

# Sawmillfloodstudy.rep

HEC-RAS Version 4.0.0 March 2008  
U.S. Army Corps of Engineers  
Hydrologic Engineering Center  
609 Second Street  
Davis, California

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## PROJECT DATA

Project Title: Sawmill flood study  
Project File : Sawmillfloodstudy.prj  
Run Date and Time: 10/22/2009 3:46:25 PM

Project in English units

## PLAN DATA

Plan Title: Conceptual 2\_FW\_Method 1  
Plan File : r:\5571\CDOC\Floodway Analysis\hec-ras\Sawmillfloodstudy.p04

Geometry Title: Sawmill Conceptual 2  
Geometry File : r:\5571\CDOC\Floodway Analysis\hec-ras\Sawmillfloodstudy.g03

Flow Title : Sawmill FEMA Floodway  
Flow File : r:\5571\CDOC\Floodway Analysis\hec-ras\Sawmillfloodstudy.f05

## Plan Summary Information:

Number of:	Cross Sections =	23	Multiple Openings =	0
	Culverts =	2	Inline Structures =	0
	Bridges =	0	Lateral Structures =	0

## Computational Information

Water surface calculation tolerance =	0.01
Critical depth calculation tolerance =	0.01
Maximum number of iterations =	20
Maximum difference tolerance =	0.3
Flow tolerance factor =	0.001

## Computation Options

Critical depth computed only where necessary  
Conveyance Calculation Method: At breaks in n values only  
Friction Slope Method: Average Conveyance  
Computational Flow Regime: Subcritical Flow

## Encroachment Data

Equal Conveyance =	True
Left Offset =	0
Right Offset =	0

River	Sawmill Branch	Reach	Sawmill Branch	Method	Value1	Value2
55160	Floodway	1	78.94	790.79		
54754	Floodway	1	-129.82	333.78		
54669	Floodway	1	15.11	320.92		
54639	Floodway	1	149.61	455.42		
54554	Floodway	1	149.69	454.52		
54178	Floodway	1	69.63	257.45		
54004	Floodway	1	50.03	715.26		
53908	Floodway	1	262	314		
53800	Floodway	1	21.65	41.67		
53721	Floodway	1	56	108		
53383	Floodway	1	28.54	228		
53232	Floodway	1	84.84	186		
53104	Floodway	1	111.88	169		
52950	Floodway	1	91.13	184		
52598	Floodway	1	63	293.05		
52151	Floodway	1	32	357.56		
51968	Floodway	1	30	359.01		
51690	Floodway	1	111	178		
51342	Floodway	1	198	277		

River	Sawmill Branch	Reach	Upstream	East
57076	Floodway	1	400	505
56188	Floodway	1	550	650

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River = Sawmill Branch    Reach = Upstream West  
 RS      Profile      Method    Value1    Value2  
 56038   Floodway      1        200      460  
 55620   Floodway      1        350      890

## FLOW DATA

Flow Title: Sawmill FEMA Floodway  
 Flow File : r:\5571\CDOC\Floodway Analysis\hec-ras\Sawmillfloodstudy.f05

## Flow Data (cfs)

River	Reach	RS	100 yr	Floodway
Sawmill Branch	Upstream East	57076	838	838
Sawmill Branch	Upstream West	56038	304	304
Sawmill Branch	Sawmill Branch	55160	1193	1193
Sawmill Branch	Sawmill Branch	51968	1488	1488

## Boundary Conditions

River	Reach	Profile	Upstream	Downstream
Sawmill Branch	Sawmill Branch	100 yr		Known WS = 60.53
Sawmill Branch	Sawmill Branch	Floodway		Known WS = 61.23

## GEOMETRY DATA

Geometry Title: Sawmill Conceptual 2  
 Geometry File : r:\5571\CDOC\Floodway Analysis\hec-ras\Sawmillfloodstudy.g03

## Reach Connection Table

River	Reach	Upstream Boundary	Downstream Boundary
Sawmill Branch	Upstream East		Junction 1
Sawmill Branch	Upstream West		Junction 1
Sawmill Branch	Sawmill Branch	Junction 1	

## JUNCTION INFORMATION

Name: Junction 1  
 Description:  
 Energy computation Method

Length across Junction		Tributary		Length	Angle
River	Reach	River	Reach		
Sawmill Branch	Upstream East	to Sawmill Branch	Sawmill Branch	0	0
Sawmill Branch	Upstream West	to Sawmill Branch	Sawmill Branch	0	0

## CROSS SECTION

RIVER: Sawmill Branch  
 REACH: Upstream East      RS: 57076

## INPUT

Description: U.S. EAST\_M3\_NEW

Station Elevation Data				num=	27					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	
-220	68.35	0	67.6	53	66.9	110	66.8	144	65.5	
199	65.1	252	64.4	273	62.5	299	62.2	310	61.7	
320	61.6	328	62.2	341	61.8	380	61.6	400	62	
441	62.1	452	61.3	458	62	460	62.5	505	62.4	
550	62.6	614	65.7	634	65.8	679	66.7	729	67.8	
751	68.2	793	68.8							

Manning's n Values		num=	3	
Sta	n Val	Sta	n Val	Sta
-220	.035	441	.03	460

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	441	460		888	888	.1	.3

## CROSS SECTION OUTPUT Profile #100 yr

E.G. Elev (ft)	65.16	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	wt. n-Val.	0.035	0.030	0.035
W.S. Elev (ft)	65.15	Reach Len. (ft)	888.00	888.00	888.00
Crit W.S. (ft)		Flow Area (sq ft)	595.88	64.77	307.99

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E.G. Slope (ft/ft)	0.000127	Area (sq ft)	595.88	64.77	307.99
Q Total (cfs)	838.00	Flow (cfs)	510.22	81.56	246.23
Top Width (ft)	410.65	Top width (ft)	248.99	19.00	142.66
Vel Total (ft/s)	0.87	Avg. Vel. (ft/s)	0.86	1.26	0.80
Max Chl Dpth (ft)	3.85	Hydr. Depth (ft)	2.39	3.41	2.16
Conv. Total (cfs)	74313.7	Conv. (cfs)	45245.8	7232.5	21835.4
Length wtd. (ft)	888.00	wetted Per. (ft)	249.13	19.13	142.72
Min Ch El (ft)	61.30	Shear (lb/sq ft)	0.02	0.03	0.02
Alpha	1.05	Stream Power (lb/ft s)	0.02	0.03	0.01
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)	9.19	5.17	5.97
C & E Loss (ft)	0.00	Cum SA (acres)	4.13	1.21	3.08

## CROSS SECTION OUTPUT Profile #Floodway

E.G. Elev (ft)	68.44	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.03	Wt. n-Val.	0.035	0.030	0.035
W.S. Elev (ft)	68.42	Reach Len. (ft)	888.00	888.00	888.00
Crit W.S. (ft)		Flow Area (sq ft)	261.10	126.85	268.58
E.G. Slope (ft/ft)	0.000084	Area (sq ft)	261.10	126.85	268.58
Q Total (cfs)	838.00	Flow (cfs)	317.45	203.65	316.90
Top Width (ft)	105.00	Top width (ft)	41.00	19.00	45.00
Vel Total (ft/s)	1.28	Avg. Vel. (ft/s)	1.22	1.61	1.18
Max Chl Dpth (ft)	7.12	Hydr. Depth (ft)	6.37	6.68	5.97
Conv. Total (cfs)	91245.7	Conv. (cfs)	34565.8	22174.5	34505.4
Length wtd. (ft)	888.00	wetted Per. (ft)	47.42	19.13	51.02
Min Ch El (ft)	61.30	Shear (lb/sq ft)	0.03	0.03	0.03
Alpha	1.05	Stream Power (lb/ft s)	0.04	0.06	0.03
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)	2.66	9.18	2.74
C & E Loss (ft)	0.00	Cum SA (acres)	0.42	1.21	0.46

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

## CROSS SECTION

RIVER: Sawmill Branch  
REACH: Upstream East RS: 56188

## INPUT

Description: 56188 Intermediate

Station	Elevation	Data	num=	10	Sta	Elev	Sta	Elev	Sta	Elev
0	70	200	67	400	65	550	61.053	590	60	
650	61.429	800	65	1100	67	1350	69	1525	70	

Manning's n	Values	num=	3
Sta	n Val	Sta	n Val
0	.035	550	.03
650	.035		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	550	650		1028	1028	.1	.3

## CROSS SECTION OUTPUT Profile #100 yr

E.G. Elev (ft)	65.08	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	Wt. n-Val.	0.035	0.030	0.035
W.S. Elev (ft)	65.06	Reach Len. (ft)	0.00	0.00	0.00
Crit W.S. (ft)		Flow Area (sq ft)	305.60	442.32	277.49
E.G. Slope (ft/ft)	0.000076	Area (sq ft)	305.60	442.32	277.49
Q Total (cfs)	838.00	Flow (cfs)	176.43	513.31	148.26
Top Width (ft)	415.63	Top width (ft)	156.25	100.00	159.38
Vel Total (ft/s)	0.82	Avg. Vel. (ft/s)	0.58	1.16	0.53
Max Chl Dpth (ft)	5.06	Hydr. Depth (ft)	1.96	4.42	1.74
Conv. Total (cfs)	96355.0	Conv. (cfs)	20285.9	59021.8	17047.3
Length wtd. (ft)	0.00	wetted Per. (ft)	156.30	100.03	159.42
Min Ch El (ft)	60.00	Shear (lb/sq ft)	0.01	0.02	0.01
Alpha	1.42	Stream Power (lb/ft s)	0.01	0.02	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)			
C & E Loss (ft)	0.00	Cum SA (acres)			

## CROSS SECTION OUTPUT Profile #Floodway

E.G. Elev (ft)	68.39	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.		0.030	
W.S. Elev (ft)	68.38	Reach Len. (ft)	0.00	0.00	0.00
Crit W.S. (ft)		Flow Area (sq ft)		773.71	
E.G. Slope (ft/ft)	0.000037	Area (sq ft)		773.71	
Q Total (cfs)	838.00	Flow (cfs)		838.00	
Top Width (ft)	100.00	Top width (ft)		100.00	
Vel Total (ft/s)	1.08	Avg. Vel. (ft/s)		1.08	
Max Chl Dpth (ft)	8.38	Hydr. Depth (ft)		7.74	
Conv. Total (cfs)	137130.7	Conv. (cfs)		137130.7	
Length wtd. (ft)	0.00	wetted Per. (ft)		114.30	
Min Ch El (ft)	60.00	Shear (lb/sq ft)		0.02	

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Alpha	1.00	Stream Power (lb/ft s)	0.02
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	
C & E Loss (ft)	0.01	Cum SA (acres)	

# CROSS SECTION

RIVER: Sawmill Branch  
 REACH: Upstream West RS: 56038

## INPUT

Description: U.S. WEST\_L3\_NEW

Station Elevation Data		num=	20						
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-100	69	0	67.3	25	67.2	66	66.6	111	66
157	65.6	185	65	245	64.2	289	64.1	334	64.7
340	64.3	344	60.8	347	60.8	351	64.4	395	64.3
442	64.1	500	66.1	562	68.2	626	69.3	686	69.7

Manning's n Values		num=	3		
Sta	n Val	Sta	n Val		
-100	.035	334	.03	351	.035

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	334	351		418	418	.1	.3

## CROSS SECTION OUTPUT Profile #100 yr

E.G. Elev (ft)	65.14	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.04	Wt. n-Val.	0.035	0.030	0.035
W.S. Elev (ft)	65.10	Reach Len. (ft)	418.00	418.00	418.00
Crit W.S. (ft)		Flow Area (sq ft)	102.77	36.62	89.21
E.G. Slope (ft/ft)	0.001094	Area (sq ft)	102.77	36.62	89.21
Q Total (cfs)	304.00	Flow (cfs)	110.48	90.65	102.87
Top Width (ft)	290.29	Top width (ft)	153.44	17.00	119.86
Vel Total (ft/s)	1.33	Avg. Vel. (ft/s)	1.07	2.48	1.15
Max Chl Dpth (ft)	4.30	Hydr. Depth (ft)	0.67	2.15	0.74
Conv. Total (cfs)	9191.0	Conv. (cfs)	3340.1	2740.7	3110.1
Length Wtd. (ft)	418.00	Wetted Per. (ft)	153.45	19.71	119.87
Min Ch El (ft)	60.80	Shear (lb/sq ft)	0.05	0.13	0.05
Alpha	1.53	Stream Power (lb/ft s)	0.05	0.31	0.06
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)	1.78	1.68	1.06
C & E Loss (ft)	0.01	Cum SA (acres)	2.64	0.61	1.16

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

## CROSS SECTION OUTPUT Profile #Floodway

E.G. Elev (ft)	68.39	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.00	Wt. n-Val.	0.035	0.030	0.035
W.S. Elev (ft)	68.39	Reach Len. (ft)	418.00	418.00	418.00
Crit W.S. (ft)		Flow Area (sq ft)	541.06	92.62	446.24
E.G. Slope (ft/ft)	0.000007	Area (sq ft)	541.06	92.62	446.24
Q Total (cfs)	304.00	Flow (cfs)	148.04	33.29	122.67
Top Width (ft)	260.00	Top width (ft)	134.00	17.00	109.00
Vel Total (ft/s)	0.28	Avg. Vel. (ft/s)	0.27	0.36	0.27
Max Chl Dpth (ft)	7.59	Hydr. Depth (ft)	4.04	5.45	4.09
Conv. Total (cfs)	117519.3	Conv. (cfs)	57226.9	12869.9	47422.5
Length Wtd. (ft)	418.00	Wetted Per. (ft)	137.60	19.71	112.68
Min Ch El (ft)	60.80	Shear (lb/sq ft)	0.00	0.00	0.00
Alpha	1.02	Stream Power (lb/ft s)	0.00	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	9.26	3.70	4.16
C & E Loss (ft)	0.00	Cum SA (acres)	2.27	0.61	0.95

