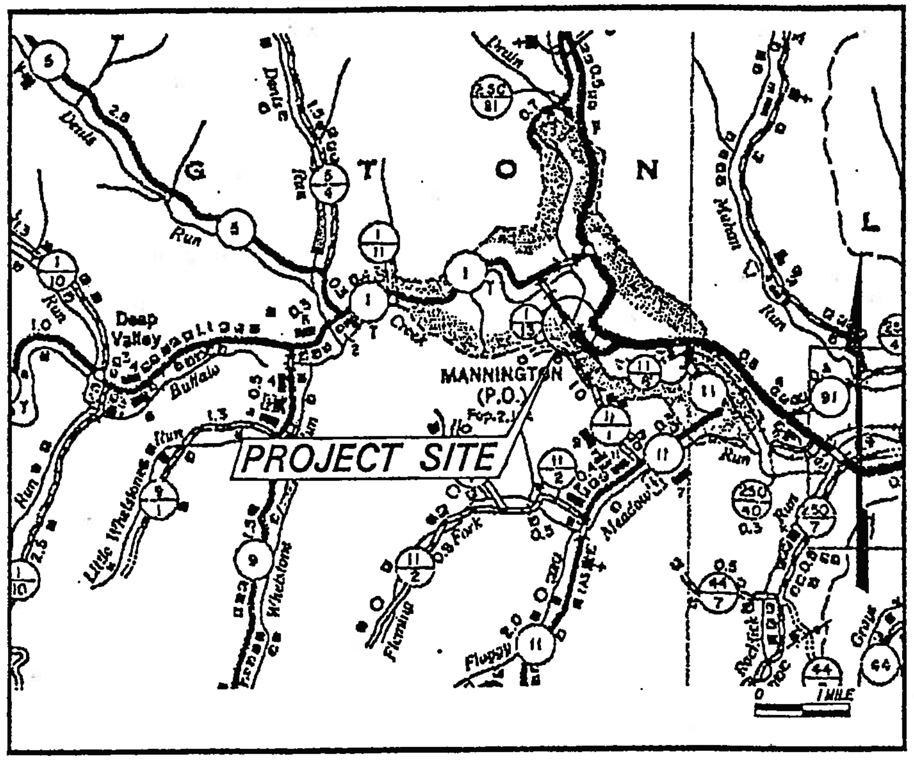
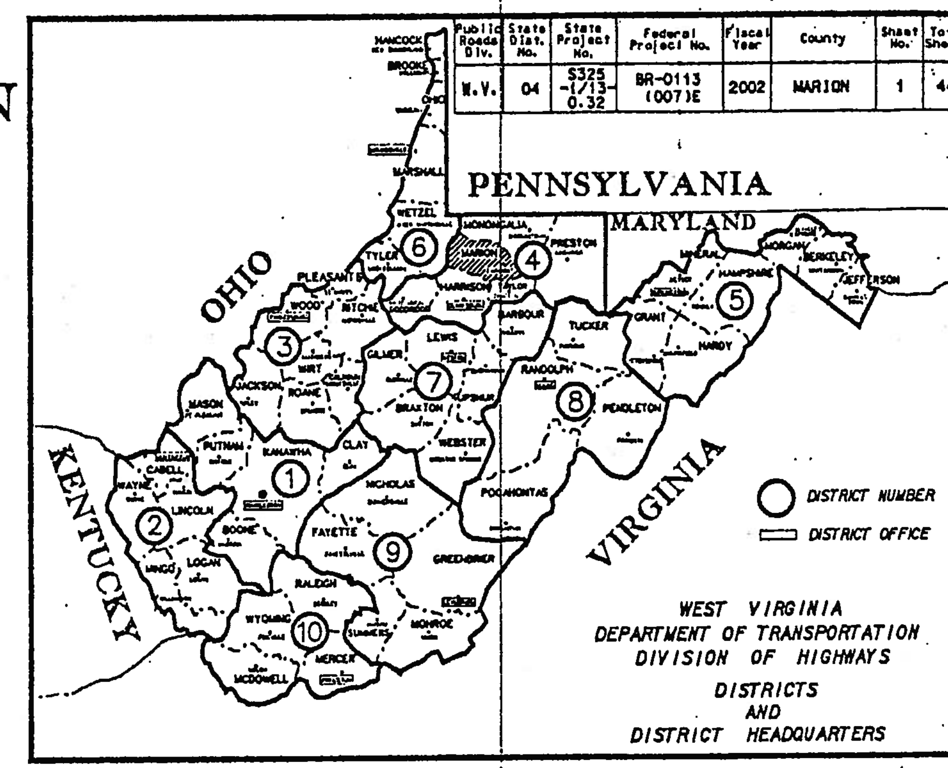
WEST VIRGINIA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
PLANS FOR CONSTRUCTION
OF
STATE HIGHWAY





Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	Fiscal Year	County	Sheet No.	Total Sheets
W.V.	04	S325 -1/13- 0.32	BR-0113 (007)E	2002	MARION	1	44

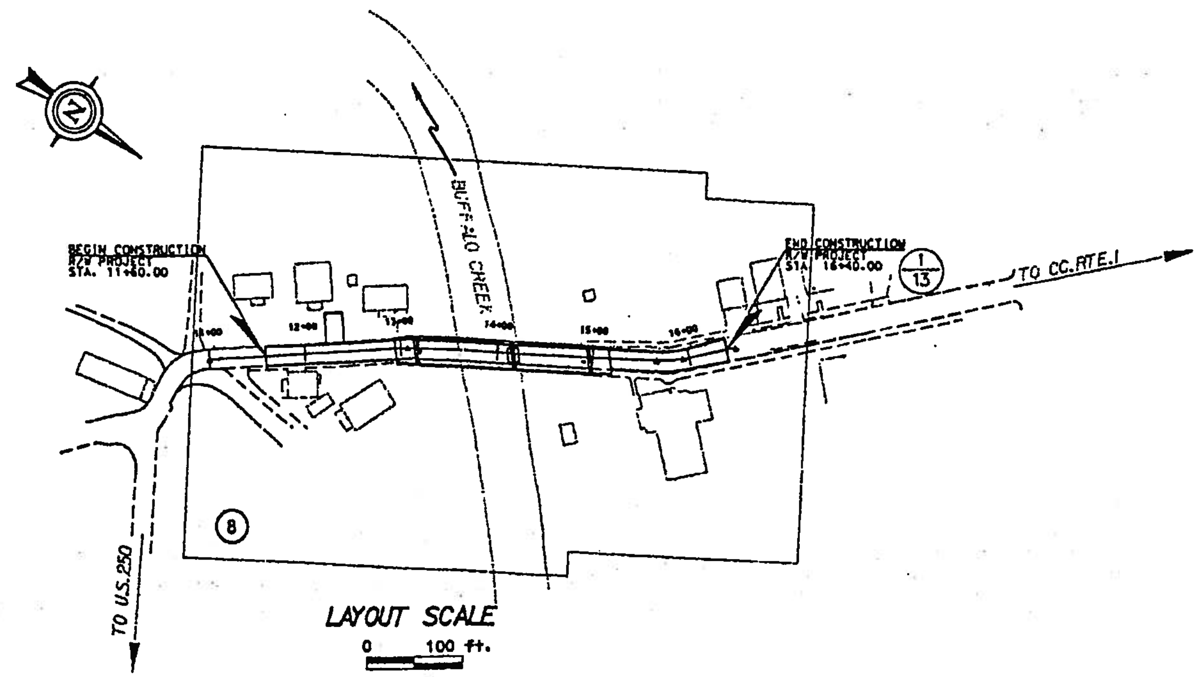
FEDERAL PROJECT NO. BR-0113(007)E
STATE PROJECT NO. S325-1/13-0.32
CO. ROUTE NO. 1/13
MANNINGTON DISTRICT
MARION COUNTY

BOWERS BRIDGE

	Station	Station	ft.	mile (s)
Roadway	11+60.00	to 13+14.48	=154.48	=0.03
Bridge	13+14.48	to 14+97.51	=183.03	=0.03
Roadway	14+94.52	to 16+40.00	=145.48	=0.03
		Total Project Length	=480	=0.09

UTILITIES
ALLEGHENY POWER
VERIZON INC.
HOPE GAS
CITY OF MANNINGTON (SEWER, WATER)

TYPE OF CONSTRUCTION
GRADE, DRAIN, PAVE, BRIDGE #10060



LAYOUT SCALE
0 100 ft.

SCALES
PLAN HOR. 0 20 ft.
PROFILE VERT. 0 5 ft.
HOR. 0 20 ft.

DESIGN DESIGNATION	
A.D.T. (2000)	= 500
A.D.T. (2020)	= 700
D.H.V.	= 91
D	= 60/40
T	= 6%
V	= 25 M.P.H.

CONVENTIONAL SIGNS
STATE LINE
COUNTY LINE
CORPORATION LINE
PROPOSED R/W LINE
PROPERTY LINE
EXISTING FENCE
PROPOSED FENCE
EDGE OF STREAM
PROPOSED GUARD RAIL
EXISTING GUARD RAIL
RAILROAD
GAS LINE
WATER LINE
TELEPHONE LINE
ELECTRIC LINE
TELEPHONE POLE
POWER POLE
COMBINED POWER AND TELEPHONE POLE
TREE
SHRUB
RIGHT OF WAY MARKER

INDEX TO SHEETS

NO.	DESCRIPTION
1	TITLE SHEET
2	TYPICAL SECTIONS
3	GENERAL NOTES & SUMMARY OF QUANTITIES
4	QUANTITY TABLES
5	COORDINATE GEOMETRY & REFERENCE POINTS
6	MAINTENANCE OF TRAFFIC
7	WATERLINE RELOCATION SPECIAL DETAIL
8	PLAN SHEET
9	PROFILE SHEET
10-30	BRIDGE #10060 PLANS
31-44	CROSS SECTION SHEETS

REVISION NUMBER	SHEET NUMBER	REVISIONS	DATE	BY
1	30A	ADDED SHEET	7/18/02	D.H.
1	8	CHANGE IN NOTE	6/17/02	D.H.

March 8th 2002
I HEREBY CERTIFY THAT THIS IS A CORRECT COPY OF THE PLANS OF PROJECT S325-1/13-0.32 BR-0113(007)E
EXECUTIVE SECRETARY

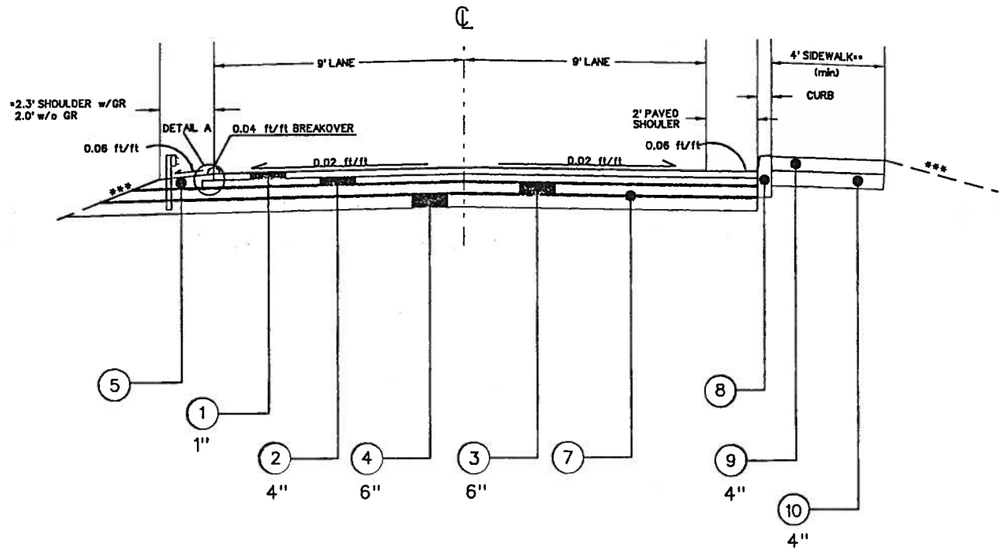
NOTES: STANDARD DETAIL BOOK VOL. I DATED JANUARY 1, 2000 & VOLUME II DATED JANUARY 1, 1994, SHALL APPLY TO THIS PROJECT.

DARRIN HOLMES REGISTERED No. 14863 STATE OF WEST VIRGINIA PROFESSIONAL ENGINEER

RECOMMENDED: DESIGNER
RECOMMENDED FOR APPROVAL: STATE HIGHWAY ENGINEER
APPROVED: COMMISSIONER OF HIGHWAYS

PROJECT NO. S325-1/13-0.32, BR-0113(007)E

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	Fiscal Year	County	Sheet No.	Total Sheets
W.V.	04	S325-1/13-0.32	BR-0113 (007)E	2002	MARION	2	44



* LEFT SHOULDER VARIES IN WIDTH BEFORE AND AFTER BRIDGE. SEE CROSS SECTIONS.

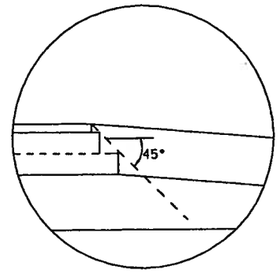
** SIDEWALK TAPERS (15:1) TO 5' WIDTH FROM STA. 12+10 TO STA. 12+25.
5' SIDEWALK FROM STA. 12+25 TO STA. 16+11.74.
SIDEWALK TAPERS (10:1) FROM STA. 16+11.74 TO EXISTING WIDTH AT STA. 16+40.

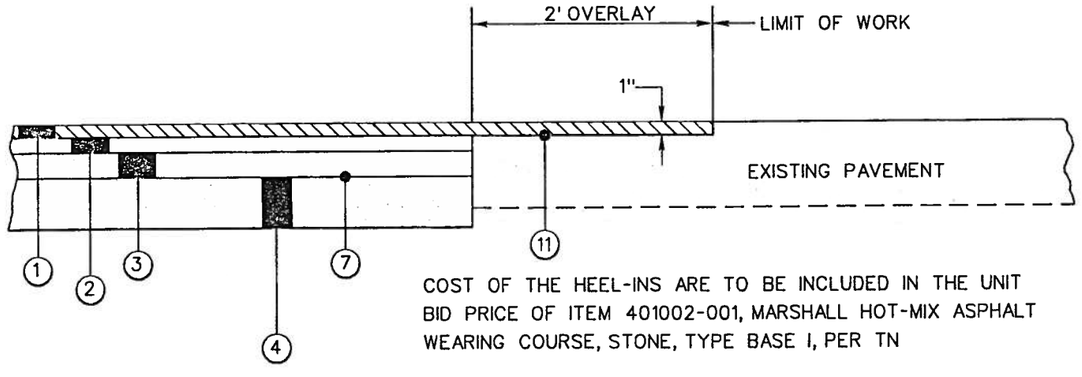
*** SEE CROSS SECTIONS FOR SLOPES

LEGEND

(1) ITEM 401002-001 MARSHALL HOT-MIX ASPHALT WEARING COURSE, STONE, TYPE BASE I, PER TN
(2) ITEM 401001-001 MARSHALL HOT-MIX ASPHALT BASE COURSE, STONE, TYPE BASE I, PER TN
(3) ITEM 307001-000 AGGREGATE BASE COURSE, CLASS I, PER CY
(4) ITEM 207002-000 SUBGRADE, PER CY
(5) ITEM 307001-000 AGGREGATE BASE COURSE, CLASS III, PER CY
(7) ITEM 207034-000 FABRIC FOR SEPARATION, PER SY
(8) ITEM 610001-001 PLAIN CONCRETE CURBING, TYPE I, PER LF
(9) ITEM 609001-001 CONCRETE SIDEWALK, PER SY
(10) ITEM 609002-001 BED COURSE MATERIAL, PER CY
(11) ITEM 408002-001 BITUMINOUS MATERIAL, PER GA

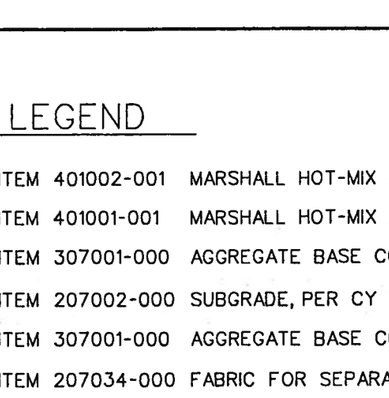
DETAIL A





COST OF THE HEEL-INS ARE TO BE INCLUDED IN THE UNIT BID PRICE OF ITEM 401002-001, MARSHALL HOT-MIX ASPHALT WEARING COURSE, STONE, TYPE BASE I, PER TN

HEEL-IN DETAIL



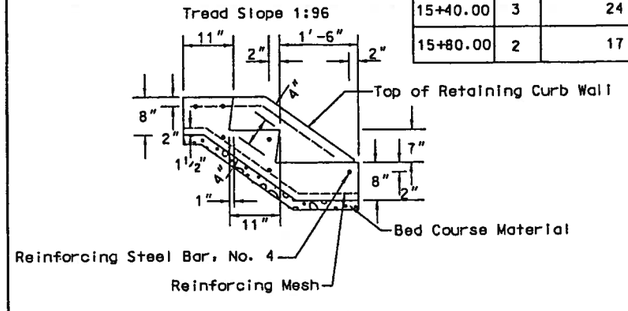
CONCRETE STEPS

Notes

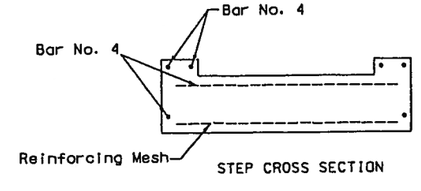
A. Due to the small amount of each item all items necessary for construction of steps shall be included in bid item for Class "B" concrete (Item 601002-001).

B. Round all exposed edges and corners to ⅜" radius

Station	Steps	Reinforcing Steel Bar (LB)	Reinforcing Mesh (SY)	Class B Concrete (CY)	Bed Course Material (CY)
15+40.00	3	24	1.6	0.4	0.1
15+80.00	2	17	1.2	.25	0.1



SECTION A-A



STEP CROSS SECTION

REVISION NUMBER	SHEET NUMBER	REVISION	DATE	BY

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

TYPICAL SECTIONS

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	Fiscal Year	County	Sheet No.	Total Sheets
W.V.	4	U320 -1/13- 0.32	BR-0113 (007)E	2002	MARION	3	44

GENERAL NOTES

GOVERNING SPECIFICATIONS

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION, DIVISION OF HIGHWAYS, STANDARD SPECIFICATIONS ROADS AND BRIDGES, ADOPTED 2000 AND THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION, DIVISION OF HIGHWAYS SUPPLEMENTAL SPECIFICATION DATED JULY 1, 2000. THE CONTRACT DOCUMENTS AND THE CONTRACT PLANS ARE THE GOVERNING PROVISIONS APPLICABLE TO THIS PROJECT.

PLUGGING EXISTING DRAINAGE STRUCTURES

THE COST OF PLUGGING EXISTING DRAINAGE PIPES WILL BE INCLUDED IN THE QUANTITY FOR ITEM 201001-000 CLEARING AND GRUBBING.

EXISTING SIDEWALK REMOVAL

THE COST OF REMOVING THE EXISTING SIDEWALK FROM APPROX. STA. 14+90 LEFT TO STA. 16+00 LEFT WILL BE INCLUDED IN THE QUANTITY FOR ITEM 201001-000 CLEARING AND GRUBBING.

ITEM 670014-001 & ITEM 670016-001

ANY WATER PIPE NEEDED FOR THE RELOCATION OF THESE TWO ITEMS WILL BE INCLUDED IN THE COST OF THE ITEMS THEMSELVES.

ITEM 675018-001

THE MANHOLE AJUSTMENT IS APPROXIMATELY A 4 FOOT INCREASE IN DEPTH. ADJUSTMENT WILL BE PERFORMED ACCORDING TO THE STANDARD SPECIFICATIONS WITH THE GUIDANCE OF THE STANDARD DETAILS FOR THE TYPE A MANHOLE. DEVIATIONS FROM THESE STANDARDS MAY BE REQUIRED AND ARE TO BE APPROVED BY THE FIELD ENGINEER.

GAS LINE AND STORM WATER PIPE INTERSECTION

EXCAVATION AROUND THE EXISTING GAS LINE AT STA. 14+46.47, 22' LEFT, MUST BE PERFORMED CAUTIOUSLY. THE CONTRACTOR WILL BE RESPONSIBLE IN THE EVENT OF A RUPTURE DURING EXCAVATION. ELEVATIONS OF THE GAS LINE HAVE BEEN NOTED ON THE PLAN SHEET. DOMINION HOPE GAS WILL PLACE STAKES IN THIS AREA LOCATING THE LINE PRIOR TO CONSTRUCTION.

ROADWAY

ITEM NO.	ITEM DESCRIPTION		QUANTITY	UNITS
201001-000	CLEARING AND GRUBBING		LS	LS
201002-000	EXISTING PAVEMENT REMOVAL		746.4	SY
204001-000	MOBILIZATION		LS	LS
207001-001	UNCLASSIFIED EXCAVATION		151.2	CY
207002-000	SUBGRADE		100.0	CY
207034-000	FABRIC FOR SEPARATION		575.4	SY
211001-000	UNCLASSIFIED BORROW EXCAVATION		206.6	CY
307001-000	AGGREGATE BASE COURSE, CLASS I		96.0	CY
307005-001	AGGREGATE BASE COURSE, STONE, CLASS X		17.7	TN
408002-001	BITUMINOUS MATERIAL		3	GA
502001-012	12 INCH PORTLAND CEMENT CONCRETE APPROACH SLAB		122	SY
601002-001	CLASS B CONCRETE		5	CY
602001-001	REINFORCING STEEL BAR		41	LB
604001-016	18 INCH METALLIC COATED CORRUGATED STEEL PIPE, A2		251	LF
604001-020	24 INCH METALLIC COATED CORRUGATED STEEL PIPE, A2		97.75	LF
605001-001	TYPE A MANHOLE		3	EA
605004-001	TYPE B INLET		5	EA
607001-001	TYPE 1 GUARDRAIL, CLASS I		68.75	LF
609001-001	CONCRETE SIDEWALK		174.4	SY
609002-001	BED COURSE MATERIAL		46.6	CY
610001-001	PLAIN CONCRETE CURBING, TYPE I		50	LF
636011-001	TRAFFIC CONTROL DEVICE		2080	UN
638002-001	RIGHT OF WAY MARKER		21	EA
639001-001	CONSTRUCTION LAYOUT STAKE		LS	LS
640005-001	MINIMAL FIELD OFFICE		8	MO
642004-002	SEED MIXTURE, B		4.2	LB
642005-002	MULCH, WOOD CELLULOSE FIBER		0.03	TN
642006-001	FERTILIZER		0.02	TN
642031-001	DITCH CHECK		2	EA
652001-001	AGRICULTURAL LIMESTONE		0.06	TN
652002-001	FERTILIZER, 10-20-10		0.02	TN
652003-001	SEED MIXTURES, B.C-1, OR C-2		4.2	LB
652004-001	STRAW OR HAY MULCH		0.09	TN
670014-001	RELOCATE FIRE HYDRANT		1	EA
670016-001	RELOCATE METER		2	EA
675018-001	ADJUSTING MANHOLE		1	EA
401001-001	MARSHALL HOT-MIX ASPHALT BASE COURSE, STONE, TYPE BASE I	AA1	140.4	TN
401001-002	MARSHALL HOT-MIX ASPHALT BASE COURSE, SLAG, TYPE BASE I	AA2	134.0	TN
401002-001	MARSHALL HOT-MIX ASPHALT WEARING COURSE, STONE, TYPE BASE I	BB1	62.5	TN
401002-002	MARSHALL HOT-MIX ASPHALT WEARING COURSE, SLAG, TYPE BASE I	BB2	59.7	TN

BRIDGE #10060, RETAINING WALL

ITEM NO.	ITEM DESCRIPTION	QUANTITY	UNITS
203001-000	DISMANTLING STRUCTURE	LS	LS
211002-000	ROCK BORROW EXCAVATION	321	CY
212001-000	STRUCTURE EXCAVATION	80	CY
212002-000	WET EXCAVATION	84	CY
212005-000	SELECT MATERIAL FOR BACKFILLING	45	CY
601002-001	CLASS B CONCRETE	110	CY
601003-001	CLASS K CONCRETE	215	CY
602001-001	REINFORCING STEEL BAR	12325	LB
602002-001	EPOXY COATED REINFORCING STEEL BAR	41102	LB
615001-001	STEEL SUPERSTRUCTURE	LS	LS
616005-006	HP 12X53 STEEL BEARING FILE, PRE-DRILLED AND DRIVEN	195	LF
617003-001	ALUMINUM RAILING	193	LF
639001-001	CONSTRUCTION LAYOUT STAKE	LS	LS

REVISION	SHEET			

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

GENERAL NOTES & SUMMARY OF QUANTITIES

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	Fiscal Year	County	Sheet No.	Total Sheets
W.V.	04	U320 -1/13- 0.32	BR-0113 1007)E	2002	MARION	4	44

GRADING SUMMARY

LOCATION		TOTAL UNCLASS. EXCAV. ITEM 207001-001	UNSUIT. EXCAV.	USABLE EXCAV.	SHRINK OR SWELL	ADJUST. EXCAV.	UNCLASS. EMBANK.	SELECT EMBANK.	TOTAL EMBANK.	EXCESS(+) OR BORROW(-)	REMARKS
STATION	STATION	C.Y.	C.Y.	C.Y.	C.Y.	C.Y.	C.Y.	C.Y.	C.Y.	C.Y.	
11+60.00	16+40.00	151.2	0	151.0	.15	128.3	303.9	0	303.9	-175.6	
TOTAL											

*BORROW COMPUTATIONS

SELECT EMBANKMENT REQUIRED (FROM TABLE "GRADING SUMMARY") = 0

SELECT EMBANKMENT AVAILABLE (FROM TABLE "PROBABLE SOURCE OF SELECT EMBANKMENT") = 0

SELECT EMBANKMENT NEEDED = 0

ROCK BORROW REQUIRED TO MEET S.E. REQUIREMENTS WITH 15% SWELL :

ITEM 211002-000, ROCK BORROW EXCAVATION = $\frac{\text{S.E. NEEDED}}{1+0.15}$ = 0

UNCLASS. EMBANKMENT REQUIRED (FROM TABLE "GRADING SUMMARY") = 303.9

ADJUSTED EXCAVATION (FROM TABLE "GRADING SUMMARY")-S.E. AVAILABLE (FROM TABLE "PROBABLE SOURCE OF S.E.") = 128.3

EMBANKMENT NEEDED = 175.6

EXCAVATION REQUIRED TO MEET EMBANK. REQUIREMENTS WITH 15% SHRINK:

ITEM 211001-000, UNCLASSIFIED BORROW EXCAVATION = $\frac{\text{EMBANK. NEEDED}}{1-0.15}$ = 206.6

PIPE CULVERT SUMMARY

LOCATION		SKEW	TYPE 604001-XXX	PIPE DESC.	18"	24"			REMARKS
STATION	STATION				L.F.	L.F.	L.F.	L.F.	
11+62.83	12+50.17		016	CMP	87.5				TYPE B INLET/TYPE B INLET
12+51.83	13+01.36	32°3'48"	016	CMP	58.5				TYPE B INLET/MANHOLE
13+06.50	13+03.60		016	CMP	9.75				TYPE B INLET/MANHOLE
13+05.00	13+24.50		020	CMP		22.25			MANHOLE/HEADWALL
15+78.00	15+78.00		016	CMP	23.25				TYPE B INLET/MANHOLE
15+75.69	15+04.00		016	CMP	70.75				MANHOLE/MANHOLE
15+02.00	15+02.00		016	CMP	11.25				TYPE B INLET/MANHOLE
15+00.00	14+24.78		020	CMP		75.50			MANHOLE/HEADWALL
Total					251.00	97.75			

GUARDRAIL

LOCATION		ITEM 607001-001				ITEM 607065-001		REMARKS
		CLASS I		CLASS II		F.E.T.		
STATION	STATION	LEFT	RIGHT	LEFT	RIGHT	LEFT	RIGHT	
12+76.00	13+05.52	31.25						BUFFERED END, THRIE BEAM
15+03.35	15+40.46	37.50						THRIE BEAM, BUFFERED END
TOTAL			68.75					

PAVING QUANTITIES

LOCATION		LENGTH	ITEM 401002-001 PRIN. STONE OR GRAVEL	ITEM 401002-002 ALT. SLAG	ITEM 401001-001 PRIN. STONE OR GRAVEL	ITEM 401001-002 ALT. SLAG	ITEM 307001-000 AGG. BASE CRS CLASS I	ITEM 207034-000 FABRIC FOR SEPARATION	ITEM 207002-000 SUBGRADE	ITEM 307005-001 AGG. BASE CRS CLASS X	ITEM 408002-001 BITUMINOUS MATERIAL	REMARKS
STATION	STATION		TON	TON	TON	TON	C.Y.	S.Y.	C.Y.	TON	GAL.	
11+60.00	16+40.00	480	62.5	59.7	140.4	134.0	96.0	575.4	100.0	17.7	3	408002-001 NEEDED ON THE SEAT FOR APPROACH SLABS ALSO.
TOTAL			62.5	59.7	140.4	134.0	96.0	575.4	100.0	17.7	3	

CONCRETE SIDEWALK

LOCATION		LENGTH		WIDTH	ITEM 609001-001 CONC. SIDEWALK	ITEM 609002-001 B. COURSE MATERIAL	REMARKS
STATION	STATION	LEFT	RIGHT	FT.	S.Y.	C.Y.	
11+60.00	13+14.48		154.48	VARIES	77.4	21.5	
14+94.52	16+40.00		145.48	VARIES	85.9	23.9	
16+00.00	16+20.00	20.00		VARIES	11.1	1.2	
TOTAL			299.96		174.4	46.6	

PLAIN CONCRETE CURBING

LOCATION		LENGTH		TYPE	REMARKS
STATION	STATION	LEFT	RIGHT		
11+60.00	12+10.00		50.00	1	
TOTAL			50.00		

*CLEARING & GRUBBING

LOCATION		AREA	AREA	REMARKS
STATION	STATION	S.F.	ACRES	
11+60.00	13+00.00	6239	0.14	
14+90.00	16+40.00	4635	0.11	
TOTAL		10874	0.25	

*SEEDING & MULCHING

LOCATION		AREA	AREA	REMARKS
STATION	STATION	S.F.	ACRES	
11+60.00	13+00.00	1134	0.03	
14+90.00	16+40.00	320	0.01	
TOTAL		1908	0.04	

