

314 (85)

WAY-302-10.08	OHIO	1 34
ASD-302-9.32	FHWA REGION 5	
		FEDERAL PROJECT

STATE OF OHIO
DEPARTMENT OF TRANSPORTATION

WAY-302-10.08
ASD-302-9.32

CHESTER TOWNSHIP, WAYNE COUNTY
ORANGE TOWNSHIP, ASHLAND COUNTY

BRS-485 (5) (6)

DESIGN DESIGNATIONS

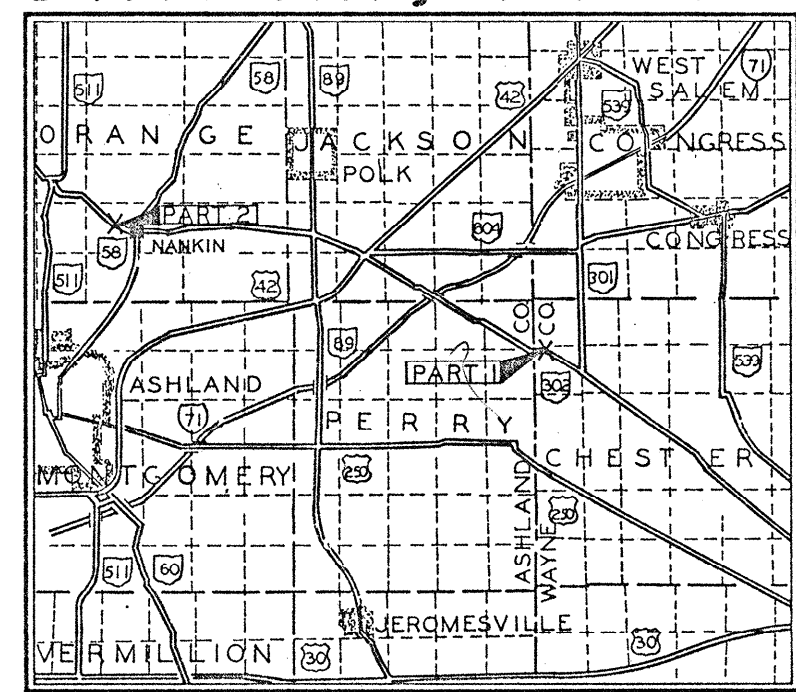
	WAY-302-10.08	ASD-302-9.32
1983 ADT	550	680
2003 ADT	820	960
DHV	80	95
D	50%	50%
T	8%	8%
V	40 MPH.	40 MPH.

CONVENTIONAL SIGNS

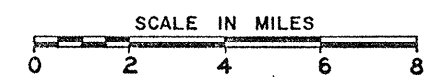
County Line	-----	Limited Access (only)	LA
Township Line	-----	Right of Way (only)	RW
Section Line	-----	Limited Access & Right of Way	LA & RW
Corporation Line	-----	Existing Right of Way	-----
Fence Line (existing)	-x-x-	Property Line	----- (in existing fence) -x-x-
Fence Line (proposed)	-x-x-	Railroad	----- or -----
Center Line	352 353	Guardrail (existing)	----- (proposed) -----
Trees	(to be removed)		
Utility Poles: Telephone	φ	Power	φ
		Light	φ

INDEX OF SHEETS

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RIGHT OF WAY	34



LOCATION MAP



LINE DATA

PROJECT	WORK
PART 1 (WAY-302-10.08)	
BEGIN STA. 531+00	STA. 530+20
END STA. 533+50	STA. 533+90
NET LENGTH 250.00 LIN. FT.	370.00 LIN. FT.
PART 2 (ASD-302-9.32)	
BEGIN STA. 492+20	STA. 492+00
END STA. 494+26.45	STA. 495+35
NET LENGTH 206.45 LIN. FT.	335.00 LIN. FT.
TOTAL PROJECT	
NET LENGTH 456.45 LIN. FT.	705.00 LIN. FT.
	OR 0.086 MILES OR 0.134 MILES

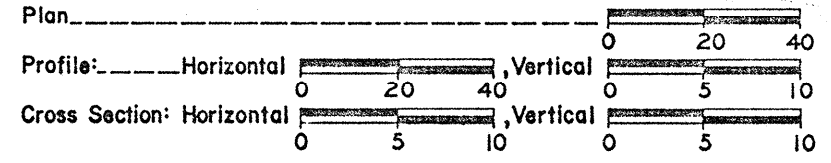
UNDERGROUND UTILITIES

48 HOURS
BEFORE YOU DIG
Call--800-362-2764 (Toll free)
OHIO UTILITIES PROTECTION SERVICE

NON-MEMBERS
MUST BE CALLED DIRECTLY

Portion to be improved: _____
State & Federal Routes: _____
Other Roads: _____

SCALES



SUPPLEMENTAL SPECIFICATIONS

803	5-27-83
824	10-08-82
836	3-12-75
939	6-28-82
847	10-17-83
947	10-17-83

Approved: _____
Date: 7/27/84 District Deputy Director of Transportation

Approved: _____
Date: 8-21-84 Engineer, Bureau of Bridges and Structural Design

Approved: _____
Date: 2-15-85 Chief Engineer, PLANNING & DESIGN

Approved: _____
Date: 2-15-85 Director, Department of Transportation

SUPPLEMENTAL PRINTS OF STANDARD CONSTRUCTION DRAWINGS

BP-5	7-16-81	AS-1-81	11-27-81
GR-1	2-05-82	DBR-2-73	4-10-73
GR-2B	2-05-82	CPP-2-73	4-10-73
GR-3	2-05-82	PSBD-1-81	9-18-81
GR-4	2-05-82	TS-ICD-1-82	11-15-82
GR-4A	1-30-84		
MC-4	7-26-76		

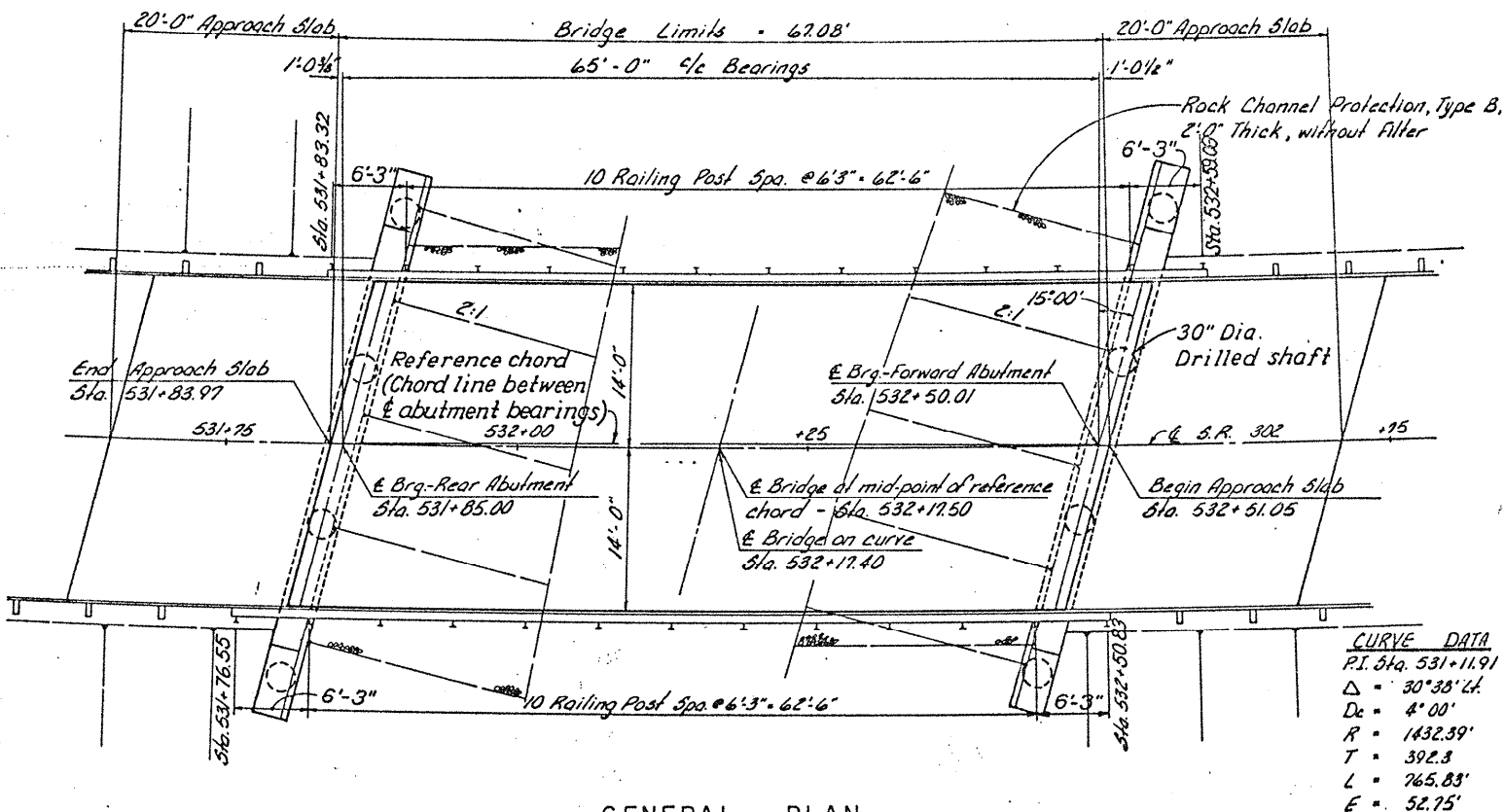
Plan Prepared By:
DISTRICT 3 DESIGN
(ROADWAY PLANS)
AND
SHAFFER, JOHNSTON,
LICHTENWALTER, ASSOC.
(STRUCTURE PLANS)

SEAL

DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

APPROVED: _____
DIVISION ADMINISTRATOR DATE

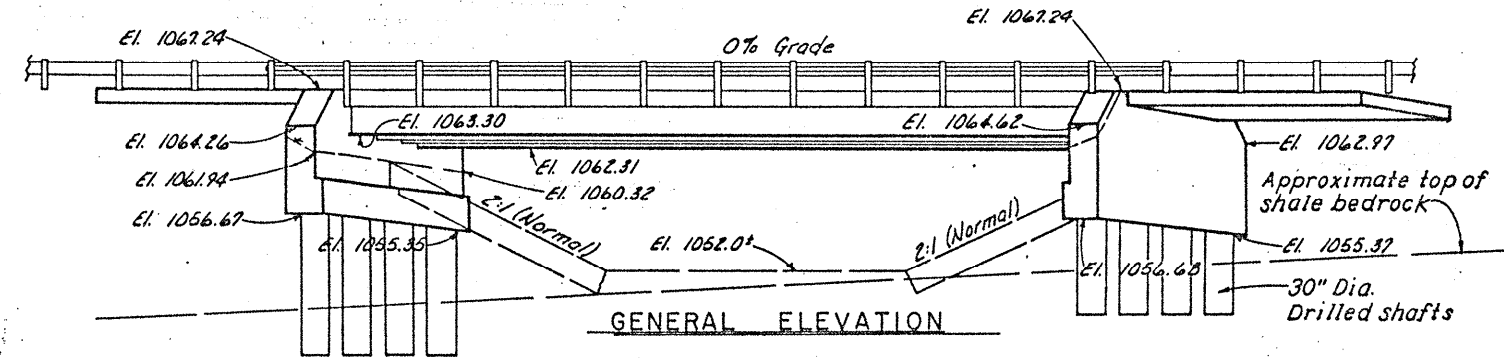
Project: WAY-302-10.08, ASD-302-9.32
Date of Letting: 19____, Contract No. _____



CURVE DATA

P.I. Sta.	531+11.91
Δ	30°38'44"
Dc	4'00"
R	1432.39'
T	392.3'
L	765.83'
E	52.75'

GENERAL PLAN



GENERAL ELEVATION

QUANTITIES CALC. RAK 10-28-83
 QUANTITIES CK'D. JH 5-29-84

FHWA REGION	STATE	PROJECT
5	OHIO	

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WAY - 302 - 1008
 ASD - 302 - 932
 PART I

GENERAL NOTES

REFERENCE shall be made to Standard Drawings
 AS-1-81, Dated 11-27-81
 DBR-2-73, Dated 4-10-73
 TS-10D-1-82, Dated 11-15-82

and to Supplemental Specifications
 824 (Dated 10-8-82)
 836 (Dated 3-12-75)

DESIGN SPECIFICATIONS: This structure conforms to "Design Specifications for Highway Bridges" adopted by the American Association of State Highway and Transportation officials, 1977, including the 1978, 1979, 1980, 1981 and 1982 Interim specifications and the Ohio "Supplement" to these specifications.

