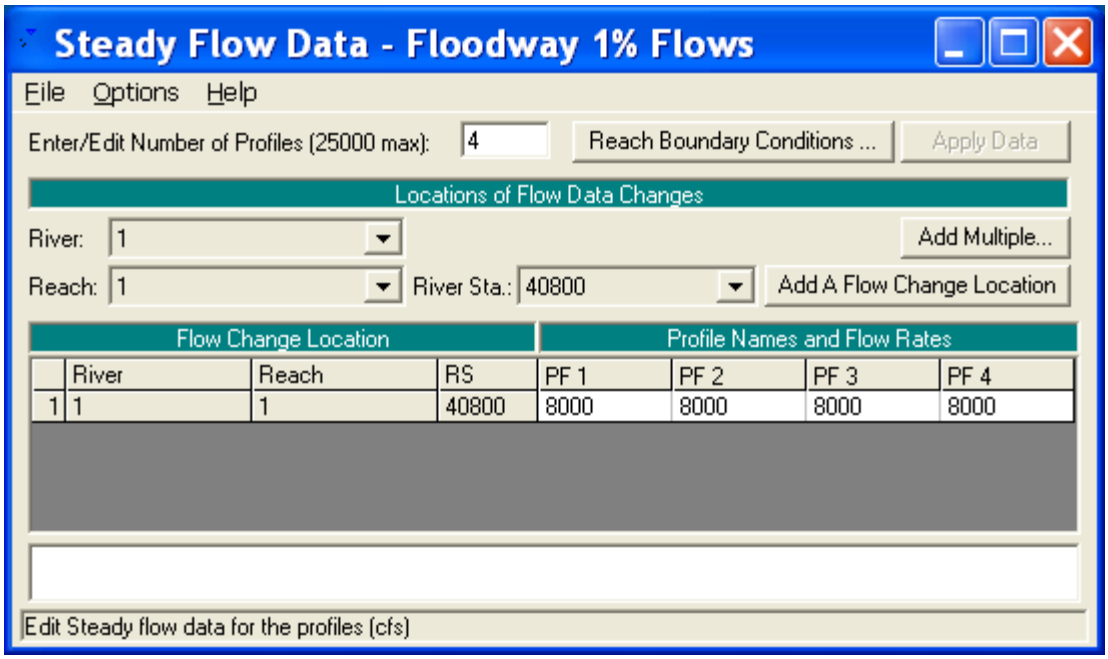
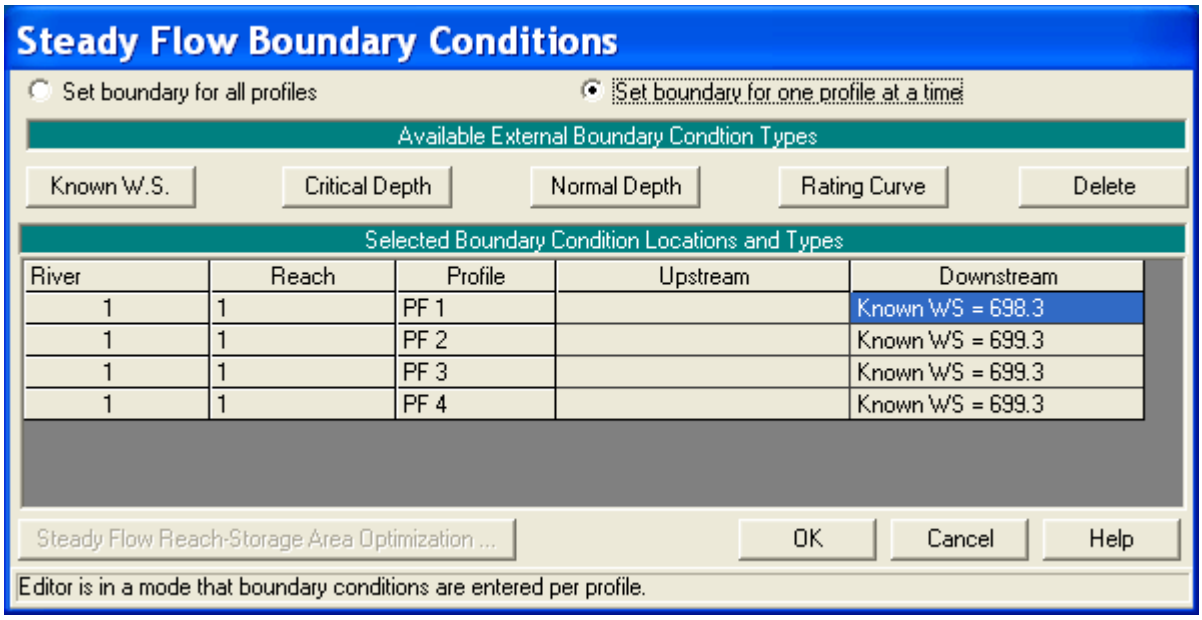
FLOODWAY WORKSHOP SOLUTION