RIGHT OF WAY MARKERS

STATION	OFFSET (ft)		REMARKS
	LEFT	RIGHT	
11+60.00		15	
12+42.83	15		
12+42.92	30		
12+11.75		17	
12+20.50		27	
13+20.38	30		
12+61.75		29	
12+81.94		22	
12+85.47		30	
13+20.00		20	
13+20.34		30	
13+20.00		20	
14+89.65		20	
15+66.71	30		
15+80.00	20		
14+91.92		30	
15+80.00		21	
16+40.00	20		
16+40.00	15		
16+40.00		20	
16+40.00		15	
TOTAL		21	

INLETS/HEADWALLS

STATION	TYPE 'B' INLET		HEADWALL		CLASS 'B' CONC.	TYPE 'A' MANHOLES	
	LT.	RT.	LT.	RT.	C.Y.	LT.	RT.
11+62.00		9.0					
12+51.00		10.0					
13+06.40	10.2						
13+03.00						22.2	
13+24.50			23.9		2.20		
15+78.00		10.0					
15+78.00						16.0	
15+02.00	10.0						
15+02.00						24.0	
14+24.78			21.3		2.20		
TOTAL		5		2	4.40		3

TEMPORARY POLLUTION CONTROL

LOCATION		ITEM 642004-002 SEED MIXTURE B	ITEM 642005-002 MULCH, WOOD CELLULOSE FIBER	ITEM 642006-001 FERTILIZER	ITEM 642031-001 DITCH CHECKS
STATION	STATION	LB	TON	TON	EA
11+60.00	16+40.00	4.2	0.03	0.02	2

SEEDING & MULCHING

LOCATION		ITEM 652001-001 AGRI-CULTURAL LIMESTONE	ITEM 652002-001 FERTILIZER 10-20-10	ITEM 652003-001 SEED MIXTURE B	ITEM 652004-001 STRAW OR HAY MULCH
STATION	STATION	TON	TON	LB.	TON
11+60.00	16+40.00	0.06	0.02	4.2	0.09

*FOR INFORMATION ONLY

REVISION NUMBER	SHEET NUMBER	REVISION	DATE	BY

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

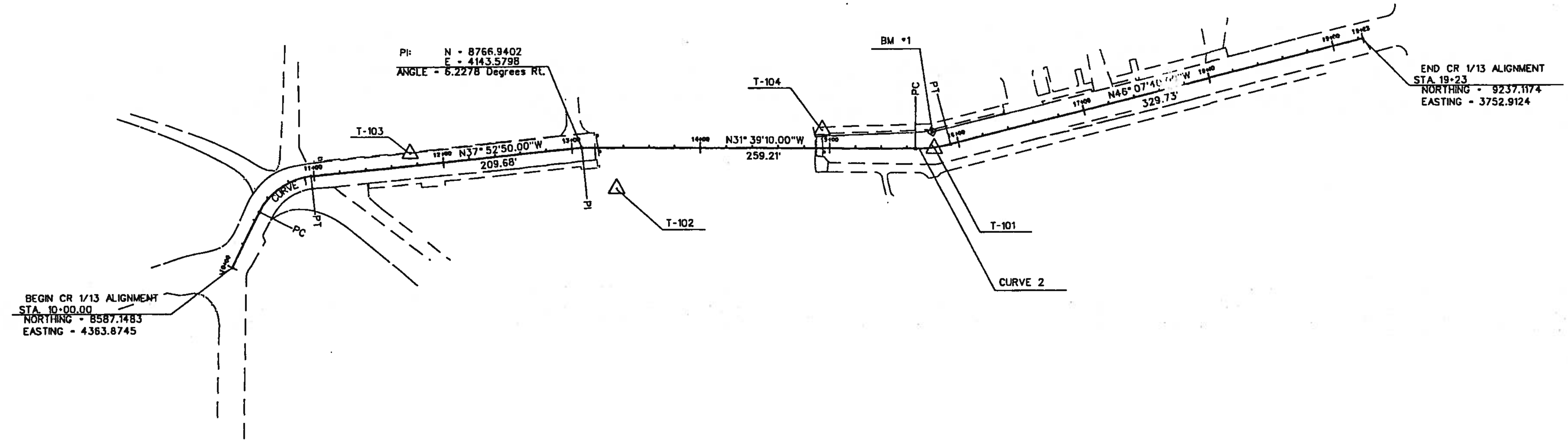
QUANTITY TABLES

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	Fiscal Year	County	Sheet No.	Total Sheets
W.V.	04	S325 -1/13- 0.32	BR-0113 (007)E	2002	MARION	5	44

BENCH MARK DESCRIPTIONS

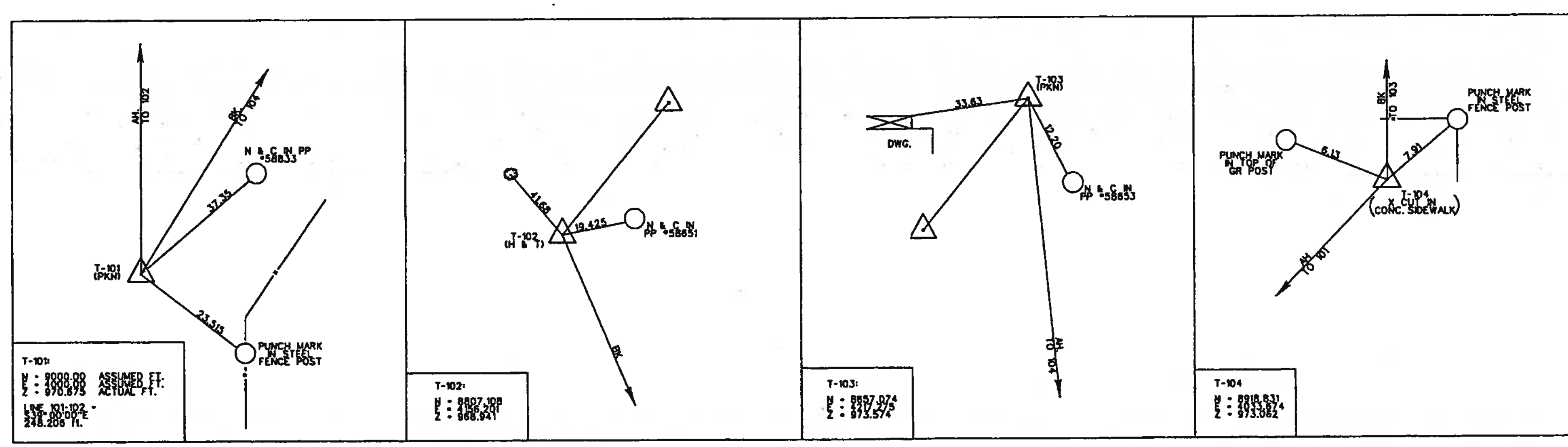
A54. ELEV. = 974.51 ft. STANDARD DISK STAMPED "A54 1935" SET IN TOP OF CONCRETE MONUMENT PROJECTING 9" ABOVE GROUND IN YARD ON SOUTHEAST CORNER OF HIGH STREET AND TANNERY ROAD.

BM #1 ELEV. = 970.485 ft. CHISELED BM SYMBOL IN CONCRETE CURB ON SOUTHWEST SIDE OF HIGH STREET ON NORTHWEST SIDE OF BUFFALO CREEK.



MAINLINE CURVE DATA

	STATION	NORTHING	EASTING
CURVE 1			
Curve Set Type: Circular			
PI ( )	10+74.95	8579.62	4289.30
PC ( )	10+47.30	8582.40	4316.81
CC ( )		8632.14	4311.79
PT ( )	10+97.81	8601.44	4272.33
Total Central Angle:	57°53'10.00" Right		
1st Subtangent Distance:	27.65		
2nd Subtangent Distance:	27.65		
External:	7.14		
Radius:	50.00		
Delta:	57°53'10.00"		
Length:	50.52		
Degree of Curvature(Arc):	114°35'30.00"		
Tangent:	27.65		
Chord:	48.39		
Middle Ordinate:	6.24		
External:	7.14		
CURVE 2			
Curve Set Type: Circular			
PI ( )	15+80.31	8999.17	4000.42
PC ( )	15+66.71	8987.59	4007.55
CC ( )		8931.39	3916.39
PT ( )	15+93.76	9008.60	3990.61
Total Central Angle:	14°28'30.00" Left		
1st Subtangent Distance:	13.60		
2nd Subtangent Distance:	13.60		
External:	0.86		
Radius:	107.09		
Delta:	14°28'30.00"		
Length:	27.06		
Degree of Curvature(Arc):	53°30'00.00"		
Tangent:	13.60		
Chord:	26.98		
Middle Ordinate:	0.85		
External:	0.86		



SCALE : 0 50 ft.

REVISION NUMBER	SHEET NUMBER	REVISION	DATE	BY

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

COORDINATE GEOMETRY & REFERENCE POINTS

PUBLIC ROADS DIV.	STATE DIST. NO.	STATE PROJECT NO.	FEDERAL PROJECT NO.	FISCAL YEAR	COUNTY	SHEET NO.	TOTAL SHEETS
W.V.	04	S325 -1/13- 0.32	BR-0113 (007)E	2002	MARION	6	44

MAINTENANCE OF TRAFFIC SUMMARY			
ITEM NO.	DESCRIPTION	QUANTITY	
		UNIT	TOTAL
636002-001	AGGREGATE FOR MAINTAINING TRAFFIC, STONE OR GRAVEL	TON	
636002-002	AGGREGATE FOR MAINTAINING TRAFFIC, SLAG	TON	
636003-001	BITUMINOUS MATERIAL FOR DUST PALLATIVE	GAL	
636004-001	CALCIUM CHLORIDE FOR DUST PALLATIVE	TON	
636005-001	TEMPORARY STRUCTURES FOR MAINTAINING TRAFFIC	LS	
636006-001	PILOT TRUCK AND DRIVER	DAY	
636007-001	ERADICATION OF PAVEMENT MARKINGS	LF	
636008-001	TEMPORARY PAVEMENT MARKINGS - PAINT 4 IN SOLID LINE	LF	
636009-001	TEMPORARY PAVEMENT MARKINGS - TAPE 4 IN SOLID LINE	LF	
636010-001	TEMPORARY RAISED PAVEMENT MARKERS, TYPE	EACH	
636011-001	TRAFFIC CONTROL DEVICE	UNIT	2,080
636012-010	PROJECT TRAFFIC CONTROL DEVICE CLEANING	EACH	
636013-001	INDIVIDUAL TRAFFIC CONTROL DEVICE CLEANING	EACH	
636014-001	FLAGGER	HOUR	
636014-002	TRAFFIC DIRECTOR	HOUR	
636015-001	TEMPORARY GUARDRAIL CHANNELIZATION DEVICE	LF	
636017-001	TEMPORARY CONCRETE BARRIER	LF	
636017-002	DOH FURNISHED TEMPORARY CONCRETE BARRIER	LF	
636018-001	REMOVE AND RESET TEMPORARY CONCRETE BARRIER	LF	
636018-002	REMOVE AND RESET DOH FURNISHED TEMP. CONCRETE BARRIER	LF	
636019-001	TEMPORARY GUARDRAIL BARRIER	LF	
636020-001	REMOVE AND RESET TEMPORARY GUARDRAIL BARRIER	LF	
636021-001	ELECTRIC ARROW	DAY	
636022-001	CHANGEABLE MESSAGE SIGN	DAY	
636023-001	TEMPORARY TRAFFIC SIGNAL	LS	
636024-001	TEMPORARY PIPE FOR MAINTAINING TRAFFIC	LF	
636025-001	WARNING LIGHTS, TYPE A	DAY	
636025-001	WARNING LIGHTS, TYPE B	DAY	
636025-001	WARNING LIGHTS, TYPE C	DAY	
636026-001	TEMPORARY LIGHTING	LS	
636028-001	SHADOW VEHICLE	DAY	
636041-001	TUBULAR MARKER, INITIAL INSTALLATION	EACH	
636042-001	TUBULAR MARKER, REPLACEMENT	EACH	
664001-008	IMPACT ATTENUATING DEVICE, TYPE IV	EACH	
664001-009	REMOVE AND RESET G.R.E.A.T. ATTENUATOR DEVICE	EACH	

MAINTENANCE OF TRAFFIC NOTES

1. MAINTENANCE OF TRAFFIC SHALL BE IN ACCORDANCE WITH SECTION 636 OF THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION, DIVISION OF HIGHWAYS STANDARD SPECIFICATIONS FOR ROADS AND BRIDGES ADOPTED 2000, THE SUPPLEMENTAL SPECIFICATIONS ADOPTED JULY 1, 2001, CONTRACT DOCUMENTS AND THE CONTRACT PLANS ARE THE GOVERNING PROVISIONS APPLICABLE TO THIS PROJECT. M.O.T. SHALL ALSO BE IN ACCORDANCE WITH THE MANUAL TRAFFIC CONTROL FOR STREET AND HIGHWAY CONSTRUCTION AND MAINTENANCE OPERATIONS ADOPTED NOV 1994, WHICH IS MADE A PART OF THIS CONTRACT AND THE TRAFFIC PLAN FOR INDIVIDUAL SEGMENTS AS DESCRIBED BELOW:
2. THE QUANTITIES OF TRAFFIC CONTROL DEVICES HAVE BEEN INCREASED BY 15 PERCENT FOR USE AS DIRECTED BY THE ENGINEER WHEN UNANTICIPATED CHANGES IN THE TRAFFIC CONTROL PLAN OCCUR.
3. REFLECTIVE SHEETING ON TEMPORARY TRAFFIC CONTROL DEVICES SHALL BE OF NEW CONDITION AT BEGINNING OF THE PROJECT LIFE. NIGHT VISIBILITY AND LEGIBILITY SHALL BE MAINTAINED.
4. ACCESS TO ALL HOUSES AND BUSINESSES SHALL BE MAINTAINED AT ALL TIMES.

SEQUENCE OF CONSTRUCTION

UTILIZE CASE A3 (WITHOUT TYPE "B" LIGHTS) WHILE CONSTRUCTING NEW BRIDGE.
USE TYPE III BARRICADES WITH "BRIDGE CLOSED" SIGNS ON BOTH APPROACHES.
PLACE "ROAD WORK AHEAD" SIGN AT APPROXIMATELY 11+60.00 AND 16+40.00.

TRAFFIC CONTROL DEVICES QUANTITIES				
DEVICE	DESCRIPTION	VALUES IN UNITS	QUANTITIES	TOTAL UNITS
x 1	SIGNS ON PORTABLE MOUNTS AND BARRICADES (TOTAL SIGN AREA 16 SQ. FT. OR GREATER)	170		
x 2	SIGNS ON PORTABLE MOUNTS AND BARRICADES (TOTAL SIGN AREA LESS THAN 16 SQ. FT.)	80	4	320
x 3	SIGNS ON PERMANENT POSTS (TOTAL SIGN AREA 16 SQ. FT. OR GREATER)	180	6	1,080
x 4	SIGNS ON PERMANENT POSTS (TOTAL SIGN AREA LESS THAN 16 SQ. FT.)	90		
x x 5	BARRICADES - TYPE I	35		
x x 6	BARRICADES - TYPE II	60		
x x 7	BARRICADES - TYPE III	90	4	360
x x 8	DRUMS	60		
9	CONES	5	10	50
10	VERTICAL PANELS OR GROUND MOUNTED DELINEATORS	10		
11	BARRIER OR GUARDRAIL MOUNTED DELINEATORS (TO BE BID INCIDENTAL TO THE COST OF THE BARRIER OR GUARDRAIL)	0		
x x 12	TEMPORARY OVERLAYS AND TEMPORARY OVERSIZE SIGNS	300		
		SUBTOTAL		1,810
		15% OF SUBTOTAL (TO BE USED AT THE DIRECTION OF THE ENGINEER)		270
		TOTAL		2,080

x - ORANGE SIGN SHEETING TO BE REFLECTIVE FLOURESCENT ORANGE - TYPE V

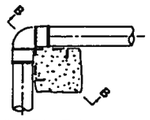
x x - BARRICADES AND DRUM SHEETING TO BE 6" FLEXIBLE HIGH INTENSITY, TYPE IV

REVISION NUMBER	SHEET NUMBER	REVISION	DATE	BY

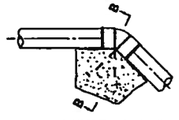
MAINTENANCE OF TRAFFIC

D:\Users\Default\BOWERS\buffalo.mot dholmes 07-MAR-2002 09:28 TRAFFIC ENGINEERING DIVISION

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	Fiscal Year	County	Sheet No.	Total Sheets
W.V.	4	S325 -1/13- 0.32	BR-0113 (007)E	2002	PRESTON	7	44

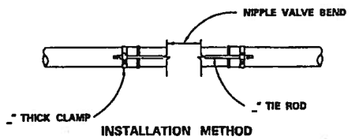


90° BEND (VERTICAL) INSTALLATION METHOD

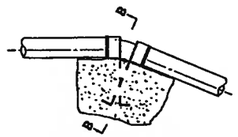


45° BEND (VERTICAL) INSTALLATION METHOD

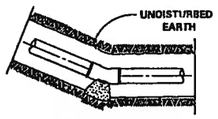
SECTION B-B



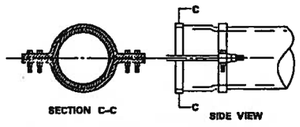
INSTALLATION METHOD TYPE I CLAMP



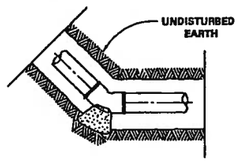
11 14° and 22 12° BEND (VERTICAL) INSTALLATION METHOD



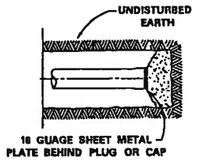
11 14° and 22 12° BEND



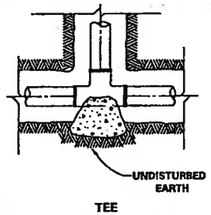
CLAMP & TIE RODS



45° BEND



PLUG OR CAP



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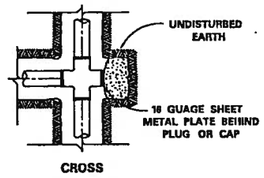
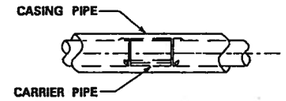


CROSS

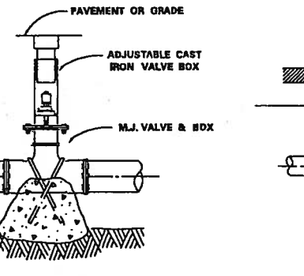


CASING SCHEDULE

CARRIER PIPE TYPE	CASING PIPE TYPE	CARRIER PIPE SIZES 2"	3"	4"	6"	8"	10"
CL 150	STEEL	DN 6"	DN 8"	DN 8"	DN 10"	DN 1'	DN 1'-4"
SDR 26	PVC	6"	8"	8"	10"	1'-3"	1'-3"
CL 200	STEEL	DN 6"	DN 8"	DN 8"	DN 10"	DN 1'	DN 1'-4"
SDR 21	PVC	6"	8"	8"	10"	1'-3"	1'-3"
C-900	STEEL	———	———	DN 10"	DN 1'	DN 1'-2"	DN 1'-4"
	PVC	———	———	10"	1'	1'-3"	1'-6"
ASTM D 3034 SDR 35	STEEL	———	———	DN 8"	DN 10"	DN 1'	DN 1'-4"
ASTM F 794 ULTRA-RIB	STEEL	———	———	———	———	DN 1'-2"	DN 1'-4"

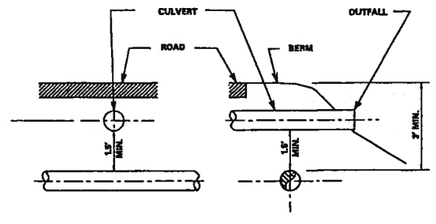
DN = DIAMETER NOMINAL

CASING



FIRE HYDRANT WITH TAPPING VALVE

GATE VALVE



CULVERT CROSSING

NOTES

The product of the height and length dimensions selected for any thrust block shall be equal to or greater than the required soil bearing area. The minimum area in any situation shall be one square foot.

The values of required soil bearing area are based on an allowable soil pressure (Sa) of 2000 psf in undisturbed earth. If a lower grade of soil is encountered, the soil bearing area must be increased as directed by the Engineer.

The table values are not applicable if soil support of the thrust blocks is interrupted by excavation or a downward sloping ground line in the vicinity behind the blocks.

If the design pressure is between the table values, the required soil bearing area for the next higher design pressure shall be used.

For design pressure exceeding 200 psig, the required soil bearing area shall be 2.01 x square inches area of the pipe x the design pressure x sin Δ/2 + 2000.

Thrusting faces of blocks shall be centered on bends horizontally.

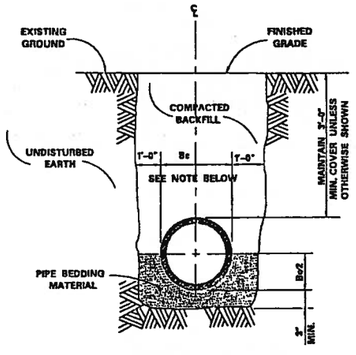
Concrete shall conform to the requirements of 670.4.3 or 715.12 of the Specifications. Reinforcing steel shall conform to 709.1 of the Specifications. The cost of concrete and steel in these thrust blocks shall be included in the cost of various pipe bid items.

With pipe lines with Design Pressure less than 100 psig the reinforcement can be 6"x6"–6x6 gage Welded Wire Fabric.

S.F. OF UNDISTURBED SOIL BEARING AREA REQUIRED IF Sa = 2000 P.S.I.

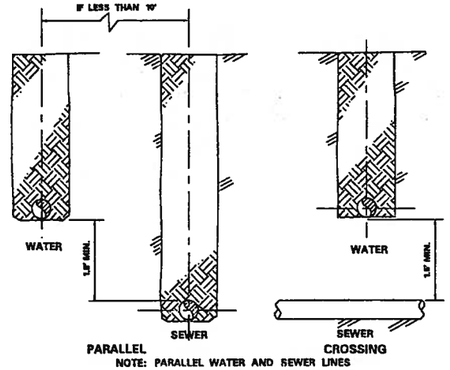
PIPE SIZE INCHES	DESIGN PRESSURE (MAXIMUM OPERATING + TEST) 11 14° 100 PSIG	150 PSIG	200 PSIG	22 12° 100 PSIG	150 PSIG	200 PSIG	45° 100 PSIG	150 PSIG	200 PSIG
4	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
6	1.0	1.0	1.0	1.0	1.0	1.2	1.1	1.7	2.2
8	1.0	1.0	1.0	1.0	1.5	2.0	2.0	3.0	4.0
10	1.0	1.2	1.0	1.5	2.4	3.1	3.1	4.6	6.1
12	1.2	1.7	2.3	2.3	3.4	4.5	4.4	6.6	8.7
16	2.0	3.0	4.0	3.9	5.8	7.7	7.7	11.5	15.4
18	2.6	3.8	5.1	5.0	7.5	10.0	9.8	14.7	19.5

	90° 100 PSIG	150 PSIG	200 PSIG	TEE 100 PSIG	150 PSIG	200 PSIG	DEAD END 100 PSIG	150 PSIG	200 PSIG
4	1.0	1.4	1.8	1	1	1	1	1	2
6	2.1	3.1	4.1	2	2	3	2	3	4
8	3.7	5.5	7.3	3	4	5	3	6	9
10	5.5	8.4	11.2	5	6	8	5	9	13
12	8.0	12.1	16.0	6	9	11	7	11	14
16	14.2	21.3	28.4	10	15	20	13	20	25
18	18.1	27.1	36.1	13	19	26	17	25	34



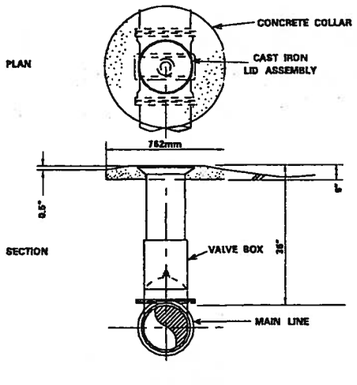
NOTE: THE MAXIMUM WIDTH OF THE TRENCH IS MEASURED ONE FOOT ABOVE THE TOP OF THE PIPE. THE TRENCH MAY BE WIDER ABOVE THIS LINE

PIPE BEDDING DETAIL

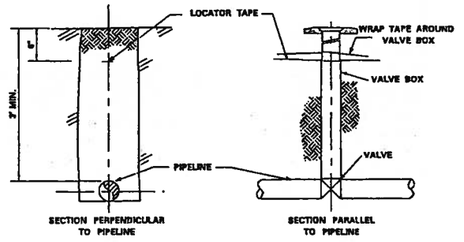


NOTE: PARALLEL WATER AND SEWER LINES GREATER THAN 10' APART—NO MIN. VERTICAL SEPARATION REQUIRED.

SEWER & WATERLINE RELATIONSHIP



VALVE BOX SETTING



LINE LOCATOR DETAIL

REVISION NUMBER	SHEET NUMBER	REVISION	DATE	BY

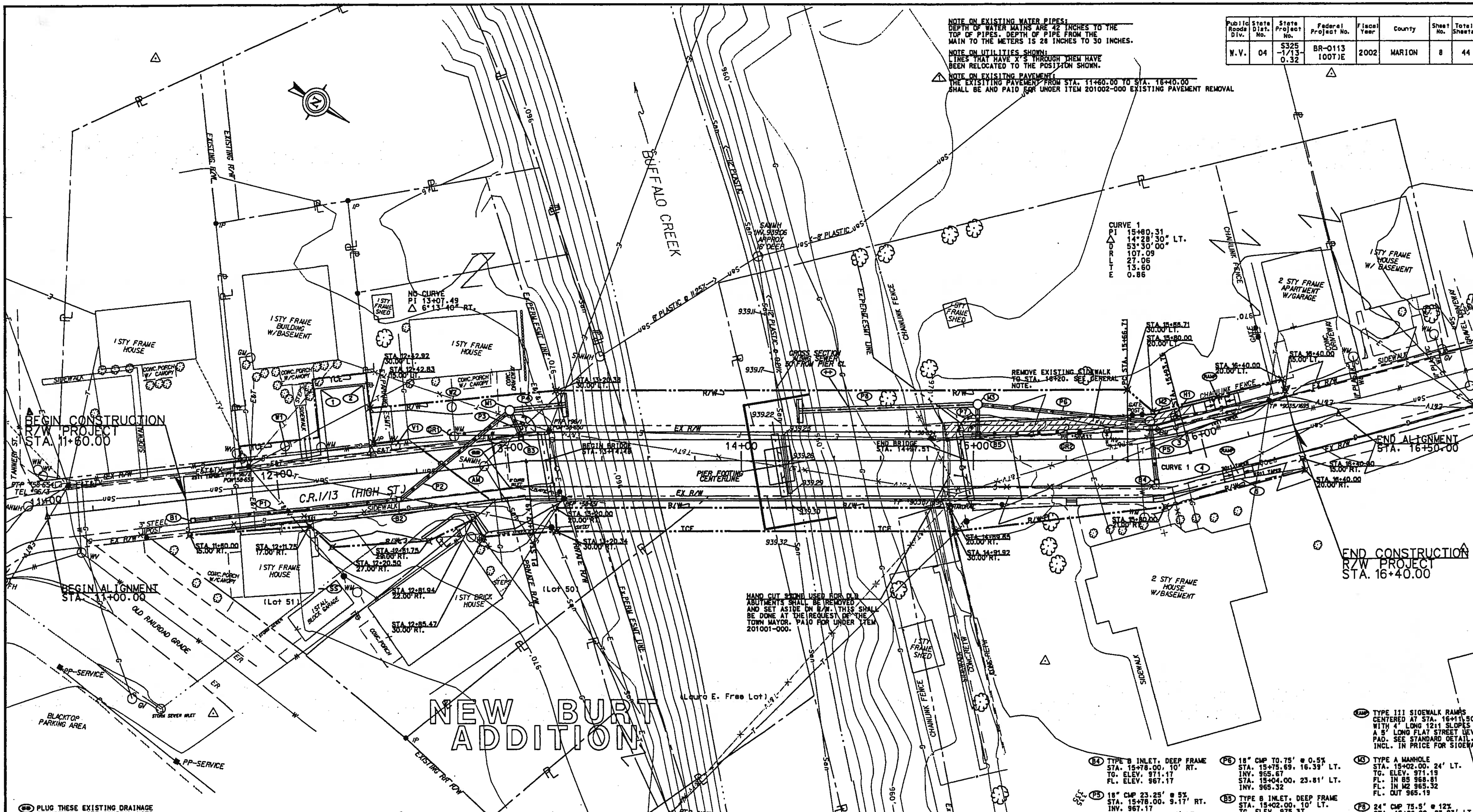
WATERLINE RELOCATION SPECIAL DETAIL

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	Fiscal Year	County	Sheet No.	Total Sheets
W.V.	04	S325 -1/13- 0.32	BR-0113 100T)E	2002	MARION	8	44

NOTE ON EXISTING WATER PIPES:
DEPTH OF WATER MAINS ARE 42 INCHES TO THE TOP OF PIPES. DEPTH OF PIPE FROM THE MAIN TO THE METERS IS 28 INCHES TO 30 INCHES.

NOTE ON UTILITIES SHOWN:
LINES THAT HAVE X'S THROUGH THEM HAVE BEEN RELOCATED TO THE POSITION SHOWN.

⚠1 NOTE ON EXISITNG PAVEMENT:
THE EXISITING PAVEMENT FROM STA. 11+60.00 TO STA. 16+40.00 SHALL BE AND PAID FOR UNDER ITEM 201002-000 EXISTING PAVEMENT REMOVAL



⊛ PLUG THESE EXISTING DRAINAGE STRUCTURES. SEE GENERAL NOTE.

(1) BEGIN PAVED PARKING AREA STA. 12+23.00, 40' LT.

(2) END PAVED PARKING AREA STA. 12+41.00, 40' LT.

(3) STA. STA 15+95.77, 9.02' LT. BEGIN 14:1 TAPER TO EXISTING WIDTH @ STA. 16+40.00

(4) STA. 15+96.21, 10.97' RT. BEGIN 30:1 TAPER TO EXISTING WIDTH @ STA. 16+40.00

(5) STA. 16+11.74, 16.49' RT. BEGIN 10:1 TAPER TO EXISTING WIDTH @ STA. 16+40.00

(GR1) BEGIN CLASS I GUARDRAIL STA. 12+76.00, 14.50' LT. 12.5' BEFORE THRIE BEAM CONNECTION BUFFERED END

(GR2) END CLASS I GUARDRAIL STA. 15+40.46, 13.00' LT. 2' FLARE

(B1) TYPE B INLET, DEEP FRAME STA. 11+62.00, 9' RT. TG. ELEV. 973.55 FL. ELEV. 969.55

(P1) 18" CMP 87.5' @ 0.5% STA. 11+62.83, 9' RT. INV. 969.55 STA. 12+50.17, 10' RT. INV. 969.11

(B2) TYPE B INLET, DEEP FRAME STA. 12+51.00, 10' RT. TG. ELEV. 974.69 FL. IN B1 969.11 FL. ELEV. 969.11

(P2) 18" CMP 58.5' @ 0.5% STA. 12+51.83, 10' RT. INV. 969.11 STA. 13+01.36, 21' LT.