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

# CROSS SECTION

RIVER: Sawmill Branch  
 REACH: Upstream West RS: 55620

## INPUT

Description: 55620 Intermediate

Station Elevation Data		num=	13						
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	68.5	300	65	630	64	660	64	690	63
725	62	735	59.9	745	62	800	63	865	64
970	66	1080	68	1130	68.5				

Manning's n Values		num=	3		
Sta	n Val	Sta	n Val		
0	.035	690	.03	800	.035

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Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.  
 690 800 460 460 460 .1 .3

## CROSS SECTION OUTPUT Profile #100 yr

E.G. Elev (ft)	65.07	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.00	Wt. n-Val.	0.035	0.030	0.035
W.S. Elev (ft)	65.07	Reach Len. (ft)	0.00	0.00	0.00
Crit W.S. (ft)		Flow Area (sq ft)	267.25	313.63	132.02
E.G. Slope (ft/ft)	0.000044	Area (sq ft)	267.25	313.63	132.02
Q Total (cfs)	304.00	Flow (cfs)	57.93	206.69	39.38
Top Width (ft)	627.08	Top width (ft)	395.94	110.00	121.14
Vel Total (ft/s)	0.43	Avg. Vel. (ft/s)	0.22	0.66	0.30
Max Chl Dpth (ft)	5.17	Hydr. Depth (ft)	0.67	2.85	1.09
Conv. Total (cfs)	45813.1	Conv. (cfs)	8730.0	31147.8	5935.3
Length Wtd. (ft)	0.00	Wetted Per. (ft)	395.96	110.46	121.16
Min Ch El (ft)	59.90	Shear (lb/sq ft)	0.00	0.01	0.00
Alpha	1.74	Stream Power (lb/ft s)	0.00	0.01	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)			
C & E Loss (ft)	0.00	Cum SA (acres)			

## CROSS SECTION OUTPUT Profile #Floodway

E.G. Elev (ft)	68.39	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.00	Wt. n-Val.	0.035	0.030	0.035
W.S. Elev (ft)	68.39	Reach Len. (ft)	0.00	0.00	0.00
Crit W.S. (ft)		Flow Area (sq ft)	1388.52	678.80	421.57
E.G. Slope (ft/ft)	0.000001	Area (sq ft)	1388.52	678.80	421.57
Q Total (cfs)	304.00	Flow (cfs)	146.17	110.24	47.59
Top Width (ft)	540.00	Top width (ft)	340.00	110.00	90.00
Vel Total (ft/s)	0.12	Avg. Vel. (ft/s)	0.11	0.16	0.11
Max Chl Dpth (ft)	8.49	Hydr. Depth (ft)	4.08	6.17	4.68
Conv. Total (cfs)	311070.0	Conv. (cfs)	149570.0	112800.9	48699.1
Length Wtd. (ft)	0.00	Wetted Per. (ft)	343.56	110.46	93.93
Min Ch El (ft)	59.90	Shear (lb/sq ft)	0.00	0.00	0.00
Alpha	1.13	Stream Power (lb/ft s)	0.00	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)			
C & E Loss (ft)	0.00	Cum SA (acres)			

## CROSS SECTION

RIVER: Sawmill Branch  
 REACH: Sawmill Branch RS: 55160

## INPUT

Description: FEMA STA 551+60\_K3

Station Elevation Data		num=	26						
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-280	68.5	-90	66.1	0	64.3	90	60.4	140	60
230	60	285	59.7	382	60.4	454	59.9	515	60.5
568	61	586	61	597	60.9	599	58.6	605	59
610	61.1	623	61.3	674	60.7	699	61.1	770	61.4
820	63.5	887	66.2	943	67.4	1000	67.8	1040	68
1080	68.3								

Manning's n Values		num=	3		
Sta	n Val	Sta	n Val	Sta	n Val
-280	.035	568	.03	623	.035

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.  
 568 623 406 406 406 .1 .3

## CROSS SECTION OUTPUT Profile #100 yr

E.G. Elev (ft)	65.07	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.00	Wt. n-Val.	0.035	0.030	0.035
W.S. Elev (ft)	65.07	Reach Len. (ft)	406.00	406.00	406.00
Crit W.S. (ft)		Flow Area (sq ft)	2614.67	242.34	744.99
E.G. Slope (ft/ft)	0.000009	Area (sq ft)	2614.67	242.34	744.99
Q Total (cfs)	1193.00	Flow (cfs)	890.79	96.03	206.19
Top Width (ft)	897.58	Top width (ft)	606.58	55.00	236.00
Vel Total (ft/s)	0.33	Avg. Vel. (ft/s)	0.34	0.40	0.28
Max Chl Dpth (ft)	6.47	Hydr. Depth (ft)	4.31	4.41	3.16
Conv. Total (cfs)	393715.3	Conv. (cfs)	293978.1	31691.2	68046.0
Length Wtd. (ft)	406.00	Wetted Per. (ft)	606.68	56.49	236.08
Min Ch El (ft)	58.60	Shear (lb/sq ft)	0.00	0.00	0.00
Alpha	1.03	Stream Power (lb/ft s)	0.00	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	37.12	3.06	13.70
C & E Loss (ft)	0.00	Cum SA (acres)	15.10	5.39	17.77

## CROSS SECTION OUTPUT Profile #Floodway

E.G. Elev (ft)	68.39	Element	Left OB	Channel	Right OB
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Vel Head (ft)	0.00	Wt. n-Val.	0.035	0.030	0.035
W.S. Elev (ft)	68.39	Reach Len. (ft)	406.00	406.00	406.00
Crit W.S. (ft)		Flow Area (sq ft)	4026.13	424.78	1207.10
E.G. Slope (ft/ft)	0.000002	Area (sq ft)	4026.13	424.78	1207.10
Q Total (cfs)	1193.00	Flow (cfs)	859.90	100.67	232.43
Top Width (ft)	711.85	Top width (ft)	489.06	55.00	167.79
Vel Total (ft/s)	0.21	Avg. Vel. (ft/s)	0.21	0.24	0.19
Max Chl Dpth (ft)	9.79	Hydr. Depth (ft)	8.23	7.72	7.19
Conv. Total (cfs)	957040.9	Conv. (cfs)	689826.8	80756.5	186457.6
Length wtd. (ft)	406.00	wetted Per. (ft)	496.59	56.49	173.93
Min Ch El (ft)	58.60	Shear (lb/sq ft)	0.00	0.00	0.00
Alpha	1.01	Stream Power (lb/ft s)	0.00	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	44.28	4.82	17.11
C & E Loss (ft)	0.00	Cum SA (acres)	6.63	5.40	9.45

## CROSS SECTION

RIVER: Sawmill Branch  
 REACH: Sawmill Branch RS: 54754

## INPUT

Description: FEMA STA 547+54\_J2

Station Elevation Data		num=	19						
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-600	67	-500	66	-66	60.76	0	60.1	30	58.2
45	57.8	68	57.7	103	57.7	130	57.8	144	58.7
147	55.2	152	55.7	156	58.8	182	58.5	248	58.3
291	59.6	369	61.9	494	64	569	66		

Manning's n Values		num=	3		
Sta	n Val	Sta	n Val	Sta	n Val
-600	.035	144	.03	156	.035

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	144	156		320	250	100	.1 .3

## CROSS SECTION OUTPUT Profile #100 yr

E.G. Elev (ft)	65.07	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.00	Wt. n-Val.	0.035	0.030	0.035
W.S. Elev (ft)	65.07	Reach Len. (ft)	320.00	250.00	100.00
Crit W.S. (ft)		Flow Area (sq ft)	2077.33	103.71	1492.88
E.G. Slope (ft/ft)	0.000010	Area (sq ft)	2077.33	103.71	1492.88
Q Total (cfs)	1193.00	Flow (cfs)	646.45	58.29	488.26
Top Width (ft)	956.83	Top width (ft)	566.79	12.00	378.04
Vel Total (ft/s)	0.32	Avg. Vel. (ft/s)	0.31	0.56	0.33
Max Chl Dpth (ft)	9.87	Hydr. Depth (ft)	3.67	8.64	3.95
Conv. Total (cfs)	386840.0	Conv. (cfs)	209616.7	18900.7	158322.6
Length wtd. (ft)	227.92	wetted Per. (ft)	566.91	14.70	378.13
Min Ch El (ft)	55.20	Shear (lb/sq ft)	0.00	0.00	0.00
Alpha	1.06	Stream Power (lb/ft s)	0.00	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	15.26	1.45	3.27
C & E Loss (ft)	0.00	Cum SA (acres)	9.63	5.08	14.90

## CROSS SECTION OUTPUT Profile #Floodway

E.G. Elev (ft)	68.39	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.00	Wt. n-Val.	0.035	0.030	0.035
W.S. Elev (ft)	68.39	Reach Len. (ft)	320.00	250.00	100.00
Crit W.S. (ft)		Flow Area (sq ft)	2468.14	143.55	1667.08
E.G. Slope (ft/ft)	0.000002	Area (sq ft)	2468.14	143.55	1667.08
Q Total (cfs)	1193.00	Flow (cfs)	678.36	49.38	465.26
Top Width (ft)	463.60	Top width (ft)	273.82	12.00	177.78
Vel Total (ft/s)	0.28	Avg. Vel. (ft/s)	0.27	0.34	0.28
Max Chl Dpth (ft)	13.19	Hydr. Depth (ft)	9.01	11.96	9.38
Conv. Total (cfs)	784897.6	Conv. (cfs)	446307.4	32489.9	306100.3
Length wtd. (ft)	219.12	wetted Per. (ft)	280.78	14.70	185.35
Min Ch El (ft)	55.20	Shear (lb/sq ft)	0.00	0.00	0.00
Alpha	1.01	Stream Power (lb/ft s)	0.00	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	14.02	2.17	3.71
C & E Loss (ft)	0.00	Cum SA (acres)	3.08	5.09	7.84

## CROSS SECTION

RIVER: Sawmill Branch  
 REACH: Sawmill Branch RS: 54669

## INPUT

Description: 54669\_Turtle Pond Bridge Section 3 (Copy)

Station Elevation Data		num=	20						
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-600	67	-500	66	-66	60.76	0	60.1	30	58.2
45	57.8	68	57.7	103	57.7	130	57.8	144	58.7

147	55.2	152	55.7	156	58.8	182	58.5	248	58.3
291	59.6	369	61.9	428	64	526	66	780	68

Manning's n Values num= 3  
 Sta n Val Sta n Val Sta n Val  
 -600 .035 144 .03 156 .035

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.  
 144 156 30 30 30 .1 .3

## CROSS SECTION OUTPUT Profile #100 yr

E.G. Elev (ft)	65.07	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.00	Wt. n-Val.	0.035	0.030	0.035
W.S. Elev (ft)	65.07	Reach Len. (ft)	30.00	30.00	30.00
Crit W.S. (ft)	59.12	Flow Area (sq ft)	2075.99	103.68	1358.90
E.G. Slope (ft/ft)	0.000010	Area (sq ft)	2075.99	103.68	1358.90
Q Total (cfs)	1193.00	Flow (cfs)	660.53	59.58	472.89
Top Width (ft)	902.80	Top width (ft)	566.59	12.00	324.20
Vel Total (ft/s)	0.34	Avg. Vel. (ft/s)	0.32	0.57	0.35
Max Chl Dpth (ft)	9.87	Hydr. Depth (ft)	3.66	8.64	4.19
Conv. Total (cfs)	378277.0	Conv. (cfs)	209439.6	18892.1	149945.3
Length Wtd. (ft)	30.00	wetted Per. (ft)	566.72	14.70	324.31
Min Ch El (ft)	55.20	Shear (lb/sq ft)	0.00	0.00	0.00
Alpha	1.06	Stream Power (lb/ft s)	0.00	0.00	0.00
Frctn Loss (ft)		Cum Volume (acre-ft)		0.85	
C & E Loss (ft)		Cum SA (acres)	5.47	5.01	14.10

## CROSS SECTION OUTPUT Profile #Floodway

E.G. Elev (ft)	68.39	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.00	Wt. n-Val.	0.035	0.030	0.035
W.S. Elev (ft)	68.39	Reach Len. (ft)	30.00	30.00	30.00
Crit W.S. (ft)	59.15	Flow Area (sq ft)	1348.07	143.52	1567.54
E.G. Slope (ft/ft)	0.000004	Area (sq ft)	1348.07	143.52	1567.54
Q Total (cfs)	1193.00	Flow (cfs)	534.52	66.45	592.03
Top Width (ft)	305.81	Top width (ft)	128.89	12.00	164.92
Vel Total (ft/s)	0.39	Avg. Vel. (ft/s)	0.40	0.46	0.38
Max Chl Dpth (ft)	13.19	Hydr. Depth (ft)	10.46	11.96	9.50
Conv. Total (cfs)	583165.8	Conv. (cfs)	261286.2	32481.1	289398.6
Length Wtd. (ft)	30.00	wetted Per. (ft)	138.20	14.70	172.86
Min Ch El (ft)	55.20	Shear (lb/sq ft)	0.00	0.00	0.00
Alpha	1.01	Stream Power (lb/ft s)	0.00	0.00	0.00
Frctn Loss (ft)		Cum Volume (acre-ft)		1.35	
C & E Loss (ft)		Cum SA (acres)	1.60	5.02	7.45

## CULVERT

RIVER: Sawmill Branch  
 REACH: Sawmill Branch RS: 54654

## INPUT

Description: Turtle Pond Bridge  
 Distance from Upstream XS = 7  
 Deck/Roadway Width = 22.9  
 Weir Coefficient = 2.6  
 Upstream Deck/Roadway Coordinates

num= 19									
Sta Hi Cord Lo Cord	Sta Hi Cord Lo Cord	Sta Hi Cord Lo Cord	Sta Hi Cord Lo Cord						
0 63	60 64.5	116 65							
137 65	141 65	141.5 65							
142.1 65	143.5 65	145.8 65							
148 65	150.6 65	152.1 65							
153.7 65	154.3 65	155 65							
164 65	214 64	355 63.7							
369 61.9									

