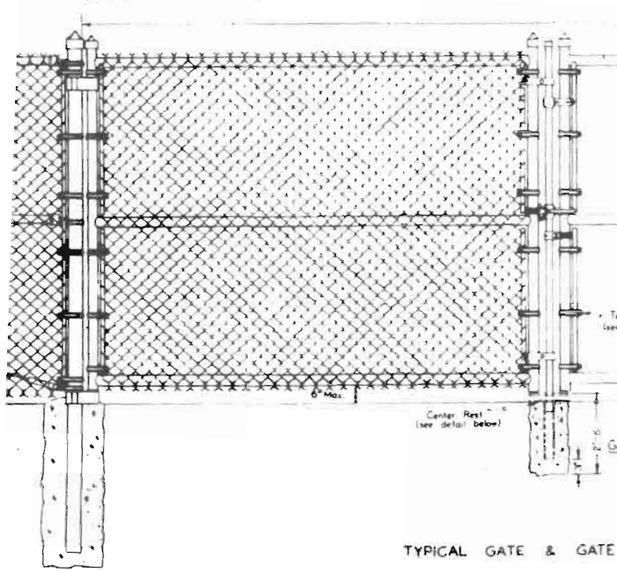
Designed by Made by J.R.L. Checked by	Approved by [illegible] Bridge Engineer Date: May 10, 1956

STANDARD M-26-D

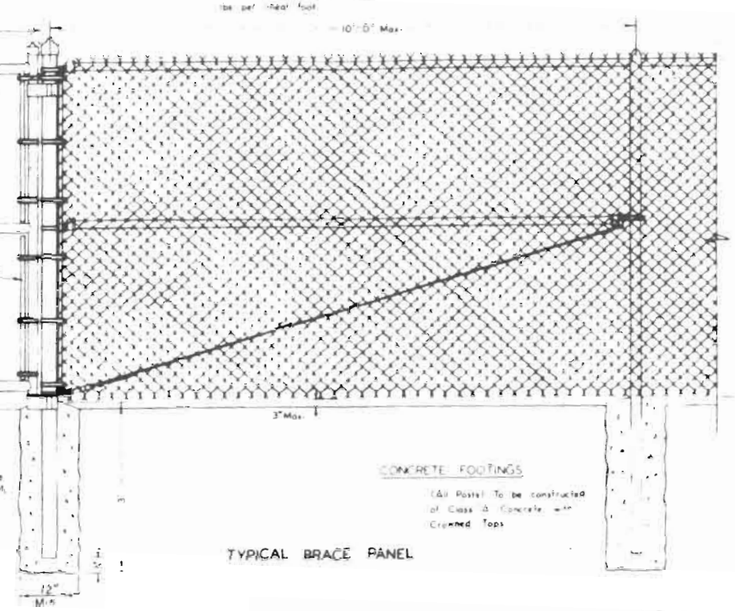
FED ROAD REG. NO.	DIVISION		SHEET NO.	TOTAL SHEETS
9	COLO	H005-3(15)	27	

REVISIONS

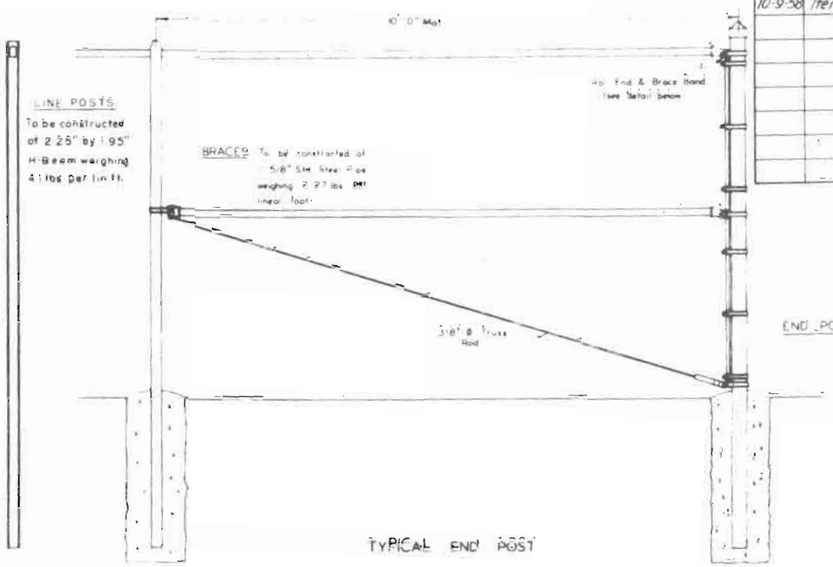
10-9-58	Item No	J.C.R.



TYPICAL GATE & GATE POSTS



TYPICAL BRACE PANEL



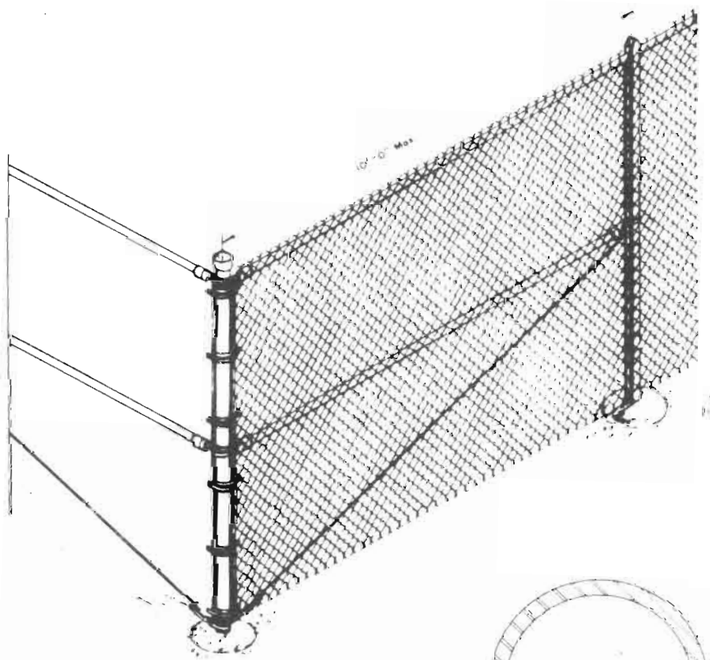
TYPICAL END POST

End Posts with Braces, Stretcher Bars and Fittings, corresponding to details shown hereon for Typical Corner Section with End Posts and Braces, are to be used in fence at intervals of not more than four hundred (400) feet.

TYPICAL LINE POST
(See alternate below)

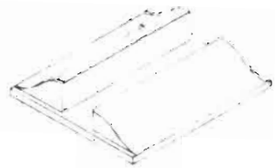
SPECIFICATION NUMBERS

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

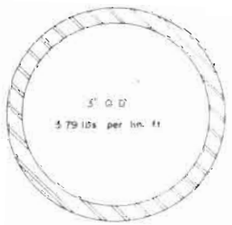


TYPICAL CORNER SECTION WITH POST & BRACES

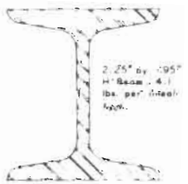
LINE POST TOP
(Top view of bunched & spinted posts)



CENTER REST



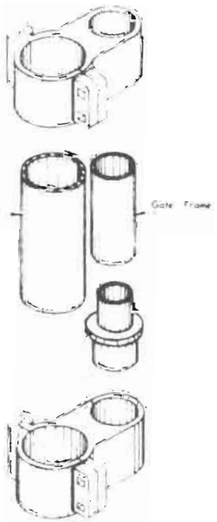
TERMINAL POSTS



H-BEAM LINE POST

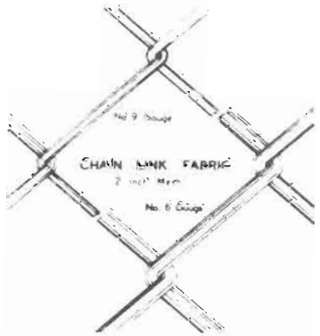
ALTERNATE LINE POST

BRACE RAIL & TOP RAIL

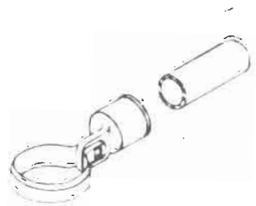


HINGE ASSEMBLY

TENSION BAND



All Fabric shall be No. 9 Gauge with a barbed finish on the top and bottom selvage unless otherwise specified.



BRACE BAND & RAIL END

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 Equivalent Standard Fittings, Gates, Posts, and Rails of "Me" 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.B.M.) Gauge galvanized Steel Wire and spaced at a minimum of 6 per 10 feet Horizontally, 8 1 per foot Vertically. Suitable Attachment Bands shall used on all Gate Posts, End Posts, Braces and Stretcher Bars.

COLORADO
DEPARTMENT OF HIGHWAYS

CHAIN LINK WIRE MESH
(SCHOOL) FENCE

Designed by: V.L.A.
Made by: E.L.H.
Checked by:
Approved by: [signature] Design Engineer
Date: 9-1-50

STANDARD ROADWAY CONSTRUCTION TRAFFIC SIGNS

STANDARD M-29-C
(SHEET 1 OF 2 SHEETS)