(B3) TYPE B INLET, DEEP FRAME STA. 13+06.40, 10.18' LT. TG. ELEV. 977.41 FL. ELEV. 971.41

(P3) 18" CMP 9.75' @ 5% STA. 13+06.50, 11' LT. INV. 971.41 STA. 13+03.60, 20.26' LT. INV. 970.89

(M1) TYPE A MANHOLE STA. 13+03.00, 22.16' LT. TG. ELEV. 974.00 FL. IN B2 968.82 FL. IN B3 970.89 FL. OUT 968.00

(P4) 24" CMP 22.25' @ 8% STA. 13+05.00, 22.16' LT. INV. 968.00

(W1) RELOCATE METER STA. 12+05.00, 18.00' LT.

(W2) RELOCATE METER STA. 12+78.00, 26.50' LT.

(V1) REMOVE AND CAP FLUSH HYDRANT STA. 12+55.00, 27.50' LT. PAID FOR IN ITEM 201001-000 CLEARING AND GRUBBING

(AM) ADJUST SANITARY MANHOLE STA. 12+89.25, CL SEE GENERAL NOTE

(SS) APPROXIMATE LOCATION OF STORM SEWER. CONTRACTOR SHALL TAKE PROPER PRECAUTIONS TO AVOID RUPTURING PIPE DURING [illegible]

(B4) TYPE B INLET, DEEP FRAME STA. 15+78.00, 10' RT. TG. ELEV. 971.17 FL. ELEV. 967.17

(P5) 18" CMP 23.25' @ 5% STA. 15+78.00, 9.17' RT. INV. 967.17 STA. 15+78.00, 14' LT. INV. 966.01

(M2) TYPE A MANHOLE STA. 15+78.00, 16' LT. TG. ELEV. 970.67 FL. IN B4 966.01 FL. OUT 965.67

(++) 6" PLASTIC GAS LINE 53' FROM M3 STA. 14+46.47, 22.06' LT. APPROX. INVERT OF GAS LINE EL. 961.4 INVERT OF STORM PIPE EL. 958.83 SHOULD BE 0.5' CLEARANCE BETWEEN PIPES AT POINT OF INTERSECTION **SEE GENERAL NOTE

(P6) 18" CMP 70.75' @ 0.5% STA. 15+75.69, 16.39' LT. INV. 965.67 STA. 15+04.00, 23.81' LT. INV. 965.32

(B5) TYPE B INLET, DEEP FRAME STA. 15+02.00, 10' LT. TG. ELEV. 975.37 FL. ELEV. 969.37

(P7) 18" CMP 11.25' @ 5% STA. 15+02.00, 10.83' LT. INV. 969.37 STA. 15+02.00, 22' LT. INV. 968.81

(RAMP) TYPE III SIDEWALK RAMPS CENTERED AT STA. 16+11.50 WITH 4' LONG 12:1 SLOPES TO A 5' LONG FLAT STREET LEVEL PAD. SEE STANDARD DETAIL. INCL. IN PRICE FOR SIDEWALK.

(M3) TYPE A MANHOLE STA. 15+02.00, 24' LT. TG. ELEV. 971.19 FL. IN B5 968.81 FL. IN M2 965.32 FL. OUT 965.19

(P8) 24" CMP 75.5' @ 12% STA. 15+00.00, 23.93' LT. INV. 965.19 STA. 14+24.78, 21.29' LT. INV. 956.16, HEADWALL XSING POINT WITH GAS LINE 53' FROM M3 EL. 956.83

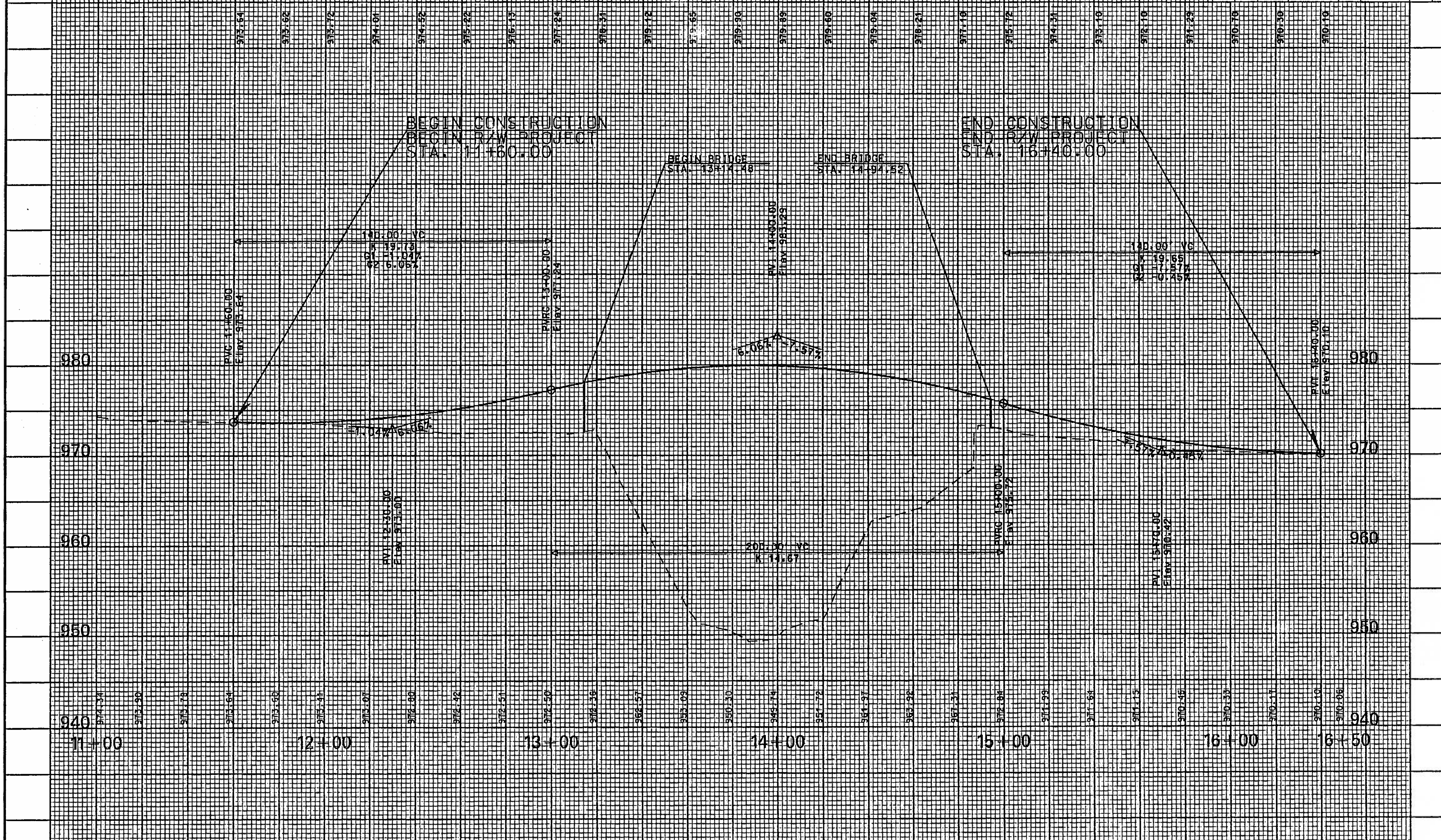
(H1) RELOCATE FIRE HYDRANT TO STA. 15+90.00, 16.50' LT.

⚠	8	CHANGE IN NOTE		6/17/02	DH

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

PLAN SHEET

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	Fiscal Year	County	Sheet No.	Total Sheets
W.V.	04	S325-1/13-0.32	BR-0113 (007)E	2002	MARION	9	44



SCALES

5 ft.

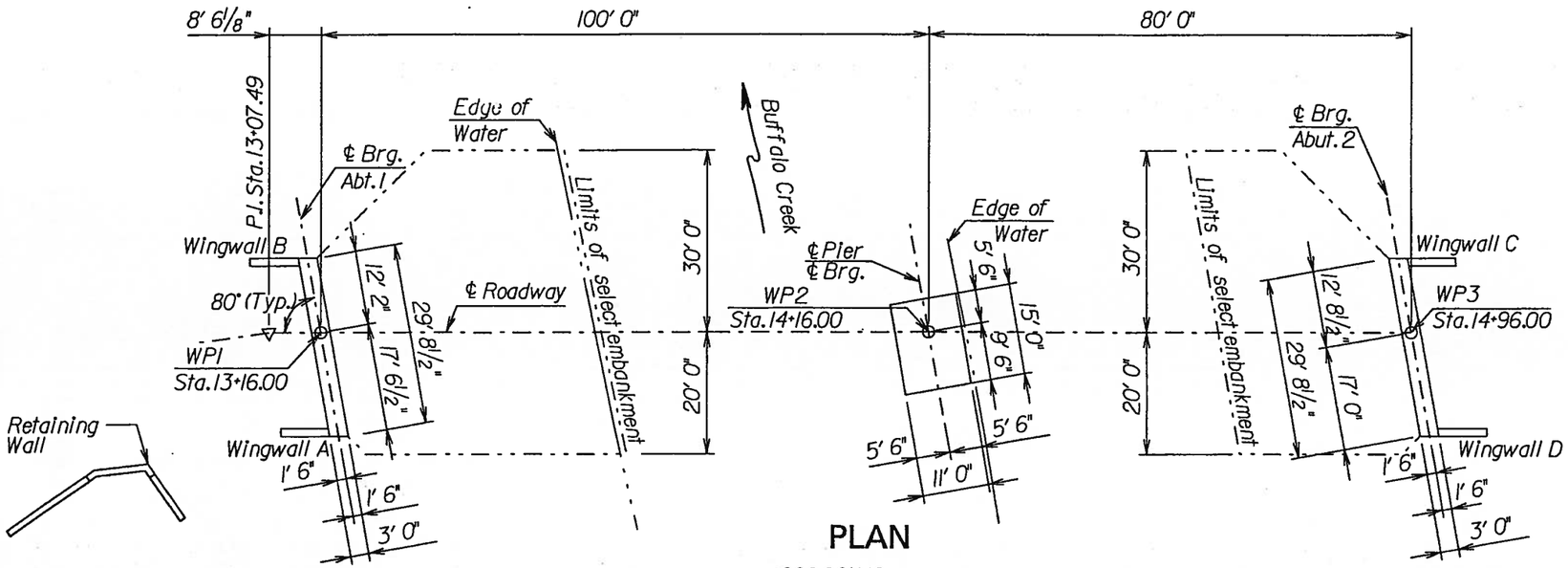
0 20 ft. 0

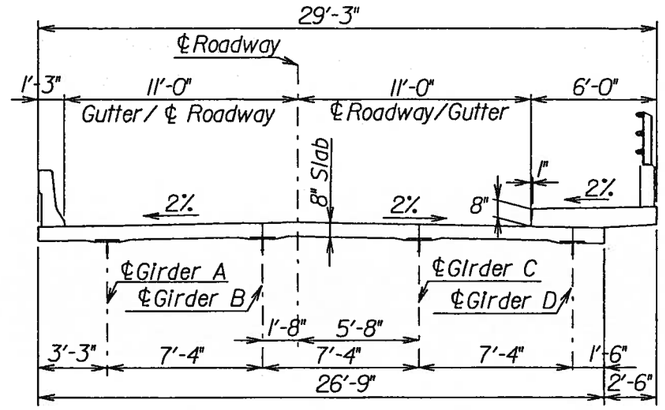
REVISION NUMBER	SHEET NUMBER	REVISION	DATE	BY

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

PROFILE SHEET

PROJECT NUMBERS		DISTRICT	COUNTY	SHEET NO.	TOTAL
STATE	FEDERAL				
S325-113-0.32	BR-0113(007)E	4	MARION	10	44





TYPICAL SECTION
Scale : 4 • 1

NO.	REVISION	DATE:	BY:

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W. VA. DEPARTMENT OF HIGHWAYS
ENGINEERING DIVISION

BOWERS BRIDGE
C.R. 113 over
BUFFALO CREEK

DESIGNED DWK	DATE 8/00	
DRAWN JKB	8/00	
CHECKED DWK	11/00	
REVIEWED RYA	1/02	

LAYOUT

SHEET 1 OF 21
BRIDGE NO. 10060

PROJECT NUMBERS		DISTRICT	COUNTY	SHEET NO.	TOTAL
STATE	FEDERAL				
S325-113-0.32	BR-0113(007)E	4	MARION	11	44

GOVERNING SPECIFICATIONS

The West Virginia Department of Transportation, Division of Highways Standard Specifications, Roads and Bridges adopted 2000, as amended by the Supplemental Specifications Dated July 1, 2001, the Contract Documents, and the Contract Plans are the Governing Provisions applicable to this project.

The superstructure is designed by the Load and Resistance Factor Design Method (LRFD) in accordance with the AASHTO LRFD Bridge Design Specifications, second edition dated 1998 with 1999 interims, using HL-93 live loading. The substructure is designed by the Strength Design Method (Load Factor Design) in accordance with the AASHTO Specifications for Roads and Bridges, sixteenth edition dated 1996 using HS25 live loading defined as 125% of HS20-44 loading. The design provides for an additional wearing surface of 25 pounds per square foot of roadway surface. This additional wearing surface is not included in this contract.

DESIGN UNIT STRESSES

Class B concrete: f'c = 3000 psi n=9
Class K concrete: f'c = 4000 n=8
Reinforcing Steel: fy = 60,000 psi

Structural Steel: AASHTO and ASTM Designations:

M 270 Grade 50W, Weathering Steel: Fy = 50,000 psi
ASTM A709 Grade HPS-70W, Weathering Steel: Fy = 70,000 psi
Fatique Case II

CONCRETE:

A water reducing retarding admixture in accordance with section 707.2 of the specifications shall be used in all superstructure concrete. Payment shall be included in Item 601003-001. Retarder will not be required below 50 degrees F. The Contractor's attention is called to the test requirements for the retarder admixture.

Chamfer all exposed edges of concrete 3/4 inches for superstructure and one inch for substructure concrete.

All concrete shall be finished with the requirements of section 601.11.

REINFORCING STEEL:

All reinforcing steel bars shall be intermediate grade billet steel in accordance with AASHTO M 31, Grade 60, unless otherwise noted in the plans. The clear distance between the reinforcing steel and the face of the concrete shall be:

Top of slab:	2.5 inches
Bottom of slab:	1.0 inch
Bottom of footings:	3.0 inches
All other locations:	2.0 inches

Reinforcement under sole plates shall be placed so as to avoid interferring with drilling the anchor bolt holes.

All reinforcing steel bars in the pier and the retaining wall are uncoated reinforcing steel. Include payment in Item 602001-001, Reinforcing Steel Bars.

All reinforcing steel bars in the deck, barriers and abutments are epoxy coated. Include payment in Item 602002-001, Epoxy Coated Reinforcing Steel Bars.

All reinforcing bar dimensions are out to out.

Minimum length of lap splice unless otherwise noted:

#4	1'-9"
#5	2'-2"
#6	2'-5"
#7	3'-9"
#8	4'-11"
#9	6'-2"
#10	7'-10"
#11	9'-7"

Lap lengths shall be increased by 20% for epoxy coated bars with adequate cover, and by 50% for epoxy coated bars with cover less than three bar diameters or spacing less than six bar diameters.

STRUCTURAL STEEL

The lump sum bid for Item 615001-001, Steel Superstructure, shall include all structural steel complete in place, including anchor bolts, elastomeric bearing pads and painting.

No field welding is permitted unless shown on the plans or approved by the Engineer.

All structural steel components, except as noted, shall meet AASHTO M270 Grade 50W. Girder flanges and webs shall meet the steel specifications (AASHTO M270, Grade 50W-T2 and ASTM A709, Grade HPS-70W) as specified on the plan sheet 9 of 21.

Anchor bolts, nuts and washers may be manufactured from ordinary mild steel and shall be hot-dip galvanized according to AASHTO M 111 after fabrication. The fabricator's shop drawings shall identify the material specification and grade for each item and are subject to approval of the Engineer.

All fasteners shall be high strength bolts 7/8 inch in diameter, unless otherwise noted.

High strength fasteners shall meet Section 709.24 and shall be black (uncoated) Type 3 (weathering steel). The high strength fasteners used in regions of the structure that require painting shall be Type 1 or 3 and shall be mechanical galvanized.

Before assembling the high strength bolted connections, remove all loose and non-adherent rust that may have formed on the connection areas by hand or power wire brushing.

BLAST CLEANING AND PAINTING

Upon completion of all fabrication operations in the shop, and before shipment to the project site, all weathering steel bridge components shall be blast cleaned to a Near White surface condition according to SSPC-SP 10. Prior to the start of any blast cleaning, all oil, grease, cutting fluids, or other foreign matter shall be removed from the surfaces of the steel by solvent cleaning according to SSPC-SP 1.

The members or portions of members listed below shall be blast cleaned and shop painted according to Section 688 using the Inorganic Zinc Rich Low VOC System, Section 711.22. Apply the full paint system in the fabrication shop, except faying surfaces of high strength bolted connections, which shall be shop painted with primer only. The color of the final top coat shall be 30045 according to Federal Standard 595 and the Gloss at an angle of 60 degrees shall not exceed 25.

Paint the ends of the girders and all other structural components encased in the concrete abutment plus one additional foot in length.

Areas of the shop applied paint system which are damaged during erection and high strength bolted connection areas that were only prime painted shall be properly cleaned and painted according to Section 688, and to the satisfaction of the Engineer.

After completion of all tightening operations, mechanical galvanized fasteners shall be solvent cleaned and field painted as specified for the structural steel.

Include cleaning and painting costs in Item 615001-001, Steel Superstructure.

For integral abutment structures, the crevice between the embedded steel and the concrete shall be suitably chamfered to provide for placement of a sealant. Seal the crevice with a sealant material meeting the requirements of ASTM C920, Type S, Grade NS, Class 25, Uses NT and M. Sealant shall be suitable for bonding between concrete and the top coat of the specified paint system. Acid-cure sealants are not allowed. Include payment in Item 615001-001, Steel Superstructure.

IDENTIFICATION MARKING STEEL MEMBERS

All steel mill and fabricator identification markings for steel plates, shapes, or fabricated members shall be by metal tags, soapstone, or some other readily removable material; or, shall be marked in an area of the completed member which will be encased or covered with concrete. Marking methods and locations are subject to approval of the Engineer.

Do not use paint or wax-based crayons for marking.

HANDLING AND STORING STEEL MEMBERS

Steel members must not be gouged, scratched, dented, or allowed to rub against other members that would result in damage to the blast cleaned profile of the steel. Members shall be handled using softeners and slings instead of chokers and chains.

Store members in the fabrication shop and on the project site in such a manner as to be kept free and clean of all foreign substances such as grease, oil, mortar and concrete, splatter, chalk and crayon marks, paint, and dirt. All storage must be above ground and sloped to allow free drainage of melted snow, rainwater, and dew. If stored for periods longer than 3 months, the members must be placed on metal supports. For periods of storage up to 3 months, members may be placed on clean, untreated, wood timbers.

Store plate girders and rolled beams with the web in the upright position. The members may be stacked provided metal or wood supports, as noted above, separate individual members. Under no circumstances shall members be nested together or bundled.

Do not allow treated lumber or treated timber to contact steel members. Contact with clean, untreated, lumber or timber will not damage the steel members.

FINAL CLEANUP OF STRUCTURAL STEEL SURFACES

Upon completion of all concrete curing operations, the contractor shall clean all steel surfaces to remove all grease, oil, concrete residue, dirt, and other foreign substances to the satisfaction of the Engineer.

Cleaning may be by high pressure water, power or hand wire brushing, or by Brush-off Blast Cleaning according to SSPC-SP 7. Cleaning shall be followed by a clean water rinse to remove all residues of detergents and cleaners if they were used. All grease and oil shall be removed prior to the clean water rinse by Solvent Cleaning.

Do not use acids to remove stains.

Include costs for final cleanup of steel surfaces in Item 615001-001, Steel Superstructure.

PROTECTION OF CONCRETE SUBSTRUCTURE

Before placing any steel superstructure members on the concrete substructure units, the Contractor shall coat all exposed areas of the abutment, tops, sides, and all faces of pier caps and pier stems to the ground or water line elevation with an approved silane based concrete sealer. Preparation of surfaces, application rates, and methods shall be as recommended by the silane manufacturer.

The Contractor shall take appropriate measures to protect the concrete substructure from rust staining during construction and curing of superstructure concrete. Water runoff from concrete curing operations shall be deflected away from the steel girders and shall not drain onto the substructure concrete after contacting the weathering steel.

Upon completion of all superstructure concrete curing operations, the Contractor shall remove all rust stains from substructure units using proprietary chemical stain removers or mild acid etching. Abrasive blast cleaning may be used to supplement the other cleaning methods if the stained areas are severe or extensive. All cleaning methods shall be subject to approval of the Engineer.

Re-coat substructure concrete at all areas where rust stains were removed, regardless of the cleaning method used, with an approved silane based concrete sealer as specified above.

Include the cost of silane coating, protecting, cleaning, and re-coating substructure units in Item 601002-001, Class B Concrete.

EXCAVATION:

All excavation below the berm elevation required for the construction of abutments will be measured and paid for under item 211001-000, Structure Excavation. All excavation for the construction of the pier will be measured and paid for under item 212002-000, Wet Excavation. No excavation will be classified as Rock Excavation. Rock and shale shall be excavated and paid for under the above classifications to the neat lines of the footings only.

Any shoring required shall be incidential to Item 212001-000.

COFERDAMS:

Concrete shall be placed in the dry. There is no separate payment for cofferdams. If cofferdams are necessary and used, all costs shall be included in the price bid for Item 212002-000, Wet Excavation.

BACKFILL

The Contractor shall backfill around the substructure as soon as possible after form removal and slope the surfaces to drain.

JOINT FILLER

All joint filler for vertical joints in the substructure shall be in accordance with Section 708.1.2. The cost shall be included in Item 601002-001.

SCOUR PROTECTION

The average stone size for scour protection for this bridge is 12 inches. Uniformly grade the rock for scour protection as follows:

Stone size:	Percentage of Gradation smaller than
2.00 ft	100%
1.25 ft	85%
1.00 ft	50%
0.50 ft	15%

The stone shall be well graded throughout the scour protection thickness as decided by the Engineer by visual inspection. Stones smaller than the specified 15% are not allowed in an amount exceeding 20% by weight. Material shall consist of rock of a quality satisfactory to the Engineer. The use of shales are not permitted.

Stone for scour protection shall be paid for under Item 211002-000, Rock Borrow Excavation per cubic yard.

SELECT MATERIAL FOR BACKFILLING

Select material for backfilling shall be placed to the limits shown on the plans and in accordance with section 212.10 of the specifications. The Contractor shall backfill around the substructure as soon as possible after form removal and slope the surface to drain.

DISMANTLING STRUCTURES

The previously existing bridge has been removed, with the exception of the cut-stone abutment #2. The remains of the abutment shall be removed to a depth of two feet below proposed grade. Material from the dismantled structure shall become property of the Contractor and shall be removed from the right of way. Material from the existing bridge abutment may be used as select embankment at the discretion of the Engineer.

Ground lines, final slopes and slope dressing shall be as directed by the Engineer.

Payment shall be included in Item 203001-000, Dismantling Structures.

PILING:

All piling shall be installed in accordance with Section 616.12 of the specifications for predrilled piling. Pile driving construction tolerances shall be within 3 inches.

All piles shall be HP12X53 steel bearing piles. All HP12X53 piling shall have a maximum design load of 70 tons.

All piling shall be driven to refusal into the foundation strata as indicated by the estimated pile tip elevations. Refusal is defined as the equivalent of 20 blows for 1 inch or less of penetration with a power hammer developing a minimum capacity of 15,000 foot pounds of energy per blow. If a larger hammer is used, the number of blows in the last 1 inch of penetration may be reduced in direct proportion to the energy rating of the hammer, but no less than 12.

Piles shall be predrilled with a hole diameter of two foot to the estimated pile tip elevations as shown on the plans.

Before beginning pile driving, the Contractor shall provide a written certification to the engineer that the pile drivers, air compressors, and air valves have been inspected and found to be in good working condition.

New stock material may be used for steel bearing piles provided that each piece can be identified by heat number and provided that certified mill test reports are furnished to the Department indicating that the material conforms to the specifications.

Payment for predrilled and driven piling shall be included in Item 616005-006 HP12X53 Steel Bearing Pile, Predrilled and Driven.

Average Pile Length: Abut. 1 — 20'-0"
Abut. 2 — 19'-0"

Stay-In-Place Prefabricated Metal Form Decking Area= 3300 Sq.ft

ESTIMATE OF QUANTITIES

ITEM	DESCRIPTION	QUANTITY	UNITS
203001-000	Dismantling Structure	LUMP SUM	LS.
211002-000	Rock Borrow Excavation	321	CY.
212001-000	Structure Excavation	80	CY.
212002-000	Wet Excavation	84	CY.
212005-000	Select Material For Backfilling	45	CY.
601002-001	Class B Concrete	110	CY.
601003-001	Class K Concrete	215	CY.
602001-001	Reinforcing Steel Bars	12,325	LB.
602002-001	Epoxy Coated Reinf. Steel Bars	41,102	LB.
* 615001-001	Steel Superstructure	LUMP SUM	LS.
616005-006	HP12X53 Steel Bearing Pile, Predrilled and Driven	195	LF.
617003-001	Aluminum Railing	193	LF.
639001-001	Construction Layout Stakes	LUMP SUM	LS.

* Includes: M270, Grade 50W-T2 (Girders & Splices) 93,850 Lbs.
M270, Grade 50W (Cross Frames, Stiffeners & Sole Plates) 10,430 Lbs.
ASTM A709, Grade HPS-70W-T2 (Girders) 24,438 Lbs.
Total 128718 Lbs.

ITEM 602002-001 EPOXY COATED REINFORCING STEEL BARS

LOCATION	#3	#4	#5	#6	#8	Total LB.
Abut.#1	0	0	2742	860	625	4227
Slab	346	17968	12329	2005	0	32648
Abut.#2	0	0	2742	860	625	4227
Total	346	17968	17813	3725	1250	41102

ITEM 602001-001 REINFORCING STEEL BARS

LOCATION	#3	#5	#6	#7	#8	Total LB.
Pier	99	2397	1905	0	5694	10095
Ret.Wall	0	2230	0	0	0	2230
Total	99	4627	1905	0	5694	12325

ITEM NO. / Desc. / Location	211002-000 Rock Borrow Excavation	212001-000 Structure Excavation	212002-000 Wet Excavation	212005-000 Select Mat'l. for Backfilling	601002-001 Class B Concrete	601003-001 Class K Concrete	616005-006 HP12X53 Steel Bearing Piles Predrilled/Driven
	CY.	CY.	CY.	CY.	CY.	CY.	LF.
Abut.#1	166	18		17	17	15	100
Pier	52		84		62		
Abut.#2	103	18		17	17	15	95
Ret.Wall		44		11	14		
Deck						185	
Total	321	80	84	45	110	215	195

NO.	REVISION	DATE:	BY:

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W. VA. DEPARTMENT OF HIGHWAYS
ENGINEERING DIVISION

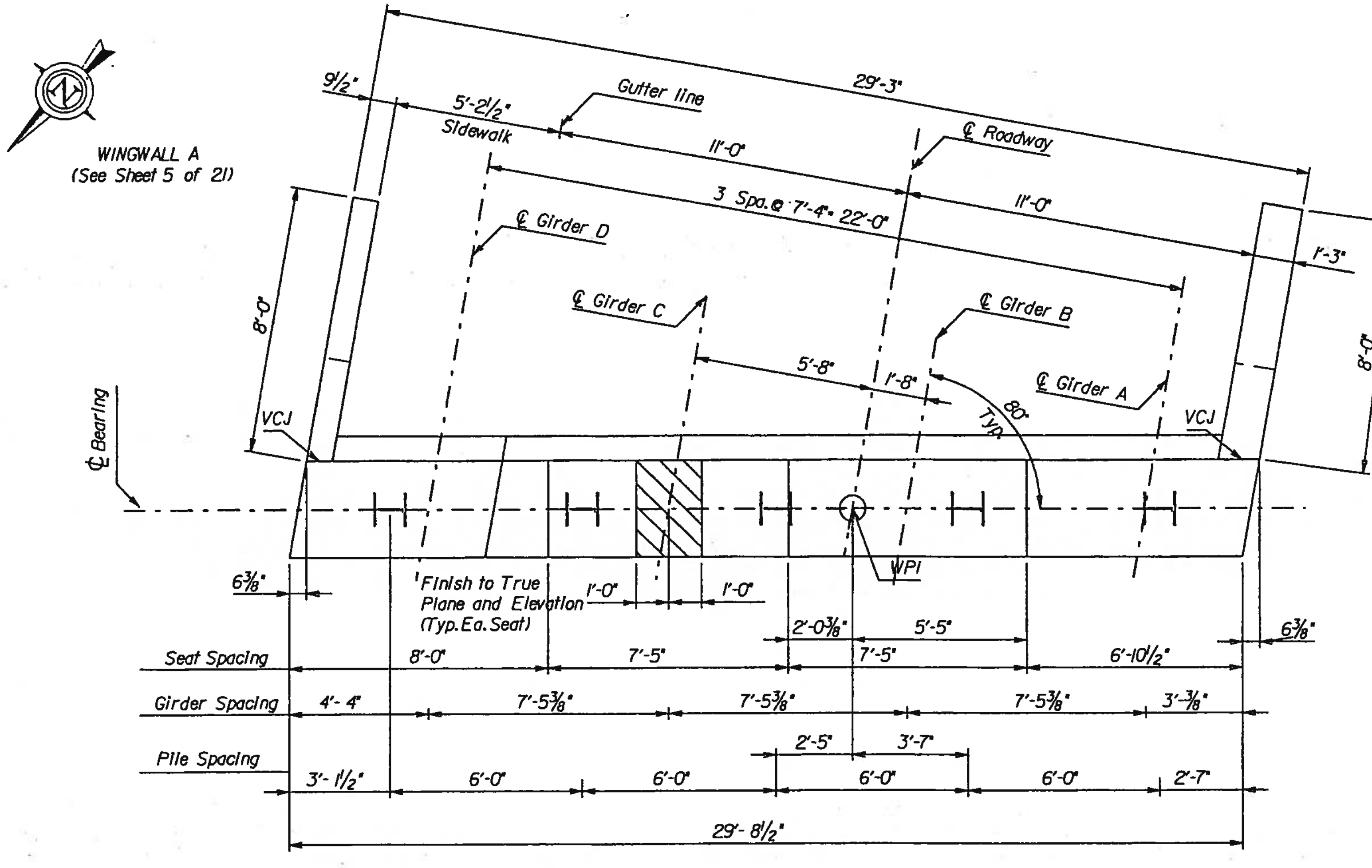
BOWERS BRIDGE
C.R. 113 over
BUFFALO CREEK

