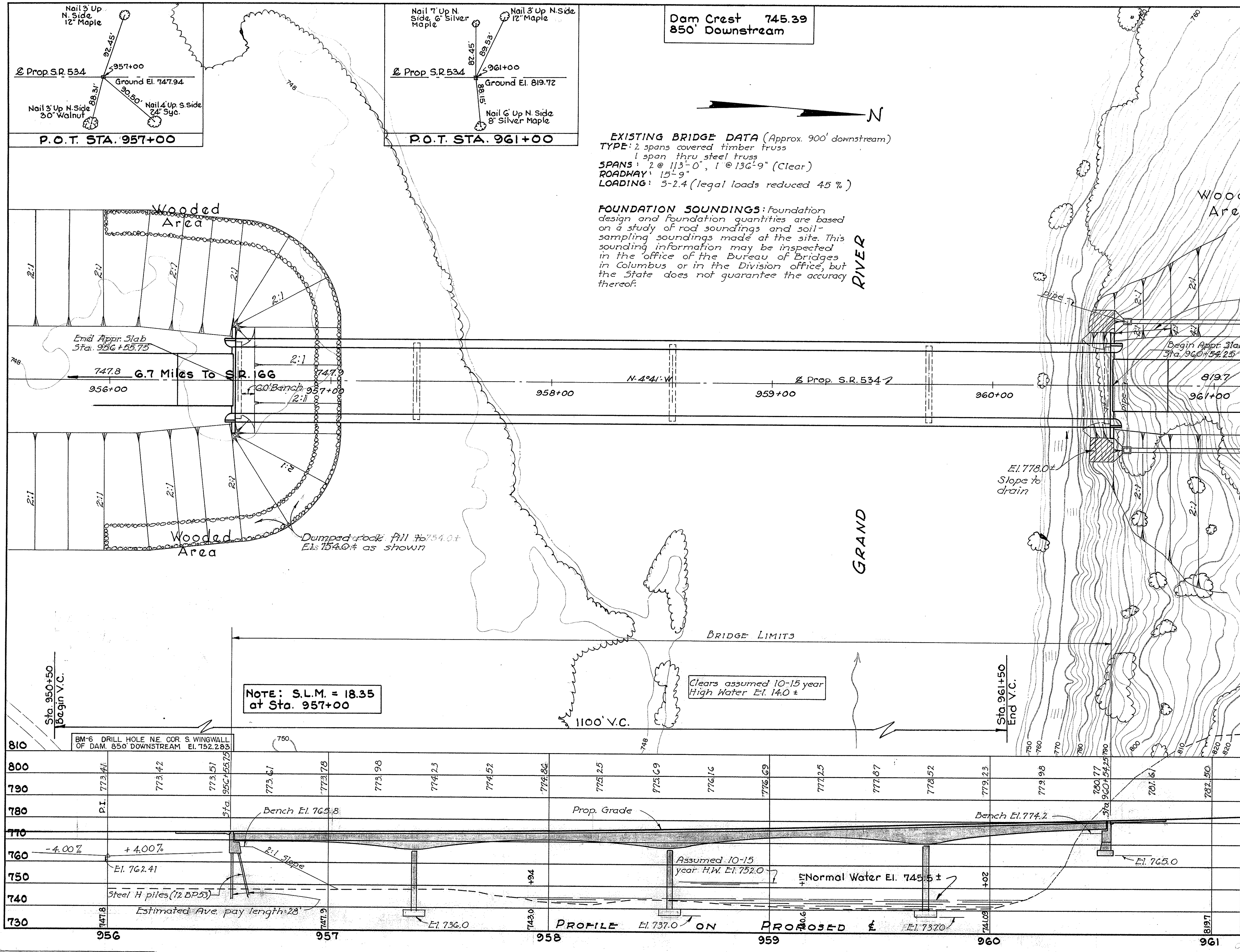


Nail 3' Up N. Side 12" Maple
℄ Prop. S.R. 534
957+00
Ground El. 747.94
92.45'
88.31'
90.50'
Nail 3' Up N. Side 30" Walnut
Nail 4' Up S. Side 24" Syc.
P.O.T. STA. 957+00
Nail 7' Up N. Side 6" Silver Maple
Nail 3' Up N. Side 12" Maple
℄ Prop. S.R. 534
961+00
Ground El. 819.72
Nail 6' Up N. Side 8" Silver Maple
P.O.T. STA. 961+00
Dam Crest 745.39
850' Downstream
N
Wooded Area
End Appr. Slab Sta. 956+55.75
747.8
6.7 Miles To S.R. 166
956+00
747.9
2:0' Bench
957+00
958+00
N-4°41'-W
℄ Prop. S.R. 534
959+00
960+00
Pipe
Transition slope 2:1 to 4:1 Both sides of road.
Begin Appr. Slab Sta. 960+54.25
819.7
3.5 Miles To Geneva
826.6
961+00
962+00
El. 778.0±
Slope to drain
Dumped rock fill to 754.0± Els. 754.0± as shown
GRAND RIVER
DRAINAGE AREA 559 SQ. MI.
BRIDGE LIMITS
Clears assumed 10-15 year High Water El. 14.0 ±
NOTE: S.L.M. = 18.35 at Sta. 957+00
Sta. 950+50 Begin V.C.
1100' V.C.
Sta. 961+50 End V.C.
BM-6 DRILL HOLE N.E. COR. S. WINGWALL OF DAM. 850' DOWNSTREAM EL. 752.283
P.I.
Bench El. 765.8
Prop. Grade
Bench El. 774.2
-4.00%
+4.00%
El. 762.41
2:1 Slope
Assumed 10-15 year H.W. El. 752.0
Normal Water El. 745.5 ±
El. 765.0
Steel H piles (12 BP53)
Estimated Ave. pay length=28'
El. 736.0
El. 737.0
El. 737.0
PROFILE ON PROPOSED ℄
956
957
958
959
960
961

EXISTING BRIDGE DATA (Approx. 900' downstream)
TYPE: 2 spans covered timber truss
1 span thru steel truss
SPANS: 2 @ 113'-0", 1 @ 136'-9" (Clear)
ROADWAY: 15'-9"
LOADING: 5-2.4 (legal loads reduced 45 %)

FOUNDATION SOUNDINGS: Foundation design and foundation quantities are based on a study of rod soundings and soil-sampling soundings made at the site. This sounding information may be inspected in the office of the Bureau of Bridges in Columbus or in the Division office, but the State does not guarantee the accuracy thereof.

FED. RD. DIVISION	STATE	PROJECT		
2	OHIO			109/126

ATB-534-(17.02-21.40)

0.5 ± Miles South of Harpersfield

PROPOSED STRUCTURE

TYPE: Continuous haunched steel girders with reinforced concrete deck and substructure
SPANS: 81'-116'-116'-81' c/c brgs.
ROADWAY: 30'-0" f/f 3'-2" Safety curb
LOAD FREQUENCY: CF=130(57)
SKEW: None
WEARING SURFACE: 1 3/4" monolithic concrete
APPROACH SLABS: AS-1-54 (25' long)
ALIGNMENT: Tangent

Exist. Bridge No. AS-534-1143 to remain

STATE OF OHIO
DEPARTMENT OF HIGHWAYS
BUREAU OF BRIDGES

SITE PLAN

BRIDGE NO. ATB-534-1834
OVER GRAND RIVER
ASHTABULA CO. S.R.-534
STA. 956+55.75
960+54.25
SCALE 1"=20'

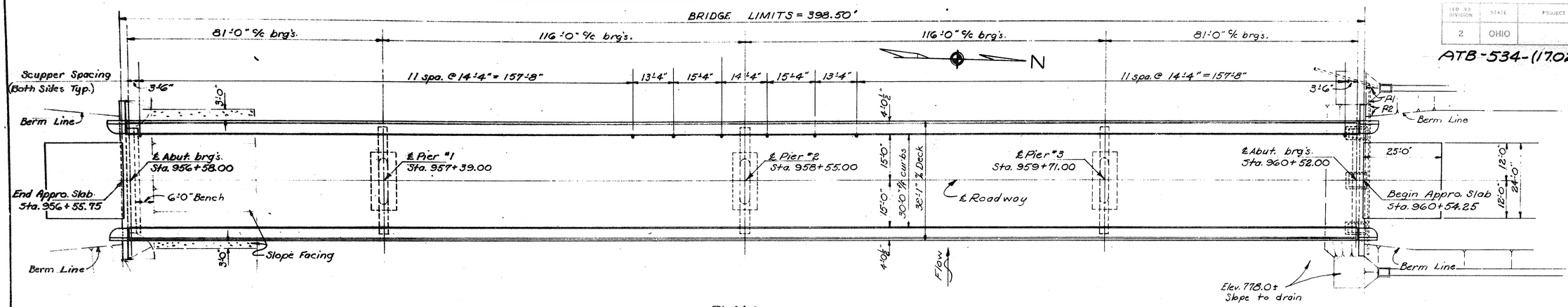
PRESENT TOPOGRAPHY		PROPOSED WORK			
SURVEYED	DRAWN	DESIGNED	DRAWN	CHECKED	REVIEWED
Aerial Survey	Aerial Survey	D.H.S.	D.H.S.	J.F.	P.E.S.

BFG 6-5-58

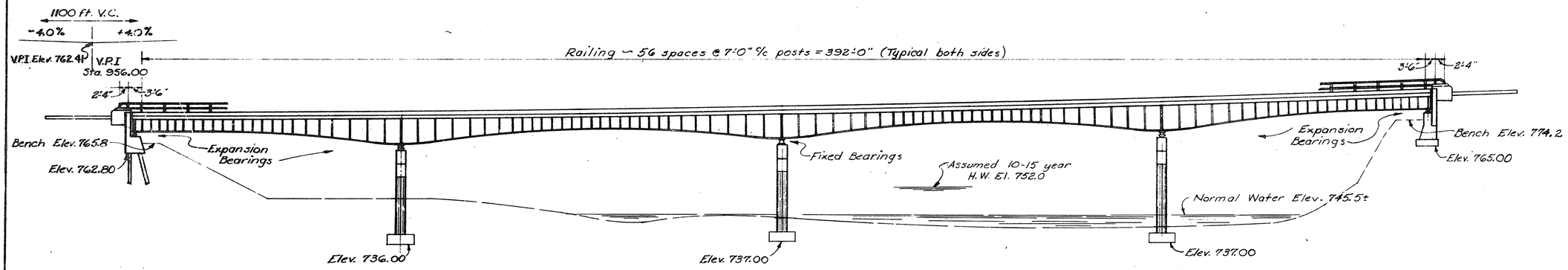
FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

110
126

ATB-534-(17.02-21.40)



PLAN



ELEVATION

ESTIMATED QUANTITIES

Item	Total	Unit	Description	Superst.	Abuts.	Piers	General		
E-2	Lump	Sum	Cofferdams, cribs and sheeting				Lump		
E-2	419	Cu. Yds.	Unclassified excavation		260	159			
E-2	38	Cu. Yds.	Shale and rock excavation		16	22			
S-1	485	Cu. Yds.	Class "C" concrete, superstructure	485					
S-1	159	Cu. Yds.	Class "C" concrete, piers above footings			159			
S-1	49	Cu. Yds.	Class "C" concrete, forward abutment above footings		49				
S-1	64	Cu. Yds.	Class "E" concrete, pier and forward abutment footings		8	56			
S-1	60	Cu. Yds.	Class "E" concrete, rear abutment		60				
S-4	156,758	lbs.	Reinforcing steel	127,040	8,438	21,280			
S-7	482,000	lbs.	Structural steel	482,000					
S-8	482,000	lbs.	Field painting of structural steel	482,000					
S-14	816	Lin. ft.	Railing (steel with concrete end posts)				816		
S-16	Lump	Sum	First test pile				Lump		
S-18	280	Lin. ft.	Steel piles, 12 BP53		280				
S-29	30	Cu. Yds.	Porous backfill		30				
S-29	54	Cu. Yds.	Slope facing (S-29.05 type)				54		
S-29	48	Lin. ft.	8" ϕ Perforated bituminous coated corrugated metal pipe.				48		
S-29	25	Lin. ft.	8" ϕ Bituminous coated corrugated metal pipe, (including pipe specials).				25		
I-10	300	Cu. Yds.	Dumped rock fill				300		

STATE OF OHIO
DEPARTMENT OF HIGHWAYS
DIVISION OF DESIGN AND CONSTRUCTION
BUREAU OF BRIDGES

2

GENERAL PLAN & ELEVATION & ESTIMATED QUANTITIES
BRIDGE No. ATB-534-1834
OVER GRAND RIVER
Sta. 956+55.75
960+54.25
Ashtabula County

DESIGNED	DRAWN	TRACED	CHECKED	REVIEWED	DATE	REVISED
D.G.K.	D.G.K.		INNES	BFG	6-5-58	

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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ATB-534-(17.02-21.40)

GENERAL NOTES

REFERENCE SHALL BE MADE TO STANDARD DRAWINGS CSB-2-56, SHEETS 2 AND 3 OF 6, REVISED 3-1-58 AND RB-1-55, DATED 3-1-55.

