PROFILE
SURVEYED
PLOTTED
GRADE CHECKED
AS NOTED
STRUCTURE NOTATIONS CHKD
J.B.L.
BY
DATE
PLAN
SURVEYED
PLOTTED
ALIGNMENT CHECKED
RT OF WAY CHECKED
NOTE BOOK NO.
5290
5300
5310
5320
5330
5340
5350
5360
1480
1485
1490
1491
1509
1510
1515
1520
1525
1530
For Final Quantities See X Sections
Quantities as Revised
P.I. 23.50
26.17
34.52
400' V.C.
1487+84.5 Back = 1488+15.2 Ahead
23.18
1491+87.7 Back = 1508+94.9 Ahead
STATION 1510+00 - END OF F.A.P. E 9. SECTION B
22.68
22.11
22.52 P.I.
20.75
200' V.C.
15.33
1515+29.3 Back = 1515+29.6 Ahead
P.I. 13.53
13.84
11.06
P.I. 10.23
11.71
300' V.C.
15.30
23.79
26.78
28.98
Clearing and Grubbing Required Sta. 1489+70 Small Willow Trees
Sta 1480+70 - 1484+70, 300 Lin Ft Wire Cable Guard Fence on Rt
P.I. 1483+28.4
Sta 1483+26 Reqd 36" x 144' Cor. Metal Pipe Culvert. U.S. Slope Paving
STA 1484+10 5'x7'x42' Conc Box Culvert for Cattle Pass W.O. 3153
PRESENT ROAD
Hardy Irrigation Canal
EQUATION
P.T. 1487+84.5 Back = 1488+15.2 Ahead
Sta 1488+80 Reqd 18"x28' Cor Metal Pipe Side Drain. Excav. for Road Approach.
P.C. 1489+30.8
Sta 1489+35 Reqd Replace 4'x3.5' Rock Culvert with 4'x96' Concrete Box Culvert
P.I. 1489+91.9
P.T. 1490+53.1
Sta 1491+40 Reqd Remove 2 Buildings from Right of Way
1491+87.7 Back = 1508+94.9 Ahead P.I. Δ 4°00'04" L
STA 1509+00 - 1509+60 Rock Retaining Wall and Rd App'ch.
P.C. 1511+32.4
P.I. 1512+24.3
P.T. 1513+13.2
P.I. 1514+82.3
P.C. 1514+34.4
P.T. 1515+29.3 Back
1515+29.6 Ahead
EQUATION
BIG THOMPSON RIVER
P.C. 1524+06.8
P.I. 1524+81.0
P.T. 1525+54.5
P.C. 1526+73.7
P.I. 1527+46.1
P.T. 1528+15.6
P.C. 1529+07.9
P.I. 1529+99.2
P.T. 1530+85.7
FED. ROAD DIST. NO. 9
STATE COLO
FED. AID PROJ. NO. E 9 B
SHEET NO. 35
TOTAL SHEETS
Rev. as Const. 2-2-34 H.E.M.

FED ROAD DIST NO	STATE	FED AID PROJ NO
9	COLO	E 9 B

Sht 1

Rev 3-30-33 · W.E.O.
" 5-16-33 · H.O.W.

COLORADO
STATE HIGHWAY DEPARTMENT

PLAN AND PROFILE OF PROPOSED
FEDERAL AID PROJECT NO. E-9 B
STATE HIGHWAY NO. 16
LARIMER COUNTY

INDEX OF SHEETS

CONST DIVISION NO 1

Sheet No	Title	Standard
Sheet No 1	Title Sheet	
" " 2	Typical Section & Summary Sheet	
" " 3	Bridge Details Sta 1312+	
" " 24	Stand Superelevation Sheet	M-1-A
" " 25	" Wire Cable Guard Fence	M-20-F
" 26	" Wire Fence & Markers	M-24-F
" " 27	" Concrete Box Culverts	M-103-D
" " 28-35	Plan & Profile	
" " 36-84	Cross Sections	

CONSTRUCTION DIVISION NO. 2

Sheet No	Title	Standard
Sheet No 1	Title Sheet	
" " 2	Typical Section & Summary Sheet	
" " 2a	Tabulation of Bridge Quantities	
" " 23	Details of Water Conduit Sta 1424+	
" " 4-5	" " Bridge Sta 1323+	C-16-Y
" " 6-9	" " " 1340+	C-16-Z
" " 10	" " " 1346+	C-16-R
" " 11-14	" " " 1388+	C-16-AA
" " 15-16	" " " 1414+	C-16-AG
" " 17-18	" " " 1425+	C-16-AH
" " 19-20	" " " 1436+	C-16-AI
" " 21	" " " 1421+ & Sta 1414+	
" " 22	Standard Concrete Box Culverts	M-104-D
" " 24	" Superelevation Sheet	M-1-A
" " 25	" Wire Cable Guard Fence	M-20-F
" " 26	" Wire Fence & Markers	M-24-F
" " 30-33	Plan and Profile	
" " 44-48, 59-61, 65-72, & 84	Cross Sections	

CONVENTIONAL SIGNS

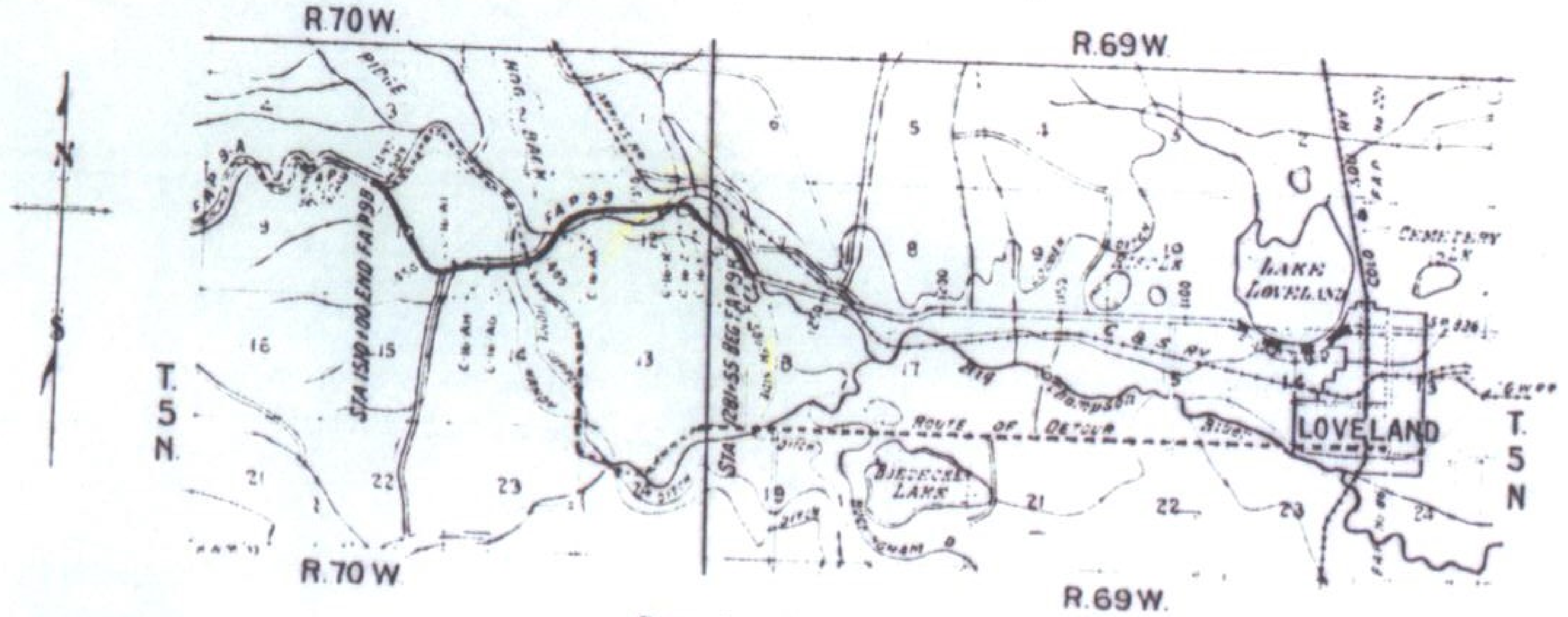
Sign	Symbol
Center Line of Survey	——┼—— 1313
Right of Way Line	— - — - —
Township Line	— — — — —
Section Line	————————
One Quarter Section Line	
Wire Cable Guard Fence	…………………
Barbed Wire Fence	· ·
Railroads	……………… — — — —
Pole Lines	● ● ●

SCALES

ON PLAN, 1 IN. - 100 FT.
ON PROFILE { 1 IN. - 100 FT. HORIZONTAL
{ 1 IN. - 10 FT. VERTICAL

GRADE LINE ON PROFILE IS SHOWN AS GRADE OF FINISHED ROAD

GROSS LENGTH OF PROJECT / NET LENGTH OF PROJECT		Feet		Miles
DIVISION NO. 1		17562.1	FEET =	3.326 MILES
" " 2		2552.5	"	0.483 "
TOTAL		20114.6	"	3.809 "



RECOMMENDED FOR APPROVAL 1/2

J. E. Callaway
ASSISTANT ENGINEER

APPROVED

Chas. Vail
STATE HIGHWAY ENGINEER

RECOMMENDED FOR APPROVAL

[redacted]

DIST. ENG. BUREAU PUBLIC ROADS

RECOMMENDED FOR APPROVAL

[redacted]

CHIEF ENG. BUREAU PUBLIC ROADS

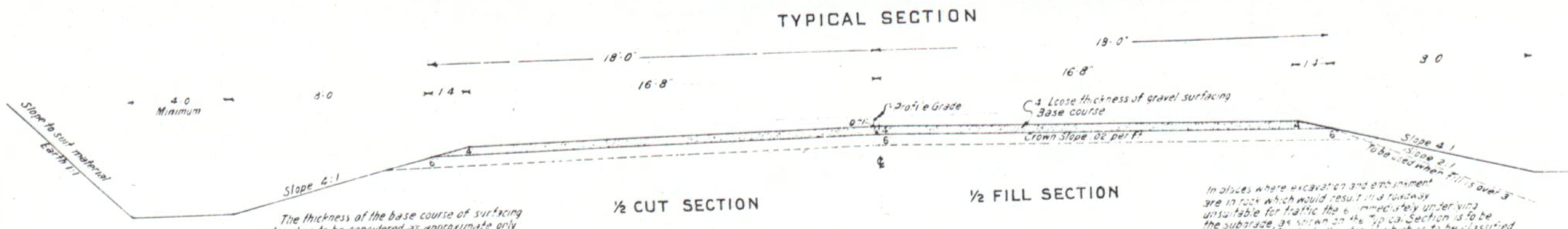
FED ROAD DIST NO	STATE	FED AID PROJ NO	SHEET NO	TOTAL SHEETS
1	COLO	E-98	2	

Rev 3/10/33 W.E.B. & [illegible] for Const Div #2

NOTE:
For Final Construction Quantities See Sheets 2X.E9B1 and 2X E9B2.

TYPICAL CROSS SECTION OF IMPROVEMENT AND SUMMARY OF QUANTITIES

TYPICAL SECTION



The thickness of the base course of surfacing material is to be considered as approximate only. Surfacing material is to be placed at the rate of 60 Tons per 100 feet of Road

In places where excavation and embankment are in rock which would result in a roadway unsuitable for traffic the 6" immediately underlying the subgrade, as shown on the Typical Section is to be constructed of selected material which is to be classified and paid for as "Unclassified Excavation"

GENERAL NOTES

This Project is to be constructed in conformity with the Specifications of the Colorado State Highway Department adopted January 1, 1930

All quantities on preliminary plans are to be considered approximate only

All curves are to be superelevated and widened as provided for by the Standard Superelevation sheet included with the plans

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

The entire Project is to be Cleared for the full width of the right of way, and the cost thereof is to be included in the lump sum price for Clearing and Grubbing the entire Project. Notes on the plans indicate the approximate locations and character of the Clearing and Grubbing required

Unless otherwise noted on the plan sheets and list of structures the inlet ends of all corrugated metal cross culverts are to be protected by dry rubble slope paving 1 ft thick placed about the end of the pipe. The approximate yardage of slope paving required is shown in the list of structures

The detour for this Project is to be over the route shown on the Title sheet. The Contractor shall at his own expense maintain in safe condition all temporary approaches to and crossings of intersecting roads.

Except as limited by the Special Provisions power equipment may be used on this Project

SUMMARY OF APPROXIMATE QUANTITIES

			CONS DIV NO 1	CONSTRUCTION DIVISION NO 2								TOTALS	
ITEM	DESCRIPTION	UNIT	ROADWAY	ROADWAY 1322-1437+40	CON SLAB BR 1322+60-1326+50	ST TRUSS BR 1339-1343	EXTEND BR Sta 1346+	ST TRUSS BR 1388-1390	CON SLAB BR Sta 1414+	ST I BEAM BR Sta 1425+	ST I BEAM BR 1436-1437+40	DIV NO 1	DIV NO 2
				(10a)	(10b)	(10c)	(10d)	(10e)	(10f)	(10g)	(10h)		
10a	Clearing & Grubbing entire Proj	LmpSum	•									•	
11a	Rem 6 culverts		•									•	
11b	.. 13 Structures		•									•	
11c	.. Bd fence & Stone walls			•									•
12a	Removing fence	Lin Ft	14100	1590	150	340		20				14,100	2100
13c	Unclassified Excavation	Cu Yd	103000	12,000	2000	2000		1000	8000	7000	2000	103,000	34,000
14a	Dry Rock Excav (Struct)	..	200	40	5	15	5	20	5	45	10	200	145
14b	.. Comm ..	..	600	130	297	369	100	214	100	467	540	600	2217
14c	Wet Rock	..	50	10	67	86	5	92	5	72	90	50	427
14d	.. Comm	..	200	40	5	170	5	155	175	50	210	200	810
18a	Station Yard Overhaul	Sta Yd	221000	54000	12000	1000		1000			1000	221000	69000
18b	Yard Mile Overhaul	Yd Mi	1000									1000	
30x	Grav or Cr Rock Surfacing	Ton	10540	920	100	150	20	40			70	10540	1300
42a	Untreated Br timber	M B M	0.300		0.8	0.5		0.3	3.8	1.1	0.6	0.300	7.1
42b	Treated ..	..		0.7									0.7
46a	Class "A" Concrete	Cu Yd	105	81	268	335	100	289	149	228	332	105	1782
46b	.. "B" ..	..	163			80						163	80
47	Reinforcing steel	Lbs	11,000	7000	20,600	39,000	3,300	39,400	12900	15000	36,900	11,000	174200
48	Structural Steel	Lb			13,600	178,800		60,600	9900	13100	18,800		394800
53a	15" Corr Met Culvert Pipe	Lin Ft	524	72								524	72
53b	18"	..	1,100									1,100	
53c	24"	..	554									554	
53e	36"	..	228									228	
65	Dry Rubble Slope Pav 1' Th	Sq Yd	72									72	
72	Wire Cable Guard fence	Lin Ft	200	666.4	200	200		131.6			200	200	1400
105	8" Dipped Sm Met Pipe (Asa)	..		340									340
153	Galv Barb Wire fence Wd posts	Lin Ft	31,200	2450	440	420		180			140	31,200	3630
75b	Gates in Barb wire fence	Each	15	1								15	1
[illegible]	[illegible]	[illegible]							63 8				169 8
78	Project Markers	Each	1									1	
79	Right of Way Markers	..	29	6								29	6
84	Rem disused Br	LmpSum	•		84a	84b	84c		84d	84e	84f	•	
81	Bronze Name Plates	Each				2		2					4
95a	Comb wire fence Wd posts	Lin ft	430									430	
95b	Driveway Gates	Each	2									2	
89a	Galv Drain Pipes 3'x2'6"	..				4		4			2		10
89b	3'x4'8"	..				12		12					24
	MATERIALS TO BE FURNISHED AND WORK TO BE DONE BY STATE FORCES (WITHOUT FED AID)												
	Restoring 13 structures	LmpSum	•									•	

FENCING REQUIREMENTS

CONSTRUCTION DIV NO 1

STATIONS	SIDE	BARBED WIRE Remove	BARBED WIRE Build	COMB W Build	STATIONS	SIDE	BARBED WIRE Remove	BARBED WIRE Build	COMB W Build
1281+55 to 1286+80	L&X	1070	660		1347+60 to 1369+00	L&X	2230		
1281+55 to 1303+35	R		2300		1366+50 to 1374+50	X	890		
1288+50 to 1300	L	160	1150		1366+50 to 1388+00	R		2150	
1290+25 to 1303+55	R	1400			1374+50 to 1388+00	L		1350	
1300+00 to 1303+50	L	400		350	1375+65	X	100		
1303+50 to 1309+00	L	550			1390+00 to 1405+80	R		1580	
1303+50 to 1322+50	L		1,900		1390+00 to 1397+40	L		740	
1305+05 to 1318+25	R&X	1,380			1397+40 to 1405+00	L&X	880		
1305+35 to 1322+05	R		1670		1406+05 to 1413+20	R		720	
1318+25 to 1322+50	L&X	400			1406+10 to 1413+20	L&X	770		
1324+50	R	20			1428+50 to 1436+00	R		800	
1324+50 to 1339+00	L		410		1428+50 to 1436+00	L		810	
1326+05 to 1337+10	R			80	1437+60 to 1486+80	R		4880	
1326+05 to 1339+00	X	360			1437+60 to 1510+00	L		5460	
1337+10 to 1339+00	R		190		1442+00	X	100		
1343+00 to 1346+75	R	410	380		1477+27	X	110		
1343+00 to 1369+80	L		2700		1486+80 to 1510+00	X	680		
1344+45 to 1346+80	L	250			1487+80 to 1510+00	R		480	
1347+20 to 1355+00	R	800	790						
					TOTALS		14020	31,120	430

CONSTRUCTION DIV NO 2

STATIONS	SIDE	BARBED WIRE Remove	BARBED WIRE Build	COMB W Build	STATIONS	SIDE	BARBED WIRE Remove	BARBED WIRE Build	COMB W Build
1322+05 to 1324+45	R		240		1419+29 to 1421+30	L		200	
1322+50 to 1323+50	X	150			1421+90 to 1425+20	X	430		
1322+50 to 1324+50	L		200		1422+00 to 1428+50	L		670	
1339+00 to 1340+25	R		140		1426+05	X	120		
1339+00 to 1341+15	X	230			1436+00 to 1436+15	R		20	
1339+00 to 1340+50	L		160		1436+80 to 1437+60	R		90	
1342+10 to 1343+00	R	110			1437+35 to 1437+60	L		30	
1342+30 to 1343+00	R		70						
1342+55 to 1343+00	L		50						
1388+00 to 1388+40	R		50						
1388+00 to 1388+40	L		50						
1383+75	R	20							
1389+85 to 1390+00	R		40						
1389+85 to 1390+00	L		40						
1413+20 to 1428+50	R		1580						
1413+20 to 1421+25	L	1030							
					TOTALS		2030	3,530	

GATES REQUIRED

STATIONS	SIDE	NO IN B W	DRIVEWAY
1281+55	L	2	
1289+66	L	1	
1302+50	L		1
1307+00	R	1	
1309+15	L	1	
1310+10	R	1	
1312+00	R	1	
1313+00	R	1	
1319+35	L	1	
1326+60	R		1
1343+10	R	1	
1355+20	L	1	
1364+10	L	1	
1412+10	L	1	
1413+15	R	1	
1421+75	R	1•	
1488+50	L	1	
TOTAL CONST DIV NO 1		15	2
" " " 2•		1	0

R.O.W. MARKERS

STATIONS	NO.
1281+55	2
1318+25	2
1349+59	4
1361+55	4
1391+00	2
1406+10	4
1419+29	3•
1425+34	3•
1429+44	3
1437+50	4
1477+27	2
1510+00	2
TOTAL CONST DIV NO 1	29
" " " 2•	6

LIST OF STRUCTURES

STATIONS	DESCRIPTION	REMOVE STRUCT	UNCLASS EXCAV	EMBANK	STRUCT EXCAVATION * Cu Yds	UNTRTD BR TIMB	CONCRETE Cu Yds		REINF STEEL	CORR MET CULV PIPE Lin Ft					DRY RUBBLE SL PAV 1' THK	8" DIPPED SM MET PIPE	MISCELL
		Each	Cu Yds	Cu Yds		M Ft B M	Cl A	Cl B	LBS	15	18	24	30	36	SQ YDS	Lin Ft	
1281+55	Project Marker & Approach			200							62						1 Proj M'kr
1287+00	Cross Culvert & Outlet ditch		10								100				3.0		
1287+80	C M P side drain & Road approach			200	20						28						
1289+66	C M P side drain & Road approach			25	5						62						
1295+00	Cross Culvert				10									84	3.0		
1301+60	Remove C M P Culv Place Cross Culv	1			30					28					7.0		
1302+50	C M P side drain Rd apprch Rem Bldg	1-Bldg		25	5					28							
1307+00	C M P side drain & Rd			130	5						66						
1307+70	Cross Culvert Remove present C M P	1			10					60					3.0		
1309+15	C M P side drain Rd apprch Rem Bldgs	2-Bldgs		330	10					28							
1310+10	C M P side drain & Rd approach			130	5					28							
1312+00	C M P			70	5												
1312+29 to 1312+47.8	16 Sp Conc slab Br, Remove old bridge				252	0.240	35.0	63.0	5020								Wire Cable Guard fen-200' Rem disused Bridge
1313+00	C M P side drain & Road approach			130	5					28							
1319+35	C M P			25	5					28							
• 1323+14 to 1323+57.4	Conc slab Bridge																
1324+50	Cross Culvert		50		70							156			4.0		
1325+25	Road approach			300													
1326+60	Road approach Move Bldg	1-Bldg		50													
• 1340+60 to 1342+24	Steel truss Br with I beam approaches																Guard fen-200'
1343+10	C M P side drain & Rd approach			70	5					28							
• 1346+76.4 to 1347+30	Extend Bridge										60						
1347+00	C M P side drain & Rd approach			100	10					28							
1355+20	C M P side drain, Rem old culvert	1			5												
1355+00 to 1356+00	Remove sidewalk & Sign	1 Sw, 1 Sign															
1356+00	Remove Gas pump	1-Gas Pump															
1356+35	Remove mail boxes	3 Mail Boxes															
1362+10	C M P side drain				5					28							
1363+95	C M P side drain				25						150						
1364+10	Road approach			100													
1366+00	Side drain & Rd approach			150							100						
1367+70 to 1368+70	Ditch change		50														
1369+12	Cross culvert & Outlet ditch		10								76				3.0		
1369+95	Side drain & Rd approach			400	10					70							
1372+50	Cross Culvert				10						66				3.0		
1378+58	Cross Culvert				10						56				3.0		
1385+00	Cross Culvert				5						70				3.0		
• 1388+50 to 1389+84.8	Steel truss Br with I beam approach																Guard fen-68.4
1397+00	Cross Culvert				10							66			4.0		
1401+60	Cross Culvert		25		10						74				3.0		
1402+00	Remove C M P Culv	1															
1404+28	Cross Culvert				10						72				3.0		
1405+82	Side drain & Road approaches			50	10					50							
1406+10	Remove C M P & Mail Box	1 1 Mail Box															
1412+10	C M P side drain & Rd approach			50	5					28							
1413+00	Cross Culvert				5							68			4.0		
• 1415+00	Side drain & Rd Approach			130	5					36							
• 1424+08	Water Conduit				120		4.0		422							340	(0.7 M ft b m Treat Br Timb
• 1420+60 to 1422+00	Remove board fence & Stone walls	[illegible]															
• 1421+75	C M P side drain & Rd approaches			600	5					36							
• 1425+05.4 - 1425+33	Steel I beam Bridge																Guard fen-200'
1426+50 to 1436+00	Channel change		1,000														
• 1436+52 to 1436+86.8	Steel I beam Bridge																
1443+00	Cross Culvert; Diversion ditch		100		15							60			4.0		
1446+00	Cross Culvert Diversion ditch		100		15							68			4.0		
1460+38	Cross Culvert				15						58				3.0		
1475+00	Cross Culvert				15							66			4.0		
1479+63	Cross Culvert				30							70			4.0		
1482+75	Cross Culvert				45									144	7.0		
1487+50	Road approach			150													
1488+50	C M P side drain & Rd approach			50						28							
1489+33	Remove Rock Culvert	1															
1489+33	4 x 4 x 96 Conc Box Culv				225		10		5898								
1491+40	Remove 2 Bldgs	2 Bldgs															Guard fen 200'
• 1414+51 to 1414+75	Concrete Slab Bridge																
1413+15	C M P side drain & Rd approach			800						46							
• 1414+00 (Back)	5 x 7 x 42 Conc Box Culv + inlet ditch		30		60		76.2		6538								
	TOTALS CONSTRUCTION DIVISION No 1	* 13	1348	3535	932	0.240	105.0	163.0	10,918	524	1100	554		228	72.0		Guard fen 200'
	" (ROADWAY) " " No 2		20	730	190		80.2		7000	72						340	" " 668.4

* Structural Excavation is estimated to be 80% Common and 20% Rock, each of which is estimated to be 80% dry and 20% wet

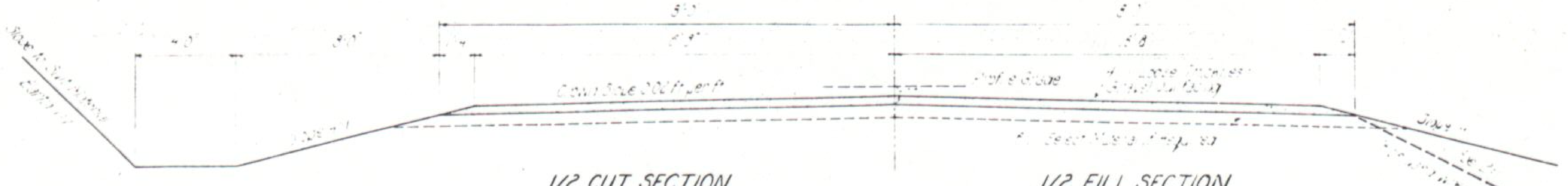
• Work to be done under CONSTRUCTION DIVISION No 2

* TOTAL REMOVALS-
ITEM 11a 6 Culverts
ITEM 11b { 6 Bldgs
1 Gas Pump
4 Mail Boxes
1 Sidewalk
1 Sign

[illegible]	State	Fed Aid Proj No	Sheet No	Total Sheets
1	[illegible]	E352	2X	

Rev. as Const. 2-3-34 A.J.T.

TYPICAL CROSS SECTION AND SUMMARY OF FINAL QUANTITIES



1/2 CUT SECTION

1/2 FILL SECTION

ROW Markers

Station	Side	No
[illegible]	R	1
[illegible]	R	1
[illegible]	R&L	2
[illegible]	R	1
[illegible]	L	1
Total		[illegible]

Gates Required

Station	Side	Nº in BW
1339+00	L	1
1343+30	L	1
1414+30	R	1
1415+30	L	1
1421+50	L	1
1421+80	R	1
Total		6

FENCES REMOVED

Stations		Side	Lin Ft
From	To		
1322+00	1323+50	R	150
1339+00	1341+15	R	345
1342+10	1343+00	R	
1389+75		R	20
1415+20	1428+50	L	130
1413+00	1420+30	R	413
1421+90	1425+30	R	615
1425+50	1428+50	R	155
1428+50	1430+86	R	242
1430+00		L	136
Totals			2348

FENCING REQUIREMENTS

[illegible]	Side	[illegible]	
		[illegible]	[illegible]
[illegible] to 1324+75	L	See Supplemental Detail	[illegible]
[illegible]	L		[illegible]
[illegible]	L		[illegible]
1339+[illegible] to 1340+[illegible]	L		[illegible]
1346+			[illegible]
1395+00	R		130
1395+00	L		154
1397+00	L		58
1413+00 to 1428+50	L		1600
1413+00 to 1420+30	R		159
1421+30 to 1425+50	R		430
1425+50 to 1428+50	R		391
1428+50 to 1430+86	R		242
1430+	R		[illegible]
1430+	L		115
Total			5099

Gravel or Crushed Rock Surfacing

Station		[illegible]
[illegible]	[illegible]	
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
Total		[illegible]

Wire Cable Guard Fence

Station	Lin Ft
1323+	250
1340+	200
1346+	200
1399+	[illegible]
1414+	150
1425+	200
1430+	2[illegible]
Total	1400

SUMMARY OF FINAL QUANTITIES

No	Description	Unit	Roadway	[illegible] Bridge	Steel Truss Bridge	[illegible] Bridge	Steel Truss Bridge	[illegible] Bridge	Steel [illegible] Bridge	Steel I Beam Bridge	Totals
[illegible]	Clearing and Grubbing	L.S.									•
[illegible]	Removing Structures	L.S.									•
[illegible]	Removing Fence	Lin Ft	[illegible]								2349
[illegible]	Unclassified Excavation	Cu Yds	[illegible]	[illegible]	433.2	[illegible]	591.9			25304	35955
[illegible]	Dry Rock Excavation (Struct)	Cu Yds	[illegible]								[illegible]
[illegible]	Dry Comm Excavation (Struct)	Cu Yds	[illegible]	23	[illegible]	[illegible]	[illegible]	57.8	243.9	443.9	705.2
[illegible]	Wet Rock Excavation (Struct)	Cu Yds		115.5	[illegible]		81.9	115.2	150.9	290.0	1036.9
[illegible]	Wet Comm Excavation (Struct)	Cu Yds		272.9	[illegible]	37.8	115.5	3.7	240.0	354.2	1157.[illegible]
[illegible]	Station Yard Overhaul	Sta Yds	34259	[illegible]	285		472.0			219.8	111416
[illegible]	Crushed Rock Surfacing	[illegible]	956.38	[illegible]	[illegible]	[illegible]	[illegible]			11.63	1570.41
[illegible]	[illegible]	[illegible]						[illegible]	.281	.08	7.261
[illegible]	[illegible] Bridge Timber	[illegible]									.7
[illegible]	Class "A" Concrete	Cu Yds	[illegible]	238.5	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	352.0	1878.5
[illegible]	Class "B" Concrete	Cu Yds									80.0
[illegible]	Reinforcing Steel	Lbs	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	14235	36444	112316
[illegible]	Structural Steel	Lbs		[illegible]	[illegible]		16271[illegible]	3304	[illegible]	19672[illegible]	397550
[illegible]	15 in Corr Metal Pipe	Lin Ft	12								12
[illegible]	18 in Corr Metal Pipe	Lin Ft	60								60
50[illegible]	Untreated Timber Piling	Lin Ft						150			160
50[illegible]	Metal Pile Shoes	Each						8			8
50[illegible]	Treated Timber Piling	Lin Ft		412							412
[illegible]	Dry Rubble Slope Paving 12" Thick	Sq Yds							285		285
[illegible]	Dry Rubble Slope Paving 8" Thick	Sq Yds							78		78
[illegible]	Wire Cable Guard Fence	Lin Ft		[illegible]	[illegible]	[illegible]	200	150	200	200	1400
[illegible]	[illegible] Barbed Wire Fence ([illegible])	Lin Ft	[illegible]	[illegible]	491	[illegible]	284			355	5099
[illegible]	Gates in Barbed Wire Fence	Each	6								6
[illegible]	Right of Way Markers	Each	4				2				6
[illegible]	Bronze Name Plates	Each					2				4
[illegible]	Removing Unused Bridges	L.S.		84a	84b	84c		84d	84e	84f	•
[illegible]	5"x2'6" Drain Pipes	Each			4		4			2	10
[illegible]	5"x4'8" Drain Pipes	Each			12		12				24
[illegible]	8" Dipped Smooth Metal Pipe	Lin Ft	340								340

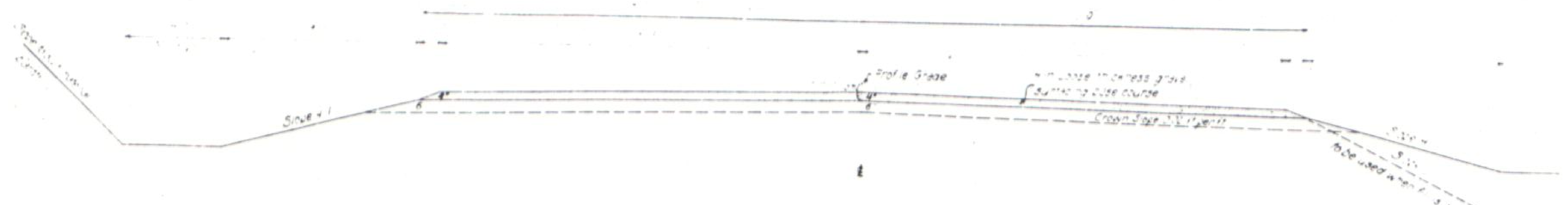
FINAL LIST OF STRUCTURES

Station	Description	[illegible]	Structural Excavation Cu Yds					Bridge [illegible]	Concrete Cu Yds		Steel Lbs		CM Culvert Pipe Lin Ft		Dry Rubble Slope Paving Sq Yds		Drain Pipes Each		Miscellaneous
		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	Reinf	Struct	15 in	18 in	12" Thick	8" Thick	5"x4'8"	5"x2'6"	
[illegible]	[illegible]	[illegible]	13.4	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]		[illegible]	963							412 lin ft. Tr. Timb Piling
[illegible]	[illegible]	1Br		[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]					12	4	2 Bronze Name Plates
[illegible]	[illegible]	1Br		25.6		[illegible]			[illegible]		[illegible]								
[illegible]+30	[illegible] Metal Pipe Culvert		9.7	5.1										60					
[illegible] to [illegible]	[illegible]		[illegible]	242.6	313	126.3	0.3		[illegible]		[illegible]	[illegible]					12	4	2 Bronze Name Plates
[illegible]	[illegible]			[illegible]					[illegible]		[illegible]								
[illegible]	[illegible]	[illegible]		107.8	[illegible]		.4		1440		[illegible]	[illegible]							
[illegible]	CMP Side Drain Pipe			[illegible]									12						
[illegible] (Opposite)	30' Span Timber Bridge			35		51	34												[illegible] lin ft. Untr. Timber Piling 8 Metal pile Shoes
[illegible]	[illegible]	1Br		114		63.4	0.267		49.3										
[illegible]	Dry Rubble Slope Pav 12" Thick														265				
[illegible]	CMP Side Culvert			24.7									36						
[illegible]	[illegible] Culvert		15.8	39.0				0.7	40		418								340' 8" dipped met. pipe
[illegible] to [illegible]	Dry Rubble Slope Pav 8" Thick															18			
[illegible] to 1425+33	Steel I Beam Bridge			166.5	130.9	174.8	3.4		2013		4355	12695							
[illegible] to [illegible]	Steel I Beam 3" Type	1Br		445.9	290.0	354.2	3.5		3582		[illegible]	186[illegible]						2	
Totals			207.1	1109.2	1086.8	1137.0	7.267	0.7	1878.5	80.0	112316	397550	12	60	285	18	24	10	

TYPICAL CROSS SECTION AND SUMMARY OF FINAL QUANTITIES

FED. RD. DIST. NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
3	COLO.	E36-1	2X	

Rev. as Const. 2-3-34 A.J.T.



SUMMARY OF FINAL QUANTITIES

ITEM	DESCRIPTION	UNIT	QUANTITY	ESTIMATED QUANTITY
10	Clearing and Grubbing entire Project	L.S.	●	
11a	Removing 6 Culverts	L.S.	●	
11b	Removing 13 Structures	L.S.	●	
11c	Removing 33 Fence & Stone Walls	L.S.	●	
12a	Removing Fence	Lin. Ft.	41639	[illegible]
13c	Unclassified Excavation	Cu. Yd.	106651.1	103100
14a	Dry Rock Excavation (Struct)	Cu. Yd.	524	
14b	Dry Common Excavation (Struct)	Cu. Yd.	599.9	491
14c	Wet Rock Excavation (Struct)	Cu. Yd.	11.7	
14d	Wet Common Excavation (Struct)	Cu. Yd.	509.8	
18a	Station Yard Overhaul	Sta. Yd.	308012	240600
18b	Yard Mile Overhaul	Yd. Mile	356.4	1000
31x	Gravel or Crushed Rock Surfacing	Ton	[illegible]	[illegible]
42a	Untreated Bridge Timber	M.B.M.	6.240	[illegible]
45a	Class "A" Concrete	Cu. Yd.	[illegible]	[illegible]
45b	Class "B" Concrete	Cu. Yd.	163.0	163.0
47	Reinforcing Steel	Lbs.	17496.	17400
53a	15 in Corr. Metal Culvert Pipe	Lin. Ft.	524	514
53b	18 in Corr. Metal Culvert Pipe	Lin. Ft.	1094	1100
53c	24 in Corr. Metal Culvert Pipe	Lin. Ft.	[illegible]	338
53e	36 in Corr. Metal Culvert Pipe	Lin. Ft.	228	228
65x	Dry Rubble Slope Paving 1 Ft. Thick	Sq. Yd.	72.0	72.0
69x	12 in Vit. Tile Underdrain	Lin. Ft.	500	500
72	Wire Cable Guard Fence	Lin. Ft.	450	500
75a	Galv. Barbed Wire Fence - Wood Posts	Lin. Ft.	3653	31200
75b	Gates in Galv. Barbed Wire Fence	Each	19	15
78	Project Markers	Each	1	1
79	Right of Way Markers	Each	21	29
84a	Remove Discarded Bridge Sta. 1312+	L.S.	●	
95a	Comb. Wire Fence - Wood Posts	Lin. Ft.	353	430
95b	Driveway Gates	Each	2	2
X	12 in Slip Joint Irrigation Pipe	Lin. Ft.	72	72

Material to be furnished and work to be done by State Forces (without Fed. Aid)

LIST OF STRUCTURES AS CONSTRUCTED

Station	Description	Remarks
1291+55	Project Marker	
129[illegible]	Cross Culvert [illegible]	
1293+50	Side Drain - Left	
1296+00	Cross Culvert	
1295+[illegible]	Divided Tile Subdrain	
1301+6[illegible]	Cross Culvert - Remove Old Culvert	
1302+50	Side Drain Lt. - Remove Building [illegible]	
1305+85	Side Drain Right	
1307+12	Cross Culvert - Remove Culvert	
1309+15	Side Drain Lt. - Rem. 2 & Repl. Bldg. Lt.	
1310+10	Side Drain Right	
1312+00	Side Drain Right	
1312+28 to [illegible]	Build Bridge - Remove Bridge	Work Order [illegible]
[illegible]	Side Drain - Right	
1319+35	Side Drain - Left	
1328+25	Cross Culvert	
1328+60	Move Building	
1343+10	Side Drain - Right	
1355+20	Side Drain Lt. - Remove Culvert	
1355 to 1356	Remove Sidewalk - Remove Sign	
1356+00	Remove Gas Pump	
1356+35	Remove Mail Boxes	
1362+10	Side Drain - Right	
1363+95	Side Drain - Right	
1365+00	Side Drain - Right	
136[illegible] to 1368+10	Ditch Change	
1369+25	Cross Drain	
1371+	Place Irrigation Ditch in Pipe	Work Order [illegible]
1373+50	Cross Drain	
[illegible]	Cross Drain	
1384+46	Cross Drain	
1396+08	Side Drain Left	
1397+00	Cross Drain	
1401+[illegible]	Cross Drain	
[illegible]	Remove Culvert	
1404+28	Cross Culvert	
1404+87	Side Drain Left	
1405+[illegible]	Cross Drain - Remove Culv. & Mail Box	Work Order 3159
[illegible]	Side Drain Left	
[illegible]	Side Drain Right	
1420+80 to 1422+00	Remove [illegible] Fence & Stone Walls	
1443+00	Cross Drain (No Div. Ditch)	
1445+97	Cross Drain (No Div. Ditch)	
1460+00	Cross Drain	
1474+00	Cross Drain	
1478+50	Cross Drain	
1481+70 to [illegible]	Guard Fence Right	
1483+[illegible]	Cross Drain	
1484+10	5 x 7 x 42 Concrete Box Culvert	Work Order [illegible]
1488+90	Side Drain Left	
1489+38	[illegible] 36 Concrete Box - Rem. Culv.	Work Order [illegible]
[illegible]	Remove 2 Buildings	
[illegible]	Cross Drain [illegible] and removed	

Totals: 6 | 15 | 524 | [illegible] | [illegible] | [illegible] | 6.240 | 184.5 | 550 | [illegible] | 524 | 1094 | [illegible] | 228 | 500 | 72 | 720 | 450 | 1

Note - 15 Lin. Ft. 24 in C.M.P. left on [illegible]

FENCE - 1

FENCE - CONTINUED - 2

GENERAL NOTES

[illegible] the material [illegible] swelled more than the estimated amount [illegible] excess material to widen [illegible] where excess material occurred were as follows [illegible] 1456 to 1462, [illegible]

Between Sta. 13[illegible] and [illegible] the Bridge Department made a grade change [illegible] grade up to original elevation [illegible] before the cut the grade [illegible] and he was paid for taking out the material shown between these cross sections and the final sections.

[illegible] 1366+[illegible] a channel change was called for on field plans. On final plans it was omitted and was to have been included in Div. Nº 2. As old ditch interferred with our road section grading could could not [illegible] channel change was made. Accordingly [illegible] was sent in and approved transferring this change [illegible]

[illegible] Sta. 13[illegible] [illegible] the [illegible] and water main. To overcome this a change of alignment and grade was made between Sta. 1311+30 and Sta. [illegible]. This was covered by Work Order Nº 3166 calling for 3317 cu. yds. Unclassified Excavation, and 20230 Sta. Yds. Overhaul in excess of original plans.

Between Sta. 1373+96 and 1374+28 there was a slab of the cliff just at the [illegible] line which was in danger of falling across the [illegible] power line and on to the highway. This was covered by Work Order Nº 3159 calling for 500 cu. yds. extra Unclassified Excavation.

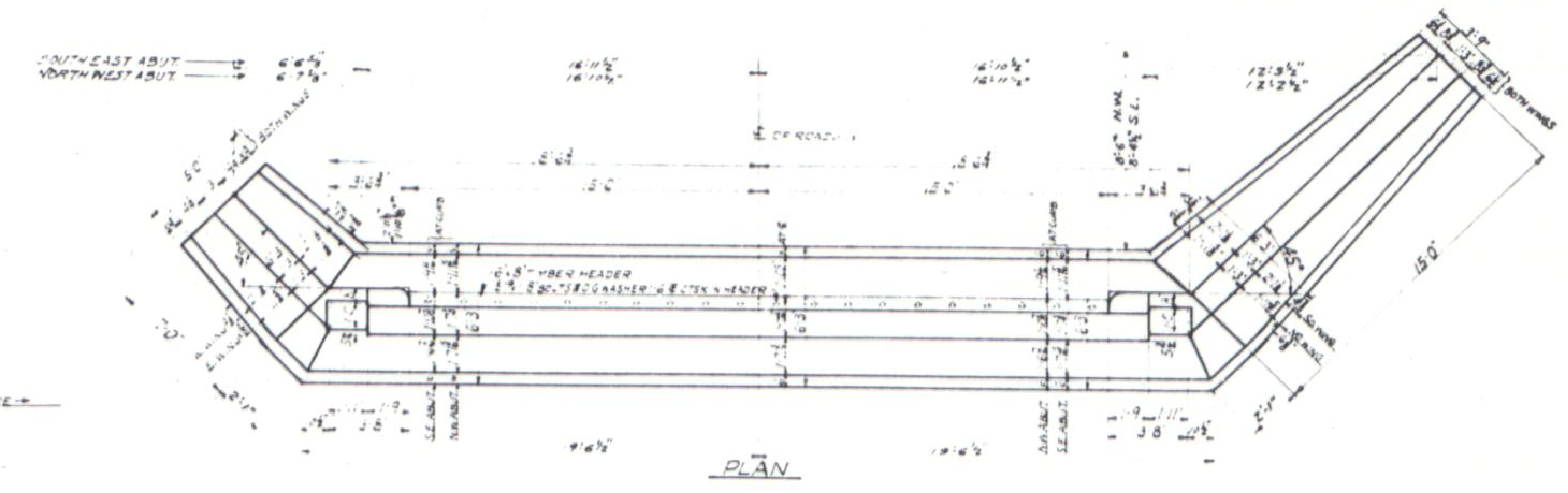
Between Sta. 1428+50 and Sta. 1436+[illegible] plans showed a slab about 3 ft. wide left on side of cut slope for use of Div. Nº 2. There being no practicable way to take this slab off after the cut was made on Div. Nº 1 it was decided to change the section on Div. Nº 1 and take in this slab. It was also decided to move the end of Div. Nº 1 back from Sta. 1428+50 to Sta. 1429+44 and leave material for Div. Nº 2 in one place instead of in the slab.

Areas of Approaches for Future Oiling

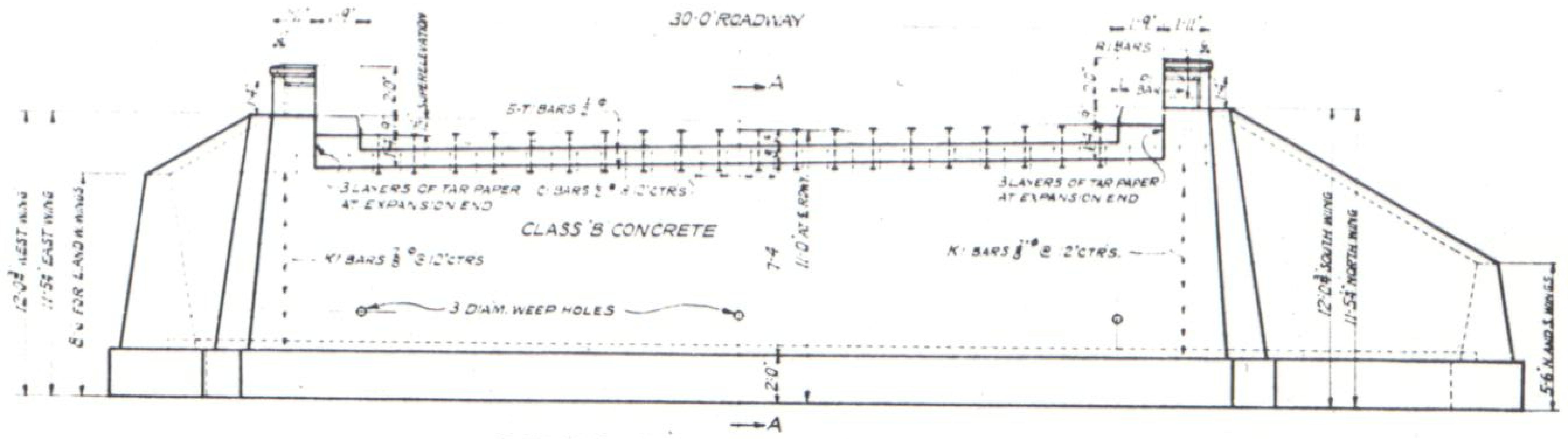
Station	Sq. Yds.	Station	Sq. Yds.	Station	Sq. Yds.
[illegible]	[illegible]	[illegible]	290	1404+87 L	380.0
[illegible]	[illegible]	[illegible]	[illegible]	1405+80 R	132.0
[illegible]	[illegible]	1362+10 R	80.0	1411+12 R	80.0
[illegible]	[illegible]	1363+95 R	93.0	1411+12 L	32.4
[illegible]	[illegible]	[illegible]	[illegible]	1414+12 R	80.0
[illegible]	[illegible]	[illegible]	30.6	[illegible]	[illegible]
1312+00 R	89.0	[illegible]	[illegible]	[illegible]	33.0
1314+85 R	72.0	[illegible]	60.4	[illegible]	58.0
1318+55 R	89.0	[illegible]	64.0	[illegible]	392.0
[illegible]	600.0	1396+08 L	54.9	[illegible]	36.0
1343+00 R	[illegible]	[illegible]	46.6	Total	5289.4

FED ROAD DIST NO	STATE	FED AID PROJ NO	SHEET NO	TOTAL SHEETS
3	COLO.	E9B	3	

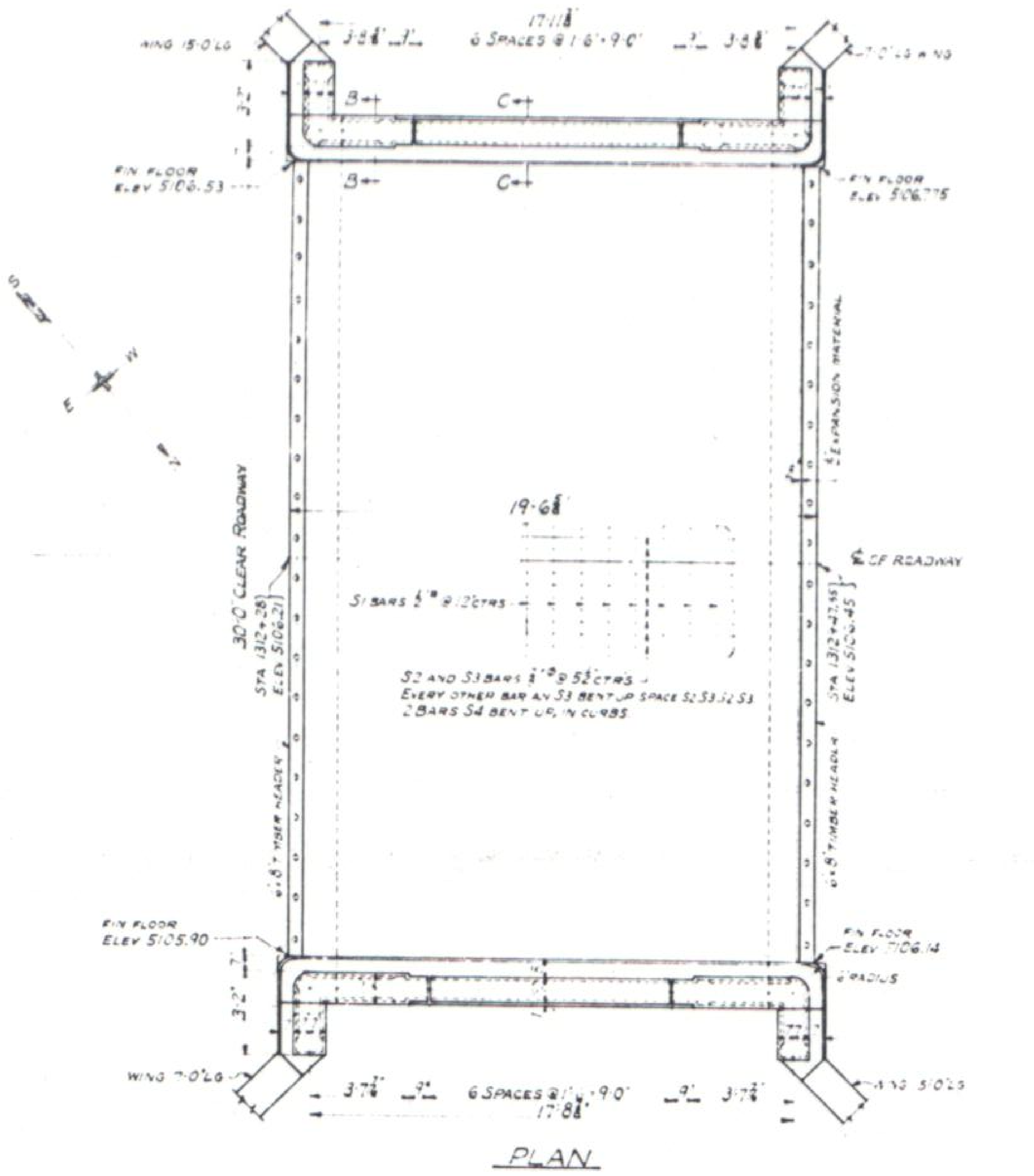
Revised Quantities As Constructed. 5-13-38 R.A.D.


SOUTH EAST ABUT.
NORTH WEST ABUT.
6'6⅞"
6'7⅞"
16'11⅝"
16'11⅞"
℄ OF ROADWAY
15'0"
6"x8" TIMBER HEADER
BOTH WINGS
12'3½"
12'2½"

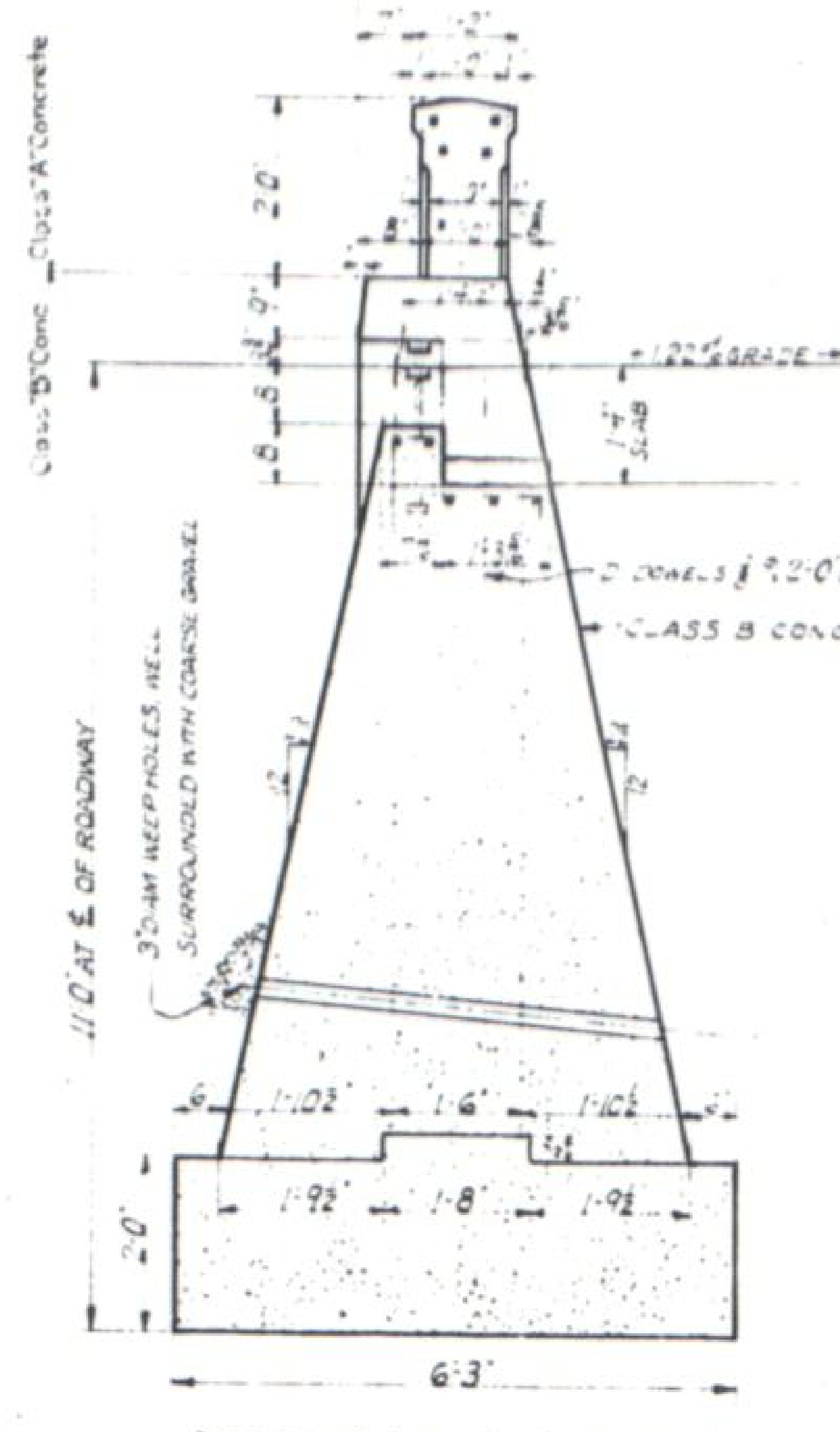
PLAN


30'0" ROADWAY
A
5-T BARS ½"
3 LAYERS OF TAR PAPER C BARS ½" @ 2' CTRS.
AT EXPANSION END
CLASS B CONCRETE
K1 BARS ⅞" @ 2' CTRS.
3 DIAM. WEEP HOLES
3 LAYERS OF TAR PAPER
AT EXPANSION END
K1 BARS ⅞" @ 2' CTRS.
R1 BARS
12'0⅞" WEST WING
11'5⅞" EAST WING
8" FOR LAND WING
12'0⅞" SOUTH WING
11'5⅞" NORTH WING
5'6" N AND S WINGS
2'0"
7'4"
11'0" AT ℄ ROADWAY

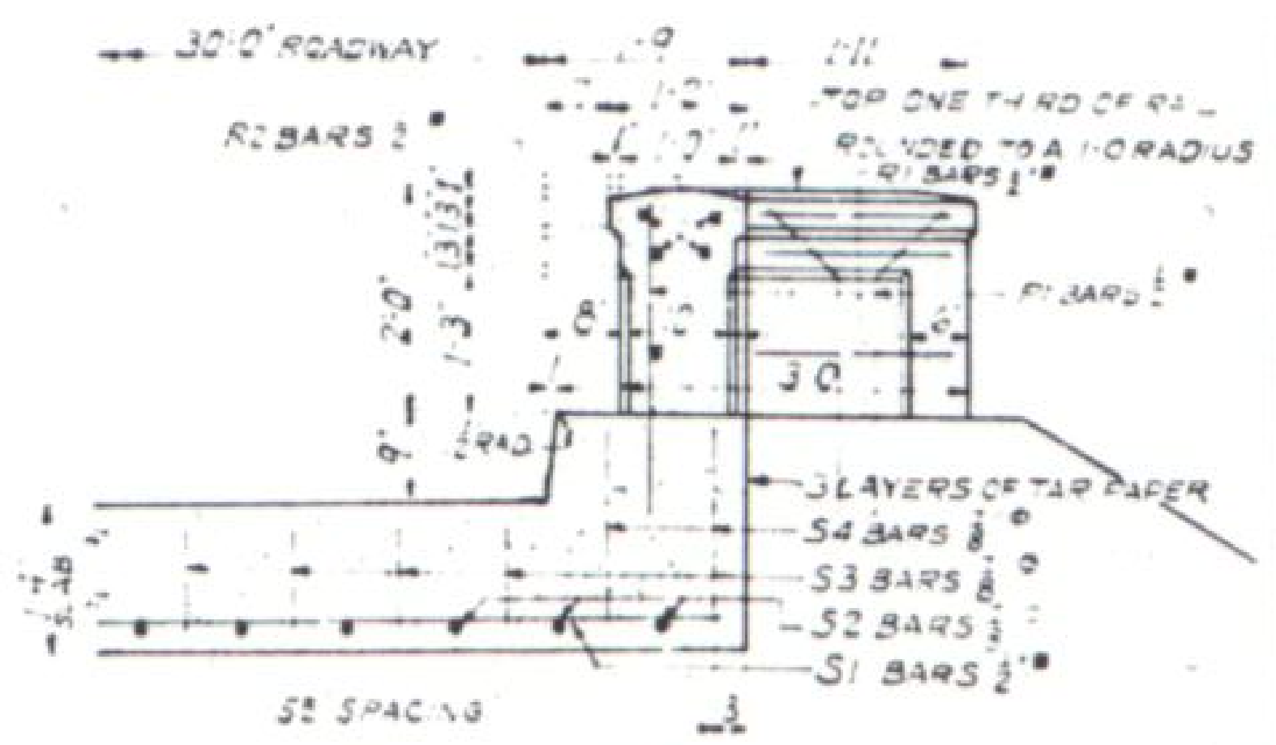
ELEVATION OF SOUTHEAST ABUTMENT
NORTHWEST ABUT. IS SIMILAR(EXCEPT AS NOTED) BY ROTATION
SLOPE OF SLAB SEAT IS OPPOSITE HAND


17'11⅞"
6 SPACES @ 1'6" = 9'0"
3'8⅞"
WING 15'0" LG.
WING 15'0" LG.
FIN. FLOOR ELEV. 5106.53
FIN. FLOOR ELEV. 5106.75
B
C
30'0" CLEAR ROADWAY
STA. 1312+28
ELEV. 5106.21
19'6⅞"
S1 BARS ½" @ 1' CTRS.
S2 AND S3 BARS ⅞" @ 5½" CTRS.
EVERY OTHER BAR AS S3 BENT UP. SPACE S2 S3 S2 S3
2 BARS S4 BENT UP IN CURBS
EXPANSION MATERIAL
℄ OF ROADWAY
STA. 1312+47.55
ELEV. 5106.43
6"x8" TIMBER HEADER
FIN. FLOOR ELEV. 5105.90
FIN. FLOOR ELEV. 5106.14
RADIUS
WING 15'0" LG.
WING 15'0" LG.
6 SPACES @ 1'6" = 9'0"
17'8⅞"
3'7⅝"
E
W

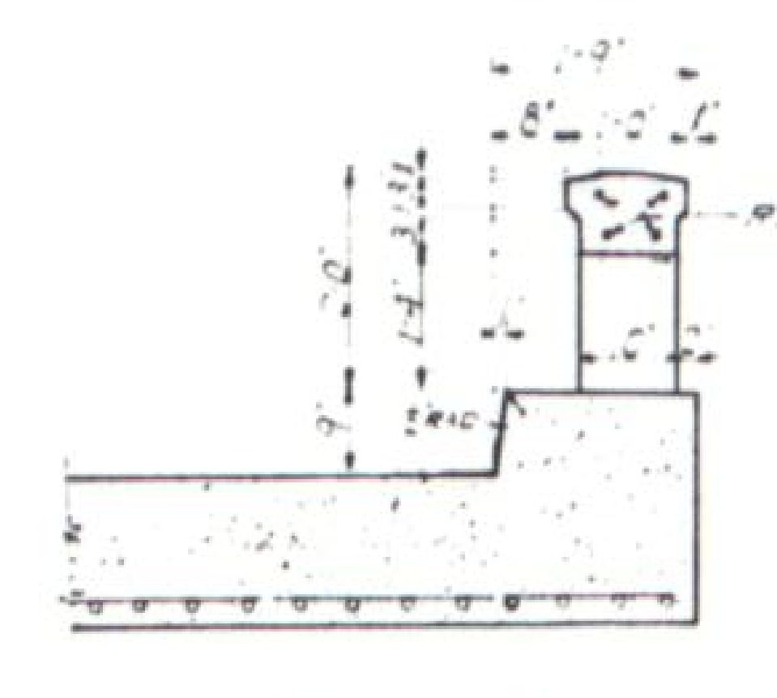
PLAN


Class "D" Conc. Class "A" Concrete
1.22% GRADE
D DOWELS ⅞" @ 2'0" CTRS. FOR FIXED END ONLY
CLASS B CONCRETE
11'0" AT ℄ OF ROADWAY
3" DIAM. WEEP HOLES, WELL SURROUNDED WITH COARSE GRAVEL
2'0"
1'10½"
1'6"
1'10½"
1'9½"
1'8"
1'9½"
6'3"

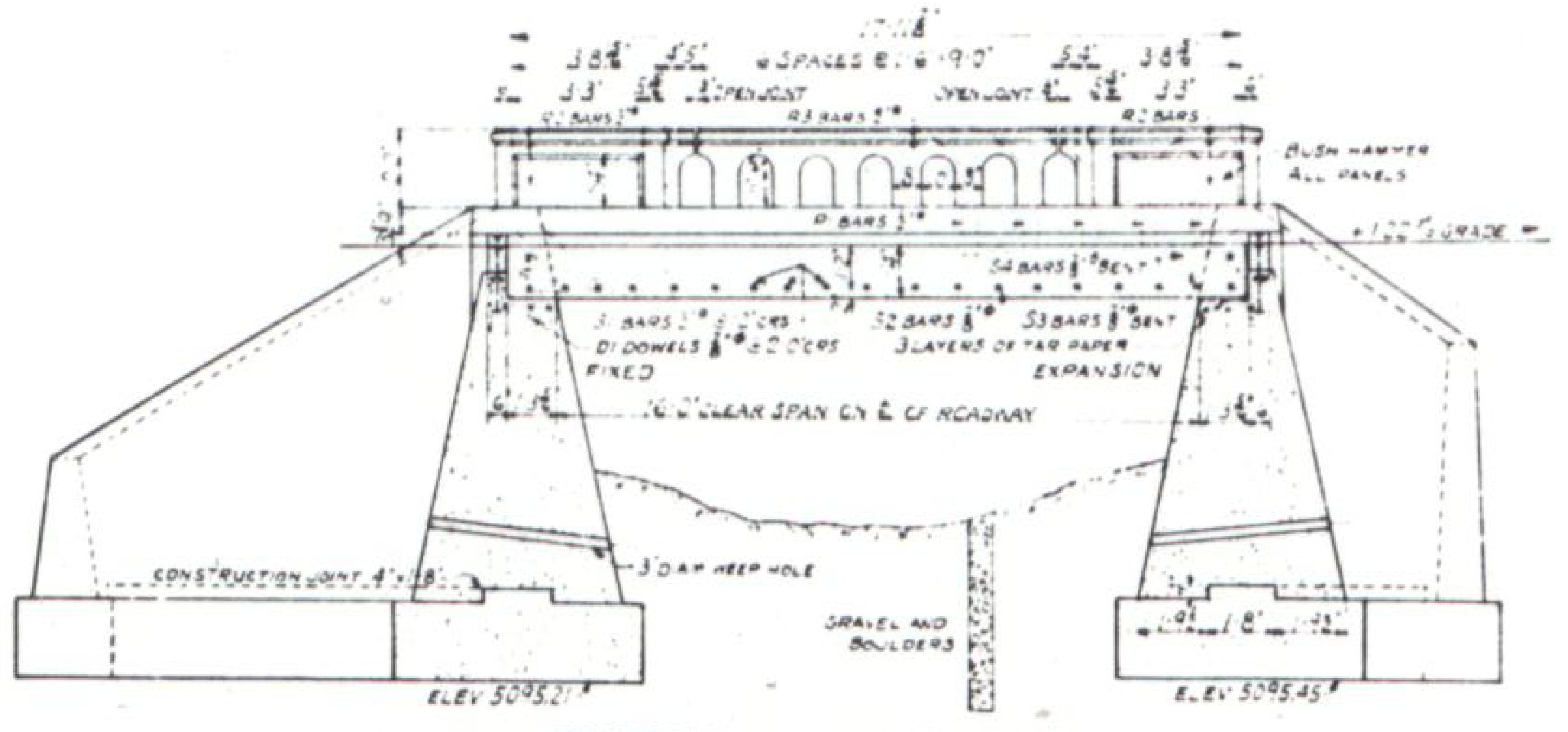
SECTION A-A ON ℄ OF ROADWAY


30'0" ROADWAY
TOP ONE THIRD OF RAIL
ROUNDED TO A 1" RADIUS
R1 BARS ½"
R2 BARS ½"
P1 BARS ½"
3'0"
3 LAYERS OF TAR PAPER
S4 BARS ⅞"
S3 BARS ⅞"
S2 BARS ⅞"
S1 BARS ½"
S2 SPACING

SECTION-B-B



SECTION-C-C


17'11⅞"
6 SPACES @ 1'6" = 9'0"
3'8⅞"
BUSH HAMMER ALL PANELS
1.22% GRADE
P BARS
S4 BARS ⅞" BENT
S2 BARS ⅞"
S3 BARS ⅞" BENT
D DOWELS ⅞" @ 2' CTRS.
FIXED
3 LAYERS OF TAR PAPER
EXPANSION
16'0" CLEAR SPAN ON ℄ OF ROADWAY
CONSTRUCTION JOINT
3" DIAM. WEEP HOLE
GRAVEL AND BOULDERS
ELEV. 5095.21
ELEV. 5095.45

SECTIONAL ELEVATION ON ℄ OF ROADWAY

BAR LIST FOR 2 ABUTMENTS

EFW

MARK	REQ'D	SIZE	LENGTH	BENDING DIAGRAM
D1	18	⅞"	2'0"	
R1	20	½"	1'6"	
T1	10	½"	37'0"	
C1	76	½"	3'8"	
K1	32	⅞"	7'6"	
P	4	½"	6'6"	

370 LINEAL FT OF ½" BARS @ 0.668 LBS PER LIN FT = 247 LBS
335 LINEAL FT OF ½" BARS @ 0.850 LBS PER LIN FT = 285 LBS
291 LINEAL FT OF ⅞" BARS @ 2.044 LBS PER LIN FT = 595 LBS
PLUS 1% FOR OVERRUN 13 LBS
TOTAL = 1140 LBS

BAR LIST FOR SUPERSTRUCTURE

EFW

MARK	REQ'D	SIZE	LENGTH	BENDING DIAGRAM
R2	20	½"	4'0"	
R3	8	½"	8'8"	
S1	21	½"	33'0"	
S2	36	⅞"	19'11"	
S3	33	⅞"	20'2"	
S4	4	⅞"	20'10½"	
P1	24	½"	6'6"	SAME AS P ABOVE

998 LINEAL FT OF ½" BARS @ 0.850 LBS PER LIN. FT = 848 LBS
1466 LINEAL FT OF ⅞" BARS @ 2.044 LBS PER LIN. FT = 2997 LBS
PLUS 1% FOR OVERRUN = 35 LBS
TOTAL = 3880 LBS

SUMMARY OF QUANTITIES FOR ENTIRE BRIDGE

EFW

ITEM NO	DESCRIPTION	UNIT	SUPERSTRUCT	2 ABUTS.	TOTAL
14a	DRY ROCK STRUCTURAL EXCAVATION	CU. YD			—
14b	DRY COMMON -"- -"-	CU YD		60.5	60.5
14c	WET ROCK -"- -"-	CU YD			—
14d	WET COMMON -"- -"-	CU. YD		150.8	150.8
42a	UNTREATED BRIDGE TIMBER	M FT B M		0.24	0.24
46a	CLASS "A" CONCRETE	CU YD	34.4	0.6	35
46b	CLASS "B" CONCRETE	CU YD		163	163
47	REINFORCING STEEL	LBS	3880	1140	5020
84	REMOVAL OF DISUSED BRIDGE	LUMP SUM			LUMP SUM
	EXPANSION JOINT MATERIAL ½"x16"	LIN. FT	34		34

GENERAL NOTES

ALL WORK SHALL BE DONE ACCORDING TO THE STANDARD SPECIFICATIONS OF THE COLORADO STATE HIGHWAY DEPARTMENT ADOPTED JAN 1 1930

ALL CONCRETE SHALL BE CLASS A

ALL EXPOSED SURFACES SHALL BE RUBBED FREE OF FORM MARKS

ALL EXPOSED CORNERS EXCEPT ON HANDRAILS SHALL BE BEVELED TO A 2" FACE

FLOOR SLABS AND CURB SHALL BE POURED MONOLITHICALLY

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

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

THICKNESS OF FLOOR SLAB SHOWN INCLUDES ½" CONCRETE WEARING SURFACE

ALL REINFORCING BARS SHALL BE ROUND OR SQUARE PLAIN OR DEFORMED AS SHOWN AND NOTED

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

SECONDARY BARS WHEN SPLICED SHALL BE GIVEN A LAP OF 40 DIAMETERS

MAIN BARS SHALL NOT BE SPLICED

SOUNDINGS AND DEPTH OF FOOTINGS SHOWN ARE ACCORDING TO THE BEST AVAILABLE DATA. IF ESSENTIALLY DIFFERENT CONDITIONS ARE ENCOUNTERED THE BRIDGE ENGINEER WILL INSPECT AND DETERMINE IF REDESIGN IS NECESSARY

MAXIMUM SOIL PRESSURE EQUALS 2500 Lbs Per Sq Ft.

LOADING DATA.