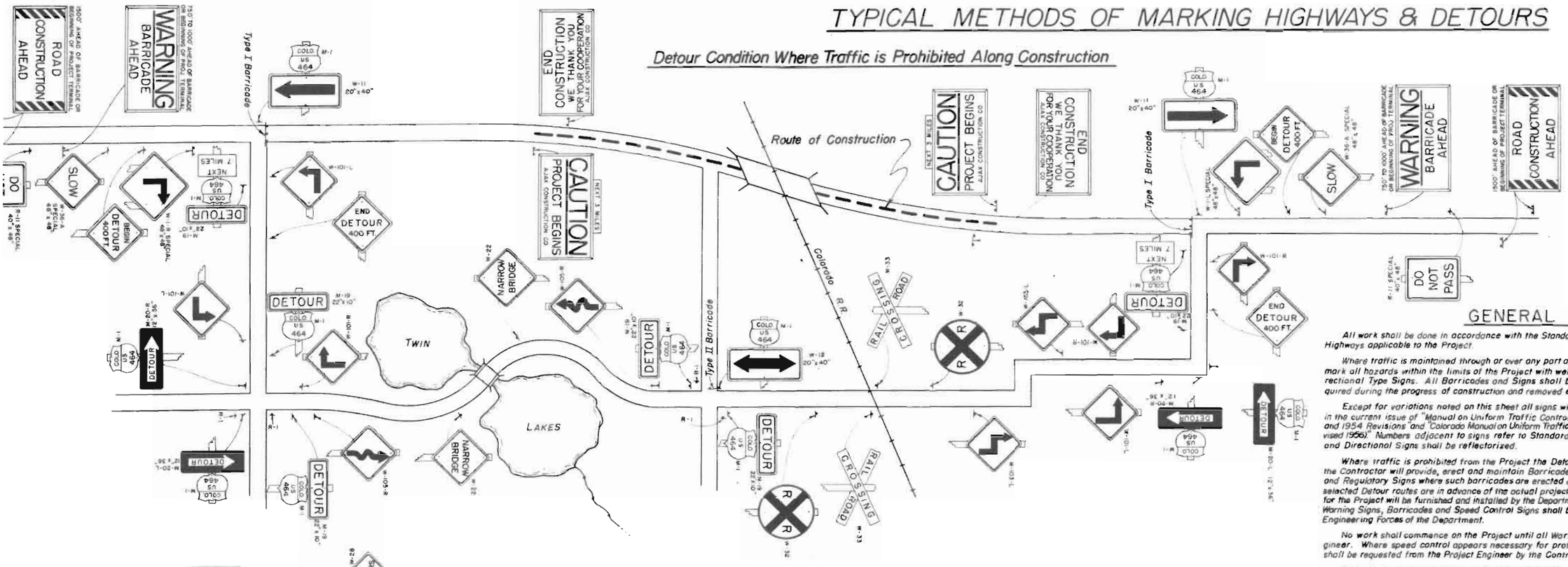
FED. ROAD REG. NO.	DIVISION		SHEET NO.	TOTAL SHEETS
8	COLO.	2000 S-3(4)	28	

REVISIONS

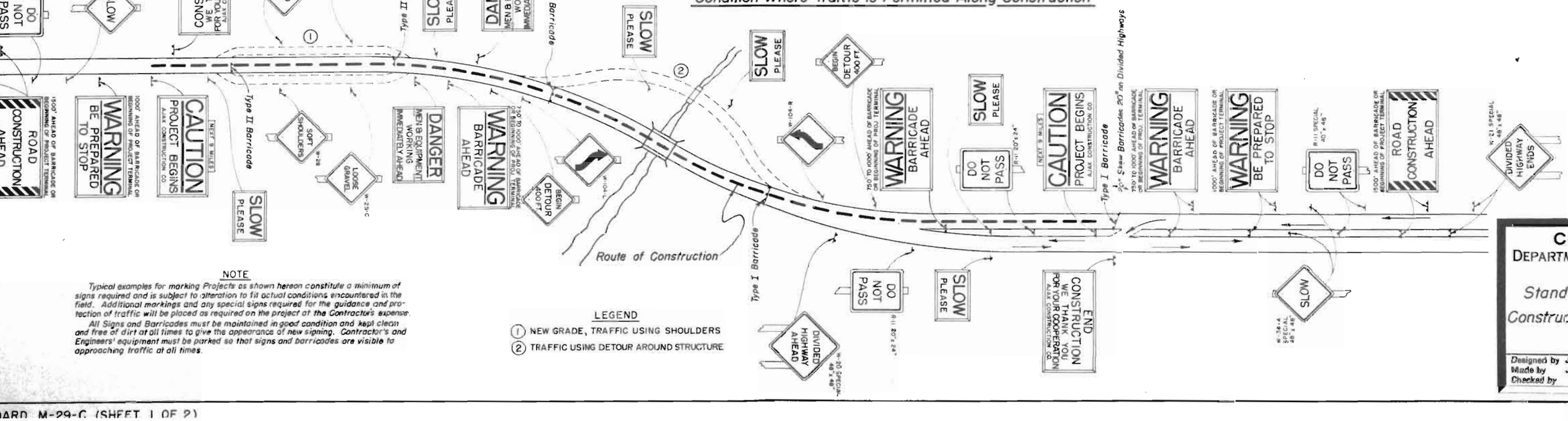
10-23-58	General	J.C.R.

TYPICAL METHODS OF MARKING HIGHWAYS & DETOURS

Detour Condition Where Traffic is Prohibited Along Construction



Condition Where Traffic is Permitted Along Construction



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 issue of "Manual on Uniform Traffic Control Devices for Streets & Highways, PRA August 1948 and 1954 Revisions and "Colorado Manual on Uniform Traffic Control Devices for Streets & Highways CDOH 1952 (Revised 1956)". Numbers adjacent to signs refer to Standards in the 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 travelling public, such speed control shall be requested from the Project Engineer by the Contractor.

All signs are to be in clear view of approaching traffic and are not to be obstructed by equipment, weeds or otherwise.

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.

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

NOTE

Typical examples for marking Projects as shown hereon constitute a minimum of signs required and is 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.

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 Engineers' equipment must be parked so that signs and barricades are visible to approaching traffic at all times.

LEGEND

1. NEW GRADE, TRAFFIC USING SHOULDERS
2. TRAFFIC USING DETOUR AROUND STRUCTURE

COLORADO
DEPARTMENT OF HIGHWAYS

Standard Roadway Construction Traffic Signs

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

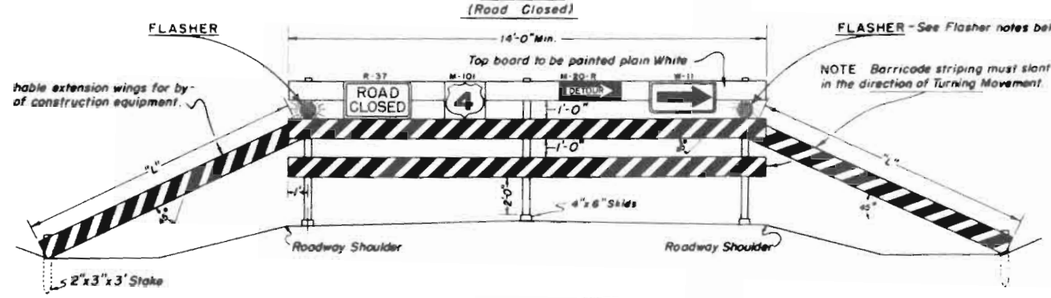
STANDARD ROADWAY CONSTRUCTION TRAFFIC SIGNS

STANDARD M-29-C
(SHEET 2 OF 2 SHEETS)

FEDERAL ROAD REGION NO.	DIVISION	PROJ. NO.	SHEET NO.	TOT SHEE
9	COLORADO	U005-3(15)	29	

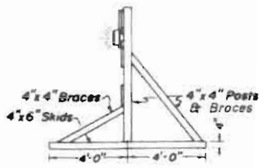
Rev 10-23-58 H J.C.R.

DETAILS OF BARRICADES

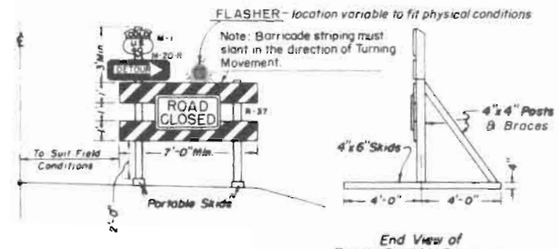


"L" Variable, length to be adequate to provide closing of borrow pit and shoulder.

NOTE
The various types & combinations of approved Signs and Beacons for Barricades required for each project will be governed by field conditions and subject to approval by the Engineer.



End View of
Type I Portable Barricade
(Optional)



End View of
Type II Portable Barricade
(Optional)

NOTE: Alternate materials or other reflective elements on Construction Traffic Signs and Barricades will be permitted only after approval of such material by the Department.

SPECIFICATIONS

PAINT - All paint and methods of painting shall be in conformity with the Standard Specifications of the Colorado Department of Highways for painting of Timber Structures.

STRIPING - Planking and Wings shall be painted with Maintenance Flat Black on both sides before adding any one of the following acceptable Reflective Strips:
(a) Wide Angle White, 7" strip, spaced 8" apart.
(b) Flat Top Silver, 3" strip, spaced 7" apart.
▲(c) Direct Process of Glass Beads on Paint, 3" strip, spaced 7" apart.

Stripes shall be applied on both front and back of barricades for opposite direction use. Diversion of traffic will be accomplished as follows:
1- Stripes for barricades diverting traffic to the left shall start on the right hand side of the lower plank and progress up to the left. 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 up in both directions.

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

Planking	1"x12" or 2"x12"	S4S
Posts (Barricades)	6"x6"	S4S
Posts (Signs)	4"x4"	S4S

The Reflectorized Stripes on planking & wings on all barricades shall be reflectorized with White or Silver Reflective Material of a type acceptable to the Department.

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

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

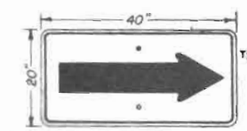
Bases to be weighted where necessary to provide stability.

▲ When this method is used as described above or when white binder and beads are applied to planking and wings, alternate black stripes using Maintenance Flat Black paint shall be applied over the reflective material in the prescribed pattern. All measurements for striping are to be made along the horizontal axis of the board.

DETAILS OF CONSTRUCTION SIGNS

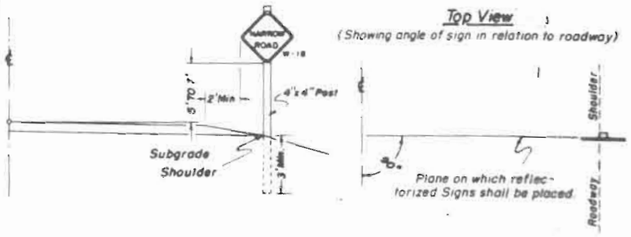
Details of Reflectorized Arrows

MARKINGS - A Wide Angle White Reflectorized Arrow of Reflective Material acceptable to the Department to be placed on a Black background. Letters to be 4" in height.



MARKINGS - A Black Arrow on a Wide Angle Yellow background of Reflective Material acceptable to the Department.

Position of Signs Relative to Roadbed & Hazards



NOTE:
Warning Signs to be made of 3/8" (Min.) plywood or No. 16 Gauge (Min.) metal 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.

DETAILS OF SIGN AND BEACON FABRICATION AND USAGE

Construction Signs "A" through and including "G" shall be made of 3/4" Plywood or other material approval by the Department, and as per details above. Signs shall be reflectorized with reflective sheeting or other reflective materials of types approved by the Department.

CONSTRUCTION SIGN "A" - Wide Angle White background with painted Black lettering. Barri- e stripes of 4" Wide Angle White placed over Black painted vertical stripe spaced as shown ve. This sign is the First advance warning sign and shall be placed 1500 feet ahead of barricade beginning of project terminal and on both sides of the travelled way in all cases.

CONSTRUCTION SIGN "B" - Apply top 23" strip of Flat Top Silver, reversed screened or spray- with Transparent Red Paint allowing the words "WARNING" and 1-inch Underline to remain as t Top Silver. Balance of lettering painted Black on a 22" strip of Wide Angle White. This sign is Second advance warning sign and shall be placed 1000 feet ahead of barricade or beginning of ject terminal and on both sides of the travelled way on divided highways and singly on two-lane hways.

CONSTRUCTION SIGN "C" - Apply top 23" strip of Flat Top Silver, reversed screened or spray- with Transparent Red Paint allowing the words "WARNING" and 1-inch Underline to remain as Top Silver. Balance of lettering painted Black on a 22" strip of Wide Angle White. This sign is Third advance warning sign in cases where barricades are used and shall be placed 750 to 0 feet ahead of barricade or beginning of project terminal and on both sides of the travelled on divided highways and singly on two-lane highways.

REVERSE SIDES OF SIGNS "A", "B" and "C" - The word "SLOW" shall be painted Black superimposed over a Yellow miniature W-36-A background panel. Balance of lettering shall painted Black on a White background.

CONSTRUCTION SIGN "D" - Apply top 24½" strip of Flat Top Silver, reversed screened or spray- with Transparent Red Paint allowing the words "CAUTION" and 1½-inch Underline to remain Flat Top Silver. Balance of lettering painted Black on a 20½" strip of Wide Angle White. This will be provided with a detachable 1" material board mounted on back of sign with 2-⅛"x 2" ts. This board shall be painted White with Black lettering. (Indicate to the nearest Mile). This shall be placed to mark the Beginning of the Project. To be placed singly and may be placed osite barricade if desirable.

CONSTRUCTION SIGN "E" - Apply top 17½" strip of Flat Top Silver, reversed screened or spray- with Transparent Red Paint allowing the words "DANGER" and 1-inch Underline to remain as Top Silver. Balance of lettering painted Black on a 27½" strip of Wide Angle White. The is of the hinged and fold type to facilitate the closing down of sign when the need is not pre- nt. This sign shall be placed 500 feet ahead of the situation on hand.

CONSTRUCTION SIGN "F" - The words "END CONSTRUCTION" and "CONTRACTORS NAME" shall be painted Black on strips 22" and 6½" respectively of Wide Angle White. For balance of lettering, apply 16½" strip of Flat Top Silver, reversed screened or sprayed with Transparent Red Paint allowing "WE THANK YOU FOR YOUR COOPERATION" remaining in Flat Top Silver. This sign shall be placed to mark the Ending of the Project. To be placed singly and may be placed opposite barricade if desirable.