DESIGN SPECIFICATIONS:
THIS STRUCTURE CONFORMS TO THE REQUIREMENTS OF "DESIGN SPECIFICATIONS FOR HIGHWAY STRUCTURES" OF THE STATE OF OHIO, DEPARTMENT OF HIGHWAYS, DATED 9-1-57, AND TO REVISIONS THEREOF DATED 2-21-58.

PILES SHALL BE DRIVEN TO FIRM CONTACT WITH ROCK. IF THE LENGTH OF PENETRATION IS APPROXIMATELY EQUAL TO THE DEPTH TO ROCK ACCORDING TO THE BRIDGE FOUNDATION INVESTIGATION REPORT, THE FIRM CONTACT SHALL BE CONSIDERED AS ATTAINED WHEN THE CAPACITY ACCORDING TO THE FORMULA IN SEC. S-18.05 IS NOT LESS THAN THE FOLLOWING VALUE FOR PILE HAMMER OF THE INDICATED ENERGY RATING:

37 TONS PER PILE USING A 11,000 FT. LB. HAMMER
32 TONS PER PILE USING A 15,000 FT. OR GREATER HAMMER

IF THE ENERGY RATING OF THE HAMMER IS BETWEEN THE RATINGS AS SHOWN ABOVE, THE REQUIRED FORMULA CAPACITY SHALL BE DETERMINED BY INTERPOLATION. THE DESIGN LOAD IS 30 TONS PER PILE.

CONCRETE DECK PLACING:
IN ORDER TO FACILITATE WATER CURING OF THE CONCRETE OF THE DECK SLAB, THE PLACING OF CONCRETE SHALL PROGRESS UPGRADE. THE SLAB MAY BE PLACED IN SECTIONS, BETWEEN TRANSVERSE CONSTRUCTION JOINTS WHICH ARE NORMAL TO THE CENTERLINE OF BRIDGE AND ARE LOCATED NEAR THE CENTER OF ANY SPAN.

SLOPE FACING (S-29.05 TYPE) SHALL BE PROVIDED UNDER THE STRUCTURE AT REAR ABUTMENT. THE POROUS DRAIN MATERIAL SHALL BE 12" THICK AND SHALL EXTEND FROM THE FACE OF THE ABUTMENT DOWN TO ELEV. 754.0 AND TRANSVERSELY TO 3 FT. OUTSIDE THE EDGE OF THE SUPERSTRUCTURE.

EXCAVATION QUANTITY INCLUDES THE REMOVAL OF FILL MATERIAL BETWEEN THE TOP OF THE EARTH BENCH AND THE BOTTOM OF THE ABUTMENT CROSSBEAM FOR THE FORWARD ABUTMENT. SHALE AND/OR ROCK EXCAVATION AT THE FORWARD ABUTMENT SHALL INCLUDE MATERIAL REMOVED BELOW ELEVATION 770.0 FOR THE CONSTRUCTION OF THE ABUTMENT PEDESTALS. EXCAVATION ABOVE ELEVATION 770.0, INCLUDING WEATHERED SHALE, SHALL BE PAID FOR AT THE UNIT PRICE BID FOR ITEM E-2, UNCLASSIFIED EXCAVATION.

WELDED STEEL:
THE STEEL FOR THE FLANGES AND WEBS OF GIRDERS AND FOR THE 1-1/4" STIFFENER PLATES SHALL CONFORM TO ASTM DESIGNATION A-373. ALL OTHER STRUCTURAL STEEL SHALL CONFORM TO EITHER ASTM A-7 (AS PER SEC. M-7.4 (A) OF THE CONSTRUCTION AND MATERIAL SPECIFICATIONS) OR TO A-373.

WELDING OF STRUCTURAL STEEL SHALL BE CLASS "A" EXCEPT AS OTHERWISE SHOWN. WELDS SHOWN AS FIELD WELDS MAY, AT THE OPTION OF THE CONTRACTOR, BE MADE IN THE SHOP.

WELDING PROCEDURE:
IN THE SHOP FABRICATION OF THE WELDED BUILTUP GIRDERS, BUTT WELDS IN FLANGES AND WEBS SHALL BE COMPLETED BEFORE THE FLANGES AND WEBS ARE WELDED TOGETHER. THE BUTT WELDS IN THE FLANGES AND WEBS AND THE WELDS CONNECTING THE FLANGES AND WEBS SHALL BE MADE WITH AUTOMATIC SUBMERGED ARC WELDING EQUIPMENT.

BOTH SHOP AND FIELD BUTT WELDS IN THE FLANGES OF THE BUILT-UP GIRDERS SHALL BE EXTENDED BEYOND THE EDGES OF THE FLANGES BY USE OF TEMPORARY EXTENSION BARS HAVING THE SAME JOINT PREPARATION AS THE PARTS BEING JOINED. THE EXTENSION BARS SHALL BE SECURELY WELDED ON BOTH SIDES FOR THE FULL DEPTH OF THE METAL AND THEY SHALL PROJECT A SUFFICIENT DISTANCE BEYOND THE FLANGES THAT THE WELD CRATERS WILL BE ENTIRELY ON THE EXTENSION BARS, BUT IN NO CASE LESS THAN THE GREATEST FLANGE THICKNESS. FLAT RUN-OFF PLATES MAY BE USED FOR THE SHOP BUTT WELDING OF THE WEB PLATES. THE TEMPORARY EXTENSION BARS AND RUN-OFF PLATES SHALL BE REMOVED AFTER THE COMPLETION OF THE WELDS AND THE ENDS OF THE WELDS SHALL BE MADE SMOOTH AND FLUSH WITH THE EDGES OF THE ABUTTING PARTS.

THE BUTT WELDS MUST PENETRATE THE FULL THICKNESS OF THE PARENT METAL AND, FOR THICKNESSES OF 3/4 INCHES OR MORE, AT LEAST THE FIRST TWO PASSES SHALL BE MADE WITH LOW HYDROGEN ELECTRODES E-6016 OR E-7016. WHEN SUCH ROOT PASSES CANNOT BE PROPERLY MADE WITH AUTOMATIC EQUIPMENT, AS REQUIRED FOR SHOP FABRICATION, MANUALLY PLACED WELDS WILL BE PERMITTED FOR SUCH PASSES ONLY.

UNLESS OTHERWISE INDICATED ON THE PLAN, BUTT WELDS MAY HAVE CONVEX REINFORCEMENT EQUAL TO 1/8 THE THICKNESS OF THE METAL BUT NOT MORE THAN 1/8 INCH. WHEN IT IS REQUIRED THAT THE SURFACE OF SUCH WELDS BE FINISHED FLUSH WITH THE ADJACENT METAL OR WHEN THE CONVEXITY IS EXCESSIVE, THE ADDITIONAL REINFORCEMENT SHALL BE REMOVED BY CHIPPING AND GRINDING NORMAL TO THE LENGTH OF THE WELD.

RADIOGRAPHIC EXAMINATION OF WELDS:
THIS WORK SHALL CONSIST OF THE PERFORMANCE AND INTERPRETATION OF A RADIOGRAPHIC EXAMINATION OF BUTT WELDS AS REQUIRED BY THESE SPECIFICATIONS. IT SHALL INCLUDE THE PREPARATION AND POSITIONING OF WELDS FOR EXAMINATION, THE RADIOGRAPHING OF WELDS, THE PROCESSING AND EXAMINATION OF RADIOGRAPHS, THE INTERPRETATION OF RADIOGRAPHS FOR COMPLIANCE WITH THESE SPECIFICATIONS, AND THE PERFORMANCE AND INTERPRETATION OF ANY RETAKES OF RADIOGRAPHS REQUIRED FOR WELDS MADE TO REPLACE UNSATISFACTORY WELDS.

APPROVAL OF DIRECTOR

THE CONTRACTOR SHALL FURNISH EVIDENCE, ACCEPTABLE TO THE DIRECTOR, OF THE ADEQUACY OF THE EQUIPMENT TO BE USED AND THE COMPETENCE OF THE PERSONNEL IN MAKING THE RADIOGRAPHIC EXAMINATION OF THE WELDS.

THE INTERPRETATION OF RADIOGRAPHS AND THE CORRECTION OF DEFECTIVE WELDS SHALL BE SUBJECT TO THE APPROVAL OF THE DIRECTOR.

SCOPE OF EXAMINATION

BY MEANS OF RADIOGRAPHIC EXAMINATION, THE CONTRACTOR SHALL FURNISH EVIDENCE OF THE ACCEPTABLE QUALITY OF THE BUTT WELDS OF ALL GIRDERS. THE PARTS OF THESE MEMBERS TO BE RADIOGRAPHED ARE AS FOLLOWS:

1. THE COMPLETE BUTT WELDS IN THE FLANGES OF EACH GIRDER.

2. ONE FOOT AT EACH END OF EACH OF THE WEB SPLICE WELDS OF EACH GIRDER.

THE SHOP EXAMINATION OF THE BUTT WELDS OF THE FLANGE PLATES AND OF THE WEB PLATES SHALL BE DETERMINED TO BE ACCEPTABLE BEFORE THESE FLANGE AND WEB PLATES ARE ASSEMBLED AND WELDED TO FORM THE GIRDERS. THE EXAMINATION OF FIELD WELDS SHALL BE MADE AS SOON AS PRACTICABLE AFTER WELDING AT EACH FIELD SPLICE IS COMPLETED.

WELD CONDITION

ALL WELDED JOINTS WHICH ARE TO BE RADIOGRAPHED SHALL BE FREE OF PAINT, SCALE AND GREASE, AND SHALL BE GROUND FREE OF ALL WELD RIPPLES AND SURFACE IRREGULARITIES ON BOTH SIDES. THE DIRECTION OF GRINDING SHALL BE PERPENDICULAR TO THE LENGTH OF THE WELD.