LIVE LOAD: A. A. S. H. O. AUG 1928 CLASS A (H-15)

DEAD LOAD: ASSUMES 15 LBS PER SQ FT ADDITIONAL WEARING SURFACE WHICH INCLUDES THE ½ IN CONCRETE MONOLITHIC WEARING SURFACE

COLORADO
STATE HIGHWAY DEPARTMENT
16 FT. CLEAR SPAN - 30 FT. ROADWAY
CONCRETE SLAB BRIDGE
CONCRETE GRAVITY ABUTMENTS
Across BUCKINGHAM DITCH
Sta. 1312+28 TO 1312+47.55
Near LOVELAND Sec. 12 T. 5 N R. 70 W

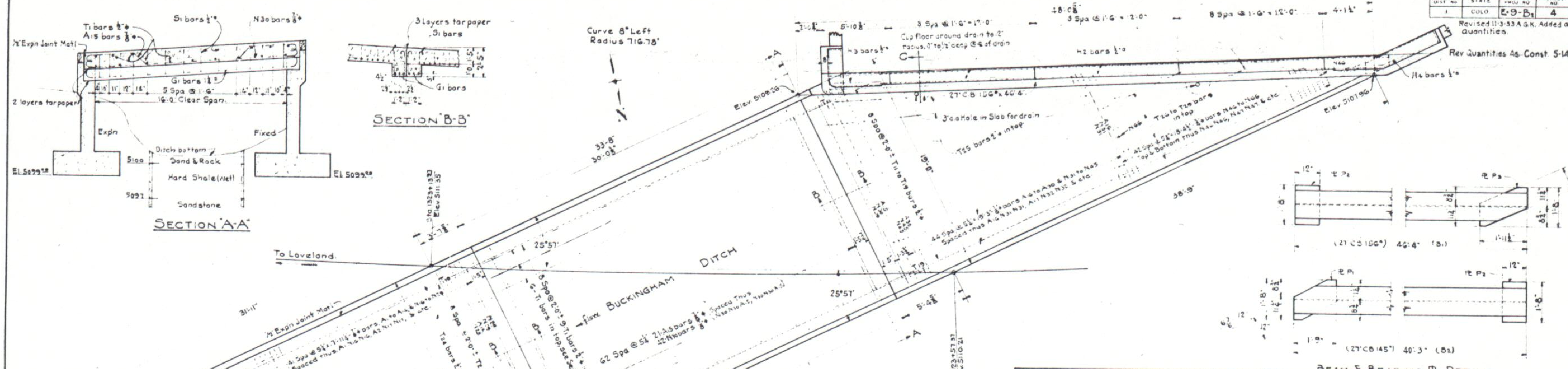
Designed by WMcM Made by WMcM Checked by EFW	Approved by C. J. Bailey Bridge Engineer Date: Jan 20, 1933

STRUCTURE NO. C-16-X

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
3	COLO	E-9-B1	4	

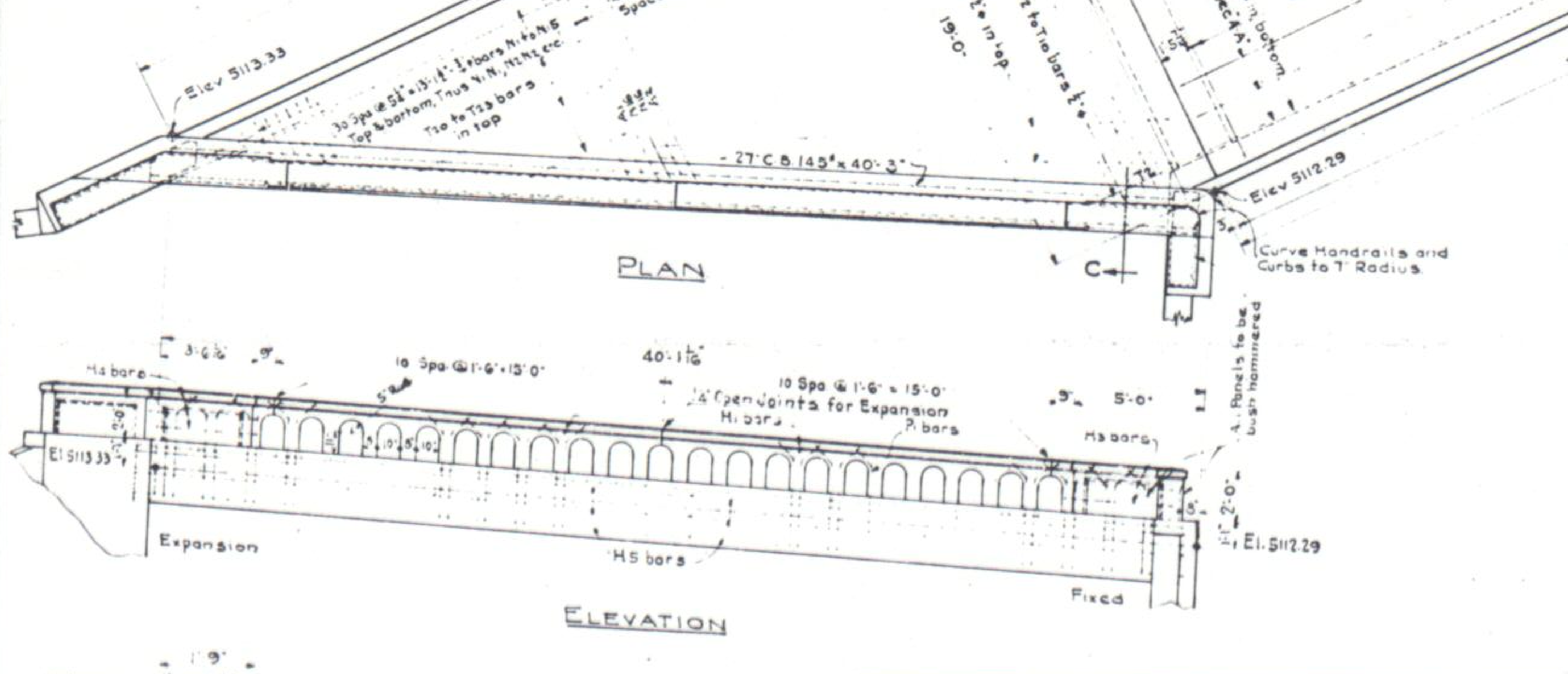
Revised 11-3-33 A.G.K. Added additional quantities.

Rev Quantities As Const. 5-14-38 R.A.D.



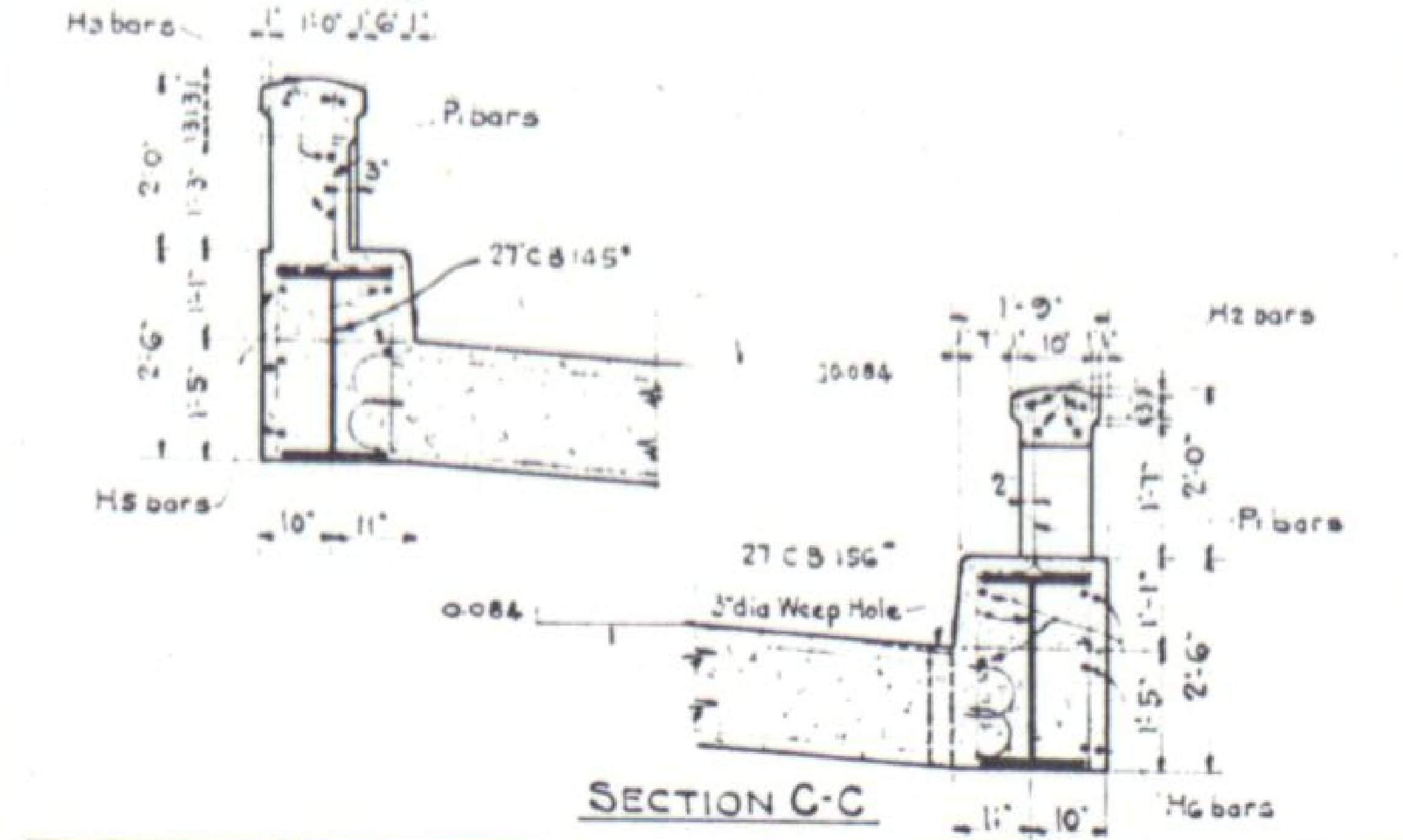
SECTION "A-A"
T1 bars ½"●
A15 bars ⅞"●
S1 bars ½"●
N30 bars ⅞"●
½" Expn Joint Mat'l
G1 bars 1¼"●
5 Spa @ 1'-6"
16'-0" Clear Span
2 layers tar paper
Expn
Fixed
Ditch bottom
Sand & Rock
Hard Shale (wet)
Sandstone
El. 5099.50
SECTION "B-B"
3 layers tar paper
S1 bars
G1 bars
Curve 8° Left
Radius 716.78'
To Loveland
BUCKINGHAM DITCH
Flow
25°57'
33'-8"
30'-0⅜"
35'-8"
31'-1"
38'-9"
Sta. 1323+13.97 Elev. 5111.35
Sta. 1323+57.37 Elev. 5110.21
Elev. 5113.33
Elev. 5112.29
Elev. 5108.26
Elev. 5101.96
½" Expn Joint Mat'l
62 Spa @ 5¼" 2½ A bars ⅞"● 2½ N bars ⅞"●
8 Spa @ 2'-0" = 16'-0" T1 bars ½"● in top
3"dia Hole in Slab for drain
27" CB 156# x 46'-4"
27" CB 145# x 40'-3"
3 Spa @ 1'-6" = 4'-6"
8 Spa @ 1'-6" = 12'-0"
Cut floor around drain to 12" radius, 3" to ½" deep @ ℄ of drain
H2 bars ½"●
H6 bars ½"●
T15 bars ½"● in top
Curve Handrails and Curbs to 1' Radius
48'-0⅝"
BEAM & BEARING PL DETAIL
(27" CB 156#) 46'-4" (B1)
(27" CB 145#) 40'-3" (B2)
℄ P1
℄ P2
℄ P3
1'-8"
12"

PLAN



H6 bars
10 Spa @ 1'-6" = 15'-0"
10 Spa @ 1'-6" = 15'-0"
40'-1⅝"
¼" Open Joints for Expansion
H1 bars
P1 bars
H5 bars
H3 bars
4 - Panels to be bush hammered
El. 5113.33
El. 5112.29
Expansion
Fixed

ELEVATION



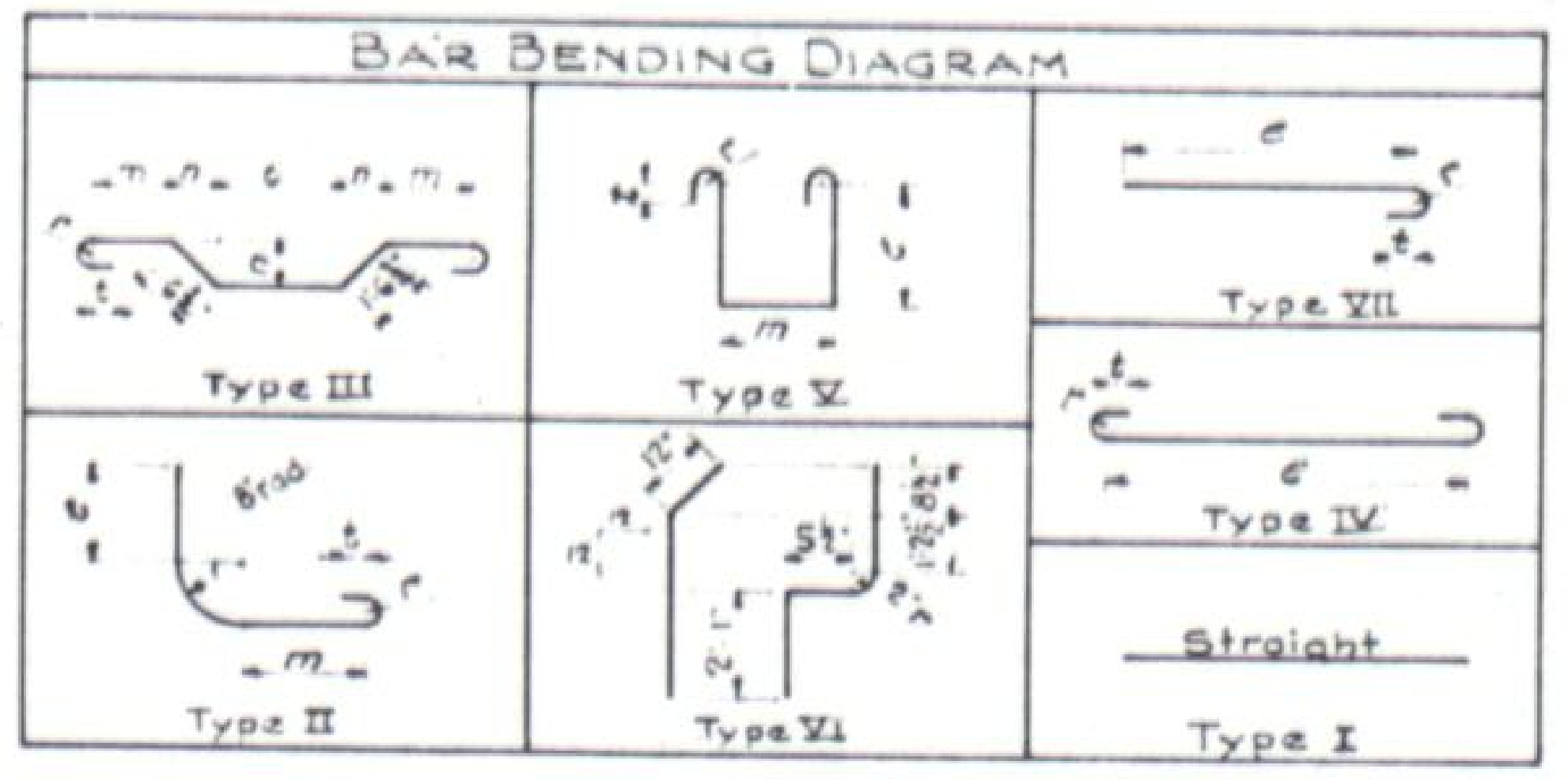
H3 bars
P1 bars
2-7 C 8 14.5#
H5 bars
H2 bars
H6 bars
27 CB 156#
3"dia Weep Hole
0.084

SECTION C-C

ADDITIONAL QUANTITIES · WORK ORDER Nº 3168

ITEM	DESCRIPTION	UNIT	WEST ABT.	BANK PROTECTION	TOTAL
14b	Dry Common Structural Excavation	Cu. Yds.			—
46a	Class "A" Concrete	Cu. Yds.	6.9	19.3	26.2
60b	Untreated Timber Piling	Lin. Ft.	472		472

BAR BENDING DIAGRAM



Type III
Type V
Type VII
Type IV
Type II
Type VI
Straight
Type I

BAR LIST FOR SUPERSTRUCTURE

MARK	SIZE	REQD	LENGTH	c	m	n	r	t	TYPE
A15	⅞"●	22	20'-5"	8'-0"	3'-5¾"	1'-1¼"	3½"	3"	III
N30	⅞"●	44	19'-6"	17'-2"			3½"	3"	IV
T1	½"●	15	29'-8"						I
G1	1¼"●	12	20'-1"	16'-9"			5"	4½"	IV
S1	½"●	56	6'-0"	1'-10⅝"	10¾"		2"	2"	V
A1 to A14	⅞"●	1 Ea.	11'-7½" to 20'-9 3/16" by 8 7/16"	3'-9⅜" to 8'-4 3/16" by 4 3/16"	1'-2⅛" to 3'-5¾" by 2⅛"	1'-1¼"	3½"	3"	III
N1 to N15	¾"●	4 Ea.	3'-5⅝" to 9'-11⅞" by 5⅝"	1'-5⅝" to 7'-11⅞" by 5⅝"			3"	2½"	IV
T2 to T10	½"●	1 Ea.	4'-8" to 34'-0" by 3'-8"						I
N16 to N29	⅞"●	2 Ea.	0'-11 5/16" to 20'-1" by 8 7/16"	3'-7 5/16" to 17'-9" by 8 7/16"			3½"	3"	IV
A16 to A30	⅞"●	1 Ea.	12'-5" to 20'-3½" by 6⅛"	4'-0¾" to 8'-0" by 3⅜"	1'-5⅜" to 3'-5" by 1 1/16"	1'-1¼"	3½"	3"	III
N31 to N45	⅞"●	2 Ea.	11'-8" to 19'-6½" by 6¾"	9'-4" to 17'-2½" by 6¾"			3½"	3"	IV
N46 to N56	¾"●	4 Ea.	3'-4" to 10'-10" by 4½"	1'-4" to 8'-10" by 4½"			3"	2½"	IV
T11 to T19	½"●	1 Ea.	5'-4" to 42'-0" by 4'-7"						I
P1	½"■	112	5'-0"						VI
H1	½"■	8	14'-8"						I
H2	½"■	12	11'-8"						I
H3	½"■	8	4'-0"						I
H4	½"■	8	5'-0"						I
H5	½"●	10	21'-6"						I
H6	½"●	10	24'-3"						I
T20 to T23	½"●	1 Ea.	4'-3" to 15'-0" by 3'-7"						I
T24	½"●	4	20'-0"						I
T25	½"●	4	22'-0"						I
T26 to T29	½"●	1 Ea.	7'-6" to 21'-3" by 4'-7"						I

BAR LIST FOR WEST ABUTMENT

MARK	SIZE	REQD	LENGTH	c	m	n	r	t	TYPE
E1	⅝"●	3	9'-10"	6'-6"	2"		2½"	2"	II
E2	⅝"●	3	6'-10"	3'-6"	2"		2½"	2"	II
E3	⅝"●	3	12'-1"	8'-3"	8"		2½"	2"	II
E4	⅝"●	3	8'-1"	4'-3"	8"		2½"	2"	II
E5	¾"●	8	14'-4"	10'-0"	1'-0"		3"	2½"	II
E6	¾"●	7	9'-5"	5'-0"	1'-1"		3"	2½"	II
E7	½"●	6	15'-2"						I
E8	½"●	2	12'-3"						I
E9	½"●	2	8'-8"						I
E10	⅝"●	12	3'-10"	3'-0"			2½"	2"	VII
E11	⅝"●	9	5'-8"	4'-10"			2½"	2"	VII
E12	½"●	5	17'-8"						I
F1	⅝"●	5	6'-4"	2'-9"	5"		2½"	2"	II
F2	⅝"●	5	7'-7"	4'-0"	5"		2½"	2"	II
F3	⅝"●	5	8'-11"	5'-3"	6"		2½"	2"	II
F4	⅝"●	4	10'-3"	6'-6"	7"		2½"	2"	II
F5	½"●	3	18'-6"						I
F6	½"●	1	13'-6"						I
F7	½"●	1	8'-6"						I
F8	½"●	2	3'-6"						I
F9	⅝"●	20	7'-1"	3'-2"	9"		2½"	2"	II
F10	⅝"●	17	9'-5"	5'-6"	9"		2½"	2"	II
F11	⅝"●	12	10'-6"	6'-4"	1'-0"		2½"	2"	II
F12	¾"●	17	8'-1"	3'-9"	1'-0"		3"	2½"	II
F13	¾"●	12	11'-7"	7'-2"	1'-1"		3"	2½"	II
F14	¾"●	10	12'-7"	8'-0"	1'-3"		3"	2½"	II
F15	¾"●	16	8'-9"	4'-2"	1'-3"		3"	2½"	II
F16	⅞"●	9	13'-7"	8'-8"	1'-5"		3½"	3"	II
F17	⅞"●	9	14'-3"	9'-3"	1'-6"		3½"	3"	II
F18	⅞"●	16	9'-7"	4'-8"	1'-5"		3½"	3"	II
F19	½"●	9	29'-8"						I
F20	½"●	12	26'-0"						I
F21	½"●	20	27'-0"						I
F22	⅝"●	17	4'-4"	3'-6"			2½"	2"	VII
F23	⅝"●	63	4'-10"	4'-0"			2½"	2"	VII
F24	⅝"●	56	5'-5"	4'-7"			2½"	2"	VII
P4	½"■	8	6'-0"						I
P3	½"■	6	1'-8"						I
P5	½"■	6	2'-0"						I
P7	⅝"●	36	3'-0"	2'-2"			2½"	2"	VII

BEAM & BEARING PL DETAIL

REQ'D
1 Beam (B1) 27" CB 156# x 46'-4"
1 Beam (B2) 27" CB 145# x 40'-3"
2 Plates (P2) 12" x 1" x 1'-8"
1 Plate (P1) 1" Thick (as detailed)
1 Plate (P3) 1" Thick (as detailed)

BAR LIST FOR EAST ABUTMENT

MARK	SIZE	REQD	LENGTH	c	m	n	r	t	TYPE
B1	⅝"●	7	14'-1"	9'-9"	1'-2"		2½"	2"	II
B2	¾"●	7	15'-6"	10'-10"	1'-4"		3"	2½"	II
B3	¾"●	7	16'-8"	11'-11"	1'-5"		3"	2½"	II
B4	⅝"●	6	9'-4"	5'-0"	1'-2"		2½"	2"	II
B5	¾"●	6	10'-8"	6'-0"	1'-4"		3"	2½"	II
B6	¾"●	7	11'-9"	7'-0"	1'-5"		3"	2½"	II
B7	½"●	10	19'-8"						I
B8	½"●	1	7'-6"						I
B9	½"●	1	13'-6"						I
B10	⅝"●	20	5'-9"	4'-11"			2½"	2"	VII
B11	⅝"●	14	5'-9"	4'-11"			2½"	2"	VII
B12	½"●	5	22'-0"						I
C1	⅝"●	6	7'-3"	3'-6"	7"		2½"	2"	II
C2	⅝"●	2	10'-1"	6'-4"	7"		2½"	2"	II
C3	⅝"●	2	11'-3"	7'-6"	7"		2½"	2"	II
C4	⅝"●	2	12'-11"	9'-2"	7"		2½"	2"	II
C5	½"●	7	11'-0"						I
C6	⅝"●	14	4'-8"	3'-10"			2½"	2"	VII
C7	½"●	5	10'-0"						I
D1	⅝"●	15	7'-9"	3'-6"	1'-1"		2½"	2"	II
D2	⅝"●	15	11'-1"	6'-10"	1'-1"		2½"	2"	II
D3	¾"●	18	8'-10"	4'-2"	1'-4"		3"	2½"	II
D4	¾"●	10	12'-6"	7'-10"	1'-4"		3"	2½"	II
D5	¾"●	9	13'-4"	8'-6"	1'-6"		3"	2½"	II
D6	⅞"●	16	9'-9"	4'-8"	1'-7"		3½"	3"	II
D7	⅞"●	10	14'-3"	9'-2"	1'-7"		3½"	3"	II
D8	⅞"●	16	10'-6"	5'-2"	1'-10"		3½"	3"	II
D9	⅞"●	11	15'-1"	9'-11"	1'-8"		3½"	3"	II
D10	⅞"●	11	16'-1"	10'-8"	1'-11"		3½"	3"	II
D11	½"●	21	27'-0"						I
D12	⅝"●	108	5'-7"	4'-9"			2½"	2"	VII
D13	½"●	7	29'-8"						I
D14	½"●	9	21'-6"						I
P4	½"■	6	6'-0"						I
P2	½"■	4	4'-0"						I
P3	½"■	6	1'-8"						I
P6	½"■	6	2'-6"						I

GENERAL NOTES

FORMS FOR CONCRETE SURFACES EXPOSED IN THE FINISHED WORK SHALL BE CONSTRUCTED OF SHIPLAP OR TONGUE AND GROOVE LUMBER ON THE FACE.

ALL WORK SHALL BE DONE ACCORDING TO THE STANDARD SPECIFICATIONS OF THE COLORADO STATE HIGHWAY DEPARTMENT ADOPTED JAN 1 1930.

ALL CONCRETE SHALL BE CLASS "A".

ALL EXPOSED SURFACES SHALL BE RUBBED FREE OF FORM MARKS.

ALL EXPOSED CORNERS EXCEPT ON HANDRAILS SHALL BE BEVELED TO A [illegible] FACE.

GIRDERS, FLOOR SLAB AND CURB SHALL BE POURED MONOLITHICALLY.

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

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

STRUCTURE IS DESIGNED FOR A [illegible] CONCRETE WEARING SURFACE.

ALL REINFORCING BARS SHALL BE ROUND OR SQUARE, PLAIN OR DEFORMED AS SHOWN AND NOTED.

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

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

MAIN BARS SHALL NOT BE SPLICED.

SOUNDINGS AND DEPTH OF FOOTINGS SHOWN ARE ACCORDING TO THE BEST AVAILABLE DATA. IF ESSENTIALLY DIFFERENT CONDITIONS ARE ENCOUNTERED THE BRIDGE ENGINEER WILL INSPECT AND DETERMINE IF REDESIGN IS NECESSARY.

REFERENCE DRAWINGS

Sheet Nº5 Details of Abutments for Concrete Slab Bridge.

SUMMARY OF QUANTITIES FOR ENTIRE BRIDGE

ITEM	DESCRIPTION	UNIT	SUPER-STRUCTURE	EAST ABUTMENT	WEST ABUTMENT	TOTALS
4a	Dry Rock Structural Excavation	Cu Yds		18.4		18.4
14b	Dry Common " "	"		25.5	34.4	▲ 103.1
14c	Wet Rock " "	"		115.3		115.3
14d	Wet Common " "	"		160.8	17.4	◆ 272.9
42a	Untreated Bridge Timber	M ft bm		0.340	0.380	0.720
46a	Class "A" Concrete	Cu Yds	87.3	93.5	86.5	267.3
47	Reinforcing Steel 1% Overrun Included	Lbs	10450	5510	4620	✱ 20401
48	Structural Steel 1½% " "	Lbs	13565			13565
11	Remove Old Bridge Complete	Lump Sum				Lump Sum
	Expansion Joint Material ½"x18"	Lin ft	66			66

▲ Includes 43.2 Cu Yd for Slope Paving. ◆ Includes 94.7 Cu Yd for Slope Paving. ✱ Scale Wt.

BAR SUMMARY

SIZE OF BAR	LBS PER LIN FT OF BAR	SUPER-STRUCTURE TOTAL LIN FT	SUPER-STRUCTURE TOTAL WT LBS	EAST ABUTMENT TOTAL LIN FT	EAST ABUTMENT TOTAL WT LBS	WEST ABUTMENT TOTAL LIN FT	WEST ABUTMENT TOTAL WT LBS
½"●	0.668	1554	1038	1638	1094	1425	952
½"■	0.850	1234	1049	77	66	70	60
⅝"●	1.043	—	—	1413	1474	1580	1648
¾"●	1.502	998	1499	776	1166	723	1086
⅞"●	2.044	2682	5482	810	1656	404	826
1¼"●	5.313	241	1280	—	—	—	—
		Plus 1%	102	Plus 1%	54	Plus 1%	48
TOTAL WEIGHT IN LBS.		10450		5510		4620	

COLORADO
STATE HIGHWAY DEPARTMENT
SUPERSTRUCTURE DETAIL FOR
CONCRETE SLAB BRIDGE
16'-0" SPAN & 30' ROADWAY
Across Buckingham Ditch
Sta. 1323+13.97 to 1323+57.37
Near Loveland Sec. 12 T. 6N R. 70W.

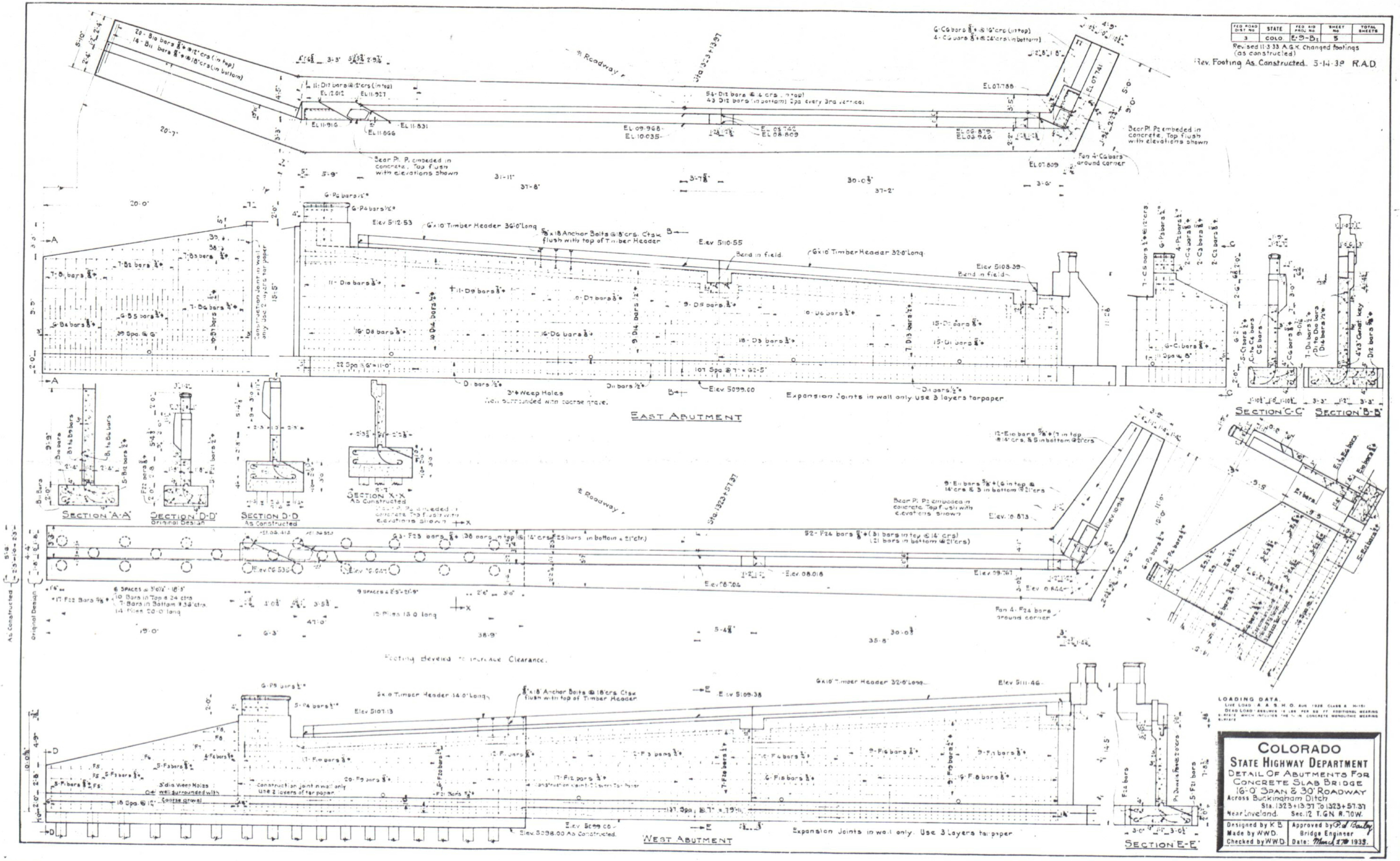
Designed by K.B. Made by W.W.D. Checked by W.W.D.	Approved by P. Bailey Bridge Engineer Date: March 27th 1933.

STRUCTURE NO. C-16-Y

FED ROAD DIST NO	STATE	FED AID PROJ NO	SHEET NO	TOTAL SHEETS
3	COLO.	E-9-B2	5	

Revised 11-3-33 A.G.K. Changed footings (as constructed)

Rev. Footing As Constructed. 3-14-38 R.A.D.



East Abutment
West Abutment
Section A-A
Section D-D' Original Design
Section D-D As Constructed
Section X-X As Constructed
Section C-C
Section B-B
Section E-E
6"x10" Timber Header 36'-0" Long
6"x10" Timber Header 32'-0" Long
6"x10" Timber Header 14'-0" Long
5/8"x18" Anchor Bolts @ 18" crs. Ctsk. flush with top of Timber Header
Expansion Joints in wall only use 3 layers tarpaper
Expansion Joints in wall only. Use 3 Layers tar paper
Construction joint in wall only use 2 layers of tar paper
3" Weep Holes surrounded with coarse gravel
3" dia. Weep Holes well surrounded with coarse gravel
Bear Pl. P1 embeded in concrete. Top flush with elevations shown
Bear Pl. P2 embeded in concrete. Top flush with elevations shown
Footing Beveled to increase Clearance.
Bend in field
4"x3" Const. key
℄ Roadway
Sta. 1323+13.97
Sta. 1323+57.37
Elev 5112.53
Elev 5110.55
Elev 5108.39
Elev 5099.00
Elev 5107.13
Elev 5109.38
Elev 5111.46
Elev 5099.00
Elev. 5098.00 As Constructed.
As Constructed
Original Design
Fan 4-C6 bars around corner
Fan 4-F24 bars around corner

LOADING DATA.
LIVE LOAD: A. A. S. H. O. AUG 1928 CLASS A H-15
DEAD LOAD: ASSUMES 15 LBS PER SQ FT ADDITIONAL WEARING SURFACE WHICH INCLUDES THE ½ IN CONCRETE MONOLITHIC WEARING SURFACE

COLORADO
STATE HIGHWAY DEPARTMENT
DETAIL OF ABUTMENTS FOR
CONCRETE SLAB BRIDGE
16'-0" SPAN & 30' ROADWAY
Across Buckingham Ditch
Sta. 1323+13.37 To 1323+57.37
Near Loveland. Sec. 12 T. 6 N. R. 70 W.

Designed by K B
Made by WWD.
Checked by WWD.

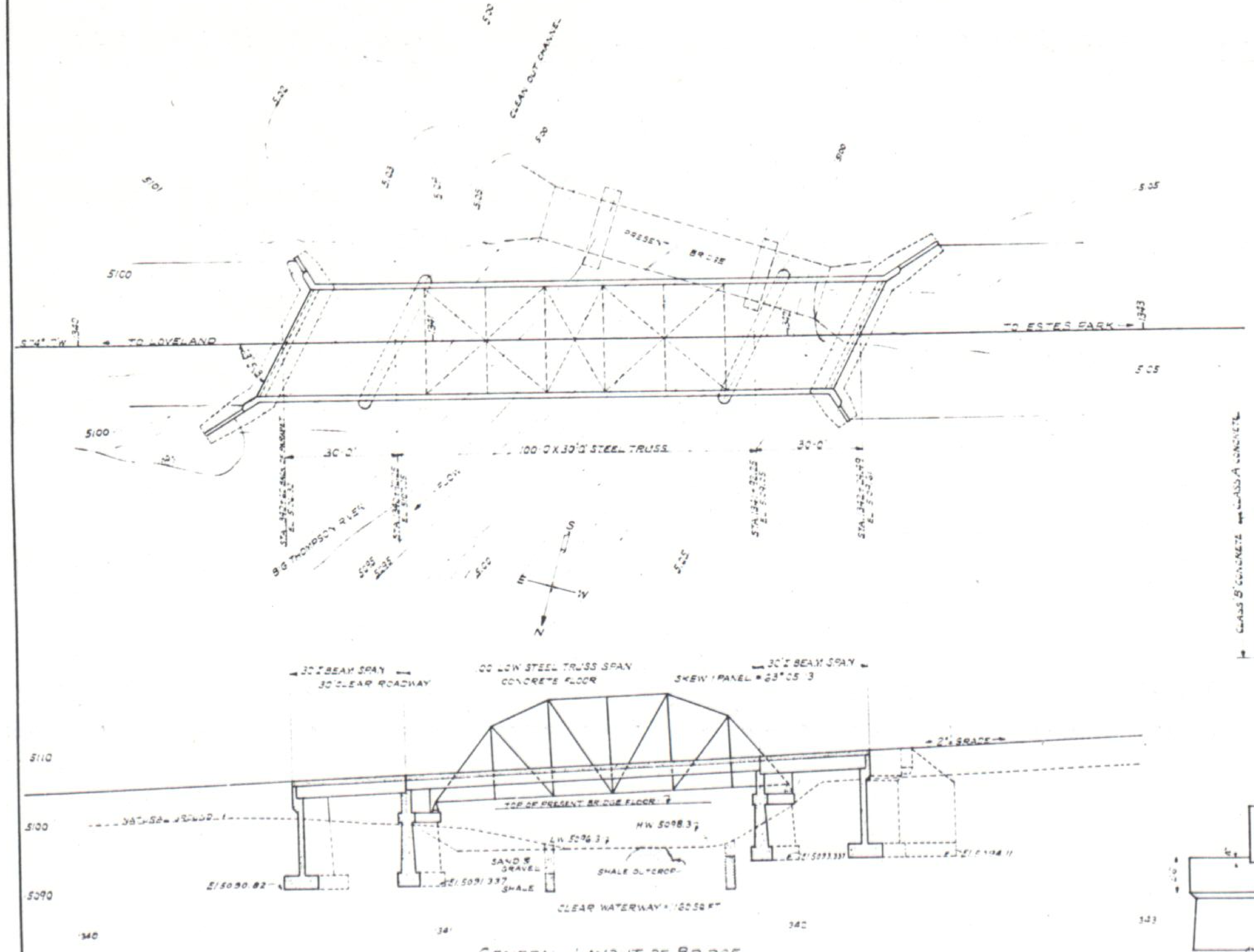
Approved by R. J. Bailey
Bridge Engineer
Date: March 27th 1933.

STRUCTURE NO. C-16-Y.

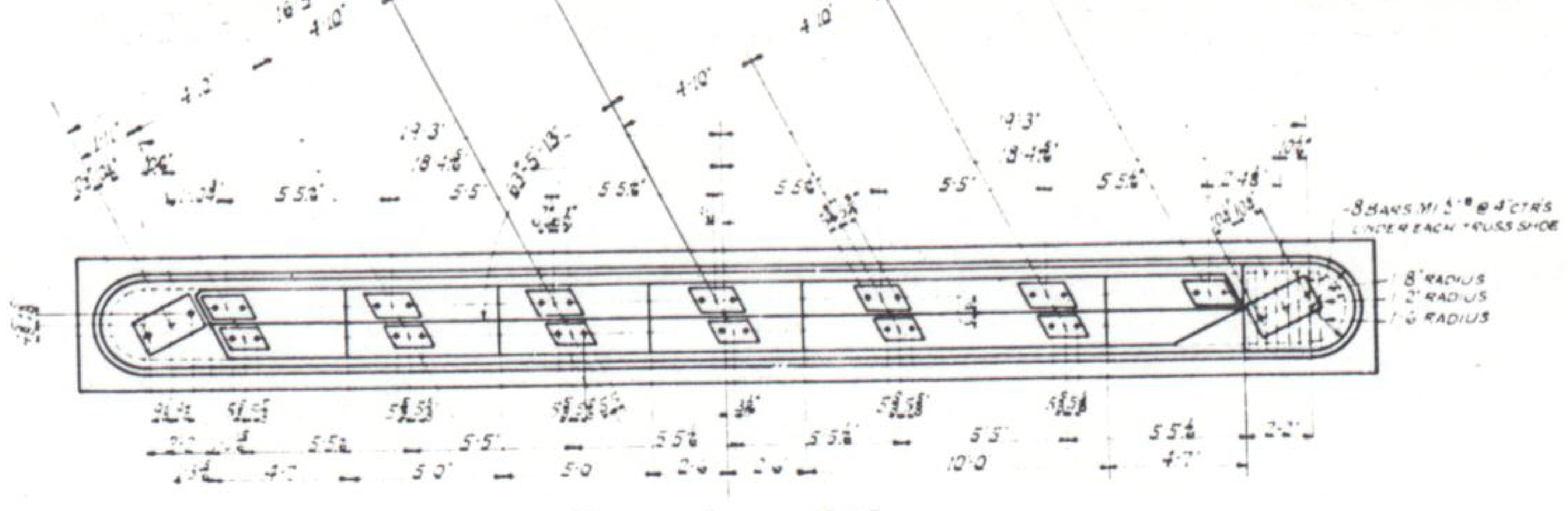
FED ROAD DIST NO	STATE	FED AID PROJ NO	SHEET NO	TOTAL SHEETS
3	COLO.	E-9 B2	6	

REVISED 11.3.33 BY G.H.O. PART ELEVATION OF PIER #3 ADDED.

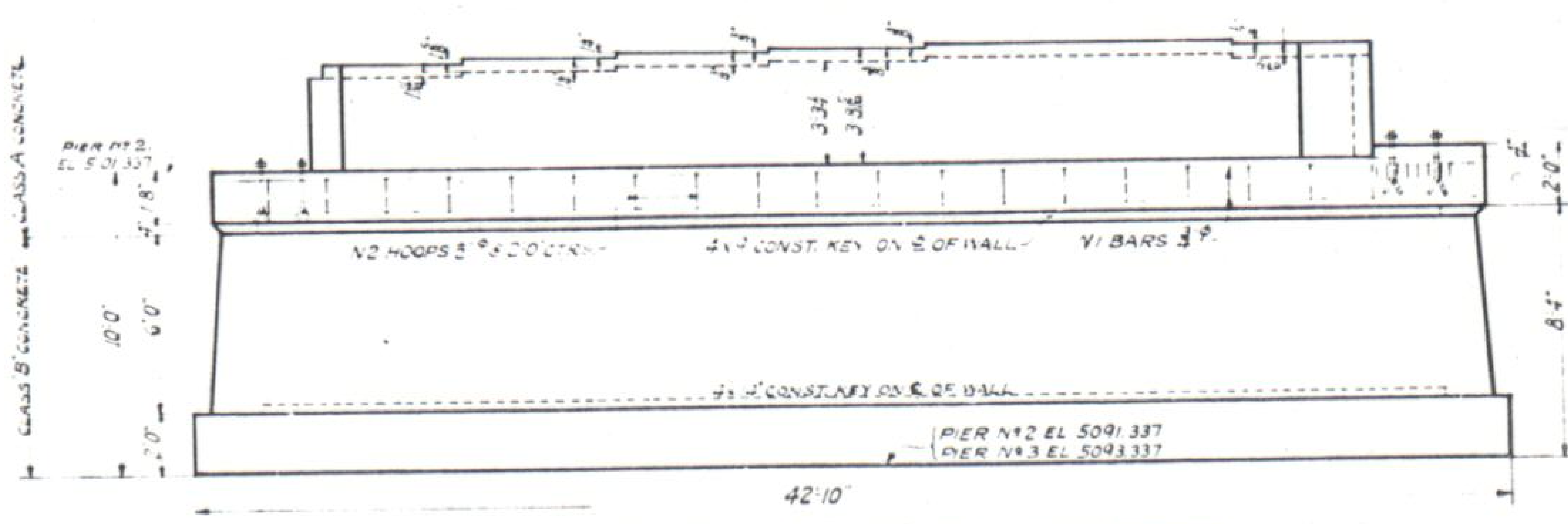
Revised Quantities As Constructed 5-14-38 R.A.D.


5100
5101
5.22
CLEAN OUT CHANNEL
5.05
PRESENT BRIDGE
S 74° 0' W 340 ← TO LOVELAND
TO ESTES PARK → 343
100'-0" X 30'-0" STEEL TRUSS
30'-0"
30'-0"
BIG THOMPSON RIVER
FLOW
N
S
E
W
30' I BEAM SPAN
30' CLEAR ROADWAY
100' LOW STEEL TRUSS SPAN
CONCRETE FLOOR
SKEW 1 PANEL = 23° 05' 3"
2% GRADE
TOP OF PRESENT BRIDGE FLOOR
H.W. 5098.3
L.W. 5096.3
SAND & GRAVEL
SHALE
SHALE OUTCROP
CLEAR WATERWAY = 1120 SQ FT
5110
5100
5090
340
341
342
343

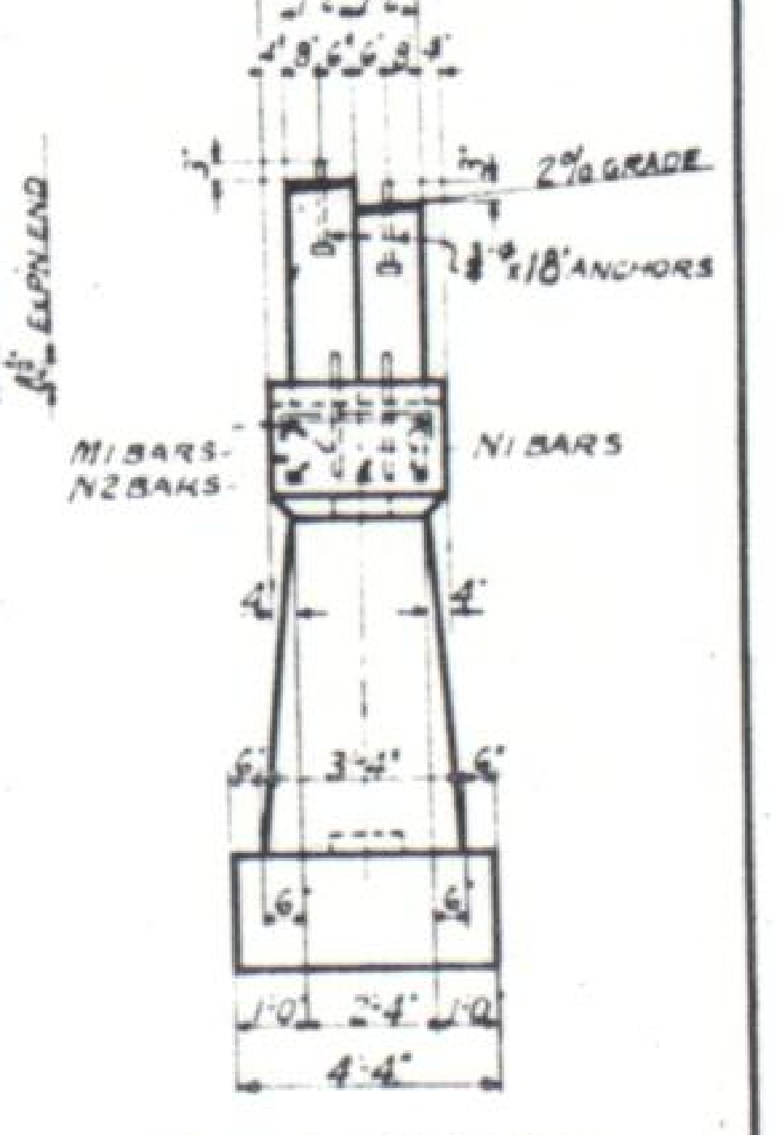
GENERAL LAYOUT OF BRIDGE


8 BARS M1 ½" ⌀ @ 4" CTRS UNDER EACH TRUSS SHOE
8' RADIUS
2' RADIUS
1' RADIUS
5.5'
16.5'
4.0'
11'

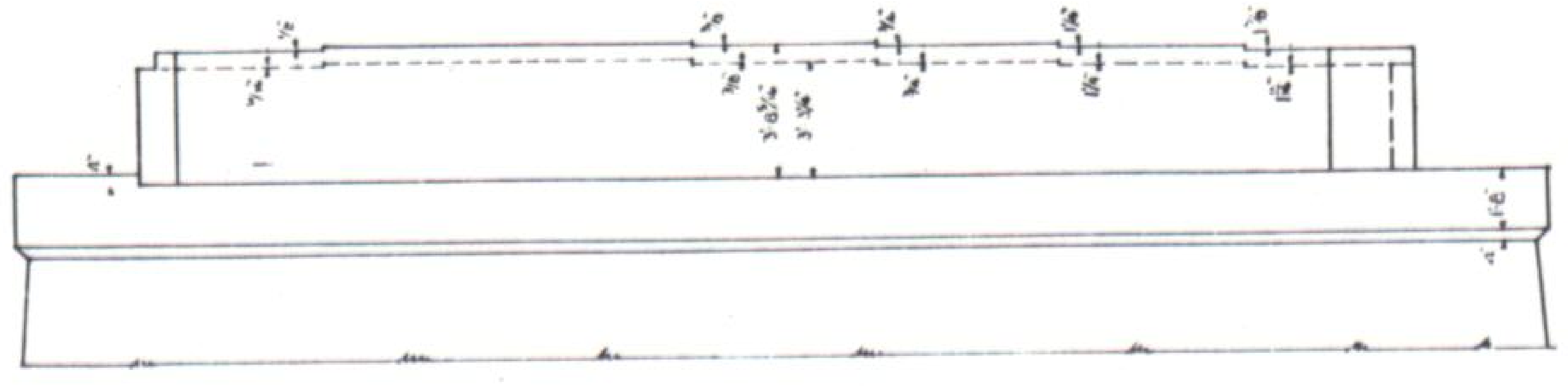
PLAN OF PIERS No 2 & 3


CLASS 'B' CONCRETE
CLASS 'A' CONCRETE
PIER No 2 EL 5091.337
PIER No 3 EL 5093.337
N2 HOOPS ½" ⌀ @ 2'-0" CTRS
4"×4" CONST. KEY ON ℄ OF WALL
Y1 BARS ¾" ⌀
42'-10"
10'-0"
6'-0"
8.4'
10.4'
2'-0"
3'-3"
FIXED END
EXPN END

ELEVATION OF PIERS No 2 SEEN FROM ℄ OF STREAM.
PIER #3 SIMILAR EXCEPT STRINGER SEATS.


2% GRADE
18" ANCHORS
M1 BARS
N2 BARS
N1 BARS
3'-4"
2'-4"
4'-4"

END ELEVATION.



PART ELEVATION OF PIER No 3
SEEN FROM ℄ OF STREAM.

BAR LIST FOR TWO PIERS				K.B.
MARK	SIZE	No	LENGTH	BENDING DIAGRAM
N1	¾" ⌀	10	40'-0"	
M1	½" ⌀	32	3'-8"	2'-8"
N2	½" ⌀	40	9'-4"	2'-8"

491 LIN FT OF ½" ⌀ BARS @ 0.850 LBS PER LIN FT = 418 LBS.
400 LIN FT. OF ¾" ⌀ BARS @ 1.502 LBS PER LIN FT = 601 LBS.
PLUS 1% FOR OVERRUN = 11 LBS
TOTAL = 1030 LBS.

REFERENCE DRAWINGS
SHEET No 7 SUPERSTRUCTURE - EAST & WEST APPROACH SPANS.
SHEET No 8 SUBSTRUCTURE - EAST & WEST ABUTMENTS
SHEET No 9 STD 100 FT. X 30 FT STEEL LOW TRUSS

SUMMARY OF QUANTITIES FOR ENTIRE STRUCTURE

ITEM No	DESCRIPTION	UNIT	SUBSTRUCTURE EAST ABUT	SUBSTRUCTURE PIERS #2 & 3	SUBSTRUCTURE WEST ABUT	SUPERSTRUCTURE 30FT APPROACHES	SUPERSTRUCTURE 100FT TRUSS SPAN	TOTAL
14a	DRY ROCK STRUCTURAL EXCAVATION	CU YD						—
14b	DRY COMMON "	CU YD	1141	633	1838			361.2
♦ 14c	WET ROCK "	CU YD	1191	806	928			2925
♦ 14d	WET COMMON	CU YD		242	267			509
42a	UNTREATED BRIDGE TIMBER	M FT B M	.205		.205			.410
46a	CLASS 'A' CONCRETE	CU YD	75	38	75	65	82	335
46b	CLASS 'B' CONCRETE	CU YD		80				80
47	REINFORCING STEEL includes 1% overrun	LBS	5630	1030	5630	11,100	15,560	*38622
48	STRUCTURAL STEEL includes 2½% overrun	LBS	40	140	40	40,000	139478	179698
54	REMOVAL OF DISUSED BRIDGE	LUMP SUM						LUMP SUM
81	BRONZE NAME PLATE	EACH				2		2
89a	DRAIN PIPE 3" DIA X 2-6" GALVANIZED	EACH				4		4
89b	DRAIN PIPE 3" DIA X 4-8" GALVANIZED	EACH					12	12

* Scale Weight.
♦ For Wet Line See Field Sheet No 48.

GENERAL NOTES

ALL WORK SHALL BE DONE ACCORDING TO THE STANDARD SPECIFICATIONS OF THE COLORADO STATE HIGHWAY DEPARTMENT ADOPTED JAN 1 1930

ALL CONCRETE SHALL BE CLASS A & CLASS 'B'

ALL EXPOSED SURFACES SHALL BE RUBBED FREE OF FORM MARKS

ALL EXPOSED CORNERS EXCEPT ON HANDRAILS SHALL BE BEVELED TO A 1" FACE

FLOOR SLABS AND CURB SHALL BE POURED MONOLITHICALLY

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

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

THICKNESS OF FLOOR SLAB SHOWN INCLUDES ½" CONCRETE WEARING SURFACE

ALL REINFORCING BARS SHALL BE ROUND OR SQUARE PLAIN OR DEFORMED AS SHOWN AND NOTED

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

SECONDARY BARS WHEN SPLICED SHALL BE GIVEN A LAP OF 50 DIAMETERS

MAIN BARS SHALL NOT BE SPLICED

SOUNDINGS AND DEPTH OF FOOTINGS SHOWN ARE ACCORDING TO THE BEST AVAILABLE DATA IF ESSENTIALLY DIFFERENT CONDITIONS ARE ENCOUNTERED THE BRIDGE ENGINEER WILL INSPECT AND DETERMINE IF REDESIGN IS NECESSARY

MAXIMUM SOIL PRESSURE EQUALS 4100 LBS

FORMS FOR CONCRETE SURFACES EXPOSED IN THE FINISHED WORK SHALL BE CONSTRUCTED OF SHIPLAP OR TONGUE AND GROOVE LUMBER ON THE FACE

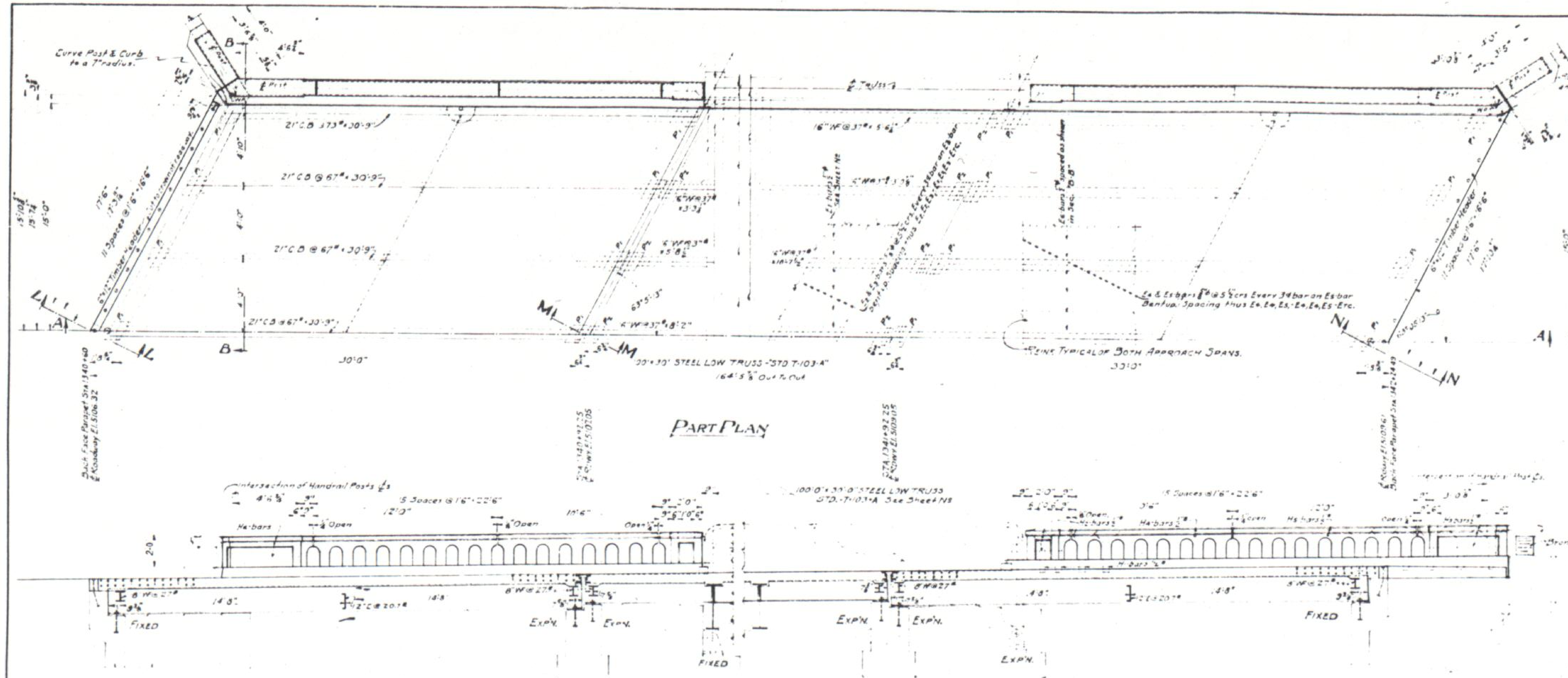
LOADING DATA
LIVE LOAD A A S H O AUG 1928 CLASS A H-15
DEAD LOAD ASSUMES 15 LBS PER SQ FT ADDITIONAL WEARING SURFACE WHICH INCLUDES THE ½ IN CONCRETE MONOLITHIC WEARING SURFACE

COLORADO
STATE HIGHWAY DEPARTMENT
PIERS No 2 & 3 AND GENERAL LAYOUT
FOR ONE SPAN @ 100FT STEEL TRUSS
AND 2-30FT APPROACH SPANS
Across BIG THOMPSON RIVER
Sta. 1340+60 TO 1342+24.49
Near LOVELAND Sec. 12 T.5N R.70W

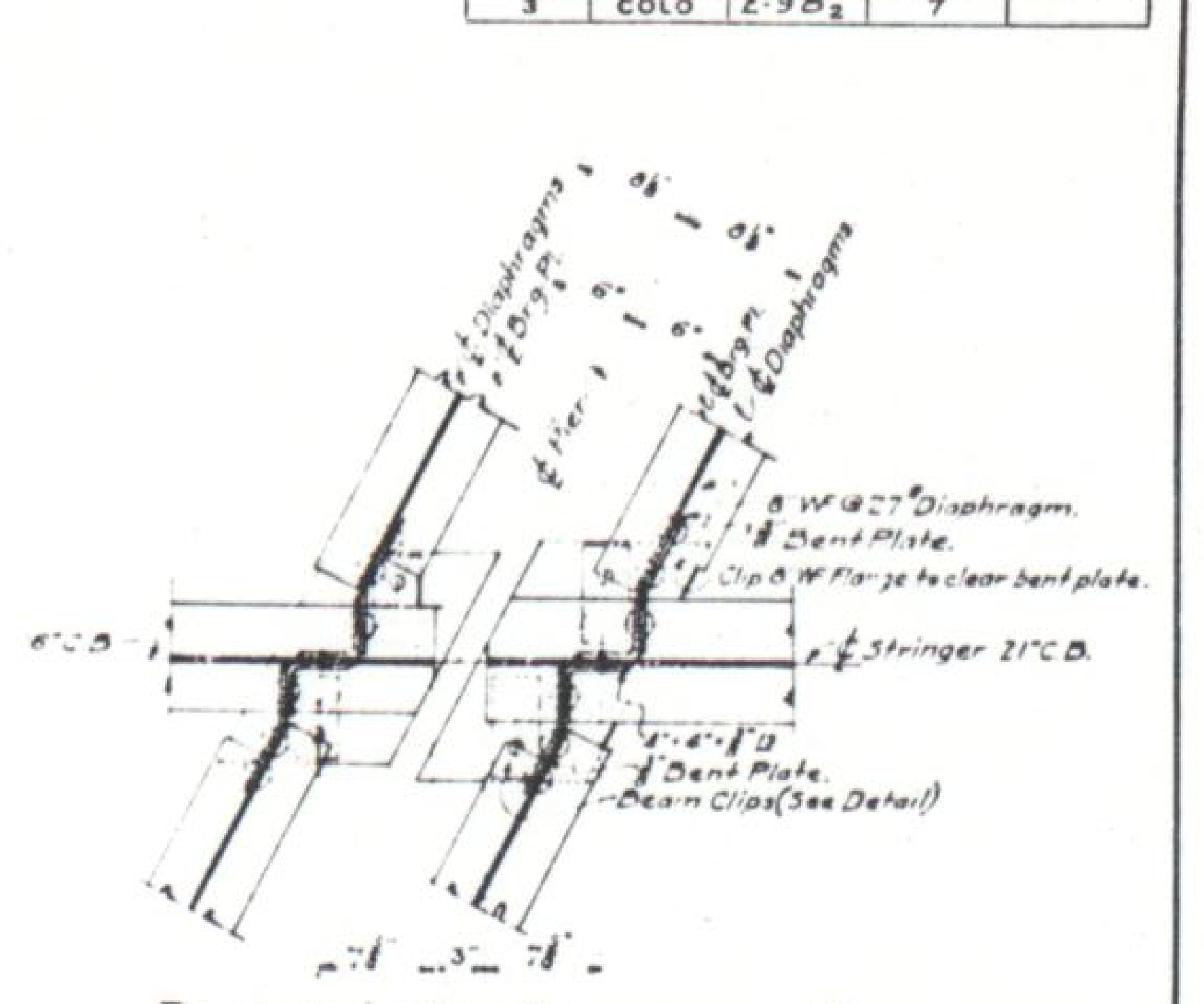
Designed by E.F.W. Made by W.McM. Checked by K.B.	Approved by P.d. Caley Bridge Engineer Date: March 27th 1933

STRUCTURE NO. C-16-Z

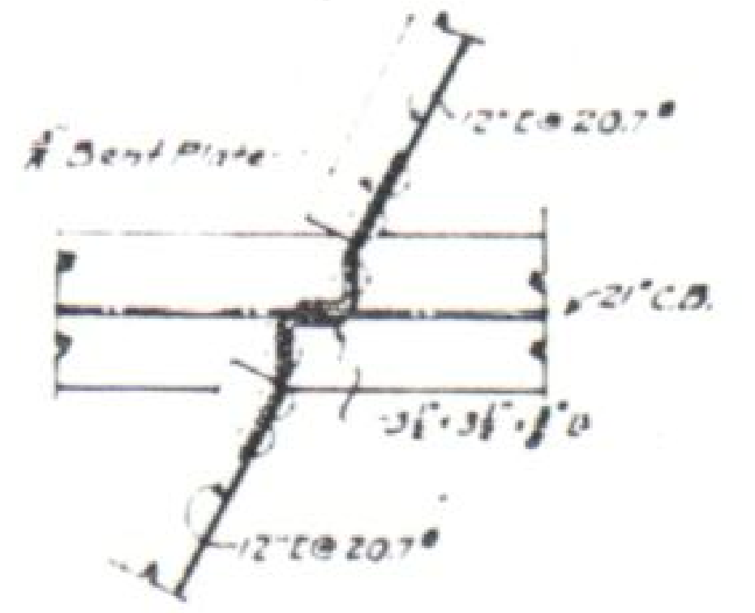
FED ROAD DIST NO	STATE	FED AID PROJ NO	SHEET NO	TOTAL SHEETS
3	COLO	E-9B2	7	


Curve Post & Curb to a 7" radius.
21"CB @ 73# x 30'-9"
21"CB @ 67# x 30'-9"
16"WF @ 37# x 5'-6"
30'-0"
100'x 30' STEEL LOW TRUSS "STD. T-103-A"
164'-5 ⅜" Out to Out
33'-0"
Bronze Name Plate
FIXED
EXP'N.
Back Face Parapet Sta. 1340+60
℄ Roadway El. 5106.32
Back Face Parapet Sta. 1342+24.49

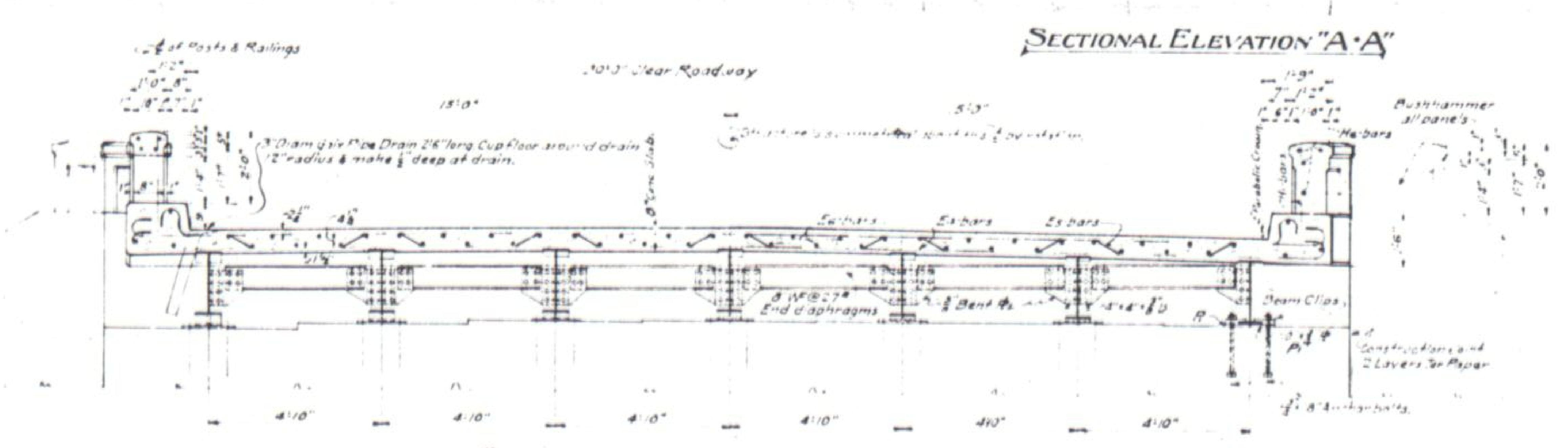
PART PLAN


8 W @ 27# Diaphragm.
⅜ Bent Plate.
Clip 8 W Flange to clear bent plate.
℄ Stringer 21"CB.
⅜ Bent Plate.
Beam Clips (See Detail)

DETAILS OF END DIAPHRAGM CONNECTIONS.


⅜ Bent Plate
21"CB @ 20.7#

DETAILS OF MIDDLE DIAPHRAGM CONNECTIONS.


30'-0" Clear Roadway
Bushhammer all panels
E4 bars
E5 bars
8 W @ 27# End diaphragms
⅜ Bent Pl.
Beam Clips
Construction Joint 2 Layers Tar Paper

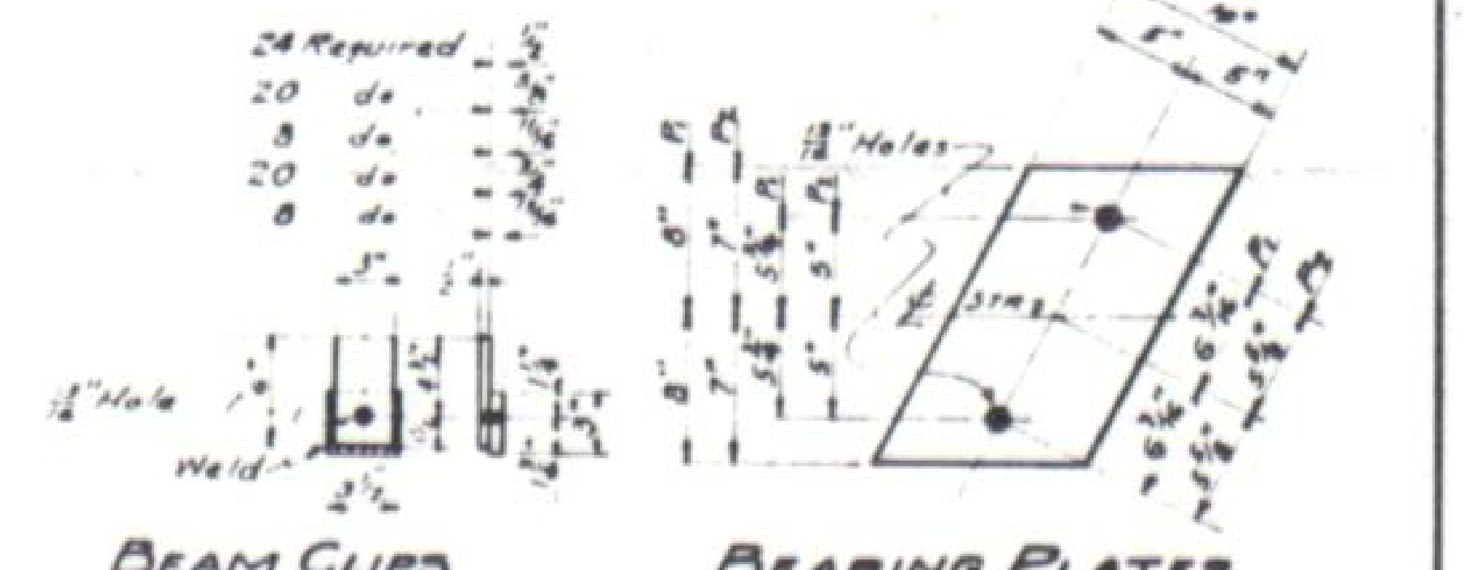
SECTIONAL ELEVATION "A-A"

BAR LIST FOR TWO APPROACH SPANS ★

MARK	SIZE	No	LENGTH	BENDING DIAGRAM
H1	½"φ	36	31'-2"	Straight Bars
H2	½"φ	16	2'-0"	
H3	½"φ	8	4'-6"	
H4	½"φ	16	10'-3"	
H5	½"φ	16	11'-9"	
H6	½"φ	8	4'-8"	
E5	⅝"φ	40	37'-10"	Bar is symmetrical about ℄ of this ℄
E4	⅝"φ	164	38'-5"	36'-9"
P1	½"φ	80	6'-6"	2'-1"

2992 Lin ft ½"φ bars @ .668 Lbs per lin ft equals 1999 Lbs.
377 do [illegible] do @ [illegible].085 do do 831 "
7827 do ⅝"φ do @ 1.043 do do 8164 "
plus 1% for over run 106 "
TOTAL 11100 Lbs

★ Reinforcement fabricator shall bundle steel for each span separately and shall tag the bundles with the station number of the nearest abutment and also mark "East Approach" or "West Approach", corresponding to the sta. number

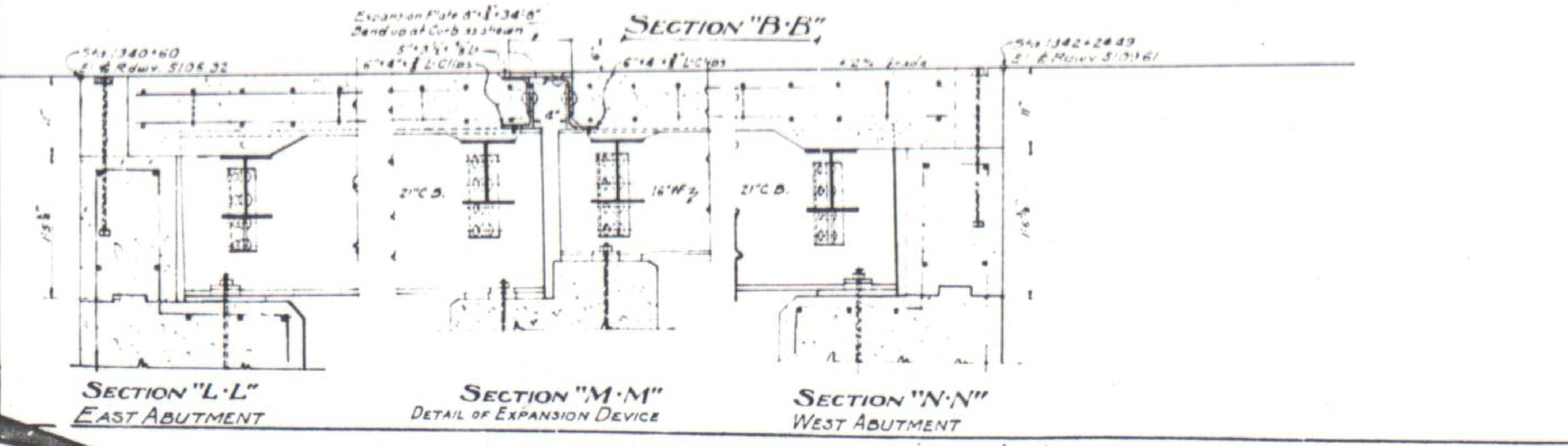

24 Required
20 do
8 do
20 do
8 do
Hole
Weld
Holes

BEAM CLIPS
STRUCTURAL STEEL
Furnish with each beam clip
One ¾" x 18" Anchor bolt with one hex nut.
80 anchors required.

BEARING PLATES
STRUCTURAL STEEL
28 REQUIRED MARK P1 ⅝" R.
12 do do P2 ¾" R.