DESIGNED SDWK	DATE 7-00
DRAWN JRB	7-00
CHECKED SDWK	10/00
REVIEWED RNA	1/02

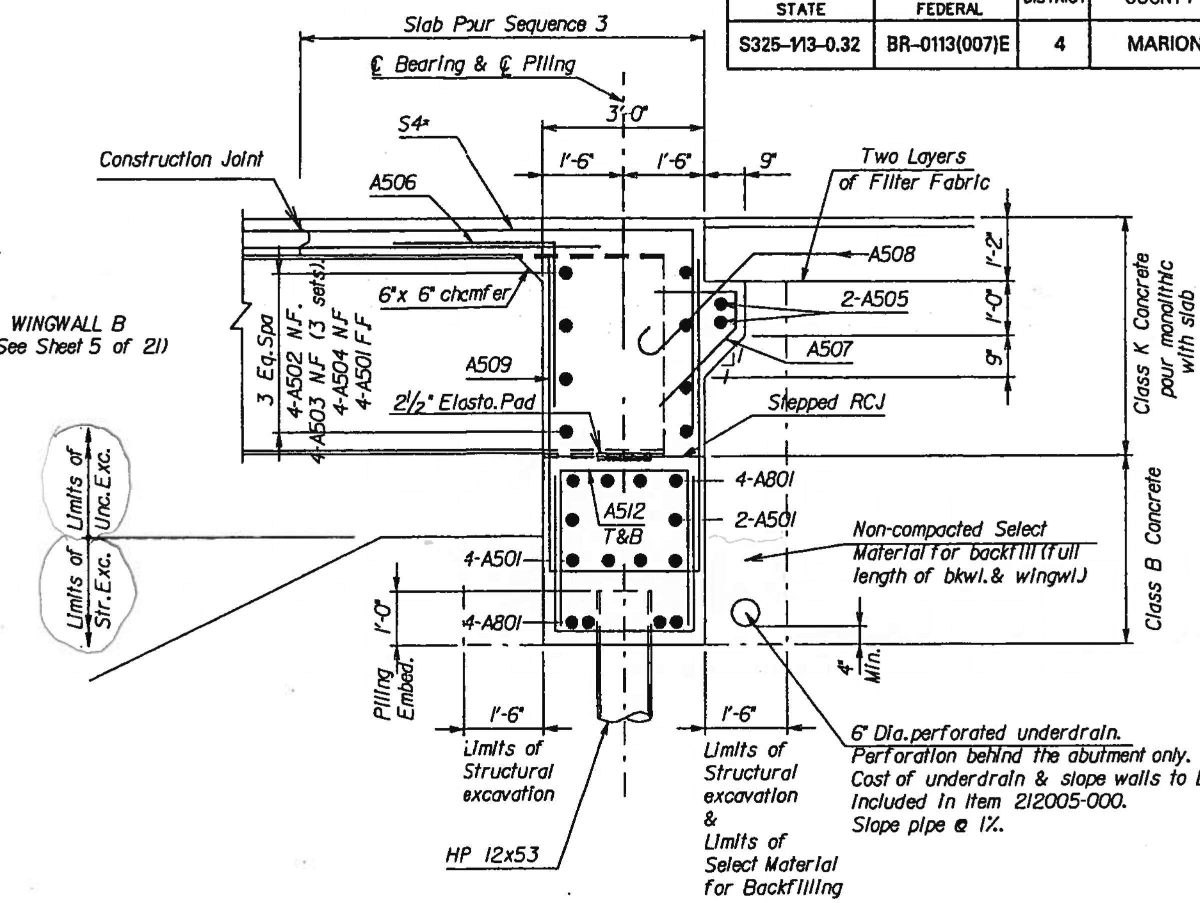
NOTES AND QUANTITIES

SHEET 2 OF 21
BRIDGE NO. 10060

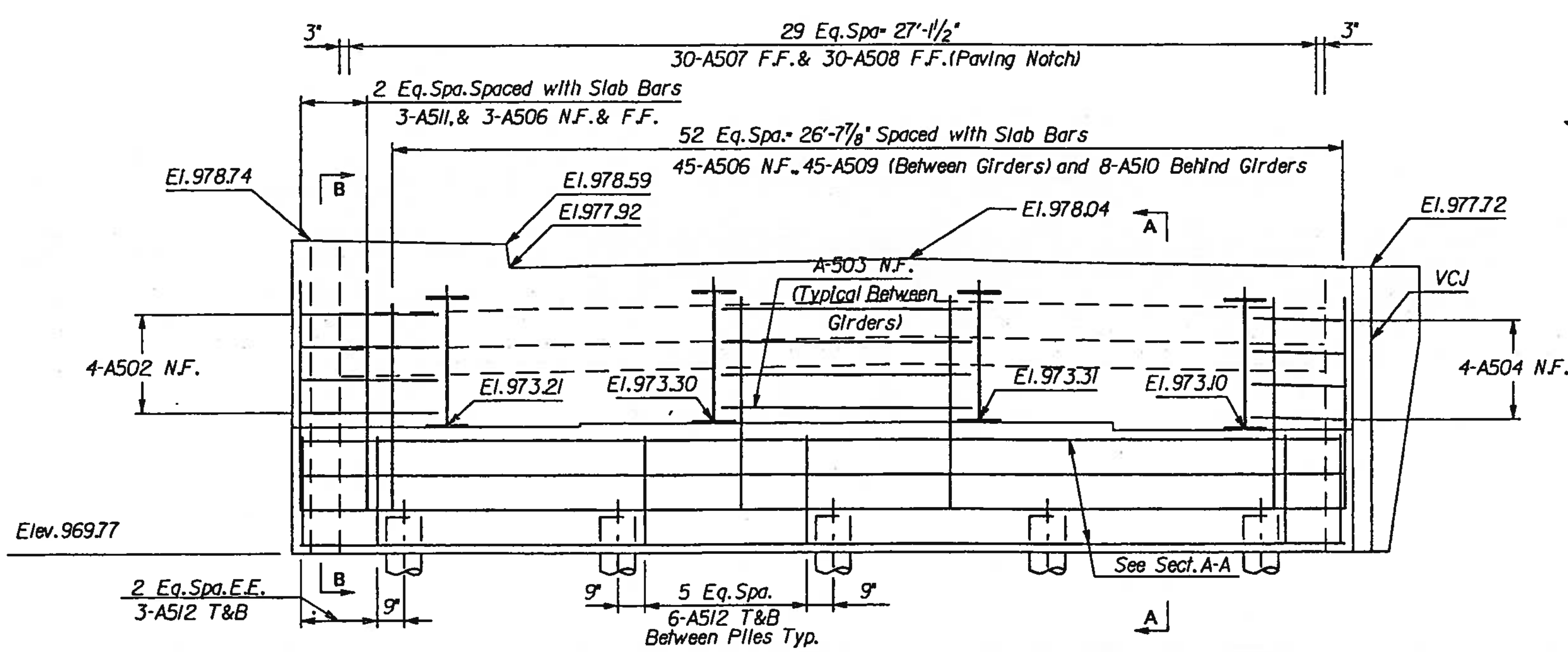
PROJECT NUMBERS STATE	PROJECT NUMBERS FEDERAL	DISTRICT	COUNTY	SHEET NO.	TOTAL
S325-113-0.32	BR-0113(007)E	4	MARION	12	44



PLAN



SECT. A–A



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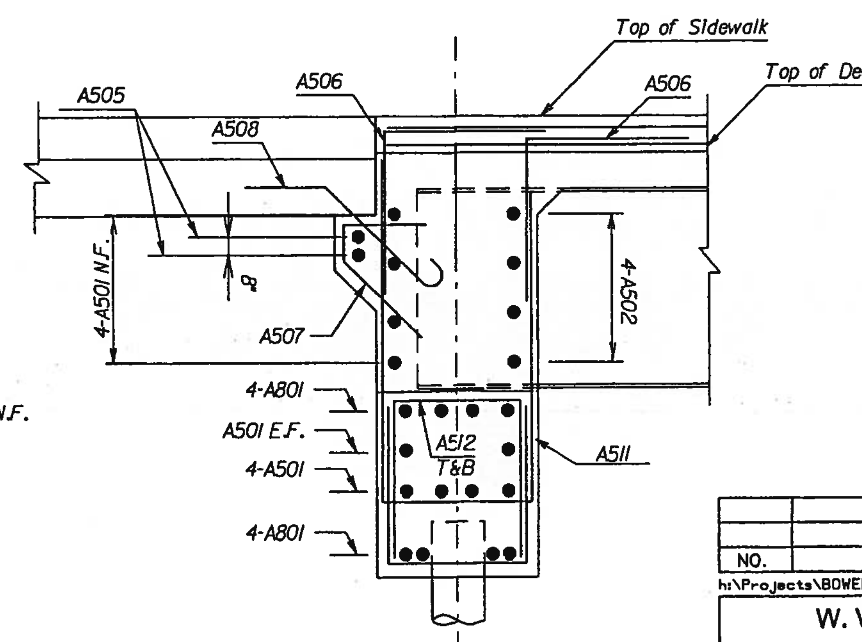

SECT. B–B

Note:
For wingwalls see sheet 5 of 21
For reinforcing see sheet 7 of 21

NO.	REVISION	DATE:	BY:

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W. VA. DEPARTMENT OF HIGHWAYS
ENGINEERING DIVISION

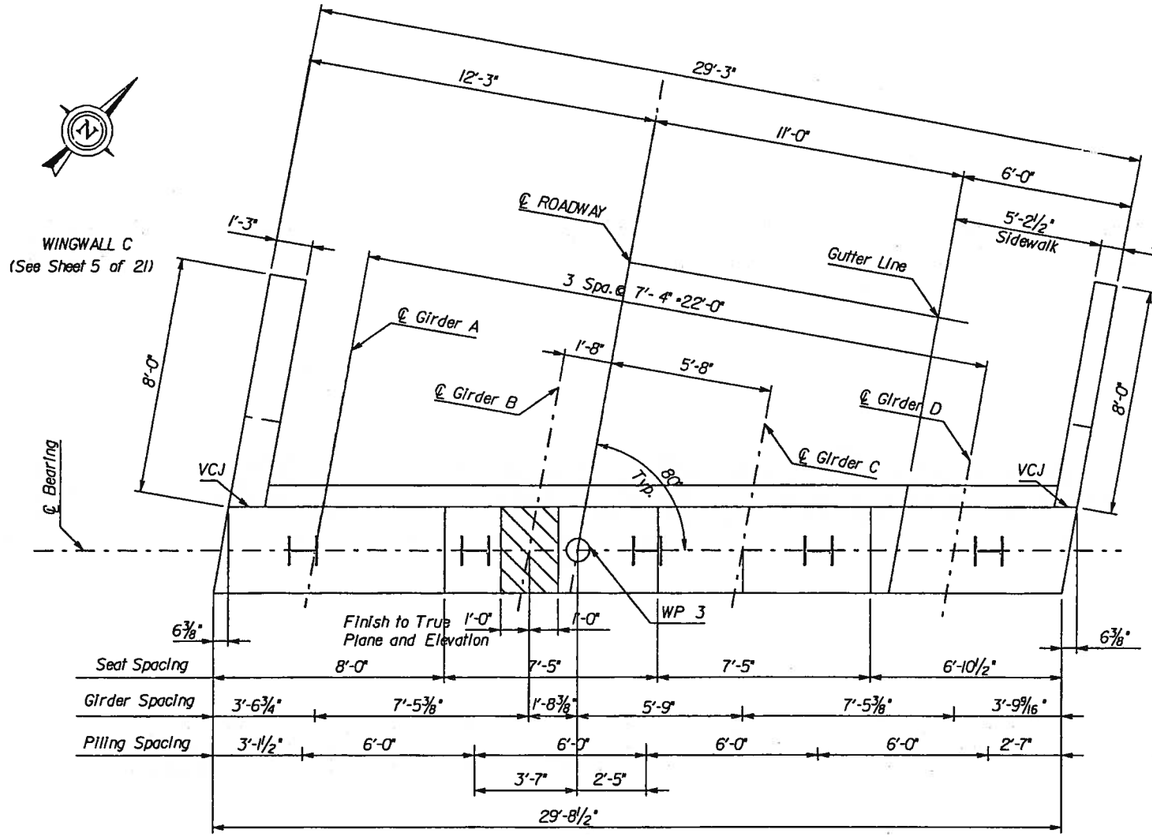
BOWERS BRIDGE
C.R. 113 over
BUFFALO CREEK

		DATE
DESIGNED	SLD	1/01
DRAWN	JRB	1/01
CHECKED	RLD	1/02
REVIEWED	RWA	1/02

ABUTMENT 1

SHEET 3 OF 21
BRIDGE NO. 10060

PROJECT NUMBERS		DISTRICT	COUNTY	SHEET NO.	TOTAL
STATE	FEDERAL				
S325-113-0.32	BR-0113(007)E	4	MARION	13	44



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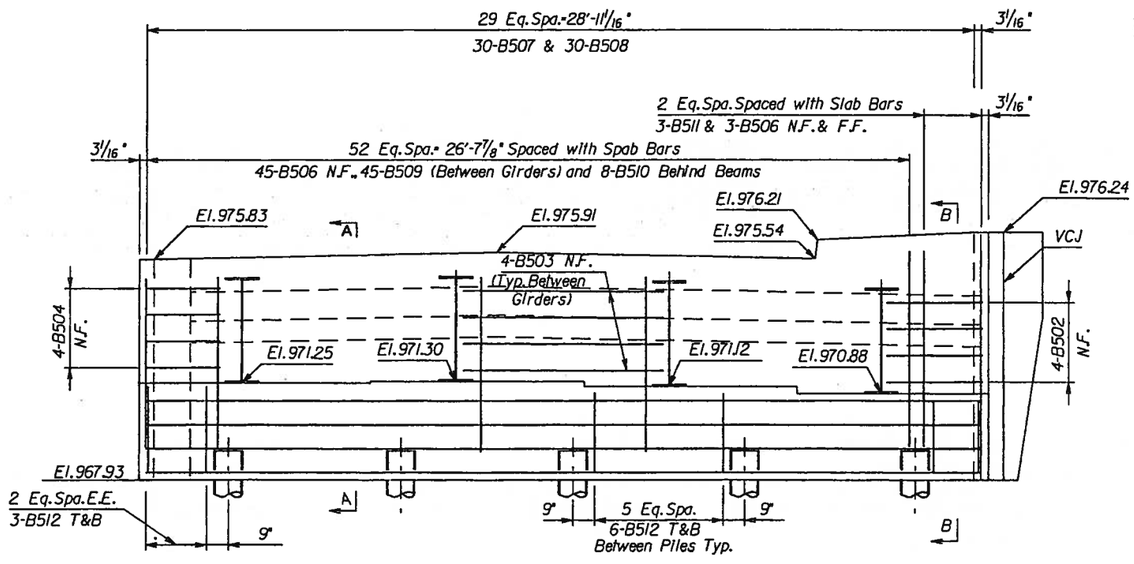

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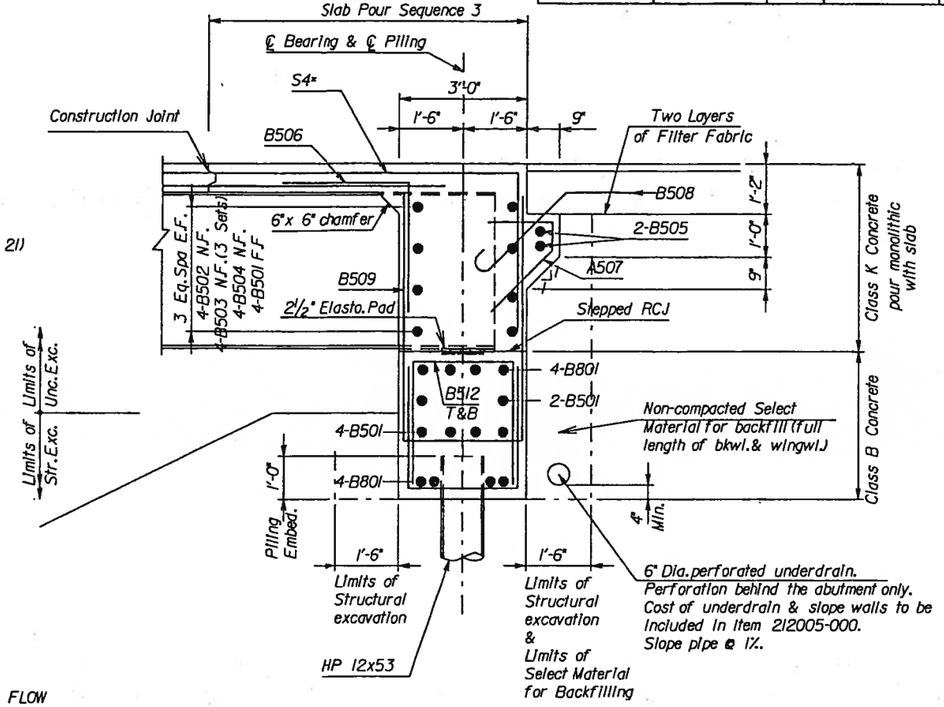
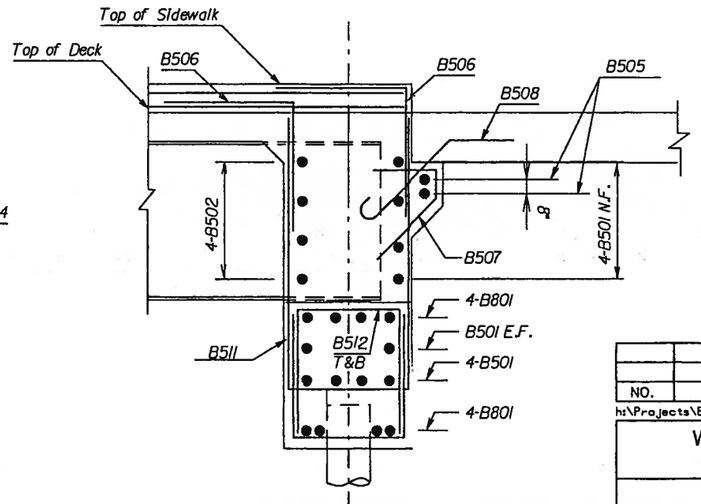


SECT. A–A

FLOW



SECT. B–B

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W. VA. DEPARTMENT OF HIGHWAYS
ENGINEERING DIVISION

BOWERS BRIDGE
C.R. 113 over
BUFFALO CREEK

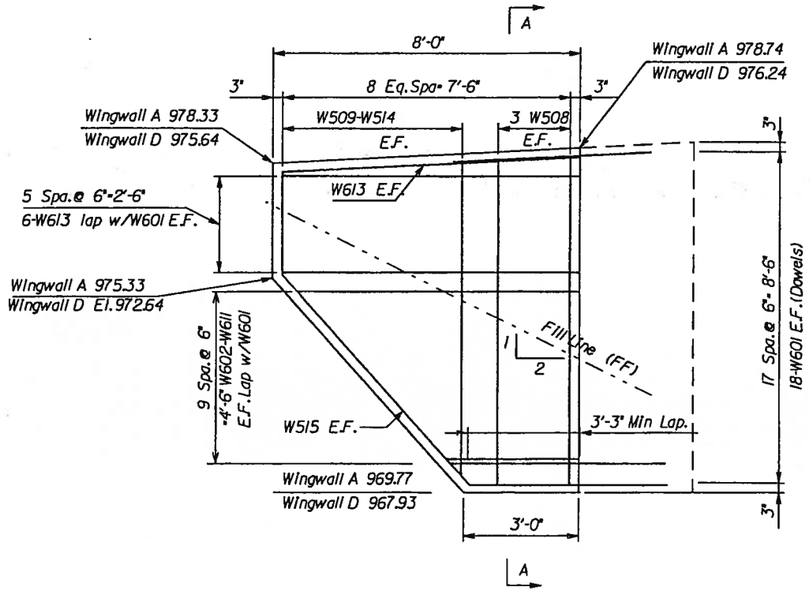
DESIGNED SLD	DATE 1/01
DRAWN JKB	1/01
CHECKED RLD	1/02
REVIEWED RLD	1/02

ABUTMENT 2

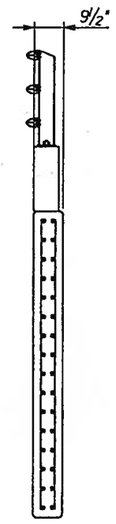
SHEET 4 OF 21

BRIDGE NO. 10060

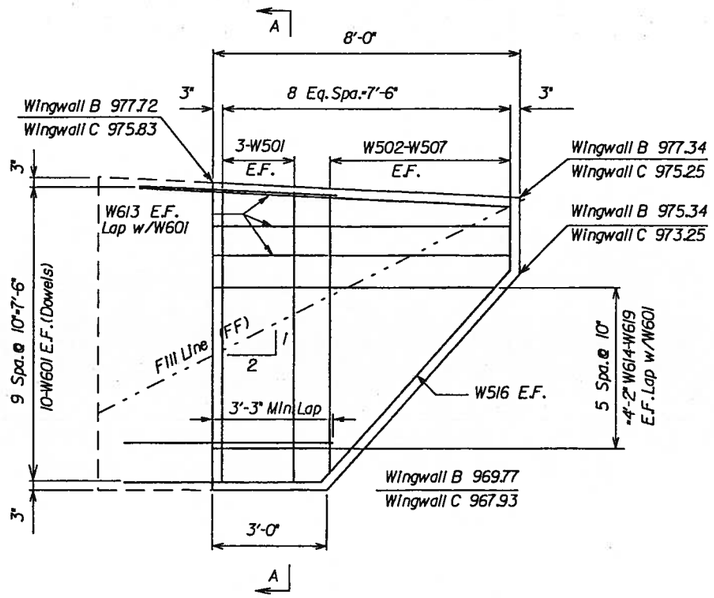
PROJECT NUMBERS		DISTRICT	COUNTY	SHEET NO.	TOTAL
STATE	FEDERAL				
S325-113-0.32	BR-0113(007)E	4	MARION	14	44



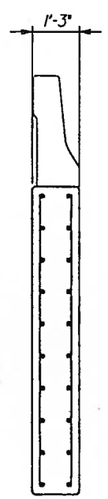
ELEVATION – WINGWALLS A&D



SECTION A–A – WINGWALLS A&D



ELEVATION – WINGWALLS B&C



SECTION A–A – WINGWALLS B&C

NOTES: ABUTMENTS 1 & 2 :

The concrete placed below the bridge seat construction joint is Class B Concrete, Item 601002-001.

The concrete placed above the bridge seat construction joint is Class K Concrete, Item 601003-001, Integrally cast with the deck.

All of the reinforcing steel bars are epoxy coated steel bars with payment as part of Item 602002-001, Epoxy Coated Reinforcing Steel Bars. For Reinforcing Bars see Sheet 7 of 21.

The bridge seat elevations are at the centerline of bearing. The roadway elevations are at the back face of the abutment. Construct the horizontal bridge seats to true plane and elevation.

The vertical construction joints are suggested and may be adjusted by the the Contractor with the approval of the Engineer.

The Contractor will line the excavated surface with filter fabric before placing Select Material for Backfilling and according to Standard Sheet DR8, Sheet 4 of 4. Extend the Select Materia for Backfilling the entire length of the wingwalls. Include cost in Item 212005-000. Select Material for Backfilling.

All piling shall be HP12x53.

RCJ: Roughened Construction Joint
VCJ: Vertical Construction Joint
NF: Near Face T&B: Top & Bottom
FF: Far Face
EF: Each Face

NO.	REVISION	DATE:	BY:

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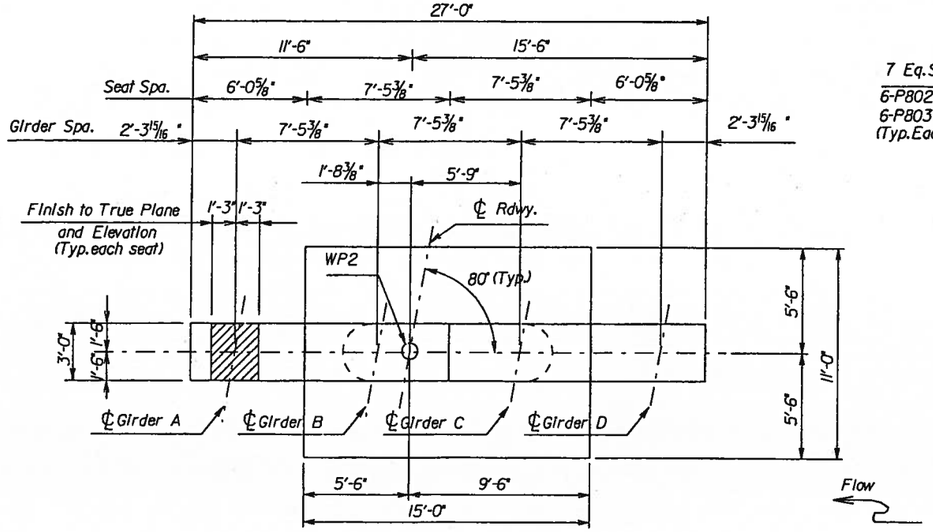
W. VA. DEPARTMENT OF HIGHWAYS
ENGINEERING DIVISION

BOWERS BRIDGE
C.R. 113 over
BUFFALO CREEK

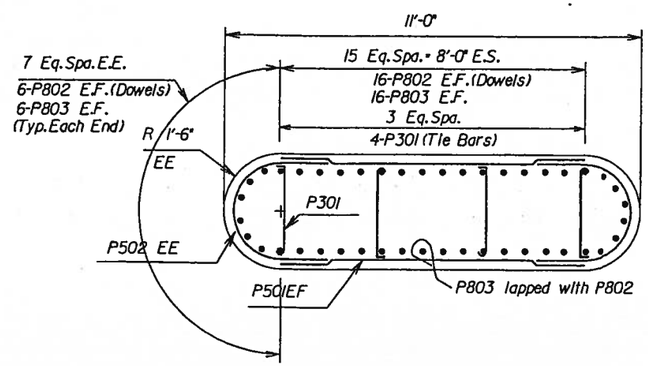
DESIGNED SLD	DATE 8-00	
DRAWN JKB	9-00	
CHECKED DWK	10-00	WINGWALLLS
REVIEWED RMA	1/02	

SHEET 5 OF 21
BRIDGE NO. 10060

PROJECT NUMBERS		DISTRICT	COUNTY	SHEET NO.	TOTAL
STATE	FEDERAL				
S325-113-0.32	BR-0113(007)E	4	MARION	15	44



CAP PLAN



COLUMN SECTION A-A

NOTE:

THE CONTRACTOR SHALL PLACE THE PIER UNDER DRY CONDITIONS. THE COST OF ANY COFFERDAM CONSTRUCTION IS INCLUDED IN WET EXCAVATION, ITEM 212002-000.

THE FOOTING SHALL BE CONSTRUCTED AT THE ELEVATION SHOWN ON THE PLANS WITHOUT THE USE OF FORMS. FOOTINGS SHALL BE KEYED A MINIMUM OF 1'-0" INTO ROCK.

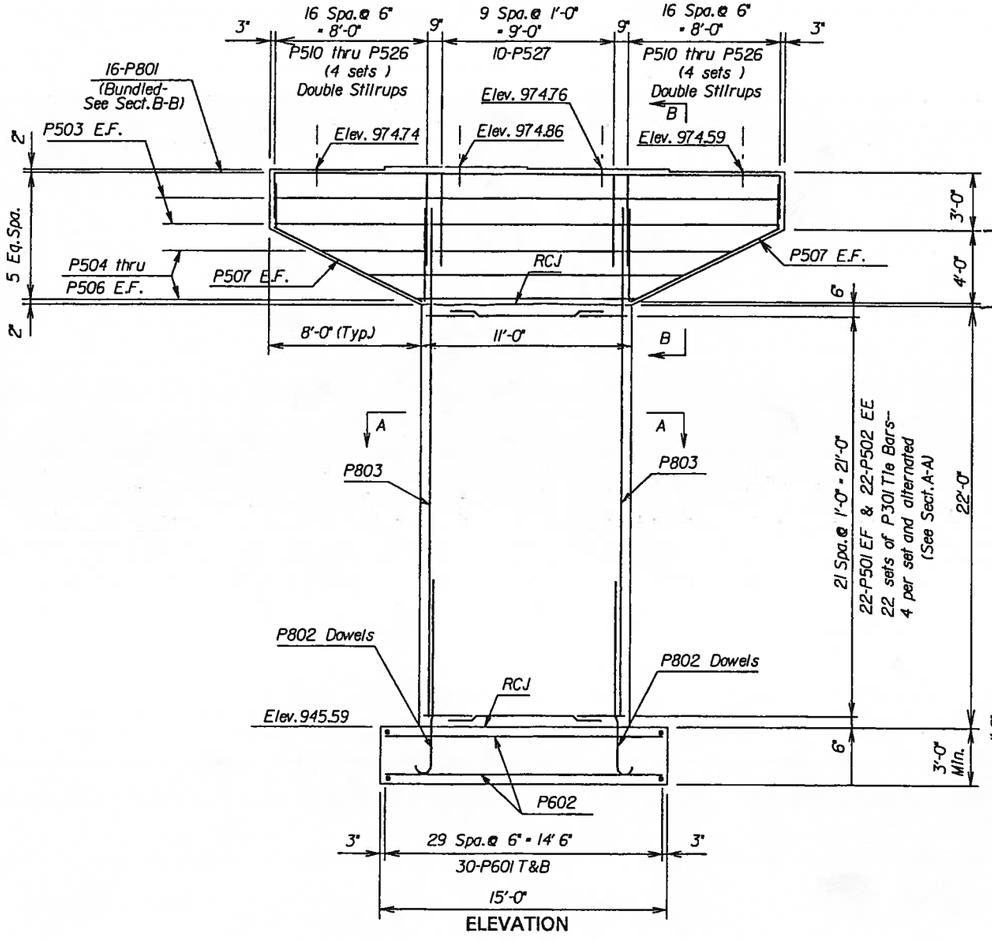
THE MAXIMUM FOUNDATION BEARING PRESSURE IS 15 KSF.

THE PIER SHALL BE CLASS B CONCRETE.

