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REFERENCE DRAWING	
GEOLOGIC STANDARD UNIFIED SOILS CLASSIFICATION	0-Z-24-1

NOTE: This is a half scale reproduction of the original drawing.




REVISION		DATE	DESCRIPTION	BY
GRAPHIC SCALE				
U. S. ARMY ENGINEER DISTRICT, PITTSBURGH CORPS OF ENGINEERS OFFICE OF THE DISTRICT ENGINEER PITTSBURGH, PENNSYLVANIA				
PREPARED BY: LEBDER	BOLIVAR FLOOD PROTECTION PROJECT ROOT CREEK BOLIVAR, NEW YORK INDEX			
DRAWN BY: STASIEWSKI				
CHECKED BY: <i>[Signature]</i>				
SUBMITTED BY: <i>[Signature]</i>				
CHIEF DESIGN BRANCH APPROVAL RECOMMENDED <i>[Signature]</i>	APPROVED: <i>[Signature]</i>	DATE 3 April 1977		
CHIEF ENGINEERING DIVISION APPROVED FOR:	COLONEL, CORPS OF ENGINEERS DISTRICT ENGINEER		SCALE	SPEC. NO.
DATE		DRAWING NUMBER 038pa.I-PI-0/1 SHEET OF		












LOCATION		DIRECTION OF HOLE FROM VERTICAL		DATE HOLE STARTED		HOLE NO.		SIZE AND TYPE OF BIT OR SAMPLER		
N752.050 E811.786		0		14 NOV 1973 Completed		TP-1		J.D. 310 BACKHOE		
ELEVATION	DEPTH	LL	PI	WT	BLOWS PER FOOT	LEGEND	CLASSIFICATION OF MATERIALS (Description)	CORE Drilled or Lost	BOX OF SAMPLE NO.	REMARKS
1585.0	0.0						BROWN SANDY GRAVEL (GP) (SAND BAR)			TOP OF HOLE
1584.5	0.5						BROWNISH GRAY ORGANIC SILTY SAND (OL) W/TRACE GRAVEL AND ROOTLETS		1	
1582.0	3.0						BROWNISH GRAY SANDY GRAVEL (GP) W/TRACE OF SILT		2	
1580.5	4.5						GRAY SANDY GRAVEL (GP) W/TRACE OF SILT		3	
1579.7	5.3						LIGHT BROWN SILTY SANDY GRAVEL (GM)		4	
1579.6	5.4						GRAY SANDY GRAVEL (GP) W/TRACE OF SILT			NO sample taken
1576.0	9.0									BOTTOM OF HOLE



LOCATION N752.096 E812.844		DIRECTION OF HOLE FROM VERTICAL  0°		DATE HOLE Started 13 NOV. 1973 Completed 13 NOV. 1973		HOLE NO.  TP-2		SIZE AND TYPE OF BIT OR SAMPLER  J.D. 310 BACKHOE		
ELEVATION	DEPTH	LL	PI	W'	BLOWS PER FOOT	LEGEND	CLASSIFICATION OF MATERIALS (Description)	SCORE Drift LOGE	BOX OF SAMPLE NO.	REMARKS
1596.7	0.0						BROWNISH GRAY SANDY GRAVEL (GP) W/ TRACE OF SILT		1	TOP OF HOLE
1593.7	3.0						BROWNISH GRAY SILTY SANDY GRAVEL (GM)		2	
1586.7	10.0									BOTTOM OF HOLE

LOCATION		DIRECTION OF HOLE FROM VERTICAL			DATE HOLE Started 13 NOV 1973 Completed 13 NOV 1973		HOLE NO.  TP-3		SIZE AND TYPE OF BIT OR SAMPLER  J.D. 310 BACKHOE	
N752.182 E813.391		0°								
ELEVATION	DEPTH	LL	PI	WC	BLOWS PER FOOT	LEGEND	CLASSIFICATION OF MATERIALS (Description)	CORE Drilled or Lost	BOX OF SAMPLE NO.	REMARKS
1601.5	0.0						BROWNISH GRAY SANDY GRAVEL (GP) W/TRACE OF SILT		1	TOP OF HOLE
1598.5	3.0						BROWNISH GRAY SANDY GRAVEL (GP) W/TRACE OF CLAY		2	
1592.0	9.5									BOTTOM OF HOLE





LOCATION		DIRECTION OF HOLE FROM VERTICAL		DATE HOLE		HOLE NO.		SIZE AND TYPE OF BIT OR SAMPLER		
N752.274 E813.708		0°		14 NOV 1973 Started Completed		TP - 4		J. D. 310 BACKHOE		
14 NOV 1973										
ELEVATION	DEPTH	LL	PL	W	Blows per Foot	LEGEND	CLASSIFICATION OF MATERIALS (Description)	CORE Drilled or Lost	BOX OF SAMPLE	REMARKS
1604.0	0.0						BROWNISH GRAY SANDY GRAVEL (GP)		1	TOP OF HOLE
1601.5	2.5						LIGHT BROWN SILTY CLAYEY SANDY GRAVEL (GC)		3	
1598.0	8.0									BOTTOM OF HOLE



LOCATION N752.319 E613.936		DIRECTION OF HOLE FROM VERTICAL  0°		DATE HOLE Started 14 NOV 1973 Completed 14 NOV 1973		HOLE NO.  TP-5		SIZE AND TYPE OF BIT OR SAMPLER  J.D. 310 BACKHOE		
ELEVATION	DEPTH	LL	PL	WV	Blows Per Foot	LEGEND	CLASSIFICATION OF MATERIALS (Description)	Core Drilled or Lost	Box of Sample	REMARKS
1608.2	0.0						GRAY GRAVELLY SAND (GP)		1	TOP OF HOLE
1604.2	4.0						BROWN SILTY CLAYEY SANDY GRAVEL (GC)		2 AND 3	Samples taken at different depths
1598.2	10.0									BOTTOM OF HOLE

LOCATION		DIRECTION OF HOLE FROM VERTICAL		DATE HOLE		HOLE NO.	SIZE AND TYPE OF BIT OR SAMPLER			
N752.346 E614.101 AT LEFT ABUTMENT DAVIS ST. BRIDGE		0°		15 NOV 1973 Started Completed			J.D. 310 BACKHOE			
ELEVATION	DEPTH	LL	PL	W	BLOWS FOOT	LEGEND	CLASSIFICATION OF MATERIALS (Description)	Core Drilled or Lost	Box SAMPLE	REMARKS
1609.4	0.0						GRAYISH BROWN SILTY SANDY GRAVEL (GP)		1	TOP OF HOLE
1607.9	1.5						BROWN SILTY CLAYEY SANDY GRAVEL (GC)		2	CONC. FOOTER ADJACENT TO TEST PIT EL. 1610.4 TO EL. 1606.4
1605.4	4.0									BOTTOM OF HOLE

LOCATION		DIRECTION OF HOLE FROM VERTICAL		DATE HOLE Started		HOLE NO.	SIZE AND TYPE OF BIT OR SAMPLER			
N752.375 E814.098 AT RIGHT ABUTMENT DAVIS ST. BRIDGE		0°		14 NOV 1973 Completed 14 NOV 1973			J.D. 310 BACKHOE			
ELEVATION	DEPTH	LL	PL	W.	Blows Per Foot	LEGEND	CLASSIFICATION OF MATERIALS ( Description )	CORE Drilled or Lost	BOX OF SAMPLE	REMARKS
1609.4	0.0						GRAYISH BROWN SILTY SANDY GRAVEL (GM)		1	TOP OF HOLE CONC. FOOTER ADJACENT TO TEST PIT EL 1610.4 TO 1608.4
1608.4	3.0						BROWN SILTY CLAYEY SANDY GRAVEL (GC)		2	BOTTOM OF HOLE
1606.4	5.0									






















LOCATION		DIRECTION OF HOLE FROM VERTICAL		DATE HOLE Started		HOLE NO.	SIZE AND TYPE OF BIT OR SAMPLER			
N752.477 E614.400		0°		15 NOV 1973 Completed 15 NOV 1973			J.D. 310 BACKHOE			
						TP-8				
ELEVATION	DEPTH	LL	PL	W	BloWS Per Foot	LEGEND	CLASSIFICATION OF MATERIALS (Description)	CORE Drilled Or Lost	BOX OF SAMPLE	REMARKS
-1615.9	0.0						TOPSOIL		1	TOP OF HOLE
-1614.4	1.5						GRAY SILTY SANDY GRAVEL (GP)		2	
-1613.4	2.5						GRAYISH BROWN SANDY GRAVEL (GP) W/ TRACE OF SILT		3	
-1611.9	4.0						GRAY SILTY SANDY GRAVEL (GM)		4	
-1611.4	4.5						GRAYISH BROWN SANDY GRAVEL (GP) W/ TRACE OF SILT		5	No Sample taken
-1609.9	6.0						BROWNISH GRAY SANDY GRAVEL (GP) W/ TRACE OF SILT		6	
-1604.9	11.0									BOTTOM OF HOLE



LOCATION N752.603 E614.830		DIRECTION  0°		DATE HOLE Started 15 NOV. 1973 Completed 15 NOV. 1973		HOLE NO.  TP-9		SIZE AND TYPE OF BIT OR SAMPLER  J.D. 310 BACKHOE		
ELEVATION	DEPTH	LL	PL	W:	BLOWS FOOT	LEGEND	CLASSIFICATION OF MATERIALS (Description)	CORE Drilled Lost	BOX OF SAMPLE	REMARKS
1618.9	0.0						BROWN SILTY SANDY GRAVEL (GP) W/TRACE OF CLAY		1	TOP OF HOLE
									2	Samples taken at different depths
									3	
1608.9	10.0									BOTTOM OF HOLE

LOCATION		DIRECTION OF HOLE FROM VERTICAL		DATE HOLE		HOLE NO.		SIZE AND TYPE OF BIT OR SAMPLER		
N752.691 E815.080 AT S/S END OF RETAINING WALL		0°		16 NOV 1973 Completed 16 NOV 1973		TP-10		J.D. 310 BACKHOE		
ELEVATION	DEPTH	LL	PL	W	BLOWS PER FOOT	LEGEND	CLASSIFICATION OF MATERIALS (Description)	CORE Drilled or LOST	BOX OF SAMPLE	REMARKS
1621.5	0.0						BROWN SILTY SANDY GRAVEL (GM)		1	TOP OF HOLE
1619.0	2.5						GRAYISH BROWN SILTY SANDY GRAVEL (GM)		3	BOTTOM OF STEEL PLATING EL. 1620.5
1617.0	4.5						W/TRACE OF CLAY			BOTTOM OF RAIL EL. 1617.2 BOTTOM OF HOLE.

LOCATION		DIRECTION OF HOLE FROM VERTICAL		DATE HOLE		HOLE NO.		SIZE AND TYPE OF BIT OR SAMPLER		
N752.641 E815.275		0°		15 NOV. 1973 Completed 15 NOV. 1973		TP-11		J.D. 310 BACKHOE		
ELEVATION	DEPTH	LL	PL	W'	BLOWS per FOOT	LEGEND	CLASSIFICATION OF MATERIALS ( Description )	CORE Drilled Lost	BOX OF SAMPLE	REMARKS
1624.6	0.0						BROWN SANDY GRAVEL (GW) W/ TRACE OF SILT		1	TOP OF HOLE
1622.1	2.5						BROWN SILTY FINE SAND(SM)W/FEW GRAVELS		2	
1618.6	5.0						BROWN GRAVELLY SAND (SP) W/TRACE OF SILT		3	
1616.6	8.0						BROWN SANDY GRAVEL (GP)		4	
1614.1	10.5									BOTTOM OF HOLE

LOCATION N752, 690 E815, 733		DIRECTION OF HOLE FROM VERTICAL  0°		DATE HOLE Started 16 NOV. 1973 Completed 16 NOV. 1973		HOLE NO.  TP-12		SIZE AND TYPE OF BIT OR SAMPLER  J.D. 310 BACKHOE		
ELEVATION	DEPTH	LL	PL	W	Blows or Foot	LEGEND	CLASSIFICATION OF MATERIALS (Description)	Core Drilled Lost	BOX OF SAMPLE	REMARKS
1629.2	0.0						BROWN SILTY SANDY GRAVEL (GM)		1	TOP OF HOLE
1626.2	3.0						GRAY SANDY SILTY CLAYEY GRAVEL (GC)		2	
1619.2	10.0									BOTTOM OF HOLE

LOCATION		DIRECTION OF HOLE FROM VERTICAL		DATE HOLE STARTED		HOLE NO.		SIZE AND TYPE OF BIT OR SAMPLER		
N752.735 E816.197		0°		16 NOV 1973 COMPLETED		TP-13		J.D. 310 BACKHOE		
				16 NOV 1973						
ELEVATION	DEPTH	LL	PL	W	BLOWS PER FOOT	LEGEND	CLASSIFICATION OF MATERIALS ( Description )	CORE Drilled Lost	BOX OF SAMPLE	REMARKS
1633.0	0.0									TOP OF HOLE
							BROWN SANDY GRAVEL (GP) W/ TRACE OF SILT		1	Samples taken at different depths
									2	
									3	
										
										
										
										
										
										
										
										
										
										
										
										
										
										
										
										
										
										

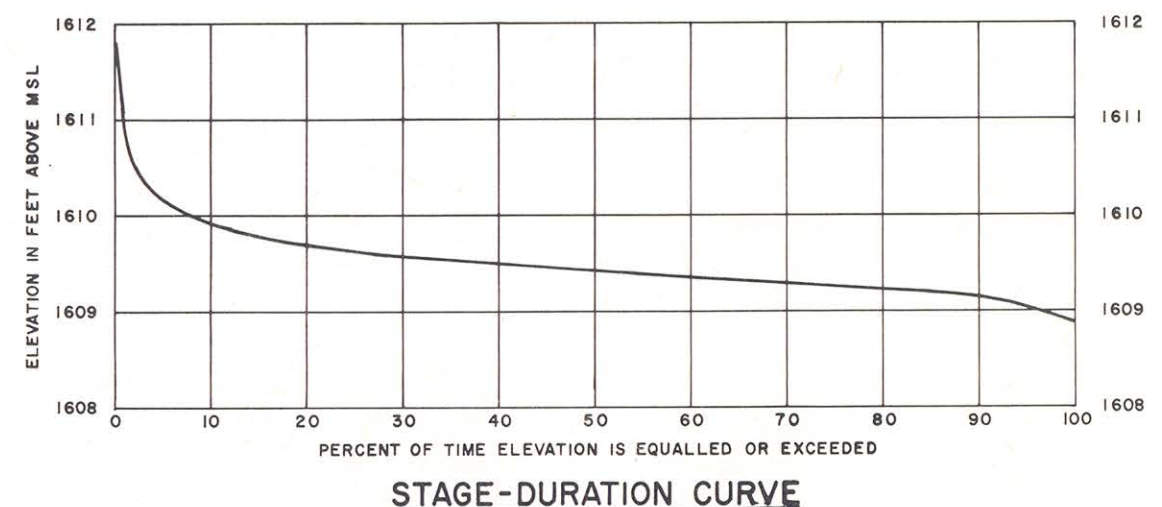
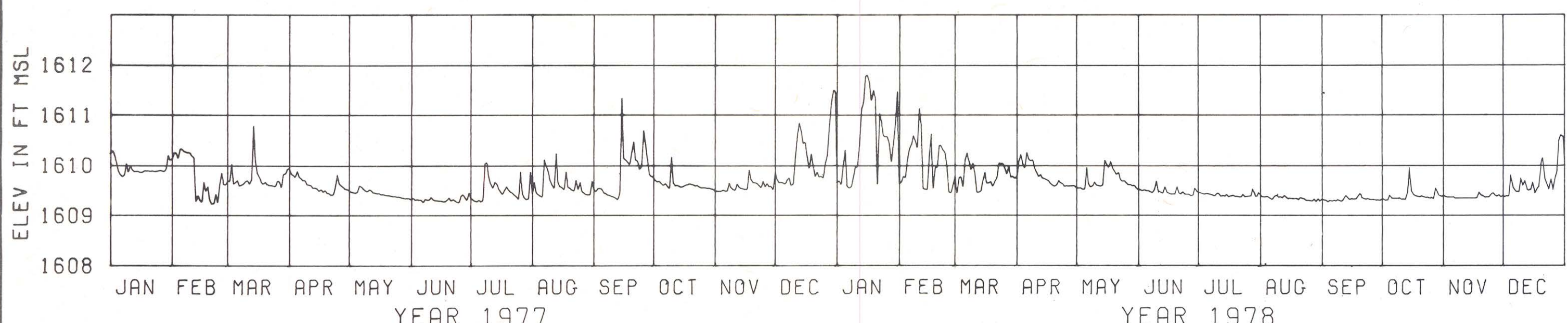
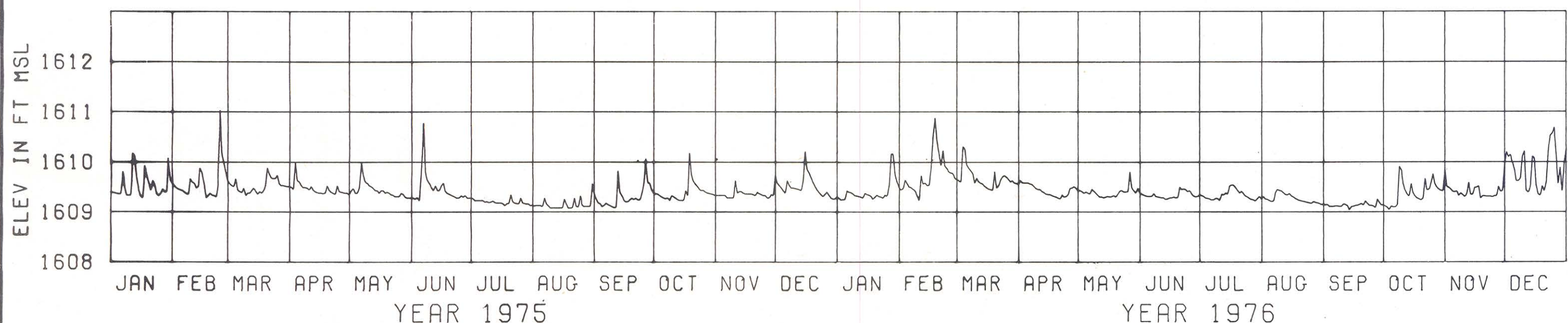
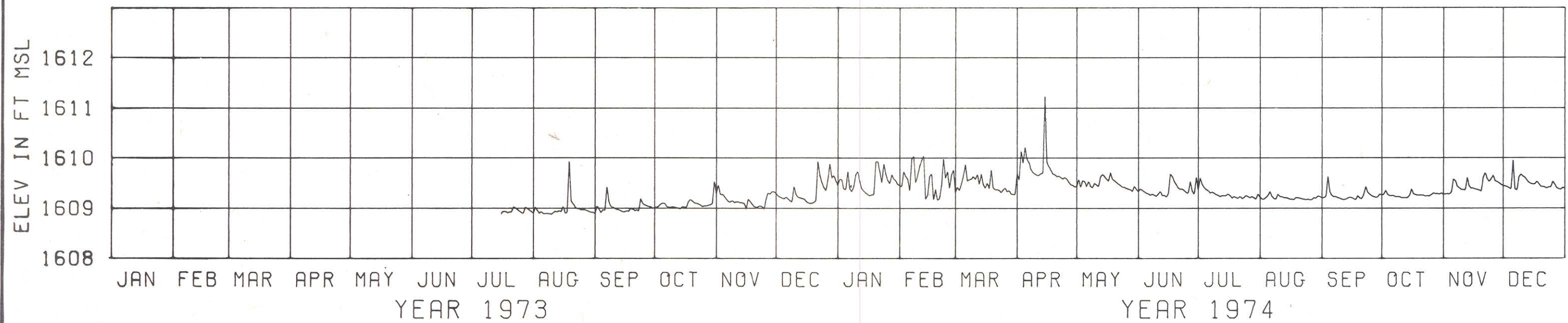
LOCATION		DIRECTION OF HOLE FROM VERTICAL		DATE HOLE Started		HOLE NO		SIZE AND TYPE OF BIT OR SAMPLER		
N752.739 E816.352		0°		16 NOV 1973 Completed		TP-14		J.D. 310 BACKHOE		
				16 NOV 1973						
ELEVATION	DEPTH	LL	PL	W	BLOWS per FOOT	LEGEND	CLASSIFICATION OF MATERIALS (Description)	CORE Drilled or Lost	BOX of SAMPLE	REMARKS
1634.0	0.0						BROWN SANDY GRAVEL (GP) W/TRACE OF SILT		1	TOP OF HOLE
1628.0	6.0									BOTTOM OF HOLE

NOTE: Water was encountered at the top of all holes except TP-8 where it was encountered at 2.0' depth.

NOTE: This is a half scale reproduction of the original drawing.

