FED. RD. DIVISION	STATE	PROJECT	
5	OHIO		

FRA-104-10.57

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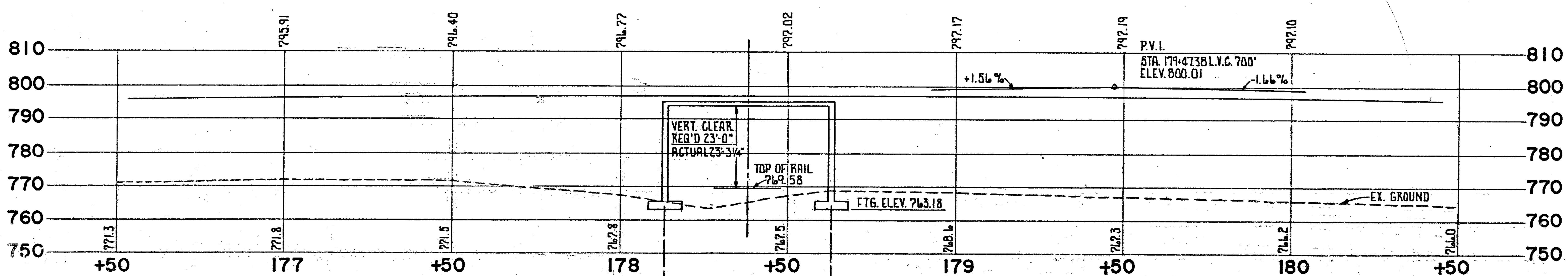
NOTE:
EARTHWORK LIMITS SHOWN ARE SCHEMATIC.
ACTUAL SLOPES SHALL CONFORM TO PLAN CROSS-SECTIONS.

PLAN



PROFILE ALONG ℄ OF S.R. 104

RIGID FRAME PILES: 12" ⌀ CAST-IN-PLACE REINFORCED CONCRETE PILES. ESTIMATED AVERAGE PAY LENGTH = 25'-0"

PROPOSED STRUCTURE

TYPE: RIGID CONCRETE FRAME.
SPAN: CLEAR SPAN 28'-0" (NORMAL)
LOADING: HS 20-44 AND MILITARY ALTERNATE LOADING.
SKEW: 35°56'30" WITH REFERENCE TANGENT

ALIGNMENT: TANGENT
SUPERELEVATION: NONE
ADT: 23109 (2000) **ADTT:** 1618 (2000)

FRANKLIN CONSULTANTS INC.
Consulting Engineers
COLUMBUS, OHIO

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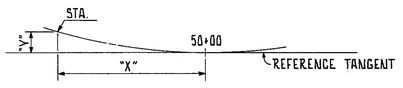
SITE PLAN
BRIDGE No. FRA-104-1124
S.R. 104 OVER N & W RAILROAD
FRANKLIN COUNTY S.R. 104

DESIGNED	DRAWN	TRACED	CHECKED	REVIEWED	DATE	REVISED
FA	J. L. J.	J. L. J.	HM	JH	10/9-78	10-31-84

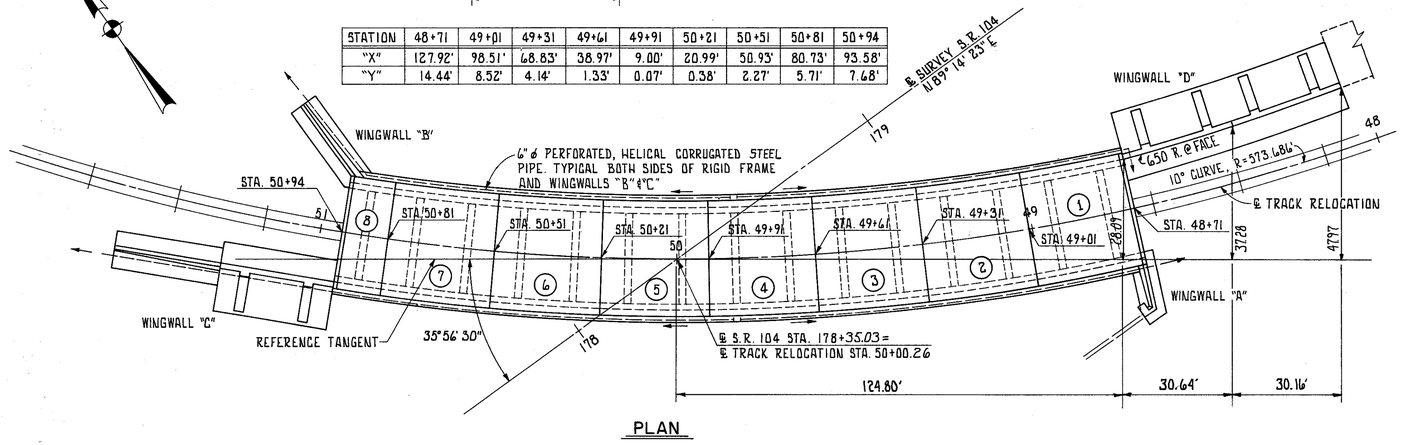
FED. RD. DIVISION	STATE	PROJECT	
5	OHIO		

189
245

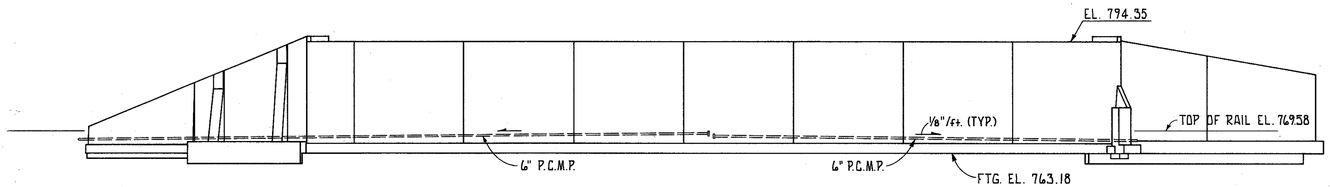
FRA-104-10.57



STATION	48+71	49+01	49+31	49+61	49+91	50+21	50+51	50+81	50+94
"X"	127.92'	98.51'	68.83'	38.97'	9.00'	20.99'	50.93'	80.73'	93.58'
"Y"	14.44'	8.52'	4.14'	1.33'	0.07'	0.38'	2.27'	5.71'	7.68'



PLAN



ELEVATION

ESTIMATED QUANTITIES

ITEM	TOTAL	UNIT	DESCRIPTION	FRAME	WING. "A"	WING. "B"	WING. "C"	WING. "D"		
503	1143	CU. YDS.	UNCLASSIFIED EXCAVATION	670	23	43	180	227		
505	LUMP	SUM	PILE DRIVING EQUIPMENT MOBILIZATION	LUMP SUM						
507	2600	LIN. FT.	12" ø CAST-IN-PLACE REINFORCED CONCRETE PILES	2600						
509	402,782	LBS.	REINFORCING STEEL	330,071	1119	1560	24,264	45,768		
511	650	CU. YDS.	CLASS C CONCRETE, FOOTINGS AND STRUTS	309	12	22	122	185		
511	1464	CU. YDS.	CLASS C CONCRETE, ABOVE FOOTINGS	1236	14	18	64	132		
512	127	SQ. YDS.	TYPE B WATERPROOFING	96			14	17		
518	947	CU. YDS.	POROUS BACKFILL	782	11	18	61	75		
518	532	LIN. FT.	6" ø PERFORATED, HELICAL CORRUGATED STEEL PIPE. 707.01	446		24	62			
523	3	HOUR	DYNAMIC LOAD TEST	3						

GENERAL NOTES

DESIGN DATA:
DESIGN LOADING - HS 20-44 AND THE ALTERNATE MILITARY LOADING.
CONCRETE CLASS "C" - UNIT STRESS 1333 P.S.I.
REINFORCING STEEL - ASTM A615, A616, OR A617 - UNIT STRESS 20,000 P.S.I.