THE WELDS SHALL BE GROUND TO SUCH A DEGREE THAT THE RESULTING RADIOGRAPHIC CONTRAST, DUE TO REMAINING IRREGULARITIES, CANNOT MASK OR BE CONFUSED WITH THAT OF ANY OBJECTIONABLE DEFECT AND THAT THE WELD SURFACE WILL MERGE SMOOTHLY INTO THE PLATE SURFACE. THE FINISHED SURFACE OF THE REINFORCEMENT MAY HAVE A CROWN OF AN APPROXIMATELY UNIFORM AMOUNT NOT TO EXCEED THE FOLLOWING:

PLATE THICKNESS	THICKNESS OF REINFORCEMENT
UP TO 1/2 INCH, INCLUSIVE	1/16 INCH
OVER 1/2 TO 1 INCH, INCLUSIVE	3/32 INCH
OVER 1 INCH	1/8 INCH

RADIOGRAPHIC TECHNIQUE

THE WELD SHALL BE RADIOGRAPHED WITH A TECHNIQUE WHICH WILL DETERMINE QUANTITATIVELY THE SIZE OF DEFECTS WITH THICKNESSES EQUAL TO OR GREATER THAN 2 PER CENT OF THE THICKNESS OF THE BASE METAL. IN THE CASE OF A WELD JOINING PLATES OF UNEQUAL THICKNESS, BOTH PLATES MUST BE RADIOGRAPHED AT 2 PER CENT SENSITIVITY, TOGETHER OR SINGLY WITH THE WELD JUNCTION EVIDENT IN BOTH VIEWS.

TO DETERMINE WHETHER THE RADIOGRAPHIC TECHNIQUE EMPLOYED IS DETECTING DEFECTS OF A THICKNESS EQUAL TO OR GREATER THAN 2 PER CENT OF THE THICKNESS OF THE BASE MATERIAL, THICKNESS GAGES OR PENETRAMETERS OF THE TYPE HEREINAFTER SPECIFIED SHALL BE PLACED ON THE SIDE OF THE WELDED PLATE NEAREST THE SOURCE OF RADIATION AT AN EXTREME EDGE OF THE RADIOGRAPHIC PLATE OR FILM.

THE MATERIAL OF THE PENETRAMETER SHALL BE SUBSTANTIALLY THE SAME AS THAT OF THE WELDED PLATES.

THE THICKNESS OF THE PENETRAMETER SHALL BE NOT MORE THAN 2 PER CENT OF THE THICKNESS OF THE PLATE EXCLUSIVE OF ANY WELD REINFORCEMENT. PENETRAMETERS DESIGNED FOR INCREMENTS OF 1/8" OF PLATE THICKNESS ARE ACCEPTABLE.

IN EACH PENETRAMETER THERE SHALL BE THREE HOLES WITH DIAMETERS EQUAL RESPECTIVELY TO TWO, THREE AND FOUR TIMES THE PENETRAMETER THICKNESS, BUT IN NO CASE SHALL LESS THAN 1/16" DIAMETER BE USED.

EACH PENETRAMETER SHALL CARRY AN IDENTIFYING NUMBER REPRESENTING IN TWO SIGNIFICANT FIGURES THE MINIMUM THICKNESS IN INCHES OF THE PLATE FOR WHICH IT MAY BE USED. PENETRAMETERS MAY BE ESTABLISHED FOR DIFFERENCES IN THICKNESS NOT TO EXCEED 1/8" SO THAT A SET OF PENETRAMETERS VARYING FOR INCREMENTS OF PLATE THICKNESS OF 1/8" WILL BE ADEQUATE TO SERVE PLATES HAVING THICKNESSES BETWEEN THESE 1/8" DIMENSIONS.

THE IMAGES OF IDENTIFYING NUMBERS AND THE HOLES OF EACH PENETRAMETER MUST APPEAR CLEARLY ON THE RADIOGRAPH TO ESTABLISH THE 2 PER CENT SENSITIVITY.

FOR PLATES UP TO AND INCLUDING 2-1/2" IN THICKNESS, EACH PENETRAMETER SHALL BE 1-1/2" LONG AND 1/2" WIDE.

THE FILM DURING EXPOSURE SHALL BE AS CLOSE TO THE WELD AS PRACTICABLE. IF POSSIBLE, THIS DISTANCE SHALL BE NOT GREATER THAN 1 INCH. IN ANY EVENT, THE RATIO:

$$\frac{\text{DISTANCE FROM SOURCE OF RADIATION TO WELD SURFACE TOWARD RADIATION}}{\text{DISTANCE FROM WELD SURFACE TOWARD RADIATION TO FILM}}$$

SHALL BE AT LEAST 7 TO 1.

ALL RADIOGRAPHS SHALL BE FREE FROM EXCESSIVE MECHANICAL PROCESSING DEFECTS WHICH WOULD INTERFERE WITH PROPER INTERPRETATION OF THE RADIOGRAPH.

IDENTIFICATION MARKERS, THE IMAGES OF WHICH WILL APPEAR ON THE FILM, SHALL BE PLACED ADJACENT TO THE WELD AND THEIR LOCATIONS SHALL BE ACCURATELY AND PERMANENTLY MARKED ON THE OUTSIDE SURFACE NEAR THE WELD SO THAT A DEFECT APPEARING ON THE RADIOGRAPH MAY BE ACCURATELY LOCATED.

THE SIZE OF FILM TO BE USED SHALL BE 4" WIDE X 15" LONG UNLESS PERMISSION TO USE A DIFFERENT SIZE IS OBTAINED IN WRITING FROM THE DIRECTOR.

STANDARDS OF ACCEPTABILITY

THE ACCEPTABILITY OF THE WELDS EXAMINED BY RADIOGRAPHY SHALL BE JUDGED BY THE FOLLOWING STANDARDS:

(1) CRACKS:
DEFINITION - A DISCONTINUITY RESULTING FROM A VERY NARROW SEPARATION OF METAL.
STANDARD - NO WELD CONTAINING CRACKS REGARDLESS OF LENGTH, SIZE OR LOCATION SHALL BE CONSIDERED ACCEPTABLE.

(2) GAS POROSITY:
DEFINITION - GAS POCKETS OR VOIDS IN METAL.
STANDARD - THE MAXIMUM DIMENSION OF ANY INDIVIDUAL GAS POCKET SHALL NOT EXCEED 1/8 INCH. THE MAXIMUM ACCUMULATION OF GAS POCKETS SHALL NOT EXCEED THAT SHOWN IN THE "POROSITY STANDARDS" OF THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS.

(3) SLAG INCLUSIONS:
DEFINITION - NON-METALLIC, SOLID MATERIAL ENTRAPPED IN WELD METAL OR BETWEEN WELD METAL AND BASE METAL.
STANDARD - A. ELONGATED SLAG INCLUSIONS: NO ELONGATED SLAG INCLUSION SHALL EXCEED TWO-THIRDS OF THE THICKNESS OF THE THINNER PLATE OF THE JOINT IN LENGTH AND 1/16" IN WIDTH, EXCEPT THAT REGARDLESS OF THE PLATE THICKNESS NO SUCH INCLUSION SHALL BE LONGER THAN 3/4" AND EXCEPT THAT NO SUCH INCLUSION WHICH IS SHORTER THAN 1/4" SHALL BE CAUSE FOR REJECTION.

B. ISOLATED SLAG INCLUSIONS: IN ANY 12 INCH LENGTH OF WELD, THE MAXIMUM WIDTH OF ANY ISOLATED SLAG INCLUSION SHALL NOT EXCEED 1/8 INCH, THE SUMMATION OF LENGTHS OF ISOLATED SLAG INCLUSIONS SHALL NOT EXCEED 1 INCH, AND THERE SHALL BE NO MORE THAN FOUR ISOLATED SLAG INCLUSIONS OF THE MAXIMUM WIDTH OF 1/8 INCH. ANY TWO SUCH INCLUSIONS SHALL BE SEPARATED BY AT LEAST 2 INCHES OF SOUND WELD METAL.

(4) INCOMPLETE FUSION:
DEFINITION - FAILURE OF THE WELD METAL TO FUSE COMPLETELY WITH THE BASE METAL OR PRECEDING BEADS.
STANDARD - NO INDIVIDUAL LACK OF FUSION SHALL EXCEED 1/2 INCH IN LENGTH. IN ANY 12 INCH LENGTH OF WELD, THE SUMMATION OF LENGTHS OF LACK OF FUSION SHALL NOT EXCEED 3/4 INCH AND INDIVIDUAL DEFECTS SHALL BE SEPARATED BY AT LEAST 6 INCHES OF SOUND METAL.

(5) INCOMPLETE PENETRATION:
DEFINITION - ROOT PENETRATION WHICH IS LESS THAN COMPLETE OR FAILURE OF A ROOT PASS AND A BACKING PASS TO FUSE WITH EACH OTHER.
STANDARD - NO INDIVIDUAL LACK OF PENETRATION SHALL EXCEED 1/2 INCH IN LENGTH. IN ANY 12 INCH LENGTH OF WELD, THE SUMMATION OF LENGTHS OF LACK OF PENETRATION SHALL NOT EXCEED 3/4 INCH AND INDIVIDUAL DEFECTS SHALL BE SEPARATED BY AT LEAST 6 INCHES OF SOUND METAL.

REPAIR OF DEFECTIVE WELDS

DEFECTIVE WELDS SHALL BE REPAIRED BY CHIPPING OR MELTING OUT SUCH DEFECTS FROM ONE OR BOTH SIDES OF THE JOINT AS REQUIRED, REMOVING ONLY SUFFICIENT WELD METAL TO CORRECT THE DEFECT. THE JOINT SHALL THEN BE REWELDED AND AGAIN RADIOGRAPHED.

ADDITIONAL RADIOGRAPHS

WHEREVER AN UNACCEPTABLE WELD OCCURS, A RADIOGRAPH SHALL BE MADE OF THE ADJOINING 12-INCH LENGTHS OF WELD TO DETERMINE IF THE FLAWS EXTEND BEYOND THE LIMITS OF THE ORIGINAL RADIOGRAPH. IF UNACCEPTABLE FLAWS OCCUR IN THESE ADJOINING LENGTHS OF WELD, THESE DEFECTIVE WELDS SHALL BE REPAIRED AND THIS ENTIRE PROCEDURE REPEATED FOR THE NEXT ADJOINING 12-INCH LENGTH OF WELD.

CUSTODY OF RADIOGRAPHS

AS SOON AS THE RADIOGRAPHING OF THE WELDMENTS ON THE FULL LENGTH OF EACH FLANGE OR WEB PLATE BETWEEN FIELD SPLICES HAS BEEN COMPLETED, THE CONTRACTOR SHALL SEND TO THE STATE THE PROCESSED CONTACT FILM (THAT FILM CLOSEST TO THE SOURCE OF RADIATION) OF ALL ORIGINAL AND RETAKE RADIOGRAPHS. THESE RADIOGRAPHS SHALL BE ACCOMPANIED BY A CERTIFICATION FROM THE CONTRACTOR THAT THE RADIOGRAPHIC EXAMINATION WAS PERFORMED IN CONFORMANCE WITH THESE SPECIFICATIONS. THE RADIOGRAPHS SHALL BECOME THE PROPERTY OF THE STATE. EACH RADIOGRAPH SHALL BE CLEARLY IDENTIFIED TO SHOW THE LOCATION ON THE STRUCTURE AT WHICH IT WAS TAKEN. UNACCEPTABLE DEFECTS SHALL BE IDENTIFIED IN EACH RADIOGRAPH IN WHICH THEY OCCUR AND THE REPAIR OR REPLACEMENT OF EACH UNACCEPTABLE WELD DEFECT SHALL BE NOTED AND IDENTIFIED.

REPORT OF COST

AFTER THE COMPLETION OF THE RADIOGRAPHIC INSPECTION OF WELDS, THE CONTRACTOR SHALL FURNISH THE STATE A COMPLETE REPORT OF THE COST OF PERFORMING THIS WORK, SEPARATED INTO THE ITEMS MENTIONED IN THE FOLLOWING PARAGRAPH.