REVISION	DATE	DESCRIPTION	BY
GRAPHIC SCALE			
U. S. ARMY ENGINEER DISTRICT PITTSBURGH CORPS OF ENGINEERS OFFICE OF THE DISTRICT ENGINEER PITTSBURGH, PENNSYLVANIA			
PREPARED BY: C. E. S.	BOLIVAR FLOOD PROTECTION PROJECT ROOT CREEK BOLIVAR, NEW YORK FOUNDATION EXPLORATION TEST PITS HOLES TP-1 TO TP-14 INCLUSIVE		
DRAWN BY: M. B.	DATE: 3 April 1979		
CHECKED BY: J. S. Longman	APPROVED: [Signature] DISTRICT ENGINEER		
SUBMITTED BY: J. S. Longman	APPROVED: [Signature] DISTRICT ENGINEER		
APPROVAL RECOMMENDED: J. S. Longman	APPROVED: [Signature] DISTRICT ENGINEER		
APPROVED FOR:	SCALE: AS SHOWN DRAWING NUMBER: 038pa.1-P1-10/1 SHEET OF		



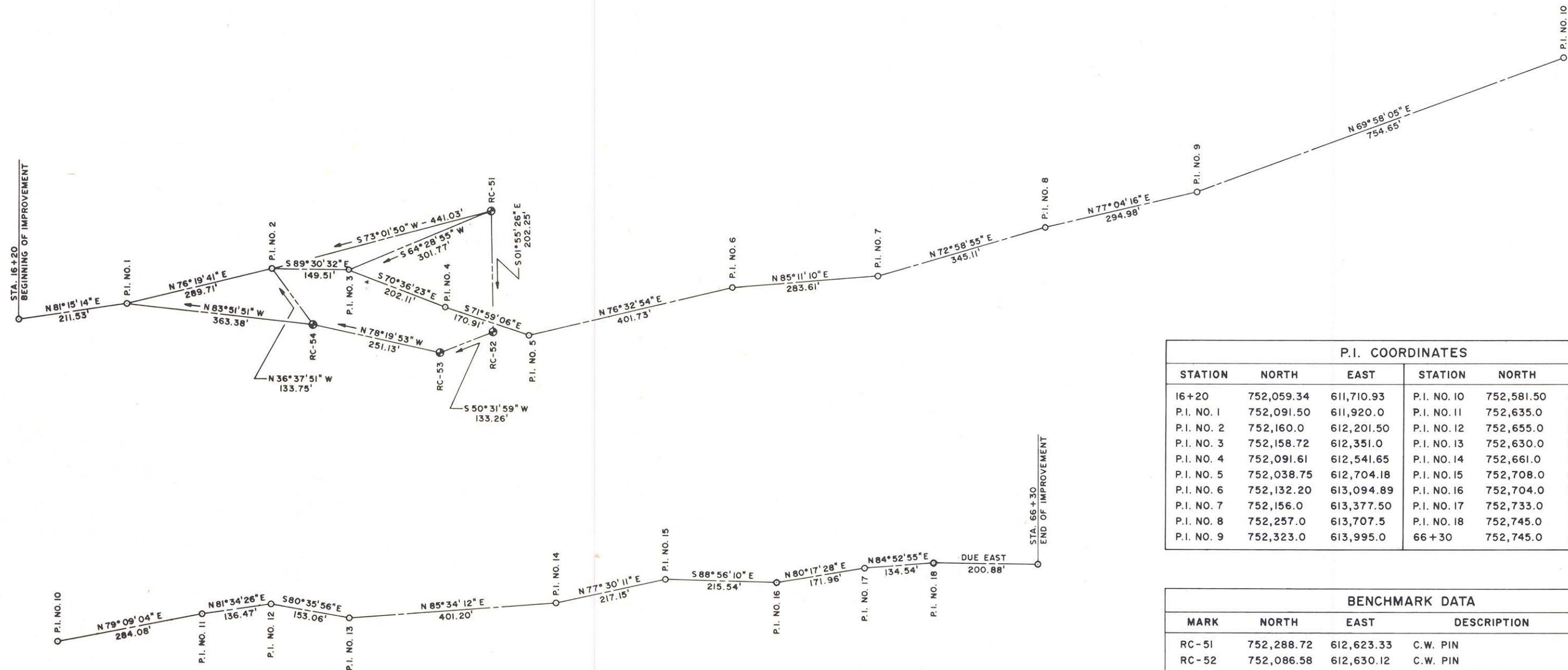


- NOTES:**
1. STAGE HYDROGRAPHS SHOWN ARE BASED ON ONCE-A-DAY READINGS OF THE U.S.C.E. WIRE WEIGHT GAGE ON ROOT CREEK IN BOLIVAR, N.Y. PEAK ELEVATIONS WERE USED IN LIEU OF THE REGULAR DAILY READINGS WHEN AVAILABLE.
  2. THE GAGE, WHICH IS LOCATED ON THE DAVIS STREET BRIDGE, HAS A DATUM OF 1603.73 FEET ABOVE MEAN SEA LEVEL.
  3. THE PERIOD OF RECORD FOR THE GAGE IS JULY 1973 TO DATE. DURING THIS PERIOD, READINGS WERE NOT TAKEN ON APPROXIMATELY 17 PERCENT OF THE DAYS. THE MISSING VALUES WERE ESTIMATED BASED ON PRECIPITATION RECORDS AND/OR THE U.S.G.S. GAGE ON OSWAYO CREEK AT SHINGLEHOUSE, PA.
  4. THE STAGE-DURATION CURVE FOR THE PERIOD OF RECORD IS BASED ON THE STAGE HYDROGRAPHS.

NOTE: This is a half scale reproduction of the original drawing.

REVISION	DATE	DESCRIPTION	BY
GRAPHIC SCALE			
U. S. ARMY ENGINEER DISTRICT, PITTSBURGH CORPS OF ENGINEERS OFFICE OF THE DISTRICT ENGINEER PITTSBURGH, PENNSYLVANIA			
PREPARED BY: SALESKY	<b>BOLIVAR FLOOD PROTECTION PROJECT</b> <b>ROOT CREEK</b> <b>BOLIVAR, NEW YORK</b> HYDROGRAPHS AND STAGE-DURATION CURVE		
DRAWN BY: STASIEWSKI			
CHECKED BY: WAS			
SUBMITTED BY: [Signature]			
APPROVAL RECOMMENDED: [Signature] CHIEF, ENGINEERING DIVISION	APPROVED: [Signature] COLONEL, CORPS OF ENGINEERS	DATE: <b>3 April 1979</b>	
SCALE: AS SHOWN		SPEC. NO. <b>038pa.1-PI-14/1</b>	
SHEET		OF	

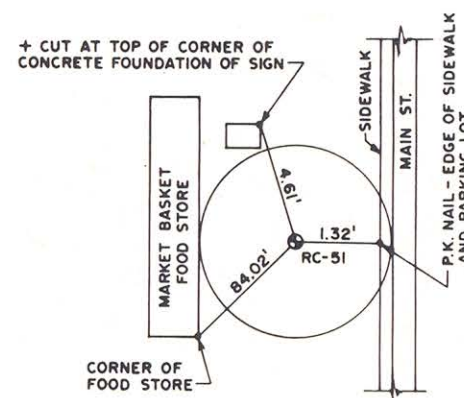




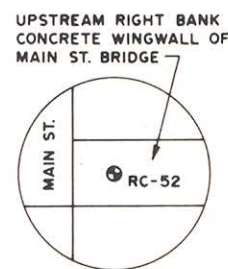
P.I. COORDINATES					
STATION	NORTH	EAST	STATION	NORTH	EAST
16+20	752,059.34	611,710.93	P.I. NO. 10	752,581.50	614,704.0
P.I. NO. 1	752,091.50	611,920.0	P.I. NO. 11	752,635.0	614,983.0
P.I. NO. 2	752,160.0	612,201.50	P.I. NO. 12	752,655.0	615,118.0
P.I. NO. 3	752,158.72	612,351.0	P.I. NO. 13	752,630.0	615,269.0
P.I. NO. 4	752,091.61	612,541.65	P.I. NO. 14	752,661.0	615,669.0
P.I. NO. 5	752,038.75	612,704.18	P.I. NO. 15	752,708.0	615,881.0
P.I. NO. 6	752,132.20	613,094.89	P.I. NO. 16	752,704.0	616,096.50
P.I. NO. 7	752,156.0	613,377.50	P.I. NO. 17	752,733.0	616,266.0
P.I. NO. 8	752,257.0	613,707.5	P.I. NO. 18	752,745.0	616,400.0
P.I. NO. 9	752,323.0	613,995.0	66+30	752,745.0	616,600.88

BENCHMARK DATA				
MARK	NORTH	EAST	DESCRIPTION	ELEV.
RC-51	752,288.72	612,623.33	C.W. PIN	1597.90
RC-52	752,086.58	612,630.12	C.W. PIN	1598.97
RC-53	752,001.88	612,527.24	+ CUT IN TOP OF CURB AT INT. OF MAIN & LEATHER STS.	1597.32
RC-54	752,052.67	612,281.30	5/8" RE-BAR	1592.10

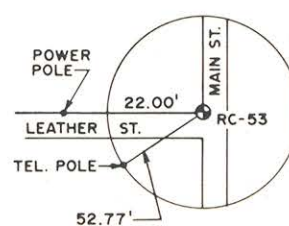
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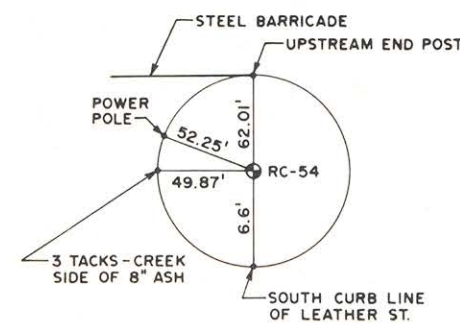
RC-51



RC-52



RC-53



RC-54

BENCHMARK LOCATIONS  
NOT TO SCALE

FOR CURVE DATA AND P.C. AND P.T. STATIONS, SEE PLAN SHEETS.

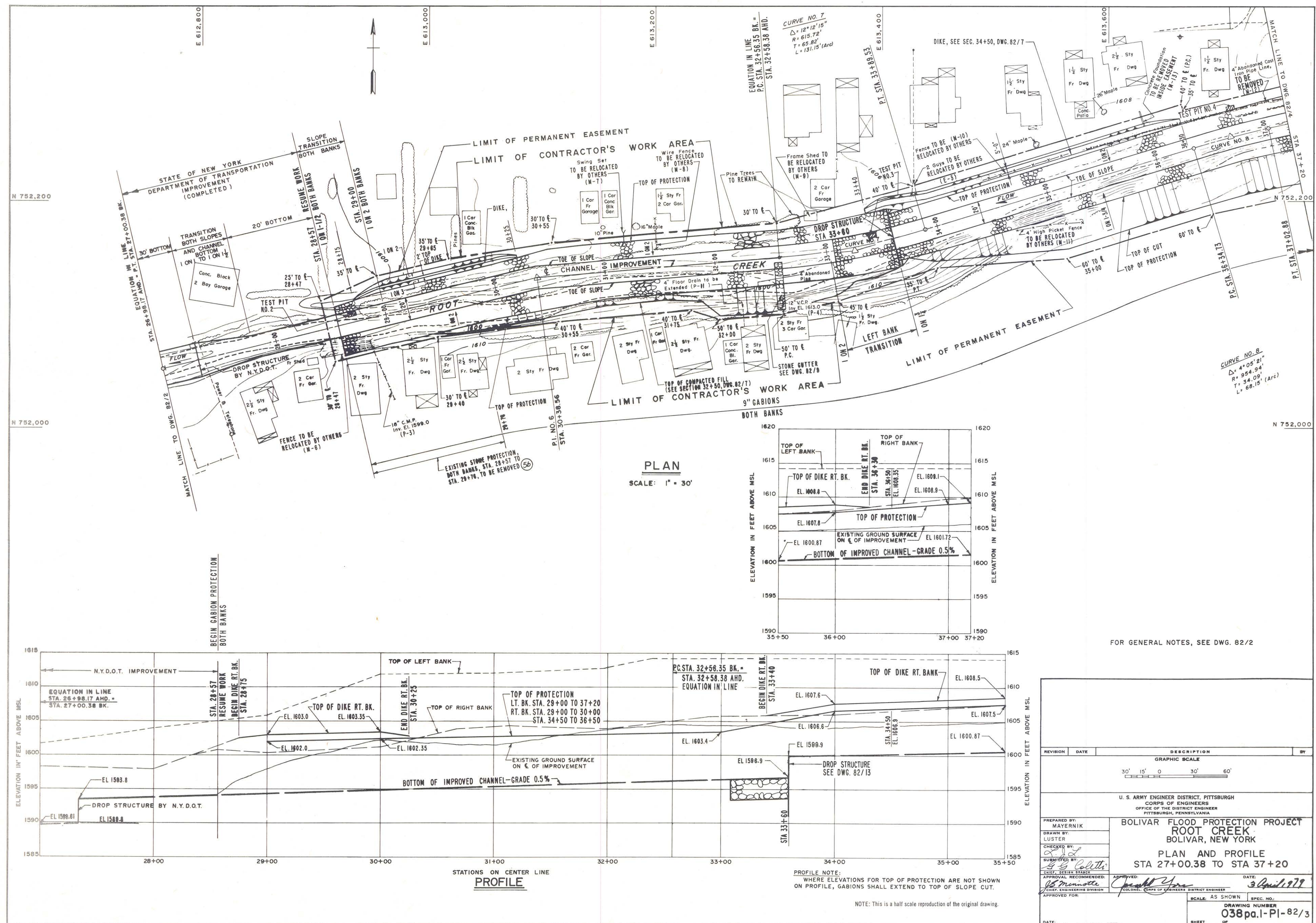
REVISION	DATE	DESCRIPTION	BY
GRAPHIC SCALE 100' 50' 0 100' 200'			
U. S. ARMY ENGINEER DISTRICT, PITTSBURGH CORPS OF ENGINEERS OFFICE OF THE DISTRICT ENGINEER PITTSBURGH, PENNSYLVANIA			
PREPARED BY: MAYERNIK	BOLIVAR FLOOD PROTECTION PROJECT ROOT CREEK BOLIVAR, NEW YORK		
DRAWN BY: MANTHEY	LAYOUT PLAN AND SURVEY BASELINE DATA		
CHECKED BY: <i>[Signature]</i>	DATE: 2 April 1979		
SUBMITTED BY: <i>[Signature]</i>	APPROVED FOR: CHIEF, ENGINEERING DIVISION		
APPROVAL RECOMMENDED: <i>[Signature]</i>	CHIEF, DISTRICT ENGINEER		
SCALE: AS SHOWN		SPEC. NO.:	
DRAWING NUMBER 038pa.I-P1-82/1		SHEET OF	

NOTE: This is a half scale reproduction of the original drawing.

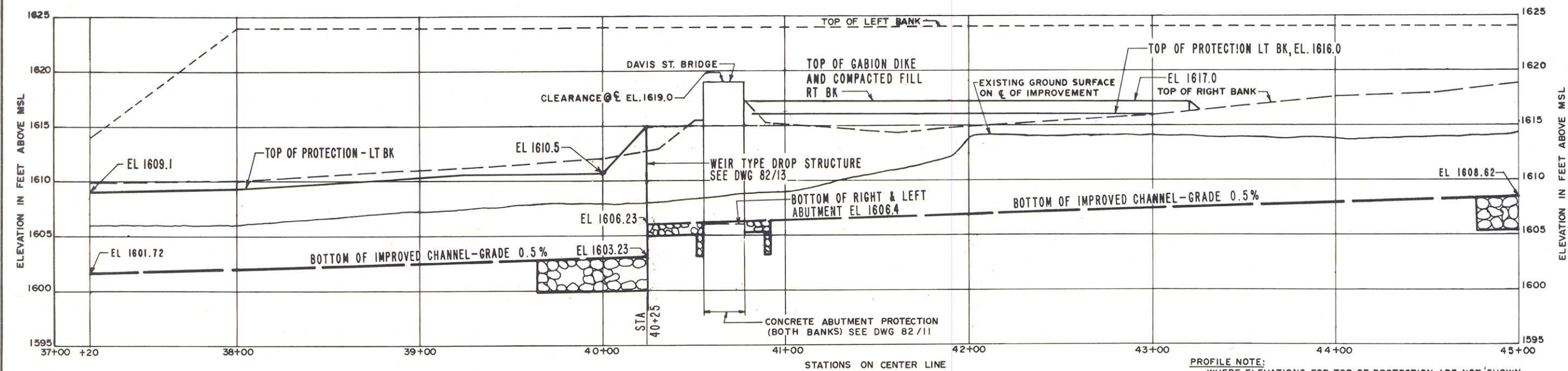
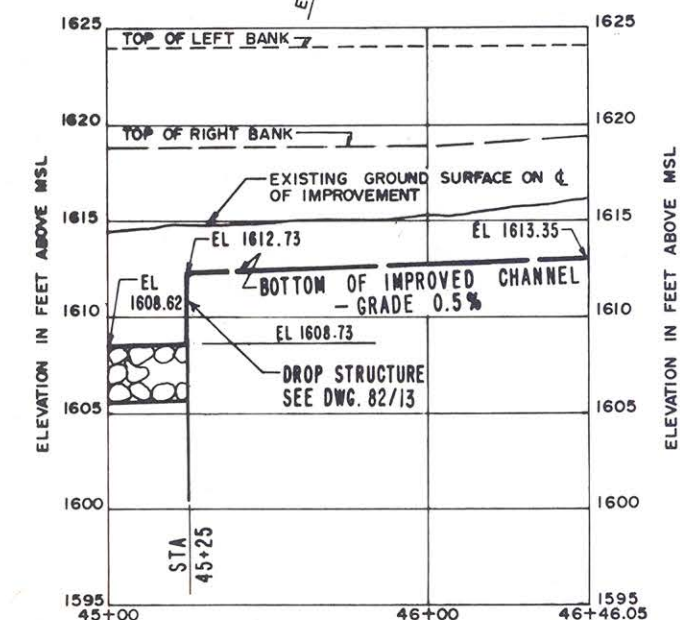
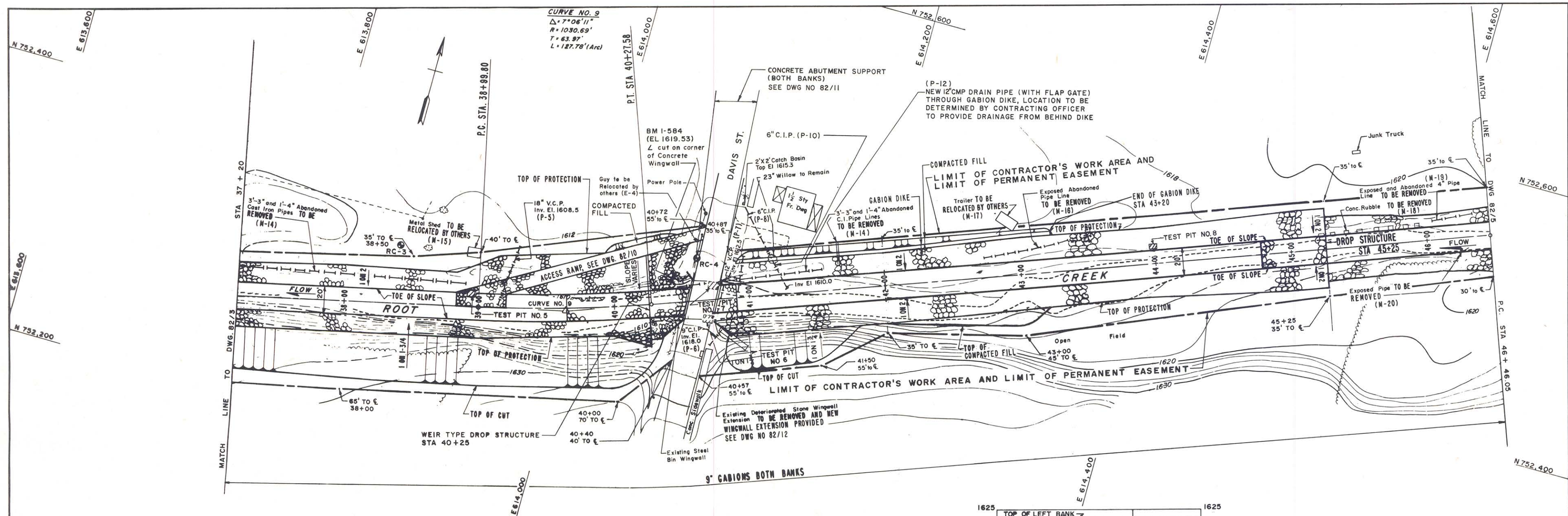












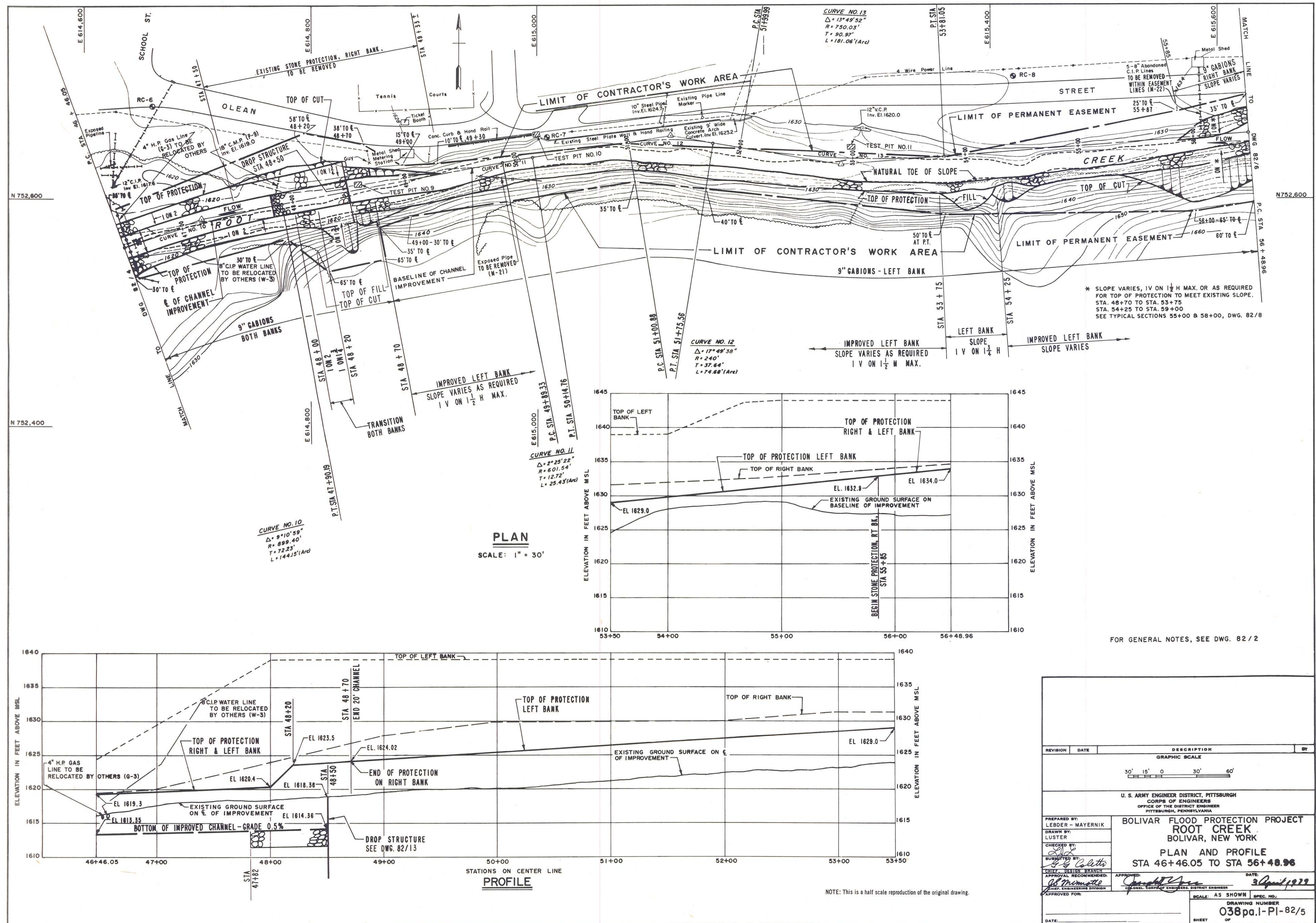
PROFILE NOTE:  
 WHERE ELEVATIONS FOR TOP OF PROTECTION ARE NOT SHOWN ON PROFILE, GABIONS SHALL EXTEND TO TOP OF EXCAVATION.