DESIGN DATA
 Design Loading - HS-20-44, case II and the Alternate Military loading
 Concrete, Class 5 - unit stress 1500 P.S.I. (Superstructure)
 Concrete, Class C - unit stress 1333 P.S.I. (Substructure)
 Reinforcing Steel - ASTM A615, A616 or A617 - Grade 60 - unit stress 24,000 P.S.I.
 Structural Steel - ASTM A588 - unit stress 27,000 P.S.I.
 Deck Protection Method - epoxy coated reinforcing steel (top mat only)

MONOLITHIC WEARING SURFACE is assumed, for design purposes, to be 1" thick.

REMOVAL OF EXISTING STRUCTURE: When no longer needed to maintain traffic the existing structure shall be removed and shall become the property of the Contractor.

UTILITY LINES: All expense involved in relocating the affected utility lines shall be borne by the Owners. The Contractor and Owners are requested to cooperate by arranging their work in such a manner that inconvenience to either will be held to a minimum.

ITEM SPECIAL SEALING OF CONCRETE SURFACES: A concrete sealer, either silane or an epoxy sealer, shall be applied to the following concrete surfaces: The vertical edges of the deck and the underside of the deck extending beyond the exterior beams. See the proposal for surface preparation requirements, application rates, materials requirements and application procedures.

ESTIMATED QUANTITIES - BRS-485(6)				SUPER	ABUTS	GEN'L
ITEM	TOTAL	UNIT	DESCRIPTION			
202	Lump	Lump	Structure Removed			Lump
503	108	Cu.Yds.	Unclassified Excavation		108	
503	LUMP	LUMP	COFFERDAMS, CRIBS AND SHEETING			LUMP
509	13,626	Lbs.	Reinforcing Steel, Grade 60	7877	5749	
511	79	Cu.Yds.	Class B Concrete, Superstructure, As Per Plan	79		
511	68	Cu.Yds.	Class C Concrete, Abutments		68	
513	47,200	Lbs.	Structural Steel, ASTM A588 (AISC Category I)	47,200		
513	588	Each	Welded Stud Shear Connectors (See proposal note)	588		
516	84	Sq.Ft.	1/2" Preformed Expansion Joint Filler			84
516	56	Sq.Ft.	1" Preformed Expansion Joint Filler			56
516	84	Lin.Ft.	PVC Waterstop, as per plan			84
Special	49	Sq.Yd.	Sealing of Concrete Surfaces (See proposal note)	49		
517	134.16	Lin.Ft.	Railing (Deep beam rail with steel tubular backup and type 2 steel posts and bolts)	134.16		
518	97	Lin.Ft.	6" Perforated Helical Corrugated Steel Pipe, 707.01		97	
518	59	Lin.Ft.	6" Non-Perforated, Helical Corrugated Steel Pipe, including specials, 707.01		59	
518	36	Cu.Yds.	Porous Backfill			36
824	7695	Lbs.	Epoxy Coated Reinforcing Steel, Grade 60	7695		
Special	271	Sq.Ft.	Protection of Concrete Surfaces (See proposal note)		271	
Special	73	Lin.Ft.	30" Dia. Drilled Shafts		73	

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SHAFFER, JOHNSTON, LICHTENWALTER & ASSOCIATES, INC.
 CONSULTING ENGINEERS - SURVEYORS
 MANSFIELD OHIO WOOSTER

GENERAL PLAN, ELEVATION, NOTES AND ESTIMATED QUANTITIES
 BRIDGE NO. WAY - 302 - 1010
 OVER BRANCH OF MUDDY FORK CREEK
 WAYNE COUNTY OHIO S.R. 302
 STA. 531+83.97 TO STA. 532+51.05

DESIGNED	DRAWN	TRACED	CHECKED	REVIEWED	DATE	REVISED
RAK	AF	RAK	RAK	RAK	JH 5-29-84	

JOB NO. EM - 944 SHEET OF

ITEM 511, CLASS S CONCRETE, SUPERSTRUCTURE, AS PER PLAN:

IN LIEU OF THE PROPORTIONING SPECIFIED IN 499.03 AND 511.02, THE FOLLOWING TABLE SHALL BE USED TO ESTABLISH THE QUANTITIES PER CUBIC YARD FOR CONCRETE, THE COARSE AGGREGATE SHALL BE LIMESTONE.

QUANTITIES PER CUBIC YARD (USING NO. 8 LIMESTONE)

FINE AGGREGATE (LB.)	COARSE AGGREGATE (LB.)	TOTAL (LB.)	CEMENT CONTENT (LB.)	WATER-CEMENT RATIO
1555	1100	2655	715	0.40

AIR CONTENT - 8±2%

HIGH RANGE WATER REDUCER MAY BE USED AT THE OPTION OF THE CONTRACTOR. THE DOSAGE RATE WILL BE DETERMINED BY THE CONTRACTOR BASED ON MANUFACTURER'S RECOMMENDATION TO ACHIEVE THE DESIRED WORKABILITY LEVEL.

HIGH RANGE WATER REDUCER SHALL CONFORM TO 705.12, ASTM-C494 TYPE F AND SHALL NOT CONTAIN CALCIUM CHLORIDE.

THE CEMENT CONTENT SHALL BE MAINTAINED AND A MAXIMUM WATER-CEMENT RATIO OF 0.40 SHALL NOT BE EXCEEDED. THE SLUMP OF THE UNPLASTICIZED CONCRETE DELIVERED TO THE JOB SITE SHALL BE 1-1/2 ± 1/2 INCH. THE SUPER-PLASTICIZING ADMIXTURE SHALL BE ADDED AT THE JOB SITE AND MIXED A MINIMUM OF FIVE (5) MINUTES. AFTER THE SUPERPLASTICIZER HAS BEEN ADDED, THE SLUMP SHALL BE 6-1/2 ± 1/2 INCH. THE CONTRACTOR SHALL FURNISH A VOLUMETRIC DISPENSER FOR THE SUPERPLASTICIZER.

CONCRETE MIXTURES CONTAINING A HIGH RANGE WATER REDUCER SHALL MEET THE SAME REQUIREMENTS FOR ENTRAINED AIR CONTENT, MINIMUM STRENGTH, AND MAXIMUM WATER-CEMENT RATIO AS REQUIRED FOR THE RESPECTIVE GRADE OF CONCRETE WITHOUT A HIGH RANGE WATER REDUCER.

SAMPLING AND TESTING FOR ENTRAINED AIR CONTENT AND MINIMUM STRENGTH SHOULD BE TAKEN FROM THE CONCRETE THAT HAS BEEN TREATED WITH A HIGH RANGE WATER REDUCER.

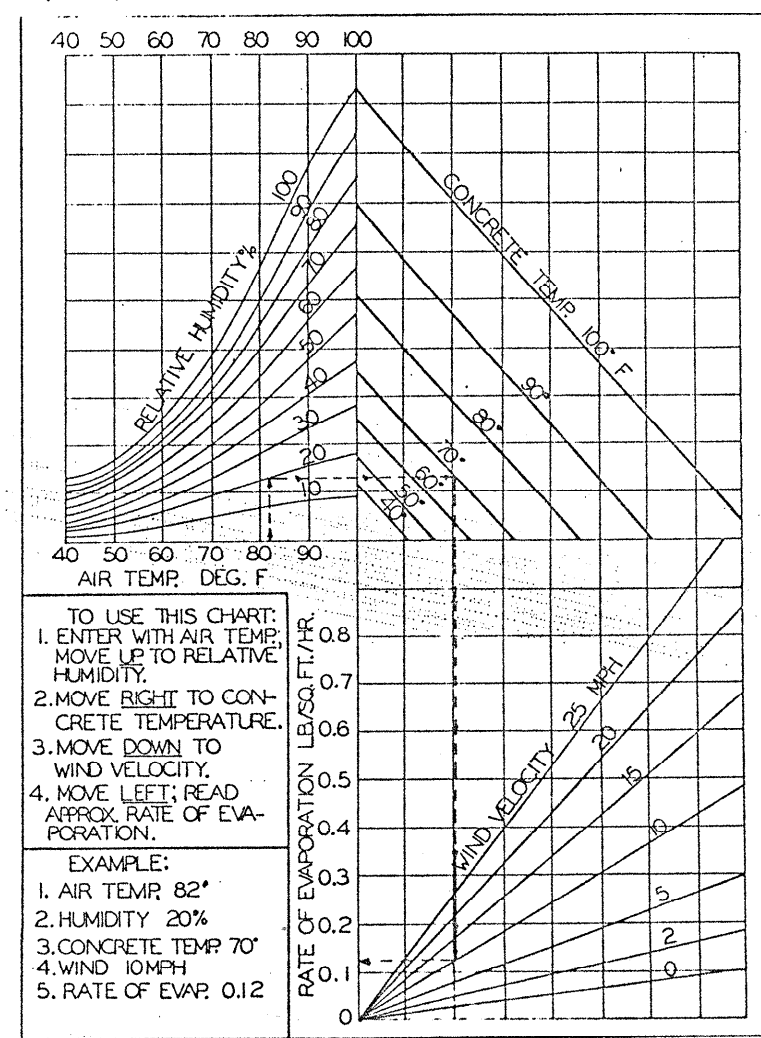
CURING SHALL BE IN ACCORDANCE WITH 511.14 TYPE A WATER CURING.

