

DEPARTMENT OF HIGHWAYS
STATE OF COLORADO

R.O.W. PURCHASED UNDER PROJECT
NO. FO17-1(2)

FEDERAL ROAD REGION NO.	DIVISION	PROJECT NO.	SP. R.
9	COLORADO	F017-11(4)	

(R-1) 4-18-67 Add Br. Loading, Str. No. 8 M-Std. D.W.D

AS CONSTRUCTED
REVISED DATE OCT 23 1967

INDEX OF SHEETS REVISED DATE OCT 23 1967

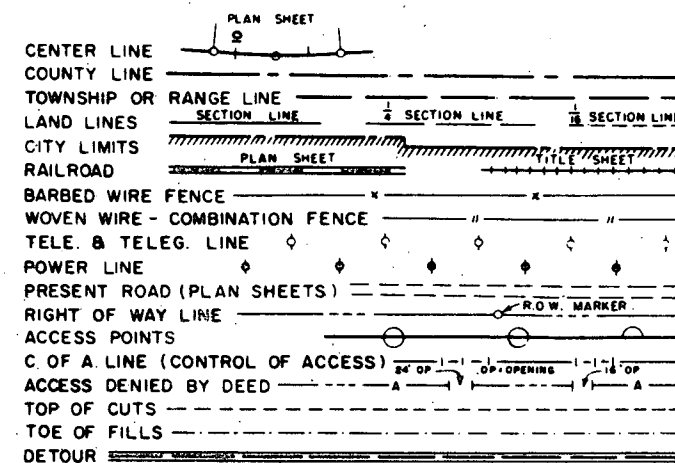
PLAN AND PROFILE OF ~~PROPOSED~~ COMPLETED

FEDERAL AID PROJECT NO. F 017-1(4)

STATE HIGHWAY NO. ~~4~~ 24

EL PASO COUNTY

CONVENTIONAL SIGNS



SCALES OF ORIGINAL DRAWINGS

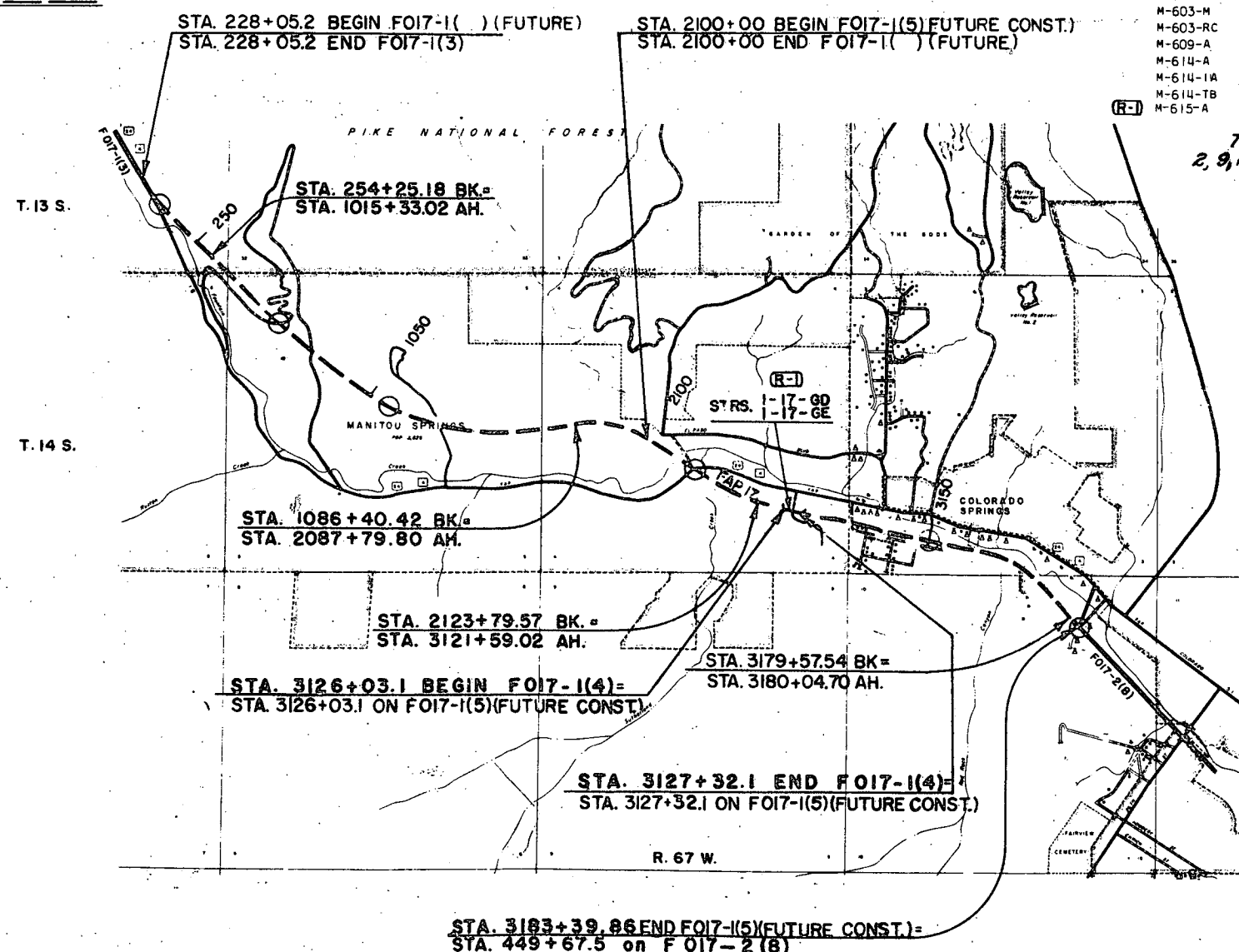
ON PLAN, 1 IN. = 100 FT.
ON PROFILE, 1 IN. = 100 FT. HORIZONTAL
1 IN. = 20 FT. VERTICAL

GRADE LINE ON PROFILE IS SHOWN AS GRADE OF FINISHED ROAD

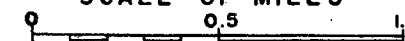
(R-1)

TABULATION OF LENGTH AND DESIGN DATA

STATION	BRIDGE	
	LIN. FT.	LOADING
(3126 02.8 E.B.) 3126+03.1 BEGIN FO17-1(4) (3126 03.4 W.B.) STR. NO. 1-TP GD & 1-17-GE (3127 31.8 E.B.) 3127+32.1 END FO17-1(4) (3127 32.4 W.B.)	129.0	HS-20-44
TOTAL	129.0	
SUMMARY	LIN. FT.	MILES.
BRIDGES	129.0	0.024
TOTAL NET & GROSS LENGTH	129.0	0.024
DESIGN DATA		
MAXIMUM DEGREE OF CURVE	NONE	
MAXIMUM GRADE	1.20 %	
MINIMUM S.S.D. HORIZONTAL	>600	
MINIMUM S.S.D. VERTICAL	>600	
MAXIMUM DESIGN SPEED	70 M.P.H.	



SCALE OF MILES



- | | | |
|-----------|---|--------|
| SHEET NO. | | |
| 1 | SKETCH MAP, INDEX OF SHEETS AND TABULATION OF LENGTH & DESIGN DATA | |
| 2 | TYPICAL SECTIONS | |
| 3 | DETAILS OF PLUNGE BASIN WITH TYPE "G" HEADWALL, SUMMARY OF EARTHWORK QUANTITIES AND GENERAL NOTES | |
| 4 | SUMMARY OF APPROXIMATE QUANTITIES | |
| 5 | STRUCTURE QUANTITIES | |
| 6 - 7 | DETAILS OF CRYSTAL HILL BLVD., STA. 3126+68.6 | |
| 8 - 24 | DETAILS OF BRIDGES 3126+, STA NOS. 1-17-GD & 1-17-GE | |
| 25 | ALIGNMENT PLAN AND PROFILE SHEET | |
| 26 - 32 | CROSS SECTIONS | |
| M-203-A | SUPERELEVATION & WIDENING OF CURVES - CROWNED HIGHWAYS | JULY |
| M-203-A-1 | SUPERELEVATION OF CURVES - DIVIDED HIGHWAYS | JULY |
| M-203-B | APPROACH ROADS, FLARING, CUT SLOPE TREATMENT, BRIDGE & CREST WIDENING | JULY |
| M-203-C | DITCH TYPES | JULY |
| M-206-A | EXCAVATION AND BACKFILL FOR STRUCTURES (2 SHEETS) | MARCH |
| M-500-A | LETTERS AND FIGURES FOR STRUCTURE NUMBERS | JULY |
| M-601-H | TYPE "G" HEADWALLS | JULY |
| M-603-B | CONCRETE END AND ANGLE SECTIONS | JULY |
| M-603-C | HEADWALLS AND END SECTIONS FOR CSP CULVERTS | JULY |
| M-603-M | METAL CULVERT PIPE | MARCH |
| M-603-RC | REINFORCED CONCRETE PIPE | MARCH |
| M-609-A | CURBS AND GUTTERS | FEB 14 |
| M-614-A | TIMBER BARRICADES | JULY |
| M-614-1A | CONSTRUCTION IDENTIFICATION SIGNS | JULY |
| M-614-TB | TRAFFIC SIGNING FOR HIGHWAY CONSTRUCTION (3 SHEETS) | JULY |
| M-615-A | EMBANKMENT PROTECTOR - TYPE 5 (SHEET 2) | JULY |

JULY 1, 196
JULY 1, 196
JULY 1, 196
JULY 1, 196
MARCH 17, 1
JULY 1, 196
JULY 1, 196
JULY 1, 196
JULY 1, 196
MARCH 20, 1
MARCH 20, 1
FEB 14, 196
JULY 1, 196
JULY 1, 196
JULY 1, 196
JUNE 30, 196

The Following Sheets "As Constructed No Revisions"
2, 9, 12-15, 18, 19, 22-24.

CONTRACTOR: RAMSOUR BROS., INC.
RESIDENT ENGR: C. A. MORAIN
PROJECT ENGR: C. L. SMITH
DATE COMPLETED: OCT 23 1967

DEPARTMENT OF HIGHWAYS
STATE OF COLORADO

FINAL APPROVAL:
AS CONSTRUCTED PLANS

Frank L. Heller 12-11-66
DISTRICT CONSTRUCTION ENGINEER DATE

SEE SPECIAL PROVISIONS FOR
NOTICE TO BIDDERS

DEPARTMENT OF HIGHWAYS
STATE OF COLORADO

APPROVED: Edna E. Shumate 4-5-6
CHIEF ENGINEER DATE

DEPARTMENT OF COMMERCE
BUREAU OF PUBLIC ROADS

APPROVED: _____ DATE: _____

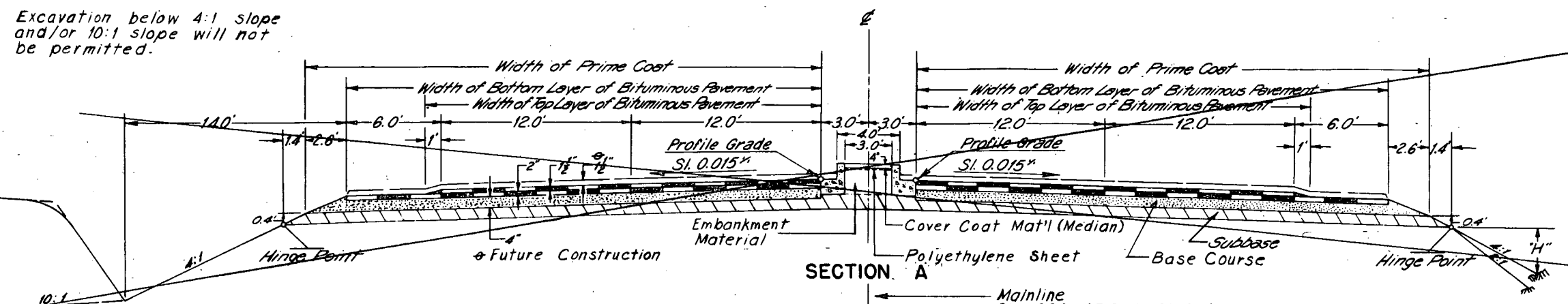
DIVISION ENGINEER

TYPICAL SECTIONS

FEDERAL ROAD REGION NO.	DISTRICT	PROJ. NO.	SHEET NO.	TOTAL SHEETS
8	COLORADO	F 017-1(4)	2	

NOTE:
See Standards for Details of
Cut Slope Treatment, Flaring
and Widening

Excavation below 4:1 slope
and/or 10:1 slope will not
be permitted.

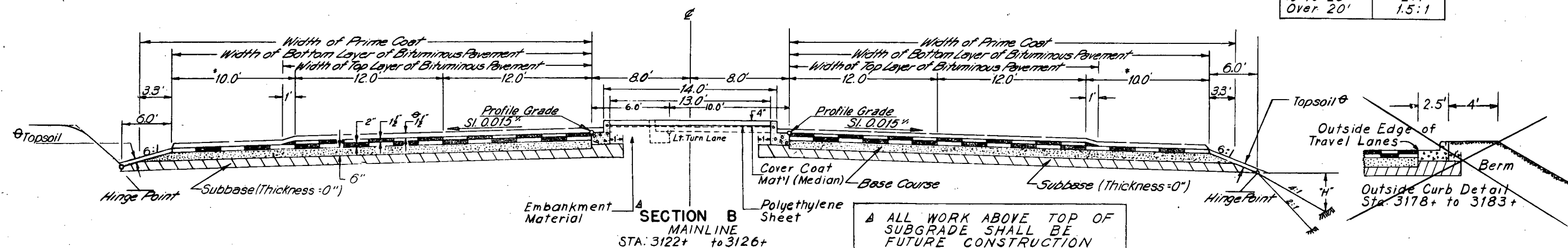


The depth and width of the side ditch
shall be varied where necessary in
order to provide proper drainage.

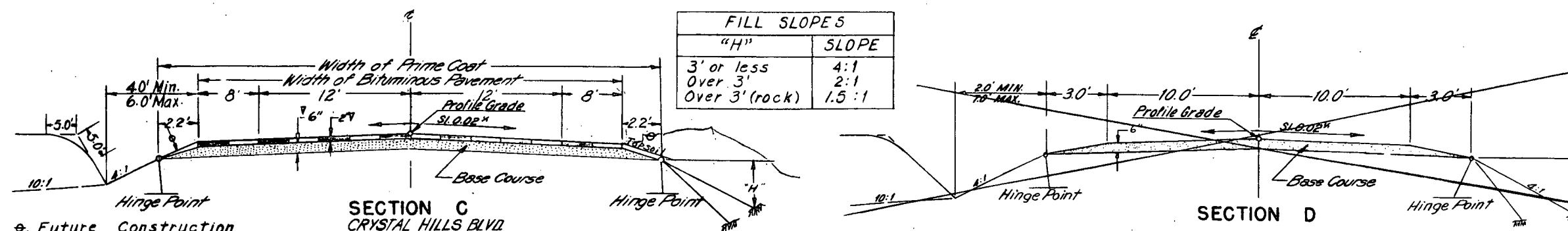
Except when topsoil is called for, the Contractor will be
required to place additional gravel or other suitable
material to this line after completion of paving operation.
Topsoil, when required, will be placed to the line shown.

Mainline
Sta. 228+05.2 to 2100+00
Sta. 2100+00 to 2105+00 transition, section A to section B, using
0" Subbase, 6" Base Course and Topsoil.
For details of median transition at intersections
see sheet Nos.

FILL SLOPES	
"H"	SLOPE
10' or less	4:1
10 to 20'	2:1
Over 20'	1.5:1



ALL WORK ABOVE TOP OF
SUBGRADE SHALL BE
FUTURE CONSTRUCTION



FILL SLOPES	
"H"	SLOPE
3' or less	4:1
Over 3'	2:1
Over 3' (rock)	1.5:1

Future Construction
Approximate Thickness

SECTION C
CRYSTAL HILLS BLVD

Material shall be placed in separate courses at the following rates
per 100 Lin. Ft. of roadway:
Bituminous Pavement 49 Tons
Base Course 141 Tons

SECTION D
BLACK CANYON ROAD

FINAL SUMMARY OF APPROXIMATE QUANTITIES

AS CONSTRUCTED
REVISED DATE OCT 23 1967

FEDERAL ROAD DISTRICT NO.	DIVISION	PROJ. NO.	SHEET NO.	TOTAL SHEETS
1	COLORADO	F 017-1(4)	4	39

ITEM NO.	ITEM	UNIT	INDEX		PLAN ROADWAY	ROADWAY	WORK ORDER NO.		FINAL ROADWAY QUANTITY	DIFF.	PLAN STR. NO. I-17-GD & I-17-GE	STR. NO. I-17-GD & I-17-GE	WORK ORDER NO.		FINAL STRUCTURE QUANTITY	DIFF.	PLAN PROJECT TOTALS	FINAL PROJECT TOTALS	TOTAL DIFF.
			BOOK	PAGE			3938	3964					3936	3939					
203	Unclassified Excavation (Haul)	Cu. Yd.	3	38	39,000	34,368			34,368	-4,632							39,000	34,368	-4,632
206	Structure Excavation (Haul)	Cu. Yd.	1	34	460	451	13		464	+ 4	370	370			370	0	830	834	+ 4
206	Structure Backfill (Class 3) (Haul)	Cu. Yd.	1	34	160	154	28		182	+ 22	320	320			320	0	480	502	+ 22
209	Wetting	M Gal.	2	26	30	23			23	- 7							30	23	- 7
210	Relay Pipe (54 inch)	Lin. Ft.	1	22	100	100			100	0							100	100	0
304	Aggregate Base Course (Class 6) (Haul)	Ton	2	39	1,800	1,705.45			1,705.45	-94.55							1,800	1,705.45	-94.55
403	Hot Bituminous Pavement (Grading E) (Haul and Asphalt)	Ton	2	35	570	560.95			560.95	- 9.05							570	560.95	- 9.05
411	Liquid Asphaltic Material (MC-70)	Gal.	2	25	2300	2101			2101	- 199							2300	2101	- 199
502	Steel Piling (10 WF 45)	Lin. Ft.	1	33							1,501	1,372	-56		1,316	-185	1,501	1,316	-185
502	Steel Piling (10 WF 45) (CUT-OFF)	Lin. Ft.	1	33							0	69			69	+ 69	0	69	+ 69
506	Riprap	Cu. Yd.	1	36	30	31			31	+ 1							30	31	+ 1
507	Concrete Slope and Ditch Paving (Reinforced)	Cu. Yd.	1	50,52,55	3	1	55		56	+ 53	170	186			186	+16	173	242	+ 69
507	Bituminous Slope and Ditch Paving	Ton	2	33	2	4.10			4.10	+ 2.10							2	4.10	+2.10
509	Structural Steel (Galvanized)	Lump Sum	1	59							1200	1185			1185	-15	1200	1185	- 15
516	Damproofing (Linseed Oil)	Sq. Yd.	1	58							84	84	+4		88	+ 4	98	102	+ 4
601	Concrete Class A	Cu. Yd.	1	35,53,54	14	14			14	0	432	432	-2		430	-2	432	430	- 2
601	Concrete Class D	Cu. Yd.	1	35															
602	Reinforcing Steel	Lb.	1	34	620	618			618	- 2	162,880	163,448	+209	-495	163,162	+282	163,500	163,780	+280
603	54 Inch Corrugated Steel Pipe	Lin. Ft.	1	22	77	77	16		93	+ 16							77	93	+ 16
609	Curb Type 6 (Section M)	Lin. Ft.	2	36	2300	2014			2014	- 286					295	-15	2300	2014	-286
613	1-1/2 Inch Electrical Conduit	Lin. Ft.	1	6							310	295					310	295	- 15
617	24 Inch Culvert Pipe	Lin. Ft.	1	57	60	60			60	0							60	60	0
620	Field Laboratory	Each	1	16	1	1			1	0							1	1	0
620	Sanitary Facility	Each	1	16	1	1			1	0							1	1	0
626	Mobilization	Lump Sum			0	0			0	0							0	0	0
	STATE FORCES Furnishing and Installing Identification Sign	Each			2	2			2	0							2	2	0
	FORCE ACCOUNT																		
	Labor +35% Labor Equipment												36.00 12.60 38.40 ★		39.50 13.83 32.10	+3.50 +1.23 -6.30			
	Materials +15% Materials						110.00 16.50 ★		113.30 17.00	+3.30 + .50									

★ AMOUNT PLANNED ON ORIGINAL WORK ORDER

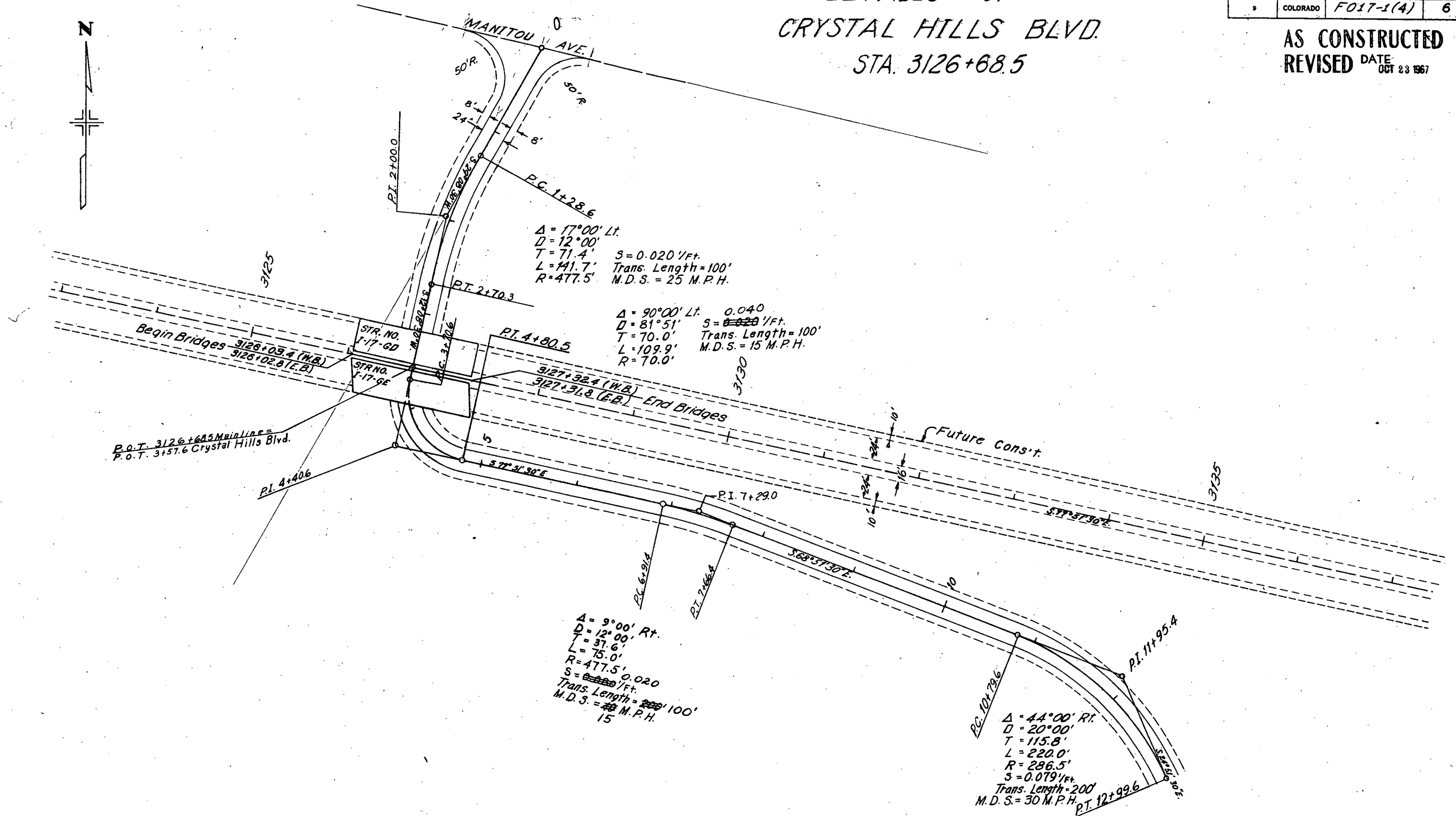
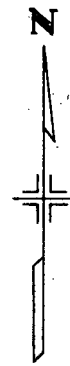
FEDERAL ROAD REGION NO.	DIVISION	PROJECT NO.	SHEET NO.
9	COLORADO	F 017-1(4)	5

**Included in Earthwork Quantities*
**Includes 1-Foot for Connecting Band*

DETAILS OF CRYSTAL HILLS BLVD. STA. 3126+68.5

FEDERAL ROAD REGION NO.	DISTRICT	PROJ. NO.	SHEET NO.	TOTAL SHEETS
9	COLORADO	F017-1(4)	6	39

AS CONSTRUCTED
 REVISED DATE OCT 23 1967



SCALE OF FEET



PROFILE CRYSTAL HILLS BLVD STA. 3126+68.5

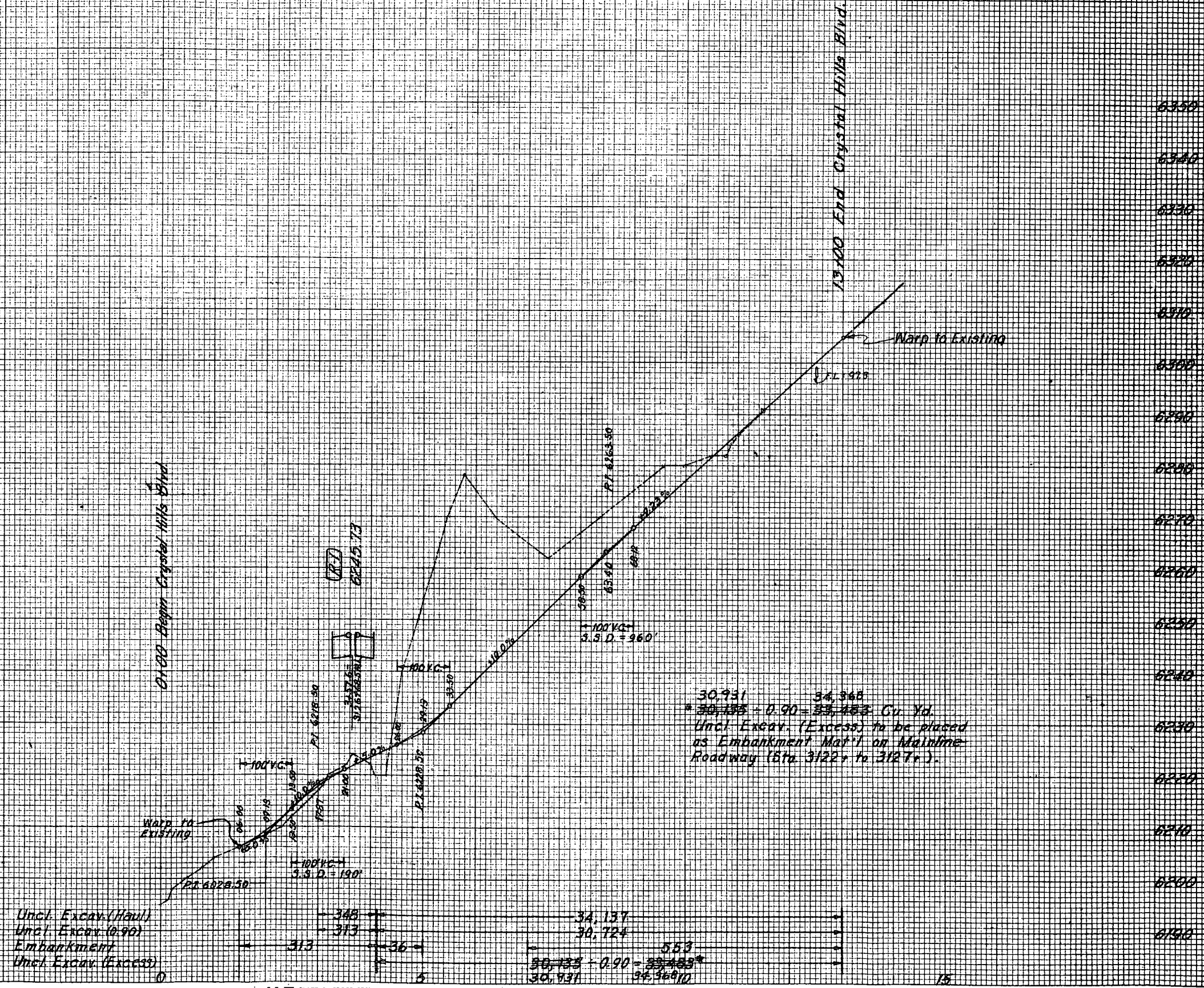
AS CONSTRUCTED
 REVISED

DATE SET 23 1967
 (R.D. 4-15-67 Rev. Br. Elevation 12.11.11)

DISTRICT	PROJ. NO.	SHEET NO.	TOTAL SHEETS
COLORADO	F 017-1(4)	7	39

FINAL SURVEY
 SURVEY PLOTTED
 NOTE BOOK AREAS
 CHECKED
 10/1/67

ORIGINAL SURVEY
 SURVEY PLOTTED
 NOTE BOOK AREAS
 CHECKED
 10/1/67



Revised Summary & Drawing E.P.A. 4-24-67 (Added test hole numbers)
Revised Note No. 2 E.P.A. 4-10-67

FED. ROAD REG. NO.	DIVISION	PROJECT NO.	SHEET NO.	TOTAL SHEETS
9	COLO.	FOIT-1 (4)	8	

AS CONSTRUCTED
REVISED DATE OCT 23 1967

SUMMARY OF QUANTITIES											STR. I-17-GD W.B.						STR. I-17-GE E.B.					
Item No.	Description	Unit	Super Str.	Abut No. 1	Pier No. 2	Pier No. 3	Abut No. 4	Total	Super Str.	Abut No. 1	Pier No. 2	Pier No. 3	Abut No. 4	Ret. Wall	Total	Super Str.	Abut No. 1	Pier No. 2	Pier No. 3	Abut No. 4	Ret. Wall	Total
206	Structure Excavation (Haul)	Cu.Yd.		5	85	80	5	175		5	70	70	5	45	195		5	70	70	5	45	195
206	Structure Backfill (Class 3) (Haul)	Cu.Yd.		10	70	65	10	155		10	55	55	10	35	160		10	55	55	10	35	160
502	Steel Piling (10 BP 42)	Lin.Ft.		177	205	207	159	748		181	204	77	76		538		181	204	77	76		538
507	Concrete Slope & Ditch Paving (Reinf.)	Cu.Yd.		45	45	45	45	180		45	45	45	45		180		45	45	45	45		180
509	Structural Steel (Galv.)	Lb.		50			52	102							102							102
516	Dampproofing (Linseed Oil)	Sq.Yd.		600			600	1200		600			600		1200		600			600		1200
601	Concrete (Class A)	Cu.Yd.		193		19	19	38		193			178	178	371						178	371
601	Concrete (Class D)	Cu.Yd.		11			11	22		11			11		22							22
602	Reinforcing Steel	Lb.		66,393	130	6754	6754	130		66,393	1327	5460	5460	1327	80,887							80,887
613	1 1/2" Electrical Conduit	Lin.Ft.		147				147		147					147							147
7	1" Exph. Jt. Material Type I AASHTO Spec. M153-54	Sq.Ft.		3.5			3.5	7		3.5			3.5		7							7
7	1 1/2" Exph. Jt. Material Type III AASHTO Spec. M153-54	Sq.Ft.			3.5	3.5		7			3.5	3.5		8	15							15

- ① 10 W 45 May be used in lieu of 10 BP 42.
② Design Weight - 10 960 Lb. For Each Structure.
③ To be included in the Bid Price for Item 601 Class D
④ To be included in the Bid Price for Item 601 Class A

Initial	Date
DGS	4-4-67

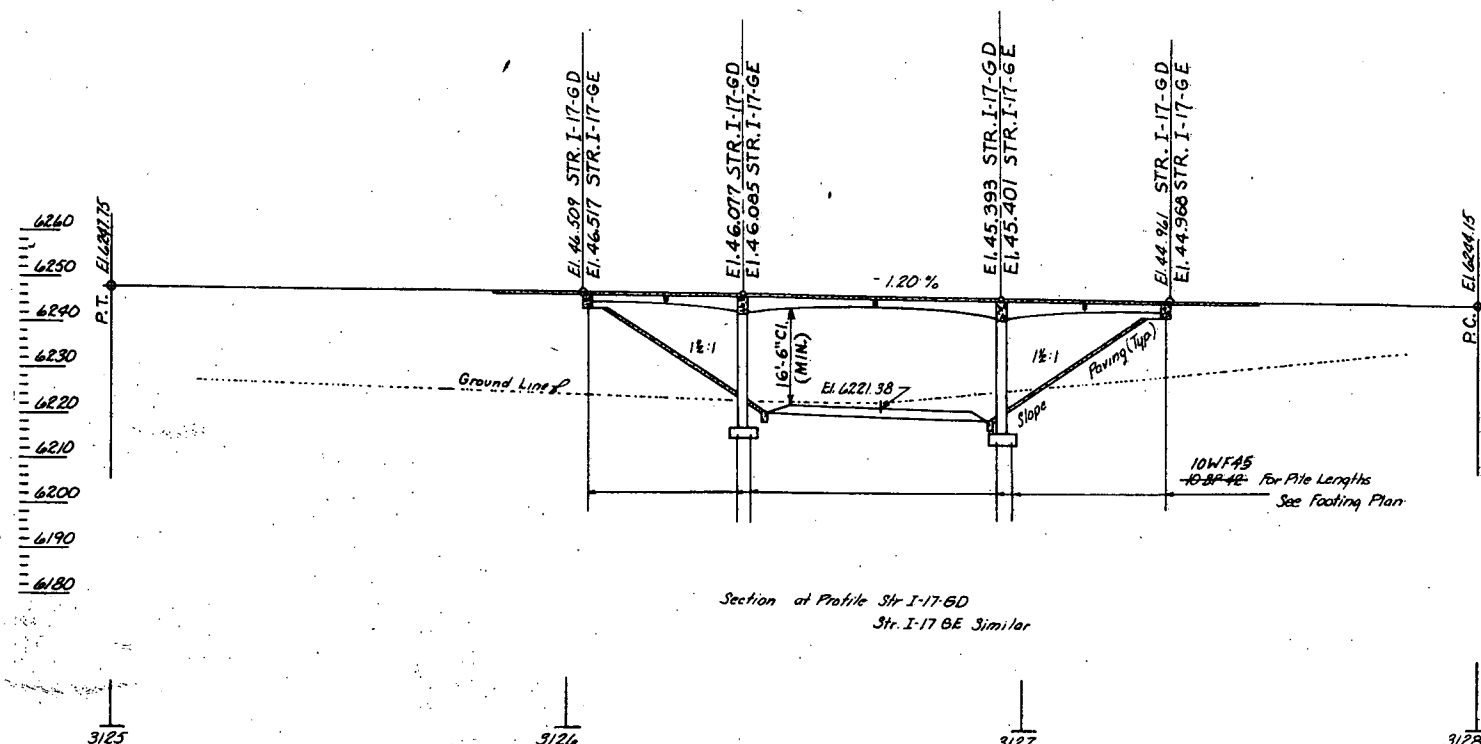
PI Sta 4+40.6
Δ 90° 00' LI
D 81° 51'
T 70.0'
L 109.9'
R 70.0'

POT Sta. 3126+68.5 Mainline
POT Sta. 3+57.6 Crystal Hills Blvd.

PC Sta. 3+70.6

PI Sta 4+40.6

PT Sta 4+80.5



Legend
A Fill
B Sand, Silty, Clayey, Gravelly
C Sandstone

NOTE: ALL PILES ARE END BEARING.
FOR SLOPE PAVING DETAILS - SEE SHEET No. _____

GENERAL NOTES

ALL WORK SHALL BE DONE ACCORDING TO THE STANDARD SPECIFICATIONS OF THE COLORADO DEPARTMENT OF HIGHWAYS APPLICABLE TO THE PROJECT.
ALL REINFORCING STEEL SHALL BE INTERMEDIATE GRADE STEEL OF A DEFORMED TYPE. EACH BAR SHALL BE TIED 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 36 DIAMETERS FOR BARS NEAR TOPS OF BEAMS HAVING MORE THAN 12 INCHES OF CONCRETE UNDER THE BARS, AND 17 DIAMETERS FOR BARS NEAR BOTTOMS OF MEMBERS. SECONDARY BARS WHEN SPICED SHALL LAP 17 DIAMETERS OF THE BAR.
DIMENSIONS FOR REINFORCING STEEL NOT SHOWN AS CLEAR SHALL BE TO THE CENTERLINE OF THE BAR.
SOUNDINGS AND DEPTH OF FOOTINGS ARE IN ACCORDANCE WITH THE BEST AVAILABLE DATA, AND WHEN DIFFERENT CONDITIONS ARE ENCOUNTERED THE BRIDGE ENGINEER WILL INSPECT AND DETERMINE IF REDESIGN IS NECESSARY.
FOOTINGS IN ROCK SHALL BE 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-204-A ALL CONCRETE SURFACES MARKED WITH THE STAKE, 1/4" AS SHOWN ON SHEET NO. _____ SHALL RECEIVE CLASS "2" SURFACE FINISH.
ALL STRUCTURAL STEEL SHALL BE PAINTED IN ACCORDANCE WITH SECTION 609 FOR PAINT.
ALL RIVETS SHALL BE 1/4" 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 TWO 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.
GRAPHICALLY OR 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 A572M-62T
ALL CONCRETE CHAMBERS TO BE 1/4" UNLESS OTHERWISE NOTED

LOADING DATA

LIVE LOAD - A.A.S.H.O. HS20-44
DEAD LOAD ASSUMES 15 LBS. PER SQ. FT. ADDITIONAL WEARING SURFACE WHICH INCLUDES THE 1/4" CONCRETE MONOLITHIC WEARING SURFACE SHOWN.

DESIGNING DATA

A.A.S.H.O. UNIT STRESSES, EXCEPT AS NOTED.
Reinforcing Steel $f_s = 30000$ lbs. per sq. in.
Structural Steel $f_s = 18000$ lbs. per sq. in.
Concrete $f_c = 1200$ lbs. per sq. in.

A36 Str. Steel $f_s = 20000$ lbs. per sq. in.

COLORADO
DEPARTMENT OF HIGHWAYS
3-Span 35'-5" Continuous Conc. Slab
& Girder 35' Rwy. & Brush Cuts

Across Crystal Hills Blvd.

Sta. 3126+03.400 to 3127+32.400
IN Manitou Spg. Sec. 4/2 - T 14/2 R 1/4
Designed by DGS
Made by JRE
Checked by JRE
Approved by [Signature]
Bridge Engineer
Date: Apr. 5, 1967

*I-17-GD W.B. STA. 3126+03.400 TO 3127+32.400
STRUCTURE NO. I-17-GE E.B. STA. 3126+02.157 TO 3127+31.805

FED. ROAD REG. NO.	DIVISION	PROJECT NO.	SHEET NO.	TOTAL SHEETS
9	COLO.	F017-1(4)	9	

PIER 3 CL
AB4 CL BRG

NORTH OUT	STATION	ELEVATION
STA BACK	3126+96.4000	6244.8569
1 TENTH	3126+99.9000	6244.8149
2 TENTH	3127+03.4000	6244.7729
3 TENTH	3127+06.9000	6244.7309
4 TENTH	3127+10.4000	6244.6889
5 TENTH	3127+13.9000	6244.6469
6 TENTH	3127+17.4000	6244.6049
7 TENTH	3127+20.9000	6244.5629
8 TENTH	3127+24.4000	6244.5209
9 TENTH	3127+27.9000	6244.4789
STA AHEAD	3127+31.4000	6244.4369

GIR 5	STATION	ELEVATION
STA BACK	3126+96.4000	6244.9132
1 TENTH	3126+99.9000	6244.8712
2 TENTH	3127+03.4000	6244.8292
3 TENTH	3127+06.9000	6244.7872
4 TENTH	3127+10.4000	6244.7452
5 TENTH	3127+13.9000	6244.7032
6 TENTH	3127+17.4000	6244.6612
7 TENTH	3127+20.9000	6244.6192
8 TENTH	3127+24.4000	6244.5772
9 TENTH	3127+27.9000	6244.5352
STA AHEAD	3127+31.4000	6244.4932

GIR 4	STATION	ELEVATION
STA BACK	3126+96.4000	6245.0294
1 TENTH	3126+99.9000	6244.9874
2 TENTH	3127+03.4000	6244.9454
3 TENTH	3127+06.9000	6244.9034
4 TENTH	3127+10.4000	6244.8614
5 TENTH	3127+13.9000	6244.8194
6 TENTH	3127+17.4000	6244.7774
7 TENTH	3127+20.9000	6244.7354
8 TENTH	3127+24.4000	6244.6934
9 TENTH	3127+27.9000	6244.6514
STA AHEAD	3127+31.4000	6244.6094

GIR 3	STATION	ELEVATION
STA BACK	3126+96.4000	6245.1457
1 TENTH	3126+99.9000	6245.1037
2 TENTH	3127+03.4000	6245.0617
3 TENTH	3127+06.9000	6245.0197
4 TENTH	3127+10.4000	6244.9777
5 TENTH	3127+13.9000	6244.9357
6 TENTH	3127+17.4000	6244.8937
7 TENTH	3127+20.9000	6244.8517
8 TENTH	3127+24.4000	6244.8097
9 TENTH	3127+27.9000	6244.7677
STA AHEAD	3127+31.4000	6244.7257

GIR 2	STATION	ELEVATION
STA BACK	3126+96.4000	6245.2619
1 TENTH	3126+99.9000	6245.2199
2 TENTH	3127+03.4000	6245.1779
3 TENTH	3127+06.9000	6245.1359
4 TENTH	3127+10.4000	6245.0939
5 TENTH	3127+13.9000	6245.0519
6 TENTH	3127+17.4000	6245.0099
7 TENTH	3127+20.9000	6244.9679
8 TENTH	3127+24.4000	6244.9259
9 TENTH	3127+27.9000	6244.8839
STA AHEAD	3127+31.4000	6244.8419

GIR 1	STATION	ELEVATION
STA BACK	3126+96.4000	6245.3782
1 TENTH	3126+99.9000	6245.3362
2 TENTH	3127+03.4000	6245.2942
3 TENTH	3127+06.9000	6245.2522
4 TENTH	3127+10.4000	6245.2102
5 TENTH	3127+13.9000	6245.1682
6 TENTH	3127+17.4000	6245.1262
7 TENTH	3127+20.9000	6245.0842
8 TENTH	3127+24.4000	6245.0422
9 TENTH	3127+27.9000	6245.0002
STA AHEAD	3127+31.4000	6244.9582

SOUTH OUT	STATION	ELEVATION
STA BACK	3126+96.4000	6245.4345
1 TENTH	3126+99.9000	6245.3925
2 TENTH	3127+03.4000	6245.3505
3 TENTH	3127+06.9000	6245.3085
4 TENTH	3127+10.4000	6245.2665
5 TENTH	3127+13.9000	6245.2245
6 TENTH	3127+17.4000	6245.1825
7 TENTH	3127+20.9000	6245.1405
8 TENTH	3127+24.4000	6245.0985
9 TENTH	3127+27.9000	6245.0565
STA AHEAD	3127+31.4000	6245.0145

DEPARTMENT OF HIGHWAYS
STATE OF COLORADO
10 POINT ELEVATIONS

I-17-GD Sta. 3126+03.4000 to 3127+32.4000
I-17-GE Sta. 3126+02.1576 to 3127+31.8067
Across CRYSTAL HILLS BLVD.

