

COLORADO DEPARTMENT OF HIGHWAYS

PLAN AND PROFILE OF PROPOSED FEDERAL AID PROJECT NO.U036-1(6) STATE HIGHWAY NO.121 DENVER & JEFFERSON COUNTIES

RIGHT OF WAY Purchased
Under Proj. No. F036-1(3)

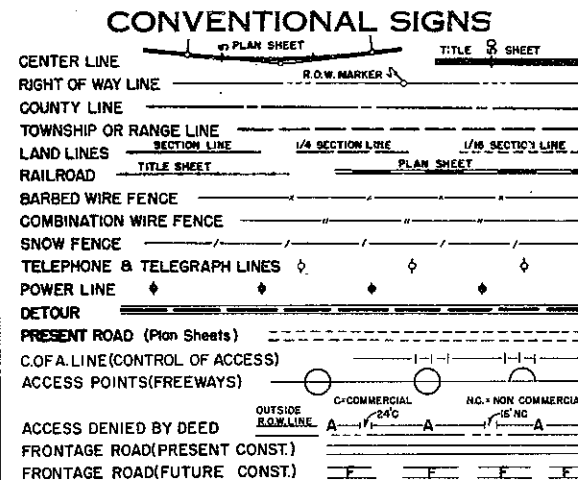
FEDERAL ROAD REGION NO.	DIVISION	PROJ. NO.	SHEET NO.	TO SHEET
9	COLORADO	U 036-1(6)	1	

INDEX OF SHEETS

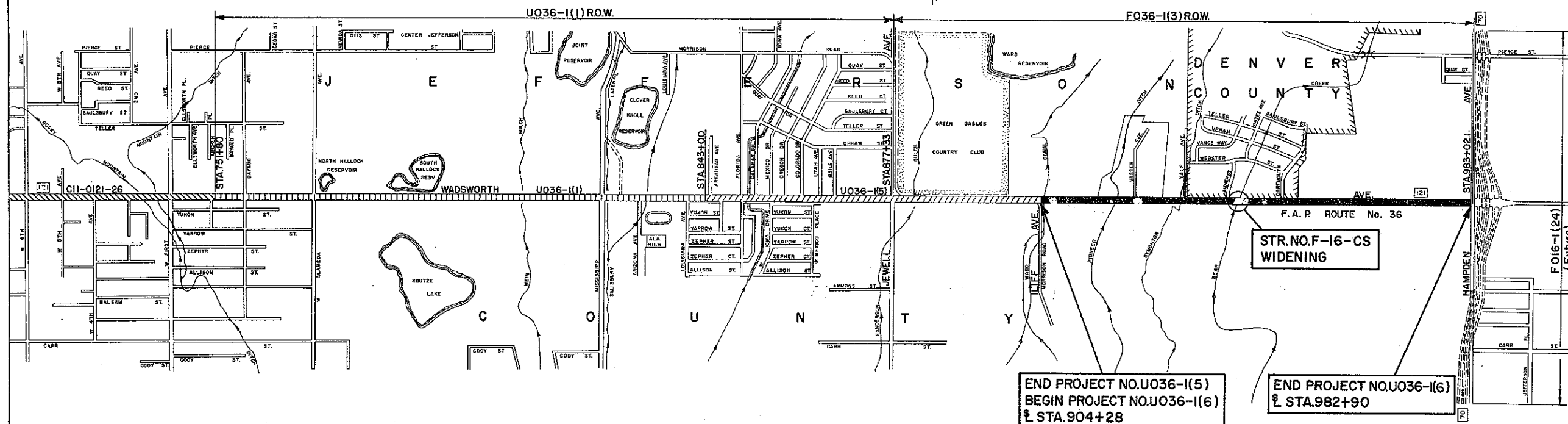
SHEET No.	TITLE PAGE
2-3	TYPICAL SECTIONS
4	TYPICAL MEDIAN ISLAND DETAIL & SPECIAL HEADWALL DETAILS
5	TYPICAL DRIVEWAY PLAN (ASPHALT) & DETAILS OF B.W. FENCE (5 STRAND)
6	GENERAL NOTES, TABULATIONS OF LENGTH & DESIGN DATA, TAB. OF SECTIONS & SUMMARY OF EARTHWORK QUANTITIES.
7-8	SUMMARY OF APPROXIMATE QUANTITIES
9	TABULATION OF REMOVAL ITEMS
10	LIST OF STRUCTURES
11	TABULATION OF SURFACING
12	TABULATIONS OF CURBS & GUTTERS, FENCING
13	TABULATION OF STORM SEWERS
14-15	DETAILS OF SIPHONS, STA. 905+
16	DETAILS OF CONCRETE SIPHON DIVERSION BOXES, STA. 905+ (STR. No. 3, 5, 17)
17	DETAILS OF DIVERSION BOXES (STR. No. 61, 64, 69 & 93)
18-20	DETAILS OF DROP INLETS & MANHOLES
21-29	DETAILS OF BRIDGE WIDENING, STR. No. F-16-CS
30-35	ROADWAY DRAINAGE PLANS
36-41	PLAN & PROFILE SHEETS
42-69	CROSS SECTIONS

LETTERS AND FIGURES FOR STRUCTURE NUMBERS
CONSTRUCTION TRAFFIC SIGNS (2 SHEETS)
IDENTIFICATION SIGNS
DITCH TYPES
BACKFILL AROUND STRUCTURES
CONCRETE MEDIAN INLETS
REINFORCED CONCRETE PIPE
C.M.P. SIPHON
METAL PLATE GUARD FENCE
WIRE FENCES AND GATES (2 SHEETS)
MARKER POSTS AND BENCH MARKS
CURBS AND GUTTERS
HEADWALLS AND APRONS FOR C.M.P. CULVERTS
CONCRETE END AND ANGLE SECTIONS
DELINEATORS

(May 1, 1962)
(Jan. 14, 1963)
(May 1, 1962)
(May 1, 1962)
(May 2, 1963)
(July 2, 1963)
(May 1, 1962)
(May 1, 1962)
(Aug. 7, 1963)
(July 25, 1963)
(May 1, 1962)
(March 25, 1963)
(May 1, 1962)
(May 1, 1962)
(Sept. 5, 1963)



SCALES OF ORIGINAL DRAWINGS
ON PLAN, 1 IN. = 50 FT.
ON PROFILE, 1 IN. = 50 FT. HORIZONTAL
1 IN. = 10 FT. VERTICAL
GRADE LINE ON PROFILE IS SHOWN AS GRADE OF FINISHED ROAD
GROSS LENGTH OF PROJECT } 7,862.0 Ft. = 1.489 Mi.
NET LENGTH OF PROJECT }



Scale: 1" = 1000'

See Special Provisions for
Notice to Bidders

COLORADO
DEPARTMENT OF HIGHWAYS

APPROVED: *Chas. E. Shumate*
By J. H. Mott
CHIEF ENGINEER

DATE: 10-24-63

DEPARTMENT OF COMMERCE
BUREAU OF PUBLIC ROADS

APPROVED: _____
DIVISION ENGINEER

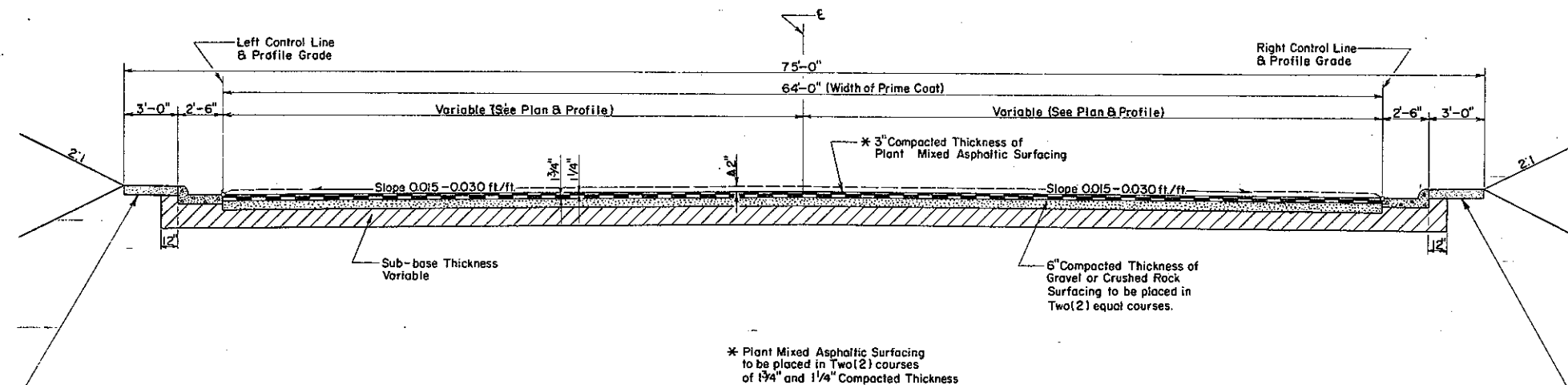
W.E.M.

FEDERAL ROAD REGION NO.	DISTRICT	PROJ. NO.	SHEET NO.	TO SHEET
9	COLORADO	U 036-1(6)	2	

TYPICAL SECTIONS

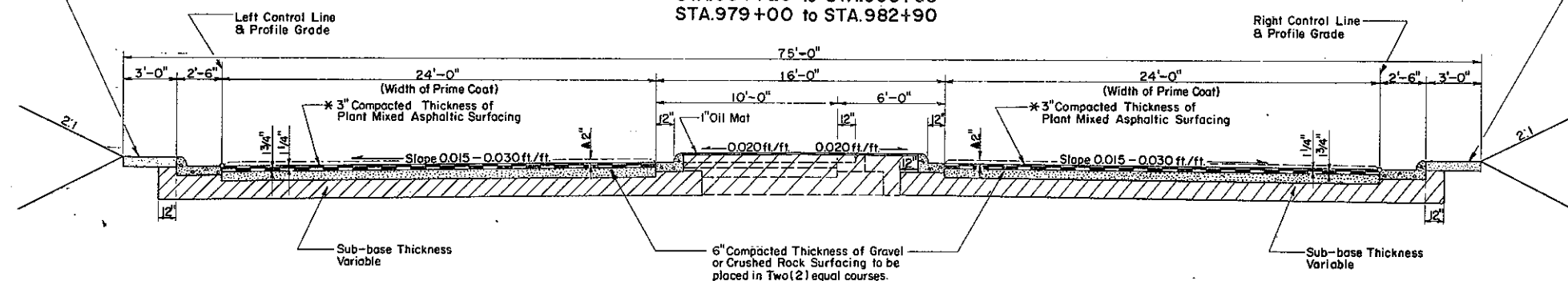
SECTION 1

STA.908+00 to STA.923+00
STA.973+00 to STA.979+00



SECTION 2

STA.904+28 to STA.908+00
STA.979+00 to STA.982+90



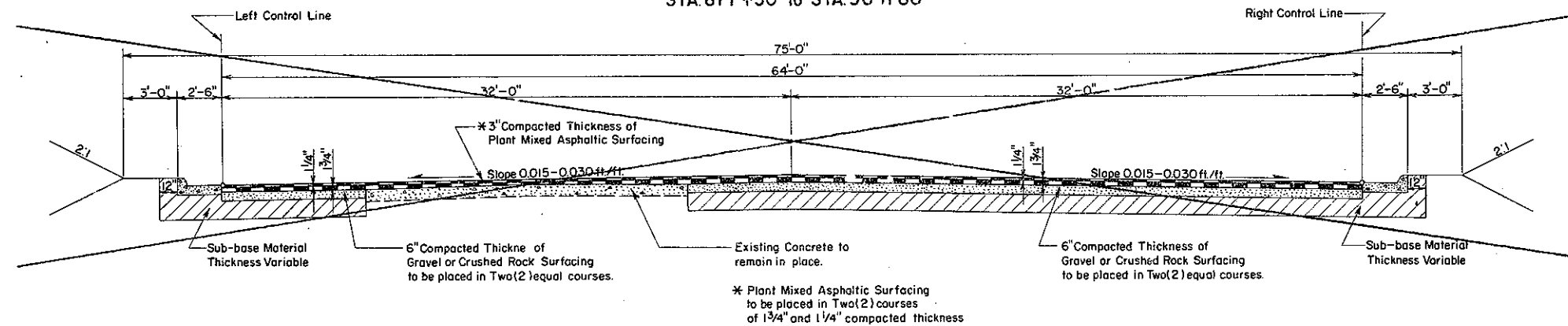
▲ 2" Plant Mix Asphaltic Pavement
Future Construction.

FEDERAL ROAD DISTRICT NO.	DISTRICT	PROJ. NO.	SHEET NO.	TOT. SHEET
9	COLORADO	U 036-1(6)	3	

TYPICAL SECTIONS

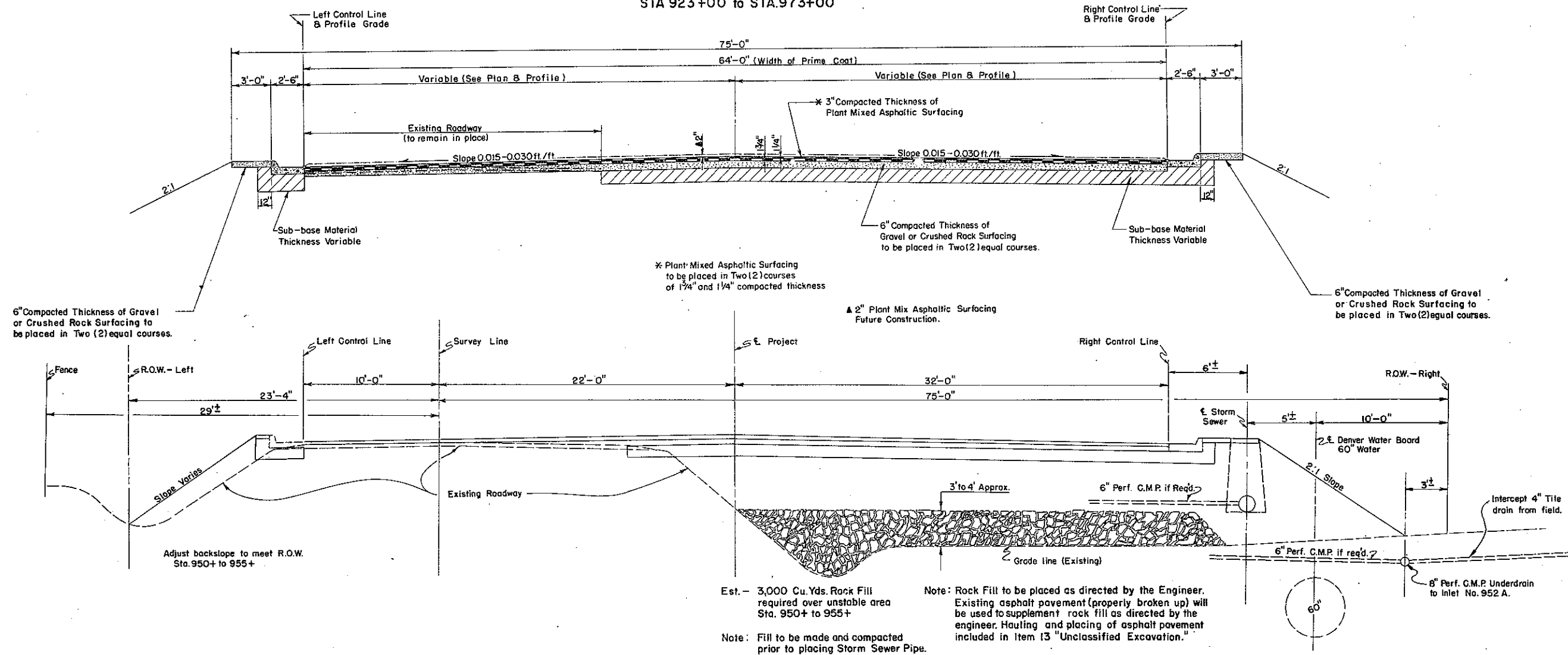
SECTION

STA. 877+50 to STA. 903+00

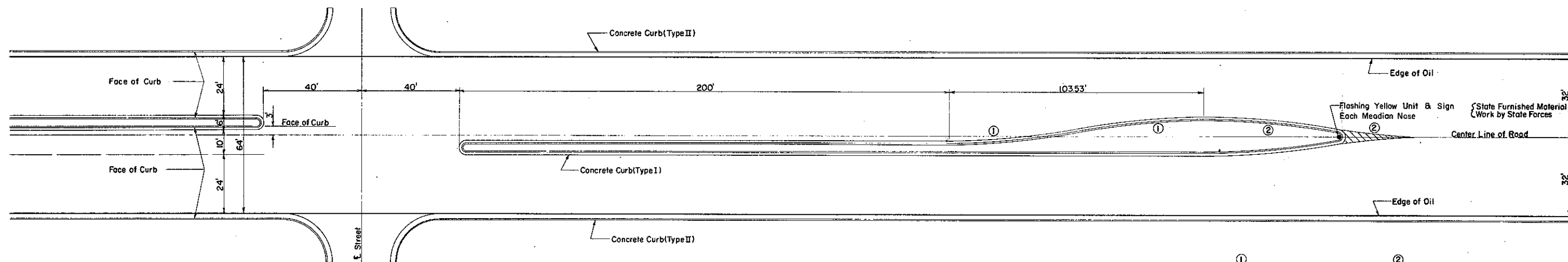


SECTION 3

STA. 923+00 to STA. 973+00

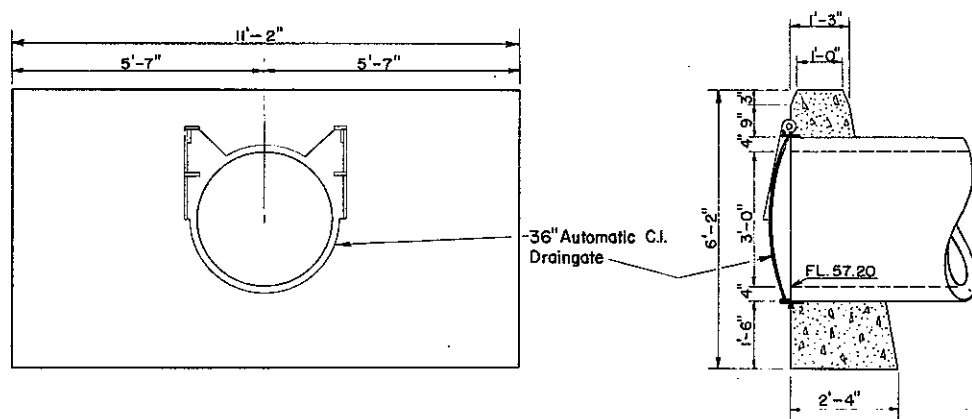


FEDERAL ROAD REGION NO.	DISTRICT	PROJ. NO.	SHEET NO.	TOTAL SHEETS
9	COLORADO	U 036-1(6)	4	



TYPICAL MEDIAN ISLAND DETAIL

①	②
REVERSE MEDIAN CURVE Δ = 9°56.1813' D = 19°06' T = 26.08' L = 52.02' R = 300'	REVERSE MEDIAN CURVE Δ = 10°18.84' D = 19°06' T = 27.96' L = 54' R = 300'

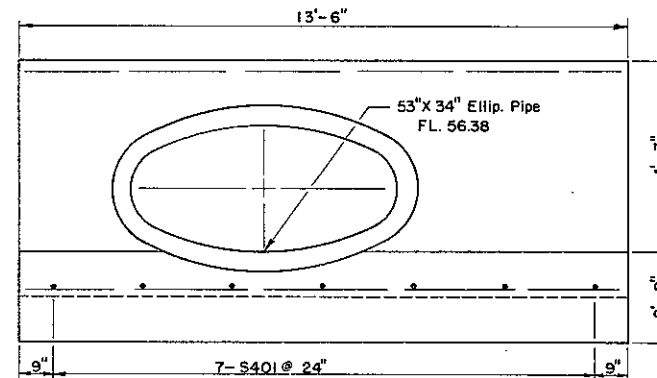
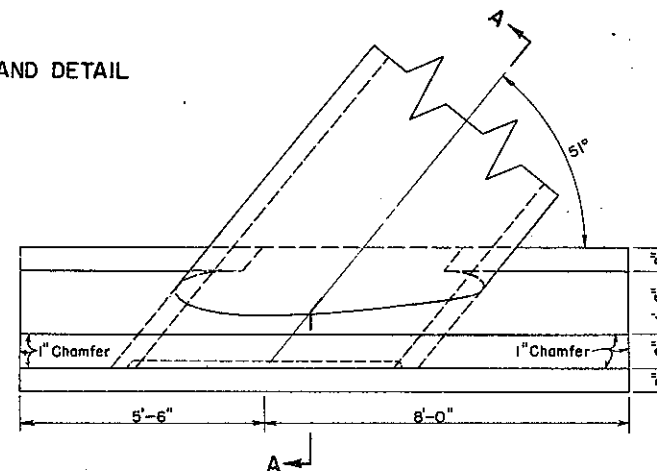


STR. NO. 38
HEADWALL FOR 36" R.C.P. @ BEAR CREEK
(See Sheet No.32 for Location)

STR. NO. 38
SUMMARY OF APPROXIMATE QUANTITIES

ITEM NO.	ITEM	UNIT	AMOUNT
14	Uncl. Str. Excavation (Miscellaneous)	Cu. Yd.	5.4
16	Structural Backfill (Class-1)	Cu. Yd.	3.0
46	Class "A" Concrete	Cu. Yd.	4.2
125	36" Automatic C.I. Draingate	Each	1

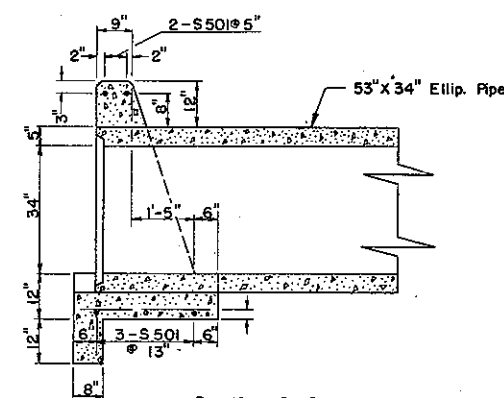
(From List of Str. Sheet 10)



STR. NO. 24 & 25
HEADWALL FOR 53"x34" ELLIPTICAL PIPE
@ PIONEER DITCH
(See Sheet No.31 for Location)

SUMMARY OF APPROXIMATE QUANTITIES

ITEM NO.	ITEM	UNIT	STR.24	STR.25
14	Uncl. Str. Excavation (Miscellaneous)	Cu. Yd.	4.5	4.5
16	Structural Backfill (Class-1)	Cu. Yd.	1.2	1.2
46	Class "A" Concrete	Cu. Yd.	4.0	4.0
47	Reinforcing Steel	lbs.	81	81
67	Riprap	Cu. Yd.	2	



Section A-A

BAR LIST

MARK	SHAPE	LENGTH	STR.24 No. Req'd	STR.25 No. Req'd
S 401		2'-10"	7	7
S 501		13'-2"	5	5

FEDERAL ROAD DIVISION NO.	DISTRICT	PROJ. NO.	SHEET NO.	TOT. SHEET
9	COLORADO	U 036 - 1 (6)	6	

TABULATION OF LENGTH AND DESIGN

STATION	DESCRIPTION	ROADWAY	MAJOR STRUCTURE
		LIN. FT.	
904+28	BEGIN U036-1(6)	3,490.48	146.02
939+18.48	END U036-1(5)		
	BEGIN BRIDGE WIDENING		
	STR.NO. F-16-CS		
	BEAR CREEK		
940+6450	END BRIDGE WIDENING	4,225.50	
982+90	END U036-1(6)		
TOTALS		7,715.98	146.02
		LIN. FT.	MILES
ROADWAY		7,715.98	1.461
MAJOR STRUCTURE		146.02	0.028
* TOTAL NET AND GROSS LENGTH		7,862.00	1.489
DESIGN DATA			
MAXIMUM DEGREE OF CURVE			10°
MAXIMUM GRADE			7.16%
MINIMUM S.S.D.(HORIZONTAL)			>1300'
MINIMUM S.S.D.(VERTICAL)			260'
DESIGN SPEED			35 MPH

* 1/4 Line (Survey Line) was used to compute length of Project.

TABULATION OF SECTIONS

TYPICAL SECTION NO.	LOCATION	STATION TO STATION	PAVEMENT WIDTH	REMARKS
2	WADSWORTH AVE.	STA.904+28 TO STA.908+00	64'	
1	WADSWORTH AVE.	STA.908+00 TO STA.923+00	64'	
3	WADSWORTH AVE.	STA.923+00 TO STA.973+00	64'	
1	WADSWORTH AVE.	STA.973+00 TO STA.979+00	64'	
2	WADSWORTH AVE.	STA.979+00 TO STA.982+90	64'	

SUMMARY OF EARTHWORK

EXCAVATION		
FROM CROSS SECTIONS	19,528	CU. YDS.
ESTIMATED FOR SUBSIDENCE	1,953	CU. YDS.
* MUCK REMOVAL	5,000	CU. YDS.
TOTALS	26,481	CU. YDS.
EMBANKMENT		
FROM CROSS SECTIONS	10,568	CU. YDS.
EMBANKMENT X FACTOR (1.25)	13,210	CU. YDS.
Δ EXCESS EXCAVATION	6,318	CU. YDS.
UNCLASSIFIED DITCH EXCAVATION		
FROM LIST OF STRUCTURES	18	CU. YDS.
COMPACTION (STANDARD)		
EXCAVATION	26,481	CU. YDS.
BASE OF CUTS AND FILLS	23,000	CU. YDS.
TOTALS	49,481	CU. YDS.

Δ Excess excavation to be used to replace muck removal & to stabilize old ditch locations along entire project, as directed by the Engineer.

* Muck removal operations are anticipated between Sta. 922+ and 972+

Approx. 3,000 Cu. Yds. of Rock Fill (Item 15) required Rt. between Sta. 950+ and 955+

GENERAL NOTES

This project is to be constructed in conformity with the Standard Specifications of the Colorado Department of Highways adopted JANUARY 1, 1958.

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

Class "A" Concrete aggregate may be substituted for pavement aggregate.

Thickness of Subbase, Surfacing, and Asphaltic Pavement as shown in Plans, is approximate only.

These materials are to be placed on the basis of tonnage shown on Plans

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

For preliminary plan quantities of asphaltic road materials, plant mixed oil processed surfacing, asphalt the following rates of application were used.

Prime Coat (over concrete) R.C.	at	.10 gal. per sq. yd.
Prime Coat (over other areas) M.C.	at	.40 gal. per sq. yd.
Plant Mixed Oil Processed Surfacing	at	110 lbs. per sq. yd.
		per 1" thickness.

Rate of application and grade of oil shall be as determined by the engineer at the time of application.

Wetting	(Embankment)	40 gal. per cu. yd.
Wetting	(Subgrade & Surfacing)	15 gal. per ton.

Application Methods for liquid asphaltic road material, which result in the discoloration of concrete pavement, curbs or gutters, will not be permitted.

Contractor may be required to apply a tack coat (Item 30) to be applied at the approximate rate of 0.05 gal. per sq. yd. between pavement courses to improve bond.

During construction of this project, traffic will use the present traveled roadway.

LIST OF STRUCTURES

FEDERAL ROAD REGION NO.	DISTRICT	PROJ. NO.	SHEET NO.	TOTAL SHEETS
9	COLORADO	U 036-1(6)	10	

LOCATION (Survey Line Stations)	DESCRIPTION	NOTE NUMBER	ITEM NO. 14 UNCL. STRUCT. EXCAVATION	ITEM NO. 16 STRUCTURE BACKFILL	ITEM NO. 46 CLASS A CONCRETE	ITEM NO. 47 REINF. STEEL	ITEM NO. 51 RELAYING PIPE (C.M.P.)	ITEM NO. 53 C.M. CULVERT PIPE	ITEM NO. 55 ASB. BONDED C.M. SIPHON PIPE (BIT. COATED)	ITEM NO. 71 C.M.P. UNDER- DRAIN	ITEM NO. 76 TRASH GUARD FOR SIPHONS	ITEM NO. 96 METAL APRONS FOR CORRUGATED METAL PIPE CULVERT	ITEM NO. 110 6" VALVE & VALVE BOX (1-B.B.M.)	ITEM NO. 113 CAST IRON WATER PIPE	ITEM NO. 11 RESET HEADGATE	ITEM NO. 13 UNCLASSIFIED DITCH EXCAVATION	ITEM NO. 129 AUTO CL. DRAINAGE	REMARKS
			MISCELLANEOUS	CLASS I														
			CUBIC YARDS	CUBIC YARDS	CUBIC YARDS	LBS.	LINEAR FEET 15' 18'	LINEAR FEET 12' 15' 18' 24' 48'	LINEAR FEET 18' 24' 36'	LINEAR FEET 6' 8'	EACH 18' 24' 36'	LINEAR FEET 12' 15' 24' 48'	EACH 2' 6'	EACH	EACH	CUBIC YARDS	36" R.C.P.	
Sta. 905+19	Req'd. Concrete Diversion Box 63' Lt. Survey Line	3	1.5	0.8	0.7													For details see sheet no. 16
Sta. 905+27	Req'd. 14' X 15" C.M. Culvert Pipe (16 gage) (Irrigation) 61' Lt. Survey Line	4	1.1	1.1				14										For location see sheet no. 14 & no. 30
Sta. 905+34	Req'd. Concrete Siphon Diversion Box 62' Lt. Survey Line	5	10	3	3.1	210.3												For details see sheet no. 16
Sta. 905+31	Req'd. 115' X 24" Asb. Bonded C.M. Siphon Pipe w/1 Std. headwall (bituminous coated) (14 gage)	6	71	27.7	2.6	160			115		1				22			For detail drawing see sheet no. 14
Sta. 905+38	Req'd. 18 Cu.Yds. Unclassified Ditch Excav. 80' Lt. Survey Line	9														18		For location see sheet no. 14
Sta. 905+41	Req'd. 51' X 18" C.M. Culvert Pipe (16 gage) (Irrigation) 61' Lt. Survey Line	11	3	4.5				51										For location see sheet no. 14 & no. 15
Sta. 905+46	Req'd. 116' X 36" Asb. Bonded C.M. Siphon Pipe w/2 Std. headwalls (bituminous coated) (12 gage)	13	121.4	40	7.5	401			116		2				34			For detail drawing see sheet no. 14
Sta. 905+68	Req'd. 122' X 18" Asb. Bonded C.M. Siphon Pipe w/1 Std. headwall (bituminous coated) (16 gage)	15	58.4	21.5	2.2	150			122		2				222			For detail drawing see sheet no. 15
Sta. 905+88	Req'd. Concrete Siphon Diversion Box 65' Lt. Survey Line	17	7.5	3.8	3.7	231.3												For detail drawing see sheet no. 16
Sta. 918+00	Req'd. Concrete Headwall for 53" X 34" Ellip. Pipe 27' Rt. of Section Line	24	4.5	1.2	4	81												For detail drawing see sheet no. 4
Sta. 918+62	Req'd. Concrete Headwall for 53" X 34" Ellip. Pipe 56' Lt. of Section Line	25	4.5	1.2	4	81												For detail drawing see sheet no. 4
Sta. 921+36	Remove & Relay 58' X 15" C.M.P. Side Drain 14' Lt. Survey Line	27	12	7			58'											Relay 15" C.M.P. 24' Lt. Sta. 938+10
Sta. 930+34	Req'd. 50' X 15" C.M. Culvert Pipe (16 gage) (Irrigation) 20' Lt. Survey Line	31	10.5	8.8				49' Δ										
Sta. 930+63	Req'd. 41' X 48" C.M. Culvert Pipe (12 gage) (Irrigation) Cross - Drain extended Rt. & Lt. Survey Line	34	19.8	36.9					20' Δ 10' Δ 10' Δ				2					Symonton Ditch Cross Drain (Extend Exist. 48')
Sta. 932+86	Remove & Relay 16' X 18" C.M.P. Side Drain 20' Lt. Survey Line	37	4	3			16'											
Sta. 940+86	Req'd. Concrete Headwall @ 36" R.C.P. w/ Drain Gate 49' Lt. Survey Line	38	5.4	3	4.2			46' Δ										For details see sheet no. 4
Sta. 952+67	Req'd. 47' X 12" C.M. Culvert Pipe (16 gage) Cross - Drain Extended Rt. of Survey Line	49	5.2	6.3														12" C.M.P. to connect to Inlet 952A & Existing 12" C.M.P.
Sta. 955+06	Req'd. 96' X 2" Cast Iron Water Pipe	56												96				2" C.I. Water Pipe to be connected w/ M.H. 9" See sheet no. 33
Sta. 959+00	Req'd. Concrete Diversion Box 30' Lt. Survey Line	61	0.4	3.8	0.9													For details see sheet no. 17
Sta. 959+18	Req'd. 40' X 12" C.M. Culvert Pipe (16 gage) (Irrigation) 30' Lt. Survey Line	63	3	1.8				40										
Sta. 959+37	Req'd. Concrete Diversion Box 30' Lt. Survey Line	64	2.3	2.7	0.7													For details see sheet no. 17
Sta. 959+44	Req'd. 100' X 12" C.M. Culvert Pipe (16 gage) (Irrigation)	68	64.3	9.7				100										
Sta. 959+59	Req'd. Concrete Diversion Box 75' Rt. Survey Line	69	4.2	3.6	0.9													For details see sheet no. 17
Sta. 959+77	Req'd. 42' X 24" C.M. Culvert Pipe (16 gage) Cross - Drain Extended Rt. of Survey Line	71	12.4	7.6				25' Δ 16' Δ										
Sta. 964+96	Req'd. 80' X 12" C.M. Culvert Pipe (16 gage) Cross - Drain	76	17	15.4				80' Δ 5-8' X 6"				2						
Sta. 966+00 to Sta. 968+25	Req'd. 8-8' X 6" C.M. Culvert Pipe Side - Drains	76A	9	4														
Sta. 968+61	Req'd. 57' X 12" C.M. Culvert Pipe (16 gage) Cross - Drain Extended Rt. & Lt. Survey Line	78	6.3	6.2				21' Δ 20' Δ 34' Δ 22' Δ				2						For Location 6" C.M. Culvert Pipe Side - Drains, see sheet no. 34
Sta. 982+70	Req'd. 44' X 15" C.M. Culvert Pipe (16 gage) Cross - Drain (Irrigation) Extended Rt. & Lt. Survey Line	92	6.6	5.6														
Sta. 982+70	Req'd. Concrete Diversion Box 45' Lt. Survey Line	93	0.6	4.6	0.6													For details see sheet no. 17
Sta. 983+02	Remove & Relay 50' X 18" C.M. Culvert Pipe 49' Rt. Survey Line (Temp. Crossing)	95	13	3			50'											
Sta. 983+02	Req'd. 50' X 15" C.M. Culvert Pipe Cross - Drain 45' Lt. Survey Line	96	18.1	6.4				50										
TOTALS			497.0	244.2	35.1	1,314.6	58'	66'	324	158	51	43	41	122	115	116		
Sta. 948+ to 960+	1300 Lin. Ft. 6" Perf. C.M.P. Underdrain		398									1300						See sheet no. 33
Sta. 951+ to 959+	876 Lin. Ft. 8" Perf. C.M.P. Underdrain		347									876						See sheet no. 33
Sta. 969+ to 971+	200' Lin. Ft. 6" Perf. C.M.P. Underdrain		56									200						See sheet no. 34
PROJECT TOTALS			1,298.0	244.2	35.1	1,314.6	58'	66'	324	158	51	43	41	122	115	116	1500	876

Δ Allowance for Connecting Band

FED. ROAD DIST. NO.	STATE	PROJ. NO.	SHEET NO.	TOTAL SHEETS
9	COLO.	U 036-1(6)	11	

LOCATION	STATION	STATION	LENGTH	SUB-BASE MATERIAL (Class I)		BASE COURSE GRAVEL SURF (Grading C)		3" PLANT MIXED ASPHALTIC SURF (Roadway)		2" PLANT MIXED ASPHALTIC SURF (Driveways)		1" PLANT MIXED ASPHALTIC SURF (Median Area)		TACK COAT R.C. - I		PRIME COAT M.C. - I								REMARKS
				SQ. FT.	TONS	SQ. FT.	TONS	SQ. YDS.	TONS	SQ. YDS.	TONS	SQ. YDS.	TONS	SQ. YDS.	TONS	SQ. YDS.	GALS.	SQ. YDS.	GALS.					
ILIFF AVE.W. - VASSAR AVE.E.	904+28	921+59	1731	129,297	9,374	119,950	4,348	12,080	1,995	85	9	178	10	12,080	605	12,173	4,870							
VASSER AVE E. - YALE AVE. E.	921+59	930+38	879	50,111	3,633	62,904	2,279	6,388	1,055	28	3			6,388	321	6,416	2,566							
YALE AVE. E. - BRIDGE	930+38	938+97.45	859	48,639	3,526	61,884	2,246	6,256	1,032	50	6			6,256	315	6,304	2,524							
BRIDGE (F-16-CS)	938+97.45	940+43.47	146																					
BRIDGE - DARTMOUTH AVE. E.	940+43.47	947+86	743	42,368	3,091	53,072	1,925	5,329	87	77	8			5,329	267	5,402	2,163							
DARTMOUTH AVE. E. - HAMPAVE.	947+86	983+02	3,516	227,259	16,476	255,820	9,281	24,856	4,111	546	64	235	13	24,856	1,232	25,357	10,151							
ANTICIPATED ADD. DR'WY. QUANT.						4,240	154			471	52					471	188							
					2,500																			
PROJECT TOTALS					38,600		20,233		9,072		142		23		2,740		22,462							
Note: Sub-Base Quantities estimated at Twelve inch thickness. Sub-Base & Gravel Quantities estimated at 145 pounds per cubic foot. Quantities at Street Intersections included in above tabulation.																								

TABULATION OF CURBS AND GUTTERS

LOCATION	STA.	STA.	TYPE II CURB & GUTTER	TYPE I CURB & GUTTER	TYPE II CURB RETURN	TYPE I CURB RETURN	REMARKS
			LIN. FT.	LIN. FT.	LIN. FT.	LIN. FT.	
ILIFF AVE. W. -- VASSER AVE. E.	904+28	921+59	3,428	552	31	19	
VASSER AVE. E. -- YALE AVE. E.	921 +59	930+38	1,647		112		
YALE AVE. E. -- BRIDGE	930 +38	938+9745	1,596		108		
BRIDGE (Str. No. F-16-CS)	938 +9745	940+4347					
BRIDGE -- DARTMOUTH AVE. E.	940+4347	947+86	1,445		31		
DARTMOUTH AVE. E. -- HAMP AVE.	947+86	982+90	6,926	711	94	19	
SUB - TOTAL			15,042	1,263			
SUB - TOTAL CURB RETURN			376	38			
PROJECT TOTALS			15,418	1,301			

TABULATION OF FENCING

STATION	SIDE	REMOVE FENCE	REMOVE & REBUILD FENCE	BUILD BARBED WIRE FENCE (5 STRAND) WITH METAL POSTS	POSTS EACH	REMOVE & REBUILD GUARD FENCE
		LIN. FT.	LIN. FT.	LIN. FT.	CORNER & LINE BRACE	LIN. FT.
904+30 -- 915 +00	LT.	1070				
908+30 -- 913 +50	RT.	520				
915+00 -- 918+85	LT.	385				
921+23 -- 930+10	RT.	922				
921+82 -- 930+13	LT.	840				
930+79 -- 933+08	LT.	394				
933+08 -- 939+08	LT.	720				
938+70 -- 940+32	RT.	55				
940+54 -- 945+00	LT.	457				
945+00 -- 952+57	LT.	757				
953+28 -- 960+00	RT.	720				
952+72 -- 960+00	LT.	665				
959+85 -- 969+80	LT.	985				
960+00 -- 969+80	RT.	1050			2	2
959+85 -- 969+80	LT.			1000	2	
961+00 -- 969+80	RT.			885	3	
969+80 -- 975+45	LT.	276				
969+80 -- 973+87	RT.	456				
973+30 -- 973+80	LT.	185				
973+80 -- 975+18	LT.		75			
973+87 -- 975+00	RT.	113				
976+35 -- 967+95	LT.	108				
975+00 -- 982+73	RT.	795				
977+65 -- 982+75	LT.	593				
938+40 -- 938+65	RT.					25
940+85 -- 941+10						25
TOTALS		12,066	75	1885	5	2

STORM SEWERS

INLET OR MANHOLE										STORM SEWER PIPE										REMARKS
NO.	LOCATION	TYPE	H	ELEVATION		PIPE SIZE & LENGTH			FLOW LINE ELEVATIONS		FITTINGS	LINE		% A GRADE						
				RIM	INVERT	15"	30" 36"		IN	OUT		7" 30" FLARE ANGLE END	FROM		TO					
							IN	OUT												
Note: All R.C.P. is Class II																				
918A	Sta. 918+00 - R.C.L.	3	45.45	63.86	5700					5700			*	918B	0.60	A Grades include Flared Ends * From Headwall (FL.EL.5706) Δ Inlet heights are computed from midpoint of Elliptical pipe. * To Headwall (FL.EL.5638)				
918B	Sta. 918+46 - L.C.L.	3	Δ 3.87	61.78	5650				10	76					0.60					
930A	Sta. 930+55 - R.C.L.	Special 3	6.10	90.30	8420															
930B	Sta. 930+65 - L.C.L.	Special 3	6.47	90.07	8360															
MH 941	Sta. 941+50 - E	IA	11.59	87.04	7545															
944A	Sta. 944+68 - 16' Rt. R.C.L.	B	3.00	78.40	7640															
MH 945	Sta. 945+50 - E	IA	7.12	83.62	7650	46										36" R.C.P. in * Conc. Headwall (EL. 7520) for details see sheet no. 4.				
945A	Sta. 945+50 - R.C.L.	3	3.00	83.14	8014											* 36" R.C.P. 36" R.C.P. in. 15" R.C.P. in. 15" R.C.P. in.				
946B	Sta. 946+50 - L.C.L.	3	3.00	83.14	8014	30														
MH 947	Sta. 947+88 - R.C.L. 4.5' Rt.	IA	6.75	83.75	7700	30										15" R.C.P. in. 30" R.C.P. in.				
948A	Sta. 948+00 - R.C.L.	3	3.34	83.34	8000											15" R.C.P. in.				
948B	Sta. 948+28 - L.C.L.	3	3.00	83.37	8037	10										15" R.C.P. in.				
MH 952	Sta. 952+63 - R.C.L. 4.5' Rt.	IA	5.98	84.48	7850	66										15" R.C.P. in. 15" R.C.P. in.				
952A	Sta. 952+55 - R.C.L. 18' Rt.	B	3.00	78.00	7650											* 8" Perforated C.M.P. in. * 8" Perforated C.M.P. in. * Connect to Existing 12" pipe. 15" R.C.P. in.				
953A	Sta. 952+95 - R.C.L.	2-3	3.75	84.25	8050											953A & 953B are double Type 3 Inlets. * Existing 4" Tile Underdrain * 8" Perforated C.M.P. Underdrain * 6" Perforated C.M.P. Underdrain * Connect to Existing 2" C.I. pipe				
953B	Sta. 953+00 - L.C.L.	2-3	3.00	84.29	8129	24														
MH 955	Sta. 955+00 - R.C.L. 4.5' Rt.	IA	5.79	89.79	8400	60														
955A	Sta. 955+80 - R.C.L.	3	5.31	11.41	610	242														
955B	Sta. 955+76 - L.C.L.	3	5.16	11.16	600															
969A	Sta. 969+75 - R.C.L.	3	2.73	40.23	3750	6										* From Flared End Section (Inv.3770)				
969B	Sta. 969+75 - L.C.L.	3	3.43	40.23	3680	64										15" R.C.P. in.				
937A	Sta. 937+70 - R.C.L.	3	3.00	85.56	8356	94										* To Flared End Section (Inv.3650) * To Bear Creek (Inv.8262)				
PROJECT TOTAL						686		472 732 106												
Inlets																				
Type B (3' Deep)																				
Type 3 (3' Deep)																				
Type 3 (4' Deep)																				
Type 3 (5' Deep)																				
Type 3 (6' Deep) (Special)																				
Manholes																				
Type IA (6' Deep)																				
Type IA (7' Deep)																				
Type IA (12' Deep)																				
53" X 34" R.C.P. Elliptical Pipe																				
3-15"																				

FED. ROAD DIST. NO.

9

STATE

COLO.

PROJ. NO.

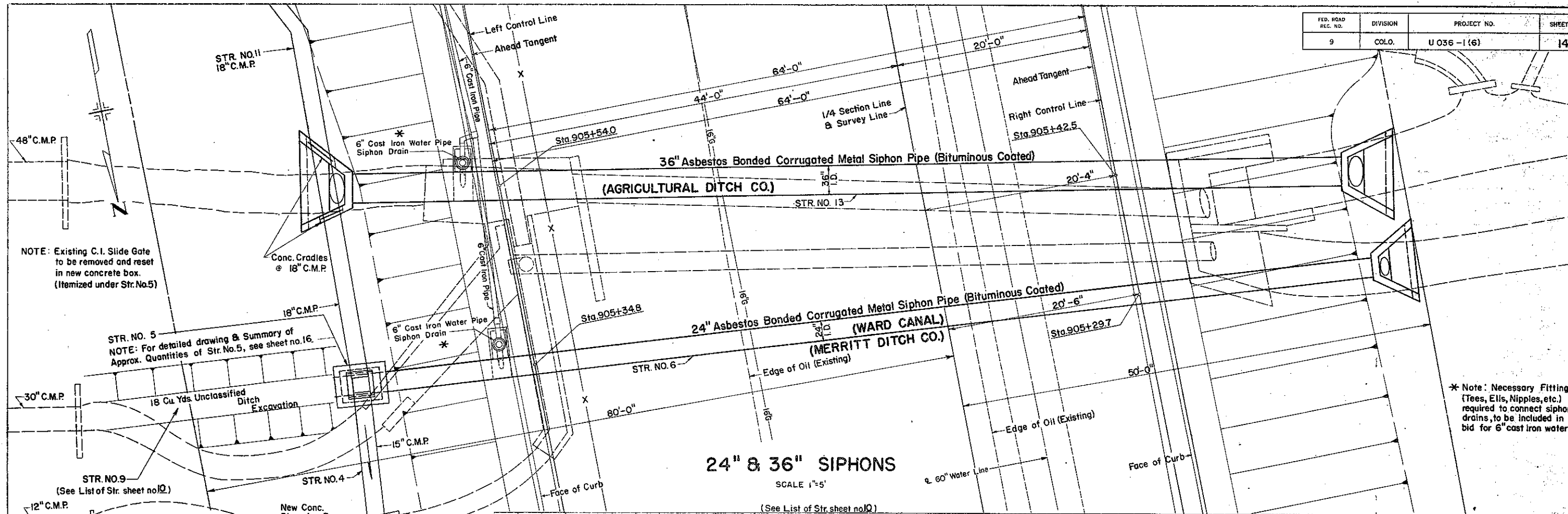
U 036-116

SHEET NO.