PLACEMENT:

PLACEMENT OF CONCRETE SHALL BE COMPLETED UNDER FAVORABLE ATMOSPHERIC CONDITIONS. FAVORABLE ATMOSPHERIC CONDITIONS EXIST WHEN THE SURFACE EVAPORATION RATE AS AFFECTED BY AMBIENT AIR TEMPERATURE, CONCRETE TEMPERATURE, RELATIVE HUMIDITY AND WIND VELOCITY IS 0.1 POUNDS PER SQUARE FOOT PER HOUR OR LESS. FIGURE (1) SHALL BE USED TO DETERMINE GRAPHICALLY THE SURFACE EVAPORATION RATE. FAVORABLE ATMOSPHERIC CONDITIONS MAY REQUIRE PLACEMENT DURING LATE EVENING (6:00 P.M. TO OFFICIAL SUNSET), NIGHT (OFFICIAL SUNSET OF OFFICIAL SUNRISE) OR EARLY MORNING (SUNRISE TO 8:00 A.M.).

IF PLACEMENT OF THE CLASS S, CONCRETE IS TO BE MADE AT NIGHT, THE CONTRACTOR SHALL SUBMIT A PLAN WHICH PROVIDES ADEQUATE LIGHTING FOR THE WORK AREA AT LEAST 15 CALENDAR DAYS IN ADVANCE AND RECEIVE WRITTEN APPROVAL FROM THE ENGINEER BEFORE PLACING THE CONCRETE. THE LIGHTS SHALL BE SO DIRECTED THAT THEY DO NOT AFFECT OR DISTRACT APPROACHING TRAFFIC.

PAYMENT FOR ALL OF THE ABOVE SHALL BE AT THE UNIT PRICE BID PER CUBIC YARD FOR ITEM 511 CLASS S CONCRETE, AS PER PLAN WHICH SHALL INCLUDE ALL LABOR, EQUIPMENT, MATERIALS AND INCIDENTALS NECESSARY TO COMPLETE THE ABOVE.



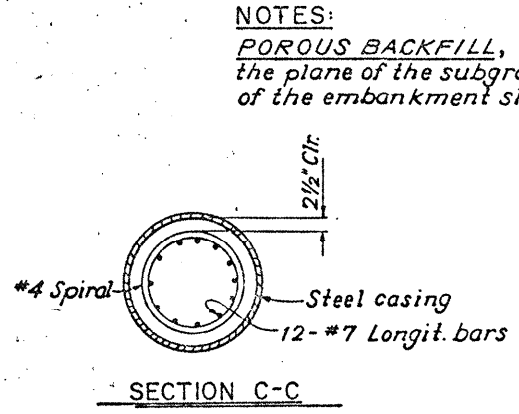
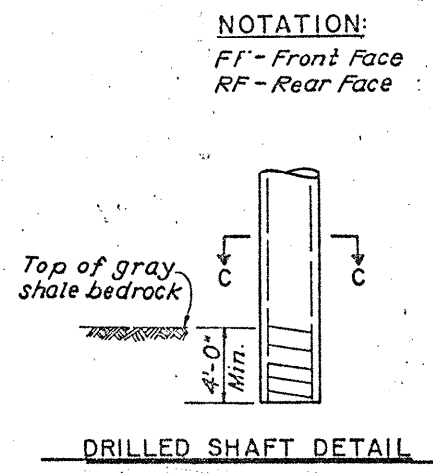
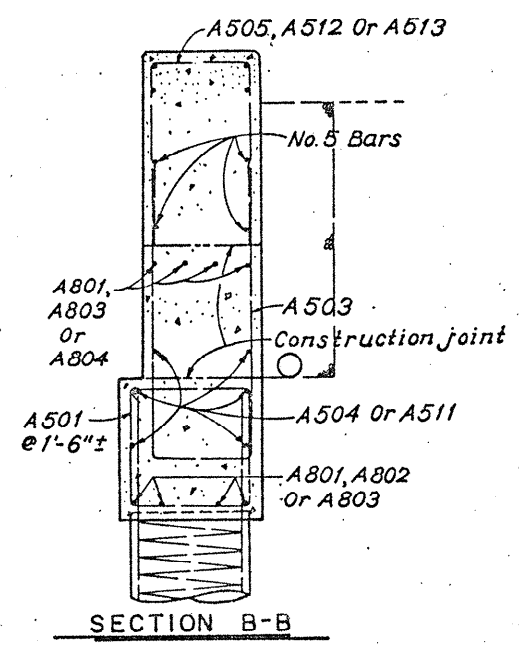
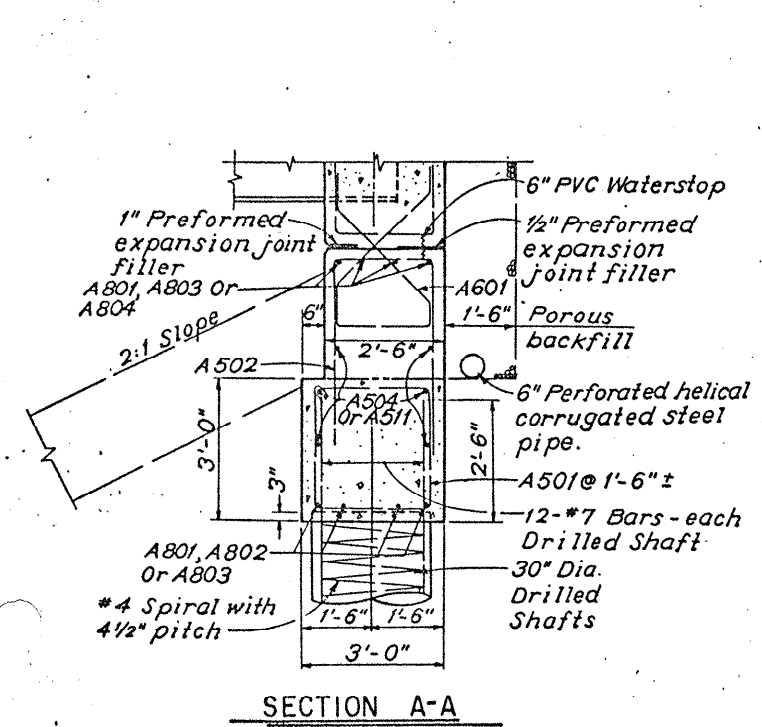
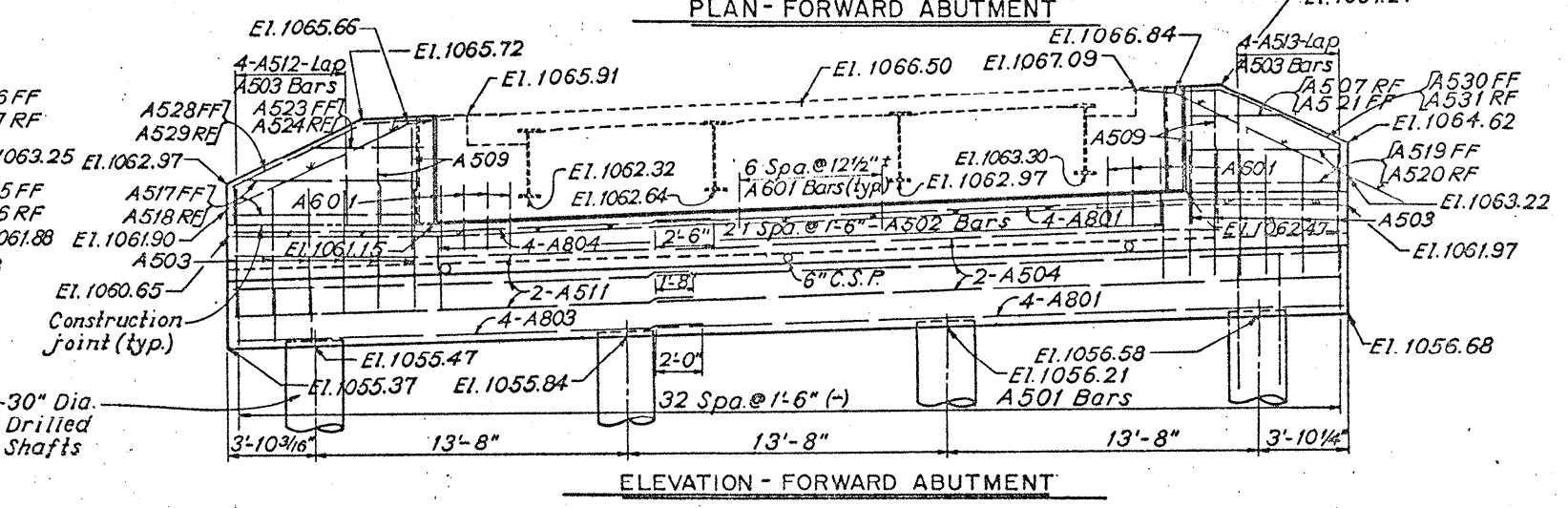
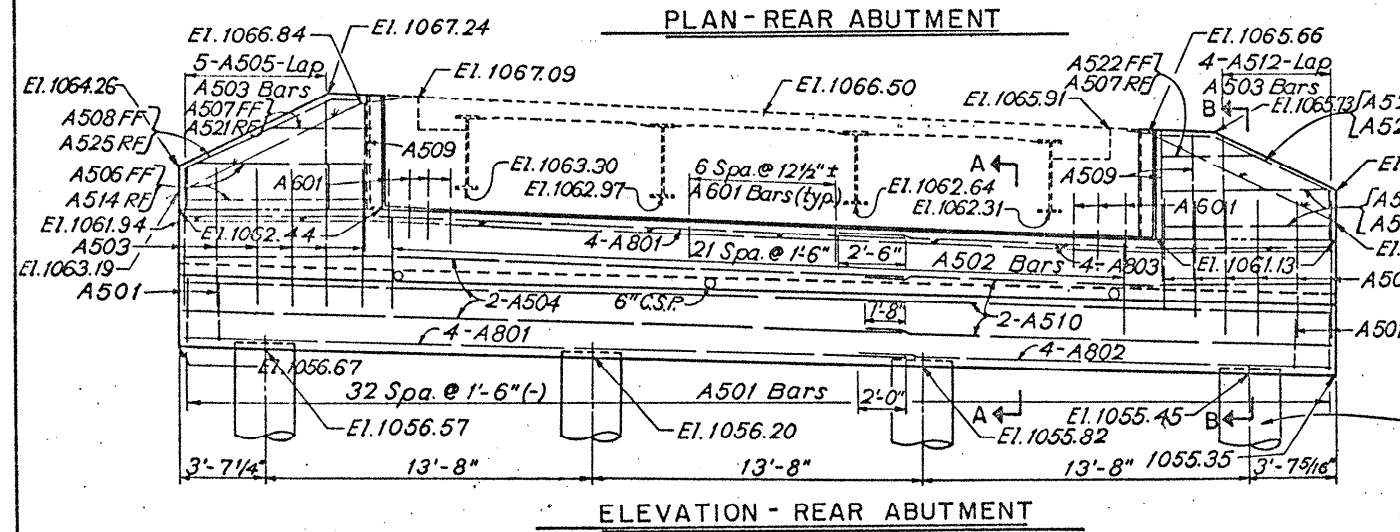
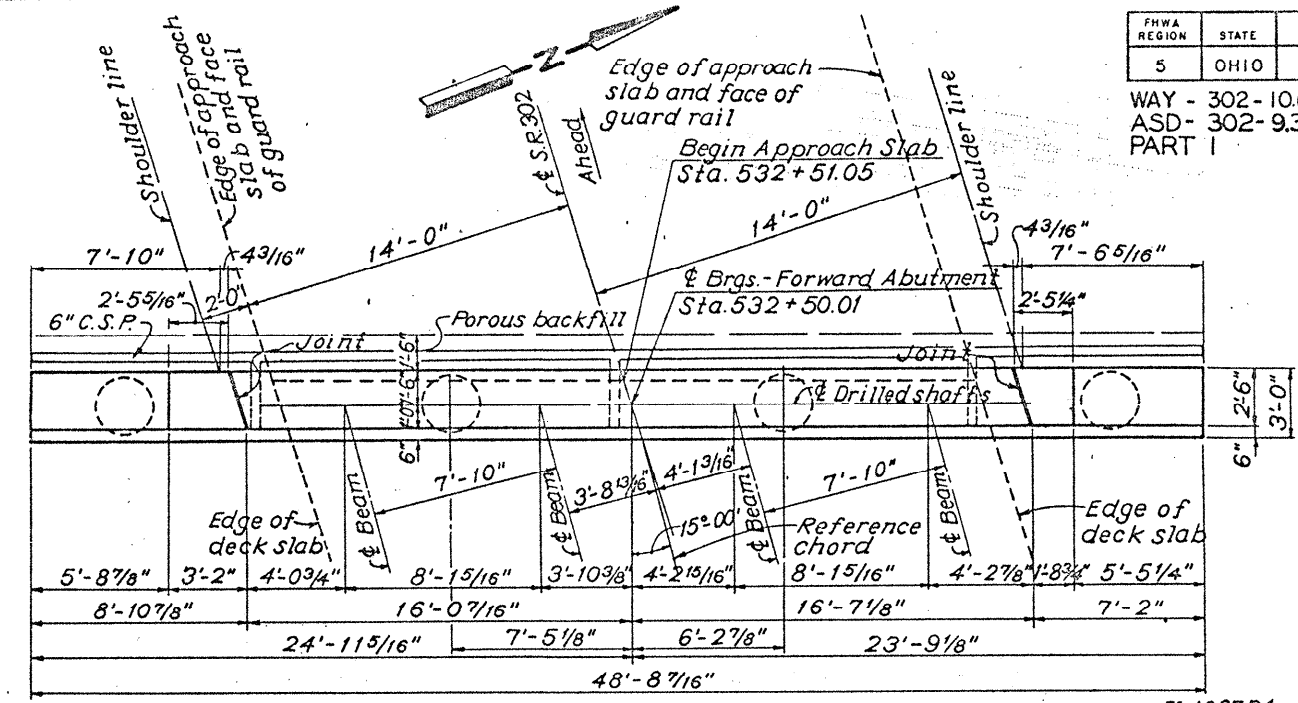
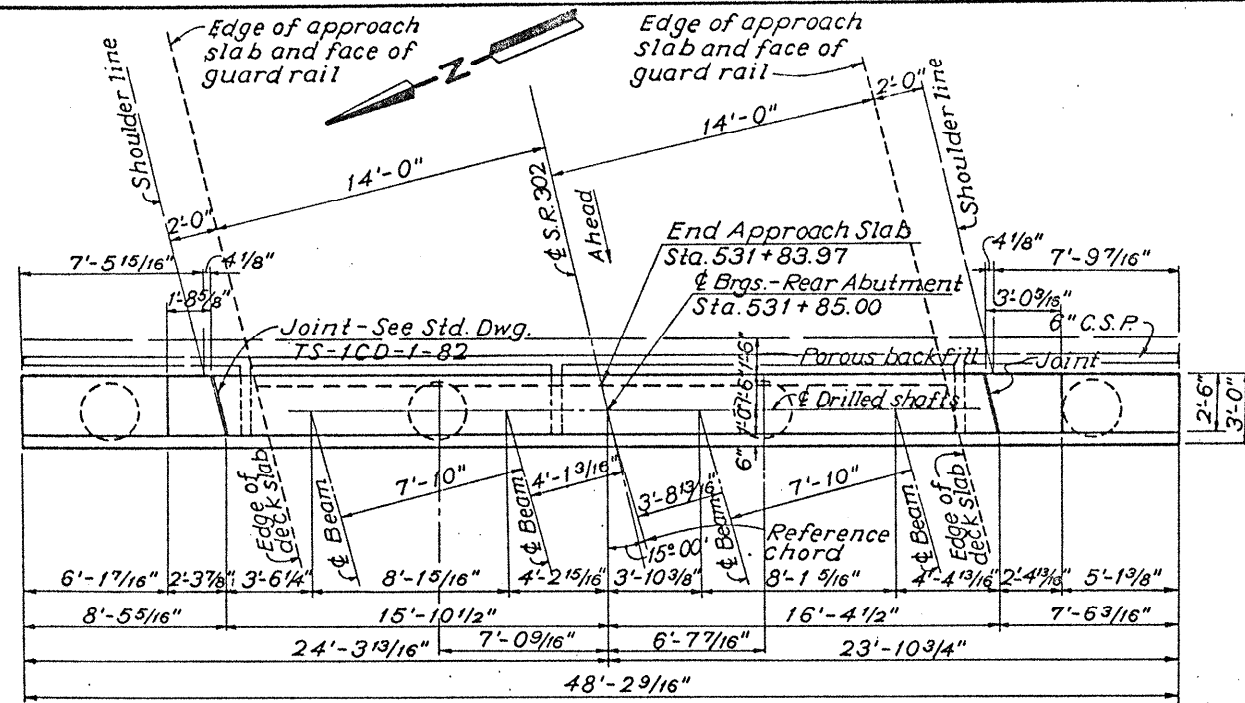
314(85)
145(85)