Sta. Near MANITOU SPRINGS, CO. T.A.S. R67W
Designed by
Made by
Checked by
Approved by
Bridge Engineer
Date: APR. 5, 1967

I-17-GD WEST BOUND
STRUCTURE NO. 1-17-GE EAST BOUND

F 017-1(4) I-17-GE EAST BND
DES INPUT - GRAVINA 12/05/66
ACROSS CRYSTAL HILLS BLVD
IN MANITOU SPRINGS
POT 3126+68.5 ML=3+57.6 C H B

INPUT DATA FOR BRIDGE I-17-GE

POT = 3126+67.8808 ALPHA = 12.22.17.77 RDWY = 38.5000 GBK = 0.3496-
PI = 3123+00.0000 EPI = 6250.1500 VC = 00400. GAH = 1.2000-
SLOPE = +0.150-

AB1 CL BRG
PIER 2 CL

NORTH OUT	STATION	ELEVATION
STA BACK	3126+03.1776	6246.5532
1 TENTH	3126+06.6776	6246.5112
2 TENTH	3126+10.1776	6246.4692
3 TENTH	3126+13.6776	6246.4272
4 TENTH	3126+17.1776	6246.3852
5 TENTH	3126+20.6776	6246.3432
6 TENTH	3126+24.1776	6246.3012
7 TENTH	3126+27.6776	6246.2592
8 TENTH	3126+31.1776	6246.2172
9 TENTH	3126+34.6776	6246.1752
STA AHEAD	3126+38.1776	6246.1332

GIR 1	STATION	ELEVATION
STA BACK	3126+04.0001	6246.4870
1 TENTH	3126+07.5001	6246.4450
2 TENTH	3126+11.0001	6246.4030
3 TENTH	3126+14.5001	6246.3610
4 TENTH	3126+18.0001	6246.3190
5 TENTH	3126+21.5001	6246.2770
6 TENTH	3126+25.0001	6246.2350
7 TENTH	3126+28.5001	6246.1930
8 TENTH	3126+32.0001	6246.1510
9 TENTH	3126+35.5001	6246.1090
STA AHEAD	3126+39.0001	6246.0670

GIR 2	STATION	ELEVATION
STA BACK	3126+05.7001	6246.3503
1 TENTH	3126+09.2001	6246.3083
2 TENTH	3126+12.7001	6246.2663
3 TENTH	3126+16.2001	6246.2243
4 TENTH	3126+19.7001	6246.1823
5 TENTH	3126+23.2001	6246.1403
6 TENTH	3126+26.7001	6246.0983
7 TENTH	3126+30.2001	6246.0563
8 TENTH	3126+33.7001	6246.0143
9 TENTH	3126+37.2001	6245.9723
STA AHEAD	3126+40.7001	6245.9303

GIR 3	STATION	ELEVATION
STA BACK	3126+07.4000	6246.2137
1 TENTH	3126+10.9000	6246.1717
2 TENTH	3126+14.4000	6246.1297
3 TENTH	3126+17.9000	6246.0877
4 TENTH	3126+21.4000	6246.0457
5 TENTH	3126+24.9000	6246.0037
6 TENTH	3126+28.4000	6245.9617
7 TENTH	3126+31.9000	6245.9197
8 TENTH	3126+35.4000	6245.8777
9 TENTH	3126+38.9000	6245.8357
STA AHEAD	3126+42.4000	6245.7937

GIR 4	STATION	ELEVATION
STA BACK	3126+09.0999	6246.0770
1 TENTH	3126+12.5999	6246.0350
2 TENTH	3126+16.0999	6245.9930
3 TENTH	3126+19.5999	6245.9510
4 TENTH	3126+23.0999	6245.9090
5 TENTH	3126+26.5999	6245.8670
6 TENTH	3126+30.0999	6245.8250
7 TENTH	3126+33.5999	6245.7830
8 TENTH	3126+37.0999	6245.7410
9 TENTH	3126+40.5999	6245.6990
STA AHEAD	3126+44.0999	6245.6570

GIR 5	STATION	ELEVATION
STA BACK	3126+10.7998	6245.9404
1 TENTH	3126+14.2998	6245.8984
2 TENTH	3126+17.7998	6245.8564
3 TENTH	3126+21.2998	6245.8144
4 TENTH	3126+24.7998	6245.7724
5 TENTH	3126+28.2998	6245.7304
6 TENTH	3126+31.7998	6245.6884
7 TENTH	3126+35.2998	6245.6464
8 TENTH	3126+38.7998	6245.6044
9 TENTH	3126+42.2998	6245.5624
STA AHEAD	3126+45.7998	6245.5204

SOUTH OUT	STATION	ELEVATION
STA BACK	3126+11.6224	6245.8742
1 TENTH	3126+15.1224	6245.8322
2 TENTH	3126+18.6224	6245.7902
3 TENTH	3126+22.1224	6245.7482
4 TENTH	3126+25.6224	6245.7062
5 TENTH	3126+29.1224	6245.6642
6 TENTH	3126+32.6224	6245.6222
7 TENTH	3126+36.1224	6245.5802
8 TENTH	3126+39.6224	6245.5382
9 TENTH	3126+43.1224	6245.4962
STA AHEAD	3126+46.6224	6245.4542

PIER 2 CL PIER 3 CL	STATION	ELEVATION
STA BACK	3126+38.1776	6246.1332
1 TENTH	3126+41.6776	6246.0912
2 TENTH	3126+45.1776	6246.0492
3 TENTH	3126+48.6776	6245.9864
4 TENTH	3126+52.1776	6245.9236
5 TENTH	3126+55.6776	6245.8608
6 TENTH	3126+59.1776	6245.7980
7 TENTH	3126+62.6776	6245.7352
8 TENTH	3126+66.1776	6245.6724
9 TENTH	3126+69.6776	6245.6096
STA AHEAD	3126+73.1776	6245.5468

GIR 1	STATION	ELEVATION
STA BACK	3126+39.0001	6246.0670
1 TENTH	3126+42.5001	6246.0250
2 TENTH	3126+46.0001	6245.9830
3 TENTH	3126+49.5001	6245.9410
4 TENTH	3126+53.0001	6245.8990
5 TENTH	3126+56.5001	6245.8570
6 TENTH	3126+60.0001	6245.8150
7 TENTH	3126+63.5001	6245.7730
8 TENTH	3126+67.0001	6245.7310
9 TENTH	3126+70.5001	6245.6890
STA AHEAD	3126+74.0001	6245.6470

GIR 2	STATION	ELEVATION
STA BACK	3126+40.7001	6245.9303
1 TENTH	3126+44.2001	6245.8883
2 TENTH	3126+47.7001	6245.8463
3 TENTH	3126+51.2001	6245.8043
4 TENTH	3126+54.7001	6245.7623
5 TENTH	3126+58.2001	6245.7203
6 TENTH	3126+61.7001	6245.6783
7 TENTH	3126+65.2001	6245.6363
8 TENTH	3126+68.7001	6245.5943
9 TENTH	3126+72.2001	6245.5523
STA AHEAD	3126+75.7001	6245.5103

GIR 3	STATION	ELEVATION
STA BACK	3126+42.4000	6245.7937
1 TENTH	3126+45.9000	6245.7517
2 TENTH	3126+49.4000	6245.7097
3 TENTH	3126+52.9000	6245.6677
4 TENTH	3126+56.4000	6245.6257
5 TENTH	3126+59.9000	6245.5837
6 TENTH	3126+63.4000	6245.5417
7 TENTH	3126+66.9000	6245.4997
8 TENTH	3126+70.4000	6245.4577
9 TENTH	3126+73.9000	6245.4157
STA AHEAD	3126+77.4000	6245.3737

GIR 4	STATION	ELEVATION
STA BACK	3126+44.0999	6245.6570
1 TENTH	3126+47.5999	6245.6150
2 TENTH	3126+51.0999	6245.5730
3 TENTH	3126+54.5999	6245.5310
4 TENTH	3126+58.0999	6245.4890
5 TENTH	3126+61.5999	6245.4470
6 TENTH	3126+65.0999	6245.4050
7 TENTH	3126+68.5999	6245.3630
8 TENTH	3126+72.0999	6245.3210
9 TENTH	3126+75.5999	6245.2790
STA AHEAD	3126+79.0999	6245.2370

GIR 5	STATION	ELEVATION
STA BACK	3126+45.7998	6245.5204
1 TENTH	3126+49.2998	6245.4784
2 TENTH	3126+52.7998	6245.4364
3 TENTH	3126+56.2998	6245.3944
4 TENTH	3126+59.7998	6245.3524
5 TENTH	3126+63.2998	6245.3104
6 TENTH	3126+66.7998	6245.2684
7 TENTH	3126+70.2998	6245.2264
8 TENTH	3126+73.7998	6245.1844
9 TENTH	3126+77.2998	6245.1424
STA AHEAD	3126+80.7998	6245.1004

SOUTH 001		
STA BACK	3126+46.6224	6245.45
1 TENTH	3126+52.9224	6245.38
2 TENTH	3126+58.0224	6245.31
3 TENTH	3126+63.7224	6245.24
4 TENTH	3126+69.4224	6245.18
5 TENTH	3126+75.1224	6245.11
6 TENTH	3126+80.8224	6245.04
7 TENTH	3126+86.5224	6244.97
8 TENTH	3126+92.2224	6244.90
9 TENTH	3126+97.9224	6244.83
STA AHEAD	3127+03.6224	6244.77

BAR LIST - SUPERSTRUCTURE

MARK	SIZE	No. REQ'D	LENGTH	TYPE	DIMENSIONS	
401	1/2" φ	84	4'-8"	III	1'-9"	6"
402		120	5'-7"	III	1'-11"	1'-1"
403		10	5'-7"		1'-11 1/2"	
404			5'-8"		1'-11 1/2"	
405			5'-9 1/2"		2'-0 1/2"	
406			5'-10 1/2"		2'-0 1/2"	
407			5'-11 1/2"		2'-1 1/2"	
408			6'-1"		2'-2"	
409			6'-2 1/2"		2'-2 1/2"	
410			6'-4 1/2"		2'-3 1/2"	
411			6'-6 1/2"		2'-4 1/2"	
412			6'-8 1/2"		2'-5 1/2"	
413			6'-10 1/2"		2'-6 1/2"	
414			7'-1"		2'-8"	
415			7'-3 1/2"		2'-9 1/2"	
416			7'-6 1/2"		2'-10 1/2"	
417			7'-9 1/2"		3'-0 1/2"	
418			8'-1"		3'-2"	
419			8'-3 1/2"		3'-4 1/2"	
420			8'-10 1/2"		3'-6 1/2"	
421			9'-3 1/2"		3'-9 1/2"	
422		10	9'-8 1/2"	III	3'-11 1/2"	1'-1"
423		20	30'-0"	Str.		
424		20	10'-0"	Str.		
426		20	5'-7 1/2"	III	1'-11 1/2"	1'-1"
427		10	5'-8"		1'-11 1/2"	
428			5'-8 1/2"		1'-11 1/2"	
429			5'-9"		2'-0"	
430			5'-9 1/2"		2'-0 1/2"	
431			5'-10"		2'-0 1/2"	
432			5'-11"		2'-1"	
433			6'-0"		2'-1 1/2"	
434			6'-1"		2'-2"	
435			6'-2 1/2"		2'-3 1/2"	
436			6'-3 1/2"		2'-3 1/2"	
437			6'-5"		2'-4"	
438			6'-7"		2'-5"	
439			6'-8 1/2"		2'-5 1/2"	
440			6'-10"		2'-6 1/2"	
441			6'-11 1/2"		2'-7 1/2"	
442			7'-1 1/2"		2'-8 1/2"	
443			7'-3 1/2"		2'-9 1/2"	
444			7'-5 1/2"		2'-10 1/2"	
445			7'-7 1/2"		2'-11 1/2"	
446			7'-10"		3'-0 1/2"	
447			8'-0 1/2"		3'-1 1/2"	
448			8'-4"		3'-3 1/2"	
449			8'-6 1/2"		3'-4 1/2"	
450			8'-9"		3'-6"	
451			8'-11 1/2"		3'-7 1/2"	
452			9'-4"		3'-9 1/2"	
453		10	9'-8 1/2"	III	3'-11 1/2"	1'-1"
454		12	32'-0"	Str.		
455	1/2" φ	52	10'-10"	III	4'-2 1/2"	1'-9"
501	1/2" φ	114	2'-0"	Str.		
502		38	4'-7"	II	1'-1"	1'-9"
503		244	10'-0"	Str.		
504		2	60'-0"	Str.		
505		1	10'-9"	Str.		
506		132	39'-6"	XV		
507		266	38'-2"	Str.		
508		20	10'-7"	Str.		
509		20	16'-7"	Str.		
510		20	23'-4"	Str.		
511		10	24'-6"	Str.		
512		10	36'-6"	Str.		
513		10	44'-6"	Str.		
514		96	60'-0"	Str.		
515	3/4" φ	48	10'-9"	Str.		
701	1/2" φ	6	32'-0"	Str.		

SUPERSTRUCTURE CON'T

MARK	SIZE	No. REQ'D	LENGTH	TYPE	DIMENSIONS	
801	1" φ	20	36'-2"	Str.		
802		10	60'-0"	Str.		
803		8	38'-2"	Str.		
805		12	6'-6"	Str.		
806		8	32'-0"	Str.		
807	1" φ	4	9'-0"	Str.		
901	1 1/2" φ	40	20'-3"	Str.		
1001	1 1/2" φ	20	60'-0"	Str.		
1002		10	13'-8"	Str.		
1003		20	42'-0"	Str.		
1004		20	31'-0"	Str.		
1005		20	16'-0"	Str.		
1006		20	26'-11"	Str.		
1007		20	13'-6"	VII	6'-9"	1'-9"
1008		10	21'-6"	VII	10'-9"	2'-6"
1009	1 1/2" φ	10	20'-0"	Str.		
1101	1 1/2" φ	20	30'-11"	Str.		
1102		10	48'-0"	Str.		
1103		10	40'-0"	Str.		
1104	1 1/2" φ	10	27'-0"	Str.		

BAR SUMMARY

6258 L.F. 1/2" φ @ .668#/ft. = 4180 LB.
 24,366 → 24,604 L.F. 3/8" φ @ 1.043#/ft. = 25,662 LB. → 25,414
 192 L.F. 7/8" φ @ 2.044#/ft. = 392 LB.
 1999 L.F. 1" φ @ 2.67#/ft. = 5337 LB.
 810 L.F. 1 1/8" φ @ 3.4#/ft. = 2754 LB.
 4340 L.F. 1 1/4" φ @ 4.303#/ft. = 18675 LB.
 1768 L.F. 1 1/2" φ @ 5.313#/ft. = 9393 LB.
 Total = 66393 LB.
 66,445

BAR LIST - PIER 2 (PIER 3 SIMILAR)

MARK	SIZE	No. REQ'D	LENGTH	TYPE	DIMENSIONS	
460	1/2" φ	75	6'-0"	IX		
601	3/4" φ	84	5'-8"	Str.		
1109	1 1/2" φ	33	5'-0"	Str.		
1110		33	24'-9"	Str.		
1111	1 1/2" φ	16	6'-2"	Str.		

BAR SUMMARY

450 L.F. 1/2" φ @ .668#/ft. = 301 LB.
 476 L.F. 3/4" φ @ 1.502#/ft. = 715 LB.
 1080 L.F. 1 1/2" φ @ 5.313#/ft. = 5738 LB.
 Total = 6754 LB.

BAR LIST - ABUT I (ABUT 4 SIMILAR)

MARK	SIZE	No. REQ'D	LENGTH	TYPE	DIMENSIONS	
480	1/2" φ	4	38'-2"	Str.		
481		38	9'-1"	V		
482		4	3'-2"	Str.		
483		2	2'-6"	Str.		
484		2	1'-10"	Str.		
485		2	2'-8"	Str.		
486		2	4'-2"	Str.		
487		4	4'-9"	Str.		
488		10	3'-1"	Str.		
489	1/2" φ	8	6'-0"	Str.		
620	3/4" φ	4	38'-2"	Str.		
1020	1 1/2" φ	4	38'-2"	Str.		

BAR SUMMARY

631 L.F. 1/2" φ @ .668#/ft. = 422 LB.
 153 L.F. 3/4" φ @ 1.502#/ft. = 230 LB.
 153 L.F. 1 1/4" φ @ 4.303#/ft. = 658 LB.
 Total = 1310 LB.

REVISIONS

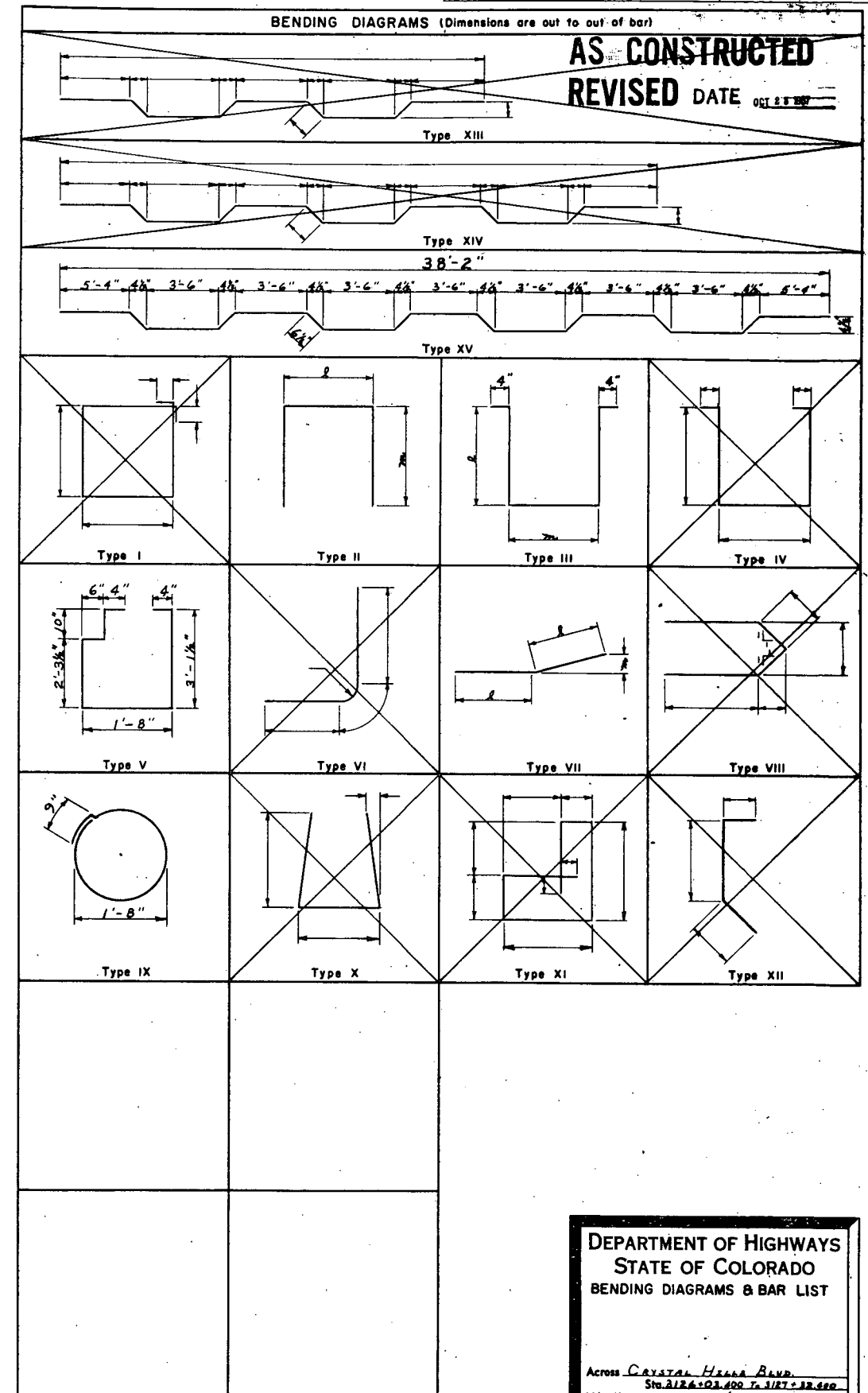
REVISIONS

R1 BAR LIST D.S.M. 4-24-67
 R2 REQ'D. BAR NO. CHANGED 7-28-67 AIT

FED. ROAD REG. NO.	DIVISION	PROJECT NO.	SHEET NO.	TOTAL SHEETS
9	COLO.	F017-1(4)	10	

BENDING DIAGRAMS (Dimensions are out to out of bar)

AS CONSTRUCTED
 REVISED DATE OCT 8 1967



DEPARTMENT OF HIGHWAYS
 STATE OF COLORADO
 BENDING DIAGRAMS & BAR LIST

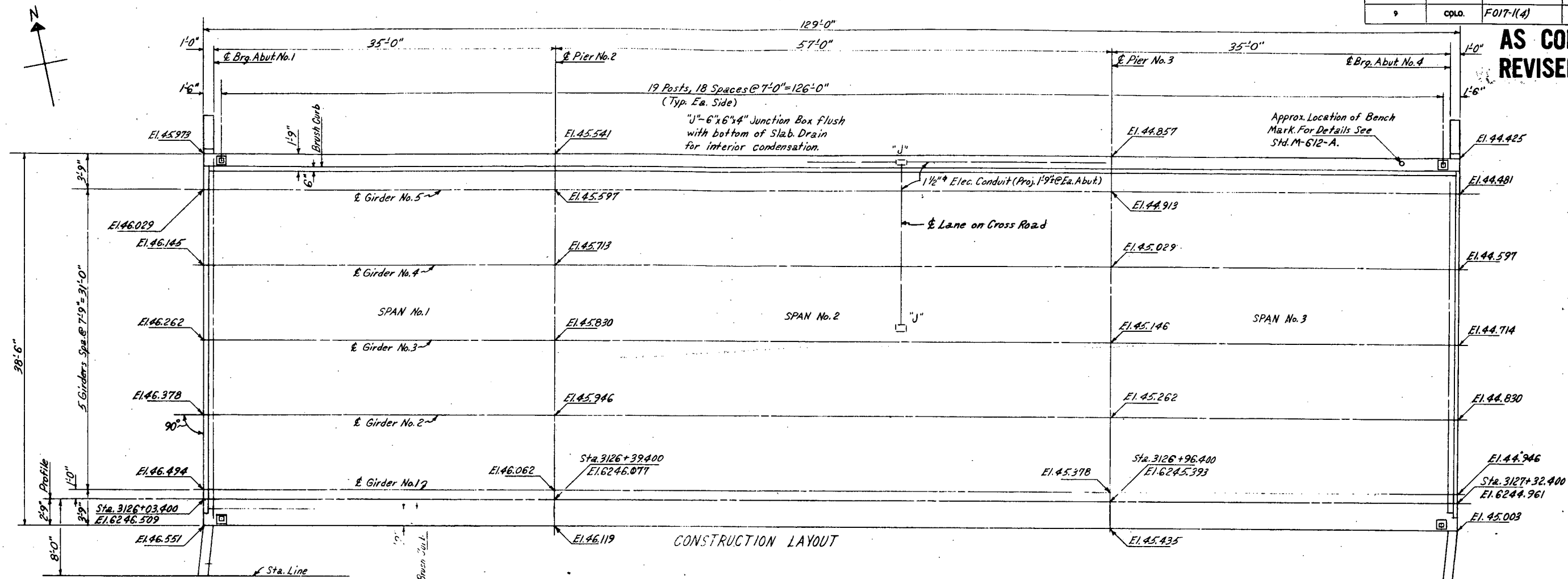
Across CRISTAL HILLS BLVD.
 Sta. 12+00 to 12+100 T. 117 S. R. 66 E.
 IN Manitou Springs Sec. 36 T. 116 S. R. 67 E.
 Designed by A.D.N. Approved by P. Charnick
 Made by R.R.A.-J.B. Bridge Engineer
 Checked by Date: Apr 5, 1967

STRUCTURE NO. I-17-GD (WEST BOUND)

(R) DELETED BRUSH CURB ON HIGH SIDE 7-28-67 AIT

FED. ROAD REG. NO.	DIVISION:	PROJECT NO.	SHEET NO.	TOTAL SHEETS
9	COLO.	F017-1(4)	11	

AS CONSTRUCTED
REVISED DATE OCT 28 1967



Tenth Points	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0
Top of Slab to Batt Girder	2'-2"	2'-2"	2'-2"	2'-2 1/8"	2'-3 1/8"	2'-5 1/8"	2'-8 3/8"	3'-0 3/8"	3'-4 1/8"	3'-10"	4'-4"	3'-6 5/8"	2'-11 3/8"	2'-6 3/8"	2'-3 1/8"	2'-2"	2'-3 1/8"	2'-6 3/8"	2'-11 3/8"	3'-6 5/8"	4'-4"	3'-10"	3'-4 1/8"	3'-0 3/8"	2'-8 3/8"	2'-5 1/8"	2'-3 1/8"	2'-2 1/8"	2'-2"	2'-2"	
Dead Load Deflection in Ft.	0	.000	.000	.000	.000	.000	.000	-.005	-.005	.000	0	.005	.016	.026	.037	.037	.037	.026	.016	.005	0	.000	-.005	-.005	.000	.000	.000	.000	.000	0	

\$ Brg. Abut. No. 1

10 Spa. @ 3.50' = 35'-0"

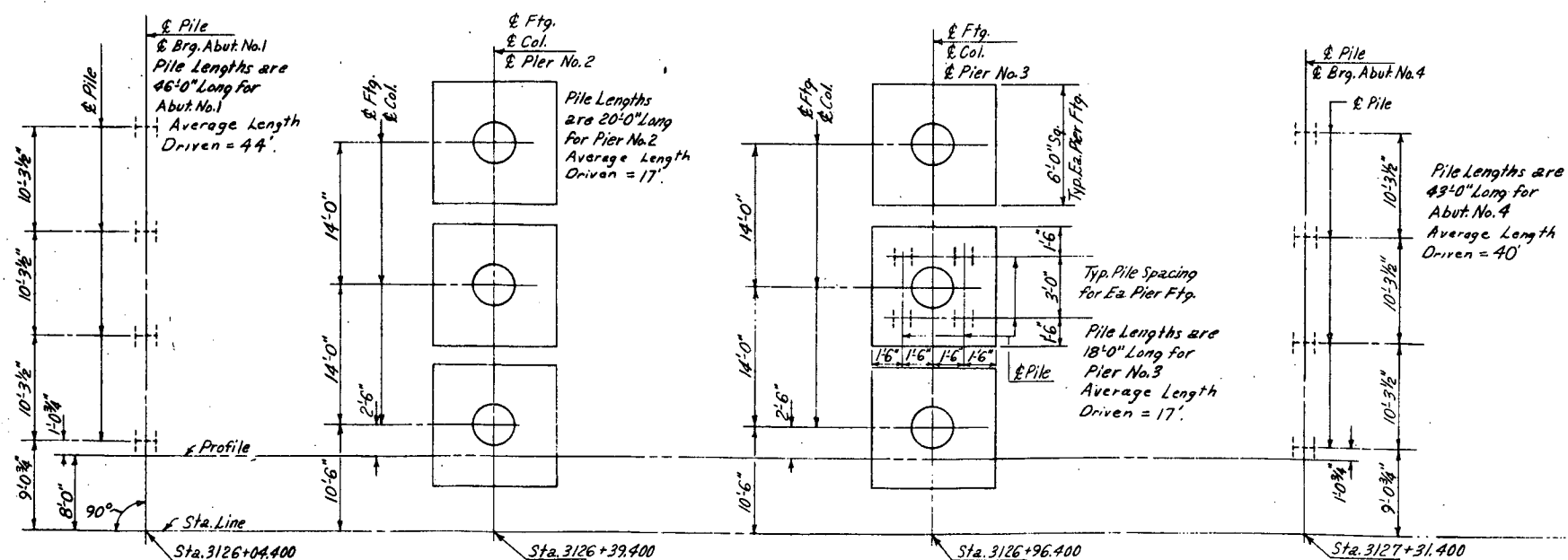
Pier No. 2

10 Spa. @ 5.70' = 57'-0"

Pier No. 3

10 Spa. @ 3.50' = 35'-0"

\$ Brg. Abut. No. 4



FOOTING PLAN *Note: Not to Scale. All Pile Lengths are Estimated*

STRUCTURE NO. I-17-GD (West Bound)

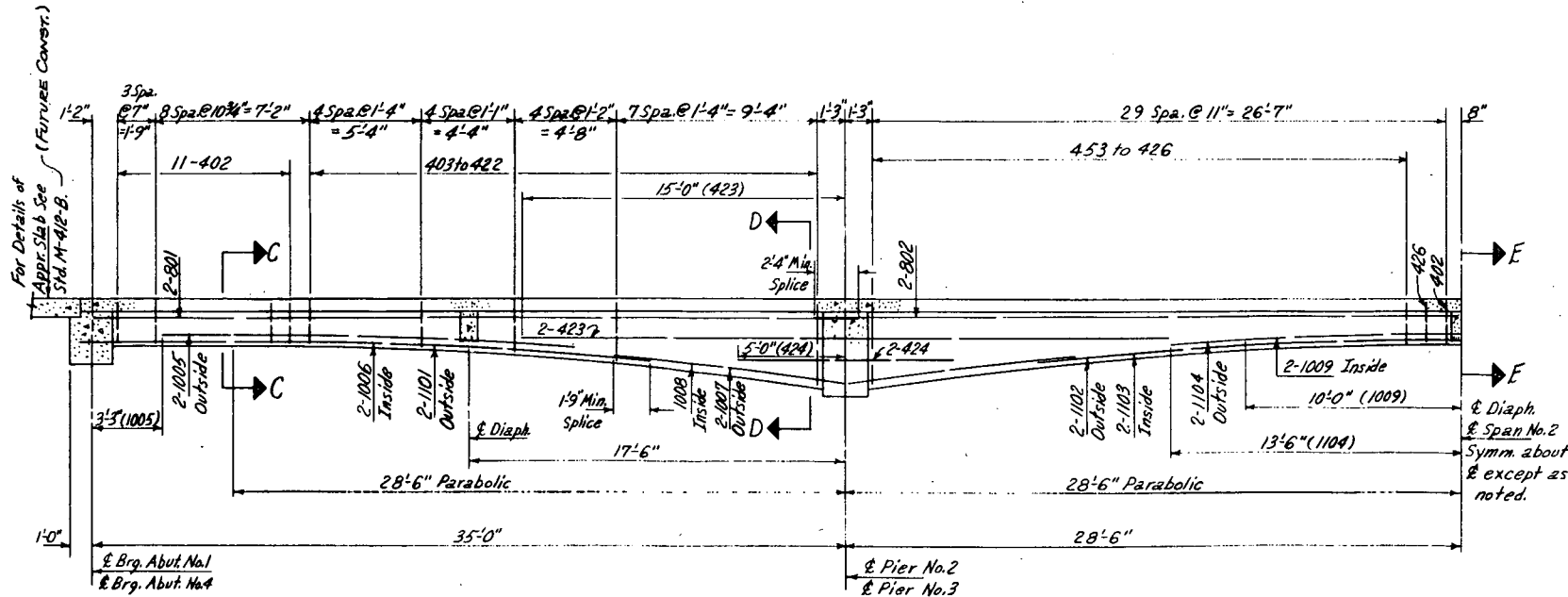
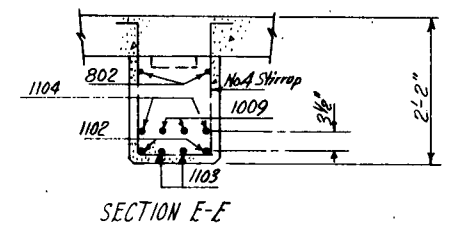
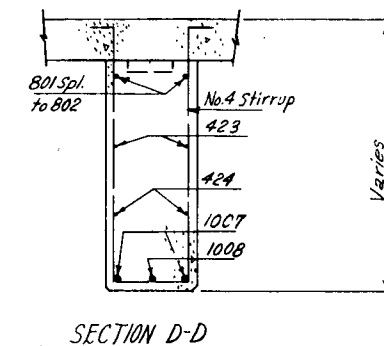
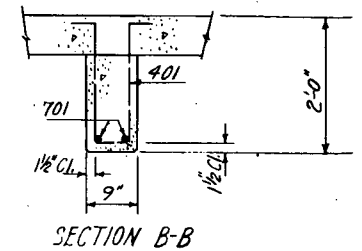
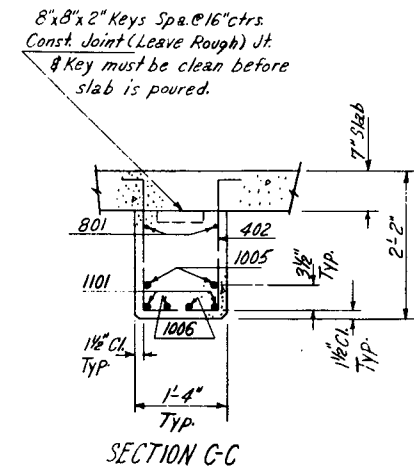
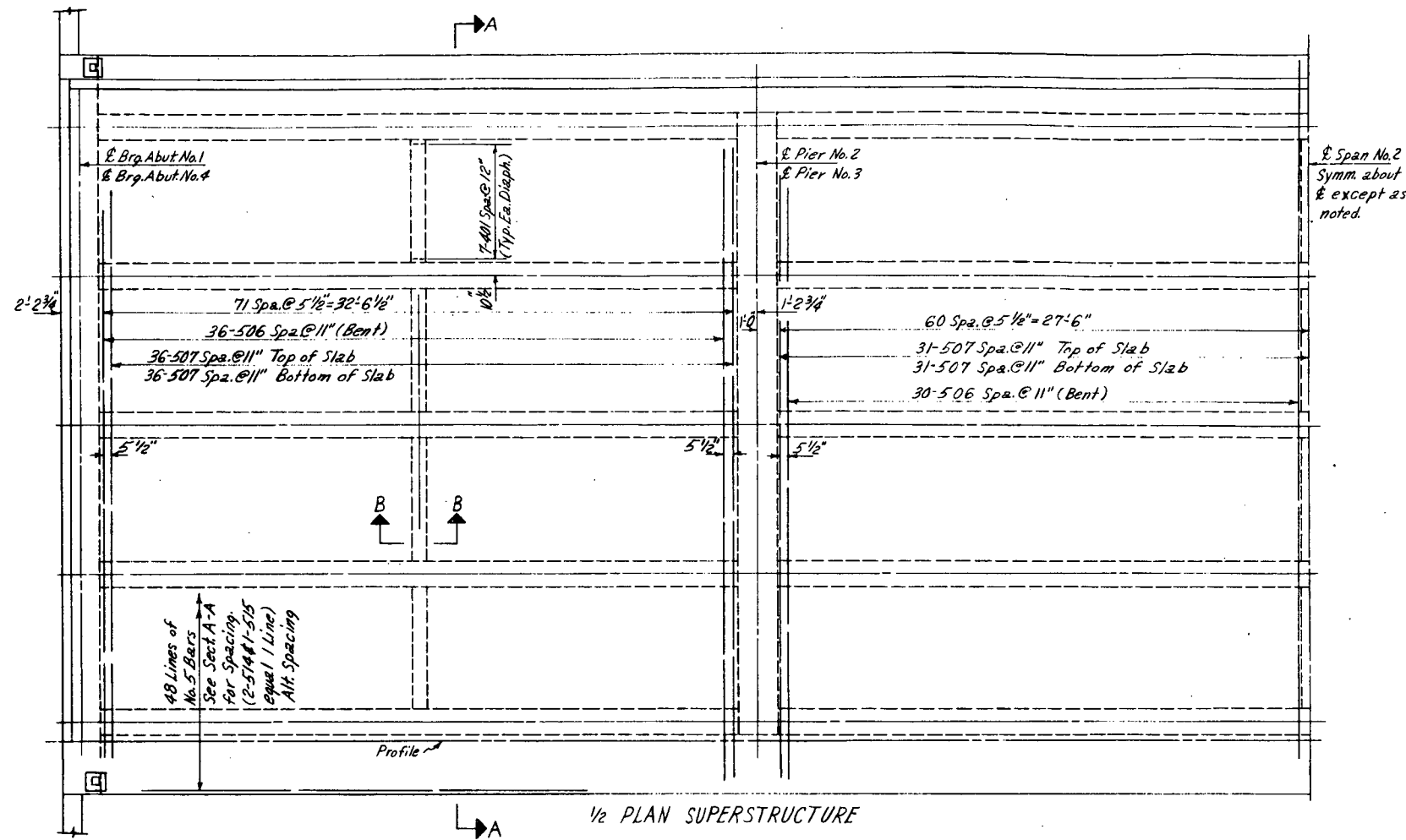
DEPARTMENT OF HIGHWAYS
STATE OF COLORADO

CONSTRUCTION LAYOUT &
FOOTING PLAN

Across Crystal Hills Blvd.
Sta 3126+03.400 to 3127+32.400
In Manitou Springs Sec. 3/4 T. 14S R. 67W

Designed by <u>J.G.</u>	Approved by <u>Pchunsky</u>
Made by <u>D.U.S.</u>	Bridge Engineer
Checked by	Date: <u>Apr. 5, 1967</u>

FED. ROAD REG. NO.	DIVISION	PROJECT NO.	SHEET NO.	TOTAL SHEETS
9	COLO.	FOH-1(A)	12	



Note: Girder shoring shall remain in place full length until all pours have reached a minimum strength of 2400 psi, and the slab shall not be poured until the girder pours have reached a minimum strength of 2400 psi.

DEPARTMENT OF HIGHWAYS
STATE OF COLORADO
SUPERSTRUCTURE DETAILS

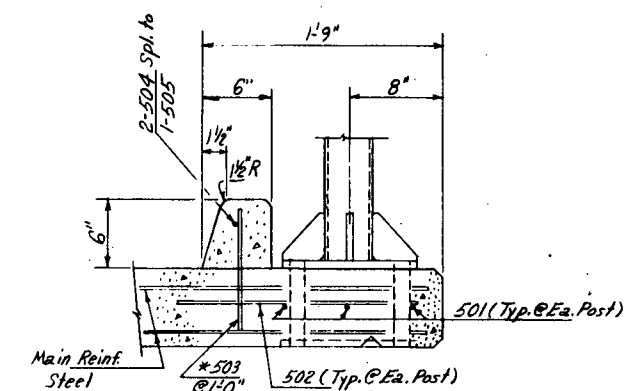
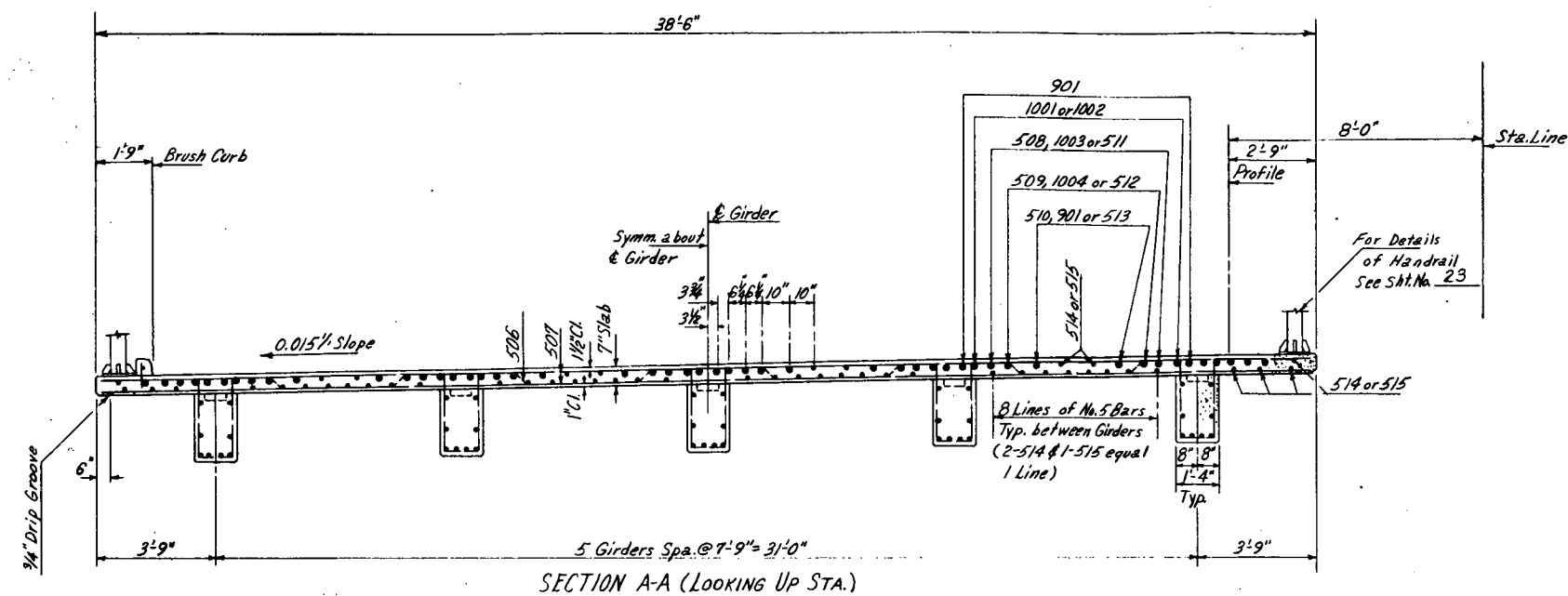
Across Crystal Hills Blvd.
Sta. 3126+03.400 to 3127+32.400
In Manitou Springs Sec. 34 T. 14S R. 67W

Designed by J.G.
Made by D.H.S.
Checked by

Approved by R.L. Hunsberger
Bridge Engineer
Date: Apr. 5, 1967

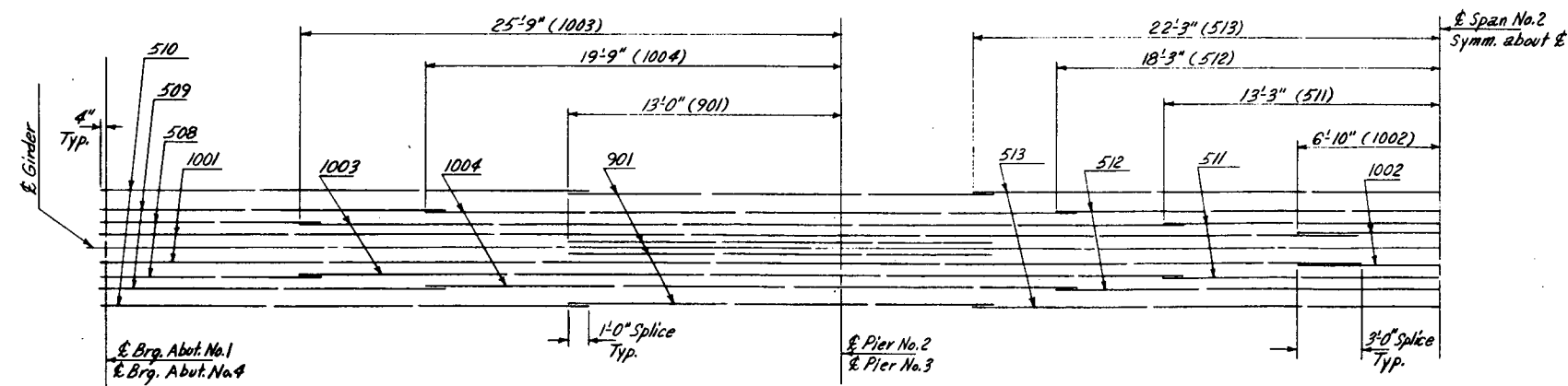
(R₁) DELETED BRUSH CURB ON HIGH SIDE 7-28-67 AIT

FED. ROAD REG. NO.	DIVISION	PROJECT NO.	SHEET NO.	TOTAL SHEETS
9	COLO.	F017-1(4)	13	



TYP. SECTION @ BRUSH CURB

*503 May be placed after slab is poured but before initial set takes place.