REFERENCE DRAWINGS

Sheet No 6 GENERAL LAYOUT, PIER DETAILS & SUMMARY OF QUANTITIES
do 7 SUPERSTRUCTURE, EAST & WEST APPROACH SPANS.
do 8 SUBSTRUCTURE - EAST & WEST ABUTMENTS.
do 9 STD 100FT x 30FT STEEL LOW TRUSS WITH CONCRETE FLOOR

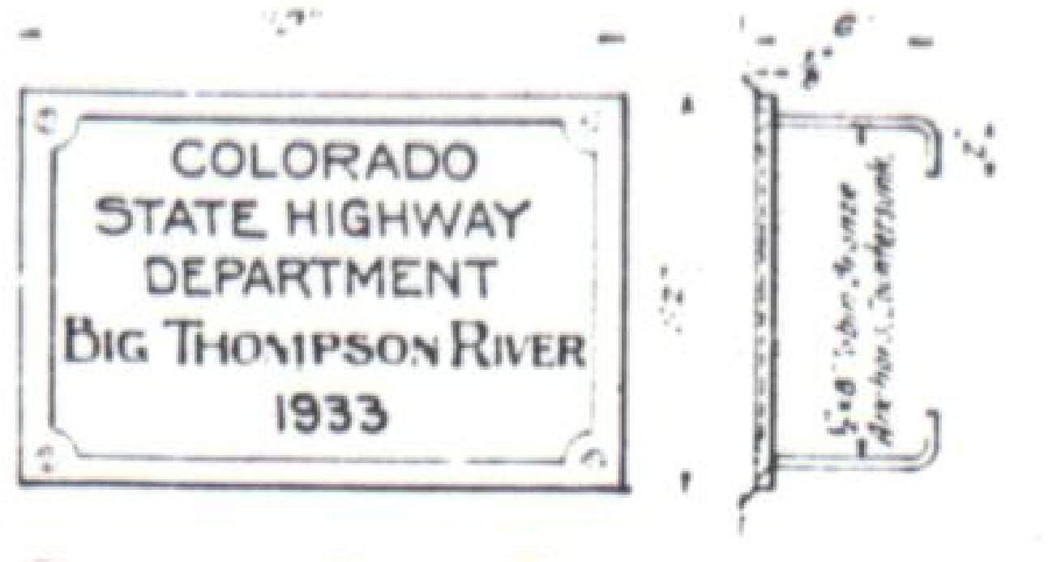

Sta. 1340+60
℄ Rdwy. 5106.32
Expansion Plate
Bend up at Curb as shown
21"CB.
16"WF
Sta. 1342+24.49
℄ Rdwy. 5107.61

SECTION "B-B"

SECTION "L-L"
EAST ABUTMENT

SECTION "M-M"
DETAIL OF EXPANSION DEVICE

SECTION "N-N"
WEST ABUTMENT


COLORADO
STATE HIGHWAY
DEPARTMENT
BIG THOMPSON RIVER
1933

DETAIL OF NAME PLATE
BRONZE - TWO REQUIRED
Place one name plate in each right hand end post of Bridge.
Letters and border to be raised ⅛"
Design of name plate shall be approved by Bridge Engineer

GENERAL NOTES

ALL WORK SHALL BE DONE ACCORDING TO THE STANDARD SPECIFICATIONS OF THE COLORADO STATE HIGHWAY DEPARTMENT ADOPTED JAN 1 [illegible]

ALL CONCRETE SHALL BE CLASS A

ALL EXPOSED SURFACES SHALL BE RUBBED FREE OF FORM MARKS

ALL EXPOSED CORNERS EXCEPT ON HANDRAILS SHALL BE BEVELED TO A 2" FACE

FLOOR SLABS AND CURB SHALL BE POURED MONOLITHICALLY

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

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

THICKNESS OF FLOOR SLAB SHOWN INCLUDES ½ CONCRETE WEARING SURFACE

ALL REINFORCING BARS SHALL BE ROUND OR SQUARE PLAIN OR DEFORMED AS SHOWN AND NOTED

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

SECONDARY BARS WHEN SPLICED SHALL BE GIVEN A LAP OF 40 DIAMETERS

MAIN BARS SHALL NOT BE SPLICED

SOUNDINGS AND DEPTH OF FOOTINGS SHOWN ARE ACCORDING TO THE BEST AVAILABLE DATA. IF ESSENTIALLY DIFFERENT CONDITIONS ARE ENCOUNTERED THE BRIDGE ENGINEER WILL INSPECT AND DETERMINE IF REDESIGN IS NECESSARY

FORMS FOR CONCRETE SURFACES EXPOSED [illegible] WORK SHALL BE CONSTRUCTED OF [illegible] TONGUE AND GROOVE LUMBER ON THE FACE

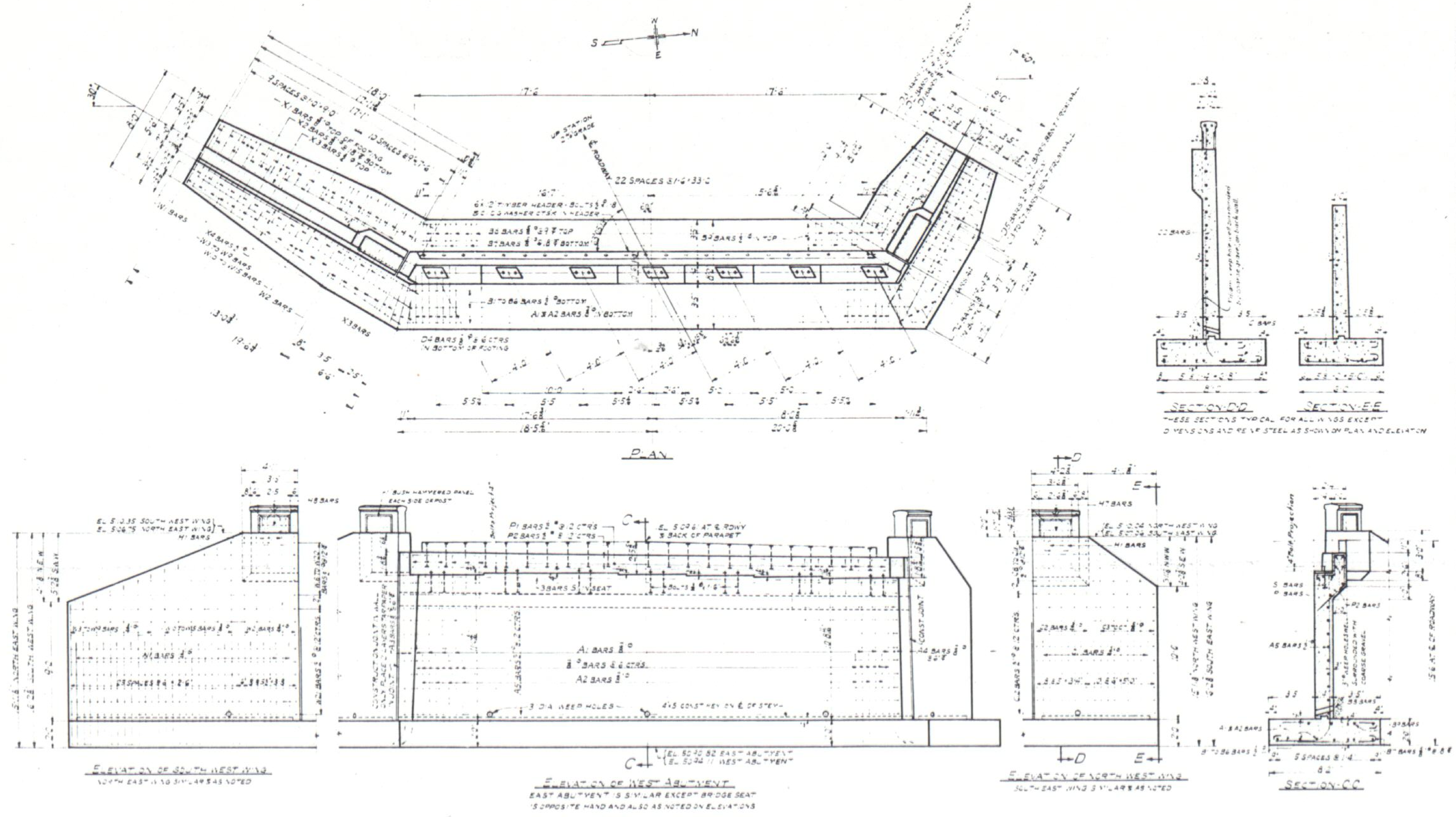
LOADING DATA.
LIVE LOAD A.A.S.H.O. AUG 1928 CLASS A H-15
DEAD LOAD ASSUMES 15 LBS PER SQ FT ADDITIONAL WEARING SURFACE WHICH INCLUDES THE ½ IN CONCRETE MONOLITHIC WEARING SURFACE

COLORADO
STATE HIGHWAY DEPARTMENT
SUPERSTRUCTURE FOR
TWO 30 FT. x 30 FT. I-BEAM SPANS
WITH CONCRETE FLOOR.
Across BIG THOMPSON RIVER
Sta. 1340+60 to 1342+24.45
Near LOVELAND Sec. T. R.

Designed by E.F.W.	Approved by P.J. Bailey
Made by E.F.W.	Bridge Engineer
Checked by K.B.	Date: March 27th 1933

STRUCTURE NO. G-16-Z

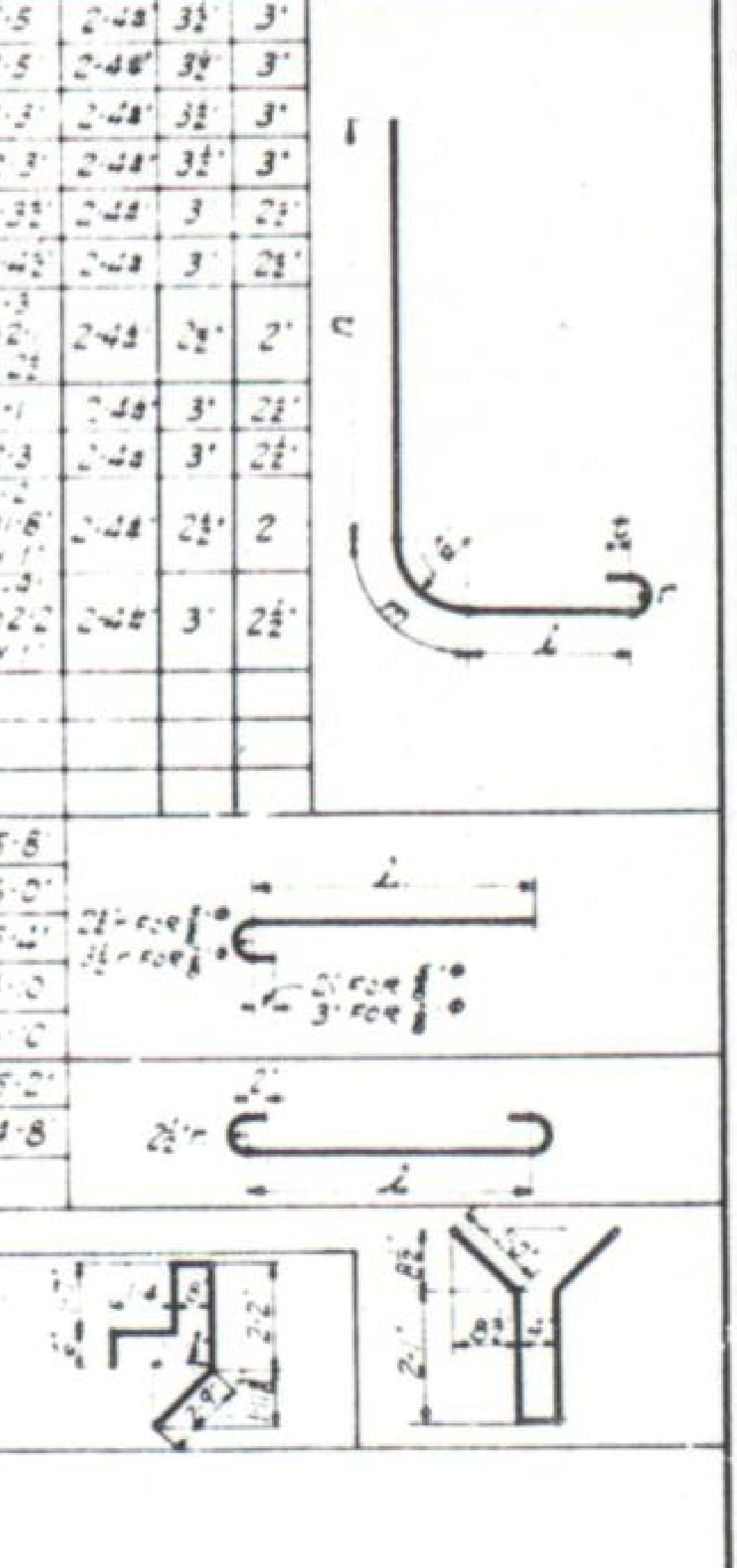
FED ROAD DIST NO	STATE	FED AID PROJ NO	SHEET NO	TOTAL SHEETS
3	COLO.	E°92	8	


PLAN
SECTION D-D
SECTION E-E
THESE SECTIONS TYPICAL FOR ALL WINGS EXCEPT DIMENSIONS AND REINF STEEL AS SHOWN ON PLAN AND ELEVATION
ELEVATION OF SOUTH WEST WING
NORTH EAST WING SIMILAR & AS NOTED
ELEVATION OF WEST ABUTMENT
EAST ABUTMENT IS SIMILAR EXCEPT BRIDGE SEAT IS OPPOSITE HAND AND ALSO AS NOTED ON ELEVATIONS
ELEVATION OF NORTH WEST WING
SOUTH EAST WING SIMILAR & AS NOTED
SECTION C-C
22 SPACES @ 1-6 = 33-0
A1 & A2 BARS ⅞° BOTTOM
D4 BARS ⅝° @ 6 CTRS IN BOTTOM OF FOOTING
3" DIA WEEP HOLES
CONST JOINT
4"Bolt Projection
3" WEEP HOLES WELL SURROUNDED WITH COARSE GRAVEL
15-6 AT ℄ OF ROADWAY

BAR LIST FOR WEST ABUTMENT

MARK	No	SIZE	LENGTH	L	m	n	r
A1	36	⅞ ●	16-7	2-5	2-4⅛	3½	3
A2	35	⅞ ●	[illegible]	2-5	2-4⅛	3½	3
A3	2	⅞ ●	8-7	2-3	2-4⅛	3½	3
A4	2	⅞ ●	18-2	2-3	2-4⅛	3½	3
C1	9	¾ ●	10-8	1-3½	2-4⅛	3	2¼
C2	5	¾ ●	12-0	2-4½	2-4⅛	3	2¼
C3 TO C7	1 EACH	⅝ ●	4-5 TO 8-3 BY 11½	1-3 TO 2-1 BY 2½	2-4⅛	2½	2
W1	7	¾ ●	0-5	1-1	2-4⅛	3	2¼
W2	5	¾ ●	0-2	2-3	2-4⅛	3	2¼
W3 TO W9	1 EACH	⅝ ●	3-4 TO 6-1 BY 5½	1-2 TO 1-8 BY 1	2-4⅛	2½	2
W10 TO W15	1 EACH	¾ ●	6-9 TO 9-0 BY 5½	1-3 TO 2-2 BY 1	2-4⅛	3	2¼
B7	22	⅝ ●	6-6	5-8			
B8	46	⅝ ●	6-0	6-0			
D2	6	⅝ ●	6-0	5-4			
X2	11	⅝ ●	5-8	4-0			
D4	8	⅝ ●	8-0	6-0			
D1	11	⅝ ●	6-0	5-2			
X1	20	⅝ ●	5-6	4-8			
H1	4	½ ●	6-6				
P1	36	½ ●	9-0				
A5	11	½ ●	36-6				
B1 TO B6	1 EACH	½ ●	33-6 TO 38-6 BY 1-0				
B9	4	½ ●	34-0				
C8 TO C11	1 EACH	½ ●	4-4 TO 8-1 BY 1-3				
C12	10	½ ●	8-9				
D3	4	½ ●	9-0				
D5	6	½ ●	12-6				
H7	4	½ ●	3-4				
H8	4	½ ●	3-2				
P2	4	½ ●	34-8				
S1	3	½ ●	36-0				
W16 TO W20	1 EACH	½ ●	5-1 TO 15-5 BY 2-7				
W21	9	½ ●	16-9				
X3	4	½ ●	17-6				
X4	6	½ ●	19-6				

BENDING DIAGRAM


n
m
6"
L
r
2½" FOR ⅝°
3½" FOR ⅞°
2" FOR ⅝°
3" FOR ⅞°
2½" r
2-2
2-1
STRAIGHT

1366 LIN FT OF ⅜ ● BARS @ 0.668 LBS PER LIN FT = 913 LBS
623 LIN FT OF ½ ● BARS @ 0.850 LBS PER LIN FT = 530 LBS
926 LIN FT OF ⅝ ● BARS @ 1.043 LBS PER LIN FT = 966 LBS
586 LIN FT OF ¾ ● BARS @ 1.502 LBS PER LIN FT = 880 LBS
1117 LIN FT OF ⅞ ● BARS @ 2.044 LBS PER LIN FT = 2283 LBS
PLUS 1%± FOR OVERRUN = 58 LBS
TOTAL = 5630 LBS

REINFORCING FOR EAST ABUTMENT IS SAME AS FOR WEST ABUTMENT BUT FABRICATOR SHALL BUNDLE STEEL BARS FOR EACH ABUTMENT SEPARATELY AND TAG FOR STATION NUMBER AND ABUTMENT

LOADING DATA.
LIVE LOAD: A.A.S.H.O. AUG 1928 CLASS A H-15
DEAD LOAD: ASSUMES 15 LBS PER SQ FT ADDITIONAL WEARING SURFACE WHICH INCLUDES THE ½ IN CONCRETE MONOLITHIC WEARING SURFACE

REFERENCE DRAWINGS

SHEET Nº 6 GENERAL LAYOUT, PIER DETAILS & SUMMARY OF QUANTITIES
SHEET Nº 7 SUPERSTRUCTURE-EAST & WEST APPROACH SPANS
SHEET Nº 9 STD. 100FT x 30FT STEEL LOW TRUSS

Maximum Soil Pressure for Abutments 3500 lbs/sq ft

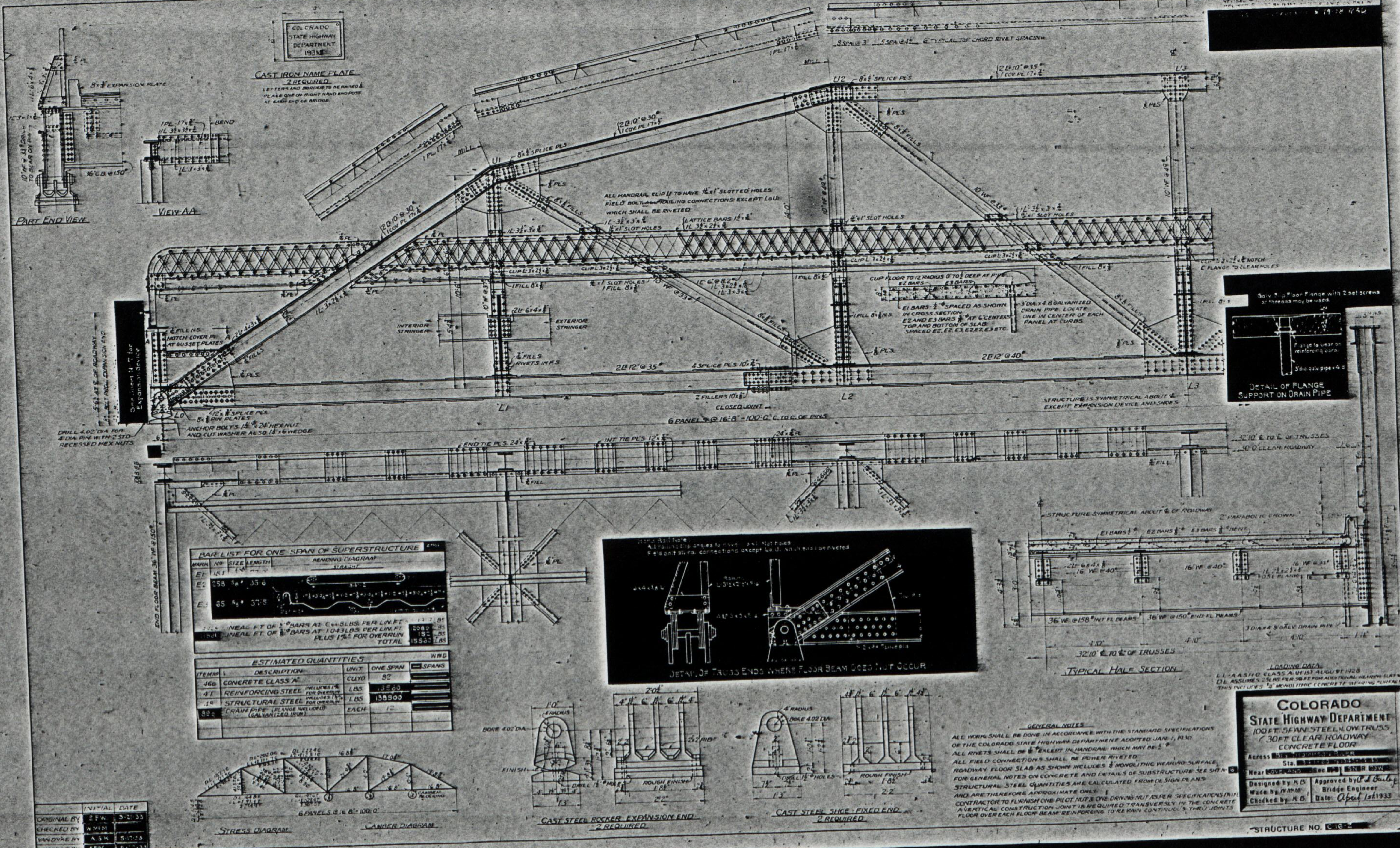
COLORADO
STATE HIGHWAY DEPARTMENT
EAST & WEST ABUTMENTS FOR
30FT. x 30FT. APPROACH SPANS
CONCRETE & STEEL I-BEAM TYPE
Across BIG THOMPSON RIVER
Sta. 1340+60 TO 1342+24.49
Near LOVELAND Sec. 12 T.5N R.70W

Designed by EFW	Approved by J. J. Conley
Made by WMcM	Bridge Engineer
Checked by KB.	Date: March 27th 1933

STRUCTURE NO. C-16-Z

T-103-A

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
3	COLO.	B-38-2	9	



COLORADO STATE HIGHWAY DEPARTMENT 1933
CAST IRON NAME PLATE
2 REQUIRED
PART END VIEW
VIEW A-A
8"x⅜" EXPANSION PLATE
16"⊏ @ 15.0#
10"⊏ @ 33# DRILL TO BEAR ON PIN
ALL TOP CHORD LACING BARS 2¼"x⅜"
END TIE PLATES 24"x⅜"
TYPICAL TOP CHORD RIVET SPACING
U1
U2
U3
L0
L1
L2
L3
2⊏ 10" @ 30# 1 COV. PL. 17"x⅜"
2⊏ 10" @ 35# 1 COV. PL. 17"x⅜"
8"x⅜" SPLICE PLS.
ALL HANDRAIL CLIPS ⊾ TO HAVE ¾"x1" SLOTTED HOLES
FIELD BOLT ALL RAILING CONNECTIONS EXCEPT L0 U1 WHICH SHALL BE RIVETED
LATTICE BARS 1¾"x⅜"
CUP FLOOR TO 12 RADIUS 0'7½" DEEP AT PIPE
E1 BARS ⅝"⌀ SPACED AS SHOWN IN CROSS SECTION
E2 AND E3 BARS ⅝"⌀ AT 6" CENTERS TOP AND BOTTOM OF SLAB SPACED E2, E2, E3, E2, E2, E3 ETC.
3" DIA. x 4'8" GALVANIZED DRAIN PIPE. LOCATE ONE IN CENTER OF EACH PANEL AT CURBS
INTERIOR STRINGER
EXTERIOR STRINGER
2⊏ 12" @ 35#
2⊏ 12" @ 40#
4 SPLICE PLS. 10"x⅜"
2 FILLERS 10"x⅜"
CLOSED JOINT
STRUCTURE IS SYMMETRICAL ABOUT ℄ EXCEPT EXPANSION DEVICE AND SHOES
6 PANELS @ 16'-8" = 100'-0" C. TO C. OF PINS
See Sheet No. 7 for Expansion device
DRILL 4.02" DIA. FOR 4" DIA. PIN WITH 2 STD. RECESSED HEX NUTS
ANCHOR BOLTS 1½"x24" HEX NUT AND CUT WASHER ALSO 1½"x6" WEDGE
END FLOOR BEAM 36" WF @ 150#
END TIE PLS. 24"x⅜"
INT. TIE PLS. 12"x⅜"
32'-10" ℄ TO ℄ OF TRUSSES
30'-0" CLEAR ROADWAY
Galv. Slip Floor Flange with 2 set screws or threads may be used.
Flange to bear on reinforcing bars.
3" dia. galv. pipe x 4'8"
DETAIL OF FLANGE SUPPORT ON DRAIN PIPE
STRUCTURE SYMMETRICAL ABOUT ℄ OF ROADWAY
2" PARABOLIC CROWN
E1 BARS
E2 BARS
E3 BARS
16" WF @ 40#
36" WF @ 158# INT. FL. BEAMS
36" WF @ 150# END FL. BEAMS
3" DIA. x 4'8" GALV. DRAIN PIPE
4'-10"
32'-10" ℄ TO ℄ OF TRUSSES
TYPICAL HALF SECTION
Hand Rail Note:
All railing clip angles to have ¾"x1" slot holes
Field bolt all rail connections except L0 U1 which shall be riveted
Railing
DETAIL OF TRUSS ENDS WHERE FLOOR BEAM DOES NOT OCCUR
2'-0½"
4" RADIUS
BORE 4.02" DIA.
FINISH
ROUGH FINISH
DRILL 1⅛" HOLES
CAST STEEL ROCKER EXPANSION END
2 REQUIRED
CAST STEEL SHOE - FIXED END
2 REQUIRED
6 PANELS @ 16'-8" = 100'-0"
STRESS DIAGRAM
CAMBER DIAGRAM

BAR LIST FOR ONE SPAN OF SUPERSTRUCTURE				
MARK	NO.	SIZE	LENGTH	BENDING DIAGRAM
E1	181			STRAIGHT
E2	258	⅝"⌀	35'-6"	
E3	65	⅝"⌀	37'-5"	

LINEAL FT. OF ½"⌀ BARS AT 0.668 LBS. PER LIN. FT.
LINEAL FT. OF ⅝"⌀ BARS AT 1.043 LBS. PER LIN. FT. — 12089 LBS.
PLUS 1½% FOR OVERRUN — 152 LBS.
TOTAL — 15580 LBS.

ESTIMATED QUANTITIES				
ITEM NO.	DESCRIPTION	UNIT	ONE SPAN	SPANS
46a	CONCRETE CLASS "A"	CU.YD.	82	
47	REINFORCING STEEL INCLUDES 1% FOR OVERRUN	LBS.	15580	
1a	STRUCTURAL STEEL INCLUDES 1½% FOR OVERRUN	LBS.	138900	
89a	DRAIN PIPE (FLANGE INCLUDED) (GALVANIZED IRON)	EACH	12	

LOADING DATA

L.L. - A.A.S.H.O. CLASS A OF 1ST AUGUST 1928
D.L. ASSUMES 25 LBS. PER SQ. FT. FOR ADDITIONAL WEARING SURFACE. THIS INCLUDES ½" MONOLITHIC CONCRETE WEARING SURFACE

GENERAL NOTES

ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS OF THE COLORADO STATE HIGHWAY DEPARTMENT ADOPTED JAN. 1, 1930
ALL RIVETS SHALL BE ⅞"⌀ EXCEPT IN HANDRAIL WHICH MAY BE ½"⌀
ALL FIELD CONNECTIONS SHALL BE POWER RIVETED
ROADWAY FLOOR SLAB AS SHOWN INCLUDES ½" MONOLITHIC WEARING SURFACE
FOR GENERAL NOTES ON CONCRETE AND DETAILS OF SUBSTRUCTURE SEE SHT. NO. 6
STRUCTURAL STEEL QUANTITIES ARE CALCULATED FROM DESIGN PLANS AND ARE THEREFORE APPROXIMATE ONLY
CONTRACTOR TO FURNISH ONE PILOT NUT & ONE DRIVING NUT AS PER SPECIFICATIONS
A VERTICAL CONSTRUCTION JOINT IS REQUIRED TRANSVERSELY IN THE CONCRETE FLOOR OVER EACH FLOOR BEAM REINFORCING TO REMAIN CONTINUOUS THRU JOINTS

	INITIAL	DATE
ORIGINAL BY	E.F.W.	3-21-33
CHECKED BY	W.M.M.	
VANDYKE BY	A.S.K.	5-17-33
CHECKED BY	F.R.W.	5-22-33

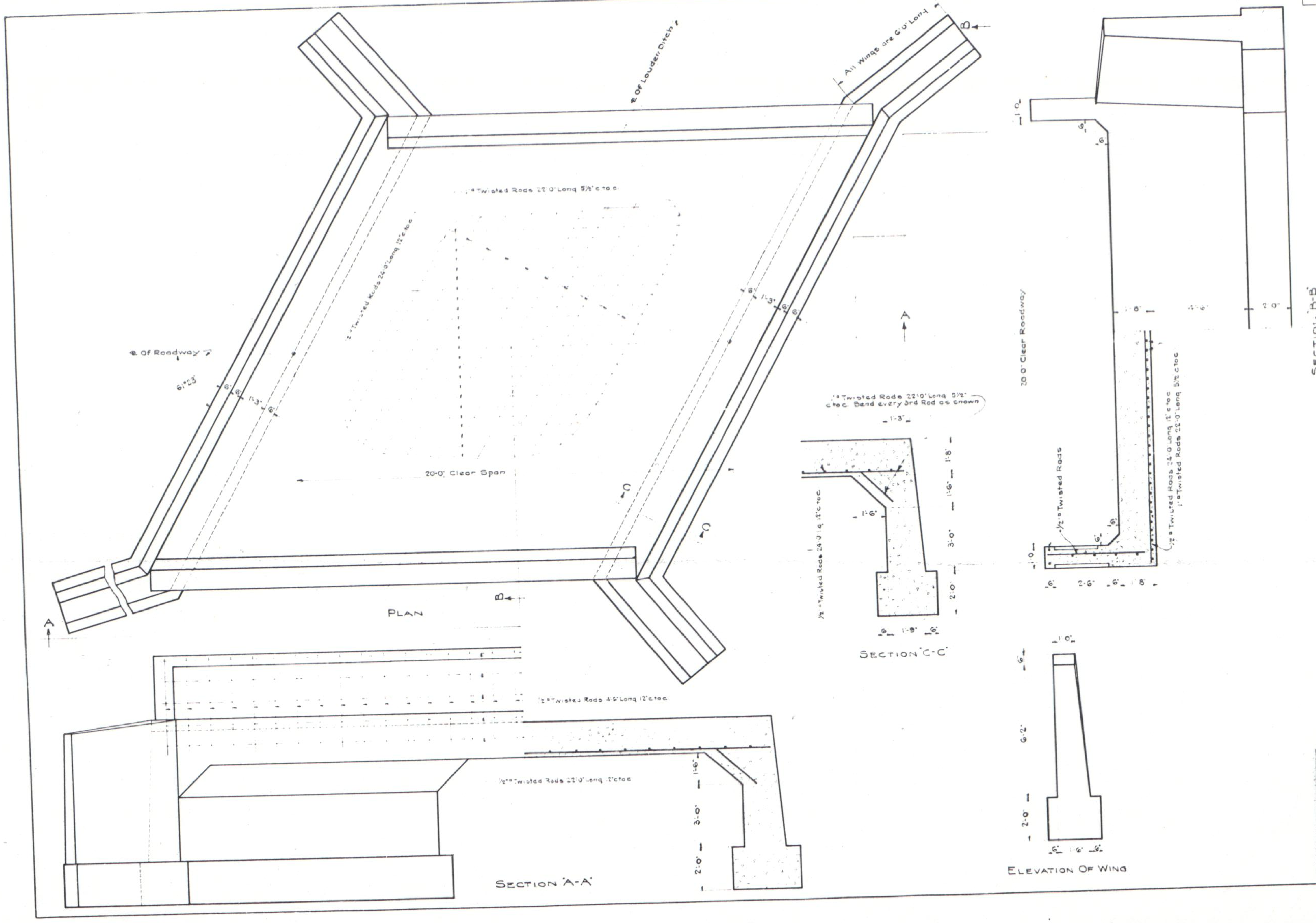
T-103-A

COLORADO
STATE HIGHWAY DEPARTMENT
100 FT. SPAN STEEL LOW TRUSS
30 FT. CLEAR ROADWAY
CONCRETE FLOOR
Across [redacted]
Sta. [redacted]
Near [redacted] Sec. [redacted]

Designed by K.B.	Approved by C. S. Bailey
Made by W.M.M.	Bridge Engineer
Checked by K.B.	Date: April 1st 1933

STRUCTURE NO. C-16-2

FED ROAD DIST NO	STATE	FED AID PROJ NO	SHEET NO	TOTAL SHEETS
3	COLO	9 b		



PLAN
℄ Of Louden Ditch
All Wings are 6'-0" Long
℄ Of Roadway
61°23'
6"
1'-3"
½" ⌀ Twisted Rods 22'-0" Long 5½" c to c
½" ⌀ Twisted Rods 24'-0" Long 12" c to c
20'-0" Clear Span
A
B
C
SECTION "A-A"
½" ⌀ Twisted Rods 4'-6" Long 12" c to c
½" ⌀ Twisted Rods 22'-0" Long 12" c to c
1'-6"
3'-0"
2'-0"
SECTION "C-C"
½" ⌀ Twisted Rods 22'-0" Long 5½" c to c. Bend every 3rd Rod as shown
½" ⌀ Twisted Rods 24'-0" Long 12" c to c
1'-3"
1'-8"
1'-9"
SECTION "B-B"
20'-0" Clear Roadway
½" ⌀ Twisted Rods
½" ⌀ Twisted Rods 24'-0" Long 12" c to c
1" ⌀ Twisted Rods 22'-0" Long 5½" c to c
2'-6"
4'-6"
2'-0"
1'-0"
ELEVATION OF WING
6'-2"

COLORADO
STATE HIGHWAY DEPARTMENT
CONCRETE SLAB BRIDGE
20' SPAN & 20' ROADWAY
Across Louden Ditch
Sta. 1346+78
Near Loveland Sec. 12 T. 5N R. 70W

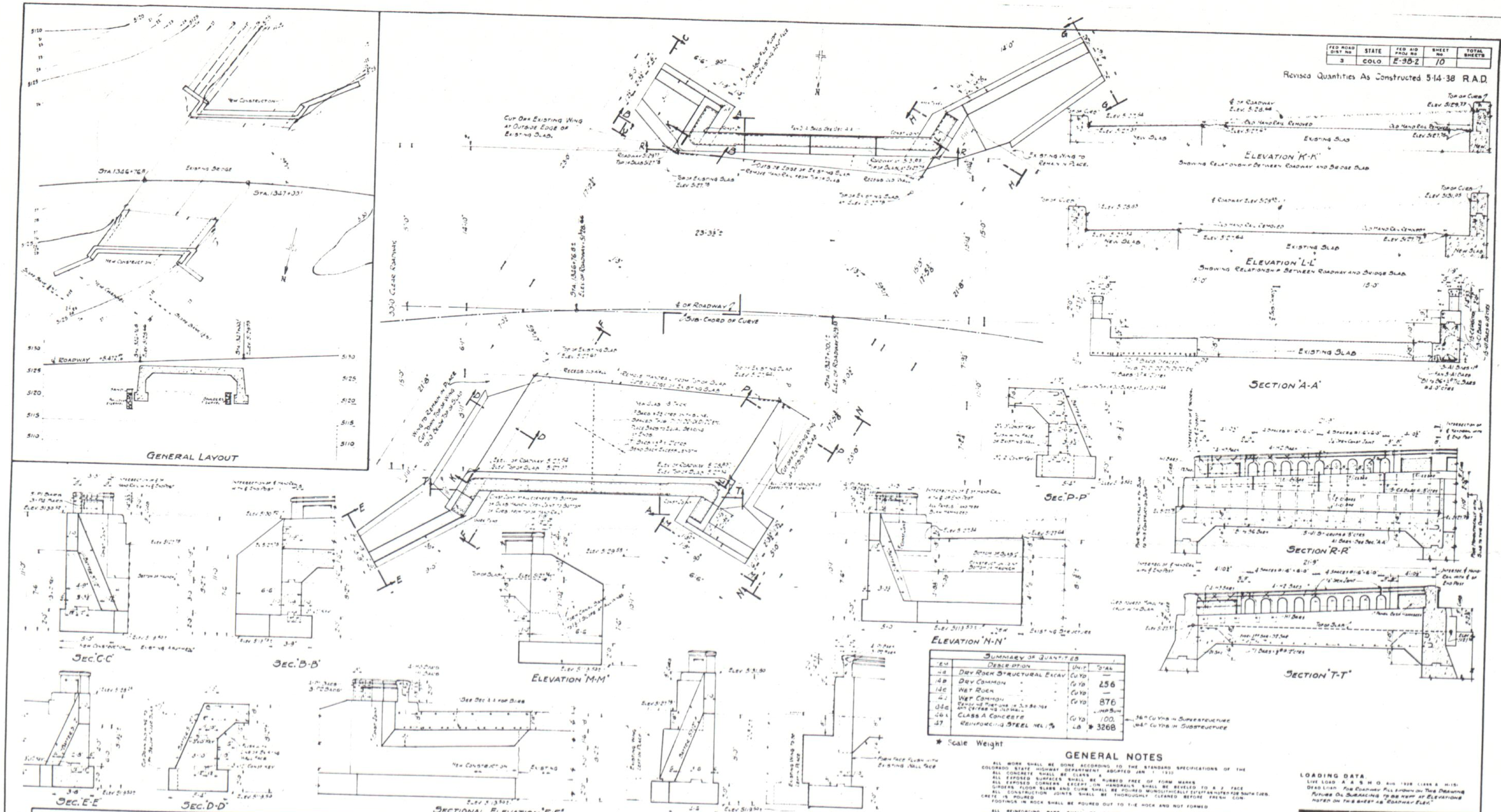
Designed by Made by WWD Checked by F.E.W.	Approved by Bridge Engineer Date: 1932

STRUCTURE NO. C-16-R.

TRIM LINE

FED ROAD DIST NO	STATE	FED AID PROJ NO	SHEET NO	TOTAL SHEETS
3	COLO	E-98-2	10	

Revised Quantities As Constructed 5-14-38 R.A.D.


GENERAL LAYOUT
Sta. 1346+76.8
Existing Bridge
Sta. 1347+33
New Construction
℄ Roadway
Cut Off Existing Wing at Outside Edge of Existing Slab.
33'-0" Clear Roadway
Sta. 1346+76.8 Elev of Roadway 5128.66
℄ of Roadway
Sub-Chord of Curve
Sta. 1347+00.1 Elev of Roadway 5129.18
Wing to Remain in Place
Existing Wing to Remain in Place.
Elevation 'K-K'
Showing Relationship Between Roadway and Bridge Slab
℄ of Roadway Elev. 5128.66
Top of Curb Elev. 5129.77
Old Hand Rail Removed
Existing Slab
New Slab
New
Elevation 'L-L'
Showing Relationship Between Roadway and Bridge Slab
Section 'A-A'
Existing Slab
Sec. 'P-P'
Section 'R-R'
Section 'T-T'
Elevation 'N-N'
Existing Structure
Elevation 'M-M'
Sec. 'C-C'
Sec. 'B-B'
Sec. 'E-E'
Sec. 'D-D'
Sectional Elevation 'F-F'
New Construction
Existing
Sec. 'G-G'
Sec. 'H-H'

Item	Summary of Quantities Description	Unit	Total
14a	Dry Rock Structural Excav	Cu Yd	—
14b	Dry Common " "	Cu Yd	256
14c	Wet Rock " "	Cu Yd	—
14d	Wet Common " "	Cu Yd	876
84c	Removing Portions of Slab Bridge and Recessing Old Wall		Lump Sum
46a	Class A Concrete	Cu Yd	100.
47	Reinforcing Steel Incl 1%	Lb	* 3268

36.0 Cu Yds in Superstructure
64.0 Cu Yds in Substructure

* Scale Weight

GENERAL NOTES

All work shall be done according to the standard specifications of the Colorado State Highway Department adopted Jan 1 1933

All concrete shall be Class A

All exposed surfaces shall be rubbed free of form marks

All exposed corners except on handrails shall be beveled to a 2" face

Girders, floor slabs and curb shall be poured monolithically except as noted for south curb.

All construction joints shall be thoroughly cleaned before fresh concrete is poured

Footings in rock shall be poured out to the rock and not formed

All reinforcing bars shall be round or square plain or deformed as shown and noted

All reinforcing bars shall be tagged with the station number and letter designation

Secondary bars when spliced shall be given a lap of 40 diameters

Main bars shall not be spliced

Soundings and depth of footings shown are according to the best available data. If essentially different conditions are encountered the bridge engineer will inspect and determine if redesign is necessary

Item 84c consists of removing present handrail & curb, with reinforcing steel contained therein, portions of wing walls, abutments, and roadway fill interfering with the new work as indicated on this sheet and as provided in the Special Provisions. This item also includes recessing vertical face of old walls as indicated on this sheet

[illegible] for concrete surfaces exposed in the finished work shall be constructed of shiplap or tongue and groove lumber on the face

LOADING DATA

Live Load A.A.S.H.O. Aug 1928 Class A H-15

Dead Load For Roadway Fill shown on this drawing. Future oil surfacing to be kept at elevations noted on this sheet as "Roadway Elev."

~ BAR LIST ~

Mark	No	Size	Length	Bending
B1 to B6	1 each	½" ø	14'-[illegible] to 30'-[illegible]	Str.
C1	3	½" ø	23'-0"	
C2	2	½" ø	5'-0"	
C3	2	½" ø	5'-8"	
H2	16	½" ø	5'-8"	
H3	16	½" ø	4'-2"	

Mark	No	Size	Length	Bending
P1	21	½" ø	4'-0"	Str.
P2	6	½" ø	1'-6"	
P3	3	½" ø	1'-10"	
P4	3	½" ø	2'-2"	
T1	26	½" ø	11'-8"	

Mark	No	Size	Length	[illegible]	[illegible]	[illegible]	Bending
C4	15	[illegible]	4'-4"	3'-0	[illegible]	[illegible]	
A1	6	1"	24'-0"	22'-[illegible]	4	3½	
D1	5	1"	25'-[illegible]	22'-[illegible]	4	3½	
D2	7	1"	24'-11"				

Mark	No	Size	Length	Bending
H1	28	½" ø	6'-6"	
U1	15	½" ø	8'-3"	

Summary of Bar List

[illegible] 1" Bars @ [illegible] = 2383.[illegible]

633 [illegible] ½" Bars @ [illegible] = 510.[illegible]

448 [illegible] ½" Bars @ [illegible] = 299.[illegible]

[illegible] = 38.[illegible]

Total = 3230.33

COLORADO
STATE HIGHWAY DEPARTMENT
WIDENING
CONCRETE SLAB BRIDGE
TO 30'-0" CLEAR ROADWAY
Across Louden Ditch.
Sta. 1346+76.8 to 1347+00.1
Near Loveland Sec. 12 T. 5N. R. 70W.

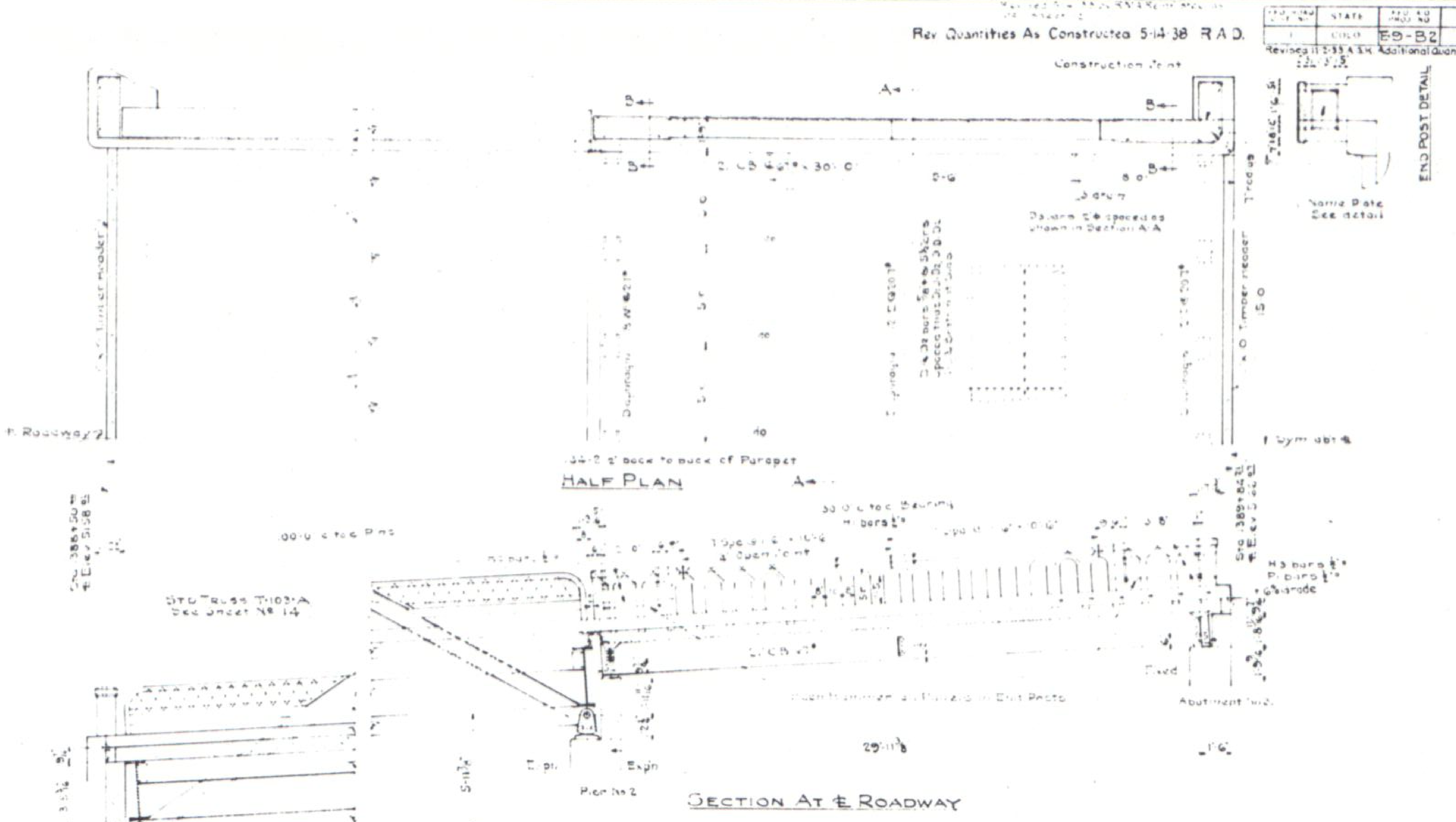
Designed by ALC Made by ALC Checked by AFH	Approved by R.L. Bailey Bridge Engineer Date: March 27th 1933.

STRUCTURE NO. C-16-R.

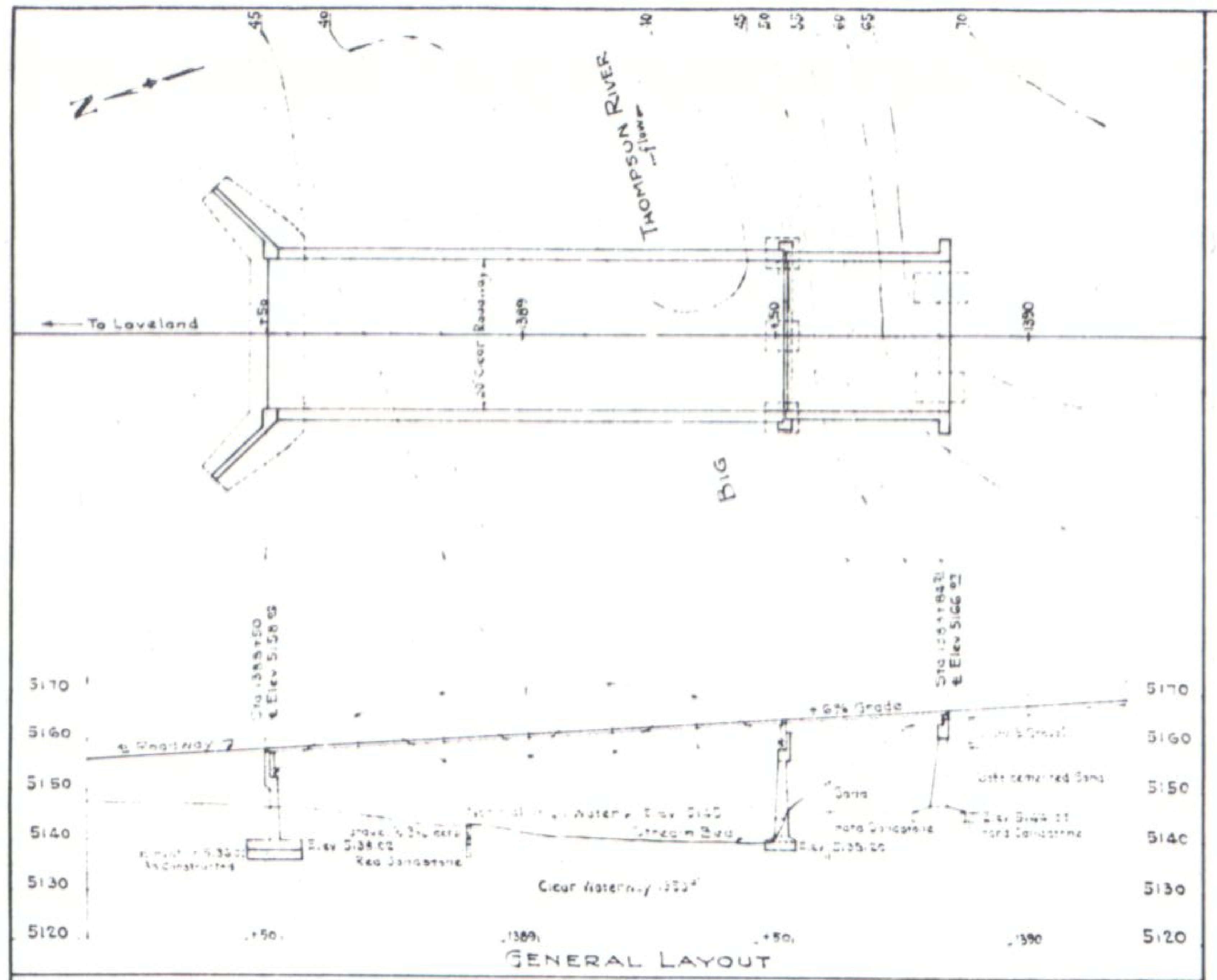
Rev Quantities As Constructed 5-14-38 R.A.D.

	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
1	COLO	E9-B2	11	

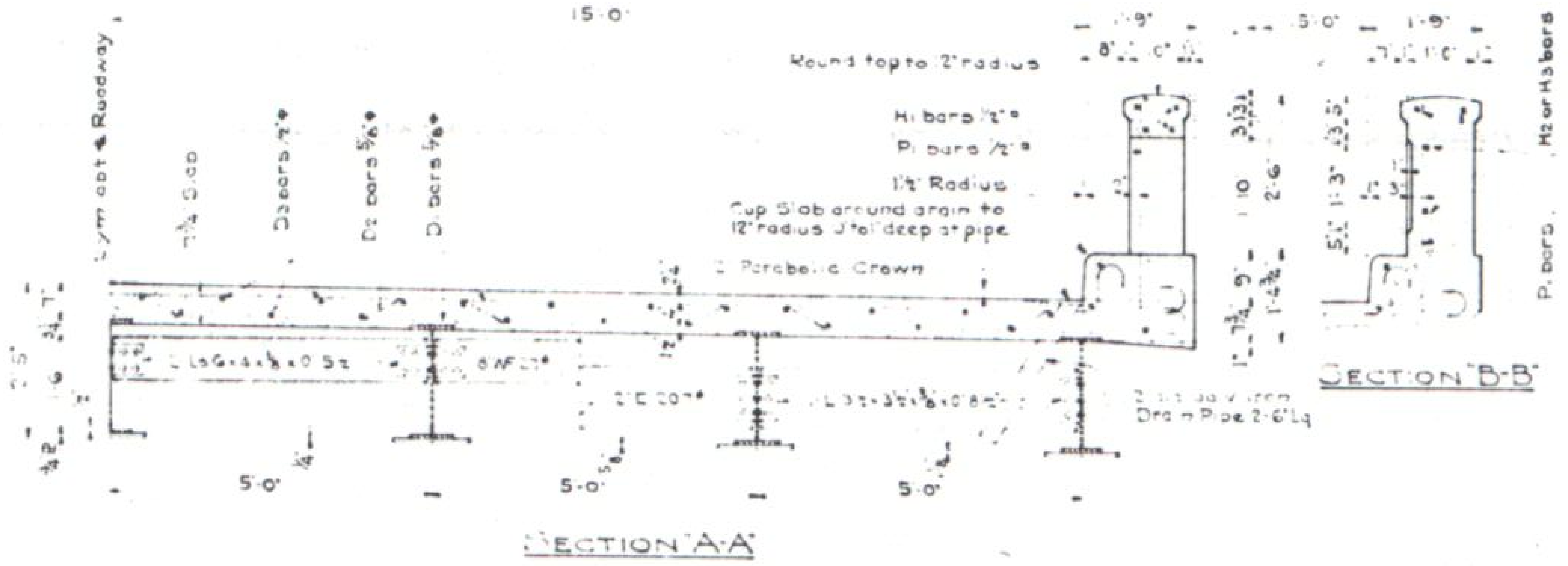
Revised 11-2-33 A.S.K. Additional Quantities Added.



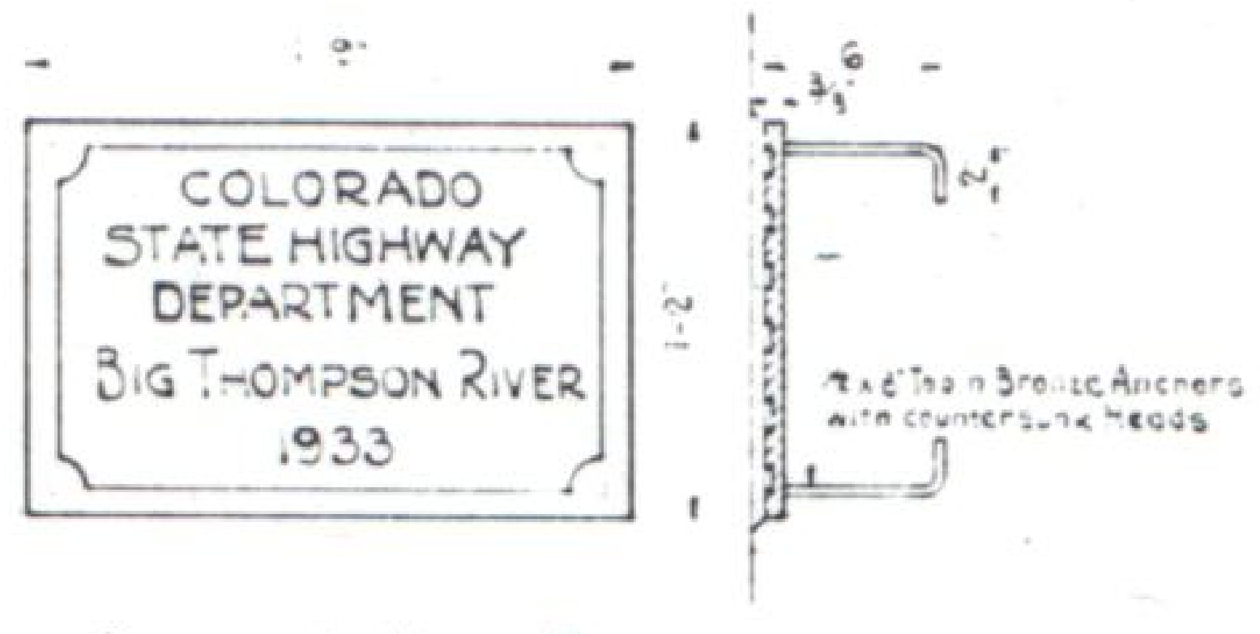
Construction Joint
END POST DETAIL
Name Plate See detail
HALF PLAN
SECTION AT ℄ ROADWAY
Std Truss T103-A See Sheet No 14
Abutment No 1
Abutment No 3
Pier No 2
Fixed
Expn
Sym abt ℄



To Loveland
THOMPSON RIVER
BIG
5170
5160
5150
5140
5130
5120
Clear Waterway
GENERAL LAYOUT

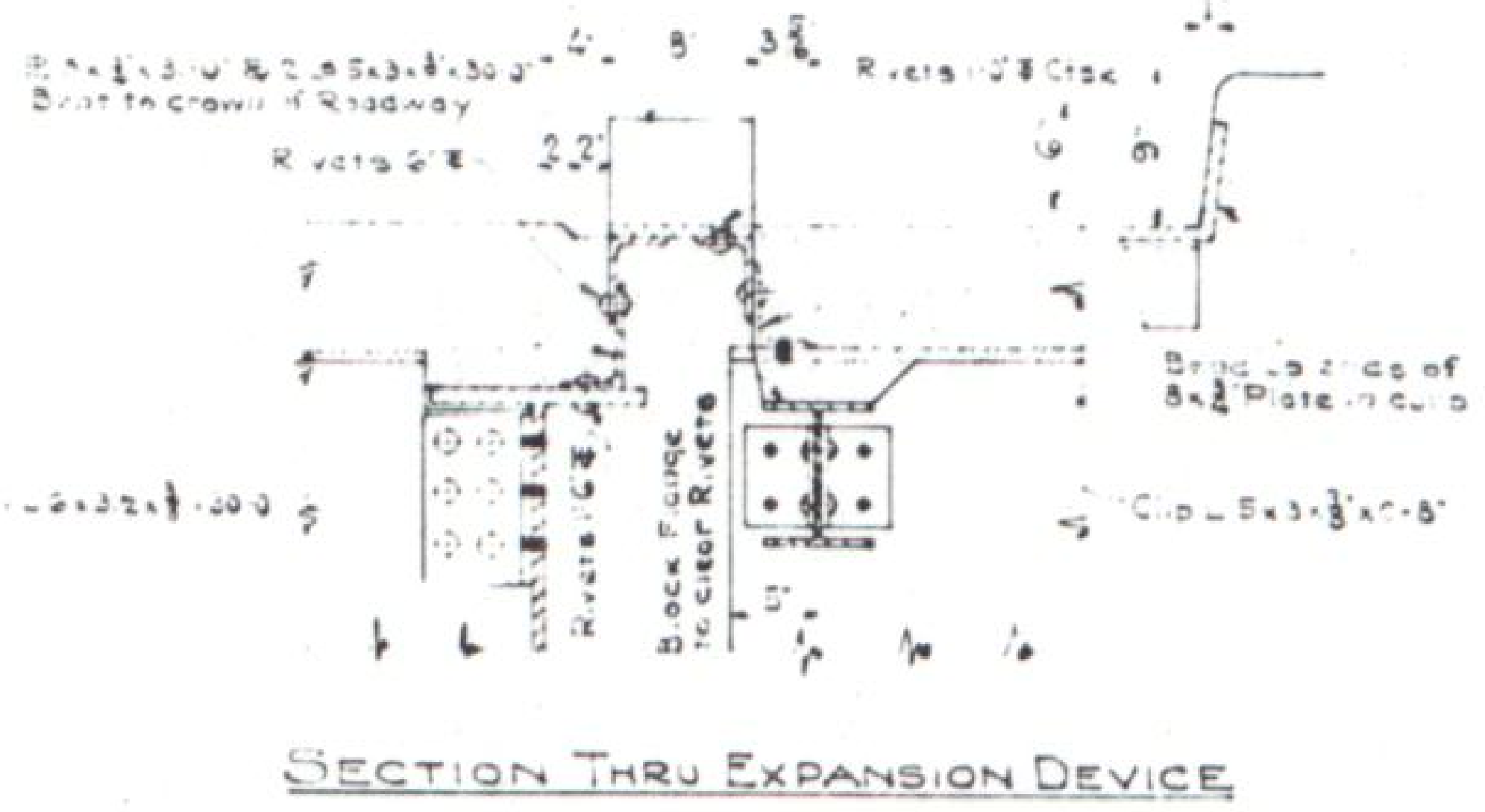


15'-0"
Round top to 2" radius
Parabolic Crown
SECTION "A-A"
SECTION "B-B"
5'-0"


COLORADO
STATE HIGHWAY
DEPARTMENT
BIG THOMPSON RIVER
1933

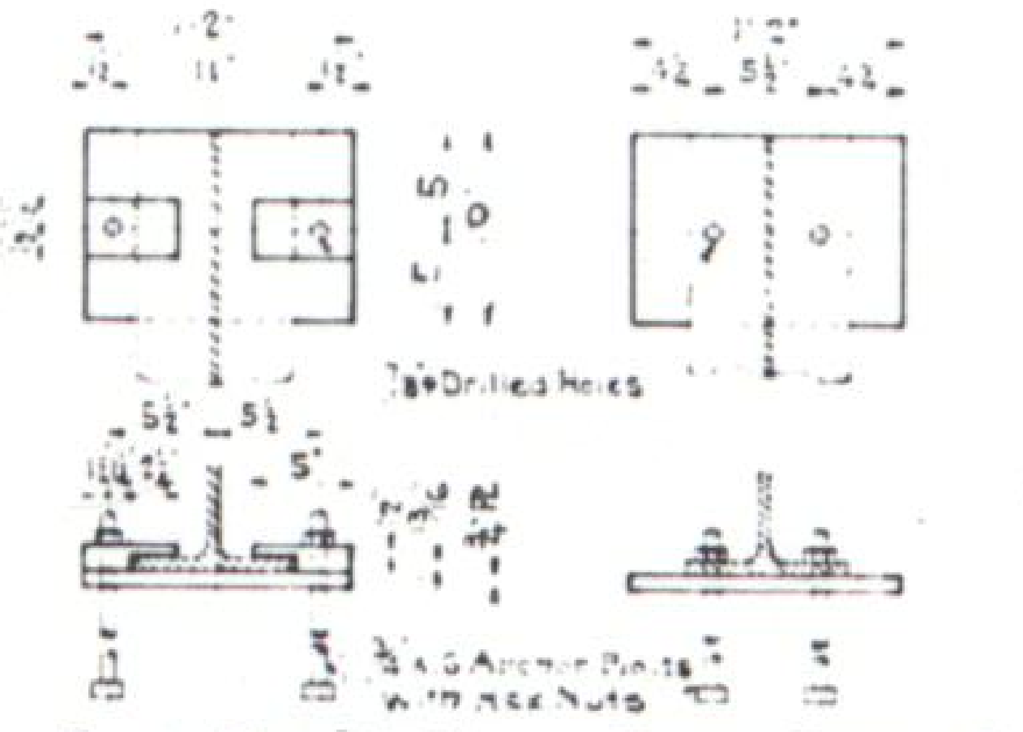
DETAIL OF NAME PLATE
2 Required

Design to be approved by Bridge Engineer. Letters and Frame to be raised. Place one Name Plate in each Right Hand End Post.



Rivets
Block Flange to clear Rivets

SECTION THRU EXPANSION DEVICE



Drilled Holes
Anchor Bolts with Hex Nuts

EXP'N END No 2 1 Req'd Complete
FIXED END No 3 1 Req'd Complete

BEARING PLATE DETAILS

SUMMARY OF QUANTITIES FOR ENTIRE BRIDGE

R.M.A.

Item	Description	Unit	100' Span Steel Truss	30' Span I-Beam	Pier No 2	Abutment No 1	Abutment No 3	Totals
14a	Dry Rock Structural Excavation	Cu Yds			373		1159	1532
14b	Dry Common "	"			71	1536	819	2426
14c	Wet Rock "	"			271	548		819
14d	Wet Common "					1263		1263
42a	Untreated Bridge Timber	M ft bm				0.50	0.50	[illegible]
46a	Class 'A' Concrete	Cu Yds	82.0	33.0	32.6	112.0	29.4	289
41	Reinforcing Steel (Overrun included)	Lbs	14910	5650	4195	6540	4920	190.9★
45	Structural Steel (")	Lbs	143186	[illegible]				162700
4	Bronze Name Plates	Each				1	1	2
89a	3" dia Galv Iron Drain Pipes (3"x2'-6")	Each		4				4
89b	3" dia Galv Iron Drain Pipes (3"x4'-8")	Each	12					12

● Wet Line As Shown on Field Plans
★ Scale Weight

ADDITIONAL QUANTITIES - WORK ORDER No 3168

Item	Description	Unit		
14b	Dry Common Struct'l Excavation	Cu Yds		
46a	Class 'A' Concrete	Cu Yds	49.2	49.2

BAR LIST FOR 30 FT APPROACH SPAN

Mark	Req'd	Size	Length	Bending Diagram
H1	16	½"ø	10'-2"	
H2	8	½"ø	4'-0"	
H3	5	½"ø	4'-9"	
D3	4	½"ø	3'-3"	
D2	13	⅞"ø	34'-5"	Sym abt ℄
D1	92	⅝"ø	34'-5"	32'-9"
P1	40	½"ø	7'-6"	

1500 Lin Ft of ½"ø bars @ .6678 Lbs per lin ft	=	1002	Lbs
548 ½"ø @ 0.850	=	466	"
3958 ⅝"ø @ 1.043	=	4129	"
Plus 1% for Overrun	=	53	"
Total	=	5650	"

GENERAL NOTES

All work shall be done according to the standard specifications of the Colorado State Highway Department.
All concrete shall be Class A.
All exposed surfaces shall be rubbed free of form marks.
All exposed corners except on handrail shall be beveled to a [illegible] face.
[illegible] slab and curb shall be poured monolithically.
All construction joints shall be thoroughly cleaned before fresh concrete is poured.
Footings in rock shall be poured [illegible] to the rock and not formed.
[illegible] designed for a [illegible] concrete wearing surface.
All reinforcing bars shall be round or square, plain or deformed as shown and noted.
All reinforcing bars shall be tagged with the station number and letter designation.
[illegible] bars when spliced shall be given a lap of [illegible] diameters.
Main bars shall not be spliced.
[illegible] and depth of footings shown are according to the best available data. If essentially different conditions are encountered the bridge engineer will [illegible] and determine if revision is necessary.
Maximum soil pressure 3000 Lbs per sq ft.
[illegible]

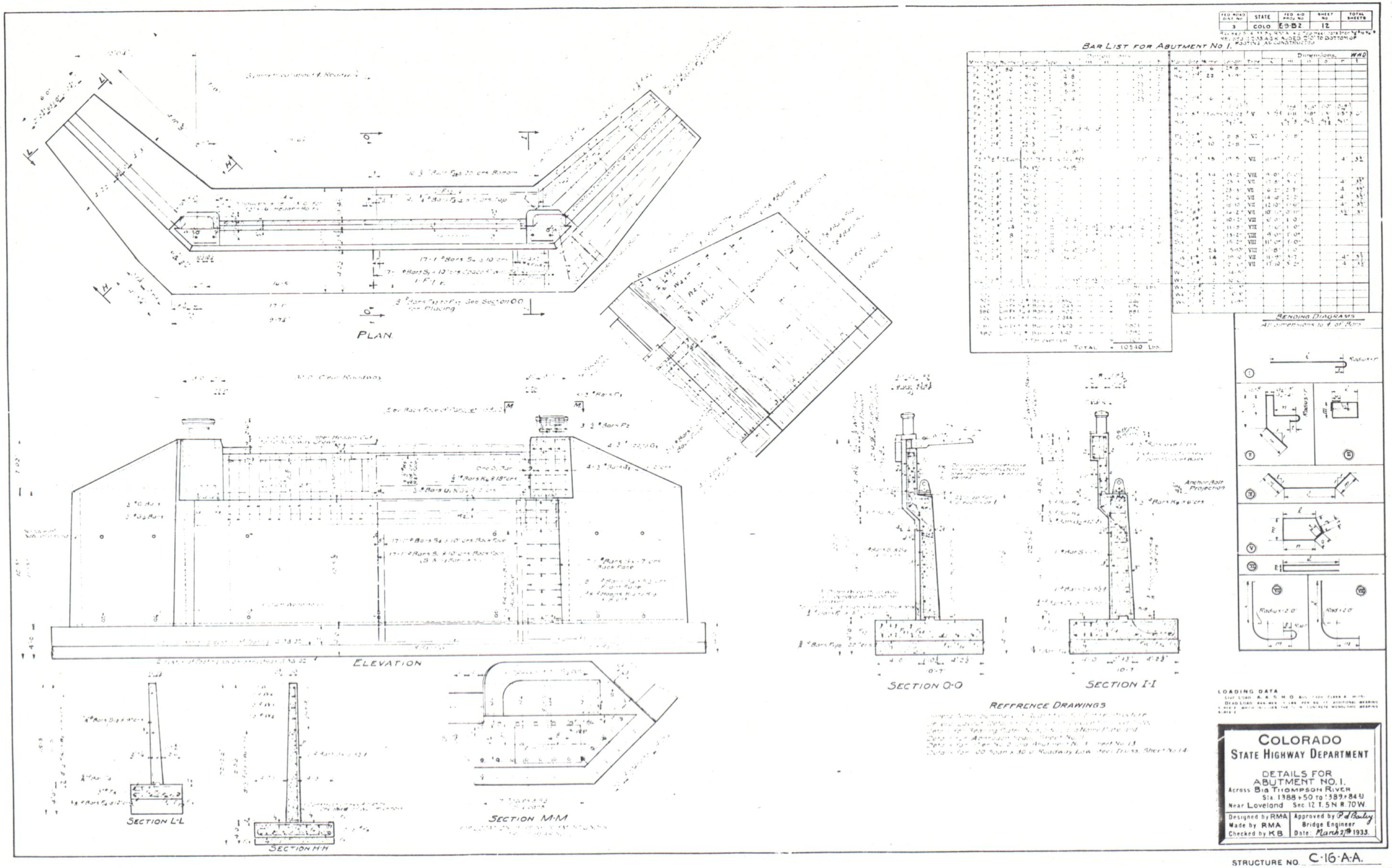
Reference Drawings
Sheet No 12 Details for Abutment No 1
Sheet No 13 Details for Pier No 2 & Abutment No 3
Sheet No 14 Details for 100' Span Low Steel Truss

COLORADO
STATE HIGHWAY DEPARTMENT
GENERAL LAYOUT & DETAILS OF SUPERSTRUCTURE FOR BRIDGE
Across Big Thompson River
Sta 1388+50 to 1389+84.21
Near Loveland Sec. 2 T. 5N. R. 70 W.

Designed by N.N.D. Made by N.N.D. Checked by R.M.A.	Approved by P.A. Bailey Bridge Engineer Date March 27th 1933

STRUCTURE NO C-16-AA

FED ROAD DIST NO	STATE	FED AID PROJ NO	SHEET NO	TOTAL SHEETS
3	COLO.	E9-B2	12	


PLAN
ELEVATION
SECTION L-L
SECTION H-H
SECTION M-M
SECTION O-O
SECTION I-I
BAR LIST FOR ABUTMENT NO 1.
Dimensions.
TOTAL 10540 Lbs.
BENDING DIAGRAMS
Radius 2.0
Rad 2.0
Anchor Bolt Projection
10-7
4'-2½"

REFFRENCE DRAWINGS

LOADING DATA

COLORADO
STATE HIGHWAY DEPARTMENT

DETAILS FOR
ABUTMENT NO. 1.
Across Big Thompson River
Sta. 1388+50 to 1389+84.3
Near Loveland Sec. 12 T. 5 N R. 70 W.