GENERAL NOTES
BRIDGE NO WAY-302-1010
OVER BRANCH OF MUDDY
FORK CREEK

FHWA REGION	STATE	PROJECT
5	OHIO	

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WAY - 302-10.08
ASD- 302-9.32
PART I



NOTATION:
FF - Front Face
RF - Rear Face

NOTES:
POROUS BACKFILL, 1'-6" thick, shall extend upward to the plane of the subgrade and laterally to the surface of the embankment slopes.

SHAFER, JOHNSTON, LICHTENWALTER & ASSOCIATES, INC.					
CONSULTING ENGINEERS - SURVEYORS					
MANFIELD	OHIO	WOOSTER			
ABUTMENTS					
BRIDGE NO. WAY - 302-1010					
OVER BRANCH OF MUDDY FORK CREEK					
WAYNE COUNTY					
S.R. 302					
STA. 531 + 83.97 TO STA. 532 + 51.05					
DESIGNED	DRAWN	TRACED	CHECKED	REVIEWED	DATE
RAK	RDP	RR	RAK	JH	1-3-84
JOB NO. EM-944					SHEET OF

FHWA REGION	STATE	PROJECT
5	OHIO	

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34

WAY - 302-10.08
ASD- 302-932
PART I

NOTES:

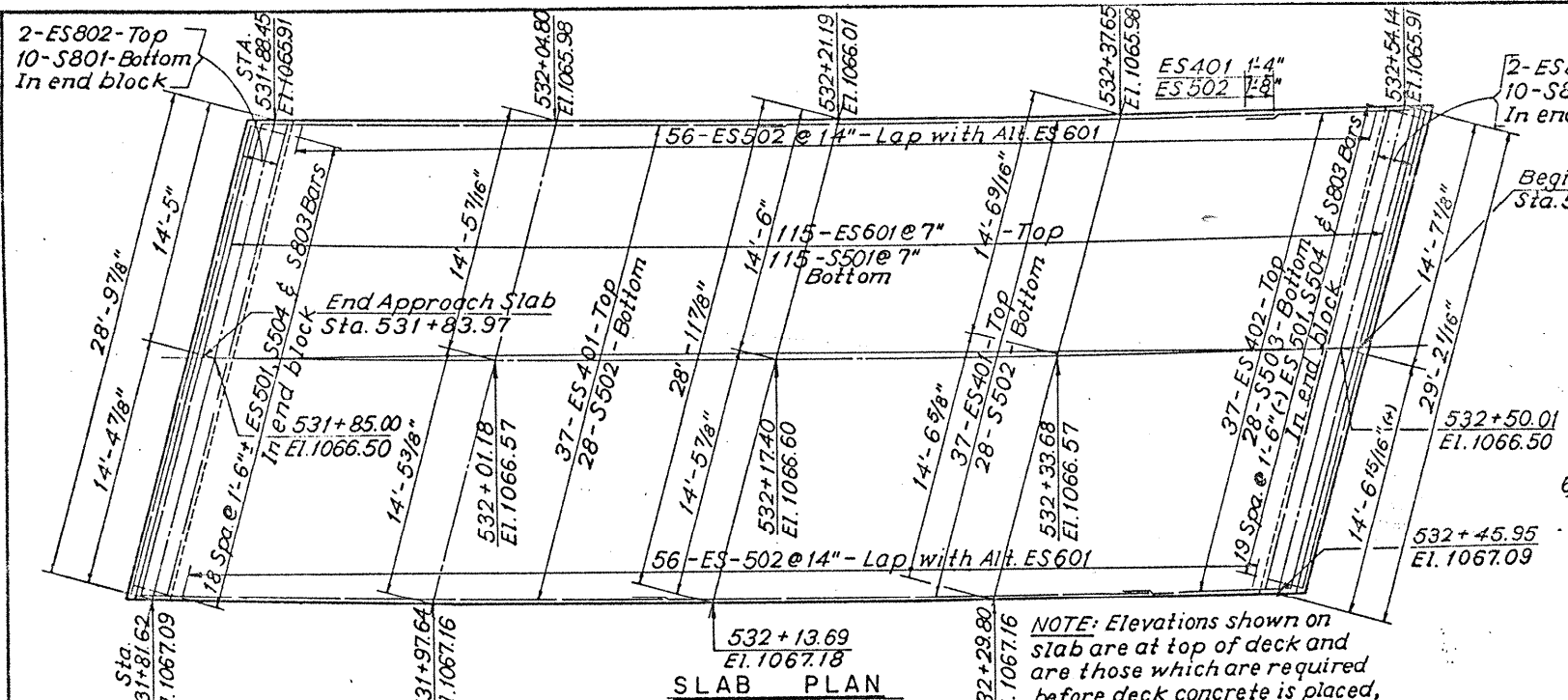
A588 STEEL is to be left unpainted. See CMS 513.221 for cleaning requirements.

INTEGRAL ABUTMENT DETAILS: See Std. Dwg. TS-ICD-1-82, Sheets 3, 4 and 5 of 5. 1 1/4" x 1/4" bolts, nuts and washers may be ASTM A307.