TYP. 1/2 PLAN OF TOP GIRDER REINFORCING STEEL

	Initial	Date
ED BY		
D BY		
BY		
D BY	DSM	3-62
BY		
D BY		

DEPARTMENT OF HIGHWAYS
STATE OF COLORADO
SUPERSTRUCTURE DETAILS

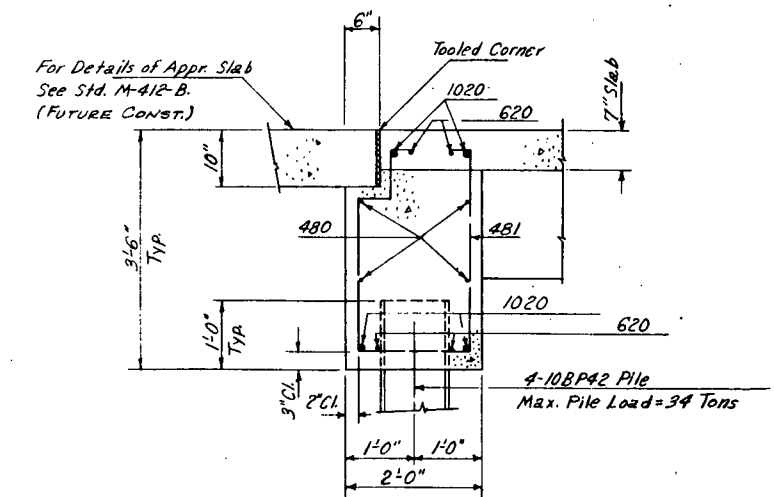
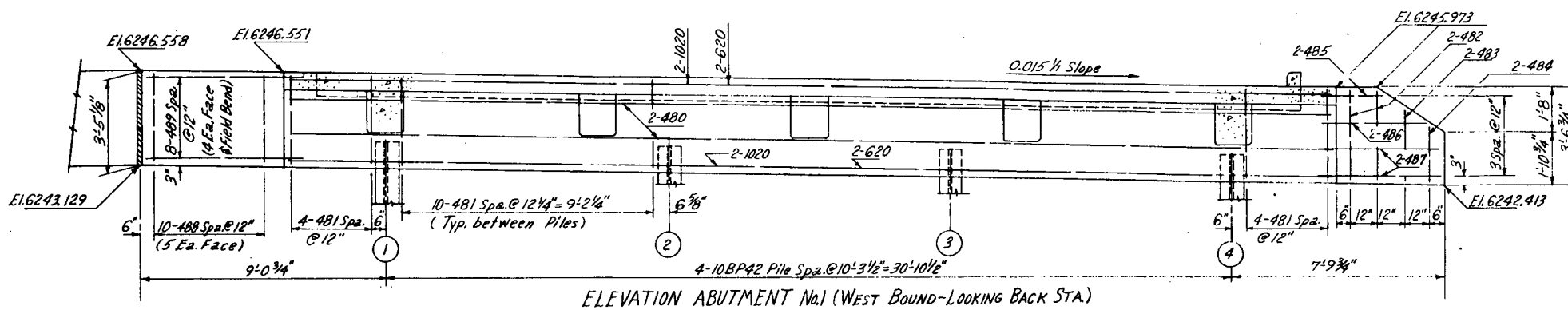
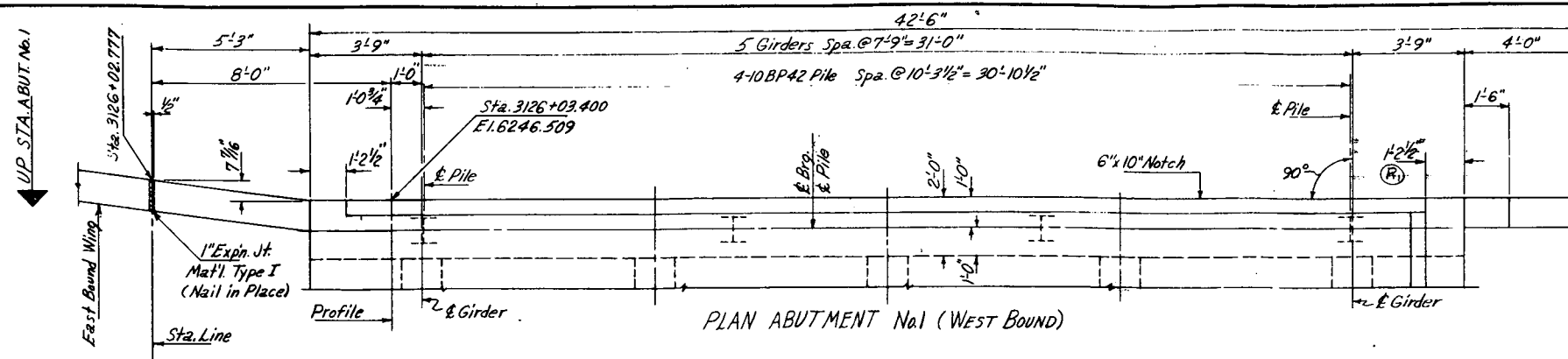
Across Crystal Hills Blvd.
Sta 3126+03.400 to 3127+32.400
I-1 Manitow Springs Sec 3/4 T 14 S R 67 W

Designed by J. G.	Approved by P. Chen <i>P. Chen</i>
Made by D. J. S.	Bridge Engineer
Checked by	Date: Apr. 5, 1967

STRUCTURE NO. I-17-GD (West Bound)

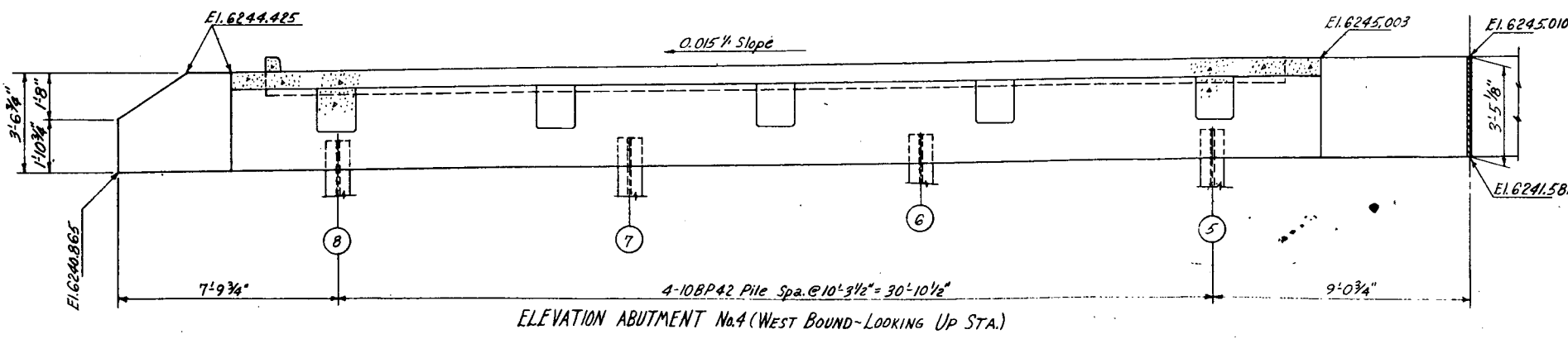
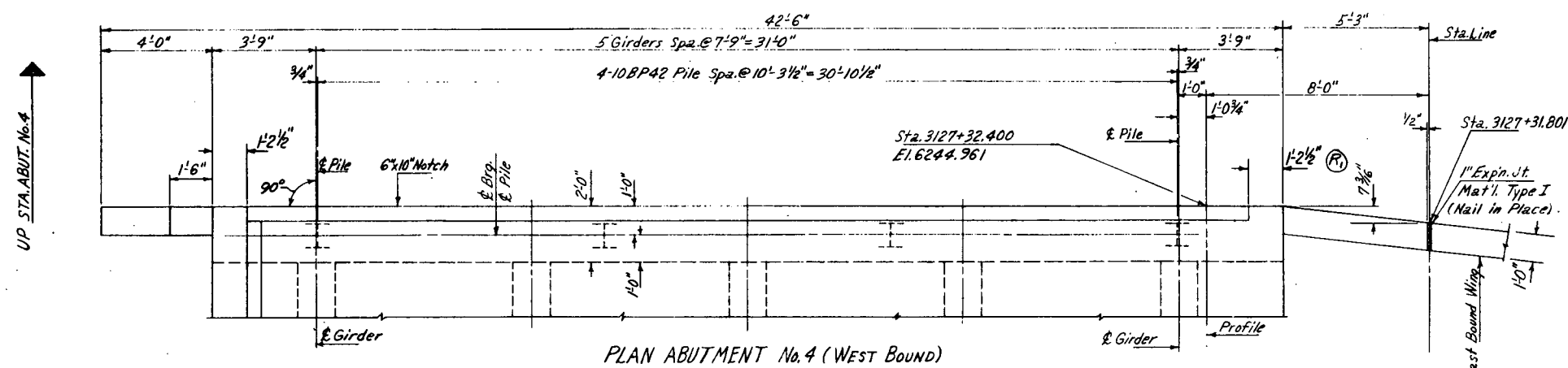
FED. ROAD REG. NO.	DIVISION	PROJECT NO.	SHEET NO.	TOTAL SHEETS
9	COLO.	FO17-1(4)	14	

- (R1) Added Approach Slab Dimensions 4-24-67 DJS
(R2) DELETED BRUSH CURB ON HIGH SIDE 7-28-67 AIT



Note: Abut. Cap & Girders below slab shall be poured monolithically.
Note: All Elevations are at Back Face of Abut.

Pile No.	Elevations @ Top of Pile
1	6243.99
2	6243.84
3	6243.68
4	6243.53
5	6242.45
6	6242.29
7	6242.14
8	6241.98



Note: Reinforcing Steel in Abut. No.4 Similar to Reinforcing Steel in Abut. No.1.

DEPARTMENT OF HIGHWAYS
STATE OF COLORADO
ABUTMENT DETAILS

Across Crystal Hills Blvd.
Sta. 3126+03.400 to 3127+32.400
In Manitou Springs Sec. 34 T.14 S. R.67W

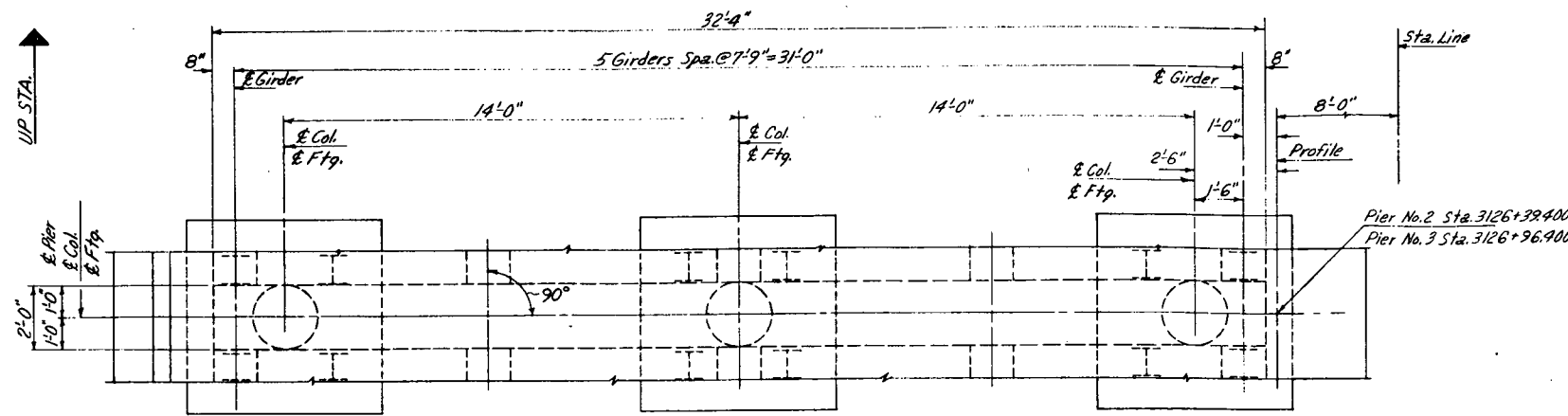
Designed by J.G.
Made by D.J.S.
Checked by

Approved by R. H. ...
Bridge Engineer
Date: Apr. 5, 1967

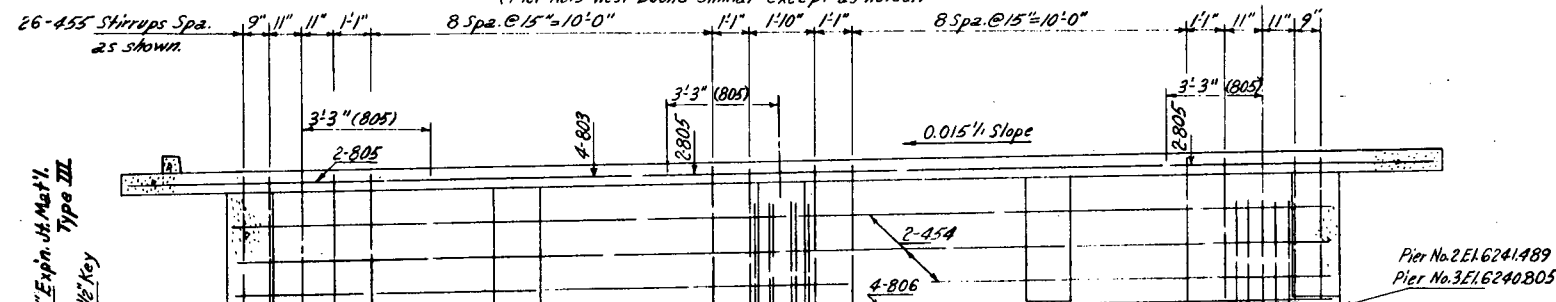
FED. ROAD REG. NO.	DIVISION	PROJECT NO.	SHEET NO.	TOTAL SHEETS
9	COLO.	F017-1(4)	15	

(R1) Rev. 1109 Dowel Proj. 4-24-67 D.U.S.

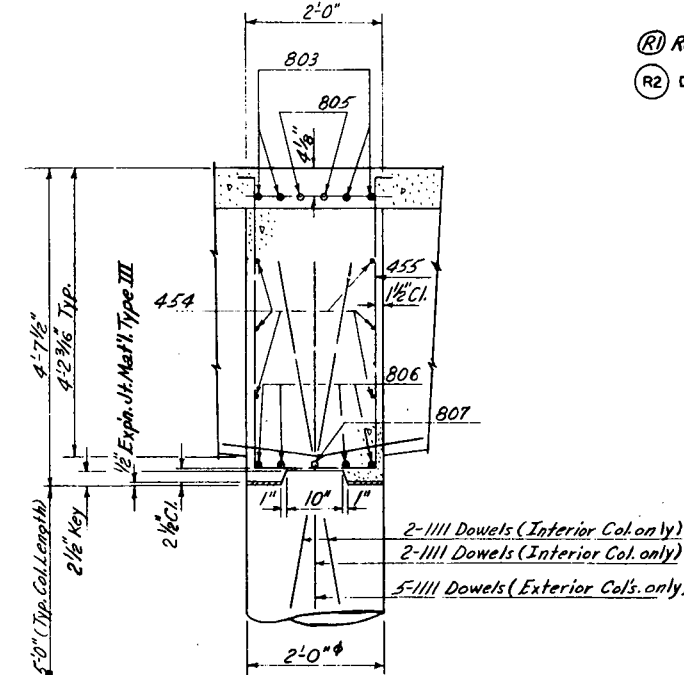
(R2) DELETED BRUSH CURB ON HIGH SIDE 7-28-67 AIT



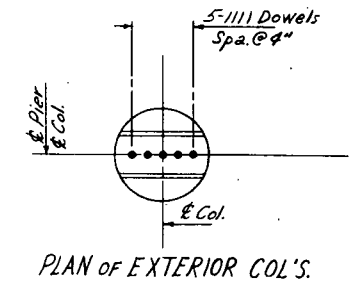
PLAN PIER No. 2 (WEST BOUND)
(Pier No. 3 West Bound Similar except as noted.)



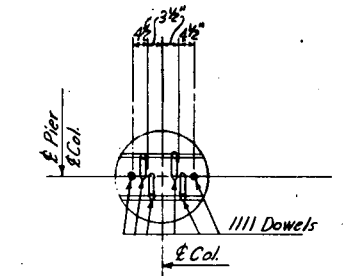
ELEVATION PIER No. 2 (WEST BOUND)
(Pier No. 3 West Bound Similar except as noted.)
Max. Pile Load = 37.5 Tons



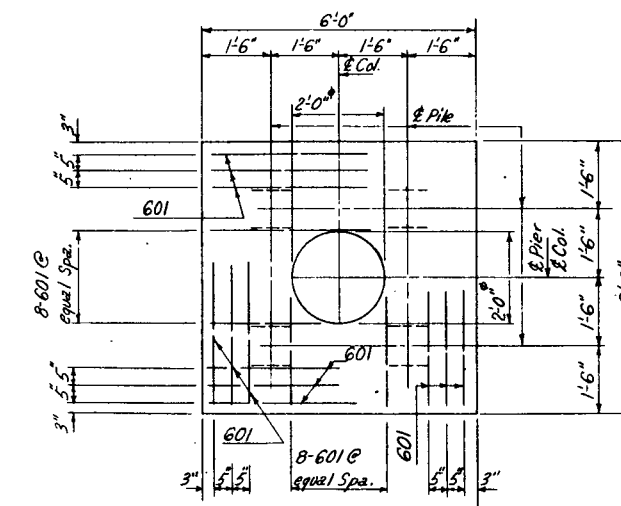
TYP. SECTION THRU PIER CAP



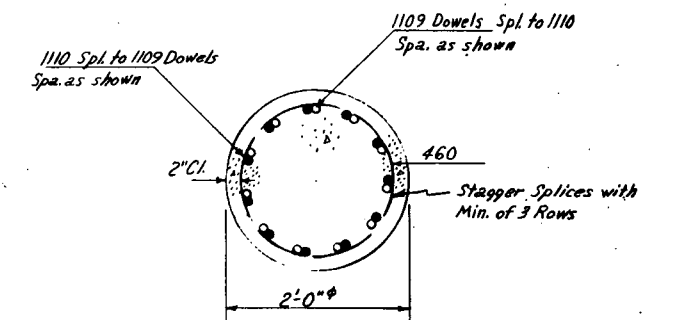
PLAN OF EXTERIOR COL'S.



PLAN OF INTERIOR COL.



TYP. PLAN OF FOOTING



TYP. SECTION THRU COL.

DEPARTMENT OF HIGHWAYS
STATE OF COLORADO
PIER DETAILS

Across Crystal Hills Blvd.
Sta. 3126+38.400 to 3126+36.900
In Manitou Springs, Co. T. 14 S. R. 67 W.
Designed by J.G. Bridge Engineers
Made by D.U.S.
Checked by
Approved by
Date: Apr. 5, 1967

STRUCTURE NO. F17-6D (West Bound)

R1 BAR LIST D.S.M. 4-24-67

FED. ROAD REG. NO.	DIVISION	PROJECT NO.	SHEET NO.	TOTAL SHEETS
9	COLO.	FOOT-1(4)	16	

BAR LIST - SUPERSTRUCTURE

MARK	SIZE	No. REQ'D	LENGTH	TYPE	DIMENSIONS l m
401	1/2"	84	4'-8"	III	1'-9" 0'-6"
402		120	5'-7"		1'-11" 1'-1"
403		10	5'-7 1/2"		1'-11 1/2"
404			5'-8"		1'-11 1/2"
405			5'-9 1/2"		2'-0 1/2"
406			5'-10 1/2"		2'-0 1/2"
407			5'-11 1/2"		2'-1 1/4"
408			6'-1"		2'-2"
409			6'-2 1/2"		2'-2 1/2"
410			6'-4 1/2"		2'-3 1/2"
411			6'-6 1/2"		2'-4 1/2"
412			6'-8 1/2"		2'-5 1/2"
413			6'-10 1/2"		2'-6 1/2"
414			7'-1"		2'-8"
415			7'-3 1/2"		2'-9 1/2"
416			7'-6 1/2"		2'-10 1/2"
417			7'-9 1/2"		3'-0 1/2"
418			8'-1"		3'-2"
419			8'-5 1/2"		3'-4 1/2"
420			8'-10 1/2"		3'-6 1/2"
421			9'-3 1/2"		3'-9 1/2"
422	10	9	9'-8 1/2"	III	3'-11 1/2" 1'-1"
423	20	30	10'-0"	Str.	
424	20	10	10'-0"	Str.	
426	20	5	5'-7 1/2"	III	1'-11 1/2" 1'-1"
427	10	5	5'-8"		1'-11 1/2"
428			5'-8 1/2"		1'-11 1/2"
429			5'-9"		2'-0"
430			5'-9 1/2"		2'-0 1/2"
431			5'-10		2'-0 1/2"
432			5'-11		2'-1"
433			6'-0		2'-1 1/2"
434			6'-1		2'-2"
435			6'-2 1/2"		2'-2 1/2"
436			6'-3 1/2"		2'-3 1/2"
437			6'-5		2'-4"
438			6'-7		2'-5"
439			6'-8 1/2"		2'-5 1/2"
440			6'-10		2'-6 1/2"
441			6'-11 1/2"		2'-7 1/2"
442			7'-1 1/2"		2'-8 1/2"
443			7'-3 1/2"		2'-9 1/2"
444			7'-5 1/2"		2'-10 1/2"
445			7'-7 1/2"		2'-11 1/2"
446			7'-10		3'-0 1/2"
447			8'-0 1/2"		3'-1 1/2"
448			8'-4		3'-3 1/2"
449			8'-6 1/2"		3'-4 1/2"
450			8'-9		3'-6"
451			8'-11 1/2"		3'-7 1/2"
452			9'-4		3'-9 1/2"
453	10	9	9'-8 1/2"	III	3'-11 1/2" 1'-1"
454	52	10	10'-10"	III	4'-2 1/2" 1'-9"
456	1/2"	12	32'-10"	Str.	
501	1/2"	114	2'-0"	Str.	
502	3/8"	38	4'-7"	II	1'-1" 1'-9"
503	1/28-256	0	10'-10"	Str.	
504	2	60	0'-0"		
505	1	10	9'-9"		
508	20	10	10'-7"		
509	20	16	16'-7"		
510	20	23	23'-4"		
511	10	26	26'-6"		
512	10	36	36'-6"		
513	10	44	44'-6"		
514	36	60	60'-0"		
515	48	10	10'-9"	Str.	
526	130	40	40'-5"	Str.	
527	1/2"	258	39'-1"	Str.	
701	1/2"	6	32'-8"	Str.	

SUPERSTRUCTURE CONT.

MARK	SIZE	No. REQ'D	LENGTH	TYPE	DIMENSIONS l m
801	1"	20	36'-2"	Str.	
802		10	60'-0"	Str.	
805		12	6'-6"	Str.	
807		4	9'-0"	Str.	
808		8	39'-0"	Str.	
809	1"	8	32'-10"	Str.	
901	1 1/8"	40	20'-3"	Str.	
1001	1 1/8"	20	60'-0"	Str.	
1002		10	13'-8"		
1003		20	42'-0"		
1004		20	31'-0"		
1005		20	16'-0"		
1006		20	26'-11"	Str.	
1007		20	13'-6"	VII	6'-9" 1'-9"
1008		10	21'-6"	VII	10'-9" 2'-6"
1009	1 1/4"	10	20'-0"	Str.	
1101	1 1/8"	20	30'-11"	Str.	
1102		10	48'-0"		
1103		10	40'-0"		
1104	1 1/8"	10	27'-0"	Str.	

BAR SUMMARY

62GB L.F. 1/2" @ 0.668 lbs./ft. = 4187 lbs.
 24,576 L.F. 1/2" @ 1.043 lbs./ft. = 25,633 lbs.
 196 L.F. 3/8" @ 2.044 lbs./ft. = 401 lbs.
 2012 L.F. 1" @ 2.670 lbs./ft. = 5372 lbs.
 810 L.F. 1 1/8" @ 3.400 lbs./ft. = 2754 lbs.
 4340 L.F. 1 1/4" @ 4.303 lbs./ft. = 18,675 lbs.
 1768 L.F. 1 1/2" @ 5.313 lbs./ft. = 9,393 lbs.
 Total = 66,415 lbs.
 60,167

BAR LIST - PIER 2 (PIER 3 SIMILAR)

MARK	SIZE	No. REQ'D	LENGTH	TYPE	DIMENSIONS l m
460	1/2"	69	6'-0"	IX	
528	3/8"	28	5'-8"	Str.	
529	3/8"	8	5'-3"	Str.	
601	3/8"	84	5'-8"	Str.	
1109	1 1/8"	27	5'-0"	Str.	
1111		16	6'-2"	Str.	
1112	1 1/8"	27	22'-6"	Str.	

BAR SUMMARY

414 L.F. 1/2" @ 0.668 lbs./ft. = 277 lbs.
 476 L.F. 3/8" @ 1.502 lbs./ft. = 715 lbs.
 841 L.F. 1" @ 5.313 lbs./ft. = 4468 lbs.
 201 L.F. 1 1/8" @ 1.403 lbs./ft. = 209 lbs.
 Total = 5669
 5468 lbs.

* These bars placed in right footer of Pier 3 only as
 reinforcing for additional footer thickness. Placed in
 lieu of piling - See Work Order # 3936.

BAR LIST - ABUT. 1

MARK	SIZE	No. REQ'D	LENGTH	TYPE	DIMENSIONS l m
465	1/2"	4	38'-11"	Str.	
466		8	4'-0"	Str.	
467		6	3'-3"	Str.	
469		10	3'-2"	Str.	
481		38	9'-1"	V	
489	1/2"	8	6'-0"	Str.	
621	3/8"	4	38'-11"	Str.	
1021	1 1/4"	4	38'-11"	Str.	

BAR SUMMARY

632 L.F. 1/2" @ 0.668 lbs./ft. = 422 lbs.
 156 L.F. 3/8" @ 1.502 lbs./ft. = 234 lbs.
 156 L.F. 1 1/4" @ 4.303 lbs./ft. = 671 lbs.
 Total = 1327 lbs.

BAR LIST - ABUT. 4

MARK	SIZE	No. REQ'D	LENGTH	TYPE	DIMENSIONS l m
465	1/2"	4	38'-11"	Str.	
471		6	3'-1"		
472		8	4'-0"		
473		8	6'-4"		
474		10	3'-2"	Str.	
481	1/2"	38	9'-1"	V	
621	3/8"	4	38'-11"	Str.	
1021	1 1/4"	4	38'-11"	Str.	

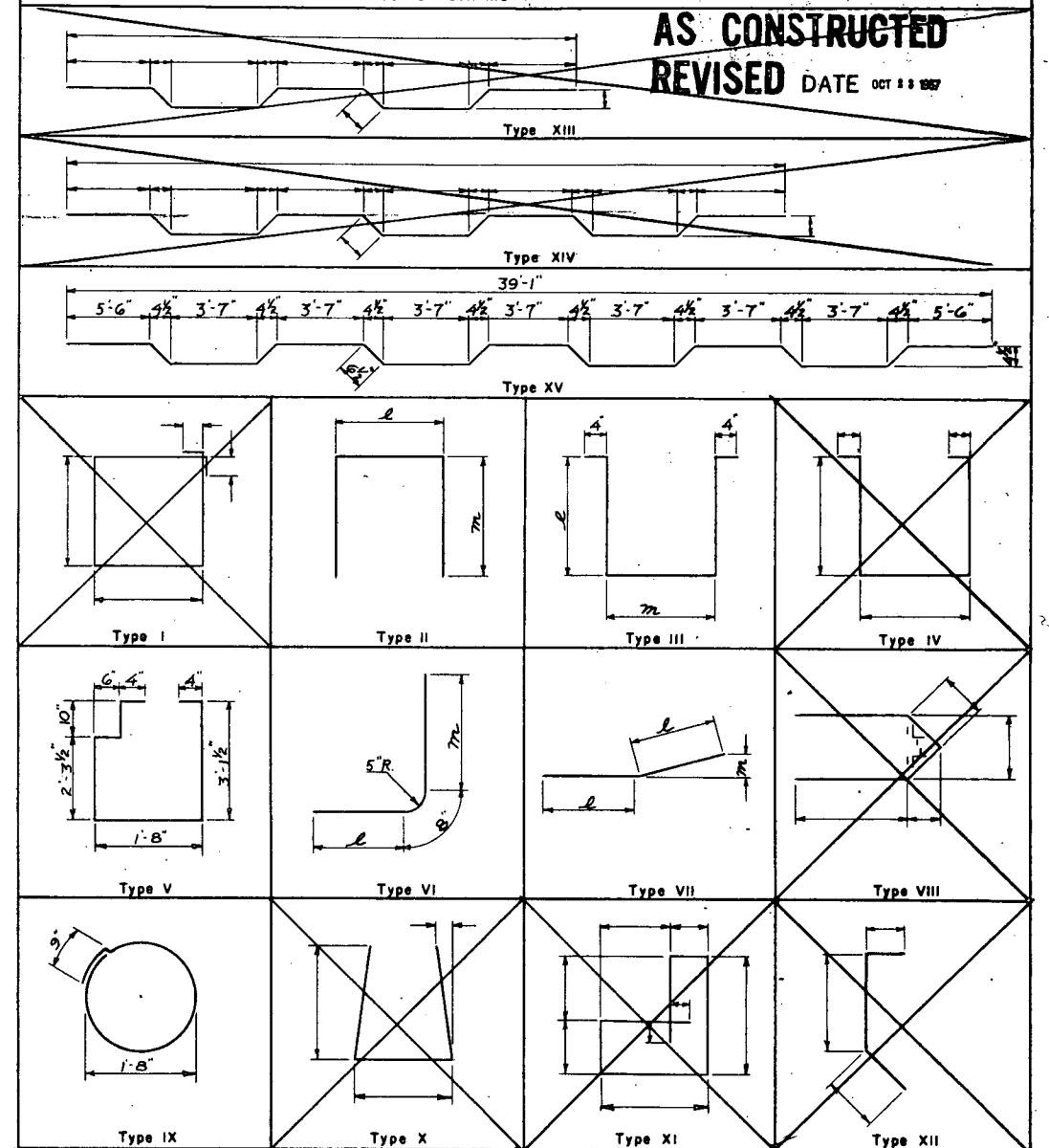
BAR SUMMARY

634 L.F. 1/2" @ 0.668 lbs./ft. = 424 lbs.
 156 L.F. 3/8" @ 1.502 lbs./ft. = 234 lbs.
 156 L.F. 1 1/4" @ 4.303 lbs./ft. = 671 lbs.
 Total = 1329 lbs.

R1 BAR LIST D.S.M. 4-24-67

R2 REQ'D BAR NO. CHANGED 7-28-67 A-T

BENDING DIAGRAMS (Dimensions are out to out of bar)



BAR LIST - RETAINING WALL

MARK	SIZE	No. REQ'D	LENGTH	TYPE	DIMENSIONS l m
4101	1/2"	18	20'-0"	Str.	
4102		36	3'-3"		
4103		1	0'-8"		
4104		1	1'-6"		
4105		1	2'-4"		
4106		1	3'-2"		
4107		1	1'-0"		
4108		1	1'-6"		
4109		1	2'-0"		
4110		1	2'-6"		
4111		1	3'-0"		
4112	1/2"	2	3'-4"	Str.	
630	3/8"	21	13'-1"	VI	10'-5" 2'-0"
631	3/8"	20	6'-3"	VI	4'-7" 1'-0"

BAR SUMMARY RET. WALL

501 L.F. 1/2" @ 0.668 lbs./ft. = 335 lbs.
 400 L.F. 3/8" @ 1.502 lbs./ft. = 601 lbs.
 Total = 936 lbs.

DEPARTMENT OF HIGHWAYS
 STATE OF COLORADO
 BENDING DIAGRAM & BAR LIST

Across Crystal Hills Blvd.
 Sta. 3126+02.767 to 3127+31.805
 In Manitou Springs Sec. 34 T. 14 S. R. 67 W.
 Designed by J.G. Approved by J.G.
 Made by D.J.S. Bridge Engineer
 Checked by Date: Apr. 5, 1967

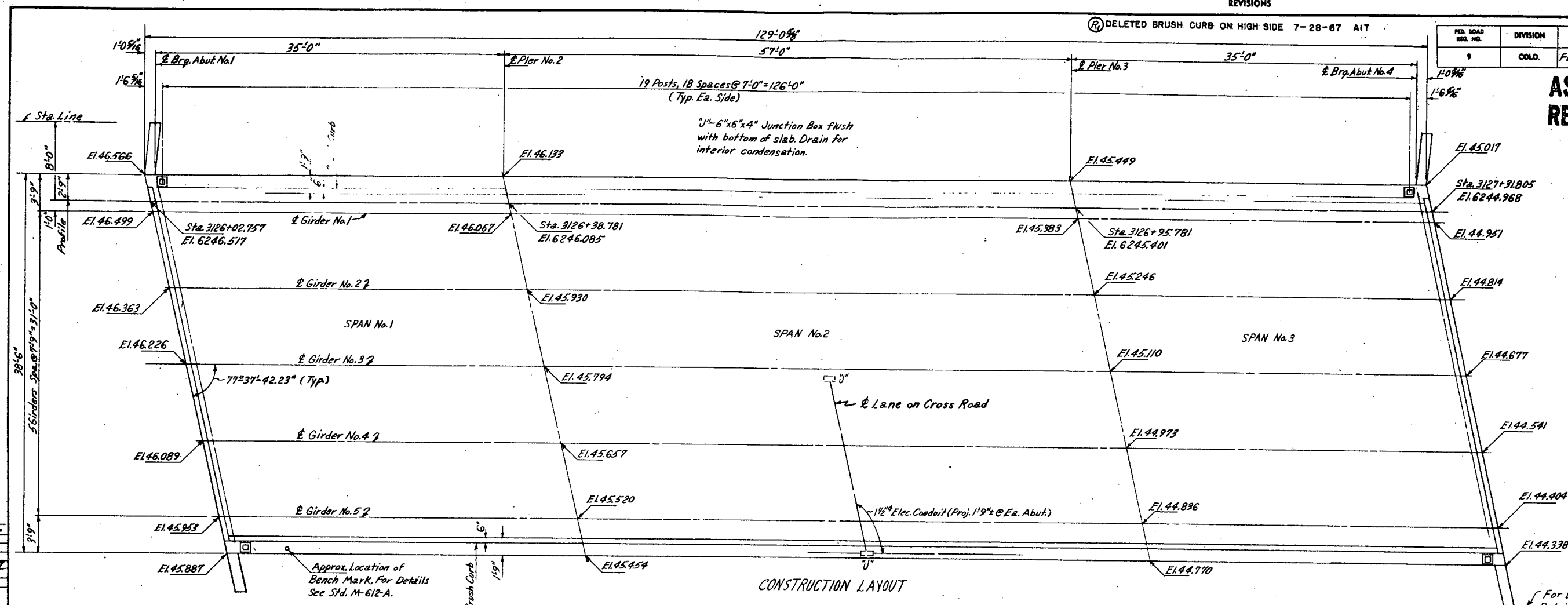
STRUCTURE NO. I-17-GE (East Bnd)

REVISIONS

Ⓡ DELETED BRUSH CURB ON HIGH SIDE 7-28-67 AIT

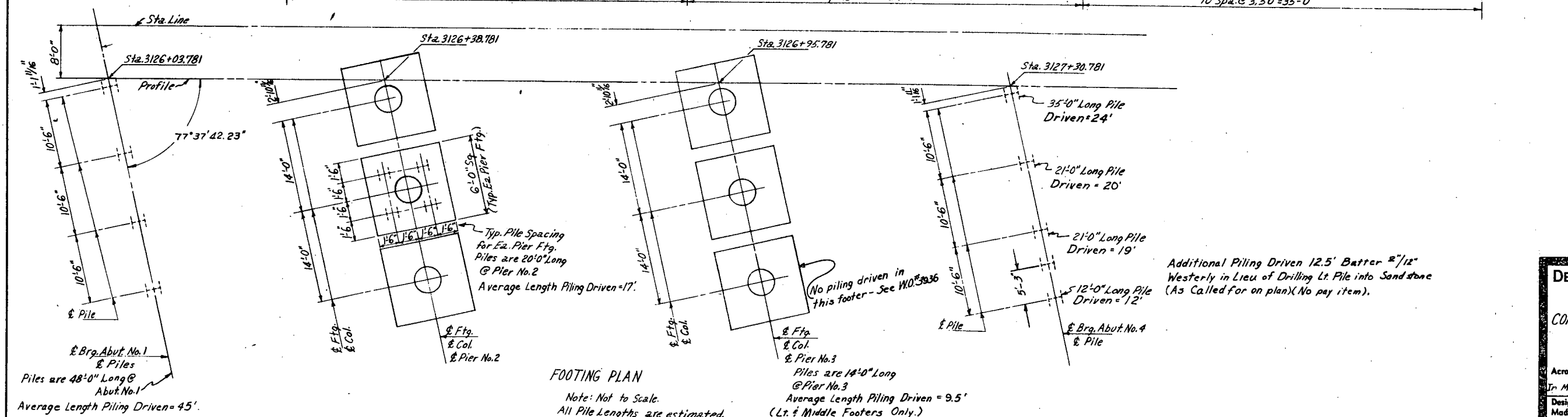
FED. ROAD REG. NO.	DIVISION	PROJECT NO.	SHEET NO.	TOTAL SHEETS
9	COLO.	F017-K(4)	17	

AS CONSTRUCTED
REVISED DATE **OCT 21 1997**



↙ For Details of Retaining Wall see Sht. No. 22.

Tenth Points		£ Brg. Abut. No.1										£ Pier No.2										£ Pier No.3										£ Brg. Abut. No.4																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
Top of Slab to Bott Girder		0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	.1	.2	.3	.4	.5



Additional Piling Driven 12.5' Batter $2\frac{1}{2}''/12''$
Westerly in Lieu of Drilling Lt. Pile into Sandstone
(As Called for on plan)(No pay item).