NOTE: This is a half scale reproduction of the original drawing.

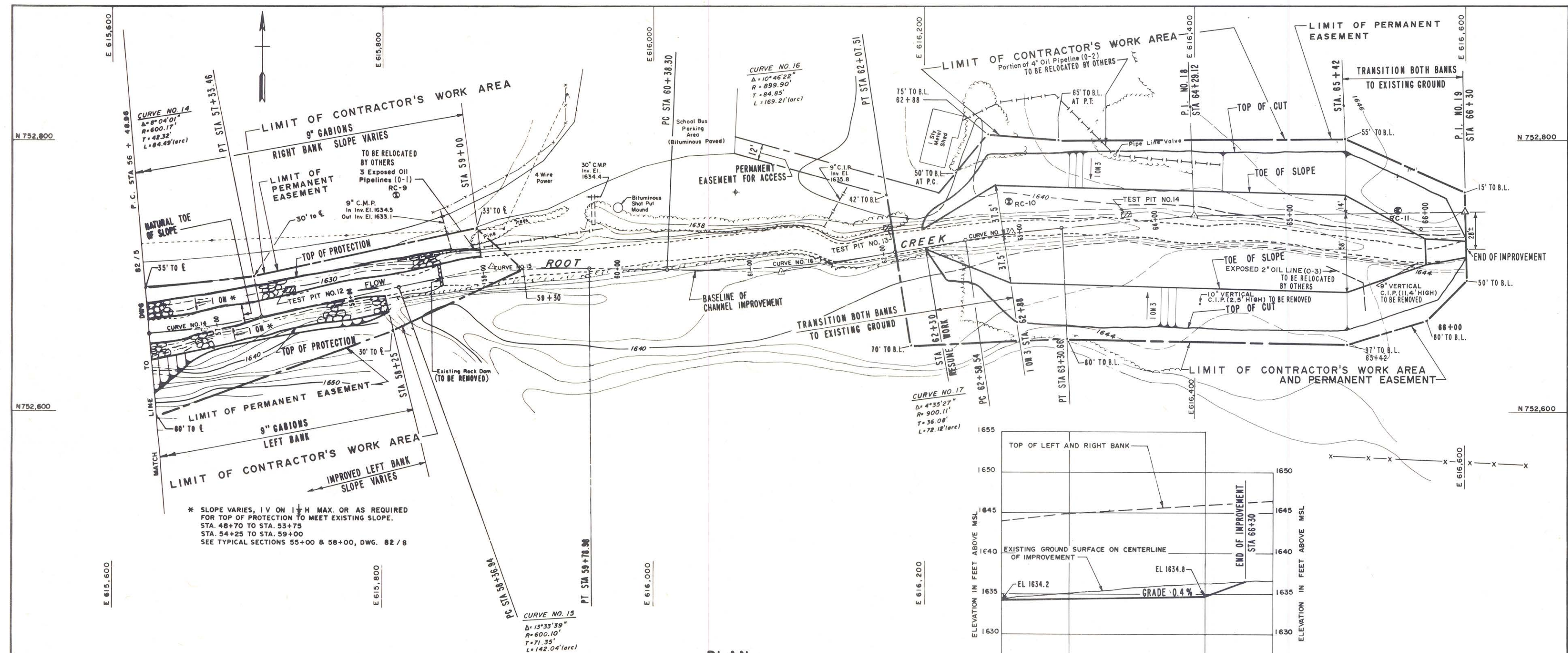
FOR GENERAL NOTES, SEE DWG. 82/2

REVISION	DATE	DESCRIPTION	BY
GRAPHIC SCALE 30' 15' 0 30' 60'			
U. S. ARMY ENGINEER DISTRICT, PITTSBURGH CORPS OF ENGINEERS OFFICE OF THE DISTRICT ENGINEER PITTSBURGH, PENNSYLVANIA			
BOLIVAR FLOOD PROTECTION PROJECT ROOT CREEK BOLIVAR, NEW YORK PLAN AND PROFILE STA 37+20 TO STA 46+46.05			
PREPARED BY: LEBODER-MAYERNIK	DRAWING NUMBER 038pa.1-PI-82/4		
DRAWN BY: LUSTER	SHEET OF		
CHECKED BY: [Signature]	DATE: 3 April 1979		
SUBMITTED BY: [Signature]	APPROVED FOR:		
APPROVAL RECOMMENDED: [Signature]	APPROVED:		
CHIEF ENGINEERING DIVISION	DISTRICT ENGINEER		

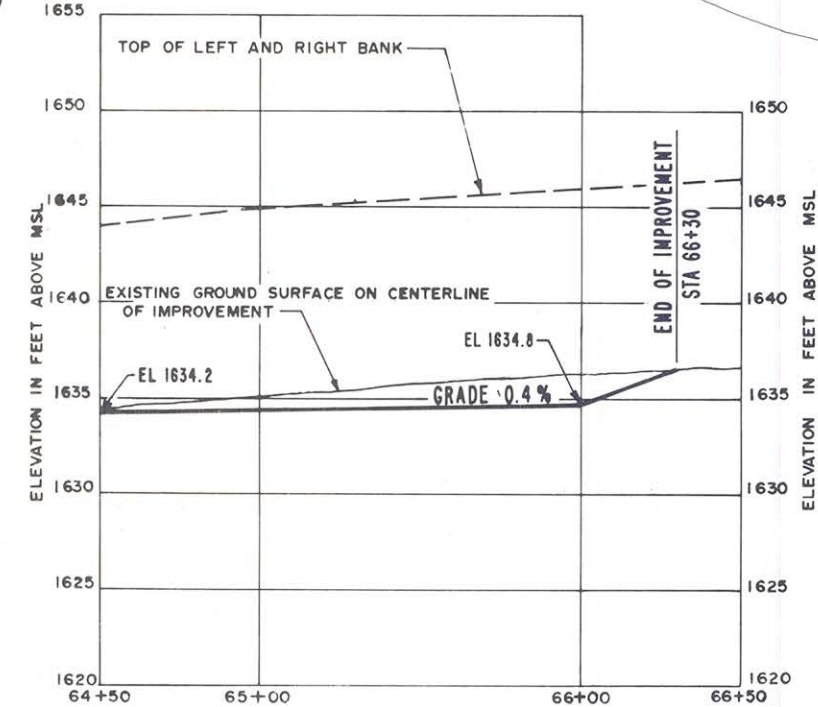




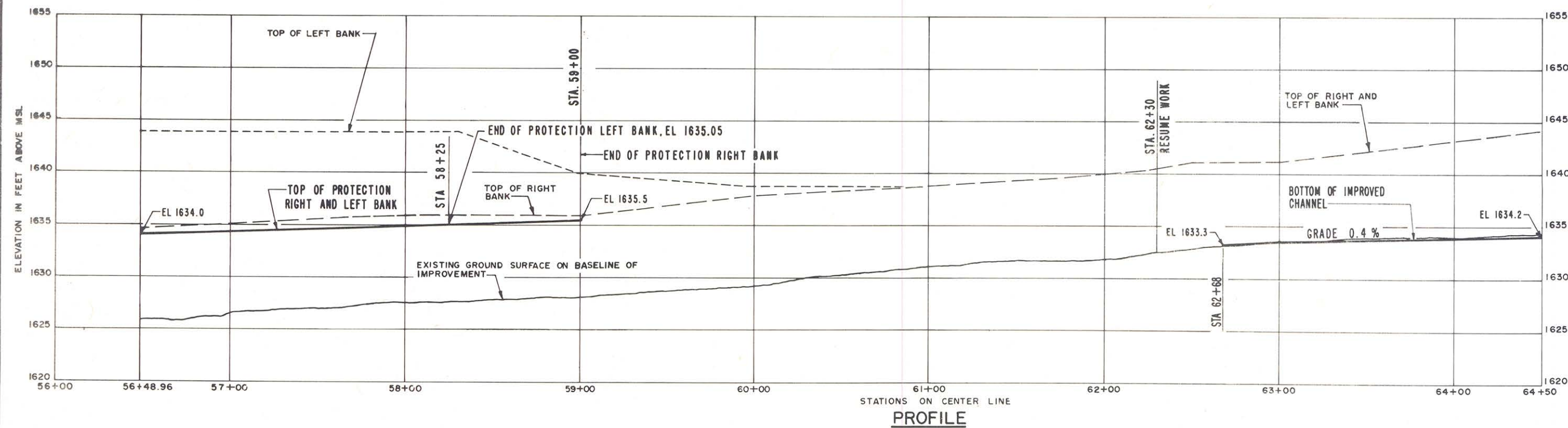




**PLAN**  
SCALE: 1" = 30'



FOR GENERAL NOTES, SEE DWG. 82 / 2

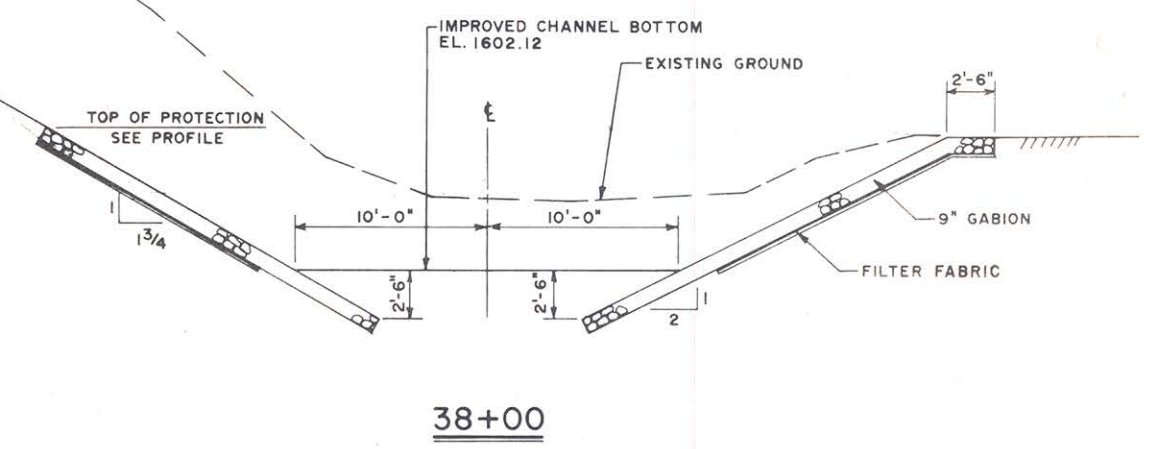
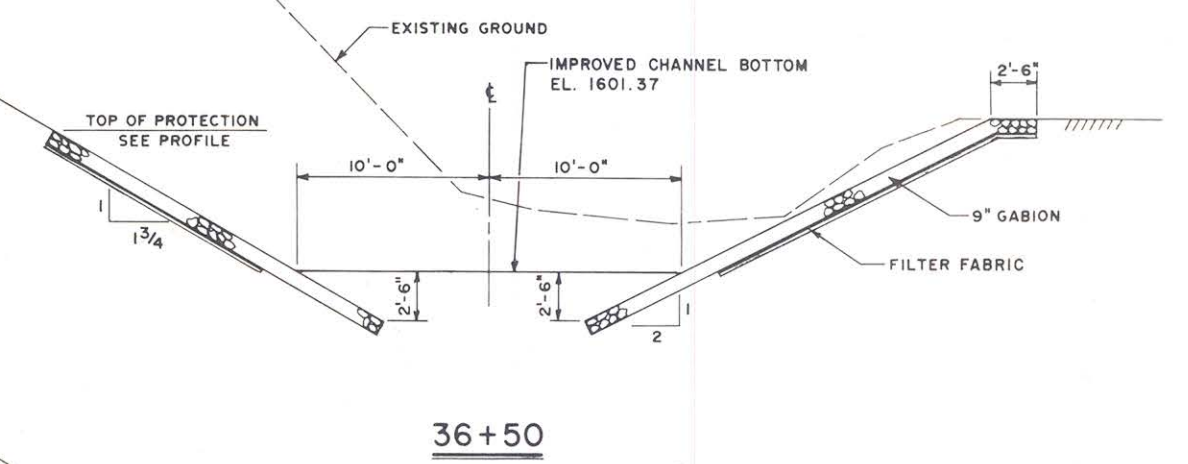
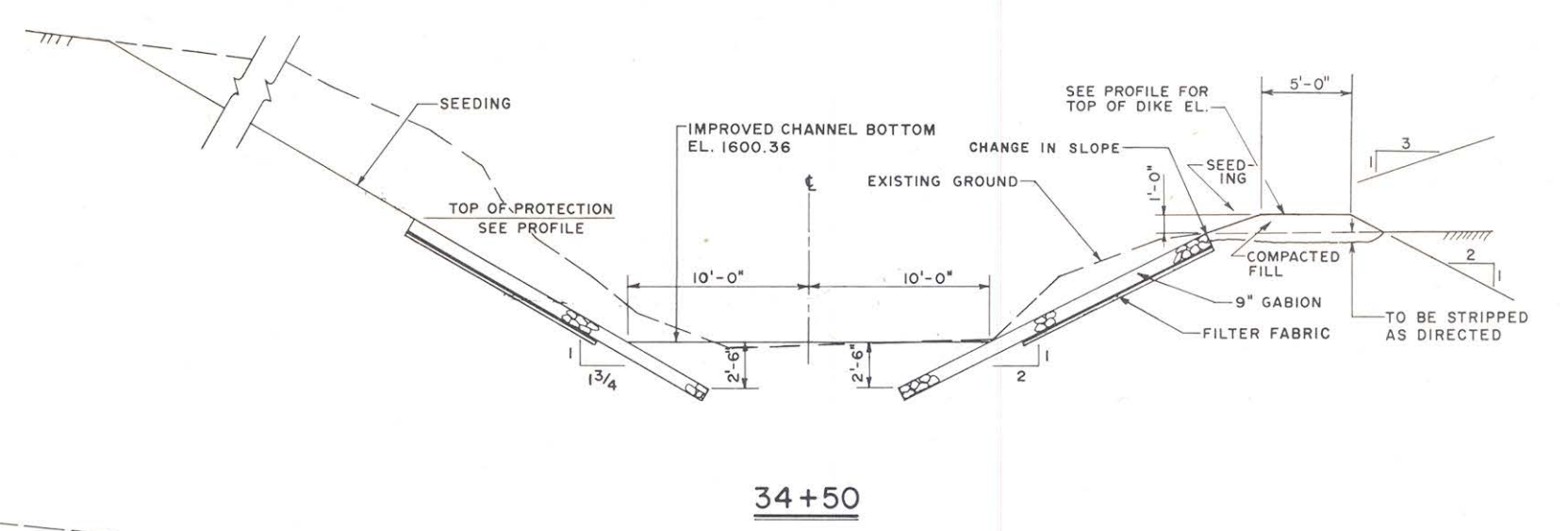
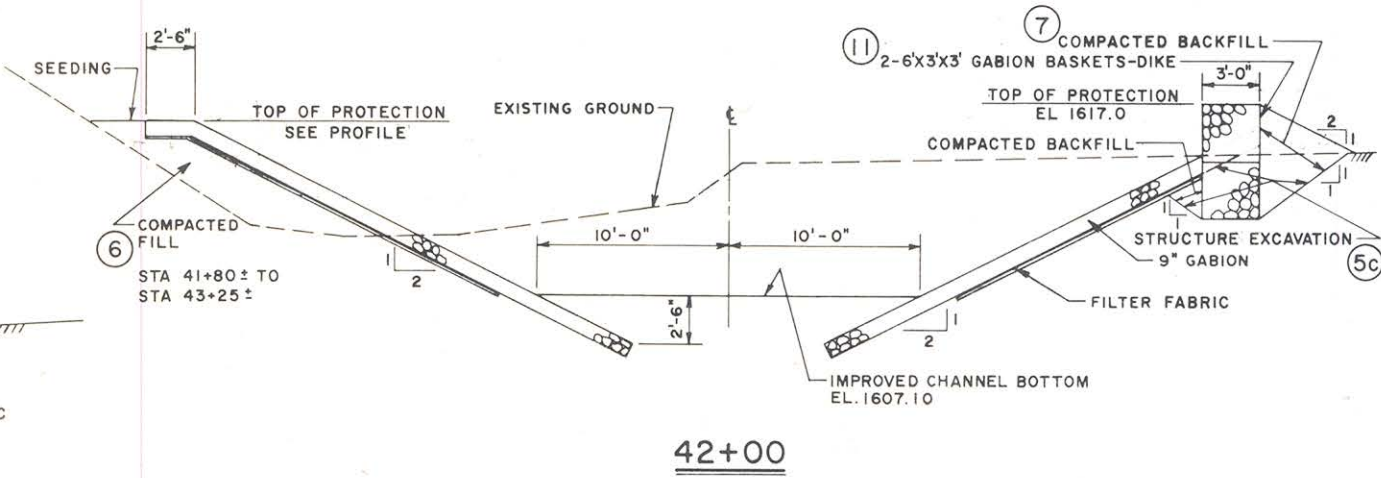
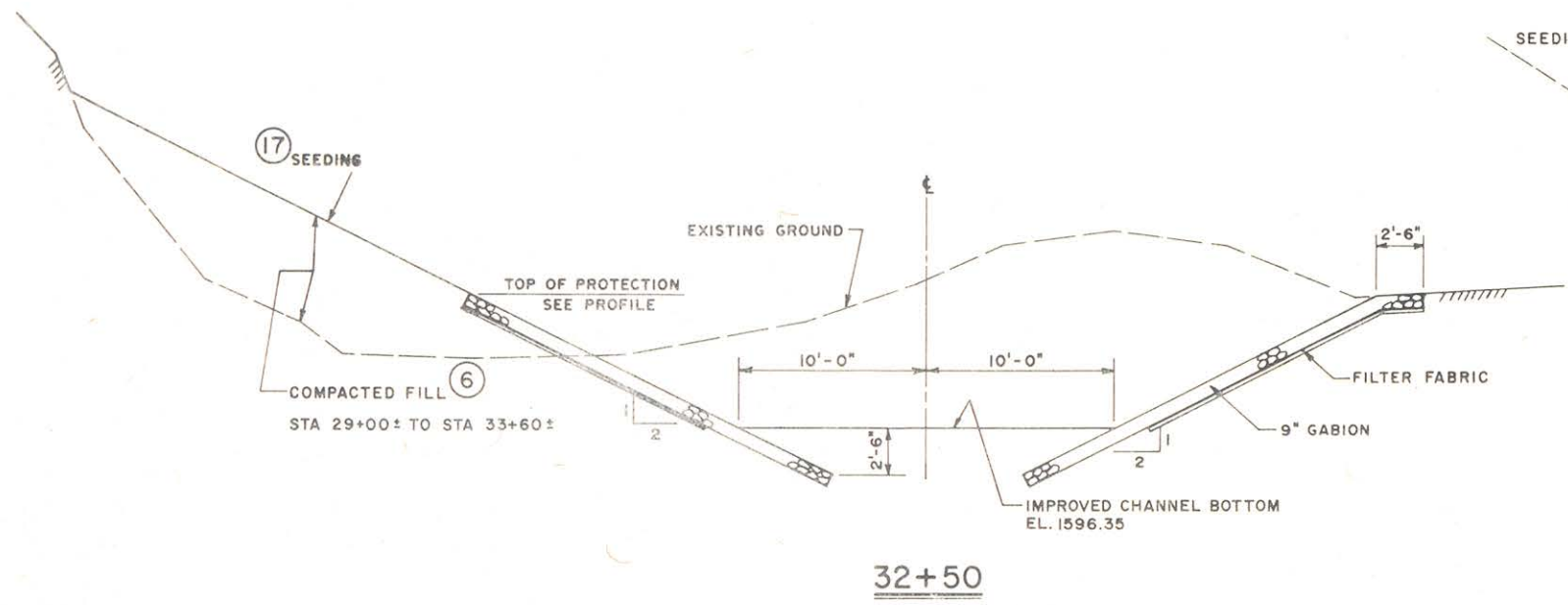
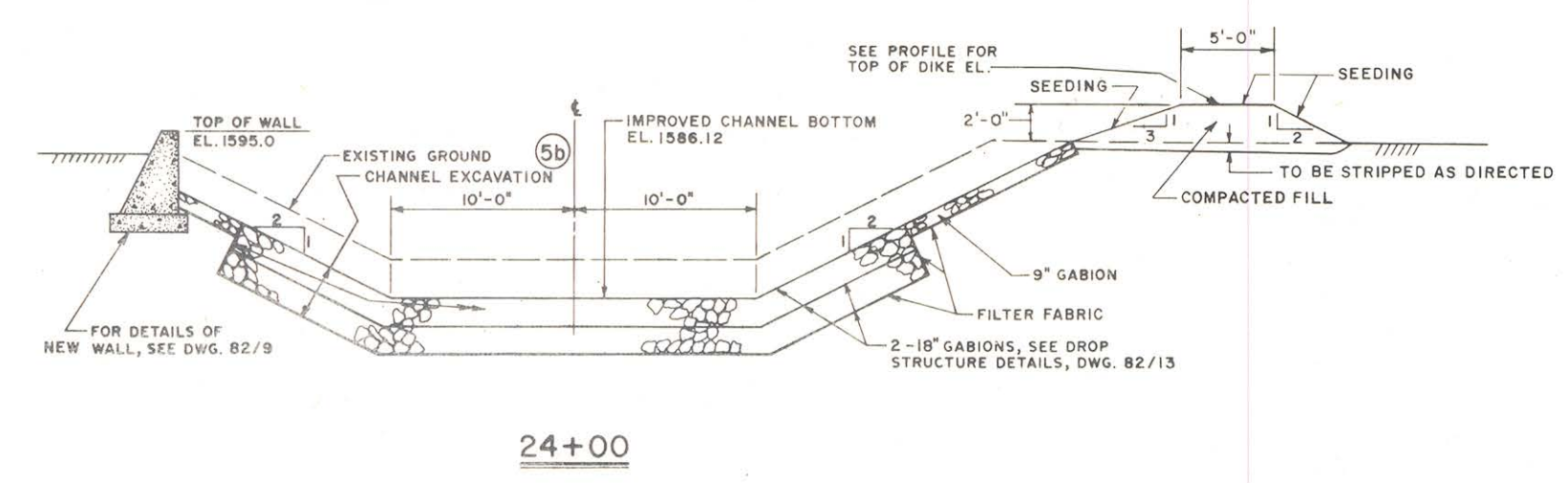
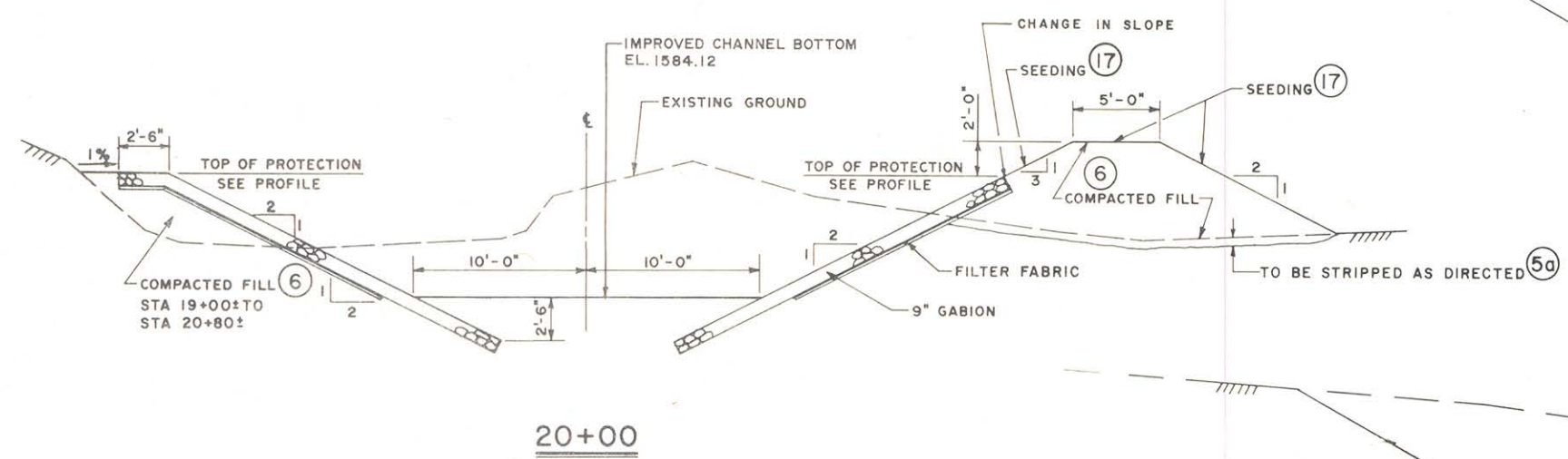
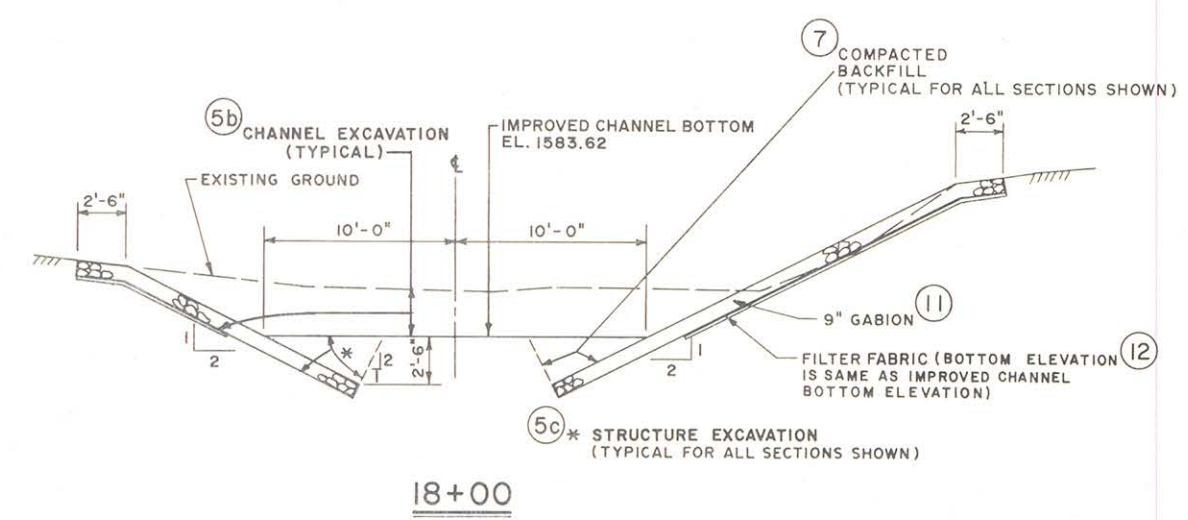