CONSTRUCTION SIGN "G" - The words "SLOW" and "PLEASE" shall be painted Black on a background of Wide Angle Yellow. This sign shall be used frequently within the limits of the Project.

All of the preceding signs shall be fastened to 2-4"x4" posts set 4 feet in the ground with a minimum of 3-1"x4" nailing strips on the back. Bottom of sign to be not less than 36" above the ground.

FLAGMAN WARNING SIGN "H" - This sign shall be made of Plastic or other lightweight material, painted Red background with White lettering on the "STOP" side and 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" - To be of 3/8" (Min.) plywood or No. 16 (Min.) gauge metal with Black painted letters on a Wide Angle Yellow Background.

CONSTRUCTION SIGN "J" - 3/8"x 9" metal slides to be placed between "NEXT ___ MILES", spaced so as to accommodate appropriate size numerals. Required numerals to be furnished by the Department and to be installed by the Contractor. Numerals calculated to the nearest Mile.

All material shall be sound and durable. Barricades, signs, symbols and lettering conforming to styles noted hereon will be of good workmanship and well maintained. Uneven lettering will not be accepted.

FLARES AND TORCHES shall be either of the oil burning or electrical type approved by the Department and shall be placed 3 feet to 5 feet ahead of the object to be illuminated. Particular care shall be taken to protect oil signs and barricades from smoke and smudge arising from the use thereof.

FLASHERS used on Type I or II Barricade shall be of the Battery or Electrical Type and shall have no less than 12.566 sq. inches of light area (4" dia. lens). The illuminating element in a flashing amber beacon or signal shall be flashed continuously at a rate between 50 or 60 flashes per minute 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.

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.	"WARNING BE PREPARED TO STOP"	Minimum 2
3.	"WARNING BARRICADE AHEAD"	As Required
4. ■	Standard Warning & Directional Signs	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: Type I Barricade	Minimum 3
	Type II Barricade	Minimum 1
9	Flashers - Type I Barricade	2 Required
	Type II Barricade	As Required

■ Including Type I Barricade located immediately inside of Project terminal points.

COLORADO DEPARTMENT OF HIGHWAYS

Standard Roadway Construction Traffic Signs

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

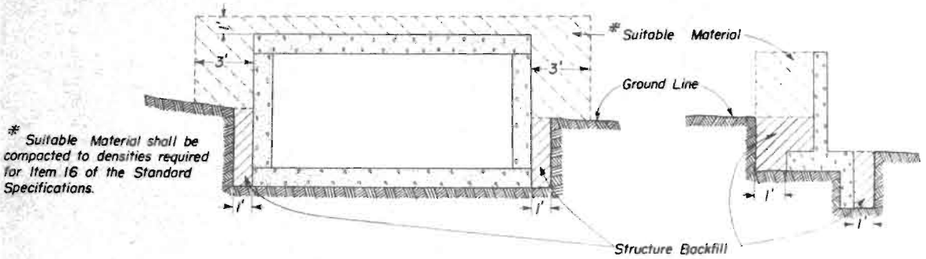
STANDARD M-60-B

FED. ROAD REGION NO.	DIVISION		SHEET NO.	TOTAL SHEETS
9	COLO.	U005-3(15)	30	

REVISIONS

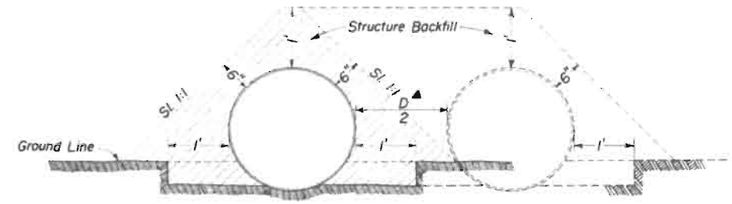
2-9-59	Dbl. Cond. & Cond. in Tr.	H.E.P.

CONCRETE BOX CULVERTS & WINGWALLS



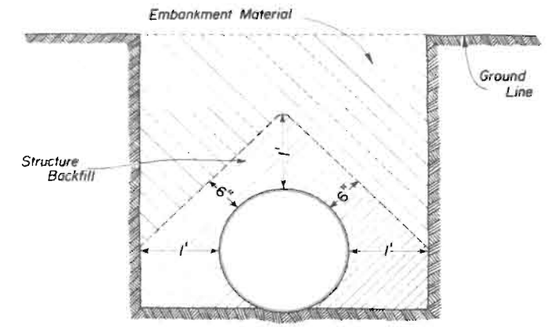
Suitable Material shall be compacted to densities required for Item 16 of the Standard Specifications.

CIRCULAR CONDUIT



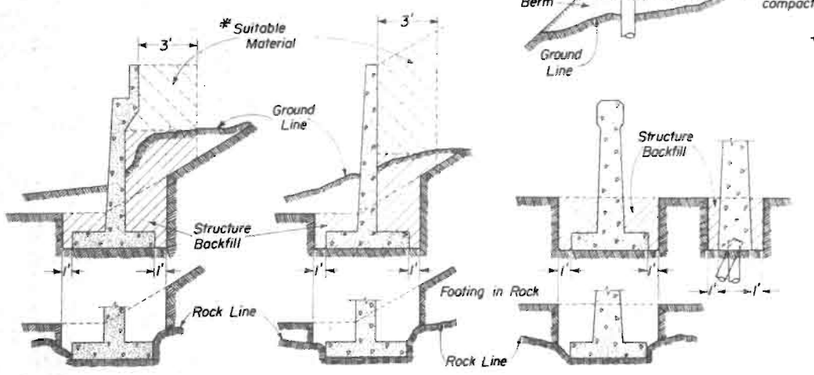
▲ When two or more conduits are layed side by side, the distance between conduits shall be 1/2 the conduit diameter but not less than 2'-0".

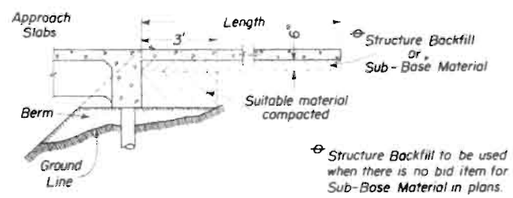
SIPHONS OR CONDUIT IN TRENCH



PIERS, ABUTMENTS, RETAINING WALLS ETC.

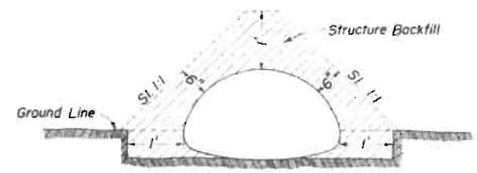
All material that is to be compacted shall be placed in horizontal layers not more than 6" inches in depth and compacted before the next layer is placed. For Arches, Rigid Frames and Box Culverts the fill shall be brought up uniformly on both sides of the center of structure to avoid stresses in the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



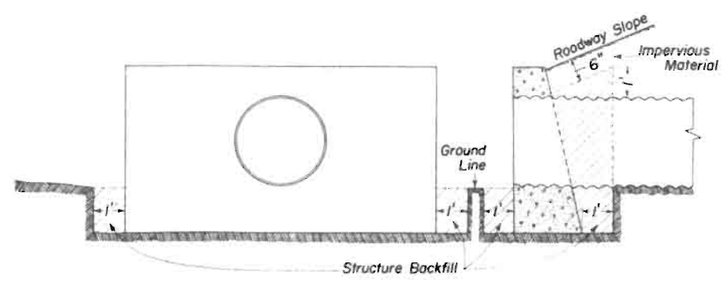


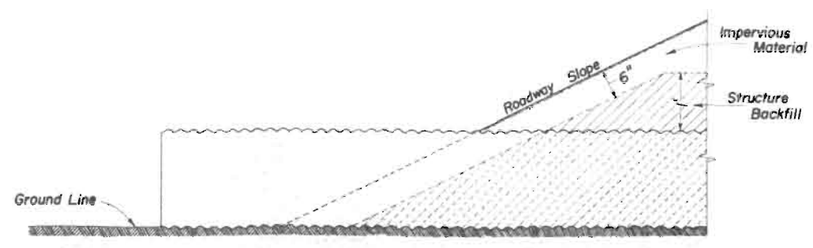
Structure Backfill to be used when there is no bid item for Sub-Base Material in plans.

ELLIPTICAL OR ARCH CONDUIT

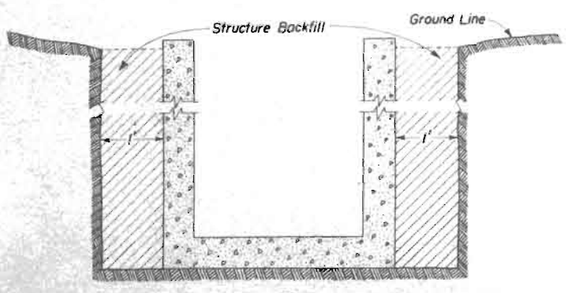


HEADWALLS AND END OF CULVERTS





DROP INLETS, DIVISION BOXES, INTERCEPTING HEADWALLS ETC.



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 other suitable material and compacted in accordance with Item 16 of the Standard Specifications.

Suitable Material shall be any "Unclassified Excavation" material developed on the project except large rock, boulders or other materials considered by the Engineer to be undesirable for backfill around culverts, boxes etc.

COLORADO
DEPARTMENT OF HIGHWAYS

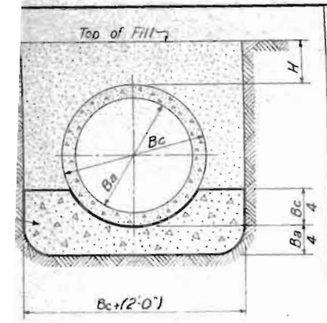
STANDARD METHODS OF BACKFILL AROUND STRUCTURES

Designed by H.E.P. Made by D.M.E. Checked by L.E.O.	Approved by [signature] Bridge Engineer Date: May 2, 1958

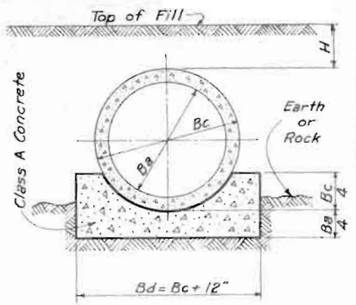
STANDARD M-112-F

FED. ROAD REGION NO.	DIVISION	PROJECT NO.	SHEET NO.	TOTAL SHEETS
9	COLO.	W008-(15)	31	

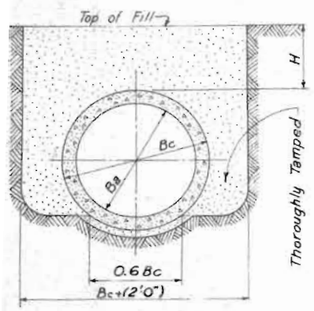
Rev - Ref of Conc. Pipe to Class - 7-9-58 E.E.O.