13

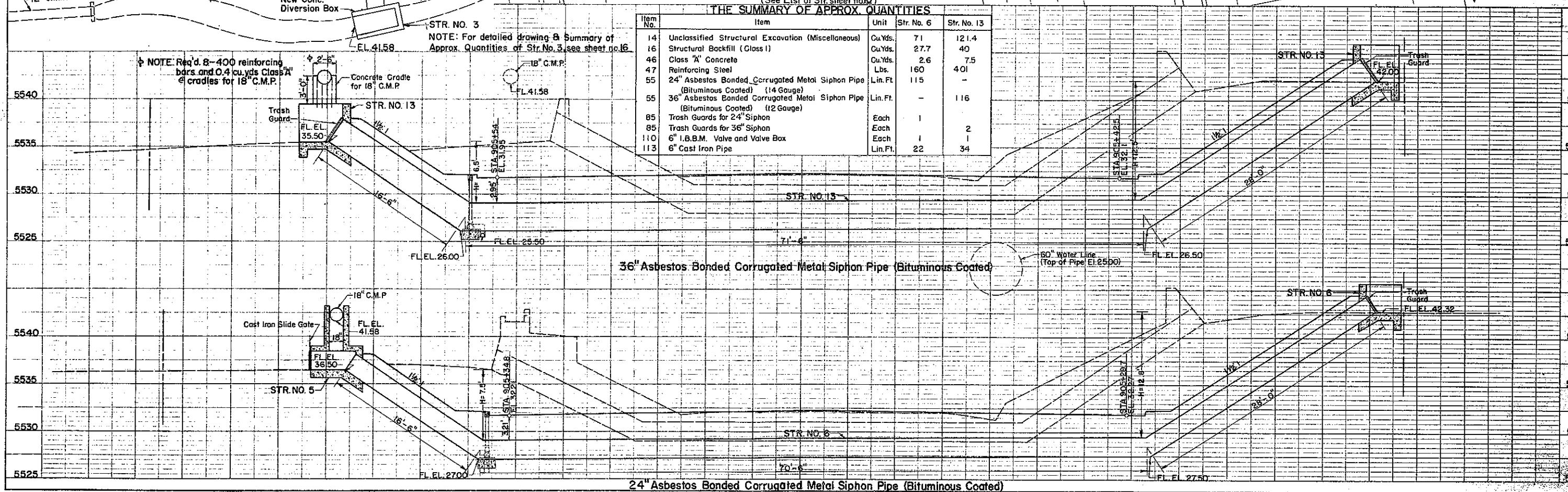
TOTAL SHEET

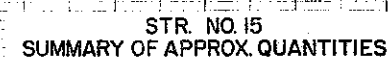
FED. ROAD DIST. NO.	STATE	PROJ. NO.	SHEET NO.	TOTAL SHEETS
9	COLO.	U 036-1(6)	13	



THE SUMMARY OF APPROX. QUANTITIES

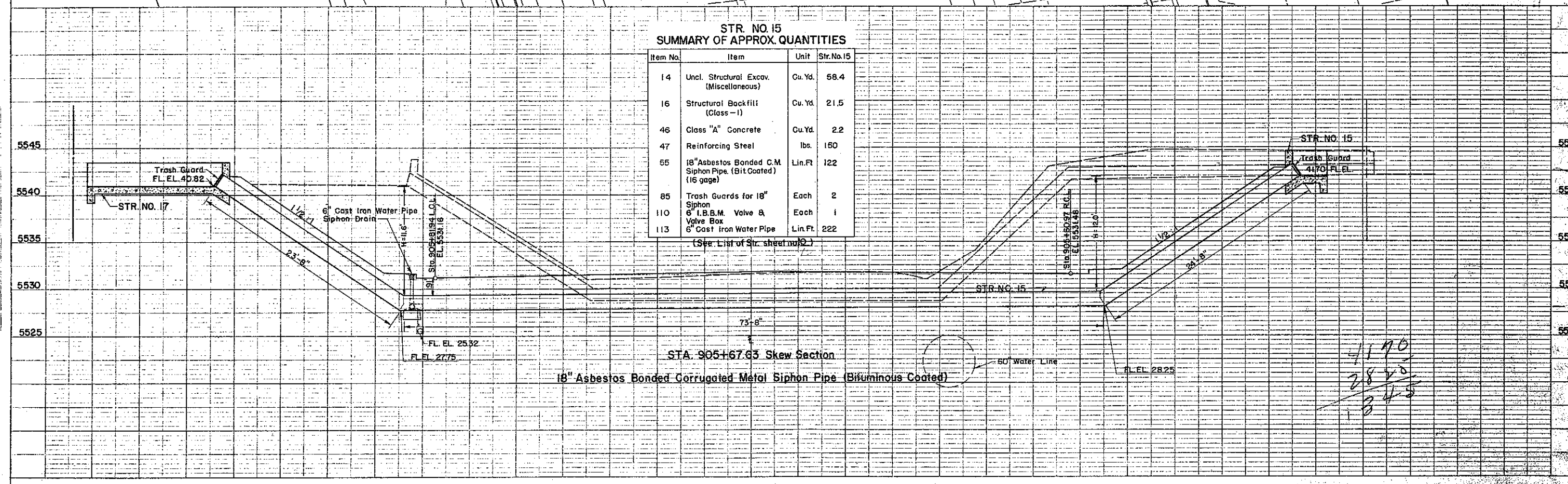
Item No.	Item	Unit	Str. No. 6	Str. No. 13
14	Unclassified Structural Excavation (Miscellaneous)	Cu. Yds.	71	121.4
16	Structural Backfill (Class I)	Cu. Yds.	27.7	40
46	Class "X" Concrete	Cu. Yds.	2.6	7.5
47	Reinforcing Steel	Lbs.	160	401
55	24" Asbestos Bonded Corrugated Metal Siphon Pipe (Bituminous Coated) (14 Gauge)	Lin. Ft.	115	-
55	36" Asbestos Bonded Corrugated Metal Siphon Pipe (Bituminous Coated) (12 Gauge)	Lin. Ft.	-	116
85	Trash Guards for 24" Siphon	Each	1	2
85	Trash Guards for 36" Siphon	Each	1	1
110	6" I.B.M. Valve and Valve Box	Each	1	1
113	6" Cast Iron Pipe	Lin. Ft.	22	34



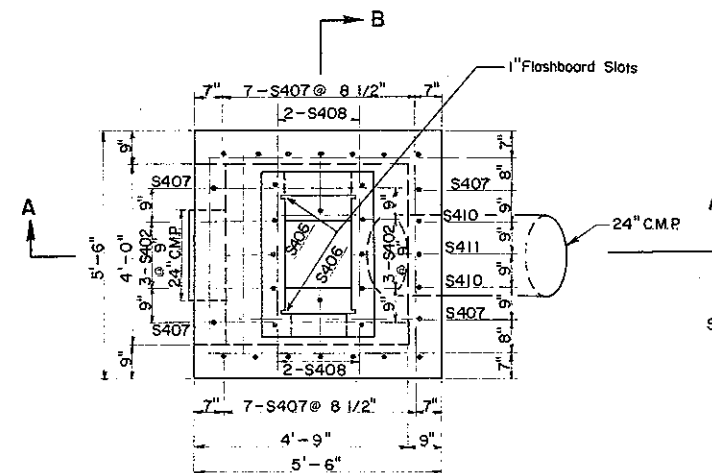
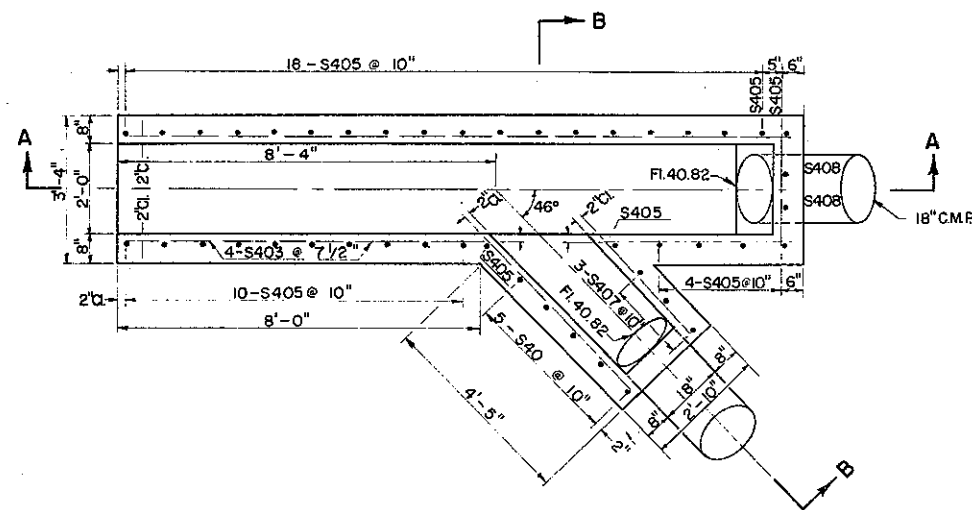


Item No.	Item	Unit	Str. No. 1
14	Uncl. Structural Excav. (Miscellaneous)	Cu. Yd.	58.4
16	Structural Backfill (Class - I)	Cu. Yd.	21.5
46	Class "A" Concrete	Cu. Yd.	2.2
47	Reinforcing Steel	lbs.	150
55	16" Asbestos Bonded C.M. Siphon Pipe. (Bit. Coated) (16 gage)	Lin. Ft.	122
85	Trash Guards for 16" Siphon	Each	2
110	6" I.B.B.M. Valve & Valve Box	Each	1
113	6" Cast Iron Water Pipe	Lin. Ft.	222

(See List of Str. sheet no) 2

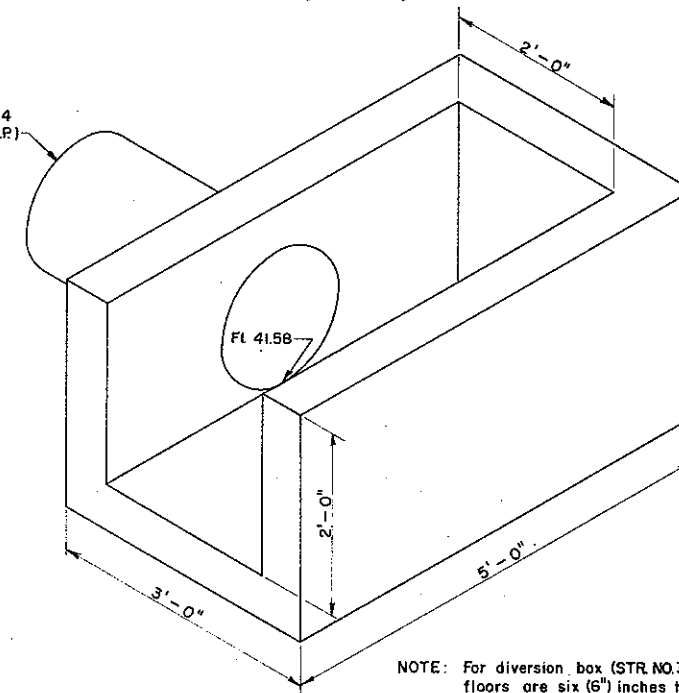


FEDERAL ROAD REGION NO.	DISTRICT	PROJ. NO.	SHEET NO.	TOTAL SHEETS
9	COLORADO	U 036-1(6)	16	

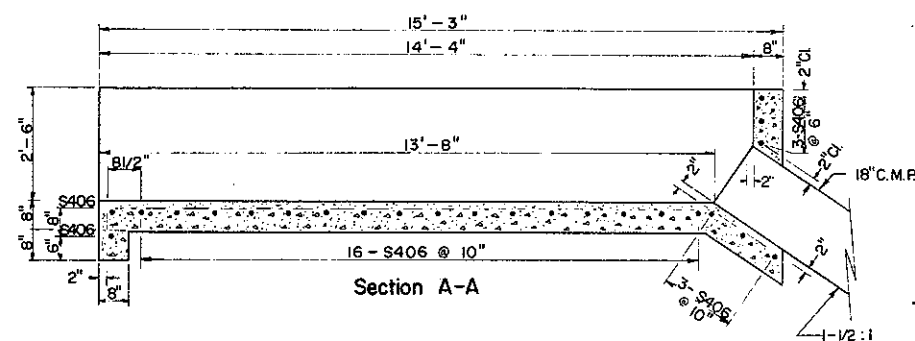


**DIVERSION BOX
STRUCTURE NO. 3**
Scale: 1" = 1'
Original Tracing

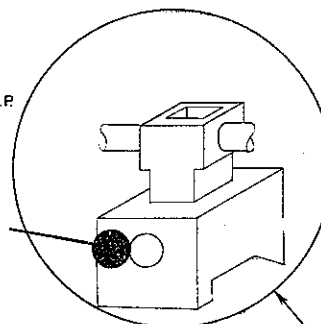
STR. NO. 4
(15" C.M.P.)



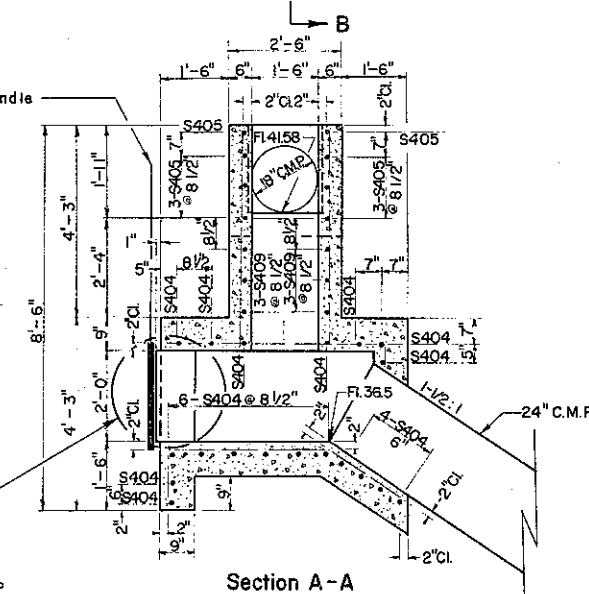
NOTE: For diversion box (STR. NO. 3) all walls and floors are six (6") inches thick.



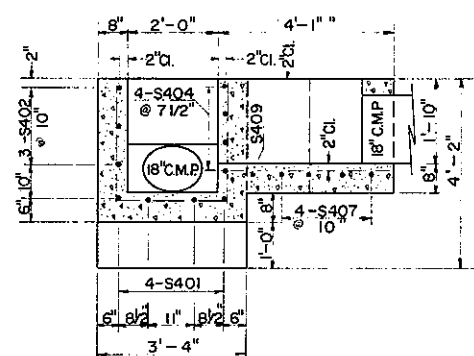
Slide Gate Handle



NOTE: The existing Slide Gate will be removed and reset. It will be attached to the protruding one (1") inch portion of the 24" C.M.P.



Section A-A

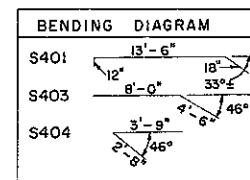


**Section B-B
CONCRETE SIPHON DIVERSION BOX
STRUCTURE NO. 17**
Scale: 1" = 2'

STR. NO. 17
SUMMARY OF APPROXIMATE QUANTITIES

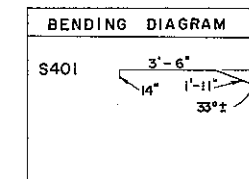
Item No.	Item	Unit	Amount
14	Uncl. Structural Excav. (Miscellaneous)	Cu. Yd.	7.5
16	Structural Backfill (Class-I)	Cu. Yd.	3.8
46	Class "A" Concrete	Cu. Yd.	3.7
47	Reinforcing Steel	lbs.	231.3

(See List of Struct. Sheet No. 10)



STR. NO. 17
Bar List

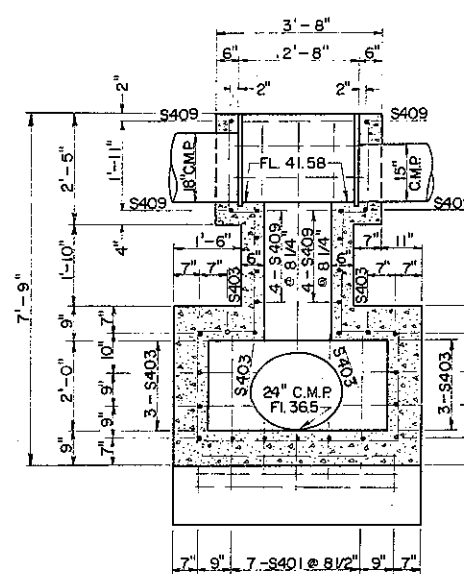
Mark	Shape	Length	No. Req'd.
S 401		14'-8"	4
S 402		14'-2"	3
S 403		12'-6"	4
S 404		6'-5"	4
S 405		2'-6"	35
S 406		2'-4"	24
S 407		1'-10"	12
S 408		1'-3"	2
S 409		1'-0"	1



**STR. NO. 3
SUMMARY OF APPROXIMATE QUANTITIES**

Item No.	Item	Unit	Amount
14	Uncl. Structural Excav. (Miscellaneous)	Cu. Yd.	1.5
16	Structural Backfill (Class-I)	Cu. Yd.	0.8
46	Class "A" Concrete	Cu. Yd.	0.7

(See List of Struct. Sheet No. 10)



**Section B-B
CONCRETE SIPHON DIVERSION BOX
STRUCTURE NO. 5**
Scale: 1" = 2'

**STR. NO. 5
SUMMARY OF APPROXIMATE QUANTITIES**

Item No.	Item	Unit	Amount
12	Remove & Reset Cast Iron Slide Gate.	Each	1
14	Uncl. Structural Excav. (Miscellaneous)	Cu. Yd.	10.0
16	Structural Backfill (Class-I)	Cu. Yd.	3.0
46	Class "A" Concrete	Cu. Yd.	3.1
47	Reinforcing Steel	lbs.	210.3
53	24" C.M. Culvert Pipe (16 Gauge)	Lin. Ft.	1.0

(See List of Struct. Sheet No. 10)

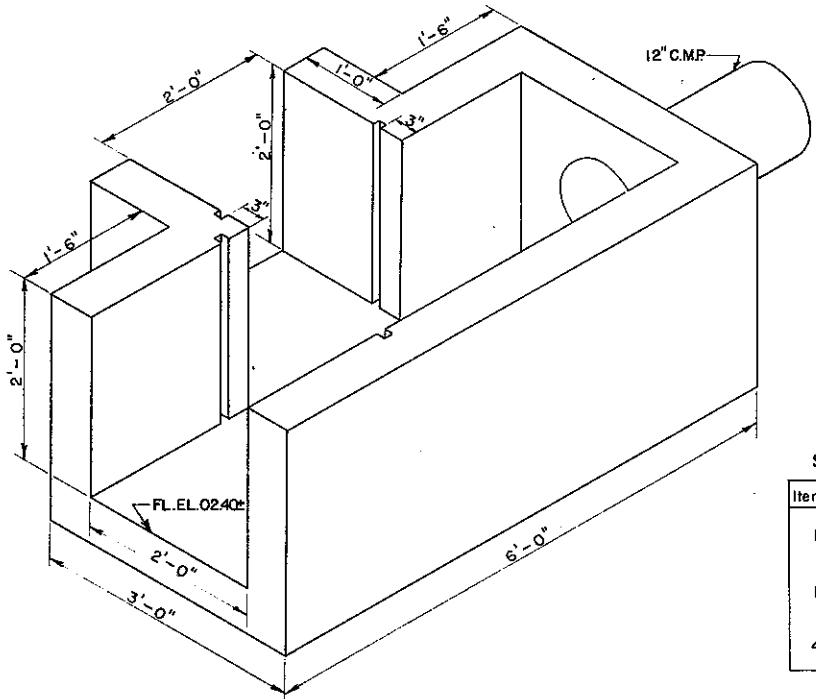
**STR. NO. 5
Bar List**

Mark	Shape	Length	No. Req'd.
S 401		6'-7"	7
S 402		4'-8"	6
S 403		4'-6"	10
S 404		4'-4"	19
S 405		3'-0"	8
S 406		2'-9"	2
S 407		2'-4"	18
S 408		1'-11"	4
S 409		1'-10"	18
S 410		0'-7"	2
S 411		0'-5"	1

FEDERAL ROAD REGION NO.	DISTRICT	PROJ. NO.	SHEET NO.	TOTAL SHEETS
9	COLORADO	U 036-1 (6)	17	

DIVERSION BOXES

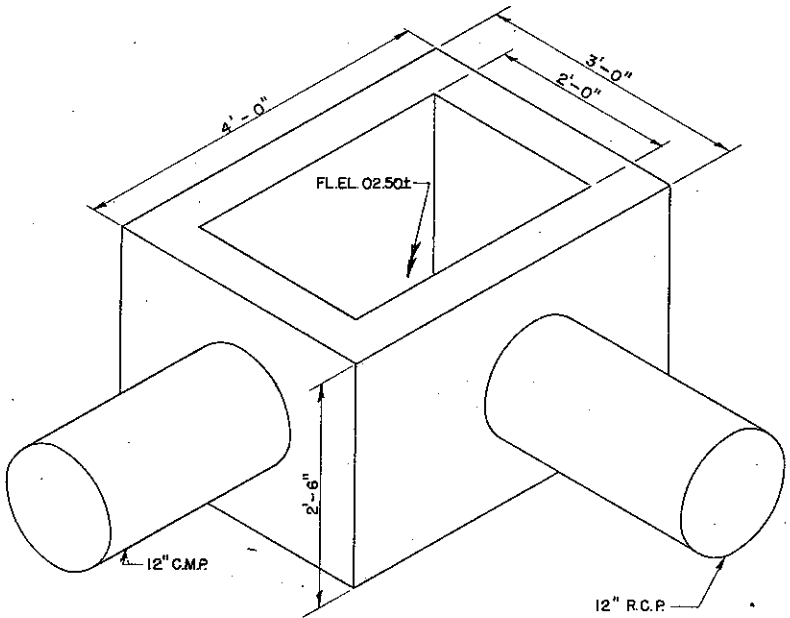
SCALE 1" = 1'
Original Tracing
Note: All walls & floors are six (6) inches thick.
All flashboard slots are 1"x1".



STR. NO. 61
SUMMARY OF APPROXIMATE QUANTITIES

Item No.	Item	Unit	Amount
14	Uncl. Structural Excav. (Miscellaneous)	Cu. Yd.	0.4
16	Structural Backfill (Class - I)	Cu. Yd.	3.8
46	Class "A" Concrete	Cu. Yd.	0.9

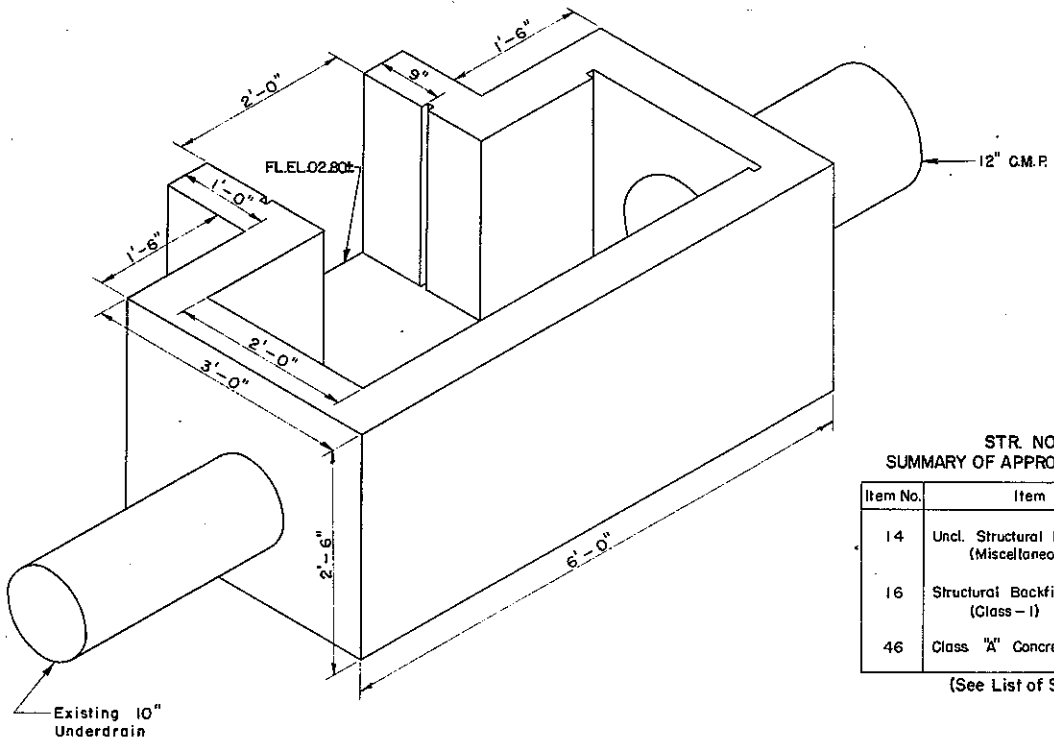
(See List of Str. sheet no. 10)



STR. NO. 64
SUMMARY OF APPROXIMATE QUANTITIES

Item No.	Item	Unit	Amount
14	Uncl. Structural Excav. (Miscellaneous)	Cu. Yd.	2.3
16	Structural Backfill (Class - I)	Cu. Yd.	2.7
46	Class "A" Concrete	Cu. Yd.	0.7

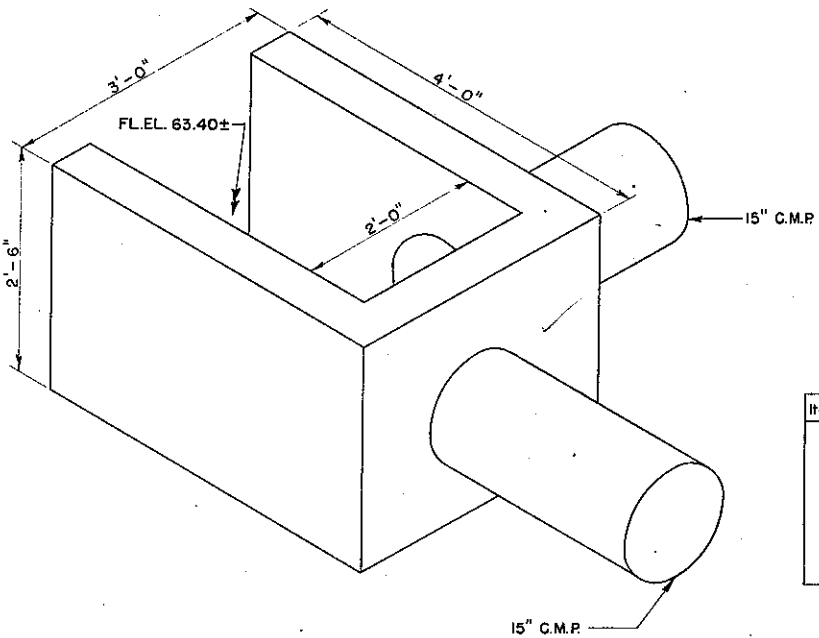
(See List of Str. sheet no. 10)



STR. NO. 69
SUMMARY OF APPROXIMATE QUANTITIES

Item No.	Item	Unit	Amount
14	Uncl. Structural Excav. (Miscellaneous)	Cu. Yd.	4.2
16	Structural Backfill (Class - I)	Cu. Yd.	3.6
46	Class "A" Concrete	Cu. Yd.	0.9

(See List of Str. sheet no. 10)

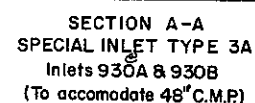


STR. NO. 93
SUMMARY OF APPROXIMATE QUANTITIES

Item No.	Item	Unit	Amount
14	Uncl. Structural Excav. (Miscellaneous)	Cu. Yd.	0.6
16	Structural Backfill (Class - I)	Cu. Yd.	4.6
46	Class "A" Concrete	Cu. Yd.	0.6

(See List of Str. sheet no. 10)

TOTAL
SHEET

[illegible]

4-40x2'-0" welded to inside face of 1/2 x 1/2 x 3/16 x 3'-10" angle and bent as shown.

4-401 x 2'-0" welded to inside face of 1 1/2 x 1 1/2 x 3/16 x 3'-10" angle and bent as shown.

INLET TYPE 3

Technical drawing of a window frame showing a plan view and a section view. The plan view shows a rectangular frame with a grid of panes. The section view shows the frame's profile with dimensions: 1 3/4" for the top and bottom sashes, and 5 7/8" for the side sashes. The total width is 3'-3 1/4".

Figure 1 is a schematic diagram of a 16-bit parallel adder. It consists of a central vertical bus with 16 horizontal lines extending from it. On the left side, there are 16 input lines, each labeled with a number from 1 to 6. On the right side, there are 16 output lines, each labeled with a number from 1 to 5. A legend at the bottom of the diagram defines the input values: 1 = 9/16, 2 = 17/16, 3 = 11/16, 4 = 17/16, 5 = 9/16, and 6 = 17/16.

Technical drawing of a rectangular frame. The top view shows a rectangle with a central opening. Dimensions are given for the overall width and height, and for the thickness of the frame. Section lines are indicated by arrows labeled C and D. The side view shows the profile of the frame with dimensions for the overall width, the width of the opening, and the thickness of the frame. The overall width is 3'-10 1/2". The width of the opening is 2'-11 1/4". The thickness of the frame is 1/2". The overall height is 3'-6 1/2". The height of the opening is 2'-11 1/4". The thickness of the frame is 1/2".

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

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

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.

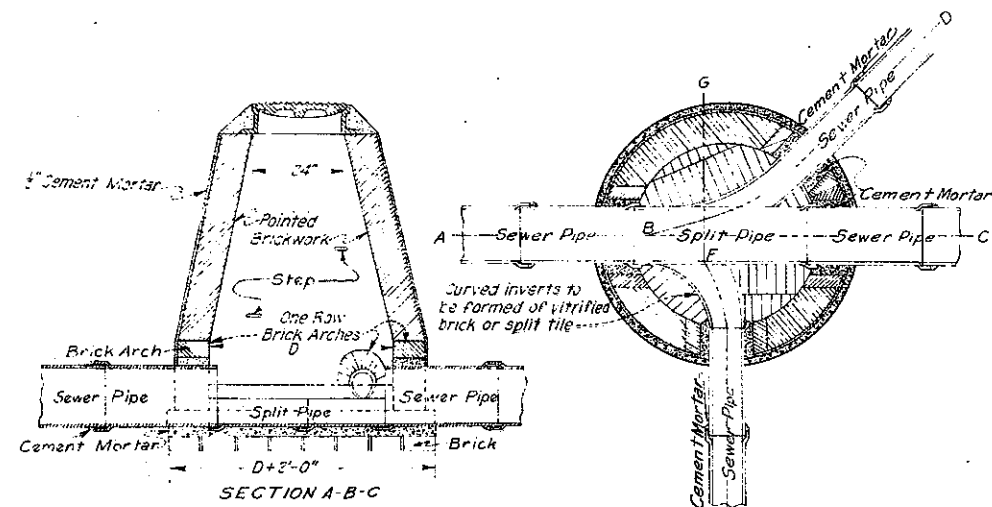
All exposed concrete corners shall be beveled to a 1" face.

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.

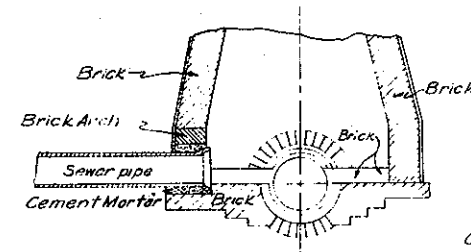
Designed by:	Approved by:
Made by:	Date:
Checked by:	

FED. ROAD DIV. NO.	STATE	PROJ. NO.	SHEET NO.	TOTAL SHEETS
9	COLO.	U 036-1(6)	19	

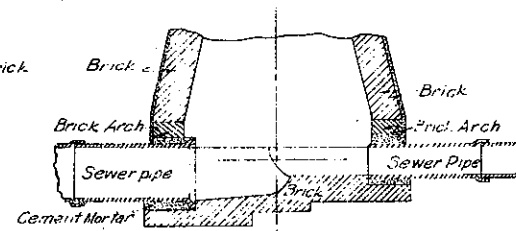


Diameter of Manhole to be 4' for Pipe Sewers 18" & under, 5' for Pipe Sewers 21" to 36" incl., and 6' for Pipe Sewers 42" to 48" incl.

PLAN

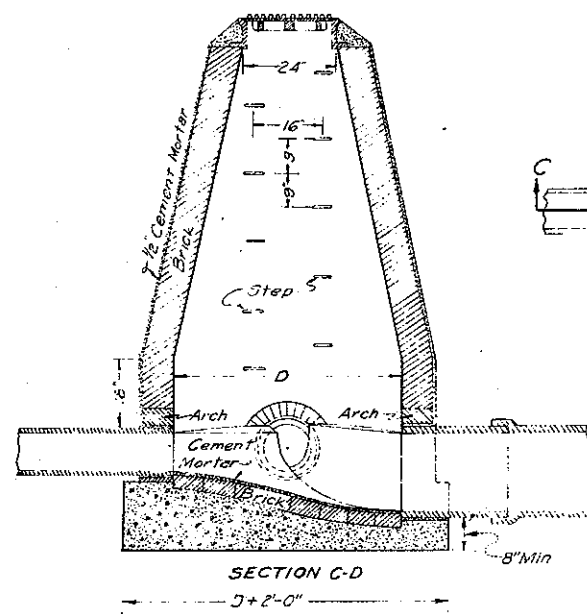


SECTION E-F-G

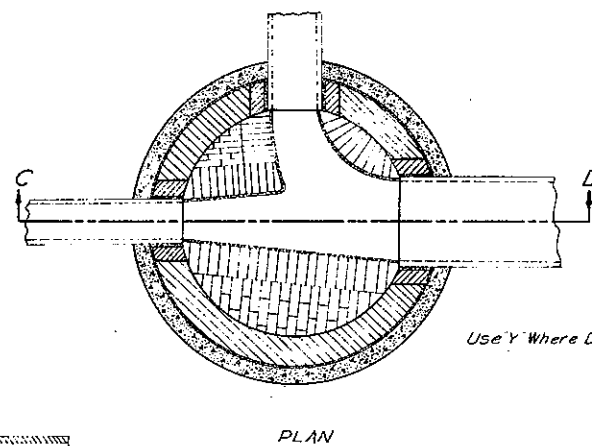


SECTION A-B-D

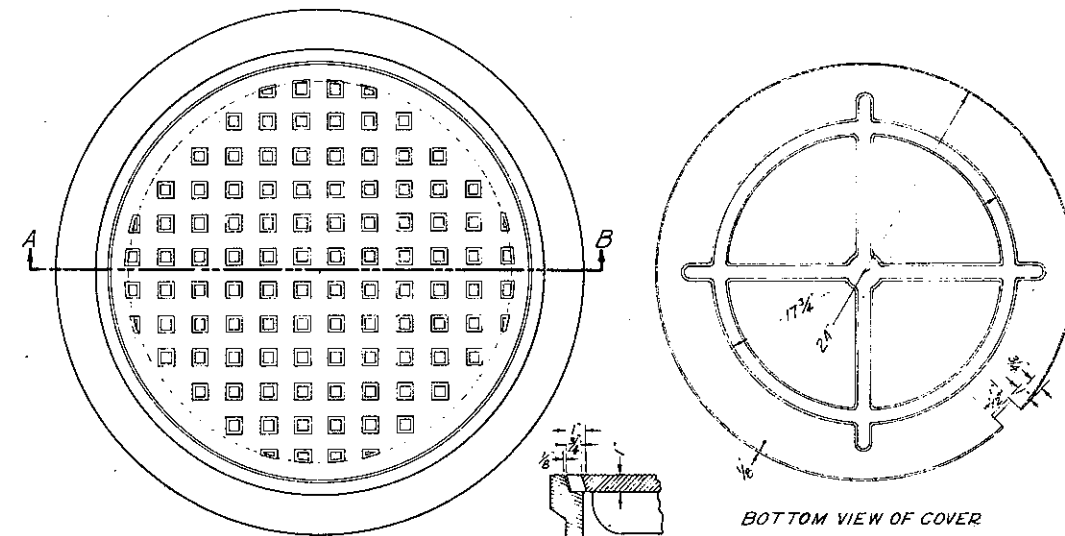
TYPE 1 MANHOLE (STORM & SANITARY)
Scale 1/2" = 1'-0"



TYPE 1-A MANHOLE
Scale 1/2" = 1'-0"
SANITARY & STORM SEWERS

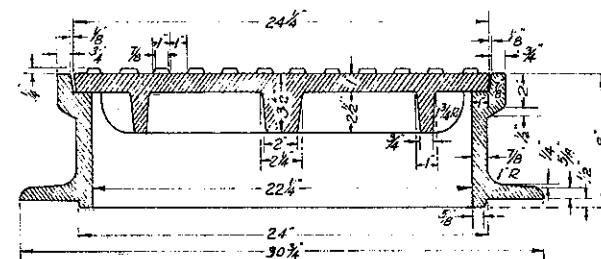


Diameter of Manhole to be 5' for Pipe Sewers 36" and Under, and 6' for Pipe Sewers 42" to 48".



TOP VIEW OF RING & COVER

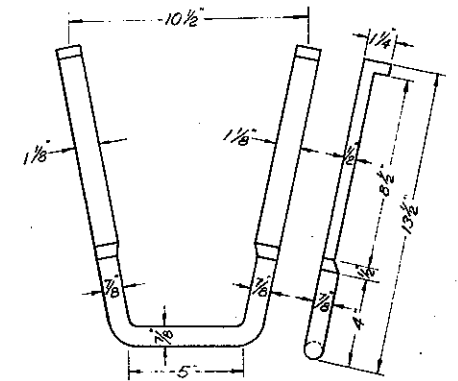
SECTION THRU SLOT USED TO LIFT COVER.



SECTION A-B

DETAILS OF MANHOLE RING & COVER
Scale 3/16" = 1"

Weight - Frame Approx. 224"
Cover Approx. 176"
400"
Dipped or Painted with Asphalt
or Cos. Tar & Oil.

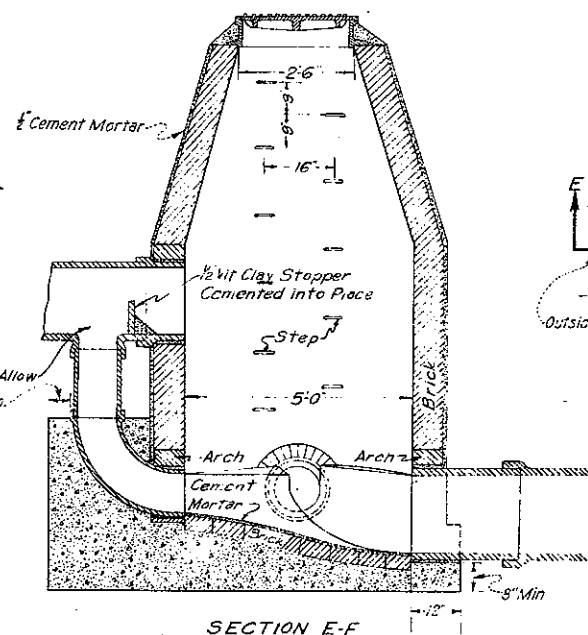


WROUGHT IRON OR
MILD STEEL STEPS

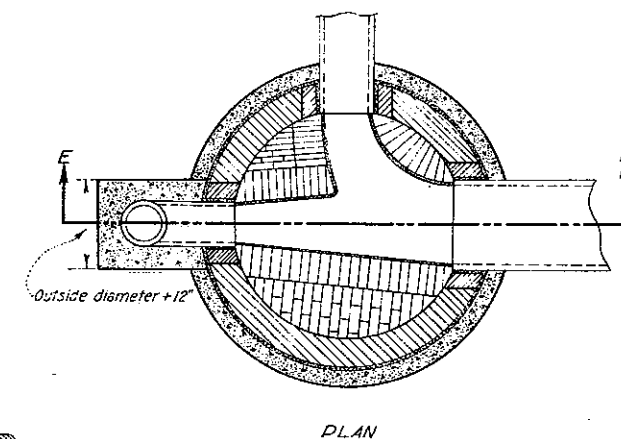
Scale 3" = 1'-0"

This Step to be Used for All Types Manholes.

GENERAL NOTES:
All brick in manholes to conform to requirements of grade
MA of A.A.S.H.O. 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 E-F



PLAN

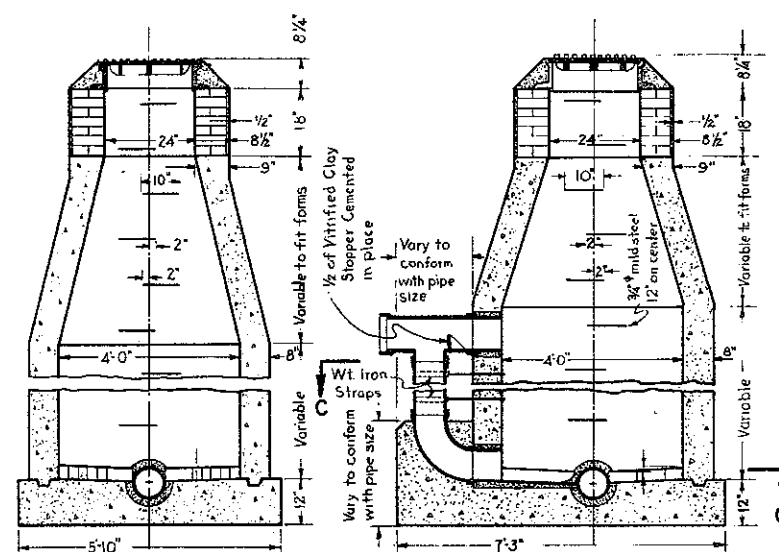
TYPE 2 MANHOLE (SANITARY ONLY)
Scale 1/2" = 1'-0"

COLORADO
DEPARTMENT OF HIGHWAYS

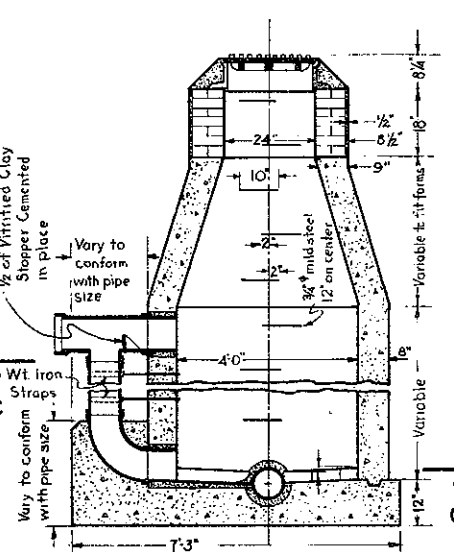
MANHOLE DETAILS
TYPE 1, 1A AND 2

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

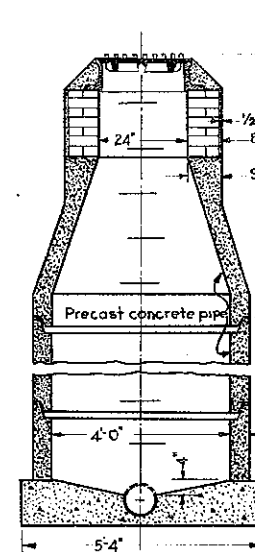
FED. ROAD DIV. NO.	STATE	PROJ. NO.	SHEET NO.	TOTAL SH.
9	COLO.	U 036-1(6)	20	



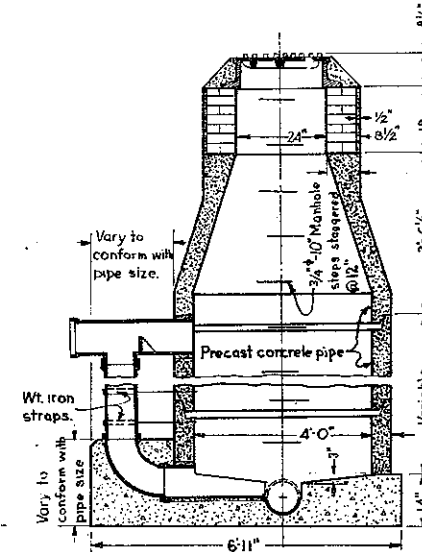
SECTION A-A



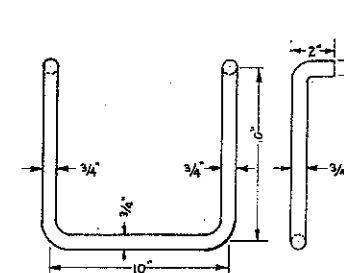
SECTION B-B



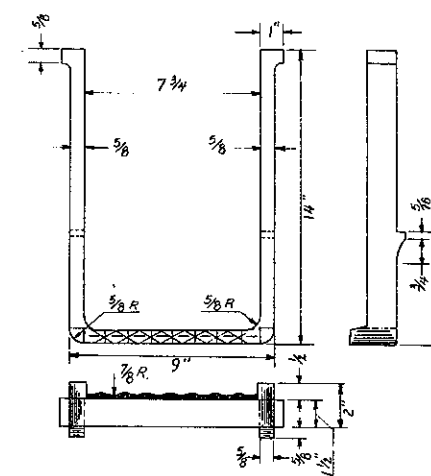
SECTION D-D



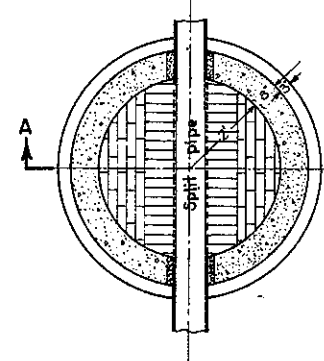
SECTION E-E



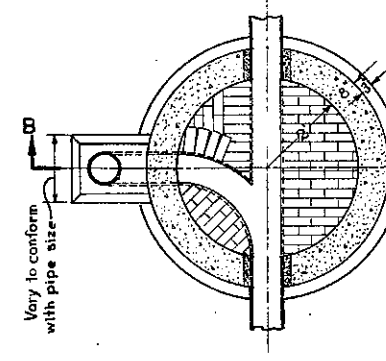
MILD STEEL STEPS
For Concrete Manholes



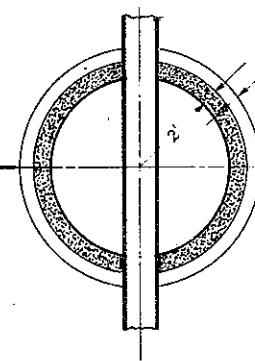
CAST IRON STEPS
For Brick Manholes



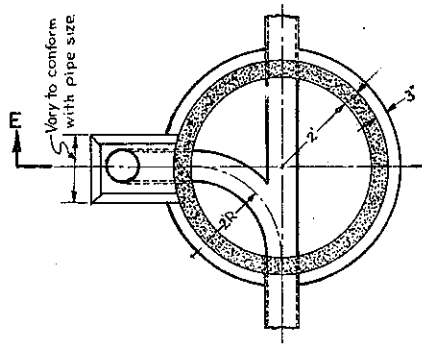
SECTIONAL PLAN



SECTION C-C

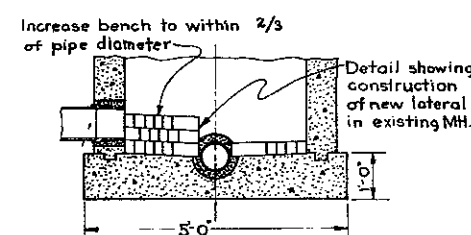


SECTIONAL PLAN



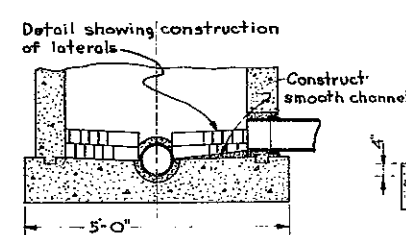
SECTIONAL PLAN

TYPE 3



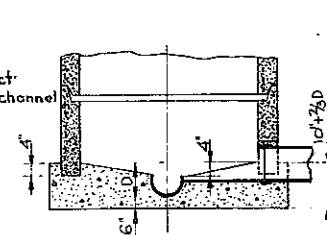
SECTION F-F

TYPE 3A



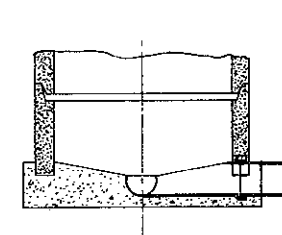
SECTION G-G

TYPE 4

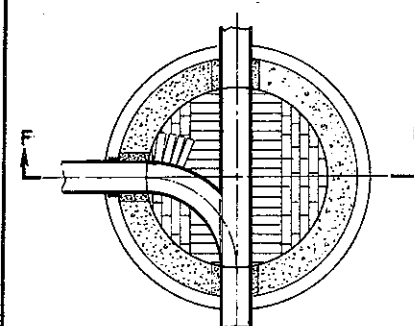


SECTION H-H

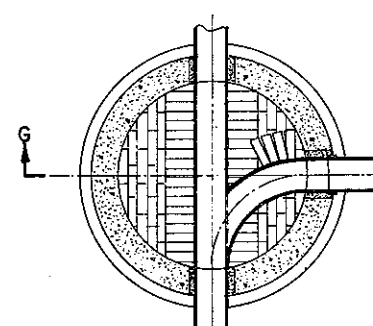
TYPE 4A



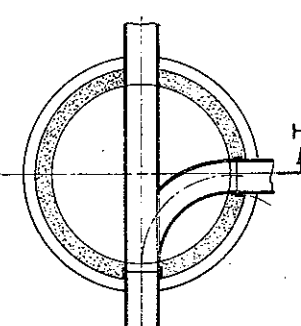
SECTION J-J



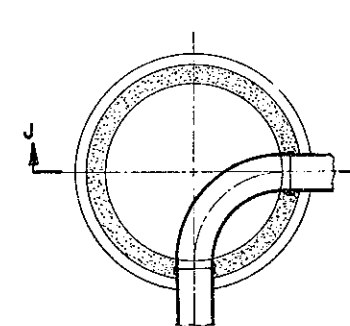
SECTIONAL PLAN
TYPE 3B



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

PLEASE DO NOT TRIM

REVISIONS

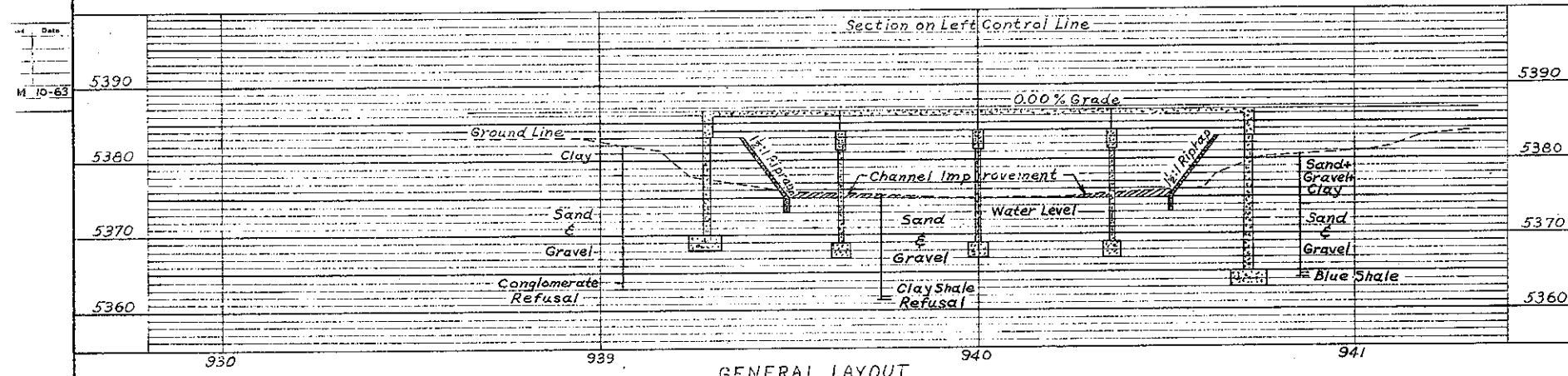
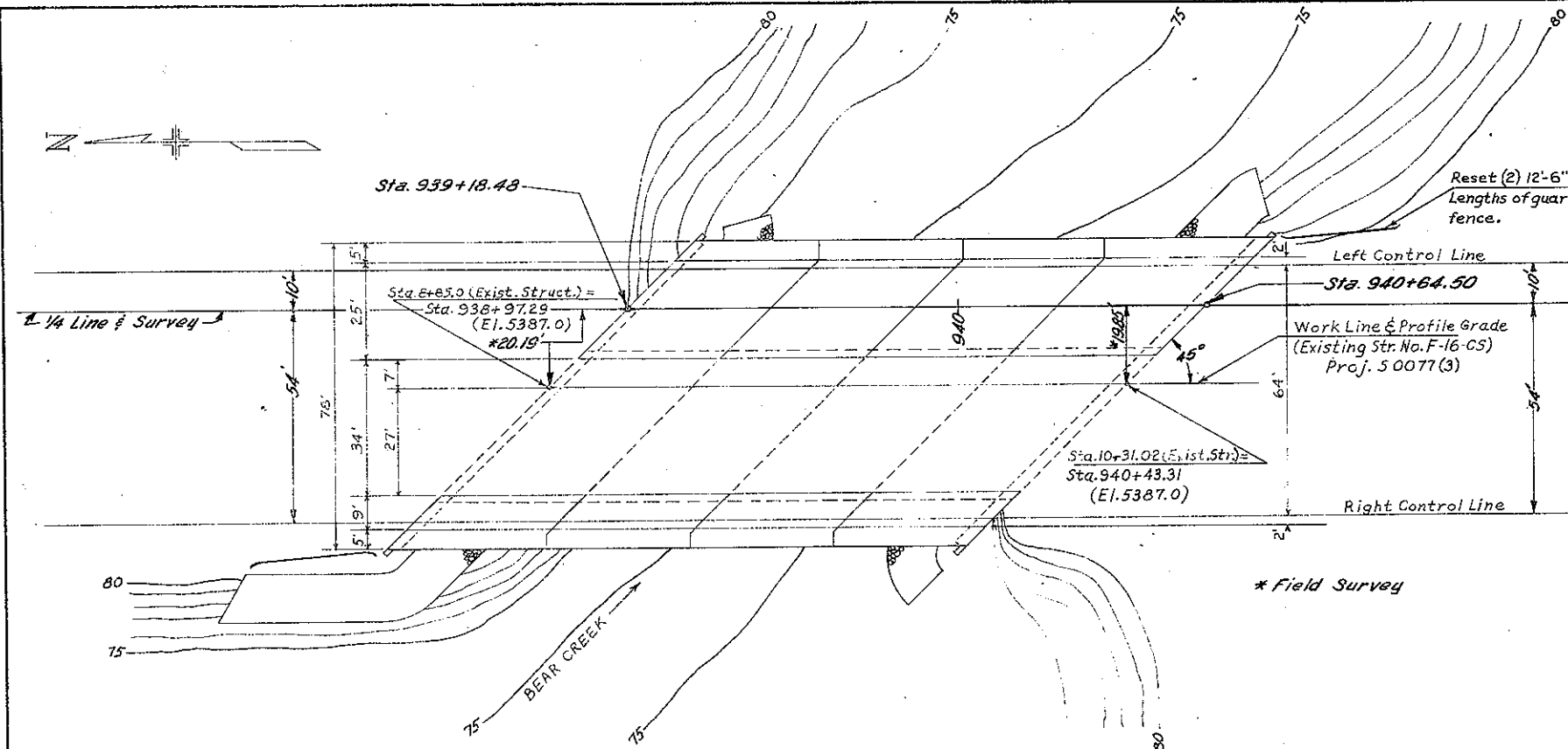
Rev: 11-1-63 Quantity Block DSM
Rev: 11-22-63 Item 46 M&P