## Upstream Bridge Cross Section Data

Station Elevation Data	num= 14								
Sta Elev	Sta Elev	Sta Elev	Sta Elev	Sta Elev	Sta Elev	Sta Elev	Sta Elev	Sta Elev	Sta Elev
0 60.1	30 58.2	45 57.8	68 57.7	103 57.7					
130 57.8	140 56.25	147 56.25	152 56.25	154 56.25					
182 58.5	248 58.3	291 59.6	369 61.9						

Manning's n Values num= 3  
 Sta n Val Sta n Val Sta n Val  
 0 .035 140 .03 154 .035

Bank Sta: Left Right Coeff Contr. Expan.  
 103 182 .1 .3

## Downstream Deck/Roadway Coordinates

num= 19									
Sta Hi Cord Lo Cord	Sta Hi Cord Lo Cord	Sta Hi Cord Lo Cord	Sta Hi Cord Lo Cord						
0 63	60 64.5	116 65							

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137	65	141	65	141.5	65
142.1	65	143.5	65	145.8	65
148	65	150.6	65	152.1	65
153.7	65	154.3	65	155	65
164	65	214	64	355	63.7
369	61.9				

## Downstream Bridge Cross Section Data

Station	Elevation	Data	num=	21					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-143	67	-78	66	-13	65	-2	63	24	62
53	61	125	60	132	59.5	139	59	140	56.25
145	56.25	152	56.25	154	56.25	158	60.1	186	60
196	61	205	62	225	62.6	245	62	270	62
295	63								

## Manning's n Values

Sta	n Val	Sta	n Val	Sta	n Val
-143	.035	125	.03	158	.035

Bank Sta:	Left	Right	Coeff	Contr.	Expan.
	125	158	.1	.3	

Upstream Embankment side slope = 0 horiz. to 1.0 vertical  
Downstream Embankment side slope = 0 horiz. to 1.0 vertical  
Maximum allowable submergence for weir flow = .95  
Elevation at which weir flow begins =  
Energy head used in spillway design =  
Spillway height used in design =  
Weir crest shape = Broad Crested

Number of Culverts = 1

Culvert Name Shape Rise Span  
Culvert #1 Semi-Circle 7  
FHWA Chart # 41- Arch; Corrugated metal  
FHWA Scale # 1 - 90 Degree headwall  
Solution Criteria = Highest U.S. EG

Culvert	Upstrm Dist	Length	Top n	Bottom n	Depth Blocked	Entrance Loss Coef	Exit Loss Coef
	7	23	.011	.011	0	.95	1

Upstream Elevation = 56.25  
Centerline Station = 147  
Downstream Elevation = 56.25  
Centerline Station = 147

## CULVERT OUTPUT Profile #100 yr Culv Group: Culvert #1

Q Culv Group (cfs)	259.00	Culv Full Len (ft)	23.00
# Barrels	1	Culv Vel US (ft/s)	3.37
Q Barrel (cfs)	259.00	Culv Vel DS (ft/s)	3.37
E.G. US. (ft)	65.07	Culv Inv El Up (ft)	56.25
W.S. US. (ft)	65.07	Culv Inv El Dn (ft)	56.25
E.G. DS (ft)	64.74	Culv Frctn Ls (ft)	0.01
W.S. DS (ft)	64.72	Culv Exit Loss (ft)	0.16
Delta EG (ft)	0.33	Culv Entr Loss (ft)	0.17
Delta WS (ft)	0.35	Q weir (cfs)	934.00
E.G. IC (ft)	64.77	Weir Sta Lft (ft)	0.00
E.G. OC (ft)	65.07	Weir Sta Rgt (ft)	369.00
Culvert Control	Outlet	Weir Submerg	0.70
Culv WS Inlet (ft)	63.25	Weir Max Depth (ft)	3.17
Culv WS Outlet (ft)	63.25	Weir Avg Depth (ft)	0.90
Culv Mnl Depth (ft)		Weir Flow Area (sq ft)	331.82
Culv Crt Depth (ft)	2.20	Min El Weir Flow (ft)	62.93

## CULVERT OUTPUT Profile #Floodway Culv Group: Culvert #1

Q Culv Group (cfs)		Culv Full Len (ft)	
# Barrels	0	Culv Vel US (ft/s)	
Q Barrel (cfs)		Culv Vel DS (ft/s)	
E.G. US. (ft)	68.39	Culv Inv El Up (ft)	56.25
W.S. US. (ft)	68.39	Culv Inv El Dn (ft)	56.25
E.G. DS (ft)	71.28	Culv Frctn Ls (ft)	
W.S. DS (ft)	71.28	Culv Exit Loss (ft)	
Delta EG (ft)	2.89	Culv Entr Loss (ft)	
Delta WS (ft)	2.89	Q weir (cfs)	0.00
E.G. IC (ft)		Weir Sta Lft (ft)	15.11
E.G. OC (ft)		Weir Sta Rgt (ft)	320.92
Culvert Control		Weir Submerg	1.00
Culv WS Inlet (ft)		Weir Max Depth (ft)	5.01
Culv WS Outlet (ft)		Weir Avg Depth (ft)	4.06
Culv Mnl Depth (ft)		Weir Flow Area (sq ft)	1241.72
Culv Crt Depth (ft)		Min El Weir Flow (ft)	63.84

warning: The weir over culvert is submerged.

Note: The culvert flow is blocked (either by a flap gate or the depth filled option).



## CROSS SECTION

RIVER: Sawmill Branch  
 REACH: Sawmill Branch RS: 54639

## INPUT

Description: 54639\_Turtle Pond Bridge Section 2 (Copy)

Station Elevation Data			num= 22								
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	67	65	66	130	65	141	63	167	62		
196	61	268	60	275	59.5	282	59	288	56.3		
295	55.8	301	60.1	329	60	339	61	348	62		
368	62.6	388	62	413	62	438	63	552	64		
635	66	750	67								

Manning's n Values			num= 3		
Sta	n Val	Sta	n Val	Sta	n Val
0	.035	268	.03	301	.035

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	268	301		85	85	.1	.3

## CROSS SECTION OUTPUT Profile #100 yr

		Element	Left OB	Channel	Right OB
E.G. Elev (ft)	64.74				
Vel Head (ft)	0.02	Wt. n-Val.	0.035	0.030	0.035
W.S. Elev (ft)	64.72	Reach Len. (ft)	85.00	85.00	85.00
Crit W.S. (ft)		Flow Area (sq ft)	462.97	216.78	571.86
E.G. Slope (ft/ft)	0.000100	Area (sq ft)	462.97	216.78	571.86
Q Total (cfs)	1193.00	Flow (cfs)	442.52	361.34	389.13
Top Width (ft)	450.30	Top width (ft)	136.46	33.00	280.85
Vel Total (ft/s)	0.95	Avg. Vel. (ft/s)	0.96	1.67	0.68
Max Chl Dpth (ft)	8.92	Hydr. Depth (ft)	3.39	6.57	2.04
Conv. Total (cfs)	119528.4	Conv. (cfs)	44336.8	36203.6	38988.0
Length Wtd. (ft)	85.00	Wetted Per. (ft)	136.65	35.01	281.00
Min Ch El (ft)	55.80	Shear (lb/sq ft)	0.02	0.04	0.01
Alpha	1.47	Stream Power (lb/ft s)	0.02	0.06	0.01
Frctn Loss (ft)	0.01	Cum volume (acre-ft)	5.85	10.55	12.82
C & E Loss (ft)	0.00	Cum SA (acres)	5.23	5.00	13.89

## CROSS SECTION OUTPUT Profile #Floodway

		Element	Left OB	Channel	Right OB
E.G. Elev (ft)	71.28				
Vel Head (ft)	0.00	Wt. n-Val.	0.035	0.030	0.035
W.S. Elev (ft)	71.28	Reach Len. (ft)	85.00	85.00	85.00
Crit W.S. (ft)		Flow Area (sq ft)	1215.03	433.20	1463.46
E.G. Slope (ft/ft)	0.000004	Area (sq ft)	1215.03	433.20	1463.46
Q Total (cfs)	1193.00	Flow (cfs)	450.18	222.31	520.50
Top Width (ft)	305.81	Top width (ft)	118.39	33.00	154.42
Vel Total (ft/s)	0.38	Avg. Vel. (ft/s)	0.37	0.51	0.36
Max Chl Dpth (ft)	15.48	Hydr. Depth (ft)	10.26	13.13	9.48
Conv. Total (cfs)	615940.0	Conv. (cfs)	232428.1	114777.9	268734.0
Length Wtd. (ft)	85.00	Wetted Per. (ft)	127.04	35.01	162.69
Min Ch El (ft)	55.80	Shear (lb/sq ft)	0.00	0.00	0.00
Alpha	1.06	Stream Power (lb/ft s)	0.00	0.00	0.00
Frctn Loss (ft)	0.00	Cum volume (acre-ft)	9.80	19.67	31.86
C & E Loss (ft)	0.00	Cum SA (acres)	1.51	5.00	7.34

## CROSS SECTION

RIVER: Sawmill Branch  
 REACH: Sawmill Branch RS: 54554

## INPUT

Description: FEMA STA 545+54\_I2

Station Elevation Data			num= 22								
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	67	65	66	130	65	141	63	167	62		
196	61	268	60	275	59.5	282	59	288	56.3		
295	55.8	301	60.1	329	60	339	61	348	62		
368	62.6	388	62	413	62	438	63	478	64		
547	66	822	68								

Manning's n Values			num= 3		
Sta	n Val	Sta	n Val	Sta	n Val
0	.035	268	.03	301	.035

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	268	301		250	370	.1	.3

## CROSS SECTION OUTPUT Profile #100 yr

		Element	Left OB	Channel	Right OB
E.G. Elev (ft)	64.73				
Vel Head (ft)	0.02	Wt. n-Val.	0.035	0.030	0.035

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W.S. Elev (ft)	64.71	Reach Len. (ft)	250.00	370.00	400.00
Crit W.S. (ft)		Flow Area (sq ft)	461.49	216.43	477.64
E.G. Slope (ft/ft)	0.000105	Area (sq ft)	461.49	216.43	477.64
Q Total (cfs)	1193.00	Flow (cfs)	452.69	370.49	369.81
Top Width (ft)	370.84	Top width (ft)	136.40	33.00	201.44
Vel Total (ft/s)	1.03	Avg. Vel. (ft/s)	0.98	1.71	0.77
Max Chl Dpth (ft)	8.91	Hydr. Depth (ft)	3.38	6.56	2.37
Conv. Total (cfs)	116256.7	Conv. (cfs)	44114.3	36104.3	36038.1
Length Wtd. (ft)	330.29	Wetted Per. (ft)	136.59	35.01	201.61
Min Ch El (ft)	55.80	Shear (lb/sq ft)	0.02	0.04	0.02
Alpha	1.37	Stream Power (lb/ft s)	0.02	0.07	0.01
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	4.95	10.13	11.80
C & E Loss (ft)	0.00	Cum SA (acres)	4.96	4.93	13.42

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

## CROSS SECTION OUTPUT Profile #Floodway

E.G. Elev (ft)	71.28	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.00	Wt. n-Val.	0.035	0.030	0.035
W.S. Elev (ft)	71.28	Reach Len. (ft)	250.00	370.00	400.00
Crit W.S. (ft)		Flow Area (sq ft)	1214.30	433.19	1453.88
E.G. Slope (ft/ft)	0.000004	Area (sq ft)	1214.30	433.19	1453.88
Q Total (cfs)	1193.00	Flow (cfs)	451.24	222.95	518.81
Top Width (ft)	304.83	Top width (ft)	118.31	33.00	153.52
Vel Total (ft/s)	0.38	Avg. Vel. (ft/s)	0.37	0.51	0.36
Max Chl Dpth (ft)	15.48	Hydr. Depth (ft)	10.26	13.13	9.47
Conv. Total (cfs)	614137.8	Conv. (cfs)	232290.1	114773.0	267074.6
Length Wtd. (ft)	332.64	Wetted Per. (ft)	126.96	35.01	161.53
Min Ch El (ft)	55.80	Shear (lb/sq ft)	0.00	0.00	0.00
Alpha	1.06	Stream Power (lb/ft s)	0.00	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	7.43	18.83	29.01
C & E Loss (ft)	0.00	Cum SA (acres)	1.28	4.94	7.04

## CROSS SECTION

RIVER: Sawmill Branch  
 REACH: Sawmill Branch RS: 54178

## INPUT

Description: FEMA STA 541+78\_H3

Station	Elevation	Data	num=	17						
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	
-40	66	0	66	30	66	50	60	106	59	
156	58.2	200	56	206	54.2	215	54.2	222	56.3	
233	57.8	245	62	259	62.1	263	63	303	64	
493	66	593	67							

Manning's n Values	num=	3			
Sta	n Val	Sta	n Val		
-40	.035	156	.03	233	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff	Contr.	Expan.
156	233	55	160	332	.1		.3