BASIS OF PAYMENT

PAYMENT FOR THIS WORK, INCLUDING ALL LABOR, EQUIPMENT, MATERIALS AND INCIDENTALS, SHALL BE INCLUDED IN THE UNIT PRICE BID FOR S-7, STRUCTURAL STEEL.

STATE OF OHIO
DEPARTMENT OF HIGHWAYS
DIVISION OF DESIGN AND CONSTRUCTION
BUREAU OF BRIDGES

GENERAL NOTES

BRIDGE NO. ATB-534-1834
OVER GRAND RIVER

STA. 956+55.75
960+54.25

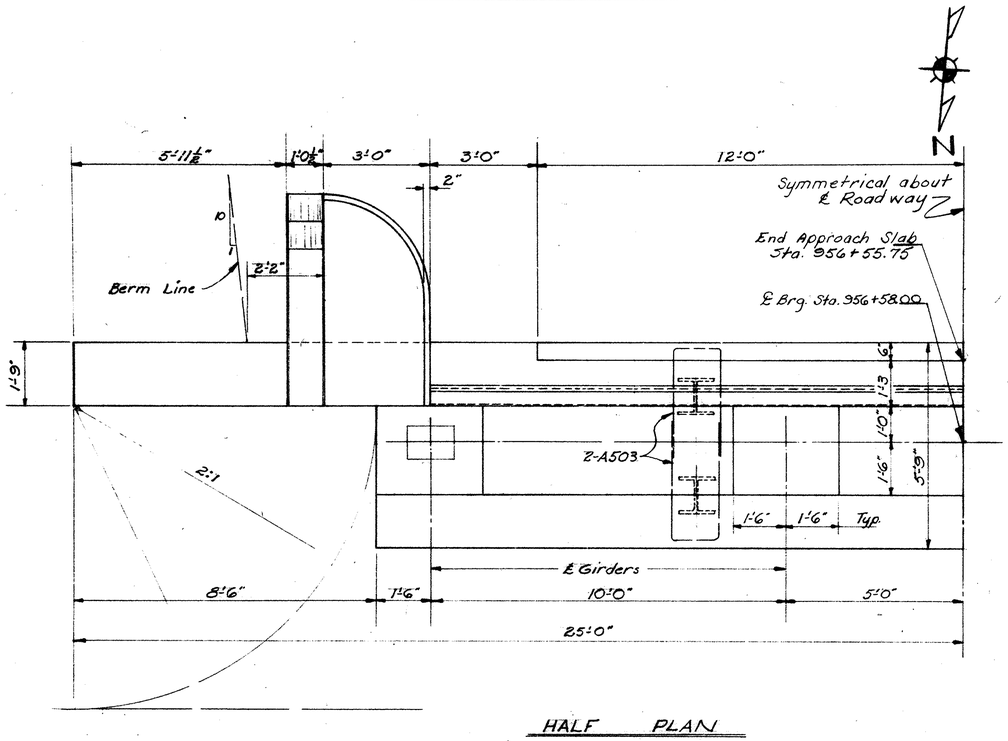
ASHTABULA COUNTY

DESIGNED	DRAWN	TRACED	CHECKED	REVIEWED	DATE	REVISED
D.G.D.			N.E.Y.	B.F.G.	6-5-58	

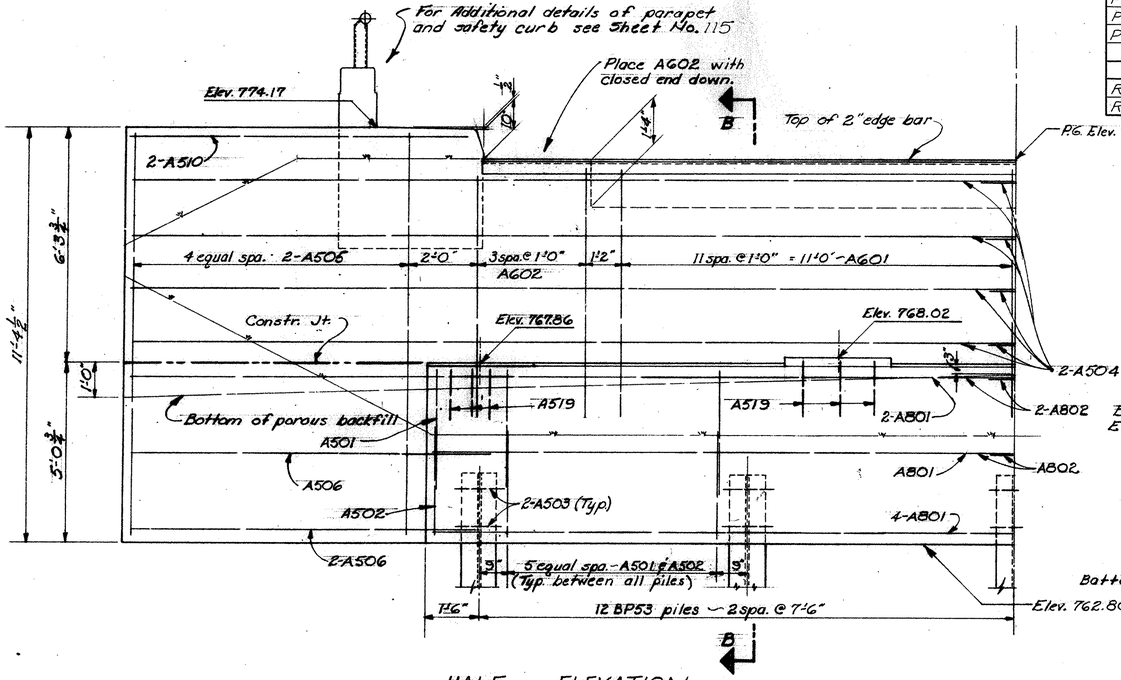
FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

112
126

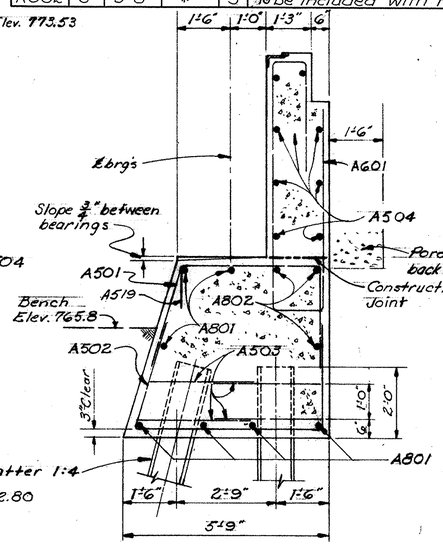
ATB-534-(17.02-21.40)



HALF PLAN



HALF ELEVATION

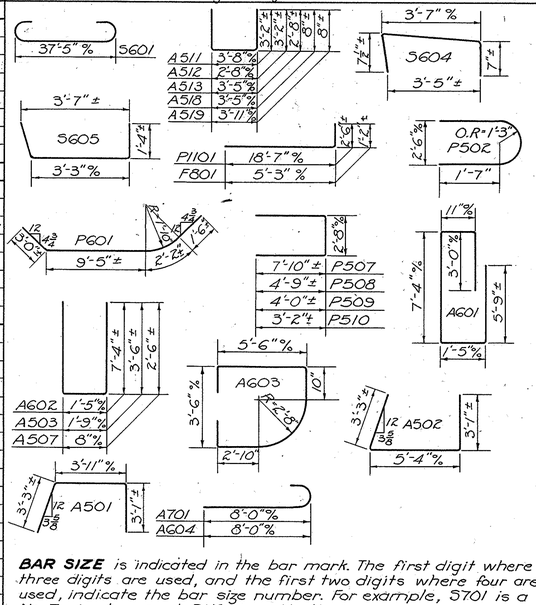


SECTION B-B

REINFORCING STEEL LIST

Mark	No.	Length	Weight	Shp
SUPERSTRUCTURE				
S701	527	37'-5"	40,305	S
S601	527	38'-9"	30,673	B
S602	748	37'-9"	42,412	S
S603	93	40'-0"	5,587	S
S604	528	4'-6"	3,569	B
S605	528	5'-8"	4,494	B
PIERS				
P1101	12	20'-9"	1,323	B
P1102	72	18'-7"	7,109	S
P801	42	23'-2"	2,598	S
P802	36	12'-0"	1,153	S
P803	2	17'-2"	92	S
P804	2	17'-10"	95	S
P805	2	20'-6"	109	S
F801	84	6'-2"	1,383	B
F802	66	9'-0"	1,586	S
F701	39	7'-8"	611	S
F702	30	17'-8"	1,083	S
P601	12	16'-0"	288	B
P501	58	11'-0"	665	S
P502	58	7'-0"	424	B
P503	6	14'-0"	88	S
P504	6	23'-0"	144	S
P505	6	32'-0"	200	S
P506	6	33'-6"	210	S
P507	15	18'-1"	283	B
P508	60	11'-11"	746	B
P509	60	10'-5"	652	B
P510	48	8'-9"	438	B
RAILING				
R501	8	4'-5"	*	S
R502	8	5'-8"	*	S

Bending Diagrams



BAR SIZE is indicated in the bar mark. The first digit where three digits are used, and the first two digits where four are used, indicate the bar size number. For example, S701 is a No. 7 size bar and P1101 is a No. 11 size.

REPLACEMENT BARS: If reinforcing bars are fabricated from stock which has previously been tested and approved by the Ohio Highway Testing Laboratory, test samples as provided in Sec. 4.02 need not be furnished and replacement bars will not be required.

* To be included with railing for payment.

Mark	No.	Length	Weight	Shp	Rear	Fwd
ABUTMENTS						
A801	25	32'-8"	2,181	S	7	18
A802	6	26'-2"	419	S	6	
A701	13	8'-10"	235	B		13
A601	46	17'-9"	1,226	B	23	23
A602	16	15'-9"	379	B	8	8
A603	16	14'-6"	348	B	8	8
A604	13	8'-8"	169	B		13
A501	26	10'-0"	271	B	26	
A502	26	11'-5"	310	B	26	
A503	20	8'-6"	177	B	20	
A504	16	25'-8"	428	S	16	
A505	20	11'-0"	229	S	20	
A506	6	9'-9"	61	S	6	
A507	20	5'-5"	113	B	10	10
A508	16	5'-6"	92	S	8	8
A509	36	3'-0"	113	S	18	18
A510	4	9'-6"	40	S	4	
A511	8	9'-9"	81	B		8
A512	16	8'-9"	146	B		16
A513	40	8'-6"	355	B		40
A514	18	24'-8"	463	S		18
A515	24	10'-0"	250	S		24
A516	4	8'-6"	35	S		4
A517	20	9'-0"	188	S		20
A518	14	4'-6"	66	B		14
A519	12	5'-0"	63	B	12	
REPLACEMENT BARS						
RE1100	1	7'-6"	-	S		
RE800	1	6'-6"	-	S		
RE700	3	6'-2"	-	S		
RE600	5	5'-11"	-	S		
RE500	1	5'-7"	-	S		

NOTES:

PROCEDURE: The embankment shall be placed and compacted up to the finished spill-thru slope and to the level of the subgrade for a distance of 200 feet back of the abutment, after which excavation shall be made for the abutment and earth bench before required piling are driven.

EXCAVATION QUANTITY includes the removal of fill material required for construction of the abutment and the removal of fill material above the level of the earth bench.

POROUS BACKFILL shall extend upward to the approach slab and to the surface of the earth shoulders, and outward to the surface of the embankment slopes. Excavation therefor, in excess of that required for construction of the abutment, shall be considered as paid for in the bid price per cu. yd. paid for porous backfill.