**PROFILE**

NOTE: This is a half scale reproduction of the original drawing.

REVISION	DATE	DESCRIPTION	BY
GRAPHIC SCALE			
U. S. ARMY ENGINEER DISTRICT, PITTSBURGH CORPS OF ENGINEERS OFFICE OF THE DISTRICT ENGINEER PITTSBURGH, PENNSYLVANIA			
PREPARED BY: LEBDER - MAYERNIK DRAWN BY: LUSTER CHECKED BY: [Signature] SUBMITTED BY: [Signature]		<b>BOLIVAR FLOOD PROTECTION PROJECT          ROOT CREEK          BOLIVAR, NEW YORK</b> <b>PLAN AND PROFILE          STA 56+48.96 TO STA 66+30</b>	
APPROVAL: RECOMMENDED [Signature] DISTRICT ENGINEER		DATE: <b>3 April 1977</b>	
APPROVED FOR:		SCALE: AS SHOWN SPEC. NO.: <b>DRAWING NUMBER          038pa.I-PI-82/6</b> SHEET OF	



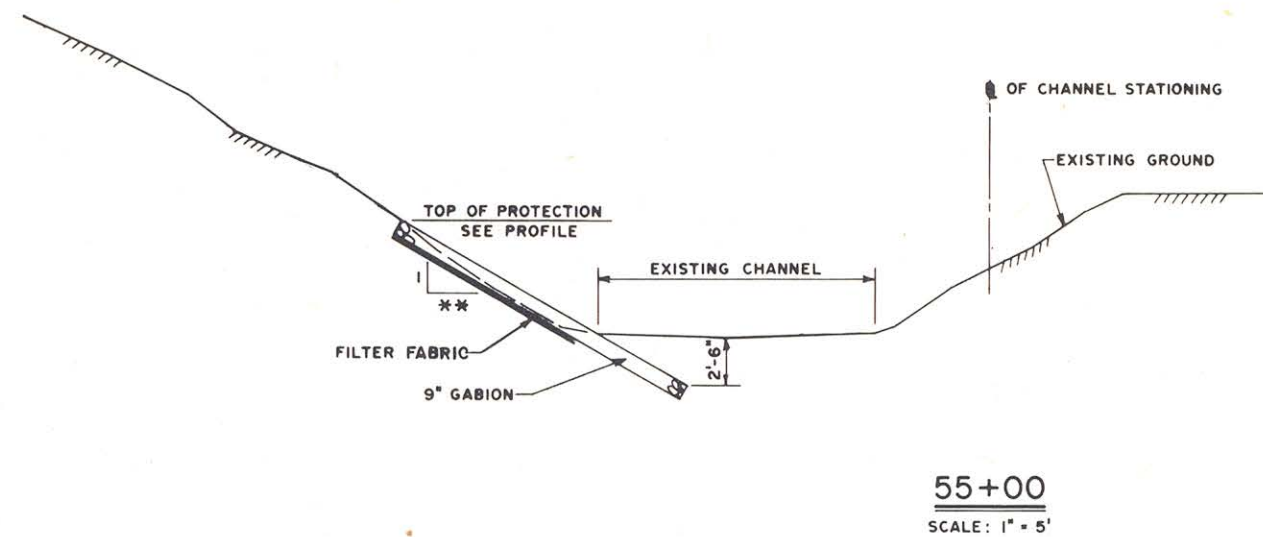
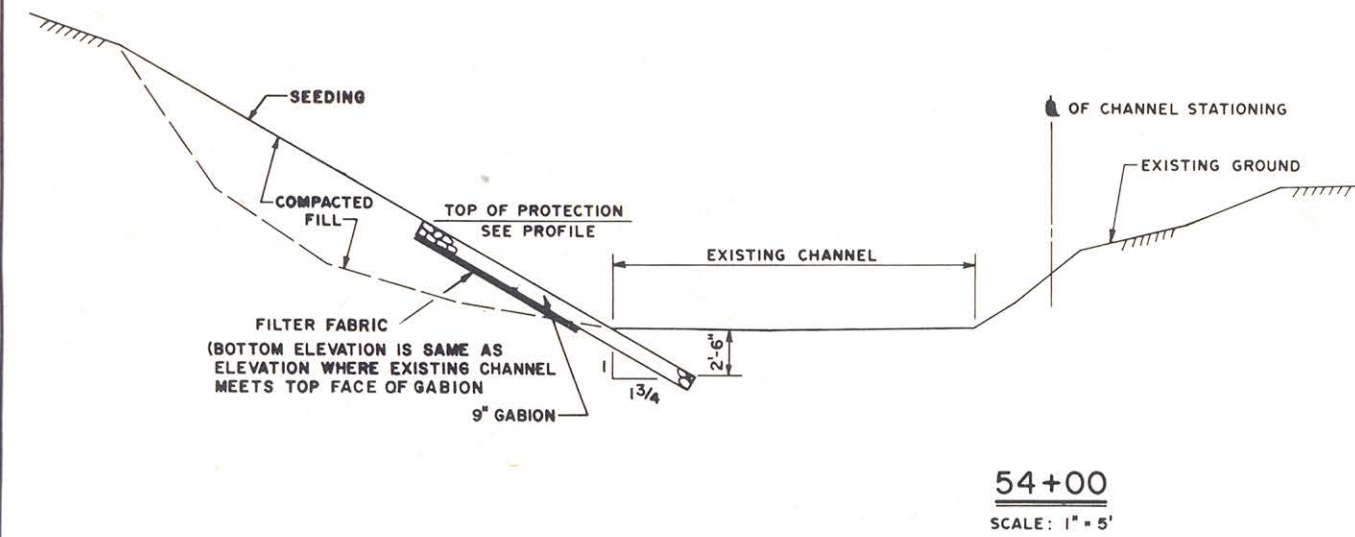
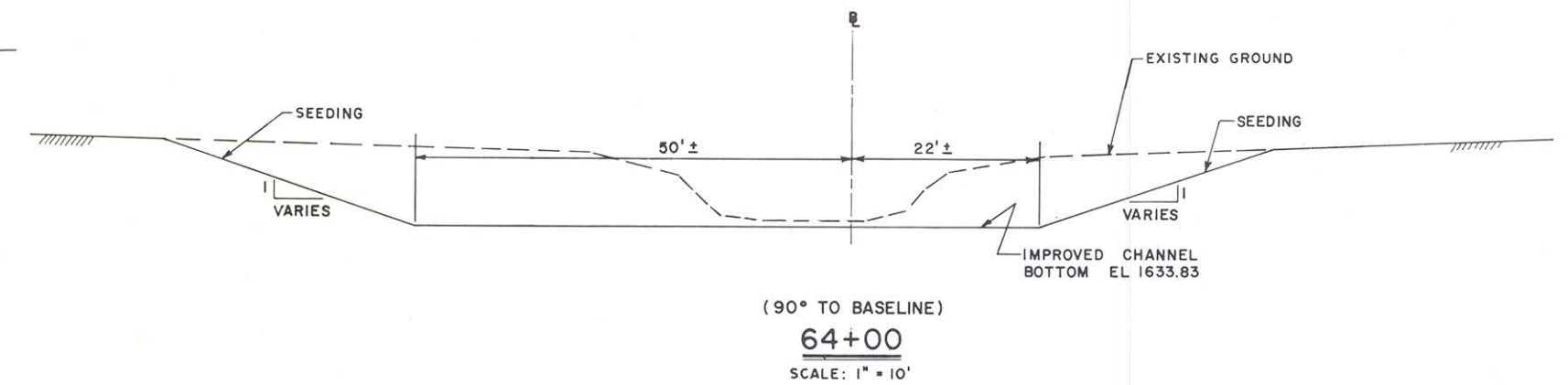
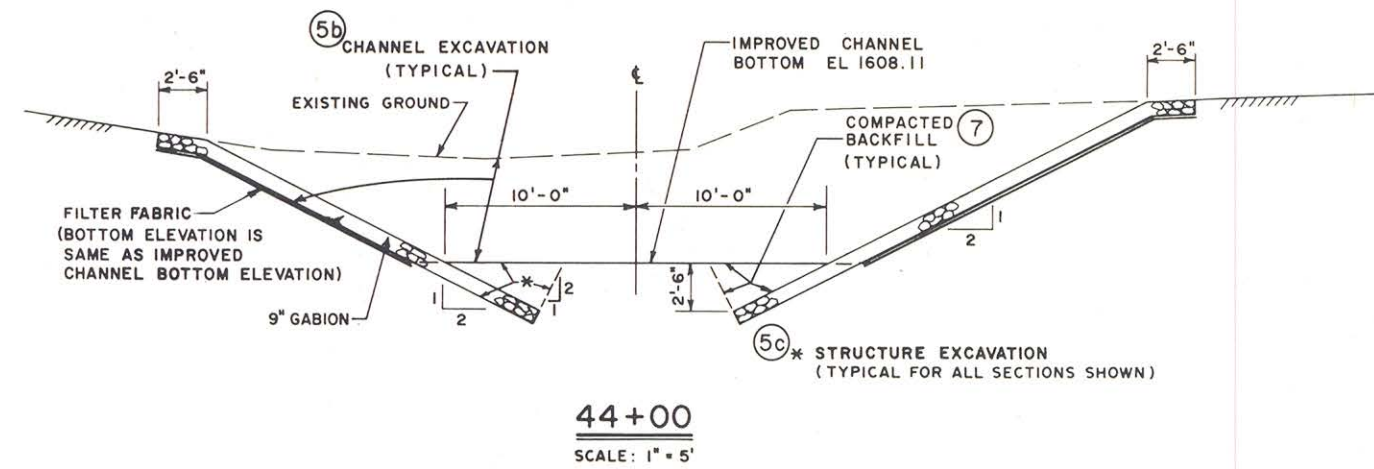


NOTE:  
FOR TYPICAL SECTION AT DROP  
STRUCTURES, SEE DWG. 82/13  
ALL SECTIONS TAKEN LOOKING  
DOWNSTREAM

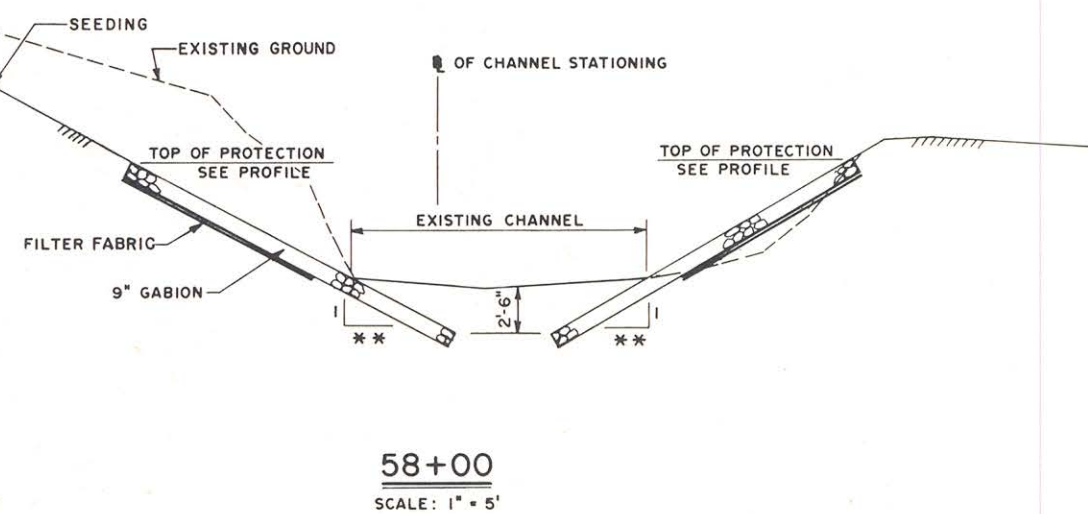
NOTE: This is a half scale reproduction of the original drawing.

REVISION	DATE	DESCRIPTION	BY
<p>GRAPHIC SCALE</p> <p>5' 0 5' 10'</p> <p>1" = 5'</p>			
<p>U. S. ARMY ENGINEER DISTRICT, PITTSBURGH CORPS OF ENGINEERS OFFICE OF THE DISTRICT ENGINEER PITTSBURGH, PENNSYLVANIA</p>			
<p>PREPARED BY: MAYERNIK</p>		<p>BOLIVAR FLOOD PROTECTION PROJECT ROOT CREEK BOLIVAR, NEW YORK</p>	
<p>DRAWN BY: MANTHEY</p>		<p>SECTIONS</p>	
<p>CHECKED BY: [Signature]</p>		<p>DATE: 3 April 1977</p>	
<p>SUBMITTED BY: [Signature]</p>		<p>APPROVED FOR: [Signature]</p>	
<p>CHIEF DESIGN BRANCH: [Signature]</p>		<p>SCALE: 1 IN. = 5 FT. SPEC. NO. 3</p>	
<p>APPROVAL RECOMMENDED: [Signature]</p>		<p>DRAWING NUMBER 038pa.1-PI-82/7</p>	
<p>DATE:</p>		<p>SHEET OF</p>	





\*\* SLOPE VARIES, IV ON 1 1/2 H MAX.  
STA. 48+70 TO STA. 53+75 ±  
STA. 54+25 TO STA. 59+00



NOTE: ALL SECTIONS TAKEN LOOKING  
DOWNSTREAM

NOTE: This is a half scale reproduction of the original drawing.