FED. ROAD REG. NO.	DIVISION	PROJECT NO.	SHEET NO.	TOT SHE
9	COLO.	U036-1(6)	21	

SUMMARY OF QUANTITIES

ITEM NO.	DESCRIPTION	UNIT	SUPER STRUCT.	ABUT. NO.1	PIER NO.2	PIER NO.3	PIER NO.4	ABUT. NO.5	TOTAL
11	Removal of Portion of Bridge	Each							1
13	Unclassified Excavation	Cu.Yd.							195
14	Unclassified Struct. Excav. Bridge	Cu.Yd.		150	75	75	75	205	580
16	Structure Backfill (Class I)	Cu.Yd.		120	60	60	60	170	470
46	Class "A" Concrete	Cu.Yd.	276	38.6	45.1	45.1	45.1	46.1	496
47	Reinforcing Steel (Incl. 1% for overrun)	Lb.	79,900	5,110	6,010	6,010	6,010	6,075	109,115
48	Structural Steel (Incl. 1% for paint)	Lb.	1,750		955	995	955		4,615
48	Structural Steel (Galvanized)	Lb.	15,855						15,855
67	Riprap (1'-6" thick)	Cu.Yd.		125				80	205
80	Sheet Copper (32 oz.)	Lb.	20						20
89	Drain Pipe (4" x 1'-6", Conc. Floor)	Each.	8						8
89	Drain Pipe (4" x 2'-0", Conc. Floor)	Each.	8						8
1	1" Exp'n. Joint Material Type I	Sq.Ft.	160						160

- ① Exp'n. Jt. Mat'l. shall be in accordance to AASHTO Specification M-153-54 and of the Type Shown and shall be included in the Bid Price for Item No. 46.
- ② Does not include galvanizing. No percentage shall be added to the weight of the bare metal for the spelter coat.



GENERAL NOTES

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

ALL CONCRETE SHALL BE CLASS "A".

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

IF BY PERMISSION OF THE ENGINEER PRIMARY BARS ARE SPICED, THEY SHALL LAP A MINIMUM OF 28 DIAMETERS FOR BARS NEAR TOPS OF BEAMS HAVING MORE THAN 12 INCHES OF CONCRETE UNDER THE BARS, AND 17 DIAMETERS FOR BARS NEAR BOTTOM OF MEMBERS. SECONDARY BARS WHEN SPICED SHALL LAP 17 DIAMETERS OF THE BAR.

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

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

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

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

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

ALL CONCRETE SURFACES MARKED WITH THE SYMBOL F AS SHOWN ON SHEET NO. 29, SHALL RECEIVE CLASS "F" SURFACE FINISH.

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

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

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

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

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

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

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

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

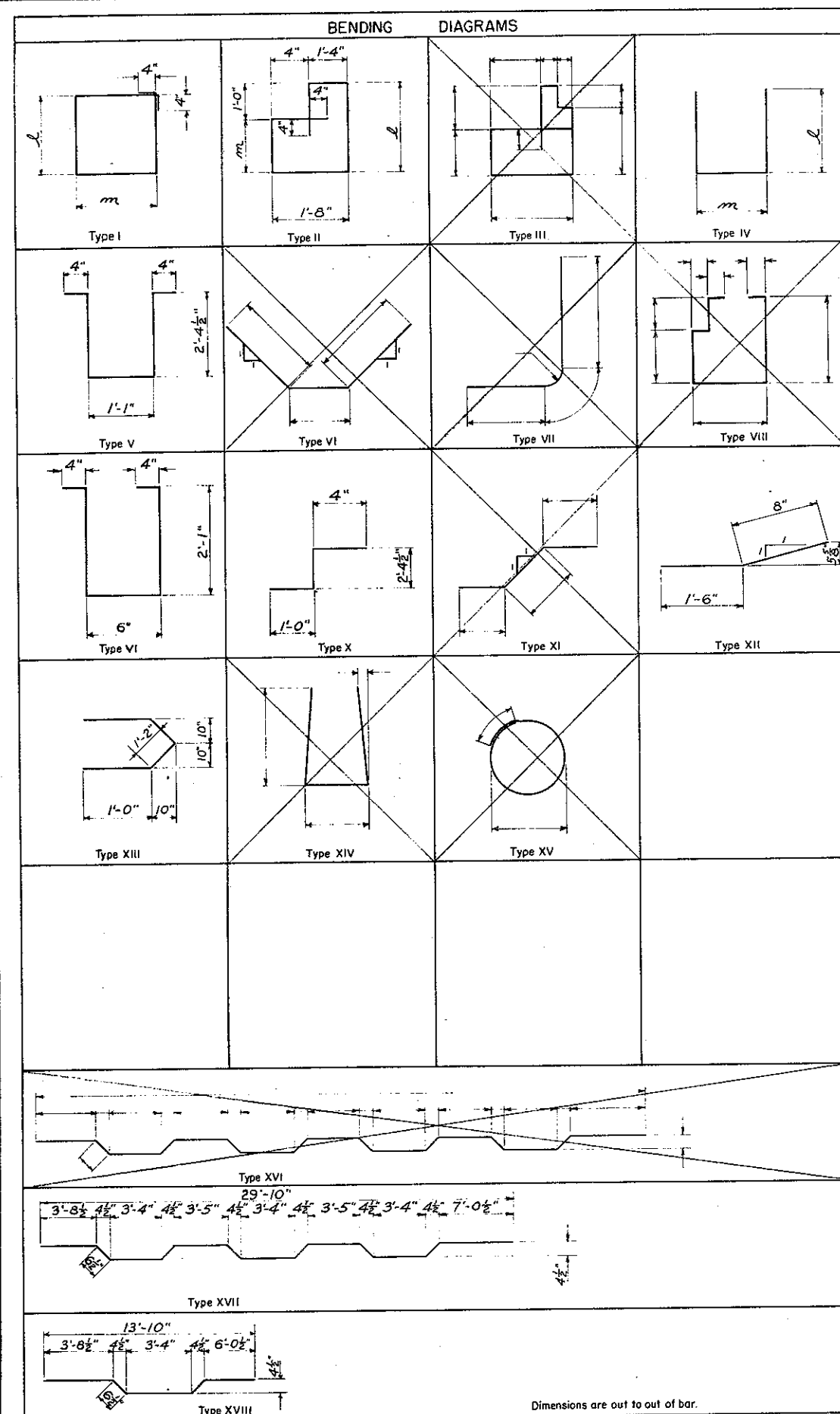
LOADING DATA.
LIVE LOAD-A. A. S. H. O. H20-S16
DEAD LOAD-ASSUMES 15 LBS. PER SQ. FT. A
AL WEARING SURFACE WHICH INCLUDES THE
CONCRETE MONOLITHIC WEARING SURFACE

DESIGNING DATA.
A. A. S. H. O. UNIT STRESSES.
fc = 1,200 Lbs. per Sq. In.
fs = 20,000 Lbs. per Sq. In. (Reinf. & Struct.)
n = 10.
fs = 18,000 Lbs. per Sq. In. (Struct. A-7 St.)

COLORADO
DEPARTMENT OF HIGHWAYS
BRIDGE WIDENING-14' WEST SIDE-30'
SIDE-4 SPANS AT 35'-CONCRETE S
& GIRDER BRIDGE-45° SKEW-68' R
5'-0" SIDEWALKS
GENERAL LAYOUT, NOTES &
SUMMARY OF QUANTITIES
ACROSS BEAR CREEK
Sta. 938+97.29 to 940+4
Near Denver Sec. 35 T4S R
Designed by GET Approved by
Made by DBS Bridge Engineer
Checked by Date: 11

STRUCTURE NO. F-16-CS

FED. ROAD REG. NO.	DIVISION	PROJECT NO.	SHEET NO.	TOTAL SHEET
9	COLO.	U036-1(6)	22	



BAR LIST - SUPERSTRUCT.

Mark	Size	No. Req'd.	Length	Type	Dimensions
401	1/2" φ	283	7'-4"	IV	1'-4" 4'-8"
402	1/2" φ	12	4'-9"	Str.	
403	1/2" φ	112	5'-3"	I	1'-5" 0'-10"
404	1/2" φ	96	3'-8"	X	
405	1/2" φ	780	6'-6"	V	
406	1/2" φ	24	3'-6"	IV	1'-6" 0'-6"
407	1/2" φ	240	5'-4"	VI	
501	1/2" φ	88	29'-10"	Str.	
502	1/2" φ	48	30'-10"	XVII	
503	1/2" φ	204	13'-10"	Str.	
504	1/2" φ	104	14'-2"	XVIII	
505	1/2" φ	8 ea.	3'-0"	to	6" to Str.
547	1/2" φ	24'-0"			
548	1/2" φ	29'-0"			
595	1/2" φ	8 ea.	5'-6"	to	6" to Str.
596	1/2" φ	8 ea.	9'-9"	to	6" to Str.
5111	1/2" φ	2'-3"			
5112	1/2" φ	4'-9"			
5129	1/2" φ	8 ea.	13'-3"	to	6" to Str.
5130	1/2" φ	19	8'-0"	Str.	
5131	1/2" φ	15	6'-0"	Str.	
5132	1/2" φ	332	35'-8"	Str.	
5133	1/2" φ	6 ea.	36'-6"	to	6" to Str.
5137	1/2" φ	31'-6"			
5138	1/2" φ	40'-3"			
5142	1/2" φ	6 ea.	36'-7"	to	6" to Str.
701	1/2" φ	36	2'-2"	Str.	
702	1/2" φ	12	37'-3"		
703	1/2" φ	12	40'-0"		
704	1/2" φ	12	16'-0"		
705	1/2" φ	12	18'-0"		
706	1/2" φ	24	5'-0"	Str.	
1101	1/2" φ	96	35'-8"	Str.	
1102	1/2" φ	48	28'-0"	Str.	
1103	1/2" φ	48	22'-0"	Str.	
1104	1/2" φ	24	9'-0"	Str.	
SUMMARY					
9510 Lin.Ft. 1/2" φ @ 0.668#/Ft. =			6,353 Lb.		
35988 Lin.Ft. 1/2" φ @ 1.043#/Ft. =			37,535 Lb.		
1533 Lin.Ft. 1/2" φ @ 2.044#/Ft. =			3,133 Lb.		
6040 Lin.Ft. 1/2" φ @ 5.313#/Ft. =			32,091 Lb.		
Plus 1% for overrun =			788 Lb.		
Total =			79,900 Lb.		

BAR LIST - ABUT. NO. 1

Mark	Size	No. Req'd.	Length	Type	Dimensions
410	1/2" φ	12	10'-2"	II	3'-1" 2'-1"
411	1/2" φ	16	10'-8"	II	3'-4" 2'-4"
412	1/2" φ	14	11'-2"	II	3'-7" 2'-7"
413	1/2" φ	12	12'-2"	I	4'-1" 1'-8"
414	1/2" φ	40	7'-4"	I	1'-8" 1'-8"
415	1/2" φ	12	8'-6"	I	2'-3" 1'-8"
416	1/2" φ	18	4'-0"	Str.	
417	1/2" φ	2	4'-5"		
418	1/2" φ	10	2'-0"	Str.	
419	1/2" φ	4	40'-0"		
420	1/2" φ	4	19'-9"	Str.	
5150	1/2" φ	22	4'-0"	Str.	
5151	1/2" φ	4	8'-0"	Str.	

BAR LIST - ABUT. NO. 1 (Cont'd.)

Mark	Size	No. Req'd.	Length	Type	Dimensions
5152	1/2" φ	8	5'-6"	Str.	
5143	1/2" φ	22	3'-6"	Str.	
601	1/2" φ	22	7'-6"	Str.	
602	1/2" φ	10	5'-6"	Str.	
603	1/2" φ	12	6'-6"	Str.	
710	1/2" φ	6	19'-8"	Str.	
711	1/2" φ	2	21'-4"	Str.	
801	1/2" φ	14	14'-3"	Str.	
802	1/2" φ	14	13'-6"	Str.	
901	1/2" φ	14	14'-5"	Str.	
902	1/2" φ	14	3'-6"	Str.	
903	1/2" φ	4	41'-5"	Str.	
1001	1/2" φ	6	41'-0"	Str.	
SUMMARY					
1330 Lin.Ft. 1/2" φ @ 0.668#/Ft. =			888 Lb.		
241 Lin.Ft. 1/2" φ @ 1.043#/Ft. =			251 Lb.		
298 Lin.Ft. 1/2" φ @ 1.502#/Ft. =			448 Lb.		
161 Lin.Ft. 1/2" φ @ 2.044#/Ft. =			329 Lb.		
249 Lin.Ft. 1/2" φ @ 2.677#/Ft. =			665 Lb.		
417 Lin.Ft. 1/2" φ @ 3.400#/Ft. =			1,418 Lb.		
246 Lin.Ft. 1/2" φ @ 4.303#/Ft. =			1,059 Lb.		
Plus 1% for overrun =			52 Lb.		
Total =			5,110 Lb.		

BAR LIST - PIER NO. 2 (3¢4 Sim.)

Mark	Size	No. Req'd.	Length	Type	Dimensions
430	1/2" φ	65	7'-4"	I	1'-8" 1'-8"
431	1/2" φ	13	4'-4"	XIII	
432	1/2" φ	47	8'-4"	I	2'-2" 1'-8"
433	1/2" φ	15	7'-10"	I	1'-11" 1'-8"
434	1/2" φ	90	10'-0"	Str.	
435	1/2" φ	22	36'-0"		
436	1/2" φ	22	17'-0"		
437	1/2" φ	1	12'-3"		
438	1/2" φ	1	3'-6"		
439	1/2" φ	2	37'-4"	Str.	
5150	1/2" φ	50	4'-0"	Str.	
715	1/2" φ	18	2'-2"	XII	
716	1/2" φ	18	2'-2"	Str.	
805	1/2" φ	5	37'-4"	Str.	
806	1/2" φ	8	16'-1"	Str.	
807	1/2" φ	40	13'-9"	Str.	
808	1/2" φ	40	3'-6"	Str.	
910	1/2" φ	6	37'-4"	Str.	
SUMMARY (Each Pier)					
3199 Lin.Ft. 1/2" φ @ 0.668#/Ft. =			2,137 Lb.		
200 Lin.Ft. 1/2" φ @ 1.043#/Ft. =			209 Lb.		
78 Lin.Ft. 1/2" φ @ 2.044#/Ft. =			159 Lb.		
1006 Lin.Ft. 1/2" φ @ 2.670#/Ft. =			2,686 Lb.		
224 Lin.Ft. 1/2" φ @ 3.400#/Ft. =			762 Lb.		
Plus 1% for overrun =			57 Lb.		
Total =			6,010 Lb.		

BAR LIST - ABUT. NO. 5

Mark	Size	No. Req'd.	Length	Type	Dimensions
410	1/2" φ	10	10'-2"	II	3'-1" 2'-1"
411	1/2" φ	16	10'-8"	II	3'-4" 2'-4"
412	1/2" φ	17	11'-2"	II	3'-7" 2'-7"
413	1/2" φ	12	12'-2"	I	4'-1" 1'-8"
414	1/2" φ	38	7'-4"	I	1'-8" 1'-8"
415	1/2" φ	16	8'-6"	I	2'-3" 1'-8"
416	1/2" φ	12	4'-0"	Str.	
417	1/2" φ	8	4'-5"	Str.	
418	1/2" φ	10	2'-0"	Str.	
421	1/2" φ	18	9'-8"	I	2'-10" 1'-8"
422	1/2" φ	4	18'-6"	Str.	
423	1/2" φ	8	21'-8"	Str.	
5143	1/2" φ	24	3'-6"	Str.	
5144	1/2" φ	8	6'-0"		
5145	1/2" φ	24	4'-6"		
5146	1/2" φ	4	10'-4"		
5147	1/2" φ	4	9'-6"	Str.	
604	1/2" φ	20	8'-0"	Str.	
605	1/2" φ	12	6'-0"	Str.	
606	1/2" φ	14	7'-0"	Str.	
712	1/2" φ	8	18'-6"	Str.	
902	1/2" φ	28	3'-6"	Str.	
904	1/2" φ	28	19'-5"	Str.	
905	1/2" φ	4	42'-4"	Str.	
1002	1/2" φ	6	42'-4"	Str.	
SUMMARY					
1547 Lin.Ft. 1/2" φ @ 0.668#/Ft. =			1,033 Lb.		
319 Lin.Ft. 1/2" φ @ 1.043#/Ft. =			333 Lb.		
330 Lin.Ft. 1/2" φ @ 1.502#/Ft. =			496 Lb.		
148 Lin.Ft. 1/2" φ @ 2.044#/Ft. =			303 Lb.		
811 Lin.Ft. 1/2" φ @ 3.400#/Ft. =			2,757 Lb.		
254 Lin.Ft. 1/2" φ @ 4.303#/Ft. =			1,093 Lb.		
Plus 1% for overrun =			60 Lb.		
Total =			6,075 Lb.		

STRUCTURE NO. F-16-CS

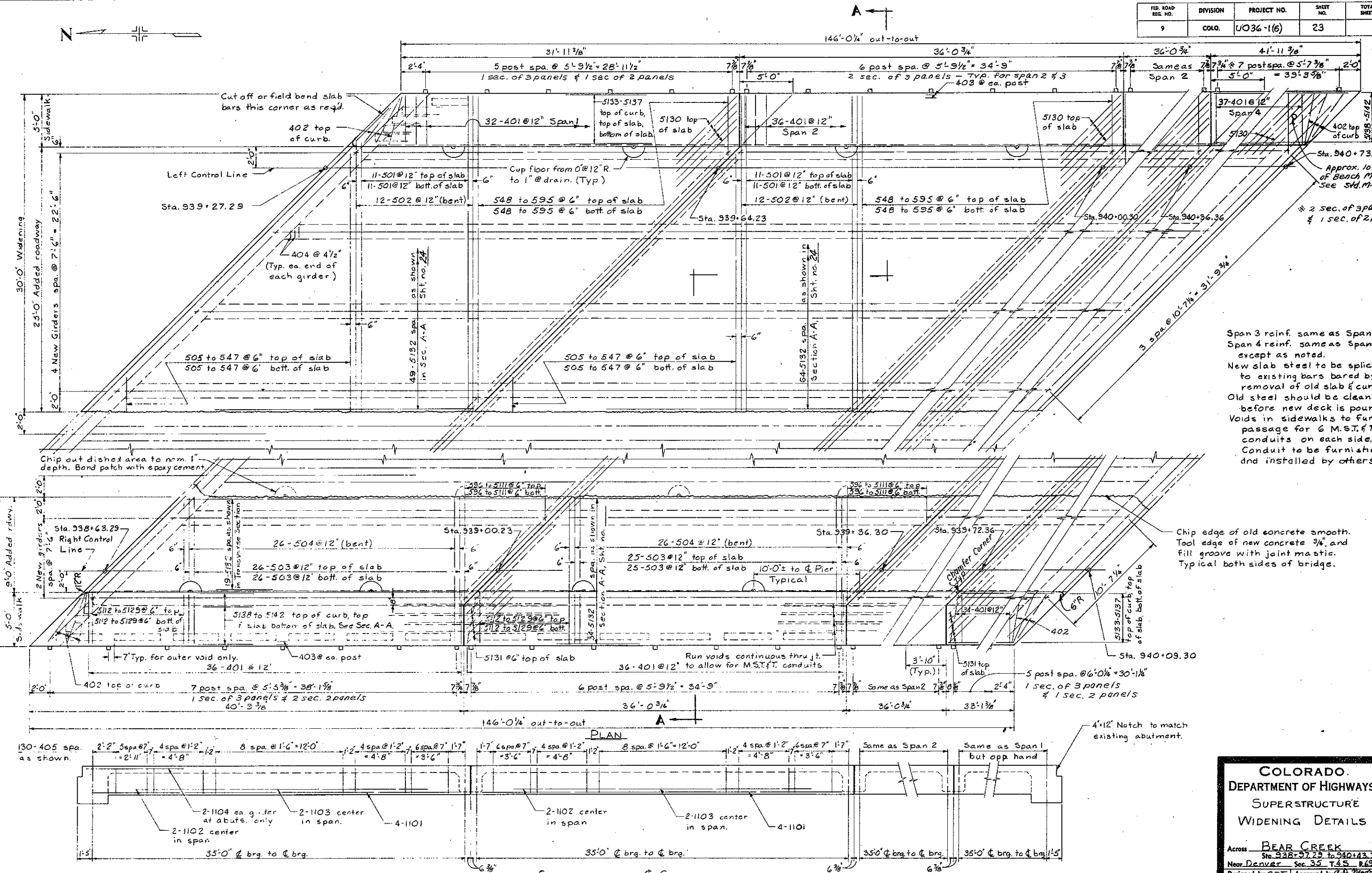
COLORADO
DEPARTMENT OF HIGHWAYS

BENDING DIAGRAMS & BAR LIST

Across BEAR CREEK
Sta. 938+97.29 to 940+43.31
Near Denver Sec. 35 T.4S. R.69

Designed by GET Approved by J. D. M.
Made by J.B.DBS Bridge Engineer
Checked by Date: Oct 18, 1963

FED. ROAD REG. NO.	DIVISION	PROJECT NO.	SHEET NO.	TOTAL SHEETS
9	COLO.	U036-1(6)	23	



**COLORADO
DEPARTMENT OF HIGHWAYS
SUPERSTRUCTURE
WIDENING DETAILS**

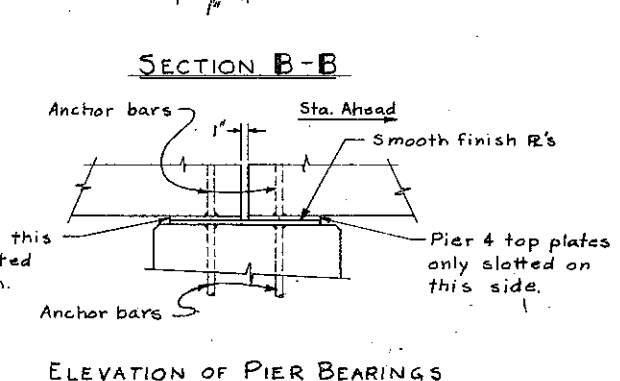
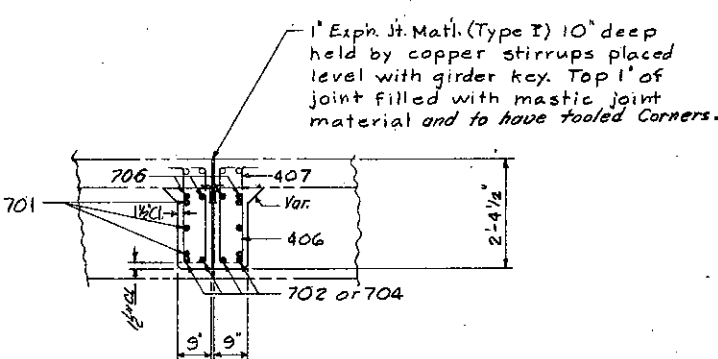
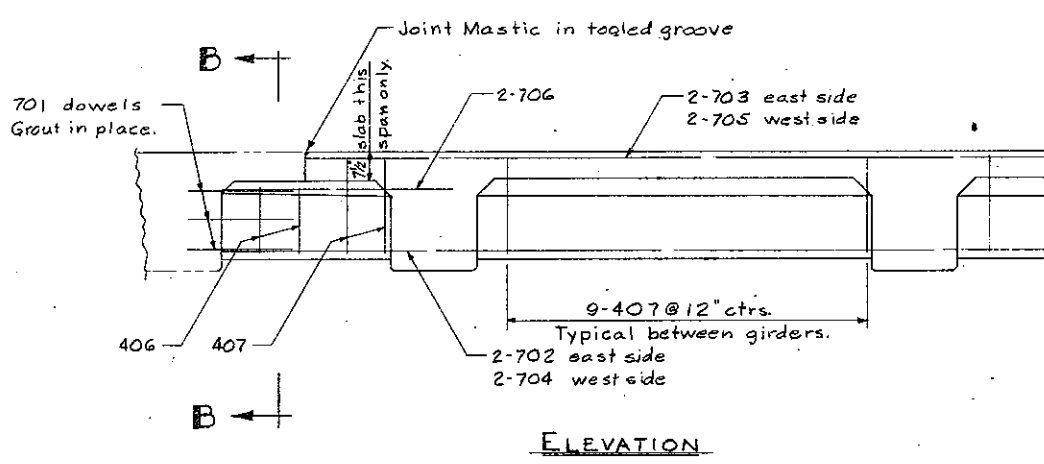
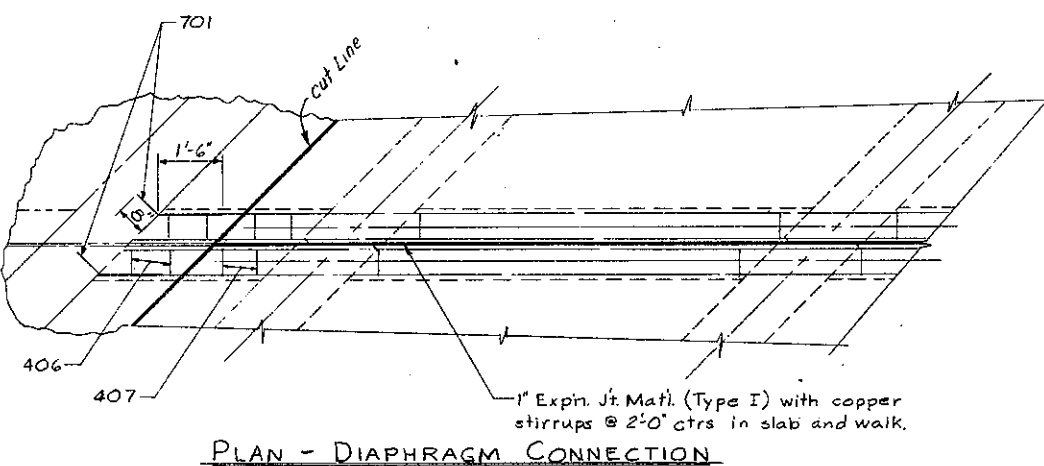
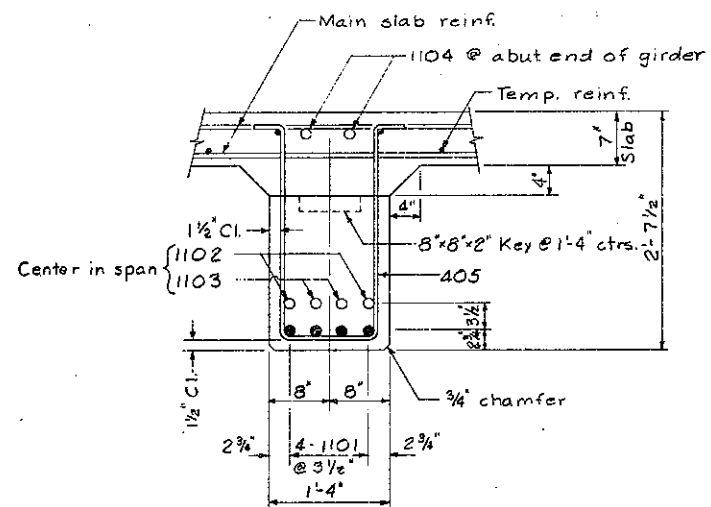
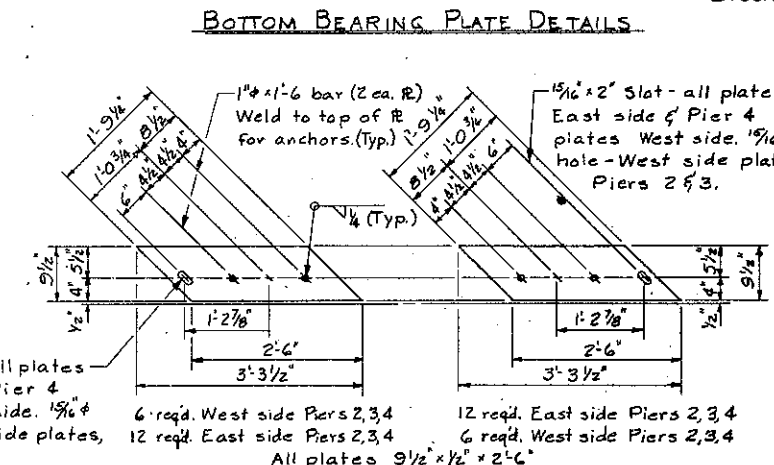
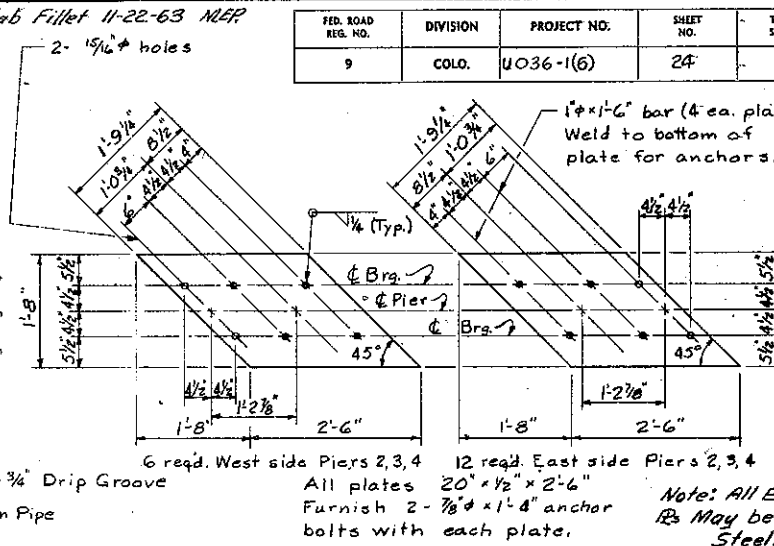
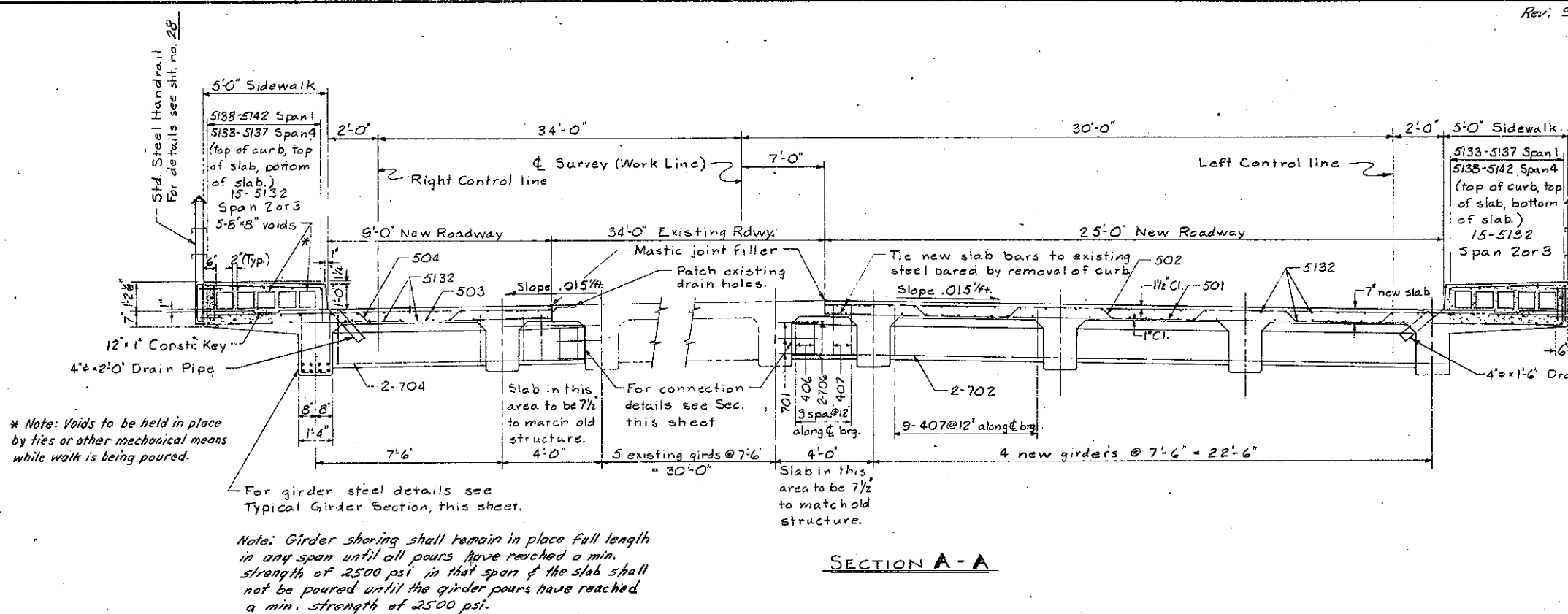
Across **BEAR CREEK**
Sta. 938+27.29 to 940+43.30
Near **DENVER** Sec. 35 T4S R63W

Designed by GET
Made by DBS
Checked by

Approved by **Bridge Engineer**
Date: **Oct 18, 1963**

STRUCTURE NO. F-16-CS

FED. ROAD REG. NO.	DIVISION	PROJECT NO.	SHEET NO.	TOT SHE.
9	COLD.	U036-1(6)	24	

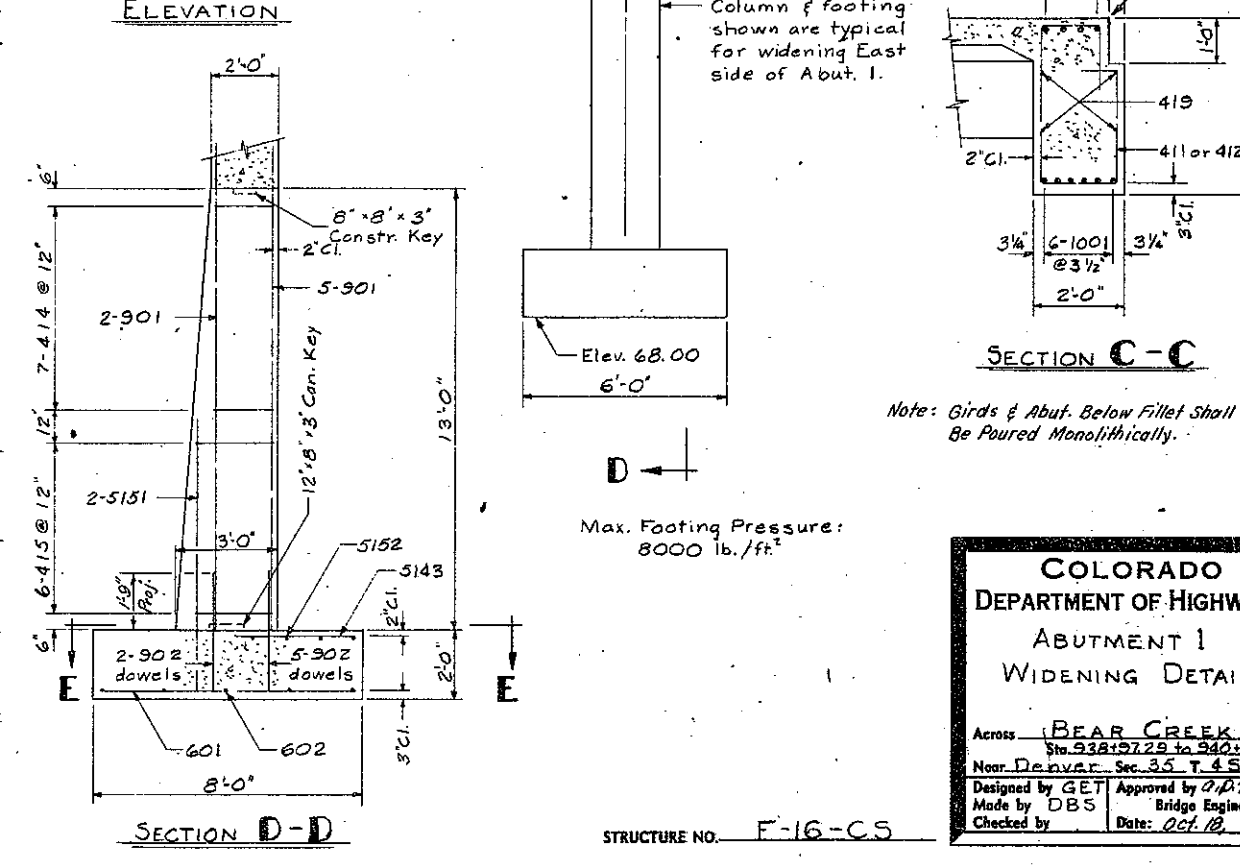
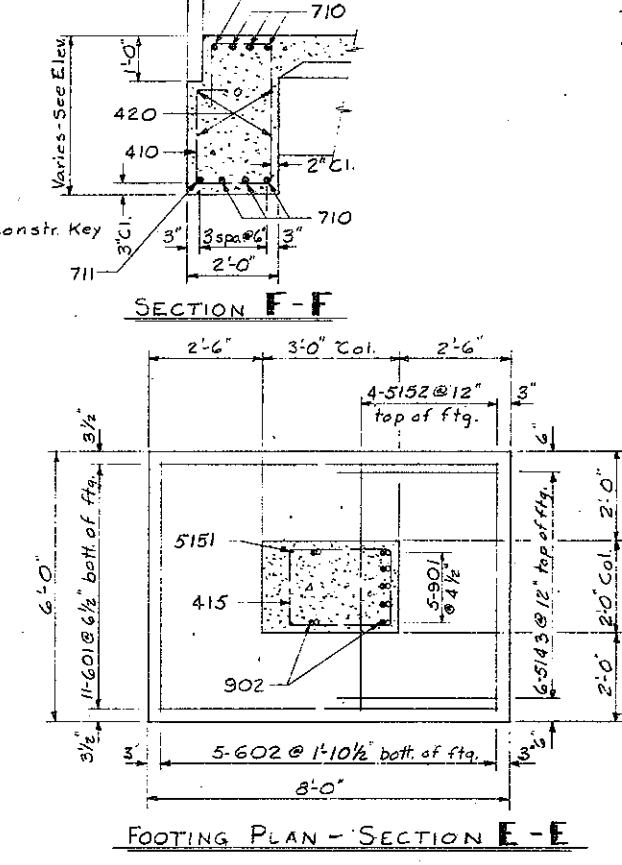
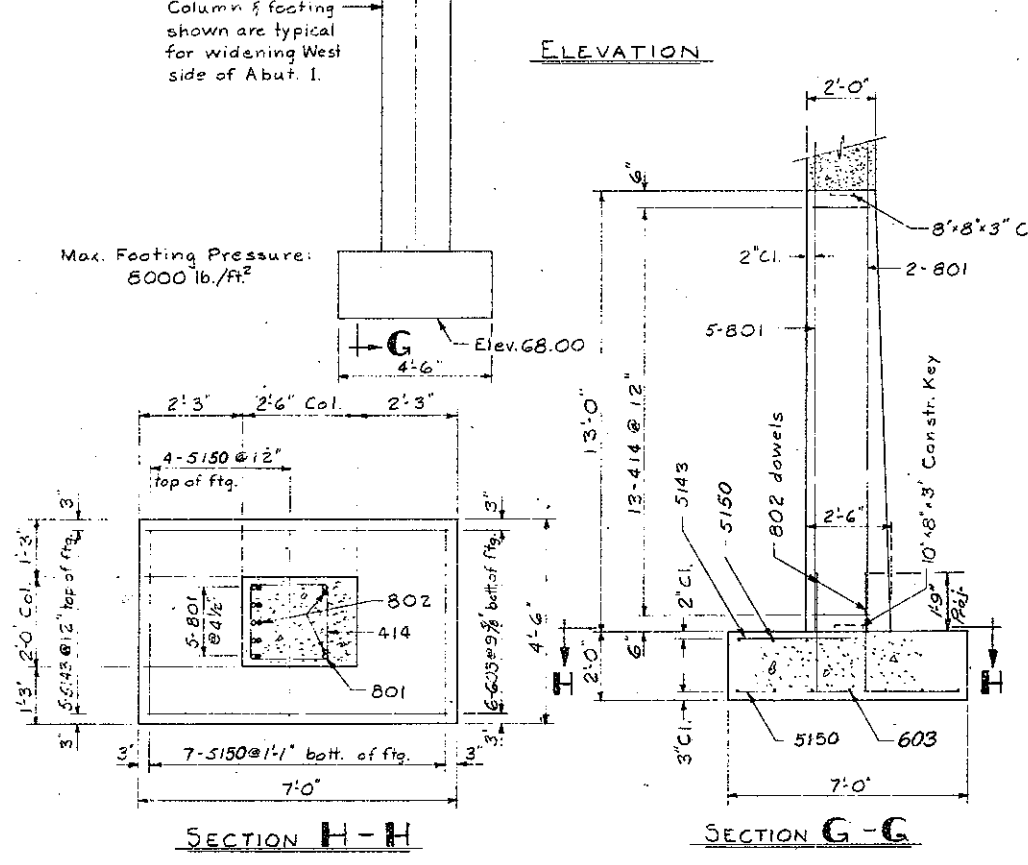
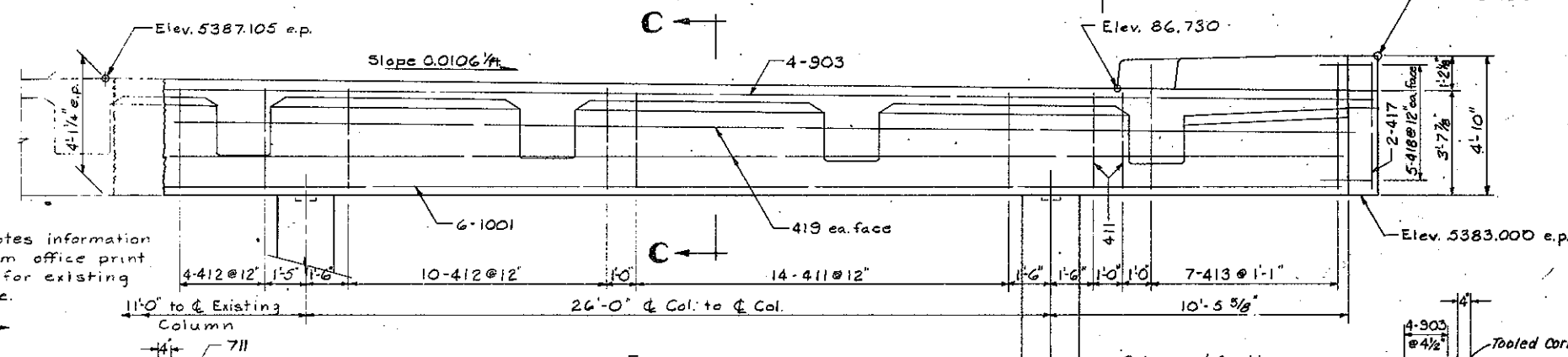
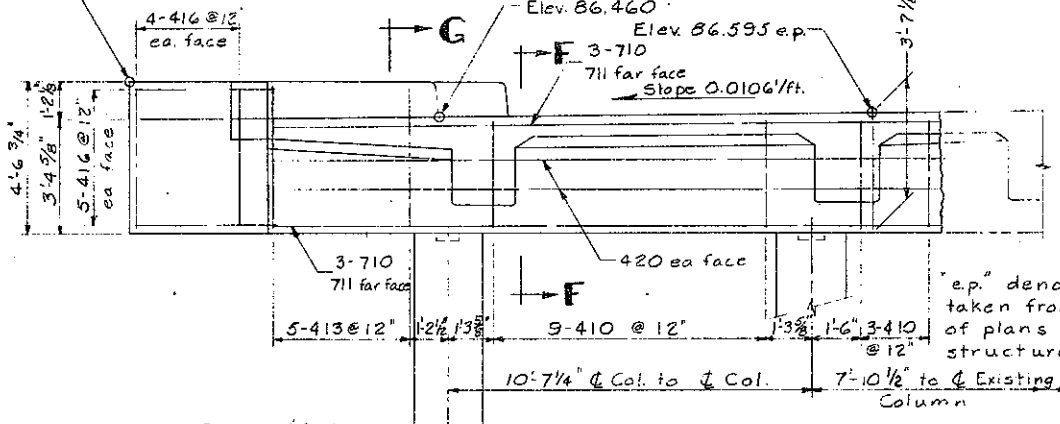
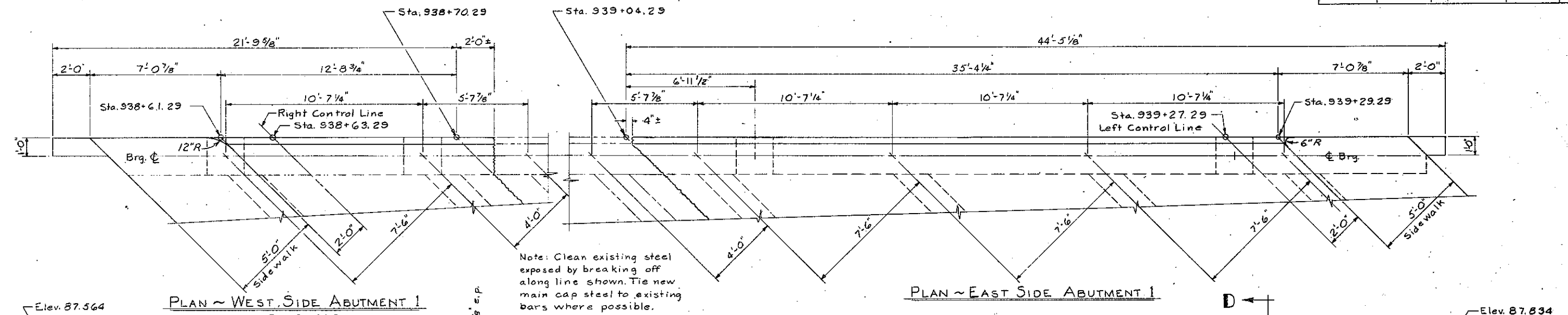