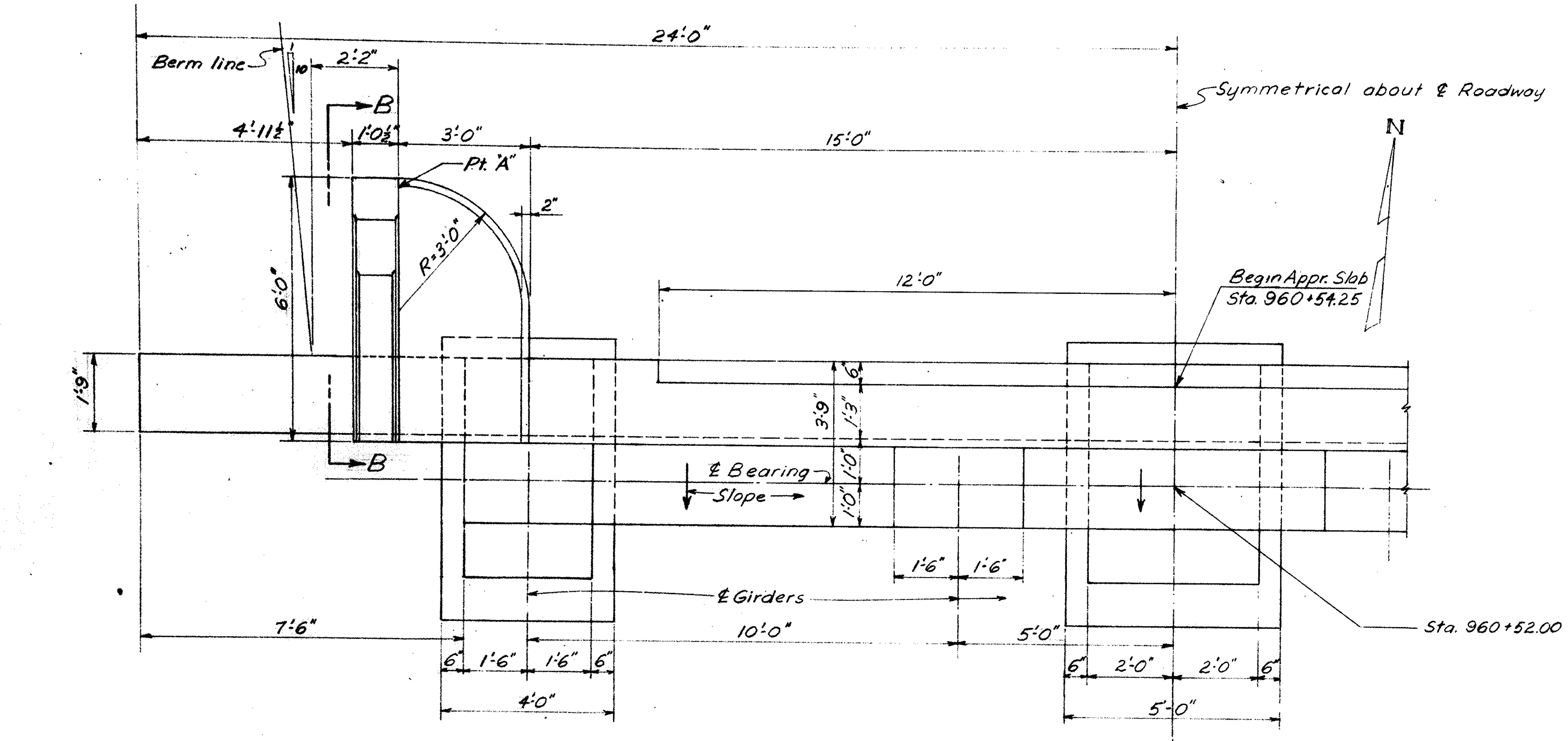
STATE OF OHIO
DEPARTMENT OF HIGHWAYS
DIVISION OF DESIGN AND CONSTRUCTION
BUREAU OF BRIDGES

REAR ABUTMENT DETAILS ℄ REINFORCING STEEL LIST

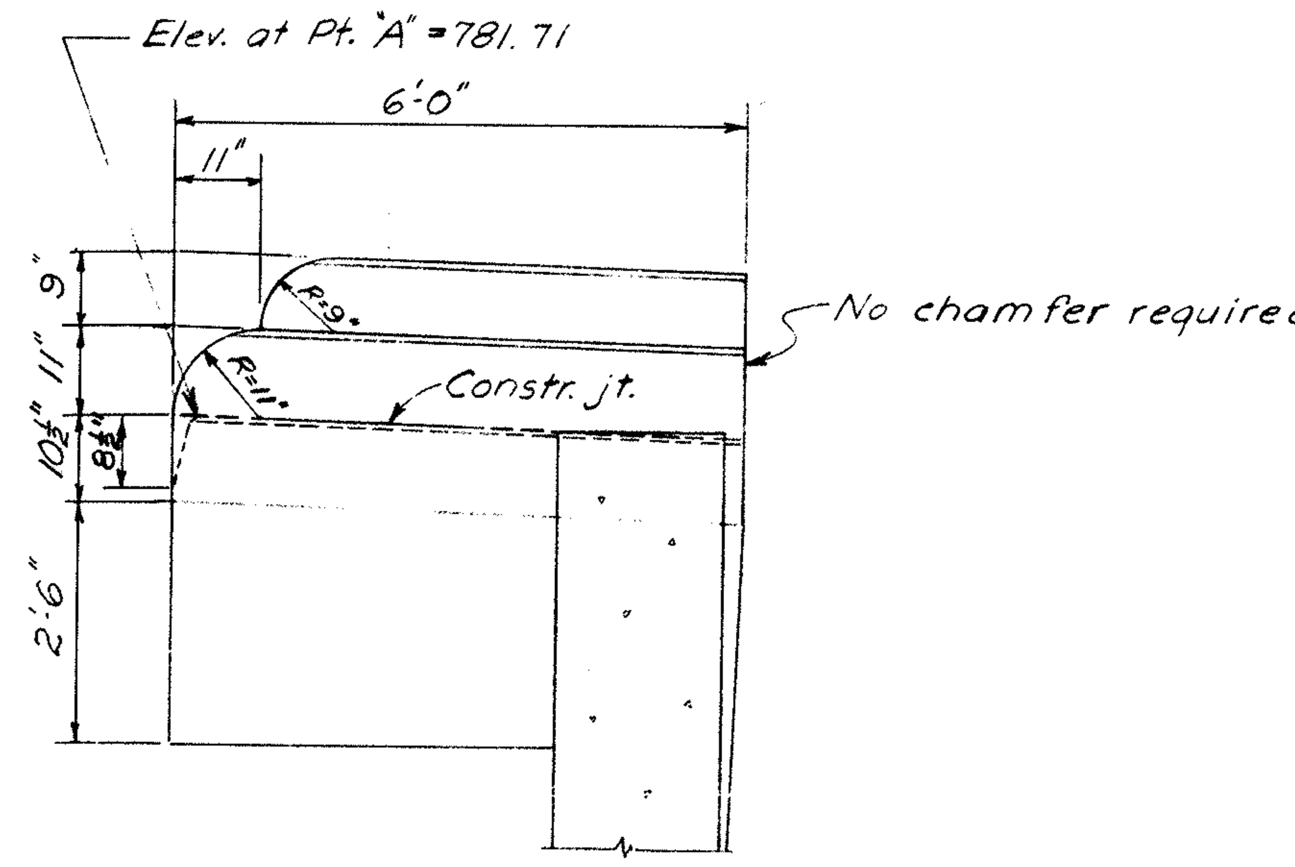
BRIDGE No. ATB-534-1834
OVER GRAND RIVER
Sta. 956+55.75
960+54.25
Ashtabula County

DESIGNED	DRAWN	TRACED	CHECKED	REVIEWED	DATE	REVISED
B.C.N.	B.C.N.		INNES	BFG	6-5-58	

ATB-534-(17.02-21.40)