DEPARTMENT OF HIGHWAYS
STATE OF COLORADO
CONSTRUCTION LAYOUT &
FOOTING PLAN

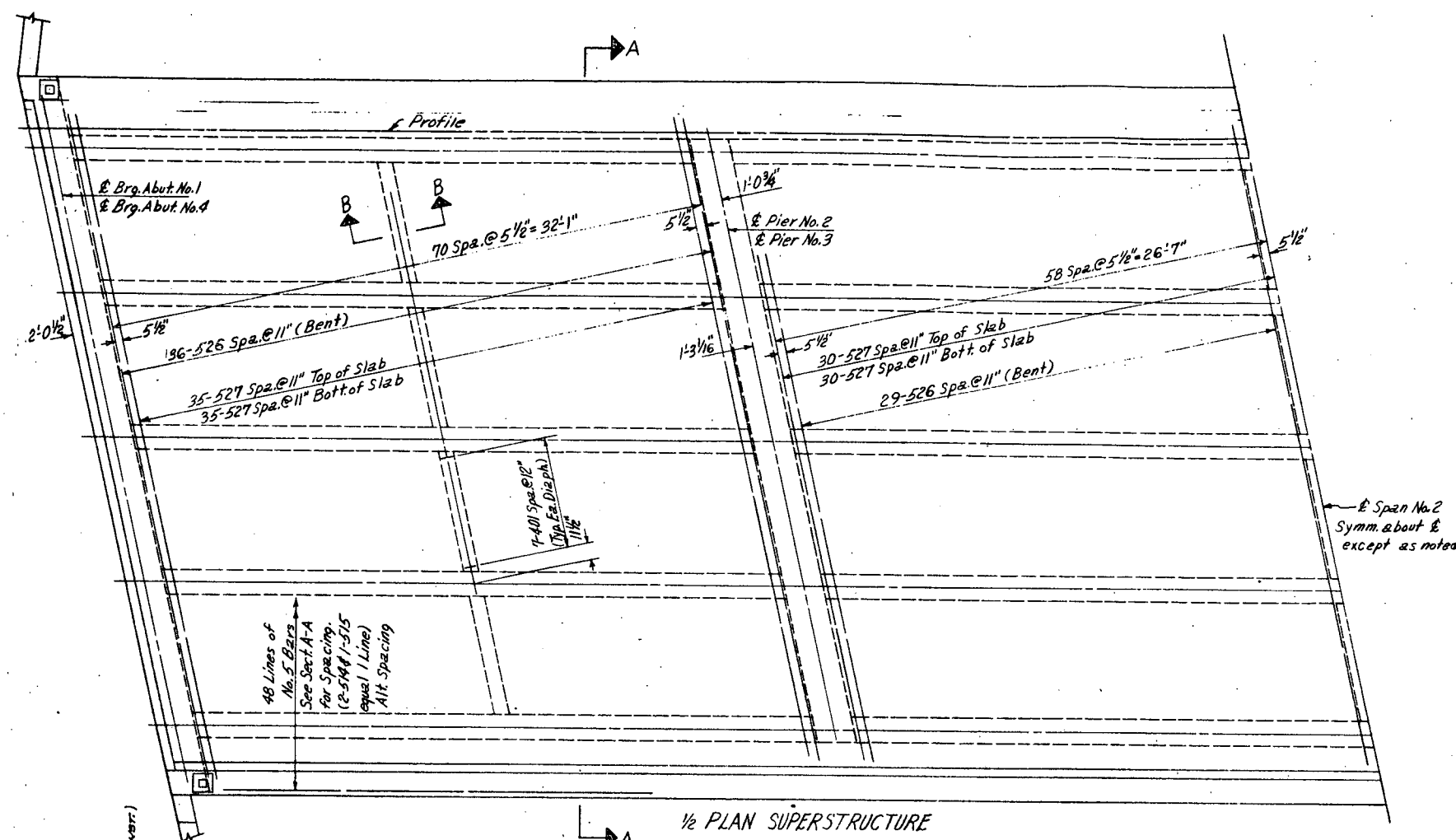
Across Crystal Hills Blvd.
Sta 3126+02.757 to 3127+31.803
In Manitou Springs Sec. 34 T. 14S R. 67W

Designed by <u>J.G.</u>	Approved by <u>Richardson</u>
Made by <u>D.J.S.</u>	Bridge Engineer
Checked by	Date: <u>Apr. 5, 1967</u>

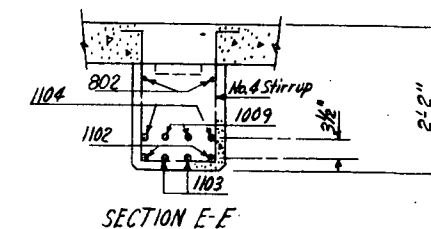
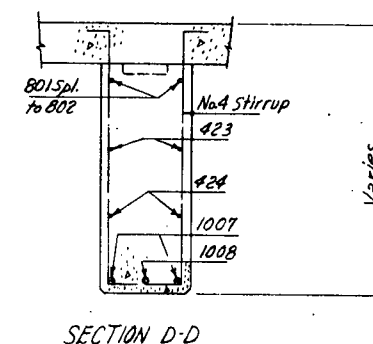
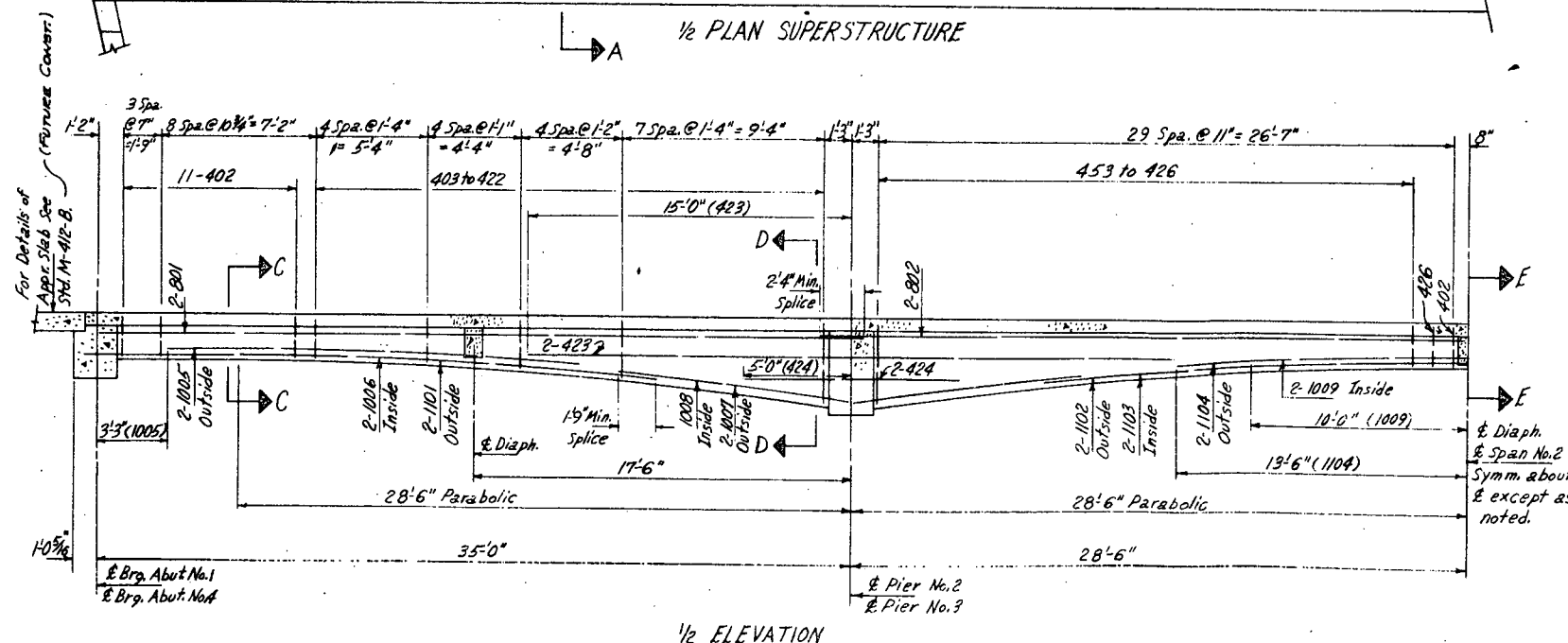
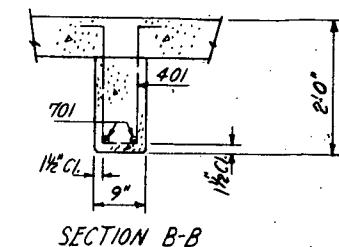
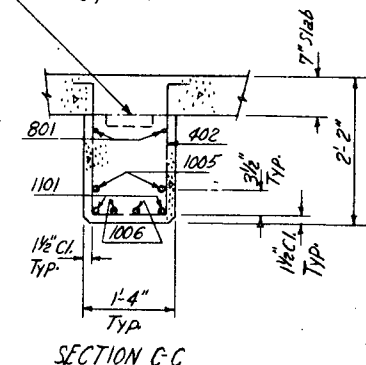
STRUCTURE NO. I-17-GF (East Bound)

FED. ROAD REG. NO.	DIVISION	PROJECT NO.	SHEET NO.	TOTAL SHEETS
9	COLO.	FO17-1(4)	18	

AS CONSTRUCTED
REVISED DATE OCT 2 1967



8"x8"x2" Keys Sp. @ 16" ctrs.
Const. Joint (Leave Rough) Jt
& Key must be clean before
slab is poured.



Note: Girder shoring shall remain in place full length until all pours have reached
a minimum strength of 2400 psi, and the slab shall not be poured until
the girder pours have reached a minimum strength of 2400 psi.

**DEPARTMENT OF HIGHWAYS
STATE OF COLORADO**

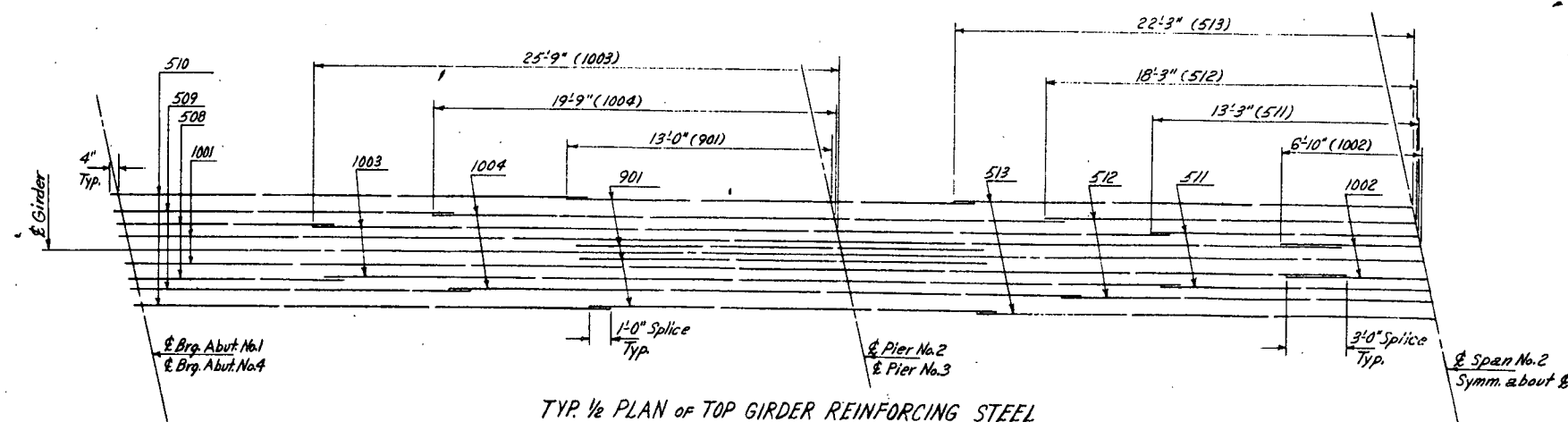
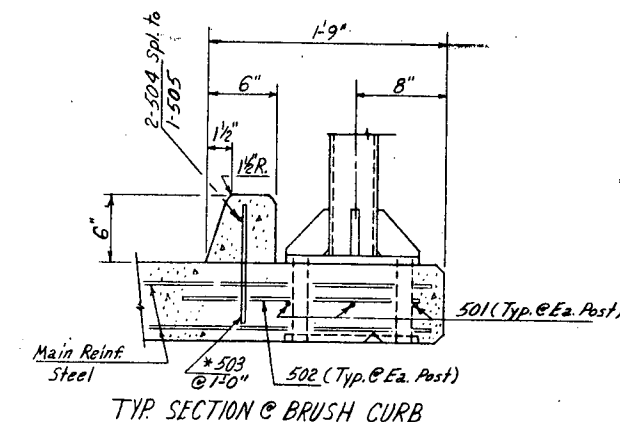
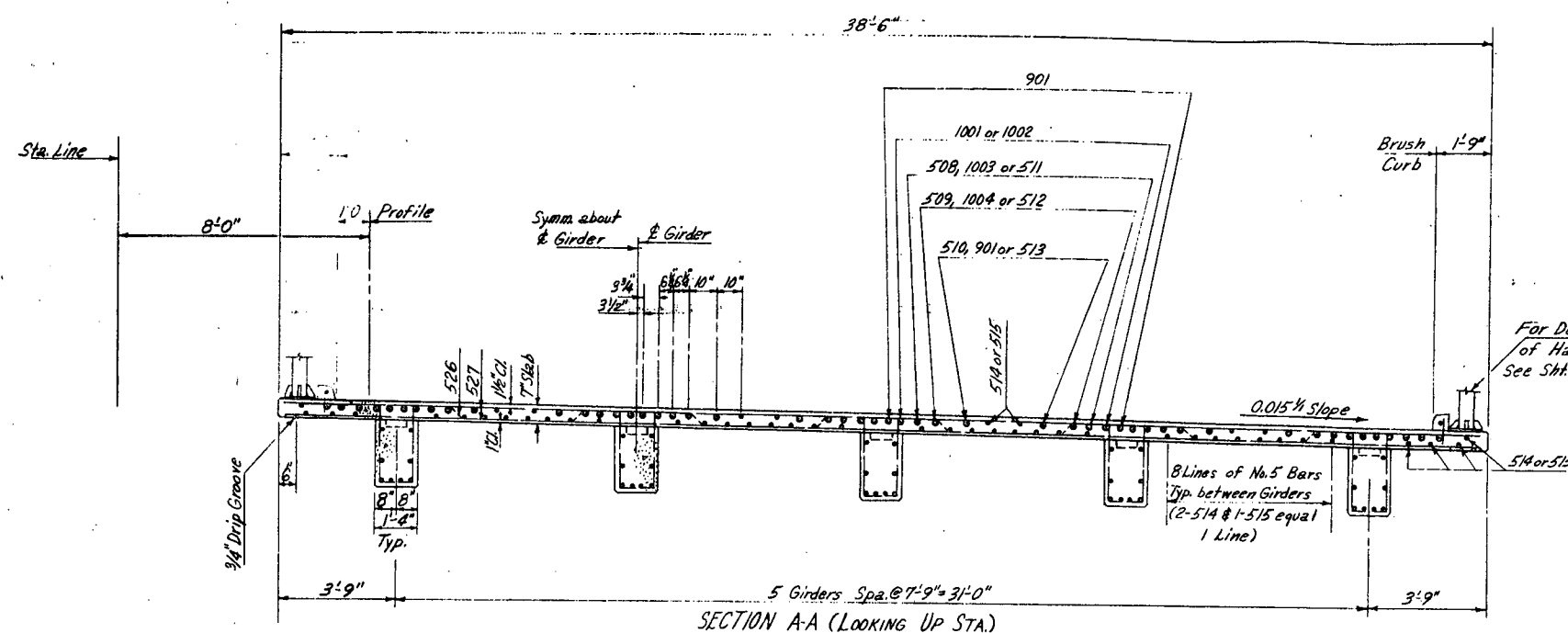
SUPERSTRUCTURE DETAILS

Across Crystal Hills Blvd.
Sta. 3126+02.74 to 3127+31.80
In Manitou Springs Sec. 36 T. 18 S. R. 71W

Designed by J.G. Approved by P. J. S.
Made by D. J. S. Bridge Engineer
Checked by Date: Apr. 5 19 67

FED. ROAD REG. NO.	DIVISION	PROJECT NO.	SHEET NO.	TOTAL SHEETS
9	COLO.	F017-1(4)	19	

AS CONSTRUCTED
REVISED DATE OCT 1 1967



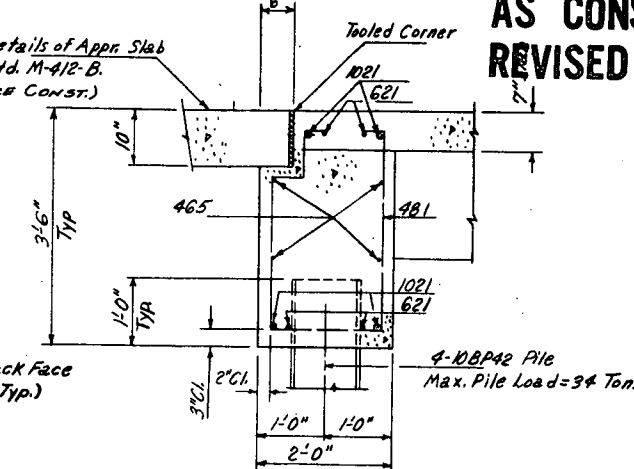
DEPARTMENT OF HIGHWAYS
STATE OF COLORADO
SUPERSTRUCTURE DETAILS

Across Crystal Hills Blvd.
Sta. 3146+00 to 3147+00
In Manitou Springs Sec. 44 T. 14 S. R. 67 W.

Designed by J. G. Made by D. J. S. Checked by
Approved by R. K. M. Bridge Engineer
Date: Dec. 5, 1967

FED. ROAD REG. NO.	DIVISION	PROJECT NO.	EMBT NO.	TOTAL EMBT
9	COLO.	FOTF(14)	20	

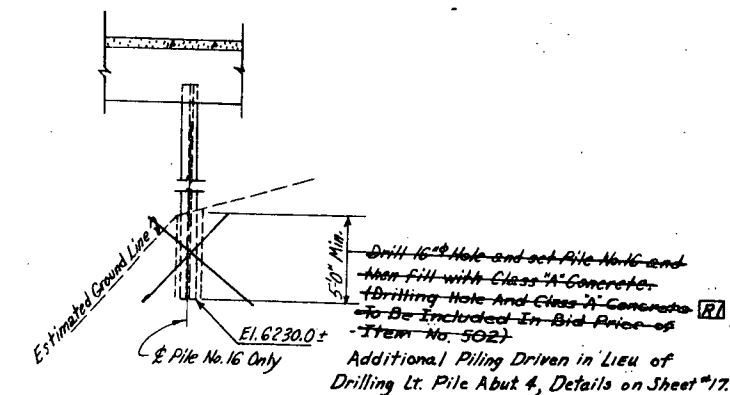
For Details of Appr. Slab
See Std. M-412-B.
(FUTURE CONST.)



- TYP. SECTION @ ABUTMENT

Note: Abut. Cap & Girders below slab shall
be poured monolithically.
Note: All Elevations are at Back Face of Abut

Pile No.	Elevations @ Top of Pile
9	6243.45
10	6243.63
11	6243.81
12	6243.99
13	6242.42
14	6242.24
15	6242.06
16	6241.88



DEPARTMENT OF HIGHWAYS
STATE OF COLORADO
ABUTMENT DETAILS

Across Crystal Hills Blvd.
Sta 3126+02.75 to 3127+31.805
In Manitou Springs, Sec. 34 T. 14S R. 67W

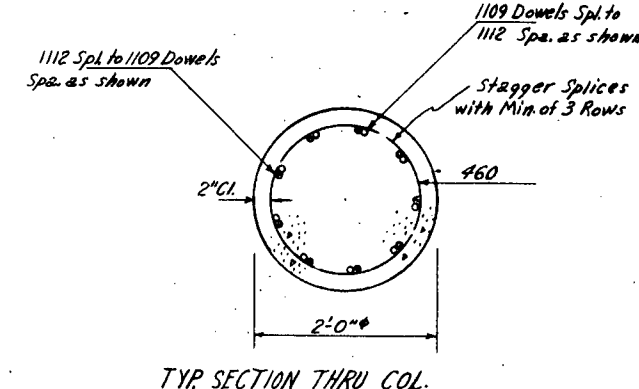
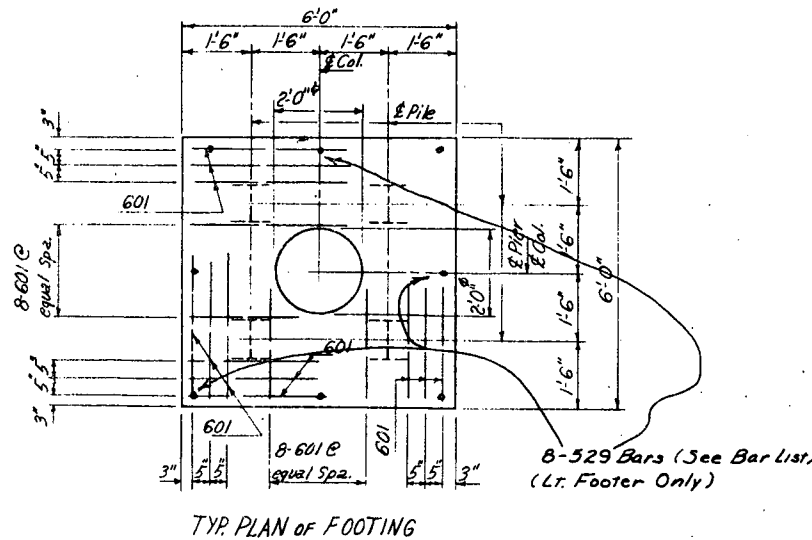
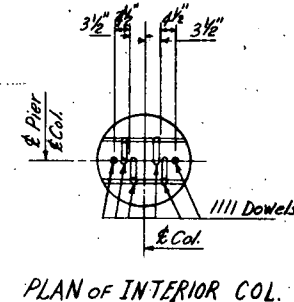
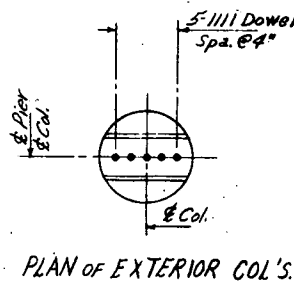
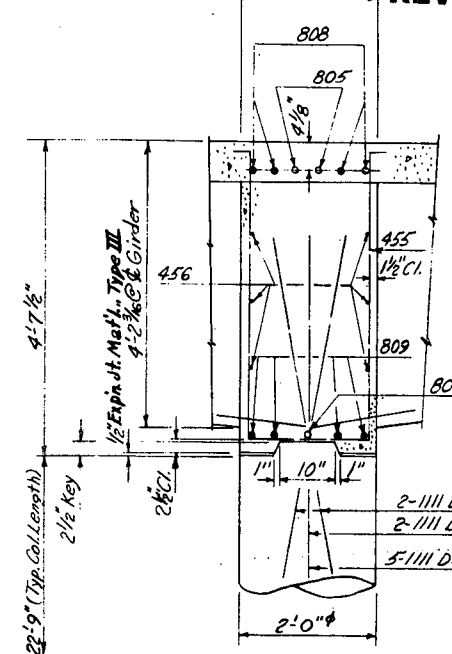
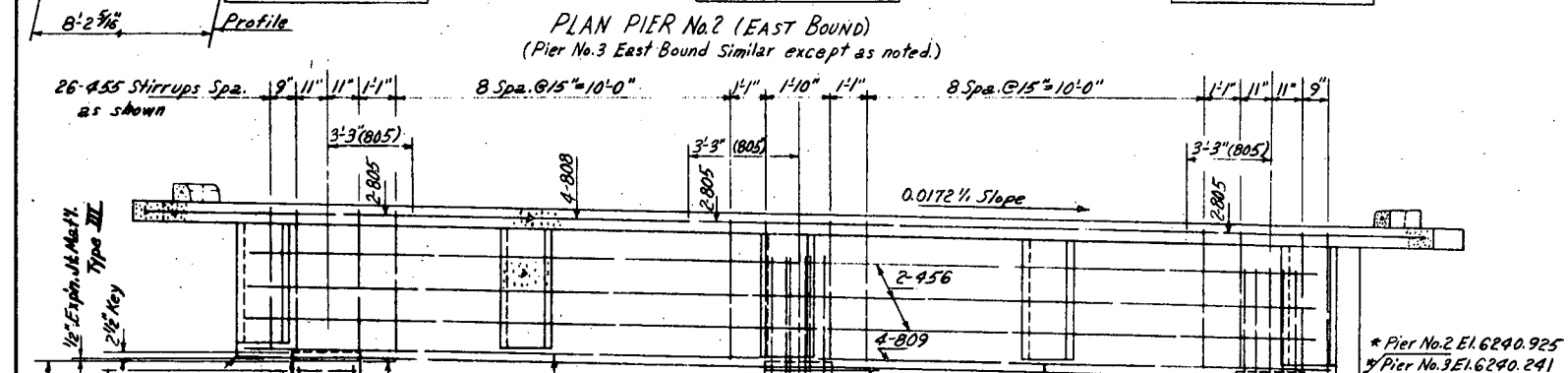
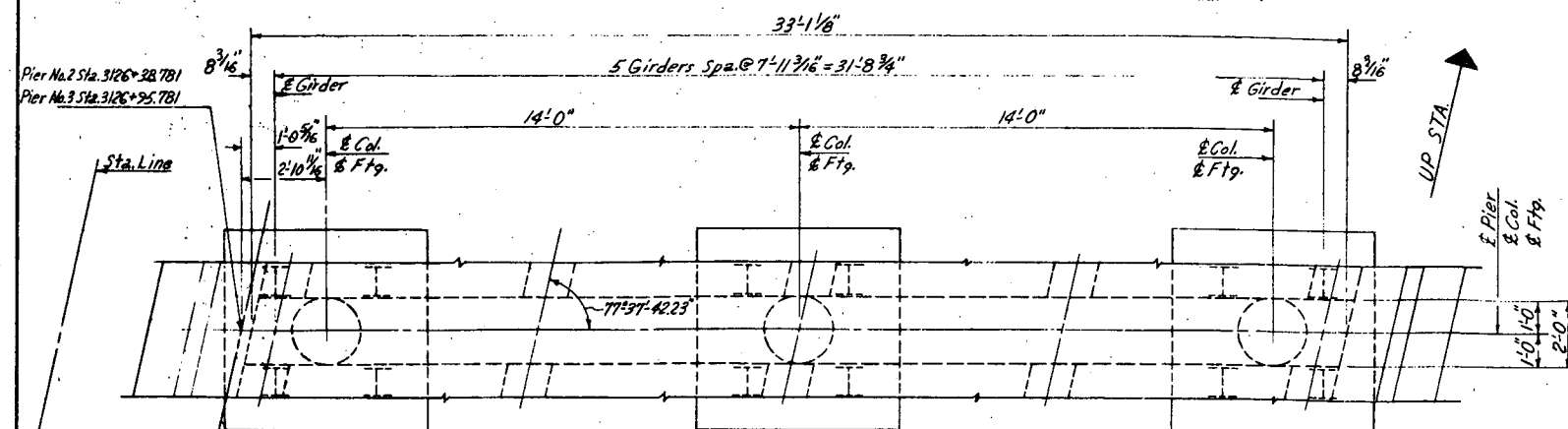
Designed by J.G. Made by D.J. S. Checked by	Approved by <u>Richard S. [Signature]</u> Bridge Engineer Date: <u>Apr. 5, 1967</u>
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STRUCTURE NO. I-17-GE (East Bound)

AS CONSTRUCTED
REVISED DATE OCT 23 1967

FED. ROAD REG. NO.	DIVISION	PROJECT NO.	SHEET NO.	TOTAL SHEETS
9	COLO.	FOIT-114	21	

- (R1) Revised 1109 Dowel Proj. 4-24-67 D. J. S.
(R2) DELETED BRUSH CURB ON HIGH SIDE 7-28-67 AIT

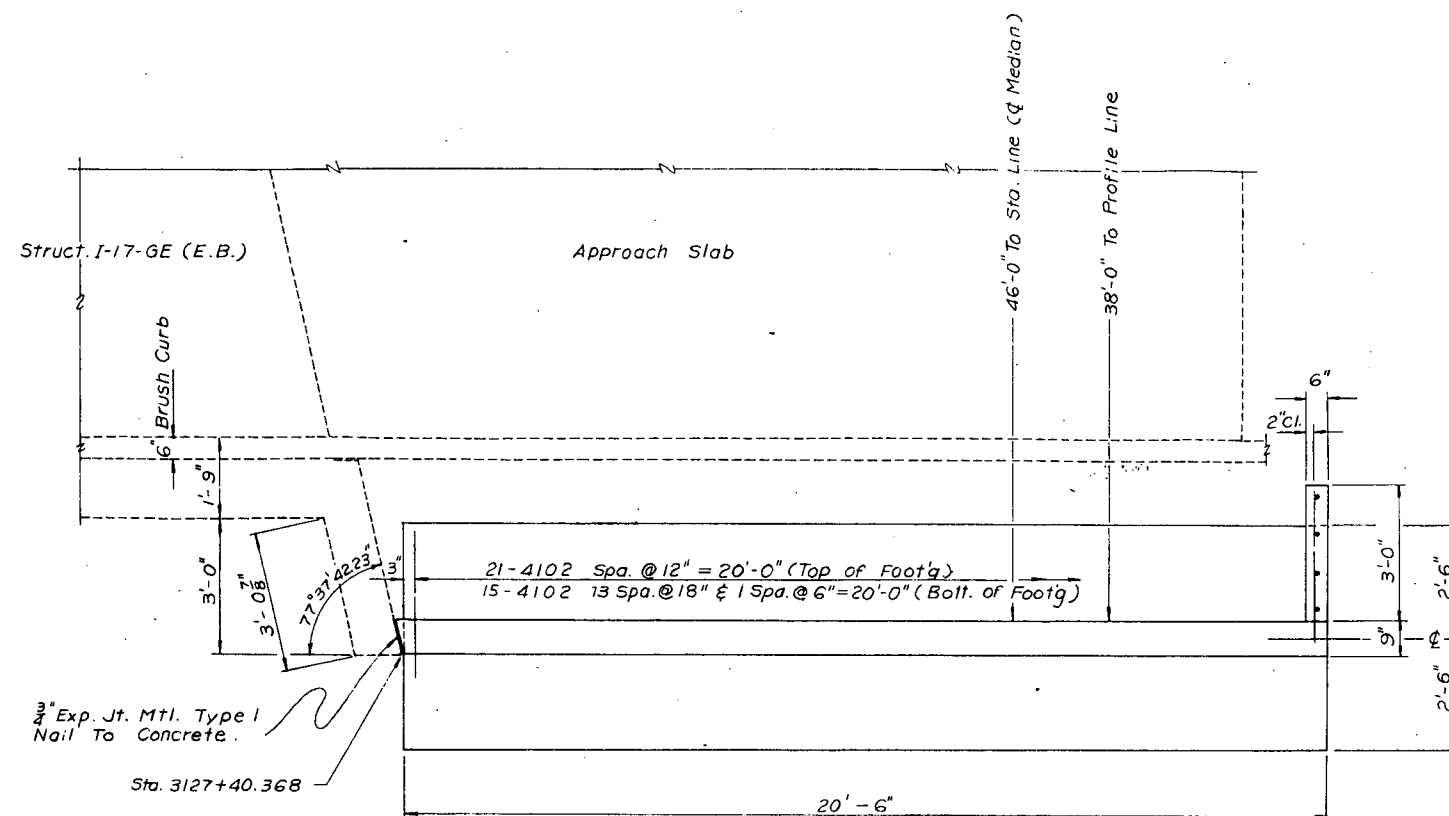


DEPARTMENT OF HIGHWAYS
STATE OF COLORADO
PIER DETAILS

Across Crystal Hills Blvd.
Sta 3126+00 to 3127+00
In Manitou Springs, Sec. 34, T.14S, R.67W

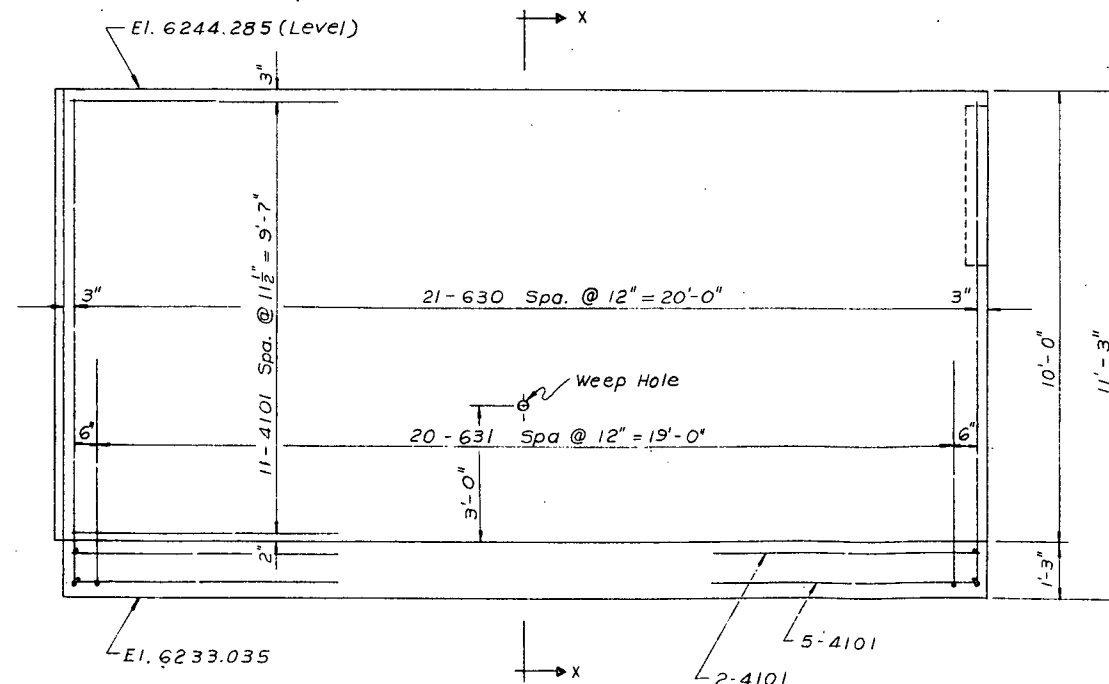
Designed by J.G. Approved by R. J. S.
Made by D. J. S. Bridge Engineer
Checked by Date: Apr. 5, 1967

FED. ROAD REG. NO.	DIVISION	PROJECT NO.	SHEET NO.	TOTAL SHEETS
9	COLO.	FO17-1 (4)	22	

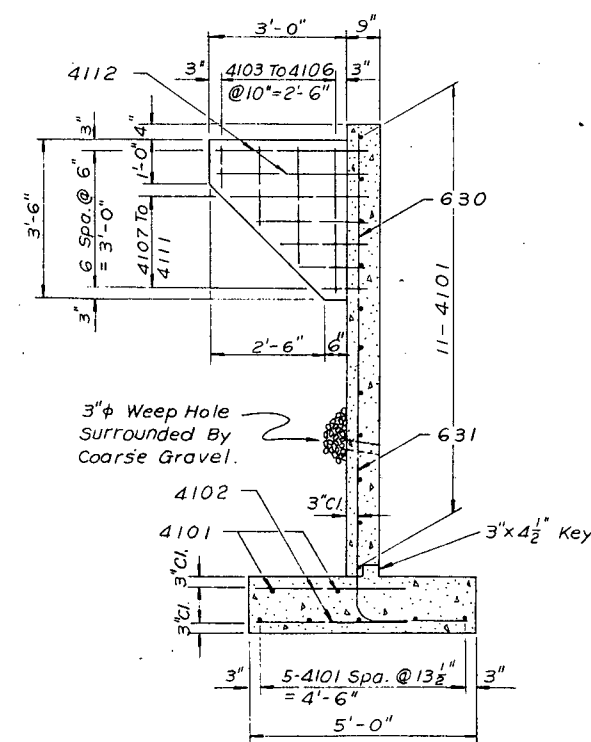


PLAN

NOTE:
Cut Footing In Sandstone
And Do Not Form The Edges.



ELEVATION



SECTION X-X

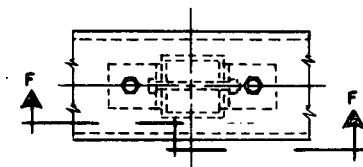
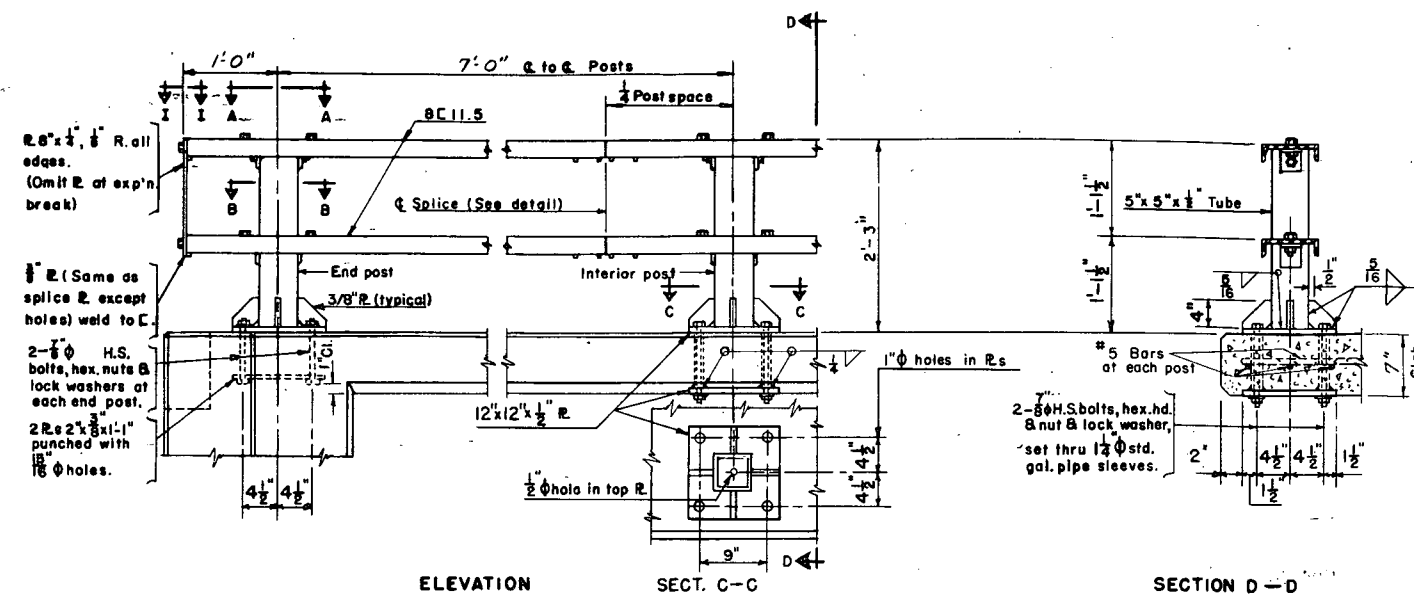
DEPARTMENT OF HIGHWAYS
STATE OF COLORADO

WING WALL DETAIL
FOR EAST & SOUTH END
OF I-17-GE

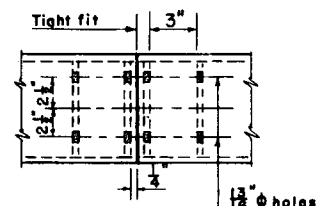
Across CRYSTAL HILLS BLVD.
Sta. 3126+02.757 to 3127+31.805
Near MANitou SPRINGS Sec. 3/4 T. 14S. R. 67W
Designed by J.G. Approved by R. H. H. H.
Made by AIT Bridge Engineer
Checked by Date: Apr 5, 1967

STRUCTURE NO. I-17-GE

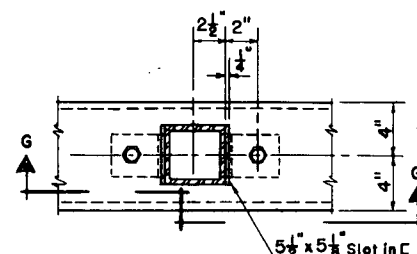
FED. ROAD REG. NO.	DIVISION	PROJECT NO.	SHEET NO.	TOTAL SHEETS
9	COLO.	F017-1(4)	23	



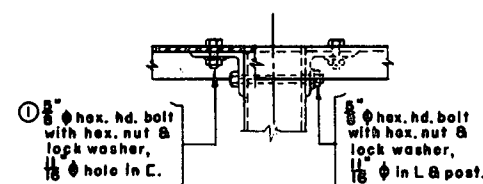
SECTION A-A



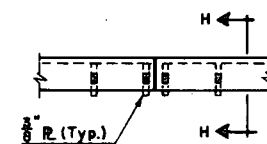
SPICE PLAN



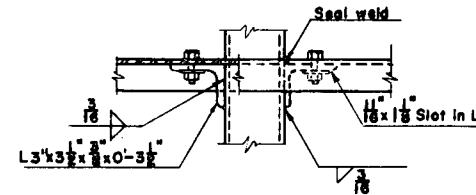
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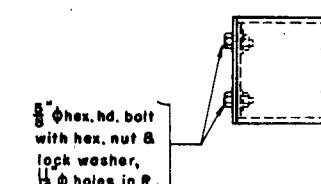
SECTION F-F



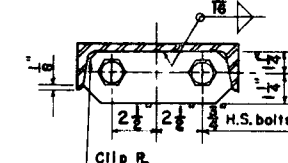
SPICE DETAIL



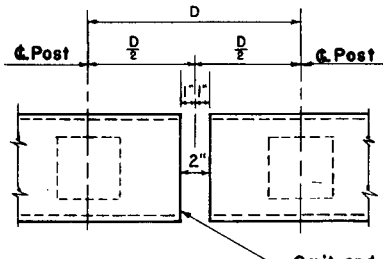
SECTION G-G



SECTION I-I



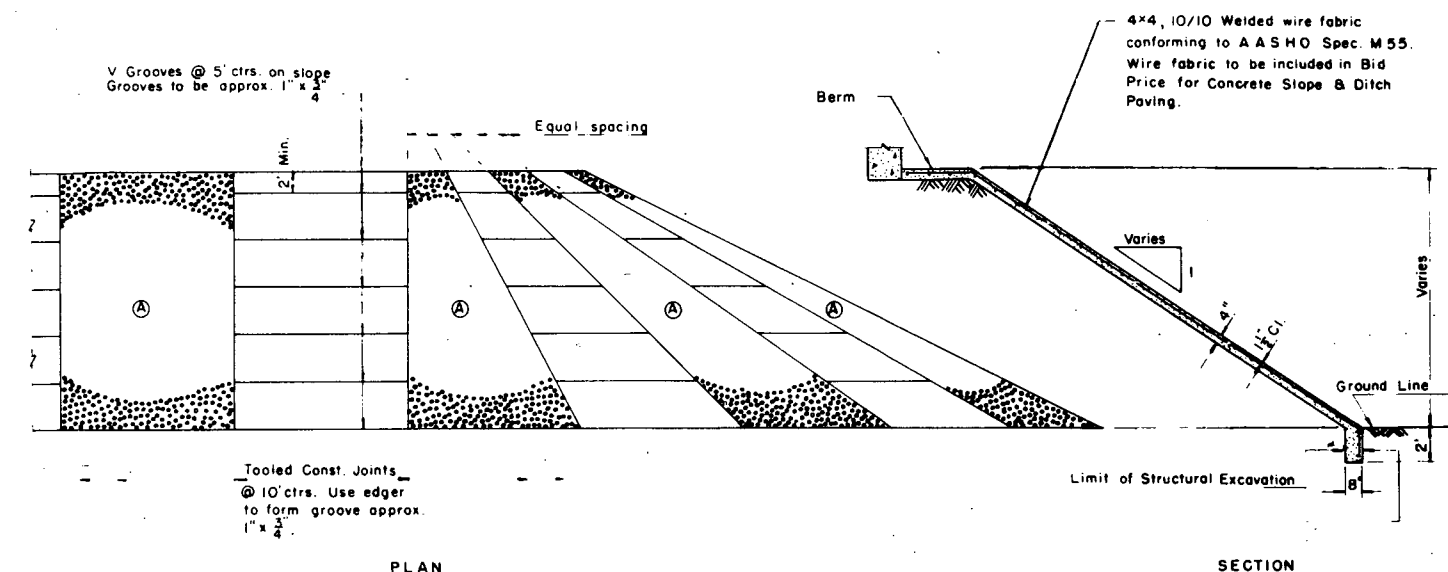
SECTION H-H



DETAIL AT EXP'N. BREAK

- Notes:
- 5" x 5" x 1/2" tube with $f_y = 50,000$ psi may be used in lieu of the posts shown.
 - Posts to be perpendicular to the grade and slope of deck.
 - All rail elements to be galvanized after fabrication in accordance with specifications.
 - A.I.S.I. 1144 steel rods may be used in lieu of H.S. bolts shown. 10" wedge test not required for either bolts or rods used in rail assembly.
 - 5/8" standard full threaded studs welded to the channel may be used. Increase size of slot in the angle to 13/16" x 1/4".
 - Channels to be continuous over 3 or 4 posts before splicing.