REVISION	DATE	DESCRIPTION	BY
GRAPHIC SCALE			
U. S. ARMY ENGINEER DISTRICT, PITTSBURGH CORPS OF ENGINEERS OFFICE OF THE DISTRICT ENGINEER PITTSBURGH, PENNSYLVANIA			
PREPARED BY: MAYERNIK	BOLIVAR FLOOD PROTECTION PROJECT		
DRAWN BY: WANTHEY	ROOT CREEK		
CHECKED BY: L. L. L.	BOLIVAR, NEW YORK		
SUBMITTED BY: J. G. Collette	SECTIONS		
APPROVAL RECOMMENDED: J. G. Collette	APPROVED: J. G. Collette	DATE: 3 April 1979	
CHIEF, DESIGN BRANCH	CHIEF, ENGINEERING DIVISION	COLONEL, CORPS OF ENGINEERS, DISTRICT ENGINEER	
SCALE: AS SHOWN		SPEC. NO.:	
DRAWING NUMBER 038pa.I-PI-82/8		SHEET OF	



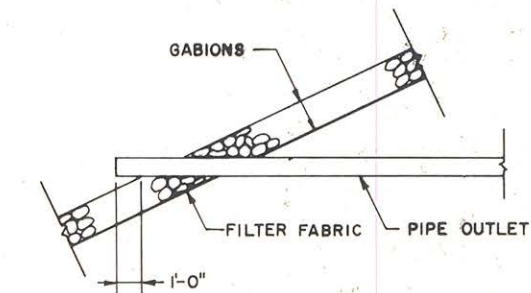
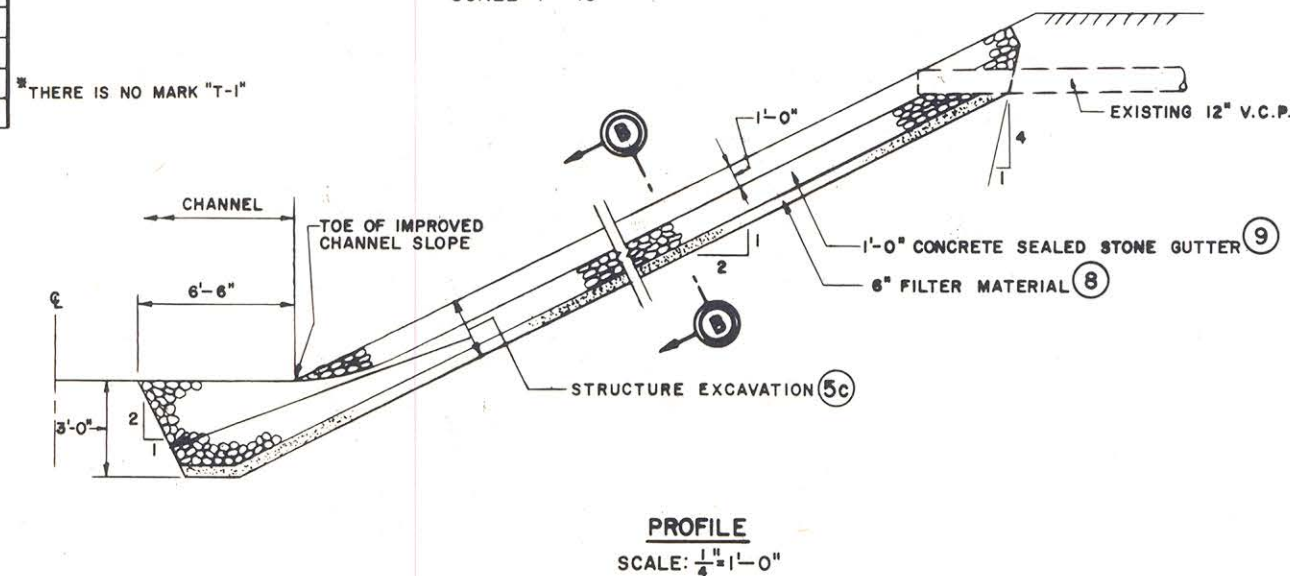
PIPE OUTLET DATA						
STATION	DWG.	BANK	MARK	SIZE & TYPE	INVERT ELEVATION	FUNCTION
21+80±	82/2	LEFT	P-1	12" CMP	1587.9	STORM DRAIN
21+80±	"	RIGHT	P-2	12" CMP	1588.8	STORM DRAIN
28+85±	82/3	LEFT	P-3	18" CMP	1599.0	STORM DRAIN
32+50±	"	LEFT	P-4	12" VCP	1613.0	STORM DRAIN
39+20±	82/4	RIGHT	P-5	18" VCP	1608.5	STORM DRAIN
40+85±	"	LEFT	P-6	8" CIP	1618.0	STORM DRAIN
40+85±	"	RIGHT	P-7	12" VCP	1612.5	STORM DRAIN
41+20±	"	RIGHT	P-8	8" CIP	1610.0	STORM DRAIN
47+80±	82/5	RIGHT	P-9	18" CMP	1619.0	STORM DRAIN
41+30±	82/4	RIGHT	P-10	8" CIP	1610.0	STORM DRAIN
48+21±	82/3	LEFT	P-11	4" VCP	-	DRAIN
41+70	82/4	RIGHT	P-12	12" CMP	1613.0±	STORM DRAIN

\*EXACT LOCATION AND ELEVATION TO BE DETERMINED BY CONTRACTING OFFICER

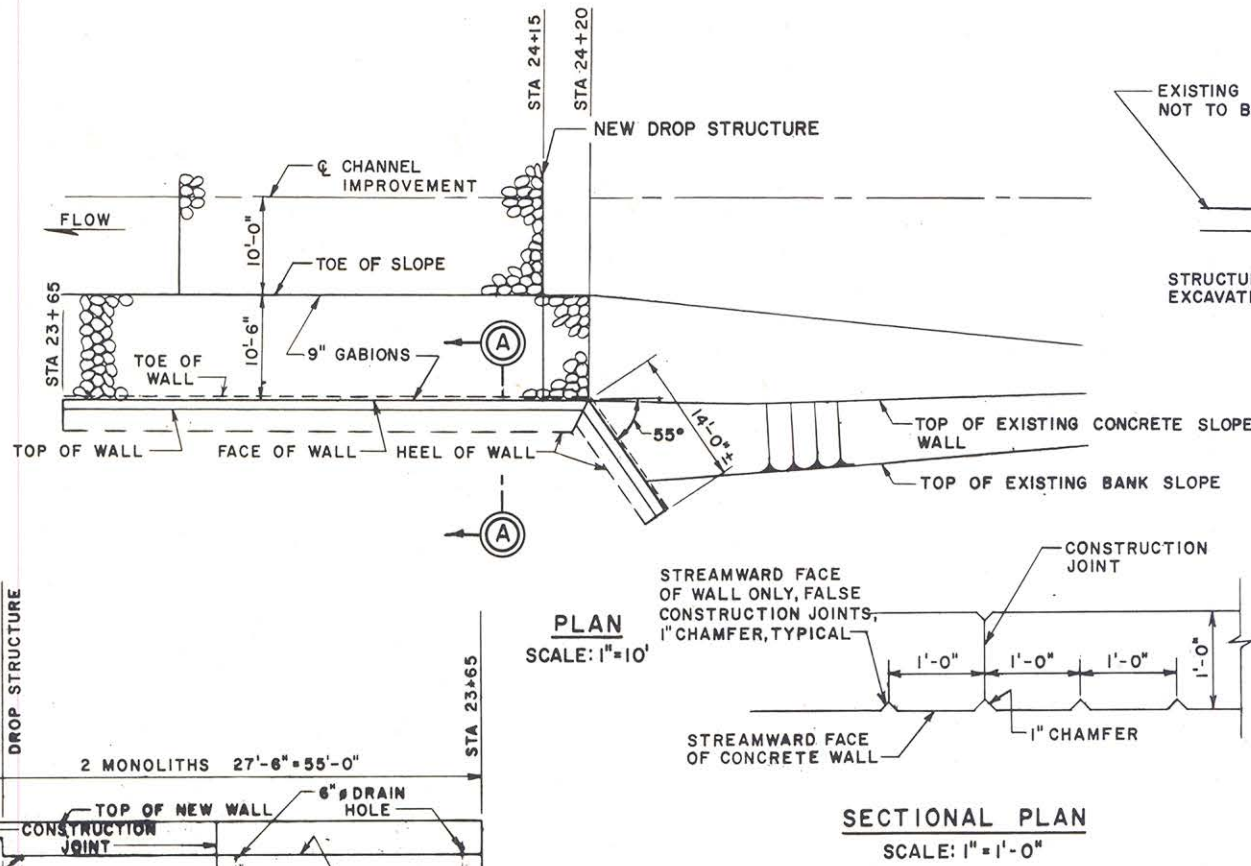
UTILITY LINE ADJUSTMENTS						
DESCRIPTION	DWG.	STATION	BANK	MARK	ADJUSTMENT REQUIRED	ADJUSTING AGENCY
3" STEEL HIGH PRESSURE GAS LINE	82/2	19+20±	BOTH	G-1	PIPE TO BE LOWERED TO CLEAR CHANNEL INVERT AND SIDE SLOPES	COMPLETED
POWER POLES (2)	"	19+20±	RIGHT	E-1	RELOCATE POLES	COMPLETED
3" STEEL HIGH PRESSURE GAS LINE	"	21+50± to 23+90±	RIGHT	G-2	PIPE TO BE LOWERED TO CLEAR SIDE SLOPE	COMPLETED
METAL CABLE T.V. POLE AND GUY	"	21+70±	LEFT	T-2	RELOCATE POLE AND GUY	COMPLETED
8" T.C.P. SANITARY SEWER LINE	"	21+85±	BOTH	S-1	PIPE TO BE RELOCATED IF NECESSARY	RELOC. NOT REQ'D
6" CAST IRON WATER LINE	"	22+17±	BOTH	W-1	PIPE TO BE RELOCATED IF NECESSARY	RELOC. NOT REQ'D
METAL CABLE T.V. POLE	"	23+20±	RIGHT	T-3	RELOCATE POLE	COMPLETED
POWER POLE AND GUY	"	24+00±	RIGHT	E-2	RELOCATE POLE AND GUY	COMPLETED
MANHOLE	"	24+00±	RIGHT	S-2	RAISE MANHOLE TO NEW GRADE	LOCAL INTERESTS
POLE AND 2 GUYS	82/3	33+90±	RIGHT	E-3	RELOCATE 2 GUYS	COMPLETED
4" STEEL HIGH PRESSURE GAS LINE	82/5	48+50±	BOTH	G-3	PIPE TO BE LOWERED TO CLEAR CHANNEL INVERT AND SIDESLOPES	COMPLETED
3- EXPOSED OIL PIPE LINES	82/6	58+80±	RIGHT	O-1	REMOVAL	GOV'T. CONTRACTOR
4" OIL PIPELINE	"	64+00±	RIGHT	O-2	REMOVAL	GOV'T. CONTRACTOR
2" OIL PIPELINE	"	65+50±	LEFT	O-3	REMOVAL	GOV'T. CONTRACTOR
2 WATER SHUT-OFF BOXES	82/2	21+56± to 22+17±	RIGHT	W-2	RELOCATION	LOCAL INTERESTS
POWER POLE GUY WIRE	82/4	40+65±	RIGHT	E-4	RELOCATION	COMPLETED
8" CIP WATER LINE	82/5	46+56±	BOTH	W-3	RELOCATION	LOCAL INTERESTS

MISCELLANEOUS ITEMS REQUIRING ADJUSTMENT						
DESCRIPTION	DWG.	STATION	BANK	ADJUSTMENT REQUIRED	ADJUSTING AGENCY	MARK
SNOW FENCE	82/2	21+50±	RIGHT	REMOVAL	LOCAL INTERESTS	M-1
BARRICADE	"	22+00±	RIGHT	RELOCATION	"	M-2
BARRICADE	"	22+00±	LEFT	RELOCATION IF REQUIRED	"	M-3
4" ABANDONED CAST IRON PIPE	"	22+50±	RIGHT	REMOVAL	GOV'T. CONTRACTOR	M-4
BARBED WIRE FENCE	82/2	23+17±	RIGHT	RELOCATION	LOCAL INTERESTS	M-5
WIRE FENCE	82/3	28+57±	LEFT	RELOCATION	"	M-6
SWING SET	"	31+10±	RIGHT	RELOCATION	"	M-7
WIRE FENCE	"	31+50±	RIGHT	RELOCATION	"	M-8
FRAME SHED	"	32+80±	RIGHT	RELOCATION	"	M-9
PICKET FENCE	"	34+75±	RIGHT	RELOCATION	"	M-10
PICKET FENCE	"	34+75±	LEFT	RELOCATION	"	M-11
4" ABANDONED CAST IRON PIPE	"	35+20± to 37+20±	RIGHT	REMOVAL	GOV'T. CONTRACTOR	M-12
CONC. FOUNDATION	82/3	36+00±	RIGHT	REMOVAL	"	M-13
ABANDONED CAST IRON PIPES	82/4	37+40± to 41+80±	RIGHT	REMOVAL	"	M-14
METAL SHED	"	38+95±	RIGHT	RELOCATION	LOCAL INTERESTS	M-15
ABANDONED PIPELINE	"	43+00±	RIGHT	REMOVAL	GOV'T. CONTRACTOR	M-16
TRAILER	"	43+00±	RIGHT	RELOCATION	LOCAL INTERESTS	M-17
CONCRETE RUBBLE	"	45+30± to 46+00±	RIGHT	REMOVAL	GOV'T. CONTRACTOR	M-18
ABANDONED 4" PIPE	"	46+00±	RIGHT	REMOVAL	"	M-19
EXPOSED PIPE	82/4	48+30±	LEFT	REMOVAL	"	M-20
EXPOSED PIPE	82/5	48+90±	LEFT	REMOVAL	GOV'T. CONTRACTOR	M-21
5-8" ABANDONED CAST IRON PIPES	"	56+10±	RIGHT	REMOVAL	"	M-22

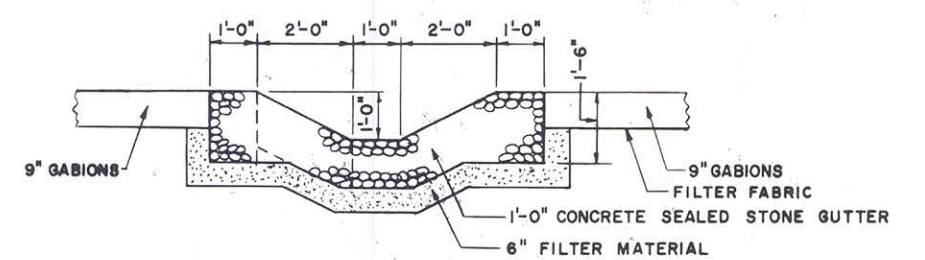
\*THERE IS NO MARK "T-1"



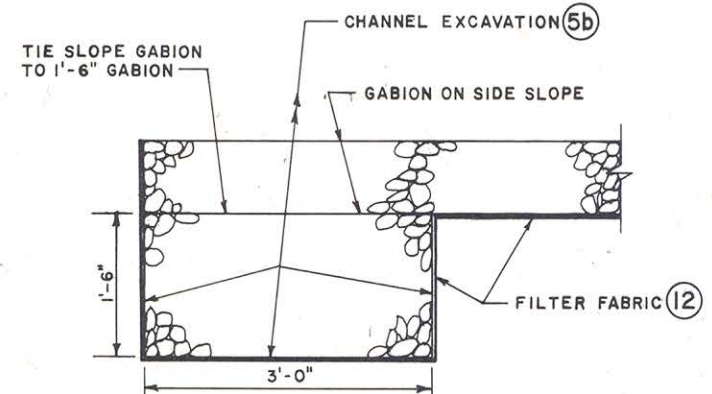
PIPE OUTLET THROUGH GABION SLOPE  
NO SCALE



CONCRETE GRAVITY WALL



SECTION A-A  
SCALE: 1/2" = 1'-0"



STONE GABBION CUT-OF WALL  
(AT BEGINNINGS AND ENDS OF GABBION ON SLOPES ONLY - NOT REQUIRED BELOW INVERT)  
NO SCALE

NOTE: This is a half scale reproduction of the original drawing.