DEEP BEAM BRIDGE GUARD RAIL WITH TUBULAR BACKUP: See Std. Dwg. DBR-2-73

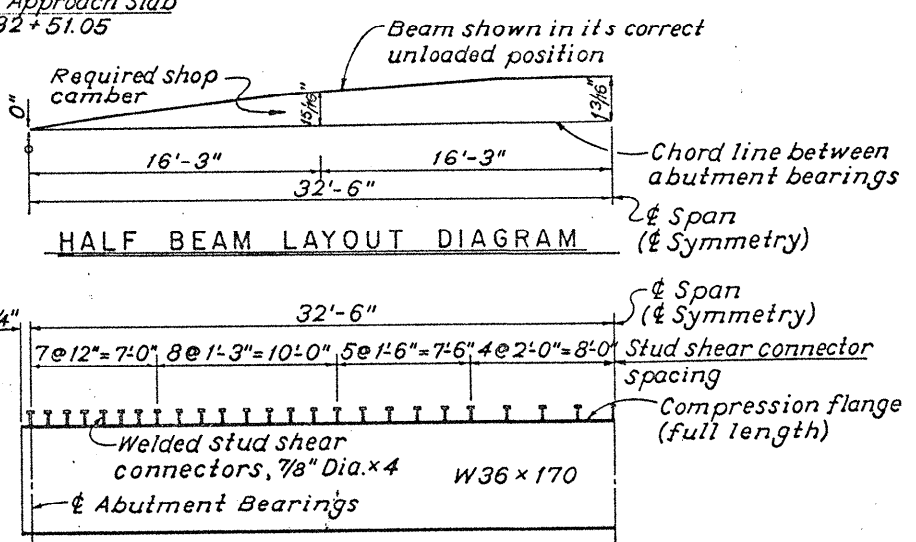
WELDED ATTACHMENT of supports for concrete deck finishing machine may be made to areas of the fascia stringer flanges designated "Compression". Attachments shall not be made to areas designated "Tension". Fillet welds to compression flanges shall be not closer than 1" from edge of flange, be not more than 2" long, and be not smaller than the minimum size required by AASHTO.

Where a shape or plate is designated (CVN) the material shall meet specified minimum notch toughness requirements as specified in 711.01 of CMS.



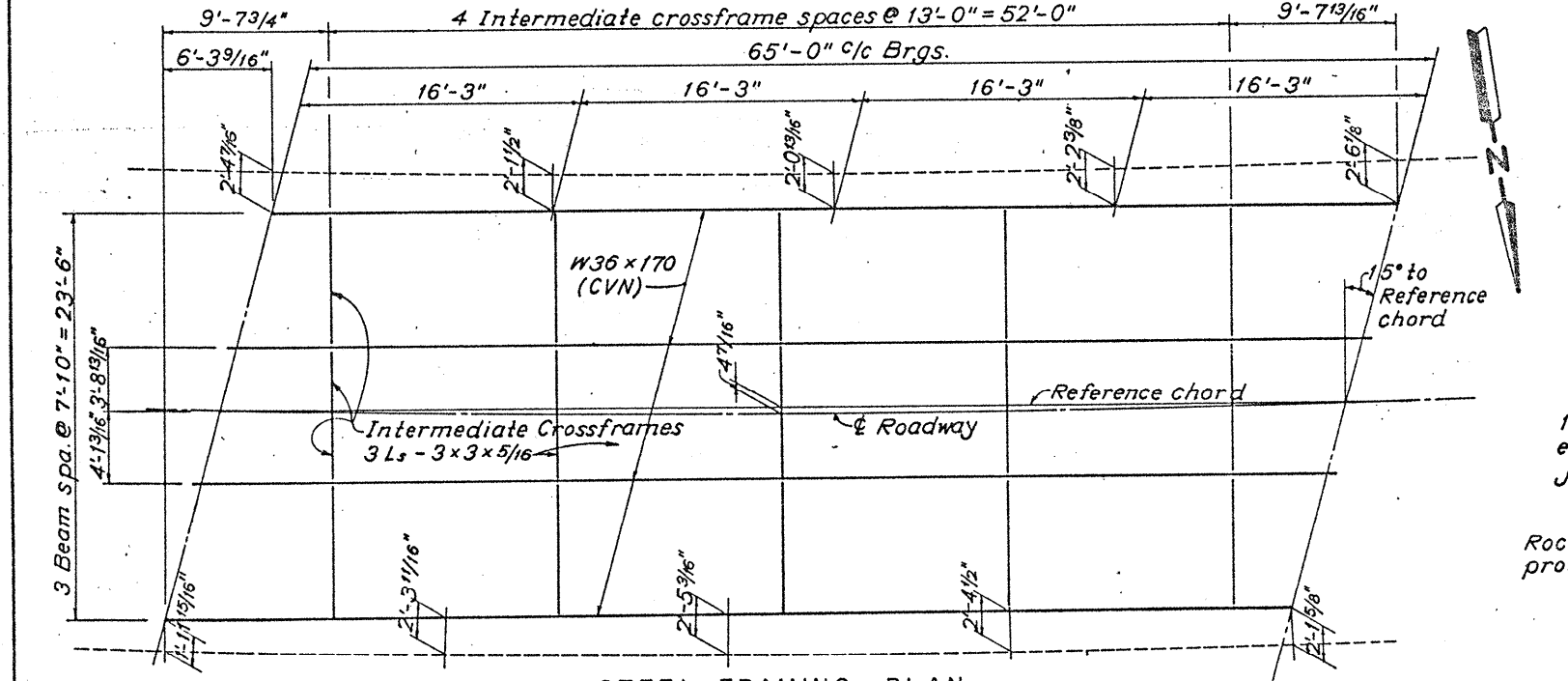
SLAB PLAN

NOTE: Elevations shown on slab are at top of deck and are those which are required before deck concrete is placed, to allow for dead load deflection.

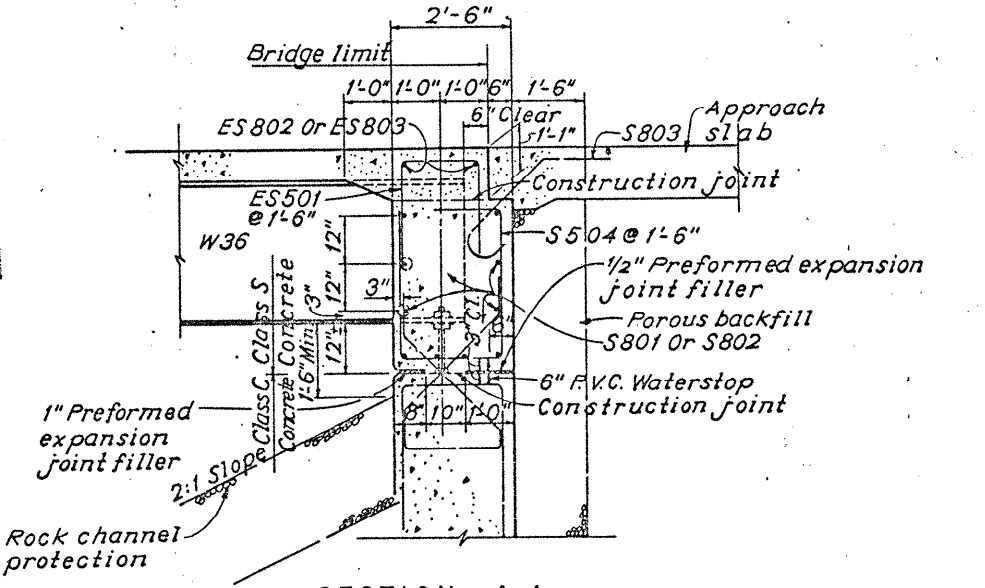


HALF BEAM LAYOUT DIAGRAM

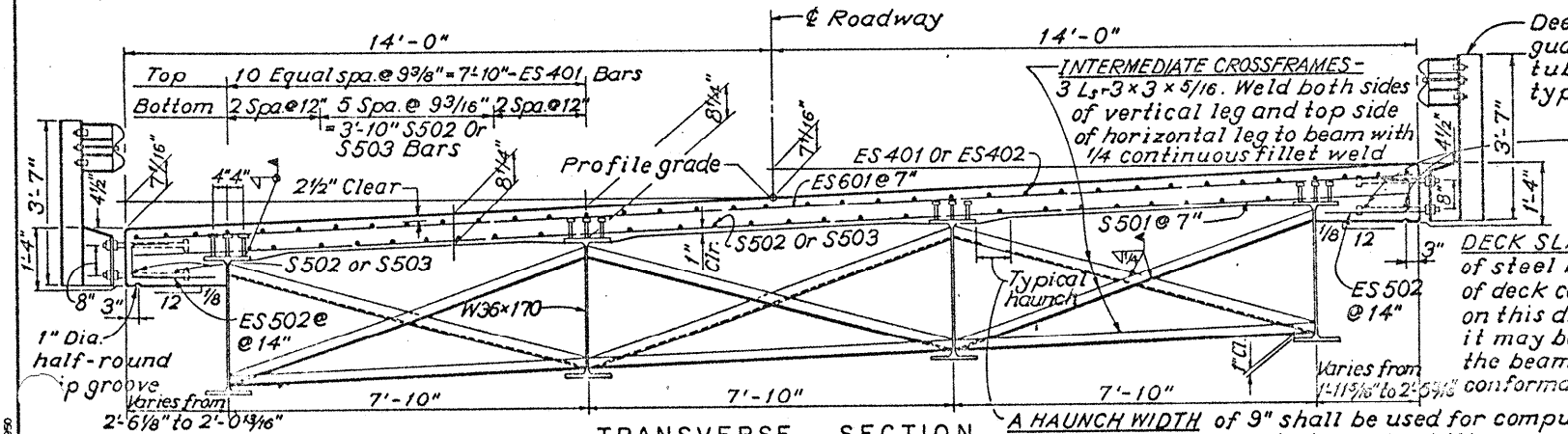
HALF BEAM ELEVATION



STEEL FRAMING PLAN



SECTION A-A



TRANSVERSE SECTION

A HAUNCH WIDTH of 9" shall be used for computing quantity of concrete. However, the haunch width may vary between 6" and 12" (Provided that the slope shall be not more than 1:4 for a haunch less than 9" width).

Deep beam bridge guard rail with tubular back-up, type 2 posts
S502 or S503

DECK SLAB DEPTH: The distance shown from top of deck slab to top of steel beam is the design dimension. The quantity of deck concrete to be paid for shall be based on this dimension, even though deviation from it may be necessary because the top flange of the beam may not have the exact camber or the conformation required to place it parallel to the finished grade.