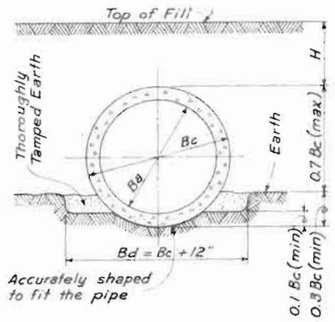
CONCRETE CRADLE BEDDING IN TRENCHES



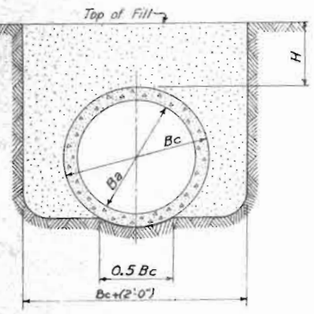
CONCRETE CRADLE BEDDING IN FILLS



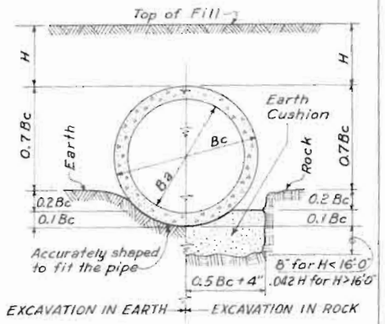
FIRST CLASS BEDDING IN TRENCHES



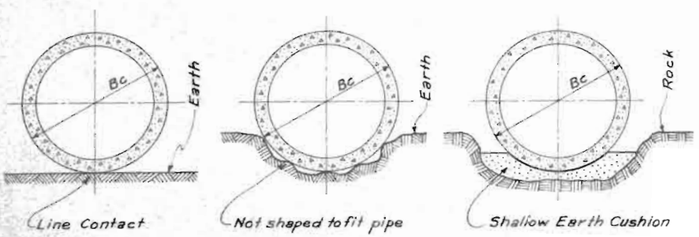
FIRST CLASS BEDDING IN FILLS



ORDINARY BEDDING IN TRENCHES

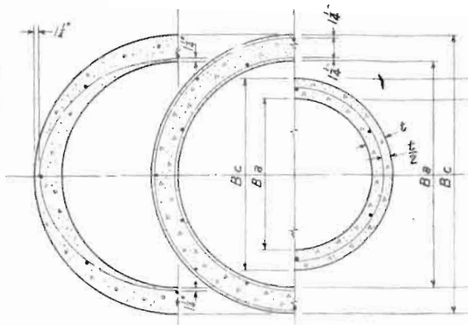


ORDINARY BEDDING IN FILLS



IMPERMISSIBLE BEDDINGS IN TRENCHES OR FILLS

THESE THREE TYPES SHALL NOT BE USED

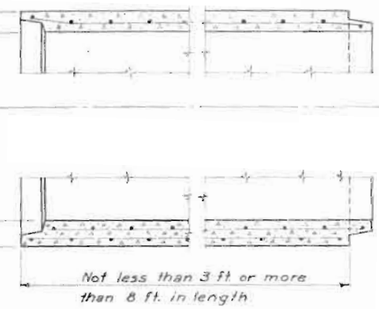


Sections with elliptical reinforcement or two lines of circular reinforcement

Section with one line of circular reinforcement

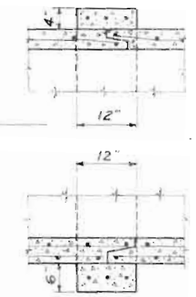
PIPE CROSS SECTIONS

Where two lines of steel are contemplated a single line placed elliptically may be used, and the area of this shall be at least 50% of the total steel area required for two lines of reinforcement. Pipe with elliptical reinforcing shall have the word "Top" or "Bottom" clearly stenciled on the inside of the pipe at the correct place to indicate the proper position when laid.



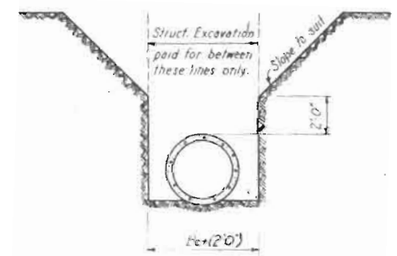
LONGITUDINAL SECTIONS

If machine made pipe is used a modified bell will be acceptable to the department.



CONCRETE COLLAR

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.



Where it is necessary to bed the pipe in a deep trench the contractor may, for his own convenience and at his own expense, slope the cut from a point 2'-0" above the top of the pipe as shown above.
Note: For Concrete Sewer Pipe Structural Excavation is not a separate pay item.

	Ba Int. Diameter (Inches)	* Bc Ext. Diameter (Inches)	Three Edge Bearing Method: Crack Point (Pounds)	Three Edge Bearing Method: Ultimate Load (Pounds)	Max. depth of fill "H" in ft. for 3 types of bedding: Concrete Cradle: Pipe in Trench	Concrete Cradle: Pipe in Fills	First Class: Pipe in Trench	First Class: Pipe in Fills	Ordinary: Pipe in Trench	Ordinary: Pipe in Fills
Reinforced Conc. Culv. Pipe Class III - A.S.T.M. C76	12	16	2250	3500	No Limit	30	No Limit	19	No Limit	16
	15	19½	2625	4065		28		18		15
	18	23	3000	4500		28		18		15
	24	30	3000	5000		22	44	14	18	12
	30	37	3375	5750		21	25	14	15	12
	36	44	4050	6600	54	21	17	14	14	12
	42	51	4725	7350	47	22	17	14	13	12
	48	58	5400	8000	46	22	17	14	13	12
	54	65	5850	9000	38	22	17	14	12	12
	60	72	6000	10000	32	21	15	14	11	12
	66	79	6300	11000	28	20	15	13	10	12
	72	86	6600	12000	26	20	14	13	18	11
	84	100	..	.	24	20	13	13	10	11
Reinforced Conc. Culv. Pipe Class IV - A.S.T.M. C76	24	30	4000	6000	No Limit	29	No Limit	18	No Limit	15
	30	37	5000	7500		30	No Limit	19	48	16
	36	44	6000	9000		30	40	19	22	16
	42	51	7000	10500		31	40	20	22	17
	48	58	8000	12000		31	37	20	23	17
	54	65	9000	13500		32	36	20	23	17
	60	72	9000	15000		29	28	19	20	16
	66	79	9500	16500	128	28	26	19	18	16
	72	86	9900	18000	64	28	24	18	17	16
	84	100	..	.	46	28	22	18	16	15
Reinforced Conc. Sewer Pipe (Class as called for on Plans - A.S.T.M. C76)	12	16	1800	2700	No Limit	24	No Limit	15	25	18
	15	19½	2000	3000		22	No Limit	14	19	12
	18	23	2200	3300		21	48	13	16	11
	21	26½	2400	3600		20	28	13	14	11
	24	30	2400	3600		18	18	12	12	10
	27	33	2550	3800		18	17	11	11	10
	30	37	2700	4050		17	15	11	10	9
	33	40½	2850	4300	49	17	14	11	10	9
	36	44	3000	4500	22	16	11	11	8	9
	42	51	3200	4800	19	16	10	10	7	9
	48	58	3400	5100	17	15	9	10	7	9
	54	65	3700	5550	17	15	9	10	7	8
	60	72	4000	6000	16	15	9	10	7	8
	66	79	4250	6350	16	15	9	10	6	8
	72	86	4500	6750	15	15	8	10	6	8
Std. Str. Unreinforced Conc. Sewer Pipe - A.S.T.M. C14	4	5⅝	1000		No Limit	35	No Limit	24		20
	6	7¾	1100			31		20		17
	8	9½	1300			28		18	No Limit	15
	10	11¾	1400			25		16	27	13
	12	14	1500			23		14	19	12
	15	17½	1750			21		13	16	11
	18	21	2000			21		13	15	11
	21	24½	2200			20	27	12	14	11
	24	28¼	2400			19	22	12	13	10

* Note: External diameter of pipe shown in the table is approximate only, having been determined by using 3000 lbs. per sq. in. concrete. If greater strength concrete is used this diameter may be decreased accordingly.

GENERAL NOTES

All work shall be done according to the Standard Specifications of the Colorado State Highway Department applicable to the project.

The type of Pipe Joint used and the field construction there-of to make the joint reasonably water-tight shall be submitted to the Department for approval.

Unless otherwise noted the type of bedding shall be Ordinary Bedding. When the maximum fill height as noted hereon, for this type of bedding, is exceeded then that type of bedding which is indicated by the allowable fill height shall be used.

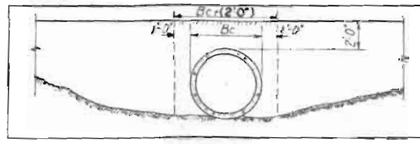
All culverts shall have headwalls or flared end sections if and as shown on the plans in accordance with Department Standards.

For size, type and location of pipe see plan sheets for project.

Supporting soils shall be composed of firm and uniform material throughout the entire length of Culvert. The soil shall be accurately shaped to fit the Pipe in accordance with the bedding conditions shown.

The Pipe shall be laid with the Bell or Groove end placed upstream.

For Std. Methods of Structure Backfill See Std. M-60-B.



If the desired fill height for pipe in a fill exceeds that given in the table, new embankment may be constructed to an elevation of two feet above the top of the pipe; a trench may then be excavated in the embankment and the pipe installed in accordance with a pipe in a trench. This work shall conform to the requirements for "Embankments" as shown in the specifications.

Minimum Depth of Fill over Concrete Pipe
Main Roadways . . . . . 2 Foot
Approach Roadways . . . . . 1 Foot

COLORADO DEPARTMENT OF HIGHWAYS

REINF. CONCRETE CULVERT PIPE
STD. STRENGTH 12", 15", 18", 24", 30", 36", 42", 48", 54", 60", 66", 72", 84"
EXTRA STR. 24", 30", 36", 42", 48", 54", 60", 66", 72", 84"

CONCRETE SEWER PIPE
REINF. 12", 15", 18", 21", 24", 27", 30", 33", 36", 42", 48", 54", 60", 66", 72".
UNREINF. 4", 6", 8", 10", 12", 15", 18", 21", 24".

Designed by W.W.D.	Approved by [illegible]
Made by W.W.D.	Bridge Engineer
Checked by R.C.	Date: Mar. 17, 1958.

REV. R.O.W. & ADDED ACCESS, 9-16-59, E.E.O.

FEDERAL ROAD REGION NO.	DIVISION	PROJ. NO.	SHEET NO.	TOT. SHEETS
9	COLORADO	U 005-3(15)	33	

PLAN

COLFAX AVE (2)
Δ 3° 58' 29"
D 2° 00'
T 99.42'
L 198.74'
R 2865.00'

NW-1 (1)
Δ 40° 58' 52"
D 18° 00'
T 118.96'
L 227.67'
R 318.33'

NW-2 (2)
Δ 216° 39' 49"
D 38° 00'
L 570.17'
R 150.79'

NW-2 (3)
θs 28° 30'
Ls 150.00'
L.T. 101.33'
S.T. 51.21'

NE-1 (1)
Δ 44° 08' 53"
D 13° 00'
T 178.75'
L 339.60'
R 440.77'

NE-1 (2)
Δ 45° 32' 27"
D 25° 00'
T 96.21'
L 182.16'
R 229.20'

NE-2 (1) (6)
θs 50° 00'
Ls 200.00'
L.T. 139.07'
S.T. 71.91'

NE-2 (2)
Δs 135° 00' 00"
Ts1 399.73'
Ts2 378.68'
Δ 47° 30' 00"
D 50° 00'
T 50.43'
L 95.00'
R 114.60'

NE-2 (3) (4)
θs 37° 30'
Ls 150.00'
L.T. 102.34'
S.T. 52.13'