**COLORADO
DEPARTMENT OF HIGHWAY
SUPERSTRUCTURE
WIDENING DETAILS**

Across **BEAR CREEK**
Sta. 938+97.25 to 940+43
Near **Denver** Sec. 35, T. 4 S. R. 1

Designed by **GET** Approved by **DBS**
Made by **DBS** Bridge Engineer
Checked by **DBS** Date: **Oct. 18, 1963**

FED. ROAD DIST. NO.	DIVISION	PROJECT NO.	SHEET NO.
9	COLO.	U036-1(6)	25

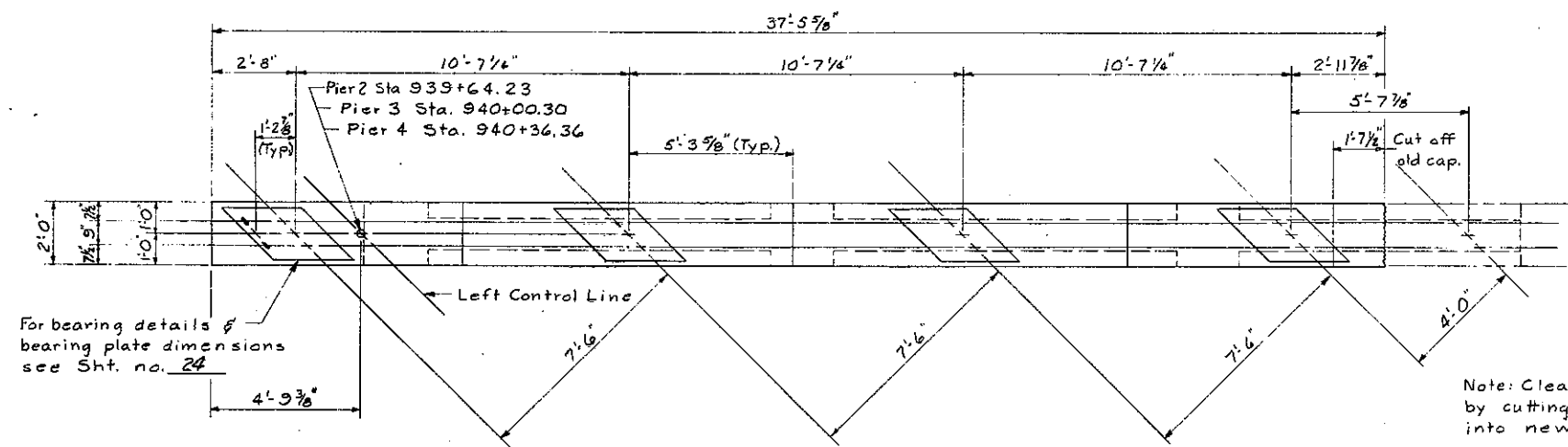


COLORADO
DEPARTMENT OF HIGHWAYS
ABUTMENT 1
WIDENING DETAIL

Across BEAR CREEK
Sta. 938+97.29 to 940+44
Near Denver, Sec. 35 T. 4 S.
Designed by GET Approved by DBS
Made by DBS Bridge Engineer
Checked by Date: Oct 18, 1963

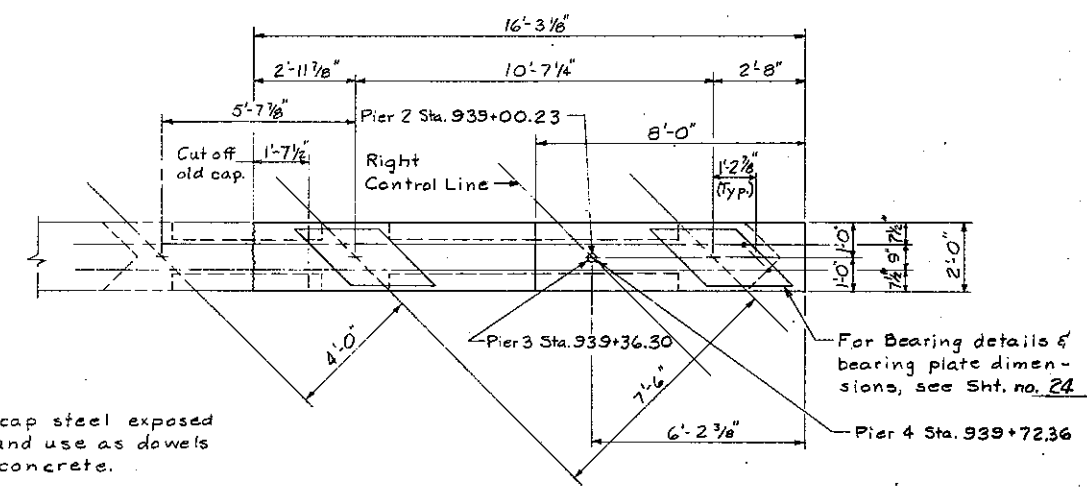
STRUCTURE NO. F-16-CS

FED. ROAD REG. NO.	DIVISION	PROJECT NO.	SHEET NO.	TOTAL SHEETS
9	COLO.	U036-1(6)	26	

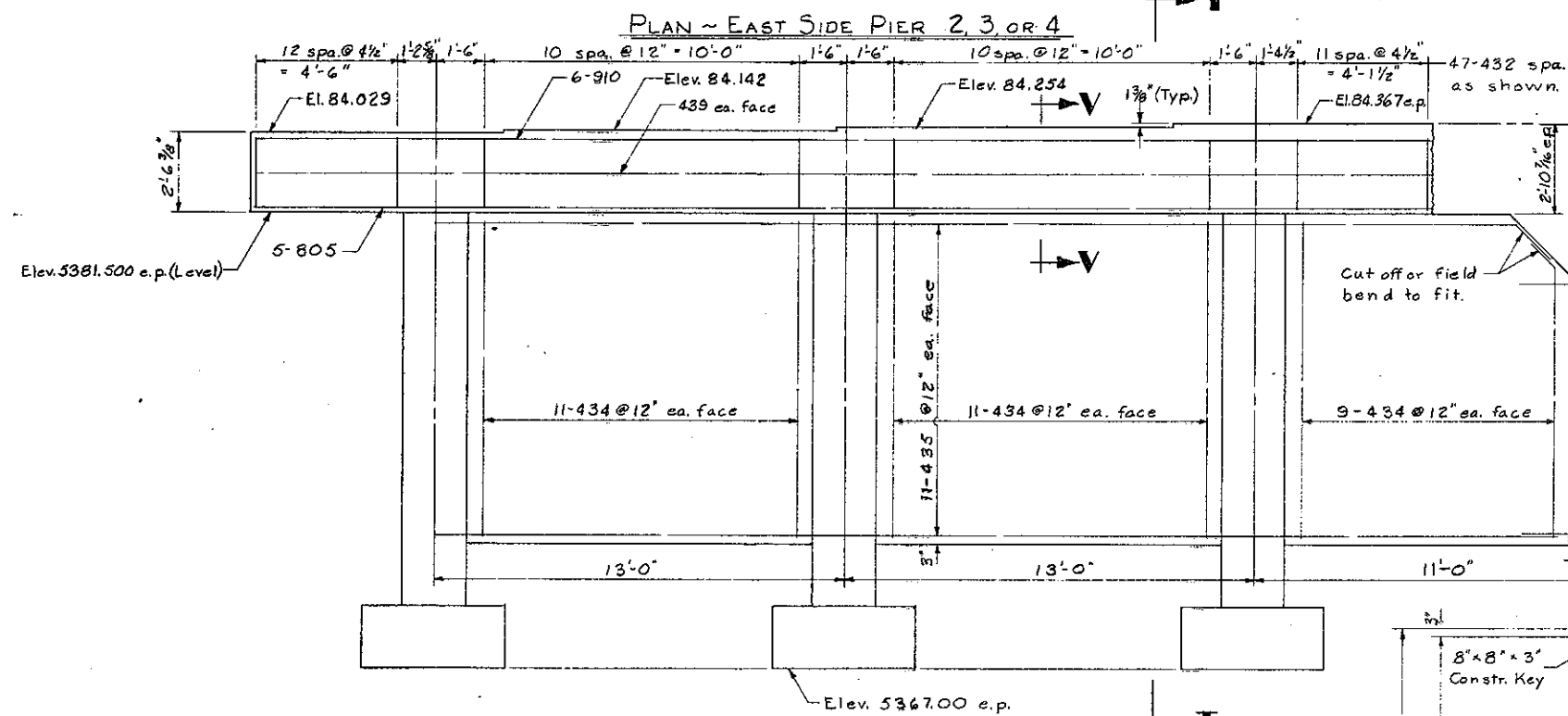


For bearing details &
bearing plate dimensions
see Sht. no. 24

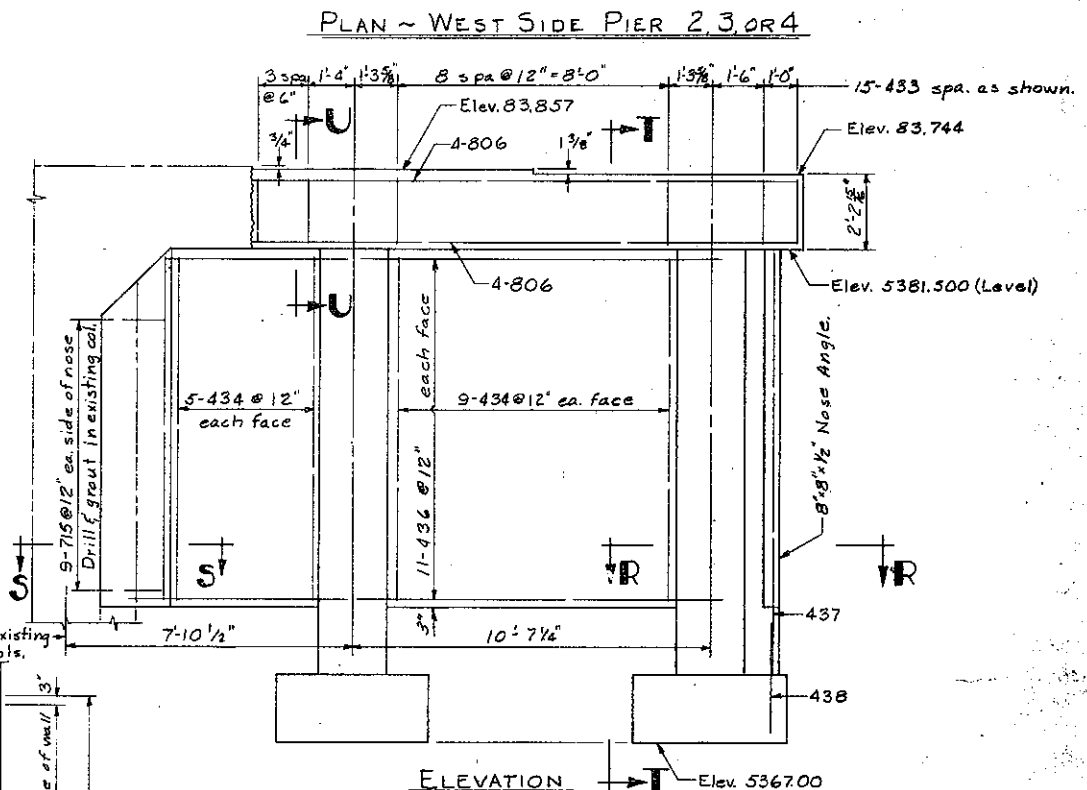
Note: Clean cap steel exposed
by cutting, and use as dowels
into new concrete.



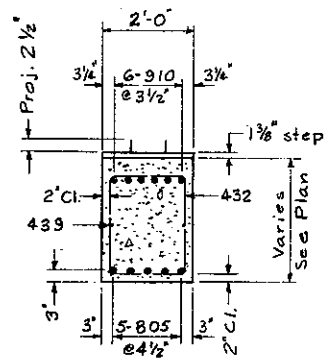
For bearing details &
bearing plate dimen-
sions, see Sht. no. 24



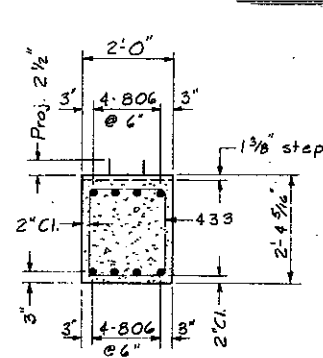
ELEVATION



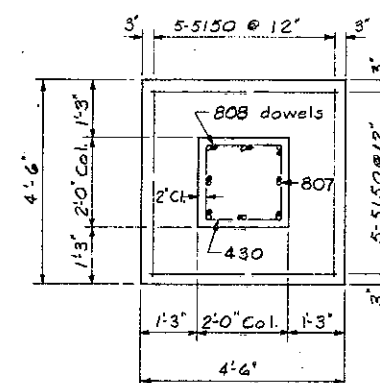
ELEVATION



SECTION V-V

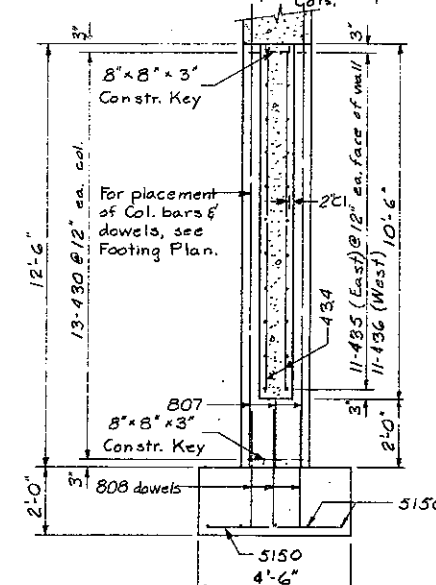


SECTION U-U

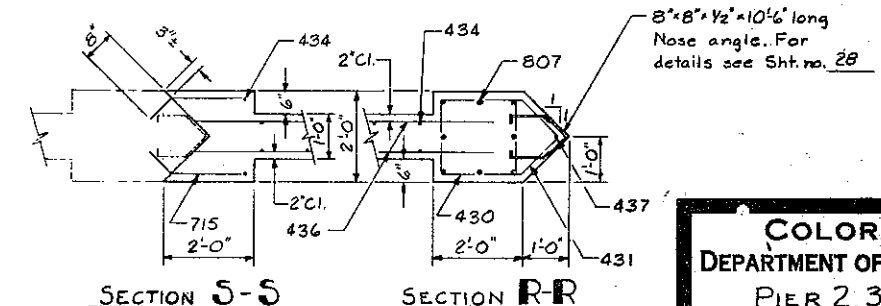


TYPICAL FOOTING PLAN

Max. Footing Pressure:
8000 lb./ft.²



SECTION T-T



SECTION S-S

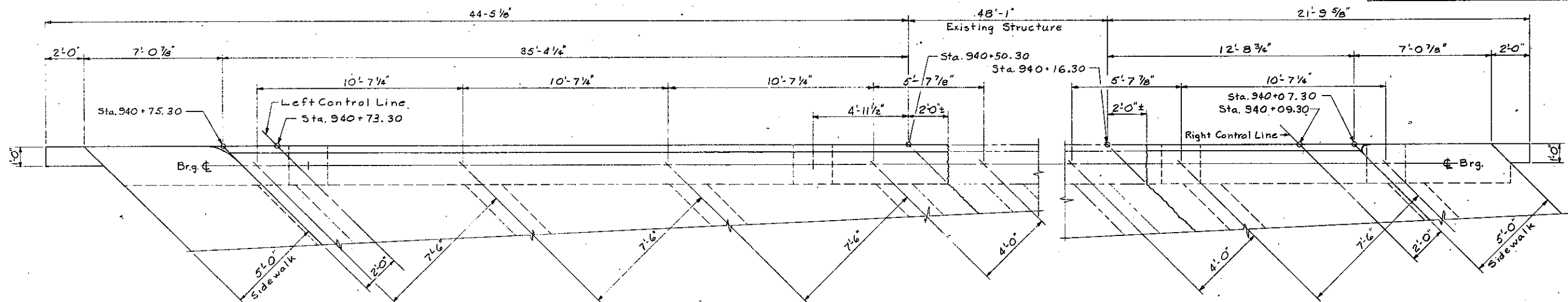
SECTION R-R

COLORADO
DEPARTMENT OF HIGHWAYS
PIER 2, 3, OR 4
WIDENING DETAILS

Across: BEAR CREEK
Sta. 938+97.25 to 940+43.31
Near Denver, See 35 T.E. 8-20-57
Designed by GET Approved by D.S. New
Made by DBS Bridge Engineer
Checked by Date: Oct 18, 1957

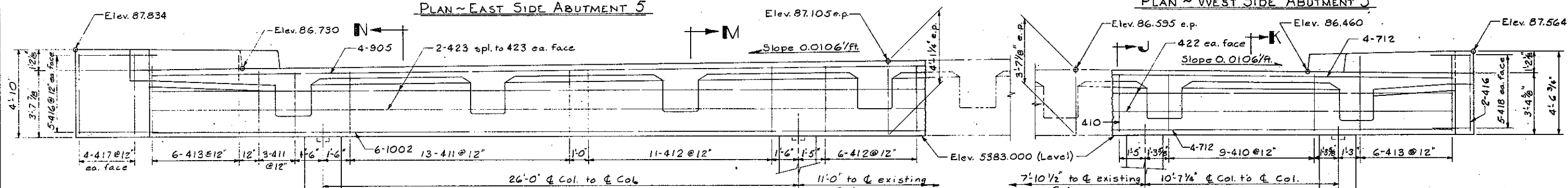
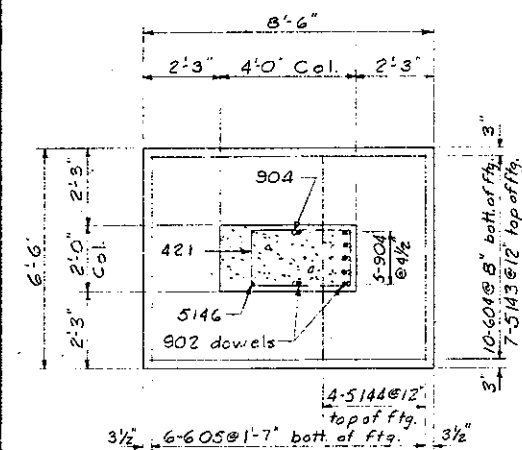
STRUCTURE NO. F-16-C5

FED. ROAD LEG. NO.	DIVISION	PROJECT NO.	SHEET NO.	IN SP.
9	COLO.	U036-1(6)	27	

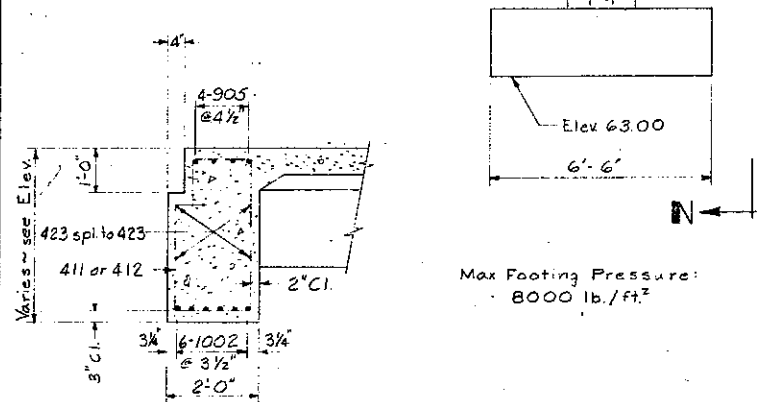


PLAN ~ EAST SIDE ABUTMENT 5

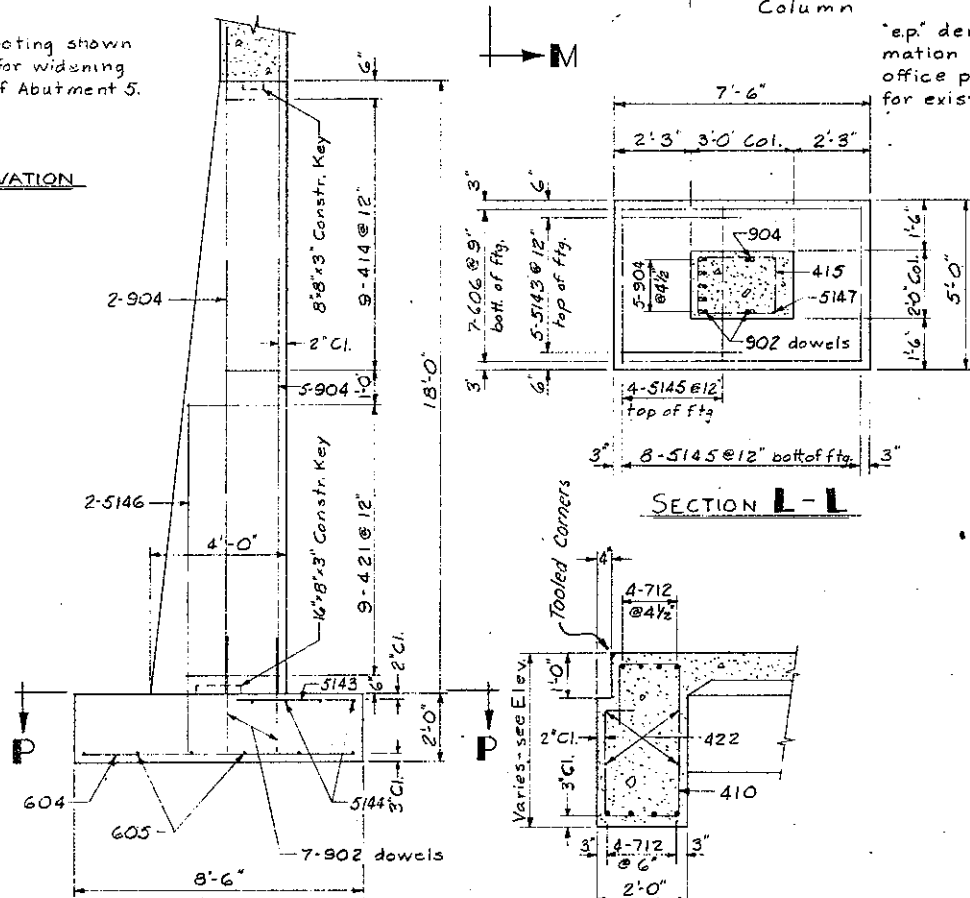
PLAN ~ WEST SIDE ABUTMENT 5

ELEVATIONELEVATION

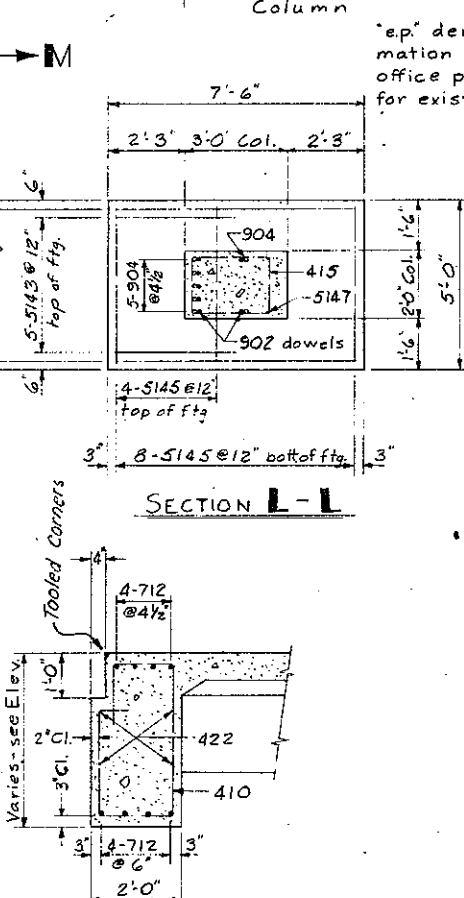
SECTION P-P



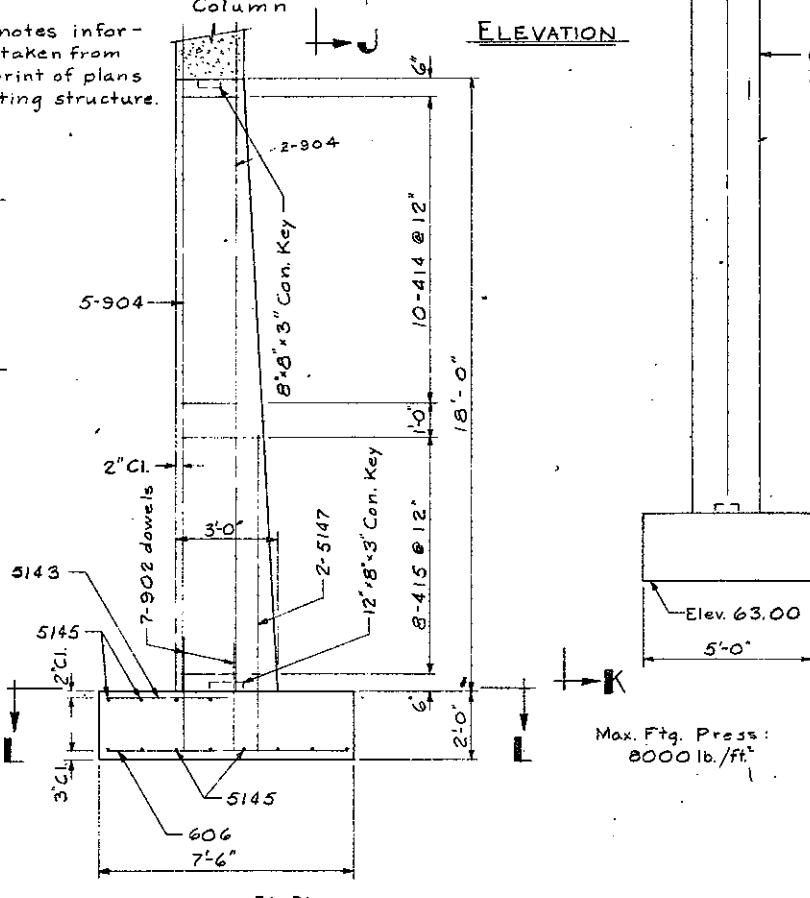
SECTION M-M



SECTION N-N



SECTION J-J



SECTION K-K

- Column & footing shown are typical for widening West side of Abutment 5.

Max. Ftg. Press:
8000 lb./ft.²

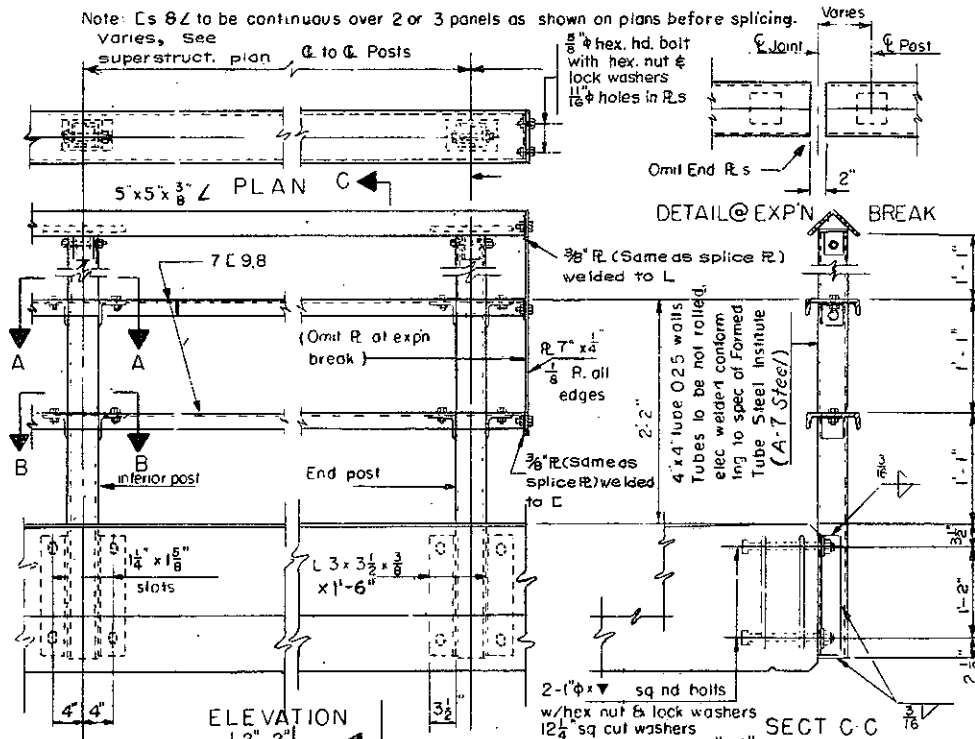
COLORADO
DEPARTMENT OF HIGHWAYS
ABUTMENT 5
WIDENING DETAILS

Across BEAR CREEK
Sta 938+92.29 to 940+43
Near Denver Sec 35 T.4S.R.

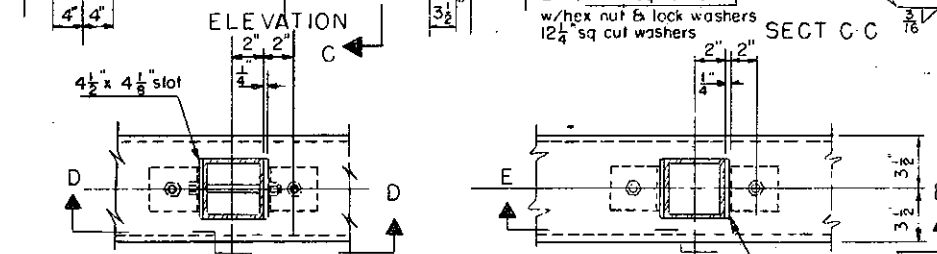
Designed by <u>GET</u>	Approved by <u>C.D. Hays</u>
Made by <u>DBS</u>	Bridge Engineer
Checked by	Date: <u>Oct. 18, 190</u>

STRUCTURE NO. F-16-CS

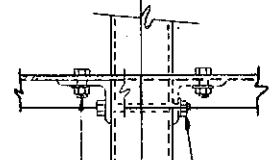
Note: Cs & Ls to be continuous over 2 or 3 panels as shown on plans before splicing. Varies, See superstruct. plan



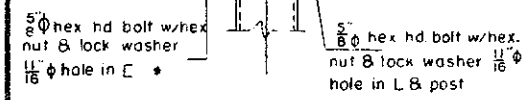
DETAIL @ EXPN. BREAK



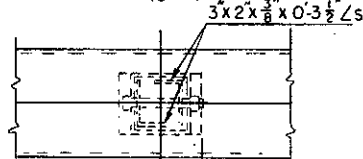
SECT. A-A



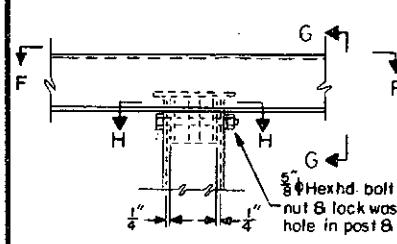
SECT. D-D



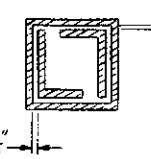
* 5/8\" granular flux filled full threaded studs welded to C may be used. increase size of slot in C to 1 3/8\" x 1 1/4\".



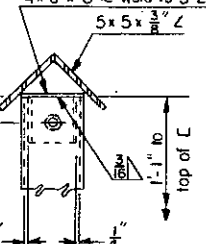
SECT. F-F



SECT. H-H



SECT. G-G

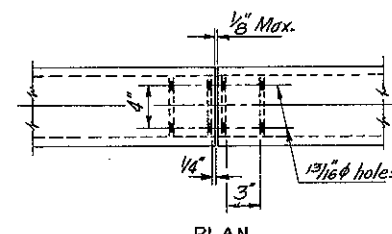


SECT. G-G

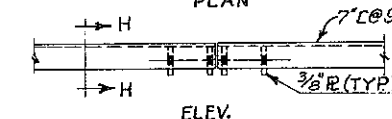
Note: All Rail Elements to be Galv.

Posts to be perpendicular to grade of deck.

HANDRAIL DETAILS

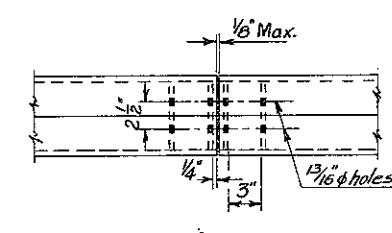


PLAN

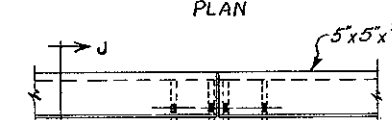


ELEV.

CHANNEL SPLICE

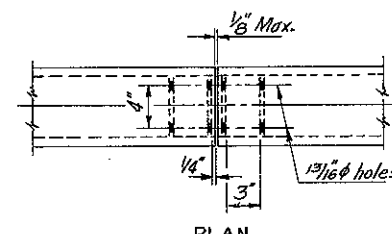


PLAN



ELEV.

ANGLE SPLICE

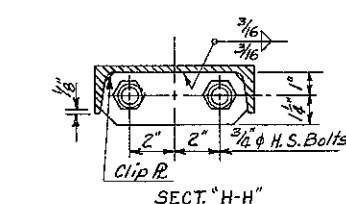


SECT. P-P

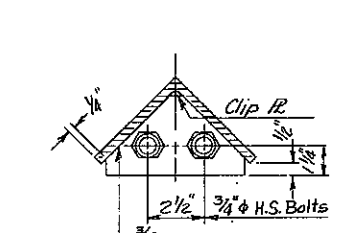
INSTALLATION

Req'd.
210 Pieces 13'-6\" for steel posts
2 Pieces 7'-9\" for steel posts
2 Pieces 5'-2\" for steel posts

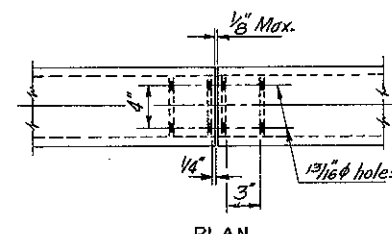
METAL PLATE GUARD RAIL



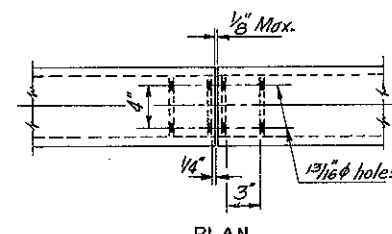
SECT. H-H



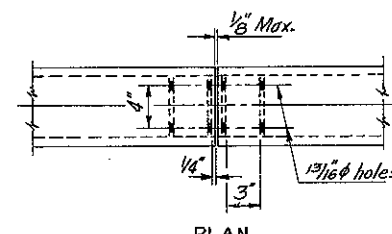
SECT. J-J



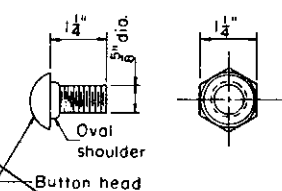
SECT. R-R



ARRANGEMENT AT POSTS



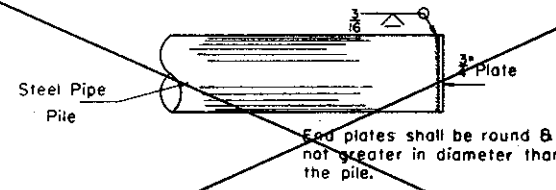
TERMINAL SECTION
Req'd. 8 Terminal Pieces



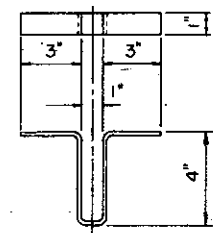
SPICE BOLT
Req'd. 1664 Splice Bolts
428 Post Bolts

BOLTS

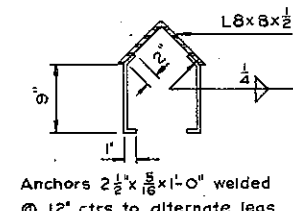
REV. ROAD DES. NO.	DIVISION	PROJECT NO.	SHEET NO.	TOTAL SHEETS
9	COLD.	U 036-106	28	



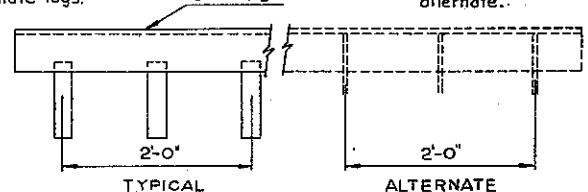
END PLATES FOR PIPE PILES



COPPER STIRRUP

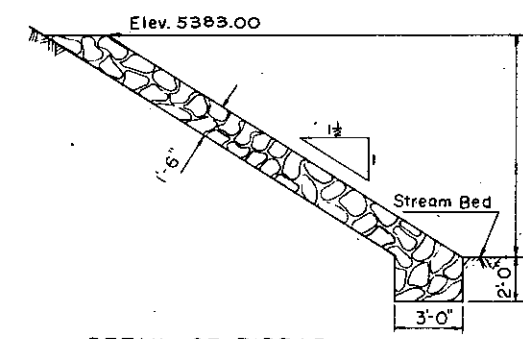


PIER NOSE ANGLE



TYPICAL

ALTERNATE



DETAIL OF RIPRAP

STRUCTURE NO. F-16-CS

**COLORADO
DEPARTMENT OF HIGHWAYS**

MISCELLANEOUS
BRIDGE DETAILS

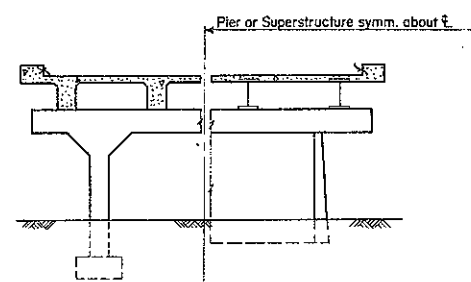
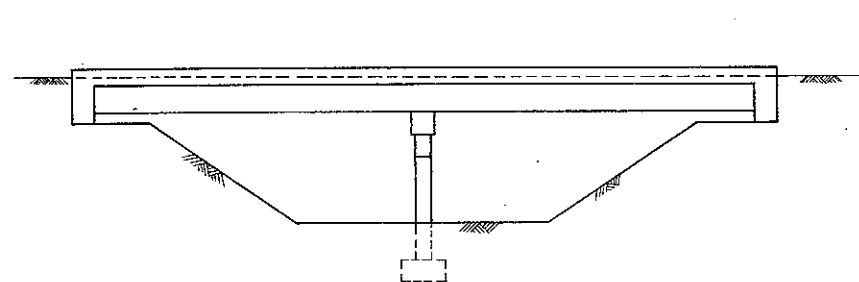
Across BEAR CREEK
Sta. 938+97.29 to 940+49.31
Near Denver, Sec. 35, T. 4 S., R. 69

Designed by
Made by
Checked by

Approved by
Bridge Engineer
Date: Oct 18, 1963

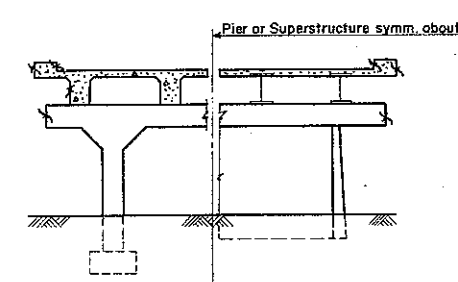
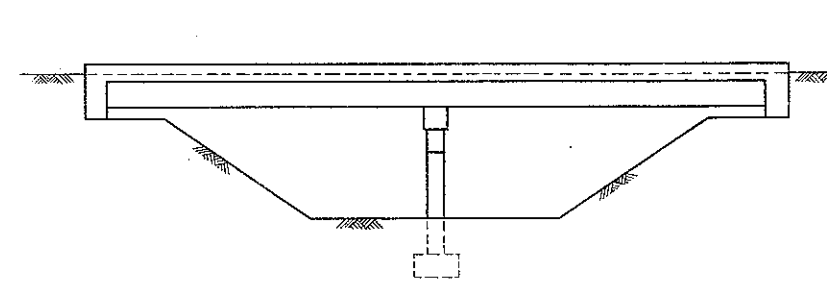
REVISIONS

FED. ROAD REGION NO.	DIVISION	PROJECT NO.	SHEET NO.	TOTAL SHEETS
9	COLO.	U 036-1(6)	29	



PIER AND SUPERSTRUCTURE

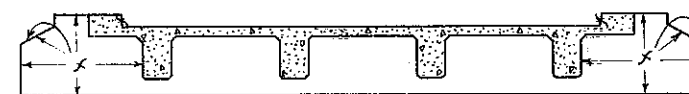
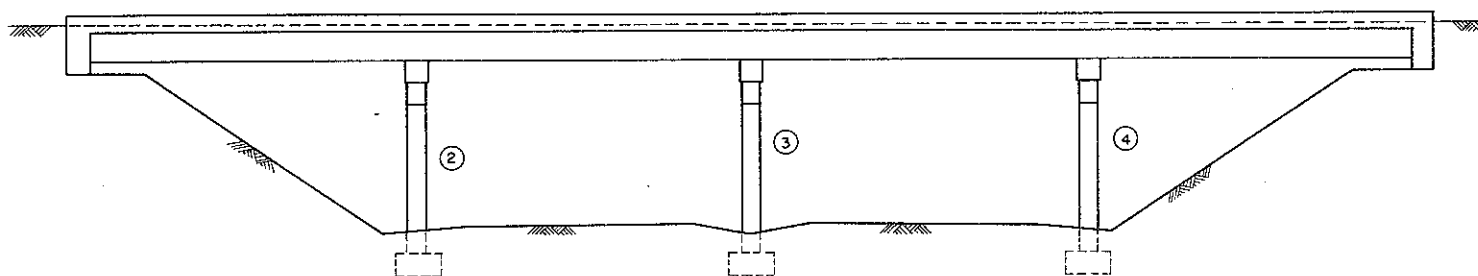
RURAL STREAM CROSSING



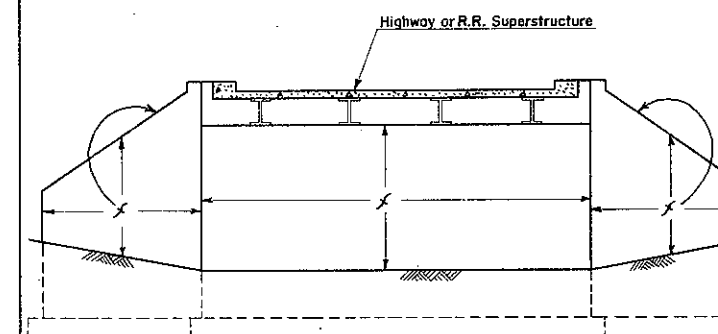
PIER AND SUPERSTRUCTURE

F-16-CS

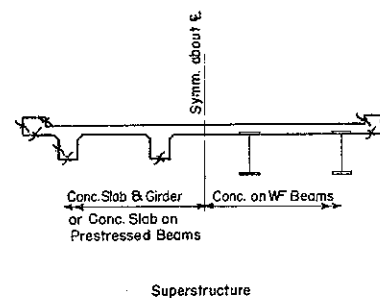
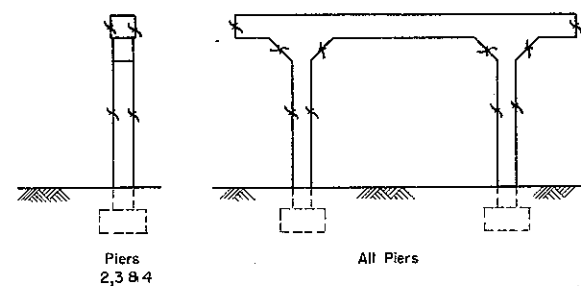
STREAM CROSSING IN OR NEAR URBAN AREA



STUB ABUTMENTS
(Underpass Only)



CANTILEVER ABUTMENTS
(Underpass Only)



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

UNDERPASS

STRUCTURE NO. F-16-CS

COLORADO
DEPARTMENT OF HIGHWAYS

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

Across Bear Cr.
Sta. 938+97.29 to 940+43
Near Denver Sec. 35 T. 4S R. 6E

Designed by A.D.N. Approved by J.S. Rupp
Made by R.R.A.-J.B. Bridge Engineer
Checked by ST Date: Oct. 18, 1964

Note: See Sheet No. 9 for List of Removals
See Sheet No. 10 for List of Structures