RAILROAD EMBANKMENT SHALL BE CONSTRUCTED TO THE LEVEL OF THE SUB-BALLAST FOR THE FULL LENGTH OF THE RIGID FRAME AND ITS WINGWALLS BEFORE EXCAVATIONS ARE MADE FOR FOOTINGS AND CONCRETE STRUTS.

FOUNDATION BEARING PRESSURE: WINGWALL FOOTINGS ARE DESIGNED FOR A MAXIMUM BEARING PRESSURE OF 2 TONS PER SQ. FT.

CONSTRUCTION CLEARANCE OF 8' -0" HORIZONTALLY FROM THE CENTER OF TRACKS AND 20' -0" VERTICALLY FROM A POINT LEVEL WITH THE TOP OF THE HIGHER RAIL, AND 4 FEET FROM THE CENTER OF TRACKS, SHALL BE MAINTAINED AT ALL TIMES.

THE APPROACH EMBANKMENT SHALL BE CONSTRUCTED TO THE LEVEL OF THE RIGID FRAME FOOTING AND UP ON A 1.5 TO 1 SLOPE FROM THE HEEL OF THE FOOTING TO THE SUBGRADE ELEVATION FOR A MINIMUM DISTANCE OF 200 FEET BACK OF THE FOOTING BEFORE ANY PORTIONS OF THE RIGID FRAME STRUCTURE ARE CONSTRUCTED. THE REMAINDER OF THE EMBANKMENT ADJACENT TO THE RIGID FRAME SHALL NOT BE PLACED UNTIL AFTER THE COMPLETION OF THE CONSTRUCTION OF THE STRUCTURE, AND IT SHALL BE PLACED IN A MANNER THAT WILL MAINTAIN APPROXIMATELY THE SAME EMBANKMENT ELEVATION ON BOTH SIDES OF THE STRUCTURE.

PILES SHALL BE DRIVEN TO A MINIMUM BEARING CAPACITY OF 48 TONS PER PILE.

ANY SOFT MATERIAL FOUND UNDER WINGWALL FOOTINGS AND GRADE BEAMS SHALL BE REMOVED AND REPLACED IN COMPLIANCE WITH ITEM 203. MATERIAL REMOVED SHALL BE GENERALLY LIMITED TO 2 FEET BELOW THE FOOTING ELEVATIONS AND 1 FOOT WIDER ON EACH SIDE OF THE FOOTING OR GRADE BEAM.

12 INCH PRECAST PRESTRESSED CONCRETE PILES MAY BE SUBSTITUTED FOR THE 12 INCH CAST-IN-PLACE REINFORCED CONCRETE PILES SHOWN ON THESE PLANS. DRAWINGS SHOWING DETAILS OF AND SPECIFICATION FOR PRESTRESSED CONCRETE PILES ARE AVAILABLE FROM THE DIRECTOR (BUREAU OF BRIDGES). IF THE PRESTRESSED PILE ALTERNATE IS CHOSEN, THE METHOD OF MEASUREMENT AND BASIS OF PAYMENT SHALL BE THE SAME AS FOR CAST-IN-PLACE REINFORCED CONCRETE PILES PER 507.

FRANKLIN CONSULTANTS INC. 2 / 8
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COLUMBUS, OHIO

GENERAL PLAN AND ELEVATION

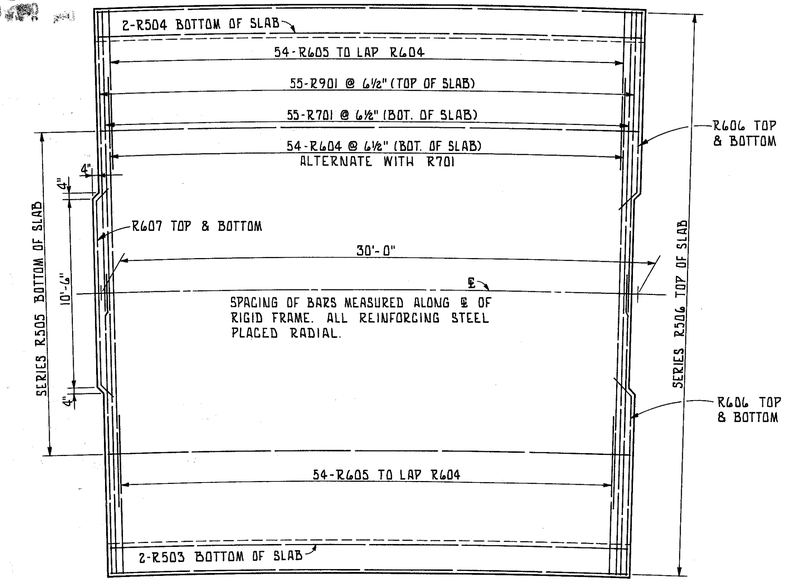
BRIDGE No. FRA-104-1124
S.R. 104 OVER N. & W. RAILROAD
FRANKLIN COUNTY S.R. 104

DESIGNED	DRAWN	TRACED	CHECKED	REVIEWED	DATE	REVISED
FA	GW	GW	HM	JF	9/2-79	10-31-84 CWS

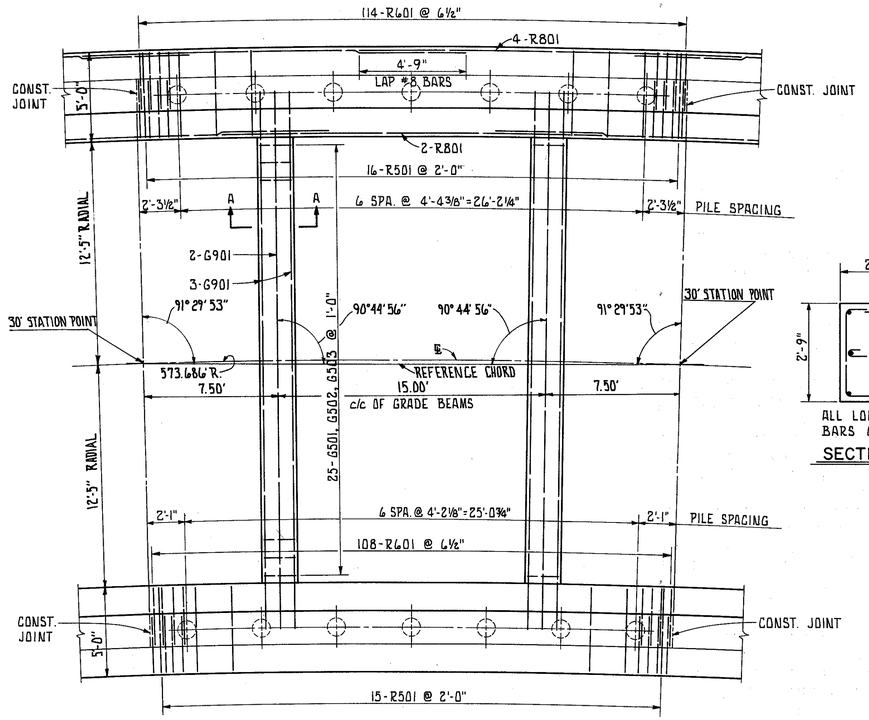
FED. RD. DIVISION	STATE	PROJECT	
5	OHIO		

190
245

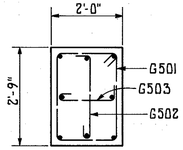
FRA-104-10.57



PLAN
SECTIONS 2 THRU 7



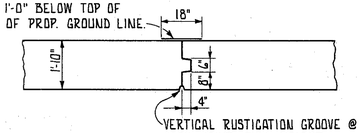
FOOTING PLAN



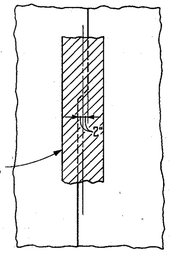
ALL LONGITUDINAL BARS G901.