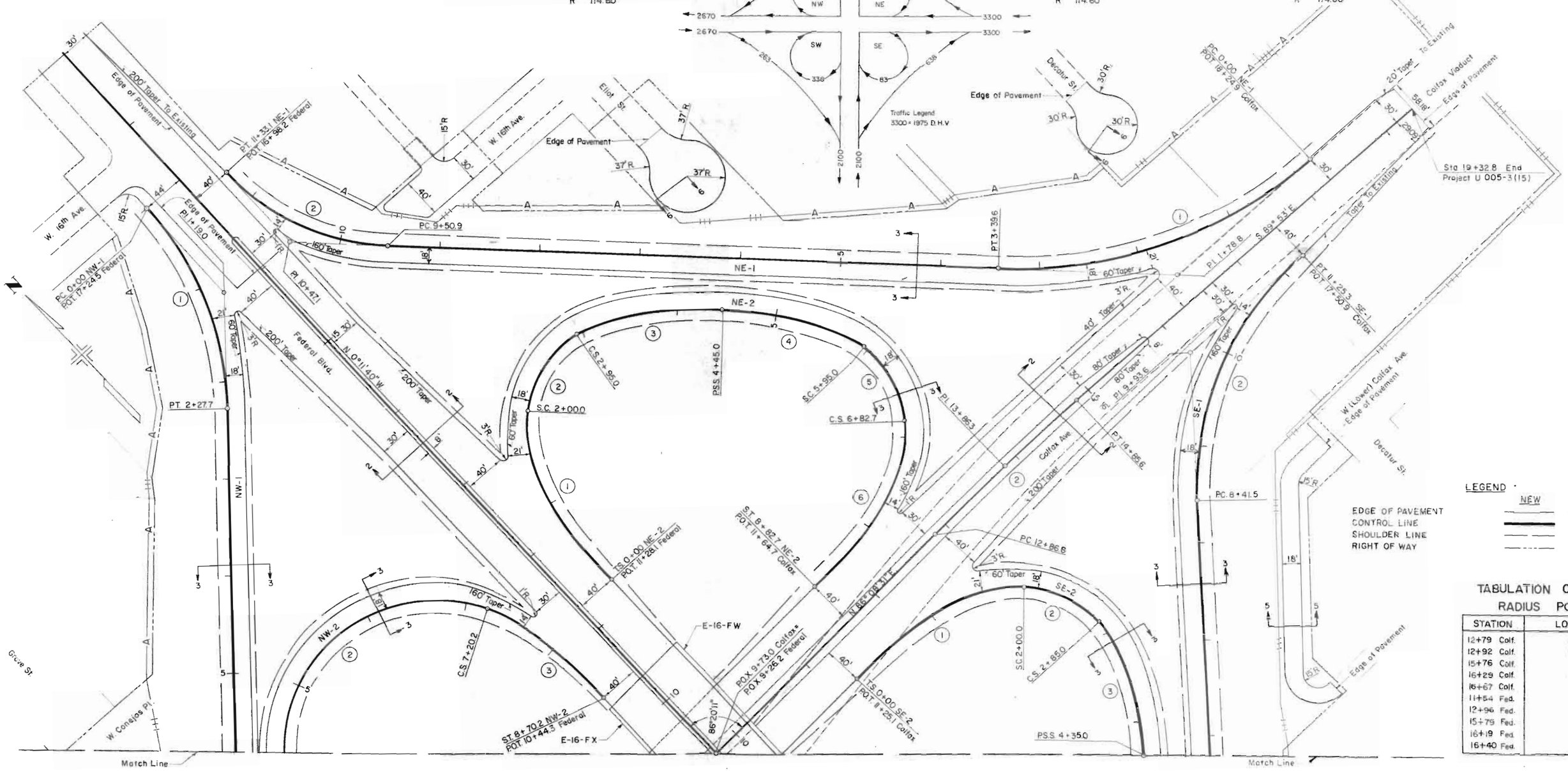
NE-2 (5)
Δs 131° 20' 11"
Ts1 353.33'
Ts2 374.14'
Δ 43° 50' 11"
D 50° 00'
T 46.11'
L 87.67'
R 114.60'

SE-1 (2)
Δ 51° 04' 45"
D 18° 00'
T 152.10'
L 283.77'
R 318.33'

SE-2 (1)
θs 50° 00'
Ls 200.00'
L.T. 139.07'
S.T. 71.91'

SE-2 (2)
Δs 130° 00' 00"
Ts1 365.67'
Ts2 344.94'
Δ 42° 30' 00"
D 50° 00'
T 44.57'
L 85.00'
R 114.60'

SE-2 (3)
θs 37° 30'
Ls 150.00'
L.T. 102.34'
S.T. 52.13'



LEGEND

	NEW	EXISTING
EDGE OF PAVEMENT		
CONTROL LINE		
SHOULDER LINE		
RIGHT OF WAY		

TABULATION OF NOSE RADIUS POINTS

STATION	LOCATION
12+79 Colf.	41' Lt.
12+92 Colf.	53' Rt.
15+76 Colf.	℄
16+29 Colf.	45' Lt.
16+67 Colf.	33' Rt.
11+54 Fed.	37' Lt.
12+96 Fed.	49' Rt.
15+79 Fed.	49' Lt.
16+19 Fed.	37' Rt.
16+40 Fed.	℄

NOTE

All cul-de-sac dimensions are from face of curb.
All tapers are 1:20 unless otherwise noted, (i.e. "To Existing" etc.).
All nose radii refer to face of curb.

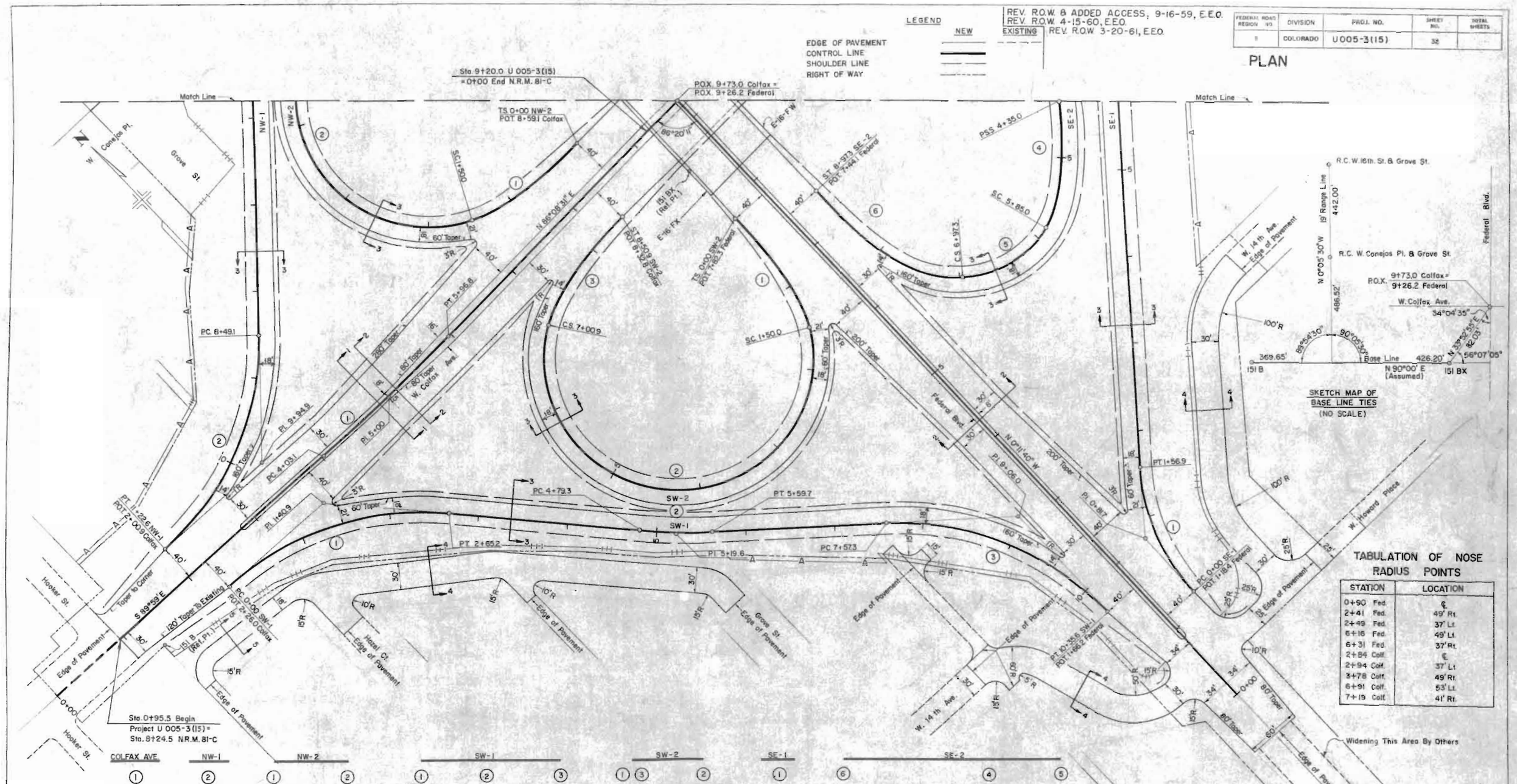
REV. R.O.W. & ADDED ACCESS, 9-16-59, E.E.O.
REV. R.O.W. 4-15-60, E.E.O.
REV. R.O.W. 3-20-61, E.E.O.

FEDERAL ROAD REGION NO.	DIVISION	PROJ. NO.	SHEET NO.	TOTAL SHEETS
8	COLORADO	U005-3(15)	32	

PLAN

LEGEND

	NEW	EXISTING
EDGE OF PAVEMENT		
CONTROL LINE		
SHOULDER LINE		
RIGHT OF WAY		



SKETCH MAP OF BASE LINE TIES
(NO SCALE)

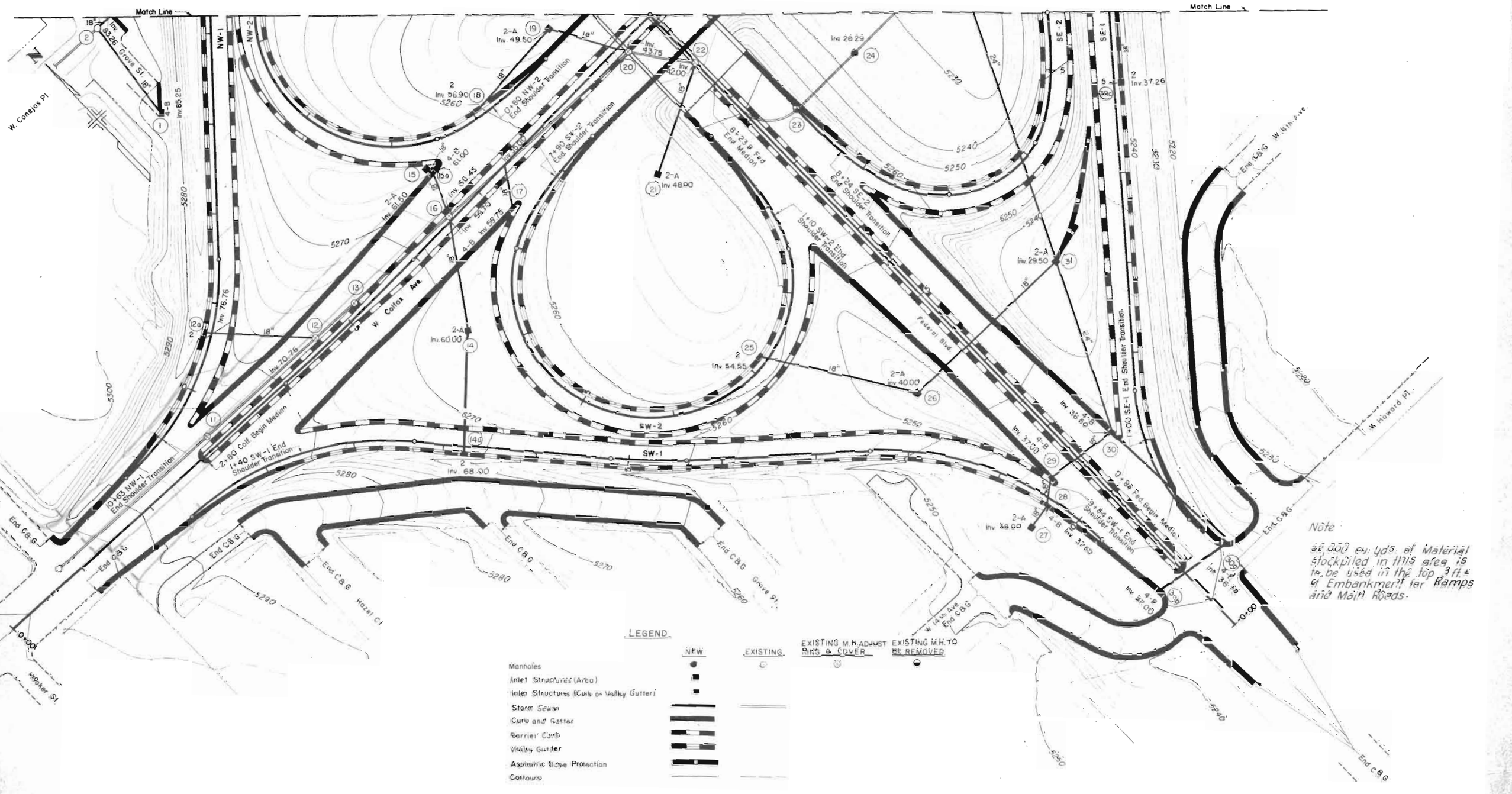
TABULATION OF NOSE RADIUS POINTS

STATION	LOCATION
0+90 Fed.	℄
2+41 Fed.	49' Rt.
2+49 Fed.	37' Lt.
6+16 Fed.	49' Lt.
6+31 Fed.	37' Rt.
2+84 Colf.	℄
2+94 Colf.	37' Lt.
3+78 Colf.	49' Rt.
6+91 Colf.	53' Lt.
7+19 Colf.	41' Rt.