## CROSS SECTION OUTPUT Profile #100 yr

E.G. Elev (ft)	64.71	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	Wt. n-Val.	0.035	0.030	0.035
W.S. Elev (ft)	64.70	Reach Len. (ft)	55.00	160.00	332.00
Crit W.S. (ft)		Flow Area (sq ft)	632.71	636.61	174.24
E.G. Slope (ft/ft)	0.000030	Area (sq ft)	632.71	636.61	174.24
Q Total (cfs)	1193.00	Flow (cfs)	441.35	703.96	47.69
Top Width (ft)	334.92	Top width (ft)	121.66	77.00	136.26
Vel Total (ft/s)	0.83	Avg. Vel. (ft/s)	0.70	1.11	0.27
Max Chl Dpth (ft)	10.50	Hydr. Depth (ft)	5.20	8.27	1.28
Conv. Total (cfs)	217118.8	Conv. (cfs)	80323.0	128116.7	8679.2
Length Wtd. (ft)	172.48	Wetted Per. (ft)	122.36	77.73	137.09
Min Ch El (ft)	54.20	Shear (lb/sq ft)	0.01	0.02	0.00
Alpha	1.32	Stream Power (lb/ft s)	0.01	0.02	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	1.81	6.51	8.81
C & E Loss (ft)	0.00	Cum SA (acres)	4.22	4.46	11.87

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

## CROSS SECTION OUTPUT Profile #Floodway

E.G. Elev (ft)	71.28	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.00	Wt. n-Val.	0.035	0.030	0.035
W.S. Elev (ft)	71.27	Reach Len. (ft)	55.00	160.00	332.00
Crit W.S. (ft)		Flow Area (sq ft)	1068.29	1142.99	251.39
E.G. Slope (ft/ft)	0.000004	Area (sq ft)	1068.29	1142.99	251.39

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Q Total (cfs)	1193.00	Flow (cfs)	441.13	672.28	79.60
Top Width (ft)	187.82	Top Width (ft)	86.37	77.00	24.45
Vel Total (ft/s)	0.48	Avg. Vel. (ft/s)	0.41	0.59	0.32
Max Chl Dpth (ft)	17.07	Hydr. Depth (ft)	12.37	14.84	10.28
Conv. Total (cfs)	602996.1	Conv. (cfs)	222964.8	339799.1	40232.2
Length Wtd. (ft)	188.44	Wetted Per. (ft)	98.01	77.73	34.35
Min Ch El (ft)	54.20	Shear (lb/sq ft)	0.00	0.00	0.00
Alpha	1.13	Stream Power (lb/ft s)	0.00	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.88	12.13	21.18
C & E Loss (ft)	0.00	Cum SA (acres)	0.69	4.47	6.22

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

## CROSS SECTION

RIVER: Sawmill Branch  
REACH: Sawmill Branch RS: 54004

## INPUT

Description: FEMA STA 540+04\_H2

Station Elevation Data		num=	18						
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-100	67	-25	65.9	0	66	20	66.4	40	66
52	61	61	60	142	59	230	58	254	57
274	57	291	60	416	61	551	62	733	63
757	65	852	66	1132	68				

Manning's n Values		num=	3
Sta	n Val	Sta	n Val
-100	.035	61	.03
		291	.035

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	61	291		96	96	.1	.3

## CROSS SECTION OUTPUT Profile #100 yr

E.G. Elev (ft)	64.71	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.00	Wt. n-Val.	0.035	0.030	0.035
W.S. Elev (ft)	64.70	Reach Len. (ft)	96.00	96.00	96.00
Crit W.S. (ft)		Flow Area (sq ft)	54.26	1399.43	1375.61
E.G. Slope (ft/ft)	0.000011	Area (sq ft)	54.26	1399.43	1375.61
Q Total (cfs)	1193.00	Flow (cfs)	15.70	772.87	404.43
Top Width (ft)	710.31	Top width (ft)	17.88	230.00	462.42
Vel Total (ft/s)	0.42	Avg. Vel. (ft/s)	0.29	0.55	0.29
Max Chl Dpth (ft)	7.70	Hydr. Depth (ft)	3.03	6.08	2.97
Conv. Total (cfs)	356292.2	Conv. (cfs)	4689.9	230818.4	120783.9
Length Wtd. (ft)	96.00	Wetted Per. (ft)	18.68	230.30	462.50
Min Ch El (ft)	57.00	Shear (lb/sq ft)	0.00	0.00	0.00
Alpha	1.28	Stream Power (lb/ft s)	0.00	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	1.37	2.77	2.90
C & E Loss (ft)	0.00	Cum SA (acres)	4.13	3.90	9.59

## CROSS SECTION OUTPUT Profile #Floodway

E.G. Elev (ft)	71.28	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.00	Wt. n-Val.	0.035	0.030	0.035
W.S. Elev (ft)	71.28	Reach Len. (ft)	96.00	96.00	96.00
Crit W.S. (ft)		Flow Area (sq ft)	116.42	2911.53	4116.41
E.G. Slope (ft/ft)	0.000001	Area (sq ft)	116.42	2911.53	4116.41
Q Total (cfs)	1193.00	Flow (cfs)	11.80	589.82	591.38
Top Width (ft)	665.23	Top width (ft)	10.97	230.00	424.26
Vel Total (ft/s)	0.17	Avg. Vel. (ft/s)	0.10	0.20	0.14
Max Chl Dpth (ft)	14.28	Hydr. Depth (ft)	10.61	12.66	9.70
Conv. Total (cfs)	1582983.0	Conv. (cfs)	15659.4	782623.5	784700.1
Length Wtd. (ft)	96.00	Wetted Per. (ft)	20.64	230.30	432.64
Min Ch El (ft)	57.00	Shear (lb/sq ft)	0.00	0.00	0.00
Alpha	1.10	Stream Power (lb/ft s)	0.00	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.13	4.69	4.54
C & E Loss (ft)	0.00	Cum SA (acres)	0.63	3.91	4.51

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

## CROSS SECTION

RIVER: Sawmill Branch  
REACH: Sawmill Branch RS: 53908

## INPUT

Description: 53908\_17A Culvert Section 3 (Copy)

Station Elevation Data		num=	14						
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev

-25	67	0	66	65	61	84	59	262	59
286	58	291	57.05	296	56.1	302	56	314	60
580	61	635	64	773	66	1150	68		

Manning's n Values	num=	3
Sta n Val	Sta n Val	Sta n Val
-25 .035	262 .03	314 .035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
262	314	108	108	108	.1	.3

## CROSS SECTION OUTPUT Profile #100 yr

E.G. Elev (ft)	64.70	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.00	Wt. n-Val.	0.035	0.030	0.035
W.S. Elev (ft)	64.70	Reach Len. (ft)	108.00	108.00	108.00
Crit W.S. (ft)	59.83	Flow Area (sq ft)	1193.11	357.65	1255.45
E.G. Slope (ft/ft)	0.000013	Area (sq ft)	1193.11	357.65	1255.45
Q Total (cfs)	1193.00	Flow (cfs)	526.82	229.65	436.53
Top width (ft)	666.48	Top width (ft)	245.11	52.00	369.36
Vel Total (ft/s)	0.43	Avg. Vel. (ft/s)	0.44	0.64	0.35
Max Chl Dpth (ft)	8.70	Hydr. Depth (ft)	4.87	6.88	3.40
Conv. Total (cfs)	329236.9	Conv. (cfs)	145387.4	63378.0	120471.5
Length Wtd. (ft)	108.00	Wetted Per. (ft)	245.36	52.85	369.45
Min Ch El (ft)	56.00	Shear (lb/sq ft)	0.00	0.01	0.00
Alpha	1.16	Stream Power (lb/ft s)	0.00	0.00	0.00
Frctn Loss (ft)		Cum Volume (acre-ft)		0.83	
C & E Loss (ft)		Cum SA (acres)	3.84	3.59	8.67

## CROSS SECTION OUTPUT Profile #Floodway

E.G. Elev (ft)	71.27	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	Wt. n-Val.		0.030	
W.S. Elev (ft)	71.23	Reach Len. (ft)	108.00	108.00	108.00
Crit W.S. (ft)	60.37	Flow Area (sq ft)		696.98	
E.G. Slope (ft/ft)	0.000063	Area (sq ft)		696.98	
Q Total (cfs)	1193.00	Flow (cfs)		1193.00	
Top width (ft)	52.00	Top width (ft)		52.00	
Vel Total (ft/s)	1.71	Avg. Vel. (ft/s)		1.71	
Max Chl Dpth (ft)	15.23	Hydr. Depth (ft)		13.40	
Conv. Total (cfs)	150850.5	Conv. (cfs)		150850.5	
Length Wtd. (ft)	108.00	Wetted Per. (ft)		76.30	
Min Ch El (ft)	56.00	Shear (lb/sq ft)		0.04	
Alpha	1.00	Stream Power (lb/ft s)		0.06	
Frctn Loss (ft)		Cum Volume (acre-ft)		0.71	
C & E Loss (ft)		Cum SA (acres)	0.62	3.60	4.04

## CULVERT

RIVER: Sawmill Branch  
 REACH: Sawmill Branch RS: 53854

## INPUT

Description: 17A Culvert  
 Distance from Upstream XS = 5  
 Deck/Roadway width = 102.9  
 Weir Coefficient = 2.6  
 Upstream Deck/Roadway Coordinates

num=	8	
Sta Hi Cord Lo Cord	Sta Hi Cord Lo Cord	Sta Hi Cord Lo Cord
-25 67 0 67	220 67 67 67	
280 67 400 67	600 67 67 67	
733 67 1200 67		

## Upstream Bridge Cross Section Data

Station Elevation Data	num=	14		
Sta Elev	Sta Elev	Sta Elev	Sta Elev	Sta Elev
-25 67	0 66	65 61	84 59	250 59
264 55.8	285 55.8	296 56.1	302 56	314 60
580 61	635 64	773 66	1150 67	

Manning's n Values	num=	4	
Sta n Val	Sta n Val	Sta n Val	Sta n Val
-25 .3	250 .08	264 .011	314 .3

Bank Sta: Left	Right	Coeff Contr.	Expan.
250	314	.1	.3

## Downstream Deck/Roadway Coordinates

num=	6	
Sta Hi Cord Lo Cord	Sta Hi Cord Lo Cord	Sta Hi Cord Lo Cord
0 67 220 67	280 67 733 67	
400 67 600 67		

## Downstream Bridge Cross Section Data

## Sawmillfloodstudy.rep

Station Elevation Data				num=	4
Sta	Elev	Sta	Elev	Sta	Elev
235	67	264	55.8	285	55.8

Manning's n Values				num=	3
Sta	n Val	Sta	n Val	Sta	n Val
235	.3	264	.011	285	.3

Bank Sta:	Left	Right	Coeff	Contr.	Expan.
	264	285	.1	.3	

Upstream Embankment side slope = 0 horiz. to 1.0 vertical  
 Downstream Embankment side slope = 0 horiz. to 1.0 vertical  
 Maximum allowable submergence for weir flow = .95  
 Elevation at which weir flow begins = 67.6  
 Energy head used in spillway design =  
 Spillway height used in design =  
 Weir crest shape = Broad Crested

Number of Culverts = 1

Culvert Name	Shape	Rise	Span
Culvert #1	Box	8	10

FWHA Chart # 8 - flared wingwalls  
 FWHA Scale # 1 - wingwall flared 30 to 75 deg.  
 Solution Criteria = Highest U.S. EG  
 Culvert Upstrm Dist Length Top n Bottom n Depth Blocked Entrance Loss Coef Exit Loss Coef  
 10 98 .011 .011 0 .3 1  
 Number of Barrels = 2  
 Upstream Elevation = 55.8  
 Centerline Stations  
 Sta. Sta.  
 269 280  
 Downstream Elevation = 55.8  
 Centerline Stations  
 Sta. Sta.  
 269 280

## CULVERT OUTPUT Profile #100 yr Culv Group: Culvert #1

Q Culv Group (cfs)	1193.00	Culv Full Len (ft)	
# Barrels	2	Culv Vel US (ft/s)	7.76
Q Barrel (cfs)	596.50	Culv Vel DS (ft/s)	7.86
E.G. US. (ft)	64.70	Culv Inv El Up (ft)	55.80
W.S. US. (ft)	64.70	Culv Inv El Dn (ft)	55.80
E.G. DS (ft)	64.35	Culv Frctn Ls (ft)	0.07
W.S. DS (ft)	62.90	Culv Exit Loss (ft)	0.00
Delta EG (ft)	0.36	Culv Entr Loss (ft)	0.28
Delta WS (ft)	1.80	Q Weir (cfs)	
E.G. IC (ft)	63.55	Weir Sta Lft (ft)	
E.G. OC (ft)	64.70	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	63.49	Weir Max Depth (ft)	
Culv WS Outlet (ft)	63.39	Weir Avg Depth (ft)	
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	4.80	Min El Weir Flow (ft)	67.60

Warning: During subcritical analysis, with the exit loss set =1.0, the projected WSEL in culvert has a lower energy than the downstream energy. Most likely, the downstream cross section blocks part of the culvert or the ineffective area is set too far in. Instead of projecting the WSEL, the program did an energy balance to get the WSEL inside the culvert at the downstream end.

## CULVERT OUTPUT Profile #Floodway Culv Group: Culvert #1

Q Culv Group (cfs)		Culv Full Len (ft)	
# Barrels	0	Culv Vel US (ft/s)	
Q Barrel (cfs)		Culv Vel DS (ft/s)	
E.G. US. (ft)	71.27	Culv Inv El Up (ft)	55.80
W.S. US. (ft)	71.23	Culv Inv El Dn (ft)	55.80
E.G. DS (ft)	66.04	Culv Frctn Ls (ft)	
W.S. DS (ft)	63.38	Culv Exit Loss (ft)	
Delta EG (ft)	5.23	Culv Entr Loss (ft)	
Delta WS (ft)	7.85	Q Weir (cfs)	1192.01
E.G. IC (ft)		Weir Sta Lft (ft)	262.00
E.G. OC (ft)		Weir Sta Rgt (ft)	314.00
Culvert Control		Weir Submerg	0.00
Culv WS Inlet (ft)		Weir Max Depth (ft)	4.27
Culv WS Outlet (ft)		Weir Avg Depth (ft)	4.27
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	221.92
Culv Crt Depth (ft)		Min El Weir Flow (ft)	

Note: The culvert flow is blocked (either by a flap gate or the depth filled option).