SECTION A-A

TYPE "B" WATERPROOFING FROM TOP OF FOOTING TO 1'-0" BELOW TOP OF FRAME OR TOP OF PROP. GROUND LINE.

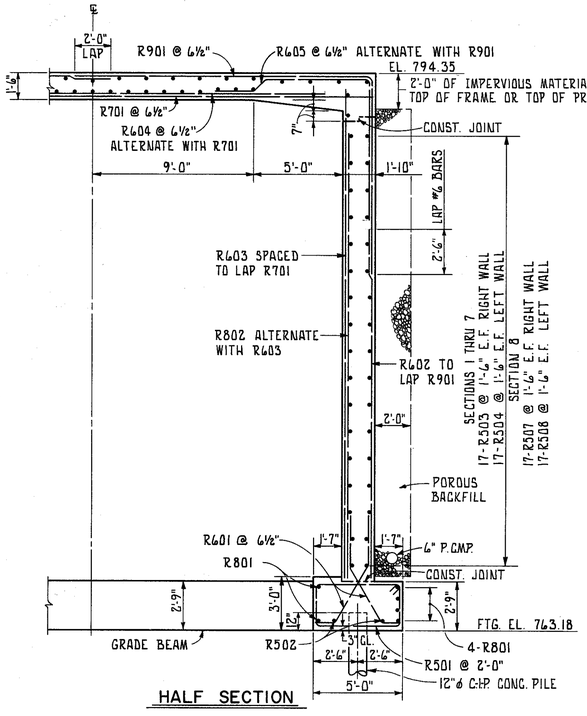


VERTICAL JOINT

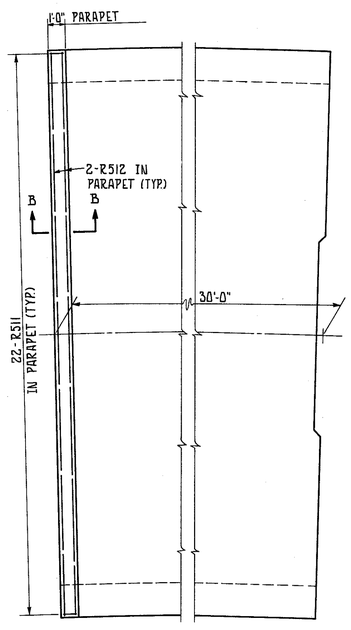


TYPE "B" WATERPROOFING, 18" WIDE, FULL LENGTH OF TOP OF RIGID FRAME.

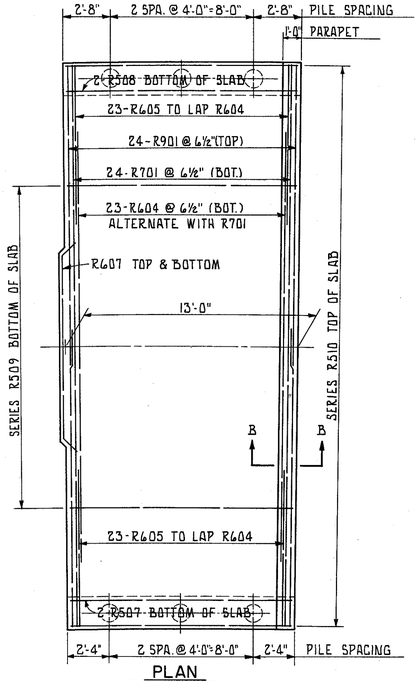
HORIZONTAL JOINT
TOP OF RIGID FRAME



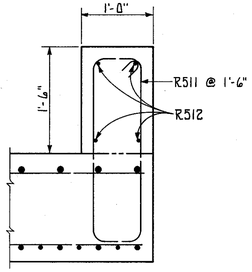
HALF SECTION



PLAN
SECTION 1



PLAN
SECTION 8



SECTION B-B

E.F. = EACH FACE

FRANKLIN CONSULTANTS INC. 3 8
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COLUMBUS, OHIO

RIGID FRAME PLAN AND DETAILS

BRIDGE No. FRA-104-1124
S.R. 104 OVER N. & W. RAILROAD
FRANKLIN COUNTY S.R. 104

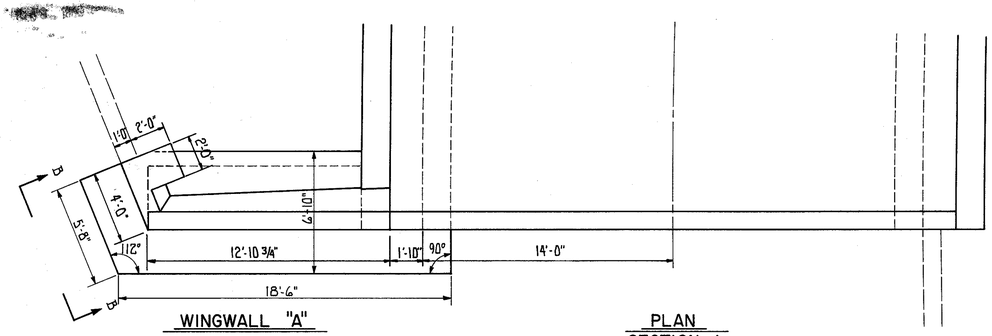
DESIGNED	DRAWN	TRACED	CHECKED	REVIEWED	DATE	REVISED
FA	GW	GW	GW	JF	9/12-79	

BRUNING 44-132 30845-1

FED. RD. DIVISION	STATE	PROJECT	
5	OHIO		

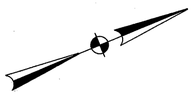
191/245

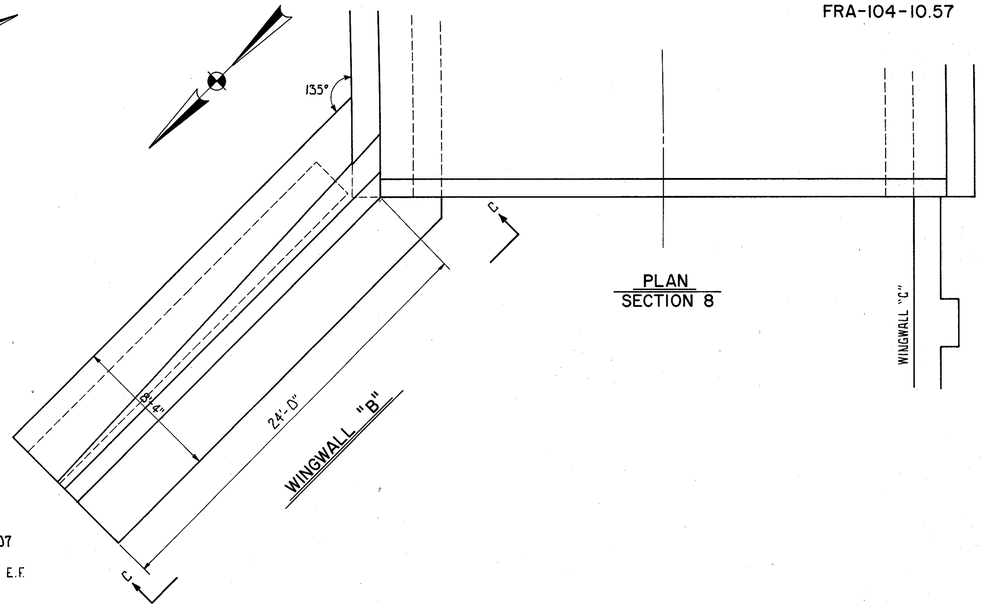
FRA-104-10.57



WINGWALL "A"