COLFAX AVE. (1)	NW-1 (2)	NW-2 (1)	NW-2 (2)	SW-1 (1)	SW-1 (2)	SW-1 (3)	SW-2 (1) (3)	SW-2 (2)	SE-1 (1)	SE-1 (6)	SE-2 (4)	SE-2 (5)
Δ 3° 52' 29"	Δ 49° 13' 48"	θ_s 28° 30'	Δ 216° 39' 49"	Δ 47° 44' 03"	Δ 8° 02' 36"	Δ 50° 05' 53"	θ_s 28° 30'	Δ 209° 20' 11"	Δ 39° 13' 55"	θ_s 50° 00'	θ_s 37° 30'	Δ_s 143° 39' 49"
D 2° 00'	D 18° 00'	L_s 150.00'	D 38° 00'	D 18° 00'	D 10° 00'	D 18° 00'	L_s 150.00'	D 38.00'	D 25° 00'	L_s 200.00'	L_s 150.00'	T_{s1} 457.99'
T 96.92'	T 145.84'	L.T. 101.33'	L 570.17'	T 140.85'	T 40.29'	T 148.78'	L.T. 101.33'	L 550.89'	T 81.69'	L.T. 139.07'	L.T. 102.34'	T_{s2} 479.56'
L 193.74'	L 273.50'	S.T. 51.21'	R 150.79'	L 265.19'	L 80.43'	L 278.32'	S.T. 51.21'	R 150.79'	L 156.93'	S.T. 71.91'	ST 52.13'	Δ 56° 09' 49"
R 2865.00'	R 318.33'			R 318.33'	R 573.00'	R 318.33'			R 229.20'			D 50° 00'
												T 61.14'
												L 112.33'
												R 114.60'

FEDERAL ROAD REGION NO.	DIVISION	PROJ. NO.	SHEET NO.	TOTAL SHEETS
8	COLORADO	U005-2(15)	34	

GRADING



Note

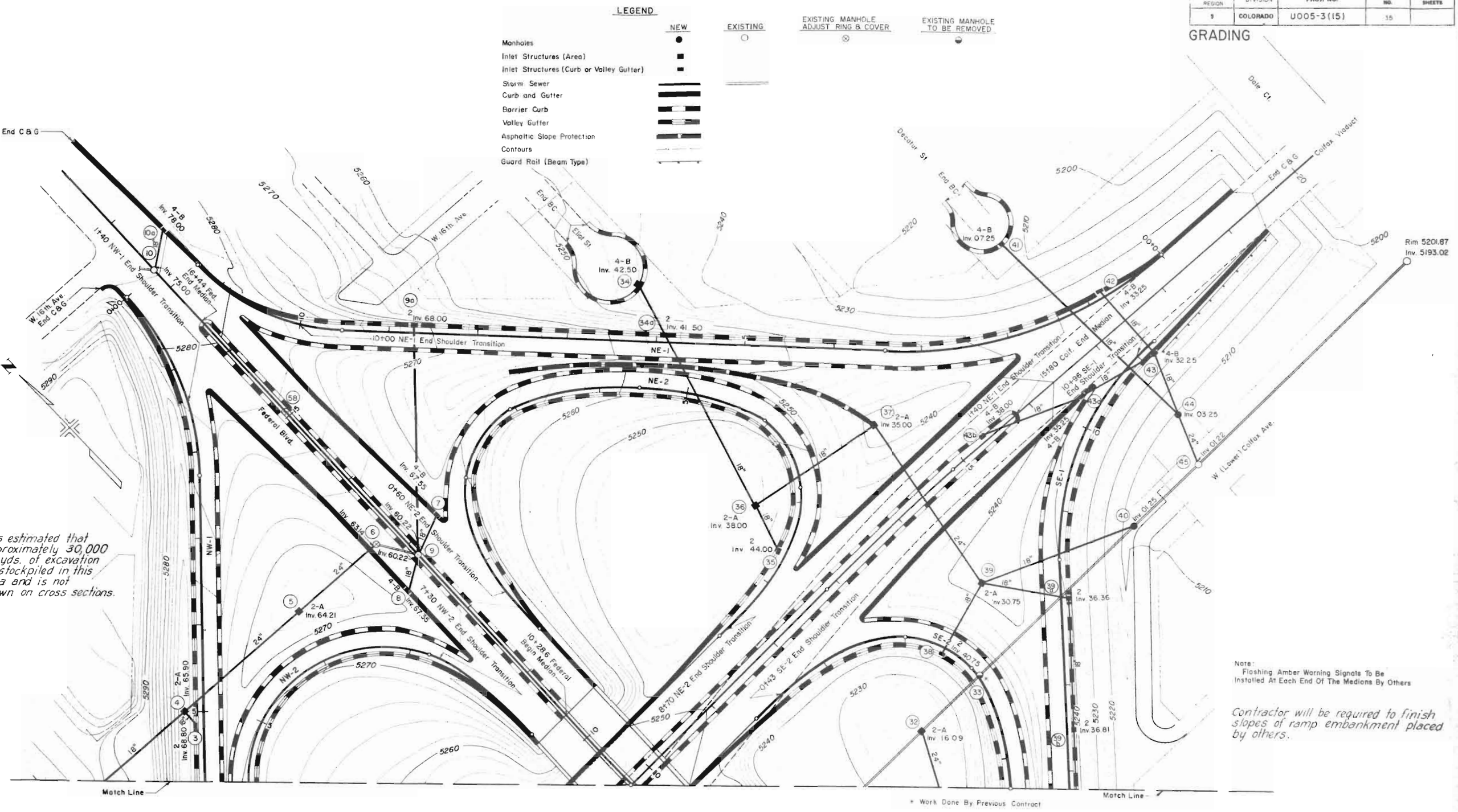
20,000 cu. yds. of Material stockpiled in this area is to be used in the top 3 ft. of Embankment for Ramps and Main Roads.

LEGEND

	NEW	EXISTING	EXISTING M.H. ADJUST RING & COVER	EXISTING M.H. TO BE REMOVED
Manholes				
Inlet Structures (Area)				
Inlet Structures (Curb or Valley Gutter)				
Storm Sewer				
Curb and Gutter				
Barrier Curb				
Valley Gutter				
Asphaltic Slope Protection				
Contours				

FEDERAL ROAD REGION	DIVISION	PROJ. NO.	SHEET NO.	TOTAL SHEETS
9	COLORADO	U005-3(15)	15	

GRADING



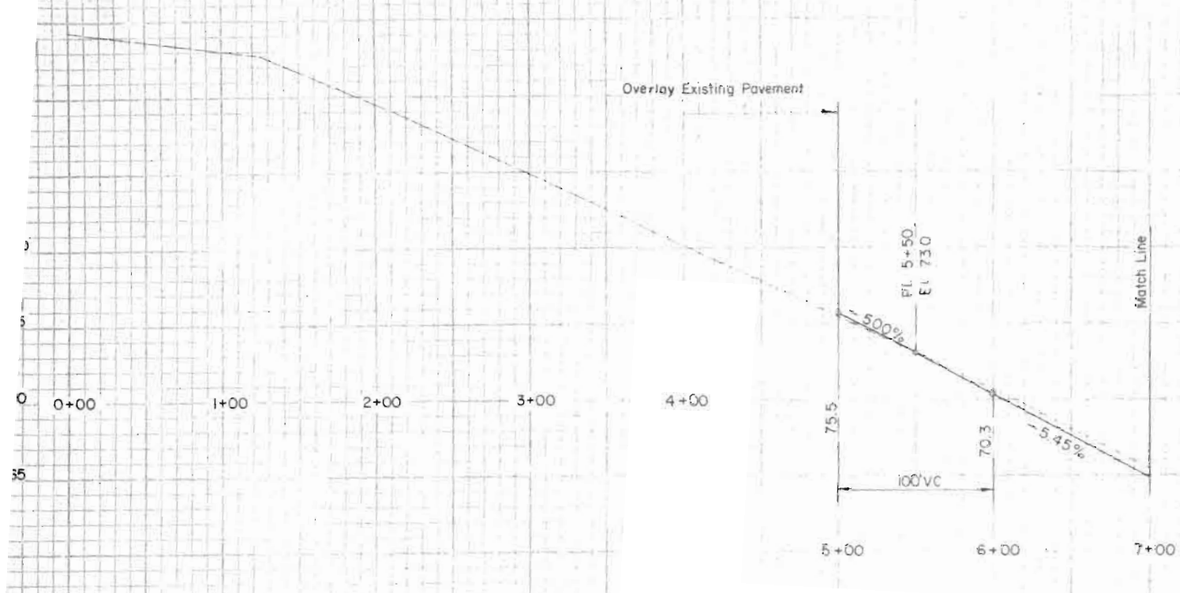
Note:
Flashing Amber Warning Signals To Be Installed At Each End Of The Medians By Others

Contractor will be required to finish slopes of ramp embankment placed by others.

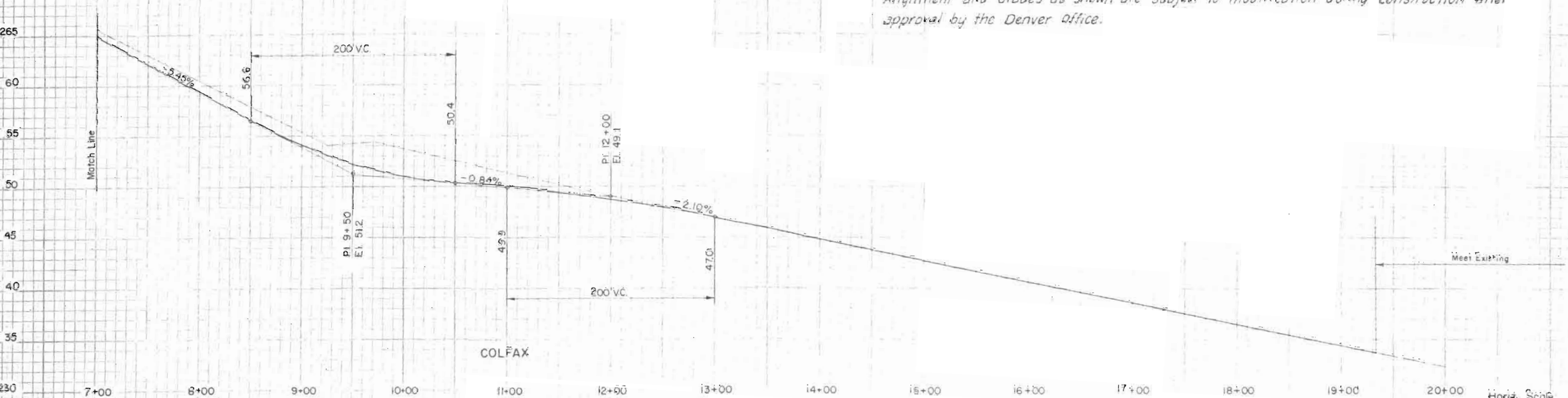
s estimated that
oximately 30,000
yds. of excavation
stockpiled in this
a and is not
wn on cross sections.