CROSS SECTION

RIVER: Sawmill Branch  
 REACH: Sawmill Branch RS: 53800

## INPUT

Description: 53800\_17A Culvert Section 2 (Copy)

Station Elevation Data		num= 4		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	67	25	57.6	30	57.6	80	67

Manning's n Values		num= 3		Sta n Val		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.05	25	.045	30	.05		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	25	30		90	108	.1	.3

## CROSS SECTION OUTPUT Profile #100 yr

E.G. Elev (ft)	64.35	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.45	Wt. n-Val.	0.050	0.045	0.050
W.S. Elev (ft)	62.90	Reach Len. (ft)	90.00	108.00	40.00
Crit W.S. (ft)	62.90	Flow Area (sq ft)	37.35	26.50	74.70
E.G. Slope (ft/ft)	0.017988	Area (sq ft)	37.35	26.50	74.70
Q Total (cfs)	1193.00	Flow (cfs)	272.76	356.71	563.54
Top Width (ft)	47.28	Top width (ft)	14.09	5.00	28.19
Vel Total (ft/s)	8.61	Avg. Vel. (ft/s)	7.30	13.46	7.54
Max Chl Dpth (ft)	5.30	Hydr. Depth (ft)	2.65	5.30	2.65
Conv. Total (cfs)	8895.2	Conv. (cfs)	2033.7	2659.6	4201.8
Length wtd. (ft)	89.78	wetted Per. (ft)	15.06	5.00	28.68
Min Ch El (ft)	57.60	Shear (lb/sq ft)	2.79	5.95	2.92
Alpha	1.26	Stream Power (lb/ft s)	20.34	80.11	22.06
Frctn Loss (ft)	0.79	Cum Volume (acre-ft)	5.48	17.83	25.32
C & E Loss (ft)	0.28	Cum SA (acres)	3.52	3.52	8.18

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

## CROSS SECTION OUTPUT Profile #Floodway

E.G. Elev (ft)	66.04	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.66	Wt. n-Val.	0.050	0.045	0.050
W.S. Elev (ft)	63.38	Reach Len. (ft)	90.00	108.00	40.00
Crit W.S. (ft)	63.38	Flow Area (sq ft)	17.25	28.89	54.63
E.G. Slope (ft/ft)	0.024090	Area (sq ft)	17.25	28.89	54.63
Q Total (cfs)	1193.00	Flow (cfs)	131.68	476.75	584.57
Top Width (ft)	20.02	Top width (ft)	3.35	5.00	11.67
Vel Total (ft/s)	11.84	Avg. Vel. (ft/s)	7.64	16.50	10.70
Max Chl Dpth (ft)	5.78	Hydr. Depth (ft)	5.15	5.78	4.68
Conv. Total (cfs)	7686.4	Conv. (cfs)	848.4	3071.6	3766.3
Length wtd. (ft)	90.35	wetted Per. (ft)	8.10	5.00	15.46
Min Ch El (ft)	57.60	Shear (lb/sq ft)	3.20	8.69	5.31
Alpha	1.22	Stream Power (lb/ft s)	24.46	143.40	56.87
Frctn Loss (ft)	0.63	Cum Volume (acre-ft)	1.16	20.00	16.83
C & E Loss (ft)	0.69	Cum SA (acres)	0.62	3.53	4.03

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

Warning: The cross section had to be extended vertically during the critical depth calculations.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

Warning: The parabolic search method failed to converge on critical depth. The program will try the cross section slice/secant method to find critical depth.

## CROSS SECTION

RIVER: Sawmill Branch  
 REACH: Sawmill Branch RS: 53721

## INPUT

## Sawmillfloodstudy.rep

Description: FEMA STA 537+21\_G2

Station	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	66.3	35	65.6	38	65	46	62	56	61
62	59	66	55	72	55	74	56	78	58
91	58.3	101	59.6	108	61.3	120	66.8	140	67

Sta	n Val	Sta	n Val	Sta	n Val
0	.05	56	.045	108	.05

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	56	108		340	340		.1	.3

## CROSS SECTION OUTPUT Profile #100 yr

		Element	Left OB	Channel	Right OB
E.G. Elev (ft)	62.65	Wt. n-Val.	0.050	0.045	0.050
Vel Head (ft)	0.51	Reach Len. (ft)	340.00	340.00	340.00
W.S. Elev (ft)	62.14	Flow Area (sq ft)	6.40	205.56	0.77
Crit W.S. (ft)		Area (sq ft)	6.40	205.56	0.77
E.G. Slope (ft/ft)	0.005228	Flow (cfs)	9.93	1182.21	0.86
Q Total (cfs)	1193.00	Top width (ft)	10.37	52.00	1.83
Top width (ft)	64.19	Avg. Vel. (ft/s)	1.55	5.75	1.13
Vel Total (ft/s)	5.61	Hydr. Depth (ft)	0.62	3.95	0.42
Max chl Dpth (ft)	7.14	Conv. (cfs)	137.3	16350.2	11.9
Conv. Total (cfs)	16499.5	Wetted Per. (ft)	10.44	54.98	2.01
Length Wtd. (ft)	340.00	Shear (lb/sq ft)	0.20	1.22	0.12
Min Ch El (ft)	55.00	Stream Power (lb/ft s)	0.31	7.02	0.14
Alpha	1.04	Cum Volume (acre-ft)	5.43	17.54	25.28
Frctn Loss (ft)	0.52	Cum SA (acres)	3.49	3.45	8.16
C & E Loss (ft)	0.13				

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

## CROSS SECTION OUTPUT Profile #Floodway

		Element	Left OB	Channel	Right OB
E.G. Elev (ft)	63.25	Wt. n-Val.		0.045	
Vel Head (ft)	0.37	Reach Len. (ft)	340.00	340.00	340.00
W.S. Elev (ft)	62.87	Flow Area (sq ft)		243.84	
Crit W.S. (ft)		Area (sq ft)		243.84	
E.G. Slope (ft/ft)	0.003267	Flow (cfs)		1193.00	
Q Total (cfs)	1193.00	Top width (ft)		52.00	
Top width (ft)	52.00	Avg. Vel. (ft/s)		4.89	
Vel Total (ft/s)	4.89	Hydr. Depth (ft)		4.69	
Max chl Dpth (ft)	7.87	Conv. (cfs)		20871.3	
Conv. Total (cfs)	20871.3	Wetted Per. (ft)		58.43	
Length Wtd. (ft)	340.00	Shear (lb/sq ft)		0.85	
Min Ch El (ft)	55.00	Stream Power (lb/ft s)		4.16	
Alpha	1.00	Cum Volume (acre-ft)	1.15	19.66	16.80
Frctn Loss (ft)	0.40	Cum SA (acres)	0.61	3.46	4.02
C & E Loss (ft)	0.08				

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

## CROSS SECTION

RIVER: Sawmill Branch  
 REACH: Sawmill Branch RS: 53383

## INPUT

Description: FEMA STA 533+83

Station	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-205	64	-29	60	-10	59	0	58.5	16	60.3
42	60.5	55	61.4	107	61	118	60	132	57
162	56	164	55	165	54	173	54	175	55
181	59	184	60	196	66	202	66.5		

Sta	n Val	Sta	n Val	Sta	n Val
-205	.05	118	.045	184	.05

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	118	184		50	150		.1	.3

## CROSS SECTION OUTPUT Profile #100 yr

		Element	Left OB	Channel	Right OB
E.G. Elev (ft)	61.99	Wt. n-Val.	0.050	0.045	0.050
Vel Head (ft)	0.08	Reach Len. (ft)	50.00	150.00	180.00
W.S. Elev (ft)	61.91	Flow Area (sq ft)	302.34	345.16	3.65
Crit W.S. (ft)		Area (sq ft)	302.34	345.16	3.65
E.G. Slope (ft/ft)	0.000725	Flow (cfs)	289.19	901.18	2.63
Q Total (cfs)	1193.00				

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Top Width (ft)	300.93	Top width (ft)	231.11	66.00	3.82
Vel Total (ft/s)	1.83	Avg. Vel. (ft/s)	0.96	2.61	0.72
Max Chl Dpth (ft)	7.91	Hydr. Depth (ft)	1.31	5.23	0.96
Conv. Total (cfs)	44306.1	Conv. (cfs)	10740.1	33468.2	97.8
Length Wtd. (ft)	124.28	Wetted Per. (ft)	231.35	68.59	4.27
Min Ch El (ft)	54.00	Shear (lb/sq ft)	0.06	0.23	0.04
Alpha	1.60	Stream Power (lb/ft s)	0.06	0.59	0.03
Frctn Loss (ft)	0.11	Cum volume (acre-ft)	4.23	15.39	25.27
C & E Loss (ft)	0.00	Cum SA (acres)	2.55	2.99	8.14

## CROSS SECTION OUTPUT Profile #Floodway

E.G. Elev (ft)	62.76	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.09	Wt. n-Val.	0.050	0.045	0.050
W.S. Elev (ft)	62.67	Reach Len. (ft)	50.00	150.00	180.00
Crit W.S. (ft)		Flow Area (sq ft)	152.20	394.94	7.11
E.G. Slope (ft/ft)	0.000606	Area (sq ft)	152.20	394.94	7.11
Q Total (cfs)	1193.00	Flow (cfs)	155.95	1031.21	5.84
Top width (ft)	160.79	Top width (ft)	89.46	66.00	5.33
Vel Total (ft/s)	2.15	Avg. Vel. (ft/s)	1.02	2.61	0.82
Max chl Dpth (ft)	8.67	Hydr. Depth (ft)	1.70	5.98	1.33
Conv. Total (cfs)	48466.3	Conv. (cfs)	6335.5	41893.3	237.4
Length Wtd. (ft)	143.37	Wetted Per. (ft)	91.81	68.59	5.96
Min Ch El (ft)	54.00	Shear (lb/sq ft)	0.06	0.22	0.05
Alpha	1.30	Stream Power (lb/ft s)	0.06	0.57	0.04
Frctn Loss (ft)	0.12	Cum Volume (acre-ft)	0.55	17.17	16.78
C & E Loss (ft)	0.01	Cum SA (acres)	0.26	3.00	4.00

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

## CROSS SECTION

RIVER: Sawmill Branch  
 REACH: Sawmill Branch RS: 53232

## INPUT

Description: FEMA STA 532+32

Station		Elevation Data		num=	15	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-246	64	-61	59			-25	60	0	61	32	61.8		
65	62.13	104	62.08			120	60.4	131	56.75	138	57.01		
146	55.69	153	55.27			170	56	186	61.11	195	65.55		

Manning's n Values		num=	3	Sta	n Val
-246	.05	104	.045	186	.05

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	104	186		118	128	.1	.3

## CROSS SECTION OUTPUT Profile #100 yr

E.G. Elev (ft)	61.89	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.09	Wt. n-Val.	0.050	0.045	0.050
W.S. Elev (ft)	61.80	Reach Len. (ft)	118.00	128.00	128.00
Crit W.S. (ft)		Flow Area (sq ft)	273.30	323.88	0.48
E.G. Slope (ft/ft)	0.001036	Area (sq ft)	273.30	323.88	0.48
Q Total (cfs)	1193.00	Flow (cfs)	325.35	867.44	0.21
Top width (ft)	277.45	Top width (ft)	196.71	79.34	1.40
Vel Total (ft/s)	2.00	Avg. Vel. (ft/s)	1.19	2.68	0.44
Max chl Dpth (ft)	6.53	Hydr. Depth (ft)	1.39	4.08	0.35
Conv. Total (cfs)	37071.1	Conv. (cfs)	10109.9	26954.7	6.6
Length Wtd. (ft)	125.23	Wetted Per. (ft)	196.79	80.94	1.56
Min Ch El (ft)	55.27	Shear (lb/sq ft)	0.09	0.26	0.02
Alpha	1.41	Stream Power (lb/ft s)	0.11	0.69	0.01
Frctn Loss (ft)	0.15	Cum Volume (acre-ft)	3.89	14.24	25.26
C & E Loss (ft)	0.00	Cum SA (acres)	2.31	2.74	8.13

Warning: Divided flow computed for this cross-section.