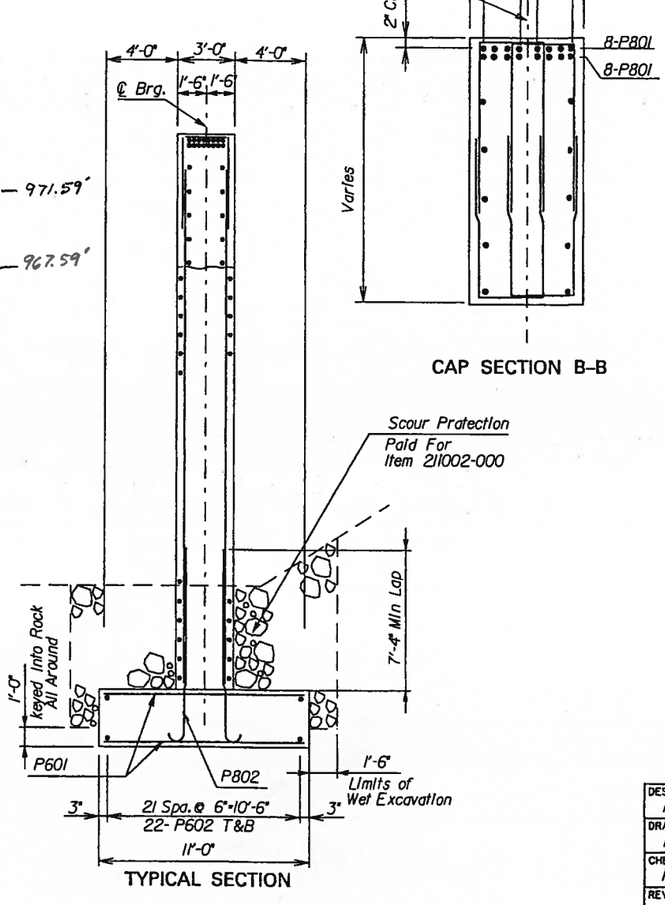
PLACE REINFORCING STEEL BARS IN THE TOP OF THE PIER CAP TO AVOID INTERFERENCE WITH THE ANCHOR BOLTS.

E.F. = EACH FACE T&B = TOP & BOTTOM
E.E. = EACH END
RCJ = ROUGHENED CONSTRUCTION JOINT

FOR LIST OF REINFORCING BARS SEE SHEET 7 OF 21.

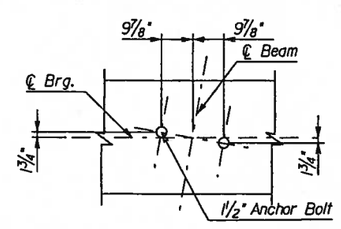


ELEVATION



TYPICAL SECTION

CAP SECTION B-B



ANCHOR BOLT LAYOUT

NO.	REVISION	DATE:	BY:

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W. VA. DEPARTMENT OF HIGHWAYS
ENGINEERING DIVISION

BOWERS BRIDGE
C.R. 113 over
BUFFALO CREEK

DESIGNED R.L.D.	DATE 1/02	
DRAWN R.L.D.	1/02	
CHECKED R.M.A.	1/02	
REVIEWED		

PIER

SHEET 6 OF 21
BRIDGE NO. 10060

PROJECT NUMBERS		DISTRICT	COUNTY	SHEET NO.	TOTAL
STATE	FEDERAL				
S325-113-0.32	BR-0113(007)E	4	MARION	16	44

MARK	TYPE	NUMBER	LENGTH	A	B	C	D	E	R
			ABUTMENT 1						
A501	Str.	10	29'-3"						
A502	Str.	4	3'-8"						
A503	Str.	12	7'-2"						
A504	Str.	4	2'-8"						
A505	Str.	2	27'-4"						
A506	10	51	6'-0"	3'-0"	3'-0"				
A507	7	30	5'-5"	2'-0"	9"	2'-8"	1'-11"		
A508	23	30	5'-0"	1'-6"	2'-6"	1'-0"	5"		
A509	4	45	14'-6"	6'-0"	2'-6"	6'-0"			
A510	4	8	10'-5"	1'-11"	2'-6"	6'-0"			
A511	4	3	15'-4"	6'-1"	2'-6"	6'-9"			
A512	4	60	7'-10"	2'-8"	2'-6"	2'-8"			
A801	Str.	8	29'-3"						
			ABUTMENT 2						
B501	Str.	10	29'-3"						
B502	Str.	4	3'-6"						
B503	Str.	12	7'-2"						
B504	Str.	4	3'-0"						
B505	Str.	2	27'-4"						
B506	10	51	6'-0"	3'-0"	3'-0"				
B507	7	30	5'-5"	2'-0"	9"	2'-8"	1'-11"		
B508	23	30	5'-0"	1'-6"	2'-6"	1'-0"	5"		
B509	4	45	14'-6"	6'-0"	2'-6"	6'-0"			
B510	4	8	10'-5"	1'-11"	2'-6"	6'-0"			
B511	4	3	15'-4"	6'-1"	2'-6"	6'-9"			
B512	4	60	7'-10"	2'-8"	2'-6"	2'-8"			
B801	Str.	8	29'-3"						
			WINGWALLS A,B,C AND D						
W501	Str.	6	7'-6"						
W502			7'-3"						
thru	Str.	2 Ea.	thru						
W507			1'-8"						
W508	Str.	6	8'-6"						
W509			2'-8"						
thru	Str.	2 Ea.							
W514			8'-2"						
W601	Str.	56	6'-0"						
W602			3'-4"						
thru	Str.	2 Ea.							
W611			7'-4"						
W612	Not Used								
W613	Str.	20	7'-9"						
W614			3'-8"						
thru	Str.	2 Ea.							
W619			7'-4"						

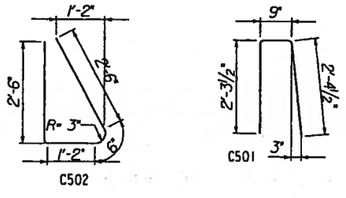
MARK	TYPE	NUMBER	LENGTH	A	B	C	D	E	R
			PIER						
P301	16	88	3'-1"	3"	2'-6"	4"			
P501	Str.	44	8'-0"						
P502	20	44	7'-11"	2'-0"	3'-11"				1'-3"
P503	Str.	4	26'-6"						
P504	Str.	2	21'-6"						
P505	Str.	2	16'-6"						
P506	Str.	2	11'-6"						
P507	Str.	4	8'-8"						
P508	Not Used								
P509	Not Used								
P510			6'-4"	2'-4"	1'-8"	2'-4"			
thru	4	8 Ea.	thru						
P526			10'-4"	4'-4"	1'-8"	4'-4"			
P527	4	10	15'-10"	6'-8"	2'-6"	6'-8"			
P601	Str.	60	10'-6"						
P602	Str.	44	14'-6"						
P801	Str.	16	26'-6"						
P802	14	44	10'-10"	1'-0"	9'-10"				
P803	Str.	44	28'-0"						

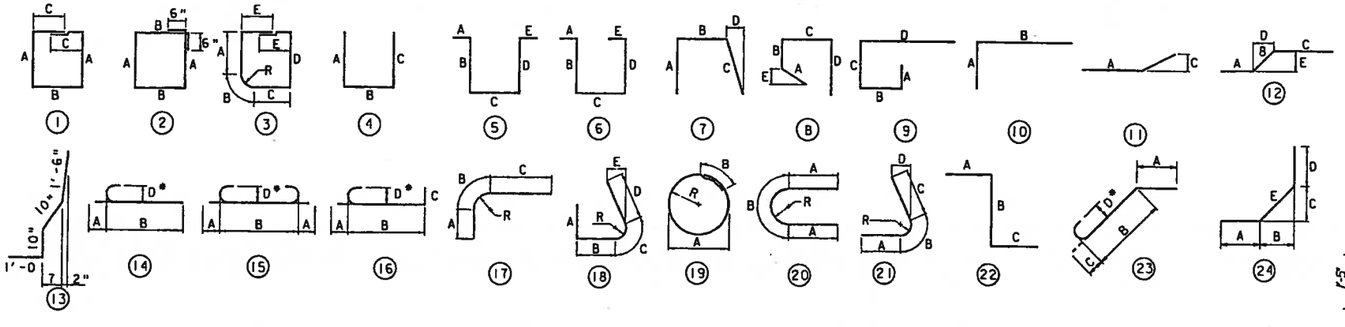
NOTE:

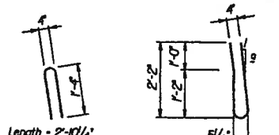
- SEE ACI DETAILING MANUAL FOR STANDARD HOOK DIMENSIONS. ALL DIMENSIONS ARE OUT TO OUT.
- FIGURES IN CIRCLES SHOW TYPES.
- "r" DIMENSION ON 180° HOOKS TO BE SHOWN ONLY WHERE NECESSARY TO RESTRICT HOOK SIZE, OTHERWISE STANDARD HOOKS ARE TO BE USED.
- REINFORCING BARS FOR ABUTMENTS ARE EPOXY COATED.
- REINFORCING BARS FOR THE PIER ARE UNCOATED.

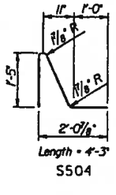
MINIMUM LAP SPLICES UNLESS OTHERWISE NOTED:

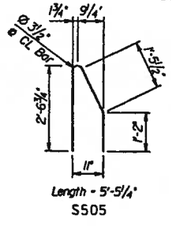
#4	1'-9"	#7	3'-9"
#5	2'-2"	#8	4'-11"
#6	2'-9"	#9	6'-2"











NO.	REVISION	DATE:	BY:

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W. VA. DEPARTMENT OF HIGHWAYS
ENGINEERING DIVISION

BOWERS BRIDGE
C.R. 113 over
BUFFALO CREEK

DESIGNED	LWS	DATE 7/00
DRAWN	JKB	8/00
CHECKED	DWK	10/00
REVIEWED	DWK	1/02

REINFORCING BARS
SHEET 1 OF 2

SHEET 7 OF 21
BRIDGE NO. 10060

PROJECT NUMBERS		DISTRICT	COUNTY	SHEET NO.	TOTAL
STATE	FEDERAL				
S325-113-0.32	BR-0113(007)E	4	MARION	17	44

MARK	TYPE	NUMBER	LENGTH	A	B	C	D	E	R
		SLAB							
S301	BENT	283	3'-3"						
S401	STR.	135	34'-5"						
S402	STR.	447	26'-9"						
S403	20	193	5'-0"	2'-3"	6"				
S404	12	265	8'-3"	1'-8"	1'-0"	5'-7"	1"	1'-0"	
S405	STR.	16	7'-6"						
S406	10	106	13'-3"	3'-0"	10'-3"				
S407	STR	28	7'-11"						
S408	STR	8	2'-6"						
S409	STR	60	38'-6"						
S410	22	265	4'-10"	1'-8"	8"	2'-6"			
S411	STR	50	37'-10"						
S501	STR.	135	34'-10"						
S502	STR	322	7'-11"						
S503	BENT	283	4'-9"						
S504	BENT	275	4'-8"						
S505	BENT	8	6'-1¼"						
S506	STR.	36	5'-1"						
S507			Not Used				3"		
S508	STR	30	26'-9"						
S509	STR	106	8'-7"						
S601	STR.	26	51'-4"						
		APPROACH SLAB 1							
AS501	STR.	20	22'-10"						
AS502	12	20	7'-6"	2'-0"	10"	4'-8"	1"	10"	
AS503	STR	20	26'-9"						
AS504	STR.	6	19'-6"						
AS505			Not Used						
AS506	STR.	22	19'-6"						
AS507	STR.	ONE	12'-10"						
AS508	11	ONE	19'-5"	7'-10"	11'-7"	1'-6"			
AS801	STR.	52	19'-6"						
AS802	STR.	ONE	12'-10"						
AS803	11	ONE	19'-5"	7'-10"	11'-7"	1'-6"			
AS804									
AS805									
AS806	STR.	ONE	13'-0"						
AS807	STR.	ONE	5'-7"						
		APPROACH SLAB 2							
AS511	STR.	20	22'-10"						
AS512	12	20	7'-7"	2'-0"	10"	4'-9"	1"	10"	
AS513	STR	20	27'-2"					10"	
AS514	STR.	29	19'-6"						
AS808	STR.	55	19'-6"						

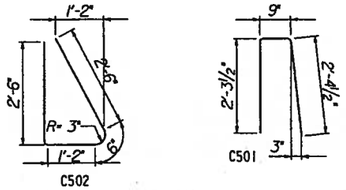
MARK	TYPE	NUMBER	LENGTH	A	B	C	D	E	R
		RETAINING WALL							
R501	STR.	8	16'-9"						
R502	STR.	20	8'-0"						
R503	11	20	4'-3"	2'-1½"	2'-1½"	1'-0¼"			
R504	11	20	4'-9"	2'-4½"	2'-4½"	2'-1"			
R505	STR.	8	9'-9"						
R506	STR.	82	3'-6"						
R507	STR.	10	17'-4"						
R508	STR.	10	9'-11"						
R509	STR.	10	11'-1"						
R510			3'-9"						
thru	STR	2 EA.	thru						
R515			5'-4"						
R516	STR.	72	4'-2"						
R517			3'-8"						
thru	STR.	2 EA.	THRU						
R526			6'-5"						
R527	STR.	26	6'-9"						
R528	NOT USED								
R529			15'-8"						
thru	STR.	2 EA.	THRU						
R533			4'-2"						
R534	11	2	17'-7"	16'-3"	1'-4"	5"			
R535	NOT USED								
R536			6'-4"						
thru	STR	2 EA.	thru						
R544			2'-8"						
R545	NOT USED								
R546			9'-0"						
thru	STR	2 EA.	THRU						
R549			3'-2"						
R550	11	2	10'-8"	9'-5"	1'-3"	6½"			

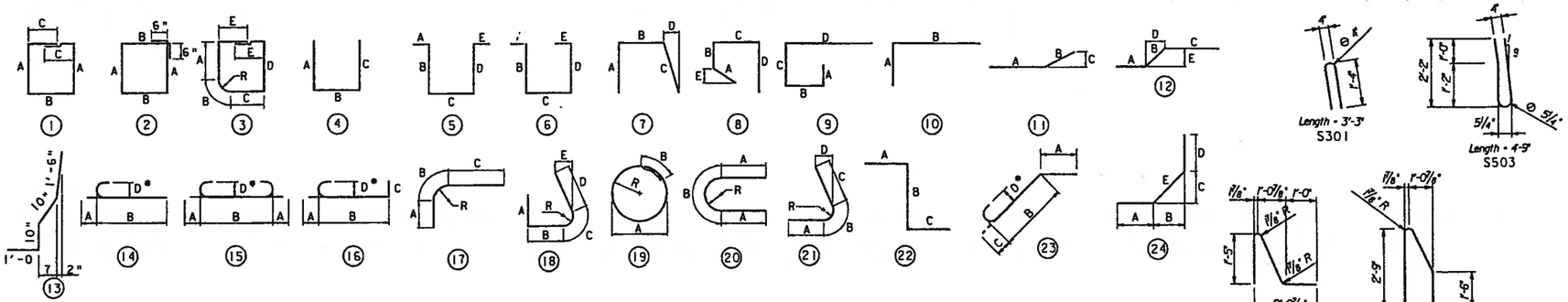
NOTE:

- SEE ACI DETAILING MANUAL FOR STANDARD HOOK DIMENSIONS. ALL DIMENSIONS ARE OUT TO OUT.
- FIGURES IN CIRCLES SHOW TYPES.
- "*" DIMENSION ON 180° HOOKS TO BE SHOWN ONLY WHERE NECESSARY TO RESTRICT HOOK SIZE. OTHERWISE STANDARD HOOKS ARE TO BE USED.
- REINFORCING BARS FOR THE THE SLAB ARE EPOXY COATED.
- REINFORCING BARS FOR THE THE RETAINING WALL AND APPROACH SLABS ARE UNCOATED.

MINIMUM LAP SPLICES UNLESS OTHERWISE NOTED:

#4	1'-9"	#7	3'-9"
#5	2'-2"	#8	4'-11"
#6	2'-9"	#9	6'-2"





NO.	REVISION	DATE:	BY:

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W. VA. DEPARTMENT OF HIGHWAYS
ENGINEERING DIVISION

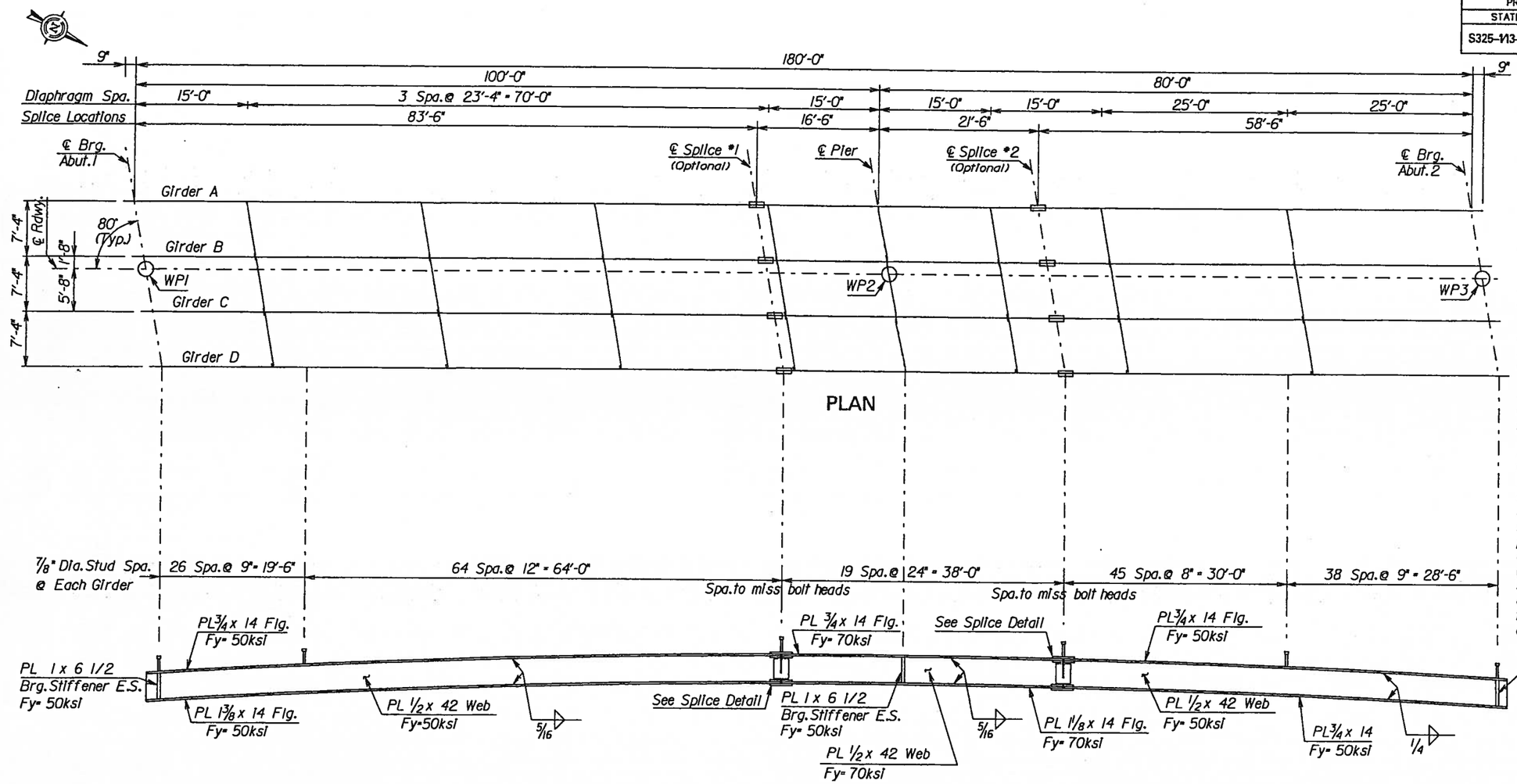
BOWERS BRIDGE
C.R. 113 over
BUFFALO CREEK

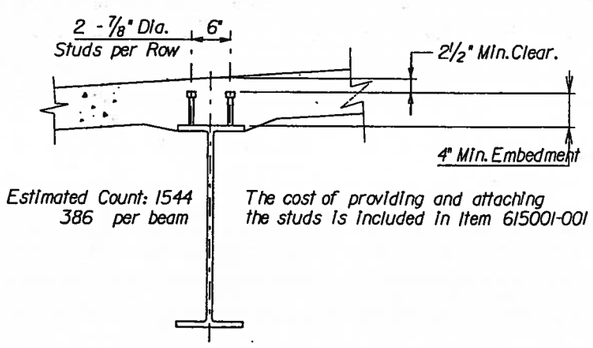
DESIGNED SLD	DATE 7/00	
DRAWN JRB	9/00	
CHECKED DWK	10/00	
REVIEWED RYLA	1/02	

REINFORCING BARS
SHEET 2 OF 2

SHEET 8 OF 21
BRIDGE NO. 10060

PROJECT NUMBERS		DISTRICT	COUNTY	SHEET NO.	TOTAL
STATE	FEDERAL				
S325-113-0.32	BR-0113(007)E	4	MARION	18	44





Estimated Count: 1544
386 per beam

The cost of providing and attaching the studs is included in Item 615001-001

STUD DETAIL

NOTE:

All girder flanges, webs, and splice plates shall be weathering steel in accordance with AASHTO M270 Grade 50W-T2 or ASTM A709, HPS70W-T2 steel as specified on the elevation view. All other structural steel shall be in accordance with AASHTO M270, Grade 50W.

All girders are parallel. All centerlines of bearing and centerlines of splice are parallel.

Bearing stiffeners and ends of girders shall be vertical under full dead load at 68°F.

All fasteners shall be High Strength Bolts 7/8" inches in diameter, unless otherwise noted.

Splices, crossframes and transverse intermediate stiffeners may be perpendicular to the girder flanges.

All welded stud shear connectors shall conform to the requirements of Section 615.3.3 of the Standard Specifications. The connectors shall be attached in the field. No shop installation of welded stud shear connectors shall be permitted. The field installation of the connectors shall not commence prior to the installation of the deck forms in the area surrounding the studs. Exterior deck overhang forms may be installed after the welded stud shear connectors. The shear connectors and deck forms shall be installed in a sequence that permits workers access through the deck area without walking through installed connectors.

E.S.—Each Side

NO.	REVISION	DATE:	BY:

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W. VA. DEPARTMENT OF HIGHWAYS
ENGINEERING DIVISION

BOWERS BRIDGE
C.R. 113 over
BUFFALO CREEK

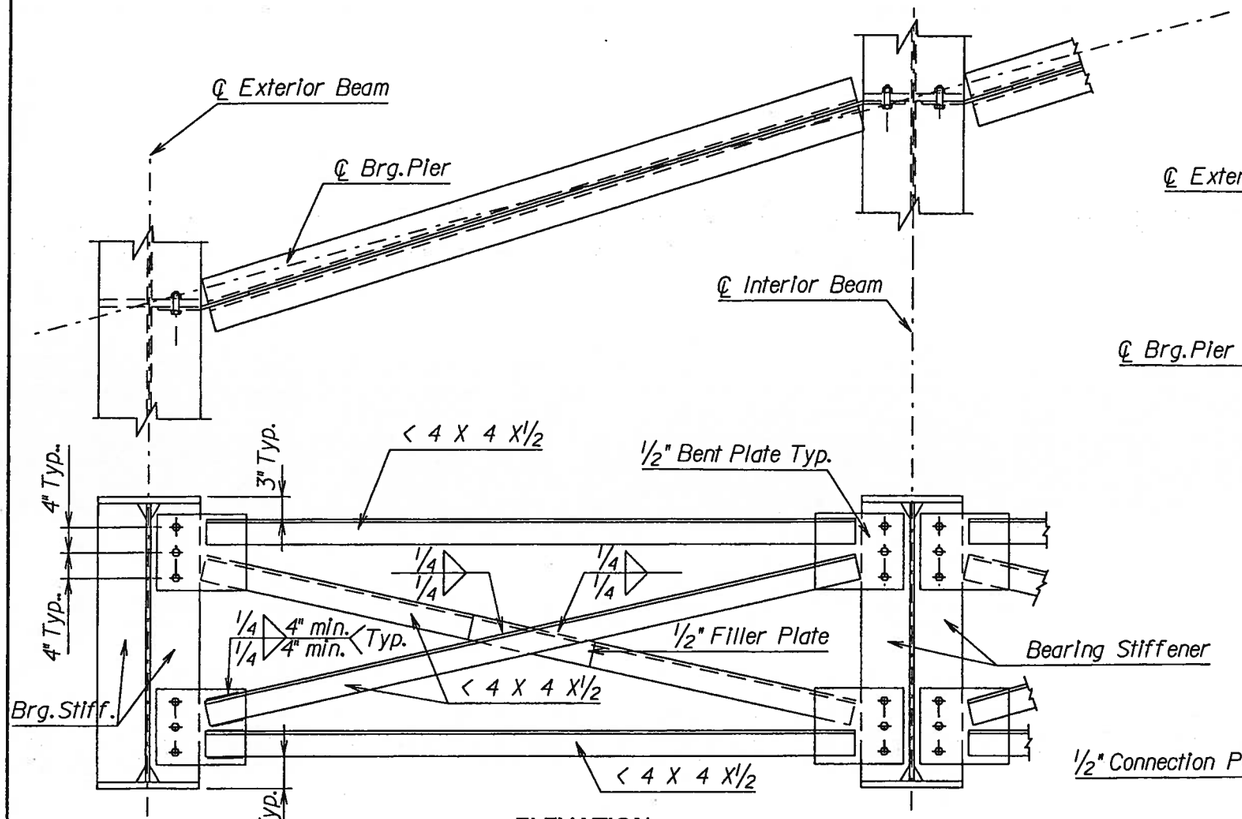
DESIGNED	DATE
R.L.D.	12/01
DRAWN R.L.D.	12/01
CHECKED R.N.A.	1/02
REVIEWED	

FRAMING PLAN

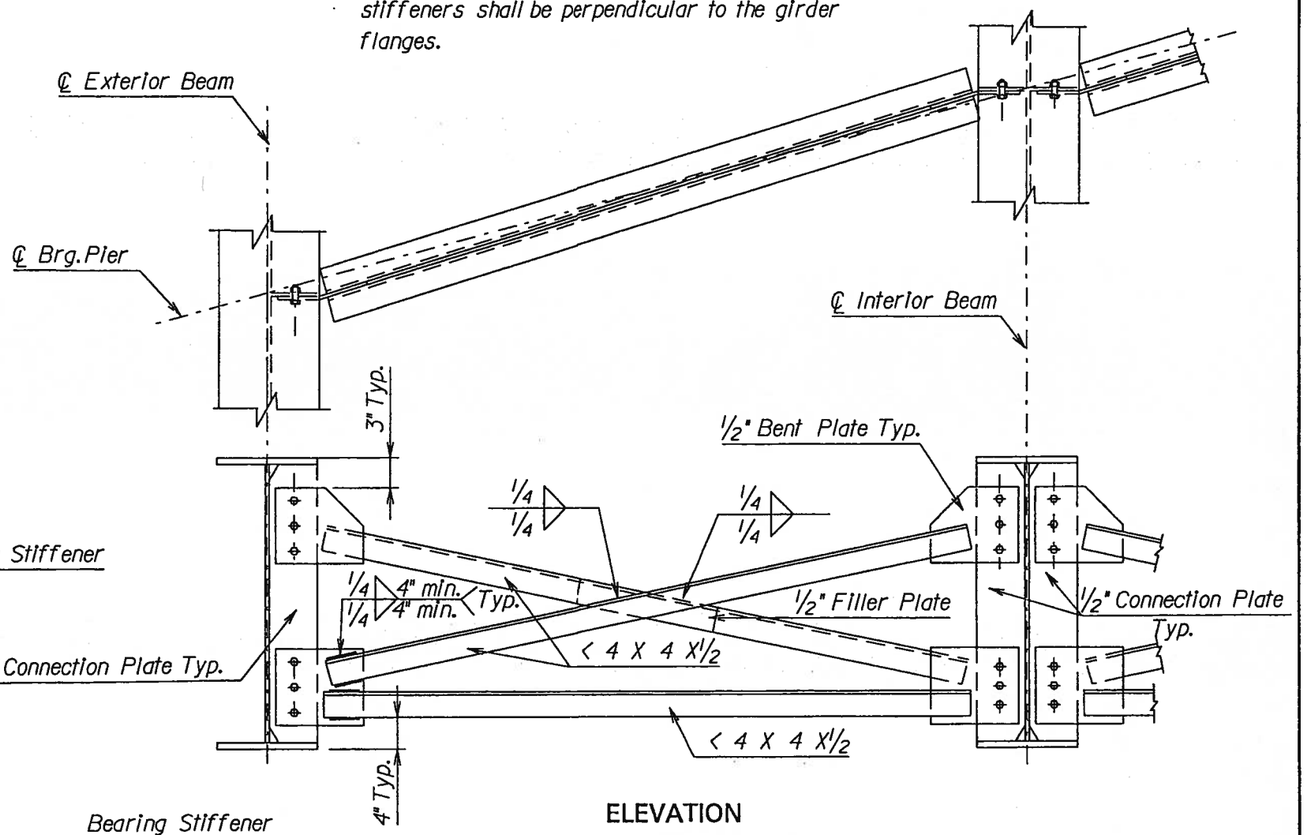
SHEET 9 OF 21
BRIDGE NO. 10060

PROJECT NUMBERS		DISTRICT	COUNTY	SHEET NO.	TOTAL
STATE	FEDERAL				
S325-113-0.32	BR-0113(007)E	4	MARION	19	44

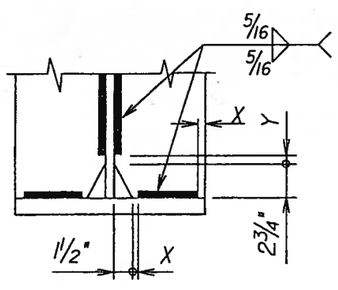
NOTE:
Splices, crossframes and transverse intermediate stiffeners shall be perpendicular to the girder flanges.