FEDERAL HIGHWAY REGION	DIVISION	PROJ. NO.	SHEET NO.	TOTAL SHEETS
9	COLORADO	U.O.D.5-3(15)	36	

COLFAX AVENUE PROFILE



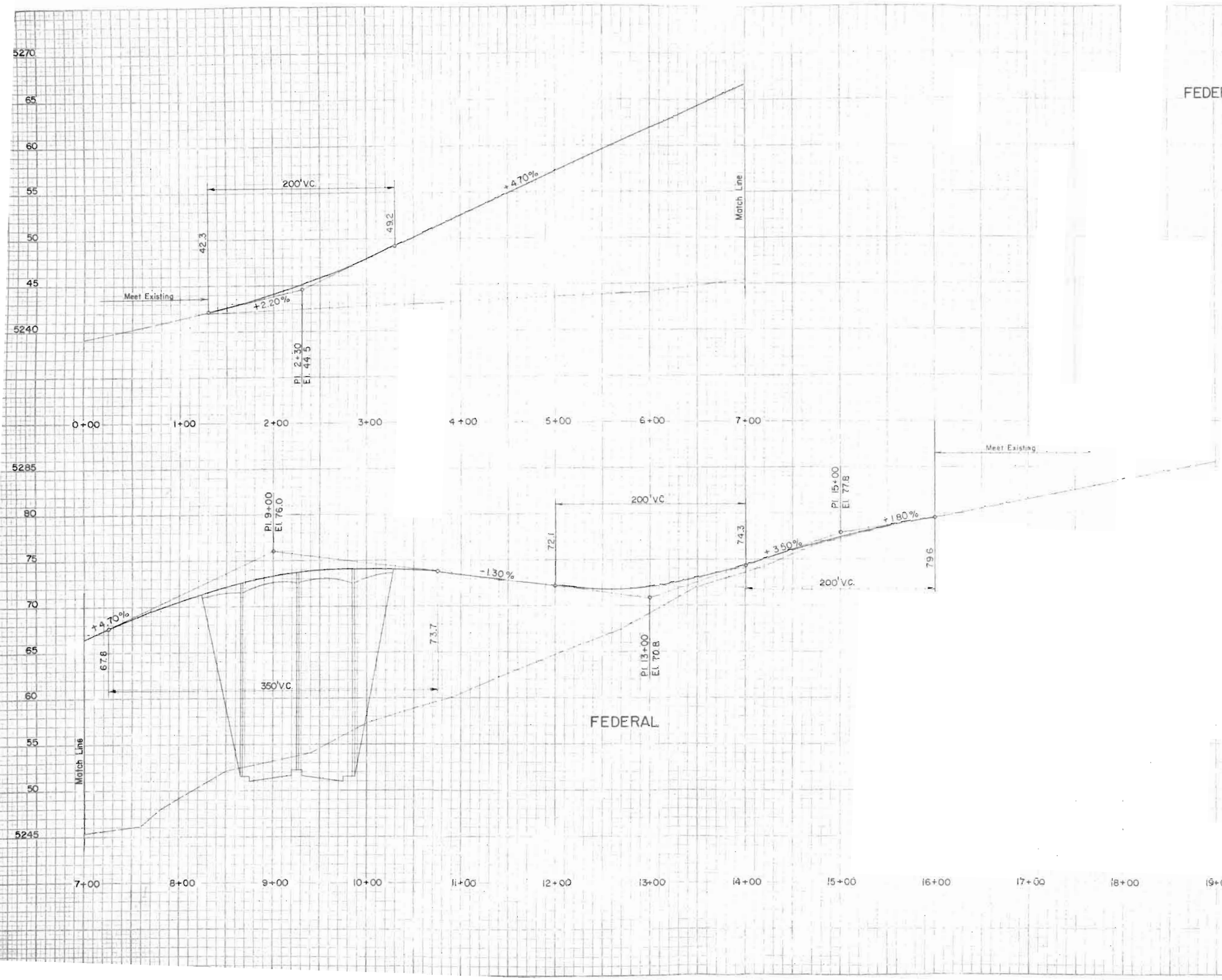
Note:
Alignment and Grades as shown are subject to modification during construction after approval by the Denver Office.



Horiz. Scale: 1" = 50'
Vert. Scale: 1" = 5'

FEDERAL ROAD SECTION	DIVISION	PROJ. NO.	SHEET NO.	TOTAL SHEETS
7	COLORADO	U005-3(15)	37	

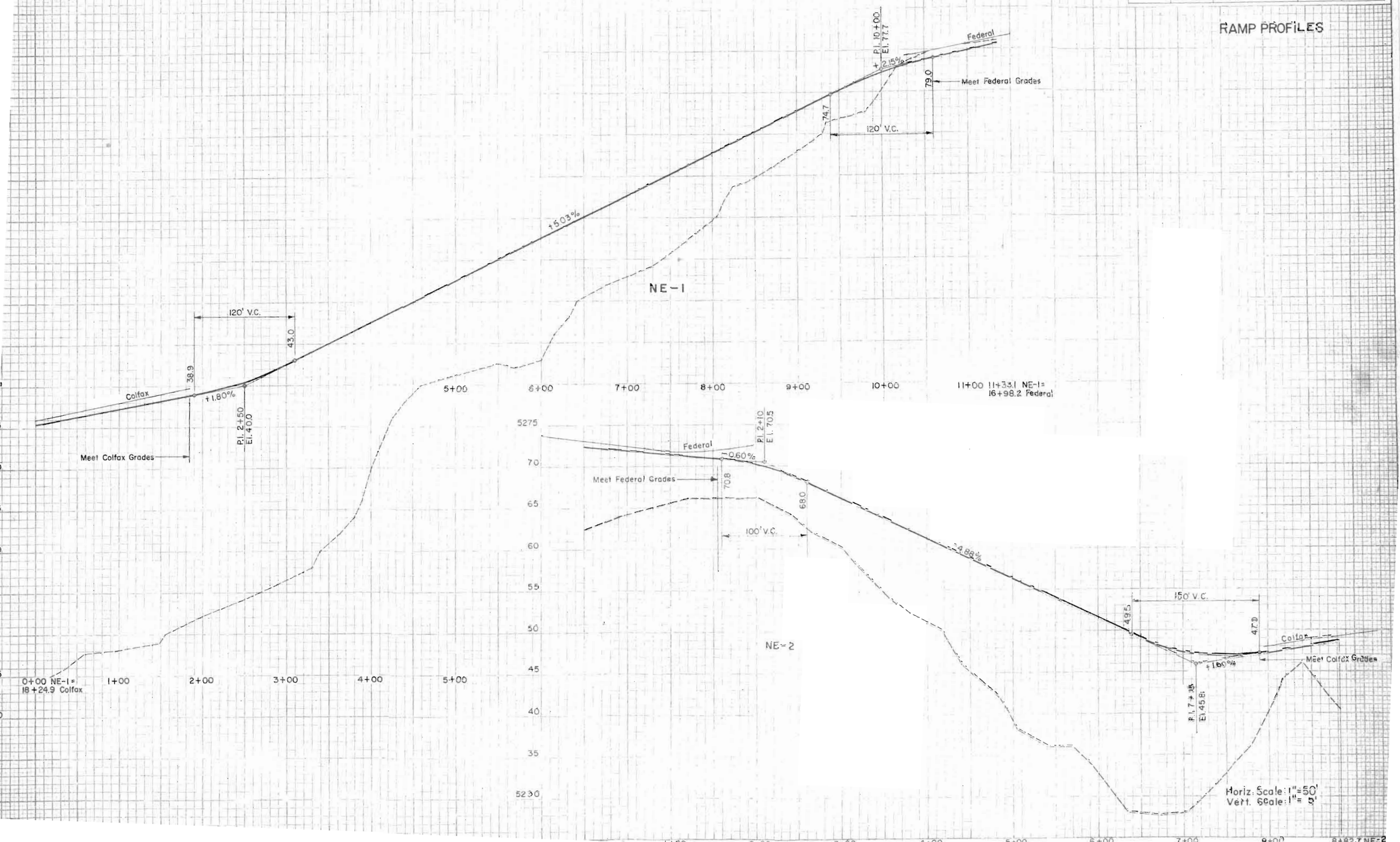
FEDERAL BOULEVARD PROFILE



Horiz. Scale 1" = 50'
Vert. Scale: 1" = 5'

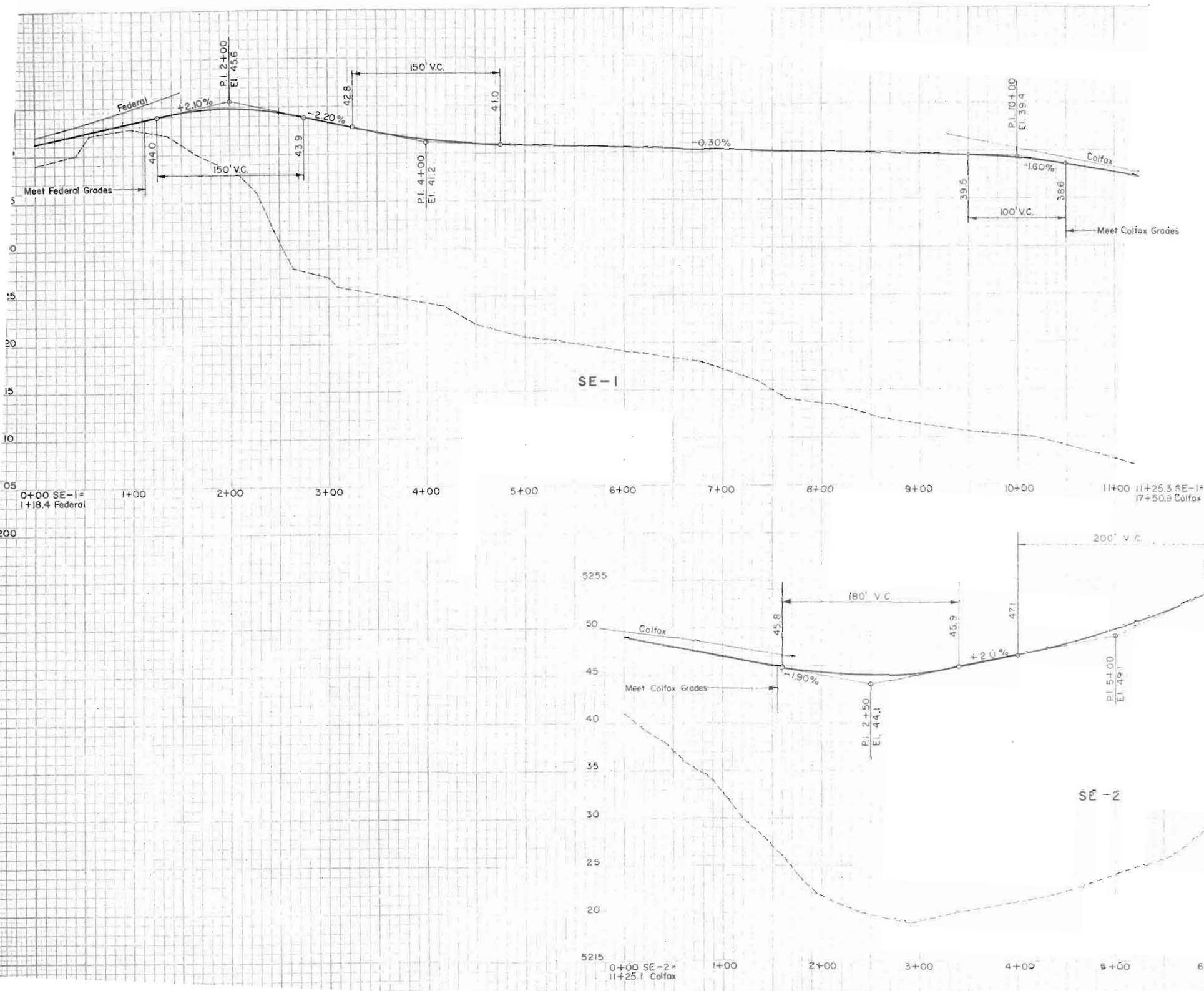
FEDERAL HIGHWAY REGION	DIVISION	PROJ. NO.	SHEET NO.	TOTAL SHEETS
8	COLORADO	U065-3(18)	38	