R.C.L. ①
 $\Delta = 4^\circ 03.9369'$
 $D = 1^\circ 00'$
 $T = 203.38'$
 $L = 406.56'$
 $R = 5730'$

L.C.L. ①
 $A = 4^{\circ}03.9369'$
 $B = 0.9889^{\circ}$
 $C = 205.65'$
 $D = 411.10'$
 $R = 5794'$

End Project No. U 036-1(5)
BEGIN PROJECT NO: U 036-1(6)
\$ STA. 904+28

Siphon's Drain Outlet Detail

FED. ROAD REG. NO.	DIVISION	PROJ. NO.	SHEET NO.	TOTAL SHEETS
9	COLO.	U 036-1(6)	30	

SANITARY SEWERS

Existing sanitary sewer
Existing sewers to be abandoned
Existing sewer to be plugged
Existing manhole requiring new work
New sewers and manholes

STORM SEWERS

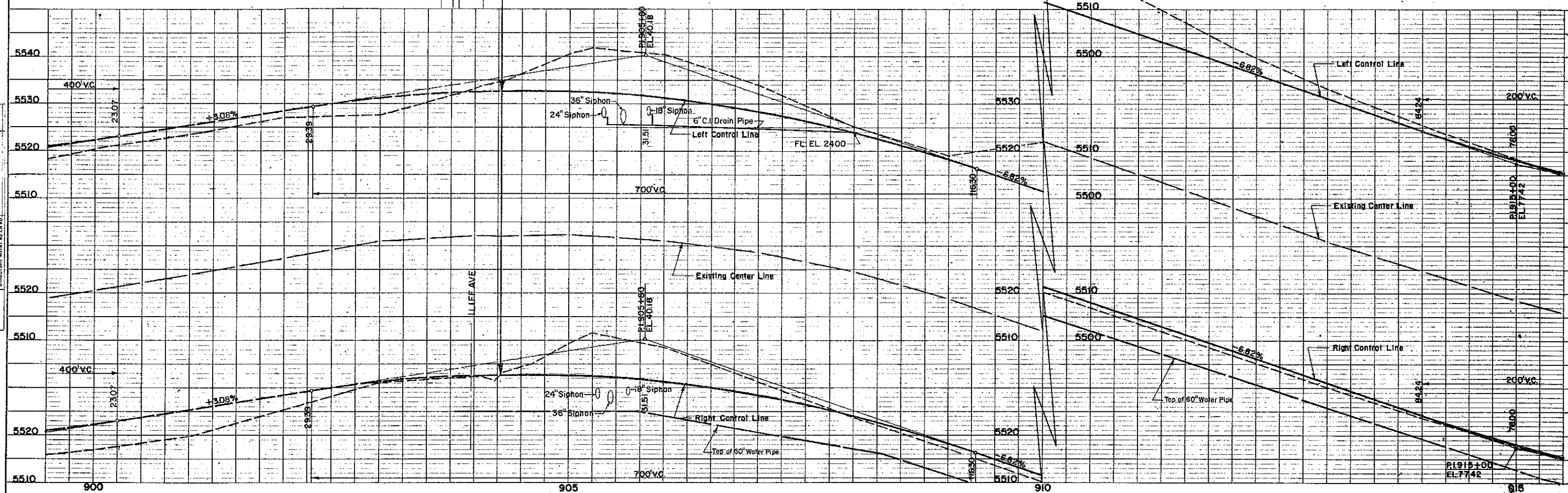
Existing lines, manholes and inlets
Existing lines to be plugged
Existing lines to be plugged and/or
inlets to be abandoned
New lines manholes and inlets

CURBS

- Driveway (Asphalt)
- Curb & Gutter (Type I)
- Curb & Gutter (Type II)
- Concrete Gutter
- Asphaltic Processed Sidewalk
- Delineators (Type II)
- Delineators (Type III)

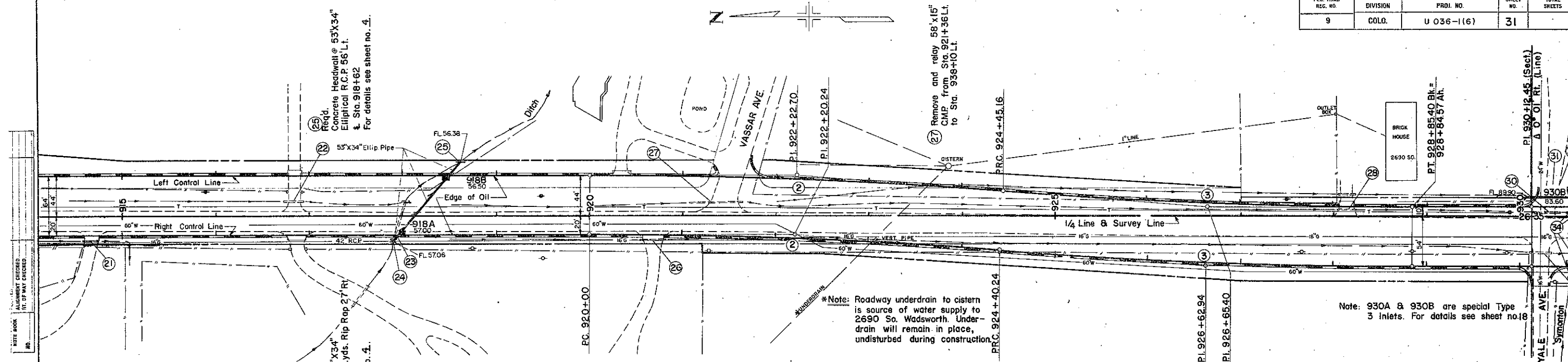
UTILITY LINES

Power lines (underground)
Tel. & Tel. lines " "
Gas lines
Water lines



ROADWAY DRAINAGE PLANS

FED. ROAD REG. NO.	DIVISION	PROJ. NO.	SHEET NO.	TOTAL SHEETS
9	COL.	U 036-1(6)	31	



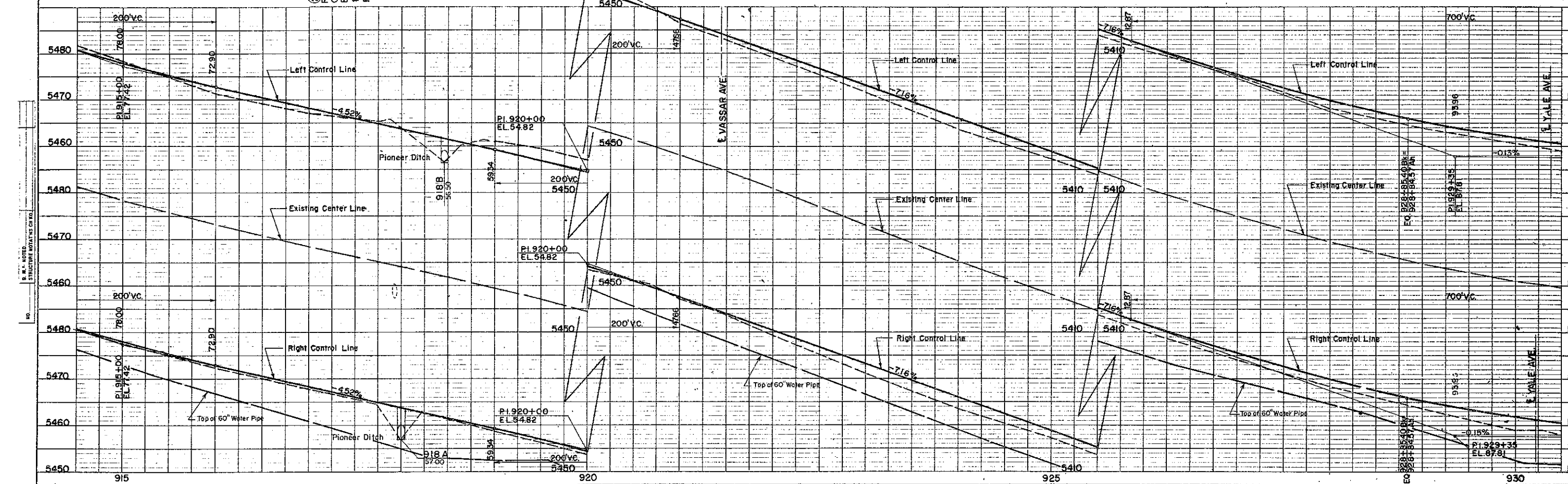
L.C.L. ② & R.C.L. ③

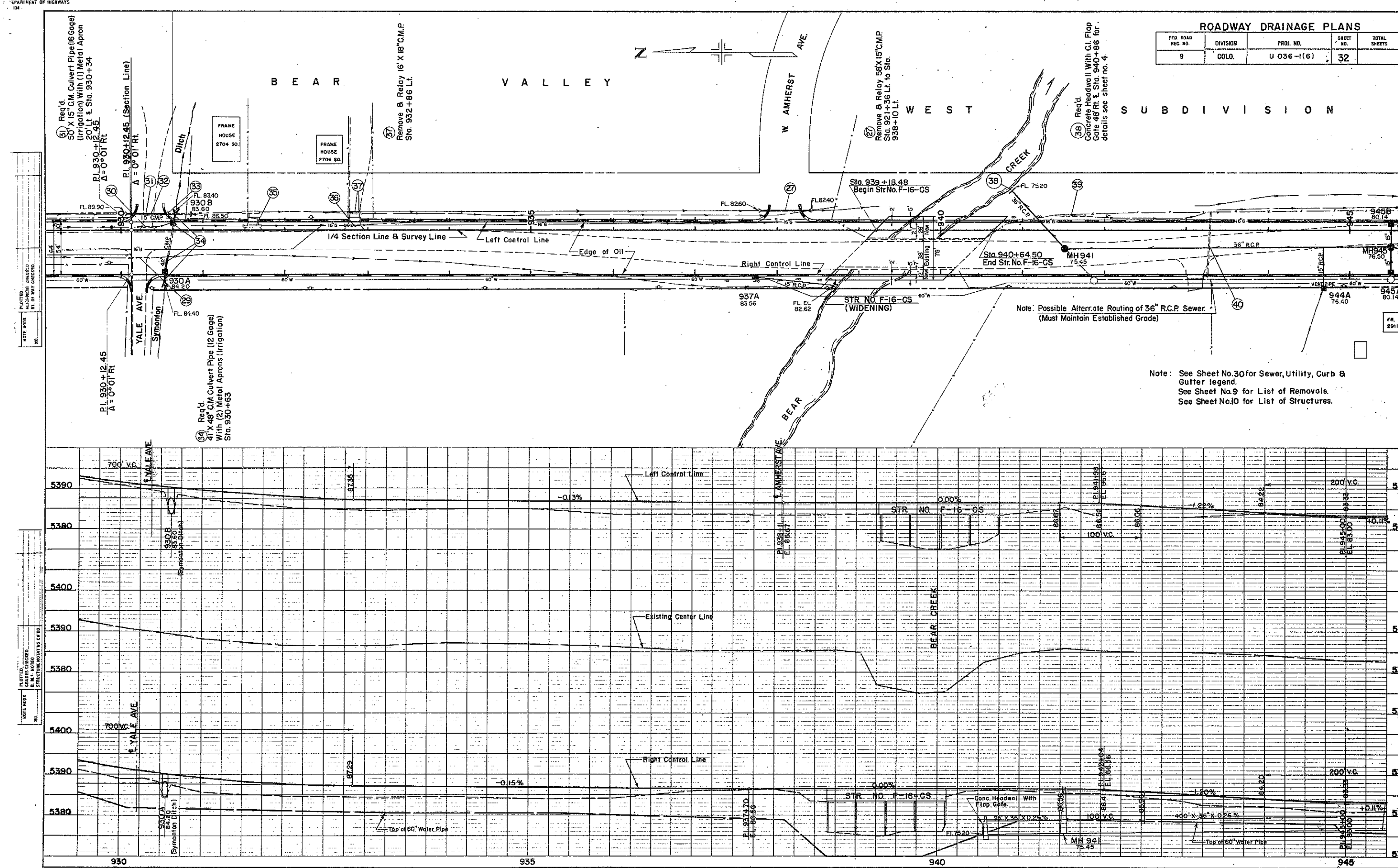
Δ = 4° 24' 14.29"
D = 0.9889'
T = 222.70'
L = 445.16'
R = 5794'

L.C.L. ③ & R.C.L. ②

Δ = 4° 24' 14.29"
D = 1° 00'
T = 220.24'
L = 440.24'
R = 5730'

Note: See Sheet No. 30 for Sewer, Utility, Curb & Gutter Legend.
See Sheet No. 9 for List of Removals.
See Sheet No. 10 for List of Structures.





ROADWAY DRAINAGE PLANS

FED. ROAD DIST. NO.	DIST.	PROJ. NO.	SHEET NO.	TOTAL SHEETS
9	COLO.	U 036-1(6)	33	

BEAR VALLEY

WEST SUB

Note: See Sheet No. 30 for Sewer, Utility, Curb & Gutter Legend.
See Sheet No. 9 for List of Removals.
See Sheet No. 10 for List of Structures.

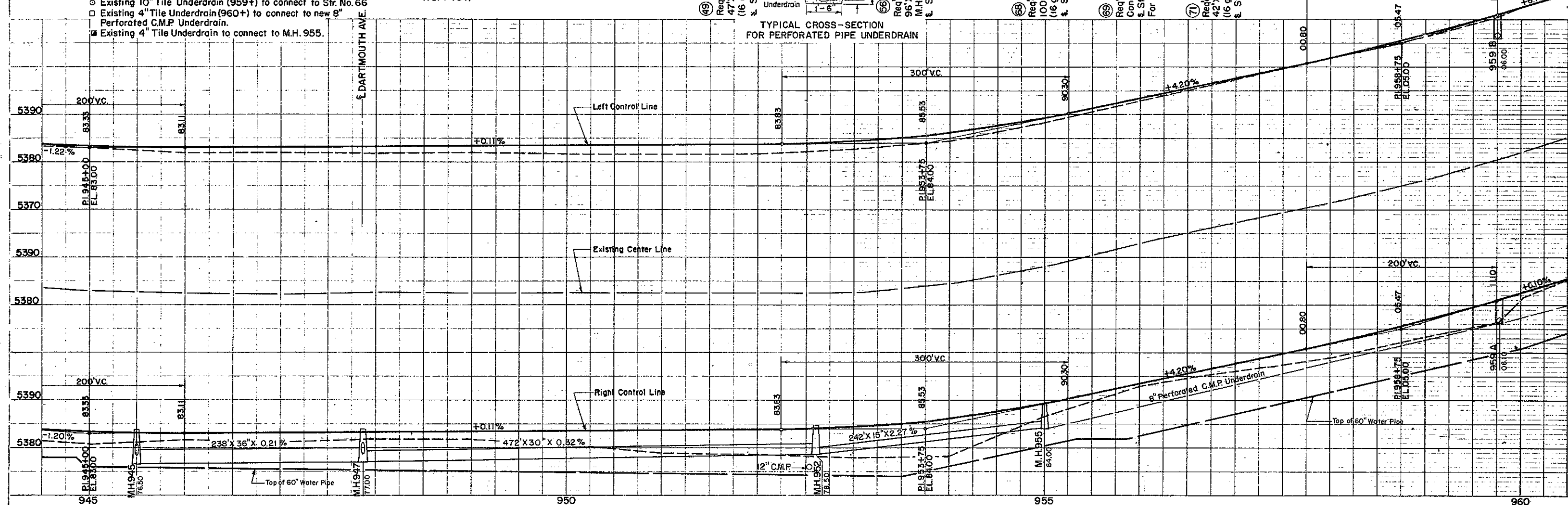
W. DARTMOUTH AVE.

Req'd.
Sta. 948+00 to Sta. 960+00
1300 Lin. ft. 6" Perforated Pipe Underdrain (Connect to 30" R.C.P., 15" R.C.P., & 8" Perforated Underdrain See Plan)
876 Lin. ft. 8" Perforated Pipe Underdrain (336' to Inlet No. 952 A & 540' to M.H. 955)

- Note: * 4" Exist. Tile Underdrain (947+) to connect to M.H. 947.
▲ 4" Exist. Tile Underdrain (950+) to connect to 30" R.C.P.
● 8" Exist. Tile Underdrain (951+) to connect to new 8" Perforated C.M.P. Underdrain.
△ 3-4" Exist. Tile Underdrain (953+) to connect to new 8" Perforated C.M.P. Underdrain.
○ 4" Exist. Tile Underdrain (956+) to connect to new 8" Perforated C.M.P. Underdrain.
◇ Existing 10" Tile Underdrain (959+) to connect to Str. No. 66.
□ Existing 4" Tile Underdrain (960+) to connect to new 8" Perforated C.M.P. Underdrain.
■ Existing 4" Tile Underdrain to connect to M.H. 955.

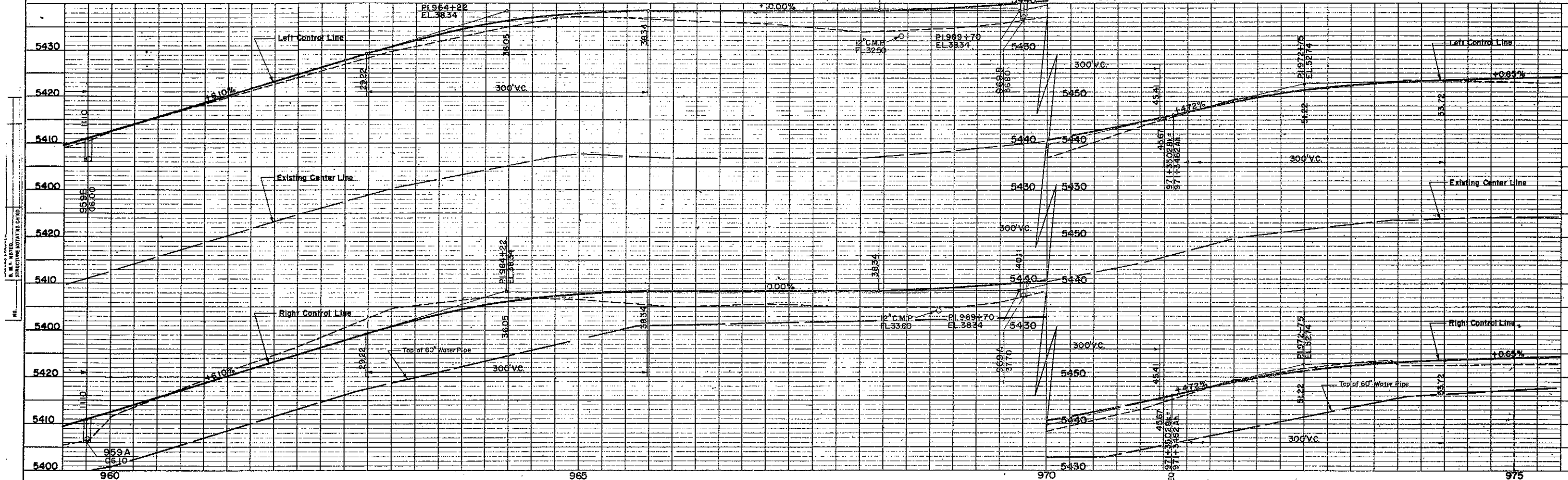
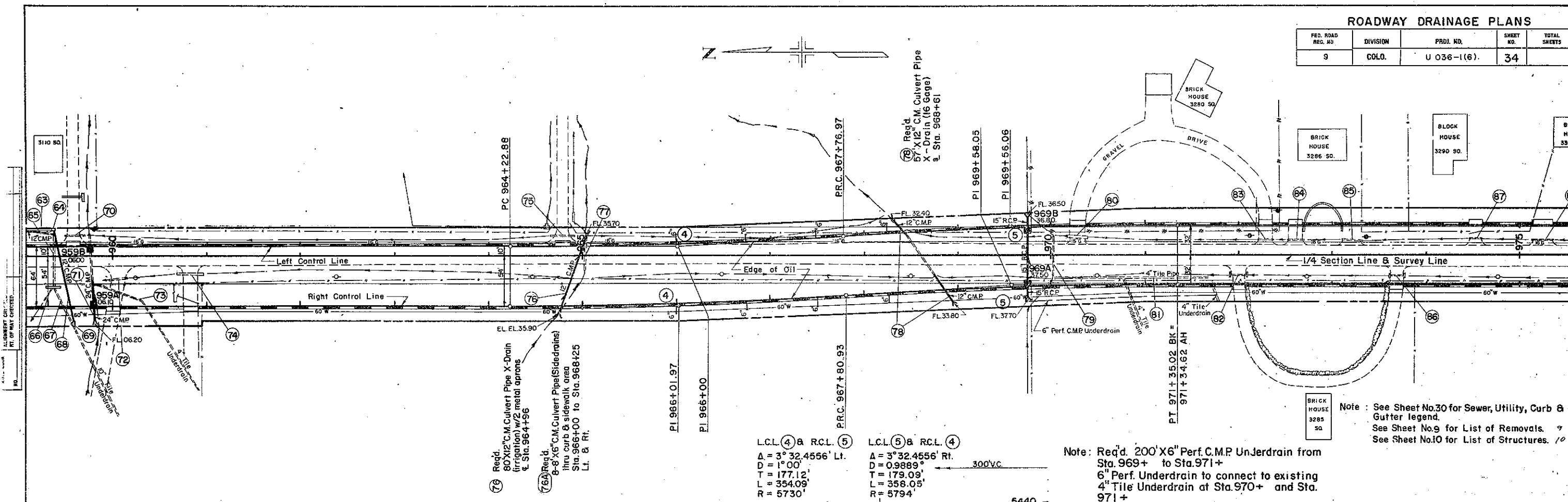
Note: Req'd. 3000 Cu.Yds. of Rock Fill Kt. Sta. 950+ to Sta. 955+. Rock Fill will be placed so as not to cover 30" & 15" R.C.P. Storm Sewer. (To be paid for under Item 15.)

TYPICAL CROSS-SECTION FOR PERFORATED PIPE UNDERDRAIN



ROADWAY DRAINAGE PLANS

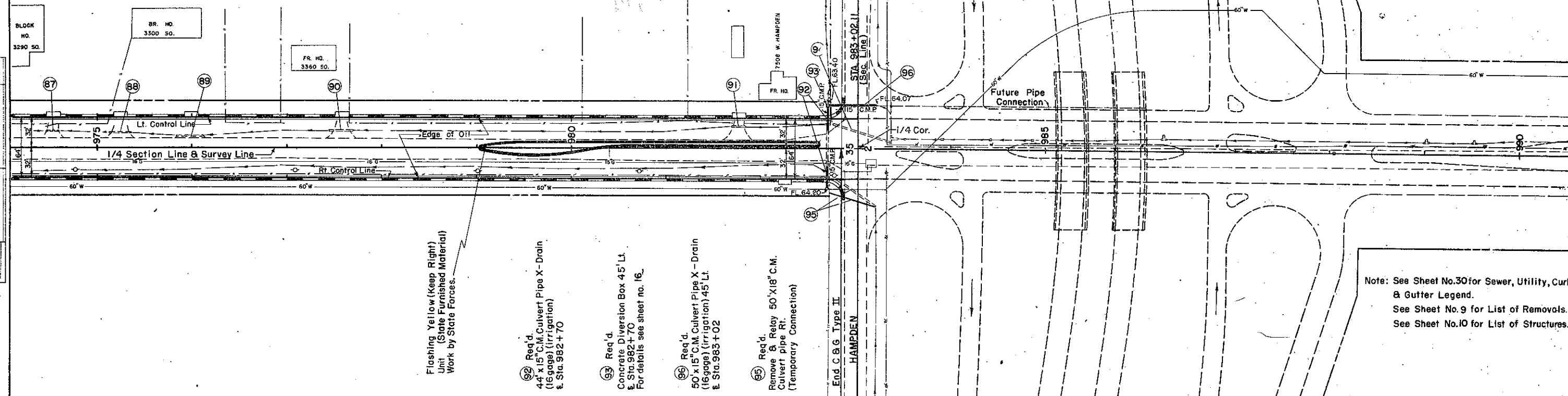
REQ. ROAD NO.	DIVISION	PRD. NO.	SHEET NO.	TOTAL SHEETS
9	COLO.	U 036-1(6)	34	



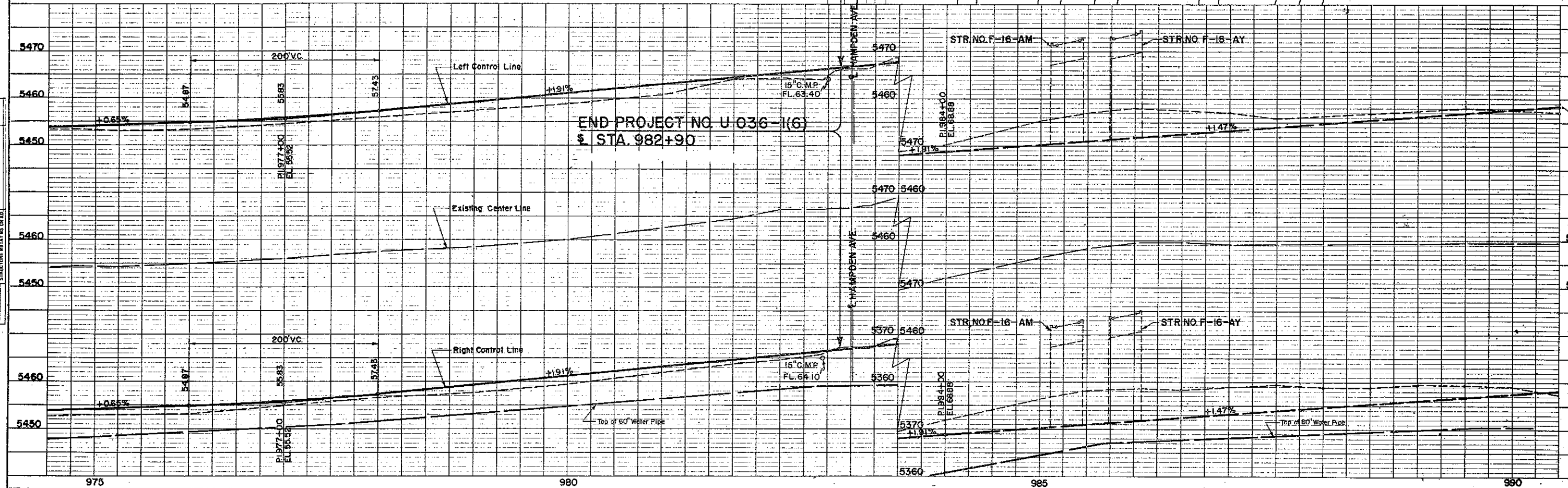
ROADWAY DRAINAGE PLANS

FED. ROAD REG. NO.	DIVISION	PROJ. NO.	SHEET NO.	TOTAL SHEETS
9	COLD.	U 036-1(6)	35	

EXCESS
EXCAVATION



Note: See Sheet No. 30 for Sewer, Utility, Curb & Gutter Legend.
See Sheet No. 9 for List of Removals.
See Sheet No. 10 for List of Structures.

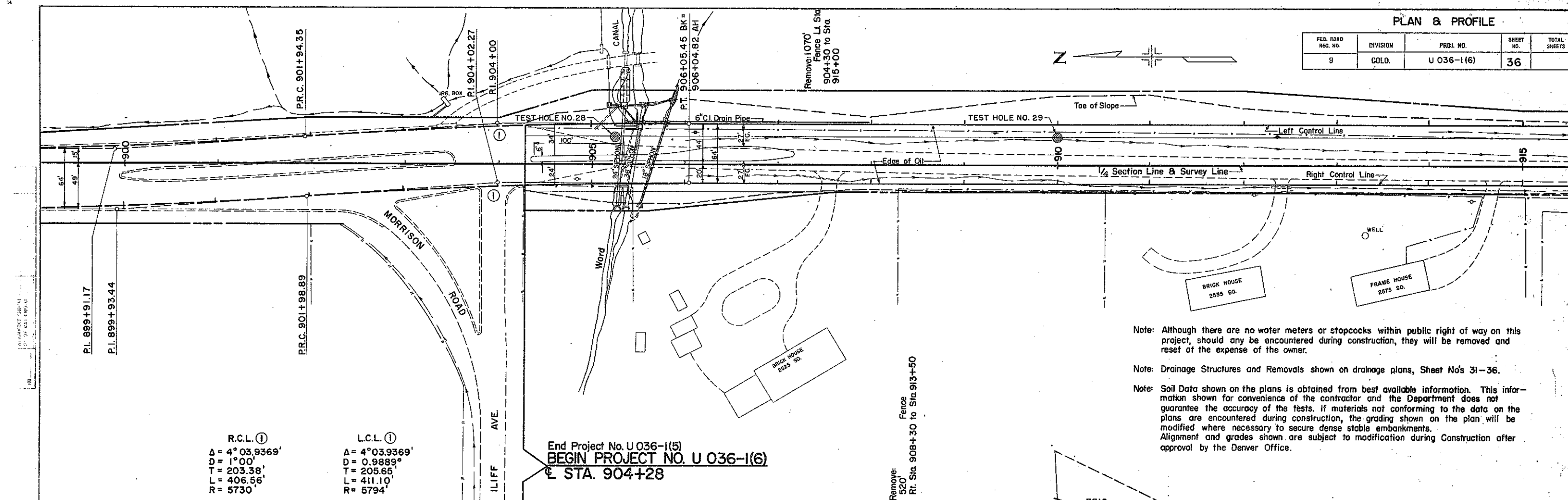
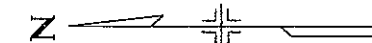


NOTE BOOK
ALIGNED CHECKED
BY: [Signature]

NOTE BOOK
STRUCTURE DETAILS CHECKED
BY: [Signature]

PLAN & PROFILE

FED. ROAD REG. NO.	DIVISION	PROJ. NO.	SHEET NO.	TOTAL SHEETS
9	COLO.	U 036-1 (6)	36	

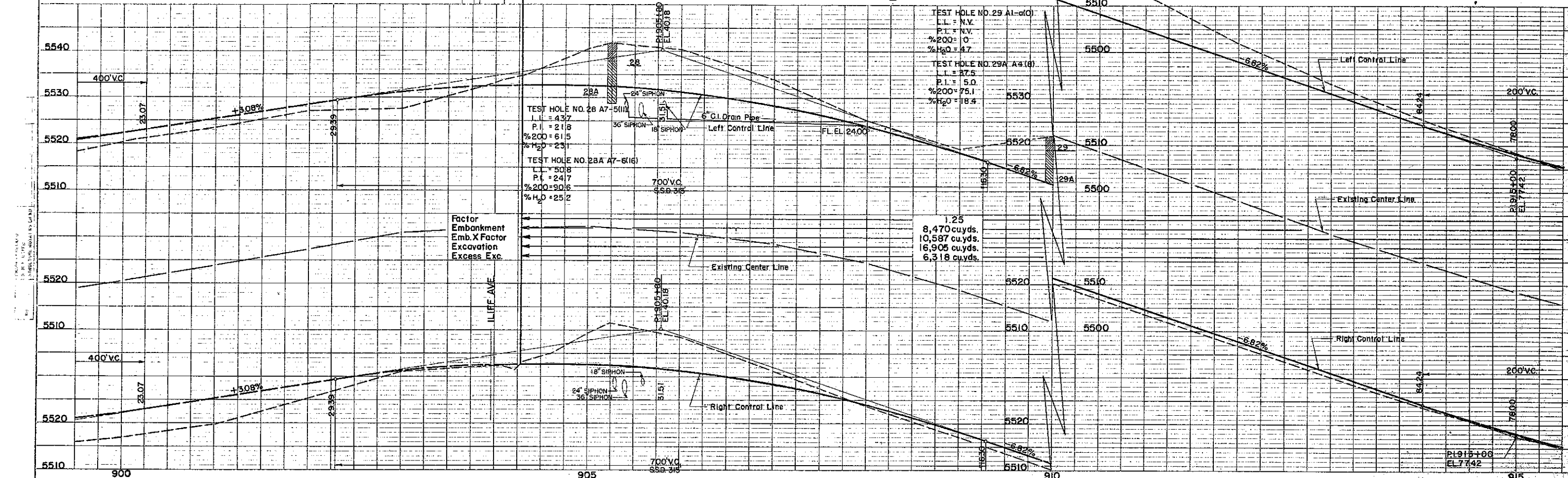


R.C.L. ①
 $\Delta = 4^{\circ}03.9369'$
 $D = 1^{\circ}00'$
 $T = 203.38'$
 $L = 406.56'$
 $R = 5730'$

L.C.L. ①
 $\Delta = 4^{\circ}03.9369'$
 $D = 0.9889'$
 $T = 205.65'$
 $L = 411.10'$
 $R = 5794'$

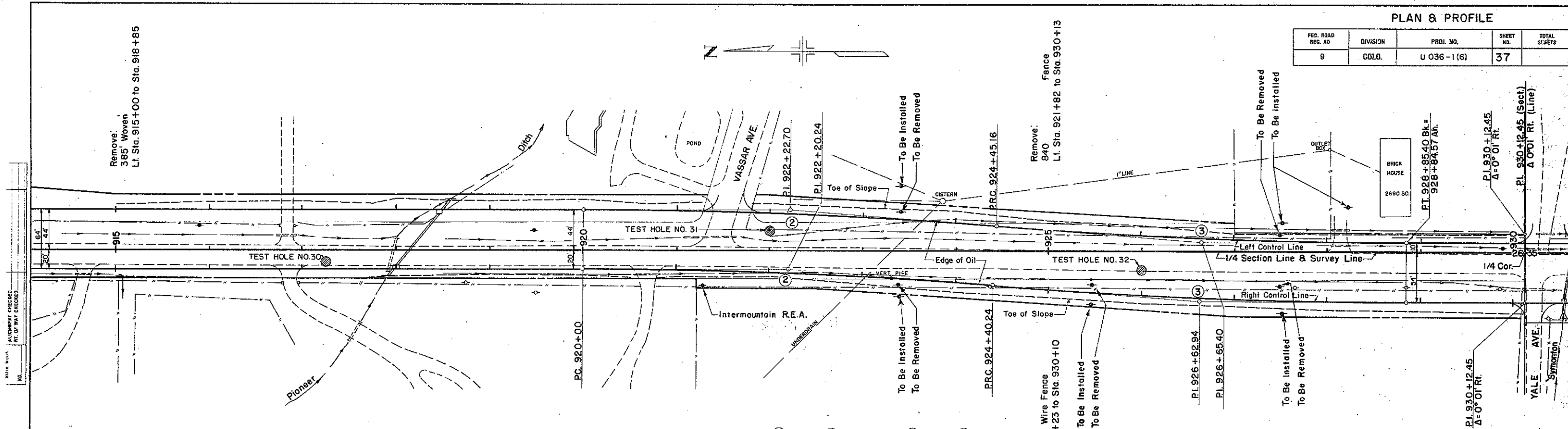
End Project No. U 036-1(5)
BEGIN PROJECT NO. U 036-1(6)
AT STA. 904+28

Remove: 520
 Fence
 Rt. Sta. 908+30 to Sta. 913+50



PLAN & PROFILE

FED. ROAD REG. NO.	DIVISION	PROJ. NO.	SHEET NO.	TOTAL SHEETS
9	COLO.	U 036-1(6)	37	



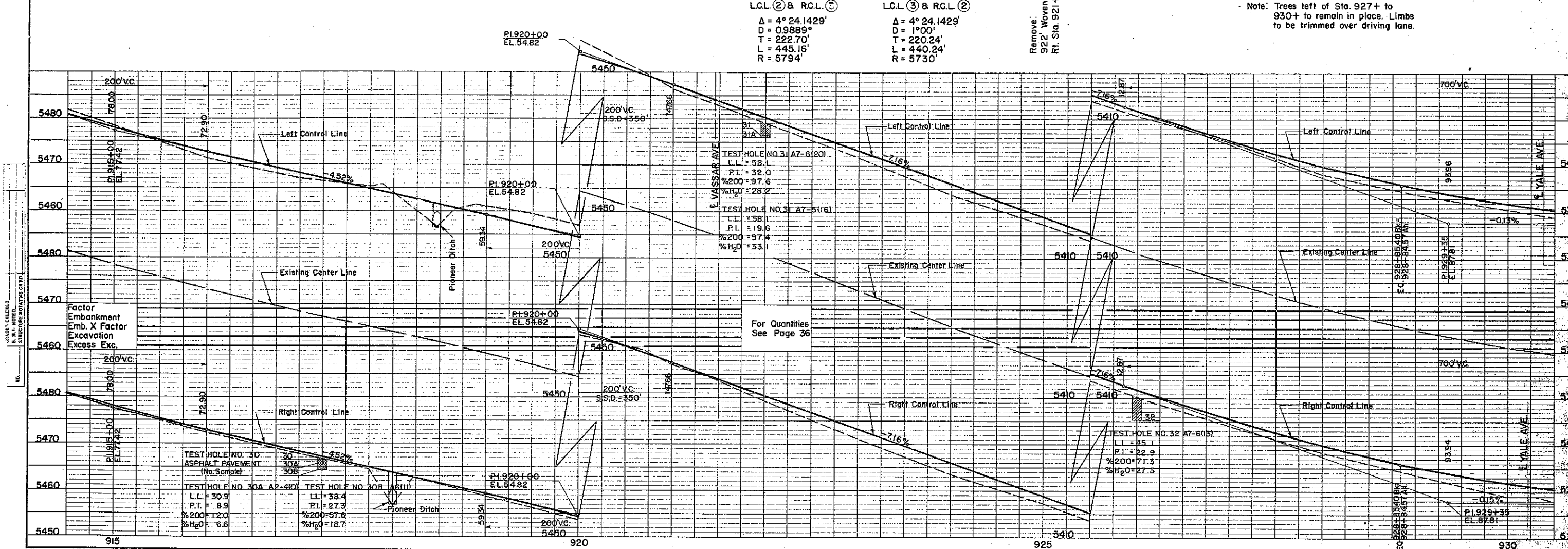
L.C.L. ② & R.C.L. ③

Δ = 4° 24' 14.29"
D = 0.9889°
T = 222.70'
L = 445.16'
R = 5794'

L.C.L. ③ & R.C.L. ②

Δ = 4° 24' 14.29"
D = 1° 00'
T = 220.24'
L = 440.24'
R = 5730'

Note: Trees left of Sta. 927+ to 930+ to remain in place. Limbs to be trimmed over driving lane.



Factor Embankment
Emb. X Factor
Excavation
Excess Exc.

For Quantities
See Page 36

TEST HOLE NO. 30
ASPHALT PAVEMENT
(No. Sampler)
LL = 30.9
P.I. = 8.9
%200 = 12.0
%H₂O = 6.6

TEST HOLE NO. 30A
AP-400
LL = 38.4
P.I. = 27.3
%200 = 97.6
%H₂O = 18.7

TEST HOLE NO. 30B
AP-400
LL = 38.4
P.I. = 27.3
%200 = 97.6
%H₂O = 18.7

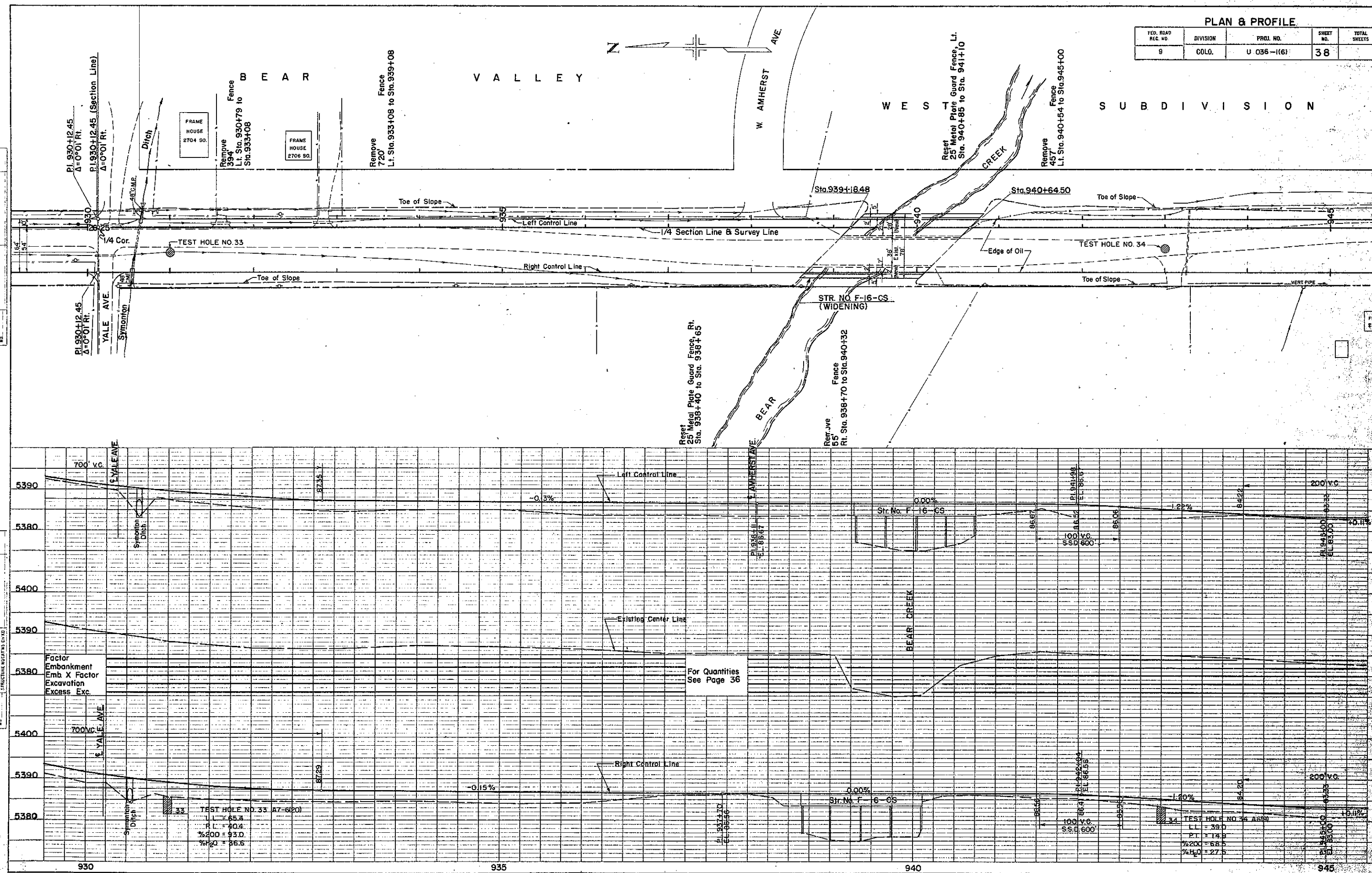
TEST HOLE NO. 31
A7-61201
LL = 58.1
P.I. = 32.0
%200 = 97.6
%H₂O = 26.2

TEST HOLE NO. 31
A7-5116
LL = 58.1
P.I. = 19.6
%200 = 97.4
%H₂O = 33.1

TEST HOLE NO. 32
A7-6057
LL = 45.1
P.I. = 22.9
%200 = 71.3
%H₂O = 27.3

TEST HOLE NO. 32
A7-6057
LL = 45.1
P.I. = 22.9
%200 = 71.3
%H₂O = 27.3

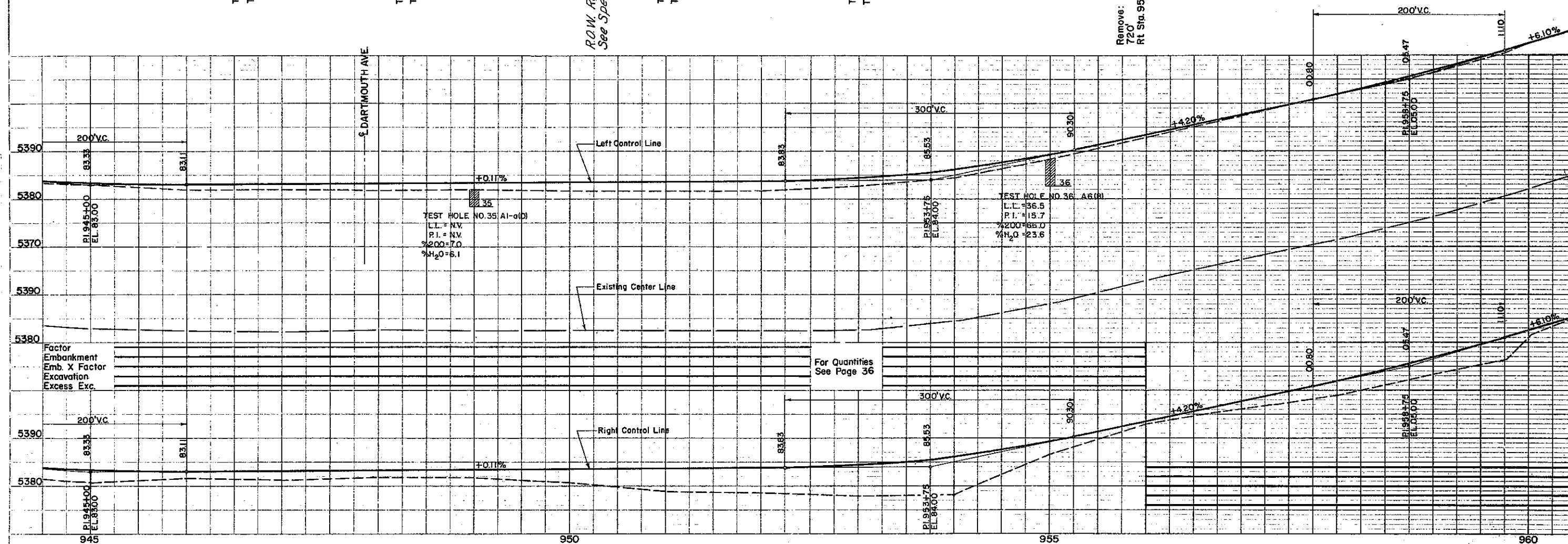
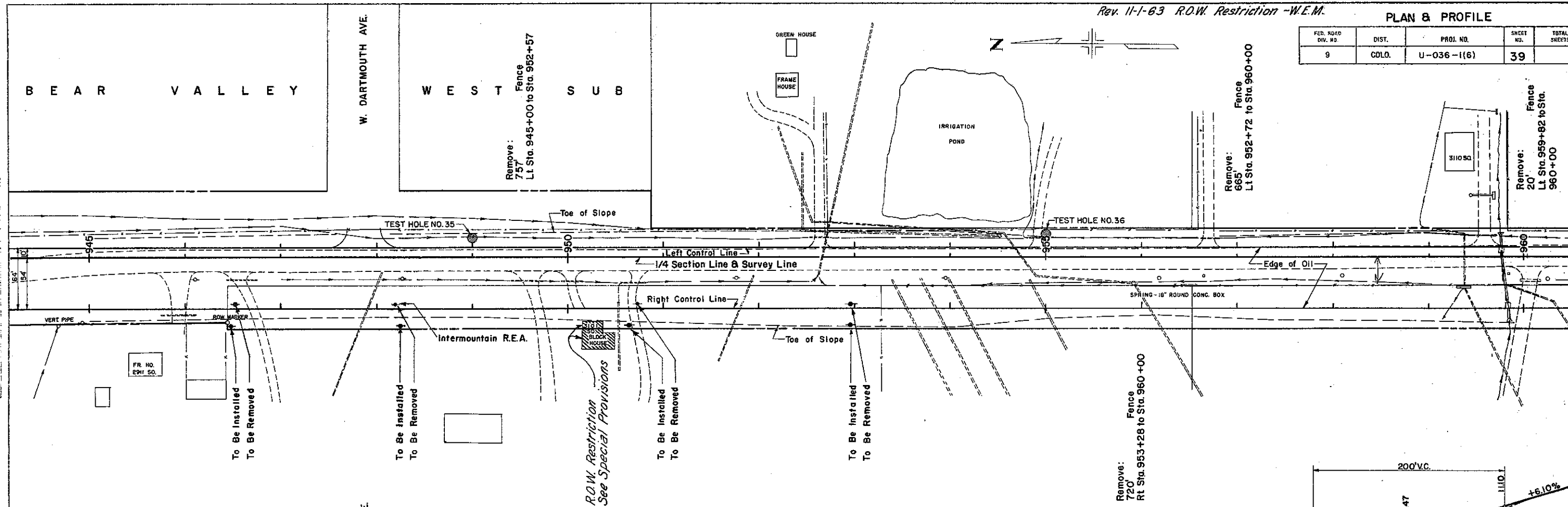
PLAN & PROFILE				
FED. ROAD REC. NO.	DIVISION	PROJ. NO.	SHEET NO.	TOTAL SHEETS
9	COLO.	U 036-(16)	38	



Rev. 11-1-83 R.O.W. Restriction -W.E.M.