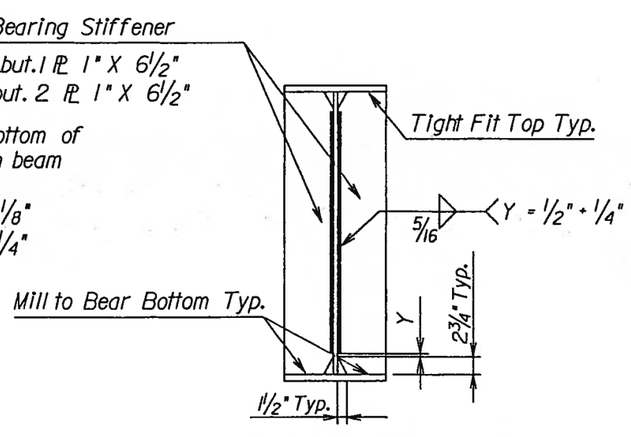
ELEVATION
PIER DIAPHRAGM



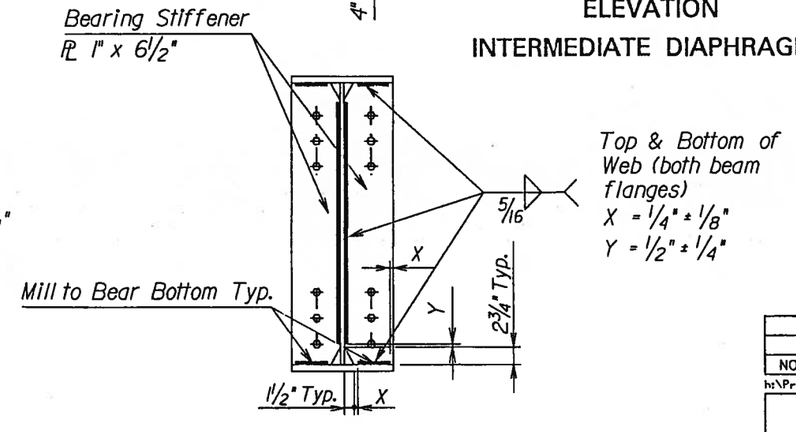
ELEVATION
INTERMEDIATE DIAPHRAGMS



CONNECTION PLATE
WELD AND CLIP DETAIL



BEARING STIFFENER DETAIL
@ ABUTMENT



BEARING STIFFENER DETAIL
@ PIER

NO.	REVISION	DATE:	BY:

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W. VA. DEPARTMENT OF HIGHWAYS
ENGINEERING DIVISION

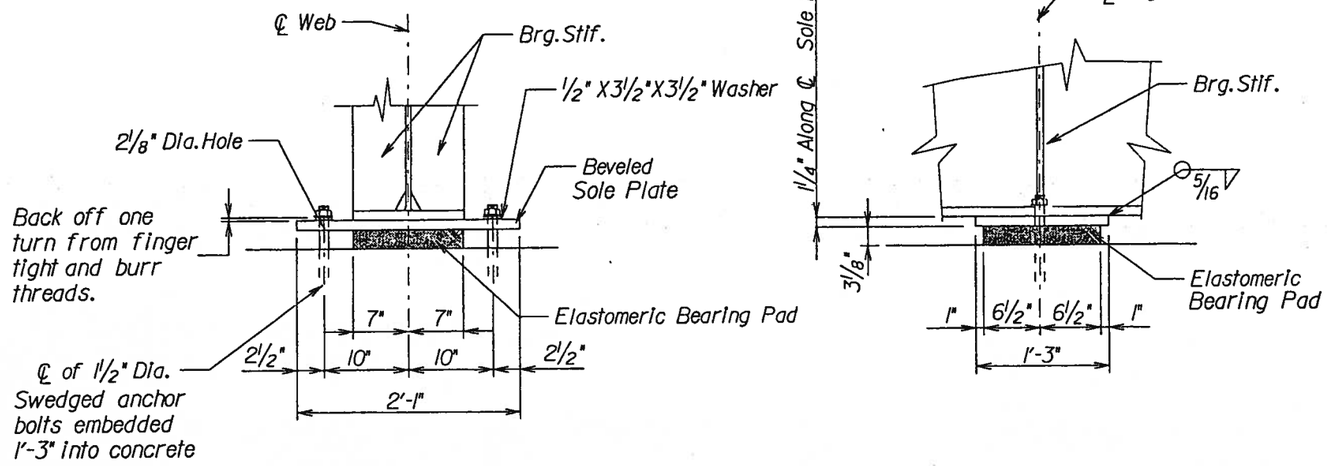
BOWERS BRIDGE
C.R. 113 over
BUFFALO CREEK

DESIGNED	DATE
R.L.D.	12/01
DRAWN	
R.L.D.	12/01
CHECKED	
R.M.A.	1/02
REVIEWED	

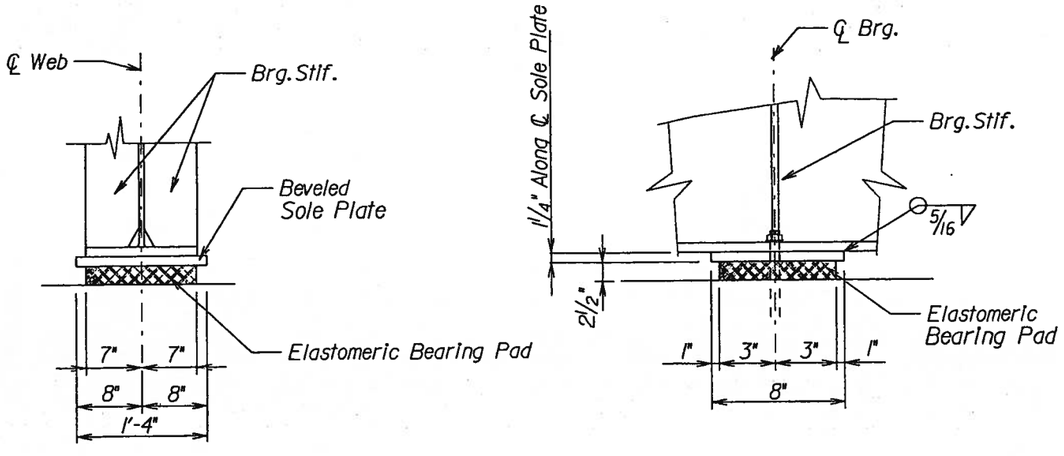
STEEL DETAILS
DIAPHRAGMS

SHEET 10 OF 21
BRIDGE NO. 10060

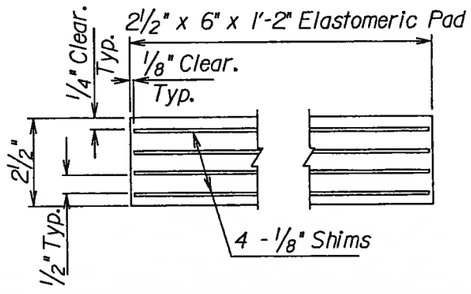
PROJECT NUMBERS		DISTRICT	COUNTY	SHEET NO.	TOTAL
STATE	FEDERAL				
S325-113-0.32	BR-0113(007)E	4	MARION	20	44



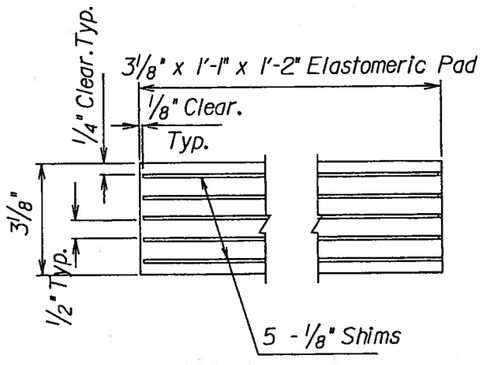
FIXED BEARING @ PIER
(4 REQUIRED)



BEARING @ ABUTMENT NO 1 & 2
(8 REQUIRED)



ELASTOMERIC BEARING PAD
@ ABUTMENTS (8 Required)



ELASTOMERIC BEARING PAD
@ PIER (4 Required)

BEARING NOTES:

The provisions for fabrication, installation, testing, and shipping of Elastomeric Bearings, specified in Section 18, "Bearing Devices," of the AASHTO LRFD Bridge Construction Specifications, shall apply. The laminate material shall be AASHTO M183 or equivalent in the thickness detailed.

The cost of Elastomeric Bearing pads shall be included in the price bid for item 615001-001.

The Bearings shall be low temperature Grade 3 and have a Shear Modulus between 130 and 175 psi, Durometer hardness of 60.

Bevel the top of the sole plates so that the bottom surface is horizontal under full dead load.

Do not paint the steel sole plate surface in contact with the bearing pad.

Bearing surfaces shall be finished according to Section 615.4.6. Finish in the direction of rotation.

NO.	REVISION	DATE:	BY:

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W. VA. DEPARTMENT OF HIGHWAYS
ENGINEERING DIVISION

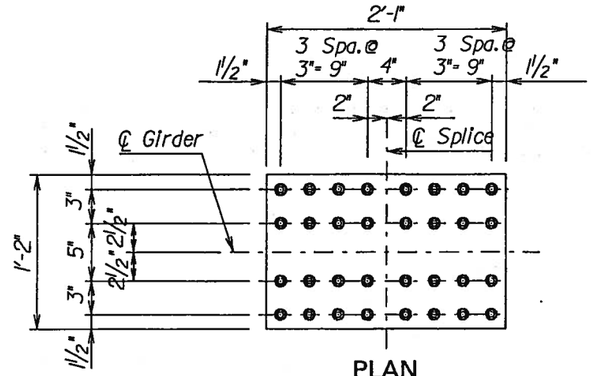
BOWERS BRIDGE
C.R. 113 over
BUFFALO CREEK

DESIGNED	DATE
R.L.D.	12/01
DRAWN	
R.L.D.	12/11
CHECKED	
R.M.A.	1/02
REVIEWED	

STEEL DETAILS
BEARINGS

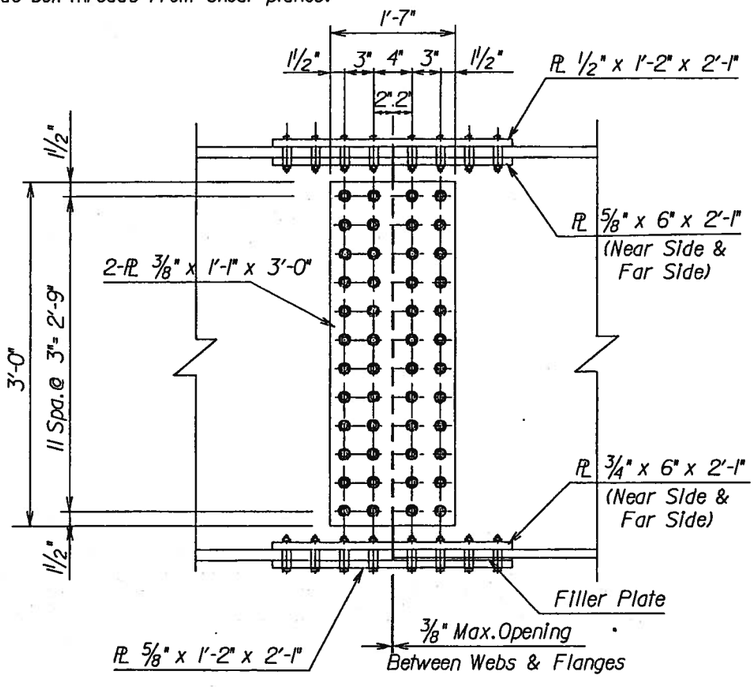
SHEET 11 OF 21
BRIDGE NO. 10060

PROJECT NUMBERS		DISTRICT	COUNTY	SHEET NO.	TOTAL
STATE	FEDERAL				
S325-113-0.32	BR-0113(007)E	4	MARION	21	44

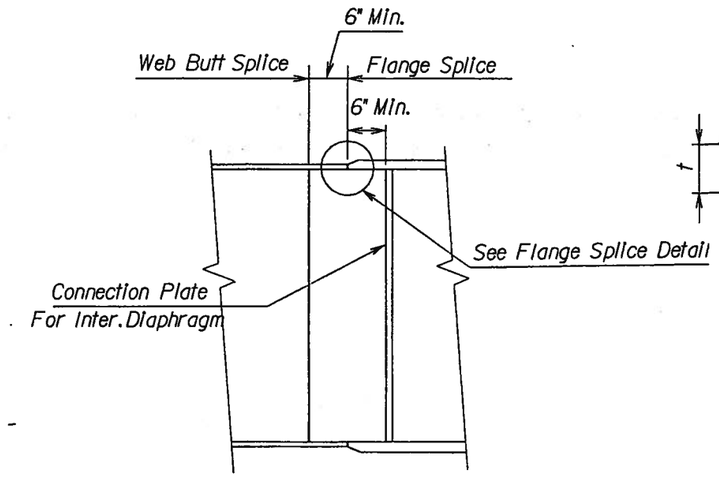


PLAN

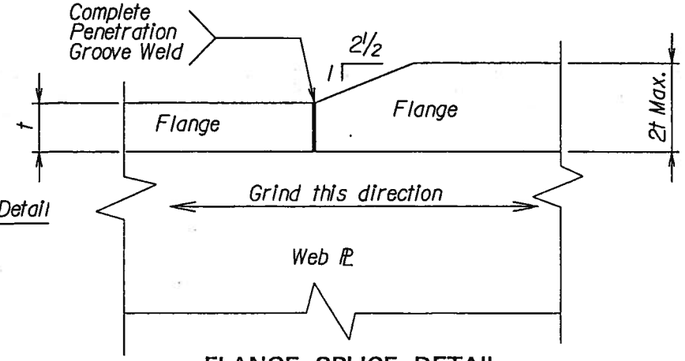
Notes:
1) Bolt spacing same for top & bot. flange.
2) Exclude bolt threads from shear planes.



ELEVATION
SPLICE DETAIL

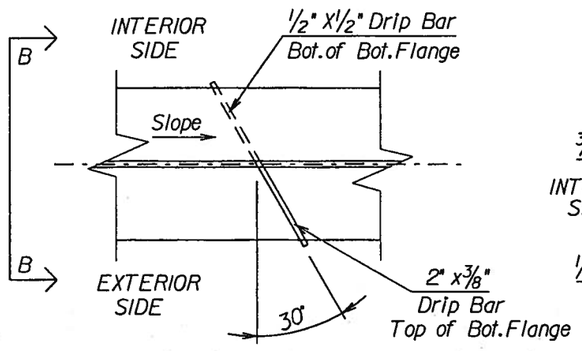


ELEVATION

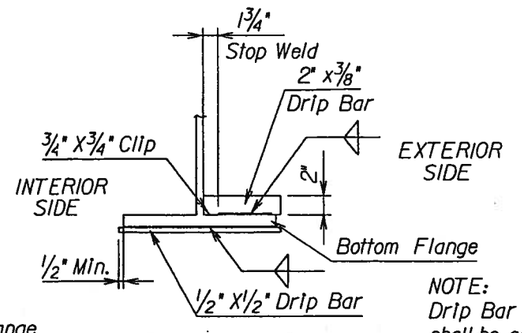


FLANGE SPLICE DETAIL

WELDED SPLICE DETAIL
(OPTIONAL)

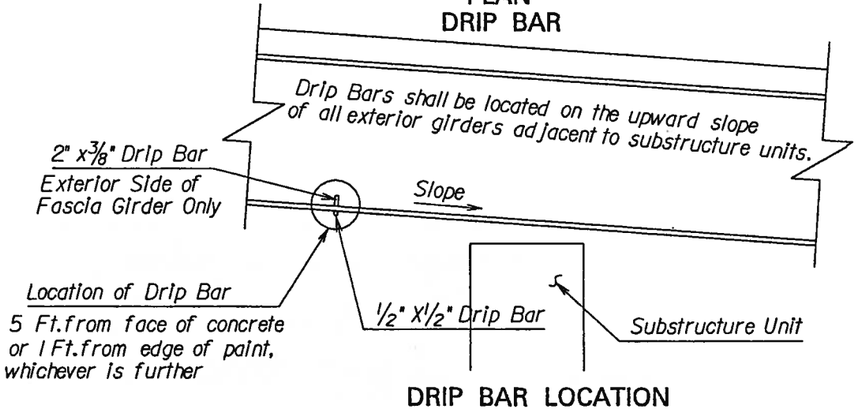


PLAN
DRIP BAR



SECTION B–B

NOTE:
Drip Bar on top of bottom flange shall be caulked against flange, web, and fillet weld with dark brown caulking subject to the approval of the Engineer. Include cost in Item 615001-001.



DRIP BAR LOCATION

NO.	REVISION	DATE:	BY:

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W. VA. DEPARTMENT OF HIGHWAYS
ENGINEERING DIVISION

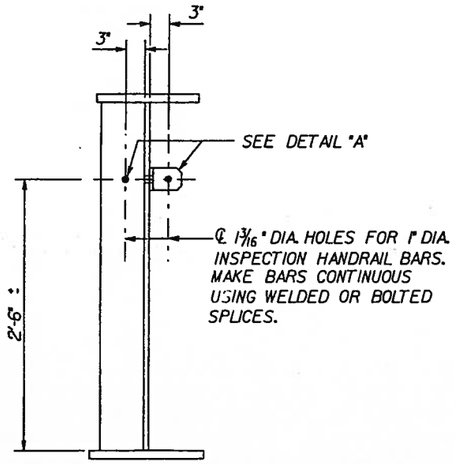
BOWERS BRIDGE
C.R. 113 over
BUFFALO CREEK

DESIGNED R.L.D.	DATE 12/01	
DRAWN R.L.D.	12/01	
CHECKED R.M.A.	1/02	
REVIEWED		

STEEL DETAILS
SPLICES AND DRIP BAR

SHEET 12 OF 21
BRIDGE NO. 10060

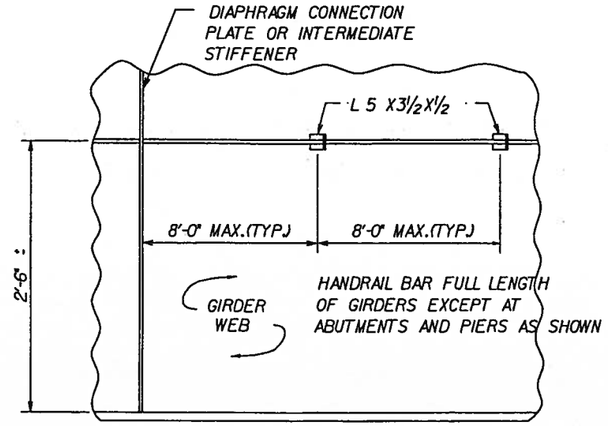
PROJECT NUMBERS		DISTRICT	COUNTY	SHEET NO.	TOTAL
STATE	FEDERAL				
S325-113-0.32	BR-0113(007)E	4	MARION	22	44



HALF SECTION AT DIAPHRAGMS CONNECTION PLATES OR INTERMEDIATE STIFFENERS

HALF SECTION BETWEEN DIAPHRAGM CONNECTION PLATES OR INTERMEDIATE STIFFENERS

SECTION FOR INSPECTION HANDRAIL INSTALLATION

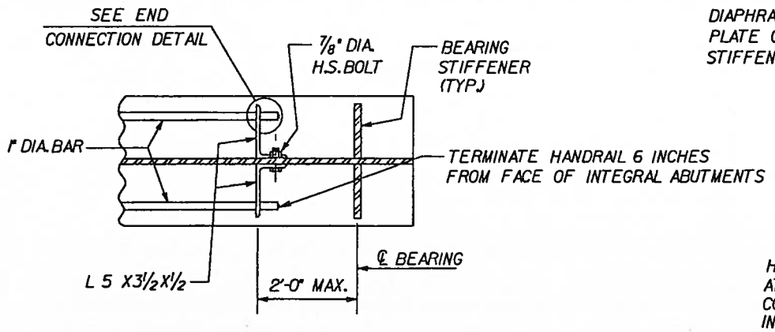


HANDRAIL ELEVATION

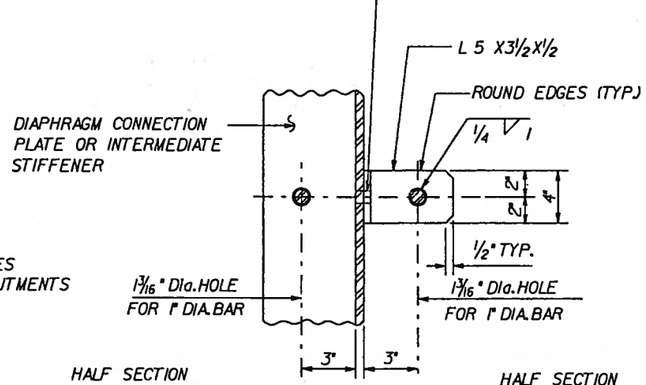
NOTE:

INSTALL HANDRAIL ON BOTH SIDES OF INTERIOR GIRDERS AND ON THE INSIDE OF THE EXTERIOR GIRDERS.

INCLUDE THE COST OF HANDRAIL IN ITEM 615001-001, STEEL SUPERSTRUCTURE.



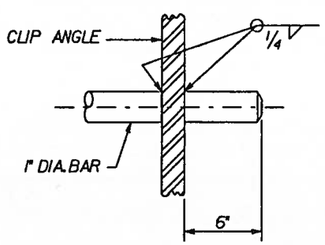
INSPECTION HANDRAIL PLAN AT ABUTMENTS AND PIERS



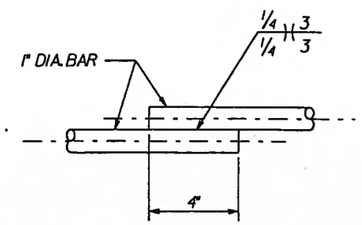
HALF SECTION AT DIAPHRAGM CONNECTION PLATES OR INTERMEDIATE STIFFENERS

HALF SECTION BETWEEN DIAPHRAGM CONNECTION PLATES OR INTERMEDIATE STIFFENERS

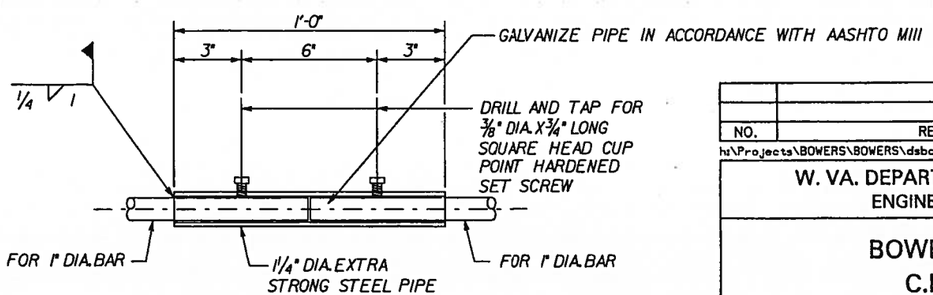
DETAIL "A"



END CONNECTION DETAIL



WELDED SHOP SPLICE DETAIL



BOLTED FIELD SPLICE DETAIL

NO.	REVISION	DATE:	BY:

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W. VA. DEPARTMENT OF HIGHWAYS
ENGINEERING DIVISION

BOWERS BRIDGE
C.R. 113 over
BUFFALO CREEK

DESIGNED	R.L.D.	DATE 12/01
DRAWN	R.L.D.	12/01
CHECKED	K.M.A.	2/01
REVIEWED		

HANDRAIL DETAILS

SHEET 13 OF 21
BRIDGE NO. 10060

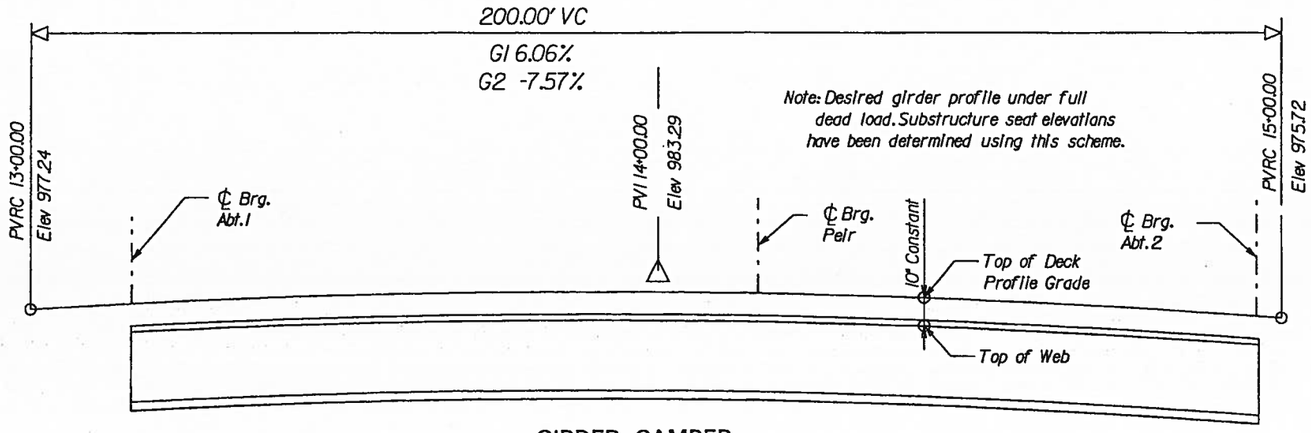
PROJECT NUMBERS		DISTRICT	COUNTY	SHEET NO.	TOTAL
STATE	FEDERAL				
S325-113-0.32	BR-0113(007)E	4	MARION	23	44

ROADWAY ELEVATIONS

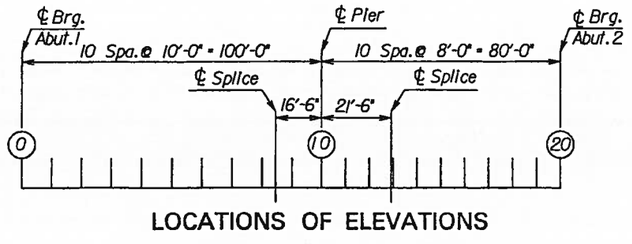
LOCATION	GIRDER A	GIRDER B	GIRDER C	GIRDER D
ABUT.1 0	977.86	978.07	978.06	977.97
1	978.33	978.54	978.51	978.42
2	978.74	978.93	978.90	978.80
3	979.08	979.26	979.22	979.11
4	979.35	979.52	979.47	979.35
5	979.55	979.71	979.65	979.53
6	979.68	979.84	979.77	979.63
7	979.74	979.89	979.82	979.67
8	979.74	979.88	979.79	979.64
9	979.67	979.80	979.71	979.54
PIER 10	979.53	979.65	979.55	979.38
11	979.37	979.48	979.37	979.20
12	979.16	979.27	979.15	978.97
13	978.91	979.02	978.89	978.70
14	978.62	978.72	978.59	978.39
15	978.29	978.38	978.24	978.03
16	977.91	977.99	977.84	977.63
17	977.49	977.56	977.41	977.18
18	977.02	977.09	976.93	976.70
19	976.51	976.57	976.40	976.17
ABUT.2 20	975.96	976.01	975.83	975.59

DEADLOAD DEFLECTIONS (FEET)

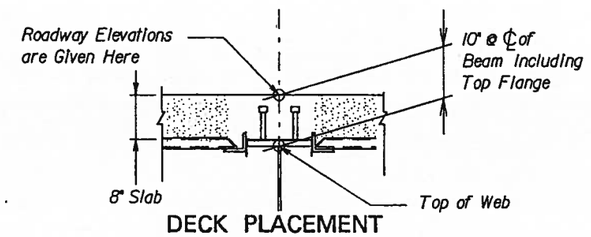
LOCATION	GIRDER A			GIRDERS B&C			GIRDER D		
	STEEL	CONCRETE	TOTAL	STEEL	CONCRETE	TOTAL	STEEL	CONCRETE	TOTAL
ABUT.1 0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1	0.015	0.072	0.087	0.015	0.069	0.084	0.015	0.063	0.078
2	0.027	0.129	0.156	0.027	0.123	0.150	0.027	0.113	0.140
3	0.036	0.171	0.207	0.036	0.163	0.199	0.036	0.149	0.185
4	0.042	0.196	0.238	0.042	0.186	0.228	0.042	0.170	0.212
5	0.041	0.194	0.235	0.042	0.185	0.227	0.041	0.169	0.210
6	0.037	0.171	0.208	0.037	0.163	0.200	0.037	0.149	0.186
7	0.029	0.135	0.164	0.030	0.129	0.159	0.029	0.118	0.147
8	0.019	0.086	0.105	0.019	0.082	0.101	0.019	0.075	0.094
9	0.008	0.036	0.044	0.008	0.034	0.042	0.008	0.031	0.039
PIER 10	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
11	-0.002	-0.007	-0.009	-0.002	-0.006	-0.008	-0.002	-0.006	-0.008
12	-0.002	0.001	-0.001	-0.002	0.002	0.000	-0.002	0.001	-0.001
13	-0.001	0.010	0.009	-0.001	0.011	0.010	-0.001	0.009	0.008
14	0.002	0.025	0.027	0.002	0.026	0.028	0.002	0.022	0.024
15	0.005	0.046	0.051	0.006	0.046	0.052	0.005	0.040	0.045
16	0.006	0.049	0.055	0.006	0.049	0.055	0.006	0.043	0.049
17	0.006	0.047	0.053	0.006	0.047	0.053	0.006	0.041	0.047
18	0.005	0.039	0.044	0.006	0.039	0.045	0.005	0.034	0.039
19	0.003	0.023	0.026	0.003	0.023	0.026	0.003	0.020	0.023
ABUT.2 20	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000



GIRDER CAMBER



LOCATIONS OF ELEVATIONS



DECK PLACEMENT OVER BEAM

NOTES:

Dead load deflections and roadway elevations given in the table are located at the centerline of the girder.

After all the superstructure steel has been erected and falsework removed, the Contractor shall take elevations along the top of the girder flanges at the points where the roadway elevations are shown. The difference between these elevations and the roadway elevations, plus the concrete dead load deflection will be the thickness of the slab at these points. The minimum slab thickness over the steel shall not be less than 8 1/4" at the centerline of the girder. If the girder has excessive camber and this minimum cannot be obtained, the roadway grade shall be adjusted to obtain this thickness.