GALVANIZED STEEL HANDRAIL DETAILS



NOTE: Slope Paving shall be poured in 10' transverse sections with a tooled construction joint at each section. Mesh to be 2" from end of joint and shall lap 4" at splice. Panels marked thus (A) are to receive an exposed aggregate finish. The exposed aggregate finish shall be made by adding 2 ounces of an approved retarder per sack of cement to the concrete mix being used in the exposed aggregate finish panels. After the concrete is struck to grade, the surface shall be sprayed with an approved retarder at the rate of approximately one gallon per 100 sq ft. of surface area. The surface shall then be sprayed with a curing compound and allowed to set from 4 to 12 hours. The setting time shall be as determined by the Engineer. After setting for the prescribed time the surface shall be broomed and washed with water to expose the aggregate. The exposed aggregate finish shall then be sprayed with a clear curing compound. In all cases the exposed aggregate finish shall be started on the first panel facing oncoming traffic. All work necessary by these requirements shall be included in the Bid Price for Item No. 507.

Note
Coarse aggregate used in exposed aggregate panels shall be composed predominately of stone contrasting in color to that of normal concrete in adjacent panels

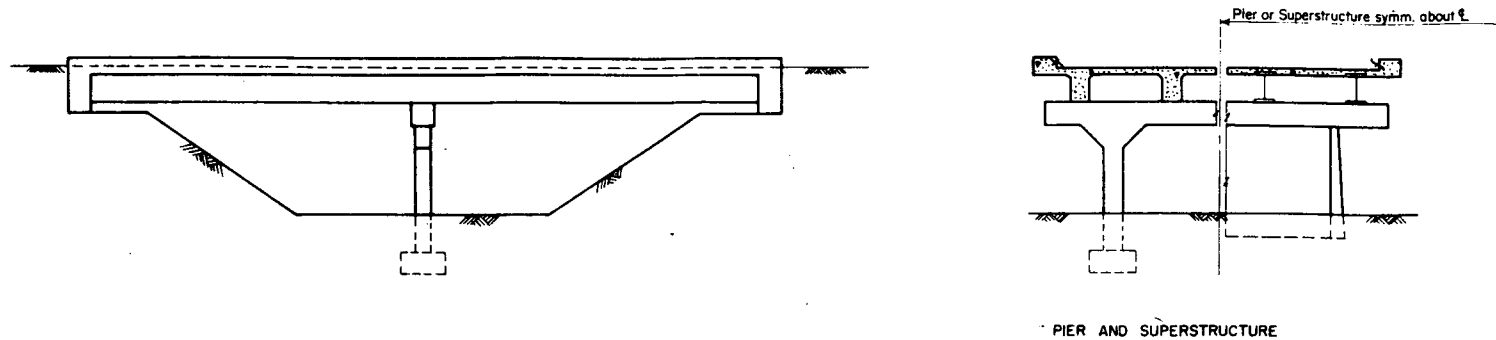
CONCRETE SLOPE & DITCH PAVING DETAILS

I-17-GD (WEST BOUND)
STRUCTURE NO. I-17-GE (EAST BOUND)

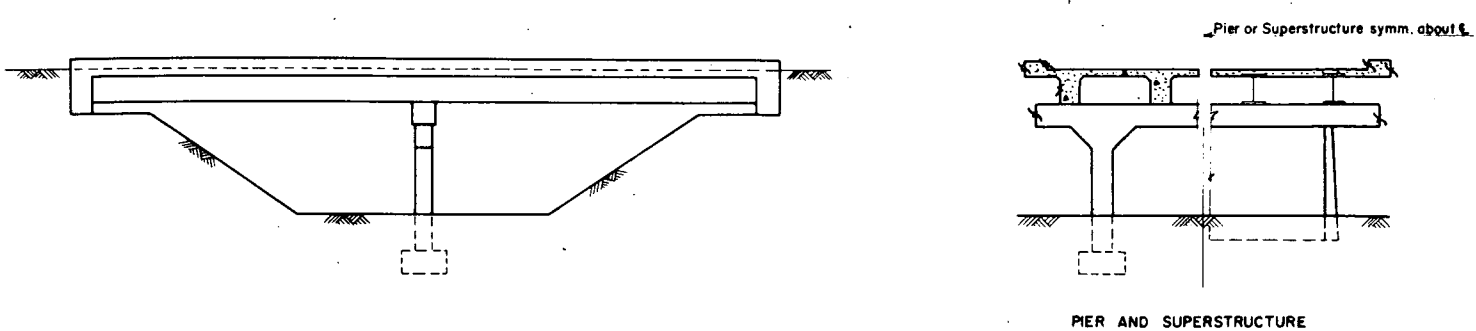
DEPARTMENT OF HIGHWAYS
STATE OF COLORADO
GALV. STEEL HANDRAIL DETAILS
CONC. SLOPE PAVING DETAILS
I-17-GD Sta. 3126+03.400 to 3127+32.400
I-17-GE Sta. 3126+02.751 to 3127+31.805
Across CRYSTAL HILLS BLVD.
Sta. 3126+02.751 to 3127+31.805
Near Manitou Springs
Designed by JG
Made by JRE
Checked by
Approved by R. H. M. R. 67
Bridge Engineer
Date: Apr. 5, 1967

REVISIONS

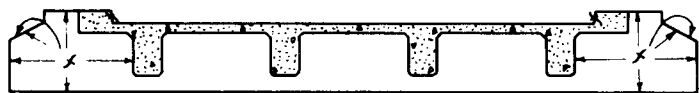
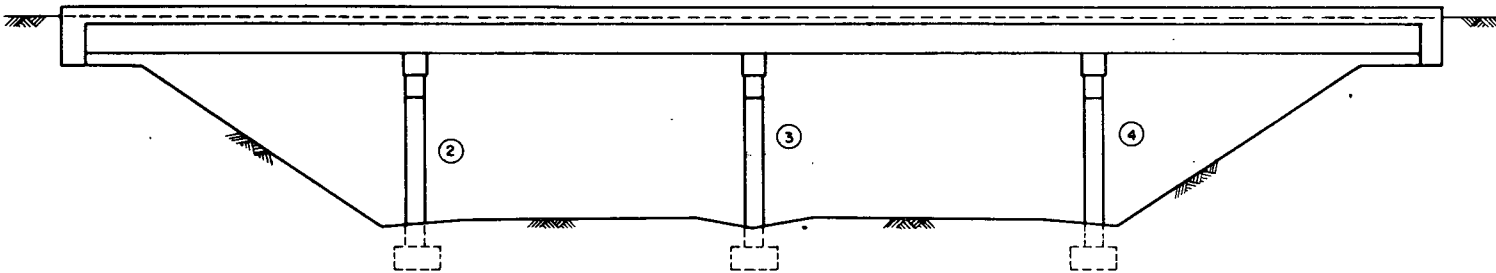
FED. ROAD REGION NO.	DIVISION	PROJECT NO.	SHEET NO.	TOTAL SHEETS
9	COLO.	F017-1 (4)	24	



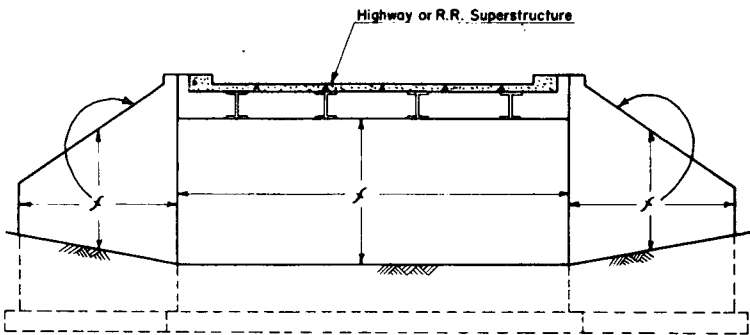
RURAL STREAM CROSSING



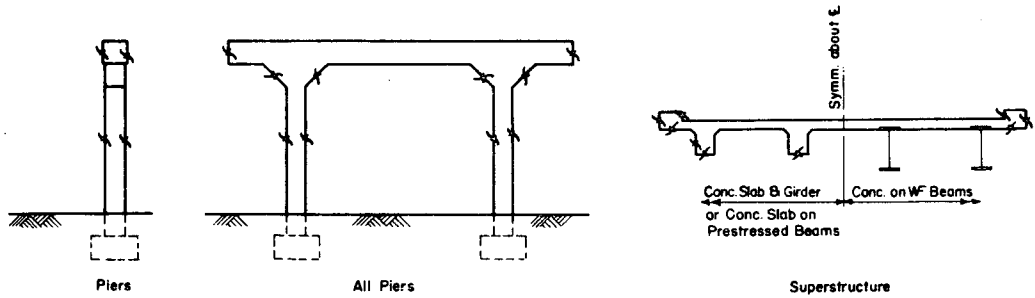
STREAM CROSSING IN OR NEAR URBAN AREA



STUB ABUTMENTS
(Underpass Only)



CANTILEVER ABUTMENTS
(Underpass Only)



In case of round columns the whole column shall receive Class 2 finish on all Piers.

UNDERPASS

COLORADO
DEPARTMENT OF HIGHWAYS

DETAILS SHOWING PORTIONS OF
STRUCTURE TO RECEIVE CLASS 2
SURFACE FINISH.

I-17-GD Sta. 3126+02.400 to 3127+32.400
I-17-GE Sta. 3126+02.400 to 3127+31.805
Across CRYSTAL HILLS BLVD.

Sta. 3126+02.400
Near Manitou Springs Sec. 4/3 T. 14 S. R. 67 N

Designed by A.D.N. Approved by R.A.A. Bridge Engineer
Made by R.A.A. Bridge Engineer
Checked by Date: Apr. 5, 1967

I-17-GD (WEST BOUND)
STRUCTURE NO. I-17-GE (EAST BOUND)

Δc 13°09'30"
Dc 4°00'
~~Tc 165.23'~~
Lc 328.96"
Rc 1432.39"
Ec 9.5'

3126 + ∞ Re-
locate Crystal
Hills Blvd. Reqd.
earthwork, surface
ing, Shoulder Roll
Bsta. 1+50 to
+00.) (Details on
sheet Nos. 6 & 7)

3 1/2" x 80" ∞ Relay
1 5/4" x 100" C, S, P, Cross
Culvert from Sta.
3 1/2" x 100" and 1 1/2"
as Req'd. Type C"
Headwalls, Wingwalls
2 1/2" Side Slopes,
L, F, R; Plunge
Basin with Riprap
118' L; Reinforced
Concrete Slab
Paving in Roadway
Ditch, R; (Detention
Sheet No. 3)
0.4 x 75' 10"

CRYST
0 ± ∞ Req'd. Identification
Signature
2 ± ∞ Req'd. Embankment
Protector (Type 5), Lt.
5 ± ∞ Req'd. Embankment
Protector ~~(Type 5)~~, Rt.
Conc. Slope Pav.

12+50 ~ Req'd 24" x 60' Cross
Culvert End Sections Lt &

Culvert End Sections, Lt. & Rt.
Inlet Basin with Reinforced Conc.
Slope & Ditch Paving, Lt. & Rt. (Slope = 75° Lt.)
13+ Req'd Identification Sign, Lt.

AS CONSTRUCTED
REVISED DATE OCT 23 1967

*Power Line Belongs to
City of Colorado Springs.*



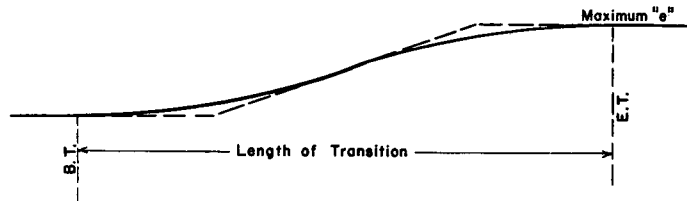
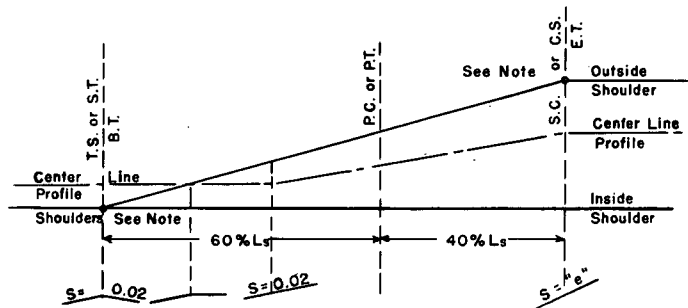
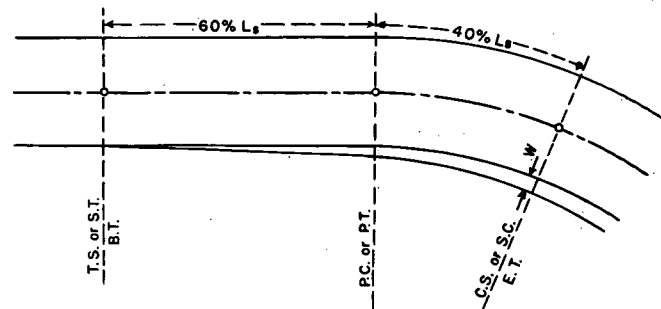
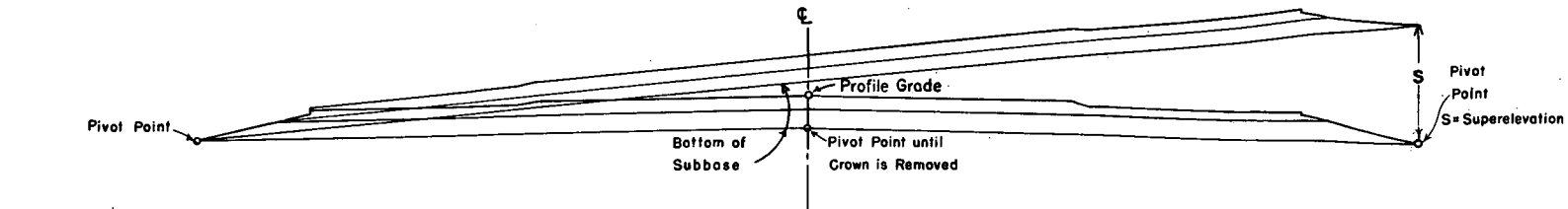
STA. 3126 + 03.1 BEGIN F 017-1(4) ^R
 STA. 3126 + 03.1 ON F 017-1(5) (Future Const.) ^{Pre}
 ST. 2123 + 79.56 Bk. - EQUATION
 3121 + 59.02 1h

STA. 3127+32.1 END F 017-1(4)
STA. 3127+32.1 ON F 017-1(5) (Future Const.)



STANDARD M-203-A
(JULY 1, 1965)

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



NOTE -
For obtaining smooth profiles on pavement edges, vertical curves can be inserted between the angular breaks at the beginning and the end of the super-elevation transition.

PAVEMENT WIDENING

Pavement Width	20 Ft.	22 Ft.	24 Ft.
Degree of Curve			
0° - 3°	0 Ft.	0 Ft.	0 Ft.
4° - 6°	2.0 Ft.	0 Ft.	0 Ft.
7° - 10°	2.5 Ft.	0 Ft.	0 Ft.
11° - 17°	3.0 Ft.	2.0 Ft.	0 Ft.
18° - 21°	3.5 Ft.	2.5 Ft.	0 Ft.
22° - Up	4.0 Ft.	3.0 Ft.	2.0 Ft.

Widening is to be on the inside edge of the pavement and the transition is to extend over the same transition length as the super-elevation.

REVISIONS	

SUPERELEVATION RATES
FOR TWO LANE CROWNED SECTION
TABLE 1

Degree of Curve	Maximum Superelevation = 0.08			Maximum Superelevation = 0.10		
	Super. Rate Ft./Ft.	Maximum Design Speed M.P.H.	Minimum Transition or Spiral Length	Super. Rate Ft./Ft.	Maximum Design Speed M.P.H.	Minimum Transition or Spiral Length
0°15'	R C	70	200'	R C	70	200'
0°30'	R C	70	200'	R C	70	200'
0°45'	.021	70	200'	.021	70	200'
1°00'	.028	70	200'	.028	70	200'
1°30'	.042	70	200'	.042	70	200'
2°00'	.056	70	200'	.055	70	200'
2°30'	.069	70	200'	.069	70	200'
3°00'	.076	70	250'	.083	70	250'
3°30'	.080	70	250'	.096	70	300'
4°	.080	65	250'	.100	65	300'
5°	.080	60	250'	.100	60	300'
6°	.080	55	200'	.100	55	250'
7°	.080	50	200'	.100	50	250'
8°	.080	45	200'	.100	45	250'
9°	.080	45	200'	.100	45	250'
10°	.080	40	200'	.100	45	250'
11°	.080	40	200'	.100	40	200'
12°	.080	40	200'	.100	40	200'
13°	.080	35	150'	.100	40	200'
14°	.080	35	150'	.100	35	200'
15°	.080	35	150'	.100	35	200'
16°	.080	35	150'	.100	35	200'
17°	.080	30	150'	.100	35	200'
18°	.080	30	150'	.100	30	200'
19°	.080	30	150'	.100	30	200'
20°	.080	30	150'	.100	30	200'
21°	.080	30	150'	.100	30	200'
22°	.080	30	150'	.100	30	200'
23°	.080	30	150'	.100	30	200'
24°	.080	30	150'	.100	30	200'
25°	.080	30	150'	.100	30	200'

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

SUPERELEVATION RATES
FOR SPECIAL CASES
TABLE 2

Degree of Curve	30 M.P.H.			35 M.P.H.			40 M.P.H.			45 M.P.H.			50 M.P.H.			55 M.P.H.			60 M.P.H.			Degree of Curve
	Required Superelevation Rate Ft./Ft.	Minimum Length of Transition or Spiral		Required Superelevation Rate Ft./Ft.	Minimum Length of Transition or Spiral		Required Superelevation Rate Ft./Ft.	Minimum Length of Transition or Spiral		Required Superelevation Rate Ft./Ft.	Minimum Length of Transition or Spiral		Required Superelevation Rate Ft./Ft.	Minimum Length of Transition or Spiral		Required Superelevation Rate Ft./Ft.	Minimum Length of Transition or Spiral		Required Superelevation Rate Ft./Ft.	Minimum Length of Transition or Spiral		
0°15'	NC	NC	0	NC	NC	0	NC	NC	0	NC	NC	0	NC	NC	0	NC	NC	0	NC	NC	0	0°15'
0°30'	NC	NC	0	NC	NC	0	NC	NC	0	NC	NC	0	NC	NC	0	NC	NC	0	NC	NC	0	0°30'
0°45'	NC	NC	0	NC	NC	0	NC	NC	0	NC	NC	0	NC	NC	0	NC	NC	0	NC	NC	0	0°45'
1°00'	NC	NC	0	NC	NC	0	NC	NC	0	NC	NC	0	NC	NC	0	NC	NC	0	NC	NC	0	1°00'
1°30'	RC	RC	100'	RC	RC	150'	RC	RC	150'	.023	.024	150'	.027	.027	150'	.031	.031	200'	.035	.034	200'	1°30'
2°00'	RC	RC	100'	RC	.021	150'	.025	.027	150'	.030	.032	150'	.035	.036	150'	.041	.042	200'	.047	.046	200'	2°00'
2°30'	RC	RC	100'	.025	.026	150'	.030	.033	150'	.036	.039	150'	.043	.045	150'	.050	.052	200'	.057	.059	200'	2°30'
3°00'	.023	.024	100'	.029	.031	150'	.035	.038	150'	.042	.046	150'	.050	.054	150'	.057	.062	200'	.066	.070	200'	3°00'
3°30'	.026	.027	100'	.033	.035	150'	.040	.045	150'	.048	.053	150'	.056	.063	150'	.064	.072	200'	.072	.081	250'	3°30'
4°	.029	.030	100'	.037	.040	150'	.044	.050	150'	.053	.060	150'	.062	.070	200'	.069	.079	200'	.076	.090	250'	4°
5°	.035	.038	100'	.044	.048	150'	.053	.060	150'	.062	.071	200'	.070	.083	200'	.077	.091	250'	.080	.099	300'	5°
6°	.041	.044	100'	.050	.056	150'	.060	.068	150'	.069	.080	200'	.076	.093	250'	.080	.098	250'		.100	300'	6°
7°	.045	.050	100'	.056	.063	150'	.066	.076	150'	.074	.088	200'	.079	.097	250'							7°
8°	.050	.055	100'	.061	.069	150'	.071	.084	200'	.078	.094	200'	.080	.100	250'							8°
9°	.054	.061	100'	.065	.075	150'	.074	.089	200'	.080	.097	250'										9°
10°	.058	.065	150'	.069	.081	150'	.077	.093	200'	.080	.100	250'										10°
11°	.061	.070	150'	.072	.085	200'	.079	.096	200'													11°
12°	.065	.074	150'	.075	.089	200'	.080	.098	200'													12°
13°	.067	.078	150'	.077	.092	200'		.100	200'													13°
14°	.070	.082	150'	.078	.095	200'																
15°	.072	.085	150'	.079	.097	200'																
16°	.074	.087	150'	.080	.099	200'																
17°	.076	.090	150'		.100	200'																
18°	.077	.093	200'		.100	200'																
19°	.078	.095	200'																			
20°	.079	.096	200'																			
21°	.080	.098	200'																			
22°	.080	.099	200'																			
23°	.080	.099	200'																			
24°	.080	.099	200'																			
25°	.080	.099	200'																			

NOTES—Transition or Spiral Lengths are shown in the tables for 2 Lane Crowned Highways.
For 3 Lane Crowned Highways use 1.2 times the lengths shown, rounded to the nearest 50 feet.
Width of Crowned Highway to be figured for Super-elevation—left pivot point to right pivot point.

Table 2 data may be used for City Streets & Interchanges.
NC=Normal Crown section.
RC=Remove adverse crown, super-elevate at normal crown slope.

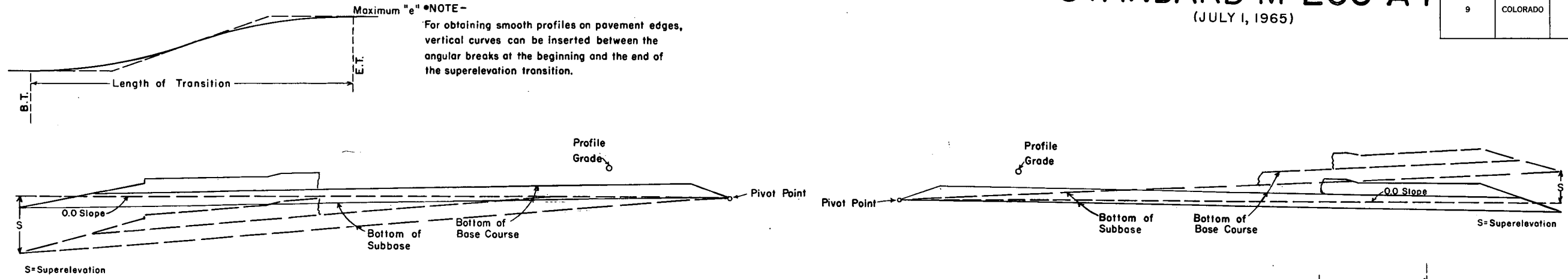
DEPARTMENT OF HIGHWAYS
STATE OF COLORADO

SUPERELEVATION &
WIDENING OF CURVES
CROWNED HIGHWAYS

Designed by S.B.L.
Made by S.B.L.
Checked by L.E.O.
Approved by
Staff Design Engr.
Date

STANDARD M-203-A-1
(JULY 1, 1965)

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



SUPERELEVATION RATES
FOR FOUR LANE DIVIDED SECTION
TABLE 1

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

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

° When Curve is Not Spiralled

SUPERELEVATION RATES
FOR SPECIAL CASES
TABLE 2

Degree of Curve	25 M.P.H.			30 M.P.H.			35 M.P.H.			40 M.P.H.			45 M.P.H.			50 M.P.H.			55 M.P.H.			60 M.P.H.			Degree of Curve
	Required Super. Rate Ft./Ft.	Minimum Length of Transition or Spiral		Required Super. Rate Ft./Ft.	Minimum Length of Transition or Spiral		Required Super. Rate Ft./Ft.	Minimum Length of Transition or Spiral		Required Super. Rate Ft./Ft.	Minimum Length of Transition or Spiral		Required Super. Rate Ft./Ft.	Minimum Length of Transition or Spiral		Required Super. Rate Ft./Ft.	Minimum Length of Transition or Spiral		Required Super. Rate Ft./Ft.	Minimum Length of Transition or Spiral		Required Super. Rate Ft./Ft.	Minimum Length of Transition or Spiral		
0° 15'	NS	NS	0	NS	NS	0	NS	NS	0	NS	NS	0	NS	NS	0	NS	NS	0	NS	NS	0	NS	NS	0	0° 15'
0° 30'	NS	NS	0	NS	NS	0	NS	NS	0	NS	NS	0	NS	NS	0	NS	NS	0	NS	NS	0	NS	NS	0	0° 30'
0° 45'	NS	NS	0	NS	NS	0	NS	NS	0	NS	NS	0	NS	NS	0	NS	NS	0	NS	NS	0	NS	NS	0	0° 45'
1° 00'	NS	NS	0	NS	NS	0	NS	NS	0	NS	NS	0	NS	NS	0	NS	NS	0	NS	NS	0	NS	NS	0	1° 00'
1° 30'	NS	NS	0	RC	RC	100'	RC	.016	150'	.019	.020	150'	.023	.024	150'	.027	.027	150'	.031	.031	200'	.035	.034	200'	1° 30'
2° 00'	RC	RC	100'	.016	.016	100'	.020	.021	150'	.025	.027	150'	.030	.032	150'	.035	.036	150'	.041	.042	200'	.047	.046	200'	2° 00'
2° 30'	RC	RC	100'	.020	.020	100'	.025	.026	150'	.030	.033	150'	.036	.039	150'	.043	.045	150'	.050	.052	200'	.057	.059	200'	2° 30'
3° 00'	.016	.017	100'	.023	.024	100'	.029	.031	150'	.035	.038	150'	.042	.046	150'	.050	.054	150'	.057	.062	200'	.066	.070	250'	3° 00'
3° 30'	.019	.019	100'	.026	.027	100'	.033	.035	150'	.040	.045	150'	.048	.053	150'	.056	.063	200'	.064	.072	250'	.072	.081	300'	3° 30'
4°	.021	.021	100'	.029	.030	100'	.037	.040	150'	.044	.050	150'	.053	.060	150'	.062	.070	200'	.069	.079	250'	.076	.090	300'	4°
5°	.026	.026	100'	.035	.038	100'	.044	.048	150'	.053	.060	150'	.062	.071	200'	.070	.083	250'	.077	.091	300'	.080	.099	350'	5°
6°	.031	.031	100'	.041	.044	100'	.050	.056	150'	.060	.068	150'	.069	.080	200'	.076	.093	250'	.080	.098	300'	.100			6°
7°	.035	.035	100'	.045	.050	100'	.056	.063	150'	.066	.076	200'	.074	.088	250'	.079	.097	300'							7°
8°	.039	.040	100'	.050	.055	100'	.061	.069	150'	.071	.084	200'	.078	.094	250'	.080									8°
9°	.043	.044	100'	.054	.061	100'	.065	.075	150'	.074	.089	200'	.080	.097	300'										9°
10°	.046	.048	100'	.058	.065	150'	.069	.081	150'	.077	.093	200'													10°
11°	.049	.052	100'	.061	.070	150'	.072	.085	200'	.079	.096	250'													11°
12°	.052	.056	100'	.065	.074	150'	.075	.089	200'	.080	.098	250'													12°
13°	.054	.060	100'	.067	.078	150'	.077	.092	200'		.100	250'													13°
14°	.057	.063	100'	.070	.082	150'	.078	.095	200'																14°
15°	.059	.067	100'	.072	.085	150'	.079	.097	200'																
16°	.061	.070	100'	.074	.087	150'	.080	.099	200'																
17°	.063	.073	100'	.076	.090	150'																			
18°	.065	.076	100'	.077	.093	200'																			
19°	.067	.078	100'	.078	.095	200'																			
20°	.069	.081	100'	.079	.096	200'																			
21°	.070	.083	100'	.080	.098	200'																			
22°	.072	.086	100'	.080	.099	200'																			
23°	.073	.088	100'		.099	200'																			
24°	.075	.090	100'		.100	200'																			
25°	.076	.091	100'																						
26°	.077	.093	150'																						
27°	.078	.094	150'																						
28°	.079	.096	150'																						
29°	.079	.097	150'																						
30°	.080	.098	150'																						
32°	.080	.099	150'																						
35°		.100	150'																						

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

DEPARTMENT OF HIGHWAYS
STATE OF COLORADO

SUPERELEVATION
OF CURVES
DIVIDED HIGHWAYS

Designed by S.B.L. Approved by
Made by S.B.L. Staff Design Engr.
Checked by L.E.O. Date

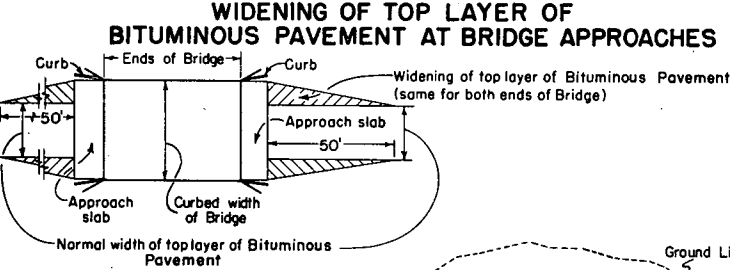
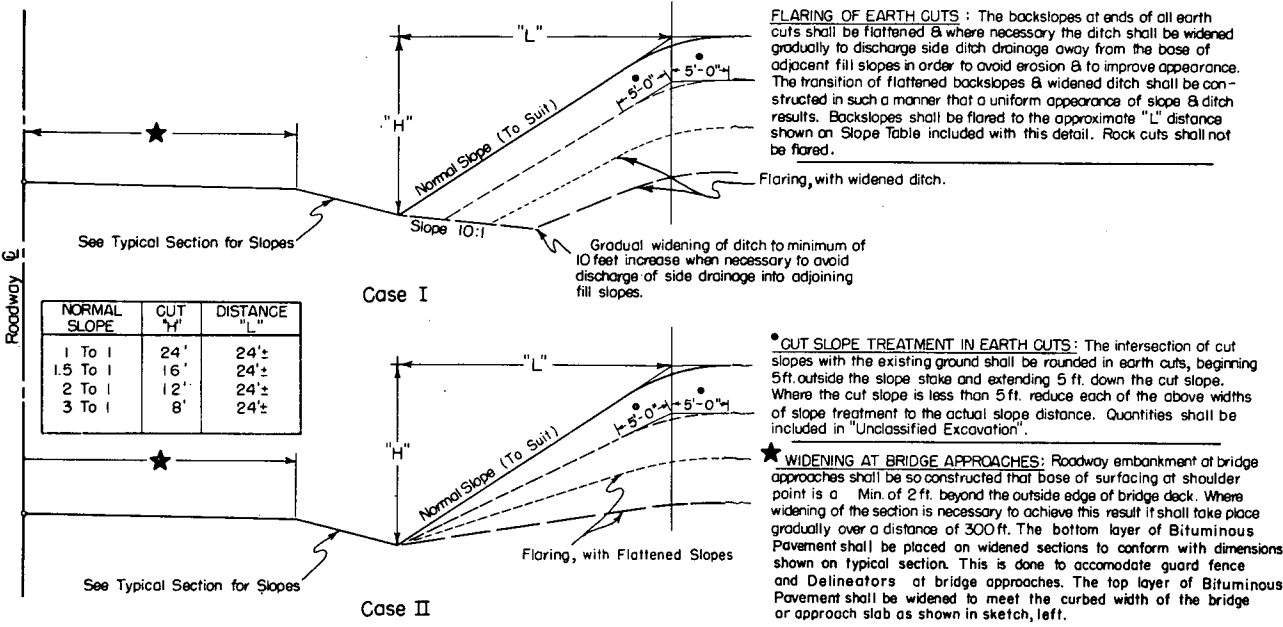
STANDARD SIDE APPROACH ROADS, FLARING, CUT SLOPE TREATMENT & WIDENING AT BRIDGES AND AT CREST OF GRADES

STANDARD M-203-B
(JULY 1, 1965)

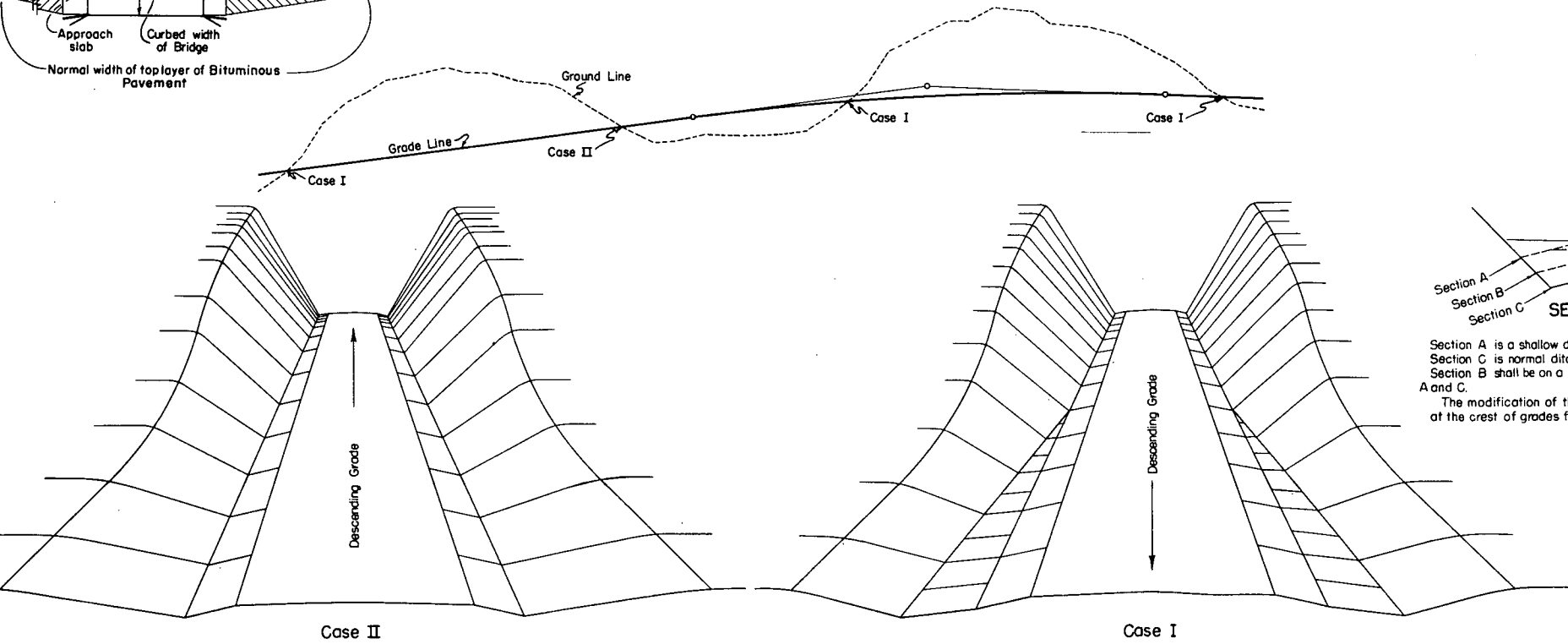
FED. ROAD REG. NO.	DIVISION	PROJECT NO.	SHEET NO.
9	COLO.		

REVISIONS	

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

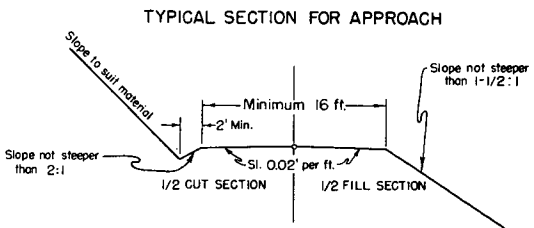
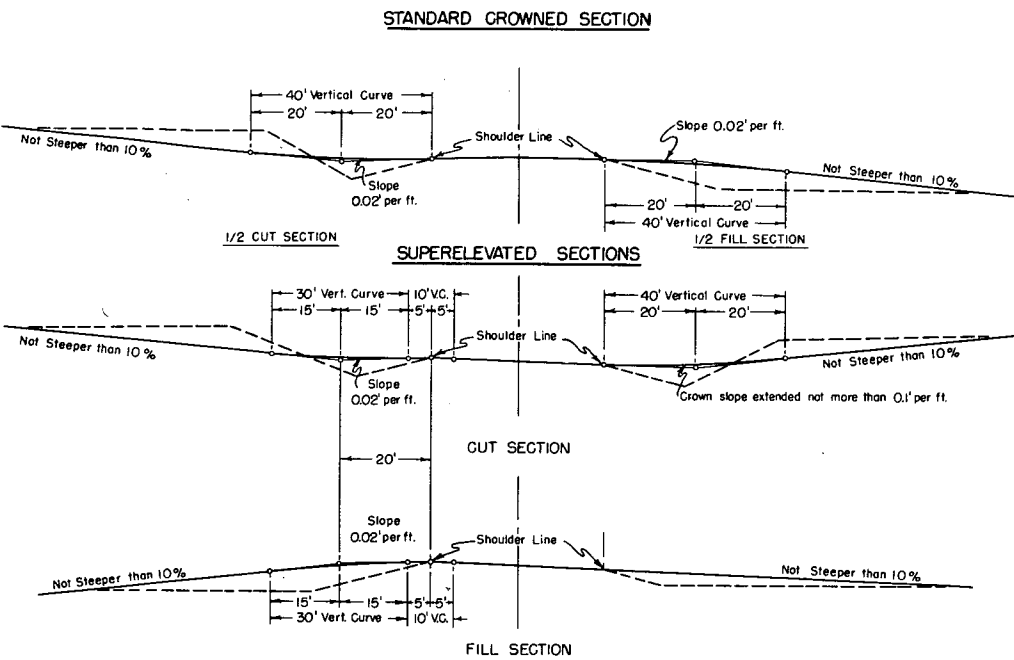


PLAN OF FLARING IN EARTH CUTS



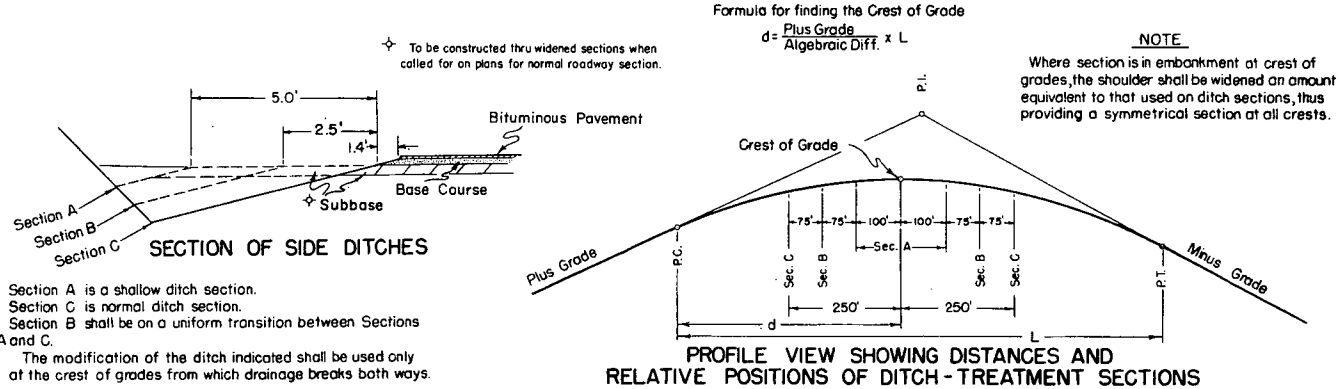
TYPICAL PLANS FOR SIDE APPROACH ROADS

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



NOTE:
Road Approaches shall conform to the above details unless otherwise indicated on plans. The width of the crowned section shall not be less than the width of the crowned section of the existing approach road and the new construction shall not be less than 16 feet in width.

DETAILS FOR DITCH & WIDENED SHOULDERS AT CREST OF GRADES
(TO BE USED ONLY WHERE SIGHT DISTANCE AT CREST OF GRADE IS 600 FT. OR LESS)



GENERAL NOTES

All work shall be done in accordance with the Standard Specifications applicable to the Project.

All side approach roads to the Project shall be Gravel Surfaced with a 4 inch thickness of Aggregate Base Course extending approximately to the Right of Way Line. Estimated tonnage and class of material required for this operation are shown in the Aggregate Base Course Plan.

The maximum grades shown are to be the limiting grades for all road approaches. Modifications of grades will be permitted where adherence to the grades as shown would cause damage to property or create other unsatisfactory conditions. Grades less than the maximum shown are to be used wherever feasible.

DEPARTMENT OF HIGHWAYS
STATE OF COLORADO

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

Designed by A. Z.
Made by S.J.M. & A.B.H.
Checked by C.R.S.