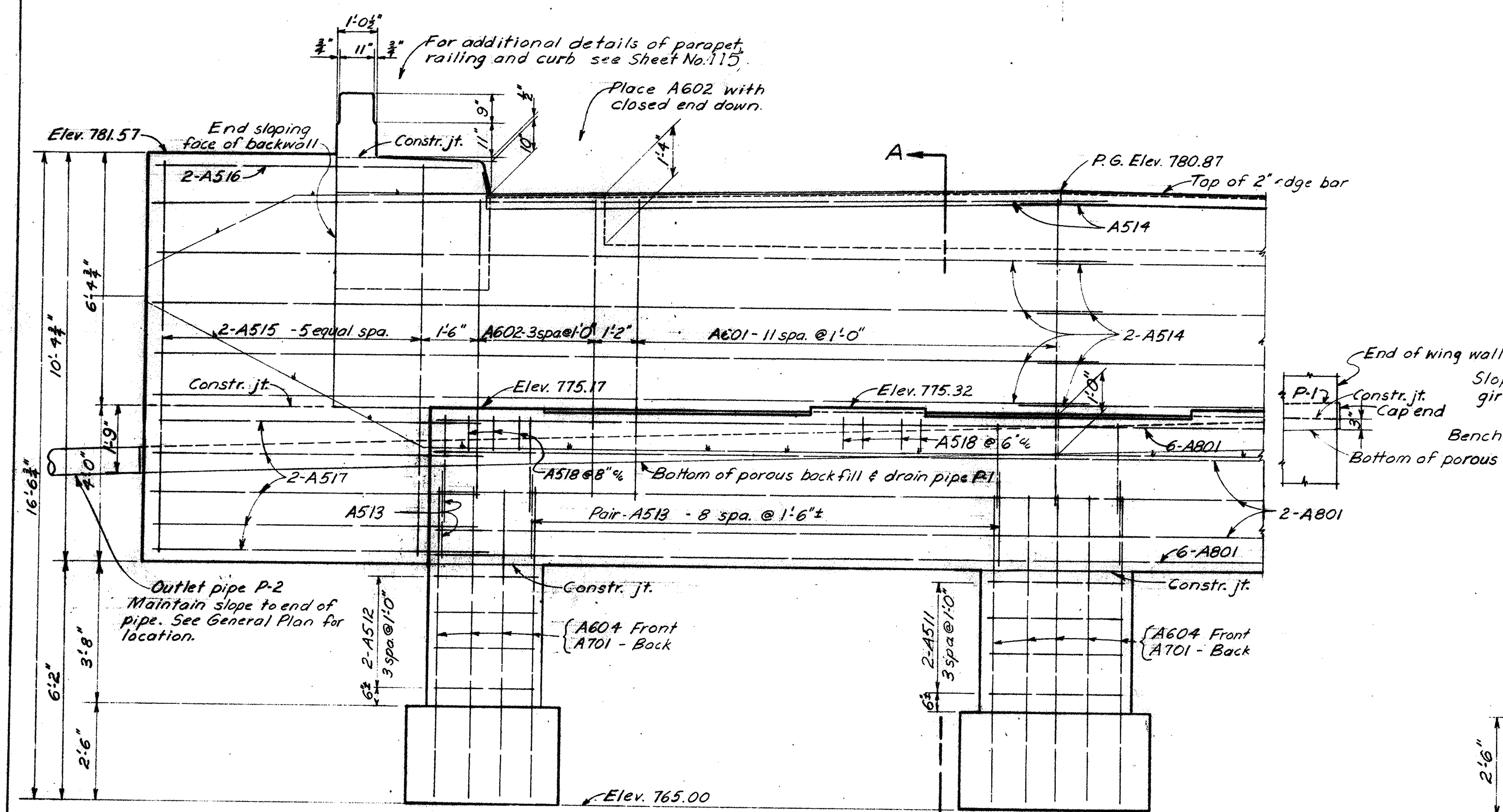
PLAN



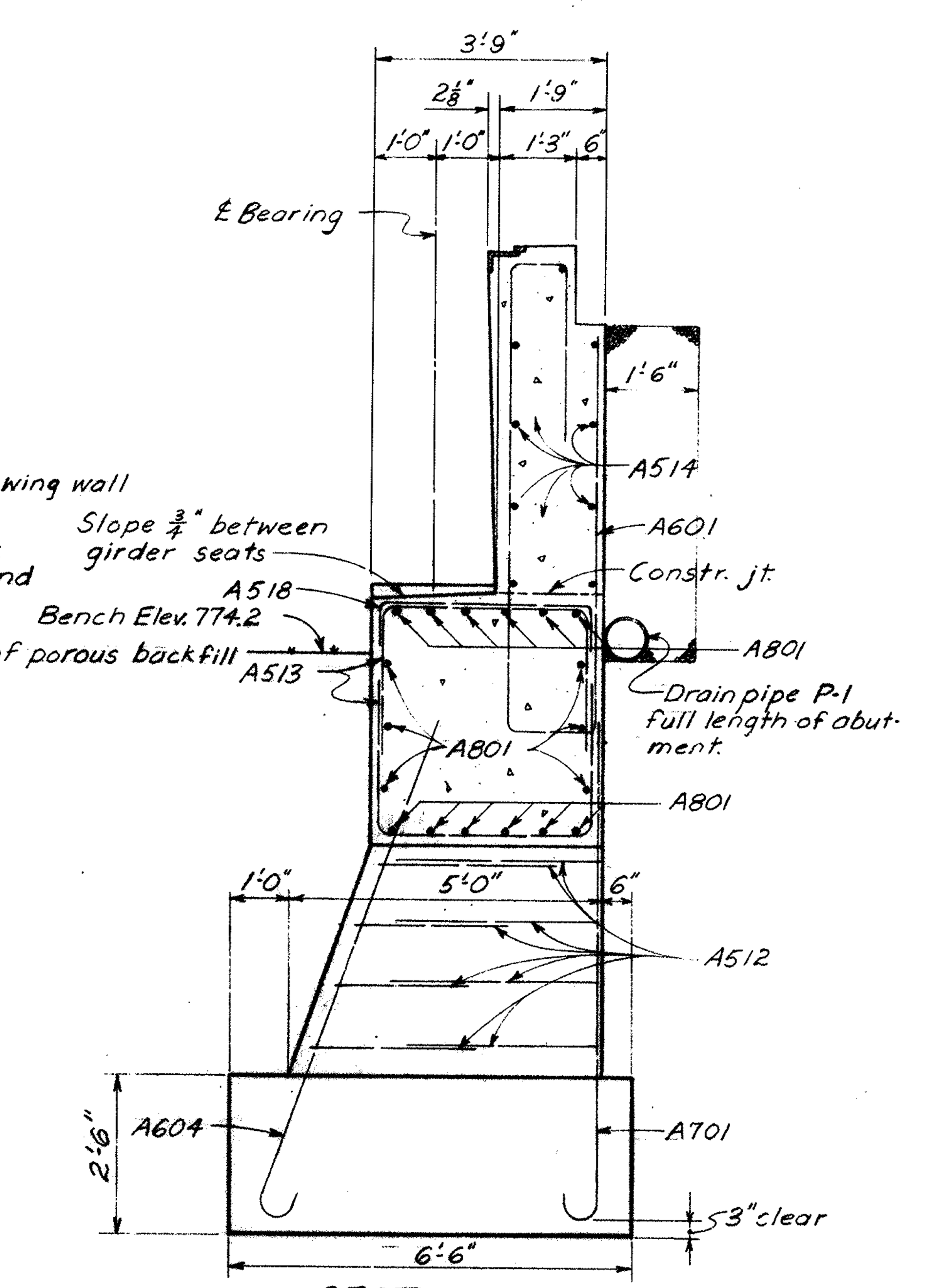
Railing not shown. See Sheet No. 115 for additional details.

SECTION B-B

Reference	Kind of Pipe	Spec.
P-1	8"φ perforated bit. coated corrugated metal pipe	M-6.4 (f)
P-2	8"φ bituminous coated corrugated metal pipe	M-6.4(c)



ELEVATION



SECTION A-A

CONCRETE shall be Class "E" for footings, Class "C" above footings.

PROCEDURE: After the pedestals are placed the backfill shall be made to the height of the earth bench and the excavation made for the cross beam.

POROUS BACKFILL 1'-6" thick shall extend upward to the approach slab and to the surface of the shoulders, and outward to the ends of the wing walls. Excavation therefor, in excess of that required for construction of the abutment, shall be considered as paid for in the bid price per cu. yd. paid for porous backfill. Excavation for outlet pipe P-2, in excess of that required for laying of the roadway drainage outlet pipe, shall be included with Item S-29, BCCMP, for payment.

FOOTINGS shall extend a minimum of 3" into firm shale or to the elevation shown, whichever is lower.

FOUNDATION BEARING PRESSURE: Footings for this abutment are designed for a maximum bearing pressure of 5 tons per sq. ft.

STATE OF OHIO
DEPARTMENT OF HIGHWAYS
DIVISION OF DESIGN AND CONSTRUCTION
BUREAU OF BRIDGES

5

FORWARD ABUTMENT DETAILS
BRIDGE NO. ATB-534-1834
OVER GRAND RIVER

STA. 956+55.75
960+54.25

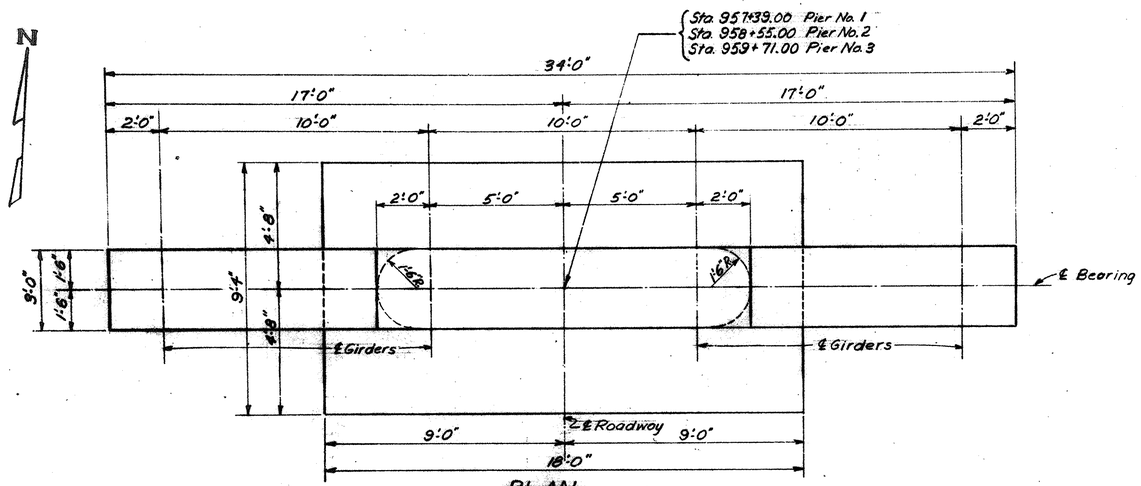
ASHTABULA COUNTY

DESIGNED	DRAWN	TRACED	CHECKED	REVIEWED	DATE	REVISED
WJJ	WJJ		INNES	BFG	6-5-58	

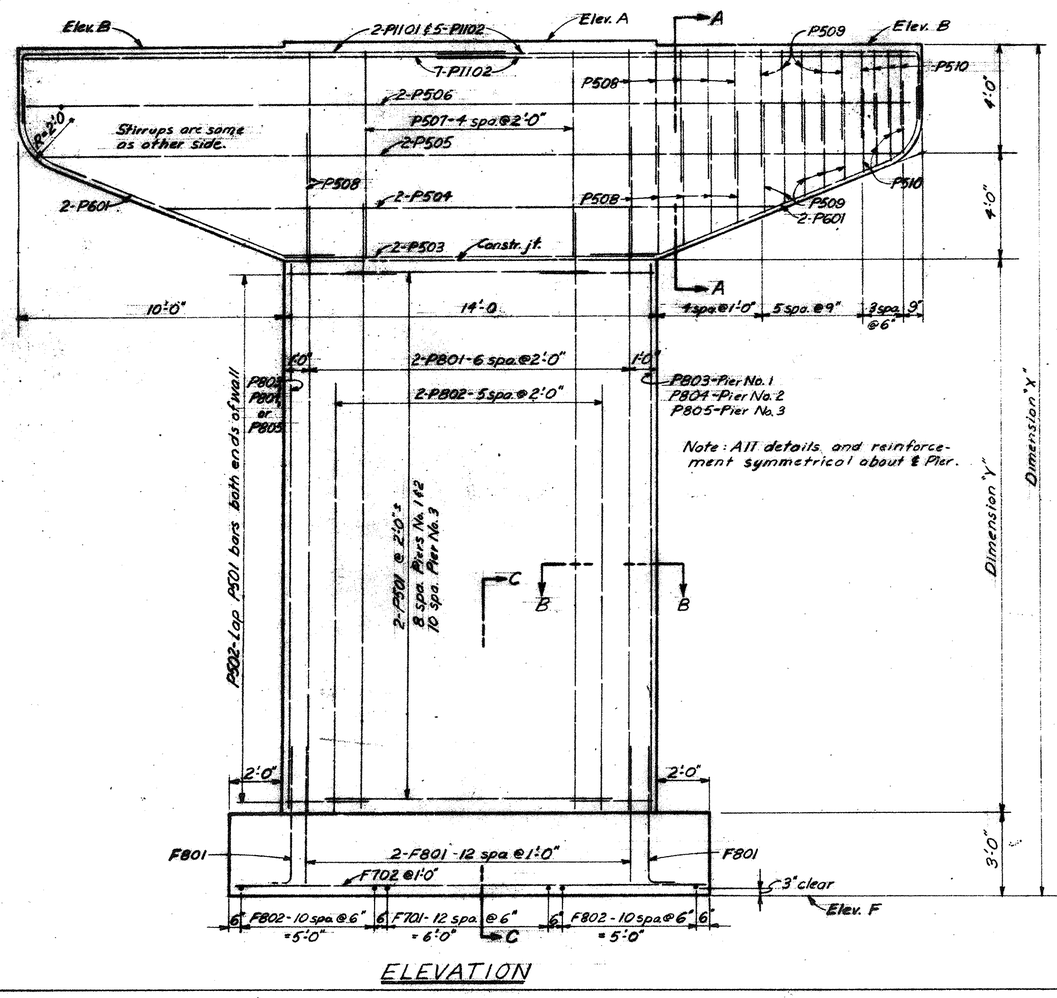
STATE RTE. NO.	SEC.	PROJECT		
2	OHIO			

114
126

ATB-534-(17.02-21.40)



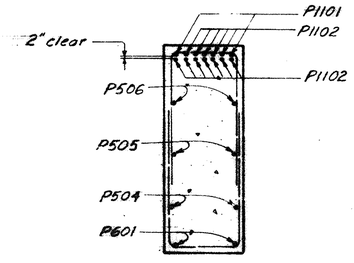
PLAN



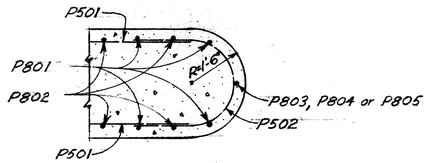
ELEVATION

Elevation	A	B	F	Dim. "X"	Dim. "Y"
Pier No. 1	764.51	764.36	736.00	28'-4 3/8"	17'-4 3/8"
Pier No. 2	766.18	766.02	737.00	29'-0 1/4"	18'-0 1/4"
Pier No. 3	768.82	768.66	737.00	31'-7 3/8"	20'-7 3/8"

Note: P1101 and P1102 bars shall be placed to clear bolster anchor bolts in Pier No. 2.