REVISION	DATE	DESCRIPTION	BY
1	3 April 1979	FINAL	W. L. LUSTER

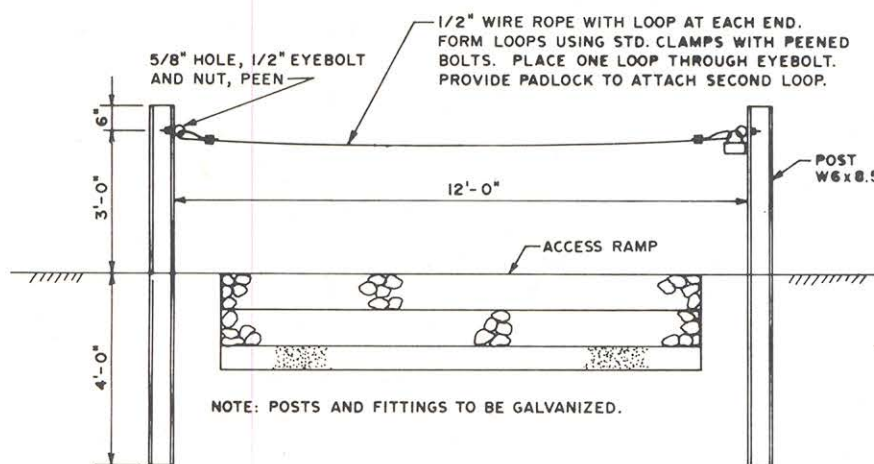
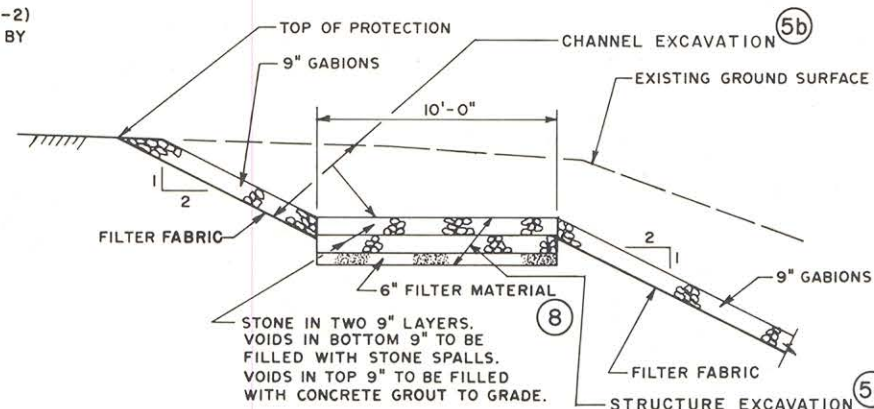
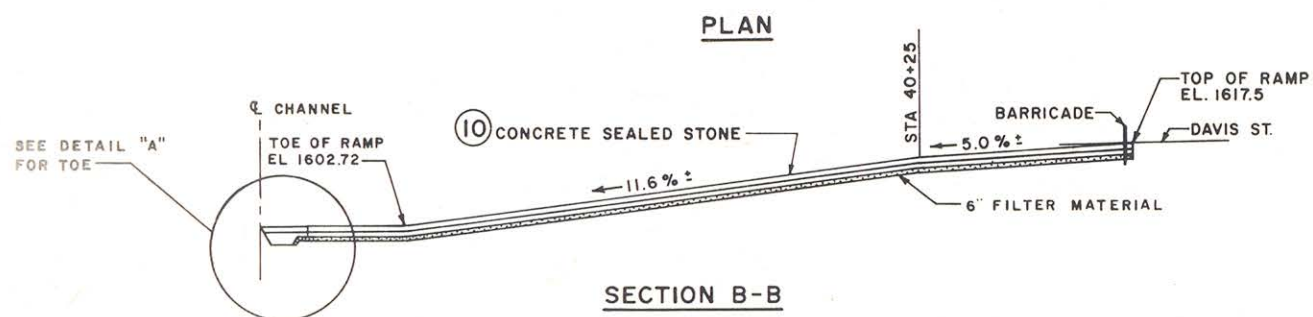
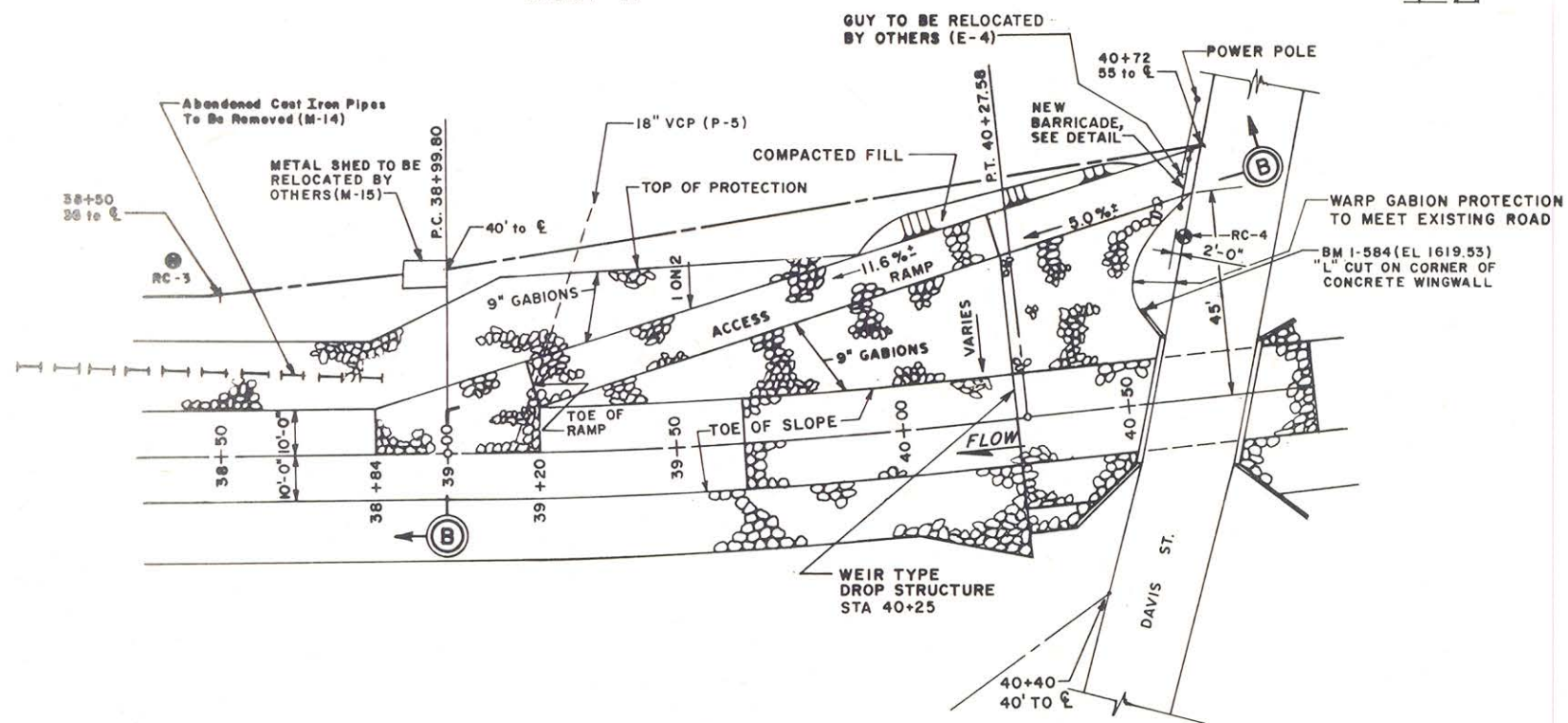
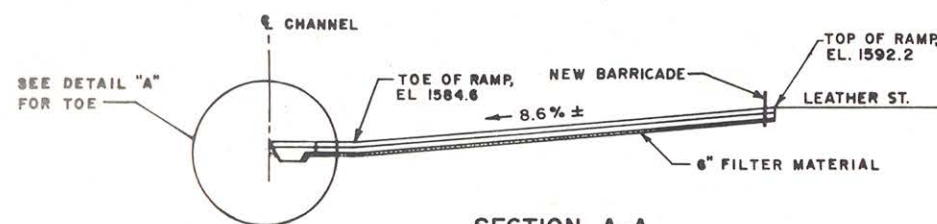
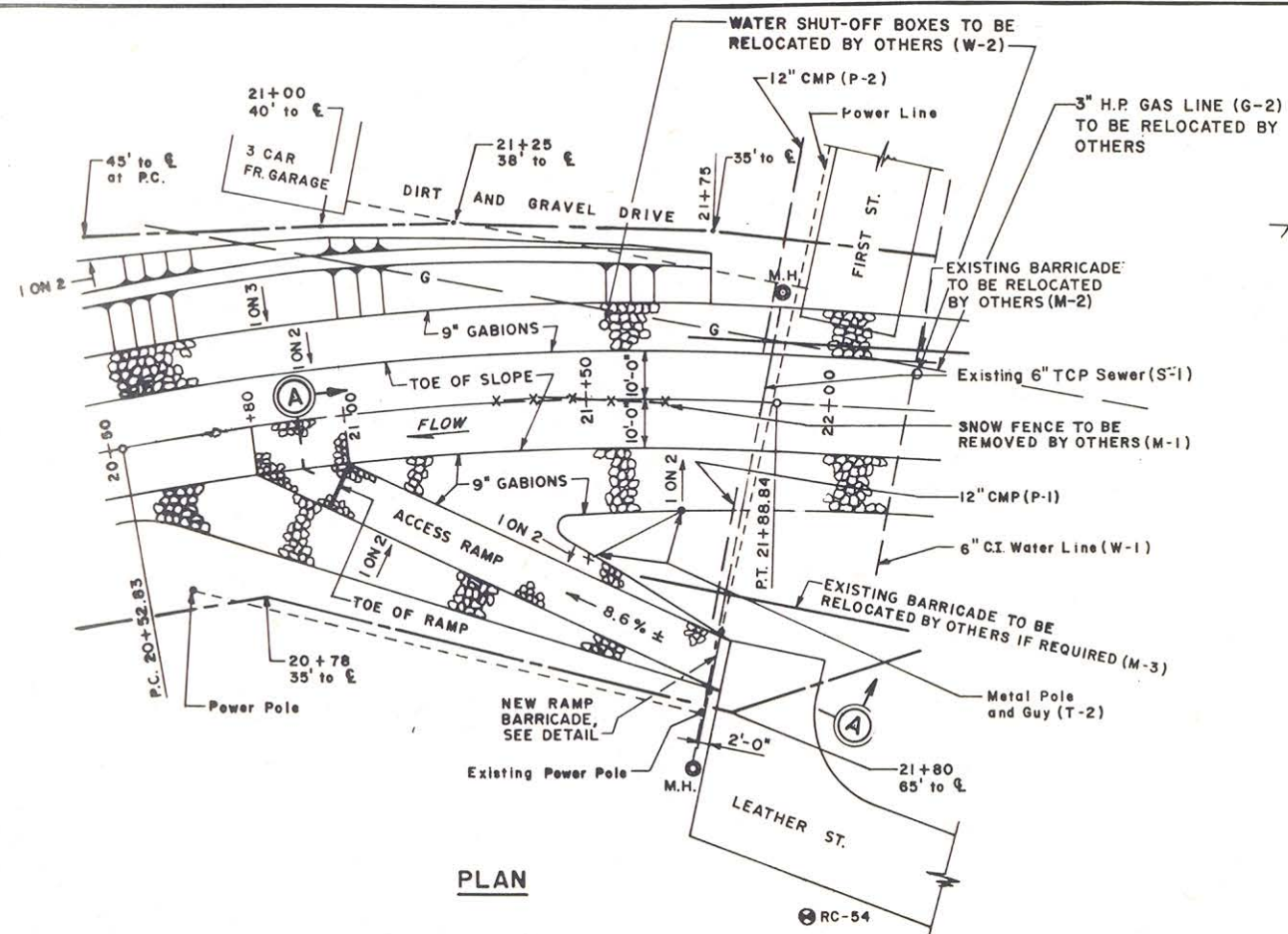
U. S. ARMY ENGINEER DISTRICT, PITTSBURGH  
CORPS OF ENGINEERS  
OFFICE OF THE DISTRICT ENGINEER  
PITTSBURGH, PENNSYLVANIA

PREPARED BY: MAYERNIK  
DRAWN BY: LUSTER  
CHECKED BY: G. G. Collette  
SUBMITTED BY: J. S. Munroe  
APPROVAL RECOMMENDED: J. S. Munroe  
APPROVED: J. S. Munroe  
DATE: 3 April 1979

BOLIVAR FLOOD PROTECTION PROJECT  
ROOT CREEK  
BOLIVAR, NEW YORK  
MISCELLANEOUS STRUCTURES AND UTILITY LINE  
ADJUSTMENTS, PIPE OUTLET DATA, CONCRETE  
GRAVITY WALL AND MISCELLANEOUS DETAILS

SCALE: AS SHOWN  
SPEC. NO.:  
DRAWING NUMBER  
038 pa.1-P1-82/9  
SHEET OF



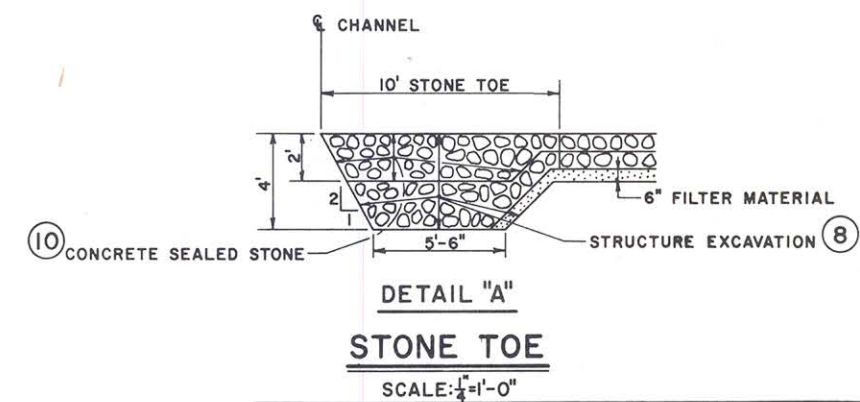


PROCEDURE FOR GROUTING OF 36" (2-18" layers) STONE FILLED GABIONS IMMEDIATELY DOWNSTREAM OF DROP STRUCTURES.

1. Install bottom 18" stone filled gabion basket.
  2. Install top 18" gabion basket and tie down to bottom basket.
  3. Place 10" ± layer of stones in top basket.
  4. Place 5" ± layer of grout on top of 10" layer of stones.
  5. Prior to grout hardening, place final layer of gabion stones. Sufficient stone must be provided to displace the concrete grout and provide a uniform distribution of the top stone layer. The surface of the top stone layer must retain the roughness characteristics of the ungrouted stones.
  6. Place and tie down top of basket.
- NOTE: The thicknesses proposed in Steps 3 and 4 above may be slightly varied to provide the best arrangement satisfactory to the Contracting Officer.

PROCEDURE FOR GROUTING OF 12" STONE FILLED GABION BASKET IN CHANNEL INVERT FROM STA. 40+25 TO STA. 40+91.

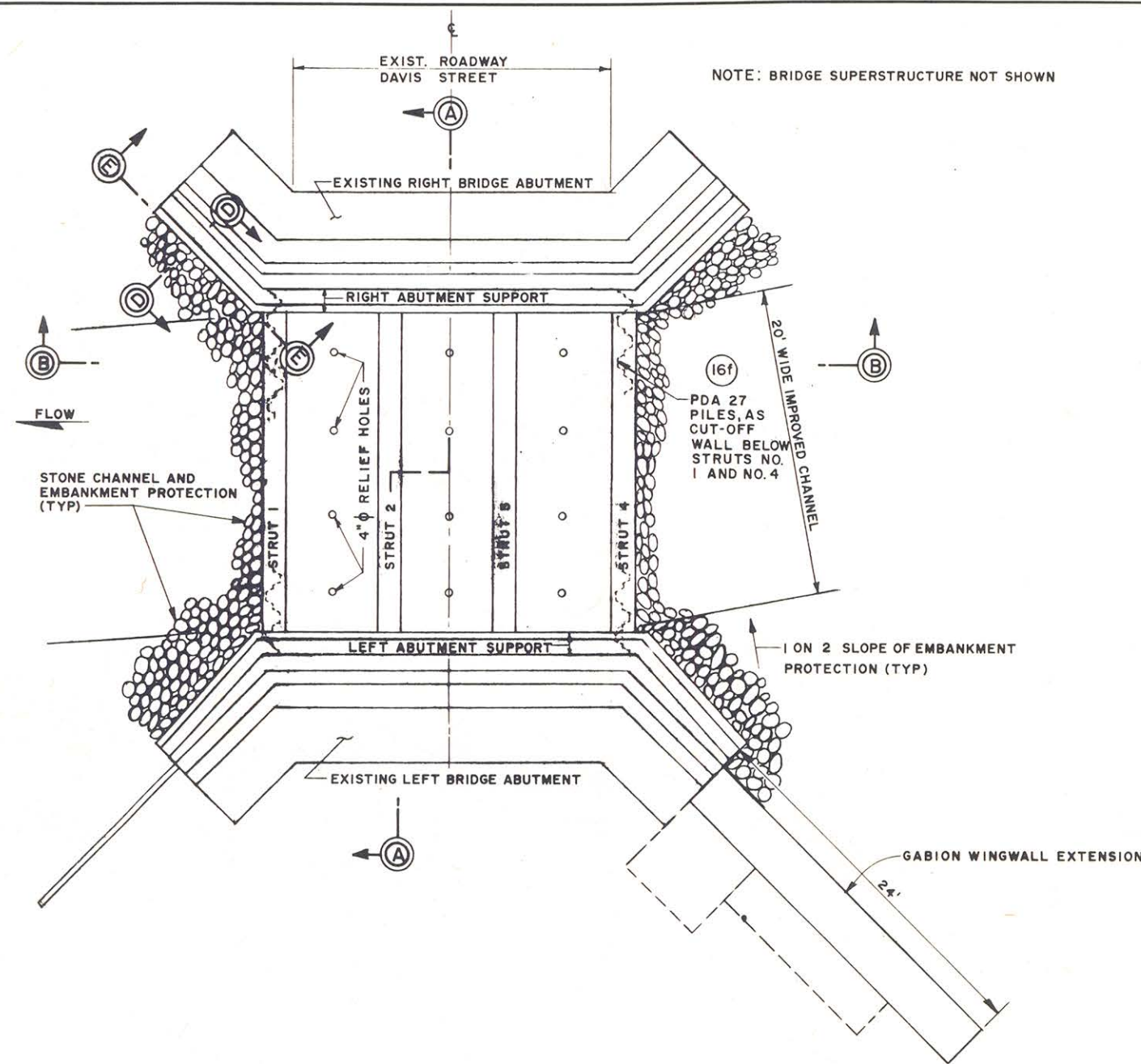
1. Install 12 inch gabion basket in invert.
2. Place 4" ± layer of stones in bottom of basket.
3. Place 5" ± layer of concrete grout on top of bottom layer of stones.
4. Prior to grout hardening, place final layer of gabion stones. Sufficient stone must be provided to displace the concrete grout and provide a uniform distribution of the top stone layer. The surface of the top stone layer must retain the roughness characteristics of the ungrouted stones.
5. Place and tie down top of basket.



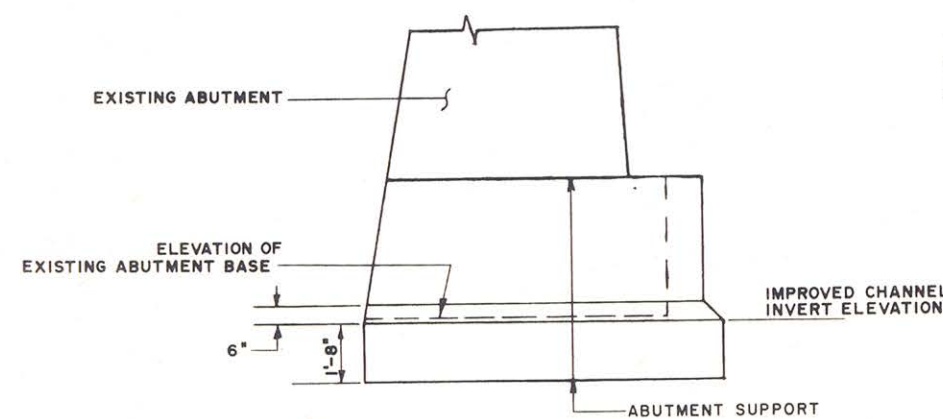
NOTE: This is a half scale reproduction of the original drawing.

REVISION	DATE	DESCRIPTION	BY
GRAPHIC SCALE			
U. S. ARMY ENGINEER DISTRICT, PITTSBURGH CORPS OF ENGINEERS OFFICE OF THE DISTRICT ENGINEER PITTSBURGH, PENNSYLVANIA			
PREPARED BY: MAYERNIK	BOLIVAR FLOOD PROTECTION PROJECT		
DRAWN BY: MANTHEY	ROOT CREEK		
CHECKED BY:	BOLIVAR, NEW YORK		
SUBMITTED BY:	ACCESS RAMPS & DETAILS		
CHIEF DESIGN BRANCH	APPROVED:	DATE:	
APPROVAL RECOMMENDED:	CHIEF ENGINEERING DIVISION	3 April 1979	
APPROVED FOR:	DATE:	SCALE: AS SHOWN	SPEC. NO.:
		DRAWING NUMBER	
		038 pa.1-P1-82/10	
		SHEET	OF

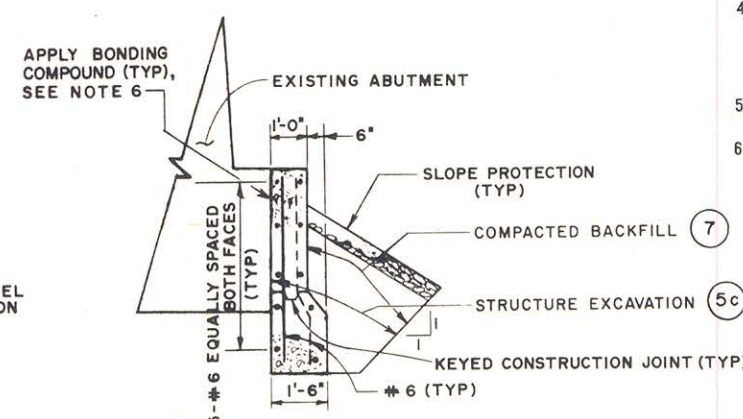




**PLAN**  
SCALE: 1" = 5'

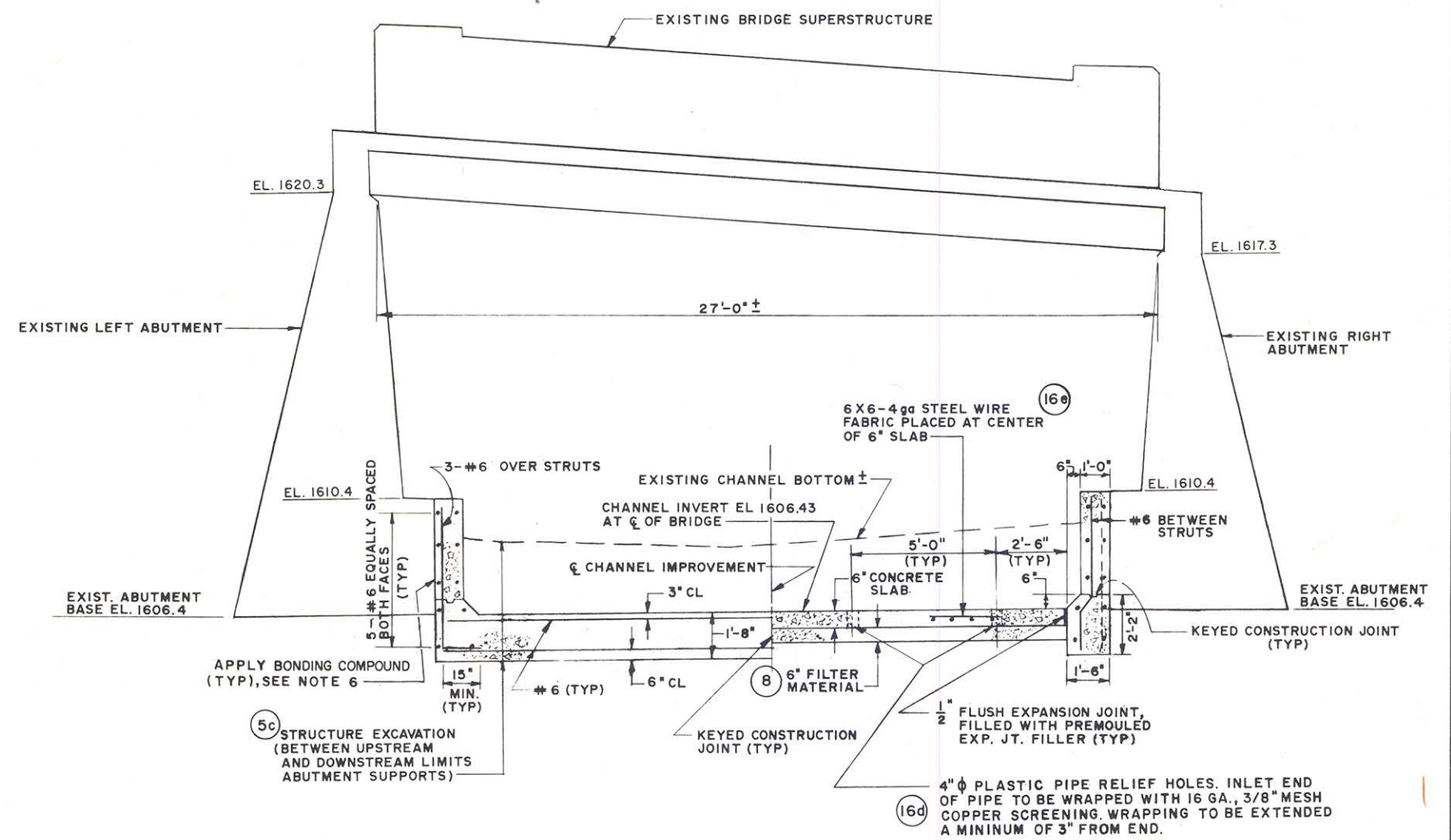


**E-E**



**D-D**

**SECTIONS**  
SCALE: 3/8" = 1'-0"



**SECTION A-A**  
SCALE: 3/8" = 1'-0"

**NOTES**

**ABUTMENT SUPPORT CONSTRUCTION PROCEDURE**

1. THE CONTRACTOR SHALL FIRST CONSTRUCT THE TEMPORARY STRUT SUPPORT SYSTEM, AS SHOWN ON DWG. 82/12.
2. THE TEMPORARY 48" Ø DIVERSION PIPE AND COMPACTED FILL DIKES SHALL BE PLACED ON THE LEFT SIDE OF CHANNEL AND STREAM FLOW DIVERTED THROUGH PIPE, AS SHOWN ON DWG. 82/12.
3. EXCAVATION AND CONSTRUCTION ON THE RIGHT HALF OF THE CHANNEL SHALL PROCEED AS FOLLOWS:  
**PHASE I**, INCLUDING RIGHT HALF OF PERMANENT STRUTS #1 AND #2, ABUTMENT SUPPORT WALL, AND 6" SLAB BETWEEN STRUTS #1 AND #2, SHALL BE EXCAVATED AND CONSTRUCTED FIRST, AS SHOWN ON DWG. 82/12, SECTION B-B. **PHASE II**, INCLUDING RIGHT HALF OF PERMANENT STRUTS #3 AND #4 AND THE REMAINING ABUTMENT SUPPORT WALL AND 6" SLABS, SHALL FOLLOW ONLY AFTER PHASE I IS COMPLETELY CONSTRUCTED, FORMS ARE REMOVED, & ABUTMENT SUPPORT WALL IS BACKFILLED. ONLY THAT AREA NEEDED TO CONSTRUCT EACH PHASE SHALL BE EXCAVATED.
4. AFTER COMPLETION OF PHASE II, THE TEMPORARY DIVERSION PIPE SHALL BE REMOVED FROM THE LEFT SIDE OF THE CHANNEL AND PLACED ON THE RIGHT SIDE OF THE CHANNEL AND THE WATER DIVERTED ACCORDINGLY. ADD WHATEVER FILL IS NEEDED TO RIGHT SIDE TO SUPPORT DIVERSION PIPE.
5. EXCAVATE AND CONSTRUCT LEFT SIDE FOLLOWING SAME PROCEDURE AS FOR RIGHT SIDE.
6. ALL EXCAVATION AND CONSTRUCTION SHALL BE DONE IN A DRY CONDITION. CONTRACTOR SHALL IMPLEMENT A DEWATERING SYSTEM, IF NECESSARY, TO MAINTAIN A DRY AREA.