Approved by *[Signature]*
Staff Design Engr.
Date: 3-4-1965

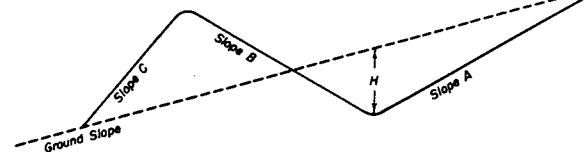
STANDARD TYPES *of* DITCHES *and* CONSTRUCTION METHODS

STANDARD M-203-C
(JULY 1, 1965)

FED. ROAD RE. 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

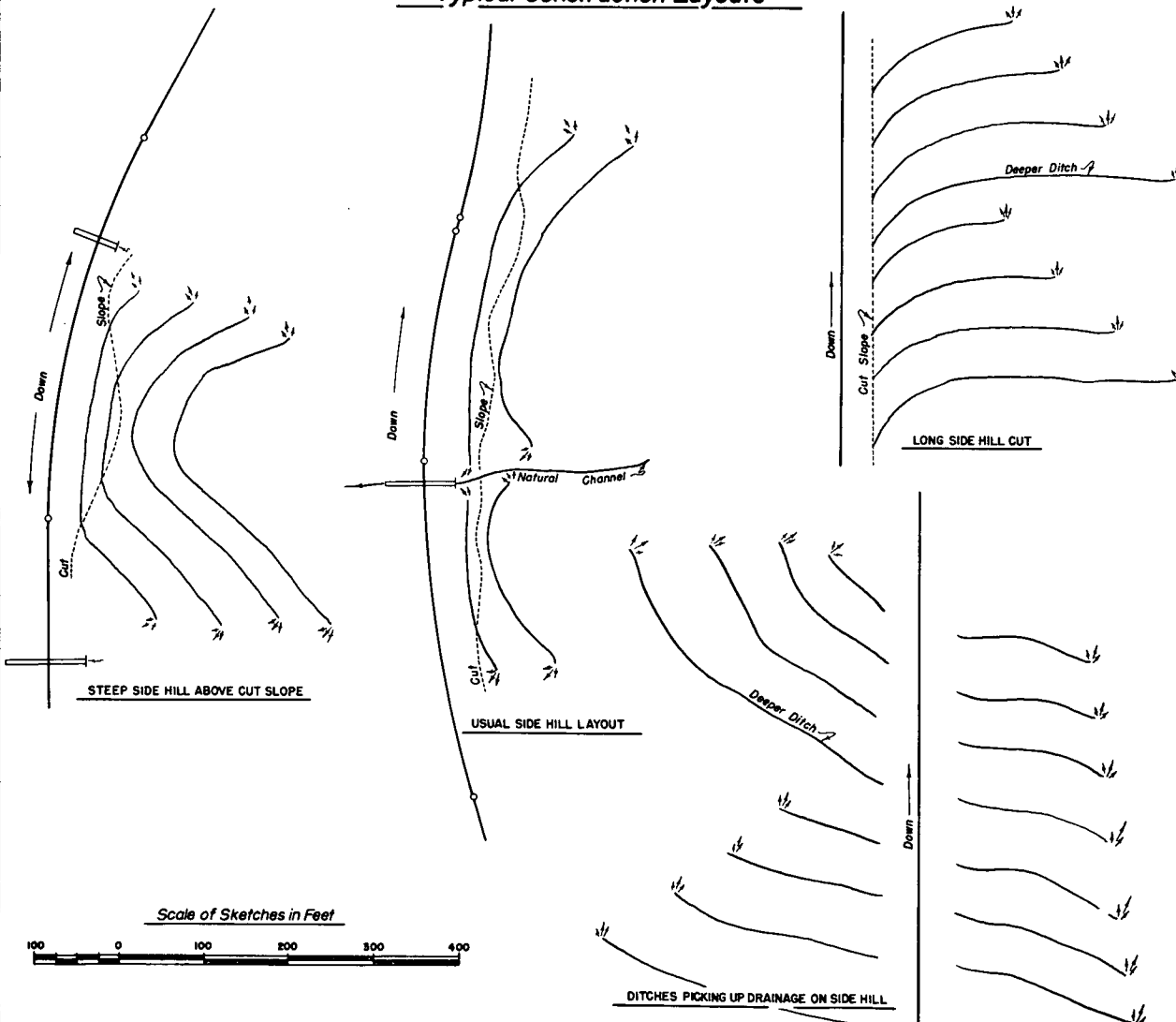
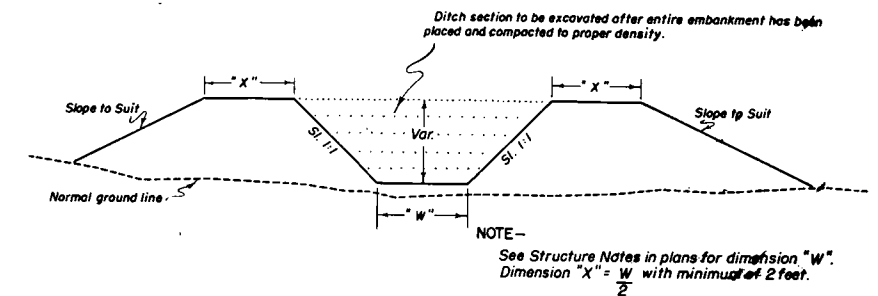


Table of Slopes and Yardages

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

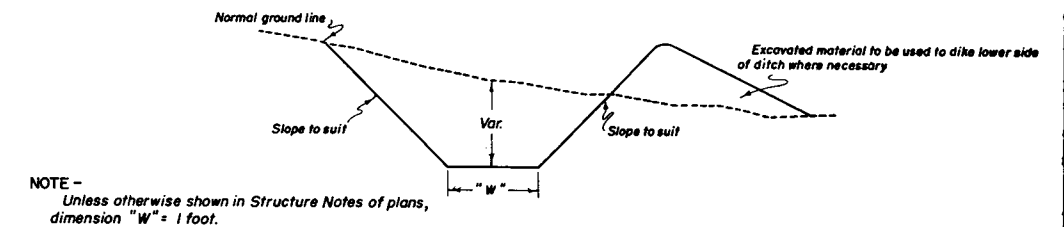
▲ Slopes are approximate and may be varied to suit conditions encountered during construction.

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 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

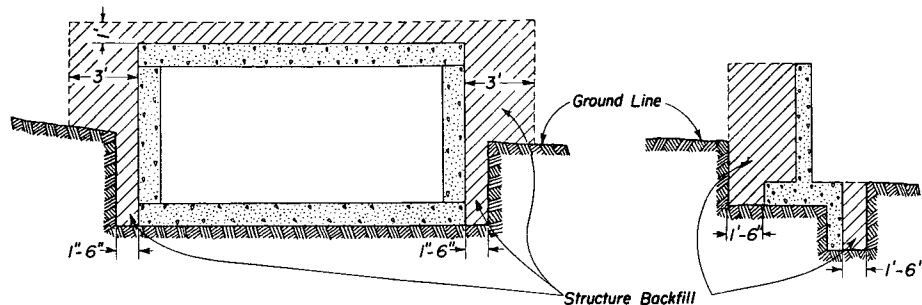
NO.	DESCRIPTION

DEPARTMENT OF HIGHWAYS
STATE OF COLORADO

DITCH TYPES

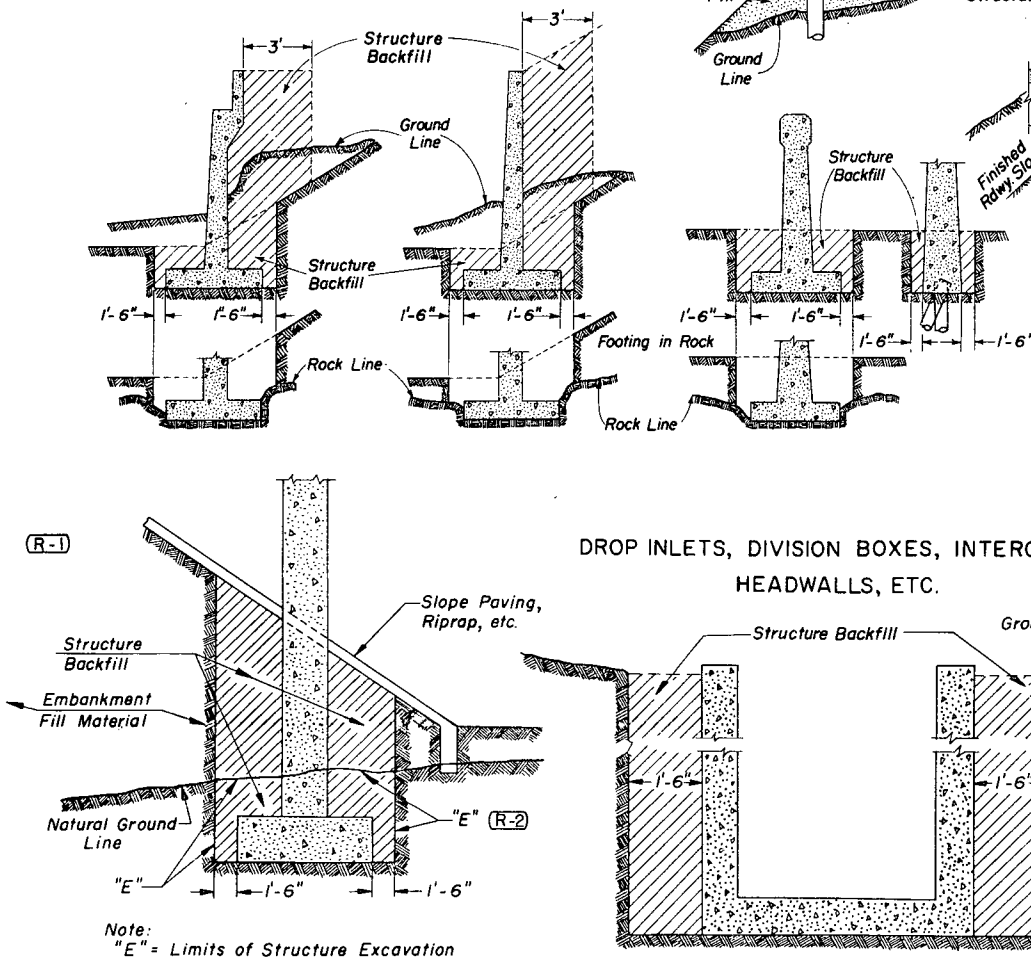
Designed by C.G.M. Approved by C.G.M.
Made by C.G.M. Staff Design Engr.
Checked by Date: July 1, 1965

CONCRETE BOX CULVERTS & WINGWALLS



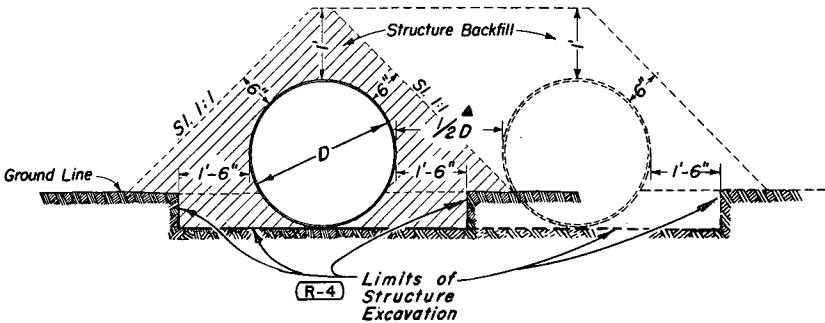
PIERS, ABUTMENTS, RETAINING WALLS ETC.

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.

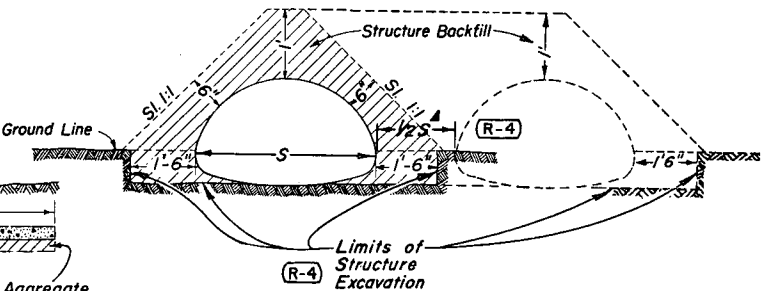


Note: "E" = Limits of Structure Excavation

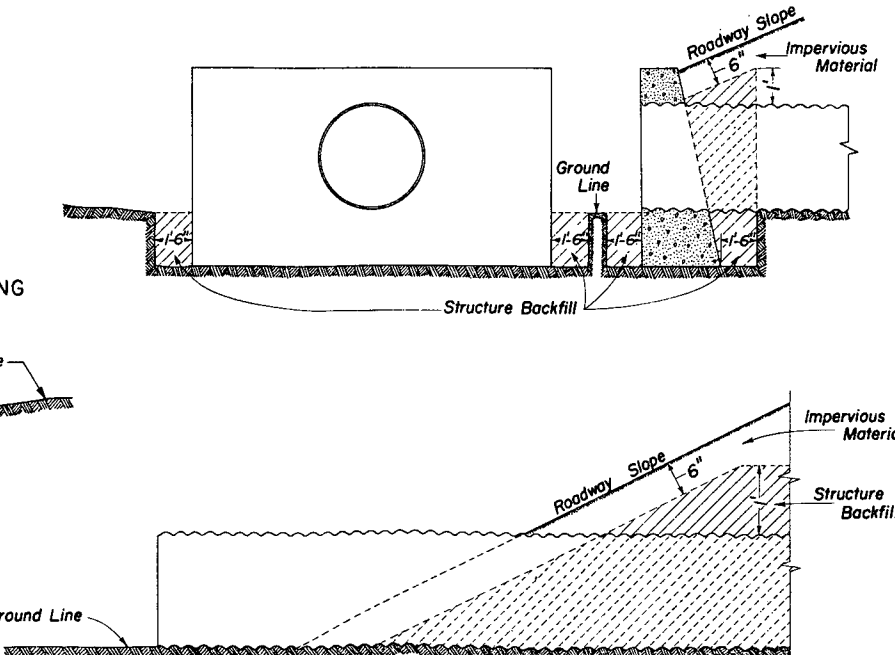
CIRCULAR CONDUIT



ELLIPTICAL OR ARCH CONDUIT



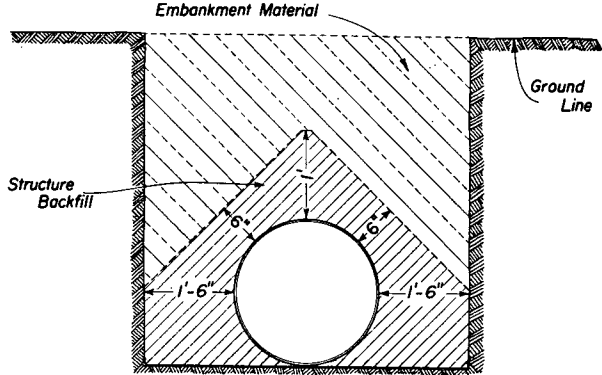
HEADWALLS AND END OF CULVERTS



STANDARD M-206-A
(JULY 1, 1965)
(SHEET 1 OF 2 SHEETS)

FED. ROAD REGION NO.	DIVISION	PROJECT NO.	SHEET NO.
9	COLO.		
REVISION			
(R-1)	10-20-65	ADDED PIER VIEW	M.R.H.
(R-2)	12-7-65	STR. EXGV.	M.R.H.
(R-3)	4-25-66	Class 2 Backfill (Trench)	M.R.H.
(R-4)	3-17-67	Conduit, Underdr'n, Box	M.R.H.

SIPHONS OR CONDUIT IN TRENCH

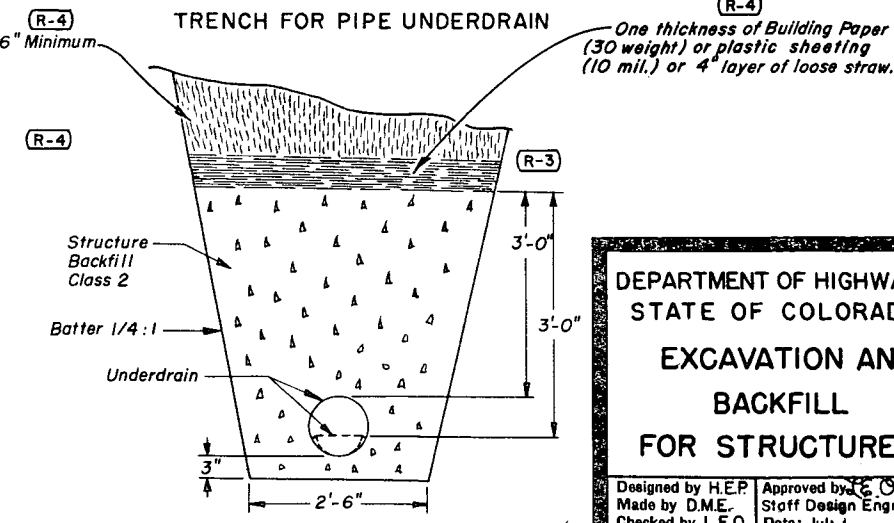


(R-4) NOTES:
When two or more conduits are laid side by side they shall be spaced so that adjacent sides of pipe shall be $\frac{1}{2}$ the Diameter or Span or 3 feet apart whichever is less. Minimum spacing shall not be less than 1 foot.
For additional culvert installation details see M Standards for metal, concrete, or structural plate pipe culverts.

GENERAL NOTES

All work shall be done according to the Standard Specifications applicable to the Project.
Where the roadway cross section is in fill, excavation for concrete footings (except those in rock or those on piles) and for box culverts shall be done according to the following:
Embankment shall be built up and compacted to a point one foot above the flowline of the box or the top of the footing. The trench shall then be excavated to accommodate construction of the box or footing.
Excavation and backfill patterns different from those indicated on these sheets will be shown elsewhere on the plans.
(R-4) Excavation for structure installation shall be classified as "Structure Excavation" unless otherwise shown on plans.

TRENCH FOR PIPE UNDERDRAIN



DEPARTMENT OF HIGHWAYS
STATE OF COLORADO
EXCAVATION AND
BACKFILL
FOR STRUCTURES

Designed by H.E.P. Approved by J.E. Olan
Made by D.M.E. Staff Design Eng.
Checked by L.E.O. Date: July 1, 1965

STANDARD M-206-A

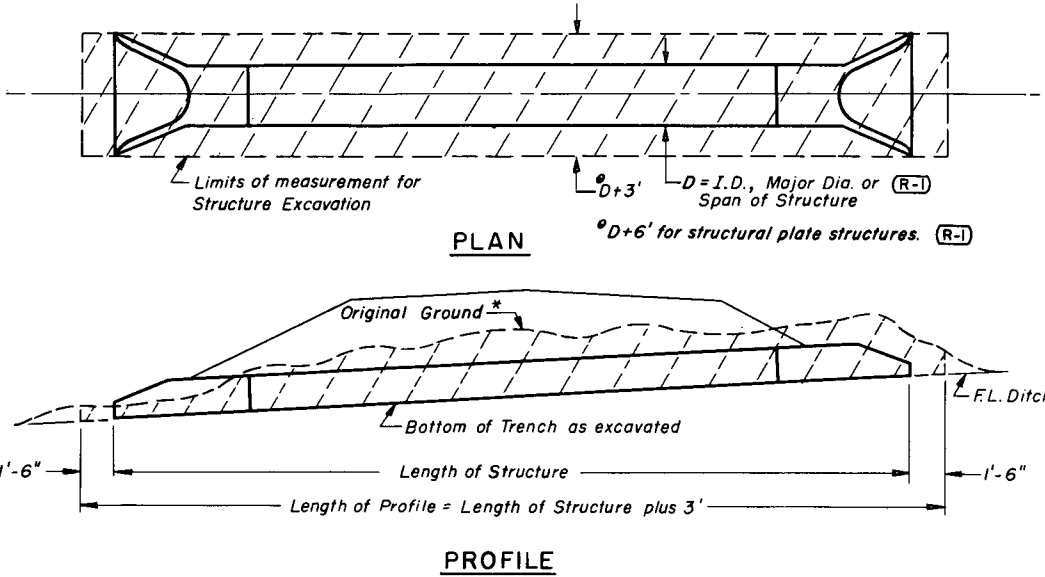
(SHEET 2)

(JULY 1, 1965)

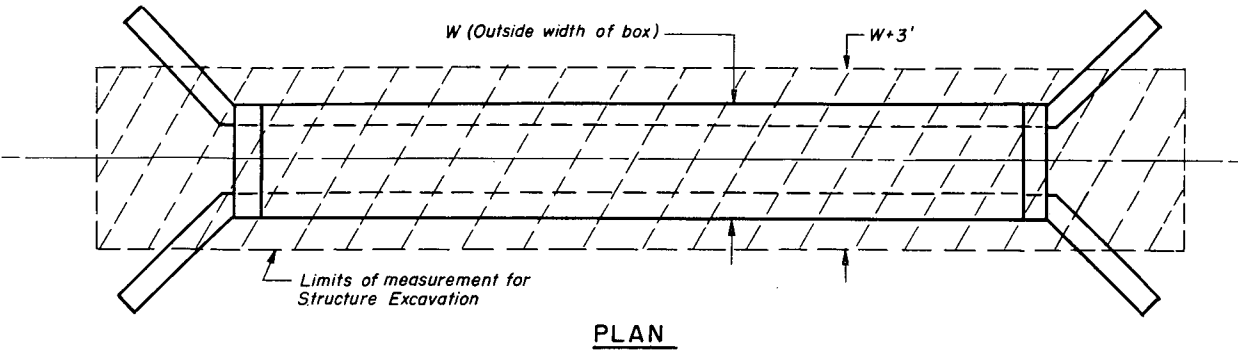
FEDERAL ROAD REGION NO.	DISTRICT	PROJ. NO.	SHEET NO.	TOTAL SHEETS
9	COLORADO			

REVISIONS:		
(R-1)	3-17-67	I. D. on Pipe Culvert Span or D, M, R, H.

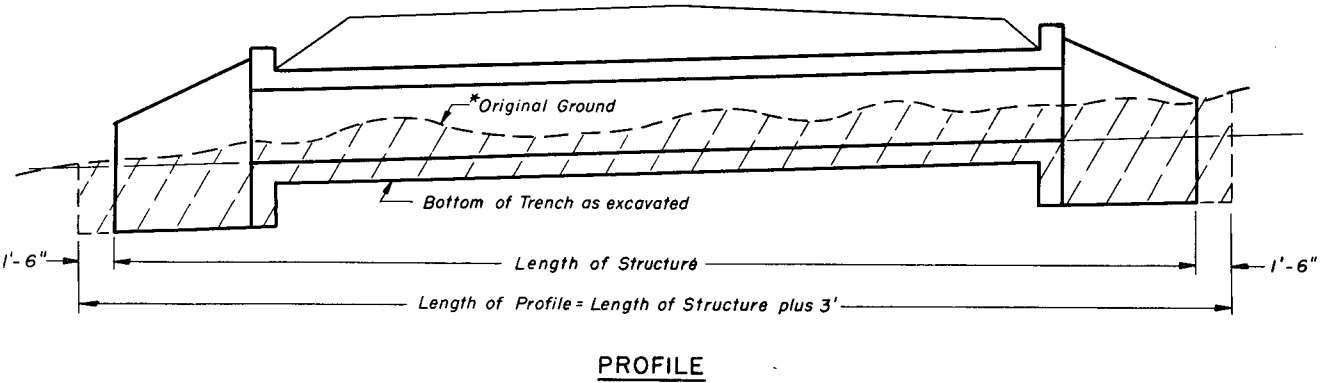
STRUCTURE EXCAVATION MEASUREMENT FOR PIPE CULVERTS



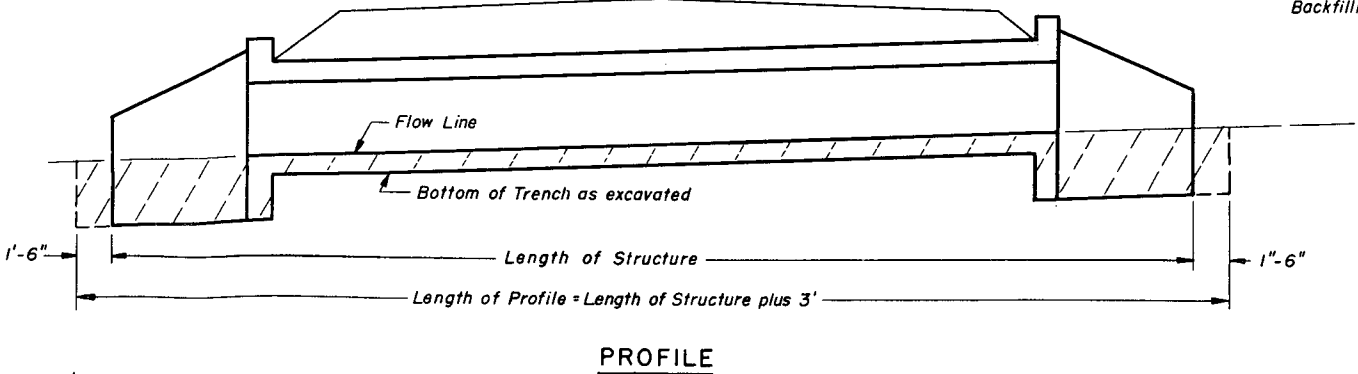
STRUCTURE EXCAVATION MEASUREMENT FOR CONCRETE BOX CULVERTS



Without Channel Change or Channel Improvement

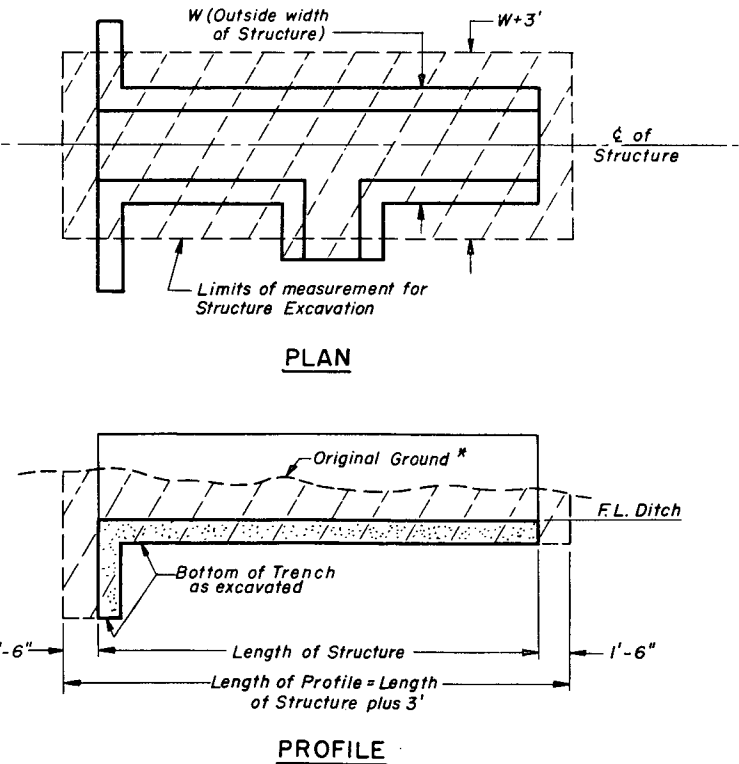


With Channel Change or Channel Improvement



NOTE:
See Sheet 1 for General Notes and Backfilling Details.

STRUCTURE EXCAVATION MEASUREMENT FOR DIVERSION OR DIVISION BOXES



* Along C of Structure

Areas to be used for Structure Excavation computations.

DEPARTMENT OF HIGHWAYS
STATE OF COLORADO

EXCAVATION AND
BACKFILL
FOR STRUCTURES

Designed by: M.R.H. Approved by: H.P.B.
Made by: H.P.B. Staff Design Engr.
Checked by: Date: July 1, 1965

STANDARD M-500-A
(JULY 1, 1965)

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

1 2 3 4 5 6 7 8 9 0 .

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

M N O P Q R S T U V W

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

Scale in inches

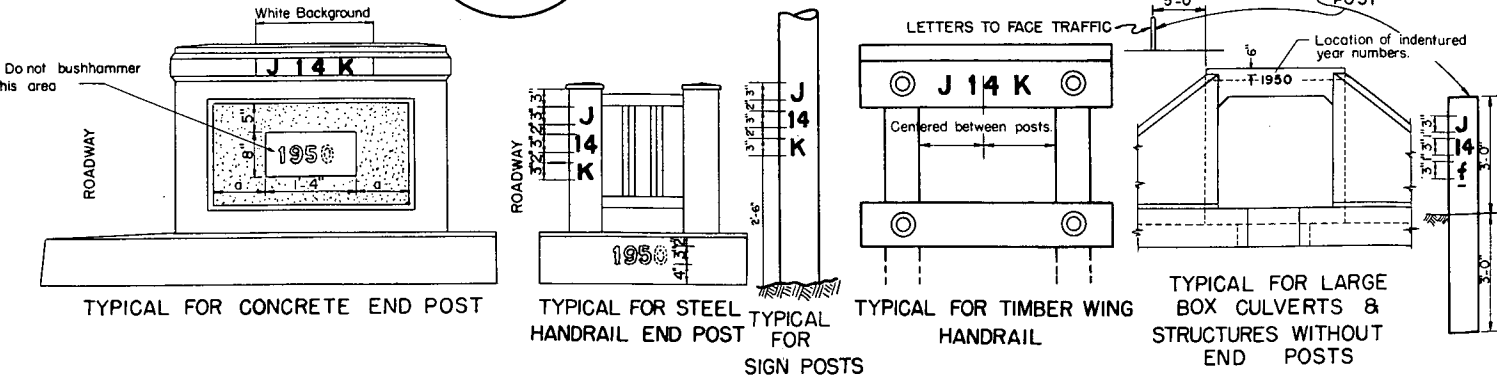
SECTION

SAMPLE BRIDGE NUMBER

SAMPLE YEAR NUMBER

GENERAL NOTES

REVISIONS



ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS 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 WITH "EXTERIOR BLACK PAINT" AS SPECIFIED IN SECTION 708 - PAINTS, OR AN ACCEPTABLE EQUIVALENT. THE BRACES OF THE STENCILED LETTERS AND FIGURES SHALL BE CAREFULLY FILLED IN BY HAND TO MAKE SOLID FIGURES.

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

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

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.

IN ADDITION TO THE REQUIREMENTS STATED ABOVE, STRUCTURE NUMBERS FOR HIGHWAYS PASSING UNDER CROSSROADS ARE TO BE PLACED AT THE FOLLOWING POINTS:

(A) FOR STRUCTURES OF 3 OR MORE SPANS, THE STRUCTURE NUMBER SHALL BE STENCILED, FACING TRAFFIC, ON THE OUTSIDE FACE OF THE END COLUMN OF THE RIGHT-HAND PIER.

(B) FOR 2-SPAN STRUCTURES, THE STRUCTURE NUMBER SHALL BE STENCILED, FACING TRAFFIC, ON THE OUTSIDE FACE OF EACH END COLUMN IN THE CENTER PIER.

DEPARTMENT OF HIGHWAYS
STATE OF COLORADO

LETTERS AND FIGURES
FOR
STRUCTURE NUMBERS

Designed by
Made by
Checked by

Approved by
Bridge Engineer
Date: July 1, 1965

(JULY 1, 1965)

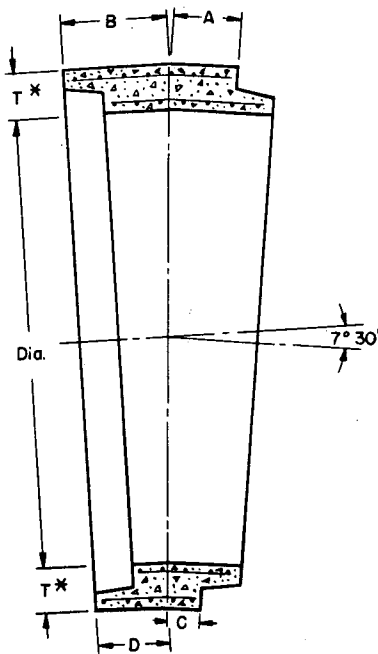
Designed by W.W.D.	Approved by: <i>Adnewbold</i>
Made by P.C.	Bridge Engineer
Checked by A.D.N.	Date: July 1, 1965

STANDARD M-603-B
(JULY 1, 1965)

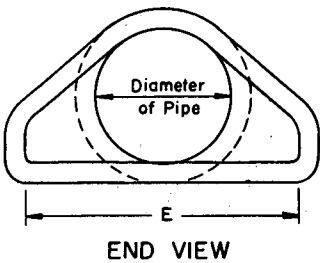
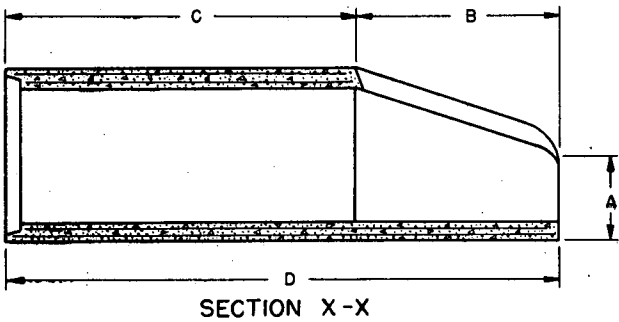
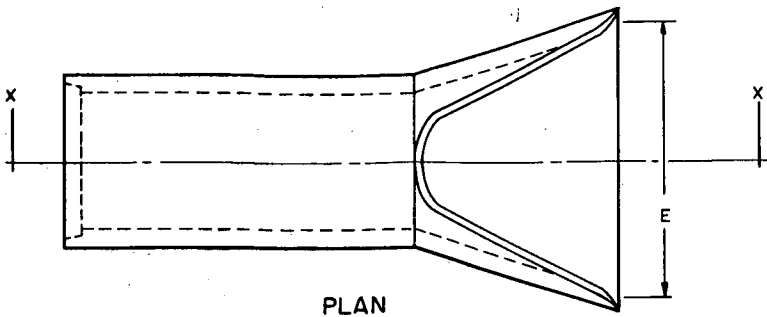
FEDERAL ROAD REGION NO.	DISTRICT	PROJ. NO.	SHEET NO.	TOTAL SHEETS
9	COLORADO			

REVISIONS	

7° 30' ANGLE SECTION FOR
CONCRETE PIPE



REINFORCED CONCRETE END SECTIONS



DIMENSIONS FOR 7° 30' ANGLE SECTIONS
(in inches)

DIAMETER OF PIPE	LENGTH ON OUTSIDE OF PIPE				AVERAGE LAYING LENGTH ON C
	A	B	C	D	
12	4 1/2	4 1/2	3 1/2	3 1/2	8
15	5 1/2	5 1/2	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 5/8	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
66					
72					
78					
84					
90					
96					

NOTES:
A, B, C and D apply to Tongue and Groove type of Joint only and can be varied for other types of Joint.
* Concrete, reinforcing steel and wall thickness for 7° 30' angle sections shall conform to the requirements of the class of pipe being used.

DIMENSIONS FOR 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"
66	2'-6"	6'-0"	2'-3"	8'-3"	8'-6"
72	3'-6"	6'-6"	1'-9"	8'-3"	9'-0"
78	3'-0"	7'-6"	1'-9"	9'-3"	9'-6"
84	3'-0"	7'-6 1/2"	1'-9"	9'-3 1/2"	10'-0"

NOTES:
Alternate equivalent designs for end sections may be submitted to the Department for approval. Payment for "Reinforced Concrete 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 "Reinforced Concrete End Sections" of the specified sizes.
End Sections shall conform to the requirements for Class 2 pipe.

GENERAL NOTES

All work shall be done in accordance with the Standard Specifications applicable to the Project.
Joints other than Tongue and Groove may be used for End Sections and 7° 30' Angle Sections but all joints for any one pipe structure must be uniform.
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.

DEPARTMENT OF HIGHWAYS
STATE OF COLORADO

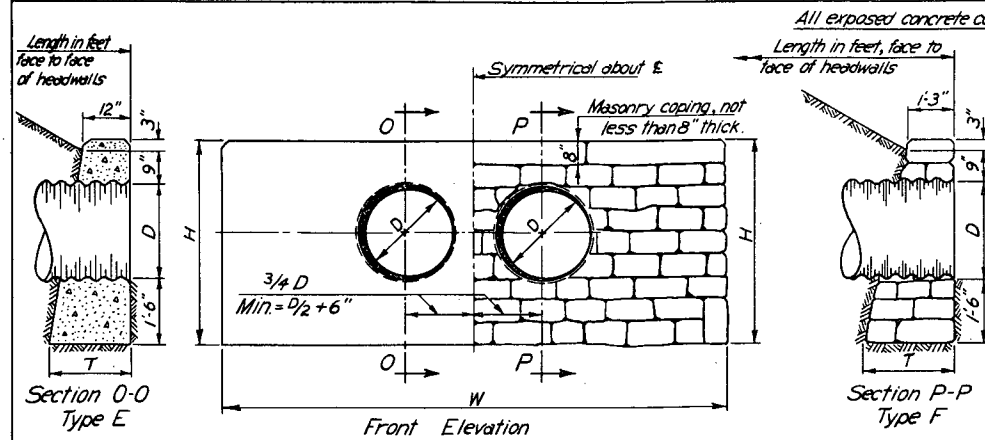
CONCRETE END
AND ANGLE
SECTIONS

Designed by M.R.H. Approved by H.P.B.
Made by H.P.B. Staff Design Engr.
Checked by Date: July 1, 1965

STANDARD M-603-C

(JULY 1, 1965)

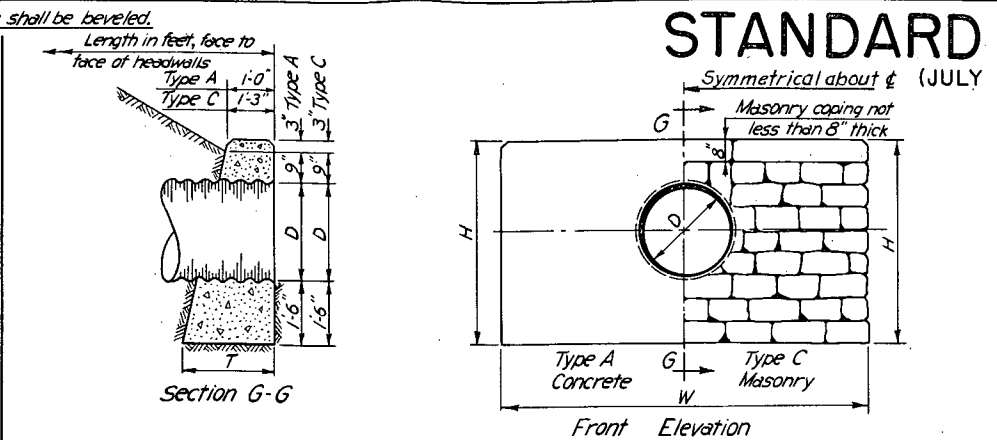
FEDERAL ROAD REG. NO.	DIVISION	PROJECT NO.	SHEET NO.
9	COLORADO		



STANDARD HEADWALLS FOR DOUBLE CORRUGATED STEEL PIPE CULVERTS

Table of Dimensions and Quantities

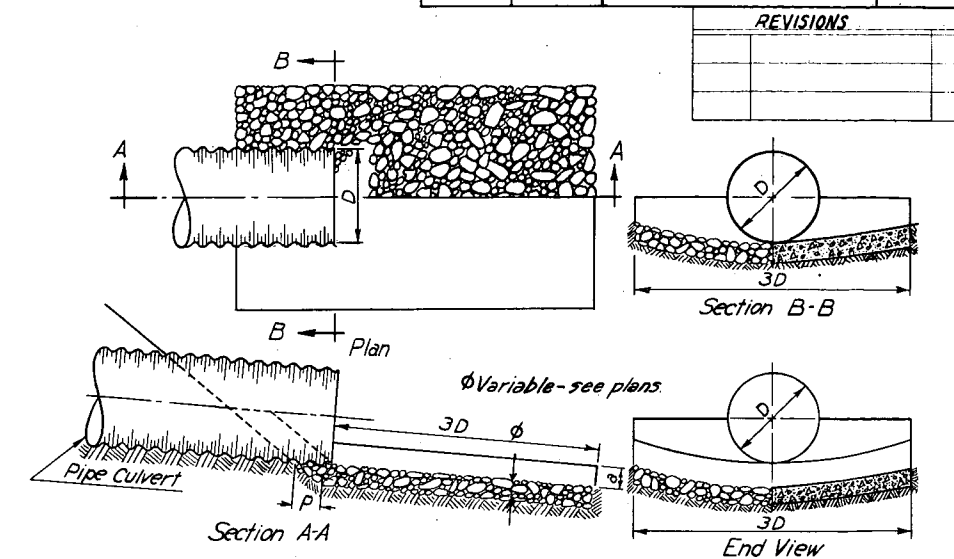
Type E			Both Types		Type F		
D Diam.	T	* Concrete in two Headwalls	W	H	Mortar Rubble Masonry in two Headwalls	T	D Diam.
15"	1'-6"	2.4 Cu. Yds.	7'-6"	3'-9"	3.1 Cu. Yds.	2'-0"	15"
18"	1'-7"	3.0 DO	8'-6"	4'-0"	3.8 DO	2'-1"	18"
24"	1'-10"	4.4 DO	10'-6"	4'-6"	5.5 DO	2'-4"	24"
30"	2'-0"	6.1 DO	12'-9"	5'-0"	7.5 DO	2'-6"	30"
36"	2'-2"	8.1 DO	15'-0"	5'-6"	10.0 DO	2'-8"	36"
42"	2'-5"	10.8 DO	17'-3"	6'-0"	12.8 DO	2'-10"	42"
48"	2'-7"	13.6 DO	19'-6"	6'-6"	16.3 DO	3'-0"	48"



STANDARD HEADWALLS FOR SINGLE CORRUGATED STEEL PIPE CULVERTS

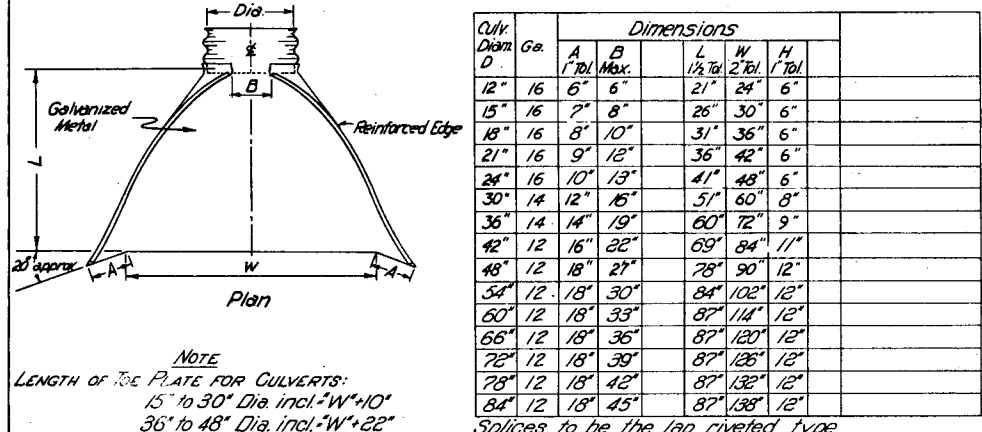
Table of Dimensions and Quantities

Type A			Both Types		Type C		
D Diam.	T	* Concrete in two Headwalls	W	H	Mortar Rubble Masonry in two Headwalls	T	D Diam.
15"	1'-6"	1.8 Cu. Yds.	5'-3"	3'-9"	2.2 Cu. Yds.	2'-0"	15"
18"	1'-7"	2.2 DO	6'-0"	4'-0"	2.8 DO	2'-1"	18"
24"	1'-10"	3.3 DO	7'-6"	4'-6"	4.1 DO	2'-4"	24"
30"	2'-0"	4.5 DO	9'-0"	5'-0"	5.6 DO	2'-6"	30"
36"	2'-2"	6.0 DO	10'-6"	5'-6"	7.4 DO	2'-8"	36"
42"	2'-5"	8.0 DO	12'-0"	6'-0"	9.2 DO	2'-10"	42"
48"	2'-7"	10.0 DO	13'-6"	6'-6"	11.5 DO	3'-0"	48"