CAMBER: Beams shall be cambered in accordance with the following:

DEFLECTION AND CAMBER			
	SPAN POINT		
	1/4	3/4	1/2
DEFLECTION DUE TO WEIGHT OF STEEL	3/16"	1/4"	
DEFLECTION DUE TO REMAINING DEAD LOAD	7/8"	1 1/8"	
ADJUSTMENT REQUIRED FOR HORIZONTAL CURVE	-1/8"	-3/16"	
REQUIRED SHOP CAMBER	13/16"	13/16"	

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CONSULTING ENGINEERS - SURVEYORS
MANSFIELD OHIO WOOSTER

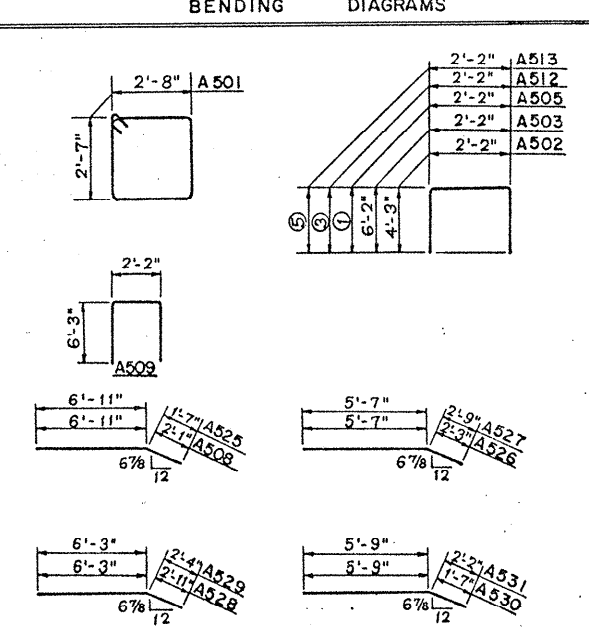
SUPERSTRUCTURE
BRIDGE NO. WAY - 302- 1010
OVER BRANCH OF MUDDY FORK CREEK
WAYNE COUNTY S.R. 302
STA. 531 + 33.97 TO STA. 532 + 51.05

DESIGNED	DRAWN	TRACED	CHECKED	REVIEWED	DATE	REVISED
RAK	RDR	AF	RAK	JH	1-3-84	

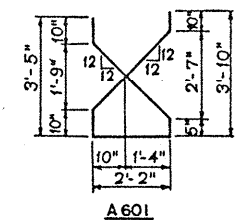
JOB NO. EM - 944 SHEET OF

ABUTMENTS

MARK	NO.	LENGTH	WEIGHT	SHAPE	REAR ABUT.	FWD. ABUT.
A501	66	11'-0"	757	BT.	33	33
A502	44	10'-5"	478	BT.	22	22
A503	24	14'-3"	357	BT.	12	12
A504	12	30'-0"	375	S	6	6
A505	2	8'-0"	42	BT.	1	1
A506	2	8'-0"	17	S	2	2
A507	3	4'-7"	14	S	2	1
A508	1	9'-0"	9	BT.	1	1
A509	7	14'-5"	105	BT.	3	4
A510	6	19'-6"	122	S	6	6
A511	6	20'-0"	125	S	6	6
A512	2	7'-6"	66	BT.	1	1
A513	1	7'-6"	34	BT.	1	1
A514	2	7'-6"	16	S	2	2
A515	2	7'-2"	15	S	2	2
A516	2	7'-8"	16	S	2	2
A517	2	8'-5"	18	S	2	2
A518	2	7'-10"	16	S	2	2
A519	2	6'-10"	14	S	2	2
A520	2	7'-4"	15	S	2	2
A521	2	4'-1"	9	S	1	1
A522	1	3'-11"	4	S	1	1
A523	1	5'-1"	5	S	1	1
A524	1	4'-5"	5	S	1	1
A525	1	8'-6"	9	BT.	1	1
A526	1	7'-10"	8	BT.	1	1
A527	1	8'-4"	9	BT.	1	1
A528	1	9'-2"	10	BT.	1	1
A529	1	8'-7"	9	BT.	1	1
A530	1	7'-4"	8	BT.	1	1
A531	1	7'-11"	8	BT.	1	1
A601	56	10'-9"	904	BT.	28	28
A801	16	30'-0"	1282	S	8	8
A802	4	19'-10"	212	S	4	4
A803	8	20'-4"	434	S	4	4
A804	4	20'-10"	222	S	4	4
TOTAL WEIGHT			5749			

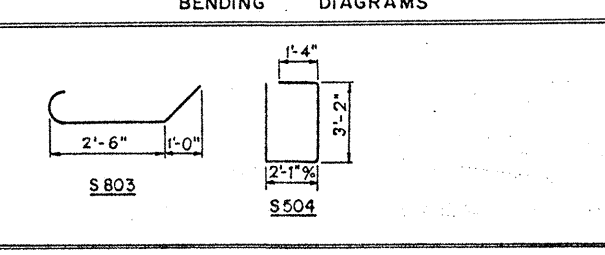


- ① Varies from 1'-8" to 4'-6". Increment = 8 1/2"
- ② Varies from 5'-3" to 10'-11". Increment = 1'-5"
- ③ Varies from 1'-11" to 4'-0 1/2". Increment = 8 1/2"
- ④ Varies from 5'-9" to 10'-0". Increment = 1'-5"
- ⑤ Varies from 2'-1" to 4'-1". Increment = 8"
- ⑥ Varies from 6'-1" to 10'-1". Increment = 1'-4"



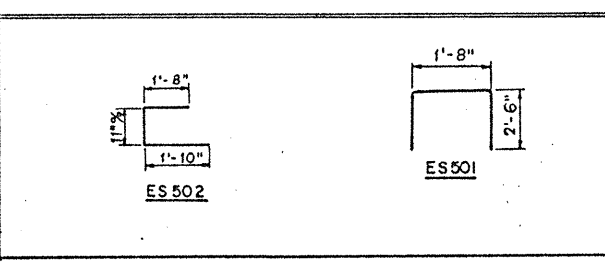
REINFORCING STEEL - SUPERSTRUCTURE

MARK	NO.	LENGTH	WEIGHT	SHAPE
S501	115	28'-6"	3418	S
S502	56	30'-0"	1752	S
S503	28	10'-2"	297	S
S504	39	9'-4"	380	BT.
S801	10	28'-5"	759	S
S802	10	28'-9"	768	S
S803	39	4'-10"	503	BT.
TOTAL WEIGHT			7877	



EPOXY COATED REINFORCING STEEL - SUPERSTRUCTURE

MARK	NO.	LENGTH	WEIGHT	SHAPE
ES401	74	30'-0"	1483	S
ES402	37	9'-6"	235	S
ES501	39	6'-5"	261	BT.
ES502	112	4'-2"	487	BT.
ES601	115	28'-6"	4923	S
ES801	2	28'-9"	154	S
ES802	2	28'-5"	152	S
TOTAL WEIGHT			7695	



NOTE:
 Refer to C.M.S. 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 additional steel spliced in accordance with 509.08.

BRUNING 33950

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SHAFER, JOHNSTON, LICHTENWALTER & ASSOCIATES, INC.
 CONSULTING ENGINEERS - SURVEYORS
 MANZFIELD OHIO WOOSTER

REINFORCING STEEL

BRIDGE NO. WAY - 302 - 1010
 OVER BRANCH OF MUDDY FORK CREEK
 WAYNE COUNTY S.R. 302
 STA. 531 + 83.97 TO STA. 532 + 51.05

DESIGNED RAK	DRAWN RDR	TRACED RAK	CHECKED RAK	REVIEWED JH	DATE 1-3-84	REVISED
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JOB NO. EM-944 SHEET OF

FEDERAL REGION	STATE	PROJECT
5	OHIO	

25
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WAY-302-10.08, ASD-302-932
PART I

ITEM SPECIAL - DRILLED SHAFTS

DESCRIPTION

THIS ITEM SHALL CONSIST OF FURNISHING AND INSTALLING DRILLED SHAFTS OF THE TYPE AND SIZE CALLED FOR BY THE PLANS. THE CONTRACTOR SHALL FURNISH ALL LABOR, MATERIALS, AND APPURTENANCES REQUIRED TO COMPLETE THE WORK AS SPECIFIED. THE LENGTHS OF THE DRILLED SHAFTS SHOWN IN THESE PLANS HAS BEEN ESTIMATED FROM THE AVAILABLE SUBSURFACE INFORMATION. THE CONTRACTOR IS EXPECTED TO FURNISH THE PROPOSED DRILLED SHAFTS AS PER THESE PLAN REQUIREMENTS WITH THE UNDERSTANDING THAT THE ESTIMATED LENGTH SHOWN ON THE PLANS MAY BE DIFFERENT FROM THE LENGTH DETERMINED TO BE NECESSARY AT THE TIME OF CONSTRUCTING THE DRILLED SHAFTS.

THE LIMITS OF EACH DRILLED SHAFT SHALL BE DEFINED AT THE TOP BY THE PLAN ELEVATION AND AT THE BOTTOM BY THE ELEVATION OF THE BOTTOM OF THE BEDROCK SOCKET.

A CASING WILL BE NECESSARY FOR EACH PIER DRILLED SHAFT AND THE CASINGS SHALL BE LEFT IN PLACE. A CASING MAY BE NECESSARY FOR EACH ABUTMENT DRILLED SHAFT. ABUTMENT DRILLED SHAFT CASINGS MAY BE REMOVED PROVIDED ALL PLAN REQUIREMENTS ARE SATISFIED.

CONTRACTOR QUALIFICATION

THE CONTRACTOR SHALL SUBMIT INFORMATION TO DOCUMENT THAT HIS PERSONNEL ARE EXPERIENCED IN THE CONSTRUCTION OF DRILLED SHAFTS OF THE TYPE AND SIZE DESCRIBED BY THE PLANS. THIS INFORMATION SHALL BE SUBMITTED AT THE PRECONSTRUCTION CONFERENCE.

DEVIATION FROM PLAN

THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE COSTS INVOLVED WHEN MAKING CORRECTIONS TO HIS UNAUTHORIZED DEVIATIONS FROM THE PLANS. THE DIRECTOR SHALL DECIDE WHEN CORRECTIONS ARE NECESSARY.

CASING

THE CASINGS SHALL BE MADE OF STEEL AND SHALL BE WATER TIGHT AND SHALL BE OF APLE STRENGTH TO WITHSTAND HANDLING STRESSES AND EXTERNAL SUBSURFACE PRESSURES. THE CASINGS SHALL BE SEATED INTO THE BEDROCK, THUS ATTEMPTING TO SEAL OFF INCOMING WATER, AND THE CASING LENGTH SHALL BE AS NECESSARY TO CONSTRUCT EACH DRILLED SHAFT.

EXCAVATION

EXCAVATION FOR THE DRILLED SHAFTS SHALL BE PERFORMED BY ROTARY DRILLING METHODS USING PRACTICAL METHODS AND MACHINERY ACCEPTABLE TO THE ENGINEER. WHEN OBJECTS SUCH AS LARGE BOULDERS ARE ENCOUNTERED, THEY SHALL BE REMOVED. BLASTING METHODS MAY BE USED ONLY AFTER RECEIVING PERMISSION FROM THE ENGINEER AND WHEN USED SHALL BE SO CONDUCTED AS TO AVOID DISTURBANCE OF THE BEDROCK FORMATION BELOW AND OUTSIDE THE LIMITS OF THE PROPOSED DRILLED SHAFT EXCAVATIONS. THE CONTRACTOR SHALL CARRY LIABILITY INSURANCE AND SHALL COMPLY WITH ALL APPLICABLE FEDERAL, STATE AND LOCAL REGULATION GOVERNING THE USE OF EXPLOSIVES. THE DRILLED SHAFTS SHALL PENETRATE INTO SOLID BEDROCK TO A DEPTH THAT PROVIDES A BEDROCK SOCKET LENGTH THAT IS NOT LESS THAN THE BEDROCK SOCKET LENGTH SHOWN IN THE PLANS. WHEN A CASING IS USED, THE BEDROCK SOCKET SHALL BE MEASURED FROM THE BOTTOM OF THE CASING TO THE BOTTOM OF THE DRILLED BEDROCK EXCAVATION. WHEN THE ENGINEER IS ASSURED THAT A PORTION OF THE METAL CASING IS EMBEDDED IN SOLID BEDROCK, THE EMBEDDED DISTANCE MAY BE INCLUDED AS PART OF THE BEDROCK SOCKET UPON THE DIRECTOR'S CONCURRENCE.