NO.	REVISION	DATE:	BY:

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W. VA. DEPARTMENT OF HIGHWAYS
ENGINEERING DIVISION

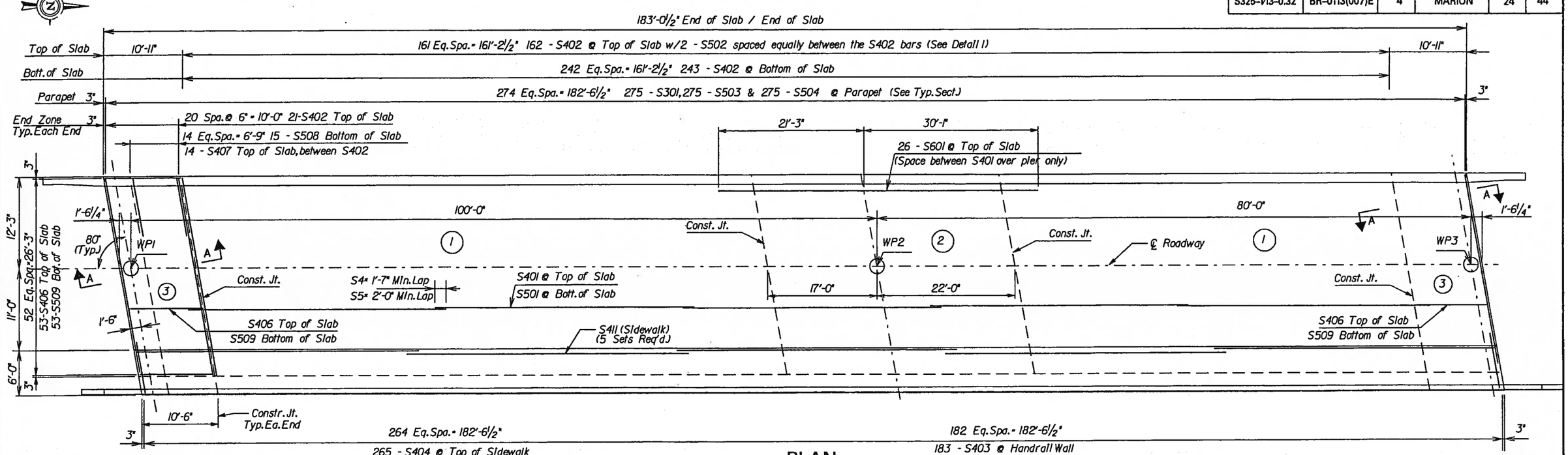
BOWERS BRIDGE
C.R. 113 over
BUFFALO CREEK

DESIGNED LWS	DATE 10/01
DRAWN LWS	10/01
CHECKED R.L.S.	1/02
REVIEWED R.L.S.	1/02

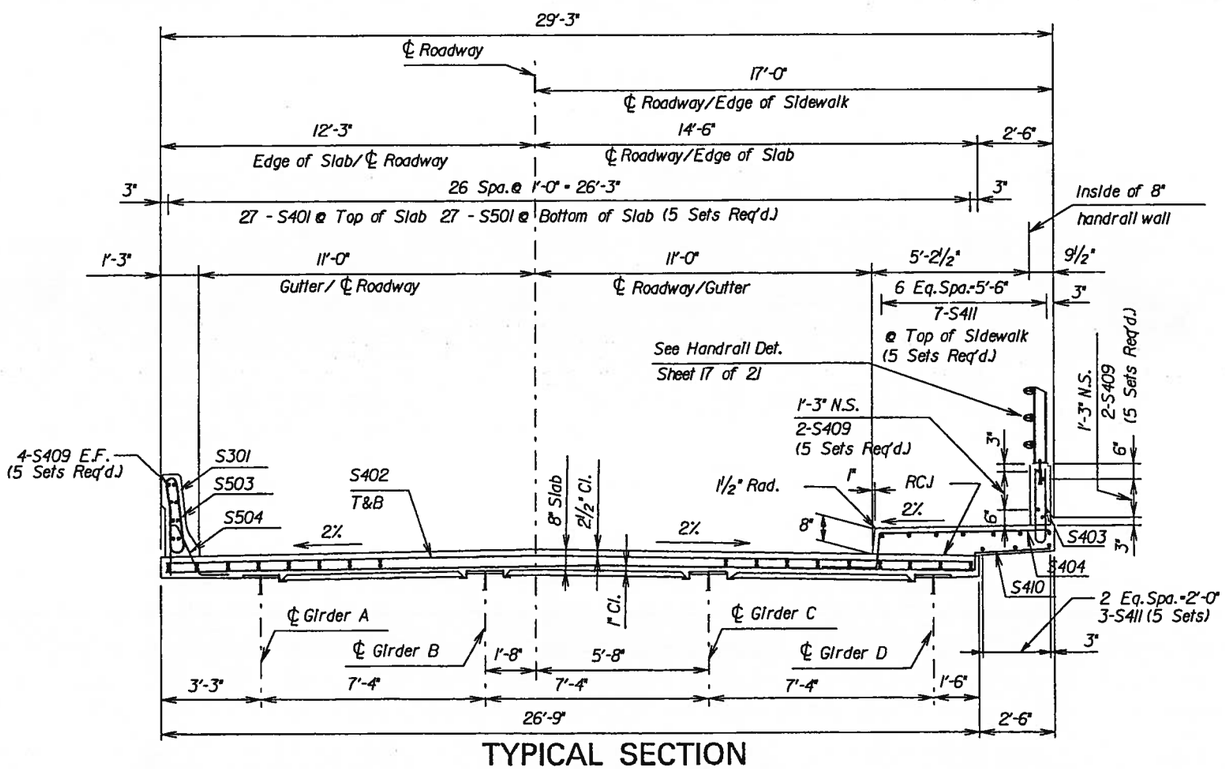
ELEVATIONS & DEFLECTIONS

SHEET 14 OF 21
BRIDGE NO. 10060

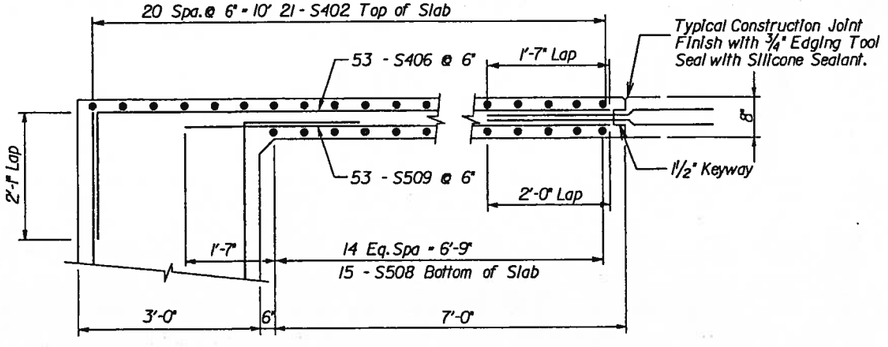
PROJECT NUMBERS		DISTRICT	COUNTY	SHEET NO.	TOTAL
STATE	FEDERAL				
S325-113-0.32	BR-0113(007)E	4	MARION	24	44



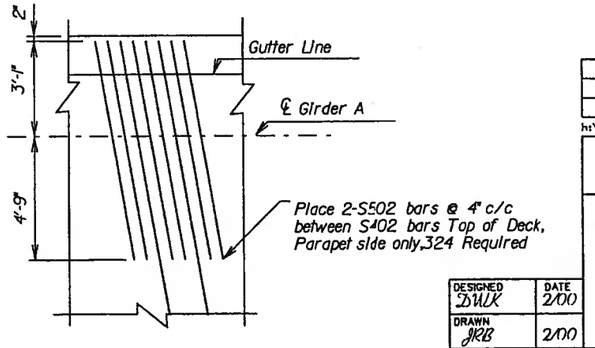
PLAN



TYPICAL SECTION



SECT A-A



DETAIL 1

NOTE: All transverse reinforcement is oriented parallel to centerline of bearing.

NO.	REVISION	DATE:	BY:

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W. VA. DEPARTMENT OF HIGHWAYS
ENGINEERING DIVISION

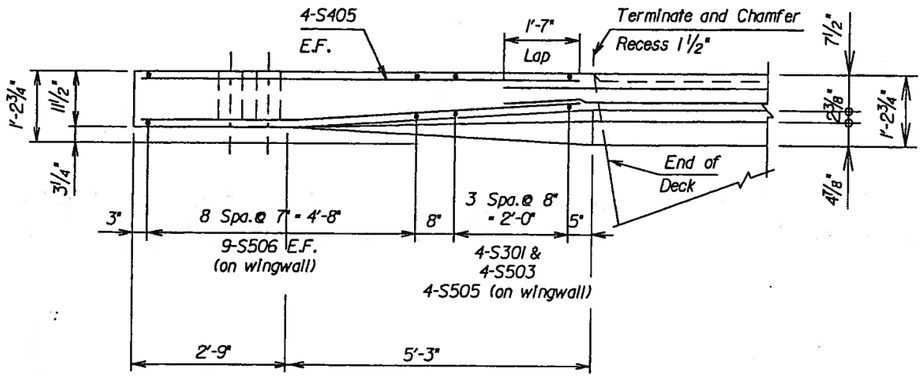
BOWERS BRIDGE
C.R. 113 over
BUFFALO CREEK

DESIGNED	DWK	DATE 2/00
DRAWN	JRB	2/00
CHECKED	RLD	1/02
REVIEWED	RMA	1/02

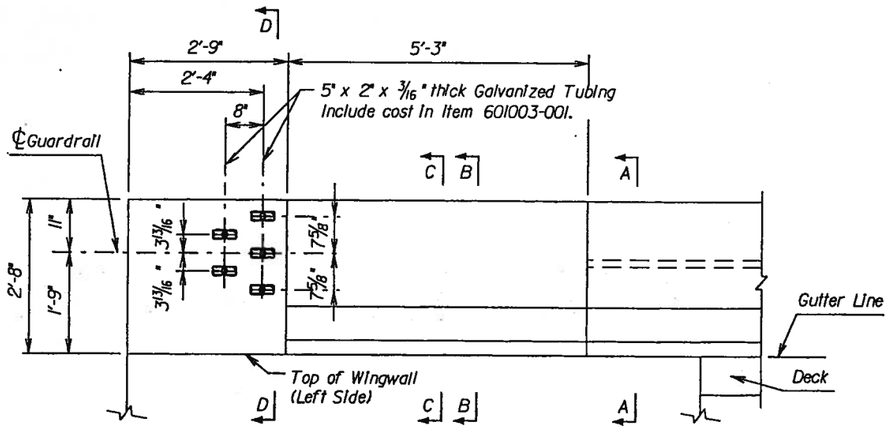
SLAB
(Sheet 1 of 3)

SHEET 15 OF 21
BRIDGE NO. 10060

PROJECT NUMBERS		DISTRICT	COUNTY	SHEET NO.	TOTAL
STATE	FEDERAL				
S325-113-0.32	BR-0113(007)E	4	MARION	25	44

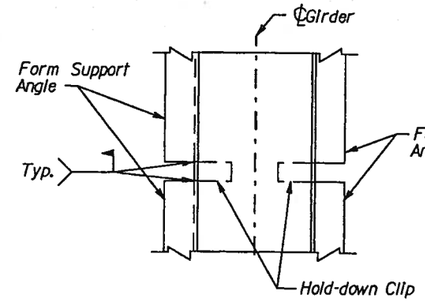


PLAN

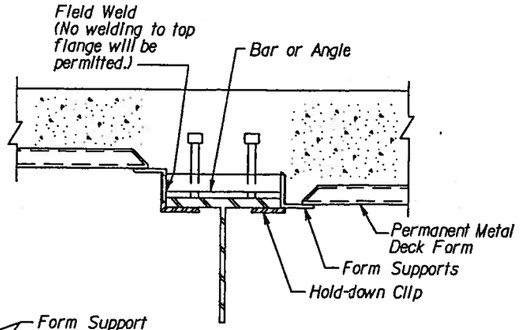


ELEVATION

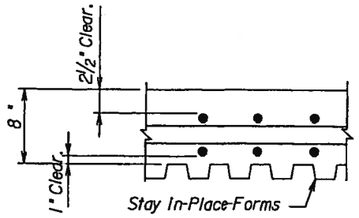
END PARAPET ATOP WINGWALL



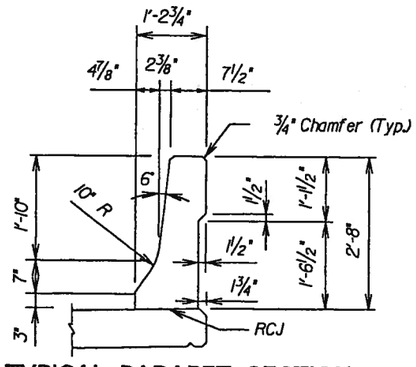
PLAN



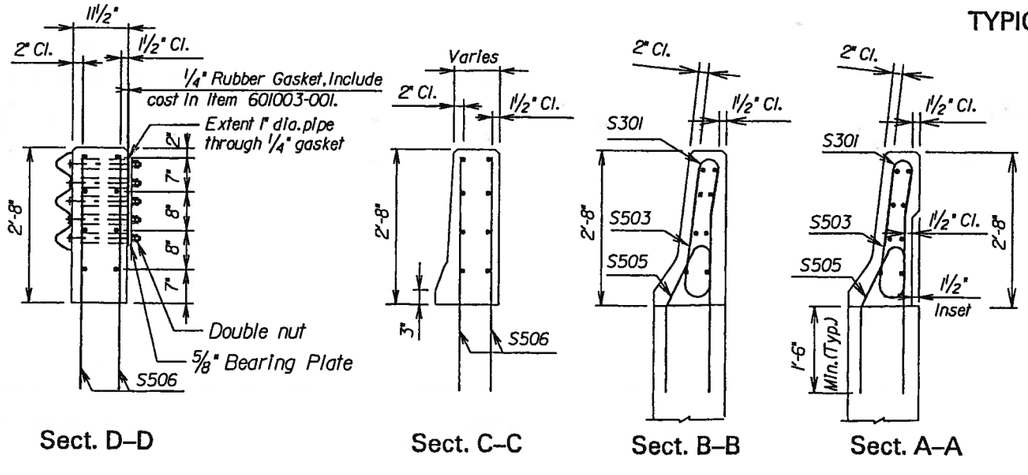
ELEVATION



STAY-IN-PLACE FORM

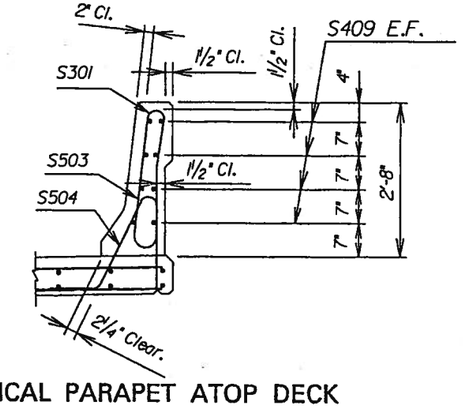


TYPICAL PARAPET SECTION ATOP DECK



Sect. D–D Sect. C–C Sect. B–B Sect. A–A

Atop Wingwalls B & C



TYPICAL PARAPET ATOP DECK WITH REINFORCING

DECK CONCRETING:

Bracing the deck overhang forms against the exterior girder may allow the forms to settle as the girder deflects laterally during the concrete placement. The contractor shall provide sufficent blocking to prevent this deflection.

The top flange of the exterior beam must be tied at regular intervals to prevent outward rotation. The maximum spacing interval is 4 feet when finishing machine rails are located on the bracket supported formwork and 8 feet when finishing machine rails are on the top flange of the beam.

The Contractor shall submit calculations and drawings for the deck overhang bracing to the Engineer for approval prior to deck placement.

The wet burlap cure period for all deck concrete shall be at least seven days. No reduction in the cure period will be permitted.

DECK PLACEMENT SEQUENCE:

The circled numbers in the deck plan show the required placement sequence of the deck. Concrete shall attain a minimum strength of 2000 psi before adjacent pours are made.

BARRIERS:
The barriers are placed without vertical joints but are vertically scored all around with a 3/4" edging tool at 20' spacing.

CLASS K CONCRETE
The deck, sidewalk and parapets shall be Class K Concrete.

GUARDRAIL CONNECTION
Connect the Thrie Beam Terminal plate and 5/8" Bearing Plate with 7/8" dia. bolts and two nuts. Tightened bottom nut against bearing plate and top nut against bottom nut to prevent nuts from loosening. Center the bolts in the 5" x 2" tubing.

Galvanizing shall be in accordance with AASHTO M111.

For reinforcing see Sheet 8 of 21.

STAY-IN-PLACE FORMS
For the purpose of estimating the quantity of Class K Concrete in the flutesof permanent metal deck forms assume a uniform thickness of one inch over the area of the stay-in-place forms. The width used shall be measured from edge of flange to edge of flange.

NO.	REVISION	DATE:	BY:

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ABBREVIATIONS:
N.F. — Near Face
F.F. — Far Face
E.F. — Each Face
RCJ — Roughened Construction Joint

W. VA. DEPARTMENT OF HIGHWAYS
ENGINEERING DIVISION

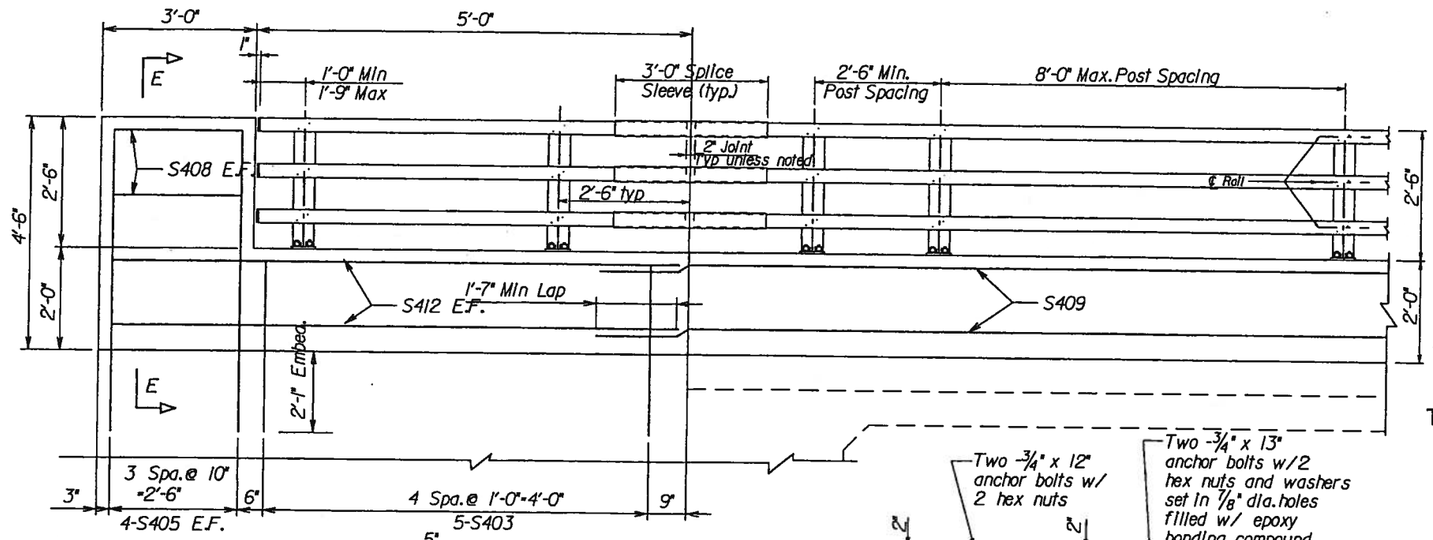
BOWERS BRIDGE
C.R. 113 over
BUFFALO CREEK

DESIGNED DWK	DATE 2/00	
DRAWN JRB	2/00	
CHECKED RLD	1/02	
REVIEWED	1/02	

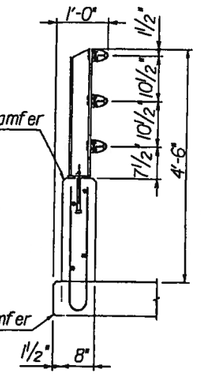
SLAB
(Sheet 2 of 3)

SHEET 16 OF 21
BRIDGE NO. 10060

PROJECT NUMBERS		DISTRICT	COUNTY	SHEET NO.	TOTAL
STATE	FEDERAL				
S325-113-0.32	BR-0113(007)E	4	MARION	26	44



TYPICAL ELEVATION



TYPICAL SECTION

NOTES:

Aluminum material shall be in accordance with Sections 709.31 through 709.41 of the Standard Specifictions.

Stainless steel bolts shall be in accordance with ASTM F593. Stainless steel nuts shall be in accordance with ASTM F594. Stainless steel washers shall be the same alloy as the bolts & nuts.

Anchor bolt assemblies shall be cast in place or drilled and grouted. All parts of the assembly shall be galvanized in accordance with ASTM A153.

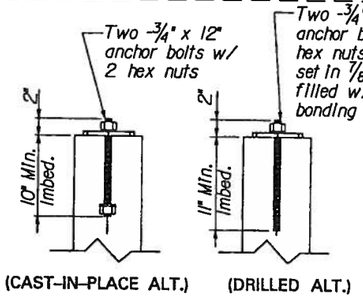
All exposed sharp edges shall be rounded. All rough-cut ends and edges shall be ground or filed smooth.

Rail posts shall be set normal to the roadway grade.

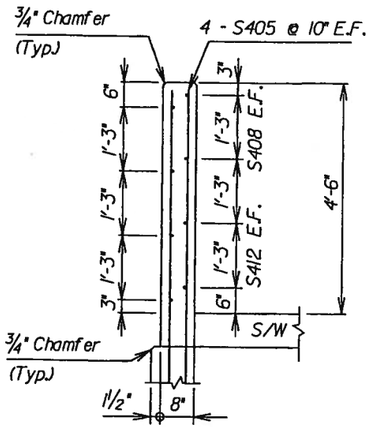
Curved rails shall be shop fabricated to the radius.

Elastomeric bearing pads shall be placed under each post. The pad shall cover the entire contact area between the post and concrete and shall be neatly trimmed. The pads shall meet the requirements of Section 715.15.

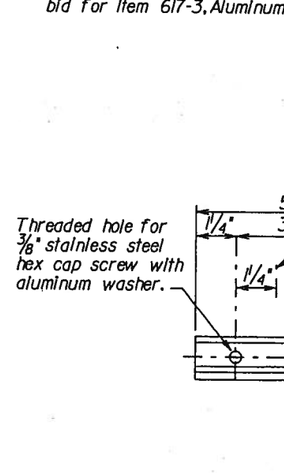
Cost of anchor bolt assemblies, railposts, rails, hardware, and elastomeric bearing pads shall be included in the unit price bid for Item 617-3, Aluminum Railing, per linear foot.



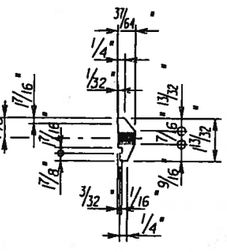
ANCHOR BOLT



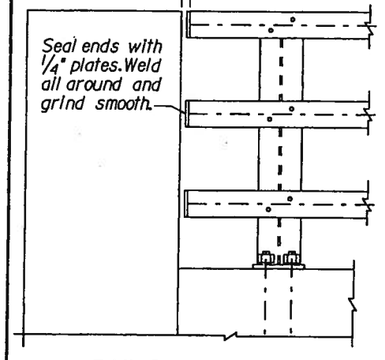
SECTION E-E



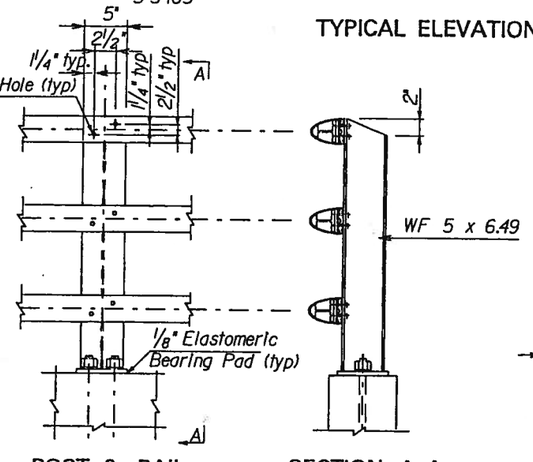
RAIL CLAMP BAR



SECTION C-C

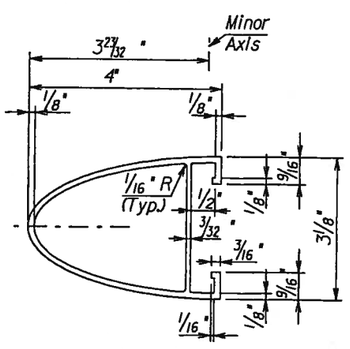


RAIL TERMINATION

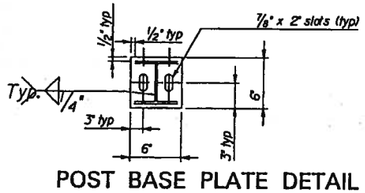


POST & RAIL CONNECTIONS

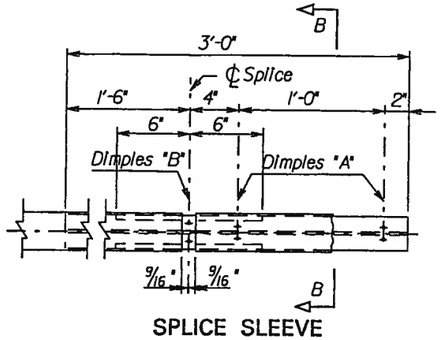
SECTION A-A



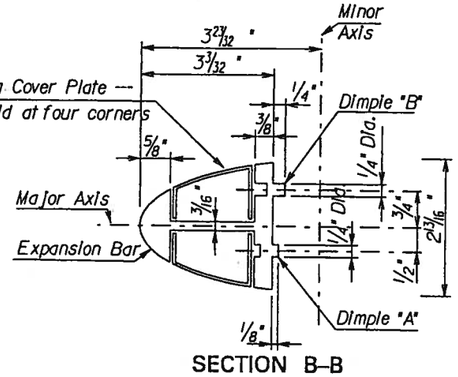
RAIL SECTION



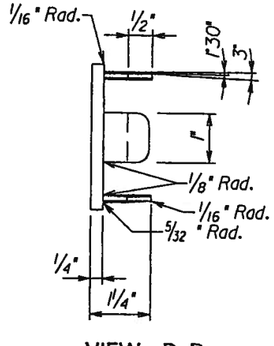
POST BASE PLATE DETAIL



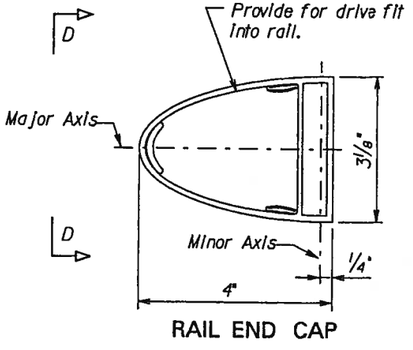
SPLICE SLEEVE



SECTION B-B (RAIL SPLICE)



VIEW D-D



RAIL END CAP

NO.	REVISION	DATE:	BY:

h:\Projects\BOWERS\BOWERS\dsbowers.slb 14-FEB-2002 08:53

W. VA. DEPARTMENT OF HIGHWAYS
ENGINEERING DIVISION

BOWERS BRIDGE
C.R. 113 over
BUFFALO CREEK

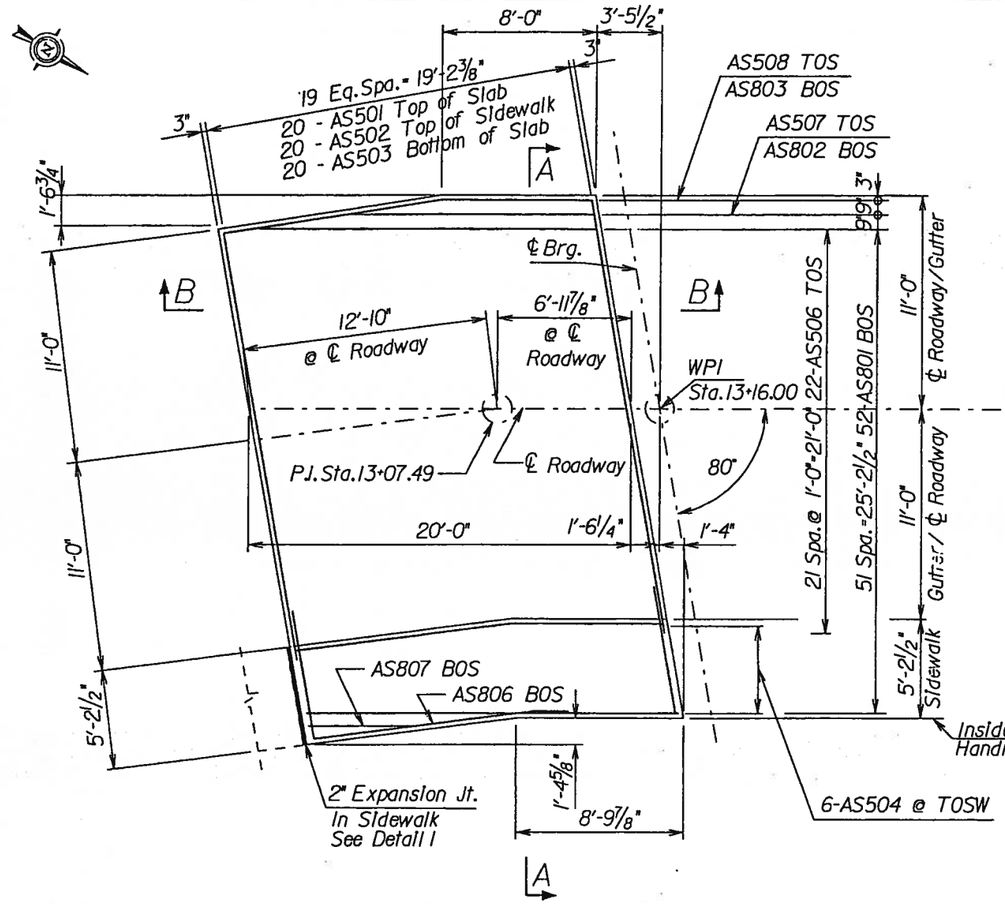
DESIGNED	DATE
DRAWN JRB	8/01
CHECKED SDWK	9/01
REVIEWED	10/02

SLAB
(Sheet 3 of 3)

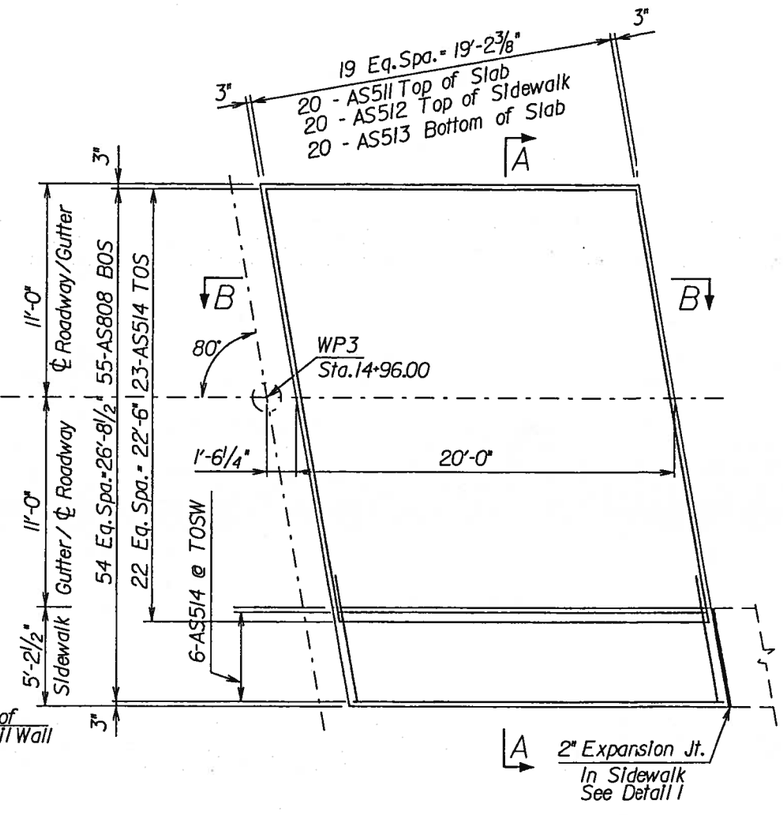
SHEET 17 OF 21

BRIDGE NO. 10060

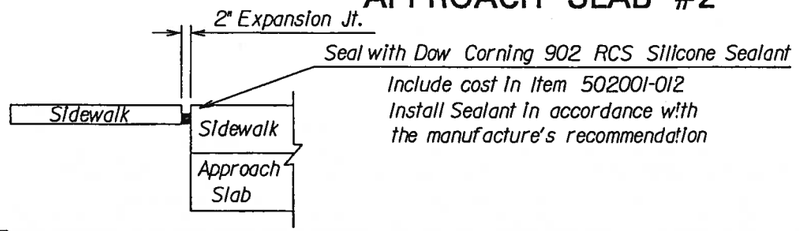
PROJECT NUMBERS		DISTRICT	COUNTY	SHEET NO.	TOTAL
STATE	FEDERAL				
S325-113-0.32	BR-0113(007)E	4	MARION	27	44



APPROACH SLAB #1



APPROACH SLAB #2



DETAIL 1

APPROACH SLABS:

The approach slabs shall be in accordance with Section 502 of the specifications, except as noted.