PLAN & PROFILE

FED. ROAD DIV. NO.	DIST.	PROJ. NO.	SHEET NO.	TOTAL SHEETS
9	COLO.	U-036-1(6)	39	



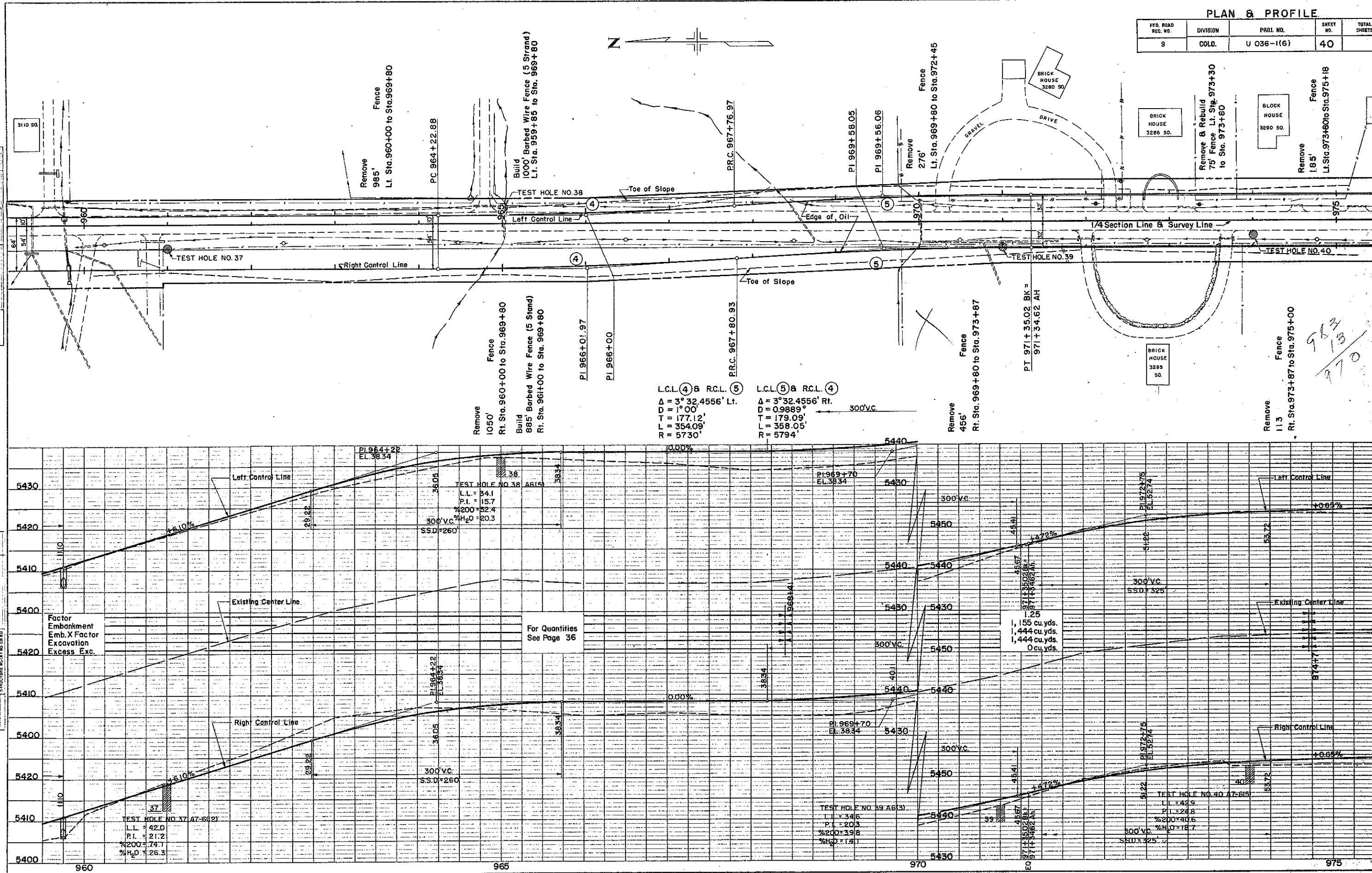
PLAN & PROFILE

FED. ROAD REC. NO.	DIVISION	PROJ. NO.	SHEET NO.	TOTAL SHEETS
9	COLO.	U 036-1(6)	40	

CONVERTED
NOTE BOOK
NO. 1

CONVERTED
NOTE BOOK
NO. 2

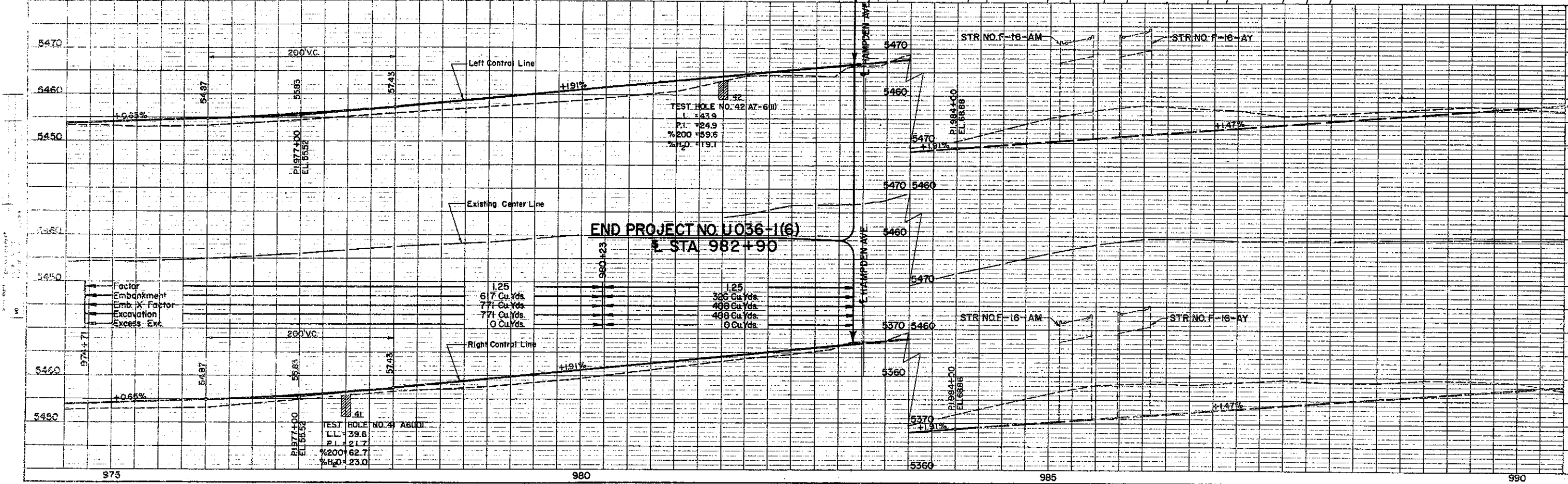
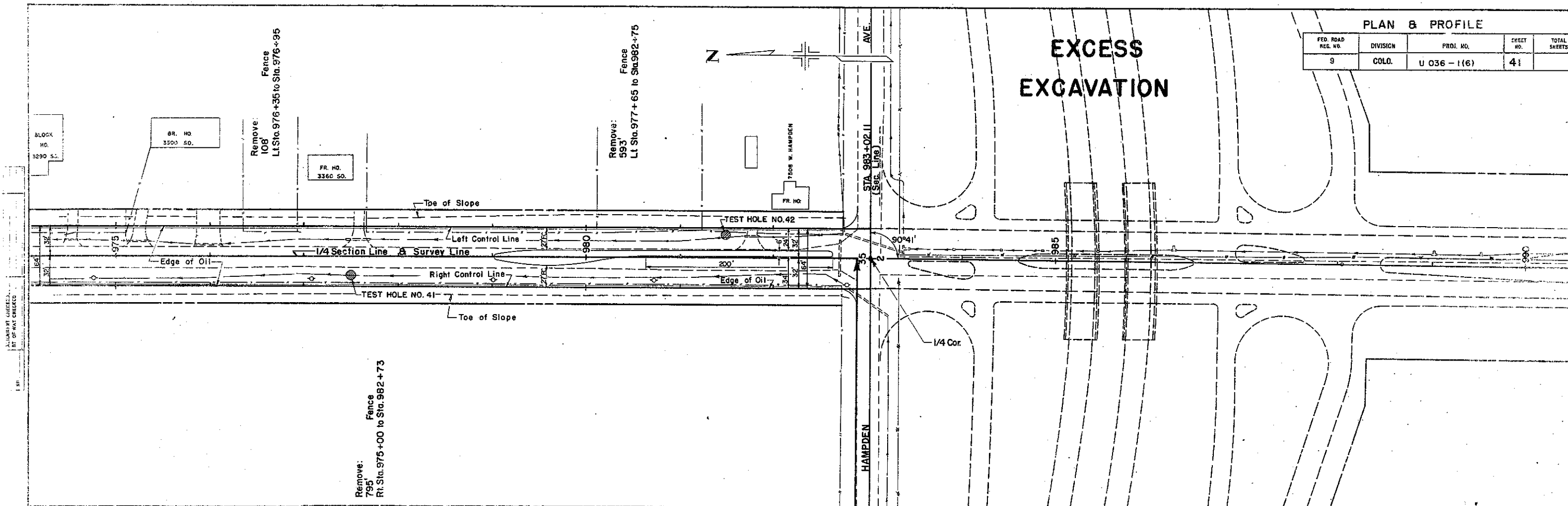
CONVERTED
NOTE BOOK
NO. 3



983
13
270

PLAN & PROFILE

FED. ROAD REG. NO.	DIVISION	PROJ. NO.	SHEET NO.	TOTAL SHEETS
9	COLO.	U 036 - (16)	41	

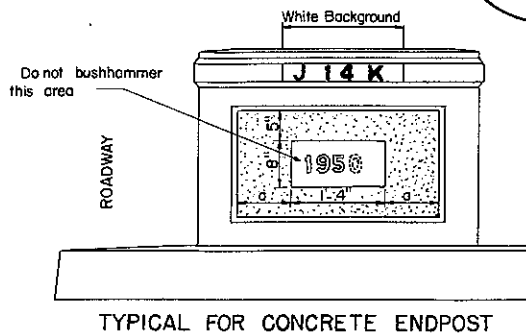


STANDARD M-5-A
(MAY 1, 1962)

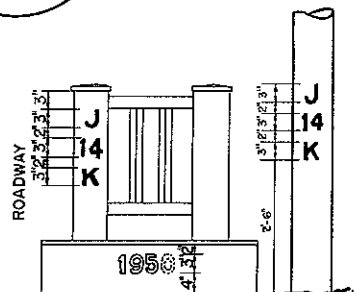
FED. ROAD REG. NO.	DIVISION	PROJECT NO.	SP
9	COLO.		



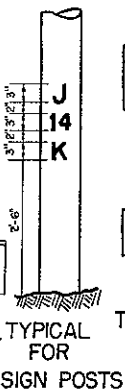
abcdefghijklmnopqrstuvwxyz



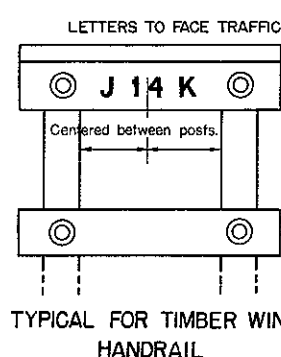
TYPICAL FOR CONCRETE ENDPOST



TYPICAL FOR STEEL
HANDRAIL END POST

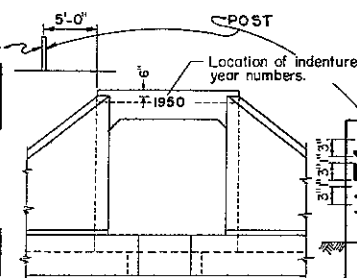


TYPICAL FOR
SIGN POSTS



TYPICAL FOR TIMBER WING
HANDRAIL

SAMPLE BRIDGE NUMBER



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 TO A 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 THOROUGHLY DRIED, CLEANED AND PROPERLY SIZED. ON TIMBER HANDRAILS THE WHITE PAINT USED ON THE BRIDGE WILL BE SATISFACTORY.

AFTER THE WHITE BACKGROUND HAS DRIED SUFFICIENTLY, THE CORRECT STRUCTURE NUMBER SHALL BE CAREFULLY STENCILED ON IT, WITH TWO COATS OF "SECOND FIELD COATS-DARK" OR EXTERIOR BLACK PAINT (MAINT) AS SPECIFIED UNDER ITEM 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 THOROUGH DRYING.

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

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

SAMPLE YEAR NUMBER

STRUCTURE NO. _____

COLORADO
DEPARTMENT OF HIGHWAYS

LETTERS AND FIGURES
FOR
STRUCTURE NUMBERS

Designed by _____
Made by _____
Checked by _____

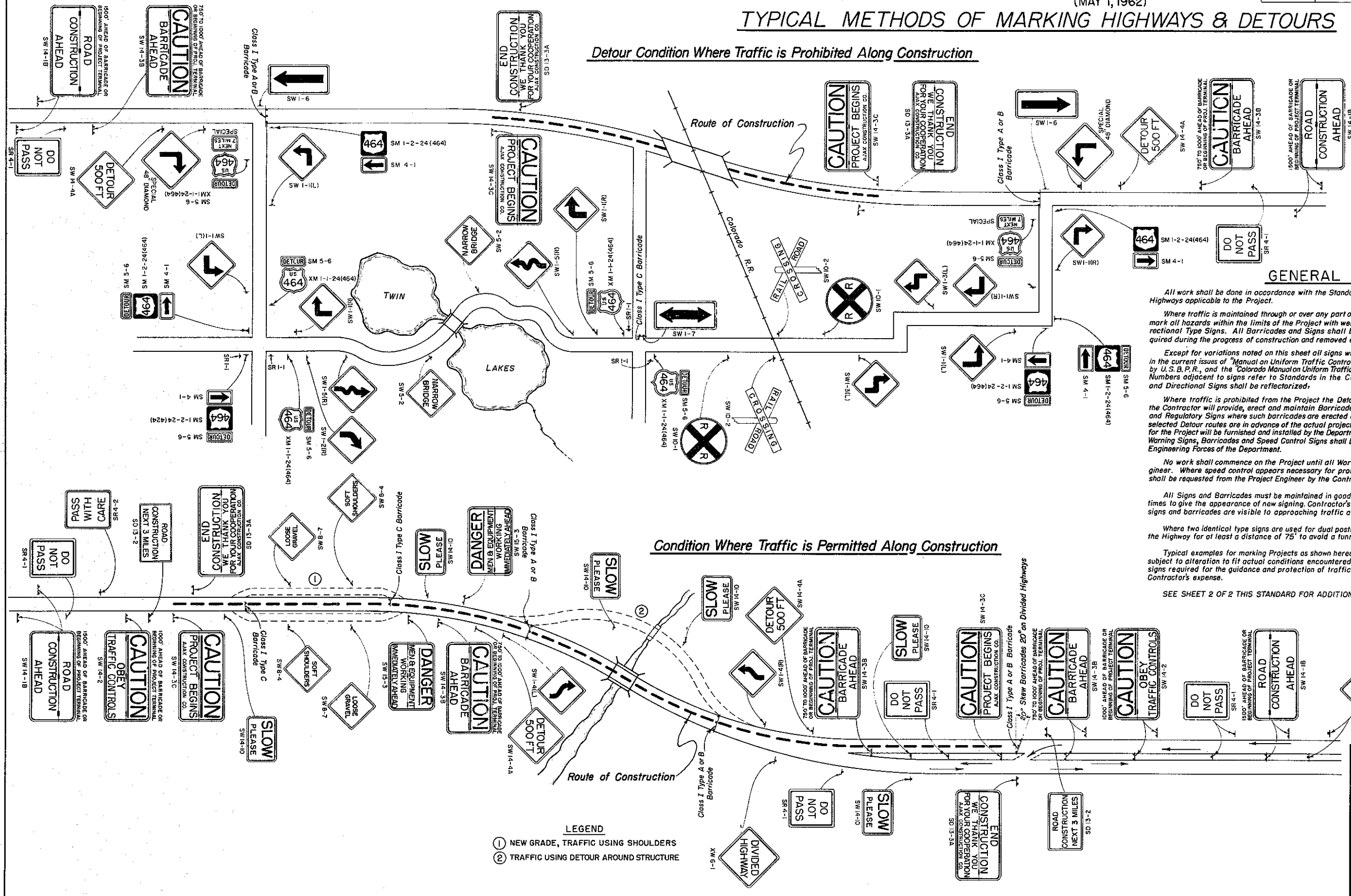
Approved by _____
Bridge Engineer
Date: Feb. 17, 1962

(MAY 1, 1962)

FED. ROAD REC. NO.	DIVISION	PROJECT NO.	SH P
9	COLO.		

[illegible]

Detour Condition Where Traffic is Prohibited 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 Rectangular Type Signs. All Barricades and Signs shall be moved, added to, changed or removed as required during the progress of construction and removed entirely when project is completed.

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

Where traffic is prohibited from the Project the Detour will be marked by the Department except the Contractor will provide, erect and maintain Barricades complete with approved Directional Arrow and Regulatory Signs where such barricades are erected and maintained at the ends of the Project or selected Detour routes 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 and Barricades must be maintained in good condition and kept clean and free of dirt at times to give the appearance of new signing. Contractor's and Engineers' equipment must be parked so signs and barricades are visible to approaching traffic at all times.

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

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

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

COLORADO
DEPARTMENT OF HIGHWAYS

Construction Traffic Sign

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

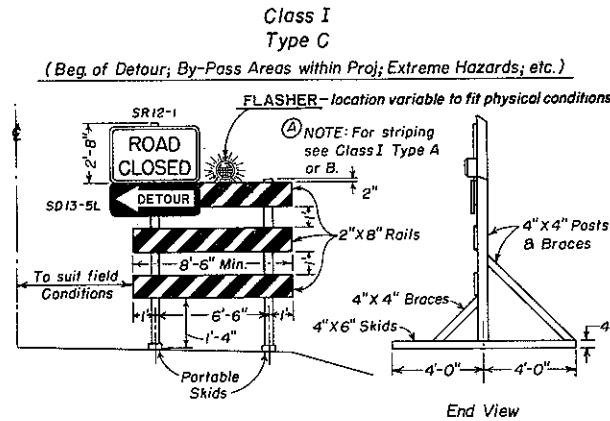
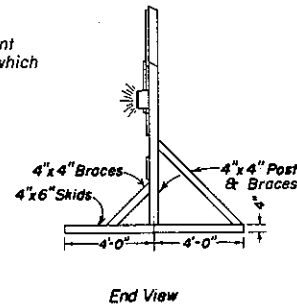
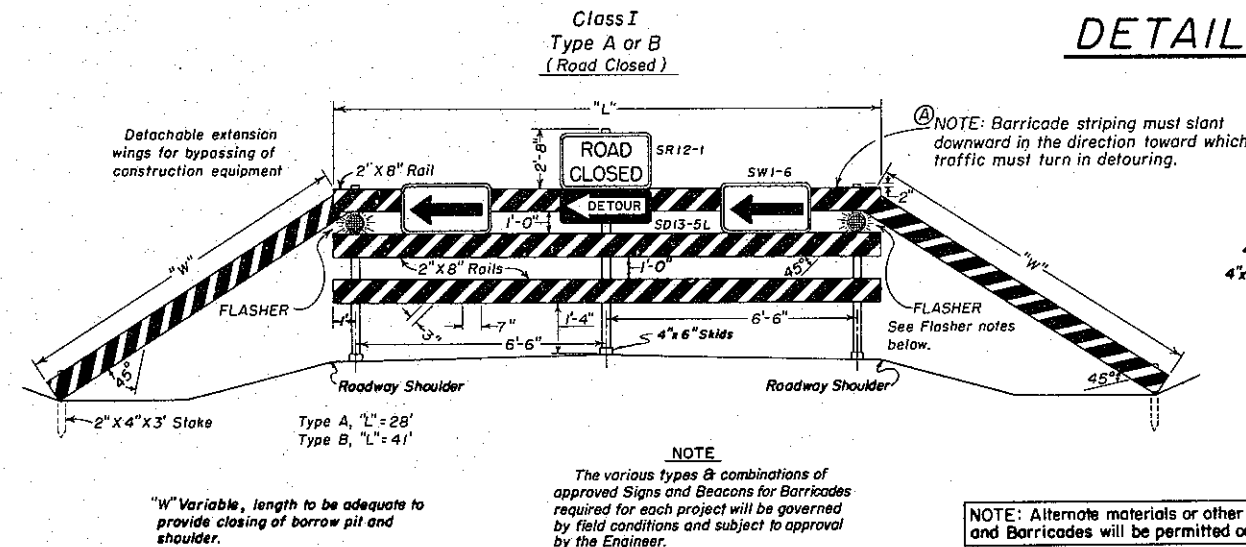
STANDARD ROADWAY CONSTRUCTION TRAFFIC SIGNS

STANDARD M-6-B
(SHEET 2 OF 2 SHEETS)
(MAY 1, 1962)

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

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

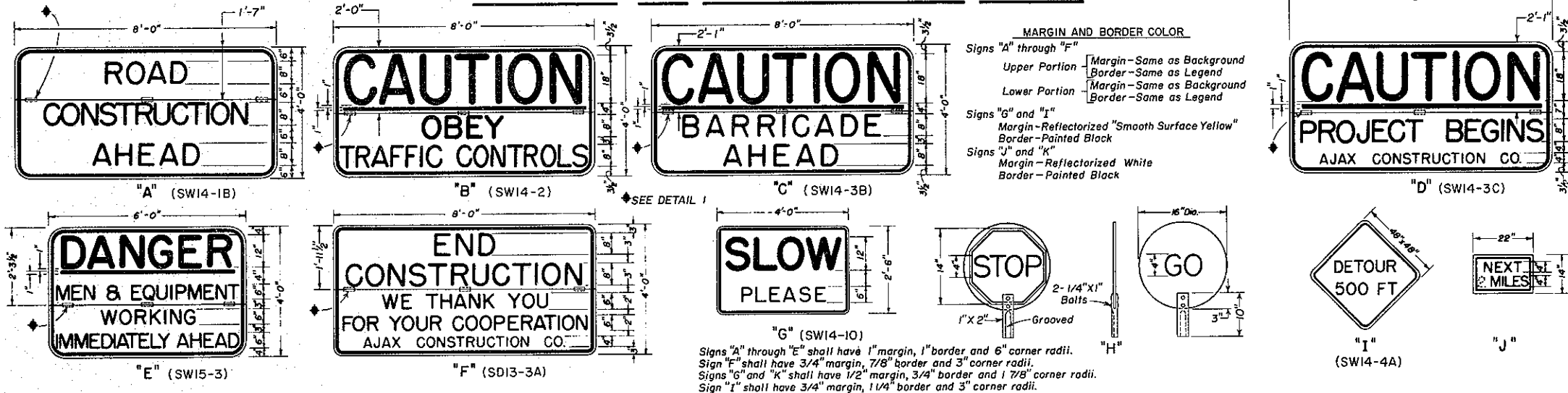
DETAILS OF BARRICADES



SPECIFICATIONS

- PAINT** - All paint and methods of painting shall be in conformity with Item 38 of the Standard Specifications.
- STRIPING** - Planking and Wings on all Barricades shall be painted with Maintenance Flat Black on both sides before adding Reflective Strips. Reflective Strips shall be "Cutout Smooth Surface Yellow," of a type approved by the Department, 3" wide and spaced 7" apart as shown in the detail.
- Division of traffic will be accomplished as follows:
1-Stripes for Barricades diverting traffic to the left shall start on the left hand side of the lower plank and progress up to the right with the stripes making an angle of 45 degrees with the horizontal axis of the board as shown in the detail. Traffic diversion to the right will be just the opposite.
2-Stripes on Barricades diverting traffic in both directions shall begin at the center of the lower plank and progress down in both directions.
- TIMBER** - All Timber used shall conform to the Standard Specifications for Miscellaneous Untreated Timber.
- | | | |
|--------------------|--------------------|-------|
| Planking | 2" x 8" | S 4 S |
| Posts (Barricades) | 4" x 4" | S 4 S |
| Posts (Signs) | 4" x 4" or 6" x 6" | S 4 S |
- Barricades may be either portable as shown or fixed with posts set into the ground.
- All skids, braces and posts to be painted yellow and nailed together with No. 20 d nails.
- Bases to be weighted where necessary to provide stability.

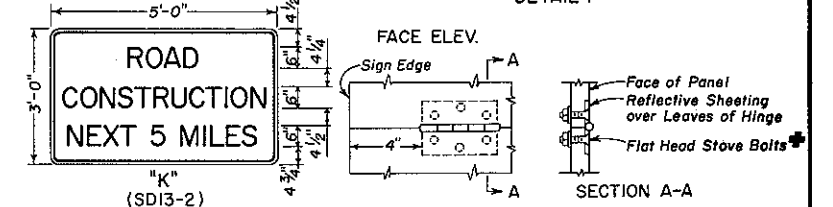
DETAILS OF CONSTRUCTION SIGNS



NOTES

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

DETAIL I



DETAILS OF SIGN AND BEACON FABRICATION AND USAGE

Construction Signs "A" through "G" and "K" shall be made of 5/8" Plywood or other material approved by the Department and as per details above.

Signs having reflectORIZED Yellow or Red surfaces shall be fabricated from "Flexible Reflective Sheeting" of the "Non-Exposed Lens" type approved by the Department. Signs having reflectORIZED White surfaces shall be fabricated from "Flexible Reflective Sheeting" of the "Exposed Lens" type approved by the Department.

Construction Sign "A" - ReflectORIZED Yellow background with painted Black lettering.

Construction Signs "B" through "D" - Top background to be reflectORIZED "Smooth Surface Red" with the legend and 1" Underline to be a White process point. Balance of lettering to be painted Black over a reflectORIZED Yellow background.

Construction Sign "E" - The word "DANGER" and the 1" Underline only are to be of a White process point over a reflectORIZED "Smooth Surface Red." Balance of lettering to be painted Black over a reflectORIZED Yellow background.

Construction Sign "F" - The words "End Construction" and "Contractors Name" shall be painted Black over a reflectORIZED White background. Balance of lettering to be applied with a White process point over a reflectORIZED "Smooth Surface Red" background.

Construction Sign "G" - The legend to be painted Black over a reflectORIZED "Smooth Surface Yellow" background.

Flagman Warning Sign "H" - This sign shall be made of Plastic or other lightweight material, approved by the Department, having a painted Red background with White lettering on the "Stop" side and a painted Green background with White lettering on the "Go" side. Handle to be grooved on one side to indicate reading of sign to Flagman. This sign will be used whenever Flagmen are necessary. Sign to be reflectORIZED if used to stop traffic at night.

Detour Warning Sign "I" - This sign shall be made of 3/8" (Min.) Plywood or other material suitable to the Department. Legend to be painted Black on a reflectORIZED "Smooth Surface Yellow" background.

Construction Sign "J" - This sign shall be made of 3/8" (Min.) Plywood or other suitable material. Legend to be painted Black on a reflectORIZED White background. 3/4" x 9" metal slides to be placed between "NEXT MILES," spaced so as to accommodate appropriate sized numerals. Numerals calculated to the nearest Mile.

Construction Sign "K" - ReflectORIZED White background with painted Black lettering.

Signs "A" through "E" and "G" shall be painted on the backside with one coat of white primer and one coat of yellow enamel.

Signs "F," "J" and "K" shall be given 2 coats of white paint on the backside.

Construction Signs shall be placed as follows:
Sign "A" - This is the first advance warning sign and shall be placed 1,500 feet ahead of barricade or beginning of project terminal and on both sides of the traveled way in all cases.
Sign "B" - This is the second advance warning sign and shall be placed 1,000 feet ahead of barricade or beginning of project terminal and on both sides of the traveled way on divided highways and singly on two-lane highways.
Sign "C" - This is the third advance warning sign in cases where barricades are used and shall be placed 750 to 1,000 feet ahead of barricade or beginning of project terminal and on both sides of the traveled way on divided highways and singly on two-lane highways.
Sign "D" - This sign shall be placed to mark the beginning of the Project. It shall be placed singly and may be placed opposite barricade if desirable.
Sign "E" - This sign shall be placed 500 feet ahead of the situation being advised of.
Sign "F" - This sign shall be placed to mark the end of the Project. It shall be placed singly and may be placed opposite barricade if desirable.
Sign "G" - This sign shall be used frequently within the limits of the Project.
Sign "K" - This sign shall be erected at the limits of any project more than 2 miles in extent, where traffic is maintained through the job.

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

Flashers used on the Barricades shall be of the Battery or Electrical Type and shall have no less than a 4" diameter lens. The illuminating element in a flashing yellow beacon or signal shall be flashed continuously at a rate between 50 to 70 flashes per minute with the "on" time being at least 25% of the cycle and which will be clearly distinguishable to traffic. The duration in which Flashers will be left in operation will be governed by field conditions and subject to approval

by the Engineer.

All material shall be sound and durable. Barricades, signs, symbols and lettering shown herein will be of good workmanship and well maintained. Uneven lettering will not be accepted.

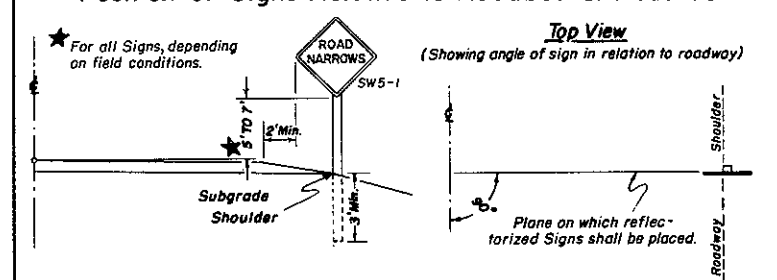
Alternate methods of processing signs or the substitution of symbols or other reflecting elements for painted symbols will be permitted only after approval of such methods or materials by the Department.

The Department shall furnish and install the following as required OUTSIDE THE LIMITS of the Project:

1. "ROAD CONSTRUCTION AHEAD"..... Minimum 4
 2. "CAUTION OBEY TRAFFIC CONTROLS"..... Minimum 2
 3. "CAUTION BARRICADE AHEAD"..... As Required
 4. Standard Warning, Guide & Directional Signs..... As Required
 5. "ROAD CONSTRUCTION NEXT 5 MILES"..... As Required
- The Contractor shall furnish and install the following as required WITHIN THE LIMITS of the Project:
1. All Barricades..... As Required
 2. "CAUTION PROJECT BEGINS"..... Minimum 2
 3. "DANGER MEN & EQUIPMENT WORKING IMMEDIATELY AHEAD"..... As Required
 4. "END CONSTRUCTION WE THANK YOU FOR YOUR COOPERATION"..... Minimum 2
 5. "SLOW PLEASE"..... As Required
 6. Standard Warning & Directional Signs..... As Required
 7. Approved Directional Arrows & Regulatory Signs for Barricades..... As Required
 8. Torches and Flares as follows: Class I Type A or B Barricade..... Minimum 3
Class I Type C Barricade..... Minimum 1
 9. Flashers - Class I Type A or B Barricade..... 2 Required
Class I Type C Barricade..... As Required

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

Position of Signs Relative to Roadbed & Hazards



NOTE:

Warning Signs to be made of 3/8" (Min.) plywood or other material suitable to the Department and shall be reflectORIZED. Location to be governed by field conditions. Exact location to be staked by the Engineer. In all cases warning signs are to be placed well in advance of hazard, the distance depending on topography, and existing approach speeds.

For all signs prefixed with the letters "R," "M" or "W" refer to the "Colorado Manual on Uniform Traffic Control Devices for Streets and Highways" of current issue.

COLORADO
DEPARTMENT OF HIGHWAYS

Construction Traffic Signs

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

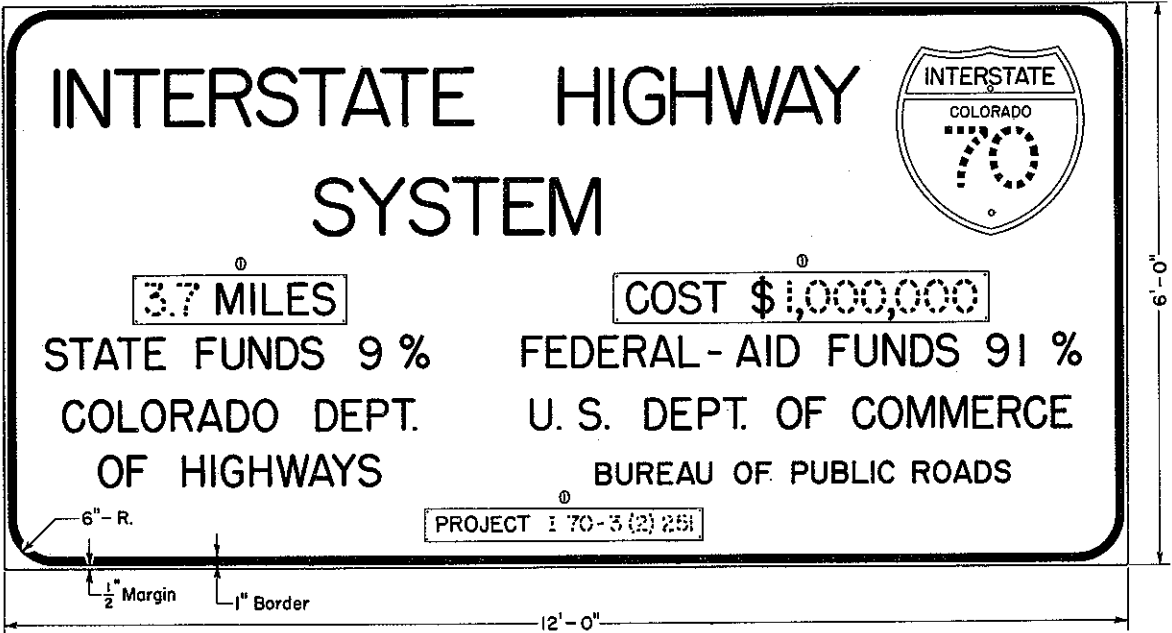
TYPICAL SIGNS

STANDARD M-6-C

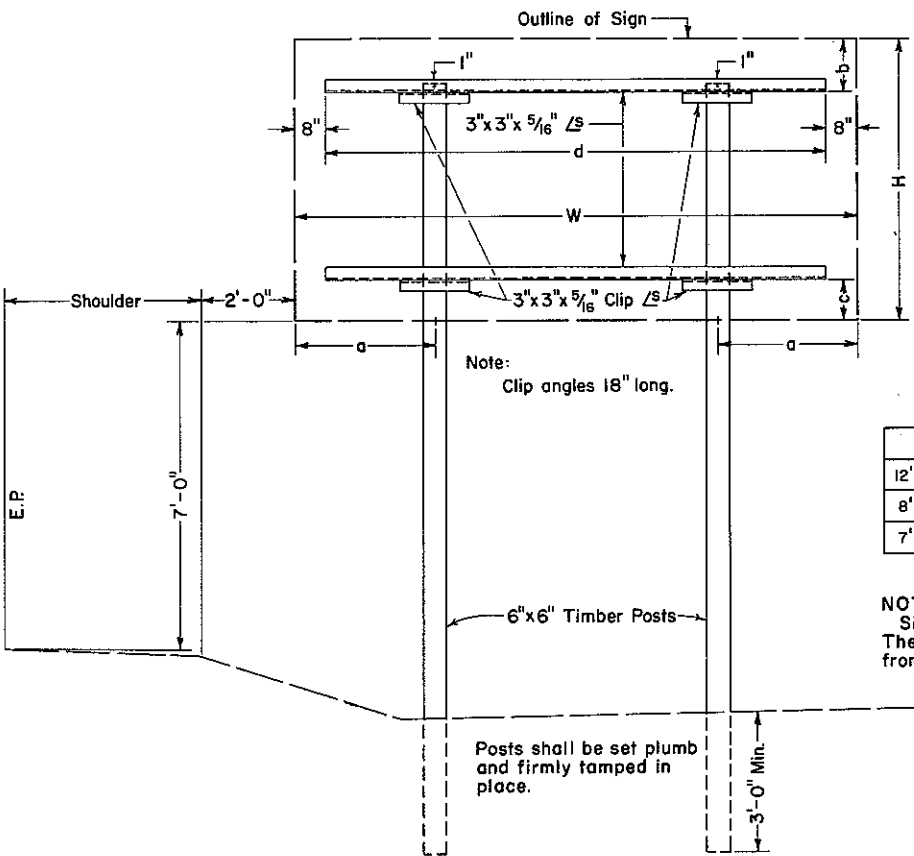
(MAY 1, 1962)

INTERSTATE SYSTEM

INSTALLATION DETAIL



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



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

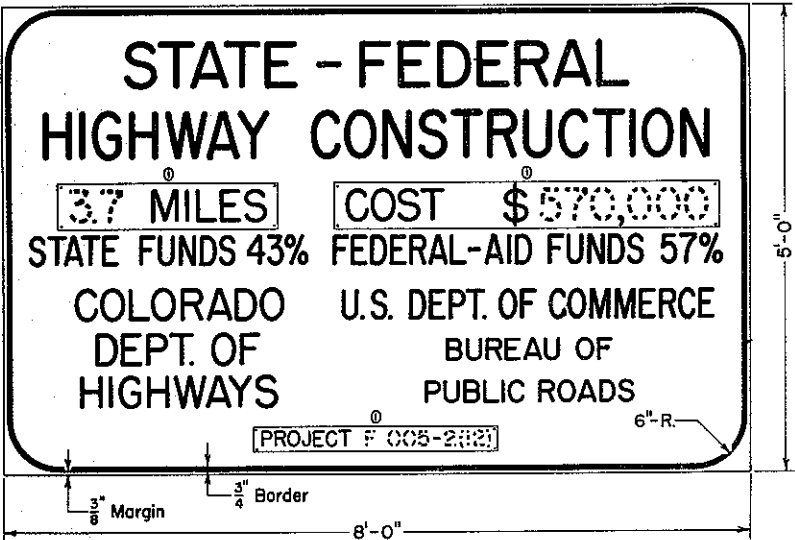
NOTE:
Signs are to be placed facing traffic approaching the work. These signs should be located so as not to obscure or detract from the effectiveness of other official signs.

REVISIONS			

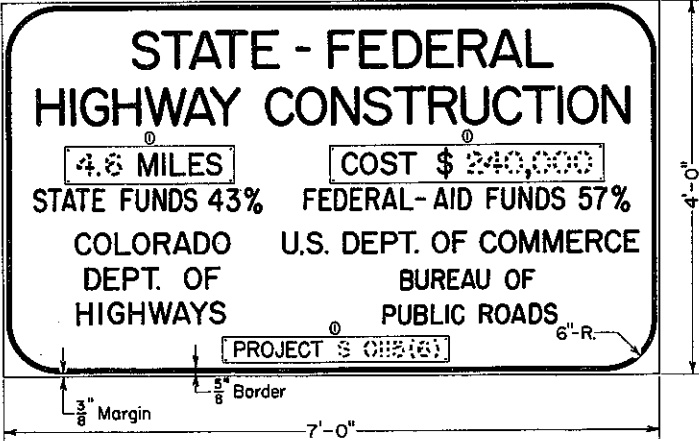
FED. ROAD REG. NO.	DIVISION	PROJECT NO.	SHEET NO.
9	COLO.		

PRIMARY SYSTEM

SECONDARY SYSTEM



① Plaque length variable, as determined by message.



① Plaque length variable, as determined by message.

GENERAL NOTES

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

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

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

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

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

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

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

COLORADO
DEPARTMENT OF HIGHWAYS

IDENTIFICATION
SIGNS

Designed by V.H. Approved by J. Zuleta
Made by D.M.E. Engr. Surveys & Plans
Checked by E.E.O. Date: Nov 15 1965

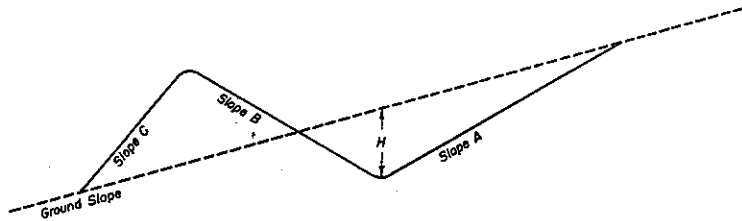
STANDARD TYPES *of* DITCHES *and* CONSTRUCTION METHODS

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

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

DETAILS *for* CONTOUR INTERCEPTING DITCHES

Typical Section for Contour Intercepting Ditches



PURPOSE & USE OF THE TABLE

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

Typical Construction Layouts

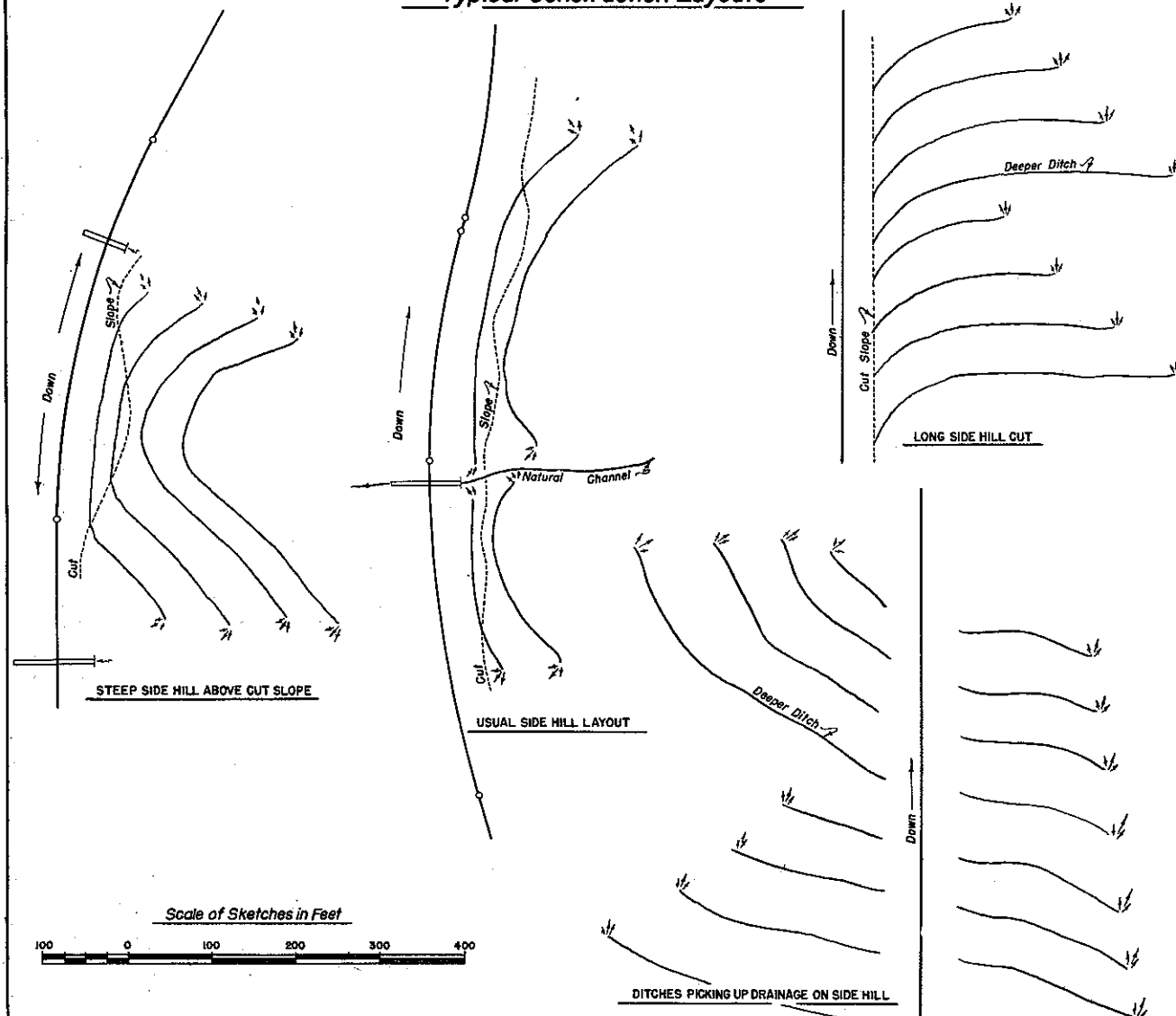
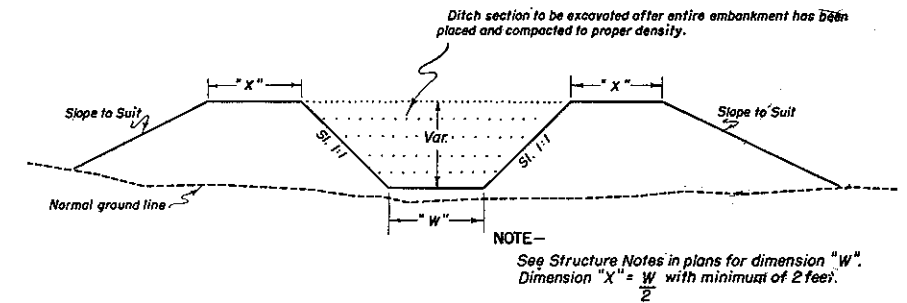


Table of Slopes and Yardages

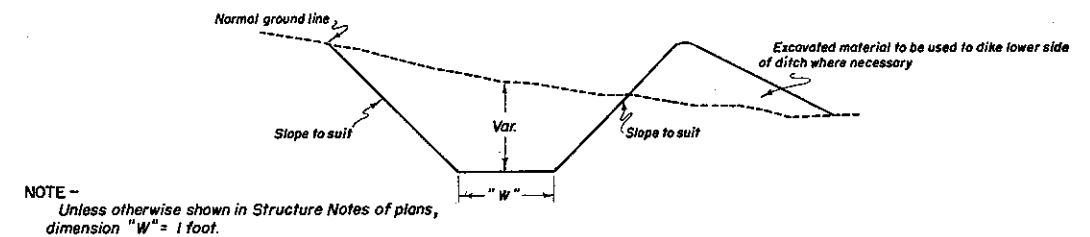
Ground Slopes	SLOPES			H	Cubic Yards per 100 lin. ft. of Ditch
	A	B	C		
5:1 Or Flatter	2:1	4:1	2:1	15"	16
				18"	23
				21"	32
		3:1		15"	15
				18"	22
				21"	30
		2:1		15"	14
				18"	20
				21"	27
		1-1/2:1		15"	13
				18"	19
				21"	25
		1-1/2:1	4:1	15"	12
				18"	18
				21"	25
4:1	2:1	4:1	2:1	15"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

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

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



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



For Cut Sections

GENERAL NOTES

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

All ditches are to be constructed to lines and grades as staked by the Engineer using the ditch section shown on plans or as ordered by the Engineer.

CONTOUR INTERCEPTING DITCHES: Ditches are to be laid out along the ground contour on a grade of not over 1% (Type of soil shall govern the grade).

Ends of ditches are to be lined up so that concentration of flow from a higher contour ditch into one of lower contour is, as far as possible avoided. The use of a deeper ditch is recommended where this condition is encountered.

The following horizontal spacing of ditches is recommended:

4% to 6%	Approximately 70' Centers
8% to 10%	Approximately 60' Centers
20% to 4:1 Slope	Approximately 55' Centers
30% to 1-1/2:1 Slope	Approximately 50' Centers

Where ditch checks are required the intervening ditch between one set of ditch checks shall not exceed a grade of 1.0%. Details of checks will be shown on plans when required.