## CROSS SECTION OUTPUT Profile #Floodway

E.G. Elev (ft)	62.63	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.15	Wt. n-Val.	0.050	0.045	
W.S. Elev (ft)	62.48	Reach Len. (ft)	118.00	128.00	128.00
Crit W.S. (ft)		Flow Area (sq ft)	7.46	379.35	
E.G. Slope (ft/ft)	0.001226	Area (sq ft)	7.46	379.35	
Q Total (cfs)	1193.00	Flow (cfs)	4.09	1188.91	
Top width (ft)	101.16	Top width (ft)	19.16	82.00	
Vel Total (ft/s)	3.08	Avg. Vel. (ft/s)	0.55	3.13	
Max chl Dpth (ft)	7.21	Hydr. Depth (ft)	0.39	4.63	
Conv. Total (cfs)	34075.1	Conv. (cfs)	116.8	33958.3	
Length Wtd. (ft)	127.96	Wetted Per. (ft)	19.54	84.99	



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Min Ch El (ft)	55.27	Shear (lb/sq ft)	0.03	0.34	
Alpha	1.03	Stream Power (lb/ft s)	0.02	1.07	
Frctn Loss (ft)	0.20	Cum Volume (acre-ft)	0.46	15.83	16.76
C & E Loss (ft)	0.01	Cum SA (acres)	0.20	2.74	3.99

## CROSS SECTION

RIVER: Sawmill Branch  
 REACH: Sawmill Branch RS: 53104

## INPUT

Description: FEMA STA 531+04

Station Elevation Data		num=	15						
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-80	64	0	58.5	33	59.4	43	60	57	61
100	61	114	60	126	55.9	136	56	147	55.1
153	55.2	157	58.4	169	60	178	64.2	182	64.7

Manning's n Values		num=	3		
Sta	n Val	Sta	n Val	Sta	n Val
-80	.05	114	.045	169	.05

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	114	169		150	150	.1	.3

## CROSS SECTION OUTPUT Profile #100 yr

E.G. Elev (ft)	61.73	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.14	Wt. n-Val.	0.050	0.045	0.050
W.S. Elev (ft)	61.60	Reach Len. (ft)	150.00	150.00	150.00
Crit W.S. (ft)		Flow Area (sq ft)	232.24	253.31	2.73
E.G. Slope (ft/ft)	0.001429	Area (sq ft)	232.24	253.31	2.73
Q Total (cfs)	1193.00	Flow (cfs)	335.49	855.04	2.47
Top Width (ft)	217.45	Top width (ft)	159.03	55.00	3.42
Vel Total (ft/s)	2.44	Avg. Vel. (ft/s)	1.44	3.38	0.90
Max Chl Dpth (ft)	6.50	Hydr. Depth (ft)	1.46	4.61	0.80
Conv. Total (cfs)	31564.6	Conv. (cfs)	8876.4	22622.9	65.3
Length Wtd. (ft)	150.00	Wetted Per. (ft)	159.24	56.95	3.77
Min Ch El (ft)	55.10	Shear (lb/sq ft)	0.13	0.40	0.06
Alpha	1.47	Stream Power (lb/ft s)	0.19	1.34	0.06
Frctn Loss (ft)	0.12	Cum Volume (acre-ft)	3.21	13.39	25.25
C & E Loss (ft)	0.02	Cum SA (acres)	1.82	2.54	8.12

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

## CROSS SECTION OUTPUT Profile #Floodway

E.G. Elev (ft)	62.43	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.27	Wt. n-Val.	0.050	0.045	
W.S. Elev (ft)	62.16	Reach Len. (ft)	150.00	150.00	150.00
Crit W.S. (ft)		Flow Area (sq ft)	4.41	284.14	
E.G. Slope (ft/ft)	0.001972	Area (sq ft)	4.41	284.14	
Q Total (cfs)	1193.00	Flow (cfs)	6.08	1186.92	
Top Width (ft)	57.12	Top width (ft)	2.12	55.00	
Vel Total (ft/s)	4.13	Avg. Vel. (ft/s)	1.38	4.18	
Max Chl Dpth (ft)	7.06	Hydr. Depth (ft)	2.08	5.17	
Conv. Total (cfs)	26862.3	Conv. (cfs)	136.9	26725.4	
Length Wtd. (ft)	150.00	Wetted Per. (ft)	4.13	59.10	
Min Ch El (ft)	55.10	Shear (lb/sq ft)	0.13	0.59	
Alpha	1.02	Stream Power (lb/ft s)	0.18	2.47	
Frctn Loss (ft)	0.17	Cum Volume (acre-ft)	0.44	14.86	16.76
C & E Loss (ft)	0.05	Cum SA (acres)	0.17	2.54	3.99

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

## CROSS SECTION

RIVER: Sawmill Branch  
 REACH: Sawmill Branch RS: 52950

## INPUT

Description: FEMA STA 529+50

Station Elevation Data		num=	16						
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-80	64	-40	63	0	59.3	16	59	75	58.7
105	60	120	58.7	125	56.5	134	54.8	151	54.5
164	56	171	57	178	58	184	59	196	63
200	63.5								

Manning's n Values		num=	3		
Sta	n Val	Sta	n Val	Sta	n Val

-80 .05 120 .045 184 .05

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.  
 120 184 360 360 402 .1 .3

## CROSS SECTION OUTPUT Profile #100 yr

E.G. Elev (ft)	61.59	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.06	Wt. n-Val.	0.050	0.045	0.050
W.S. Elev (ft)	61.53	Reach Len. (ft)	360.00	360.00	402.00
Crit W.S. (ft)		Flow Area (sq ft)	320.50	352.47	9.57
E.G. Slope (ft/ft)	0.000517	Area (sq ft)	320.50	352.47	9.57
Q Total (cfs)	1193.00	Flow (cfs)	368.64	817.07	7.29
Top width (ft)	215.63	Top width (ft)	144.06	64.00	7.58
Vel Total (ft/s)	1.75	Avg. Vel. (ft/s)	1.15	2.32	0.76
Max Chl Dpth (ft)	7.03	Hydr. Depth (ft)	2.22	5.51	1.26
Conv. Total (cfs)	52485.7	Conv. (cfs)	16218.2	35946.9	320.6
Length Wtd. (ft)	375.34	Wetted Per. (ft)	144.25	64.94	7.99
Min Ch El (ft)	54.50	Shear (lb/sq ft)	0.07	0.18	0.04
Alpha	1.34	Stream Power (lb/ft s)	0.08	0.41	0.03
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)	2.26	12.35	25.23
C & E Loss (ft)	0.02	Cum SA (acres)	1.30	2.34	8.11

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

## CROSS SECTION OUTPUT Profile #Floodway

E.G. Elev (ft)	62.21	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.11	Wt. n-Val.	0.050	0.045	
W.S. Elev (ft)	62.10	Reach Len. (ft)	360.00	360.00	402.00
Crit W.S. (ft)		Flow Area (sq ft)	74.55	389.27	
E.G. Slope (ft/ft)	0.000702	Area (sq ft)	74.55	389.27	
Q Total (cfs)	1193.00	Flow (cfs)	103.91	1089.09	
Top width (ft)	92.87	Top width (ft)	28.87	64.00	
Vel Total (ft/s)	2.57	Avg. Vel. (ft/s)	1.39	2.80	
Max Chl Dpth (ft)	7.60	Hydr. Depth (ft)	2.58	6.08	
Conv. Total (cfs)	45041.4	Conv. (cfs)	3923.1	41118.3	
Length Wtd. (ft)	372.97	Wetted Per. (ft)	31.64	68.04	
Min Ch El (ft)	54.50	Shear (lb/sq ft)	0.10	0.25	
Alpha	1.11	Stream Power (lb/ft s)	0.14	0.70	
Frctn Loss (ft)	0.12	Cum Volume (acre-ft)	0.31	13.70	16.76
C & E Loss (ft)	0.03	Cum SA (acres)	0.12	2.34	3.99

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

## CROSS SECTION

RIVER: Sawmill Branch  
 REACH: Sawmill Branch RS: 52598

## INPUT

Description: FEMA STA 525+98\_F2

Station	Elevation	Data	num=	23						
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	
0	64.5	24	64	48	63	55	62	63	61	
80	56	113	55.5	118	56	125	58	160	58.2	
181	58	211	57.7	256	57.6	336	57.9	361	56.6	
373	56.5	393	58.4	413	61.5	440	61	475	61	
486	62	513	63	553	63.5					

Manning's n	Values	num=	3		
Sta	n Val	Sta	n Val	Sta	n Val
0	.05	63	.045	125	.05

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.  
 63 125 450 450 340 .1 .3

## CROSS SECTION OUTPUT Profile #100 yr

E.G. Elev (ft)	61.48	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	Wt. n-Val.	0.050	0.045	0.050
W.S. Elev (ft)	61.47	Reach Len. (ft)	450.00	450.00	340.00
Crit W.S. (ft)		Flow Area (sq ft)	0.89	299.18	1066.01
E.G. Slope (ft/ft)	0.000139	Area (sq ft)	0.89	299.18	1066.01
Q Total (cfs)	1193.00	Flow (cfs)	0.12	328.73	864.15
Top width (ft)	419.16	Top width (ft)	3.76	62.00	353.40
Vel Total (ft/s)	0.87	Avg. Vel. (ft/s)	0.13	1.10	0.81
Max Chl Dpth (ft)	5.97	Hydr. Depth (ft)	0.24	4.83	3.02
Conv. Total (cfs)	101259.5	Conv. (cfs)	10.0	27902.2	73347.3
Length Wtd. (ft)	366.71	Wetted Per. (ft)	3.79	63.03	353.79
Min Ch El (ft)	55.50	Shear (lb/sq ft)	0.00	0.04	0.03
Alpha	1.06	Stream Power (lb/ft s)	0.00	0.05	0.02
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)	0.93	9.66	20.27

C & E Loss (ft)	0.00	Cum SA (acres)	0.69	1.82	6.44
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Warning: Divided flow computed for this cross-section.

## CROSS SECTION OUTPUT Profile #Floodway

E.G. Elev (ft)	62.06	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.		0.045	0.050
W.S. Elev (ft)	62.04	Reach Len. (ft)	450.00	450.00	340.00
Crit W.S. (ft)		Flow Area (sq ft)		334.67	706.33
E.G. Slope (ft/ft)	0.000188	Area (sq ft)		334.67	706.33
Q Total (cfs)	1193.00	Flow (cfs)		456.07	736.93
Top width (ft)	230.05	Top width (ft)		62.00	168.05
Vel Total (ft/s)	1.15	Avg. Vel. (ft/s)		1.36	1.04
Max Chl Dpth (ft)	6.54	Hydr. Depth (ft)		5.40	4.20
Conv. Total (cfs)	87023.7	Conv. (cfs)		33268.4	53755.3
Length Wtd. (ft)	376.45	Wetted Per. (ft)		64.07	172.36
Min Ch El (ft)	55.50	Shear (lb/sq ft)		0.06	0.05
Alpha	1.05	Stream Power (lb/ft s)		0.08	0.05
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)		10.71	13.50
C & E Loss (ft)	0.00	Cum SA (acres)		1.82	3.21

## CROSS SECTION

RIVER: Sawmill Branch  
 REACH: Sawmill Branch RS: 52151

## INPUT

Description: FEMA STA 521+51

Station Elevation Data		num=	24
Sta	Elev	Sta	Elev
0	69	12	68.5
41	55.5	61	55
120	59.4	163	58
407	58	432	57.1
554	60	574	61
		609	62
		659	62.5

Manning's n Values		num=	3
Sta	n Val	Sta	n Val
0	.05	32	.045
		88	.05

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff	Contr.	Expan.
32	88	200	183	50	.1	.3	

## CROSS SECTION OUTPUT Profile #100 yr

E.G. Elev (ft)	61.45	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	Wt. n-Val.		0.045	0.050
W.S. Elev (ft)	61.44	Reach Len. (ft)	200.00	183.00	50.00
Crit W.S. (ft)		Flow Area (sq ft)		297.36	1676.14
E.G. Slope (ft/ft)	0.000072	Area (sq ft)		297.36	1676.14
Q Total (cfs)	1193.00	Flow (cfs)		248.99	942.42
Top width (ft)	562.26	Top width (ft)		56.00	501.38
Vel Total (ft/s)	0.60	Avg. Vel. (ft/s)		0.84	0.56
Max Chl Dpth (ft)	6.44	Hydr. Depth (ft)		5.31	3.34
Conv. Total (cfs)	140939.3	Conv. (cfs)		29415.9	111336.0
Length Wtd. (ft)	77.79	Wetted Per. (ft)		57.35	501.60
Min Ch El (ft)	55.00	Shear (lb/sq ft)		0.02	0.01
Alpha	1.09	Stream Power (lb/ft s)		0.02	0.01
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)		6.57	9.57
C & E Loss (ft)	0.00	Cum SA (acres)		1.21	3.10

## CROSS SECTION OUTPUT Profile #Floodway

E.G. Elev (ft)	62.01	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	Wt. n-Val.		0.045	0.050
W.S. Elev (ft)	62.00	Reach Len. (ft)	200.00	183.00	50.00
Crit W.S. (ft)		Flow Area (sq ft)		328.77	1129.39
E.G. Slope (ft/ft)	0.000099	Area (sq ft)		328.77	1129.39
Q Total (cfs)	1193.00	Flow (cfs)		334.54	858.46
Top width (ft)	325.56	Top width (ft)		56.00	269.56
Vel Total (ft/s)	0.82	Avg. Vel. (ft/s)		1.02	0.76
Max Chl Dpth (ft)	7.00	Hydr. Depth (ft)		5.87	4.19
Conv. Total (cfs)	119864.0	Conv. (cfs)		33611.7	86252.3
Length Wtd. (ft)	86.24	Wetted Per. (ft)		60.35	274.15
Min Ch El (ft)	55.00	Shear (lb/sq ft)		0.03	0.03
Alpha	1.05	Stream Power (lb/ft s)		0.03	0.02
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)		7.28	6.34
C & E Loss (ft)	0.00	Cum SA (acres)		1.21	1.51

## CROSS SECTION

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RIVER: Sawmill Branch  
 REACH: Sawmill Branch RS: 51968

## INPUT

Description: FEMA STA 519+68

Station Elevation Data		num= 20		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	65	15	60	30	59	40	56	60	55
75	56	85	59	130	59	160	58	278	57
288	56	292	56	305	57	345	58	415	58
525	58	545	59	585	60	630	62	770	64

Manning's n Values		num= 3		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val
0	.05	30	.045	85	.05

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	30	85		228	278	.1	.3

## CROSS SECTION OUTPUT Profile #100 yr

E.G. Elev (ft)		61.44	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	Wt. n-Val.	0.050	0.045	0.050	
W.S. Elev (ft)	61.43	Reach Len. (ft)	228.00	278.00	380.00	
Crit W.S. (ft)		Flow Area (sq ft)	32.01	286.12	1729.19	
E.G. Slope (ft/ft)	0.000110	Area (sq ft)	32.01	286.12	1729.19	
Q Total (cfs)	1488.00	Flow (cfs)	13.84	293.74	1180.43	
Top width (ft)	606.45	Top width (ft)	19.29	55.00	532.16	
Vel Total (ft/s)	0.73	Avg. Vel. (ft/s)	0.43	1.03	0.68	
Max Chl Dpth (ft)	6.43	Hydr. Depth (ft)	1.66	5.20	3.25	
Conv. Total (cfs)	142077.8	Conv. (cfs)	1321.1	28046.6	112710.1	
Length wtd. (ft)	316.55	wetted Per. (ft)	19.55	55.94	532.35	
Min Ch El (ft)	55.00	Shear (lb/sq ft)	0.01	0.04	0.02	
Alpha	1.10	Stream Power (lb/ft s)	0.00	0.04	0.02	
Frctn Loss (ft)	0.07	Cum volume (acre-ft)	0.81	5.35	7.61	
C & E Loss (ft)	0.01	Cum SA (acres)	0.59	0.97	2.51	