All joint filler for vertical joints shall be in accordance with Section 708.1.2.

Hot poured elastic joint sealer shall conform to Section 708.3.

Curing of the approach slabs shall be with burlap and water in accordance with the specifications. The use of a vapor barrier burlap will be permitted.

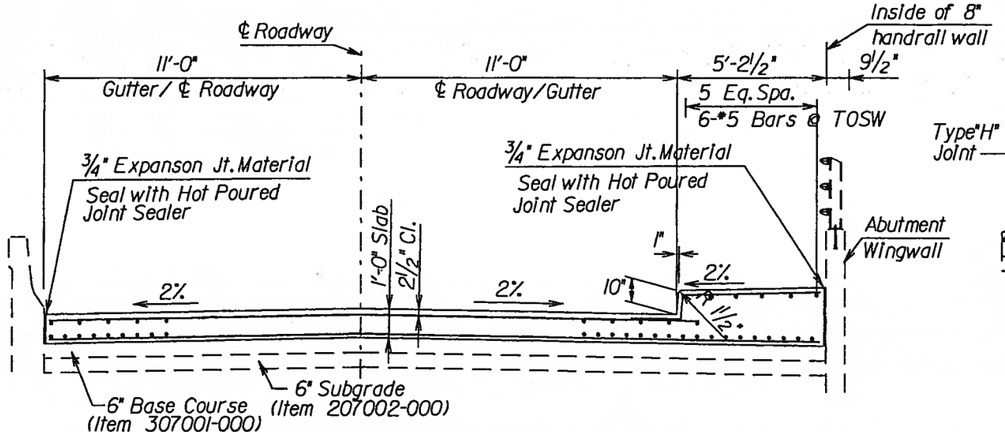
Reinforcing steel bars in the approach slabs shall be Epoxy coated and shall be in accordance with ASTM A615, Grade 60. Payment is included in Item 502001-012. For Reinforcing Steel see Sheet 8 of 21. Estimated reinforcing steel weight: 9500 Lbs.

The roadway portion of the approach slabs shall be primed with bituminous material and topped with 2 inches of HLBC skid resistant pavement.

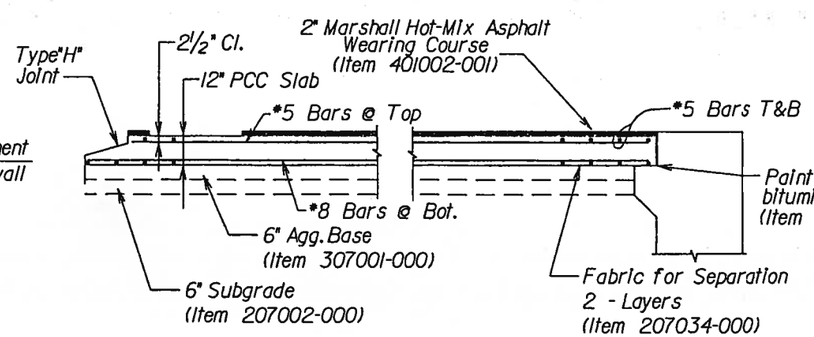
Quantities for Items 207002-000, 207034-000, 307001-000, 401002-001, and 408002-001 as well as the approach slab pay Item 502001-012 are included in the roadway estimate of quantities.

TOS - Top of Slab
BOS - Bottom of Slab
TOSW - Top of Sidewalk
BOSW - Bottom of Sidewalk

ESTIMATE OF QUANTITY (Sq.Yd)			
ITEM	SLAB 1	SLAB 2	TOTAL
502001-012	61 SY	61 SY	122 SY



SECTION A-A



SECTION B-B

NO.	REVISION	DATE:	BY:

H:\Projects\BOWERS\BOWERS\dsbowers.aps 07-FEB-2002 13:08

W. VA. DEPARTMENT OF HIGHWAYS
ENGINEERING DIVISION

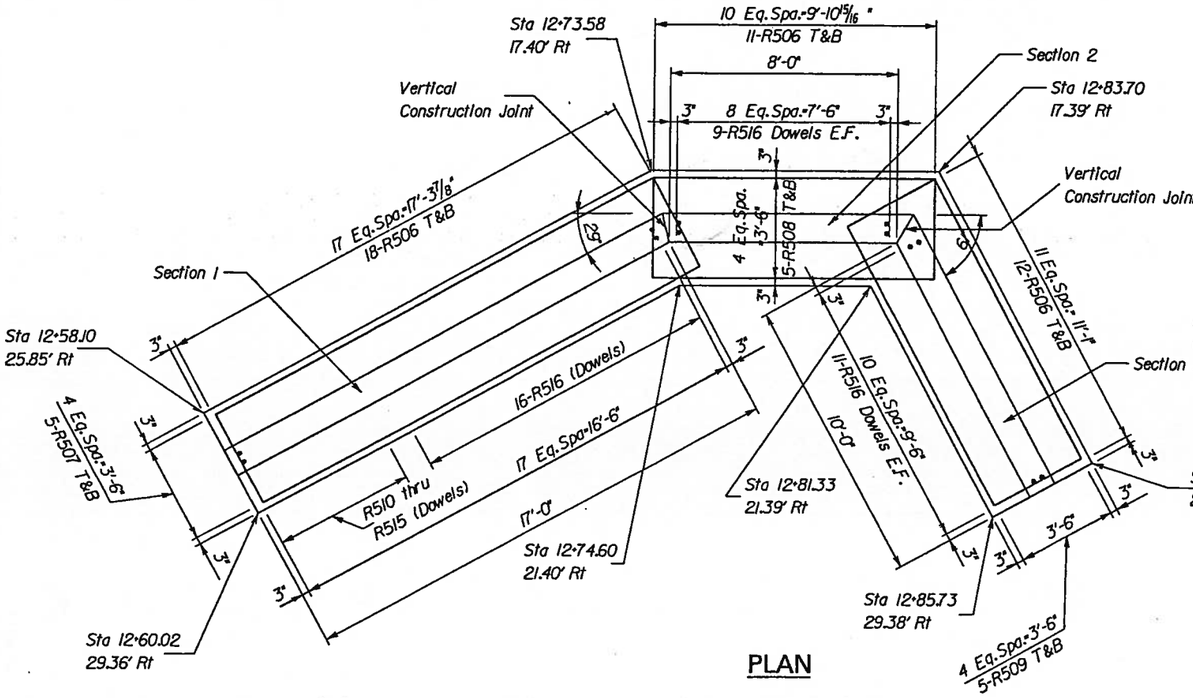
BOWERS BRIDGE
C.R. 113 over
BUFFALO CREEK

DESIGNED	DATE
DRAWN JRB	3/00
CHECKED RLS	1/02
REVIEWED RMA	1/02

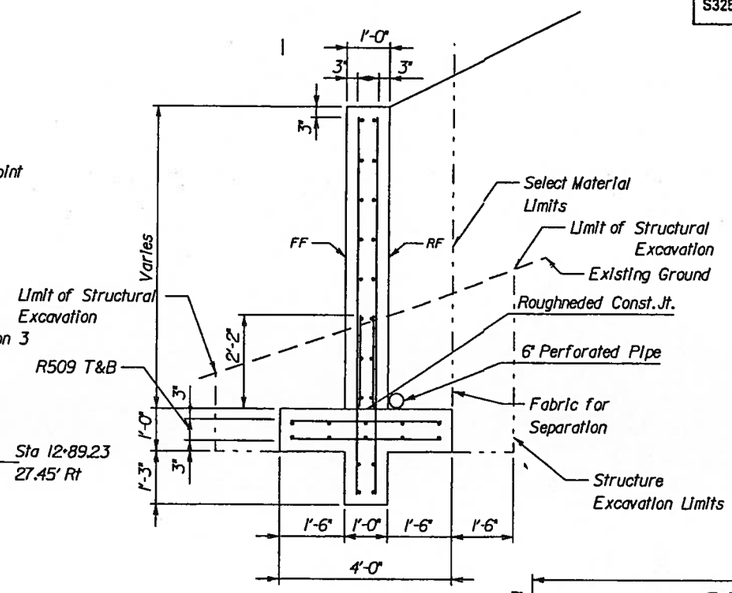
APPROACH SLABS

SHEET 18 OF 21
BRIDGE NO. 10060

PROJECT NUMBERS		DISTRICT	COUNTY	SHEET NO.	TOTAL
STATE	FEDERAL				
S325-113-0.32	BR-0113(007)E	4	MARION	28	44

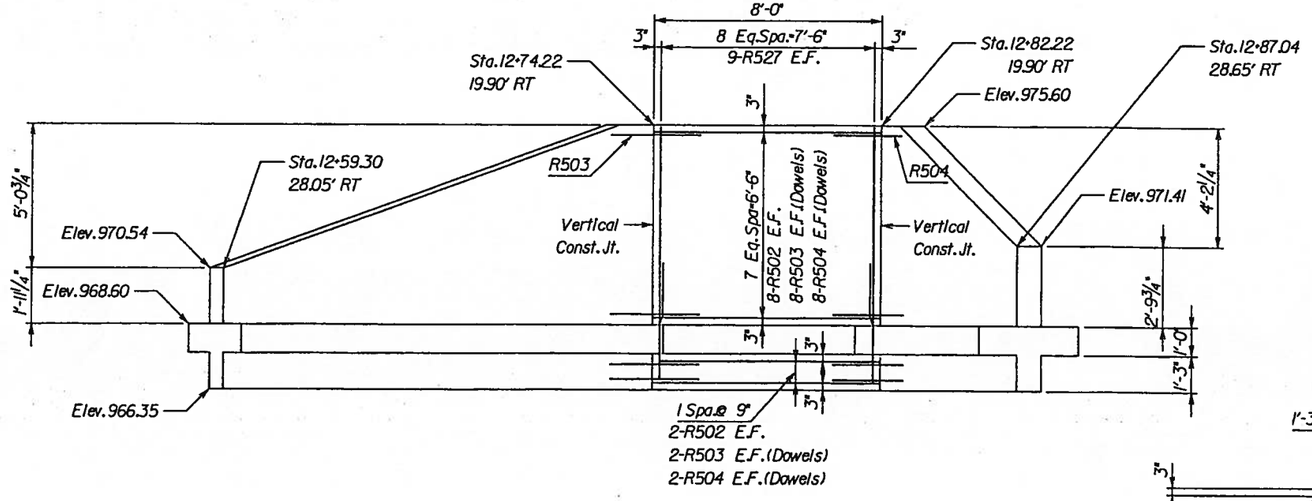


PLAN

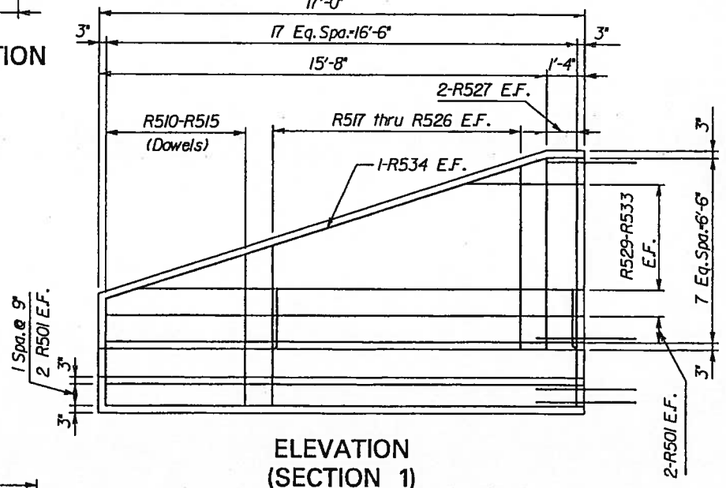


TYPICAL SECTION

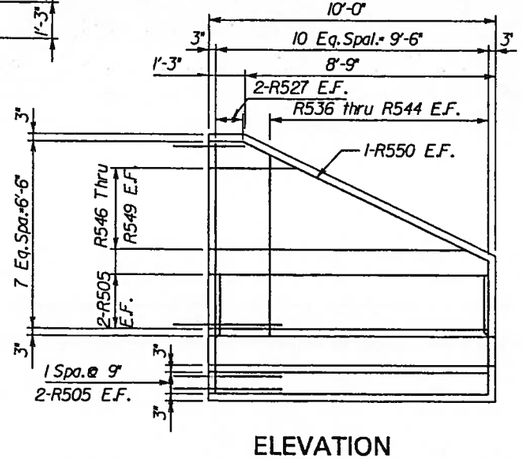
F.F.— Front Face
R.F.— Rear Face



ELEVATION



ELEVATION
(SECTION 1)



ELEVATION
(SECTION 3)

NO.	REVISION	DATE:	BY:

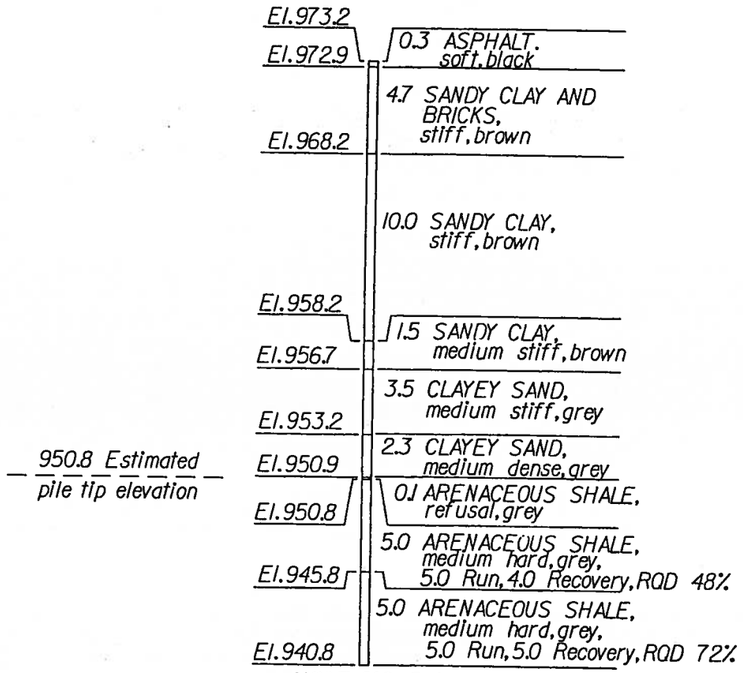
h:\Projects\BOWERS\BOWERS\dsbowers.rat 30-JAN-2002 10:45

W. VA. DEPARTMENT OF HIGHWAYS
ENGINEERING DIVISION

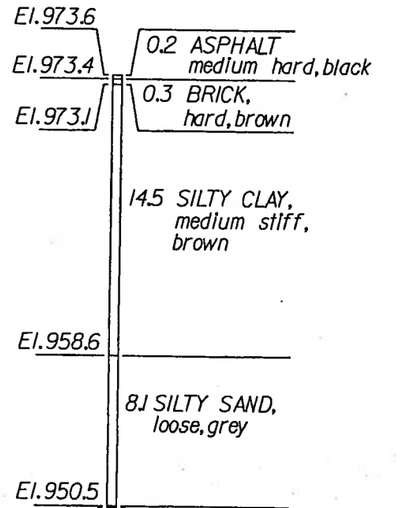
BOWERS BRIDGE
C.R.113 OVER
BUFFALO CREEK

DESIGNED LWS	DATE 7/00	SHEET 19 OF 21	
DRAWN LWS	7/00		
CHECKED DWK	10/00	RETAINING WALL	BRIDGE NO. 10060
REVIEWED [illegible]	1/02		

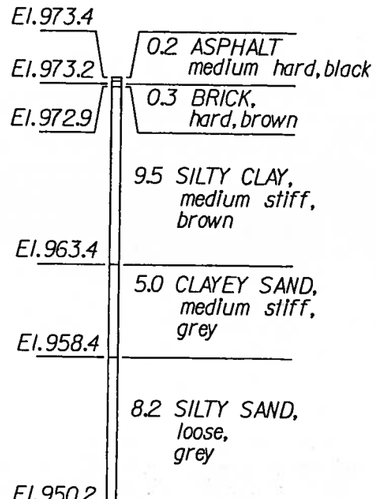
PROJECT NUMBERS		DISTRICT	COUNTY	SHEET NO.	TOTAL
STATE	FEDERAL				
S325-113-0.32	BR-0113(007)E	4	MARION	29	44



HOLE NO. C-3
STA. : 13+14.50
OFFSET: 11.0 RT. ℄



HOLE NO. C-6
STA. : 14+95.50
OFFSET: 6.0 LT. ℄



HOLE NO. C-7
STA. : 14+97.50
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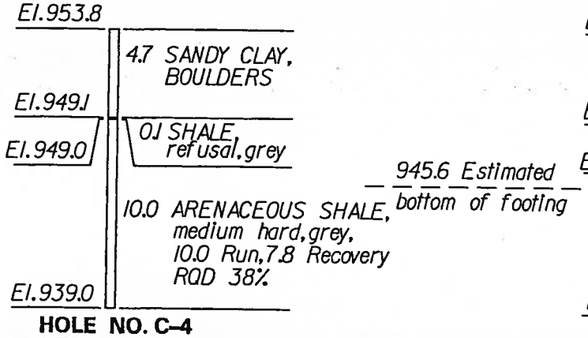
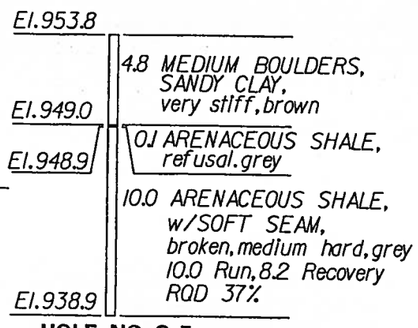


HOLE NO. C-4
STA. : 14+32.00
OFFSET: 7.0 LT. ℄



HOLE NO. C-5
STA. : 14+32.00
OFFSET: 8.0 RT. ℄

NOTE:
Core were drilled March 2000 using standard department procedures.

NO.	REVISION	DATE:	BY:

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W. VA. DEPARTMENT OF HIGHWAYS
ENGINEERING DIVISION

BOWERS BRIDGE
C.R. 113 over
BUFFALO CREEK

DESIGNED	DATE
DRAWN JRB	3/00
CHECKED DWK	3/00
REVIEWED	

SHEET 20 OF 21
BRIDGE NO.

CORE BORINGS

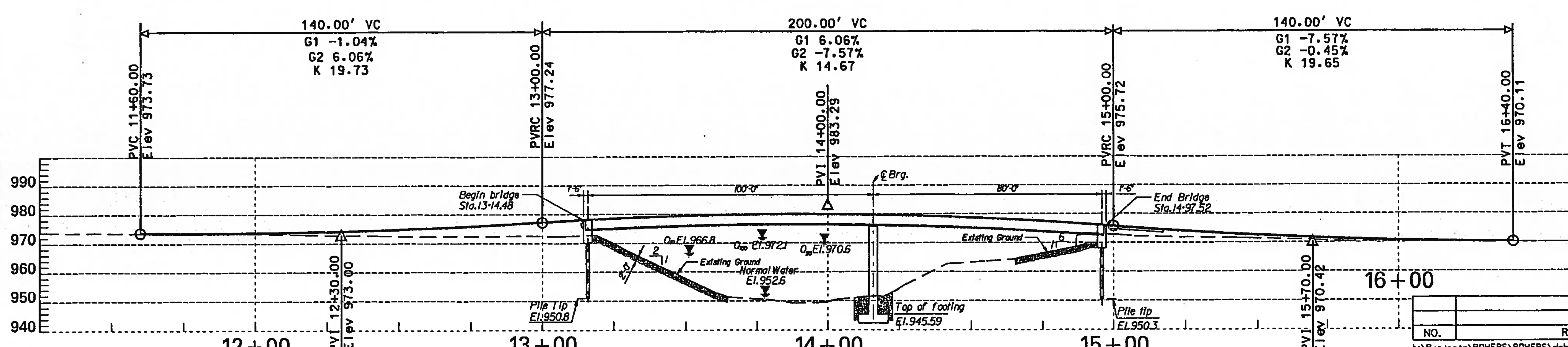
PROJECT NUMBERS		DISTRICT	COUNTY	SHEET NO.	TOTAL
STATE	FEDERAL				
S325-1/13-0.32	BR-0113(007)E	4	MARION	30	44

BORING	STATION	OFF SET	NORTHING	EASTING
C-3	13+14.50	11.00RT.	8778.68	4149.27
C-4	14+32.00	7.00LT.	8855.10	4082.18
C-5	14+32.00	8.00RT.	8863.51	4091.10
C-6	14+95.50	6.00LT.	8914.89	4045.32
C-7	14+97.50	8.00RT.	8924.37	4055.93

SCALES
0 20 ft.
20 ft. 0

HYDRAULIC DATA

DRAINAGE AREA-63 SQUARE MILES
BRIDGE WATERWAY OPENING-2800 SF
HYDRAULIC LENGTH - 12 MI.
50 YR. FLOOD RISK ASSESSMENT:
MAGNITUDE-6640 CFS
VELOCITY-3.6 FT/S
PERT. W. S. ELEV.-970.6
100 YR. FLOOD RISK ASSESSMENT:
MAGNITUDE-7990
VELOCITY=3.9 FT/S
W. S. ELEV.=972.1



NO.	REVISION	DATE:	BY:

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W. VA. DEPARTMENT OF HIGHWAYS
ENGINEERING DIVISION

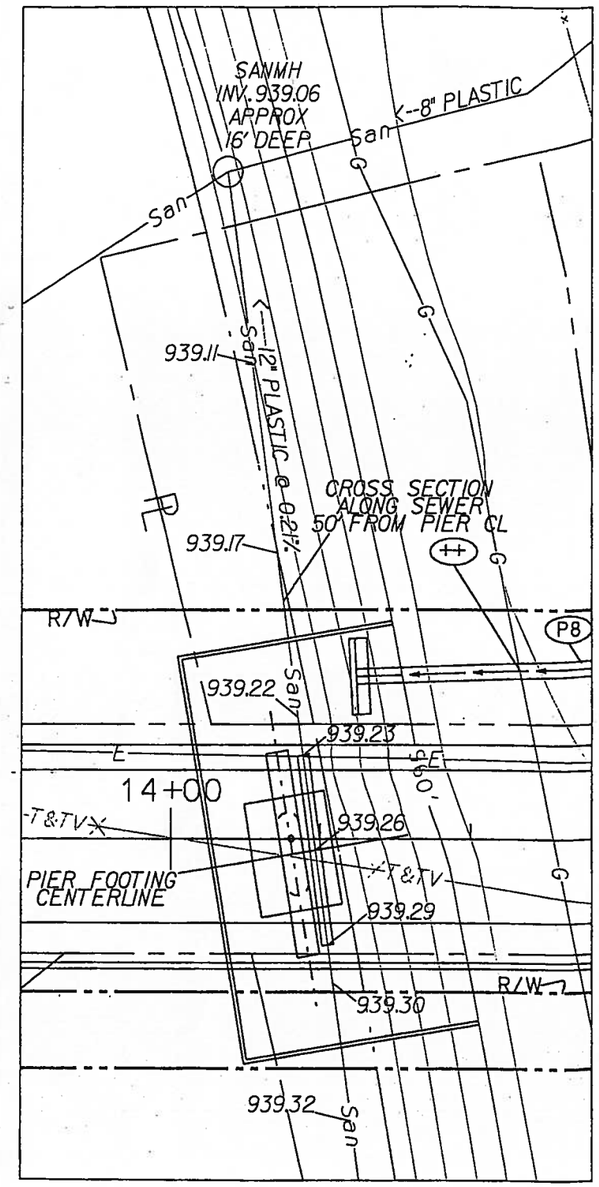
BOWERS BRIDGE
C.R. 1/13 over
BUFFALO CREEK

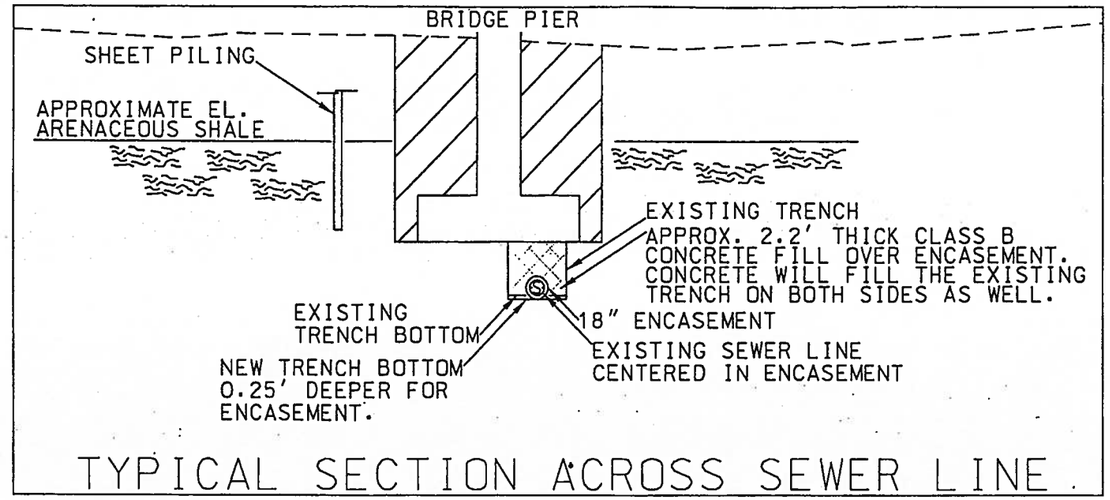
		DATE
DESIGNED	DWK	2/00
DRAWN	DWK	2/00
CHECKED	RLD	1/02
REVIEWED	RNA	1/02

SITUATION PLAN

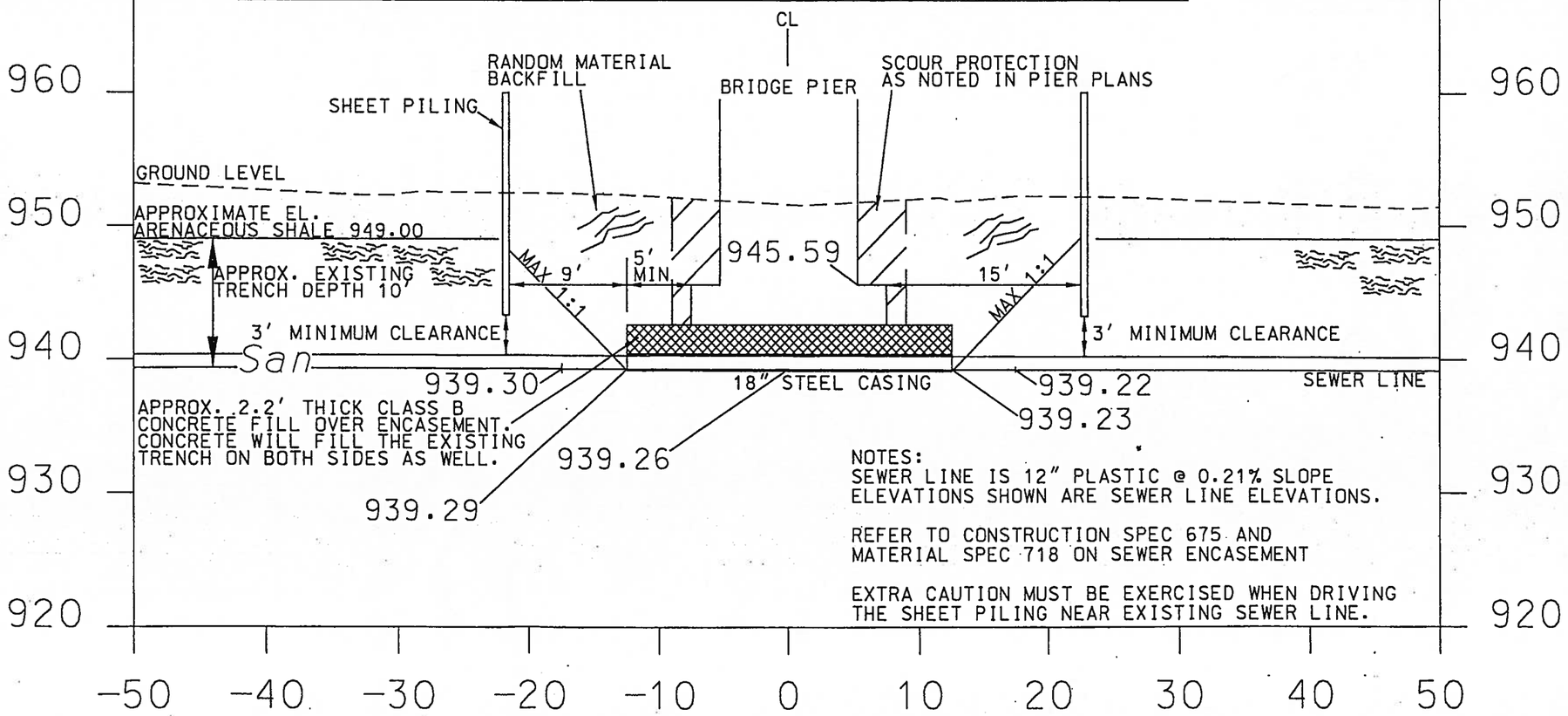
SHEET 21 OF 21
BRIDGE NO. 10060

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	Fiscal Year	County	Sheet No.	Total Sheets
W.V.	04	S325-1/13-0.32	BR-0113 (007)E	2002	MARION	30A	44





TYPICAL SECTION ACROSS SEWER LINE



CROSS SECTION ALONG THE
SEWER LINE AT THE INTERSECTION
OF THE PIER FOOTER CENTERLINE.

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

SEWER ENCASEMENT DETAIL