REVISIONS

NO.	DESCRIPTION	DATE

COLORADO
DEPARTMENT OF HIGHWAYS

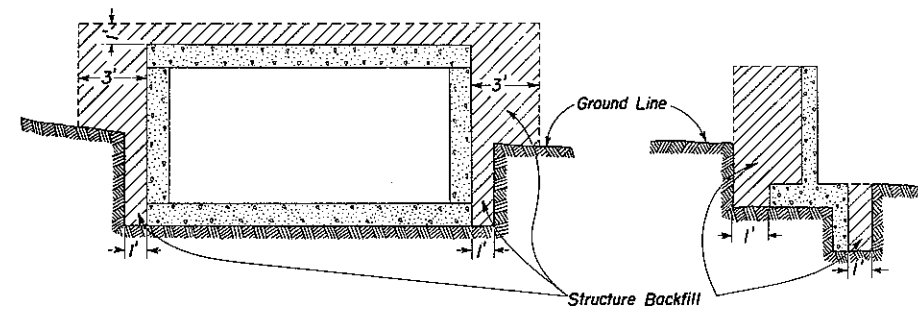
DITCH TYPES

Designed by C.G.M. Approved by C.G.M.
Made by C.G.M. Engineer, Survey & Plans
Checked by Date: Apr. 13, 1962

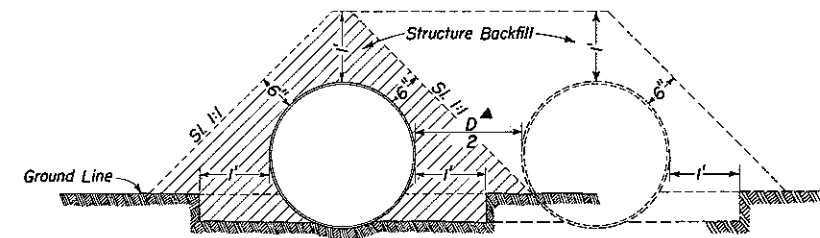
STANDARD M-16-A (MAY 1, 1962)

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

CONCRETE BOX CULVERTS & WINGWALLS



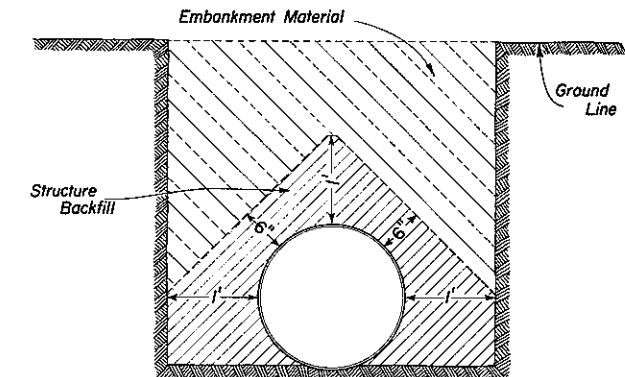
CIRCULAR CONDUIT



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

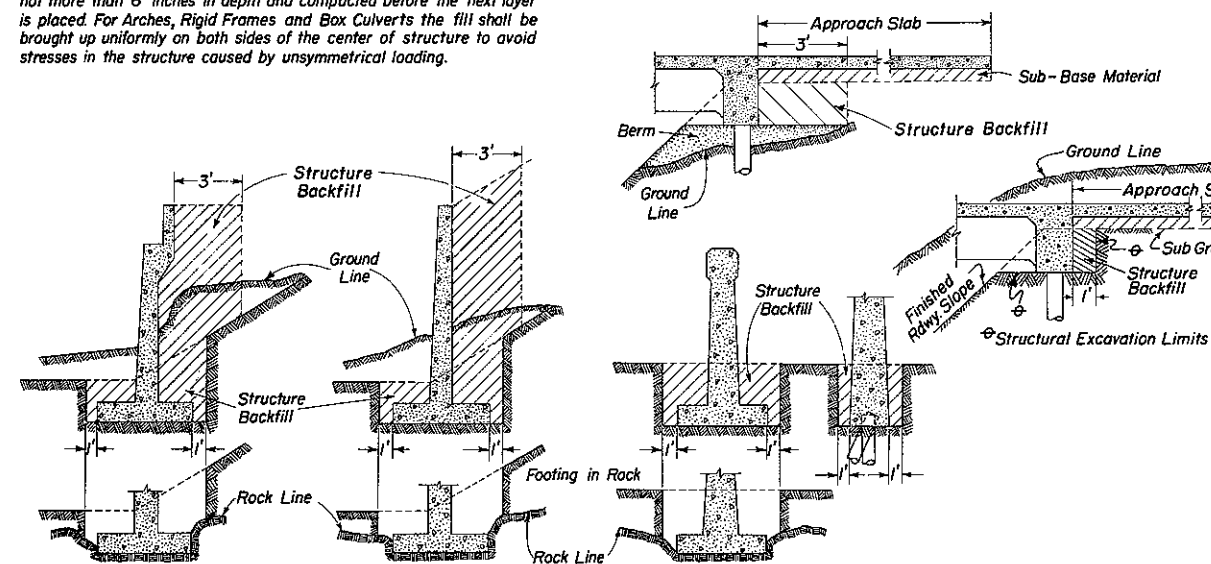
See Design Aid No. 16, 16a or 16b for computation of quantities.

SIPHONS OR CONDUIT IN TRENCH

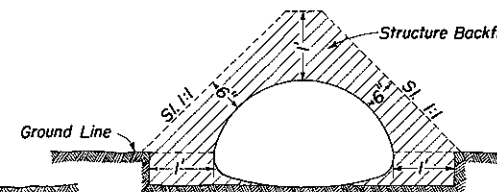


PIERS, ABUTMENTS, RETAINING WALLS ETC.

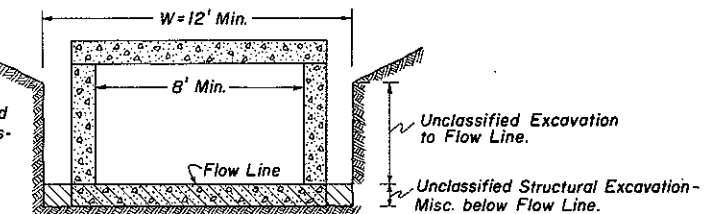
All material that is to be compacted shall be placed in horizontal layers not more than 6" inches in depth and compacted before the next layer is placed. For Arches, Rigid Frames and Box Culverts the fill shall be brought up uniformly on both sides of the center of structure to avoid stresses in the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



ELLIPTICAL OR ARCH CONDUIT



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



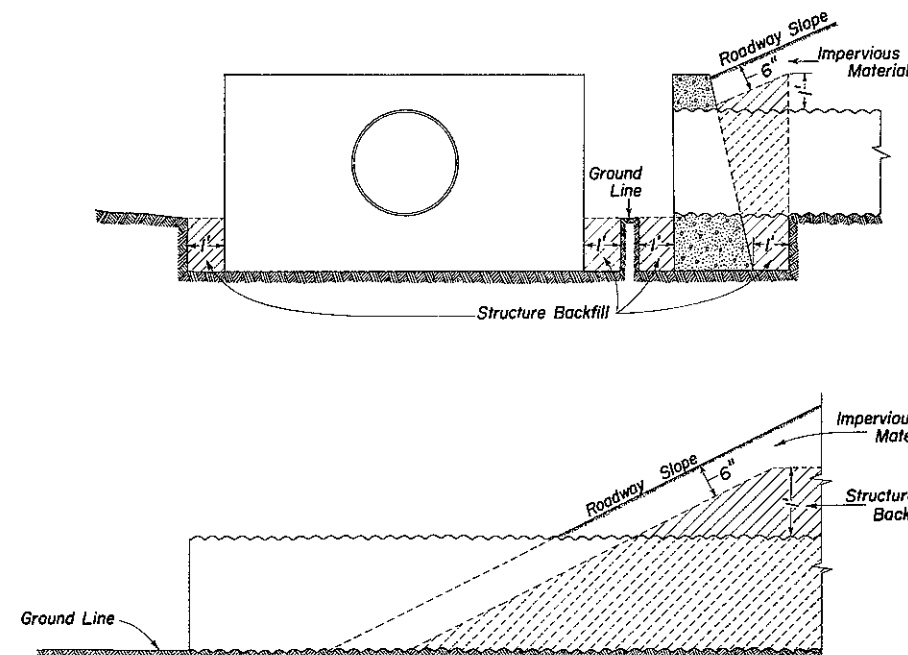
GENERAL NOTES

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

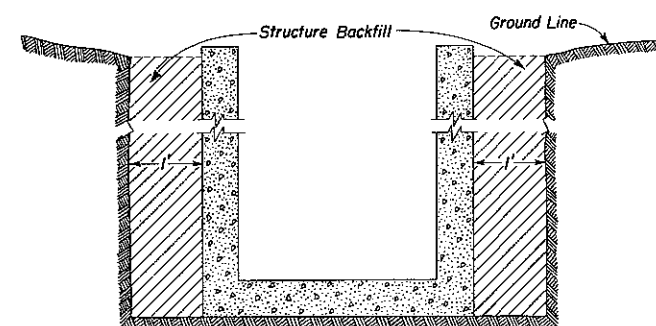
If, in the opinion of the Engineer, the material beneath the Structure is of such character as to cause unequal settlement along the length of the Structure, the material shall be removed to such a depth ordered, and backfilled with gravel or Structure Backfill and compacted in accordance with Item 16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

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

HEADWALLS AND END OF CULVERTS



DROP INLETS, DIVISION BOXES, INTERCEPTING HEADWALLS ETC.



STANDARD M-46-B
(MAY 1, 1962)

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

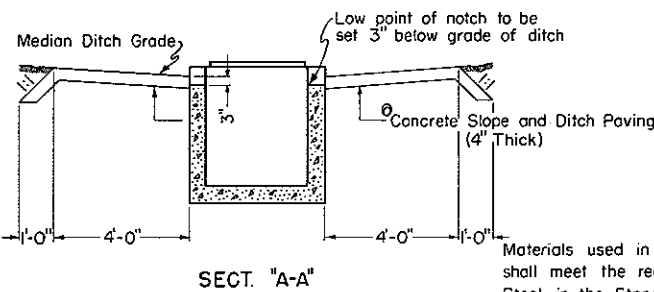
REVISIONS		
4-18-63	Rev. Steps	L.E.O.
7-2-63	Rev. Step Dimension	L.E.O.

QUANTITIES FOR ONE INLET

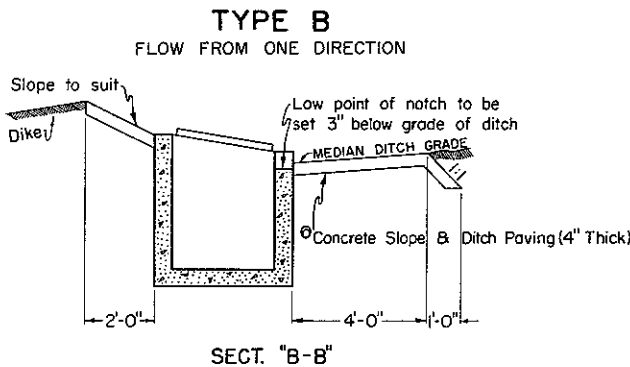
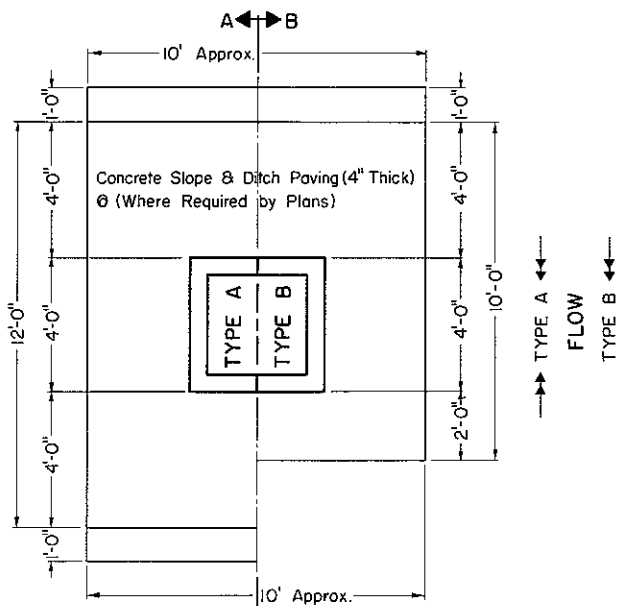
H	CLASS "A" CONCRETE		REINFORCING STEEL	
	CU. YDS.		O LBS.	
	TYPE A	TYPE B	TYPE A	TYPE B
3'-0"	0.91	1.00	83	93
3'-6"	1.04	1.13	89	100
4'-0"	1.17	1.26	105	116
4'-6"	1.30	1.39	115	126
5'-0"	1.43	1.52	136	146
5'-6"	1.56	1.65	142	153
6'-0"	1.69	1.78	158	169
6'-6"	1.82	1.91	168	179
7'-0"	1.95	2.04	185	195
7'-6"	2.08	2.17	191	202
8'-0"	2.21	2.30	211	222
8'-6"	2.34	2.43	217	228
9'-0"	2.47	2.56	234	244
9'-6"	2.60	2.69	244	255
10'-0"	2.73	2.82	260	271
10'-6"	2.86	2.95	266	277
11'-0"	2.99	3.08	287	297
11'-6"	3.12	3.21	293	304
12'-0"	3.25	3.34	309	320

0 includes 1% for overrun.
Volume occupied by pipes not to be deducted from quantities.

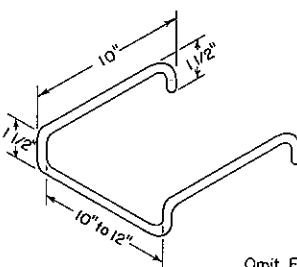
TYPE A
FOR USE AT BOTTOM OF VERTICAL CURVE



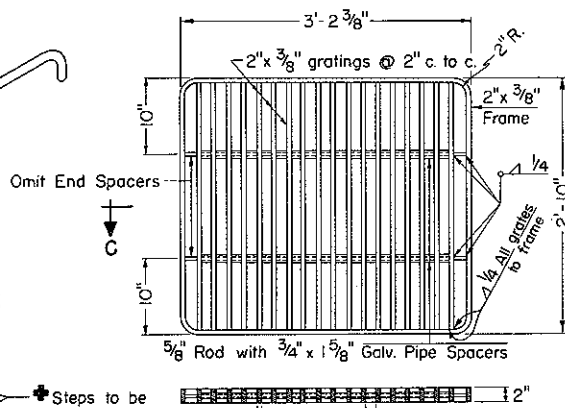
Materials used in the construction of Inlet Gratings shall meet the requirements of Item 48, Structural Steel, in the Standard Specifications.



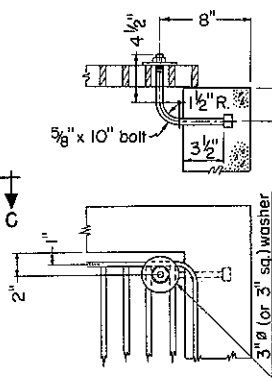
DETAIL OF INLET STEP



LAYOUT OF INLET IN MEDIAN DITCH



DETAIL OF FASTENER
4 REQ'D FOR EACH INLET



DETAIL OF GRATING

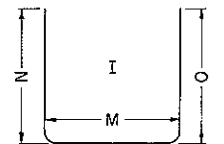
MATERIAL LIST FOR GRATING AND FASTENERS			
Strap Iron Frame	1 pc.	2" x 3/8" x 11'-9 5/8"	@ 2.55 lb. per ft. = 30.0 lb.
Strap Iron Gratings	18 pcs.	2" x 3/8" x 2'-9 1/4"	@ 2.55 lb. per ft. = 127.2 lb.
Galv. Iron Pipe Spacers	34 pcs.	3/4" x 1 1/2"	@ 1.13 lb. per ft. = 5.2 lb.
Tie Rods	2 pcs.	5/8" x 3'-15 5/8"	@ 1.04 lb. per ft. = 6.5 lb.
Bolts	4 pcs.	5/8" x 10"	@ 1.03 lb. ea. = 4.1 lb.
Washers	4 pcs.		@ 0.23 lb. ea. = 0.9 lb.

NOTE: Acceptable equivalent Gratings may be substituted after approval by the Engineer.

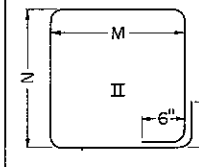
BENDING DIAGRAMS (SAME FOR TYPES A & B)
All dimensions out to out of bars

Steps required as follows:
H=4'-6" ... 1 step
H=5'-0", 5'-6" & 6'-0" ... 2 steps
H=6'-6", 7'-0" & 7'-6" ... 3 steps
H=8'-0", 8'-6" & 9'-0" ... 4 steps
H=9'-6", 10'-0" & 10'-6" ... 5 steps
H=11'-0", 11'-6" & 12'-0" ... 6 steps
All Steps shall be 3/4" A-7 Steel Bars and shall be galvanized per ASTM Designation A123-59. Steps for Inlets shall be included for payment under "Reinforcing Steel."

increase or decrease dimensions N & O 6" for each 6" increase or decrease of H above or below 4'-0"



Note for 404 bar
Subtract one bar for H less than 4'. Add one bar for each foot increase in H.



NOTE: Cut or bend bars to fit around pipes as required.

GENERAL NOTES

All work shall be done according to the Standard Specifications of the Colorado Department of Highways applicable to the project.
All concrete shall be Class "A".
All walls shall have forms on both sides. Bevel all exposed corners to a 1" face.
All reinforcing bars shall be deformed, of intermediate grade, and shall be tagged with the station number and bar designation.

All edge distances not marked clear are to the center of the bar.
Inlet grating to be painted as per specifications for structural steel. One shop coat of Zinc Chromate primer and two field coats of Aluminum.

COLORADO
DEPARTMENT OF HIGHWAYS

CONCRETE MEDIAN INLETS

Designed by
Made by ABH
Checked by DLV
Approved by
Date: May 17, 1962

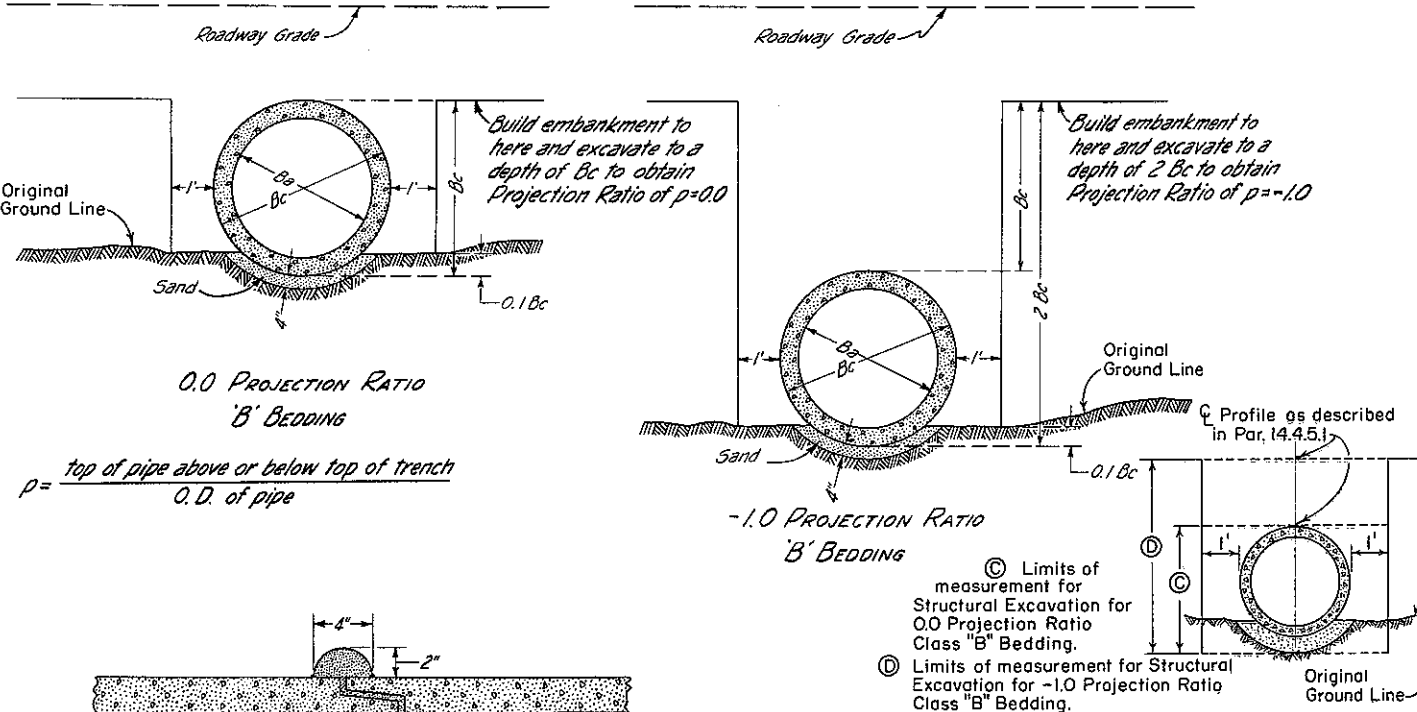
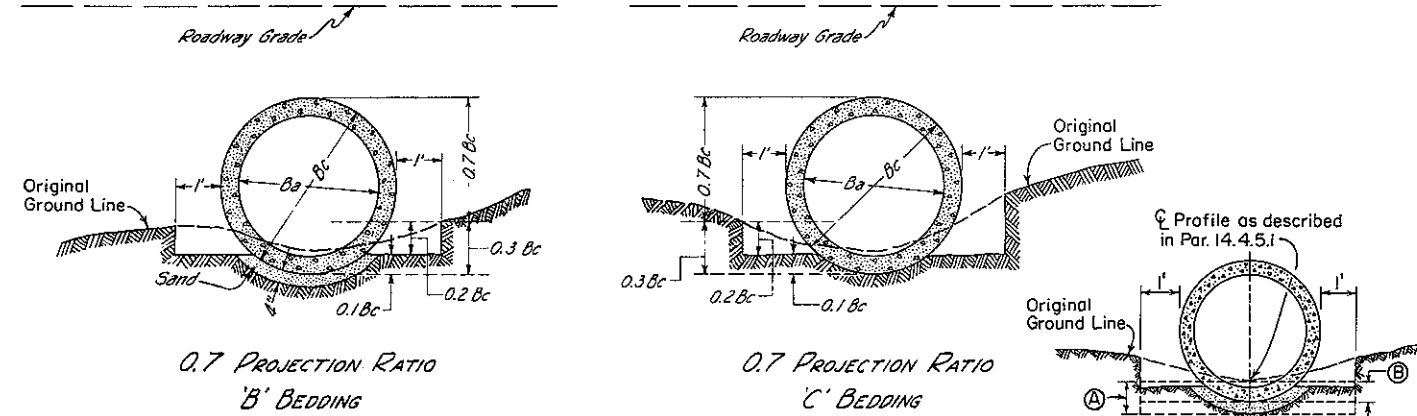
BAR LIST FOR H=4'-0"									
MARK	NO. REQ'D	KIND	TYPE A			LENGTH	TYPE B		
			M	N	O		M	N	O
401	2	I	3'-6"	3'-3"	3'-3"	10'-0"	3'-6"	3'-3"	4'-1"
402	2	I	3'-6"	3'-6"	3'-6"	10'-6"	3'-6"	3'-6"	4'-1"
403	5	I	3'-6"	3'-7"	3'-7"	10'-8"	3'-6"	3'-7"	4'-1"
404	4	II	3'-7"	3'-7"	3'-7"	15'-4"	3'-7"	3'-7"	4'-1"
405	1	I	3'-7"	3'-7"	3'-7"	10'-9"	3'-7"	3'-7"	4'-1"
406	1	I	3'-6"	4'-1"	4'-1"	11'-8"	3'-6"	4'-1"	4'-1"
407	1	I	3'-6"	3'-10"	3'-10"	11'-2"	3'-6"	3'-10"	3'-10"
408	1	I	3'-6"	3'-8"	3'-8"	10'-10"	3'-6"	3'-8"	3'-8"
409	1	I	3'-6"	3'-7"	3'-7"	10'-8"	3'-6"	3'-7"	3'-7"
410	1	I	3'-6"	3'-7"	3'-7"	10'-8"	3'-6"	3'-7"	3'-7"

All reinforcing bars to be 1/2" #.

STANDARD M-52-A

(MAY 1, 1962)

FED. ROAD REG. NO.	DIVISION	PROJECT NO.	SHEET NO.
9	C&O.		



GENERAL NOTES

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

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

Type 'B' bedding is to be used in solid rock.

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

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

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

Ba	HEIGHT OF FILL	PROJECTION RATIO	BEDDING	CLASS
12"	#-7'	0.7	C	II
	7'-10'	0.7	C	III
	10'-15'	0.7	C	IV
	15'-19'	0.7	B	IV
	19'-29'	0.0	B	IV
15"	#-8'	0.7	C	II
	8'-11'	0.7	C	III
	11'-16'	0.7	C	IV
	16'-20'	0.7	B	IV
	20'-30'	0.0	B	IV
18"	#-9'	0.7	C	II
	9'-12'	0.7	C	III
	12'-17'	0.7	C	IV
	17'-22'	0.7	B	IV
	22'-32'	0.0	B	IV
21"	#-10'	0.7	C	II
	10'-13'	0.7	C	III
	13'-18'	0.7	C	IV
	18'-23'	0.7	B	IV
	23'-34'	0.0	B	IV
24"	#-11'	0.7	C	II
	11'-14'	0.7	C	III
	14'-20'	0.7	C	IV
	20'-25'	0.7	B	IV
	25'-35'	0.0	B	IV
27"	#-12'	0.7	C	II
	12'-15'	0.7	C	III
	15'-21'	0.7	C	IV
	21'-26'	0.7	B	IV
	26'-36'	0.0	B	IV
30"	#-13'	0.7	C	II
	13'-16'	0.7	C	III
	16'-22'	0.7	C	IV
	22'-27'	0.7	B	IV
	27'-37'	0.0	B	IV
33"	#-14'	0.7	C	II
	14'-17'	0.7	C	III
	17'-23'	0.7	C	IV
	23'-28'	0.7	B	IV
	28'-38'	0.0	B	IV
36"	#-15'	0.7	C	II
	15'-18'	0.7	C	III
	18'-24'	0.7	C	IV
	24'-29'	0.7	B	IV
	29'-39'	0.0	B	IV
42"	#-16'	0.7	C	II
	16'-19'	0.7	C	III
	19'-25'	0.7	C	IV
	25'-30'	0.7	B	IV
	30'-40'	0.0	B	IV
48"	#-17'	0.7	C	II
	17'-20'	0.7	C	III
	20'-26'	0.7	C	IV
	26'-31'	0.7	B	IV
	31'-41'	0.0	B	IV

① Height above Top of Pipe

* Minimum cover with concrete pavement shall be 1.25' and with asphalt or gravel 1.75'.

Minimum cover on Side Drains shall be 1.0'.

Ba	HEIGHT OF FILL	PROJECTION RATIO	BEDDING	CLASS
54"	#-10'	0.7	C	II
	10'-14'	0.7	C	III
	14'-19'	0.7	C	IV
	19'-23'	0.7	B	IV
	23'-34'	0.0	B	IV
60"	#-11'	0.7	C	II
	11'-14'	0.7	C	III
	14'-20'	0.7	C	IV
	20'-24'	0.7	B	IV
	24'-35'	0.0	B	IV
66"	#-12'	0.7	C	II
	12'-15'	0.7	C	III
	15'-21'	0.7	C	IV
	21'-25'	0.7	B	IV
	25'-35'	0.0	B	IV
72"	#-13'	0.7	C	II
	13'-16'	0.7	C	III
	16'-22'	0.7	C	IV
	22'-27'	0.7	B	IV
	27'-37'	0.0	B	IV
78"	#-14'	0.7	C	II
	14'-17'	0.7	C	III
	17'-23'	0.7	C	IV
	23'-28'	0.7	B	IV
	28'-38'	0.0	B	IV
84"	#-15'	0.7	C	II
	15'-18'	0.7	C	III
	18'-24'	0.7	C	IV
	24'-29'	0.7	B	IV
	29'-39'	0.0	B	IV
90"	#-16'	0.7	C	II
	16'-19'	0.7	C	III
	19'-25'	0.7	C	IV
	25'-30'	0.7	B	IV
	30'-40'	0.0	B	IV
96"	#-17'	0.7	C	II
	17'-20'	0.7	C	III
	20'-26'	0.7	C	IV
	26'-31'	0.7	B	IV
	31'-41'	0.0	B	IV
102"	#-18'	0.7	C	II
	18'-21'	0.7	C	III
	21'-27'	0.7	C	IV
	27'-32'	0.7	B	IV
	32'-42'	0.0	B	IV
108"	#-19'	0.7	C	II
	19'-22'	0.7	C	III
	22'-28'	0.7	C	IV
	28'-33'	0.7	B	IV
	33'-43'	0.0	B	IV

REVISIONS	

COLORADO
DEPARTMENT OF HIGHWAYS

**REINFORCED CONCRETE
PIPE**

Designed by *L.E.O.*
Made by *A.M.E.*
Checked by *L.E.O.*

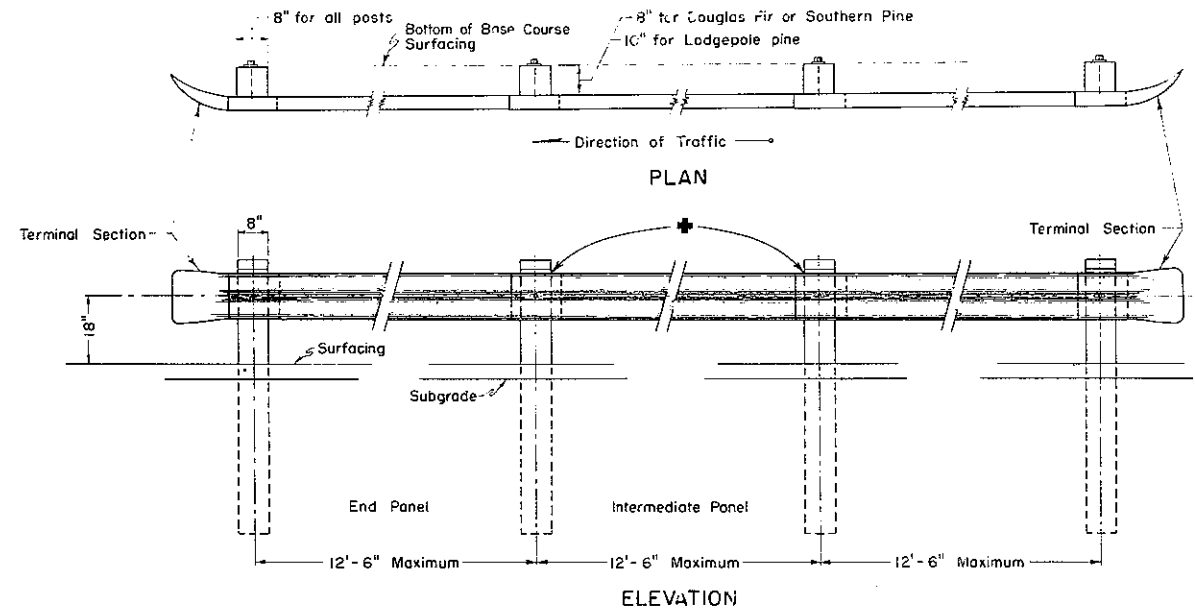
Approved by *A. Newcomb*
Bridge Engineer
Date: *May 16, 1960*

STANDARD M-75-A

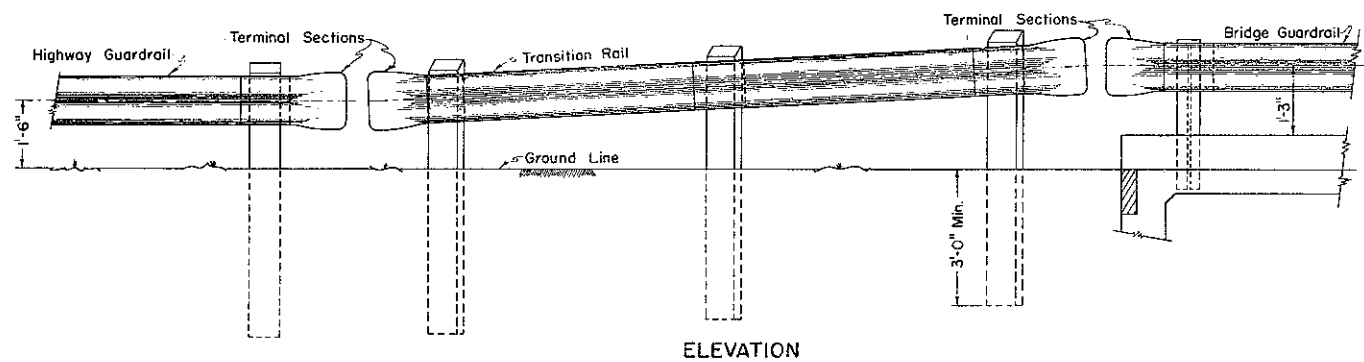
(MAY 1, 1962)

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

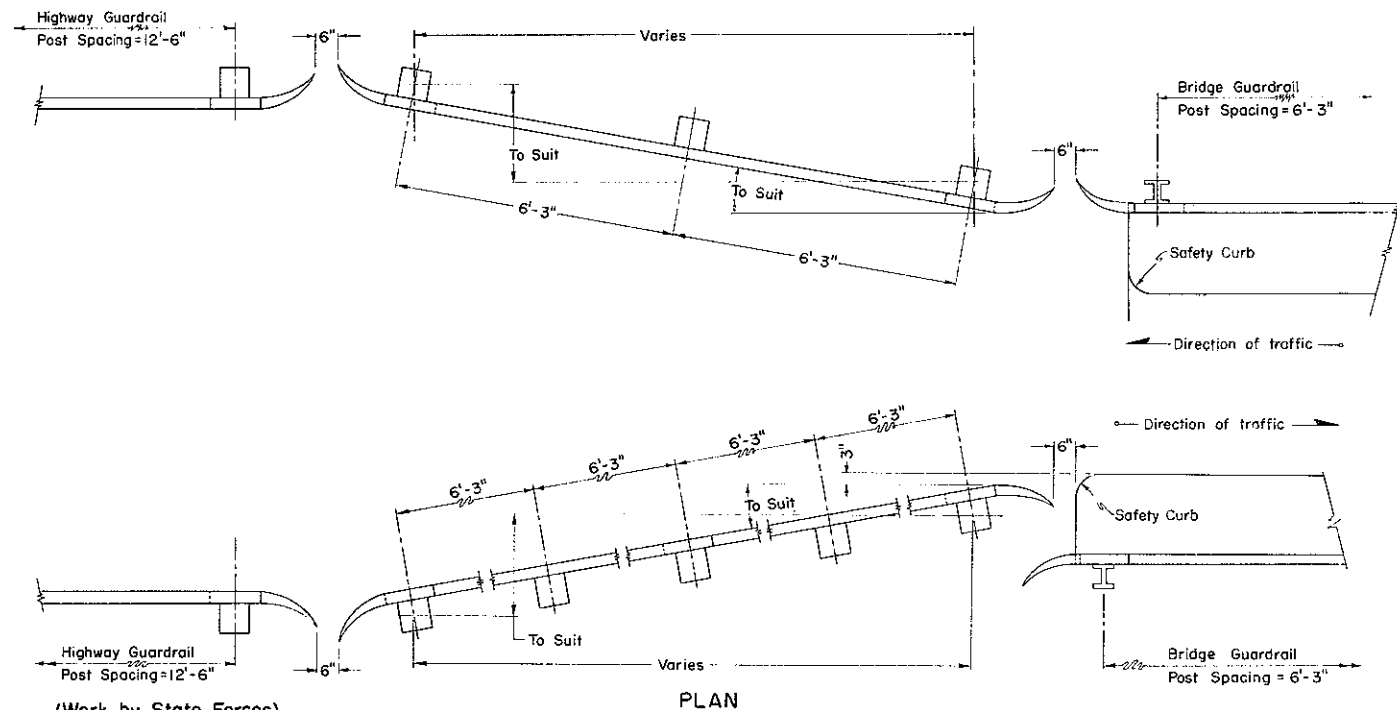
REVISIONS	
1-3-63 Add 25' Sect. B Rect Washer	LEO.
7-1-63 Add. Coating Class	LEO.
8-7-63 Rev. General Note	LEO.



TYPICAL METAL PLATE GUARD RAIL

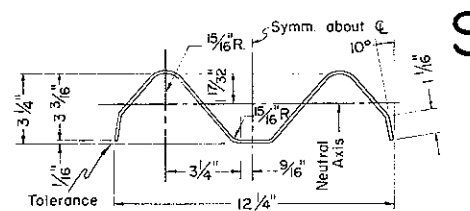


ELEVATION

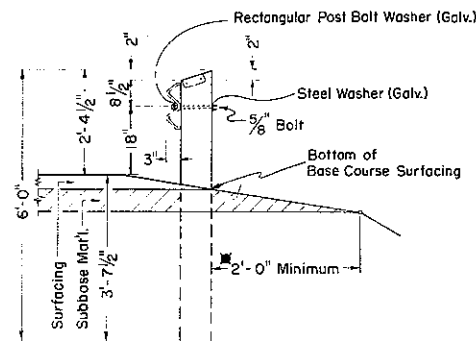


PLAN

TRANSITION RAIL AT BRIDGES ONLY

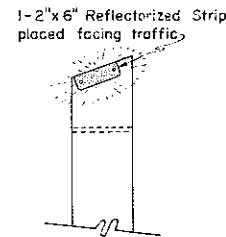


SECTION THRU RAIL ELEMENT

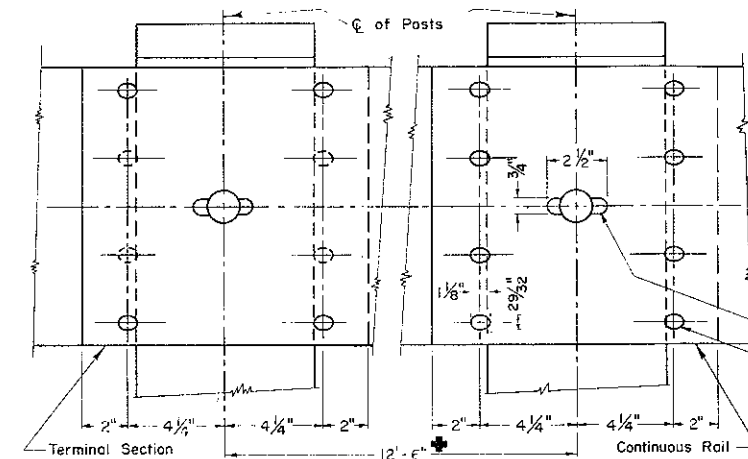


Where Subbase width does not give the two feet, subgrade shall be widened for lateral support.

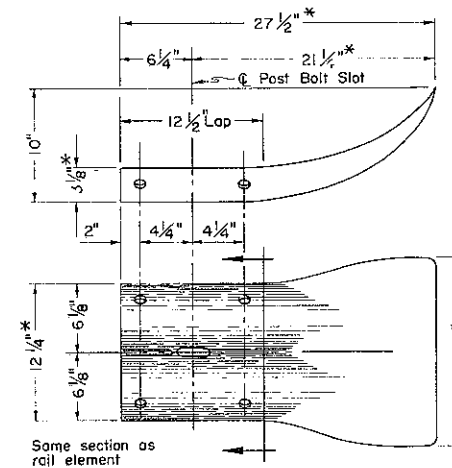
DETAIL SHOWING TYPICAL LOCATION OF GUARD FENCE



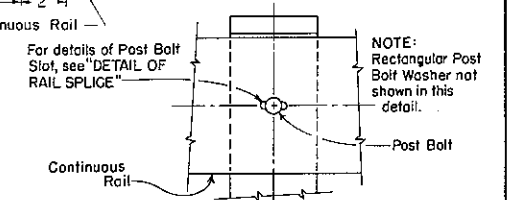
INSTALLATION DETAILS OF REFLECTORIZED STRIP (Work by State Forces)



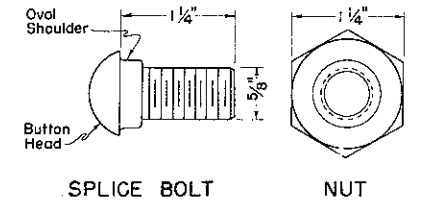
DETAIL OF RAIL SPLICE (Rectangular Post Bolt Washer not shown in this detail)



DETAIL OF TERMINAL SECTION



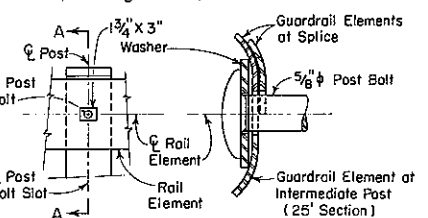
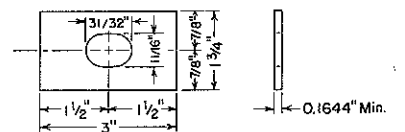
DETAIL OF INTERMEDIATE POST CONNECTION FOR 25' RAIL SECTION



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

NUT

RECTANGULAR POST BOLT WASHER MIN. 8 GAGE (GALV.) (REQUIRED AT ALL POSTS)



POST CONNECTION

SECTION A-A

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 $\frac{1}{16}$ inch larger than diameter of bolt before treatment is applied. All wood posts shall be pressure treated for the full length of the posts with "Creosote Oil" as provided for in the Specifications.

Timber posts fabricated from Douglas Fir or Southern Pine shall be 8" x 8" square. Timber posts fabricated from Lodgepole Pine shall be 8" x 10" 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.

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.

METAL PLATE GUARD FENCE (STEEL) SPECIFICATIONS

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

Metal plate guard rail galvanized in accordance with Coating Class 2.50 of 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 wrought steel washers shall be used under all bolt heads and nuts coming in contact with wood posts.

METAL PLATE GUARD FENCE (ALUMINUM) SPECIFICATIONS

Aluminum plates shall have a nominal thickness of not less than 0.125 inches.

No painting of the aluminum guard rail elements, end sections or fasteners will be required.

MATERIAL SPECIFICATIONS: The following members shall be of the alloy and temper specified, and shall conform to the ASTM specification listed below.

Member	Alloy	ASTM Specification
Rail elements	2024 - T3	B 209
Terminal Sections	2024 - T42	B 209
Bolts	2024 - T4	B 211
Nuts	6061 - T6	B 211
Washers	2024 - T4	B 211

Dimensions marked by (*) may vary by no more than $\frac{1}{2}$ inch.

All rail elements, terminal sections and appurtenances shall be treated to prevent oxidation.

COLORADO
DEPARTMENT OF HIGHWAYS

METAL PLATE GUARD FENCE

Designed by
Made by J.R.V.
Checked by

Approved by A.R. Newbold
Bridge Engineer
Date: May 15, 1956

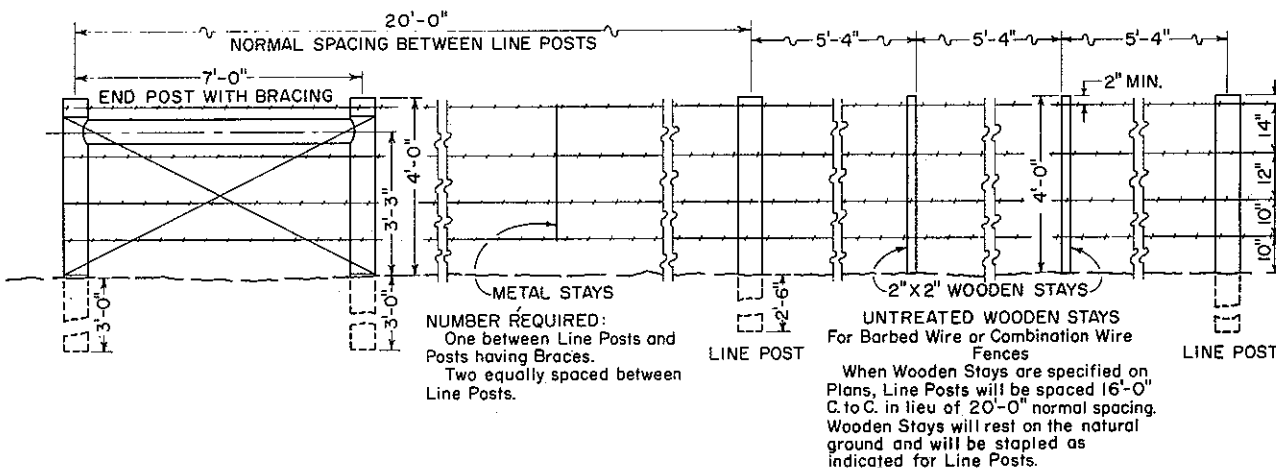
STANDARD M-76-A

(SHEET 1 OF 2 SHEETS)
(MAY 1, 1962)

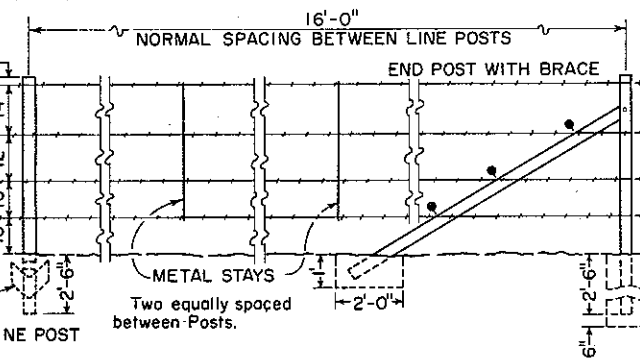
FED. ROAD REG. NO.	DIVISION	PROJECT NO.	SHEET NO.
9	COLORADO		

REVISIONS		
5-23-62	Rev. Line Brace Detail For Metal Post	L.E.O.
6-6-62	Rev. Fc. Int. for Wood Posts	L.E.O.
8-9-62	Rev. Line Brace Detail For Metal Post	J.C.R.
9-18-62	Add. Alternate Brace Attach. Detail	L.E.O.
2-11-63	Rev. Bolt Holes in Posts & Braces	L.E.O.
4-15-63	Rev. Note on Wire Splice	J.C.R.
7-25-63		L.E.O.