PLAN
SECTION I





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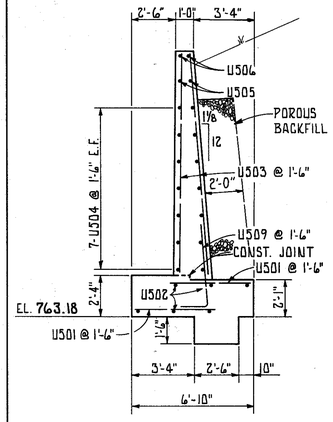
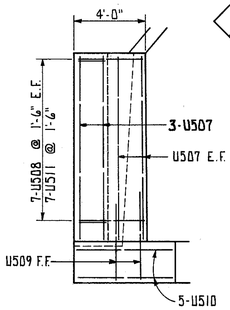
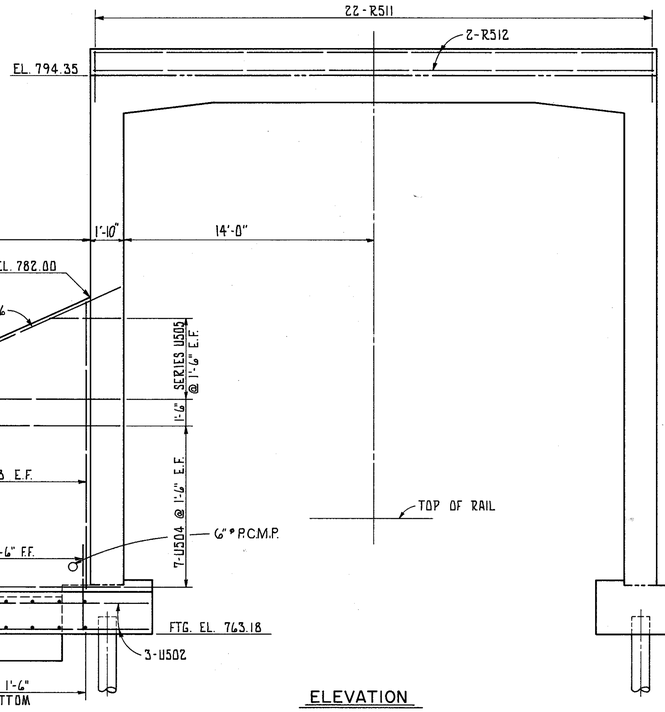
SECTION 8



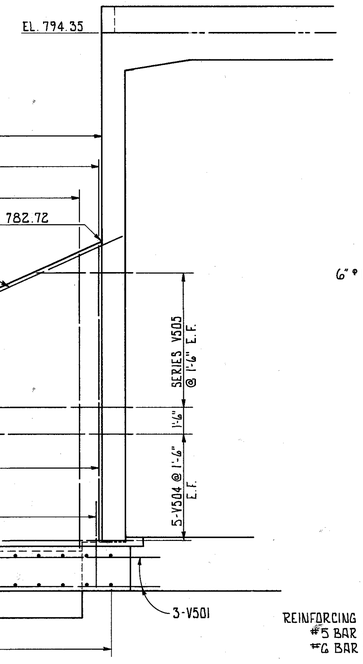
SECTION A-A



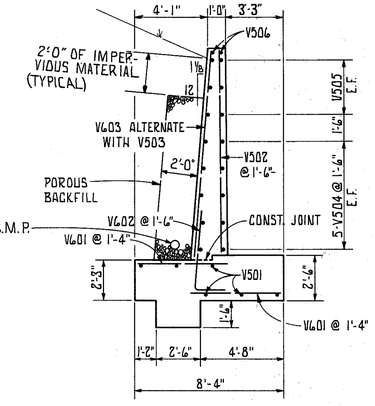
VIEW B-B



ELEVATION



VIEW C-C



SECTION D-D

REINFORCING BAR LAPS:
#5 BAR = 1'-9"
#6 BAR = 2'-1"