Floodway Determination

Floodway Trial 1

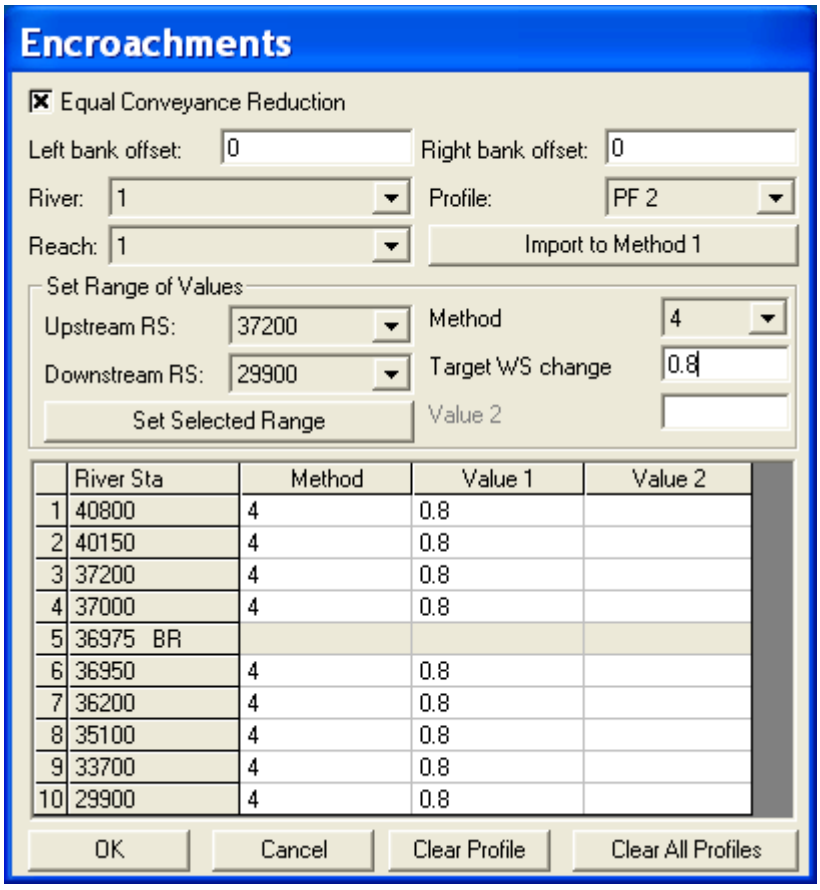
First, the number of profiles must be set for the floodway run. At least two are required. For the initial runs, four profiles were used. Also, the starting water surface elevations must be set for the profiles.





After the flow-profiles are set, the Encroachment data are entered under **Options,** *then* **Encroachments** *in the* **Steady Flow Editor**.

The first trial was set to compute Method 4 with 0.8 and 1.0 foot rise, and Method 5 with a 1.0 foot rise on water surface and energy elevation. The figure below shows the Encroachment Editor for the Method 4 input. The data are entered for profiles 2 through 4.



The Floodway Summary Table 1 shows the first trial results. (The cross-section order was switched to downstream to upstream to review the results from the downstream order.) None of the floodway profiles met the specified criteria. The two best profiles were the second, Method 4 with 0.8-foot rise, and profile 4, Method 5 with a 1.0-foot water surface and energy elevation target. It is clear that the bridge sections will alter the rise in upstream water surface elevation, especially with weir flow conditions.