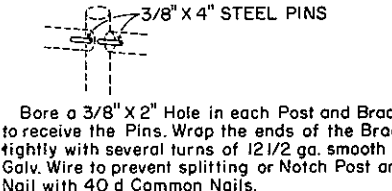
BARBED WIRE FENCE WITH WOODEN POSTS



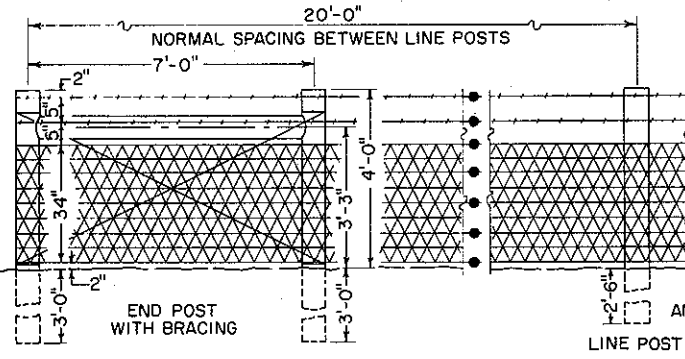
BARBED WIRE FENCE WITH METAL POSTS



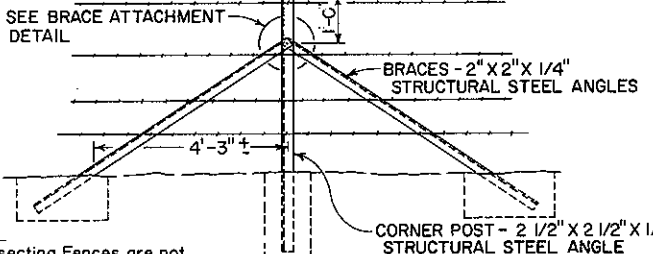
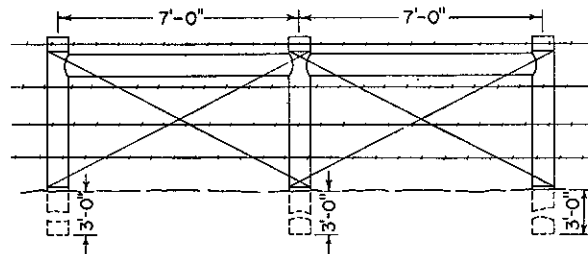
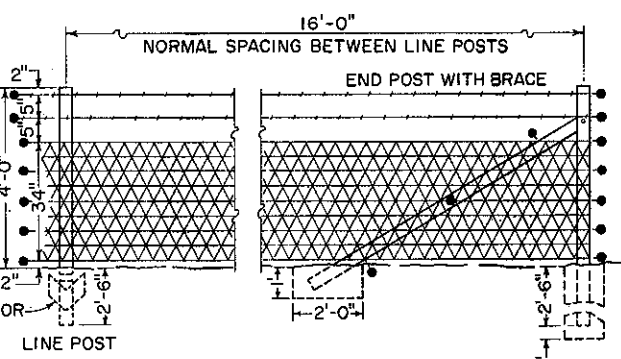
CROSS BRACE DOWELING DETAIL



COMBINATION WIRE FENCE WITH WOODEN POSTS



COMBINATION WIRE FENCE WITH METAL POSTS

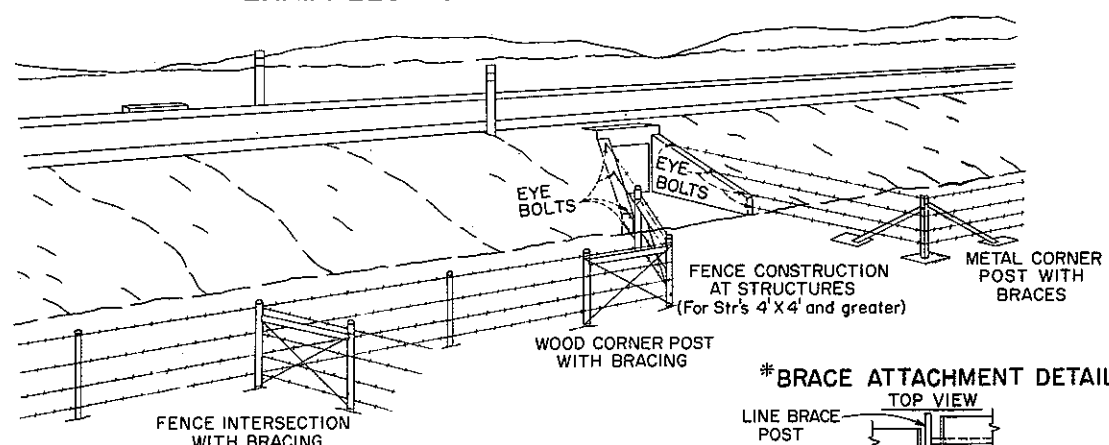


LINE BRACES

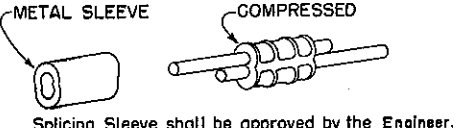
When Gates, Angles, Corners or Intersecting Fences are not specified therein, Line Braces shall be spaced as follows:
Metal Posts - 800' Intervals
Wooden Posts - 1,400' Intervals

TYPICAL INSTALLATION AT FENCE INTERSECTIONS

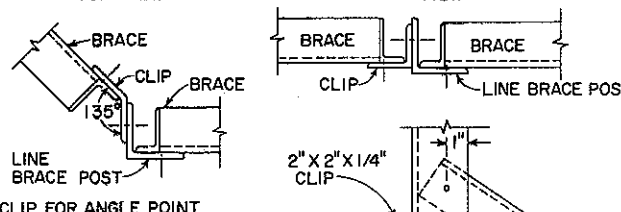
ILLUSTRATIVE SKETCH SHOWING TYPICAL EXAMPLES FOR CONSTRUCTING FENCES



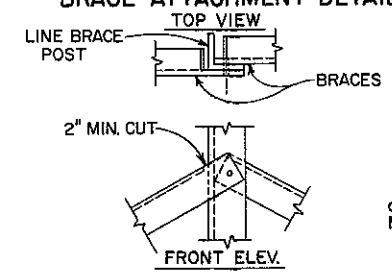
ACCEPTABLE WIRE SPLICE



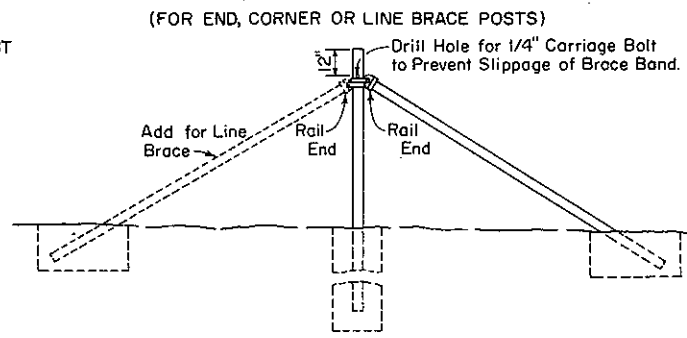
*ALTERNATE BRACE ATTACHMENT DETAIL TOP VIEW



*BRACE ATTACHMENT DETAIL TOP VIEW



ALTERNATE POST (FOR END, CORNER OR LINE BRACE POSTS)



COLORADO
DEPARTMENT OF HIGHWAYS
WIRE FENCES
AND
GATES

Designed by L.E.O. Approved by J.C.R.
Made by T.E.F. Engr. Surveys & Plans
Checked by E.E.O. Date: 6-12-1961

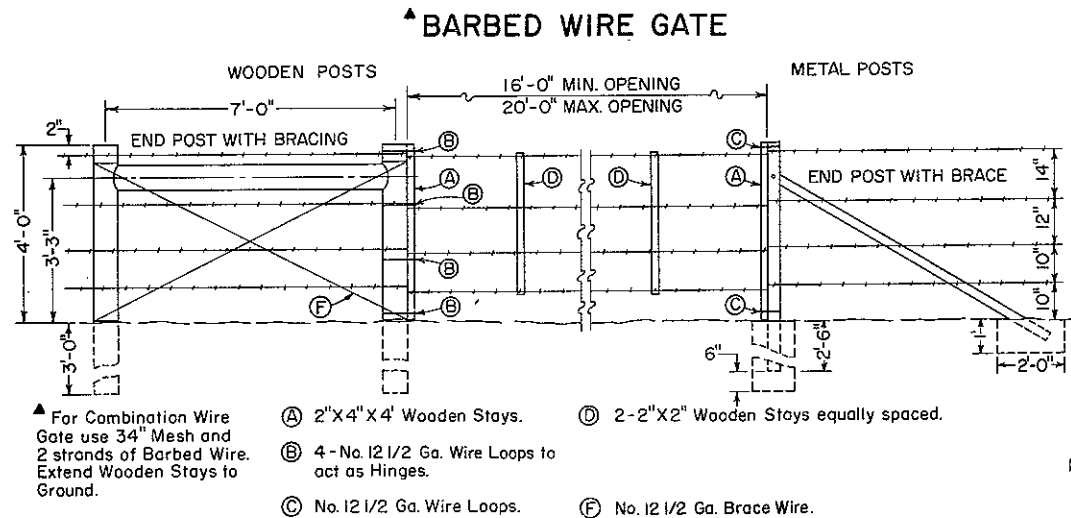
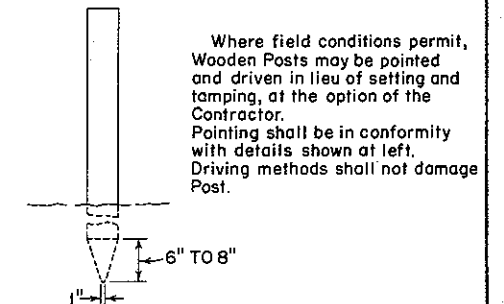
STANDARD M-76-A

(SHEET 2 OF 2 SHEETS)
(MAY 1, 1962)

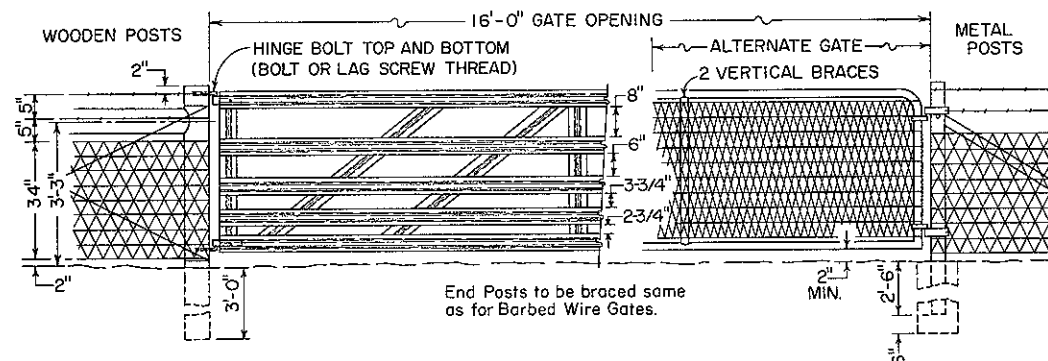
FED. ROAD REG. NO.	DIVISION	PROJECT NO.	SHEET NO.
9	COLO.		

REVISIONS		
5-23-62	Tie For Angle Post	L.E.O.
8-9-62	Brace Bolt Size	J.C.R.
9-21-62	Rev. Angle Post & Ties	L.E.O.
2-11-63	Rev. Gates & Posts	L.E.O.
4-15-63		J.C.R.
7-25-63	Rev. Ref. to Commercial Std. 184-51	L.E.O.

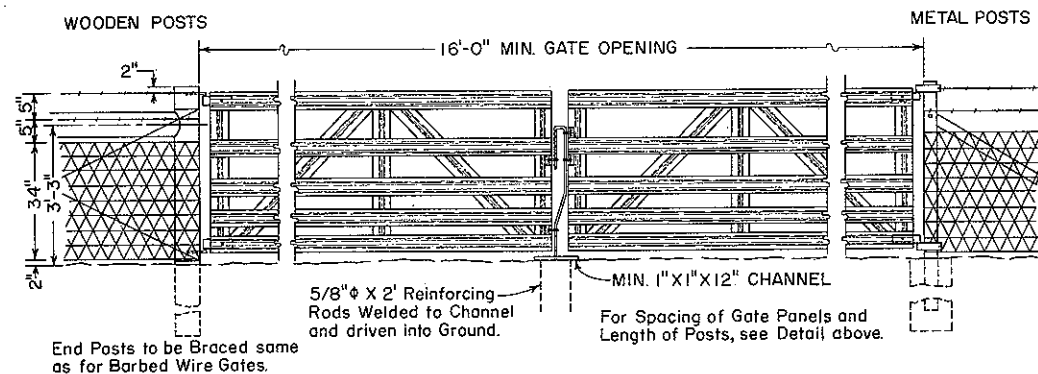
POST POINTING DETAILS



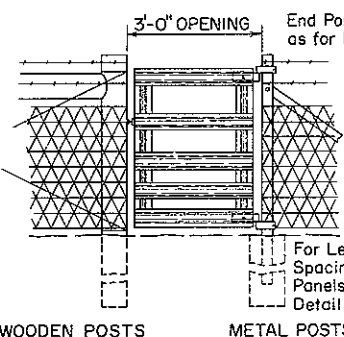
DRIVEWAY GATES



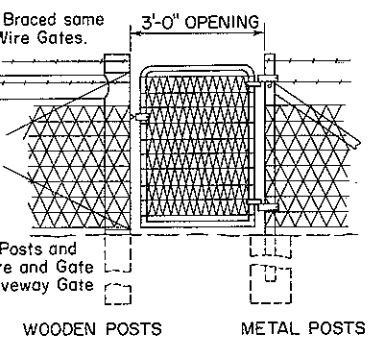
TWIN DRIVEWAY GATES



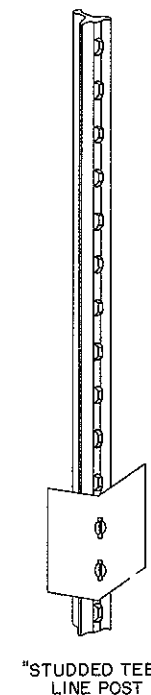
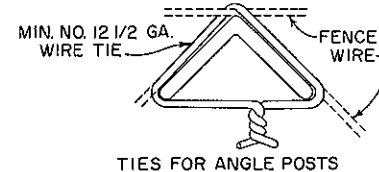
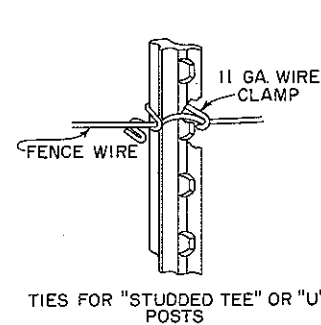
WALK GATE



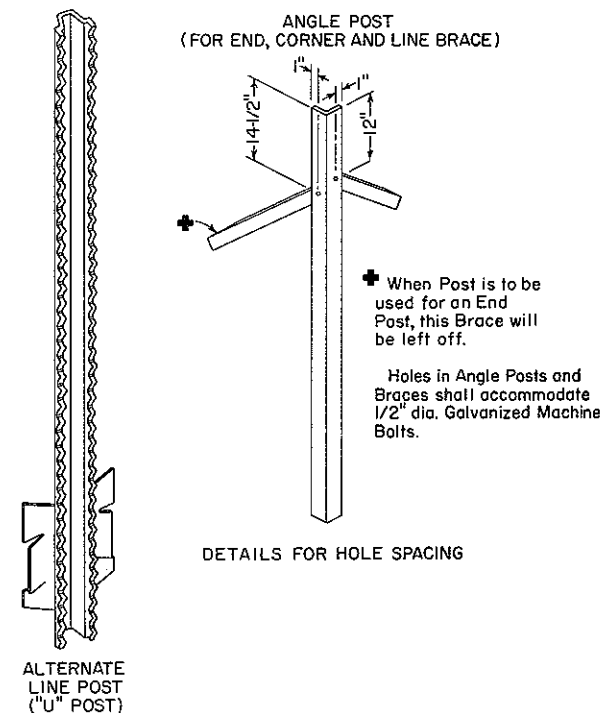
ALTERNATE WALK GATE



FENCE WIRE TIES



TYPICAL METAL POSTS



GENERAL NOTES

ALTERNATES:
END, CORNER AND LINE BRACE POSTS
Type - 2 1/2" O.D. Galvanized Tubular Steel.
Weight - 3.47 lbs./lin. ft. Min.

BRACES:
Type - 1 3/8" O.D. Tubular Steel with 2 1/2" Brace Band, Hinge Bolt and 1 3/8" I.D. Rail End; all Galvanized.
Weight - 1.6 lbs./lin. ft. Min.
Length - 6'-6" Min.

BARBED WIRE:
Barbed wire shall conform to Standard Specifications and shall have No. 14 Gauge Galvanized double wrapped barbs. 80 rod reels shall weigh a min. of 78 lbs. net & shall meet ASTM A121-57, Class 1.

4"X4" WIRE MESH:
Wire mesh used in combination wire fence as shown shall be galvanized and conform to the following:
Width - 34"
Weight - 0.76 lbs./lin. ft. Min.
Horizontal Wires - 2 strands, No. 12 1/2 ga. wire.
Cross Wires - 1 strand, No. 14 ga. wire.
Construction - cross wires to be woven with horizontal wires making a one piece fabric.
Shall meet ASTM A116-57, Class 1.

GATES:
DRIVEWAY GATES:
Height - approximately 42" (5 panels) --- Width of gate opening - 16'-0"
Weight - Galvanized Steel, 90 lbs. Min. --- Tempered Aluminum, 45 lbs. Min.
① Gates to be of Riveted construction as follows: Min. 4 No. 10 rivets at each right angle connection and where diagonal braces connect to horizontal panels; Min. 3 No. 10 rivets where diagonal braces connect to top and bottom panels.
ALTERNATE DRIVEWAY GATES:
Height - 42"
Weight - Not less than 79 lbs. complete with latch and hinges.
Width of gate opening - 16'-0"
Gate Frame - 1" I.D. Standard Galvanized Pipe or acceptable equivalent and shall be of all welded construction.
Mesh to be of same construction as shown for 4"X4" wire mesh except it shall be 2"X4" mesh 42" high.

① **WALK GATES:**
Height - approx. 42" (5 panels)
Weight - Galvanized Steel, 18 lbs. Min.
Tempered Aluminum, 10 lbs. Min.
Width of gate opening - 3'-0"

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

Fence wire to be placed on either road or field side of posts depending on local conditions, i.e. on curves the wire should be placed on the side of the post which would prevent tension on fence ties. This will also apply where wind drift, tumble weeds or other conditions would exert unusual pressure against the wire.

WOOD POSTS:
All line posts shall have a min. dia. of four (4) inches & be 6'-6" long.
All end, corner, intersection and brace posts shall have a minimum diameter of five (5) inches and be 7'-0" long.
Fence wire will be stapled to wooden posts or tied to metal posts as shown marked - on barbed wire or combination wire fence details.

METAL POSTS:
All posts and braces shall be of the types and weights shown or acceptable equivalents.
Holes to be provided in end, corner and gate posts as detailed.

CORNER POSTS:
Type - 2 1/2" X 2 1/2" X 1/4" Structural Steel Angles.
Weight - 3.81 lbs./lin. ft. Min.
Length - 6'-6" Min.
No. of Braces - 2

LINE POSTS:
Type - "Studded Tee" or "U".
Weight - 1.28 lbs./lin. ft. Min. (without Anchor)
Length - 6'-6" Min.
Anchor - Securely fastened, with bearing surface sufficient to resist movement of post. Weight - 0.57 lb. Min.

END POSTS:
Type - 2 1/2" X 2 1/2" X 1/4" Structural Steel Angles.
Weight - 3.81 lbs./lin. ft. Min.
Length - 6'-6" Min.
No. of Braces - 1

BRACES: (For Corner, End or Line Brace Posts)
Type - 2" X 2" X 1/4" Structural Steel Angles.
Weight - 3.08 lbs./lin. ft. Min.
Length - Same as corner and end posts used.
Posts shall meet requirements of Par. 4.5 of U.S. Dept. of Commerce Commercial Standard 184-51. Acceptable material includes re-rolled railroad rails.

ALTERNATE WALK GATES:
Height - 42"
Weight - Not less than 16 lbs. complete with latch and hinges.
Width of gate opening - 3'-0"
Gate Frame - 3/4" I.D. Standard Galvanized Pipe or acceptable equivalent and shall be of all welded construction.
Mesh to be of same construction as shown for Driveway Gate.

Alternate equivalent standard metal gates other than shown will be acceptable subject to the Engineer's approval.

In lieu of galvanized finish on gate frames, Cadmium Plated pipe or Aluminum painting with Zinc Chromate Primer as per Specifications will be considered to be equivalent.

LATCHES AND HINGES:
Galvanized steel or Aluminum of standard make.
Hinges shall be placed as shown, to prevent theft.
In lieu of standard make latches it will be permissible to use an electro-galvanized chain, eyebolt and snaphook type latch. Eyebolt, chain and snaphook assembly to be secured to latch side of gate. Gate closure effected by wrapping chain around end post and snapping hook into chain.

COLORADO
DEPARTMENT OF HIGHWAYS
WIRE FENCES
AND
GATES

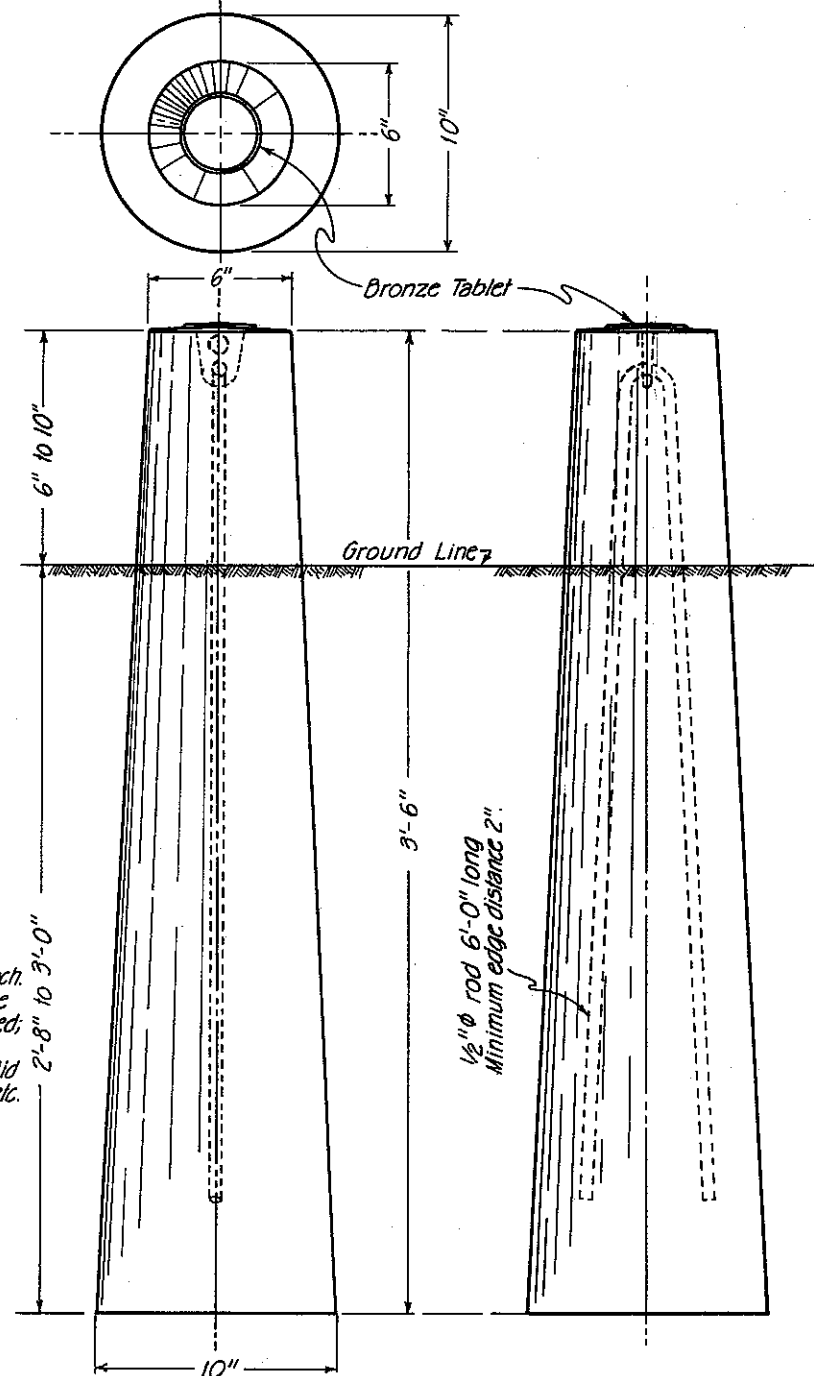
Designed by L.E.O. Approved by J. E. Sullivan
Made by T.E.F. Engr. Surveys & Plans
Checked by E.E.O. Date: 6-12-1961

RIGHT OF WAY MARKER POST STANDARD M-81-A

(MAY 1, 1962)

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

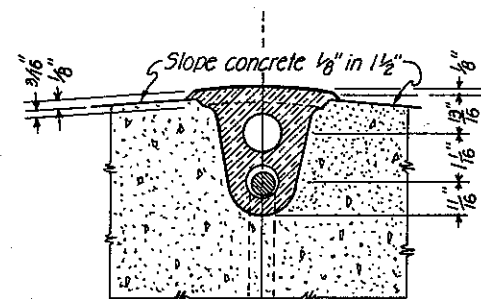
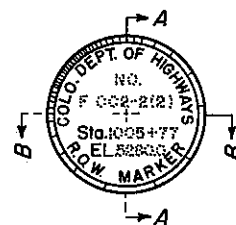
REVISIONS		



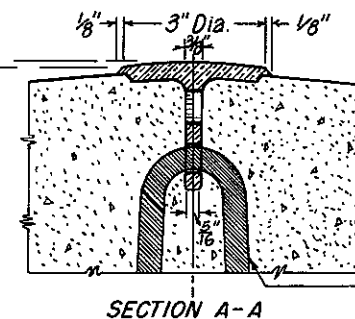
NOTES FOR R.O.W. MARKER POSTS

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

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



SECTION B-B



SECTION A-A

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

Omit and use 12"x1/2" ϕ bar for Bench Mark Tablet.

BENCH MARK

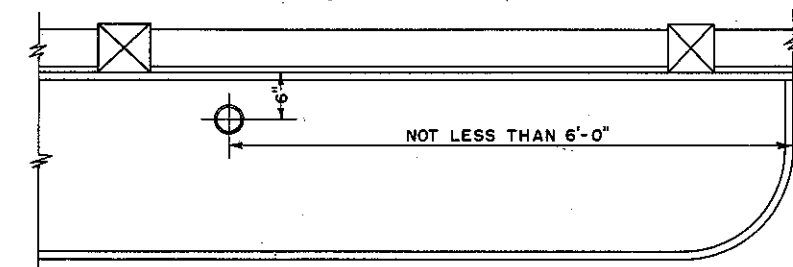
All work shall be done in accordance with Standard Specifications of the Colorado Department of Highways applicable to the project.

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).

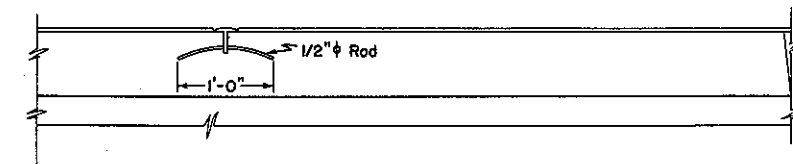
Bronze Bench Mark Tablets will be furnished by the Department at no expense to the Contractor.

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

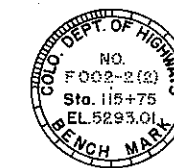
Note: Where 2'-0" safety curbs are not used place marker in center of curb.



PLAN



ELEVATION



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

COLORADO
DEPARTMENT OF HIGHWAYS

MARKER POSTS
AND
BENCH MARKS

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

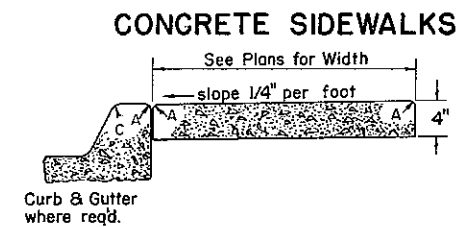
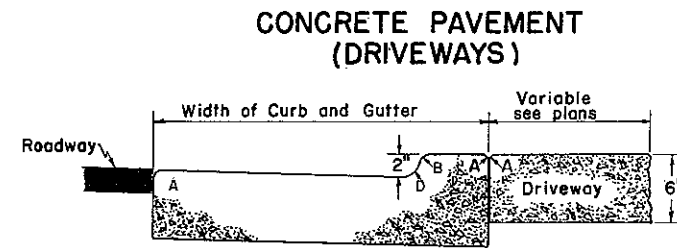
STANDARD CURBS AND GUTTERS

STANDARD M-84-A
(MAY 1, 1962)

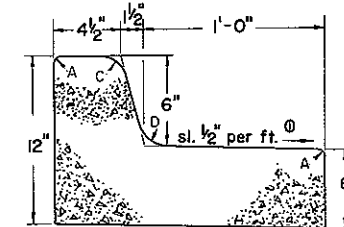
FED. ROAD REG. NO.	DIVISION	PROJECT NO.	SHEET NO.
9	COLC		

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

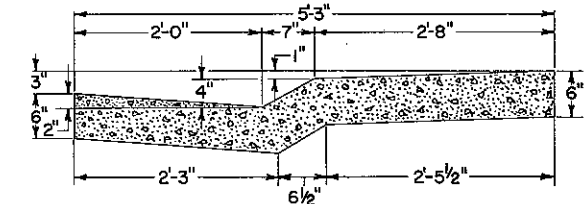
LEGEND FOR RADII
A = 1/8"
B = 1"
C = 1 1/2"
D = 1 1/2" to 2"



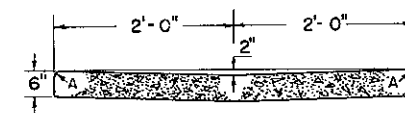
CONCRETE COMBINATION CURB AND GUTTER
(6" Barrier-1' Gutter) (Type I)



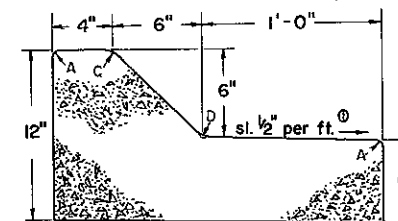
CONCRETE COMBINATION CURB,
GUTTER AND SIDEWALK (TYPE II-M)



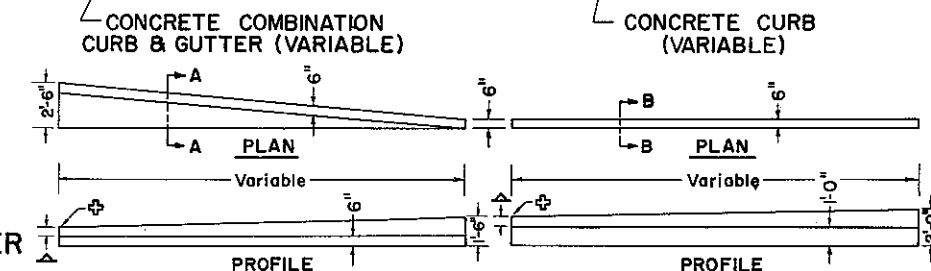
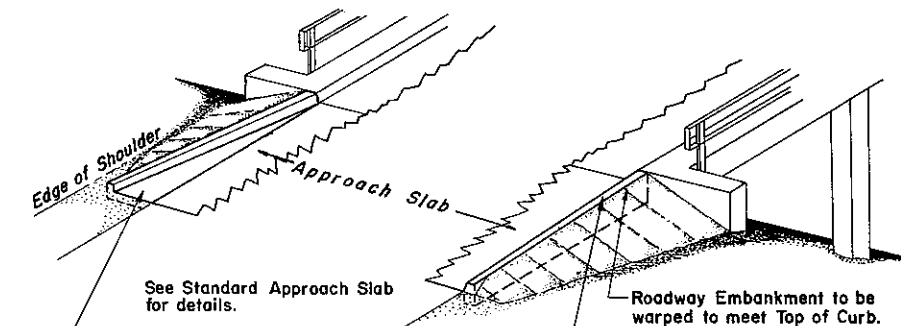
CONCRETE GUTTER



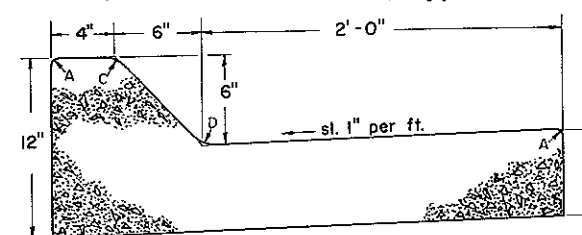
CONCRETE COMBINATION CURB AND GUTTER
(6" Mountable-1' Gutter) (Type I-M)



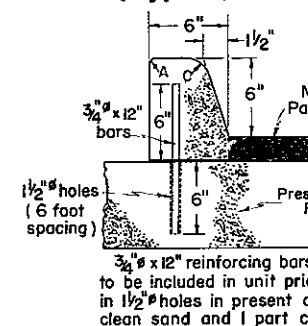
DETAILS OF CONCRETE COMBINATION CURB
& GUTTER (VARIABLE) AND CONCRETE CURB (VARIABLE)



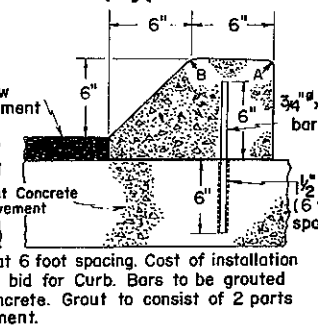
CONCRETE COMBINATION CURB AND GUTTER
(6" Mountable-2' Gutter) (Type II-M)



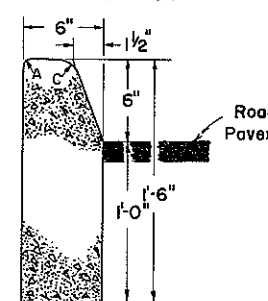
CONCRETE CURB
(6" Barrier-Doweled)
(Type I)



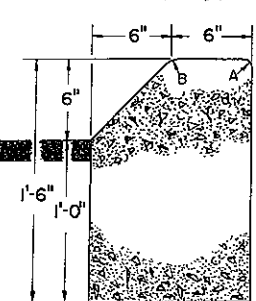
CONCRETE CURB
(6" Mountable-Doweled)
(Type I-M)



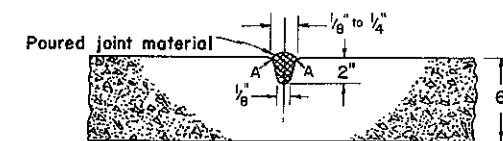
CONCRETE CURB
(6" Barrier) (Type II)



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

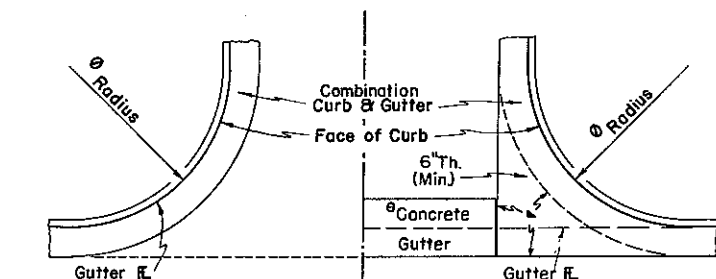


TRANSVERSE WEAKENED PLANE JOINT
FOR CONCRETE PAVEMENT (DRIVEWAYS)



This joint required where length of slab exceeds 15 feet.

CONSTRUCTION OF CONCRETE
GUTTERS AT INTERSECTIONS

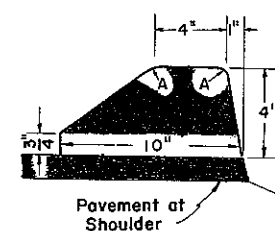


Length of Radius as shown elsewhere on Plans.

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

This section to be built when Concrete Gutter is required.

ASPHALTIC SHOULDER ROLL



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

GENERAL NOTES

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

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

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

COLORADO
DEPARTMENT OF HIGHWAYS

CURBS AND GUTTERS

Designed by *W.D.*
Made by *W.D.*
Checked by *C.R.S.*
Approved by *A. J. Williams*
Date: *Sept 29 19 58*

STANDARD M-152-A

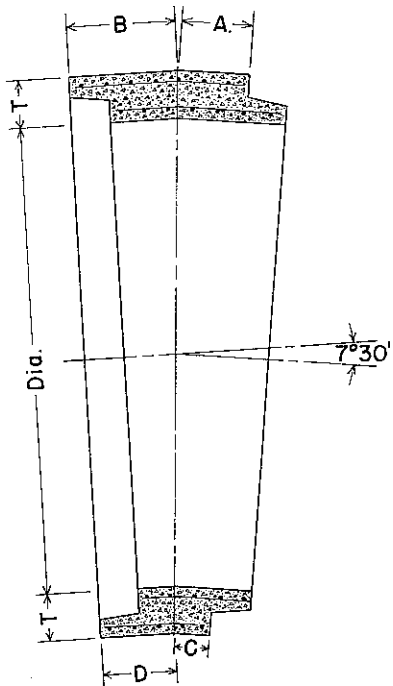
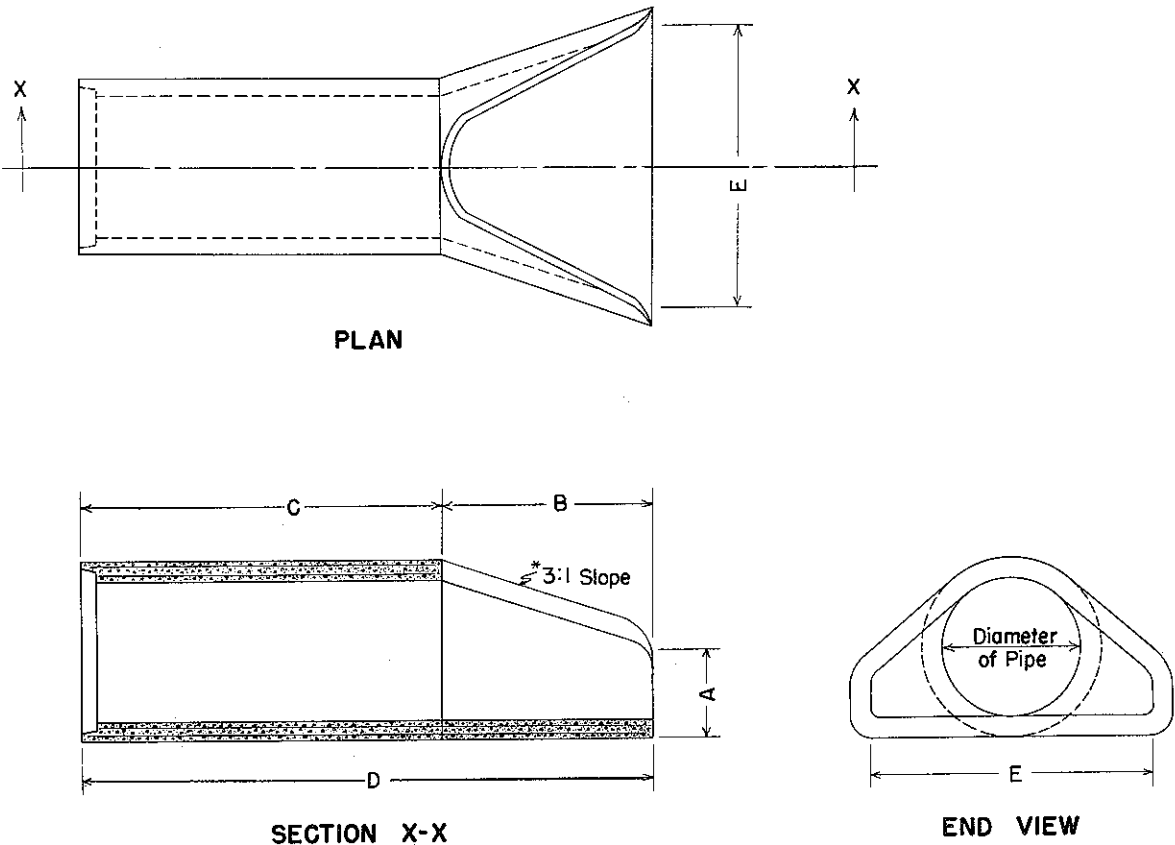
(MAY 1, 1962)

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

REVISIONS		

FLARED END SECTION FOR CONCRETE PIPE

7°30' ANGLE SECTION FOR CONCRETE PIPE



DIMENSIONS FOR FLARED END SECTIONS

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

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

NOTE:

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

DIMENSIONS FOR 7°30' ANGLE SECTIONS

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

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

GENERAL NOTES

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

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

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

COLORADO
DEPARTMENT OF HIGHWAYS

CONCRETE END
AND ANGLE
SECTIONS

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

STANDARD M-192-A

(NOV. 1, 1962)

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

REVISIONS		
11-15-62	Rev. Location	L.E.O.
2-26-63	Posts & Bridge Approach	L.E.O.
5-15-63	Reflector Height	J.C.R.
7-5-63	Rev. Post Space, Tolerance & Reflect. Ht.	L.E.O.
9-5-63	Rev. Height at Bridges	L.E.O.

GENERAL NOTES

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

See tabulation in plans for delineator post requirements.

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

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

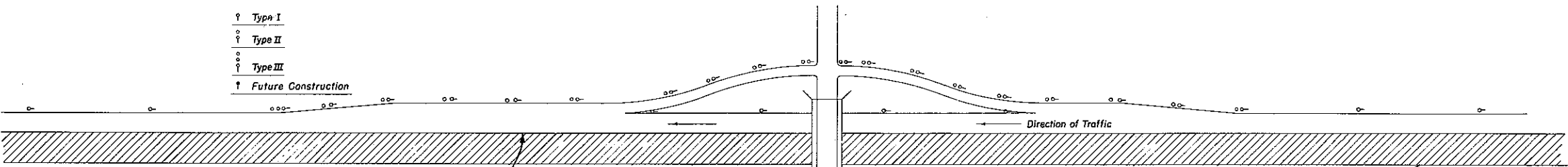
When normal delineator spacing falls on a road approach or crossroad, move delineator either direction a distance not to exceed 1/4 normal spacing.

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

Delineator Posts are not to be placed along Frontage Roads.

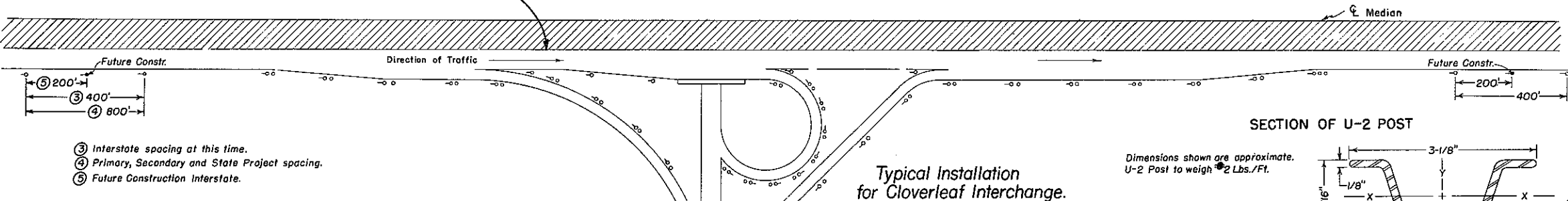
Color of Posts shall be Interstate Green.

Type I
Type II
Type III
Future Construction



EDGE OF PAVED SHOULDER

Typical Installation for Diamond Interchange.

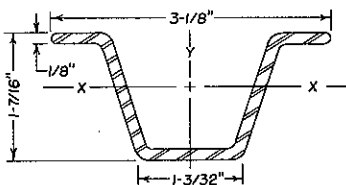


SECTION OF U-2 POST

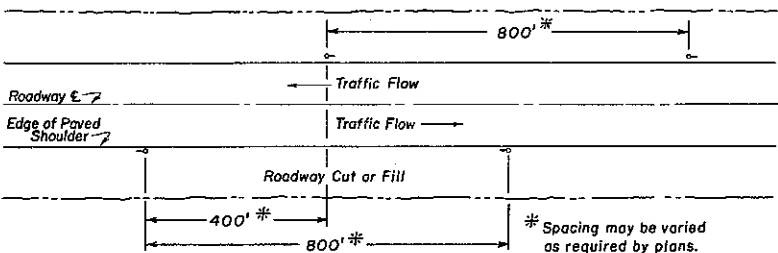
Dimensions shown are approximate.
U-2 Post to weigh 2 Lbs./Ft.

Alternate post acceptable if section modulus is at least 0.200 in.³ about X-X axis or at least 0.250 in.³ about Y-Y axis.

A mill tolerance of minus 3-1/2% of the weight of any one post will be allowed.



Spacing for Delineator Posts on Tangents (Two Lane - Two Way Traffic)

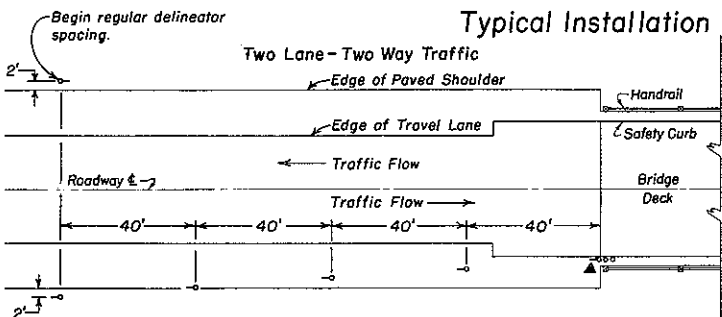


SPACING FOR DELINEATOR POSTS ON HORIZONTAL CURVES

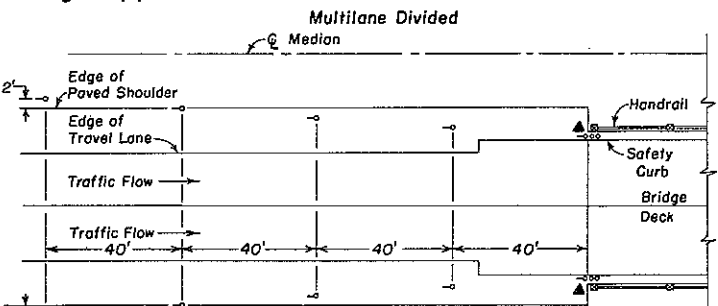
DEGREE OF CURVE	RADIUS	① SPACING ON CURVE	② SPACING IN ADVANCE OF AND BEYOND SIMPLE CURVE			DEGREE OF CURVE	RADIUS	① SPACING ON CURVE	② SPACING IN ADVANCE OF AND BEYOND SIMPLE CURVE		
			FIRST SPACE	SECOND SPACE	THIRD SPACE				FIRST SPACE	SECOND SPACE	THIRD SPACE
0°30'	11460.0'	200	200	200	200	8°00'	716.3'	52	94	156	200
1°00'	5730.0'	151	200	200	200	8°30'	674.1'	50	90	150	200
1°30'	3820.0'	123	200	200	200	9°00'	636.7'	48	86	144	200
2°00'	2865.0'	106	191	200	200	9°30'	603.2'	47	85	141	200
2°30'	2292.0'	95	171	200	200	10°00'	573.0'	46	83	138	200
3°00'	1910.0'	86	155	200	200	10°30'	545.7'	45	81	135	200
3°30'	1637.1'	80	144	200	200	11°00'	520.9'	43	77	129	200
4°00'	1432.5'	74	133	200	200	11°30'	498.3'	42	76	126	200
4°30'	1273.3'	70	126	200	200	12°00'	477.5'	41	74	123	200
5°00'	1146.0'	66	119	198	200	15°00'	382.0'	36	65	108	200
5°30'	1041.8'	63	113	189	200	18°00'	318.3'	33	59	99	198
6°00'	955.0'	60	108	180	200	21°00'	272.9'	30	54	90	180
6°30'	881.5'	58	104	174	200	25°00'	229.2'	27	49	81	162
7°00'	818.6'	55	99	165	200	30°00'	191.0'	24	43	72	144
7°30'	764.0'	53	95	159	200						

① $S = 2 \sqrt{R - 50}$ 1-ST. SPACE = 1.8 S 2-ND. SPACE = 3 S 3-RD. SPACE = 6 S
NO SPACES TO EXCEED 200 FT.

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



Typical Installation at Bridge Approaches



▲ Where curb to curb width of bridge is equal to or greater than roadway width plus usable shoulder width, use this delineator only and omit all others.
Note: Where guard rail is present, place delineators outside of guard rail and at height which will permit clear view of all three Delineator buttons.

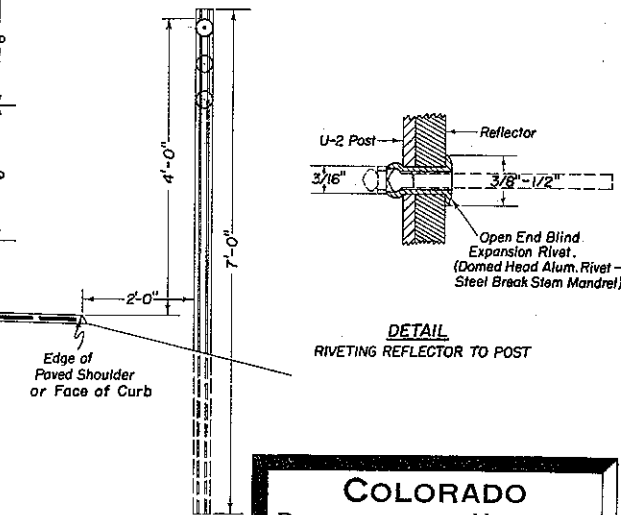
When approach slab has curb, place Type III delineator immediately behind curb.

TYPE I
1-3" diam.
Crystal
Reflector
on U-2 Post

TYPE II
2-3" diam.
Yellow
Reflectors
on U-2 Post

TYPE III
3-3" diam.
Yellow
Reflectors
on U-2 Post

Min. 3 holes in all posts required as shown.



COLORADO
DEPARTMENT OF HIGHWAYS

DELINEATORS

Designed by CKM
Made by WNC
Checked by LEO

Approved by E. J. Zeman
Engineer, Surveys & Plans
Date: October 19, 1962