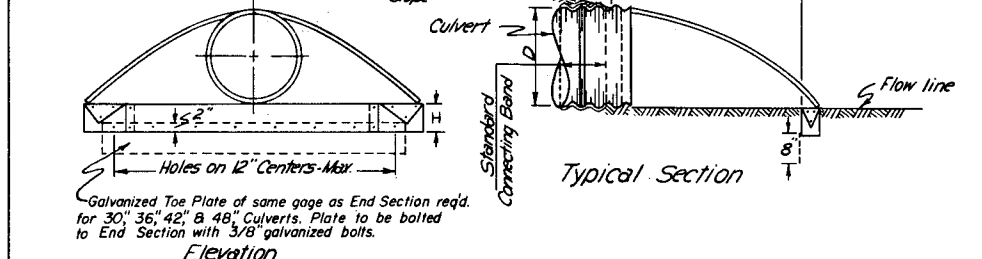


CONCRETE OR GROUTED RUBBLE APRON FOR PIPE CULVERT

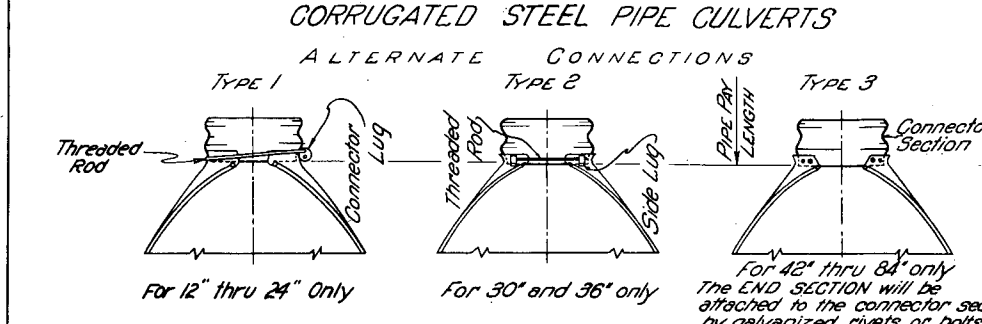
Square Yards of Slope and Ditch Paving														
Fill Slope	D	15"	18"	24"	30"	36"	42"	48"	54"	60"	66"	72"	78"	84"
1 1/2:1	2'-0"	3	4	6	9	12	17	21	27	33	39	46	54	62
2:1	2'-0"	3	4	7	10	13	18	22	28	34	41	49	57	66
3:1	3'-0"	3	4	7	11	15	20	25	31	38	45	54	63	72
4:1	4'-0"	3	5	8	12	16	22	28	34	42	50	59	69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



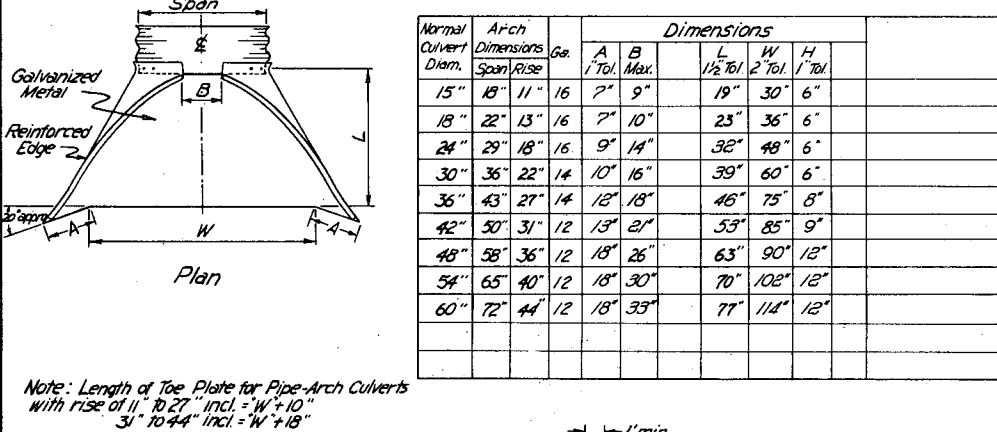
STANDARD END SECTIONS FOR ROUND ANNULAR OR HELICALLY CORRUGATED STEEL PIPE CULVERTS



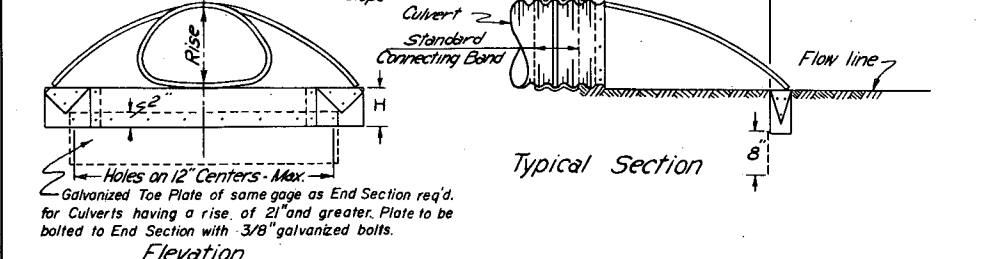
STANDARD END SECTIONS FOR CORRUGATED STEEL PIPE ARCH CULVERTS



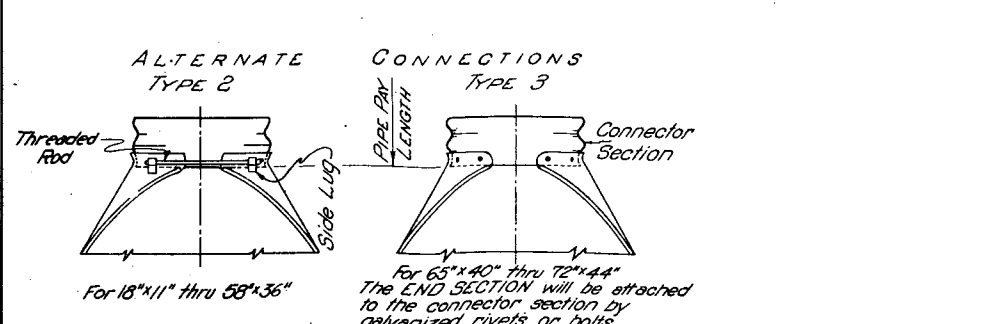
ALTERNATE CONNECTIONS



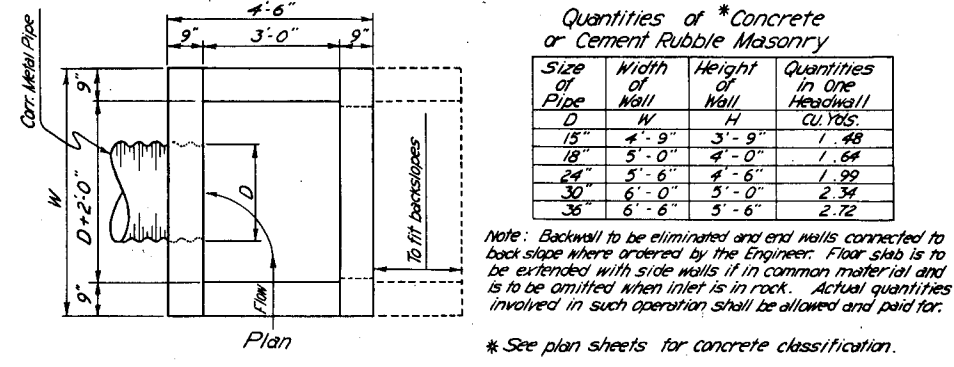
STANDARD END SECTIONS FOR CORRUGATED STEEL PIPE ARCH CULVERTS



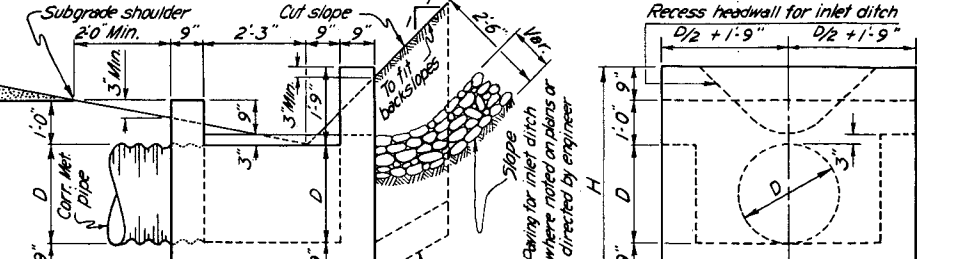
STANDARD END SECTIONS FOR CORRUGATED STEEL PIPE ARCH CULVERTS



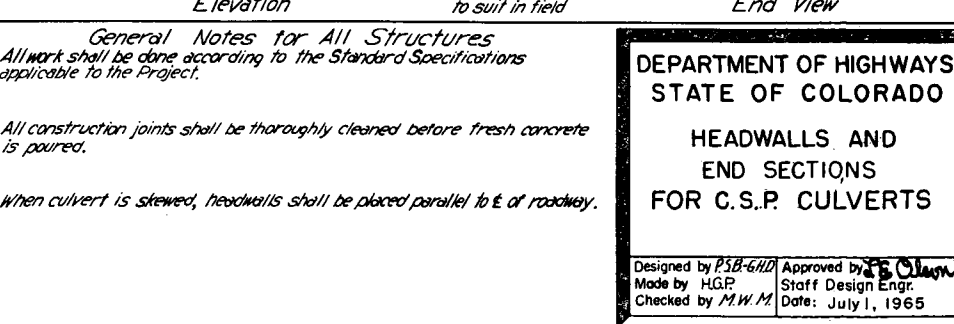
ALTERNATE CONNECTIONS



QUANTITIES OF CONCRETE OR CEMENT RUBBLE MASONRY



INTERCEPTING HEADWALLS



GENERAL NOTES FOR ALL STRUCTURES

DEPARTMENT OF HIGHWAYS
STATE OF COLORADO

HEADWALLS AND
END SECTIONS
FOR C.S.P. CULVERTS

Designed by PSB-GHD
Made by HGP
Checked by M.W.M.

Approved by J.E. Olson
Staff Design Engr.
Date: July 1, 1965

STANDARD M-603-M

(MARCH 20, 1967)

FEDERAL ROAD DISTRICT	PROJ. NO.	SHEET NO.	TOTAL SHEETS
9	COLORADO		

REVISIONS

FILL HEIGHT AND GAGE TABLES FOR METAL CULVERT PIPE (RIVETED, WELDED OR HELICAL FABRICATION)

TABLE I
CORRUGATED STEEL PIPE

(2" x 1/2") OR (2-2/3" x 1/2") CORRUGATIONS

PIPE SIZE (B _g) Inches	AREA (Sq.Ft.)	HEIGHT OF FILL OVER TOP OF PIPE IN FEET															
		1 to 10	10+ 15	15+ 20	20+ to 25	25+ to 30	30+ to 35	35+ to 40	40+ to 45	45+ to 50	50+ to 55	55+ to 60	60+ to 70	70+ to 80	80+ to 90	90+ to 100	
		GAGE															
12	0.8	16	16	16	16	16	16	16	16	16	16	16	16	16	14	12	
15	1.2	16	16	16	16	16	16	16	16	16	16	16	16	14	12	10	
18	1.8	16	16	16	16	16	16	16	16	16	14	14	12	12	10	8	
24	3.1	16	16	16	16	16	14	12	10	10	8						
30	4.9	16	16	16	16	14	14	12	12	10	8						
36	7.1	16	16	16	16	14	14	12	10	8							
42	9.6	16	16	16	16	16	14	14	12	8							
48	12.6	16	16	16	16	14	14	12	8								
54	15.9	14	14	14	14	14	12	12									
60	19.6	12	12	12	12	12	12	10									
66	23.8	12	12	12	12	12	10	10	8								
72	28.3	10	10	10	10	8											
78	33.0	8	8	8	8												
84	38.0	8	8	8													

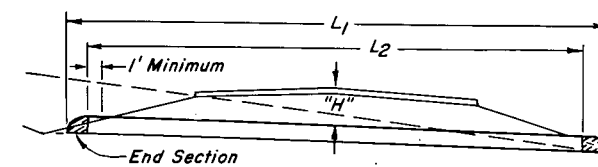
--- See General Note.

TABLE II
CORRUGATED STEEL PIPE ARCH

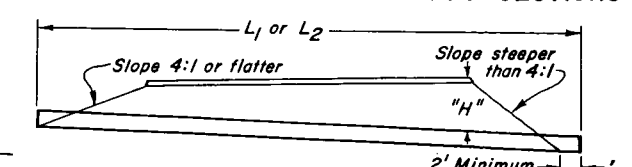
(2" x 1/2") OR (2-2/3" x 1/2") CORRUGATIONS

PIPE SIZE Span-Rise (Inches)	AREA (Sq. Ft.)	CORNER RADIUS (Inches)	HEIGHT OF FILL OVER TOP OF PIPE IN FEET					
			1.5 to 7	7+ to 8	8+ to 9	9+ to 10	10+ to 12	12+ to 13
18 x 11	1.1	3 1/2	16	16	16	16	16	16
22 x 13	1.6	4	16	16	16	16	16	16
25 x 16	2.2	4	16	16	16	16		
29 x 18	2.8	4 1/2	16	16	16			
36 x 22	4.4	5	16	16	16			
43 x 27	6.4	5 1/2	16					
50 x 31	8.7	6	14					
58 x 36	11.4	7	12					
65 x 40	14.3	8	12					
72 x 44	17.6	9	10					

METAL CULVERT WITH END SECTIONS



METAL CULVERT WITHOUT END SECTIONS



"H" = Maximum height of fill over top of Culvert, including pavement.

L₁ = Length of Culvert to be measured when placed in accordance with Section 617.

L₂ = Length of pipe to be measured when placed in accordance with Section 603.

TABLE III
CORRUGATED STEEL PIPE

3" x 1" CORRUGATIONS

PIPE SIZE (B _g) Inches	AREA (Sq.Ft.)	HEIGHT OF FILL OVER TOP OF PIPE IN FEET															
		1 to 10	10+ to 15	15+ to 20	20+ to 25	25+ to 30	30+ to 35	35+ to 40	40+ to 45	45+ to 50	50+ to 55	55+ to 60	60+ to 70	70+ to 80			
GAGE																	
36	7.1	16	16	16	16	16	14	14	12	12	12	12	10	8			
42	9.6	16	16	16	16	14	14	14	12	12	12	12	8				
48	12.6	16	16	16	14	14	14	12	12	12	12	10	8				
54	15.9	16	16	16	14	14	12	12	10	8							
60	19.6	16	16	16	14	12	12	12	10								
66	23.8	16	16	14	14	12	12	10									
72	28.3	16	16	14	12	12	12	10									
78	33.0	16	16	14	12	10	8										
84	38.0	14	14	14	12	12											
90	44.0	14	14	12	12	12											
96	50.3	12	12	12	12	10											
102	57.0	12	12	12	12												
108	64.0	12	12	12	10												
114	70.9	10	10	10	8												
120	78.6	10	10	10	8												

--- See General Note.

TABLE IV
CORRUGATED STEEL PIPE

3" x 1" CORRUGATIONS

SPOT WELDED OR BOLTED 15" STEEL X 325 GULCH FABRICATION																
PIPE SIZE (B _g) Inches	AREA (Sq.Ft.)	HEIGHT OF FILL OVER TOP OF PIPE IN FEET														
		1 to 10	10+ to 15	15+ to 20	20+ to 25	25+ to 30	30+ to 35	35+ to 40	40+ to 45	45+ to 50	50+ to 55	55+ to 60	60+ to 70	70+ to 80	80+ to 90	90+ to 100
G A G E																
36	7.1	16	16	16	16	16	16	16	14	14	12	12	12	12	10	10
42	9.6	16	16	16	16	16	16	16	14	14	12	12	12	10	8	
48	12.6	16	16	16	16	16	14	14	14	12	12	12	10	8		
54	15.9	16	16	16	16	16	14	14	12	12	10	10				
60	19.6	16	16	16	16	14	14	12	12	10	8					
66	23.8	16	16	16	14	14	12	12	10	8						
72	28.3	16	16	16	14	14	12	12	10							
78	33.0	16	16	16	14	12	12	10	8							
84	38.0	14	14	14	14	12	12	10								
90	44.0	14	14	14	14	12	12	10								
96	50.3	12	12	12	12	12	10	8								
102	57.0	12	12	12	12	12	10	8								
108	64.0	12	12	12	12	12	10									
114	70.9	10	10	10	10	10	8									
120	78.6	10	10	10	10	10										
-----See General Note.																

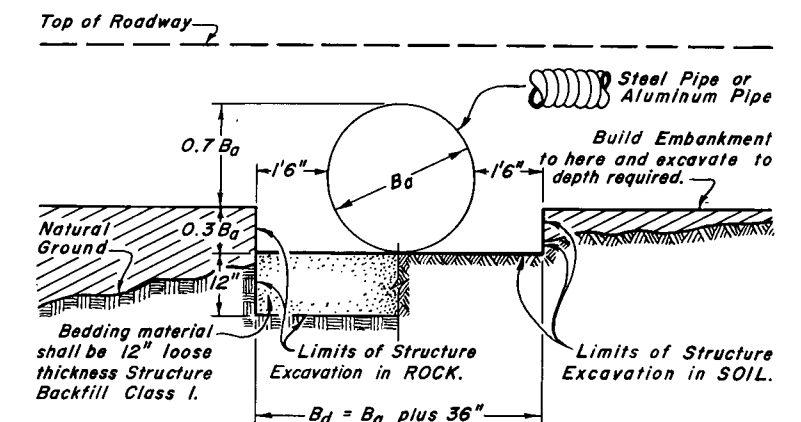
--- See General Note.

TABLE V
CORRUGATED STEEL PIPE ARCH

3" x 1" CORRUGATIONS

PIPE SIZE Span- Rise (Inches)	AREA (Sq.Ft.)	CORNER RADIUS (Inches)	CORROSION HEIGHT OF FILL OVER TOP OF PIPE IN FEET					
			1.5 to 10	10+ to 11	11+ to 12	12+ to 14	14+ to 15	
			G A G E					
43 x 27	6.4	7 3/4	16	16	16			
50 x 31	8.7	9	16	16	16			
58 x 36	11.4	10 1/2	16	16	16			
65 x 40	14.3	12	16	16	16			
72 x 44	17.6	13 1/4	16	16	16			
73 x 55	22.0	18	16	16	16	16	16	
81 x 59	26.0	18	14	14	14	14	14	
87 x 63	31.0	18	14	14	14	14	14	
95 x 67	35.0	18	12	12	12			
103 x 71	41.0	18	12	12				
112 x 75	46.0	18	12					
117 x 79	52.0	18	12					
128 x 83	58.0	18	10					

INSTALLATION OF METAL CULVERT PIPE



NOTE: Spacing for multiple pipe installations shall conform to the details shown on M Standard for Excavation and Backfill for Structures.

TABLE VI
CORRUGATED ALUMINUM PIPE

2-2/3" x 1/2" CORRUGATIONS

PIPE SIZE (B _g) Inches	AREA (Sq. Ft.)	HEIGHT OF FILL OVER TOP OF PIPE IN FEET															
		1 to 10	10+ to 15	15+ to 20	20+ to 25	25+ to 30	30+ to 35	35+ to 40	40+ to 45	45+ to 50	50+ to 55	55+ to 60	60+ to 70	70+ to 80			
G A G E																	
12	0.8	16	16	16	16	16	16	16	14	12	12	12	12	12			
18	1.8	16	16	16	16	16	14	12	10	8	8						
24	3.1	16	16	16	16	14	10										
30	4.9	16	16	16	12	12	8										
36	7.1	16	16	14	12	8											
42	9.6	14	14	12	14	12	12	8									
48	12.6	12	12	12	12	10	8	8									
54	15.9	12	12	10	8	8											
60	19.6	10	10	8													
66	23.8	10	8														
72	28.3	8															

----- See General Note.

--- See General Note.

TABLE VII
CORRUGATED ALUMINUM PIPE ARCH

2-2/3" x 1/2" CORRUGATIONS

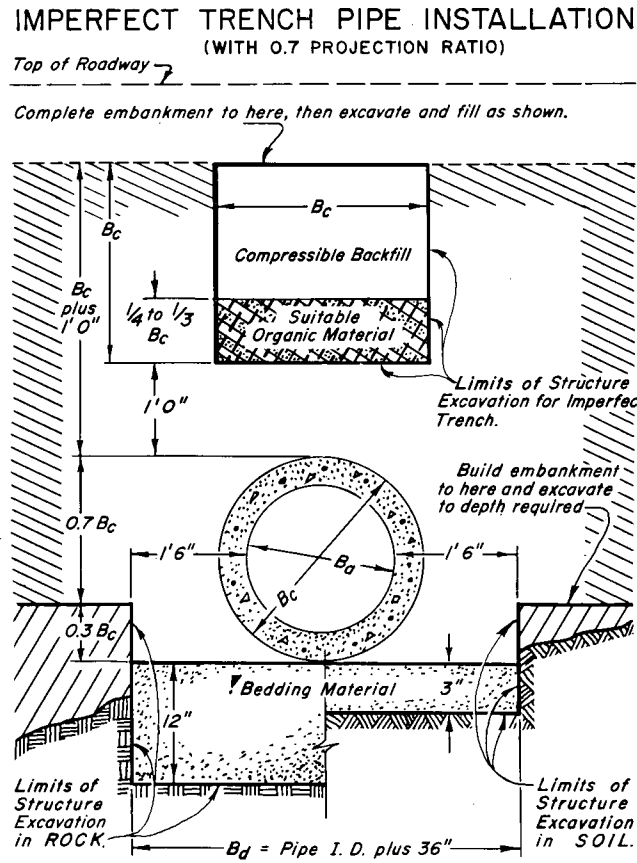
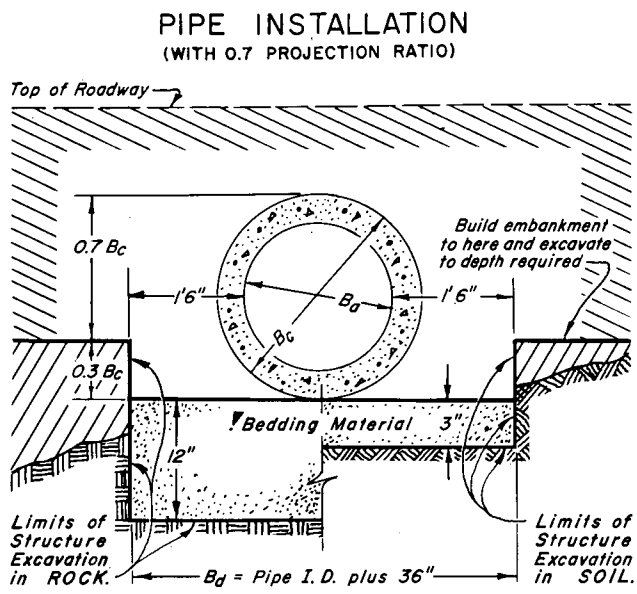
PIPE SIZE Span-Rise (Inches)	AREA (Sq. Ft.)	CORNER RADIUS (Inches)	HEIGHT OF FILL OVER TOP OF PIPE IN FEET					
			1.5 to 7	7+ to 9	9+ to 11	11+ to 13	13+ to 14	14+ to 15
18 x 11	1.1	4 3/4	16	16	16	16	16	16
22 x 13	1.6	4 3/4	16	16	16	16	16	16
25 x 16	2.2	4 1/2	16	16	16	16		
29 x 18	2.8	4 1/2	16	16	16			
36 x 22	4.4	5	16	16				
43 x 27	6.4	5 1/2	14					
50 x 31	8.7	6	12					
58 x 36	11.4	7	10					
65 x 40	14.3	8	10					
72 x 44	17.6	9	8					

GENERAL NOTES

- All work shall be done in accordance with the Standard Specifications applicable to the project.
- The tables on this sheet show minimum gages for structural requirements only. They are intended for use only where corrosive and/or abrasive conditions are negligible. Heavier

STANDARD M-603-RC
(MARCH 20, 1967)

FEDERAL ROAD REGION NO.	DISTRICT	PROJ. NO.	SHEET NO.	TOTAL SHEETS
9	COLORADO			
REVISIONS				



Bedding Material for SOIL shall be 3" loose thickness Structure Backfill Class 3.
Bedding Material for ROCK shall be 12" loose thickness Structure Backfill Class 1.

REINFORCED CONCRETE PIPE DIMENSIONS
(FOR INFORMATION ONLY)

PIPE SIZE (In. I.D.) Ba	* WALL THICKNESS (Inches) Bc	OUTSIDE DIAMETER (Feet) Bc	0.3 Bc (Feet)	0.7 Bc (Feet)
12	2	1.33	0.40	0.93
15	2-1/4	1.63	0.49	1.14
18	2-1/2	1.92	0.58	1.34
21	2-3/4	2.21	0.66	1.55
24	3	2.50	0.75	1.75
27	3-1/4	2.79	0.84	1.95
30	3-1/2	3.08	0.92	2.16
33	3-3/4	3.38	1.01	2.37
36	4	3.67	1.10	2.57
42	4-1/2	4.25	1.28	2.97
48	5	4.83	1.45	3.38
54	5-1/2	5.42	1.62	3.80
60	6	6.00	1.80	4.20
66	6-1/2	6.58	1.97	4.61
72	7	7.17	2.15	5.02
78	7-1/2	7.75	2.32	5.43
84	8	8.33	2.50	5.83
90	8-1/2	8.92	2.68	6.24
96	9	9.50	2.85	6.65
102	9-1/2	10.08	3.02	7.06
108	10	10.67	3.20	7.47

* Wall thickness dimensions are based on ASTM Designation C 76 (Wall B).

SAFE HEIGHTS OF FILL OVER REINFORCED CONCRETE PIPE

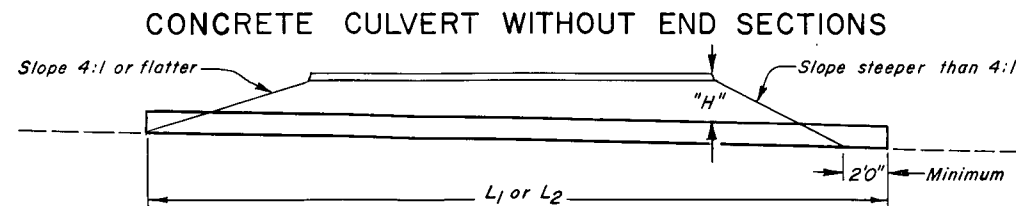
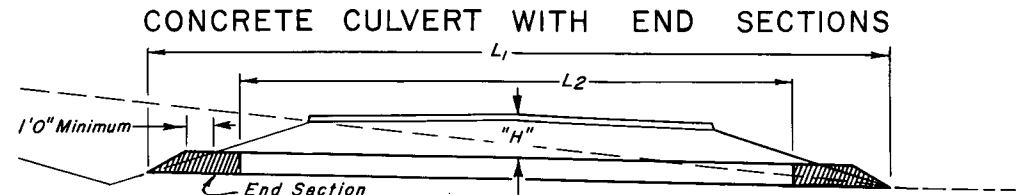
PIPE SIZE (In. I.D.) Ba	HEIGHT OF FILL OVER TOP OF PIPE IN FEET			
	CLASS II 1000 - D	CLASS III 1350 - D	CLASS IV 2000 - D	CLASS V 3000 - D
..Thru..	Min. to	Min. to	+ to...	+ to...
12 18	18	23	23	36
21 27	19	24	24	36
30 39	19	25	25	37
42 48	19	25	25	37
51 63	20	26	26	37
66 72	20	26	26	37
75 84	20	26	26	37
87 108	20	26	26	37

Pipe design is based on safety factor of 1.33 on ultimate strength. Pipe Class is designated at .01 inch crack D-load. (See ASTM Designation C 76.)

Safe heights of fill over top of pipe are based on unit weight of soil at 120 lbs. per cubic foot.

Changes in design factors will require compensating change in pipe design.

For Imperfect Trench, compute pipe class required as outlined in the Concrete Pipe Handbook prepared by the American Concrete Pipe Association (or other references with Iowa State College Theories).



"H" = Maximum height of fill over top of Culvert, including pavement.
L1 = Length of Culvert to be measured when placed in accordance with Section 617.
L2 = Length of Pipe to be measured when placed in accordance with Section 603.

GENERAL NOTES

All work shall be done in accordance with the Standard Specifications applicable to the project.

Class II pipe shall not be used on main roadway but is permissible in medians, road approaches and other areas not subject to repeated traffic loads.

IMPERFECT TRENCH
Fill heights greater than maximum allowed in the Safe Heights of Fill Table on this sheet will require Imperfect Trench type of installation or special design of structure. If possible, use safe overfill and stronger pipe up to the limit shown on the Safe Heights of Fill Table.

Minimum cover excluding pavement shall be 1 foot.
Spacing for multiple pipe installations shall conform to the details shown on M Standard for Excavation and Backfill for Structures.

DEPARTMENT OF HIGHWAYS
STATE OF COLORADO

REINFORCED CONCRETE PIPE

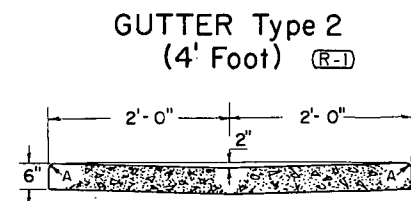
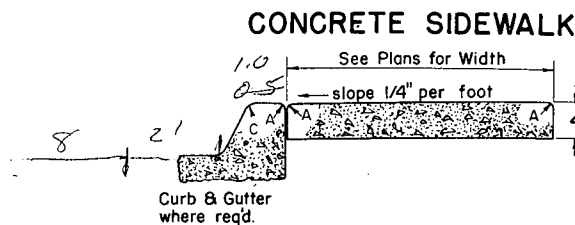
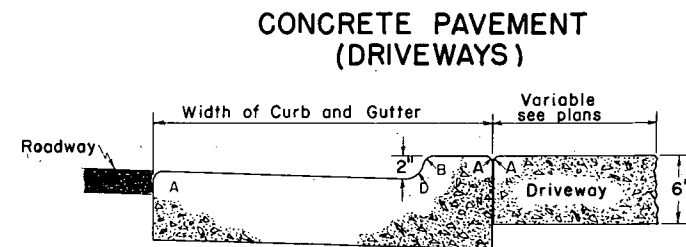
Designed by M.R.H. Approved by
Made by J.R.B. Staff Design Engr.
Checked by R.S.M. Date:

STANDARD CURBS AND GUTTERS

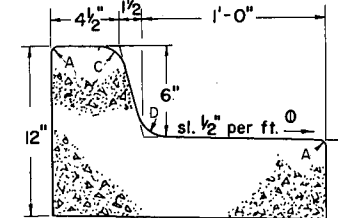
STANDARD M-609-A
(JULY 1, 1965)

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

REVISIONS		
(R-1)	11-16-65 Subtitle	M.R.H.
(R-2)	2-14-66 General Notes	M.R.H.

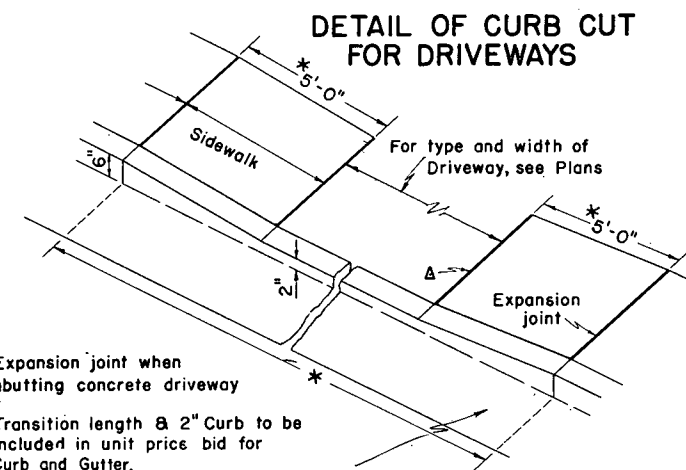
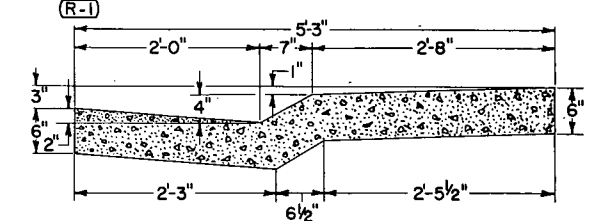


CURB AND GUTTER Type 2
(6" Barrier - 1' Gutter) (Section IB)
(R-1)

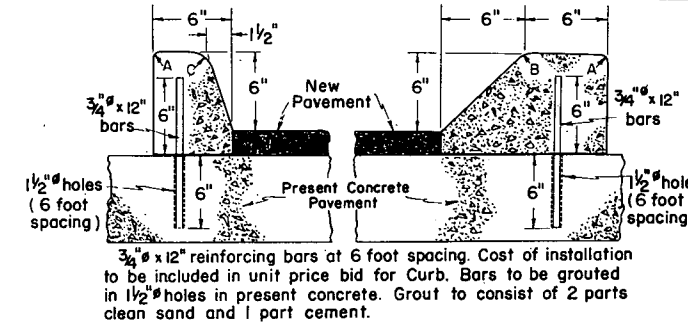


LEGEND FOR RADII	
A	= 1/8"
B	= 1"
C	= 1 1/2"
D	= 1 1/2" to 2"

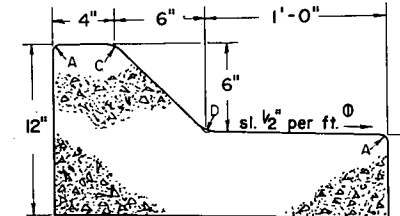
CURB AND GUTTER (Type 2)
(4" Mountable with Sidewalk) (Section MS)
(R-1)



CURB Type 4 (6" Barrier) (Section B) (R-1)
CURB Type 4 (6" Mountable) (Section M) (R-1)

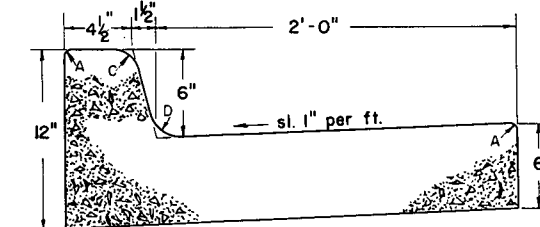


CURB AND GUTTER Type 2
(6" Mountable - 1' Gutter) (Section IM)
(R-1)

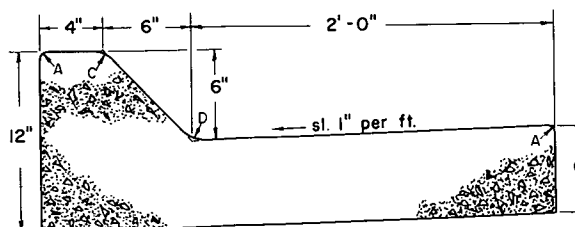


⊙ Slope in opposite direction when required to fit field conditions.

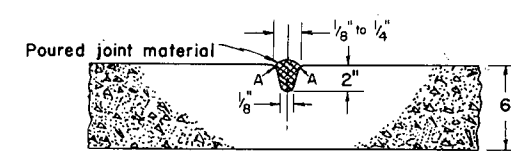
(R-1) CURB AND GUTTER Type 2
(6" Barrier - 2' Gutter) (Section IB)



(R-1) CURB AND GUTTER Type 2
(6" Mountable - 2' Gutter) (Section IM)

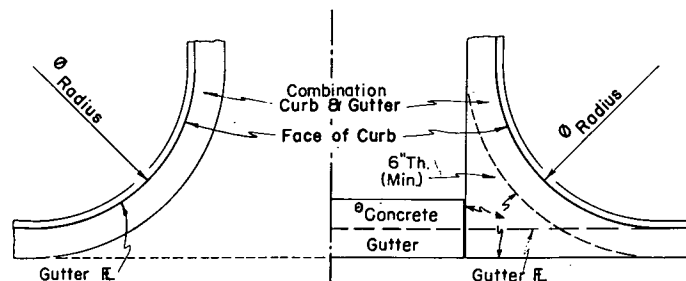


TRANSVERSE CONTRACTION JOINT
FOR CONCRETE PAVEMENT (DRIVEWAYS)



This joint required where length of slab exceeds 15 feet.

CONSTRUCTION OF CONCRETE
GUTTERS AT INTERSECTIONS



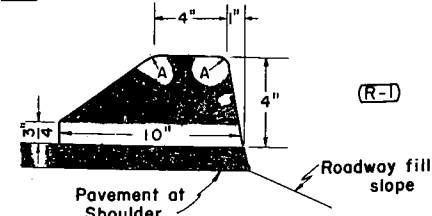
⊙ Length of Radius as shown elsewhere on Plans.

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

This area shall be poured monolithically with curb and gutter and will be paid for as Concrete Pavement of specified thickness.

This section to be built when Concrete Gutter is required.

CURB Type 6
(4" Mountable) (Section M)
(R-1)



GENERAL NOTES

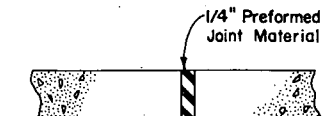
All work shall be done in accordance with the Standard Specifications applicable to the project.

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.

Interval between expansion joints shall not be less than 4 feet nor more than 15 feet.

(R-2) Concrete shall be Class "A" or Class "D".

SIDEWALK
EXPANSION JOINT



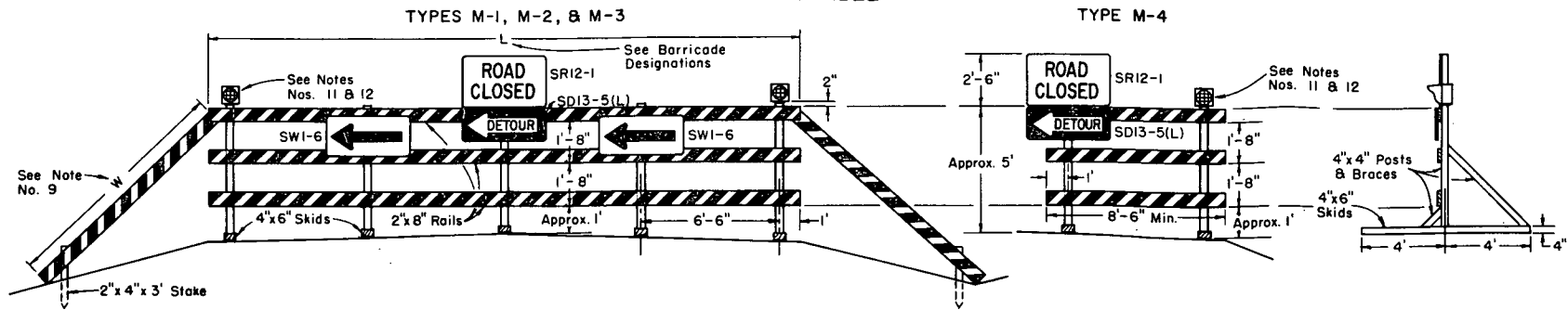
DEPARTMENT OF HIGHWAYS
STATE OF COLORADO

CURBS AND GUTTERS

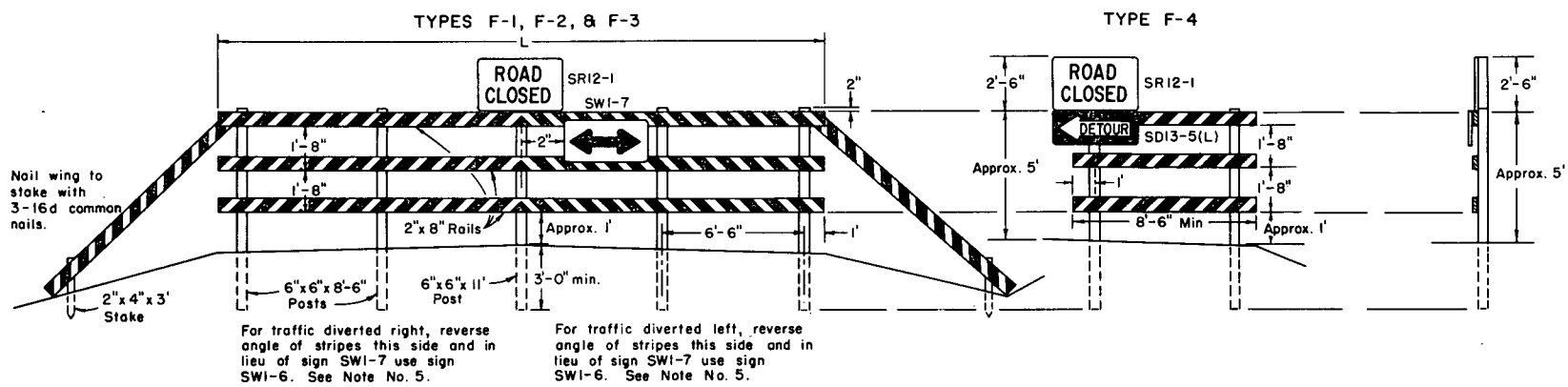
Designed by *W.D.*
Made by *W.D.*
Checked by *C.R.S.*
Approved by *W.D.*
Staff Design Eng.
Date: July 1, 1965

CLASS I BARRICADES
(3 RAILS)

MOVABLE

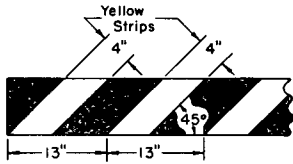
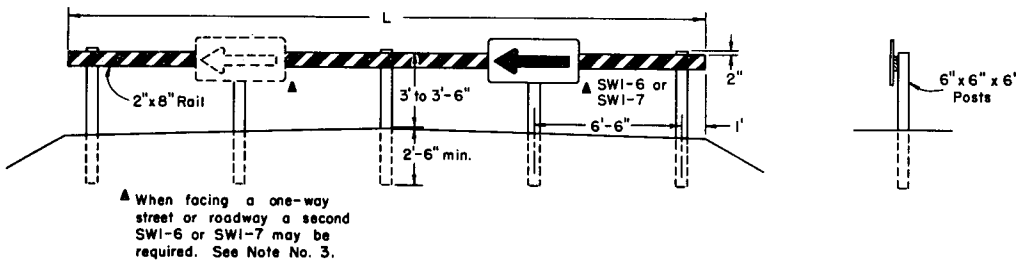


FIXED

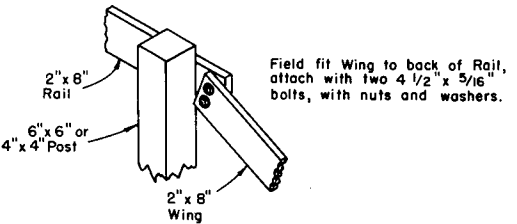


CLASS II BARRICADE
(1 RAIL)

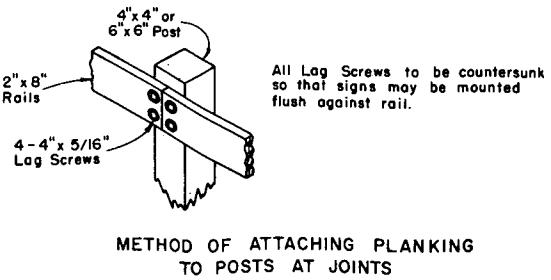
FIXED
TYPE F-6



DETAIL OF RAIL
AND WING STRIPING

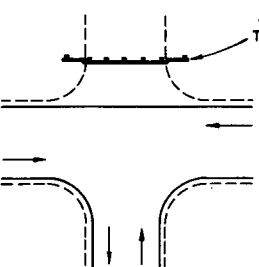


REAR VIEW OF BARRICADE
SHOWING WING ATTACHED
(See Note No. 9)

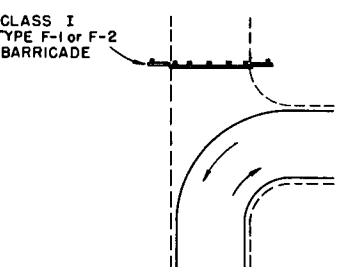


METHOD OF ATTACHING PLANKING
TO POSTS AT JOINTS

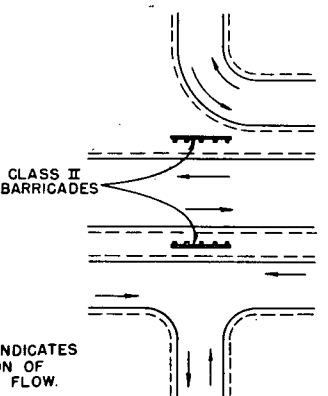
SITUATION A



SITUATION B



SITUATION C



INDICATES
DIRECTION OF
TRAFFIC FLOW.