WATERING

THE CONTRACTOR SHALL BE RESPONSIBLE FOR CONTROLLING ANY INCOMING WATER TO THE EXTENT THAT THE SHAFT EXCAVATION IS MAINTAINED DRY ENOUGH FOR PERFORMANCE OF THE REQUIRED INSPECTION OPERATION. THE PREFERRED METHOD OF CONSTRUCTION IS TO PLACE THE CONCRETE IN A CLEAN DRY EXCAVATION. THE CONTRACTOR IS EXPECTED TO MAKE A REASONABLE ATTEMPT TO SEAL WATER OUT OF THE DRILLED SHAFT EXCAVATION.

BOTTOM CLEANOUT

THE BOTTOM OF THE DRILLED SHAFT EXCAVATION SHALL BE AS CLEAN AS PRACTICABLE (NO MORE THAN ONE QUARTER INCH OF LOOSE MATERIAL ON THE BOTTOM) PRIOR TO CONCRETE PLACEMENT. DRILLING SPOILS THAT ADHERE TO THE VERTICAL SIDES OF THE OF THE BEDROCK SOCKET ARE TO BE REMOVED.

PROOF TESTING

THE ENGINEER MAY REQUIRE THE BEDROCK BELOW THE BOTTOM OF THE BEDROCK SOCKET OF EVERY PIER DRILLED SHAFT TO BE CORED TO VERIFY THE INTEGRITY OF THE BEDROCK. MINIMUM REQUIREMENTS ARE ONE PROOF TEST AT ONE OF THE DRILLED SHAFTS AT EACH PIER LOCATION. THIS OPERATION SHALL BE IN ACCORDANCE WITH AND PAID FOR AS PER ITEM SPECIAL - PROOF TESTING.

APPROVAL BEFORE CONCRETE PLACEMENT

THE CONTRACTOR SHALL SUBMIT TO THE PROJECT ENGINEER A WRITTEN REPORT OF STEPS AND PROCEDURES THAT HE PROPOSES TO FOLLOW WHEN PLACING AND MONITORING THE CONCRETE PLACEMENT. CONCRETE SHALL NOT BE PLACED IN ANY DRILLED SHAFT EXCAVATION WITHOUT PRIOR APPROVAL FROM THE ENGINEER. THE DRILLED SHAFT EXCAVATION SHALL BE INSPECTED IMMEDIATELY BEFORE THE CONCRETE IS PLACED. A LIGHT POWERFUL ENOUGH TO THOROUGHLY INSPECT THE SIDES, BOTTOM AND REINFORCING STEEL CAGE OF THE DRILLED SHAFT IS REQUIRED. NO CONCRETE SHALL BE PLACED DURING INCLEMENT WEATHER CONDITIONS WHICH PROHIBIT A THOROUGH INSPECTION.

CONCRETE PLACEMENT

THE CONCRETE FOR THE DRILLED SHAFTS SHALL BE PLACED AS PER 511 EXCEPT AS MODIFIED BY THE PLANS. THE CONCRETE PLACEMENT OPERATION SHOULD BE CONTINUOUS FROM START TO FINISH. THE CONCRETE FOR THE BEDROCK SOCKET SHALL BE PLACED AGAINST THE IN-SITU BEDROCK AND SHALL BE PLACED PROMPTLY AFTER THE FINAL INSPECTION OF THE SHAFT. IF PRACTICABLE, THE CONCRETE SHALL BE PLACED IN A CLEAN DRY EXCAVATION. CARE SHALL BE TAKEN TO ENSURE THAT CONCRETE IS NOT BEING PLACED IN MOVING WATER. THE CONCRETE CAN BE PLACED IN A DRY DRILLED SHAFT EXCAVATION BY THE FREE FALL METHOD PROVIDED THE CONCRETE FALLS TO IT'S FINAL POSITION THROUGH AIR WITHOUT STRIKING THE SIDES OF THE HOLE, THE REINFORCING STEEL CAGE, OR ANY OTHER OBSTRUCTION. THE FREE FALL METHOD ALLOWS THE CONCRETE TO BE DROPPED FROM THE TOP THROUGH A CENTERING CHUTE TO THE CONCRETE'S FINAL POSITION.

IF THE ENGINEER DETERMINES THAT DEWATERING IS NOT PRACTICABLE, THE CONTRACTOR WILL BE GIVEN PERMISSION TO PLACE THE CONCRETE UNDER WATER. TO PLACE CONCRETE UNDER WATER, THE DRILLED SHAFT EXCAVATION SHALL BE FILLED WITH WATER TO SUCH A DEPTH THAT ALL WATER MOTION HAS CEASED, THE CONCRETE SHALL THEN BE PLACED BY MEANS OF A PUMP. THE PUMP EQUIPMENT SHALL BE SO ARRANGED THAT NO VIBRATIONS RESULT WHICH MIGHT DAMAGE FRESHLY PLACED CONCRETE. PIPES CARRYING CONCRETE FROM THE PUMP TO THE SHAFT SHOULD BE LAID OUT WITH A MINIMUM NUMBER OF BENDS. THE PIPE USED TO CONVEY THE CONCRETE TO THE BOTTOM OF THE DRILLED SHAFT EXCAVATION SHALL BE ANCHORED TO THE STEEL CASING TO PREVENT THE PIPE FROM UNDULATING DURING THE INITIAL PLACEMENT OF THE CONCRETE.

THE PUMPING EQUIPMENT SHALL BE SUITABLE IN KIND AND ADEQUATE IN CAPACITY FOR THE WORK REQUIRED. THE USE OF ALUMINUM PIPE AS A CONVEYANCE FOR THE CONCRETE WILL NOT BE PERMITTED. AN ADEQUATE QUANTITY OF GROUT MORTAR OR CONCRETE WITH COARSE AGGREGATE OMITTED SHALL BE PUMPED THROUGH THE EQUIPMENT AHEAD OF THE SPECIFICATION CONCRETE TO PROVIDE LUBRICATION TO THE PUMPING SYSTEM. THE CONCRETE USED FOR LUBRICATION SHALL NOT BE PLACED IN THE SHAFT. THE LUBRICATION PROCESS WILL NOT BE REPEATED AS LONG AS THE PUMPING OPERATIONS ARE CONTINUOUS. THE OPERATION OF THE PUMP SHALL BE SUCH THAT A CONTINUOUS STREAM OF CONCRETE WITHOUT AIR POCKETS IS PRODUCED, IN ORDER TO PREVENT THE CONTAMINATION OF THE CONCRETE PLACED INITIALLY AT THE BOTTOM OF THE SHAFT. THE OUTLET END OF THE PUMPING PIPE SHALL BE SEALED WITH A DIAPHRAGM OR PLUG THAT IS FLUSHED OUT WHEN THE HYDROSTATIC PRESSURE FROM THE COLUMN OF CONCRETE EXCEEDS THAT OF THE WATER IN THE SHAFT. THE INITIAL RATE OF CONCRETE PLACEMENT MUST BE CAREFULLY CONTROLLED SO AS NOT TO LIFT OR DISPLACE THE CAGE OF REINFORCING STEEL. THE CONVEYING SYSTEM SHALL BE WATER TIGHT AND THE OUTLET END SHALL ALWAYS REMAIN WELL BELOW THE TOP OF THE FRESHLY PLACED CONCRETE. THE PREFERRED CONCRETE PLACEMENT PROCEDURE IS TO MAINTAIN THE OUTLET END OF THE PUMPING SYSTEM AT APPROXIMATELY 15 FEET BELOW THE TOP OF THE FRESH CONCRETE. WHEN THE CONCRETE REACHES THE TOP OF THE DRILLED SHAFT COLUMN ALL LAITANCE SHALL BE REMOVED.

ALTERNATE CONSTRUCTION METHODS

THE CONTRACTOR MAY PROPOSE ALTERNATE CONSTRUCTION METHODS WHICH WILL BE APPROVED OR REJECTED BY THE DIRECTOR.

TOLERANCES

THE CONTRACTOR SHALL LOCATE AND CONSTRUCT THE TOP CENTER OF THE PIER DRILLED SHAFTS WITHIN A ONE-INCH RADIUS OF THE POSITION INDICATED BY THE PLANS. THE PIER SHAFTS ARE TO BE INSTALLED VERTICALLY AND MUST BE WITHIN 1.0 PERCENT OF PLUMB FOR THE TOTAL LENGTH OF THE DRILLED SHAFT.

THE TOP CENTER OF THE ABUTMENT DRILLED SHAFTS SHALL BE LOCATED WITHIN A 3 INCH RADIUS OF THE POSITION INDICATED BY THE PLANS. THE ABUTMENT VERTICAL DRILLED SHAFTS ARE TO BE INSTALLED WITHIN 2.0 PERCENT OF PLUMB FOR THE TOTAL LENGTH OF THE DRILLED SHAFTS. THE ABUTMENT BATTERED DRILLED SHAFTS ARE TO BE INSTALLED WITHIN 5.0 PERCENT OF PLAN FOR THE TOTAL LENGTH OF THE DRILLED SHAFTS.

IF A DRILLED SHAFT(S) IS CONSTRUCTED OUTSIDE OF THE PLAN TOLERANCES, THE CONTRACTOR MAY BE SUBJECT TO REDUCED PAYMENT AS DETERMINED BY THE DIRECTOR.

CONCRETE

CONCRETE FOR ALL DRILLED SHAFTS SHALL BE CLASS S CONCRETE AND SHALL BE IN ACCORDANCE WITH 511, EXCEPT AS MODIFIED AND SUPPLEMENTED HEREIN. THE REQUIRED SLUMP IS SIX (6) INCHES, PLUS OR MINUS ONE-HALF INCH. THE MAXIMUM WATER TO CEMENT RATIO SHALL BE 0.50. IF CONCRETE IS PLACED UNDER WATER, THE REQUIREMENT OF ADDING 10 PERCENT MORE CEMENT TO THE CONCRETE MIX SHALL BE WAIVED. THE TOP 5 TO 10 FEET OF THE DRILLED SHAFTS ARE REQUIRED TO BE VIBRATED. ONLY A MINIMAL VIBRATORY EFFORT IS NECESSARY. SPECIAL CARE SHALL BE TAKEN NOT TO OVER-VIBRATE THE DRILLED SHAFT CONCRETE.

REINFORCING STEEL

REINFORCING STEEL SHALL MEET THE REQUIREMENTS OF 509. THE REINFORCING STEEL SHALL BE GRADE 60. THE SPIRAL REINFORCING STEEL MAY BE PLAIN BARS ASTM A62 OR A615. THE REINFORCING STEEL SHALL BE COMPLETELY ASSEMBLED PRIOR TO PLACEMENT AND THE LENGTH SHALL BE AS NECESSARY TO CONSTRUCT EACH DRILLED SHAFT.