N.F. = NEAR FACE
F.F. = FAR FACE
E.F. = EACH FACE

FRANKLIN CONSULTANTS INC. 4 / 8
Consulting Engineers
COLUMBUS, OHIO

WINGWALLS "A" & "B" DETAILS

BRIDGE No. FRA-104-1124
S.R. 104 OVER N. & W. RAILROAD
FRANKLIN COUNTY S.R. 104

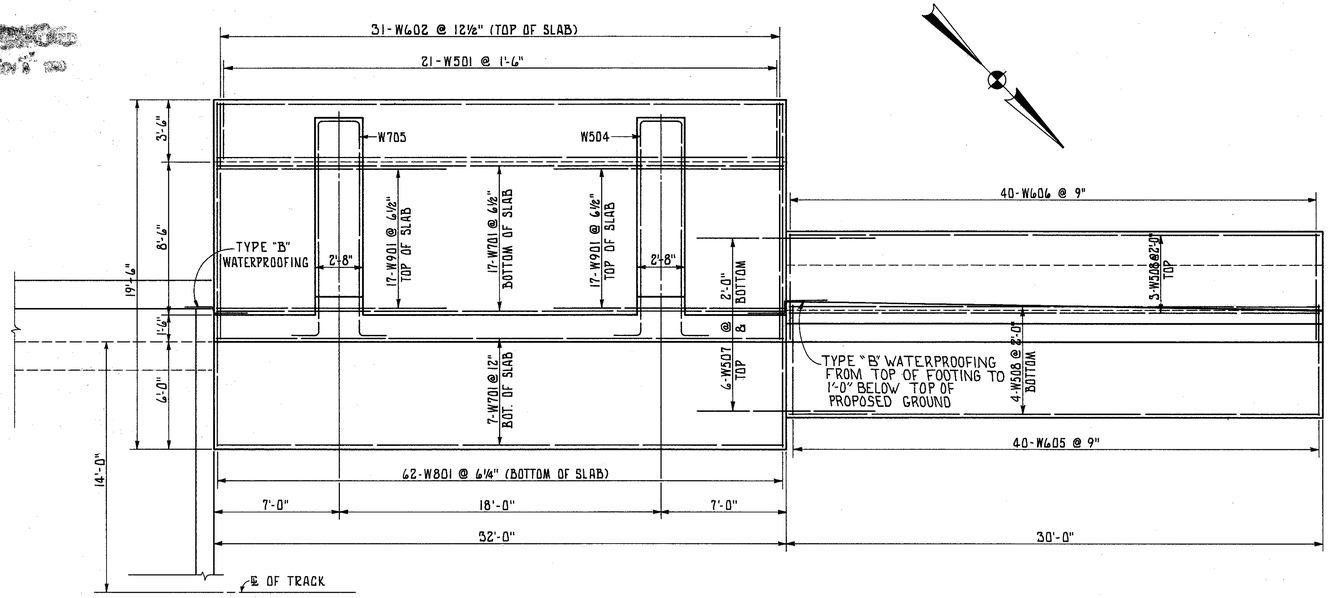
DESIGNED	DRAWN	TRACED	CHECKED	REVIEWED	DATE	REVISED
FA	GW	GW	GW	JK	9/12/19	

BRUNING 44-132 30845-1

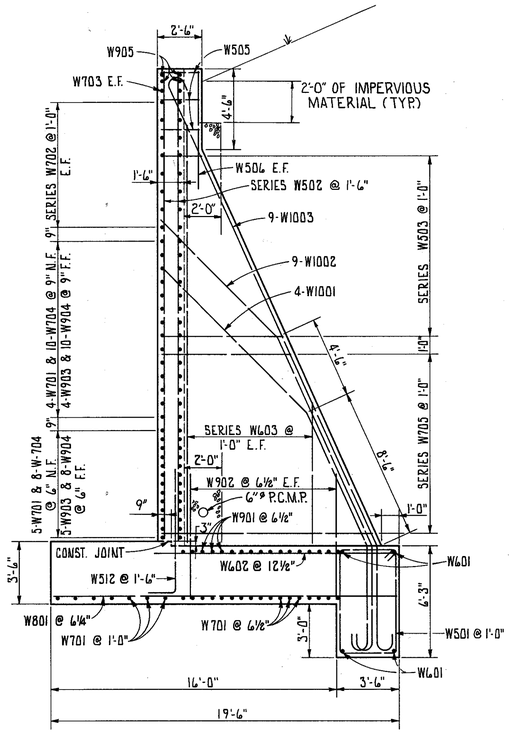
FED. RD. DIVISION	STATE	PROJECT	
5	OHIO		

192
245

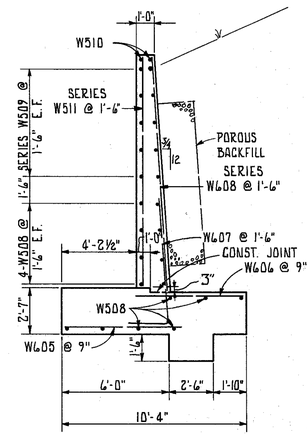
FRA-104-10.57



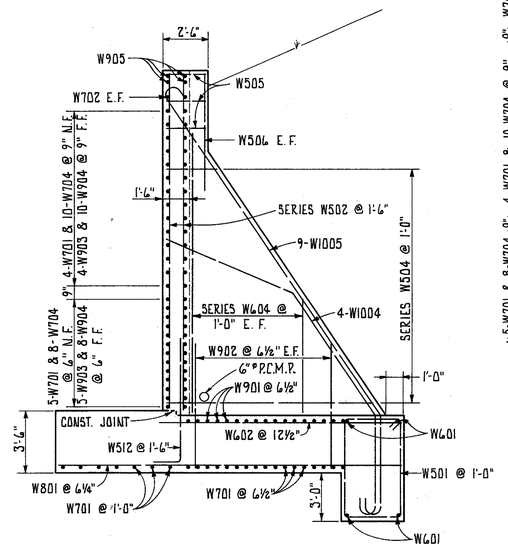
PLAN



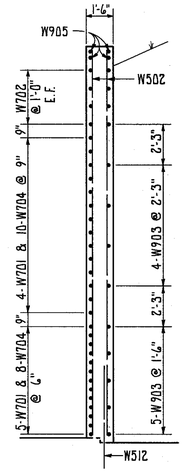
SECTION A-A



SECTION C-C



SECTION B-B



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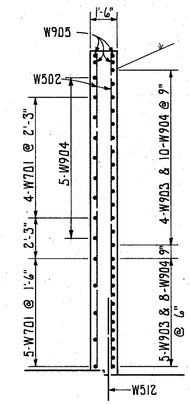
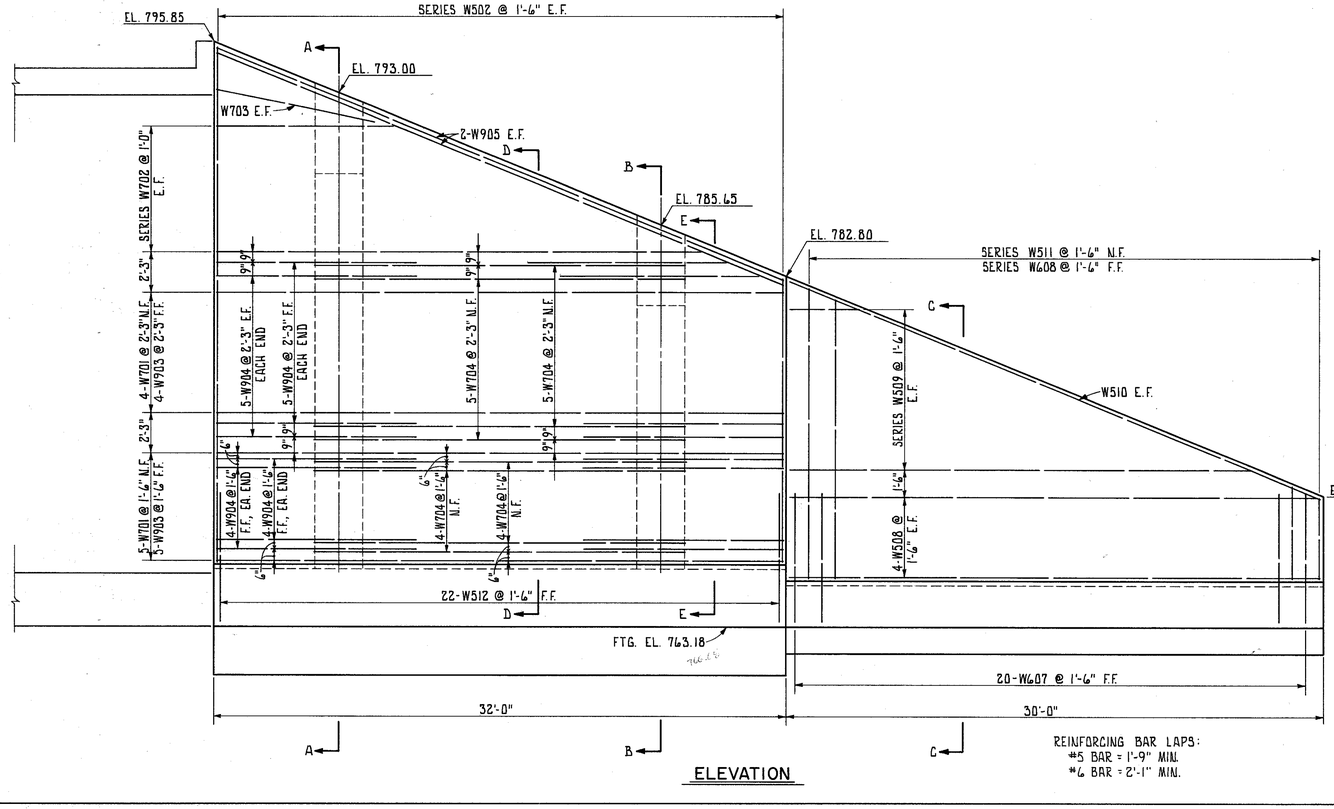


SECTION E-E



ELEVATION

REINFORCING BAR LAPS:
#5 BAR = 1'-9" MIN.
#6 BAR = 2'-1" MIN.