SECTION A-A

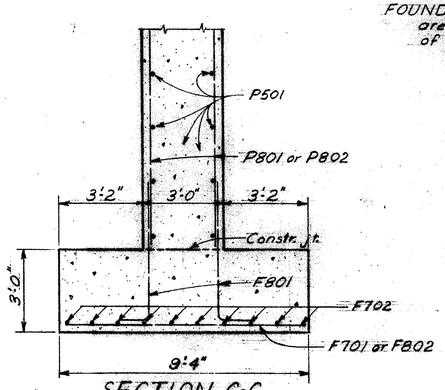


SECTION B-B

CONCRETE shall be Class "E" for footings and Class "C" for pier walls and caps.

FOOTINGS shall extend into firm shale a minimum of 3" at Piers No. 1 and 2, and a minimum of 2'-6" at Pier No. 3, or to the elevation shown, whichever is lower.

FOUNDATION BEARING PRESSURE: Pier footings are designed for a maximum bearing pressure of 8 tons per sq. ft.



SECTION C-C

STATE OF OHIO
DEPARTMENT OF HIGHWAYS
DIVISION OF DESIGN AND CONSTRUCTION
BUREAU OF BRIDGES

6

PIER DETAILS

BRIDGE NO. ATB-534-1834
OVER GRAND RIVER

STA. 956+55.75
960+54.25

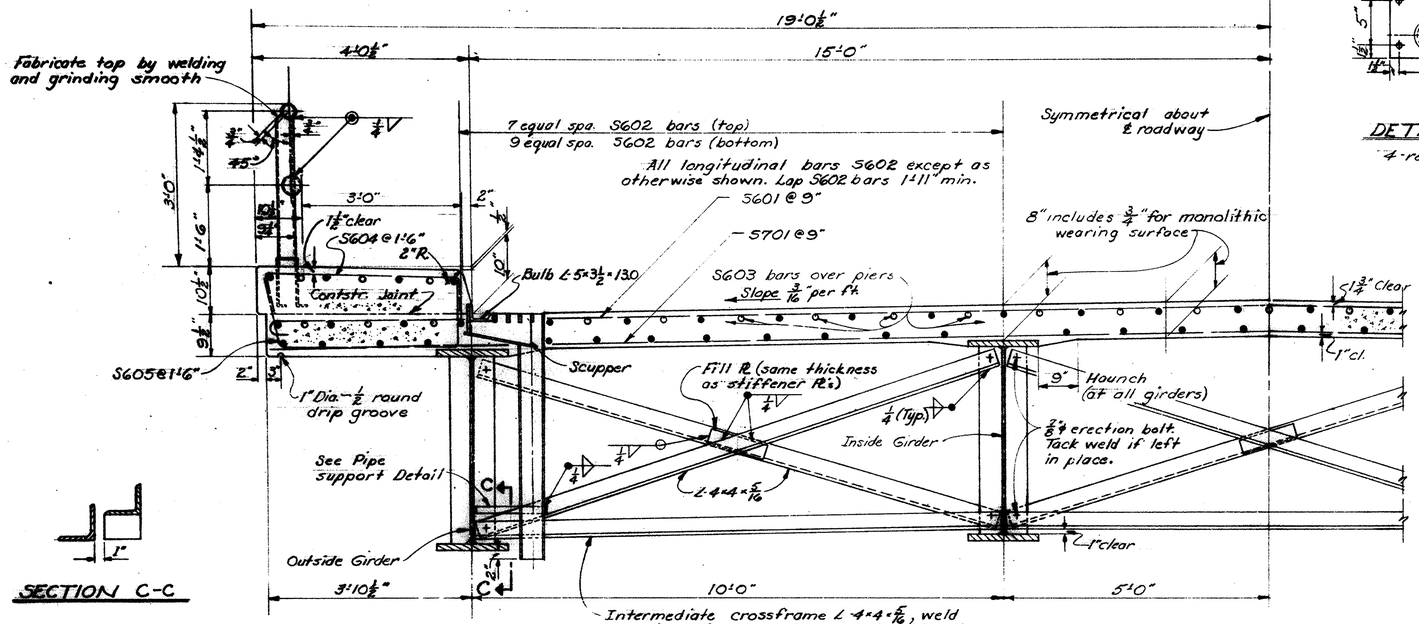
ASHTABULA COUNTY

DESIGNED	DRAWN	TRACED	CHECKED	RECEIVED	DATE	REVISED
WB	WB		INNES	BFG.	6-5-58	

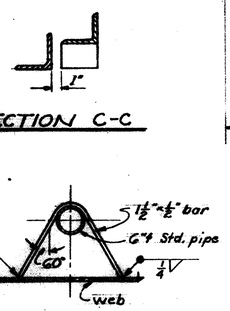
FED. & STATE DIVISION	STATE	PROJECT	
2	OHIO	-	

115
126

ATB-534-(17.02-21.40)

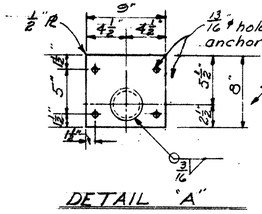


HALF TRANSVERSE SECTION

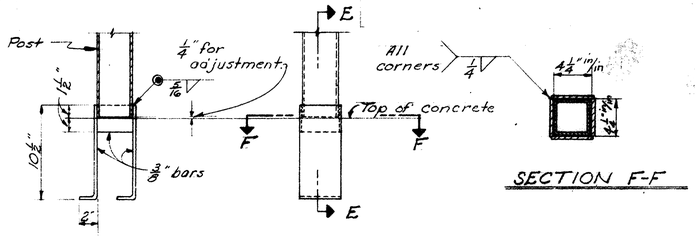


PIPE SUPPORT DETAIL

SECTION C-C



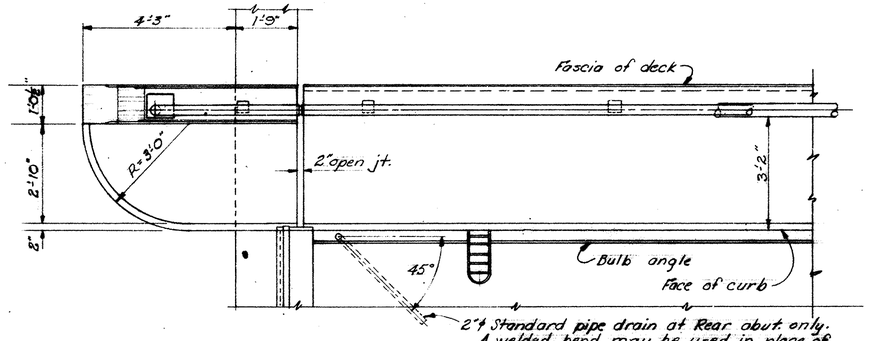
DETAIL "A"
4 required

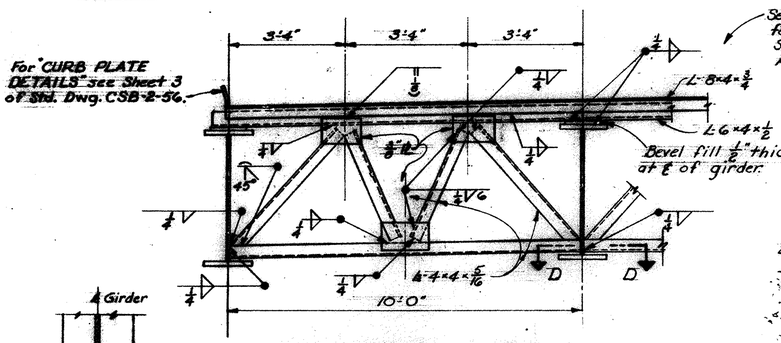


SECTION E-E

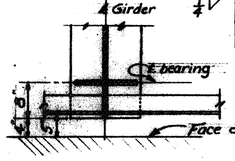
SECTION F-F

DETAILS OF POST ANCHORS
Include post anchors with railing for payment.





END CROSSFRAME DETAIL



SECTION D-D

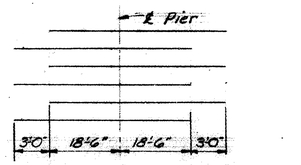
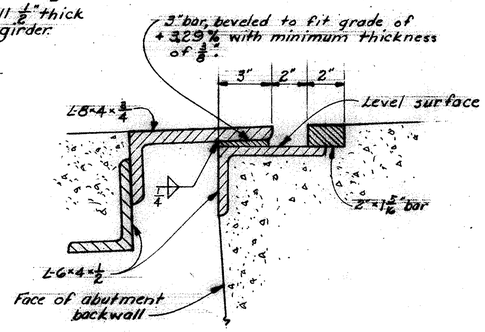
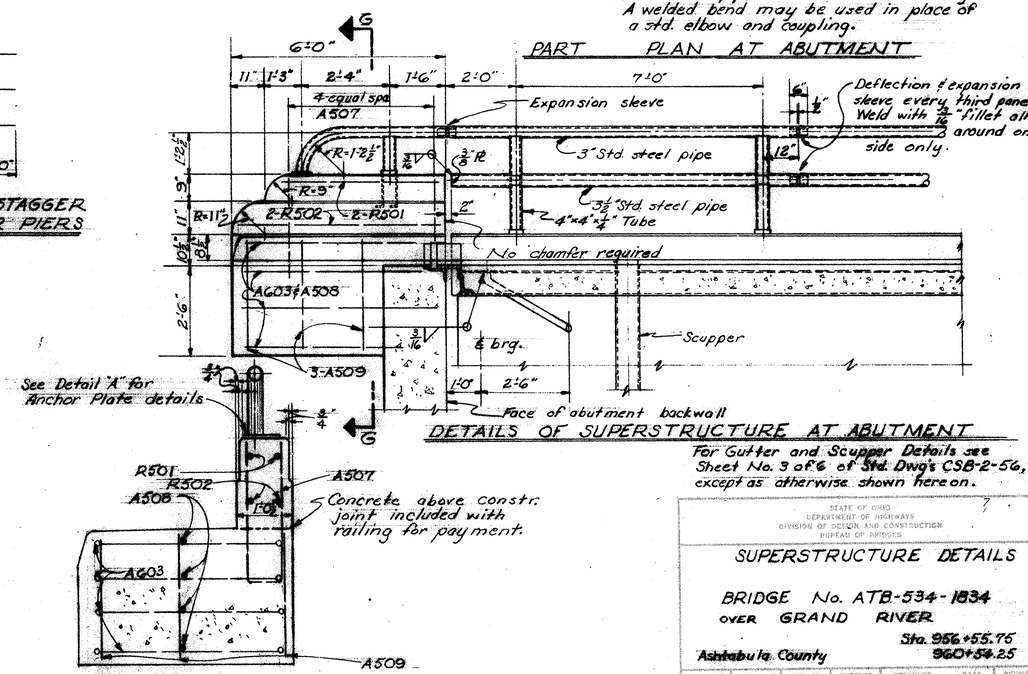


DIAGRAM SHOWING STAGGER OF S603 BARS OVER PIERS



SECTION THRU END FINISH AT FORWARD ABUTMENT

FOR ADDITIONAL details, notes, and detail of end dam at rear abutment see Sec. C-C on Sheet 2 of 6 of Std. Dwg. CSB-2-56.