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

## CROSS SECTION OUTPUT Profile #Floodway

E.G. Elev (ft)		62.00	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.	0.045	0.050	0.050	
W.S. Elev (ft)	61.98	Reach Len. (ft)	228.00	278.00	380.00	
Crit W.S. (ft)		Flow Area (sq ft)	316.58	1152.97		
E.G. Slope (ft/ft)	0.000153	Area (sq ft)	316.58	1152.97		
Q Total (cfs)	1488.00	Flow (cfs)	396.02	1091.98		
Top width (ft)	329.01	Top width (ft)	55.00	274.01		
Vel Total (ft/s)	1.01	Avg. Vel. (ft/s)	1.25	0.95		
Max Chl Dpth (ft)	6.98	Hydr. Depth (ft)	5.76	4.21		
Conv. Total (cfs)	120492.5	Conv. (cfs)	32068.2	88424.3		
Length wtd. (ft)	315.43	wetted Per. (ft)	58.92	278.12		
Min Ch El (ft)	55.00	Shear (lb/sq ft)	0.05	0.04		
Alpha	1.05	Stream Power (lb/ft s)	0.06	0.04		
Frctn Loss (ft)	0.09	Cum volume (acre-ft)	5.92	5.03		
C & E Loss (ft)	0.01	Cum SA (acres)	0.97	1.20		

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

## CROSS SECTION

RIVER: Sawmill Branch  
 REACH: Sawmill Branch RS: 51690

## INPUT

Description: FEMA STA 516+90\_E2

Station Elevation Data		num= 13		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	65	20	64	28	63	38	61	61	60
111	59	115	55	125	53	156	53	164	56
178	60	184	61	450	65				

Manning's n Values		num= 3		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val
0	.05	111	.045	178	.05

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	111	178		348	348	.1	.3

## CROSS SECTION OUTPUT Profile #100 yr

E.G. Elev (ft)		61.35	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.14	Wt. n-Val.	0.050	0.045	0.050	

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W.S. Elev (ft)	61.21	Reach Len. (ft)	348.00	348.00	290.00
Crit W.S. (ft)		Flow Area (sq ft)	101.93	442.06	5.72
E.G. Slope (ft/ft)	0.000768	Area (sq ft)	101.93	442.06	5.72
Q Total (cfs)	1488.00	Flow (cfs)	103.79	1382.16	2.04
Top Width (ft)	161.00	Top width (ft)	74.05	67.00	19.95
Vel Total (ft/s)	2.71	Avg. Vel. (ft/s)	1.02	3.13	0.36
Max Chl Dpth (ft)	8.21	Hydr. Depth (ft)	1.38	6.60	0.29
Conv. Total (cfs)	53710.9	Conv. (cfs)	3746.5	49890.7	73.8
Length Wtd. (ft)	347.74	Wetted Per. (ft)	74.10	69.96	20.04
Min Ch El (ft)	53.00	Shear (lb/sq ft)	0.07	0.30	0.01
Alpha	1.25	Stream Power (lb/ft s)	0.07	0.95	0.00
Frctn Loss (ft)	0.48	Cum Volume (acre-ft)	0.46	3.03	0.05
C & E Loss (ft)	0.02	Cum SA (acres)	0.35	0.58	0.10

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

## CROSS SECTION OUTPUT Profile #Floodway

E.G. Elev (ft)	61.90	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.15	Wt. n-Val.		0.045	
W.S. Elev (ft)	61.74	Reach Len. (ft)	348.00	348.00	290.00
Crit W.S. (ft)		Flow Area (sq ft)		477.89	
E.G. Slope (ft/ft)	0.000745	Area (sq ft)		477.89	
Q Total (cfs)	1488.00	Flow (cfs)		1488.00	
Top Width (ft)	67.00	Top width (ft)		67.00	
Vel Total (ft/s)	3.11	Avg. Vel. (ft/s)		3.11	
Max Chl Dpth (ft)	8.74	Hydr. Depth (ft)		7.13	
Conv. Total (cfs)	54503.5	Conv. (cfs)		54503.5	
Length Wtd. (ft)	348.00	Wetted Per. (ft)		74.45	
Min Ch El (ft)	53.00	Shear (lb/sq ft)		0.30	
Alpha	1.00	Stream Power (lb/ft s)		0.93	
Frctn Loss (ft)	0.40	Cum Volume (acre-ft)		3.39	
C & E Loss (ft)	0.01	Cum SA (acres)		0.58	

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

## CROSS SECTION

RIVER: Sawmill Branch  
 REACH: Sawmill Branch RS: 51342

## INPUT

Description: FEMA STA 513+42

Station Elevation Data		num=	15						
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	67	176	66	186	60	198	59	228	57
238	55	242	53	249	54	257	55	277	59
284	60	291	61	303	62	315	63	450	64

Manning's n Values		num=	3		
Sta	n Val	Sta	n Val	Sta	n Val
0	.05	198	.045	277	.05

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	198	277		80	80	.1	.3

## CROSS SECTION OUTPUT Profile #100 yr

E.G. Elev (ft)	60.85	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.32	Wt. n-Val.	0.050	0.045	0.050
W.S. Elev (ft)	60.53	Reach Len. (ft)			
Crit W.S. (ft)	58.69	Flow Area (sq ft)	12.59	315.37	8.19
E.G. Slope (ft/ft)	0.003154	Area (sq ft)	12.59	315.37	8.19
Q Total (cfs)	1488.00	Flow (cfs)	20.50	1456.14	11.36
Top Width (ft)	102.59	Top width (ft)	12.88	79.00	10.71
Vel Total (ft/s)	4.43	Avg. Vel. (ft/s)	1.63	4.62	1.39
Max Chl Dpth (ft)	7.53	Hydr. Depth (ft)	0.98	3.99	0.76
Conv. Total (cfs)	26496.9	Conv. (cfs)	365.1	25929.5	202.3
Length Wtd. (ft)		Wetted Per. (ft)	13.07	80.27	10.82
Min Ch El (ft)	53.00	Shear (lb/sq ft)	0.19	0.77	0.15
Alpha	1.07	Stream Power (lb/ft s)	0.31	3.57	0.21
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

## CROSS SECTION OUTPUT Profile #Floodway

E.G. Elev (ft)	61.48	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.25	Wt. n-Val.		0.045	
W.S. Elev (ft)	61.23	Reach Len. (ft)			
Crit W.S. (ft)	58.69	Flow Area (sq ft)		370.67	
E.G. Slope (ft/ft)	0.002066	Area (sq ft)		370.67	
Q Total (cfs)	1488.00	Flow (cfs)		1488.00	

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Top Width (ft)	79.00	Top width (ft)	79.00
Vel Total (ft/s)	4.01	Avg. Vel. (ft/s)	4.01
Max Chl Dpth (ft)	8.23	Hydr. Depth (ft)	4.69
Conv. Total (cfs)	32740.4	Conv. (cfs)	32740.4
Length Wtd. (ft)		Wetted Per. (ft)	84.73
Min Ch El (ft)	53.00	Shear (lb/sq ft)	0.56
Alpha	1.00	Stream Power (lb/ft s)	2.26
Frctn Loss (ft)		Cum volume (acre-ft)	
C & E Loss (ft)		Cum SA (acres)	

## SUMMARY OF MANNING'S N VALUES

River: Sawmill Branch

Reach	River Sta.	n1	n2	n3
Upstream East	57076	.035	.03	.035
Upstream East	56188	.035	.03	.035
Upstream West	56038	.035	.03	.035
Upstream West	55620	.035	.03	.035
Sawmill Branch	55160	.035	.03	.035
Sawmill Branch	54754	.035	.03	.035
Sawmill Branch	54669	.035	.03	.035
Sawmill Branch	54654	Culvert		
Sawmill Branch	54639	.035	.03	.035
Sawmill Branch	54554	.035	.03	.035
Sawmill Branch	54178	.035	.03	.035
Sawmill Branch	54004	.035	.03	.035
Sawmill Branch	53908	.035	.03	.035
Sawmill Branch	53854	Culvert		
Sawmill Branch	53800	.05	.045	.05
Sawmill Branch	53721	.05	.045	.05
Sawmill Branch	53383	.05	.045	.05
Sawmill Branch	53232	.05	.045	.05
Sawmill Branch	53104	.05	.045	.05
Sawmill Branch	52950	.05	.045	.05
Sawmill Branch	52598	.05	.045	.05
Sawmill Branch	52151	.05	.045	.05
Sawmill Branch	51968	.05	.045	.05
Sawmill Branch	51690	.05	.045	.05
Sawmill Branch	51342	.05	.045	.05

## SUMMARY OF REACH LENGTHS

River: Sawmill Branch

Reach	River Sta.	Left	Channel	Right
Upstream East	57076	888	888	888
Upstream East	56188	1028	1028	1028
Upstream West	56038	418	418	418
Upstream West	55620	460	460	460
Sawmill Branch	55160	406	406	406
Sawmill Branch	54754	320	250	100
Sawmill Branch	54669	30	30	30
Sawmill Branch	54654	Culvert		
Sawmill Branch	54639	85	85	85
Sawmill Branch	54554	250	370	400
Sawmill Branch	54178	55	160	332
Sawmill Branch	54004	96	96	96
Sawmill Branch	53908	108	108	108
Sawmill Branch	53854	Culvert		
Sawmill Branch	53800	90	108	40
Sawmill Branch	53721	340	340	340
Sawmill Branch	53383	50	150	180
Sawmill Branch	53232	118	128	128
Sawmill Branch	53104	150	150	150
Sawmill Branch	52950	360	360	402
Sawmill Branch	52598	450	450	340
Sawmill Branch	52151	200	183	50
Sawmill Branch	51968	228	278	380
Sawmill Branch	51690	348	348	290
Sawmill Branch	51342	80	80	80

## SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS

River: Sawmill Branch

Reach	River Sta.	Contr.	Expan.
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Upstream East	57076	.1	.3
Upstream East	56188	.1	.3
Upstream West	56038	.1	.3
Upstream West	55620	.1	.3
Sawmill Branch	55160	.1	.3
Sawmill Branch	54754	.1	.3
Sawmill Branch	54669	.1	.3
Sawmill Branch	54654	Culvert	
Sawmill Branch	54639	.1	.3
Sawmill Branch	54554	.1	.3
Sawmill Branch	54178	.1	.3
Sawmill Branch	54004	.1	.3
Sawmill Branch	53908	.1	.3
Sawmill Branch	53854	Culvert	
Sawmill Branch	53800	.1	.3
Sawmill Branch	53721	.1	.3
Sawmill Branch	53383	.1	.3
Sawmill Branch	53232	.1	.3
Sawmill Branch	53104	.1	.3
Sawmill Branch	52950	.1	.3
Sawmill Branch	52598	.1	.3
Sawmill Branch	52151	.1	.3
Sawmill Branch	51968	.1	.3
Sawmill Branch	51690	.1	.3
Sawmill Branch	51342	.1	.3

## Profile Output Table - Encroachment 1

Reach Channel	Q Right	River Sta Enc Sta L	Profile Ch Sta L	W.S. Elev Ch Sta R	Prof Delta WS Enc Sta R	E.G. Elev (ft)	Top width Act (ft)	Q Left (cfs)	Q
(cfs)	(cfs)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(cfs)	
Upstream East	81.56	57076	100 yr	65.15		65.16	410.65	510.22	
246.23			441.00	460.00					
Upstream East	203.65	57076	Floodway	68.42	3.27	68.44	105.00	317.45	
316.90		400.00	441.00	460.00	505.00				
Upstream East	513.31	56188	100 yr	65.06		65.08	415.63	176.43	
148.26			550.00	650.00					
Upstream East	838.00	56188	Floodway	68.38	3.31	68.39	100.00		
		550.00	550.00	650.00	650.00				
Upstream West	90.65	56038	100 yr	65.10		65.14	290.29	110.48	
102.87			334.00	351.00					
Upstream West	33.29	56038	Floodway	68.39	3.29	68.39	260.00	148.04	
122.67		200.00	334.00	351.00	460.00				
Upstream West	206.69	55620	100 yr	65.07		65.07	627.08	57.93	
39.38			690.00	800.00					
Upstream west	110.24	55620	Floodway	68.39	3.32	68.39	540.00	146.17	
47.59		350.00	690.00	800.00	890.00				
Sawmill Branch	96.03	55160	100 yr	65.07		65.07	897.58	890.79	
206.19			568.00	623.00					
Sawmill Branch	100.67	55160	Floodway	68.39	3.32	68.39	711.85	859.90	
232.43		78.94	568.00	623.00	790.79				
Sawmill Branch	58.29	54754	100 yr	65.07		65.07	956.83	646.45	
488.26			144.00	156.00					
Sawmill Branch	49.38	54754	Floodway	68.39	3.32	68.39	463.60	678.36	
465.26		-129.82	144.00	156.00	333.78				
Sawmill Branch	59.58	54669	100 yr	65.07		65.07	902.80	660.53	
472.89			144.00	156.00					
Sawmill Branch	66.45	54669	Floodway	68.39	3.32	68.39	305.81	534.52	
592.03		15.11	144.00	156.00	320.92				
Sawmill Branch		54654	Culvert						
Sawmill Branch	361.34	54639	100 yr	64.72		64.74	450.30	442.52	
389.13			268.00	301.00					
Sawmill Branch	222.31	54639	Floodway	71.28	6.56	71.28	305.81	450.18	
520.50		149.61	268.00	301.00	455.42				