STANDARD M-614-A
(JULY 1, 1965)

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

REVISIONS

GENERAL NOTES

- All work shall be done in accordance with the Standard Specifications applicable to the Project.
- All signs and sign materials shall conform to the standards set forth in the "Manual on Uniform Traffic Control Devices for All Classes of Streets and Highways" published by the Department of Highways and this standard.
- The various types and combinations of approved Signs and Beacons for Barricades required for each project shall be governed by field conditions and subject to approval by the Engineer. All traffic controls shall be placed for best visibility and legibility and maintained in good condition at all times. Oversigning is to be avoided.
- Painting shall conform with Subsection 508.08 of the Standard Specifications. All skids, braces, and posts shall be painted with 2 coats of "Exterior Black Paint." Planking and wings on all barricades shall be painted with 2 coats of "Exterior Black Paint" on all sides before adding reflective strips. Reflective strips shall be "cut from smooth surface yellow reflective sheeting" of a type approved by the Department.
- Each barricade rail shall be striped on the face side only with reflective yellow strips slanting downward at a 45° angle toward the side to which traffic is to turn or pass. See "DETAIL OF RAIL AND WING STRIPING."
- When barricades are designated on plans the portion of the posts below ground line shall either be dipped in or painted with hot creosote oil. The portion of the post above ground line shall be painted with 2 coats of "Exterior Black Paint."
- All skids, braces, and posts shall be nailed together with No. 20d nails. All screws, bolts, nuts, and washers shall be galvanized or cadmium plated. Skids (bases) of movable barricades shall be weighted where necessary to provide stability.
- All timber used shall conform to the Standard Specifications for Miscellaneous Untreated Timber S4S. Timber shall conform to Construction grade Paragraph 123B or 125B of Standard No. 15 Grading & Dressing Rule for West Coast Douglas Fir (1956) or Dense Structural 58 and LL Structural 58 Paragraph 284 or 285 of 1956 Grading Rules for Southern Pine.
- Detachable extension wings for bypassing of construction equipment are permitted. "W" is variable, length shall be adequate to provide closing of borrow pit and/or shoulder as required.
- Alternate materials or other reflective elements on Traffic signs or Barricades will be permitted only after approval of such material by the Department in writing.
- A Flashing Beacon for use on Barricades is a section of a standard traffic signal head or a similar-type device having a yellow lens in the face, which is illuminated by intermittent flashes. Where commercial power is not available, the beacon may be adapted to operate from storage batteries. Each signal unit lens shall have a visible diameter of not less than 8 inches. Each unit complete shall be of such design as to render the lens when illuminated clearly visible to traffic facing the signal at all distances up to 1000 feet under all atmospheric conditions except dense fog. The color of the yellow lens for caution shall be in accordance with Technical Report No. 1 of the Institute of Traffic Engineers. All beacon flashers shall be equipped with filters for suppression of radio interference. The illuminating element in a flashing yellow beacon shall be flashed at a rate of not less than 50 times nor more than 60 times per minute. The illuminated period of each flash shall be not less than half and not more than two-thirds of the total cycle. The use of Flashing Beacons will be governed by field conditions. Flashing Beacons when warranted generally should be operated continuously throughout the 24 hours of the day. Warrant for Flashing Beacons may be found in Sec. 3G of the "Manual on Uniform Traffic Control Devices for Streets and Highways" published by the U.S. Department of Commerce, Bureau of Public Roads, June, 1961 (or latest revision).
- Flashers are portable, power-operated, lens-directed, enclosed lights, illuminated by rapid intermittent flashes of short duration. Flashers may be used in connection with barricades when approved by the Engineer. An array of random flashers which tends to obscure rather than delineate the traveled way will not be permitted. The use of flashers on a job will be governed by Sec. 5D of the "Manual on Uniform Traffic Control Devices for Streets and Highways" published by the U.S. Department of Commerce, Bureau of Public Roads, June, 1961 (or latest revision). The color of the light emitted by a flasher shall be yellow.
- Flashing Beacons and Flashers, when used, shall be positioned above the top rail of the barricades to produce the most effective results.
- Barricades used as "Traffic Controls for Highway Construction" are not to be paid for separately.
- Barricades will be paid for separately when designated on plans as bid items.
- For additional general information on control of traffic through work areas refer to the "Manual on Uniform Traffic Control Devices for Streets and Highway", Part II, published by the U.S. Department of Commerce, Bureau of Public Roads, June, 1961 (or latest revision).

BARRICADE DESIGNATIONS					
Class	Type	Roadway Width	L	Description	
I	M-1	F-1	26'-34'	28'	Barricade complete with SR12-1 sign and SWI-6 or SWI-7 signs as required.
I	M-2	F-2	35'-44'	41'	Barricade complete with SR12-1 sign and SWI-6 or SWI-7 signs as required.
I	M-3	F-3	Variable	28'	Barricade (without extension wings) complete with SR12-1 sign and SWI-6 or SWI-7 signs as required.
I	M-4	F-4	Variable	Variable 8'-6" min.	Wing Barricade (signs only as appropriate).
II	-	F-6	Variable	28'	Barricade complete with appropriate signs.

DEPARTMENT OF HIGHWAYS
STATE OF COLORADO

TIMBER
BARRICADES

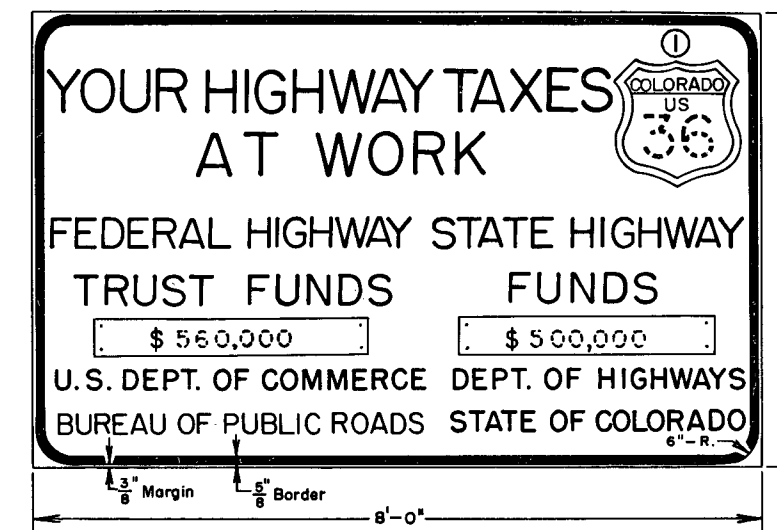
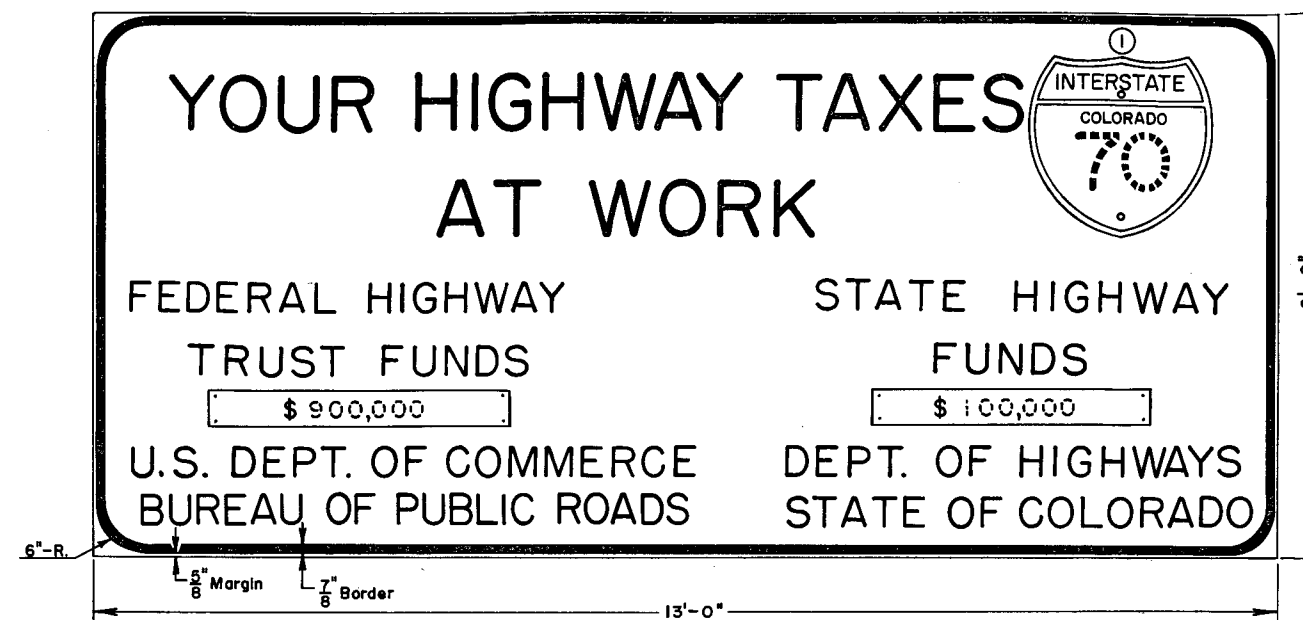
Designed By: D.R.W.
Made By: J.L.S.
Checked By: J.B.
Approved By: [Signature]
Date: JULY 1, 1965

STANDARD M-614-IA

(JULY 1, 1965)

PRIMARY & SECONDARY SYSTEM

FEDERAL ROAD REGION NO.	DISTRICT	PROJ. NO.	SHEET NO.	TOTAL SHEETS
9	COLORADO			

[illegible]

GENERAL NOTES

All work shall be done in accordance with the Standard Specifications applicable to the project.

Signs shall be made of $\frac{3}{4}$ " Plywood or other material approved by the Department.

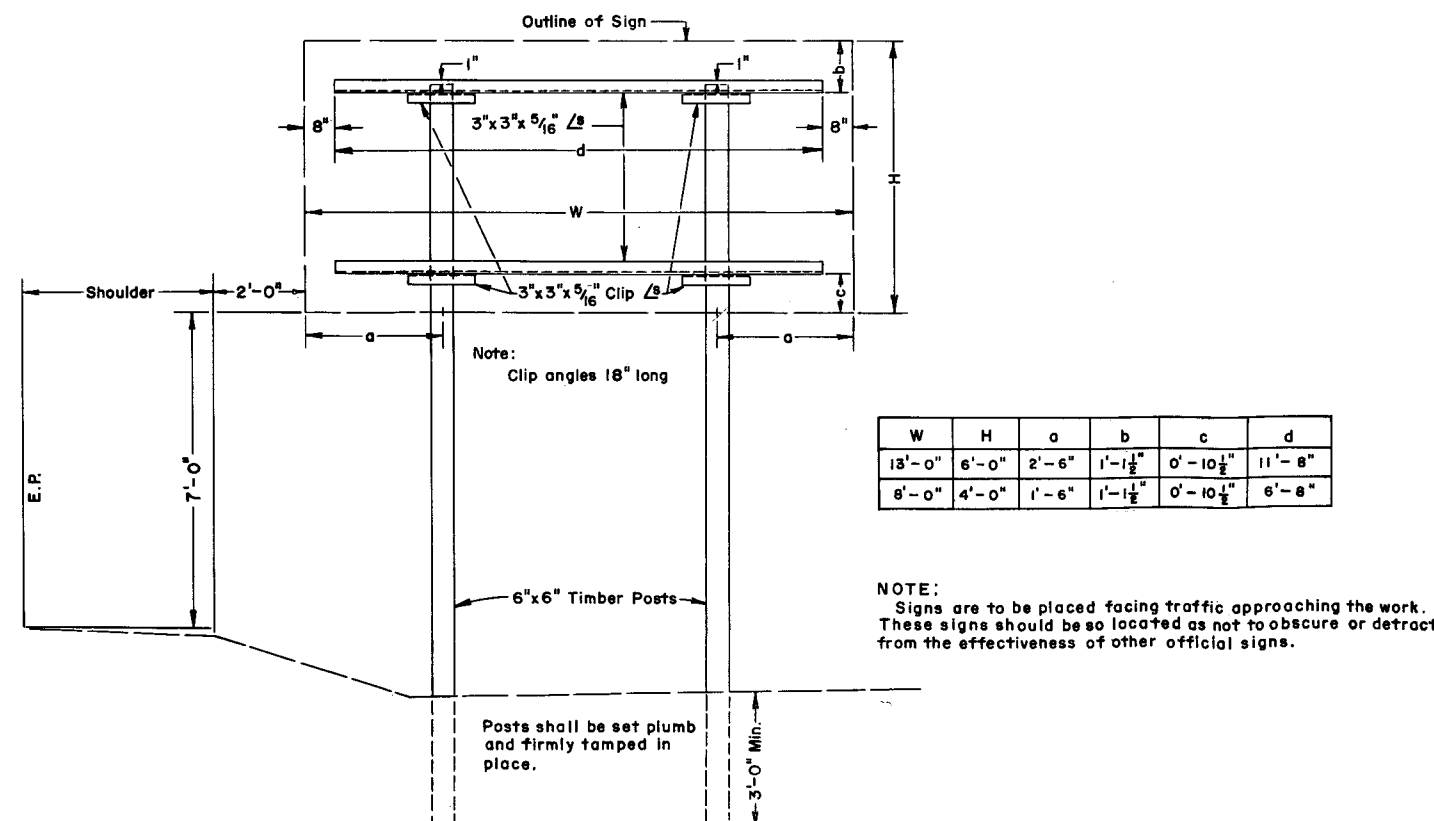
When a third governmental agency is participating its official name should be included centrally in lines 6 and 7

Posts shall be 6"X6" S4S timber or other material approved by the Department and shall be painted white.

Signs are to be non-reflectORIZED, black letters, numerals, and border on plain white background. Route Marker plaques to be the appropriate standard colors, non-reflectORIZED.

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

These signs will be furnished and installed by State Forces.



① Applicable Interstate, U. S. Shield or State Route Shield.

DEPARTMENT OF HIGHWAYS
STATE OF COLORADO
CONSTRUCTION
IDENTIFICATION
SIGNS

Designed by B.F.R.	Approved by: <i>[Signature]</i>
Made by D.J.B.	
Checked by M.R.H.	Date: July 1, 1965

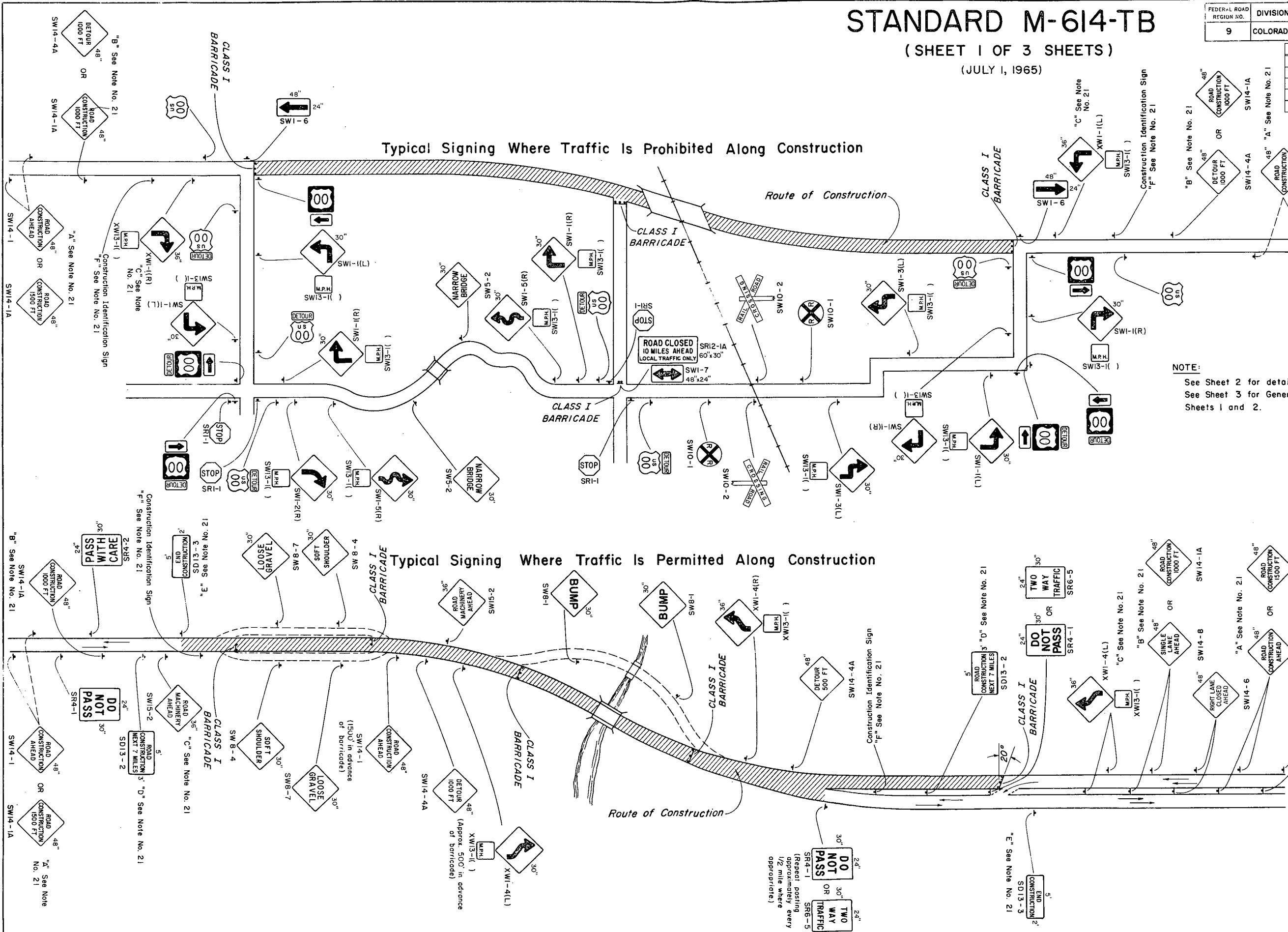
STANDARD M-614-TB

(SHEET 1 OF 3 SHEETS)

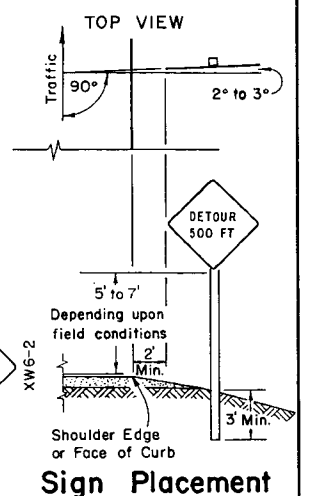
(JULY 1, 1965)

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

REVISIONS



NOTE:
See Sheet 2 for detailed drawings of signs.
See Sheet 3 for General Notes applicable to
Sheets 1 and 2.



DEPARTMENT OF HIGHWAYS
STATE OF COLORADO
TRAFFIC SIGNING
FOR HIGHWAY
CONSTRUCTION

Designed By: D.R.W.
Made By: J.L.S.
Checked By: J.B.

Approved By: *[Signature]*
Date: AUGUST 9, 1965

STANDARD M-614-TB

(SHEET 2 OF 3 SHEETS)

(JULY 1, 1965)

WARNING SIGNS

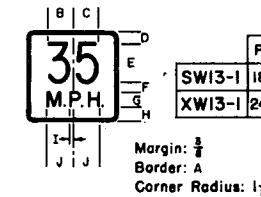
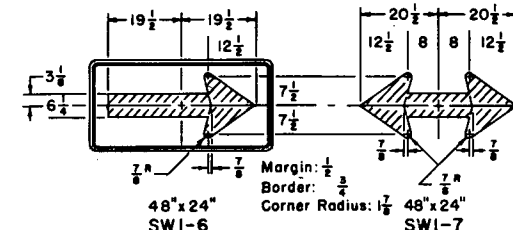
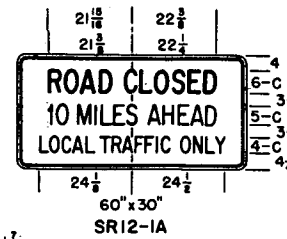
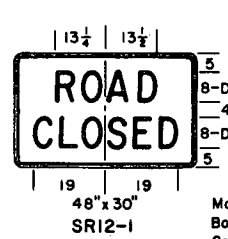
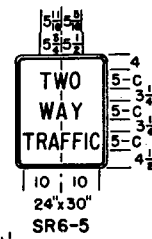
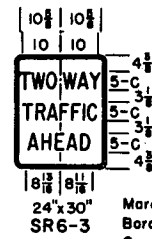
See Note No. 10

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

REVISIONS			

REGULATORY SIGNS

See Note No. 9



Panel	A	B	C	D	E	F	G	H	I	J
SW13-1	18"x18"	5 1/2"	5 1/2"	2 1/2"	8-C	2	3-E	2 1/2"	5 1/2"	5 1/2"
XW13-1	24"x24"	6 1/2"	6 1/2"	3 1/2"	10-C	2 1/2"	4-E	4	15 1/2"	6 1/2"

WARNING SIGNS

See Note No. 10

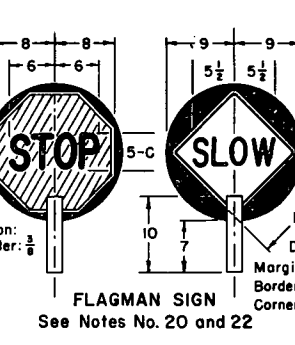
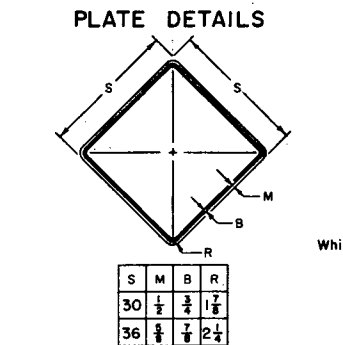
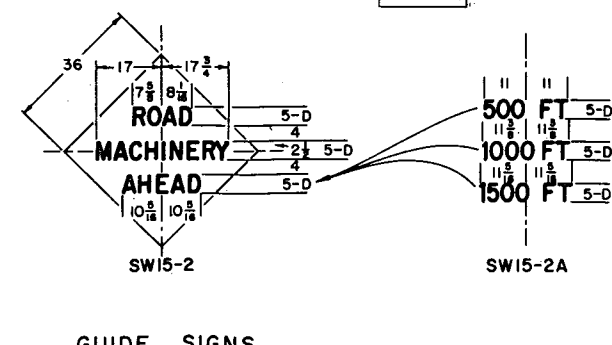
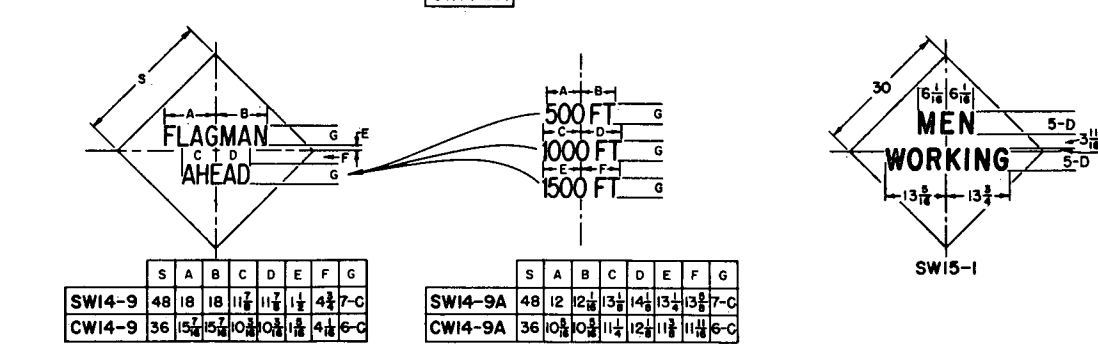
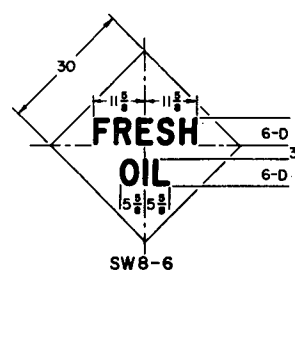
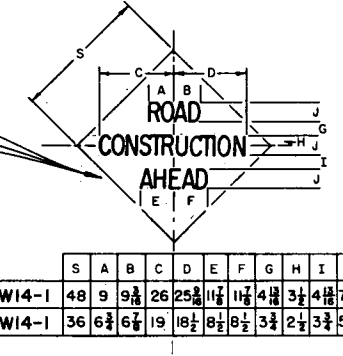
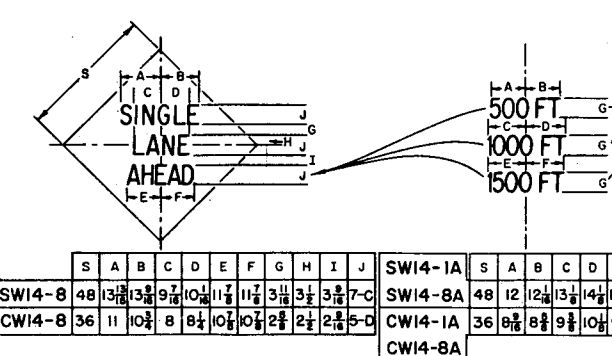
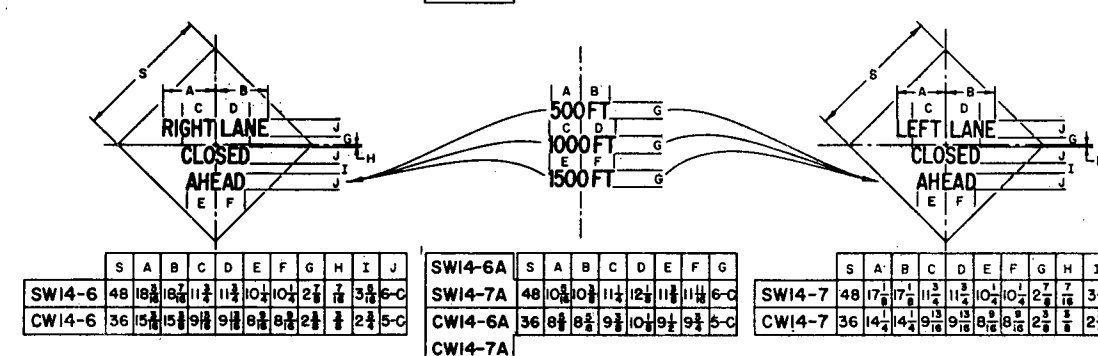
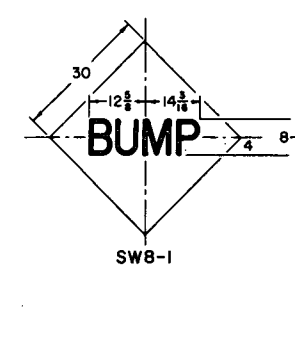
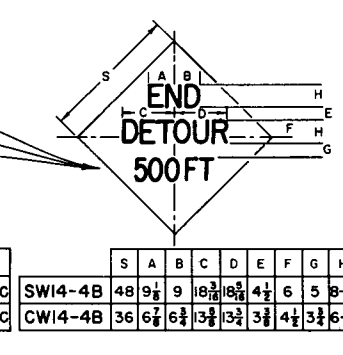
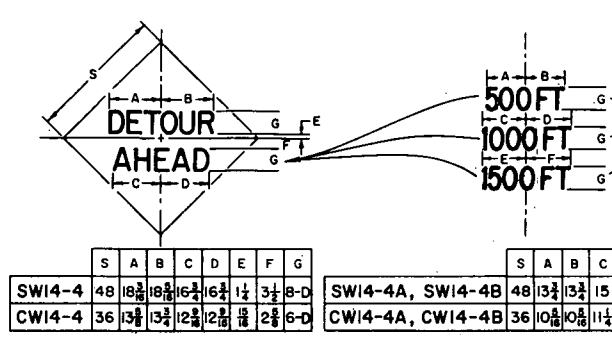
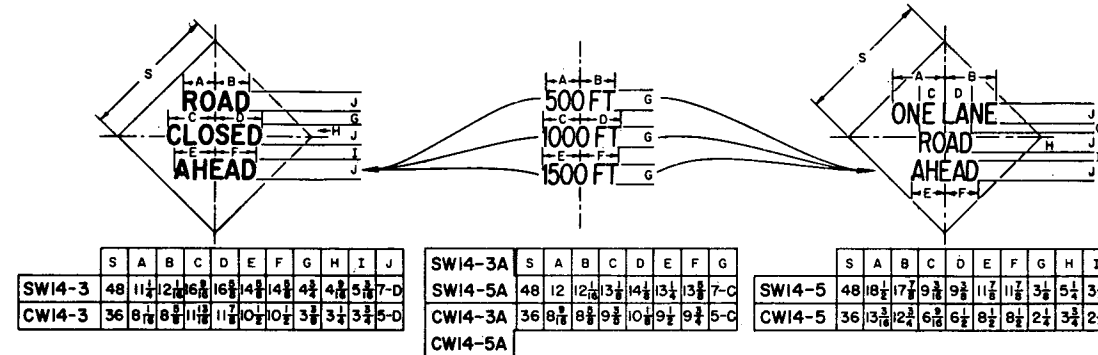
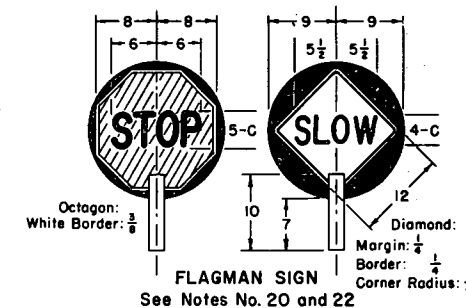
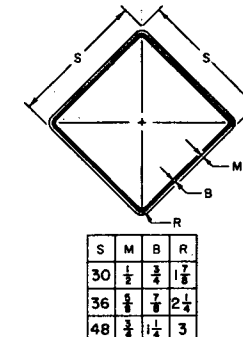


PLATE DETAILS



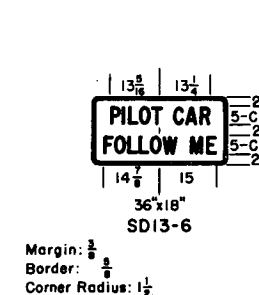
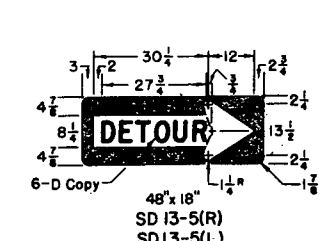
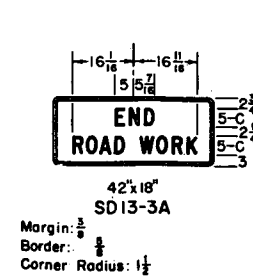
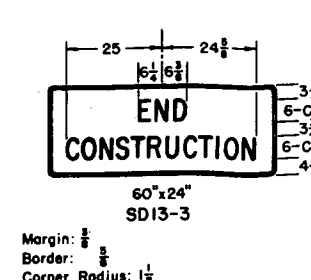
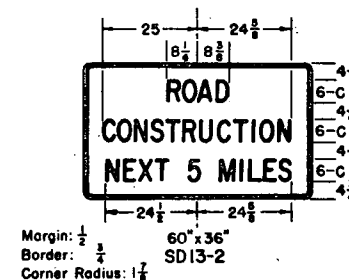
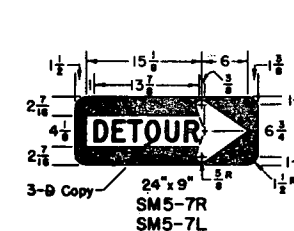
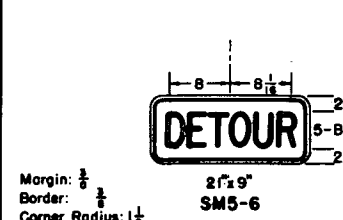
NOTES:

SEE SHEET 1 FOR TYPICAL SIGNING AND SIGN PLACEMENT. SEE SHEET 3 FOR GENERAL NOTES APPLICABLE TO SHEETS 1 AND 2.

ALL DIMENSIONS THAT ARE NOT LABELED ARE IN INCHES.

GUIDE SIGNS

See Note No. 11



DEPARTMENT OF HIGHWAYS
STATE OF COLORADO
TRAFFIC SIGNING
FOR HIGHWAY
CONSTRUCTION

Designed By: D.R.W.
Made By: H.B.D.
Checked By: J.B.
Approved By:
Date: AUGUST 9, 1965

STANDARD M-614-TB

(SHEET 3 OF 3 SHEETS)

(JULY 1, 1965)

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

REVISIONS		

GENERAL NOTES

- All work shall be done in accordance with: (a) the Standard Specifications applicable to the Project, and (b) the "Manual on Uniform Traffic Control Devices for all Classes of Streets and Highways" published by the Department of Highways.
- 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 (including connecting roads) with well-maintained Barricades, Warning, and Guide Signs. All Barricades and Signs shall be moved, added to, changed or removed as required during the progress of construction and removed entirely when the Project is completed.
- Where traffic is prohibited from the Project the Detour will be marked by the Department except that the Contractor shall provide, erect and maintain Barricades, complete, (when required) at the ends of the Project, ends of the Detour and connecting roads. All U.S. or State Route Markers required for the Project will be furnished and installed by the Department. The location and positioning of Warning Signs, Barricades, and Regulatory Signs shall be as recommended by the appropriate District Engineering Forces of the Department.
- Work on the Project shall not be started until all required signs are in place and approved by the Engineer. Where speed control appears necessary such speed control shall be requested from the Engineer by the Contractor. Control of speed through a construction zone may be achieved by Advisory Speed plates in conjunction with Warning Signs (SW13-1 for use with 30" Warning Signs and XW13-1 for use with 36" and 48" Warning Signs). The Advisory Speed plate is to be posted only at those locations where the safe speed is lower than the imposed Regulatory speed limit.
- All Signs and Barricades shall be placed for best visibility and legibility, maintained in good condition and kept clean and free of dirt at all times. Contractor's and Engineer's vehicles and equipment must be parked so that signs and barricades are visible to approaching traffic at all times.
- Where two identical signs are used for dual posting they are to be staggered on the two sides of the roadway for a minimum distance of 75' to avoid a tunneling effect.
- Examples for marking Projects, as shown on Sheet 1, are typical of signs required and are subject to alteration to fit actual conditions encountered in the field. Locations for control devices are to be staked by the Engineer. In all cases Warning signs are to be placed well in advance of the hazard, the distance depending on topography and existing approach speeds. Additional markings and any special signs required for the guidance and protection of traffic will be placed as required on the Project at the Contractor's expense.
- Desirable sizes for signs are shown on Sheet 1 of this Standard. Larger or smaller signs shall be used where warranted. Detailed dimensions for signs normally used in connection with construction are shown on Sheet 2 of this Standard. For information on standard roadway signs not detailed on this Standard see the "Manual on Uniform Traffic Control Devices for all Classes of Streets and Highways" published by the Department of Highways.
- Signs with the prefix "R" in the sign code are Regulatory signs and as such impose legal compulsions or restrictions on drivers and should only be used as authorized by the Engineer.
- Signs with the prefix "W" in the sign code are Warning signs and are used to alert traffic to existing or potentially hazardous conditions.
- Signs with the prefix "D" or "M" in the sign code are Guide signs. Those with the prefix "D" convey general information and those with the prefix "M" are used for marking the traffic route.
- All signs shall be reflectorized unless otherwise specified on plans. Regulatory and Guide signs (unless otherwise specified) shall have a screen processed black legend and border on a white flexible reflective sheeting, non-exposed lens background. The back side of Regulatory and Guide signs shall be painted with two coats of "Exterior Sign White Paint." Warning signs shall have a screen processed black legend and border on a highway yellow flexible reflective sheeting, non-exposed lens background. The back side of Warning signs shall be painted with two coats of "Federal Yellow Synthetic Sign Enamel."
- Painting for wood surfaces shall conform with Section 508 of the Standard Specifications.
- Posts for regulatory, warning, and guide signs will normally be 4"x 4" or 6"x 6" and shall conform to the Standard Specifications for Untreated Timber-S4S. Timber shall conform to Construction grade Paragraph 123B or 125B of Standard No. 15 Grading & Dressing Rules for West Coast Douglas Fir (1956) or Dense Structural 58 and LL Structural 58 Paragraph 284 or 285 of 1956 Grading Rules for Southern Pine. Posts shall be painted with one coat of "White Wood Primer" and one coat of "Outside White Paint."
- Sign panels furnished by the Contractor for use only during construction may be fabricated from plywood, aluminum, steel or other suitable material but shall be stable and durable enough to meet other requirements of this Standard.
- All material shall be sound and durable. Barricades, signs, symbols, and lettering shall be of good workmanship. 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 by the Department.
- Torches and Lanterns shall be either of the fuel-burning or battery-powered type approved by the Department. Particular care shall be taken to protect all signs and barricades from smoke and smudge.
- Barricades, Flashing Beacons and Flashers - Refer to appropriate "M" Standard (Timber Barricades) for details.
- Flagman Sign - This sign shall have a black painted background on both sides to form a contrast for the octagonal Stop sign and the diamond Warning sign. The "STOP" sign shall be fabricated by reverse screen process using transparent red paint on smooth surface silver reflective sheeting. The "SLOW" side of the Flagman Sign shall be black process paint on smooth surface yellow reflective sheeting. Handle to be grooved on one side to indicate reading of sign to Flagman.
- Sign "A": This is the first advance warning sign and shall be placed 1,500 feet ahead of Barricade or project terminal. Postings are required on both sides of the roadway on divided highways. Dual posting is required where warranted on two-lane, two-way highways.
Sign "B": This is the second advance warning sign and shall be placed 1,000 feet ahead of barricade or project terminal. Postings are required on both sides of the roadway on divided highways and singly on two-lane, two-way highways.
Sign "C": This is the third advance warning sign in cases where barricades are used and shall be placed 500 to 750 feet ahead of barricade or potentially hazardous condition. Postings are required on both sides of the roadway on divided highways and singly on two-lane, two-way highways.
Sign "D": SD13-2 - This sign shall be placed to mark the beginning of a Project of more than 2 miles in extent, where traffic is maintained through the project. It shall be placed singly and near the beginning of construction.
Sign "E": SD13-3 - 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 "F": Construction identification signs shall be furnished and installed by the Department on all Federal-Aid and Forest Highway Projects where actual construction is in progress and visible to highway users. These signs should be located so as not to obscure or detract from the effectiveness of other official signs. Where two or more projects are contiguous the appropriate data may be included in one set of signs. Refer to appropriate "M" Standard (Identification Signs) for sign details.
Signs A through F shall be furnished, installed and maintained by the Department.
- When Flags are used in lieu of the Flagman Sign, they shall be a minimum of 18"x18", made of a good grade of bright red material, and fastened securely to a staff of approximately 3 foot length. The free edge should be weighted to insure that the flag will hang vertically, even in heavy winds.

SPECIAL NOTE: Requirements of this Standard are optional to those of Standard M-614-TA through 12-31-65. Following that date Standard M-614-TA will be obsolete.

DEPARTMENT OF HIGHWAYS
STATE OF COLORADO

TRAFFIC SIGNING
FOR HIGHWAY
CONSTRUCTION

Designed By: D.R.W.
Made By: J.L.S.
Checked By: J.B.
Approved By: *[Signature]*
Date: AUGUST 9, 1965