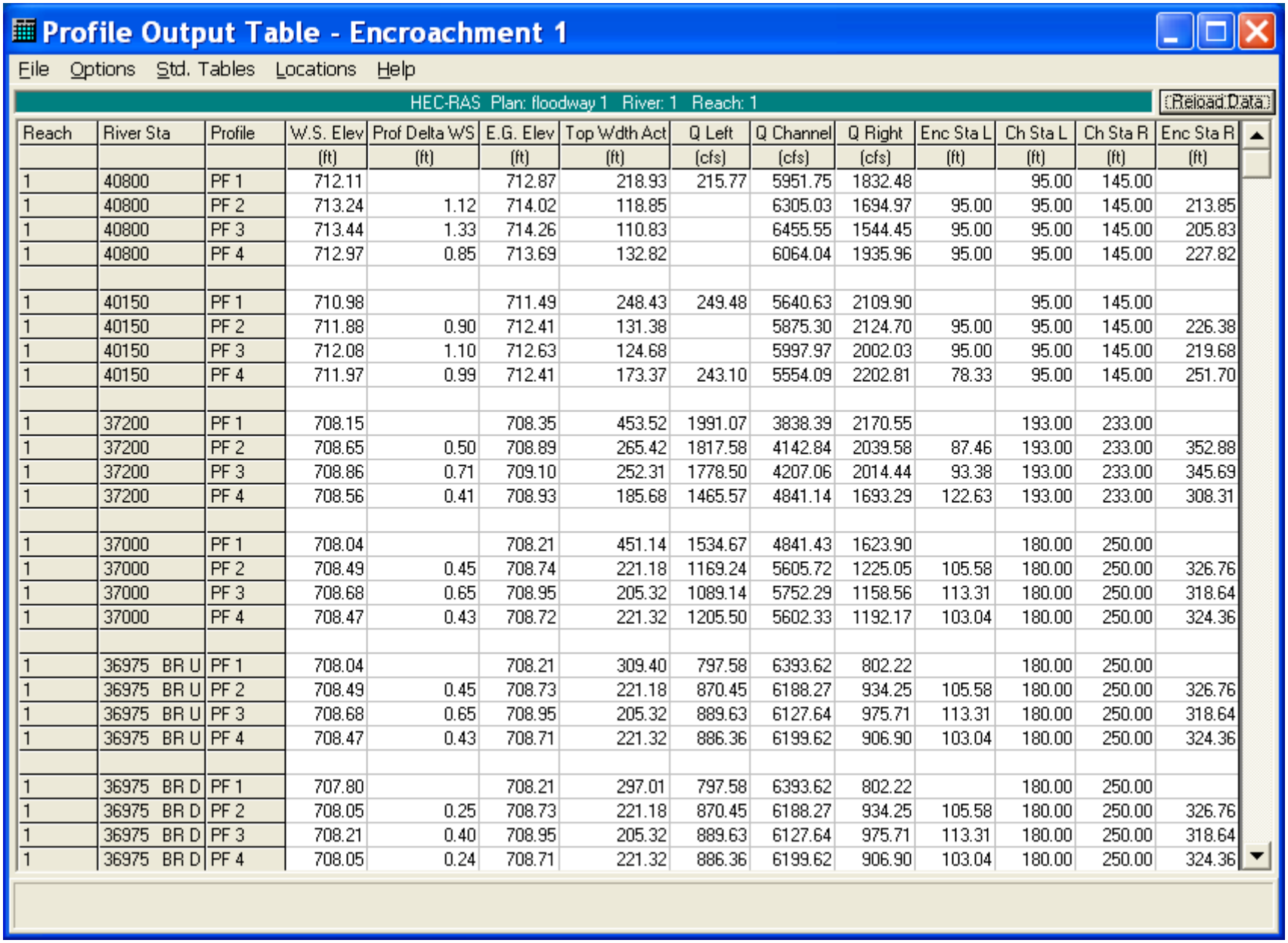
Floodway Summary Table 1, Trial 1

Profile Output Table - Encroachment 1

File Options Std. Tables Locations Help

HEC-RAS Plan: floodway 1 River: 1 Reach: 1 Reload Data

Reach	River Sta	Profile	W.S. Elev (ft)	Prof Delta WS (ft)	E.G. Elev (ft)	Top Wdth Act (ft)	Q Left (cfs)	Q Channel (cfs)	Q Right (cfs)	Enc Sta L (ft)	Ch Sta L (ft)	Ch Sta R (ft)	Enc Sta R (ft)
1	36975 BR D	PF 1	707.80		708.21	297.01	797.58	6393.62	802.22		180.00	250.00	
1	36975 BR D	PF 2	708.05	0.25	708.73	221.18	870.45	6188.27	934.25	105.58	180.00	250.00	326.76
1	36975 BR D	PF 3	708.21	0.40	708.95	205.32	889.63	6127.64	975.71	113.31	180.00	250.00	318.64
1	36975 BR D	PF 4	708.05	0.24	708.71	221.32	886.36	6199.62	906.90	103.04	180.00	250.00	324.36
1	36950	PF 1	705.99		706.27	416.47	1356.91	5289.62	1353.47		180.00	250.00	
1	36950	PF 2	706.86	0.87	707.19	221.18	1087.83	5771.29	1140.89	105.58	180.00	250.00	326.76
1	36950	PF 3	707.20	1.21	707.53	205.32	1023.42	5884.01	1092.57	113.31	180.00	250.00	318.64
1	36950	PF 4	706.83	0.84	707.16	221.32	1119.29	5769.14	1111.57	103.04	180.00	250.00	324.36
1	36200	PF 1	705.10		705.40	402.02	1449.29	3974.25	2576.45		230.00	270.00	
1	36200	PF 2	705.98	0.88	706.33	189.03	1179.45	4292.46	2528.09	182.64	230.00	270.00	371.67