INSPECTION

THE CONTRACTOR SHALL PROVIDE AND MAINTAIN SUITABLE MEANS FOR ACCESS AND SAFE DESCENT INTO ALL DRILLED SHAFT EXCAVATIONS THAT ARE PROTECTED BY A CASING AND HAVE A DIAMETER THAT IS LARGE ENOUGH TO ALLOW A PERSON TO SAFELY ENTER AND PERFORM THE REQUIRED INSPECTION. ACCESS CAN BE PROVIDED BY A POSITIVE FORWARD AND REVERSE HYDRAULIC WINCH OR A POWER-UP AND POWER-DOWN HOIST ON A CRANE. THE METHOD CHOSEN FOR ENTERING AND LEAVING THE SHAFT SHALL BE CONVENIENT, SAFE AND NOT UNCOMFORTABLE FOR THE USER. THE CONTRACTOR SHALL ALSO PROVIDE PROTECTIVE CLOTHING FOR USE BY THOSE MAKING AN INSPECTION OF THE SHAFT.

SMALL DIAMETER AND/OR UNCASED DRILLED SHAFT EXCAVATIONS SHALL BE INSPECTED AS THOROUGHLY AS PRACTICABLE.

A CHART HAS BEEN INCLUDED WITH THE PLANS ON SHEET 8 OF 8 AND SHALL BE COMPLETED BY THE ENGINEER. THE CONTRACTOR SHALL PROVIDE ALL NECESSARY EQUIPMENT NEEDED TO OBTAIN THE MEASUREMENTS FOR COMPLETING THE CHART AND THE CONTRACTOR SHALL ASSIST THE ENGINEER IN OBTAINING THESE MEASUREMENTS. MEASUREMENTS SHALL BE OBTAINED PRIOR TO PLACING CONCRETE.

THE ENGINEER SHOULD OBTAIN PHOTOGRAPHS OF THE CONTRACTOR'S CONSTRUCTION PROCEDURES.

SAFETY PROVISIONS

THE CONTRACTOR SHALL HAVE AT THE JOB SITE ALL EQUIPMENT AND MATERIALS NEEDED TO PROVIDE SAFE CONSTRUCTION AND INSPECTION OF THE DRILLED SHAFTS AS REQUIRED BY CITY, STATE AND FEDERAL SAFETY REQUIREMENTS.

SAFETY PROVISIONS SHALL INCLUDE, BUT NOT BE LIMITED TO, THE REQUIREMENTS SPECIFIED BY THE PLANS, SPECIAL PROVISIONS, AND PROPOSAL.

THE CONTRACTOR SHALL PROVIDE CONTINUOUS SURVEILLANCE OF ALL PERSONS IN THE PIER DRILLED SHAFT EXCAVATION. AT ALL TIMES WHEN A PERSON IS IN THE PIER DRILLED SHAFT EXCAVATION, PROVISION SHALL BE MADE FOR PUMPING FRESH AIR TO SAID PERSON. ALL LIGHTING SHALL BE WITH ELECTRIC LIGHTS. MECHANICAL EQUIPMENT USED INSIDE THE SHAFT SHALL BE OPERATED BY AIR OR ELECTRICITY. THE USE OF GASOLINE ENGINES OR OTHER TYPES OF EQUIPMENT PRODUCING FUMES THAT MAY ENTER THE EXCAVATION WILL NOT BE PERMITTED. THE CONTRACTOR SHALL PROVIDE GAS DETECTION AND OXYGEN ANALYZERS, AND SHALL TEST THE DRILLED-IN PIER COLUMN EXCAVATION ATMOSPHERE QUALITATIVELY THROUGHOUT THE COLUMN'S ENTIRE LENGTH AND ASSURE THAT THE QUANTITIES OF GASES AND OXYGEN PRESENT ARE IN SAFE AMOUNT AND SAFE PROPORTIONS PRIOR TO PERMITTING ANY PERSON TO ENTER THE SHAFT.

METHOD OF MEASUREMENT

THE LENGTH OF EACH DRILLED SHAFT TO BE PAID FOR SHALL BE THE COMPLETED AND ACCEPTED LENGTH, MEASURED ALONG THE AXIS OF THE DRILLED SHAFT FROM THE BOTTOM OF THE BEDROCK SOCKET TO THE PROPOSED TOP ELEVATION, AS PER PLAN. THE REINFORCING STEEL THAT PROJECTS FROM THE DRILLED SHAFT INTO THE PIER COLUMN OR THE ABUTMENT FOOTING AS SPECIFIED BY THE PLANS IS INCLUDED WITH THE DRILLED SHAFT FOR PAYMENT BUT SHALL NOT BE INCLUDED IN THE MEASURED LENGTH OF THE DRILLED SHAFT.

BASIS OF PAYMENT

PAYMENT FOR FURNISHING AND INSTALLING DRILLED SHAFTS WILL BE MADE AT THE CONTRACT UNIT PRICE PER LINEAR FOOT OF ACCEPTED SHAFTS AS PER ITEM SPECIAL DRILLED-SHAFTS, WHICH SHALL INCLUDE ALL LABOR, MATERIALS, AND EQUIPMENT NECESSARY TO COMPLETE THE ITEM AS SPECIFIED.

6/8

SHAFER, JOHNSTON, LICHTENWALDER & ASSOCIATES, INC.				
CONSULTING ENGINEERS - SURVEYORS				
MANSFIELD		OHIO		WOOSTER
DRILLED SHAFT NOTES				
BRIDGE NO. WAY - 302 - 1010				
OVER BRANCH OF MUDDY FORK CREEK				
WAYNE COUNTY S. R. 302				
STA. 531 + 03.97 TO STA. 532 + 51.05				
DESIGNED	DRAWN	TRACED	CHECKED	REVIEWED
RAK	RDR	RAK	JH	1-31-84
JOB NO. EM-944				SHEET OF

FHWA REGION	STATE	PROJECT	
5	OHIO		

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WAY - 302-10.08
ASD - 302-932
PART I

DESIGN PARAMETERS

THE DESIGN LOAD TO BE SUPPORTED BY EACH DRILLED SHAFT IS 62.3 TONS, WHICH IS ASSUMED TO BE RESISTED BY SHAFT ADHESION WITHIN A PORTION OF THE BEDROCK SOCKET AND ALSO BY SHAFT AND END BEARING PRESSURE. THE ALLOWABLE BEDROCK SOCKET ADHESION IS ONE TON PER SQUARE FOOT WHICH IS ASSUMED TO ACT ALONG THE BOTTOM TWO (2) FEET OF THE BEDROCK SOCKET. THE ALLOWABLE END BEARING PRESSURE IS 20 TONS PER SQUARE FOOT.

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SHAFER, JOHNSTON, LICHTENWALTER & ASSOCIATES, INC. CONSULTING ENGINEERS - SURVEYORS MANSFIELD OHIO WOOSTER					
DRILLED SHAFT NOTES BRIDGE NO. WAY - 302 - 1010 OVER BRANCH OF MUDDY FORK CREEK WAYNE COUNTY S.R. 302 STA. 531 + 83.97 TO STA. 532 + 51.05					
DESIGNED RAK	DRAWN RDR	TRACED RAK	CHECKED RAK	REVIEWED JH	DATE 1-31-84
JOB NO. EM-944			SHEET OF		

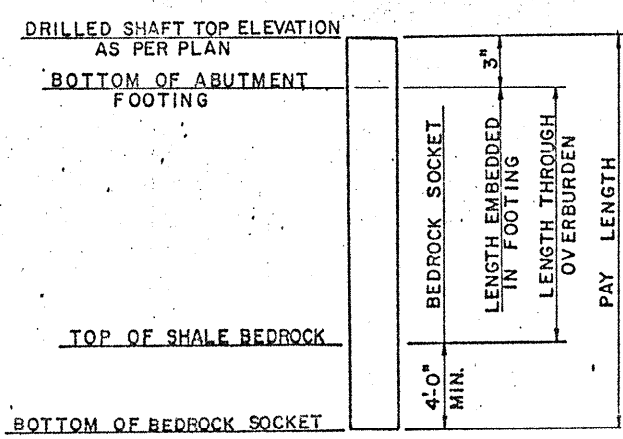
INSPECTION RECORD FOR DRILLED SHAFTS

BRIDGE NO. _____	GENERAL CONTRACTOR _____	TYPE & MODEL OF DRILLING MACHINERY _____	TYPE OF CONCRETE PUMP _____	COST PER LINEAL FOOT _____
LOCATION _____	DRILLING CONTRACTOR _____	MAX. CONTINUOUS TORQUE _____ FT.-LB.	HOSE DIAMETER _____ INCHES	ABUT. DRILLED SHAFTS _____
PROJECT NO. _____	PROJECT ENGINEER _____	CROWD (MAX. CONTINUOUS DOWNWARD FORCE) _____ LBS.	CAPACITY _____ CU.FT./MIN.	

SUBSTRUCTURE		DATE AND TIME OF DRILLING		APPROX. ELEVATION OF TOP OF OVER BURDEN	UNDER-REAM BASE DIAMETER	LENGTH OF DRILLED SHAFTS			OBSTRUCTIONS ENCOUNTERED		UNDER REAMS			LENGTH OF CASING (FEET)	CASING GAUGE OR THICKNESS	REINFORCING STEEL				CONCRETE				TOLERANCES (INCH)		SHAFT DIA.	REMARKS
																VERTICAL		SPIRAL		SLUMP TEST RESULT (INCH.)	CYLINDER STRENGTH (P.S.I.)	AIR TEMP (F)	TIME NEEDED TO PLACE CONCRETE (HR.)	QUANTITY (CU. YD.)	DEVIATION FROM PLUMB OR PLAN BATTER		
ABUT.	LOCATION OR NUMBER	STARTED	FINISHED		EMBEDDED IN FOOTING	THROUGH OVER BURDEN TO TOP OF UNDER-REAM	PAY LENGTH	NUMBER	SIZE (INCH.)	APPROX. ELEVATION OF TOP OF UNDER-REAMS	APPROX. ELEV. OF BOTT. OF UNDER-REAMS	LENGTH OF UNDER-REAMS (FEET)	BAR SIZE NO.	NO. OF REBARS	BAR SIZE NO.	PITCH (INCH)										N-S	E-W

PROJECT ENGINEER COMMENTS

METHOD OF CONSTRUCTION



NOTE:
"WHEN INSPECTION RECORD IS COMPLETE SUBMIT A COPY TO THE BUREAU OF BRIDGES"

STATE OF OHIO
DEPARTMENT OF TRANSPORTATION
BUREAU OF BRIDGES AND STRUCTURAL DESIGN

DRILLED SHAFTS

BRIDGE NO. WAY - 302-1010
OVER BRANCH OF MUDDY FORK CREEK
WAYNE COUNTY
STA. 531+83.97 TO STA. 532+51.05

DESIGNED: RLE, DRAWN: RLE, TRACED: GFT, CHECKED: CKT, REVIEWED: DATE: 8-20-81