NOTE: ALL FOOTING KEYS SHALL BE PLACED IN A CAREFULLY MADE TRENCH AGAINST UNDISTURBED EARTH

N.F. = NEAR FACE
F.F. = FAR FACE
E.F. = EACH FACE

FRANKLIN CONSULTANTS INC. 5 / 8
Consulting Engineers
COLUMBUS, OHIO

WINGWALL "C" DETAILS

BRIDGE No. FRA-104-1124
S.R. 104 OVER N. & W. RAILROAD
FRANKLIN COUNTY S.R. 104

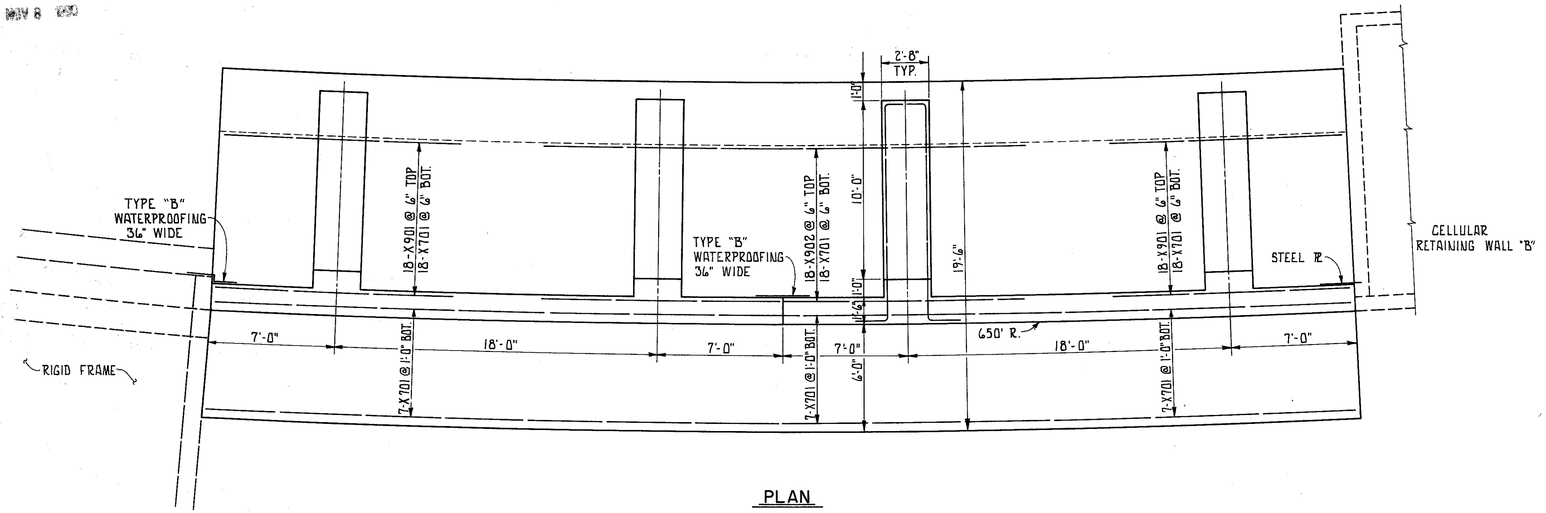
DESIGNED	DRAWN	TRACED	CHECKED	REVIEWED	DATE	REVISED
FA	GW	GW	GW	JF	9-2-77	

BRUNING 44-132 30845-1

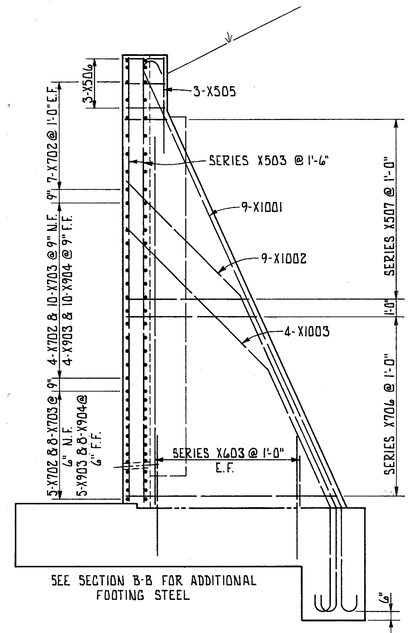
FED. RD. DIVISION	STATE	PROJECT	
5	OHIO		

193
245

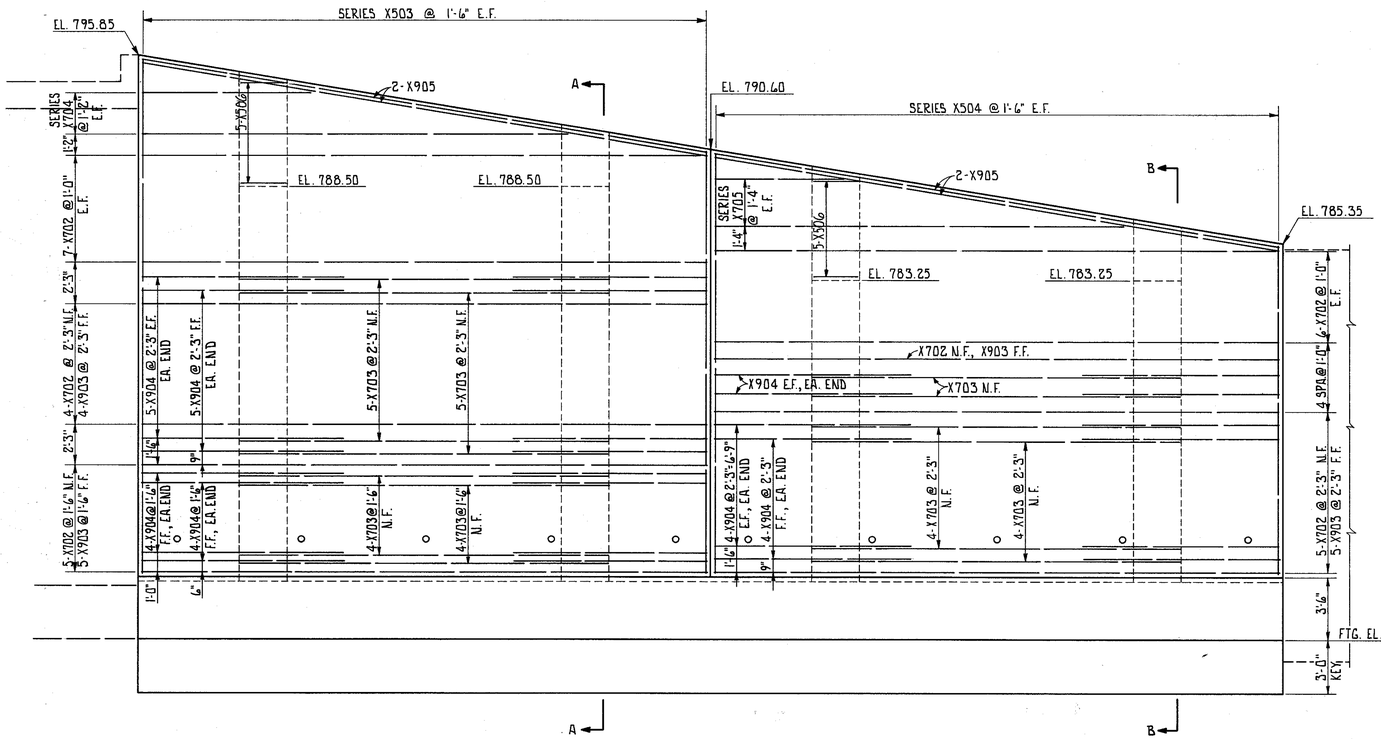
FRA-104-10.57



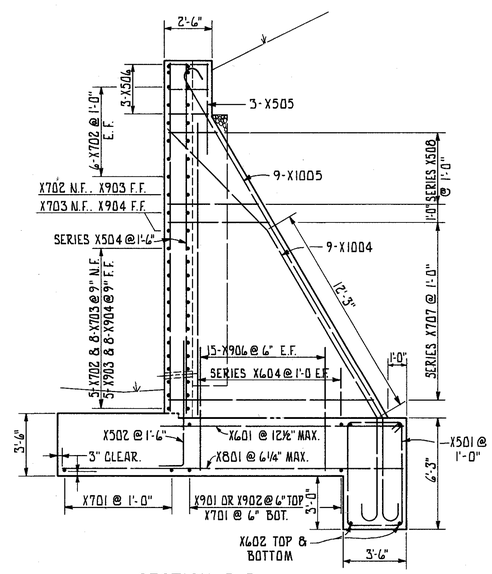
PLAN



SECTION A-A



ELEVATION



SECTION B-B

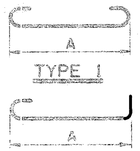
FRANKLIN CONSULTANTS INC. 6 | 8
Consulting Engineers
COLUMBUS, OHIO

WINGWALL "D" DETAILS

BRIDGE No. FRA-104-1124
S.R. 104 OVER N. & W. RAILROAD
FRANKLIN COUNTY S.R. 104

DESIGNED	DRAWN	TRACED	CHECKED	REVIEWED	DATE	REVISED
HM	GW	GW	S.W.M			

BRUNING 44-132 30845-1



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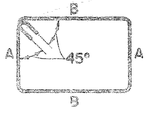

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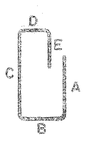

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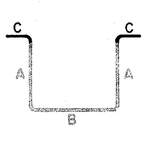

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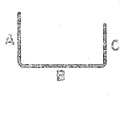

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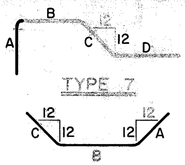

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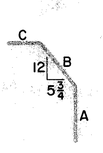

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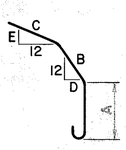