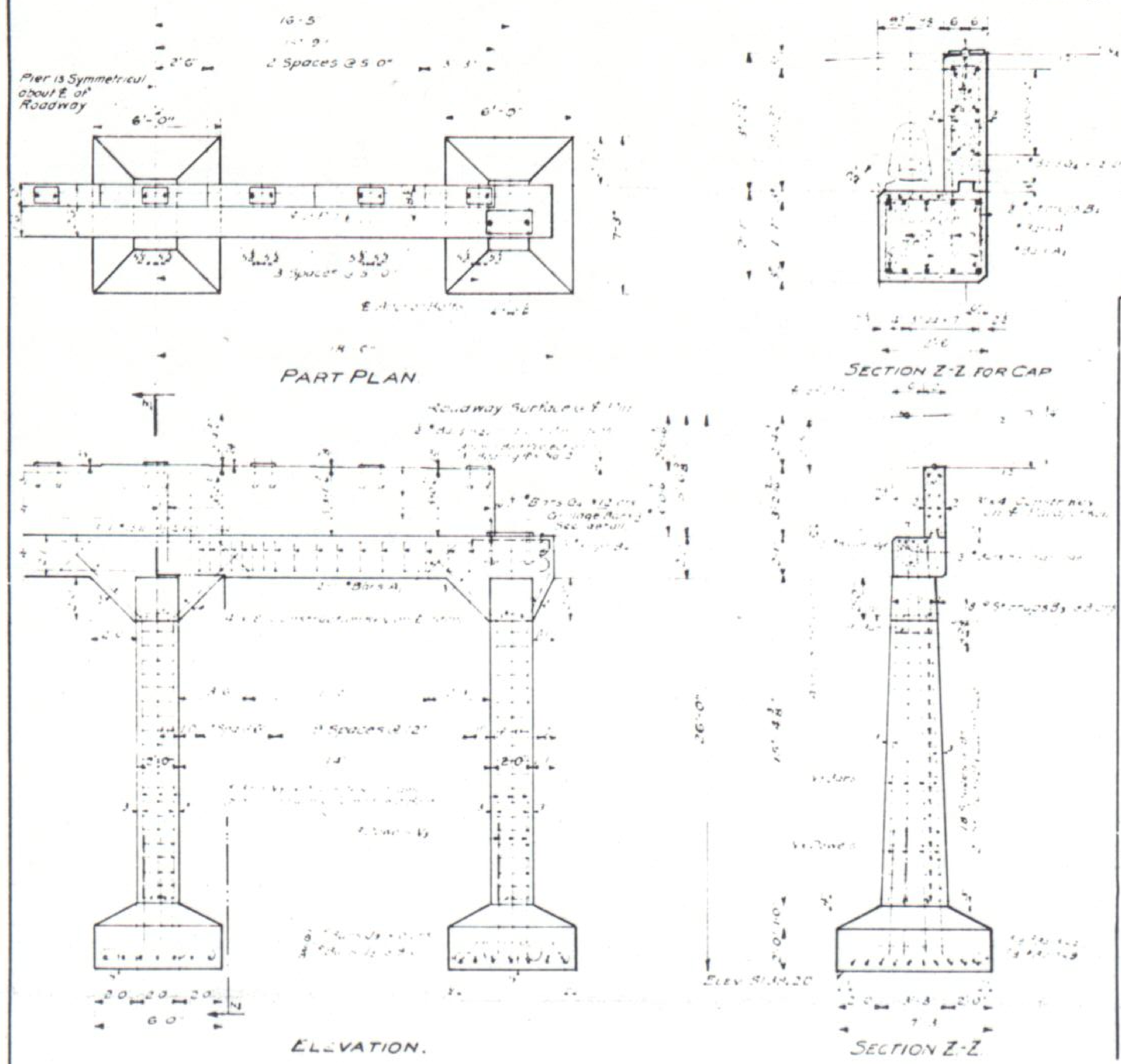
Designed by RMA
Made by RMA
Checked by KB

Approved by P. L. Bailey
Bridge Engineer
Date: March 27th 1933.

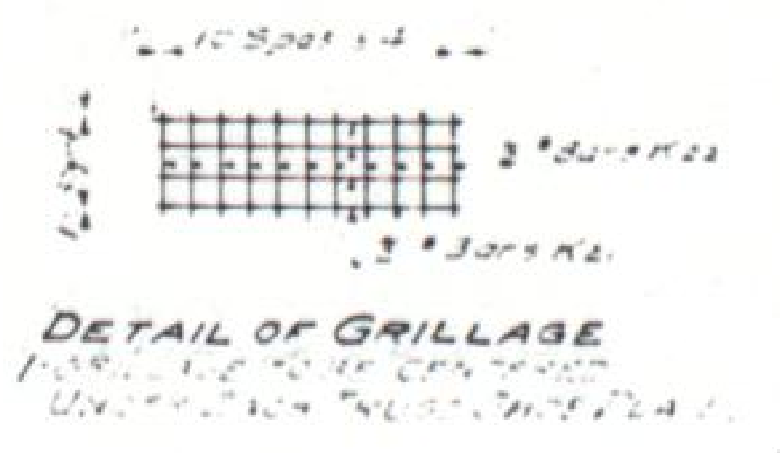
STRUCTURE NO. C-16-A-A.

FED ROAD DIST NO	STATE	FED AID PROJ NO	SHEET NO	TOTAL SHEETS
3	COLO	E982	13	

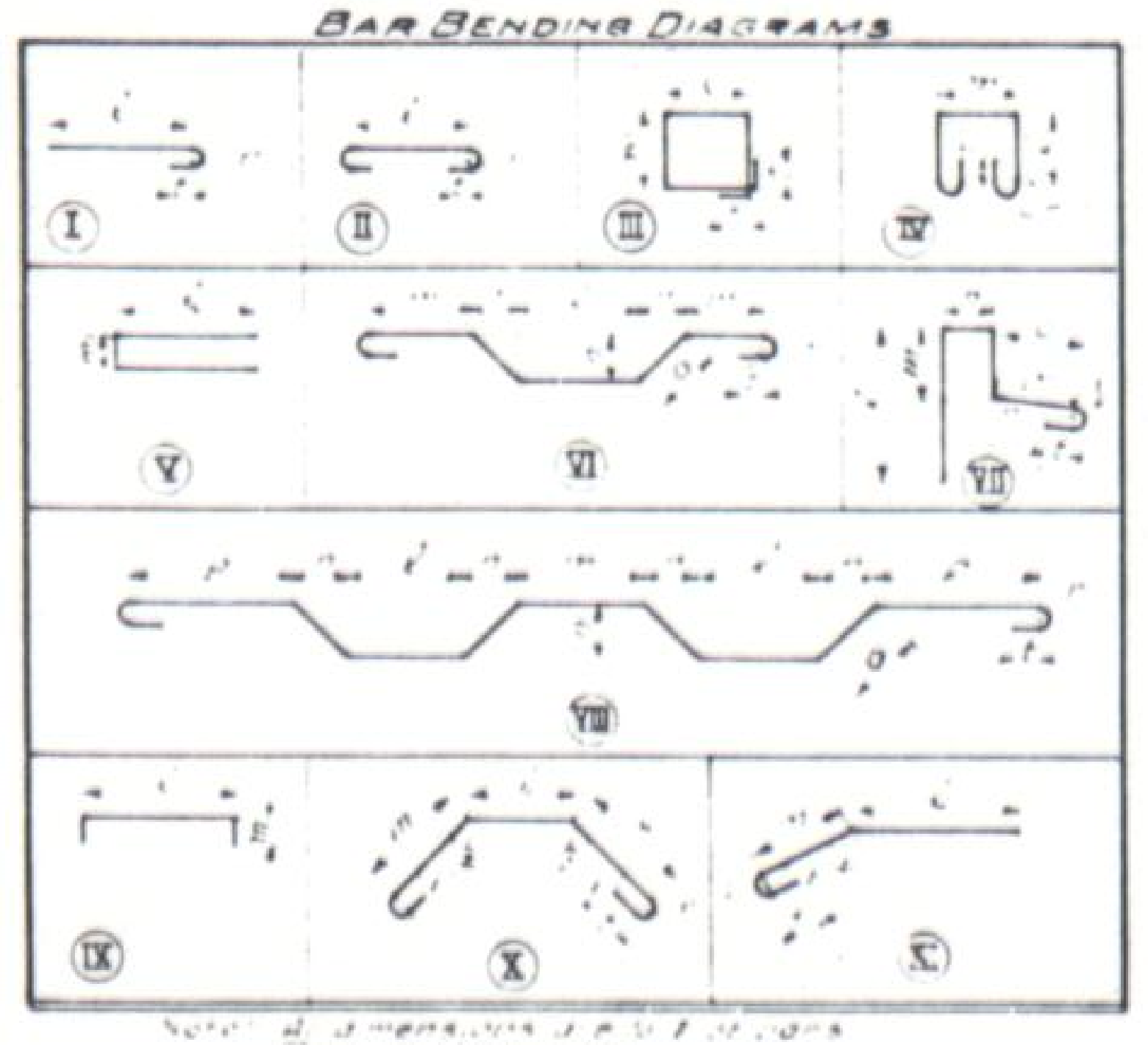
PIER No. 2 DETAILS



Pier is Symmetrical about ℄ of Roadway
2 Spaces @ 5-0"
6'-0"
PART PLAN
SECTION Z-Z FOR CAP
Roadway Surface
ELEVATION.
SECTION Z-Z
6'-0"


DETAIL OF GRILLAGE

BAR BENDING DIAGRAMS



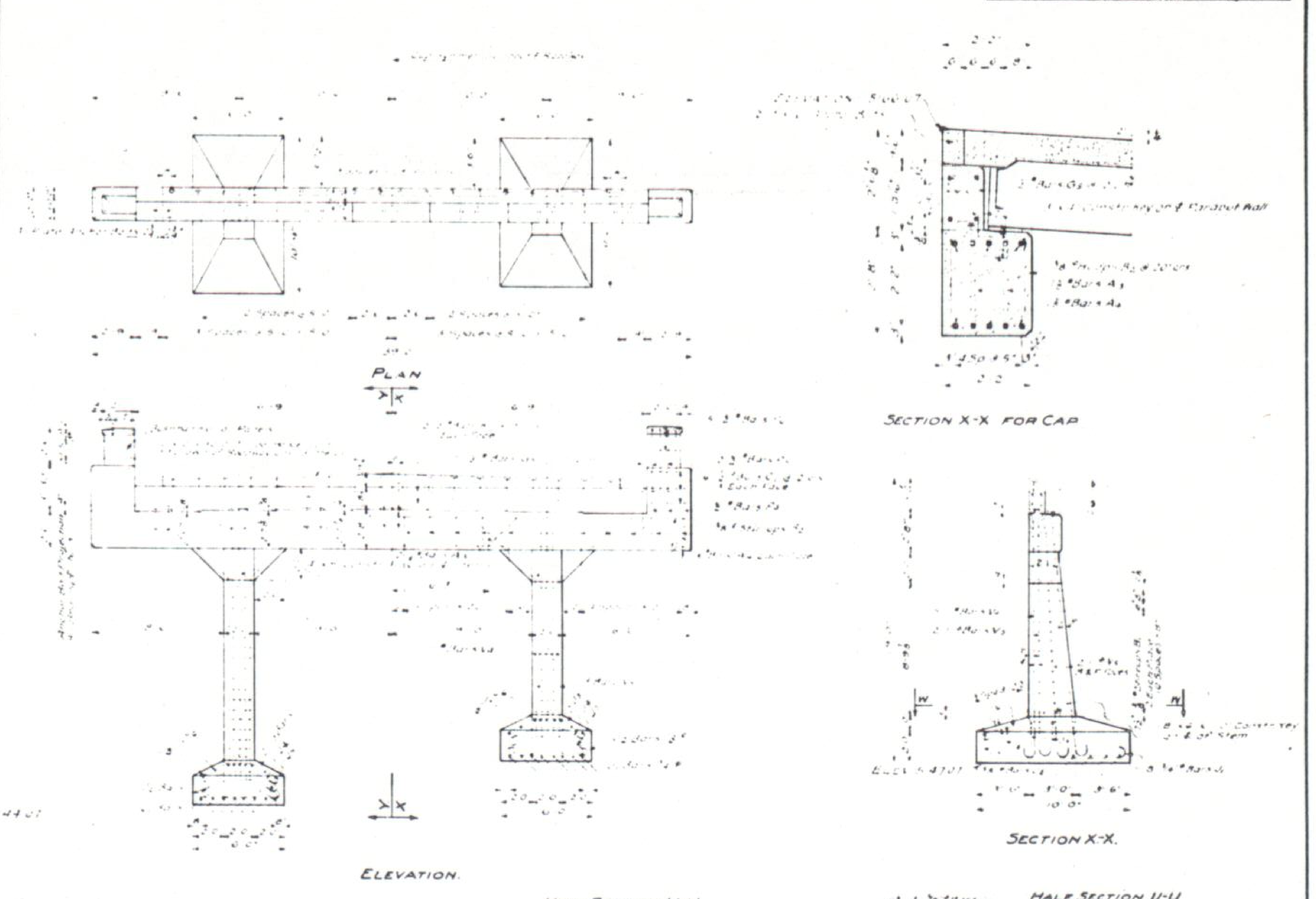
I
II
III
IV
V
VI
VII
VIII
IX
X
XI

BAR LIST FOR PIER No 2

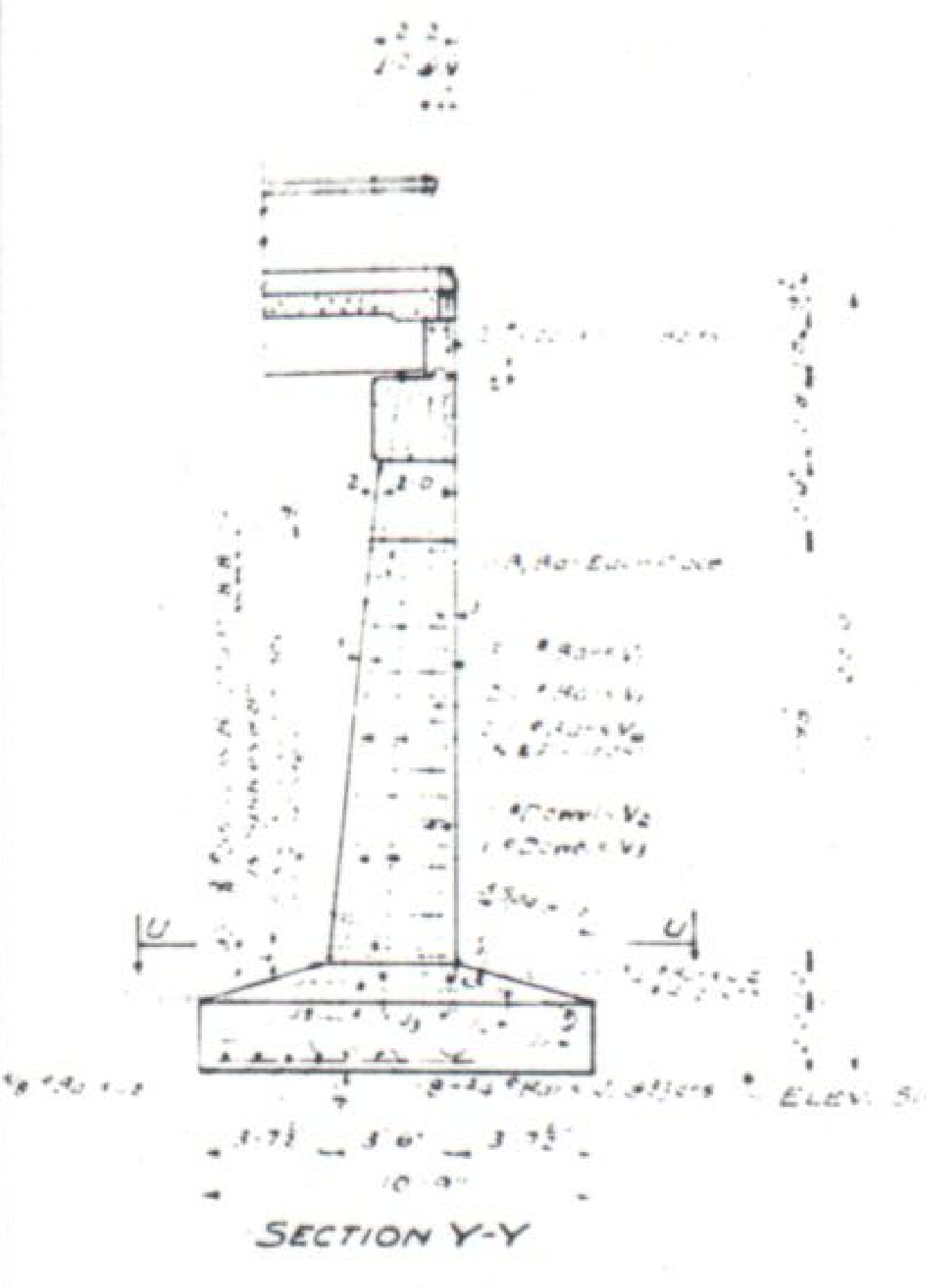
MARK	SIZE	NUMBER	LENGTH	TYPE				
A1	1"●	2	40-0	VIII	8-2	[illegible]	[illegible]	[illegible]
A2	1"●	6	39-0	II	[illegible]		[illegible]	[illegible]
B3	3/8●	17	[illegible]	X	[illegible]	[illegible]	[illegible]	
B4	1/2●	30	5-0	III	2-2½	1-3½		6
G4	1/2●	32	[illegible]	IX	[illegible]	0-8	2	2
J2	5/8●	40	6-7	II	4-11		2½	2
J3	5/8●	21	7-10	II	6-2		2½	2
K20	1/2●	6	31-0	—				
K21	1/2●	8	4-6	IX	3-0			
K22	1/2●	22	2-6	II	1-2		2	2
V3	1"●	30	7-9	I	6-5		4	[illegible]
V7	1"●	30	17-0	—	Field Bend			

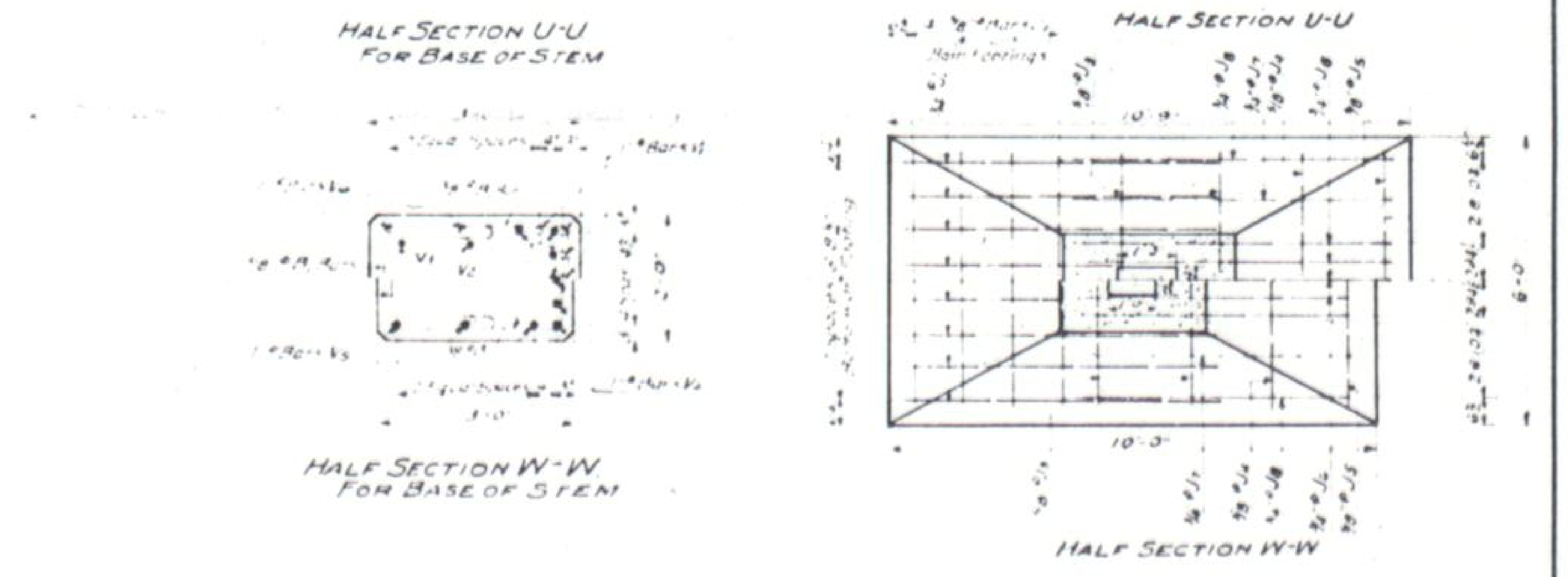
[illegible] Lin Ft 1"● Bars @ 3.40 Lbs per ft = [illegible] Lbs
[illegible] Lin Ft [illegible] Bars @ 2.67 " " " = [illegible] "
[illegible] Lin Ft 5/8● Bars @ 1.04 " " " = [illegible] "
[illegible] Lin Ft 1/2● Bars @ 0.668 " " " = [illegible] "
[illegible] Lin Ft 3/8● Bars @ 0.376 " " " = [illegible] "
[illegible] % for Overrun = [illegible] "
TOTAL = [illegible] Lbs

ABUTMENT No 3 DETAILS



PLAN
SECTION X-X FOR CAP
ELEVATION.
SECTION X-X.





HALF SECTION U-U FOR BASE OF STEM
HALF SECTION W-W FOR BASE OF STEM
HALF SECTION U-U
HALF SECTION W-W
10'-0"
6'-0"

BAR LIST FOR ABUTMENT No 3.

MARK	SIZE	NUMBER	LENGTH	TYPE					
A3	1⅛●	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	4½	4
A4	1⅛●	[illegible]	[illegible]	[illegible]	[illegible]			4½	4
B1	3/8●	53	5-8½	V	1-6½	[illegible]		1½	
B2	3/8●	20	9-2	II	2-3½	[illegible]			6
C1	1/2●	12	2-5	—					
G5	1/2●	32	7-4½	VII	3-5	[illegible]	[illegible]	[illegible]	[illegible]
J1	3/4●	6	7-3	[illegible]	6-3			3	[illegible]
J2	5/8●	9	6-7	II	4-11			2½	2
J3	5/8●	4	7-6	X	1-10	2-0		[illegible]	
J4	5/8●	[illegible]	7-0	X	3-7	3-10½		2½	[illegible]
J5	5/8●	2	6-7	X	4-11			2½	[illegible]
J6	3/4●	10	7-4½	XI	3-2	3-2½		3	[illegible]
J7	3/4●	4	7-6	XI	[illegible]	[illegible]		[illegible]	[illegible]
J8	3/4●	4	7-3	I	6-3			3	[illegible]
K5	1/2●	4	29-6	—					
P4	1/2●	6	11-0	V	5-0	1-10			
P5	1/2●	4	7-6	V	3-5	0-8			
P6	1/2●	10	1-2	—					
V1	1"●	7	6-0	—	Field Bend				
V2	1"●	7	[illegible]	I	[illegible]			4	[illegible]
V3	1"●	4	[illegible]	I	[illegible]			4	[illegible]
V4	1"●	5	[illegible]	I	[illegible]			4	[illegible]
V5	1"●	6	[illegible]	I	[illegible]				[illegible]
V6	1"●	4	[illegible]	—	Field Bend				

[illegible]
TOTAL = 3920 Lbs

[illegible]

LOADING DATA.
LIVE LOAD: A.A.S.H.O. AUG. 1929 CLASS A H-15.
DEAD LOAD: ASSUMES 15 LBS. PER SQ. FT. ADDITIONAL WEARING SURFACE WHICH INCLUDES THE ½ IN. CONCRETE MONOLITHIC WEARING SURFACE.

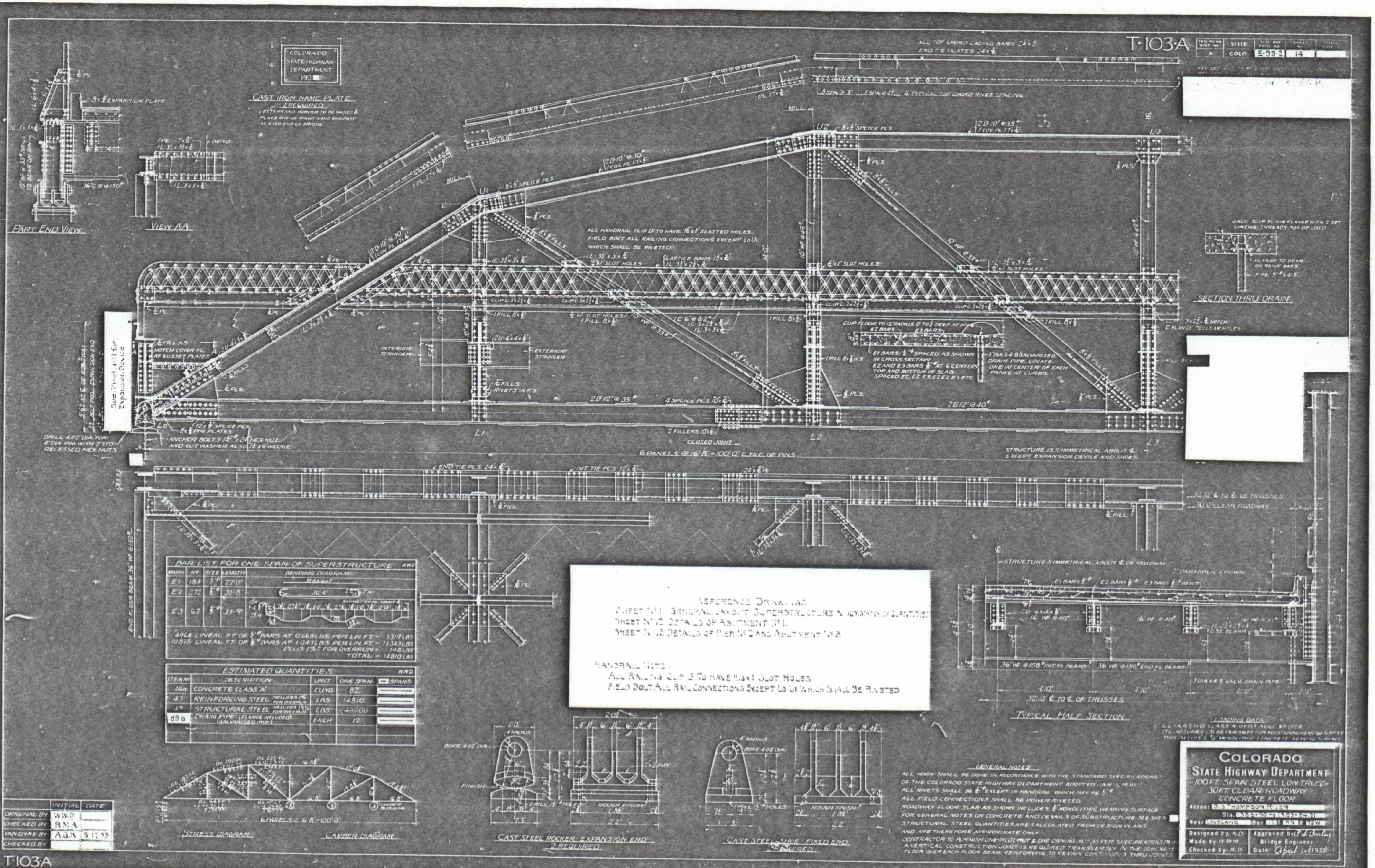
COLORADO
STATE HIGHWAY DEPARTMENT
DETAILS FOR PIER NO 2 AND
ABUTMENT NO. 3.

Across Big Thompson River
Sta. 1389+50 To 1389+84.21
Near Loveland Sec.12 T.5N R.70W.

Designed by RMA	Approved by P. J. Bailey
Made by RMA	Bridge Engineer
Checked by KB	Date: March 27th 1933

STRUCTURE NO. C-16-A-A.

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
3	COLO	E-93-2	14	


COLORADO STATE HIGHWAY DEPARTMENT 193
CAST IRON NAME PLATE
2 REQUIRED
PART END VIEW
VIEW AA
ALL TOP CHORD LACING BARS 2¼x¼
END TIE PLATES 24x¼
TYPICAL TOP CHORD RIVET SPACING
U1
U2
U3
L0
L1
L2
L3
MILL
8x¼ SPLICE PLS
2 [10" @ 30# 1 COV. PL. 17x¼
2 [10" @ 35# 1 COV. PL. 17x¼
LATTICE BARS 1½x¼
CLIP L 3x2½x¼
¼ PLS
¼ FILLS
INTERIOR STRINGER
EXTERIOR STRINGER
2 [12" @ 35#
2 [12" @ 40#
4 SPLICE PLS
2 FILLERS
CLOSED JOINT
6 PANELS @ 16'-8" = 100'-0" C. TO C. OF PINS
STRUCTURE IS SYMMETRICAL ABOUT ℄ EXCEPT EXPANSION DEVICE AND SHOES
See Sheet # 11 for Expansion Device
DRILL 4.02" DIA. FOR 4" DIA. PIN WITH 2 STD. RECESSED HEX NUTS
ANCHOR BOLTS 1½x24 HEX NUT AND CUT WASHER ALSO 1½x6 WEDGE
CUP FLOOR TO 12" RADIUS 0 TO 2" DEEP AT PIPE
E1 BARS ½" SPACED AS SHOWN IN CROSS SECTION
E2 AND E3 BARS ⅝" AT 6" CENTERS TOP AND BOTTOM OF SLAB
SPACED E2, E2, E3, E2, E2, E3 ETC.
3" DIA. x 4'-8 GALVANIZED DRAIN PIPE. LOCATE ONE AT CENTER OF EACH PANEL AT CURBS
SECTION THRU DRAIN
END FLOOR BEAM 36" WF @ 150#
END TIE PLS 24x¼
INT. TIE PLS 12x¼
32'-10" ℄ TO ℄ OF TRUSSES
30'-0" CLEAR ROADWAY
STRUCTURE SYMMETRICAL ABOUT ℄ OF ROADWAY
PARABOLIC CROWN
E1 BARS ½"
E2 BARS ⅝"
E3 BARS ⅝" BENT
16" WF @ 40#
36" WF @ 158# INT. FL. BEAMS
36" WF @ 150# END FL. BEAMS
TYPICAL HALF SECTION
STRESS DIAGRAM
CAMBER DIAGRAM
6 PANELS @ 16'-8" = 100'-0"
CAST STEEL ROCKER EXPANSION END
2 REQUIRED
CAST STEEL SHOE FIXED END
2 REQUIRED
4" RADIUS
BORE 4.02" DIA.
FINISH
ROUGH FINISH
DRILL 1¼" HOLES

ALL HANDRAIL CLIP L'S TO HAVE 13/16x1" SLOTTED HOLES
FIELD BOLT ALL RAILING CONNECTIONS EXCEPT L0U1 WHICH SHALL BE RIVETED

BAR LIST FOR ONE SPAN OF SUPERSTRUCTURE W.W.D.

MARK	NO.	SIZE	LENGTH	BENDING DIAGRAM
E1	184	½"ɸ	27'-0"	STRAIGHT
E2	272	⅝"ɸ	31'-8"	30'-4"
E3	67	⅝"ɸ	33'-9"	SYMMETRICAL ABOUT ℄

4968 LINEAL FT. OF ½"ɸ BARS AT 0.668 LBS. PER LIN. FT. = 3319 LBS.
10815 LINEAL FT. OF ⅝"ɸ BARS AT 1.043 LBS. PER LIN. FT. = 11343 LBS.
PLUS 1% FOR OVERRUN = 148 LBS.
TOTAL = 14810 LBS.

ESTIMATED QUANTITIES W.W.D.

ITEM NO.	DESCRIPTION	UNIT	ONE SPAN	SPANS
46a	CONCRETE CLASS "A"	CU. YD.	82	
47	REINFORCING STEEL INCLUDES 1% FOR OVERRUN	LBS.	14810	
49	STRUCTURAL STEEL INCLUDES 1% FOR OVERRUN	LBS.	44000	
89b	DRAIN PIPE (FLANGE INCLUDED) (GALVANIZED IRON)	EACH	12	

REFERENCE DRAWINGS
SHEET NO. 11 GENERAL LAYOUT, SUPERSTRUCTURE & SUMMARY OF QUANTITIES
SHEET NO. 12 DETAILS OF ABUTMENT NO. 1
SHEET NO. 13 DETAILS OF PIER NO. 2 AND ABUTMENT NO. 3

HANDRAIL NOTES:
ALL RAILING CLIP L'S TO HAVE 13/16x1 SLOT HOLES
FIELD BOLT ALL RAIL CONNECTIONS EXCEPT L0 U1 WHICH SHALL BE RIVETED

LOADING DATA
L.L. A.A.S.H.O. CLASS A-15 (H-15) AUG. 1ST 1928
D.L. ASSUMES 25 LBS. PER SQ. FT. FOR ADDITIONAL WEARING SURFACE
THIS INCLUDES ½" MONOLITHIC CONCRETE WEARING SURFACE

GENERAL NOTES
ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS OF THE COLORADO STATE HIGHWAY DEPARTMENT ADOPTED JAN. 1, 1930.
ALL RIVETS SHALL BE ⅞"ɸ EXCEPT IN HANDRAIL WHICH MAY BE ⅝"ɸ
ALL FIELD CONNECTIONS SHALL BE POWER RIVETED.
ROADWAY FLOOR SLAB AS SHOWN INCLUDES ½" MONOLITHIC WEARING SURFACE
FOR GENERAL NOTES ON CONCRETE AND DETAILS OF SUBSTRUCTURE SEE SHT. N
STRUCTURAL STEEL QUANTITIES ARE CALCULATED FROM DESIGN PLANS AND ARE THEREFORE APPROXIMATE ONLY.
CONTRACTOR TO FURNISH ONE PILOT NUT & ONE DRIVING NUT AS PER SPECIFICATIONS
A VERTICAL CONSTRUCTION JOINT IS REQUIRED TRANSVERSELY IN THE CONCRETE FLOOR OVER EACH FLOOR BEAM. REINFORCING TO REMAIN CONTINUOUS THRU JOINTS.

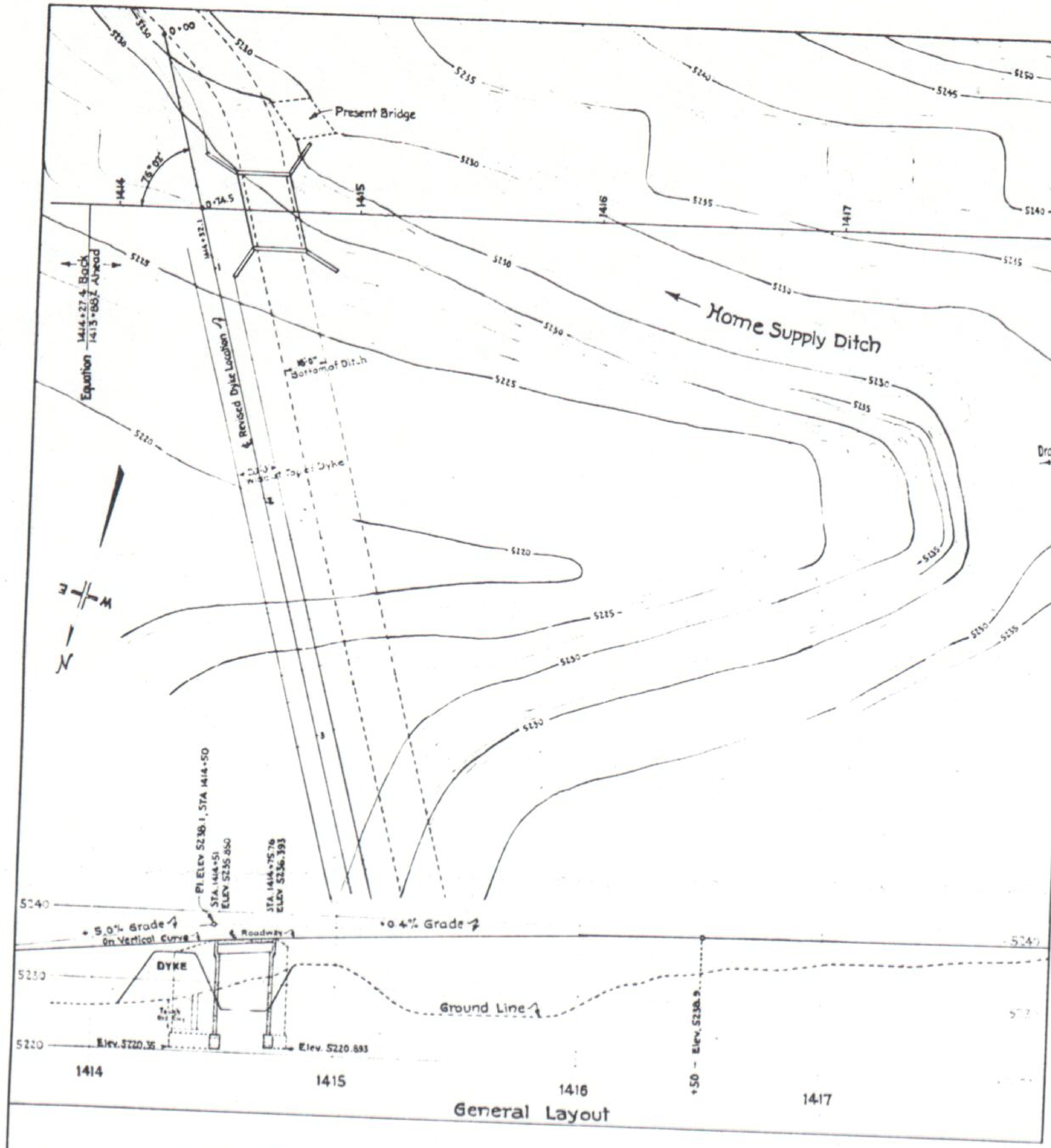
	INITIAL	DATE
ORIGINAL BY	W.W.D.	
CHECKED BY	R.M.A.	
VANDYKE BY	A.G.K.	5-17-33
CHECKED BY		

COLORADO
STATE HIGHWAY DEPARTMENT
100 FT. SPAN STEEL LOW TRUSS
30 FT. CLEAR ROADWAY
CONCRETE FLOOR
Across B.G. THOMPSON RIVER
Sta.
Near LOVELAND Sec. 12 T. 5 N R. 70 W
Designed by K.B. Approved by P. L. Bailey
Made by W.W.M. Bridge Engineer
Checked by K.B. Date: April 1st 1933

STRUCTURE NO. C-16-AA

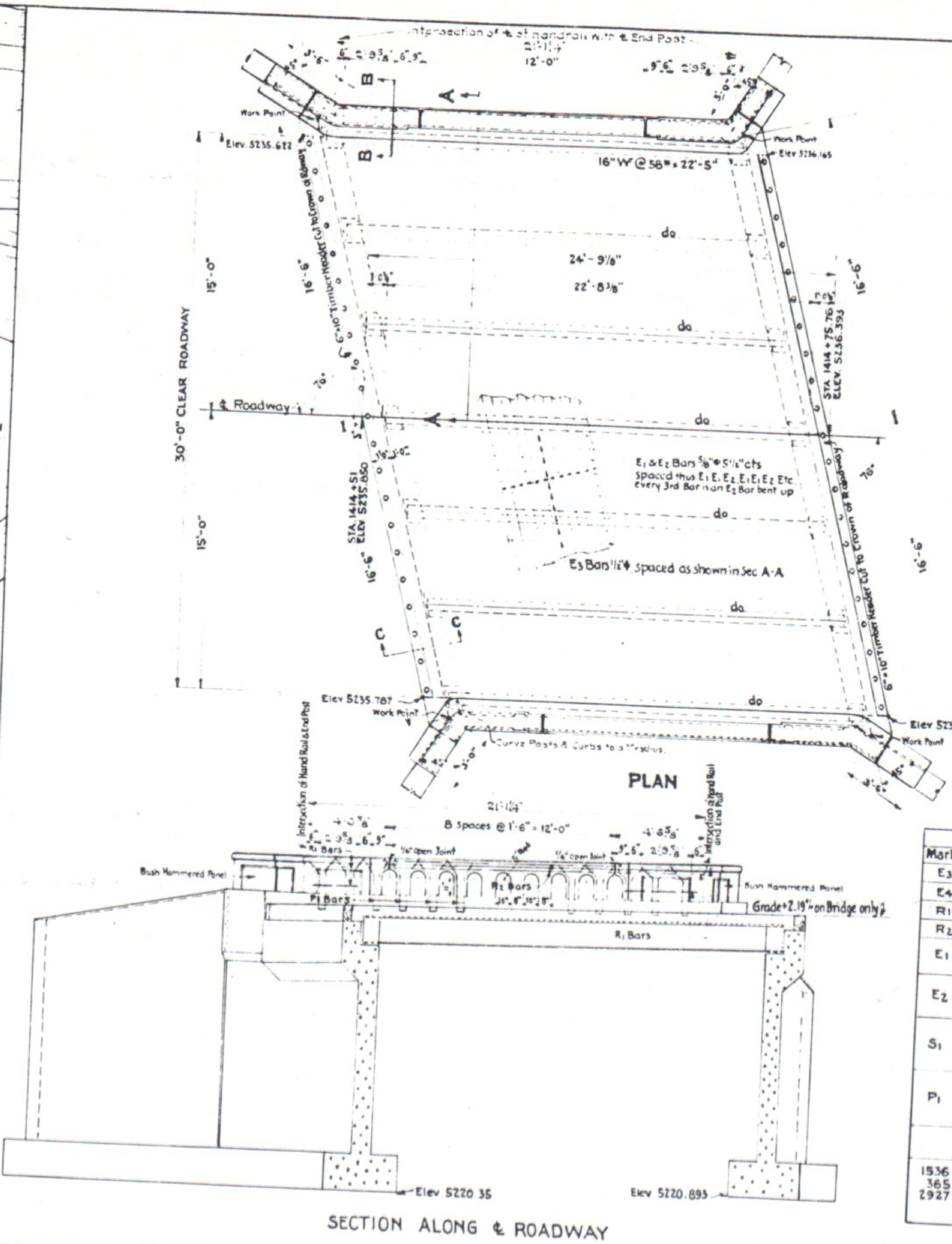
FED ROAD DIST NO	STATE	FED AID PROJ NO	SHEET NO	TOTAL SHEETS
3	COLO.	E-9-B2	15	

Revised Quantities As Constructed. 5-14-38 R.A.D.



Equation 1414+27.4 Back 1413+88.2 Ahead
Present Bridge
Revised Dyke Location
Home Supply Ditch
Bottom of Ditch
Top of Dyke
Draw
1414
1415
1416
1417
P.I. Elev 5238.1, STA 1414+50
STA 1414+51 ELEV 5235.850
STA 1414+75.76 ELEV 5236.393
+5.0% Grade on Vertical Curve
+0.4% Grade
Roadway
DYKE
Ground Line
Elev. 5220.36
Elev. 5220.893
+50 - Elev. 5238.9
5240
5230
5220

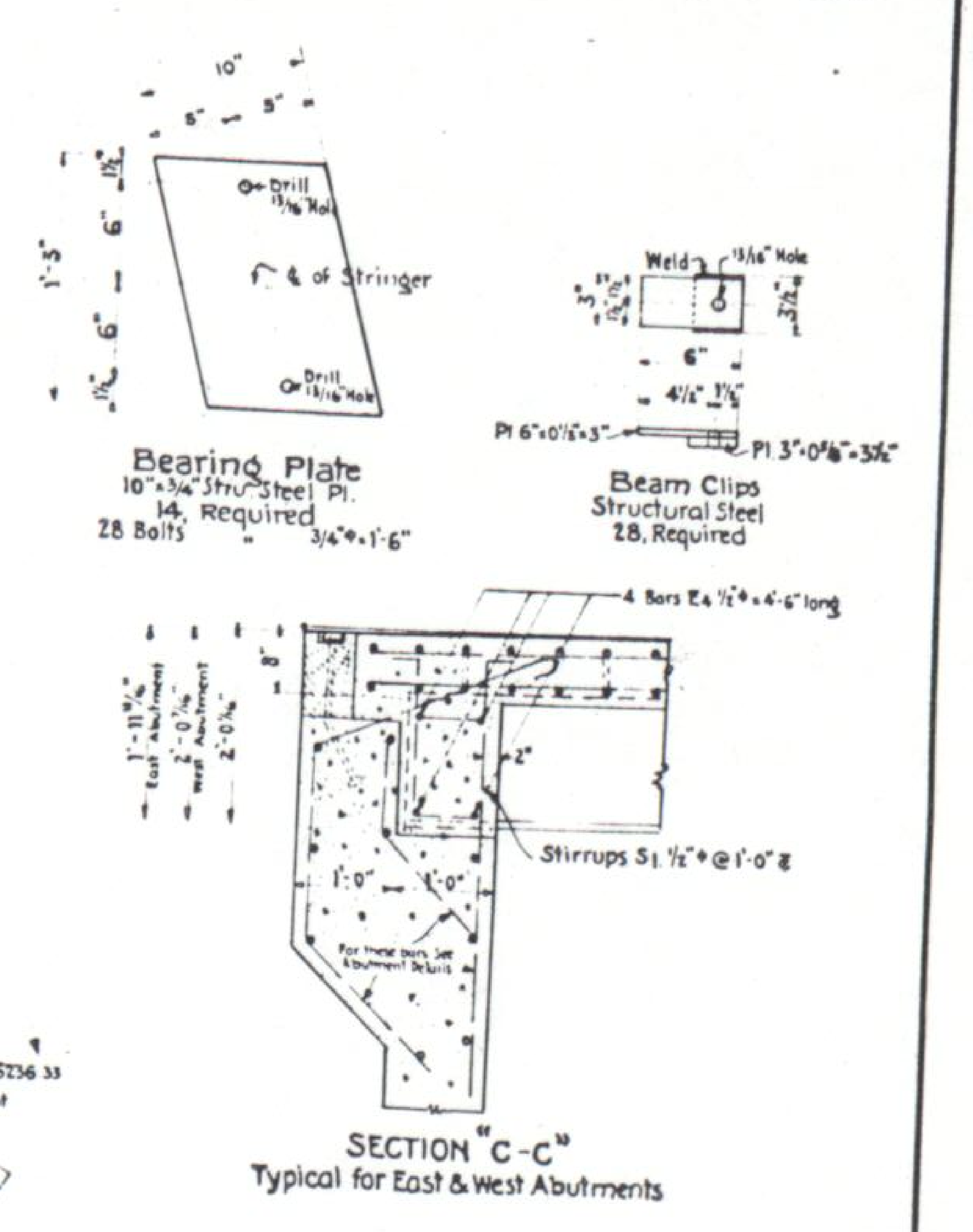
General Layout



Intersection of ¢ of Handrail with ¢ End Post
12'-0"
16"W @ 58# x 22'-5"
Work Point
Elev. 5236.672
Elev. 5236.165
30'-0" CLEAR ROADWAY
15'-0"
16'-6"
24'-9⅞"
22'-8⅜"
do
¢ Roadway
STA. 1414+51 ELEV 5235.850
STA 1414+75.76 ELEV 5236.393
6"×10" Timber Header Cut to Crown of Roadway
E1 & E2 Bars ⅝"φ 5¼" cts Spaced thus E1 E1 E2 E1 E1 E2 Etc Every 3rd Bar is an E2 Bar bent up
E3 Bars ½"φ spaced as shown in Sec A-A
Elev 5235.787
Elev 5236.33
Curve Posts & Curbs to a 1' radius
Intersection of Hand Rail & End Post
8 Spaces @ 1'-6" = 12'-0"
Bush Hammered Panel
R1 Bars
P1 Bars
Grade +2.1% on Bridge only
Elev 5220.35
Elev 5220.893

PLAN

SECTION ALONG ¢ ROADWAY

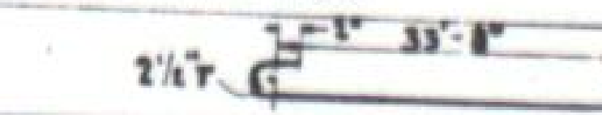
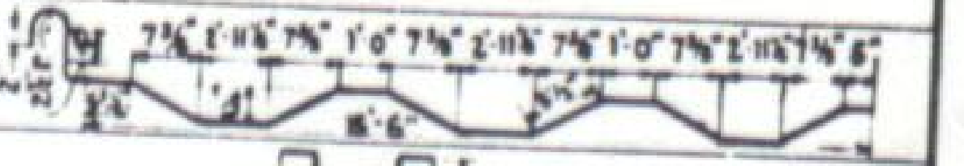
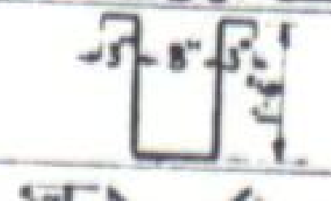
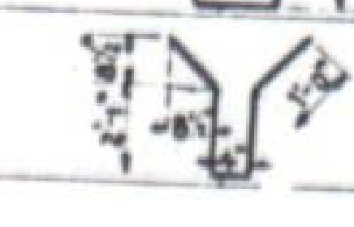


10"
5"
1'-3"
6"
Drill 13/16" Hole
¢ of Stringer
Weld
13/16" Hole
Pl 6"×0½"×3"
Pl 3"×0⅝"×3¾"
4 Bars E4 ½"φ × 4'-6" long
Stirrups S1 ½"φ @ 1'-0" ¢
1'-11¾" East Abutment
2'-0¾" West Abutment
1'-0"

Bearing Plate
10"×¾" Stru. Steel Pl.
14, Required
28 Bolts ¾"φ×1'-6"

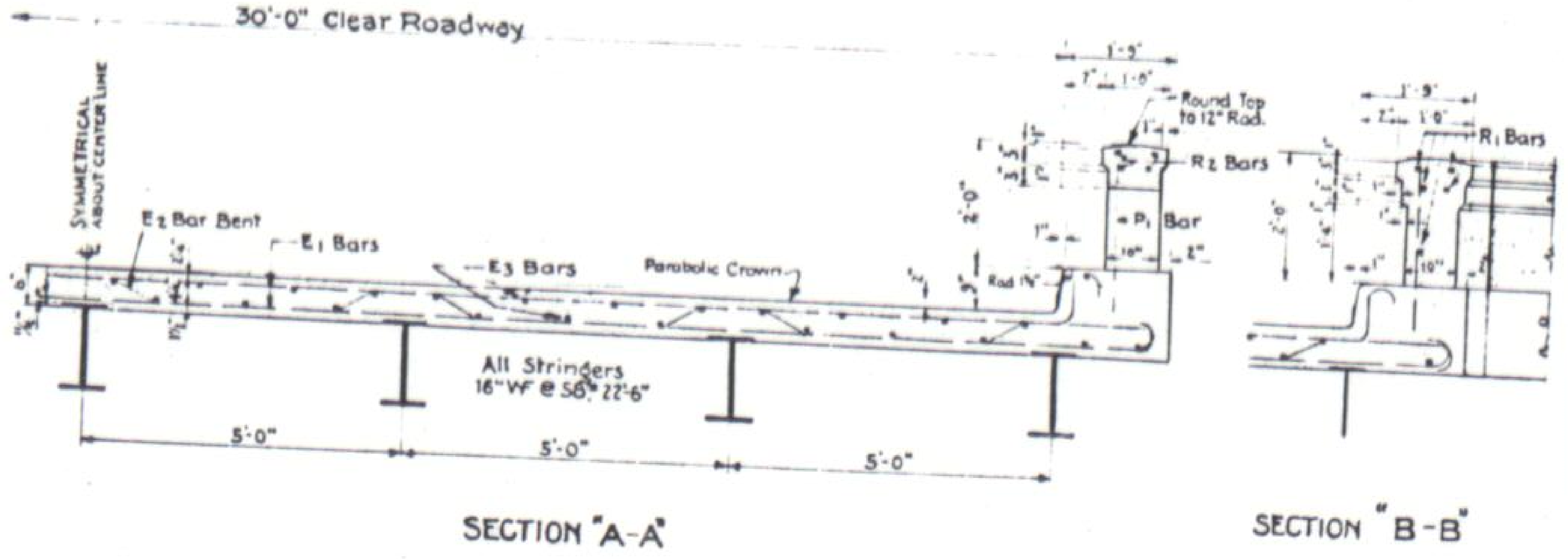
Beam Clips
Structural Steel
28, Required

SECTION "C-C"
Typical for East & West Abutments

Mark	Size	Reqd	Length	Bending Diagram
E3	½"φ	48	23'-4"	
E4	½"φ	48	4'-6"	
R1	½"□	20	4'-6"	
R2	½"□	8	11'-8"	Bend in the Field
E1	⅝"φ	66		
E2	⅝"φ	17	35'-1½"	
S1	½"φ	48	4'-2"	
P1	½"□	28	6'-6"	

Bar List for Superstructure

1536 Lin Ft. of ½"φ bar @ 0.668 lbs per lin. ft. = 1026 lbs.
365 do ½"□ do @ 0.850 do do = 310 "
2927 do ⅝"φ do @ 1.043 do do = 3053 "
Plus 1% for Overrun = 41 "
Total = 4430 "



30'-0" Clear Roadway
SYMMETRICAL ABOUT CENTER LINE
E2 Bar Bent
E1 Bars
E3 Bars
Parabolic Crown
All Stringers 16"W @ 58# 22'-6"
5'-0"
R1 Bars
P1 Bar
Round Top to 12" Rad.
1'-9"

SECTION "A-A"

SECTION "B-B"

Summary of Quantities for Entire Structure

Item	Description	Unit	Super Structure	East Abutment	West Abutment	Totals
14a	Dry Rock Structural Excavation	Cu Yds				—
14b	Dry Common " "	"		72.9	34.9	107.8
14c	Wet Rock " "	"		78.9	97.3	176.2
14d	* Wet Common " "	"				—
42a	Untreated Bridge Timber	M ft BM		0.160	0.160	0.320
46a	Class "A" Concrete	Cu Yds	28	65.	56.	149
47	Reinforcing Steel (1% Overrun incld)	lbs	4430	4530	3870.	12775 ✱
48	Structural Steel (1% " ")	"	9830	37	37	9904

* Wet Line as shown on Field Plans
✱ Scale Weight

GENERAL NOTES

ALL WORK SHALL BE DONE ACCORDING TO THE STANDARD SPECIFICATIONS OF THE COLORADO STATE HIGHWAY DEPARTMENT ADOPTED JAN 1, 1930

ALL CONCRETE SHALL BE CLASS A

ALL EXPOSED SURFACES SHALL BE RUBBED FREE OF FORM MARKS

ALL EXPOSED CORNERS EXCEPT ON HANDRAILS SHALL BE BEVELED TO A 2 FACE

GIRDERS FLOOR SLABS AND CURB SHALL BE POURED MONOLITHICALLY

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

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

THICKNESS OF FLOOR SLAB SHOWN INCLUDES ½ CONCRETE WEARING SURFACE

ALL REINFORCING BARS SHALL BE ROUND OR SQUARE PLAIN OR DEFORMED AS SHOWN AND NOTED

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

SECONDARY BARS WHEN SPLICED SHALL BE GIVEN A LAP OF 10 DIAMETERS

MAIN BARS SHALL NOT BE SPLICED

SOUNDINGS AND DEPTH OF FOOTINGS SHOWN ARE ACCORDING TO THE BEST AVAILABLE DATA IF ESSENTIALLY DIFFERENT CONDITIONS ARE ENCOUNTERED THE BRIDGE ENGINEER WILL INSPECT AND DETERMINE IF REDESIGN IS NECESSARY

MAXIMUM SOIL PRESSURE EQUALS

FORMS FOR CONCRETE SURFACES EXPOSED IN THE FINISHED WORK SHALL BE CONSTRUCTED OF SHIPLAP OR TONGUE AND GROOVE LUMBER ON THE FACE.

LOADING DATA.
LIVE LOAD: A. A. S. H. O. AUG 1928 CLASS A (H-15)
DEAD LOAD: ASSUMES 15 LBS PER SQ FT ADDITIONAL WEARING SURFACE WHICH INCLUDES THE ½ IN CONCRETE MONOLITHIC WEARING SURFACE

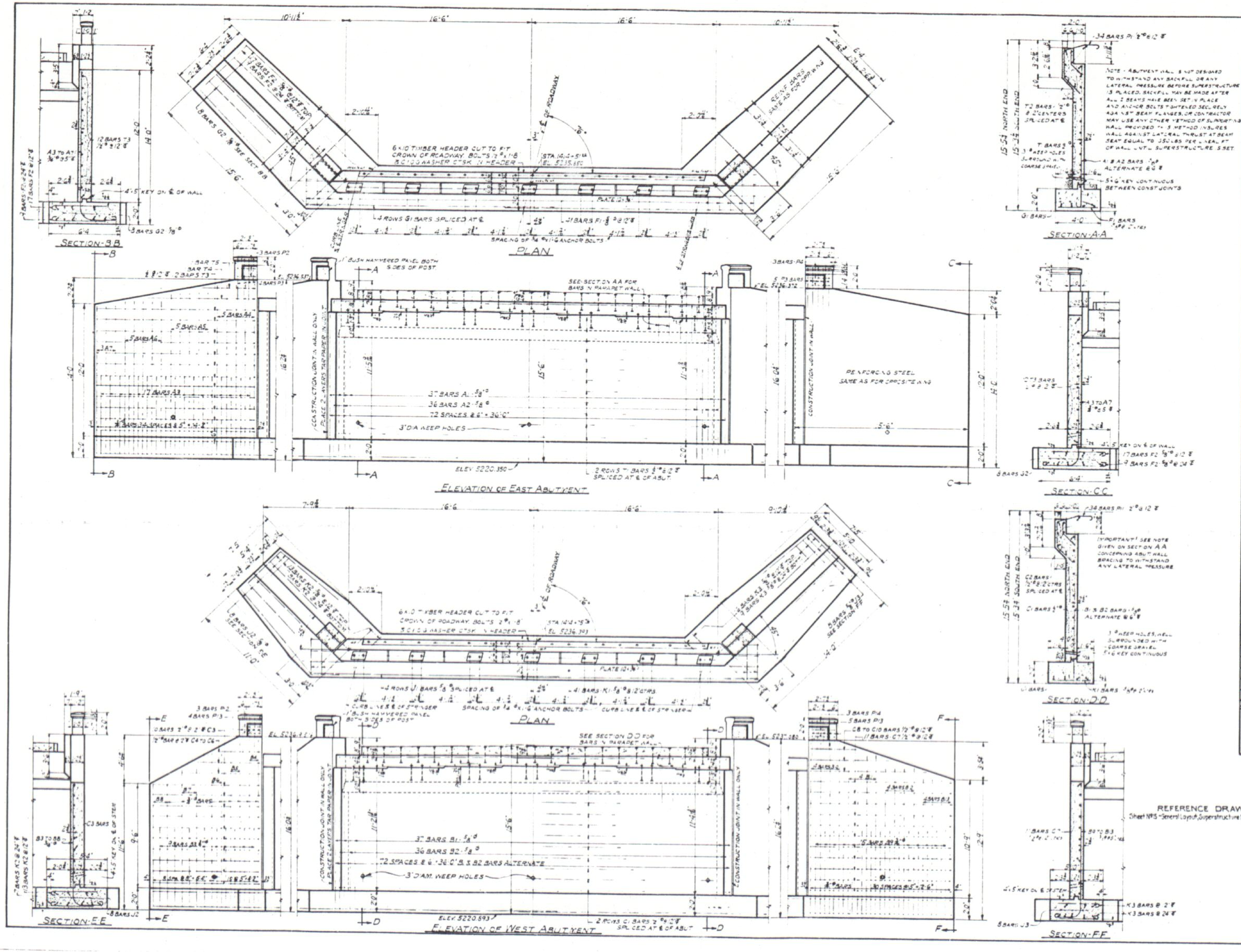
Reference Drawing: For Details of Substructure See sheet Nº 16.

COLORADO
STATE HIGHWAY DEPARTMENT
GENERAL LAYOUT AND DETAILS OF
SUPERSTRUCTURE FOR 22 FT. SPAN
CONCRETE I-BEAM BRIDGE
Across HOME SUPPLY DITCH
Sta. 1414+51 To 1414+75.76
Near Loveland Sec.11, T.5N. R.70W.

Designed by ALC	Approved by P. L. Bailey
Made by SJS	Bridge Engineer
Checked by WRM	Date: March 27th. 1933

STRUCTURE NO. C-16-AG

FED ROAD DIST NO	STATE	FED AID PROJ NO	SHEET NO	TOTAL SHEETS
3	COLO.	E-9B2	16	


PLAN
6 x 10 TIMBER HEADER CUT TO FIT CROWN OF ROADWAY. BOLTS 1/2"ϕ x 1'-8" & C.I.O.G. WASHER C'TSK. IN HEADER
STA. 1414+51.50
EL. 5235.850
℄ OF ROADWAY
PLATE 12 x 3/4"
4 ROWS G1 BARS SPLICED AT ℄
21 BARS F1 5/8"ϕ @ 12"
SPACING OF 3/4"ϕ x 1'-6" ANCHOR BOLTS
CURB LINE & ℄ OF STRINGER
REIN'F. BARS SAME AS FOR OPP. WING
SEE SECT. B-B
ELEVATION OF EAST ABUTMENT
ELEV. 5220.350
EL. 5236.572
BUSH HAMMERED PANEL BOTH SIDES OF POST
SEE SECTION A-A FOR BARS IN PARAPET WALL
CONSTRUCTION JOINT IN WALL ONLY
PLACE 2 LAYERS TAR PAPER IN JOINT
37 BARS A1 5/8"ϕ
36 BARS A2 5/8"ϕ
72 SPACES @ 6" = 36'-0"
3" DIA. WEEP HOLES
2 ROWS T BARS 1/2"ϕ @ 12"
SPLICED AT ℄ OF ABUT.
REINFORCING STEEL SAME AS FOR OPPOSITE WING
SECTION-B-B
12 BARS T3 1/2"ϕ @ 12"
A3 TO A7 3/4"ϕ @ 5"
4"x5" KEY ON ℄ OF WALL
7 BARS F2 @ 24"
17 BARS F2 @ 12"
6 BARS G2 5/8"ϕ
SECTION-A-A
15'-5 3/4" NORTH END
15'-3 3/4" SOUTH END
34 BARS P1 1/2"ϕ @ 12"
T2 BARS 1/2"ϕ @ 2' CENTERS SPLICED AT ℄
T BARS
3"ϕ WEEP HOLES SURROUND WITH COARSE GRAVEL
A1 & A2 BARS 5/8"ϕ ALTERNATE @ 6"
5"x6" KEY CONTINUOUS BETWEEN CONST. JOINTS
G1 BARS
F1 BARS
SECTION-C-C
17 BARS F2 5/8"ϕ @ 12"
9 BARS F2 5/8"ϕ @ 24"
8 BARS G2
PLAN
6 x 10 TIMBER HEADER CUT TO FIT CROWN OF ROADWAY. BOLTS 3/4"ϕ x 1'-8" & C.I.O.G. WASHER C'TSK. IN HEADER
STA. 1414+75.76
EL. 5236.393
4 ROWS J1 BARS 5/8"ϕ SPLICED AT ℄
41 BARS K1 5/8"ϕ @ 12" CTRS.
ELEVATION OF WEST ABUTMENT
ELEV. 5220.893
EL. 5237.080
SEE SECTION D-D FOR BARS IN PARAPET WALL
37 BARS B1 5/8"ϕ
36 BARS B2 5/8"ϕ
72 SPACES @ 6" = 36'-0" B1 & B2 BARS ALTERNATE
3" DIAM. WEEP HOLES
2 ROWS C1 BARS 1/2"ϕ @ 12"
SPLICED AT ℄ OF ABUT.
3 BARS P14
5 BARS P13
C8 TO C10 BARS 1/2"ϕ @ 12"
11 BARS C7 1/2"ϕ @ 12"
SECTION-D-D
34 BARS P11 1/2"ϕ @ 12"
C2 BARS 1/2"ϕ @ 2' CTRS SPLICED AT ℄
C1 BARS 1/2"ϕ
B1 & B2 BARS 5/8"ϕ ALTERNATE @ 6"
3"ϕ WEEP HOLES, WELL SURROUNDED WITH COARSE GRAVEL
5 x 6 KEY CONTINUOUS
K1 BARS 5/8"ϕ @ 12" CTRS
SECTION-E-E
SECTION-F-F
K3 BARS @ 2'
K3 BARS @ 24"
8 BARS J3
8 BARS J2

NOTE - ABUTMENT WALL IS NOT DESIGNED TO WITHSTAND ANY BACKFILL OR ANY LATERAL PRESSURE BEFORE SUPERSTRUCTURE IS PLACED. BACKFILL MAY BE MADE AFTER ALL I BEAMS HAVE BEEN SET IN PLACE AND ANCHOR BOLTS TIGHTENED SECURELY AGAINST BEAM FLANGES, OR CONTRACTOR MAY USE ANY OTHER METHOD OF SUPPORTING WALL PROVIDED THIS METHOD INSURES WALL AGAINST LATERAL THRUST AT BEAM SEAT EQUAL TO 350 LBS PER LINEAL FT OF WALL UNTIL SUPERSTRUCTURE IS SET.

IMPORTANT! SEE NOTE GIVEN ON SECTION A-A CONCERNING ABUT. WALL BRACING TO WITHSTAND ANY LATERAL PRESSURE

BAR LIST FOR EAST ABUTMENT

W.McM.

MARK	No	SIZE	LENGTH	l	m	BENDING DIAGRAM
F1	41	5/8"ϕ	3'-6"			
G1	8	5/8"ϕ	21'-6"			
G2	16	5/8"ϕ	17'-0"			
P2	3	1/2"ϕ	1'-8"			
P3	9	1/2"ϕ	4'-0"			
P4	3	1/2"ϕ	2'-2"			STRAIGHT
T1	24	1/2"ϕ	18'-10"			
T2	14	1/2"ϕ	17'-9"			
T3	24	1/2"ϕ	14'-3"			
T4	2	1/2"ϕ	9'-9"			
T5	2	1/2"ϕ	5'-0"			
P1	34	1/2"ϕ	7'-4"			
A1	37	5/8"ϕ	13'-6"	12'-8"		
F2	52	5/8"ϕ	6'-1"	5'-3"		
A2	36	5/8"ϕ	15'-2"			
A3	34	3/4"ϕ	10'-9"	6'-2"	2'-0"	
A4	10	3/4"ϕ	19'-6"	14'-6"	2'-5"	
A5	10	3/4"ϕ	18'-7"	13'-9"	2'-3"	
A6	10	3/4"ϕ	17'-9"	13'-1"	2'-1"	
A7	6	3/4"ϕ	16'-11"	12'-4"	2'-0"	

BAR LIST FOR WEST ABUTMENT

MARK	No	SIZE	LENGTH	l	m	BENDING DIAGRAM
C1	24	1/2"ϕ	18'-10"			
C2	14	1/2"ϕ	17'-9"			
C3	10	1/2"ϕ	9'-9"			
C4 TO C6	1 EACH	1/2"ϕ	7'-6" TO 4'-0" BY 1'-9 STEPS			
C7	11	1/2"ϕ	12'-9"			
C8 TO C10	1 EACH	1/2"ϕ	10'-4 TO 4'-4" BY 3'-0 STEPS			
J1	8	5/8"ϕ	21'-6"			
J2	8	5/8"ϕ	12'-8"			
J3	8	5/8"ϕ	15'-6"			
P12	3	1/2"ϕ	1'-8"			
P13	9	1/2"ϕ	4'-0"			
P14	3	1/2"ϕ	2'-2"			
K1	41	5/8"ϕ	3'-6"			
P11	34	1/2"ϕ	7'-5"			
K2	20	5/8"ϕ	5'-7"	4'-9"		
K3	25	5/8"ϕ	6'-0"	5'-2"		
B1	37	5/8"ϕ	13'-4"	12'-6"		
B2	36	5/8"ϕ	15'-0"			
B3	9	3/4"ϕ	10'-3"	6'-2	1'-6"	
B4	2	3/4"ϕ	19'-4"	14'-5"	2'-4"	
B5	2	3/4"ϕ	18'-8"	13'-10"	2'-3"	
B6	2	3/4"ϕ	17'-7"	12'-11"	2'-1"	
B7	2	3/4"ϕ	15'-9"	11'-5"	1'-9"	
B8	2	3/4"ϕ	13'-11"	9'-11"	1'-5"	
B9	15	3/4"ϕ	11'-0"	6'-8"	1'-9"	
B10	4	3/4"ϕ	19'-7"	14'-6"	2'-6"	
B11	4	3/4"ϕ	18'-3"	13'-5"	2'-3"	
B12	4	3/4"ϕ	16'-10"	12'-3"	2'-0"	
B13	4	3/4"ϕ	15'-6"	11'-2"	1'-9"	

EAST ABUT.	WEST ABUT.		EAST ABUT.	WEST ABUT.
1369	1277	LIN. FT. OF 1/2"ϕ BARS @ 0.668# =	915#	853#
1950	1836	LIN. FT. OF 5/8"ϕ BARS @ 1.043# =	2034	1915
1025	708	LIN. FT. OF 3/4"ϕ BARS @ 1.502# =	1540	1063
		PLUS 1% ± FOR OVERRUN =	41	39
		TOTAL =	4530#	3870#

LOADING DATA.
LIVE LOAD: A. A. S. H. O. AUG. 1928 CLASS A. H-15
DEAD LOAD: ASSUMES 15 LBS. PER SQ. FT. ADDITIONAL WEARING SURFACE WHICH INCLUDES THE ½ IN. CONCRETE MONOLITHIC WEARING SURFACE

REFERENCE DRAWINGS
Sheet No. 15 - General Layout, Superstructure Details & Summary.

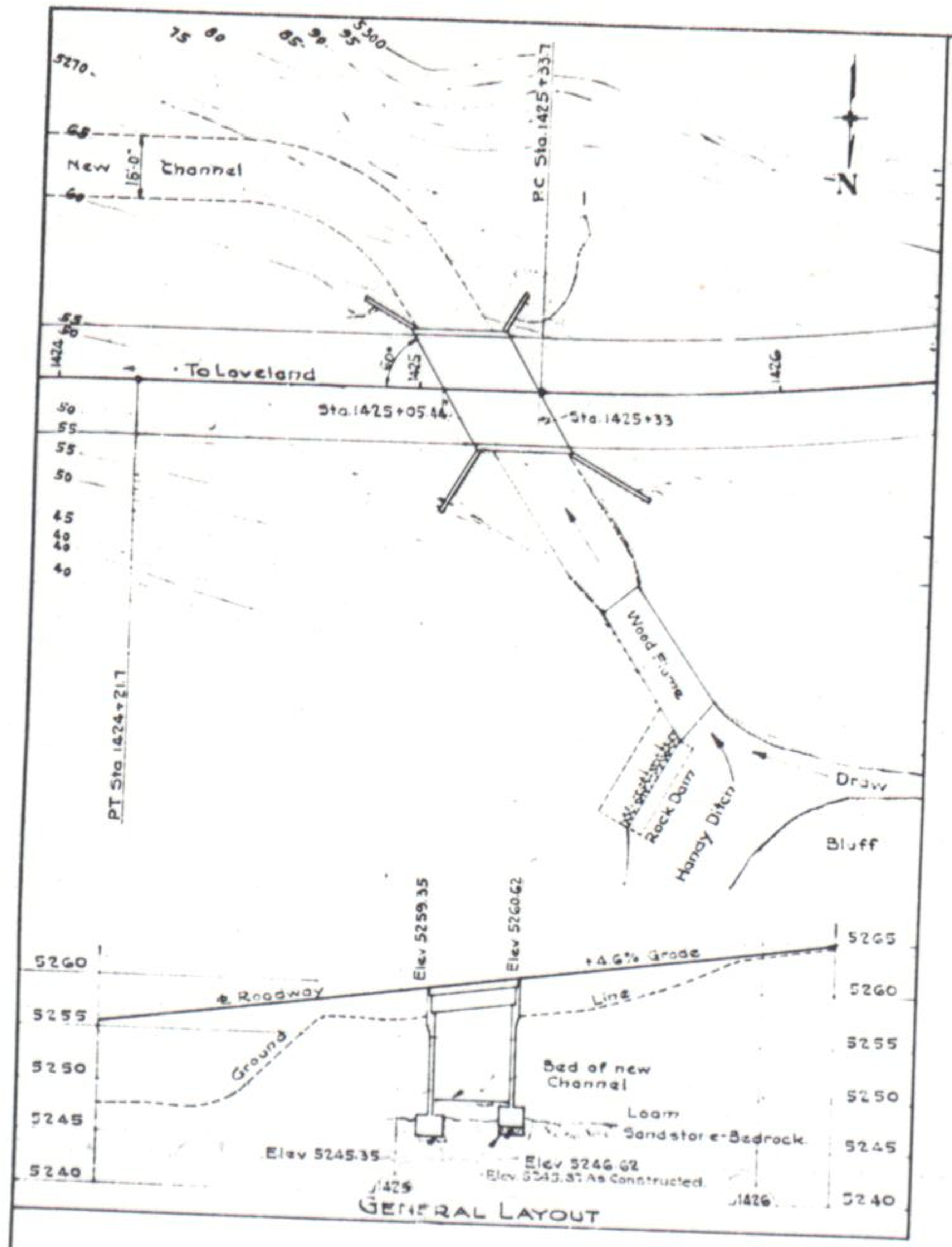
COLORADO
STATE HIGHWAY DEPARTMENT
EAST & WEST ABUTMENTS FOR
ONE SPAN AT 22 FT. x 30 FT. RDWY.
CONCRETE & STEEL I BEAM BRIDGE.
Across HOME SUPPLY DITCH
Sta. 1414+51.50 TO 1414+75.76
Near LOVELAND Sec. 11 T. 5N R. 70W

Designed by A.L.C	Approved by C. L. Bailey
Made by A.L.C W.McM.	Bridge Engineer
Checked by W.McM.	Date: March 17th 1933

STRUCTURE NO. C-16-AG

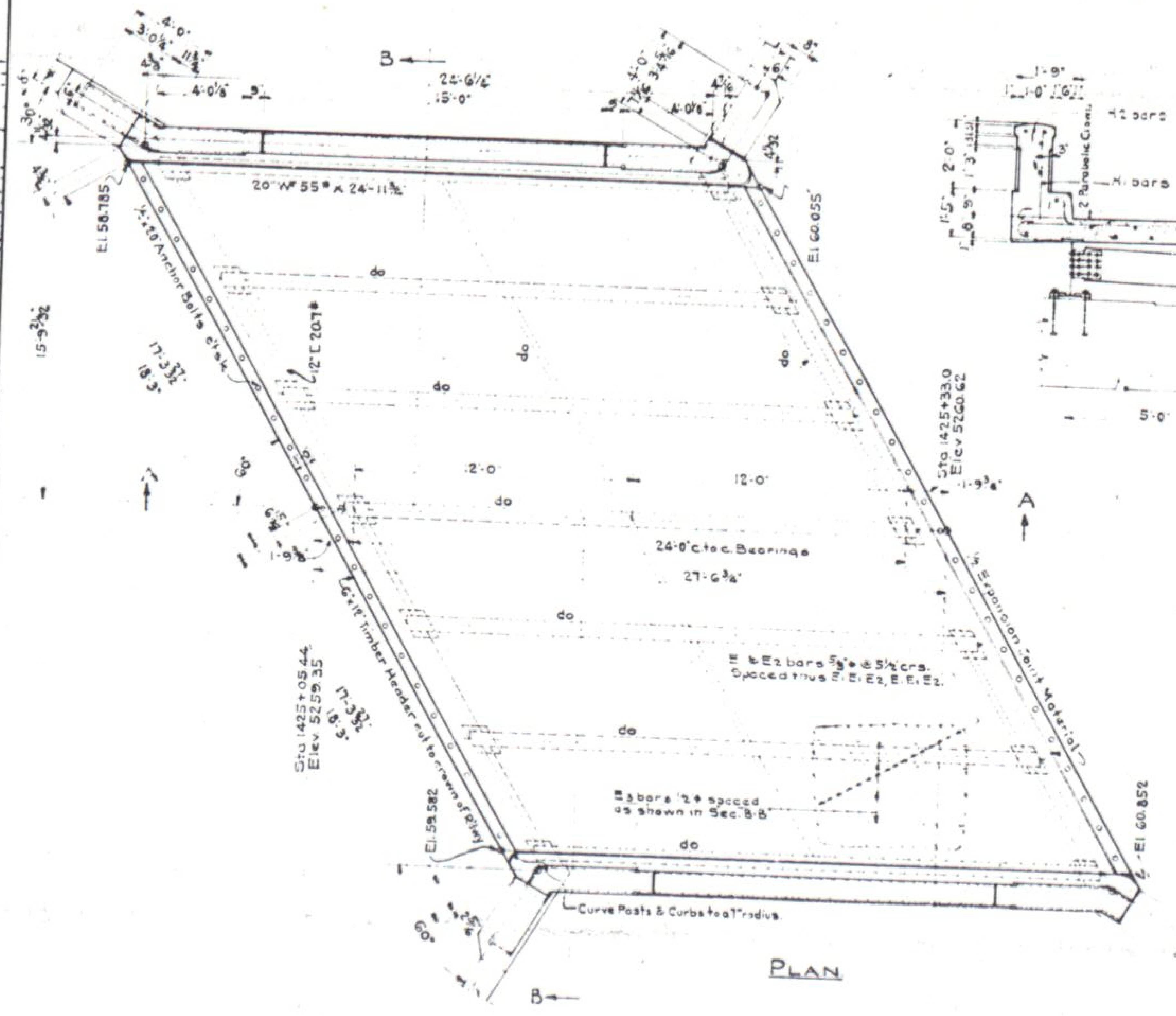
FED ROAD DIST NO	STATE	FED AID PROJ NO	SHEET NO	TOTAL SHEETS
3	COLO	E-9-B2	17	

Revised 11-2-33 A.G.K. Addition to Summary of Quantities
Revised Quantities As Constructed. 5-14-38 R.A.D.