**GENERAL NOTES**

1.  $f_c = 3000$  psi; REINFORCING TO BE GRADE 40.
2. CONCRETE FINISH TO BE CLASS B FOR EXPOSED SURFACES AND CLASS D FOR UNEXPOSED SURFACES.
3. ALL EXPOSED CORNERS AND CONSTRUCTION JOINTS TO HAVE 1" CHAMFER.
4. LAP SLICES, UNLESS OTHERWISE SHOWN, SHALL BE AS FOLLOWS:  

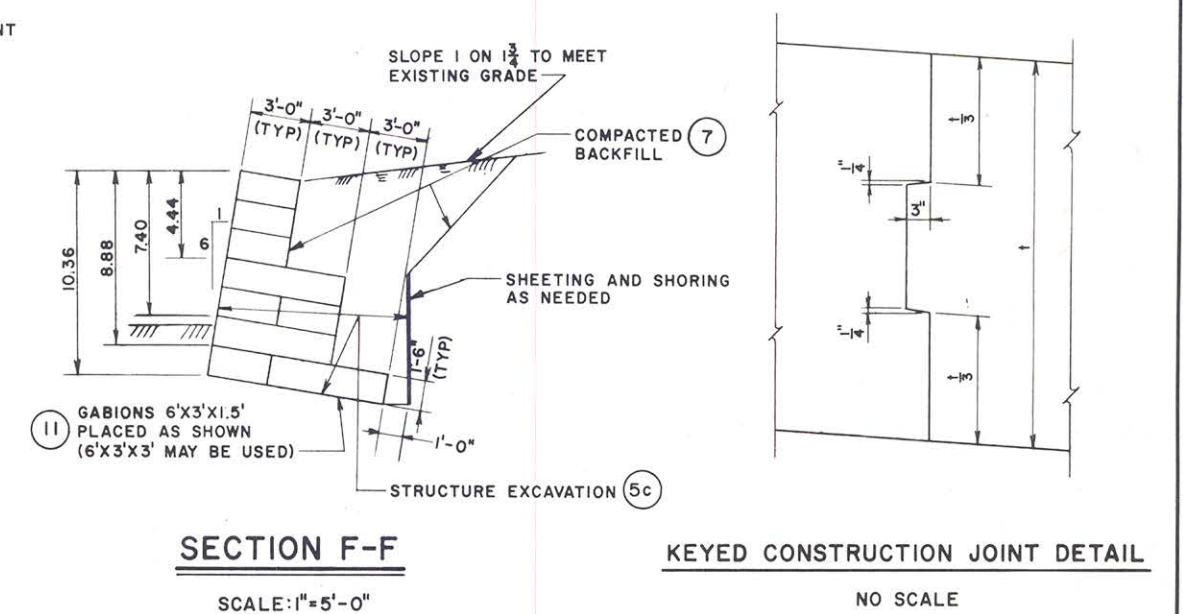
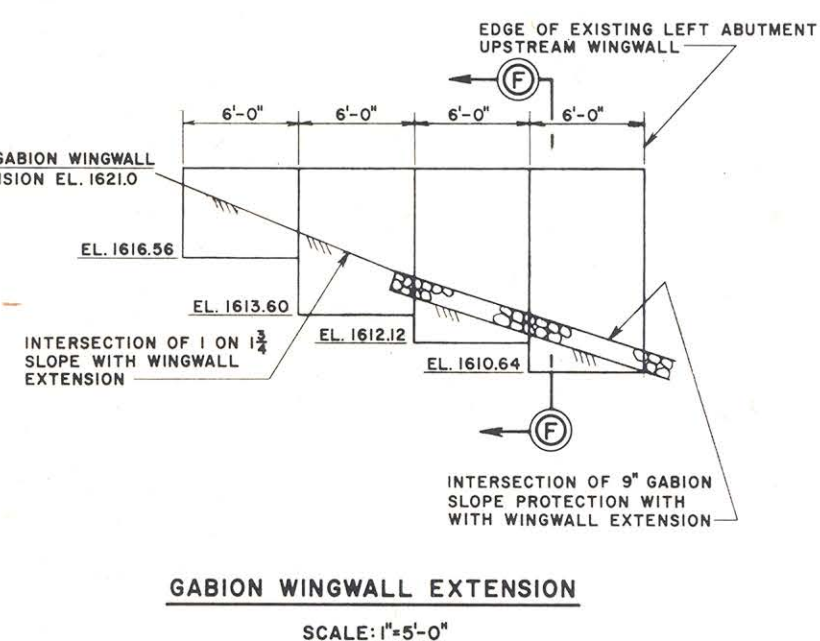
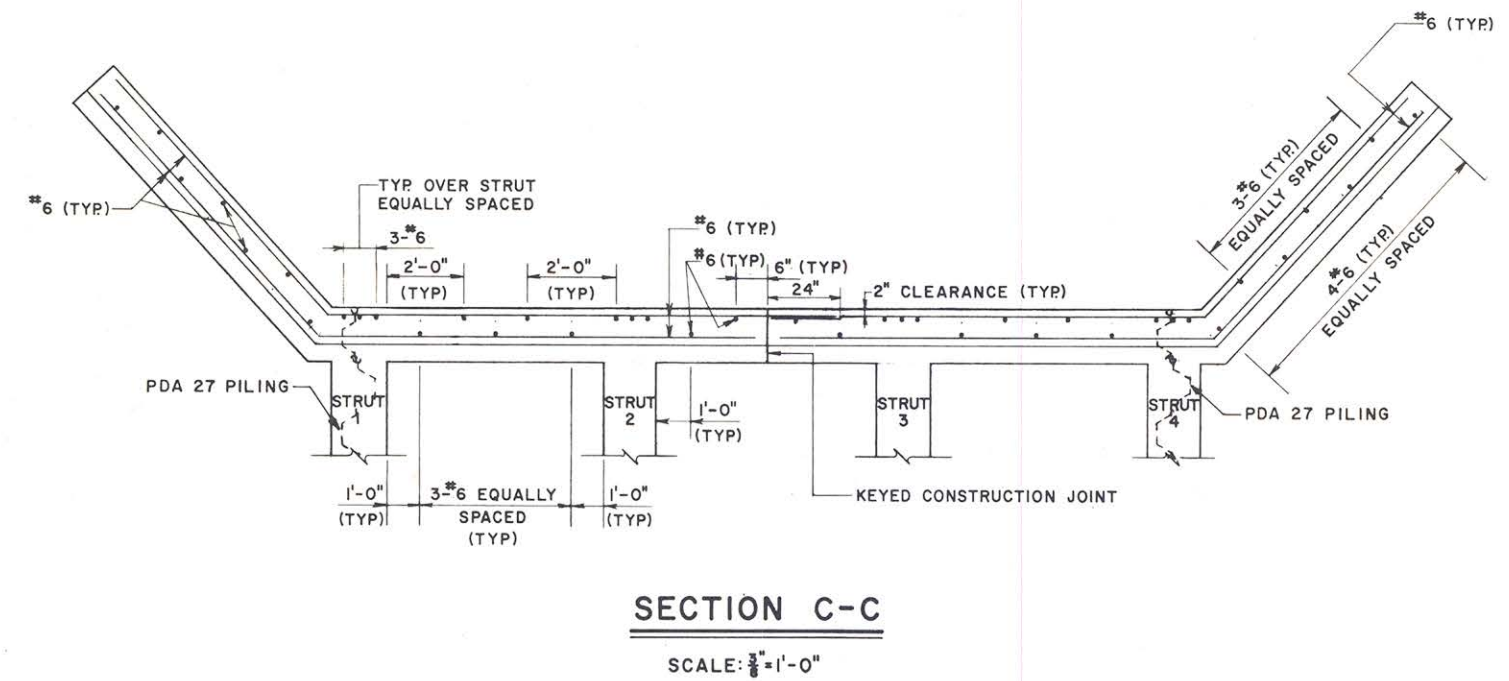
BAR SIZE	TOP BAR	OTHER BAR
#4	20"	13"
#6	31"	22"
5. REINFORCING BAR BENDING SHALL CONFORM TO THE REQUIREMENTS OF THE CONCRETE REINFORCING STEEL INSTITUTE.
6. ALL CONTACT AREAS BETWEEN NEW FRESH CONCRETE AND OLD HARDENED CONCRETE SHALL BE CLEANED BEFORE APPLYING A BONDING COMPOUND.

NOTE: WORK THIS DRAWING WITH DRAWING 82/12

REVISION	DATE	DESCRIPTION	BY
GRAPHIC SCALE			
<p>U. S. ARMY ENGINEER DISTRICT, PITTSBURGH CORPS OF ENGINEERS OFFICE OF THE DISTRICT ENGINEER PITTSBURGH, PENNSYLVANIA</p>			
PREPARED BY: RAMBO	BOLIVAR FLOOD PROTECTION PROJECT		
DRAWN BY: LUSTER	ROOT CREEK		
CHECKED BY: [Signature]	BOLIVAR, NEW YORK		
SUBMITTED BY: [Signature]	DAVIS STREET BRIDGE		
CHIEF, DESIGN BRANCH	ABUTMENT SUPPORT		
APPROVAL RECOMMENDED: [Signature]	APPROVED: [Signature]	DATE: 30 April 1979	
CHIEF, ENGINEERING DIVISION	SPECIAL NO.:		
APPROVED FOR:	DRAWING NUMBER 038pa.1-P1-82/11		
DATE:	SHEET OF		

NOTE: This is a half scale reproduction of the original drawing.



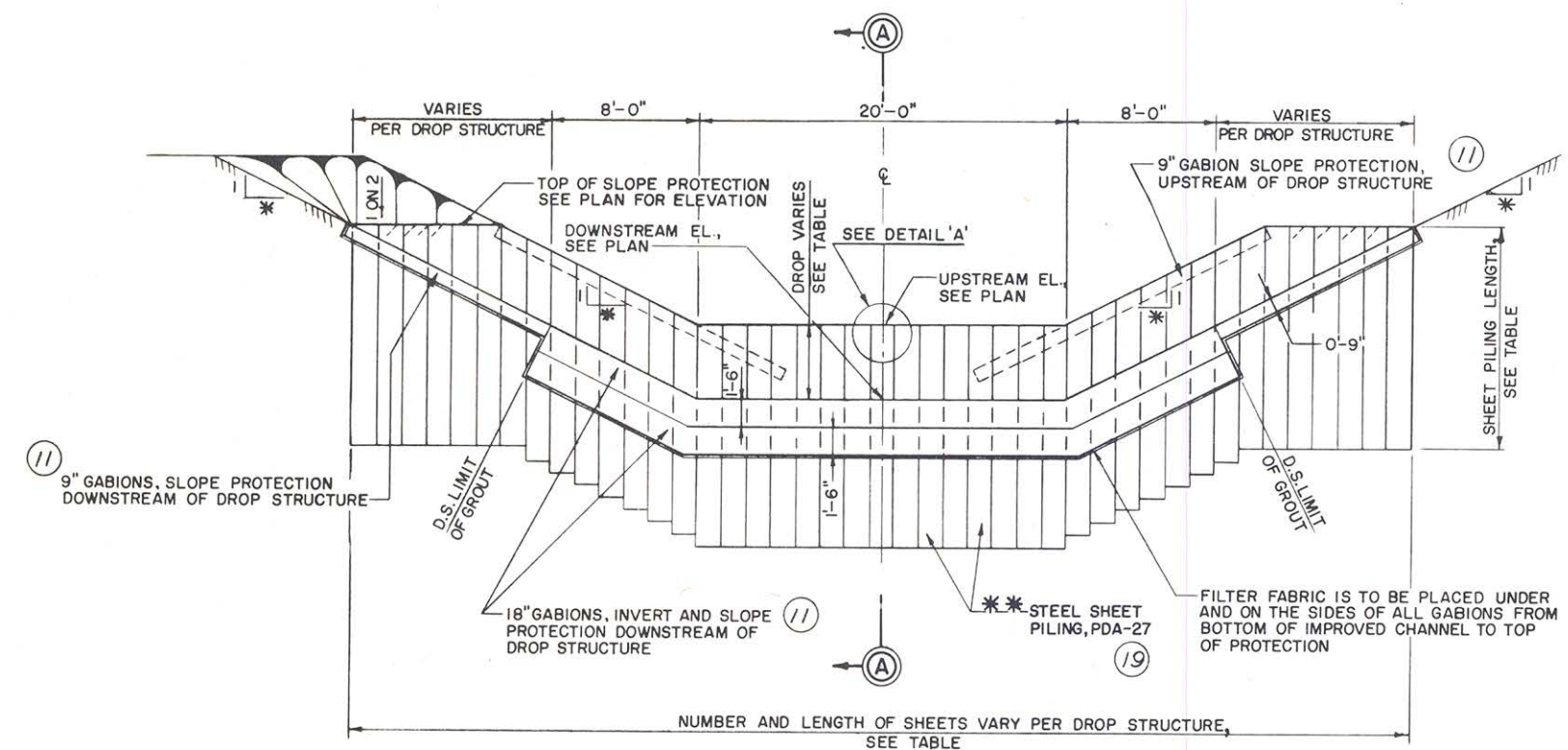
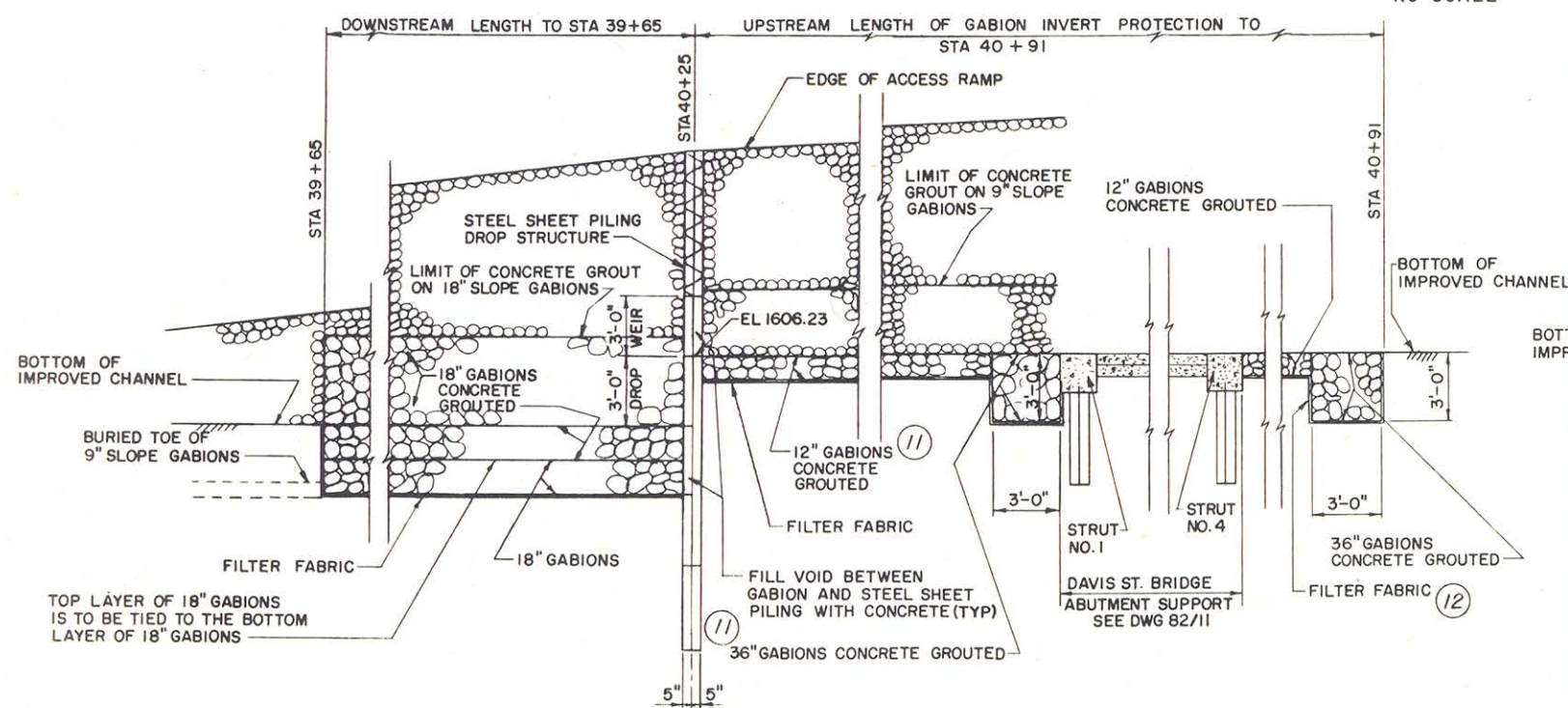
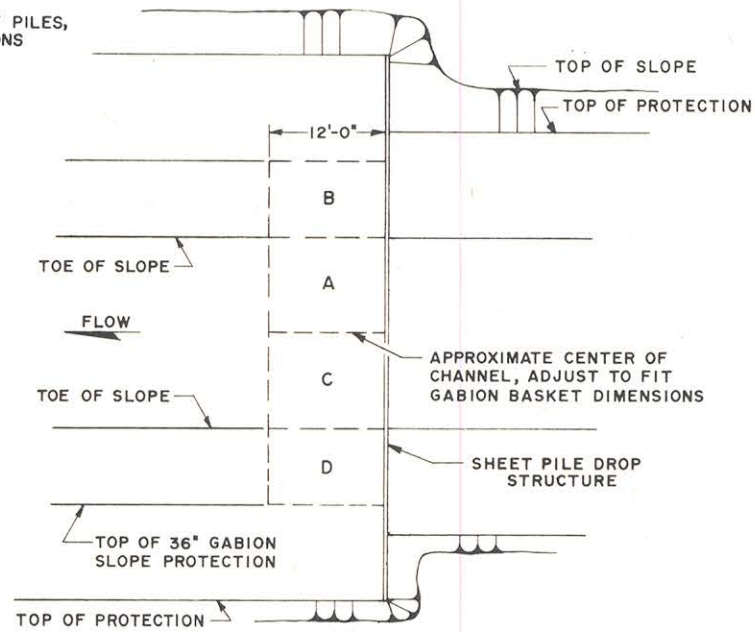
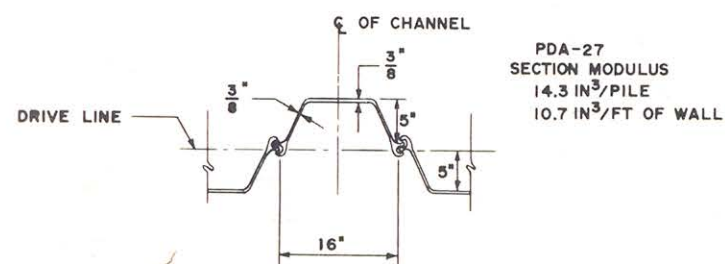
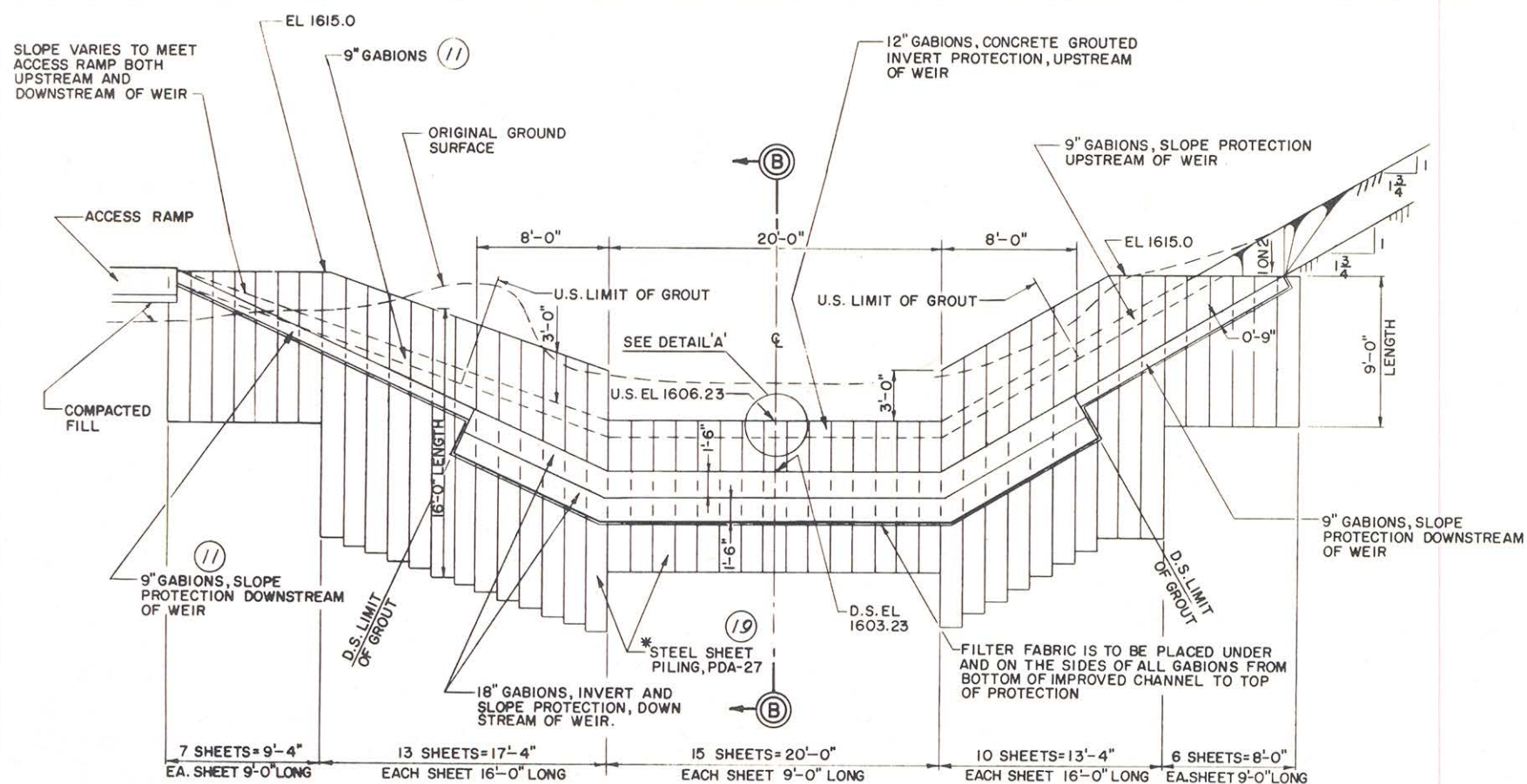