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Sawmill Branch	54554	100 yr	64.71			64.73	370.84	452.69
370.49	369.81	268.00	301.00					
Sawmill Branch	54554	Floodway	71.28		6.57	71.28	304.83	451.24
222.95	518.81	268.00	301.00	454.52				
Sawmill Branch	54178	100 yr	64.70			64.71	334.92	441.35
703.96	47.69	156.00	233.00					
Sawmill Branch	54178	Floodway	71.27		6.58	71.28	187.82	441.13
672.28	79.60	156.00	233.00	257.45				
Sawmill Branch	54004	100 yr	64.70			64.71	710.31	15.70
772.87	404.43	61.00	291.00					
Sawmill Branch	54004	Floodway	71.28		6.57	71.28	665.23	11.80
589.82	591.38	61.00	291.00	715.26				
Sawmill Branch	53908	100 yr	64.70			64.70	666.48	526.82
229.65	436.53	262.00	314.00					
Sawmill Branch	53908	Floodway	71.23		6.53	71.27	52.00	
1193.00		262.00	314.00	314.00				
Sawmill Branch	53854							
Sawmill Branch	53800	100 yr	62.90			64.35	47.28	272.76
356.71	563.54	25.00	30.00					
Sawmill Branch	53800	Floodway	63.38		0.48	66.04	20.02	131.68
476.75	584.57	25.00	30.00	41.67				
Sawmill Branch	53721	100 yr	62.14			62.65	64.19	9.93
1182.21	0.86	56.00	108.00					
Sawmill Branch	53721	Floodway	62.87		0.74	63.25	52.00	
1193.00		56.00	108.00	108.00				
Sawmill Branch	53383	100 yr	61.91			61.99	300.93	289.19
901.18	2.63	118.00	184.00					
Sawmill Branch	53383	Floodway	62.67		0.75	62.76	160.79	155.95
1031.21	5.84	118.00	184.00	228.00				
Sawmill Branch	53232	100 yr	61.80			61.89	277.45	325.35
867.44	0.21	104.00	186.00					
Sawmill Branch	53232	Floodway	62.48		0.68	62.63	101.16	4.09
1188.91		104.00	186.00	186.00				
Sawmill Branch	53104	100 yr	61.60			61.73	217.45	335.49
855.04	2.47	114.00	169.00					
Sawmill Branch	53104	Floodway	62.16		0.56	62.43	57.12	6.08
1186.92		114.00	169.00	169.00				
Sawmill Branch	52950	100 yr	61.53			61.59	215.63	368.64
817.07	7.29	120.00	184.00					
Sawmill Branch	52950	Floodway	62.10		0.57	62.21	92.87	103.91
1089.09		120.00	184.00	184.00				
Sawmill Branch	52598	100 yr	61.47			61.48	419.16	0.12
328.73	864.15	63.00	125.00					
Sawmill Branch	52598	Floodway	62.04		0.57	62.06	230.05	
456.07	736.93	63.00	125.00	293.05				
Sawmill Branch	52151	100 yr	61.44			61.45	562.26	1.59
248.99	942.42	32.00	88.00					
Sawmill Branch	52151	Floodway	62.00		0.56	62.01	325.56	
334.54	858.46	32.00	88.00	357.56				
Sawmill Branch	51968	100 yr	61.43			61.44	606.45	13.84
293.74	1180.43	30.00	85.00					
Sawmill Branch	51968	Floodway	61.98		0.55	62.00	329.01	
396.02	1091.98	30.00	85.00	359.01				
Sawmill Branch	51690	100 yr	61.21			61.35	161.00	103.79
1382.16	2.04	111.00	178.00					
Sawmill Branch	51690	Floodway	61.74		0.53	61.90	67.00	
1488.00		111.00	178.00	178.00				



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Sawmill Branch	51342	100 yr	60.53			60.85	102.59	20.50
1456.14 11.36		198.00	277.00					
Sawmill Branch	51342	Floodway	61.23			61.48	79.00	
1488.00	198.00	198.00	277.00	277.00	0.70			

## Profile Output Table - Encroachment 2

Reach Center Station (ft)	River Sta Dist Center R (ft)	Profile Enc Sta R (ft)	Prof Delta K Perc R (ft)	WS Enc WD (ft)	Top wdth Act (ft)	K Perc L	Enc Sta L (ft)	Dist Center L (ft)
Upstream East 450.50	57076	100 yr			410.65			
Upstream East 450.50	57076 54.50	Floodway 505.00	3.27 22.56	105.00	105.00	44.94	400.00	50.50
Upstream East 600.00	56188	100 yr			415.63			
Upstream East 600.00	56188 50.00	Floodway 650.00	3.31 32.27	100.00	100.00	30.02	550.00	50.00
Upstream West 342.50	56038	100 yr			290.29			
Upstream West 342.50	56038 117.50	Floodway 460.00	3.29 5.41	260.00	260.00	15.77	200.00	142.50
Upstream West 745.00	55620	100 yr			627.08			
Upstream West 745.00	55620 145.00	Floodway 890.00	3.32 5.11	540.00	540.00	8.99	350.00	395.00
Sawmill Branch 595.50	55160	100 yr			897.58			
Sawmill Branch 595.50	55160 195.29	Floodway 790.79	3.32 -0.16	711.85	711.85	0.28	78.94	516.56
Sawmill Branch 150.00	54754	100 yr			956.83			
Sawmill Branch 150.00	54754 183.78	Floodway 333.78	3.32 12.14	463.60	463.60	14.59	-129.82	279.82
Sawmill Branch 150.00	54669	100 yr			902.80			
Sawmill Branch 150.00	54669	Floodway 320.92	3.32	305.81	305.81		15.11	
Sawmill Branch	54654	Culvert						
Sawmill Branch 284.50	54639	100 yr			450.30			
Sawmill Branch 284.50	54639 170.92	Floodway 455.42	6.56 25.92	305.81	305.81	10.59	149.61	134.89
Sawmill Branch 284.50	54554	100 yr			370.84			
Sawmill Branch 284.50	54554 170.02	Floodway 454.52	6.57 21.49	304.83	304.83	11.26	149.69	134.81
Sawmill Branch 194.50	54178	100 yr			334.92			
Sawmill Branch 194.50	54178 62.95	Floodway 257.45	6.58 28.68	187.82	187.82	11.32	69.63	124.87
Sawmill Branch 176.00	54004	100 yr			710.31			
Sawmill Branch 176.00	54004 539.26	Floodway 715.26	6.57 10.89	665.23	665.23	5.27	50.03	125.97
Sawmill Branch	53908	100 yr			666.48			

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Sawmill Branch	288.00	53908	Floodway	6.53	52.00	52.00	262.00		
	288.00		314.00		52.00				
Sawmill Branch		53854							
			Culvert						
Sawmill Branch	27.50	53800	100 yr			47.28			
Sawmill Branch	27.50	53800	Floodway	0.48	20.02	20.02	15.68	21.65	5.85
		14.17	41.67	13.96	20.02				
Sawmill Branch	82.00	53721	100 yr			64.19			
Sawmill Branch	82.00	53721	Floodway	0.74	52.00	52.00	2.19	56.00	26.00
		26.00	108.00	0.29	52.00				
Sawmill Branch	151.00	53383	100 yr			300.93			
Sawmill Branch	151.00	53383	Floodway	0.75	199.46	160.79	24.31	28.54	122.46
		77.00	228.00	0.00	199.46				
Sawmill Branch	145.00	53232	100 yr			277.45			
Sawmill Branch	145.00	53232	Floodway	0.68	101.16	101.16	33.65	84.84	60.16
		41.00	186.00	0.08	101.16				
Sawmill Branch	141.50	53104	100 yr			217.45			
Sawmill Branch	141.50	53104	Floodway	0.56	57.12	57.12	34.83	111.88	29.62
		27.50	169.00	0.34	57.12				
Sawmill Branch	152.00	52950	100 yr			215.63			
Sawmill Branch	152.00	52950	Floodway	0.57	92.87	92.87	29.24	91.13	60.87
		32.00	184.00	0.84	92.87				
Sawmill Branch	94.00	52598	100 yr			419.16			
Sawmill Branch	94.00	52598	Floodway	0.57	230.05	230.05	0.07	63.00	31.00
		199.05	293.05	27.65	230.05				
Sawmill Branch	60.00	52151	100 yr			562.26			
Sawmill Branch	60.00	52151	Floodway	0.56	325.56	325.56	0.18	32.00	28.00
		297.56	357.56	31.16	325.56				
Sawmill Branch	57.50	51968	100 yr			606.45			
Sawmill Branch	57.50	51968	Floodway	0.55	329.01	329.01	1.14	30.00	27.50
		301.51	359.01	31.27	329.01				
Sawmill Branch	144.50	51690	100 yr			161.00			
Sawmill Branch	144.50	51690	Floodway	0.53	67.00	67.00	10.01	111.00	33.50
		33.50	178.00	0.73	67.00				
Sawmill Branch	237.50	51342	100 yr			102.59			
Sawmill Branch	237.50	51342	Floodway	0.70	79.00	79.00	2.45	198.00	39.50
		39.50	277.00	1.51	79.00				

## ERRORS WARNINGS AND NOTES

Errors Warnings and Notes for Plan : Method 1

River: Sawmill Branch Reach: Upstream East RS: 57076 Profile: Floodway  
 warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.  
 This may indicate the need for additional cross sections.

River: Sawmill Branch Reach: Upstream West RS: 56038 Profile: 100 yr  
 warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.

This may indicate the need for additional cross sections.

River: Sawmill Branch Reach: Upstream West RS: 56038 Profile: Floodway

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.

This may indicate the need for additional cross sections.

River: Sawmill Branch Reach: Sawmill Branch RS: 54654 Profile: Floodway

Warning: The weir over culvert is submerged.

River: Sawmill Branch Reach: Sawmill Branch RS: 54654 Profile: Floodway Culv: Culvert #1

Note: The culvert flow is blocked (either by a flap gate or the depth filled option).

River: Sawmill Branch Reach: Sawmill Branch RS: 54554 Profile: 100 yr

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.

This may indicate the need for additional cross sections.

River: Sawmill Branch Reach: Sawmill Branch RS: 54178 Profile: 100 yr

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.

This may indicate the need for additional cross sections.

River: Sawmill Branch Reach: Sawmill Branch RS: 54178 Profile: Floodway

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.

This may indicate the need for additional cross sections.

River: Sawmill Branch Reach: Sawmill Branch RS: 54004 Profile: Floodway

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.

This may indicate the need for additional cross sections.

River: Sawmill Branch Reach: Sawmill Branch RS: 53854 Profile: 100 yr Culv: Culvert #1

Warning: During subcritical analysis, with the exit loss set =1.0, the projected WSEL in culvert has a lower energy than the

downstream energy. Most likely, the downstream cross section blocks part of the culvert or the ineffective area is

set too far in. Instead of projecting the WSEL, the program did an energy balance to get the WSEL inside the culvert

at the downstream end.

River: Sawmill Branch Reach: Sawmill Branch RS: 53854 Profile: Floodway Culv: Culvert #1

Note: The culvert flow is blocked (either by a flap gate or the depth filled option).

River: Sawmill Branch Reach: Sawmill Branch RS: 53800 Profile: 100 yr

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth

for the water surface and continued on with the calculations.

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.

This may indicate the need for additional cross sections.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate

the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated

water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The

program defaulted to critical depth.

River: Sawmill Branch Reach: Sawmill Branch RS: 53800 Profile: Floodway

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth

for the water surface and continued on with the calculations.

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.

This may indicate the need for additional cross sections.

Warning: The cross section had to be extended vertically during the critical depth calculations.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate

the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated

water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The

program defaulted to critical depth.

Warning: The parabolic search method failed to converge on critical depth. The program will try the cross section

slice/secant method to find critical depth.

River: Sawmill Branch Reach: Sawmill Branch RS: 53721 Profile: 100 yr

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.

This may indicate the need for additional cross sections.

River: Sawmill Branch Reach: Sawmill Branch RS: 53721 Profile: Floodway

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.

This may indicate the need for additional cross sections.

River: Sawmill Branch Reach: Sawmill Branch RS: 53383 Profile: Floodway

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.

This may indicate the need for additional cross sections.

River: Sawmill Branch Reach: Sawmill Branch RS: 53232 Profile: 100 yr

Warning: Divided flow computed for this cross-section.

River: Sawmill Branch Reach: Sawmill Branch RS: 53104 Profile: 100 yr

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.

This may indicate the need for additional cross sections.

River: Sawmill Branch Reach: Sawmill Branch RS: 53104 Profile: Floodway

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.

This may indicate the need for additional cross sections.

River: Sawmill Branch Reach: Sawmill Branch RS: 52950 Profile: 100 yr

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.

This may indicate the need for additional cross sections.

River: Sawmill Branch Reach: Sawmill Branch RS: 52950 Profile: Floodway

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.

This may indicate the need for additional cross sections.

River: Sawmill Branch Reach: Sawmill Branch RS: 52598 Profile: 100 yr

Warning: Divided flow computed for this cross-section.

River: Sawmill Branch Reach: Sawmill Branch RS: 51968 Profile: 100 yr

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.

This may indicate the need for additional cross sections.

River: Sawmill Branch Reach: Sawmill Branch RS: 51968 Profile: Floodway

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.

This may indicate the need for additional cross sections.

River: Sawmill Branch Reach: Sawmill Branch RS: 51690 Profile: 100 yr

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.

This may indicate the need for additional cross sections.

River: Sawmill Branch Reach: Sawmill Branch RS: 51690 Profile: Floodway

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.

This may indicate the need for additional cross sections.