1	36200	PF 3	706.35	1.25	706.70	179.88	1111.66	4365.03	2523.31	187.08	230.00	270.00	366.96
1	36200	PF 4	706.07	0.97	706.35	224.06	1399.79	4002.55	2597.66	164.52	230.00	270.00	388.58
1	35100	PF 1	703.80		704.11	325.03	435.42	3539.33	4025.25		115.00	150.00	
1	35100	PF 2	704.73	0.92	705.07	235.41	4.49	3819.36	4176.15	114.25	115.00	150.00	349.65
1	35100	PF 3	705.08	1.27	705.35	224.45		3498.79	4501.21	115.00	115.00	150.00	339.45
1	35100	PF 4	704.83	1.02	705.10	234.12		3442.06	4557.94	115.00	115.00	150.00	349.12
1	33700	PF 1	702.25		702.47	466.90	2092.02	3490.84	2417.13		245.00	285.00	
1	33700	PF 2	703.24	0.99	703.48	305.99	1928.48	3741.67	2329.86	124.52	245.00	285.00	430.52
1	33700	PF 3	703.41	1.16	703.67	290.38	1877.89	3823.71	2298.40	131.93	245.00	285.00	422.31
1	33700	PF 4	703.24	1.00	703.47	326.89	2004.44	3605.85	2389.72	114.75	245.00	285.00	441.64
1	29900	PF 1	698.30		698.51	526.75	3945.98	3733.96	320.06		460.00	508.00	
1	29900	PF 2	699.30	1.00	699.50	340.57	4202.50	3797.50		167.43	460.00	508.00	508.00
1	29900	PF 3	699.30	1.00	699.52	322.40	4079.53	3920.48		185.60	460.00	508.00	508.00
1	29900	PF 4	699.30	1.00	699.52	322.40	4079.53	3920.48		185.60	460.00	508.00	508.00