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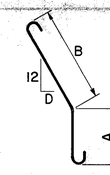

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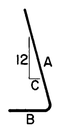

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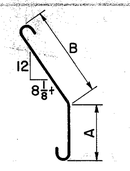

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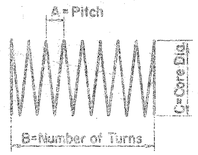


TYPE 12

TYPE 13

TYPE 14

TYPE 15

FED. HIGHWAY DIVISION	STATE	PROJECT	
5	OHIO		

194
245

FRA-104-10.57

LEGEND

R.Rt. = Rear Right
R.Lt. = Rear Left
C.Rt. = Center Right
C.Lt. = Center Left
F.Rt. = Forward Right
F.Lt. = Forward Left
Rt.Br. = Right Bridge
Lt.Br. = Left Bridge
Fwd. = Forward

RIGID FRAME

MARK	NO.	LENGTH	WEIGHT	TYPE	A	B	C	D	E	R.Rt.	R.Lt.	F.Rt.	F.Lt.
R501	224	14'-4"	3349	3	2'-4"	4'-8"							
R502	60	17'-0"	1064	STR.									
R503	252	28'-10"	7578	STR.									
R504	252	30'-4"	7973	STR.									
R505	7 SERIES OF 19, 29'-2" TO 30'-2"		4115	STR.				5/8"+ INCREMENTS					
R506	7 SERIES OF 21, 28'-10" TO 30'-6"		4549	STR.				1" INCREMENTS					
R507	36	12'-3"	460	STR.									
R508	36	13'-0"	488	STR.									
R509	1 SERIES OF 19, 12'-6" TO 12'-10"		251	STR.				1/4"- INCREMENTS					
R510	1 SERIES OF 21, 12'-4" TO 13'-0"		277	STR.				3/8"+ INCREMENTS					
R511	44	6'-10"	314	3	2'-7"	8"							
R512	8	31'-4"	261	STR.									
R601	1650	8'-5"	20,859	9	2'-9"	4'-6"	1'-2"						
R602	818	19'-9"	24,266	STR.									
R603	818	27'-2"	33,378	STR.									
R604	401	26'-0"	15,660	STR.									
R605	802	16'-1"	19,374	7	8'-0"	4'-6"	1'-8"	2'-0"					
R606	28	11'-6"	484	8	1'-6"	10'-0"	———						
R607	14	12'-3"	258	8	1'-0"	10'-3"	1'-0"						
R701	409	31'-4"	26,195	STR.									
R801	180	21'-0"	10,093	STR.									
R802	816	25'-0"	54,468	STR.									
R901	818	27'-5"	76,251	6	16'-8"	11'-0"	———						
G501	375	8'-4"	3259	3	1'-8"	2'-4"							
G502	375	3'-8"	1434	2	2'-4"								
G503	375	3'-0"	1173	2	1'-8"								
G901	120	30'-0"	12,240	STR.									
		TOTAL =	330,071										

WINGWALL "A"

MARK	NO.	LENGTH	WEIGHT	TYPE	A	B	C	D	E	
U501	18	4'-6"	84	STR.						
U502	6	17'-0"	106	STR.						
U503	2 SERIES OF 9, 10'-8" TO 16'-0"		250	STR.						8" INCREMENTS
U504	14	14'-5"	211	STR.						
U505	2 SERIES OF 4, 3'-10" TO 13'-7"		73	STR.						3'-3" INCREMENTS
U506	2	15'-10"	33	STR.						
U507	10	10'-4"	108	STR.						
U508	14	3'-8"	54	STR.						
U509	12	6'-2"	77	12	4'-9"	1'-6"	1⅛			
U510	10	5'-4"	56	STR.						
U511	7	9'-2"	67	3	1'-8"	2'-8"				
		TOTAL =	1119							

WINGWALL "B"

MARK	NO.	LENGTH	WEIGHT	TYPE	A	B	C	D	E	
V501	6	24'-8"	167	STR.						
V502	1 SERIES OF 17, 6'-0" TO 16'-8"		201	STR.						8" INCREMENTS
V503	1 SERIES OF 9, 6'-2" TO 16'-10"		108	STR.						1'-4" INCREMENTS
V504	10	26'-0"	271	STR.						
V505	2 SERIES OF 6, 5'-2" TO 22'-0"		163	STR.						3'-4 3/8" INCREMENTS
V506	2	27'-6"	57	STR.						
V601	38	5'-0"	285	STR.						
V602	17	6'-7"	168	12	5'-1"	1'-8"	1⅛			
V603	1 SERIES OF 8, 7'-0" TO 16'-4"		140	STR.						1'-4" INCREMENTS
		TOTAL =	1560							

WINGWALL "C"

MARK	NO.	LENGTH	WEIGHT	TYPE	A	B	C	D	E	
W501	21	18'-4"	402	3	3'-2"	5'-10"				
W502	2 SERIES OF 22, 15'-10" TO 28'-8"		1021	STR.						7"+ INCREMENTS
W503	1 SERIES OF 11, ▲9'-6" TO 18'-7"		161	5	2'-4" TO 4'-10½"	2'-4"	1'-6"			▲10⅞" INCREMENTS
W504	1 SERIES OF 14, ▲10'-6" TO 28'-2"		282	5	2'-10" TO 11'-8"	2'-4"	1'-6"			▲16⅝" INCREMENTS
W505	6	9'-2"	57	5	2'-2"	2'-4"	1'-6"			
W506	4	7'-0"	29	STR.						
W507	12	10'-0"	125	STR.						
W508	15	29'-8"	464	STR.						
W509	2 SERIES OF 7, 4'-2" TO 26'-2"		221	STR.						3'-8" INCREMENTS
W510	2	32'-2"	67	STR.						
W511	1 SERIES OF 20, 4'-6" TO 15'-7"		209	STR.						7" INCREMENTS
W512	22	8'-8"	199	6	7'-3"	1'-6"	———			
W601	4	31'-8"	190	STR.						
W602	31	13'-6"	629	STR.						
W603	2 SERIES OF 8, 6'-6" TO 23'-2"		356	STR.						2'-4½" INCREMENTS
W604	2 SERIES OF 7, 5'-10" TO 15'-4"		223	STR.						1'-7" INCREMENTS
W605	40	6'-6"	391	STR.						
W606	40	4'-0"	360	STR.						
W607	20	8'-11"	268	12	7'-3"	1'-10"	3/4			
W608	1 SERIES OF 20, 4'-9" TO 15'-10"		309	STR.						7" INCREMENTS
W701	33	31'-8"	2136	STR.						
W702	2 SERIES OF 8, 9'-10" TO 27'-0"		602	STR.						2'-5½" INCREMENTS
W703	2	9'-0"	37	STR.						
W704	18	20'-8"	760	STR.						
W705	1 SERIES OF 11, ▲19'-4" TO 28'-4"		536	5	7'-4" TO 11'-10"	2'-4"	1'-6"			▲10⅞" INCREMENTS

WINGWALL "C" (CONT'D)

MARK	NO.	LENGTH	WEIGHT	TYPE	A	B	C	D	E	R.Br.	Lt.Br.
W801	62	19'-2"	3173	STR.							
W901	34	13'-0"	1503	STR.							
W902	62	8'-5"	1774	6	7'-0"	1'-6"	———				
W903	9	31'-8"	969	STR.							
W904	46	11'-4"	1773	STR.							
W905	4	34'-3"	466	STR.							
W1001	4	26'-10"	462	10	5'-9"	8'-2"	11'-6"	5⅞	12		
W1002	9	29'-1"	1126	10	5'-9"	12'-9"	9'-2"	5⅞	12		
W1003	9	36'-7"	1417	11	5'-9"	28'-0"		5⅞			
W1004	4	23'-0"	396	10	5'-9"	8'-2"	7'-8"	8⅛+	5		
W1005	9	30'-3"	1171	13	5'-9"	21'-8"					
		TOTAL =	24,264								

SPIRAL REINFORCING BARS: The "Length" shown in the steel list for spiral bars is the distance from the top of the footing to the bottom of the pier cap. The "Number of Turns" shown is the "Length" divided by the "Pitch", plus three turns (total number of closed coils), expressed as the nearest whole number with ½ closed coils provided at the ends of each spiral unit. Four steel channel, tee or angle spacers weighing approximately 0.80 pounds per lineal foot of spacers shall be provided for each spiral unit. They shall be equally spaced along the periphery of the coil. The number of pounds of these spacers, based on 0.80 pounds per lineal foot, will be paid for as reinforcing steel and is included in the tabulated quantity of spiral bars.