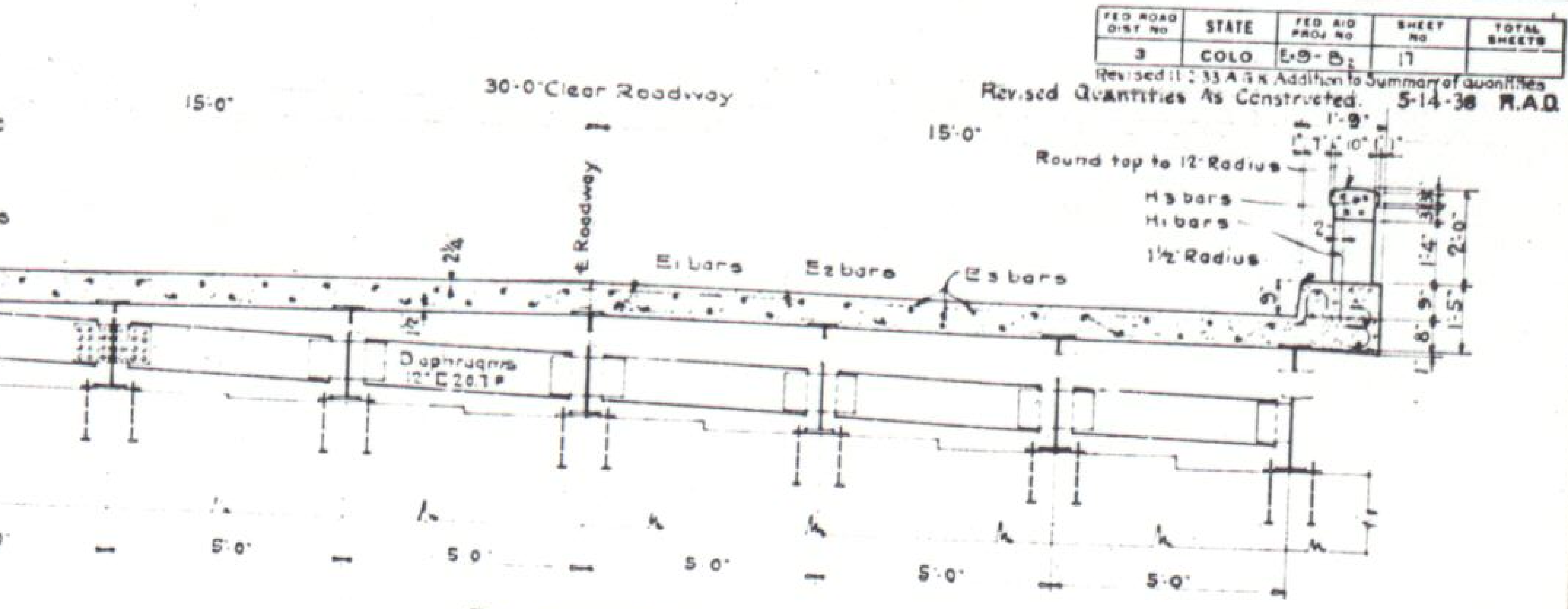
5270
75
80
85
New Channel
16'-0"
PC Sta 1425+33.7
To Loveland
Sta 1425+05.44
Sta 1425+33
1425
1426
Wood Flume
Rock Dam
Handy Ditch
Draw
Bluff
PT Sta 1424+21.7
Elev 5259.35
Elev 5260.62
+4.6% Grade
℄ Roadway
Line
Ground
Bed of new Channel
Loam
Sandstone-Bedrock
Elev 5245.35
Elev 5246.62
Elev 5243.37 As Constructed
5260
5255
5250
5245
5240

GENERAL LAYOUT



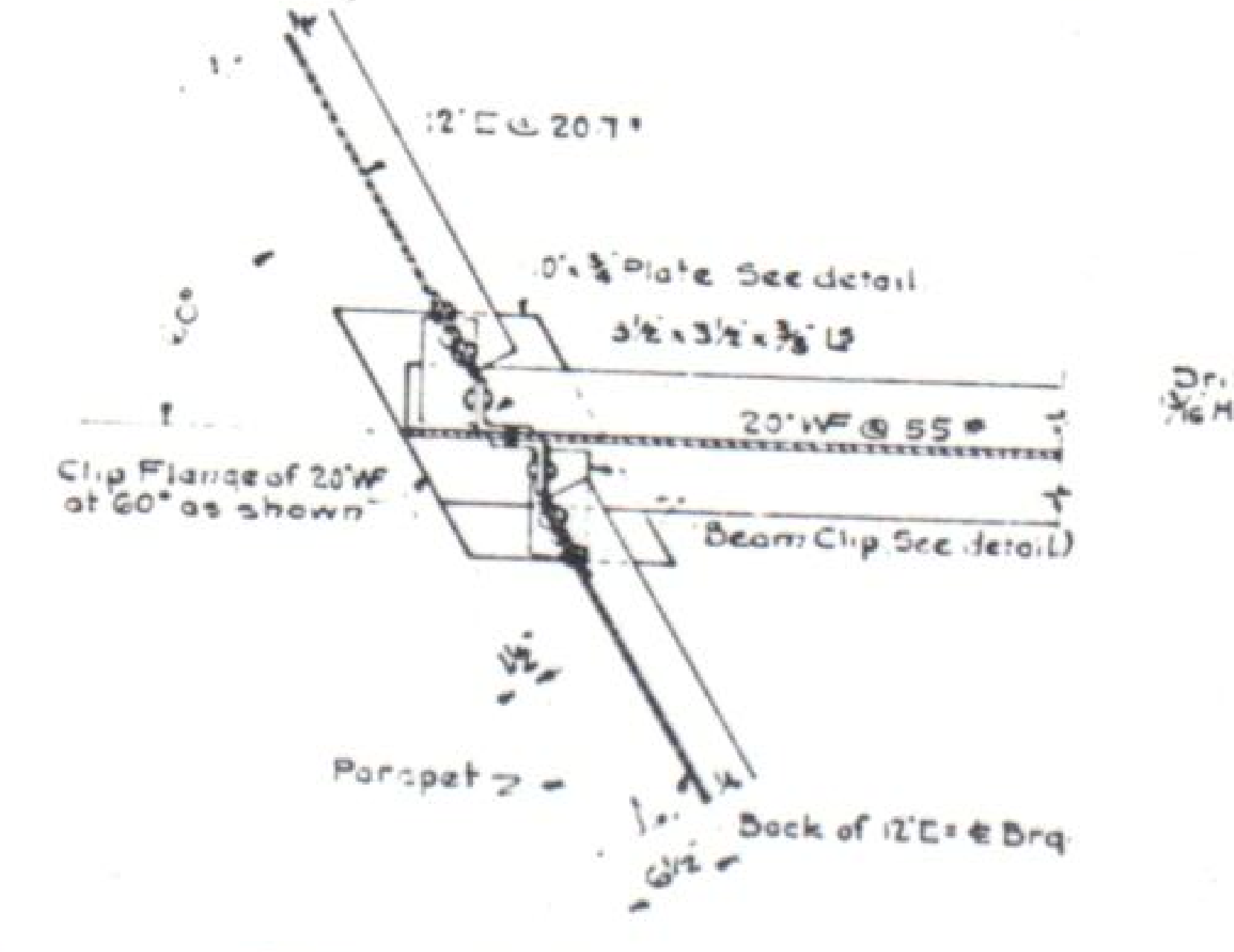
B
24'-6⅛"
15'-0"
4'-0⅛"
20" WF 55# x 24'-11⅝"
El 58.785
El 60.055
El 59.582
El 60.852
12" ⊏ 20.7#
¾"x18" Anchor Bolts
6"x12" Timber Header
12'-0"
24'-0" c to c Bearings
27'-6¾"
E1 & E2 bars ⅝"φ @ 5½" ctrs. Spaced thus E1 E2 E1 E2
E3 bars ½"φ spaced as shown in Sec. B-B
Sta 1425+05.44 Elev 5259.35
Sta 1425+33.0 Elev 5260.62
Expansion Joint Material
Curve Posts & Curbs to 1" radius
do
A
60°

PLAN



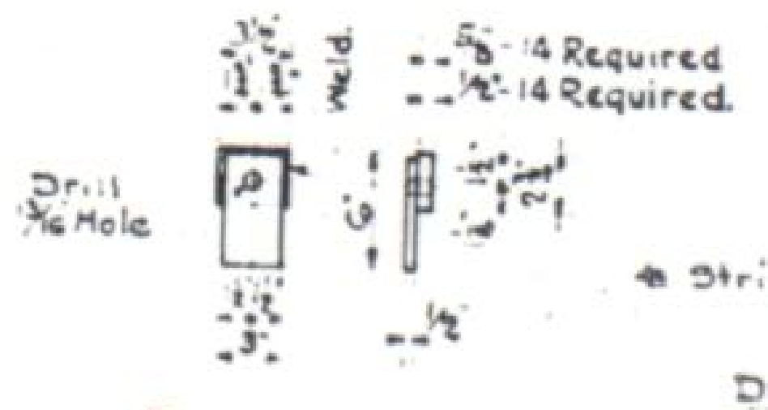
30'-0" Clear Roadway
15'-0"
15'-0"
1'-9"
2'-0"
1'-5"
Round top to 12" Radius
H3 bars
H1 bars
H2 bars
1½" Radius
2 Parabolic Crown
℄ Roadway
E1 bars
E2 bars
E3 bars
Diaphragms 12" ⊏ 20.7#
5'-0"
5'-0"
5'-0"
5'-0"
5'-0"
5'-0"

SECTION 'B-B'



12" ⊏ @ 20.7#
⅝" x ⅜" Plate See detail
3⅛" x 3⅛" x ⅜" L5
20" WF @ 55#
Clip Flange of 20" WF at 60° as shown
Beam Clip See detail
Parapet
Back of 12" ⊏ & Brg

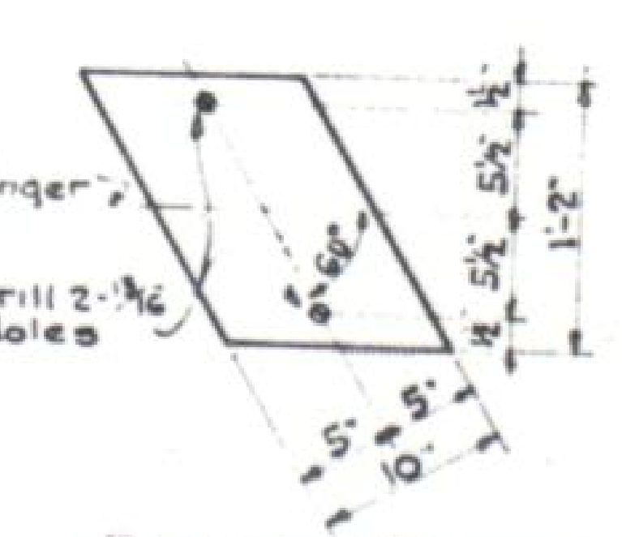
DETAIL OF DIAPHRAGM CONNECTION



⅝"φ 14 Required
½"φ 14 Required
Drill ⅝" Hole
Weld

BEAM CLIPS

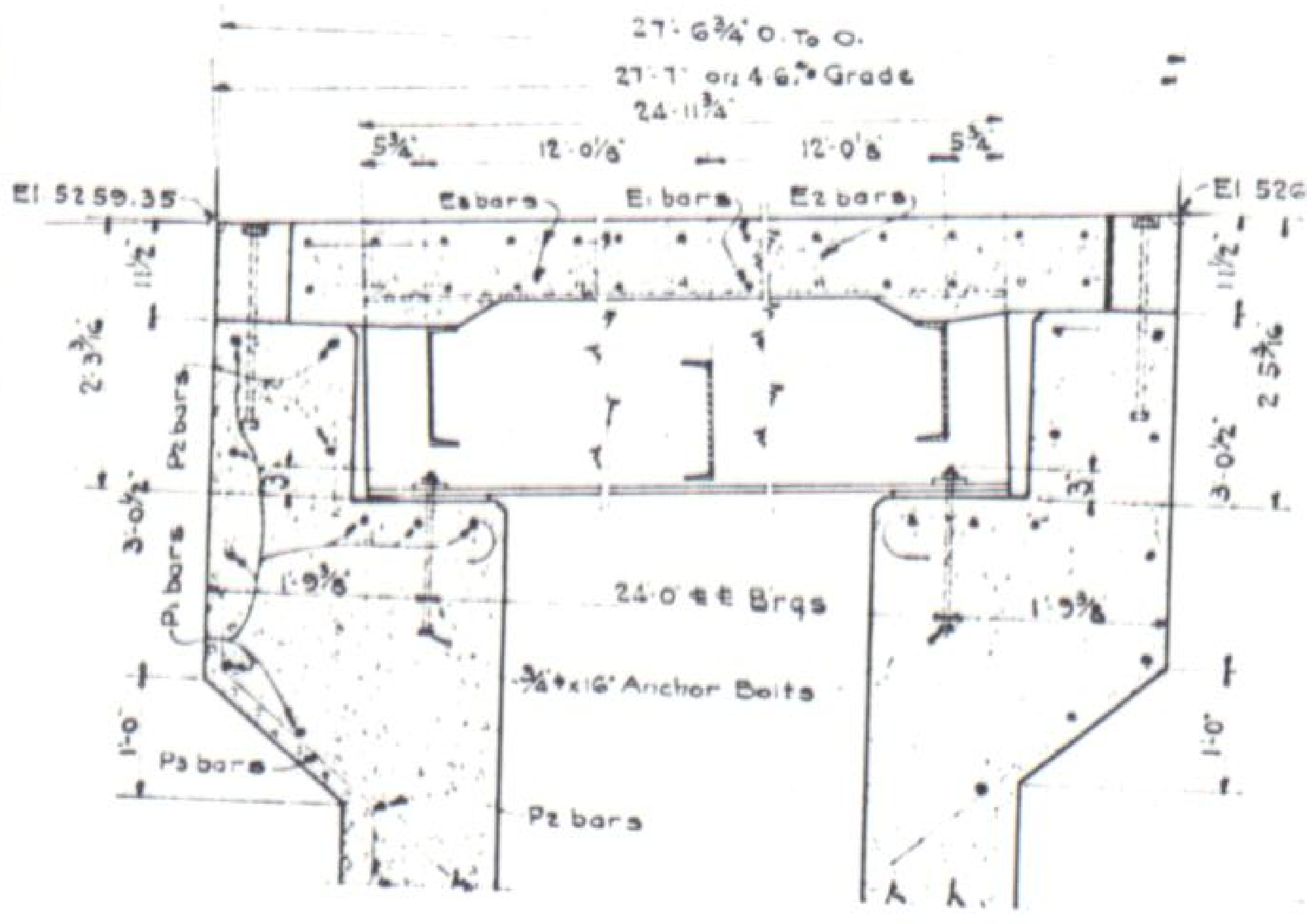
Structural Steel
28 Required.



℄ Stringer
Drill 2-1⅛" Holes
5½"
5½"
1'-2"
5"
5"
10"

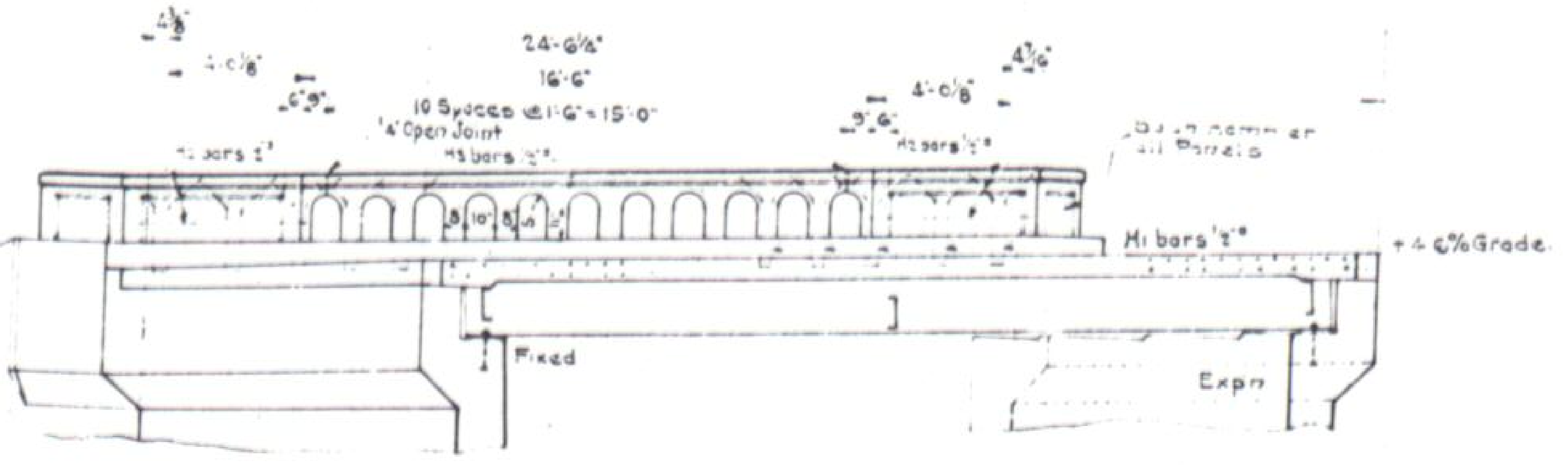
BEARING PLATE

10"x⅝" Stru. Steel Pl.
14 Required.



27'-6¾" o. to o.
27'-7" on 4.6% Grade
24'-11⅝"
12'-0⅝"
12'-0⅝"
El 5259.35
El 5260.62
E3 bars
E1 bars
E2 bars
P1 bars
P2 bars
P3 bars
2'-3⅝"
3'-0½"
1'-0"
24'-0" ℄ ℄ Brgs
¾"x16" Anchor Bolts

SECTION ALONG ℄ ROADWAY



24'-6⅛"
16'-6"
10 Spaces @ 1'-6" = 15'-0"
4'-0⅛"
½" Open Joint
H3 bars
H2 bars
H1 bars
+4.6% Grade
Fixed
Expn

SECTION 'A-A'

ITEM	DESCRIPTION	Unit	SUPER STRUCTURE	EAST ABUTMENT	WEST ABUTMENT	TOTALS
14a	Dry Rock Structural Excavation	Cu Yds				—
14b	Dry Common " "	"		561	1104	1665
▲ 14c	Wet Rock " "	"		1309		1309
▲ 14d	Wet Common " "			195	1551	1746
42a	Untreated Bridge Timber	M ft bm		0.216	0.216	0.432
46a	Class 'A' Concrete	Cu Yds	27.5	79.0	80.0	186.5
47	Reinforcing Steel (1% Overrun Incl'd)	Lbs	4630	5110	5210	14835 *
48	Structural Steel 1½% " "	"	12875	35	35	12945
	Expansion Joint Material ½" x 12"	Lin Ft	35			35
	ADDITIONAL QUANTITIES · WORK ORDER № 3169					
14d	Wet Common Structural Excavation	Cu Yds				—
46a	Class 'A' Concrete	Cu Yds			14.8	14.8

▲ Wet Line As Shown on Field Plans.
* Scale Weight.

BAR LIST FOR SUPERSTRUCTURE

W.W.D.

MARK	SIZE	REQD	LENGTH	BENDING DIAGRAM.
E3	½"φ	48	26'-0"	
H2	½"φ	16	5'-0"	
H3	½"φ	8	14'-8"	
E2	⅝"φ	17	39'-0"	℄ bar
E1	⅝"φ	66	39'-6"	37'-10"
H1	½"φ	32	6'-6"	2'-1" 1'-8" 1¼"

1248 Lin Ft of ½"φ bar @ 0.668 Lbs per lin ft = 834 Lbs
400 do ½"φ @ 0.850 do do = 340 "
3270 do ⅝"φ @ 1.043 do do = 3411 "
Plus 1% For Overrun = 45 "
Total = 4630 Lbs.

GENERAL NOTES

All work shall be done according to the standard specifications of the Colorado State Highway Department adopted Jan. 1, 1930.

All concrete shall be class A.

All exposed surfaces shall be rubbed free of form marks.

All exposed corners except on handrails shall be beveled to a 2" face. Floor slabs and curb shall be poured monolithically.

All construction joints shall be thoroughly cleaned before fresh concrete is poured.

Footings in rock shall be poured out to the rock and not formed.

Thickness of floor slab shown includes ½" concrete wearing surface.

All reinforcing bars shall be round or square plain or deformed as shown and noted.

All reinforcing bars shall be tagged with the station number and letter designation.

Secondary bars when spliced shall be given a lap of 50 diameters. Main bars shall not be spliced.

Soundings and depth of footings shown are according to the best available data. If essentially different conditions are encountered the bridge engineer will inspect and determine if redesign is necessary.

Maximum soil pressure equals 3600 Lbs/sq ft.

Forms for concrete surfaces exposed in the finished work shall be constructed of S2S or tongue and groove lumber on the face.

REFERENCE DRAWINGS

Sheet № 18 Substructure Details for 24' span Conc. I Beam Bridge.

LOADING DATA

Live Load A.A.S.H.O. Aug. 1928 Class A. H-15.
Dead Load: Assumed 15 Lbs per sq ft additional wearing surface which includes the ½" in concrete monolithic wearing surface.

COLORADO
STATE HIGHWAY DEPARTMENT

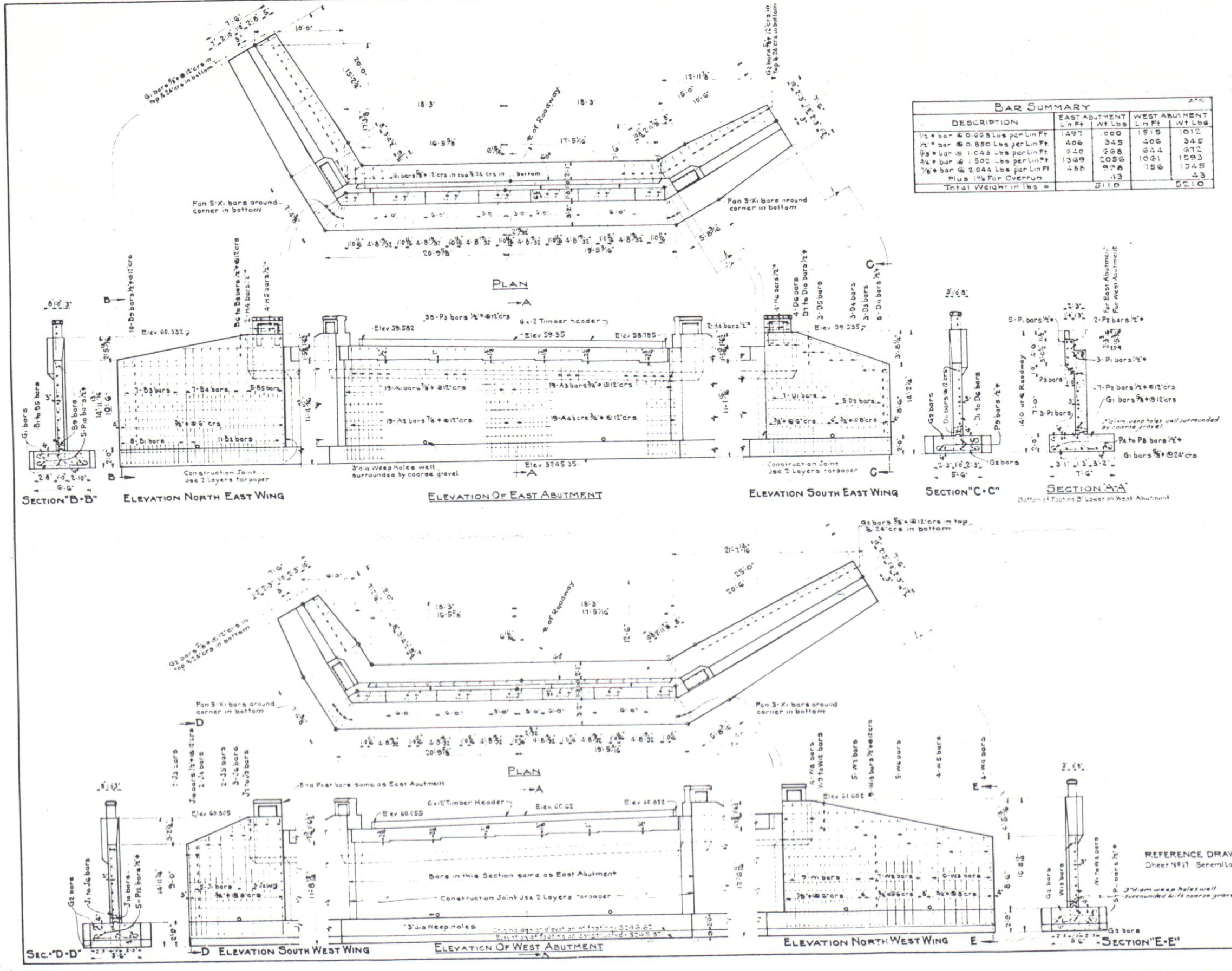
General Layout & Details of
Superstructure For 24' Span
Concrete I Beam Bridge
Across Handy Ditch
Sta. 1425+05.44 To 1425+33.38
Near Loveland Sec. 11 T. 5N. R. 70W.

Designed by EFW Made by EFW & WWD Checked by WWD	Approved by P. J. Bailey Bridge Engineer Date: March 27th 1933.

STRUCTURE NO. C-16-AH

FED ROAD DIST NO	STATE	FED. AID PROJ. NO.	SHEET NO	TOTAL SHEETS
3	COLO.	E-9-B2	18	

Revised 11-2-33 A.G.R. Added 9" to bottom of footing on West Abutment (As Constructed)


PLAN
Fan 5-X1 bars around corner in bottom
Fan 3-X1 bars around corner in bottom
G1 bars 5/8"● @ 12" crs in top & 24" crs in bottom
G2 bars 5/8"● @ 12" crs in top & 24" crs in bottom
℄ of Roadway
SECTION "B-B"
ELEVATION NORTH EAST WING
ELEVATION OF EAST ABUTMENT
ELEVATION SOUTH EAST WING
SECTION "C-C"
SECTION "A-A"
Bottom of Footing 9" Lower on West Abutment
Elev 60.332
Elev 59.582
Elev 59.35
Elev 58.785
Elev 59.335
Elev 5245.35
35-P3 bars 1/2"● @ 12" crs
6x12 Timber Header
19-A1 bars 7/8"● @ 12" crs
19-A2 bars 7/8"● @ 12" crs
19-A3 bars 3/4"● @ 12" crs
19-A4 bars 3/4"● @ 12" crs
3" dia Weep Holes well surrounded by coarse gravel
Construction Joint Use 2 Layers tarpaper
For East Abutment
For West Abutment
SEC. "D-D"
ELEVATION SOUTH WEST WING
ELEVATION OF WEST ABUTMENT
ELEVATION NORTH WEST WING
SECTION "E-E"
End Post bars same as East Abutment
Bars in this Section same as East Abutment
Construction Joint Use 2 Layers tarpaper
3" dia Weep Holes
Elev 60.325
Elev 60.055
Elev 60.62
Elev 60.652
Elev 61.662
3" diam. weep holes well surrounded with coarse gravel.

REFERENCE DRAWINGS
Sheet Nº 17 General Layout, Superstructure Details & Summary of Quantities

BAR SUMMARY

DESCRIPTION	EAST ABUTMENT Lin Ft	EAST ABUTMENT Wt. Lbs	WEST ABUTMENT Lin Ft	WEST ABUTMENT Wt Lbs
1/2"● bar @ 0.668 Lbs per Lin Ft	1497	1000	1515	1012
1/2"□ bar @ 0.850 Lbs per Lin Ft	406	345	406	345
5/8"● bar @ 1.043 Lbs per Lin Ft	640	668	644	672
3/4"● bar @ 1.502 Lbs per Lin Ft	1369	2056	1061	1593
7/8"● bar @ 2.044 Lbs per Lin Ft	488	998	756	1545
Plus 1% For Overrun		43		43
Total Weight in lbs =	5110		5210	

BAR LIST FOR EAST ABUTMENT

MARK	SIZE	REQ'D	LENGTH	c	m	r	t	Bending Diagram
A1	7/8"●	19	15'-0"	9'-4"	1'-10½"	3½"	3"	
A2	7/8"●	19	10'-9"	5'-0"	1'-10½"	3½"	3"	
A3	3/4"●	19	14'-4"	8'-9½"	1'-11"	3"	2½"	
A4	3/4"●	19	10'-1"	4'-6½"	1'-11"	3"	2½"	
D1	3/4"●	7	11'-3"	6'-0"	1'-7½"	3"	2½"	
D2	3/4"●	5	9'-5"	5'-0"	9½"	3"	2½"	
D3	3/4"●	3	12'-10"	8'-5"	9½"	3"	2½"	
D4	3/4"●	3	14'-9"	9'-10"	1'-3½"	3"	2½"	
D5	3/4"●	3	16'-5"	11'-1"	1'-8½"	3"	2½"	
D6	3/4"●	4	17'-7"	12'-0½"	1'-11"	3"	2½"	
B1	3/4"●	8	10'-0"	5'-0"	1'-4½"	3"	2½"	
B2	3/4"●	11	11'-4"	6'-0"	1'-8½"	3"	2½"	
B3	3/4"●	7	15'-5"	10'-5"	1'-4½"	3"	2½"	
B4	3/4"●	7	17'-0"	11'-8"	1'-8½"	3"	2½"	
B5	3/4"●	5	18'-4"	12'-9"	1'-11½"	3"	2½"	
H4	1/2"□	4	7'-0"					
P2	1/2"●	12	37'-8"					
P1	1/2"●	8	36'-6"					
P4 to P8	1/2"●	1 Each	36'-6" to 47'-0" by 2'-7½"					
D7 to D10	1/2"●	1 Each	5'-0" to 13'-3" by 2'-9"					
D11	1/2"●	8	13'-8"					
P9	1/2"●	5	15'-0"					
P10	1/2"●	5	20'-0"					
B6 to B8	1/2"●	1 Each	6'-0" to 17'-0" by 5'-6"					
B9	1/2"●	10	18'-10"					
H5	1/2"□	4	3'-0"					
H6	1/2"□	4	2'-8"					
P3	1/2"□	38	9'-4"			2"	2"	
G1	5/8"●	91	6'-0"	5'-2"		2½"	2"	
G2	5/8"●	17	5'-6"	4'-8"		2½"	2"	
X1	3/4"●	8	6'-8"	5'-8"		3"	2½"	

BAR LIST FOR WEST ABUTMENT

MARK	SIZE	REQ'D	LENGTH	c	m	r	t	Bending Diagram
A1	7/8"●	19	15'-0"	9'-4"	1'-10½"	3½"	3"	
A2	7/8"●	19	10'-8"	5'-0"	1'-10½"	3½"	3"	
A3	3/4"●	19	14'-4"	8'-9½"	1'-11"	3"	2½"	
A4	3/4"●	19	10'-1"	4'-6½"	1'-11"	3"	2½"	
W1	7/8"●	9	11'-11"	6'-6"	1'-7½"	3½"	3"	
W2	3/4"●	7	10'-8"	5'-9"	1'-3½"	3"	2½"	
W3	3/4"●	6	9'-5"	5'-0"	9½"	3"	2½"	
W4	3/4"●	4	12'-10"	8'-5"	9½"	3"	2½"	
W5	3/4"●	4	14'-5"	9'-8"	1'-1½"	3"	2½"	
W6	3/4"●	5	15'-9"	10'-9"	1'-4½"	3"	2½"	
W7	7/8"●	5	17'-4"	11'-10"	1'-8½"	3½"	3"	
W8	7/8"●	4	18'-5"	12'-9"	1'-10½"	3½"	3"	
J1	3/4"●	5	9'-5"	5'-0"	9½"	3"	2½"	
J2	3/4"●	3	11'-7"	6'-0"	1'-11½"	3"	2½"	
J3	3/4"●	2	13'-3"	8'-10"	9½"	3"	2½"	
J4	3/4"●	2	15'-0"	10'-1"	1'-3½"	3"	2½"	
J5	3/4"●	2	16'-8"	11'-4"	1'-8½"	3"	2½"	
J6	3/4"●	3	17'-7"	12'-0"	1'-11½"	3	2½"	
H4	1/2"□	4	7'-0"					
P2	1/2"●	12	37'-8"					
P1	1/2"●	8	36'-6"					
P4 to P8	1/2"●	1 Each	36'-6" to 47'-0" by 2'-7½"					
W9 to W12	1/2"●	1 Each	5'-0" to 18'-0" by 4'-4"					
W13	1/2"●	9	23'-9"					
P11	1/2"●	5	25'-0"					
J7 to J9	1/2"●	1 Each	4'-6" to 9'-0" by 2'-3"					
J10	1/2"●	9	10'-10"					
P12	1/2"●	5	12'-0"					
H5	1/2"□	4	3'-0"					
H6	1/2"□	4	2'-8"					
P3	1/2"□	38	9'-4"			2"	2"	
G1	5/8"●	67	6'-0"	5'-2"		2½"	2"	
G2	5/8"●	44	5'-6"	4'-8"		2½"	2"	
X1	3/4"●	8	6'-8"	5'-8"		3"	2½"	

LOADING DATA.
LIVE LOAD: A. A. S. H. O. AUG. 1929 CLASS A (H-15)
DEAD LOAD: ASSUMES 15 LBS PER SQ FT ADDITIONAL WEARING SURFACE WHICH INCLUDES THE ½ IN CONCRETE MONOLITHIC WEARING SURFACE

COLORADO
STATE HIGHWAY DEPARTMENT
SUBSTRUCTURE DETAILS
FOR 24' SPAN
CONCRETE I BEAM BRIDGE
Across Handy Ditch
Sta. 1425+05.44 To 1425+33.0
Near Loveland. Sec. 11 T. 5N R. 70W.

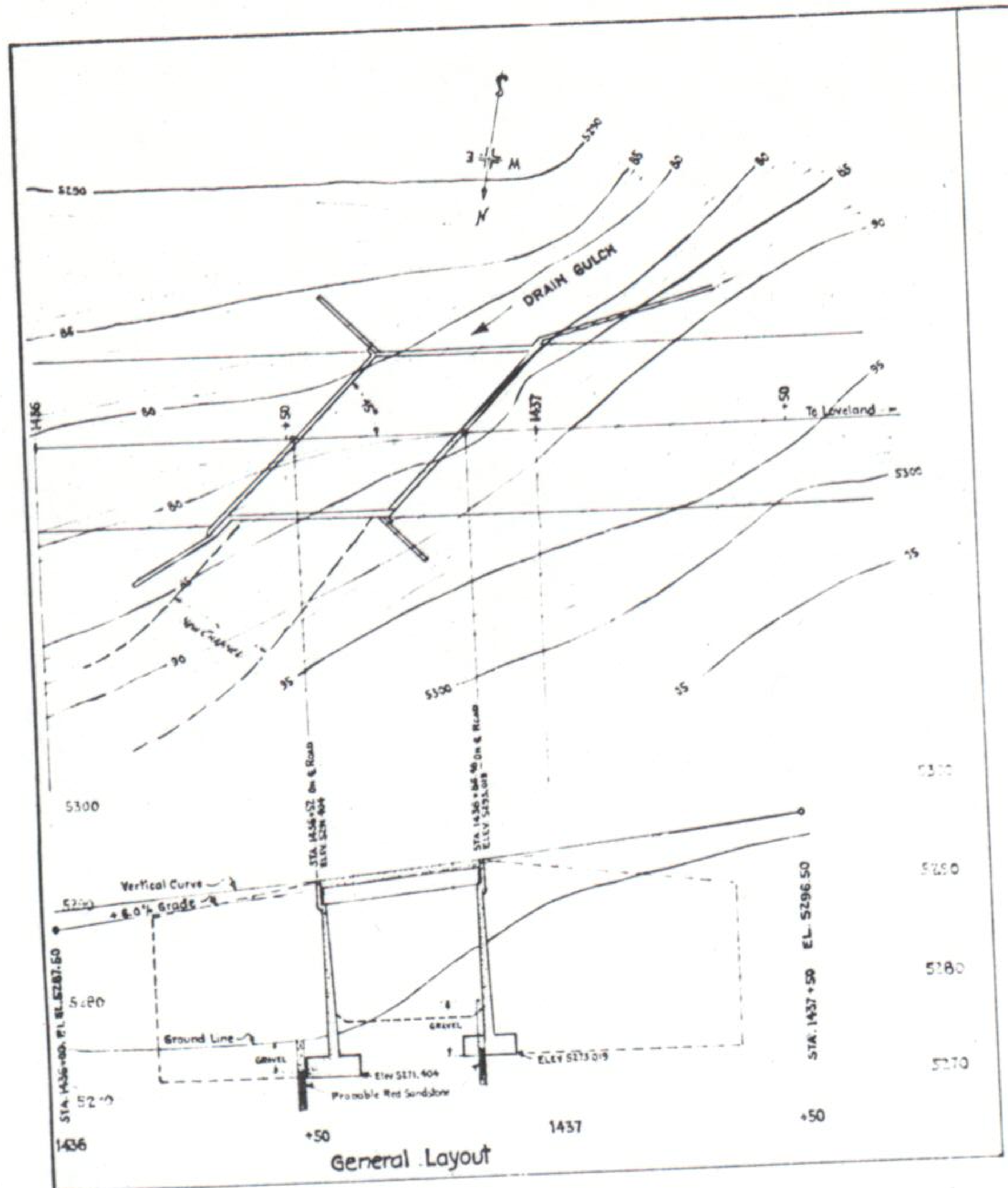
Designed by E.F.W.
Made by E.F.W. & W.W.D.
Checked by W.W.D.

Approved by P. J. Bailey
Bridge Engineer
Date: March 1st 1933.

STRUCTURE NO. C-16-AH

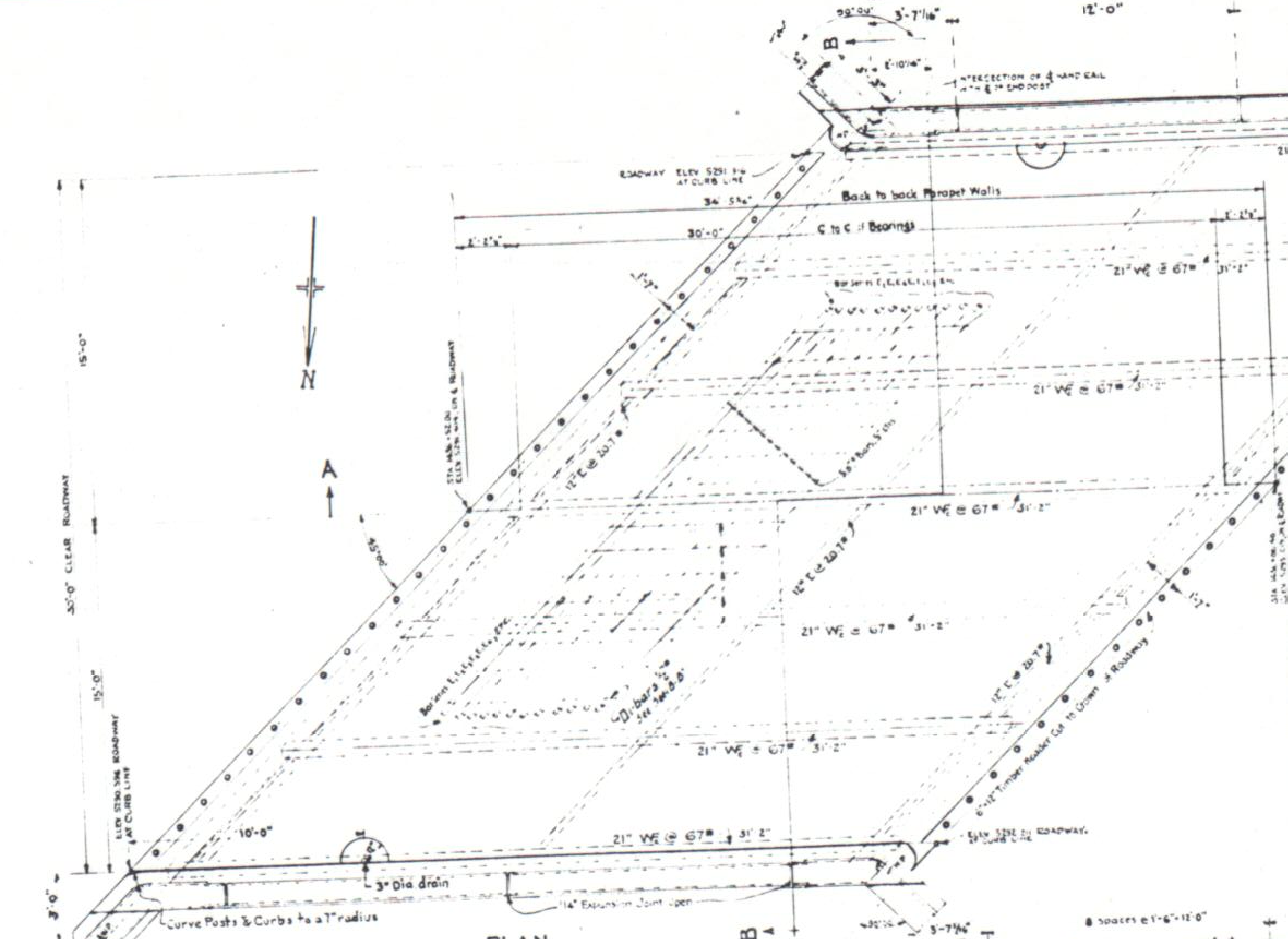
3	COLO	E-982	15	

Rev. Quantities As Constructed. 5-14-38 R.A.D.



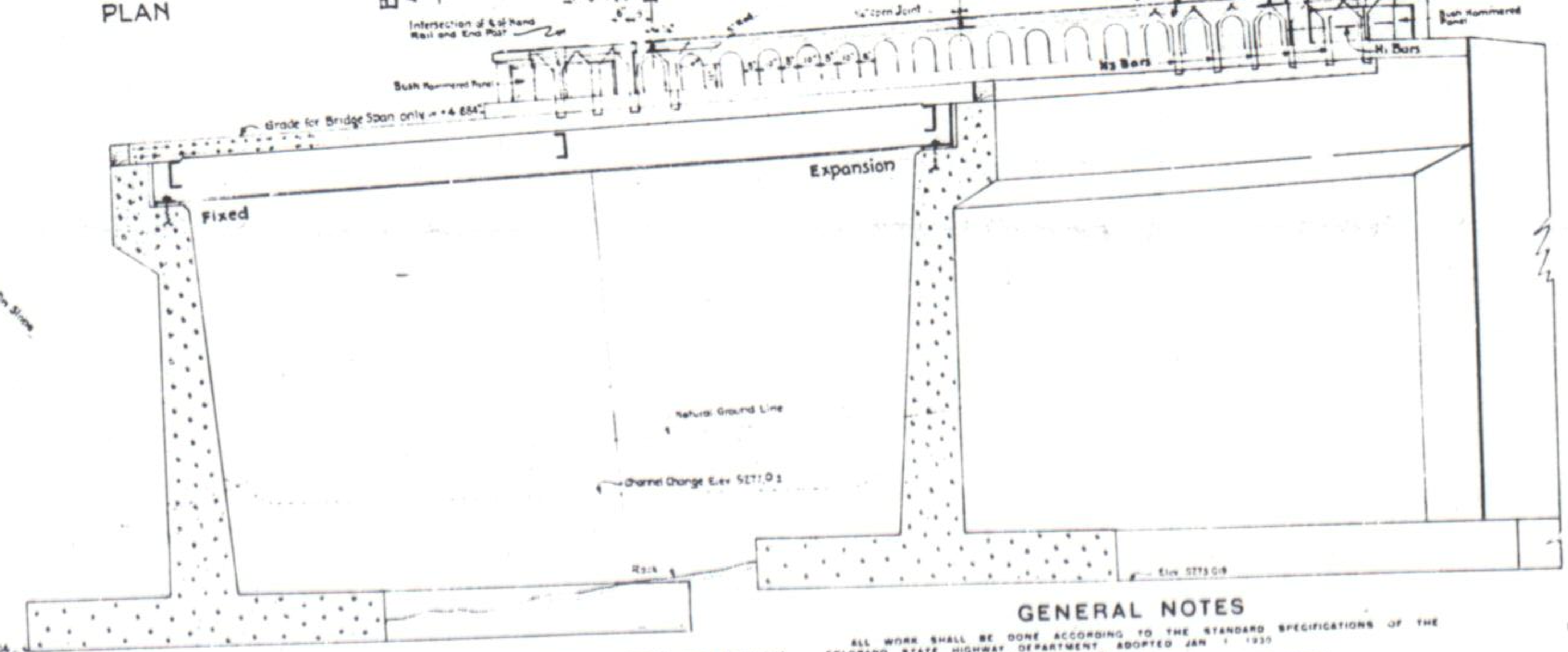
DRAIN GULCH
To Loveland
Vertical Curve
+8.0% Grade
Ground Line
Probable Red Sandstone
STA. 1436+00 EL. 5287.50
STA. 1437+50 EL. 5296.50
1436
+50
1437
+50

General Layout



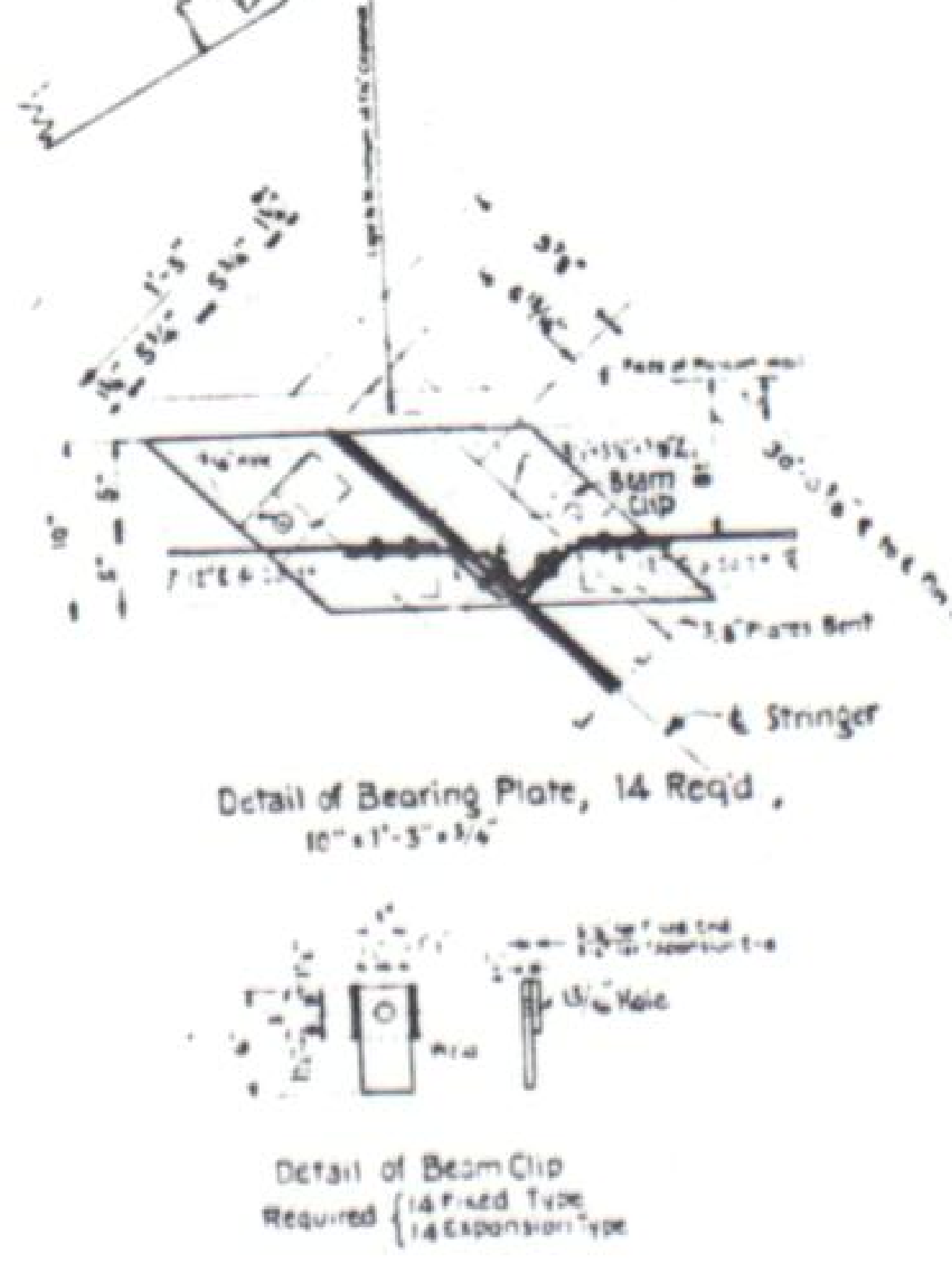
Back to back Parapet Walls
C to C of Bearings
30'-0" Clear Roadway
21" WF @ 67# 31'-2"
3" Dia drain
Curve Posts & Curbs to a 7" radius
1/2" Expansion Joint Material
A
B
N

PLAN



Fixed
Expansion
Natural Ground Line
H1 Bars
H3 Bars
Bush Hammered Panel

SECTION AT ℄ ROADWAY "A-A"



Beam Clip
℄ Stringer

Detail of Bearing Plate, 14 Req'd.

Detail of Beam Clip
Required { 14 Fixed Type / 14 Expansion Type

Summary Of Quantities For Entire Structure

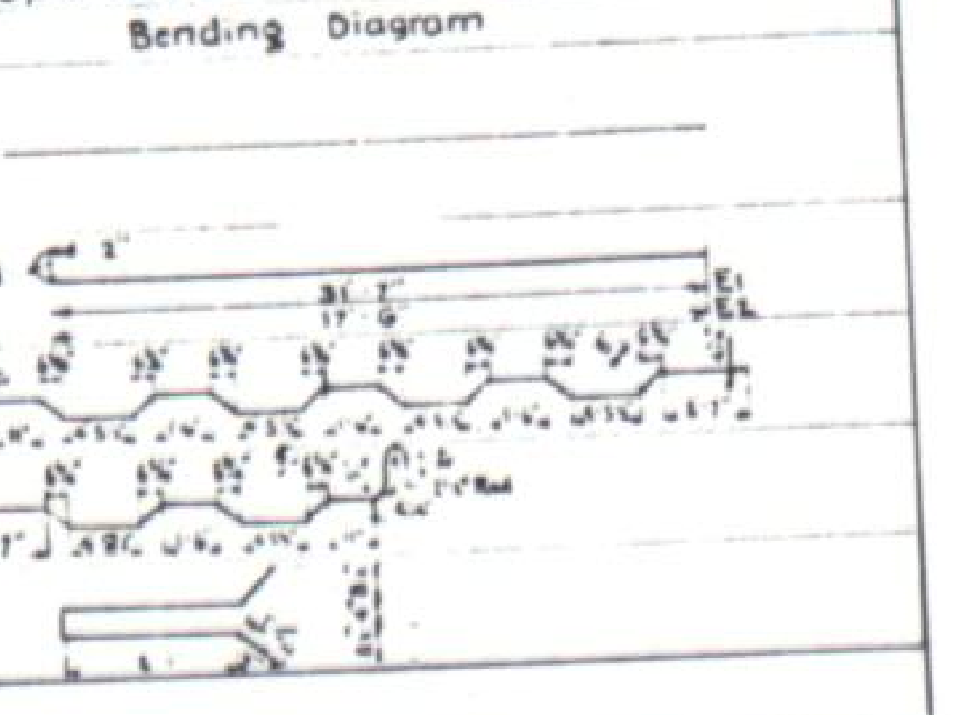
Item	Description	Unit	Super Structure	East Abutment	West Abutment	Totals
14a	Dry Rock Structural Excavation	Cu Yds		125.9	218.0	443.9
14b	Dry Common " "	"		71.5	218.5	290.0
14c	Wet Rock " "	"		227.4	126.8	354.2
14d	* Wet Common " "	"		.252	.252	0.504
42a	Untreated Bridge Timber	M ft BM				
46a	Class "A" Concrete	Cu Yds	35.	136.	161.	332.
47	Reinforcing Steel (1% overrun Included)	Lbs	6800	13840	16120	36444 ✱
48	Structural Steel (1½% " ")	"	18592	40	40	18672.
	Expansion Joint Material ½"x12"	Lin Ft	43			43.
89a	Galv Drain Pipes 3" Dia × 2'6" Long	Pcs	2			2

* Wet Line As Shown on Field Plans.
✱ Scale Weight.

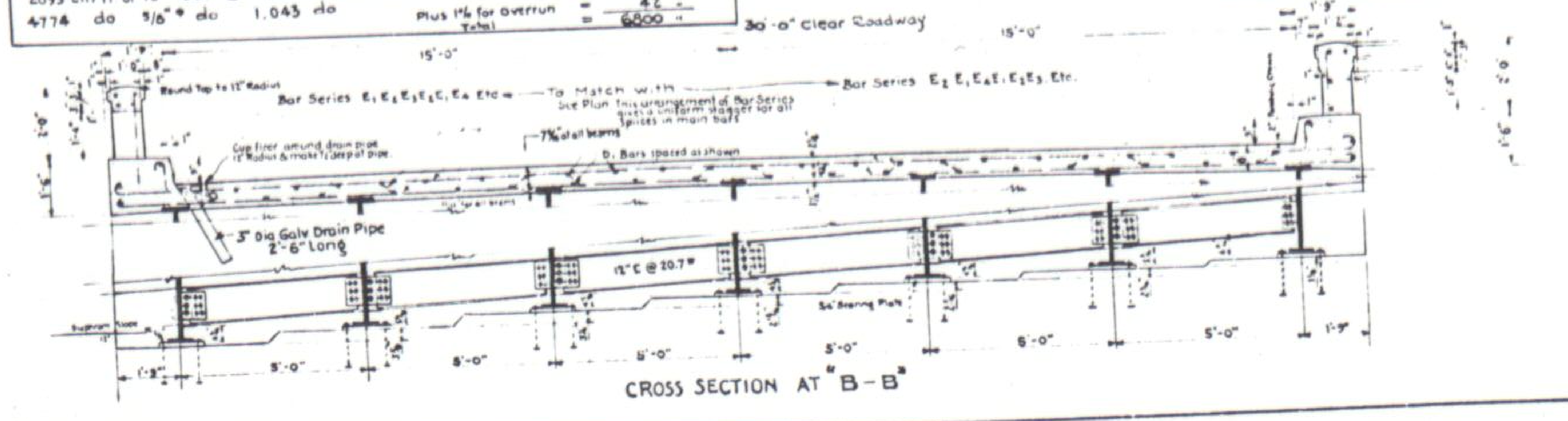
Bar List for Superstructure

Mark	Size	Reqd.	Length
H1	½"▫	16	3'-6"
H2	½"▫	16	11'-8"
D1	½"▫	48	32'-7"
E1	5/8"●	76	32'-5"
E2	5/8"●	76	18'-4"
E3	5/8"●	18	32'-9"
E4	5/8"●	18	18'-2"
H3	½"▫	44	6'-6"

Bending Diagram



2093 Lin ft of ½"▫ bar @ 0.850 lbs per lin. ft = 1779 lbs
4774 do 5/8"● do 1.043 do = 4979 "
Plus 1% for overrun = 42 "
Total = 6800 "



30'-0" Clear Roadway
15'-0"
Round Top to 12" Radius
Bar Series E1 E2 E3 E4 E1 E2 Etc
To Match with
See Plan. This arrangement of Bar Series gives a uniform stagger for all splices in main bars
D1 Bars spaced as shown
Cut Fillet around drain pipe 12" Radius & make 1" deep at pipe
3" Dia Galv Drain Pipe 2'-6" Long
12" ℄ @ 20.7#
5'-0"
1'-9"

CROSS SECTION AT "B-B"

GENERAL NOTES

ALL WORK SHALL BE DONE ACCORDING TO THE STANDARD SPECIFICATIONS OF THE COLORADO STATE HIGHWAY DEPARTMENT ADOPTED JAN 1 1930

ALL CONCRETE SHALL BE CLASS A

ALL EXPOSED SURFACES SHALL BE RUBBED FREE OF FORM MARKS

ALL EXPOSED CORNERS EXCEPT ON HANDRAILS SHALL BE BEVELED TO A 2 FACE

GIRDERS FLOOR SLABS AND CURB SHALL BE POURED MONOLITHICALLY

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

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

THICKNESS OF FLOOR SLAB SHOWN INCLUDES ½ CONCRETE WEARING SURFACE

ALL REINFORCING BARS SHALL BE ROUND OR SQUARE PLAIN OR DEFORMED AS SHOWN AND NOTED

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

SECONDARY BARS WHEN SPLICED SHALL BE GIVEN A LAP OF 40 DIAMETERS

MAIN BARS SHALL NOT BE SPLICED

SOUNDINGS AND DEPTH OF FOOTINGS SHOWN ARE ACCORDING TO THE BEST AVAILABLE DATA. IF ESSENTIALLY DIFFERENT CONDITIONS ARE ENCOUNTERED THE BRIDGE ENGINEER WILL INSPECT AND DETERMINE IF REDESIGN IS NECESSARY

MAXIMUM SOIL PRESSURE EQUALS [illegible]

[illegible] OF [illegible] TONGUE AND GROOVE LUMBER ON THE FACE

REFERENCE DRAWINGS

Sheet 19 20 East & West Abutments.

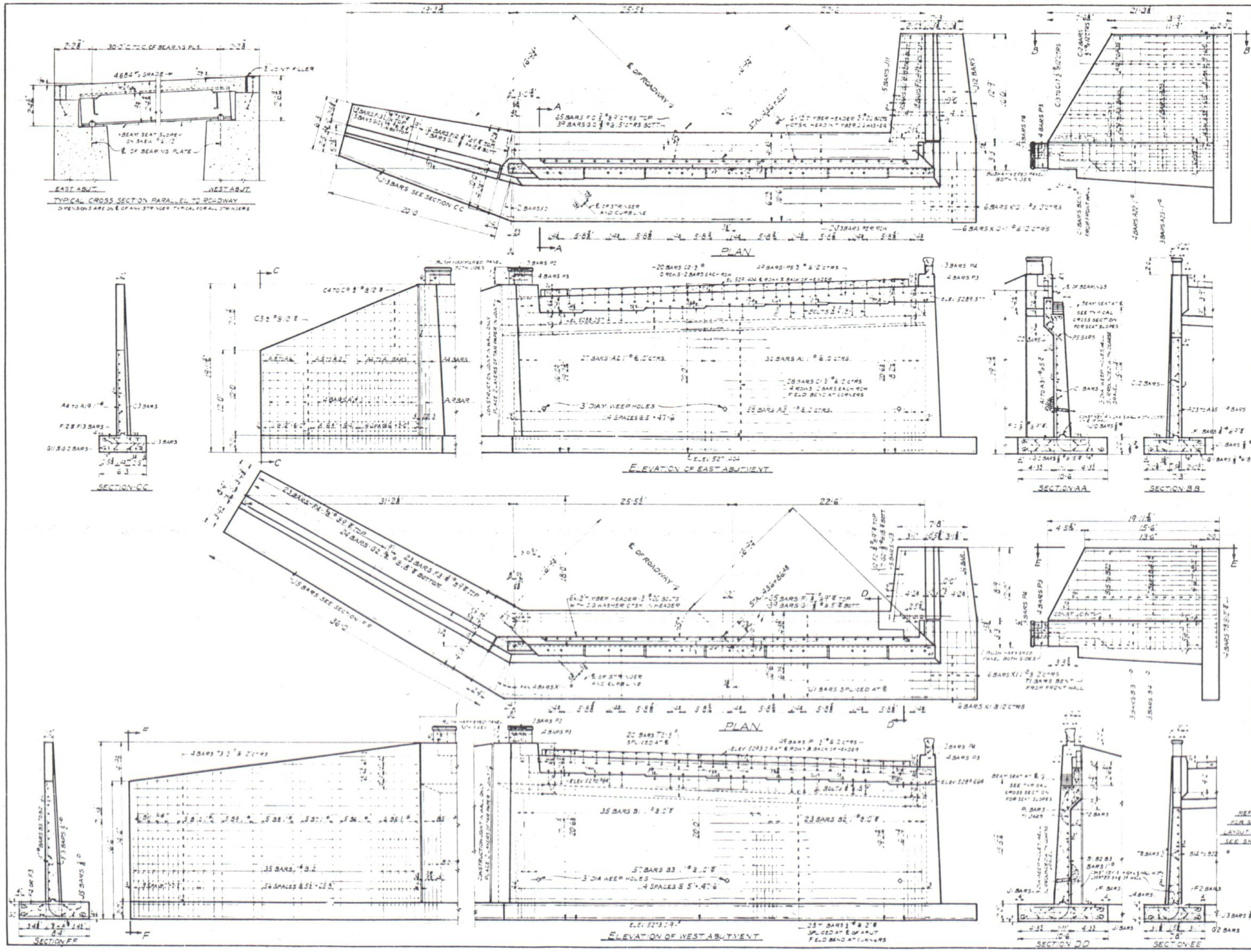
LOADING DATA.
LIVE LOAD: A. A. S. H. O. AUG 1928 CLASS A H-15.
DEAD LOAD: ASSUMES 15 LBS PER SQ FT ADDITIONAL WEARING SURFACE WHICH INCLUDES THE ½ IN CONCRETE MONOLITHIC WEARING SURFACE

COLORADO
STATE HIGHWAY DEPARTMENT
GENERAL LAYOUT
SUPERSTRUCTURE DETAILS
SUMMARY OF QUANTITIES
Across DRAIN GULCH
Sta. 1436+52.00 to 1436+84.48
Near LOVELAND Sec. 11 T.5N. R.70W.

Designed by A.L.C Made by S.J.B. Checked by K.D.	Approved by P.d. Bailey Bridge Engineer Date: March 27th 1933

STRUCTURE NO. C-15-A1

FED ROAD DIST NO	STATE	FED AID PROJ NO	SHEET NO	TOTAL SHEETS
3	COLO.	E-95-2	20	


TYPICAL CROSS SECTION PARALLEL TO ROADWAY
DIMENSIONS ARE ON ℄ OF ANY STRINGER TYPICAL FOR ALL STRINGERS
30'-0" C TO C OF BEARING PLS.
EAST ABUT.
WEST ABUT.
BEAM SEAT SLOPE ON SKEW
℄ OF BEARING PLATE
JOINT FILLER
PLAN
℄ OF ROADWAY
ELEVATION OF EAST ABUTMENT
SECTION CC
SECTION AA
SECTION BB
CONSTRUCTION JOINT IN WALL ONLY PLACE 2 LAYERS OF TAR PAPER IN JOINT
3" DIA. WEEP HOLES
PLAN
ELEVATION OF WEST ABUTMENT
SECTION FF
SECTION DD
SECTION EE
25'-5¾"
22'-6"
31'-2¾"
19'-11¾"
36'-0"
20'-0"

BAR LIST FOR EAST ABUTMENT

MARK	No	SIZE	LENGTH	BENDING DIAGRAM		
J10	20	5/8"■	25'-6"			
J11	5	5/8"■	13'-0"			
J12	3	5/8"■	16'-6"			
J13	8	5/8"■	24'-0"			
C1	28	1/2"■	27'-3"			
C2	20	1/2"■	25'-8"			
C3	10	1/2"■	8'-4"			
C4 TO C30	1 EACH	1/2"■	6'-6" TO 4'-0" BY 2.4"			
C32	2	1/2"■	2'-5"			
C3 TO C?	1 EACH	1/2"■	[illegible] TO 3'-7" BY 1.8"			
P2	3	1/2"■	1'-5"			
P3	8	1/2"■	4'-0"			
P4	3	1/2"■	1'-3"			
P5	44	1/2"■	9'-0"			
F10	65	1/2"■	8'-7"	l-7'-5	r-3½"	t-3"
F11	8	3/4"■	7'-4"	6'-4"	3"	2½"
F12	13	3/4"■	7'-10"	6'-0"	3"	2½"
F13	3	5/8"■	6'-2"	5'-4"	2½"	2"
G10	33	5/8"■	7'-4"	6'-6"	2½"	2"
G11	18	5/8"■	7'-1"	6'-3"	2½"	2"
G12	5	5/8"■	6'-2"	5'-4"	2½"	2"
X10	14	1"■	9'-2"	7'-10"	4"	3½"
A1	30	1"■	23'-2"	15'-9"	m-4'-0"	
A2	27	1"■	22'-2"	14'-9"	4'-0"	
A3	58	1"■	16'-1"	8'-5"	4'-0"	
A4	2	1"■	24'-10"	17'-11"	3'-6"	
A4 TO A11	1 EACH	1"■	24'-0" TO 21'-5" BY 6"	17'-11" TO 15'-0" BY 5"	3'-6" TO 2'-9" BY [illegible]	
A12 TO A15	1 EACH	1"■	20'-6" TO 18'-3" BY 9"	14'-5" TO 12'-8" BY 7"	[illegible] TO 2'-2" BY 2"	
A16 TO A18	1 EACH	1"■	17'-5" TO 15'-2" BY 1'-2½"	11'-0" TO 10'-2" BY 5"	2'-0" TO 1'-7" BY 2½"	
A19	15	1"■	13'-1"	8'-0"	1'-8"	
A22	4	1"■	24'-0"	17'-0"	3'-7"	
A23	14	1"■	13'-8"	8'-2"	2'-1"	
A24 TO A31	1 EACH	1"■	26'-1" TO 21'-1½" BY 8.2"	18'-1" TO 15'-0" BY 7"	3'-1" TO 2'-8½" BY 1½"	
A32 TO A35	1 EACH	1"■	20'-5" TO 17'-2" BY 1'-1"	14'-6" TO 11'-9" BY 1"	2'-6" TO 2'-0" BY 2"	

BAR LIST FOR WEST ABUTMENT

MARK	No	SIZE	LENGTH	BENDING DIAGRAM		
J1	20	5/8"■	26'-0"			
J3	5	5/8"■	8'-0"			
J4	3	5/8"■	12'-6"			
J5	8	5/8"■	40'-0"			
T1	28	1/2"■	27'-6"			
T2	20	1/2"■	26'-3"			
T3	14	1/2"■	33'-4"			
T4 TO T7	1 EACH	1/2"■	3'-0" TO 9'-7" BY 7.5"			
T8	14	1/2"■	8'-5"			
T9	1	1/2"■	6'-4"			
T10	1	1/2"■	4'-4"			
P2	3	1/2"■	1'-5"			
P3	8	1/2"■	4'-0"			
P4	3	1/2"■	1'-0"			
P1	49	1/2"■	9'-6"			
F1	65	1/2"■	8'-7"	l-7'-5	r-3½"	t-3"
F2	12	3/4"■	7'-8"	6'-8"	3"	2½"
F3	23	3/4"■	7'-9"	6'-9"	3"	2½"
F4	23	5/8"■	6'-8"	5'-10"	2½"	2"
G1	39	5/8"■	7'-4"	6'-6"	2½"	2"
G2	31	5/8"■	7'-1"	6'-3"	2½"	2"
X1	16	1"■	9'-2"	7'-10"	4"	3½"
B1	35	1"■	23'-0"	15'-7"	m-4'-0"	
B2	23	1"■	22'-2"	14'-9"	4'-0"	
B3	57	1"■	16'-1"	8'-8"	4'-0"	
B5	8	1"■	25'-8"	18'-8"	3'-7"	
B6	5	1"■	24'-10"	18'-0"	3'-5"	
B7	5	1"■	24'-1"	17'-4"	3'-4"	
B8	5	1"■	23'-3"	16'-8"	3'-2"	
B9	5	1"■	22'-6"	16'-0"	3'-1"	
B10	5	1"■	21'-8"	15'-4"	2'-11"	
B11	4	1"■	20'-11"	14'-8"	2'-10"	
B12	35	1"■	14'-2"	8'-0"	2'-9"	
B13	3	1"■	23'-7"	16'-7"	3'-7"	
B14	10	1"■	13'-8"	7'-10"	2'-5"	
B15 TO B18	1 EACH	1"■	24'-2" TO 22'-2" BY 8"	17'-8" TO 16'-9" BY [illegible]	3'-0"	
B19 TO B22	1 EACH	1"■	21'-0" TO 18'-8" BY 8"	[illegible]	2'-4"	

EAST ABT.	WEST ABT.		EAST ABT.	WEST ABT.
1707	1973	LIN FT OF 1/2"■ BARS @ 0.668# PER LIN FT =	1140#	1318#
483	507	LIN FT OF 1/2"■ BARS @ 0.850# PER LIN FT =	411	431
1316	1581	LIN FT OF 5/8"■ BARS @ 1.043# PER LIN FT =	1373	1649
257	270	LIN FT OF 3/4"■ BARS @ 1.502# PER LIN FT =	386	406
558	558	LIN FT OF 7/8"■ BARS @ 2.044# PER LIN FT =	1141	1141
3465	4126	LIN FT OF 1"■ BARS @ 2.670# PER LIN FT =	9252	11016
		PLUS 1%± FOR OVERRUN =	137	159
		TOTAL =	13840#	16120#

LOADING DATA.