Profile Output Table - Encroachment 1

File Options Std. Tables Locations Help

HEC-RAS Plan: floodway 1 River: 1 Reach: 1 Reload Data

Reach	River Sta	Profile	W.S. Elev (ft)	Prof Delta WS (ft)	E.G. Elev (ft)	Top Wdth Act (ft)	Q Left (cfs)	Q Channel (cfs)	Q Right (cfs)	Enc Sta L (ft)	Ch Sta L (ft)	Ch Sta R (ft)	Enc Sta R (ft)
1	40800	PF 1	712.11		712.87	218.93	215.77	5951.75	1832.48		95.00	145.00	
1	40800	PF 2	713.24	1.12	714.02	118.85		6305.03	1694.97	95.00	95.00	145.00	213.85
1	40800	PF 3	713.44	1.33	714.26	110.83		6455.55	1544.45	95.00	95.00	145.00	205.83
1	40800	PF 4	712.97	0.85	713.69	132.82		6064.04	1935.96	95.00	95.00	145.00	227.82
1	40150	PF 1	710.98		711.49	248.43	249.48	5640.63	2109.90		95.00	145.00	
1	40150	PF 2	711.88	0.90	712.41	131.38		5875.30	2124.70	95.00	95.00	145.00	226.38
1	40150	PF 3	712.08	1.10	712.63	124.68		5997.97	2002.03	95.00	95.00	145.00	219.68
1	40150	PF 4	711.97	0.99	712.41	173.37	243.10	5554.09	2202.81	78.33	95.00	145.00	251.70
1	37200	PF 1	708.15		708.35	453.52	1991.07	3838.39	2170.55		193.00	233.00	
1	37200	PF 2	708.65	0.50	708.89	265.42	1817.58	4142.84	2039.58	87.46	193.00	233.00	352.88
1	37200	PF 3	708.86	0.71	709.10	252.31	1778.50	4207.06	2014.44	93.38	193.00	233.00	345.69
1	37200	PF 4	708.56	0.41	708.93	185.68	1465.57	4841.14	1693.29	122.63	193.00	233.00	308.31
1	37000	PF 1	708.04		708.21	451.14	1534.67	4841.43	1623.90		180.00	250.00	
1	37000	PF 2	708.49	0.45	708.74	221.18	1169.24	5605.72	1225.05	105.58	180.00	250.00	326.76
1	37000	PF 3	708.68	0.65	708.95	205.32	1089.14	5752.29	1158.56	113.31	180.00	250.00	318.64
1	37000	PF 4	708.47	0.43	708.72	221.32	1205.50	5602.33	1192.17	103.04	180.00	250.00	324.36
1	36975 BR U	PF 1	708.04		708.21	309.40	797.58	6393.62	802.22		180.00	250.00	
1	36975 BR U	PF 2	708.49	0.45	708.73	221.18	870.45	6188.27	934.25	105.58	180.00	250.00	326.76
1	36975 BR U	PF 3	708.68	0.65	708.95	205.32	889.63	6127.64	975.71	113.31	180.00	250.00	318.64
1	36975 BR U	PF 4	708.47	0.43	708.71	221.32	886.36	6199.62	906.90	103.04	180.00	250.00	324.36
1	36975 BR D	PF 1	707.80		708.21	297.01	797.58	6393.62	802.22		180.00	250.00	
1	36975 BR D	PF 2	708.05	0.25	708.73	221.18	870.45	6188.27	934.25	105.58	180.00	250.00	326.76
1	36975 BR D	PF 3	708.21	0.40	708.95	205.32	889.63	6127.64	975.71	113.31	180.00	250.00	318.64
1	36975 BR D	PF 4	708.05	0.24	708.71	221.32	886.36	6199.62	906.90	103.04	180.00	250.00	324.36

The computed encroachment stations from any profile can be easily transferred as Method 1 data. Because Profile 4 (method 5 with 1.0 foot rise for water surface and energy grade) has the best overall result, those encroachments were converted to method 1 for application on a second simulation. Upstream from the bridge the rise in water surface elevation is below the target (1.00 foot) at sections closest to the bridge, but this occurs because the bridge is in a weir flow condition. Experience with this reach of stream has shown that encroaching slightly more than the method 5 at these sections will cause the last two sections (40150 and 40800) to rise greater than one foot. Therefore the results of method 5 encroachment (profile 4) were used with only minor adjustment. The Floodway Summary Table below shows the model result.

The results can be displayed on an XYZ Graphic to better see the floodway. As shown on the next page, the floodway seems to swing in and out with undulating top widths. These results can be plotted on the plan map based on the distances shown in the table above. A third trial may be appropriate to define the floodway more consistent with the curvature of the stream. Also, the computed results must be considered preliminary until it is coordinated with State and community officials. Where the floodplain is entirely contained within one community, the location of the floodway is negotiable and should be coordinated..@ (FEMA 37).