PART PLAN AT ABUTMENT

SECTION G-G

DETAILS OF SUPERSTRUCTURE AT ABUTMENT

For Gutter and Scupper Details see Sheet No. 3 of 6 of Std. Dwg's CSB-2-56, except as otherwise shown hereon.

STATE OF OHIO
DEPARTMENT OF HIGHWAYS
DIVISION OF DESIGN AND CONSTRUCTION
BUREAU OF BRIDGES

SUPERSTRUCTURE DETAILS

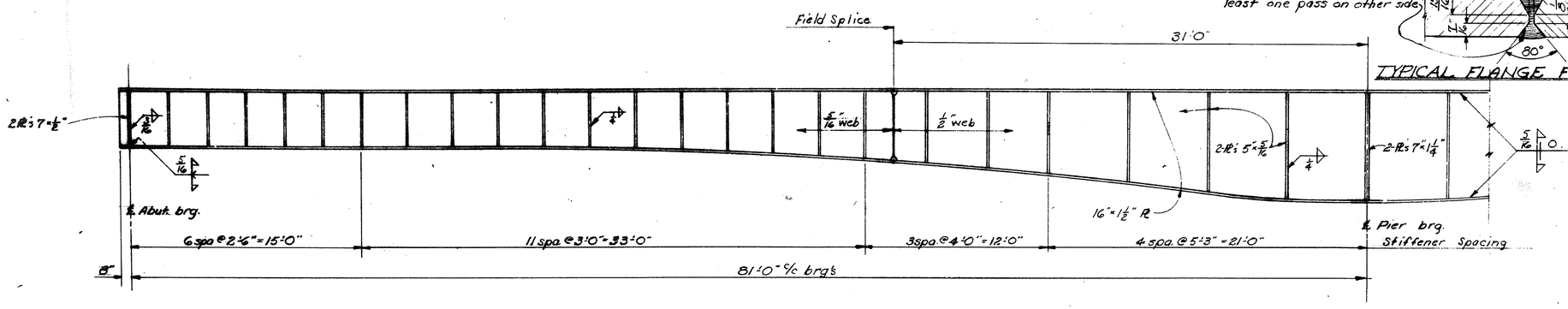
BRIDGE No. ATB-534-1834
OVER GRAND RIVER
Sta. 956+55.75
960+54.25
Ashtabula County

DESIGNED	DRAWN	TRACED	CHECKED	RECOMMENDED	DATE	REVISED
B.C.H.	B.C.H.		H.B.Y.	BFG	6-5-58	

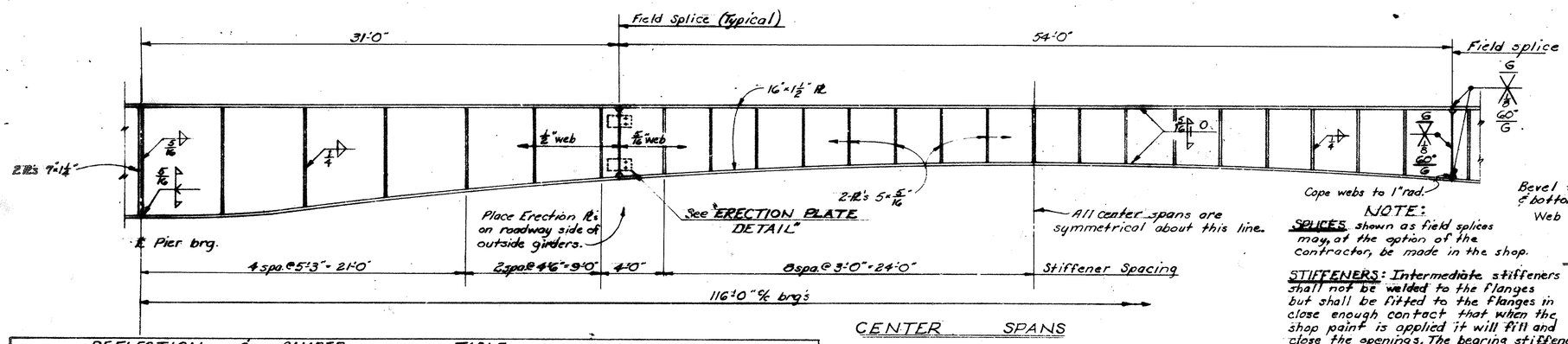
FED. RD. DIVISION	STATE	PROJECT		
2	OHIO			

116
126

ATB-534-(17.02-21.40)



END SPANS

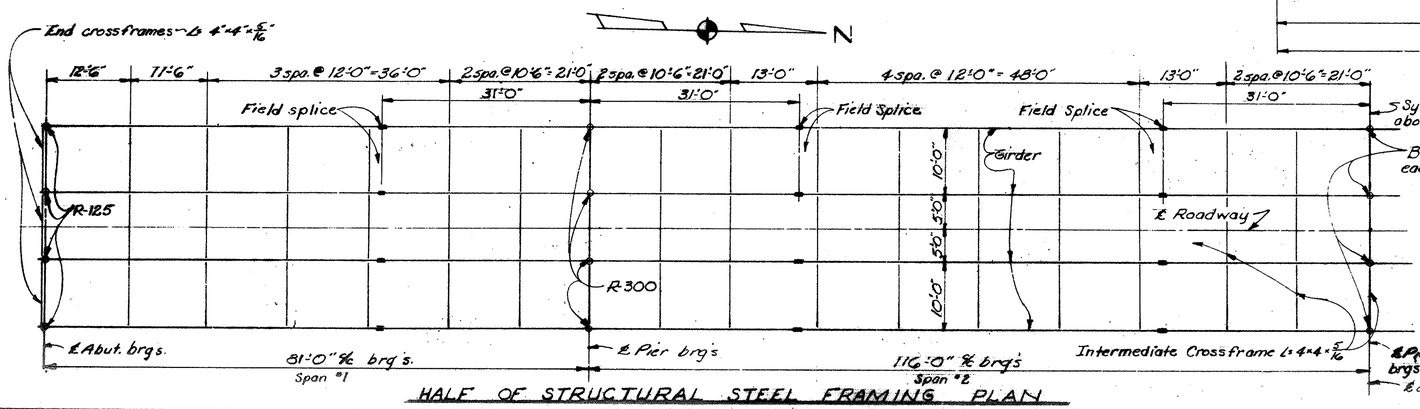


CENTER SPANS

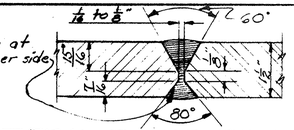
DEFLECTION & CAMBER TABLE

Location	Inside Girders: End Spans 1	2	3 Splice	4	Center Spans 5	6 Splice	7	8 Splice	9	Outside Girders: End Spans 1	2	3 Splice	4	Center Spans 5	6 Splice	7	8 Splice	9
Deflection due to weight of steel	+.05"	+.06"	+.03"	+.00"	+.06"	+.09"	+.15"	+.08"	+.05"	+.05"	+.06"	+.03"	+.00"	+.06"	+.09"	+.16"	+.08"	+.06"
Deflection due to remaining dead load	+.21"	+.27"	+.14"	+.02"	+.23"	+.34"	+.58"	+.33"	+.20"	+.25"	+.32"	+.17"	+.03"	+.27"	+.41"	+.68"	+.38"	+.24
Convexity required for vertical curve*	-.09"	-.10"	-.06"	-.01"	-.07"	-.11"	-.18"	-.11"	-.07"	-.09"	-.10"	-.06"	-.01"	-.07"	-.11"	-.18"	-.11"	-.07"
Sum of deflection and convexity	+.23"	+.27"	+.11"	+.01"	+.22"	+.32"	+.55"	+.30"	+.18"	+.21"	+.28"	+.14"	+.02"	+.26"	+.39"	+.66"	+.35"	+.23
Camber required	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

* Vertical curve is a sag type curve.

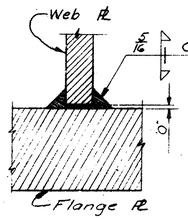


HALF OF STRUCTURAL STEEL FRAMING PLAN

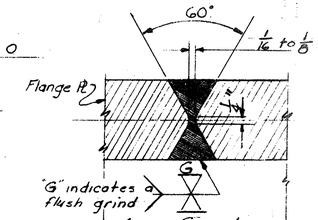


TYPICAL FLANGE FIELD SPLICE

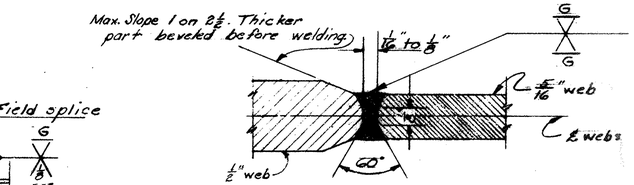
Weld after welding at least one pass on other side.



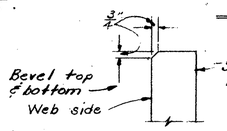
WEB TO FLANGE CONNECTION



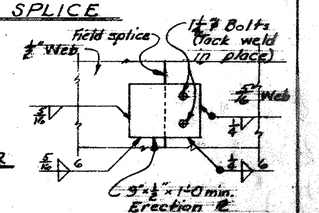
TYPICAL FLANGE SHOP SPLICE



WEB SPLICE



STIFFENER CORNER CUT (TYP)

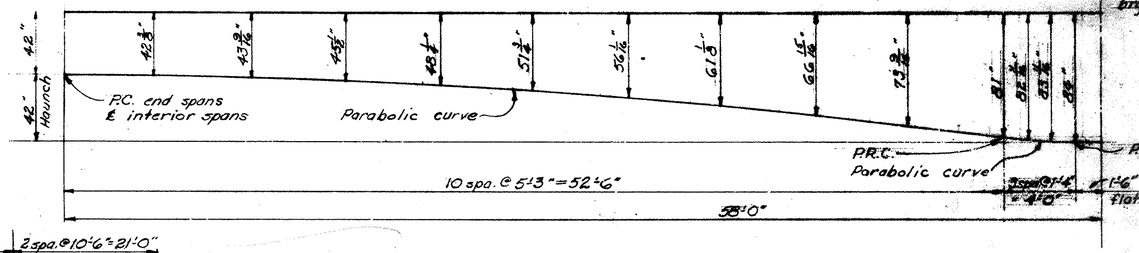


ERECTION PLATE DETAIL

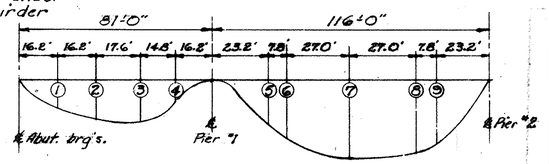
NOTE:

SPLICES shown as field splices may, at the option of the contractor, be made in the shop.

STIFFENERS: Intermediate stiffeners shall not be welded to the flanges but shall be fitted to the flanges in close enough contact that when the shop paint is applied it will fill and close the openings. The bearing stiffeners over piers and abutments shall be grooved and fully butt-welded to the lower flange and fitted in close contact, without welding, at the upper flange.



TEMPLATE FOR WEB PLATE'S



DEFLECTION DIAGRAM

(See Deflection and Camber table for ordinate values)

STATE OF OHIO
DEPARTMENT OF HIGHWAYS
DIVISION OF DESIGN AND CONSTRUCTION
BUREAU OF BRIDGES

GIRDER DETAILS

BRIDGE No. ATB-534-1834
OVER GRAND RIVER
Sta. 386+55.75
Ashtabula County 390+35.25

DESIGNED	DRAWN	TRACED	CHECKED	REVIEWED	DATE	REVISED
RCK.	RCK.		NEY	BFG	6-5-58	