LIVE LOAD: A. A. S. H. O. AUG. 1928 CLASS A H-15

DEAD LOAD: ASSUMES 15 LBS PER SQ FT ADDITIONAL WEARING SURFACE WHICH INCLUDES THE ½" IN CONCRETE MONOLITHIC WEARING SURFACE

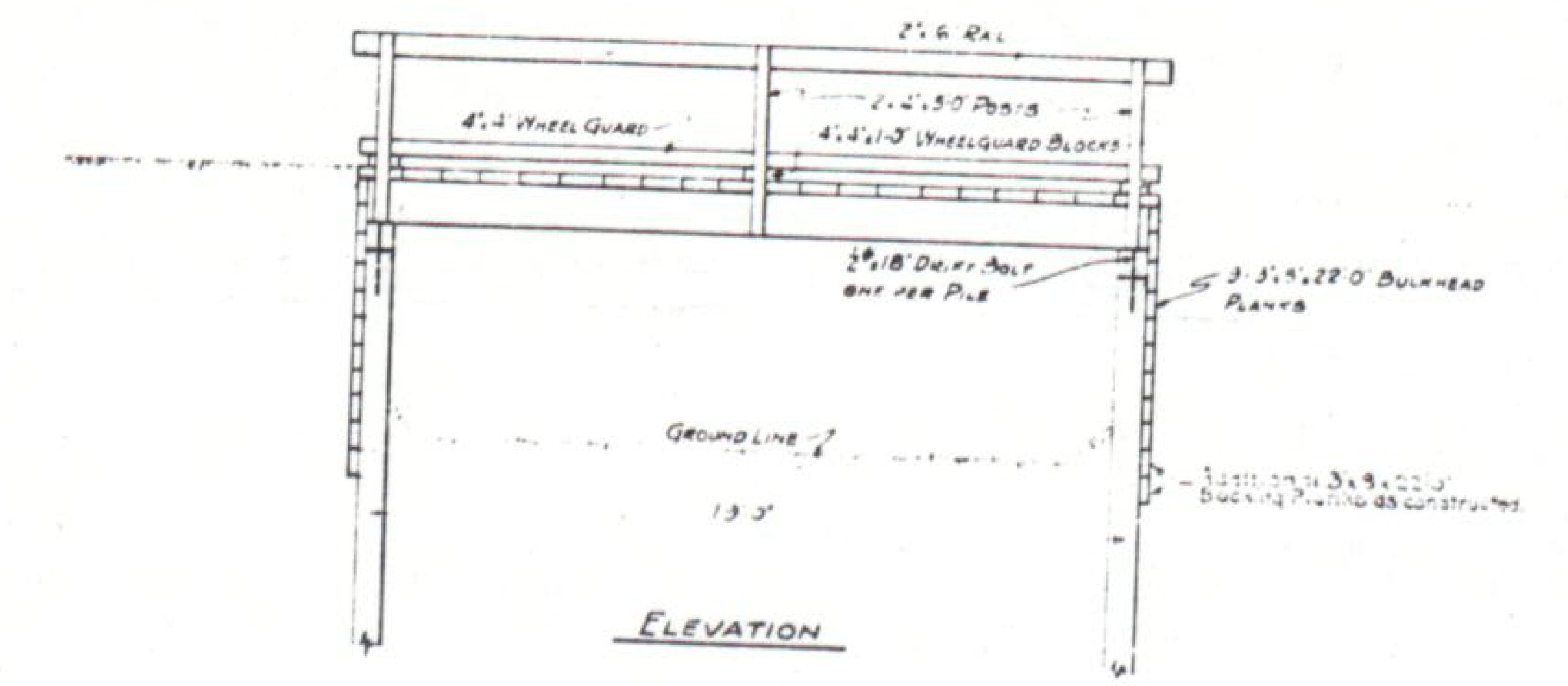
REFERENCE DRAWINGS
FOR SUPERSTRUCTURE, GENERAL
LAYOUT & SUMMARY OF QUANTITIES
SEE SHEET No 19

COLORADO
STATE HIGHWAY DEPARTMENT

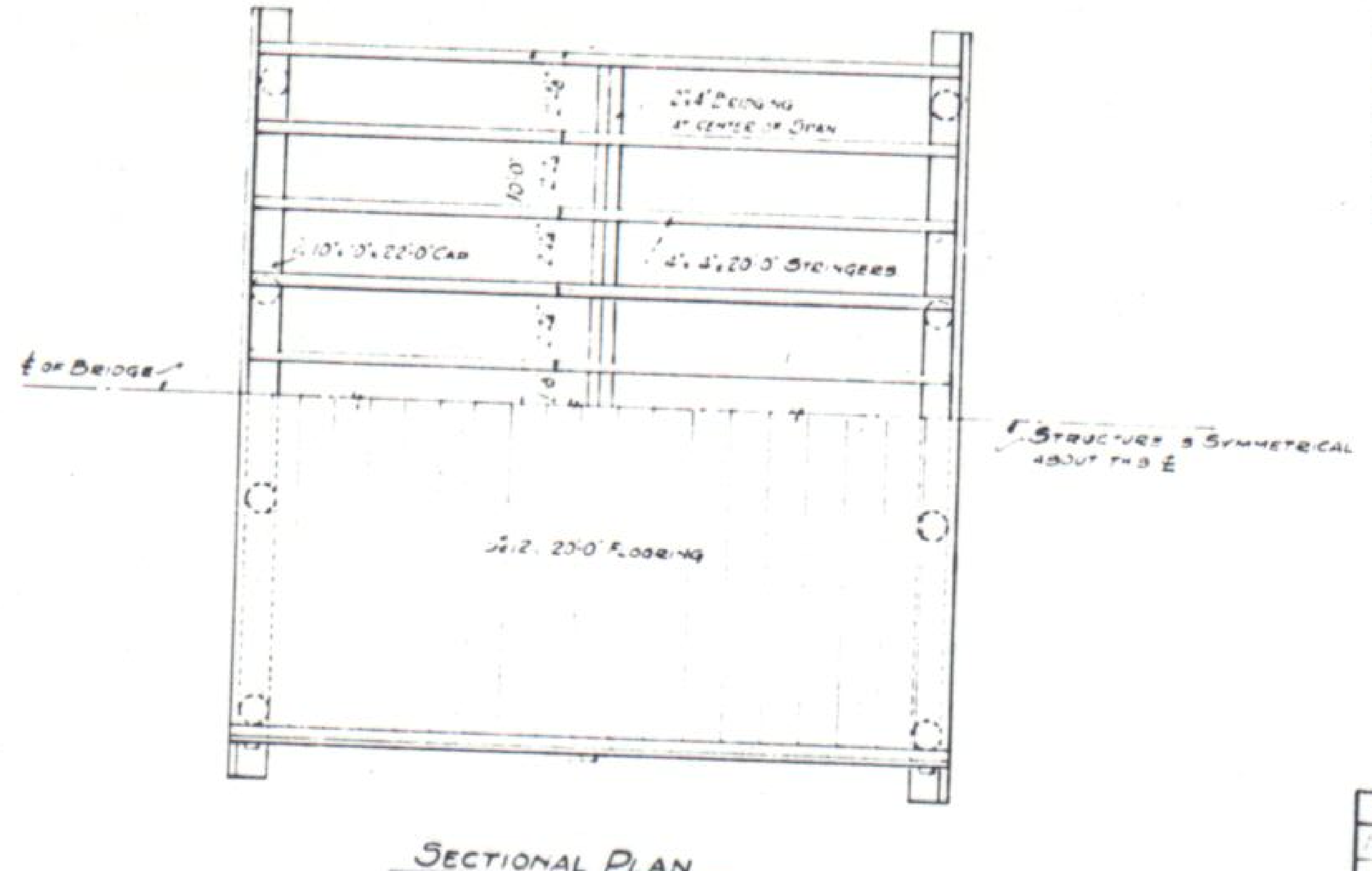
EAST & WEST ABUTMENTS
FOR ONE SPAN AT 30 FT x 24 FT RDWY.
CONCRETE & STEEL I BEAM BRIDGE
Across DRAIN GULCH.
Sta. 1436+52.50 TO 1436+86.48
Near LOVELAND Sec. 11 T.5N. R.70W

Designed by A.L.C.	Approved by R. S. Bailey
Made by W.McM.	Bridge Engineer
Checked by K.B.	Date: March 27th 1933

STRUCTURE NO. C-16-AI


2"x6" Rail
4"x4" Wheel Guard
2"x4"x5'0" Posts
4"x4"x1'0" Wheelguard Blocks
3/4"x18" Drift Bolt one per Pile
3-3"x12"x22'0" Bulkhead Planks
Ground Line
19'3"

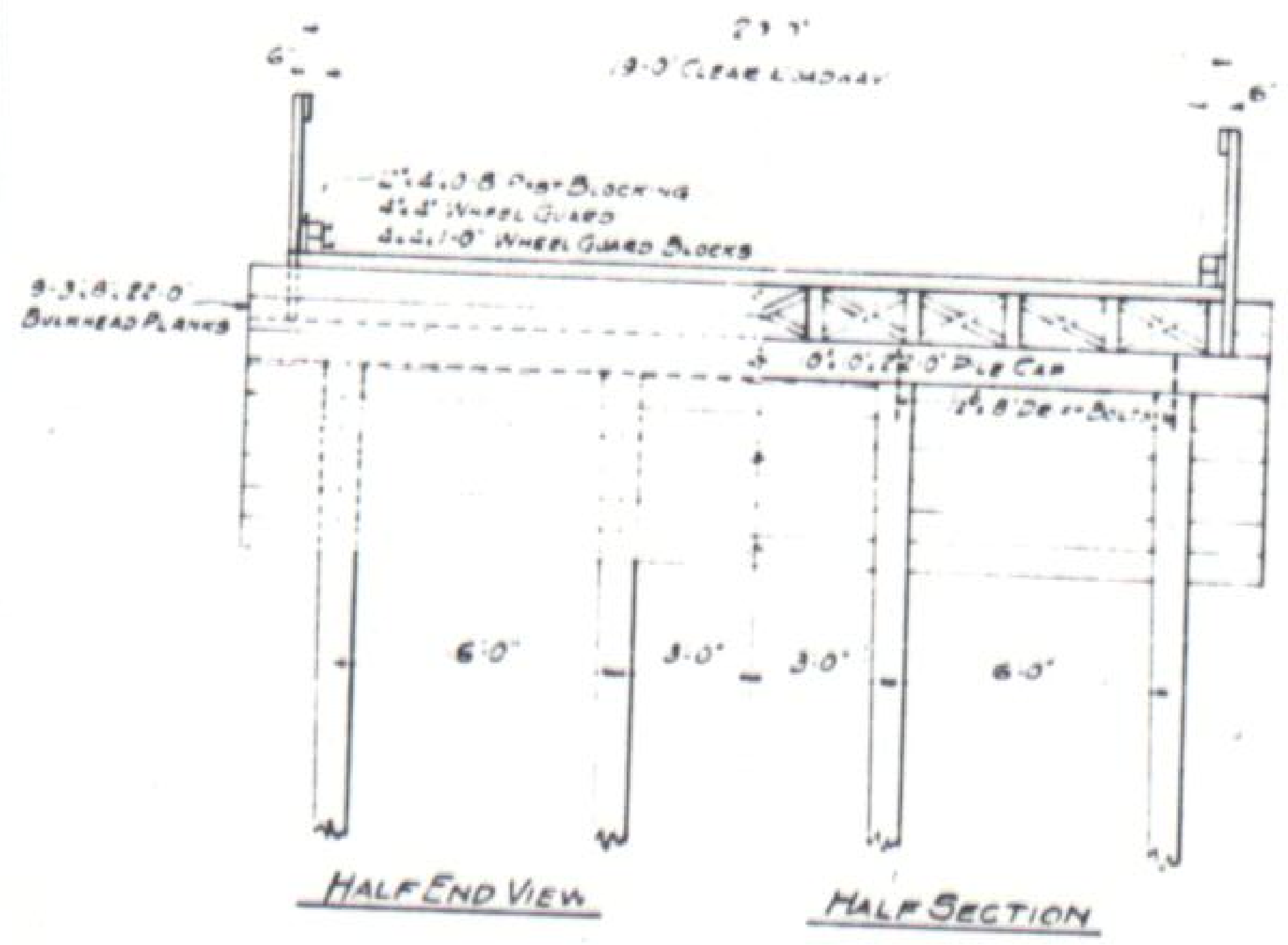
ELEVATION


2"x4" Bridging at center of span
10"x10"x22'0" Cap
4"x12"x23'0" Stringers
℄ of Bridge
℄ Structure is Symmetrical about this ℄
3"x12"x23'0" Flooring

SECTIONAL PLAN

LIST OF TIMBER FOR ENTIRE BRIDGE			
PILING 8 PILES @ 20 FT LONG = 160 LIN. FT.			
STRUCTURAL TIMBER - UNTREATED.			
DESCRIPTION	NO	SIZE	M.FT.B.M.
CAP	2	10"x10"x22'0"	0.368
STRINGERS	10	4"x12"x23'0"	0.934
TOTAL STRUCTURAL TIMBER			1.302
NATIVE TIMBER - UNTREATED			
HANDRAILS	2	2"x6"x20'0"	0.040
HANDRAIL POSTS	6	2"x4"x5'0"	0.020
POST BLOCKING	6	2"x4"x3'5"	0.003
WHEEL GUARDS	2	4"x4"x23'0"	0.053
WHEEL GUARD BLOCKING	6	4"x4"x1'0"	0.008
FLOOR PLANKS	20	3"x12"x23'0"	1.200
BRIDGING	19	2"x4"x2'2"	0.026
BULKHEAD PLANKS	18	3"x6"x22'0"	0.792
TOTAL NATIVE TIMBER			2.142
PILE SHOES - CAST IRON			
PILE SHOES @ 35 LBS EACH			= 8 SHOES
NAILS & DRIFT BOLTS			
DRIFT BOLTS 3/4"x18"			8 BOLTS
NAILS 20d COMMON			7 LBS.
NAILS 60d COMMON			53 LBS

SUMMARY OF QUANTITIES FOR ENTIRE BRIDGE			
ITEM	DESCRIPTION	UNIT	TOTAL
14b	DRY COMMON STRUCT EXCAVATION	CU. YD.	38
42a	STRUCTURAL TIMBER - UNTREATED	M.FT.B.M.	1.302
42d	NATIVE TIMBER - UNTREATED	M.FT.B.M.	2.142
60b	PILING - UNTREATED	LIN. FT.	160
60c	PILE SHOES	EACH	8
14d	Wet Common Struct Exc	Cu. Yd.	51
ADDITIONAL QUANTITIES WORK ORDER Nº 5188			
42a	Struct'l Timber - Untreated	M.Ft.B.M.	0.178

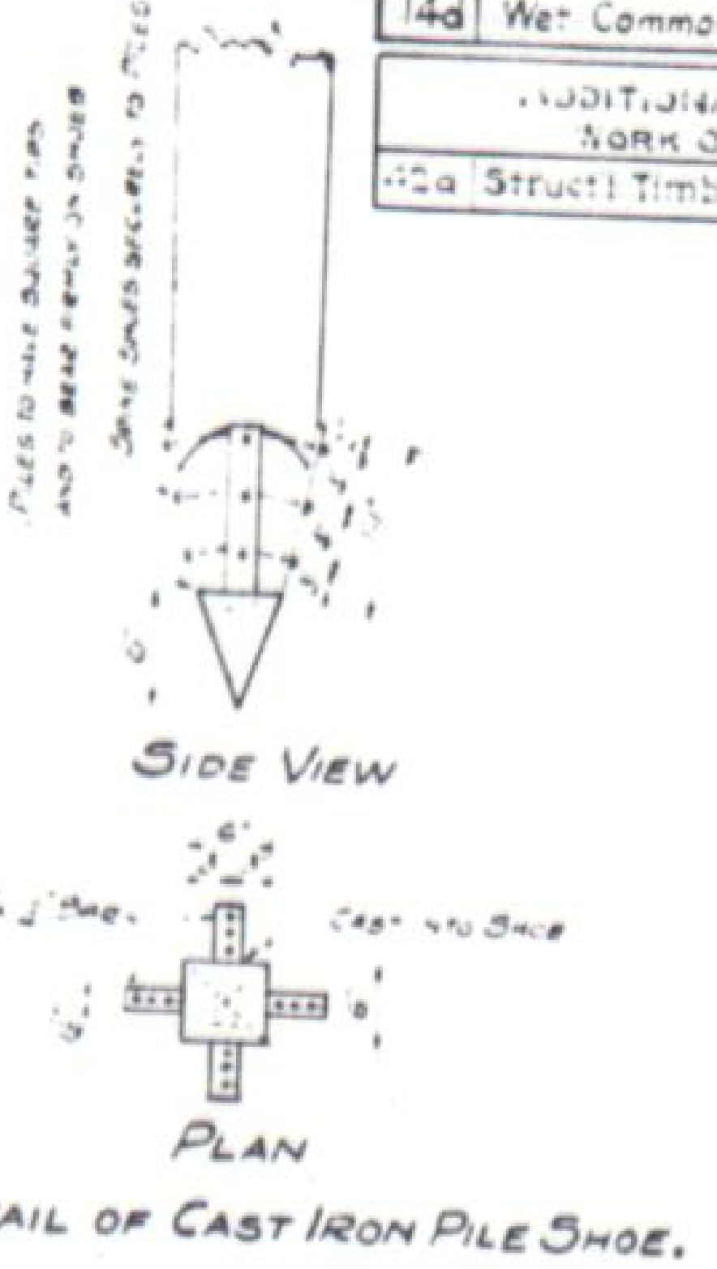

23'0"
19'0" Clear Roadway
2"x4"x1'6" Post Blocking
4"x4" Wheel Guard
4"x4"x1'0" Wheel Guard Blocks
3-3"x6"x22'0" Bulkhead Planks
10"x10"x22'0" Pile Cap
3/4"x18" Drift Bolt
6'0"
3'0"
3'0"
6'0"

HALF END VIEW

HALF SECTION

NAILING DIRECTIONS
Rails to Posts: 2 20d per rail per post
Posts to Post Blocking: 2-20d nails per block
Post Blocking to Wheel Guards and Wheel Guard Blocking: 2-20d nails per block
Wheel Guard Blocks: 2 60d nails per block
Wheel Guards to Blocks: 2 60d nails per wheel guard per block
Floor Planks to Stringers: 2-60d nails per plank per stringer
Posts to Stringers: 4-20d nails per post
Stringers to Caps: 2 60d nails per stringer per cap
Bulkhead Planks to Stringers and Piles: 2 60d nails per plank per stringer or per pile.
Bridging to Stringers: 2-20d nails per end of bridging

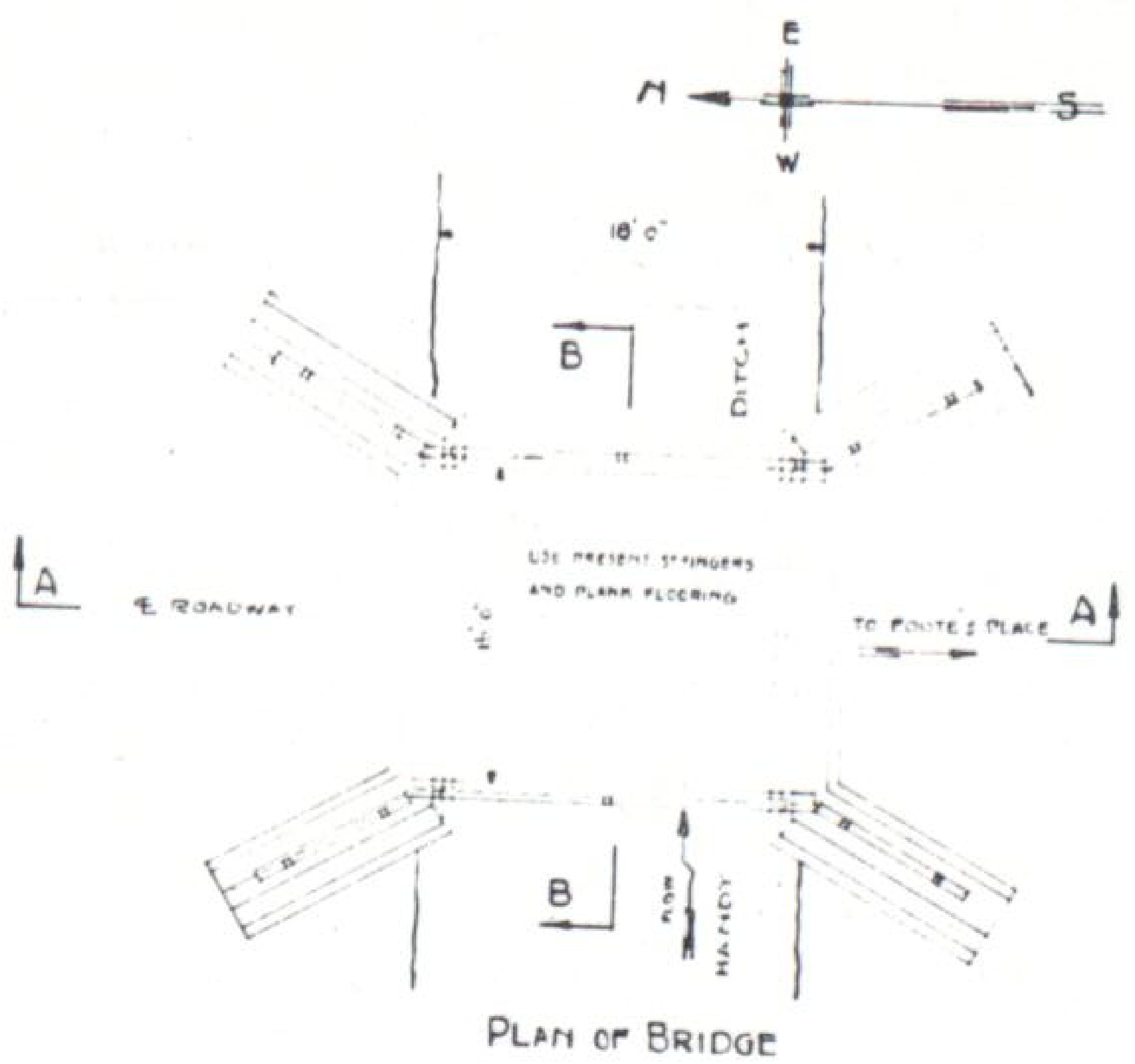
FARM BRIDGE OVER HOME SUPPLY DITCH.
OPPOSITE STA. 1415+00±


Piles to have square tips and to bear firmly in shoes
Spike shoes securely to piles
Cast Iron Shoe

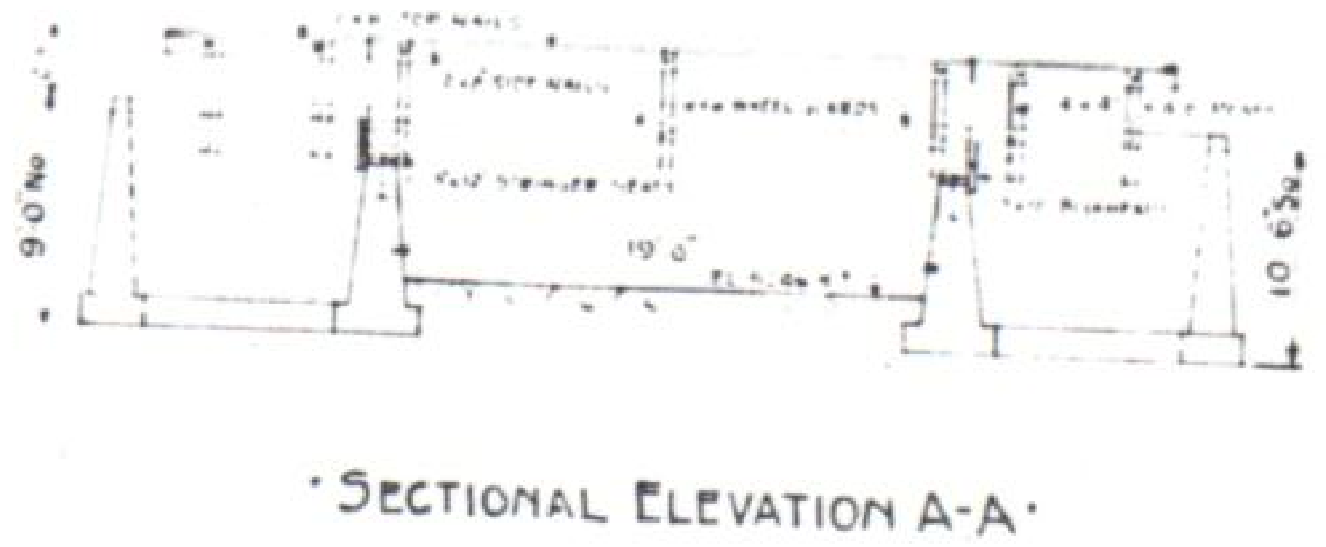
SIDE VIEW

PLAN

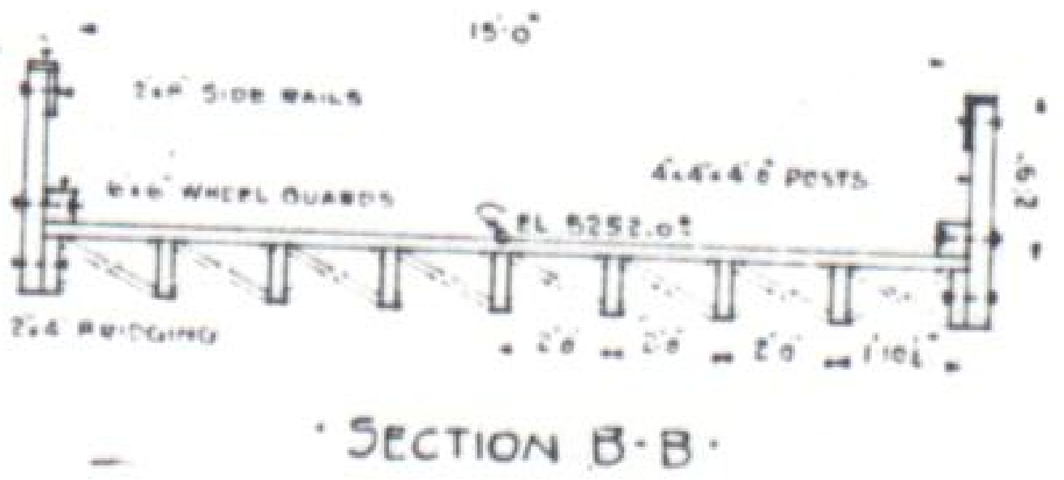
DETAIL OF CAST IRON PILE SHOE.


N
E
W
S
18'0"
B
B
A
A
℄ Roadway
Ditch
Use present stringers and plank flooring
To Fourth Street Place
Handy

PLAN OF BRIDGE


9'0" No
19'0"
10'6" So

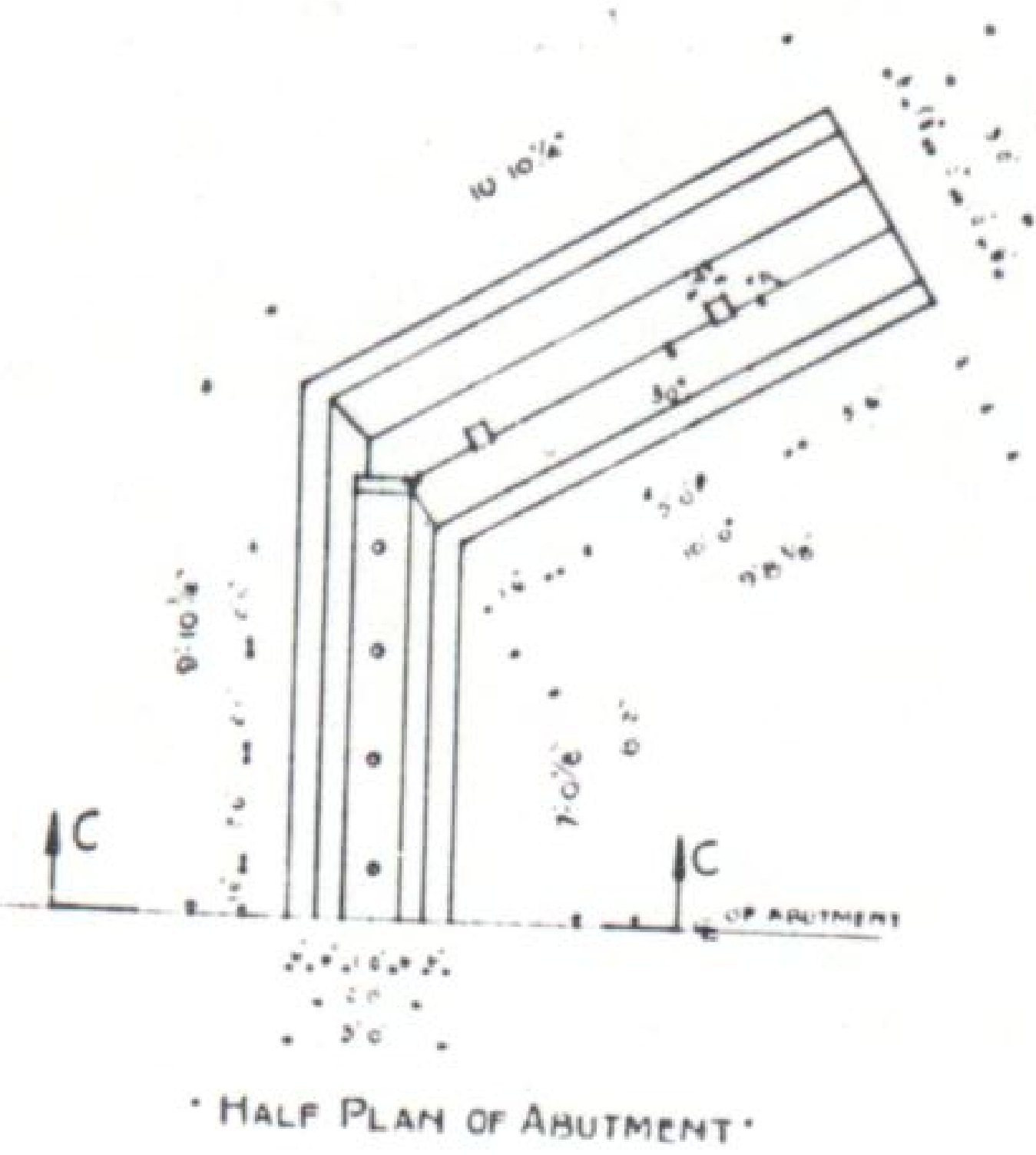
·SECTIONAL ELEVATION A-A·


2"x6" Top Rails
2"x8" Side Rails
15'0"
4"x4"x4' Posts
6"x6" Wheel Guards
EL. 5252.0
2x4 Bridging

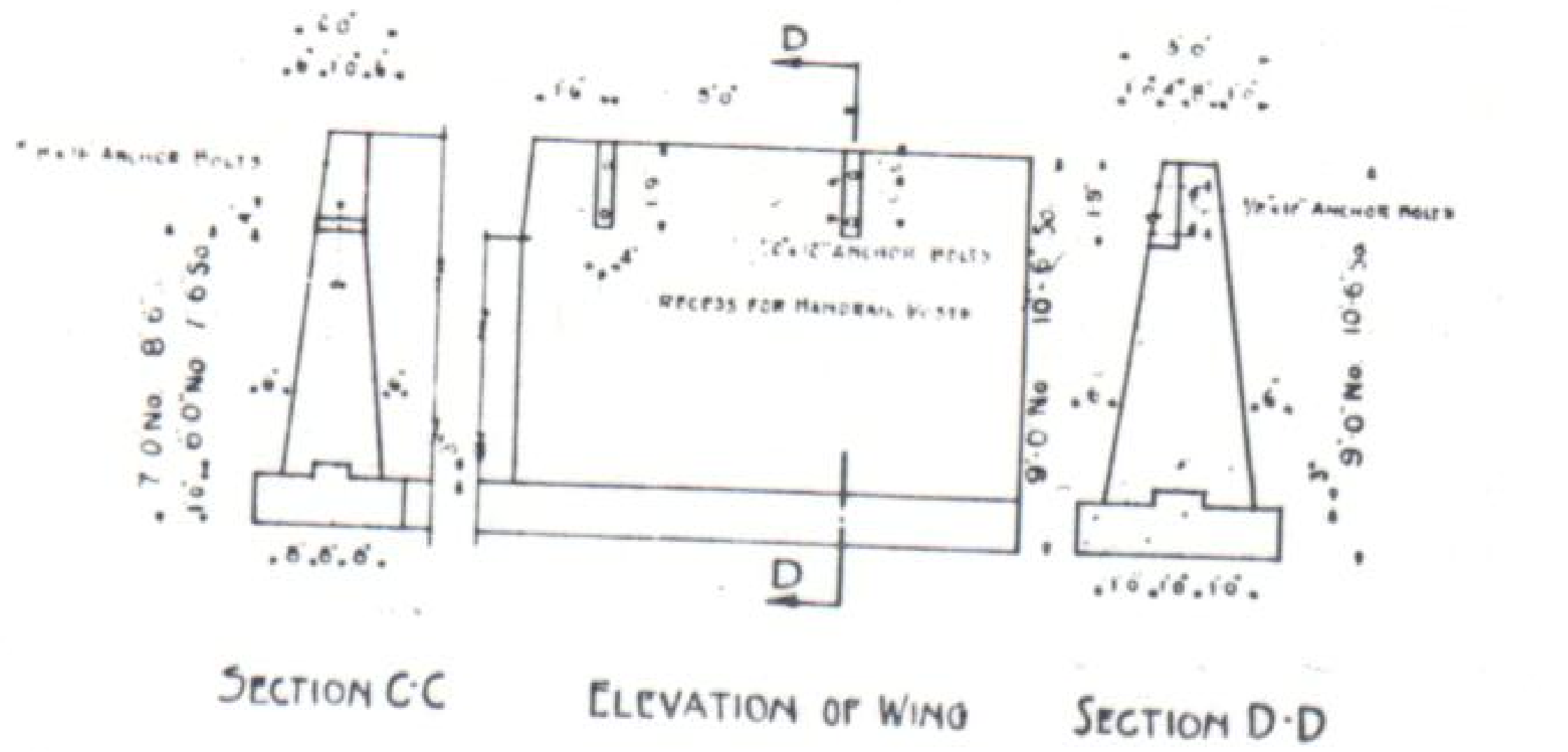
·SECTION B-B·

LIST OF NEW UNTREATED TIMBER FOR BRIDGE			
DESCRIPTION	NUMBER	SIZE	M.FT.B.M.
TOP RAILS S4S	4	2"x6"x8'0"	.032
" " "	2	2"x6"x21'0"	.042
SIDE " "	4	2"x8"x8'0"	.043
" " "	2	2"x8"x21'0"	.056
HANDRAIL POSTS S4S	14	4"x4"x4'0"	.075
WHEEL GUARDS	2	6"x6"x21'0"	.126
BULKHEAD PLANKS	4	3"x10"x16'0"	.160
BRIDGE SEATS	2	3"x12"x16'0"	.096
STRINGER BRIDGING	2	2"x4"x16'0"	.022
TOTAL UNTREATED BRIDGE TIMBER			.652

·BOLTS AND WASHERS FOR ENTIRE BRIDGE·						
LOCATION	ITEM	SIZE	NO	LENGTH	WGT EA	TOTAL WGT
BRIDGE SEAT ANCHORS	BOLTS	5/8"	16	16"	1.65	26.4
HANDRAIL POSTS TO WINGS	"	1/2"	16	12"	.82	13.2
" " " STRINGERS	"	1/2"	6	9"	.65	3.9
" " " WHEEL GUARD	"	1/2"	6	11"	.77	4.6
" " " RAILS	"	1/2"	14	9"	.65	9.1
WHEEL GUARDS TO STRINGERS	"	5/8"	10	24"	2.35	23.5
	WASHERS	5/8"	36		.75	27.0
	"	1/2"	68		.50	34.0
TOTAL WEIGHT BOLTS AND WASHERS LBS·						142.0


10'10¾"
C
C
7'0"
9'10"
of Abutment

·HALF PLAN OF ABUTMENT·


D
D
Anchor Bolts
Recess for Handrail Posts
7'0" No 8'6"
3'6" 6'0" No 6'5"
9'0" No 10'6"

SECTION C-C

ELEVATION OF WING

SECTION D-D

·LIST OF NAILS AND SPIKES·					
LOCATION	ITEM	NUMBER	LENGTH	Nº PER LB.	TOTAL WEIGHT
FLOOR PLANKS TO STRINGERS	WIRE SPIKES	378	7"	7	54
BULKHEAD " " "	" "	72	7"	7	11
STRINGERS TO BRIDGE SEATS	40d NAILS	72	5"	18	4
RAILS TO POSTS	40d "	56	5"	18	3
BRIDGING TO STRINGERS	30d "	64	4½"	24	3
TOTAL WEIGHT NAILS & SPIKES LBS·					75

·SUMMARY OF NEW QUANTITIES·			
ITEM Nº	DESCRIPTION	UNIT	TOTAL
14a	DRY ROCK STRUCTURAL EXCAVATION	CU. YDS.	—
14b	" COMMON " "	" "	774
14c	WET ROCK " "	" "	—
14d	" COMMON " "	" "	654
42a	UNTREATED BRIDGE TIMBER	M.FT.B.M.	0.652
46a	CLASS "A" CONCRETE	CU. YDS.	49.3

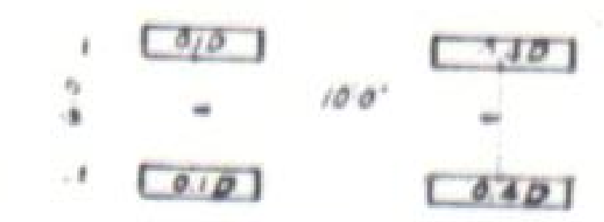
FARM BRIDGE OVER HANDY DITCH
OPPOSITE STA. 1421+00±

FED ROAD DIST NO	STATE	FED AID PROJ NO	SHEET NO	TOTAL SHEETS
3	COLO	E-9 B2	21	

CONSTRUCTION DIVISION Nº 2
Revised 11-2-33 A.G.K. Added 4 Backing Planks
(As Constructed)

Revised Quantities and Height Abuts As Constructed. 5-14-38
R.A.Q.

LOADING DATA FOR 'HOME SUPPLY' BRIDGE.
D.L. TIMBER: 3½ LBS PER BD. FT.
L.L. - D-6; 12000 LBS



TYPICAL TRUCK
NO IMPACT INCLUDED

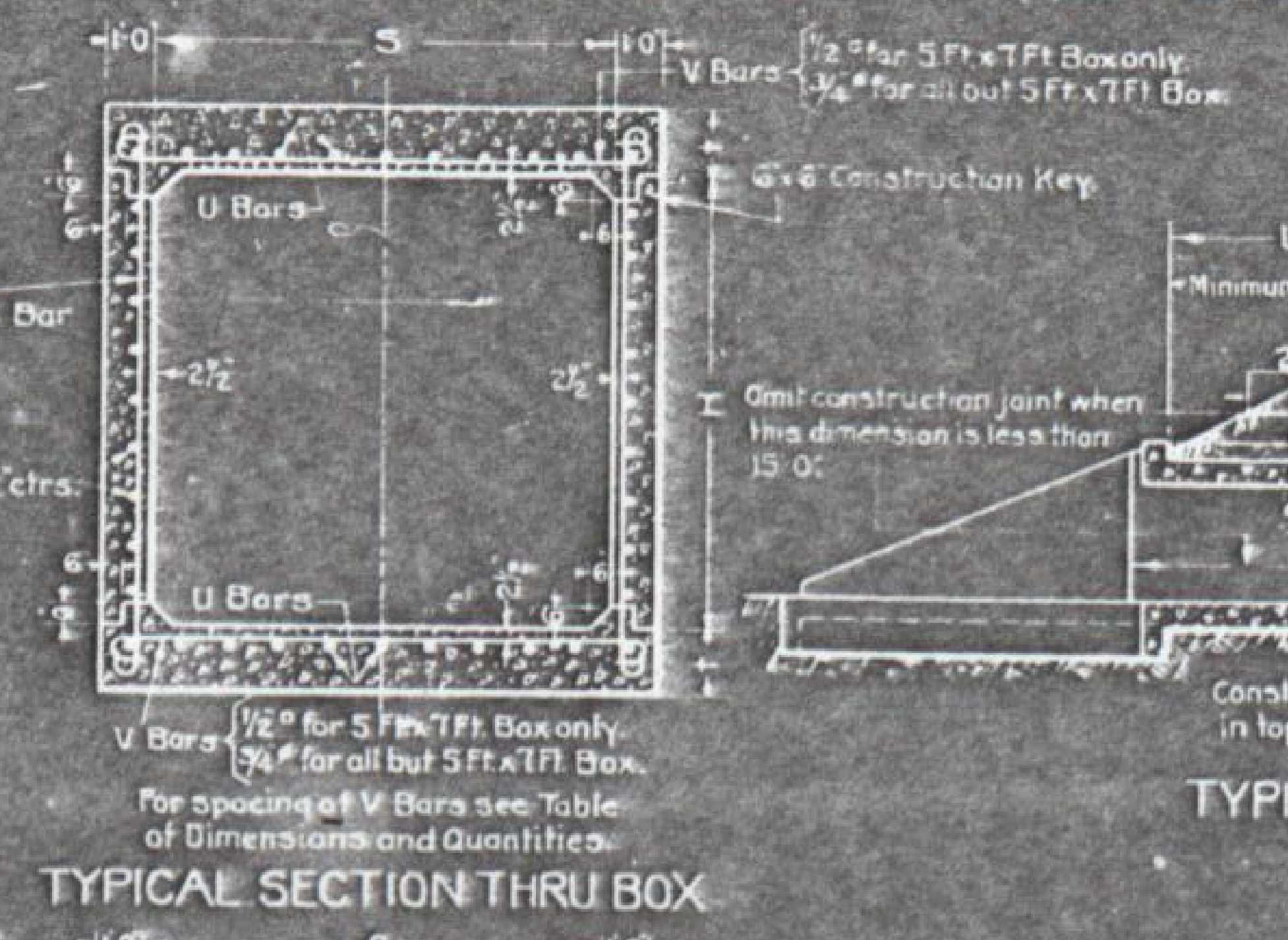
COLORADO
STATE HIGHWAY DEPARTMENT
19'0" SPAN TIMBER BRIDGES
19'-0" CLEAR ROADWAY
4A 15'-0" CLEAR ROADWAY
Across IRRIGATION DITCHES
OPPOSITE STA 1415+00± & STA. 1421+00±
Near LOVELAND Sec. 11 T. 5N. R. 70 W.

Designed by E.F.W.	Approved by P. S. Bailey
Made by A.C.G. H.D.	Bridge Engineer
Checked by G.H.D.	Date: April 1st, 1933.

STRUCTURE NO.________

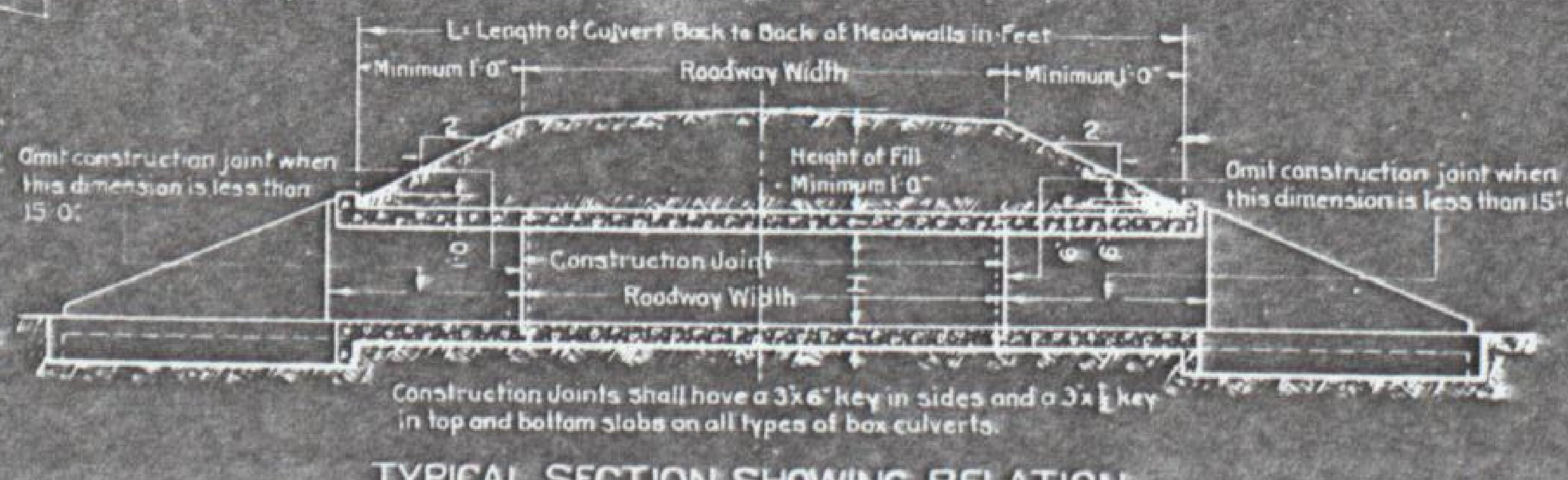
STANDARD M-104-D

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
3	COLO	E3B-2	22	



1'-0"
S
1'-0"
V Bars ½" for 5 Ft x 7 Ft Box only, ¾" for all but 5 Ft x 7 Ft Box
6"x6" Construction Key
U Bars
W Bars One every other V Bar
U Bars ½" at about 12" ctrs.
2½"
V Bars ½" for 5 Ft x 7 Ft Box only, ¾" for all but 5 Ft x 7 Ft Box
For spacing of V Bars see Table of Dimensions and Quantities

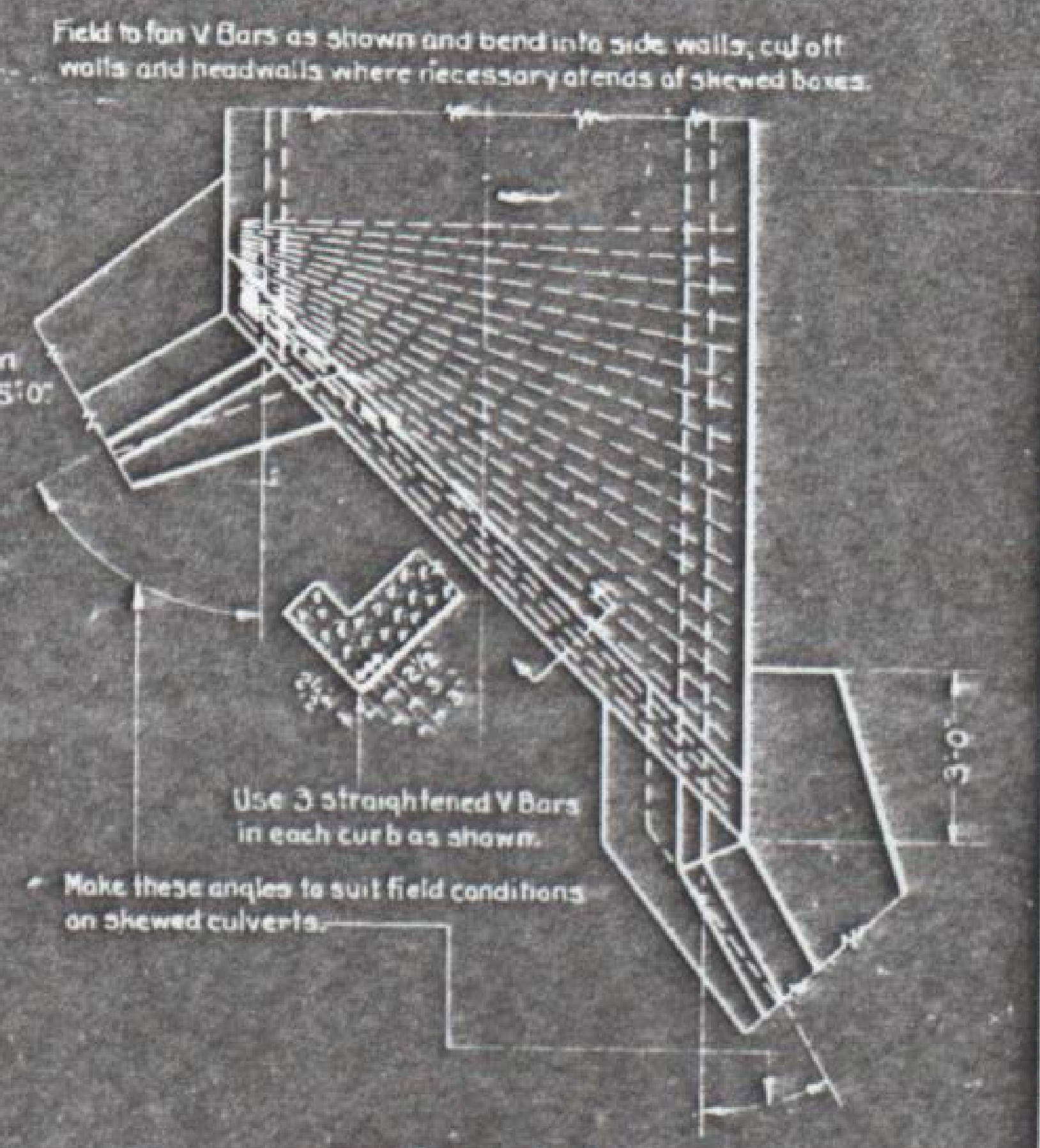
TYPICAL SECTION THRU BOX



L= Length of Culvert Back to Back of Headwalls in Feet
Minimum 1'-0"
Roadway Width
Minimum 1'-0"
Omit construction joint when this dimension is less than 15'-0"
Height of Fill Minimum 1'-0"
Construction Joint
Roadway Width
Omit construction joint when this dimension is less than 15'-0"

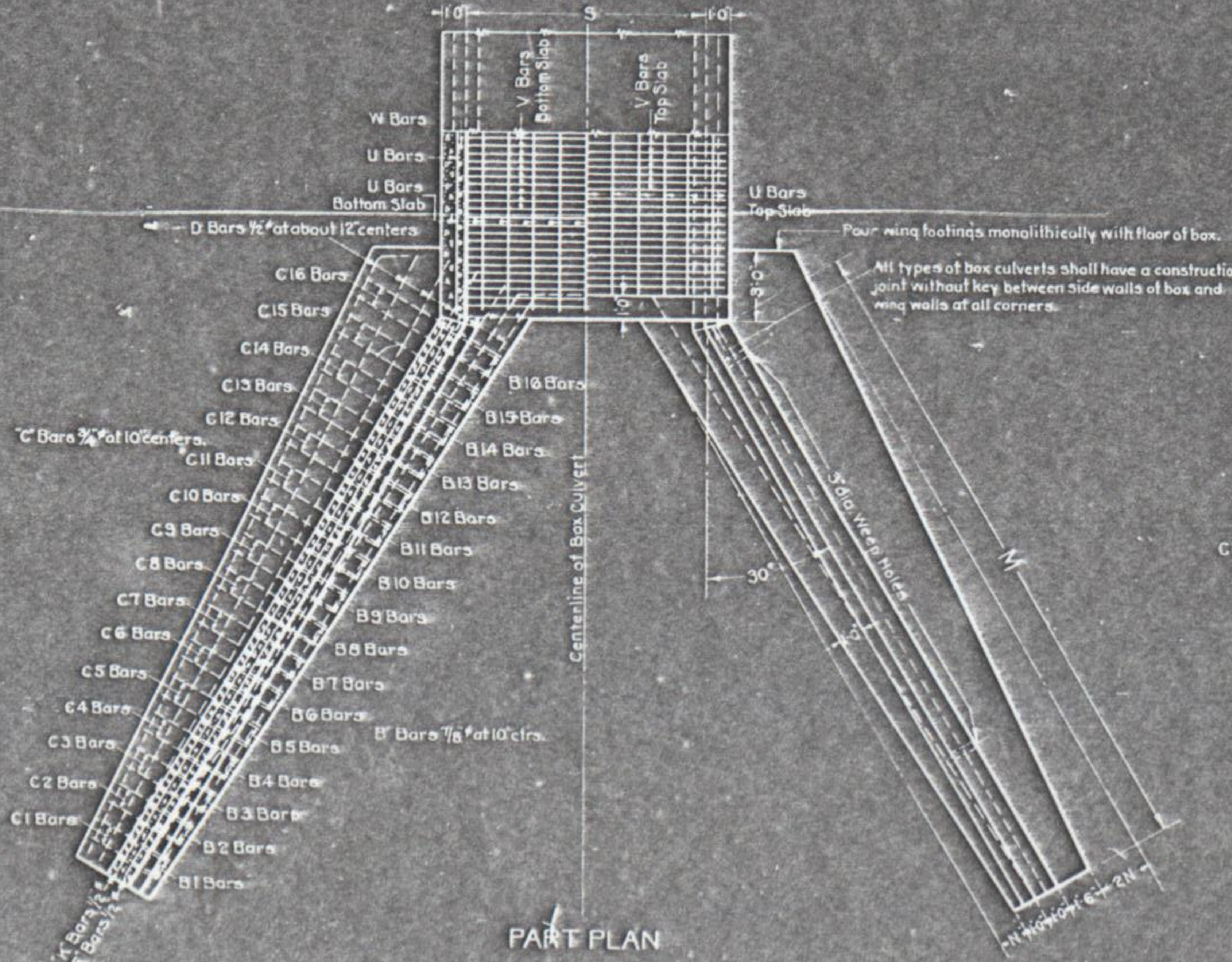
Construction Joints shall have a 3"x6" key in sides and a 3"x1" key in top and bottom slabs on all types of box culverts.

TYPICAL SECTION SHOWING RELATION OF CULVERT TO ROADWAY



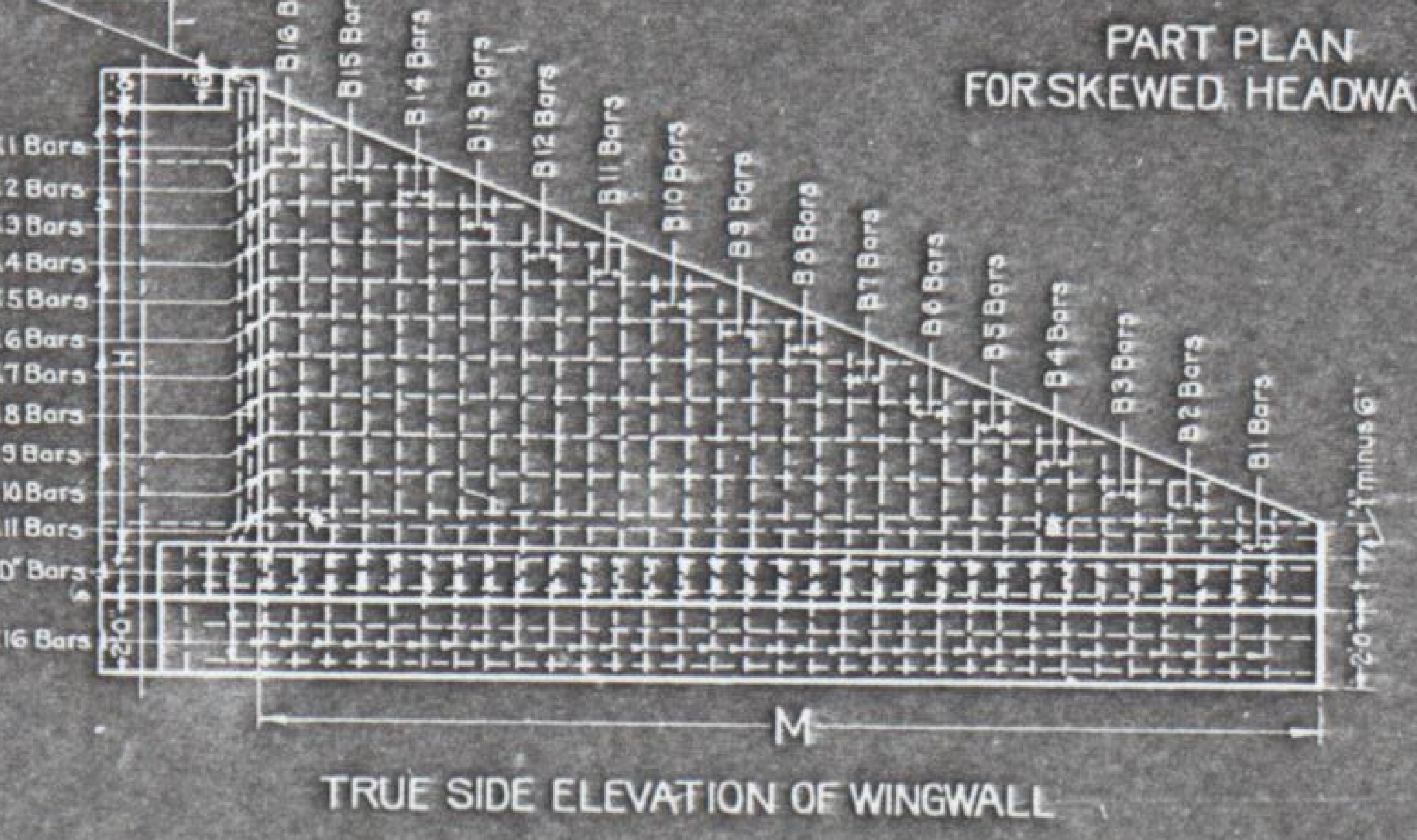
Field to fan V Bars as shown and bend into side walls; cut off walls and headwalls where necessary at ends of skewed boxes.
Use 3 straightened V Bars in each curb as shown.
Make these angles to suit field conditions on skewed culverts.
3'-0"

PART PLAN FOR SKEWED HEADWALLS



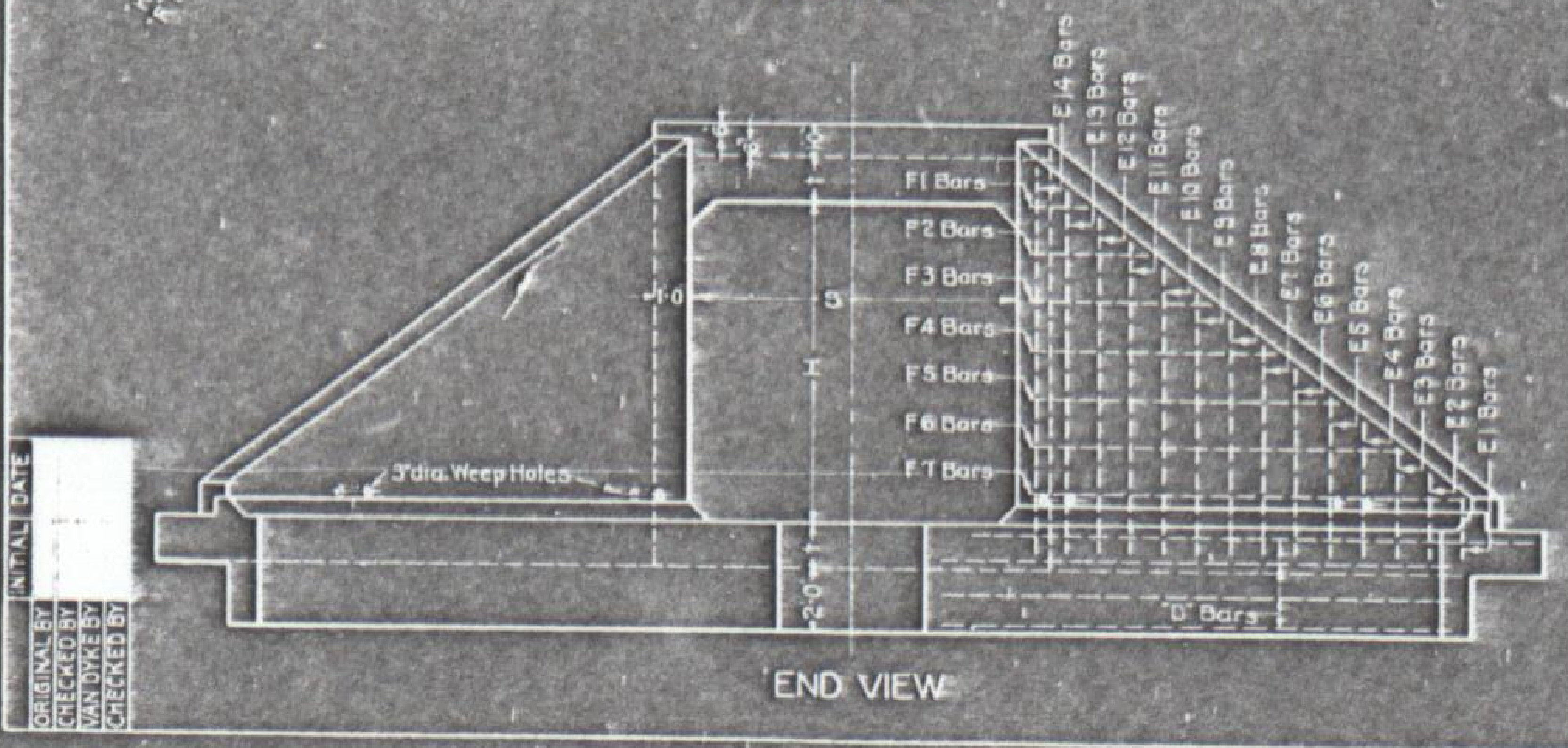
1'-0"
S
1'-0"
V Bars Bottom Slab
V Bars Top Slab
W Bars
U Bars
U Bars Bottom Slab
U Bars Top Slab
D Bars ½" at about 12" centers
Pour wing footings monolithically with floor of box.
All types of box culverts shall have a construction joint without key between side walls of box and wing walls at all corners.
3'-0"
C16 Bars
C15 Bars
C14 Bars
C13 Bars
C12 Bars
"C" Bars ¾" at 10" centers
C11 Bars
C10 Bars
C9 Bars
C8 Bars
C7 Bars
C6 Bars
C5 Bars
C4 Bars
C3 Bars
C2 Bars
C1 Bars
B16 Bars
B15 Bars
B14 Bars
B13 Bars
B12 Bars
B11 Bars
B10 Bars
B9 Bars
B8 Bars
B7 Bars
B6 Bars
"B" Bars ⅞" at 10" ctrs.
B5 Bars
B4 Bars
B3 Bars
B2 Bars
B1 Bars
"K" Bars
Centerline of Box Culvert
30°
3" dia. Weep Holes
M

PART PLAN



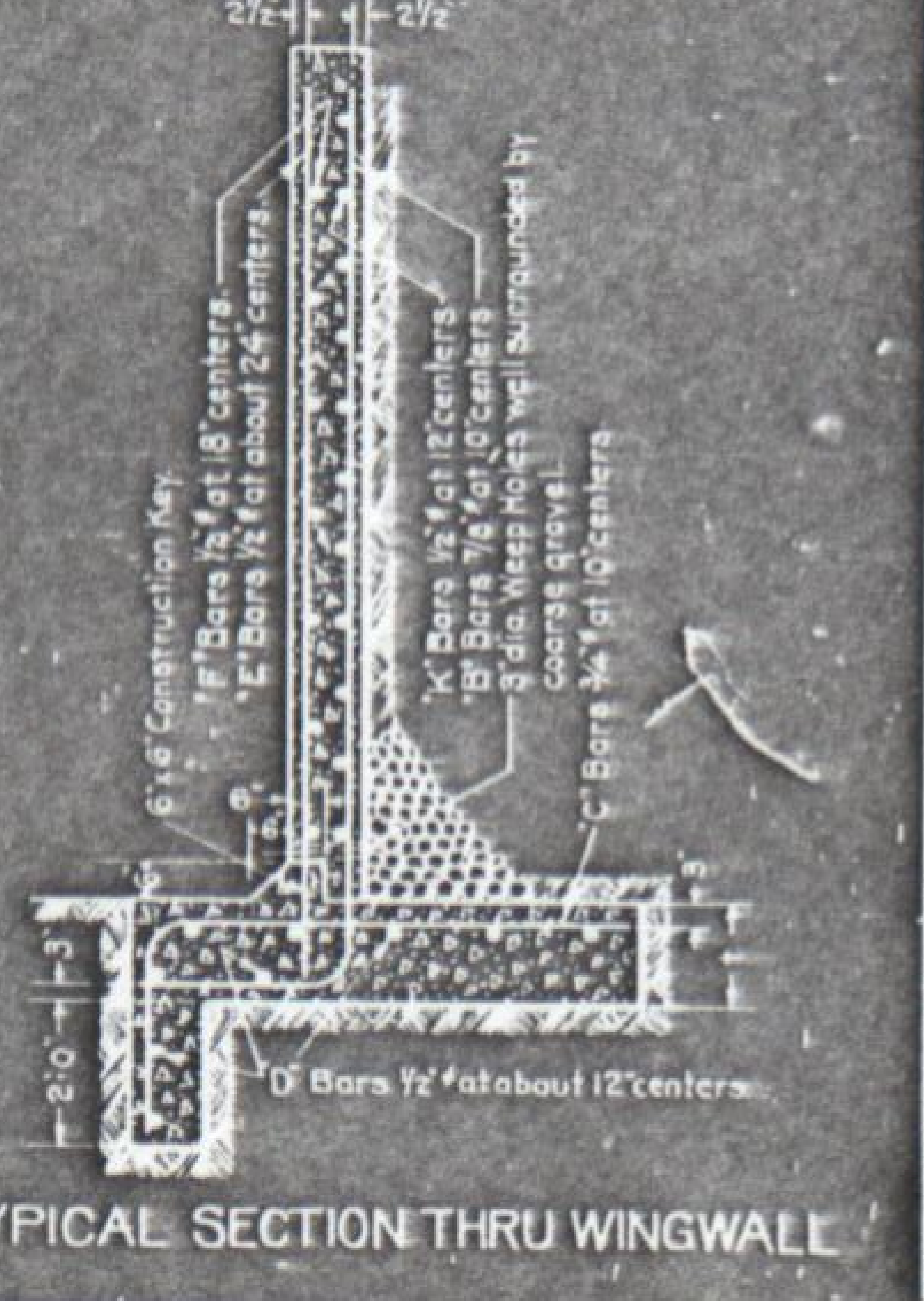
2½"
K1 Bars
K2 Bars
K3 Bars
K4 Bars
K5 Bars
K6 Bars
K7 Bars
K8 Bars
K9 Bars
K10 Bars
K11 Bars
"D" Bars
C1 to C16 Bars
H
B16 Bars
B15 Bars
B14 Bars
B13 Bars
B12 Bars
B11 Bars
B10 Bars
B9 Bars
B8 Bars
B7 Bars
B6 Bars
B5 Bars
B4 Bars
B3 Bars
B2 Bars
B1 Bars
2'-0"
1'-minus 6"
M

TRUE SIDE ELEVATION OF WINGWALL



F1 Bars
F2 Bars
F3 Bars
F4 Bars
F5 Bars
F6 Bars
F7 Bars
E14 Bars
E13 Bars
E12 Bars
E11 Bars
E10 Bars
E9 Bars
E8 Bars
E7 Bars
E6 Bars
E5 Bars
E4 Bars
E3 Bars
E2 Bars
E1 Bars
3" dia. Weep Holes
H
S
2'-0"
"D" Bars

END VIEW



2½"
1'-0"
2½"
6"x6" Construction Key
"F" Bars ½" at 18" centers
"E" Bars ½" at about 24" centers
"K" Bars ½" at 12" centers
"B" Bars ⅞" at 10" centers
3" dia. Weep Holes well surrounded by coarse gravel
"C" Bars ¾" at 10" centers
"D" Bars ½" at about 12" centers
2'-0"
3"

TYPICAL SECTION THRU WINGWALL

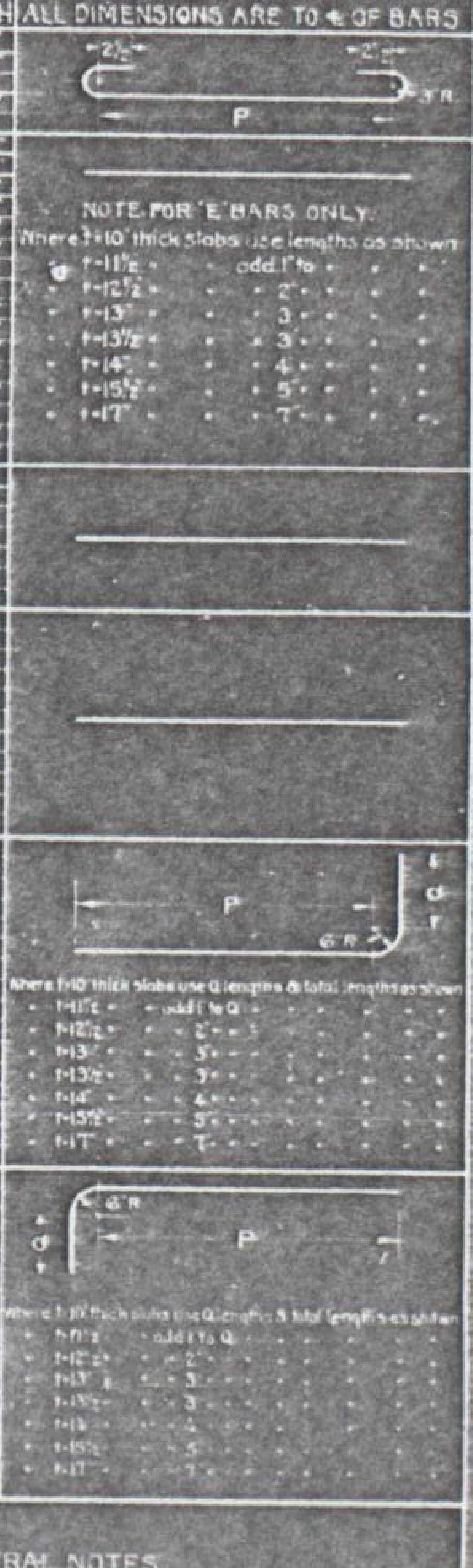
ORIGINAL BY	INITIAL	DATE
CHECKED BY		
VAN DYKE BY		
CHECKED BY		

REINFORCEMENT BAR LIST

USE BARS FOR	MARK	SIZE	NUMBER	DIMENSION P		TOTAL LENGTH
All Boxes but 5'x7'	V	¾"•	24(L+2) divided by Spacing	S+1'-1"		P+2'-0"
5'x7' Box Only	V	½"•		S+1'-4"		P+2'-0"
All Sizes	W	*	½ No. of V Bars	H+12"		P+2'-0"
All Sizes	U	½"•	*			L+1'-8"
All Sizes	D	½"•	36			M+2'-0"
All Sizes	E1	½"•	4			9"
All Sizes	E2	½"•	4			1'-[illegible]
All Sizes	E3	½"•	4			2'-4"
All Sizes	E4	½"•	4			3'-2"
All Sizes	E5	½"•	4			4'-0"
All Sizes	E6	½"•	4			4'-9"
All Sizes	E7	½"•	4			5'-7"
H=5 Ft and over	E8	½"•	4			6'-4"
H=6 Ft and over	E9	½"•	4			7'-[illegible]
H=7 Ft and over	E10	½"•	4			8'-0"
H=8 Ft and over	E11	½"•	4			8'-9"
H=8 Ft and over	E12	½"•	4			9'-7"
H=10 Ft.	E13	½"•	4			10'-5"
H=10 Ft.	E14	½"•	4			11'-2"
All Sizes	F1	½"•	4			4'-8"
All Sizes	F2	½"•	4			8'-3"
All Sizes	F3	½"•	4			12'-0"
H=5 Ft and over	F4	½"•	4			15'-9"
H=6 Ft & 7 Ft and over	F5	½"•	4			19'-6"
H=8 Ft and over	F6	½"•	4			23'-3"
H=10 Ft.	F7	½"•	4			27'-0"
All Sizes	K1	½"•	4			[illegible]
All Sizes	K2	½"•	4			4'-6"
All Sizes	K3	½"•	4			7'-0"
All Sizes	K4	½"•	4			9'-6"
All Sizes	K5	½"•	4			12'-0"
H=5 Ft and over	K6	½"•	4			14'-6"
H=6 Ft and over	K7	½"•	4			17'-0"
H=7 Ft and over	K8	½"•	4			19'-6"
H=8 Ft and over	K9	½"•	4			22'-0"
H=10 Ft.	K10	½"•	4			24'-6"
H=10 Ft.	K11	½"•	4			27'-0"
All Sizes	B1	⅞"•	8	P=1'-0"	Q=6"	2'-[illegible]
All Sizes	B2	⅞"•	8	P=1'-0"	Q=1'-2"	2'-11"
All Sizes	B3	⅞"•	8	P=1'-1"	Q=1'-10"	3'-8"
All Sizes	B4	⅞"•	8	P=1'-2"	Q=2'-6"	4'-5"
All Sizes	B5	⅞"•	8	P=1'-3"	Q=3'-2"	5'-2"
All Sizes	B6	⅞"•	8	P=1'-4"	Q=3'-10"	5'-11"
All Sizes	B7	⅞"•	8	P=1'-5"	Q=4'-6"	6'-8"
H=5 Ft and over	B8	⅞"•	8	P=1'-5"	Q=5'-2"	7'-4"
H=5 Ft and over	B9	⅞"•	(5Ft-4) 8	P=1'-6"	Q=5'-10"	8'-1"
H=6 Ft and over	B10	⅞"•	8	P=1'-7"	Q=6'-6"	8'-10"
H=7 Ft and over	B11	⅞"•	8	P=1'-8"	Q=7'-2"	9'-7"
H=7 Ft and over	B12	⅞"•	(7Ft-4) 8	P=1'-9"	Q=7'-10"	10'-4"
H=8 Ft and over	B13	⅞"•	8	P=1'-10"	Q=8'-6"	11'-1"
H=10 Ft.	B14	⅞"•	8	P=1'-11"	Q=9'-2"	11'-10"
H=10 Ft.	B15	⅞"•	8	P=1'-11"	Q=9'-10"	12'-6"
H=10 Ft.	B16	⅞"•	8	P=2'-0"	Q=10'-6"	13'-3"
All Sizes	C1	¾"•	8	P=2'-8"	Q=1'-10"	5'-4"
All Sizes	C2	¾"•	8	P=2'-11"	Q=1'-10"	5'-7"
All Sizes	C3	¾"•	8	P=3'-1"	Q=1'-10"	5'-9"
All Sizes	C4	¾"•	8	P=3'-4"	Q=1'-10"	6'-0"
All Sizes	C5	¾"•	8	P=3'-7"	Q=1'-10"	6'-3"
All Sizes	C6	¾"•	8	P=3'-9"	Q=1'-10"	6'-5"
All Sizes	C7	¾"•	8	P=4'-0"	Q=1'-10"	6'-8"
H=5 Ft and over	C8	¾"•	8	P=4'-2"	Q=1'-10"	6'-10"
H=5 Ft and over	C9	¾"•	(5Ft-4) 8	P=4'-5"	Q=1'-10"	7'-1"
H=6 Ft and over	C10	¾"•	8	P=4'-8"	Q=1'-10"	7'-4"
H=7 Ft and over	C11	¾"•	8	P=4'-10"	Q=1'-10"	7'-6"
H=7 Ft and over	C12	¾"•	(7Ft-4) 8	P=5'-1"	Q=1'-10"	7'-9"
H=8 Ft and over	C13	¾"•	8	P=5'-4"	Q=1'-10"	8'-0"
H=8 Ft and over	C14	¾"•	8	P=5'-6"	Q=1'-10"	8'-2"
H=10 Ft.	C15	¾"•	8	P=5'-9"	Q=1'-10"	8'-5"
H=10 Ft.	C16	¾"•	8	P=6'-0"	Q=1'-10"	8'-8"

★ SEE TABLE OF DIMENSIONS AND QUANTITIES

BENDING DIAGRAM ALL DIMENSIONS ARE TO ℄ OF BARS



2½"
2½"
3" R.
P
P
6" R.
Q
P
6" R.
Q

NOTE FOR "E" BARS ONLY.
Where t=10" thick slabs use lengths as shown
t=11½" add 1" to " " "
t=12½" " 2" " " "
t=13" " 3" " " "
t=13½" " 3" " " "
t=14" " 4" " " "
t=15½" " 5" " " "
t=17" " 7" " " "

Where t=10" thick slabs use Q lengths & total lengths as shown
t=11½" add 1" to Q " "
t=12½" " 2" " " "
t=13" " 3" " " "
t=13½" " 3" " " "
t=14" " 4" " " "
t=15½" " 5" " " "
t=17" " 7" " " "

Where t=10" thick slabs use Q lengths & total lengths as shown
t=11½" add 1" to Q " "
t=12½" " 2" " " "
t=13" " 3" " " "
t=13½" " 3" " " "
t=14" " 4" " " "
t=15½" " 5" " " "
t=17" " 7" " " "

TABLE OF DIMENSIONS AND QUANTITIES

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

HEIGHT OF FILL ALLOWED	TYPE	SPAN S	HEIGHT H	THICKNESS OF SLAB t	SPACING OF BARS V	SIZE OF BARS W	NUMBER OF U BARS PER BOX	LENGTH OF WINGWALL M	DIMENSION N	QUANTITIES FOR ONE LIN. FT. OF BOX		QUANTITIES FOR TWO HEADWALLS	
										CONCRETE CU. YDS.	STEEL LBS.	CONCRETE CU. YDS.	STEEL LBS.
11'-6"		5'-0"	7'-0"	10"	4"	½"•	24	20'-0"	10"	0.969	79	35.5	3260
7'-0"	8 I	8'-0"	4'-0"	11½"	5½"	½"•	24	12'-6"	7"	1.025	100	22.5	1795
			5'-0"	11½"	5½"	½"•	26	15'-0"	8"	1.099	103	27.0	2275
			6'-0"	11½"	5½"	½"•	28	17'-6"	9"	1.173	106	33.0	2810
			8'-0"	11½"	5½"	½"•	32	22'-6"	1'-0"	1.321	116	45.0	4095
8'-6"	8 II	8'-0"	4'-0"	12½"	5"	½"•	24	12'-6"	7"	1.087	109	23.5	1810
			5'-0"	12½"	5"	½"•	26	15'-0"	8"	1.161	112	27.5	2300
			6'-0"	12½"	5"	½"•	28	17'-6"	9"	1.235	115	34.0	2835
			8'-0"	12½"	5"	½"•	32	22'-6"	1'-0"	1.383	126	47.0	4130
10'-6"	8 III	8'-0"	4'-0"	13½"	4½"	½"•	24	12'-6"	7"	1.149	120	24.0	1870
			5'-0"	13½"	4½"	½"•	26	15'-0"	8"	1.223	122	29.5	2360
			6'-0"	13½"	4½"	½"•	28	17'-6"	9"	1.297	126	35.5	2900
			8'-0"	13½"	4½"	½"•	32	22'-6"	1'-0"	1.445	137	48.5	4210
4'-0"	10 I	10'-0"	4'-0"	13"	5"	½"•	28	12'-6"	7"	1.278	126	24.0	1860
			6'-0"	13"	5"	½"•	32	17'-6"	9"	1.426	131	35.5	2890
			8'-0"	13"	5"	½"•	36	22'-6"	1'-0"	1.575	138	48.5	4185
			10'-0"	13"	5"	⅝"•	40	27'-6"	1'-2"	1.723	156	64.0	5455
6'-0"	10 II	10'-0"	4'-0"	14"	4½"	½"•	28	12'-6"	7"	1.352	138	25.0	1925
			6'-0"	14"	4½"	½"•	32	17'-6"	9"	1.500	144	37.5	2960
			8'-0"	14"	4½"	½"•	36	22'-6"	1'-0"	1.649	151	51.0	4270
			10'-0"	14"	4½"	⅝"•	40	27'-6"	1'-2"	1.797	170	66.0	5550
9'-0"	10 III	10'-0"	4'-0"	15½"	4"	½"•	28	12'-6"	7"	1.463	153	27.0	1985
			6'-0"	15½"	4"	½"•	32	17'-6"	9"	1.612	160	39.5	3035
			8'-0"	15½"	4"	½"•	36	22'-6"	1'-0"	1.760	166	54.0	4350
			10'-0"	15½"	4"	⅝"•	40	27'-6"	1'-2"	1.908	188	69.5	5640
12'-0"	10 IV	10'-0"	4'-0"	17"	3½"	½"•	28	12'-6"	7"	1.575	172	29.0	2070
			6'-0"	17"	3½"	½"•	32	17'-6"	9"	1.723	179	42.0	3135
			8'-0"	17"	3½"	½"•	36	22'-6"	1'-0"	1.871	194	57.0	4470
			10'-0"	17"	3½"	¾"•	40	27'-6"	1'-2"	2.019	232	73.5	5780

ALC

GENERAL NOTES.

ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS OF THE COLORADO STATE HIGHWAY DEPARTMENT, ADOPTED JANUARY 1, 1930.
ALL CONCRETE SHALL BE CLASS "A".
ALL WALLS SHALL HAVE [illegible] ON BOTH SIDES.
ALL CONSTRUCTION JOINTS SHALL BE THOROUGHLY CLEANED BEFORE FRESH CONCRETE IS POURED.
ALL BARS SHALL BE ROUND OR SQUARE, PLAIN OR DEFORMED AS SHOWN.
MINIMUM DISTANCE FROM CENTERLINE OF BARS TO EDGE OF CONCRETE TO BE 2½".
LONG BARS WHEN SPLICED SHALL BE LAPPED TWO FEET.
FOR CULVERTS REQUIRED AND GOVERNING DIMENSIONS SEE SHEET NO.
ALL REINFORCING BARS SHALL BE TAGGED WITH THE STATION NUMBER AND LETTER DESIGNATION.
THIS DESIGN NOT TO BE USED WHEN HEIGHT OF FILL OVER BOX EXCEEDS THAT TABULATED AS ALLOWABLE.
POUR WING FOOTINGS MONOLITHICALLY WITH FLOOR OF BOX.
POUR WINGS INDEPENDENT OF SIDES OF BOX.
THE USE OF ADDITIONAL CONSTRUCTION JOINTS [illegible]. SHOULD [illegible] CONDITIONS REQUIRE, CONSTRUCTION JOINTS MAY BE MADE ON A VERTICAL PLANE PERPENDICULAR TO CENTERLINE OF CULVERT AND SHALL HAVE KEYS AS SHOWN.
SUPPORTING SOILS FOR ALL CULVERTS MUST BE COMPOSED OF FIRM AND UNIFORM MATERIAL THROUGHOUT.
ALL BACKFILLING TO AND OVER CULVERTS SHALL BE LAID IN LAYERS NOT EXCEEDING SIX INCHES IN DEPTH AND EACH LAYER SHALL BE ROLLED OR HAND TAMPED WHERE INACCESSIBLE TO ROLLER, ALSO MOISTENED WHEN NECESSARY.

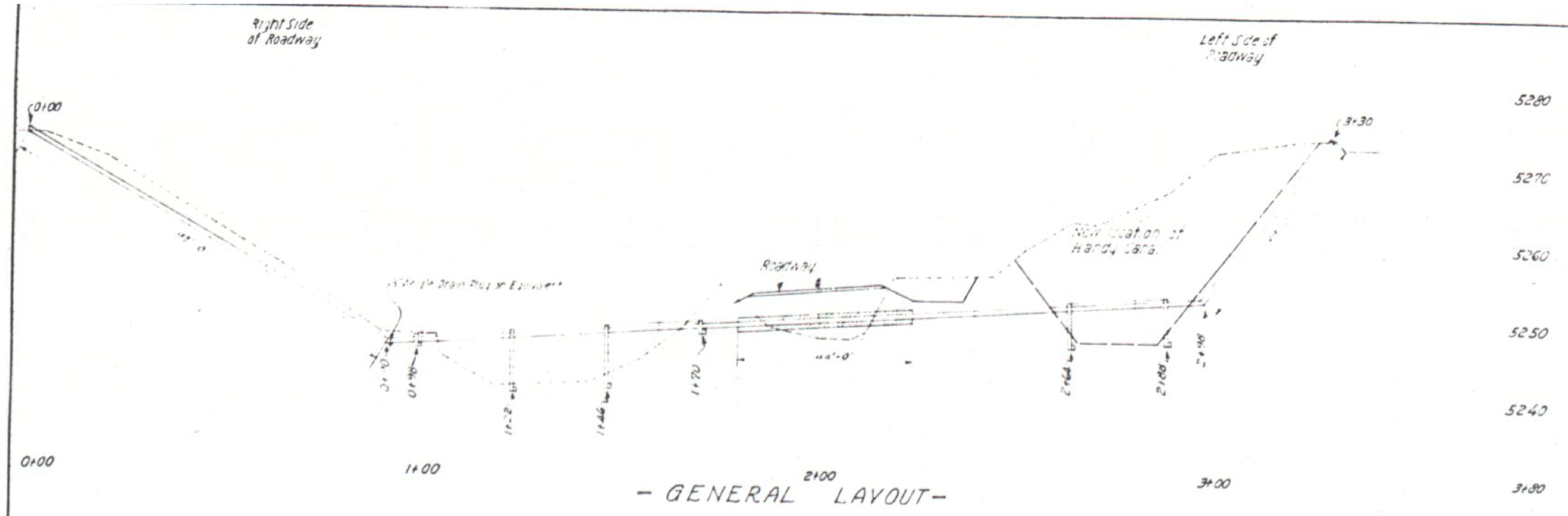
LOADING DATA
LL-AASHO H-15

COLORADO
STATE HIGHWAY DEPARTMENT
STANDARD
CONCRETE BOX CULVERT
8 FT. x 4 FT. 5 FT. x 7 FT. 10 FT. x 6 FT.
8 FT. x 5 FT. 8 FT. x 8 FT. 10 FT. x 8 FT.
8 FT. x 6 FT. 10 FT. x 4 FT. 10 FT. x 10 FT.

Designed by A.G.K. | Approved by [signature] Bridge Engineer
Made by A.G.K.
Checked by A.L.C. | Date 7-20, 1932

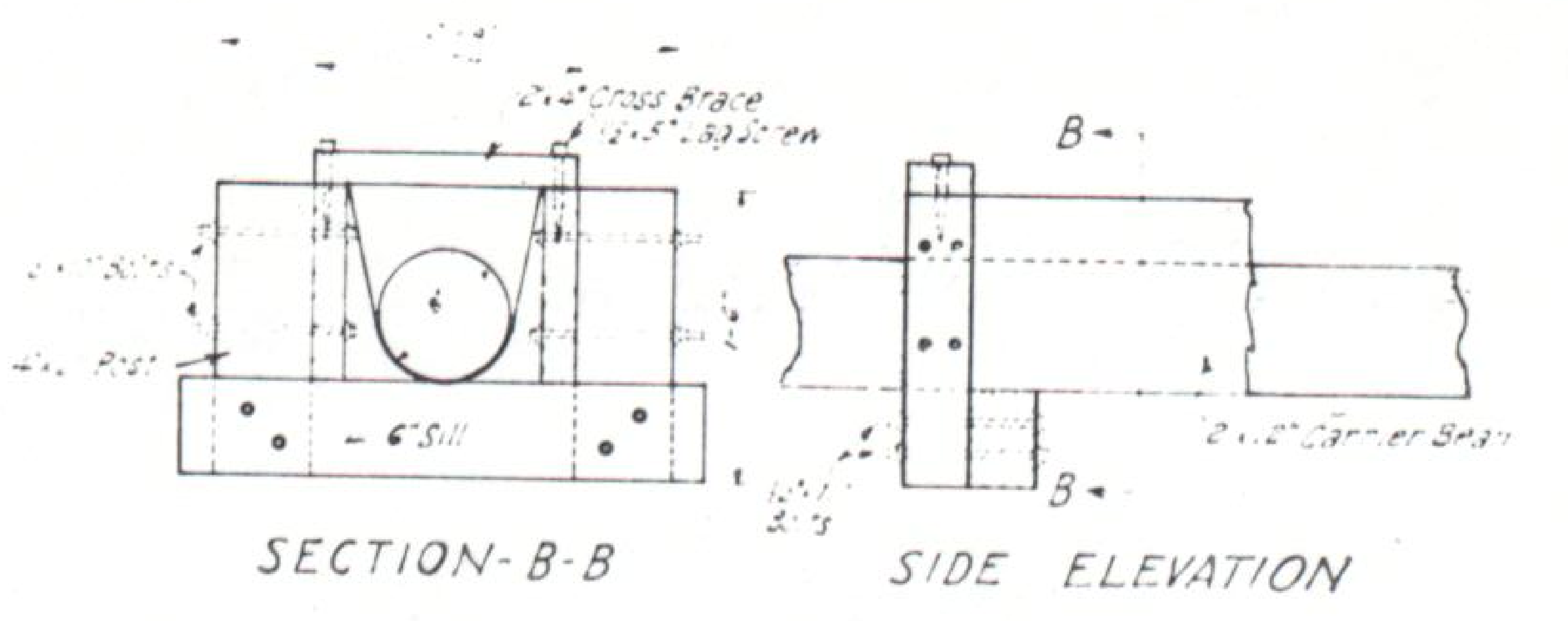
STRUCTURE NO.

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
	COLO.	E-9-B[illegible]	23	



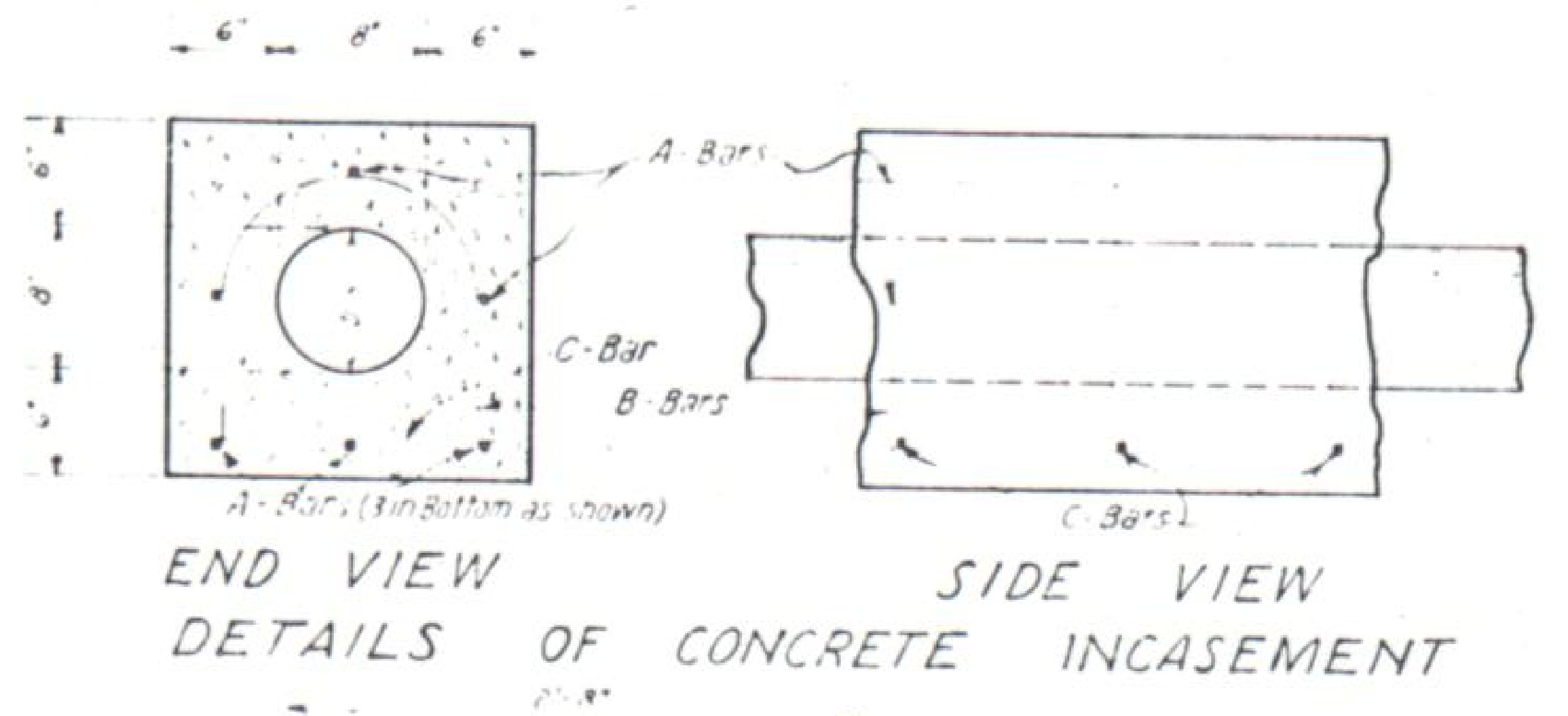
Right Side of Roadway
Left Side of Roadway
0+00
1+00
2+00
3+00
3+30
5280
5270
5260
5250
5240
Roadway

- GENERAL LAYOUT -



2"×4" Cross Brace
1/2"×5" Lag Screw
4"×6" Post
6" Sill
B
2"×12" Carrier Beam

SECTION-B-B SIDE ELEVATION



6"
8"
6"
A-Bars
C-Bar
B-Bars
A-Bars (3 in Bottom as shown)
C-Bars

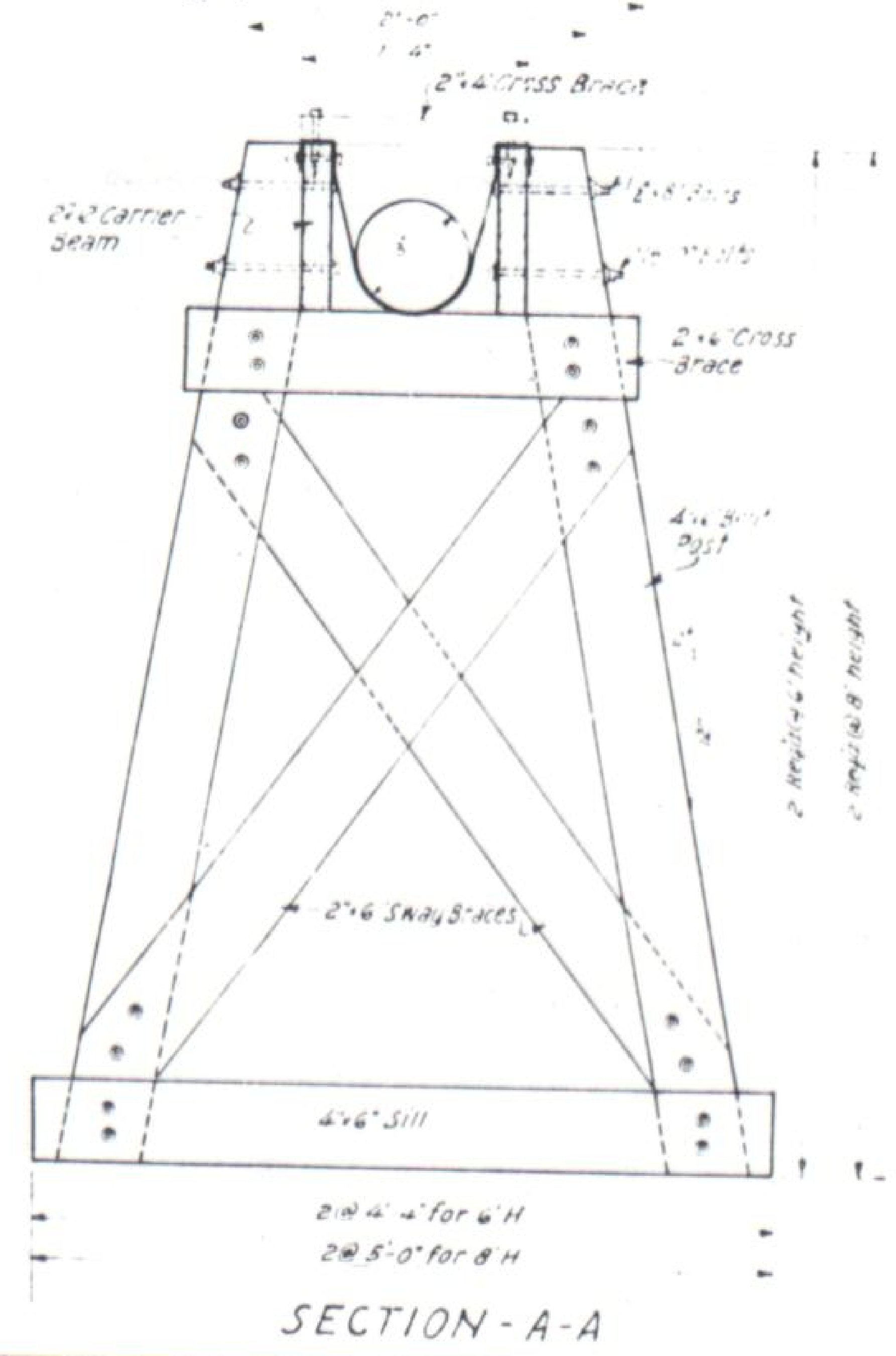
END VIEW SIDE VIEW

DETAILS OF CONCRETE INCASEMENT

BAR LIST & BENDING DIAGRAM

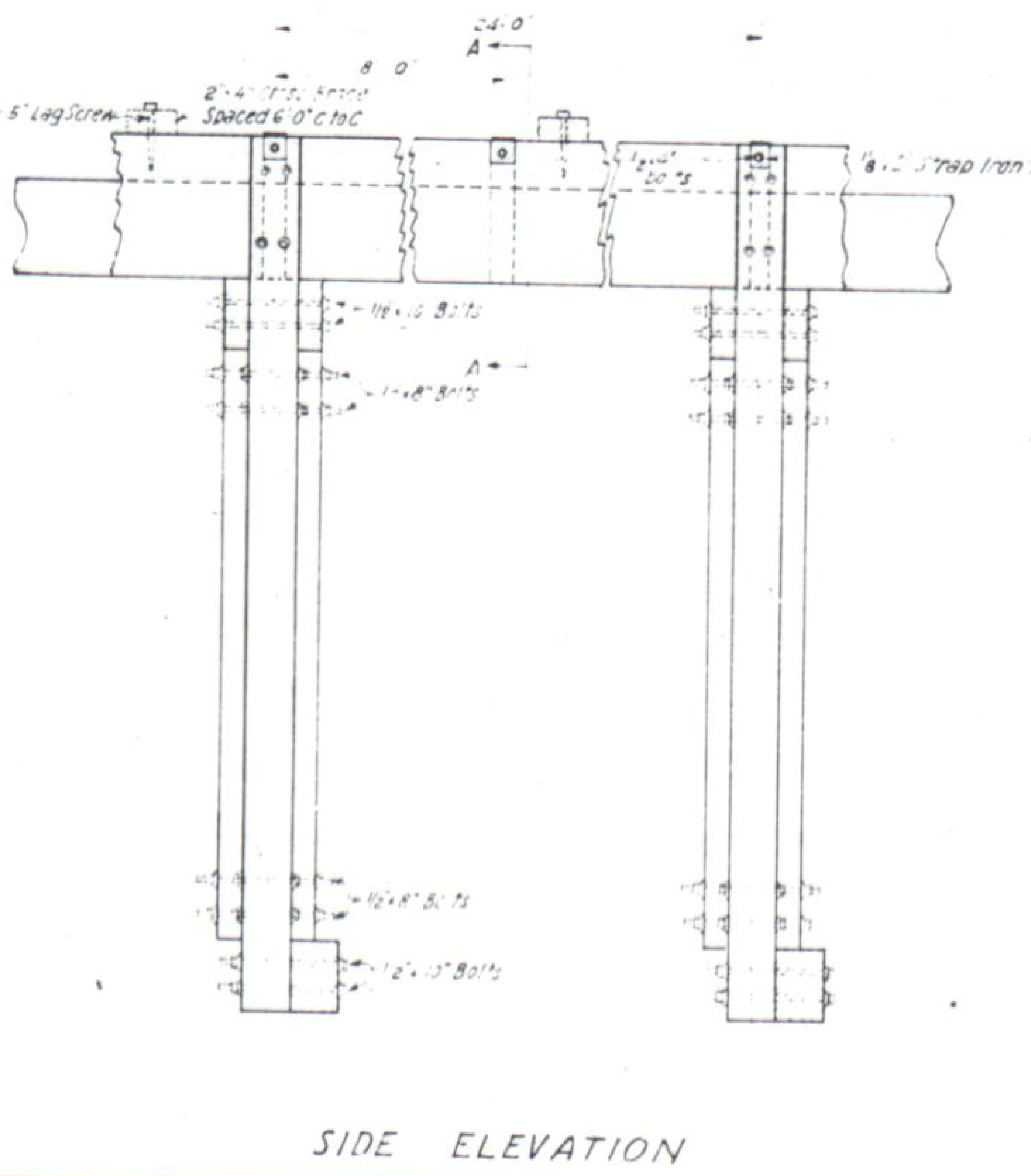
MARK	SIZE	LENGTH	No	SPACING	BENDING DIAGRAM
A-Bars	½"■	43'-8"	6	10"±	
B-Bars	½"■	3'-0"	45	12"	
C-Bars	½"■	1'-4"	45	12"	

TOTAL STEEL [illegible] of ½"■ Bars @ 0.85 lb. + 1% for overrun = 422 lb
Class "A" Concrete: = 4.0 Cu.Yd.



2"×4" Cross Brace
2"×12" Carrier Beam
1/2"×8" Bolts
2"×6" Cross Brace
4"×6" Bent Post
2"×6" Sway Braces
4"×6" Sill
2 Req'd @ 6' height
2 Req'd @ 8' height
2 @ 4'-4" for 6'H
2 @ 5'-0" for 8'H

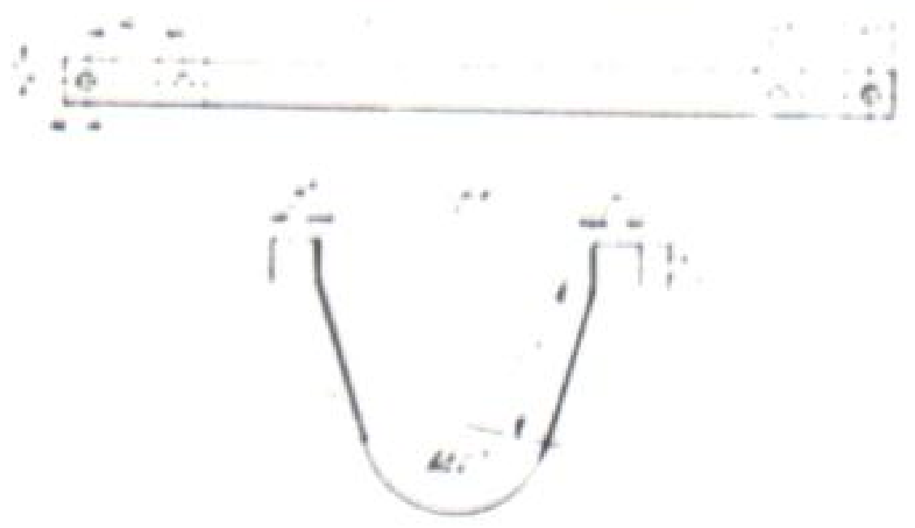
SECTION-A-A



1/2"×5" Lag Screw
2"×4" Cross Brace Spaced 6'-0" c to c
24'-0"
8'-0"
A
1/8"×2" Strap Iron Hanger
1/2"×9" Bolts
1/2"×8" Bolts
1/2"×10" Bolts

SIDE ELEVATION

DETAIL OF STRAP IRON HANGER



BILL OF MATERIALS

Description	Size	Pieces	Length	M.F.B.M.
Sills	4"×[illegible]	2	4'-4"	.018
	[illegible]	2	[illegible]	.024
	4"×6"	2	[illegible]	.011
Bent Posts	4"×6"	4	8'-2"	[illegible]
"	4"×6"	4	6'-2"	.050
	4"×6"	4	1'-6"	.012
Cross Braces	2"×6"	4	5'-6"	.022
" "	2"×4"	4	7'-6"	.030
" "	2"×6"	8	2'-8"	.022
" "	2"×4"	14	1'-4"	.016
Carrier Beams	2"×12"	8	24'-0"	.384
				0.655
Galv Mach Bolts	½"×8"	48		
" " "	½"×9"	16		
" " "	½"×10"	40		
" " "	½"×4"	28		
" Lag Screws	½"×5"	36		
" Cut Washers	½"	300		
Strap Iron Hangers	⅛"×2"	14	3'-2"	

SUMMARY OF QUANTITIES

NO	ITEM	UNIT	QUANTITY
14a	Dry Rock Excav (Struct)	Cu.Yd	15.8
14b	" Com " "	" "	39
14c	Wet Rock " "	" "	0
14d	" Com " "	" "	0
42b	Treated Bridge Timber	M.Ft.B.M.	07
46a	Class "A" Concrete	Cu.Yd	4
47	Reinforcing Steel	Lb	422
[illegible]	8" Dipped Smooth Metal Pipe (14Ga)	Lin Ft	340

GENERAL NOTES

ALL WORK SHALL BE DONE ACCORDING TO THE STANDARD SPECIFICATIONS OF THE COLORADO STATE HIGHWAY DEPARTMENT.
ALL CONCRETE SHALL BE CLASS A.
[illegible]
ALL HOLES SHALL BE DRILLED IN THE FIELD.
ALL WASHERS SHALL BE [illegible] CUT WASHERS.
[illegible]
JOINTS IN PIPE SHALL BE HOT DRIVE JOINTS WITH WIRE LUGS OR EQUIVALENT.

COLORADO
STATE HIGHWAY DEPARTMENT
WATER CONDUIT
Across
Sta 1424+
Near Sec T R

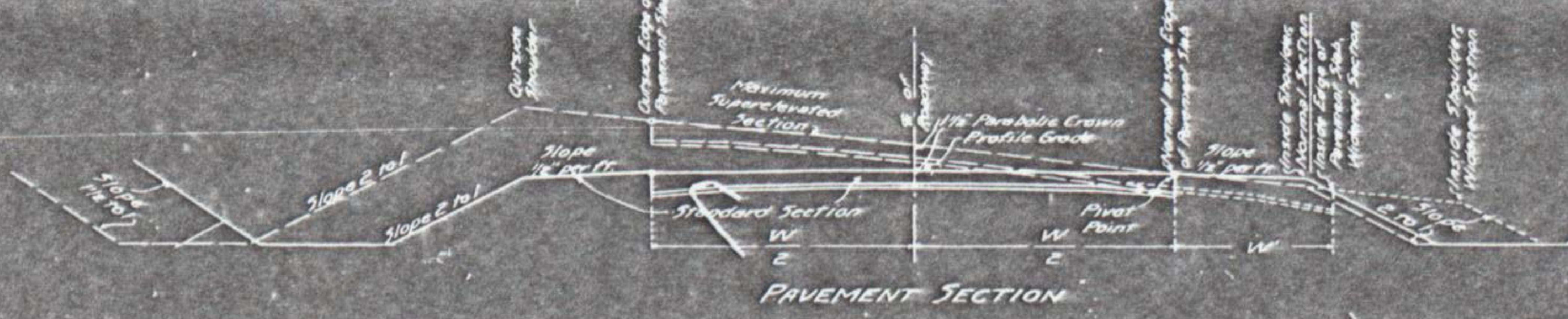
Designed by Made by Checked by	Approved by Bridge Engineer Date 193

STRUCTURE NO ____

M-I-A

Fed. Road Dist. No.	State	Fed. Aid Proj. No.	Sheet No.	Total Sheets
3	COLO.	E 9 B	24	

Revised 8-17-32-S.B.L. (200 Length)
8-31-32-S.B.L.



Outside Shoulder
Outside Edge of Pavement Slab
Maximum Superelevated Section
℄ of Roadway
1½" Parabolic Crown
Profile Grade
Normal Inside Edge of Pavement Slab
Inside Shoulder Normal Section
Inside Edge of Pavement Slab Widened Section
Inside Shoulder Widened Section
Slope 2 to 1
Slope ½" per ft.
Standard Section
Pivot Point
W/2
W'

PAVEMENT SECTION

SUPERELEVATION AND WIDENING NOTES FOR PAVEMENT SECTION

Curves on projects using the pavement section are to be superelevated and widened as indicated in the accompanying drawings and table.

The normal inside edge of the pavement slab is to remain at the standard elevation of 0.125 ft. below the profile grade, and the outside edge of the slab is to be superelevated at the rate per foot width of roadway given in the table or graph. The section is to be rotated about the normal inside edge of the pavement.

When the degree of curvature exceeds 10°, the inside portion of the pavement slab is to be widened from the normal inside edge as per the table below. Curves of 10° or less are not to be widened. The 1½" parabolic crown is to be used for curves of 10° and under. The widened section is to have a flat crown.

The slope of the shoulders shall conform to the rate per foot width of roadway required except that the inside shoulder shall maintain the standard slope of 0.0417 ft. per foot width until the superelevation rate exceeds this standard slope.

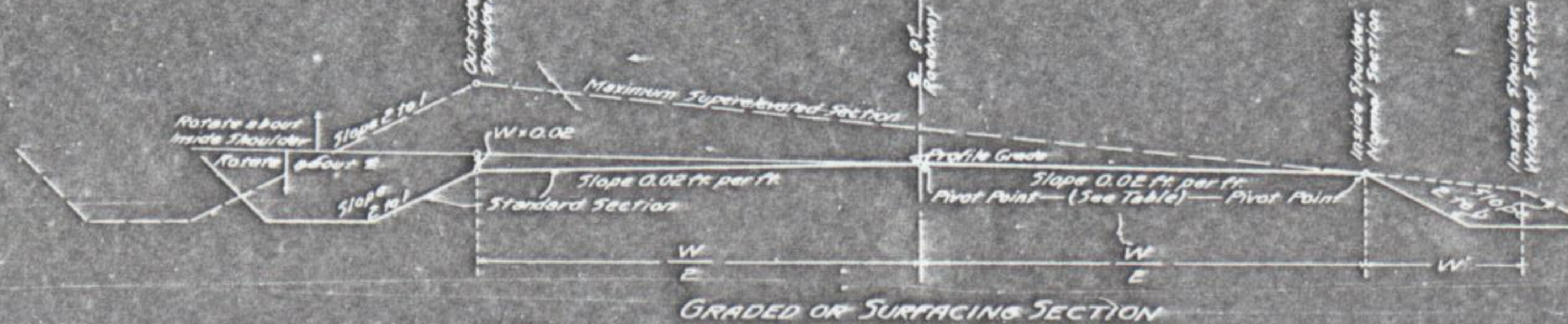
The outside ditch along a superelevated section is to be modified from the standard where a deeper ditch is required to provide drainage.

Details of plans for superelevating and widening are shown on the General Plan for Widening and the Graph of Superelevation Factors.

The subgrade for future pavement is to be constructed to conform to the superelevation and widening requirements for the pavement section.

SUPERELEVATION FACTORS AND OFFSETS FOR WIDENING FOR PAVEMENT SECTION

Distance from B.T.	20 Ft.	40 Ft.	60 Ft.	80 Ft.	100 Ft.=P.C.	120 Ft.	140 Ft.	160 Ft.	180 Ft.	200 Ft.=E.T.	On Curve
Factor	0.02	0.08	0.18	0.32	0.50	0.68	0.82	0.92	0.98	1.00	1.00
Degree of Curve	Rate of Superelevation (in Feet) per Foot Width of Roadway										
2° and Under	0.0004	0.0017	0.0038	0.0067	0.0105	0.0143	0.0172	0.0193	0.0206	0.0210	0.0210
3°	0.0006	0.0025	0.0057	0.0101	0.0158	0.0214	0.0258	0.0290	0.0309	0.0315	0.0315
4°	0.0008	0.0034	0.0076	0.0134	0.0210	0.0286	0.0344	0.0386	0.0412	0.0420	0.0420
5°	0.0010	0.0042	0.0094	0.0168	0.0262	0.0357	0.0430	0.0483	0.0514	0.0525	0.0525
6°	0.0013	0.0050	0.0113	0.0202	0.0315	0.0428	0.0517	0.0580	0.0617	0.0630	0.0630
7°	0.0015	0.0059	0.0132	0.0235	0.0368	0.0500	0.0603	0.0676	0.0720	0.0735	0.0735
8°	0.0017	0.0067	0.0151	0.0269	0.0420	0.0571	0.0689	0.0773	0.0823	0.0840	0.0840
9°	0.0019	0.0076	0.0170	0.0302	0.0472	0.0643	0.0775	0.0869	0.0926	0.0945	0.0945
10° and Over	0.0020	0.0080	0.0180	0.0320	0.0500	0.0680	0.0820	0.0920	0.0980	0.1000	0.1000
	Offsets for Widening-W'-(in Feet)										
Over 10°-Under 12°	0.06	0.24	0.54	0.96	1.50	2.04	2.46	2.76	2.94	3.00	3.00
12° - " 15°	0.08	0.32	0.72	1.28	2.00	2.72	3.28	3.68	3.92	4.00	4.00
15° - " 20°	0.10	0.40	0.90	1.60	2.50	3.40	4.10	4.60	4.90	5.00	5.00
Over 20°	0.12	0.48	1.08	1.92	3.00	4.08	4.92	5.52	5.88	6.00	6.00



Outside Shoulder
Maximum Superelevated Section
℄ of Roadway
Rotate about Inside Shoulder
Rotate about ℄
Slope 2 to 1
W=0.02
Profile Grade
Slope 0.02 ft. per ft.
Standard Section
Pivot Point—(See Table)—Pivot Point
Inside Shoulder Normal Section
Inside Shoulder Widened Section
W/2
W'

GRADED OR SURFACING SECTION

SUPERELEVATION AND WIDENING NOTES FOR GRADED OR SURFACING SECTIONS

Curves on projects using the graded or surfacing section are to be superelevated and widened as indicated in the accompanying sketches and table.

The normal inside shoulder and ditch are to remain as shown in the typical section shown on sheet #2. The outside shoulder is to be the high point of the section.

The outside ditch along a superelevated section is to be modified from the standard where a deeper ditch is required to provide drainage.

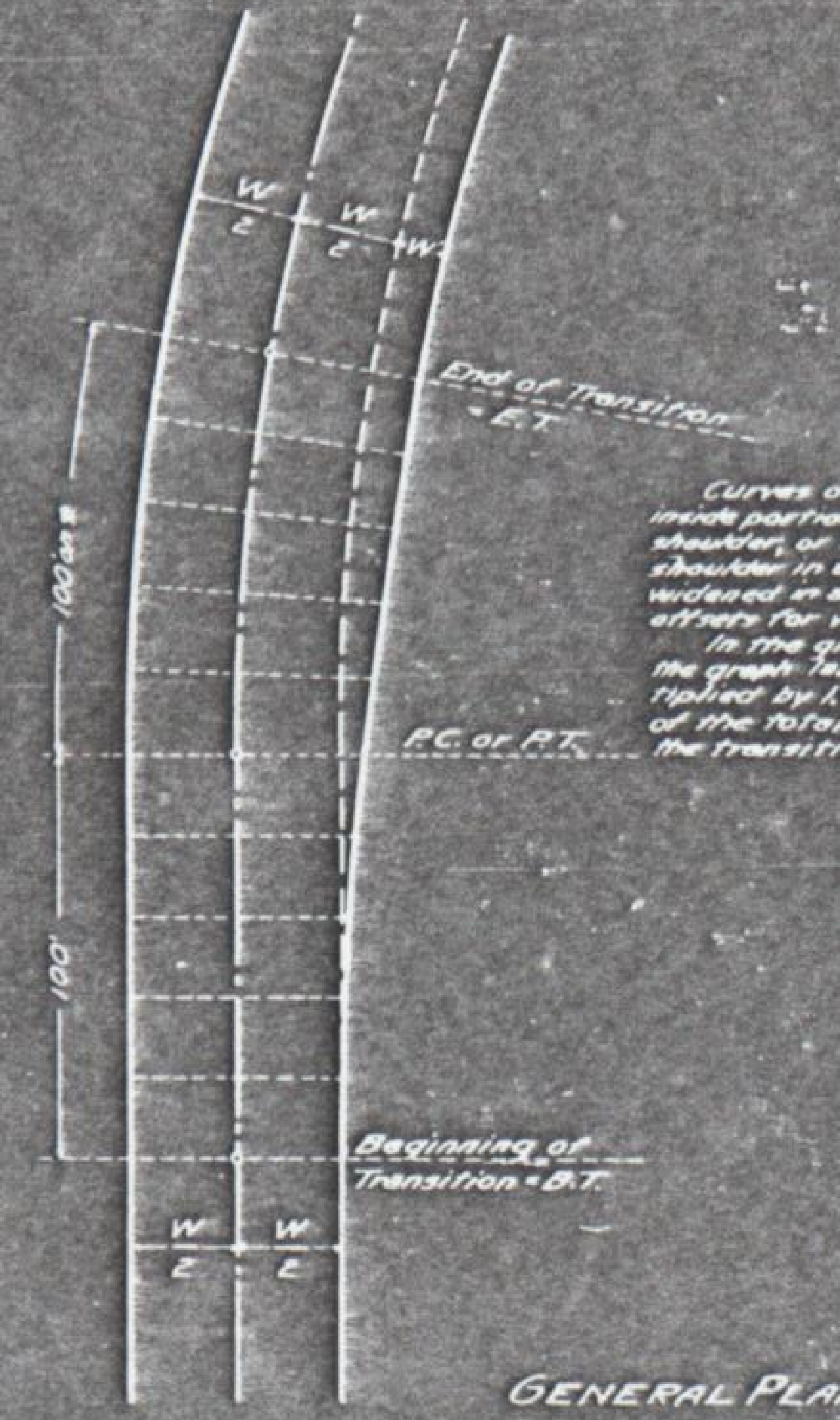
The center line pivot point is to be used as long as the superelevation does not exceed 0.02 feet per foot width of roadway. The normal inside shoulder pivot point is to be used for a superelevation rate in excess of 0.02 ft. per foot width of roadway.

When the degree of curvature exceeds 10° the inside shoulder is to be widened from the normal inside shoulder line as shown by the table and cross section. Curves of 10° and less are not to be widened.

Details of plans for superelevation and widening are shown on the General Plan for Widening and the Graph of Superelevation Factors.

SUPERELEVATION FACTORS AND OFFSETS FOR WIDENING FOR GRADED OR SURFACING SECTIONS

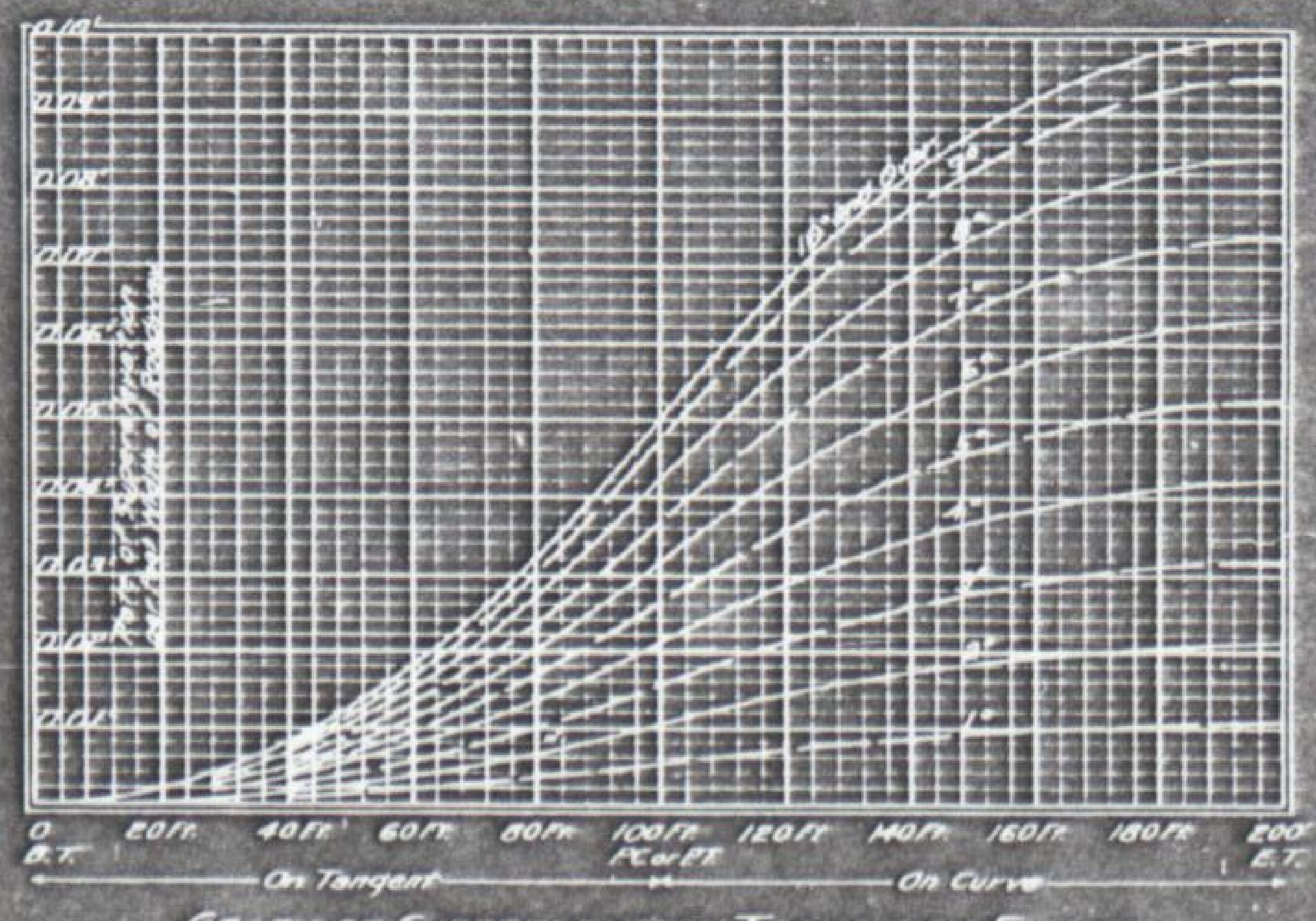
Distance from B.T.	20 Ft.	40 Ft.	60 Ft.	80 Ft.	100 Ft.=P.C.	120 Ft.	140 Ft.	160 Ft.	180 Ft.	200'=E.T.	On Curve	Length of Transition Rotated about:	
Factor	0.02	0.08	0.18	0.32	0.50	0.68	0.82	0.92	0.98	1.00	1.00		
Degree of Curve	Rate of Superelevation (in Feet) per Foot Width of Roadway											Center Line	Inside Shoulder
2° and Under	0.0004	0.0017	0.0038	0.0067	0.0105	0.0143	0.0172	0.0193	0.0206	0.0210	0.0210	169 Ft.	71 Ft.
3°	0.0006	0.0025	0.0057	0.0101	0.0158	0.0214	0.0258	0.0290	0.0309	0.0315	0.0315	115 "	85 "
4°	0.0008	0.0034	0.0076	0.0134	0.0210	0.0286	0.0344	0.0386	0.0412	0.0420	0.0420	98 "	102 "
5°	0.0010	0.0042	0.0094	0.0168	0.0262	0.0357	0.0430	0.0483	0.0514	0.0525	0.0525	87 "	113 "
6°	0.0013	0.0050	0.0113	0.0202	0.0315	0.0428	0.0517	0.0580	0.0617	0.0630	0.0630	80 Ft.	120 Ft.
7°	0.0015	0.0059	0.0132	0.0235	0.0368	0.0500	0.0603	0.0676	0.0720	0.0735	0.0735	74 "	126 "
8°	0.0017	0.0067	0.0151	0.0269	0.0420	0.0571	0.0689	0.0773	0.0823	0.0840	0.0840	69 "	131 "
9°	0.0019	0.0076	0.0170	0.0302	0.0472	0.0643	0.0775	0.0869	0.0926	0.0945	0.0945	65 "	135 "
10° and Over	0.0020	0.0080	0.0180	0.0320	0.0500	0.0680	0.0820	0.0920	0.0980	0.1000	0.1000	63 "	137 "
	Offsets for Widening-W'-(in Feet)												
Over 10°-Under 12°	0.06	0.24	0.54	0.96	1.50	2.04	2.46	2.76	2.94	3.00	3.00		
12° - " 15°	0.08	0.32	0.72	1.28	2.00	2.72	3.28	3.68	3.92	4.00	4.00		
15° - " 20°	0.10	0.40	0.90	1.60	2.50	3.40	4.10	4.60	4.90	5.00	5.00		
Over 20°	0.12	0.48	1.08	1.92	3.00	4.08	4.92	5.52	5.88	6.00	6.00		



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

In the graph below the values for the graph labeled "10° and Over," multiplied by 1,000 gives the percentage of the total widening at any point on the transition.

GENERAL PLAN FOR WIDENING



GRAPH OF SUPERELEVATION TRANSITION FACTORS

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

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

0.0105 ft. x Degree of Curvature.

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

The above graph has been prepared from the rates of superelevation shown in the tabulations.

COLORADO
STATE HIGHWAY DEPARTMENT
STANDARD METHODS
FOR SUPERELEVATION AND
WIDENING OF CURVES

Designed by S.B.L. Made by S.B.L. Checked by J.O.M.	Approved by: Date: Aug. 17, 1932.

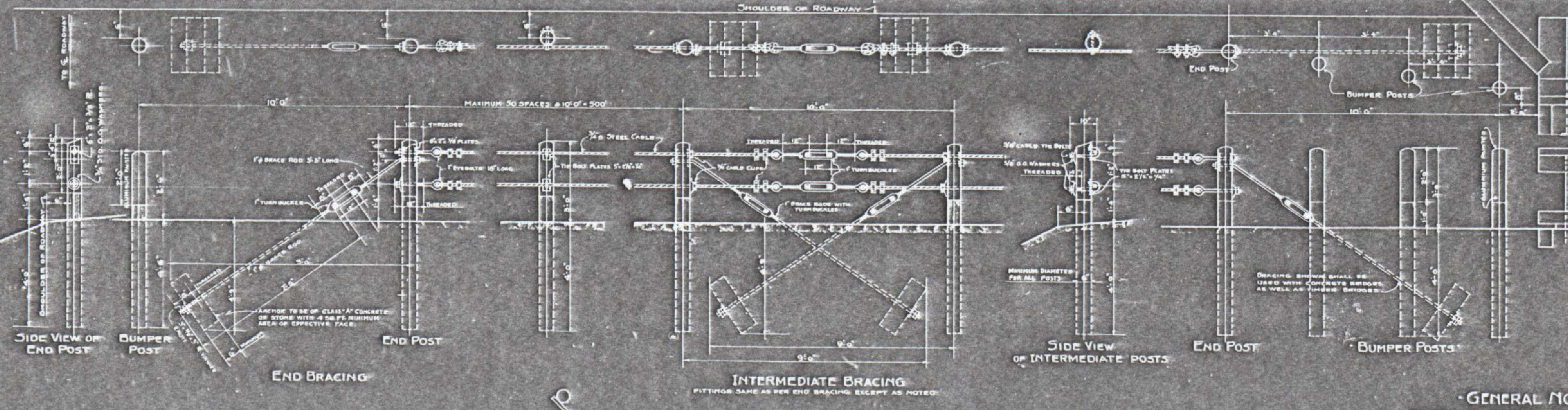
M-I-A

STANDARD
M-20-F

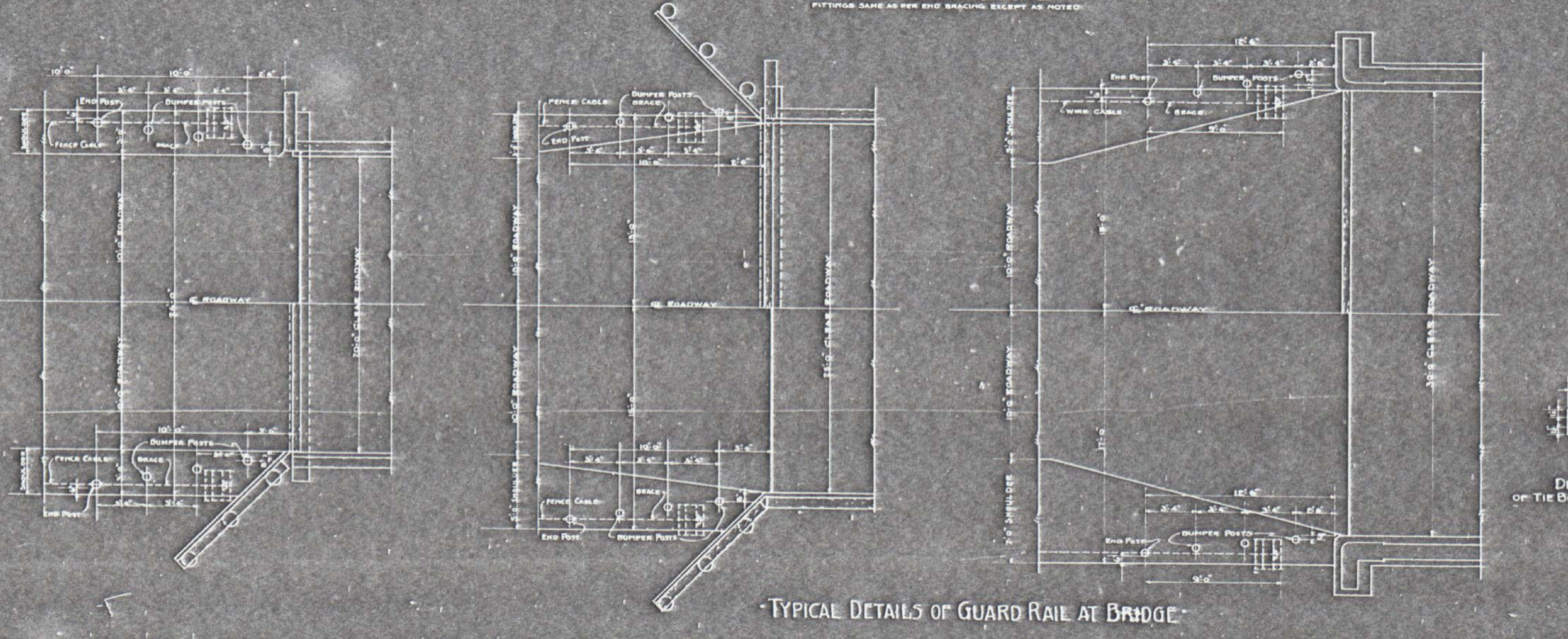
FED ROAD DIST NO	STATE	FED AID PROJ NO	SHEET NO	TOTAL SHEETS
3	COLO	F 9 B	25	

STANDARD WIRE CABLE GUARD FENCE WITH TIMBER POSTS.

ITEM Nº 72



SHOULDER OF ROADWAY
TO ℄ ROADWAY
MAXIMUM 50 SPACES @ 10'0" = 500'
10'0"
⅝" STEEL CABLE
THREADED
TURNBUCKLE
⅝" BRACE ROD 5'-2" LONG
ANCHOR TO BE OF CLASS "A" CONCRETE OR STONE WITH 4 SQ. FT. MINIMUM AREA OF EFFECTIVE FACE
⅝" CABLE CLIPS
BRACE RODS WITH TURNBUCKLES
MINIMUM DIAMETER FOR ALL POSTS
BRACING SHOWN SHALL BE USED WITH CONCRETE BRIDGES AS WELL AS TIMBER BRIDGES
ALUMINUM PAINTED
END POST
BUMPER POSTS
SIDE VIEW OF END POST
BUMPER POST
END BRACING
END POST
INTERMEDIATE BRACING
FITTINGS SAME AS PER END BRACING EXCEPT AS NOTED
SIDE VIEW OF INTERMEDIATE POSTS
END POST
BUMPER POSTS



END POST
BUMPER POSTS
FENCE CABLE
BRACE
WIRE CABLE
SHOULDER
10'0" ROADWAY
℄ ROADWAY
20'0" CLEAR ROADWAY
24'0" CLEAR ROADWAY
30'0" CLEAR ROADWAY
9'0"
12'0"

TYPICAL DETAILS OF GUARD RAIL AT BRIDGE

GENERAL NOTES

ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS OF THE COLORADO STATE HIGHWAY DEPARTMENT, ADOPTED JANUARY 1, 1930.

THE LENGTH OF GUARD FENCE TO BE PAID FOR AND DESIGNATED ON SHEET M-2 SHALL BE MEASURED FROM END POST TO END POST.

THE PRICE PER LINEAR FOOT SHALL BE AS SPECIFIED IN ITEM Nº 72 OF THE STANDARD SPECIFICATIONS AND SHALL INCLUDE THE NECESSARY BUMPER POSTS AND BRACINGS COMPLETE.

WHEN CONTINUOUS FENCE IS MORE THAN 500 FT. IN LENGTH, IT SHALL HAVE INTERMEDIATE SPLICES AND ANCHORS.

ALL POSTS SHALL BE MADE FROM SEASONED, STRAIGHT, SOUND LODGE POLE PINE, SOUTHERN YELLOW PINE OR

NO SECTION OF POSTS SHALL BE LESS THAN 6" IN DIAMETER.

ALL POSTS SHALL BE ENTIRELY PEELED AND SHAVED, THOROLY SEASONED AND DRY, TOPS BEVELED AND ALL HOLES DRILLED BEFORE TREATMENT IS APPLIED.

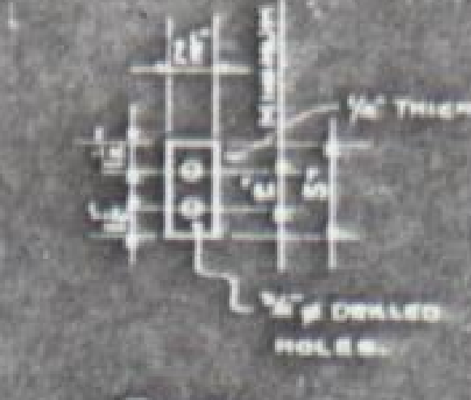
ALL POSTS SHALL BE PRESSURE TREATED WITH CREOSOTE FOR THE FULL LENGTH OF POSTS, AS PROVIDED FOR IN THE SPECIFICATIONS. THE TOP TWO (2) FEET OF EACH POST SHALL BE GIVEN TWO (2) COATS OF APPROVED ALUMINUM PAINT.

ALL POSTS SHALL BE SET AND TAMPED-IN PLUMB AND FIRM, TO THE LINES AND GRADES DIRECTED BY THE ENGINEER.

ALL FITTINGS SHALL BE HOT DIP GALV. STEEL, WITH SIZES AS NOTED AND LOCATED AS SHOWN.

EYE BOLTS SHALL BE WELDED OR DROP FORGED.

STANDARD CAST IRON O.G. WASHERS SHALL BE USED UNDER ALL NUTS AND CABLE CLIPS IN CONTACT WITH WOOD POSTS.



⅜" THICK
⅝" ⌀ DRILLED HOLES

DETAIL
OF TIE BOLT PLATE

COLORADO
STATE HIGHWAY DEPARTMENT
STANDARD
WIRE CABLE GUARD FENCE

Designed by G.H.D.
Made by G.H.D.
Checked by E.F.W.

Approved by G. A. Bailey
Bridge Engineer
Date: Nov. 20th 1931.

STANDARD M-24-F

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
3	COLO.	E4P	26	

Revised Aug. 8-1932. A.G.K. Added note for intersecting fences.
Revised Oct. 11-1932. A.G.K. Changed Staples to be 1½" long and to be galvanized.
Revised 12-14-32. A.G.K. Galvanized Gate Frames.

16'-0"
6'-0"
2"x2" Wooden Stays for gate.
Wire Loop
Nº 12½ Gauge Tie Wire and Post Brace required at Ends, Corners and Gate Posts.
40 D. Nails
Post for Cross Brace
Nº 12½ Gauge Wire Loops for Gates.
6" Minimum dia. of Posts
Gate Opening
Metal Stay
Two Metal Stays spaced equally in each panel.
Galvanized Barbed Wire
Natural Ground Line
Minimum 6'-0"
Minimum 2'-0"
2'-3"
Staples to be at least 1½" long made of Nº 9 Gauge Wire Base, Galv.
1-Nº 12½ Gauge 20 Ft. Tie Wire required at each brace
Ground Line
6'-0" Minimum Height
Minimum Height of Gate 42"
14'-0" Gate Opening
1" Minimum Dia. Galvanized Pipe Frame or an equivalent.
6" Minimum Dia. of Posts
Not less than 2"
3'-0" Gate Opening
FED. AID PROJ. 292-A 292-B
STATE HWY. R. O. W.
½" Reinforcing Bars 7'-3" Long
⅜" Reinforcing Bars 5'-9" long
8'-0"
6'-0"

Additional Quantities Required for One Gate in Barbed Wire Fences Item Nº 75 b.

- 2 - 2"x2"x 4'-0" Wooden Stays.
- 2 - 6" Dia. x 6'-0" long Cross Brace Posts.
- 2 - 6" Dia. x 6'-0" long Standard Posts.
- 2 - Tie Wires for Braces - 40 Lin. Ft. of Nº 12½ Gauge Wire.
- 6 - 40 D. Common Nails.

All End, Corner and Gate Posts to be 6" Minimum dia. All other Posts 5" Minimum dia.

ELEVATION OF BARBED WIRE FENCE WITH WOODEN POSTS.

ITEM Nº 75 a.

1 - Post read. for Cross Brace on each side of gates.
2 - Posts read. for Cross Brace at each corner post.
1 - Standard Post read with each Cross Brace.

Horizontal Wires: Strands of 2 Nº 12½ Std. Gauge Wire.
Cross Wires: Single Strand of Nº 14 Std. Gauge Wire.
4"x4" Wire Mesh 34" Wide or an equivalent type to weigh not less than 0.75 pounds per linear foot.
All End, Corner and Gate Posts to be 6" Minimum dia.
All other Posts to be 5" Minimum diameter.

ELEVATION OF COMBINATION WIRE FENCE WITH WOODEN POSTS.

ITEM Nº 95 a.

Gate Complete with Hinges and Latch to Weigh Not Less than 70 Lbs.
2"x4" Single Strand Wire Mesh Filler or an Equivalent Type.
Width of Mesh Approx. 40"
Horizontal Wires Nº 10 Gauge.
Cross Wires Nº 12½ Gauge.
Galvanized Metal Latch and Hinges.

ELEVATION OF DRIVEWAY GATE.

ITEM Nº 95 b.

¾" Minimum Dia. galvanized pipe frame or an equivalent.
Gate Complete with Hinges and Latch to Weigh Not Less than 19 Lbs.
2"x4" Single Strand Wire Mesh Filler or an Equivalent Type.
Width of Mesh Approx. 40"
Horizontal Wires Nº 10 Gauge.
Cross Wires Nº 12½ Gauge.
Galvanized Metal Latch and Hinges.

ELEVATION OF WALK GATE.

ITEM Nº 95 c.

GENERAL NOTES FOR WIRE FENCES.

All work shall be done in accordance with the Standard Specifications of the Colorado State Highway Department, Adopted January 1-1930.

Barbed Wire shall be of Standard Make, not lighter than Nº 12½ Gauge, Galvanized and with Two Point Barbs spaced not more than 5" apart.

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

Wire Mesh used in Driveway Gates shall be painted with an approved water proof asphalt or mineral paint.

Staples shall be at least 1½" long, made of Nº 9 Gauge Wire Base Galv., 8 staples read. per post for barbed wire fence and 14 Staples per post for Combination Wire Fence.

All Wooden Posts shall be made from seasoned, straight, sound Lodge Pole Pine, Southern Yellow Pine or

All Wooden Posts shall be entirely peeled and shaved, thoroughly seasoned and dry before treatment.

All Wooden Posts shall be pressure treated with Creosote Oil for the full length of posts, as provided in the specifications.

Cross Braces, Brace Posts and Tie Wires are to be used at all places where intersecting fences are encountered.

PROJECT MARKER POST.

ITEM Nº 78.

RIGHT OF WAY MARKER POST.

ITEM Nº 79.

NOTES FOR PROJECT MARKER POSTS.

All Letters and Numbers shall be 2" Plain Upright Block, Painted or Stenciled on the Concrete with a good quality of Black Paint. See Item Nº 41 "Second Field Coat-Dark."

Numbers and arrows shall show the proper numbers and directions of the projects each way from where the post is placed.

Post is to be set with sign facing the road at the end of the project, Five feet beyond edge of shoulder in such a position that the sign will properly indicate the projects to which it refers.

NOTES FOR RIGHT OF WAY MARKER POSTS.

All Letters shall be 1½" Plain and Depressed ¼ inch.

Post shall be set with Lettering Facing the Road at Points indicated on the Plans.

GENERAL NOTES FOR MARKER POSTS.

All Work shall be done in accordance with the Standard Specifications of The Colorado State Highway Department, Adopted January 1-1930.

Posts shall be made of Class "D" Concrete (Slump 3" to 6") except use White Portland Cement.

Reinforcing Bars shall be round or square, plain or deformed as shown and noted.

All Exposed Surfaces shall be rubbed free of form marks.

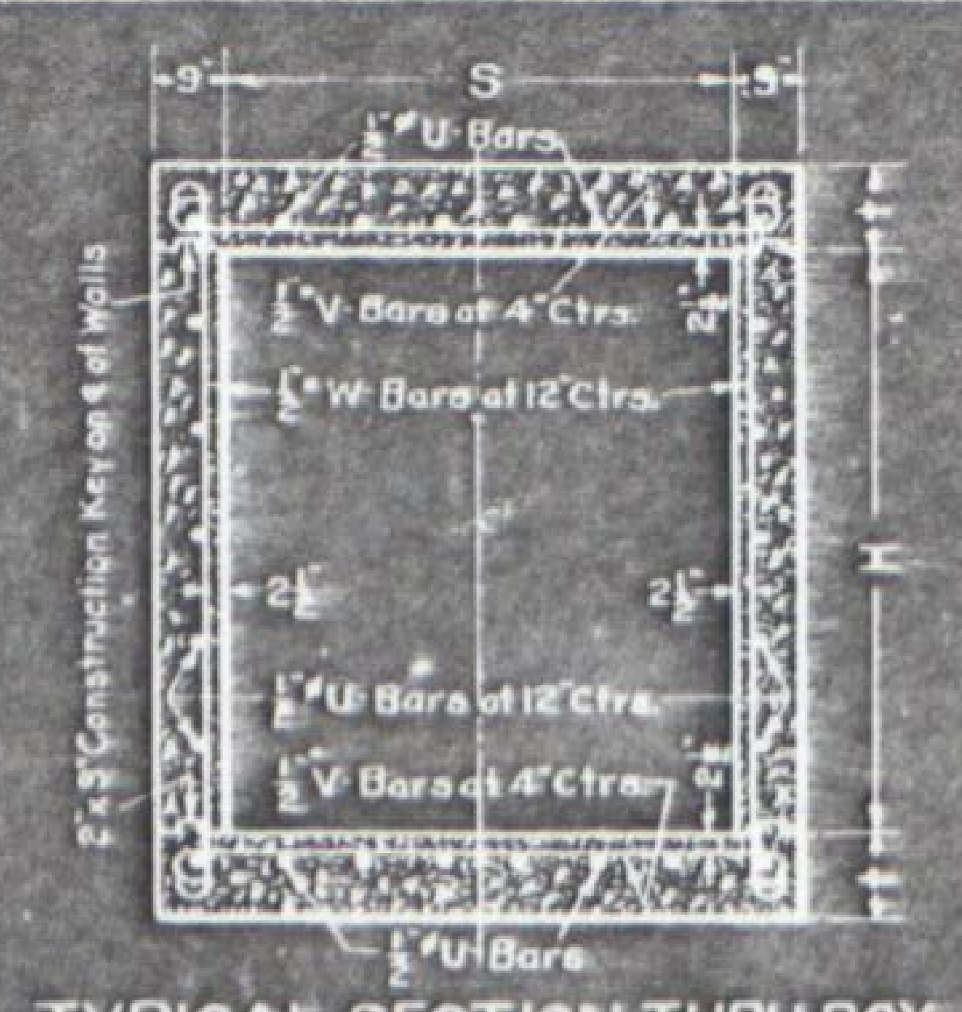
	INITIAL	DATE
ORIGINAL BY		
CHECKED BY		
VANDYKE BY		
CHECKED BY		

M-24-F

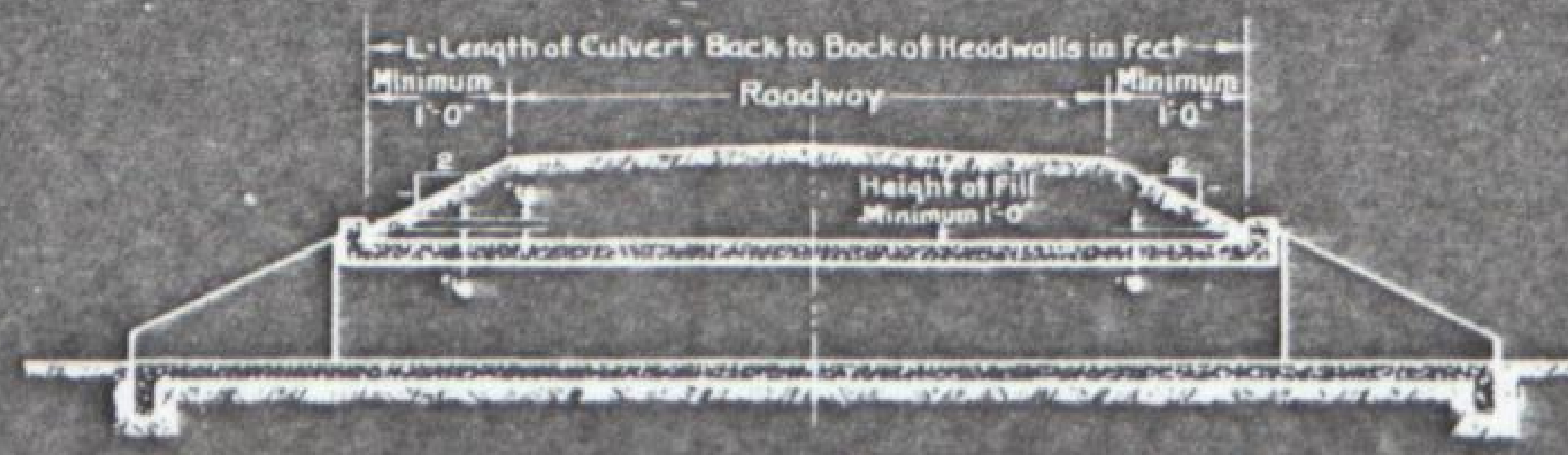
COLORADO
STATE HIGHWAY DEPARTMENT
STANDARD
WIRE FENCES
AND
MARKER POSTS

Designed by AGK	Approved by
Made by AGK	Bridge Engineer
Checked by G.H.G.	Date: Feb. 1 1932.