GENERAL NOTES: DIVERSION WORK WILL BE PAID FOR UNDER  
ITEM 16a. TEMPORARY SUPPORT SYSTEM WILL BE PAID FOR  
UNDER ITEM 16b.

NOTE: WORK THIS DRAWING WITH DRAWING 82/II

REVISION	DATE	DESCRIPTION	BY
GRAPHIC SCALE			
<p align="center">U. S. ARMY ENGINEER DISTRICT, PITTSBURGH  CORPS OF ENGINEERS  OFFICE OF THE DISTRICT ENGINEER  PITTSBURGH, PENNSYLVANIA</p>			
PREPARED BY: RAMBO DRAWN BY: LUSTER CHECKED BY: <i>SA</i> SUBMITTED BY: <i>SA Collette</i>	BOLIVAR FLOOD PROTECTION PROJECT ROOT CREEK BOLIVAR NEW YORK DAVIS STREET BRIDGE ABUTMENT SUPPORT DETAILS		
APPROVAL RECOMMENDED: <i>At Minnesota</i> CHIEF, ENGINEERING DIVISION	APPROVED: <i>Franklin</i> CHIEF, CORPS OF ENGINEERS, DISTRICT ENGINEER	DATE: <i>3 April 1979</i>	
APPROVED FOR:  DATE:	SCALE:	SPEC. NO.:	
	DRAWING NUMBER 038pa.1-PI-82/12 <i>of</i>		
	SHEET		



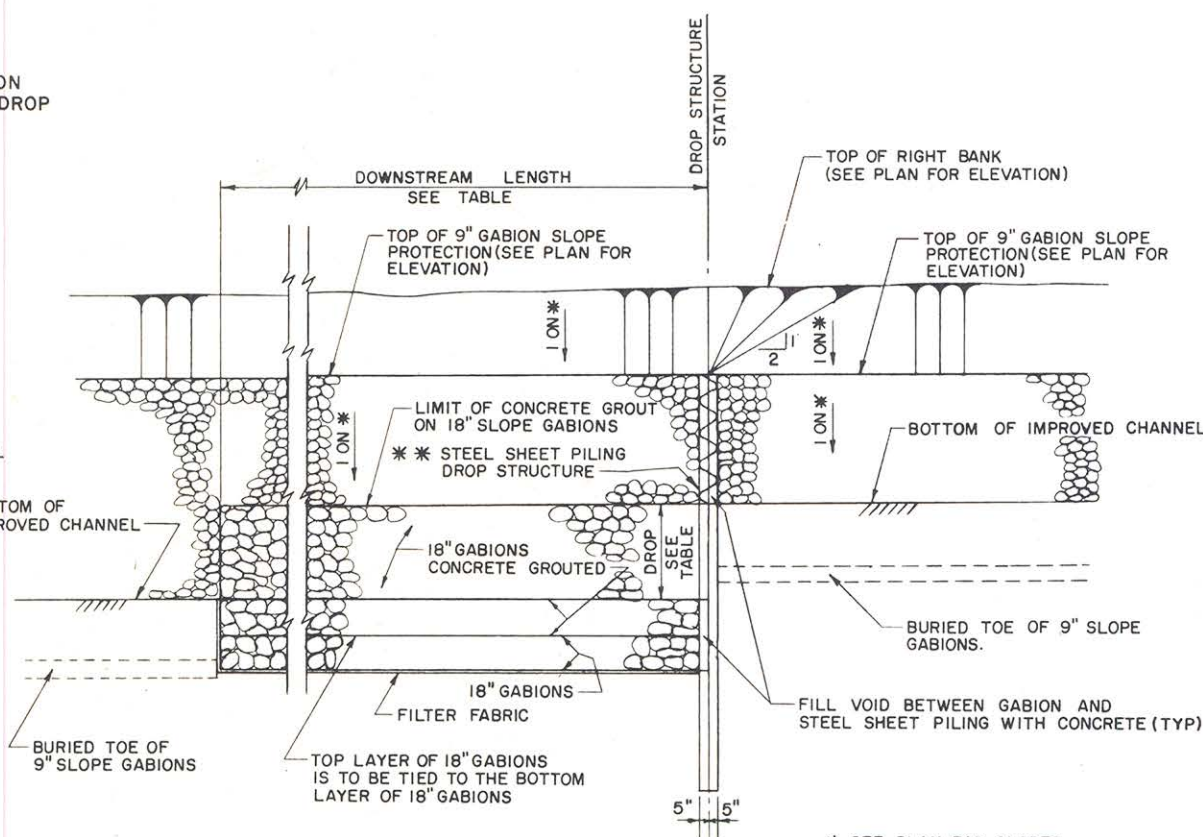


- # PROCEDURES FOR INSTALLING SHEET PILE DROP STRUCTURES AND 36" GABIONS IN CHANNEL BOTTOM AT DROP STRUCTURES

1. Install all sheet piling at drop structure. Prior to installation of piling, channel excavation for a distance of 12 feet downstream from the drop structure will not be permitted deeper than the elevation of the improved channel bottom upstream of the structure.
2. Excavation for the 36" (2'-18") gabions (downstream of drop structure) below the improved channel bottom & sides shall be in the sequence A, B, C, and D as shown in Detail B.
3. All segments must be protected to prevent erosion below the improved channel sides and bottom prior to the installation of the 36" gabion protection.
4. Each segment (ie A, B, etc) must be completed entirely including excavation, placement of gabions and grouting before beginning work on next segment.

TYPICAL SECTION  
DROP STRUCTURE

DROP STRUCTURE TABLE				
DROP STRUCTURE STATION	DROP	DOWNSTREAM LENGTH	LENGTH OF EACH SHEET PILE	NUMBER OF SHEET PILES
STA 24 + 15	2'	36'	6'	36 SHEETS
STA 33 + 60	3'	53'	9'	43 SHEETS
STA 40 + 25		SEE DETAILS OF WEIR TYPE		
STA 45 + 25	4'	50'	12'	45 SHEETS
STA 48 + 50	4'	68'	12'	41 SHEETS



\* SEE PLAN FOR SLOPES  
\* \* SEE TABLE FOR LENGTH AND  
NUMBER OF SHEETS

NOTE: This is a half scale reproduction of the original drawing.

REVISION		DATE	DESCRIPTION	BY
<p style="text-align: center;"><b>GRAPHIC SCALE</b></p>				
<p style="text-align: center;"> <b>U. S. ARMY ENGINEER DISTRICT, PITTSBURGH</b>  <b>CORPS OF ENGINEERS</b>  <b>OFFICE OF THE DISTRICT ENGINEER</b>  <b>PITTSBURGH, PENNSYLVANIA</b> </p>				
PREPARED BY: CES		<p style="text-align: center;"> <b>BOLIVAR FLOOD PROTECTION PROJECT</b>  <b>ROOT CREEK</b>  <b>BOLIVAR, NEW YORK</b>    <b>DROP STRUCTURES DETAILS</b> </p>		
DRAWN BY: FAIRLEY				
CHECKED BY: <i>[Signature]</i>				
SUBMITTED BY: <i>G. G. Calvert</i>				
CHIEF DESIGN BRANCH APPROVAL RECOMMENDED: <i>J. G. [Signature]</i> CHIEF, ENGINEERING DIVISION		APPROVED: <i>[Signature]</i> COLONEL, CORPS OF ENGINEERS, DISTRICT ENGINEER		
APPROVED FOR:  DATE:		DATE: <i>9 April 1979</i>		
DATE:		SCALE: AS SHOWN DRAWING NUMBER <b>038 pa. I-PI-82/13</b>		
DATE:		SHEET OF		



UNIFIED SOIL CLASSIFICATION (Including Identification and Description)												
Major Divisions		Group Symbols	SYMBOL		Typical Names	Field Identification Procedures (Excluding particles larger than 3 inches and basing fractions on estimated weights)	Information Required for Describing Soils	Laboratory Classification Criteria				
1	2		Hatching	Color				8	9			
Coarse-grained Soils More than half of material is larger than No. 200 sieve size. The No. 200 sieve size is about the smallest particle visible to the naked eye.	Gravels More than half of coarse fraction is larger than No. 4 sieve size. (For visual classification, the 1/4-in. size may be used as equivalent to the No. 4 sieve size)	Clean Gravels (Little or no fines)	GW		RED	Well-graded gravels, gravel-sand mixtures, little or no fines.	Wide range in grain sizes and substantial amounts of all intermediate particle sizes.	For undisturbed soils add information on stratification, degree of compactness, cementation, moisture conditions and drainage characteristics.  Give typical name; indicate approximate percentages of sand and gravel, max. size; angularity, surface condition, and hardness of the coarse grains; local or geologic name and other pertinent descriptive information; and symbol in parentheses.  Example: Silty sand, gravelly; about 20% hard, angular gravel particles 1/2-in. maximum size; rounded and subangular sand grains coarse to fine; about 15% nonplastic fines with low dry strength, well compacted and moist in place; alluvial sand; (SM).	<div>Use grain-size curve in identifying the fractions as given under field identification.</div> <div>Determining percentages of gravel and sand from grain-size curve. Depending on percentage of fines (fraction smaller than No. 200 sieve size) coarse-grained soils are classified as follows:  GW, GP, SW, SP, GM, GC, SM, SC Borderline cases requiring use of dual symbols:  Less than 5% More than 12% 5% to 12%</div>			
			GP			Poorly-graded gravels, gravel-sand mixtures, little or no fines.	Predominantly one size or a range of sizes with some intermediate sizes missing.					
		Gravels with Fines (Appreciable amount of fines)	GM		YELLOW	Silty gravels, gravel-sand-silt mixtures.	Nonplastic fines or fines with low plasticity (for identification procedures see ML below).					
			GC			Clayey gravels, gravel-sand-clay mixtures.	Plastic fines (for identification procedures see CL below).					
	Clean Sands (little or no fines)	SW		RED	Well-graded sands, gravelly sands, little or no fines.	Wide range in grain size and substantial amounts of all intermediate particle sizes.						
		SP			Poorly-graded sands, gravelly sands, little or no fines.	Predominantly one size or a range of sizes with some intermediate sizes missing.						
		Sands with Fines (Appreciable amount of fines)	SM		YELLOW	Silty sands, sand-silt mixtures.	Nonplastic fines or fines with low plasticity (for identification procedures see ML below).					
			SC			Clayey sands, sand-clay mixtures.	Plastic fines (for identification procedures see CL below).					
	Fine-grained Soils More than half of material is smaller than No. 200 sieve size. The No. 200 sieve size is about the smallest particle visible to the naked eye.	Silt and Clays Liquid limit less than 50				Identification Procedures on Fraction Smaller than No. 40 Sieve Size				Give typical name, indicate degree and character of plasticity, amount and maximum size of coarse grains, color in wet condition, odor if any, local or geologic name, and other pertinent descriptive information; and symbol in parentheses.  For undisturbed soils add information on structure, stratification, consistency in undisturbed and remolded states, moisture and drainage conditions.  Example: Clayey silt, brown, slightly plastic, small percentage of fine sand, numerous vertical root holes, firm and dry in place, loess, (ML).		
			GREEN	ML		Inorganic silts and very fine sands, rock, flour, silty or clayey fine sands or clayey silts with slight plasticity.	None to slight				Quick to slow	None
				CL		Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays.	Medium to high				None to very slow	Medium
				OL		Organic silts and organic silty clays of low plasticity.	Slight to medium				Slow	Slight
BLUE			MH		Inorganic silts, micaceous or diatomaceous fine, sandy or silty soils, elastic silts.	Slight to medium	Slow to none	Slight to medium				
			CH		Inorganic clays of high plasticity, fat clays.	High to very high	None	High				
			OH		Organic clays of medium to high plasticity, organic silts.	Medium to high	None to very slow	Slight to medium				
Highly Organic Soils		Pt		ORANGE	Peat and other highly organic soils.	Readily identified by color, odor, spongy feel and frequently by fibrous texture.						

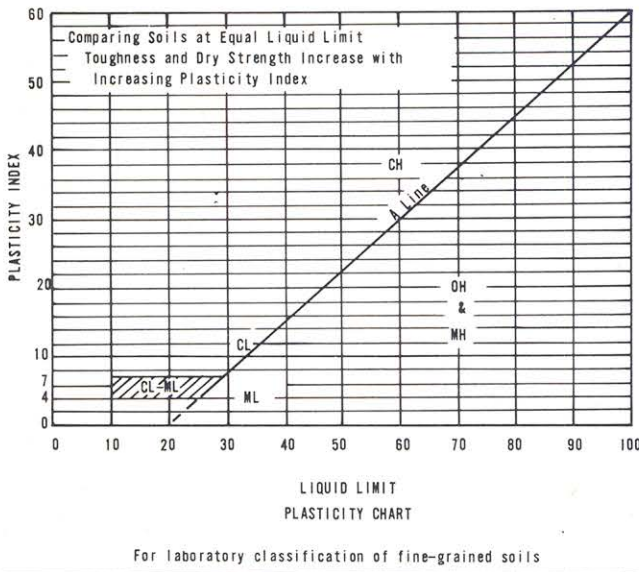
For laboratory classification of fine-grained soils

(1) Boundary classifications: Soils possessing characteristics of two groups are designated by combinations of group symbols. For example GW-GC, well-graded gravel-sand mixture with clay binder. (2) All sieve sizes on this chart are U. S. standard.

FIELD IDENTIFICATION PROCEDURES FOR FINE-GRAINED SOILS OR FRACTIONS  
These procedures are to be performed on the minus No. 40 sieve size particles, approximately 1/64 in. For field classification purposes, screening is not intended, simply remove by hand the coarse particles that interfere with the tests.

<b>Dilatancy (Reaction to shaking)</b> After removing particles larger than No. 40 sieve size, prepare a pat of moist soil with a volume of about one-half cubic inch. Add enough water if necessary to make the soil soft but not sticky. Place the pat in the open palm of one hand and shake horizontally, striking vigorously against the other hand several times. A positive reaction consists of the appearance of water on the surface of the pat which changes to a livery consistency and becomes glossy. When the sample is squeezed between the fingers, the water and gloss disappear from the surface, the pat stiffens, and finally it cracks or crumbles. The rapidity of appearance of water during shaking and of its disappearance during squeezing assist in identifying the character of the fines in a soil. Very fine clean sands give the quickest and most distinct reaction whereas a plastic clay has no reaction. Inorganic silts, such as a typical rock flour, show a moderately quick reaction.	<b>Dry Strength (Crushing characteristics)</b> After removing particles larger than No. 40 sieve size, mold a pat of soil to the consistency of putty, adding water if necessary. Allow the pat to dry completely by oven, sun, or air drying, and then test its strength by breaking and crumbling between the fingers. This strength is a measure of the character and quantity of the colloidal fraction contained in the soil. The dry strength increases with increasing plasticity. High dry strength is characteristic for clays of the CH group. A typical inorganic silt possesses only very slight dry strength. Silty fine sands and silts have about the same slight dry strength, but can be distinguished by the feel when powdering the dried specimen. Fine sand feels gritty whereas a typical silt has the smooth feel of flour.	<b>Toughness (Consistency near plastic limit)</b> After removing particles larger than the No. 40 sieve size, a specimen of soil about one-half inch cube in size, is molded to the consistency of putty. If too dry, water must be added and if sticky, the specimen should be spread out in a thin layer and allowed to lose some moisture by evaporation. Then the specimen is rolled out by hand on a smooth surface or between the palms into a thread about one-eighth inch in diameter. The thread is then folded and rerolled repeatedly. During this manipulation the moisture content is gradually reduced and the specimen stiffens, finally loses its plasticity, and crumbles when the plastic limit is reached. After the thread crumbles, the pieces should be lumped together and a slight kneading action continued until the lump crumbles. The tougher the thread near the plastic limit and the stiffer the lump when it finally crumbles, the more potent is the colloidal clay fraction in the soil. Weakness of the thread at the plastic limit and quick loss of coherence of the lump below the plastic limit indicate either inorganic clay of low plasticity, or materials such as kaolin-type clays and organic clays which occur below the A-line. Highly organic clays have a very weak and spongy feel at the plastic limit.
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Adopted by Corps of Engineers and Bureau of Reclamation, January 1952



NOTE: This is a half scale reproduction of the original drawing.

REVISION	DATE	DESCRIPTION	BY
GRAPHIC SCALE			
U. S. ARMY ENGINEER DISTRICT, PITTSBURGH CORPS OF ENGINEERS OFFICE OF THE DISTRICT ENGINEER PITTSBURGH, PENNSYLVANIA			
PREPARED BY:	GEOLOGIC STANDARD UNIFIED SOILS CLASSIFICATION		
DRAWN BY:	EM-1110-1-1806		
CHECKED BY:	PLATE I		
SUBMITTED BY:	DATE: 13 March 78		
CHIEF ENGINEER & MAIL ROOM	APPROVED: [Signature]		
APPROVAL RECOMMENDED:	APPROVED: [Signature]		
CHIEF ENGINEERING DIVISION	APPROVED: [Signature]		
APPROVED FOR:	SCALE: 1" = 10'		
DATE:	DRAWING NUMBER 0-Z 24-1		
	SHEET 1 OF 1		