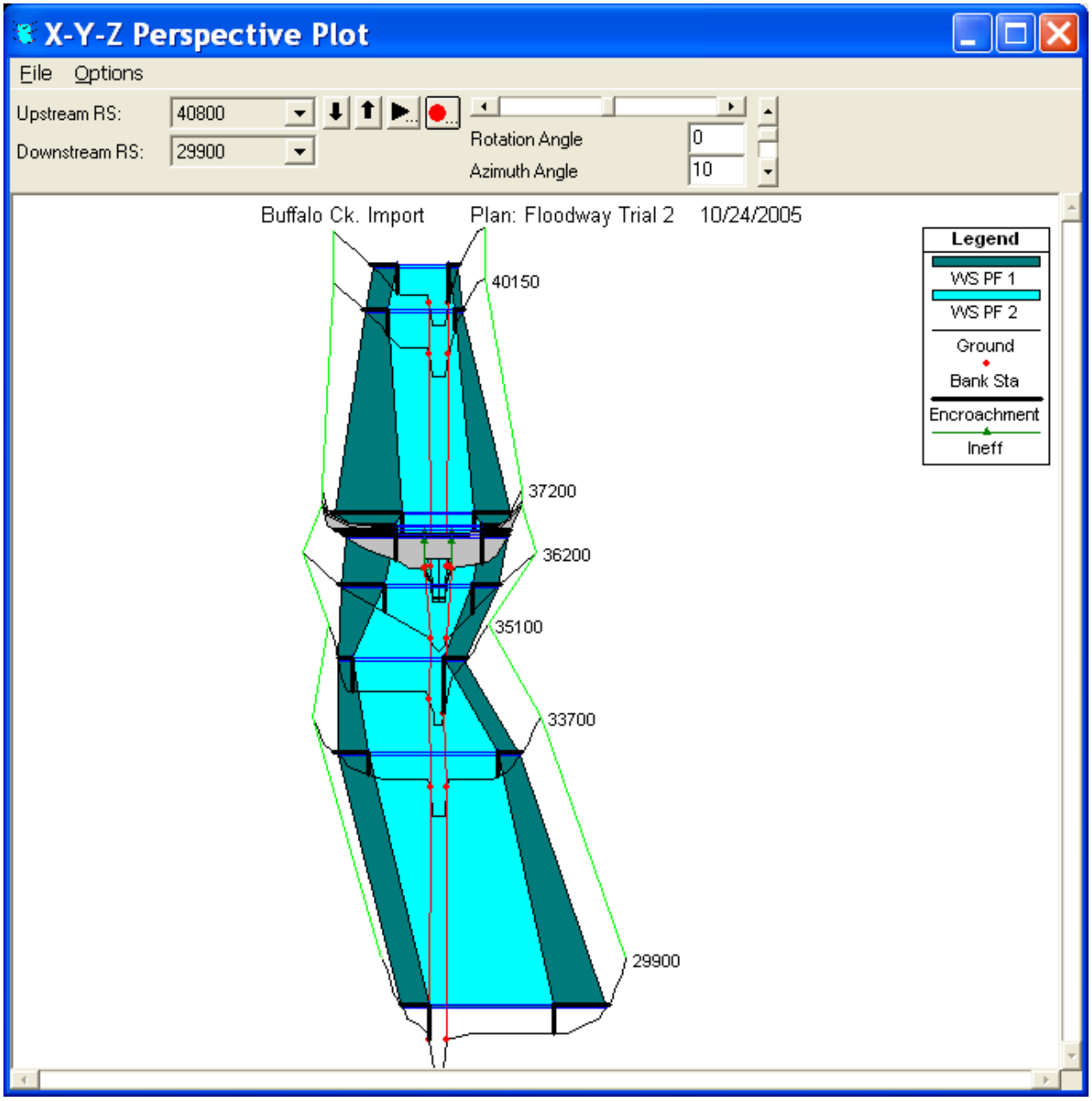
Floodway Encroachment Table 3

Profile Output Table - Encroachment 3

File Options Std. Tables Locations Help

HEC-RAS Plan: floodway 2 River: 1 Reach: 1 Profile: PF 2 [Reload Data]

Reach	River Sta	Profile	Top Wdth Act (ft)	Area (sq ft)	Vel Total (ft/s)	W.S. Elev (ft)	Base WS (ft)	Prof Delta WS (ft)
1	40800	PF 2	133	1514	5.3	713.0	712.1	0.85
1	40150	PF 2	173	2145	3.7	712.0	711.0	0.99
1	37200	PF 2	186	2465	3.2	708.6	708.2	0.40
1	37000	PF 2	221	2785	2.9	708.5	708.0	0.42
1	36975 BR U	PF 2	221	1107	6.9	708.5	708.0	0.42
1	36975 BR D	PF 2	221	1019	6.9	708.0	707.8	0.24
1	36950	PF 2	221	2421	3.3	706.8	706.0	0.82
1	36200	PF 2	224	2813	2.8	706.0	705.1	0.95
1	35100	PF 2	234	2518	3.2	704.8	703.8	0.99
1	33700	PF 2	333	3017	2.7	703.2	702.2	0.97
1	29900	PF 2	322	3090	2.6	699.3	698.3	1.00


X-Y-Z Perspective Plot
File Options
Upstream RS: 40800
Downstream RS: 29900
Rotation Angle 0
Azimuth Angle 10
Buffalo Ck. Import Plan: Floodway Trial 2 10/24/2005
Legend
WS PF 1
WS PF 2
Ground
Bank Sta
Encroachment
Ineff
40150
37200
36200
35100
33700
29900