RAMP PROFILES



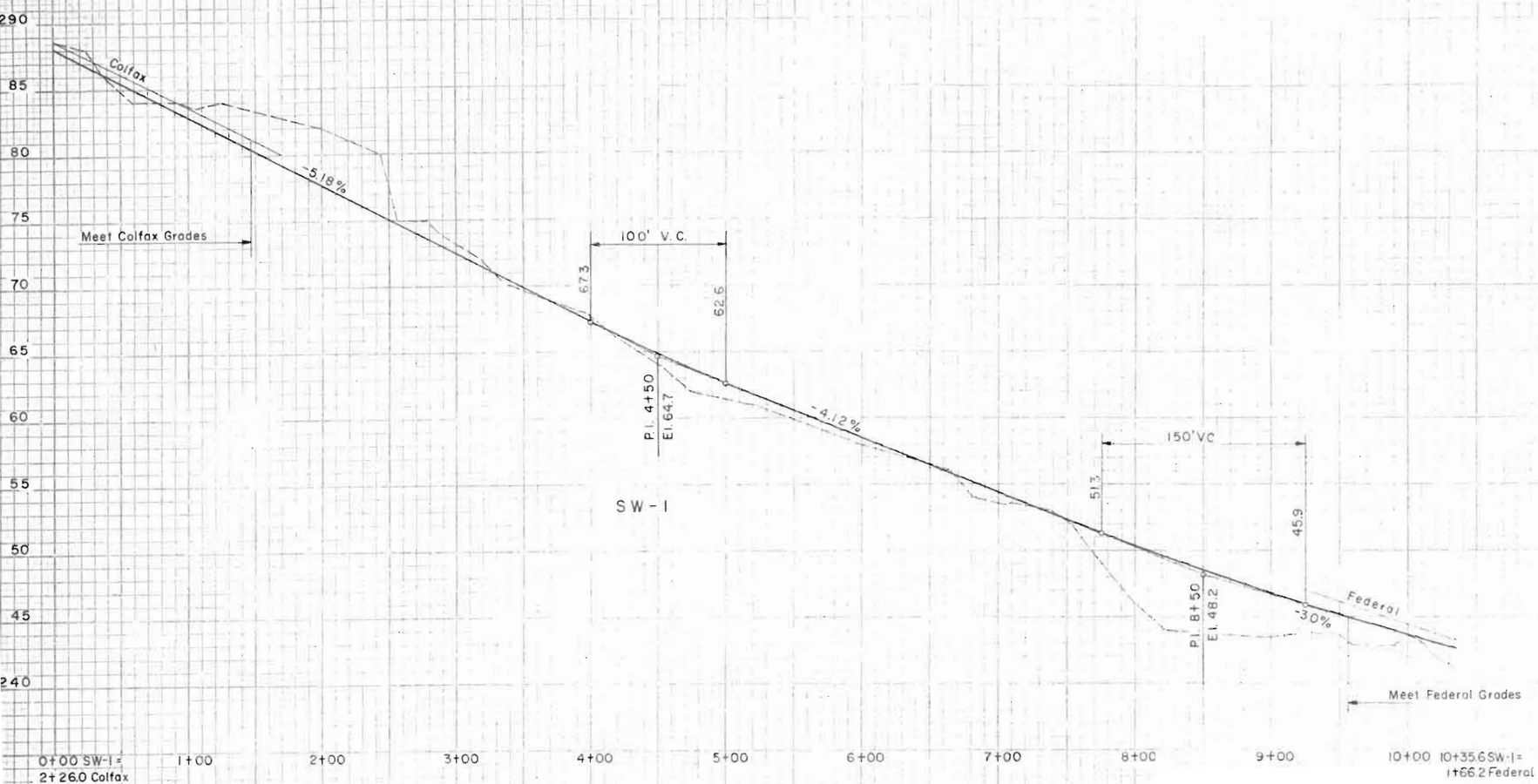
FEDERAL HIGHWAY REGION	DIVISION	PROJ. NO.	SHEET NO.	TOTAL SHEETS
9	COLORADO	U005-3(15)	39	

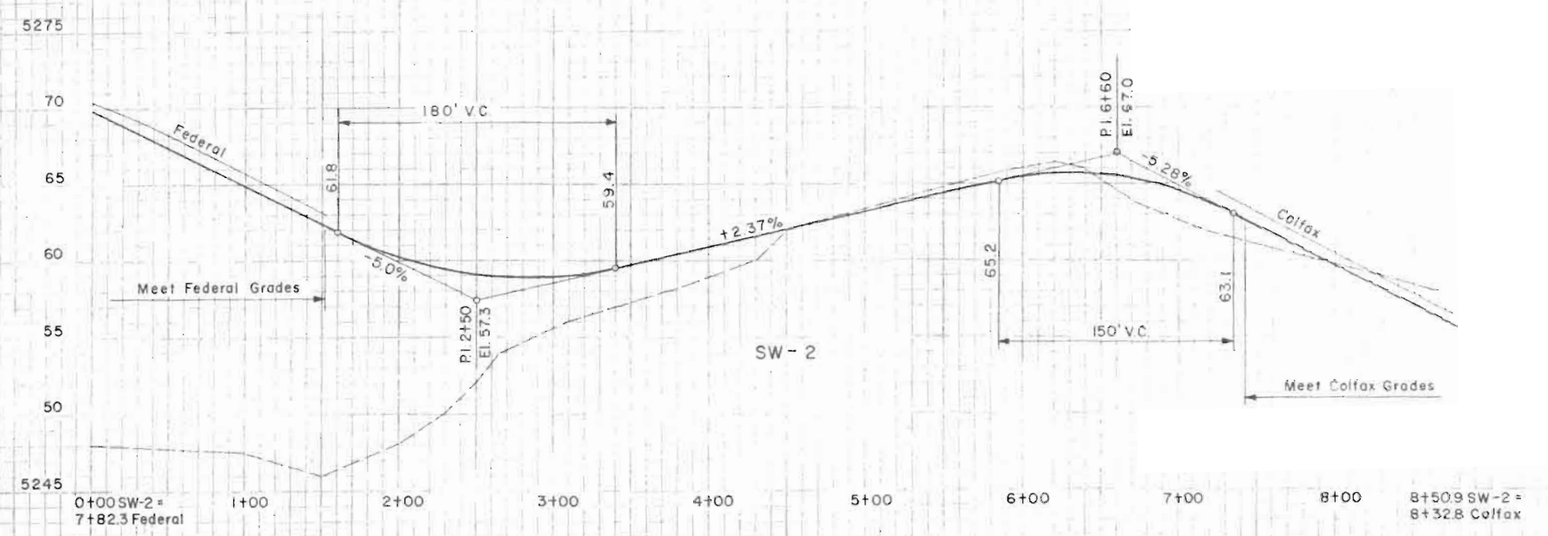
RAMP PROFILES



FEDERAL ROAD REGION	DIVISION	PROJ. NO.	SHEET NO.	TOTAL SHEETS
9	COLORADO	U005-3(15)	40	

RAMP PROFILES

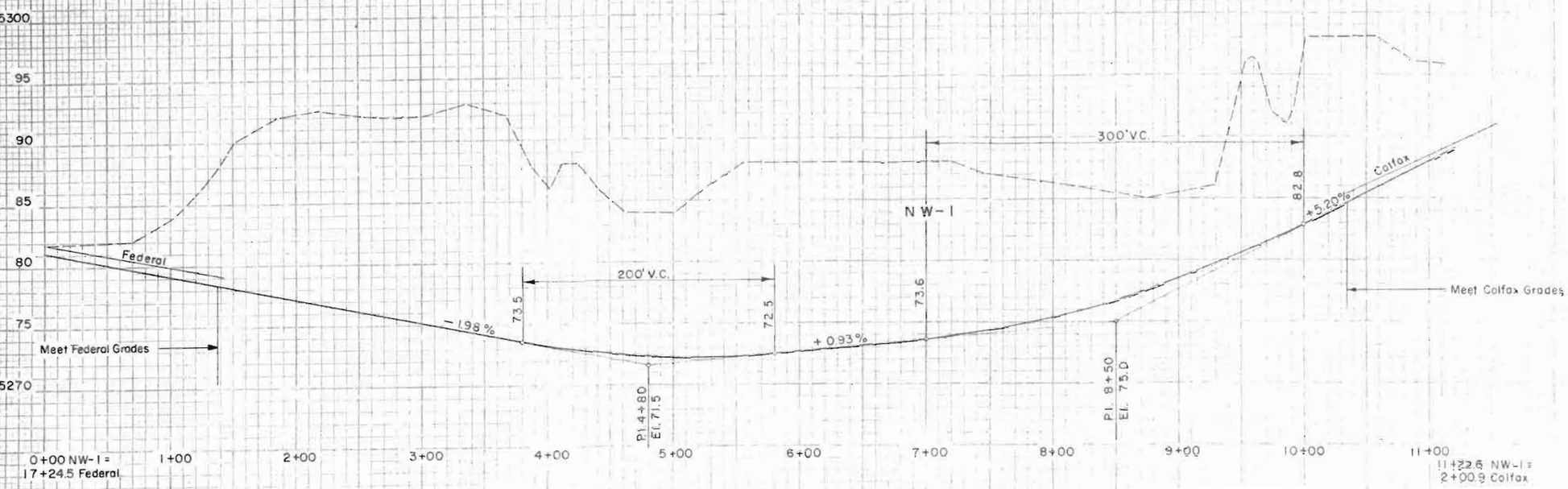




Horiz. Scale: 1" = 50'
Vert. Scale: 1" = 5'

FEDERAL ROAD REGION	DIVISION	PROJ. NO.	SHEET NO.	TOTAL SHEETS
9	COLORADO	U005-3(15)	41	

RAMP PROFILES



Horiz. Scale: 1" = 50'
Vert. Scale: 1" = 5'

Excavation Cu. Yds.	Excavation Area	Embankment Area	Embankment Cu. Yds.	Excavation Cu. Yds.	Excavation Area	Embankment Area	Embankment Cu. Yds.

FED. ROAD REGION NO.	DIVISION	PROJ. NO.	SHEET NO.	TOTAL SHEETS
9	COLO.	U 005-1 (15)	42	

SUMMARY OF EARTHWORK

U 005-3 (15)

Excavation	
From Cross Sections	138,526
From Borrow & Stockpile	97,023
Remove DETOUR	* 5,040
Total	240,589 Cu. Yds.
Embankment	
From Cross Sections	191,251
Borrow	5,040
Total	196,291 Cu. Yds.
Embankment x Factor	235,549 Cu. Yds.

* Material removed from Detour to be used to flatten slopes.

Compaction	235,549 Cu. Yds.

SHEET TOTALS		
	EXCAVATION	CU. YDS.
	EXCAVATION	CU. YDS.
	EMBANKMENT	CU. YDS.