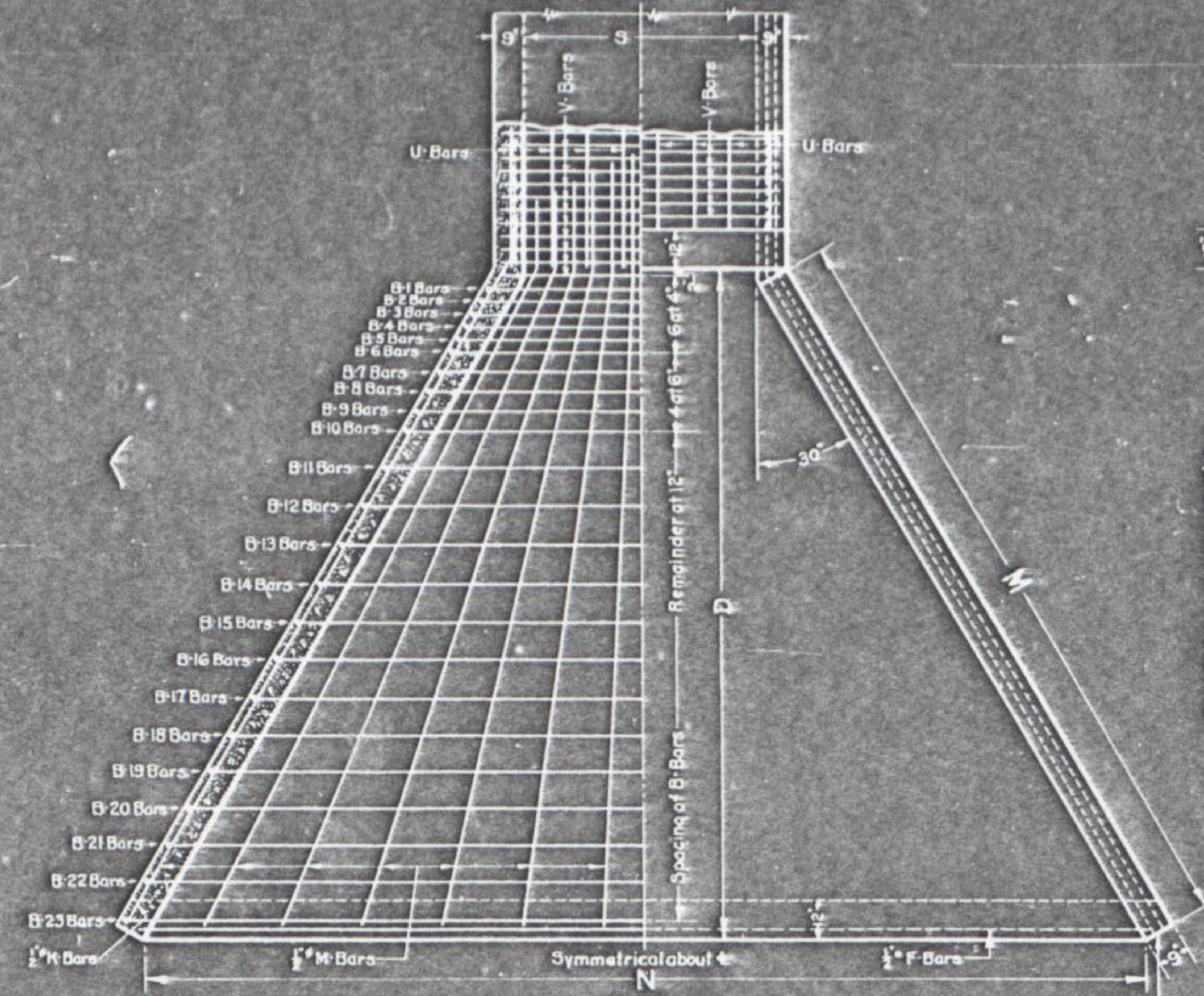
STRUCTURE NO.


S
3"
½" U-Bars
½" V-Bars at 4" Ctrs.
½" W-Bars at 12" Ctrs.
½" U-Bars at 12" Ctrs.
½" V-Bars at 4" Ctrs.
2"x3" Construction Key on ℄ of Walls
H

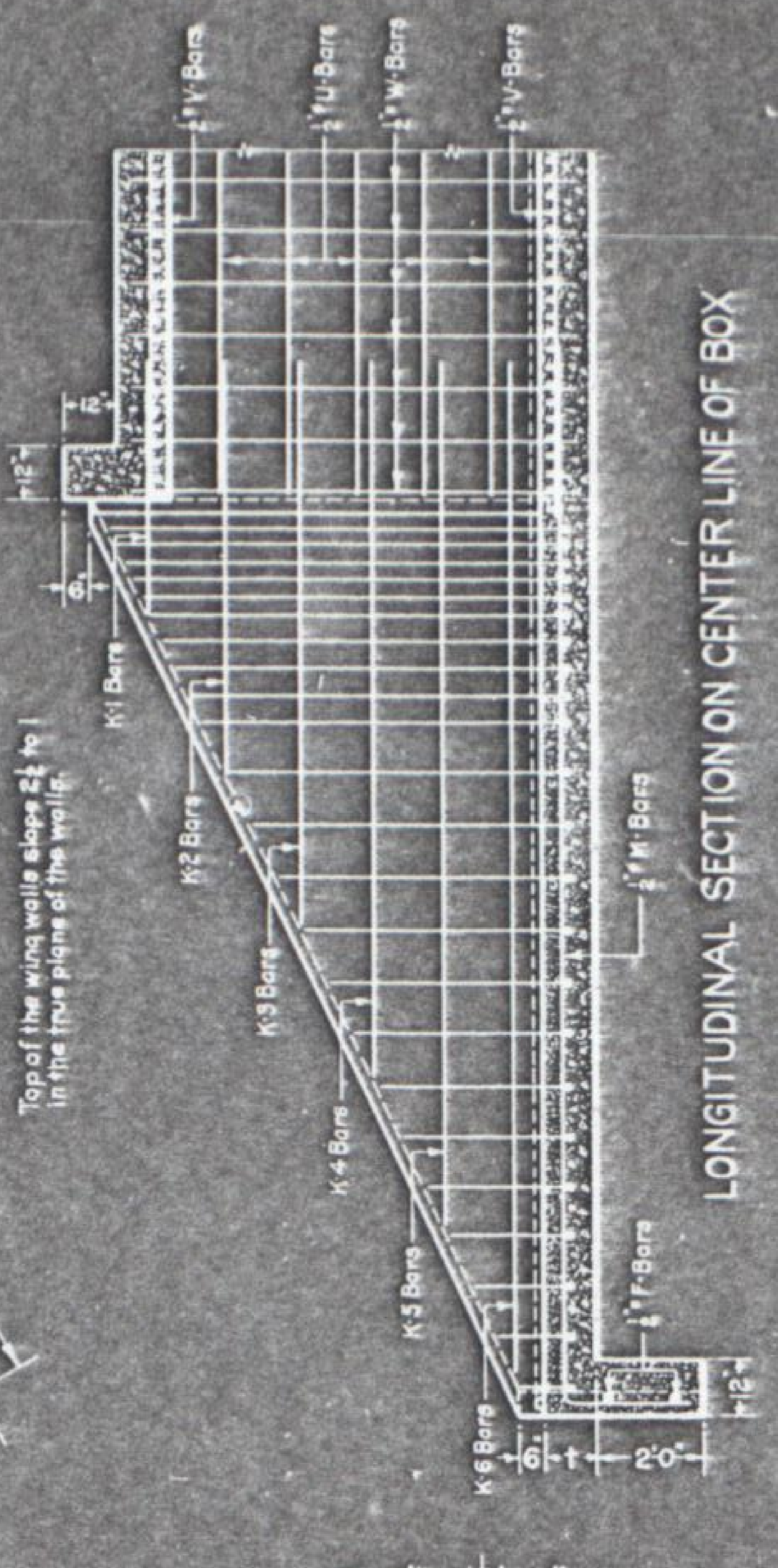
TYPICAL SECTION THRU BOX


L-Length of Culvert Back to Back of Headwalls in Feet
Minimum 1'-0"
Roadway
Minimum 1'-0"
Height of Fill Minimum 1'-0"

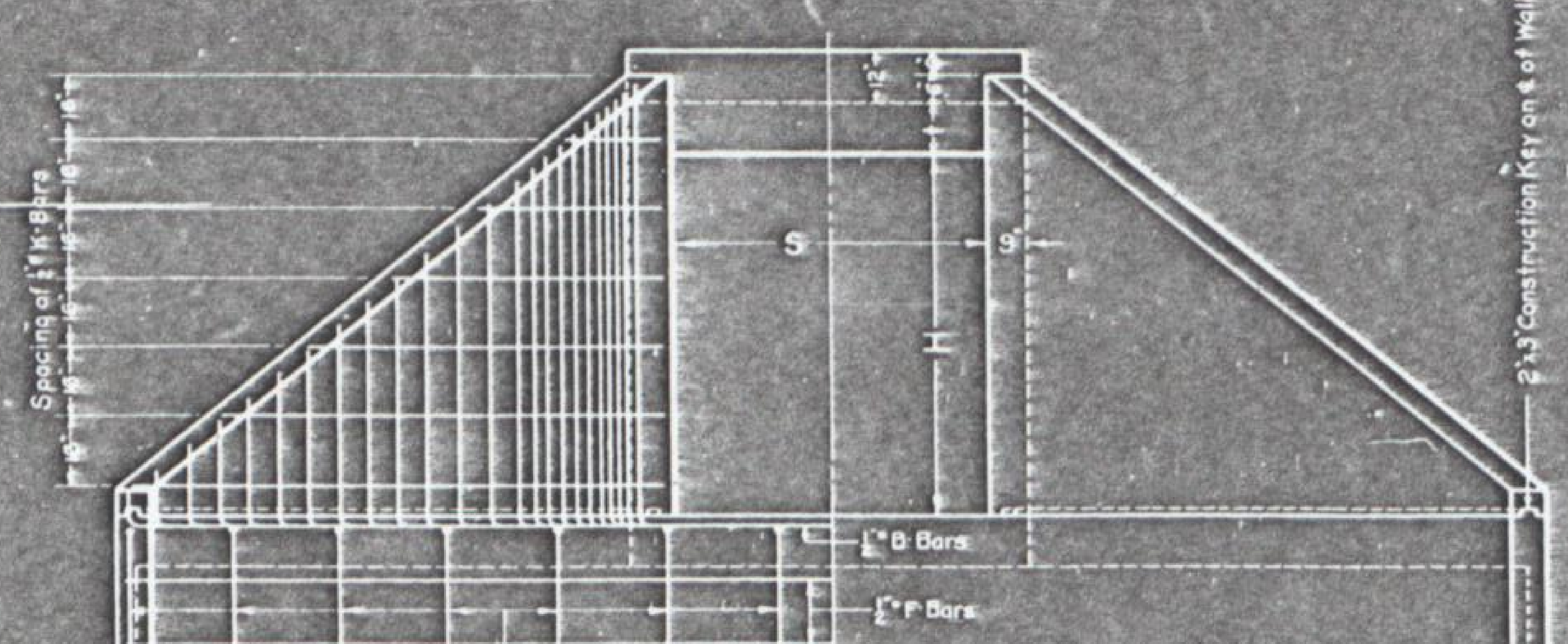
TYPICAL SECTION SHOWING RELATION OF CULVERT TO ROADWAY


S
U-Bars
V-Bars
B-1 Bars
B-2 Bars
B-3 Bars
B-4 Bars
B-5 Bars
B-6 Bars
B-7 Bars
B-8 Bars
B-9 Bars
B-10 Bars
B-11 Bars
B-12 Bars
B-13 Bars
B-14 Bars
B-15 Bars
B-16 Bars
B-17 Bars
B-18 Bars
B-19 Bars
B-20 Bars
B-21 Bars
B-22 Bars
B-23 Bars
½" M-Bars
Remainder at 12"
Spacing of B-Bars
D
30°
M
½" M-Bars
½" F-Bars
Symmetrical about ℄
N

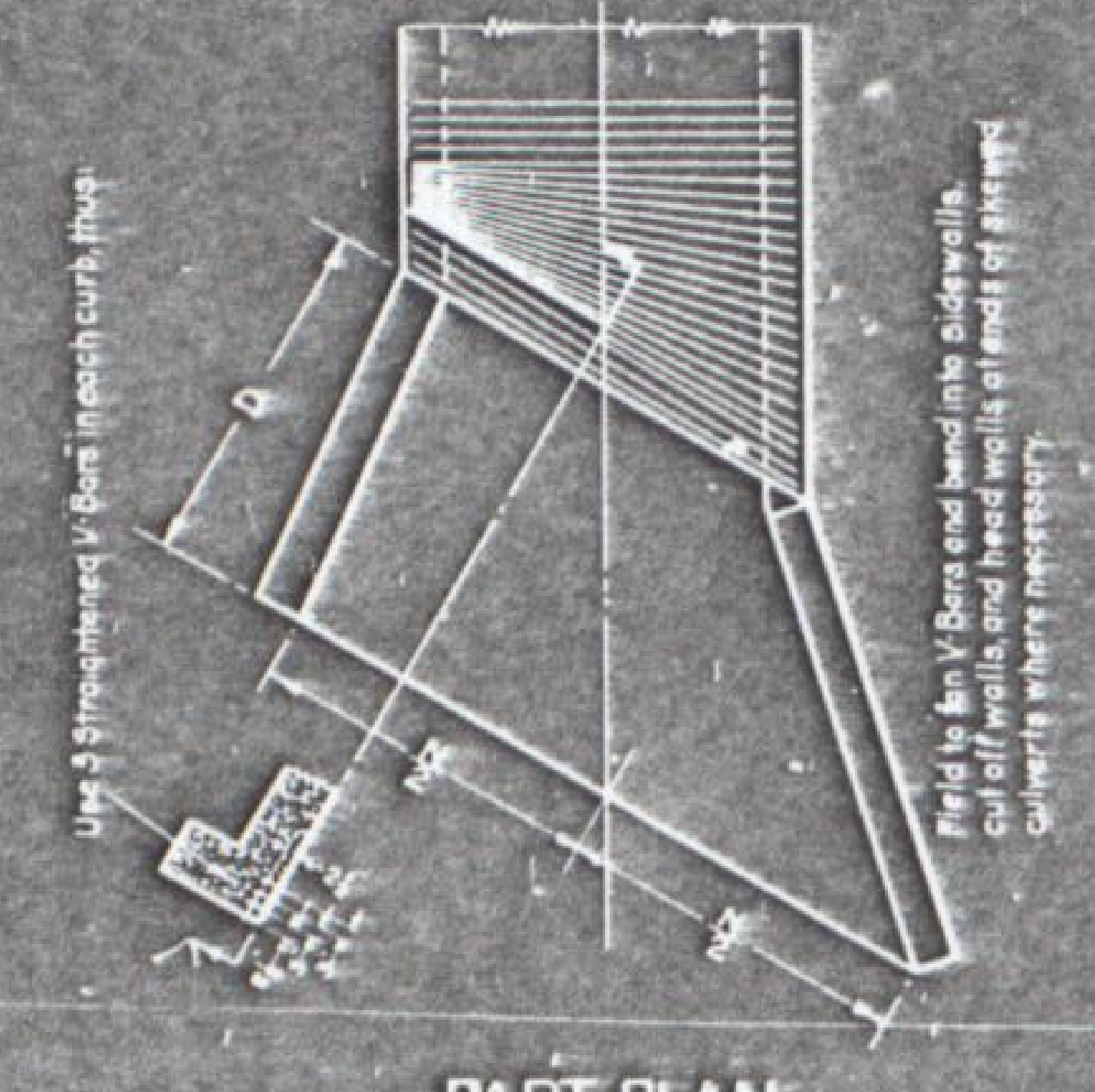
PART PLAN


½" V-Bars
½" U-Bars
½" W-Bars
½" V-Bars
K-1 Bars
K-2 Bars
K-3 Bars
K-4 Bars
K-5 Bars
K-6 Bars
½" M-Bars
½" F-Bars
Top of the wing walls slope 2½ to 1 in the true plane of the walls
2'-0"

LONGITUDINAL SECTION ON CENTER LINE OF BOX


Spacing of ½" K-Bars
S
H
9"
2"x3" Construction Key on ℄ of Walls
½" B-Bars
½" F-Bars
½" M-Bars

END VIEW


Use 3 Straightened V-Bars in each curb, thus:
Field to Bend V-Bars and bend into sidewalls, cut off walls, and head walls at ends of skewed culverts where necessary.
D

PART PLAN
FOR SKEWED HEADWALLS

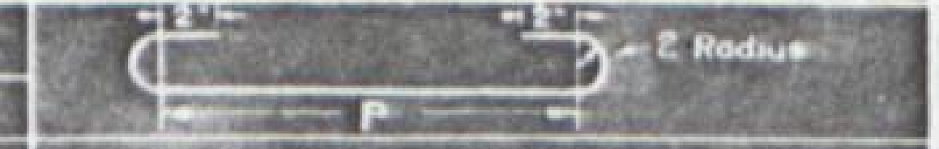
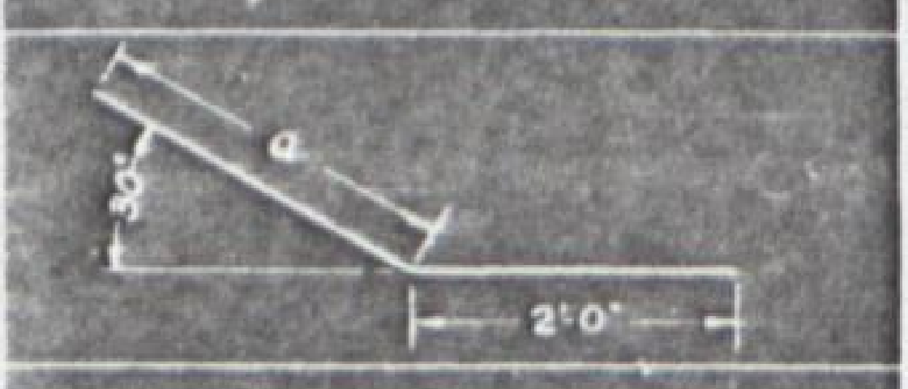
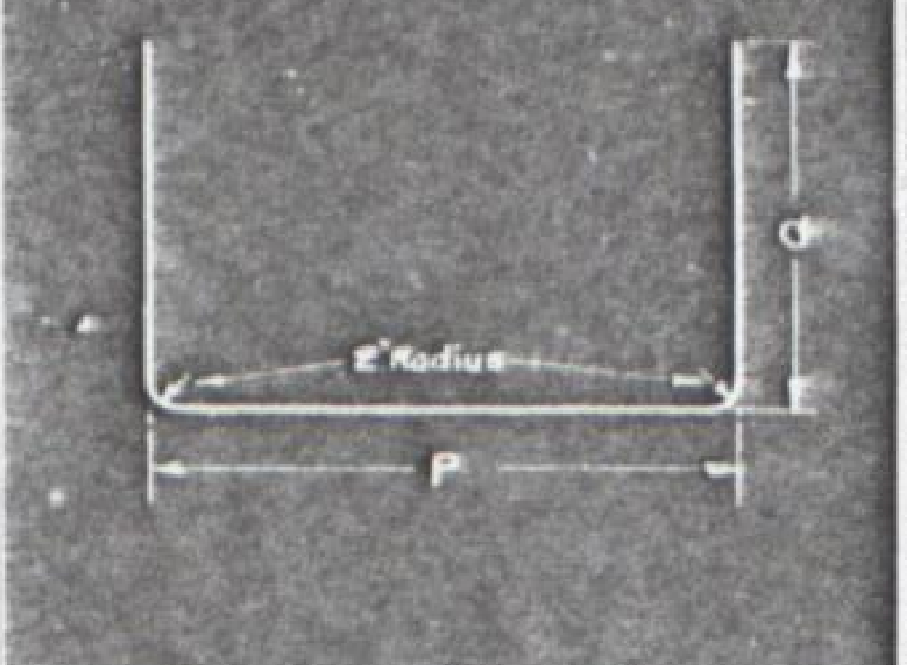
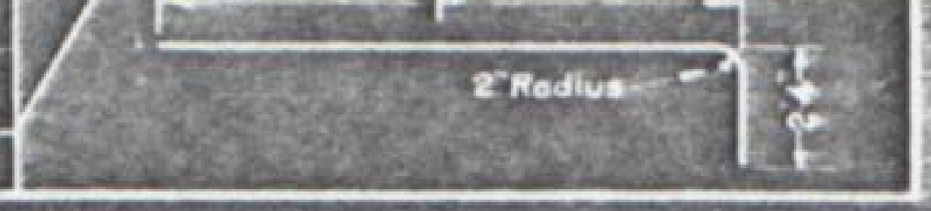
ORIGINAL BY	INITIAL	DATE
CHECKED BY		
VAN DYKE BY		
CHECKED BY		

STANDARD M-103-D

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
3	COLO.	E 93	27	

REINFORCEMENT BAR LIST

WWD

USE BARS FOR	MARK	SIZE	NUMBER	DIMENSION P	DIMENSION Q	TOTAL LENGTH	BENDING DIAGRAM ALL DIMENSIONS ARE TO ℄ OF BARS
ALL SIZES	V	½"	(6·L)+14	S+10"		S+2'-2"	 2" 2" 2" Radius P
" "	W	½"	(2·L)+6	H+10"		H+2'-2"	
" "	F	½"	4	L		N+0'-3"	
" "	U	½"	SEE ★ BELOW	★		L+1'-8"	
" "	K-1	½"	4		3'-4"	5'-4"	 Q 30° 2'-0"
H=2'-0" OR MORE	K-2	½"	4		6'-8"	8'-8"	
H=3'-0" " "	K-3	½"	4		10'-0"	12'-0"	
H=5'-0" " "	K-4	½"	4		13'-4"	15'-4"	
H=6'-0" " "	K-5	½"	4		16'-8"	18'-8"	
H=7'-0" " "	K-6	½"	4		20'-0"	22'-0"	
ALL SIZES	B-1	½"	2	S+ 1'-6"	H+ 1'-3"	P+(2×Q)-2"	 Q 2" Radius P
" "	B-2	½"	2	S+ 1'-11"	H+ 1'-1"		
" "	B-3	½"	2	S+ 2'-3"	H+ 0'-11"		
" "	B-4	½"	2	S+ 2'-8"	H+ 0'-9"		
" "	B-5	½"	2	S+ 3'-0"	H+ 0'-8"		
" "	B-6	½"	2	S+ 3'-5"	H+ 0'-6"		
" "	B-7	½"	2	S+ 4'-0"	H+ 0'-3"		
" "	B-8	½"	2	S+ 4'-7"	H+ 0'-0"		
" "	B-9	½"	2	S+ 5'-2"	H- 0'-3"		
H=1'-6" OR MORE	B-10	½"	2	S+ 5'-9"	H- 0'-5"		
H=2'-0" " "	B-11	½"	2	S+ 6'-11"	H- 0'-11"		
H=3'-0" " "	B-12	½"	2	S+ 8'-1"	H- 1'-4"		
H=3'-0" " "	B-13	½"	2	S+ 9'-3"	H- 1'-10"		
H=3'-0" " "	B-14	½"	2	S+10'-5"	H- 2'-3"		
H=4'-0" " "	B-15	½"	2	S+11'-7"	H- 2'-9"		
H=4'-0" " "	B-16	½"	2	S+12'-9"	H- 3'-3"		
H=5'-0" " "	B-17	½"	2	S+13'-11"	H- 3'-8"		
H=5'-0" " "	B-18	½"	2	S+15'-1"	H- 4'-2"		
H=6'-0" " "	B-19	½"	2	S+16'-3"	H- 4'-7"		
H=6'-0" " "	B-20	½"	2	S+17'-5"	H- 5'-1"		
H=6'-0" " "	B-21	½"	2	S+18'-7"	H- 5'-6"		
H=7'-0" " "	B-22	½"	2	S+19'-9"	H- 6'-0"		
H=7'-0" " "	B-23	½"	2	S+20'-11"	H- 6'-5"		
ALL SIZES	M	½"	(S+1)×2	D+ 3'-0"		D+5'-3"	 P 2" Radius 2"

★ See Table of Dimensions and Quantities

TABLE OF DIMENSIONS AND QUANTITIES

WWD

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

SPAN S	HEIGHT H	HEIGHT OF FILL ALLOWED	DIMENSION M	DIMENSION N	DIMENSION D	THICKNESS OF SLAB t	NUMBER OF U-BARS PER BOX	QUANTITIES FOR ONE LINEAL FT. OF BOX		QUANTITIES FOR TWO HEADWALLS		STRUCTURAL EXCAVATION	
								CONCRETE CU.YDS.	STEEL LBS.	CONCRETE CU.YDS.	STEEL LBS.	TWO HEADWALLS SQ.FT.	TWO CUT-OFF WALLS CU.YDS.
1'-6"	1'-6"	29'-6"	5'-6¼"	7'-2⅞"	5'-1⅞"	8½"	8	0.241	30.6	4.5	285	116.91	4.40
2'-0"	2'-0"	22'-6"	6'-9¼"	8'-11⅞"	6'-2⅞"	8½"	8	0.295	34.0	6.1	380	153.44	5.18
3'-0"	1'-0"	19'-0"	4'-7"	7'-9⅜"	4'-4⅛"	10"	8	0.332	37.5	5.0	310	116.50	4.65
3'-0"	2'-0"	19'-0"	7'-1"	10'-3⅜"	6'-6⅛"	10"	10	0.388	40.5	7.7	430	178.11	5.76
3'-0"	3'-0"	19'-0"	9'-7"	12'-9⅜"	8'-8⅛"	10"	12	0.444	43.6	11.0	605	250.88	6.87
4'-0"	2'-0"	15'-0"	7'-1"	11'-3⅜"	6'-6⅛"	10"	12	0.450	47.0	8.5	485	195.13	6.19
4'-0"	3'-0"	15'-0"	9'-7"	13'-9⅜"	8'-8⅛"	10"	14	0.506	50.0	12.0	660	272.24	7.31
4'-0"	4'-0"	15'-0"	12'-1"	16'-3⅜"	10'-10⅛"	10"	16	0.562	53.1	16.0	800	359.71	8.42
5'-0"	3'-0"	11'-6"	9'-7"	14'-9⅜"	8'-8⅛"	10"	16	0.567	56.6	12.8	720	293.60	7.76
5'-0"	4'-0"	11'-6"	12'-1"	17'-3⅜"	10'-10⅛"	10"	18	0.623	59.6	17.1	865	385.43	8.87
5'-0"	5'-0"	11'-6"	14'-7"	19'-9⅜"	13'-0"	10"	20	0.679	62.7	21.9	1070	488.07	9.98
6'-0"	2'-0"	10'-0"	7'-4¾"	13'-7⅛"	6'-9¾"	11½"	16	0.645	60.0	11.3	590	239.30	7.23
6'-0"	3'-0"	10'-0"	9'-10¾"	16'-1⅛"	8'-11¼"	11½"	18	0.699	63.0	15.3	785	325.95	8.34
6'-0"	4'-0"	10'-0"	12'-4¾"	18'-7⅛"	11'-1¼"	11½"	20	0.755	66.2	20.1	935	423.57	9.45
6'-0"	5'-0"	10'-0"	14'-10¾"	21'-1⅛"	13'-3¼"	11½"	22	0.810	69.2	25.6	1145	532.02	10.56
6'-0"	6'-0"	10'-0"	17'-4¾"	23'-7⅛"	15'-5¼"	11½"	24	0.866	72.3	31.7	1420	651.48	11.67
6'-0"	7'-0"	10'-0"	19'-10¾"	26'-1⅛"	17'-7¼"	11½"	26	0.923	75.3	38.5	1685	781.58	12.79

GENERAL NOTES

ALL WORK SHALL BE DONE ACCORDING TO THE STANDARD SPECIFICATIONS OF THE COLORADO STATE HIGHWAY DEPARTMENT ADOPTED JANUARY 1-1930.

ALL CONCRETE SHALL BE CLASS "A".

ALL EXPOSED SURFACES SHALL BE RUBBED FREE OF FORM MARKS.

ALL WALLS SHALL HAVE FORMS ON BOTH SIDES.

MINIMUM DISTANCE BETWEEN CENTER LINE OF BAR AND EDGE OF CONCRETE TO BE 2½".

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

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

FOR CULVERTS REQUIRED AND GOVERNING DIMENSIONS SEE SHEET NO E.

ALL REINFORCING BARS SHALL BE ROUND OR SQUARE, PLAIN OR DEFORMED AS SHOWN AND NOTED.

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

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

MAIN BARS SHALL NOT BE SPLICED.

SOUNDINGS AND DEPTH OF FOOTINGS SHOWN ARE ACCORDING TO THE BEST AVAILABLE DATA. IF ESSENTIALLY DIFFERENT CONDITIONS ARE ENCOUNTERED, THE ENGINEER WILL INSPECT AND DETERMINE IF REDESIGN IS NECESSARY.

POUR WING FOOTINGS MONOLITHICALLY WITH FLOOR OF BOX.

THE USE OF ADDITIONAL CONSTRUCTION JOINTS UNDESIRABLE. SHOULD FIELD CONDITIONS REQUIRE, CONSTRUCTION JOINTS MAY BE MADE ON A VERTICAL PLANE PERPENDICULAR TO CENTERLINE OF CULVERT AND SHALL HAVE A 2"x3" KEY.

THIS DESIGN NOT TO BE USED WHEN HEIGHT OF FILL EXCEEDS THE ALLOWABLE TABULATED.

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

ALL BACKFILLING IN APPROACHES, TO AND OVER CULVERTS, SHALL BE LAID IN LAYERS NOT EXCEEDING 6" IN DEPTH AND EACH LAYER SHALL BE ROLLED OR HAND TAMPED WHERE INACCESSIBLE TO ROLLER, ALSO MOISTENED WHEN NECESSARY.

LOADING DATA
LL-A.A.S.H.O. H-15.

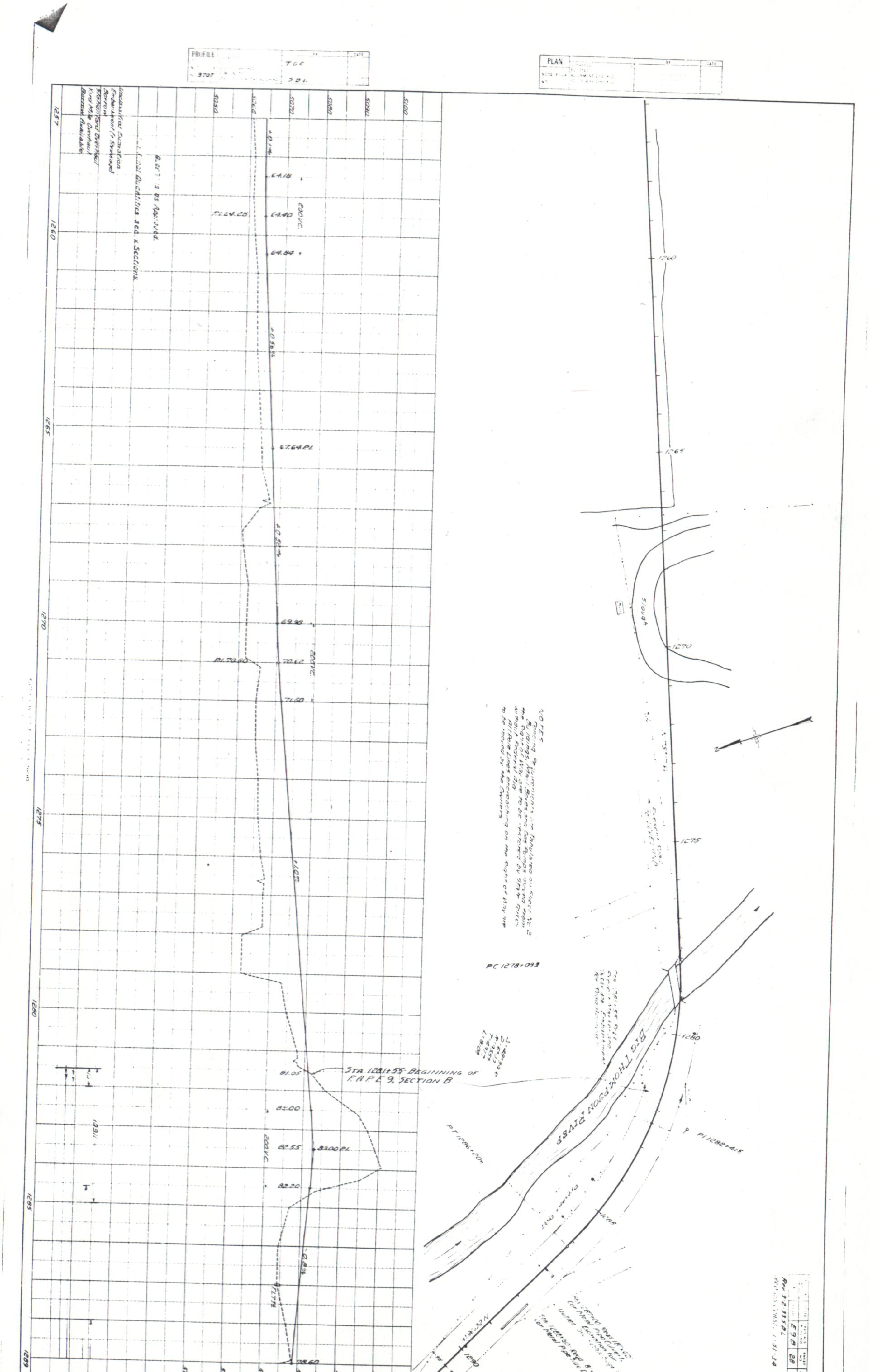
COLORADO
STATE HIGHWAY DEPARTMENT
CONCRETE BOX CULVERTS

1½' × 1½'	4' × 2'	5' × 4'	6' × 4'
2' × 2'	4' × 3'	5' × 5'	6' × 5'
3' × 1'	4' × 4'	6' × 2'	6' × 6'
3' × 2'	5' × 3'	6' × 3'	6' × 7'
3' × 3'			

Designed by A.G.K.
Made by A.G.K.
Checked by W.W.D.

Approved by Bailey
Bridge Engineer
Date: Nov 6th 1931

STRUCTURE NO. ____________


PROFILE
3707
TGC
SBL
PLAN
5000
5010
5020
5030
5040
5050
5060
5070
5080
5090
5100
1257
1260
1265
1270
1275
1280
1285
1289
Unclassified Excavation
Embankment (+Shrinkage)
Borrow
Overhaul
Plots as Approved
Quantities see X Sections
PI 64.28
64.18
64.40
64.84
200' V.C.
67.64 PI
PI 70.60
69.98
70.60
71.60
81.05
STA 1281+55 - BEGINNING OF F.A.P. E 9, SECTION B
82.00
82.55
83.00 PI
82.20
78.60
NOTES
Fencing Requirements are tabulated on Sheet No. 2
Buildings, Mail Boxes and Gas Pumps moved from the Right of Way are to be restored by State Forces without Federal Aid
All Pole Lines encroaching on the Right of Way are to be moved by the Owners
PC 1278+09.8
PT 1286+20
PI 1282+41.5
BIG THOMPSON RIVER
1260
1265
1270
1275
1280
1285
1290
Sta 1287+00 Reqd 18" C.G. Cor Metal Pipe Culvert
Outlet Excavation for
Sta 1288+60 Reqd 8' 9.4' Cor Metal Pipe Drain
N 22° W
Rev 9-2-33 SBL
E 9 B
28
1-31-34 HWV

PLAN
PROFILE
Buckingham Ditch
BIG THOMPSON RIVER
N 56°25' W
N 40°13' W
ROW
1290
1295
1300
1305
1310
1315
1320
PC 1293+573
PI 1296+117
PI 1298+573
Δ=29°47' L
D=6°00'
R=955.0
T=254.0
L=496.4
PC 1305+73.5
PI 1309+81.9
Δ=16°12' R
D=2°00'
R=2865.0
T=407.8
L=810.0
PT 1313+83
PC 1318+51.2 (8° Left)
5120
5110
5100
5090
5080
5070
200' V.C.
PI 80.18
PI 02.74
95.48 P.I.
08.64 P.I.
+0.87%
+3.06%
+1.22%
Unc. Exc.
Embank.
Borrow
Sta. Yd. O.H.
Yd. Mi. O.H.
STATE
COLO.
E 9 B
SHEET NO.
29
TOTAL SHEETS

Sta 1296+50 to 1301+50
5.0' of 12" Vit. Tile Sub Drain W.C. #3159
Rock backfill W.C. 3164

Sta 1303+00 to 1303+50. The portion of fill exposed to the river is to be constructed of heavy rock obtained from the roadway excavation. Sta 1281+55 to 1285+00 Work is included in Unclassified Excavation and Overhaul

Sta 1301+00 Replace Gas Engines and Pump Repair Dam W.C. #3164

Sta 1301+50 Read 15'×28' Cor. Metal Pipe Side Drain, Embankment for Road Approach, Move Shed off Right of Way.

Sta 1309+15 Read 15'×60' Cor. Metal Pipe Side Drain, Embankment for Road Approach, Move Buildings off Right of Way

Sta 1309+23 Place Vegetable Stand on Concrete Footing Bill #5 W.O. #3165 Class "C" Concrete

Sta 1310+10 Read 15'×28' Cor. Metal Pipe Side Drain, Embankment for Road Approach

Sta 1312+00 Read 15'×28' Cor. Metal Pipe Side Drain, Embankment for Road Approach

Sta 1314+35 Read 15'×28' Cor. Metal Pipe Side Drain, Embankment for Road Approach

Sta 1318+35 Read 15'×28' Cor. Metal Pipe Side Drain.

Sta 1317+50 End for Road Approach

Clearing and Grubbing Required Sta 1295 to 1302 - Small Trees & Brush 1302+50 to 1303+50 - Small Trees

BRIDGE STRUCTURE NOTES - STA 1312+28 TO 1312+476 - No C-16-X.

PRESENT STRUCTURE
Span - 1 @ 16'
Clear Roadway - 20'
Clear Waterway - 80 □'
Type of Superstructure - Timber Deck
Type of Substructure - Concrete Abutments
Requirements as to Removal - Remove

STREAM DATA
Drainage Area in Sq. Mi. - Irrigation Ditch
Velocity during High Water - Slow
Elevation of
Maximum High Water - Low Water -
Normal Stage 5102 - Stream Bed 5099
Drift - None
Scour - None

PROPOSED STRUCTURE
Position referred to Present Structure - 22' North
Span - 1 @ 16' Clear
Clear Roadway - 30'
Clear Waterway - 80 □'
Type of Superstructure - Concrete Slab
Type of Substructure - Gravity Type Concrete
Detour Structure Requirements - Use Old Bridge
R.R. Siding Loveland Haul to Bridge Site 6 Mi.

NEARBY STRUCTURES ON SAME STREAM
Location -
Waterway -
Record during Floods -

Quantities as Approved.
For Final Quantities see X Sections.

Re. as Const. 2-1-34 A.J.T.

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
3	COLO.	E 9 B	29	

Rev. as Const. 2-1-34 A.J.T.

ERFO 108(1)
SEC. 2
BEGIN SEC. 2
END SEC. 2
C-16-K
N. 26° 38' W.
1290
1295
1300
1305
1310
1315
1320
50'
P.C. 1293+57.7
Δ=29°47'L
D=6°00'
R=955.0
T=254.0
L=496.4
P.T. 1298+54.1
Buckingham Ditch
Sta. 1301+00 Replace Gas Engines and Pump Repair Dam. W.O. #3164
Sta. 1302+50 - Reqd. 15"x28' Cor. Metal Pipe Side Drain, Embankment for Road Approach, Move Shed off Right of Way.
Ho.
Driveway. Gate Reqd.
N. 56° 25' W.
12" Vit. Tile Sub Drain
Gate
Sta. 1296+00 - Reqd. 18"x62' Cor. Metal Pipe Culvert. Dry Rubble Slope Paving
P.I. 1296+11.7
Sta. 1296+50 to 1301+50 500' of 12" Vit. Tile Sub Drain W.O. #3159 Rock backfill W.O. 3164
Sta. 1301+62 Reqd. Replace 21" Cor. Metal Pipe with 36"x84' Cor. Metal Pipe Culvert. Dry Rubble Slope Paving Exc. for Inlet Ditch
BIG THOMPSON RIVER
Sta. 1303+00 to 1304+50 - The portion of fill exposed to the river is to be constructed of heavy rock obtained from the roadway excavation, Sta. 1281+55 to 1285+00. Work is included in Unclassified Excavation and Overhaul.
P.C. 1305+73.2
Sta. 1307+72 - Reqd. Replace 12" Cor. Metal Pipe with 18"x66' Cor. Metal Pipe Culvert. Exc. for Inlet Ditch Dry Rubble Slope Paving
Gate Reqd.
Drink stands
Sta. 1309+15 - Reqd. 15"x60' Cor. Metal Pipe Side Drain, Embankment for Road Approach, Move Buildings off Right of Way.
P.I. 1309+81.0
Sta. 1309+23. Place Vegetable Stand on Concrete Footing. Bill #5. W.O. #3165. Class "A" Concrete
Sta. 1306+85 - Reqd. 15"x28' Cor. Metal Pipe Side Drain, Embankment for Road Approach.
Δ=16°12'R
D=2°00'
R=2865.0
T=407.8
L=810.0
Sta. 1310+10 - Reqd. 15"x28' Cor. Metal Pipe Side Drain, Embankment for Road Approach.
Sta. 1312+00 - Reqd. 15"x28' Cor. Metal Pipe Side Drain, Embankment for Road Approach.
Sta. 1312+28 to 1312+47.6 - Reqd. Remove Timber Bridge with Concrete Headwalls. Build 16' Span Concrete Slab Bridge. See Details on Sheet #3. 3 - 50' lengths of Guard Fence.
P.T. 1313+83.2
Sta. 1314+8.5 Reqd. 15"x28' Cor. Metal Pipe Side Drain, Embankment for Road Approach.
N. 40° 13' W.
Sta. 1317+50 Emb. for Road Approach
R.O.W.
Gate Reqd.
P.C. 1318+51.2 (8° Left)
Sta. 1319+35 - Reqd. 15"x28' Cor. Metal Pipe Side Drain,

PLAN

NOTE BOOK

NO.

SURVEYED

PLOTTED

ALIGNMENT CHECKED

RT. OF WAY CHECKED

BY

DATE

Clearing and Grubbing Required:
Sta. 1295 to 1302 - Small Trees & Brush.
" 1302+50 to 1303+50 - Small Trees.

BRIDGE STRUCTURE NOTES - STA. 1312+28 TO 1312+47.6 - NO. C-16-X.

PRESENT STRUCTURE
Span - 1@16'
Clear Roadway - 20'
Clear Waterway - 60 □' ±
Type of Superstructure - Timber Deck
Type of Substructure - Concrete Abutments
Requirements as to Removal - Remove

STREAM DATA
Drainage Area in Sq. Mi. - Irrigation Ditch
Velocity during High Water - Slow
Elevation of:
Maximum High Water - -Low Water -
Normal Stage - 5102 - Stream Bed - 5099
Drift - None
Scour - None

PROPOSED STRUCTURE
Position referred to Present Structure - 22' North
Span - 1@16' Clear
Clear Roadway - 30'
Clear Waterway - 80 □'
Type of Superstructure - Concrete Slab
Type of Substructure - Gravity Type Concrete
Detour Structure Requirements - Use Old Bridge
R.R. Siding - Loveland - Haul to Bridge Site - 6 Mi.

NEARBY STRUCTURES ON SAME STREAM
Location -
Waterway -
Record during Floods -

PROFILE
PLAN
NOTE
Quantities as Approved For Final Quantities See Cross Sections.
CONST. DIV. # 2
CONST. DIV. # 2
300' V.C.
300' V.C.
300' V.C.
100' V.C.
200' V.C.
200' V.C.
400' V.C.
P.I. 00.12
P.I. 13.12
P.I. 32.265
P.I. 41.41
P.I. 47.29
1326+68³ Back
1337+03⁰ Ahead
Bridge in Place to be Extended
Note Sta. 1342+50 to 1352+00 Grade Changed Profile Corrected
5100
5110
5120
5130
5140
5150
5160
1325
1326
1337
1340
1345
1350
1355
1360
BIG THOMPSON
RIVER
STRUCTURE C-162
STRUCTURE C-16-P
EQUATION
EQUATION
P.T. 1326+68³ Back
1337+03⁰ Ahead
P.C. 1345+60³
P.I. 1347+62⁰
P.T. 1349+59³
P.C. 1356+86³
P.I. 1359+21⁰
P.T. 1361+54⁶ Back
= 1361+55⁴ Ahead
Sta. 1322+50 - 1324+50 and Sta. 1330+00 - 1343+00 - To Be Constructed Under Construction Division No. 2.
Buckingham Ditch
Louden Ditch
R.O.W.
L = 773.27
M = 113.37
E = 134.69
1040.36
1064.80
90

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
3	COLO.	E9B	30	

Rev. 3-30-33 - W.E.G.
Rev. as Constructed. 1-31-34
A. J. T.

Sta. 1322+50 - 1324+50 and Sta. 1339+00 - 1343+00 - To Be Constructed under Construction Division No. 2.

Sta. 1346+80 Rip Rap Salvaged and Replaced. W.O.# 2646.

Sta. 1338+25 - Reqd. 24"x132' Cor. Metal Pipe Culvert, Excavn. for Outlet. Dry Rubble Slope Paving.

Sta. 1323+14.0 to 1323+57.4 Reqd. - Remove Timber Bridge. Build 43.5' Span Concrete Slab Bridge. See Details on Sheets No. 4 & 5. Also Reqd. 3-50 ft. Lengths and 1-100' Lengths of Guard Fence. Additional Footing. Extra Class 'A' Concrete, Treated Timber Piling Bank Protection. W.O. 3168

Sta. 1326+60 - Move House from Right of Way.

Sta. 1340+60 to 1342+24.5 - Reqd. Remove Combination Steel and Timber Truss with Approaches. Build 1-100' Span Steel Low Truss and 2-30' Spans I Beam Approaches. See Details on Sheets No. 6-7-8 & 9. Also Req'd. 4-50' lengths of Guard Fence.

Sta. 1343+10 - Reqd. 15"x28' Cor. Metal Pipe Side Drain, Embankment for Road Approach.

Sta. 1346+80 Excavation for Channel Change

Sta. 1346+76.8 to 1347+00± - Concrete Bridge in Place. Required to be extended. Work to be done under Construction Division No. 2. See Details on Sheet No. 10. Also Req'd 4-50' lengths of Guard Fence.

Sta. 1355+20 - Reqd. Replace 12" C.M.P. with 15"x28' Cor. Metal Pipe Side Drain. Emb. for Rd. Approach.

Sta. 1355-1356 - Reqd. Remove Sign and Portion of Brick Sidewalk, Move Gas Pump from Right of Way. 309 cu. yd. Embankmt. for Road Approach available at Sta. 1368+ and included in Profile Quantities.

Sta. 1356+35 - Reqd. Move 3 Mail Boxes.

Clearing and Grubbing Required:
Sta. 1322 to 1324 - Small Trees
" 1347 " 1348 - Fruit Trees
" 1350 " 1355 - " "

P.C. 1318+51.2
Δ=65°22'L
D=8°00'
R=716.3
T=459.5
L=817.1
N.40°13'W.
R.O.W.
50'
Gate
Gate Reqd.
1320
STRUCTURE C-16-Y
BEGIN SEC. 3
Buckingham Ditch
83+00
84+00
85+00
83+33
85+40
1325
P.T. 1326+68.3 Back = 1337+03.2 Ahead
S.74°25'W.
P.I. 1323+10.7
N.41°25'E. 1340.6 ft. to S.E. Corner Section 1, T.5N., R.70W.
Ho.
Flag Pole
Store
Gas Pump
EQUATION
STRUCTURE C-16-Z
1340
RIVER
BIG THOMPSON
N
END SEC. 3
1345
STRUCTURE C-16-R
P.I. 1347+62.0
Louden Ditch
Channel Change
P.C. 1345+62.2
Δ=15°53'R
D=4°00'
R=1432.5
T=199.8
L=397.1
P.T. 1349+59.3
N 0°18' E
R.O.W. one only.
1350
60'
40'
N.89°42'W.
727.0
1355
Drink Stand
Gas Pump
Sign
P.C. 1356+86.3
Δ=9°22'L
D=2°00'
R=2865.0
T=234.7
L=468.3
S 9°04' E
1360
P.I. 1359+21.0
P.T. 1361+54.6 Back = 1361+55.4 Ahead
S 80°56'W.
NO. R.O.W.
USM
CONST. DIV. #2
125
325
5.29
18
149
Uncl. Exc.
Emb. + 15%
36
1177
CONST. DIV. No. 2.
544
544
Note

PLAN

SURVEYED
PLOTTED
ALIGNMENT CHECKED
RT. OF WAY CHECKED

NOTE BOOK NO.

BY

DATE

FED ROAD DIST NO | STATE | FED AID PROJ NO | SHEET NO | TOTAL SHEETS
5 | COLO | E9B | 91 |
Rev 3-30-33 · W.E.G.
Revised as Const. 2-2-34 H.W.K.
PLAN
PROFILE
T.G.C.
S.B.L.
9706
Big 'T' School →
EQUATION
P.I. 1359+21
P.T. 1361+54.6 Back
1361+55.4 Ahead
Δ = 9°22' L
D = 2°00'
R = 2865.0
T = 234.7
L = 468.3
Sta 1362+10 - Reqd 15 x 38 Cor Metal Pipe Side Drain
Emb for Road Approach
COUNTY ROAD
Sta 1363+40 Reqd 18 x 20.6 Cor Metal Pipe Side Drain
Sta 1366+00 - Reqd 18 x 100 Cor Metal Pipe Side Drain, Embankment for Road Approach
S 80°56' W
Excavation for Ditch Change 3' x 58' C.M.P. W.O. 3165
2' x 70' Galv Water Pipe W.O. 3165
Sta 1369+25 Reqd 18 x 76 Cor Metal Pipe Culvert, Excav for Outlet, Dry Rubble Slope Paving
Sta 1369+95 Embankment for Road Approach
Sta 1371+ Place Irr. Ditch in 2' x 72' Slip Joint Irrigation Pipe W.O. 3161
Replace Bulkhead Tunnel W.O. 3165
Sta 1371+00 to 1373+50. The portion of fill exposed to the river is to be constructed of heavy rock obtained from the roadway excavation from adjacent stations. Work is included in Unclassified Excavation and Overhaul.
P.C. 1372+03.8
Sta 1373+50 Reqd 18 x 66 Cor Metal Pipe Culvert, Dry Rubble Slope Paving
Δ = 30°58' L
D = 4°
T = 396.2
L = 774.2
E = 54.2
R = 1432.3
NOTE
STA. 1372+03.8 TO 1386+36.3
Line Changed W.O. 2646
Plan Corrected
BIG THOMPSON RIVER
P.I. 1379+77
P.C. 1381+29
S 49° 58' W
Δ = 15°13' L
D = 5°
T = 255
L = 507
E = 17
R = 1910
P.T. 1386+36.3 Back
1386+77.0 Ahead
Equation
STA. 1386+30
18 x 60 C.M.P. Culvert
STRUCTURE C-16-AN
S 34° 45' W
R.O.W.
Sta 1384+40 Reqd 18 x Cor Metal Pipe Culvert Dry Rubble Slope Paving
Sta 1388+20 to 1389+84.4 Reqd 1-100 Span Steel Low Truss and 1-30 Span I-Beam Approach. See Details on Sheets No. 113 to 114. Also Reqd 4-50 lengths of Guard Fence. Extra Footing Class A Concrete W.O. 3168.
STA 1387+00
Emb for Road Approaches
P.I. 1383+84.2
STA 1356 TO 1382
City of Loveland Power Line Moved W.O. 3162.
STA. 1371+70 to 1380+62
816 S Lin Ft. of Loveland City Water Main protected by Gunite Concrete W.O. 3162.
STA. 1377+00
Reqd 18 x 58 C.M.P. Culvert, Dry Rubble Slope Pav.
Original P.I. 1378+92.8
BORROW PIT
P.I. 1376+00
Note: The Contractor will be required to protect the Neville and Loveland Pipe Lines. All revisions in these lines are to be made by the Owners.
Clearing & Grubbing Required:
Sta 1360 to 1365 · Fruit Trees
· 1366+50 to 1369 · Brush & Small Trees
· 1384 to 1388 · Cottonwood Trees.
· 1391 " 1392 " "
· 1371 " 1373 " "
Sta 1388+00 - 1390+00 - To Be Constructed under Construction Division No. 2.
NOTE.
STA. 1371+50 TO 1388+50
Grade Changed. W.O. 2646.
Profile Corrected.
5180
5170
5160
5150
5140
5130
+0.34%
-2.3%
-2.28%
+5.224%
-3.276%
+6.0%
400' V.C.
500' V.C.
300' V.C.
200' V.C.
P.I. 52.17
P.I. 36.21
P.I. 62.43
Water Tunnel Pres. Rock Hill
24" Wood Stave Pipe Line Covered 6" with Wire Mesh Reinforced Concrete
1386+36.3 Back
EQUATION
1386+77.0 Ahead
Hard Red Sandstone
CONSTRUCTION DIVISION NO. 2
Quantities as Approved for Final Quantities See X Sections
Uncl. Exc.
Embankment
Borrow
Sta Yd. O.H.
Yd. M.O.H.
Bor. Haul.
1161
3259
8490
2090
6600
8690
2058
1858
2436
2409
6113
27
953
7344
6391
12,725
12.00±
Adjacent to R.O.W. on North
492
12
910
504
1360
1365
1370
1375
1380
1385
1390
1392

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
3	COLO.	E9B	31	

Rev. 3-30-33 - W.E.G.
Revised as Const. 2-2-34. H.W.Y.

PLAN
NOTE BOOK NO.
SURVEYED
PLOTTED
ALIGNMENT CHECKED
RT. OF WAY CHECKED
BY
DATE
Δ=9°22'L
D=2°00'
R=2865°
T=234?
L=468³
S9°-04'E
P.T. 1361+546 Back
= 1361+554 Ahead
P.I. 1359+21°
1360
1365
1370
1375
1380
1385
60'
40'
50'
R.O.W.
R.O.W.
NO R.O.W. Markers
Ho.
Ho.
Filling Sta.
Sign
School
COUNTY ROAD
Louden Ditch
Present Road
S.80°56'W.
N
SEC. 4
BEGIN SEC. 4
END SEC. 4
SEC. 5
BEGIN SEC. 5
END SEC. 5
STRUCTURE C-16-AA
BIG THOMPSON RIVER
Gate
Gate
Gate
Borrow Pit.
Neville Pipe Line (12" Pipe)
24" Water Main.
S 49° 58' W.
S 34° 45' W
R.O.W.
P.C. 1372+03²
P.T. 1379+77²
P.C. 1381+29²
P.I. 1376+00
P.I. 1383+84²
Original P.I. 1378+92²
(original) P.I. 1378+92²
P.T. 1386 + 36² Back / 1386 + 77² Ahead
Equation
Δ = 30°-58' L
D = 4°
T = 396⁸'
L = 774²'
E = 54°
R = 1432³'
Δ = 15°13' L
D = 3°
T = 255¹'
L = 507²'
E = 17°
R = 1910'

EQUATION
Sta. 1362+10 - Reqd. 15"x 28' Cor. Metal Pipe Side Drain.
Emb. for Road Approach.

Sta. 1363+95 - Reqd. 18"x 206' Cor. Metal Pipe Side Drain.

Sta. 1366+00 - Reqd. 18"x 100' Cor. Metal Pipe Side Drain, Embankment for Road Approach.

Sta. 1367+70 to 1368+70 - Reqd. Excavation for Ditch Change. 15" x 58' C.M.P. W.O. 3165.
2"x 70' Galv. Water Pipe W.O. 3165

Sta. 1369+25 - Reqd. 18"x 76' Cor. Metal Pipe Culvert, Excav. for Outlet. Dry Rubble Slope Paving

Sta. 1369+95 - Embankment for Road Approach.

Sta. 1371± Place Irr. Ditch in 12"x 72' Slip Joint Irrigation Pipe W.O. 3161. Replace Bulkhead Tunnel. W.O. 3165.

Sta. 1371+00 to 1374+50 - The portion of fill exposed to the river is to be constructed of heavy rock obtained from the roadway excavation from adjacent stations. Work is included in Unclassified Excavation and Overhaul.

Sta. 1373+50 - Reqd. 18"x 66' Cor. Metal Pipe Culvert. Dry Rubble Slope Paving.

NOTE.
STA. 1372 +03² TO 1386+36²
Line Changed. W.O. 2646
Plan Corrected.

STA. 1386+30
18"x 60' C.M.P. Culvert.

STA. 1377+00
Req'd. 18"x 56' C.M.P. Culvert. Dry Rubble Slope Pav.

STA 1356 TO 1382
City of Loveland
Power Line Moved. W.O. 3162.

STA. 1371+70, To 1380+62
816.5 Lin. Ft. of Loveland City Water Main
protected by Gunite Concrete. W.O. 3162.

STA. 1387+00
Emb for Road Approaches.

Sta. 1384+46 - Reqd. 18"x 76' Cor. Metal Pipe Culvert. Dry Rubble Slope Paving.

Sta. 1388+50 to 1389+84² Reqd. 1-100' Span Steel Low Truss and 1-30' Span I Beam Approach. See Details on Sheets No. 11-12-13 & 14. Also Req'd. 4-50' lengths of Guard Fence. Extra Footing Class "A" Concrete W.O. 3168.

Note.- The Contractor will be required to protect the Neville and Loveland Pipe Lines. All revisions in these lines are to be made by the Owners.

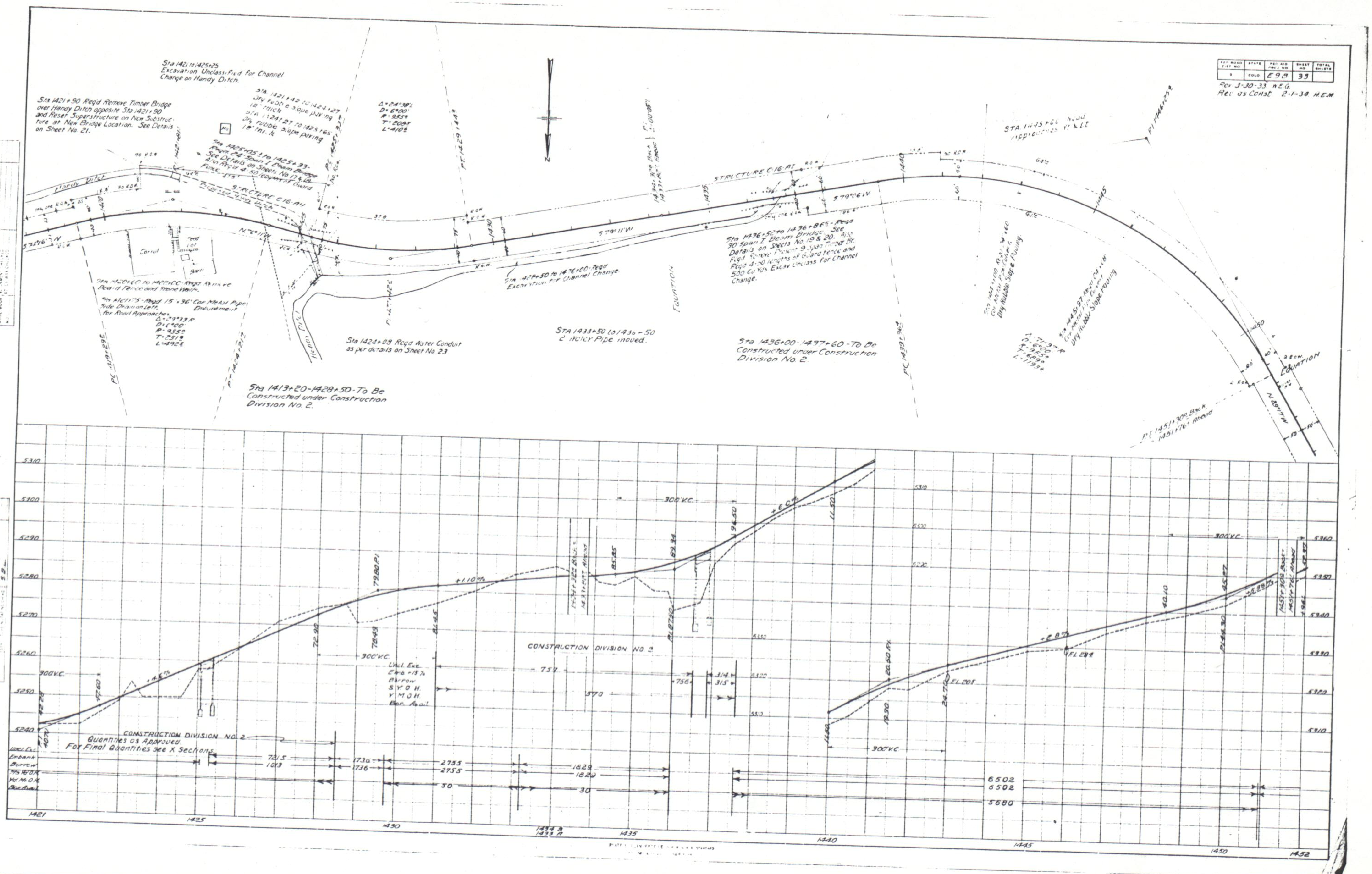
Clearing & Grubbing Required:
Sta. 1360 to 1365 - Fruit Trees.
" 1366+50 to 1369 - Brush & Small Trees.
" 1384 to 1388 - Cottonwood Trees.
" 1391 " 1392 - " "
" 1371 " 1373 - " "

Sta. 1388+00 - 1390+00 -
To Be Constructed under
Construction Division No. 2.

NOTE.

5180

PLAN
NOTE BOOK NO.
PROFILE
TCC
FED ROAD DIST NO | STATE | FED A PROJ NO | SHEET NO | TOTAL SHEETS
5 | COLO | E9B | 32 |
Rev 3-30-33 - W.E.G.
Rev as Const. 2-1-34 H.E.M.
STAS. 1398+00
402+00
1406+10
Construct permanent barricades
W.O. 3165
1396+08 15"x68' C.M.P.
Side Drain & Rd App.
Sta 1397+00 Reqd 18"x66' Cor Metal Pipe Culvert Dry Rub. & Slope Paving
PI 1399+40
PC 1394+30
S 34°15' W
Δ = 39°34' R
D = 4°00'
R = 1432.5
T = 515.3
L = 989.5
Sta 1401+60 Reqd 18"x74' Cor Metal Pipe Culvert, Dry Rubble Slope Paving
Sta 1402+00 Reqd Remove 15"x18' Cor Metal Pipe
Sta 1404+28 Reqd 18"x72' Cor Metal Pipe Culvert. Dry Rubble Slope Paving
Excav. for outlet ditch.
P.T. 1404+19
2690 ft. to S.E. Corner
Section 11, T.5N., R.70W.
Sta 1405+15
To Berthoud
Sta 1404+87 Reqd 15"x98' Cor Metal Pipe Side Drain, Embankment for Road Approaches
Sta 1405+80 - 24"x36' Cor. Metal Pipe Side Drain with Headwalls to Remain in Place.
Sta 1406+10 Reqd Remove Mail Box (Right) and 15" Cor Metal Pipe (Left) 24"x50' C.M.P. Cross Drain Dry Rubble Slope Paving
Excav. for outlet ditch.
STA 1406+00 - 1422+00
Loveland Power Line moved.
S 74°19' W
1400
1405
1410
STA 1412+12 24"x26' C.M.P. Side Drain and Emb. for Road Approach
Sta 1411+20 Reqd 15"x28' Cor Metal Pipe Side Drain, Embankment for Road Approach
Sta 1414+51 to 1414+75 Reqd 22' Span Concrete Slab Bridge. See Details on Sheets No 15 & 16. Remove present 16' Span Timber Bridge. Also Reqd approx. 400' Right of Centerline 1-19' Span Timber Crossing as per Sheet No. 21 and 500 Cu. Yds. Embankment for approach. Reqd 3-50 lengths of Guard Fence at Roadway Bridge
Sta 1414+00 Back Reqd. 5x7x42' Concrete Box Culvert and Exc. Uncl. for Inlet
Sta 1413+20 - 1428+50 - To Be Constructed under Construction Division No. 2.
P.I. 0.003 L
1414+27.4 Back = 1413+89.2 Ahead
EQUATION
Sta 1415+00 Reqd 15"x96' Cor Metal Pipe Side Drain, for Road Approach.
Embank.
Gate
STRUCTURE C-16-Ab
Proposed Dike
New Ditch Channel
Home Supply Ditch
Handy Ditch
Sta 1414+60 Reqd Excavation for New Channel. Excavated Material to be used in Dike
20'
2:1 Slope
2:1 Slope
TYPICAL SECTION OF DIKE
Clearing and Grubbing Required:
Sta 1400+20 - Brush
" 1401+30 Tree
" 1402+50 - 1403+50 - Small Trees
" 1406+20 - Small Trees
S 74°16' W
1420
PC 1419+29
Sta 1421 to 1425+25 Excavation Unclassified for Channel Change on Handy Ditch.
Sta 1421+90 Reqd. Remove Timber Bridge over Handy Ditch opposite Sta 1421+90 and Reset Superstructure on New Substructure at New Bridge Location. See Details on Sheet No. 21.
PI 1421+81
Proposed Handy Ditch
Open Ditch
Corral
Barn
Sta 1420+60 to 1422+00 Reqd. Remove Board Fence and Stone Walls.
Sta 1421+75 - Reqd 15"x36' Cor. Metal Pipe Side Drain, on Left. Embankment for Road Approaches
Δ = 29°33' R
D = 6°00'
R = 955.0
T = 251.9
L = 492.5
P.T. 1424+21
Sta 1424+08 Reqd Water Conduit as per details on Sheet No. 23
5170
5180
5190
5200
5210
5220
5230
5240
+6.0
85.05
400' V.C.
96.59
97.02 P.I.
99.26
P.L. 99.3
+1.12%
03.74 P.I.
P.L. 01.92
+0.97%
P.L. 00.8
09.08
10.53 P.I.
16.67
300' V.C.
16.53
+1.6%
P.L. 22.8
+39 = 28.10
P.L. 23.4
1414+27.4 Back =
1413+89.2 Ahead
38.10 P.I.
35.85
500' V.C.
39.10
+0.4%
40.10
P.I. 40.70
42.28
900' V.C.
+3.6%
Quantities as Approved
For Final Quantities see X Sections
CONSTRUCTION DIVISION NO. 2
Uncl. Exc.
Embank.
Borrow
Sta. Yd. O.H.
Yd. Mi. O.H.
Dry Rubble
505
1303
8049
6191
2711
3130
5621
48030
145
51990
1391
1395
1400
1405
1410
1414 B
1413 A
1415
1420
1422


FLAN
PROFILE
T.G.C.
Sta 1421 to 1425+25 Excavation Unclassified for Channel Change on Handy Ditch.
Sta 1421+90 Req'd Remove Timber Bridge over Handy Ditch opposite Sta 1421+90 and Reset Superstructure on New Substructure at New Bridge Location. See Details on Sheet No. 21.
STA. 1421+42 to 1424+27 Dry rubble slope paving 12" thick
STA 1424+27 to 1425+65 Dry rubble slope paving 18" thick
Sta 1425+05± to 1425+33 Req'd 24' Span I Beam Bridge See Details on Sheets No 17 & 18 Also Req'd 4-50 lengths of Guard Fence
Δ=24°38'L
D=6°00'
R=955±
T=208±
L=410±
Handy Ditch
Proposed Handy Ditch
STRUCTURE C-16-A11
Corral
Feed Lot
Barn
S 71°16' N
N 76°11'W
S 79°11'W
Sta 1420+60 to 1422+00 Req'd Remove Board Fence and Stone Walls.
Sta 1421+75 Req'd 15'×36" Cor Metal Pipe Side Drain on Left for Road Approaches. Embankment
Δ=29°33'R
D=6°00'
R=955±
T=251±
L=492±
PC 1419+29±
PT 1424+21±
PC 1425+33±
PT 1429+44±
Sta 1424+08 Req'd Water Conduit as per details on Sheet No 23
Sta 1428+50 to 1436+00 Req'd Excavation for Channel Change.
Sta 1413+20-1428+50-To Be Constructed under Construction Division No. 2.
STA 1433+50 to 1436+50 2" Water Pipe moved.
EQUATION
1434+30± Back 1433+82± Ahead
STRUCTURE C-16-A1
S 79°06'W
Sta 1436+52 to 1436+86.5 Req'd 30 Span I Beam Bridge. See Details on Sheets No. 19 & 20. Also Req'd Remove Present 9 Span Timber Br. Req'd 4-50 lengths of Guard Fence and 500 Cu Yds Excav Unclass for Channel Change.
Sta 1436+00-1497+60-To Be Constructed under Construction Division No. 2.
PC 1439+36±
Sta 1443+00 Req'd 24"×60' Cor Metal Pipe Culvert Dry Rubble Slope Paving
Sta 1445+97 Req'd 24"×68' Cor Metal Pipe Culvert Dry Rubble Slope Paving
Δ=71°37'R
D=6°00'
R=955±
T=689±
L=1193±
STA 1443+00 Road Approaches Rt & Lt
PI 1446+25±
PI 1451+30± Back 1451+76± Ahead
N 89°17'W
EQUATION
1420
1430
1435
1440
1445
1450
Rev. 3-30-33 W.E.G.
Rev. as Const 2-1-34 H.E.M.
300' V.C.
42.28
40.70
47.60
+4.5%
72.90
78.49
79.80 PI
81.45
+1.10%
1434+30± Back 1433+82± Ahead
85.85
89.34
PI 87.60
96.50
+6.0%
11.50
11.60
19.30
20.60 PI
24.70
EL 20.5
+6.8%
EL 28.4
40.10
PI 44.30
45.97
+2.89%
1451+30± Back 1451+76± Ahead
52.97
CONSTRUCTION DIVISION NO 2
Uncl. Exc.
Emb +15%
Borrow
S.Y.O.H.
Y.M.O.H.
Bor. Avail.
757
570
756
314
315
CONSTRUCTION DIVISION NO 2 Quantities as Approved For Final Quantities See X Sections
Uncl. Exc.
Embank
Borrow
Sta Yd O.H.
Yd Mi O.H.
Bor. Avail.
7215
1013
1730
1736
2755
2755
50
1829
1829
30
6502
6502
5680
5240
5250
5260
5270
5280
5290
5300
5310
5320
5330
5340
5350
5360
1421
1425
1430
1434 B
1433 A
1435
1440
1445
1450
1452

FED ROAD DIST NO	STATE	FED AID PROJ NO	SHEET NO	TOTAL SHEETS
5	COLO	E 9 B	39	

PLAN
PROFILE
5.B.L.
3108
P.T. 1451+30.0 Back
= 1451+76.1 Ahead
EQUATION
U.S.G.S. B.M. Elev. 5351.23
Sta 1452+15 - U.S.G.S. Bench Mark to be Preserved until moved by Engineer
N. 29°17' W.
Sta 1460+00 Reqd 18"x56 Cor. Metal Pipe Culvert. Dry Rubble Slope Paving
STA 1469+50 Road Approach
Sta 1474+00 Reqd 24"x60 Cor. Metal Pipe Culvert Dry Rubble Slope Paving
Sta 1478+50 - Reqd 24"x70 Cor. Metal Pipe Culvert Dry Rubble Slope Paving
STA 1479+30 Loveland Power Line moved.
PC 1478+53.4
3281' to W¼ Corner Section 10
P.I. 1483+28.4
Δ-27°56' L
D-3°00'
R-1910.0
T-475.9
L-931.1
1455
1460
1465
1470
1475
1480
1451+30.0 Back
1451+76.1 Ahead
+5.38%
74.10
400 V.C.
84.86 P.I.
83.32
87.46
F.L. 55
+2.3%
07.86
1476 P.I.
08.86
600 V.C.
48.08
F.L. 90
-5.56%
F.L. 67
P.I. 67.50
-5.50%
5410
5400
5390
5380
5370
5360
5350
5340
5330
5320
Quantities as Approved.
For Final Quantities see X Sections
Uncl. Exc.
Embank.
Borrow
Sta Yd O.H.
Yd Mi. O.H.
Bor. Haul
1160
1160
3338
3338
1940
3632
2852
30510
55
13274
783
1451
1455
1460
1465
1470
1475
1480

FED ROAD DIST NO	STATE	FED AID PROJ NO	SHEET NO	TOTAL SHEETS
5	COLO	E 9 B	34	

Rev. as Const. 2-1-34 H.E.M.