REINFORCING STEEL SAMPLES: Refer to CMS Sections 106.03, 700, 709.01 through 709.05 and 709.08. Sufficient additional reinforcing steel shall be provided for sampling. Random samples shall be replaced in the structures by the additional steel, spliced in accordance with 509.08.

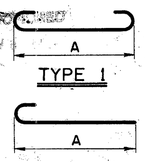
7 / 8

FRANKLIN CONSULTANTS INC.
Consulting Engineers
COLUMBUS, OHIO

REINFORCING STEEL

BRIDGE NO. FRA-104-1124
S.R. 104 OVER N & W RAILROAD
FRANKLIN COUNTY S.R. 104

DESIGN	DRAWN	TRACED	CHECKED	REVIEWED	DATE	PROJECT
FA	GW	GW	GW	JF	9-12-79	



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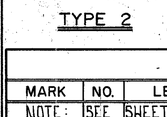

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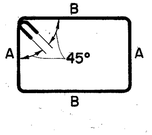

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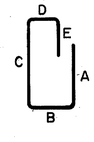

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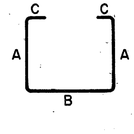

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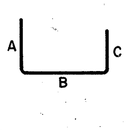

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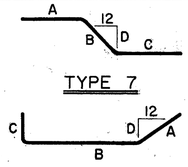
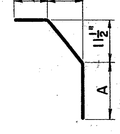


TYPE 7 TYPE 8



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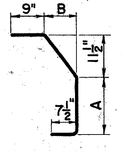

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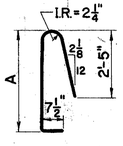

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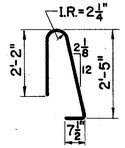

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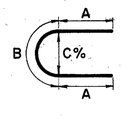

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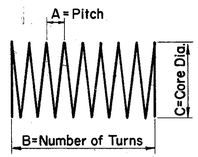

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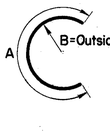

TYPE 15

FED. RD. DIVISION	STATE	PROJECT	
5	OHIO		

195
245

FRA-104-10.57

LEGEND

R.Rt. = Rear Right
R.Lt. = Rear Left
C.Rt. = Center Right
C.Lt. = Center Left
F.Rt. = Forward Right
F.Lt. = Forward Left
Rt.Br. = Right Bridge
Lt.Br. = Left Bridge
Fwd. = Forward

WINGWALL "D"

MARK	NO.	LENGTH	WEIGHT	TYPE	A	B	C	D	E	R.Rt.	R.Lt.	F.Rt.	F.Lt.
NOTE:	SEE	SHEET 7 OF 8	FOR BAR	BENDING	DIAGRAMS.								
X501	63	18'-2"	1194	3	3'-0"	5'-10"							
X502	44	8'-8"	398	6	7'-3"	1'-6"	——						
X503	2 SERIES	OF 22, 23'-9" TO 29'-0"	1210	STR.				3" INCREMENTS					
X504	2 SERIES	OF 22, 18'-6" TO 23'-9"	969	STR.				3" INCREMENTS					
X505	12	5'-0"	63	STR.									
X506	16	9'-2"	153	5	2'-2"	2'-4"	1'-6"						
X507	2 SERIES	OF 11, 9'-6" TO 18'-7"	322	5	2'-4" TO 6'-10½"	2'-4"	1'-6"	▲10⅞" INCREMENTS					
X508	2 SERIES	OF 5, 10'-7" TO 15'-4"	135	5	2'-10½" TO 5'-3"	2'-4"	1'-6"	▲14¼" INCREMENTS					
X601	62	13'-6"	1257	STR.									
X602	12	21'-10"	394	STR.									
X603	4 SERIES	OF 9, 2'-8" TO 20'-4"	622	STR.				2'-2½" INCREMENTS					
X604	4 SERIES	OF 9, 2'-5" TO 15'-9"	491	STR.				1'-8" INCREMENTS					
X701	75	22'-9"	3488	STR.									
X702	41	31'-8"	2654	STR.									
X703	28	20'-8"	1183	STR.									
X704	2 SERIES	OF 3, 9'-0" TO 23'-6"	199	STR.				7'-3" INCREMENTS					
X705	2 SERIES	OF 3, 7'-0" TO 23'-2"	185	STR.				8'-1" INCREMENTS					
X706	2 SERIES	OF 11, 19'-4" TO 28'-4"	1072	5	7'-4" TO 11'-10"	2'-4"	1'-6"	▲10⅞" INCREMENTS					
X707	2 SERIES	OF 11, 16'-4" TO 28'-2"	1001	5	5'-10" TO 11'-9"	2'-4"	1'-6"	▲14¼" INCREMENTS					
X801	124	19'-0"	6291	STR.									
X901	36	13'-0"	1591	STR.									
X902	18	27'-0"	1652	STR.									
X903	15	31'-8"	1615	STR.									
X904	76	11'-4"	2929	STR.									
X905	8	32'-0"	870	STR.									
X906	120	8'-3"	3366	6	7'-0"	1'-6"	——						
X1001	18	35'-9"	2769	11	5'-9"	27'-2"		5⅞"					
X1002	18	29'-2"	2259	10	5'-9"	13'-0"	9'-0"	5⅞"	12				
X1003	8	26'-10"	924	10	5'-9"	8'-6"	11'-2"	5⅞"	12				
X1004	18	27'-3"	2111	10	5'-9"	12'-3"	7'-10"	7⅛"	12				
X1005	18	31'-0"	2401	11	5'-9"	22'-5"		7⅛"					
		TOTAL =	45,768										

PIERS

MARK	NO.	LENGTH	WEIGHT	TYPE	A	B	C	D	E

SUPERSTRUCTURE

MARK	NO.	LENGTH	WEIGHT	TYPE	A	B	C	D	E	Rt.Br.	Lt.Br.

SPIRAL REINFORCING BARS: The "Length" shown in the steel list for spiral bars is the distance from the top of the footing to the bottom of the pier cap. The "Number of Turns" shown is the "Length" divided by the "Pitch", plus three turns (total number of closed coils), expressed as the nearest whole number with ½ closed coils provided at the ends of each spiral unit. Four steel channel, tee or angle spacers weighing approximately 0.80 pounds per lineal foot of spacers shall be provided for each spiral unit. They shall be equally spaced along the periphery of the coil. The number of pounds of these spacers, based on 0.80 pounds per lineal foot, will be paid for as reinforcing steel and is included in the tabulated quantity of spiral bars.

REINFORCING STEEL SAMPLES: Refer to CMS Sections 106.03, 700, 709.01 through 709.05 and 709.08. Sufficient additional reinforcing steel shall be provided for sampling. Random samples shall be replaced in the structures by the additional steel, spliced in accordance with 509.08.

5 | 8

FRANKLIN CONSULTANTS INC.
Consulting Engineers
COLUMBUS, OHIO

REINFORCING STEEL

BRIDGE No. FRA-104-1124
S.R. 104 OVER N.&W. RAILROAD
FRANKLIN COUNTY S.R. 104

DESIGNED	DRAWN	TRACED	CHECKED	REVIEWED	DATE	REVISED
HM	GW	GW		FA	3/31/79	